



Cisco Aironet 1570 Series Outdoor Access Point Hardware Installation Guide

Last Updated: May 15, 2016

Cisco Systems, Inc.
www.cisco.com

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

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.

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: www.cisco.com/go/trademarks. 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. (1110R)

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.

© 2014 - 2015 Cisco Systems, Inc. All rights reserved.



Preface ix

Objectives ix

Audience ix

Organization x

Conventions x

Related Documentation xvi

Obtaining Documentation and Submitting a Service Request iii-xvii

CHAPTER 1

Product Overview 1-1

Access Point Models 1-1

Product IDs and Supported Regulatory Domains 1-2

Parts of each Access Point Model 1-4

Face of the AP 1-4

Back of the AP 1-6

Head of the AP 1-7

Base of the AP 1-10

Left Side of the AP 1-13

Right Side of the AP 1-14

CHAPTER 2

Preparing for Installation 2-1

Safety Warnings 2-2

FCC Safety Compliance Statement 2-4

Safety Precautions 2-4

Access Point Installation Guidelines 2-4

Site Surveys 2-5

Before Beginning the Installation 2-6

Safety Precautions when Installing Antennas 2-6

Safety Instructions for Antennas and Radios 2-7

Avoiding Damage to Radios in a Testing Environment 2-7

Safety Instructions for Powering the Access Point 2-8

Translated Safety Warnings 2-9

CHAPTER 3

Mounting the Access Point 3-1

- Unpacking the Access Point 3-2
 - AP1572IC Package Contents 3-2
 - AP1572EC Package Contents 3-2
 - AP1572EAC Package Contents 3-2
- Optional AP Hardware 3-3
- Tools and Hardware Common For All Mounting Options 3-3
- Typical Access Point Installation Components 3-4
- Choosing the Mounting Kit 3-5
- Strand Mount Kit 1 3-7
 - Strand Mounting Using SMK1 3-7
- Strand Mount Kit 2 3-9
 - Strand Mounting Using SMK2 3-10
- Strand Mount Kit 3 3-14
 - Strand Mounting Using SMK3 3-15
- Pole Mount Kit 1 3-19
 - Pole Mounting Using PMK1 3-20
- Pole Mount Kit 2 3-23
 - Pole Mounting Using PMK2 3-29
 - Vertically Mounting Without Pivot Bracket For 4 to 8 inches Vertical Pole 3-37
 - Wall Mounting Using PMK2 3-40
- Pole Mount Kit 3 3-41
 - Pole Mounting Using PMK3 3-43
 - Wall Mounting Using PMK3 3-50

CHAPTER 4

Installing Other Components 4-1

- Supported Antennas 4-2
 - AP1572I Internal Antennas 4-2
 - AP1572E External Antennas 4-2
 - Non-Cisco Antennas 4-3
 - Antenna Configurations 4-3
- Installing External Antennas 4-4
 - Antenna N-Type Connector Locations 4-5
 - External Antenna Mounting Configurations 4-6
 - Omni Antennas 4-6
 - AIR-ANT2513P4M-N= 4-6
 - AIR-ANT2588P3M-N= 4-7
 - AIR-ANT2413P2M-N= and AIR-ANT5114P2M-N= 4-7

Weatherproofing the Type N Connector Joint	4-8
Detailed Documentation for all Supported External Antennas	4-9
Installing a Lightning Arrestor	4-10
Installation Considerations	4-10
Installation Notes	4-10
Installing the Lightning Arrestor Outdoors	4-10
Cable for the Lightning Arrestor	4-11
Grounding the Access Point	4-12
Connecting a Fiber-optic Cable to the AP	4-13
Powering the Access Point	4-16
Power-over-Cable	4-16
AC Power Supply	4-17
DC Interface	4-17
PoE-Input	4-17
Restrictions on Features under Different Operating Conditions	4-18
Connecting a Power Injector	4-20
Connecting an Ethernet Cable to the Access Point	4-20
Connecting a DC Power Cable to the Access Point	4-22
Connecting Streetlight AC Power	4-25
Connecting an AC Power Cable to the Access Point	4-27
Installing AC Power Plug on AIR-CORD-R3P-40UE=	4-28
Procedure for Connecting AC power Cable to Access Point	4-28
Connecting PoC Power to the Access Point	4-29
Installing the GPS Antenna	4-30
Installing Attenuators, Fuses, and Shunts	4-34
Installing an Attenuator Plug	4-34
Using a Signal Test Probe	4-34
Installing a Fuse or Shunt	4-34
Handling the AP when installing Attenuators, Fuses, and Shunts	4-34
What to do after hardware installation	4-35

CHAPTER 5

Troubleshooting 5-1

Finding the Product Serial Number	2
Guidelines for Using the Access Points	5-3
Important Notes	5-3
Convergence Delays	5-3
Bridge Loop	5-4
Controller DHCP Server	5-4

MAP Data Traffic	5-4
Controller MAC Filter List	5-4
Using DHCP Option 43	5-4
Monitoring the Access Point LEDs	5-5
Verifying Controller Association	5-6
Changing the Bridge Group Name	5-7
Access Point Power Injector	5-7
Monitoring the Power Injector LEDs	5-9
Using the Reset Button	5-9
Resetting the Access Point	5-9

APPENDIX A

Access Point Tech Specs References A-1

Access Point Data Sheet	A-1
Radio Channels and Power Levels	A-1
Power Distribution Budget	A-2
Access Point Operating Temperature Specifications	A-3

APPENDIX B

Declarations of Conformity and Regulatory Information B-1

Manufacturers Federal Communication Commission Declaration of Conformity Statement	B-2
Industry Canada	B-3
Canadian Compliance Statement	B-4
European Community, Switzerland, Norway, Iceland, and Liechtenstein	B-6
Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC & Medical Directive 93/42/EEC	B-6
Declaration of Conformity for RF Exposure	B-9
United States	B-9
Canada	B-9
European Union	B-9
Australia	B-10
Guidelines for Operating Cisco Aironet Access Points in Japan	B-11
Japanese Translation	B-11
English Translation	B-11
VCCI Statement for Japan	B-12
Administrative Rules for Cisco Aironet Access Points in Taiwan	B-12
Chinese Translation	B-12
English Translation	B-13
Chinese Translation	B-13

English Translation	B-13
Statement 371—Power Cable and AC Adapter	B-14
English Translation	B-14
EU Declaration of Conformity	B-14
Operation of Cisco Aironet Access Points in Brazil	B-14
Access Point Models	B-14
Regulatory Information	B-15
Portuguese Translation	B-15
English Translation	B-15

APPENDIX C**Access Point Pinouts C-1**

APPENDIX D**Configuring DHCP Option 43 D-1**

Overview	D-2
Configuring Option 43 for 1570 Series Access Points	D-2



Preface

This section describes the objectives, audience, organization, and conventions of the *Cisco Aironet 1570 Series Outdoor Access Point Hardware Installation Guide*.

Objectives

This publication explains the steps for installing the Cisco Aironet 1570 Series Outdoor Access Point (called the *access point*, or abbreviated as *AP* in this document). The access point is available in an internal antenna model with cable modem (AP1572IC), an external antenna AC model (AP1572EAC) and an external antenna model with cable modem (AP1572EC).

The 1570 series is a dual-radio platform that supports dual-band (2.4 GHz and 5 GHz) operation.

Audience

This publication is for the person installing and configuring an access point for the first time. The installer should be familiar with network structures, terms, and concepts.


Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030


Warning

This equipment must be installed in restricted access locations in Norway, Finland, and Sweden. Only trained and qualified personnel are allowed to install, replace, or service this equipment as instructed in this installation guide.

Organization

This guide contains the following sections:

Chapter	Title	Description
Chapter 1	Product Overview	Describes the major components and features of the access point.
Chapter 2	Preparing for Installation	Provides the safety warnings, guidelines and related information which you must follow before starting with the installation of the access point
Chapter 3	Mounting the Access Point	Describes what's in the product package. Provides access point mounting information.
Chapter 4		
Chapter 5	Troubleshooting	Provides basic troubleshooting procedures for the access point.
Appendix A	Access Point Tech Specs References	Indicates how to access the documents that list the technical specifications for the access point, and the access point radio channels and maximum power levels supported by the world regulatory domains.
Appendix B	Declarations of Conformity and Regulatory Information	Describes the regulatory conventions to which the access point conforms and provides guidelines for operating access points in Japan.
Appendix C	Access Point Pinouts	Describes the connector pinouts for the access point.
Appendix D	Configuring DHCP Option 43	Describes the procedure to configure DHCP Option 43.

Conventions

Notes use the following conventions:



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Cautions use the following conventions:



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warnings use the following conventions:



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelyyn liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettujen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezne, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告 重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskade. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornienie DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Related Documentation

To access this guide and other related documentation online from Cisco.com:

-
- Step 1** Go to the Product/Technology Support page on Cisco.com, at the following URL:
<http://www.cisco.com/cisco/web/psa/default.html?mode=prod&level0=278875243>
- Step 2** Using the listing columns under **Browse Products and Technologies**, browse to **Products > Wireless > Outdoor Wireless > Cisco Aironet 1570 Series**.
- Step 3** Click on **Cisco Aironet 1570 Series** or on the models listed. This opens the corresponding product/model support page which has links to all related guides and software downloads.
-

For information on deploying this access point in a network, see the Cisco Aironet 1570 Series Access Point Deployment Guide, at:

http://www.cisco.com/c/en/us/td/docs/wireless/technology/apdeploy/8-0/AP_1570_DG/b_Aironet_AP_1570_DG.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.



Product Overview

The Cisco Aironet 1570 Series Outdoor Access Point (hereafter called the *access point* or *AP*) is a wireless outdoor access point which is designed for use in a variety of network configurations. The access point can be configured, monitored, and operated through a Cisco wireless LAN controller (hereafter called a *controller*). The controllers use a browser-based management system, a command-line interface (CLI), or the Cisco Prime Infrastructure (PI) network management system to manage the controller and the associated access points. The access point supports hardware-based advanced encryption standard (AES) encryption between wireless nodes to provide end-to-end security. The access point can also be deployed in an autonomous mode and be configured via the CLI.

Access Point Models

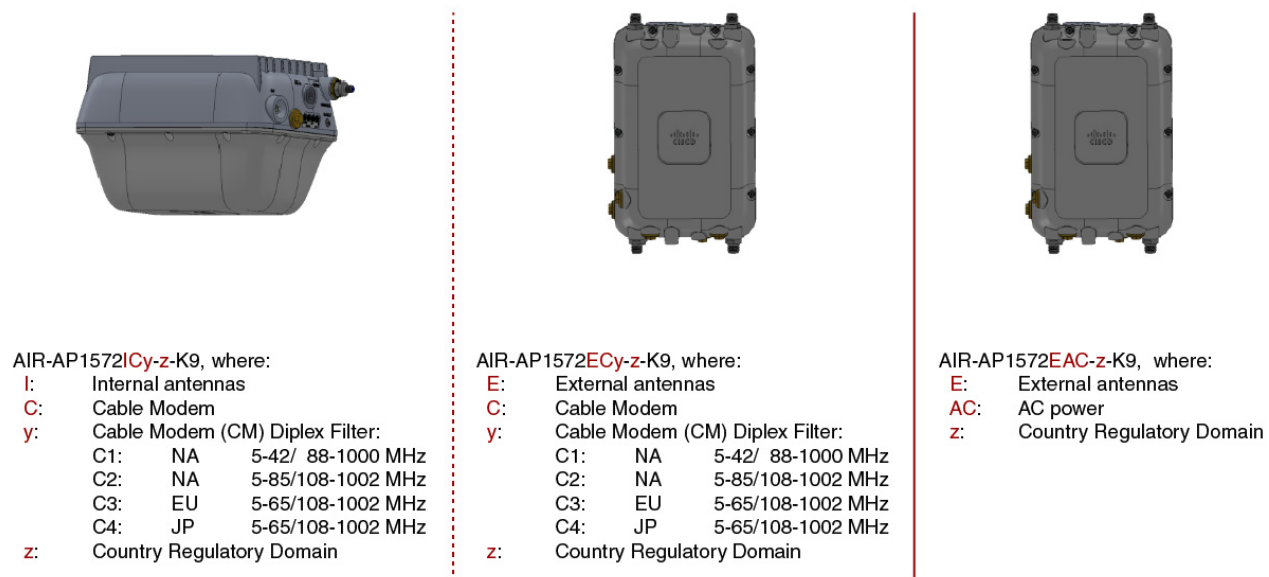
The Cisco Aironet 1570 Series Outdoor Access Point is available in three models: AP1572IC, AP1572EC, and AP1572EAC. The features of these models are described in the following table:

Model	AP1572IC	AP1572EC	AP1572EAC
Antennas	Internal antennas	External antennas	
Input power options	<ul style="list-style-type: none">• Power-over-Cable, via Cable Modem• DC	<ul style="list-style-type: none">• Power-over-Cable, via Cable Modem• DC• PoE-In (Standard UPoE or AIR-PWRINJ1500-2 power injector)	<ul style="list-style-type: none">• AC Power• DC• PoE-In (Standard UPoE or AIR-PWRINJ1500-2 power injector)
Output power options	—	PoE-Out (supporting up to 802.3at devices). Not available when PoE-In voltage is present.	
Radio	4Tx-4Rx: 3 Spatial Streams (Simultaneous dual-band radio consisting of an 802.11ac Wave 1 4x4:3 5 GHz radio and 4x4:3 802.11n 2.4 GHz radio.)		
Equivalent Isotropically Radiated Power (EIRP)	The maximum allowed by regional regulatory laws, is provided.		
	Capable of 34/36 dBm	Capable of 36/38 dBm	
Backhaul	Cable Modem, Ethernet, Fiber, and Mesh		Ethernet, Fiber, and Mesh
Installation Options	Cable Strand, Pole, and Wall mounting options are possible for all models.		

Model	AP1572IC	AP1572EC	AP1572EAC
Global Positioning System (GPS) location module	Available on all models. Works only with the optionally available GPS antenna.		
External Module option	To support possible future modules, the AP has a dedicated port that allows connection of an external module to the AP's internal UART interface.		

Product IDs and Supported Regulatory Domains

Figure 1-1 Product ID Nomenclature of Access Point Models



353242

The 1570 series access points have product IDs in the format **AIR-AP1572xyy-z-K9**, where:

- **x** indicates the type of antennas. The options are:
 - **I**—indicating internal antennas.
 - **E**—indicating external antennas.
- **yy** indicates the cable modem type. The models with cable modems can be powered by Power-over-cable or DC power. The options are:
 - **C1**—Indicates Power-over-cable with North American domain (N4) cable modem supporting 5-42/ 54-1000 MHz Diplex Filter, and 8x4 or 16x4 channel bonding options.
 - **C2**—Indicates Power-over-cable with North American domain (N8) cable modem supporting 5-85/108-1002 MHz Diplex Filter, and 8x4 or 16x8 or 24x8 channel bonding options.
 - **C3**—Indicates Power-over-cable with European domain (E8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options.
 - **C4**—Indicates Power-over-cable with Japanese domain (J8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options.
 - **AC**— indicates AC power supply, applicable only to external antenna models.

- z indicates the regulatory domain. The supported regulatory domains are:
 - A, B, C, D, E, F, H, K, M, N, Q, R, S, T, Z

Click this URL to browse to a list of countries and regulatory domains supported by the 1570:

www.cisco.com/go/aironet/compliance

Product IDs of Access Point Models in the Cisco Aironet 1570 Series

The following table shows the nine product IDs based on radios, antenna types and powering options:

Product ID	Description of Radios, Antenna Types, Power options
With External Antennas and powered by AC power	
AIR-AP1572EAC-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with external antennas • AC, DC, or PoE input power
With External Antennas and powered by Power-over-Cable	
AIR-AP1572EC1-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with external antennas • Power-over-cable with North American domain (N4) cable modem supporting 5-42/54-1000 MHz Diplex Filter, and 8x4 or 16x4 channel bonding options
AIR-AP1572EC2-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with external antennas • Power-over-cable with North American domain (N8) cable modem supporting 5-85/108-1002 MHz Diplex Filter, and 8x4 or 16x8 or 24x8 channel bonding options
AIR-AP1572EC3-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with external antennas • Power-over-cable with European domain (E8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options
AIR-AP1572EC4-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with external antennas • Power-over-cable with Japanese domain (J8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options
With Internal Antennas and powered by Power-over-Cable	
AIR-AP1572IC1-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with internal antennas • Power-over-cable with North American domain (N4) cable modem supporting 5-42/54-1000 MHz Diplex Filter, and 8x4 or 16x4 channel bonding options
AIR-AP1572IC2-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with internal antennas • Power-over-cable with North American domain (N8) cable modem supporting 5-85/108-1002 MHz Diplex Filter, and 8x4 or 16x8 or 24x8 channel bonding options
AIR-AP1572IC3-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with internal antennas • Power-over-cable with European domain (E8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options
AIR-AP1572IC4-z-K9	<ul style="list-style-type: none"> • Two radios (4x4:3 5 GHz and 4x4:3 2.4 GHz) with internal antennas • Power-over-cable with Japanese domain (J8) cable modem supporting 5-65/108-1002 MHz Diplex Filter, and 8x4 or 16x4 or 24x8 channel bonding options

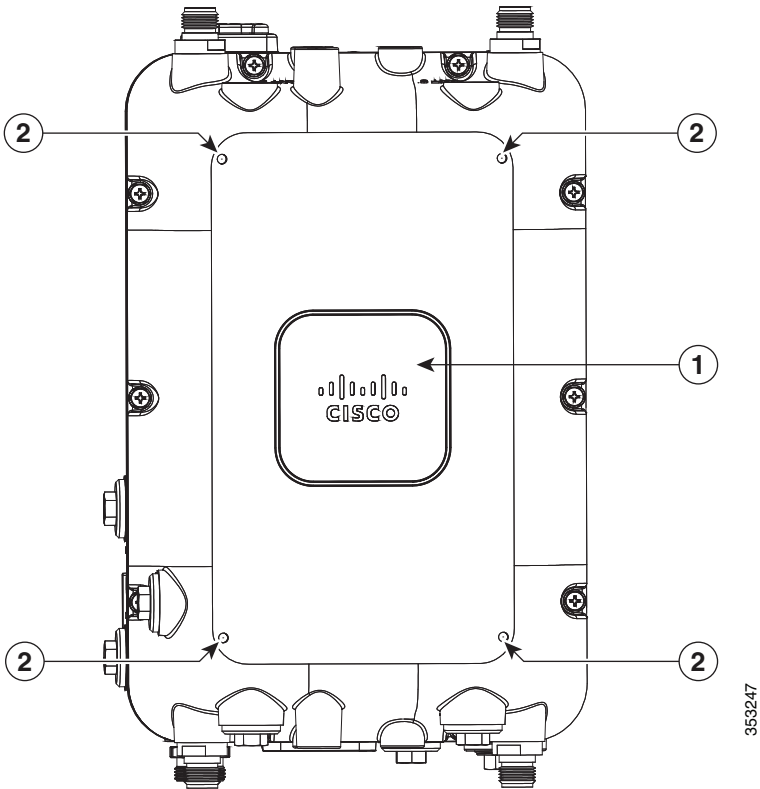
Parts of each Access Point Model

The parts, ports, and connectors of each side of each AP model is illustrated in the following sections.

Face of the AP

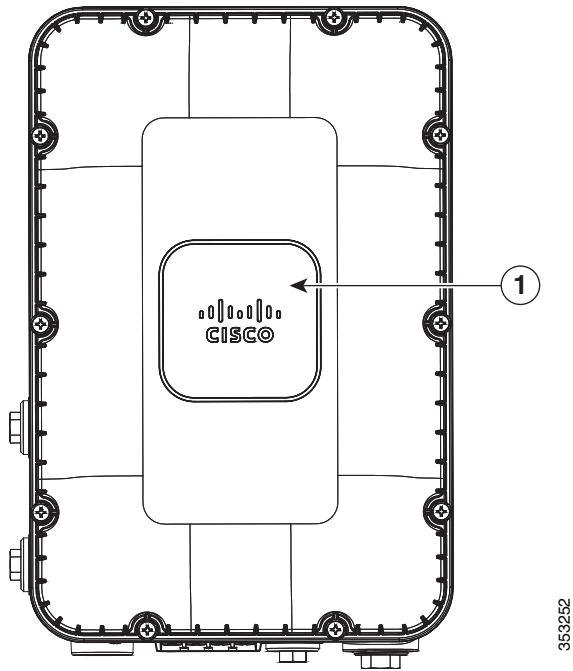
The Face of the access point has the recognizable Cisco logo on it. It is devoid of any ports and connectors. For AP1572EC and AP1572EAC models, the face of the AP has screw holes on it (see [Figure 1-2](#) and [Figure 1-3](#)), which support mounting an external module in future applications.

Figure 1-2 Face of the AP, on AP1572EC and AP1572EAC models



1	Cisco logo	2	Screw holes for future external module support.
---	------------	---	---

Figure 1-3 Face of the AP, on AP1572IC model

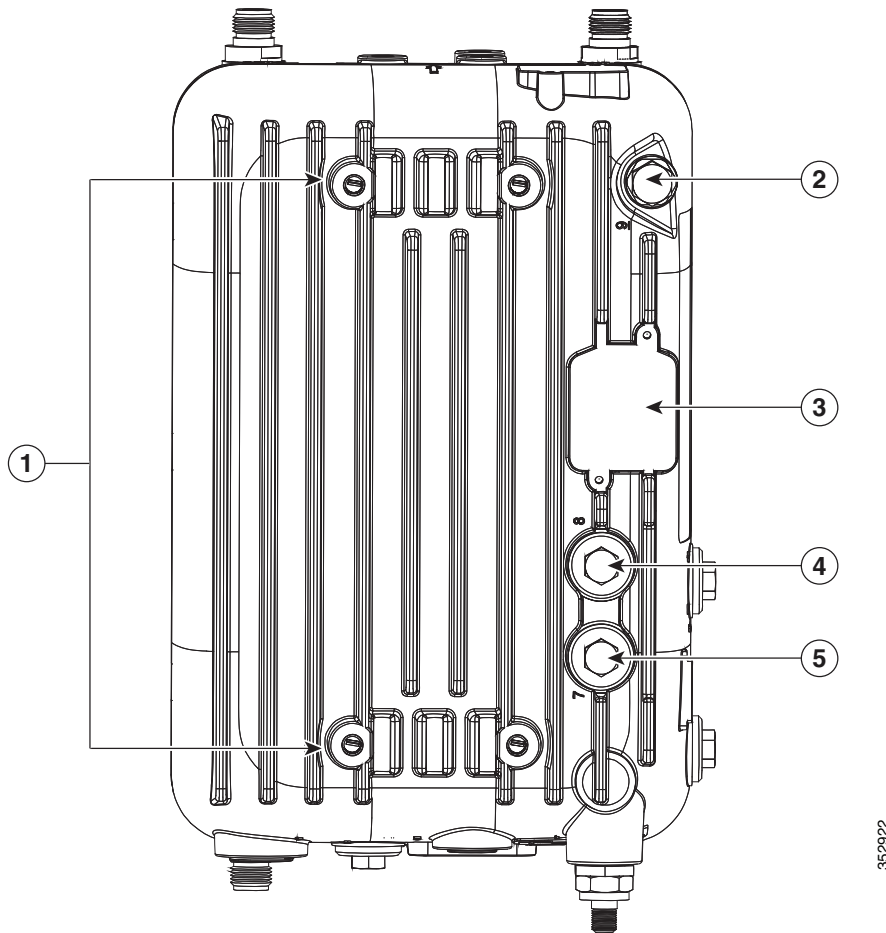


1	Cisco logo
----------	------------

Back of the AP

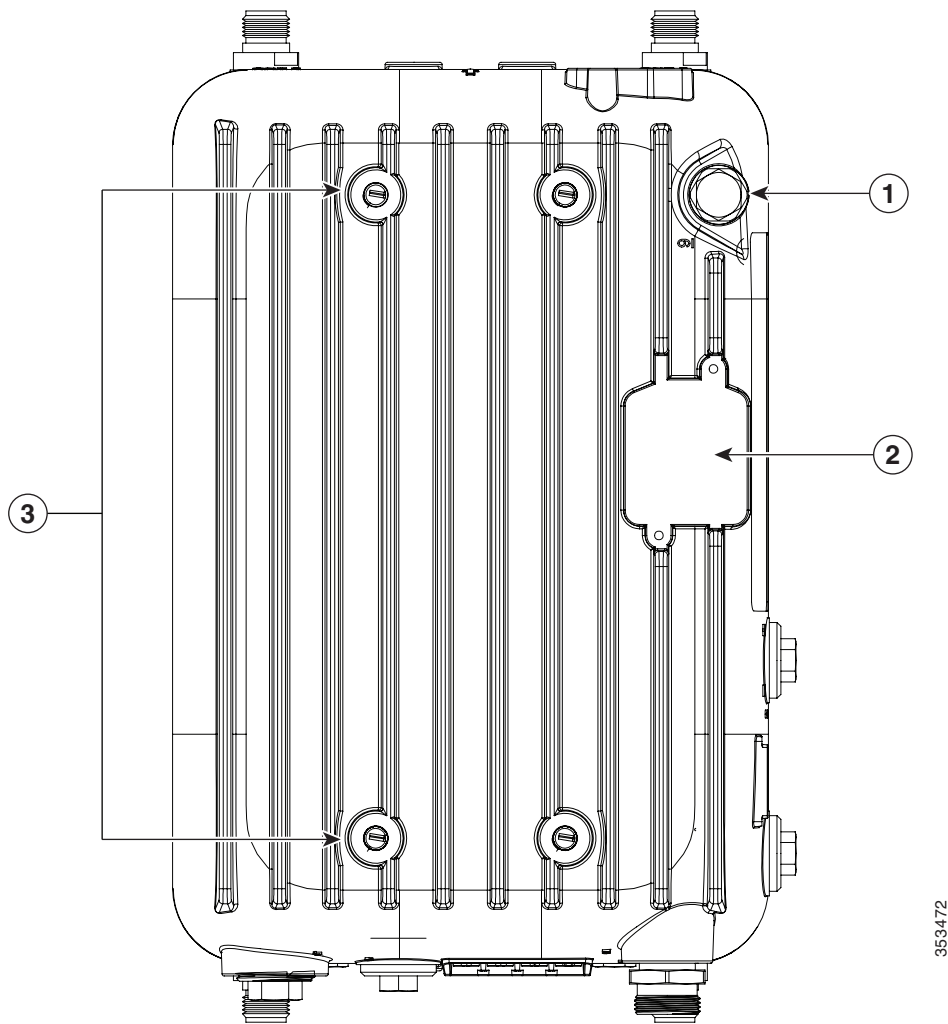
The Back of the access point is identifiable by the radiation fins, and also the screw holes that are used when mounting the AP on the supported mounting kits. The back of the AP faces upwards when the AP is mounted in a horizontal orientation. The back of the AP on AP1572IC and AP1572EC (see [Figure 1-4](#)) is different from that of AP1572EAC (see [Figure 1-5](#)).

Figure 1-4 Back of the AP on AP1572IC and AP1572EC



352922

1	Four screw holes for M8 x16mm bolts used to fasten the AP onto mounting kits.	2	Port for GPS antenna connector.
3	Spot for mounting the GPS antenna.	4	Screw covering Fuse/Shunt port, labeled "8". Fuse/Shunt port is provided only in AP1570IC and AP1570EC models. Not provided in AP1570EAC model.
5	Screw covering Cable RF Attenuator, labeled "7". Cable RF Attenuator provided only in AP1570IC and AP1570EC models. Not provided in AP1570EAC model.		

Figure 1-5 Back of the AP on AP1572EAC

1	Port for GPS antenna connector.	2	Spot for mounting the GPS antenna.
3	Four screw holes for M8 x16mm bolts used to fasten the AP onto mounting kits.		

Head of the AP

The Head of the AP faces upwards when the AP is mounted in a vertical orientation. The head of the AP for the internal antenna model is devoid of any ports and connectors (see [Figure 1-6](#)), and is different from that of the external antenna models (see [Figure 1-7](#)).

Figure 1-6 Head of the AP, on AP1572IC model

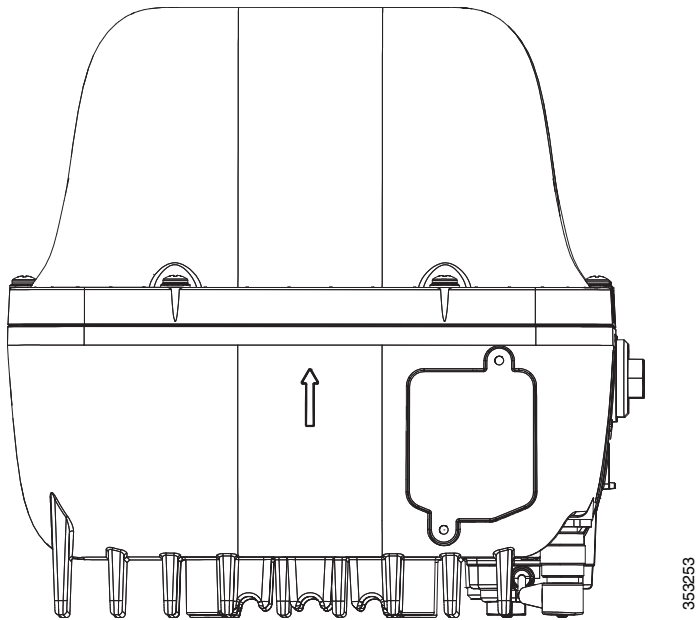
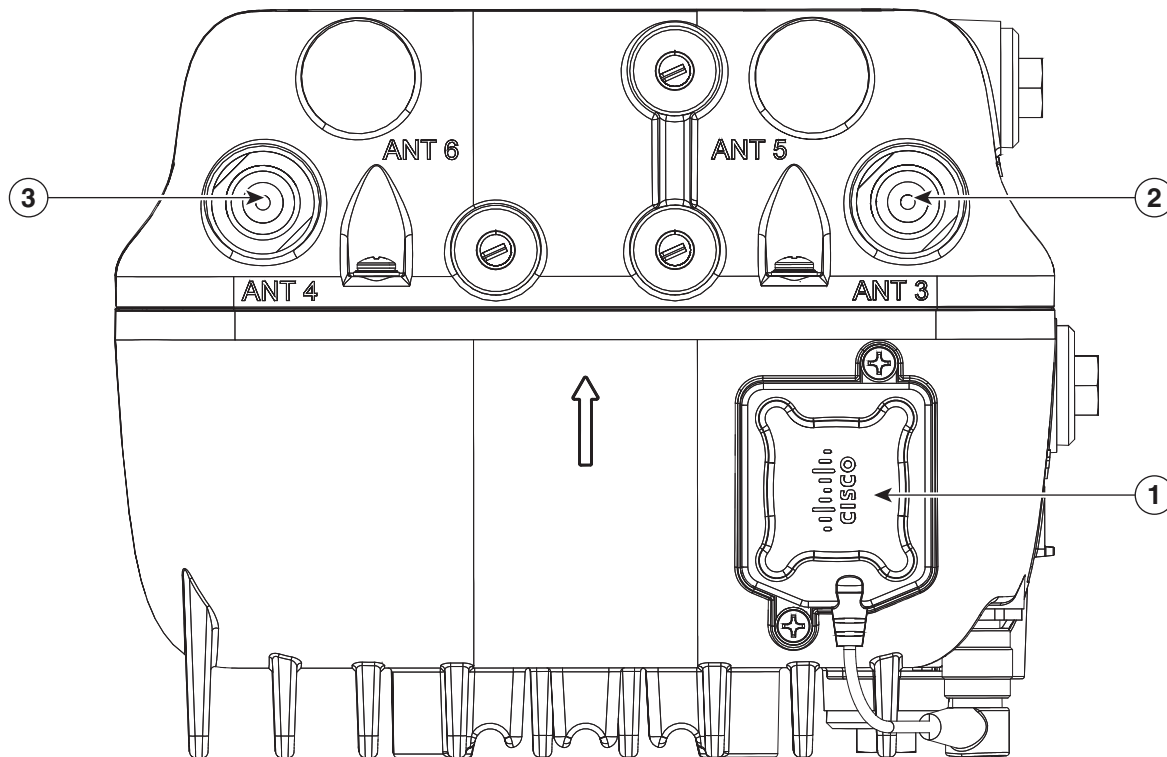


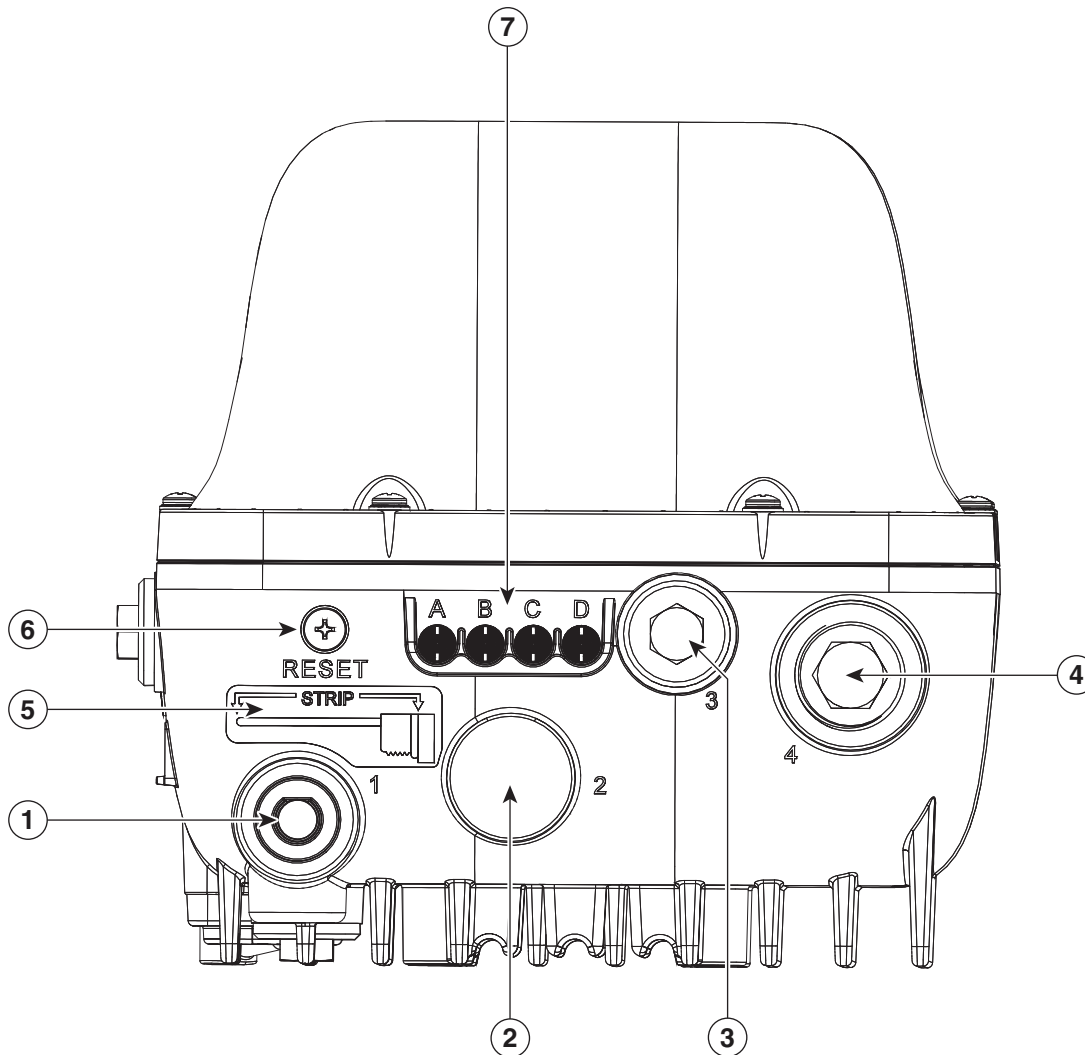
Figure 1-7 Head of the AP, on AP1572EC and AP1572EAC models

1	Spot for mounting the GPS antenna (here, showing the GP antenna mounted).	2	Antenna port labeled “3” on the AP
3	Antenna ports labeled “4” on the AP		

Base of the AP

The Base of the AP is identifiable by the four LED status lights and the Reset button on it. The base of the AP faces downwards when the AP is mounted in a vertical orientation. The base for different AP models is shown in [Figure 1-8](#), [Figure 1-9](#), and [Figure 1-10](#).

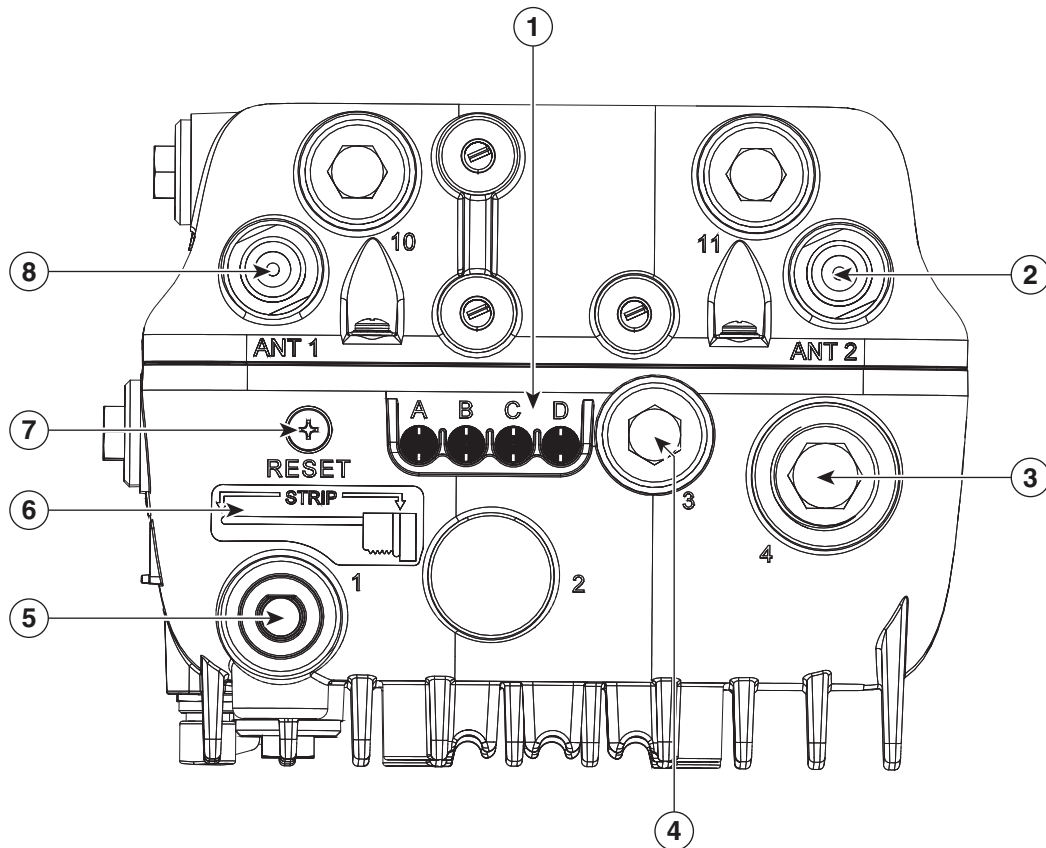
Figure 1-8 Base of the AP on AP1572IC model



353251

1	Cable stinger port for Power-over-Cable.	2	Unused port slot
3	Ethernet port	4	SFP port
5	Stinger trim measure for cutting any non-Cisco cable stinger to size	6	Screw covering Reset Button
7	Status LEDs labeled "A" to "D" ¹		

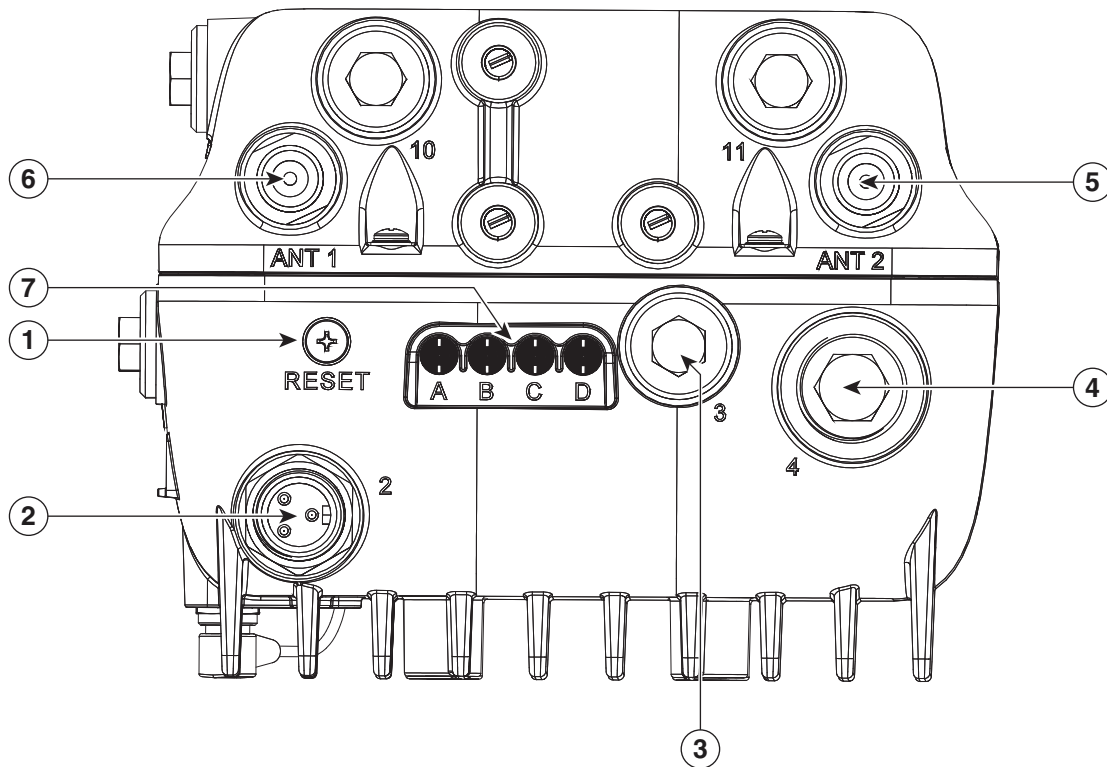
1. The LEDs are visible when AP is installed in both horizontal and vertical orientations.

Figure 1-9 Base of the AP on AP1572EC model

353249

1	Status LEDs labeled “A” to “D” ¹	2	Antenna N-type connector port 2
3	SFP port	4	Ethernet port
5	Cable stinger port for Power-over-Cable.	6	Stinger trim measure for cutting any non-Cisco cable stinger to size
7	Screw covering Reset Button	8	Antenna N-type connector port 1

1. The LEDs are visible when AP is installed in both horizontal and vertical orientations.

Figure 1-10 Base of the AP1572EAC model

353246

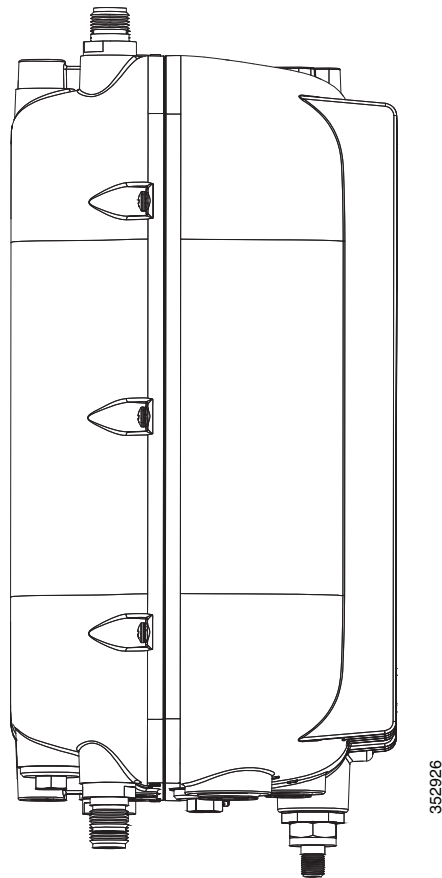
1	Screw covering Reset Button	2	AC Port
3	Ethernet port	4	SFP port
5	Antenna N-type connector port 2	6	Antenna N-type connector port 1
7	Status LEDs labeled "A" to "D" ¹		

1. The LEDs are visible when AP is installed in both horizontal and vertical orientations.

Left Side of the AP

The Left side of the access point is devoid of any ports and connectors. The left side of the AP is similar across all AP models (see [Figure 1-11](#)).

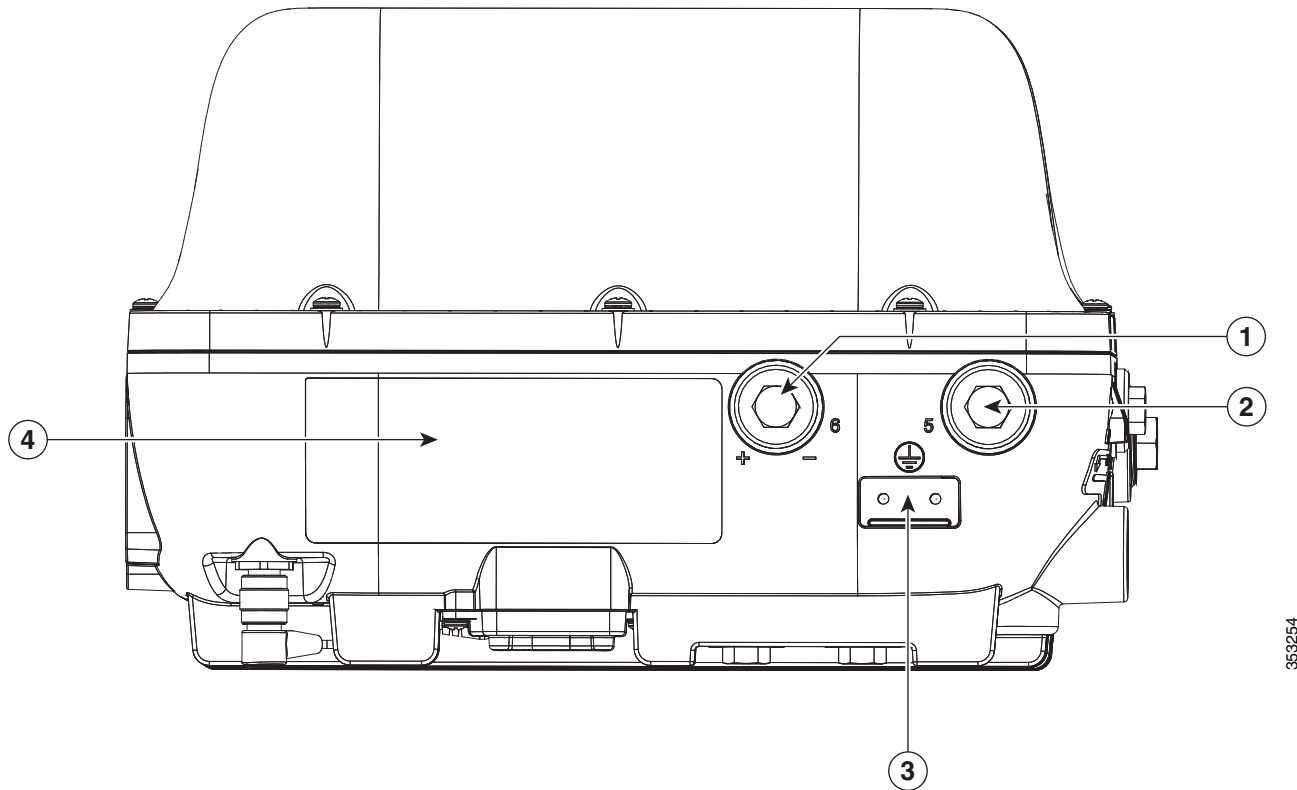
Figure 1-11 *Left Side of the AP*



Right Side of the AP

The Right side of the access point is also called the Ground side, because it has the metal surface with the ground strap screw holes. The right side of the AP for the internal antenna model (see [Figure 1-12](#)) is different from that of the external antenna models (see [Figure 1-13](#))

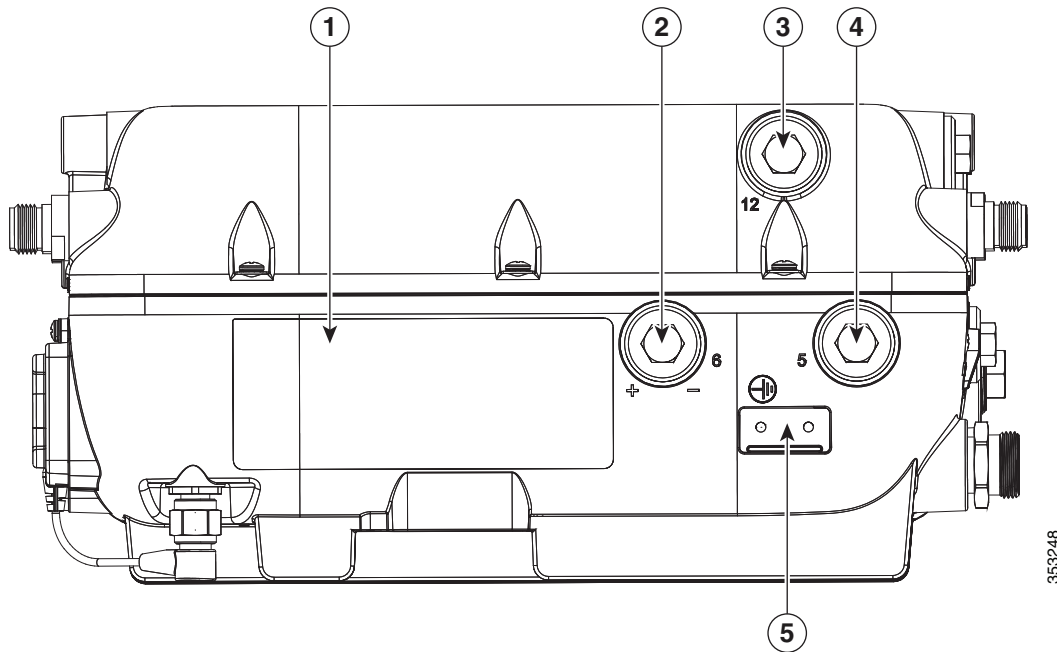
Figure 1-12 Right side of the AP, on AP1572IC model



353254

1	DC power port, labeled "6" on the AP	2	Console port, labeled "5" on the AP ¹
3	Metal plate for attaching grounding lug	4	Labels showing Product ID and port numbering scheme

1. The console interface is via an RJ-45 port.

Figure 1-13 Right side of the AP, on AP1572EC and AP1572EAC models

353248

1	Label showing Product ID and port numbering scheme	2	DC power port, labeled “6” on the AP
3	Serial port, labeled “12” on the AP	4	Console port, labeled “5” on the AP ¹
5	Metal plate for attaching grounding lug		

1. The console interface is via an RJ-45 port.



Preparing for Installation

This chapter provides the safety warnings, guidelines and related information which you must follow before starting with the installation of the access point. These sections are included in this chapter:

- [Safety Warnings, page 2-2](#)
- [FCC Safety Compliance Statement, page 2-4](#)
- [Safety Precautions, page 2-4](#)
- [Access Point Installation Guidelines, page 2-4](#)
- [Safety Precautions when Installing Antennas, page 2-6](#)
- [Safety Instructions for Antennas and Radios, page 2-7](#)
- [Avoiding Damage to Radios in a Testing Environment, page 2-7](#)
- [Safety Instructions for Powering the Access Point, page 2-8](#)
- [Translated Safety Warnings, page 2-9](#)

Safety Warnings

To see translated versions of all safety warnings, browse to the document on Cisco.com, see [Translated Safety Warnings, page 2-9](#) for instructions.



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

Statement 1071

SAVE THESE INSTRUCTIONS



Warning

This equipment is to be installed by trained and qualified personnel, as per these installation instructions. The installer is responsible for obtaining any required local or national safety inspections of the structural integrity of the installation by the local authority/inspection department.



Warning

Do not operate the unit near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use. Statement 364



Warning

The cables specified in this installation guide that are used with the specified cable glands provide protection against ingress of moisture for a Type 4/IP67 classified enclosure. If substitute cable are used, the installer must ensure that the size (OD) of the cable meets the acceptable range allowed by the cable gland.



Warning

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 366



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004



Warning

Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Caution

All installation methods for mounting an access point on any wall surface is subject to the acceptance of local jurisdiction.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030


Warning

Installation of the equipment must comply with local and national electrical codes. Statement 1074


Warning

Installation of the equipment must comply with local and national electrical codes. Statement 1074


Warning

In order to comply with radio frequency (RF) exposure limits, the antennas should be placed no less than 50 cm (20") from your body or nearby persons. Statement 339


Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.
Statement 1001


Warning

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.
Statement 1022


Warning

Installation of the equipment must comply with local and national electrical codes. Statement 1074


Warning

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023


Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028


Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030


Warning

Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. Statement 1033


Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046.


Warning

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54). Statement 1052

**Caution**

Before connecting or disconnecting a power cord, you must remove power from the power cord using a suitable service disconnect.

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 Aironet antennas, Cisco Aironet 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:

- 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 look at your proposed installation.
- Plan your installation carefully and completely before you begin. Successful raising of a mast or tower is largely a matter of coordination. Each person 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 the access point and 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 access point. If the assembly starts to drop, get away from it and let it fall.
- 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. They will remove it safely.

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

Access Point Installation Guidelines

Personnel installing the access point must understand wireless access points and bridging techniques and grounding methods.

Because the access point is a radio device, it is susceptible to common causes of interference that can reduce throughput and range. Follow these basic guidelines to ensure the best possible performance:

- Review the FCC guidelines for installing and operating outdoor wireless LAN devices at http://www.cisco.com/c/en/us/products/collateral/routers/3200-series-rugged-integrated-services-routers-isr/data_sheet_c78-647116.html

- Perform a site survey before beginning the installation.
- Install the access point in an area where structures, trees, or hills do not obstruct radio signals to and from the access point.
- The access points can be installed at any height, but best throughput is achieved when all the access points are mounted at the same height. We recommend installing the access points no higher than 40 feet to allow support for wireless clients on the ground.

**Note**

To calculate path loss and to determine how far apart to install access points, consult an RF planning expert.

Site Surveys

Every network application is a unique installation. Before installing multiple access points, you should perform a site survey to determine the optimum use of networking components and to 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 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.

A proper site survey involves temporarily setting up mesh links and taking measurements to determine whether your antenna calculations are accurate. Determine the correct locations and antenna types before you drill holes and route cables and mounting equipment.

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 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 access points 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 access to both of the mesh site locations?
- Do you have the proper permits, if required?
- Are you following the proper safety procedures and practices?

- Have you configured the access points 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.

Before Beginning the Installation

Before you begin the installation process:

- Ensure that a site survey has been performed.
- Ensure that your network infrastructure devices are operational and properly configured.
- Ensure that your controllers are connected to switch trunk ports.
- Ensure that your switch is configured with untagged access ports for connecting your access points.
- Ensure that a DHCP server with Option 43 configured is reachable by your access points, or manually configure the controller information in the access point (for additional information, refer to the [“Configuring DHCP Option 43” section on page D-1](#)).
- Become familiar with the access point installation components.

Safety Precautions when Installing Antennas



Warning

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, as they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (e.g. U.S.: NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54). Statement 280

1. 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.
2. 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.
3. Contact your electric power company. Tell them your plans and ask them to come look at your proposed installation.
4. 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.
5. 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.
6. 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.

7. 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.
8. If an accident should occur with the power lines, call for qualified emergency help immediately.

Safety Instructions for Antennas and Radios



In order to comply with radio frequency (RF) exposure limits, the antennas should be placed no less than 50 cm (20") from your body or nearby persons. Statement 339



Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (for example, U.S.: NFPA 70, National Electric Code, Article 180, Canada: Canadian Electrical Code, Section 54). Statement 1052



Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

Avoiding Damage to Radios in a Testing Environment

The radios on outdoor units (bridges) have higher transmit power levels than radios on indoor units (access points). When you test high-power radios in a link, you must avoid exceeding the maximum receive input level for the receiver. 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 test bed, the following equation describes the relationships among transmit power, antenna gain, attenuation, and receiver sensitivity:

$$\text{txpwr} + \text{tx gain} + \text{rx gain} - [\text{attenuation due to antenna spacing}] < \text{max rx input level}$$

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:

$\text{txpwr} - [\text{attenuation due to coaxial components}] < \text{max rx input level}$

**Caution**

Under no circumstances should you connect the antenna port from one access point to the antenna port of another access point 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 access point 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.

Safety Instructions for Powering the Access Point

**Warning**

Installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning**

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 366

**Warning**

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

**Warning**

Installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning**

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 366

**Warning**

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

**Warning**

Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. Statement 1033

**Warning**

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023

**Caution**

Power injectors must be used indoors only. Do not place a power injector in an unprotected outdoor environment because water could get into the power injector and cause a short circuit and possible fire.

**Caution**

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

Translated Safety Warnings

For translated safety warnings, refer to the safety warning document that shipped with your access point or that is available on Cisco.com.

To browse to the document on Cisco.com, follow these steps:

-
- Step 1** Click this link and go to the Cisco Wireless documentation home page:
- <http://www.cisco.com/en/US/products/hw/wireless/index.html>
- Step 2** Click **Support** and the Support and Documentation page displays.
- Step 3** Click **Wireless** in the Find Product Support column.
- Step 4** Click **1570**.
- Step 5** Click **Install and Upgrade**.
- Step 6** Click **Install and Upgrade Guides**.
- Step 7** Click **Translated Safety Warnings for Cisco Aironet 1570 Series Outdoor Access Points**.
-



Mounting the Access Point

This chapter describes how to install the 1572 access point and contains the following sections:

- [Unpacking the Access Point, page 3-2](#)
- [Tools and Hardware Common For All Mounting Options, page 3-3](#)
- [Choosing the Mounting Kit, page 3-5](#)
- [Strand Mount Kit 1, page 3-7](#)
- [Strand Mount Kit 2, page 3-9](#)
- [Strand Mount Kit 3, page 3-14](#)
- [Pole Mount Kit 1, page 3-19](#)
- [Pole Mount Kit 2, page 3-23](#)
- [Pole Mount Kit 3, page 3-41](#)

Unpacking the Access Point

To unpack the access point, follow these steps:

-
- | | |
|---------------|--|
| Step 1 | Open the shipping container and carefully remove the contents. |
| Step 2 | Return all packing materials to the shipping container, and save it. |
| Step 3 | Ensure that all items listed in the following sections are included in the shipment. If any item is damaged or missing, notify your authorized Cisco sales representative. |
-

AP1572IC Package Contents

- One AP1572IC series access point
- Grounding Lug kit containing #6 AWG grounding wire with grounding lug (having two holes), and two M4.0 x 10mm screws
- Oxide inhibitor paste
- Cisco product documentation pointer card

AP1572EC Package Contents

- One AP1572EC series access point
- Grounding Lug kit containing #6 AWG grounding wire with grounding lug (having two holes), and two M4.0 x 10mm screws
- Two M5.0 x 10mm screws
- Four 10 inch environmental seal tape
- Oxide inhibitor paste
- One PG13.5 cable gland
- Cisco product documentation pointer card

AP1572EAC Package Contents

- One AP1572EAC series access point
- Grounding Lug kit containing #6 AWG grounding wire with grounding lug (having two holes), and two M4.0 x 10mm screws
- Four 10 inch environmental seal tape
- Oxide inhibitor paste
- Two PG13.5 cable glands
- DC Connector (Cisco Part Number 29-100226-01)

- Cisco product documentation pointer card

Optional AP Hardware

Depending on your requirements, you can order the following optional equipment from Cisco as part of your shipment:

- Strand mounts kits
- Pole mount kits
- External antennas
- GPS antenna

Tools and Hardware Common For All Mounting Options

The tools and hardware required for each mounting option, is listed in the corresponding sections. The following tools and materials are required during various stages of installing the AP, for all mounting options:

- 10 mm open end or box wrench, for M6 bolts
- 13 mm box-end wrench or socket set, for M8 bolts
- Adjustable wrench with opening up to 33 mm and 28 mm socket.
- 0.5 inch or 13 mm wrench (for port plugs)
- Ground lug crimping tool (Panduit CT-720 with CD-720-1 die)
- 6-AWG copper ground wire
- Small flat-screwdriver for DC power connector
- Optional shielded outdoor-rated Ethernet (CAT5e or better) cable with 0.20 to 0.35 in (0.51 to 0.89 cm) diameter
- Optional Ethernet RJ-45 connector and installation tool
- Optional shielded outdoor-rated DC power cable with 0.20 to 0.35 inch (.0.51 to 0.89 cm) diameter, rated at 10 amp, 10-16 V DC cable.
- Optional ground rod, as required by local regulations
- Optional ladder, power lift, rope, or other tools as required
- 5/16" socket wrench (alternative to M8 bolts) for PMK1 mount clamp
- Installation tool for the steel band straps (AIR-BAND-INST-TL=) for fastening the strap brackets when using PMK2 and PMK3.

Typical Access Point Installation Components

The access point is designed to be installed in an outdoor environment, such as on exterior walls, off cable strands, and on vertical and horizontal poles, such as streetlight poles. Carefully review [Figure 3-1](#) to become familiar with the system components, connectors, indicators, cables, system interconnection, and grounding.

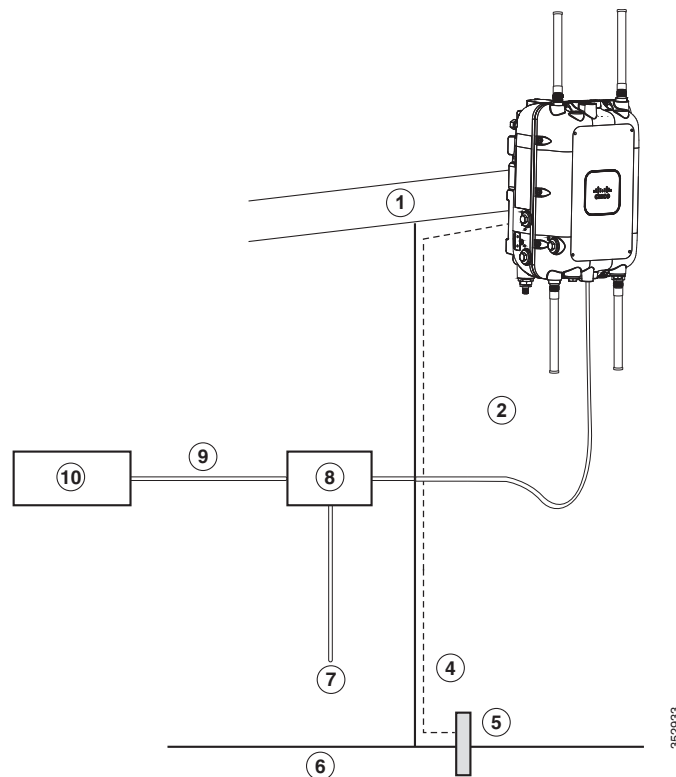


Note

The illustrations in this document show all available connections for the access point. Unused connections are capped with a connector plug to ensure the watertight integrity of the access point, except for the AC power entry connector on the in AP1572EAC version access point. Liquid-tight adapters are provided for connector openings, which can be installed before or after deploying the access point.

When not using the AC input connector to power the in AP1572EAC version (for example when powering using the Cisco power injector), it is important to cover the AC power entry connector. The correct cap is Remke part number 75-0086 (<http://www.remke.com/>). This cap is included with the AIR-PWRINJ1500-2= power injector. If you are using PoE directly from a switch or powering via DC, then you will need to order AIR-ACC15-AC-PLGS=.

Figure 3-1 Components in a Typical Access Point Installation



1	Pole or wall on which AP is vertically mounted.	6	Ground
2	Shielded outdoor-rated Ethernet (CAT5e or better) cable ¹	7	AC power cord ²
3	Water drip loop	8	Power injector ³
4	6-AWG copper grounding wire ¹	9	Shielded Ethernet (CAT5e or better) cable ¹
5	Ground rod ¹	10	Controller (through a switch)

1. User supplied.
2. The safety ground wire in the AC power cord must have a ground path to a grounding rod.
3. The shielded Ethernet cable has a ground path through the power injector and the safety ground wire in the AC power cord.

**Note**

The access point is designed with consideration for resistance to effects of lightning effects on the access point electronics. The access point employs lightning arrestor circuitry on the Ethernet and power ports. On the input Ethernet port, Gas Discharge Tubes (GDT) are used for the Power Entry Module (PEM) to mitigate lightning effect. On the AC power, GDTs are also used along with fuses to mitigate high-current condition. For the DC power, a fuse is used to mitigate high current condition.

While not a common practice, the user may want to consider using lightning protection at the antenna ports for added protection. To meet EN/IEC60950-22 (Clause 4.2) requirements, the installer must ensure that additional protection is provided external to this equipment to reduce transient surges from Overvoltage IV to Overvoltage Category II at the AC power input of the access point. The over-voltage and fault-current protection components used to achieve this protection must comply with the IEC 61643 series of standards. To meet CAN/CSA-C22.2 No. 60950-22-07/UL60950-22 requirements, the installer may use alternative components to provide this additional protection. Those components may comply with ANSI/IEEE C62.11, CSA Certification Notice No. 516, CSA C22.2 No. 1, or UL 1449. Suitability of the components for the application must be determined for the intended installation. (For example, some devices are suitable for installation on the load side of the service entrance only, and some are suitable for use with cord-connected equipment only.)

Choosing the Mounting Kit

Personnel installing the access point must understand wireless access points and bridging techniques and grounding methods.

**Note**

- When mounting an access point horizontally or vertically, ensure that the base of the access point, with the LED indicators, is visible from the ground below the access point.
- Ensure that the access point is mounted in such a way so that all antenna ports and the console port are accessible for future use.

Depending on the particular AP version, the 1570 Series Access Point can be strand, wall, or pole mounted. From the following tables, choose a mounting kit for your access point version based on your mounting scenario.

Table 3-1 *Mounting Kits for AP1572IC*

AP Orientation	AP1572IC is always mounted in a horizontal orientation.
Kit for Strand Mount without Cable Bundle	Strand Mount Kit 1 [AIR-ACCSMK1570-1]
Kits for Strand Mount with Cable Bundle	Strand Mount Kit 2 [AIR-ACCSMK1570-2] Strand Mount Kit 3 [AIR-ACCSMK1570-3]
Kit for Wall, Vertical Pole, Horizontal Pole and Off-Angle Pole	Pole Mount Kit 3 [AIR-ACCPMK1570-3=]

Table 3-2 *Mounting Kits for AP1572EC*

AP Orientation	AP1572EC can be mounted in horizontal and vertical orientations. However, Strand Mount Kit 1 is not supported.
Kits for Strand Mount with Cable Bundle	Strand Mount Kit 2 [AIR-ACCSMK1570-2] Strand Mount Kit 3 [AIR-ACCSMK1570-3]
Kit for Vertical Pole	Pole Mount Kit 1 [AIR-ACCPMK1570-1] (poles of diameter 2 to 6 inches) Pole Mount Kit 2 [AIR-ACCPMK1570-2=] (poles of diameter 2 to 16 inches)
Kit for Wall, Horizontal Pole, and Off-Angle Pole	Pole Mount Kit 2 [AIR-ACCPMK1570-2=]
Kit for Wall, Vertical Pole, Horizontal Pole and Off-Angle Pole	Pole Mount Kit 3 [AIR-ACCPMK1570-3=]

Table 3-3 *Mounting Kits for AP1572EAC*

AP Orientation	AP1572EAC is always mounted in a vertical orientation. It is not mounted on cable strands.
Kit for Vertical Pole	Pole Mount Kit 1 [AIR-ACCPMK1570-1] (poles of diameter 2 to 6 inches) Pole Mount Kit 2 [AIR-ACCPMK1570-2=] (poles of diameter 2 to 16 inches)
Kit for Wall, Horizontal Pole, and Off-Angle Pole	Pole Mount Kit 2 [AIR-ACCPMK1570-2=]

Strand Mount Kit 1

The Strand Mount Kit 1 (abbreviated as SMK1) is for mounting the AP directly to a cable strand, when there is no cable bundle. SMK1 consists of two single-piece clamps, which clamp the cable strand across the back of the access point. As the cable strand runs directly across the back surface of the AP, there is no space left between the back surface of the AP and the cable strand.

For instructions on mounting an AP using SMK1, see [Strand Mounting Using SMK1, page 3-7](#).

Strand Mounting Using SMK1

When mounting the access point on a cable strand where you don't have to accommodate a cable bundle, you can use the SMK1 strand mount kit.

**Note**

The access point must be installed on a cable strand by a professional cable installer.

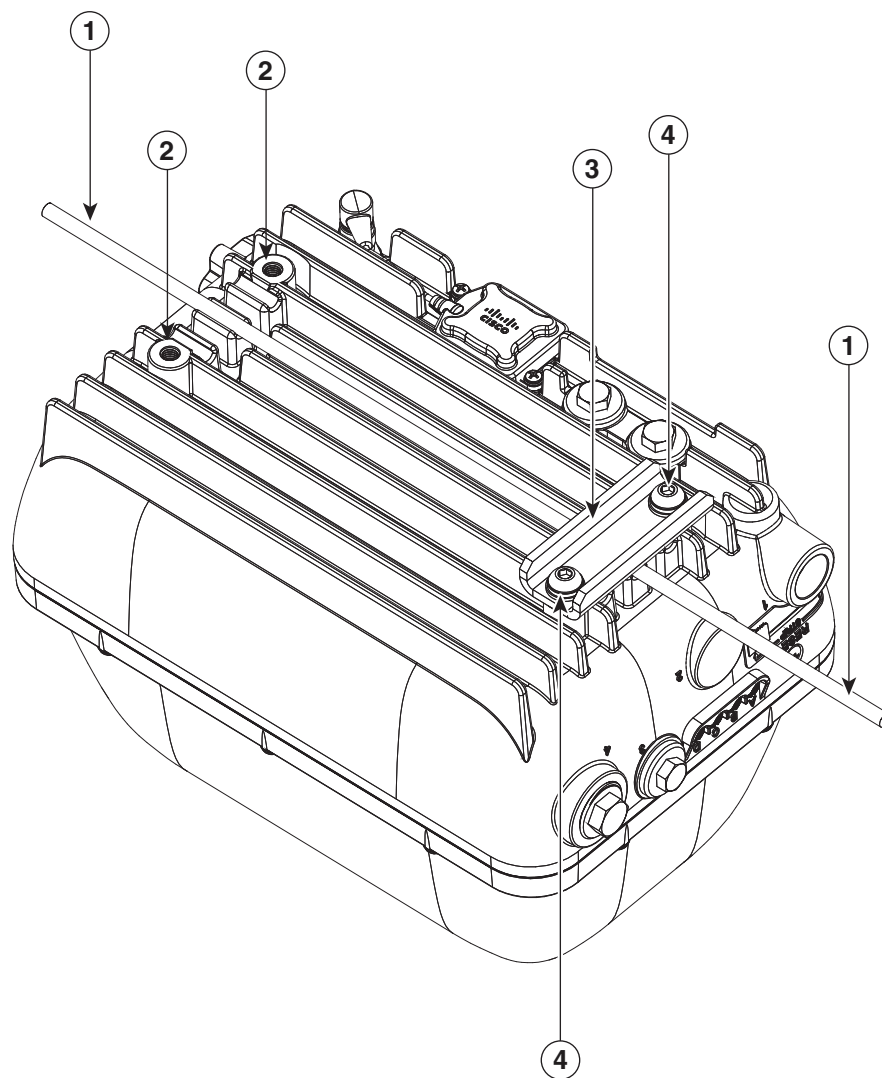
[Table 3-1](#) lists the materials you need to strand mount the AP using SMK1.

Table 3-1 Materials Needed to Mount the AP using SMK1

Material Needed	In Kit?
SMK1 strand mount kit	Yes
Four M8 x16mm button-head bolts, and its washers	Yes
5 mm hex wrench	No

To mount the access point, follow these steps:

- Step 1** Hold the AP's back surface up against the support cable, and ensure that the cable runs through one of the three sets of cable grooves.
- When installing external antennas, which are mounted on the AP using an additional antenna bracket, the AP may tilt to one side due to the uneven weight distribution. To counteract this tilt, three sets of cable grooves are provided on the back surface of the AP. This allows you to run the cable through different sets of the grooves so as to adjust the cable's position against the AP's back surface, and thereby counter the tilt.

Figure 3-2 AP Back Surface with Cable Strand in Cable Grooves

353257

1	Cable Strand/Support Cable running through center cable grooves.	2	Screw holes for the M8 x16mm button-head bolts, to fasten the SMK1 cable clamp to the AP.
3	SMK1 cable clamp, already installed, with supporting cable running through center groove.	4	Two M8 x16mm button-head bolts used to fasten each SMK1 cable clamp.

Step 2 Clamp the cable using the SMK1 cable clamps. Secure each clamp with two M8 x16mm bolts (with lock washers) on the back surface of the access point (see [Figure 3-2](#)). Hand-tighten the bolts to 13 to 15 ft.lbf (17.6 to 20.3 Nm).



Note The strand support cable and the SMK1 kit together provide the grounding for the access point.

- Step 3** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, “Installing Other Components.”](#)

Strand Mount Kit 2

The Strand Mount Kit 2 (abbreviated as SMK2) can accommodate a 1.75 inch cable bundle between the support cable strand and the back surface of the AP. The SMK2 allows a distance of 2.42 inches from the back surface of the AP to the center of the cable strand (see [Figure 3-4](#)).

The SMK2 consists of these parts:

- Strand mount cable brackets (see [Figure 3-5](#))
- Cable clamps (see [Figure 3-5](#))
- 5/16"-18 bolt for fastening the cable clamps to the strand mount cable bracket (see [Figure 3-5](#))

For instructions on mounting an AP using SMK2, see [Strand Mounting Using SMK2](#), page 3-10.

Figure 3-3 SMK2 Cable Clamps and Cable Bracket Assembly Dimensions in inches [and millimeters]

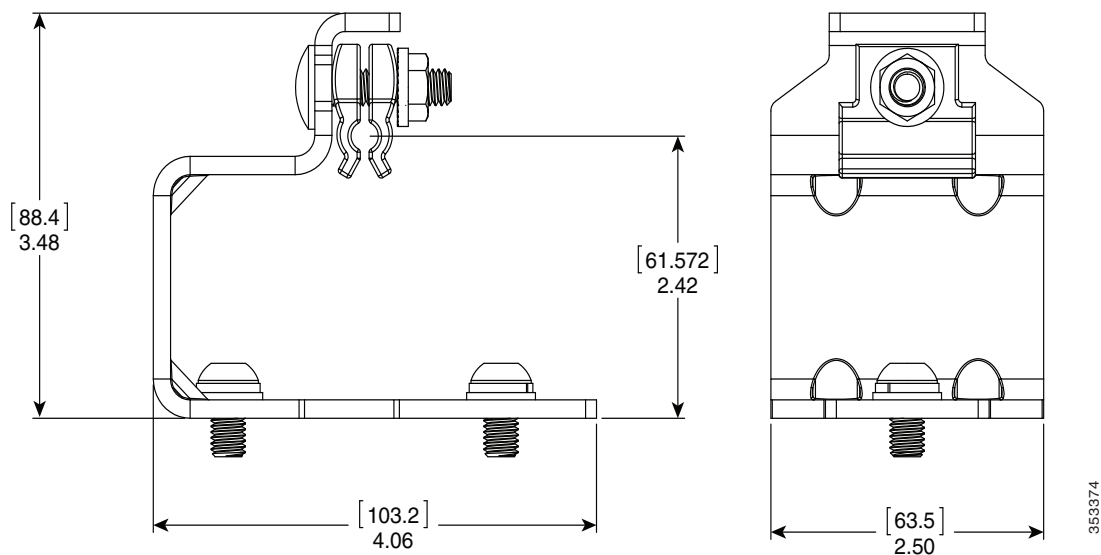
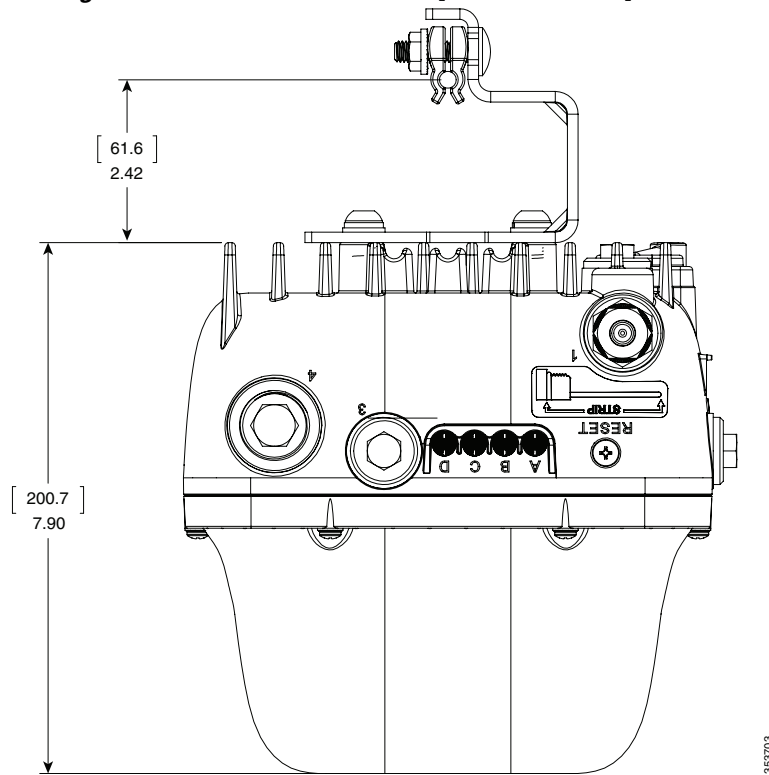


Figure 3-4 AP Mounted Using SMK2 - Dimensions in inches [and millimeters]



Strand Mounting Using SMK2

When mounting the access point on a cable strand where you need to accommodate a cable bundle also, you must use SMK2 strand mount kit.



Note

The access point must be installed on a cable strand by a professional cable installer.

Table 3-2 lists the materials you need to strand mount the AP using SMK2.

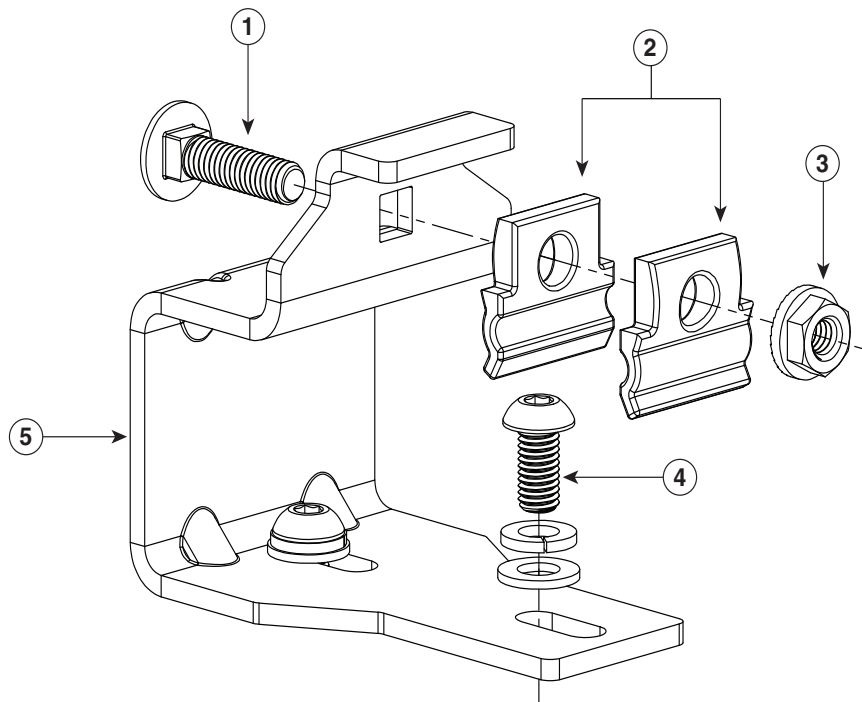
Table 3-2 Materials Needed to Mount the AP using SMK2

Material Needed	In Kit?
SMK2 strand mount kit	Yes
Four M8 x16mm button-head bolts, and its washers	Yes
5 mm hex wrench	No
13 mm box-end wrench	No

To mount the access point, follow these steps:

- Step 1** Assemble the cable clamps to the cable bracket, on both cable brackets (see [Figure 3-5](#)). You should hand-tighten the nuts sufficiently enough to only prevent them from falling off.

Figure 3-5 Assembling Cable Clamps on Cable Bracket



353373

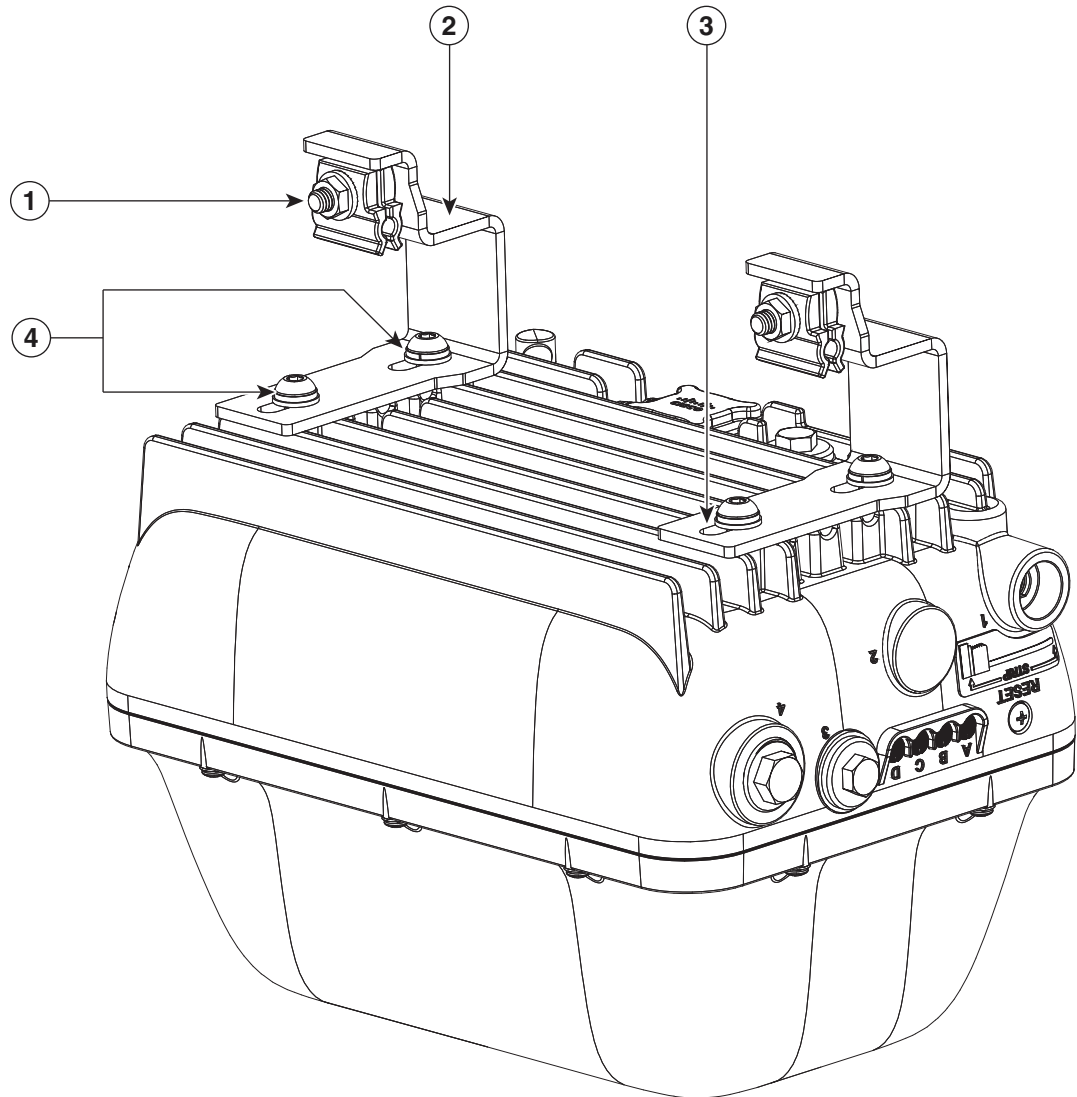
1	5/16"-18 bolt	2	Cable Clamps
3	5/16"-18 nut	4	M8 x 16mm bolt
5	Cable Bracket		

- Step 2** Secure each cable bracket with two M8 x 16 bolts (with lock washers) on the back surface of the access point. ([Figure 3-7](#)). Hand-tighten the bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).



Tip

When installing external antennas, which are mounted on the AP using an additional antenna bracket, the AP may tilt to one side due to the uneven weight distribution. To counteract this tilt, elongated M8x16 bolt holes are provided on the cable bracket. This allows you to adjust the cable brackets' position against the AP's back surface, to cancel the tilt.

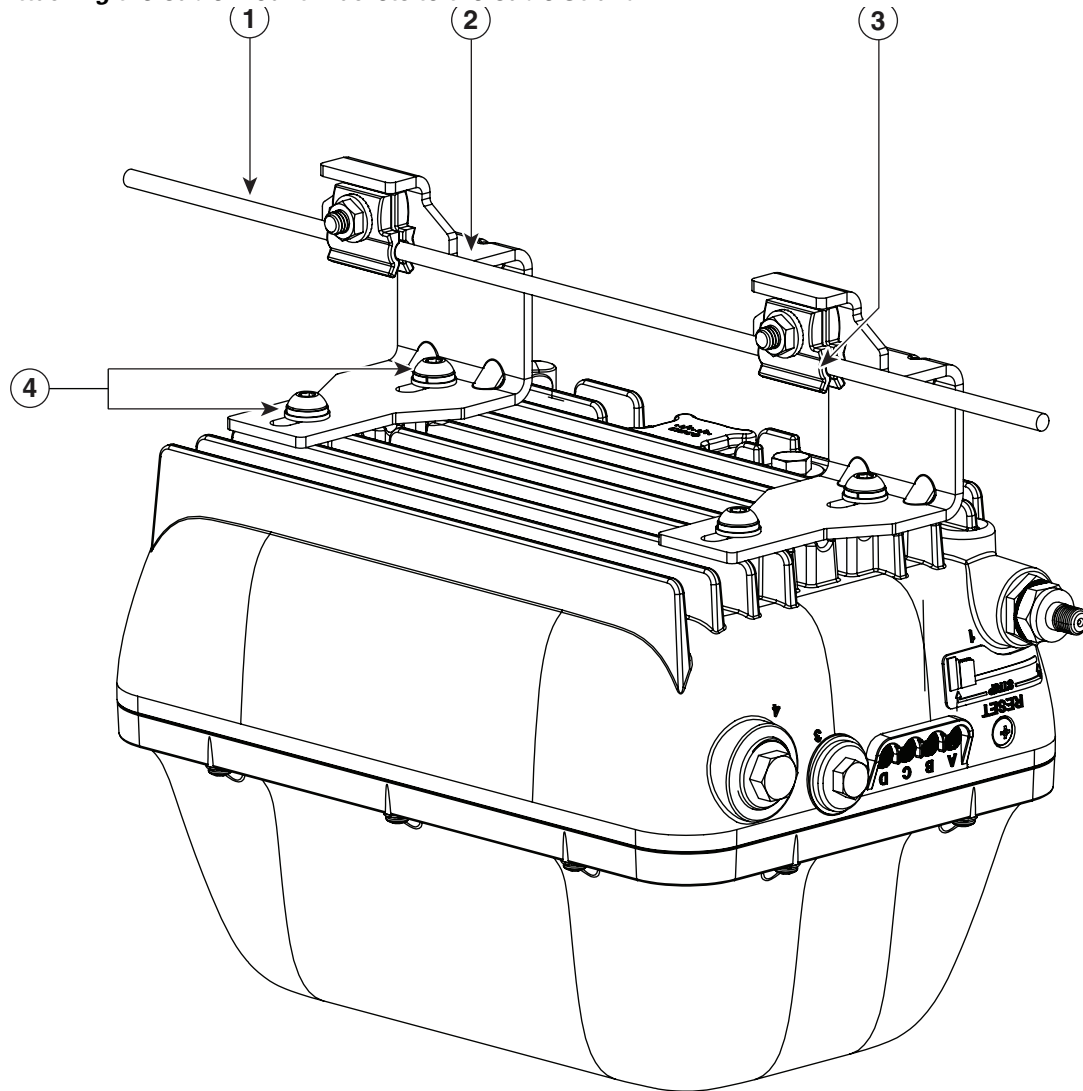
Figure 3-6 Cable Brackets Attached to Back Surface of Access Point

353256

1	5/16"-18 bolt, flange washer, and cable clamps on the cable bracket	2	Cable bracket assembly
3	Elongated M8x16 bolt holes for tilt adjustment	4	M8 x16mm button-head bolts, which fasten the cable bracket assembly to the AP.

- Step 3** Place the cable bracket, attached to the AP, on the cable strand, with each pair of cable clamps clamping on to the cable strand. Then, tighten the cable clamps by tightening the two 5/16"-18 nuts to 13 to 15 lb.ft (17.6 to 20.3 Nm). See [Figure 3-7](#).

Figure 3-7 Attaching the Cable Mount Brackets to the Cable Strand



353255

1	Cable Strand/Support Cable running through center cable grooves	2	Cable bracket assembly
3	5/16"-18 bolt, flange washer, and cable clamps, which clamp the support cable to the cable bracket	4	M8 x 16mm button-head bolts, which fasten the cable bracket assembly to the AP.



Note

During installation, the cable strand/support cable might have to be pulled away from the fiber or cable bundle. Be sure to resecure the cable after installation.

**Note**

The strand support cable and the SMK2 kit together provide the grounding for the access point.

- Step 4** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, “Installing Other Components.”](#)

Strand Mount Kit 3

The Strand Mount Kit 3 (abbreviated as SMK3) is used when you have large external antennas mounted to the AP using external antenna mounts such as AIR-ACCAMK1=. The SMK3 can accommodate a 3.6 inch cable bundle between the support cable strand and the back surface of the AP (see [Figure 3-9](#)). The SMK3 can also accommodate up to 10 degrees of strand/cable droop.

The SMK3 consists of these parts:

- Height-adjustable strand mount cable brackets (see [Figure 3-10](#))
- Cable clamps (see [Figure 3-10](#))
- Fasteners (see [Figure 3-10](#))

For instructions on mounting an AP using SMK3, see [Strand Mounting Using SMK3, page 3-15](#).

Figure 3-8 SMK3 Cable Clamps and Cable Bracket Assembly Dimensions in inches [and millimeters]

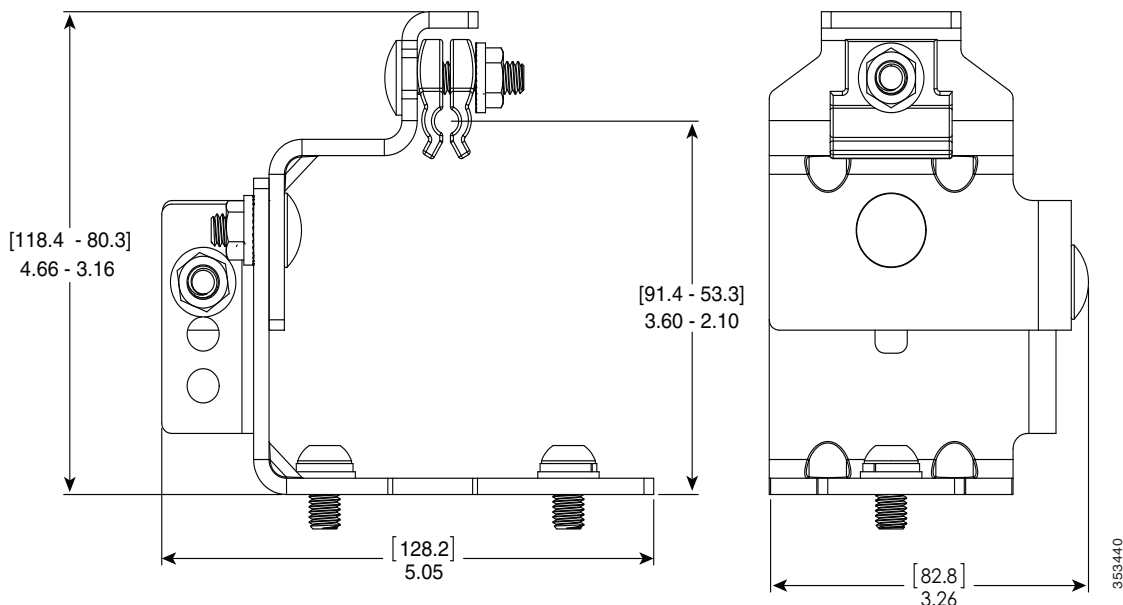
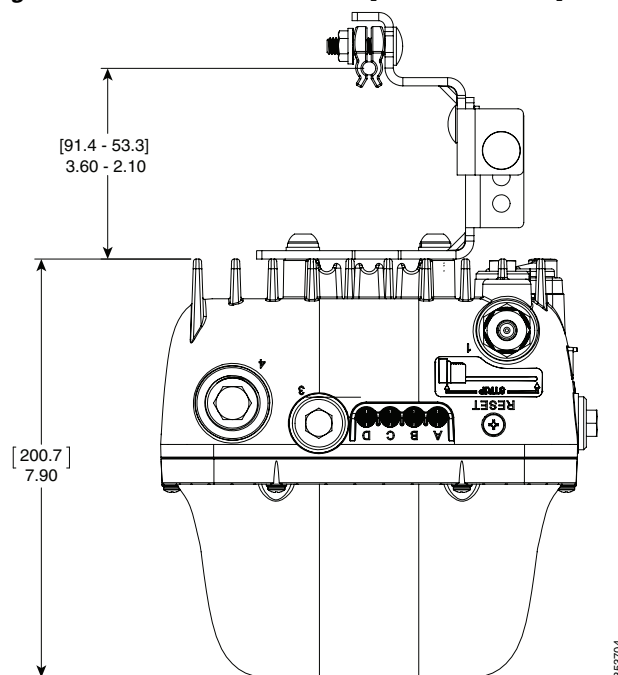


Figure 3-9 AP Mounted Using SMK3 - Dimensions in inches [and millimeters]

Strand Mounting Using SMK3

When mounting the access point on a cable strand where you need to accommodate a cable bundle also, you must use SMK3 strand mount kit.



Note

The access point must be installed on a cable strand by a professional cable installer.

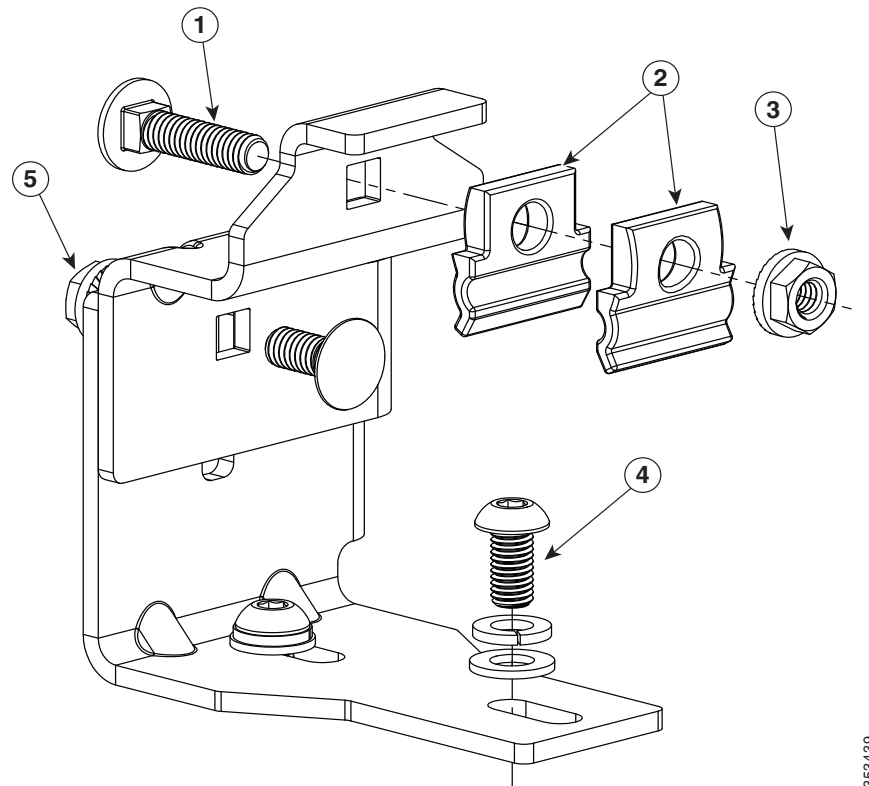
Table 3-2 lists the materials you need to strand mount the AP using SMK3.

Table 3-3 Materials Needed to Mount the AP using SMK2

Material Needed	In Kit?
SMK3 strand mount kit	Yes
Four M8 x16mm button-head bolts, and its washers	Yes
5 mm hex wrench	No
13 mm box-end wrench	No

To mount the access point, follow these steps:

- Step 1** Assemble the cable clamps to the cable bracket, on both cable brackets (see Figure 3-10). Set the height of the cable brackets as required. You should hand-tighten the cable clamp nuts sufficiently enough to only prevent them from falling off.

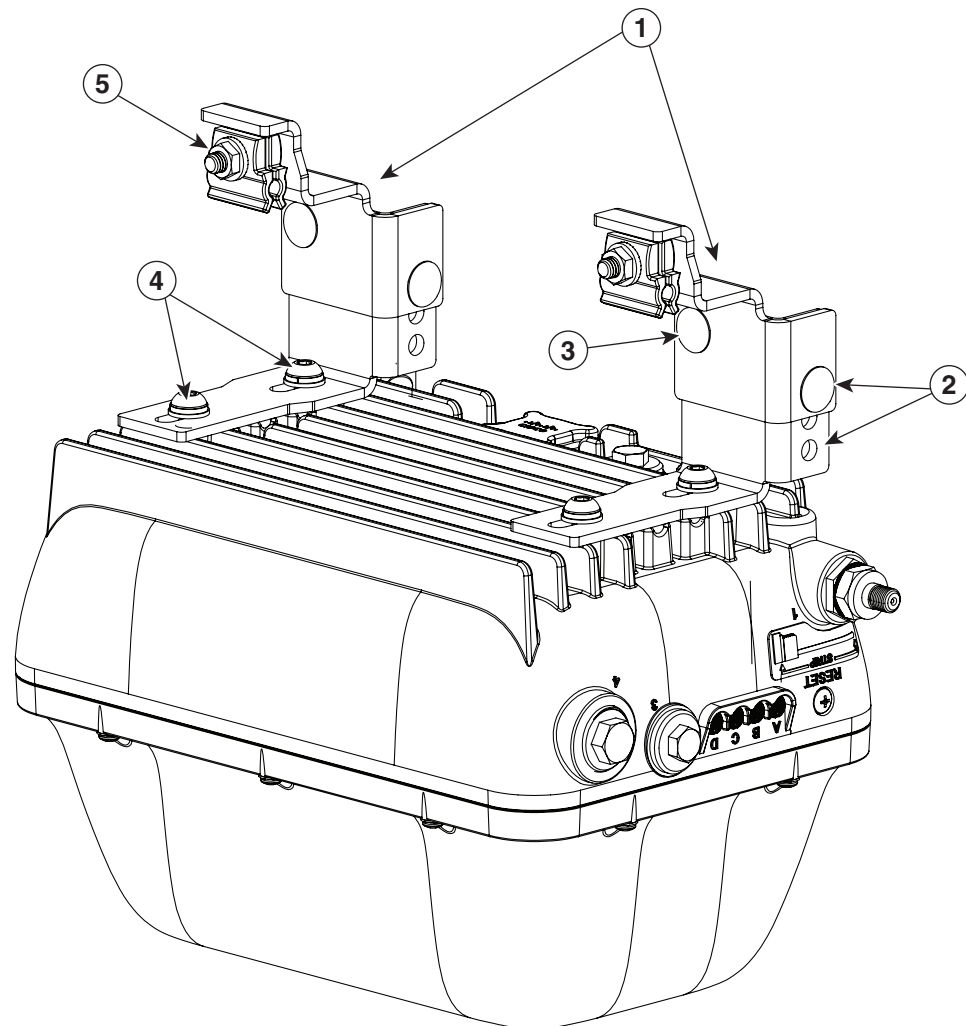
Figure 3-10 Assembling Cable Clamps on Cable Bracket

1	5/16"-18 bolt	2	Cable Clamps
3	5/16"-18 nut with washer	4	M8 x16mm bolt
5	5/16"-18 bolt and nut for the height-adjustable cable bracket		

Step 2 Secure each cable bracket with two M8 x16 bolts (with lock washers) on the back surface of the access point. (Figure 3-12). Hand-tighten the bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).

**Tip**

When installing external antennas, which are mounted on the AP using an additional antenna bracket, the AP may tilt to one side due to the uneven weight distribution. To counteract this tilt, elongated M8x16 bolt holes are provided on the cable bracket. This allows you to adjust the cable brackets' position against the AP's back surface, to cancel the tilt.

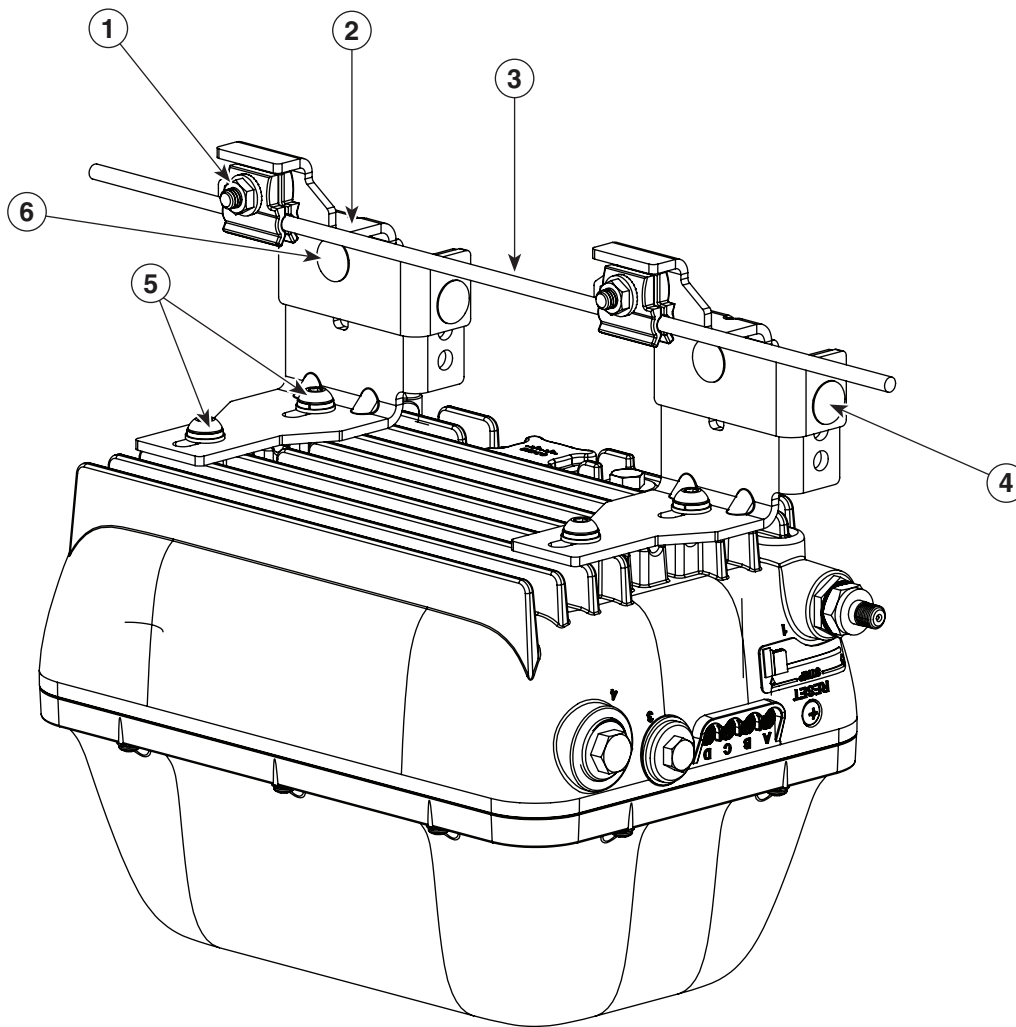
Figure 3-11 Cable Brackets Attached to Back Surface of Access Point

353441

1	Height-adjustable cable brackets.	2 and 3	5/16"-18 bolts and holes used for adjusting the height of the cable brackets.
4	M8x16 mm button-head bolts in elongated holes for tilt adjustment. These fasten the cable bracket assembly to the AP.	5	5/16"-18 bolt, flange washer, and cable clamps on the cable bracket.

- Step 3** Place the cable bracket, attached to the AP, on the cable strand, with each pair of cable clamps clamping on to the cable strand. Then, tighten the cable clamps by tightening the two 5/16"-18 nuts to 13 to 15 lb.ft (17.6 to 20.3 Nm). See [Figure 3-12](#).

Figure 3-12 Attaching the Cable Mount Brackets to the Cable Strand



353476

1	5/16"-18 bolt, flange washer, and cable clamps, which clamp the support cable to the height-adjustable cable bracket	4	5/16"-18 bolt and nut for the height-adjustable cable bracket
2	Cable bracket assembly	5	M8 x 16mm button-head bolts, which fasten the cable bracket assembly to the AP
3	Cable Strand/Support Cable running through center cable grooves	6	5/16"-18 bolt and nut for the height-adjustable cable bracket



Note During installation, the cable strand/support cable might have to be pulled away from the fiber

or cable bundle. Be sure to resecure the cable after installation.

**Note**

The strand support cable and the SMK2 kit together provide the grounding for the access point.

- Step 4** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, “Installing Other Components.”](#)
-

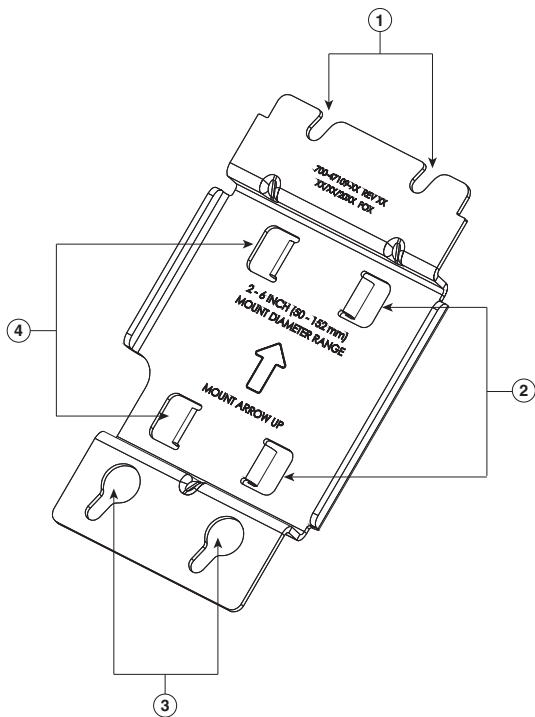
Pole Mount Kit 1

The Pole Mount Kit 1 (abbreviated as PMK1) can be used to vertically mount the AP on a vertical pole. Poles of diameter ranging from 2 to 6 inches (50 to 152 mm) are supported. PMK1 consists of a one-piece pole mount bracket, and two adjustable steel band straps.

[Figure 3-13](#) shows the one-piece pole mount bracket PMK1 kit.

**Note**

PMK1 maintains a very low profile with only a 1.0 inch clearance between the pole and the AP.

Figure 3-13 PMK1 One-Piece Pole Mounting Bracket

1 and 3	Key hole slots for the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK1	2 and 4	Slots for passing the steel band straps through.
----------------	---	----------------	--

For mounting the AP using PMK1, see [Pole Mounting Using PMK1](#), page 3-20.

Pole Mounting Using PMK1

You can use PMK1 for vertically mounting the AP on vertical poles, with diameters ranging from 2 to 6 inches (50 to 152 mm). Ensure that you have the materials listed in [Table 3-4](#) to mount the AP.

Table 3-4 Materials Needed to Mount the AP using PMK1

Material Needed	In Kit?
One PMK1 pole mount bracket	Yes
Four M8 x12mm hex head bolts with built-in washers	Yes
Two stainless steel band straps (adjustable to fit poles of 2– 6 inches, 50–152 mm). These band straps have a pull-lock-tighten system.	Yes
13 mm box-end wrench	No
5/16 socket head wrench for tightening the steel band straps	No

A typical installation using PMK1 is shown in [Figure 3-15](#).

To mount the access point onto a vertical pole or streetlight pole, follow these steps:

Step 1 Select a mounting location on the pole to mount the access point.



Note If you will be using a streetlight power tap adapter, position the access point within 3 ft (1 m) of the outdoor light control. The AC/DC adapter must be used with street light power tap.

Step 2 Slide the two band straps through the top and bottom set of mounting slots on the mounting brackets, and then hold the bracket up against the pole.

Step 3 Wrap the band straps around the pole, lock them and then lightly tighten the clamps using the 5/16 socket head wrench. Only tighten them enough to keep the bracket from sliding down the pole.

Step 4 Screw a M8 x 12mm hex head bolt into each of the four bolt holes on the back side of the access point. Do not screw the bolt in all the way. Leave a gap of about 0.13 inch (3.3 mm). Refer [Figure 3-14](#).

Step 5 Position the four bolts on the access point into the bracket's keyhole slots. Check to be sure that the access point is properly seated in the slots. Refer [Figure 3-14](#).



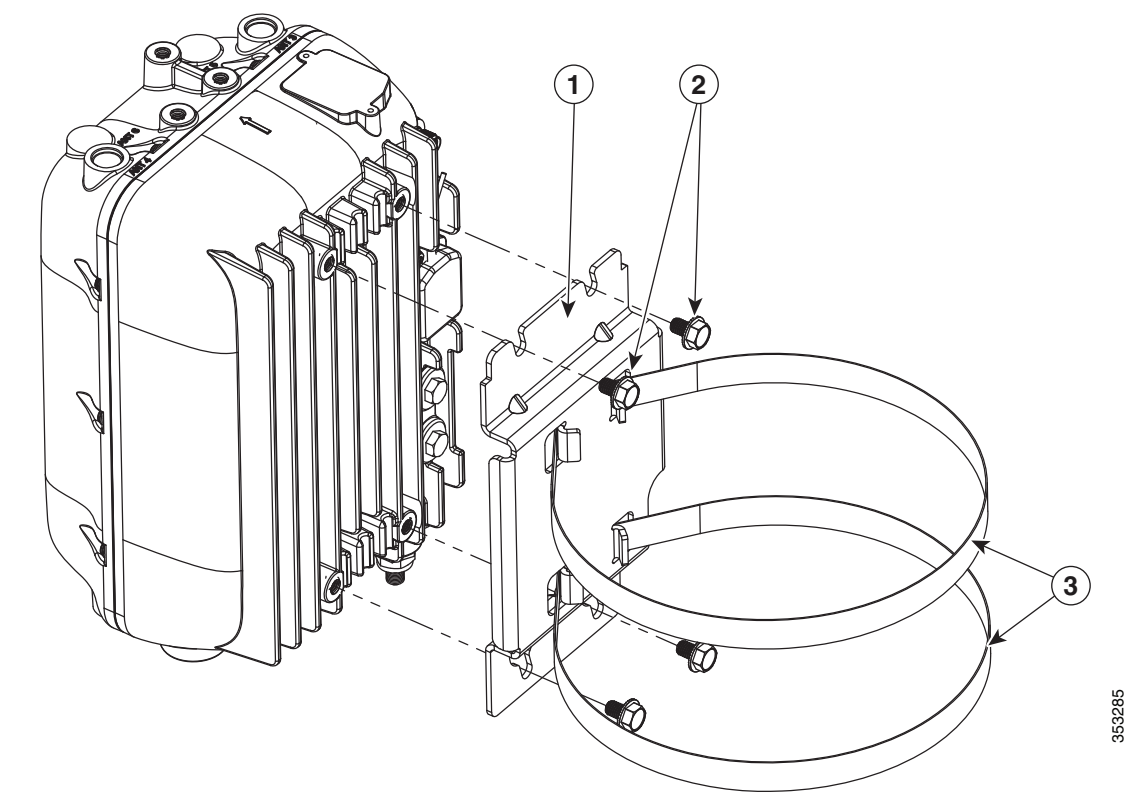
Note Ensure that the access point should be positioned with its base facing the ground so that the LEDs on the base can be viewed from the ground.

Step 6 Using a 13 mm wrench, tighten the four M8 bolts that connect the access point to the bracket to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).

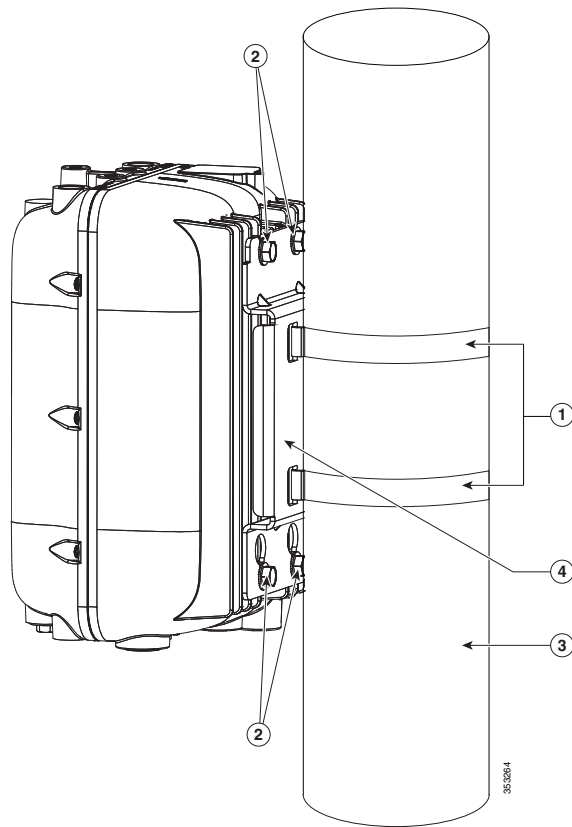
Step 7 Tighten the band straps with the wrench so that the access point does not slide on the pole. Ensure that the straps are tight enough to not let the AP move. Refer [Figure 3-15](#).

Step 8 Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, "Installing Other Components."](#)

Figure 3-14 Exploded view of PMK1 used to Vertically Mount an AP1572E



1	PMK1	2	M8 x 12mm hex head bolt
3	Stainless steel band straps		

Figure 3-15 AP1572E Vertically Mounted on Vertical Pole with PMK1

1	Stainless steel band straps	2	M8 x 12mm hex head bolt
3	Vertical pole	4	PMK1

Pole Mount Kit 2

The Pole Mount Kit 2 (abbreviated as PMK2) can be used to vertically mount the AP on a vertical pole, a horizontal pole, or on an off-angle pole. Poles of diameter ranging from 2 to 16 inches are supported. This kit can also be used to vertically mount the AP on a wall.

The PMK2 consists of these parts:

- A wall mount bracket, for vertical mounting on walls (see [Figure 3-17](#))
- A pivot bracket (see [Figure 3-18](#))
- Two strap brackets (see [Figure 3-19](#))
- Two adjustable steel band straps

The Pivot Bracket and the Strap Brackets, are used only when mounting the AP on poles.

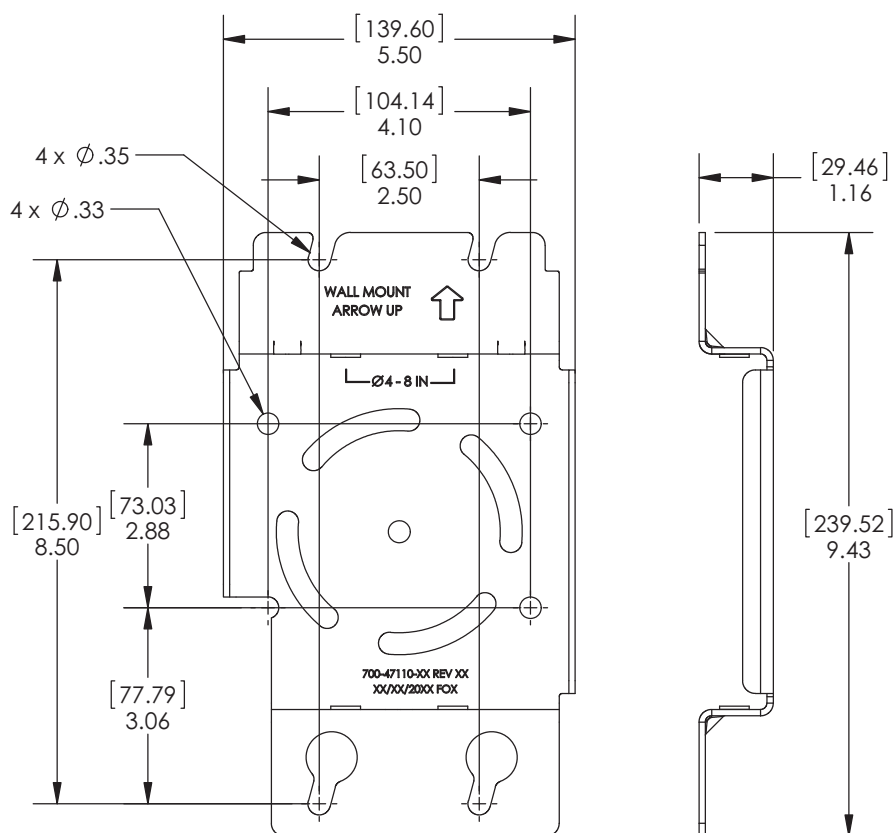
By itself, the Wall Mount Bracket, is used for vertical mounting on the AP on walls. For more information, see [Wall Mounting Using PMK2, page 3-40](#). When mounting the AP on poles, the Wall Mount Bracket is used along with the Pivot Bracket and the Strap Brackets.

When all three pieces of the PKM2 kit are assembled (see [Figure 3-20](#)), the pivot bracket attached to the wall mount bracket allows reorienting the PMK2 mount assembly by up to 90 degrees from vertical. This allows the AP to be vertically mounted on horizontal poles and off-angle poles. The pivot bracket also provides three sets of bolt holes for the strap brackets to attach, thereby supporting three pole diameter ranges: 2 to 6, 6 to 11, and 11 to 16 inches (see [Figure 3-18](#) and [Figure 3-19](#)).

For more information on vertically mounting the AP on poles, see [Pole Mounting Using PMK2](#), [page 3-29](#).

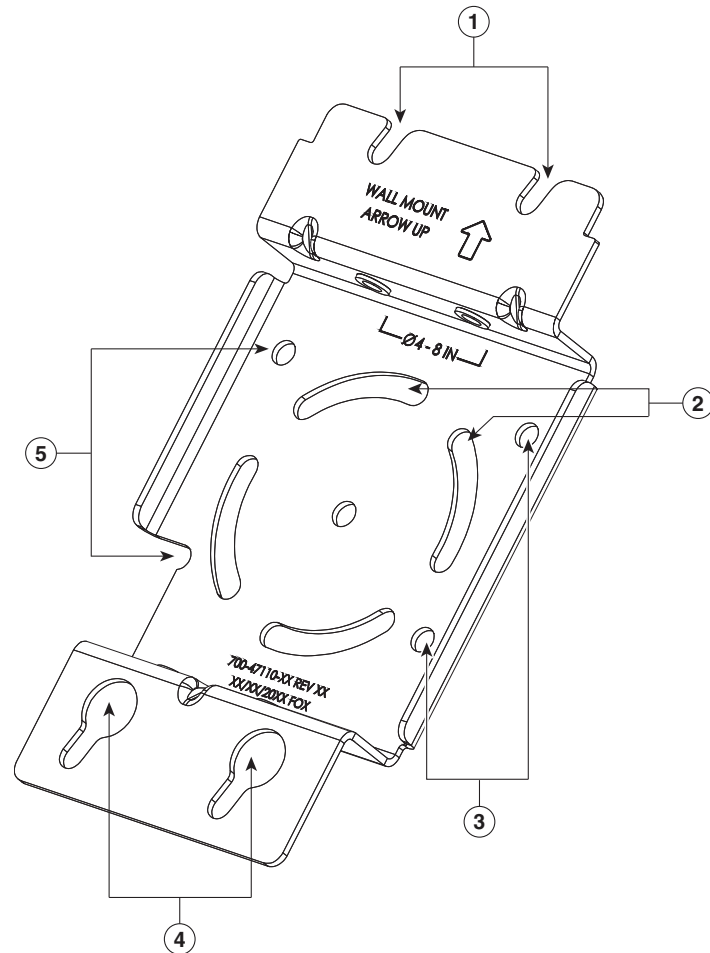
You can choose to discard the pivot bracket and attach the strap brackets directly to the wall mount bracket. However, this assembly can be used for vertically mounting the AP only on vertical poles, with diameter ranging from 4 to 8 inches. See [Vertically Mounting Without Pivot Bracket For 4 to 8 inches Vertical Pole](#), [page 3-37](#).

Figure 3-16 *PMK2 Wall Mount Bracket Dimensions in inches [and millimeters]*

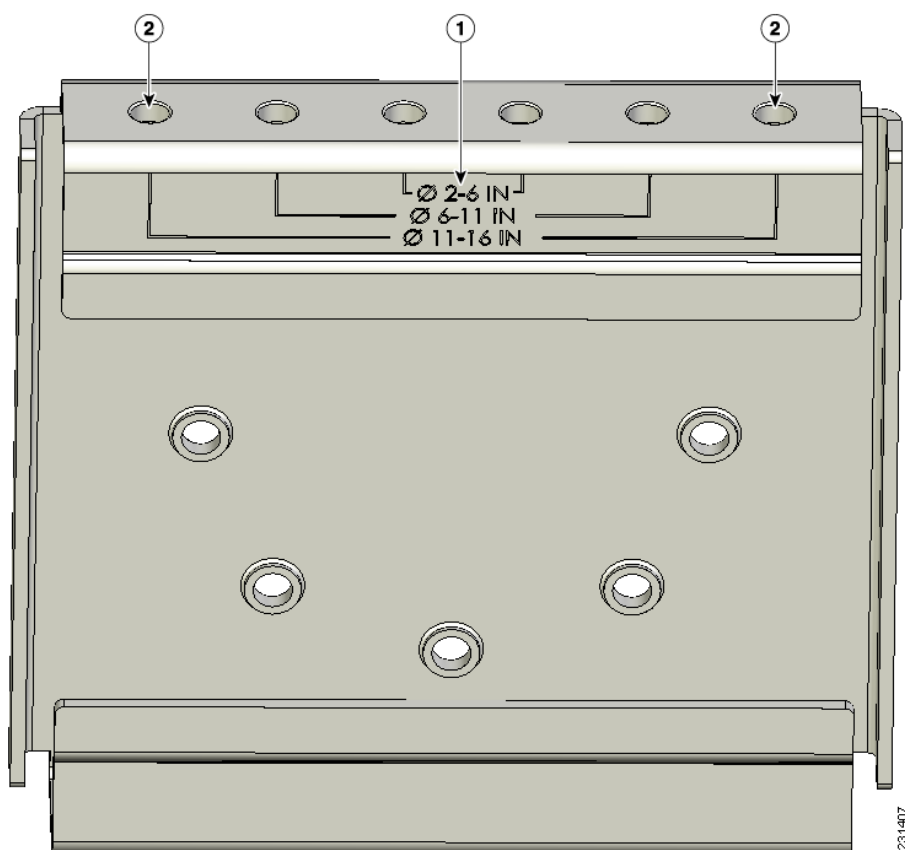


353244

Figure 3-17 PMK2 Wall Mount Bracket

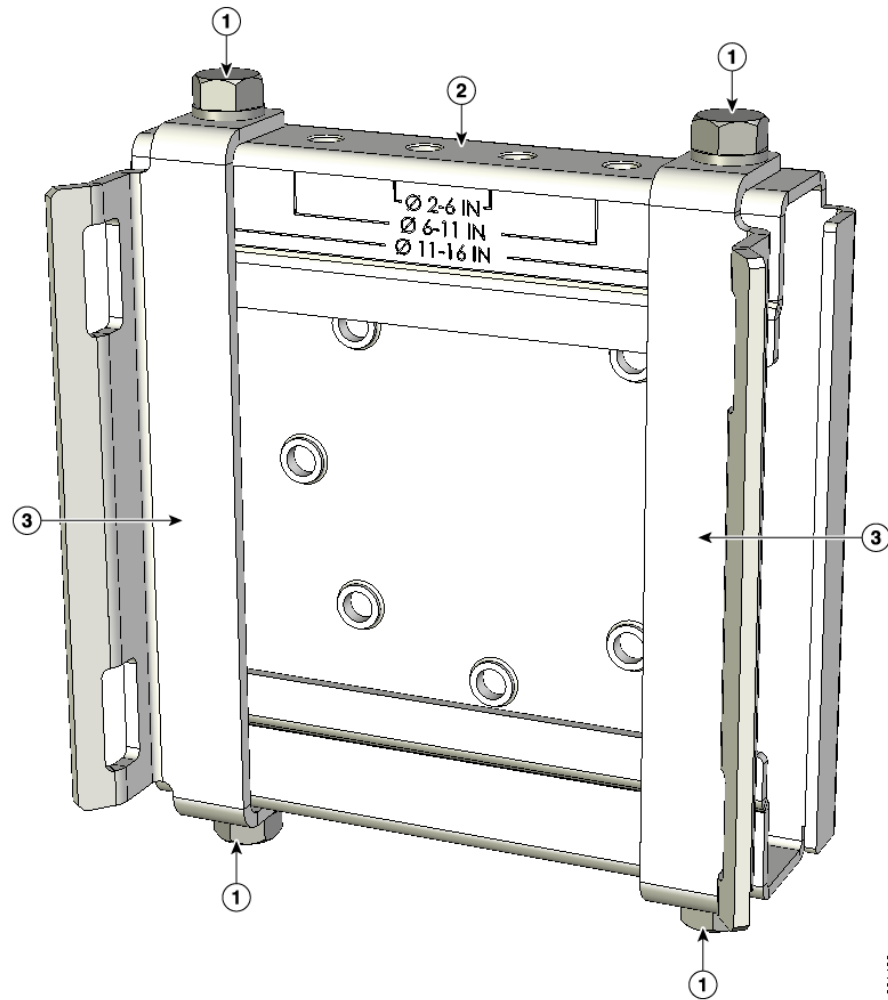


1 and 4	Key hole slots for the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK2 Wall Mount Bracket	2	Curved slots for pivot bracket M8 x 12mm hex head bolts, which allows rotating the wall mount bracket against the pivot bracket.
3 and 5	Screw holes for fasteners to be used when attaching PMK2 Wall Mount Bracket to a wall		

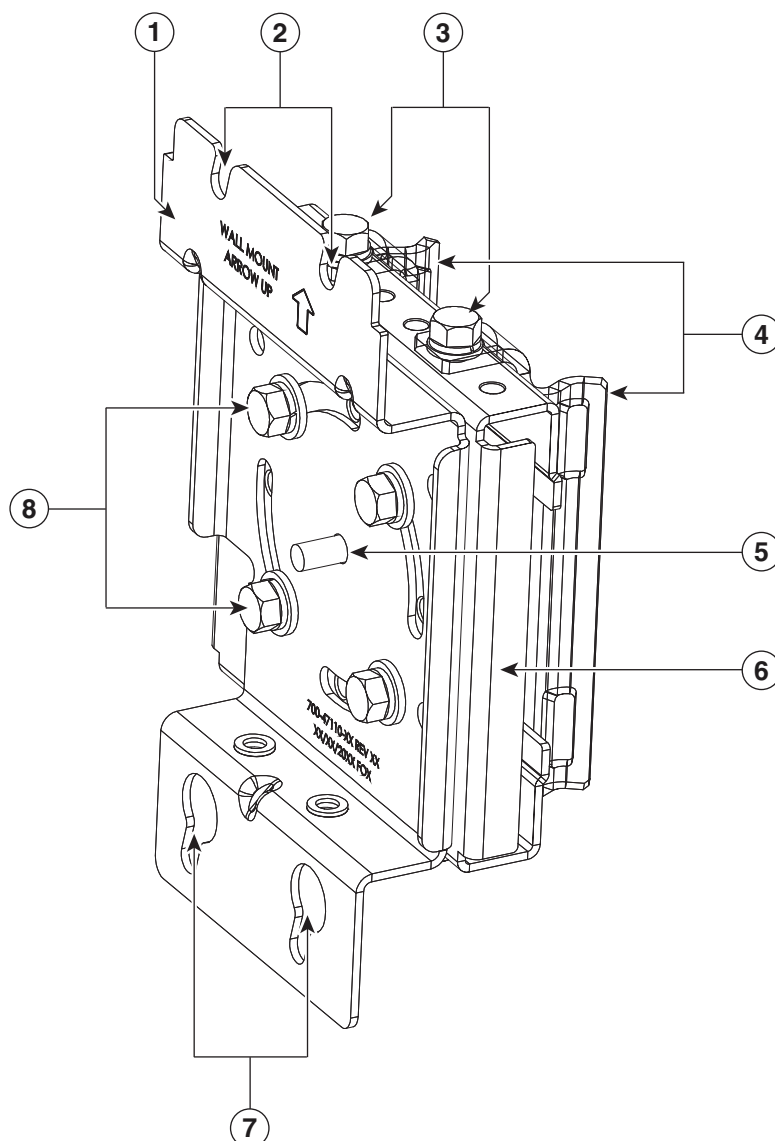
Figure 3-18 *Pivot Bracket with Adjustment Hole Locations*

1	Pole diameter indicators	2	Bolt holes for pole diameters (11 to 16 inches indicated)
---	--------------------------	---	---

Figure 3-19 Strap Brackets assembled on the Pivot Bracket



1	M8 x 16mm bolts	2	Pivot bracket
3	Strap bracket (shown positioned for 11 to 16 inch diameter pole)		

Figure 3-20 All Three Parts of PMK2 Assembled 5

353265

1	PMk2 wall mount bracket	2	Key hole slots for the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK2 Wall Mount Bracket
3	M8 x 16mm bolts, used to mount the strap brackets on to the pivot bracket	4	Strap brackets mounted on the pivot bracket (shown positioned for 6 to 11 inch diameter pole)
5	The axis around which the wall mount bracket can rotate on the pivot bracket. This allows for mounting on off-angle poles.	6	Pivot bracket
7	Key hole slots for the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK2 Wall Mount Bracket	8	M8 x 16mm bolts, used to mount the wall mount bracket on to the pivot bracket

Pole Mounting Using PMK2

You can use PMK2 for vertically mounting the AP on vertical poles, horizontal poles, and off-angle poles of diameter ranging from 2 to 16 inches. For more information, see [Pole Mount Kit 2, page 3-23](#).

Table 3-5 Materials Needed to Mount the AP using PMK2

Material Needed	In Kit?
One PMK2 wall mount bracket	Yes
Two PMK2 strap brackets	Yes
One PMK2 pivot bracket	Yes
Four M8 x12mm hex head bolts	Yes
Eight M8 x16mm bolts (with lock washers)	Yes
13 mm box-end wrench and/or socket	No
Steel Band Strap banding tool (AIR-BAND-INST-TL=)	No



Tip

If you need to vertically mount the AP on vertical poles of diameter ranging from 5 to 8 inches (127 to 203 mm), you can use PMK2 without the pivot bracket. See [Vertically Mounting Without Pivot Bracket For 4 to 8 inches Vertical Pole](#)

To mount the AP using PMK2, follow these steps.

- Step 1** Position the strap brackets on the pivot bracket according to the diameter of the pole. Secure each strap bracket with two M8 x16 bolts (with lock washers) and M8 nuts ([Figure 3-21](#)). Tighten the bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 2** Select a mounting location on the pole to mount the access point.
- For vertical poles, position the strap and pivot brackets assembly as shown in [Figure 3-24](#). The pivot bracket is oriented vertically.
 - For horizontal poles, position the strap and pivot brackets assembly as shown in [Figure 3-25](#). The pivot bracket is oriented horizontally.



Note

If you will be using a streetlight power tap adapter, position the access point within 3 ft (1 m) of the outdoor light control

- Step 3** Mount the strap and pivot brackets assembly at the mounting location on the pole, using the two band straps (refer [Figure 3-23](#)), as follows:
- For pole diameters more than 3.5 inch (89 mm), loop each metal band strap twice through the slots on the strap brackets (see [Figure 3-22](#)). Follow the instructions provided with the band strap tool (BAND IT) (AIR-BAND-INST-TL=).
 - For pole diameters equal to or less than 3.5 inch (89 mm), loop each metal band strap twice through the slots on the strap brackets and also through the narrow space between the pole clamp bracket and the strap brackets (see [Figure 3-22](#)). This ensures maximum holding strength, especially for extreme environments. Following the instructions provided with the band strap tool (BAND IT) (AIR-BAND-INST-TL=).

**Caution**

Do not loop the metal band straps through the large open area between the pole clamp bracket and the strap brackets (see [Figure 3-22](#)), because this does not properly secure the access point.

**Caution**

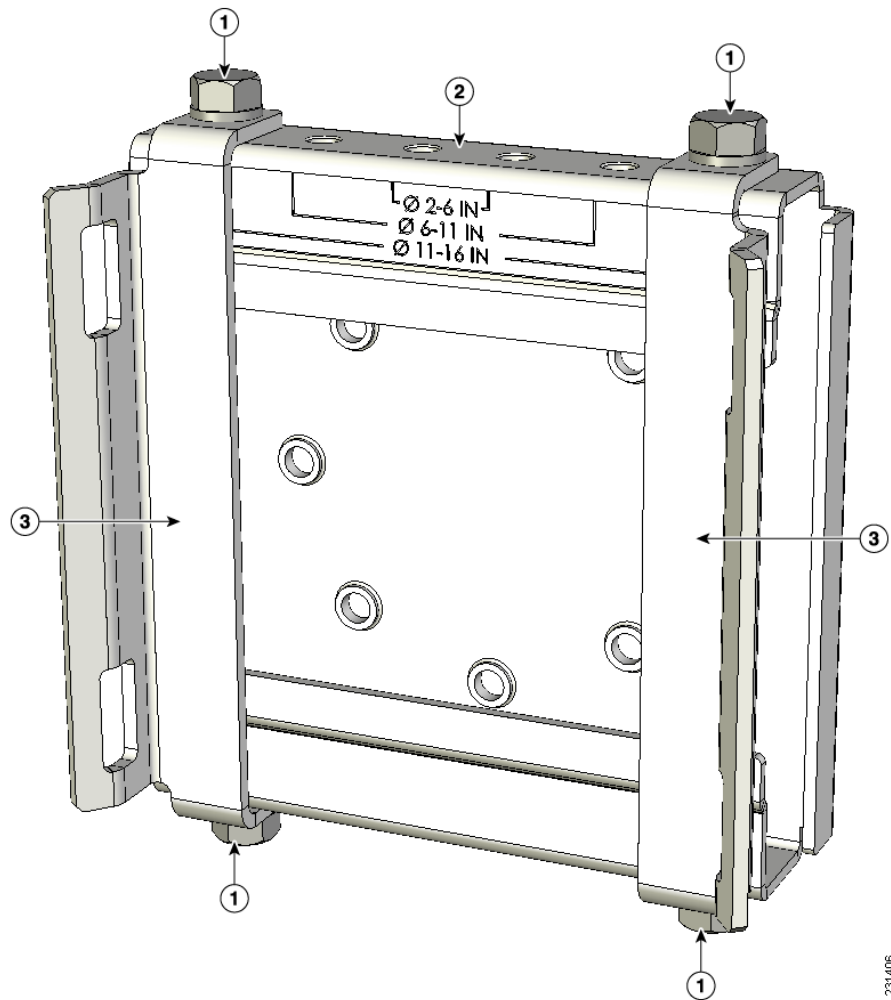
Position the strap and pivot brackets assembly on the pole as needed before tightening the metal band straps. After the metal band straps are tightened to the full tension, the strap and pivot brackets assembly's position on the pole cannot be adjusted unless the metal band straps are cut or disassembled.

- Step 4** Tighten the metal band straps 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 band straps are as tight as possible.
- Step 5** Hold the wall mount bracket against the pivot bracket such that the curved slots and the bolt holes line up.
- Step 6** Insert and hand-tighten four M8 x16 bolts (with flat and lock washers) into the bolt holes. Do not over tighten.
- Step 7** For off-angle poles, you can now rotate the mounting bracket as required. Rotate to ensure that the AP will be oriented vertically and that the LEDs on the base of the AP will be visible from the ground.

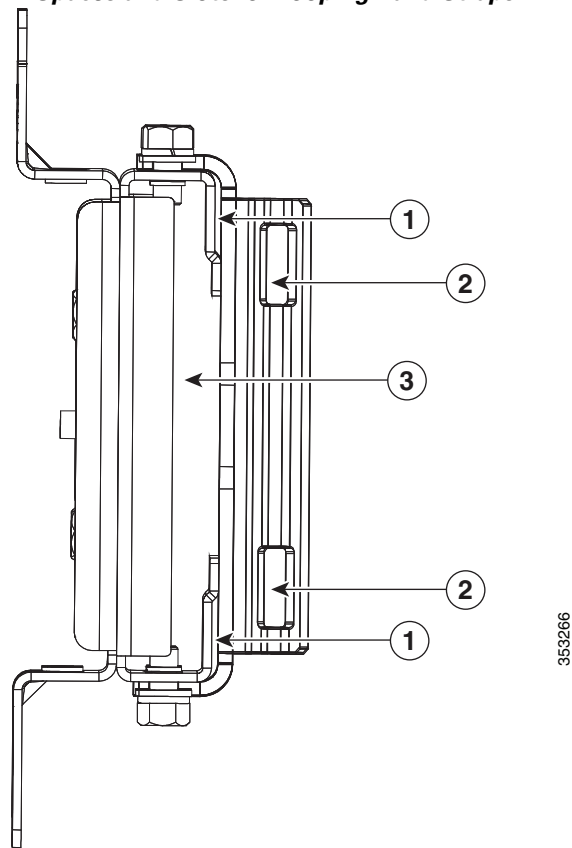
**Note**

The wall mount bracket can be rotated to up to 45° from the vertical, while attached to the pivot bracket. This allows you to compensate for the tilt of off-angle poles, such as tilted streetlight arms.

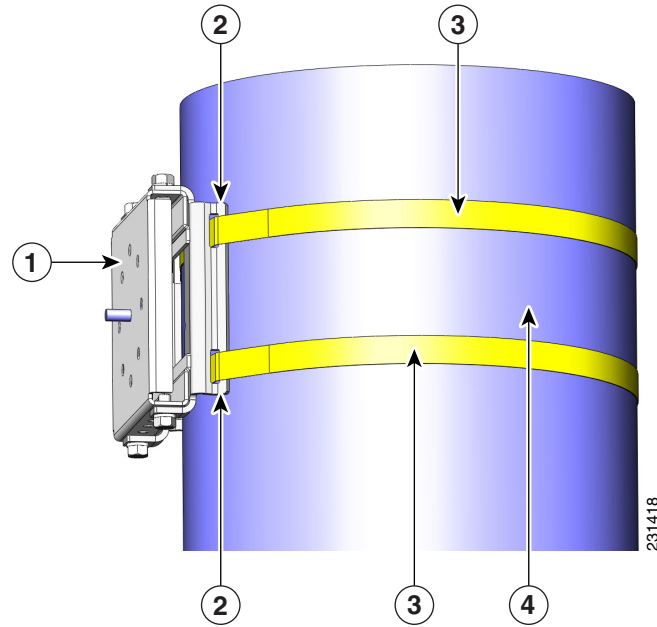
- Step 8** Make final adjustments, if needed, to the top edge of the wall mount bracket so that it is horizontal. Ensure such that the AP will be oriented vertically and that the LEDs on the base of the AP will be visible from the ground. Then tighten the bolts four bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 9** Screw an M8 bolt into each of the four bolt holes on the back side of the access point. Do not screw the bolt in all the way. Leave a gap of about 0.13 inch (3.3 mm).
- Step 10** Position the four bolts on the access point into the bracket's keyhole slots. Check to ensure that the access point is properly seated in the slots. (see [Figure 3-26](#))
- Step 11** Using a 13 mm open-end or socket wrench, tighten the four bolts that connect the access point to the bracket to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 12** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, "Installing Other Components."](#)

Figure 3-21 Strap Brackets attached to Pivot Bracket

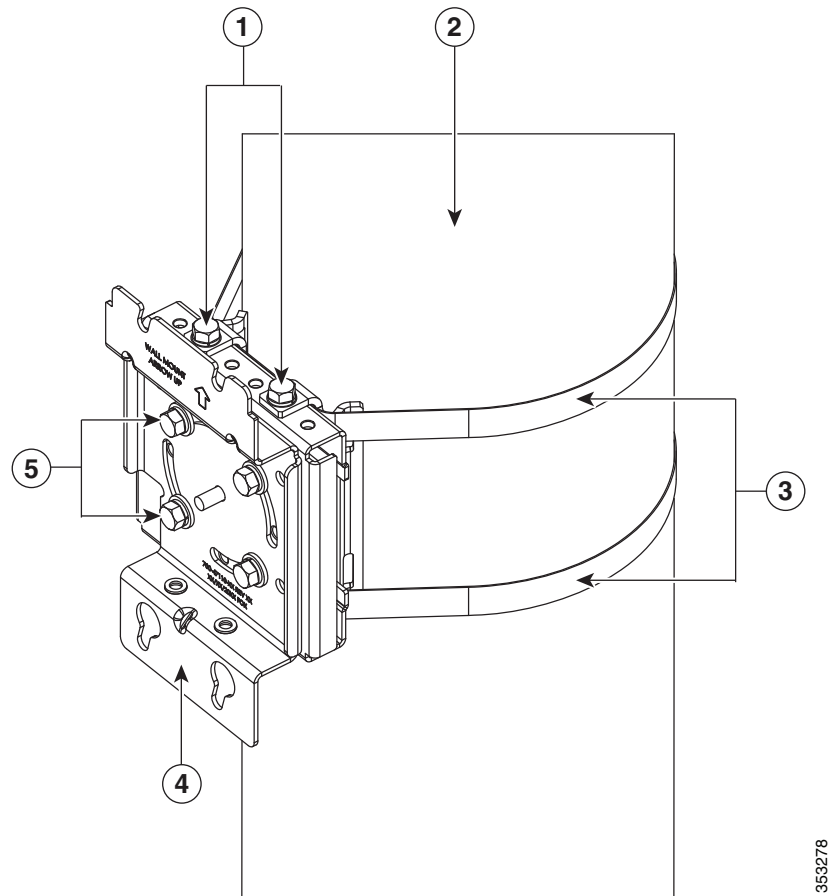
1	M8 x 16mm bolts (with lock washers)	3	Strap bracket (shown positioned for 11 to 16 inch diameter pole)
2	Pivot bracket		

Figure 3-22 Spaces and Slots for Looping Band Straps

1	Narrow space for looping metal band straps through. To be done for poles of diameter 3.5 inches or less.	2	Slots on Strap Brackets. To be used for looping metal band straps through, when mounting on poles of diameter more than 3.5 inches.
3	Large open space which is not to be used for looping.		

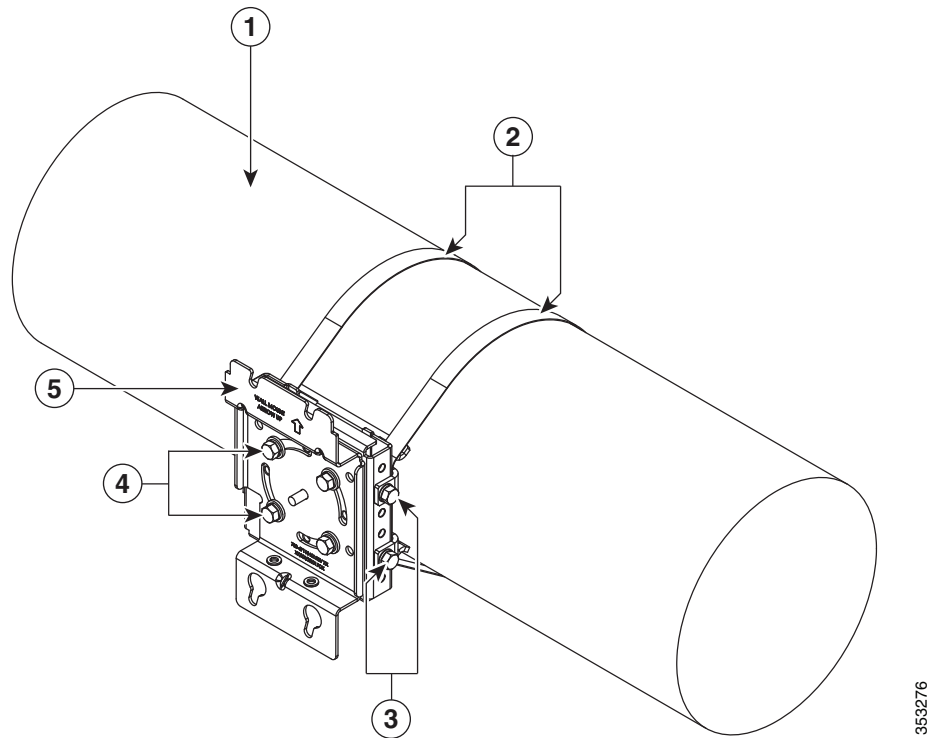
Figure 3-23 Strap Bracket-Pivot Bracket Assembly Mounted on Pole with Band Straps

1	Pivot bracket	3	Metal band straps
2	Strap slot in Strap bracket	4	Pole

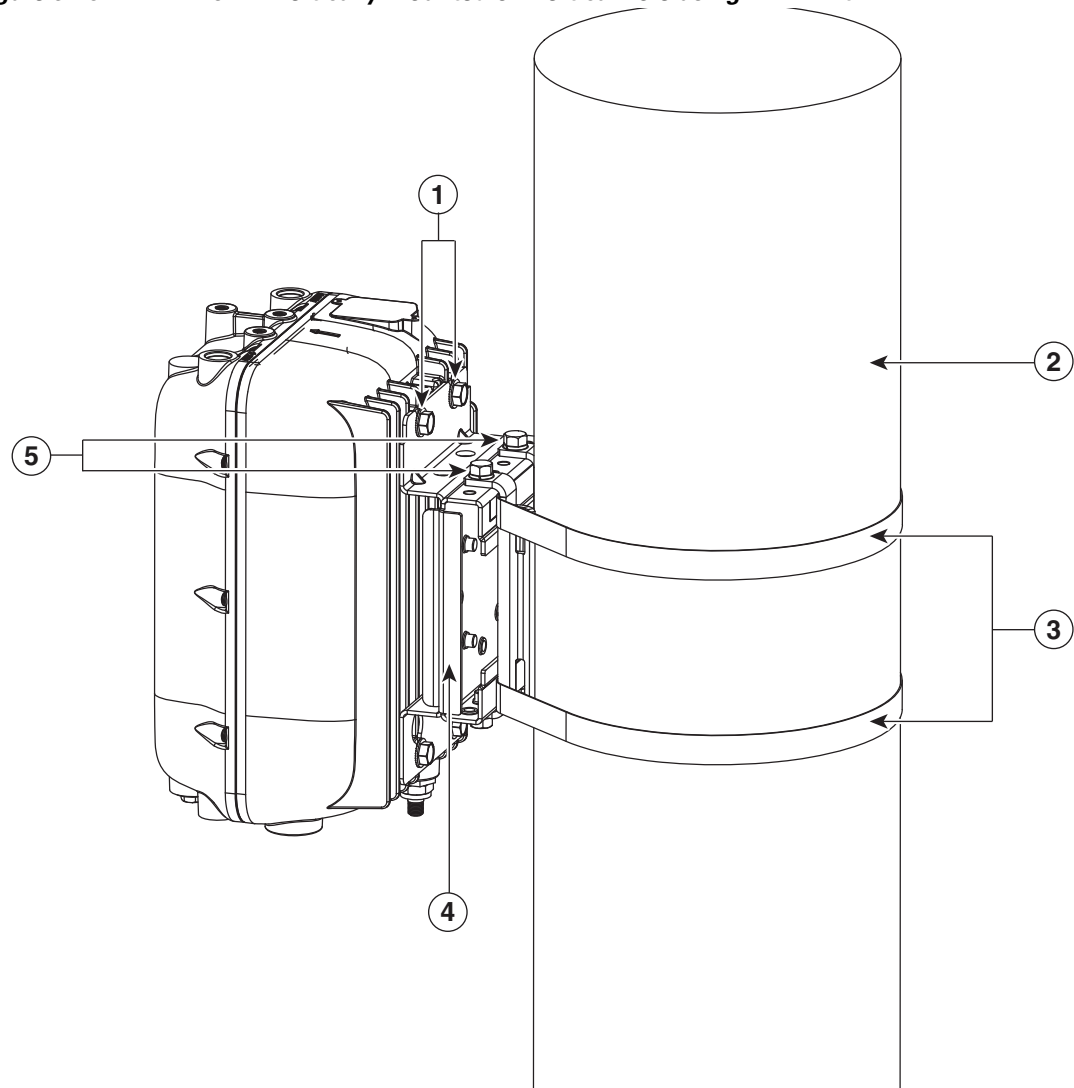
Figure 3-24 Wall Bracket Attached to Strap Bracket-Pivot Bracket Assembly for Vertical Pole

1	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in vertical orientation.	2	Pole
3	Metal band straps	4	Wall mount bracket, mounted on strap bracket-pivot bracket assembly
5	M8 x16mm bolts, used to mount the wall mount bracket on to the pivot bracket		

Figure 3-25 Wall Bracket attached to Strap Bracket-Pivot Bracket Assembly for Horizontal Pole



1	Pole	2	Metal band straps
3	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in horizontal orientation.	4	M8 x16mm bolts, used to mount the wall mount bracket on to the pivot bracket
5	Wall mount bracket, mounted on strap bracket-pivot bracket assembly		

Figure 3-26 AP1572E Vertically Mounted on Vertical Pole using PMK2 Kit

1	M8x12mm bolts, used to fasten the AP to the PMK2 wall mount bracket	2	Pole
3	Metal band straps	4	Pivot bracket
5	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in vertical orientation.		

Vertically Mounting Without Pivot Bracket For 4 to 8 inches Vertical Pole

If you need to vertically mount the AP on vertical poles of diameter ranging from 4 to 8 inches (102 to 203 mm), you can use PMK2 without the pivot bracket. In this case, you fix the PMK2 strap brackets directly to the PMK2 wall mount bracket.

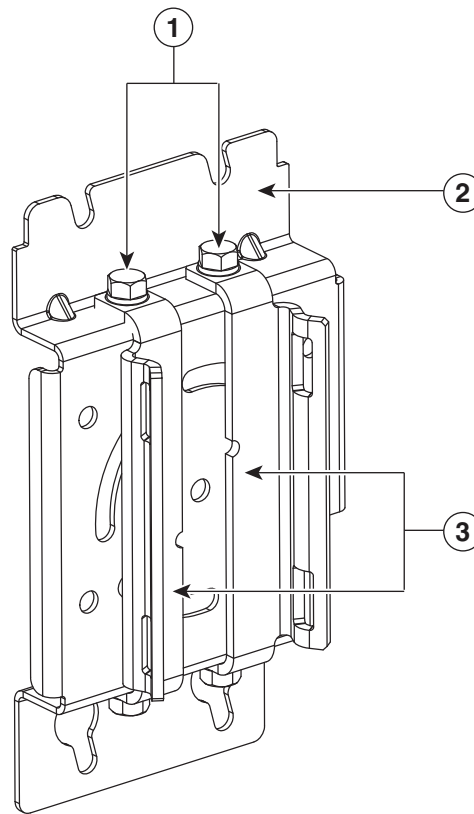
-
- Step 1** Position the strap brackets on the wall mount bracket as shown in [Figure 3-27](#).
- Step 2** Secure each strap bracket with two M8 x16 bolts (with lock washers). Tighten the bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 3** Select a mounting location on the pole to mount the access point.
- Step 4** Mount the strap and wall-mount brackets assembly to the pole using the two metal band straps (refer [Figure 3-28](#)). Ensure such that the AP will be oriented vertically and that the LEDs on the base of the AP will be visible from the ground.

Loop each band strap twice through the slots on the strap bracket, and then tighten the band straps using the band strap tool (BAND IT) (AIR-BAND-INST-TL=). Follow the operating instructions provided by tool's manufacturer to tighten the metal bands to full tension.

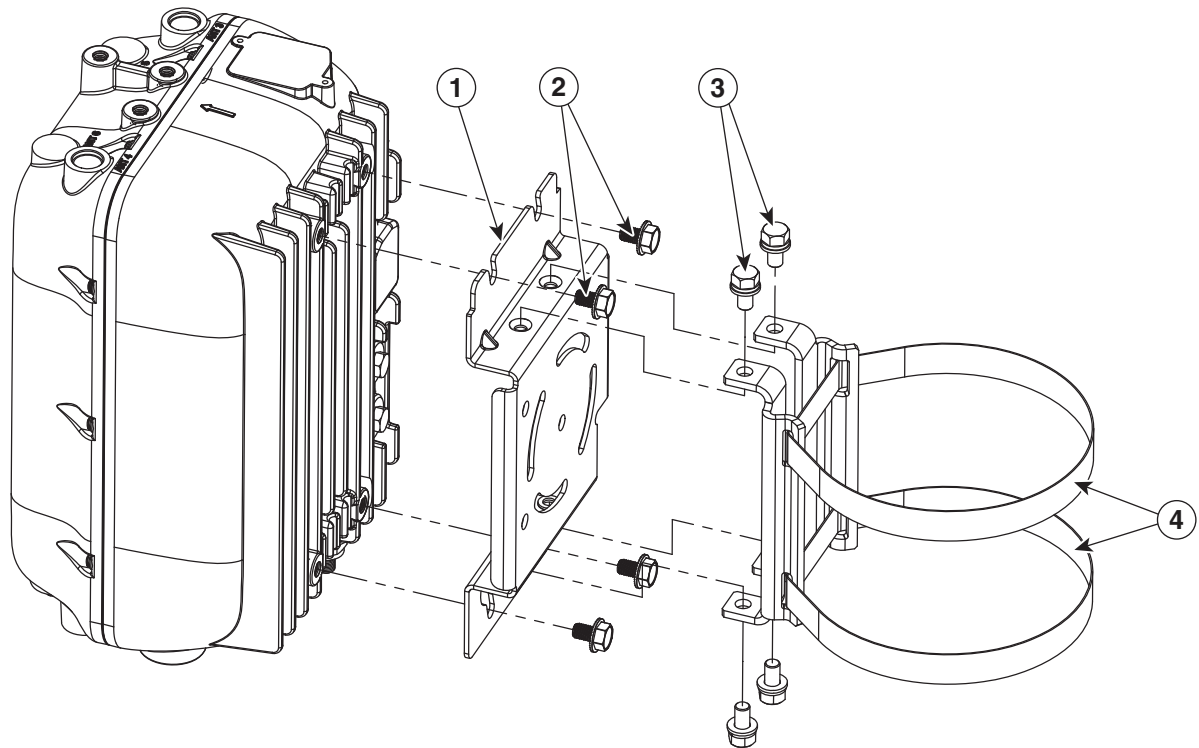


Note Installing and final tightening of the band straps are done together. After the metal bands are tightened to full tension, the position of the AP on the pole cannot be adjusted unless the metal bands are cut or disassembled.

- Step 5** Screw an M8 x 12 mm bolt into each of the four bolt holes on the back side of the access point. Do not screw the bolt in all the way. Leave a gap of about 0.13 inch (3.3 mm).
- Step 6** Position the four bolts on the access point into the bracket's keyhole slots. Check to ensure that the access point is properly seated in the slots. (refer [Figure 3-28](#))
- Step 7** Using a 13mm wrench, tighten the four bolts that connect the access point to the bracket to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 8** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, "Installing Other Components."](#)
-

Figure 3-27 PMK2 Strap Brackets directly attached to PMK2 Wall Mount Bracket

1	M8x16mm bolts used to attach the strap brackets to the wall mount bracket	2	PMK2 wall mount bracket
3	PMK2 strap brackets		

Figure 3-28 Exploded view of PMK2 mount without Pivot Bracket for 4 to 8 inches Vertical Pole

353282

1	PMK2 wall mount bracket	2	M8x12mm bolts, used to fasten the AP to the PMK2 wall mount bracket
3	M8x16mm bolts used to attach the strap brackets to the wall mount bracket	4	Band straps

Wall Mounting Using PMK2

To vertically mount the AP on a wall, you can use PMK2 without the pivot bracket and the strap brackets. Using only the PMK2 wall mount bracket, you can vertically mount the AP on a wall. For more information about PMK2, see [Pole Mount Kit 2, page 3-23](#).

Table 3-6 Materials Needed to Mount the AP on a Wall using PMK2

Material Needed	In Kit?
One PMK2 wall mount bracket	Yes
Four M8 x12mm hex head bolts	Yes
The mounting hardware and tools required to secure the PMK2 Wall Mount Bracket, to wall or vertical surface, depends on the material of the wall or vertical surface. The mounting surface, attaching screws, and optional wall anchors you may use, must be able to support a 50-lb (22.7 kg) static weight.	No
13 mm box-end wrench	No



Caution

The mounting surface, attaching screws, and optional wall anchors must be able to support a 50-lb (22.7 kg) static weight, and should conform to all local codes and regulations.

To mount the access point on a vertical wall, follow these instructions:

Step 1 Use the wall mount bracket as a template to mark four screw hole locations on your mounting surface. The recommended screw hole locations are shown in [Figure 3-17](#). The dimensions of the wall mount bracket are shown in [Figure 3-16](#).

Step 2 Using four screws and optional screw anchors, attach the wall mount bracket to the wall. Ensure that the four screws are fully tightened.



Note

If necessary, use suitable screw anchors and an exterior-grade plywood backboard to mount the access point to stucco, cement, or drywall.

Step 3 Screw an M8 bolt into each of the four bolt holes on the back side of the access point. Do not screw the bolt in all the way. Leave a gap of about 0.13 inch (3.3 mm).

Step 4 Position the four bolts on the access point into the bracket's keyhole slots. Check to be sure that the access point is properly seated in the slots.

Step 5 Using a 13mm wrench, tighten the four bolts that connect the access point to the bracket to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).

Step 6 Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, "Installing Other Components."](#)

Pole Mount Kit 3

The Pole Mount Kit 3 (abbreviated as PMK3) can be used to horizontally mount the AP on a vertical pole, a horizontal pole, or on an off-angle pole, that has a diameter of 2 to 16 inches. This kit can also be used to horizontally mount the AP on a wall.

The PMK3 consists of these parts:

- A wall mount bracket for horizontal mounting (see [Figure 3-30](#))
- A pivot bracket, same as that in PMK2 (see [Figure 3-18](#))
- Two strap brackets, same as those in PMK2 (see [Figure 3-19](#))
- Two adjustable steel band straps

[Figure 3-18](#) illustrates the pole diameter indicators and bolt holes on the pivot bracket. The Pivot Bracket and the Strap Brackets, are used only when mounting the AP on poles.

By itself, the PMK3 Wall Mount Bracket, is used for horizontally mounting on the AP on walls. For more information, see [Wall Mounting Using PMK3, page 3-50](#). When mounting the AP on poles, the Wall Mount Bracket is used along with the Pivot Bracket and the Strap Brackets.

When all three pieces of the PKM3 kit are assembled, the pivot bracket attached to the wall mount bracket allows reorienting the PMK2 mount assembly by up to 90 degrees from vertical. This allows the AP to be vertically mounted on horizontal poles and off-angle poles. The pivot bracket also provides three sets of bolt holes for the strap brackets to attach, thereby supporting three pole diameter ranges: 2 to 6, 6 to 11, and 11 to 16 inches (see [Figure 3-18](#) and [Figure 3-19](#)).

For more information on horizontally mounting the AP on poles, see [Pole Mounting Using PMK3, page 3-43](#).

Figure 3-29 PMK3 Wall Mount Bracket Dimensions in inches [and millimeters]

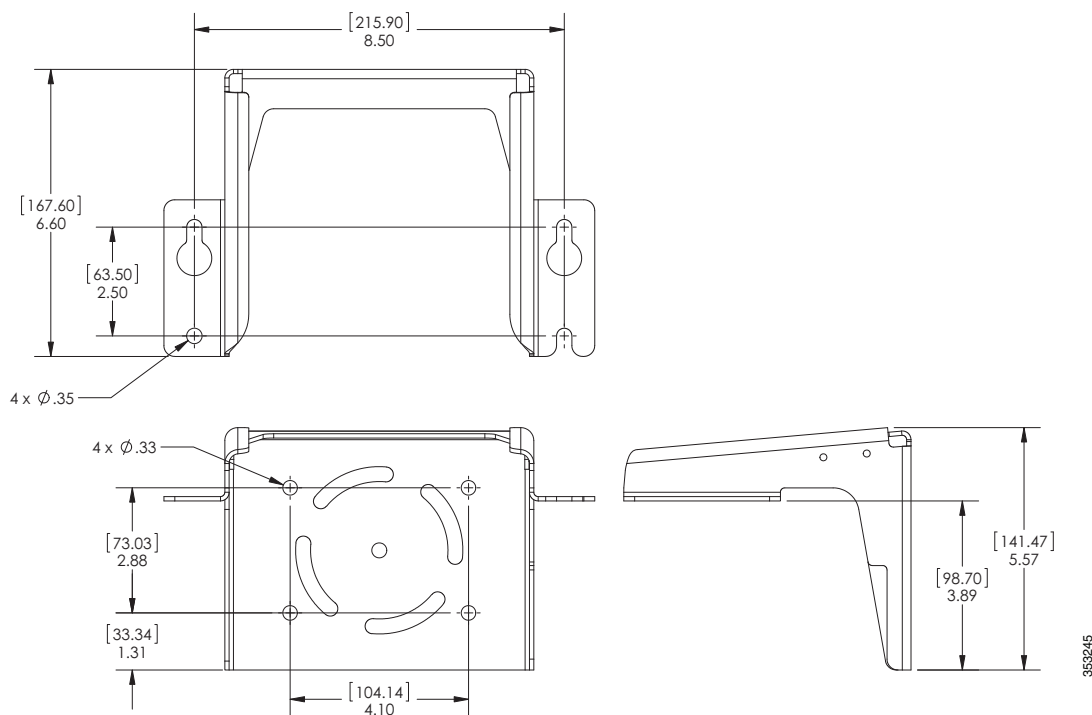
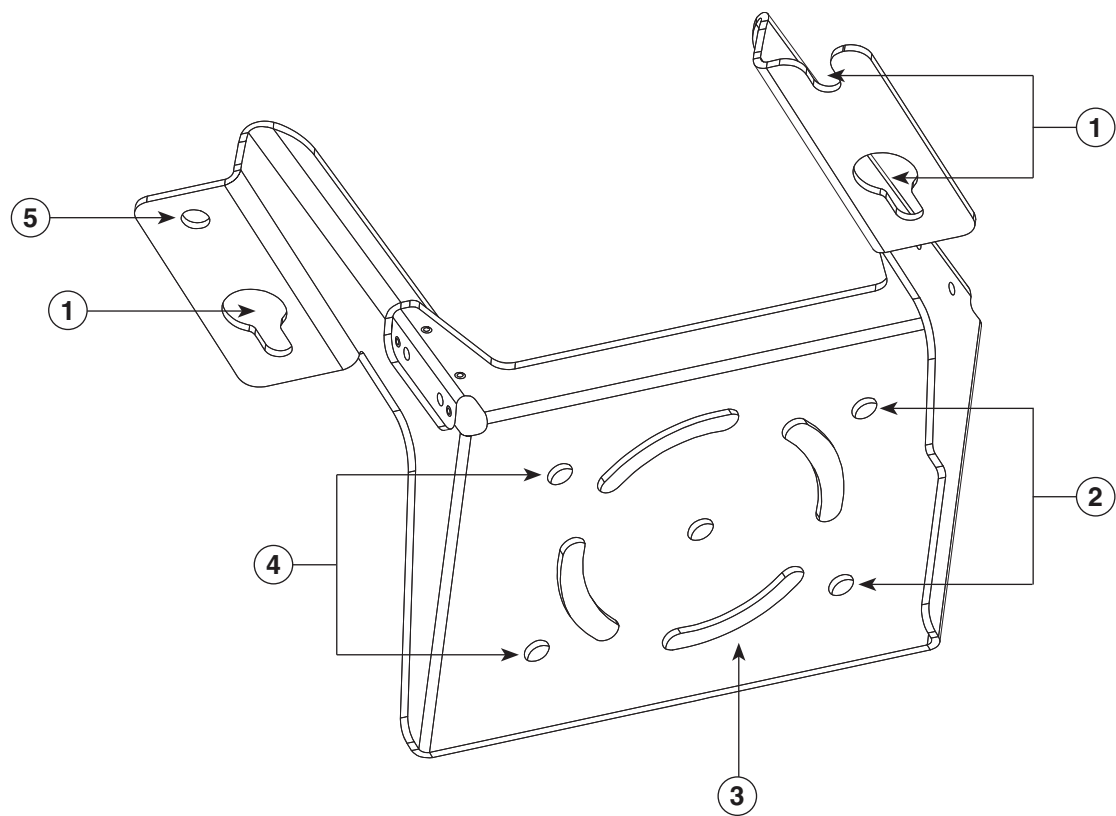


Figure 3-30 PMK3 Wall Mounting Bracket for Mounting AP Horizontally

1	Key hole slots for three of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket.	2 and 4	Screw holes for fasteners to be used when attaching PMK3 Wall Mount Bracket to a wall.
3	Curved slots for pivot bracket M8 x 12mm hex head bolts, which allows rotating the wall mount bracket against the pivot bracket.	5	Screw hole for one of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket. When this bolt alone fastens the AP to the wall mount bracket, then it can be used to as pivot to rotate the AP outwards for easy access to ports 7 and 8.

Pole Mounting Using PMK3

You can use PMK3 for horizontally mounting the AP on vertical poles, horizontal poles, and on off-angle poles of diameter ranging from 2 to 16 inches. For more information about PMK3, see [Pole Mount Kit 3, page 3-41](#).

Table 3-7 Materials Needed to Mount the AP using PMK3

Material Needed	In Kit?
One PMK3 wall mount bracket	Yes
Two PMK3 strap brackets	Yes
One PMK3 pivot bracket	Yes
Four M8 x12mm hex head bolts	Yes
Eight M8 x16mm bolts (with lock washers)	Yes
Two 0.75 inches (19 mm) stainless steel band straps (adjustable 2– 6 inches, 50–406 mm)	Yes
13 mm box-end wrench	No
Steel Band Strap banding tool (AIR-BAND-INST-TL=)	No

To mount the AP using PMK3, follow these steps.

- Step 1** Position the strap brackets on the pivot bracket according to the diameter of the pole. Secure each strap bracket with two M8 x16 bolts (with lock washers) and M8 nuts ([Figure 3-21](#)). Tighten the bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 2** Select a mounting location on the pole to mount the access point.
- For vertical poles, position the strap and pivot brackets assembly as shown in [Figure 3-32](#). The pivot bracket is oriented vertically.
 - For horizontal poles, position the strap and pivot brackets assembly as shown in [Figure 3-33](#). The pivot bracket is oriented horizontally.



Note

If you will be using a streetlight power tap adapter, position the access point within 3 ft (1 m) of the outdoor light control

- Step 3** Mount the strap and pivot brackets assembly at the mounting location on the pole, using the two band straps, as follows:
- For pole diameters more than 3.5 inch (89 mm), loop each metal band strap twice through the slots on the strap brackets (see [Figure 3-22](#)). Follow the instructions provided with the band strap tool (BAND IT) (AIR-BAND-INST-TL=).
 - For pole diameters equal to or less than 3.5 inch (89 mm), loop each metal band strap twice through the slots on the strap brackets and also through the narrow space between the pole clamp bracket and the strap brackets (see [Figure 3-22](#)). This ensures maximum holding strength, especially for extreme environments. Following the instructions provided with the band strap tool (BAND IT) (AIR-BAND-INST-TL=).

**Caution**

Do not loop the metal band straps through the large open area between the pole clamp bracket and the strap brackets (see [Figure 3-22](#)), because this does not properly secure the access point.

**Caution**

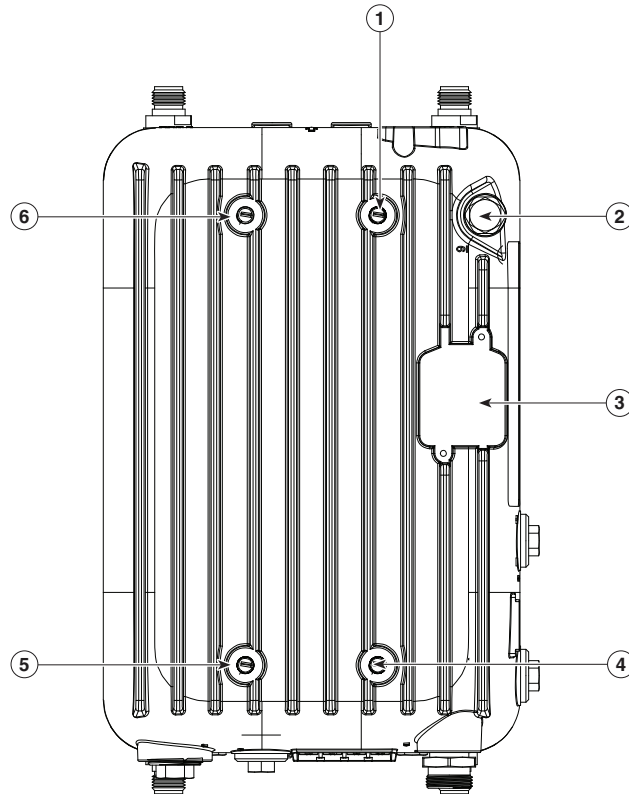
Position the strap and pivot brackets assembly on the pole as needed before tightening the metal band straps. After the metal band straps are tightened to the full tension, the strap and pivot brackets assembly's position on the pole cannot be adjusted unless the metal band straps are cut or disassembled.

- Step 4** Tighten the metal band straps 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 band straps are as tight as possible.
- Step 5** Hold the PMK3 horizontal wall mount bracket against the pivot bracket such that the curved slots and the bolt holes line up.
- Step 6** Insert and hand-tighten four M8 x16 bolts (with flat and lock washers) into the bolt holes. Do not over tighten.
- Step 7** For off-angle poles, you can now rotate the mounting bracket as required. Rotate to ensure that the AP will be oriented vertically and that the LEDs on the base of the AP will be visible from the ground.

**Note**

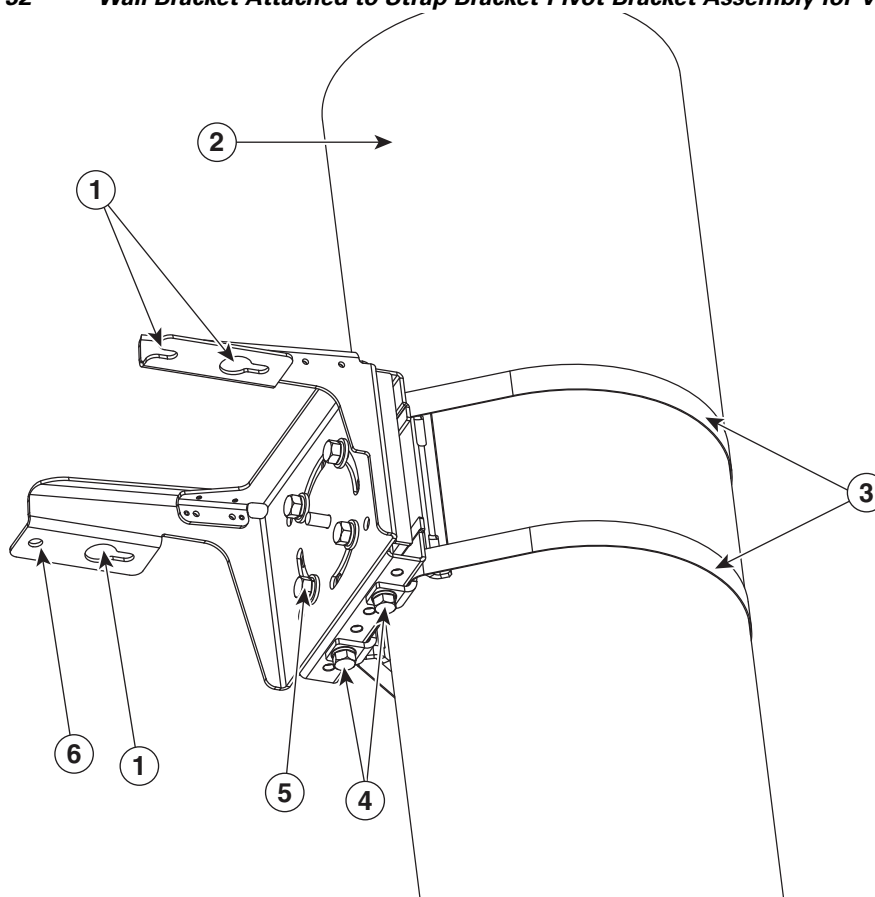
The horizontal wall mount bracket can be rotated to up to 45° from the vertical, while attached to the pivot bracket. This allows you to compensate for the tilt of off-angle poles, such as tilted streetlight arms.

- Step 8** Make final adjustments, if needed, to the top edge of the horizontal wall mount bracket so that it is horizontal. Ensure such that the AP will be oriented vertically and that the LEDs on the base of the AP will be visible from the ground. Then tighten the bolts four bolts to 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 9** Screw M8 bolts into three of the four bolt holes on the back side of the access point (Screw holes 1, 4, and 5 in [Figure 3-31](#))
Do not screw in the bolts all the way. Leave a gap of about 0.13 inch (3.3 mm).
- Step 10** Position the three bolts on the access point into the wall mount bracket's keyhole slots. Check to ensure that the access point is properly seated in the slots. (see [Figure 3-34](#))
- Step 11** Screw in the fourth M8 x 12mm hex head bolt into the non-keyhole type screw hole (Screw hole 6 in [Figure 3-31](#)).
Using a 13 mm open-end or socket wrench, tighten all four M8 x 12mm hex head bolts to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).
- Step 12** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, "Installing Other Components."](#)

Figure 3-31 Keyhole type Screw Holes and the Non-keyhole type Screw Hole

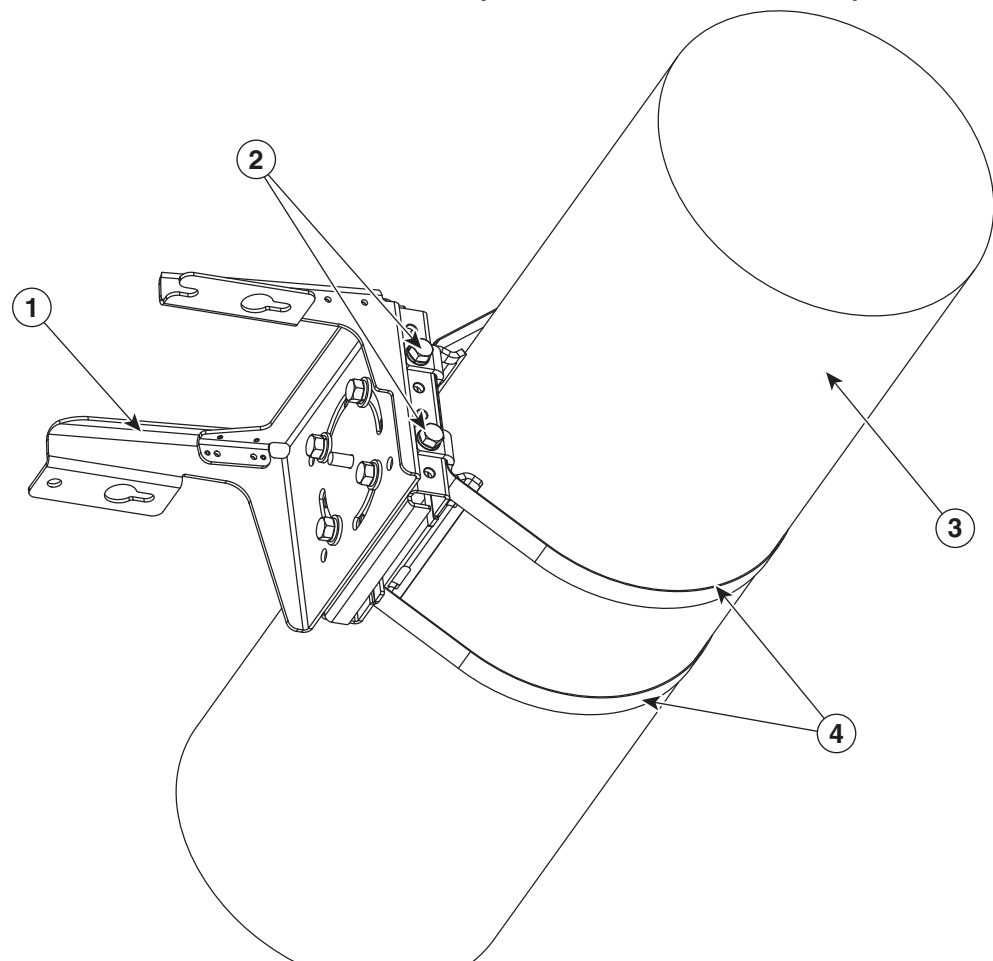
353475

1, 4, and 5	Keyhole type slots for three of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket.	2	AP's GPS antenna connector port
3	Spot for mounting GPS antenna on the back of the AP.	6	Screw hole for one of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket. When this bolt alone fastens the AP to the wall mount bracket, then it can be used to as pivot to rotate the AP outwards for easy access to ports 7 and 8.

Figure 3-32 Wall Bracket Attached to Strap Bracket-Pivot Bracket Assembly for Vertical Pole

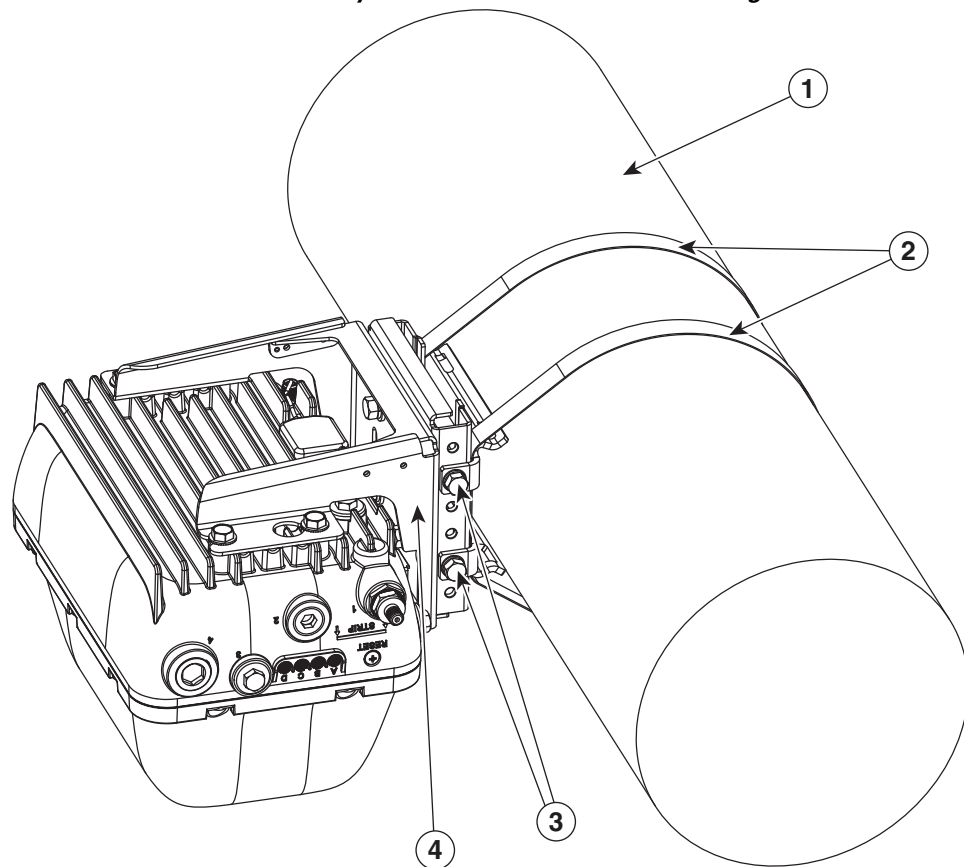
1	Key hole slots for three of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket.	2	Pole
3	Metal band straps	4	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in vertical orientation.
5	M8 x16mm bolts, used to mount the wall mount bracket on to the pivot bracket	6	Screw hole for one of the four M8 x 12mm hex head bolts, using which the AP is mounted on PMK3 Wall Mount Bracket. When this bolt alone fastens the AP to the wall mount bracket, then it can be used to as pivot to rotate the AP outwards for easy access to ports 7 and 8.

Figure 3-33 Wall Bracket attached to Strap Bracket-Pivot Bracket Assembly for Horizontal Pole



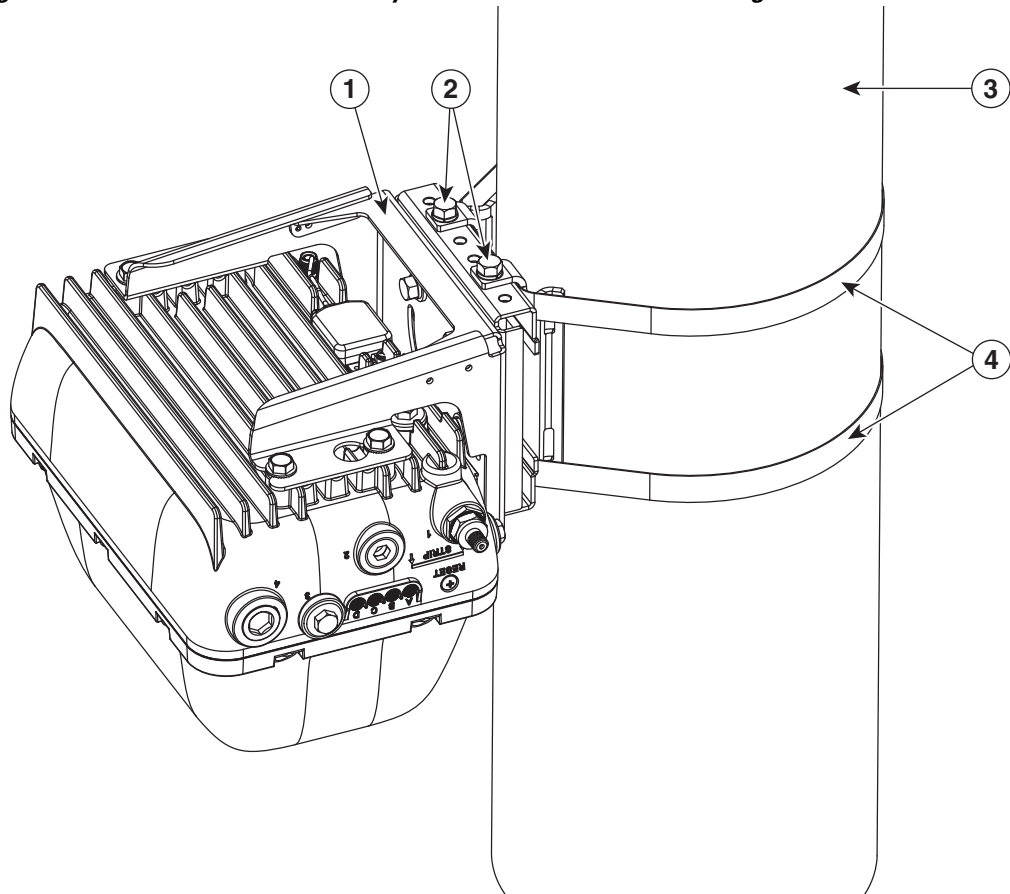
353280

1	PMK3 wall mount bracket	2	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in horizontal orientation.
3	Pole	4	Metal band straps

Figure 3-34 *AP1572I Horizontally Mounted on Horizontal Pole using PMK3 Kit*

353281

1	Pole	2	Metal band straps
3	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in horizontal orientation.	4	PMK3 wall mount bracket

Figure 3-35 *AP1572I Horizontally Mounted on Vertical Pole using PMK3 Kit*

1438

1	PMK3 wall mount bracket	2	M8x16mm bolts used to attach the strap brackets to the pivot bracket. The strap brackets are set for pole of 6 to 11 inches diameter, and the pivot bracket is in horizontal orientation.
3	Pole	4	Metal band straps

Wall Mounting Using PMK3

To horizontally mount the AP on a wall, you can use PMK3 without the pivot bracket and the strap brackets. Using only the PMK3 wall mount bracket, you can horizontally mount the AP on a wall. For more information about PMK3, see [Pole Mount Kit 3, page 3-41](#).

Table 3-8 Materials Needed to Mount the AP on a Wall using PMK2

Material Needed	In Kit?
One PMK2 wall mount bracket	Yes
Four M8 x12mm hex head bolts	Yes
Four M8 x1.25x16 bolts (with lock washers)	Yes
10 mm box-end wrench	No
The mounting hardware and tools required to secure the PMK3 Wall Mount Bracket, to wall or vertical surface, depends on the material of the wall or vertical surface. The mounting surface, attaching screws, and optional wall anchors you may use, must be able to support a 50-lb (22.7 kg) static weight.	No



Caution

The mounting surface, attaching screws, and optional wall anchors must be able to support a 50-lb (22.7 kg) static weight, and should conform to all local codes and regulations.

To mount the access point on a vertical wall, follow these instructions:

- Step 1** Use the wall mount bracket as a template to mark four screw hole locations on your mounting surface. The recommended screw hole locations are shown in [Figure 3-30](#). The dimensions of the PMK3 wall mount bracket is shown in [Figure 3-29](#).
- Step 2** Using four screws and optional screw anchors, attach the wall mount bracket to the wall. Ensure that the four screws are fully tightened.



Note

If necessary, use suitable screw anchors and an exterior-grade plywood backboard to mount the access point to stucco, cement, or drywall.

- Step 3** Screw M8 bolts into three of the four bolt holes on the back side of the access point (Screw holes 1, 4, and 5 in [Figure 3-31](#)). Do not screw in the bolts all the way. Leave a gap of about 0.13 inch (3.3 mm).
- Step 4** Position the three bolts on the access point into the wall mount bracket's keyhole slots. Check to ensure that the access point is properly seated in the slots. (see [Figure 3-34](#))
- Step 5** Screw in the fourth M8 x 12mm hex head bolt into the non-keyhole type screw hole (Screw hole 6 in [Figure 3-31](#)). Using a 13 mm open-end or socket wrench, tighten all four M8 x 12mm hex head bolts to a torque of 13 to 15 lb.ft (17.6 to 20.3 Nm).

- Step 6** Continue with installing antennas, connecting the data cables, grounding the access point, and powering the access point. For information on these, see [Chapter 4, “Installing Other Components.”](#)
-



Installing Other Components

This chapter contains information and instructions on how on installing antennas, grounding the AP, powering the AP, and other AP accessories. It contains the following sections:

- [Supported Antennas, page 4-2](#)
- [Installing External Antennas, page 4-4](#)
- [Grounding the Access Point, page 4-12](#)
- [Connecting a Fiber-optic Cable to the AP, page 4-13](#)
- [Powering the Access Point, page 4-16](#)
- [Installing the GPS Antenna, page 4-30](#)
- [Installing Attenuators, Fuses, and Shunts, page 4-34](#)
- [What to do after hardware installation, page 4-35](#)

Supported Antennas

All versions of 1570 series access points have 4x4:3 2.4 GHz radios and 4x4:3 5 GHz radios.

AP1572I Internal Antennas

AP1572I has four internal dual band antennas. The maximum 2.4 GHz gain is 4 dBi. The maximum 5 GHz gain is 6 dBi.

AP1572E External Antennas

AP1572E has four dual band antenna ports, to which external antennas can be mounted to or connected to, as specified in [Table 4-1](#).

Table 4-1 Supported External Antennas for AP1572E

Antenna	Band	Operating Frequency Range (MHz)	Peak Gain in dBi	Type	No. of Ports Required	No. of Antennas Supported	Mounting
AIR-ANT2568VG-N=	Dual	2400 - 2490 5250 - 5925	6 (2G) 8 (5G)	Omni	1	4	Mounted directly on AP
AIR-ANT2547VG-N	Dual	2400 - 2483 5150 - 5875	4 (2G) 7 (5G)	Omni	1	4	Mounted directly on AP
AIR-ANT2588P3M-N=	Dual	2400 - 2500 5150 - 5900	8 (2G) 8 (5G)	Directional	3	1	Not mounted on the AP. Mounted separately and then connected to the AP via coaxial cables.
AIR-ANT2513P4M-N	Dual	2400 - 2500 5150 - 5900	13 (2G) 13 (5G)	Directional	4	1	Not mounted on the AP. Mounted separately and then connected to the AP via coaxial cables.
AIR-ANT2420V-N	2.4 GHz	2400 - 2500	2	Omni	1		Mounted directly on AP
AIR-ANT2450V-N	2.4 GHz	2400 - 2484	5	Omni	1	2	Mounted directly on AP
AIR-ANT2480V-N	2.4 GHz	2400 - 2484	8	Omni	1	2	Mounted directly on AP
AIR-ANT2413P2M-N=	2.4 GHz	2400 - 2500	13	Directional	2	1	Mounted on the AP using AIR-ACCAMK1=
AIR-ANT5140V-N	5 GHz	5250 - 5875	4	Omni	1		Mounted directly on AP
AIR-ANT5180V-N	5 GHz	4900 - 5850	8	Omni	1	2	Mounted directly on AP

Antenna	Band	Operating Frequency Range (MHz)	Peak Gain in dBi	Type	No. of Ports Required	No. of Antennas Supported	Mounting
AIR-ANT5114P2M-N=	5 GHz	5150 - 5900	14	Directional	2	1	Mounted on the AP using AIR-ACCAMK1=
AIR-ANT5114P-N=	5 GHz	5150 - 5900	14	Directional	2		Not mounted on the AP. Mounted separately and then connected to the AP via coaxial cables.

Non-Cisco Antennas

Cisco does not support any third-party antennas. RF connectivity and compliance of third party antennas is the customer's responsibility. Cisco does not recommend any third-party antennas, and Cisco Technical Assistance Center will not be able to provide any support for third-party antennas. Cisco's FCC Part 15 compliance is only guaranteed with Cisco antennas or antennas that are of the same design and gain as Cisco antennas.

Antenna Configurations

All versions of the 1570 series access points contain a 4x4:3 2.4 GHz radio and a 4x4:3 5 GHz radio, which are connected to physical antennas/antenna ports numbered 1, 2, 3, and 4. These radios can be configured for both dual-band (both 2.4 GHz and 5 GHz signals coming from the same antenna ports) and single band (2.4 GHz and 5 GHz signals coming from different antennas / antenna ports). The 2.4 and 5 GHz radios connected to these antennas/antenna ports are user configurable as follows:

- The maximum number of active Tx/Rx antennas/antenna ports paths for both the 2.4 and 5 GHz 4x4 radios is restricted to the modes of operation set forth in Section 3.2.7.
- The allowable configurations for the 5 GHz radio are:

Mode	Active Antennas / Ports			
	1	2	3	4
2x2 Single Band			Yes	Yes
2x2 Dual Band	Yes	Yes		
3x3 Dual Band	Yes	Yes	Yes	
4x4 Dual Band	Yes	Yes	Yes	Yes

- The allowable configurations for the 2.4 GHz radio are:

Mode	Active Antennas / Ports			
	1	2	3	4
2x2 Single Band	Yes	Yes		
2x2 Dual Band	Yes	Yes		
3x3 Dual Band	Yes	Yes	Yes	
4x4 Dual Band	Yes	Yes	Yes	Yes

Installing External Antennas

**Note**

Before connecting power to the access point, ensure that the antennas are attached to the access point

See the section “[Supported Antennas](#)” [section on page 4-2](#) for details of the antennas supported by the 1572 series access points.

For installation instructions and detailed information on an antenna, refer to that particular antenna’s document located at:

<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, refer to “[Safety Precautions when Installing Antennas](#)” [section on page 2-6](#).

**Note**

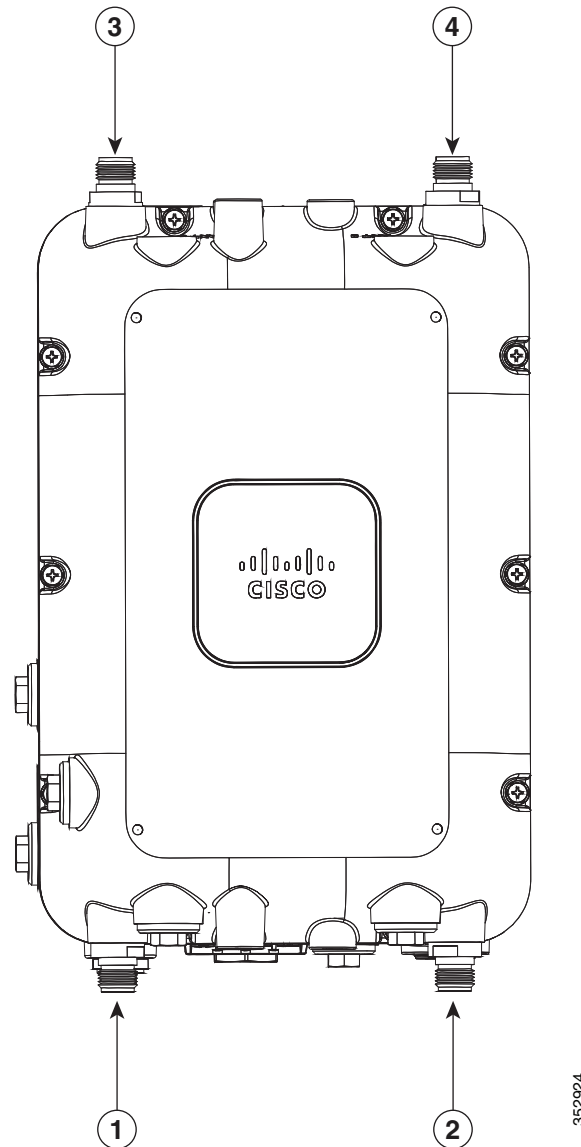
Omnidirectional antennas are vertically polarized and should be mounted vertically.

Antenna N-Type Connector Locations

The AP1572E access point version has two N-type antenna connectors located on the base and two N-type antenna connectors on the head of the access point. The N-type connectors support variety of the Cisco Aironet antennas. For detailed information on these antennas, refer to Antenna Configurations, in chapter 1.

Figure 4-1 shows the antenna port locations on the AP.

Figure 4-1 **Antenna Port Locations - AP Face View**



1	Antenna port 1- Type N connector (with cap)	2	Antenna port 2 - Type N connector (with cap)
3	Antenna port 3 - Type N connector (with cap)	4	Antenna port 4 - Type N connector (with cap)

External Antenna Mounting Configurations

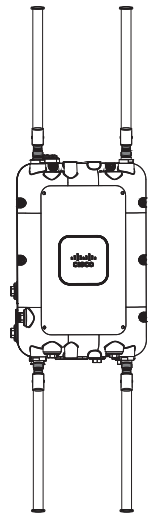
Omni Antennas

Omni antennas can be mounted directly to the access point (see [Figure 4-2](#)). The supported omni antennas are:

- AIR-ANT2547V-N
- AIR-ANT2547VG-N
- AIR-ANT2568VG-N
- AIR-ANT2440V-N
- AIR-ANT2450V-N
- AIR-ANT2480V-N
- AIR-ANT5140V-N
- AIR-ANT5180V-N

The AP should always be operated with four omni antennas attached for best performance. If you decide to use less than four antennas, ensure that the unused antenna ports are properly covered with an appropriate N-male connector cap (Cisco provides a kit of 10 such caps in AIR-ACC15-N-CAP=).

Figure 4-2 **AIR-CAP1572EAC-x-K9 with AIR-ANT2547VG-N**

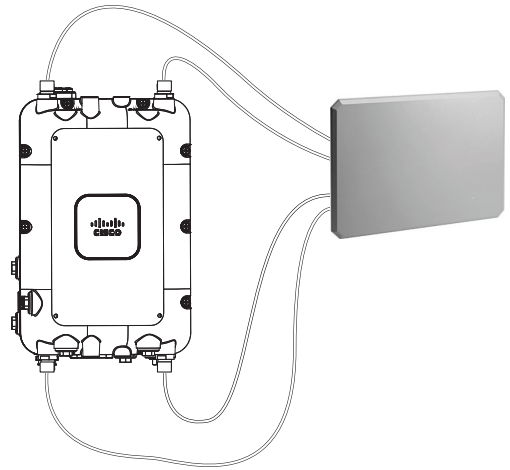


AIR-ANT2513P4M-N=

The AP1572 can be used with a directional antenna that connects via cables (either directly attached to the antenna or with separate cables). See [Figure 4-3](#).

AIR-ANT2513P4M-N= comes with its own mounting kit that will allow it to be mounted to the same pole or wall where the AP1572 is also mounted. Four N-male to N-male cables (such as AIR-CAB005LL-N=) are required to connect the antenna to the AP.

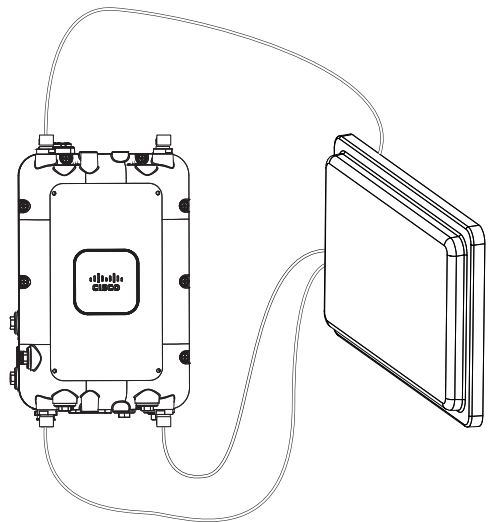
Figure 4-3 *AIR-CAP1572EAC-x-K9 with AIR-ANT2513P4M-N=*



AIR-ANT2588P3M-N=

The AIR-ANT2588P3M-N= comes with its own mounting kit which allows it to be mounted to the same pole or wall where the AP1572 is mounted. Three N-male to N-male cables (such as AIR-CAB005LL-N=) are required to connect the antenna to the AP. Connect the cables to Ports 1,2, and 3 and install an N-male cap on Port 4. See [Figure 4-4](#).

Figure 4-4 *AIR-CAP1572EAC-x-K9 with AIR-ANT2588P3M-N=*



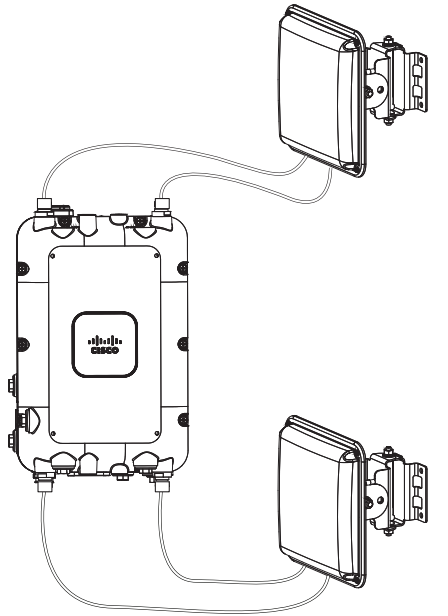
AIR-ANT2413P2M-N= and AIR-ANT5114P2M-N=

The AIR-ANT2413P2M-N= and AIR-ANT5114P2M-N= antennas come with their own mounting kits which will allow them to be mounted on the same pole or wall where the AP1572 is mounted. These antennas come with two attached cables to connect directly to the AP. The AP should be placed in single band antenna mode and AIR-ANT2413P2M-N= should be connected to Antenna Ports 1 and 2, and AIR-ANT5114P2M-N= should be connected to Antenna Ports 3 and 4 on the AP. See [Figure 4-5](#)

Using an optional antenna mounting bracket kit, the directional antennas AIR-ANT2413P2M-N and AIR-ANT5114P2M-N can also be mounted directly on the AP1572EC access point in a strand mount or pole mount environment. The antenna bracket kit contains four bracket sections and fasteners that you can assemble in multiple configurations to position and aim the directional antenna in a range of positions. For more information on mounting the antenna with the optional mounting bracket, refer to *Installing Directional-Antenna Mounting Kits on Cisco 1550 Series Outdoor Mesh Access Points*, at the following URL:

http://www.cisco.com/c/en/us/td/docs/wireless/access_point/1550/quick/guide/1550antbracket.html

Figure 4-5 AIR-CAP1572EAC-x-K9 with AIR-ANT2413P2M-N= and AIR-ANT5114P2M-N=



Weatherproofing the Type N Connector Joint



Note

The following is a general procedure for weatherproofing a Type N connector joint.

- Step 1** Ensure that the type N connectors are clean and dry.
- Step 2** Apply the oxide inhibitor paste with a Q-tip to each connector pin and the receptacle interiors of both the connectors. This ensures an airtight and watertight seal between the connectors.

- Step 3** Fasten the antenna cable's N-type male connector to the access point's N-type male connector and tighten as directed in the antenna guide.
- Step 4** Wipe away any excess oxide inhibitor paste.
- Step 5** Tightly wrap the fastened connectors with two layers of electrical tape, such that the wrapping extends 1 inch past each end of the connection.
- Step 6** Tightly wrap the electrical tape layers with two layers of butyl mastic tape, such that the wrapping extends 1 inch past each end of the electrical tape wrapping.
- Your RF connection can now stay clean and dry for a long time.
-

Detailed Documentation for all Supported External Antennas

For detailed information on supported antennas, refer the following links:

- Cisco Aironet Dual-Band Omnidirectional Antenna (AIR-ANT2568VG-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2568vgn.html>
- Cisco Aironet Dual-Band Omnidirectional Antenna (AIR-ANT2547VG-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2547vgn.html>
- Cisco Aironet 2.4-GHz/5-GHz 8-dBi Directional Antenna (AIR-ANT2588P3M-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2588p3m-n.html>
- Cisco Aironet Four-Port Dual-Band Polarization-Diverse Array Antenna (AIR-ANT2513P4M-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2513p4mn.html>
- Cisco Aironet 5-dBi Omnidirectional Antenna (AIR-ANT2450V-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2450v.html>
- Cisco Aironet 8-dBi Omnidirectional Antenna (AIR-ANT2480V-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2480v.html>
- Cisco Aironet 2.4-GHz 13-dBi Directional Antenna (AIR-ANT2413P2M-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant2413p2m-n.html>
- Cisco Aironet 4-dBi Omnidirectional Antenna (AIR-ANT5140V-R)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant5140v.html>
- Cisco Aironet 8-dBi Omnidirectional Antenna (AIR-ANT5180V-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant5180v.html>
- Cisco Aironet 5-GHz 14-dBi Directional Antenna (AIR-ANT5114P2M-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant5114p2m-n.html>
- Cisco Aironet 14-dBi Patch Antenna (AIR-ANT5114P-N)
<http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant5114p.html>

Installing a Lightning Arrestor

Overvoltage transients can be created through lightning static discharges, switch processes, direct contact with power lines, or through earth currents. The Cisco Aironet AIR-ACC245LA-N Lightning Arrestor limits the amplitude and duration of disturbing interference voltages and improves the over voltage resistance of in-line equipment, systems, and components. A lightning arrestor installed according to these mounting instructions balances the voltage potential, thus preventing inductive interference to parallel signal lines within the protected system.

Installation Considerations

Cisco recommends that you bulkhead mount the lightning arrestor so it can be installed as a wall-feed through on the wall of the protected space.

The importance of obtaining a good ground and bonding connection cannot be overstressed. Consider these points when grounding the lightning arrestor:

- Connect the lightning arrestor components directly to the grounding point.
- The contact points of the ground connection must be clean and free of dust and moisture.
- Tighten threaded contacts to the torque specified by the manufacturer.

Installation Notes

This lightning arrestor is designed to be installed between the antenna cable that is attached to an outdoor antenna and the Cisco Aironet wireless device. You can install the lightning arrestor either indoors or outdoors. It can be connected directly to a wireless device having an external N connector. It can also be mounted inline or as a feed-through. Feed-through installations require 5/8 in. (16 mm) hole to accommodate the lightning arrestor.

**Note**

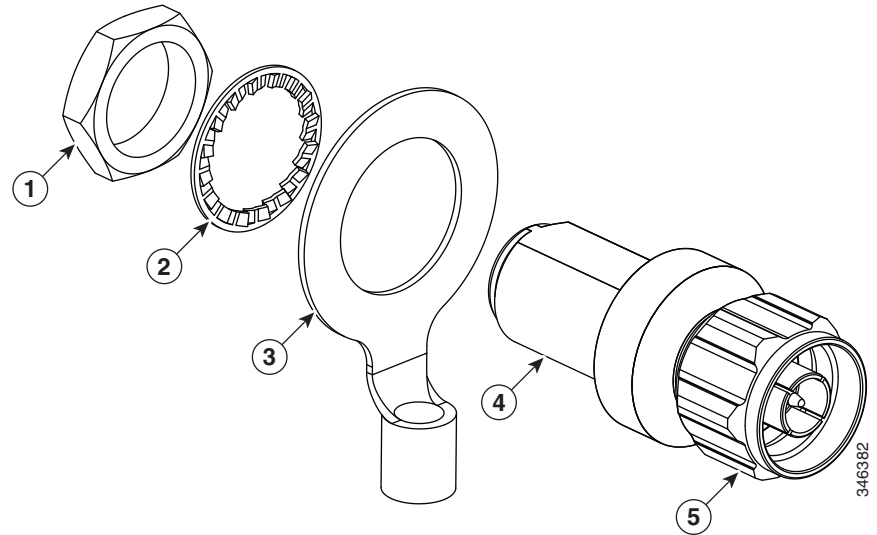
This lightning arrestor is part of a lightning arrestor kit. The kit contains a lightning arrestor and a grounding lug.

**Note**

When you install the lightning arrestor, follow the regulations or best practices applicable to lightning protection installation in your local area.

Installing the Lightning Arrestor Outdoors

If you install the lightning arrestor outdoors, use the supplied ground lug and a heavy wire (#6 solid copper) to connect it to a good earth ground, such as a ground rod. The connection should be as short as possible.

Figure 4-6 **Lightning Arrestor Details**

1	Nut	4	Unprotected side (to antenna)
2	Lockwasher	5	Protected side (to wireless device)
3	Ground lug		

Cable for the Lightning Arrestor

Coaxial cable loses efficiency as the frequency increases, resulting in signal loss. The cable should be kept as short as possible because cable length also determines the amount of signal loss (the longer the run, the greater the loss).

Cisco recommends a high-quality, low-loss cable for use with the lightning arrestor.

Grounding the Access Point

The access point must be grounded before connecting power.



Warning

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 366

In all outdoor installations and when powering the access point with AC power, you must follow these instructions to properly ground the case:

- Step 1** If using insulated 6-AWG copper ground wire, strip the insulation as required for the grounding lug.
- Step 2** Use the appropriate crimping tool to crimp the bare 6-AWG copper ground wire to the supplied grounding lug.

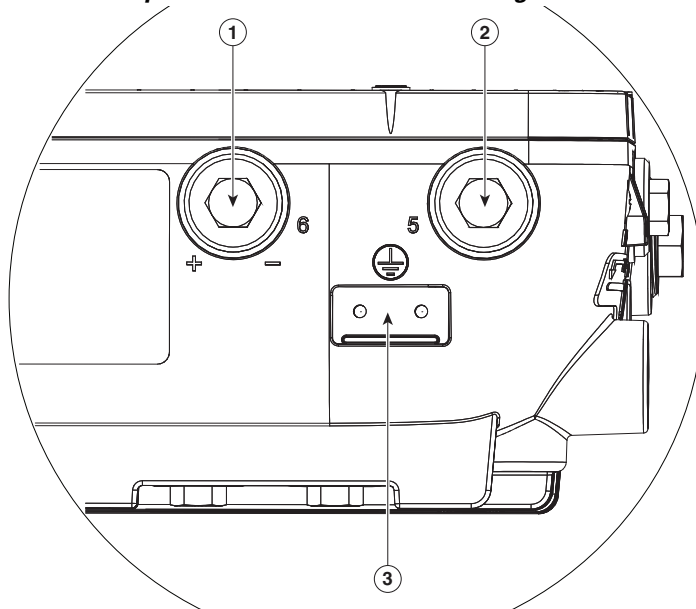


Note

The grounding lug and hardware used must comply with local and national electrical codes.

- Step 3** Open the anti-corrosion sealant (supplied), and apply a liberal amount over the metal surface where the ground strap screw holes are located (see [Figure 4-7](#) below).

Figure 4-7 Ground Strap Screw Holes Located on the Right Side of the AP



1	DC power port, labeled “6” on the AP	3	Metal plate with screw holes for attaching the grounding lug
2	Console port, labeled “5” on the AP		

- Step 4** Connect the grounding lug to the access point grounding screw holes using the supplied two Phillips head screws (M4 x10 mm) with lock washers. Tighten the grounding screw to 22 to 24 lb-in (2.49 to 2.71 Nm).
- Step 5** Connect the other end of the ground wire to a reliable earth ground, such as a grounding rod or an appropriate grounding point on a metal streetlight pole that is grounded.
-

Connecting a Fiber-optic Cable to the AP

The Cisco supplied fiber-optic kit enables the access point to support fiber-optic network connections. You require the following materials for connecting the fiber-optic cable to the AP:

- Small form-factor pluggable (SFP) transceiver module
- SFP module adapter
- SC or Duplex LC fiber-optic cables. The outer diameter of the fiber optic cable should be 0.24-0.47 inches (6-12 mm).
- Cable gland. The cable gland cannot hold a cable with diameter more than 0.47" (12 mm).
- Adjustable wrench

You can connect the fiber-optic networking cable to the SFP port (labeled '4' on the base of the AP). The small form-factor pluggable (SFP) transceiver module is used to connect the cable to the SFP port. The SFP port provides both Power-over-Cable and backhaul over fiber options. To install the SFP transceiver module and the cable, follow this procedure:

-
- Step 1** Ensure that all power sources have been disconnected from the access point.
- Step 2** Remove the covering plug from the SFP port by following the guidelines given in this step.
- The SFP port covering plug is designed to be removed only once, and then be replaced with the SFP adapter. The plug does not have a rubber O-ring, but is fixed in place using a sealant on the threads at manufacturing. While removing the plug, you need to ensure that its hex bolt-head does not get stripped. For this:
- a. Place the AP on its back (resting on the heat fins) on a solid, but padded surface, to avoid scratching the paint.
 - b. Pressing down with your hand on the face of the AP and holding the AP firmly in place, proceed to the next step.
 - c. Use a 5/8" (16 mm) 6-point socket wrench to loosen the hex bolt-head SFP port plug. Firmly and carefully, turn the socket wrench counter-clockwise to loosen the plug. This requires a torque of 25 ft-lb (34 Nm).
- Though not ideal, a 5/8" (16 mm) 12-point socket wrench can be used too. A crescent wrench is to be used only if the socket wrenches are not available. Do not use a pipe or monkey wrench for this task, as it will strip the hex bolt-head.
- Step 3** Insert the SFP module into the SFP port, and ensure that it latches properly.

- Step 4** Loosen the cable gland's nut (round end of the cable gland) by turning counterclockwise, but do not remove.
- Step 5** Thread the fiber optic cable, from its unterminated end, into the cable gland. See [Figure 4-8](#) and [Figure 4-9](#).
- Thread the cable through the gland all the way till the gland is near the SC or LC optic fiber connectors. The cable gland's nut must remain loose at this time.



Note The SC or LC optic fiber connectors are too big to pass through the cable gland. That is the reason why you need to thread the cable through the gland from the unterminated end (even if the cable is quite long).

- Step 6** Insert the SC or LC optic fiber connector-end of the cable, into the SFP module adapter. Do not attach the cable gland to the adapter yet. See [Figure 4-10](#).
- Step 7** Insert the SC or LC optic fiber connector into the SFP module and ensure that it latches into place. See [Figure 4-10](#).
- Step 8** Add sealant or tape around the adapter's pipe thread, and then it screw into the AP chassis.
- Step 9** Keeping the cable gland nut loose, carefully screw the threaded end of the cable gland into the SFP module adapter and hand-tighten. Use an adjustable wrench to tighten the threaded end of the cable gland to 6-7 lb.ft (8.1 to 9.5 Nm).
- Step 10** Tighten the cable gland nut until it is properly fastened around the fiber optic cable. Use an adjustable or open-end wrench to tighten to 2.7 to 3.2 lb.ft (3.66 to 4.34 Nm).



Caution When removing this SFP assembly it is absolutely imperative that you proceed in the reverse order of this installation. Start by loosening the cable gland's nut.

Figure 4-8 SC Fiber-optic cable

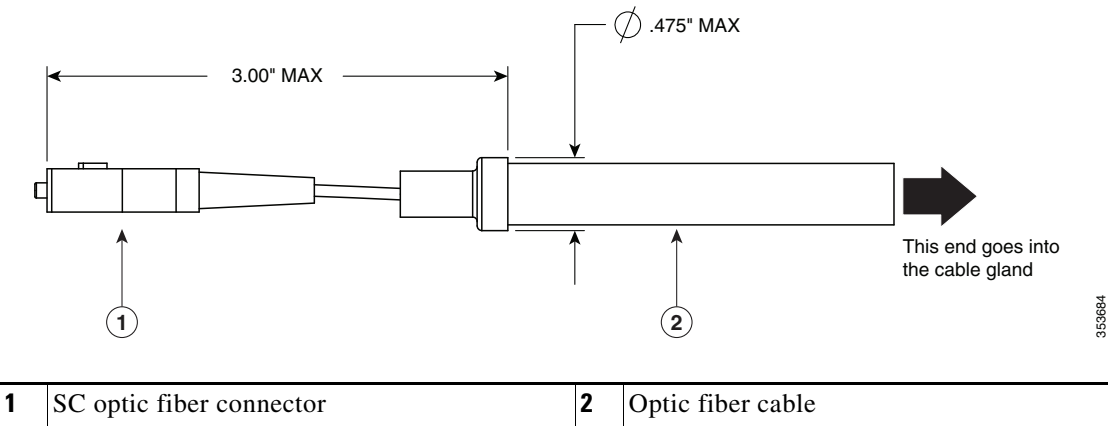
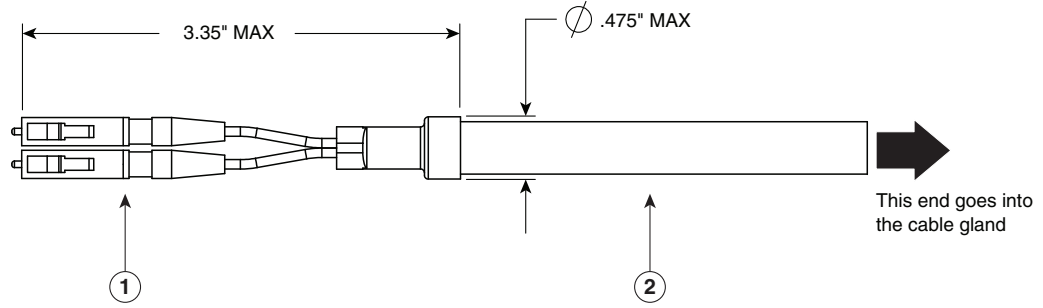
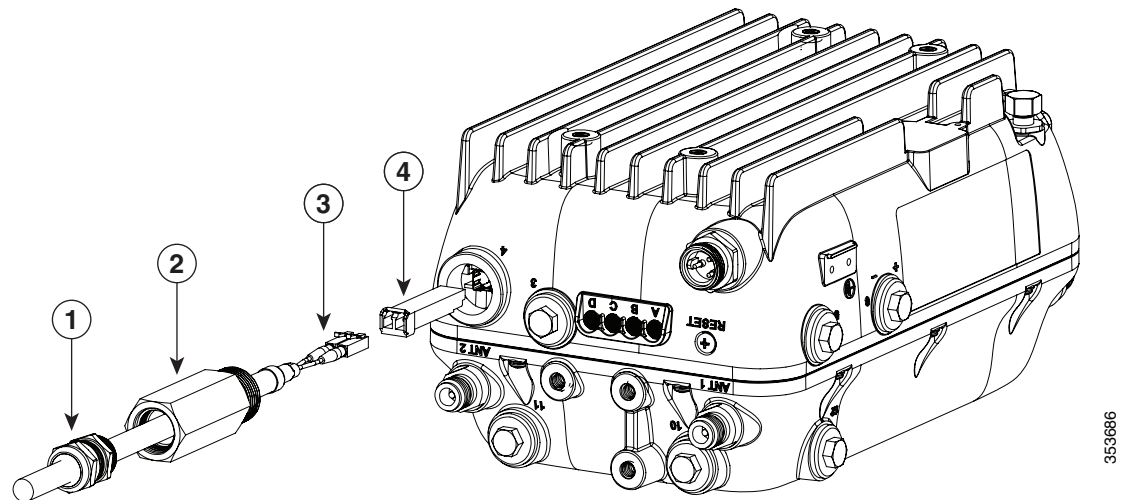


Figure 4-9 Duplex LC Fiber Optic Cable



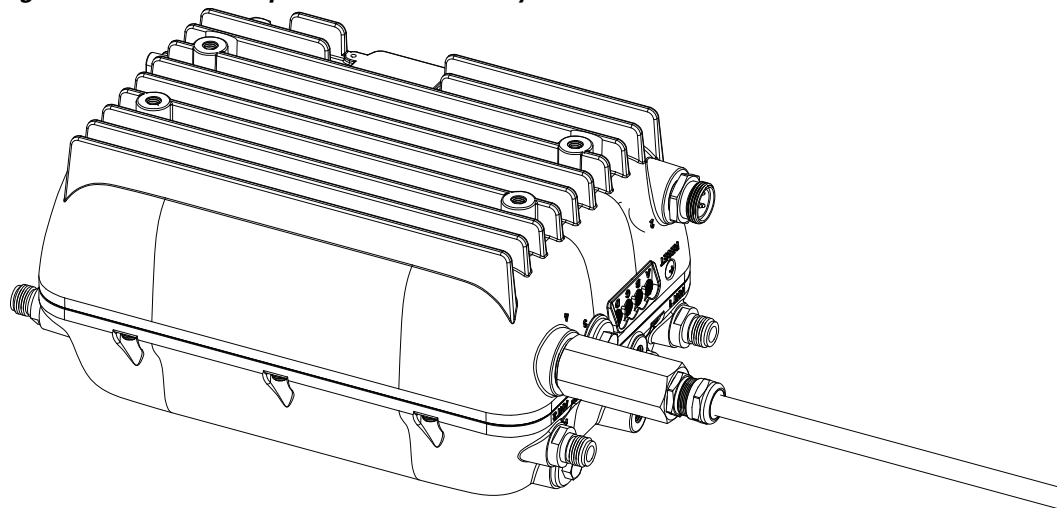
1	Duplex LC optic fiber connector	2	Optic fiber cable
----------	---------------------------------	----------	-------------------

Figure 4-10 Exploded View of Connecting Fiber-optic Cable to AP



1	Cable gland	3	Duplex LC Fiber-optic cable
2	SFP module adapter	4	SFP transceiver module

Figure 4-11 *Fiber-optic Cable Successfully Connected to AP*



353687

Powering the Access Point

The external antenna versions (AP1572E versions) support power over Ethernet input (on the AC version only), power over Ethernet output supporting up to 802.3at devices, internal AC or power over cable power supply options.

If multiple power sources are available, the access point will select the power source which is higher on the following prioritization list. If a power source is removed, access point will automatically switch to the next available power source, as per this list:

1. Power-over-cable or AC (whichever is available on your AP)
2. External DC input
3. PoE (available in AC powered versions of AP)

Power-over-Cable

All versions of AP1572I and some versions of AP1572E are equipped with a power-over-cable (PoC) power supply. The power supply can accept quasi-AC signals in the 40 to 90 V RMS range.

Versions of the AP that have a PoC power supply, also have a shunt/fuse interface providing direct in-line access to the PoC AC signal. The AP comes with a shunt in the shunt/fuse location. By removing the shunt or fuse, field technicians can immediately remove power to the AP for service and repairs, and then restore power by re-installing the shunt or fuse. You can install a fuse in the shunt/fuse location to limit the maximum sustained current supplied to the AP to prevent damage to the AP or to the cable plant. Fuses of various amperage are available, and so you can select the appropriate fuse rating depending on the configuration and operating voltage.

For connecting a PoC power supply to the access point, see [Connecting PoC Power to the Access Point, page 4-29](#).

AC Power Supply

Non PoC versions of the AP come equipped with an AC power supply. The power supply is designed to accept AC voltage from 100 V to 277 V RMS.

The following AC power cords are supported:

Product ID	Description
AIR-CORD-R3P-40NA=	Power cord, 40 ft, North American Plug
AIR-CORD-R3P-40UE=	Power cord, 40 ft, European Harmonized, Unterminated
AIR-PWR-ST-LT-R3P=	Power cord, 4 ft, Street Light Tap

For connecting Streetlight AC power to the access point, see [Connecting Streetlight AC Power, page 4-25](#).

For connecting an AC power supply to the access point, see [Connecting an AC Power Cable to the Access Point, page 4-27](#).

DC Interface

All versions of the AP have an externally accessible DC input connector. The DC input accepts voltages in the 10 to 16V range. The power supplied should be 10 amp.

For connecting a DC power supply to the access point, see [Connecting a DC Power Cable to the Access Point, page 4-22](#).

PoE-Input

AC powered versions of AP1572EAC can be powered by UPOE compliant power sourcing equipment. In addition to being powered by UPOE sources, the access point can also be powered by the AIR-PWRINJ1500-2 power injector.

The access point also supports an Ethernet uplink port (PoE-In). The access point Ethernet uplink port uses an RJ-45 connector (with weatherproofing) to link the access point to the 10BASE-T, 100BASE-T or 1000BASE-T network. The Ethernet cable is used to send and receive Ethernet data and to optionally supply inline power from the power injector or a suitably powered switch port.



Tip

The access point senses the Ethernet and power signals and automatically switches internal circuitry to match the cable connections.

The Ethernet cable must be a shielded outdoor rated Category 5e (CAT5e) or better cable. The access point senses the Ethernet and power signals and automatically switches internal circuitry to match the cable connections.

Depending on the version of the AP, a 1572 series access point supports these power sources:

- Power-over-Cable on AP1572IC and AP1572EC versions
- AC power on AP1572EAC version

The 1572EAC access point can be powered via the PoE input from an in-line power injector or a suitably powered switch port. The AIR-PWRINJ1500-2= power injector can be used.

**Caution**

Do not place the power injector in an unprotected outdoor environment because water could get into the power injector and cause a short circuit and possible fire.

**Warning**

Connect the unit only to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950 based safety standards Statement 1033

For connecting the AIR-PWRINJ1500-2 power injector, see [Connecting a Power Injector, page 4-20](#).

For connecting an Ethernet cable to the access point, see [Connecting an Ethernet Cable to the Access Point, page 4-20](#)

Restrictions on Features under Different Operating Conditions

To limit the maximum power consumption and ensure thermal integrity of the access point, there are factory-defined restrictions on the features that are active under a given operating condition. This is different for different versions of the AP.

The following restrictions are applicable to all versions under all operating conditions:

- The cable modem will be disabled when the small form-factor pluggable (SFP) port is enabled:
 - If an SFP device is detected on startup, the cable modem will be disabled and remain disabled until the AP is rebooted.
 - If no SFP device is detected on startup, the SFP port will be disabled and remain disabled until the AP is rebooted.
 - If no SFP device is detected at startup and the cable modem is connected, then the cable modem will be used as the uplink. The SFP will not be disabled. However, if an SFP device is plugged in later, the AP will require a reboot to choose the SFP port as the uplink.
- You cannot disable any Ethernet ports.
- The power available on the PoE output port can be 802.3at, 802.3af, or disabled depending on other configuration options.
- PoE-Output is disabled when PoE-Input voltage is present.
- If the AP is powered by other means and then switches to UPOE, the AP will automatically reconfigure itself as required.
- The access point has protection mechanisms to prevent overheating by reducing certain functionalities, if internal temperatures exceed factory-defined limits. Protection measures include reducing the number of active transmit paths on one or more radios. The number of active transmit paths will return to the user's selected configuration when the overheating condition subsides. However, if the protection measures do not sufficiently reduce the temperature, then the AP will ultimately power down, with the LEDs flashing yellow at flashes per second. When the overheating condition subsides, the AP will power up automatically.

The following tables show the maximum radio transmission paths for various versions of the AP depending on the kind of input power, cable modem status, and SFP port status.

**Note**

The AP supports all modes described in the following tables, in ambient temperatures of -40°C to +45°C in all supported orientations, with a solar loading of 753 Watts/m². For details on the operating temperature ranges of the access point, see [Access Point Operating Temperature Specifications, page A-3](#).

Table 4-1 Radio Transmission Paths on AP1572IC powered by PoC or DC

Maximum 5G TX Paths	Maximum 2.4G TX Paths	Cable Modem Active?	SFP Device Inserted?
4	4	Yes	No
4	4	No	Yes

Table 4-2 Radio Transmission Paths on AP1572EC powered by PoC or DC

Maximum 5G TX Paths	Maximum 2.4G TX Paths	Cable Modem Active?	SFP Device Inserted?	802.3 PoE Output Mode
4	4	Yes	No	AF
4	0 (Disabled)	Yes	No	AT
2	2	Yes	No	AT
0 (Disabled)	4	Yes	No	AT
4	4	No	Yes	AF
4	0 (Disabled)	No	Yes	AT
2	2	No	Yes	AT
0 (Disabled)	4	No	Yes	AT

Table 4-3 Radio Transmission Paths on AP1572EAC

Power Source	Maximum 5G TX Paths	Maximum 2.4G TX Paths	802.3 PoE Output Mode
AC or DC	4	4	AT
AC or DC	4	0 (Disabled)	AT
AC or DC	2	2	AT
AC or DC	0 (Disabled)	4	AT
UPOE Input	4	4	Disabled
UPOE Input	4	0 (Disabled)	Disabled
UPOE Input	2	2	Disabled
UPOE Input	0 (Disabled)	4	Disabled

Connecting a Power Injector

The 1570 Series Access Points supports the AIR-PWRINJ1500-2= (100-240 VAC input, indoor use only) power injectors. The power injector provides (AIR-PWRINJ1500-2=) 56 VDC to the access point over the Ethernet cable and supports a total end-to-end Ethernet cable length of 100 m (328 ft) from the switch to the access point.

When your access point is powered by an optional power injector, follow these steps to complete the installation:

Step 1 Before applying PoE to the access point, ensure that the access point is grounded (see the [“Grounding the Access Point”](#) section on page 4-12).

Step 2 Review [Figure 3-1](#) to identify the components needed for the installation.



Note The 1500 power injector can only be used in an indoor environment, therefore, the cable from the injector must travel from the protected location to the outside mounted access point.

Step 3 Connect a CAT5e or better Ethernet cable from your wired LAN network to the power injector.



Warning

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023



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



Tip To forward bridge traffic, add a switch between the power injector and controller. Refer to the *Cisco Wireless Mesh Access Points, Design and Deployment Guide, Release 7.0* for more information.

Step 4 Ensure that the antennas are connected and that a ground is attached to the access point before you apply power to the access point.

Step 5 Connect a shielded outdoor-rated Ethernet (CAT5e or better) cable between the power injector and the PoE-in connector of the access point.

Step 6 Connect the Ethernet cable to the access point PoE-In port (see [“Connecting an Ethernet Cable to the Access Point”](#) section on page 4-20).

Connecting an Ethernet Cable to the Access Point

You need to supply these tools and materials:

- Shielded outdoor-rated Ethernet (CAT5e or better) cable with 0.2 to 0.35 in. (0.51 to 0.89 cm) diameter

- RJ-45 connector and installation tool
- Adjustable Wrench or 0.875 inch open-end wrench
- 0.5 inch or 13 mm wrench

To connect the shielded Ethernet cable to the access point, follow these steps:

Step 1 Disconnect power to the power injector, and ensure all power sources to the access point are turned off.



Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

Step 2 Ensure that access point is properly grounded as described in “[Grounding the Access Point](#)” section on [page 4-12](#).

Step 3 Use a 0.5 inch or 13 mm wrench to remove the Ethernet connector cover plug which covers the Ethernet port labeled ‘3’ on the base of the access point. See [Base of the AP, page 1-10](#) for more information on where the port is located.

Do not discard the plug and rubber seal unless you are certain that the port will not have to be re-plugged.

Step 4 Loosen the sealing nut of the cable gland, which is at its round end (see [Figure 4-12](#)), by turning it counter clockwise, but do not remove it.



Note

Verify that the cable gland has a rubber gasket and ensure that it is not damaged.



Warning

Failure to install the cable gland and rubber gasket properly will cause the cable grip to leak.

Figure 4-12 Cable Gland



1 Thread end

2 Round end

Step 5 Insert the unterminated end of the Ethernet cable through the sealing nut end of the cable gland (see [Figure 4-12](#)), and pull several inches of cable through the cable gland.

Step 6 Install an RJ-45 connector on the unterminated end of the Ethernet cable using your Ethernet cable installation tool.

**Warning**

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023

**Warning**

When installing the RJ-45 connector, ensure that cable gland and the rubber gasket are present and installed properly, to avoid water leakage into the enclosure. See [Figure 4-12](#).

- Step 7** Carefully insert the RJ-45 cable connector into the Ethernet port opening on the access point, and connect to the internal Ethernet connector.
- Step 8** Slide the cable gland with the rubber gasket towards the access point, and screw the threaded end of the body into the access point, and hand-tighten.
- Step 9** Use an adjustable wrench or a 0.875 inch wrench to tighten the threaded end of the body into the enclosure. Tighten to 15 lb.ft.
- Step 10** Use an adjustable wrench and tighten the thread-lock seal nut to 6 to 7 lb.ft (8.1 to 9.5 Nm).
- Step 11** Turn on power to the power injector.

Connecting a DC Power Cable to the Access Point

When powering the access point with DC power, you must ensure that DC power can be conveniently removed from the unit. The power should not be removed by disconnecting the DC power connector on the unit.

**Warning**

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022

**Warning**

Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. Statement 1033

To connect a DC power cable, you need these tools and material:

- Shielded outdoor-rated DC power cable (minimum 18 AWG) with outside cable diameter of 0.20 to 0.35 inch (0.51 to 0.89 cm).
- Adjustable wrench or 0.875 inch open-end wrench
- Small flat-head screw driver
- Two-pin DC terminal block connector (use only the Cisco supplied DC connector. Cisco Part Number 29-100226-01)
- 0.5 inch or 13mm wrench

To connect the DC power cable to the access point, follow these steps:

- Step 1** Before connecting DC power to the access point, ensure that the ground is connected to the access point (see the [“Grounding the Access Point”](#) section on page 4-12).
- Step 2** Turn off all power sources to the access point, including the DC power source.

Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

Caution

When installing DC power to the access point, always connect the access point end of the cable FIRST. When removing the DC power connector, always disconnect the access point end of the cable LAST.

Step 3

Use a 0.5 inch or 13 mm wrench to remove the DC connector cover plug from the access point. The DC power port is located on the right side of the access point and is labeled '6'. See [Right Side of the AP, page 1-14](#) for more information on where the port is located.

Do not discard plug and rubber seal unless you are certain that the port will not have to be re-plugged.

Step 4

Loosen the thread-Lock sealing nut of the cable gland by turning it counter clockwise, but do not remove (see [Figure 4-13](#)).



Note

Verify that the cable gland has a rubber gasket and ensure that it is not damaged.

Warning

Failure to install the cable gland and the rubber gasket properly will cause the cable grip to leak.

Figure 4-13 Cable Gland



1	Thread end	2	Round end
----------	------------	----------	-----------



Note

The cable gland can accept cables of diameter from 0.20 to 0.35 in. (0.51 to 0.89 cm).

Step 5

Insert a bare end of the DC power cable into the rounded end of the cable gland (see [Figure 4-13](#)), and pull approximately 6 inches of cable through the adapter.

Warning

When installing the DC power cable, ensure that cable gland and the rubber gasket are present and installed properly, to avoid water leakage into the enclosure.

Step 6

Strip the DC cable jacket back by about 1 inch to expose the wires and then strip the insulation by about 0.5 inch (or 12 mm) from each wire.

- Step 7** Push in the orange colored spring-loaded securing tabs and insert the wire (see [Figure 4-14](#)) all the way into the two-position terminal block connector (Cisco Part Number 29-100226-01, [Figure 4-15](#)), and then release the tabs. Tug on the wire to ensure that it is properly secured.

Figure 4-14 Push in the securing tab, and wire, as the arrow shows

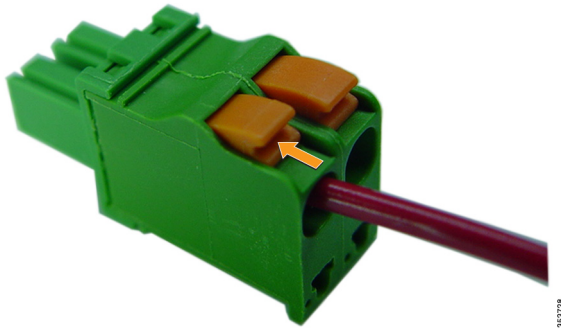
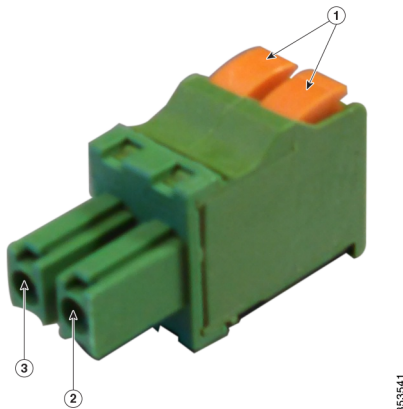


Figure 4-15 Two-Position Terminal Block Connector



1	Securing tabs	3	Ground (DC return)
2	DC +		

- Step 8** Insert the terminal block connector into the DC power opening in the access point case, and carefully push the terminal block connector into the internal connector.



Note Ensure that the polarity of the terminal block connector properly matches the polarity markings on the enclosure - see [Figure 4-15](#). Use only the Cisco supplied block connector 29-100226-01.

- Step 9** Slide the cable gland with the rubber seal towards the access point, and screw the threaded end of the body into the access point, and hand-tighten.
- Step 10** Use an adjustable wrench or a 28 mm wrench to tighten the threaded end of the body to 15 lb.ft.
- Step 11** Use an adjustable wrench and tighten the thread-lock seal nut to 6 to 7 lb.ft (8.1 to 9.5 Nm).
- Step 12** Ensure that the antennas are connected to the access point before you apply power to the access point.

Step 13 Turn on the DC power at the designated circuits.

Connecting Streetlight AC Power

The access point can be installed on a streetlight pole and powered from a streetlight outdoor light control using the optional streetlight power tap adapter (AIR-PWR-ST-LT-R3P). See [Figure 4-16](#).



Caution

The access point can be powered by a light pole twist-lock outdoor light control that provides 100-to 277-VAC 50/60 Hz power. Do not connect to an outdoor light control powered by higher voltages.

When powering the access point with AC power other than the streetlight power tap adapter, you must ensure that the following conditions are observed:

1. AC power can be conveniently removed from the unit. The power should not be removed by disconnecting the AC power connector on the unit.



Warning

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022



Caution

Before connecting or disconnecting a power cord, you must remove AC power from the power cord using a suitable service disconnect.

2. You must protect any AC power plugs and AC receptacles from water and other outdoor elements. You can use a UL-listed waterproofing enclosure suitable for covering the AC receptacle and AC power plug that supplies power to the unit as described in Article 406 of the NEC.
3. When you install the access point outdoors or in a wet or damp location, the AC branch circuit that powers the access point should have ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC).



Warning

Be very careful when connecting the streetlight adapter to Category 3 pole-top power. If you are not careful, you may electrocute yourself or fall. Statement 363

To install an access point on a streetlight pole, follow these steps:

Step 1 Before beginning the installation, ensure the AC power to the streetlight pole is turned off.

Step 2 Turn off power to the AC power source at the designated circuits.



Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



Caution

For your safety, when connecting the access point AC power connector, always connect the access point end of the cable FIRST. When removing the AC power connector, always disconnect the access point end of the cable LAST.

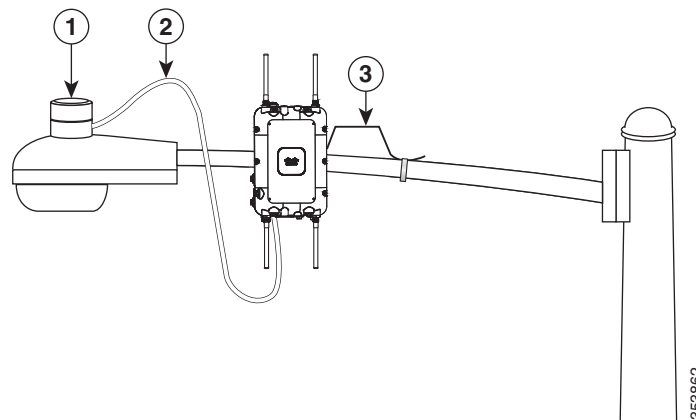
- 

When installing the streetlight power tap adapter to the access point AC power connector, always connect the access point end of the cable **FIRST**. When removing the streetlight power tap adapter, always disconnect the access point end of the cable **LAST**.



Ensure that your antennas are connected to the access point before you apply power to the access point.

- Figure 4-16** **Connecting Streetlight AC Power**



1	LC-10 twist-lock adapter	3	6-AWG ground wire
2	Streetlight power tap adapter cable		

Connecting an AC Power Cable to the Access Point

When powering the access point with AC power other than the streetlight power tap adapter, you must ensure that the following conditions are observed:

- AC power can be conveniently removed from the unit. The power should not be removed by disconnecting the AC power connector on the unit.



Note Before connecting or disconnecting a power cord, you must remove AC power from the power cord using a suitable service disconnect.

- You must protect all AC power plugs and AC receptacles from water and other outdoor elements. You can use a UL-listed waterproofing enclosure suitable for covering the AC receptacle and AC power plug that supplies power to the unit as described in Article 406 of the NEC.
- When you install the access point in a wet or damp location, the AC branch circuit that powers the access point should have ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC).

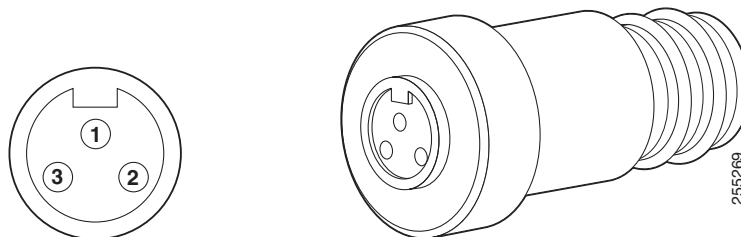
The AP1572EAC supports the following AC power cables and connectors available from Cisco:

AC Power Cord, Connector	Dimensions	Description
AC Power Cord AIR-CORD-R3P-40NA=	Diameter: 0.4 to 0.413 in. (10.2 mm to 10.5 mm) Length: 40-ft (12.2-m)	This cord is for installations in the US and Canada, and comes with pre-installed connectors at both ends. The three prong plug is limited to 120 VAC. Internal wiring is rated at 600 VAC insulation protection.
AC Power Cord AIR-CORD-R3P-40UE=	Diameter: 0.4 to 0.413 in. (10.2 mm to 10.5 mm) Length: 40-ft (12.2-m)	This cord for installations in the European Union. This cord comes with a pre-installed connector for connecting to the AP's AC port. You will need to source and install a country-specific connector to the blunt cut end of the cable. For information on installing an AC power plug, see Installing AC Power Plug on AIR-CORD-R3P-40UE= , page 4-28. Power cord rating is 100 to 480 VAC. Internal wiring is 16 AWG.
Field-installable Connector AIR-ACC15-AC-PLGS=	Cable Diameter Supported: 9 to 14 mm	This is a kit of five field terminable connectors. For these connectors you will need to source an appropriate 3-wire AC cable. This connector supports a cable of 330 VAC, 13 Amps rating. The wiring size supported is 12 to 16 AWG.

Installing AC Power Plug on AIR-CORD-R3P-40UE=

When using a user-supplied AC power plug on the AIR-CORD-R3P-40UE= power cord, ensure that the plug is certified for outdoor use and that it has a minimum IP67 rating, such as Interpower 84131251 or Hubbell HBL316P6W (IEC/EN 60309) pin-and-sleeve type connectors. The power cord plug pinouts are listed in [Figure 4-17](#).

Figure 4-17 Plug Pinouts



Pin	Description	Conductor Color	Pin	Description	Conductor Color
1	Ground	Green/Yellow	3	Neutral	Blue
2	Live	Brown			

Procedure for Connecting AC power Cable to Access Point

To connect an AC power cable to the access point, perform these steps:

- Step 1** Prior to applying AC power, ensure the access point is grounded (see [Grounding the Access Point](#), [page 4-12](#)).
- Step 2** Turn off power to the AC power source at the designated circuits.



Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



Caution

When connecting the access point AC power connector, always connect the access point end of the cable FIRST. When removing the AC power connector, always disconnect the access point end of the cable LAST.

- Step 3** Align the numbered holes in the AC power cable connector with the pins in the access point AC power port (on the base of the 1572EAC. See [Figure 1-10](#)), and push the cable connector into the access point connector.

- Step 4** When the connector is fully seated in the AC port, hand tighten the cable connector ring by turning it clockwise.

Connecting PoC Power to the Access Point

The Power-over-Cable (PoC) configuration contains a cable modem, RF splitter (within the AP), and a cable stinger connector. The cable stinger port for Power-over-Cable connections is labeled '1' on the base of the AP (see [Base of the AP, page 1-10](#)).



Note

To ensure system performance, with respect to immunity from external electromagnetic fields, use a well shielded coaxial cable, preferably a quad-shield cable.



Note

The AP1572IC and AP1572EC versions of the AP are classified as a type “Hazardous Voltage Secondary” circuit as per the UL/IEC/EN 60950-1 safety standard. The cable distribution network used with this versions must provide transient reduction to the level for this type of circuit classification (that is, 500V transient/lightning surge).

To connect cable PoC power to the access point, follow these steps:

- Step 1** Ensure that all power sources have been disconnected from the access point and that the AP is properly grounded. See [Grounding the Access Point, page 4-12](#).



Warning

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

- Step 2** Remove the attenuator plug (port labeled '7'), and the Shunt plug (port labeled '8') from their ports on the back of the AP. Follow your cable company's procedures to measure the cable signal strength and possibly adjust signal attenuation externally to the access point or on the RF splitter. For more information on the attenuator and shunt ports, see [Installing Attenuators, Fuses, and Shunts, page 4-34](#).
- Step 3** The Cisco-supplied cable stinger connector pin is 29-100357-01. If you are using a third-party cable stinger connector pin, then cut it down to the correct length using the trim measure provided right next to the Power-over-Cable port (labeled '1' on the base of the AP).
- The cable stinger connector pin must be 1.70 ± 0.05 inch (43.1 ± 1.2 cm) in length, but you are encouraged to use the trim measure on the AP as the scale of measure.
- Step 4** Insert the cable stinger connector pin into the Power-over-Cable port. The Power-over-Cable port is equipped with a spring-loaded stinger seizing mechanism. Hence, push the stinger all the way in until the threads hit.
- Step 5** Thread the cable stinger connector ring into the PoC connector opening. Use an adjustable wrench to tighten the connector to 6 to 7 ft lbs (8.1 to 9.5 Nm).
- Step 6** Connect the cable company's PoC cable to cable stinger plug as per their specifications.
- Step 7** Turn on cable PoC power.

- Step 8** Reinstall the RF splitter shunt plug, and the attenuator plug.
-

Installing the GPS Antenna

All models of the 1570 Series support location information when the optional GPS antenna (AIR-ANT-GPS-1) is installed and connected. The AP has two mounting positions for the GPS antenna, on the head of the AP and on the back of the AP, which need to be used depending on whether the AP is horizontally or vertically oriented when deployed (see [Figure 4-19](#) and [Figure 4-20](#)).

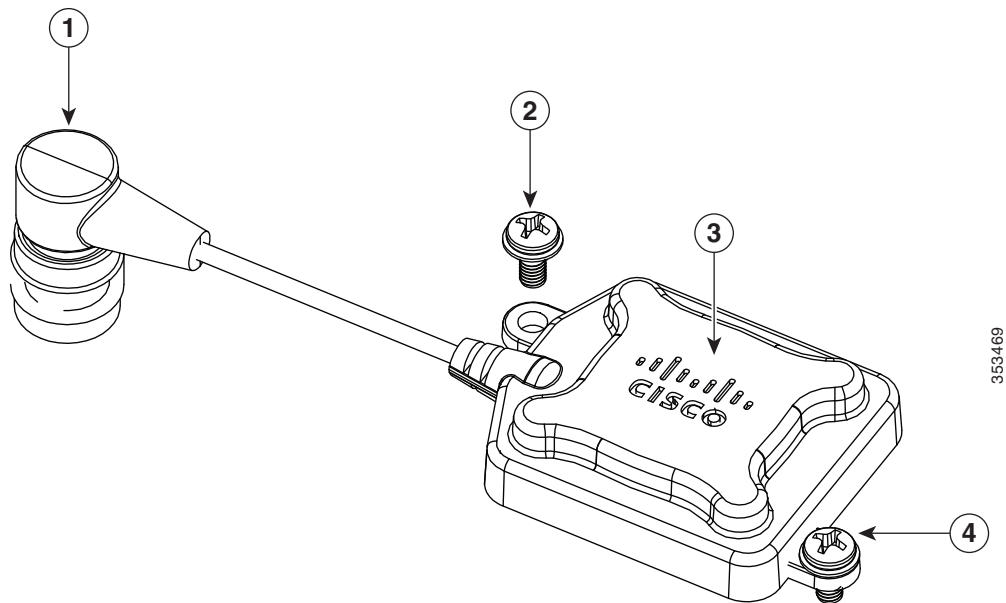
**Note**

Ensure that the GPS antenna always has a clear unobstructed view of the sky, for proper functioning.

To install the GPS antenna:

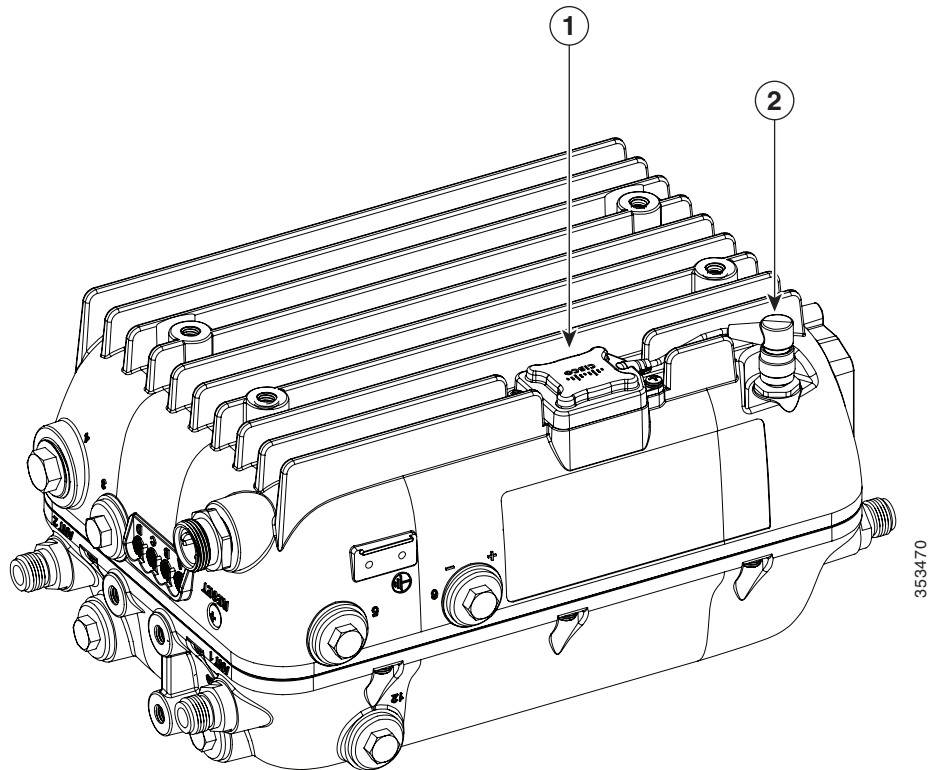
- Step 1** Remove the protective cap covering the access point's GPS antenna connector port.
- Step 2** Screw down the GPS antenna connector onto the AP's GPS antenna connector port, just enough so that it doesn't fall off.
- Step 3** If the AP is mounted horizontally, screw down the GPS antenna at the designated spot on the back of the AP (see [Figure 4-19](#)).
If the AP is mounted vertically, screw down the GPS antenna at the designated spot on the head of the AP (see [Figure 4-20](#)).
- Step 4** The GPS antenna is fixed to the AP using two M3.5x0.6x8 mm Pan Head Phillips stainless steel screws.
- Step 5** Fully tighten the GPS antenna connector onto the access point's GPS antenna connector port.
-

Figure 4-18 GPS Antenna and its connector



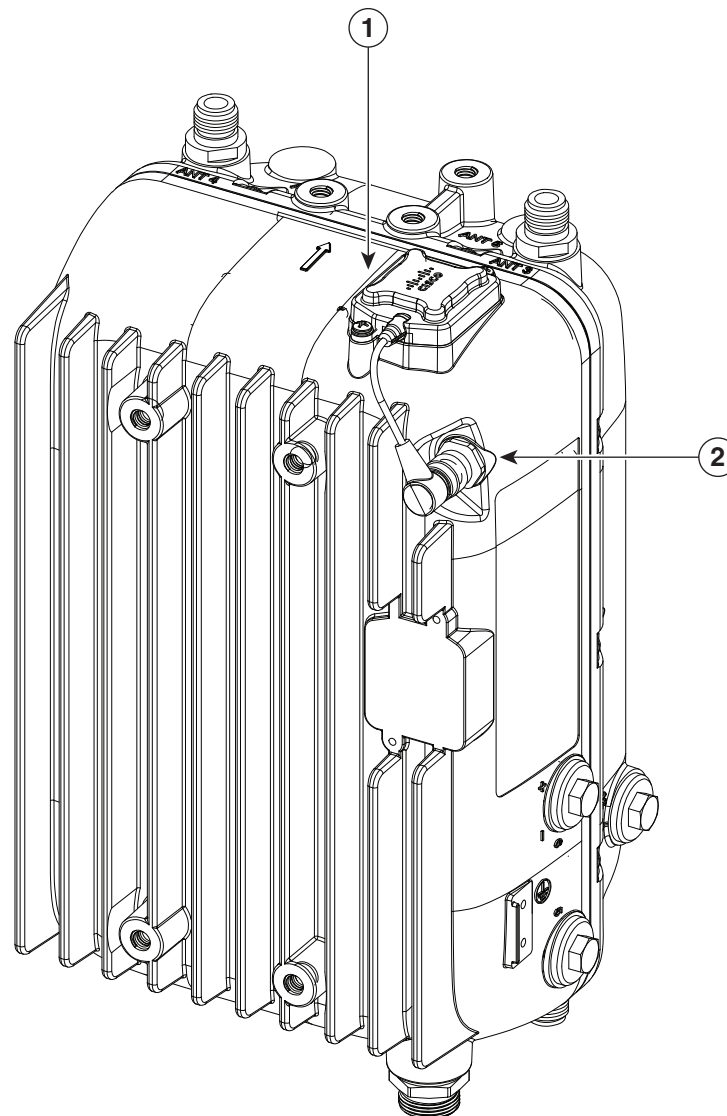
1	GPS antenna connector	2 and 4	M3.5x0.6x8 mm Pan Head Phillips stainless steel screws, used to fasten the GPS antenna to the AP.
3	GPS antenna		

Figure 4-19 GPS antenna installed on a horizontally oriented AP1572EC



1	GPS antenna installed on the back of the AP	2	GPS antenna connector plugged into AP's antenna connector port
---	---	---	--

Figure 4-20 GPS antenna installed on a vertically oriented AP1572EC



353471

1	GPS antenna installed on the head of the AP	2	GPS antenna connector plugged into AP's antenna connector port
----------	---	----------	--

Installing Attenuators, Fuses, and Shunts

Installing an Attenuator Plug

You can install an attenuator plug on the RF splitter, in port 8 on the back of the access point (see [Figure 1-4](#)).

Plug-in attenuator pads produce flat (even) loss across the forward and reverse frequency spectrum. Pads are used during station balancing to adjust signal levels as needed. The loss (in dB) produced is equal to the pad value printed on the top of the pad.

Using a Signal Test Probe

You can use test probes (such as the Communication Associates CA008927) to measure the DS signal level directly from the attenuator plug-in interface in port 8 on the back of the access point (see [Figure 1-4](#)).

You need to remove any installed attenuator pads, which will disconnect the cable modem from the HFC network. You can then insert the test probe into the plug-in interface, providing an F-connector interface to directly measure downstream signal levels. Based on the measured signal level, you can decide on an attenuator value and then plug in the corresponding attenuator pad into the port.

Installing a Fuse or Shunt

You can install a power fuse or a power shunt in port 7 on the back of the access point (see [Figure 1-4](#)). Fuses with different fuse ratings are available from Cisco.

**Note**

By default a 20 A fuse is provided as shunt.

Handling the AP when installing Attenuators, Fuses, and Shunts

To access port 7 or port 8 (see [Figure 1-4](#)):

- For strand mounted APs, you can access ports 7 and 8, without having to dislodge the AP from its mount.
- For pole and wall mounted APs, you can following one of the following procedures, depending on your mounting kit,

For pole mounted and wall mounted APs, mounted using PMK1 or PMK2, to access port 7 or port 8:

-
- | | |
|---------------|---|
| Step 1 | Slide the AP up, off the wall mount bracket's key hole slots. |
| Step 2 | Remove the four M8 x 12mm hex head bolts from the back of the AP, and then fix them on the face of the AP in the screw holes intended for future external module support (see Face of the AP, page 1-4). Do not fully tighten the bolts. |

- Step 3** With the face of the AP aligned to the wall mount bracket, slide bolts on the face of the AP, down into the key hole slots on the wall mount bracket.
- Step 4** Unscrew the protector cap of the port and proceed with your task. When you are done with your task, retrace your steps to mount the AP back properly. See the following sections to ensure that you have properly mounted the AP.
- [Pole Mount Kit 1, page 3-19](#)
 - [Pole Mount Kit 2, page 3-23](#)
-

For pole mounted and wall mounted APs, mounted using PMK3, to access port 7 or port 8:

- Step 1** Remove the three M8 x 12mm hex head bolts, used in the key hole type screw holes on the PMK3 wall mount bracket, as marked in Figure.
- Step 2** You can now rotate the AP outwards from the mount, using the remaining one bolt as the pivot. Rotate the AP out just enough access port 7 or 8.



Note You may need to loosen this bolt just enough to rotate the AP out.

- Step 3** Unscrew the protector cap of the port and proceed with your task. When you are done with your task, retrace your steps to mount the AP back properly. See [Pole Mount Kit 3, page 3-41](#) to ensure that you have properly mounted the AP.
-

What to do after hardware installation

Once your AP and its accessories are installed, power up the AP. The following operating modes are supported by the 1570 series access points:

- Unified Modes
 - Local
 - Flexconnect
 - Bridge
 - Flexconnect with Bridge Mode
 - Monitor
 - Spectrum Expert
 - Sniffer
 - Rogue Detector
- Autonomous Mode

After the AP is powered up you can proceed with configuring the access point. For more information, see the following documents:

- For information on configuring a Lightweight Access Points and Mesh Access Points, see the *Cisco Wireless LAN Controller Configuration Guide*, release 8.0 or newer. The release 8.0 guide is available at:
http://www.cisco.com/c/en/us/td/docs/wireless/controller/8-0/configuration-guide/b_cg80.html
- For Access Points in autonomous mode, see the Cisco IOS Configuration Guide for Autonomous Aironet Access Points Cisco IOS Release 15.3(3)JAB, or newer. The 15.3(3)JAB guide is available at:
http://www.cisco.com/c/en/us/td/docs/wireless/access_point/15-3-3/configuration/guide/cg15-3-3.html



Troubleshooting

This chapter provides troubleshooting procedures for basic problems with the access point. For the most up-to-date, detailed troubleshooting information, refer to the Cisco Technical Support and Documentation website at the following URL:

<http://www.cisco.com/cisco/web/support/index.html>

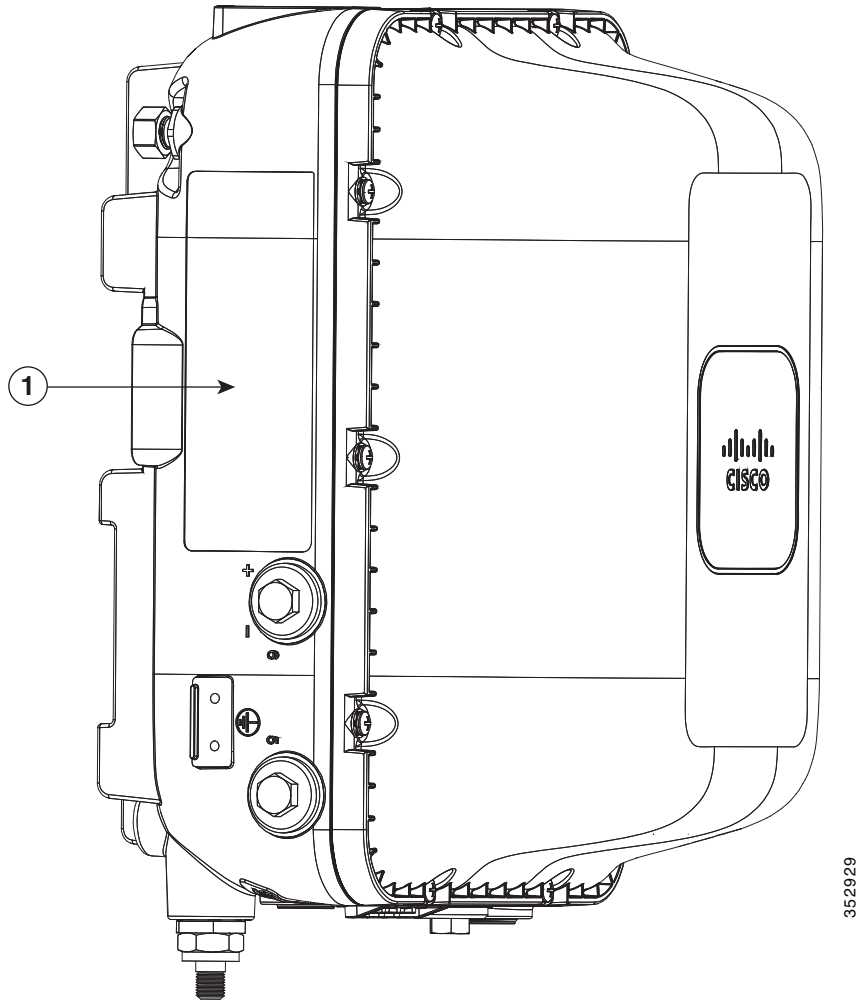
Sections in this chapter include:

- [Guidelines for Using the Access Points, page 5-3](#)
- [Controller MAC Filter List, page 5-4](#)
- [Using DHCP Option 43, page 5-4](#)
- [Monitoring the Access Point LEDs, page 5-5](#)
- [Verifying Controller Association, page 5-6](#)
- [Changing the Bridge Group Name, page 5-7](#)
- [Access Point Power Injector, page 5-7](#)
- [Using the Reset Button, page 5-9](#)

Finding the Product Serial Number

The access point serial number is on the right side of the access point (refer to [Figure 1](#)).

Figure 1 *Location of Serial Number Label*



The access point serial number label (labeled '1' in the figure above) contains the following information:

- Model number, such as AIR-AP1572EAC-*x*-K9, where *x* is the regulatory domain.
- Serial number, such as WCN0636279B (11 alphanumeric digits).
- Access point MAC address, for example 68BDABF54600 (12 hexadecimal digits). It is located under the serial number.
- Safety Warnings
- Ports and their identification numbers

You need your product serial number when requesting support from the Cisco Technical Assistance Center.

Guidelines for Using the Access Points

You should keep these guidelines in mind when you use the access points:

- The access point only supports Layer 3 CAPWAP communications with the controllers.

In Layer 3 operation, the access point and the controller can be on the same or different subnets. The access point communicates with the controller using standard IP packets. A Layer 3 access point on a different subnet than the controller requires a DHCP server on the access point subnet and a route to the controller. The route to the controller must have destination UDP ports 12222 and 12223 open for CAPWAP communications. The route to the primary, secondary, and tertiary controllers must allow IP packet fragments.

- Before deploying your access points, ensure that the following has been done:
 - Your controllers are connected to switch ports that are configured as trunk ports.
 - Your access points are connected to switch ports that are configured as untagged access ports.
 - A DHCP server is reachable by your access points and has been configured with Option 43. Option 43 provides the IP addresses of the management interfaces of your controllers. Typically, a DHCP server can be configured on a Cisco switch.
 - Optionally, a DNS server can be configured to enable CISCO-CAPWAP-CONTROLLER. Use *local domain* to resolve to the IP address of the management interface of your controller.
 - Your controllers are configured and reachable by the access points.
 - Your controllers are configured with the access point MAC addresses and the MAC filter list is enabled.
 - Your switch must forward DHCP requests.
- After the access points are associated to the controller, you should change the bridge group name (BGN) from the default value. With the default BGN, the mesh access points (MAPs) can potentially try to connect with other mesh networks and slow down the convergence of the network.

Important Notes

Convergence Delays

During deployment, the access points can experience convergence delays due to various causes. The following list identifies some operating conditions that can cause convergence delays:

- A root access point (RAP) attempts to connect to a controller using any of the wired ports (cable, fiber-optic, PoE-in). If the wired ports are operational, the RAP can potentially spend several minutes on each port prior to connecting to a controller.
- If a RAP is unable to connect to a controller over the wired ports, it attempts to connect using the wireless network. This results in additional delays when multiple potential wireless paths are available.
- If a MAP is unable to connect to a RAP using a wireless connection, it then attempts to connect using any available wired port. The access point can potentially spend several minutes for each connection method, before attempting the wireless network again.

- To minimize convergence delays, if a device is connected to your wired ports, make sure Ethernet Bridging is enabled on the AP. This can be enabled from the WLC GUI under **Wireless > Access Points > AP_Name > Mesh > Ethernet Bridging**.

Bridge Loop

The access point supports packet bridging between wired and wireless network connections. The same network must never be connected to multiple wired ports on an access point or on two bridged access points. A bridge loop causes network routing problems.

Controller DHCP Server

The controller DHCP server only assigns IP addresses to lightweight access points and wireless clients associated to an access point. It does not assign an IP address to other devices, including Ethernet bridging clients on the mesh access points.

MAP Data Traffic

If the signal on the access point backhaul channel has a high signal-to-noise ratio, it is possible for a MAP to connect to the controller, via parent node, but not be able to pass data traffic, such as pinging the access point. This can occur because the default data rate for backhaul control packets is set to 6 Mb/s, and the backhaul data rate set to auto by the user.

Controller MAC Filter List

Before activating your access point, you must ensure that the access point MAC address has been added to the controller MAC filter list and that **Mac Filter List** is enabled.



Note

The access point MAC address and barcode is located on the bottom of the unit. When two MAC addresses are shown, use the top MAC address.

To view the MAC addresses added to the controller MAC filter list, you can use the controller CLI or the controller GUI:

- Controller CLI—Use the **show macfilter summary** controller CLI command to view the MAC addresses added to the controller filter list.
- Controller GUI—Log into your controller web interface using a web browser, and choose **SECURITY > AAA > MAC Filtering** to view the MAC addresses added to the controller filter list.

Using DHCP Option 43

You can use DHCP Option 43 to provide a list of controller IP addresses to the access points, enabling the access point to find and join a controller. Refer to the product documentation for your DHCP server for instructions on configuring DHCP Option 43. For additional information, refer to the [“Configuring DHCP Option 43” section on page D-1](#).

Monitoring the Access Point LEDs

If your access point is not working properly, look at the LEDs on the base of the unit. You can use them to quickly assess the status of the unit.

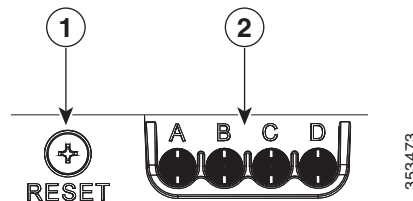


Note

It is expected that there will be small variations in LED color intensity and hue from unit to unit. This is within the normal range of the LED manufacturer specifications and is not a defect.

The access point's LEDs are located next to the Reset button, on the base of the AP. See [Figure 5-2](#).

Figure 5-2 Access Point LEDs labeled A to D



1	Reset Button	2	LEDs labeled A to D
----------	--------------	----------	---------------------

The access point LED signals are listed in the following table.

A	RF-2 LED—Status of the 5 GHz MIMO backhaul radio	C	Uplink LED—Ethernet, cable, or fiber status
B	RF-1 LED—Status of the 2.4 GHz MIMO access radio	D	Status LED—access point and software status

The color and the meaning of the access point LED signals are described in [Table 5-1](#).

Table 5-1 Access Point LED Signals

LED	Color ^{1, 2, 3}	Meaning
Status	Black	No power applied or LED off.
	Steady green	Access point is operational.
	Blinking green	Download or upgrade of Cisco IOS image file in progress.
	Steady amber	Mesh neighbor access point discovery in progress.
	Blinking amber	Mesh authentication in progress.
	Blinking red / green / amber	CAPWAP discovery in progress.
	Steady red	Firmware failure. Contact your support organization for assistance.
Uplink	Black	All network ports down or LED off.
	Steady green	Uplink port is operational (cable, fiber optic, or Ethernet).

Table 5-1 **Access Point LED Signals (continued)**

LED	Color ^{1, 2, 3}	Meaning
RF-1	Black	Radio turned off or LED off.
	Steady green	Radio is operational; network is good.
	Steady red	Firmware failure. Contact your support organization for assistance.
RF-2	Black	Radio is turned off or LED off.
	Steady green	Radio is operational; network is good.
	Steady red	Firmware failure. Contact your support organization for assistance.

1. If all LEDs off, the access point has no power.
2. When the access point power supply is initially turned on, all LEDs are amber.
If the power supplied is insufficient, then all LEDs blinking amber at 1 second intervals. Supply sufficient power to remedy this.
3. If the temperature of the AP exceeds its working temperature range, then the AP shuts down, with all LEDs blinking amber at 0.5 sec intervals. The Wireless LAN Controller is also notified. The AP reboots automatically when the temperature gets back within the working range.

Verifying Controller Association

To verify that your access point is associated to the controller, follow these steps:

-
- Step 1** Log into your controller web interface using a web browser.
You can also use the controller CLI **show ap summary** command from the controller console port.
 - Step 2** Click **Wireless**, and verify that your access point MAC address is listed under Ethernet MAC.
 - Step 3** Log out of the controller, and close your web browser.
-

Changing the Bridge Group Name

The bridge group name (BGN) controls the association of the access points to a RAP. BGNs can be used to logically group the radios to avoid different networks on the same channel from communicating with each other. This setting is also useful if you have more than one RAP in your network in the same area.

If you have two RAPs in your network in the same area (for more capacity), we recommend that you configure the two RAPs with different BGNs and on different channels.

The BGN is a string of ten characters maximum. A factory-set bridge group name (NULL VALUE) is assigned during manufacturing. It is not visible to you, but allows new access point radios to join a network of new access points. The BGN can be reconfigured from the Controller CLI and GUI. After configuring the BGN, the access point reboots.

After the access points are deployed and associated to the controller, the BGN should be changed from the default value to prevent the MAPs from attempting to associate to other mesh networks.

The BGN should be configured very carefully on a live network. You should always start with the most distant access point (last node) from the RAP and move towards the RAP. If you start configuring the BGN in a different location, then the access points beyond this point (farther away) are dropped, as they have a different BGN.

To configure the BGN for the access points using the controller GUI, follow these steps:

-
- Step 1** Log into your controller using a web browser.
 - Step 2** Click **Wireless**. When access points associates to the controller, the access point name appears in the AP Name list.
 - Step 3** Click on an access point name.
 - Step 4** Find the Mesh Information section, and enter the new BGN in the Bridge Group Name field.
 - Step 5** Click **Apply**.
 - Step 6** Repeat Steps 2 through 5 for each access point.
 - Step 7** Log out from your controller, and close your web browser.
-

Access Point Power Injector

The power injector (AIR-PWRINJ1500-2=) has three LEDs on the front end of the case (see [Figure 5-3](#)). For detailed information on the power injector, see the *Cisco Aironet 1550 Series Outdoor Access Point Power Injector Installation Instructions*.

Figure 5-3 Power Injector Connectors and LEDs



1	Mounting tabs	4	AC POWER LED
2	AP POWER LED	5	TO AP—Ethernet connector (RJ-45) to access point (10/100/1000BASE-T)
3	FAULT LED	6	TO SWITCH—Ethernet connector (RJ-45) to switch (10/100/1000BASE-T)

Monitoring the Power Injector LEDs

You can use the power injector LEDs to check the power injector status. The LEDs provide the following status information:

- **AP POWER**—Turns solid green after successful discovery; indicates that power injector is supplying power to the access point.
- **FAULT**—Turns solid red when a fault occurs during discovery mode or power-up. Check Ethernet cables and connections before contacting your support organization for assistance.
- **AC POWER**—Turns solid green when power injector is receiving AC power and is ready to provide power to the access point.

Using the Reset Button

The access point has a reset button located on the base (see [Base of the AP, page 1-10](#)), positioned beside the status LEDs. The reset button is recessed in a small hole that is sealed with a screw and a rubber gasket.

Resetting the Access Point

The Reset button reboots the access point. To use the Reset button:

-
- | | |
|---------------|--|
| Step 1 | Use a Phillips screwdriver to remove the reset button screw. Ensure that you do not lose the screw and the rubber gasket. |
| Step 2 | To press the Reset button, use a straightened paper-clip or a small screwdriver or a pen. |
| Step 3 | Inspect the gasket. If the gasket has any signs of damage, it should be replaced to avoid water leakage into the unit. |
| Step 4 | Close the recess with the screw and the gasket. Use a Phillips screwdriver to tighten the screw to 1.8 to 2 lb.ft (2.49 to 2.71 Nm). |
-



Access Point Tech Specs References

Access Point Data Sheet

The detailed technical specifications for the Cisco Aironet 1570 Series Outdoor Access Points are available at the following URL:

<http://www.cisco.com/c/dam/en/us/products/collateral/wireless/aironet-1570-series/datasheet-c78-732348.pdf>

You can also download a copy of the *Cisco Aironet 1570 Series Outdoor Access Point Data Sheet* from the above URL for offline use.

Radio Channels and Power Levels

For channel and maximum power level settings, refer to the *Channels and Maximum Power Settings for Cisco Aironet Lightweight Access Points and Bridges* document available on the Cisco Wireless documentation page of Cisco.com.

To browse to the document, follow these steps:

-
- | | |
|---------------|--|
| Step 1 | Click this link and go to the Cisco Wireless documentation home page:
http://www.cisco.com/en/US/products/hw/wireless/index.html |
| Step 2 | Click Support . The Support and Documentation page displays. |
| Step 3 | Click Wireless |
| Step 4 | Click 1570 . |
| Step 5 | Click Install and Upgrade . |
| Step 6 | Click Install and Upgrade Guides . |
| Step 7 | Click Channels and Maximum Power Settings for Cisco 1570 Series Outdoor Access Points document. |
-

Power Distribution Budget

Table A-1 lists the power distribution budget for AP1572IC access point configurations.

Table A-1 Power Distribution Budget for the AP1572IC Access Point

Condition	Typical Power (Watts)	Maximum Power (Watts)
Power using power-over-cable (90V)	38	41
Power using 12VDC input	31	36
With SFP	26	28

Table A-2 lists the power distribution budget for AP1572EC access point configurations.

Table A-2 Power Distribution Budget for AP1572EC Access Point

Condition	Typical Power (Watts)	Absolute Max Power (Watts)
Power using power-over-cable (90V)	38	42
Power using 12 VDC input	31	35
With SFP	26	30
With 30W PoE-out	76	80

Table A-3 lists the power distribution budget for AP1572EAC access point configurations.

Table A-3 Power Distribution Budget for AP1572EAC Access Point

Condition	Typical Power (Watts)	Absolute Max Power (Watts)
Power using AC input (100VAC)	25	31
Power using AC input (277VAC)	25	31
Power using 12VDC input	20	24
Power using PoE input (injector or UPoE, 42-57V)	23	27
With SFP, AC power	24	28
With 30W PoE-out, AC power	65	72

Access Point Operating Temperature Specifications

Temperature Condition	Value
Operating Temperature Range	-40 to 65°C (-40 to 149°F) with solar loading
Maximum Operating Temperature for AP1572EC, with: <ul style="list-style-type: none">PoE-Out activeCable Modem activeFull throughput on all Tx channelsMounted horizontally Maximum solar loadingDeployed in a high-power regulatory domain	45°C (AP will be fully operational with 4Tx) If temperature continues to increase, the number of transmitters is decreased to 2Tx, and then to 1Tx at 55°C.
Maximum Operating Temperature for: <ul style="list-style-type: none">AP1572IC, AP1572EACAP1572EC without all features active, or mounted vertically (aids better air flow over the radiating fins on the back of the AP)	> 45°C



Declarations of Conformity and Regulatory Information

This appendix provides declarations of conformity and regulatory information for the Cisco Aironet 1570 Series Outdoor Access Points.

This appendix contains the following sections:

- [Manufacturers Federal Communication Commission Declaration of Conformity Statement, page B-2](#)
- [Industry Canada, page B-3](#)
- [European Community, Switzerland, Norway, Iceland, and Liechtenstein, page B-6](#)
- [Declaration of Conformity for RF Exposure, page B-9](#)
- [Guidelines for Operating Cisco Aironet Access Points in Japan, page B-11](#)
- [VCCI Statement for Japan, page B-12](#)
- [Administrative Rules for Cisco Aironet Access Points in Taiwan, page B-12](#)
- [EU Declaration of Conformity, page B-14](#)

Manufacturers Federal Communication Commission Declaration of Conformity Statement

**Models:****FCC Certification number:**

AIR-AP1572EAC-B-K9	LDK102093P
AIR-AP1572EC1-B-K9	
AIR-AP1572EC2-B-K9	
AIR-AP1572IC1-B-K9	
AIR-AP1572IC2-B-K9	

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, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of 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 residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

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

**Caution**

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

**Caution**

To meet regulatory restrictions, the access point must be professionally installed.

Requirements of operator to register the RLAN device operating Outdoors in the 5150 -5250 MHz band and addressing possible interference issues in this band.

Section 15.407(j) of the rules established filing requirements for U-NII operators that deploy a collection of more than 1000 outdoor access

points with the 5.15-5.25 GHz band, parties must submit a letter to the FCC lab acknowledging that, should harmful interference to licensed services

in this band occur, they will be required to take corrective action. Corrective actions may include reducing power, turning off devices, changing frequency

bands, and/or further reducing power radiated in the vertical direction.

This material shall be submitted to :

Federal Communications Commission

Laboratory Division, Office of Engineering and Technology

7435 Oakland Mills Road, Columbia, MD, 21046

Attn: U-NII Coordination,

or via website at <https://www.fcc.gov/labhelp>

use subject line U-NII Filing

Industry Canada

Models:

AIR-AP1572EAC-A-K9

AIR-AP1572EC1-A-K9

AIR-AP1572EC2-A-K9

AIR-AP1572IC1-A-K9

AIR-AP1572IC2-A-K9

IC Certification Number:

2461B-LDK102093P

Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte les exigences du Règlement sur le matériel brouilleur du Canada.

This device complies with Class B Limits of Industry Canada. Operation is subject to the following two conditions:

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

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.

Cisco Aironet Access Points are certified to the requirements of RSS-210. The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

This device has been designed to operate with antennas having a maximum gain of 13 dBi for 2.4 GHz and 14 dBi for 5 GHz. Antennas having a gain greater are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted 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.

Dual Band Omni	Max Antenna Gain 7dBi
Single Band Omni	Max Antenna Gain 8 dBi
Single Band Directional	Max Antenna Gain 14dBi
Dual Band Directional	Max Antenna Gain 8 dBi
Antenna Impedance in all cases is 50 Ohms	

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.

This system has been evaluated for RF exposure for Humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on RSS-102 Rev 2. To maintain compliance, the minimum separation distance for antennas that have 8 dBi to 14 dBi gain, is 23.6 inches (60 cm) from general bystanders. The minimum separation distance from antennas that have less than 8 dBi gain to general bystanders is 9.8 inches (25cm).

Ce système a été évalué pour l'exposition aux RF pour les humains en référence à la norme ANSI C 95.1 (American National Standards Institute) limites. L'évaluation a été basée sur RSS-102 Rev 2. La distance minimale de séparation de l'antenne de toute personne est de 7.9 "(20 cm) pour les gains d'antenne jusqu'à 8 dBi et 20" (50 cm) pour les gains d'antenne de 14 dbi pour assurer le respect.

This access point is also compliant to EN 50835 for RF exposure.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Access Point Models:

AIR-AP1572EAC-E-K9

AIR-AP1572EC3-E-K9

AIR-AP1572IC3-E-K9

Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC & Medical Directive 93/42/EEC

This declaration is only valid for configurations (combinations of software, firmware, and hardware) provided and supported by Cisco Systems. The use of software or firmware not provided and supported by Cisco Systems may result in the equipment no longer being compliant with the regulatory requirements.

Български [Bulgarian]:	Това оборудване отговаря на съществените изисквания и приложими клаузи на Директива 1999/5/EC.
Česky [Czech]:	Toto zařízení je v souladu se základními požadavky a ostatními odpovídajícími ustanoveními Směrnice 1999/5/EC.
Dansk [Danish]:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.
Deutsch [German]:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Eesti [Estonian]:	See seade vastab direktiivi 1999/5/EÜ olulistele nõuetele ja teistele asjakohastele sätetele.
English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]:	Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 1999/5/CE.
Ελληνική [Greek]:	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 1999/5/EC.
Français [French]:	Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.
Íslenska [Icelandic]:	Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 1999/5/EC.
Italiano [Italian]:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/CE.
Latviešu [Latvian]:	Šī iekārta atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]:	Šis įrenginys tenkina 1999/5/EB Direktyvos esminius reikalavimus ir kitas šios direktyvos nuostatas.

142729

Nederlands [Dutch]:	Dit apparaat voldoet aan de essentiële eisen en andere van toepassing zijnde bepalingen van de Richtlijn 1999/5/EC.
Malti [Maltese]:	Dan l-apparat huwa konformi mal-htigiet essenzjali u l-provedimenti l-oħra rilevanti tad-Direttiva 1999/5/EC.
Magyar [Hungarian]:	Ez a készülék teljesíti az alapvető követelményeket és más 1999/5/EK irányelvben meghatározott vonatkozó rendelkezéseket.
Norsk [Norwegian]:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EF.
Polski [Polish]:	Urządzenie jest zgodne z ogólnymi wymaganiami oraz szczególnymi warunkami określonymi Dyrektywą UE: 1999/5/EC.
Português [Portuguese]:	Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 1999/5/EC.
Slovensko [Slovenian]:	Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi pogoji Direktive 1999/5/EC.
Slovensky [Slovak]:	Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktív: 1999/5/EC.
Suomi [Finnish]:	Tämä laite täyttää direktiivin 1999/5/EY olennaiset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen.
Svenska [Swedish]:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

121404

The following standards were applied:

EMC—EN 301.489-1 v1.8.1; EN 301.489-17 v2.1.1

Health & Safety—EN60950-1: 2005; EN 50385: 2002

Radio—EN 300 328 v 1.7.1; EN 301.893 v 1.5.1

The conformity assessment procedure referred to in Article 10.4 and Annex III of Directive 1999/5/EC has been followed.

This device also conforms to the EMC requirements of the Medical Devices Directive 93/42/EEC.



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.

The product carries the CE Mark:



Declaration of Conformity for RF Exposure

The following is the declaration of conformity for RF exposure for the United States, Canada, European Union and Australia.

United States

This system has been evaluated for RF exposure for Humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on ANSI C 95.1 and FCC OET Bulletin 65C rev 01.01. To maintain compliance, the minimum separation distance for antennas that have:

- 8.1 dBi to 14 dBi gain, is 23.6 inches (60 cm) from general bystanders.
- 6.1 dBi to 8 dBi gain, is 9.8 inches (25cm) from general bystanders.
- 6 dBi gain or less, is 7.9 inches (20cm) from general bystanders

Canada

This system has been evaluated for RF exposure for Humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on RSS-102 Rev 2. To maintain compliance, the minimum separation distance for antennas that have 8 dBi to 14 dBi gain, is 20 inches (50 cm) from general bystanders. The minimum separation distance from antennas that have less than 8 dBi gain to general bystanders is 10 inches (25 cm).

Ce système a été évalué pour l'exposition aux RF pour les humains en référence à la norme ANSI C 95.1 (American National Standards Institute) limites. L'évaluation a été basée sur RSS-102 Rev 2. La distance minimale de séparation de l'antenne de toute personne est de 10 "(25 cm) pour les gains d'antenne jusqu'à 8 dBi et 20" (50 cm) pour les gains d'antenne de 14 dBi pour assurer le respect.

European Union

This system has been evaluated for RF exposure for Humans in reference to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. The evaluation was based on the EN 50385 Product Standard to Demonstrate Compliance of Radio Base stations and Fixed Terminals for Wireless Telecommunications Systems with basic restrictions or reference levels related to Human Exposure to Radio Frequency Electromagnetic Fields from 300 MHz to 40 GHz. To maintain compliance, the minimum separation distance for antennas that have 8 dBi to 14 dBi gain, is 23.6 inches (60 cm) from general bystanders. The minimum separation distance from antennas that have less than 8 dBi gain to general bystanders is 9.8 inches (25cm).

Australia

This system has been evaluated for RF exposure for Humans as referenced in the Australian Radiation Protection standard and has been evaluated to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. To maintain compliance, the minimum separation distance from antennas that have less than 8 dBi gain to general bystanders is 9.8 inches (25cm) and antennas with 8 dBi gain shall have 50cm separation.

Antennas with greater than 8 dBi gain are not supported in Australia.

Guidelines for Operating Cisco Aironet Access Points in Japan

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

Lightweight Access Point Model:

AIR-AP1572EAC-Q-K9

AIR-AP1572EC4-Q-K9

AIR-AP1572IC4-Q-K9

Japanese Translation

この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。

- 1 この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力無線局が運用されていないことを確認して下さい。
- 2 万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した上、下記連絡先にご連絡頂き、混信回避のための処置等(例えば、パーティションの設置など)についてご相談して下さい。
- 3 その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問い合わせ下さい。

連絡先 : 03-6434-6500

43768

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

VCCI Statement for Japan



Warning

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

警告

この装置は、クラスA情報技術装置です。この装置を家庭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

Administrative Rules for Cisco Aironet Access Points in Taiwan

This section provides administrative rules for operating Cisco Aironet Access Points in Taiwan. The rules are provided in both Chinese and English.

Chinese Translation

低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

127048

English Translation

Administrative Rules for Low-power Radio-Frequency Devices

Article 12

For those low-power radio-frequency devices that have already received a type-approval, companies, business units or users should not change its frequencies, increase its power or change its original features and functions.

Article 14

The operation of the low-power radio-frequency devices is subject to the conditions that no harmful interference is caused to aviation safety and authorized radio station; and if interference is caused, the user must stop operating the device immediately and can't re-operate it until the harmful interference is clear.

The authorized radio station means a radio-communication service operating in accordance with the Communication Act.

The operation of the low-power radio-frequency devices is subject to the interference caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator.

Chinese Translation

低功率射頻電機技術規範

4.7 無線資訊傳輸設備

4.7.6 無線資訊傳輸設備須忍受合法通信之干擾且不得干擾合法通信；如造成干擾，應立即停用，俟無干擾之虞，始得繼續使用。

4.7.7 無線資訊傳輸設備的製造廠商應確保頻率穩定性，如依製造廠商使用手冊上所述正常操作，發射的信號應維持於操作頻帶中。

209139

English Translation

Low-power Radio-frequency Devices Technical Specifications

4.7

Unlicensed National Information Infrastructure

4.7.6

The U-NII devices shall accept any interference from legal communications and shall not interfere the legal communications. If interference is caused, the user must stop operating the device immediately and can't re-operate it until the harmful interference is clear.

4.7.7

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual.

Statement 371—Power Cable and AC Adapter

接続ケーブル、電源コード、AC アダプタ、バッテリーなどの部品は、必ず添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となります。また、電気用品安全法により、当該法の認定（PSE とコードに表記）でなく UL 認定（UL または CSA マークがコードに表記）の電源ケーブルは弊社が指定する製品以外の電気機器には使用できないためご注意ください。

English Translation

When installing the product, please use the provided or designated connection cables/power cables/AC adapters. Using any other cables/adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the “UL” shown on the code) for any other electrical devices than products designated by CISCO. The use of cables that are certified by Electrical Appliance and Material Safety Law (that have “PSE” shown on the code) is not limited to CISCO-designated products.

EU Declaration of Conformity

All the Declaration of Conformity statements related to this product can be found at the following location:

<http://www.ciscofax.com>

Operation of Cisco Aironet Access Points in Brazil

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

Access Point Models

AIR-AP1572EAC-Z-K9

AIR-AP1572EC1-Z-K9

AIR-AP1572EC2-Z-K9

AIR-AP1572EC3-Z-K9

AIR-AP1572IC1-Z-K9

AIR-AP1572IC2-Z-K9

AIR-AP1572IC3-Z-K9

Regulatory Information

Figure B-1 contains Brazil regulatory information for the access point models identified in the previous section.

Figure B-1 Brazil Regulatory Information



Portuguese Translation

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

English Translation

This equipment operates on a secondary basis and consequently must accept harmful interference, including interference from stations of the same kind. This equipment may not cause harmful interference to systems operating on a primary basis.



Access Point Pinouts

This appendix describes the pin signals of the access point Ethernet connectors, and the power injector input and output connectors.

[Table C-1](#) describes the pin signals of the access point LAN connector

Table C-1 Access Point LAN Connector Pinouts

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T)
2	
3	Ethernet signal pair (10/100/1000BASE-T)
6	
4	Ethernet signal pair (10/100/1000BASE-T)
5	
7	Ethernet signal pair (10/100/1000BASE-T)
8	
Shield	Chassis ground

[Table C-2](#) describes the pin signals for the access point PoE-in Ethernet connector. The Pinouts given in this table are applicable to AIR-POWERINJ1500. Not all PoE power sources follow these pinouts.

Table C-2 Access Point PoE-In Ethernet Connector Pinouts for AIR-POWERINJ1500

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T) and DC return
2	
3	Ethernet signal pair (10/100/1000BASE-T) and DC (+)
6	
4	Ethernet signal pair (1000BASE-T) and DC (+)
5	

Table C-2 Access Point PoE-In Ethernet Connector Pinouts for AIR-POWERINJ1500

Pin Number	Signal Name
7	Ethernet signal pair (1000BASE-T) and DC return
8	
Shield	Chassis ground

Table C-3 describes the pin signals for the power injector input connector (To Switch).

Table C-3 Power Injector Input Connector (To Switch) Pinouts

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T)
2	
3	Ethernet signal pair 10/100/1000BASE-T)
6	
4	Ethernet signal pair (1000BASE-T)
5	
7	Ethernet signal pair (1000BASE-T)
8	
Shield	Chassis ground

Table C-4 describes the RJ-45 pin signals for the power injector output connector (To AP). The Pinouts given in this table are applicable to AIR-POWERINJ1500. Not all PoE power sources follow these pinouts.

Table C-4 Power Injector AIR-POWERINJ1500 Output Connector (To AP) Pinouts

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T) and DC return
2	
3	Ethernet signal pair (10/100/1000BASE-T) and DC (+)
6	
4	Ethernet signal pair (1000BASE-T) and DC (+)
5	
7	Ethernet signal pair (1000BASE-T) and DC return
8	
Shield	Chassis ground



Configuring DHCP Option 43

This appendix describes the steps needed to configure DHCP Option 43 on a DHCP server, such as a Cisco Catalyst 3750 series switch, for use with Cisco Aironet Access Points. This appendix contains these sections:

- [Overview, page D-2](#)
- [Configuring Option 43 for 1570 Series Access Points, page D-2](#)

Overview

For up-to-date information on how to use DHCP Option 43 and to see sample configurations for DHCP Option 43 for lightweight Cisco Aironet access points (LAPs), go to this URL:

<http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/97066-dhcp-option-43-00.html>

The following section contains a DHCP Option 43 configuration example on a DHCP server for use with Cisco Aironet Access Points. For other DHCP server implementations, consult DHCP server product documentation for configuring DHCP Option 43. In Option 43, use the IP address of the controller management interface.

**Note**

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

Cisco Aironet 1570 series access points use a type-length-value (TLV) format for DHCP Option 43. DHCP servers must be programmed to return the option based on the access point DHCP Vendor Class Identifier (VCI) string (DHCP Option 60). The VCI strings for Cisco access points that can operate in lightweight mode are listed in [Table D-1](#).

Table D-1 **Lightweight Access Point VCI Strings**

Access Point	Vendor Class Identifier (VCI)
Cisco Aironet 1570 series	Cisco AP c1570

The following is the format of the TLV block:

- Type: 0xf1 (decimal 241)
- Length: Number of controller IP addresses * 4
- Value: List of WLC management interfaces

Configuring Option 43 for 1570 Series Access Points

To configure DHCP Option 43 for Cisco Aironet 1570 series access points in the embedded Cisco IOS DHCP server, follow these steps:

- 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. The commands used to create a DHCP pool are as follows:

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

Where:

pool name is the name of the DHCP pool, such as AP1570

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 60 line using the following syntax:

```
option 60 ascii "VCI string"
```

For the VCI string, use the value from [Table D-1](#). The quotation marks must be included.

Step 4 Add the Option 43 line using the following syntax:

```
option 43 hex hex string
```

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

Type + Length + Value

Type is always *f1(hex)*. *Length* is the number of controller management IP addresses times 4 in hex. *Value* is the IP address of the controller listed sequentially in hex.

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 listed below:

```
option 43 hex f1080a7e7e020a7f7f02
```
