



## Before You Begin

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This chapter describes what steps you need to take before beginning the installation of your Access Point.

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## Unpacking the Access Point

When you are unpacking the access point, do not remove the foam blocks attached to the antenna connectors. The foam protects the antenna connectors during installation.

To unpack the access point, follow these steps:

### Procedure

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- 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, on page 1](#) are included in the shipment. If any item is damaged or missing, notify your sales representative.
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## Package Contents

The typical access point package contains the following items:

- Access point
  - IW-6300H-AC-x-K9 (AC power model)
  - IW-6300H-DC-x-K9 (DC power model)
  - IW-6300H-DCW-x-K9 (DC wide range power model)

- Mount kit: choose either IOT-ACCPMK or IOT-ACCPMKHZM for your specific requirement.
  - IOT-ACCPMK—Used in mild environment.
  - IOT-ACCPMKHZM—316 Stainless Steel bracket, with greater resistance to corrosion.
  - IOT-ACCPMK-LB—(Optional) Extender Bracket Kit. Used to install the AP with antennas facing down.
- Ground lug and screws with lock washers
- Weatherization tape and anti-seize compound

## Tools and Hardware

The tools and hardware used to install the access point are described in the following sections:

### Optional Tools and Hardware

The optional tools and hardware that can be obtained from Cisco are:

- Optional power injector (AIR-PWRINJ-60GRDx=)
- Antennas, 2.4/5-GHz
- Optional banding strap tool (BAND IT) (AIR-BAND-INST-TL=)

### Optional Tools and Hardware That You Supply

Tools and materials that are user-supplied are:

- 1/2" or 13-mm socket wrench, used to open the Access Cover and to attach the mounting bracket
- #2 Phillips or Flat screw driver to clamp wire terminal and ground terminal
- 3/8" Allen wrench with 13-18" long wrench handle to remove 1/2" NPT port plugs
- Loctite 565 Thread Sealant for 1/2" NPT Ports
- 6-AWG copper ground wire
- Ethernet RJ-45 connector and installation tool
- Optional ground rod, as required by local regulations
- Optional ladder, power lift, rope, or other tools as required
- ESD-preventive cord and wrist strap
- Wire-stripping tools for stripping 14- and 18-gauge wires
- Crimping tool

If installed in a hazardous location, please note the additional items (see Product Document of Compliance for further details)

- ATEX/IECEX certified Armored cable for routing in conduit
- Customer supplied ATEX/IECEX certified 1/2" NPT conduit (rigid or flex), or ATEX/IECEX certified cable gland or barrier gland for each connection suitable to maintain IP66/67
- ATEX/IECEX certified AC or DC power cable, based on the AP model ordered

## Pole Installation Hardware and Tools

To install the access point on a vertical metal, wood, or fiberglass pole, you need the following additional hardware and tools:

- Customer banding strap tool (BAND IT)—(AIR-BAND-INST-TL=)
- Customer-supplied 13-mm and box-end wrench or socket set

## Warnings



### 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



### Caution

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

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 9001

# Safety Information

Follow the guidelines in this section to ensure proper operation and safe use of the access point.

## 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



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



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



**Warning** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



**Warning** This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024



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



**Warning** Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 9001



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

**Warning**

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 75° C (167° F) Statement 1047

**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

**Warning**

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

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.

## 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.




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**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.

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- 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:

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




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**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. It is recommended to keep the received signal strength at or below -30 dBm to avoid degraded PER. 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.

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## Safety Precautions When Installing Antennas




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**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

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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.

## Installation Guidelines

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:

- For information on planning and initially configuring your Cisco Mesh network, refer to the *Cisco Wireless Mesh Access Points, Design and Deployment Guide*.
- Review the FCC guidelines for installing and operating outdoor wireless LAN devices.
- 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. Cisco recommends installing the access points no higher than 40 feet to allow support for wireless clients on the ground.



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

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## 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.

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.
- **Applications and type of devices to be used on the WLAN.**

## 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 software configuration guide).
- Become familiar with the access point installation components.