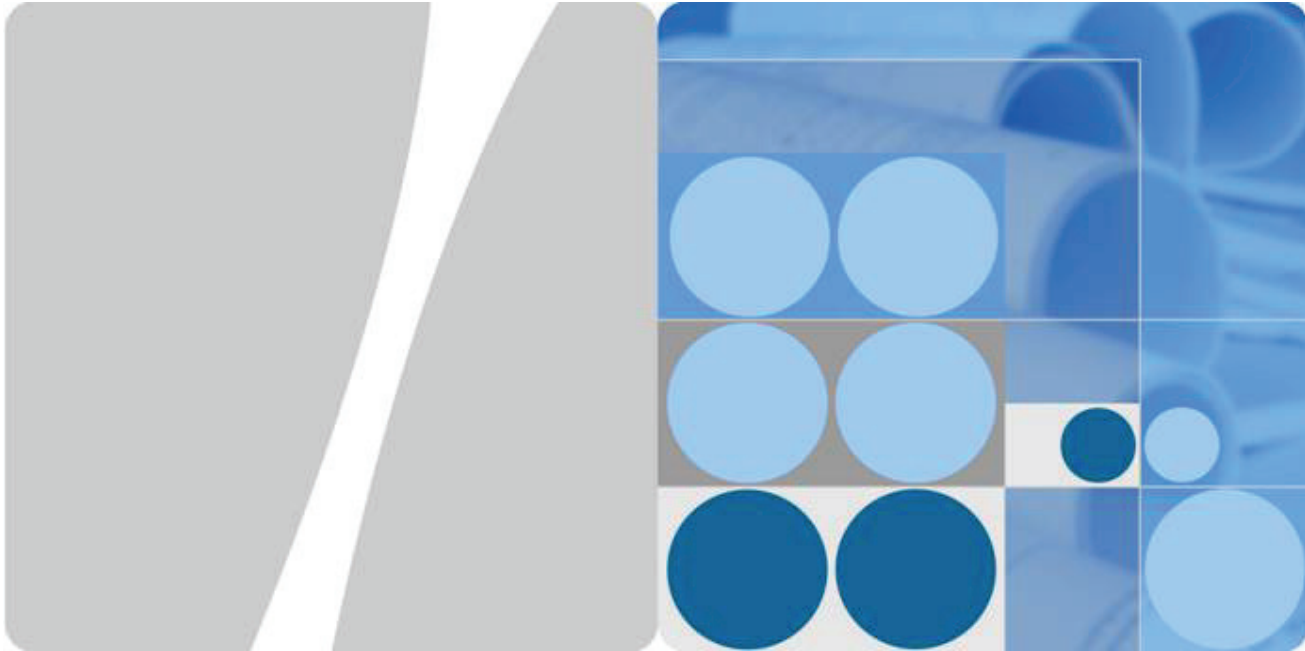




DBS3900 LampSite

Installation Guide

Issue **08**
Date **2016-05-30**

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About This Document

Overview

This document describes how to install the modules and cables for the BBU, DCU3900, RHUB3908, pRRU3901, pRRU3902, pRRU3907, and pRRU3911. It also provides checklists for hardware installation.

NOTE

- Unless otherwise specified, BBU in this document refers to BBU3900 and BBU3910.
- DCU3900 in this document refers to DCU.
- RHUB3908 in this document refers to RHUB.
- Unless otherwise specified, pRRU in this document refers to pRRU3901, pRRU3902, pRRU3907, and pRRU3911.

Product Version

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

Product Name	Solution Version	Product Version
DBS3900 LampSite	● SRAN10.1 and later versions ● RAN17.1 and later versions ● eRAN8.1 and later versions ● eRAN TDD 8.1 and later versions	V100R010C10 and later versions

Intended Audience

This document is intended for:

- BTS installation personnel

Contents

About This Document.....	ii
1 Changes in DBS3900 LampSite Installation Guide.....	1
2 Installation Preparations.....	5
2.1 Reference Documents.....	6
2.2 Preparing Tools and Instruments.....	6
2.3 Requirements for Installation Personnel.....	7
3 Unpacking and Checking.....	8
4 Installing a BBU.....	10
5 Installing a DCU.....	11
6 Installing an RHUB.....	12
6.1 Information About the Installation.....	13
6.1.1 Installation Scenarios.....	13
6.1.2 Installation Clearance Requirements.....	18
6.1.3 Installation Environment.....	20
6.2 Installation Process.....	22
6.3 Installing an RHUB.....	23
6.3.1 Installing an RHUB in a 19-Inch Cabinet or Rack.....	23
6.3.2 Installing an RHUB in a 19-Inch Shelf.....	26
6.3.3 Installing an RHUB on a Wall.....	29
6.4 Installing RHUB Cables.....	33
6.4.1 Requirements for Cable Layout.....	33
6.4.2 Cable List.....	36
6.4.3 Cable Connections.....	42
6.4.4 Cable Installation Process.....	43
6.4.5 Installing PGND Cable.....	44
6.4.6 Installing Ethernet Cable.....	46
6.4.7 Installing CRPI Optical Cables.....	49
6.4.8 Installing Alarm Cable (Optional).....	51
6.4.9 Installing Power Cable.....	52
6.5 Checking the RHUB Hardware Installation.....	53
6.6 Power-on Check on an RHUB.....	55

7 Installing a pRRU3901.....	57
7.1 Information About the Installation.....	58
7.1.1 Product Family.....	58
7.1.2 Installation Scenario.....	59
7.1.3 Space Requirements.....	63
7.1.4 Installation Environment Requirements.....	64
7.2 Obtaining the MAC Address (Optional)	65
7.3 Installation Process.....	65
7.4 Installing a pRRU3901.....	66
7.4.1 pRRU3901 Mounting Kits.....	67
7.4.2 Installing a pRRU3901 on a Wall.....	68
7.4.3 Installing a pRRU3901 on a Ceiling.....	71
7.4.4 Installing a pRRU3901 on a Pole.....	74
7.4.5 Installing a pRRU3901 on a Plate.....	76
7.4.6 Installing a pRRU3901 on a Keel.....	79
7.4.7 Installing the Cabinet.....	82
7.5 Installing pRRU3901 Cables.....	89
7.5.1 Requirements for Cable Layout.....	89
7.5.2 pRRU3901 Cable List.....	91
7.5.3 Cable Connections (Indoor).....	91
7.5.4 Cable Connections (Outdoor).....	94
7.5.5 Cable Connections (LTE TDD).....	95
7.5.6 pRRU3901 cable installation process.....	97
7.5.7 Installing an Ethernet Cable.....	97
7.5.8 Installing an RF jumpers (Optional).....	99
7.6 Checking the pRRU3901 Hardware Installation.....	101
7.7 Powering on the pRRU3901.....	103
8 Installing a pRRU3902 or pRRU3911.....	104
8.1 Information About the Installation.....	105
8.1.1 Product Family.....	105
8.1.2 Installation Scenario.....	107
8.1.3 Space Requirements.....	111
8.1.4 Installation Environment Requirements.....	112
8.2 Installation Process.....	113
8.3 Installing a pRRU.....	114
8.3.1 Mounting Kits.....	114
8.3.2 Installing a pRRU on a Wall.....	116
8.3.3 Installing a pRRU on a Ceiling.....	119
8.3.4 Installing a pRRU on a Pole.....	123
8.3.5 Installing a pRRU on a Plate.....	124
8.3.6 Installing a pRRUon a Keel.....	131
8.3.7 Installing a pRRU on Steel Hangers.....	134

8.3.8 Installing the Cabinet.....	138
8.4 Installing pRRU Cables.....	142
8.4.1 Requirements for Cable Layout.....	142
8.4.2 Cable List.....	143
8.4.3 Cable Connections.....	144
8.4.4 Cable Installation Process.....	148
8.4.5 Installing a pRRU3902 Ethernet Cable.....	148
8.4.6 Installing a pRRU3911 Ethernet Cable.....	153
8.4.7 Installing a pRRU3902 RF Jumper (Optional).....	156
8.4.8 Installing a pRRU3911 RF Jumper (Optional).....	158
8.5 (Optional) Installing a Combiner.....	160
8.6 Checking the pRRU Hardware Installation.....	162
8.7 Powering on the pRRU.....	163
9 Installing a pRRU3907 or pRRU3916.....	165
9.1 Information About the Installation.....	166
9.1.1 pRRU Product Family.....	166
9.1.2 Constraints and Limitations.....	166
9.1.3 Installation Clearance and Space Requirements.....	169
9.1.4 Installation Environment Requirements.....	172
9.2 Installation Process.....	173
9.3 Installing a pRRU.....	173
9.3.1 pRRU Mounting Kits.....	173
9.3.2 Installing a pRRU on a Wall.....	175
9.3.3 Installing a pRRU on a Pole.....	178
9.4 Installing pRRU Cables.....	180
9.4.1 Cabling Requirements.....	180
9.4.2 pRRU Cable List.....	182
9.4.3 pRRU3907 Cable Connections.....	183
9.4.4 pRRU3916 Cable Connections.....	183
9.4.5 pRRU cable installation process.....	184
9.4.6 Installing a PGND Cable.....	185
9.4.7 Installing a pRRU3907 RF Jumper.....	186
9.4.8 Installing a pRRU3916 RF Jumper.....	190
9.4.9 Opening the Cover Plate of a pRRU Cabling Cavity.....	192
9.4.10 Installing an Ethernet Cable.....	193
9.4.11 Closing the Cover Plate of a pRRU Cabling Cavity.....	195
9.5 Checking the pRRU Hardware Installation.....	197
9.6 Powering on the pRRU.....	198
10 (Optional) Installing the Extender-PoE90.....	200
11 (Optional) Installing the EXD3902 and Cables.....	204
11.1 Installation Scenario.....	205

11.2 Installation Clearance and Space Requirements.....	208
11.3 Installation Process.....	210
11.4 Installing an EXD3902.....	211
11.4.1 EXD3902 Mounting Kits.....	211
11.4.2 Installing an EXD3902 on a Wall.....	212
11.4.3 Installing an EXD3902 on a Pole.....	216
11.5 Installing EXD3902 Cables.....	218
11.5.1 Cabling Requirements.....	218
11.5.2 EXD3902 Cable Connections.....	219
11.5.3 Installing a PGND cable.....	220
11.5.4 Opening the Cover Plate of an EXD3902 Cabling Cavity.....	222
11.5.5 Installing an Ethernet Cable.....	223
11.5.6 Closing the Cover Plate of an EXD3902 Cabling Cavity.....	224
11.6 Checking the EXD3902 Hardware Installation.....	225
11.7 Powering on the EXD3902.....	226
12 (Optional) Installing the PoE Surge Protector and Cables.....	228
13 (Optional) Installing the RF Surge Protector and Cables.....	230
14 (Optional) Installing the Cabinet and Cabinet Cables.....	232
14.1 Installation Clearance Requirements.....	233
14.2 Mounting Bracket and Attachment Plate.....	233
14.2.1 Mounting Bracket.....	233
14.2.2 Attachment Plate.....	234
14.3 Installing a Cabinet.....	235
14.3.1 Installing the Cabinet on a Wall.....	235
14.3.2 Installing the Cabinet on a Pole.....	240
14.3.3 Installing the Cabinet on U-steel.....	242
14.3.4 Installing the Cabinet on Angle Steel.....	246
14.3.5 Installing the Cabinet on Metal Grid.....	249
14.3.6 Installing the Cabinet on the Floor.....	254
14.4 Installing Cabinet Cables.....	258
14.4.1 Cable Connections.....	258
14.4.2 Installing a PGND Cable for the Cabinet.....	261
15 Appendix.....	263
15.1 MAC Collection Template.....	264
15.2 Assembling a Shielded RJ45 Connector and an Ethernet Cable.....	264
15.3 DBS3900 LampSite Engineering Label.....	268
15.4 Attaching an L-Shaped Label.....	271
15.5 Attaching a Sign Plate Label.....	272

1 Changes in DBS3900 LampSite Installation Guide

This chapter describes the changes in the *DBS3900 LampSite Installation Guide*.

08 (2016-05-30)

This is the eighth commercial release.

Compared with 07 (2015-12-30), this issue incorporates the following new topics:

- **8.3.4 Installing a pRRU on a Pole**
- **10 (Optional) Installing the Extender-PoE90**
- **11 (Optional) Installing the EXD3902 and Cables**

Compared with 07 (2015-12-30), this issue incorporates the following changes:

Content	Change Description
8.4.5 Installing a pRRU3902 Ethernet Cable	Renamed the outdoor Extender to Extender-PoE90.
8.4.6 Installing a pRRU3911 Ethernet Cable	

Compared with 07 (2015-12-30), no information is deleted.

07 (2015-12-30)

This is the seventh commercial release.

Compared with 06 (2015-10-30), this issue incorporates the following new topics:

- **8.4.6 Installing a pRRU3911 Ethernet Cable**
- **12 (Optional) Installing the PoE Surge Protector and Cables**
- **13 (Optional) Installing the RF Surge Protector and Cables**
- **14 (Optional) Installing the Cabinet and Cabinet Cables**

Compared with 06 (2015-10-30), this issue incorporates the following changes:

Content	Change Description
Entire document	Added the information about pRRU3911 and the cabinet used in the outside scenario.

Compared with 06 (2015-10-30), no information is deleted.

06 (2015-10-30)

This is the sixth commercial release.

Compared with 05 (2015-08-30), this issue includes the following new topics:

- **9 Installing a pRRU3907 or pRRU3916**

Compared with 05 (2015-08-30), no information is changed.

Compared with 05 (2015-08-30), no information is deleted.

05 (2015-08-30)

This is the fifth commercial release.

Compared with 04 (2015-07-30), no information is added.

Compared with 04 (2015-07-30), this issue incorporates the following changes

Content	Change Description
6.4.7 Installing CPRI Optical Cables	Added the descriptions about the CPRI optical fiber connection in sharing BBUs with Macro Networks scenario.

Compared with 04 (2015-07-30), no information is deleted.

04 (2015-07-30)

This is the fourth commercial release.

Compared with 03 (2015-06-30), no information is added.

Compared with 03 (2015-06-30), this issue incorporates the following changes.

Content	Change Description
Entire document	Added the RHUB that has no electrical transmission port.

Compared with 03 (2015-06-30), no information is deleted.

03 (2015-06-30)

This is the third commercial release.

Compared with 02 (2015-05-08), this issue includes the following new topics:

- **5 Installing a DCU**

Compared with 02 (2015-05-08), this issue incorporates the following changes:

Content	Change Description
Entire document	Added the descriptions about the DCU.

Compared with 02 (2015-05-08), no information is deleted.

02 (2015-05-08)

This is the second commercial release.

Compared with 01 (2015-03-23), no information is added.

Compared with 01 (2015-03-23), this issue incorporates the following changes:

Content	Change Description
6.4.9 Installing Power Cable	Modified the RHUB configurations of upper-level circuit breakers.
8.1.2 Installation Scenario	Deleted the minimum space requirements of the pRRU3901.
8.1.3 Space Requirements	Deleted the minimum space requirements of the pRRU3902.
8.3.2 Installing a pRRU on a Wall	Added the step about locking the protection screw of pRRU3902.
8.3.3 Installing a pRRU on a Ceiling	
8.3.5 Installing a pRRU on a Plate	
8.3.6 Installing a pRRU on a Keel	

Compared with 01 (2015-03-23), no information is deleted.

01 (2015-03-23)

This is the first commercial release.

Compared with draft B (2015-02-10), this issue includes the following new topics:

- **8 Installing a pRRU3902 or pRRU3911**

Compared with draft B (2015-02-10), this issue incorporates the following changes:

Content	Change Description
Entire document	Added the descriptions about the pRRU3902.

Compared with draft B (2015-02-10), no information is deleted.

Draft B (2015-02-10)

This is a draft release.

Compared with draft A (2015-01-15), no information is added.

Compared with draft A (2015-01-15), this issue incorporates the following change:

Content	Change Description
6.1.1 Installation Scenarios	Added the descriptions about the RHUB panel must not face upwards.

Compared with draft A (2015-01-15), no information is deleted.

Draft A (2015-01-15)

This is a draft release.

Compared with Issue 08 (2014-12-30) of V100R009C00, no information is added.

Compared with Issue 08 (2014-12-30) of V100R009C00, this issue incorporates the following change:

Content	Change Description
Entire document	The base station in the LampSite solution is renamed DBS3900 LampSite.

Compared with Issue 08 (2014-12-30) of V100R009C00, no information is deleted.

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.

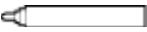
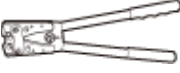
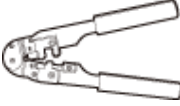
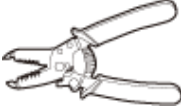
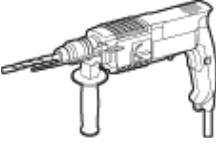
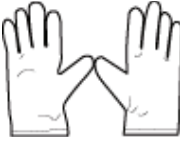
2.1 Reference Documents

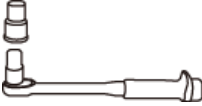
Before the installation, you must read the following documents:

- *DBS3900 LampSite Hardware Description*
- *Installation Reference*

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 	Crown saw (Ø60) 	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) 
Hole screwdriver (T20)  	-	-

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 RHUB or pRRU within 7 days after it is unpacked.

Procedure

Step 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.

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

5 Installing a DCU

This chapter describes the process of installing a DCU.

For details about the installation of the DCU, see DCU3900 Installation Guide.

6 Installing an RHUB

About This Chapter

This chapter describes the process of installing an RHUB. RHUBs are classified into those with electrical transmission ports and those with no electrical transmission ports. Unless otherwise specified, this document uses the RHUBs with no electrical transmission ports as an example.

6.1 Information About the Installation

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

6.2 Installation Process

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

6.3 Installing an RHUB

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

6.4 Installing RHUB Cables

This section describes how to install cables for an RHUB.

6.5 Checking the RHUB Hardware Installation

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

6.6 Power-on Check on an RHUB

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

6.1 Information About the Installation

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

6.1.1 Installation Scenarios

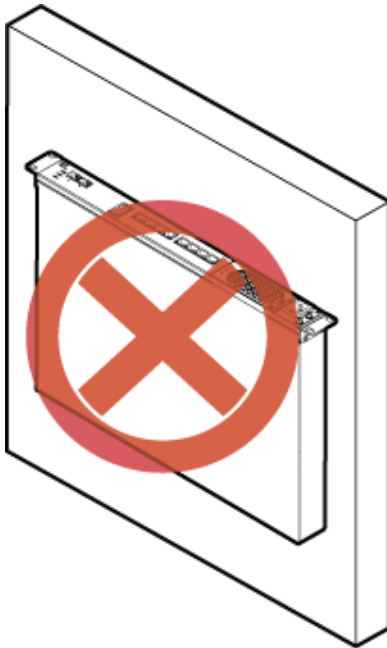
An RHUB can be installed in a 19-inch cabinet, rack, shelf, or on a wall.



NOTICE

To prevent the RHUB from water drops, the RHUB panel must not face upwards (shown in [Figure 6-1](#)) in any installation scenarios.

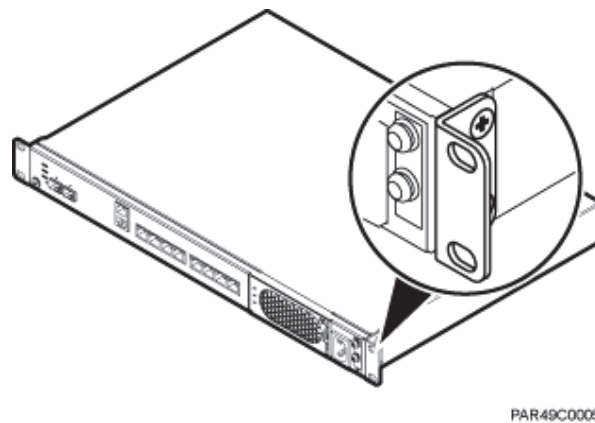
Figure 6-1 Improper installation mode



The RHUB 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:

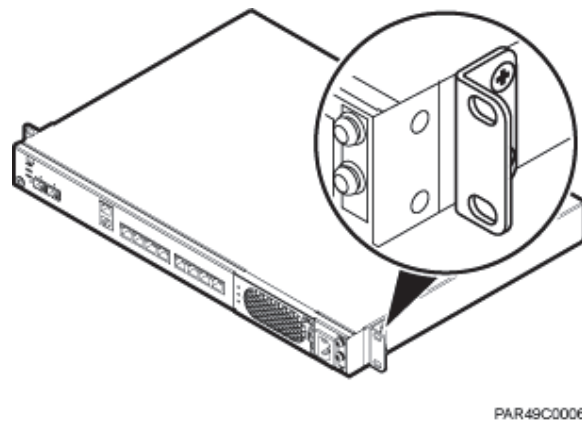
- In standard mode, the front of the mounting ear is aligned with the RHUB panel, as shown in [Figure 6-2](#).

Figure 6-2 Installing mounting ears in standard mode



- In reverse mode, the front of the mounting ear is 31 mm away from the RHUB panel, as shown in [Figure 6-3](#).

Figure 6-3 Installing mounting ears in reverse mode



Installing an RHUB in a 19-Inch Cabinet or Rack

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

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

[Figure 6-4](#) and [Figure 6-5](#) show RHUBs installed in a cabinet or rack, respectively.

Figure 6-4 Installing an RHUB in a 19-inch cabinet or rack in standard mode

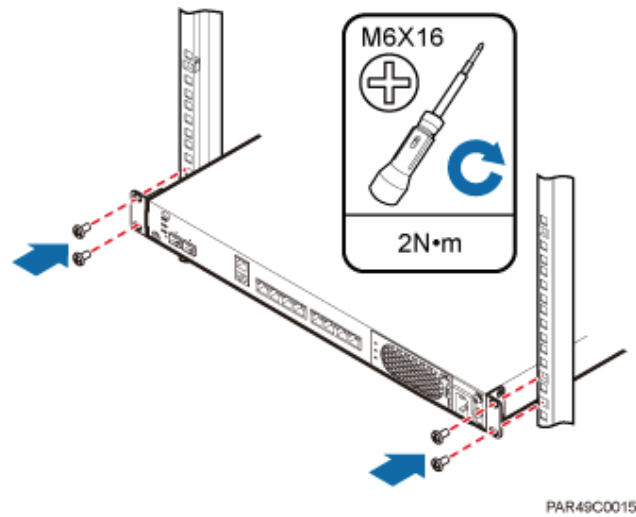
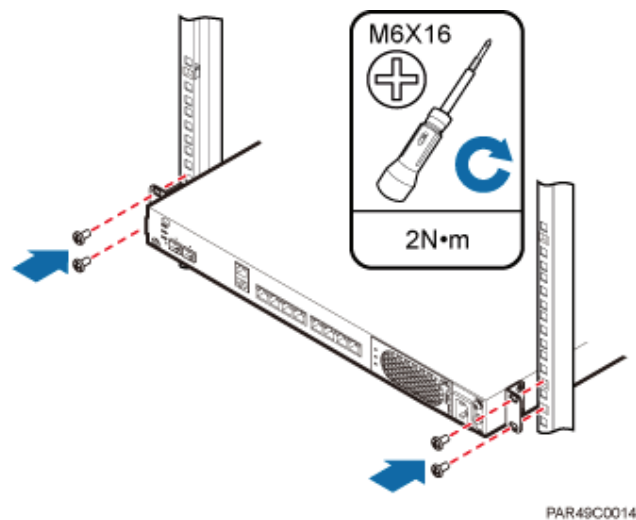


Figure 6-5 Installing an RHUB in a 19-inch cabinet in reverse mode



Installing an RHUB in a 19-Inch Shelf

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

Figure 6-6 and **Figure 6-7** show RHUBs installed in a 19-inch shelf.

Figure 6-6 RHUB installed in a 19-inch shelf in standard mode

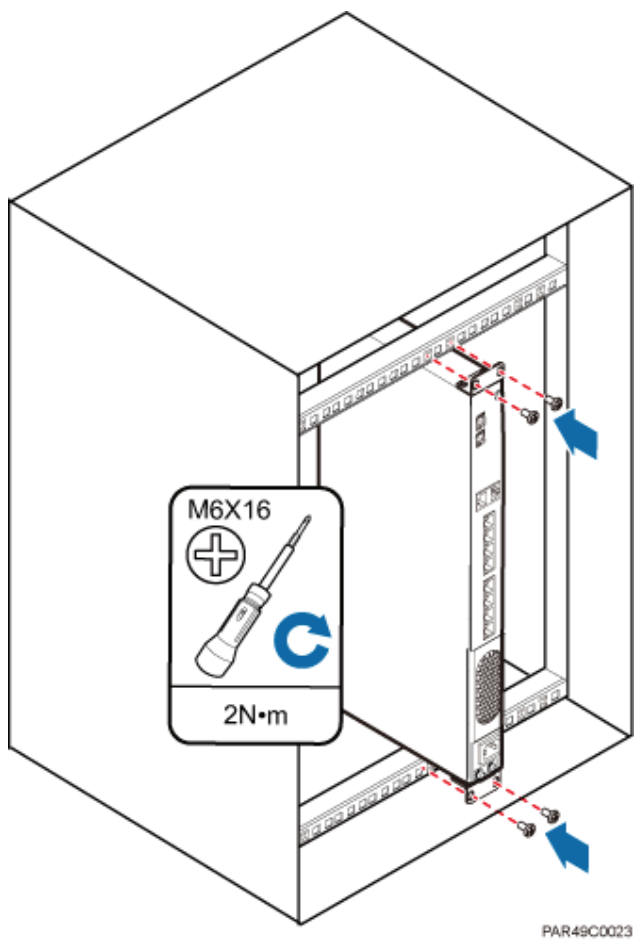
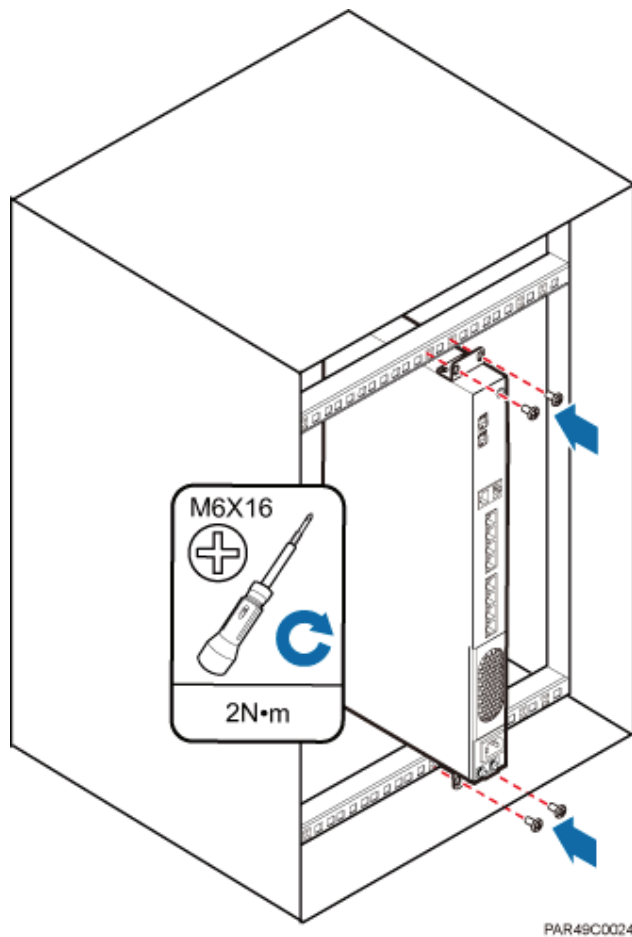


Figure 6-7 RHUB installed in a 19-inch shelf in reverse mode



Installing an RHUB on a Wall

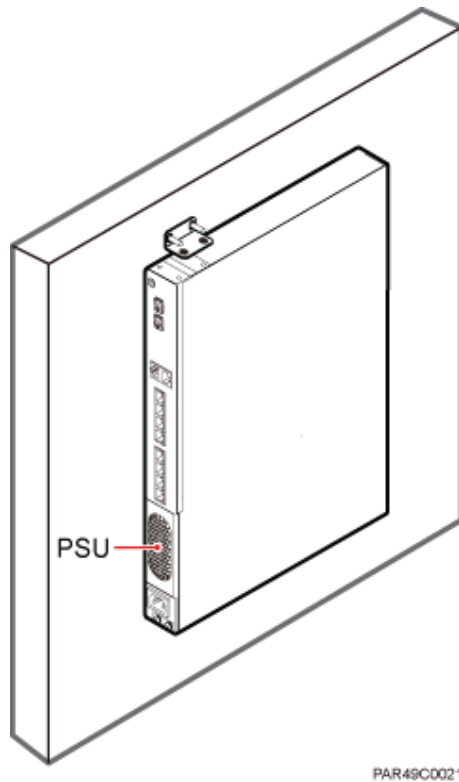
An RHUB can be installed on a wall.

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

- When a single RHUB is installed, the wall must have a capacity of bearing at least four times the weight of the RHUB.
- 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 6-8 shows an RHUB installed on a wall.

Figure 6-8 RHUB installed on a wall



6.1.2 Installation Clearance Requirements

When an RHUB 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 RHUB.
- 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 6-9 shows the installation clearance for the RHUB installed in a 19-inch cabinet, rack, or shelf.

Figure 6-9 Installation clearance for an RHUB installed in a 19-inch cabinet, rack, or shelf

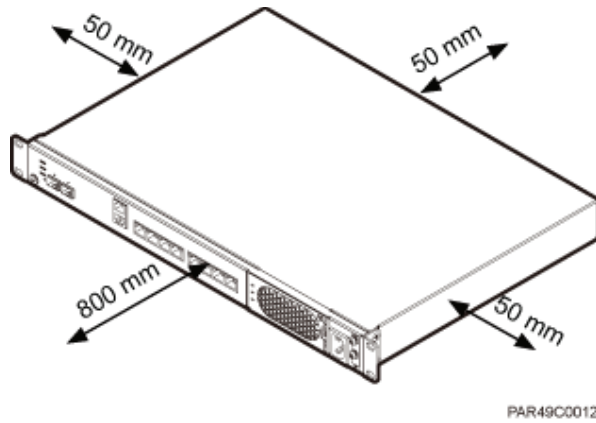


Figure 6-10 and **Figure 6-11** shows the recommended and minimum installation clearance respectively when the RHUB is installed on a wall.

Figure 6-10 Recommended installation clearance for a wall-mounted RHUB (unit: mm)

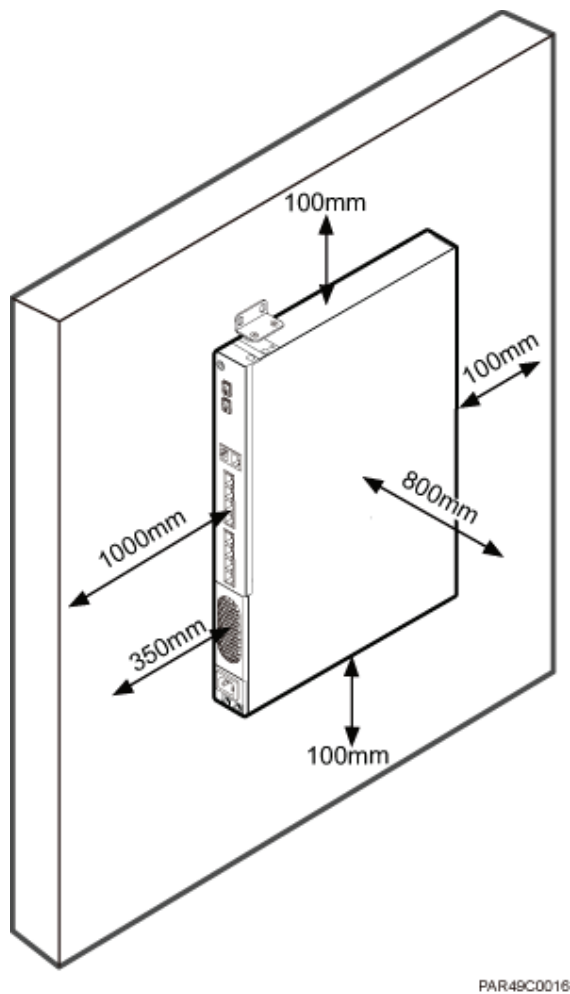
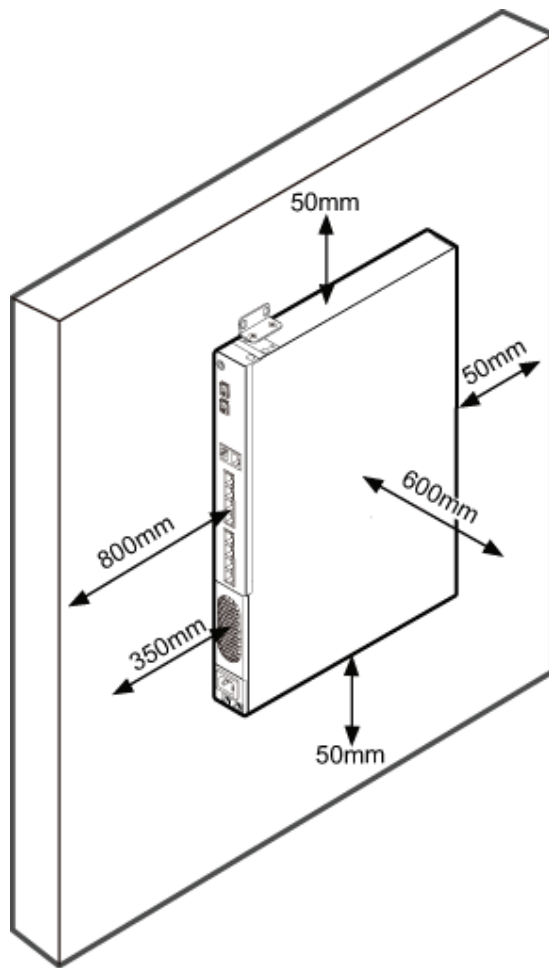


Figure 6-11 Minimum installation clearance for a wall-mounted RHUB (unit: mm)



PAR49C0016

6.1.3 Installation Environment

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

RHUB Running Environment Specifications

Table 6-1 shows the environment specifications for the RHUB 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 RHUB cannot be blocked.

Table 6-1 RHUB environment specifications

Specifications	Installation Scenario	RHUB 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 RHUB, 1 U space is required between two RHUBs.

Other Running Environment Specifications

- The RHUB cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.
- The RHUB cannot be installed near a strong heat source.
- The RHUB 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 RHUB 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 such as power stations, high-voltage substations, and wired TV towers.
- The RHUB must be installed in a dry, ventilating, and dust-proof place.
- If the RHUB is installed in parking areas or basements, the installation position must be well-ventilated.

Requirements for the Upper-level Circuit Breaker

Type C upper-level AC circuit breakers or slow-blow fuses must be used for power cables. The maximum current must not exceed 16 A. [Table 6-2](#) describes the recommended specifications.

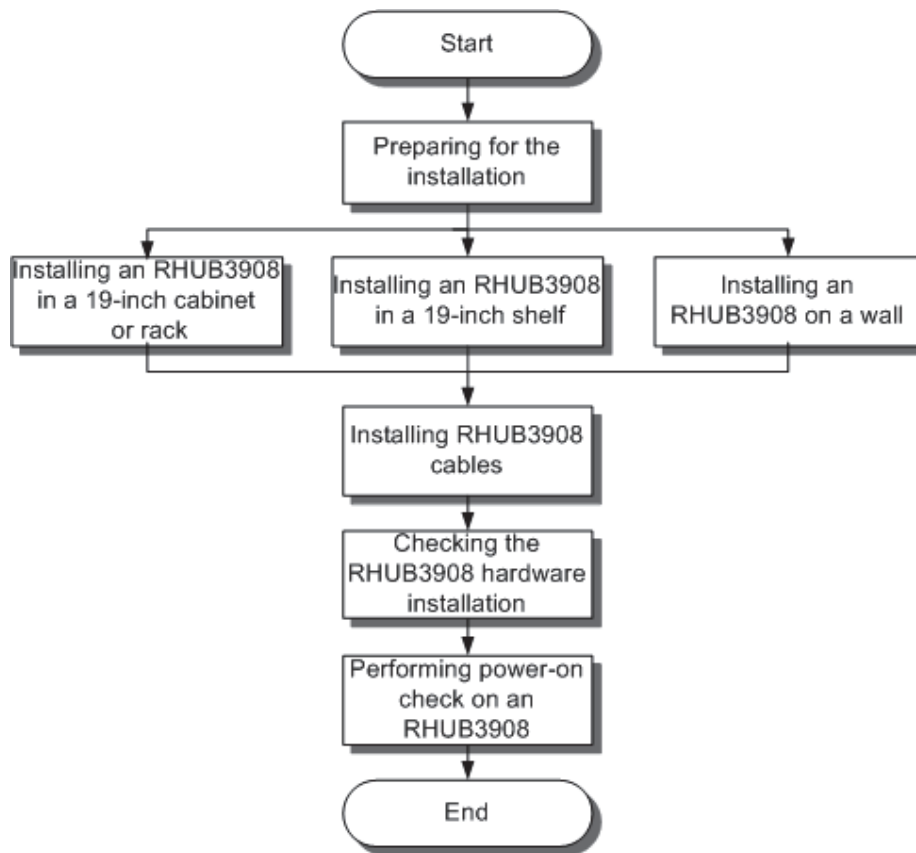
Table 6-2 Circuit breaker specifications for power cables

Power Supply	Upper-level AC Circuit Breaker (For a single RHUB)	Cross-Sectional Area of the Input Power Cable
220 V AC single-phase	≥ 6 A	1.5 mm ²
110 V AC dual-live-wire		
110 V AC single-phase	≥ 12 A	

6.2 Installation Process

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

[Figure 6-12](#) shows the RHUB installation process.

Figure 6-12 RHUB installation process

6.3 Installing an RHUB

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

6.3.1 Installing an RHUB in a 19-Inch Cabinet or Rack

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

Procedure

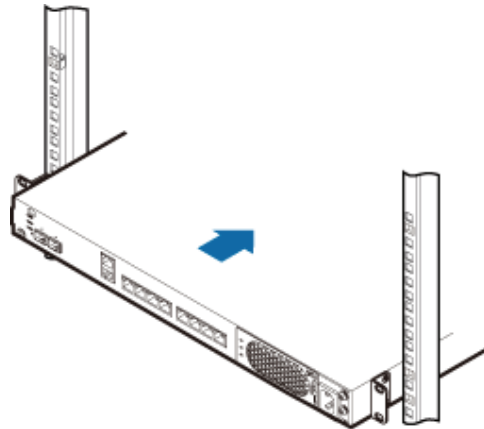
- The following describes how to install an RHUB with mounting ears in reverse mode:

NOTE

If necessary, request one more person for assistance.

- a. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB into the required position in the cabinet, as shown in [Figure 6-13](#).

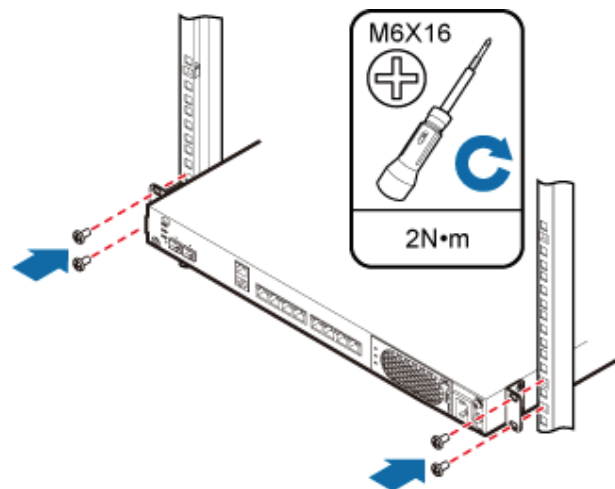
Figure 6-13 Pushing an RHUB into a cabinet



PAR49C0014

- b. 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 6-14](#).

Figure 6-14 Tightening screws



PAR49C0014

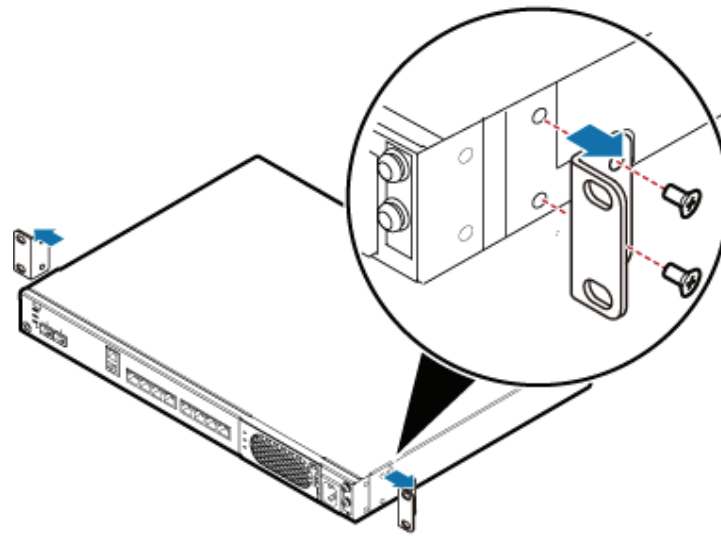
- The following describes how to install an RHUB with mounting ears aligned with the RHUB panel:

NOTE

If necessary, request one more person for assistance.

- a. Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 6-15](#).

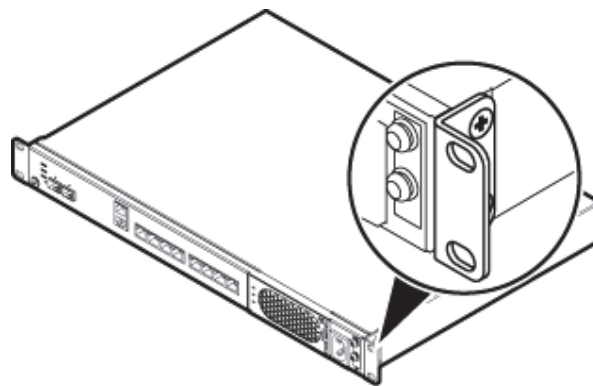
Figure 6-15 Removing mounting ears and screws



PAR49C0051

- b. 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 6-16](#). The mounting ears must be aligned with the RHUB panel.

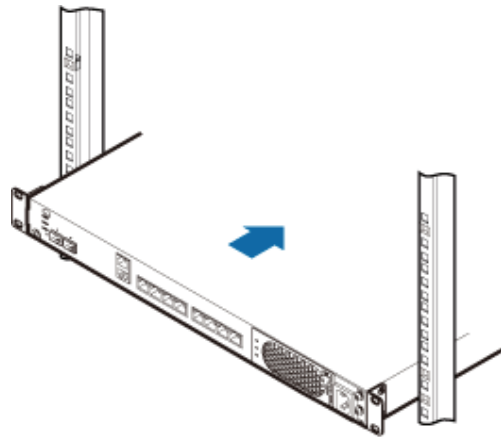
Figure 6-16 Installing mounting ears in standard mode



PAR49C0005

- c. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB into the required position in the cabinet, as shown in [Figure 6-17](#).

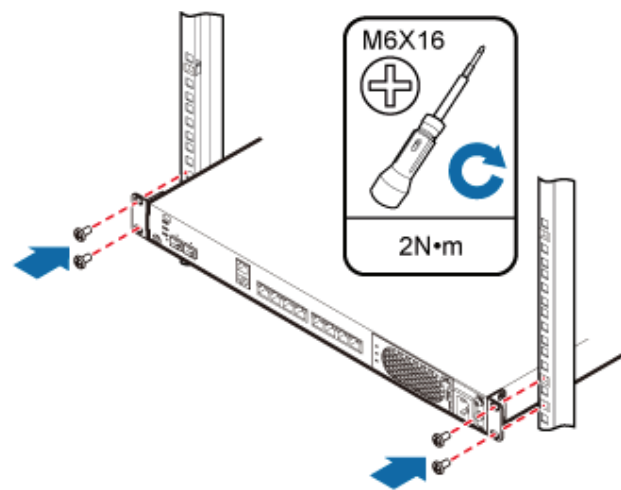
Figure 6-17 Pushing an RHUB into a cabinet



PAR49C0015

- d. 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 6-18](#).

Figure 6-18 Tightening screws



PAR49C0015

----End

6.3.2 Installing an RHUB in a 19-Inch Shelf

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

Procedure

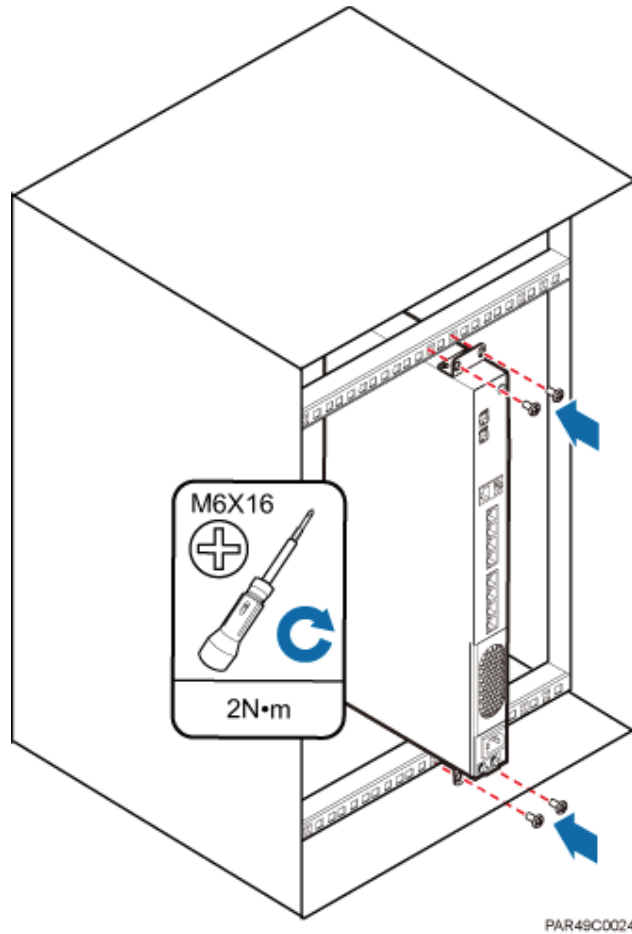
- The following describes how to install an RHUB with mounting ears installed in reverse mode:

 NOTE

If necessary, request one more person for assistance.

- a. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB into the required position in the shelf.
- b. 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 6-19](#).

Figure 6-19 Tightening screws



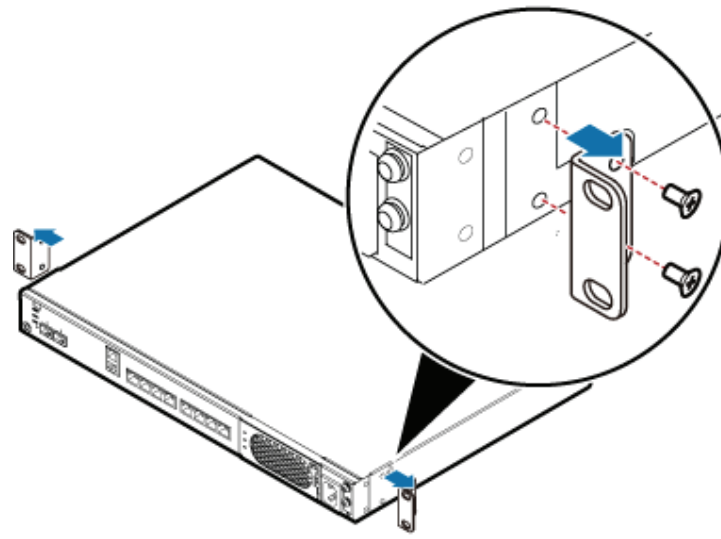
- The following describes how to install an RHUB with mounting ears installed in standard mode:

NOTE

If necessary, request one more person for assistance.

- a. Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 6-20](#).

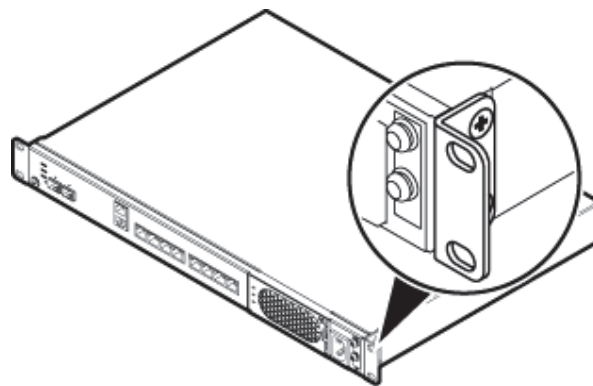
Figure 6-20 Removing mounting ears and screws



PAR49C0051

- b. 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 6-21](#). The mounting ears must be aligned with the RHUB panel.

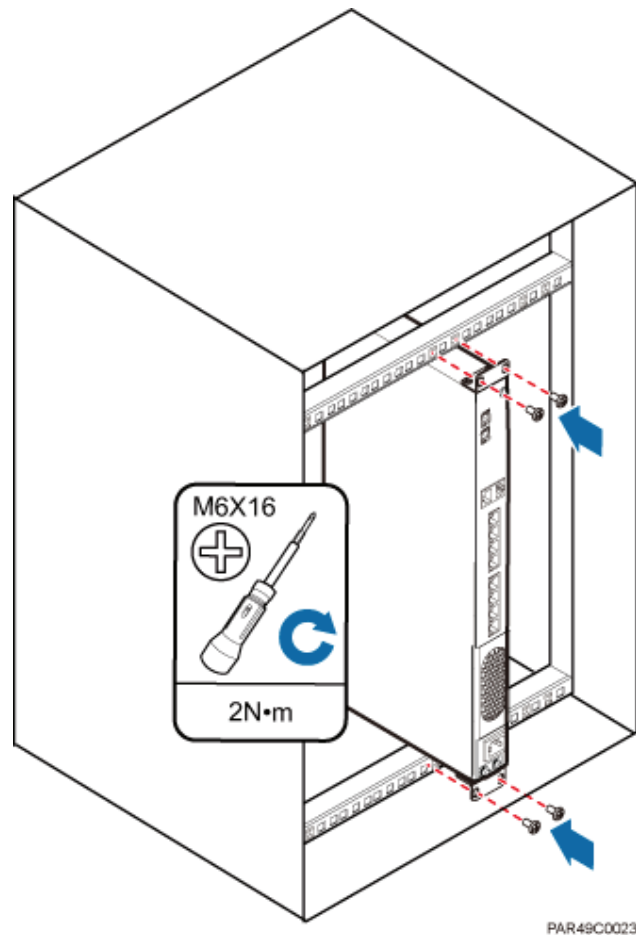
Figure 6-21 Installing mounting ears in standard mode



PAR49C0005

- c. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB into the required position in the cabinet, as shown in .
- d. 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 6-22](#).

Figure 6-22 Tightening screws



---End

6.3.3 Installing an RHUB on a Wall

An RHUB can be installed on a wall.

Context



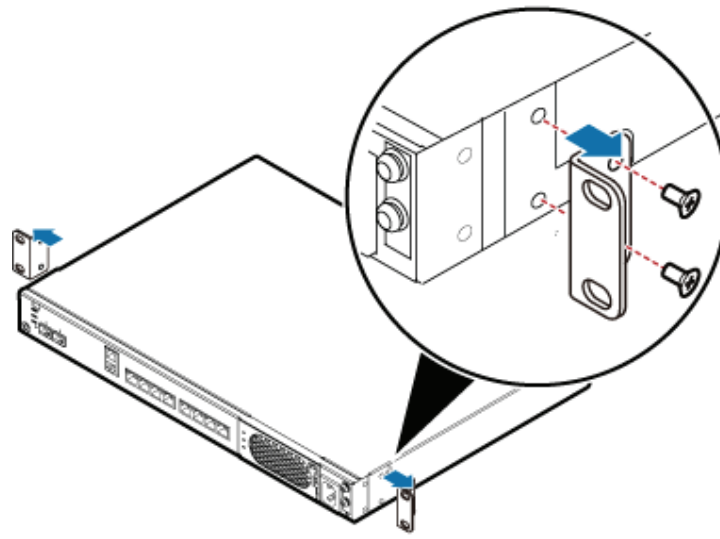
CAUTION

Suitable for mounting on concrete or other non-combustible surface only.

Procedure

- Step 1** The mounting ears are installed in reverse mode by default. Before installing an RHUB on a wall, modify the installation mode of the mounting ears on the RHUB.
- Use a torque screwdriver or Phillips screwdriver to remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 6-23](#).

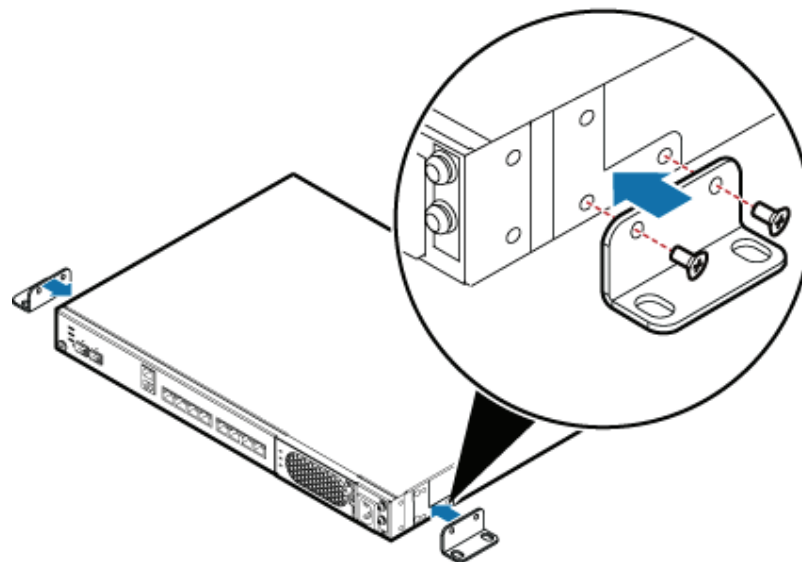
Figure 6-23 Removing screws and mounting ears



PAR49C0051

- 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 6-24**.

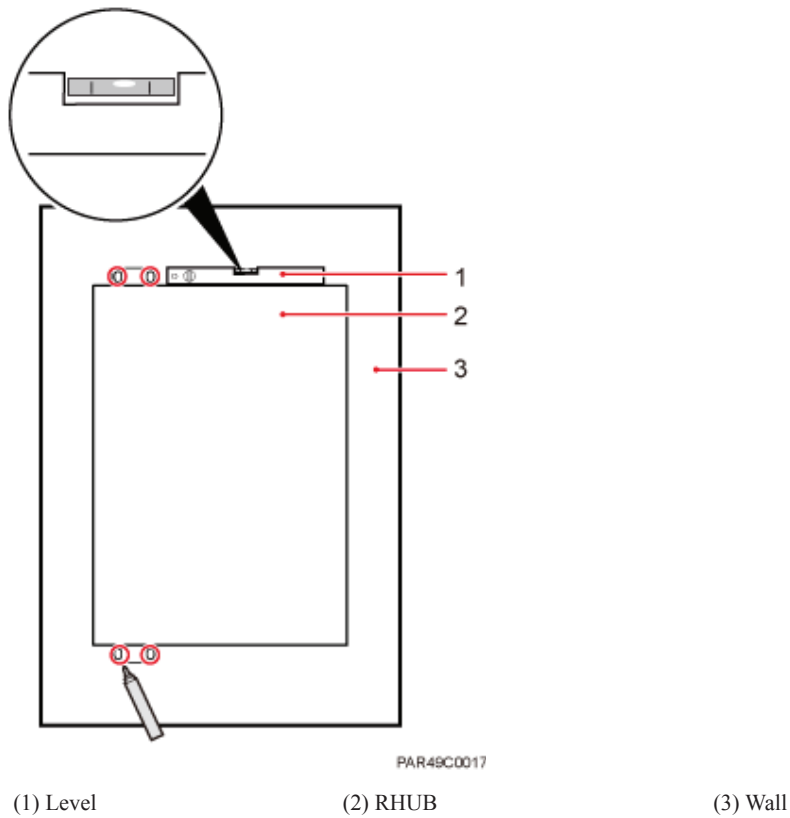
Figure 6-24 Installing mounting ears and screws



PAR49C0010

- Step 2** Determine the position on the wall for installing the RHUB based on the requirements in the engineering blueprint and **6.1.2 Installation Clearance Requirements**. Place the RHUB 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 6-25**.

Figure 6-25 Anchor points for installing an RHUB on a wall

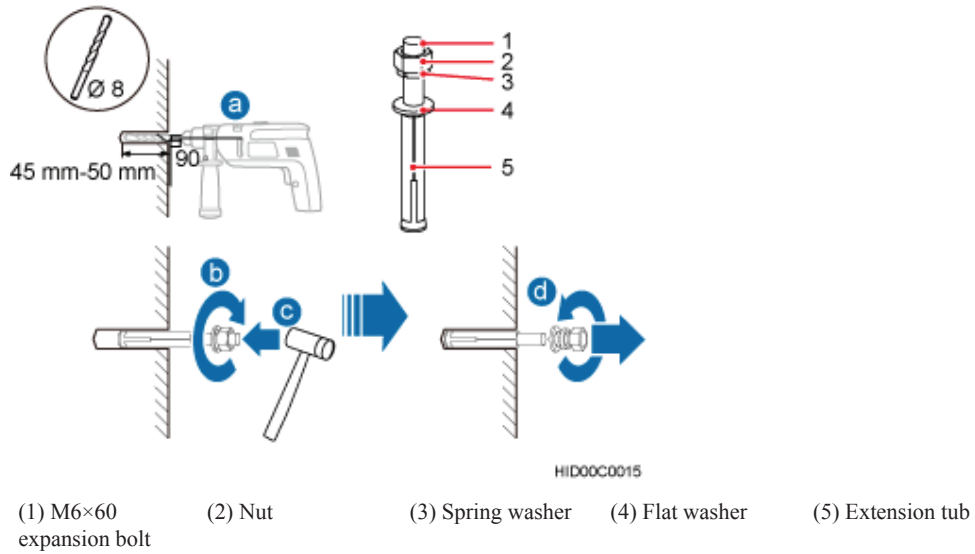


CAUTION

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 6-26](#).

Figure 6-26 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.

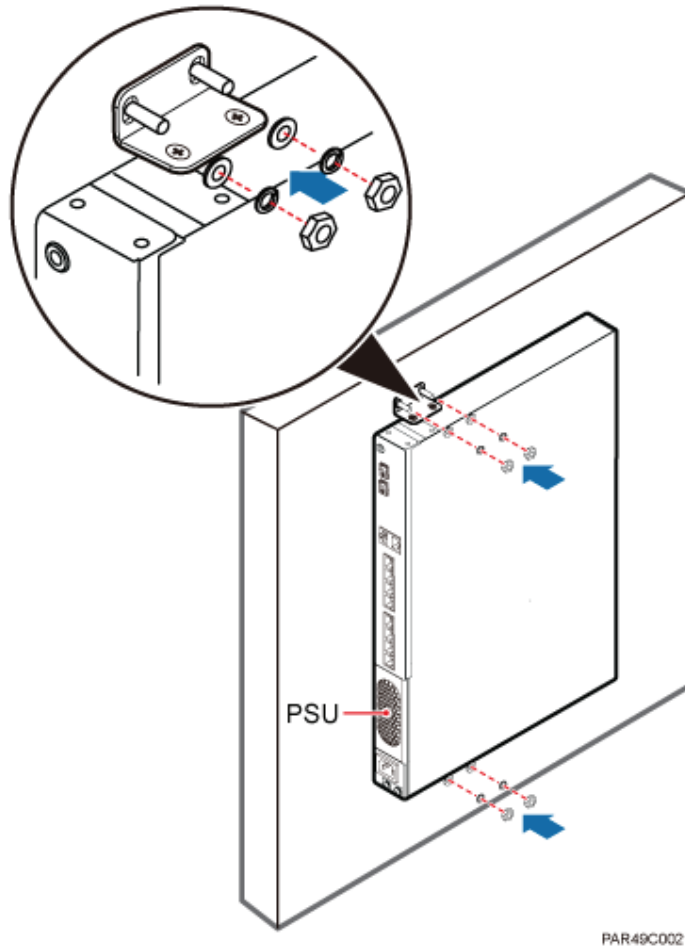


NOTICE

After removing an expansion bolt, ensure that the top of the expansion sleeve is level with the wall. If it is not level, the RHUB 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 RHUB to the wall, as shown in [Figure 6-27](#).

Figure 6-27 Installing an RHUB on a wall



NOTE

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

----End

6.4 Installing RHUB Cables

This section describes how to install cables for an RHUB.

6.4.1 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

National Standards

- Code for Engineering Design of Generic Cabling System for Building and Campus (GB 50311-2007)
- Code for Engineering Acceptance of Generic Cabling System for Building and Campus (GB50312-2007).
- Security Protection Engineering Technology Specifications (GB 50348-2004)
- Code for Construction and Acceptance of the Electronic Information System Room (GB 50462-2008)
- Code for Quality Acceptance of the Intelligent Building Engineering (GB 50339-2003)
- Code for Quality Acceptance of Electric Engineering Construction in Building (GB 50303-2002)
- Technical Specification for Construction and Acceptance of Telecommunication Conduit Engineering (GB 50374-2006)

International Standards

- Generic Cabling for Customer Premises (ISO/IEC 11801)
- Commercial Building Telecommunications Cabling Standard (EIA/TIA 568)
- Commercial Building Standard for Telecommunication Pathways and Spaces (EIA/TIA 569)
- Administration Standard for Commercial Telecommunications Infrastructure (EIA/TIA 606)
- Grounding and Bonding Requirements for Telecommunications in Commercial Buildings (EIA/TIA 607)
- Generic Cabling Systems for Information Technology (EN 50173)
- Cabling Installation for Information Technology (EN 50174)

Bending radius

- The bending radius of a power cable or a protection ground (PGND) cable is at least five 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

- The steel pipe or fire-resistant rigid polyvinyl chloride pipe should be used for the cable duct or for routing cables. The cross-sectional usage of the cable duct should be 30% to 50% and that of the pipe for routing cables should be 25% to 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 RHUB.
- 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.
- The point at which an Ethernet cable is bundled must be spaced 400 mm or less from the Ethernet port on an RHUB.
- For the RHUB used in the elevator engine room on the rooftop, generator set for the subway engine, and equipment room with central air conditioning, Ethernet cables must be led through metallic conduits that are reliably grounded at both ends.

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.

6.4.2 Cable List

The DBS3900 LampSite cable list includes BBU cable list, DCU cable list, RHUB cable list, pRRU cable list.

BBU Cable List

The following table lists BBU3900 cables and BBU3910 cables.

NOTE

Except the CPRI fiber optic cable, for details about the cables exterior and related description in [Table 6-3](#) and [Table 6-4](#), see *3900 Series Base Station Cables*.

Table 6-3 BBU3900&BBU3910 cable list

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
BBU PGND Cable	OT terminal (M4, 6 mm ² or 0.009 in. ²)	Ground terminal on the BBU	OT terminal (M8, 6 mm ² or 0.009 in. ²)	External ground bar
BBU Power Cable	3V3 connector	-48V port on UPEU in BBU	Depending on the power equipment	Depending on the power equipment
E1/T1 Cable	DB26 male connector	E1/T1 port on the UMPT, GTMU, UELP, WMPT, or UTRP in the BBU	Depending on site requirements	External transmission equipment

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
E1/T1 Surge Protection Transfer Cable	DB26 male connector	E1/T1 port on the UMPT, GTMU, UELP, WMPT, or UTRP in the BBU	DB25 connector	INSIDE port on the UELP in the SLPU
FE/GE Ethernet Cable	RJ45 connector	● FE0 port near OUTSIDE on the UFLP in the BBU ● FE0 port on the UMPT, GTMU, or WMPT in the BBU ● FE/GE port on the UTRP in the BBU ● FE/GE port on the LMPT in the BBU	RJ45 connector	External transmission equipment
FE/GE Surge Protection Transfer Cable	RJ45 connector	FE0 port on the UMPT, GTMU, or WMPT in the BBU FE/GE port on the UTRP in the BBU	RJ45 connector	FE0 port near INSIDE on the UFLP in the SLPU
Interconnection Cable Between FE/GE Electrical Ports	RJ45 connector	FE0 port on the WMPT in the BBU	RJ45 connector	FE0 port on the GTMU in the BBU
Interconnection Cable Between FE/GE Optical Ports	LC connector	FE1 port on the WMPT in the BBU	LC connector	FE1 port on the GTMU in the BBU

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
FE/GE Fiber Optic Cable	LC connector	FE1 port on the WMPT, GTMU, LMPT, or UMPT in the BBU	FC, SC, or LC connector	External transmission equipment
CPRI Optical Fiber	DLC connector	CPRI port on the GTMU, WBBP, LBBP, or UBRI in the BBU	DLC connector	CPRI_W port on an RRU
APMI-BBU Monitoring Signal Cable	RJ45 connector	MON1 port on the UPEU or UEIU in the BBU	Twisted pair	TX+, TX-, RX+, or RX- port on the APMI
HEUA-BBU Monitoring Signal Cable	RJ45 connector	M0N1 port on the UPEU or UEIU in the BBU	RJ45 connector	COM_IN port on the HEUA
CMUA-BBU Monitoring Signal Cable	RJ45 connector	M0N1 port on the UPEU or UEIU in the BBU	RJ45 connector	COM_IN port on the CMUA
CMUE-BBU Monitoring Signal Cable	RJ45 connector	M0N1 port on the UPEU or UEIU in the BBU	RJ45 connector	COM_IN port on the CMUE
CMUEA-BBU Monitoring Signal Cable	RJ45 connector	M0N1 port on the UPEU or UEIU in the BBU	RJ45 connector	COM_IN port on the CMUEA
EMUA/EMUB Monitoring Signal Cable	RJ45 connector	M0N1 port on the UPEU or UEIU in the BBU	DB9 male connector	RS-485 port on the EMUA
PSU (EPW25-24S48D) Monitoring Signal Cable	RJ45 connector	EXT_ALM0 port on the UPEU or UEIU in the BBU	Cord end terminal	ALM terminal on the PSU (DC/DC)

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
PSU (EPW25-24S48D) In-Position Signal Cable	RJ45 connector	EXT_ALM0 port on the UPEU or UEIU in the BBU	RJ45 connector	RESENT port on the PSU (DC/DC)
BBU Alarm Cable	RJ45 connector	EXT_ALM0 port on the UPEU or UEIU in the BBU	RJ45 connector	External alarm device
GPS Clock Signal Cable	SMA male connector	GPS port on LMPT, USCU, or UMPTa6 in the BBU	Type N female connector	GPS surge protector
BBU Interconnection Signal Cables	DLC connector	M0 to M4 ports on the UCIU in the BBU	DLC connector	CI port on the UMPT in the BBU
Cable Between Two Combined Base Stations	DB15 male connector	GCK port on the UCIU in the BBU	MD36 or DB15 male connector	DCTB or DGLUb
Adapter Used for Local Maintenance	USB ^a connector	USB ^a port on the UMPT in the BBU	Network connector	Ethernet cable

 NOTE

a: The security of the USB port is ensured by encryption, and the USB port can be shut down using commands. The USB commission port is used for commissioning the base station rather than configuring and exporting information of the base station.

The following table lists BBU3910A cables.

Table 6-4 BBU3910A cable list

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
PGND cable for the BBU3910A	OT terminal (M6, 16 mm ² or 0.025 in. ²)	Ground terminal on the BBU3910A	OT terminal (M8, 16 mm ² or 0.025 in. ²)	Ground terminal on the ground bar

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
Power cable for the BBU3910A	EPC4 connector	NEG(-) and RTN(+) ports on the BBU3910A	Depending on the power equipment	Depending on the power equipment
Dry contact alarm cable for the BBU3910A	DB15 waterproof male connector (waterproof on the connector's both sides)	EXT_ALM port on the BBU3910A	Cord end terminal	Equipment to be monitored
RS485 alarm cable for the BBU3910A	DB15 waterproof male connector (waterproof on the connector's both sides)	EXT_ALM port on the BBU3910A	RJ45 connector	COM_IN port on the OPM50M
CPRI Optical Fiber	DLC connector	CPRI port on the BBU3910A	DLC connector	CPRI_W port on an RRU
FE/GE fiber optic cable	LC connector	GE1 port on the BBU3910A	LC, FC, or SC connector	External transmission equipment
FE/GE Ethernet cable	RJ45 connector	GE0 port on the BBU3910A	RJ45 connector	External transmission equipment
E1/T1 cable	DB26 waterproof male connector	E1/T1 port on the BBU3910A	Depending on site requirements	External transmission equipment

DCU Cable List

For details about the DCU cables, see *DCU3900 Cables* in DCU3900 Hardware Description.

RHUB Cable List

Table 6-5 lists RHUB cables.

Table 6-5 RHUB 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 RHUB	OT terminal (M6, 6 mm ² [0.009 in. ²])	Ground terminal on the external ground bar
Power Supply Cable	C13 female connector	AC power input socket on the RHUB	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 RHUB
		CPRI port on the LBBP, WBBP or UBBP in the BBU	DLC connector	CPRI port on the DCU
		CPRI port on the DCU		CPRI0 or CPRI1 port on the RHUB
		CPRI0 or CPRI1 port on the RHUB	DLC connector	CPRI0 or CPRI1 port on the RHUB
		CPRI port on the LBBP, WBBP or UBBP in the BBU	FC connector, SC connector, or LC connector	ODF
		CPRI port on the DCU		
		CPRI0 or CPRI1 port on the RHUB		
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on the RHUB	RJ45 connector	CPRI_E0~CPRI_E1 port on the pRRU
(Optional) Alarm Cable	RJ45 connector	EXT_ALM port on the RHUB	Bare end	Alarm signal port of the monitored equipment

 NOTE

- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU, DCU or RHUB through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB 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 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.

pRRU Cable List

Table 6-6 lists pRRU cables.

Table 6-6 List of pRRU3901 cables

Cable	One End		The Other End	
	Connector	Connected to ...	Connector	Connected to ...
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on RHUB	RJ45 connector	CPRI_E0~CPRI_E1 port on pRRU
	RJ45 connector	Transmission port on Access Control(AC)	RJ45 connector	● GE port on pRRU3901 ● CPRI_E1 port on pRRU3911
(Optional) RF Jumper	SMA straight male connector/ Type N male connector	External antenna TX/RX RF port on pRRU	Based on the port model of the antenna system.	Antenna system

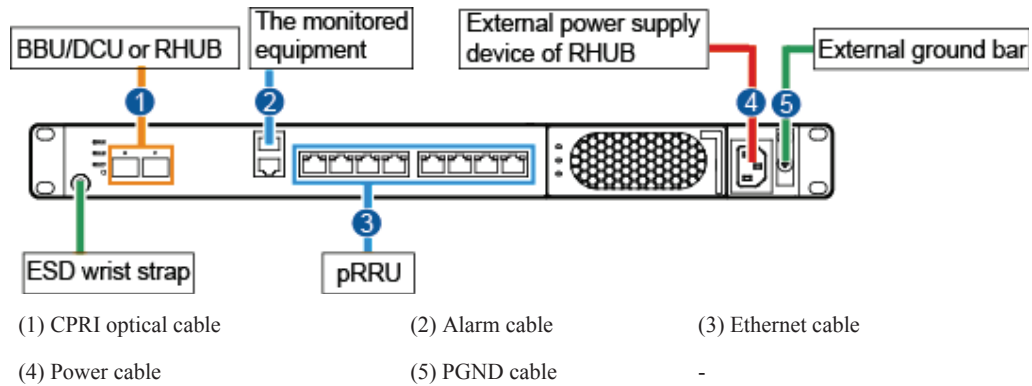
 NOTE

- When the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used,
 - In the indoor scenario, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.
 - In the outdoor scenario (only pRRU3901 and pRRU3902), the Ethernet cable is divided into two parts, one among RHUB-PoE surge protector 2- PoE surge protector 3-Extender and the other among the Extender- PoE surge protector 4- PoE surge protector 1-pRRU.

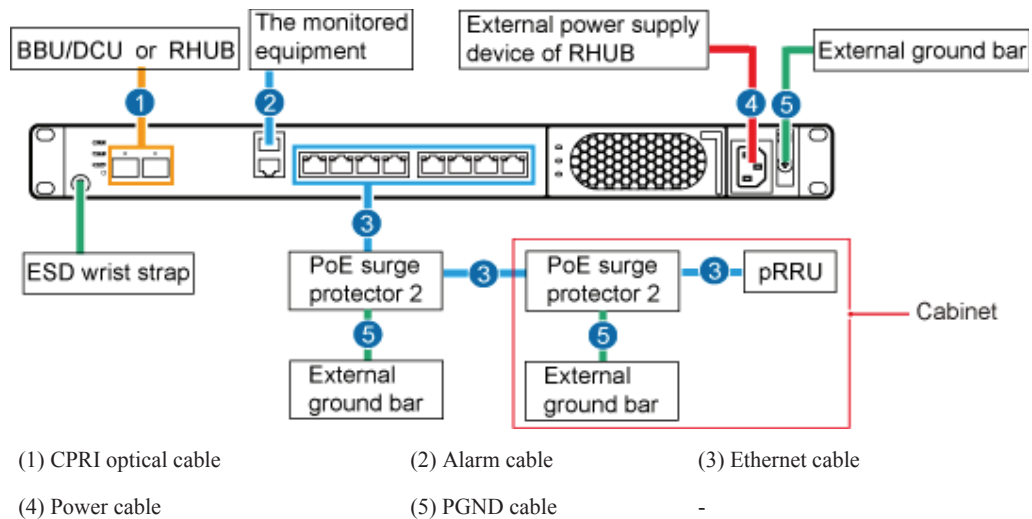
6.4.3 Cable Connections

This section describes the cable connections for an RHUB.

Figure 6-28, Figure 6-29 shows the cable connections for an RHUB. The port of ETH are reserved.

Figure 6-28 Cable connections for an RHUB (indoor)**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.

Figure 6-29 Cable connections for an RHUB (outdoor)**NOTE**

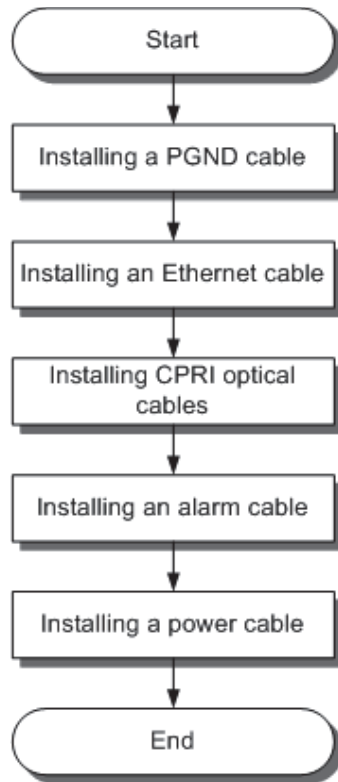
The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.

6.4.4 Cable Installation Process

This section describes the process of installing RHUB cables.

Figure 6-30 shows the RHUB cable installation process.

Figure 6-30 RHUB cable installation process



6.4.5 Installing PGND Cable

An RHUB PGND cable ensures proper grounding of an RHUB.

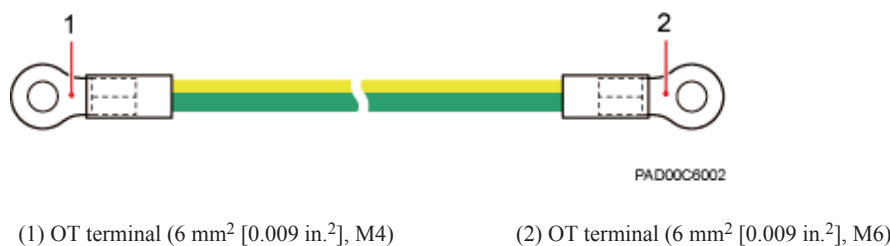
Prerequisites

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 6-31 Exterior of a PGND cable



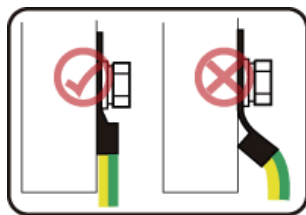
 NOTE

- 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 RHUB using a PGND cable.
 - When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in [Figure 6-32](#).
-

Figure 6-32 Correct direction of an OT terminal for the PGND cable

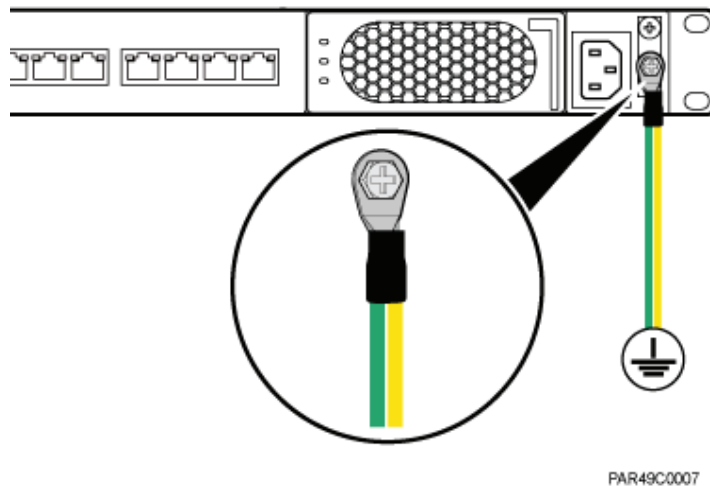


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Procedure

- Step 1** Route the PGND cable by referring to [6.4.1 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 RHUB 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 RHUB panel, as shown in [Figure 6-33](#).

Figure 6-33 Installing an RHUB 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 [6.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

6.4.6 Installing Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- 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.
- The Ethernet cables can be straight-through cables or crossover cables.
- With the internal PoE module providing power, the maximum length of an Ethernet cable is 100 m. With the Extender, the distance of the pRRU and RHUB can be extended by the Extender up to a total distance of 200 m.
- 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.

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 RHUB and a pRRU.

For details about the cable connections in the different scenarios, see [6.4.3 Cable Connections](#). The Ethernet cable connections between RHUB and pRRUs are the same. The

following section describes the connections between RHUB-Extender-pRRU3901 as an example.

In the outdoor scenario, PoE surge protector is needed to provide surge protection for the Ethernet ports. For details about the installation of PoE surge protector, see [12 \(Optional\) Installing the PoE Surge Protector and Cables](#).

Procedure

Step 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 *DBS3900 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 Connect the RJ45 connector at the other end of the Ethernet cable to any port ranging from CPRI_E0 to CPRI_E7 on the RHUB panel based on the engineering design.

Step 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.

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.

Step 4 Remove the dustproof cap of the CPRI_E0 port on the pRRU.

Step 5 Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU panel, as shown in [Figure 6-34](#), [Figure 6-35](#).

Figure 6-34 Install an Ethernet cable between an RHUB and a pRRU3901

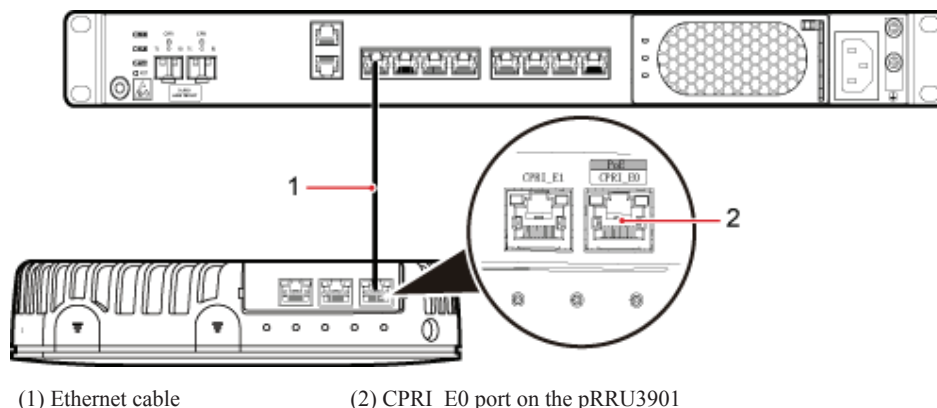
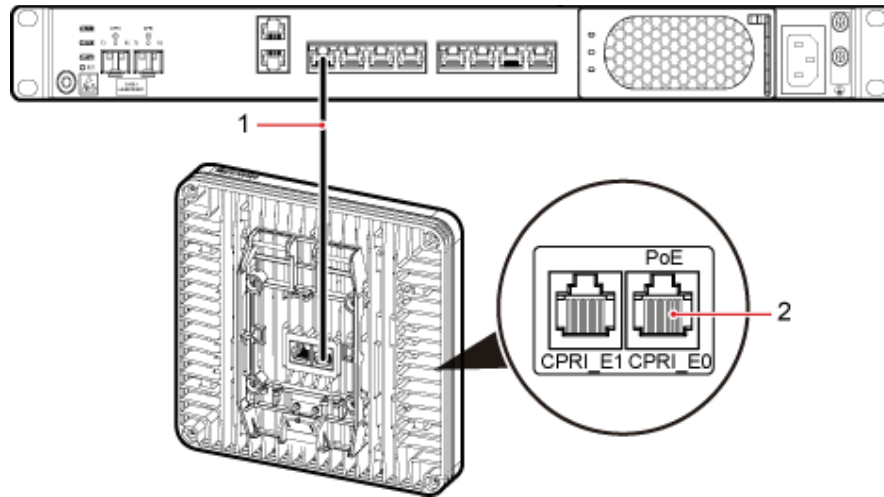


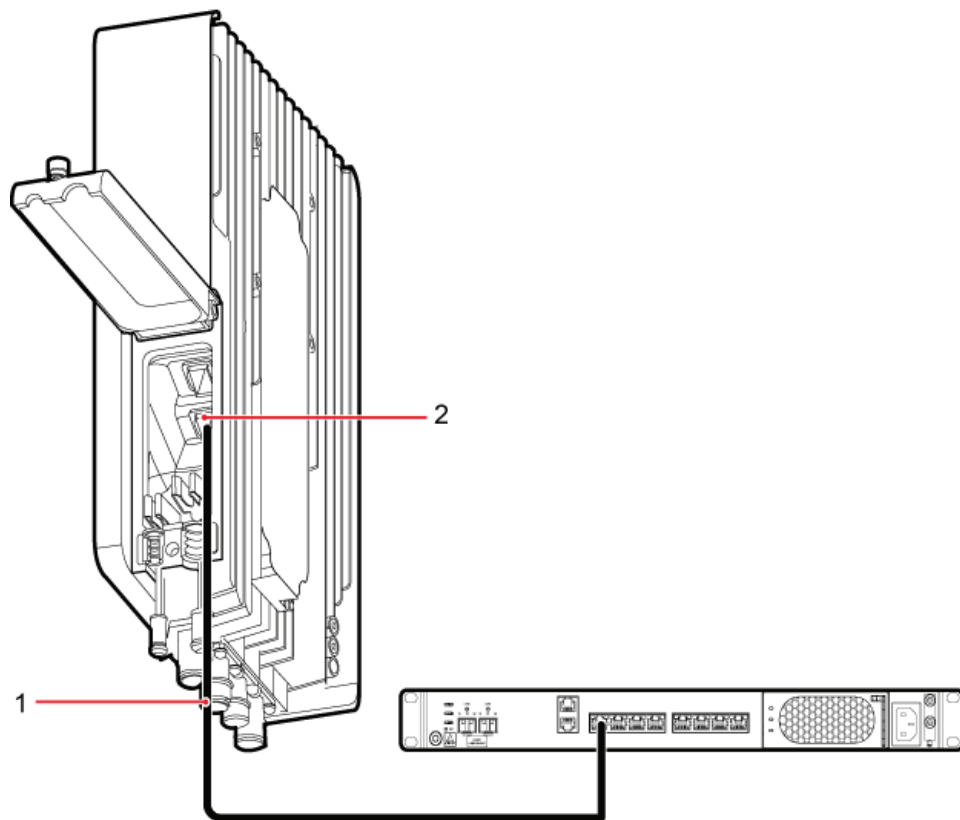
Figure 6-35 Install an Ethernet cable between an RHUB and a pRRU3902 or pRRU3911



(1) Ethernet cable

(2) CPRI_E0 port on the pRRU3902

Figure 6-36 Install an Ethernet cable between an RHUB and a pRRU3907



(1) Ethernet cable

(2) CPRI_E0 port on the pRRU

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----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [6.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

6.4.7 Installing CPRI Optical Cables

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

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 **CPRI Topology** in *DBS3900 LampSite Technical Description*.
- An optical module to be installed must match the rate of its corresponding port.

NOTE

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

- Step 1** Install an optical module, as shown in [Figure 6-37](#) and [Figure 6-38](#).
1. Remove the dust-proof cap from the CPRI port on the RHUB 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 RHUB, DCU, BBU or ODF.
 5. Raise the puller of the optical module.

Figure 6-37 Removing the dust-proof cap from a port

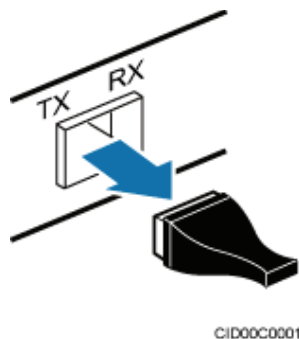
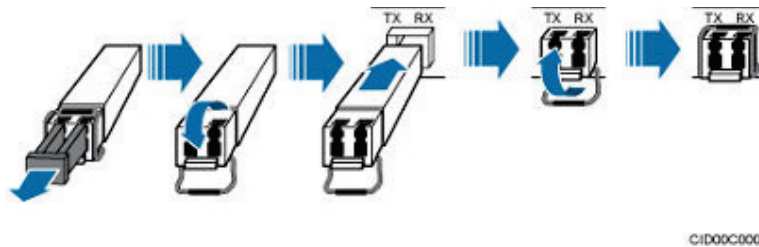


Figure 6-38 Installing an optical module

Step 2 Install a CPRI optical cable, as shown in [Figure 6-39](#).

1. Remove the dust-proof cap from the optical cable connector.
2. Install the optical cables by referring to [Table 6-7](#).

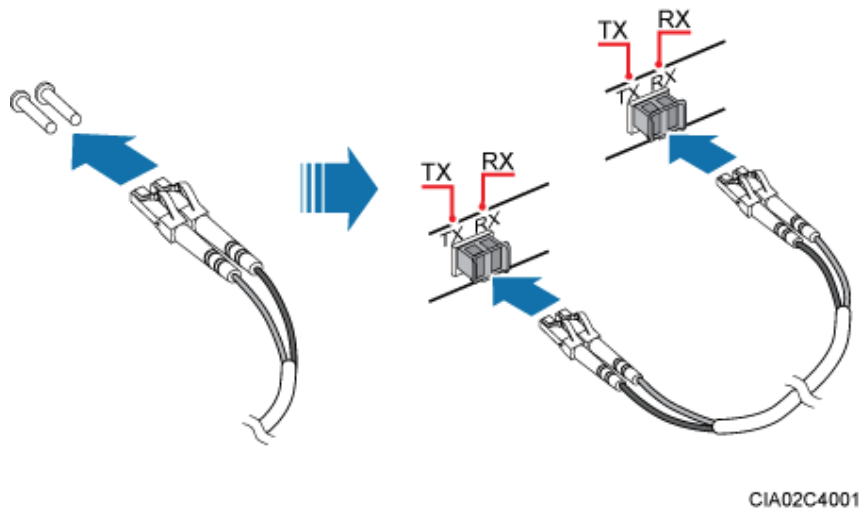
Table 6-7 CPRI optical cable connections

One End		The Other End	
Connect or	Connected to	Connector	Connected to
DLC connector	BBU/LBBP&WBBP/CPRI port	DLC connector	CPRI0 or CPRI1 port on the RHUB
	BBU/LBBP&WBBP/CPRI port	DLC connector	CPRI port on the DCU
	CPRI port on the DCU		CPRI0 or CPRI1 port on the RHUB
	CPRI0 or CPRI1 port on the RHUB	DLC connector	CPRI0 or CPRI1 port on the RHUB
	BBU/LBBP&WBBP/CPRI port	FC, SC, or LC connector	ODF
	CPRI port on the DCU		
	CPRI0 or CPRI1 port on the RHUB		

NOTE

- In sharing BBUs with Macro Networks scenario, RHUBs share only main control boards with RF modules on macro base stations, not baseband processing units.
- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU or RHUB through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU/DCU or RHUB 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 6-39](#) shows how to install a CPRI optical cable for connecting the BBU and RHUBs.

Figure 6-39 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 [6.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

6.4.8 Installing Alarm Cable (Optional)

An RHUB alarm cable transmits dry node alarm signals.

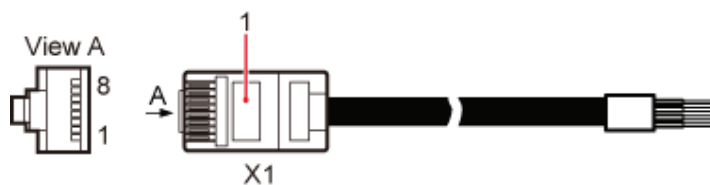
Prerequisites

Connectors for an alarm cable are prepared.

Context

[Figure 6-40](#) shows the exterior of an RHUB alarm cable. [6.4.2 Cable List](#) shows the installation position on both ends of the RHUB cable.

Figure 6-40 RHUB alarm cable



Procedure

- Step 1** Connect the RJ45 connector on one end of the alarm cable to the EXT_ALM port on the RHUB.

- 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 [6.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

6.4.9 Installing Power Cable

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

Context

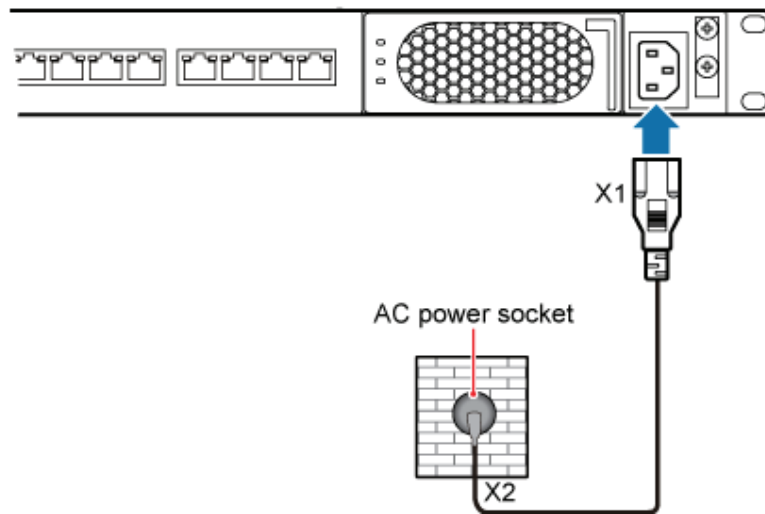
[Table 6-8](#) lists the recommended configurations of upper-level circuit breakers and power cables for a RHUB.

Table 6-8 Configurations of upper-level circuit breakers and power cables

Power Supply	Upper-level AC Circuit Breaker (For a single RHUB)	Cross-Sectional Area of the Input Power Cable
220 V AC single-phase	≥ 6 A	1 mm ²
110 V AC single-phase	≥ 10 A	1.25 mm ²

Procedure

- Step 1** Route the power cable by referring to [6.4.1 Requirements for Cable Layout](#).
- Step 2** Connect the power connector on the X1 end to the AC power input port on the RHUB panel, as shown in [Figure 6-41](#).
- Step 3** Connect the power connector on the X2 end to the external power supply port, as shown in [Figure 6-41](#).

Figure 6-41 Installing an RHUB power cable

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [6.4.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

6.5 Checking the RHUB Hardware Installation

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

Table 6-9 lists the hardware installation checking items.

Table 6-9 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 RHUB is properly installed.
3	The surface of the RHUB is neat and clean. The external paint is intact. The labels, tags, and nameplates are correct, legible, and complete.

Table 6-10 lists the checking list of the power cable and PGND cable connections.

Table 6-10 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 6-11 lists the check items of the signal cable connection.

Table 6-11 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.

No.	Item
8	The distance between the bundled fiber tails and the RHUB panel is less than 70 mm.

Table 6-12 lists the checking items for other cable connections.

Table 6-12 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.

6.6 Power-on Check on an RHUB

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

Context

After the RHUB and pRRUs are installed and connected to each other, power on them no matter whether the BBU is installed.



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

Step 1 Measure the RHUB earth resistance.

If...	Then...
The RHUB earth resistance is less than 10 ohms	Go to Step 2 .
The RHUB 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 RHUB.

If...	Then...
The external power supply ranges from 100 V AC to 240 V AC	Go to Step 3 .
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 RHUB. Wait 3 to 5 minutes, check the status of the RUN indicator of the RHUB after the RHUB 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 RHUB, 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 RHUB, and check the power input again. Rectify the board faulty and power on the RHUB 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 RHUB if the uploading is not finished in 5 minutes, and check whether the configuration file is correct. Power on the RHUB again after the fault is rectified.

 NOTE

If an RHUB is not connected to any BBU, the RHUB is considered normally powered on when any indicator on the RHUB is on.

----**End**

7 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.

7.1 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.

7.2 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.

7.3 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.

7.4 Installing a pRRU3901

This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or standard keel, but not on an aluminum panel or a non-standard keel.

7.5 Installing pRRU3901 Cables

This section describes the procedure of installing the pRRU3901 cables.

7.6 Checking the pRRU3901 Hardware Installation

pRRU3901 hardware installation checking includes hardware and cable installation checking.

7.7 Powering on the pRRU3901

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

7.1 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.

7.1.1 Product Family

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

Table 7-1 lists the pRRU3901 product family.

Table 7-1 pRRU3901 product family

Category	Equipment	Optional or Mandatory	Quantity	Function
Main equipment	pRRU 3901	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.
	Cabinet	Optional	● None and one Extender is needed ● Yes and two Extenders are needed	Install the pRRU3901 and Extender in the outdoor scenario.
	Extender	Optional	1 or 2 NOTE The quantity depends on the number of Ethernet cables in use.	Extends the distance between the pRRU3901 and RHUB.

7.1.2 Installation Scenario

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

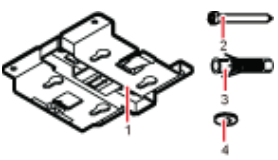
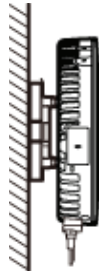
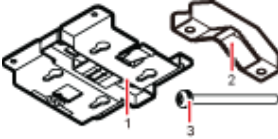
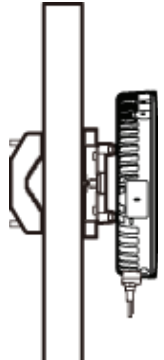
Installing a pRRU3901 on a wall

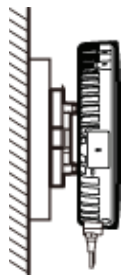
NOTE

- 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 7-2](#).

Table 7-2 Wall-mounted suggestion

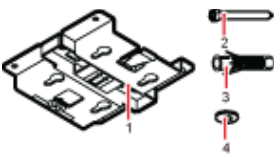
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a wall by drilling holes For details, see 7.4.2 Installing a pRRU3901 on a Wall .	● The wall can bear a load at least four times the weight of a pRRU3901. ● The screws must be tightened with a torque of 10 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 pRRU on a wall using a V clamp through an attachment plate For details, see 7.4.5 Installing a pRRU3901 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 80 mm.	1. Plate 2. V clamp 3. Bolt (M6X80) 	

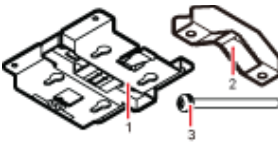
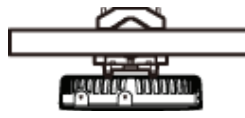
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a wall using a plate on a metal wall	The wall cannot bear a load at least four times the weight of the pRRU. For example, EPS walls, MDF walls, or walls cannot be drilled.	The plate is prepared by customers.	

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 7-3](#).

Table 7-3 Ceiling-mounted suggestion

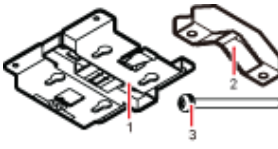
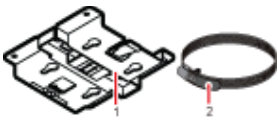
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a ceiling by drilling holes For details, see 7.4.3 Installing a pRRU3901 on a Ceiling .	● The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU3901. ● The screws 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 	

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a ceiling using a V clamp through an attachment plate For details, see 7.4.5 Installing a pRRU3901 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 80 mm.	1. Plate 2. V clamp 3. Bolt (M6X80) 	
Installing the pRRU3901 on a pole For details, see 7.4.4 Installing a pRRU3901 on a Pole .	A pole under the ceiling can bear a load at least four times the weight of the pRRU3901.	For details, see Table 7-4 .	For details, see Table 7-4 .
Installing the pRRU3901 on a keel For details, see 7.4.6 Installing a pRRU3901 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 7-5 .	For details, see Table 7-5 .

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 7-4](#).

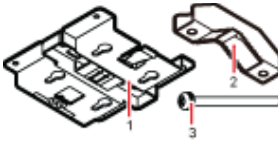
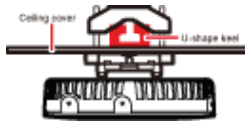
Table 7-4 Pole-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a pole For details, see 7.4.4 Installing a pRRU3901 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.

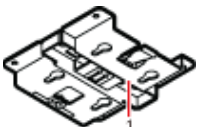
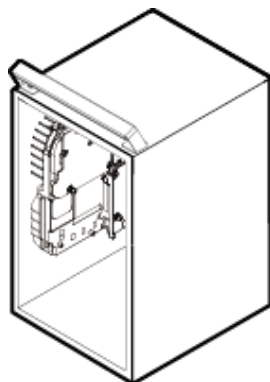
Table 7-5 Keel-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU3901 on a keel For details, see 7.4.6 Installing a pRRU3901 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 pRRU installed on a U-shaped keel.

pRRU3901 cabinet

In the outdoor scenario, pRRU3901 should be installed in the cabinet.

Table 7-6 Cabinet installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the cabinet For details, see 7.4.7 Installing the Cabinet	Remove the housing before installing a pRRU3901 in the cabinet.	1. Plate 	

7.1.3 Space Requirements

This chapter describes the space requirements of the pRRU3901.

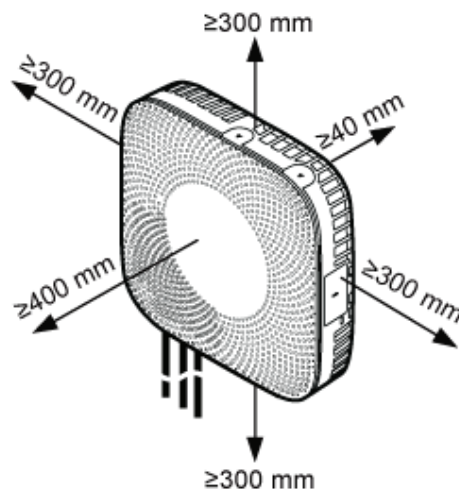
When the pRRU3901 is installed on a wall, ceiling, pole or keel, the minimum space is required for easy cabling and O&M. Based on the engineering practice, the recommendation for the installation space is provided.

 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 7-1](#) shows the recommended space requirements of the pRRU3901.

Figure 7-1 Recommended space requirements of the pRRU3901



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 40 mm on the back of the pRRU3901 is reserved for ventilation.

In the outdoor scenario, there is no space requirement for the pRRU3901 installing in the cabinet.

7.1.4 Installation Environment Requirements

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

Running Environment Specifications

Table 7-7 shows the environment specifications for the pRRU3901 installed indoors.

Table 7-7 pRRU3901 environment specifications

Specifications	Condition	Remarks
Operating temperature	● Indoor: - 5 °C to + 40 °C ● Outdoor: - 20 °C to + 40 °C	-
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 such as power stations, high-voltage substations, and wired TV towers.

- 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.

7.2 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.

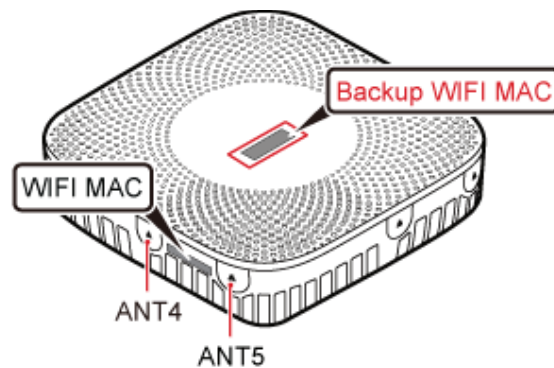
Procedure

- Step 1** Remove the backup WIFI MAC label from the front housing of the pRRU3901 and keep them secure, as shown in [Figure 7-2](#).

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 7-2 Removing backup WIFI MAC label



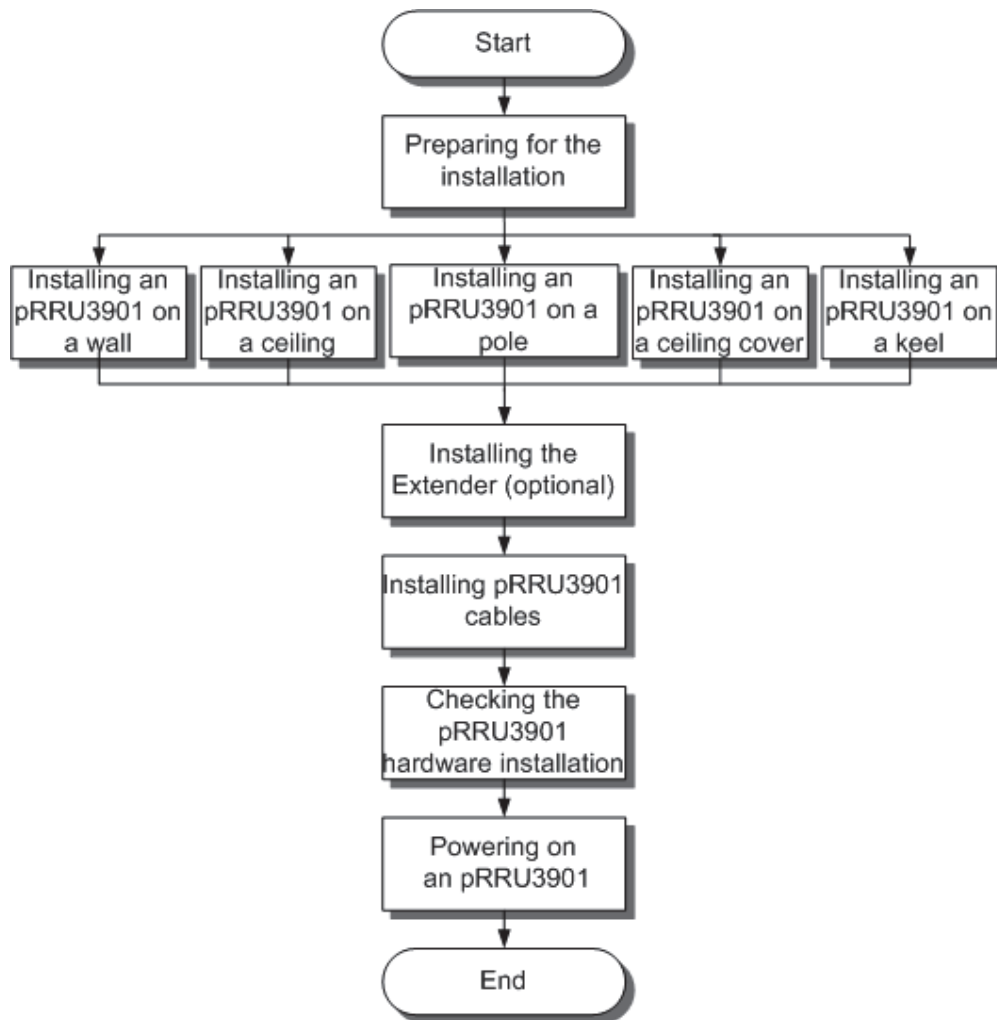
- Step 2** Save the MAC according to [15.1 MAC Collection Template](#), and report it to the pRRU3901 commissioning personnel.

----End

7.3 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 7-3](#) shows the pRRU3901 installation process.

Figure 7-3 pRRU3901 installation process

7.4 Installing a pRRU3901

This section describes the pRRU3901 installation process. A pRRU3901 can be installed on a wall, ceiling, indoor metal pole, or standard keel, but not on an aluminum panel or a non-standard keel.

NOTE

Note the following when installing the pRRU3901:

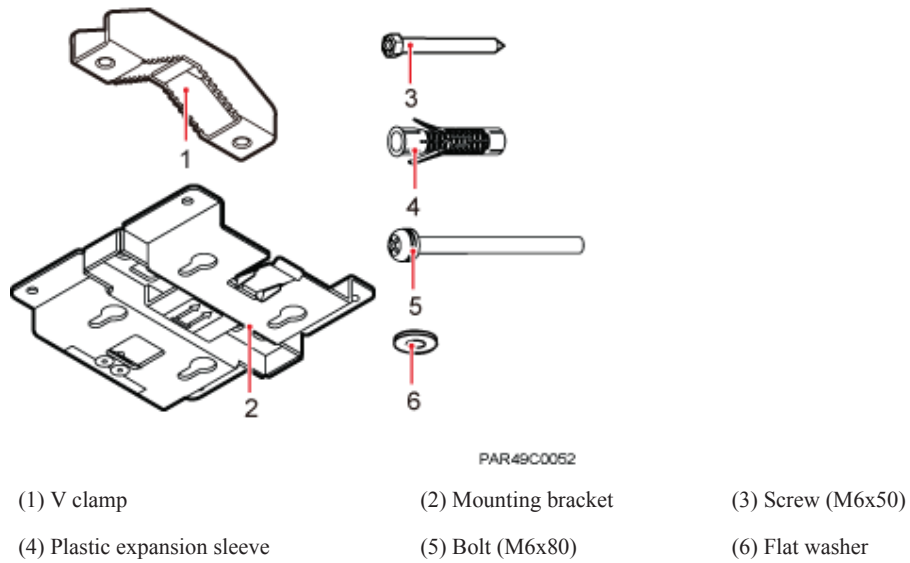
- The pRRU3901 cannot be grounded. If the pRRU3901 is grounded but the RHUB connected to this pRRU3901 is not, the pRRU3901 may fail to be powered on.
- A minimum distance of 50 cm must be reserved between the pRRU3901 and the incandescent lamp.
- The installation spacing between the pRRU3901 and the 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.

7.4.1 pRRU3901 Mounting Kits

This section describes the pRRU3901 mounting kits.

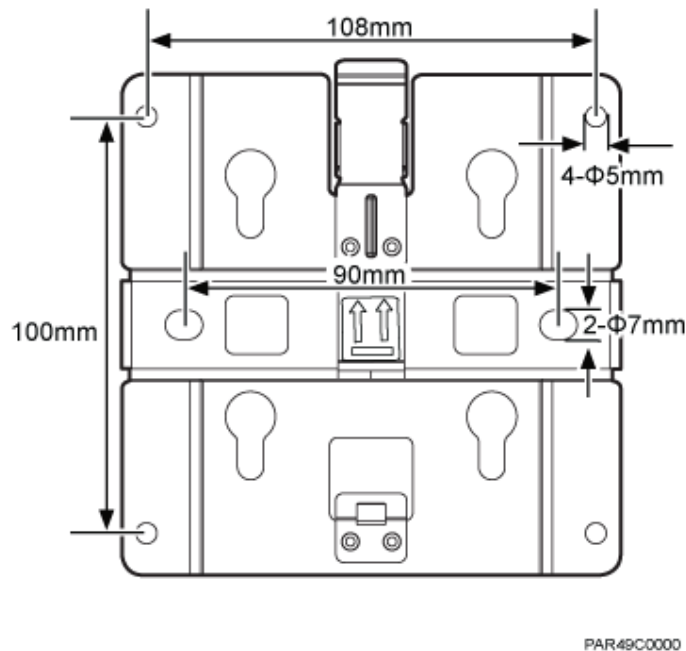
Figure 7-4 shows the exterior of the pRRU3901 mounting kits.

Figure 7-4 pRRU3901 mounting kits



The following figure shows the specifications of the mounting bracket.

Figure 7-5 Mounting bracket specifications



7.4.2 Installing a pRRU3901 on a Wall

This section describes how to install a pRRU3901 on an indoor wall. If a wall indoors has adequate load bearing capacity and installation space, it is good practice to install the pRRU3901 on the wall. If the wall does not have adequate load bearing capacity, choose an installation mode based on site requirements.

Context



NOTICE

This section describes only the wall-mounted installation in which mounting kits are directly installed on the wall without auxiliary devices. The procedure for other wall-mounted installation modes is similar.

Procedure

- Step 1** Determine the position for installing the pRRU3901 based on the construction blueprint and the clearance requirements.

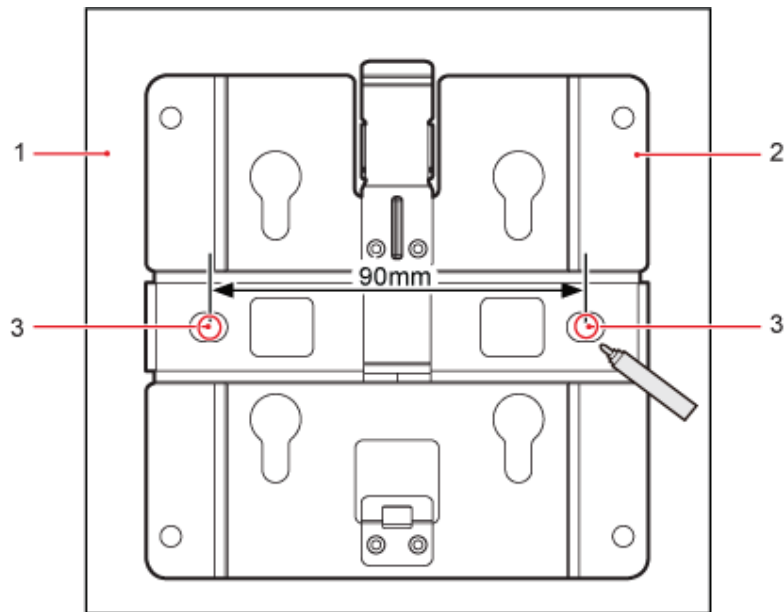


NOTE

For details about the clearance requirements, see [7.1.3 Space Requirements](#).

- Step 2** Place the mounting bracket in the installation position against the wall. Then, level the mounting bracket and use a marker to mark two anchor points. See [Figure 7-6](#).

Figure 7-6 Anchor points on the pRRU3901 mounting bracket (unit: mm)



PAR49C0000

(1) Wall

(2) Mounting bracket

(3) Anchor point

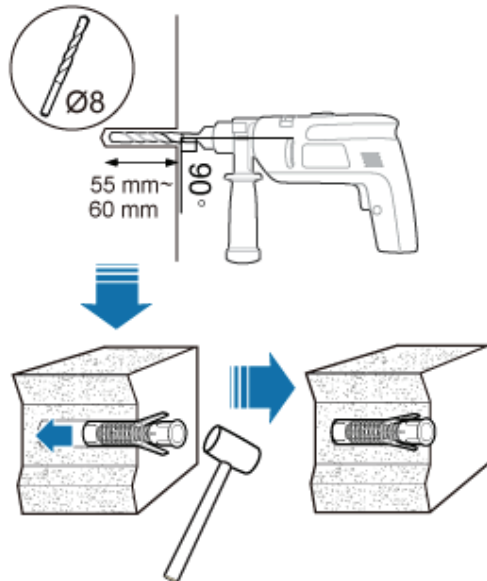


CAUTION

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

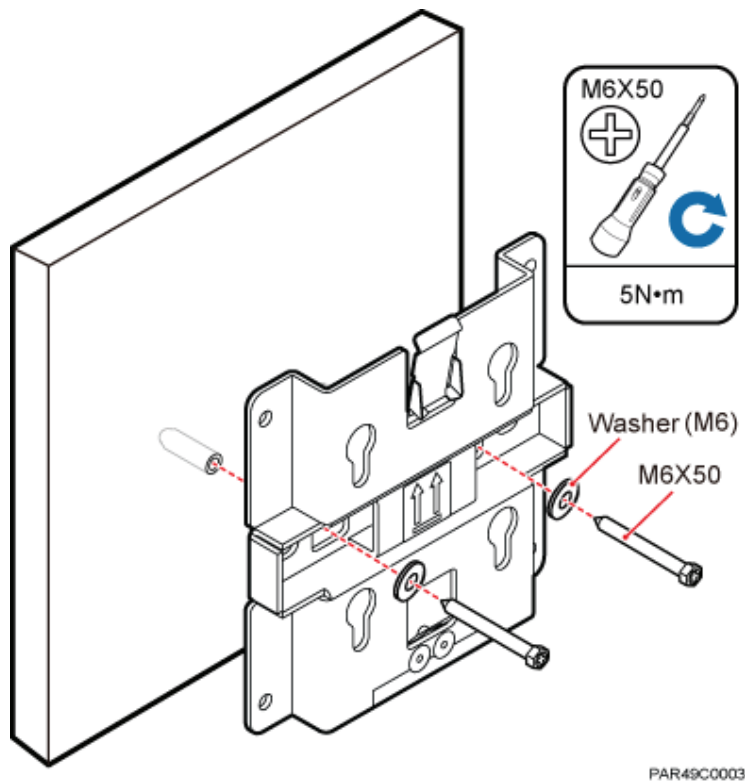
- Step 3** Use a hammer drill with $\phi 8$ bore to drill holes at the marked anchor points, as shown in **Figure 7-7**. Use a vacuum cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to hit a plastic expansion sleeve into each hole.

Figure 7-7 Drilling holes and installing expansion bolts



- Step 4** Lead the M6x50 screws through the washers, and then through the drilling holes on the mounting bracket to the plastic expansion sleeves, and torque the screws to 5 N•m, as shown in **Figure 7-8**.

Figure 7-8 Installing the mounting bracket



NOTE

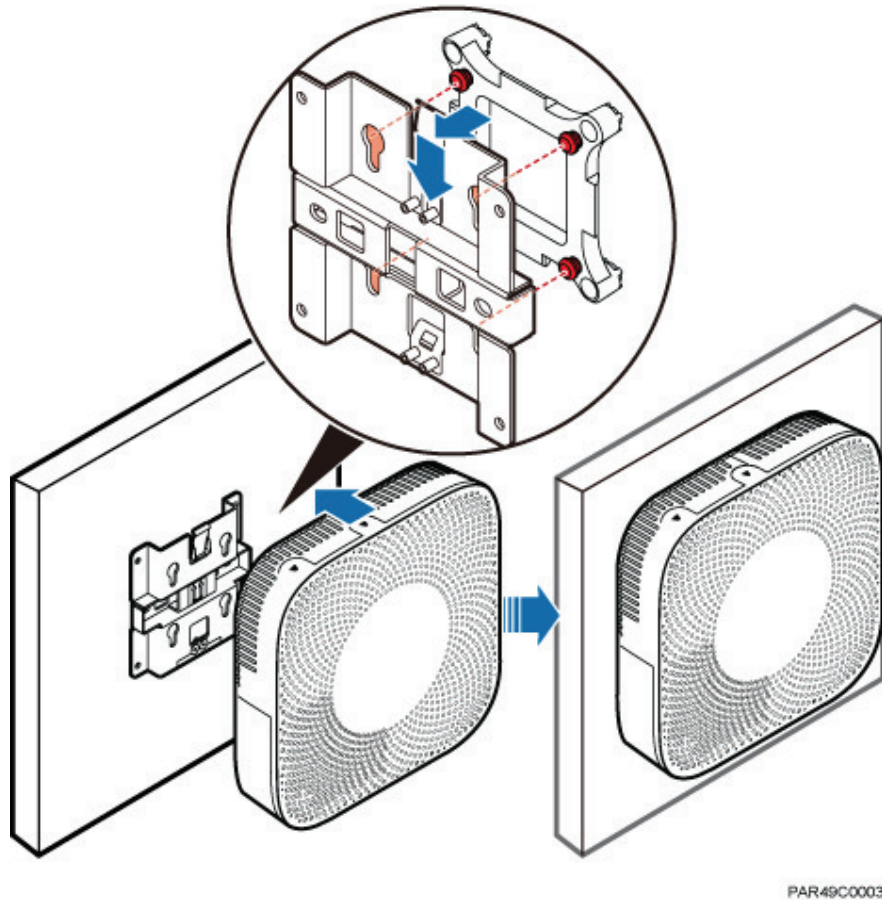
If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

- Step 5** Fit the four hooks of the pRRU3901 into the mounting holes on the mounting bracket and then press the pRRU3901 downwards until a click is heard. See [Figure 7-9](#).

NOTE

It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 7-9 Installing the pRRU3901 on a wall



-----End

7.4.3 Installing a pRRU3901 on a Ceiling

This section describes how to install a pRRU3901 on the ceiling, such as the concrete ceiling, when the ceiling has adequate load bearing capacity and installation space.

Context



NOTICE

If the pRRU3901 is installed on a 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

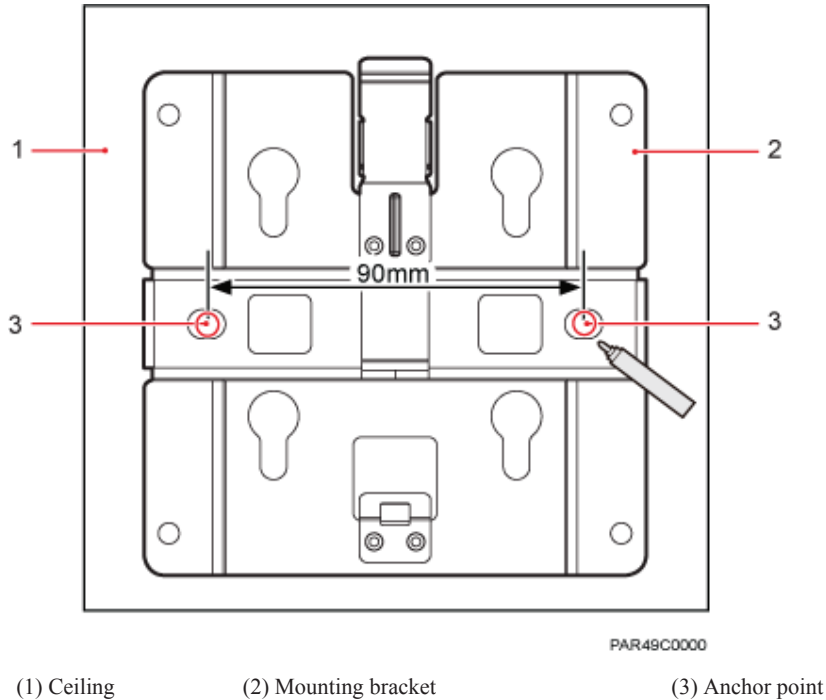
- Step 1** Determine the position for installing the pRRU3901 based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [7.1.3 Space Requirements](#).

- Step 2** Place the mounting bracket in the installation position against the ceiling. Then, level the mounting bracket and use a marker to mark two anchor points. See [Figure 7-10](#).

Figure 7-10 Anchor points on the pRRU3901 mounting bracket (unit: mm)

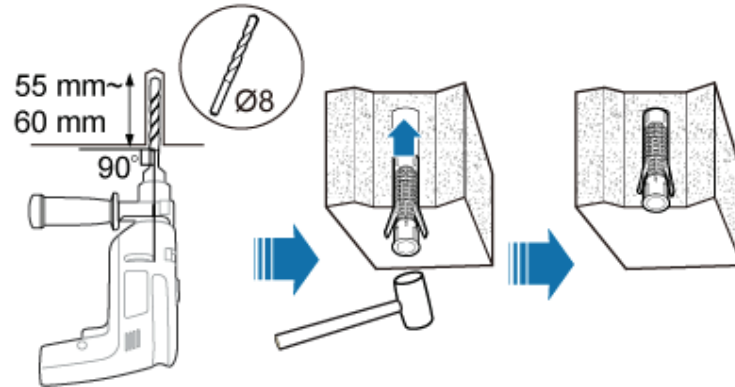


CAUTION

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

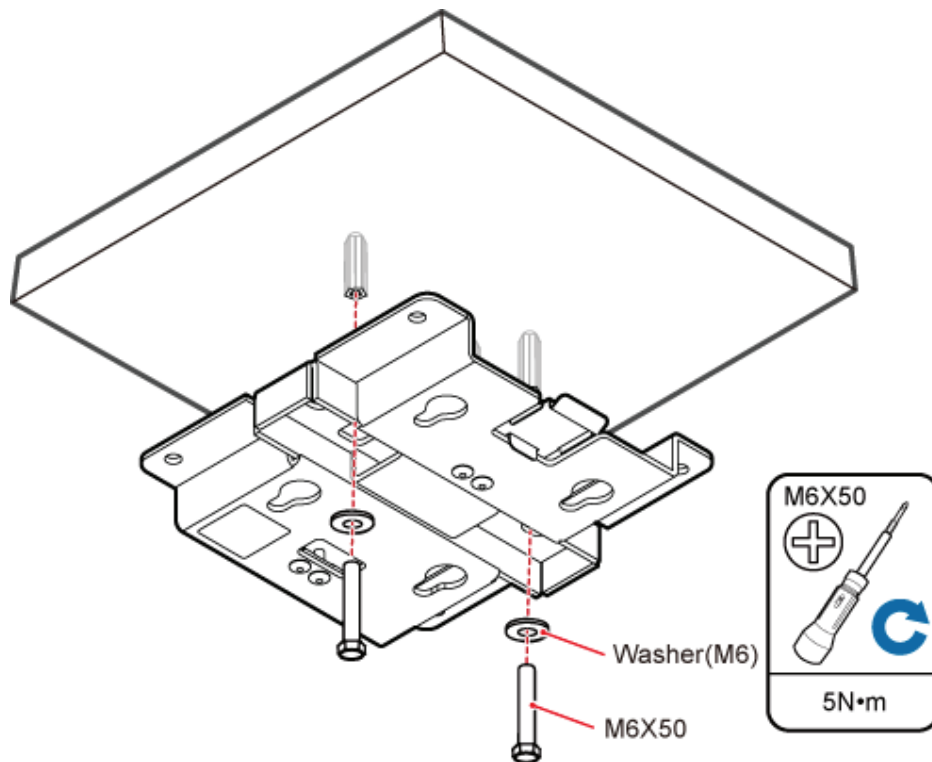
- Step 3** Use a hammer drill with $\phi 8$ bore to drill holes at the marked anchor points, as shown in [Figure 7-11](#). Use a vacuum cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to hit a plastic expansion sleeve into each hole.

Figure 7-11 Drilling holes and installing expansion bolts



Step 4 Lead the M6x50 screws through the washers, and then through the drilling holes on the mounting bracket to the plastic expansion sleeves, and use a torque screwdriver to torque the screws to 5 N•m, as shown in **Figure 7-12**.

Figure 7-12 Installing the mounting bracket



NOTE

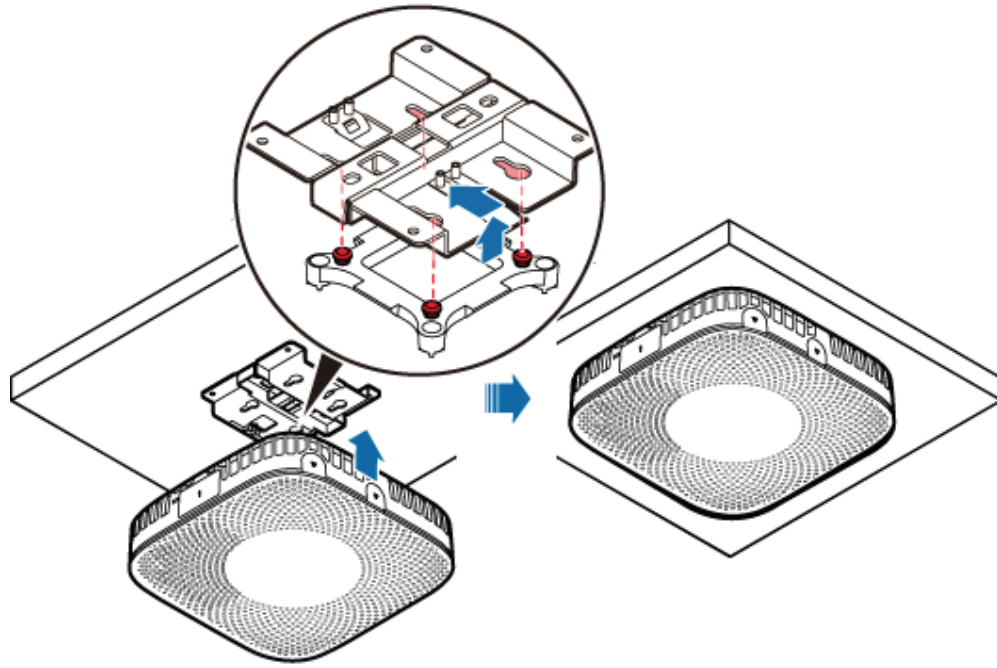
If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

Step 5 Fit the four hooks of the pRRU3901 into the mounting holes on the mounting bracket and then press the pRRU3901 downwards until a click is heard. See **Figure 7-13**.

NOTE

It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 7-13 Installing a pRRU3901 on a ceiling



PAR49C0037

----End

7.4.4 Installing a pRRU3901 on a Pole

This section describes how to install a pRRU3901 on a metal pole indoors.

Procedure

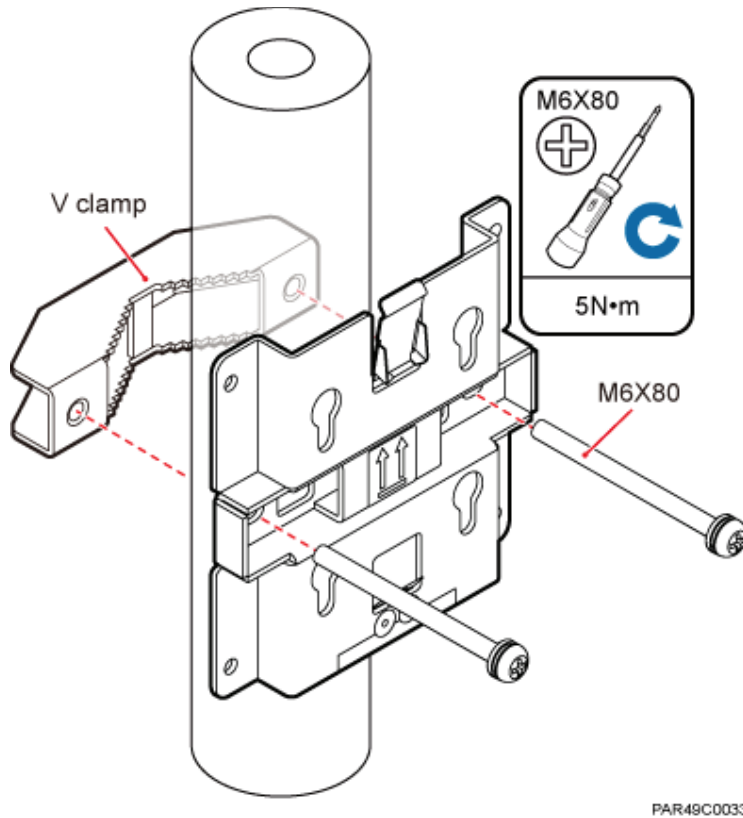
- Step 1** Determine the position for installing the pRRU3901 based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [7.1.3 Space Requirements](#).

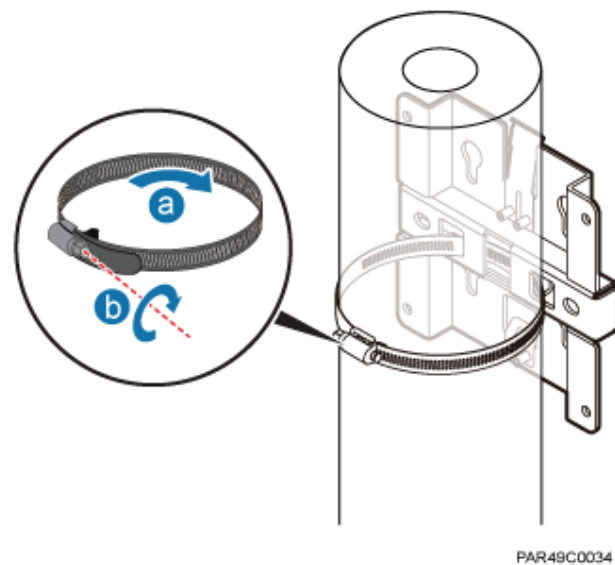
- Step 2** If the diameter of the pole ranges from 30 mm to 70 mm, use the delivered V clamp, mounting bracket, and bolts to install the pRRU3901 on the pole. Lead the M6x80 bolts through the mounting bracket, and torque the bolts to 5 N•m, as shown in [Figure 7-14](#).

Figure 7-14 Securing the pRRU3901 mounting bracket on the metal pole



If the diameter of the pole is greater than 70 mm, use the hose clamp to install the mounting bracket on the pole. The hose clamp is prepared by customers. Torque the bolts to 5 N·m, as shown in [Figure 7-15](#).

Figure 7-15 Securing the pRRU3901 mounting bracket on the metal pole

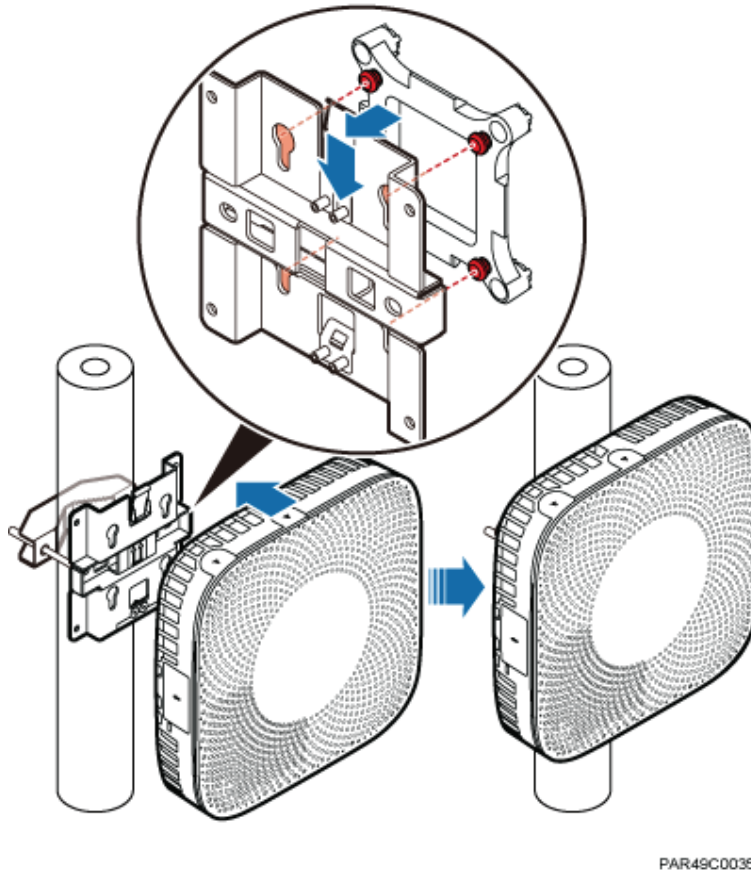


- Step 3** Fit the four hooks of the pRRU3901 into the mounting holes on the mounting bracket and then press the pRRU3901 downwards until a click is heard. See [Figure 7-16](#).

 NOTE

It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 7-16 Installing a pRRU3901 on a pole



PAR49C0035

---End

7.4.5 Installing a pRRU3901 on a Plate

This section describes how to install a pRRU3901 on a plate. If a suspended ceiling plate has adequate load bearing capacity and installation space, the pRRU3901 can be installed on the plate. However, it is good practice not to install a pRRU3901 on an aluminum plate.

Procedure

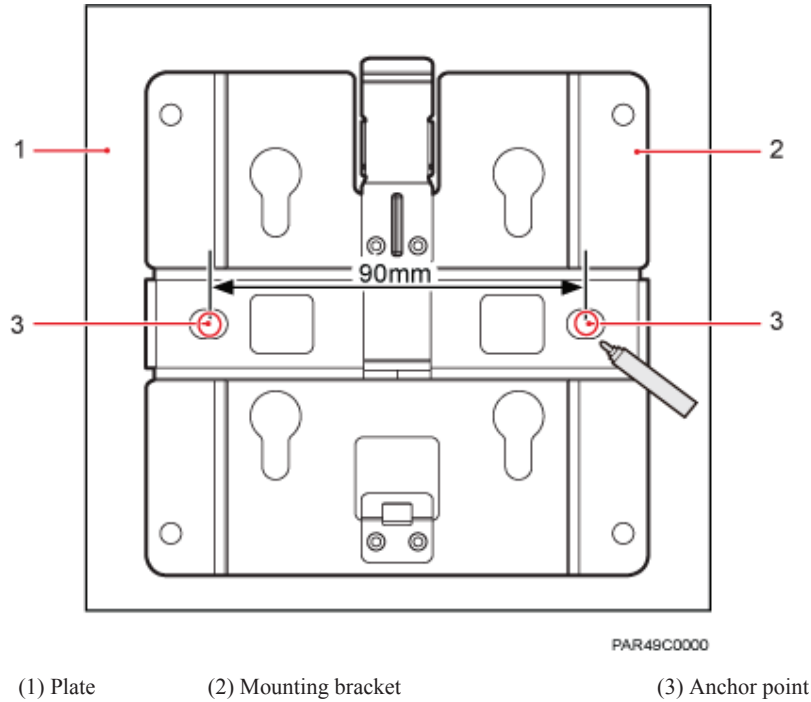
- Step 1** Determine the position for installing the pRRU3901 based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [7.1.3 Space Requirements](#).

- Step 2** Place the mounting bracket in the installation position against the wall. Then, level the mounting bracket and use a marker to mark two anchor points. See [Figure 7-17](#).

Figure 7-17 Anchor points on the pRRU3901 mounting bracket (unit: mm)

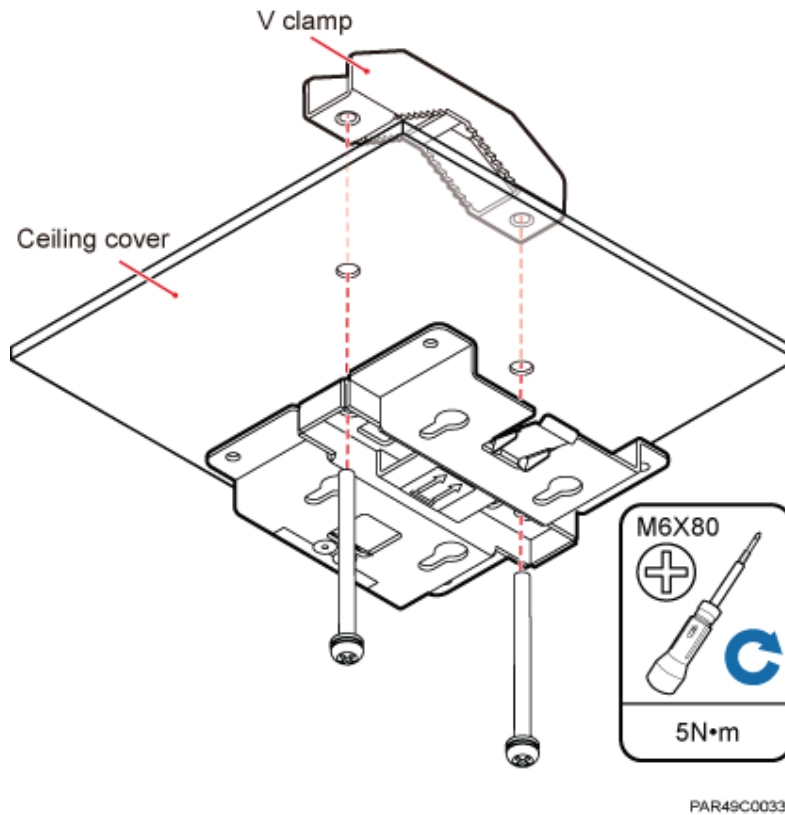


CAUTION

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

- Step 3** Use a hammer drill with $\phi 8$ bore to drill holes at the anchor points.
- Step 4** Lead the M6x80 bolts through the mounting bracket and the ceiling plate, and use a torque screwdriver to torque the bolts to 5 N•m, as shown in [Figure 7-18](#).

Figure 7-18 Installing the pRRU3901 mounting bracket

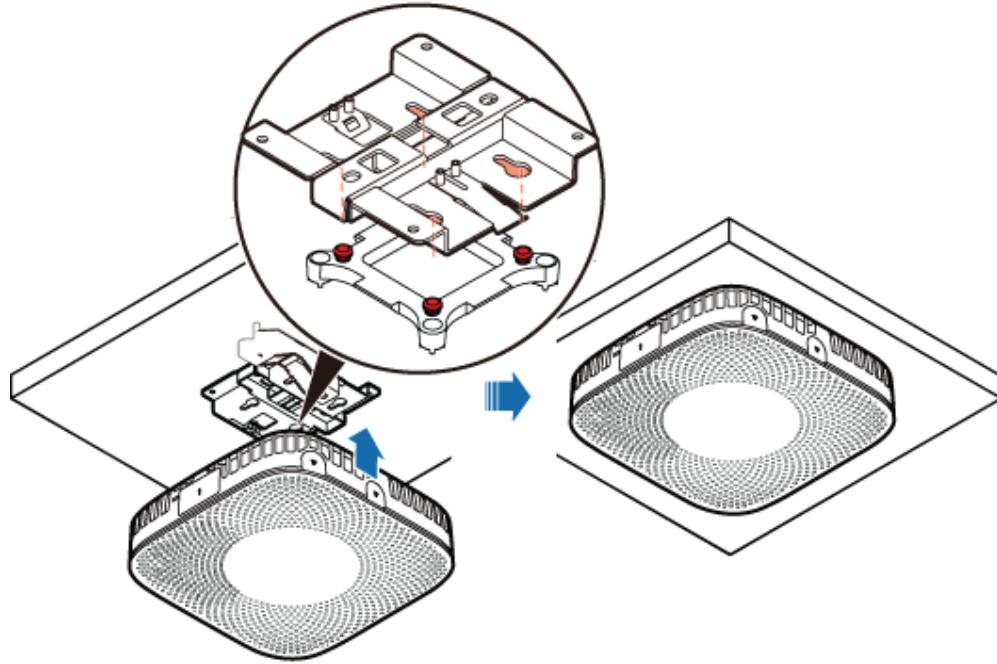


- Step 5** Fit the four hooks of the pRRU3901 into the mounting holes on the mounting bracket and then press the pRRU3901 downwards until a click is heard. See [Figure 7-19](#).

NOTE

It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 7-19 Installing a pRRU3901 on a plate



PAR49C0037

---End

7.4.6 Installing a pRRU3901 on a Keel

This section describes how to install a pRRU3901 on a keel. If a suspended ceiling plate cannot bear the pRRU3901, the pRRU3901 can be installed on the keel on the ceiling.

Context

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

- The mounting bracket 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 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.

Procedure

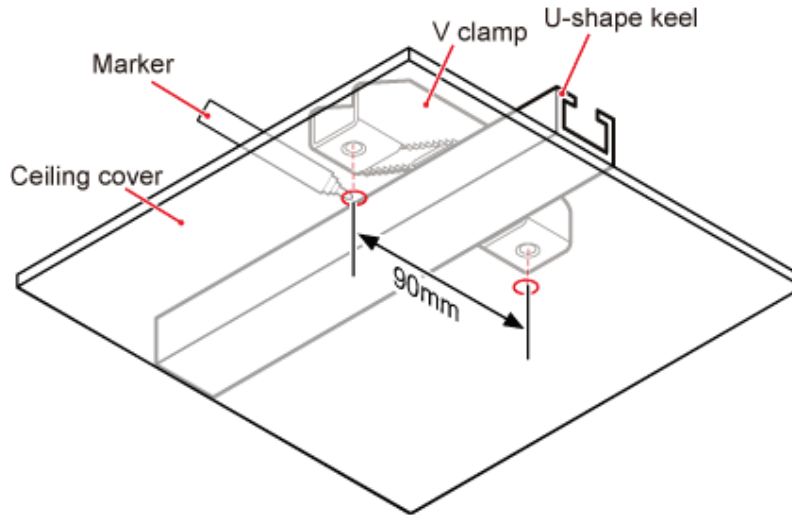
- Step 1** Determine the position for installing the pRRU3901 based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [7.1.3 Space Requirements](#).

- Step 2** Place the V clamp across the keel, and use a marker to mark the projective positions of the mounting holes on the suspended ceiling plate, as shown in [Figure 7-20](#).

Figure 7-20 Anchor points on the suspended ceiling plate (unit: mm)

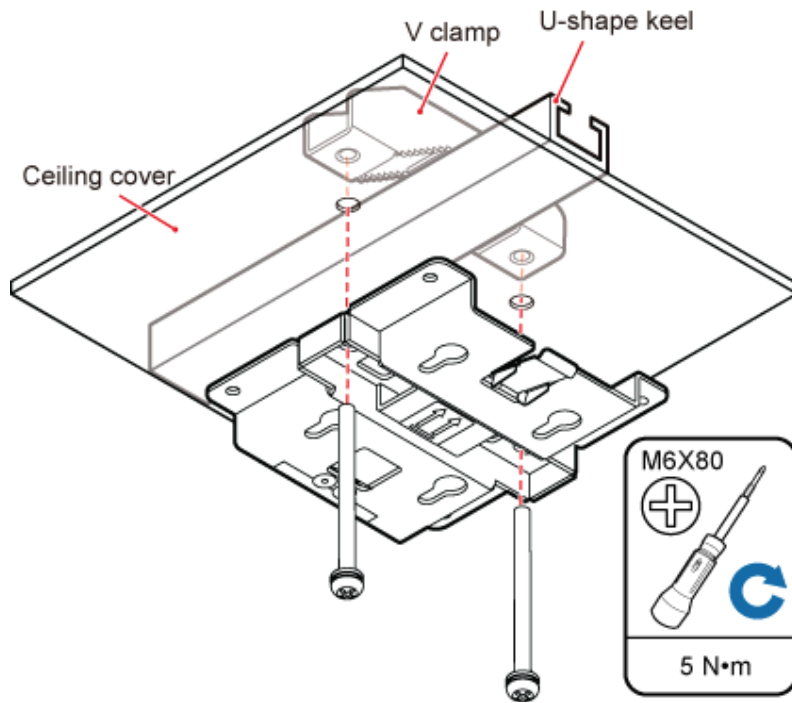


CAUTION

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 with $\Phi 12$ bore.
- Step 4** Lead the M6x80 bolts through the mounting bracket and the suspended ceiling plate. Use a torque screwdriver to torque the bolts to 5 N•m, as shown in [Figure 7-21](#).

Figure 7-21 Installing the pRRU3901 mounting bracket

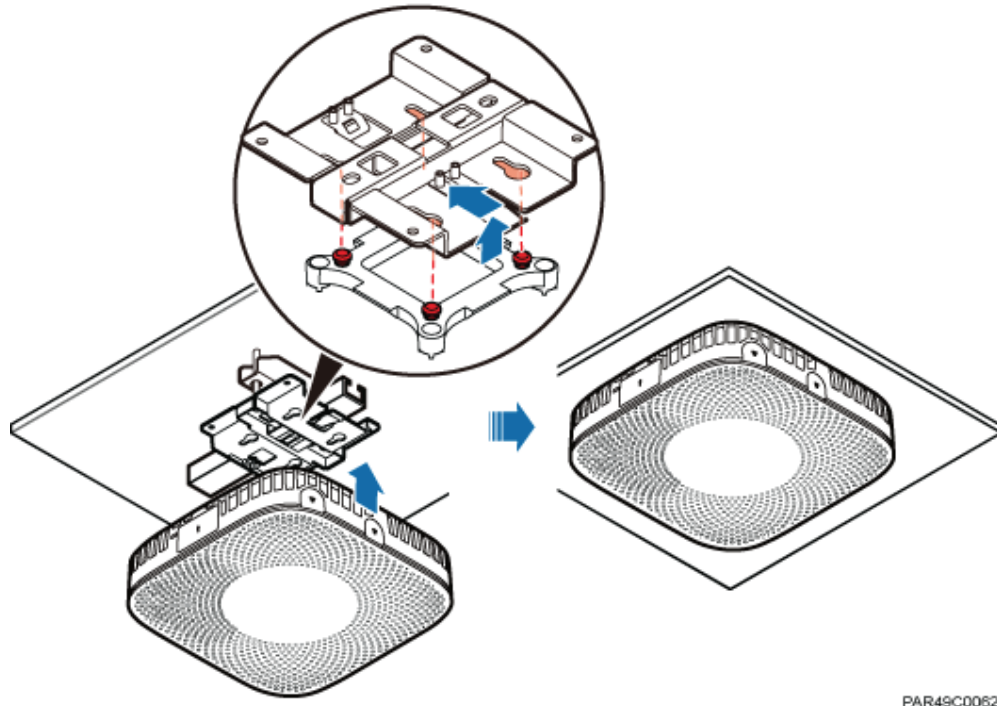


Step 5 Fit the four hooks of the pRRU3901 into the mounting holes on the mounting bracket and then press the pRRU3901 downwards until a click is heard. See [Figure 7-22](#).

NOTE

It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 7-22 Installing a pRRU3901 on a keel



----End

7.4.7 Installing the Cabinet

In the outdoor scenario, the pRRU3901 should be installed in the cabinet firstly.

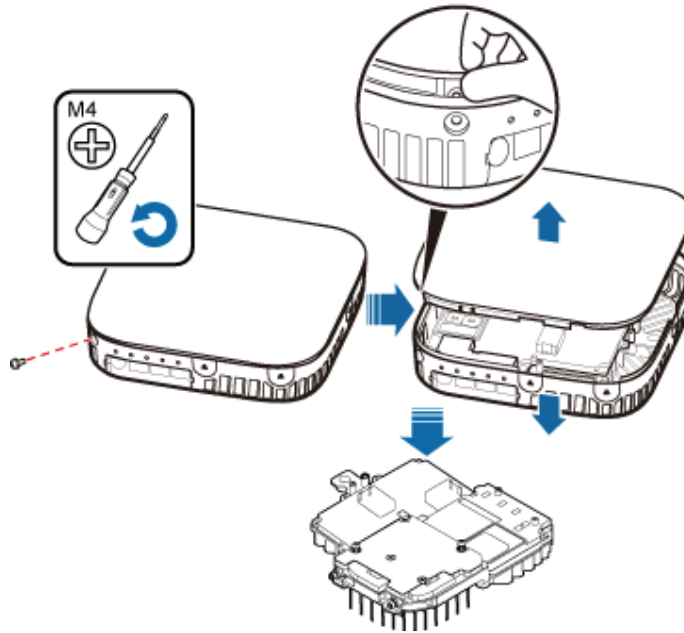
Context

- When installed in the cabinet, the housing of pRRU3901 should be removed.
- An RF surge protector provides surge protection for the RF ports on pRRU3902, and a PoE surge protector provides surge protection for the CPRI ports.
- One pRRU3901 with internal antenna need to be configured with one or two PoE surge protectors.
- One pRRU3901 with external antenna need to be configured with one PoE surge protector, or two RF surge protectors when one RF daughter board is configured, or four RF surge protectors when two RF daughter boards are configured.

Procedure

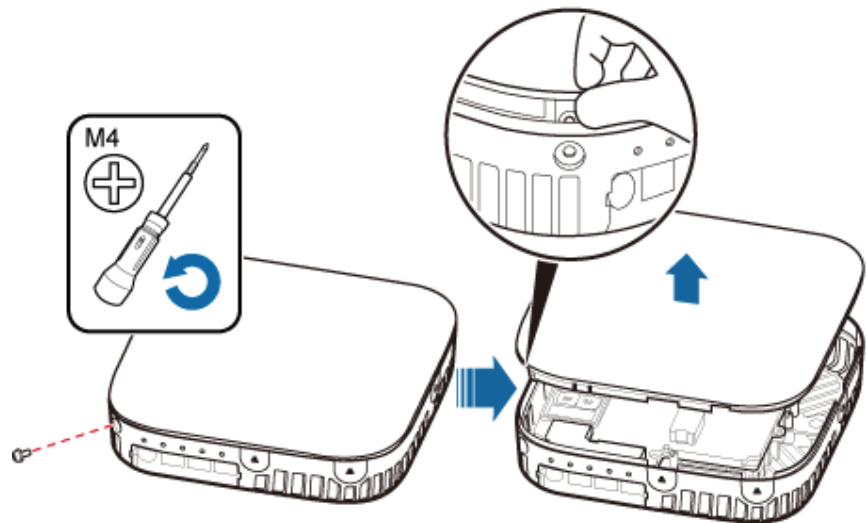
Step 1 Remove the housing on the top and at the bottom of pRRU3901, as shown in [Figure 7-23](#).

Figure 7-23 Removing the housing of pRRU3901



1. Use the M4 Phillips screwdriver to loosen the Phillips screw on the pRRU housing. Wrench and remove the housing from the installation position of the Phillips screw hole, as shown in [Figure 7-24](#).

Figure 7-24 Removing the pRRU housing

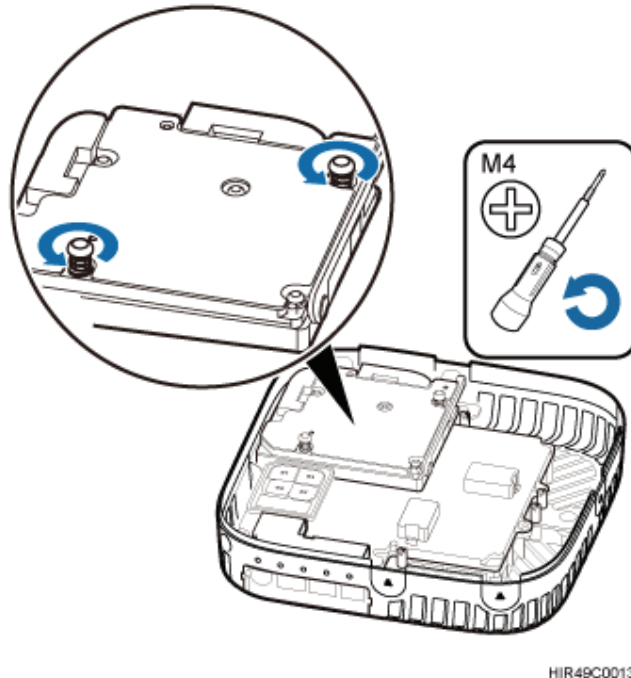


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 NOTE

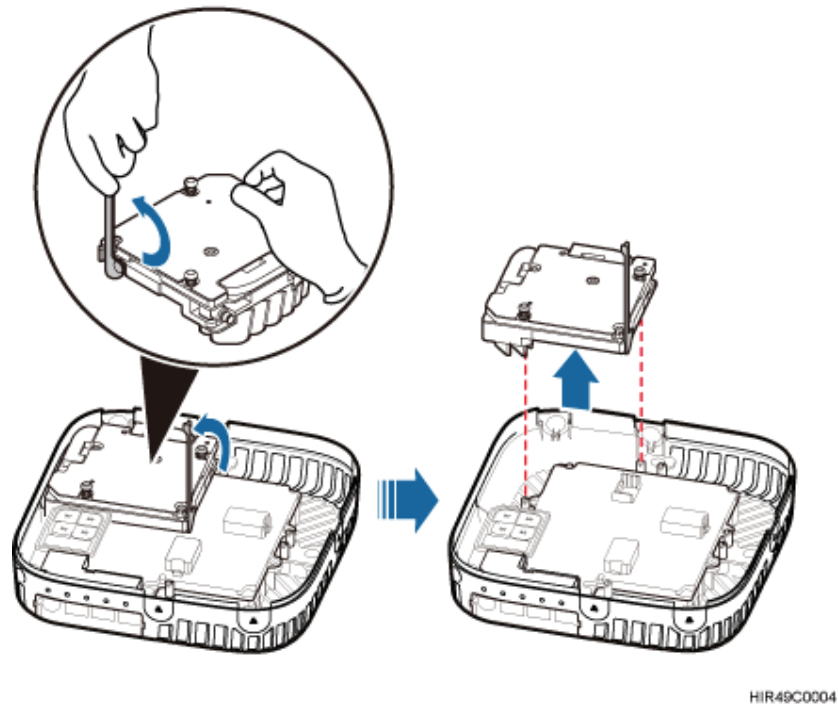
- The pRRU housing and the RF daughter board can be secured using either Phillips screws or protection screws, requiring the same installation operations. This section uses Phillips screws as an example to describe the installation operations.
 - Keep the Phillips screw secure for future use.
2. Use the M4 Phillips screwdriver to loosen the Phillips screws on the RF daughter board, as shown in [Figure 7-25](#).

Figure 7-25 Loosen the Phillips screws



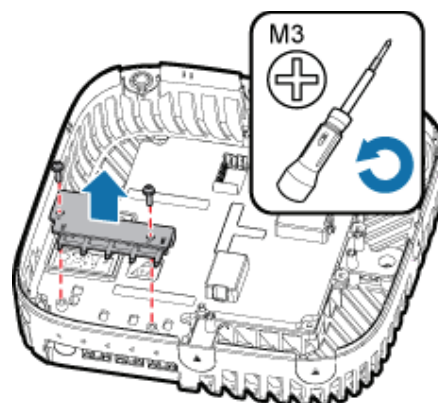
3. Use the left hand to hold the RF daughter board and the right hand to hold the right handle of the RF daughter board to remove the RF daughter board and put it into an ESD box or bag, as shown in [Figure 7-26](#).

Figure 7-26 Removing the RF daughter board in slot1



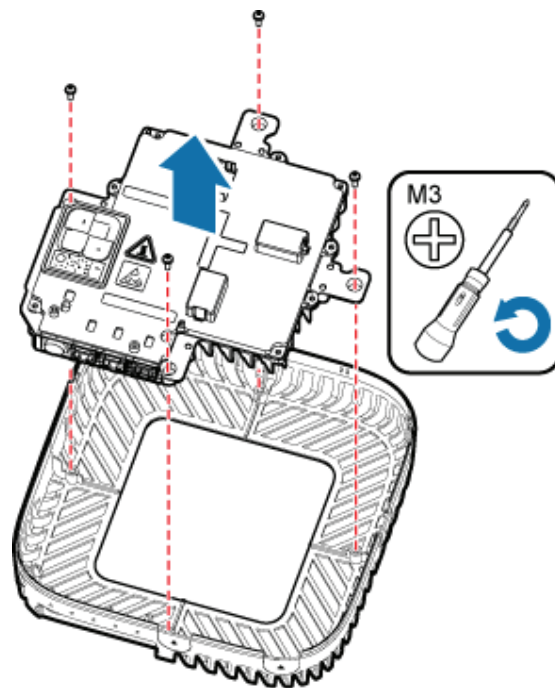
4. Use an M3 Phillips screwdriver to loosen the two fastening screws of the light pipe, and remove the light pipe, as shown in [Figure 7-27](#).

Figure 7-27 Removing the light pipe



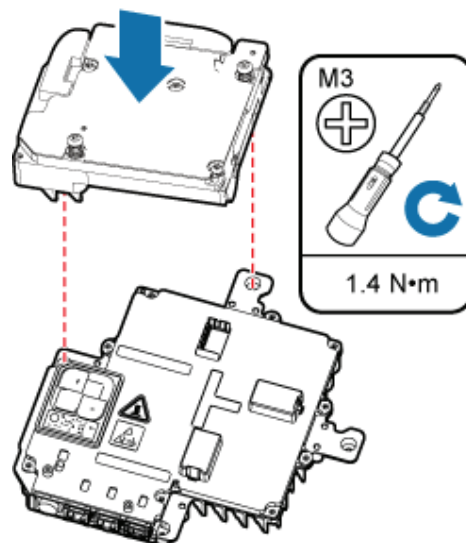
5. Use the M3 Phillips screwdriver to loosen the four fastening screws of the pDock mother board, and remove the pDock mother board, as shown in [Figure 7-28](#).

Figure 7-28 Removing the pDock mother board



6. Install the RF daughter boards in slots S1, and use the M4 Phillips screwdriver to tighten the two fastening screws always carried on each daughter board to 1.4 N•m, as shown in [Figure 7-29](#).

Figure 7-29 Installing the RF daughter boards

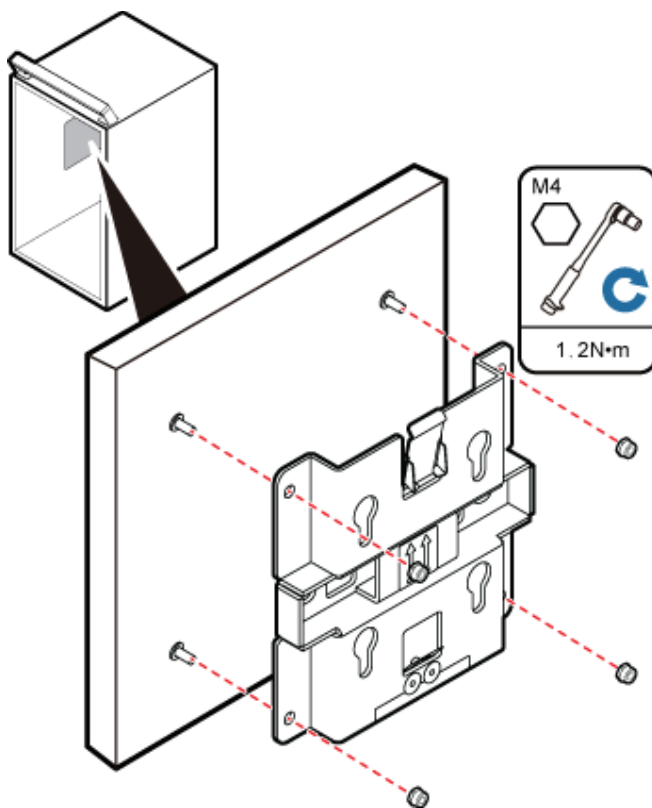


NOTICE

The installation positions of the RF daughter boards must be consistent before and after the replacement.

Step 2 Install the plate onto the cabinet, as shown in [Figure 7-30](#).

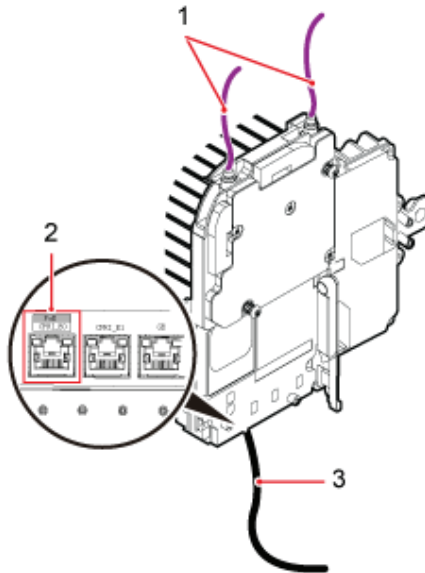
Figure 7-30 Installing the plate onto the cabinet



NOTICE

Make sure all the cables are installed before installing the plate. For details about installing the cables of pRRU3901, see [Figure 7-31](#).

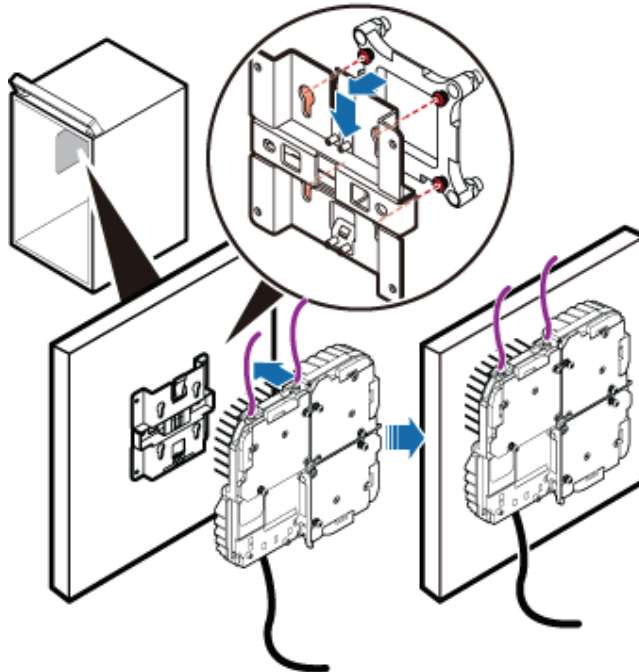
Figure 7-31 Installing the pRRU3901 cables



(1) RF Jumper	(2) CPRI_E0 port	(3) Ethernet Cable
---------------	------------------	--------------------

Step 3 Fit the four hooks on pRRU3901 into the hooks on the mounting bracket, and then push pRRU3901 down against the mounting bracket until a click is heard, as shown in [Figure 7-32](#).

Figure 7-32 Installing a pRRU3901 into the cabinet



----End

7.5 Installing pRRU3901 Cables

This section describes the procedure of installing the pRRU3901 cables.

7.5.1 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

National Standards

- Code for Engineering Design of Generic Cabling System for Building and Campus (GB 50311-2007)
- Code for Engineering Acceptance of Generic Cabling System for Building and Campus (GB50312-2007).
- Security Protection Engineering Technology Specifications (GB 50348-2004)
- Code for Construction and Acceptance of the Electronic Information System Room (GB 50462-2008)
- Code for Quality Acceptance of the Intelligent Building Engineering (GB 50339-2003)
- Code for Quality Acceptance of Electric Engineering Construction in Building (GB 50303-2002)

- Technical Specification for Construction and Acceptance of Telecommunication Conduit Engineering (GB 50374-2006)

International Standards

- Generic Cabling for Customer Premises (ISO/IEC 11801)
- Commercial Building Telecommunications Cabling Standard (EIA/TIA 568)
- Commercial Building Standard for Telecommunication Pathways and Spaces (EIA/TIA 569)
- Administration Standard for Commercial Telecommunications Infrastructure (EIA/TIA 606)
- Grounding and Bonding Requirements for Telecommunications in Commercial Buildings (EIA/TIA 607)
- Generic Cabling Systems for Information Technology (EN 50173)
- Cabling Installation for Information Technology (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

- The steel pipe or fire-resistant rigid polyvinyl chloride pipe should be used for the cable duct or for routing cables. The cross-sectional usage of the cable duct should be 30% to 50% and that of the pipe for routing cables should be 25% to 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.
- 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.
- The point at which an Ethernet cable is bundled must be spaced 400 mm or less from the Ethernet port on a pRRU.
- For the pRRU3901 used in the elevator engine room on the rooftop, generator set for the subway engine, and equipment room with central air conditioning, Ethernet cables must be led through metallic conduits that are reliably grounded at both ends.

7.5.2 pRRU3901 Cable List

This section describes pRRU3901 cable connections.

Table 7-8 List of pRRU3901 cables

Cable	One End		The Other End	
	Connector	Connected to ...	Connector	Connected to ...
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on RHUB	RJ45 connector	CPRI_E0~CPRI_E1 port on pRRU
	RJ45 connector	Transmission port on Access Control(AC)	RJ45 connector	● GE port on pRRU3901 ● CPRI_E1 port on pRRU3911
(Optional) RF Jumper	SMA straight male connector/ Type N male connector	External antenna TX/RX RF port on pRRU	Based on the port model of the antenna system.	Antenna system

NOTE

When the RHUB and the pRRU3901 connected using the Ethernet cable. If the Extender is used,

- In the indoor scenario, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU3901.
- In the outdoor scenario, the Ethernet cable is divided into two parts, one among RHUB-PoE surge protector 2- PoE surge protector 3-Extender and the other among the Extender- PoE surge protector 4- PoE surge protector 1-pRRU3901.

7.5.3 Cable Connections (Indoor)

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:

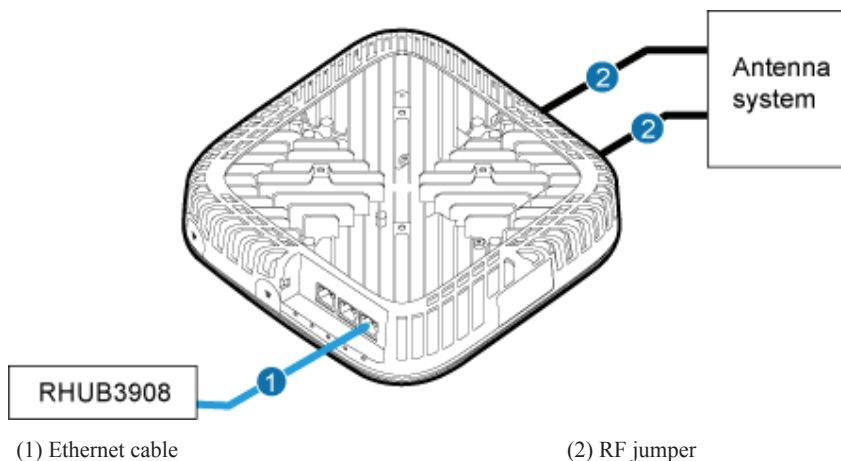
- The pRRU3901 can obtain power supply through the power over Ethernet (PoE).
- For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to RF daughter

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) RF Jumper of the *DBS3900 LampSite Hardware Description*.

Figure 7-33 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

Figure 7-33 pRRU3901 cable connection (1)

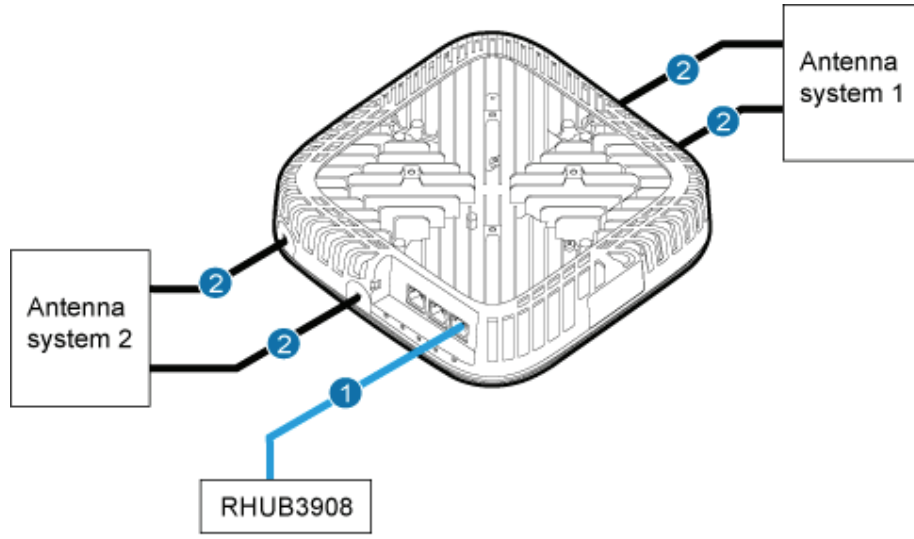


NOTE

- The Extender can be used to lengthen the distance between the RHUB and the pRRU3901 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 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 pRRU panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB panel. On the RHUB panel, CPRI_E0 and CPRI_E1, CPRI_E2 and CPRI_E3, CPRI_E4 and CPRI_E5, and CPRI_E6 and CPRI_E7 are used in pairs. CPRI_E0 on the pRRU panel connects to the even-numbered CPRI port (for example, CPRI_E0, CPRI_E2, CPRI_E4, or CPRI_E6) on the RHUB panel, and CPRI_E1 on the pRRU panel connects to the odd-numbered CPRI port (for example, CPRI_E1, CPRI_E3, CPRI_E5, or CPRI_E7). This document describes signal transmission using one Ethernet cable as an example.

Figure 7-34 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards.

Figure 7-34 pRRU3901 cable connection (2)



PAR49C0028

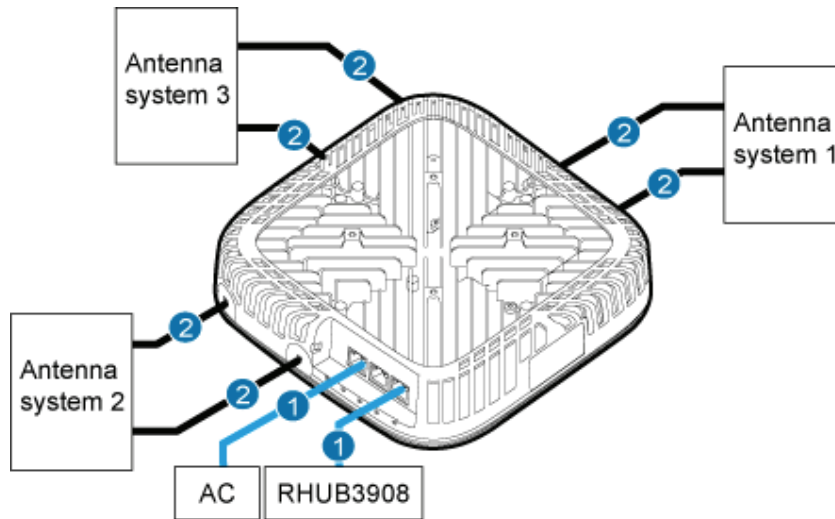
(1) Ethernet cable

(2) RF jumper

NOTE

- The Extender can be used to lengthen the distance between the RHUB and the pRRU3901 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 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 pRRU panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB panel. On the RHUB panel, CPRI_E0 and CPRI_E1, CPRI_E2 and CPRI_E3, CPRI_E4 and CPRI_E5, and CPRI_E6 and CPRI_E7 are used in pairs. CPRI_E0 on the pRRU panel connects to the even-numbered CPRI port (for example, CPRI_E0, CPRI_E2, CPRI_E4, or CPRI_E6) on the RHUB panel, and CPRI_E1 on the pRRU panel connects to the odd-numbered CPRI port (for example, CPRI_E1, CPRI_E3, CPRI_E5, or CPRI_E7). This document describes signal transmission using one Ethernet cable as an example.

Figure 7-34 shows the cable connection when the pRRU3901 is configured with two RF Daughter Boards and one Wi-Fi daughter board.

Figure 7-35 pRRU3901 cable connection (3)

PAR49C0026

(1) Ethernet cable

(2) RF jumper

NOTE

- The Extender can be used to lengthen the distance between the RHUB and the pRRU3901 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 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 pRRU panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB panel. On the RHUB panel, CPRI_E0 and CPRI_E1, CPRI_E2 and CPRI_E3, CPRI_E4 and CPRI_E5, and CPRI_E6 and CPRI_E7 are used in pairs. CPRI_E0 on the pRRU panel connects to the even-numbered CPRI port (for example, CPRI_E0, CPRI_E2, CPRI_E4, or CPRI_E6) on the RHUB panel, and CPRI_E1 on the pRRU panel connects to the odd-numbered CPRI port (for example, CPRI_E1, CPRI_E3, CPRI_E5, or CPRI_E7). This document describes signal transmission using one Ethernet cable as an example.

7.5.4 Cable Connections (Outdoor)

This section describes the cable connections for a pRRU3901 installed outside.

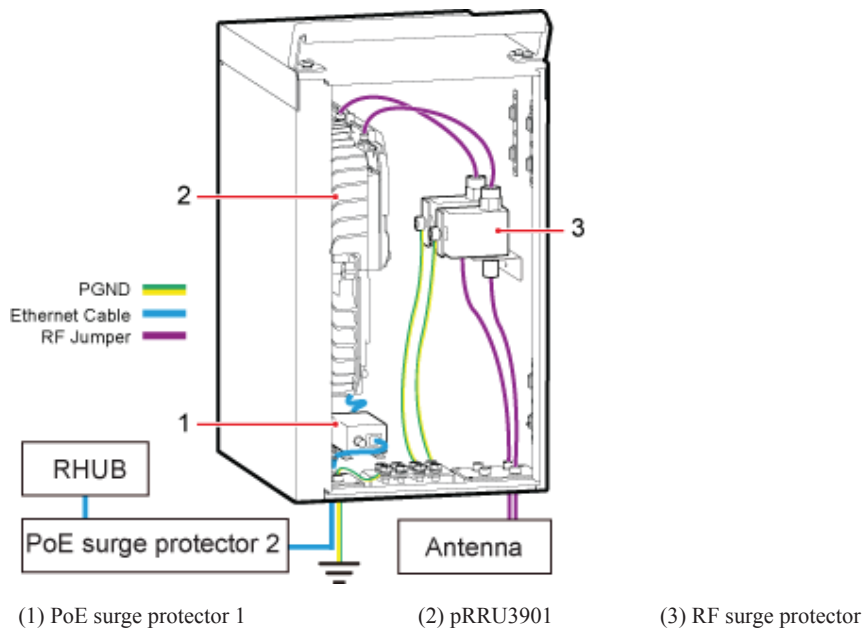
Before installing the pRRU3901 cables, you must be aware of the following information:

- 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) RF Jumper of the *DBS3900 LampSite Hardware Description*.

pRRU3901 can be configured with one RF daughter board, or two RF daughter boards, or two RF daughter boards and one WiFi daughter board. **Figure 7-36** shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board in the outside scenario.

Figure 7-36 pRRU3901 cable connection



NOTE

- 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 pRRU panel and the other end to any two ports of CPRI_E0 to CPRI_E7 on the RHUB panel. On the RHUB panel, CPRI_E0 and CPRI_E1, CPRI_E2 and CPRI_E3, CPRI_E4 and CPRI_E5, and CPRI_E6 and CPRI_E7 are used in pairs. CPRI_E0 on the pRRU panel connects to the even-numbered CPRI port (for example, CPRI_E0, CPRI_E2, CPRI_E4, or CPRI_E6) on the RHUB panel, and CPRI_E1 on the pRRU panel connects to the odd-numbered CPRI port (for example, CPRI_E1, CPRI_E3, CPRI_E5, or CPRI_E7). This document describes signal transmission using one Ethernet cable as an example.
- The Extender can be used to lengthen the distance between the RHUB and the pRRU3901 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one among the RHUB, PoE surge protector 2, PoE surge protector 3, Extender and the other among Extender, PoE surge protector 4, PoE surge protector 1, pRRU3901.
- For details about installation of the PoE surge protector and cables, see [12 \(Optional\) Installing the PoE Surge Protector and Cables](#).
- For details about installation of the RF surge protector and cables, see [13 \(Optional\) Installing the RF Surge Protector and Cables](#).

7.5.5 Cable Connections (LTE TDD)

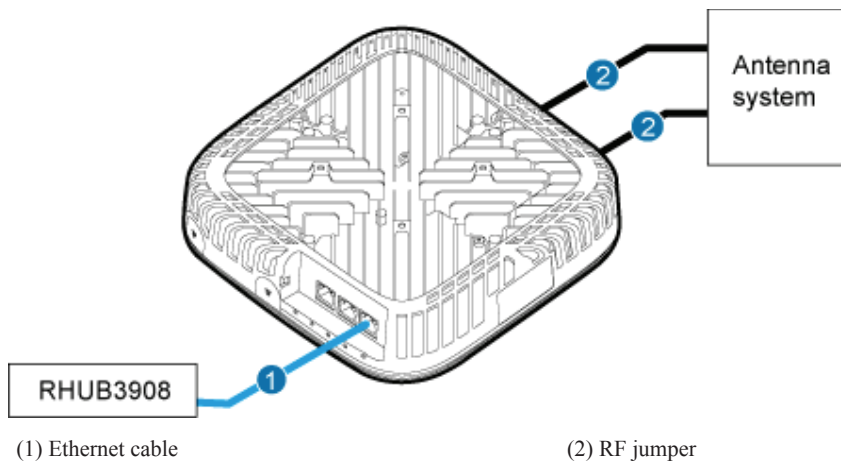
This section describes the cable connections for a single pRRU3901 and multiple pRRU3901s in LTE TDD mode.

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) RF Jumper of the *DBS3900 LampSite Hardware Description*.

Figure 7-37 shows the cable connection when the pRRU3901 is configured with only one RF Daughter Board.

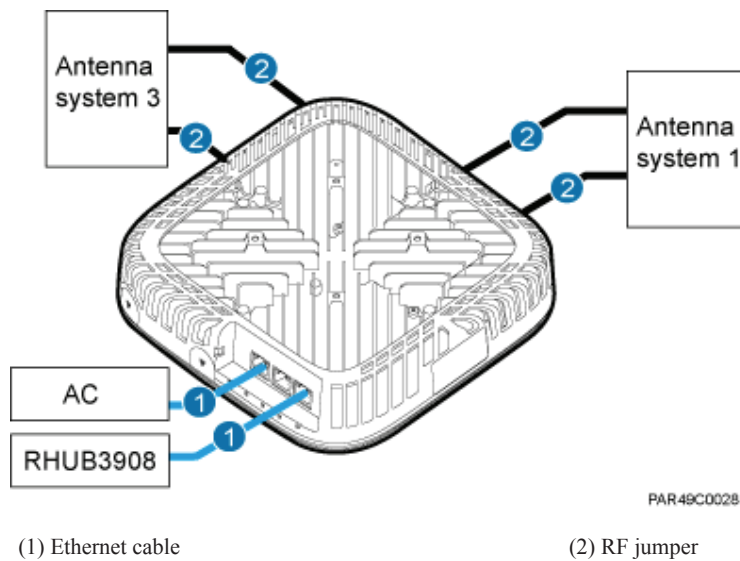
Figure 7-37 pRRU3901 cable connection (1)



NOTE

Figure 7-38 shows the cable connection when the pRRU3901 is configured with one RF Daughter Boards and one Wi-Fi daughter board.

Figure 7-38 pRRU3901 cable connection (2)



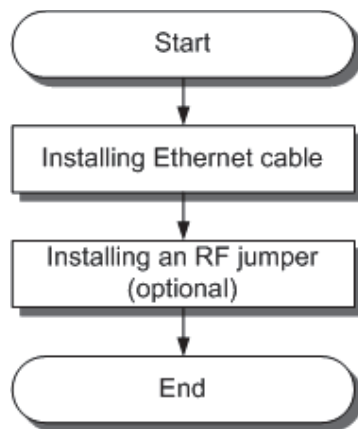
NOTE

7.5.6 pRRU3901 cable installation process

This section describes the process of installing pRRU3901 cables.

Figure 7-39 shows the process of installing pRRU3901 cables.

Figure 7-39 pRRU3901 cable installation process



7.5.7 Installing an Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- 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.

- The Ethernet cables can be straight-through cables or crossover cables.
- 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 RHUB can be extended by the Extender up to a total distance of 200 m.
- 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.

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 RHUB 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 RHUB as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

For details about the cable connections in the different scenarios, see [7.5.3 Cable Connections \(Indoor\)](#) and [7.5.4 Cable Connections \(Outdoor\)](#). The Ethernet cable connections between RHUB and pRRUs are the same. The following section describes the connections between RHUB-Extender-pRRU3901 as an example.

In the outdoor scenario, PoE surge protector is needed to provide surge protection for the Ethernet ports. For details about the installation of PoE surge protector, see [12 \(Optional\) Installing the PoE Surge Protector and Cables](#).

Procedure

Step 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 *DBS3900 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.

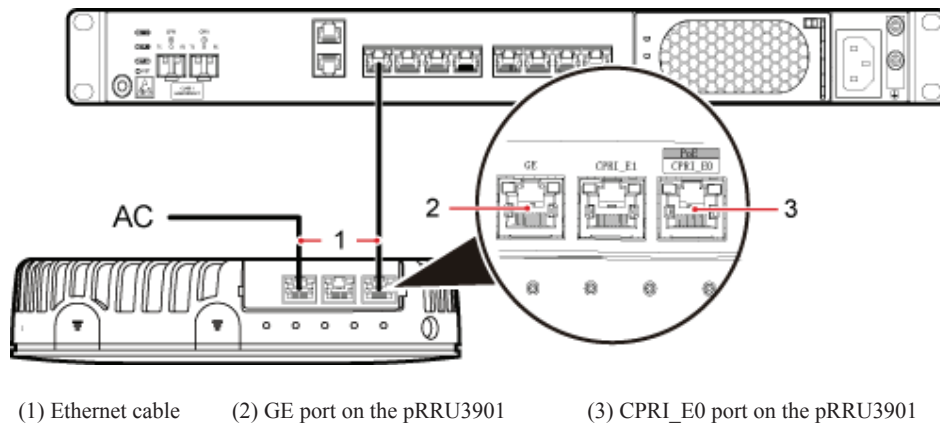
2. Check whether the made RJ45 connector is qualified by following instructions in *Checking the Appearance of Metal Contact Strips*.
3. To complete the assembly of the other end, repeat [Step 1.1](#) and [Step 1.2](#).
4. Check whether the touch points on the connectors at both ends are normally conducted 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 RHUB 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 RHUB panel based on the engineering design, as shown in [Figure 7-40](#).

Figure 7-40 Installing an Ethernet cable



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.

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 7-40](#).

----End

Follow-up Procedure

1. Route the cable, and then use a cable tie to bind the cable. For details, see [7.5.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

7.5.8 Installing an RF jumpers (Optional)

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

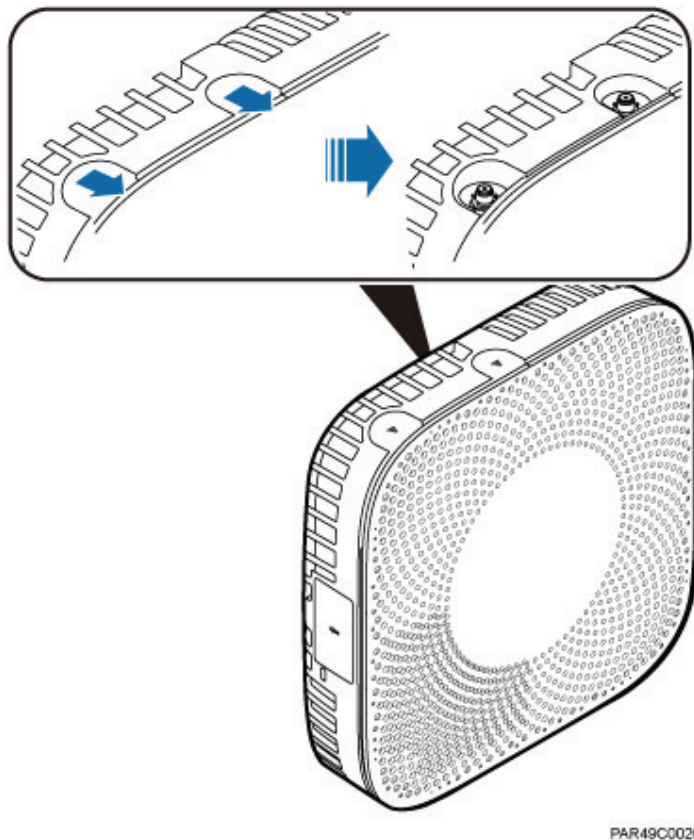
Context

- 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.
- For details about the cable connections in the different scenarios, see [7.5.3 Cable Connections \(Indoor\)](#) and [7.5.4 Cable Connections \(Outdoor\)](#). The installation of RF jumper cables are the same. The following section describes the connections between antenna and pRRU3901 in the indoor scenario as an example.
- In the outdoor scenario, RF surge protector is needed to provide surge protection for the RF ports. For details about the installation of RF surge protector, see [13 \(Optional\) Installing the RF Surge Protector and Cables](#).

Procedure

- Step 1** Expose the SMA female connector by removing the pRRU3901 antenna housing, as shown in [Figure 7-41](#).

Figure 7-41 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**

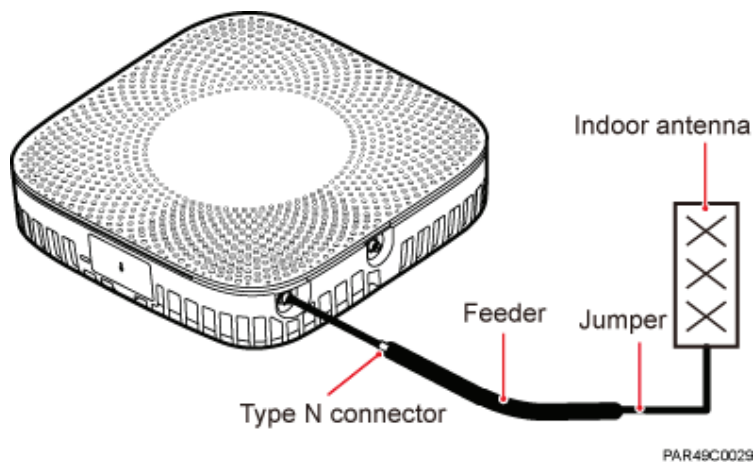
Tighten it with hands, and then use a torque wrench to tighten it with a rotational speed of less than or equal to 2.4 rpm to tighten it.

- 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 7-42 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 [7.5.1 Requirements for Cable Layout](#).
2. Label the installed cable. For details, see section [15.4 Attaching an L-Shaped Label](#).

7.6 Checking the pRRU3901 Hardware Installation

pRRU3901 hardware installation checking includes hardware and cable installation checking.

[Table 7-9](#) lists the hardware installation checking items.

Table 7-9 Hardware installation checking list

No.	Item
1	Ensure that the pRRU3901 is not grounded.

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

Table 7-10 lists the check items of the signal cable connection.

Table 7-10 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 7-11 lists the checking items for other cable connections.

Table 7-11 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.

7.7 Powering on the pRRU3901

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

Context

After the RHUB and pRRUs are installed and connected to each other, power on them no matter whether the BBU is installed.

Procedure

- Step 1** 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.

NOTE

Check the indicator status 30 minutes after the power-on if a pRRU is not connected to any BBU. The pRRU is considered normally powered on when any indicator on the pRRU is on.

----End

8 Installing a pRRU3902 or pRRU3911

About This Chapter

This chapter describes the pRRU3902/pRRU3911 installation process. The pRRU3902 and pRRU3911 are installed in similar way, and this chapter uses the pRRU3902 as an example.

[8.1 Information About the Installation](#)

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

[8.2 Installation Process](#)

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

[8.3 Installing a pRRU](#)

This section describes the pRRU installation process. A pRRU can be installed on a wall, ceiling, indoor metal pole, or keel, but not on an aluminum panel or a non-standard keel.

[8.4 Installing pRRU Cables](#)

This section describes the procedure of installing the pRRU cables.

[8.5 \(Optional\) Installing a Combiner](#)

This section describes how to install a combiner. The pRRU3902 using external antennas must be configured with a combiner.

[8.6 Checking the pRRU Hardware Installation](#)

pRRU hardware installation checking includes hardware and cable installation checking.

[8.7 Powering on the pRRU](#)

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

8.1 Information About the Installation

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

8.1.1 Product Family

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

Table 8-1 lists the pRRU product family.

Table 8-1 pRRU product family

Product Type	Category	Equipment	Optional or Mandatory	Quantity	Function
pRRU3902	Main equipment	pRRU3902 with internal antennas	Mandatory	1	Functions as a remote radio unit that processes RF signals.
		pRRU3902 supporting external antennas	Mandatory	1	Functions as a remote radio unit that processes RF signals. It has no internal antennas and must connect to external antennas.
		Combiner	Optional	2	Combines signals of RF units operating in different frequency bands.

Product Type	Category	Equipment	Optional or Mandatory	Quantity	Function
	Auxiliary device	Mounting kits	Mandatory	1	Supports the pRRU3902 installation on a wall, ceiling, keel, or steel hangers. The mounting kits vary with the pRRU3902 installation mode.
		Cabinet	Optional	● None and one Extender is needed ● Yes and two Extenders are needed	Install the pRRU3902 and Extender in the outdoor scenario.
		Extender	Optional	1 or 2 NOTE The quantity depends on the number of Ethernet cables in use.	Extends the distance between the pRRU3902 and RHUB.
pRRU3911	Main equipment	pRRU3911 with internal antennas	Mandatory	1	Functions as a remote radio unit that processes RF signals.
		pRRU3911 supporting external antennas	Mandatory	1	Functions as a remote radio unit that processes RF signals.

Product Type	Category	Equipment	Optional or Mandatory	Quantity	Function
	Auxiliary device	Mounting kits	Mandatory	1	Supports the pRRU3911 installation on a wall, ceiling, keel, or steel hangers. The mounting kits vary with the installation mode.
		Extender	Optional	1 or 2 NOTE The quantity depends on the number of Ethernet cables in use.	Extends the distance between the pRRU3911 and RHUB.

8.1.2 Installation Scenario

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

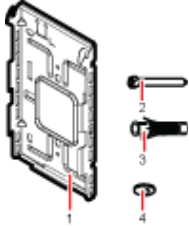
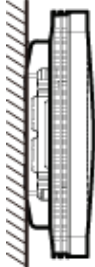
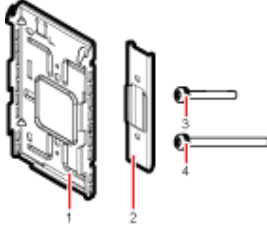
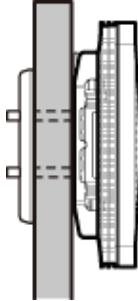
Installing on a wall

 NOTE

- The pRRU 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 pRRU must keep away from a metal wall to avoid the impact on the antenna performance.

When a pRRU is installed on a wall, installation modes vary with the quality of wall, as shown in [Table 8-2](#).

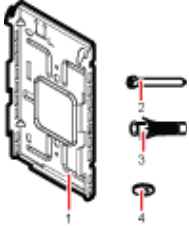
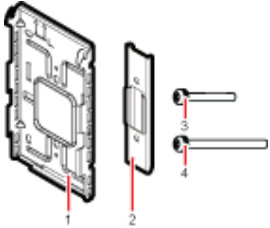
Table 8-2 Wall-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a wall by drilling holes For details, see 8.3.2 Installing a pRRU on a Wall .	- The wall can bear a load at least four times the weight of a pRRU. - The screws must be tightened with a torque of 1.5 N·m. This ensures the screws work properly and the wall remains intact without cracks in it.	1. Plate 2. Screw (M3.5x35) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU on a wall using a clamp through an attachment plate For details, see 8.3.5 Installing a pRRU on a Plate .	- The wall can bear a load at least four times the weight of a pRRU. - The thickness of the wall is less than 45 mm.	1. Plate 2. Clamp 3. Bolt (M4x35) 4. Bolt (M4x60) 	
Installing the pRRU on a wall using a plate on a metal wall	The wall cannot bear a load at least four times the weight of the pRRU. For example, EPS walls, MDF walls, or walls cannot be drilled.	The plate is prepared by customers.	

Installing on a ceiling

When a pRRU is installed on a ceiling, installation modes vary with the quality of the ceiling, as shown in [Table 8-3](#).

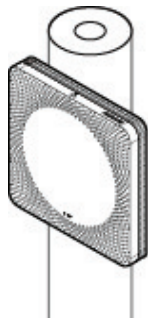
Table 8-3 Ceiling-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a ceiling by drilling holes For details, see 8.3.3 Installing a pRRU on a Ceiling .	- The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU. - The screws must be tightened with a torque of 1.5 N·m. This ensures the screws work properly and the ceiling remains intact without cracks in it.	1. Plate 2. Screw (M3.5 x 35) 3. Plastic expansion sleeve 4. Flat washer 	
Installing the pRRU on a ceiling using a clamp through an attachment plate For details, see 8.3.5 Installing a pRRU on a Plate .	- The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU. - The thickness of the ceiling is less than 45 mm.	1. Plate 2. U-shaped metal plate 3. Bolt (M4 x 35) 4. Bolt (M4 x 60) 	
Installing the pRRU on a keel For details, see 8.3.6 Installing a pRRU on a Keel .	A keel under the ceiling can bear a load at least four times the weight of the pRRU.	For details, see Table 8-5 .	For details, see Table 8-5 .

Installation on a pole

To install a pRRU on a pole, use small hose clamps with a diameter ranging from 60 mm to 114 mm or larger hose clamps with a diameter ranging from 114 mm to 381 mm.

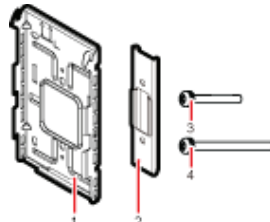
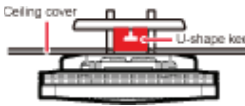
Table 8-4 Pole-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a pole For details, see 8.3.4 Installing a pRRU on a Pole .	The pole diameter ranges from 60 mm to 114 mm or from 114 mm to 381 mm	1. Plate 2. Hose clamp (prepared by customer) 	

Installing on a keel

The pRRU 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.

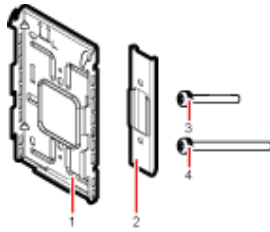
Table 8-5 Keel-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a keel For details, see 8.3.6 Installing a pRRU on a Keel .	The keel is in U-shape, T-shape, H-shape, or other shapes.	1. Plate 2. U-shaped metal plate 3. Bolt (M4 x 35) 4. Bolt (M4 x 60) 	 shows the pRRU installed on a U-shaped keel.

Installing on a on steel hangers

Either M6 or M8 steel hangers can be used for installation.

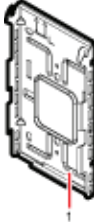
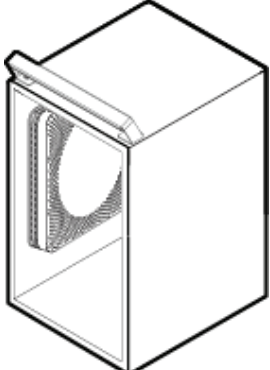
Table 8-6 Steel hangers installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a steel hangers For details, see 8.3.7 Installing a pRRU on Steel Hangers .	Either M6 or M8 steel hangers can be used for installation.	1. Plate 2. U-shaped metal plate 3. Bolt (M4 x 35) 4. Bolt (M4 x 60) 	

Cabinet

In the outside scenario, pRRU3902 should be installed in the cabinet.

Table 8-7 Cabinet installation suggestion

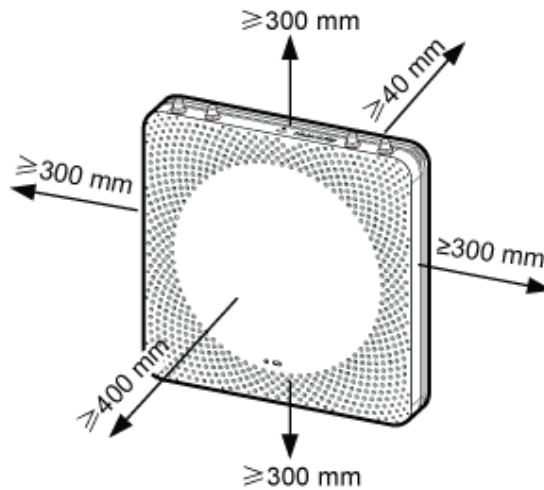
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the cabinet For details, see 8.3.8 Installing the Cabinet .	–	1. Plate 	

8.1.3 Space Requirements

This chapter describes the space requirements of the pRRU.

When the pRRU 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.

Figure 8-1 shows the recommended space requirements of the pRRU when the external antenna is required.

Figure 8-1 Recommended space requirements

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

- At least 300 mm above the pRRU is reserved for maintenance.
- At least 300 mm under the pRRU is reserved for cabling.
- At least 300 mm on the left of the pRRU is reserved for maintenance.
- At least 300 mm on the right of the pRRU is reserved for maintenance.
- At least 400 mm in front of the pRRU is reserved for maintenance
- At least 40 mm on the back of the pRRU is reserved for ventilation.

In the outdoor scenario, there is no space requirement for the pRRU3902 installing in the cabinet.

8.1.4 Installation Environment Requirements

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

Running Environment Specifications

Table 8-8 shows the environment specifications for the pRRU installed indoors.

Table 8-8 environment specifications

Specifications	Condition	Remarks
Operating temperature	● Indoor: - 5 °C to + 40 °C ● Outside: - 20 °C to + 40 °C	-
Relative humidity	5% RH to 95% RH	-
Altitude	- 60 m to + 1800 m	Works properly.

Specifications	Condition	Remarks
	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 pRRU cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.
- The pRRU cannot be installed near a strong heat source.
- The pRRU 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 pRRU 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 such as power stations, high-voltage substations, and wired TV towers.
- The pRRU must be installed in a dry, ventilating, and dust-proof place.
- If the pRRU is installed in parking areas or basements, the installation position must be well-ventilated.

8.2 Installation Process

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

Figure 8-2 shows the pRRU installation process.

Figure 8-2 Installation process

8.3 Installing a pRRU

This section describes the pRRU installation process. A pRRU can be installed on a wall, ceiling, indoor metal pole, or keel, but not on an aluminum panel or a non-standard keel.

NOTE

Note the following when installing the pRRU:

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

8.3.1 Mounting Kits

This section describes the pRRU mounting kits.

Figure 8-3 shows the exterior of the pRRU mounting kits.

Figure 8-3 Mounting kits

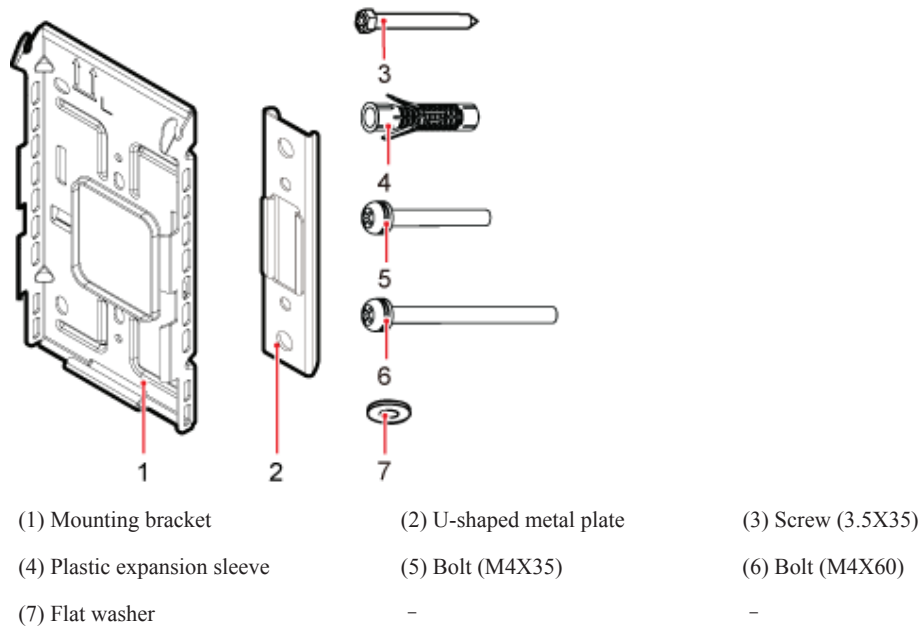


Figure 8-4, **Figure 8-5** show the specifications of the mounting bracket.

Figure 8-4 Mounting bracket specifications

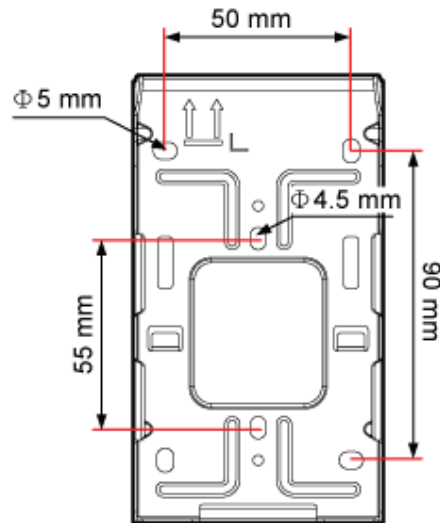
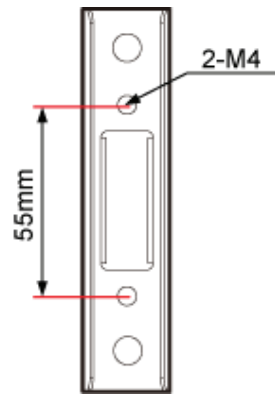


Figure 8-5 U-shaped metal plate specifications



8.3.2 Installing a pRRU on a Wall

This section describes how to install a pRRU on an indoor wall. If a wall indoors has adequate load bearing capacity and installation space, it is good practice to install the pRRU on the wall. If the wall does not have adequate load bearing capacity, choose an installation mode based on site requirements.

Context

 NOTE

This section describes only the wall-mounted installation in which mounting kits are directly installed on the wall without auxiliary devices. The procedure for other wall-mounted installation modes is similar.

Procedure

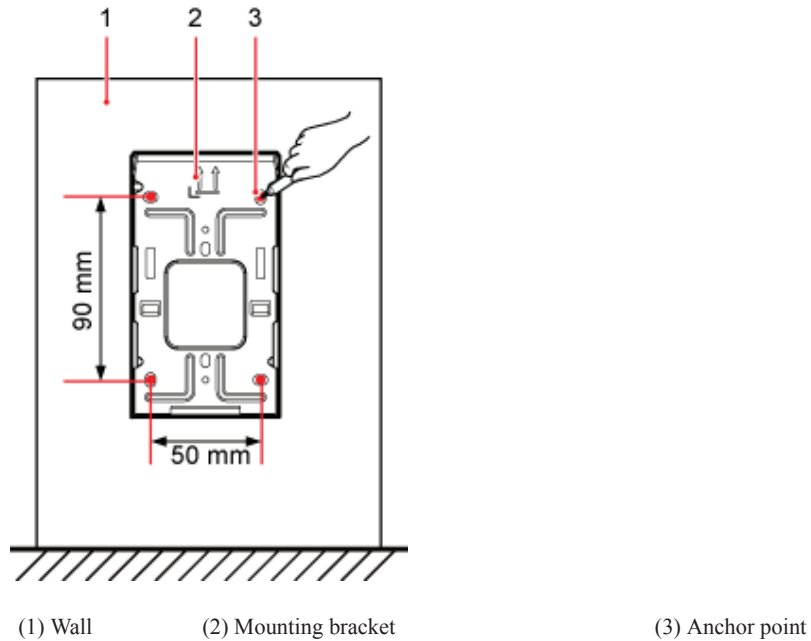
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- Step 2** Place the mounting bracket in the installation position against the wall. Then, level the mounting bracket and use a marker to mark four anchor points. See [Figure 8-6](#).

Figure 8-6 Anchor points on the pRRU mounting bracket

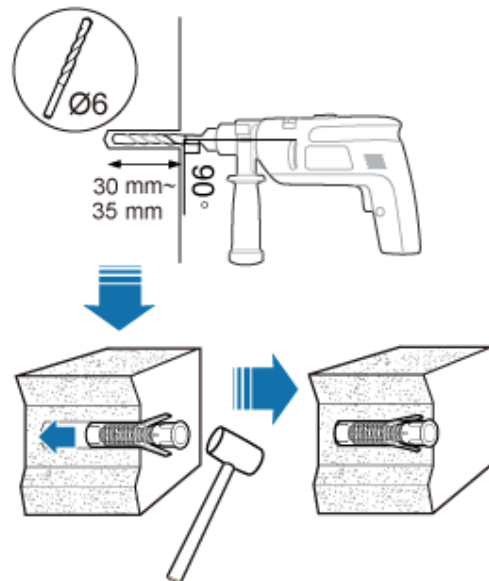


NOTE

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

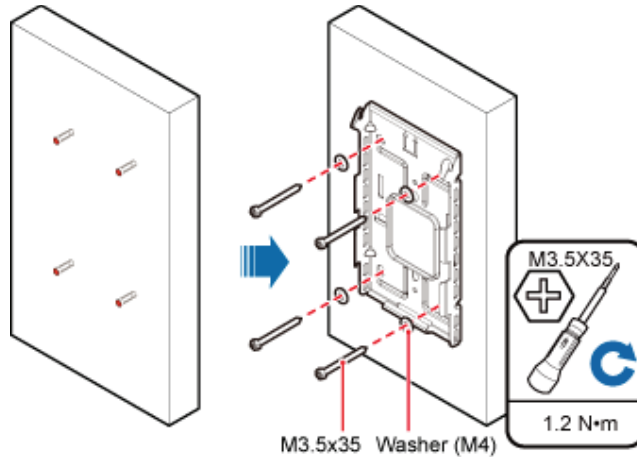
- Step 3** Use a hammer drill with $\phi 6$ bore to drill holes at the marked anchor points, as shown in **Figure 8-7**. Use a vacuum cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to hit a plastic expansion sleeve into each hole.

Figure 8-7 Drilling holes and installing expansion bolts



- Step 4** Lead the M3.5x35 screws through the washers, and then through the drilling holes on the mounting bracket to the plastic expansion sleeves, and torque the screws to 1.2 N•m, as shown in [Figure 8-8](#).

Figure 8-8 Installing the mounting bracket

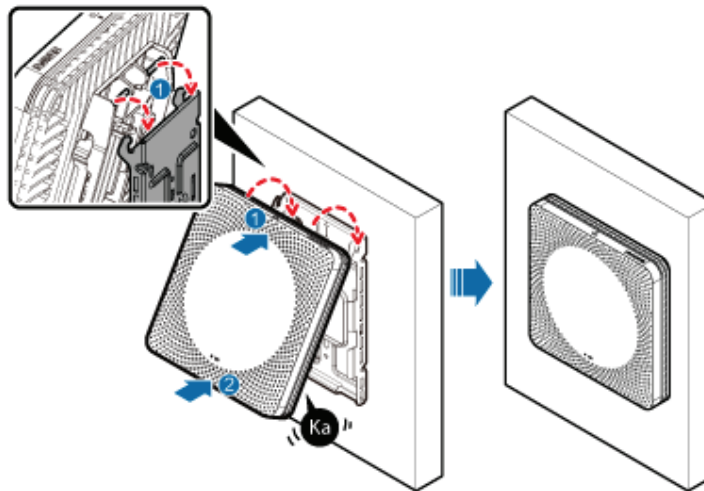


NOTE

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 rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-9](#).

Figure 8-9 Installing a pRRU on a wall



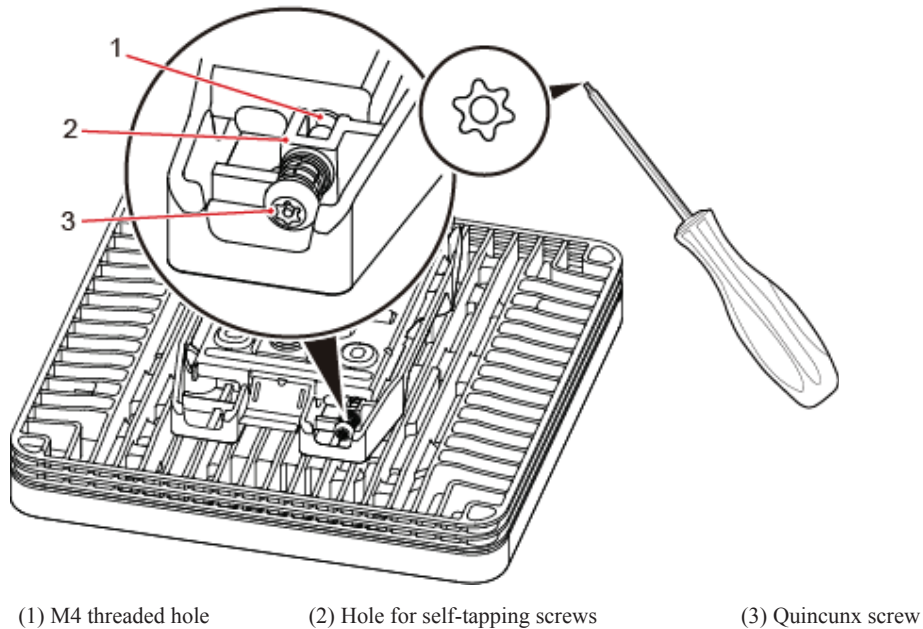
NOTE

- Before installing the pRRU, connect one end of the Ethernet cable to the CPRI_E0 port on pRRU.
- It is good practice to perform the installation from the side view to promptly align the hooks with the rotation axis.

- Step 6 Optional:** Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-10](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-10 Locking the protection screw



---End

8.3.3 Installing a pRRU on a Ceiling

This section describes how to install a pRRU on the ceiling, such as the concrete ceiling, when the ceiling has adequate load bearing capacity and installation space.

Context

 NOTE

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

Procedure

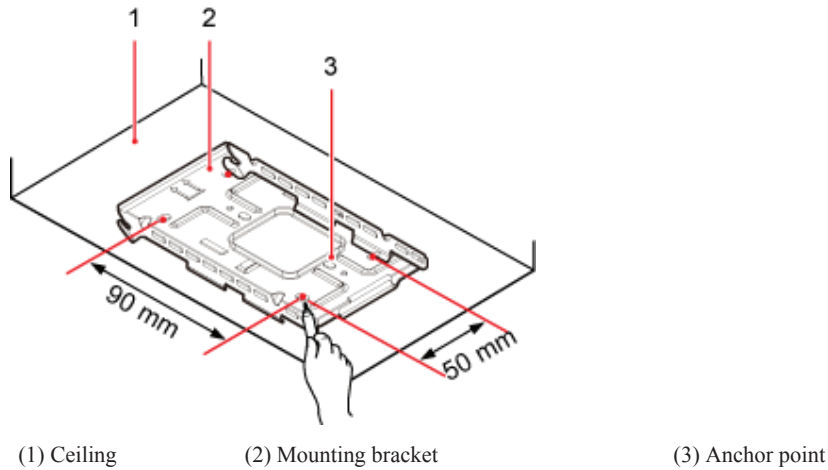
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- Step 2** Place the mounting bracket in the installation position against the ceiling. Then, level the mounting bracket and use a marker to mark four anchor points. See [Figure 8-11](#).

Figure 8-11 Anchor points on the pRRU mounting bracket

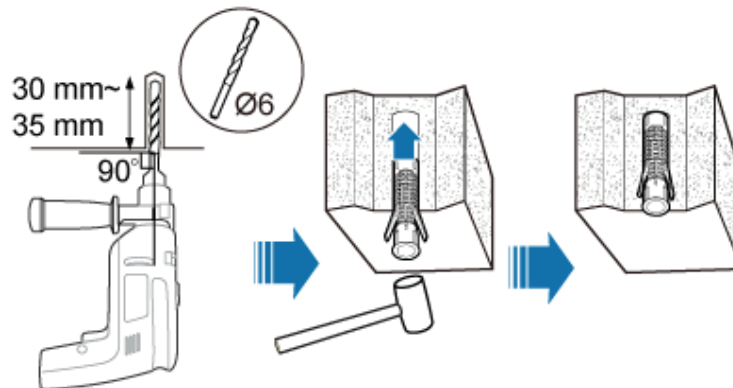


NOTE

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

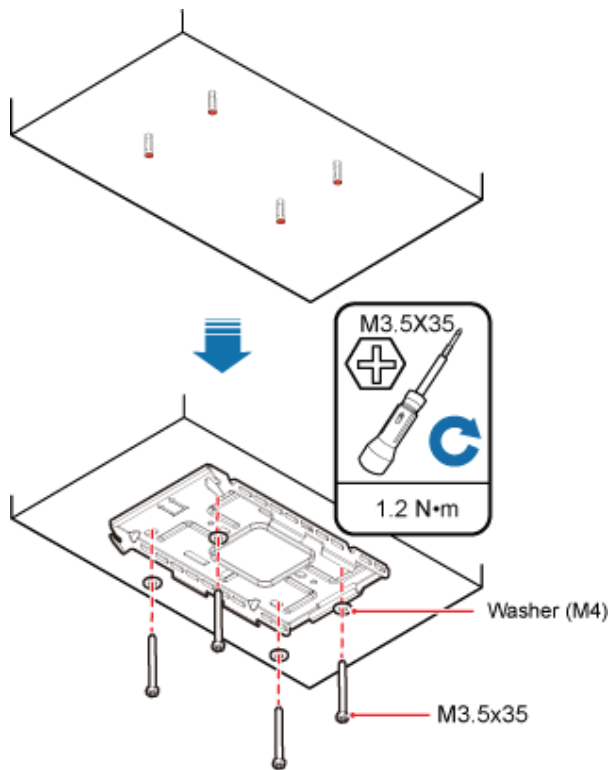
- Step 3** Use a hammer drill with $\phi 6$ bore to drill holes at the marked anchor points, as shown in **Figure 8-12**. Use a vacuum cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then,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

Figure 8-12 Drilling holes and installing expansion bolts



- Step 4** Lead the M3.5x35 screws through the washers, and then through the drilling holes on the mounting bracket to the plastic expansion sleeves, and use a torque screwdriver to torque the screws to 1.2 N•m, as shown in **Figure 8-13**.

Figure 8-13 Installing the mounting bracket

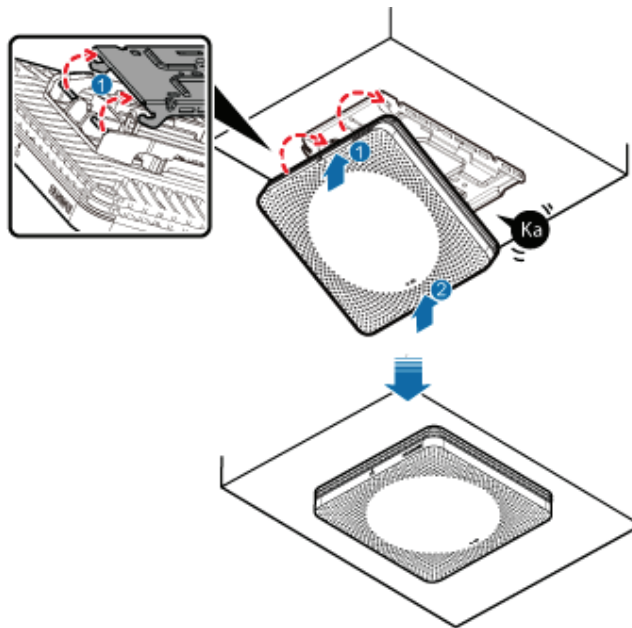


NOTE

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 rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-14](#).

Figure 8-14 Installing a pRRU on a ceiling



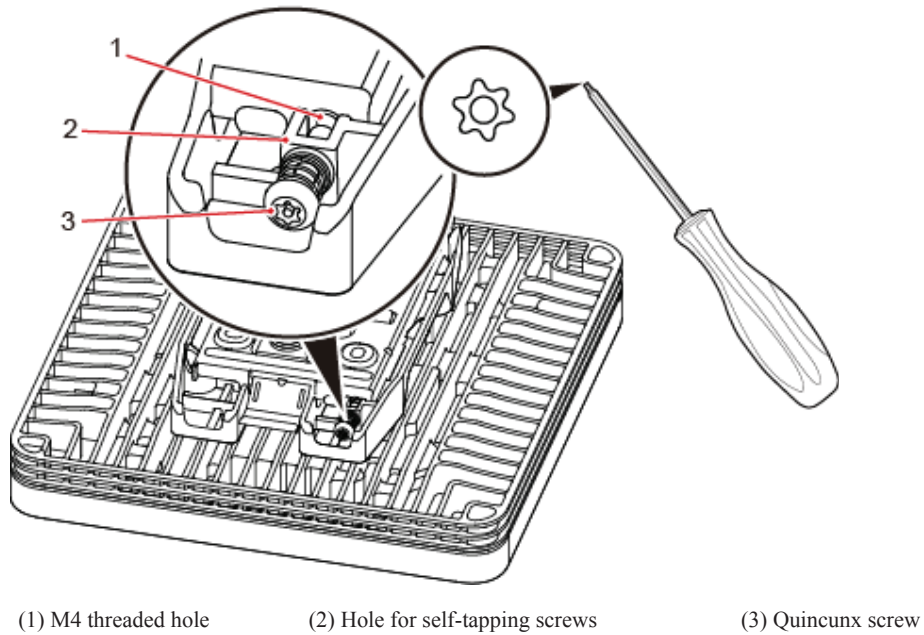
NOTE

- Before installing the pRRU, connect one end of the Ethernet cable to the CPRI_E0 port on pRRU.
- It is good practice to perform the installation from the side view to promptly align the hooks with the rotation axis.

Step 6 Optional: Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-15](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-15 Locking the protection screw



----End

8.3.4 Installing a pRRU on a Pole

This section describes how to install a pRRU on a metal pole indoors.

Procedure

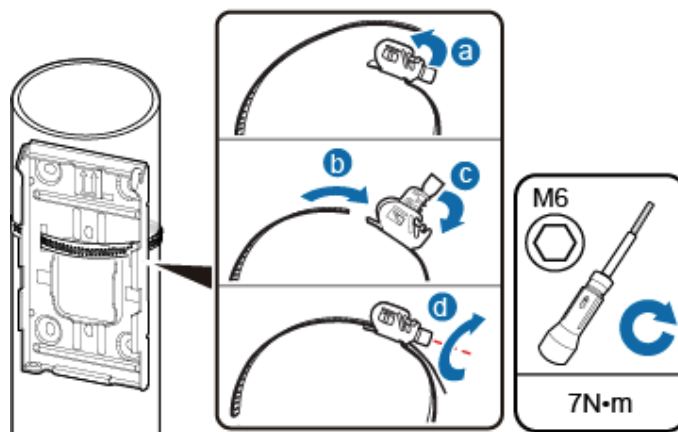
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the pRRU installation clearance requirements.

NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- Step 2** Secure the pRRU mounting bracket on the metal pole, as shown in [Figure 8-16](#).

Figure 8-16 Securing the pRRU mounting bracket on the metal pole



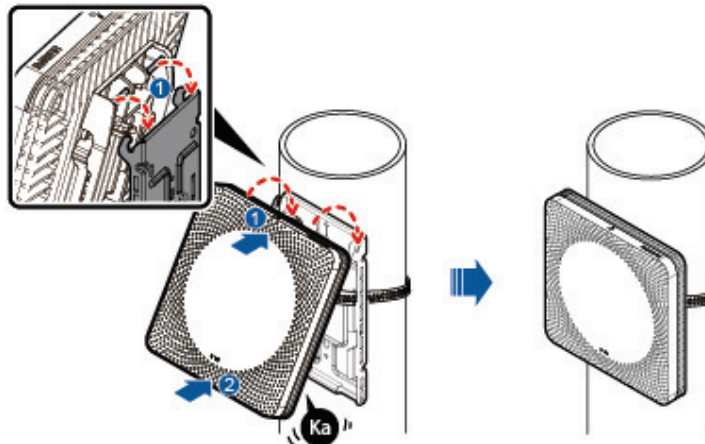
1. Determine a position for installing the pRRU. Then, place the separate mounting kit onto the pole, thread the hose clamp through the mounting kit, and encircle the pole with the hose clamp, as shown by illustrations a, b, and c in [Figure 8-16](#).
2. Use an M6 inner hexagon screwdriver to tighten the bolt on each hose clamp to 5 N·m to secure the mounting kit, as shown by illustration d in [Figure 8-16](#).

Step 3 Fit the four hooks of the pRRU into the mounting holes on the mounting bracket and then press the pRRU downwards until a click is heard. See [Figure 8-17](#).

 NOTE

- It is good practice to connect one end of an Ethernet cable to the CPRI_E0 port on the pRRU before the pRRU is installed.
- It is good practice to perform the installation from the side view to promptly align the hooks with the mounting holes.

Figure 8-17 Installing the pRRU on a pole



---End

8.3.5 Installing a pRRU on a Plate

This section describes how to install a pRRU on a plate. If a suspended ceiling plate has adequate load bearing capacity and installation space, the pRRU can be installed on the plate. However, it is good practice not to install a pRRU on an aluminum plate. The installation modes are classified into installation on a removable suspended ceiling plate and installation on an overall suspended ceiling.

Procedure

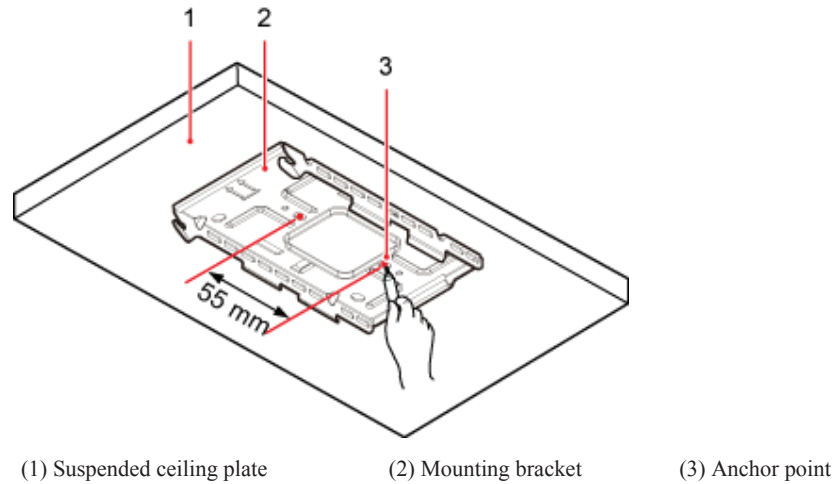
- Installation on a removable suspended ceiling plate
This installation mode applies when the suspended ceiling plate (for example, a metal plate) is removable.
 - a. Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- b. Place the mounting bracket in the installation position against the wall. Then, level the mounting bracket and use a marker to mark two anchor points. See [Figure 8-18](#).

Figure 8-18 Anchor points on the pRRU mounting bracket

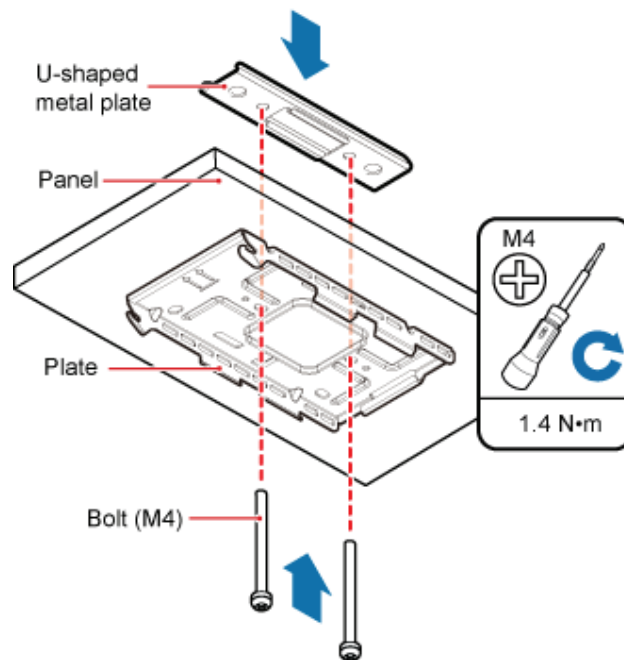


NOTE

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

- c. Use a hammer drill with $\phi 6$ bore to drill holes at the anchor points.
- d. Lead two bolts (M4) through the mounting bracket and the suspended ceiling plate, and use a torque screwdriver to torque the bolts to 1.4 N•m, as shown in [Figure 8-19](#).

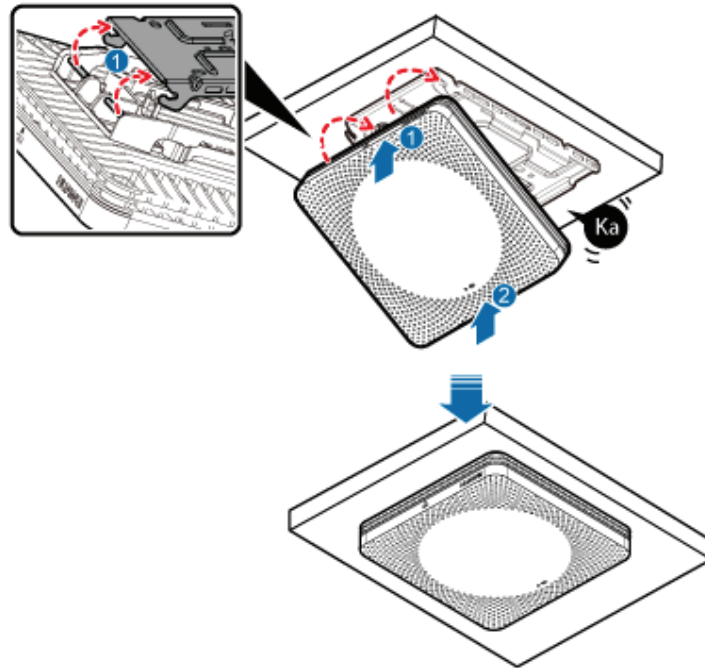
Figure 8-19 Installing the pRRU mounting bracket



 NOTE

- The bolt used for installing the pRRU on a suspended ceiling plate depends on the plate thickness:
 - The delivered bolt (M4x35) is used if the plate thickness is less than 25 mm.
 - The delivered bolt (M4X60) is used if the plate thickness ranges from 25 mm to 45 mm.
 - If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.
- e. Fit the rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-20](#).

Figure 8-20 Installing a pRRU on a plate



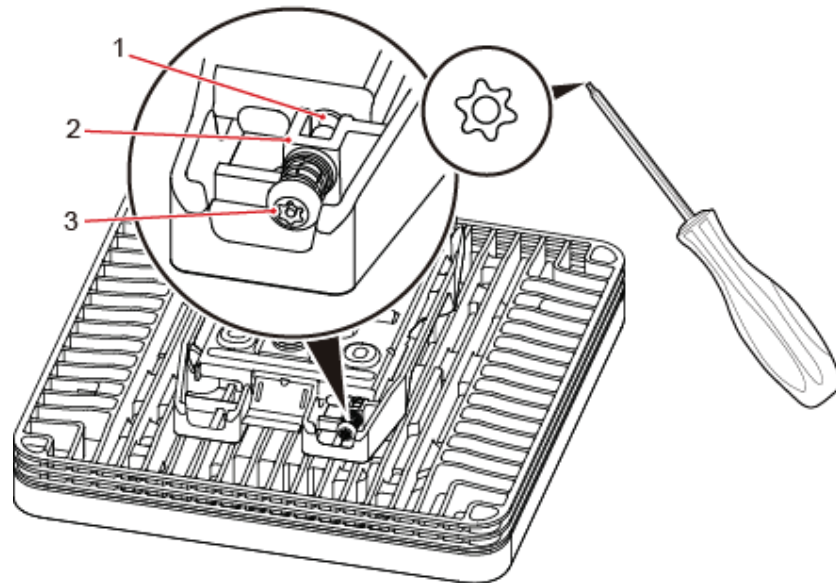
 NOTE

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

- f. Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-21](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-21 Locking the protection screw



(1) M4 threaded hole

(2) Hole for self-tapping screws

(3) Quincunx screw

- Installation on an overall suspended ceiling

This installation mode applies when the suspended ceiling (for example, made of plaster board) cannot be removed.

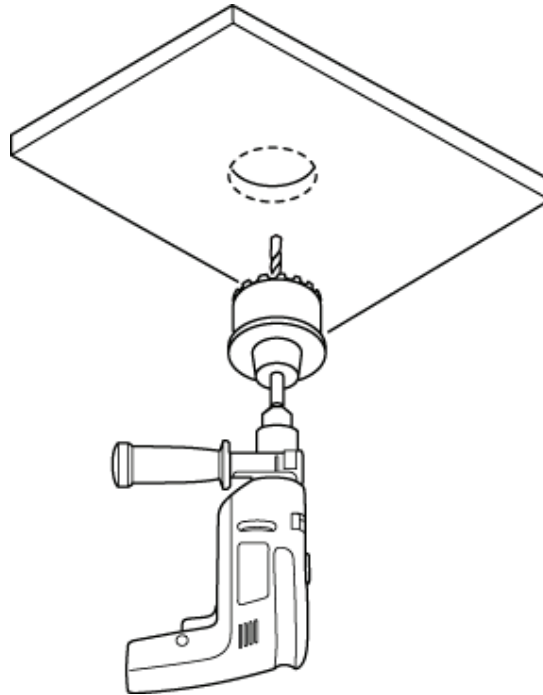
- a. Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- b. Use a crown saw to drill a hole with a diameter of 60 mm to 65 mm at the installation position for the pRRU, as shown in [Figure 8-22](#).

Figure 8-22 Drilling holes by using a crown saw

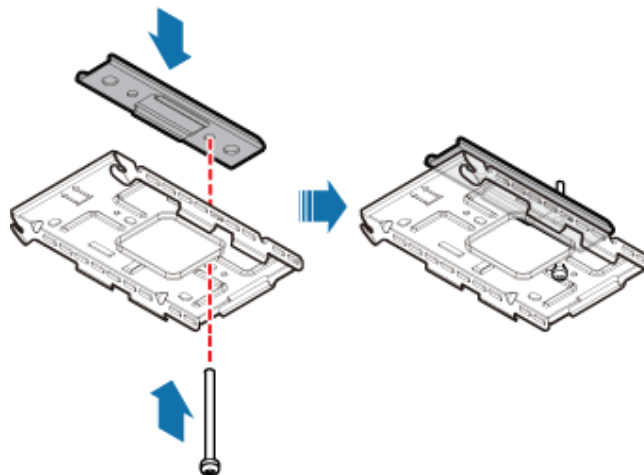


NOTE

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

- c. Use a bolt (M4) to partially connect the mounting bracket and the U-shaped metal plate, as shown in [Figure 8-23](#).

Figure 8-23 Partially connecting the mounting bracket and the U-shaped metal plate

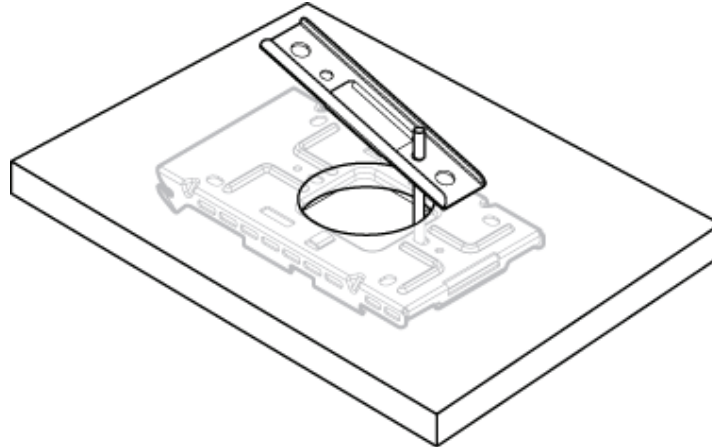


 NOTE

The bolt used for installing the pRRU on a suspended ceiling plate depends on the plate thickness:

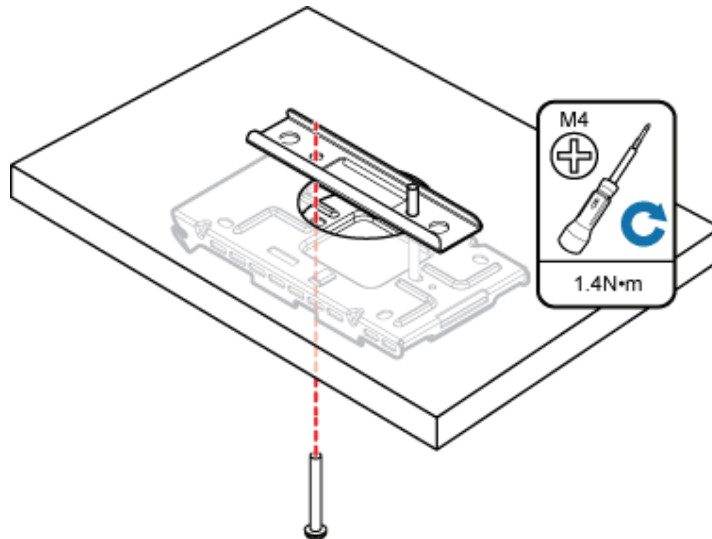
- The delivered bolt (M4x35) is used if the plate thickness is less than 25 mm.
 - The delivered bolt (M4x60) is used if the plate thickness ranges from 25 mm to 45 mm.
- d. Lead the U-shaped metal plate through the hole on the ceiling, as shown in [Figure 8-24](#).

Figure 8-24 Routing the U-shaped metal plate through the hole on the ceiling



- e. Install another bolt with the same length and use a torque screwdriver to torque the bolts to 1.4 N·m, as shown in [Figure 8-25](#).

Figure 8-25 Assembling the mounting bracket and the U-shaped metal plate

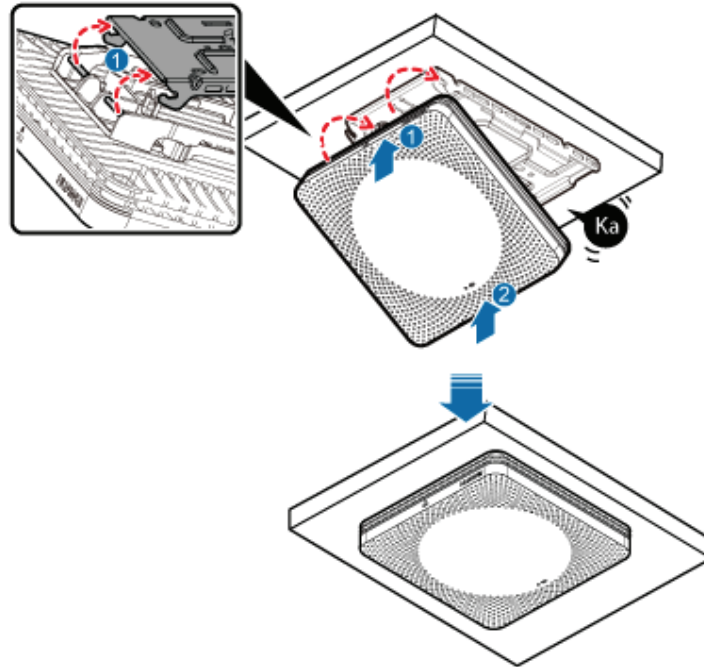


 NOTE

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

- f. Fit the rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-26](#).

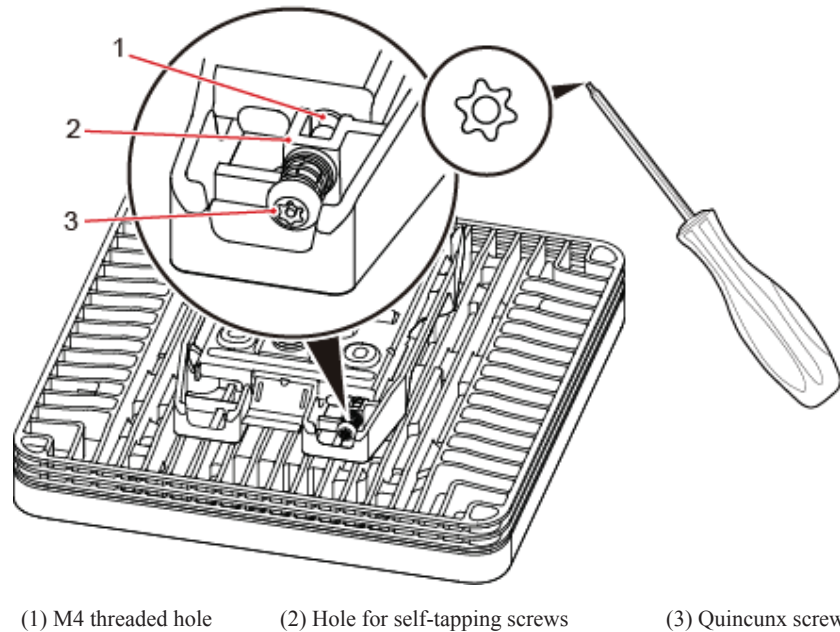
Figure 8-26 Installing a pRRU on a plate



NOTE

- Before installing the pRRU, connect one end of the Ethernet cable to the CPRI_E0 port on pRRU.
 - It is good practice to perform the installation from the side view to promptly align the hooks with the rotation axis.
- g. Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-27](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-27 Locking the protection screw

---End

8.3.6 Installing a pRRU on a Keel

This section describes how to install a pRRU3901 on a keel. If a suspended ceiling plate cannot bear the pRRU, the pRRU can be installed on the keel on the ceiling. The standard keel with a width less than 45 mm, instead of the non-standard keel, is recommended.

Context

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

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

The keel used on the ceiling is thin. During installation, fix the mounting kits onto the large surface instead of the small surface of the keel to prevent distorting the keel.

Procedure

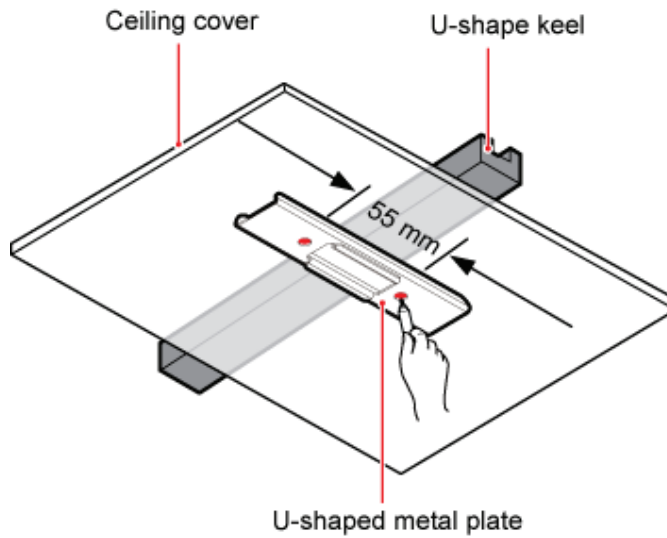
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- Step 2** Place the U-shaped metal plate across the keel. Use a marker to mark the projective positions of the mounting holes on the suspended ceiling plate, as shown in [Figure 8-28](#).

Figure 8-28 Anchor points on the suspended ceiling plate

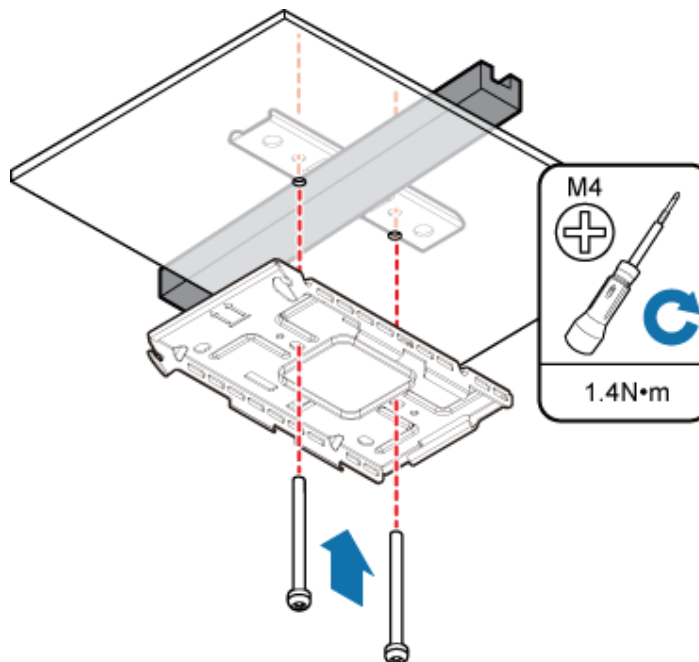


NOTE

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 with $\Phi 12$ bore.
- Step 4** Lead two bolts (M4) through the mounting bracket and the ceiling plate. Use a torque screwdriver to torque the bolts to $1.4 \text{ N}\cdot\text{m}$, as shown in [Figure 8-29](#).

Figure 8-29 Installing the mounting bracket

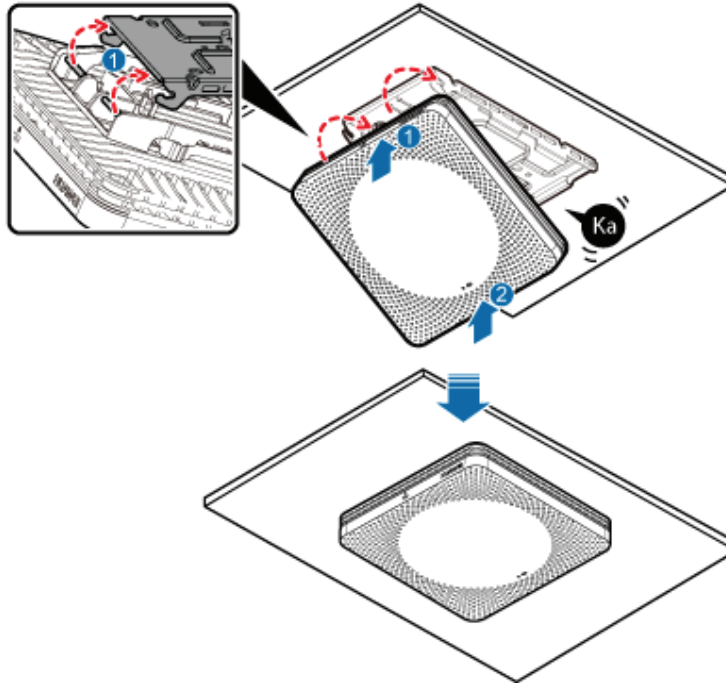


 NOTE

- The bolt used for installing the pRRU on a suspended ceiling plate depends on the plate thickness:
 - The delivered bolt (M4 x 35) is used if the plate thickness is less than 25 mm.
 - The delivered bolt (M4 x 60) is used if the plate thickness ranges from 25 mm to 45 mm.
- 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 rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-30](#).

Figure 8-30 Installing a pRRU on a keel



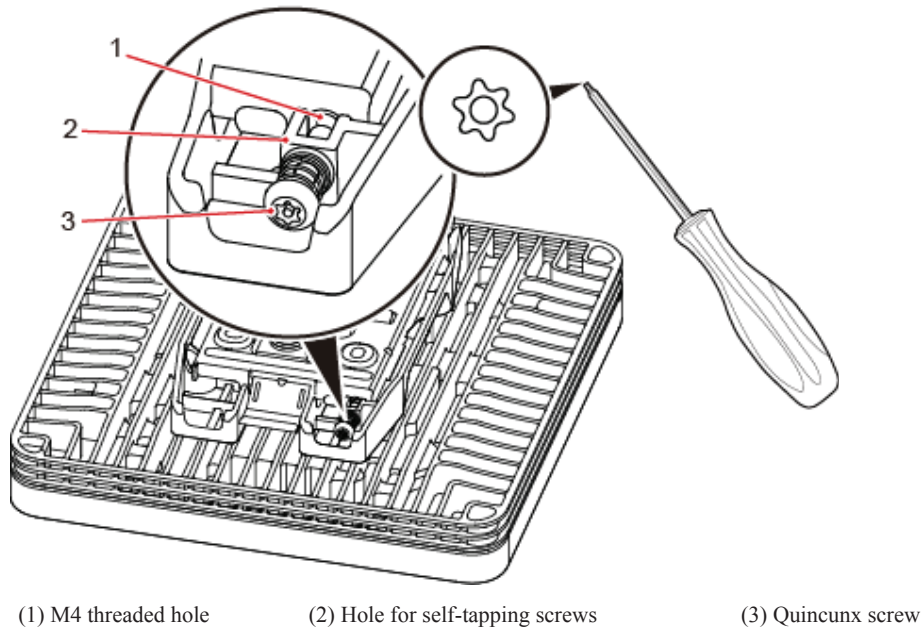
 NOTE

- Before installing the pRRU, connect one end of the Ethernet cable to the CPRI_E0 port on pRRU.
- It is good practice to perform the installation from the side view to promptly align the hooks with the rotation axis.

Step 6 Optional: Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-31](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-31 Locking the protection screw



----End

8.3.7 Installing a pRRU on Steel Hangers

This section describes how to install a pRRU on steel hangers.

Context

Either M6 or M8 steel hangers can be used for installation.

Procedure

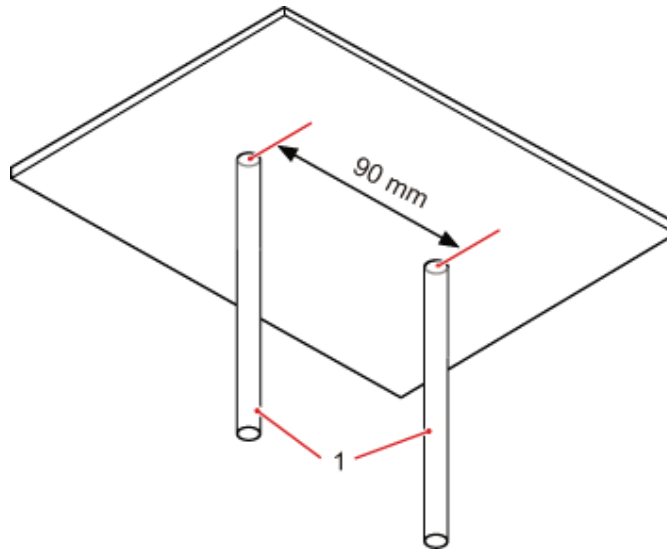
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the clearance requirements.

 NOTE

For details about the clearance requirements, see [8.1.3 Space Requirements](#).

- Step 2** Install two steel hangers onto the ceiling. A distance of 90 mm must be retained between the two hangers, as shown in [Figure 8-32](#).

Figure 8-32 Installing steel hangers

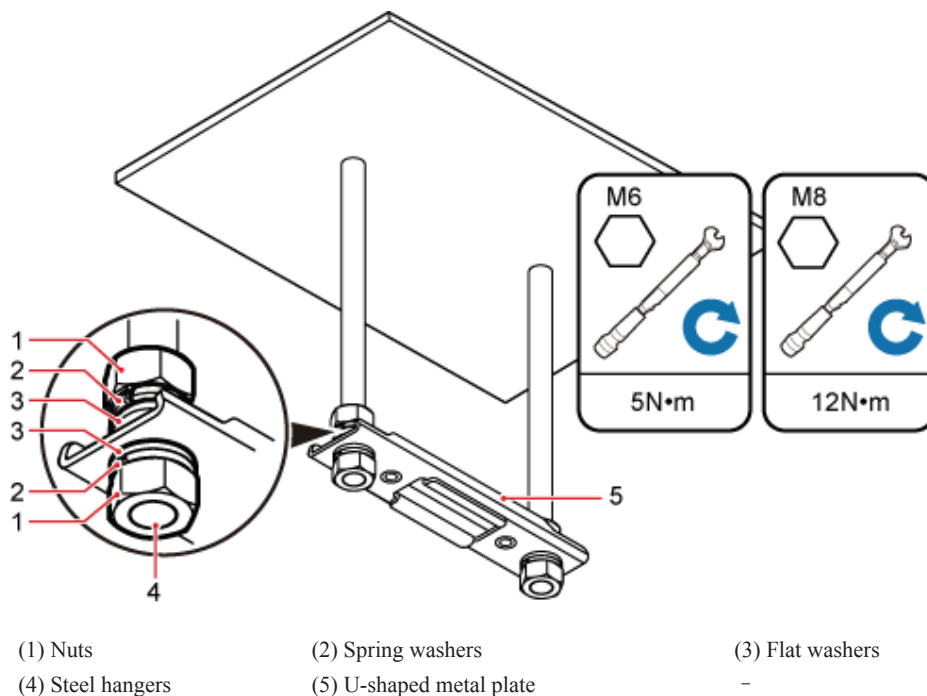


Step 3 Install the nuts, spring washers, flat washers, and a U-shaped metal plate onto the steel hangers, and use a torque wrench to torque the U-shaped metal plate to 5 N•m (on M6 steel hangers) or 12 N•m (on M8 steel hangers). See [Figure 8-33](#).

NOTE

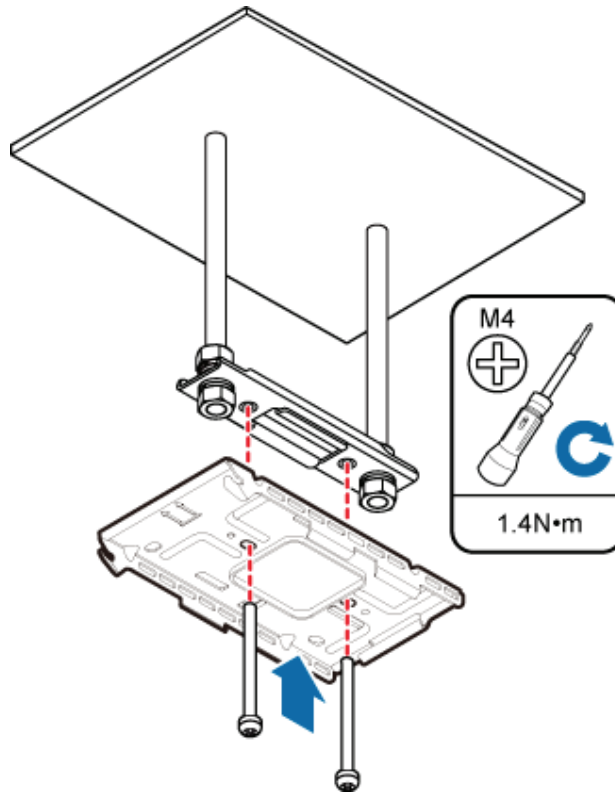
- The edge side of the U-shaped metal plate must face upwards.
- The nuts on the underside of the U-shaped metal plate must be completely fixed into the steel hangers, and the lower surface of a nut cannot be exposed on the end side of steel hangers, as shown in [Figure 8-33](#).

Figure 8-33 Installing the U-shaped metal plate onto the steel hangers



- Step 4** Lead two bolts (M4x35) through the mounting bracket and the ceiling plate. Use a torque screwdriver to torque the bolts to 1.4 N•m, as shown in [Figure 8-34](#).

Figure 8-34 Installing the mounting bracket

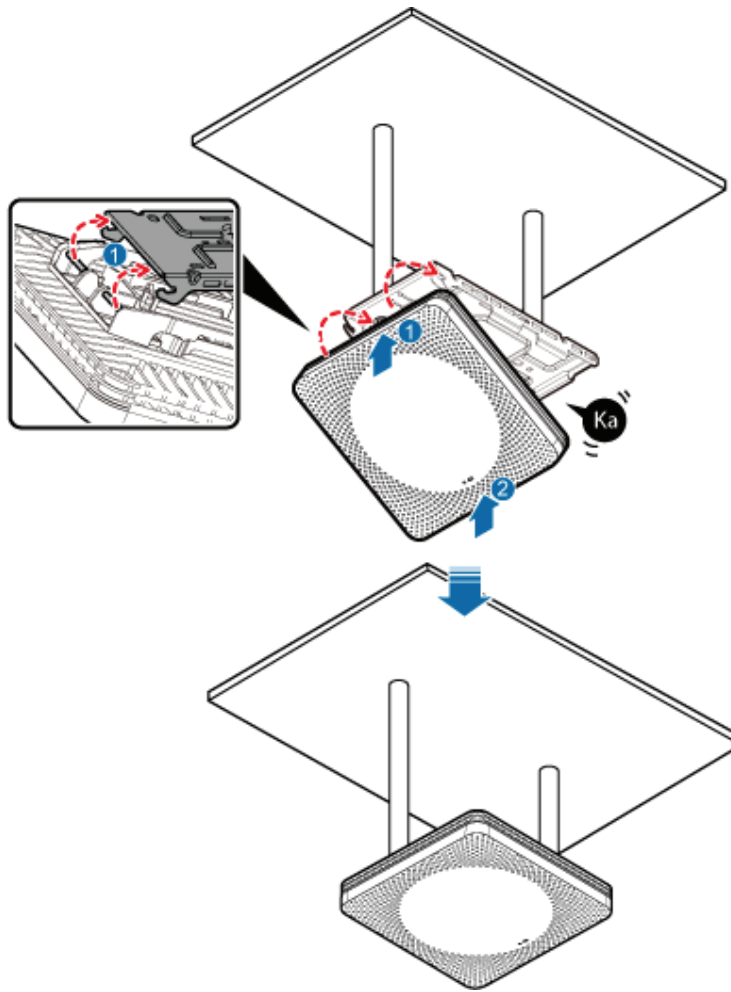


NOTE

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 rotation axis on the pRRU into the hooks on the mounting bracket, and then push the pRRU against the mounting bracket until a click is heard. See [Figure 8-35](#).

Figure 8-35 Installing a pRRU on a keel



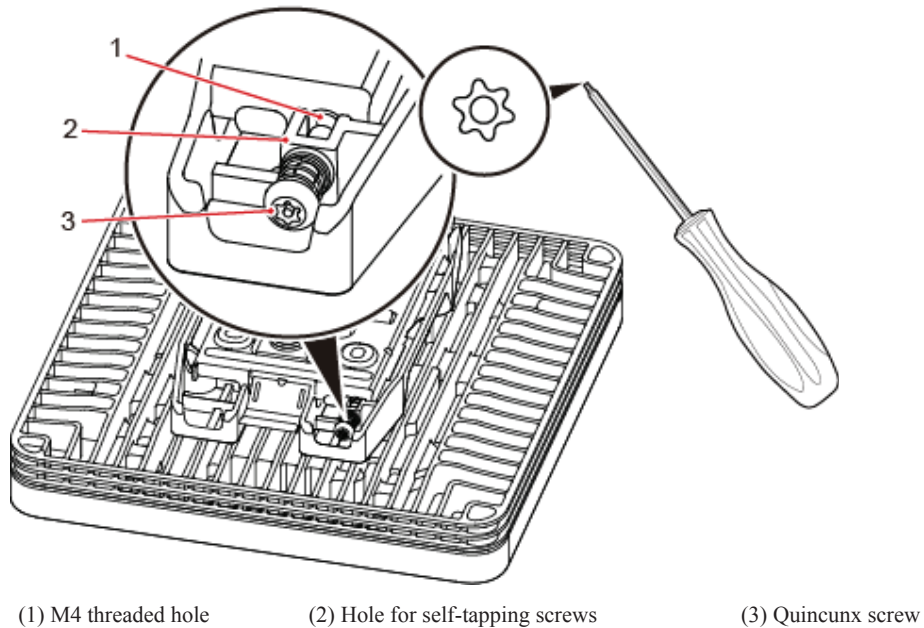
NOTE

- Before installing the pRRU, connect one end of the Ethernet cable to the CPRI_E0 port on pRRU.
- It is good practice to perform the installation from the side view to promptly align the hooks with the rotation axis.

Step 6 Optional: Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-36](#).

The protection screw protects the pRRU from being removed and must be locked if required.

Figure 8-36 Locking the protection screw



---End

8.3.8 Installing the Cabinet

In the outdoor scenario, the pRRU3902 should be installed in the cabinet firstly.

Context

An RF surge protector provides surge protection for the RF ports on pRRU3902, and a PoE surge protector provides surge protection for the CPRI ports.

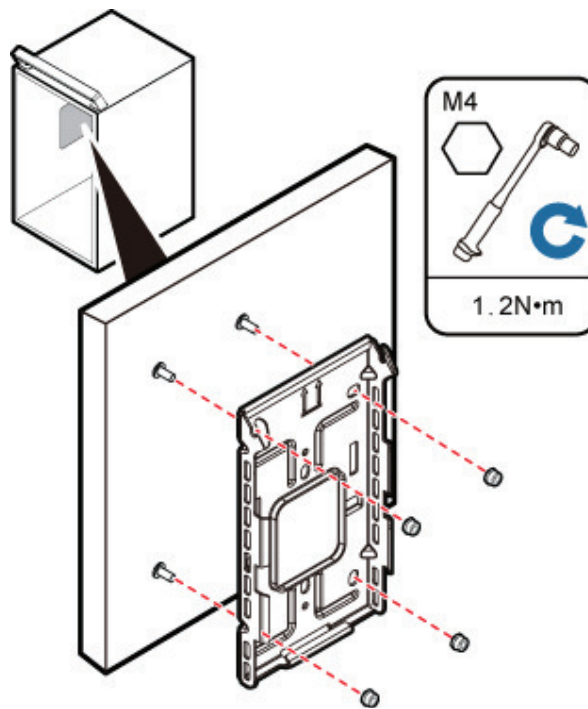
One pRRU3902 with internal antenna need to be configured with one PoE surge protector.

One pRRU3902 with external antenna need to be configured with one PoE surge protector and four RF surge protectors at the same time.

Procedure

Step 1 Install the plate onto the cabinet, as shown in [Figure 8-37](#).

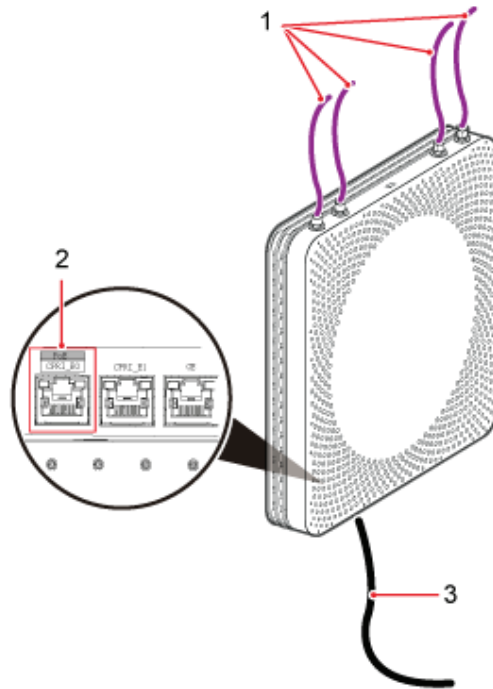
Figure 8-37 Installing the plate onto the cabinet



 NOTE

Make sure all the cables are installed before installing the plate. For details about installing the cables of pRRU3902, see [Figure 8-38](#).

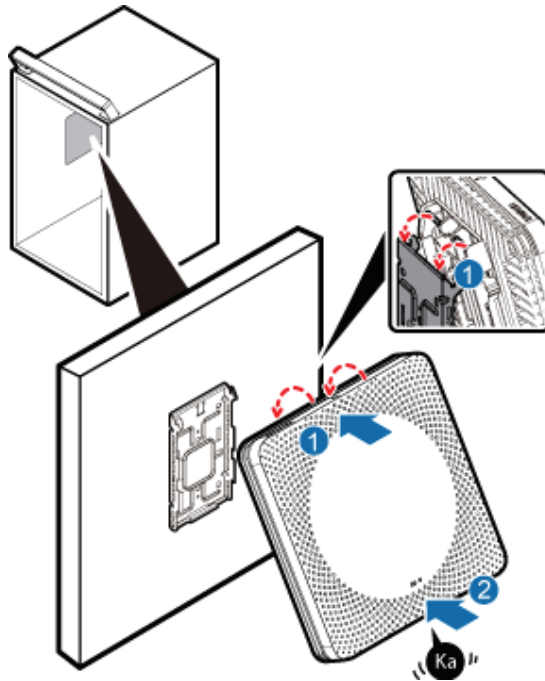
Figure 8-38 Installing the pRRU3902 cables



(1) RF Jumper	(2) CPRI_E0 port	(3) Ethernet Cable
---------------	------------------	--------------------

Step 2 Fit the rotation axis on pRRU3902 into the hooks on the mounting bracket, and then push pRRU3902 against the mounting bracket until a click is heard, as shown in [Figure 8-39](#).

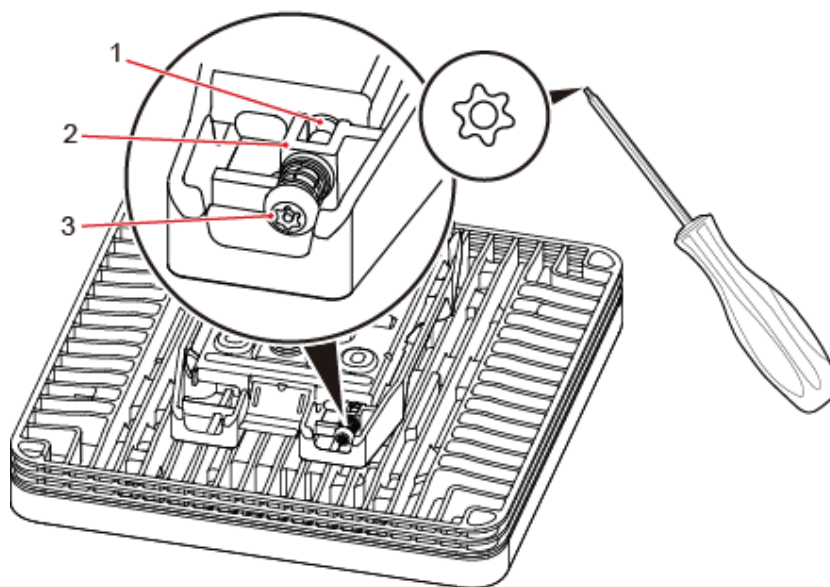
Figure 8-39 Installing a pRRU3902 into the cabinet



Step 3 Optional: Use T20 with hole screwdriver to lock the protection screw on the attachment plate. See [Figure 8-40](#).

The protection screw protects the pRRU3902 from being removed and must be locked if required.

Figure 8-40 Locking the protection screw



(1) M4 threaded hole

(2) Hole for self-tapping screws

(3) Quincunx screw

----End

8.4 Installing pRRU Cables

This section describes the procedure of installing the pRRU cables.

8.4.1 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

National Standards

- Code for Engineering Design of Generic Cabling System for Building and Campus (GB 50311-2007)
- Code for Engineering Acceptance of Generic Cabling System for Building and Campus (GB50312-2007).
- Security Protection Engineering Technology Specifications (GB 50348-2004)
- Code for Construction and Acceptance of the Electronic Information System Room (GB 50462-2008)
- Code for Quality Acceptance of the Intelligent Building Engineering (GB 50339-2003)
- Code for Quality Acceptance of Electric Engineering Construction in Building (GB 50303-2002)
- Technical Specification for Construction and Acceptance of Telecommunication Conduit Engineering (GB 50374-2006)

International Standards

- Generic Cabling for Customer Premises (ISO/IEC 11801)
- Commercial Building Telecommunications Cabling Standard (EIA/TIA 568)
- Commercial Building Standard for Telecommunication Pathways and Spaces (EIA/TIA 569)
- Administration Standard for Commercial Telecommunications Infrastructure (EIA/TIA 606)
- Grounding and Bonding Requirements for Telecommunications in Commercial Buildings (EIA/TIA 607)
- Generic Cabling Systems for Information Technology (EN 50173)
- Cabling Installation for Information Technology (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 five times the diameter of the cable.
- The bending radius of a 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.
- 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

- The steel pipe or fire-resistant rigid polyvinyl chloride pipe should be used for the cable duct or for routing cables. The cross-sectional usage of the cable duct should be 30% to 50% and that of the pipe for routing cables should be 25% to 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.
- 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.
- The point at which an Ethernet cable is bundled must be spaced 400 mm or less from the Ethernet port on a pRRU.
- For the pRRU used in the elevator engine room on the rooftop, generator set for the subway engine, and equipment room with central air conditioning, Ethernet cables must be led through metallic conduits that are reliably grounded at both ends.

8.4.2 Cable List

This section describes pRRU cable connections.

pRRU3902 Cables

Table 8-9 List of pRRU3901 cables

Cable	One End		The Other End	
	Connector	Connected to ...	Connector	Connected to ...
Ethernet Cable	RJ45 connector	CPRI_E0~CPRI_E7 port on RHUB	RJ45 connector	CPRI_E0~CPRI_E1 port on pRRU
	RJ45 connector	Transmission port on Access Control(AC)	RJ45 connector	● GE port on pRRU3901 ● CPRI_E1 port on pRRU3911
(Optional) RF Jumper	SMA straight male connector/ Type N male connector	External antenna TX/RX RF port on pRRU	Based on the port model of the antenna system.	Antenna system

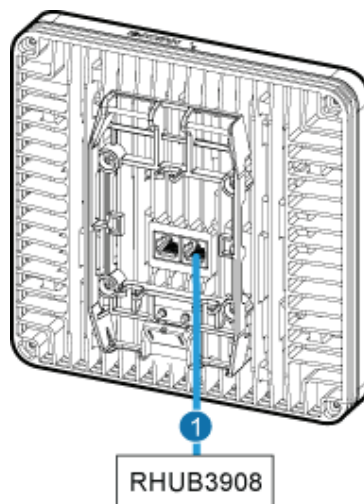
8.4.3 Cable Connections

This section describes the cable connections for a single pRRU.

pRRU3902 (Indoor)

Figure 8-41 shows the cable connection of pRRU3902 with internal antenna.

Figure 8-41 pRRU3902 cable connection (1)



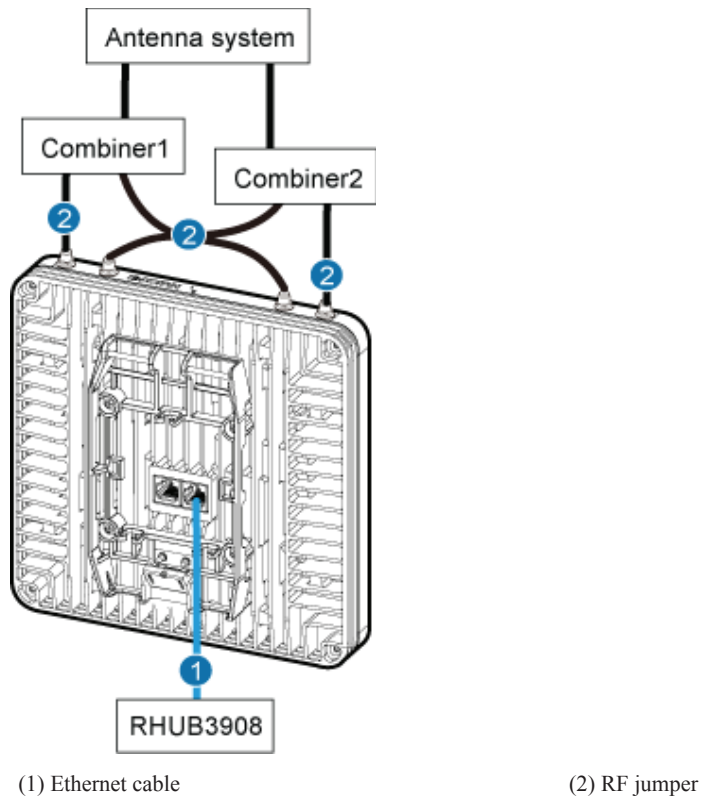
(1) Ethernet cable

NOTE

The Extender can be used to lengthen the distance between the RHUB and the pRRU3902 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 pRRU3902.

Figure 8-42 shows the cable connection when the pRRU3902 supporting external antennas.

Figure 8-42 pRRU3902 cable connection (2)

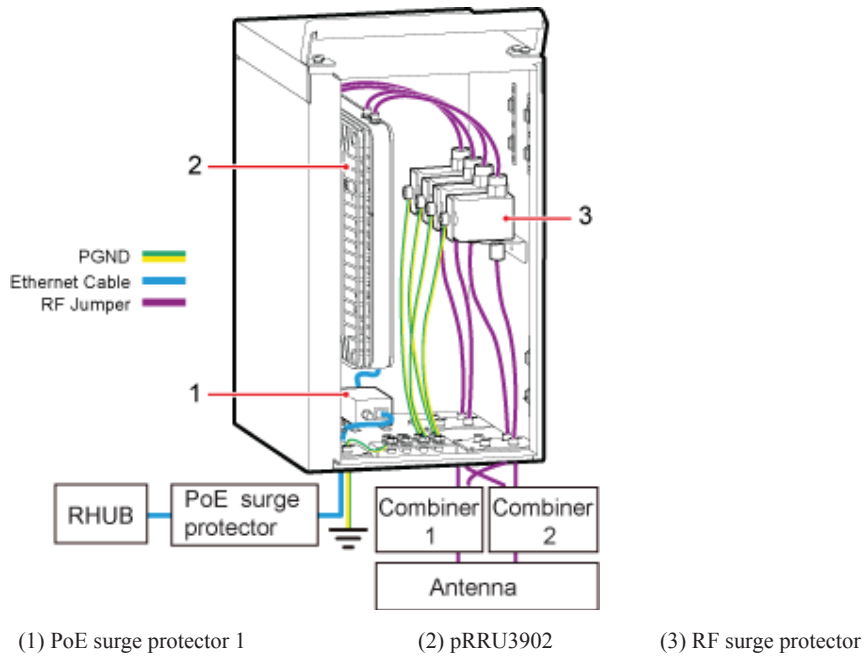
**NOTE**

The Extender can be used to lengthen the distance between the RHUB and the pRRU3902 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 pRRU3902.

pRRU3902 (Outdoor)

Figure 8-43 shows the cable connection of pRRU3902 installed outside.

Figure 8-43 pRRU3902 cable connection



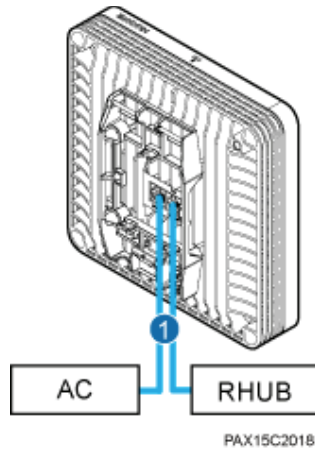
NOTE

- The Extender can be used to lengthen the distance between the RHUB and the pRRU3902 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one among the RHUB, PoE surge protector 2, PoE surge protector 3, Extender and the other among Extender, PoE surge protector 4, PoE surge protector 1, pRRU3902.
- For details about installation of the PoE surge protector and cables, see [12 \(Optional\) Installing the PoE Surge Protector and Cables](#).
- For details about installation of the RF surge protector and cables, see [13 \(Optional\) Installing the RF Surge Protector and Cables](#).

pRRU3911

Figure 8-44 shows the cable connections of pRRU3911 with internal antenna.

Figure 8-44 pRRU3911 cable connection (1)



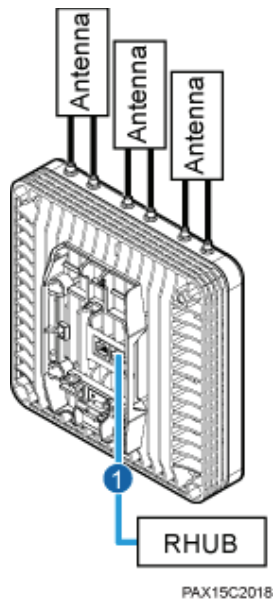
(1) Ethernet cable

NOTE

The Extender can be used to lengthen the distance between the RHUB and the pRRU3911 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 pRRU3911.

Figure 8-45 shows the cable connections of pRRU3911 with external antenna.

Figure 8-45 pRRU3911 cable connection (2)



(1) Ethernet cable

NOTE

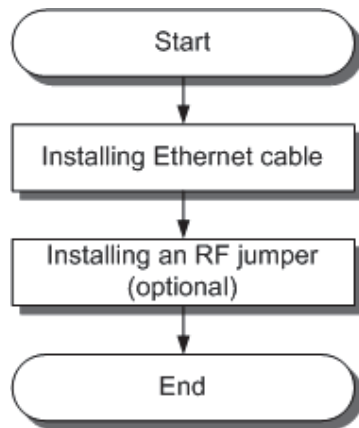
The Extender can be used to lengthen the distance between the RHUB and the pRRU3911 connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU3911.

8.4.4 Cable Installation Process

This section describes the process of installing pRRU cables.

Figure 8-46 shows the process of installing pRRU cables.

Figure 8-46 cable installation process



 NOTE

Only the pRRU3902 using external antennas requires RF jumpers, and the pRRU3911 requires no RF jumpers.

8.4.5 Installing a pRRU3902 Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- 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.
- The Ethernet cables can be straight-through cables.
- 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 RHUB can be extended by the Extender up to a total distance of 200 m.
- 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.

Context

The Ethernet cable has the following functions:

- Provides power supply for the pRRU3902 when the cable connects the CPRI_E0 port on the pRRU3902 to the RHUB.
- Transmits CPRI signals between an RHUB and a pRRU3902.

For details about the cable connections in the different scenarios, see [8.4.3 Cable Connections](#). The Ethernet cable connections between RHUB and pRRUs are the same. The following section describes the connections between RHUB-Extender-pRRU3902 as an example.

In the outdoor scenario, PoE surge protector is needed to provide surge protection for the Ethernet ports. For details about the installation of PoE surge protector, see [12 \(Optional\) Installing the PoE Surge Protector and Cables](#).

Procedure

Step 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*, *Assembling the Shielded RJ45 Connector and the Ethernet Cable*.

NOTE

- Follow pin assignment instructions described in section Ethernet Cable in *DBS3900 LampSite Hardware Description* to assemble the RJ45 connector and the Ethernet cable. Otherwise, the transmission signal quality deteriorates and CPRI links may be disconnected.
 - The pRRU3902 supports both unshielded and shielded Ethernet cables. It is good practice to use unshielded Ethernet cables.
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 RHUB and a pRRU3902.

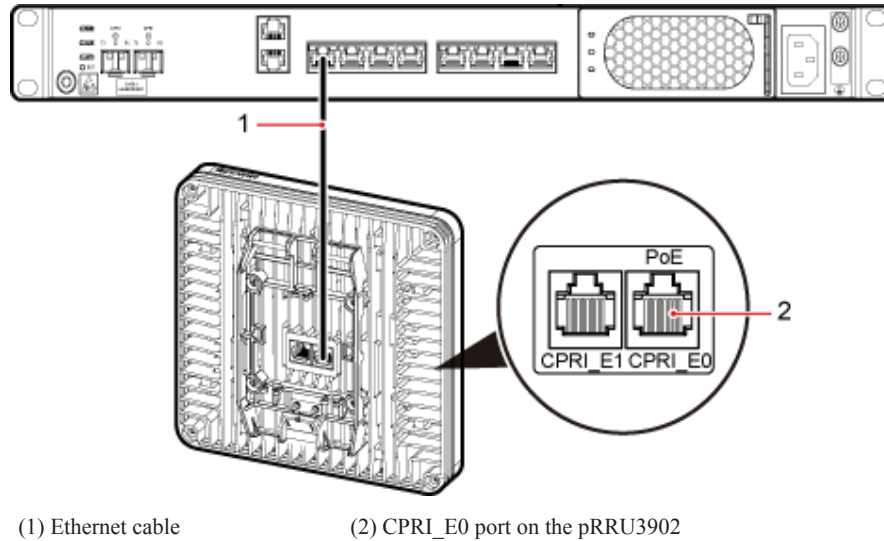
Step 3 Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU3902 panel.

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.

In this scene, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU3902.

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 RHUB panel based on the engineering design, as shown in [Figure 8-47](#).

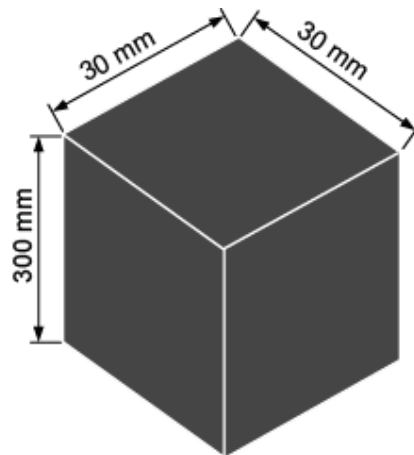
Figure 8-47 Installing an Ethernet cable



Step 6 Optional: If the pRRU3902 is installed in a place with water dripping risks, seal its Ethernet ports with mastic cement.

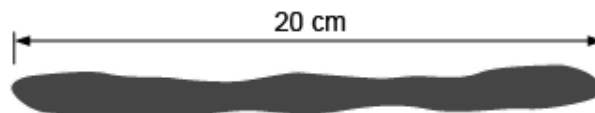
1. Take about 40 g mastic cement, as shown in [Figure 8-48](#).

Figure 8-48 Mastic cement cube



2. Flatten the mastic cement into a 20 cm strip, as shown in [Figure 8-49](#).

Figure 8-49 Flattening the mastic cement into a strip



3. Shape the mastic cement strip around the Ethernet ports from outside the connector clips. Ensure the external sides of the connectors are fully sealed, as shown in [Figure 8-50](#).