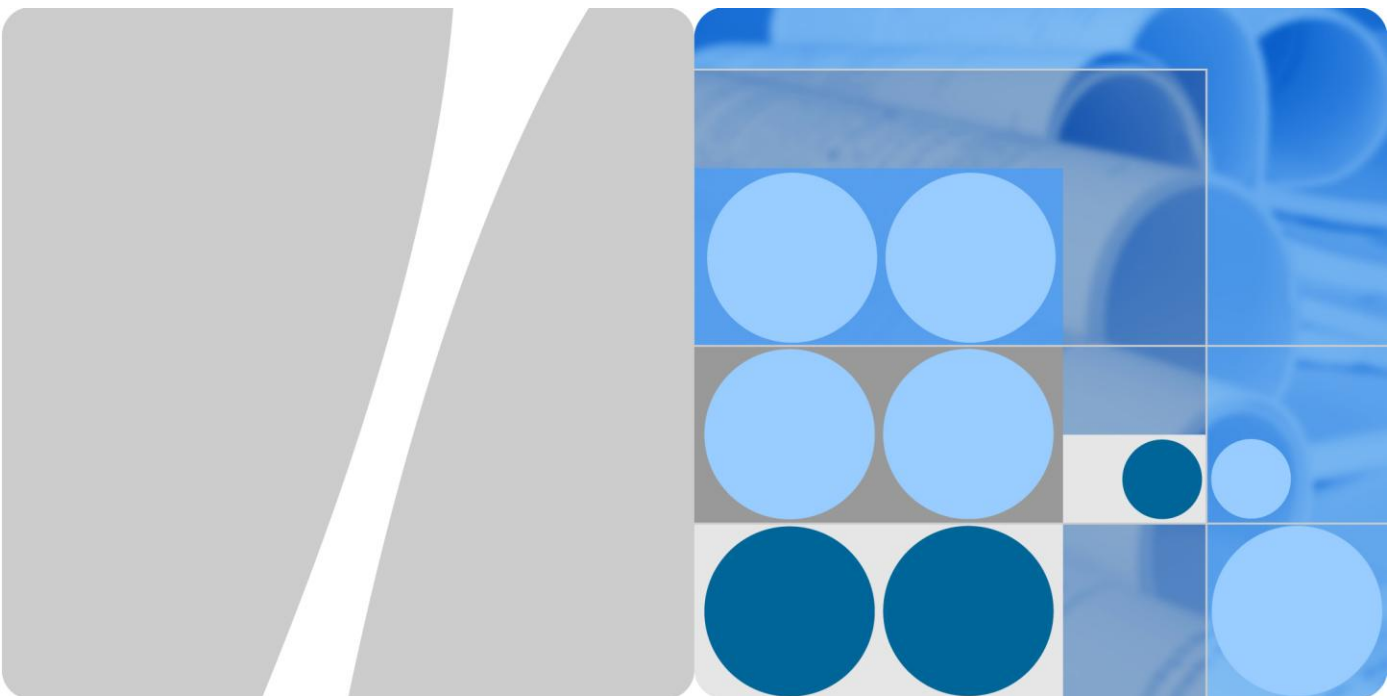




LampSite

Installation Guide

Issue **08**
Date **2014-12-30**

HUAWEI TECHNOLOGIES CO., LTD.



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About This Document

Overview

This document describes how to install the modules and cables for the RHUB3908, pRRU3901 indoors. It also provides checklists for hardware installation.

Product Version

The following table lists the product version related to this document.

Product Name	Solution Version	Product Version
DBS3900	• SRAN9.0 and later versions • RAN16.0 and later versions • eRAN7.0 and later versions • eRAN TDD 7.0 and later versions	V100R009C00 and later versions

Intended Audience

This document is intended for:

- BTS installation personnel

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1 Changes in LampSite Installation Guide

This chapter describes the changes in the *LampSite Installation Guide*.

08 (2015-01-15)

This is the eighth commercial release.

Compared with 07 (2014-11-15), this issue includes the following new topics:

- [4 Installing a BBU](#)

Compared with 07 (2014-11-15), this issue incorporates the following changes:

Content	Change Description
Entire document	• Changed RHUB, and pRRU to RHUB3908, and pRRU3901, respectively. • Added the pRRU3901 with three transmission ports plus no PWR port (or the pRRU3901 AWS+PCS+WIFI for use in North America) .
6.7 Powering on the pRRU3901	Deleted the description that the pRRU3901 supports AC/DC power supply.

Compared with 07 (2014-11-15), no information is deleted.

07 (2014-11-15)

This is the seventh commercial release.

Compared with 06 (2014-09-30), no information is added.

Compared with 06 (2014-09-30), this issue incorporates the following change:

Content	Change Description
Space Requirements	Added the requirements on the installation space when the pRRU3901 working on the 2.6 GHz

Content	Change Description
	band and the Wi-Fi module need to process services concurrently.

Compared with 06 (2014-09-30), this issue excludes the following topic:

- Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)

06 (2014-09-30)

This is the sixth commercial release.

Compared with 05 (2014-08-30), no information is added.

Compared with 05 (2014-08-30), this issue incorporates the following changes:

Content	Change Description
pRRU Installation Environment Requirements	Changed the operating temperature of pRRU3901s to a range from - 5 °C to + 40 °C.
Requirements for Cable Layout	Added the cabling requirements for Ethernet cables.
Requirements for Cable Layout	

Compared with 05 (2014-08-30), no information is deleted.

05 (2014-08-30)

This is the fifth commercial release.

Compared with 04 (2014-07-30), no information is added.

Compared with 04 (2014-07-30), this issue incorporates the following changes:

Content	Change Description
Installation Clearance Requirements of an RHUB	Added the security precautions for the RHUB3908 installation environment.
Requirements for Cable Layout	
Installing an Ethernet Cable	Added the Ethernet cable specifications and requirements on flame spread rating.
Installing an Ethernet Cable	

Compared with 04 (2014-07-30), no information is deleted.

04 (2014-07-30)

This is the fourth commercial release.

Compared with 03 (2014-06-30), no information is added.

Compared with 03 (2014-06-30), this issue incorporates the following change:

Content	Change Description
7 Installing the Extender (Optional)	Added the descriptions about installing a Extender on a Ceiling.

Compared with 03 (2014-06-30), no information is deleted.

03 (2014-06-30)

This is the third commercial release.

Compared with 02 (2014-05-30), this issue includes the following new topics:

- [8.2 LampSite Engineering Label](#)
- [8.3 Attaching an L-Shaped Label](#)

Compared with 02 (2014-05-30), this issue incorporates the following changes:

Content	Change Description
Cable Connections	Modified the description about cable connections of the RHUB3908.
Installing RHUB Cables	Added the steps for attaching labels to cables.
Installing pRRU Cables	
Installing an Ethernet Cable	Added the steps for making Ethernet cables.
Installing an Ethernet Cable	
Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)	Added the descriptions about the supported block type.

Compared with 02 (2014-05-30), no information is deleted.

02 (2014-05-30)

This is the second commercial release.

Compared with 01 (2014-04-26), no information is added.

Compared with 01 (2014-04-26), this issue incorporates the following change:

Content	Change Description
Entire document	Added the descriptions about the LTE FDD+LTE FDD mode.

Compared with 01 (2014-04-26), no information is deleted.

01 (2014-04-26)

This is the first commercial release.

Compared with Draft C (2014-03-26), no information is added.

Compared with Draft C (2014-03-26), this issue incorporates the following change:

Content	Change Description
Entire document	Changed the pRRU3901 name from pRRU3901 with two Ethernet ports to pRRU3901 with two transmission ports, and pRRU3901 with three Ethernet ports to pRRU3901 with three transmission ports.

Compared with Draft C (2014-03-26), no information is deleted.

Draft C (2014-03-26)

This is a draft release.

Compared with Draft B (2014-02-28), no information is added.

Compared with Draft B (2014-02-28), this issue incorporates the following changes:

Content	Change Description
Installing CRPI Optical Cables	Added the description of connecting the CPRI cable to the TX and RX ports of the optical module crossly.
pRRU Installation Environment Requirements	The operating temperature of pRRU3901 is updated.

Compared with Draft B (2014-02-28), no information is deleted.

Draft B (2014-02-28)

This is a draft release.

Compared with draft A (2013-11-30), this issue includes the following new topics:

- Obtaining the MAC Address (Optional)
- Cable Connections
- MAC Collection Template

Compared with draft A (2013-11-30), this issue incorporates the following changes:

Content	Change Description
Entire document	Added descriptions about pRRU3901s with

Content	Change Description
	three transmission ports. Such pRRU3901s support integrated Wi-Fi services.
	Added the descriptions about the UMTS, LTE FDD and UMTS+LTE FDD mode.
LampSite Installation Guide	Optimized descriptions about matching product versions.
Installing an Ethernet Cable	Changed the cable name from RHUB3908-pRRU3901 Ethernet cable to Ethernet cable.
Installing an Ethernet Cable	

Compared with draft A (2013-11-30), this issue excludes the following topics:

- Installing External Antennas (Optional)
- RHUB3908 Exterior
- RHUB3908 Ports and Indicators
- pRRU3901 Exterior
- pRRU3901 Ports and Indicators

Draft A (2013-11-30)

This is a draft release.

2 Installation Preparations

About This Chapter

Before starting the installation, you must obtain the required reference documents, tools, and instruments, and familiarize yourself with the skills required.

2.1 Reference Documents

Before the installation, you must read the following documents:

2.2 Preparing Tools and Instruments

This section describes the tools and instruments that must be prepared before the installation.

2.3 Requirements for Installation Personnel

This section describes requirements for installation engineers. They must be qualified and trained, and familiar with correct operation methods and safety precautions before performing any operations.

2.1 Reference Documents

Before the installation, you must read the following documents:

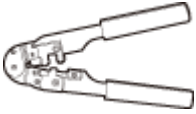
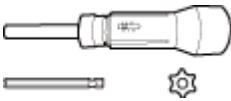
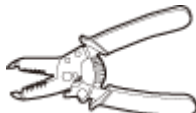
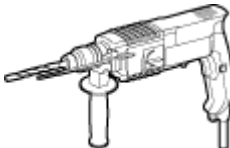
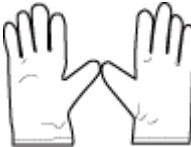
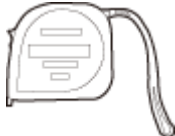
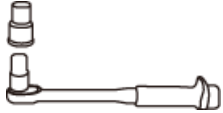
- *LampSite Hardware Description*
- *Installation Reference*

For details about how to install a baseband unit (BBU), see *DBS3900 Installation Guide*.

2.2 Preparing Tools and Instruments

This section describes the tools and instruments that must be prepared before the installation.

Marker  Level 	Torque screwdriver   (M4 to M6)	Diagonal pliers 
--	---	--

Power cable crimping tool 	RJ11 crimping tool 	Cable cutter 
Rubber mallet 	T20 torque torx screwdriver 	Wire stripper 
Hammer drill (Ø6, Ø8 and Ø12) 	Torque wrench (Ø10 mm) 	Protective gloves 
Guarded blade utility knife 	ESD gloves 	Long measuring tape 
Multimeter 	Network cable tester 	Vacuum cleaner 
Ladder 	Torque wrench for SMA connector 	Socket wrench (M6) 

2.3 Requirements for Installation Personnel

This section describes requirements for installation engineers. They must be qualified and trained, and familiar with correct operation methods and safety precautions before performing any operations.

Before the installation, pay attention to the following items:

- Technical engineers must take Huawei training and be familiar with proper installation and operation methods.
- The number of installation personnel depends on the engineering schedule and installation environment. Generally, three to five persons are required. Generally, only three to five onsite personnel are necessary.

3 Unpacking and Checking

This section describes how to unpack and check the delivered equipment to ensure that the materials are complete and intact.

Context



NOTE

The following lists important notes when you are transporting, lifting, or installing the equipment or components:

- Protect them from colliding with doors, walls, shelves, or other objects.
- Wear clean gloves and do not touch them with bare hands, sweat-soaked gloves, or dirty gloves.



NOTICE

You must power on the RHUB3908 or pRRU within 7 days after it is unpacked.

Procedure

1. Count the total number of the shipments.

If...	Then...
The total number of the components is consistent with that recorded in the packing lists on all packing boxes	Go to Step 2 .
The total number of the components is inconsistent with that recorded in the packing lists on all packing boxes	Report the problems and causes to the local Huawei office.

- Step 2** Check the exterior of each packing box.

If...	Then...
The exterior of each packing box is intact	Go to Step 3 .
It is damaged or soaked	Report the problems and causes to the local Huawei office.
The collision label is red	Do not unpack the packing box and claim for compensation from the transportation company.

Step 3 Check the type and quantity of the equipment in the boxes according to the packing list.

If...	Then...
The type and number are consistent with the packing list on each packing list	Sign the <i>Packing List</i> with the operator.
There is any shortage, wrong delivery, or damaged equipment	Report the problems and causes to the local Huawei office.



NOTICE

Perform the following operations to protect the components from any damages and help find out the cause of any damage in future: 1. Store the unpacked equipment and packing materials indoors. 2. Take photos of the storeroom, rusted or eroded equipment, packing box, and packing materials. 3. File the photos.

----End

4

Installing a BBU

This chapter describes the process of installing a BBU.

The BBU can have BBU3900 and BBU3910. Unless otherwise specified, the BBU refers to both the BBU3900 and BBU3910 in this document.

For details about the installation of the BBU, see *DBS3900 Installation Guide*.

5

Installing an RHUB3908

About This Chapter

This chapter describes the process of installing an RHUB3908.

[5.1 Information About the Installation](#)

This section describes the information to be learnt before RHUB3908 installation, including the RHUB3908 installation scenarios, clearance, and installation environment.

[5.2 Installation Process](#)

The RHUB3908 installation involves installing an RHUB3908 module, installing RHUB3908 cables, checking the RHUB3908 hardware installation, and powering on the RHUB3908.

[5.3 Installing an RHUB3908](#)

An RHUB3908 can be installed in a cabinet, rack, shelf, or on a wall.

[5.4 Installing RHUB3908 Cables](#)

This section describes how to install cables for an RHUB3908.

[5.5 Checking the RHUB3908 Hardware Installation](#)

After an RHUB3908 is installed, check the installation of hardware including the devices and related cables.

[5.6 Power-on Check on an RHUB3908](#)

This section describes the power-on check on the RHUB3908 after the RHUB3908 hardware is installed and checked.

5.1 Information About the Installation

This section describes the information to be learnt before RHUB3908 installation, including the RHUB3908 installation scenarios, clearance, and installation environment.

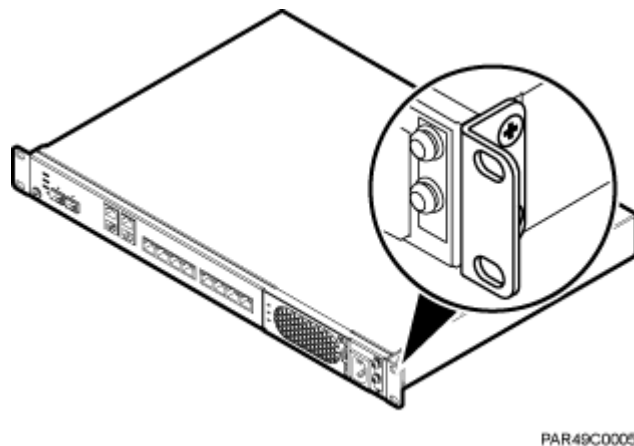
5.1.1 RHUB3908 Installation Scenarios

An RHUB3908 can be installed in a 19-inch cabinet, rack, shelf, or on a wall.

The RHUB3908 supports that mounting ears are installed in standard mode or reverse mode. The reverse mode is used by default. The two installation modes are defined as follows:

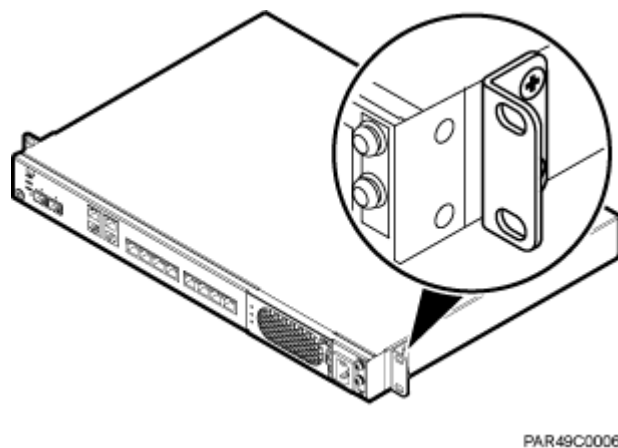
- In standard mode, the front of the mounting ear is aligned with the RHUB3908 panel, as shown in [Figure 5-1](#).

Figure 5-1 Installing mounting ears in standard mode



- In reverse mode, the front of the mounting ear is 31 mm away from the RHUB3908 panel, as shown in [Figure 5-2](#).

Figure 5-2 Installing mounting ears in reverse mode



Installing an RHUB3908 in a 19-Inch Cabinet or Rack

Installing an RHUB3908 in a 19-inch cabinet or rack: Secure the mounting ear to the mounting bracket by using M6 screws.

- If there is no other modules installed in the 1 U space near the RHUB3908, install the RHUB3908 directly. Otherwise, remove the modules before installing the RHUB3908.
- Before installation, you need to check the installation mode supported by the rack and adjust the position of the mounting ear.

Figure 5-3 and Figure 5-4 show RHUB3908s installed in a cabinet or rack, respectively.

Figure 5-3 Installing an RHUB3908 in a 19-inch cabinet or rack in standard mode

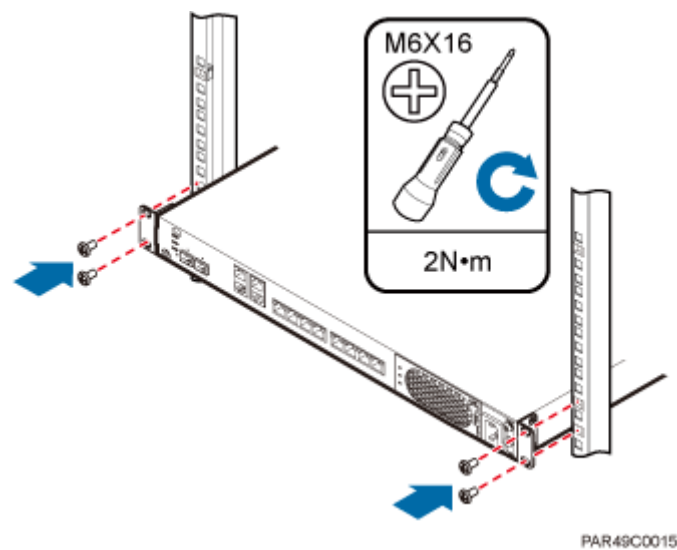
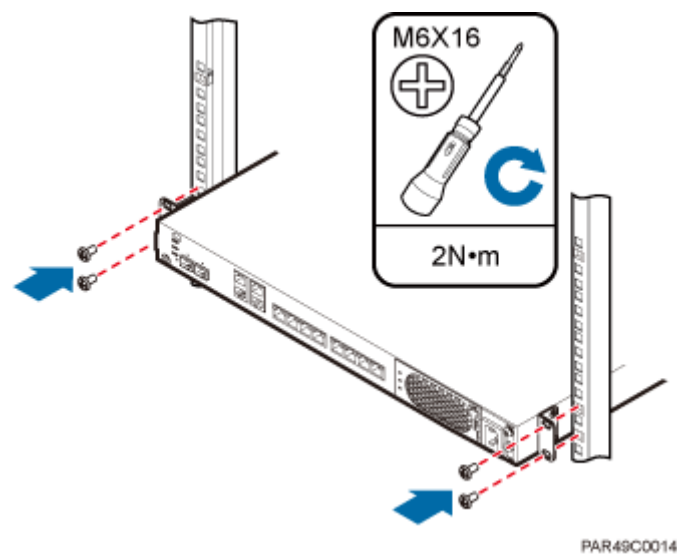


Figure 5-4 Installing an RHUB3908 in a 19-inch cabinet in reverse mode



Installing an RHUB3908 in a 19-Inch Shelf

When an RHUB3908 is installed in a 19-inch shelf, the shelf must be installed on a wall. One shelf can house multiple RHUB3908s with 1 U space between two RHUB3908s.

Figure 5-5 and Figure 5-6 show RHUB3908s installed in a 19-inch shelf.

Figure 5-5 RHUB3908 installed in a 19-inch shelf in standard mode

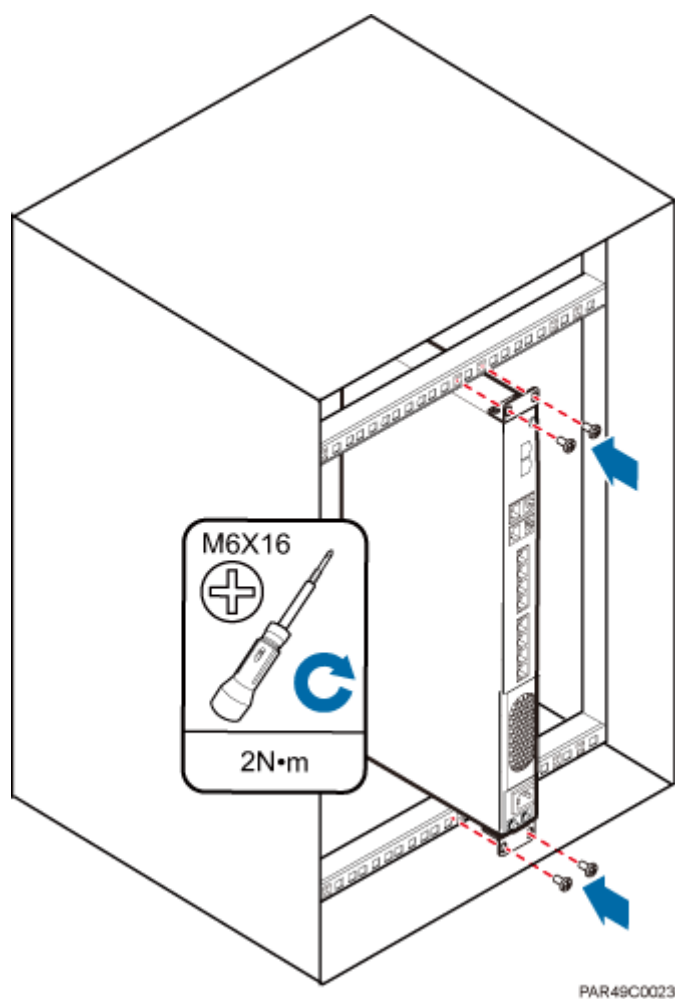
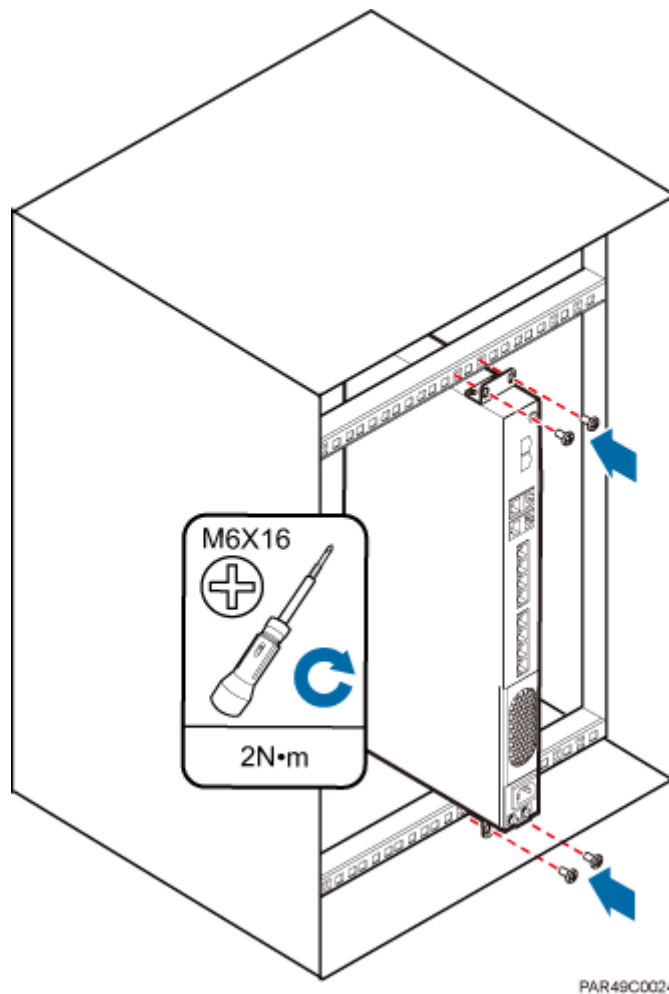


Figure 5-6 RHUB3908 installed in a 19-inch shelf in reverse mode



Installing an RHUB3908 on a Wall

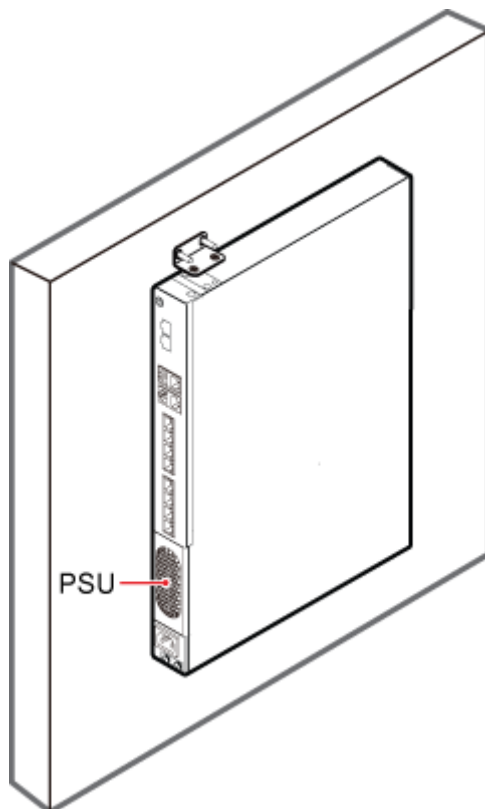
An RHUB3908 can be installed on a wall.

The wall on which an RHUB3908 is installed must meet the following requirements:

- When a single RHUB3908 is installed, the wall must have a capacity of bearing at least four times the weight of the RHUB3908.
- Expansion bolts must be tightened to 10 N m (88.507 bf in.) to ensure the bolts work properly and the wall remains intact without cracks in it.

[Figure 5-7](#) shows an RHUB3908 installed on a wall.

Figure 5-7 RHUB3908 installed on a wall



5.1.2 Installation Clearance Requirements of an RHUB3908

When an RHUB3908 is installed in a 19-inch cabinet, rack, shelf, or on a wall, a minimum clearance is required for easy cabling and operation and maintenance. A recommended installation clearance is provided based on experience.



NOTICE

- Do not install or place inflammable materials above or under an RHUB3908.
- A clearance of 350 mm must be reserved in front of the air intake vent of the fan of the power supply unit (PSU) for maintenance.

[Figure 5-8](#) shows the installation clearance for the RHUB3908 installed in a 19-inch cabinet, rack, or shelf.

Figure 5-8 Installation clearance for an RHUB3908 installed in a 19-inch cabinet, rack, or shelf

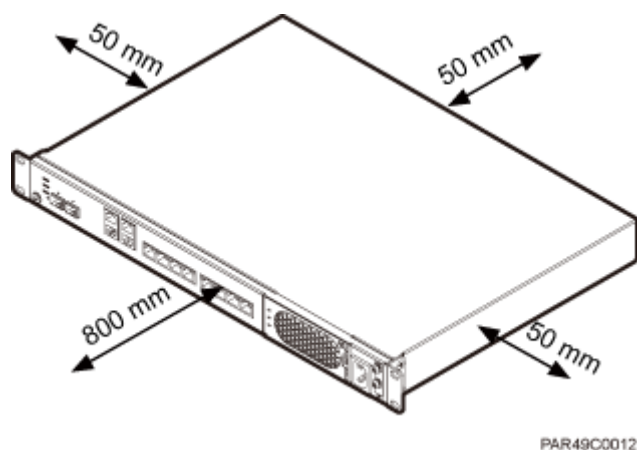


Figure 5-9 and Figure 5-10 shows the recommended and minimum installation clearance respectively when the RHUB3908 is installed on a wall.

Figure 5-9 Recommended installation clearance for a wall-mounted RHUB3908 (unit: mm)

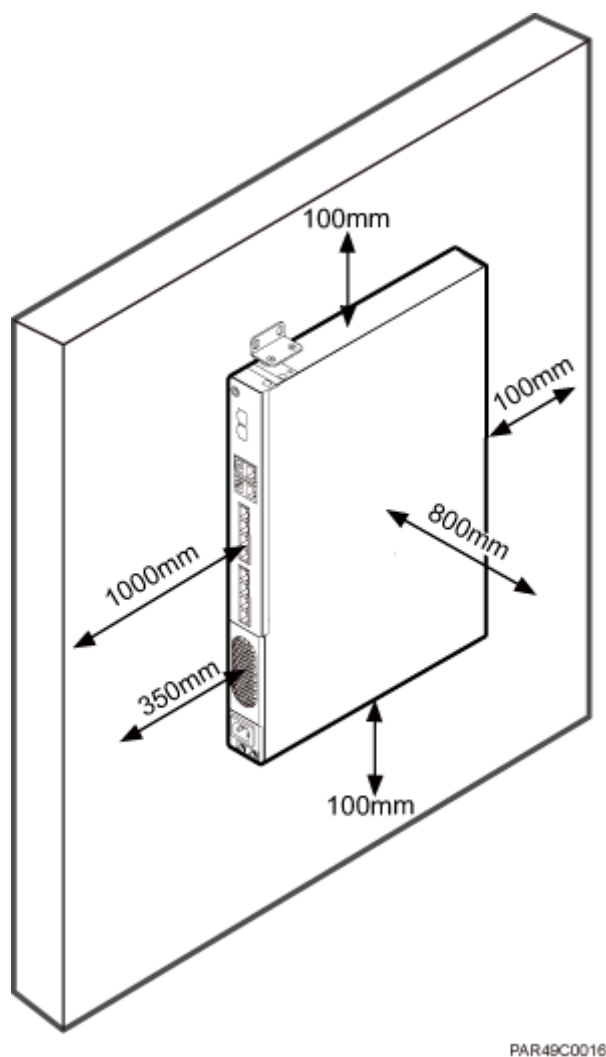
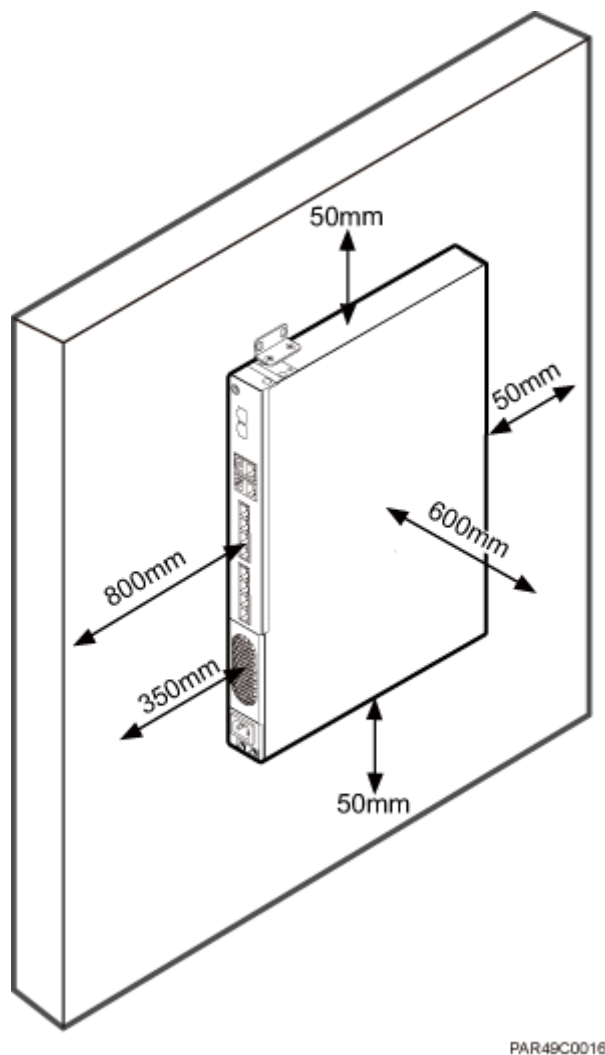


Figure 5-10 Minimum installation clearance for a wall-mounted RHUB3908 (unit: mm)



5.1.3 Installation Environment of an RHUB3908

The installation environment of an RHUB3908 involves the running environment specifications for the RHUB3908 and other specifications.

RHUB3908 Running Environment Specifications

Table 5-1 shows the environment specifications for the RHUB3908 installed indoors.

- The temperature and humidity of the installation position must ensure normal operation. A cool and ventilated place is recommended.
- The heat dissipation holes on the RHUB3908 cannot be blocked.

Table 5-1 RHUB3908 environment specifications

Specifications	Installation Scenario	RHUB3908 Quantity	Condition	Remarks
Operating temperature	Installed on a wall or in a 19-inch rack.	N/A	-5 °C to +50 °C	N/A
	Installed in a shelf.	1	-5 °C to +45 °C	N/A
		2	-5 °C to +43 °C	N/A
		3	-5 °C to +40 °C	N/A
Relative humidity	Installed in all scenarios.	N/A	5% RH to 95% RH	N/A
Altitude	N/A	N/A	-60 m to +1800 m	Works properly.
			1800 m to 4000 m	Above the 1800 m altitude, the maximum operating temperature decreases by 1 °C each time the altitude increases by 220 m.

**NOTE**

Installing more than one RHUB3908, 1 U space is required between two RHUB3908s.

Other Running Environment Specifications

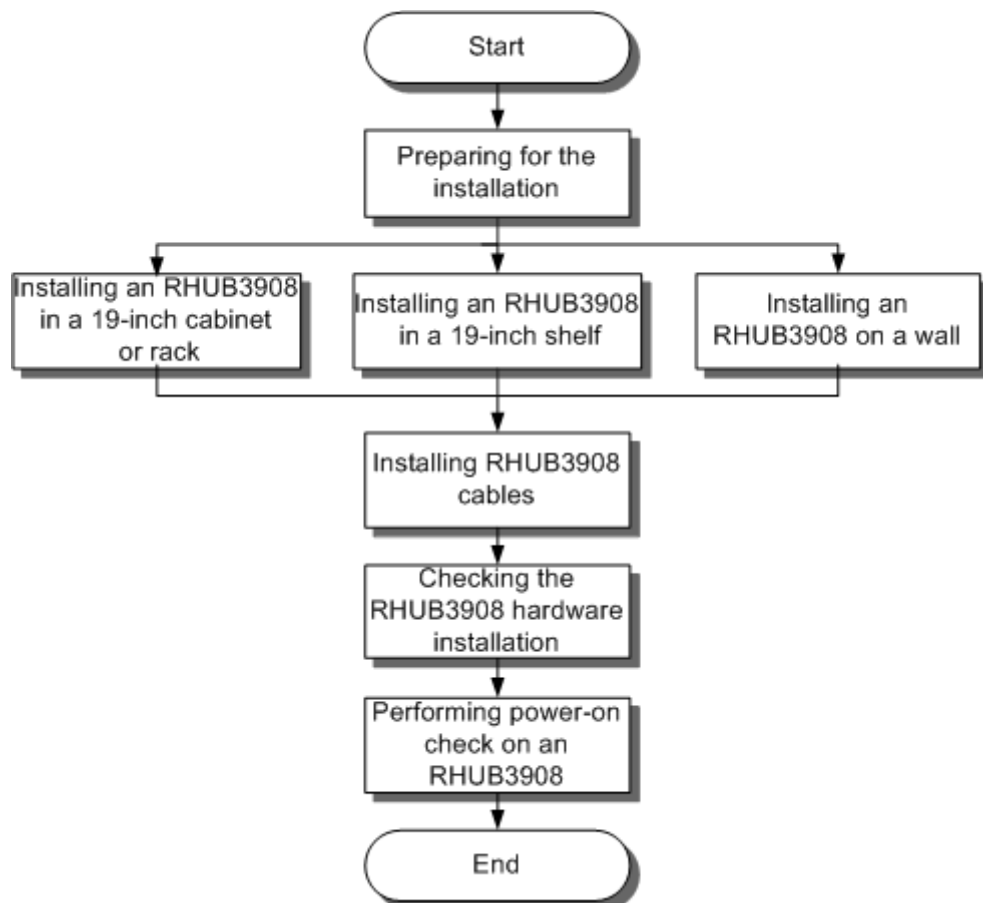
- The RHUB3908 cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.
- The RHUB3908 cannot be installed near a strong heat source.
- The RHUB3908 cannot be installed in a position with water dripping, such as outdoor equipment of air conditioners, pipe, and leaking or dripping roofs.
- The installation position must be far from rains. If the RHUB3908 is installed on a wall, there must be no window on either side of the wall.
- The installation position must be far away from high voltage, highly corrosive devices, flammable or explosive substances, and electromagnetic interference.
- The RHUB3908 must be installed in a dry, ventilating, and dust-proof place.
- If the RHUB3908 is installed in parking areas or basements, the installation position must be well-ventilated.

5.2 Installation Process

The RHUB3908 installation involves installing an RHUB3908 module, installing RHUB3908 cables, checking the RHUB3908 hardware installation, and powering on the RHUB3908.

Figure 5-11 shows the RHUB3908 installation process.

Figure 5-11 RHUB3908 installation process



5.3 Installing an RHUB3908

An RHUB3908 can be installed in a cabinet, rack, shelf, or on a wall.

5.3.1 Installing an RHUB3908 in a 19-Inch Cabinet or Rack

This section describes how to install an RHUB3908 in a 19-inch cabinet.

Procedure

- The following describes how to install an RHUB3908 with mounting ears in reverse mode:

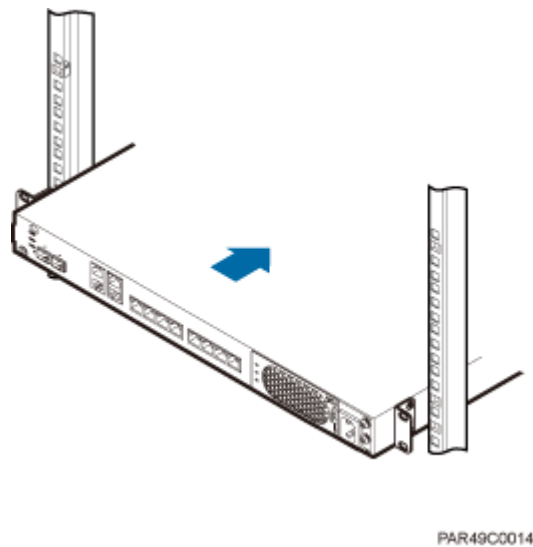


NOTE

If necessary, request one more person for assistance.

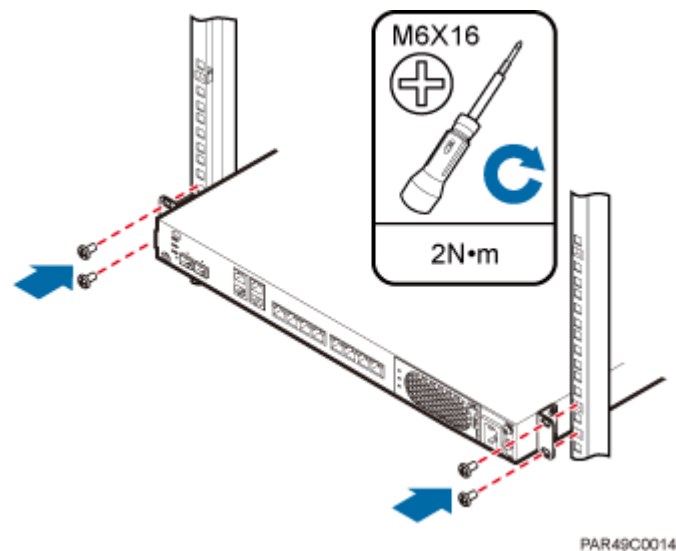
1. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in [Figure 5-12](#).

Figure 5-12 Pushing an RHUB3908 into a cabinet



2. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 5-13](#).

Figure 5-13 Tightening screws



- The following describes how to install an RHUB3908 with mounting ears aligned with the RHUB3908 panel:

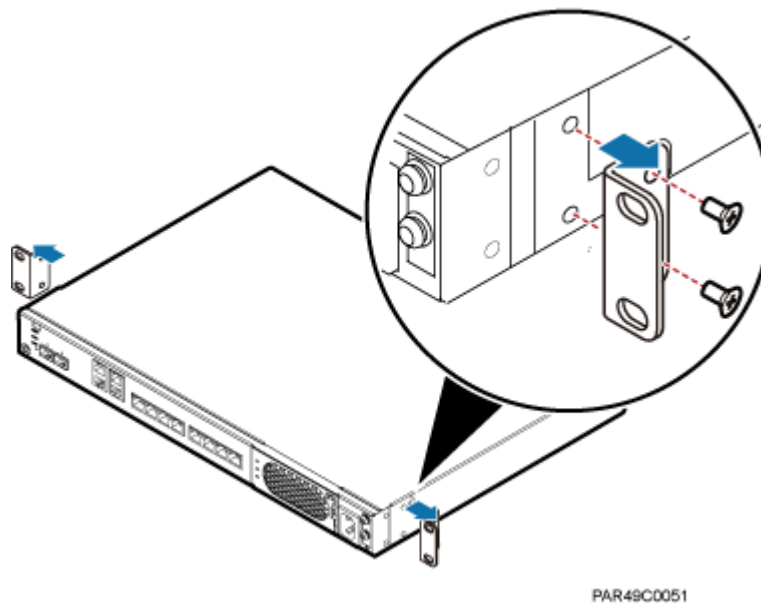


NOTE

If necessary, request one more person for assistance.

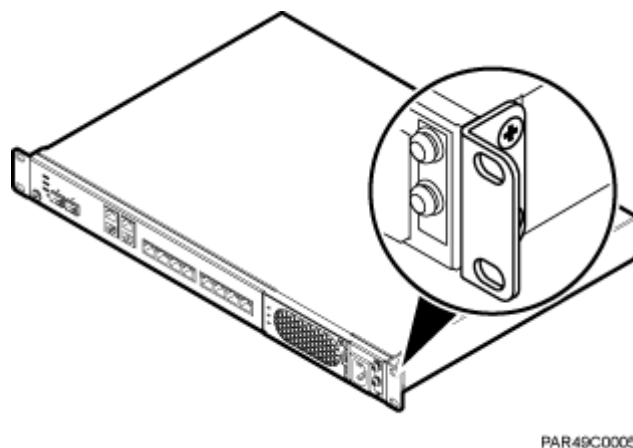
1. Remove the mounting ears on both sides of the RHUB3908 by removing the four M4×8 screws, as shown in [Figure 5-14](#).

Figure 5-14 Removing mounting ears and screws



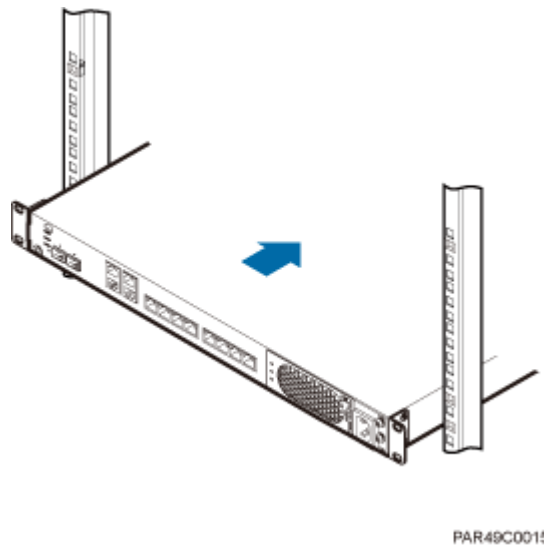
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in [Figure 5-15](#). The mounting ears must be aligned with the RHUB3908 panel.

Figure 5-15 Installing mounting ears in standard mode



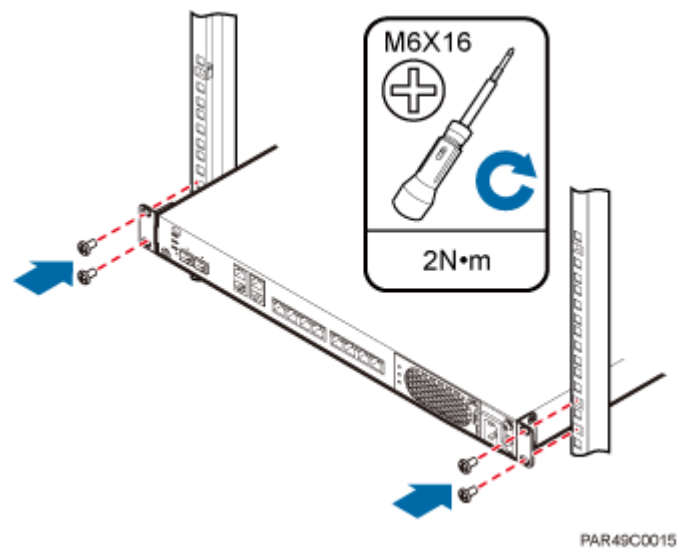
3. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in [Figure 5-16](#).

Figure 5-16 Pushing an RHUB3908 into a cabinet



4. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 5-17](#).

Figure 5-17 Tightening screws



----End

5.3.2 Installing an RHUB3908 in a 19-Inch Shelf

If a shelf houses more than one RHUB3908, 1 U space is required between two RHUB3908s. The PSU must be installed at the bottom of the cabinet.

Procedure

- The following describes how to install an RHUB3908 with mounting ears installed in reverse mode:

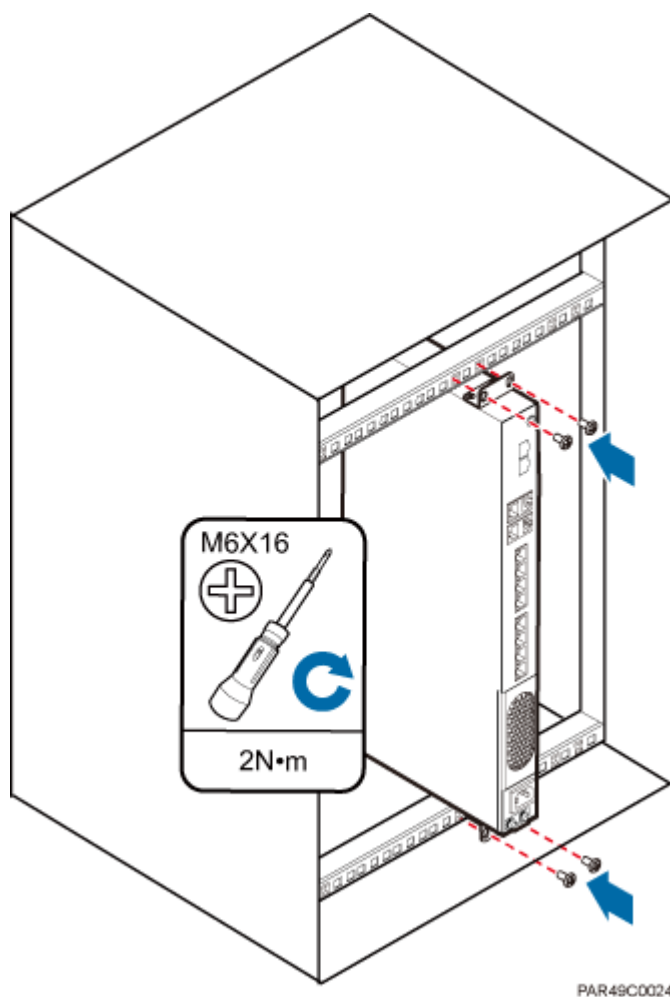


NOTE

If necessary, request one more person for assistance.

- With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the shelf.
- Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 5-18](#).

Figure 5-18 Tightening screws



- The following describes how to install an RHUB3908 with mounting ears installed in standard mode:

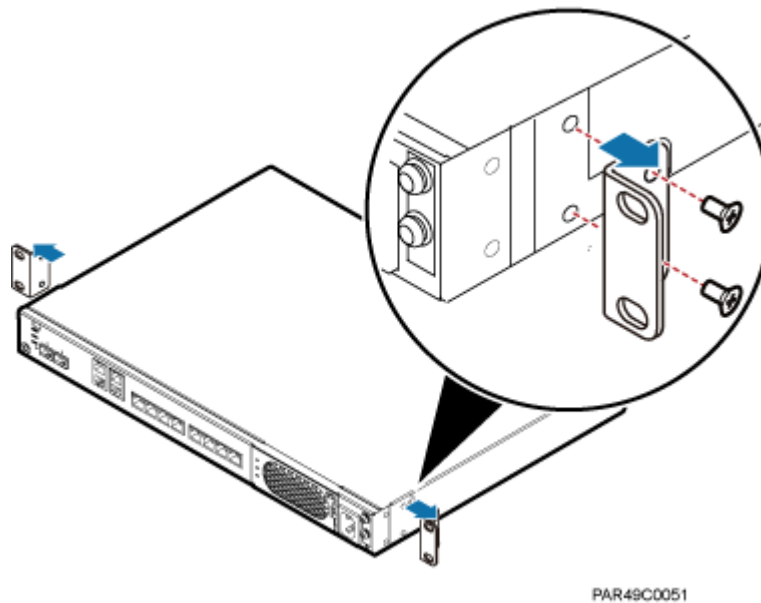


NOTE

If necessary, request one more person for assistance.

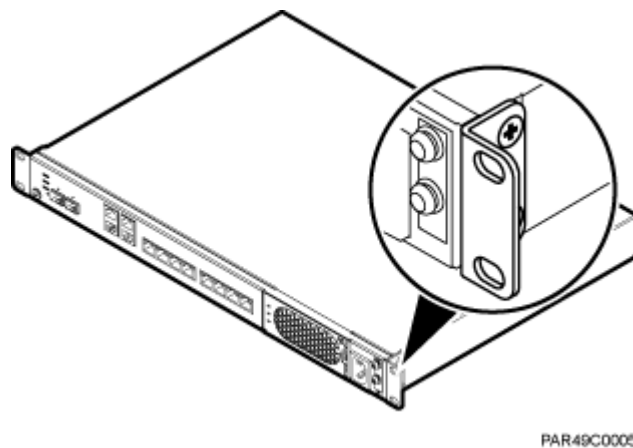
- Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 5-19](#).

Figure 5-19 Removing mounting ears and screws



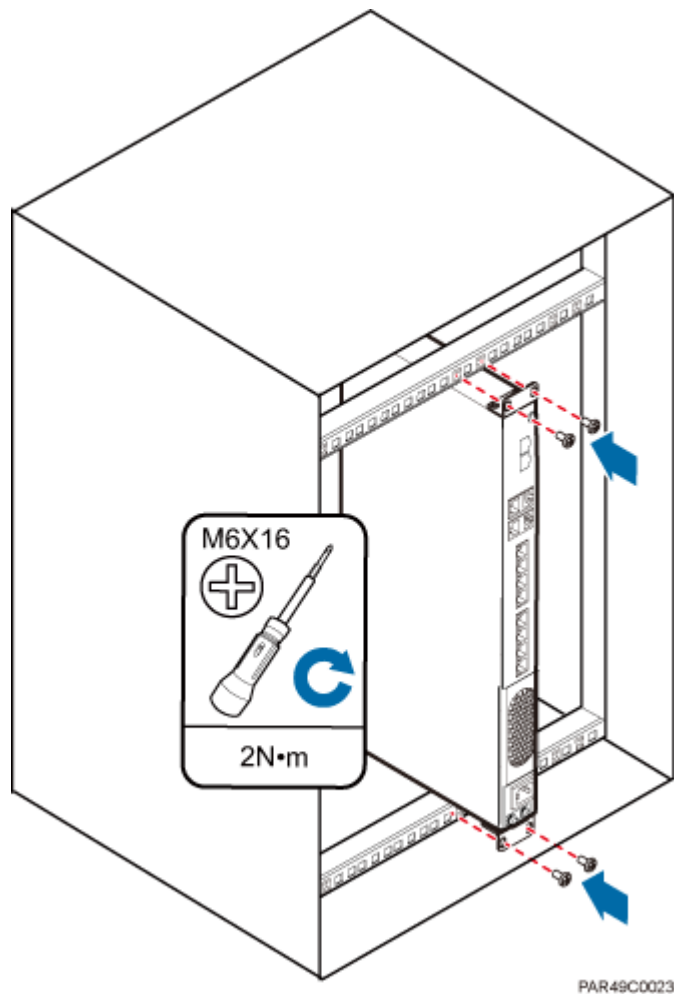
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in [Figure 5-20](#). The mounting ears must be aligned with the RHUB panel.

Figure 5-20 Installing mounting ears in standard mode



3. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB3908 into the required position in the cabinet, as shown in .
4. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 5-21](#).

Figure 5-21 Tightening screws



----End

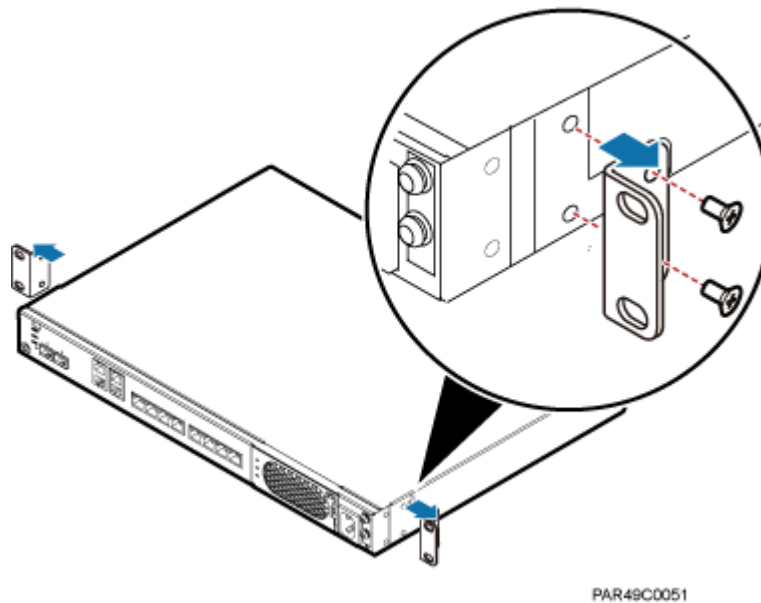
5.3.3 Installing an RHUB3908 on a Wall

An RHUB3908 can be installed on a wall.

Procedure

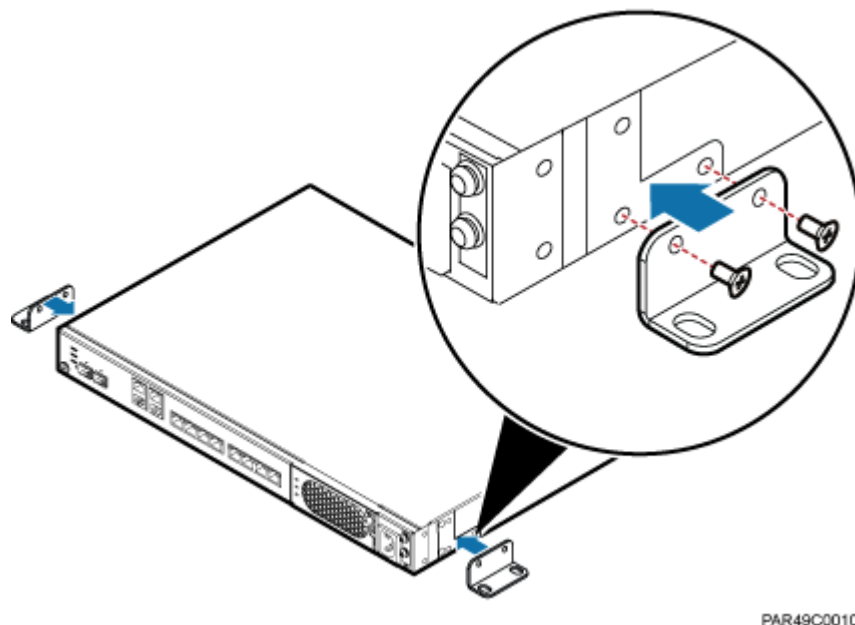
1. The mounting ears are installed in reverse mode by default. Before installing an RHUB3908 on a wall, modify the installation mode of the mounting ears on the RHUB3908.
- Use a torque screwdriver or Phillips screwdriver to remove the mounting ears on both sides of the RHUB3908 by removing the four M4 ×8 screws, as shown in [Figure 5-22](#).

Figure 5-22 Removing screws and mounting ears



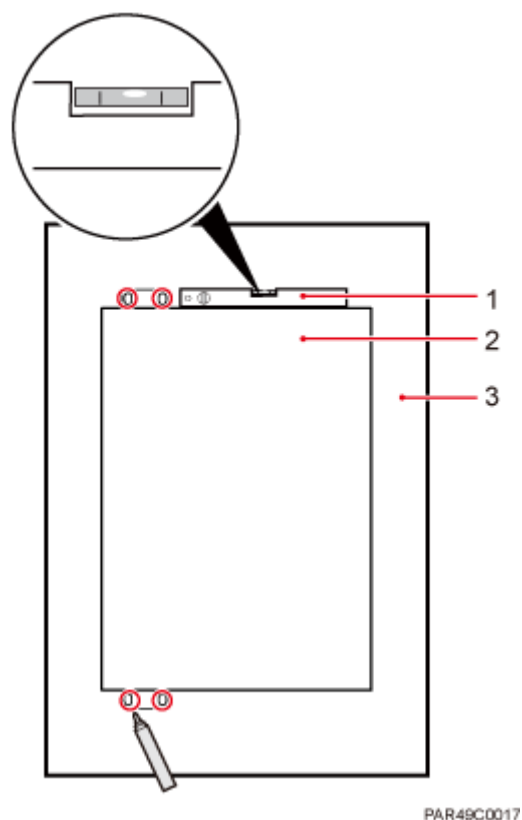
- Rotate the mounting ears 90 degrees clockwise, and use a torque screwdriver or Phillips screwdriver to secure the mounting ear with a torque of 1.4 N•m, as shown in [Figure 5-23](#).

Figure 5-23 Installing mounting ears and screws



- Step 2** Determine the position on the wall for installing the RHUB3908 based on the requirements in the engineering blueprint and Installation Clearance Requirements of an RHUB. Place the RHUB3908 to the position to be installed against the wall, and then mark the four anchor points where the mounting ear screws are fastened using a marker, as shown in [Figure 5-24](#).

Figure 5-24 Anchor points for installing an RHUB3908 on a wall



(1) Level

(2) RHUB3908

(3) Wall

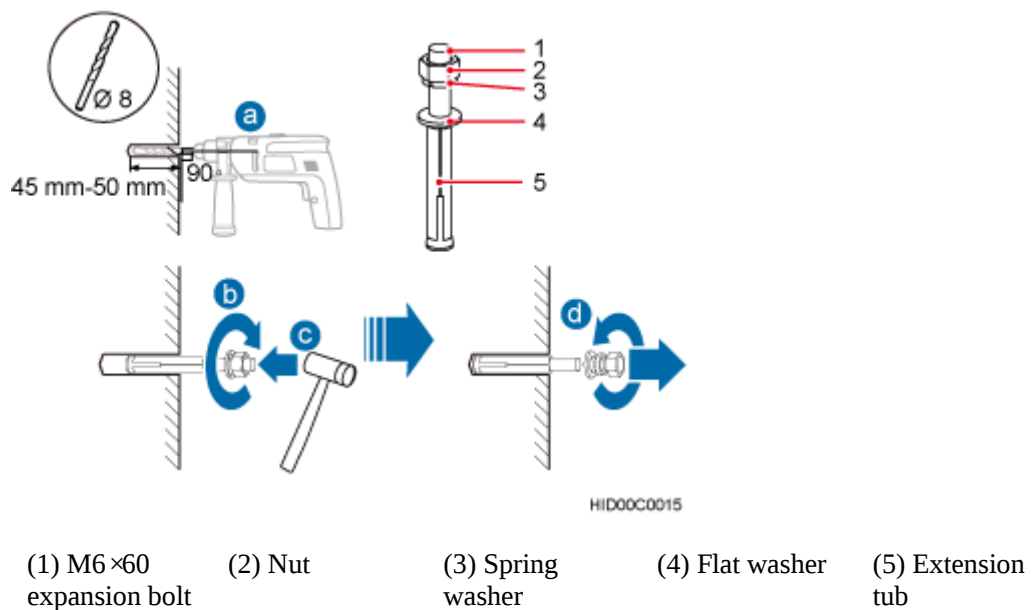


CAUTION

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

Step 3 Drill holes at the anchor point and install expansion bolts, as shown in [Figure 5-25](#).

Figure 5-25 Drilling holes and installing expansion bolts



1. Use a hammer drill with bit 8 to drill holes with a diameter of 8 mm and a depth of 45 mm to 50 mm at the marked anchor points. All the holes have the same depth.
2. Use a vacuum cleaner to clear the dust inside and around each hole. If the distance between two holes is incorrect, mark and drill holes again.
3. Partially tighten an expansion bolt and place it vertically into each hole.
4. Use a rubber mallet to hit the expansion bolt until the entire expansion sleeve is in the hole.
5. Remove the M6×60 bolt, nut, spring washer, and flat washer from each expansion bolt in sequence.

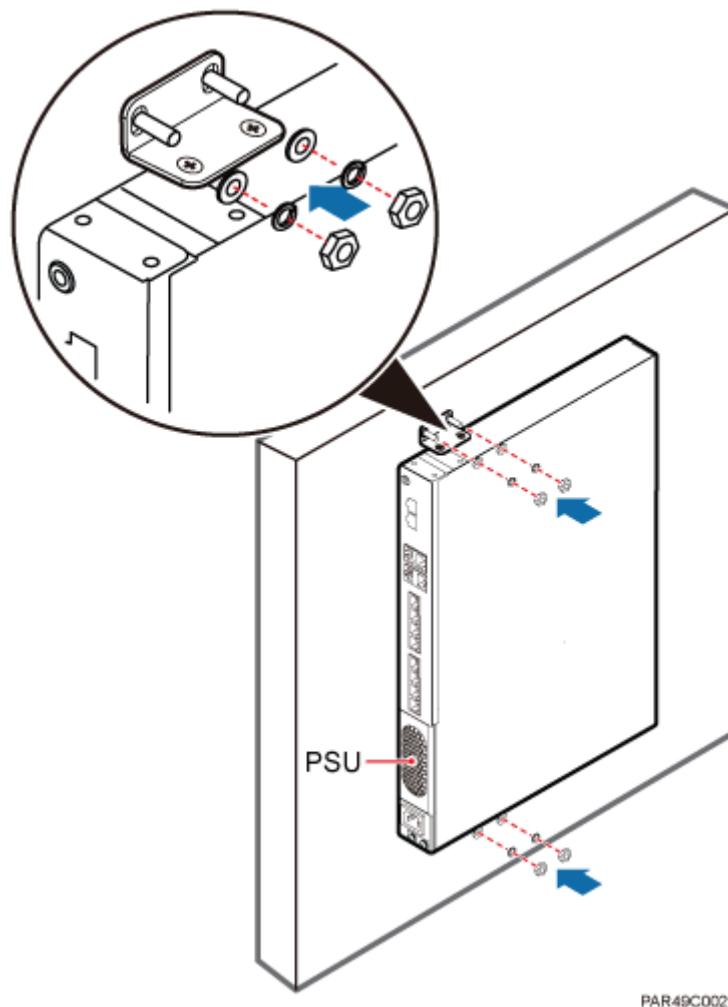


NOTICE

After removing an expansion bolt, ensure that the top of the expansion sleeve is level with the wall. If it is not level, the RHUB3908 cannot be installed on the concrete floor evenly and securely.

- Step 4** Align the mounting holes with the four M6×60 expansion bolts. Install spring washer 6 and flat washer 6 in sequence on each M6×60 expansion bolt, insert the bolts to each expansion tub, and then use a torque wrench or socket wrench to tighten the four M6×60 bolts with a torque of 5 N•m to secure the RHUB3908 to the wall, as shown in [Figure 5-26](#).

Figure 5-26 Installing an RHUB3908 on a wall



NOTE

As shown in the preceding figure, when the RHUB3908 is placed against the wall, ensure that the RHUB3908 panel is vertical to the ground and the PSU is on the lower part of the RHUB3908 panel.

----End

5.4 Installing RHUB3908 Cables

This section describes how to install cables for an RHUB3908.

5.4.1 Requirements for Cable Layout

Cables must be routed according to the specified cabling requirements to prevent signal interference.



NOTE

If a cable listed below is not required, skip the requirements for routing the cable.

General Requirements for Cable Layout

中国标准

- 综合布线系统工程设计规范 GB 50311-2007
- 综合布线工程验收规范（含条文说明） GB 50312-2007
- 安全防范工程技术规范 GB 50348-2004
- 电子信息系统机房施工及验收规范 GB 50462-2008
- 智能建筑工程质量验收规范 GB 50339-2003
- 建筑电气工程施工质量验收规范 GB 50303-2002
- 通信管道工程施工及验收技术规范 GB 50374-2006

国际标准

- 用户建筑综合布 ISO / IEC 11801
- 商业建筑电信布线标准 EIA / TIA 568
- 商业建筑电信布线安装标准 EIA / TIA 569
- 商业建筑通信基础结构管理规范 EIA / TIA 606
- 商业建筑通信接地要求 EIA / TIA 60
- 信息系统通用布线标准 EN 50173
- 信息系统布线安装标准 EN 50174

Bending radius

- The bending radius of a power cable or a protection ground (PGND) cable is at least three times the diameter of the cable.
- The bending radius of an optical cable is at least 20 times the diameter of the optical cable, and the minimum bending radius of the branch at each end of the optical cable is 30 mm.
- The bending radius of the signal cable must be at least five times the diameter of the cable.

Cable Binding

- Cables of the same type are bound together.
- Different types of cables must be separately routed with a minimum spacing of 30 mm and cannot be entangled or crossed.
- The cables are bound tightly and neatly and the cable sheath is intact.
- The cable ties face the same direction and all cable ties bound at similar positions must be in a straight line.
- The extra length of each indoor cable tie must be cut off. A slack of 5 mm is reserved for each outdoor cable tie. All cut surfaces have no sharp edges.
- Labels or nameplates are attached to both ends, joints, or turns of cables after they are installed.

Safety

- 穿管/线槽采用钢管或阻燃聚氯乙烯硬质管，线槽的截面利用率应为 30%~50%，穿管的截面利用率应为 25%~30%。

- Cables are placed away from sharp objects or wall burrs. If these positions are inevitable, protection pipes are required for the cables.
- Cables are routed away from heat sources, or heat-insulation materials are added between cables and heat sources.
- Cables are routed away the cooling vents of the RHUB3908.
- A clearance is reserved at turns of a cable or the position close to a device, facilitating cable and device maintenance. The recommended clearance is about 0.1 m.

Requirements for Special Cables

Ethernet Cable

- A maximum of 100 Ethernet cables can be bundled if no PVC pipes are used. If pipes are used, a maximum of 24 Ethernet cables can be led through a pipe. In this case, ensure that 1/3 space inside the pipes must be vacant.

Power cable

- Positions for routing power cables meet requirements of the engineering design.
- Cables are routed only by qualified and trained personnel before all preparations are made.
- Cables are routed in an untangled and orderly fashion.

PGND cable

- PGND cables are buried in the ground or routed indoors. They cannot be routed overhead before they are routed into the equipment room.
- Outer conductors of coaxial cables and both ends of the shield layers on shielded cables are in proper electrical contact with the metal surface of the equipment to which they are connected.
- PGND cables and signal cables are installed in an untangled and orderly fashion. A certain distance is reserved between them to prevent interference from each other.
- Fuses or switches are not allowed on PGND cables.
- Other devices cannot be used for electrical connections of PGND cables.
- All the metal parts in the equipment are reliably connected to the ground terminal.

Optical cable

- Cables are routed in an untangled and orderly fashion.
- Optical fibers cannot be bound at turns.
- Optical fibers cannot be stretched with too much force or stepped on, and they are far away from sharp objects. Heavy objects cannot be placed on optical cables.
- When optical cables are routed, the extra length of the cables is coiled around special devices, such as a fiber coiler.
- Even strength is applied when optical cables are coiled and optical cables cannot be bent in a forcible manner.
- Vacant optical connectors are covered with dust-proof caps.
- Fiber optic cables cannot be squeezed by the cabinet door when routed through the cabinet.
- If optical cables need to be routed on the tower platform, the optical cables are routed along the inner side of the guard rail and the distance between the guard rail and the cable is the shortest one.

- If optical cables need to be routed close to a device on the tower, the optical cables are secured to the guard rail or pole with cable clips and the device cannot be far away from the position for securing the optical cables.
- If the optical cable close to a device on the tower is too long, the optical cables are wrapped and secured to the tower.

5.4.2 RHUB3908 Cable List

This section describes the connector types and connections of the RHUB3908 cables.

Table 5-2 lists RHUB3908 cables.

Table 5-2 RHUB3908 cable list

Cable	One End		The Other End	
	Connector	Connected to...	Connector	Connected to...
PGND cable	OT terminal (M4, 6 mm ² [0.009 in. ²])	Ground screws on the RHUB3908	OT terminal (M6, 6 mm ² [0.009 in. ²])	Ground terminal on the external ground bar
RHUB3908 Power Supply Cable	C13 female connector	AC power input socket on the RHUB3908	3-pin connector	External power input socket
CPRI Optical Fiber	DLC connector	CPRI port on the LBBP, WBBP or UBBP in the BBU	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
		CPRI0 or CPRI1 port on the RHUB3908	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
		CPRI port on the LBBP, WBBP or UBBP in the BBU	FC connector, SC connector, or LC connector	ODF
		CPRI0 or CPRI1 port on the RHUB3908	FC connector, SC connector, or LC connector	ODF
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on the RHUB3908	RJ45 connector	CPRI_E0~CPRI_E1 port on the pRRU3901
(Optional) RHUB3908	RJ45 connector	EXT_ALM port on the	Bare end	Alarm signal port of the monitored

Cable	One End		The Other End	
	Connector	Connected to...	Connector	Connected to...
Alarm Cable		RHUB3908		equipment

NOTE

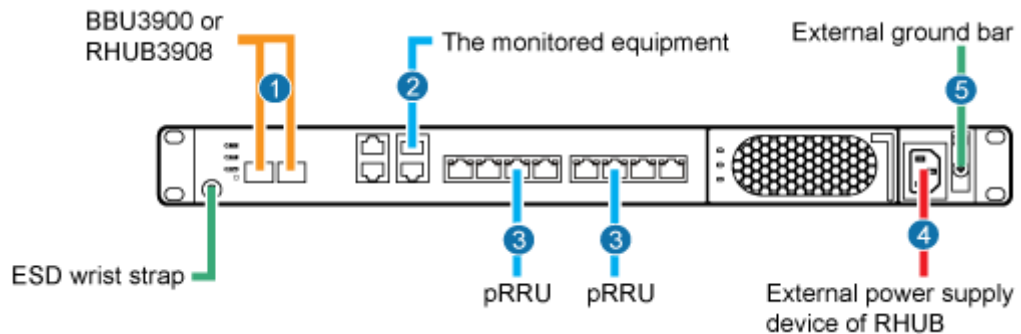
- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU, or RHUB3908 through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB3908 through a connector corresponding to the adapter. The connectors include the FC connector, SC connector, and LC connector.
- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

5.4.3 Cable Connections

This section describes the cable connections for an RHUB3908.

Figure 5-27 shows the cable connections for an RHUB3908. The port of GE0, GE1 and ETH are reserved.

Figure 5-27 Cable connections for an RHUB3908



- | | | |
|--------------------------|--------------------------|--------------------|
| (1) CPRI optical cable | (2) RHUB3908 alarm cable | (3) Ethernet cable |
| (4) RHUB3908 power cable | (5) PGND cable | - |

NOTE

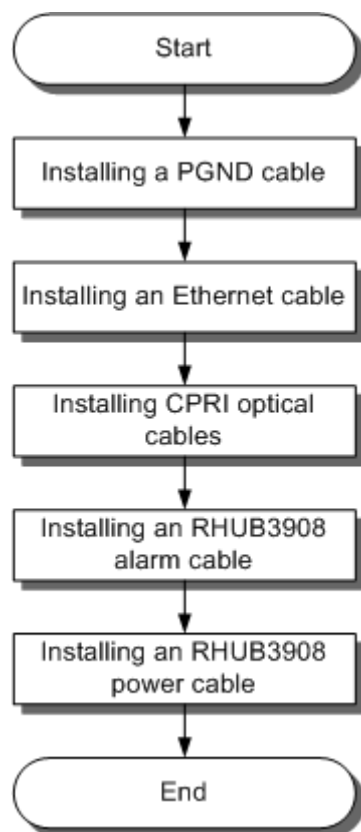
The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

5.4.4 RHUB3908 Cable Installation Process

This section describes the process of installing RHUB3908 cables.

Figure 5-28 shows the RHUB3908 cable installation process.

Figure 5-28 RHUB3908 cable installation process



5.4.5 Installing an RHUB3908 PGND Cable

An RHUB3908 PGND cable ensures proper grounding of an RHUB3908.

Prerequisites

The OT terminals at both ends of the PGND cable are prepared.

Context

The yellow and green or green PGND cable is a single cable. The cross-sectional area of the PGND cable is 6 mm² (0.009 in.²). Both ends of the cable are OT terminals, as shown in Figure 1.

Figure 5-29 Exterior of a PGND cable



PAD00C8002

(1) OT terminal (6 mm² [0.009 in.²], M4)

(2) OT terminal (6 mm² [0.009 in.²], M6)



NOTE

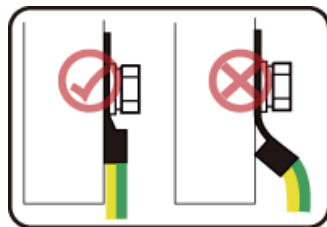
- If the PGND cable is provided by the customer, a copper-core cable with a minimum cross-sectional area of 6 mm² (0.009 in.²) or 10 AWG is recommended.
- The OT terminals at both ends of the PGND cable are assembled at the site.
- The M6 OT terminal has the default size. You can replace it with another OT terminal of the expected size based on the site requirement.



NOTICE

- Ensure proper grounding of the RHUB3908 using a PGND cable.
- When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in [Figure 5-30](#).

Figure 5-30 Correct direction of an OT terminal for the PGND cable



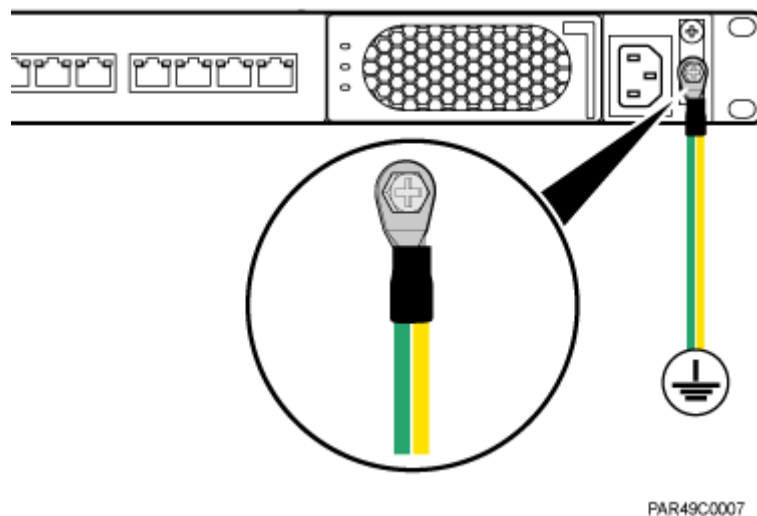
EIR22C6001

Procedure

1. Route the PGND cable by referring to Requirements for Cable Layout.

Step 2 Use a torque screwdriver or Phillips screwdriver to secure the M4 OT terminal at one end of the PGND cable to the ground screw on the RHUB3908 panel with a torque of 1.4 N•m. If the OT terminal is a one-hole OT terminal, connect it to the ground screw on the lower part of the RHUB3908 panel, as shown in [Figure 5-31](#).

Figure 5-31 Installing an RHUB3908 PGND cable



- Step 3** Use a torque screwdriver or Phillips screwdriver to secure the M8 OT terminal at one end of the PGND cable to the wiring terminal on the ground bar at the site with a torque of 1.4 N•m.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see Requirements for Cable Layout.
2. Label the installed cable. For details, see [section 8.3 Attaching an L-Shaped Label](#).

5.4.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable. A pRRU3901 can have two transmission ports or three transmission ports, requiring the same installation operations. This section uses the pRRU3901 with three transmission ports as an example.

Prerequisites

- Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.
- The Ethernet cable must be of Category 5e (enhanced) or higher. In addition, its cross-sectional area must be 24 AWG or larger and frame spread rating must be CM or higher. With the internal PoE module providing power, the maximum length of an Ethernet cable is 100 m. With the Extender, the distance of the pRRU3901 and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

Context

The Ethernet cable has the following functions:

- Provides power supply for the pRRU when connected to the CPRI_E0 port on the pRRU.
- Transmits CPRI signals between an RHUB3908 and a pRRU.

Using the CPRI_E1 port on the pRRU3901 has the same Ethernet cable connection to the RHUB3908 as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

Procedure

1. Make the Ethernet cables.
1. Assemble an RJ45 connector and an Ethernet cable by following instructions in *Assembling the Unshielded RJ45 Connector and the Ethernet Cable of Installation Reference*.



NOTE

Follow pin assignment instructions described in section Ethernet Cable in *LampSite Hardware Description* to assemble the unshielded RJ45 connector and the Ethernet cable. Otherwise, the transmission signal quality deteriorates and CPRI links may be disconnected.

2. Check whether the made RJ45 connector is qualified by following instructions in *Checking the Appearance of Metal Contact Strips*.
3. To complete the assembly of the other end, repeat [Step 1.1](#) and [Step 1.2](#).
4. Check whether the touch points on the connectors at both ends are normally conducted and well contacted and whether the connections are correct by following instructions in *Testing the Connection of Assembled Cables of Installation Reference*.

Step 2 Remove the dustproof cap of the CPRI_E0 port on the pRRU3901.

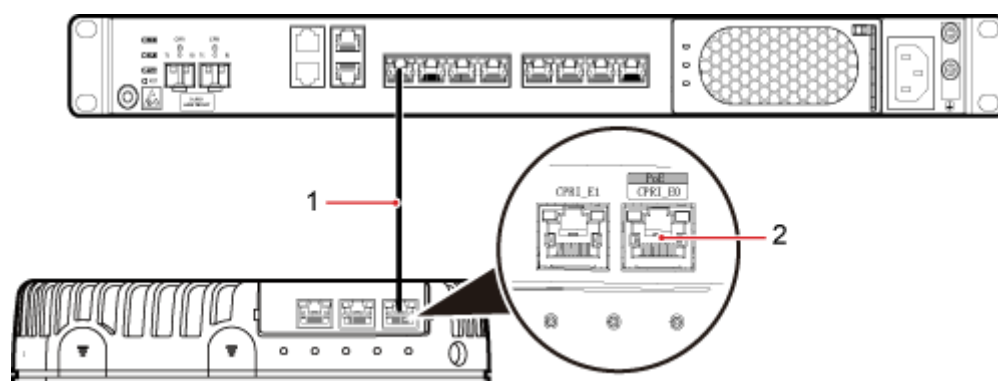
Step 3 Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU3901 panel.

Step 4 Optional: Connect the RJ45 connector at the other end of the Ethernet cable to the output port of the Extender. Then, connect the RJ45 connector at one end of another Ethernet cable to the input port of the Extender.

If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.

Step 5 Connect the RJ45 connector at the other end of the Ethernet cable to any port ranging from CPRI_E0 to CPRI_E7 on the RHUB3908 panel based on the engineering design, as shown in [Figure 5-32](#).

Figure 5-32 Install an Ethernet cable between an RHUB3908 and a pRRU3901



(1) Ethernet cable

(2) CPRI_E0 port on the pRRU3901



NOTE

The pRRU3901 can have two transmission ports plus PWR port or three transmission ports (plus PWR port or no PWR port). The Ethernet cable connection between the pRRU3901 in any appearance and the RHUB3908 is similar. This section uses the pRRU3901 with three transmission ports plus no PWR port as an example.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [5.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

5.4.7 Installing CPRI Optical Cables

Optical fibers can be used to interconnect BBU and RHUB3908s, or cascade RHUB3908s.

Context

- Multi-mode optical modules for CPRI ports are labeled MM and each has a black or gray puller.
- Single-mode optical modules are labeled SM and each has a blue puller.
- For details about the connection of CPRI optical cables, see *Typical Networking in LampSite Technical Description* and CPRI Optical Fiber in *LampSite Hardware Description*.
- An optical module to be installed must match the rate of its corresponding port.



NOTICE

The performance of an optical module that is exposed to the air for more than 20 minutes may be abnormal. Therefore, you must insert a fiber optic cable into an unpacked optical module within 20 minutes.

Procedure

1. Install an optical module, as shown in [Figure 5-33](#) and [Figure 5-34](#).
1. Remove the dust-proof cap from the CPRI port on the RHUB3908 panel.
2. Remove the dust-proof cap on the optical module.
3. Lower the puller of the optical module.
4. Insert the optical module into the CPRI port on the RHUB3908, BBU or ODF.
5. Raise the puller of the optical module.

Figure 5-33 Removing the dust-proof cap from a port

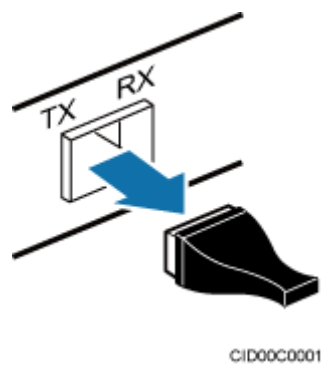
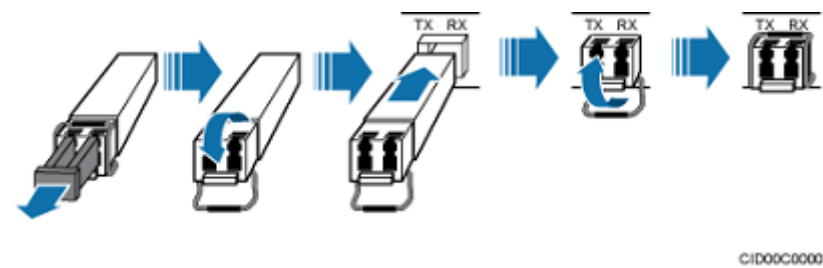


Figure 5-34 Installing an optical module



Step 2 Install a CPRI optical cable, as shown in [Figure 5-35](#).

1. Remove the dust-proof cap from the optical cable connector.
2. Install the optical cables by referring to [Table 5-3](#).

Table 5-3 CPRI optical cable connections

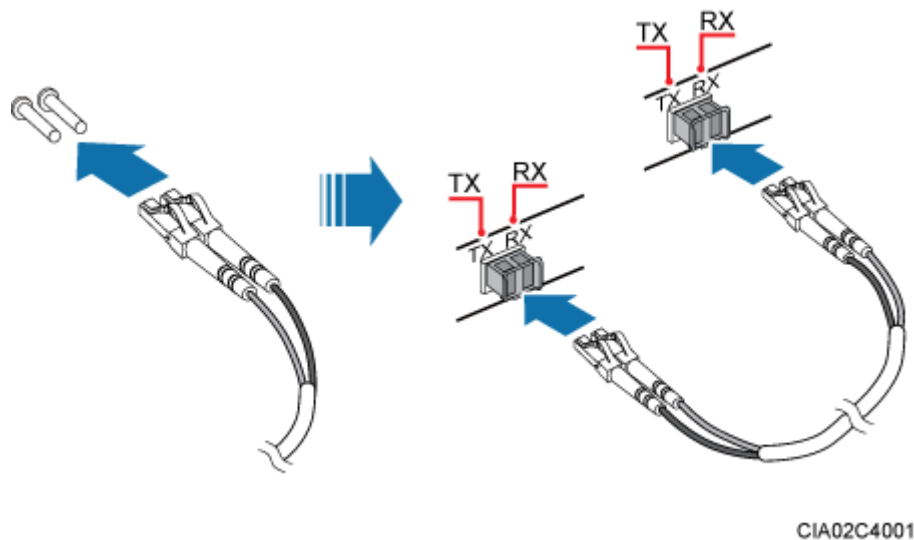
One End		The Other End	
Connector	Connected to	Connector	Connected to
DLC connector	BBU3900/LBBP&WBBP&UBBP/CPRI port	DLC connector	CPRI0 or CPRI1 port on the RHUB3908
	CPRI0 or CPRI1 port on the RHUB3908		CPRI0 or CPRI1 port on the RHUB3908
	BBU3900/LBBP&WBBP&UBBP/CPRI port	FC, SC, or LC connector	ODF
	CPRI0 or CPRI1 port on the RHUB3908		



NOTE

- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU or RHUB3908 through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB3908 through a connector corresponding to the adapter. The connectors include the FC connector, SC connector, and LC connector.
- When connecting the CPRI cable to the TX and RX ports of the optical module through connectors in a cross manner, ensure that one end of a core of the CPRI cable is connected to the TX port and the other end is connected to the RX port. [Figure 5-35](#) shows how to install a CPRI optical cable for connecting the BBU and RHUB3908s.

Figure 5-35 Installing an CRPI optical cable



----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [5.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

5.4.8 Installing an RHUB3908 Alarm Cable (Optional)

An RHUB3908 alarm cable transmits dry node alarm signals.

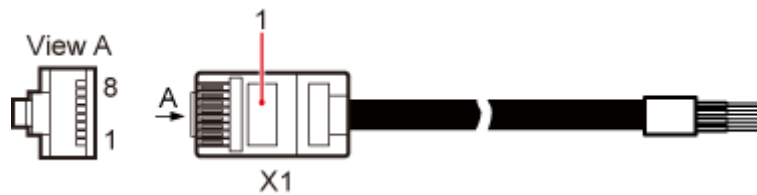
Prerequisites

Connectors for an alarm cable are prepared.

Context

[Figure 5-36](#) shows the exterior of an RHUB3908 alarm cable. RHUB Cable List shows the installation position on both ends of the RHUB3908 cable.

Figure 5-36 RHUB3908 alarm cable



Procedure

1. Connect the RJ45 connector on one end of the alarm cable to the EXT_ALM port on the RHUB3908.

Step 2 Connect the other end of the alarm cable to the alarm cable port on the device to be monitored.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [5.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

5.4.9 Installing an RHUB3908 Power Cable

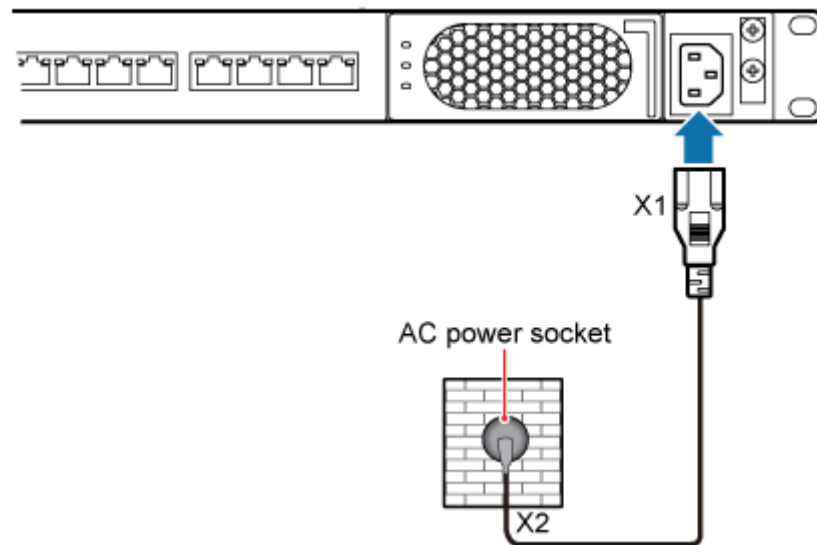
The RHUB3908 power cable provides 110 V AC/220 V AC power supply for the RHUB3908.

Procedure

1. Route the power cable by referring to Requirements for Cable Layout.

Step 2 Connect the power connector on the X1 end to the AC power input port on the RHUB3908 panel, as shown in [Figure 5-37](#).

Step 3 Connect the power connector on the X2 end to the external power supply port, as shown in [Figure 5-37](#).

Figure 5-37 Installing an RHUB3908 power cable

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [5.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

5.5 Checking the RHUB3908 Hardware Installation

After an RHUB3908 is installed, check the installation of hardware including the devices and related cables.

[Table 5-4](#) lists the hardware installation checking items.

Table 5-4 Hardware installation checking list

No.	Item
1	The position for each device conforms to the engineering design and meets the space requirement.
2	Ensure that the RHUB3908 is properly installed.
3	The surface of the RHUB3908 is neat and clean. The external paint is intact. The labels, tags, and nameplates are correct, legible, and complete.

[Table 5-5](#) lists the checking list of the power cable and PGND cable connections.

Table 5-5 Checklist for power cable and PGND cable connections

No.	Item
1	The power cables and PGND cables comply with the requirements of local regulations.
2	The power cables or the PGND cables are not inversely connected or short-circuited.
3	The power cables and PGND cables are bound separately from other cables.
4	Labels are attached to both ends of the power cables, PGND cables, optical fibers, and Ethernet cables.
5	The power cables and PGND cables are intact.
6	The power cables and PGND cables have no weld nugget.
7	No breaking device such as a switch or fuse lies in the electric connection of the grounding system.
8	The redundant part of PGND cable is stripped off.
9	The lugs at both ends of the power cable or PGND cable are securely soldered or crimped.
10	The flat washers and spring washers are fixed securely and closely at all the wiring terminals.
11	The work GND cable and PGND cable of the BTS share a group of grounding conductors with the lightning and GND cables of the building.

Table 5-6 lists the check items of the signal cable connection.

Table 5-6 Checklist for the signal cable connection

No.	Item
1	The connectors of the signal cables must securely connected.
2	The connectors of the signal cables are intact.
3	The signal cables are intact.
4	The cable ties are evenly spaced. The signal cables are bound neatly with cable ties to proper tightness, and arranged at even intervals in the same direction.
5	The extra length of the cable ties is cut and removed. The cut surfaces of the indoor cables are smooth and have no sharp edges.
6	The cable layout facilitates maintenance and expansion.
7	Correct and clear labels are attached to both ends of the signal cables.
8	The distance between the bundled fiber tails and the RHUB3908 panel is less than 70 mm.

Table 5-7 lists the checking items for other cable connections.

Table 5-7 Checklist for other cable connections

No.	Item
1	The connectors of the other cables must securely connected.
2	Labels on the cables are legible and bound based on the engineering requirements. The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
3	Positions for routing the cables must meet requirements of the engineering design.

5.6 Power-on Check on an RHUB3908

This section describes the power-on check on the RHUB3908 after the RHUB3908 hardware is installed and checked.

Context



DANGER

Power-on check involves high-voltage operation. Be cautious when conducting the power-on check. Any direct contact with the input voltage or indirect contact through damp objects might endanger your life.

Procedure

1. Measure the RHUB3908 earth resistance.

If...	Then...
The RHUB3908 earth resistance is less than 10 ohms	Go to Step 2 .
The RHUB3908 earth resistance is equal to or larger than 10 ohms	Find out the cause and ensure that the resistance meets requirement. Then, go to Step 2 .

- Step 2** Measure the voltage of the RHUB3908.

If...	Then...
The external power supply ranges from 100 V AC to 240 V AC	Go to Step 3 .

If...	Then...
The external power supply does not range from 100 V AC to 240 V AC	Find out the cause and ensure that the resistance meets requirement. Then, go to Step 3 .

Step 3 Power on the RHUB3908. Wait 3 to 5 minutes, check the status of the RUN indicator of the RHUB3908 after the RHUB3908 runs properly.

If the Status of the RUN Indicator...	It Indicates that...	Then...
Steady on	The power supply is normal while the board is faulty.	Power off the RHUB3908, and power on it again after rectifying the board fault.
Steady off	There is no power input or the board is faulty.	Power off the RHUB3908, and check the power input again. Rectify the board faulty and power on the RHUB3908 again if the power input is normal.
On for 1s and off for 1s	The devices work properly.	End the operation.
On for 0.125s and off for 0.125s	The board software is being uploaded.	Power off the RHUB3908 if the uploading is not finished in 5 minutes, and check whether the configuration file is correct. Power on the RHUB3908 again after the fault is rectified.

----End

6

Installing a pRRU3901

About This Chapter

This chapter describes the pRRU3901 installation process. The pRRU3901 can have two transmission ports (plus PWR port) or three transmission ports (plus PWR port or no PWR port). Unless otherwise specified, this document uses the pRRU3901 with three transmission ports plus no PWR port as an example.



NOTE

The pRRU3901 with three transmission ports plus no PWR port is named the pRRU3901 AWS+PCS+WIFI in North America.

6.1 Information About the Installation

This section describes the information that you must be familiar with before installing a pRRU3901, including the pRRU3901 product family, installation scenarios, installation space and environment requirements.

6.2 Obtaining the MAC Address (Optional)

Before installing a pRRU3901, record the media access control (MAC) address, which will be used during pRRU3901 commissioning. This section applies only when a pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

6.3 Installation Process

This section describes the pRRU3901 installation process, which involves installing a pRRU3901, and cables, checking the pRRU3901 hardware installation, and powering on the pRRU3901.

6.4 Installing a pRRU3901

This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or keel.

6.5 Installing pRRU3901 Cables

This section describes the procedure of installing the pRRU3901 cables.

6.6 Checking the pRRU3901 Hardware Installation

pRRU3901 hardware installation checking includes hardware and cable installation checking.

6.7 Powering on the pRRU3901

This section describes the power-on check on the pRRU3901 after the pRRU3901 hardware is installed and checked.

6.1 Information About the Installation

This section describes the information that you must be familiar with before installing a pRRU3901, including the pRRU3901 product family, installation scenarios, installation space and environment requirements.

6.1.1 pRRU3901 Product Family

This chapter describes the configurations and functions of the pRRU3901 components.

[Table 6-1](#) lists the pRRU3901 product family.

Table 6-1 pRRU3901 product family

Category	Equipment	Optional Item	Quantity	Function
Main equipment	pRRU3901	Mandatory	1	Processes the radio frequency signals.
	External antenna	Optional	2	Provides external antennas for the pRRU3901. NOTE Configure two external antennas for each RF daughter board.
Auxiliary device	Mounting kits	Mandatory	1	Supports the pRRU3901 installation on a wall, pole, ceiling, or keel. The mounting kits vary with the pRRU3901 installation mode.
	Extender	Optional	1	Extends the distance between the pRRU3901 and RHUB3908.

6.1.2 pRRU3901 Installation Scenario

The pRRU3901 can be installed on a wall, ceiling, pole, or keel. The following table describes the installation in different scenarios.

Installing a pRRU3901 on a wall

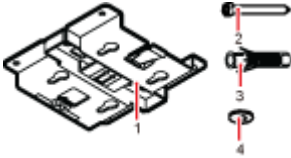
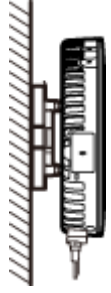
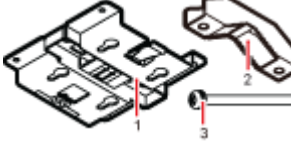
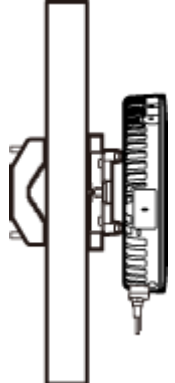
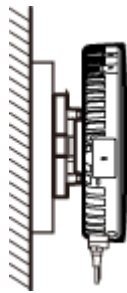


NOTE

- The pRRU3901 must keep a minimum of 0.5 m away from the power equipment with interference, and keep a minimum of 2 m away from the source with radiation.
- The pRRU3901 must keep away from a metal wall to avoid the impact on the antenna performance.

When a pRRU3901 is installed on a wall, installation modes vary with the quality of wall, as shown in [Table 6-2](#).

Table 6-2 Wall-mounted suggestion

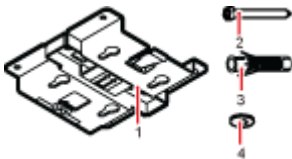
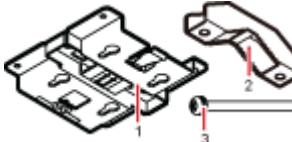
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a wall by drilling holes For details, see pRRU Installed on a Wall.	• The wall can bear a load at least four times the weight of a pRRU3901. • The screws must be tightened with a torque of 10 N m. This ensures the screws work properly and the wall remains intact without cracks in it.	1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU3901 on a wall using a V clamp through an attachment plate For details, see pRRU Installed on a Plate.	• The wall can bear a load at least four times the weight of a pRRU3901. • The thickness of the wall is less than the bolt length (80 mm).	1. Plate 2. V clamp 3. Bolt (M6X80) 	
Installing the pRRU3901 on a wall using a plate on a metal wall	• The wall cannot bear a load at least four times the weight of the pRRU3901. For example, EPS walls, MDF walls, or walls cannot be drilled. • The wall is too thick to drill, and the pRRU3901	The plate is prepared by customers.	

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
	cannot be installed on a wall using a V clamp through an attachment plate.		

Installing a pRRU3901 on a ceiling

When a pRRU3901 is installed on a ceiling, installation modes vary with the quality of the ceiling, as shown in [Table 6-3](#).

Table 6-3 Ceiling-mounted suggestion

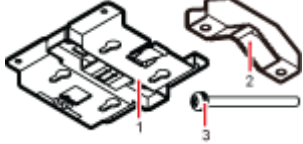
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a ceiling by drilling holes For details, see pRRU Installed on a Ceiling.	- The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU3901. - The screws must be tightened with a torque of 10 N m. This ensures the screws work properly and the ceiling remains intact without cracks in it.	1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU3901 on a ceiling using a V clamp through an attachment plate For details, see pRRU Installed on a Plate.	- The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU3901. - The thickness of the ceiling is less than the bolt length (80 mm).	1. Plate 2. V clamp 3. Bolt (M6X80) 	
Installing the pRRU3901 on a pole For details, see	A pole under the ceiling can bear a load at least four times the weight of	For details, see Table 6-4 .	For details, see Table 6-4 .

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
pRRU Installed on a Pole.	the pRRU3901.		
Installing the pRRU3901 on a keel For details, see pRRU Installed on a Keel.	A keel under the ceiling can bear a load at least four times the weight of the pRRU3901.	For details, see Table 6-5 .	For details, see Table 6-5 .

Installing the pRRU3901 on a pole

When a pRRU3901 is installed on a pole, installation modes vary with the diameter of the pole, as shown in [Table 6-4](#).

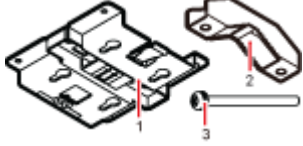
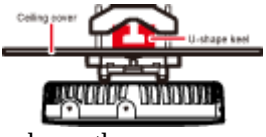
Table 6-4 Pole-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a pole For details, see pRRU Installed on a Pole.	The diameter of the pole ranges from 30 mm to 70 mm.	1. Plate 2. V clamp 3. Bolt (M6X80) 	
	The diameter of the pole ranges from 70 mm to 110 mm.	1. Plate 2. Hose clamp, which is prepared by the customer 	

Installing the pRRU3901 on a keel

The pRRU3901 can be installed on a keel of U-shape, T-shape, or H-shape. For the keels of other shapes, they are determined based on the onsite requirements.

Table 6-5 Keel-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a keel For details, see pRRU Installed on a Keel.	The keel is in U-shape, T-shape, H-shape, or other shapes.	1. Plate 2. V clamp 3. Bolt (M6X80) 	 shows the pRRU3901 installed on a U-shaped keel.

6.1.3 Space Requirements

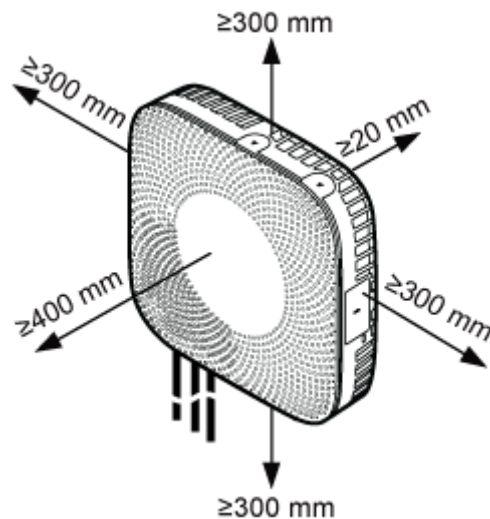
When the pRRU3901 is installed on a wall, ceiling, pole or keel, the minimum space is required for easy cabling and O&M. Based on the engineering practice, the recommendation for the installation space is provided.

NOTE

During installation, a minimum clearance of 2 m must be reserved between the pRRU3901 working on the 2.6 GHz band and the Wi-Fi module if they need to process services concurrently.

Figure 6-1 shows the recommended space requirements of the pRRU3901 when the external antenna is required.

Figure 6-1 Recommended space requirements of the pRRU3901



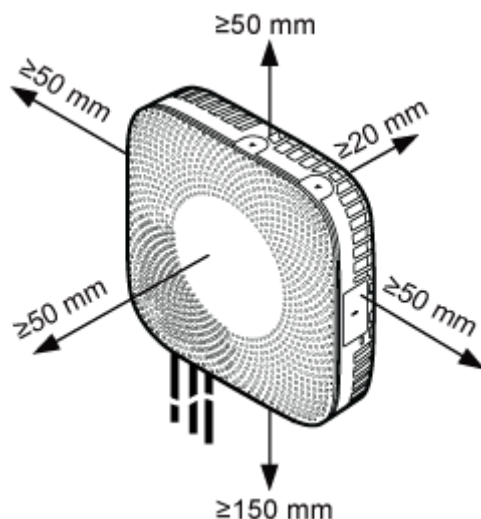
When the external antenna is required, the recommended space for installing a single pRRU3901 is described as follows:

- At least 300 mm above the pRRU3901 is reserved for maintenance.
- At least 300 mm under the pRRU3901 is reserved for cabling.
- At least 300 mm on the left of the pRRU3901 is reserved for maintenance.

- At least 300 mm on the right of the pRRU3901 is reserved for maintenance.
- At least 400 mm in front of the pRRU3901 is reserved for maintenance
- At least 20 mm on the back of the pRRU3901 is reserved for ventilation.

Figure 6-2 shows the minimum space requirements of the pRRU3901 when the external antenna is not required.

Figure 6-2 Minimum space requirements of the pRRU3901



When the external antenna is not required, the minimum space for installing a single pRRU3901 is described as follows:

- At least 50 mm above the pRRU3901 is reserved for maintenance.
- At least 150 mm under the pRRU3901 is reserved for cabling.
- At least 50 mm on the left of the pRRU3901 is reserved for maintenance.
- At least 50 mm on the right of the pRRU3901 is reserved for maintenance.
- At least 50 mm in front of the pRRU3901 for maintenance.
- At least 20 mm on the back of the pRRU3901 is reserved for ventilation.

6.1.4 pRRU3901 Installation Environment Requirements

The installation environment of a pRRU3901 involves the running environment specifications for the pRRU3901 and other specifications.

pRRU3901 Running Environment Specifications

Table 6-6 shows the environment specifications for the pRRU3901 installed indoors.

Table 6-6 pRRU3901 environment specifications

Specifications	Condition	Remarks
Operating temperature	- 5 °C to + 40 °C	-

Specifications	Condition	Remarks
e		
Relative humidity	5% RH to 95% RH	-
Altitude	- 60 m to + 1800 m	Works properly.
	1800 m to 4000 m	Above the 1800 m altitude, the maximum operating temperature decreases by 1 °C each time the altitude increases by 220 m.

Other Running Environment Specifications

- The pRRU3901 cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.
- The pRRU3901 cannot be installed near a strong heat source.
- The pRRU3901 cannot be installed in a position with water dripping, such as outdoor equipment of air conditioners, pipe, and leaking or dripping roofs.
- The installation position must be far from rains. If the pRRU3901 is installed on a wall, there must be no window on either side of the wall.
- The installation position must be far away from high voltage, highly corrosive devices, flammable or explosive substances, and electromagnetic interference.
- The pRRU3901 must be installed in a dry, ventilating, and dust-proof place.
- If the pRRU3901 is installed in parking areas or basements, the installation position must be well-ventilated.

6.2 Obtaining the MAC Address (Optional)

Before installing a pRRU3901, record the media access control (MAC) address, which will be used during pRRU3901 commissioning. This section applies only when a pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

Context

The MAC address indicates the IP address through which a device can be reached.

Procedure

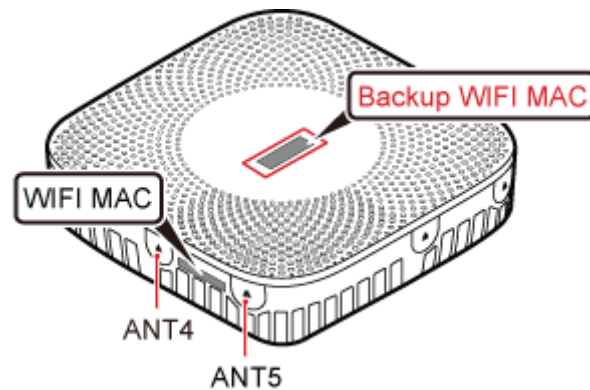
1. Remove the backup WIFI MAC label from the front housing of the pRRU3901 and keep them secure, as shown in [Figure 6-3](#).



NOTE

- Do not remove the WIFI MAC label on the side of the pRRU3901 housing.
- Before removing the backup WIFI MAC label, photograph it.

Figure 6-3 Removing backup WIFI MAC label



Step 2 Save the MAC according to MAC Collection Template, and report it to the pRRU3901 commissioning personnel.

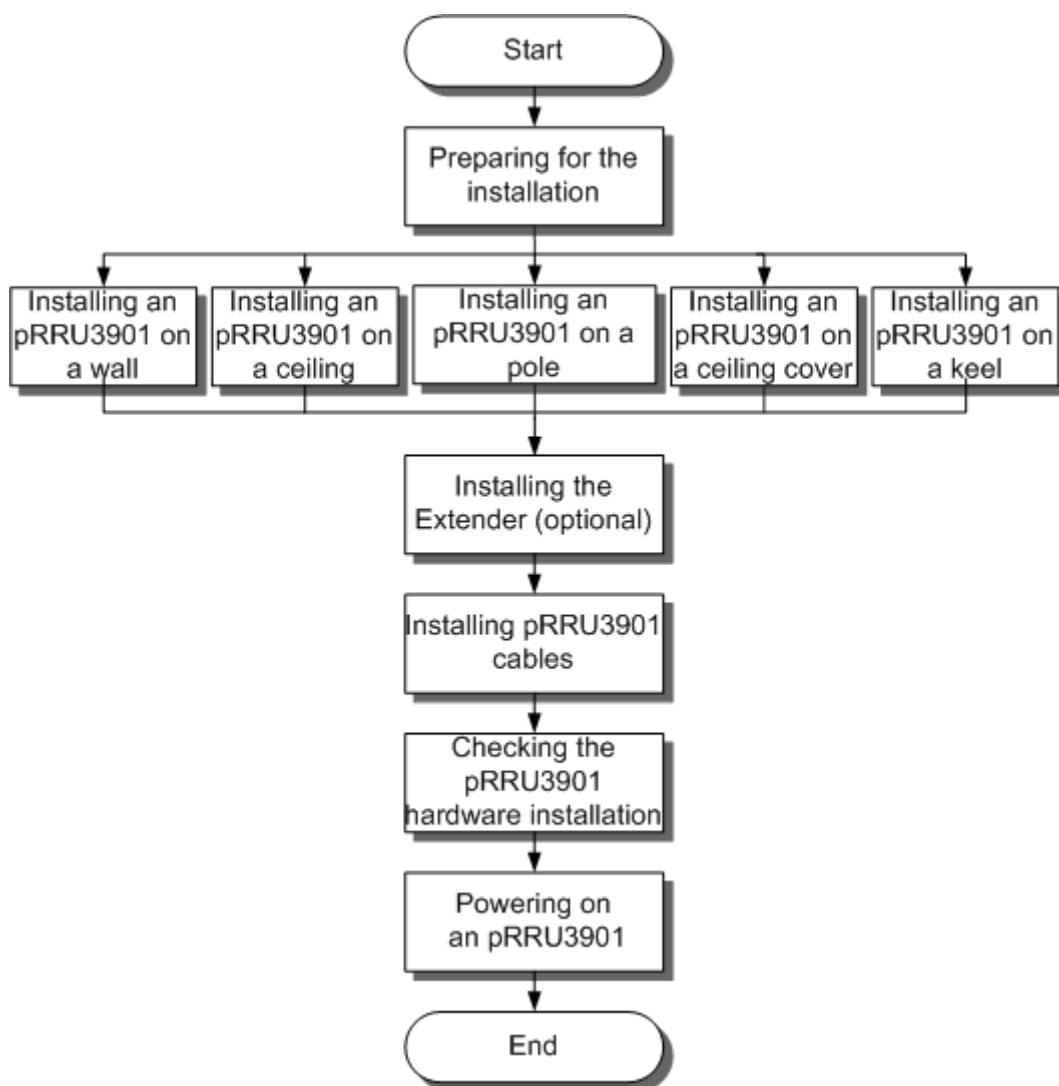
----End

6.3 Installation Process

This section describes the pRRU3901 installation process, which involves installing a pRRU3901, and cables, checking the pRRU3901 hardware installation, and powering on the pRRU3901.

[Figure 6-4](#) shows the pRRU3901 installation process.

Figure 6-4 pRRU3901 installation process



6.4 Installing a pRRU3901

This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or keel.



NOTE

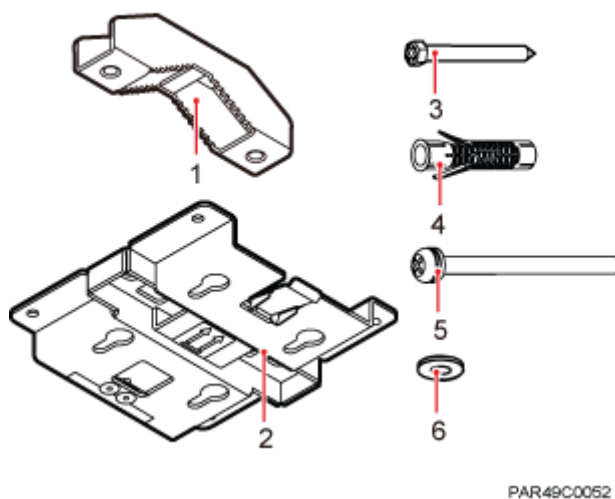
- The pRRU3901 cannot be grounded. If the pRRU3901 is grounded but the RHUB3908 connected to this pRRU3901 is not, the pRRU3901 may fail to be powered on.
- A minimum distance of 50 cm must be reserved between the pRRU3901 and the incandescent lamp.
- The installation spacing between the pRRU3901 and the temperature sensor must be greater than 50 cm.
- It is good practice to install the pRRU3901 on materials that can tolerate a temperature higher than 65 °C and have an ignition point higher than 70 °C.

6.4.1 pRRU3901 Installation Kits

This section describes the pRRU3901 installation kits.

Figure 6-5 shows the exterior of the pRRU3901 installation kits.

Figure 6-5 pRRU3901 installation kits



(1) V clamp

(2) Plate

(3) Screw (M6x50)

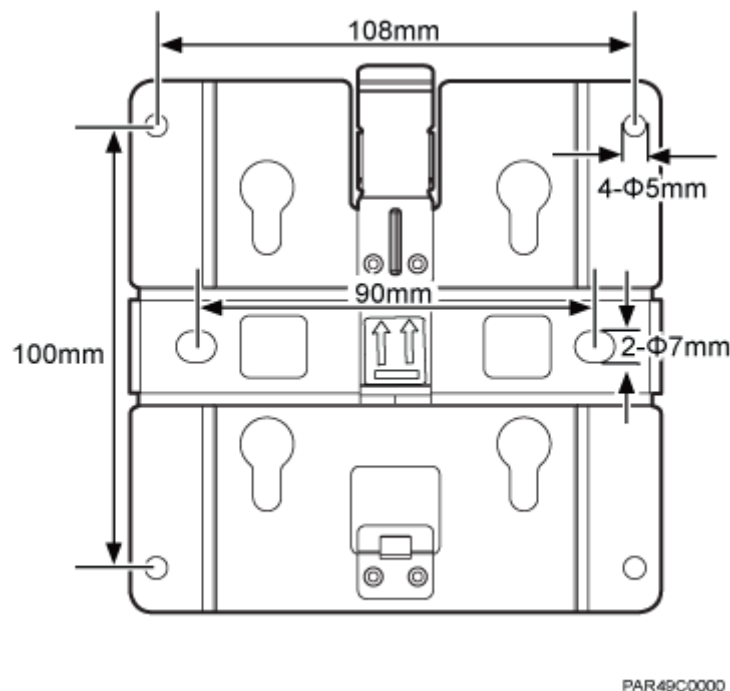
(4) Plastic expansion sleeve

(5) Bolt (M6x80)

(6) Flat washer

The following figure shows the specifications of the installation plate.

Figure 6-6 Plate specifications



6.4.2 pRRU3901 Installed on a Wall

If the wall indoors has sufficient load bearing capacity and space, the pRRU3901 is recommended to install on a wall. If the wall cannot bear the capacity, choose an installation mode based on site requirements.

Context



NOTICE

This section only describes the procedure of installing the pRRU3901 on a wall without any other auxiliary devices. The installation procedure of other wall-mounted modes is similar to that of installing the pRRU3901 on a wall without auxiliary devices.

Procedure

1. Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

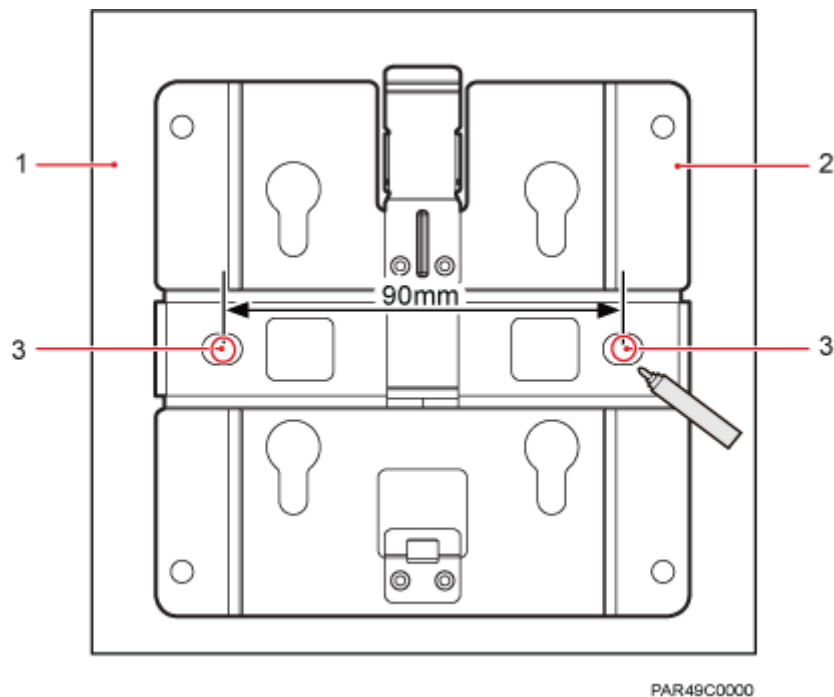


NOTE

For pRRU3901 installation space requirements, see Space Requirements.

- Step 2** Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 6-7](#).

Figure 6-7 Anchor points of the pRRU3901 installation kits (unit: mm)



(1) Wall

(2) Plate

(3) Anchor point

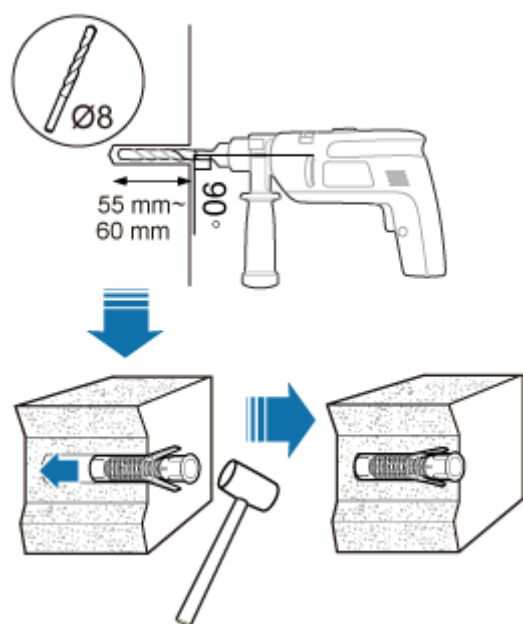


CAUTION

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

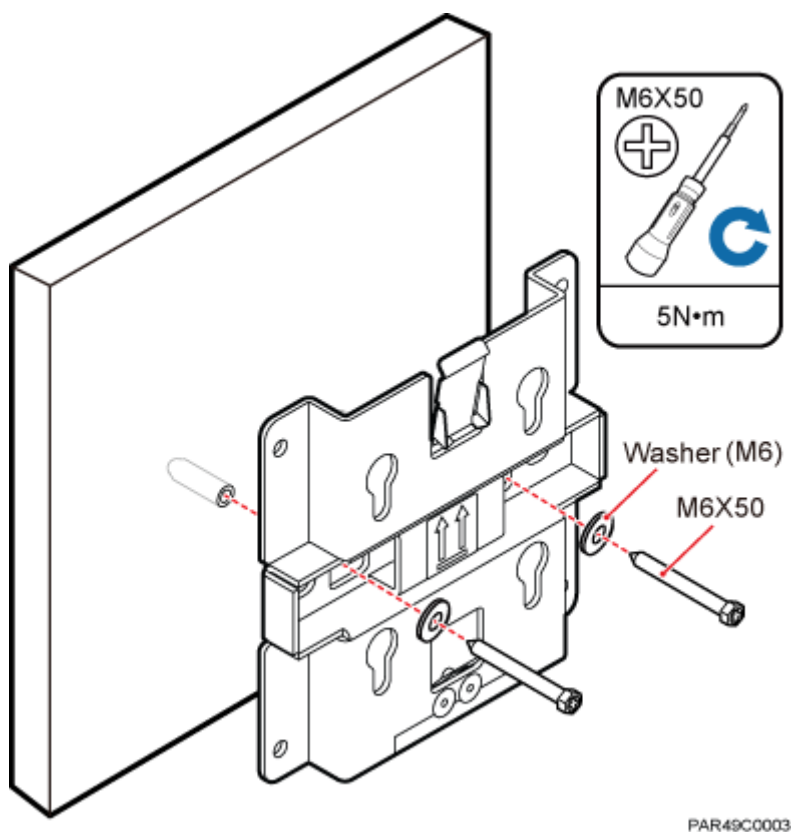
- Step 3** Use a hammer drill with a $\phi 8$ bit to drill holes at the marked anchor points as shown in as shown in [Figure 6-8](#). Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 6-8 Drilling holes and installing expansion bolts



Step 4 Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and tighten the screw to a torque of 5 N•m, as shown in [Figure 6-9](#).

Figure 6-9 Installing the plate





NOTE

If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

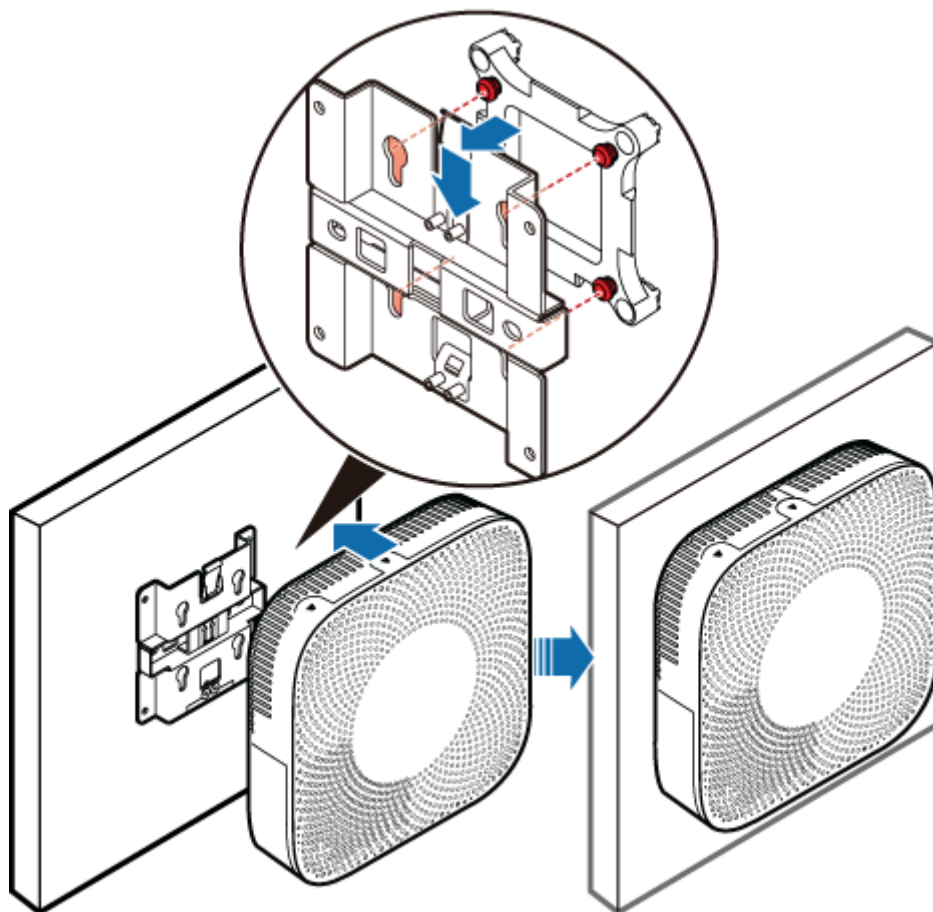
- Step 5** Fit the four hooks of the pRRU3901 into the installation kits, as shown in [Figure 6-10](#). If the hooks are properly installed, a slight clack can be heard.



NOTE

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-10 Installing the pRRU3901 on a plate



PAR49C0003

----End

6.4.3 pRRU3901 Installed on a Ceiling

This section describes the procedure of installing a pRRU3901 on the ceiling, such as the concrete ceiling, when the ceiling has sufficient load bearing capacity and installation space.

Context



NOTICE

If the pRRU3901 is installed on the ceiling, the temperature of the ceiling may increase by a maximum of 30 degrees. Therefore, whether a pRRU3901 can be installed on a ceiling depends on the ceiling material.

Procedure

1. Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

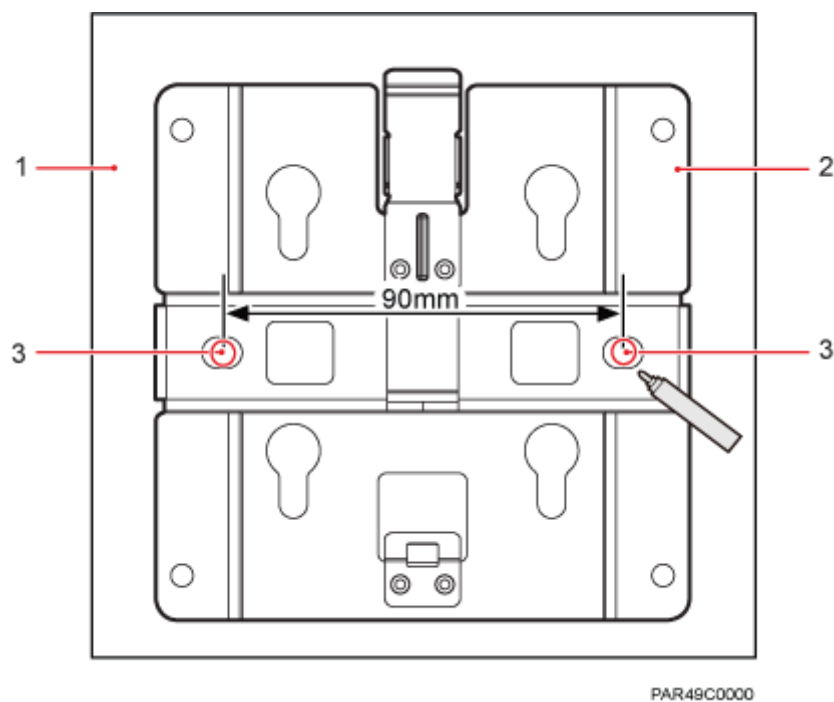


NOTE

For pRRU3901 installation space requirements, see Space Requirements.

- Step 2** Place the plate in the installation position against the ceiling. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 6-11](#).

Figure 6-11 Anchor points of the pRRU3901 installation kits (unit: mm)



(1) Ceiling

(2) Plate

(3) Anchor point of the bolt

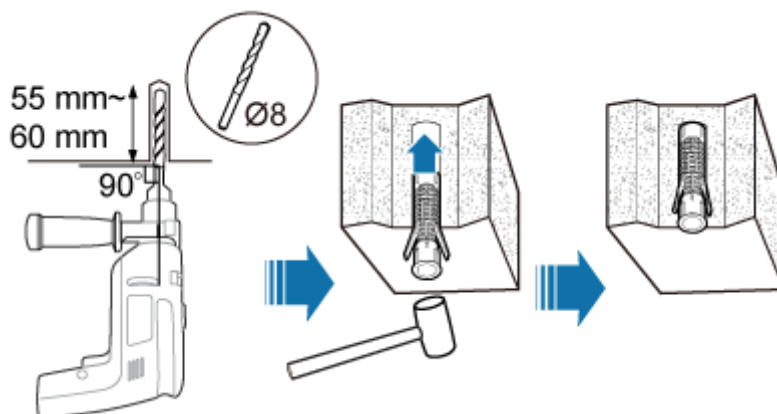


CAUTION

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

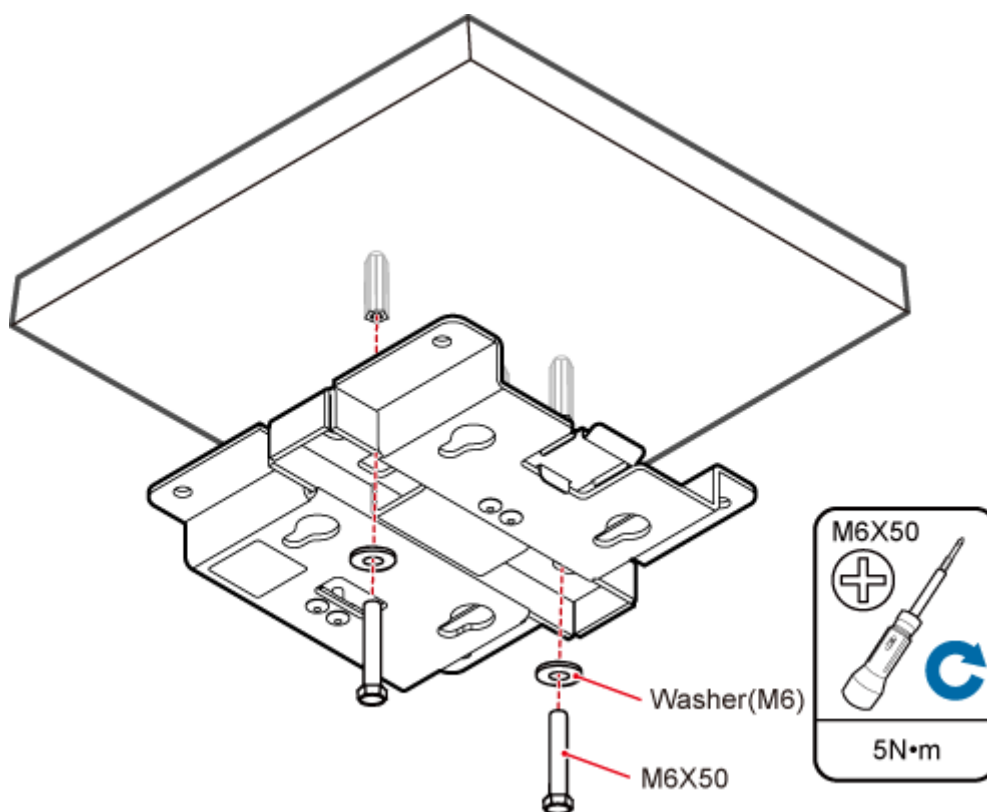
- Step 3** Use a hammer drill with a $\phi 8$ bit to drill holes at the marked anchor points as shown in as shown in [Figure 6-12](#). Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 6-12 Drilling holes and installing expansion bolts



- Step 4** Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and use a torque screwdriver to tighten the screw with a torque of 5 N•m, as shown in [Figure 6-13](#).

Figure 6-13 Installing the plate



NOTE

If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

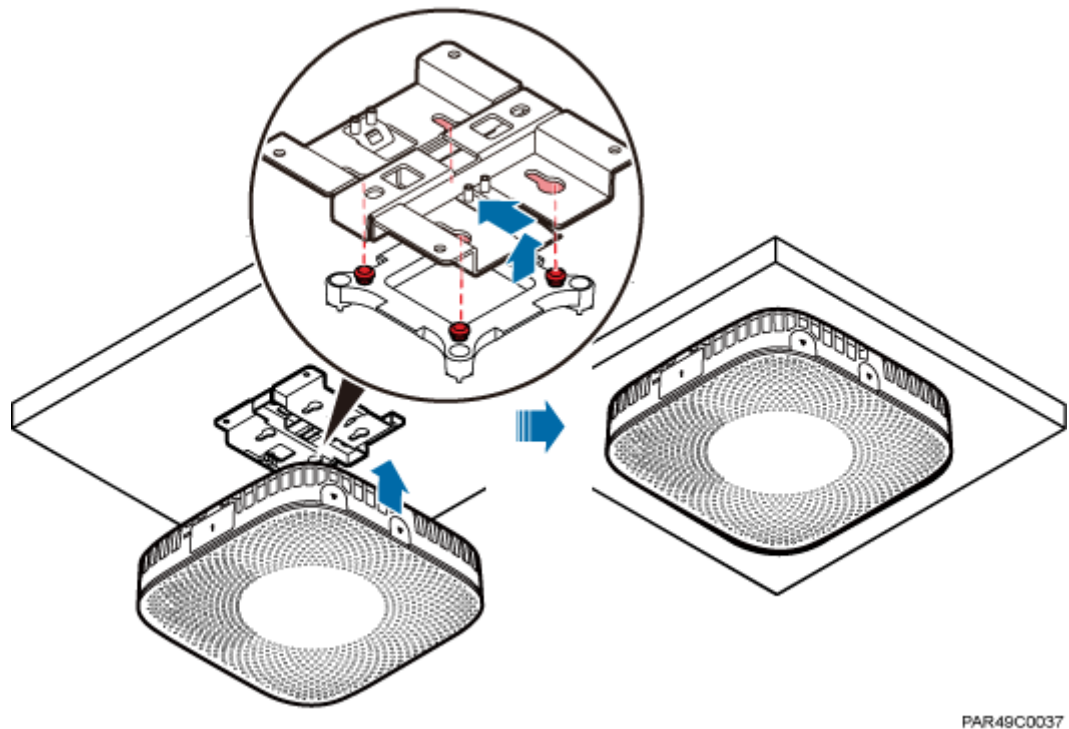
Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in [Figure 6-14](#). If the hooks are properly installed, a slight clack can be heard.



NOTE

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-14 Installing a pRRU3901



----End

6.4.4 pRRU3901 Installed on a Pole

A pRRU3901 can be installed on a metal pole indoors.

Procedure

1. Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

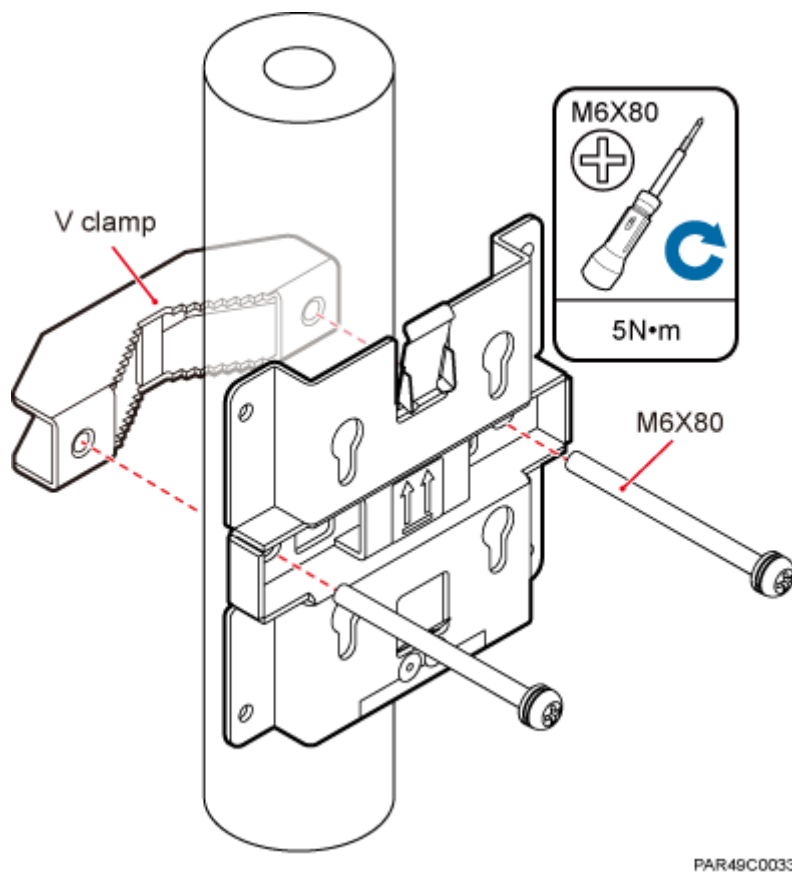


NOTE

For pRRU3901 installation space requirements, see Space Requirements.

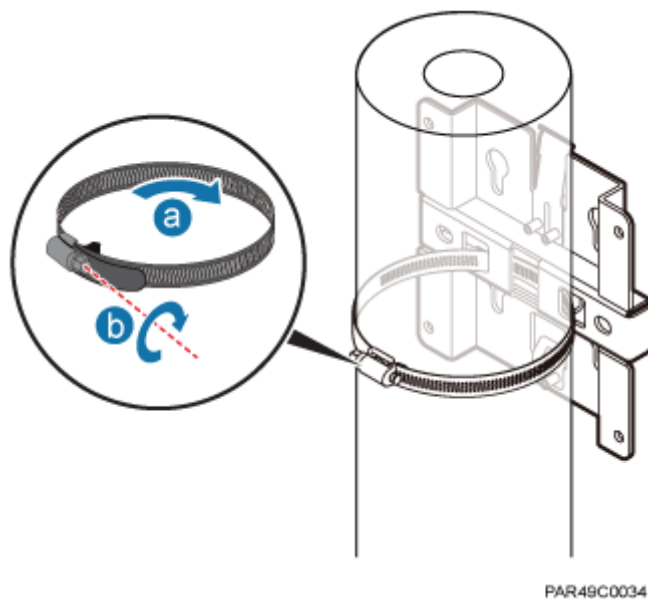
- Step 2** If the diameter of the pole ranges from 30 mm to 70 mm, use the delivered V clamp, installation plate, and bolts to install the pRRU3901 on the pole. Lead the M6x80 bolt through the plate, and tighten the bolt to a torque of 5 N•m, as shown in [Figure 6-15](#).

Figure 6-15 Securing the pRRU3901 installation kits on the metal pole



If the diameter of the pole is larger than 70 mm, use the hose clamp to install the plate on the pole. The hose clamp is prepared by customers. Tighten the bolt with a torque of 5 N•m, as shown in [Figure 6-16](#).

Figure 6-16 Securing the pRRU3901 installation kits on the metal pole



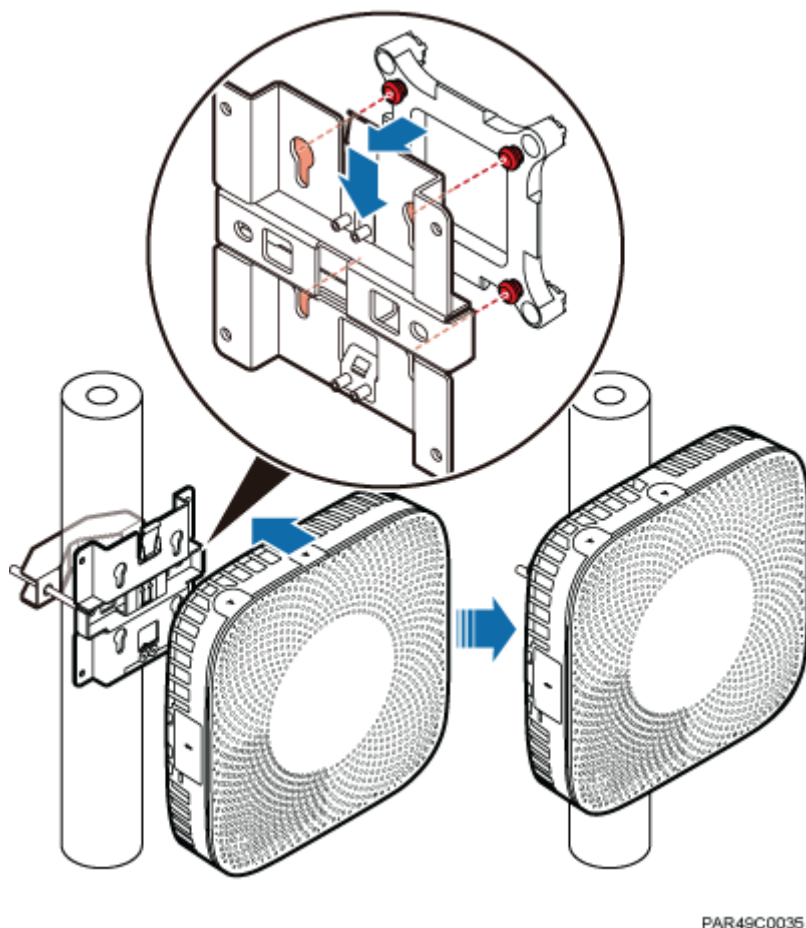
Step 3 Fit the four hooks of the pRRU3901 into the installation kits, as shown in [Figure 6-17](#). If the hooks are properly installed, a slight clack can be heard.



NOTE

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-17 Installing a pRRU3901



----End

6.4.5 pRRU3901 Installed on a Plate

If the plate on the ceiling has sufficient load bearing capacity and space installation, the pRRU3901 can be installed on the plate of the ceiling indoors.

Procedure

1. Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.

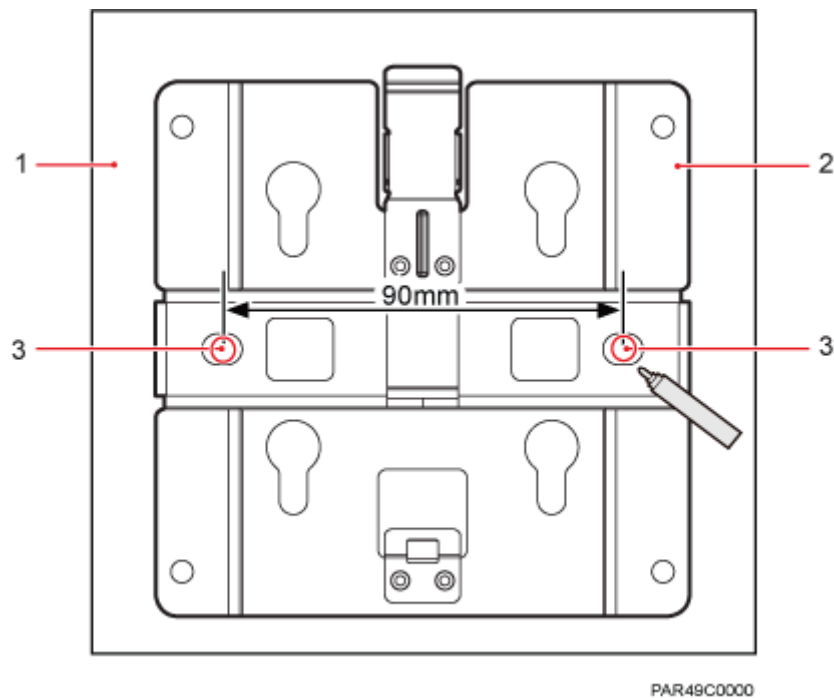


NOTE

For pRRU3901 installation space requirements, see Space Requirements.

- Step 2** Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 6-18](#).

Figure 6-18 Anchor points of the pRRU3901 installation kits (unit: mm)



(1) Panel

(2) Plate

(3) Anchor point

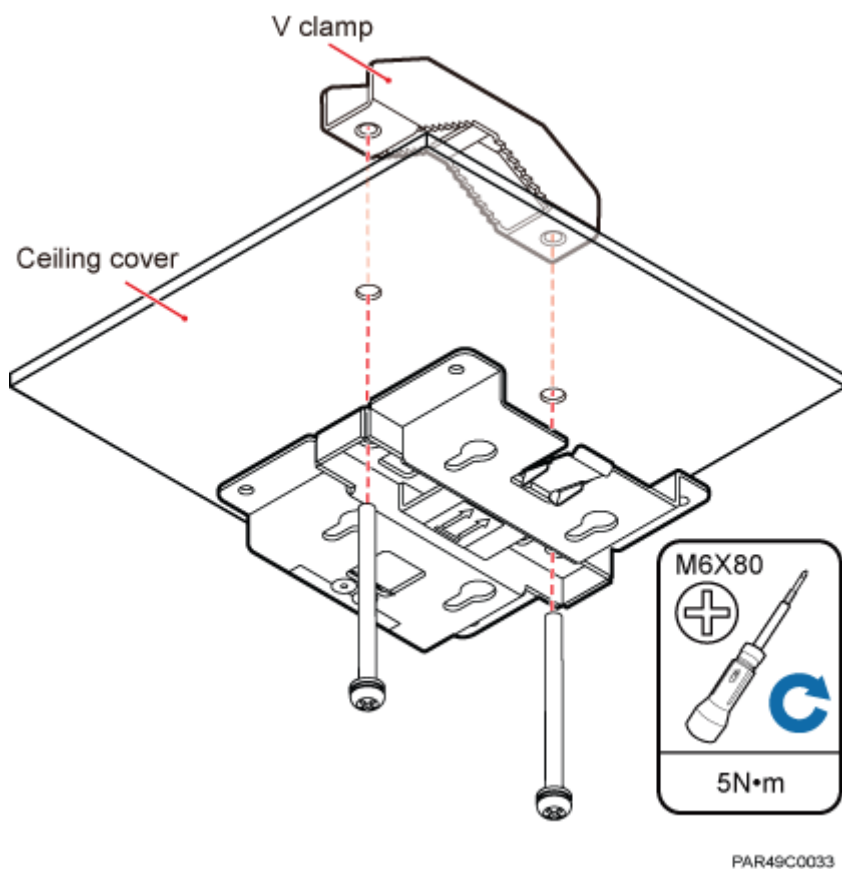


CAUTION

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

- Step 3** Use a hammer drill with bit 8 to drill holes at the anchor points.
- Step 4** Lead the bolt M6x80 through the panel and daughter board, and tighten the torque screwdriver to a torque of 5 N•m, as shown in [Figure 6-19](#).

Figure 6-19 Installing the pRRU3901 installation kits



Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in [Figure 6-20](#). If the hooks are properly installed, a slight clack can be heard.



NOTE

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

----End

If the ceiling cover cannot bear the pRRU3901, the pRRU3901 can be installed on the keel of a ceiling.

Before installing the pRRU3901 on a keel, ensure that the keel is strong enough to bear the pRRU3901.

- The installation kits of the pRRU3901 can be installed on the keel of the following specifications: GBT 11981-2008, JIS A6517-2002, and ASTM C635 C635M-2007. The installation mode must depends on onsite requirements because there are various keels.
- This section describes the procedure of installing a pRRU3901 on the keel of JIS standard used in Japan. The procedure of installing a pRRU3901 on other keels is the same as that of installing a pRRU3901 on the keel of JIS standard.

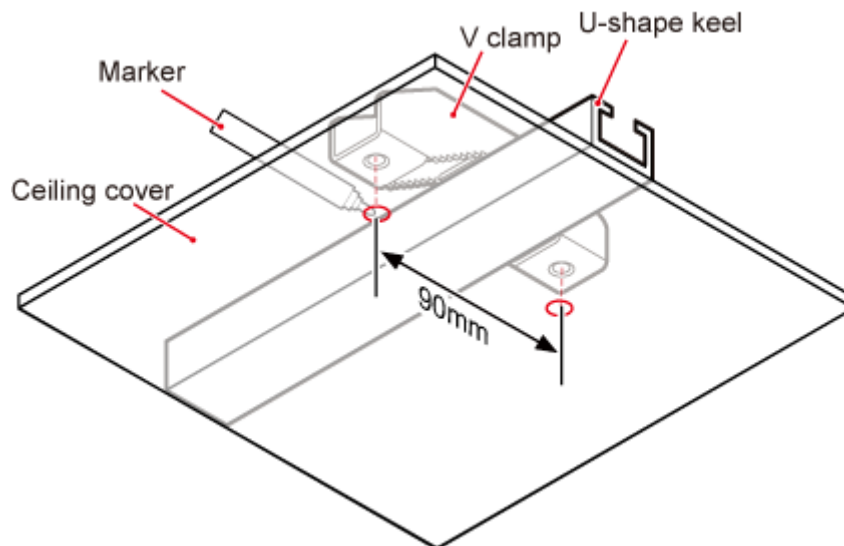
1. Determine the position for installing the pRRU3901 based on the construction blueprint and the space requirements.



For pRRU3901 installation space requirements, see Space Requirements.

- Step 2** Lead the V clamp on across the keel, and mark the projective position on the cover with a marker, as shown in [Figure 6-21](#).

Figure 6-21 Anchor points on a plate (unit: mm)

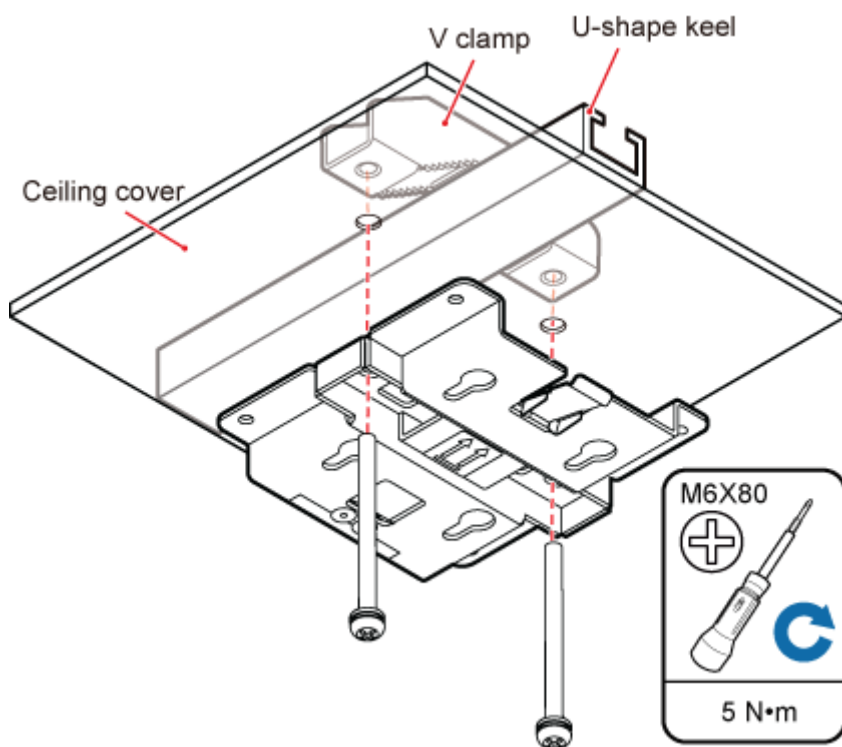


CAUTION

To prevent inhalation or eye contact with dust, take adequate preventive measures when drilling holes.

- Step 3** Use a hammer drill to drill holes at the anchor points. You are advised to use the hammer drill $\Phi 12$.
- Step 4** Lead the bolt M6x80 through the installation plate and ceiling cover, and then socket to tighten the bolt to a torque of 5 N•m, as shown in [Figure 6-22](#).

Figure 6-22 Installing the pRRU3901 installation kits



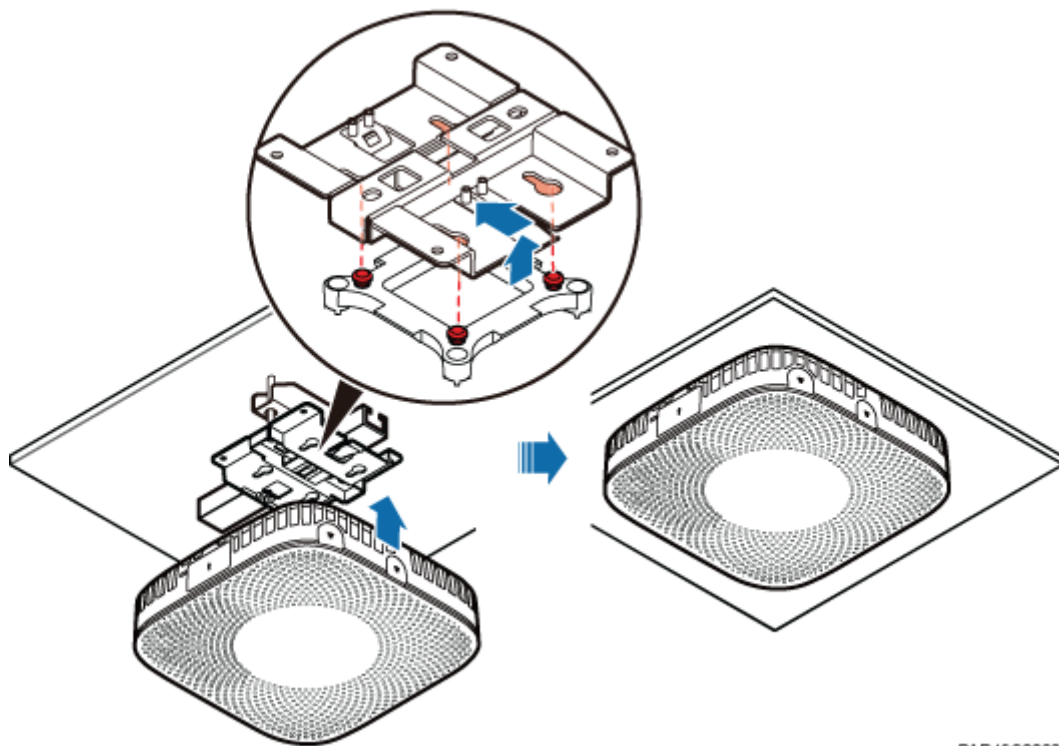
Step 5 Fit the four hooks of the pRRU3901 into the installation kits, as shown in [Figure 6-23](#). If the hooks are properly installed, a slight clack can be heard.



NOTE

It is recommended that you observe the installation from one side of the pRRU3901 when inserting hooks into the kits.

Figure 6-23 Installing a pRRU3901



PAR49C0062

---End

6.5 Installing pRRU3901 Cables

This section describes the procedure of installing the pRRU3901 cables.

6.5.1 Requirements for Cable Layout

Cables must be routed according to the specified cabling requirements to prevent signal interference.



NOTE

If certain cables listed below are not required, skip the requirements for routing these cables.

General Requirements for Cable Layout

中国标准

- 综合布线系统工程设计规范 GB 50311-2007
- 综合布线工程验收规范（含条文说明） GB 50312-2007
- 安全防范工程技术规范 GB 50348-2004
- 电子信息系统机房施工及验收规范 GB 50462-2008
- 智能建筑工程质量验收规范 GB 50339-2003
- 建筑电气工程施工质量验收规范 GB 50303-2002

- 通信管道工程施工及验收技术规范 GB 50374-2006

国际标准

- 用户建筑综合布 ISO / IEC 11801
- 商业建筑电信布线标准 EIA / TIA 568
- 商业建筑电信布线安装标准 EIA / TIA 569
- 商业建筑通信基础结构管理规范 EIA / TIA 606
- 商业建筑通信接地要求 EIA / TIA 60
- 信息系统通用布线标准 EN 50173
- 信息系统布线安装标准 EN 50174

Bending radius

- The bending radius of a 1/4" jumper, a 1/2" softer jumper, and a 1/2" common jumper must be longer than 35 mm, 50 mm, and 127 mm, respectively.
- The bending radius of a power cable is at least three times the diameter of the cable.
- The bending radius of a signal cable must be at least five times of the diameter of the cable.

Cable binding

- Cables of the same type are bound together.
- Different types of cables must be separately routed with a minimum spacing of 30 mm and cannot be entangled.
- The cables are bound tightly and neatly and the sheaths of the cables is intact.
- The cable ties face the same direction and all cable ties bound at similar positions must be in a straight line.
- The extra length of each indoor cable tie must be cut off. A slack of 5 mm is reserved for each outdoor cable tie before the extra length is cut off. All cut surfaces are without sharp edges.
- Labels or nameplates are attached to both ends, joints, or turns of cables after they are installed.

Safety

- Cables are placed away from sharp objects or wall burrs. If these positions are inevitable, protection pipes are required for the cables.
- Cables are routed away from heat sources, or heat-insulation materials are added between cables and heat sources.
- A clearance is reserved at turns of a cable or the position close to a device, facilitating cable and device maintenance. The recommended clearance is about 0.1 m.

Requirements for Special Cables

Ethernet Cable

- A maximum of 100 Ethernet cables can be bundled if no PVC pipes are used. If pipes are used, a maximum of 24 Ethernet cables can be led through a pipe. In this case, ensure that 1/3 space inside the pipes must be vacant.

6.5.2 pRRU3901 Cable List

This section describes pRRU3901 cable connections.

Table 6-7 lists pRRU3901 cables.

Table 6-7 List of pRRU3901 cables

Cable	One End		The Other End	
	Connector	Connected to ...	Connector	Connected to ...
Ethernet Cable	RJ45 connector	RHUB3908/CPRI_E0~CPRI_E7 port	RJ45 connector	pRRU3901/CPRI_E0~CPRI_E1 port
	RJ45 connector	AC or Transmission port	RJ45 connector	pRRU3901/GE port
(Optional) pRRU3901 RF Jumper	SMA straight male connector	External antenna TX/RX RF port on the pRRU3901	Based on the port model of the antenna system.	Antenna system



NOTE

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.
- The Ethernet cable used for connecting the GE port on the pRRU3901 to the AC transmission port is required only when the pRRU3901 have three transmission ports and is configured with the Wi-Fi daughter board.

6.5.3 Cable Connections

This section describes the cable connections for a single pRRU3901 and multiple pRRU3901s in UMTS, LTE FDD, UMTS+LTE FDD, LTE FDD+LTE FDD mode.

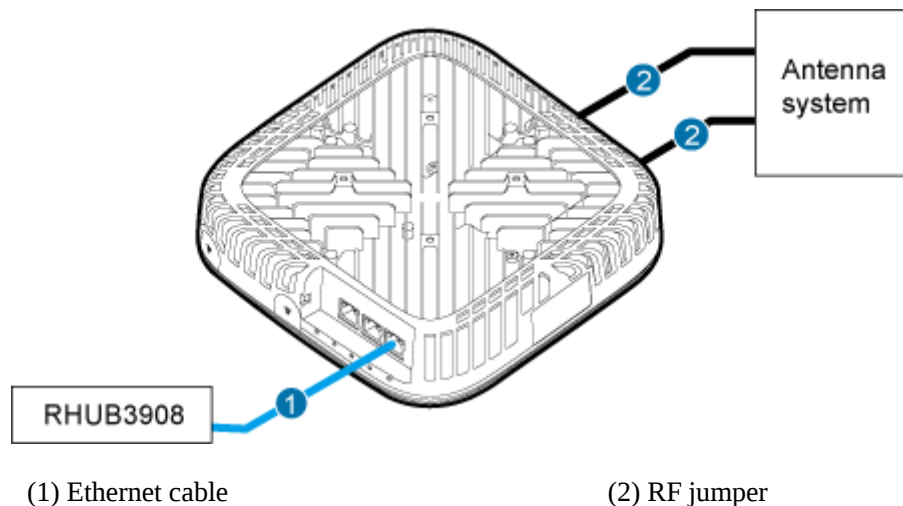
Before installing the pRRU3901 cables, you must be aware of the following information:

- The pRRU3901 can obtain power supply through the power over Ethernet (PoE).
- For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to RF daughter board 2, the TX port and RX port are ANT2 and ANT3, respectively. For external antennas corresponding to RF daughter board 3, the TX port and RX port are ANT4 and ANT5, respectively.
- The external antenna system is optional, and the pRRU3901 jumpers are not delivered. By default, the pRRU3901s are configured with built-in antennas. If the external antenna system is connected, the antenna system automatically switches to the external one. One end of the pRRU3901 RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU3901. The other end of the pRRU3901 RF jumper is the type N male connector, which is connected to the antenna system. For the

standard of the pRRU3901 RF jumper, see (Optional) pRRU3901 RF Jumper of the *LampSite Hardware Description*.

Figure 6-24 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

Figure 6-24 pRRU3901 cable connection (1)

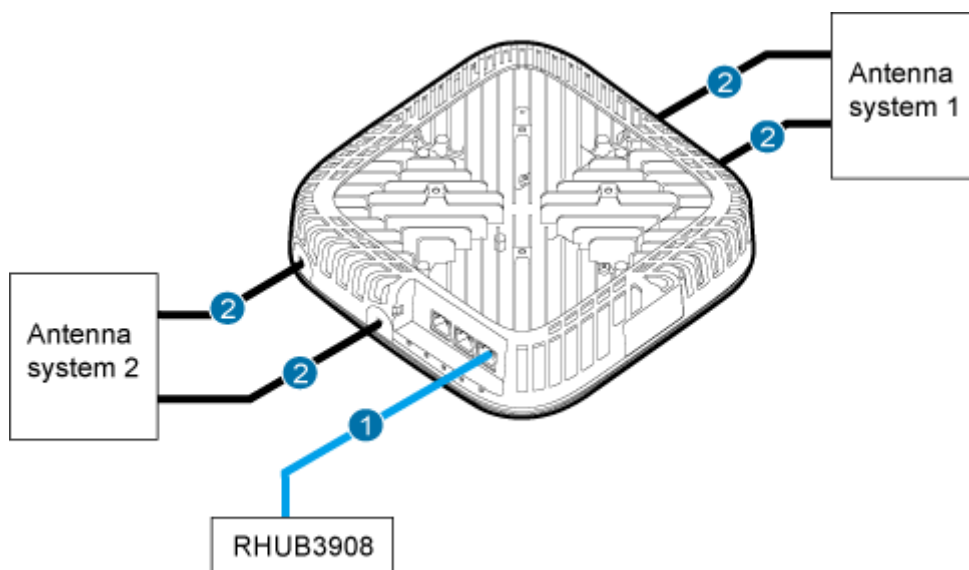


NOTE

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.
- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

Figure 6-25 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards.

Figure 6-25 pRRU3901 cable connection (2)



PAR49C0028

(1) Ethernet cable

(2) RF jumper

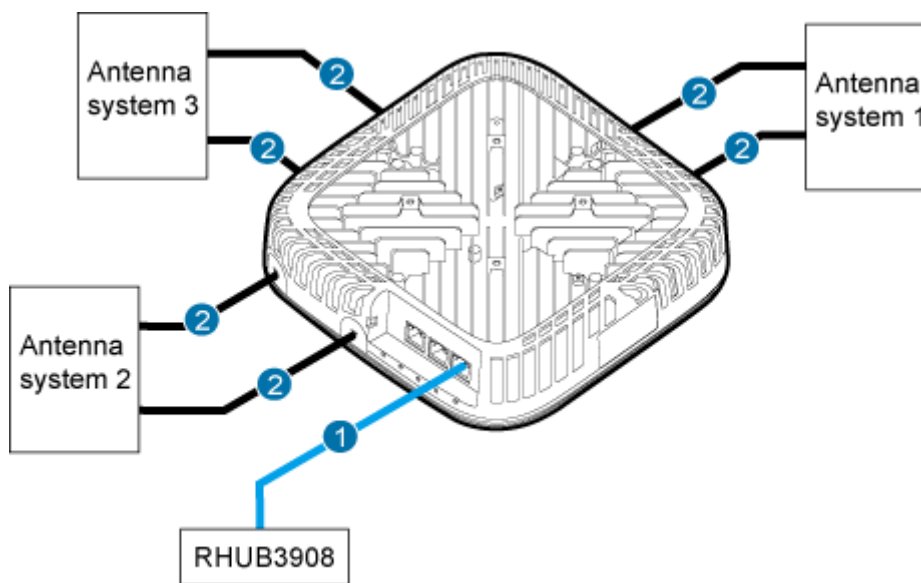


NOTE

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.
- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

Figure 6-26 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards and one Wi-Fi daughter board.

Figure 6-26 pRRU3901 cable connection (3)



PAR49C0028

(1) Ethernet cable

(2) RF jumper



NOTE

- The Extender can be used to lengthen the distance between the RHUB3908 and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB3908 and the Extender and the other between the Extender and the pRRU3901.
- When two Ethernet cables are used to transmit CPRI signals, connect one end of the cables to the CPRI_E0 and CPRI_E1 ports on the pRRU3901 panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB3908 panel. This document describes signal transmission using one Ethernet cable as an example.

6.5.4 Cable Connections (LTE TDD)

This section describes the cable connections for a single pRRU3901 and multiple pRRU3901s in LTE TDD mode.

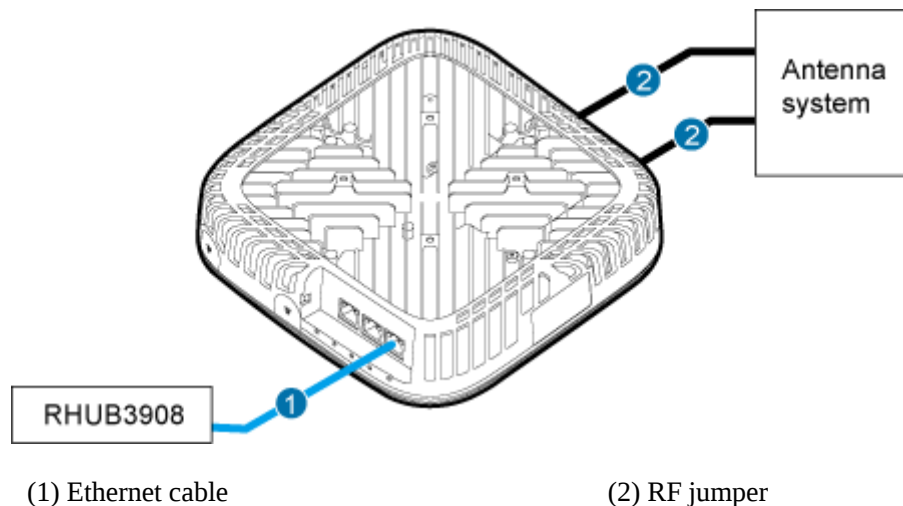
Before installing the pRRU3901 cables, you must be aware of the following information:

- The pRRU3901 can obtain power supply through the power over Ethernet (PoE).
- For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to RF daughter board 2, the TX port and RX port are ANT2 and ANT3, respectively. For external antennas corresponding to RF daughter board 3, the TX port and RX port are ANT4 and ANT5, respectively.
- The external antenna system is optional, and the pRRU3901 jumpers are not delivered. By default, the pRRU3901s are configured with built-in antennas. If the external antenna system is connected, the antenna system automatically switches to the external one. One end of the pRRU3901 RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU3901. The other end of the pRRU3901 RF jumper is the type N male connector, which is connected to the antenna system. For the

standard of the pRRU3901 RF jumper, please see (Optional) pRRU RF Jumper of the *LampSite Hardware Description*.

Figure 6-27 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

Figure 6-27 pRRU3901 cable connection (1)



NOTE

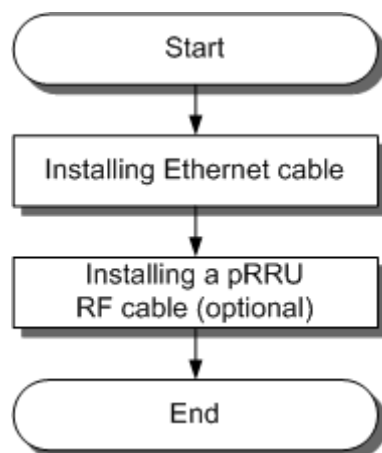
The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.

6.5.5 pRRU3901 cable installation process

This section describes the process of installing pRRU3901 cables.

Figure 6-28 shows the process of installing pRRU3901 cables.

Figure 6-28 pRRU3901 cable installation process



6.5.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.
- The Ethernet cable must be of Category 5e (enhanced) or higher. In addition, its cross-sectional area must be 24 AWG or larger and frame spread rating must be CM or higher. With the internal PoE module providing power, the maximum length of an Ethernet cable is 100 m. With the Extender, the distance of the pRRU3901 and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

Context

The Ethernet cable has the following functions:

- Provides power supply for the pRRU3901 when the cable connects the CPRI_E0 port on the pRRU3901 to the RHUB.
- Transmits CPRI signals between an RHUB3908 and a pRRU3901.
- Provides Wi-Fi services for the pRRU3901 when the cable connects the GE port on the pRRU3901 with three transmission ports to the AC.

Using the CPRI_E1 port on the pRRU3901 has the same Ethernet cable connection to the RHUB3908 as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

Procedure

1. Make the Ethernet cables.
1. Assemble an RJ45 connector and an Ethernet cable by following instructions in *Assembling the Unshielded RJ45 Connector and the Ethernet Cable of Installation Reference*.



NOTE

Follow pin assignment instructions described in section Ethernet Cable in *LampSite Hardware Description* to assemble the unshielded RJ45 connector and the Ethernet cable. Otherwise, the transmission signal quality deteriorates and CPRI links may be disconnected.

2. Check whether the made RJ45 connector is qualified by following instructions in *Checking the Appearance of Metal Contact Strips*.
3. To complete the assembly of the other end, repeat [Step 1.1](#) and [Step 1.2](#).
4. Check whether the touch points on the connectors at both ends are normally conducted and well contacted and whether the connections are correct by following instructions in *Testing the Connection of Assembled Cables of Installation Reference*.

Step 2 Install an Ethernet cable between an RHUB3908 and a pRRU3901.

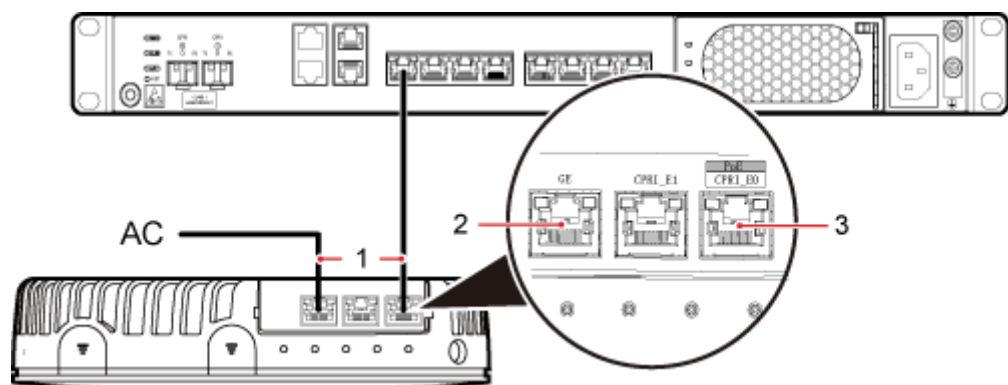
1. Remove the dustproof cap of the CPRI_E0 port on the pRRU3901.
2. Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU3901 panel.
3. **Optional:** Connect the RJ45 connector at the other end of the Ethernet cable to the output port of the Extender. Then, connect the RJ45 connector at one end of another Ethernet cable to the input port of the Extender.

4. Connect the RJ45 connector at the other end of the Ethernet cable to any port ranging from CPRI_E0 to CPRI_E7 on the RHUB3908 panel based on the engineering design, as shown in [Figure 6-29](#).

Step 3 Optional: Install the Ethernet cable between the pRRU3901 and the AC. This operation is required when the pRRU3901 with three transmission ports is configured with a Wi-Fi daughter board.

1. Remove the dustproof cap of the GE port on the pRRU3901.
2. Connect the RJ45 connector at one end of the Ethernet cable to the GE port on the pRRU3901 panel.
3. Connect the RJ45 connector at the other end of the Ethernet cable to the transmission port of the AC based on the engineering design, as shown in [Figure 6-29](#).

Figure 6-29 Installing an Ethernet cable



(1) Ethernet cable (2) GE port on the pRRU3901 (3) CPRI_E0 port on the pRRU3901

NOTE

The pRRU3901 can have two transmission ports plus one PWR port or three transmission ports (plus one PWR port or no PWR port), requiring the same installation operations. This section uses the pRRU3901 with three transmission ports no PWR port as an example.

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [6.5.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

6.5.7 Installing pRRU3901 Jumpers (Optional)

pRRU3901 jumpers transmit radio frequency signals. One end of the jumper is the SMA straight male connector, and the other end is the type N connector.

Context

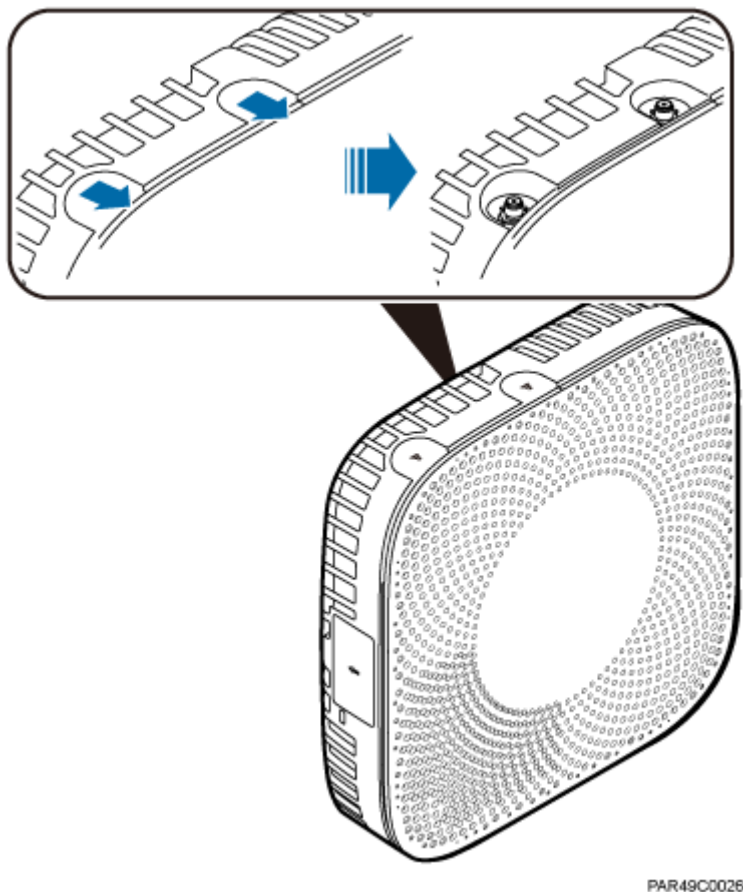
- If the RF jumper is provided by the customer, the jumper must not be lower than the RG316 specifications. In addition, the jumpers can be used after they are checked by Huawei engineers.

- pRRU3901s can be connected to external whip antennas or external remote antennas (through pRRU3901 RF jumpers). Whip antennas are delivered optionally. RF jumpers are not delivered.

Procedure

1. Expose the SMA female connector by removing the pRRU3901 antenna housing, as shown in Figure 6-30.

Figure 6-30 Removing the pRRU3901 antenna housing



- Step 2** Use a torque wrench with a torque of 0.6 N•m to connect the SMA straight male connector on a jumper to the ANT port on the pRRU3901 panel.



NOTICE

Tighten it with hands, and then use a torque wrench to tighten it with a rotational speed of less than or equal to 2.4 rpm to tighten it.

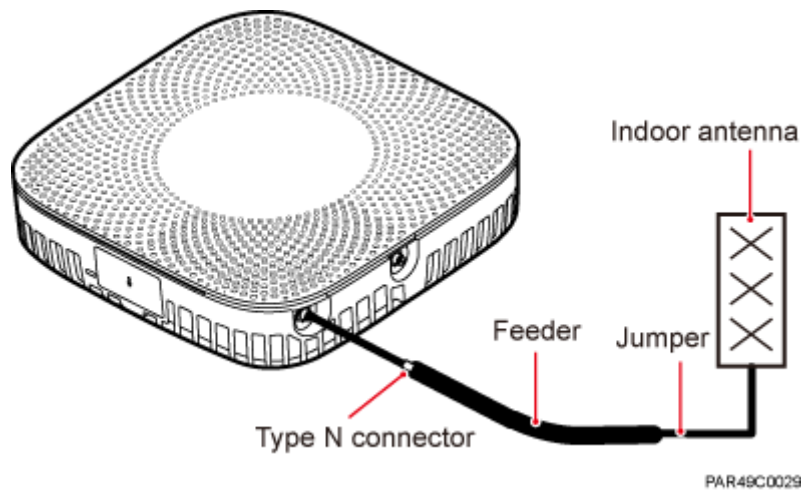
- Step 3** Connect the type N female connector of the jumper to the type N male connector of the RF feeder connected to the built-in antenna.



NOTICE

Tighten the feeder close to the type N connector to ensure that the jumper is not tightened. In this way, the connectors on both ends of a jumper are not affected by the external force.

Figure 6-31 Installing jumpers between the pRRU3901 and external antennas



----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [6.5.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [8.3 Attaching an L-Shaped Label](#).

6.6 Checking the pRRU3901 Hardware Installation

pRRU3901 hardware installation checking includes hardware and cable installation checking.

[Table 6-8](#) lists the hardware installation checking items.

Table 6-8 Hardware installation checking list

No.	Item
1	Ensure that the pRRU3901 is not grounded.
2	The position for each device conforms to the engineering design and meets the space requirement.
3	Ensure that the pRRU3901 is properly installed.
4	The surface of the pRRU3901 is neat and clean. The external paint is intact.

No.	Item
	The labels, tags, and nameplates are correct, legible, and complete.

Table 6-9 lists the check items of the signal cable connection.

Table 6-9 Checklist for the signal cable connection

No.	Item
1	The connectors of the signal cables must securely connected.
2	The connectors of the signal cables are intact.
3	The signal cables are intact.
4	The cable ties are evenly spaced. The signal cables are bound neatly with cable ties to proper tightness, and arranged at even intervals in the same direction.
5	The extra length of the cable ties is cut and removed. The cut surfaces of the indoor cables are smooth and have no sharp edges.
6	The cable layout facilitates maintenance and expansion.
7	Correct and clear labels are attached to both ends of the signal cables.

Table 6-10 lists the checking items for other cable connections.

Table 6-10 Checklist for other cable connections

No.	Item
1	The connectors of the other cables must securely connected.
2	Labels on the cables are legible and bound based on the engineering requirements. The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
3	Positions for routing the cables must meet requirements of the engineering design.

6.7 Powering on the pRRU3901

This section describes the power-on check on the pRRU3901 after the pRRU3901 hardware is installed and checked.

Procedure

1. Power on the pRRU3901.

The pRRU3901 can be powered in PoE mode. The RHUB3908 adopts the PoE power supply to provide power for the pRRU3901 over the CPRI_E0 port.

Step 2 Power on the pRRU3901. Wait 3 to 5 minutes, check the status of the RUN indicator on the pRRU3901.

If the RUN Indicator...	Because...	Then...
Steady on	There is power input, but the board is faulty.	Power off the power supply, rectify the fault, and power on the pRRU3901.
Steady off	There is no power input, or an alarm is reported on the board.	Power off the power supply and check the power input. If no fault is found after the pRRU3901 is powered off, clear the fault on the board, and power on the pRRU3901.
On for 1s and off for 1s	The device works properly.	End this operation.
On for 0.125s and off for 0.125s	The software of the board is loading.	Wait five minutes for the software to be successfully loaded. If the software is loading five minutes later, shut off the power supply. Check whether the data configuration file is correct. After the fault is rectify, power on the pRRU3901 again.

----End

7

Installing the Extender (Optional)

This section describes the Extender installation process.

Context

When an RHUB3908 and a pRRU need extended install, use extender. With the Extender, the distance of the pRRU and RHUB3908 can be extended by the Extender up to a total distance of 200 m.

The Extender can be installed on a wall or ceiling in the same mode. This section describes wall-mounted installation as an example.

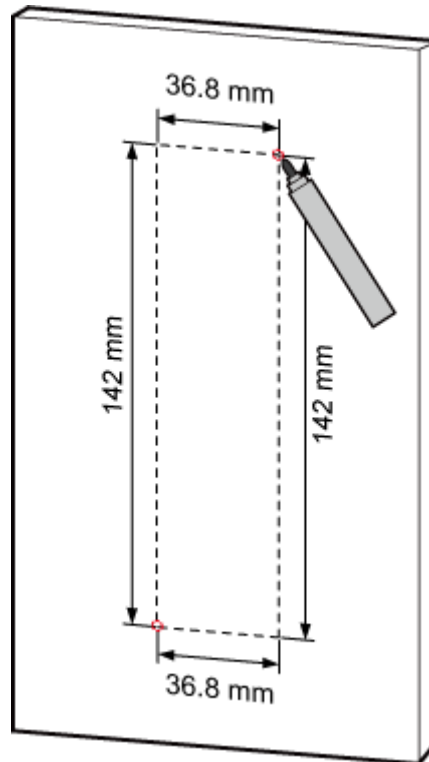
Only space above and under the Extender is required to be reserved when installing the Extender. The recommended space for installing the Extender is described as follows:

- At least 150 mm above the Extender is reserved for cabling.
- At least 150 mm under the Extender is reserved for cabling.

Procedure

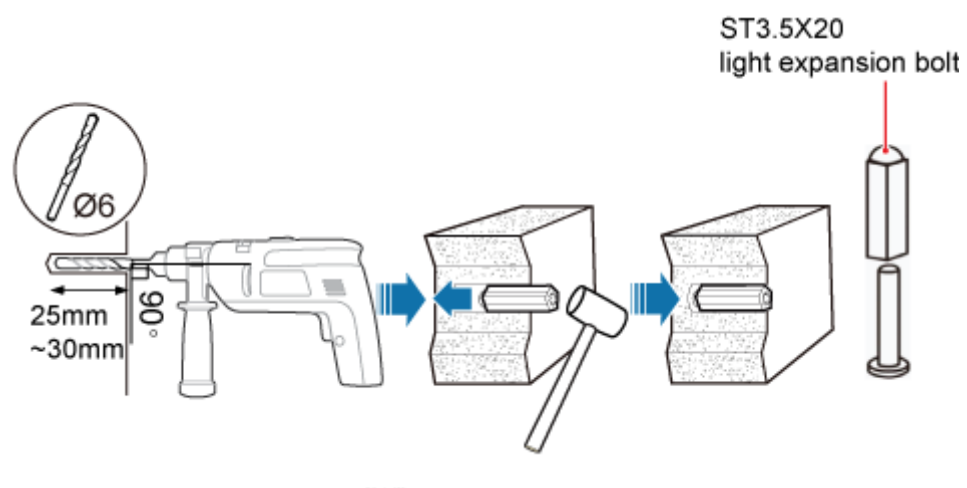
1. Use a marker to mark the two anchor points according to inter-hole spacing, as shown in [Figure 7-1](#).

Figure 7-1 Marking anchor points



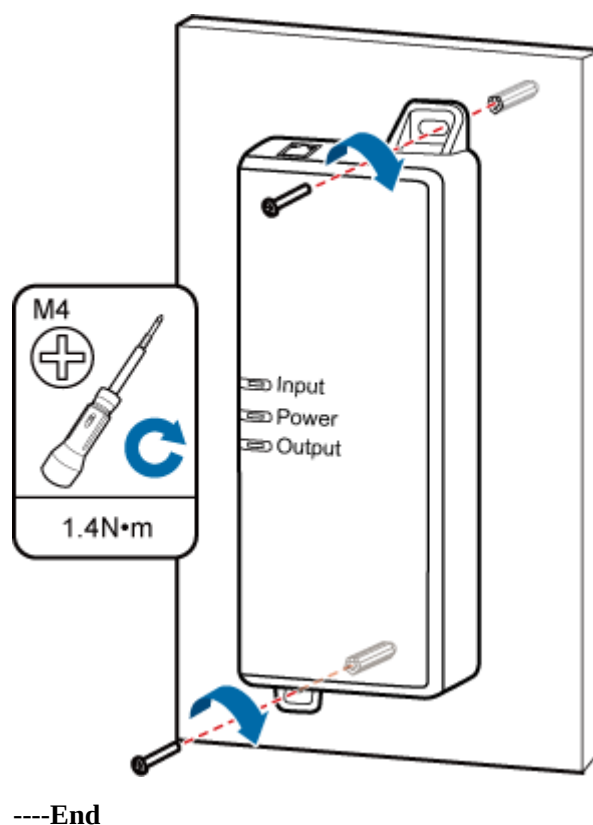
Step 2 Drill holes at the anchor points, and install expansion bolt assemblies, as shown in [Figure 7-2](#). The diameter of the hole is 6 mm, and the depth is 25 mm to 30 mm.

Figure 7-2 Drilling holes and installing expansion bolts



Step 3 Place the Extender in the corresponding position and use an M4 Phillips screwdriver to tighten the screws to 1.4 N•m, as shown in [Figure 7-3](#).

Figure 7-3 Installing Extender



8 Appendix

About This Chapter

This chapter describes reference information during installation.

8.1 MAC Collection Template

This section describes the MAC collection template for a pRRU3901 with three transmission ports.

8.2 LampSite Engineering Label

This section describes the content and presents the exterior of LampSite engineering labels.

8.3 Attaching an L-Shaped Label

This section describes the procedure and precautions to be taken for attaching an L-shaped label.

8.4 Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)

This section describes the procedures for installing RF daughter boards on a pRRU3901.

8.1 MAC Collection Template

This section describes the MAC collection template for a pRRU3901 with three transmission ports.

The MAC collection template is used to record the installation position, MAC address of the site at the initial installation stage to facilitate subsequent commissioning and maintenance. [Table 8-1](#) shows the MAC collection template.

Table 8-1 MAC collection template

No.	Site Number	Site Name	WIFI MAC	Location Information
<i>Sample</i>	<i>01</i>	<i>pRRU3901</i>		<i>xx floor, xx building, xx mansion</i>

No.	Site Number	Site Name	WIFI MAC	Location Information
Note: The MAC collection template is essential to the engineering stage and subsequent maintenance, especially when multiple devices are installed at a short distance. This is because the template defines the radio network to access. Maintain this template with caution.				

8.2 LampSite Engineering Label

This section describes the content and presents the exterior of LampSite engineering labels.

Label Content

The LampSite engineering labels include the RHUB3908 power label, RHUB3908 ground label, RHUB3908 alarm or monitoring label, RHUB3908 optical transmission label, and RHUB3908 network transmission label, the pRRU3901 power label, pRRU3901 network transmission label, pRRU3901 antenna label. The engineering labels are used for LampSite units RHUB3908 and pRRU3901 for indoor scenarios.

By default, blank labels are delivered for LampSite and must be filled in onsite. [Table 8-2](#) describes the content of engineering labels.

Table 8-2 LampSite Engineering Label Content

NE	Label Content		Description	Corresponding port on the base station
RHUB3908	Power label	RHUB3908x PWR	Label for the RHUB3908x power cable. x specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	PWR

NE	Label Content		Description	Corresponding port on the base station
	Ground label	RHUB3908x PGND	Label for the RHUB3908x ground cable. x specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	
	Alarm or monitoring label	RHUB3908x EXT_ALM	Label for the RHUB3908x alarm cable. x specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking.	EXT-ALM
	Optical transmission label	RHUB3908x BBU/RHUB3908a/ RHUB3908b	Label for the RHUB3908x CPRI cable. x specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking. a can be set to 0 or 1. 0 and 1 respectively correspond to CPRI0 port and CPRI1 port of the upper-level RHUB3908. b can be set to 0 or 1. 0 and 1 respectively correspond to CPRI0 port and CPRI1 port of the lower-level RHUB3908.	CPRI0 or CPRI1
	Network transmission label	RHUB3908x CPRI_Ea	Label for the RHUB3908x Ethernet cable. x specifies the number of RHUB3908s and cannot exceed the maximum RHUB3908 number supported by the networking. a can be set to 0 or 1. 0 and 1 respectively	CPRI_E0 to CPRI_E7

NE	Label Content		Description	Corresponding port on the base station
			correspond to CPRI_E0 port and CPRI_E1 port of the pRRU3901.	
pRRU3901	Power label	pRRU3901y PWR	Label for the pRRU3901y power cable. y specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking.	PWR or CPRI_E0
	Network transmission label	pRRU3901y CPRI_Ea	Label for the pRRU3901y Ethernet cable. - y specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking. - a can be set to 0 to 7, which respectively correspond to CPRI_E0 port to CPRI_E7 port of the RHUB3908.	CPRI_E0 or CPRI_E1
	Antenna label	pRRU3901y ANTa	Label for the pRRU3901y RF Jumper. - y specifies the number of pRRU3901s and cannot exceed the maximum pRRU3901 number supported by the networking. - a can be set to 0 to 5, which respectively correspond to ANT0 port and ANT5 port of the pRRU3901.	ANT0 to ANT5

**NOTE**

- In the label, **RHUB3908** and **pRRU3901** identify the specific LampSite NEs.
- If only one RHUB3908 is deployed, mark it as RHUB39080 on the label. If multiple RHUB3908s are deployed, mark them in ascending sequence, beginning with RHUB39080.
- If only one pRRU3901 is deployed, mark it as pRRU39010 on the label. If multiple pRRU3901s are deployed, mark them in ascending sequence, beginning with pRRU39010.
- For details about the maximum number of RHUB3908s and pRRU3901s in the LampSite solution, see *Typical Configurations* in *LampSite Technical Description*.

Label Structure

Using the RHUB3908 power label as an example, [Figure 8-1](#) shows the structure of a LampSite engineering label.

Figure 8-1 Label structure



8.3 Attaching an L-Shaped Label

This section describes the procedure and precautions to be taken for attaching an L-shaped label.

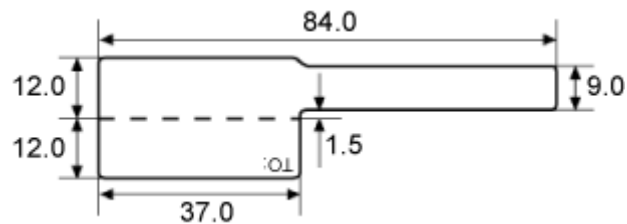
Context

- This section applies to Huawei sign plate labels. If other engineering labels in accordance with local standards are used on site, follow the local standards for attaching sign plate labels.
- In the LampSite solution, blank L-Shaped engineering labels are delivered by default.
- The L-shaped label is usually used for the signal cable, E1/T1 cable, optical cable, and power cable. The description in this section takes the Ethernet cable in a base station as an example.

Procedure

1. Obtain the engineering label to be attached from the whole set of the L-shaped engineering labels, as shown in [Figure 8-2](#).

Figure 8-2 Engineering label to be attached



- Step 2** Attach the long end of the engineering label to the cable in the position 20 mm away from the connector, and then turn over the long end along the adhesive face. Ensure that the edges of the turned-over engineering label are in a line, as shown in [Figure 8-3](#).

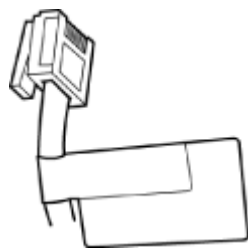


NOTE

By default, the label is attached in the position 20 mm away from the connector. If required, you can change the position to make installation faster and more efficient. Consistency and neatness, however, must be maintained.

- Step 3** Adhere the long end to the labeling area. Ensure that the spacing between the cable and the labeling area is 2 mm to 3 mm.

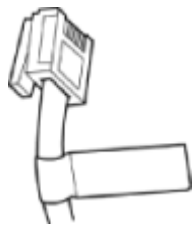
Figure 8-3 Adhering the long end to the labeling area



- Step 4** Turn over the labeling area along the adhesive face from the bottom, and then finish attaching the engineering label, as shown in [Figure 8-4](#) and [Figure 8-5](#). Ensure that the edges of the turned-over labeling area are in a line.

Figure 8-4 Turning over the labeling area along the adhesive face



Figure 8-5 Attached engineering label

Step 5 Fill in the attached blank label by referring to [8.2 LampSite Engineering Label](#).

----End

8.4 Installing RF Daughter Boards on a pRRU3901 (in Capacity Expansion Scenarios)

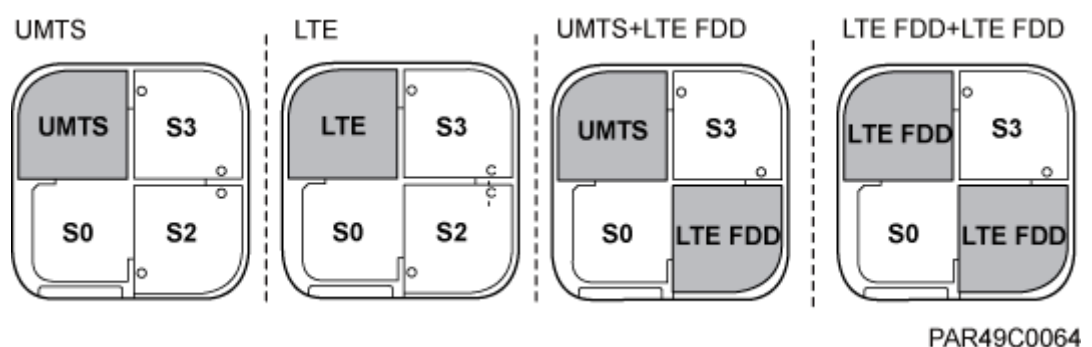
This section describes the procedures for installing RF daughter boards on a pRRU3901.

Context

An RF daughter Board is only installed in product pRRU3901 AWS+PCS+WIFIInd pRRU3901 AWS+PCS+WIFI, and it transmits, receives, and processes RF signals.

The preferred slot for an RF daughter board depends on the mode of the RF daughter board.

[Figure 8-6](#) shows the slot for installing the RF daughter boards.

Figure 8-6 Slot for installing the RF daughter boards**NOTE**

- Unless otherwise specified, LTE mode in this document refers to LTE TDD and LTE FDD.
- This section describes how to install an RF daughter board in slot S2 as an example.

Procedure

Step 1 Instruct the network operator to block the pRRU3901.



NOTE

The LampSite solution supports immediate block, idle block, and delayed block. Application of idle block and delayed block produces the same effect as application of immediate block.

- On the UMTS side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board.
- On the LTE side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board.

Step 2 Power off the pRRU3901.

Powering off the pRRU3901 interrupts all the services carried on the pRRU3901.

Step 3 Wear ESD gloves.

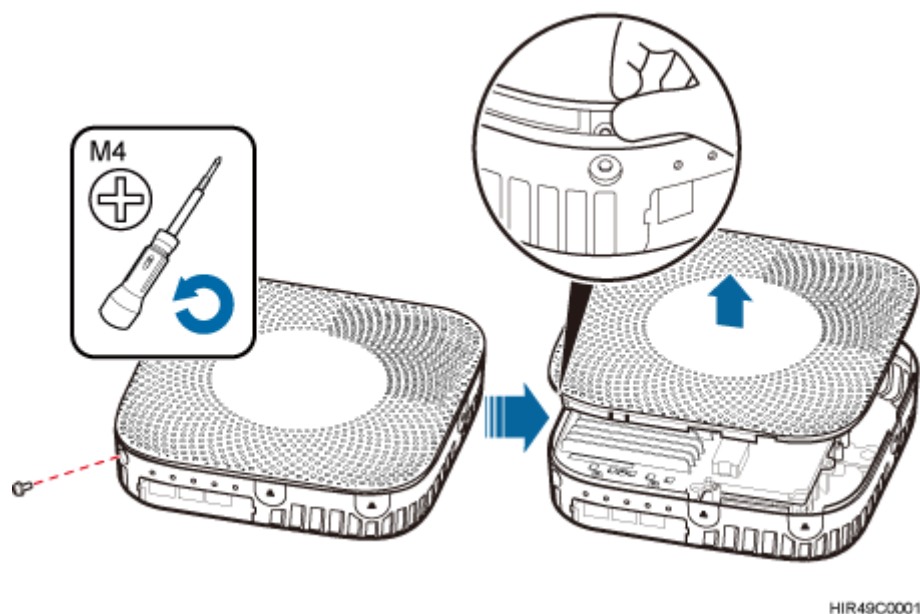


NOTICE

Take proper ESD protection measures. For example, wear ESD gloves to prevent electrostatic damage to the boards, modules, or electronic components.

Step 4 Use an M4 Phillips screwdriver to loosen the Phillips screw on the pRRU3901 housing. Wrench and remove the housing from the installation position of the Phillips screw hole, as shown in [Figure 8-7](#).

Figure 8-7 Removing the pRRU3901 housing



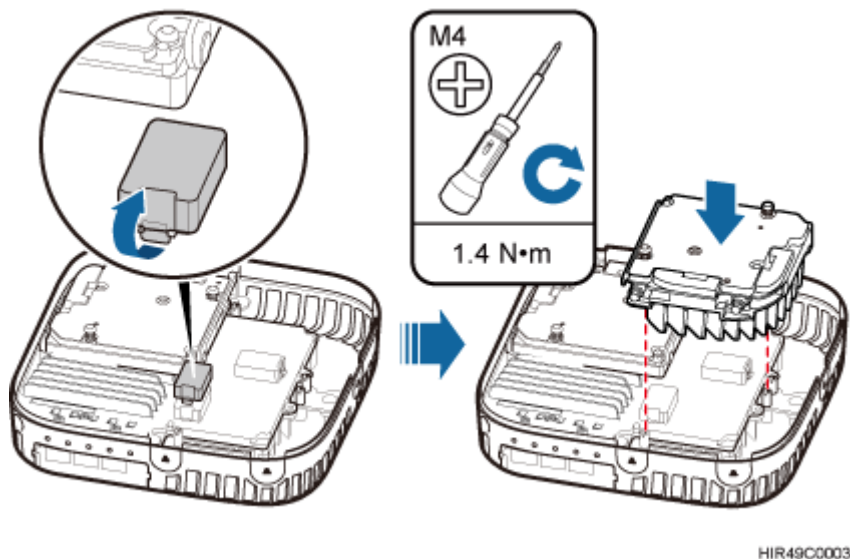
NOTE

- Either Phillips screws or protection screws can be used for installing the pRRU3901 housing and the RF daughter board, requiring the same installation operations. This section uses Phillips screws as an example to describe the installation operations.
- Keep the Phillips screw secure for future use.

Step 5 Install an RF daughter board in slot S2.

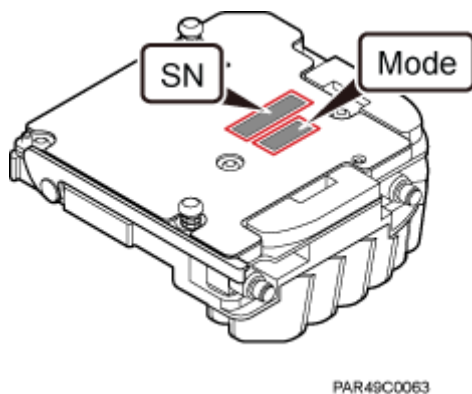
3. Remove the protective cover from the RF daughter board connector of slot S2.
4. Level the handles of an RF daughter board of the required mode, and insert the handles separately in the two dowels of slot S2, and use the M4 Phillips screwdriver to tighten the two Phillips screws on the RF daughter board with a torque of 1.4 N•m, as shown in [Figure 8-8](#).

Figure 8-8 Installing the RF daughter board in slot S2



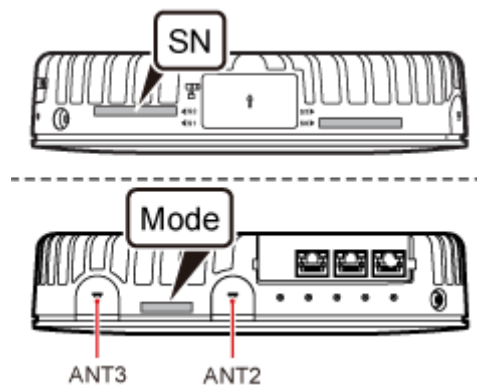
- Step 6** Remove the SN label and mode label on the surface of the RF daughter board, as shown in [Figure 8-9](#).

Figure 8-9 Removing the SN label and mode label



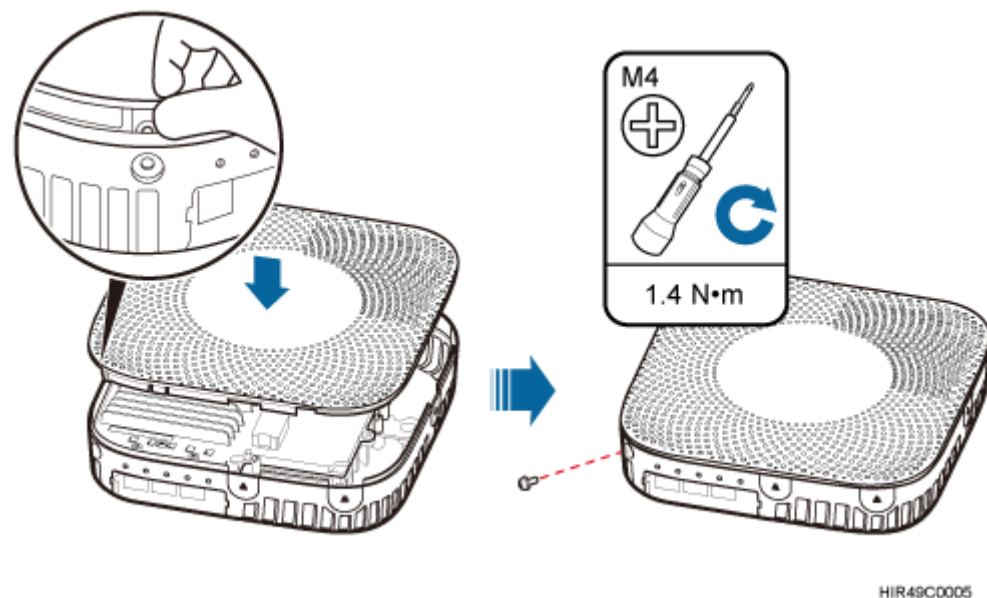
- Step 7** Attach the removed SN label to the corresponding position for S2 label on the nameplate side of the pRRU3901 housing and the mode label to a position (for the label of slot S2 on the side of the pRRU3901 housing) between antenna ports ANT2 and ANT3, as shown in [Figure 8-10](#).

Figure 8-10 Attaching the SN label and mode label



Step 8 Close the pRRU3901 housing and tamp each side of the housing until a click is heard. Ensure that the groove gaps between the front and back housings are evenly distributed. Use the M4 Phillips screwdriver to tighten the Phillips screw on the housing with a torque of 1.4 N•m, as shown in [Figure 8-11](#).

Figure 8-11 Installing the pRRU3901 housing



NOTE

The Phillips screw is the one removed and kept in [Step 4](#).

Step 9 Power on the pRRU3901.

Step 10 Instruct the network operator to unblock the pRRU3901.

- On the UMTS side, log in to the NodeB LMT and run the **UBL BRD** command to unblock the RF daughter board of the pRRU3901.
- On the LTE side, log in to the eNodeB LMT and run the **UBL BRD** command to unblock the RF daughter board of the pRRU3901.

Step 11 Take off the ESD gloves and pack up all the tools.

----End