Cisco IR500 Series WPAN Gateway and Range Extender Installation and Configuration Guide

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Cisco Systems, Inc.
www.cisco.com

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Preface

Audience

This guide is for the networking or computer technician responsible for installing and configuring WPAN gateway and WPAN range extender devices.

Conventions

This document uses the following conventions:

Convention	Indication
bold font	Commands and keywords and user-entered text appear in **bold** font.
italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
[ ]	Elements in square brackets are optional.
{x | y | z }	Required alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
`courier` font	Terminal sessions and information the system displays appear in `courier` font.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

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

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Caution Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

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.

SAVE THESE INSTRUCTIONS

Warning **Statements using this symbol are provided for additional information and to comply with regulatory and customer requirements.**

Related Documents

Before installing, configuring, or upgrading the WPAN gateway or WPAN range extender, see the release notes on Cisco.com for the latest information.

The following documents relate to the deployment of the WPAN gateway and WPAN range extender:

- *Cisco Connected Grid Network Management System User Guide*. Contact Cisco for a copy of this document.
- *Cisco Connected Grid WPAN Module for CGR 1000 Series Installation and CG-Mesh Configuration Guide*
- "Mapping of Address and Port Using Translation" chapter of *Cisco Systems, Inc. IP Addressing: NAT Configuration Guide, Cisco IOS XE Release 3S (ASR 1000)*
- *Raw Socket Transport Software Configuration Guide for Cisco 1000 Series Connected Grid Routers (Cisco IOS)*

Obtaining Documentation and Submitting a Service Request

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

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

Overview

This chapter includes the following topics:

Features

WPAN Gateway Features

The WPAN Gateway provides secure network connectivity over 6LoWPAN/RPL/IEEE 802.15.4g/e subnets to field devices equipped with Ethernet and serial adapters. The device features:

Its main characteristics are:

- Small form factor IEEE 802.15.4g/e 902-928 MHz frequency band operation
- Network Backhaul Interface
  - 1 x IEEE 802.15.4g/e WPAN 902-928 MHz Mesh interface
- Network Device Interfaces
  - 1 x 10/100 Fast Ethernet
  - 1 x RS232 Serial port
  - 1 x USB port
  - 1 x RS232/RS485 Serial port
  - 1 x Console port
- Alarm input

- 6LoWPAN (RFC4944 and RFC6282)—IPv6 adaptation layer
- RPL (RFC 6206, 6550, 6551, 6553, 6554, 6719)—Layer-3 Mesh Networking
- IEEE 802.1x and 802.11i—Authentication and Key Management
- Constrained Application Protocol (CoAP) and CoAP Secure Management Policy (CSMP) Network Management
- Raw Socket TCP—non-IP serial devices connectivity
- Real-Time Clock—for maintaining the current time
- Temperature Sensor—for measuring internal temperature of the device
- IP30 enclosure

WPAN Range Extender Features

The WPAN range extender extends the range of an RF wireless mesh network, providing longer reach between WPAN endpoints and other WPAN networks.

WPAN range extenders support the full CG-Mesh network platform, including IEEE 802.15.4g/e, IEEE 802.1X, IPv6, and RPL.

The WPAN range extender features:

- Small form factor IEEE 802.15.4g/e 902-928 MHz frequency band operation
- 1 x Serial console port for configuration and management
- Real-Time Clock—for maintaining the current time
- Temperature Sensor—for measuring internal temperature of the device
- Ruggedized IP67 outdoor enclosure
- Optional battery backup

Models

WPAN Gateway Models

Table 1-1 lists and describes the WPAN gateway models.

WPAN Range Extender Models

Table 1-2 lists and describes the WPAN range extender models.

Table 1-2 WPAN Range Extender Models

Model	Description
IR529-WP-915S/K9	Connected Grid Basic Range Extender—IEEE 802.15.4e/g WPAN 900 MHz
IR529-UBWP-915S/K9	Connected Grid Advanced Range Extender, configurable with single antenna and battery backup support—IEEE 802.15.4e/g WPAN 900 MHz
IR529-UBWP-915D/K9	Connected Grid Advanced Range Extender, configurable with dual antenna and battery backup support—IEEE 802.15.4e/g WPAN 900 MHz
IR529-UWP-915D/K9	Connected Grid Advanced Range Extender, configurable with dual antenna—IEEE 802.15.4e/g WPAN 900 MHz

Assembly Details

Front Panel—WPAN Gateway

This section describes the front panel components shown in Figure 1-1:

Figure 1-1 Front Panel of WPAN Gateway IR509U-WP-915/K9 Model

1	Status LEDs	**6**	10/100 Fast Ethernet port
2	Antenna connector	**7**	Power[1] and alarm connector
3	RS232-DCE/RS485 selectable port	**8**	Reset button
4	RS232-DTE port	**9**	Ground connection point
5	USB port		

1. DC power.

Status LEDS

The status LEDs provide status information on the WPAN gateway status, activity, and performance. For more information, see the "WPAN Gateway LEDs" section on page 1-12.

Antenna Connector

The antenna connector is a QMA, panel-mounted, 50-ohm connector for connecting the antenna to the WPAN gateway.

RS232/RS485 DCE Port

The RS232/RS485 DCE port is a configurable serial port for connecting a serial device to the WPAN Gateway. The Connected Grid Network Management System (CG-NMS) application is used to configure the port.

The port can be configured for RS232 or RS485. RS232 operates in full duplex mode on the port, and RS485 operates in half duplex or full duplex mode. You can also use the CG-NMS to obtain statistics about the serial port including bytes sent and bytes received information.

For information about connecting to the RS232-DCE or RS485 port, see the "Connecting to the RS232DCE/RS485 or RS232-DTE Ports" section on page 2-33.

RS232 DTE Port

The RS232 DTE port is a configurable serial port for connecting a serial device to the WPAN Gateway. The Connected Grid Network Management System (CG-NMS) application is used to configure the port.

You can also use the CG-NMS to obtain statistics about the port including bytes sent and bytes received information.

For information about connecting to the RS232 DTE port, see the "Connecting to the RS232DCE/RS485 or RS232-DTE Ports" section on page 2-33.

USB Port

For information about the USB port, see the *Cisco IR 500 Series WPAN Gateway and Range Extender Release Notes* on Cisco.com.

For information about connecting to the USB port, see the "Connecting to the USB Port" section on page 2-35.

10/100 Fast Ethernet Port

The 10/100 Fast Ethernet port provides IPv4 connectivity to devices. Connectivity over the IPv6-based Field Area Network (FAN) is provided using the Mapping of Address and Port using Translation (MAP-T) protocol by the WPAN gateway.

For information about connecting to the Fast Ethernet 10/100 port, see the "Connecting to the 10/100 Fast Ethernet Port" section on page 2-34.

Power and Alarm Connector

You connect the DC power and alarm connections to the WPAN gateway through the front panel connector. The gateway requires a DC power supply. The power connector labeling is on the connector. Figure 1-2 shows the power and alarm connector.

Figure 1-2 WPAN Gateway Power and Alarm Connector

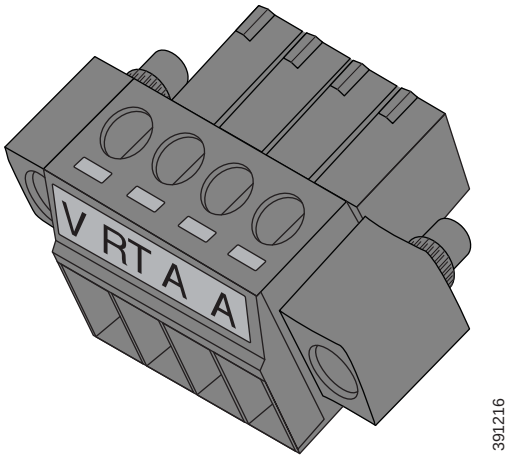


Table 1-3 describes the power connections.

Table 1-3 WPAN Gateway Power Connections

Label	Description
V	Positive DC power connection
RT	Return DC power connection

The alarm input connections allow the WPAN gateway to be wired to monitor an alarm condition. The alarm can be configured by the Connected Grid Network Management System to operate on a normally open (NO) or normally closed (NC) basis. Table 1-4 describes the alarm connections.

Table 1-4 Alarm Connections

Label	Description
A	Each alarm connection is labeled identically—this means each connection can be an ‘Alarm in’ or ‘Alarm reference’ signal, provided the second alarm connection provides the other alarm signal.

The alarm input could be used to detect a remote alarm condition such as a normally locked cabinet door being opened or tampered with, or an attached electromechanical device losing power.

For information about wiring the power and alarm connector, see the “Wiring the WPAN Gateway DC Power” section on page 2-20 and the “Wiring the WPAN Gateway Alarm” section on page 2-29.

Reset Switch

The reset switch is used to rest the WPAN gateway to its factory settings. To activate the reset, press the reset switch for three seconds.

Rear Panel—WPAN Gateway

This section describes the WPAN gateway rear panel components shown in Figure 1-3:

Figure 1-3 Rear Panel of WPAN Gateway IR509U-WP-915/K9 Model

1	Console port

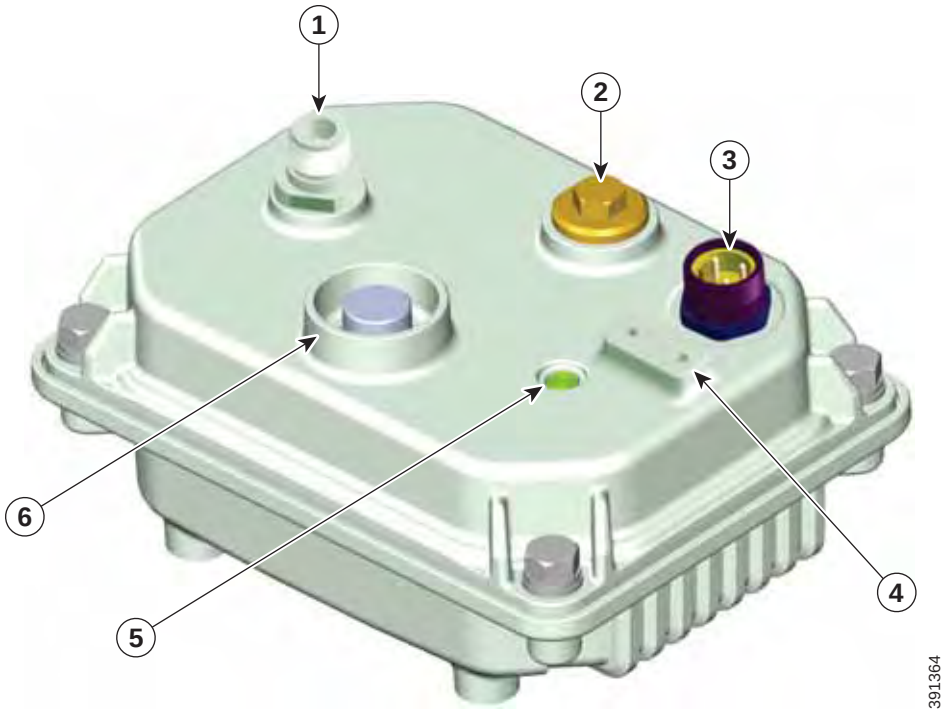
You can connect the WPAN gateway to a PC or laptop through the RJ-45 console port. The RJ-45 console port uses the Cisco Console Port RJ45-to-DB9 cable (Cisco part number 72-3383-01).

For information about connecting to the console port, see the "Connecting to the WPAN Gateway Console Port" section on page 5-13.

Bottom Panel—WPAN Range Extender

This section describes the WPAN Range Extender bottom panel components shown in Figure 1-4:

Figure 1-4 Bottom Panel of Basic Range Extender IR529-WP-915S/K9 Model



1	Antenna connector—N-type (female)	**4**	Ground connection
2	Console port	**5**	System LED
3	Power[1] connector	**6**	Protective vent port

1. AC power.

Figure 1-5 Bottom Panel of Advanced Range Extender IR529-UBWP-915S/K9 Model

1	Antenna connector—N-type (female)	**5**	Protective vent port
2	Unused port	**6**	Ground connection
3	Hard points M8 x 1.25 mm, 8 mm deep (5/16-18 in., 5/16 in. deep)	**7**	Power[1] connector
4	Console port	**8**	System LED

1. AC power.

Figure 1-6 Bottom Panel of Advanced Range Extender IR529-UBWP-915D/K9 and IR529-UWP-915D/K9 Models

1	Antenna connector 1—N-type (female)	**5**	Protective vent port
2	Antenna connector 2—N-type (female)	**6**	Ground connection
3	Hard points M8 x 1.25 mm, 8 mm deep (5/16-18 in., 5/16 in. deep)	**7**	Power[1] connector
4	Console port	**8**	System LED

1. AC power.

Antenna Connector

The antenna connector is a type N female coaxial connector.

Hard Points

The hard points are used for alternate mounting or as attach points for additional equipment.

Console Port

You can connect the WPAN range extender to a PC or laptop through the RJ-45 console port. The RJ-45 console port uses the Cisco Console Port RJ45-to-DB9 cable (Cisco part number 72-3383-01).

The console port is covered with a cable port seal—this is a liquid tight cover for protecting the WPAN range extender from environmental elements.

For information about connecting to the console port, see the "Connecting to the WPAN Range Extender Console Port" section on page 5-13.

Protective Vent Port

The protective vent port relieves pressure buildup inside the extender chassis that can be caused by changing temperatures in the installation environment. This prevents pressure from building up and damaging enclosure seals and the potential exposure of sensitive components to water. The vent also protects the extender interior from dust, dirt, water, and other environmental elements.

Ground Connection

The ground connection is used to ground the WPAN extender. A provided wired grounding lug is attached to the ground connection using screws. The other end of the ground wire is connected to an earth ground, such as a grounding rod or an appropriate grounding point on a pole that is grounded.

Power Connector

The power connector connects to the Cisco AC power cable shipped with the unit. Figure 1-7 shows the 3 pin AC power connector.

Figure 1-7 WPAN Range Extender AC Power Connector

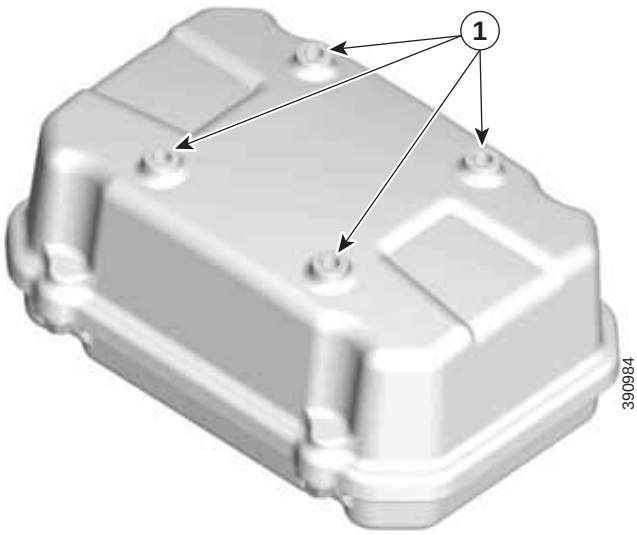
System LED

The system LED provide status information on the WPAN range extender activity and performance.

Top Panel—WPAN Range Extender

This section describes the WPAN range extender top panel components shown in Figure 1-7.

Figure 1-8 Top Panel of Basic and Advanced Range Extender



1	Mounting holes

The mounting holes are for attaching the range extender to the bracket supplied for mounting the device on a pole or wall.

LEDs

WPAN Gateway LEDs

You can use the LEDs to monitor the gateway status, activity, and performance. Figure 1-9 shows the front panel LEDs.

Note Each front panel LED has an equivalent matching LED on the top panel (See Figure 1-1).

Figure 1-9 WPAN Gateway Front Panel LEDS

1	WPAN LED	**6**	USB LED
2	RSSI (Received Signal Strength Indication) LED	**7**	10/100 FE LED
3	RS232-DCE LED	**8**	Alarm (ALM) LED
4	RS485 LED	**9**	System (SYS) LED
5	RS232-DTE LED	**10**	Power (PWR) LED

WPAN LED

The WPAN LED shows the status of the WPAN interface. Table 1-5 lists the WPAN LED colors and their meanings.

Table 1-5 WPAN LED Status Descriptions

Color		Description
Yellow	**Green**	
Off	Off	WPAN port is disabled.
Slow blink	Off	Searching for network.
Fast blink	Off	Network Access Control (obtaining link-layer keys).
Slow blink	Slow blink	Joining network.
Fast blink	Fast blink	Configuring default route
Off	Slow blink	DHCPv6

Table 1-5 WPAN LED Status Descriptions (continued)

Color		Description
Yellow	**Green**	
Off	Fast blink	Registering with NMS
Flash	On	Yellow flash indicates transmission activity

RSSI LED

The RSSI LED shows the WPAN received signal strength at the WPAN interface. Table 1-6 lists the RSSI LED colors and their meanings.

Table 1-6 RSSI LED Status Description

Color		Description
Yellow	**Green**	
Blinking	Off	Link state to IEEE 802.1x Relay: RSSI below threshold.
Off	Blinking	Link state to IEEE 802.1x Relay: RSSI above threshold.
On	Off	RSSI below threshold and/or link ETX above threshold.
Off	On	RSSI above threshold and link ETX below threshold.

RS232-DCE LED

The RS232-DCE LED shows the status of the RS232 serial communication on the port. Table 1-7 lists the RS232-DCE LED colors and their meanings.

Table 1-7 RS232-DCE LED Status Description

Color	Description
Off	RS232 is not selected as the serial communication standard—RS485 is selected, or the port is turned off completely.
Green	RS232 is selected as the serial communication standard and the port is active.

RS485 LED

The RS485 LED shows the status of the RS485 serial communication on the port. Table 1-7 lists the RS485 LED colors and their meanings.

Table 1-8 RS485 LED Status Description

Color	Description
Off	RS485 is not selected as the serial communication standard—RS232 is selected, or the port is turned off completely.
Green	RS485 is selected as the serial communication standard and the port is active.

USB LED

The USB Led shows the status of the USB port. Table 1-9 lists the USB LED Colors and their meanings.

Table 1-9 USB LED Status Description

Color	Description
Off	USB is not selected as the active DA2 Port (Which means that either the RS232 is selected as the active DA2 Port or the DA2 port is turned off completely)
Solid yellow	USB is selected as the DA2 Port and is active, but does not detect any USB device plugged in yet.
Solid green	USB port is active and has detected a USB device plugged in to its USB Port

RS232-DTE LED

The RS232-DTE LED shows the status of the RS232-DTE port. Table 1-10 lists the USB LED Colors and their meanings.

Table 1-10 RS232-DTE LED Status Description

Color	Description
Off	RS232-DTE is not selected as the active DA2 Port (Which means that either the USB is selected as the active DA2 Port or the DA2 port is turned off completely).
Solid green	RS232-DTE is selected as the DA2 Port and is active.

10/100 FE LED

The 10/100 FE LED shows the connectivity status of the 10/100 FE port. Table 1-11 lists the 10/100 FE LED colors and their meanings.

Table 1-11 10/100 FE LED Status Description

Color	Description
Off	10/100 FE port is inactive—the port is powered off or nothing is connected to it.
Green	10/100 FE port is active—a link is established with a connected device, and communication is established and a speed is negotiated.
Blinking yellow	Traffic activity detected—data communication with a connected device is in progress.

Power LED

The Power LED shows the power status of the WPAN gateway. Table 1-12 lists the power LED colors and their meanings.

System LED

The System LED indicates the system status. Table 1-14 lists the system LED colors and their meanings.

Table 1-13 System LED Status Description

Color	Description
Blinking Yellow	System is booting up
Blinking Green	System is active

Alarm LED

The Alarm LED indicates the alarm status. Table 1-14 lists the alarm LED colors and their meanings.

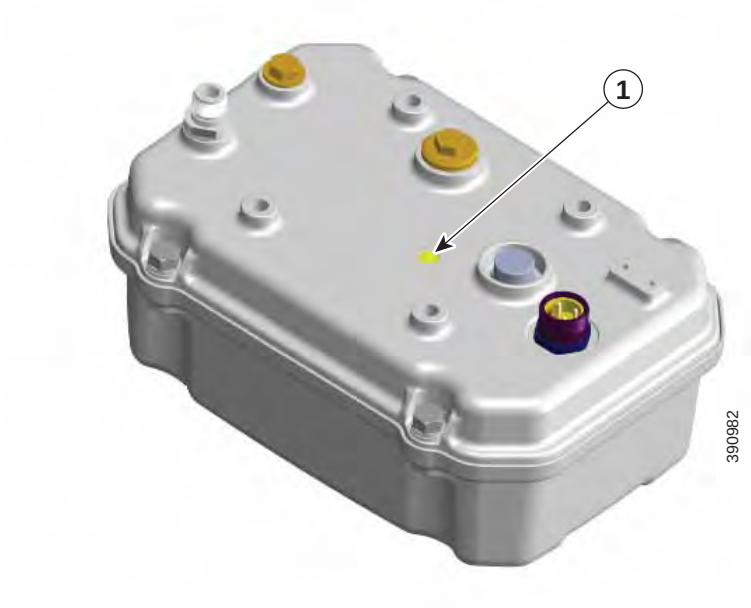
Table 1-14 Alarm LED Status Description

Color	Status
Blinking Red	Bootload is in progress.
Off	No alarm detected.
Red	Alarm detected.

WPAN Range Extender LEDs

The WPAN Range Extender has one LED—a System LED.

Figure 1-10 WPAN Range Extender Status LED



1	System LED

The System LED indicates the system status. lists the system LED colors and their meanings.

Table 1-15 System LED Status Description

Color	Description
Blinking Yellow	System is booting up
Blinking Green	System is active

Management Options

Connected Grid Network Management System

The Cisco Connected Grid Network Management System (CG-NMS) manages the WPAN gateway and WPAN range extender devices. CG-NMS provides:

- Backend network configuration
- Device monitoring
- Event notification services
- Network firmware upgrades

- Power outage/restoration notification
- Meter registration

CG-NMS also retrieves statistics on network traffic from the devices. For more information on CG-NMS and configuring the devices, see the *Cisco Connected Grid Network Management System* User Guide on Cisco.com.

CSMP Client

CSMP Client is a GUI field tool used to manage and monitor the WPAN gateway and WPAN range extender hardware and networking information.

The field tool provides two functions, "GET" and “POST” to obtain status and performance information about the devices in real-time. It can be used as a diagnostic tool to check a single device or the whole mesh network.

The field tool has three connection modes to connect a WPAN gateway or WPAN range extender:

- Serial connection
- IPv6 wireless connectivity
- Point-to-Point Protocol (PPP)

Connected Grid Device Manager

Connected Grid Device Manager (CG-DM) is a GUI field tool used to troubleshoot, configure and to update firmware images on WPAN Gateway devices.

Installation

This chapter describes how to install your WPAN gateway and WPAN range extender, and connect the devices to other devices.

Read these topics, and perform the procedures in this order:

Preparing for Installation

This section provides information about these topics:

Warnings

These warnings are translated into several languages in the Regulatory Compliance and Safety Information for these WPAN gateway and WPAN range extender devices.

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

Warning **In order to comply with FCC radio frequency (RF) exposure limits, antennas for this product should be located a minimum of 7.9 in. (20 cm) or more from the body of all persons.** Statement 332

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

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 2A**
Statement 1005

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 1040

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:**
- Basic WPAN Range Extender: 140°F (60°C)
- Advanced WPAN Range Extender / WPAN Gateway: 158°F (70°C)
Statement 1047

Warning **Installation of the equipment must comply with local and national electric codes.** Statement 1074

Warning **Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning.** Statement 1088

Caution Airflow around the WPAN gateway must be unrestricted. The gateway dimensions (height x width x depth) are 1.125 x 4.0 x 5.0 in. (2.86 x 10.16 x 12.7 cm). To prevent the WPAN gateway from overheating, there must be the following minimum clearances:

- Sides: 1.0 in. (25.4 mm)
- Front: 1.0 in. (25.4 mm)
- Rear: 1.0 in. (25.4 mm)
- Top: 1.0 in. (25.4 mm)—the device can be installed in a 1.25” tall slot, but the mounting surface must have thermal conductive properties equivalent to or better then 302 stainless steel (16.3 W/m-k)

Contact your Cisco Technical Assistance Centre (TAC) if tighter spacings are required.

Additional Information for Installation in a Hazardous Environment

Hazardous Locations Warnings for WPAN Gateway Only

Warning **Exposure to some chemicals could degrade the sealing properties of materials used in the sealed relay device.** Statement 381

Warning **Failure to securely tighten the captive screws can result in an electrical arc if the connector is accidentally removed.** Statement 397

Warning **When you connect or disconnect the power and/or alarm connector with power applied, an electrical arc can occur. This could cause an explosion in hazardous area installations. Be sure that all power is removed from the switch and any other circuits. Be sure that power cannot be accidentally turned on or verify that the area is nonhazardous before proceeding.** Statement 1058

Warning **In switch installations in a hazardous location, the DC power source could be located away from the vicinity of the switch. Before performing any of the following procedures, locate the DC circuit to ensure that the power is removed and cannot be turned on accidentally, or verify that the area is nonhazardous before proceeding.** Statement 1059

Warning **This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. The enclosure must meet IP 54 or NEMA type 4 minimum enclosure rating standards.** Statement 1063

Warning **Use twisted-pair supply wires suitable for 86°F (30°C) above surrounding ambient temperature outside the enclosure.** Statement 1067

Warning **This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), and at altitudes up to 2000 meters without derating.** Statement 1068

Warning **When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with a proper wiring method that complies with the governing electrical codes.** Statement 1069

Warning **Do not connect or disconnect cables to the ports while power is applied to the switch or any device on the network because an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed from the switch and cannot be accidentally be turned on, or verify that the area is nonhazardous before proceeding.** Statement 1070

Warning **Explosion Hazard—Do not connect or disconnect wiring while the field-side power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or that the area is nonhazardous before proceeding.** Statement 1081

Warning **Explosion Hazard—The area must be known to be nonhazardous before installing, servicing, or replacing the unit.** Statement 1082

Warning **Explosion Hazard—Substitution of components may impair suitability for Class I, Division 2/Zone 2.** Statement 1083

Caution This equipment is only suitable for use in Class I, Division 2, Groups A, B, C, D, or nonhazardous locations.

Caution For the WPAN gateway, connect only to an NEC Class 2 power source or limited power source as defined by IEC 60950-1.

North American Hazardous Location Approval for WPAN Gateway

English: **Products marked "Class I, Div 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.**

French: **Informations sur l'utilisation de cet équipement en environnements dangereux:**

Les produits marqués "Class I, Div 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

EMC Environmental Conditions for Products Installed in the European Union

This section applies to products to be installed in the European Union.

The equipment is intended to operate under the following environmental conditions with respect to EMC:

- A separate defined location under the user's control.
- Earthing and bonding shall meet the requirements of ETS 300 253 or CCITT K27.
- AC-power distribution shall be one of the following types, where applicable: TN-S and TN-C as defined in IEC 364-3.

In addition, if equipment is operated in a domestic environment, interference could occur.

Tools and Hardware Required

- WPAN Gateway Tools and Hardware Required, page 2-5
- WPAN Range Extender Tools and Hardware Required, page 2-6

WPAN Gateway Tools and Hardware Required

The tools and hardware required for installing the WPAN gateway are:

- For power and alarm connections, use UL- and CSA-rated style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire
- Wire-stripping tools for stripping 10- and 18-gauge wires
- Ratcheting torque flathead screwdriver that exerts up to 15 in-lb (1.69 N-m) of pressure.
- A number-2 Phillips screwdriver.

WPAN Range Extender Tools and Hardware Required

The tools and hardware required for installing the WPAN range extender are:

- Crimping tool (such as Thomas & Bett part number WT2000, ERG-2001, or equivalent).
- 6-gauge copper ground wire
- Wire-stripping tools for stripping 6-gauge wire
- A number-2 Phillips screwdriver

Unpacking the Components

WPAN Gateway Package Contents

The typical WPAN gateway package contains the following items:

- WPAN gateway
- Cisco product documentation and translated safety warnings
- 4-way power and alarm connector
- Ground lug (part number 32-204389=)
- Ground screw (part number 48-1163-01=)
- Side wall mounting brackets
- Front and rear wall mounting brackets

Unpacking the WPAN Gateway

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

To unpack the WPAN gateway, 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” section are included in the shipment. If any item is damaged or missing, notify your sales representative.

WPAN Range Extender Package Contents

The typical WPAN range extender package contains the following items:

- WPAN range extender
- Cisco product documentation and translated safety warnings
- Power cable (Cisco Part Number: 72-5307-01)
- Ground lug (Panduit PLCD6-10A-L) and screws

Unpacking the WPAN Range Extender

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

To unpack the range extender, 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” section are included in the shipment. If any item is damaged or missing, notify your sales representative.

Installation Guidelines

Because the WPAN gateway and WPAN range extender are radio devices, they are 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* on Cisco.com
- Review the FCC guidelines for installing and operating outdoor wireless LAN devices at: http://www.cisco.com/en/US/partner/prod/collateral/routers/ps272/data_sheet_c78-647116_ps11451_Products_Data_Sheet.html
- Perform a site survey before beginning the installation.
- Install the WPAN gateway and WPAN range extender in an area where structures, trees, or hills do not obstruct radio signals to and from the devices.
- The WPAN gateway and WPAN range extender can be installed at any height, but best throughput is achieved when all the WPAN gateways and WPAN range extenders are mounted at the same height. We recommend installing the devices no higher than 40 feet to allow support for wireless clients on the ground.

Caution Airflow around the WPAN gateway must be unrestricted. The gateway dimensions (height x width x depth) are 1.125 x 4.0 x 5.0 in. (2.86 x 10.16 x 12.7 cm). To prevent the WPAN gateway from overheating, there must be the following minimum clearances:
- Sides: 1.0 in. (25.4 mm)
- Front: 1.0 in. (25.4 mm)

- Rear: 1.0 in. (25.4 mm)
- Top: 1.0 in. (25.4 mm)—the device can be installed in a 1.25” tall slot, but the mounting surface must have thermal conductive properties equivalent to or better then 302 stainless steel (16.3 W/m-k)

Contact your Cisco Technical Assistance Centre (TAC) if tighter spacings are required.

Site Surveys

Every network application is a unique installation. Before installing multiple WPAN gateways and WPAN range extenders, 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.

Becoming Familiar with WPAN Gateway and WPAN Range Extender Installation Options and Components

WPAN Gateway Installation Options and Components

The WPAN gateway has a ruggedized IP41 enclosure and it can be installed in the following locations:

- Outdoor cabinet installations—the WPAN gateway is mounted on a DIN rail within the cabinet. For more information, see the “Mounting the WPAN Gateway on a DIN Rail” section on page 2-9.
- Interior wall installations—the WPAN gateway is mounted on a wall using wall mounting brackets. For more information, see the “Mounting the WPAN Gateway on a Wall” section on page 2-13.

WPAN Range Extender Installation Options and Components

The WPAN range extender (basic or advanced model) is mounted on a pole. For more information, see the “Mounting the Range Extender on a Pole” section on page 2-15.

Installing the Devices

Mounting the WPAN Gateway

Mounting the WPAN Gateway on a DIN Rail

Attaching the DIN Rail Mounting Bracket to the WPAN Gateway

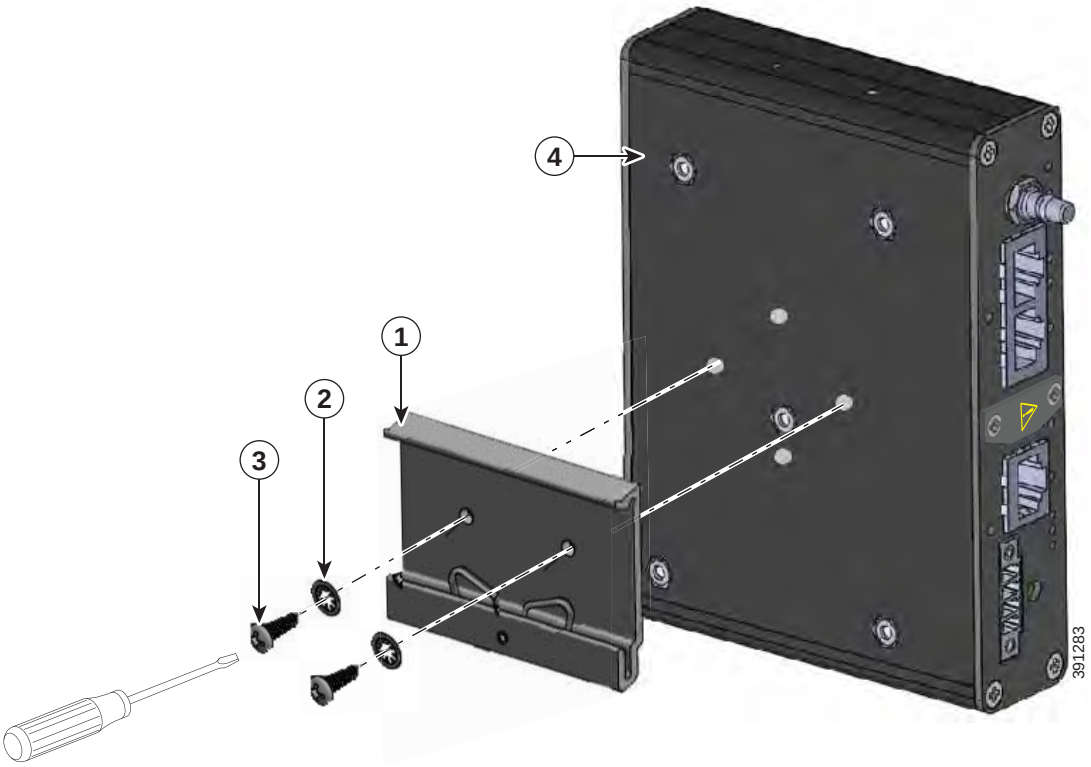
The WPAN gateway is attached to a DIN rail spring loaded mounting bracket (part number 700-103853-01) for mounting on a DIN rail.

To attach the DIN rail mounting bracket to the gateway:

Step 1 Decide if the WPAN gateway is to be mounted in a horizontal or vertical orientation.

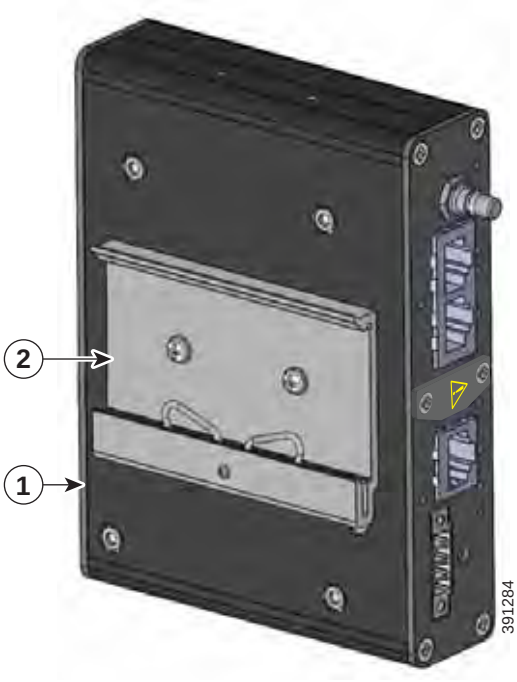
Step 2 Align the DIN rail mounting bracket with the mounting hoes as shown in Figure 2-1, and screw the mounting screws and washers into place. The completed assembly is shown in Figure 2-2.

Figure 2-1 Attaching the DIN Rail Mounting Bracket to the WPAN Gateway



1	DIN rail mounting bracket (part number 700-103853-01)	**3**	Screws
2	Toothed lock washer	**4**	WPAN gateway

Figure 2-2 Assembled WPAN Gateway and DIN Rail Mounting Bracket



1	WPAN gateway
2	DIN rail mounting bracket

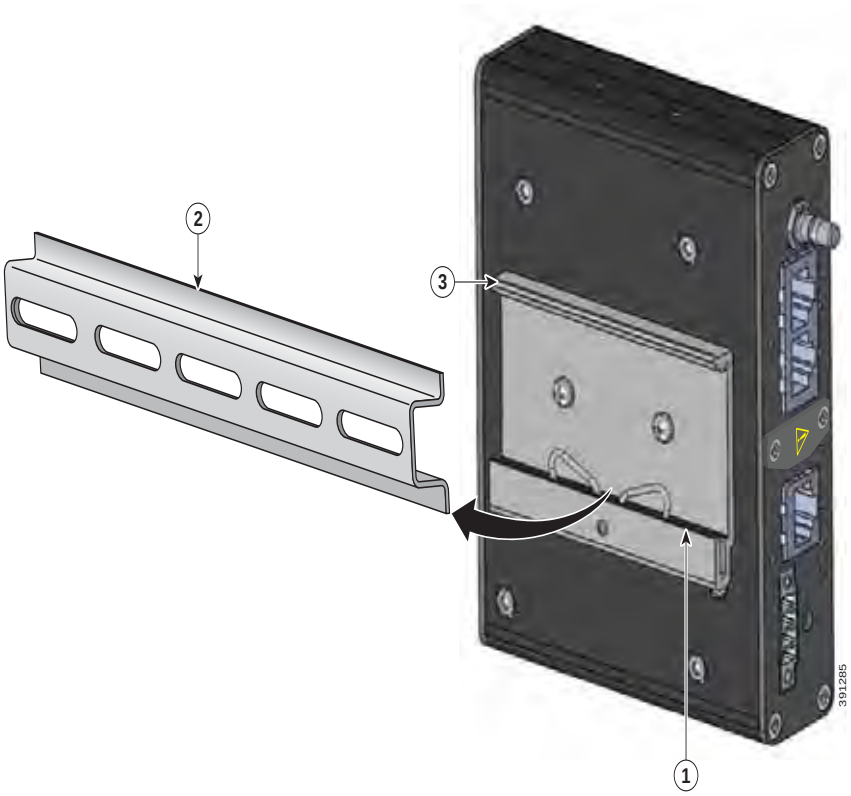
Attaching the WPAN Gateway to a DIN Rail

To attach the WPAN Gateway to a DIN Rail:

Step 1 Position the base of the WPAN Gateway (and the attached DIN mounting rail) directly in front of the DIN rail.

Step 2 Place the spring loaded lower lip of the DIN mounting bracket over the lower edge of the DIN rail as shown in Figure 2-3, and put pressure on it by pressing it upwards. Maintain the pressure.

Figure 2-3 Positioning the WPAN Gateway on the DIN Rail



1	DIN rail mounting bracket lower lip	**3**	DIN rail mounting bracket upper lip
2	DIN rail		

Step 3 Place the upper lip of the DIN mounting bracket over the upper edge of the DIN rail. Release the pressure on the lower lip. The WPAN Gateway will mount onto the DIN rail as shown in Figure 2-4.

Figure 2-4 WPAN Gateway Mounted on the DIN Rail

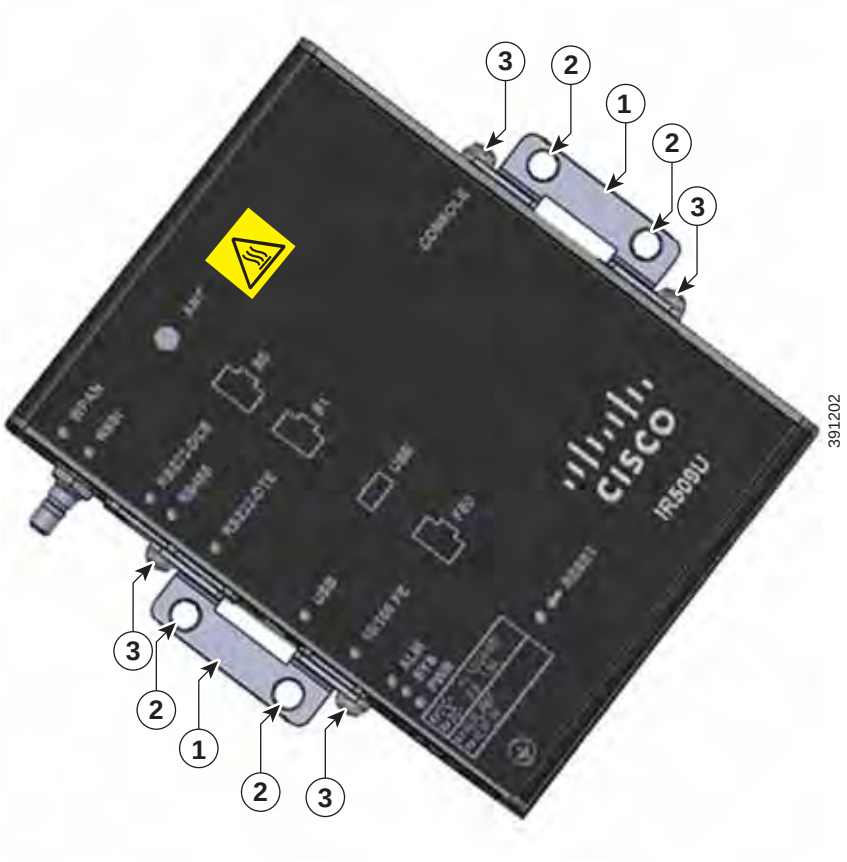
1	DIN rail
2	WPAN gateway

Mounting the WPAN Gateway on a Wall

To mount the WPAN gateway on a wall:

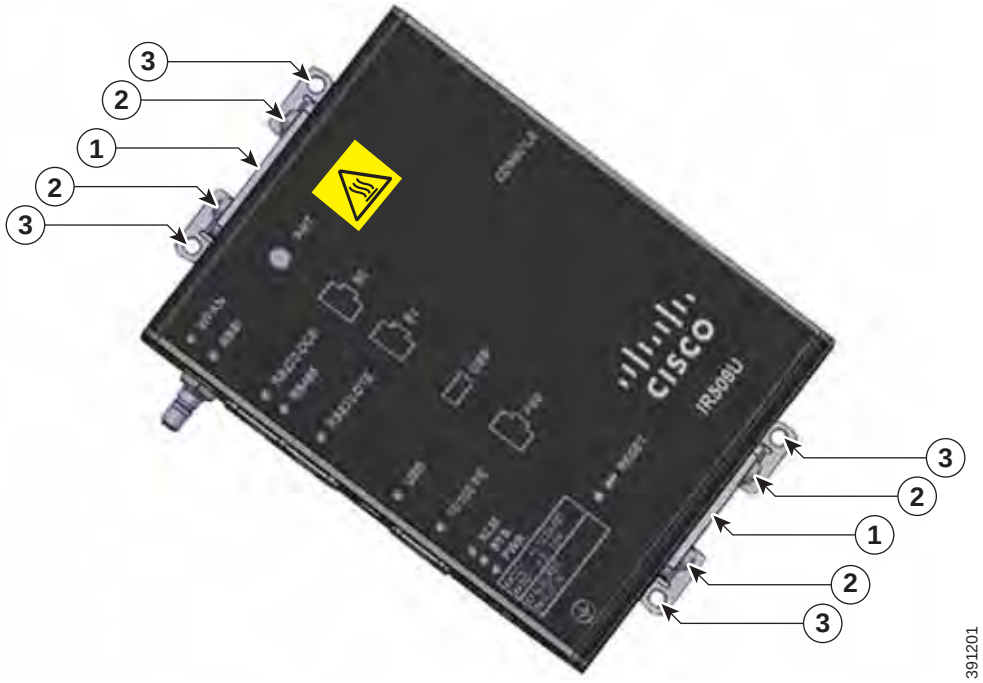
Step 1 Note the mounting orientation of the WPAN gateway based on the use of front and rear wall mounting brackets (see Figure 2-5) or side wall mounting brackets (see Figure 2-6).

Figure 2-5 WPAN Gateway with Front and Rear Wall Mounting Brackets



1	Front and rear wall mounting bracket	**3**	Attachment screws
2	Mounting holes		

Figure 2-6 WPAN Gateway with Side Wall Mounting Brackets



1	Side wall mounting bracket	**3**	Mounting holes
2	Attachment screws		

Step 2 Prepare M8 threaded mounting holes on the wall or the associated mounting plate based on the mounting dimensions.

Step 3 Place the extender and brackets in the mounting position and screw the M8 mounting screws into position.

Mounting the Range Extender

Mounting the Range Extender on a Pole

This section includes all the procedures required to mount the range extender on any supported pole type. This section covers:

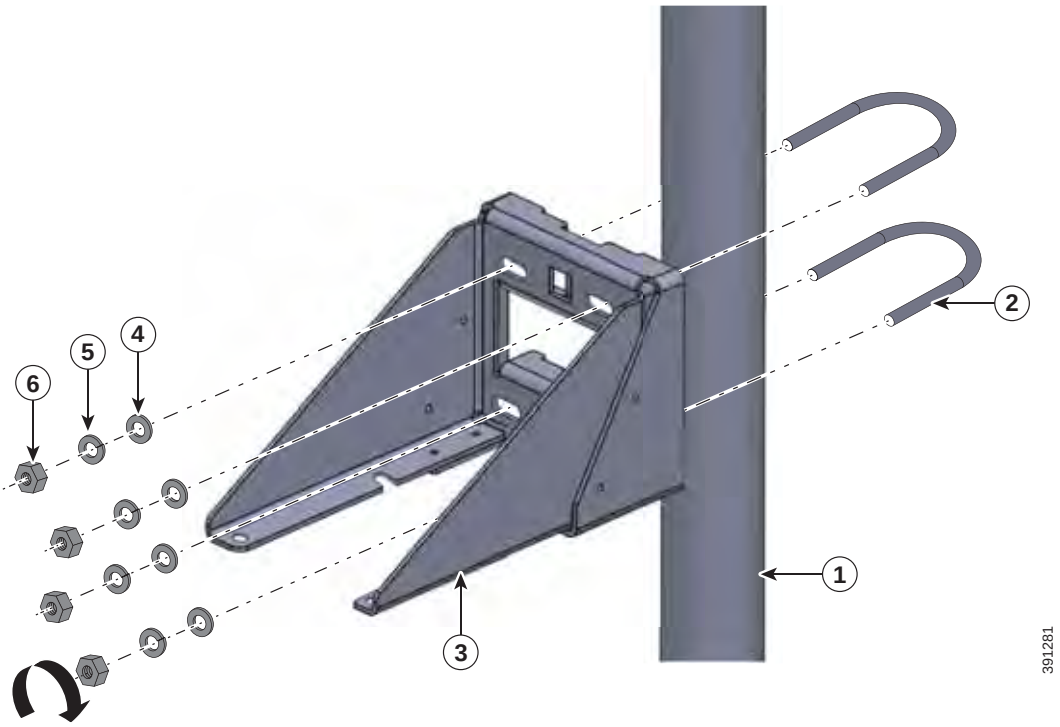
Extender Orientation

When mounting the WPAN extender on a pole, ensure that the extender is oriented with the antenna pointing downwards (see Figure 2-8).

Attaching the Mounting Bracket to a Pole

Attach the mounting bracket to the pole as shown in Fig.

Figure 2-7 Attaching the Range Extender Mounting Bracket to a Pole

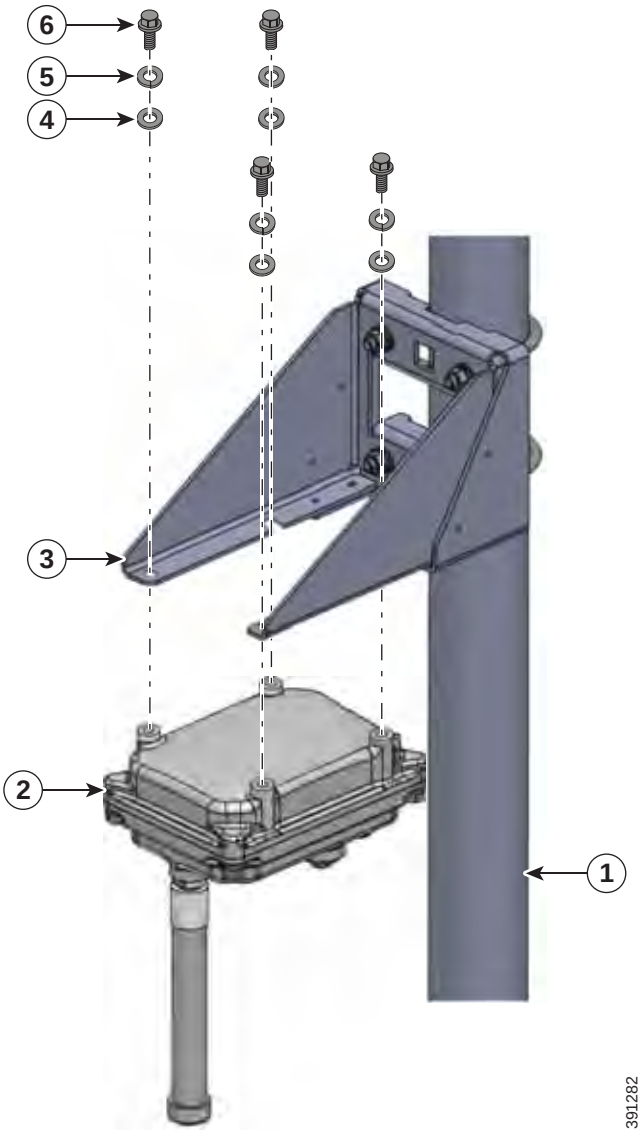


1	Pole	**4**	Washer
2	U bolt (part number 62-2766-01)	**5**	Spring loaded washer
3	Pole mounting bracket (part number 700-45850-01)	**6**	Nut

Attaching the Range Extender to the Mounting Bracket

Attach the range extender to the mounting bracket as shown in Figure 2-8.

Figure 2-8 Attaching the Range Extender to the Pole Mounting Bracket



1	Pole	**4**	Washer
2	WPAN range extender	**5**	Spring loaded washer
3	Pole mounting bracket (part number 700-45850-01)	**6**	Screw

Connecting the Protective Ground and Power

Grounding the WPAN Gateway

Make sure to follow any grounding requirements at your site.

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 **This equipment is intended to be grounded to comply with emission and immunity requirements. Ensure that the switch functional ground lug is connected to earth ground during normal use.** Statement 1064

Caution To make sure that the equipment is reliably connected to earth ground, follow the grounding procedure instructions, and use 14-to-16 AWG wire.

Caution Use at least a 4 mm^2 conductor to connect to the external grounding screw.

The ground lug (part number 32-204389=) for the WPAN gateway is supplied.

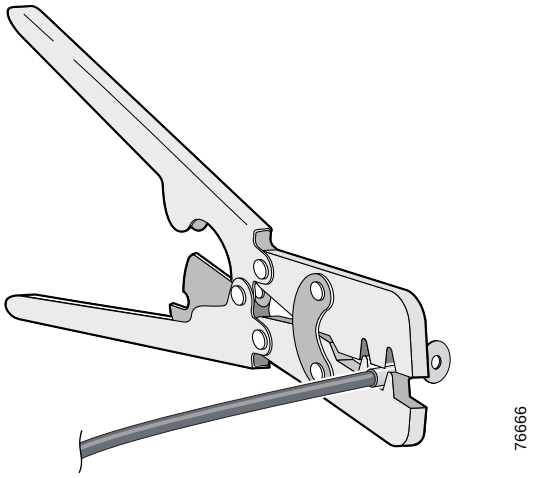
To ground the WPAN Gateway to earth ground by using the ground screw, follow these steps:

Step 1 Locate the ground screw (part number 48-1163-01=) in the WPAN gateway packaging kit. Store the ground screw for later use.

Step 2 Use a wire stripping tool to strip the 14-to-16 AWG grounding wire to 0.22 in. (5.56 mm).

Step 3 Insert the ground wire into the ring terminal lug, and using a crimping tool, crimp the terminal to the wire. See Figure 2-9.

Figure 2-9 Crimping the Ring Terminal



Step 4 Slide the ground screw through the terminal.

Step 5 Insert the ground screw into the functional ground screw opening on the right side panel.

Step 6 Use a ratcheting torque screwdriver to tighten the ground screw and ring terminal to the WPAN gateway side panel to 3.5 in-lb (0.4 N-m). The torque should not exceed 3.5 in-lb (0.4 N-m). See Figure 2-10.

Figure 2-10 Installing the Ground-Lug Screw

1	Ground cable

Step 7 Attach the other end of the ground wire to a grounded bare metal surface, such as a ground bus, a grounded DIN rail, or a grounded bare rack.

Wiring the WPAN Gateway DC Power

Warning **When you connect or disconnect the power and/or alarm connector with power applied, an electrical arc can occur. This could cause an explosion in hazardous area installations. Be sure that all power is removed from the switch and any other circuits. Be sure that power cannot be accidentally turned on or verify that the area is nonhazardous before proceeding.** Statement 1058

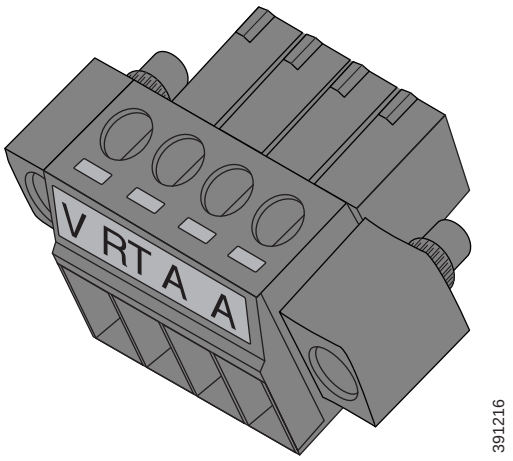
Warning **Explosion Hazard—The area must be known to be nonhazardous before installing, servicing, or replacing the unit.** Statement 1082

Warning **Explosion Hazard—Substitution of components may impair suitability for Class I, Division 2/Zone 2.** Statement 1083

To wire the WPAN Gateway to a DC power source:

Step 1 Locate the power and alarm connector on the WPAN gateway front panel (see Figure 2-11).

Figure 2-11 WPAN Gateway Power and Alarm Connector

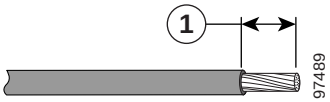


Step 2 Identify the connector positive and return DC power connections. The labels for the power and alarm connector are shown in Table 2-1.

Step 3 Measure two strands of twisted-pair copper wire (18-to-20 AWG) long enough to connect to the DC power source.

Step 4 Using an 18-gauge wire-stripping tool, strip each of the two twisted pair wires coming from each DC-input power source to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the power connector after installation.

Figure 2-12 Stripping the Power Connection Wire



1	0.25 in. (6.3 mm) ± 0.02 in. (0.5 mm)

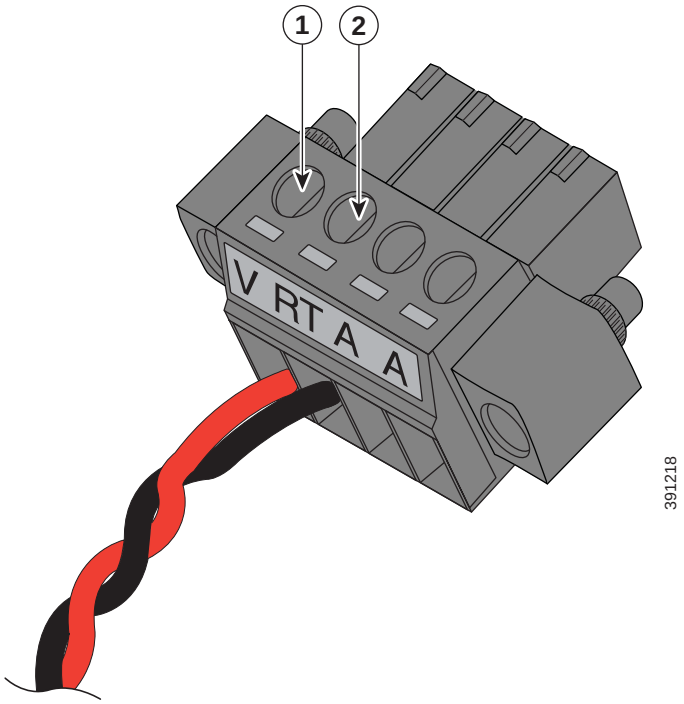
Step 5 Remove the two captive screws that attach the power and alarm connector to the WPAN gateway, and remove the connector. See Figure 2-13.

Figure 2-13 Removing the Power and Alarm Connector from the WPAN Gateway

1	Power and alarm connector		Power and alarm connector connection

Step 6 On the power and alarm connector, insert the exposed part of the positive wire into the connection labeled "V" and the exposed part of the return wire into the connection labeled "RT". See Figure 2-14. Make sure that you cannot see any wire lead. Only wire with insulation should extend from the connector

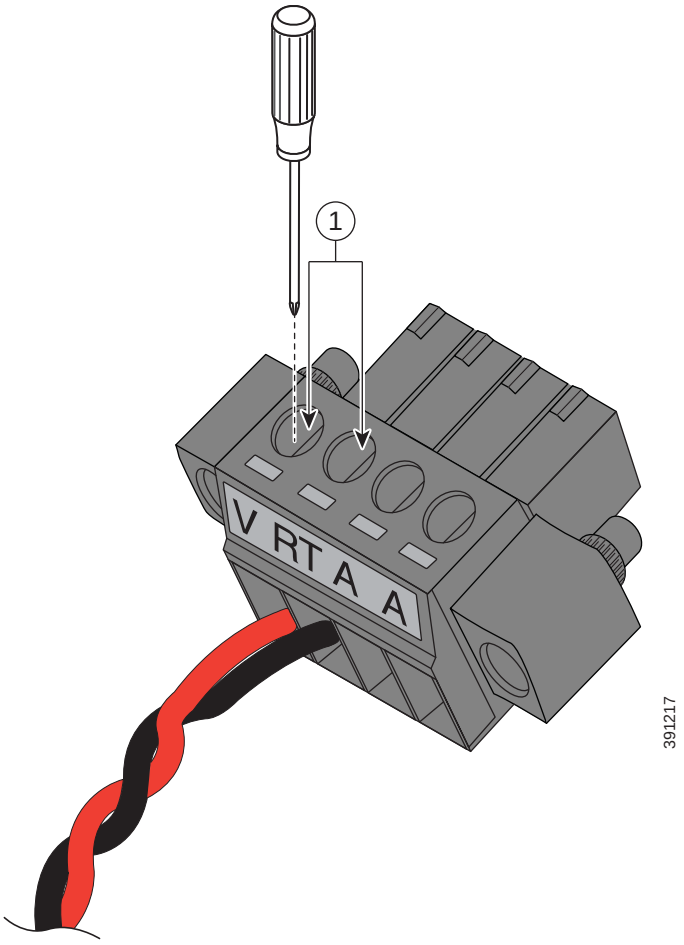
Figure 2-14 Inserting the Power and Return Connections in the Power and Alarm Connector



1	Power source positive connection	**2**	Power source return connection

Step 7 Use a ratcheting torque flathead screwdriver to torque the power connector captive screws (above the installed wire leads) to 2 in-lb (0.23 N-m). See Figure 2-15.

Figure 2-15 Torquing the Power and Ground Captive Screws



1	Power and ground captive screws

Step 8 Connect the other end of the positive wire to the positive terminal on the DC power source, and connect the other end of the return wire to the return terminal on the DC power source.

The power and alarm connector is attached to the WPAN gateway when the alarm connections on the connector are completed. For information about wiring the alarm connections and attaching the power and alarm connector, see the "Attaching the Power and Alarm Connector to the WPAN Gateway" section on page 2-31.

Grounding the WPAN Range Extender

In all installations, after the WPAN range extender is mounted, you must properly ground the unit before connecting power cables.

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

The range extender is shipped with a grounding kit as shown in Figure 2-16.

Figure 2-16 WPAN Range Extender Grounding Kit Contents

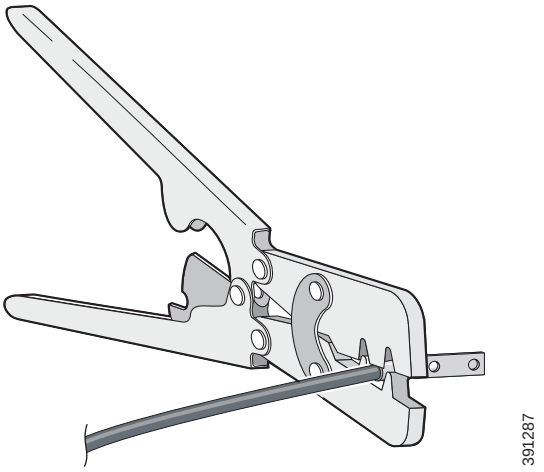
1	Grounding lug
2	Screws x 2

Note You can perform these steps when the mounting bracket security panel is installed.

To ground the range extender, follow these steps:

Step 1 Use a crimping tool to crimp the 6-gauge ground wire (included in the grounding kit) to the grounding lug. See Figure 2-17.

Figure 2-17 Crimping the Ground Lug



Step 2 Connect the grounding lug to the range extender ground connection point shown in Figure 2-18 using the supplied screws. Tighten the screws to 10 to 12 foot-pounds of torque.

Figure 2-18 Installing the Ground Lug

1	Ground connection

Step 3 If necessary, strip the other end of the ground wire and connect it to a reliable earth ground, such as a grounding rod or an appropriate grounding point on a pole that is grounded.

Wiring the WPAN Range Extender AC Power

When wiring the range extender AC power, you must ensure that the following conditions are met:

- AC power can be readily and conveniently removed from the WPAN range extender. The power should not be removed by disconnecting the AC power connector on the unit. It should be removed by disabling AC power at the power circuit.

Warning **The AC power supply has double pole/neutral fusing.** Statement 188

Warning **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.** Statement 1019

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

- You must protect AC power plugs and AC receptacles from water and other outdoor elements. You can use a UL-listed waterproofing enclosure suitable for covering the AC receptacle and AC power plug that supplies power to the unit, as described in Article 406 of the National Electric Code (NEC).
- When you install the unit outdoors, or in a wet or damp location, the AC branch circuit that powers the unit should have ground fault protection (GFCI), as required by Article 210 of the NEC.
- If the power cord goes through a metal cover, a bushing should be installed to prevent fraying of the cord. When using a strain relief bushing, you should follow these recommendations:
  - Use properly sized parts
  - Use bushings that are safety certified
  - Use parts that are suitable for outdoor installation
- Ensure that the user-supplied AC power plug is certified for outdoor use and has a minimum IP67 rating.

The topics in this section include:

AC Power Cable

The WPAN range extender supports the Cisco AC power cable that is shipped with the unit. One end of the cable has the range extender AC power connector; the other end is unfinished and you must provide and attach an AC power plug, or terminate the cable at your installation site. The AC power plug or termination method you use depends on the power source, such as a junction box, at your site.

If you attach an AC power plug:

- Use a plug that complies with local and national electrical codes.
- Verify the connection between the cable and plug is weatherproof.

You might have to cut the cable if a specific cable length is needed for your installation.

Caution Ensure that the power source is OFF before connecting or disconnecting the power cord wires from the power source.

Caution To attach the appropriate connector the AC power cable, follow the manual or other instructions provided by the electrical equipment vendor, ensuring that you comply with the electrical codes for your installation location.

Figure 2-19 WPAN Gateway AC Power Cable (WPAN Gateway Connector End)

Connecting to AC Power

To connect the WPAN range extender power connector in Figure 2-19 to an AC power source, follow these steps:

Caution When connecting the AC power connector, always connect the WPAN range extender end of the cable first. When removing the AC power connector, always disconnect the WPAN range extender end of the cable last.

Step 1 Verify that the unit is grounded as described in the "Grounding the WPAN Range Extender" section on page 2-24.

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

Step 3 Align the notch in the WPAN range extender power cable connector with the key in the range extender AC power connector, and push the cable connector into the range extender connector. When the cable connector is fully seated, rotate the cable connector ring clockwise until it is hand-tightened to a torque of 6-7 ft-lbs (8.13-9.49 N-m).

Step 4 Confirm the WPAN antennas are connected to the range extender before you apply power to the range extender.

Step 5 Connect the other end of the AC power cable to the power source, using the instructions that came with the connecting device.

Step 6 Turn on AC power at the designated circuits. The range extender will power on and boot the software image.

Wiring the Alarm Circuits

Wiring the WPAN Gateway Alarm

To connect the WPAN gateway alarm connections:

Step 1 Note the alarm connections as described in Figure 2-20. The alarm connection labels are described in Table 2-2.

Figure 2-20 WPAN Gateway Power and Alarm Connector

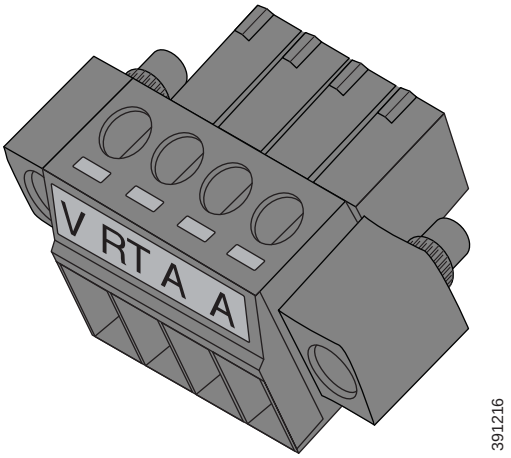


Table 2-2 Power and Alarm Connector Labels

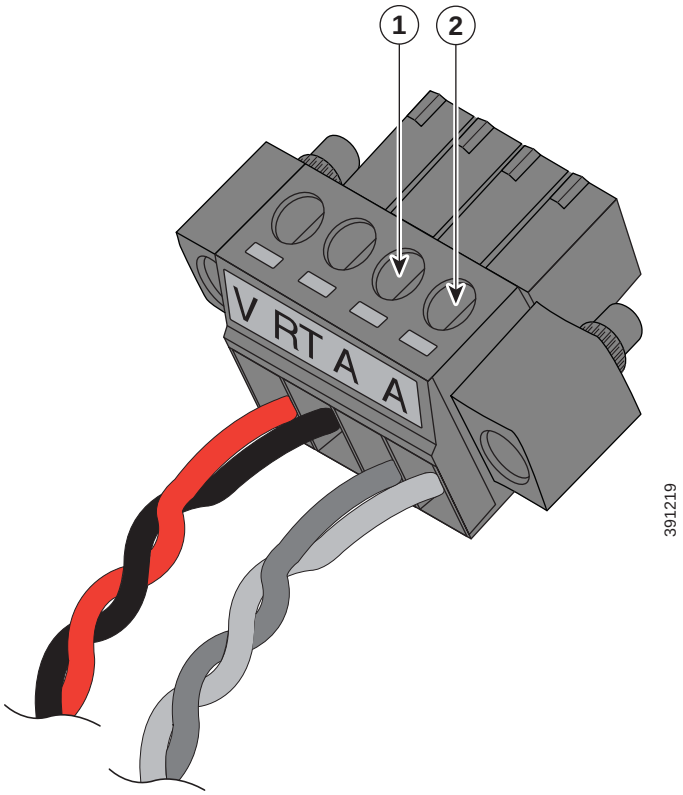
Label	Description
V	Positive DC power connection
RT	Return
A	Each alarm connection is labeled identically—this means each connection can be an ‘Alarm in’ or ‘Alarm reference’ signal, provided the second alarm connection provides the other alarm signal.

Step 2 Measure two strands of twisted-pair wire (18-to-20 AWG) long enough to connect to the external alarm device.

Step 3 Use a wire stripper to remove the casing from both ends of each wire to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wires. Stripping more than the recommended amount of wire can leave exposed wire from the alarm connector after installation.

Step 4 Insert the exposed wires for the external alarm device into the power and alarm connector connections as shown in Figure 2-21.

Figure 2-21 Inserting Wires into the Alarm Connections

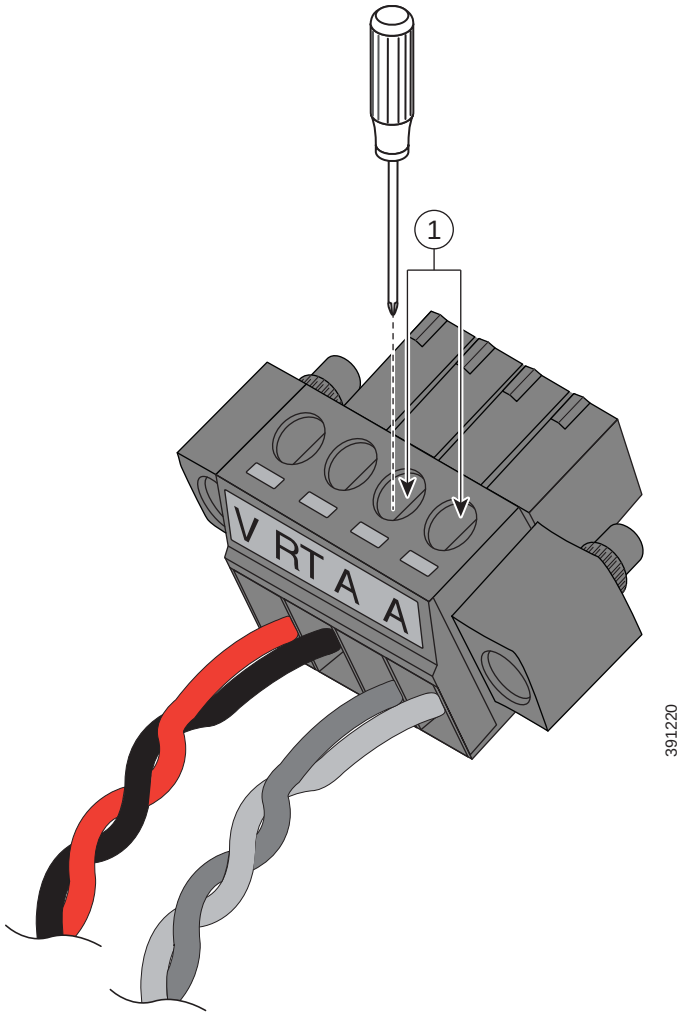


1	Alarm reference	**2**	Alarm in

Step 5 Use a ratcheting torque flathead screwdriver to tighten the alarm connector captive screw (above the installed wire leads) to 2 in-lb (0.23 N-m). See Figure 2-22.

Caution Do not over-torque the power and alarm connector's captive screws. The torque should not exceed 2 in-lb (0.23 N-m).

Figure 2-22 Securing the Alarm Connections Captive Screws



1	Alarm connections captive screws

Attaching the Power and Alarm Connector to the WPAN Gateway

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 2A**
Statement 1005

To attach the power and alarm connector to the front panel of WPAN gateway:

Step 1 Insert the power and alarm connector into the receptacle on the WPAN gateway front panel. See Figure 2-23.

Figure 2-23 Connecting the Power and Alarm Connector to the WPAN Gateway

1	Power and alarm connector captive right side screw

Step 2 Use a ratcheting torque flathead screwdriver to tighten the captive screws on both sides of the power and alarm connector to 2 in-lb (0.23 N-m).

Caution Do not over-torque the power and alarm connector's captive screws. The torque should not exceed 2 in-lb (0.23 N-m).

Connecting to Device Ports

Connecting to WPAN Gateway Ports

Connecting to the RS232DCE/RS485 or RS232-DTE Ports

To connect to the RS232DCE/RS485 or RS232-DTE Ports:

Step 1 Use a twisted four-pair, Category 5 or higher cable for connecting to the port.

Step 2 Connect the cable to the RJ-45 connector port. See Figure 2-24.

Figure 2-24 Connecting to the RS232DCE/RS485 or RS232-DTE Ports

1	RS232DCE/RS485 port
2	RS232-DTE port

Step 3 Connect the other end of the cable to the connecting device. For the RS232-DCE/RS485 port, the RS232-DCE or RS485 LED turns on, depending on the type of serial communication used, when both the gateway and the connected device have established a link. For the RS232-DTE port, the RS 232-DTE LED turns on when both the WPAN gateway and the connected device have established a link.

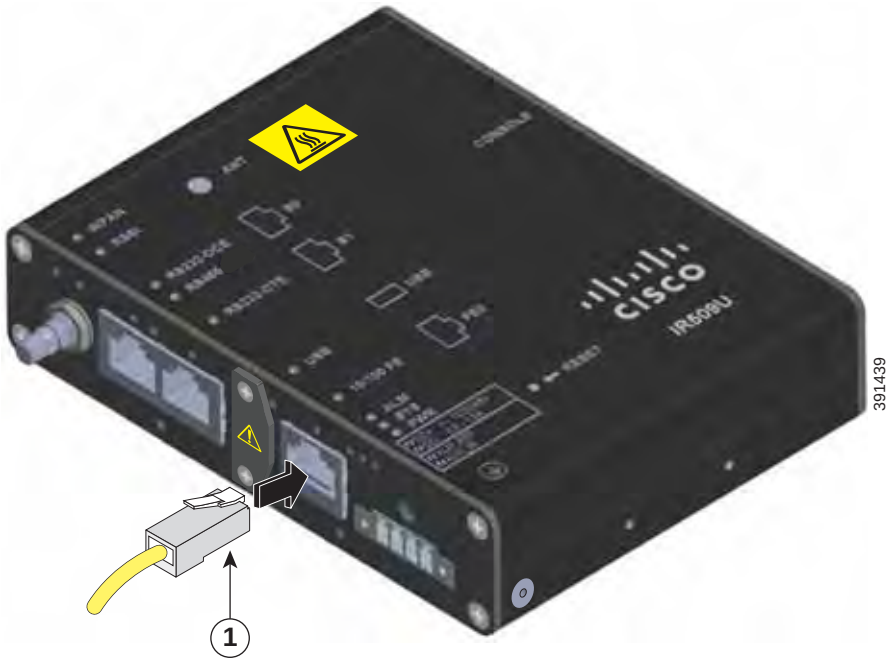
Connecting to the 10/100 Fast Ethernet Port

To connect to the 10/100 Fast Ethernet port:

Step 1 Use a twisted four-pair, Category 5 or higher cable for connecting to the port.

Step 2 Connect the cable to the RJ-45 connector port. See Figure 2-25.

Figure 2-25 Connecting to the 10/100 Fast Ethernet Port



1	10/100 Fast Ethernet port

Step 3 Connect the other end of the cable to the connecting device. The 10/100 FE LED turns on when both the WPAN gateway and the connected device have established a link.

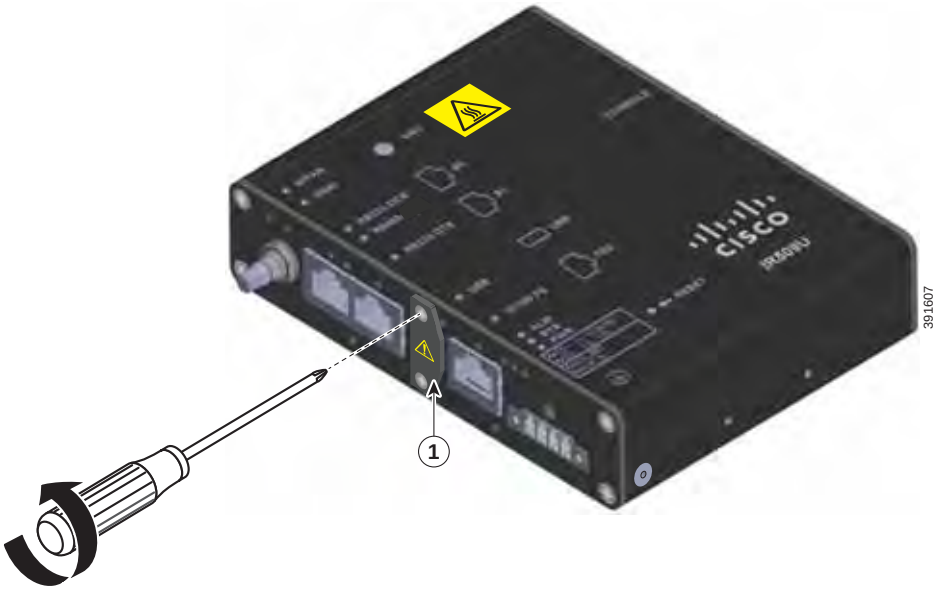
Connecting to the USB Port

Note If you are connecting to the USB port:
- a connection (to the USB port) can only be made in a non-hazardous environment
- the USB port cover must be reinstalled before the WPAN gateway can be deployed in a hazardous environment

To connect to the USB port:

Step 1 Remove the two captive screws that attach the USB port cover to the front panel. See Figure 2-26.

Figure 2-26 Removing the USB Port Cover Captive Screws



1	USB port cover

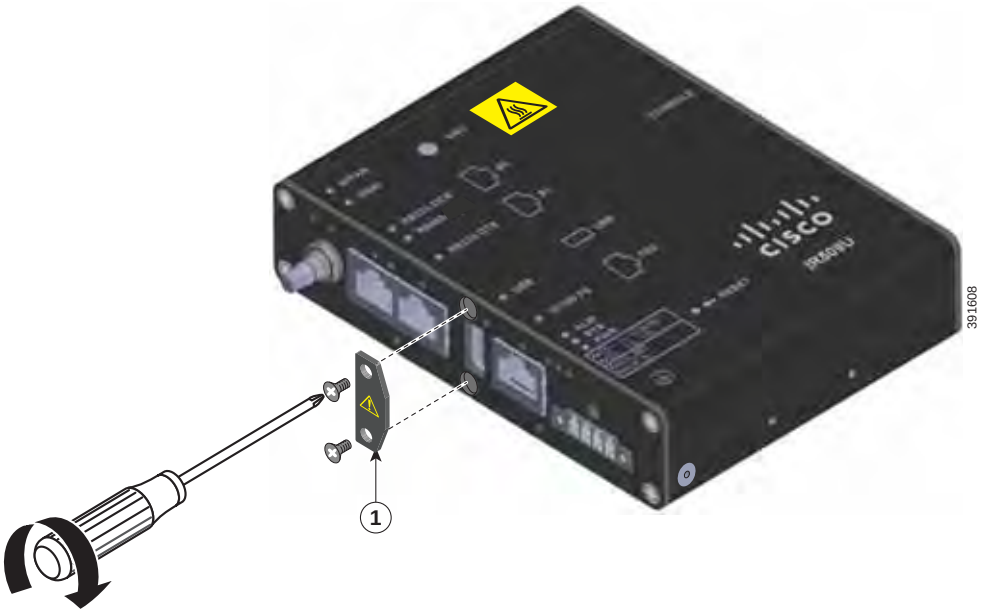
Step 2 Connect the USB cable connector to the USB port. See Figure 2-27.

Figure 2-27 Connecting the USB Cable Connector to the USB Port

1	USB cable connector

Step 3 When you are finished using the USB port, put the USB port cover back in place. See Figure 2-28.

Figure 2-28 Placing the USB Port Cover Back in Place



Connecting to the Console Port

For information about connecting to the WPAN gateway console port, see the "Connecting to the WPAN Gateway Console Port" section on page 5-13.

Connecting to WPAN Range Extender Ports

Connecting to the Console Port

For information about connecting to the WPAN range extender console port, see the "Connecting to the WPAN Range Extender Console Port" section on page 5-13.