

LampSite

Installation Guide

Issue 02
Date 2014-05-27

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About This Document

Overview

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

Product Version

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

Product Name	Product Version
RHUB3908 (referred to as RHUB in this document)	V100R009C00 and later versions Single-mode versions mapping V100R009C00:
pRRU3901 (referred to as pRRU in this document)	● NodeB: V200R016C00 ● eNodeB: V100R007C00

Intended Audience

This document is intended for:

- BTS installation personnel

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1 Changes in LampSite Installation Guide

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

02 (2014-05-27)

This is the second commercial release.

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

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

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

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

01 (2014-04-26)

This is the first commercial release.

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

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

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

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

Draft C (2014-03-26)

This is a draft release.

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

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

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

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

Draft B (2014-02-28)

This is a draft release.

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

- [5.2 Obtaining the MAC Address \(Optional\)](#)
- [5.7.3 Cable Connections](#)
- [6.1 MAC Collection Template](#)

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

Content	Change Description
Entire document	Added descriptions about pRRUs with three transmission ports. Such pRRUs support integrated Wi-Fi services.
	Added the descriptions about the UMTS, LTE FDD and UMTS+LTE FDD mode.
About This Document	Optimized descriptions about matching product versions.
4.4.6 Installing an Ethernet Cable	Changed the cable name from RHUB-pRRU Ethernet cable to Ethernet cable.
5.7.6 Installing an Ethernet Cable	

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

- Installing External Antennas (Optional)
- RHUB Exterior

- RHUB Ports and Indicators
- pRRU Exterior
- pRRU Ports and Indicators

Draft A (2013-11-30)

This is a draft release.

2 Installation Preparations

About This Chapter

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

[2.1 Reference Documents](#)

Before the installation, you must read the following documents:

[2.2 Preparing Tools and Instruments](#)

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

[2.3 Requirements for Installation Personnel](#)

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

2.1 Reference Documents

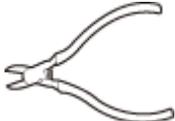
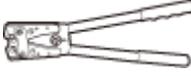
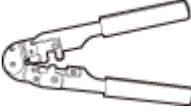
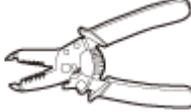
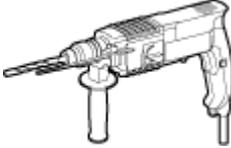
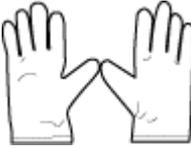
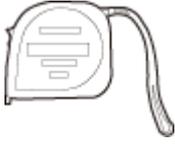
Before the installation, you must read the following documents:

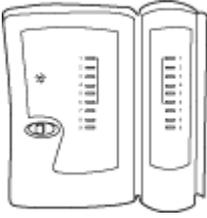
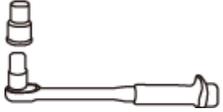
- *LampSite Hardware Description*
- *Installation Reference*

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

2.2 Preparing Tools and Instruments

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

<p>Marker</p>  <p>Level</p> 	<p>Torque screwdriver</p>  <p>⊕ (M4 to M6)</p> 	<p>Diagonal pliers</p> 
<p>Power cable crimping tool</p> 	<p>RJ11 crimping tool</p> 	<p>Cable cutter</p> 
<p>Rubber mallet</p> 	<p>T20 torque torx screwdriver</p>   	<p>Wire stripper</p> 
<p>Hammer drill (Ø6, Ø8 and Ø12)</p> 	<p>Torque wrench (Ø10 mm)</p> 	<p>Protective gloves</p> 
<p>Guarded blade utility knife</p> 	<p>ESD gloves</p> 	<p>Long measuring tape</p> 

<p>Multimeter</p> 	<p>Network cable tester</p> 	<p>Vacuum cleaner</p> 
<p>Ladder</p> 	<p>Torque wrench for SMA connector</p> 	<p>Socket wrench (M6)</p> 

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 an RHUB

About This Chapter

This chapter describes the process of installing an RHUB.

[4.1 Information About the Installation](#)

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

[4.2 Installation Process](#)

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

[4.3 Installing an RHUB](#)

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

[4.4 Installing RHUB Cables](#)

This section describes how to install cables for an RHUB.

[4.5 Checking the RHUB Hardware Installation](#)

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

[4.6 Power-on Check on an RHUB](#)

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

4.1 Information About the Installation

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

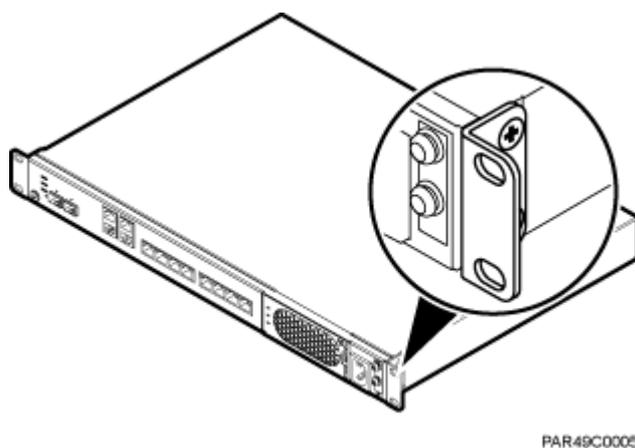
4.1.1 RHUB Installation Scenarios

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

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

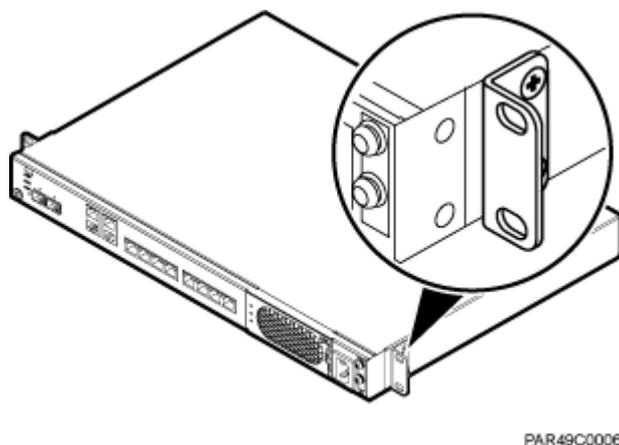
- In standard mode, the front of the mounting ear is aligned with the RHUB panel, as shown in [Figure 4-1](#).

Figure 4-1 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 4-2](#).

Figure 4-2 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 is 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 4-3 and **Figure 4-4** show RHUBs installed in a cabinet or rack, respectively.

Figure 4-3 Installing an RHUB in a 19-inch cabinet or rack in standard mode

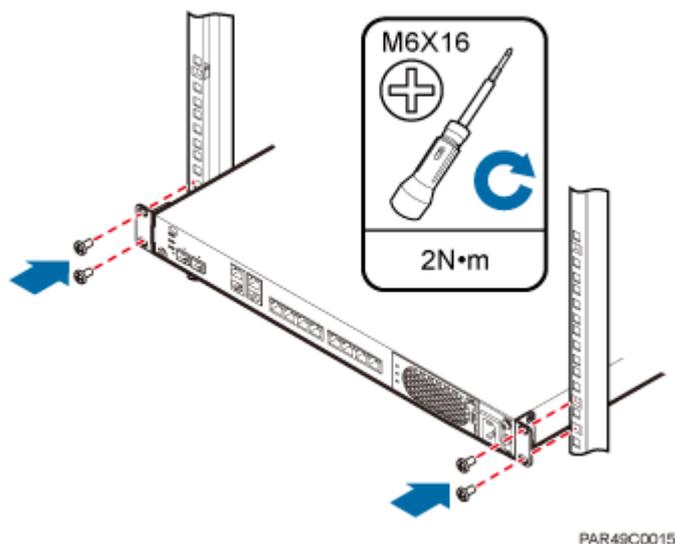
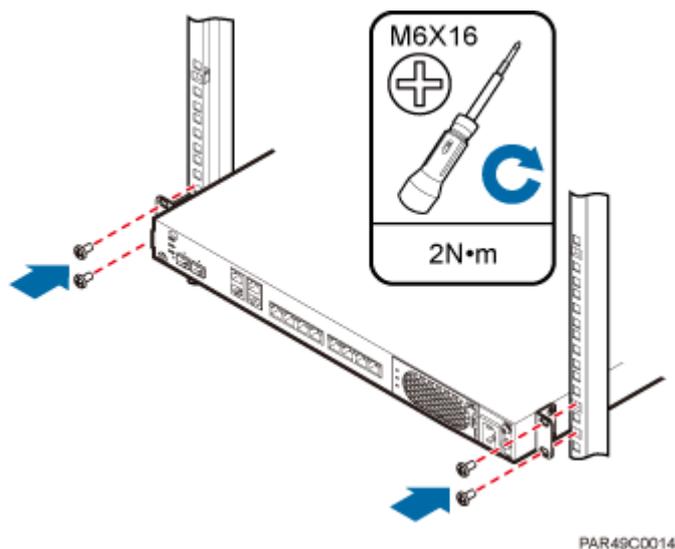


Figure 4-4 Installing an RHUB in a 19-inch cabinet in reverse mode



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 4-5 and **Figure 4-6** show RHUBs installed in a 19-inch shelf.

Figure 4-5 RHUB installed in a 19-inch shelf in standard mode

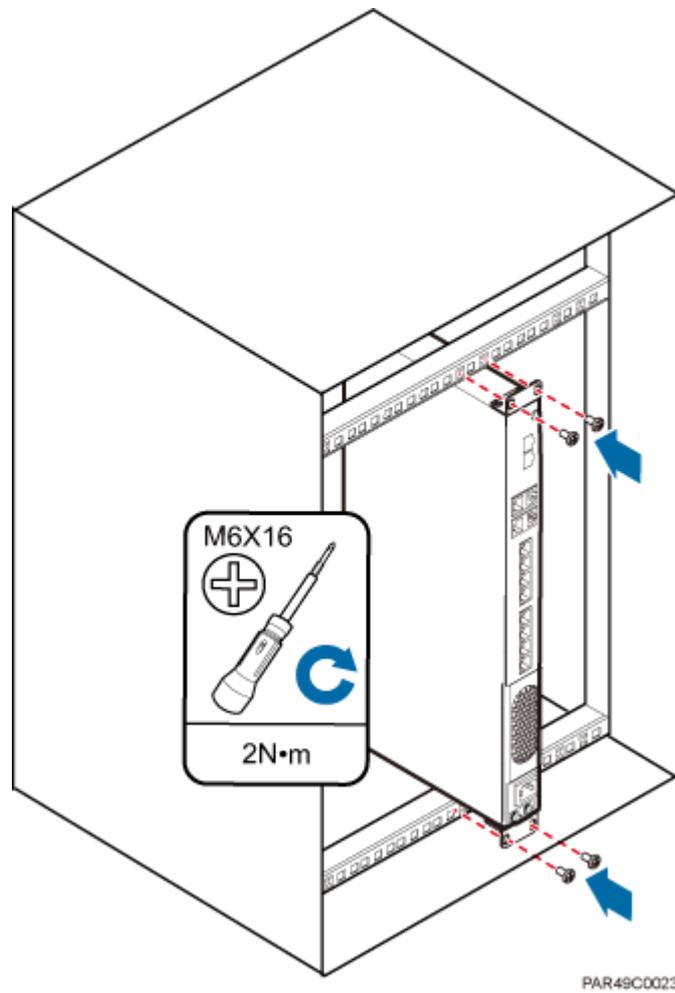
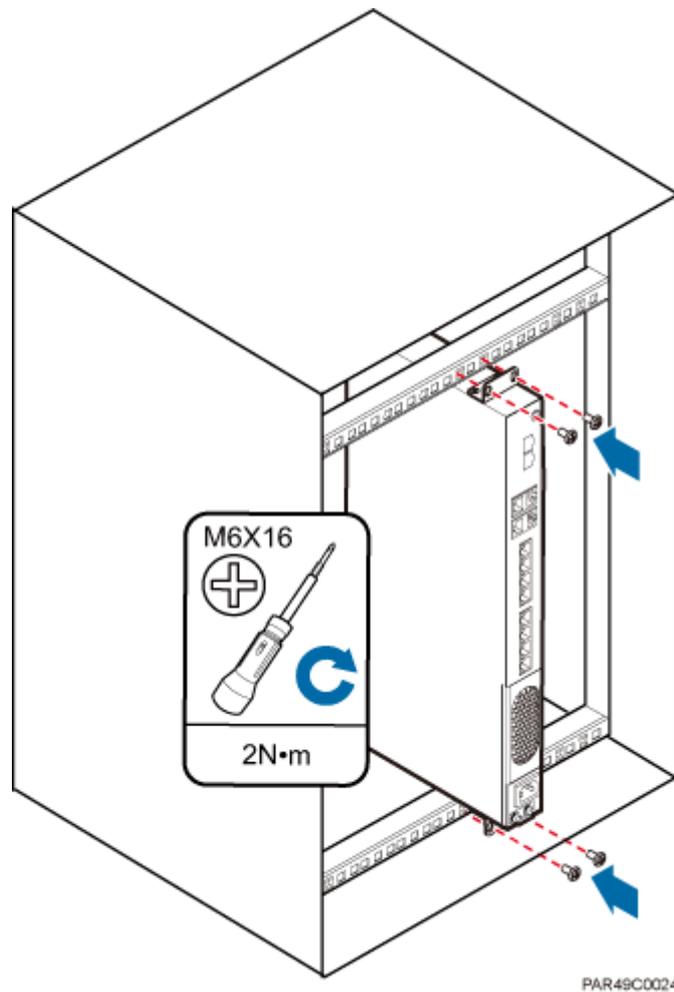


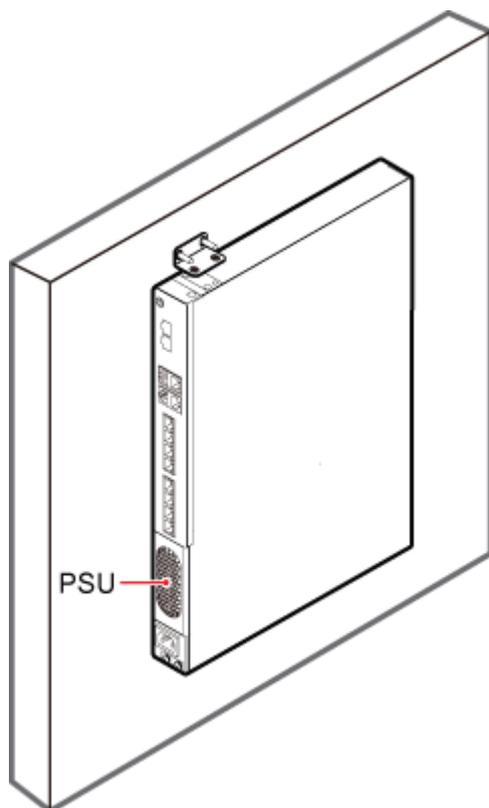
Figure 4-6 RHUB installed in a 19-inch shelf in reverse mode



Installing an RHUB on a Wall

Figure 4-7 shows an RHUB installed on a wall.

Figure 4-7 RHUB installed on a wall



4.1.2 Installation Clearance Requirements of an RHUB

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.

Figure 4-8 shows the installation clearance for the RHUB installed in a 19-inch cabinet, rack, or shelf.

Figure 4-8 Installation clearance for an RHUB installed in a 19-inch cabinet, rack, or shelf

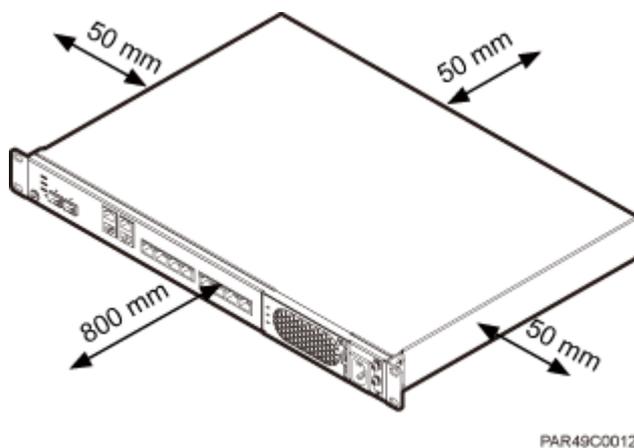
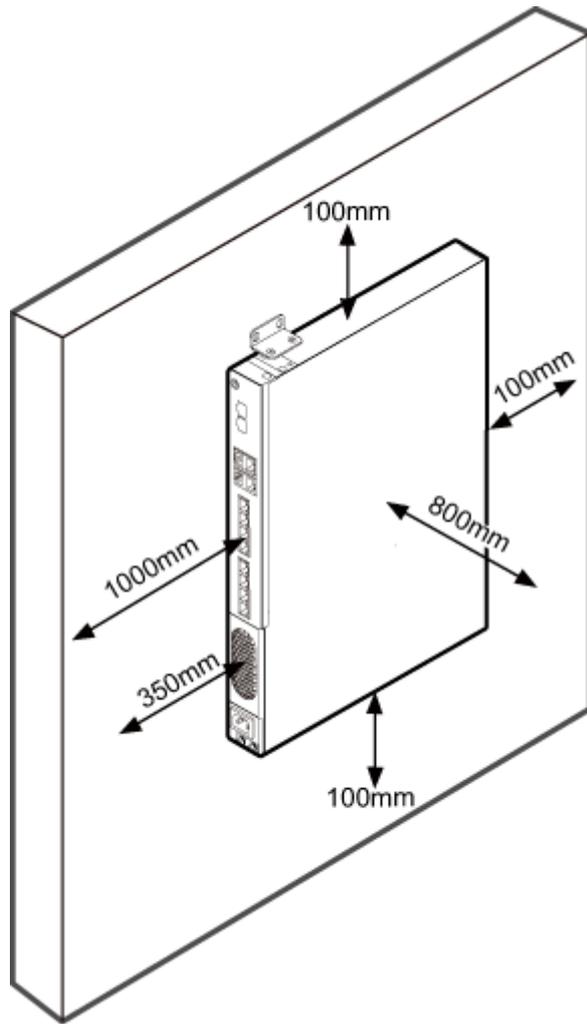


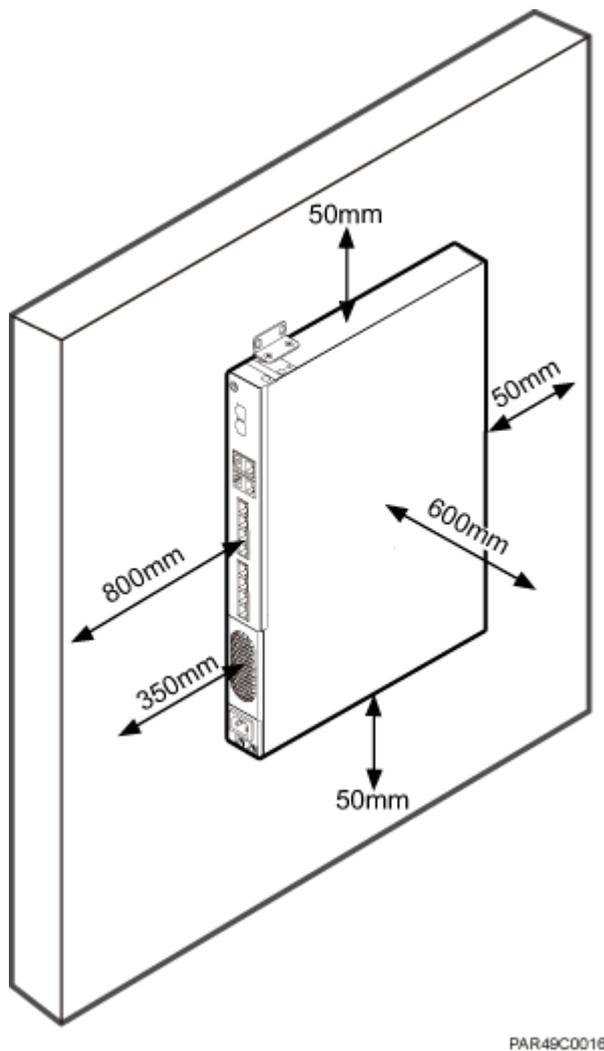
Figure 4-9 and Figure 4-10 shows the recommended and minimum installation clearance respectively when the RHUB is installed on a wall.

Figure 4-9 Recommended installation clearance for a wall-mounted RHUB (unit: mm)



PAR49C0016

Figure 4-10 Minimum installation clearance for a wall-mounted RHUB (unit: mm)



NOTICE

A clearance of 350 mm must be reserved in front of the air inlet of the fan of the power supply unit (PSU) for maintenance.

4.1.3 Installation Environment of an RHUB

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

RHUB Running Environment Specifications

Table 4-1 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 4-1 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

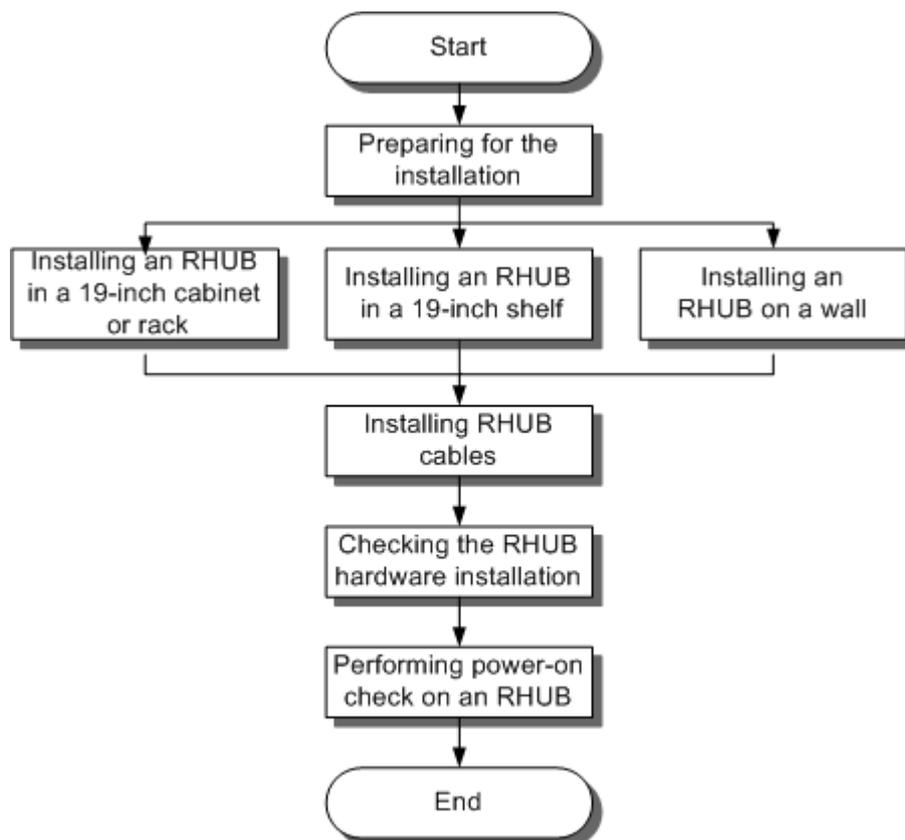
- The RHUB cannot be installed at an air outlet of the heat dissipation box of an air conditioner or other heat-generating appliances.
- The RHUB cannot be installed near a strong heat source.
- The RHUB cannot be installed in a position with water dripping, such as outdoor equipment of air conditioners, 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.
- 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.

4.2 Installation Process

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

Figure 4-11 shows the RHUB installation process.

Figure 4-11 RHUB installation process



4.3 Installing an RHUB

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

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

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

Procedure

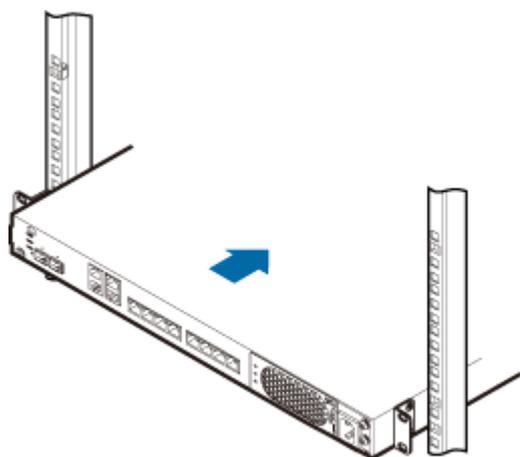
- The following describes how to install an RHUB with mounting ears in reverse mode:

NOTE

If necessary, request one more person for assistance.

1. 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 4-12**.

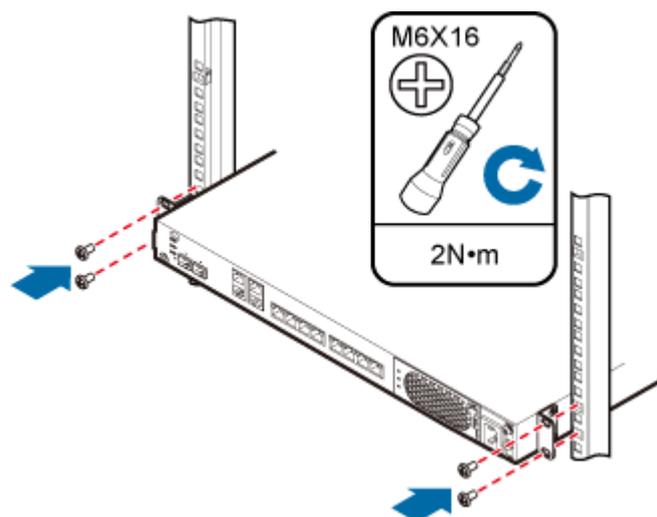
Figure 4-12 Pushing an RHUB into a cabinet



PAR49C0014

2. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 4-13](#).

Figure 4-13 Tightening screws



PAR49C0014

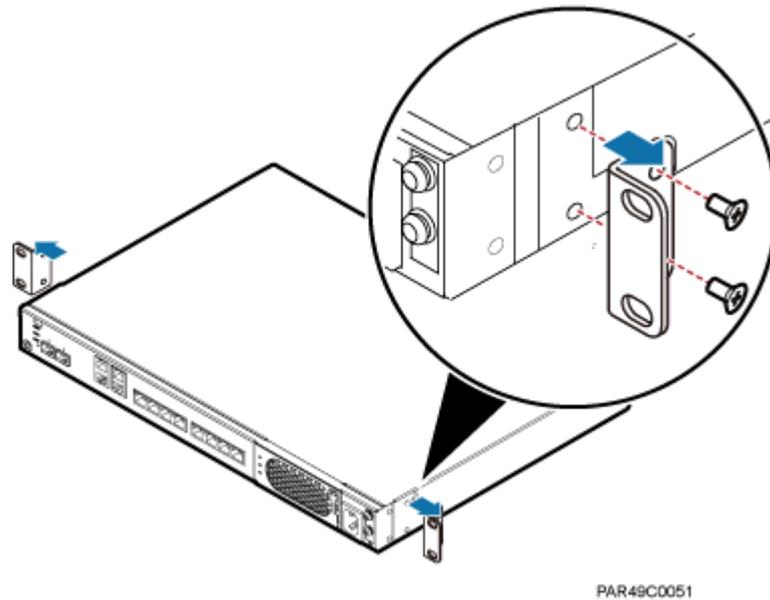
- The following describes how to install an RHUB with mounting ears aligned with the RHUB panel:

 **NOTE**

If necessary, request one more person for assistance.

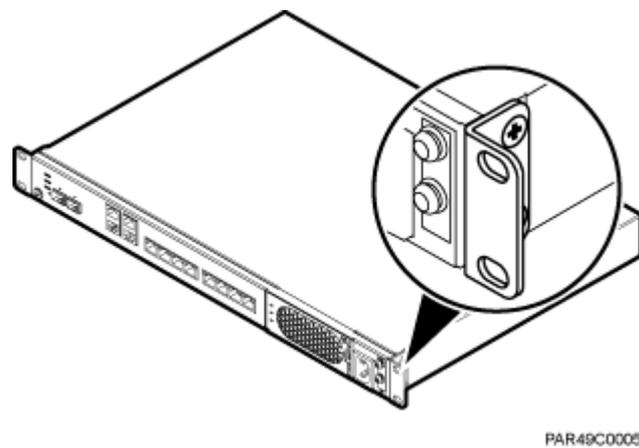
1. Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 4-14](#).

Figure 4-14 Removing mounting ears and screws



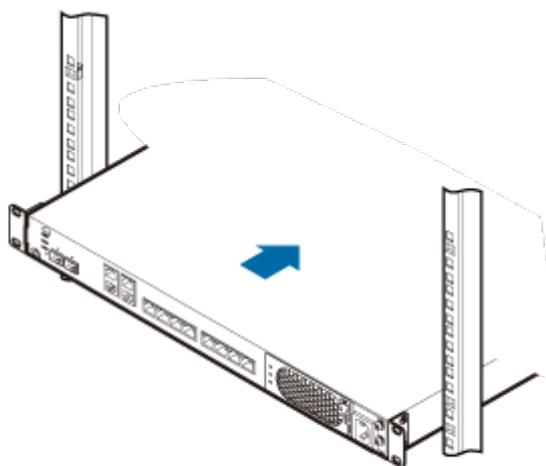
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in [Figure 4-15](#). The mounting ears must be aligned with the RHUB panel.

Figure 4-15 Installing mounting ears in standard mode



3. 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 4-16](#).

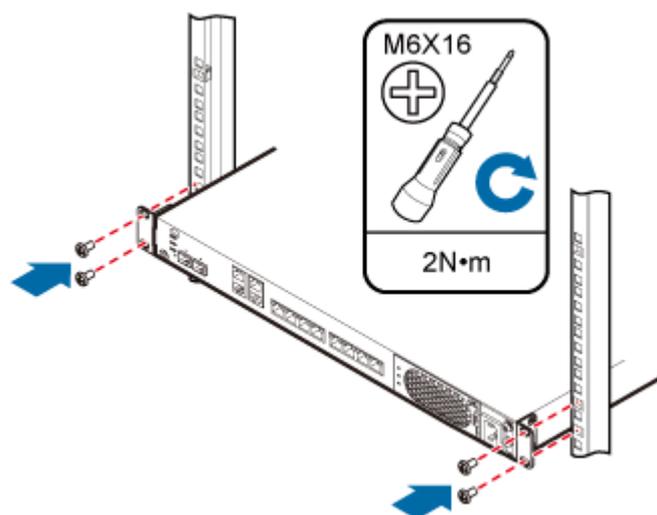
Figure 4-16 Pushing an RHUB into a cabinet



PAR49C0015

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

Figure 4-17 Tightening screws



PAR49C0015

----End

4.3.2 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

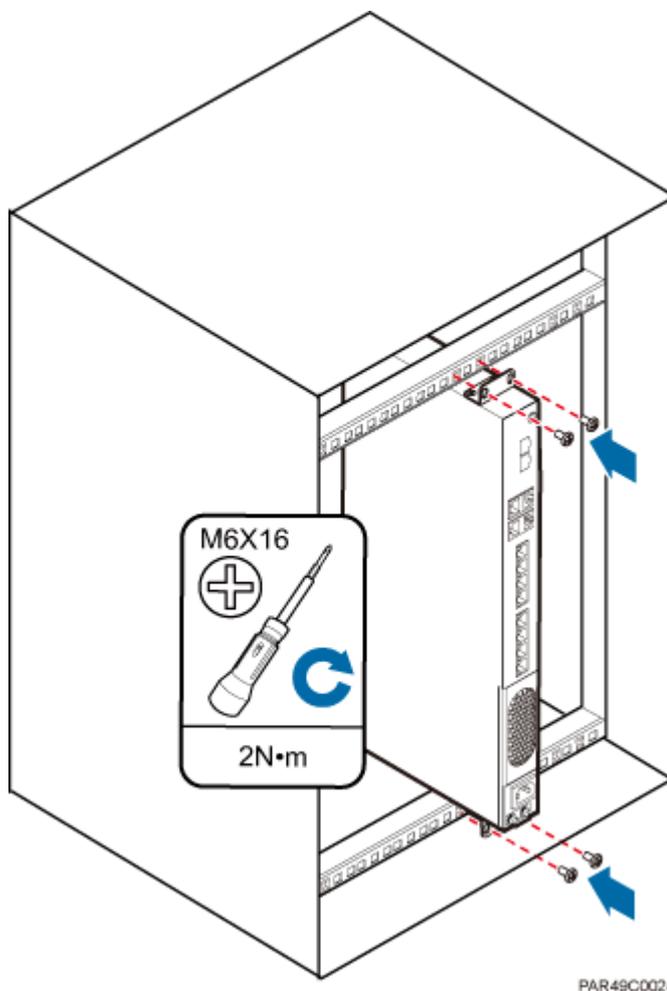
- The following describes how to install an RHUB with mounting ears installed in reverse mode:

 **NOTE**

If necessary, request one more person for assistance.

1. With one hand holding it, align the mounting holes with the installation holes, slowly push the RHUB into the required position in the shelf.
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 4-18](#).

Figure 4-18 Tightening screws



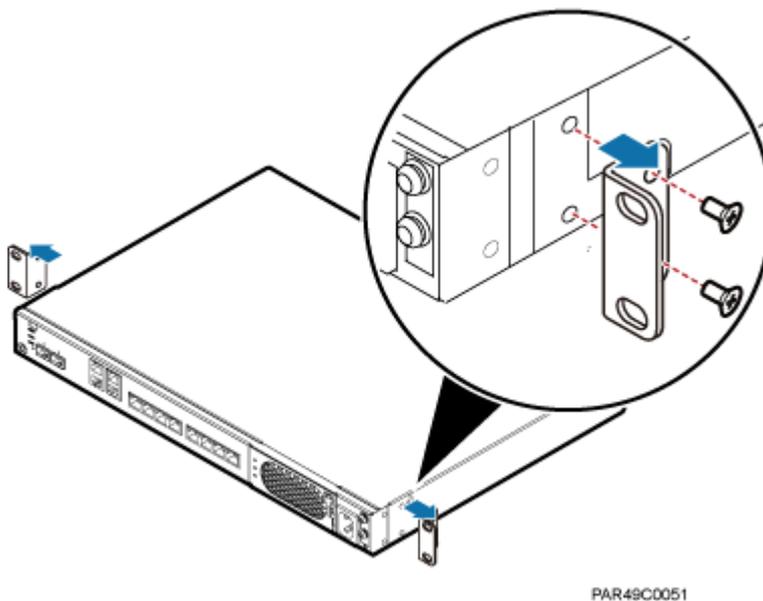
- The following describes how to install an RHUB with mounting ears installed in standard mode:

NOTE

If necessary, request one more person for assistance.

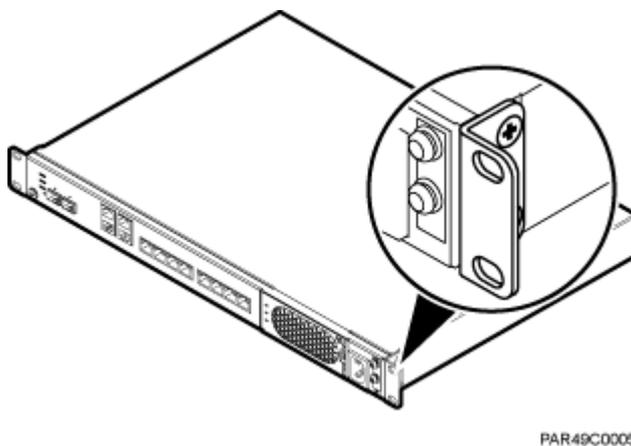
1. Remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 4-19](#).

Figure 4-19 Removing mounting ears and screws



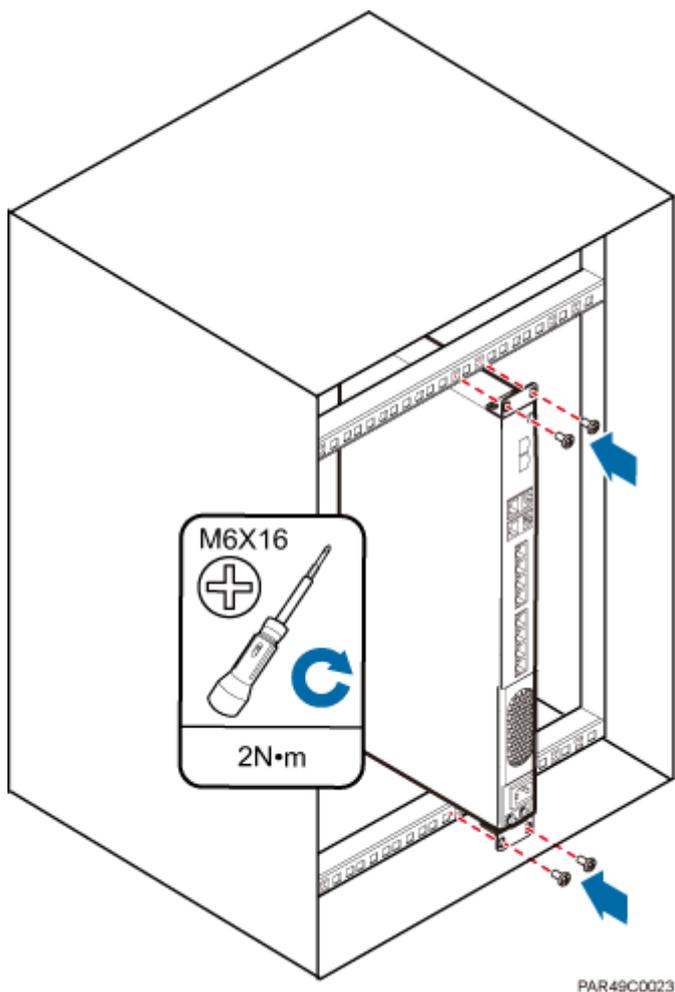
2. Use a torque screwdriver or Phillips screwdriver to tighten the four M4×8 screws with a torque of 1.4 N•m to install the removed mounting ears again, as shown in [Figure 4-20](#). The mounting ears must be aligned with the RHUB panel.

Figure 4-20 Installing mounting ears in standard mode



3. 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 .
4. Use a torque screwdriver or Phillips screwdriver to tighten the four M6×16 screws with a torque of 2 N•m, as shown in [Figure 4-21](#).

Figure 4-21 Tightening screws



---End

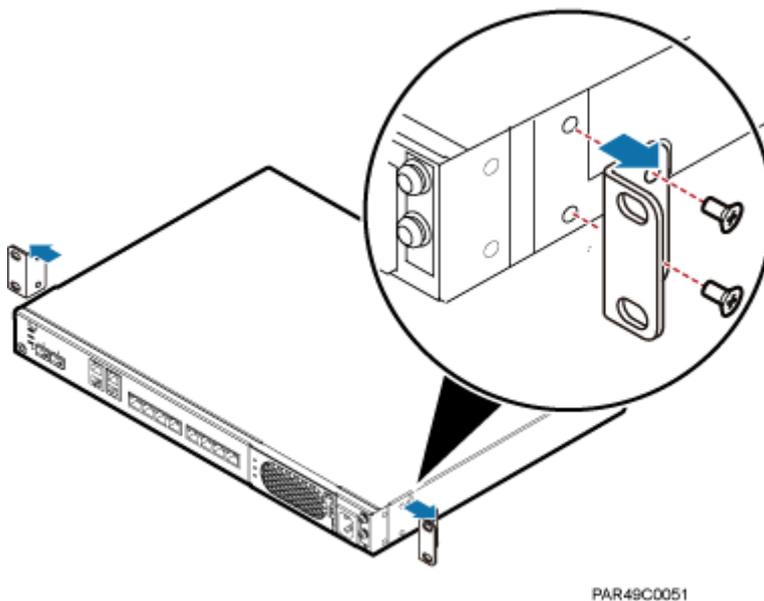
4.3.3 Installing an RHUB on a Wall

An RHUB can be installed on a wall.

Procedure

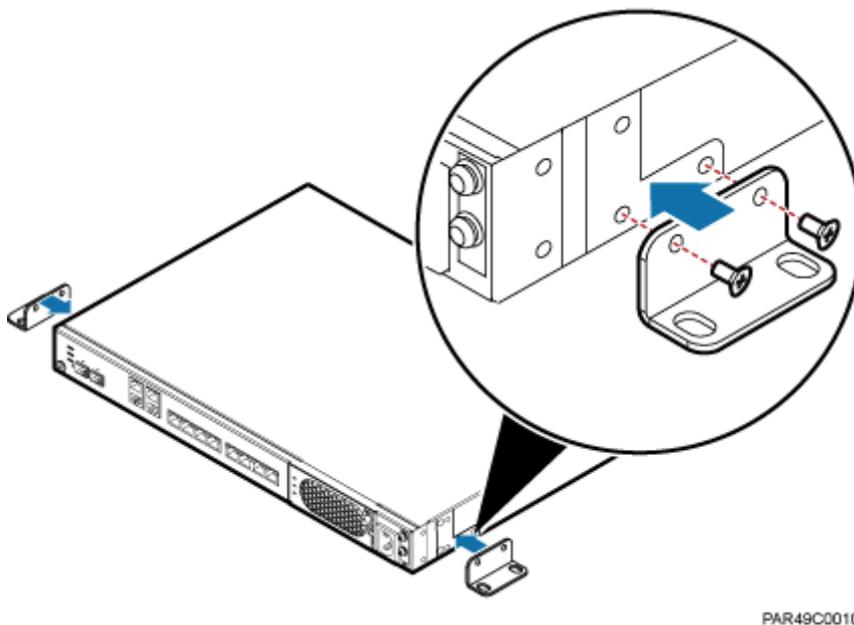
- Step 1** The mounting ears are installed in reverse mode by default. Before installing an RHUB on a wall, modify the installation mode of the mounting ears on the RHUB.
- Use a torque screwdriver or Phillips screwdriver to remove the mounting ears on both sides of the RHUB by removing the four M4×8 screws, as shown in [Figure 4-22](#).

Figure 4-22 Removing screws and mounting ears



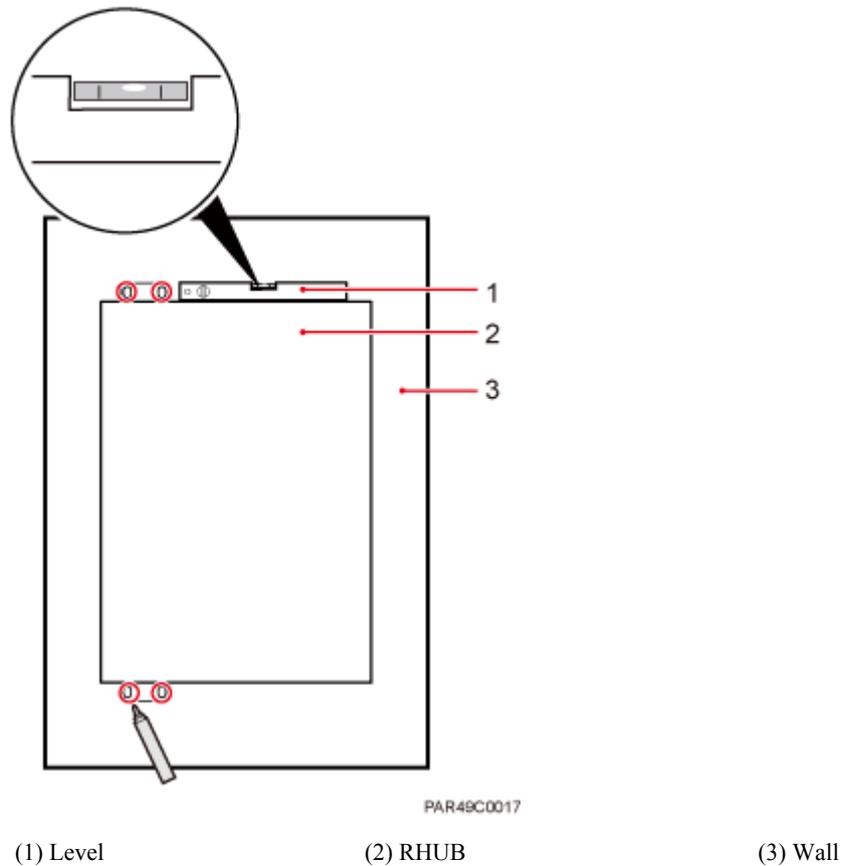
- Rotate the mounting ears 90 degrees clockwise, and use a torque screwdriver or Phillips screwdriver to secure the mounting ear with a torque of 1.4 N•m, as shown in **Figure 4-23**.

Figure 4-23 Installing mounting ears and screws



- Step 2** Determine the position on the wall for installing the RHUB based on the requirements in the engineering blueprint and **4.1.2 Installation Clearance Requirements of an RHUB**. 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 4-24**.

Figure 4-24 Anchor points for installing an RHUB on a wall

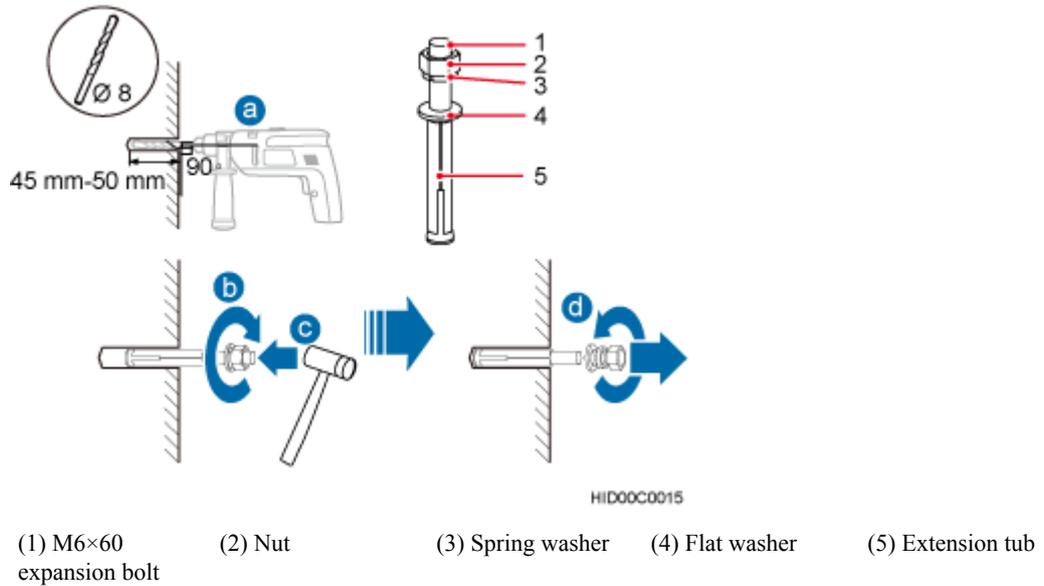


CAUTION

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 4-25](#).

Figure 4-25 Drilling holes and installing expansion bolts



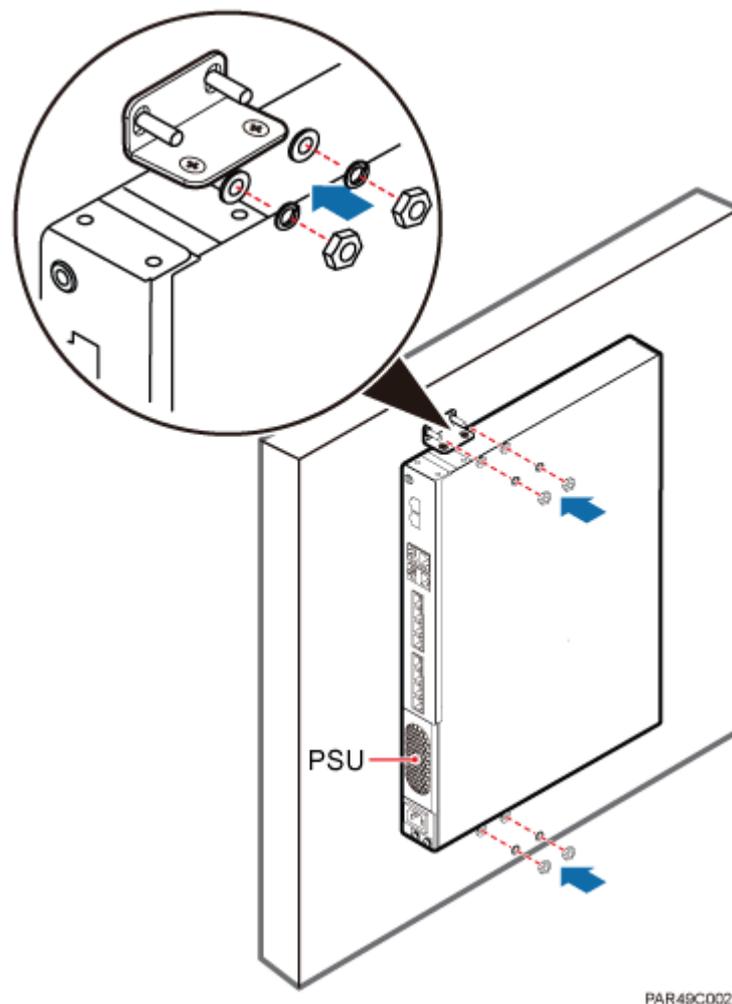
1. Use a hammer drill with bit 8 to drill holes with a diameter of 8 mm and a depth of 45 mm to 50 mm at the marked anchor points. All the holes have the same depth.
2. Use a vacuum cleaner to clear the dust inside and around each hole. If the distance between two holes is incorrect, mark and drill holes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

 **NOTICE**

After removing an expansion bolt, ensure that the top of the expansion sleeve is level with the wall. If it is not level, the 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 4-26](#).

Figure 4-26 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

4.4 Installing RHUB Cables

This section describes how to install cables for an RHUB.

4.4.1 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

Bending radius

- The bending radius of the 7/8" feeder and 5/4" feeder are greater than 250 mm and 380 mm, respectively.
- The bending radius of the 1/4" jumper, the 1/2" softer jumper, and the 1/2" common jumper are greater than 35 mm, 50 mm, and 127 mm, respectively.
- The bending radius of a power cable or a protection ground (PGND) cable is at least three times the diameter of the cable.
- The bending radius of an optical cable is at least 20 times the diameter of the optical cable, and the minimum bending radius of the branch at each end of the optical cable is 30 mm.
- The bending radius of an E1/T1 cable is at least three times the diameter of the cable.
- The bending radius of an E1/T1 cable is 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

- 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

Power cable

- Positions for routing power cables meet requirements of the engineering design.
- If the length of a power cable is insufficient, the cable is replaced with a new one and no joint or solder joint is allowed on the original cable.
- Cables are routed only by qualified and trained personnel before all preparations are made.
- Cables are routed in an untangled and orderly fashion.
- If DC power cables need to be routed on the tower platform, the cables are routed along the inner side of the guard rail and the distance between the guard rail and the cable is short.
- If DC power cables need to be routed close to a device on the tower, the 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 cables.

PGND cable

- PGND cables for a base station are connected to the same ground bar.
- 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

- A minimum of three qualified or trained personnel are required to route optical cables.
- The ambient temperature for optical cables ranges from -40°C to $+60^{\circ}\text{C}$. If the actual temperature is not within the range, preventive measures are taken or a new cabling route is required.
- 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.
- 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.

4.4.2 RHUB Cable List

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

Table 4-2 lists RHUB cables.

Table 4-2 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
RHUB 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
		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
		CPRI0 or CPRI1 port on the RHUB	FC connector, SC connector, or LC connector	ODF
Ethernet cable	RJ45 connector	CPRI_E0~CPRI_E7 port on the RHUB	RJ45 connector	CPRI_E0~CPRI_E1 port on the pRRU
(Optional) RHUB alarm cable	RJ45 connector	EXT_ALM port on the RHUB	Bare end	Alarm signal port of the backup power system

 **NOTE**

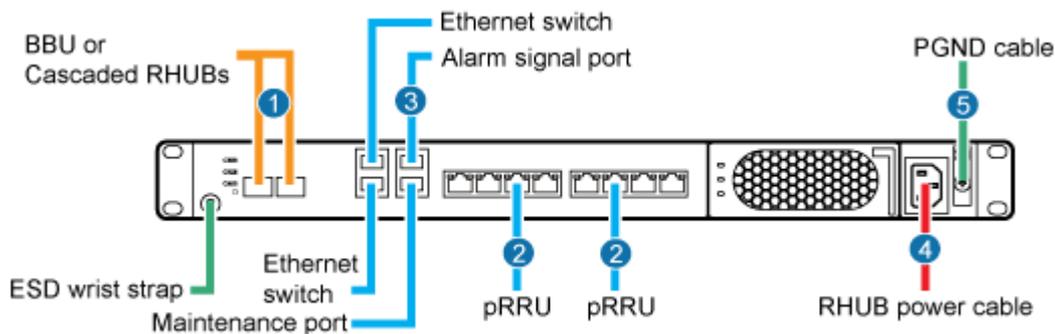
- If one end of the CPRI cable is connected to the DLC connector, the other end connects the BBU, or RHUB through the DLC connector. If one end of the CPRI cable is connected to the ODF adapter, the other end connects the BBU or RHUB through a connector corresponding to the adapter. The connectors include 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.

4.4.3 Cable Connections

This section describes the cable connections for an RHUB.

Figure 4-27 shows the cable connections for an RHUB. The port connected to the Ethernet switch serves as a reserved port.

Figure 4-27 Cable connections for an RHUB



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

NOTE

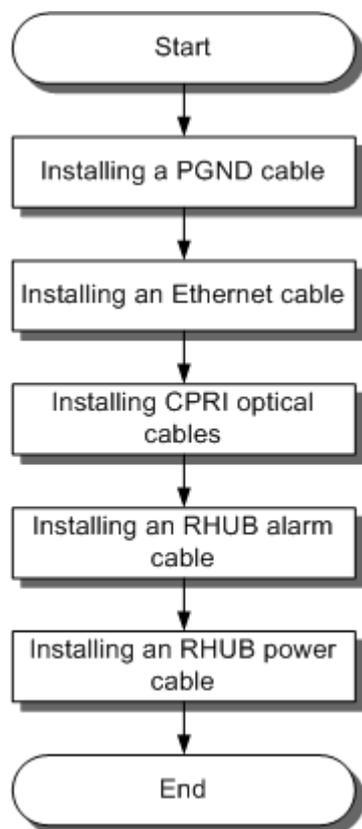
The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.

4.4.4 RHUB Cable Installation Process

This section describes the process of installing RHUB cables.

Figure 4-28 shows the RHUB cable installation process.

Figure 4-28 RHUB cable installation process



4.4.5 Installing an RHUB 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 4-29 Exterior of a PGND cable



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

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

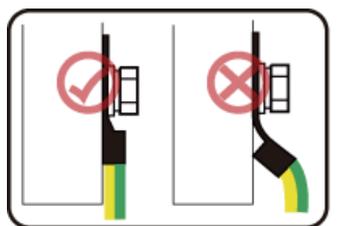
 **NOTE**

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

 **NOTICE**

- Ensure proper grounding of the RHUB using a PGND cable.
 - When installing the PGND cable, tightly press the OT terminal in the correct direction, as shown in [Figure 4-30](#).
-

Figure 4-30 Correct direction of an OT terminal for the PGND cable

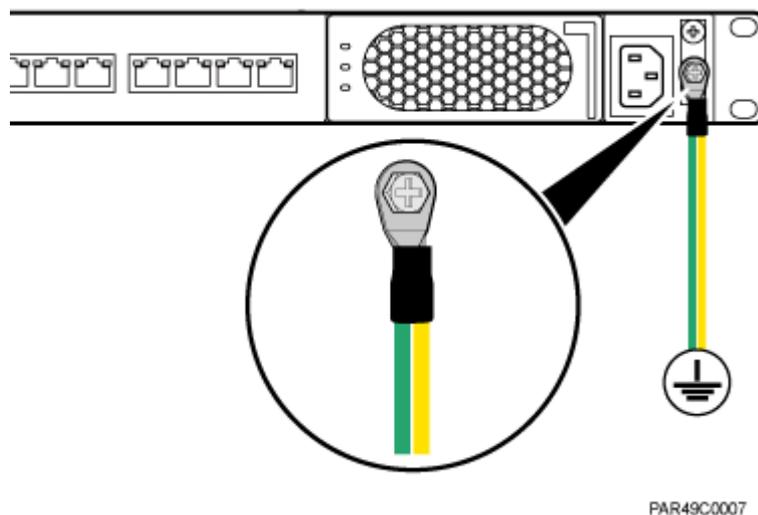


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Procedure

- Step 1** Route the PGND cable by referring to [4.4.1 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 4-31](#).

Figure 4-31 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

4.4.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.
- Cables of Category 5e (enhanced) or higher specification is used for connecting the RHUB and pRRU. With the internal PoE module providing power, the distance of the pRRU and RHUB can be extended by the Extender up to a total distance of 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.

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.

NOTE

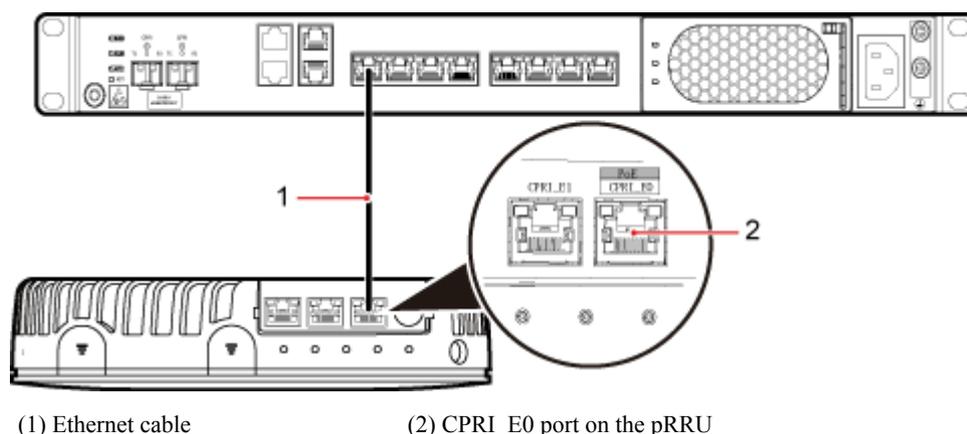
- A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. This section uses the pRRU with three transmission ports as an example.
- Using the CPRI_E1 port on the pRRU has the same Ethernet cable connection to the RHUB as using the CPRI_E0 port. The following section describes the connection using the CPRI_E0 port.

Procedure

- Step 1** Remove the dustproof cap of the CPRI_E0 port on the pRRU.

- Step 2** Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU panel.
- 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.
- Step 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 4-32](#).

Figure 4-32 Install an Ethernet cable between an RHUB and a pRRU.



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.

---End

4.4.7 Installing CRPI 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 Networking* in *LampSite Technical Description* and *CPRI Optical Fiber* in *LampSite Hardware Description*.
- An optical module to be installed must match the rate of its corresponding port.

NOTICE

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

Procedure

- Step 1** Install an optical module, as shown in [Figure 4-33](#) and [Figure 4-34](#).
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, BBU or ODF.
 5. Raise the puller of the optical module.

Figure 4-33 Removing the dust-proof cap from a port

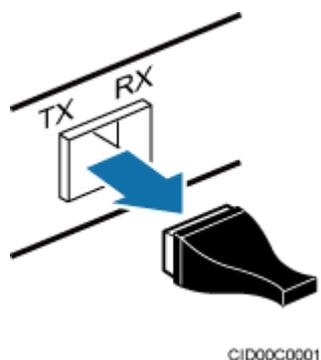
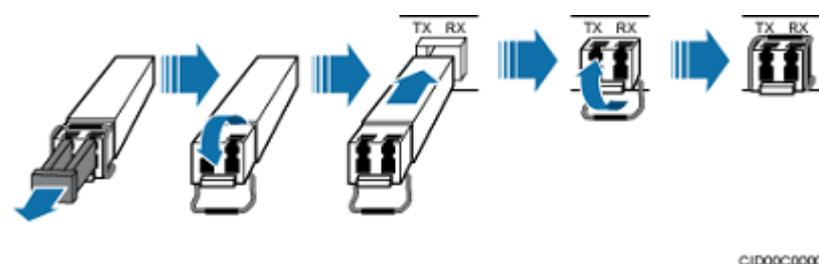


Figure 4-34 Installing an optical module



- Step 2** Install a CPRI optical cable, as shown in [Figure 4-35](#).
1. Remove the dust-proof cap from the optical cable connector.
 2. Install the optical cables by referring to [Table 4-3](#).

Table 4-3 CPRI optical cable connections

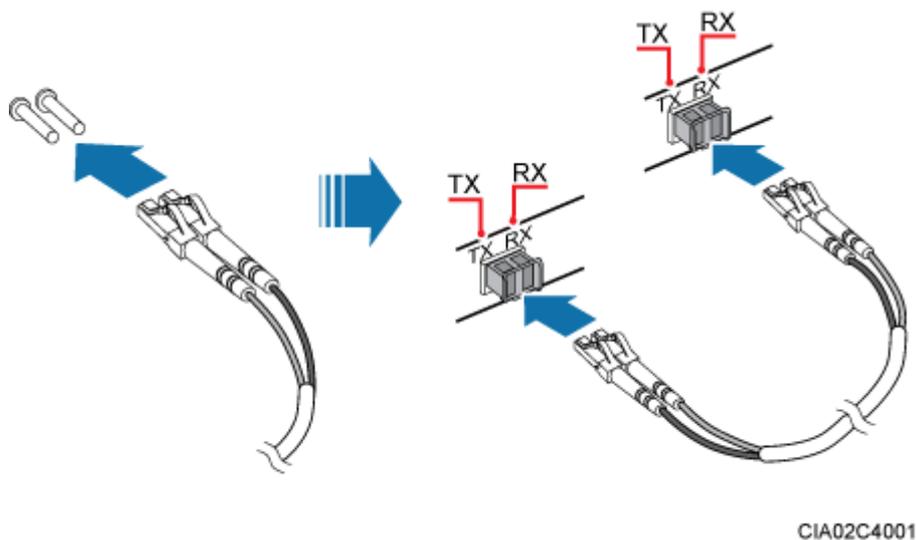
One End		The Other End	
Connector	Connected to	Connector	Connected to
DLC connector	BBU/ LBBP&WBBP&UBBP/ CPRI port	DLC connector	CPRI0 or CPRI1 port on the RHUB
	CPRI0 or CPRI1 port on the RHUB		CPRI0 or CPRI1 port on the RHUB

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

 **NOTE**

- 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 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 4-35** shows how to install a CPRI optical cable for connecting the BBU and RHUBs.

Figure 4-35 Installing an CRPI optical cable



Step 3 Route the cable, and then use a cable tie to bind the cable. For details, see [4.4.1 Requirements for Cable Layout](#).

Step 4 Label the installed cable. For details, see section Attaching an L-Shaped Label in the *Installation Reference*.

----End

4.4.8 Installing an RHUB Alarm Cable (Optional)

An RHUB alarm cable transmits dry node alarm signals.

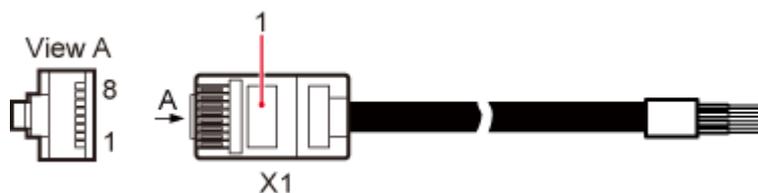
Prerequisites

Connectors for an alarm cable are prepared.

Context

Figure 4-36 shows the exterior of an RHUB alarm cable. **4.4.2 RHUB Cable List** shows the installation position on both ends of the RHUB cable.

Figure 4-36 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

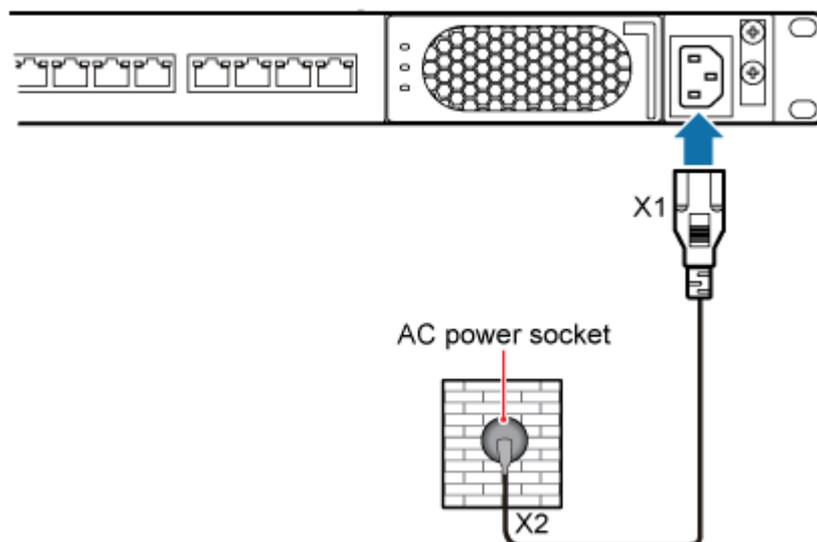
4.4.9 Installing an RHUB Power Cable

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

Procedure

- Step 1** Route the power cable by referring to **4.4.1 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 4-37**.
- Step 3** Connect the power connector on the X2 end to the external power supply port, as shown in **Figure 4-37**.

Figure 4-37 Installing an RHUB power cable



---End

4.5 Checking the RHUB Hardware Installation

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

Table 4-4 lists the hardware installation checking items.

Table 4-4 Hardware installation checking list

No.	Item
1	The position for each device conforms to the engineering design and meets the space requirement.
2	Ensure that the 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 4-5 lists the checking list of the power cable and PGND cable connections.

Table 4-5 Checklist for power cable and PGND cable connections

No.	Item
1	The power cables and PGND cables comply with the requirements of local regulations.

No.	Item
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 4-6 lists the check items of the signal cable connection.

Table 4-6 Checklist for the signal cable connection

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

Table 4-7 lists the checking items for other cable connections.

Table 4-7 Checklist for other cable connections

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

4.6 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



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.

---End

5 Installing a pRRU

About This Chapter

This chapter describes the pRRU installation process. A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. Unless otherwise specified, this document uses the pRRU with three transmission ports as an example.

[5.1 Information About the Installation](#)

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

[5.2 Obtaining the MAC Address \(Optional\)](#)

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

[5.3 Installation Process](#)

This section describes the pRRU installation process, which involves installing a pRRU, the AC/DC power adapter, and cables, checking the pRRU hardware installation, and powering on the pRRU.

[5.4 Installing a pRRU](#)

This section describes the pRRU installation process. A pRRU can be installed on a wall, ceiling, indoor metal pole, or keel. A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. Unless otherwise specified, this document uses the pRRU with three transmission ports as an example.

[5.5 Installing the AC/DC Power Adapter \(Optional\)](#)

The pRRU can obtain power supply using the AC/DC power adapter, which is used as required. An AC/DC power adapter is small and can be installed on a wall or pole. When it is installed, a support for it is required.

[5.6 Installing the Extender \(Optional\)](#)

This section describes the Extender installation process.

[5.7 Installing pRRU Cables](#)

This section describes the procedure of installing the pRRU cables.

5.8 Checking the pRRU Hardware Installation

pRRU hardware installation checking includes hardware and cable installation checking.

5.9 Powering on the pRRU

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

5.1 Information About the Installation

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

5.1.1 pRRU Product Family

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

Table 5-1 lists the pRRU product family.

Table 5-1 pRRU product family

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

5.1.2 pRRU Installation Scenario

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

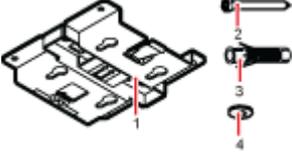
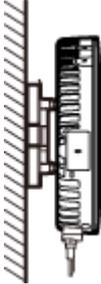
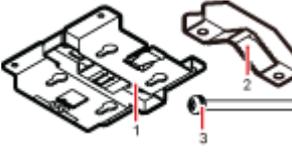
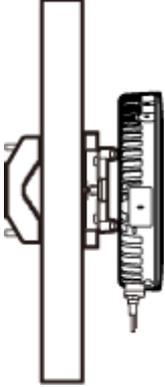
Installing a pRRU on a wall

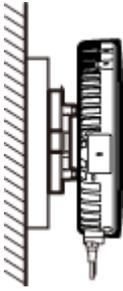
 **NOTE**

- 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 5-2](#).

Table 5-2 Wall-mounted suggestion

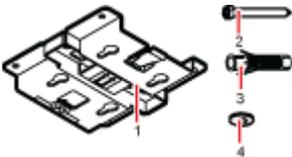
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
<p>Installing the pRRU on a wall by drilling holes</p> <p>For details, see 5.4.2 pRRU Installed on a Wall.</p>	<ul style="list-style-type: none"> ● The wall can bear a load at least four times the weight of a pRRU. ● The screws must be tightened with a torque of 10 N·m. This ensures the screws work properly and the wall remains intact without cracks in it. 	<ol style="list-style-type: none"> 1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	
<p>Installing the pRRU on a wall using a V clamp through an attachment plate</p> <p>For details, see 5.4.5 pRRU Installed on a Plate.</p>	<ul style="list-style-type: none"> ● The wall can bear a load at least four times the weight of a pRRU. ● The thickness of the wall is less than the bolt length (80 mm). 	<ol style="list-style-type: none"> 1. Plate 2. V clamp 3. Bolt (M6X80) 	

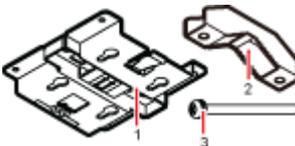
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a wall using a plate on a metal wall	<ul style="list-style-type: none"> ● The wall cannot bear a load at least four times the weight of the pRRU. For example, EPS walls, MDF walls, or walls cannot be drilled. ● The wall is too thick to drill, and the pRRU cannot be installed on a wall using a V clamp through an attachment plate. 	The plate is prepared by customers.	

Installing a pRRU on a ceiling

When a pRRU is installed on a ceiling, installation modes vary with the quality of the ceiling, as shown in [Table 5-3](#).

Table 5-3 Ceiling-mounted suggestion

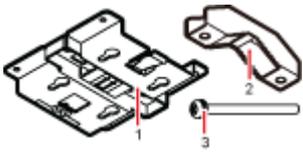
Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a ceiling by drilling holes For details, see 5.4.3 pRRU Installed on a Ceiling .	<ul style="list-style-type: none"> ● The ceiling, such as a concrete ceiling, can bear a load at least four times the weight of the pRRU. ● The screws must be tightened with a torque of 10 N·m. This ensures the screws work properly and the ceiling remains intact without cracks in it. 	<ol style="list-style-type: none"> 1. Plate 2. Screw (M6X50) 3. Plastic expansion sleeve 4. Flat washer 	

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
<p>Installing the pRRU on a ceiling using a V clamp through an attachment plate</p> <p>For details, see 5.4.5 pRRU Installed on a Plate.</p>	<ul style="list-style-type: none"> ● 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 the bolt length (80 mm). 	<p>1. Plate 2. V clamp 3. Bolt (M6X80)</p> 	
<p>Installing the pRRU on a pole</p> <p>For details, see 5.4.4 pRRU Installed on a Pole.</p>	<p>A pole under the ceiling can bear a load at least four times the weight of the pRRU.</p>	<p>For details, see Table 5-4.</p>	<p>For details, see Table 5-4.</p>
<p>Installing the pRRU on a keel</p> <p>For details, see 5.4.6 pRRU Installed on a Keel.</p>	<p>A keel under the ceiling can bear a load at least four times the weight of the pRRU.</p>	<p>For details, see Table 5-5.</p>	<p>For details, see Table 5-5.</p>

Installing the pRRU on a pole

When a pRRU is installed on a pole, installation modes vary with the diameter of the pole, as shown in [Table 5-4](#).

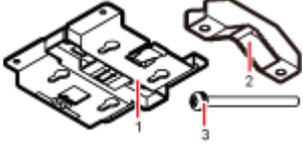
Table 5-4 Pole-mounted suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a pole For details, see 5.4.4 pRRU Installed on a Pole .	The diameter of the pole ranges from 30 mm to 70 mm.	<ol style="list-style-type: none"> 1. Plate 2. V clamp 3. Bolt (M6X80) 	
	The diameter of the pole ranges from 70 mm to 110 mm.	<ol style="list-style-type: none"> 1. Plate 2. Hose clamp, which is prepared by the customer 	

Installing the pRRU 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 5-5 Keel-mounted installation suggestion

Installation Mode	Requirements	Mounting Brackets	Installation Diagram
Installing the pRRU on a keel For details, see 5.4.6 pRRU Installed on a Keel .	The keel is in U-shape, T-shape, H-shape, or other shapes.	<ol style="list-style-type: none"> 1. Plate 2. V clamp 3. Bolt (M6X80) 	 <p>shows the pRRU installed on a U-shaped keel.</p>

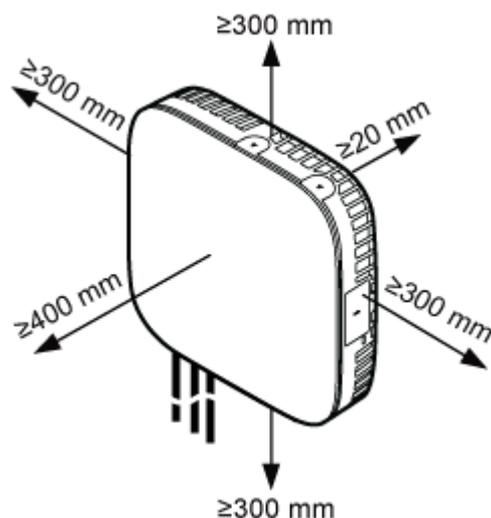
5.1.3 Space Requirements

pRRU Space Requirements

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 5-1 shows the recommended space requirements of the pRRU when the external antenna is required.

Figure 5-1 Recommended space requirements of the pRRU

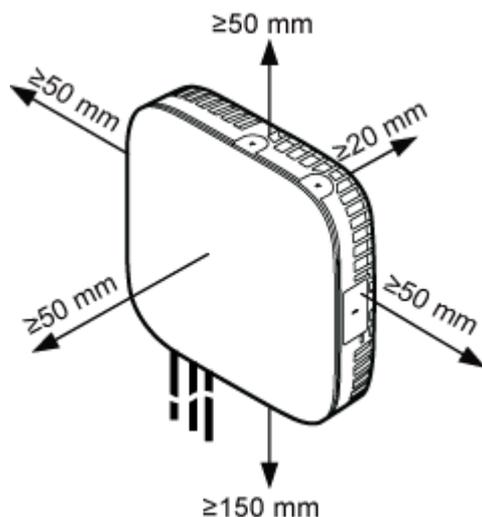


When the external antenna is required, the recommended space for installing a single pRRU is described as follows:

- 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 20 mm on the back of the pRRU is reserved for ventilation.

Figure 5-2 shows the minimum space requirements of the pRRU when the external antenna is not required.

Figure 5-2 Minimum space requirements of the pRRU



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

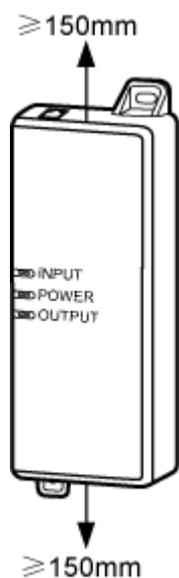
- At least 50 mm above the pRRU is reserved for maintenance.
- At least 150 mm under the pRRU is reserved for cabling.
- At least 50 mm on the left of the pRRU is reserved for maintenance.
- At least 50 mm on the right of the pRRU is reserved for maintenance.
- At least 50 mm in front of the pRRU for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

Extender Space Requirements

Only space above and under the Extender is required to be reserved when installing the Extender.

Figure 5-3 shows the recommended space requirements of the Extender.

Figure 5-3 Recommended space requirements of the Extender



The recommended space for installing the Extender is described as follows:

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

5.1.4 pRRU Installation Environment Requirements

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

pRRU Running Environment Specifications

Table 5-6 shows the environment specifications for the pRRU installed indoors.

Table 5-6 pRRU environment specifications

Specifications	Condition	Remarks
Operating temperature	-5°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 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.
- 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.

5.2 Obtaining the MAC Address (Optional)

Before installing a pRRU, record the media access control (MAC) address, which will be used during pRRU commissioning. This section applies only when a pRRU 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.

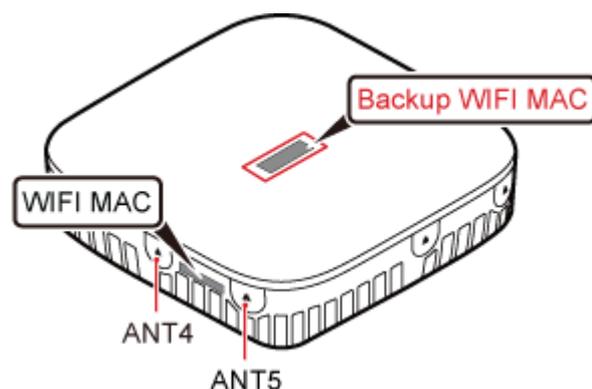
Procedure

- Step 1** Remove the backup WIFI MAC label from the front housing of the pRRU and keep them secure, as shown in [Figure 5-4](#).

 **NOTE**

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

Figure 5-4 Removing backup WIFI MAC label



- Step 2** Save the MAC according to [6.1 MAC Collection Template](#), and report it to the pRRU commissioning personnel.

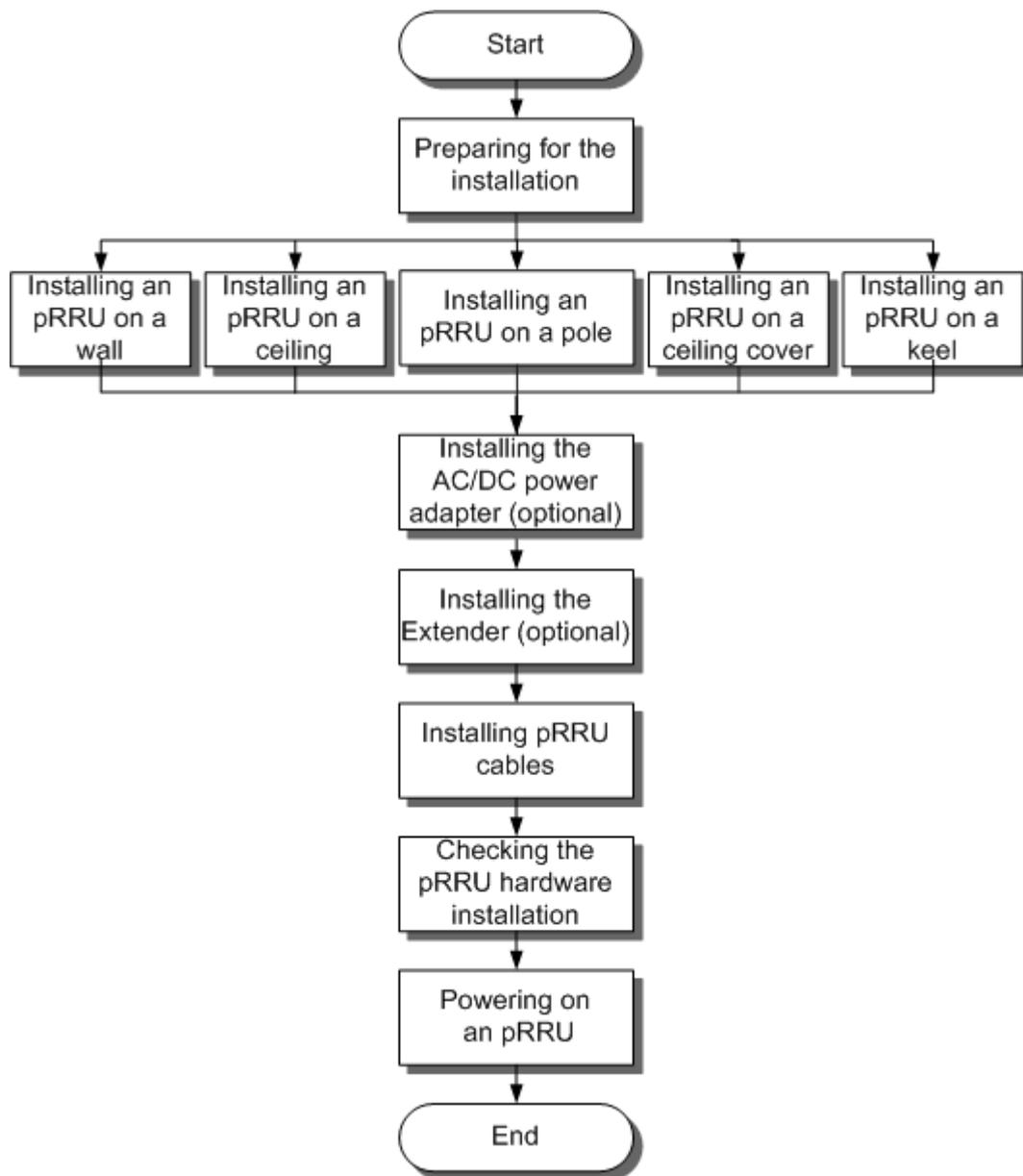
----End

5.3 Installation Process

This section describes the pRRU installation process, which involves installing a pRRU, the AC/DC power adapter, and cables, checking the pRRU hardware installation, and powering on the pRRU.

[Figure 5-5](#) shows the pRRU installation process.

Figure 5-5 pRRU installation process



5.4 Installing a pRRU

This section describes the pRRU installation process. A pRRU can be installed on a wall, ceiling, indoor metal pole, or keel. A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. Unless otherwise specified, this document uses the pRRU with three transmission ports as an example.

 **NOTE**

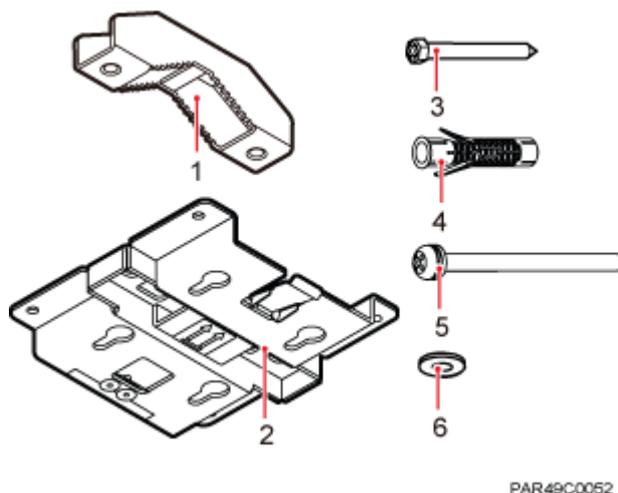
- The pRRU cannot be grounded. If the pRRU is grounded but the RHUB connected to this pRRU is not, the pRRU may fail to be powered on.
- A minimum distance of 50 cm must be reserved between the pRRU and the incandescent lamp.
- The installation spacing between the pRRU and the temperature sensor must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

5.4.1 pRRU Installation Kits

This section describes the pRRU installation kits.

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

Figure 5-6 pRRU installation kits

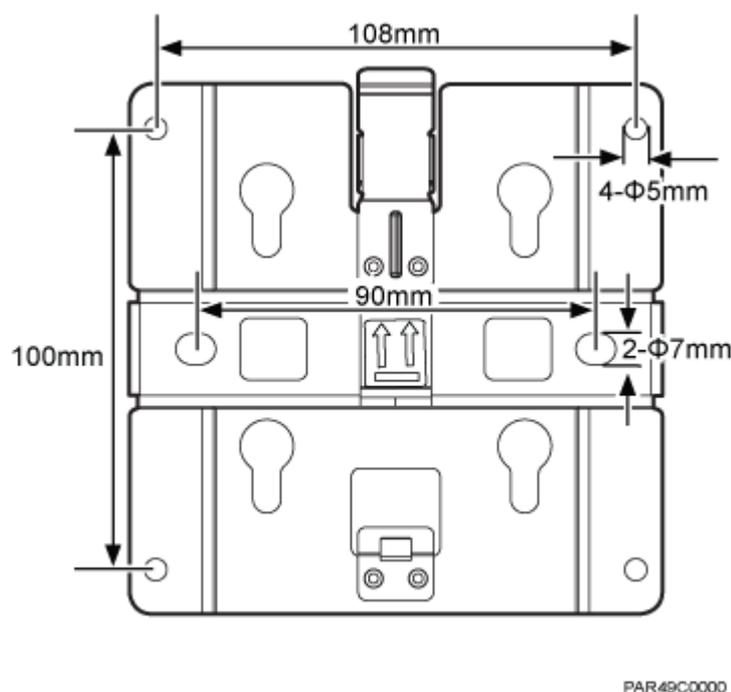


PAR49C0052

- | | | |
|------------------------------|------------------|-------------------|
| (1) V clamp | (2) Plate | (3) Screw (M6x50) |
| (4) Plastic expansion sleeve | (5) Bolt (M6x80) | (6) Flat washer |

The following figure shows the specifications of the installation plate.

Figure 5-7 Plate specifications



5.4.2 pRRU Installed on a Wall

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

Context



NOTICE

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

Procedure

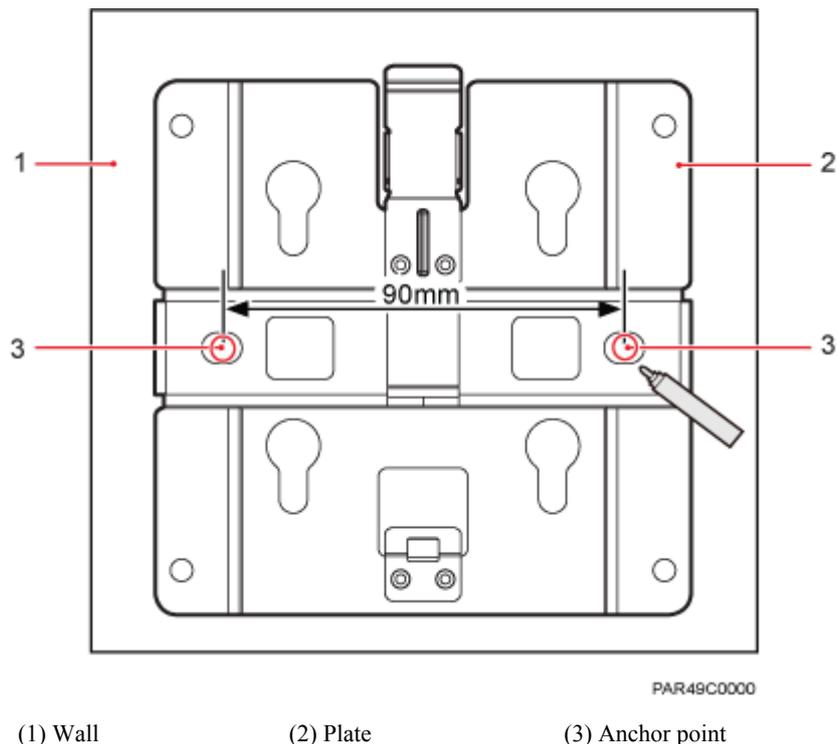
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the space requirements.

 **NOTE**

For pRRU installation space requirements, see [5.1.3 Space Requirements](#).

- Step 2** Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 5-8](#).

Figure 5-8 Anchor points of the pRRU installation kits (unit: mm)

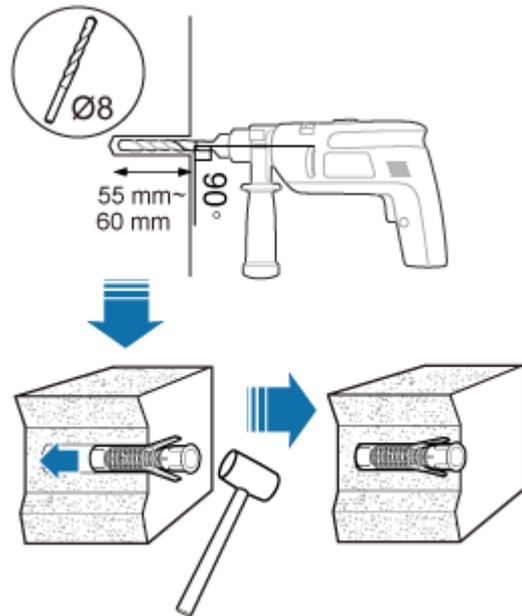


CAUTION

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

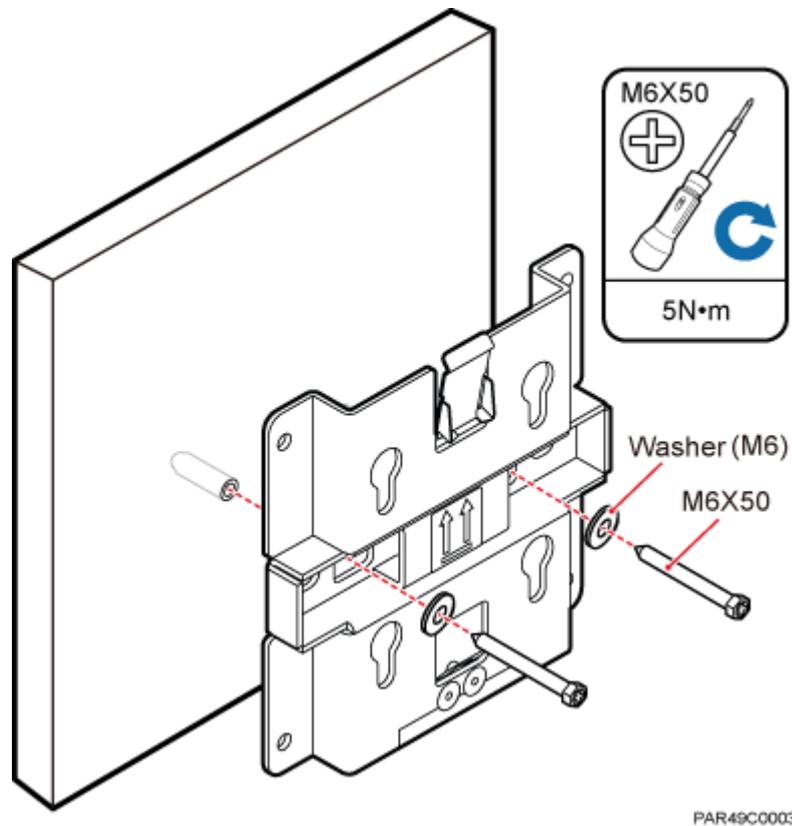
- Step 3** Use a hammer drill with a $\phi 8$ bit to drill holes at the marked anchor points as shown in as shown in [Figure 5-9](#). Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 5-9 Drilling holes and installing expansion bolts



Step 4 Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and tighten the screw to a torque of 5 N•m, as shown in [Figure 5-10](#).

Figure 5-10 Installing the plate



 **NOTE**

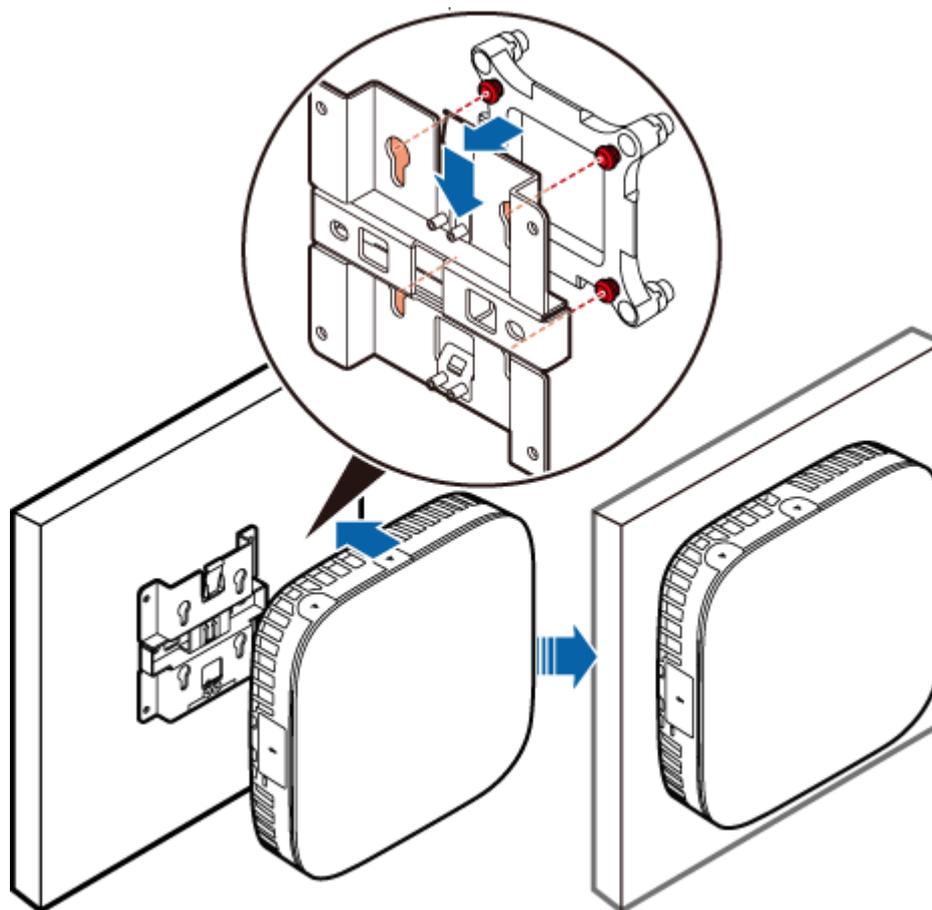
If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

Step 5 Fit the four hooks of the pRRU into the installation kits, as shown in **Figure 5-11**. If the hooks are properly installed, a slight clack can be heard.

 **NOTE**

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

Figure 5-11 Installing the pRRU on a plate



PAR49C0003

---End

5.4.3 pRRU Installed on a Ceiling

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

Context

NOTICE

If the pRRU is installed on the 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

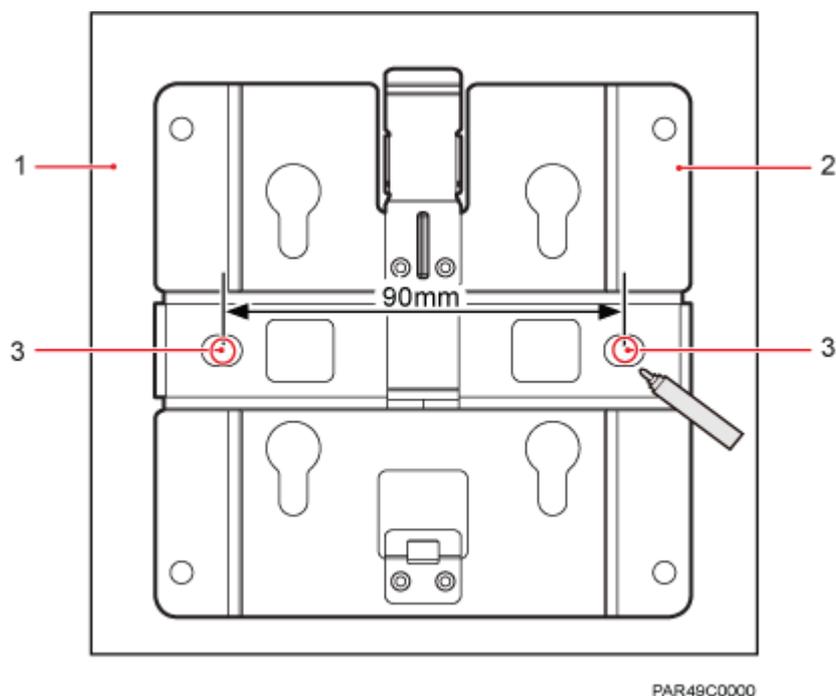
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the space requirements.

 NOTE

For pRRU installation space requirements, see [5.1.3 Space Requirements](#).

- Step 2** Place the plate in the installation position against the ceiling. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 5-12](#).

Figure 5-12 Anchor points of the pRRU installation kits (unit: mm)



(1) Ceiling

(2) Plate

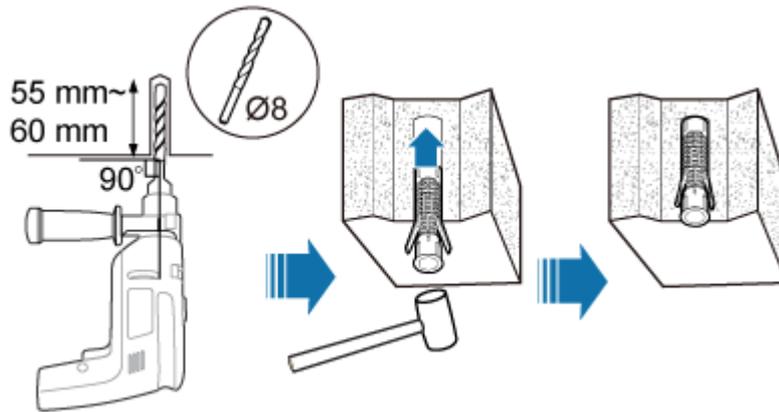
(3) Anchor point of the bolt

CAUTION

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

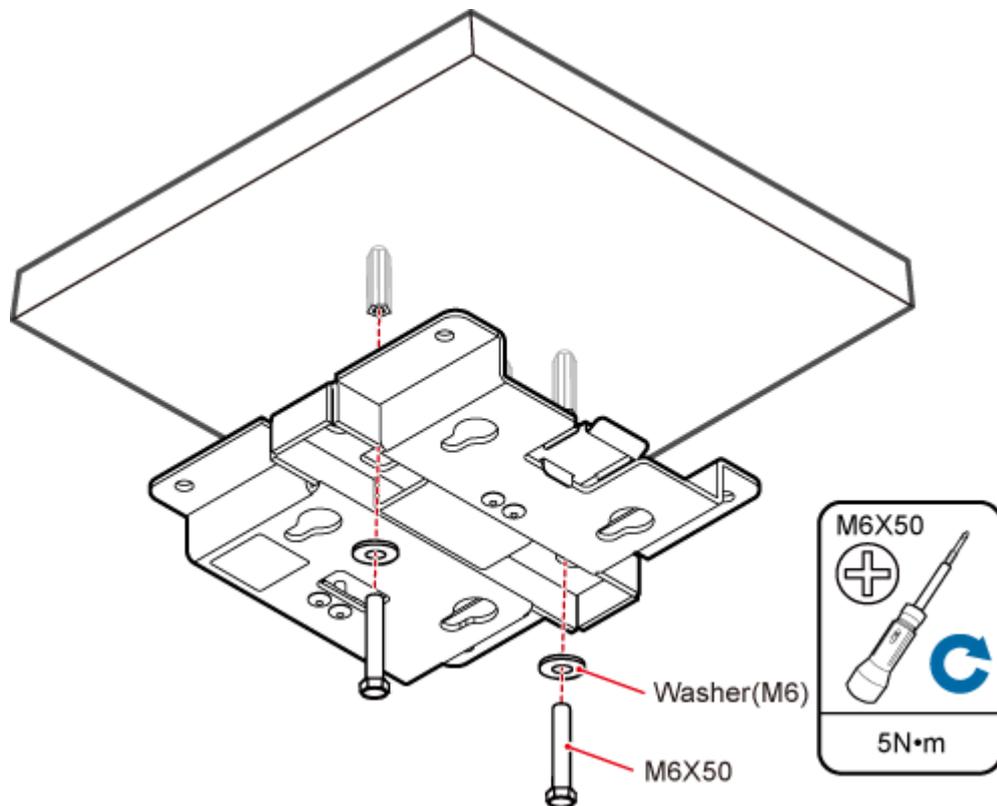
- Step 3** Use a hammer drill with a $\phi 8$ bit to drill holes at the marked anchor points as shown in as shown in **Figure 5-13**. Use the cleaner to clean the dust inside and around the holes and measure the distance between them. If they are inaccurately positioned, re-measure and re-drill the holes. Then, use a rubber mallet to push the two plastic expansion sleeve into the holes.

Figure 5-13 Drilling holes and installing expansion bolts



- Step 4** Lead the M6x50 screw through the washer, and then through the drilling holes of the plate to the plastic expansion sleeve, and use a torque screwdriver to tighten the screw with a torque of 5 N•m, as shown in **Figure 5-14**.

Figure 5-14 Installing the plate



NOTE

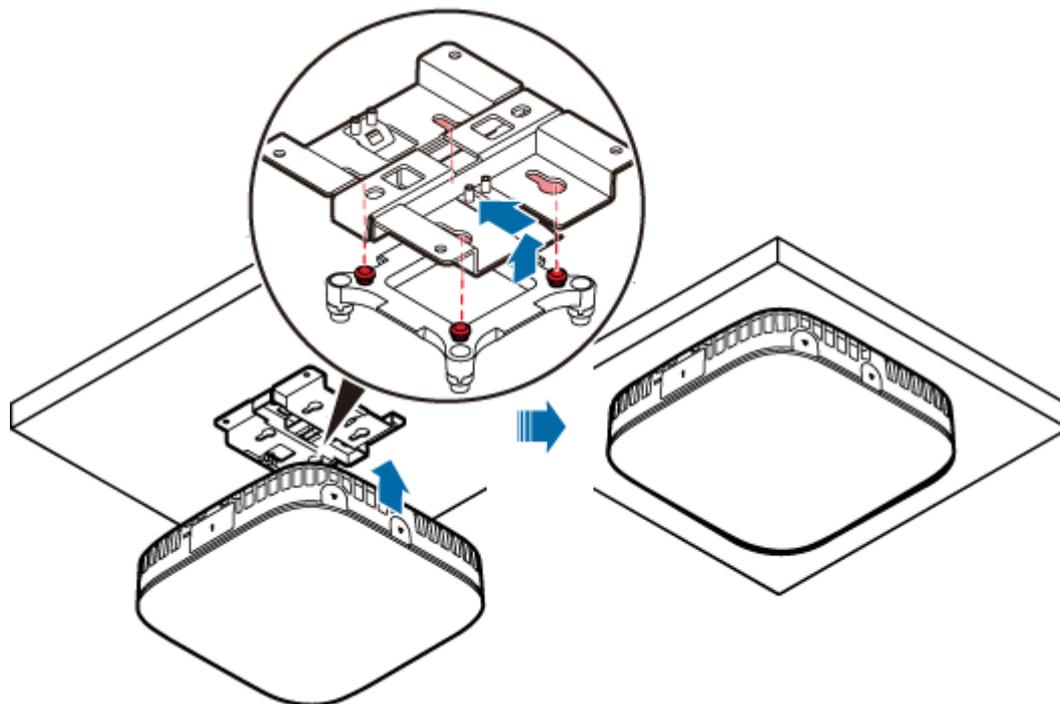
If the screws cannot be tightened using a Phillips screwdriver, use a hex key or an electric screwdriver to assist the installation.

- Step 5** Fit the four hooks of the pRRU into the installation kits, as shown in [Figure 5-15](#). If the hooks are properly installed, a slight clack can be heard.

 **NOTE**

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

Figure 5-15 Installing a pRRU



PAR49C0037

----End

5.4.4 pRRU Installed on a Pole

A pRRU can be installed on a metal pole indoors.

Procedure

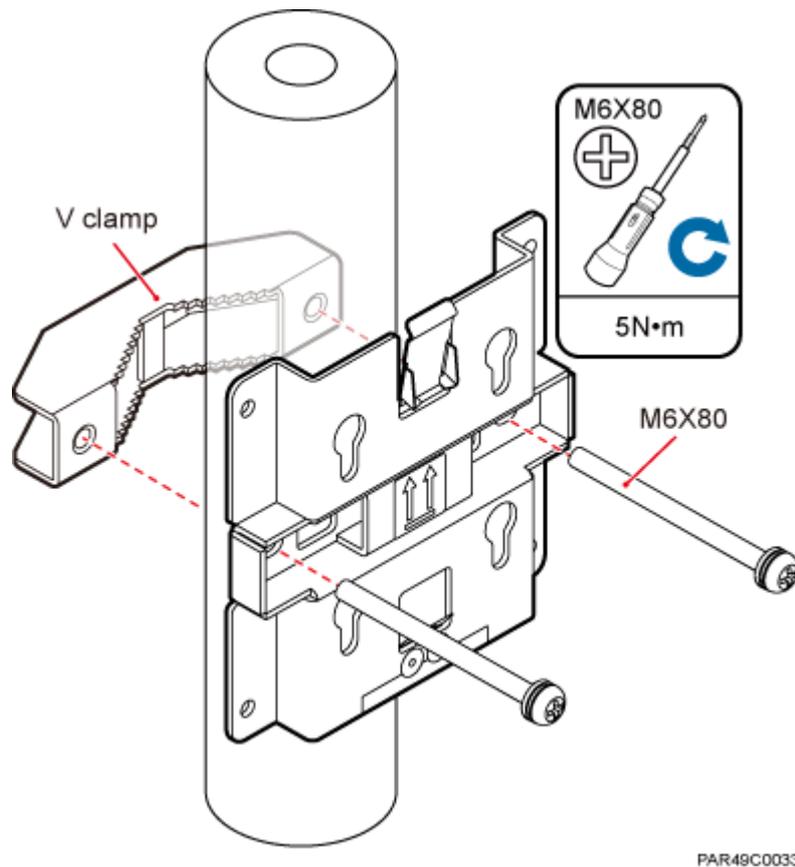
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the space requirements.

 **NOTE**

For pRRU installation space requirements, see [5.1.3 Space Requirements](#).

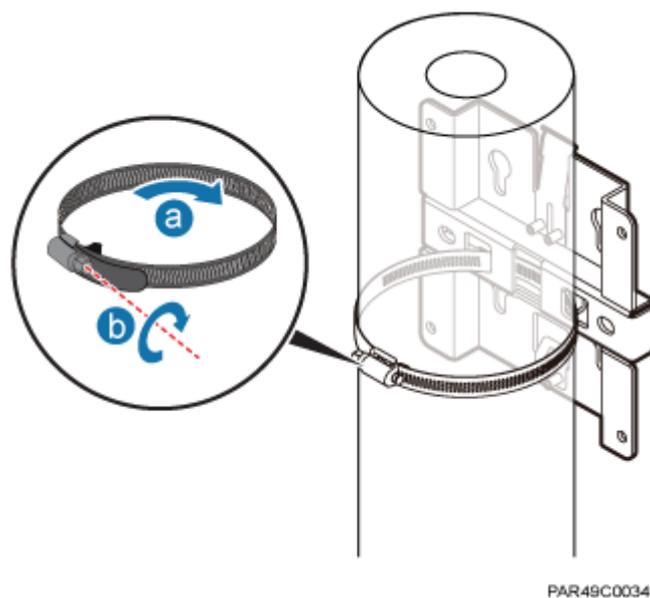
- Step 2** If the diameter of the pole ranges from 30 mm to 70 mm, use the delivered V clamp, installation plate, and bolts to install the pRRU on the pole. Lead the M6x80 bolt through the plate, and tighten the bolt to a torque of 5 N•m, as shown in [Figure 5-16](#).

Figure 5-16 Securing the pRRU installation kits on the metal pole



If the diameter of the pole is larger than 70 mm, use the hose clamp to install the plate on the pole. The hose clamp is prepared by customers. Tighten the bolt with a torque of 5 N·m, as shown in [Figure 5-17](#).

Figure 5-17 Securing the pRRU installation kits on the metal pole

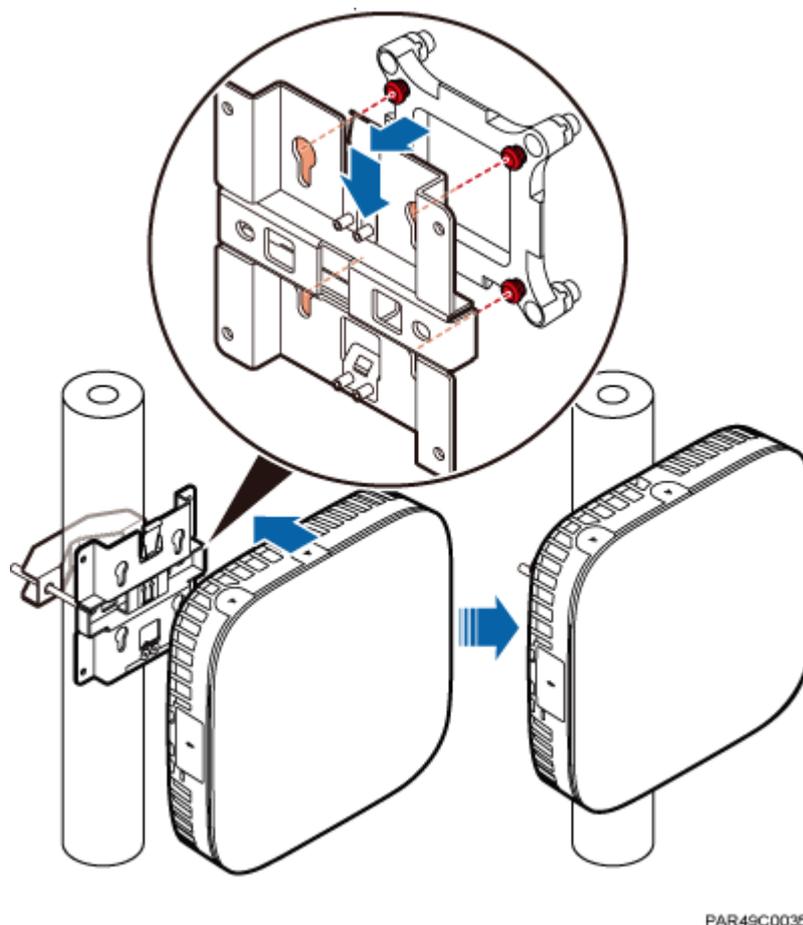


- Step 3** Fit the four hooks of the pRRU into the installation kits, as shown in [Figure 5-18](#). If the hooks are properly installed, a slight clack can be heard.

 **NOTE**

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

Figure 5-18 Installing a pRRU



---End

5.4.5 pRRU Installed on a Plate

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

Procedure

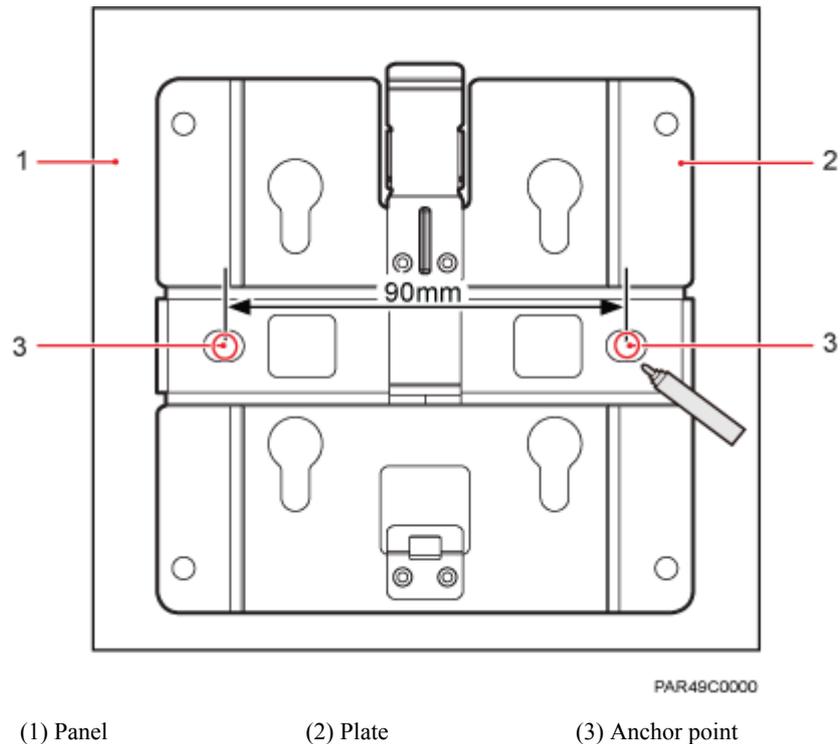
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the space requirements.

 **NOTE**

For pRRU installation space requirements, see [5.1.3 Space Requirements](#).

- Step 2** Place the plate in the installation position against the wall. Then, level the plate and mark the two anchor points using a marker, as shown in [Figure 5-19](#).

Figure 5-19 Anchor points of the pRRU installation kits (unit: mm)



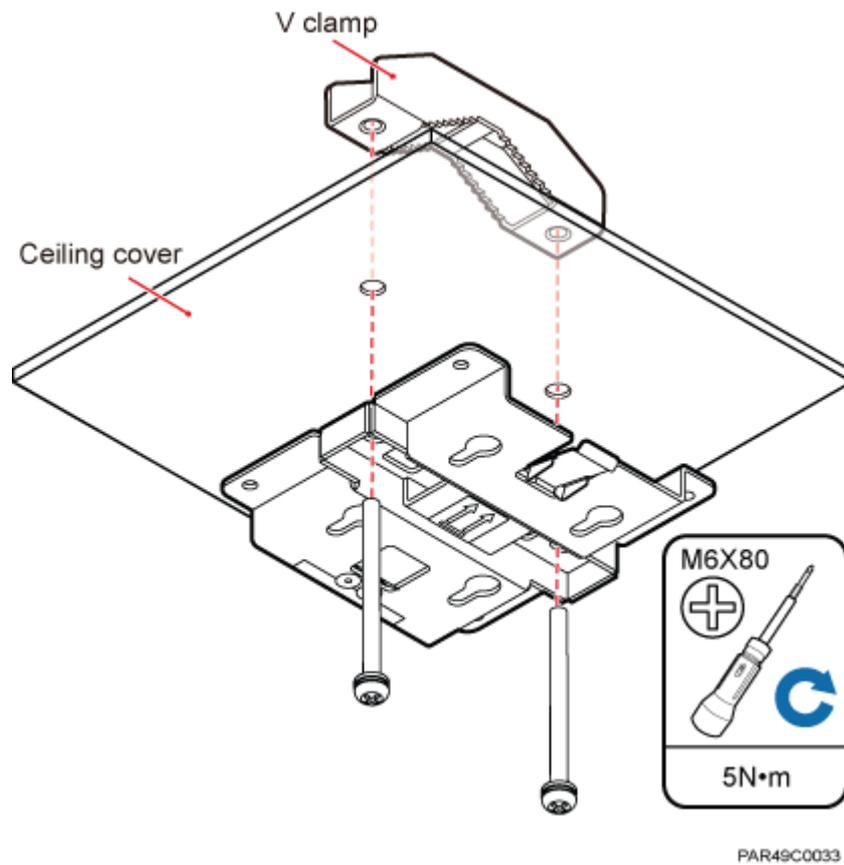
CAUTION

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

Step 3 Use a hammer drill with bit 8 to drill holes at the anchor points.

Step 4 Lead the bolt M6x80 through the panel and daughter board, and tighten the torque screwdriver to a torque of 5 N•m, as shown in [Figure 5-20](#).

Figure 5-20 Installing the pRRU installation kits

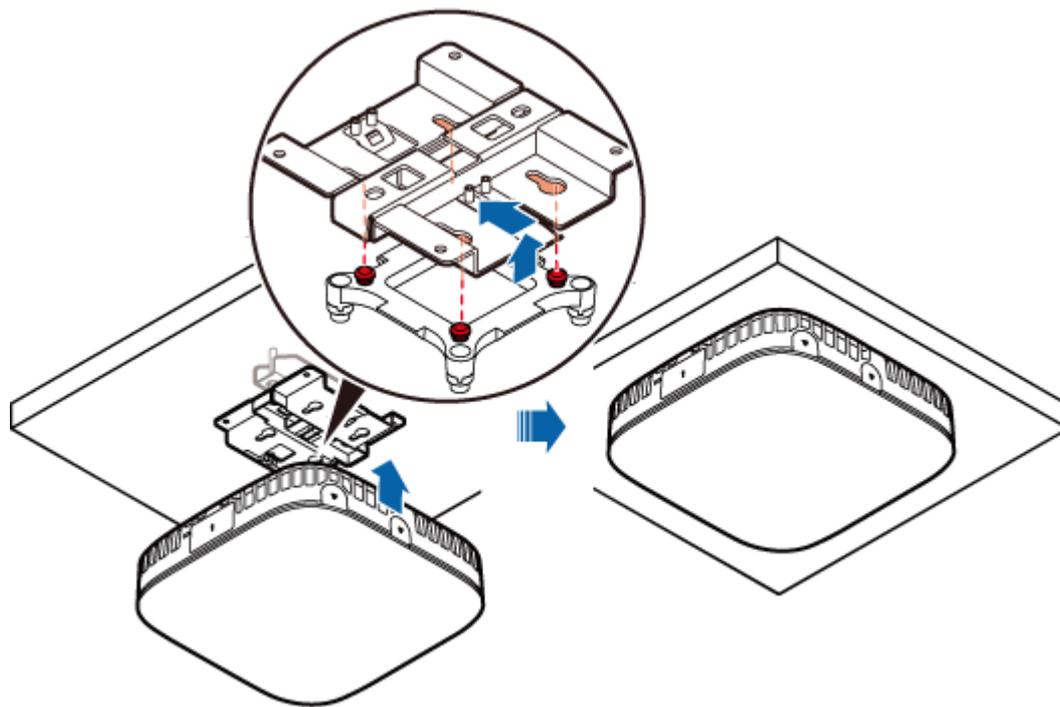


Step 5 Fit the four hooks of the pRRU into the installation kits, as shown in [Figure 5-21](#). If the hooks are properly installed, a slight clack can be heard.

NOTE

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

Figure 5-21 Installing a pRRU



PAR49C0037

---End

5.4.6 pRRU Installed on a Keel

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

Context

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

- The installation kits 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 must depend 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.

Procedure

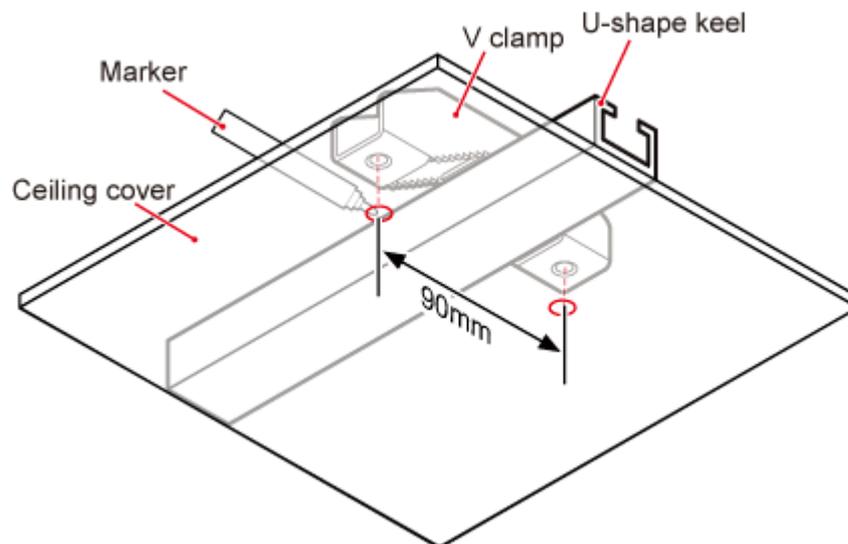
- Step 1** Determine the position for installing the pRRU based on the construction blueprint and the space requirements.

 **NOTE**

For pRRU installation space requirements, see [5.1.3 Space Requirements](#).

- Step 2** Lead the V clamp on across the keel, and mark the projective position on the cover with a marker, as shown in [Figure 5-22](#).

Figure 5-22 Anchor points on a plate (unit: mm)

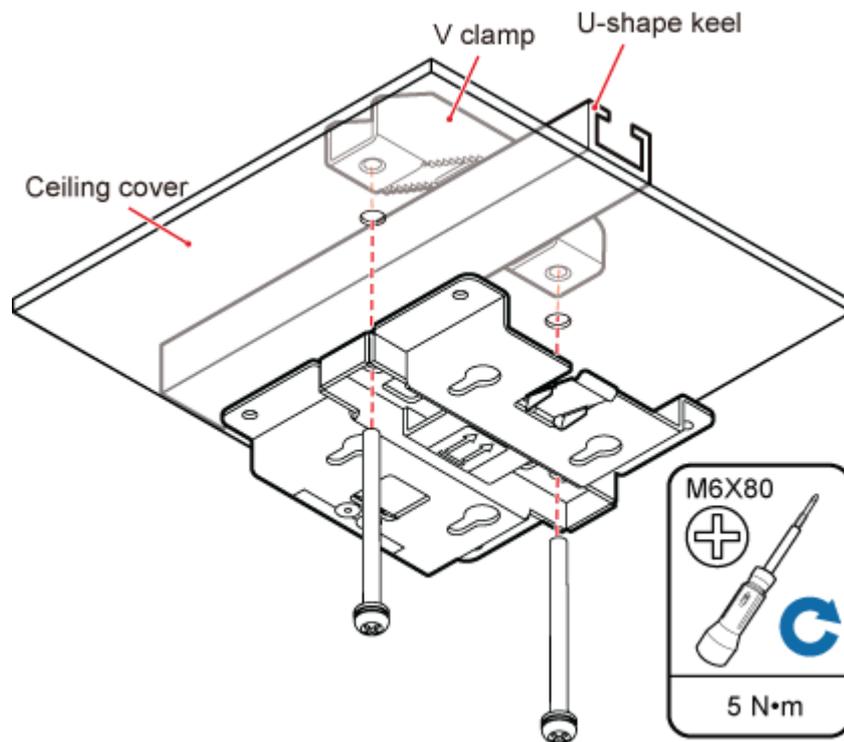


CAUTION

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

- Step 3** Use a hammer drill to drill holes at the anchor points. You are advised to use the hammer drill $\Phi 12$.
- Step 4** Lead the bolt M6x80 through the installation plate and ceiling cover, and then socket to tighten the bolt to a torque of 5 N•m, as shown in [Figure 5-23](#).

Figure 5-23 Installing the pRRU installation kits

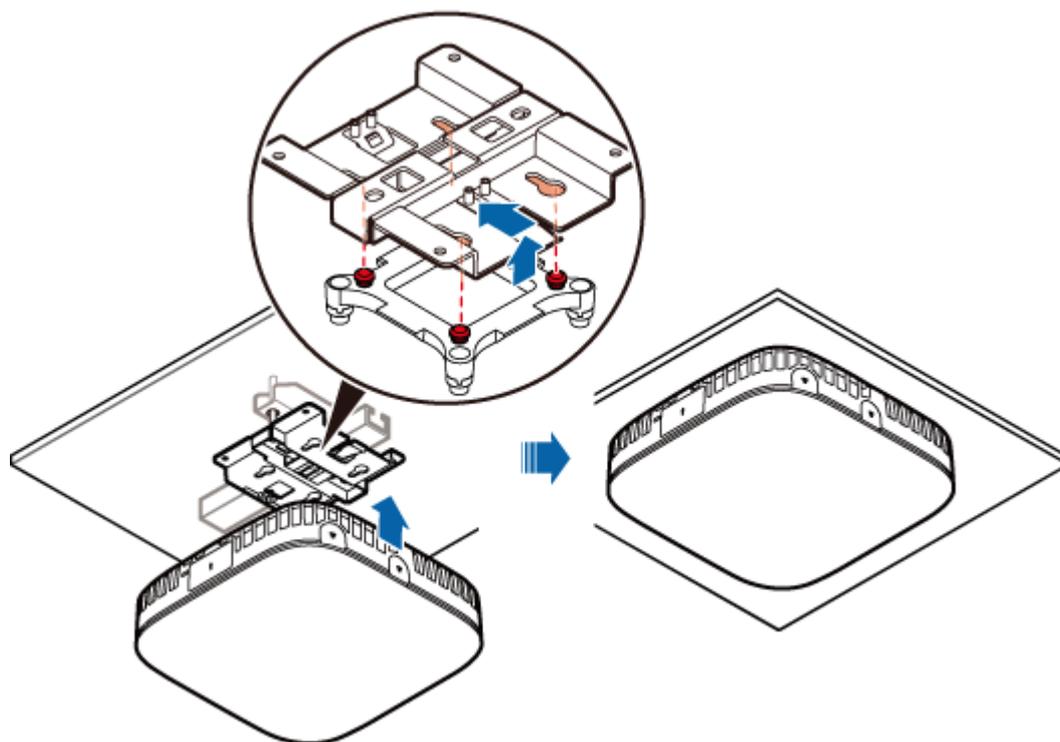


Step 5 Fit the four hooks of the pRRU into the installation kits, as shown in [Figure 5-24](#). If the hooks are properly installed, a slight clack can be heard.

NOTE

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

Figure 5-24 Installing a pRRU



PAR49C0062

----End

5.5 Installing the AC/DC Power Adapter (Optional)

The pRRU can obtain power supply using the AC/DC power adapter, which is used as required. An AC/DC power adapter is small and can be installed on a wall or pole. When it is installed, a support for it is required.

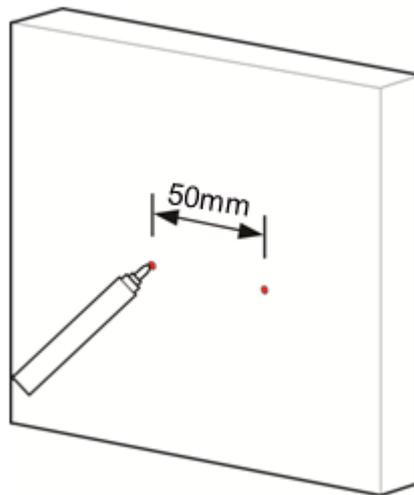
Context

- An AC/DC power adapter is small and can be installed on a wall or pole. When it is installed, a support for it is required.
- The distance between the AC/DC power adapter and the pRRU must be within 1.5 m.

Procedure

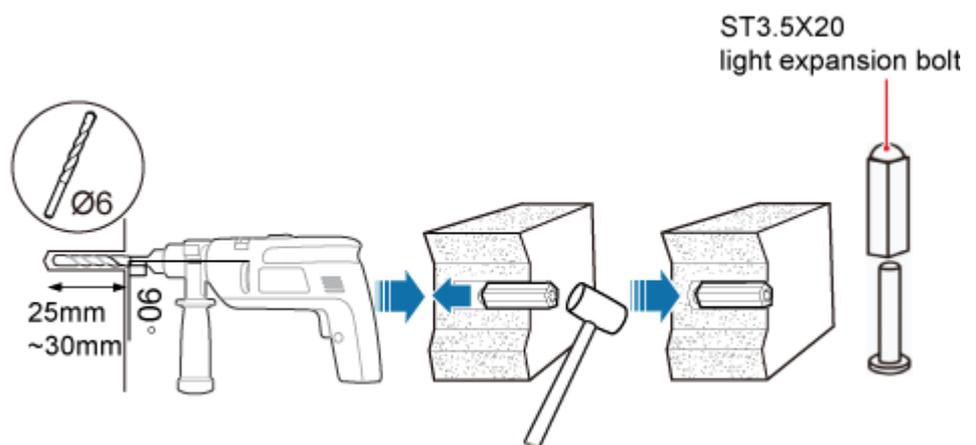
- Wall-mounted
 1. Use a marker to mark the two anchor points of the support for the AC/DC adapter which is level to the wall. The interval of the two anchor points is 50 mm, as shown in [Figure 5-25](#).

Figure 5-25 Anchor points of the support for the AC/DC power adapter (unit: mm)



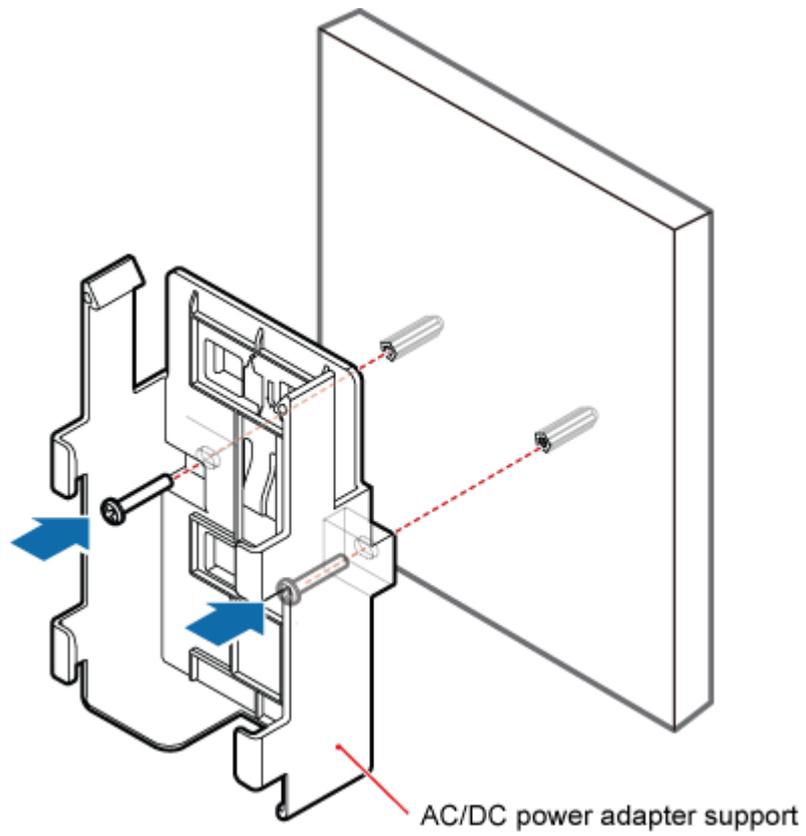
2. Use a hammer drill $\Phi 6$ to drill holes at anchor points, as shown in **Figure 5-26**. The diameter of the hole is 6 mm, the depth is 25 mm to 30 mm, and the interval of the two holes is 50 mm.

Figure 5-26 Drilling holes and installing expansion bolts



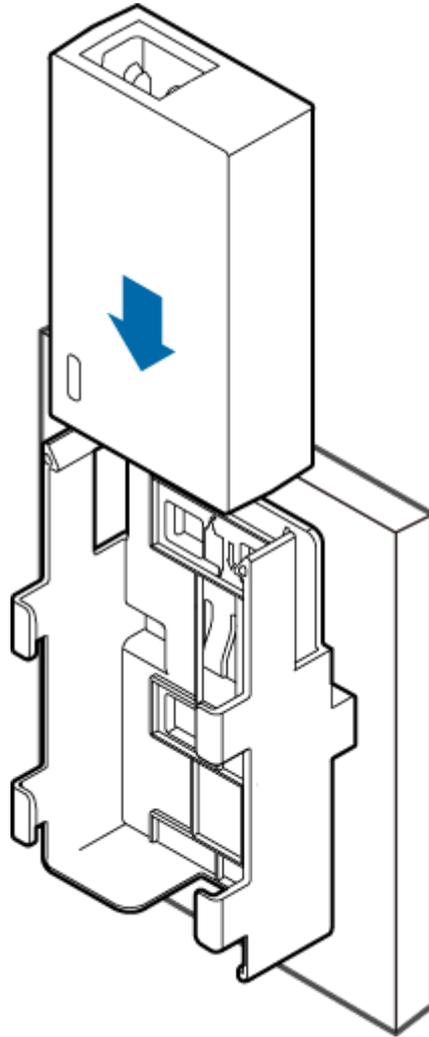
3. Use two tapping screws to secure the power adapter support to the wall, as shown in **Figure 5-27**.

Figure 5-27 Tightening the power adapter support



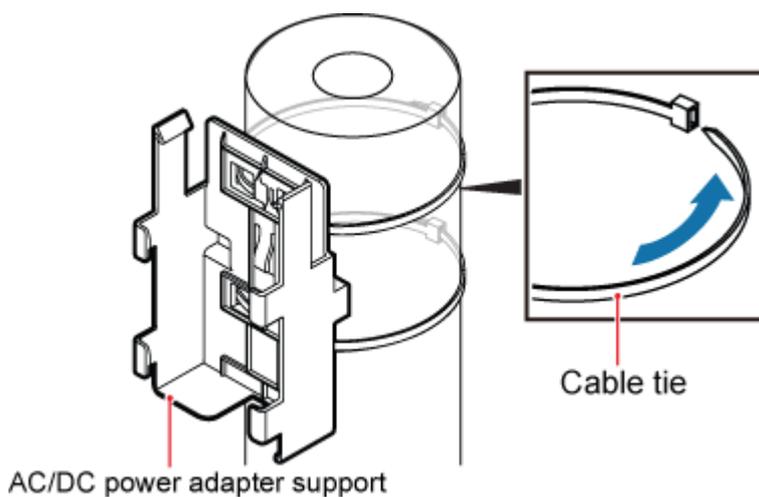
4. Place the AC/DC power adapter on the support by referring to [Figure 5-28](#).

Figure 5-28 Installing the AC/DC power adapter



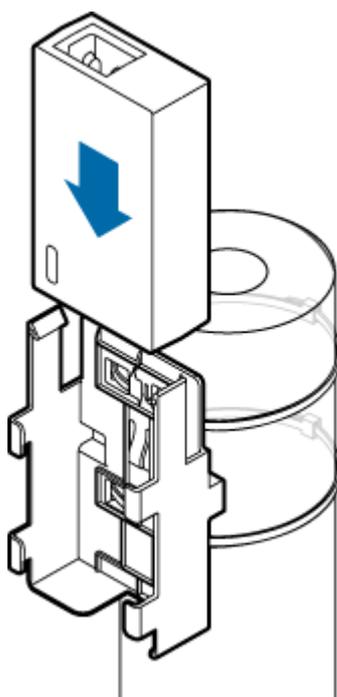
- On a pole
 1. Route the cable ties through the notches on the support and secure the fixing hoops to a pole, as shown in [Figure 5-29](#).

Figure 5-29 Wrap binding straps



2. Place the AC/DC power adapter on the support by referring to [Figure 5-30](#).

Figure 5-30 Wrap binding straps



---End

5.6 Installing the Extender (Optional)

This section describes the Extender installation process.

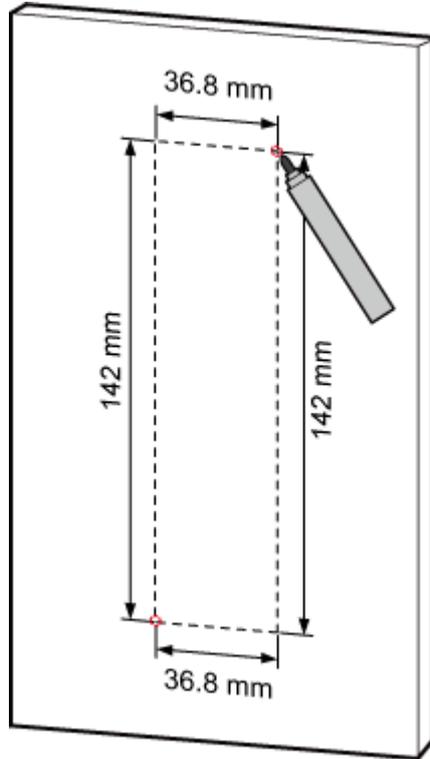
Context

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

Procedure

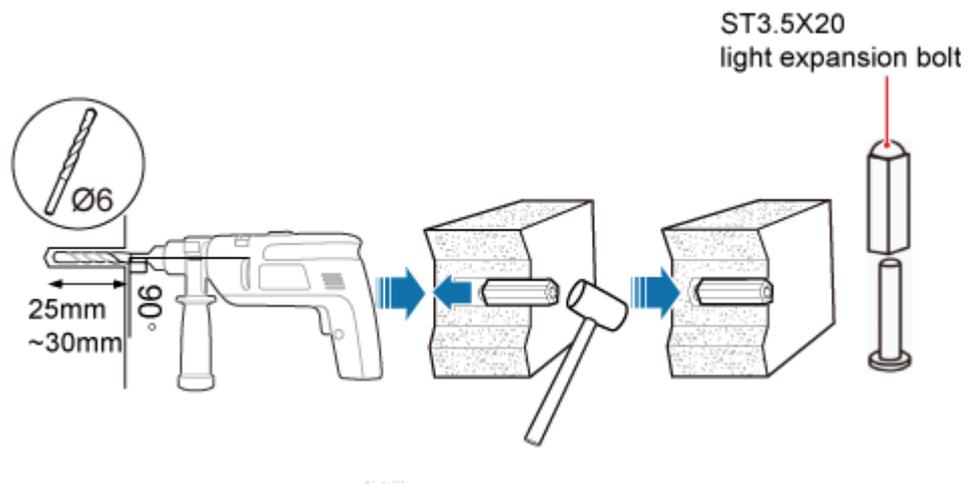
- Step 1** Use a marker to mark the two anchor points according to inter-hole spacing, as shown in [Figure 5-31](#).

Figure 5-31 Marking anchor points



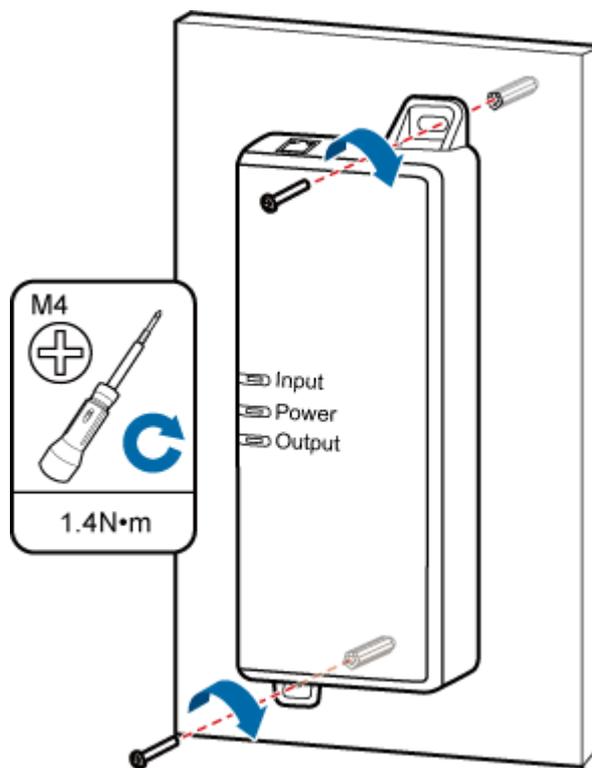
- Step 2** Drill holes at the anchor points, and install expansion bolt assemblies, as shown in [Figure 5-32](#). The diameter of the hole is 6 mm, and the depth is 25 mm to 30 mm.

Figure 5-32 Drilling holes and installing expansion bolts



- Step 3** Place the Extender in the corresponding position and use an M4 Phillips screwdriver to tighten the screws to 1.4 N•m, as shown in [Figure 5-33](#).

Figure 5-33 Installing Extender



---End

5.7 Installing pRRU Cables

This section describes the procedure of installing the pRRU cables.

5.7.1 Cabling Requirements

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

Bending radius

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

Cable binding

- Cables of the same type are bound together.

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

Safety

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

5.7.2 List of pRRU Cables

This section describes pRRU cable connections.

Table 5-7 lists pRRU cables.

Table 5-7 List of pRRU cables

Cable	One End		The Other End	
	Connector	Connected to ...	Connector	Connected to ...
Ethernet Cable	RJ45 connector	RHUB/ CPRI_E0~CPRI_E7 port	RJ45 connector	pRRU/ CPRI_E0~CPRI_E1 port
	RJ45 connector	AC or Transmission port	RJ45 connector	pRRU/GE port
pRRU RF Jumper	SMA straight male connector	External antenna TX/ RX RF port on the pRRU	Based on the port model of the antenna system.	Antenna system
Adapter Power Cable	C13 female connector	C14 male connector on the AC/DC adapter	Based on the country and area where the connector is used.	AC power socket

 **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.
- The Ethernet cable used for connecting the GE port on the pRRU to the AC transmission port is required only when the pRRU have three transmission ports and is configured with the Wi-Fi daughter board.

5.7.3 Cable Connections

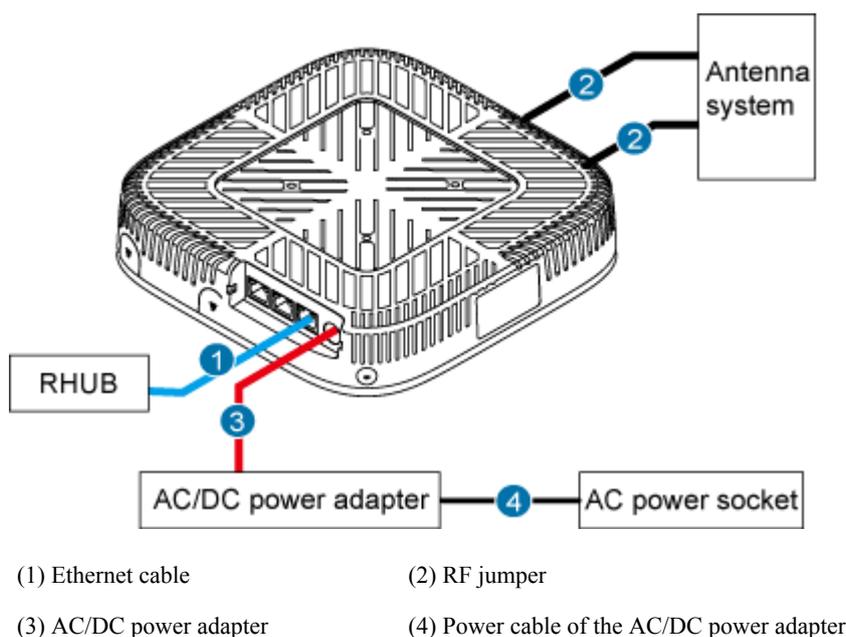
This section describes the cable connections for a single pRRU and multiple pRRUs.

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

- The pRRU can obtain power supply through the power over Ethernet (PoE) or AC/DC power adapter. You are suggested to use AC/DC power adapter.
- 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 pRRU jumpers are not delivered. By default, the pRRUs 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 pRRU RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU. The other end of the pRRU RF jumper is the type N male connector, which is connected to the antenna system. For the standard of the pRRU RF jumper, see pRRU RF Jumper of the *LampSite Hardware Description*.

Figure 5-34 shows the cable connection when the pRRU is configured with only one RF Daughter Board.

Figure 5-34 pRRU cable connection (1)

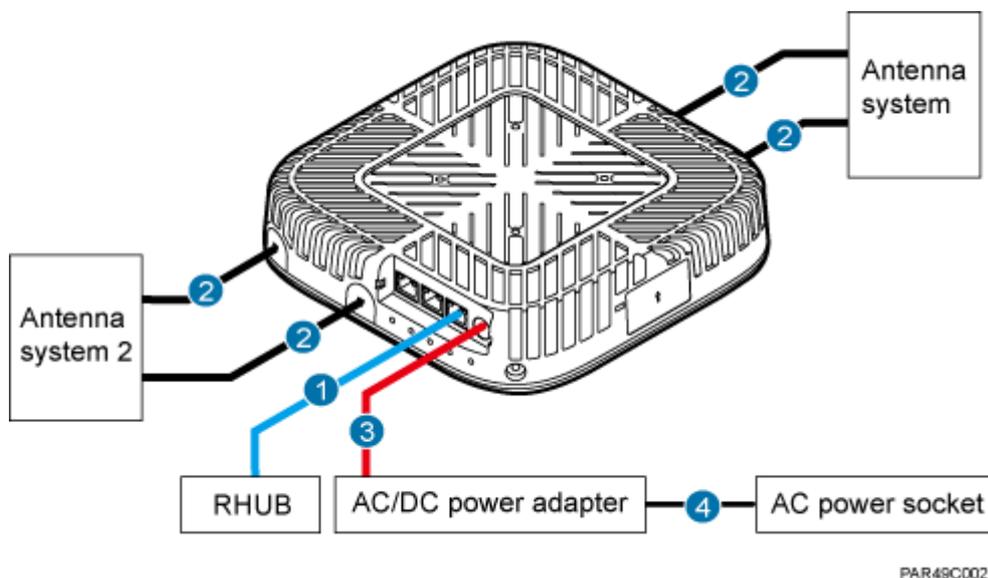


NOTE

- The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.
- 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. This document describes signal transmission using one Ethernet cable as an example.

Figure 5-35 shows the cable connection when the pRRU is configured with two RF Daughter Boards.

Figure 5-35 pRRU cable connection (2)



- | | |
|-------------------------|--|
| (1) Ethernet cable | (2) RF jumper |
| (3) AC/DC power adapter | (4) Power cable of the AC/DC power adapter |

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.
- 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. This document describes signal transmission using one Ethernet cable as an example.

5.7.4 Cable Connections (LTE TDD)

This section describes the cable connections for a single pRRU and multiple pRRUs.

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

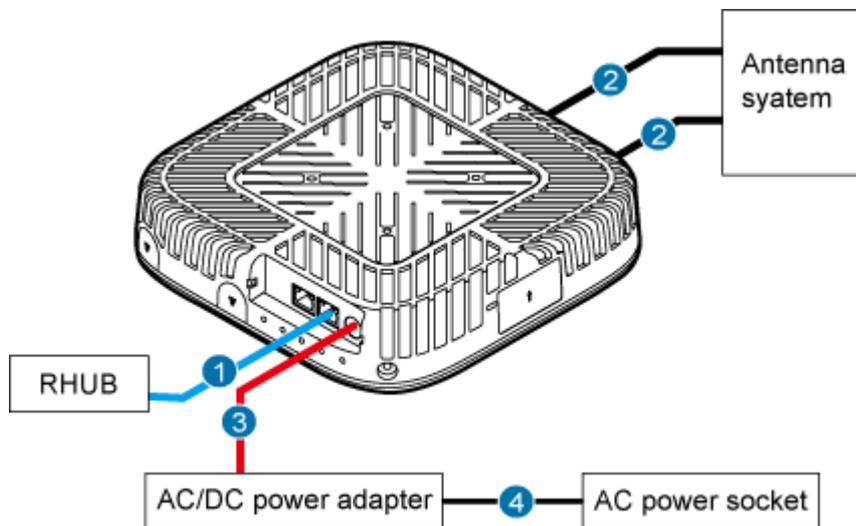
- The pRRU can obtain power supply through the power over Ethernet (PoE) or AC/DC power adapter. You are suggested to use AC/DC power adapter.
- For external antennas corresponding to RF daughter board 1, the TX port and RX port are ANT0 and ANT1, respectively. For external antennas corresponding to 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 pRRU jumpers are not delivered. By default, the pRRUs 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 pRRU RF jumper is the SMA male connector, which is connected to the external antenna TX/RX RF port on the pRRU. The other end of the pRRU RF jumper is the type N male connector, which is connected to the antenna system. For the standard of the pRRU RF jumper, please see pRRU RF Jumper of the *LampSite Hardware Description*.

Figure 5-36 shows the cable connection when the pRRU is configured with only one RF Daughter Board.

Figure 5-36 pRRU cable connection (1)



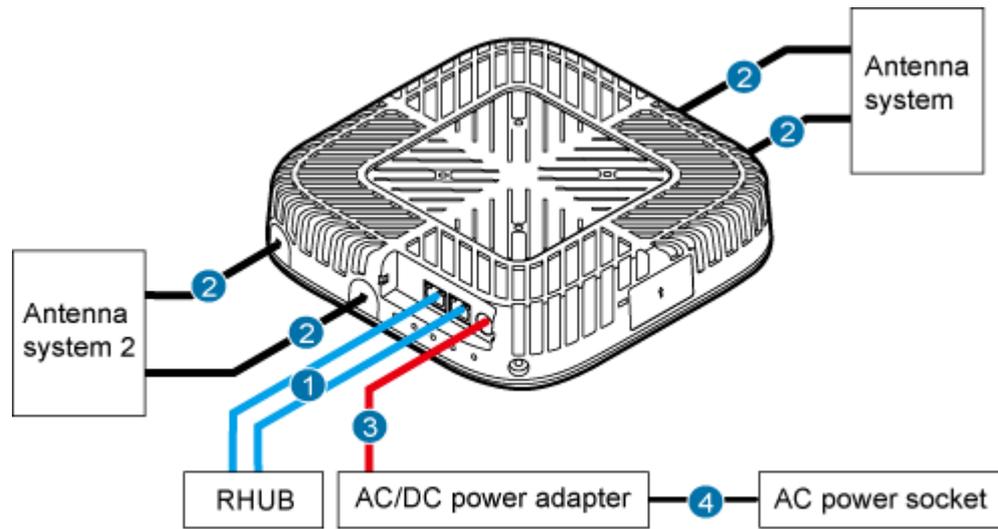
- | | |
|-------------------------|--|
| (1) Ethernet cable | (2) RF jumper |
| (3) AC/DC power adapter | (4) Power cable of the AC/DC power adapter |

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 5-37 shows the cable connection when the pRRU is configured with two RF Daughter Boards.

Figure 5-37 pRRU cable connection (2)



PAR49C0028

- (1) Ethernet cable
- (2) RF jumper
- (3) AC/DC power adapter
- (4) Power cable of the AC/DC power adapter

NOTE

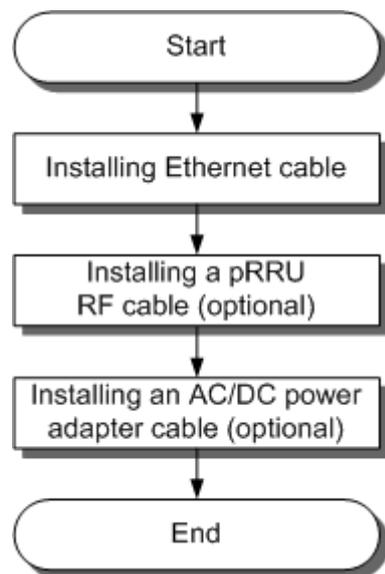
The Extender can be used to lengthen the distance between the RHUB and the pRRU connected using the Ethernet cable. If the Extender is used, the Ethernet cable is divided into two parts, one between the RHUB and the Extender and the other between the Extender and the pRRU.

5.7.5 pRRU cable installation process

This section describes the process of installing pRRU cables.

Figure 5-38 shows the process of installing pRRU cables.

Figure 5-38 pRRU cable installation process



5.7.6 Installing an Ethernet Cable

This section describes how to install an Ethernet cable.

Prerequisites

- Ethernet cables are not delivered, and they must be prepared onsite. You need to use a network cable tester to test the Ethernet cable connection.
- Cables of Category 5e (enhanced) or higher specification is used for connecting the RHUB and pRRU. With the internal PoE module providing power, the distance of the pRRU and RHUB can be extended by the Extender up to a total distance of 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.

Context

The Ethernet cable has the following functions:

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

NOTE

- A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. This section uses the pRRU with three transmission ports as an example.
- Using the CPRI_E1 port on the pRRU 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.

Procedure

Step 1 Install an Ethernet cable between an RHUB and a pRRU.

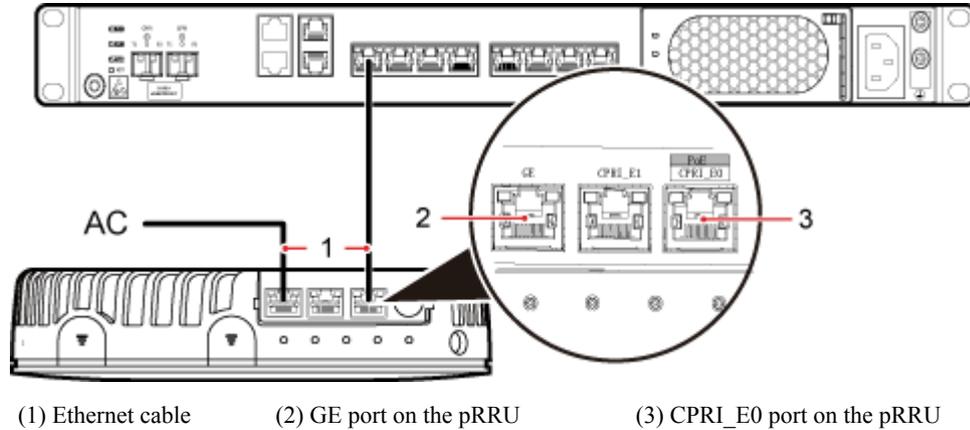
1. Remove the dustproof cap of the CPRI_E0 port on the pRRU.
2. Connect the RJ45 connector at one end of the Ethernet cable to the CPRI_E0 port on the pRRU panel.
3. **Optional:** Connect the RJ45 connector at the other end of the Ethernet cable to the output port of the Extender. Then, connect the RJ45 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 5-39](#).

Step 2 Optional: Install the Ethernet cable between the pRRU and the AC. This operation is required when the pRRU with three transmission ports is configured with a Wi-Fi daughter board.

1. Remove the dustproof cap of the GE port on the pRRU.
2. Connect the RJ45 connector at one end of the Ethernet cable to the GE port on the pRRU 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 5-39**.

Figure 5-39 Installing an Ethernet cable



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.

---End

5.7.7 Installing pRRU Jumpers (Optional)

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

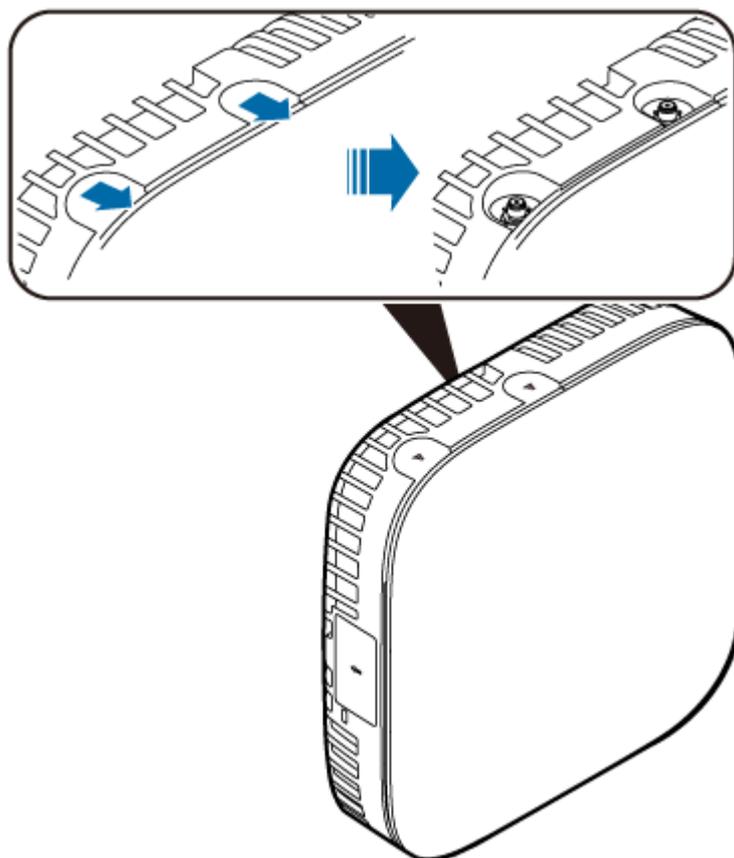
Context

- If the RF jumper is provided by the customer, the jumper must not be lower than the RG316 specifications. In addition, the jumpers can be used after they are checked by Huawei engineers.
- pRRUs can be connected to external whip antennas or external remote antennas (through pRRU RF jumpers). Whip antennas are delivered optionally. RF jumpers are not delivered.

Procedure

- Step 1** Expose the SMA female connector by removing the pRRU antenna housing, as shown in **Figure 5-40**.

Figure 5-40 Removing the pRRU antenna housing



PAR49C0026

- 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 pRRU panel.

 **NOTICE**

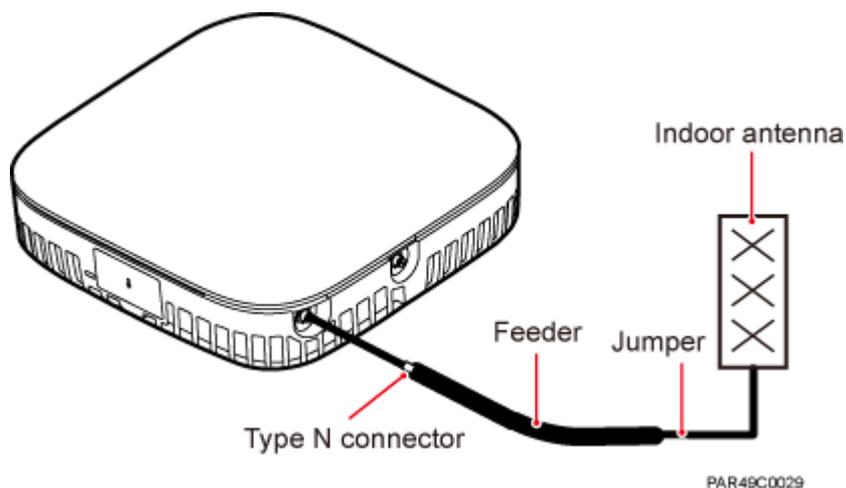
Tighten it with hands, and then use a torque wrench to tighten it with a rotational speed of less than or equal to 2.4 rpm to tighten it.

-
- 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 5-41 Installing jumpers between the pRRU and external antennas



---End

5.7.8 Installing adapter power cables

The pRRU can be powered by the AC/DC power adapter.

Prerequisites

- The pRRU use the AC/DC power adapter to obtain power supply, and the AC/DC power adapter is installed.

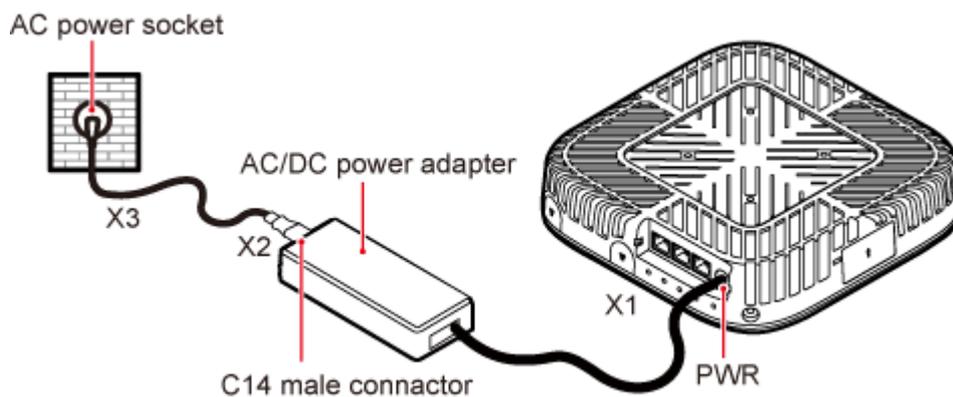
Context

- One end of the adapter power cable is the C13 female connector, which is connected to the C14 male connector on the adapter, and the other end of the adapter power cable is connected to the AC power socket.

Procedure

- Step 1** The X1 end is connected to the PWR port on the pRRU, as shown in [Figure 5-42](#).
- Step 2** The X2 end (the C13 female connector on the AC/DC power adapter cable) is connected to the AC power input port, as shown in [Figure 5-42](#).
- Step 3** The X3 end is connected to the external power supply port of the AC adapter, as shown in [Figure 5-42](#).

Figure 5-42 Installing adapter power cables



PAR49C0031

Step 4 Route cables by referring to [4.4.1 Requirements for Cable Layout](#).

---End

5.8 Checking the pRRU Hardware Installation

pRRU hardware installation checking includes hardware and cable installation checking.

Table 5-8 lists the hardware installation checking items.

Table 5-8 Hardware installation checking list

No.	Item
1	Ensure that the pRRU is not grounded.
2	The position for each device conforms to the engineering design and meets the space requirement.
3	Ensure that the pRRU is properly installed.
4	The surface of the pRRU is neat and clean. The external paint is intact. The labels, tags, and nameplates are correct, legible, and complete.

Table 5-9 lists the check items of the signal cable connection.

Table 5-9 Checklist for the signal cable connection

No.	Item
1	The connectors of the signal cables must securely connected.
2	The connectors of the signal cables are intact.
3	The signal cables are intact.

No.	Item
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 5-10 lists the checking items for other cable connections.

Table 5-10 Checklist for other cable connections

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

5.9 Powering on the pRRU

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

Procedure

Step 1 Optional: Measure the voltage of the pRRU. This operation is required when AC/DC power adapter is used.

If...	Then...
The voltage of the AC power adapter ranges from 100 V AC to 240 V AC (AC/DC power adapter is used)	Go to Step 2 . Otherwise, check for the cause until the voltage meets the requirement, and go to Step 2 .

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

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 pRRU.
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 pRRU is powered off, clear the fault on the board, and power on the pRRU.
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 pRRU again.

----End

6 Appendix

About This Chapter

This chapter describes reference information during installation and the procedures for installing RF daughter boards on a pRRU in capacity expansion scenarios.

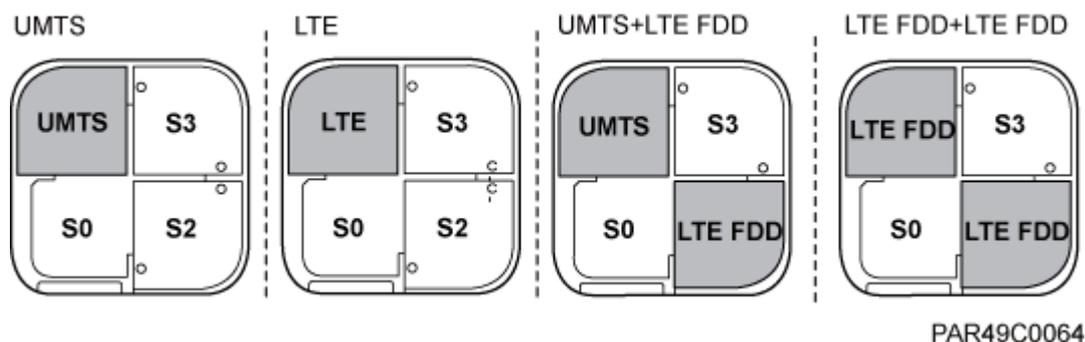
[6.1 MAC Collection Template](#)

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

[6.2 Installing RF Daughter Boards on a pRRU \(in Capacity Expansion Scenarios\)](#)

This section describes the procedures for installing RF daughter boards on a pRRU. A pRRU can have two transmission ports or three transmission ports, requiring the same installation operations. This section uses the pRRU with three transmission ports as an example.

Figure 6-1 Slot for installing the RF daughter boards



NOTE

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

Procedure

- Step 1** Instruct the network operator to block the pRRU.
- On the UMTS side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board.
 - On the LTE side, log in to the LMT and run the **BLK BRD** command to block the RF daughter board.



CAUTION

A pRRU that has just been powered off has afterheat. Take scald-proof measures when removing the modules.

- Step 2** Power off the pRRU.
Powering off the pRRU interrupts all the services carried on the pRRU.
- Step 3** Wear ESD gloves.

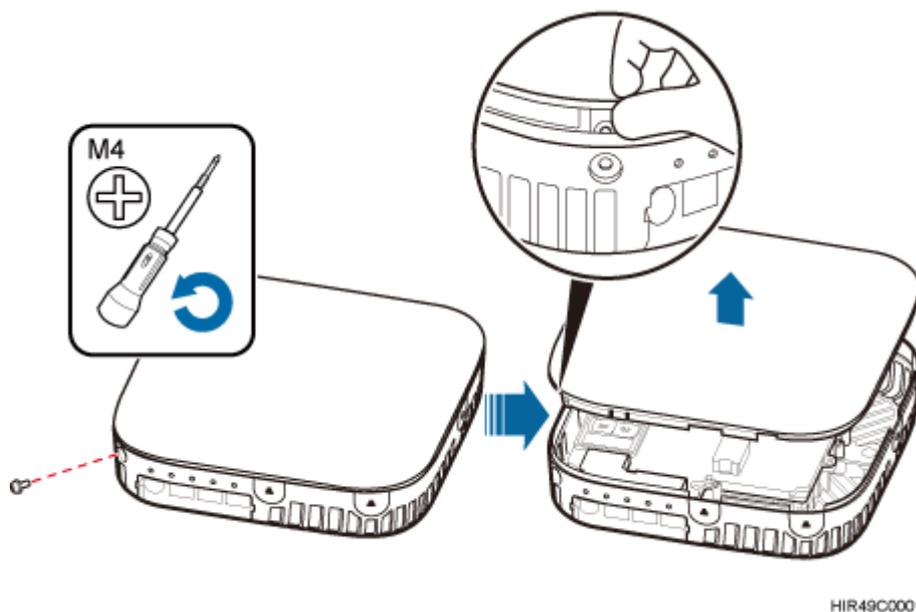


NOTICE

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

- Step 4** Use an M4 Phillips screwdriver to loosen the Phillips screw on the pRRU housing. Wrench and remove the housing from the installation position of the Phillips screw hole, as shown in [Figure 6-2](#).

Figure 6-2 Removing the pRRU housing



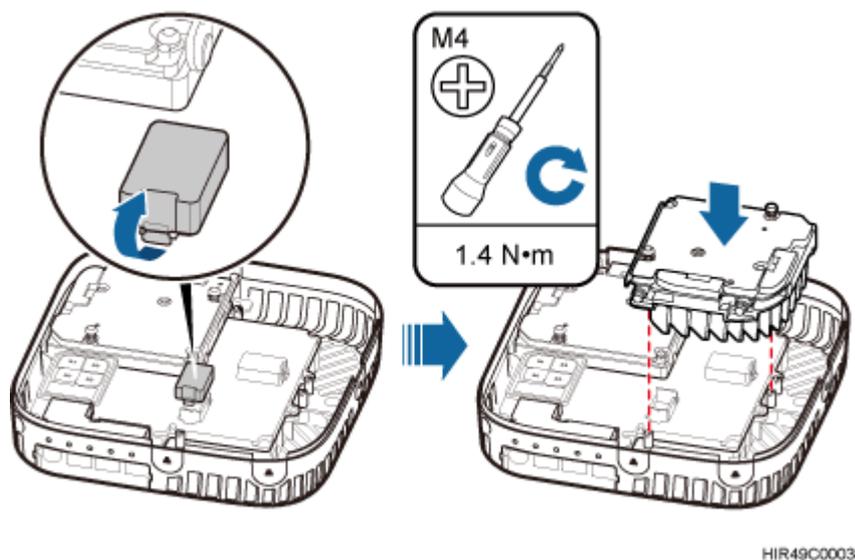
NOTE

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

Step 5 Install an RF daughter board in slot S2.

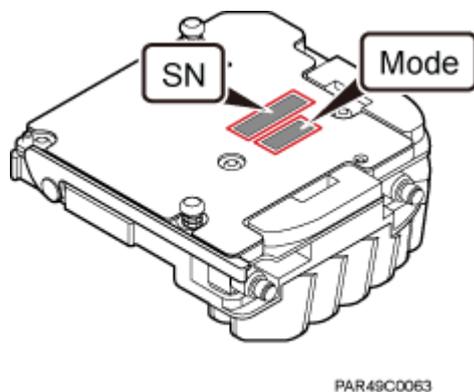
1. Remove the protective cover from the RF daughter board connector of slot S2.
2. Level the handles of an RF daughter board of the required mode, and insert the handles separately in the two dowels of slot S2, and use the M4 Phillips screwdriver to tighten the two Phillips screws on the RF daughter board with a torque of 1.4 N•m, as shown in [Figure 6-3](#).

Figure 6-3 Installing the RF daughter board in slot S2



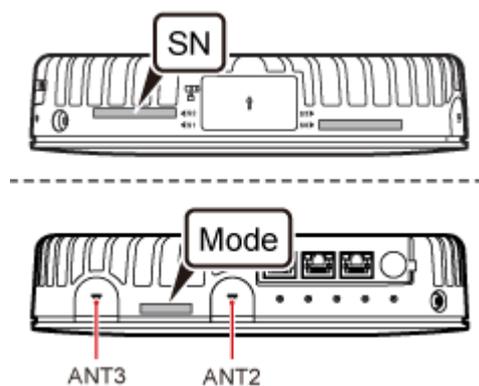
- Step 6** Remove the SN label and mode label on the surface of the RF daughter board, as shown in [Figure 6-4](#).

Figure 6-4 Removing the SN label and mode label



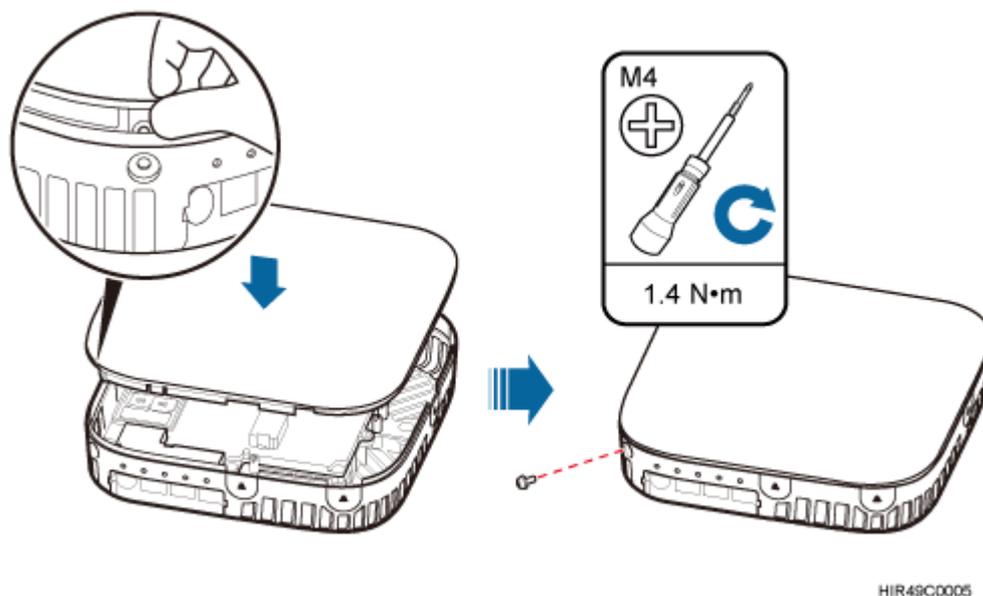
- Step 7** Attach the removed SN label to the corresponding position for S2 label on the nameplate side of the pRRU housing and the mode label to a position (for the label of slot S2 on the side of the pRRU housing) between antenna ports ANT2 and ANT3, as shown in [Figure 6-5](#).

Figure 6-5 Attaching the SN label and mode label



- Step 8** Close the pRRU housing and tamp each side of the housing until a click is heard. Ensure that the groove gaps between the front and back housings are evenly distributed. Use the M4 Phillips screwdriver to tighten the Phillips screw on the housing with a torque of 1.4 N•m, as shown in [Figure 6-6](#).

Figure 6-6 Installing the pRRU housing



NOTE

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

Step 9 Power on the pRRU.

Step 10 Instruct the network operator to unblock the pRRU.

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

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

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