

Cisco Catalyst IW9167E Heavy Duty Access Point Hardware Installation Guide

First Published: 2023-02-23

Last Modified: 2024-12-06

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

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, users are encouraged to try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications to this product not authorized by Cisco could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB’s public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies of this document are considered uncontrolled. See the current online version for the latest version.

Cisco has more than 200 offices worldwide. Addresses and phone numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: https://www.cisco.com/c/en/us/about/legal/trademarks.html. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1721R)

© 2023 –2024 Cisco Systems, Inc. All rights reserved.



CONTENTS

PREFACE

Preface vii

About this Guide vii

Conventions vii

Related Documentation viii

Communications, services, and additional information viii

Cisco Bug Search Tool viii

Documentation feedback viii

CHAPTER 1

About Cisco Catalyst IW9167E Heavy Duty Access Point 1

Cisco Catalyst IW9167E Heavy Duty Access Point 1

Cisco Catalyst IW9167E Heavy Duty Access Point Features 1

Connectors and Ports 2

4-Pin Micro-Fit Connector for DC Power 4

M12-RJ45 Adapter 4

M12-PWR Adapter 5

Power Sources 6

Data Connectivity 7

Antennas and Radios 9

Supported External Antennas 9

CHAPTER 2

Unpacking Your Access Point 13

Package Contents 13

Unpacking the Access Point 13

Cisco Orderable Accessories 13

CHAPTER 3

Installation Overview 17

Performing a Preinstallation Configuration (Optional) 17
Preinstallation Checks and Installation Guidelines 19
Mounting the Access Point 20
Mounting Hardware 20
Mounting Bracket Part Numbers 20
Using the Integrated Flange Mounts 20
Using the DIN Rail Mounting Bracket 22
Using the Pole Mounting Bracket 24
Using the Mounting Bracket AIR-ACCPMK3700= 24
Using the Mounting Bracket AIR-ACCPMK3700-2= 25
Attaching a Power Adapter 30
Attaching a Power Adapter Using the Mounting Bracket AIR-ACCPMK3700= 30
Attaching a Power Adapter Using the Mounting Bracket AIR-ACCPMK3700-2= 32
Grounding the Access Point 33
Powering the Access Point 35
Power Sources 35
Power Feature Matrix 36
Connecting a Power Injector 37
Connecting to the DC Power Port Using Cable Gland 37
Connecting DC Power Port Using M12 Adapter 39
Connecting Data Cables 41
Connect using an Ethernet Cable 41
Connecting to the RJ-45 Port Using Cable Gland 41
Connecting to the RJ-45 Port Using M12 Adapter 42
Connect using a Fiber-Optic Cable 44
Connecting to SFP Port Using Cable Gland 44
Using M12 Adapter on SFP Port 45

CHAPTER 4 **Configuring and Deploying the Access Point** 49
Controller Discovery Process 49
Deploying the Access Point in a Wireless Network 50
Checking the Access Point LEDs 50

CHAPTER 5 **Troubleshooting** 53

Using the Reset Button 53
Troubleshooting the Access Point to Controller Join Process 54
Important Information for Controller-based Deployments 54
Configuring DHCP Option 43 55

CHAPTER 6 **Safety Guidelines and Warnings 57**
Safety Instructions 57
FCC Safety Compliance Statement 58
Safety Precautions 58
Safety Precautions when Installing Antennas 59
Avoiding Damage to Radios in a Testing Environment 60
Performing Site Surveys 61

CHAPTER 7 **Declarations of Conformity and Regulatory Information 63**
Manufacturers Federal Communications Commission Declaration of Conformity Statement 63
Operation of Cisco Catalyst Access Points in México 64
VCCI Statement for Japan 65
Statement 2012—Voluntary Control Council for Interference (VCCI) Class A Warning for Japan 65
ステートメント 2012 - 日本向け VCCI クラス A に関する警告 65
Guidelines for Operating Cisco Catalyst Access Points in Japan 65
Compliance Statement for Canada 66
Industry Canada 67
China Compliance Statement 67
European Community, Switzerland, Norway, Iceland, and Liechtenstein 67
Operation of Cisco Catalyst Access Points in Brazil 68
Declaration of Conformity for RF Exposure 69
Generic Discussion on RF Exposure 69
This Device Meets International Guidelines for Exposure to Radio Waves 70
This Device Meets FCC Guidelines for Exposure to Radio Waves 70
This Device Meets the Industry Canada Guidelines for Exposure to Radio Waves 71
Cet appareil est conforme aux directives internationales en matière d'exposition aux fréquences radioélectriques 71
Additional Information on RF Exposure 71
Declaration of Conformity Statements 72



Preface

This preface describes this guide and provides information about the conventions used in this guide, and related documentation.

It includes the following sections:

- About this Guide, on page vii
- Conventions, on page vii
- Related Documentation, on page viii
- Communications, services, and additional information, on page viii

About this Guide

This guide provides instructions to install your Cisco Access Point and provides links to resources that can help you configure it. This guide also provides mounting instructions and troubleshooting information.

Conventions

This document uses the following conventions for notes, cautions, and safety warnings. Notes and cautions contain important information that you should know.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Caution Means *reader be careful*. Cautions contain information about something you might do that could result in equipment damage or loss of data.

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

Related Documentation

All user documentation for the Catalyst IW9167E Heavy Duty access point is available at the following URL:

https://www.cisco.com/c/en/us/support/wireless/catalyst-iw9167-series/series.html

For detailed information and guidelines about configuring and deploying your access point in a wireless network, see the following documentation:

Communications, services, and additional information

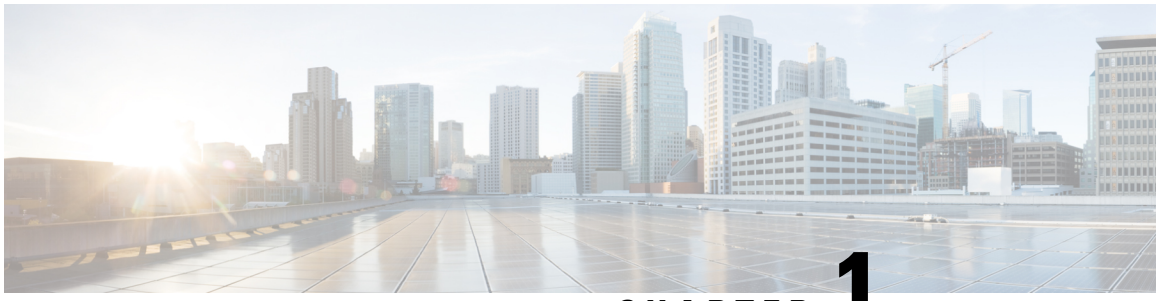
- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.
- To get the business impact you're looking for with the technologies that matter, visit Cisco Services.
- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions, and services, visit Cisco DevNet.
- To obtain general networking, training, and certification titles, visit Cisco Press.
- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a gateway to the Cisco bug-tracking system, which maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. The BST provides you with detailed defect information about your products and software.

Documentation feedback

To provide feedback about Cisco technical documentation, use the feedback form available in the right pane of every online document.



CHAPTER 1

About Cisco Catalyst IW9167E Heavy Duty Access Point

- Cisco Catalyst IW9167E Heavy Duty Access Point, on page 1
- Cisco Catalyst IW9167E Heavy Duty Access Point Features, on page 1
- Connectors and Ports, on page 2
- Power Sources, on page 6
- Data Connectivity, on page 7
- Antennas and Radios, on page 9

Cisco Catalyst IW9167E Heavy Duty Access Point

The Cisco Catalyst IW9167E Heavy Duty Access Point is a tri-band 802.11ax (Wi-Fi 6) AP that provides reliable wireless connectivity for mission-critical applications as organizations automate processes and operations. It can operate as Wi-Fi 6 or Cisco Ultra-Reliable Wireless Backhaul (Cisco URWB). Wi-Fi 6 technology brings higher density, higher throughput, more channels, power efficiency, and improved security in industrial or outdoor locations. Cisco URWB provides ultra-reliable wireless connectivity for moving assets or to extend the network where running fiber isn't feasible or is too costly.

The Cisco Catalyst IW9167E Heavy Duty Access Point comes with three 4x4 radios, in a heavy-duty design that is IP67 rated, and packed with advanced features.

The Cisco Catalyst IW9167E Heavy Duty Access Point Series includes the following hardware model:

- Catalyst IW9167EH-x—Standard model featuring eight external antenna connections supporting AP, URWB, and WGB software options..

x denotes the regulatory domain: A, B, E, F, Q, Z, or ROW.

A full listing of the AP's features and specifications is provided in the Cisco Catalyst IW9167E Heavy Duty Access Point Data Sheet.

Cisco Catalyst IW9167E Heavy Duty Access Point Features

This Access Point is supported on Cisco Catalyst 9800 wireless controller-based products, and has the following features:

- 2 GB DDR4 memory, 1 GB NAND Flash
- Tri-radio, dual band support: 2.4-GHz Slot 0, 5-GHz Slot 1, and 5/6 GHz Slot 2
- 4 x 4 MIMO with up to four spatial streams
- 8 x N-type female connectors for Wi-Fi, 1x TNC female for GNSS, multi-protocol loT radio, Aux radio, Barometer
- Bluetooth Low Energy (BLE) radio enables IoT use cases such as location tracking and way finding.
- Operation mode—Cisco URWB, WGB, or AP
- 1 x multi-Gigabit (mGig) copper Ethernet port (supporting PoE, including IEEE 802.3at/bt, Cisco UPoE, 100 Mbps/1 Gbps/2.5 Gbps/5 Gbps)
- 1 x SFP interface—supports up to 10 Gbps

Note For 10G SFP fiber module, Cisco PID SFP-10G-LR10-I has guaranteed performance with the Catalyst IW9167E access point.

- Optional M12 adapter for network and power interfaces

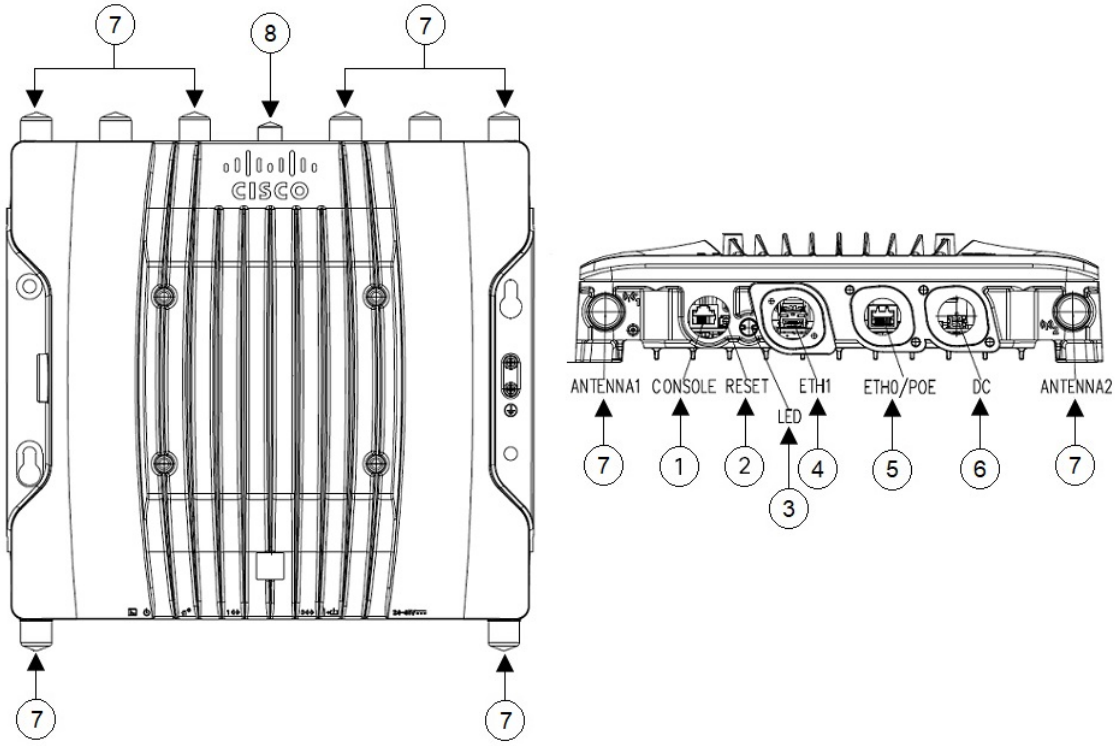
Note The M12 adapter is not compatible with Cisco Catalyst IW9167EH-HZ Access Point.

- Dual power input options—PoE-in and 24–48VDC
- Water and dust resistance—IP 66/67
- Hardened for shock, vibration, and extreme temperatures
- Operating temperature:
  - -40°C to 70°C without solar loading
  - Support cold start at -40°C and extend working at -50°C.

Connectors and Ports

The following figures show the available ports and connectors on the AP.

Figure 1: IW9167EH Connectors and Ports



1	Console port (RJ-45)	2	Reset button For information on how to use the Reset button, see Using the Reset Button, on page 53.
3	Status LED	4	SFP (copper) 100M/1000M/10G Multigigabit Ethernet /M12 X-code or SFP (fiber) 1G/10G **Note** M12 X-code port by using M12-RJ45 adapter can support up to 2.5G rate.
5	100M/1000M/2.5G/5G Multigigabit Ethernet (RJ-45) /M12 X-code auto-sensing PoE+ in (802.3at/bt), UPOE-in **Note** M12 X-code port by using M12-RJ45 adapter can support up to 2.5G rate.	6	DC power input (micro-fit, or M12 4-pin A-code by using M12 adapter)
7	Antenna ports	8	GNSS port

4-Pin Micro-Fit Connector for DC Power

The following figures show the 4-pin Micro-Fit connector for DC power.

Figure 2: Mating Connector: Molex Micro-Fit 43025-0400

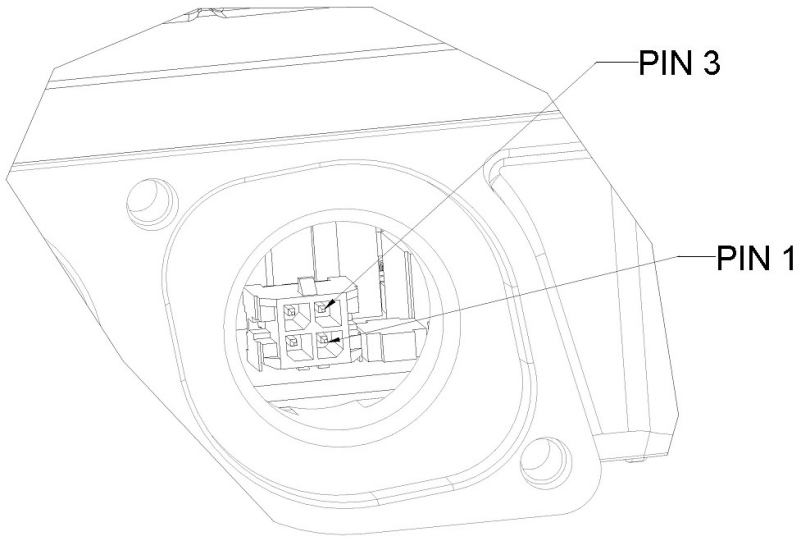
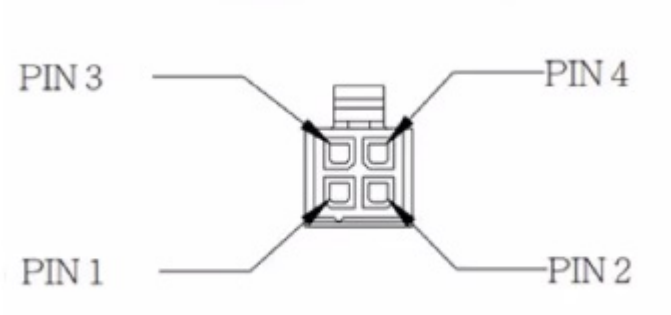


Figure 3: Mating Connector Front View



Molex Micro-Fit Pin	Assignment
Pin 1	Black (- Negative Terminal)
Pin 2	Not assigned
Pin 3	White (+ Positive Terminal)
Pin 4	Not assigned

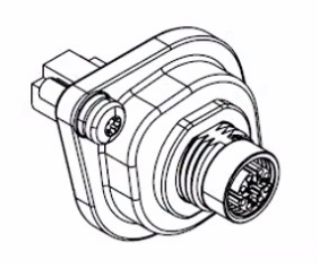
M12-RJ45 Adapter

M12-RJ45 adapter (Cisco PID: IW-ACC-M12ETH=) can be used to support M12 X-coded connector.

Note The M12 adapter is not compatible with Cisco Catalyst IW9167EH-HZ Access Point.

Note M12 X-code port by using M12-RJ45 adapter can support up to 2.5G rate.

Figure 4: M12-RJ45 Adapter (Cisco PID: IW-ACC-M12ETH=)



The following table shows the M12-RJ45 adapter pinouts.

Table 1: M12-RJ45 Pinouts

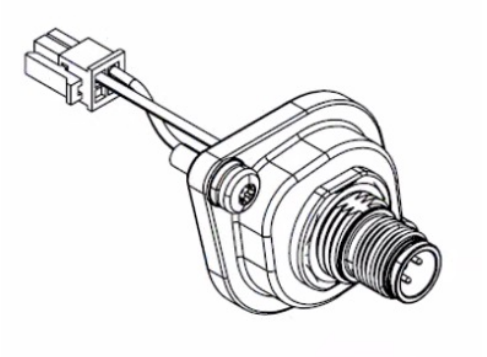
RJ45	Signal	M12 X-Code
1	B1_DA+	1
2	B1_DA-	2
3	B1_DB+	3
6	B1_DB-	4
7	B1_DD+	5
8	B1_DD-	6
5	B1_DC-	7
4	B1_DC+	8

M12-PWR Adapter

M12-PWR adapter (Cisco PID: IW-ACC-M12PWR=) can be used to support M12 A-coded DC power connector.

Note The M12 adapter is not compatible with Cisco Catalyst IW9167EH-HZ Access Point.

Figure 5: M12-PWR Adapter (Cisco PID: IW-ACC-M12PWR=)



The following table shows the M12-PWR adapter pinouts.

Table 2: M12-PWR Pinouts

Micro-FIT 4P	Wire	M12 A-Code
3	RED (22 AWG)	1
2	N/C	2
1	BLACK (22 AWG)	3
4	N/C	4

Power Sources

The Cisco Catalyst IW9167 Series Access Points supports the following power sources:

- DC power input: 24 to 48 Vdc, 2.0 to 0.9 A

Note Use DC cable with only No. 18 AWG or larger.

- Power over Ethernet (PoE) input: 42.5 to 57 Vdc, 1.0 to 0.7 A

  802.3at (PoE+), 802.3bt (PoE++), Cisco Universal PoE (Cisco UPOE). For more information, see Powering the Access Point, on page 35.

Note Use CAT5e or better Ethernet cable with only No. 24 AWG or larger telecommunication line cord.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

Power Adapters

The Cisco Catalyst IW9167E Heavy Duty Access Point supports the following DC power adapters:

- PID: IW-PWRADPT-MFIT4P=: Operating: -40°C to +65°C, 60W.
- PID: IW-PWRADPT-MFIT4IN=: Operating: -40°C to +65°C, 60W.

Power Injectors

The Cisco Catalyst IW9167E Heavy Duty Access Point supports the following power injectors:

- IW-PWRINJ-60RGDMG=: Operating: -40°C to +70°C. Power derating of 60W at 70°C, and 65W at 65°C. Supports 100M/1G/2.5G/5G/10G rates.
- AIR-PWRINJ-60RGD1=: Operation: -40°C to +50°C, 60W. Supports 10M/100M/1G rates.
- AIR-PWRINJ-60RGD2=: Operation: -40°C to +50°C, 60W. Supports 10M/100M/1G rates.

Caution When the AP is installed outdoors or in a wet or damp location, the AC branch circuit powering the AP should be provided with ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC).

Ethernet (PoE) Ports

The AP supports an Ethernet uplink port (also for PoE-IN). The Ethernet cable uses an RJ-45 connector (with weatherproofing) is used to send and receive Ethernet data and optionally supply inline power from the power injector or a suitably powered switch port.

Tip The AP senses the Ethernet and power signals, and automatically switch internal circuitry to match the cable connections.

Data Connectivity

Ethernet (PoE) Ports

The AP supports an Ethernet uplink port (also for PoE-IN). The Ethernet uplink port on the AP uses an RJ-45 connector (with weatherproofing) to link the AP to the 100BASE-T, 1000BASE-T, 2.5G BASE-T, or 5G BASE-T network.

The Ethernet cable must be a *shielded*, outdoor rated, Category 5e (CAT 5e) or better cable. Category 6A (CAT 6A) cable is needed for 5G rate.

Tip The AP senses the Ethernet and power signals, and automatically switch internal circuitry to match the cable connections.

SFP Option

Warning **Statement 1008—**Class 1 Laser Product

This product is a Class 1 laser product.

The factory-orderable fiber option provides a fiber input and output capability. Fiber data is transmitted and received over a single or dual-strand fiber cable, depending on the SFP, which is connected to the access point using these SFP modules:

Table 3: Supported SFP Modules

PID	Distance	Fiber/Cable	Operating Temperature Range
GLC-SX-MM-RGD=	220-550m	MMF	IND
GLC-LX-SM-RGD=	550m/10km	MMF/SMF	IND
GLC-T-RGD=[1]	100m	CAT 5e	IND
SFP-10G-LR10-I	10km	SMF	IND
SFP-10G-T-X[2]	30m@10Gbps	CAT 6A/CAT 7	EXT
SFP-10G-SR-I=	300m	OM3	IND

[1] GLC-T-RGD= supports only 1000BASE-T connection.
[2] SFP-10G-T-X is not in supported in Cisco IOS XE Release 17.9.3.

Note SFP modules are not hot-swappable. When you plug and unplug the SFP module, a manual reload of the AP is required.

Client data is passed to the network controller through the fiber connection via a fiber-capable switch or controller. Configuration information can be found in the controller configuration guide of the switch or controller you are using.

Antennas and Radios

The Catalyst IW9167EH access point has eight N-type female connectors to support multiple antenna options, such as the self-identifying antennas (SIA) on designated three SIA ports, dual-band antennas, and single-band antennas.

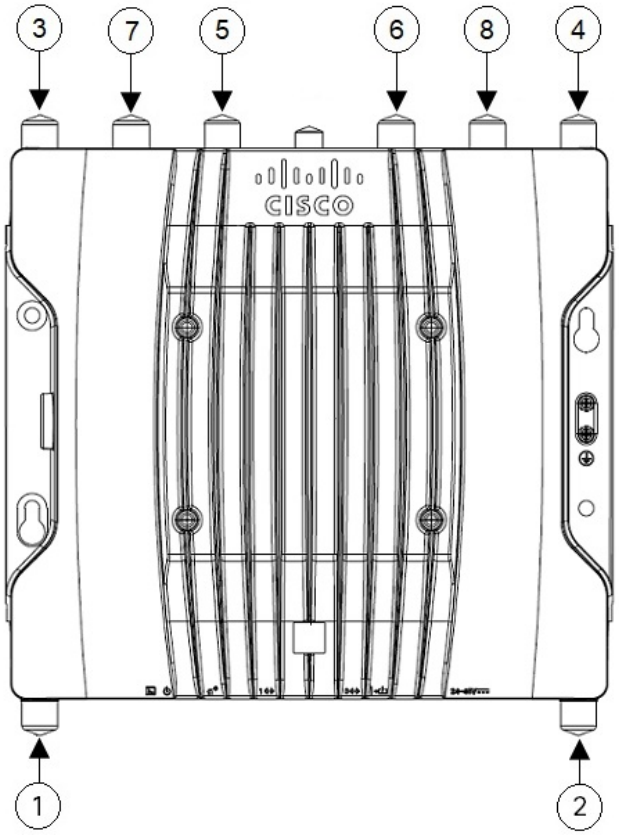
Supported External Antennas

The following figure shows the antenna ports of the Catalyst IW9167E access point.

Note

- Antenna caps must be installed when an antenna is not in use. Tighten with maximum torque range: 2.5 lbf.in.

Figure 6: Catalyst IW9167EH Access Point Antenna Ports



1	Port 1 Supports 2.4 GHz radio in 4x4, 2x2, or 1x1 mode. Supports 5 GHz radio in 4x4 mode. Supports SIA.	2	Port 2 Supports 2.4 GHz radio in 4x4, 2x2 mode. Supports 5 GHz radio in 4x4 mode.

3	Port 3 Supports 2.4 GHz radio in 4x4 mode. Supports 5 GHz radio in 4x4,2x2 mode.	4	Port 4 Supports 2.4 GHz radio in 4x4 mode. Supports 5 GHz radio in 4x4, 2x2, or 1x1 mode. Supports Bluetooth Low Energy (BLE) radio. Supports SIA.
5	Port 5 Supports 5/6 GHz radio in 4x4,2x2,1x1 mode. Supports SIA.	6	Port 6 Supports 5/6 GHz radio in 4x4,2x2 mode.
7	Port 7 Supports 5/6 GHz radio in 4x4 mode.	8	Port 8 Supports 5/6 GHz radio in 4x4 mode.

Note Do not connect omnidirectional antennas directly to both ports 1 - 4 and ports 5 - 8. To avoid interference between the 5 GHz and 5/6 GHz radios, use coaxial cables and mount one set of antennas at least 3 ft. (1 m) vertically away from the antennas attached directly to the chassis. Omnidirectional antennas may be connected to either ports 1 - 4 or 5 - 8, but not to any combination of both 5 GHz and 5/6 GHz radios' antenna ports simultaneously.

If you connect directional antennas to both 5 GHz and 5/6 GHz radios, space them at least 10 ft. (3 m) apart vertically, or at least 5 ft. (1.5 m) apart horizontally with their main beams aimed at least 90 degrees apart.

Supported Wi-Fi Antennas

The Catalyst IW9167EH access point supports the following external Wi-Fi antennas.

Table 4: Supported Wi-Fi Antennas

PID	Antenna Gain (dBi)				Connector	Antenna Name
	2.4 GHz	4.9 GHz	5 GHz	6 GHz		
IW-ANT-OMH-2567-N=	4	7	7	7	N male	2.4/5 GHz Tri-Band Omnidirectional Dipole Antenna, Horizontally Polarized, Self-Identifying
AIR-ANT2547V-N=	4	—	7	–	N male	Cisco Aironet Dual-Band Omnidirectional Dipole Antenna (White)
AIR-ANT2547VG-N=	4	—	7	–	N male	Cisco Aironet Dual-Band Omnidirectional Dipole Antenna (Gray)
AIR-ANT2547VG-NS=	4	—	7	–	N male	Cisco Aironet Dual-Band Omnidirectional Dipole Antenna (Gray), Self-Identifying

PID	Antenna Gain (dBi)				Connector	Antenna Name
AIR-ANT2568VG-N=	6	—	8	–	N male	Cisco Aironet Dual-Band Omnidirectional Dipole Antenna (Gray)
AIR-ANT2568VG-NS=	6	—	8	–	N male	Cisco Aironet Dual-Band Omnidirectional Dipole Antenna (Gray), Self-Identifying
AIR-ANT2480V-N=	8	—	—	–	N male	Cisco Aironet 2.4 GHz 8 dBi Omnidirectional Dipole Antenna
AIR-ANT5180V-N=	—	7	8	–	N male	Cisco Aironet 5 GHz 8 dBi Omnidirectional Dipole Antenna
AIR-ANT2413P2M-N=	13	—	—	–	N male (x2)	Cisco Aironet 2.4 GHz 13 dBi Dual-Port Dual-Polarized Directional Panel Antenna
AIR-ANT5114P2M-N=	—	—	13	–	N male (x2)	Cisco Aironet 5 GHz 13 dBi Dual-Port Dual-Polarized Directional Panel Antenna
AIR-ANT2513P4M-N=	13	—	13	–	N female (x4)	Cisco Aironet Four-Port Dual-Band Polarization-Diverse Directional Panel Antenna
IW-ANT-PNL25610-R=	8.65	—	8.35	9.25	RP-TNC jack (x8), TNC female (x1, GNSS)	Cisco Tri-Band 8-Element Dual-Slant +/-45 Degree Polarized Directional Stadium Antenna with GNSS, Self-Identifying

For installation instructions and detailed information on any of these antennas, refer to the antenna data sheet on Cisco.com, or see the antenna guides at:

- Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide
- http://www.cisco.com/c/en/us/support/wireless/aironet-antennas-accessories/products-installation-guides-list.html

Follow all safety precautions when installing the antennas. For information on safety, see Safety Precautions when Installing Antennas, on page 59.

Supported URWB Antennas

Table 5: Supported URWB Antennas

PID	Antenna Gain (dBi)				Connector	Antenna Name
	2.4 GHz	**4.9 GHz**	**5 GHz**	**6 GHz**		

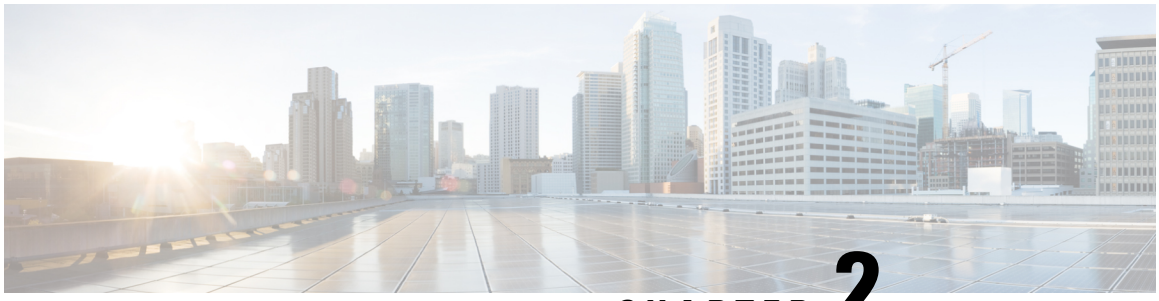
PID	Antenna Gain (dBi)				Connector	Antenna Name
IW-ANT-OMM-53-N=	—	3	3	—	N female	5 GHz Omnidirectional Multi-Polarized Antenna
IW-ANT-OMV-55-N=	—	—	5	—	N female	5 GHz Vertically Polarized Omnidirectional Dipole Antenna
IW-ANT-OMH-55-N=	—	—	5	—	N female	5 GHz Horizontally Polarized Omnidirectional Dipole Antenna
IW-ANT-PNL-59-N=	—	—	9	—	N female (x2)	5 GHz Dual-Port Dual-Slant +/-45 Degree Polarized Directional Panel Antenna
IW-ANT-SKS-514-Q=	—	14	14	—	QMA female (x2)	5 GHz Directional Shark Antenna, Dual-Slant +/-45 Degree Polarized
IW-ANT-SKD-513-Q=	—	13	13	—	QMA female (x2)	5 GHz Bidirectional Shark Antenna, Dual-Slant +/-45 Degree Polarized

Supported GNSS Antenna

The following table shows the external GNSS antennas supported by the Catalyst IW9167EH access point.

Table 6: Supported GNSS Antenna

PID	Frequencies Supported	Connector	Description
ANT-GNSS-OUT-TNC=	1560 - 1608 MHz	TNC male	Outdoor Active GNSS Antenna with 15-ft. integrated cable



CHAPTER 2

Unpacking Your Access Point

- Package Contents, on page 13
- Unpacking the Access Point, on page 13
- Cisco Orderable Accessories, on page 13

Package Contents

Each AP package contains the following items:

- One Catalyst IW9167EH Access Point
- Ground lug kit with oxide inhibitor
- One PG13.5 gland
- Weatherization tape

Unpacking the Access Point

To unpack the AP, follow these steps:

Procedure

Step 1 Unpack and remove the access point and the selected mounting accessory kit from the shipping box.

Step 2 Return the packing material to the shipping container and save it for future use.

Step 3 Verify that you have received all items ordered. If any item is missing or damaged, contact your Cisco representative or reseller for instructions.

Cisco Orderable Accessories

Order the following accessories separately from Cisco:

- AP mounting brackets

Table 7: Supported Mounting Bracket for Catalyst IW9167EH and -HZ AP Models

Cisco PID	Description
AIR-ACCDMK3700=	DIN Rail mounting bracket
AIR-ACCPMK3700=	Pole mounting bracket (for 2”–3.2” diameter pole)
AIR-ACCPMK3700-2=	Pole mounting bracket (for 2”–16” diameter pole)

- Accessory kits

Cisco PID	Description	Usage Restrictions
AIR-SFP-KIT1=	Gland kit for SFP port (Qty: 5)	—
IW-ACC-M12ETH=	Adapter, M12 X-code to RJ45 Ethernet connector	Not applicable for Hazloc usage
IW-ACC-M12PWR=	Adapter, M12 4 Pin A-Code to Micro-fit power connector	Not applicable for Hazloc usage
IW-ACC-M12SPCR1=	Spacer for M12 when using on SFP port (Qty: 5)	Not applicable for Hazloc usage

- M12 Cables

Cisco PID	Description
CAB-PWR-M12-10=	M12 DC power cable, 4 pins, A-Code, 10 ft
CAB-RJ45-M12-10=	M12 to RJ-45 Ethernet cable, 8 pins, X-Code, 10 ft
CAB-ETHM12-M12-10=	M12 to M12 Ethernet cable, 8 pins, X-Code, 10 ft

- RF Coaxial Adapters

Cisco PID	Description
AIR-ACC370-NF-NF=	N(f) to N(f) RF adapter DC-11 GHz

- RF Coaxial Cables

Cisco PID	Description
CAB-L400-5-N-N=	5 ft. LMR-400-DB, N(m)-STR to N(m)-R/A
CAB-L400-5-N-NS=	5 ft. LMR-400-DB, N(m)-STR to N(m)-STR
AIR-CAB010LL-N=	10 ft. LMR-400-DB, N(m)-STR to N(m)-STR
CAB-L400-20-N-N=	20 ft. LMR-400-DB, N(m)-STR to N(m)-RA

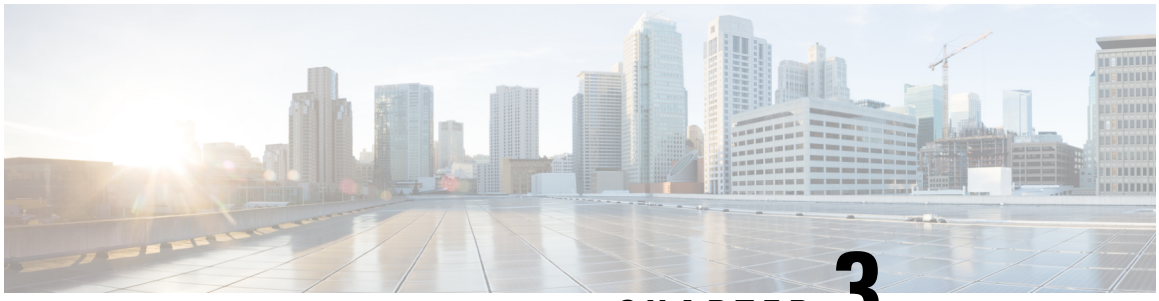
Cisco PID	Description
AIR-CAB025HZ-N=	25 ft. LMR-400-DB/FR/CMR, N(m)-STR to N(m)-RA
CAB-L600-30-N-N=	30 ft. LMR-600-DB, N(m)-STR to N(m)-RA
CAB-L240-10-Q-N=	10 ft. LMR-240-FR/CMR, N(m)-STR to QMA(m)-RA
CAB-L240-15-Q-N=	15 ft. LMR-240-FR/CMR, N(m)-STR to QMA(m)-RA
CAB-L240-20-Q-N=	20 ft. LMR-240-FR/CMR, N(m)-STR to QMA(m)-RA

- Lightning Arrestors

Lightning Arrestor	Description
CGR-LA-NF-NF=	Lightning Arrestor kit, N(f) connectors
CGR-LA-NM-NF=	Lightning Arrestor kit, N(m) to N(f)
ACC-LA-G-TM-TF=	Lightning Arrestor kit, TNC(m) to TNC(f) for GNSS

- Power adapter and power injectors when PoE is not available

Power Supply	Description
IW-PWRADPT-MFIT4P=	Power Adapter, AC-DC, Micro-Fit 4-Pin connector
IW-PWRADPT-MFITIN=	Power Adapter, AC-DC, Micro-Fit 4-Pin connector, India use
IW-PWRINJ-60RGDMG=	Power Injector, 60W, outdoor 5GE
AIR-PWRINJ-60RGD1=	60W outdoor rated power injector, with North America AC power plug. For more information, see the power injector data sheet.
AIR-PWRINJ-60RGD2=	60W outdoor rated power injector, International version with blunt-end cable. For more information, see the power injector data sheet.



CHAPTER 3

Installation Overview

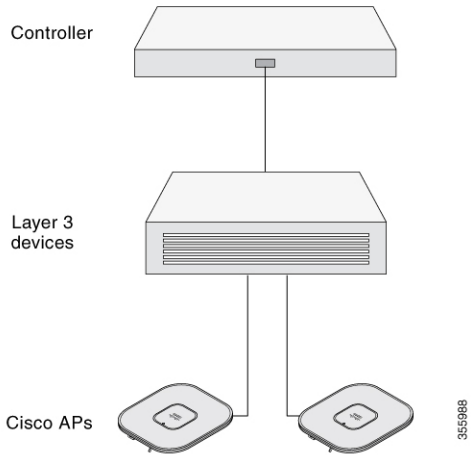
- Performing a Preinstallation Configuration (Optional), on page 17
- Preinstallation Checks and Installation Guidelines, on page 19
- Mounting the Access Point, on page 20
- Attaching a Power Adapter, on page 30
- Grounding the Access Point, on page 33
- Powering the Access Point, on page 35
- Connecting Data Cables, on page 41

Performing a Preinstallation Configuration (Optional)

The following procedures describe the processes to ensure that your AP installation and initial operation go as expected.

Note Performing a preinstallation configuration is an optional procedure. If your network controller is properly configured, you can install your AP in its final location and connect it to the network from there.

The following illustration shows the preinstallation configuration setup:



Perform the following steps:

Before you begin

Ensure that the Cisco Controller Distribution System (DS) port is connected to the network. Use the procedure for CLI or GUI as described in the release appropriate Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide.

- Enable Layer 3 connectivity between APs, Cisco Controller Management, and AP-Manager interface.
- Configure the switch to which your AP has to attach. See the Cisco Wireless Controller Configuration Guide for the release you are using, for additional information.
- Configure the Cisco Catalyst 9800 Series Wireless Controller as the primary so that new APs always join it.
- Ensure that the DHCP is enabled on the network. The AP must receive its IP address through DHCP.

Note An 802.11ax AP is assigned an IP address from the DHCP server only if a default router (gateway) is configured on the DHCP server (enabling the AP to receive its gateway IP address) and the gateway ARP is resolved.

- CAPWAP UDP ports must not be blocked in the network.
- The AP must be able to find the IP address of the controller. This can be accomplished using DHCP, DNS, or IP subnet broadcast. This guide describes the DHCP method to convey the controller IP address. For other methods, see the product documentation.

Note The AP requires a multi-gigabit Ethernet (5 Gbps) link to prevent the Ethernet port from becoming a bottleneck for traffic.

Procedure

Step 1 Power the AP using supported power source.

- As the AP attempts to connect to the controller, the LED cycles through a green, red, and off sequence, which can take up to five minutes.

  Note
  If the AP remains in this mode for more than five minutes, the AP cannot find the primary Cisco Catalyst 9800 Series Wireless Controller. Check the connection between the AP and the Cisco Catalyst 9800 Series Wireless Controller and be sure that they are on the same subnet.

- If the AP shuts down, check the power source.
- After the AP finds the Cisco Catalyst 9800 Series Wireless Controller, it attempts to download the new operating system code if the AP code version differs from the Cisco Catalyst 9800 Series Wireless Controller code version. While this is happening, the Status LED blinks blue.

If the operating system download is successful, the AP reboots.

Step 2 (Optional) Configure the AP. Use the controller CLI, GUI, or Cisco DNA Center to customize the access point-specific 802.11ax network settings.

Step 3 If the preinstallation configuration is successful, the Status LED is green, indicating normal operation. Disconnect the AP and mount it at the location at which you intend to deploy it on the wireless network.

Step 4 If your AP does not indicate normal operation, turn it off and repeat the preinstallation configuration.

Note
When you are installing a Layer 3 access point on a subnet that is different from the Cisco Catalyst 9800 Series Wireless Controller, ensure the following setup is configured:

- A DHCP server is reachable from the subnet on which you plan to install the AP.
- The subnet has a route back to the controller.
- This route has destination UDP ports 5246 and 5247 open for CAPWAP communications.
- The route back to the primary, secondary, and tertiary controller allows IP packet fragments.
- If address translation is used, the access point and the controller have a static 1-to-1 NAT to an outside address. Port Address Translation is not supported.

Preinstallation Checks and Installation Guidelines

Before you mount and deploy your access point, we recommend that you perform a site survey (or use the Site Planning tool) to determine the best location to install your access point.

You should have the following information about your wireless network available:

- Access point locations
- Access point mounting options: To a vertical or horizontal wall or a pole
- Access point power options: Use either of the following options to power the AP:
  - DC power input
  - Cisco-approved power injector
  - 802.3at (PoE+), 802.3bt, and Cisco Universal PoE (Cisco UPOE)
- Operating temperature: -40° to +158°F (-40° to +70°C) with solar load and still air.
- Console access using the console port

  We recommend that you use a console cable that is one meter or less in length.



Note The AP may face issues while booting if you use an unterminated console cable (not plugged into any device or terminal) or a console cable that is more than one meter in length.

We recommend that you make a site map showing access point locations so that you can record the device MAC addresses from each location and return them to the person who is planning or managing your wireless network.

Mounting the Access Point

Mounting Hardware

The Catalyst IW9167E access point has built-in mounting flanges. You can also use the following mounting hardware:

- DIN rail mounting bracket
- Pole mounting bracket

Required mounting hardware depends on the mounting location:

- For ceilings or hard ceilings or walls, directly mount the access point using the built-in mounting flanges.

The mounting flanges are on the sides of the access point that are without ports.

- For electrical cabinets or network boxes, directly mount the access point using the mounting flanges or use the DIN rail mounting bracket.
- For pole mounting, use the pole mounting bracket.

Mounting Bracket Part Numbers

Note These brackets do not ship with the access point, but you can order them separately.

Table 8: Mounting Bracket Part Numbers

Mounting Bracket	Cisco Part Number
DIN Rail Mounting Bracket	AIR-ACCDMK3700=
Pole Mounting Bracket (for 2”–3.2” diameter pole)	AIR-ACCPMK3700=
Pole Mounting Bracket (for 2”–16” diameter pole)	AIR-ACCPMK3700-2=

Using the Integrated Flange Mounts

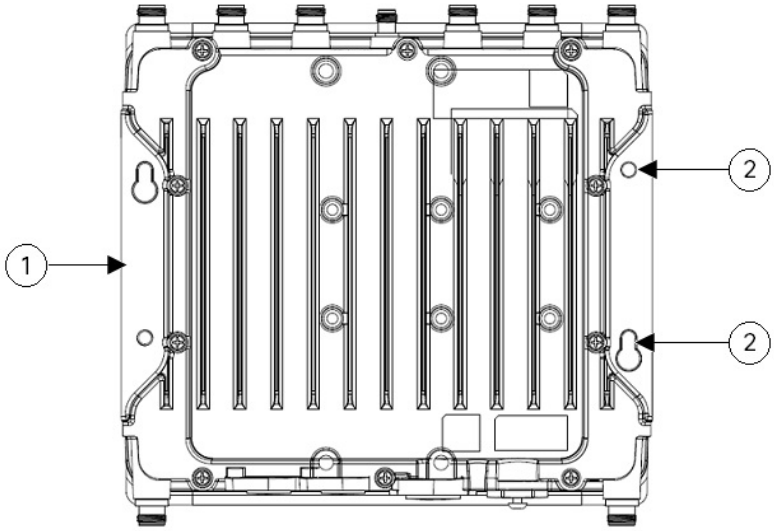
Direct mounting using the integrated flange mounts is typically for confined spaces or deployments that experience severe shock and vibration.

To mount the access point using the integrated flange mounts:

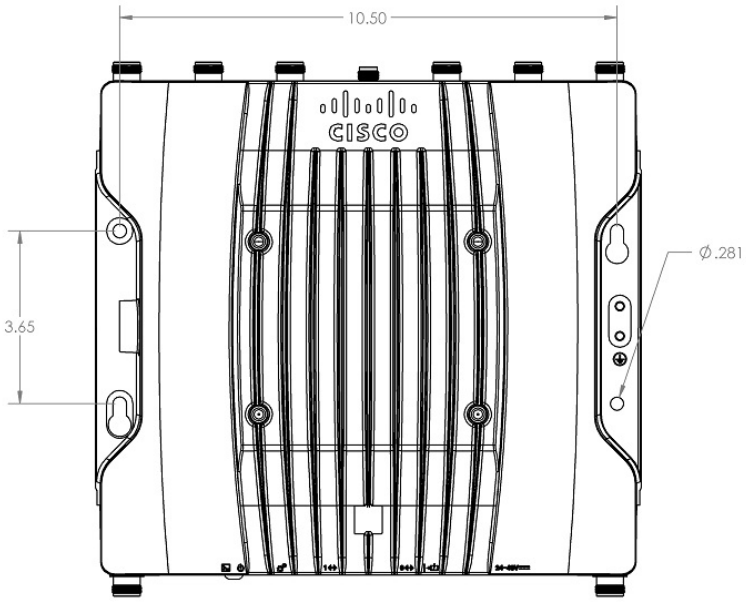
Procedure

Step 1 Choose the access point location that can safely support the weight of the access point.

Step 2 Use the access point mounting holes as a template, and mark them at the mounting location.



1	Main mounting flange	2	Mounting holes



Step 3 Drill holes on the mounting surface for plastic wall anchors to suit 1/4-20 or M6 bolts, and add the appropriate anchors.

Step 4 Align the access point mounting holes with the suspended ceiling mounting holes.

Step 5 Insert a mounting screw in each of the four mounting holes and tighten.

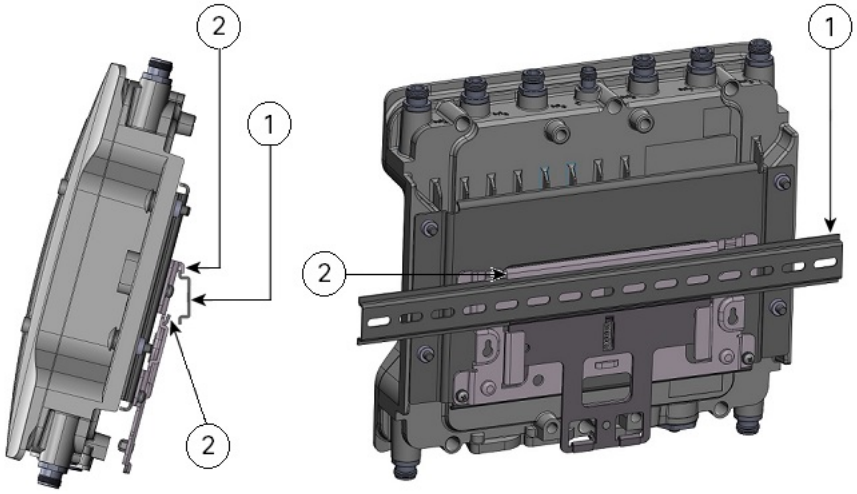
Step 6 You can use the keyholes for “hands-free” installation.

Note
Ensure that the access point is firmly secured.

Using the DIN Rail Mounting Bracket

You can use DIN rail mounting in network or electrical closets or cabinets, or in wiring rooms that have low-levels of shock and vibration. Figure 7: DIN Rail Mounting Assembly, on page 22 shows the DIN rail and DIN rail mounting assembly.

Figure 7: DIN Rail Mounting Assembly

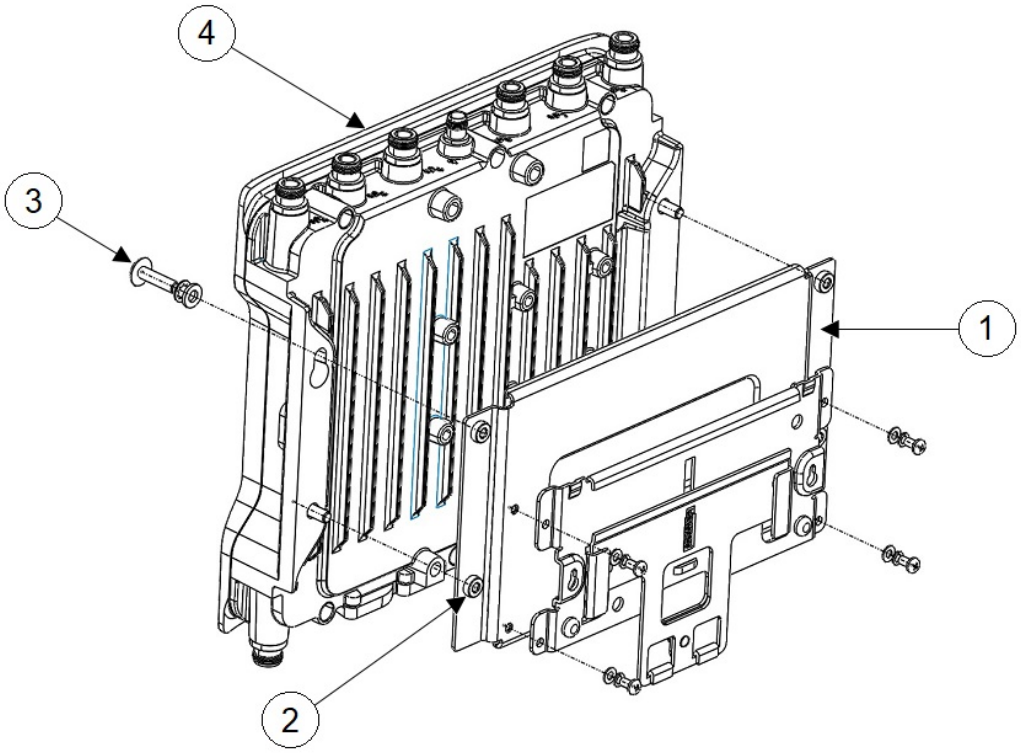


1	35 mm DIN rail (not supplied by Cisco)	2	DIN rail mounting bracket clip

To DIN rail mount the access point:

Procedure

Step 1 Assemble the access point and DIN rail mounting bracket using the M6 hardware supplied as shown in the following figure.



1	Steel DIN mounting bracket	3	M6 screw (Torque 6–7 ft-lbs)
2	M6 insert	4	Access Point

Step 2 Position the access point assembly directly in front of the DIN rail.

Step 3 Insert the DIN rail mounting bracket under the spring-loaded upper mounting clips.



Note
Ensure that the DIN rail seats into the anti-slip clips.

Step 4 Pull down the retention handles until the lower lip of the DIN rail mounting bracket seats in the lower mounting bracket clip.

Step 5 Release the retention handles.

Using the Pole Mounting Bracket

You can choose one of the following pole mounting brackets in the following table, according to the size of the pole that you are going to mount your access point on.

Table 9: Pole Mounting Brackets

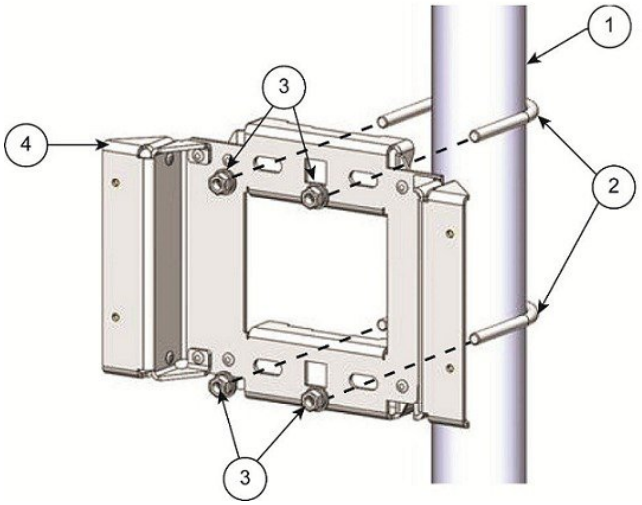
Mounting Bracket	Cisco Part Number	Applicable Pole Diameter
Pole Mounting Bracket	AIR-ACCPMK3700=	2–3.2 inches
Pole Mounting Bracket 2	AIR-ACCPMK3700-2=	2–16 inches

Using the Mounting Bracket AIR-ACCPMK3700=

To mount the access point on a pole using the mounting bracket AIR-ACCPMK3700=:

Procedure

Step 1 Use the supplied U bolts, washers, and nuts to attach the mounting bracket to the pole.

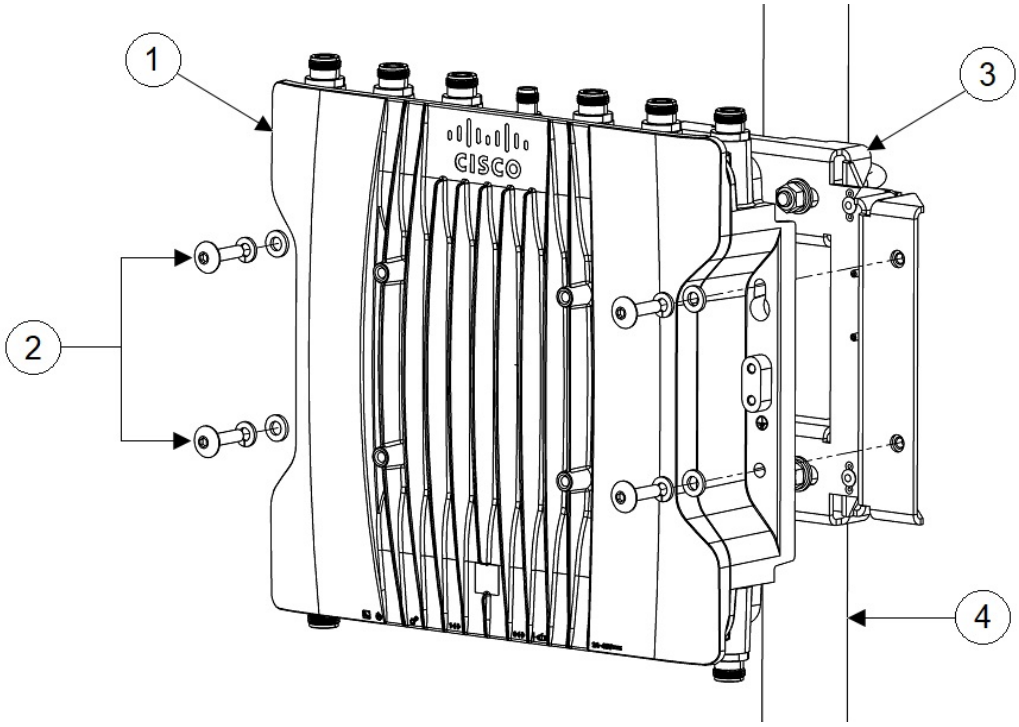


1	2"– 3.2" (5–8 cm) diameter pole	3	M8 x 1.25 nuts and washers
2	M8 x 1.25 U-bolt	4	Pole mounting bracket

Step 2 Use the included bolts, washers, and nuts to attach the access point to the mounting plate.

Note
Ensure that you symmetrically tighten the nuts on the U-bolts. If you over tighten one side, the U-bolt will skew.

Step 3 Torque the nuts to 6 to 7 foot-pounds.



1	Access point	3	Pole mounting bracket
2	M6 bolts and washers	4	2"– 3.2" (5–8 cm) diameter pole

Note
Ensure that the access point is firmly secured to the mounting bracket.

You can use the keyholes for “hands-free” installation. Ensure that you torque the nuts to 6 to 7 ft-lbs.

Caution
Never leave the access point unattended if the mounting hardware is not torqued to full value.

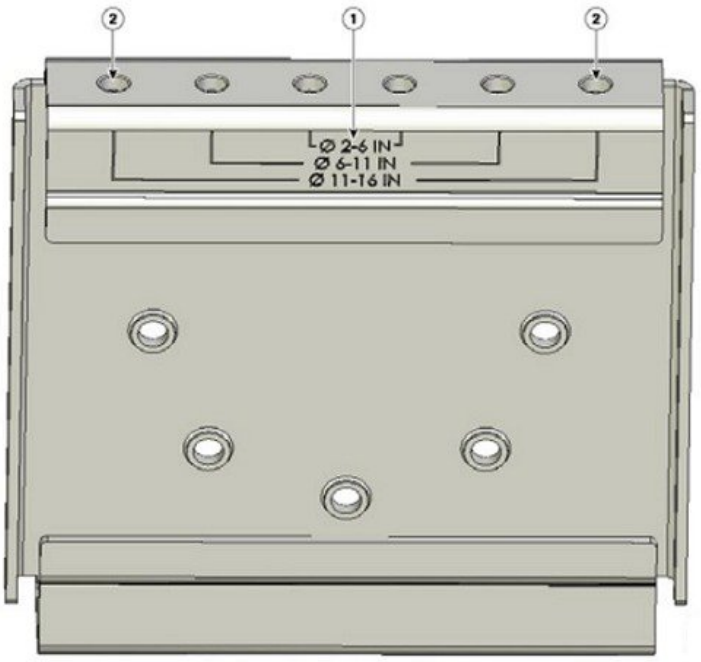
Using the Mounting Bracket AIR-ACCPMK3700-2=

The mounting bracket AIR-ACCPMK3700-2= supports poles from 2 to 16 inches in diameter. To mount the access point on a pole using this mounting bracket:

Procedure

Step 1 Assemble two strap brackets on the pole clamp bracket that are positioned for the pole diameter you are using to mount the access point. The following image illustrates the pole diameter indicators and bolt holes on the pole clamp bracket.

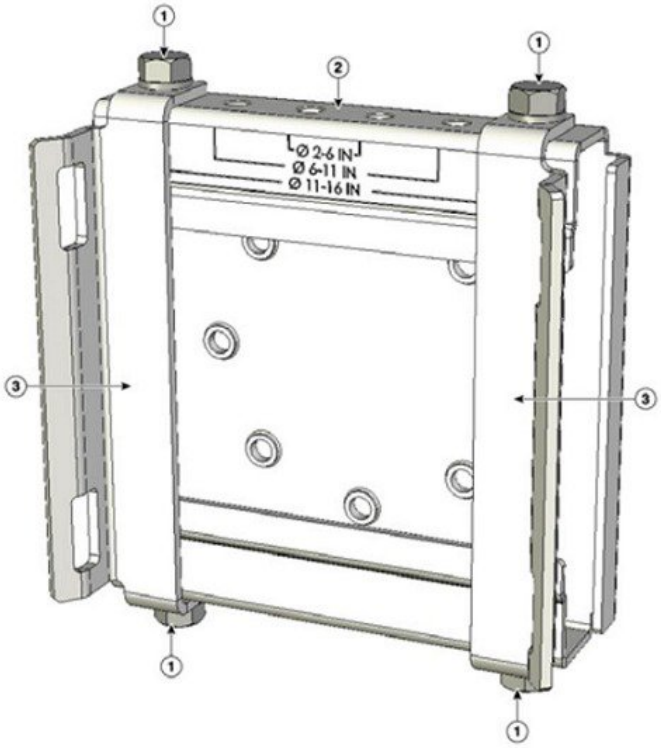
Figure 8: Pole Clamp Bracket Adjustment Hole Locations



1	Pole size indicators • 2 to 6 in. • 6 to 11 in. • 11 to 16 in.
2	Bolt holes for pole diameters (11 to 16 inches indicated)

Step 2 Position the strap brackets on the pole clamp bracket for the pole diameter you are using and secure each strap bracket with two M8 x16 bolts (with lock washers), as the following image shows. Tighten the bolts to 13 to 15 ft lbs (17.6 to 20.3 N-m).

Figure 9: Assembled Pole Clamp Bracket and Strap Brackets



1	M8 x1.25x16 bolts (with lock washers)	3	Strap bracket (shown positioned for 11 to 16 inch diameter pole)
2	Pole clamp bracket		

Step 3 Screw the M8 nut onto the pole clamp bracket support bolt, and tighten just enough to prevent the bolt from falling off.

Step 4 To mount your access point on a vertical pole, you need to install two metal bands around the pole to support the access point. This process requires extra tools and material not provided in the pole mount kit (see the following table for details).

Table 10: Material Needed to Mount Access Point on a Pole

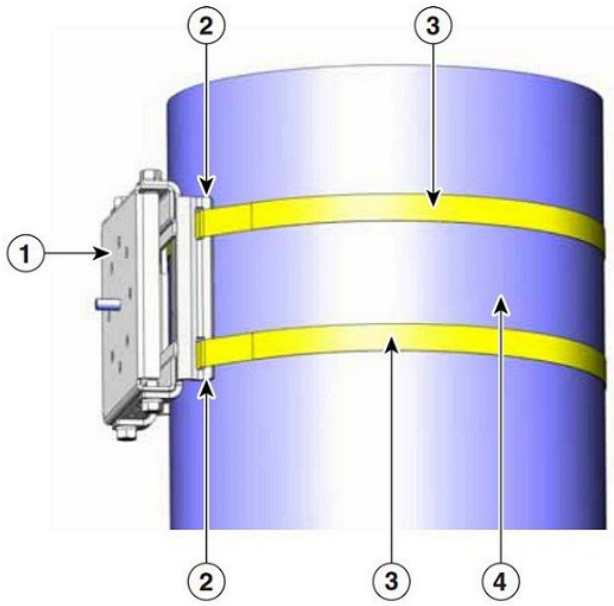
Mounting Method	Materials Required	In Kit
Vertical pole	Two 0.75-in (1.9 cm) stainless steel bands	Yes
	Banding strap tool (BAND IT) (Cisco AIR-BAND-INST-TL=)	No
	Ground lug (provided with access point)	Yes
	Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://onlinecatalog.panduit.com)	No
	#6 AWG ground wire	No

Step 5 Select a mounting location on the pole to mount the access point. You can attach the access point to any pole from 2 to 16 inch (5.1 to 40.6 cm) in diameter.

Step 6 For poles larger than 3.5 inch (8.9 cm), mount the pole clamp bracket assembly to a pole (see the following image) using two metal straps. Following the instructions provided with the banding strap tool (BAND IT) (AIR-BAND-INST-TL=), loop each metal strap twice through the slots on the strap bracket.

Caution
Do not place the metal straps in the large open area between the pole clamp bracket and the strap brackets, because this does not properly secure the access point.

Figure 10: Clamp Bracket Assembly Mounted on Poles Larger than 3.5 inch (8.9 cm)



1	Pole clamp bracket	3	Metal mounting strap
2	Strap slot in strap bracket	4	Pole

Step 7 For pole diameters of 3.5 inch (8.9 cm) or less, mount the pole clamp bracket assembly to a pole using two metal straps looped through the space between the pole clamp bracket and the strap brackets to provide maximum holding strength for extreme environments. Following the instructions provided with the banding strap tool (BAND IT) (AIR-BAND-INST-TL=), loop each metal strap twice.

Caution
Do not place the metal straps in the large open area between the pole clamp bracket and the strap brackets because this does not properly secure the access point.

Step 8 Position the pole clamp bracket on the pole as needed before tightening the metal bands.

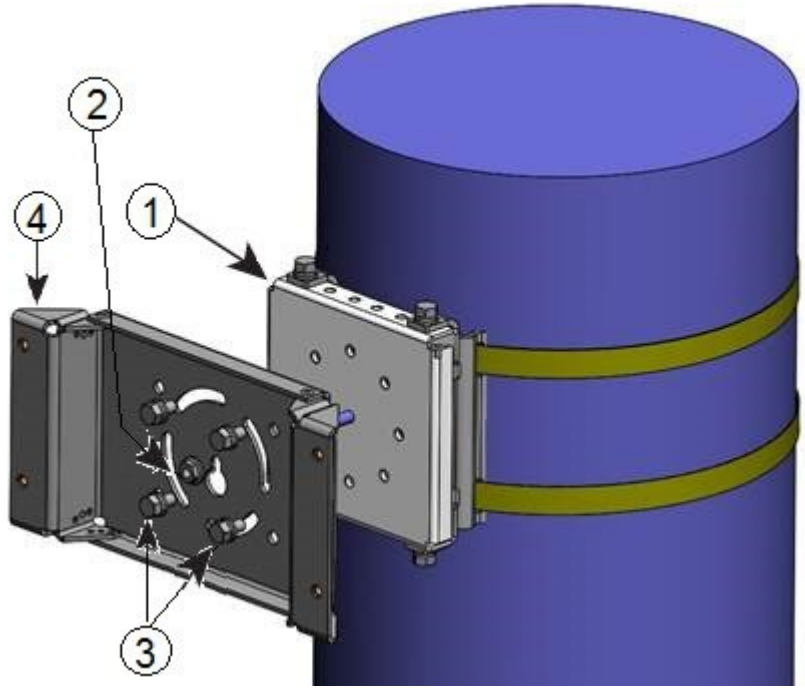
Note
When the metal bands are tightened to the full tension, the pole clamp bracket cannot be adjusted unless the metal bands are cut or disassembled.

Step 9 Tighten the metal bands using the banding strap tool (BAND IT) (Cisco AIR-BAND-INST-TL=) by following the operating instructions in the box with the tool. Ensure that the metal bands are as tight as possible.

Step 10 Place the mounting bracket onto the pole clamp bracket support bolt.

Step 11 Install four M8 x16 bolts (with flat and lock washers) into the bolt holes.

Figure 11: Mounting Bracket and Pole Clamp Bracket Assembly



1	Pole clamp bracket assembly	3	Bolt holes
2	Access point support bolt	4	Mounting bracket

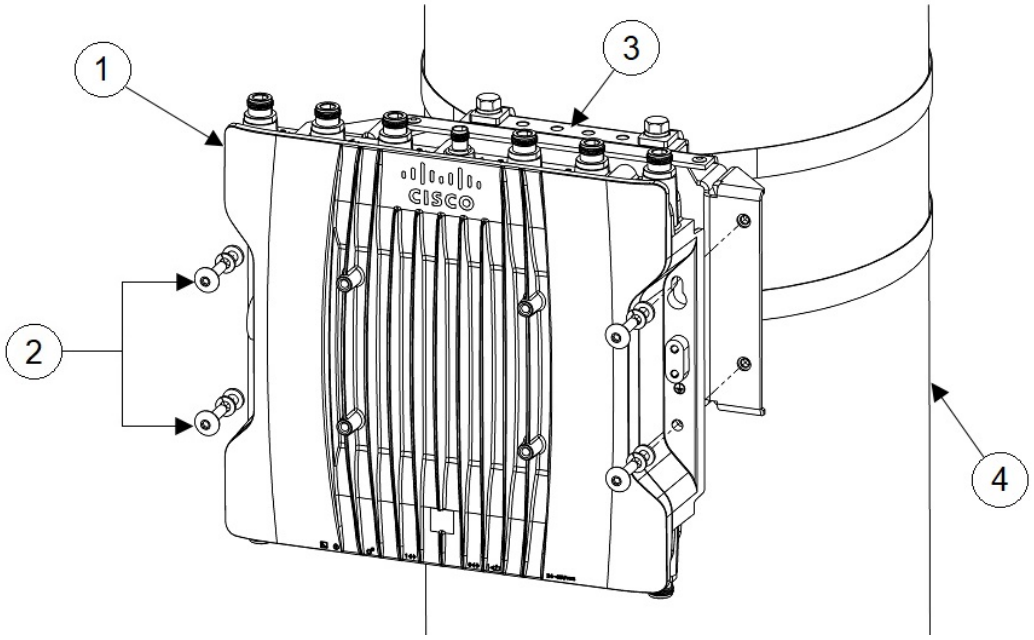
Step 12 Hand-tighten the bolts and the nut (do not overtighten).

Step 13 Adjust the top edge of the mounting bracket until it is horizontal and tighten the bolts and the flange nut to 13 to 15 ft-lbs (17.6 to 20.3 N-m).

Step 14 Use the included bolts, washers, and nuts to attach the access point to the mounting plate.

Step 15 Torque the nuts to 6 to 7 ft-lbs.

Figure 12: Access Point Installed in the Mounting Bracket



1	Access point	3	Pole mounting bracket
2	M6 bolts and washers	4	Pole

Note
Ensure that the access point is firmly secured to the mounting bracket.

Caution
Never leave the access point unattended if the mounting hardware is not torqued to full value.

Attaching a Power Adapter

If you want to attach a power adapter (IW-PWRADPT-MFIT4P=) to the access point on a pole using the mounting bracket AIR-ACCPMK3700= or AIR-ACCPMK3700-2=, use the procedures in the following sections.

Attaching a Power Adapter Using the Mounting Bracket AIR-ACCPMK3700=

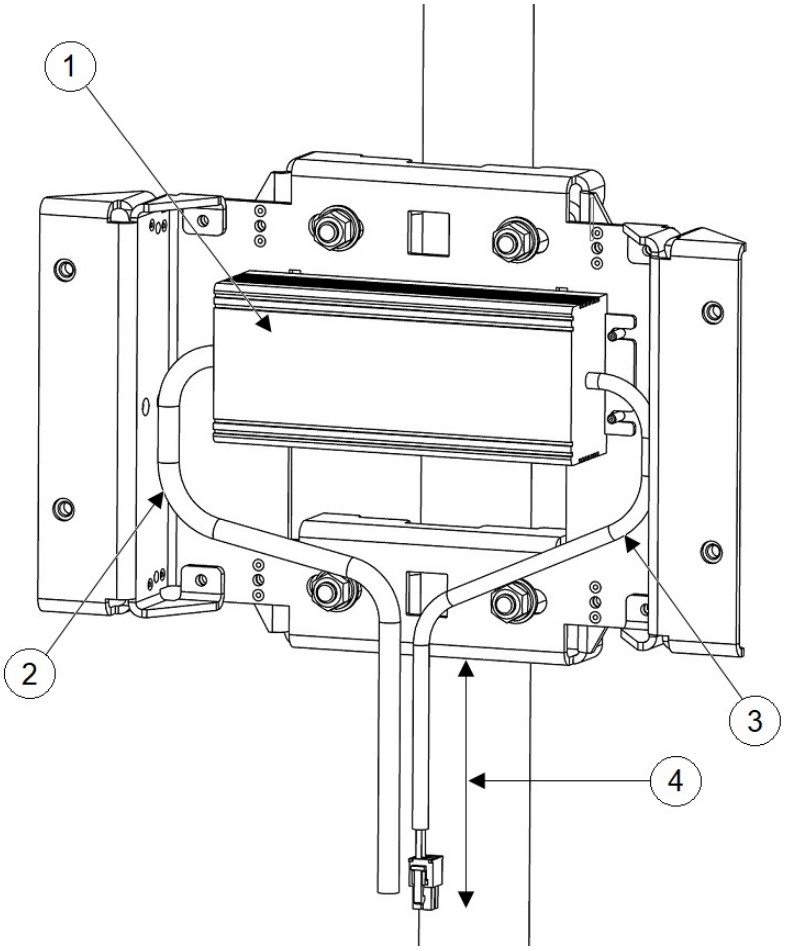
To attach a power adapter (IW-PWRADPT-MFIT4P=) to the access point on a pole using the mounting bracket AIR-ACCPMK3700=, use the following procedures:

Procedure

Step 1 Ensure you have the mounting bracket set up as described in Step 1 of Using the Mounting Bracket AIR-ACCPMK3700= , on page 24.

Step 2 Attach the power supply using 4x 6-32 screws and torque the screws to 8.3-11 in-lbs, as shown in the following figure.

Figure 13: Power Adapter Installed Using Mounting Bracket AIR-ACCPMK3700=



1	Power Adapter	3	DC Output Cable
2	Tie Wraps	4	10 inches Minimum Length

Step 3 Ensure that the excess cable is bundled and tie wrapped to the mounting bracket. Route the cable as shown in the figure in Step 2.

Step 4 Ensure that there is 10 inches minimum length from the bottom edge of the power supply to the end of the connector as shown in the figure in Step 2.

Step 5 Attach the access point to the mounting plate as described in Step 2 and Step 3 of Using the Mounting Bracket AIR-ACCPMK3700= , on page 24.

Attaching a Power Adapter Using the Mounting Bracket AIR-ACCPMK3700-2=

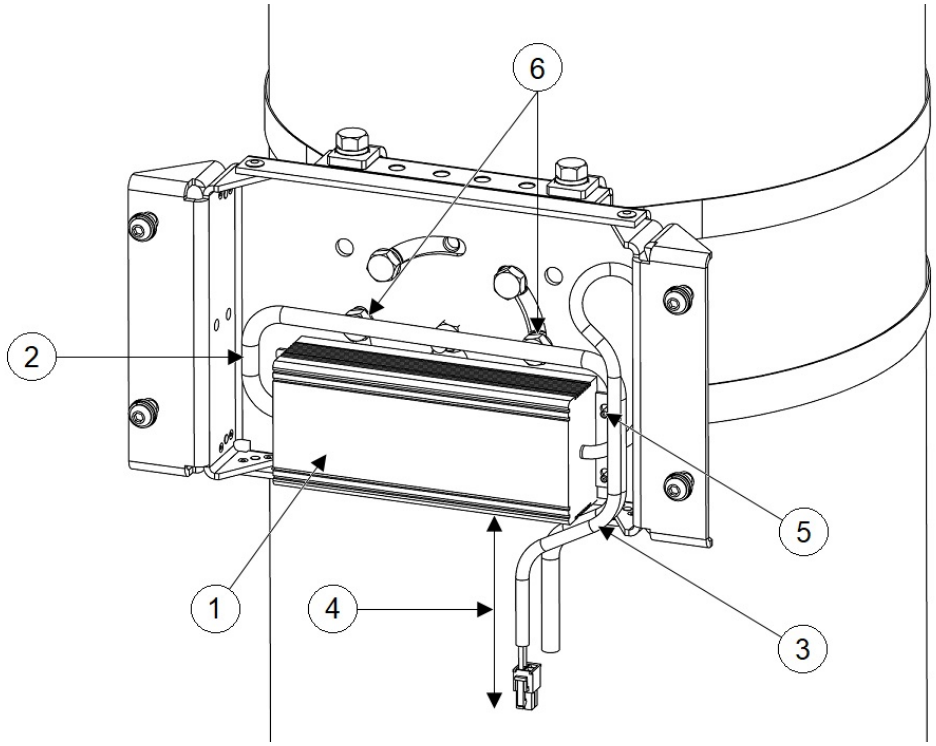
To attach a power adapter (IW-PWRADPT-MFIT4P=) to the access point on a pole using the mounting bracket AIR-ACCPMK3700-2=, use the following procedures:

Procedure

Step 1 Ensure you have the mounting bracket set up as described in Step 1 through Step 13 of Using the Mounting Bracket AIR-ACCPMK3700-2=, on page 25. But for step 11, the 2 lower bolts need to be repositioned to the locations indicated as No. 6 in the following figure.

Step 2 Attach the power supply using 4x 6-32 screws and torque the screws to 8.3-11 in-lbs, as shown in the following figure.

Figure 14: Power Adapter Installed Using Mounting Bracket AIR-ACCPMK3700-2=



1	Power Adapter	4	10 inches Minimum Length
2	Tie Wraps	5	4x 6-32 Screws
3	DC Output Cable	6	Reposition the bolts

Step 3 Ensure that the excess cable is bundled and tie wrapped to the mounting bracket. Route the cable as shown in the figure in Step 2.

Step 4 Ensure that there is 10 inches minimum length from the bottom edge of the power supply to the end of the connector as shown in the figure in Step 2.

Step 5 Attach the access point to the mounting plate as described in step 14 and step 15 of Using the Mounting Bracket AIR-ACCPMK3700-2=, on page 25.

Grounding the Access Point

In all installations, after mounting the access point, you must properly ground the unit before connecting power cables.

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 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.

The access point is shipped with a grounding kit.

Figure 15: Access Point Grounding Kit Contents



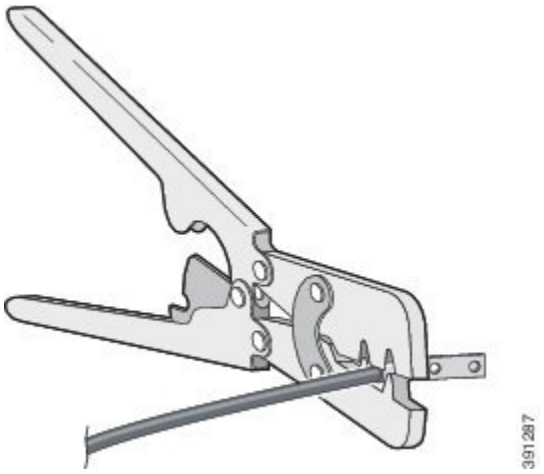
1	Grounding lug	2	Screws x 2, M4 x 6mm

Note The grounding kit also includes the oxide inhibitor, which is contained in a tube.

To ground the access point:

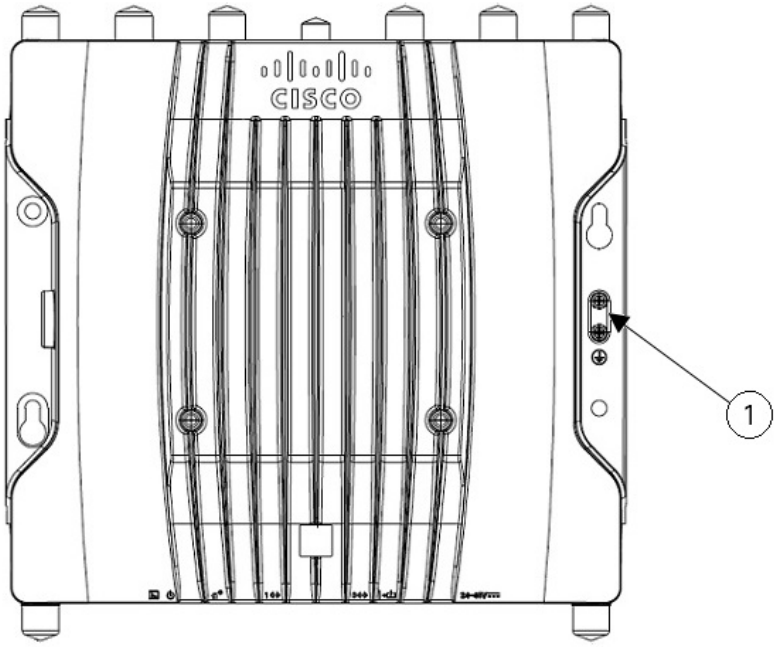
Procedure

Step 1 Use a crimping tool to crimp a 6-AWG (13.3 mm^2) ground wire (not included in the grounding kit) to the ground lug.



Step 2 Connect the supplied ground lug to the access point ground connection point using the supplied screws.

Apply supplied oxide inhibitor between the ground lug and the access point ground connection.



1	AP ground connection point

Step 3 Tighten the screws to 20-25 inch-lbs of torque.

Step 4 If necessary, strip the other end of the ground wire and connect it to a reliable earth ground such as a grounding rod or appropriate ground point on a grounded pole.

Length of the ground cable should not exceed 1 meter, and 0.5 meter is preferred.

Use supplied oxide inhibitor on the grounded interface.

Powering the Access Point

The AP supports these power sources:

- DC power – 24–48 VDC
- Power-over-Ethernet (PoE)

The AP can be powered via the PoE input from an inline power injector or a suitably powered switch port. Depending on the configuration and regulatory domain, the required power for full operation is 802.3bt or UPOE.

For more information, see Power Sources, on page 6.

Power Sources

The Cisco Catalyst IW9167 Series Access Points supports the following power sources:

- DC power input: 24 to 48 Vdc, 2.0 to 0.9 A

Note Use DC cable with only No. 18 AWG or larger.

- Power over Ethernet (PoE) input: 42.5 to 57 Vdc, 1.0 to 0.7 A

  802.3at (PoE+), 802.3bt (PoE++), Cisco Universal PoE (Cisco UPOE). For more information, see Powering the Access Point, on page 35.

Note Use CAT5e or better Ethernet cable with only No. 24 AWG or larger telecommunication line cord.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

Power Adapters

The Cisco Catalyst IW9167E Heavy Duty Access Point supports the following DC power adapters:

- PID: IW-PWRADPT-MFIT4P=: Operating: -40°C to +65°C, 60W.
- PID: IW-PWRADPT-MFIT4IN=: Operating: -40°C to +65°C, 60W.

Power Injectors

The Cisco Catalyst IW9167E Heavy Duty Access Point supports the following power injectors:

- IW-PWRINJ-60RGDMG=: Operating: -40°C to +70°C. Power derating of 60W at 70°C, and 65W at 65°C. Supports 100M/1G/2.5G/5G/10G rates.
- AIR-PWRINJ-60RGD1=: Operation: -40°C to +50°C, 60W. Supports 10M/100M/1G rates.
- AIR-PWRINJ-60RGD2=: Operation: -40°C to +50°C, 60W. Supports 10M/100M/1G rates.

Caution When the AP is installed outdoors or in a wet or damp location, the AC branch circuit powering the AP should be provided with ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC).

Ethernet (PoE) Ports

The AP supports an Ethernet uplink port (also for PoE-IN). The Ethernet cable uses an RJ-45 connector (with weatherproofing) is used to send and receive Ethernet data and optionally supply inline power from the power injector or a suitably powered switch port.

Tip The AP senses the Ethernet and power signals, and automatically switch internal circuitry to match the cable connections.

Power Feature Matrix

The following table provides the AP power feature matrix.

Table 11: Catalyst IW9167EH Access Point Power Feature Matrix

Power Input	2.4 GHz Radio	dBm Per Path	5 GHz Radio	dBm Per Path	6 GHz Radio	dBm Per Path	Aux Radio	GNSS	mGig Eth	SFP
24-48V	4x4	24	4x4	24	4x4	17	Yes	Yes	max 5G	Yes
802.3bt/ UPOE	4x4	24	4x4	24	4x4	17	Yes	Yes	max 5G	Yes
802.3at	2x2	23	2x2	23	2x2	17	Yes	Yes	max 1G	Yes/1G

Connecting a Power Injector

The AP supports the following power injectors:

Table 12: Supporting Power Injectors

Power Source	Description
AIR-PWRINJ-60RGD1=	60W rated outdoor power injector, with North America AC plug
AIR-PWRINJ-60RGD2=	60W rated outdoor power injector, global version without AC plug
IW-PWRINJ-60RGDMG=	60W rated outdoor power injector, 5GE

The power injector provides DC voltage to the AP over the Ethernet cable and supports a total end-to-end Ethernet cable length of 100 m (328 ft) from the switch to the AP.

When an optional power injector powers your AP, follow these steps to complete the installation:

Procedure

Step 1 Before applying PoE to the AP, ensure that the AP is grounded (see Grounding the Access Point, on page 33).

Step 2 Connect a CAT5e or better Ethernet cable from your wired LAN network to the power injector.

Note
The installer is responsible for ensuring that powering the AP from this type of power injector is allowed by local and/or national safety and telecommunications equipment standards.

Step 3 Ensure that the antennas are connected, and that ground is attached to the AP before you apply power to the AP.

Step 4 Connect a shielded outdoor-rated Ethernet (CAT5e or better) cable between the power injector and the AP's PoE-in connector.

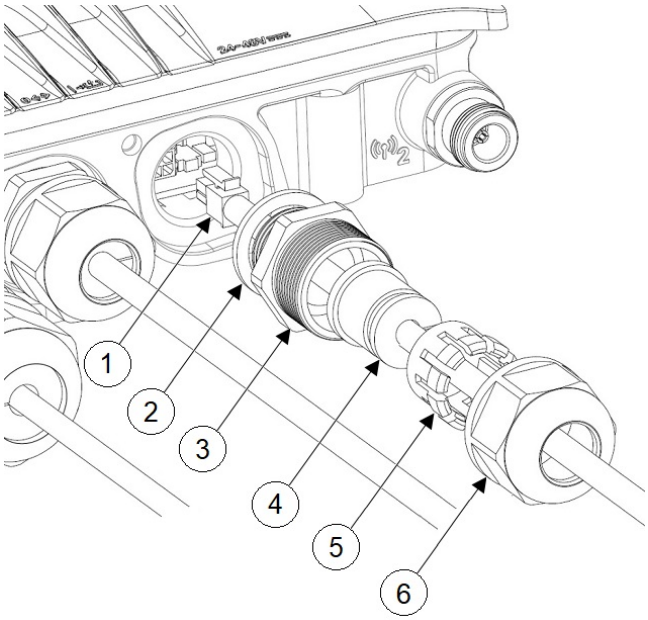
Step 5 Connect the Ethernet cable to the AP PoE-In port.

Connecting to the DC Power Port Using Cable Gland

Follow these steps to connect to the DC power port using Cable Gland:

Procedure

Step 1 Disassemble PG13 cable gland and slide parts over DC cable in the order shown in the following figure:



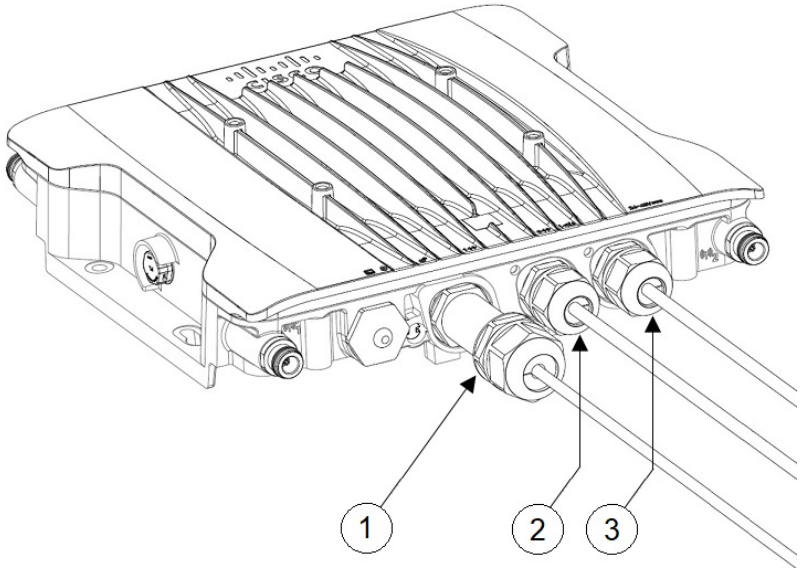
1	DC cable	4	Grommet
2	Gasket	5	Ferrule
3	PG13 body	6	Clamp nut

Step 2 Plug 4P connector cable into the DC connector in the chassis.

Step 3 Thread the PG13 body (with gasket) into the chassis.

Step 4 Insert the grommet into the ferrule, and press it into the PG13 body.

Step 5 Tighten the clamp nut onto the PG13 body until the grommet compresses onto the DC cable.



1	SFP port connected using cable gland
2	RJ-45 port connected using cable gland
3	DC power port connected using cable gland

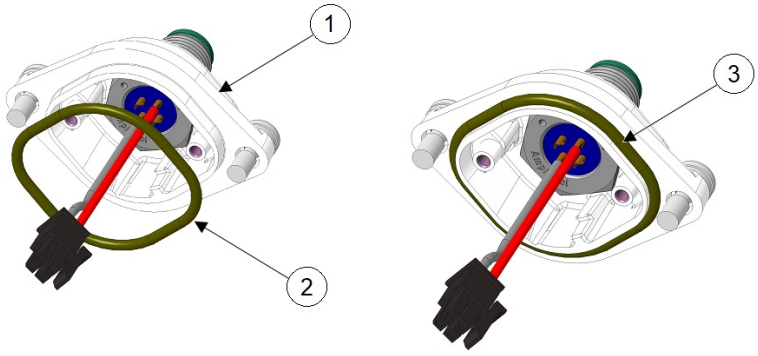
Connecting DC Power Port Using M12 Adapter

Follow these steps to connect to the DC power port using M12 adapter:

Before you begin

O-rings are shipped separately from the M12 adapter. You need to place the o-ring on the adapter before installing the M12 adapter to the chassis.

Figure 16: Installing O-ring on the M12 Adapter

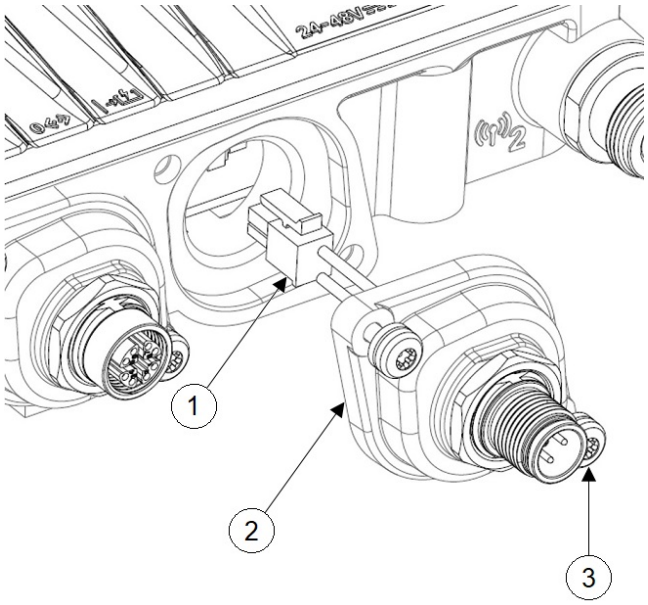


1	M12 adapter	2	O-ring
3	O-ring installed on M12 adapter		

Procedure

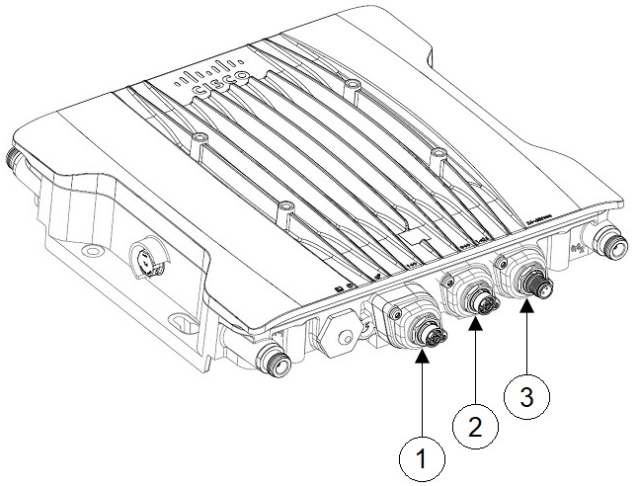
Step 1 Ensure the O-ring is on the M12-PWR adapter.

Step 2 Plug in DC connector into the chassis. Press M12-PWR adapter onto the chassis, and ensure that the wires are not pinched.



1	DC connector	3	Captive screws Tighten with 15-20 in-lbs torque.
2	M12-PWR adapter		

Step 3 Tighten the M12-PWR adapter captive screws into the chassis.



Tighten the M12 captive screws with 15-20 in-lbs torque.

1	SFP port connected using M12 adapter	3	DC power port connected using M12 adapter
2	RJ-45 port connected using M12 adapter		

Connecting Data Cables

This AP supports data connections through the Ethernet port and the Small Form-factor Pluggable (SFP) port.

If you are using the SFP port to deliver data through a fiber-optic cable, the AP must be powered by DC power, power adapter, PoE+ power source, or a power injector.

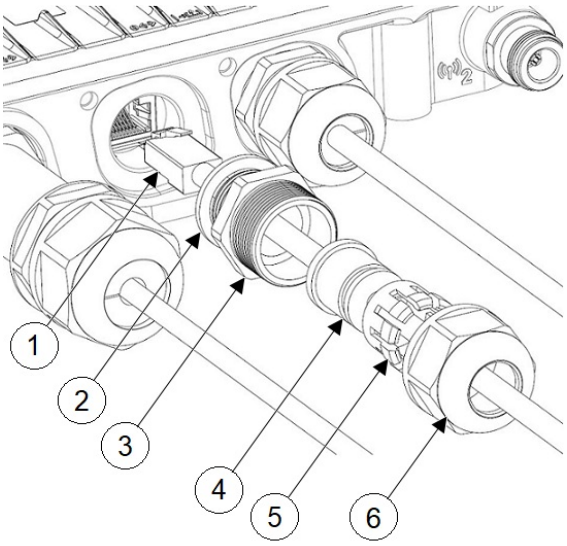
Connect using an Ethernet Cable

Connecting to the RJ-45 Port Using Cable Gland

Follow these steps to connect to the RJ-45 port using Cable Gland:

Procedure

Step 1 Disassemble PG13 cable gland and slide parts over RJ-45 cable in the order that is shown in the following figure:



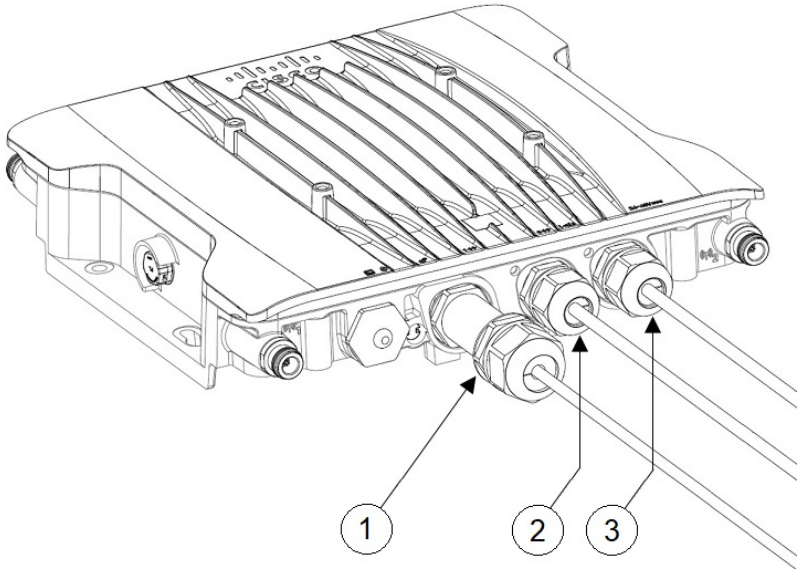
1	RJ-45 cable	4	Grommet
2	Gasket	5	Ferrule
3	PG13 body	6	Clamp nut

Step 2 Plug the RJ-45 cable into the RJ-45 connector in the chassis.

Step 3 Thread the PG13 body (with gasket) into the chassis.

Step 4 Insert the grommet into the ferrule, and press it into the PG13 body.

Step 5 Tighten the clamp nut onto the PG13 body until the grommet compresses onto the RJ-45 cable.



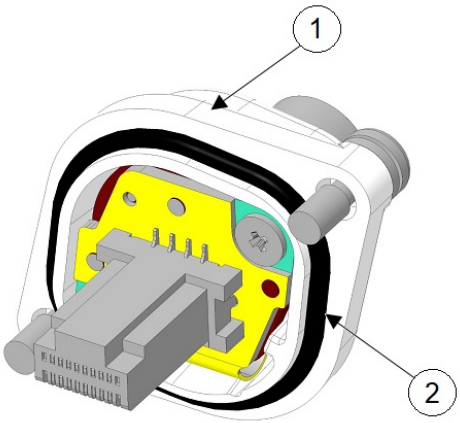
1	SFP port connected using cable gland
2	RJ-45 port connected using cable gland
3	DC power port connected using cable gland

Connecting to the RJ-45 Port Using M12 Adapter

Follow these steps to connect to the RJ-45 port using M12 adapter:

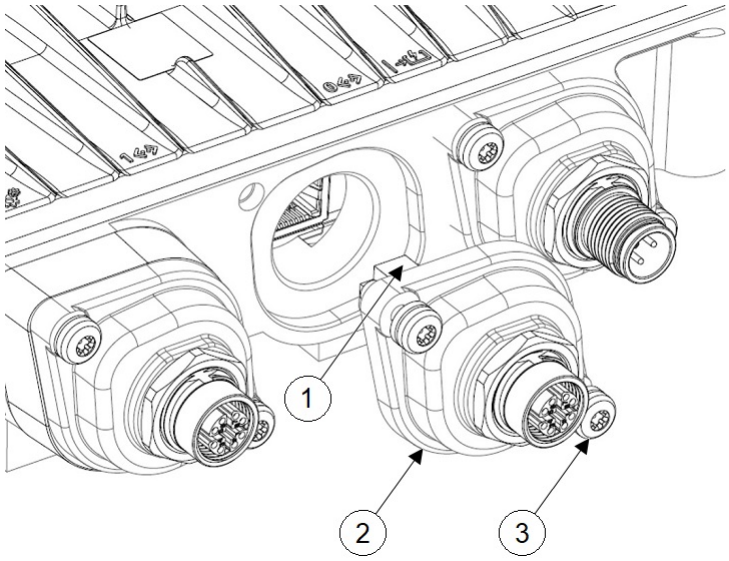
Procedure

Step 1 Ensure the O-ring is on the M12 adapter.



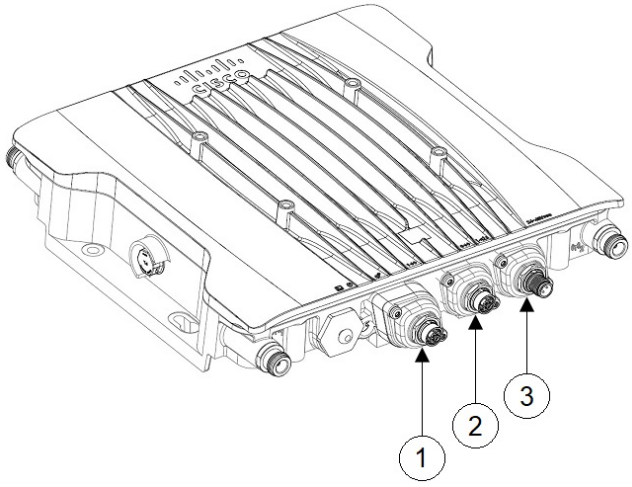
1	M12 adapter	2	O-ring

Step 2 Align the RJ-45 tab with the RJ-45 connector in the chassis, and plug the M12 adapter into the chassis.



1	RJ-45 tab	3	Captive screws Tighten with 15-20 in-lbs torque.
2	M12-RJ45 adapter		

Step 3 Tighten the M12 adapter captive screws into the chassis.



1	SFP port connected using M12 adapter	3	DC power port connected using M12 adapter
2	RJ-45 port connected using M12 adapter		

Connect using a Fiber-Optic Cable

Connecting to SFP Port Using Cable Gland

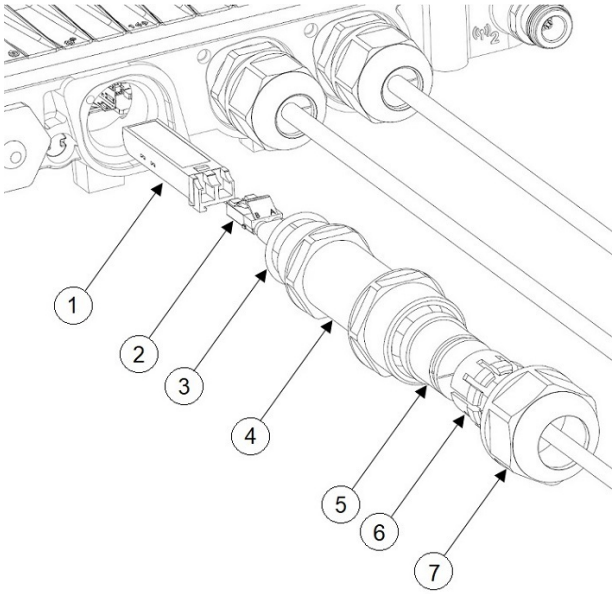
Follow these steps to connect to the SFP port using cable gland:

Note Copper SFP or Fiber SFP will be detected by the system only after a power cycle.

Procedure

Step 1 Insert the fiber SFP into the chassis.

Step 2 Disassemble the fiber adapter and slide parts over fiber cable in the order shown in the following figure:



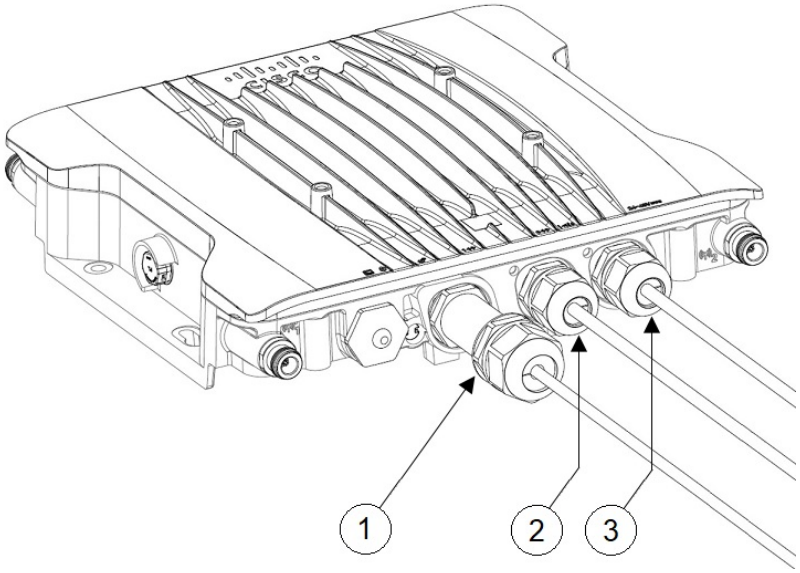
1	Fiber SFP	5	Grommet
2	Fiber cable	6	Ferrule
3	O-Ring	7	Clamp nut
4	Adapter body		

Step 3 Plug the fiber cable into the SFP.

Step 4 Thread the adapter body (with O-Ring) into the chassis.

Step 5 Insert the grommet into the ferrule, and press it into the adapter body.

Step 6 Tighten the clamp nut onto the adapter body until the grommet compresses onto the fiber cable.



1	SFP port connected using cable gland
2	RJ-45 port connected using cable gland
3	DC power port connected using cable gland

Using M12 Adapter on SFP Port

M12 adapter can be used only with a copper SFP and not supported with fiber SFP.

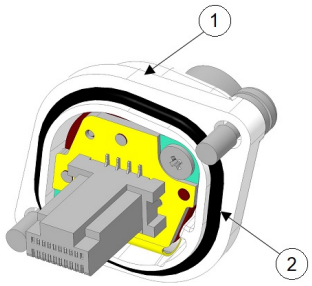
Note Copper SFP or Fiber SFP will be detected by the system only after a power cycle.

Follow these steps to connect M12 adapter to the SFP port:

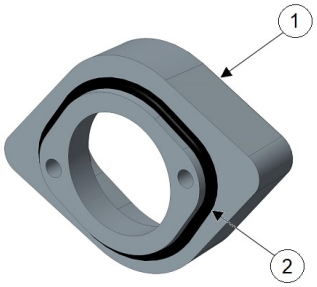
Procedure

Step 1 Insert the copper SFP in the chassis.

Step 2 Ensure the O-rings are on the M12 adapter and spacer.

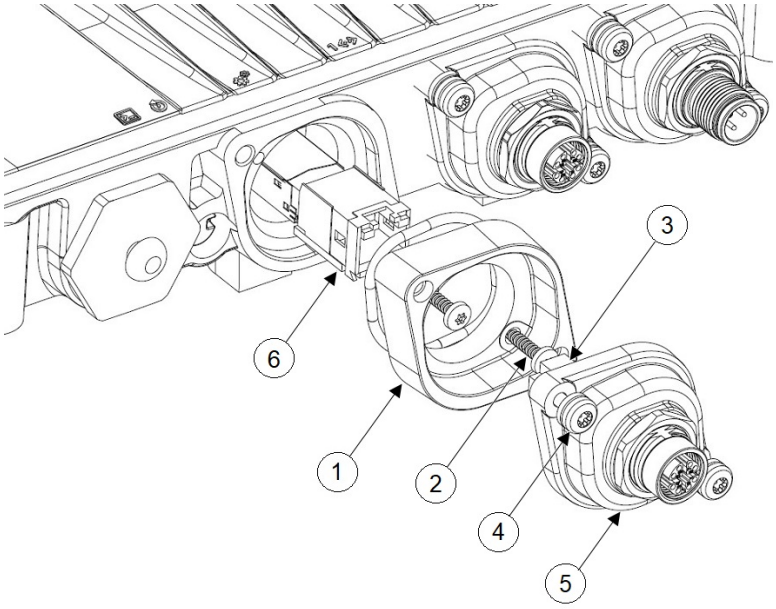


1	M12 adapter	2	O-ring



1	Spacer	2	O-ring

Step 3 Attach the spacer to the chassis with the screws provided (**2** in the following figure).

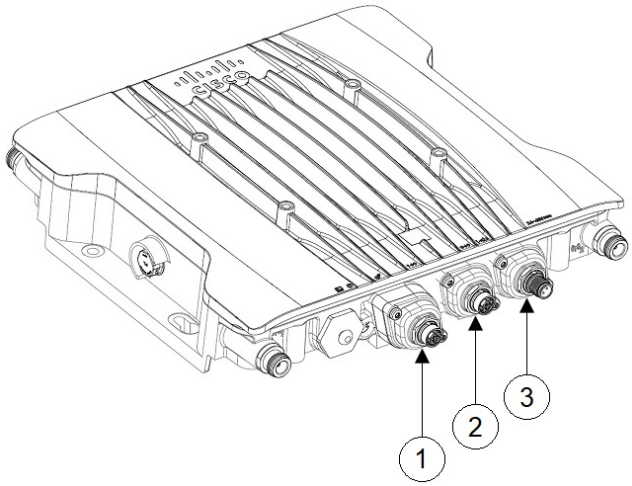


1	Spacer	4	Captive screws Tighten with 15-20 in-lbs torque.

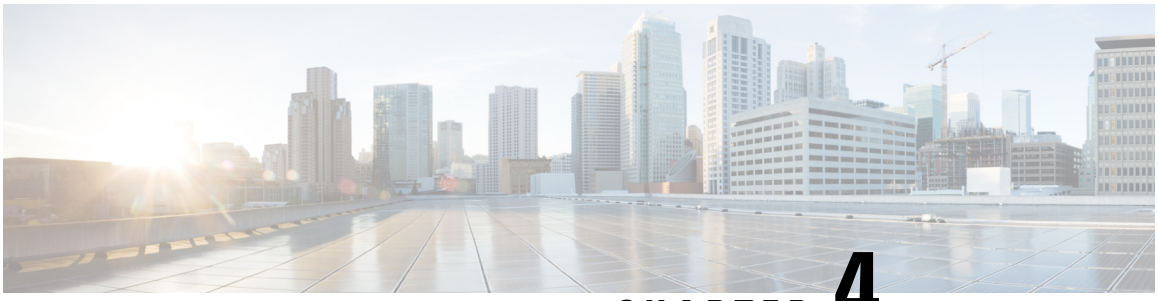
2	Spacer screws, M3 Tighten with 8-10 in-lbs torque minimum or until it sits flush.	5	M12-RJ45 adapter
3	RJ-45 tab	6	Copper SFP

Step 4 Align the RJ-45 tab with the RJ-45 connector in the chassis and plug the M12 adapter into the chassis

Step 5 Tighten the M12 adapter captive screws into the chassis (**4** in the above figure).



1	SFP port connected using M12 adapter	3	DC power port connected using M12 adapter
2	RJ-45 port connected using M12 adapter		



CHAPTER 4

Configuring and Deploying the Access Point

This section describes how to connect the AP to a controller. For instructions on how to configure the AP, see the relevant release's *Cisco Wireless Controller Configuration Guide.*

- Controller Discovery Process, on page 49
- Deploying the Access Point in a Wireless Network, on page 50
- Checking the Access Point LEDs, on page 50

Controller Discovery Process

The Cisco AP must join a controller to function as an AP and start serving clients. Cisco uses a process called controller discovery process to join a controller. The devices use Lightweight Access Point Protocol (LWAPP) to communicate with each other. The AP can be plugged associated to a controller regardless of the physical location or logical location in the network. A new AP, out of the box, can be plugged in anywhere regardless of the subnet. After it is plugged in, it locates the controller, receives the controller version of the software image and configuration. After this is sent to the AP, it can start serving clients.

Guidelines and Limitations

- You cannot edit or query any AP using the controller CLI if the AP's name contains a space.
- Make sure that the controller is set to the current time. If the controller is set to a time that has already occurred, the AP might not join the controller because its certificate might not be valid for that time.

The controller must discover AP before it can become an active part of the network. The AP supports the following controller discovery processes:

- Locally stored controller IP address discovery: If the AP was previously joined to a controller, the primary, secondary, and tertiary controllers' IP addresses are stored in the AP's non-volatile memory. This process of storing controller IP addresses on an AP for later deployment is called priming the AP. For more information about priming, see Performing a Preinstallation Configuration (Optional), on page 17.
- DHCP server discovery: This feature uses DHCP option 43 to provide controller IP address to the AP. Cisco switches support a DHCP server option that is typically used for this capability. For more information about DHCP option 43, see Configuring DHCP Option 43, on page 55.
- DNS discovery: The AP can discover controllers through your domain name server (DNS). For the AP to do so, you must configure your DNS to return controller IP addresses in response to CISCO-CAPWAP-CONTROLLER.localdomain, where localdomain is the AP domain name. Configuring

the CISCO-CAPWAP-CONTROLLER provides backward compatibility in an existing customer deployment. When an AP receives an IP address and DNS information from a DHCP server, it contacts the DNS to resolve CISCO-CAPWAP-CONTROLLER.localdomain. When the DNS sends a list of controller IP addresses, the AP sends discovery requests to the controllers.

Deploying the Access Point in a Wireless Network

After you have mounted the AP, follow these steps to deploy it in a wireless network:

Procedure

Step 1 Connect the power supply and power up the AP.

Step 2 Observe the AP's LED.

For LED descriptions, see Checking the Access Point LEDs, on page 50.

a) When you power up the AP, it begins a power-up sequence that you can verify by observing the AP's LED. If the power-up sequence is successful, the discovery and join process begins. During this process, the LED blinks sequentially green, red, and off. When the AP has joined a controller, and there are no clients associated, the LED is green or blue when clients are associated with it.
b) If the LED is not on, the AP is most likely not receiving power.
c) If the LED blinks sequentially for more than five minutes, the AP could not find its primary, secondary, and tertiary controller. Check the connection between the AP and the controller, and be sure the AP and the controller are either on the same subnet or that the AP has a route back to its primary, secondary, and tertiary controller. If the AP is not on the same subnet as the controller, be sure that there is a properly configured DHCP server on the same subnet as the AP. See Configuring DHCP Option 43, on page 55 for additional information.

Step 3 Reconfigure the controller so that it is not the primary controller.

Note
Use the primary controller to configure the AP only. Avoid using this controller in a working network.

Checking the Access Point LEDs

The location of the AP status LED is shown in Connectors and Ports, on page 2.

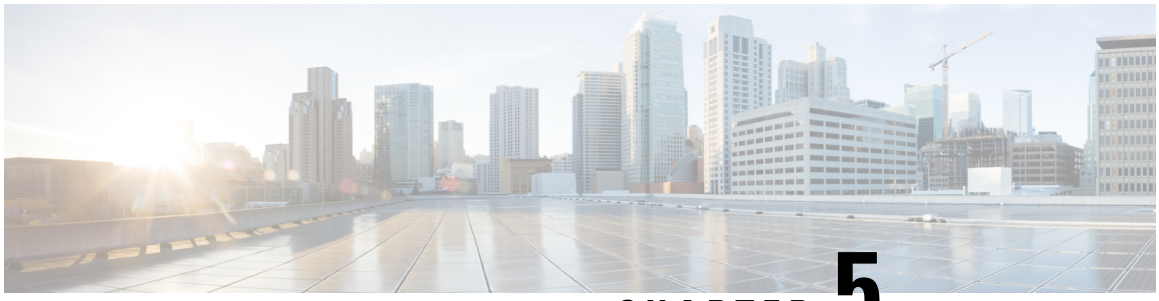
Note Regarding LED status colors, it is expected that there will be small variations in color intensity and hue from unit to unit. This is within the normal range of the LED manufacturer's specifications and is not a defect. However, the intensity of the LED can be changed through the controller.

The AP status LED indicates various conditions and are described in the following table.

Table 13: AP LED Signals

LED Message Type	Color	Meaning
Boot loader status sequence	Blinking Green	Boot loader status sequence: • DRAM memory test in progress • DRAM memory test OK • Board initialization in progress • Initializing FLASH file system • FLASH memory test OK • Initializing Ethernet • Ethernet OK • Starting AP OS • Initialization successful
Boot loader warnings	Blinking Red	Configuration recovery is in progress (the Reset button has been pushed for 2 to 3 seconds)
	Solid Red	There is an Ethernet failure or an image recovery (the Reset button has been pushed for 20-30 seconds)
	Blinking Green	Image recovery is in progress (the Reset button has been released)
CAPWAP OS		
Association status	Chirping (short blips) Green	This status indicates a normal operating condition. The unit is joined to a controller, but no wireless client is associated with it.
	Solid Green	Normal operating condition with at least one wireless client associated with the unit.
Operating Status	Blinking Amber	A software upgrade is in progress.
	Cycling through Green, Red, and Amber	Discovery or join process is in progress.
	Rapidly cycling through Red, Green, Amber, and Off	This status indicates that the AP location command has been invoked.
	Blinking Red	This status indicates that an Ethernet link is not operational.
	Cycling through Red, Green, and Amber	This is a general warning of insufficient inline power.
Cisco URWB OS		

LED Message Type	Color	Meaning
Link Quality/SNR Indicator	Blinking Green	SNR Excellent (>=25)
	Fade-in Green	SNR Good (15<=x<25)
	Fade-in Amber	SNR Poor (10<=x<15)
	Fade-in Red	SNR Unbearable (<10)
Operating Status	Cycling through Red, Green, and Amber	This is a general warning of insufficient inline power.
Limbo (Provisioning) mode: Fallback	Chirping (short blips) Amber	In the state of requesting IP address from DHCP server.
Limbo (Provisioning) mode: DHCP	Amber	This status indicates that the IP address is retrieved from DHCP server.



CHAPTER 5

Troubleshooting

- Using the Reset Button, on page 53
- Troubleshooting the Access Point to Controller Join Process, on page 54
- Important Information for Controller-based Deployments, on page 54
- Configuring DHCP Option 43, on page 55

Using the Reset Button

Using the **Reset** button,(see Connectors and Ports, on page 2), you can reset the AP to factory default or clear the AP's internal storage.

Note Using the **Reset** button does not change the booting OS (CAPWAP or URWB).

To reset the AP to the default factory-shipped configuration, perform the following steps:

Procedure

Step 1 Press, and continue to press the **Reset** button on the access point during the AP boot cycle.

Step 2 Press until the AP status LED changes to blinking red. It indicates that the Reset signal has been caught by u-boot.

Step 3
- Press the **Reset** button for less than 20 seconds to reset the AP to the default factory-shipped configuration. The AP configuration files are cleared.
- Press the **Reset** button for more than 20 seconds, but less than 60 seconds to clear the AP internal storage, including all the configuration files.

Note
- If the **Reset** button is pressed for more than 30 seconds, but less than 60 seconds, the FIPS mode flag is also cleared during the full factory reset of the AP. If the FIPS flag is set, the console access is disabled.
- The AP status LED changes to solid red, and all the files in the AP storage directory are cleared.

- If you keep the **Reset** button pressed for more than 60 seconds, the button is assumed as being faulty and no changes are made.

Troubleshooting the Access Point to Controller Join Process

AP can fail to join a controller for many reasons: a RADIUS authorization is pending; self-signed certificates are not enabled on the controller; the AP and the controller regulatory domains do not match, and so on.

Controller software enables you to configure the AP to send all CAPWAP-related errors to a syslog server. You do not have to enable any debug commands on the controller. View all the of the CAPWAP error messages from the syslog server itself.

The AP is not maintained on the controller until it receives a CAPWAP join request from the AP. Therefore, it can be challenging to determine why the CAPWAP discovery request from a particular AP was rejected. To troubleshoot such joining problems without enabling CAPWAP debug commands on the controller, the controller collects information for all APs that send a discovery message and maintains information for any AP that has successfully joined it.

The controller collects all join-related information for each AP that sends a CAPWAP discovery request to the controller. The collection begins with the first discovery message received from the AP and ends with the last configuration payload sent from the controller to the AP.

When the controller maintains join-related information for the maximum number of APs, it does not collect information for any more APs.

An AP sends all syslog messages to IP address 255.255.255.255 by default.

You can also configure a DHCP server to return a syslog server IP address to the AP using option 7 on the server. The AP then starts sending all syslog messages to this IP address.

You can configure the syslog server for APs and view the AP join information only from the controller CLI interface.

Important Information for Controller-based Deployments

Keep these guidelines in mind when you use the AP:

- The AP can only communicate with Cisco controllers.
- The AP does not support Wireless Domain Services (WDS) and cannot communicate with WDS devices. However, the controller provides functionality equivalent to WDS when the AP joins it.
- CAPWAP does not support Layer 2. The AP must get an IP address and discover the controller using Layer 3, DHCP, DNS, or IP subnet broadcast.
- The AP console port is enabled for monitoring and debugging purposes. All configuration commands are disabled when the AP is connected to a controller.

Configuring DHCP Option 43

You can use DHCP Option 43 to provide a list of controller IP addresses to the AP, enabling it to find and join a controller.

The following is a DHCP Option 43 configuration example on a Microsoft Windows 2003 Enterprise DHCP server for Cisco Catalyst lightweight APs. For other DHCP server implementations, consult the product documentation to configure DHCP Option 43. In Option 43, use the IP address of the controller management interface.

Note DHCP Option 43 is limited to one AP type per DHCP pool. You must configure a separate DHCP pool for each AP type.

The AP uses the type-length-value (TLV) format for DHCP Option 43. DHCP servers must be programmed to return the option based on the AP DHCP Vendor Class Identifier (VCI) string (DHCP Option 60). The VCI string for the AP:

The format of the TLV block is listed below:

- Type—0xf1 (decimal 241)
- Length—Number of controller IP addresses * 4
- Value—IP addresses of the controller management interfaces listed sequentially in hexadecimal format.

Procedure

Step 1 Enter configuration mode at the Cisco IOS CLI.

Step 2 Create the DHCP pool, including the necessary parameters such as default router and name server. A DHCP scope example is as follows:

Example:

```
ip dhcp pool <pool name>
network <IP Network> <Netmask>
default-router <Default router>
dns-server <DNS Server>
```

Where:

Example:

```
<pool name> is the name of the DHCP pool, such as IW9167EH
<IP Network> is the network IP address where the controller resides, such as 10.0.15.1
<Netmask> is the subnet mask, such as 255.255.255.0
<Default router> is the IP address of the default router, such as 10.0.0.1
<DNS Server> is the IP address of the DNS server, such as 10.0.10.2
```

Step 3 Add the option 43 line using the following syntax:

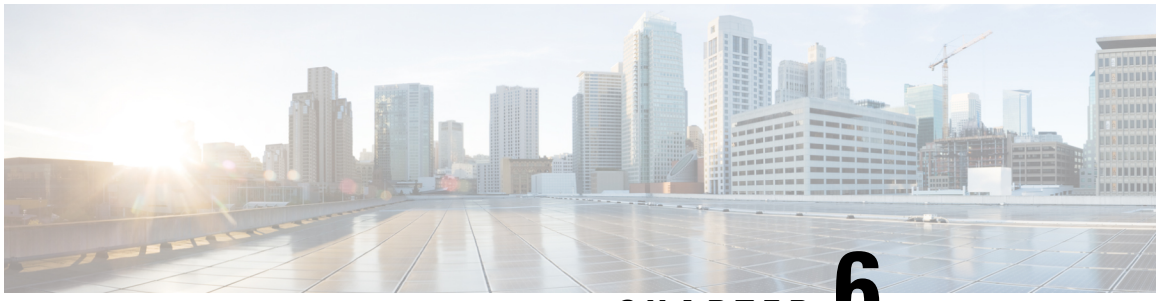
Example:

```
option 43 hex <hex string>
```

The hex string is assembled by concatenating the TLV values shown below:

Type + Length + Value

For example, suppose that there are two controllers with management interface IP addresses, 10.126.126.2 and 10.127.127.2. The type is f1(hex). The length is 2 * 4 = 8 = 08 (hex). The IP addresses translate to 0a7e7e02 and 0a7f7f02. Assembling the string then yields f1080a7e7e020a7f7f02. The resulting Cisco IOS command added to the DHCP scope is **option 43 hex f1080a7e7e020a7f7f02**.



CHAPTER 6

Safety Guidelines and Warnings

- Safety Instructions, on page 57
- FCC Safety Compliance Statement, on page 58
- Safety Precautions, on page 58
- Safety Precautions when Installing Antennas, on page 59
- Avoiding Damage to Radios in a Testing Environment, on page 60
- Performing Site Surveys, on page 61

Safety Instructions

The translated warnings are available in the Translated Safety Warnings for Cisco Catalyst Access Points, which is available on Cisco.com.

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



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

Warning **Statement 9001—**Product Disposal

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

Caution **Ensure to connect the power cord of the power adapter to a socket outlet with an earthing connection.**

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 438—**Taiwan RoHS

Restricted Substances Content Disclosure Table web address: http://www.cisco.com/go/taiwanrohs

Warning **Statement 1008—**Class 1 Laser Product

This product is a Class 1 laser product.

FCC Safety Compliance Statement

The FCC, with its action in ET Docket 96-8, has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC-certified equipment. When used with approved Cisco antennas, Cisco Catalyst products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio device according to the instructions in this publication results in user exposure substantially below the FCC recommended limits.

Safety Precautions

For safety and to achieve a good installation, please read and follow these safety precautions:

Note The recommended operating atmospheric pressure range for the Ex device shall be between 80 kPa (0,8 bar) and 110 kPa (1,1 bar).

- Select your installation site with safety as well as performance in mind. Remember: electric power lines and phone lines look alike. For safety, assume that any overhead line can kill.

- Call your electric power company. Tell them your plans, and ask them to come to look at your proposed installation
- Plan your installation carefully and thoroughly before you begin. Successful raising of a mast or tower is mostly a matter of coordination. Each person should be assigned to a specific task and know what to do and when to do it. One person should be in charge of the operation to issue instructions and watch for signs of trouble.
- When installing the AP or its antennas, remember:
  - Do not use a metal ladder.
  - Do not work on a wet or windy day.
  - Do dress properly—shoes with rubber soles and heels, rubber gloves, long-sleeved shirt or jacket.
- Use a rope to lift the AP. If the assembly starts to drop, get away from it and let it fall.
- If any part of the antenna system comes in contact with a power line, do not touch it or remove it yourself. Call your local power company. They will remove it safely.

If an accident should occur, call for qualified emergency help immediately.

Safety Precautions when Installing Antennas

- Before you install an antenna, contact your Cisco account representative to explain which mounting method to use for the size and type of antenna that you are about to install
- Select your installation site with safety, as well as performance, in mind. Remember that electric power lines and phone lines look alike. For your safety, assume that any overhead line can kill you.
- Contact your electric power company. Tell them your plans and ask them to come look at your proposed installation.
- Plan your installation carefully and completely before you begin. Each person involved in an installation should be assigned to a specific task and should know what to do and when to do it. One person should be in charge of the operation to issue instructions and watch for signs of trouble.
- When installing your antenna, follow these guidelines:
  - Do not use a metal ladder
  - Do not work on a wet or windy day
  - Do dress properly—wear shoes with rubber soles and heels, rubber gloves, and a long-sleeved shirt or jacket
- If the assembly starts to drop, move away from it and let it fall. Because the antenna, mast, cable, and metal guy wires are all excellent conductors of electrical current, even the slightest touch of any of these parts to a power line completes an electrical path through the antenna and the installer.
- If any part of the antenna system should come in contact with a power line, do not touch it or try to remove it yourself. Call your local power company to have it removed safely.
- If an accident should occur with the power lines, call for qualified emergency help immediately.

Avoiding Damage to Radios in a Testing Environment

The radios on outdoor units (bridges) have higher transmit power levels than radios on indoor units (APs). When you test high-power radios in a link, you must avoid exceeding the receiver's maximum receive input level. At levels above the normal operating range, packet error rate (PER) performance is degraded. At even higher levels, the receiver can be permanently damaged. To avoid receiver damage and PER degradation, you can use one of the following techniques:

- Separate the omnidirectional antennas by at least 2 ft (0.6 m) to avoid receiver damage or by at least 25 ft (7.6 m) to avoid PER degradation.

Note These distances assume free space path loss and are conservative estimates. Required separation distances for damage and performance degradation levels in actual deployments are less if conditions are not non-line-of-sight.

- Reduce the configured transmit power to the minimum level.
- Use directional antennas, and keep them away from each other.
- Cable the radios together using a combination of attenuators, combiners, or splitters to achieve a total attenuation of at least 60 dB.

For a radiated testbed, the following equation describes the relationships among transmit power, antenna gain, attenuation, and receiver sensitivity:

```
txpwr + tx gain + rx gain - [attenuation due to antenna spacing] < max rx input level
Where:
txpwr = Radio transmit power level
tx gain = transmitter antenna gain
rx gain = receiver antenna gain
```

For a conducted test bed, the following equation describes the relationships among transmit power, antenna gain, and receiver sensitivity:

```
txpwr - [attenuation due to coaxial components] < max rx input level
```

Caution Under no circumstances should you connect the antenna port from one AP to the antenna port of another AP without using an RF attenuator. If you connect antenna ports, you must not exceed the maximum survivable receive level of 0 dBm. Never exceed 0 dBm, or damage to the AP can occur. Using attenuators, combiners, and splitters having a total of at least 60 dB of attenuation ensures that the receiver is not damaged and that PER performance is not degraded.

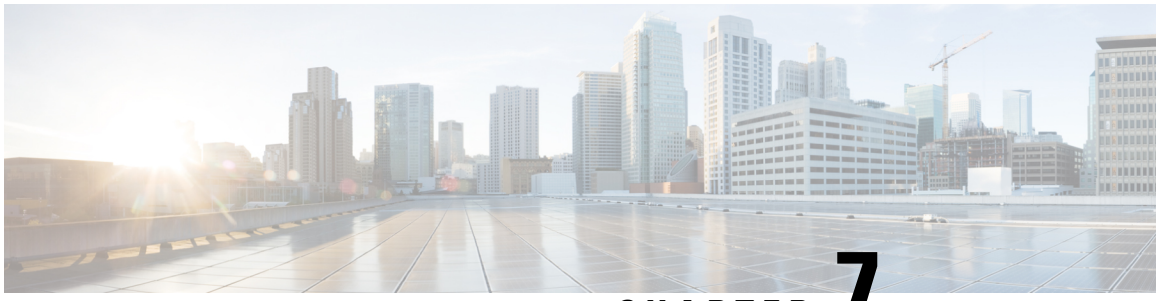
Performing Site Surveys

Every network application is a unique installation. Before installing multiple APs, you should perform a site survey to determine the optimum use of networking components and maximize range, coverage, and network performance.

Site surveys reveal problems that can be resolved before the network is operational. Because 802.11a/b/g/n/ac/ax operates in an unlicensed spectrum, there may be sources of interference from other 802.11a wireless devices (especially in multi-tenant buildings) that could degrade your 802.11 signals. A site survey can determine if such interference exists at the time of deployment.

Consider the following operating and environmental conditions when performing a site survey:

- Data rates: Sensitivity and range are inversely proportional to data bit rates. The maximum radio range is achieved at the lowest workable data rate. A decrease in receiver sensitivity occurs as the radio data increases.
- Antenna type and placement: Proper antenna configuration is a critical factor in maximizing radio range. As a general rule, range increases in proportion to antenna height. However, do not place the antenna higher than necessary because the extra height also increases potential interference from other unlicensed radio systems and decreases the wireless coverage from the ground.
- Physical environment: Clear or open areas provide better radio range than closed or filled areas.
- Obstructions: Physical obstructions such as buildings, trees, or hills can hinder the performance of wireless devices. Avoid locating the devices in a location where there is an obstruction between the sending and receiving antennas.
- How far is your wireless link?
- Has a previous site survey been conducted?
- Do you have a clear Fresnel zone between the APs or radio line of sight?
- What is the minimum acceptable data rate within the link?
- Do you have the correct antenna (if more than one antenna is being offered?)
- Do you have the proper permits, if required?
- Are you following the proper safety procedures and practices?
- Have you configured the APs before you go onsite? It is always easier to resolve configurations or device problems first.
- Do you have the proper tools and equipment to complete your survey?



CHAPTER 7

Declarations of Conformity and Regulatory Information

- Manufacturers Federal Communications Commission Declaration of Conformity Statement, on page 63
- Operation of Cisco Catalyst Access Points in México, on page 64
- VCCI Statement for Japan, on page 65
- Compliance Statement for Canada, on page 66
- China Compliance Statement, on page 67
- European Community, Switzerland, Norway, Iceland, and Liechtenstein, on page 67
- Operation of Cisco Catalyst Access Points in Brazil, on page 68
- Declaration of Conformity for RF Exposure, on page 69
- Declaration of Conformity Statements, on page 72

Manufacturers Federal Communications Commission Declaration of Conformity Statement

Access Point Models	Certification Number
IW9167EH–B	LDKIW9167EH

Manufacturer:

Cisco Systems, Inc.

170 West Tasman Drive

San Jose, CA 95134-1706

USA

This device complies with Part 15 rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference,
2. This device must accept any interference received, including interference that may cause undesired operation.

Note Cisco Catalyst IW9167EH-Z Access Points: Supports operation in indoor bands starting from 5150-5350MHz . Outdoor operation is strictly prohibited in 5150-5350MHz . Outdoor operation is allowed in the frequency bands starting from 5500-5825MHz

Federal Communications Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency when using the integrated antennas. Any changes or modification to the product not expressly approved by Cisco could void the user's authority to operate this device.

Caution The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft. Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

Operation of Cisco Catalyst Access Points in México

Declaración para México

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

VCCI Statement for Japan

Statement 2012—Voluntary Control Council for Interference (VCCI) Class A Warning for Japan

Warning **Statement 2012—**Voluntary Control Council for Interference (VCCI) Class A Warning for Japan

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, you may be required to take corrective actions.

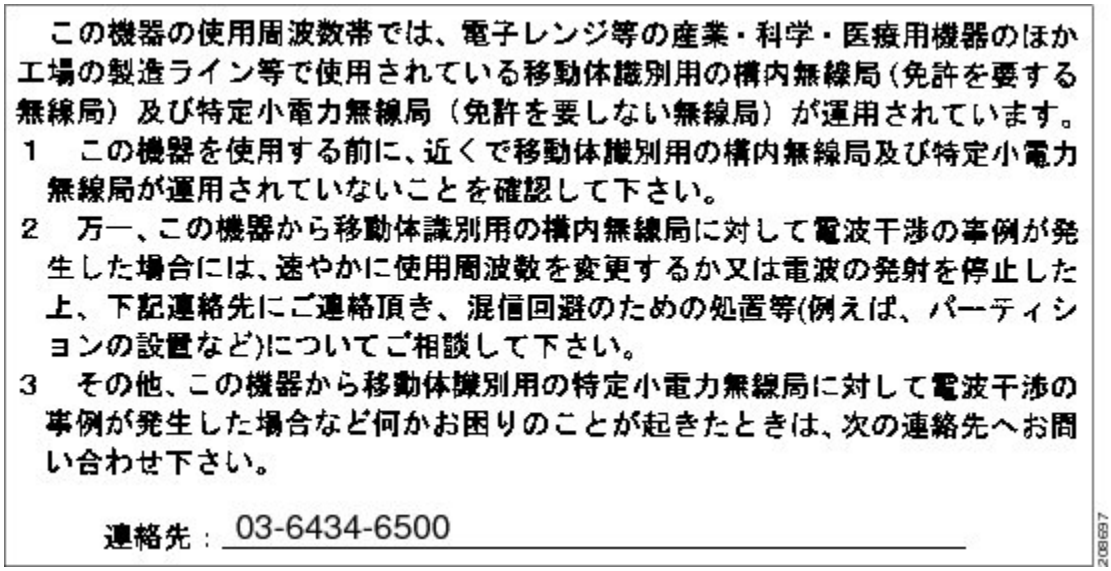
ステートメント 2012 - 日本向け VCCI クラス A に関する警告

警告 ステートメント 2012 - 日本向け VCCI クラス A に関する警告

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

Guidelines for Operating Cisco Catalyst Access Points in Japan

This section provides guidelines for avoiding interference when operating Cisco Catalyst access points in Japan. These guidelines are provided in both Japanese and English.



English Translation

This equipment operates in the same frequency bandwidth as industrial, scientific, and medical devices such as microwave ovens and mobile object identification (RF-ID) systems (licensed premises radio stations and unlicensed specified low-power radio stations) used in factory production lines.

1. Before using this equipment, make sure that no premises radio stations or specified low-power radio stations of RF-ID are used in the vicinity.
2. If this equipment causes RF interference to a premises radio station of RF-ID, promptly change the frequency or stop using the device; contact the number below and ask for recommendations on avoiding radio interference, such as setting partitions.
3. If this equipment causes RF interference to a specified low-power radio station of RF-ID, contact the number below.

Contact Number: **03-6434-6500**

Compliance Statement for Canada

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.La bande 5 150-5 250 MHz est réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Users are advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.Les utilisateurs êtes avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs

principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

Industry Canada

Access Point Models	Certification Number
IW9167EH-A	IC:2461A-IW9167EH

China Compliance Statement

Access point model

IW9167EH-ROW 无线接入器

Simplified Chinese Translation

安全和电磁辐射证书

本设备符合FCC规则第15部分、欧洲共同体委员会发布的指令2014/53/EU、其他一些安全、电磁发射和无线电证书。

CMIIT-核准编号标识在产品本体背面标签。

English Translation

Safety and Electromagnetic Radiation Certificate

This device complies with Part 15 of the FCC Rules, Directive 2014/53/EU of the Commission of the European Communities, and other safety, Electromagnetic Emissions and Radio certificates.

This device is certified by the China State Radio Regulatory Committee (SRRC) with a valid CMIIT ID. The CMIIT ID is marked on the label of the product.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Access Point Models:

IW9167EH-E

The product carries the CE Mark:



Note This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Cisco Corporate Compliance.

Attention This radio equipment operates in the frequency band 5860–5930 MHz, which is not harmonized across the European Union. The use of this equipment is subject to restrictions or licensing requirements in some EU member states.

Users are advised to check national regulations prior to use.

This equipment complies with EU radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm (7.87 inches) between the radiator & your body.

The frequency and the maximum transmitted power in EU are listed below:

2402–2480 MHz (LE): 9.8 dBm

2400–2483.5 MHz: 19.95 dBm

5180–5240 MHz: 22.98 dBm

5260–5320 MHz: 22.98 dBm

5500–5700 MHz: 29.97 dBm

5725–5850 MHz: 35.09 dBm

5860–5930 MHz: 32.0 dBm

	AT	BE	BG	HR	CY	CZ	DK
	EE	FI	FR	DE	EL	HU	IE
	IT	LV	LT	LU	MT	NL	PL
	PT	RO	SK	SI	ES	SE	UK(NI)

Norway(NO), Iceland(IS), Lichtenstein(LI), Turkey(TR), Switzerland(CH)

Operation of Cisco Catalyst Access Points in Brazil

This section contains special information for operation of Cisco Catalyst access points in Brazil.

Access Point Models	Certification Number
IW9167EH-ROW	22399-23-01086
IW9167IH-ROW	05646-24-01086

Figure 17: Brazil Regulatory Information



Anatel https://www.gov.br/anatel/pt-br

Resolução 680 de 27 de junho de 2017

Portuguese

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

English

This equipment is not entitled to the protection from harmful interference and may not cause interference with duly authorized systems.

CISPR22 Statement

Este produto não é apropriado para uso em ambientes domésticos, pois poderá causarinterferências eletromagnéticas que obrigam o usuário a tomar medidas necessárias para minimizarestas interferências.

This product is not suitable for use in a domestic environment as it may cause electromagneticinterference that requires the user to take necessary actions to minimize such interference.

Declaration of Conformity for RF Exposure

This section contains information on compliance with guidelines related to RF exposure.

Generic Discussion on RF Exposure

The Cisco products are designed to comply with the following national and international standards on Human Exposure to Radio Frequencies:

- US 47 Code of Federal Regulations Part 2 Subpart J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers / IEEE C 95.1 (99)
- International Commission on Non Ionizing Radiation Protection (ICNIRP) 98

- Ministry of Health (Canada) Safety Code 6. Limits on Human Exposure to Radio Frequency Fields in the range from 3kHz to 300 GHz
- Australia Radiation Protection Standard

To ensure compliance with various national and international Electromagnetic Field (EMF) standards, the system should only be operated with Cisco approved antennas and accessories.

This Device Meets International Guidelines for Exposure to Radio Waves

The Catalyst IW9167EH device includes a radio transmitter and receiver. It is designed not to exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) recommended by international guidelines. The guidelines were developed by an independent scientific organization (ICNIRP) and include a substantial safety margin designed to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

RF Exposure Distance
20 cm

The World Health Organization has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure then you can easily do so by reorienting antennas away from the user or placing he antennas at a greater separation distance then recommended.

This Device Meets FCC Guidelines for Exposure to Radio Waves

The Catalyst IW9167EH device includes a radio transmitter and receiver. It is designed not to exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) as referenced in FCC Part 1.1310. The guidelines are based on IEEE ANSI C 95.1 (92) and include a substantial safety margin designed to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

The device has been tested and found compliant with the applicable regulations as part of the radio certification process.

RF Exposure Distance
107 cm

The US Food and Drug Administration has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. The FCC recommends that if you are interested in further reducing your exposure then you can easily do so by reorienting antennas away from the user or placing the antennas at a greater separation distance then recommended or lowering the transmitter power output.

This Device Meets the Industry Canada Guidelines for Exposure to Radio Waves

The device includes a radio transmitter and receiver. It is designed not to exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) as referenced in Health Canada Safety Code 6. The guidelines include a substantial safety margin designed into the limit to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

RF Exposure Distance
60 cm

Health Canada states that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure you can easily do so by reorienting antennas away from the user, placing the antennas at a greater separation distance than recommended, or lowering the transmitter power output.

Cet appareil est conforme aux directives internationales en matière d'exposition aux fréquences radioélectriques

Cet appareil de la gamme comprend un émetteur-récepteur radio. Il a été conçu de manière à respecter les limites en matière d'exposition aux fréquences radioélectriques (champs électromagnétiques de fréquence radio), recommandées dans le code de sécurité 6 de Santé Canada. Ces directives intègrent une marge de sécurité importante destinée à assurer la sécurité de tous, indépendamment de l'âge et de la santé.

Par conséquent, les systèmes sont conçus pour être exploités en évitant que l'utilisateur n'entre en contact avec les antennes. Il est recommandé de poser le système là où les antennes sont à une distance minimale telle que précisée par l'utilisateur conformément aux directives réglementaires qui sont conçues pour réduire l'exposition générale de l'utilisateur ou de l'opérateur.

Distance d'exposition RF
60 cm

Santé Canada affirme que la littérature scientifique actuelle n'indique pas qu'il faille prendre des précautions particulières lors de l'utilisation d'un appareil sans fil. Si vous voulez réduire votre exposition encore davantage, selon l'agence, vous pouvez facilement le faire en réorientant les antennes afin qu'elles soient dirigées à l'écart de l'utilisateur, en les plaçant à une distance d'éloignement supérieure à celle recommandée ou en réduisant la puissance de sortie de l'émetteur.

Additional Information on RF Exposure

You can find additional information on the subject at the following links:

- Cisco Systems Spread Spectrum Radios and RF Safety white paper at this URL: http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/prodlit/rfhr_wi.htm

- FCC Bulletin 56: Questions and Answers about Biological Effects and Potential Hazards of Radio Frequency Electromagnetic Fields
- FCC Bulletin 65: Evaluating Compliance with the FCC guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

You can obtain additional information from the following organizations:

- World Health Organization Internal Commission on Non-Ionizing Radiation Protection at this URL: www.who.int/emf
- United Kingdom, National Radiological Protection Board at this URL: www.nrpb.org.uk
- Cellular Telecommunications Association at this URL: www.wow-com.com
- The Mobile Manufacturers Forum at this URL: www.mmfai.org

Declaration of Conformity Statements

All the Declaration of Conformity statements related to this product can be found at the following location: https://pas.cisco.com/pdtcnc/#/