Cisco Aironet 1560 Series Outdoor Access Point Hardware Installation Guide

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Preface

This section describes the objectives, audience, organization, and conventions of the *Cisco Aironet 1560 Series Outdoor Access Point Hardware Installation Guide.*

Objectives

This publication explains the steps for installing the Cisco Aironet 1560 Series Outdoor Access Points (called the *access point* or *AP* in this document).

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	Overview	Describes the major components and features of the access point.
Chapter 2	Installing the Access Point	Provides warnings, safety information, and mounting information you need to install your access point.

Chapter	Title	Description
Chapter 3	Troubleshooting	Provides basic troubleshooting procedures for the access point.
Appendix A	Safety Guidelines and Warnings	Provides the safety warnings and guidelines that need to be strictly followed during the deployment of the access point.
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 E	Access Point Pinouts	Describes the connector pinouts for the access point.

Conventions

This publication uses the following conventions:

Convention	Description
boldface font	Commands, command options, and keywords are in boldface.
italic font	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
`screen font`	Terminal sessions and information the system displays are in screen font.
`boldface` `screen font`	Information you must enter is in boldface screen font.
`italic` `screen font`	Arguments for which you supply values are in italic screen font.
^	The symbol ^ represents the key labeled Control. For example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords, are in angle brackets.

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 käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen 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 figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto 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 legemesbeskadigelse. 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 أخر 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 כד 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

Upozornenie **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 Documents

To view all support information for the Cisco Aironet 1560 Series, see:

http://www.cisco.com/c/en/us/support/wireless/aironet-1560-series/tsd-products-support-series-home.html

In addition to the documentation available on the support page, you will need to refer to the following guides:

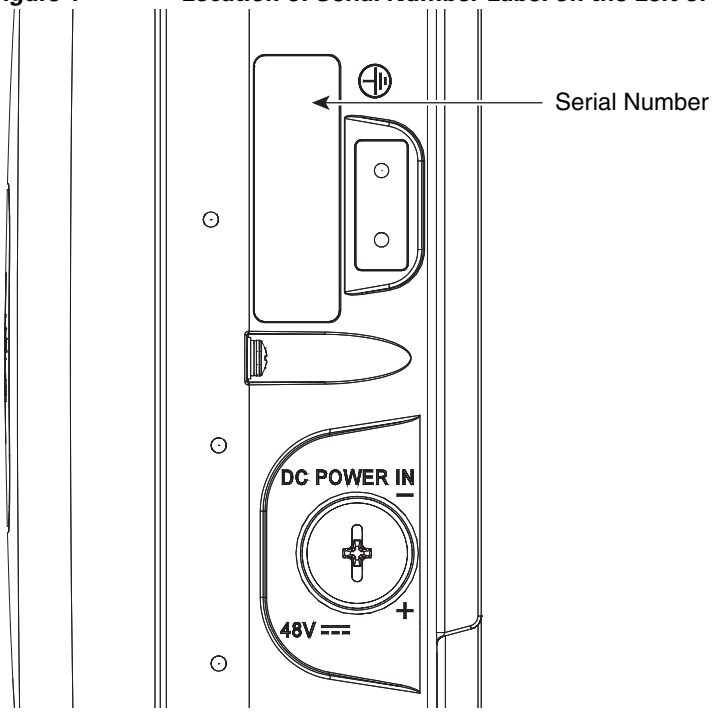
- *Cisco Wireless LAN Controller Configuration Guide*
- *Release Notes for Cisco Wireless LAN Controllers and Lightweight Access Points*
- *Cisco Mobility Express Configuration and User Guide*
- *DHCP OPTION 43 for Lightweight Cisco Aironet Access Points Configuration Example*

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

Finding the Product Serial Number

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

Figure 1 Location of Serial Number Label on the Left of the AP



The access point serial number label contains the following information:

- 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.

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

Obtaining Documentation, Support, and Security Guidelines

For information on obtaining documentation and support, providing documentation feedback, security guidelines, and recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html

To view all new wireless documentation, click on **Wireless**.

Overview

The Cisco Aironet 1560 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 supports wireless client access, point-to-point bridging, point-to-multipoint bridging, and point-to-multipoint mesh wireless connectivity.

About the 1560 Access Point

The 1560 access point supports two radios (2.4-GHz and 5-GHz) and provides client access using the unlicensed RF Wi-Fi spectrum. The radios have 802.11ac Wave 2 capability.

The 5 GHz radios have 802.11ac Wave 2 capability. The 2.4 GHz or 5 GHz radio can be used for client access or can be used for both client access and backhaul traffic. Depending on the model, the access point can support up to 1.3 Gbps data rates.

The detailed technical specifications for the Cisco Aironet 1560 Series Outdoor Access Points are available in the *Cisco Aironet 1560 Series Outdoor Access Point Data Sheet,* at the following URL:

http://www.cisco.com/c/en/us/products/collateral/wireless/aironet-1560-series/datasheet-c78-737416.html

The access point is a standalone unit that can be wall, pole or tower mounted. The access point can also operate as a relay node for other access points not directly connected to a wired network. Intelligent wireless routing is provided by the patented Adaptive Wireless Path Protocol (AWPP). This enables each access point to identify its neighbors and intelligently choose the optimal path to the wired network by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller.

The access point can be configured, monitored, and operated through a Cisco wireless LAN controller (hereafter called a *controller*) as described in the *Cisco Wireless LAN Controller Configuration Guide.* The *Cisco Wireless Mesh Access Points, Design and Deployment Guide,* describes how to plan and initially configure the Cisco mesh network, which supports wireless point-to-point, point-to-multipoint, and mesh deployments.

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.

Access Point Models

The model numbers (or part numbers) and configuration for the Cisco Aironet 1560 Outdoor Access Points are described in Table 1-1.

For a detailed description of the declarations of conformity and regulatory information for the 1560 access points refer to Appendix B, "Declarations of Conformity and Regulatory Information."

Table 1-1 1560 Access Point Model Numbers and Descriptions

Model (or part number)	Configuration
AIR-AP1562I-*x*-K9	The AP 1562I has integrated omni antennas and contains a 2.4 GHz and 5 GHz radio with an option to configure in centralized, Flexconnect, Mobility Express, or mesh mode. This is a stand alone unit that can be wall, pole or tower mounted. It can also operate as a relay node for other access points that are not directly connected to a wired network.
AIR-AP1562E-*x*-K9	The AP 1562E has 4 external antenna ports and contains a 2.4 GHz and 5 GHz radio with an option to configure in centralized, Flexconnect, or mesh mode. This is a stand alone unit that can be wall, pole or tower mounted. It can also operate as a relay node for other access points that are not directly connected to a wired network.
AIR-AP1562D-*x*-K9	The AP 1562 has integrated directional antennas and contains a 2.4 GHz and 5 GHz radio with an option to configure in centralized, Flexconnect, or mesh mode. This is a stand alone unit that can be wall, pole or tower mounted. It can also operate as a relay node for other access points that are not directly connected to a wired network.

Regulatory Domains

The "-*x*" in the 1560 model numbers represent the domain. For example, in AIR-AP1562I-*x*-K9, the -*x* represents a regulatory domain for a specific country. For specific regulatory domains supported by each 1560 access point model, refer to the Wireless LAN Compliance Status at the following URL:

http://www.cisco.com/go/aironet/compliance

Hardware Features

This section describes the hardware features of the 1560 access point models. The following hardware features are described in this section:

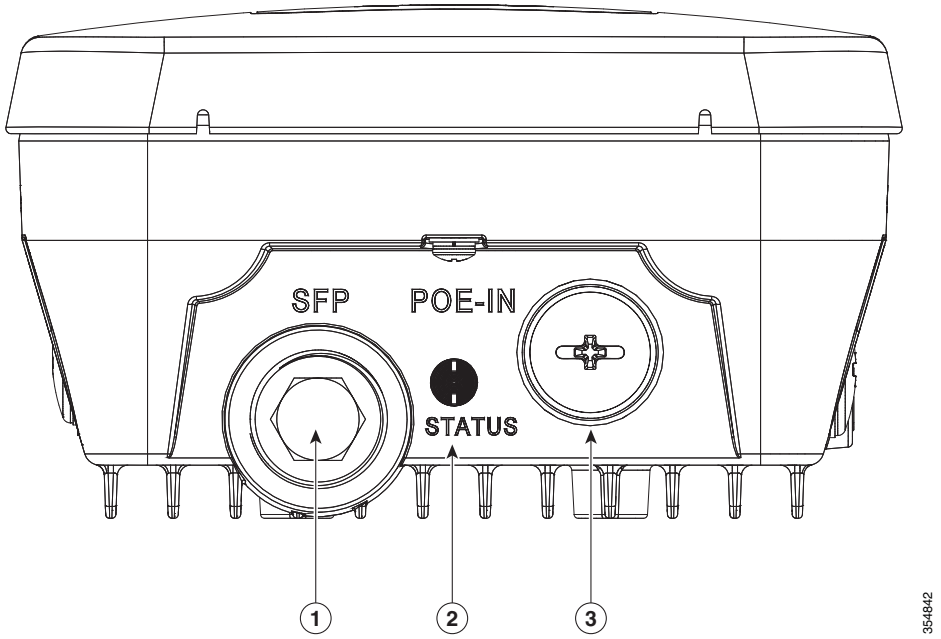
Ports and Connectors

Figure 1-4 and Figure 1-5 show the access point connectors for all models. Figure 1-1 shows the base connectors for internal antenna model, and Figure 1-2 and Figure 1-3 show the external antenna Type-N connectors.

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. Liquid-tight adapters are provided for connector openings, which can be installed before or after deploying the access point.

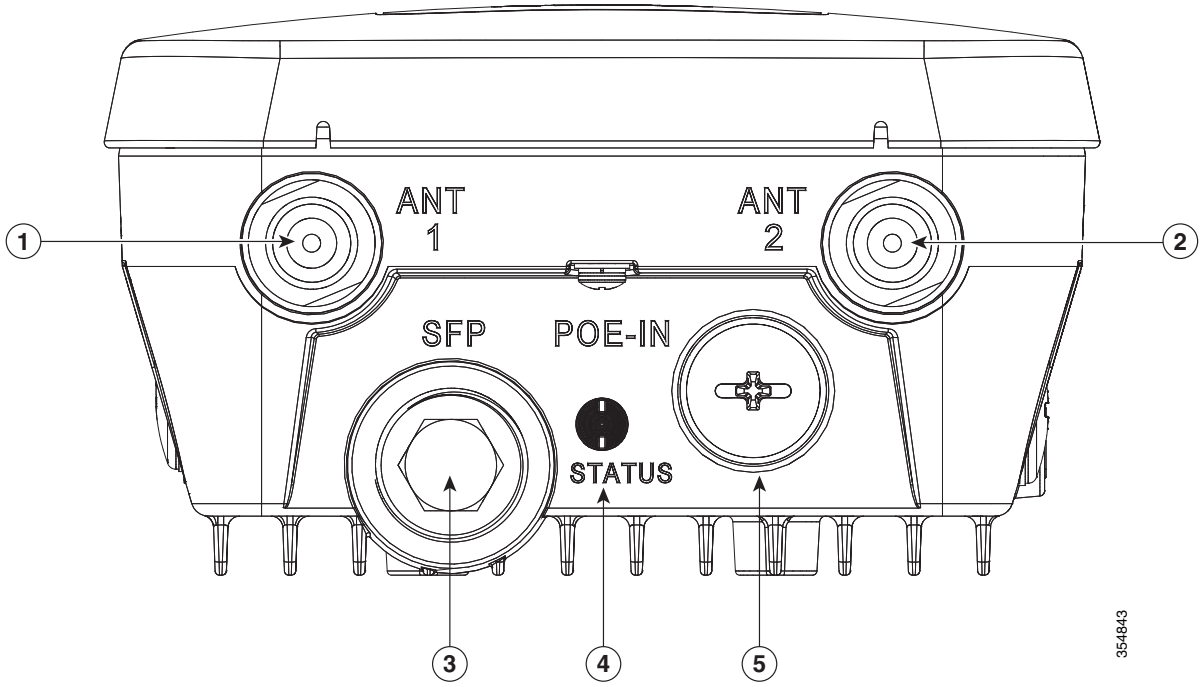
Connectors on the Base

Figure 1-1 Access Point Models AP1562I and AP1562D Base Connectors



1	SFP port If the port is not being used, then do not remove the covering plug. Otherwise, it may lead to water leaking into the access point.	**3**	Gigabit Ethernet and PoE-In port If the port is not in use, then the covering plug must be tightened to 12.5 lbf-in torque. Otherwise, it may lead to water leaking into the access point.
2	Status LED		

Figure 1-2 Access Point Model AP1562E Base Connectors

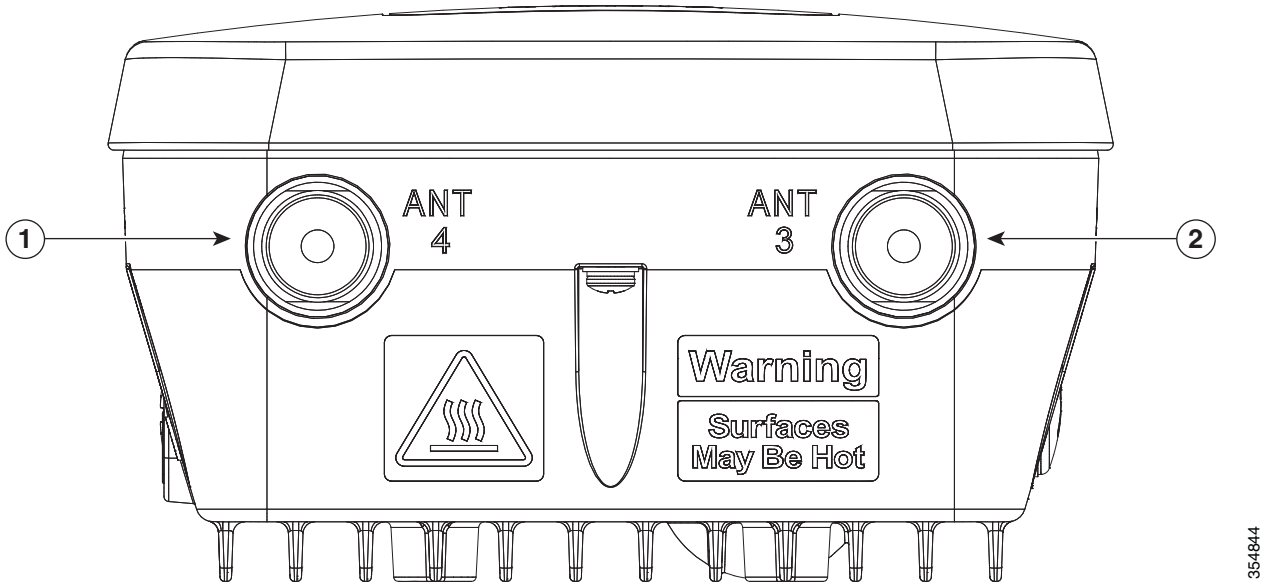


1	Antenna 1 port	**4**	Status LED
2	Antenna 2 port	**5**	Gigabit Ethernet/WAN and PoE-In port. If the port is not in use, then the covering plug must be tightened to 12.5 lbf-in torque. Otherwise, it may lead to water leaking into the access point.
3	SFP port If the port is not being used, then do not remove the covering plug. Otherwise, it may lead to water leaking into the access point.		

Connectors on the Head

Note The AP1562I and AP1562D models do not have any connectors on the head of the AP.

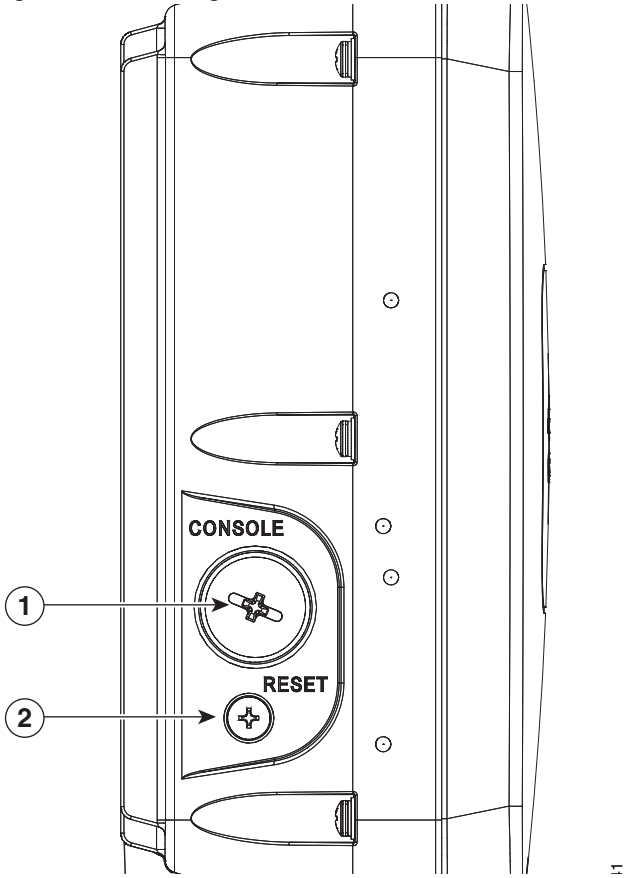
Figure 1-3 Access Point Model AP1562E Head Connectors



1	Antenna port 4	**2**	Antenna port 3

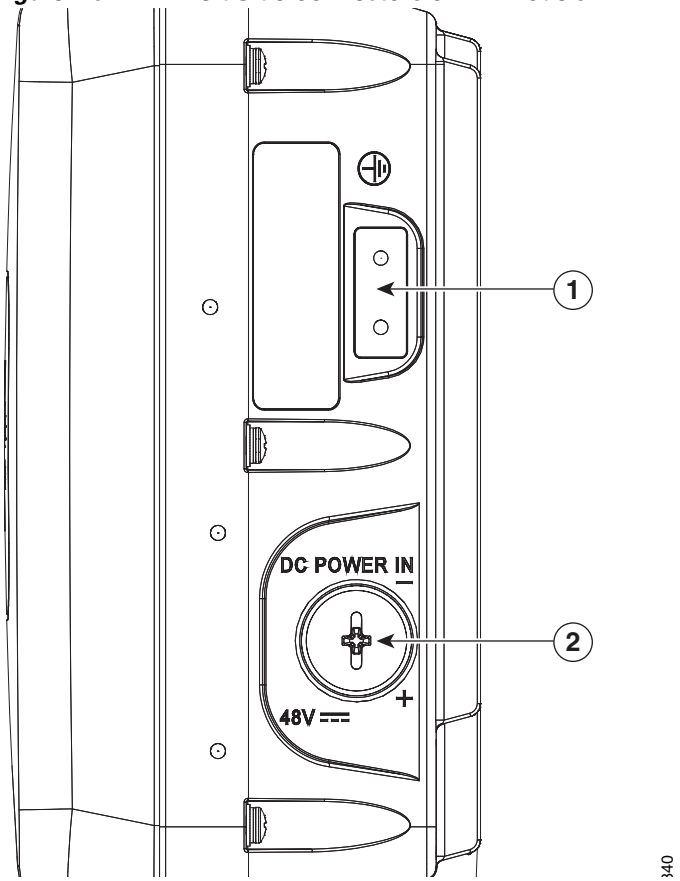
Connectors on the Sides

Figure 1-4 Right Side Connectors on all models



1	Console port. The console port is under a covering plug. Inspect the seal of the plug and properly tighten it at the time of installation, and also every time the plug is removed and replaced. Tighten the plug to 12.5 lbf-in. If you do not tighten the plug properly, it will not meet IP67 criteria, and may lead to water leaking into the unit.	**2**	Reset button. The reset button is under a covering screw. Properly tighten it at the time of installation, and also every time it is removed and replaced. Tighten the screw to 24 lbf-in. If you do not tighten the screw properly, it will not meet IP67 criteria, and may lead to water leaking into the unit.

Figure 1-5 Left Side Connectors on All Models



1	Ground Pad.	**2**	DC Power-In (covered) (42 V – 57 V). If the port is not in use, then the covering plug must be tightened to 12.5 lbf-in torque. Otherwise, it may lead to water leaking into the access point.

Internal Antenna Models

AP1562I (Internal Antenna)

The AP1562I model has an internal omnidirectional antenna. The 1562I access point 802.11b/g/n radio is used primarily for local access and its 802.11a/n/ac radio for wireless backhaul in the Mesh.

The 2 GHz b/g/n radio operates in 2.4 GHz ISM band. It supports channels 1-11 in the US, 1-13 in Europe, and 1-13 in Japan. It has 3 transmitters with a maximum total output power of 29 dBm for 802.11b/g/n operation. Output power is configurable for 8 levels in 3 dB steps. It has three receivers that enable maximum-ratio combining (MRC).

The 5 GHz a/n radio operates in the UNII-1 band (5.15-5.25 GHz), UNII-2 band (5.25 - 5.35 GHz), UNII-2 Extended/ETSI band (5.47 - 5.725 GHz), and the upper ISM band (5.725 - 5.850 GHz). It has three transmitters with a maximum total output power of 29 dBm depending on the regulatory domain. Tx power settings will change depending on the regulatory domain. Output power is configurable in 3 dB steps. Its three receivers enable maximum-ratio combining (MRC).

The 1562I access point is equipped with three integrated dual-band antennas with 7 dBi gain at 2 GHz and 4 dBi gain at 5 GHz.

AP1562D (Internal Directional Antenna)

The 1562D access point 802.11b/g/n radio is used primarily for local access and its 802.11a/n/ac radio for wireless backhaul in the Mesh.

The 2 GHz b/g/n radio operates in 2.4 GHz ISM band. It supports channels 1-11 in the US, 1-13 in Europe, and 1-13 in Japan. It has 2 transmitters with a maximum total output power of 27 dBm for 802.11b/g/n operation. Output power is configurable for 8 levels in 3 dB steps. It has two receivers that enable maximum-ratio combining (MRC).

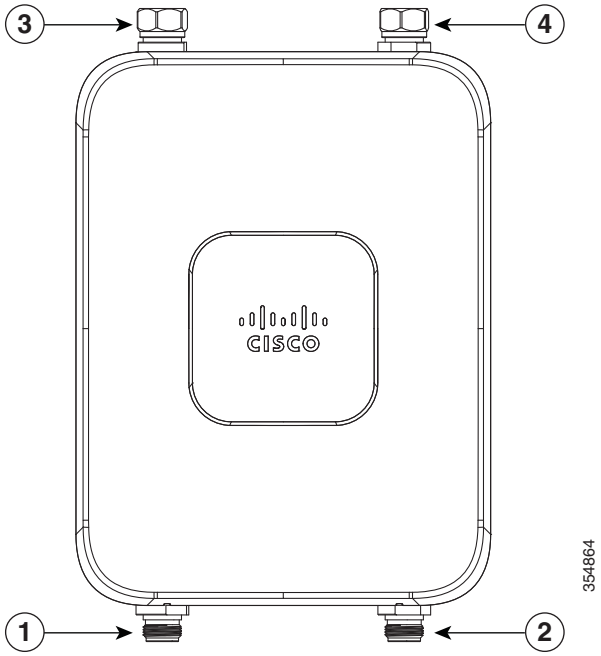
The 5 GHz a/n radio operates in the UNII-1 band (5.15-5.25 GHz), UNII-2 band (5.25 - 5.35 GHz), UNII-2 Extended/ETSI band (5.47 - 5.725 GHz), and the upper ISM band (5.725 - 5.850 GHz). It has two transmitters with a maximum total output power of 27 dBm depending on the regulatory domain. Tx power settings will change depending on the regulatory domain. Output power is configurable in 3 dB steps. Its two receivers enable maximum-ratio combining (MRC).

The 1562D access point is equipped with two integrated dual-band antennas with 9 dBi gain at 2 GHz and 10 dBi gain at 5 GHz.

External Antenna Model

Figure 1-6 shows the antenna port locations for model AP1562E. The ports used depend on the optional antennas ordered. For detailed information on these antennas, refer to Installing External Antennas, page 2-30.

Figure 1-6 External Antenna Port Locations for Access Point Model AP1562E



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

AP1562E (External Antenna)

The 1562E access points is equipped with four N-type RF connectors. The 1562E can be configured via software to support dual band or single band antennas. When configured for dual band antennas, antenna ports 1 and 2 on the base of the unit (Figure 1-2) are used to support multiple input/multiple output (MIMO) operation on both 2.4 and 5 GHz radios. When using the Cisco Aironet AIR-ANT2547V-N or AIR-ANT2547VG-N omnidirectional antennas, the antenna can be connected directly to the access point (Figure 2-17). If the antennas are remotely located, an appropriate low loss RF cable should be used

Note Ensure that the antenna band mode is configured before the access point is installed.

When configured for single band antennas, antenna port 1 and antenna port 2 support MIMO operation for the 2.4 GHz radio, and antenna ports 3 and 4 (Figure 1-3) support MIMO on the 5 GHz radio. See the *Cisco Wireless LAN Controller Configuration Guide* for information on the software configuration.

The 2 GHz b/g/n radio operates in 2.4 GHz ISM band. It supports channels 1-11 in the US, 1-13 in Europe, and 1-13 in Japan. It has 2 transmitters with a maximum total output power of 27 dBm for 802.11b/g/n operation. Output power is configurable for 8 levels in 3 dB steps. It has two receivers that enable maximum-ratio combining (MRC).

The 5 GHz a/n radio operates in the UNII-1 band (5.15-5.25 GHz), UNII-2 band (5.25 - 5.35 GHz), UNII-2 Extended/ETSI band (5.47 - 5.725 GHz), and the upper ISM band (5.725 - 5.850 GHz). It has two transmitters with a maximum total output power of 27 dBm depending on the regulatory domain. Tx power settings will change depending on the regulatory domain. Output power is configurable in 3 dB steps. Its two receivers enable maximum-ratio combining (MRC).

Power Sources

The 1560 series access point supports these power sources:

- DC power – 42-57 VDC
- Power over Ethernet (PoE) – For more information, see "Powering the Access Point" section on page 2-44.

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

Caution Several forms of PoE are supported. See Table Table 2-9 for the PoE options and their corresponding modes of operation.

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).

Power Injectors

The 1560 series access points support the following power injectors:

- AIR-PWRINJ-60RGD1
- AIR-PWRINJ-60RGD2

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

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).

Ethernet (PoE) Ports

The access point 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.

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

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.

Network Deployment Examples

The access point is a wireless device designed for wireless client access and point-to-point bridging, point-to-multipoint bridging, and point-to-multipoint mesh wireless connectivity. The access point provides 5-GHz backhaul capability to link with another access point to reach a wired network connection or to provide repeater operations for other access points.

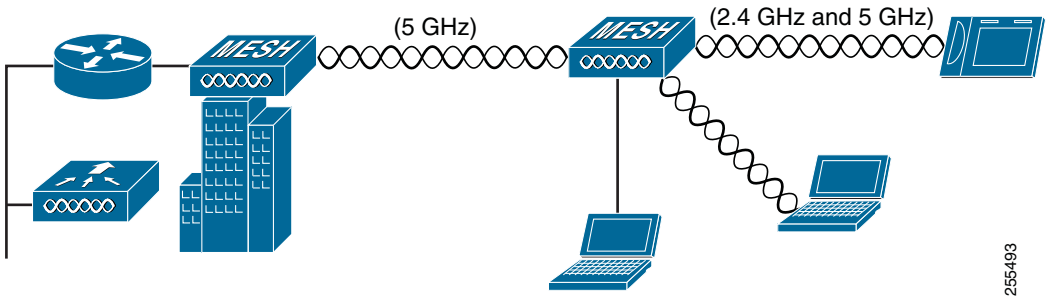
The access point plays two primary radio roles: a root access point (hereafter called a RAP) or a mesh (non-root) access point (hereafter called a MAP), which is the default role of all access points. When the access point has a fiber or wired Ethernet connection to the controller (through a switch), the radio role is called a RAP. In order to be considered a RAP, the access point must be configured as a RAP. A RAP is a parent node to any bridging or mesh network. A controller can support one or more RAPs, each one parenting the same or different wireless networks. There can be more than one RAP for the same mesh network for redundancy. RAPs and MAPs can support wireless clients on the 2.4-GHz and 5-GHz band. Client access on 5-GHz is called universal client access.

When the access point does not have a wired Ethernet connection to the controller (through a switch), the radio role is called a MAP. The MAPs have a wireless connection (through the backhaul interface) to other MAPs and finally to a RAP which has an Ethernet connection through a switch to the controller. MAPs may also have a wired Ethernet connection to a local LAN and serve as a bridge endpoint for that LAN (using a point-to-point or point-to-multipoint bridge connection).

Wireless Backhaul

The access point supports wireless backhaul capability using the 5 GHz radio to bridge to another access point to reach a wired network connection to a controller (see Figure 1-7). The access point connected to the wired network is considered a RAP in this configuration. The remote access point is considered a MAP and transfers wireless client traffic to the RAP for transfer to the wired network. Control And Provisioning of Wireless Access Points (CAPWAP) control traffic is also transferred over this bridged link.

Figure 1-7 Access Point Backhaul Example

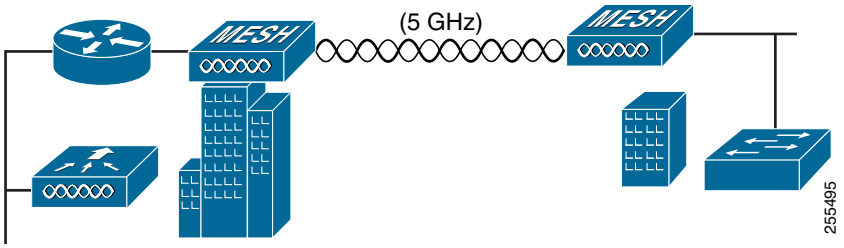


Point-to-Point Bridging

The access points can be used to extend a remote network by using the 5 GHz backhaul radio to bridge the two network segments as shown in Figure 1-8. To support Ethernet bridging, you must enable bridging on the controller for each access point. By default this capability is turned-off for all access points.

Wireless client access is supported; however, if bridging between tall buildings, the 2.4-GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access.

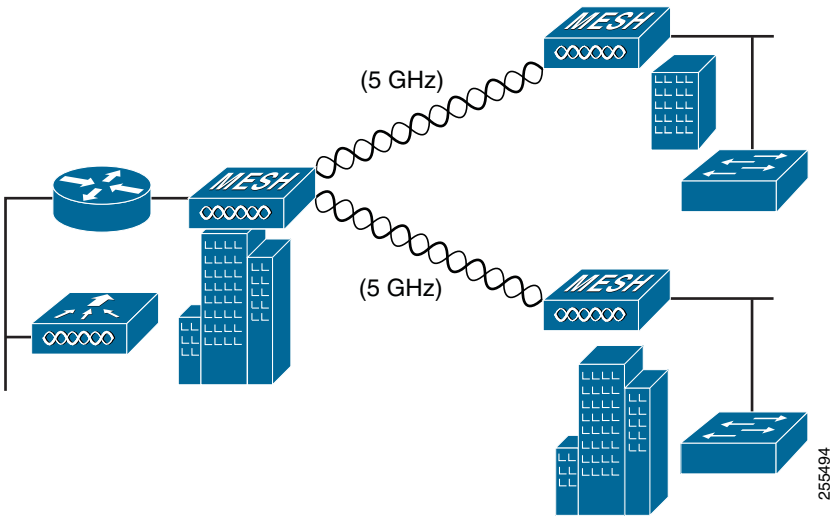
Figure 1-8 Access Point Point-to-Point Bridging Example



Point-to-Multipoint Bridging

The access points can be used as a RAP to connect multiple remote MAPs with their associated wired networks. By default this capability is turned-off for all access points. To support Ethernet bridging, you must enable bridging on the controller for each access point. Wireless client access can be provided over the bridging link; however, if bridging between tall buildings, the 2.4-GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access. Figure 1-9 illustrates an example of access point-to-multipoint bridging.

Figure 1-9 Access Point to Multipoint Bridging Example



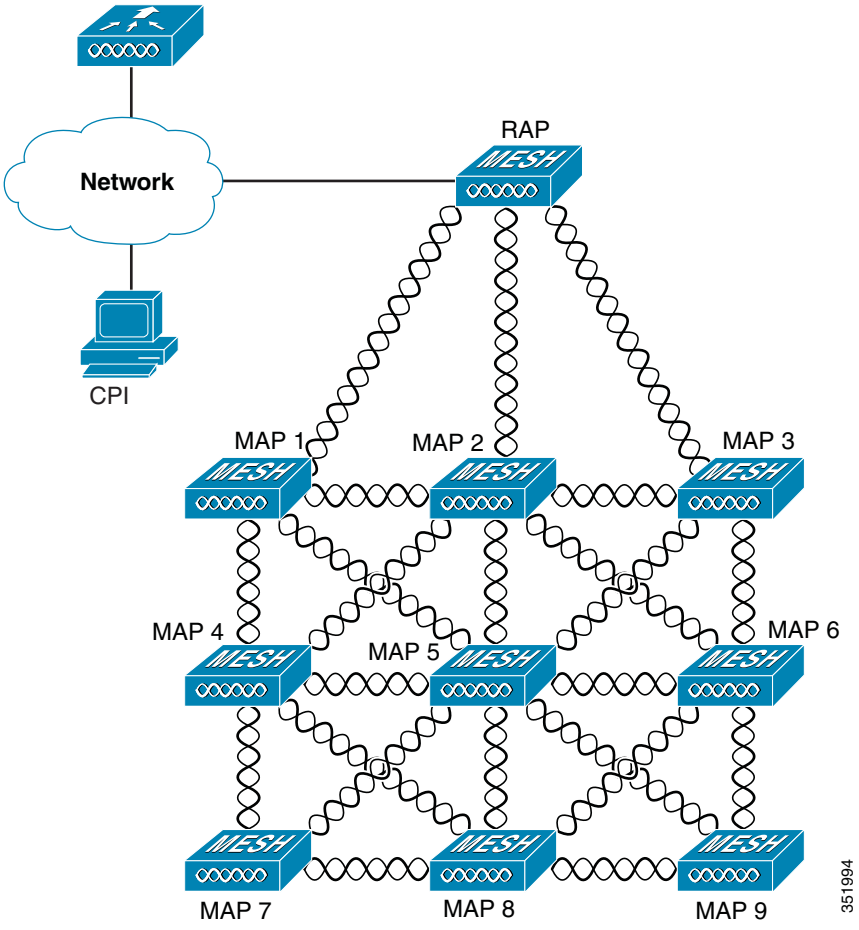
Point-to-Multipoint Mesh Network

The access point is typically deployed in a mesh network configuration. In a typical mesh deployment, one or more RAPs have a wired network connection through a switch to a controller. Other remote MAPs without wired network connections use the backhaul feature to optimally link to a RAP that is connected to the wired network. In the mesh network, the links between the access points are referred to as the *backhaul links*.

Intelligent wireless routing is provided by the Adaptive Wireless Path protocol (AWPP). This enables each MAP to identify its neighbors and intelligently choose the optimal path to the RAP with the wired network connection by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller with signal strength given priority since signal strength determines the data rate available for backhaul.

Figure 1-10 illustrates a typical mesh configuration using MAPs and RAPs.

Figure 1-10 Typical Mesh Configuration Using Access Points

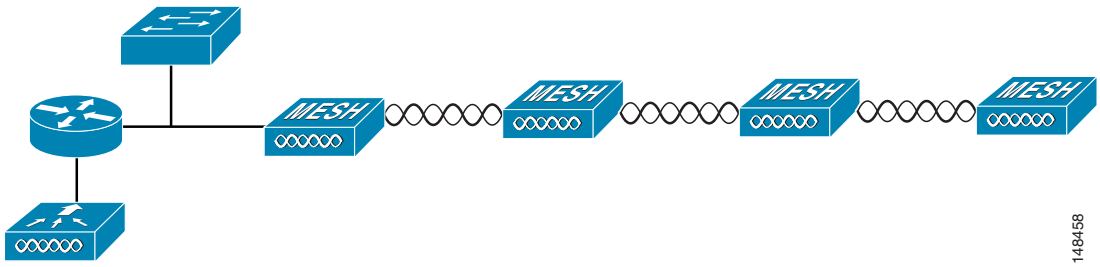


Layer 3 Network Operation

The access points support Layer 3 network operation. Access points and controllers in Layer 3 configurations use IP addresses and UDP packets, which can be routed through large networks. Layer 3 operation is scalable and recommended by Cisco.

Figure 1-11 illustrates a typical Layer-3 wireless network configuration containing access points and a controller.

Figure 1-11 Typical Layer 3 Access Point Network Configuration Example



Installing the Access Point

This chapter describes how to install the 1560 access point and its accessories. It contains the following sections:

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 "Package Contents" are included in the shipment. If any item is damaged or missing, notify your authorized Cisco sales representative.

Your shipment may also contain additional equipment as per your order, as listed in Optional Tools and Hardware From Cisco, page 2-2.

For additional hardware that is required for installation, see Additional Tools and Hardware Required for Installation, page 2-3.

Package Contents

Each access point package contains the following items:

- One 1560 series access point
- Two-pin DC power connector
- Ground lug and screws with lock washers
- Plastic cable gland and rubber seal
- Weatherization tape and anti-corrosion sealant
- Cisco product documentation and pointer card

Optional Tools and Hardware From Cisco

Depending on what you ordered, the following optional equipment may be part of your shipment:

- External antennas. See the "Installing External Antennas" section on page 2-30.
- Wall/Pole mount bracket AIR-ACC1530-PMK1=
- Wall/Pole mount bracket for AP and AC/DC power adapter AIR-ACC1560-PMK1=
- Wall/Pole mount bracket with tilt mechanism, spare only AIR-ACC1530-PMK2=
- Street light power tap (AIR-PWR-ST-LT-R3P=), works only with the AC/DC power adapter.
- Power injector AIR-PWRINJ6=
- AP cover / Solar Shield for 1560, AIR-ACC1560-CVR=. Spare only.
- AC/DC power adapter, AIR-PWRADPT-RGD1=. Spare only.
- AIR-PWRINJ-60-PMK= mounting bracket for AIR-PWRINJ-60RGDx=
- Spare Parts kit containing extra cable glands, power connector, ground lug, etc. (AIR-ACC1530-KIT1=)
- AIR-PWRINJ-60RGD1=
- AIR-PWRINJ-60RGD2=

- FIPS kit (AIRLAP-FIPSKIT=)
- Lightning Arrestor kit (AIR-ACC245LA-N=)

Additional Tools and Hardware Required for Installation

You need to independently procure the following tools and materials which maybe required during various stages of installing the AP:

- Ground lug crimping tool (Panduit CT-720 with CD-720-1 die)
- 6-AWG copper ground wire
- 10 mm open end or box wrench
- 13 mm box-end wrench or socket set
- 16 mm box-end wrench or socket set
- Large flat or Phillips screw driver (for port plugs)
- Small flat screwdriver for DC power connector
- Shielded outdoor-rated Ethernet (CAT5e or better) cable of 0.20 to 0.35 inches (0.51 to 0.89 cm) diameter.
- Ethernet RJ-45 connector and installation tool
- Shielded outdoor-rated DC power cable with 0.20 to 0.35 inch (.0.51 to 0.89 cm) diameter
- Ground rod, as required by local regulations

Pre-Installation Checks and Installation Guidelines

As 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:

- Thoroughly review the information provided in Safety Guidelines and Warnings, page A-1.
- For information on planning and initially configuring your Cisco Mesh network, refer to the *Cisco Wireless Access Points, Design and Deployment Guide, Release 7.3*.
- 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
- Install the access point in an area where structures, trees, or hills do not obstruct radio signals to and from the access point.
- We recommend installing the access points no higher than 40 feet to allow support for wireless clients on the ground. Best throughput is achieved when all the access points are mounted at the same height.
- The console port is under a sealed plug. Inspect the seal of the plug at the time of installation. Every time the plug is removed or replaced, properly tighten it. Tighten the plug to 15 lbf-in. If you do not tighten the plug properly, it will not meet IP67 criteria, and may lead to water leaking into the unit.
- If the DC power port, SFP port, or the PoE-In port is not in use, then the port's covering plug must be tightened to 12.5 lbf-in torque. Otherwise, it may lead to water leaking into the access point.

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

Before you begin the installation process, ensure the following:

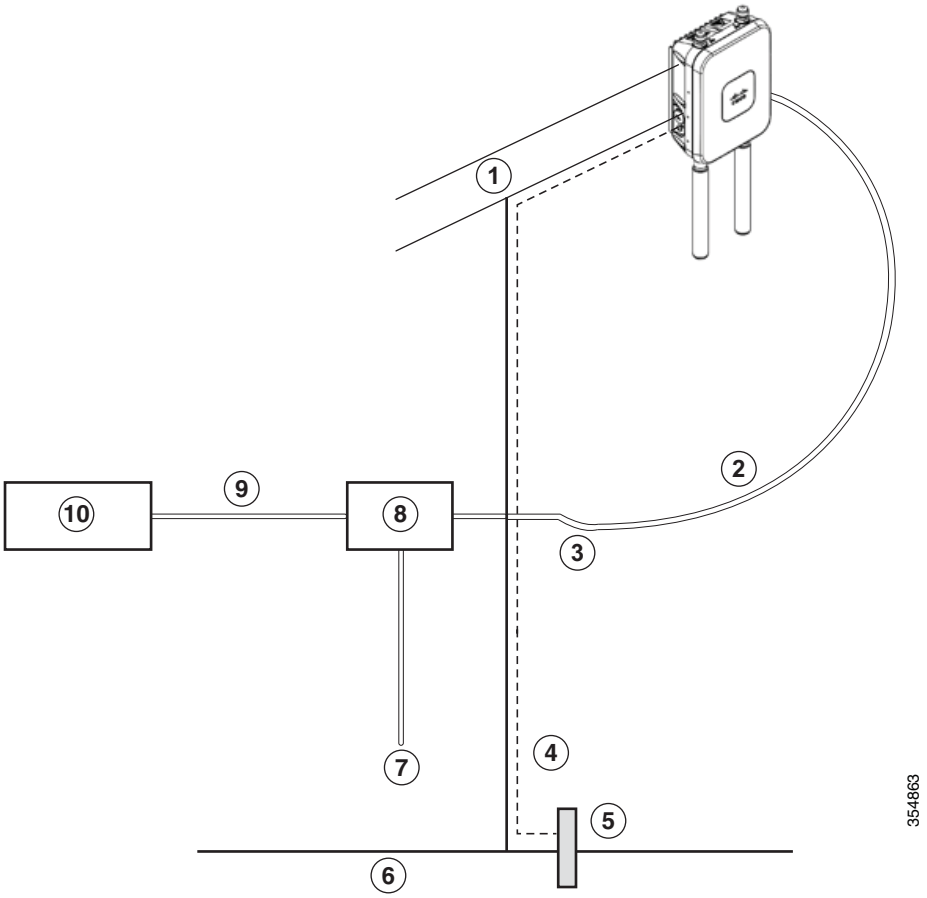
- Perform a site survey. See the "Performing Site Surveys" section on page A-5.
- Your network infrastructure devices must be operational and properly configured.
- Your controllers are connected to switch trunk ports.
- Your switch is configured with untagged access ports for connecting your access points.
- A DHCP server with Option 43 configured is reachable by your access points, or manually configure the controller information in the access point. For information on configuring the DHCP Option 43, visit the following URL:

  http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/97066-dhcp-option-43-00.html
- Become familiar with the access point installation components. See the "Typical Access Point Installation Components" section on page 2-5.

Typical Access Point Installation Components

The access point is designed to be installed in an outdoor environment, such as the exterior roof overhang of a tall building or a streetlight pole. Carefully review Figure 2-1 to become familiar with the system components, connectors, indicators, cables, system interconnection, and grounding.

Figure 2-1 Components in a Typical Access Point Installation



1	Building roof-overhang	**6**	Ground
2	Shielded outdoor-rated Ethernet (CAT5e or better) cable[1]	**7**	Power cord
3	Water drip loop	**8**	Power injector
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. Independently sourced by the user.

Mounting the Access Point

This section provides instructions for installing your access points. Personnel installing the access point must have a good understanding of wireless access points, bridging techniques, and grounding methods.

Choosing a Mounting Kit

The 1560 Series Access Point can be wall, pole, or tower mounted. The available mounting kits are provided in the table below.

AP Mounting Kit	Purpose
AIR-ACC1530-PMK1=	Fixed mounting kit for vertical mounting on wall and pole. See: • Wall Mounting the Access Point with AIR-ACC1530-PMK1=, page 2-7 • Pole Mounting the Access Point with AIR-ACC1530-PMK1=, page 2-13
AIR-ACC1560-PMK1=	Fixed mounting kit, allowing mounting of both AP and power supply, for vertical mounting on wall and pole. See: • Wall Mounting the Access Point with AIR-ACC1560-PMK1=, page 2-10 • Pole Mounting the Access Point with the AIR-ACC1560-PMK1= Kit, page 2-15
AIR-ACC1530-PMK2=	Pivoted mounting kit for both vertical and horizontal mounting, on wall and pole. See: • Wall Mounting the AP using AIR-ACC1530-PMK2= Pivoting Mounting Kit, page 2-17 • Pole Mounting the AP using AIR-ACC1530-PMK2= Pivoting Mounting Kit, page 2-22 • Horizontally Mounting the Access Point using AIR-ACC1530-PMK2=, page 2-26

Note

- When mounting an access point vertically, ensure that the access point is oriented with the LED indicators pointing down.
- You must also ensure the access point is mounted in such a way as to ensure that all antenna ports and the console port are accessible for future use.
- Omnidirectional antennas should be mounted vertically.
- Directional antennas should be installed with the main beam aimed parallel to or tilted down toward the horizon

Wall Mounting the Access Point with AIR-ACC1530-PMK1=

The AIR-ACC1530-PMK1= mounting kit contains a mounting bracket for wall mounting or pole mounting.

You can use the mounting bracket as a template to mark the positions of the mounting holes for your installation, install the mounting bracket, and then attach the access point to the bracket.

Table 2-1 lists the materials needed for this installation.

Table 2-1 Materials Required to Mount Access Point Using AIR-ACC1530-PMK1=

Materials Required	In Kit?
Ground lug and screws (provided with access point)	Yes
Wall Mount Bracket	Yes
Four M6 x 12-mm Hex-head Bolts	Yes
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
10-mm box-end wrench or socket set	No

Caution The mounting wall, attaching screws, and wall anchors must be able to support a 50-lb (22.7 kg) static weight.

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

Step 1 Use the mounting bracket as a template to mark four screw hole locations on the mounting wall. The mounting bracket screw hole locations are shown in Figure 2-2. The dimensions of the mounting bracket is shown in Figure 2-3.

Step 2 Use four screws and, if required, wall anchors to attach the mounting plate to the mounting surface. These screws and anchors are to be sourced independently.

Note You can use an exterior-grade plywood backboard to mount the access point to stucco, cement, or drywall.

Note The mounting wall, attaching screws, and wall anchors must be able to support a 50-lb (22.7 kg) static weight.

Step 3 Screw an M6 x12 mm bolt into each of the four support bolt holes on the back of the access point. Do not screw the bolt all the way in, but leave a gap of approximately 0.13 inch (3.3 mm).

Step 4 Position the access point against mounting bracket such that the four support bolts on the back of the AP, slot into the keyhole slots on the mounting bracket.

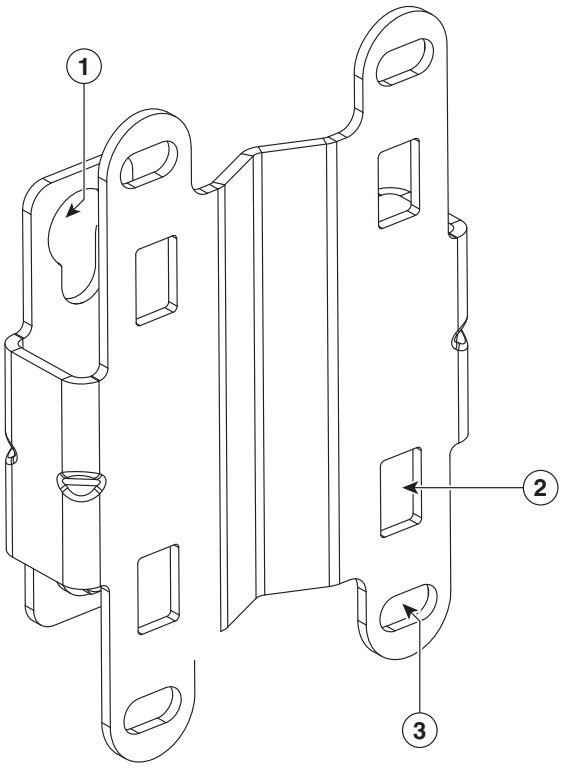
Step 5 Slide the access point down to sit securely in keyhole slots on the mounting bracket.

Note The access point should be mounted with the status LED on the base facing downwards.

Step 6 Using a 10mm wrench, tighten the four bolts that connect the access point to the bracket, to a torque of 40 lbf-in.

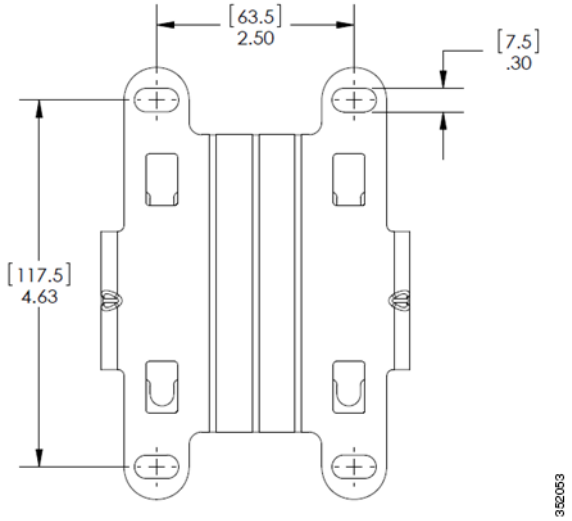
Step 7 Proceed with installing antennas (only for external antenna models), connecting the data cables, grounding the access point, powering and configuring the access point.

Figure 2-2 Mounting Bracket for Wall and Pole Mounting



1	One of four keyhole slots for mounting the AP.	**3**	Bracket mount holes for fastening bracket to the wall. You can use bolts of up to 1/4" or 6 mm in diameter.
2	One of four slots for steel band clamps, used for pole mounting only.		

Figure 2-3 Mounting Bracket Dimensions



Wall Mounting the Access Point with AIR-ACC1560-PMK1=

The AIR-ACC1560-PMK1= mounting kit contains a mounting bracket, for wall mounting or pole mounting, the access point and the power supply together.

You can use the mounting bracket as a template to mark the positions of the mounting holes for your installation, install the mounting bracket, and then attach the access point to the bracket.

Table 2-1 lists the materials needed for this installation.

Table 2-2 Materials Required to Mount Access Point using AIR-ACC1560-PMK1=

Materials Required	In Kit?
Ground lug and screws (provided with access point)	Yes
Wall Mount Bracket	Yes
Four M6 x 12-mm Hex-head Bolts	Yes
Four #8-32 screws to mount the power supply	Yes
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
10-mm box-end wrench or socket set	No

Caution The mounting wall, attaching screws, and wall anchors must be able to support a 50-lb (22.7 kg) static weight.

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

Step 1 Use the mounting bracket as a template to mark six screw hole locations on the mounting wall. The mounting bracket screw hole locations and the dimensions of the mounting bracket are shown in Figure 2-4.

Step 2 Use six screws and, if required, wall anchors to attach the mounting plate to the mounting surface. These screws and anchors are to be sourced independently.

Note You can use an exterior-grade plywood backboard to mount the access point to stucco, cement, or drywall.

Note The mounting wall, attaching screws, and wall anchors must be able to support a 50-lb (22.7 kg) static weight.

Step 3 Screw an M6 x12 mm bolt into each of the four support bolt holes on the back of the access point. Do not screw the bolt all the way in, but leave a gap of approximately 0.13 inch (3.3 mm).

Step 4 Position the access point against mounting bracket such that the four support bolts on the back of the AP, slot into the keyhole slots on the mounting bracket.

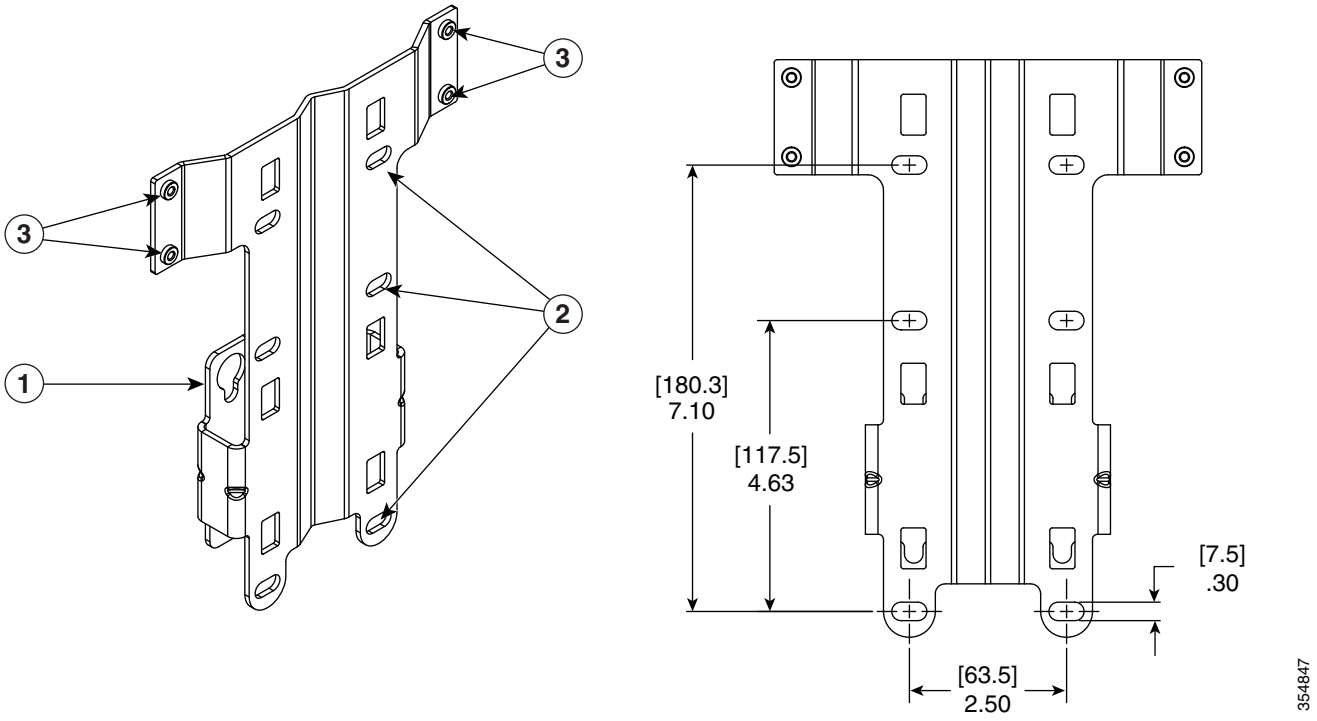
Step 5 Slide the access point down to sit securely in keyhole slots on the mounting bracket.

Note The access point should be mounted with the status LED on the base facing downwards.

Step 6 Using a 10mm wrench, tighten the four bolts that connect the access point to the bracket, to a torque of 40 lbf-in.

Step 7 Proceed with installing antennas (only for external antenna models), connecting the data cables, grounding the access point, powering and configuring the access point..

Figure 2-4 Mounting Bracket for Wall and Pole Mounting AP with Power Supply



1	One of four keyhole slots for mounting the AP.	**3**	Screw holes for fastening the power supply to the bracket.
2	Three of six bracket mount holes for fastening the bracket to a wall. Support bolts of up to 1/4" (6 mm) in diameter.		

Pole Mounting the Access Point with AIR-ACC1530-PMK1=

The AIR-ACC1530-PMK1= mounting kit contains a mounting bracket that can be used for both wall mounting and pole mounting. This kit can be used to install the access point on a pole, mast or streetlight. It supports metal, wood or fiberglass poles from 2 to 8 inches in diameter.

Table 2-3 **Materials Needed to Mount the AP on a Vertical Pole**

Materials Needed	In Kit?
One wall mount bracket	Yes
Four M6 x12mm hex head bolts	Yes
Two stainless steel band clamps (adjustable 2"–5", 51–127 mm)	Yes
Two stainless steel band clamps (adjustable 5"–8", 127–203 mm)	Yes
10 mm box-end wrench	No
Outdoor rated shielded Ethernet cable	No
Ground lug (provided with the access point)	Yes
Ground block and rod	No
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
#6 AWG ground wire	No

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

Step 1 Select a mounting location on the pole to mount the access point. You can attach the access point to a pole having a diameter of 2 to 8 inches (5.1 to 20.1 cm).

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. An AC/DC adapter needs to be used for street light pole deployments.

Step 2 Hold the bracket up against the pole, and slide the two band straps through the top and bottom sets of mounting slots on the mounting bracket (see Figure 2-5).

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

Step 4 Screw an M6 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" (3.3mm).

Step 5 Position the four bolts on the access point into the bracket keyhole slots. Check to be sure that the access point is properly seated in the slots (see Figure 2-5).

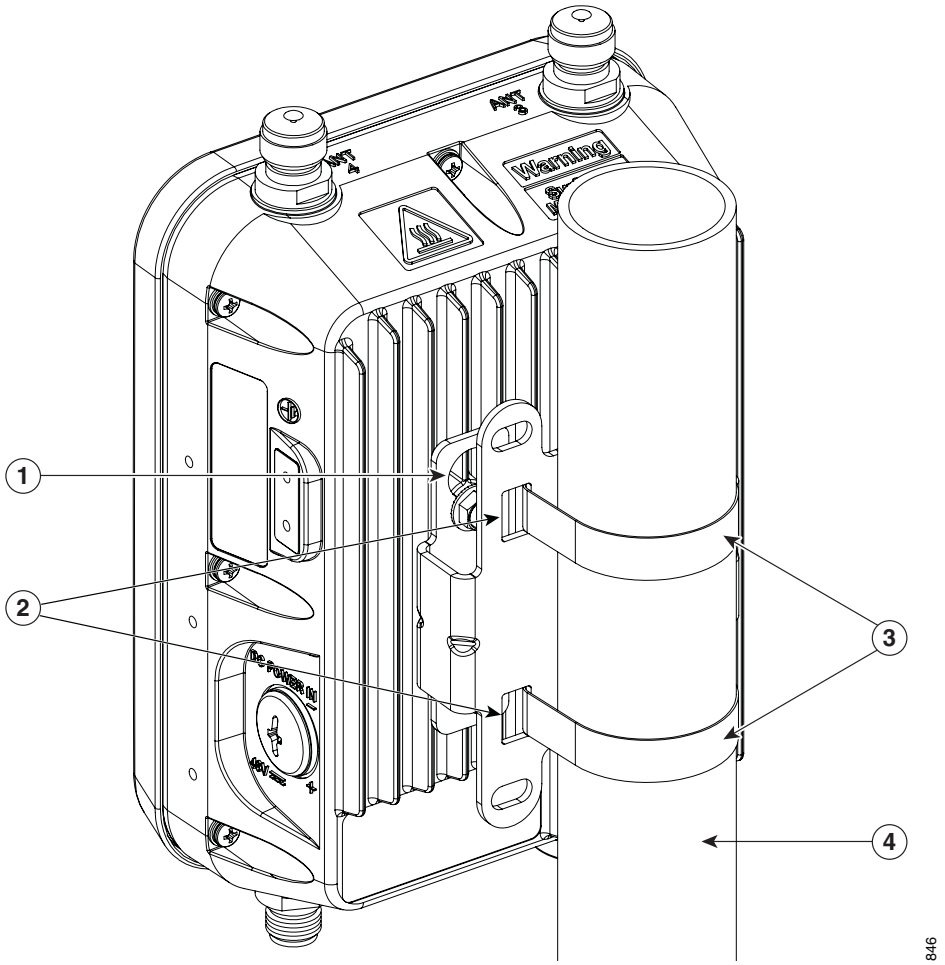
Note The access point should be mounted with the status LED on the base facing downwards.

Step 6 Using a 10mm wrench, tighten the four bolts that connect the access point to the bracket to a torque of 40 lbf-in.

Step 7 Locate the access point to its final position. Tighten the band clamps with the wrench so that the access point does not slide on the pole. Ensure that the clamps are tight enough to not let the AP move.

Step 8 Proceed with installing antennas (only for external antenna models), connecting the data cables, grounding the access point, powering and configuring the access point.

Figure 2-5 AP Mounted on a Pole



1	One of four M6 keyhole slots for mounting the AP on the bracket.	**3**	Top and bottom steel band clamps
2	Top and bottom sets of band clamp slots for passing the clamps through.	**4**	Pole (wood, metal, or fiberglass), 2 in. to 8 in. (50 mm to 203 mm) diameter

Pole Mounting the Access Point with the AIR-ACC1560-PMK1= Kit

The AIR-ACC1560-PMK1= fixed mounting kit contains a mounting bracket, for both wall-mounting and pole-mounting, the access point along with the power supply kit. This mounting kit supports metal, wood or fiberglass poles from 2 to 8 inches in diameter.

Table 2-4 **Materials Needed to Mount the AP**

Materials Needed	In Kit?
One wall mount bracket	Yes
Four M6 x12mm hex head bolts	Yes
Four #8-32 screws to mount the power supply	Yes
Three stainless steel band clamps (adjustable 2"–5", 51–127 mm)	Yes
Three stainless steel band clamps (adjustable 5"–8", 127–203 mm)	Yes
10 mm box-end wrench	No
Outdoor rated shielded ethernet cable	No
Ground lug (provided with the access point)	Yes
Ground block and rod	No
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
#6 AWG ground wire	No

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. You can attach the access point to a pole having a diameter of 2 to 8 inches (5.1 to 20.1 cm).

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. An AC/DC adapter needs to be used for street light pole deployments.

Step 2 Hold the bracket up against the pole, and slide the three band straps through the top, middle, and bottom sets of mounting slots on the mounting bracket (see Figure 2-6).

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

Step 4 Screw an M6 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" (3.3mm).

Step 5 Position the four bolts on the access point into the bracket keyhole slots. Check to be sure that the access point is properly seated in the slots (see Figure 2-6).

Note The access point should be mounted with the status LED on the base facing downwards.

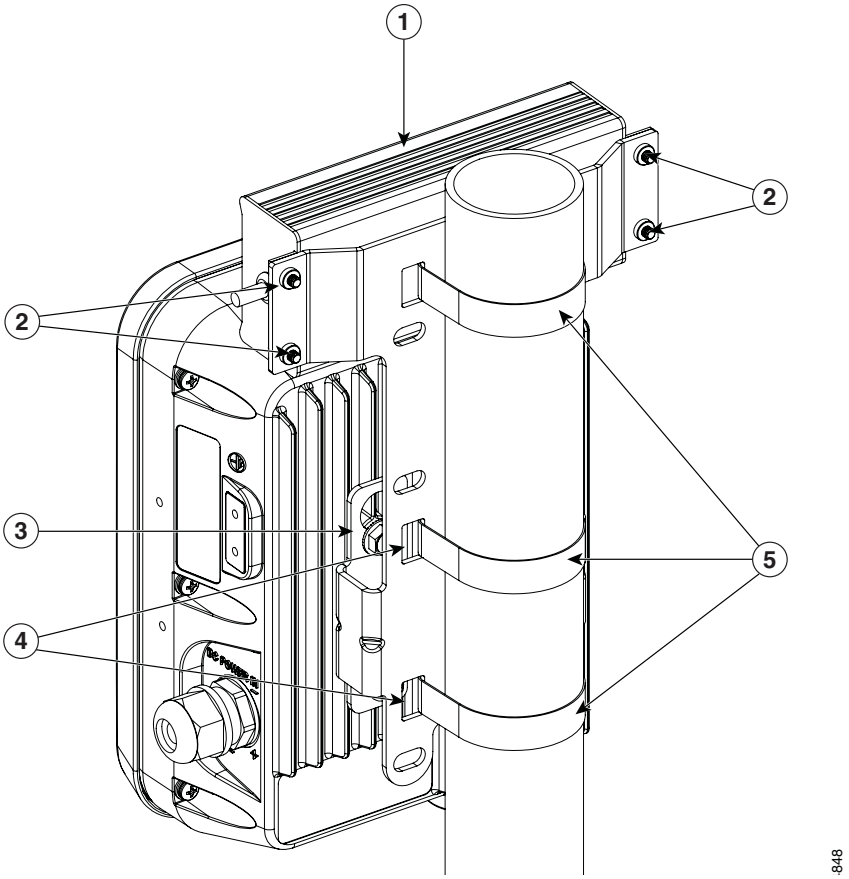
Step 6 Using a 10mm wrench, tighten the four bolts that connect the access point to the bracket to a torque of 40 lbf-in.

Step 7 Mount the power supply to the bracket with four #8-32 screws.

Step 8 Locate the access point to its final position. Tighten the band clamps with the wrench. Ensure that the clamps are tight enough to not let the AP move.

Step 9 Continue with the Grounding the Access Point, page 2-42.

Figure 2-6 AP and Power Supply Mounted on a Pole



1	Power supply.	**4**	Band clamp slots for passing the clamps through.
2	Screw holes for four #8-32 screws.	**5**	Steel band clamps.
3	One of four M6 keyhole slots for mounting the AP on the bracket.		

Wall Mounting the AP using AIR-ACC1530-PMK2= Pivoting Mounting Kit

The optional pivoting mounting kit AIR-ACC1530-PMK2= contains a pivoting mounting bracket for both wall and pole mounting. This kit allows for adjusting the position of the AP by pivoting the AP along its vertical plane.

Table 2-5 Materials for Mounting on Wall with Pivoting Mounting Kit

Materials Required for mounting AP vertically on a wall with pivoting mounting kit	In Kit
Ground lug and screws (provided with access point)	Yes
Pivoting mount kit and hardware	Yes
(8) M6 x 12-mm Hex-head Bolts	Yes
Adapter bracket for option horizontal mount	Yes
Two stainless steel band clamps (adjustable 2"-5", 51 mm - 127 mm)	Yes
Two stainless steel band clamps (adjustable 5"-8", 127 mm - 203 mm)	Yes
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws (6mm max)	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
13-mm box-end wrench or socket set	No
10-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.

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

Step 1 Disassemble the pivot kit, if not already disassembled. See Figure 2-7.

Step 2 Use the wall-plate end of the mounting bracket as a template to mark four screw hole locations on the mounting surface. See Figure 2-7 for the mounting bracket screw hole locations (screw holes of maximum 6 mm in size).

See Figure 2-8 for the dimensions of the pivoting mounting bracket.

Step 3 Use four screws and, if required, wall anchors to attach the wall-plate end of the mounting bracket to the mounting surface. These screws and anchors are to be sourced independently.

Note You can use an exterior-grade plywood backboard to mount the access point to stucco, cement, or drywall.

Note The mounting wall, attaching screws, and wall anchors must be able to support a 50-lb (22.7 kg) static weight.

Step 4 Align the AP-plate end of the bracket with the screw holes in the back of the access point.

Step 5 Fasten the bracket plate to the AP by using four M8 x12 mm bolts and a 10 mm box or socket wrench. Torque the bolts to 40 lbf-in.

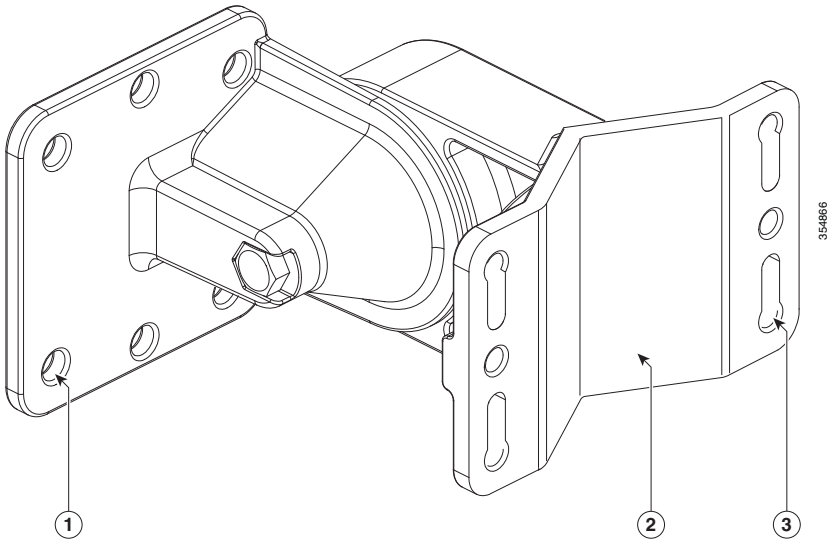
Step 6 Using the 90.0 mm M8 long screw and the hardware supplied with the pivoting bracket, bolt the AP and bracket plate, to the wall plate mounted on the wall. See Figure 2-7 for this assembly. Do not fully tighten the assembly.

Note The access point should be mounted with the status LED on the base facing downwards.

Step 7 Pivot the AP as required, and then fully tighten the 90.0 mm M8 long screw using a 13 mm wrench.

Step 8 Proceed with installing antennas (only for external antenna models), connecting the data cables, grounding the access point, powering and configuring the access point..

Figure 2-7 Pivoting Mounting Bracket



1	One of four bolt holes for fastening to the back of the AP. This is the AP-plate end of the bracket, and is fastened to the back of the AP.	**3**	Screw holes for wall mounting. These screw holes can also be used as slots for steel band clamps in pole-mount installations.
2	Wall-plate end of the bracket. This plate is fastened to the wall.		

Figure 2-8 Pivoting Mounting Bracket Dimensions

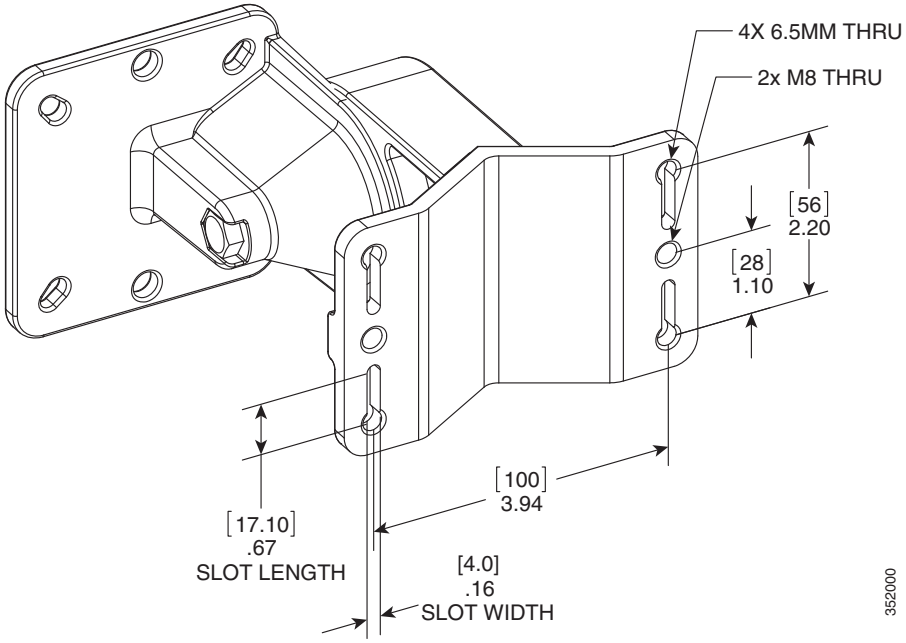
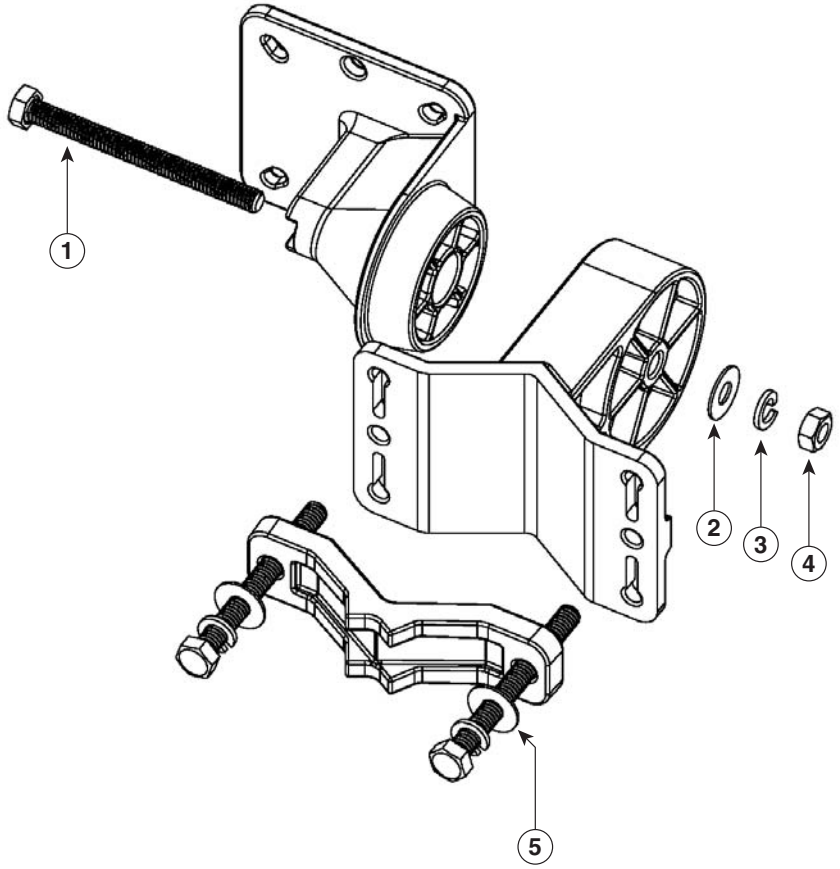
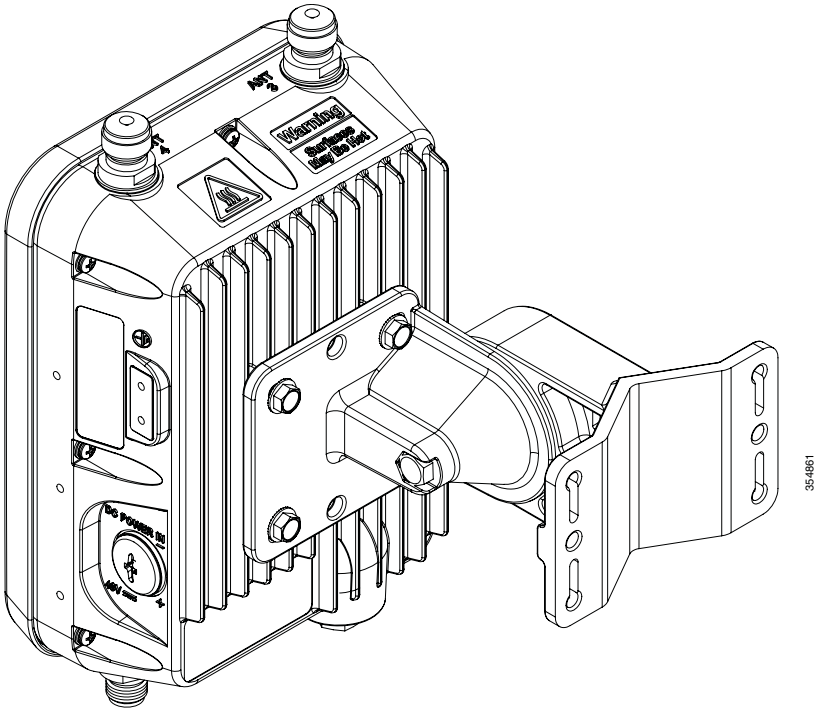


Figure 2-9 Exploded View of the Pivoting Mounting Kit



1	90.0 mm M8 screw	**4**	M8 nut
2	M8 washer	**5**	80.0 mm M8 screw with washer and spring washer, for fastening the pole-mount screw clamp to the pivoting bracket base plate.
3	M8 spring washer		

Figure 2-10 Visualization of AP Fastened to the Pivoting Mounting Kit



Pole Mounting the AP using AIR-ACC1530-PMK2= Pivoting Mounting Kit

The optional pivoting mounting kit AIR-ACC1530-PMK2= contains a pivoting mounting bracket for both wall and pole mounting. This kit can be used to install the access point on a pole, mast, or streetlight. It supports metal, wood or fiberglass poles from 2 to 8 inches in diameter.

The AIR-ACC1530-PMK2= pivoting mounting kit allows for adjusting the position of the AP by pivoting the AP along its vertical plane.

Table 2-6 Materials for Mounting the AP on a Pole using AIR-ACC1530-PMK2=

Materials Required	In Kit?
Ground lug and screws (provided with access point)	Yes
Pivoting mount kit and hardware	Yes
(8) M6 x 12-mm Hex-head Bolts	Yes
Adapter bracket for option horizontal mount	Yes
Two stainless steel band clamps (adjustable 2"-5", 51 mm - 127 mm)	Yes
Two stainless steel band clamps (adjustable 5"-8", 127 mm - 203 mm)	Yes
Crimping tool for ground lug, Panduit CT0720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws (6mm max)	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
13-mm box-end wrench or socket set	No
10-mm box-end wrench	No

To mount the access point on a pole, follow these steps:

Step 1 Select a mounting location on the pole to mount the access point. You can attach the access point to any pole with a diameter from 2 to 8 inches (5.1 to 40.6 cm).

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 2 Disassemble the pivot kit, if not already disassembled. See Figure 2-7.

Step 3 Fasten the pivot bracket base plate to the pole using either one set of the adjustable band clamps or the screw clamp (the screw clamp can be used only on poles that are not more than 3 inches in diameter).

Step 4 Position the pole clamp bracket on the pole as needed before tightening the steel bands clamps or the screw clamp. Tighten only enough to hold the bracket base plate in place, so as to prevent it from sliding along the pole. Fully tighten only after the access point is mounted and positioned.

Step 5 Align the AP-plate end of the bracket with the screw holes in the back of the access point.

Step 6 Fasten the bracket plate to the AP by using four M8 x12 mm bolts and a 10 mm box or socket wrench. Torque the bolts to 40 lbf-in.

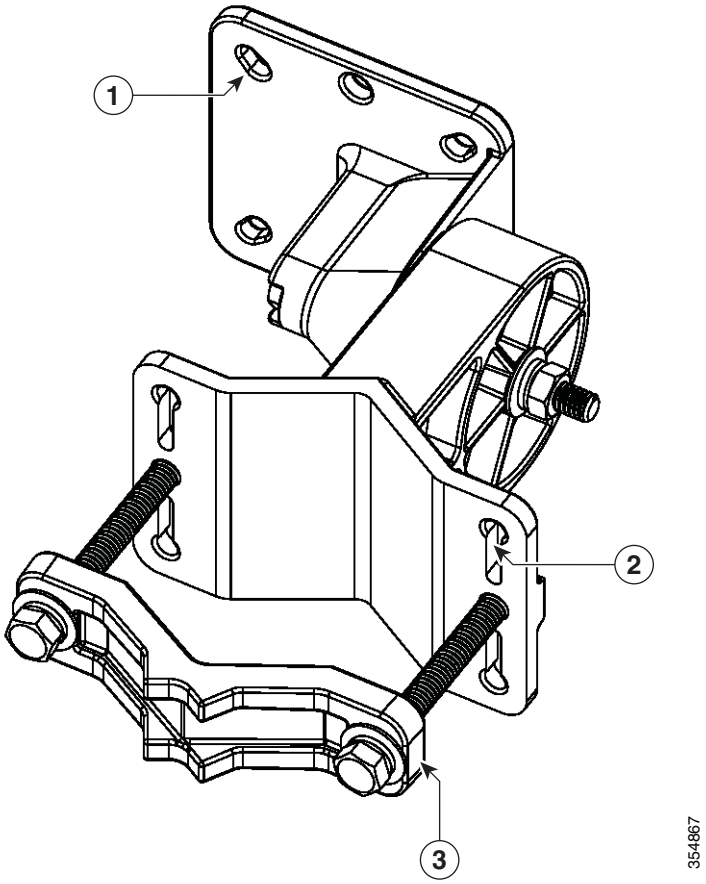
Step 7 Using the 90.0 mm M8 long screw and the hardware supplied with the pivoting bracket, bolt the AP and bracket plate, to the base plate mounted on the pole. See Figure 2-12 for this assembly. Do not fully tighten the assembly.

Note The access point should be mounted with the status LED on the base facing downwards.

Step 8 Pivot and position the AP as required, and then fully tighten the 90.0 mm M8 long screw using a 13 mm wrench, and then tighten the clamps on the pole.

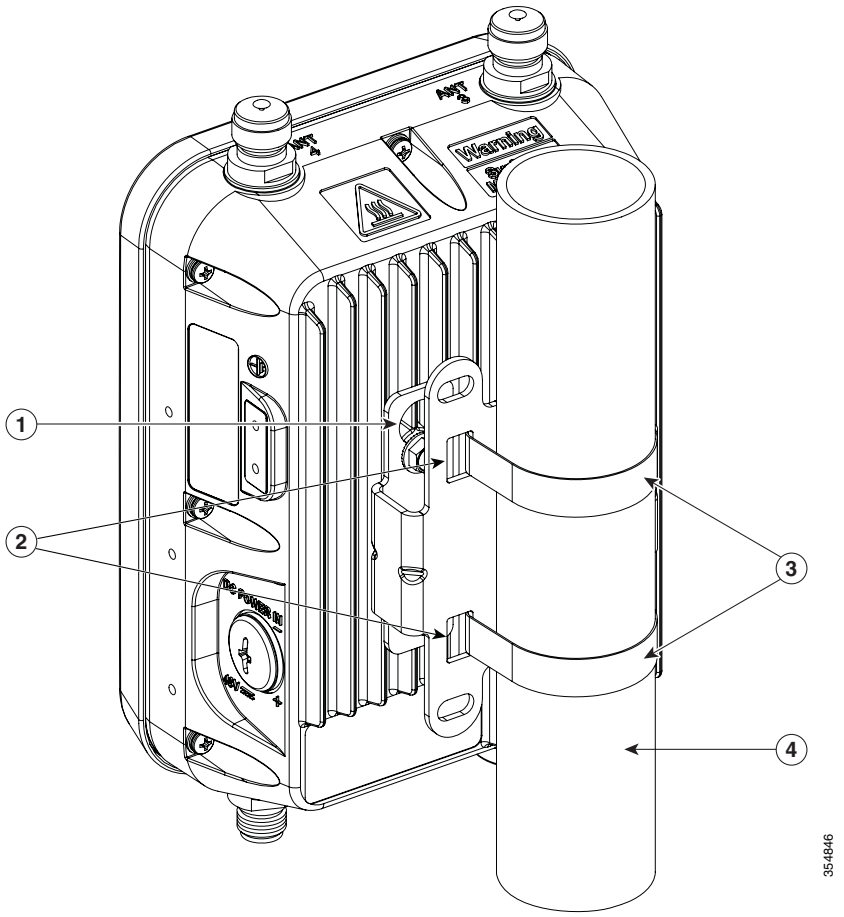
Step 9 Proceed with installing antennas (only for external antenna models), connecting the data cables, grounding the access point, powering and configuring the access point.

Figure 2-11 Pivoting Mounting Kit with Pole Mount Clamp



1	One of four mounting holes for the access point. This is the AP-plate end of the bracket, and is fastened to the back of the AP.	**3**	Pole mount screw clamp. It can fit poles having a diameter of up to 3 in. (76mm).
2	One of four slots for band clamps. This is the pivot bracket base plate, and is fastened to the pole. Pole mount installation using band clamps are shown in Figure 2-12.		

Figure 2-12 AP Wall Mounted Using the Pivoting Mounting Bracket



1	One of four mounting holes for mounting the access point to the bracket.	**3**	Steel band clamps.
2	Slots for band clamps.	**4**	Pole.

Horizontally Mounting the Access Point using AIR-ACC1530-PMK2=

The AIR-ACC1530-PMK2= pivoting pole mount kit contains a horizontal mount plate that allows the AP to be mounted horizontally, as shown in Figure 2-14. The horizontal mounting provides better omni antenna coverage.

Table 2-7 Materials Needed for Horizontally Mounting the AP using AIR-ACC1530-PMK2=

Materials Required	In Kit?
Ground lug and screws (provided with access point)	Yes
Pivoting mount kit and hardware	Yes
8 M6 x 12-mm Hex-head Bolts	Yes
Adapter bracket for option horizontal mount	Yes
Two stainless steel band clamps (adjustable 2"-5", 51 mm - 127 mm)	Yes
Two stainless steel band clamps (adjustable 5"-8", 127 mm - 203 mm)	Yes
Crimping tool for ground lug, Panduit CT0720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws (6mm max)	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
13-mm box-end wrench or socket set	No
10-mm box-end wrench	No

To mount the AP horizontally using AIR-ACC1530-PMK2=, follow these steps:

Step 1 Mount the pivot bracket to a wall or a pole as shown in the previous procedures. However, stop before mounting the pivot bracket plate directly to the access point.

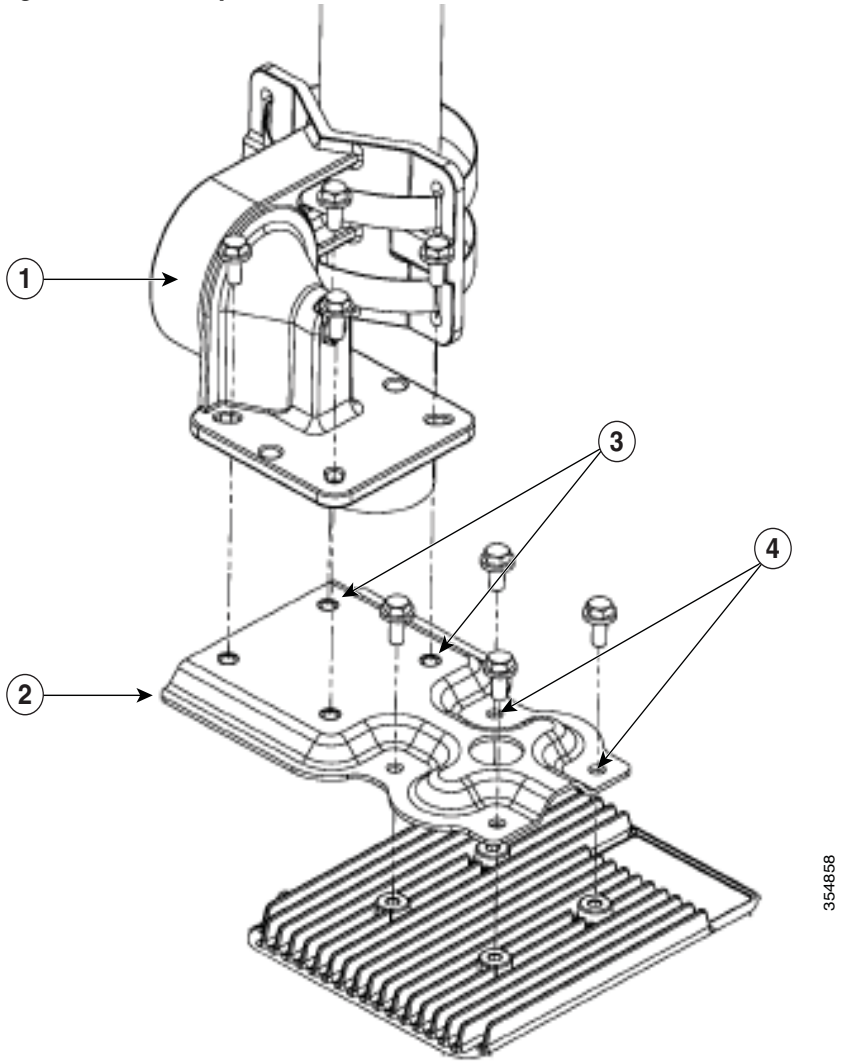
Step 2 Using four M6 x 12 mm bolts, fasten the horizontal adapter plate to the pivot bracket plate.

Step 3 Using the remaining four M6 x 12 mm bolts, mount the other side of the horizontal mounting plate to the AP. See Figure 2-13 for the exploded view.

Step 4 Using a 10 mm wrench or socket, tighten all M6 bolts to 40 lbf-in (4.5 Nm).

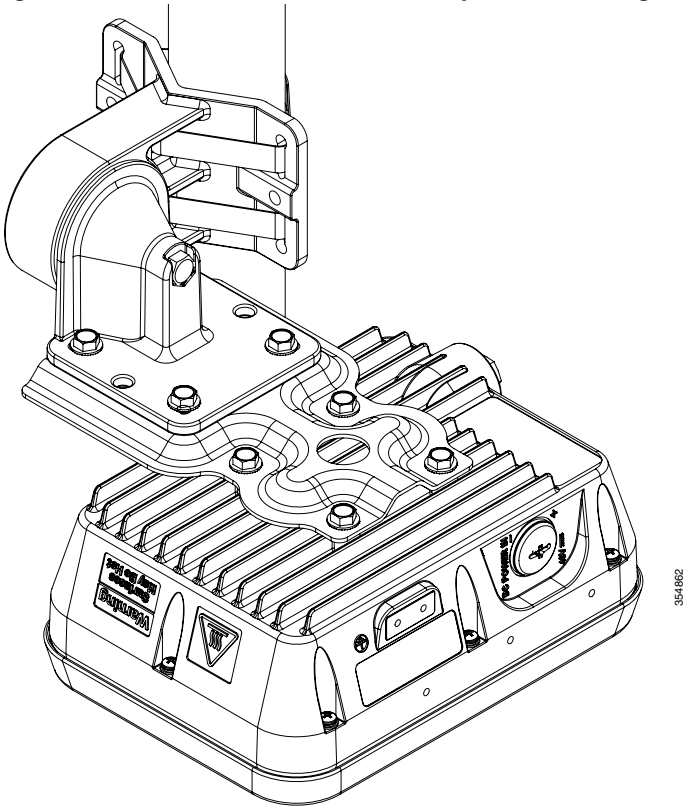
Step 5 Position and orient the access point as needed and tighten the mount kit bolts using a 13 mm wrench or socket. See Figure 2-14.

Figure 2-13 Exploded View of the Pivot Bracket Parts with Horizontal Mount Plate



1	Pivoting bracket. Can be mounted on a pole or a wall.	**3**	Two out of four screw holes for mounting the horizontal mounting plate to the pivoting bracket.
2	Horizontal mounting plate.	**4**	Two out of four screw holes for mounting the access point to the horizontal mounting plate.

Figure 2-14 Access Point Horizontally Mounted using the Optional Horizontal Mount Plate



Installing AP Cover AIR-ACC1560-CVR=

You can install a cover AIR-ACC1560-CVR=, which also acts as a a solar shield. The cover can be installed prior to or after all connections are made. However, if remote cabled antennas are to be installed, the shield must be installed before the antenna cables are attached to the AP.

Step 1 This step applies only to AP1562D models.

The cover AIR-ACC1560-CVR= is factory fitted with an adapter for installing on AP models AP1562I and AP1562E. You need to remove this adapter before installing the cover on AP1562D AP models. For this:

a. Slide a large flat blade screw driver into the opening shown in Figure 2-15.

b. Pry up the adapter while pushing the screw driver further into it, until the adapter pop out.

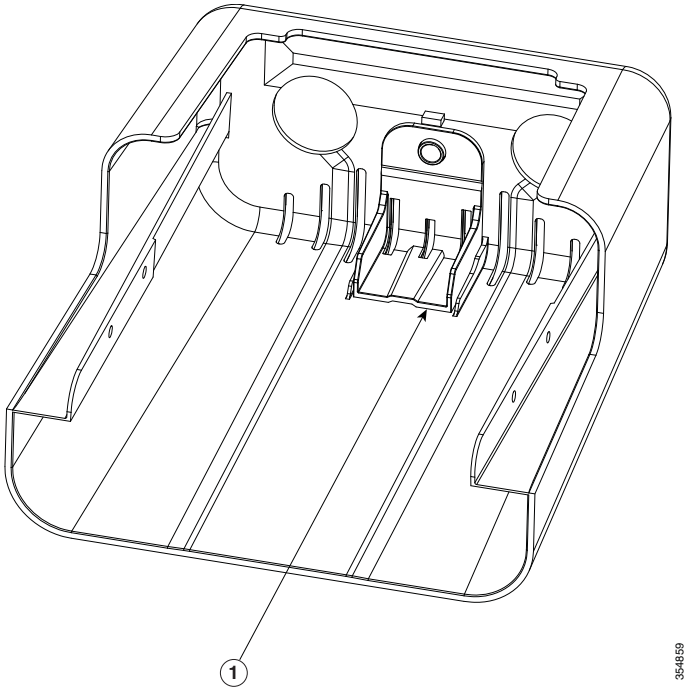
c. Discard the adapter.

Step 2 Position and slide the cover over the AP as shown in Figure 2-16.

Step 3 Align the two holes on each side of the cover with the screw holes on corresponding side of the AP.

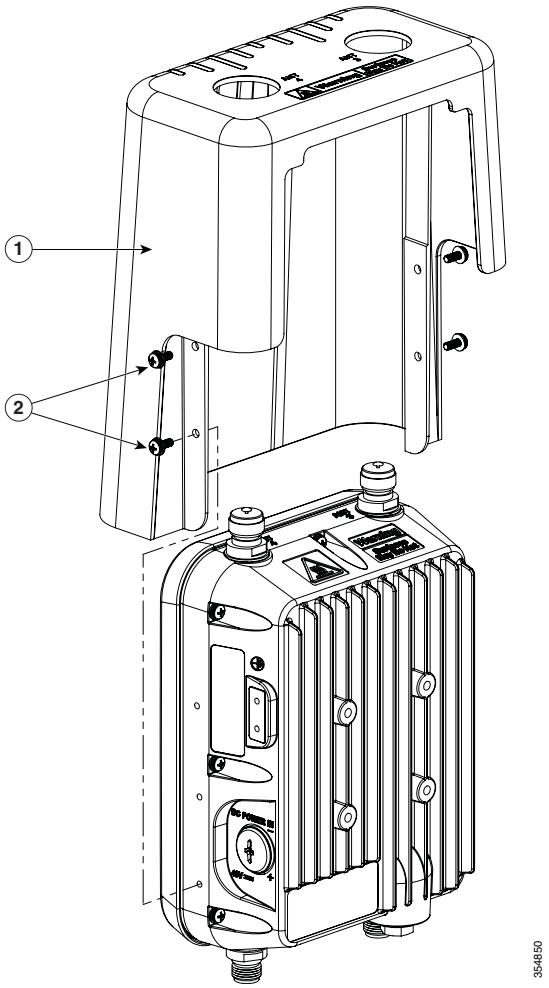
Step 4 Insert and install #8-32 screws through the screw holes in the cover and into the AP. Tighten the screws to 10 lb-in.

Figure 2-15 Only for AP1562D - Removing the Adapter from the Cover



1	Slide a large flat blade screw driver into this opening and the pry the adapter out.

Figure 2-16 Installing the Cover on the AP



1	Solar Shield	**2**	Two of four #8-32 screws

Installing External Antennas

Table 2-8 shows the external antennas supported by the 1562E access point and provides required quantities for each model.

Table 2-8 1562E Access Point Supported External Antennas

Product ID	Frequency Band	Gain	Type
AIR-ANT2547VG-N	2.4 / 5 GHz	4 / 7 dBi	Omnidirectional (gray)
AIR-ANT2547V-N	2.4 / 5 GHz	4 / 7 dBi	Omnidirectional (white)
AIR-ANT2568VG-N	2.4 / 5 GHz	6 / 8 dBi	Omnidirectional (gray)
AIR-ANT2588P3M-N=	2.4 / 5 GHz	8 / 8 dBi	Directional

Table 2-8 1562E Access Point Supported External Antennas

Product ID	Frequency Band	Gain	Type
AIR-ANT2450V-N	2.4 GHz	5 dBi	Omnidirectional
AIR-ANT2480V-N	2.4 GHz	8 dBi	Omnidirectional
AIR-ANT2413P2M-N=	2.4 GHz	13 dBi	Directional
AIR-ANT5180V-N	5 GHz	8 dBi	Omnidirectional
AIR-ANT5114P2M-N=	5 GHz	14 dBi	Directional

For installation instructions and detailed information on any of these antennas, refer to the antenna guide 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 A-4.

Non-Cisco Antennas

Cisco does not support any third-party antennas. RF connectivity and compliance of third party antennas is the user'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.

Cisco Flexible Antenna Port

The Cisco Flexible Antenna Port feature on the 1562 series access points allows support for either dual-band or single-band antennas on the same AP. This is configurable using a CLI command from the wireless LAN controller.

To have dual-band ports, use the two antenna ports on the base (ports 1 and 2) to connect to dual-band omni or directional antennas.

To have single-band ports, use two separate 2.4 GHz and two 5 GHz antenna ports.

External Antenna Mounting Configurations

The selection of the antenna is determined in the configuration of the product. The 1562E antennas can be mounted on a wall, pole and/or tower mounted. Always refer to the *Ordering Guide* for the updated list of supported antennas.

The 1562E access point supports a variety of antennas designed for outdoor use with radios operating in the 2.4-GHz and 5-GHz frequency bands. The 1562E supports the external antennas listed in the following sections.

Cisco Aironet Dual-Band Omnidirectional Antenna (AIR-ANT2547V-N, AIR-ANT2547VG-N)

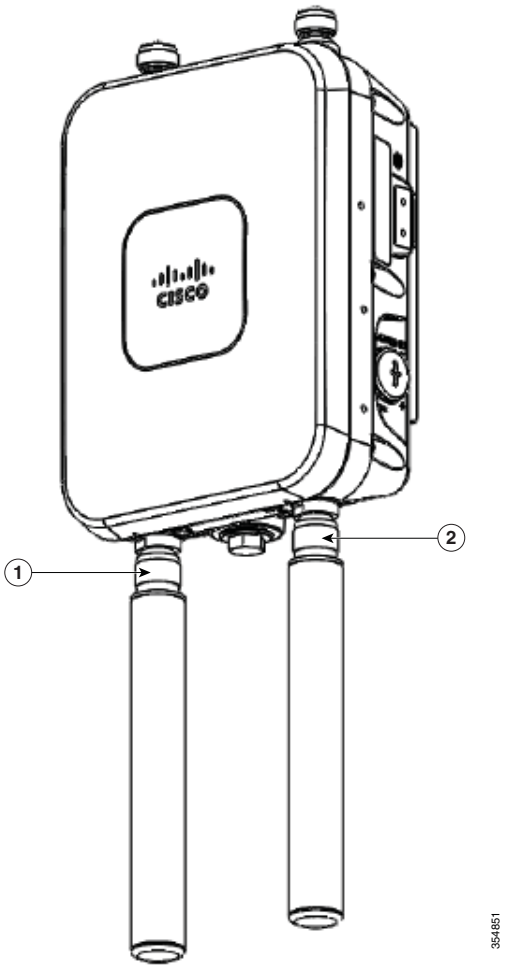
The Dual-Band Omnidirectional Antenna, referred to as a "stick" antenna, is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in the 2.4-GHz and 5-GHz frequency bands (Figure 2-17). Basic operating features of the antenna are:

- Omnidirectional collinear array
- Operates in the 2.4 GHz and 5 GHz frequency bands
- Gain:
  - 2400–2483 MHz — 4-dBi
  - 5250–5875 MHz — 7-dBi

The antenna is designed to create an omnidirectional broadcast pattern. To achieve this pattern, mount the access point clear of any obstructions to the sides of the radiating element.

For detailed information on this antenna, refer to the *Cisco Aironet Dual-Band Omnidirectional Antenna (AIR-ANT2547V-N, AIR-ANT2547VG-N)* document. Follow all safety precautions when installing the antennas. For information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-17 Cisco Aironet Dual-Band Omnidirectional Antenna - Installed Only on Model AIR-AP1562E-x-K9



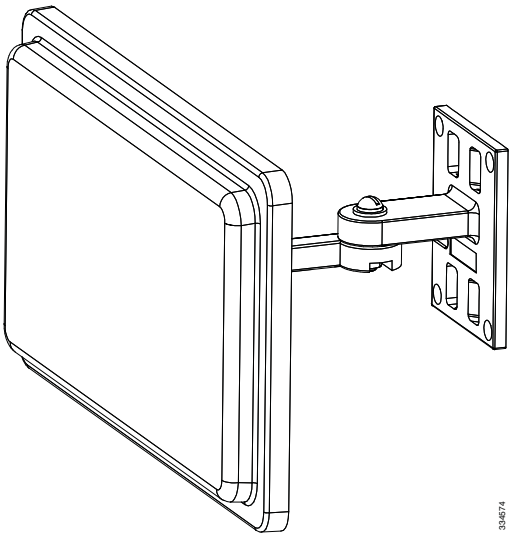
1	Antenna connected to antenna port 1(Type-N connector) (TX/RX)	**2**	Antenna connected to antenna port 2(Type-N connector) (TX/RX)

Cisco Aironet 2.4-GHz/5-GHz 8-dBi Directional Antenna (AIR-ANT2588P3M-N)

The Cisco Aironet 2.4-GHz/5-GHz 8-dBi Directional Antenna is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in both the 2.4-GHz and 5-GHz frequency bands. This antenna has 8-dBi gain in both bands.

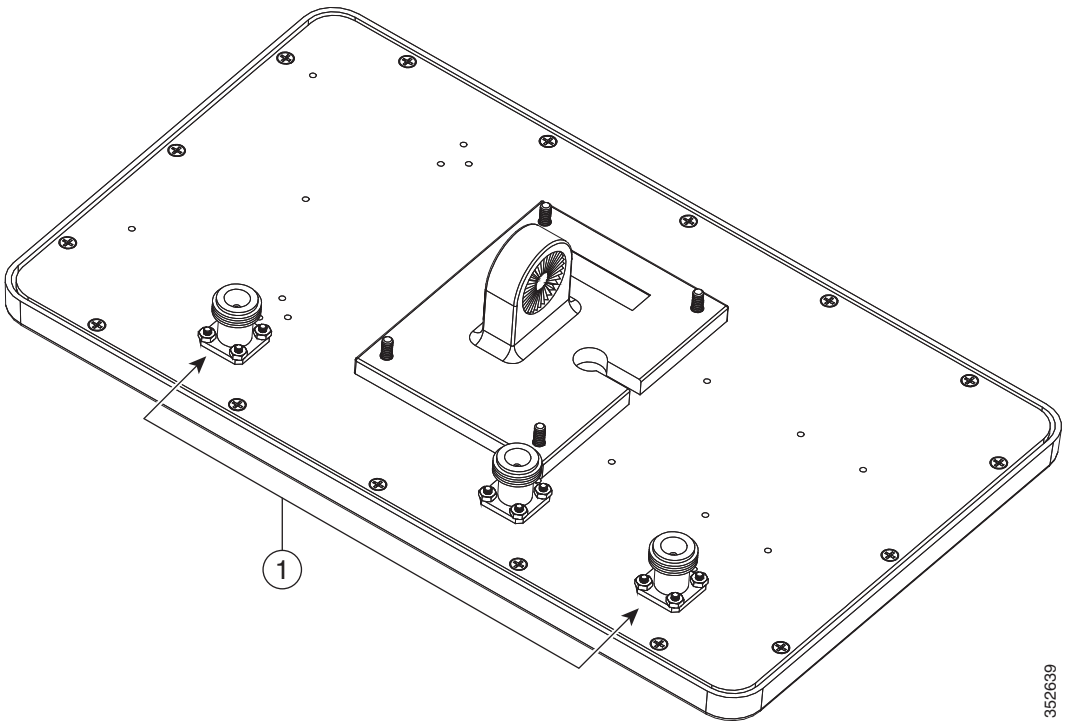
For detailed information on this antenna, refer to the *Cisco Aironet 2.4-GHz/5-GHz 8-dBi Directional Antenna (AIR-ANT2588P3M-N)* document. Follow all safety precautions when installing the antennas, for information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-18 Cisco Aironet 2.4-GHz/5-GHz 8-dBi Directional Antenna - Installed Only on Model AIR-AP1562E-x-K9



Note When installing the AIR-ANT2588P3M-N with the Cisco Aironet 1560 Series AP, connect the outermost antenna ports (marked ‘1’ in Figure 2-19) to the AP’s dual band antenna ports.

Figure 2-19 Antenna Ports For Connection to AP’s Dual Band Ports



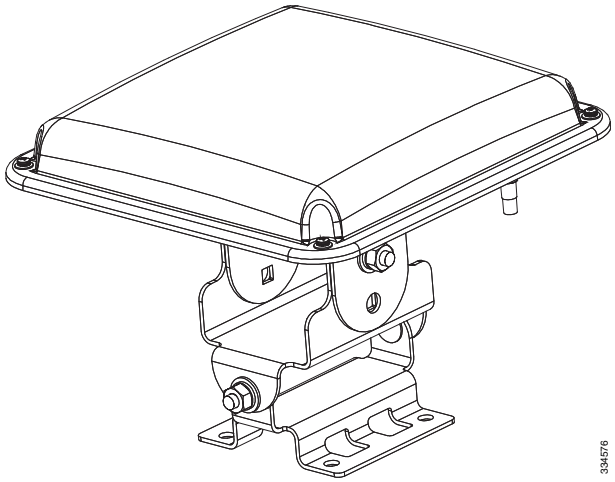
Cisco Aironet 5-GHz 14-dBi 2-Port Directional Antenna (AIR-ANT5114P2M-N)

The Cisco Aironet 5-GHz 14-dBi 2-Port Directional Antenna is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in the 5-GHz frequency band. This antenna has 14-dBi in the 5-GHz band.

For more information, see the *Cisco Aironet 5-GHz 14-dBi Directional Antenna* document, at the following URL:
http://www.cisco.com/c/en/us/td/docs/wireless/antenna/installation/guide/ant5114p2m-n.html.

For detailed information on this antenna, see the *Cisco Aironet 5-GHz 14-dBi Directional Antenna (AIR-ANT5114P2M-N)* document. Follow all safety precautions when installing the antennas, for information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-20 Cisco Aironet 5-GHz 14-dBi Directional Antenna - Installed Only on Models AIR-AP1562E-x-K9

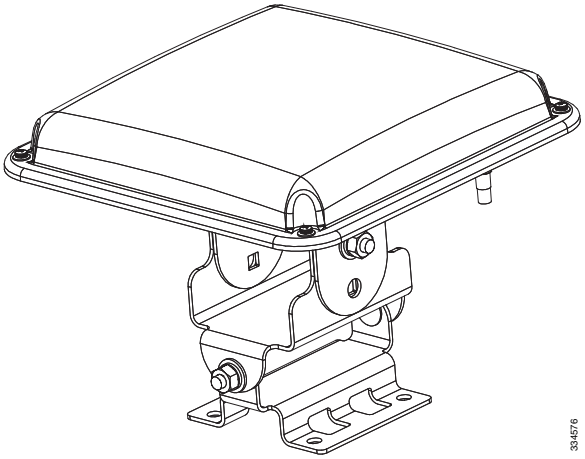


Cisco Aironet 2.4-GHz 13-dBi 2-Port Directional Antenna (AIR-ANT2413P2M-N)

The Cisco Aironet 2.4-GHz 13-dBi 2-Port Directional Antenna is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in the 2.4-GHz frequency band. This antenna has 13-dBi gain in the 2.4-GHz frequency band.

For detailed information on this antenna, refer to the *Cisco Aironet 2.4-GHz 13-dBi Directional Antenna (AIR-ANT2413P2M-N)* document. Follow all safety precautions when installing the antennas, for information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-21 Cisco Aironet 2.4-GHz 13-dBi Directional Antenna - Installed Only on Models AIR-AP1562E-x-K9

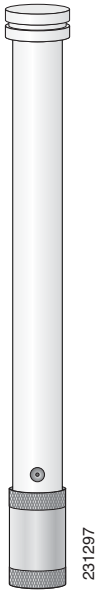


Cisco Aironet 2.4-GHz 5-dBi Omnidirectional Antenna (AIR-ANT2450V-N)

The Cisco Aironet 2.4-GHz 5-dBi Omnidirectional Antenna is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in the 2.4-GHz frequency band. This antenna has a 5-dBi gain in the 2.4-GHz band.

For detailed information on this antenna, refer to the document *Cisco Aironet 5-dBI Omnidirectional Antenna (AIR-ANT2450V-N).* Follow all safety precautions when installing the antennas. For information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-22 Cisco Aironet 2.4-GHz 5-dBi Omni Antenna - Installed Only on Model AIR-AP1562E-x-K9



Cisco Aironet 2.4-GHz 8-dBi Omnidirectional Antenna (AIR-ANT2480V-N)

The Cisco Aironet 2.4-GHz 8-dBi Omnidirectional Antenna is designed for outdoor use with Cisco Aironet Outdoor Access Points with radios operating in the 2.4-GHz frequency band. This antenna has 8-dBi gain in the 2.4-GHz frequency band.

For detailed information on this antenna, refer to the document *Cisco Aironet 8-dBi Omnidirectional Antenna (AIR-ANT2480V-N)*. Follow all safety precautions when installing the antennas, for information on safety, refer to "Safety Precautions when Installing Antennas" section on page A-4.

Figure 2-23 Cisco Aironet 2.4-GHz 8-dBi Omni Antenna - Installed Only on Model AIR-AP1562E-x-K9i