



**Issue**

**Date**

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# About This Document

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## Purpose

This document describes the process of installing DC blade RRU3971 (referred to as RRU in this document).

## Product Versions

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

Product Name	Solution Version	Product Version
DBS3900	<ul style="list-style-type: none"><li>● SRAN9.0</li><li>● GBSS16.0</li><li>● eRAN7.0</li></ul>	V100R009C00
	<ul style="list-style-type: none"><li>● SRAN10.1 and later versions</li><li>● GBSS17.1 and later versions</li><li>● eRAN8.1 and later versions</li></ul>	V100R010C10 and later versions

## Intended Audience

This document is intended for:

Base station installation engineers

## Organization

### [1 Changes in RRU3971 Installation Guide](#)

This section describes the changes in the RRU3971 Installation Guide.

### [2 Installation Preparations](#)

This chapter describes the reference documents, tools, and instruments that must be ready before the installation. In addition, it specifies the skills and prerequisites that installation engineers must have.

### 3 Information About the Installation

Before installing an RRU, you must be familiar with its exterior, ports, indicators, installation options and installation clearance requirements.

### 4 Unpacking the Equipment

This chapter describes how to unpack and check the delivered equipment to ensure that all the materials are included and intact.

### 5 Installation Process

The installation process involves installing an RRU and RRU cables, checking the RRU hardware installation, and powering on an RRU.

### 6 Hoisting an RRU and Related Cables onto a Tower

This section describes the procedure for hoisting an RRU and related cables onto a tower and the precautions that must be taken.

### 7 Installing the RRU

This chapter describes the procedure for installing the RRU. The procedure for installing the RRU varies depending on installation options.

### 8 Installing RRU Cables

This chapter describes the procedure for installing RRU cables.

### 9 Checking the RRU Hardware Installation

After an RRU is installed, check the hardware installation.

### 10 Powering On an RRU



After all the devices are installed, check the power-on status of an RRU.




### 11 Appendix

## Conventions

### Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 <b>DANGER</b>	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Symbol	Description
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 <b>NOTICE</b>	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 <b>NOTE</b>	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

### General Conventions

The general conventions that may be found in this document are defined as follows.

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
<b>Boldface</b>	Names of files, directories, folders, and users are in <b>boldface</b> . For example, log in as user <b>root</b> .
<i>Italic</i>	Book titles are in <i>italics</i> .
Courier New	Examples of information displayed on the screen are in Courier New.

### Command Conventions

The command conventions that may be found in this document are defined as follows.

Convention	Description
<b>Boldface</b>	The keywords of a command line are in <b>boldface</b> .
<i>Italic</i>	Command arguments are in <i>italics</i> .
[ ]	Items (keywords or arguments) in brackets [ ] are optional.
{ x   y   ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[ x   y   ... ]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.

Convention	Description
{ x   y   ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[ x   y   ... ]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

### GUI Conventions

The GUI conventions that may be found in this document are defined as follows.

Convention	Description
<b>Boldface</b>	Buttons, menus, parameters, tabs, window, and dialog titles are in <b>boldface</b> . For example, click <b>OK</b> .
>	Multi-level menus are in <b>boldface</b> and separated by the ">" signs. For example, choose <b>File &gt; Create &gt; Folder</b> .

### Keyboard Operations

The keyboard operations that may be found in this document are defined as follows.

Format	Description
<b>Key</b>	Press the key. For example, press <b>Enter</b> and press <b>Tab</b> .
<b>Key 1+Key 2</b>	Press the keys concurrently. For example, pressing <b>Ctrl+Alt+A</b> means the three keys should be pressed concurrently.
<b>Key 1, Key 2</b>	Press the keys in turn. For example, pressing <b>Alt, A</b> means the two keys should be pressed in turn.

### Mouse Operations

The mouse operations that may be found in this document are defined as follows.

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.

<b>Action</b>	<b>Description</b>
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

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# 1 Changes in RRU3971 Installation Guide

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This section describes the changes in the RRU3971 Installation Guide.

## **Draft A (2015-09-30)**

This is a draft.

# 2 Installation Preparations

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## About This Chapter

This chapter describes the reference documents, tools, and instruments that must be ready before the installation. In addition, it specifies the skills and prerequisites that installation engineers must have.

### [2.1 Reference Documents](#)

Before the installation, you must be familiar with reference documents.

### [2.2 Tools and Instruments](#)

You must prepare the following tools and instruments before the installation.

### [2.3 Skills and Requirements for Onsite Personnel](#)

Onsite personnel must be qualified and trained. Before performing any operation, onsite personnel must be familiar with correct operation methods and safety precautions.

## 2.1 Reference Documents

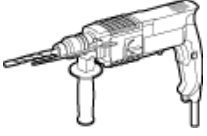
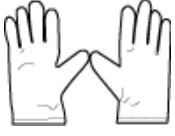







Before the installation, you must be familiar with reference documents.












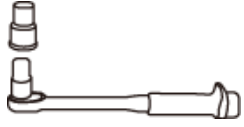

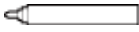



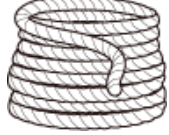
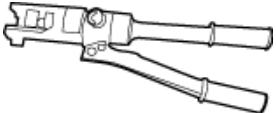
The following reference documents are required during RRU installation:

- RRU3971 Hardware Description
- DBS3900 Installation Guide
- OCB User Guide
- OCB-01M User Guide

## 2.2 Tools and Instruments

You must prepare the following tools and instruments before the installation.

Hammer drill (a $\phi 12$ bit) 	ESD gloves 	Vacuum cleaner 
Heat gun 	Phillips screwdriver (M3 to M6) 	Flat-head screwdriver (M3 to M6) 
Rubber mallet 	COAX crimping tool 	Wire stripper 

<p>Utility knife</p> 	<p>Cable cutter</p> 	<p>Adjustable wrench (size <math>\geq 32</math> mm [1.26 in.])</p>  <p>Torque wrench</p>  <p>Size: 16 mm (0.63 in.) and 22 mm (0.87 in.)</p> <p>Combination wrench</p>  <p>Size: 16 mm (0.63 in.) and 22 mm (0.87 in.)</p>
<p>Level</p> 	<p>Torque screwdriver</p>   <p>5 mm</p>  <p>5 mm</p>  <p>(M3 to M6)</p>  <p>(M3 to M6)</p>	<p>Torque socket</p> 
<p>Multimeter</p> 	<p>Marker (diameter <math>\leq 10</math> mm [0.39 in.])</p> 	<p>Measuring tape</p> 
<p>Inner hexagon wrench</p>  <p>5 mm</p>	<p>Fixed pulley (weight-bearing capacity <math>&gt; 500</math> kg or 1102.5 lb)</p> 	<p>Lifting sling</p> 
<p>Hydraulic pliers</p> 	<p>-</p>	<p>-</p>

## 2.3 Skills and Requirements for Onsite Personnel

Onsite personnel must be qualified and trained. Before performing any operation, onsite personnel must be familiar with correct operation methods and safety precautions.

Before the installation, pay attention to the following items:

- The customer's technical engineers must be trained by Huawei and be familiar with the proper installation and operation methods.
- The number of onsite personnel depends on the engineering schedule and installation environment. Generally, only three to five onsite personnel are necessary.

# 3 Information About the Installation

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## About This Chapter

Before installing an RRU, you must be familiar with its exterior, ports, indicators, installation options and installation clearance requirements.

### [3.1 RRU Exterior](#)

This section describes the exterior and dimensions of an RRU.

### [3.2 RRU Ports](#)

This section describes ports on the RRU panels. An RRU has a bottom panel, cabling cavity panel, and indicator panel.

### [3.3 RRU Indicators](#)

This section describes six indicators on an RRU. They indicate the running status of the RRU.

### [3.4 Installation Scenarios](#)

An RRU can be installed on a pole, U-steel, angle steel, wall, or IFS06. Installation scenarios must meet heat-dissipation and waterproofing requirements of the RRU.

### [3.5 Installation Clearance Requirements of an RRU](#)

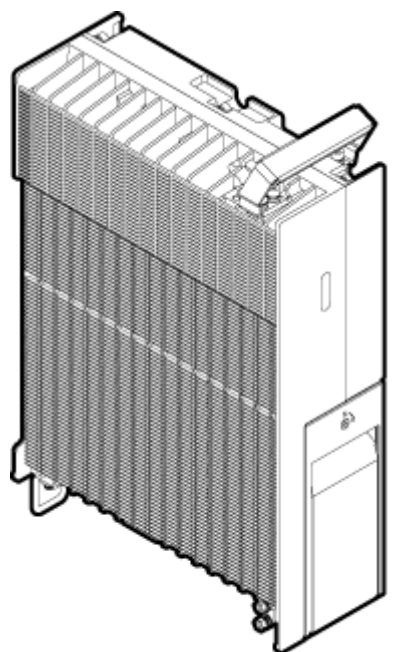
This section describes the requirements for the installation clearance of a single RRU and multiple RRUs and the requirements for the installation spacing between RRUs.

## 3.1 RRU Exterior

This section describes the exterior and dimensions of an RRU.

**Figure 3-1** shows the exterior of an RRU.

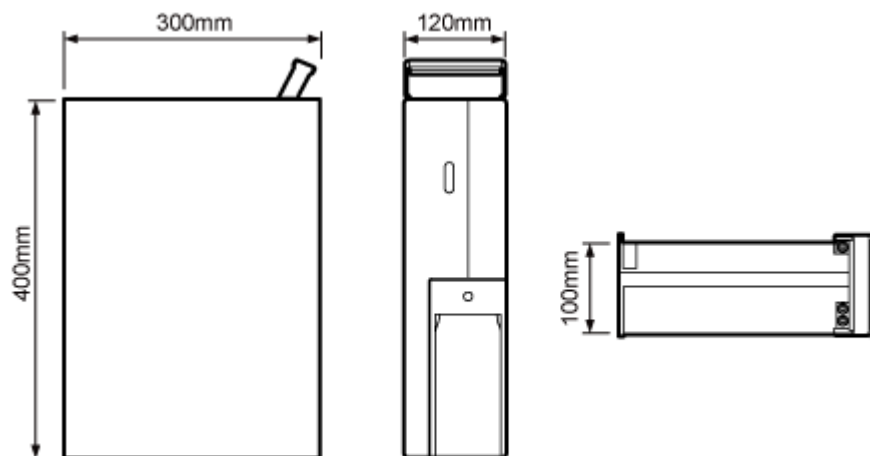
**Figure 3-1** RRU exterior



PAR96C0001

**Figure 3-2** shows RRU dimensions.

**Figure 3-2** RRU dimensions



PAR96C0005

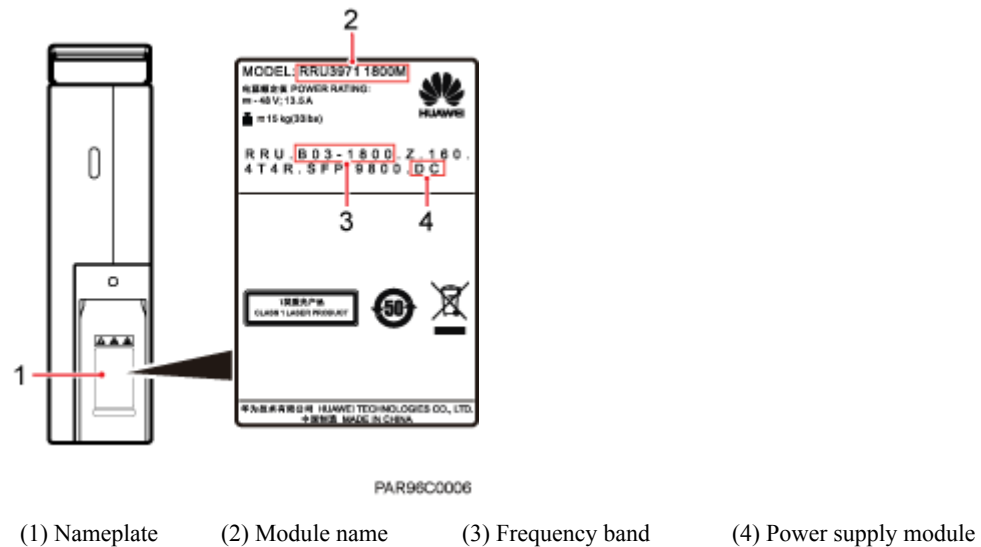


You can obtain the RRU name, RRU frequency band and power supply information from the nameplate on the cover plate. **Figure 3-3** shows the positions of the nameplate on the RRU.

 **NOTE**

The actual nameplate may differ from what is shown in the figure.

**Figure 3-3** Positions of the nameplate

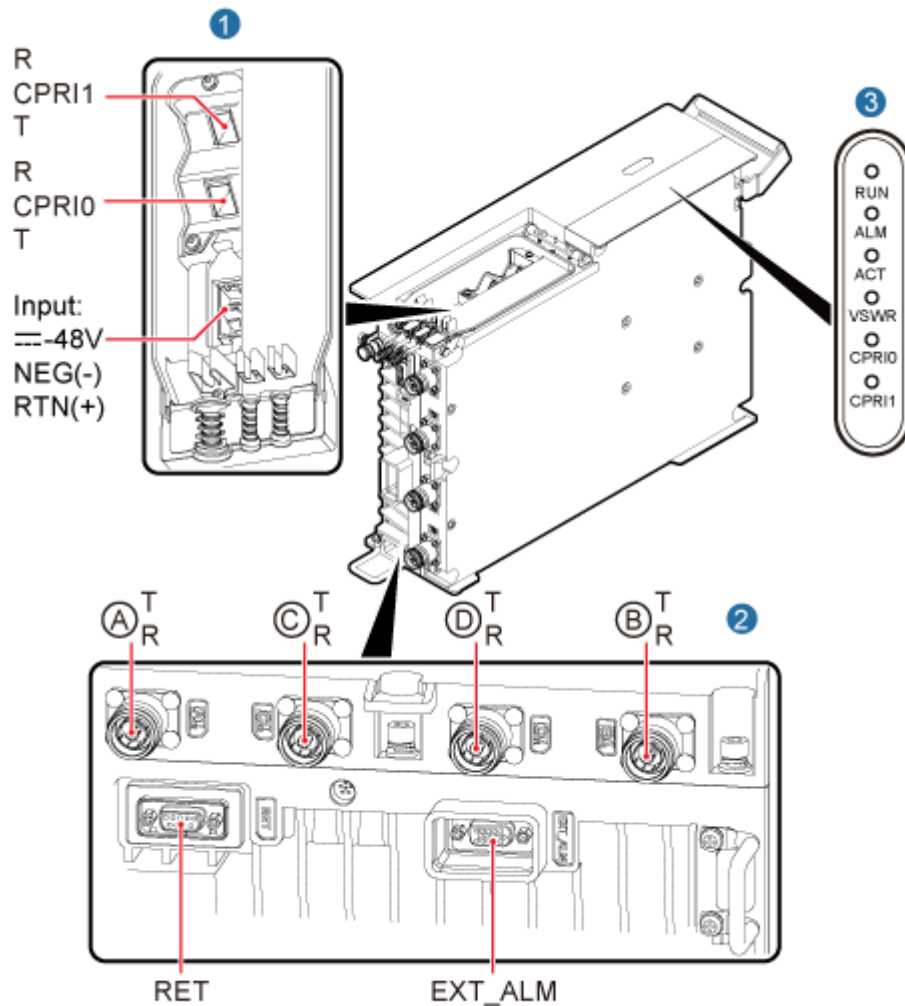


## 3.2 RRU Ports

This section describes ports on the RRU panels. An RRU has a bottom panel, cabling cavity panel, and indicator panel.

**Figure 3-4** shows the ports on the RRU panels.

**Figure 3-4** Ports on the RRU panels



PAR96C0052

**Table 3-1** describes ports and indicators on the RRU panels.

**Table 3-1** Ports and indicators on the RRU panels

Item	Silkscreen	Remarks
(1) Ports in the cabling cavity	RTN(+)	Power supply socket, for details about RRU power cable experience and specifications, see RRU Power Cable.
	NEG(-)	
	CPRI0	Optical/electrical port 0, connected to the BBU
	CPRI1	Optical/electrical port 1, connected to the BBU

Item	Silkscreen	Remarks
(2) Bottom ports	A T/R	TX/RX port A, supporting RET signal transmission
	C T/R	TX/RX port C
	D T/R	TX/RX port D
	B T/R	TX/RX port B, supporting RET signal transmission
	EXT_ALM	Alarm monitoring port used for monitoring one RS485 signal and two dry contact signals
	RET	Communication port for the RET antenna, supporting RET signal transmission
(3) Indicator	RUN	For details, see <a href="#">3.3 RRU Indicators</a> .
	ALM	
	ACT	
	VSWR	
	CPRI0	
	CPRI1	

 **NOTE**

- The port for transmitting RET signals is determined by the software.
- Connect the **CPRI0** port to the BBU by default in the single-mode scenario.

## 3.3 RRU Indicators

This section describes six indicators on an RRU. They indicate the running status of the RRU.

For detailed positions of RRU indicators, see [3.2 RRU Ports](#).

[Table 3-2](#) describes RRU indicators.

**Table 3-2** RRU Indicators

Indicator	Color	Status	Meaning
RUN	Green	Steady on	The power input is available, but the board is faulty.
		Steady off	No power input is available or the board is faulty.

Indicator	Color	Status	Meaning
		Blinking (on for 1s and off for 1s)	The board is running properly.
		Blinking (on for 0.125s and off for 0.125s)	The board software is being loaded or the board is not working.
ALM	Red	Steady on	Alarms are generated, and the module must be replaced.
		Blinking (on for 1s and off for 1s)	Alarms are generated. The alarms may be caused by faults on the related board or ports. Therefore, you need to locate the fault before deciding whether to replace the module.
		Steady off	No alarms are generated.
ACT	Green	Steady on	The board is working properly when TX channels are enabled or software is being loaded to a board that is not started.
		Blinking (on for 1s and off for 1s)	The board is running with TX channels disabled.
VSWR	Red	Steady off	No voltage standing wave ratio (VSWR) alarm is generated.
		Blinking (on for 1s and off for 1s)	VSWR alarms are generated on the <b>ANT_TX/RXB</b> port.
		Steady on	VSWR alarms are generated on the <b>ANT_TX/RXA</b> port.
		Blinking (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the <b>ANT_TX/RXA</b> and <b>ANT_TX/RXB</b> ports.
CPRI0	Red and green	Steady green	The CPRI link is running properly.
		Steady red	An optical module fails to receive or transmit signals possibly because the optical module is faulty or the optical fiber is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of faults on the mutual lock of dual-mode clock sources or mismatched data rates on CPRI ports.
		Steady off	The optical module cannot be detected or is powered off.
CPRI1	Red and green	Steady green	The CPRI link is running properly.

Indicator	Color	Status	Meaning
		Steady red	An optical module fails to receive or transmit signals possibly because the optical module is faulty or the optical fiber is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of faults on the mutual lock of dual-mode clock sources or mismatched data rates on CPRI ports.
		Steady off	The optical module cannot be detected or is powered off.

 **NOTE**

VSWR indicators on RRUs providing one or more than two TX channels have two types of status:

- Steady off: No VSWR alarm is generated.
- Steady on: VSWR alarms are generated on one or more ports.

## 3.4 Installation Scenarios

An RRU can be installed on a pole, U-steel, angle steel, wall, or IFS06. Installation scenarios must meet heat-dissipation and waterproofing requirements of the RRU.

### Requirements for the Installation Scenarios

#### Application scenarios:

To ensure proper heat dissipation of the RRU, the following requirements must be met:

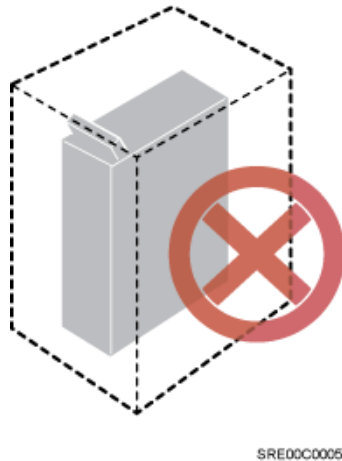
- The RRU cannot be installed in an enclosed cabinet without a cooling system.
- The RRU cannot be installed in an enclosed camouflage box.
- The RRU cannot be installed in an enclosed equipment room without a cooling system.
- When multiple RRUs are installed in centralized mode, the minimum clearance requirements must be met. For details about the minimum clearance requirements, see [3.5.2 Clearance for Three or More RRUs](#) and [3.5.3 Installation Spacing Between RRUs](#).
- RRU mounting kits in assembled installation mode are not allowed in indoor scenarios.

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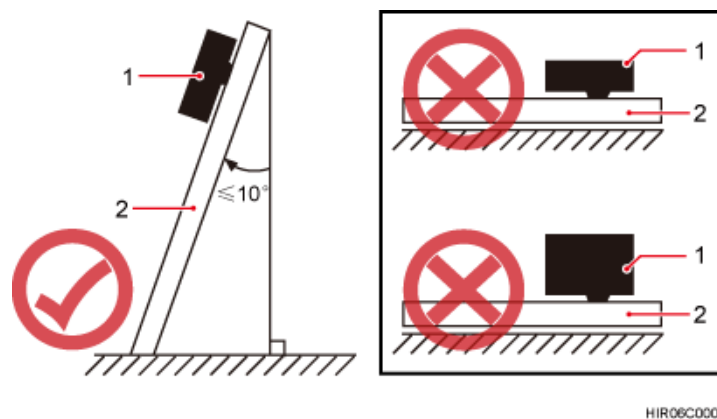
 **NOTICE**

If the RRU is inappropriately installed, heat dissipation of the RRU deteriorates and the RRU may not work properly, as shown in [Figure 3-5](#).

---

**Figure 3-5** inappropriately installed RRU**Correct installation methods:**

- The installation supports' specifications described in this document are only based on the exterior and dimensions of the mounting kits. Before installing equipment, assess the strength and reliability of the installation support to determine whether it can bear the weight of the equipment.
- To ensure the heat dissipation of the RRU and waterproofing of the ports at the bottom of the RRU, the vertical deviation angle of an RRU must be less than or equal to 10 degrees, as shown [Figure 3-6](#).
- On a tower, an RRU can be installed on a pole, angle steel, or U-steel. The side-mounted installation mode (one side instead of the rear of an RRU is mounted on the support) is recommended for RRUs on the main pole secured on a tower. This installation mode allows multiple RRUs to be installed next to each other at the same level on a pole. When the horizontal distance between the main and auxiliary poles on a tower is equal to or greater than 810 mm (23.62 in.), the side-mounted mode is recommended for installing RRUs on the auxiliary pole to meet the minimum clearance requirements. Otherwise, the standard mode is recommended for installing RRUs on the auxiliary pole.

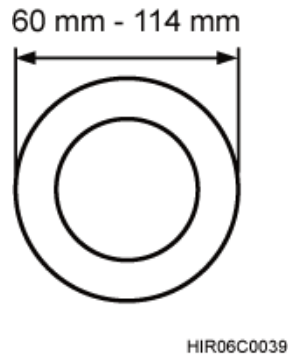
**Figure 3-6** Requirements for the vertical deviation angle of an RRU

(1) RRU      (2) Installation support (pole, U-steel, angle steel, or wall)

## Installing an RRU on a Pole

**Figure 3-7** shows the diameter of a pole for installing an RRU.

**Figure 3-7** Diameter of a pole



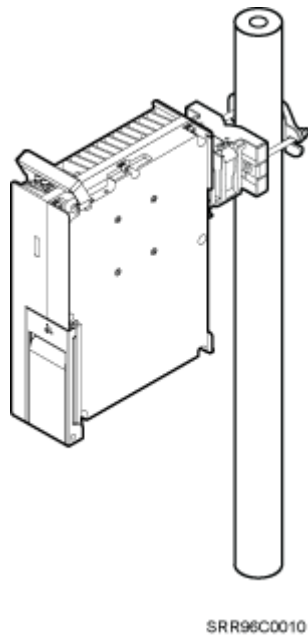
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### NOTICE

- The diameter of a pole for installing an RRU ranges from 60 mm (2.36 in.) to 114 mm (4.49 in.). The recommended diameter is 80 mm (3.15 in.).
  - When the diameter of a pole ranges from 60 mm (2.36 in.) to 76 mm (2.99 in.), a maximum of three RRUs can be installed on the pole and the side-mounted installation is recommended. The RRU installation in standard mode is not recommended.
  - Only a pole whose diameter ranges from 76 mm (2.99 in.) to 114 mm (4.49 in.) supports more than three RRUs.
  - The recommended thickness of the pole wall is 3.5 mm (0.14 in.) or above.
- 

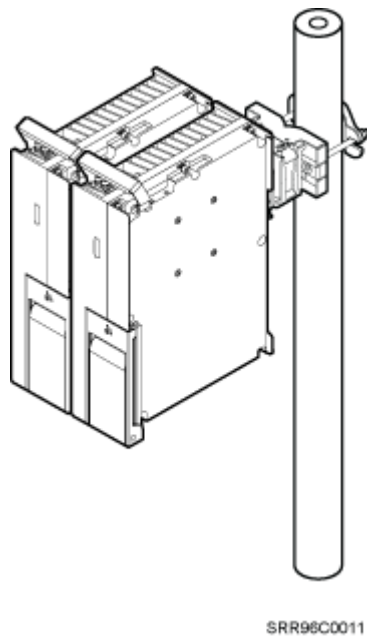
**Figure 3-8** shows a single RRU installed on a pole.

**Figure 3-8** A single RRU installed on a pole



**Figure 3-9** shows two RRUs installed on a pole.

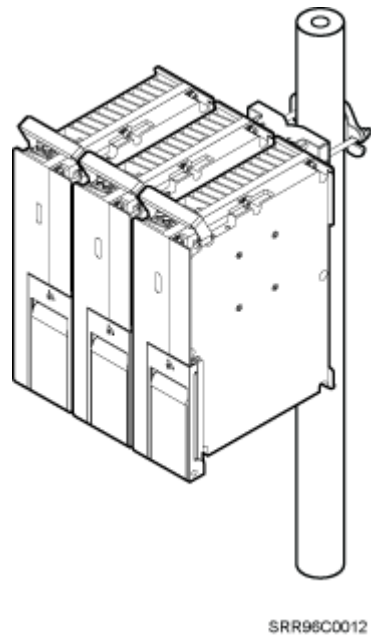
**Figure 3-9** Two RRUs installed on a pole



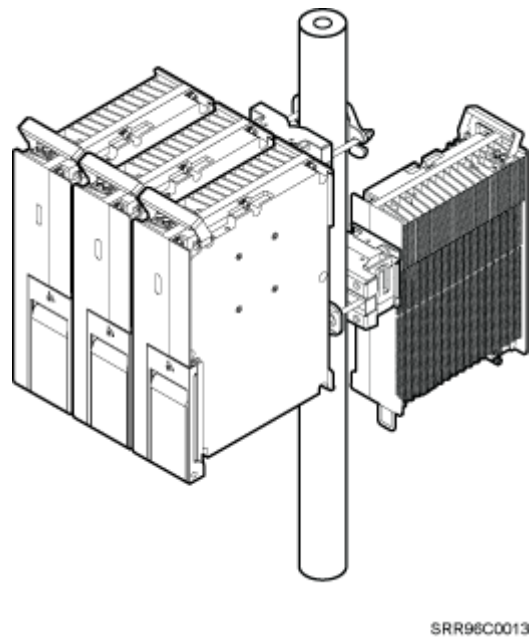
**Figure 3-10**, **Figure 3-11**, and **Figure 3-12** show multiple RRUs installed on a pole.



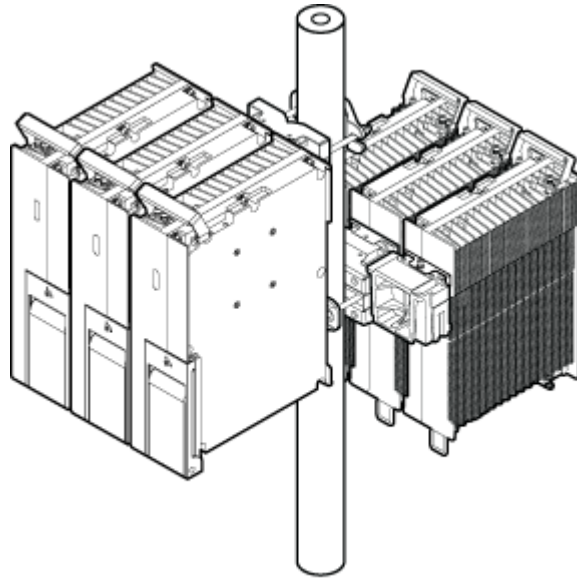
**Figure 3-10** Three RRUs installed on a pole



**Figure 3-11** Four RRUs installed on a pole



**Figure 3-12** Six RRUs installed on a pole

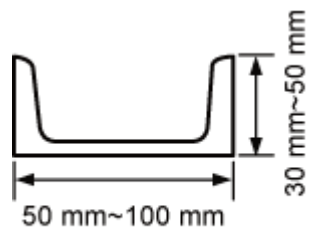


SRR96C0014

## Installing an RRU on U-Steel

**Figure 3-13** shows U-steel specifications.

**Figure 3-13** U-steel specifications



HIR06C0037

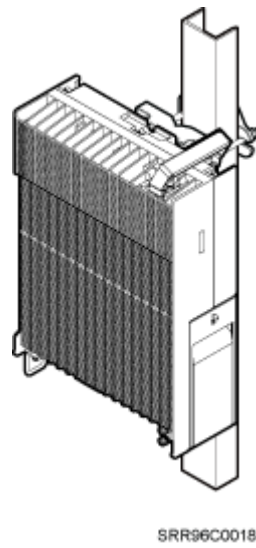


## NOTICE

U-steel only supports the standard installation of a single RRU.

**Figure 3-14** shows an RRU installed on U-steel.

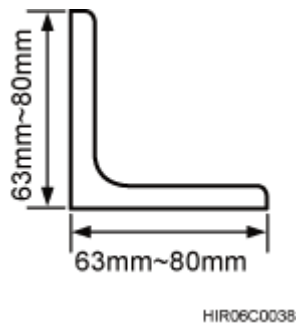
**Figure 3-14** RRU installed on U-steel



## Installing an RRU on Angle Steel

**Figure 3-15** shows angle steel specifications.

**Figure 3-15** Angle steel specifications



---

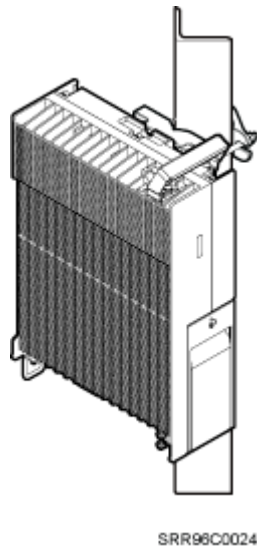


### NOTICE

Angle steel only supports the standard installation of a single RRU.

---

**Figure 3-16** shows an RRU installed on angle steel.

**Figure 3-16** RRU installed on angle steel

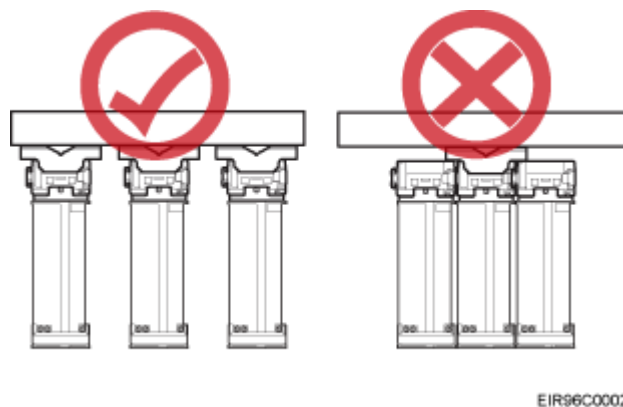
## Installing an RRU on a Wall

The wall for installing RRUs must meet the following requirements:

- For each RRU, the wall must be able to bear a weight four times heavier than the RRU's weight and the bolts' pulling force of 1.25 kN (281.25 lbf) vertical to the wall.
- Expansion bolts must be tightened to 30 N•m to ensure that the bolts work properly and the wall remains intact.

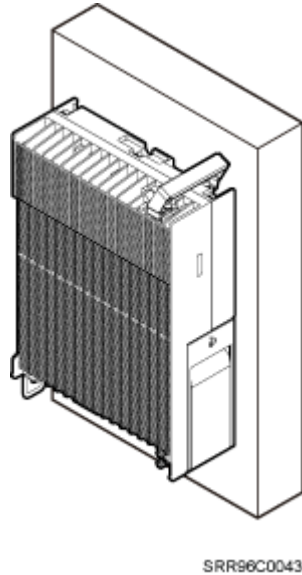
### NOTICE

- The standard installation is recommended for RRUs installed on a wall.
- When RRUs are installed on a wall in side-mounted mode, do not combine mounting brackets for multiple RRUs, as shown in [Figure 3-17](#).

**Figure 3-17** Correct installation of mounting brackets for multiple RRUs installed on a wall in side-mounted mode

**Figure 3-18** shows an RRU installed on a wall.

**Figure 3-18** RRU installed on a wall



## Installing an RRU on an IFS06

- The upper and lower adjustable beams on an IFS06 can be moved up and down to fit for heights of RRUs.
- The IFS06 supports at least three RRUs when the ambient temperature is higher than or equal to the lowest operating temperature of the RRUs and at least 5°C (41°F) lower than the highest operating temperature of the RRUs. The IFS06 supports a maximum of six RRUs when the ambient temperature is higher than or equal to the lowest operating temperature of the RRUs and at least 10°C (50°F) lower than the highest operating temperature of the RRUs.

 **NOTE**

For details about the operating temperature of the RRUs, see section "Technical Specifications of RRUs" in *3900 Series Base Station Technical Description*.

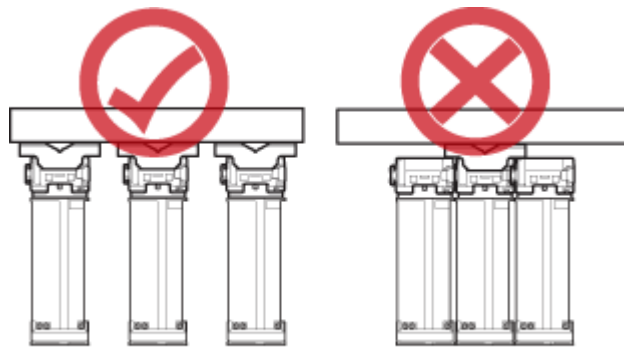
---

 **NOTICE**

The mounting brackets for multiple RRUs cannot be combined when the RRUs are installed on an IFS06, as shown in **Figure 3-19**.

---

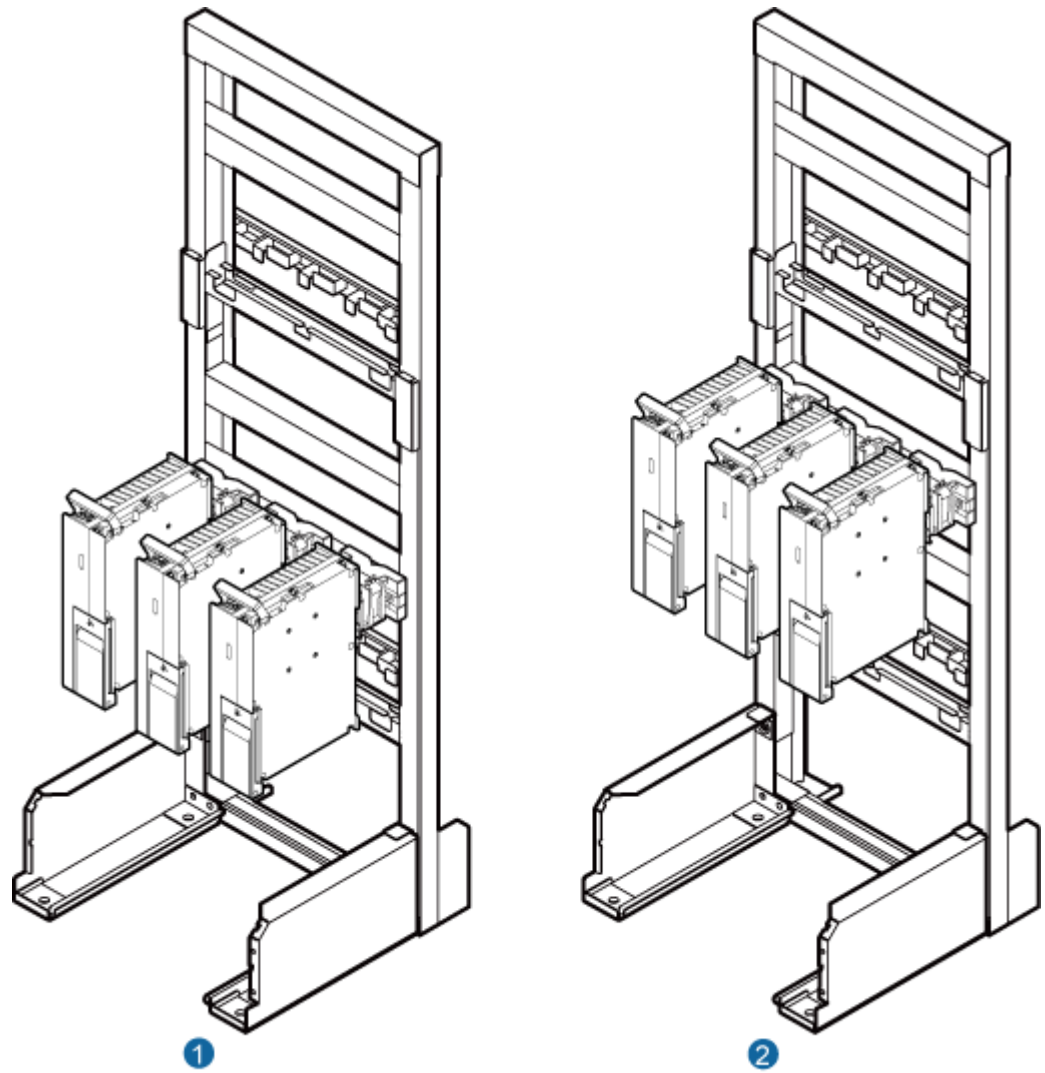
**Figure 3-19** Correct installation of mounting brackets for RRUs installed on an IFS06



EIR96C0002

**Figure 3-20** and **Figure 3-21** show RRUs installed on an IFS06.

Figure 3-20 Three RRUs installed on an IFS06

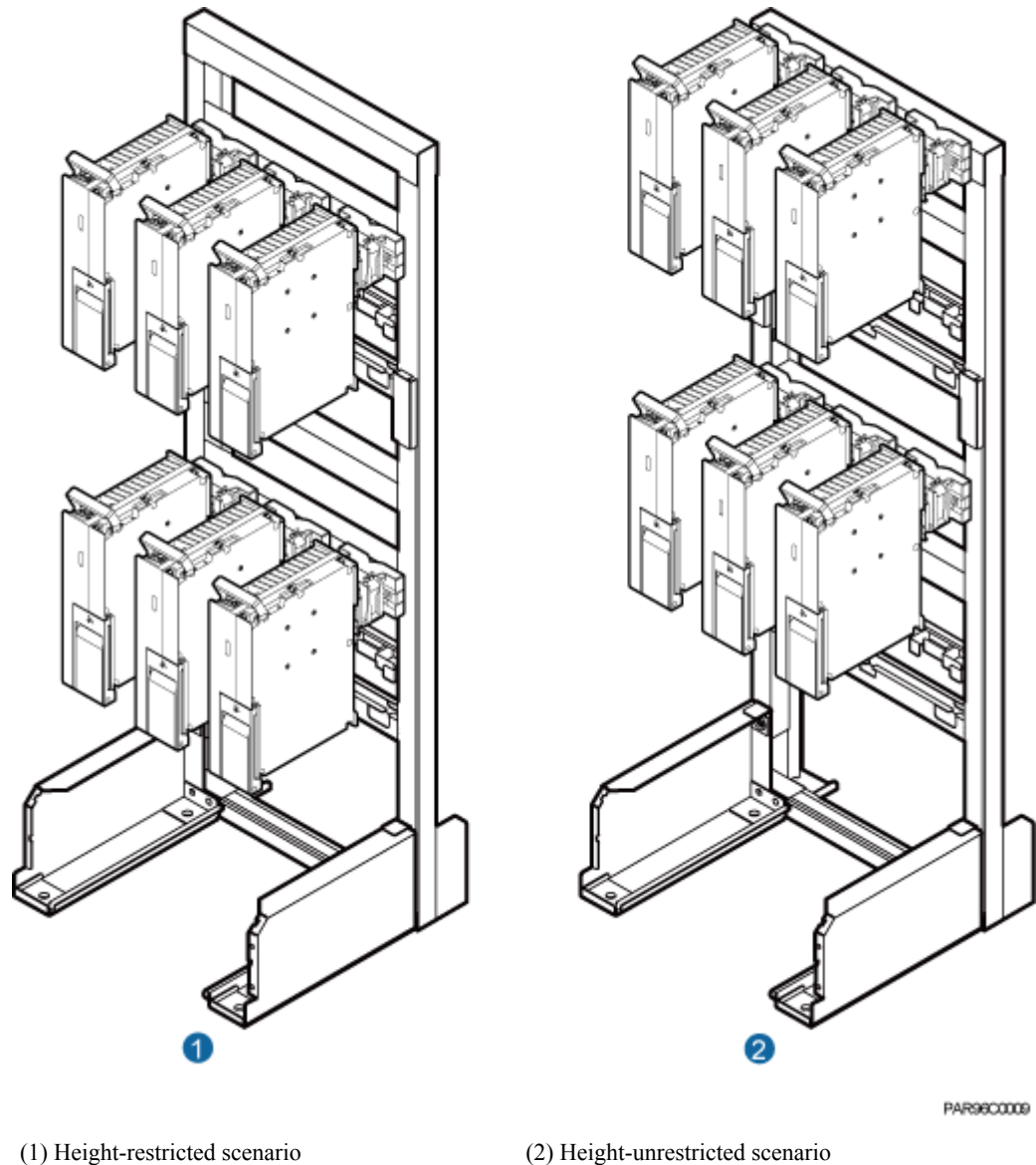


(1) Height-restricted scenario

(2) Height-unrestricted scenario

PAR96C0008

Figure 3-21 Six RRUs installed on an IFS06



## 3.5 Installation Clearance Requirements of an RRU

This section describes the requirements for the installation clearance of a single RRU and multiple RRUs and the requirements for the installation spacing between RRUs.

### 3.5.1 Clearance for a Single RRU

This section describes the recommended and minimum clearances for a single RRU.



---

 **NOTICE**

If an RRU is installed on the bitumen ground, the RRU must be at least 500 mm (700 mm or more as recommended) away from the bitumen ground. The following describes the space requirements for installing a single RRU on the non-bitumen ground.

---

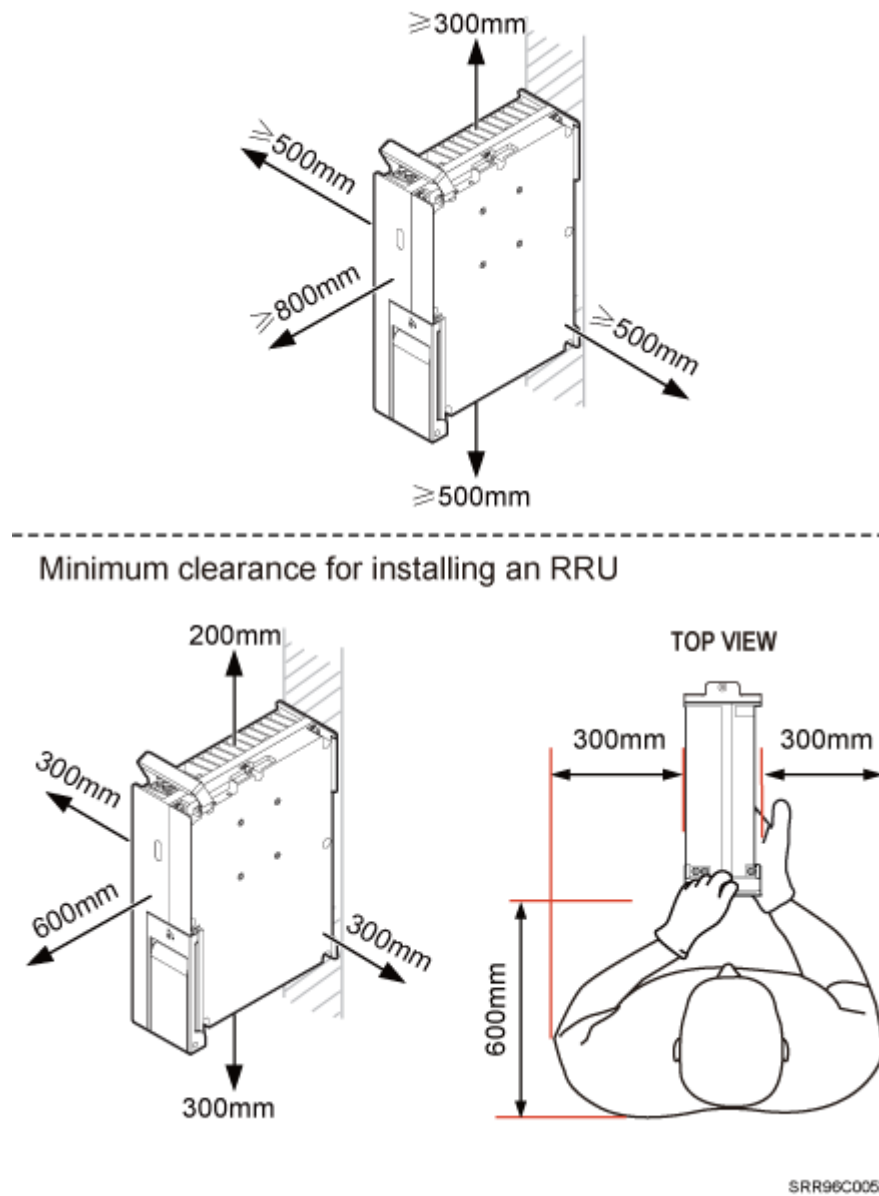
 **NOTE**

- The recommended clearances ensure normal running and provide appropriate space for operation and maintenance (O&M). If the installation space is sufficient, leave the recommended clearances after installing the equipment.
- The minimum clearance ensures normal running and heat dissipation, but O&M activities such as checking indicator status and opening the cabling cavity cannot be properly conducted. If the installation space is restricted, leave the minimum clearance after installing the equipment.

## Clearance for a Single RRU in Side-Mounted Mode

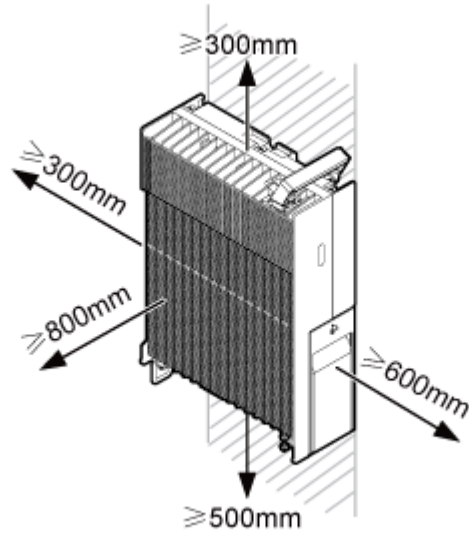
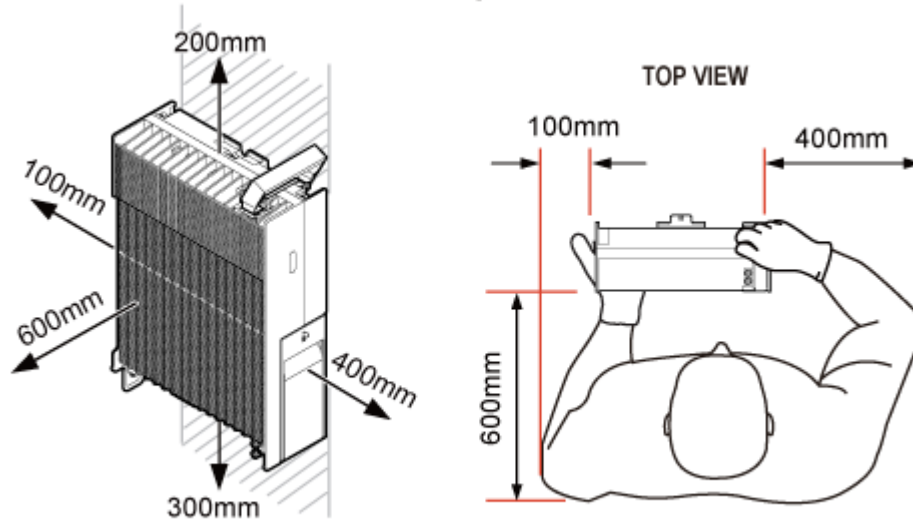
[Figure 3-22](#) shows the clearance for a single RRU in side-mounted mode.

**Figure 3-22** Clearance for a single RRU in side-mounted mode  
Recommended clearances for installing an RRU



## Clearance for a Single RRU in Standard Mode

**Figure 3-23** shows the clearance for a single RRU in standard mode.

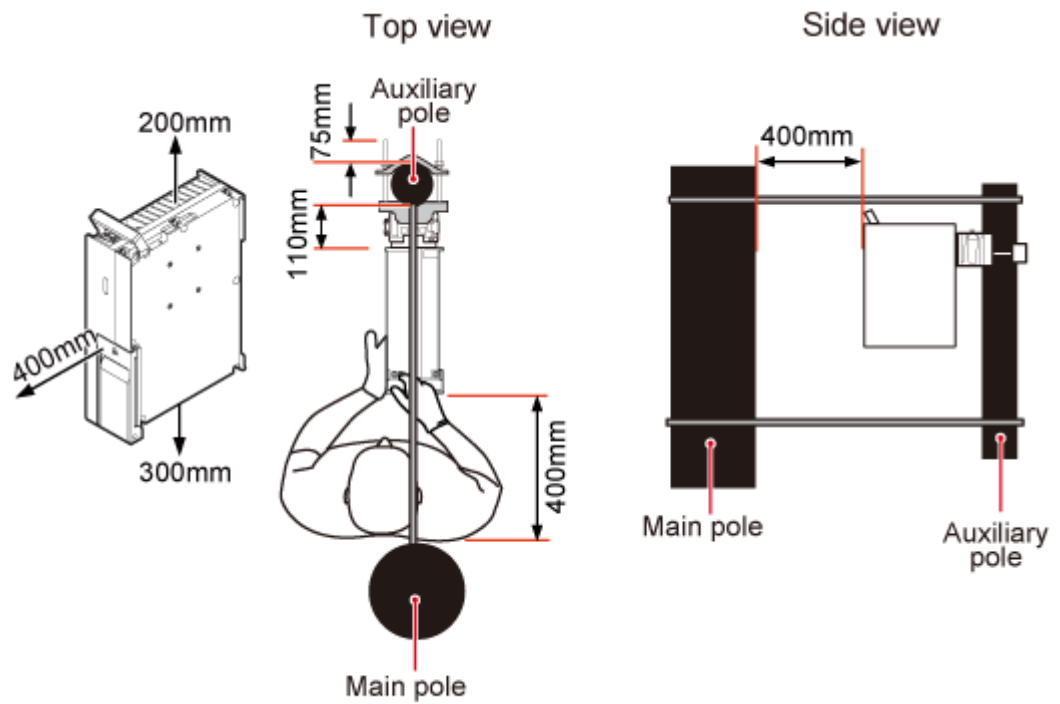
**Figure 3-23** Clearance for a single RRU in standard mode**Recommended clearances for installing an RRU****Minimum clearance for installing an RRU**

SRR96C0051

**Clearance for a Single Tower-Mounted RRU**

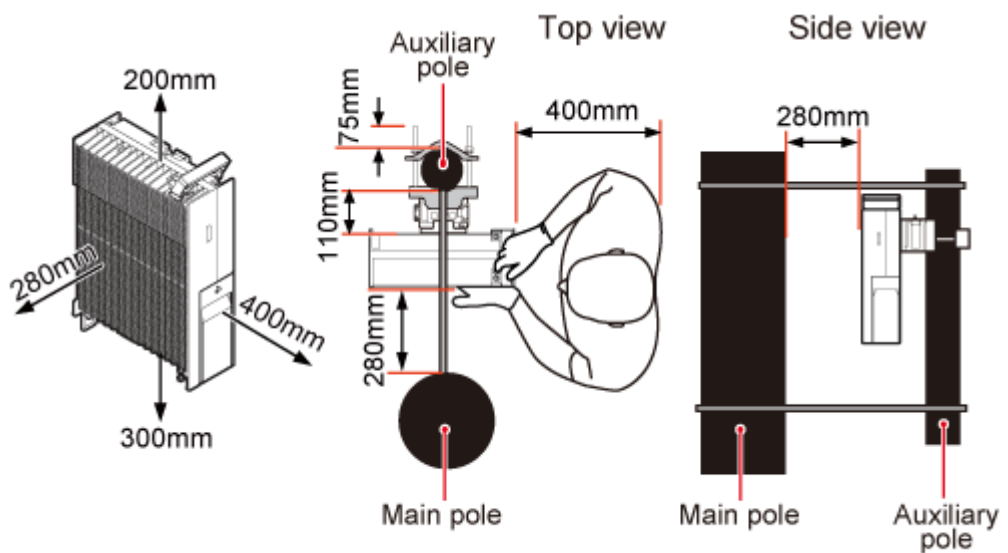
[Figure 3-24](#) and [Figure 3-25](#) show the minimum clearances for a single RRU in side-mounted mode and standard mode on a tower.

**Figure 3-24** Minimum clearance for a single RRU in side-mounted mode on a



SRR96C0027

**Figure 3-25** Minimum clearance for a single RRU in standard mode on a tower



SRR96C0053

### 3.5.2 Clearance for Three or More RRUs

This section describes the recommended and minimum clearances for three or more RRUs.

## NOTICE

If an RRU is installed on the bitumen ground, the RRU must be at least 500 mm (700 mm or more as recommended) away from the bitumen ground. The following describes the space requirements for installing multiple RRUs on the non-bitumen ground.

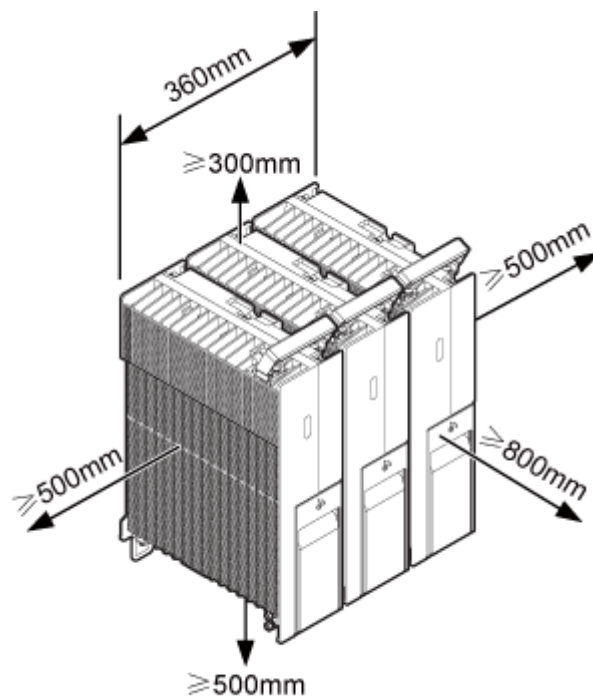
### NOTE

- The recommended clearances ensure normal running and provide appropriate space for operation and maintenance (O&M). If the installation space is sufficient, leave the recommended clearances after installing the equipment.
- The minimum clearance ensures normal running and heat dissipation, but O&M activities such as checking indicator status and opening the cabling cavity cannot be properly conducted. If the installation space is restricted, leave the minimum clearance after installing the equipment.

## Recommended Clearances for Three or More RRUs Installed in Centralized Mode

**Figure 3-26** shows the recommended clearances for three or more RRUs installed in centralized mode.

**Figure 3-26** Recommended clearances for three or more RRUs installed in centralized mode

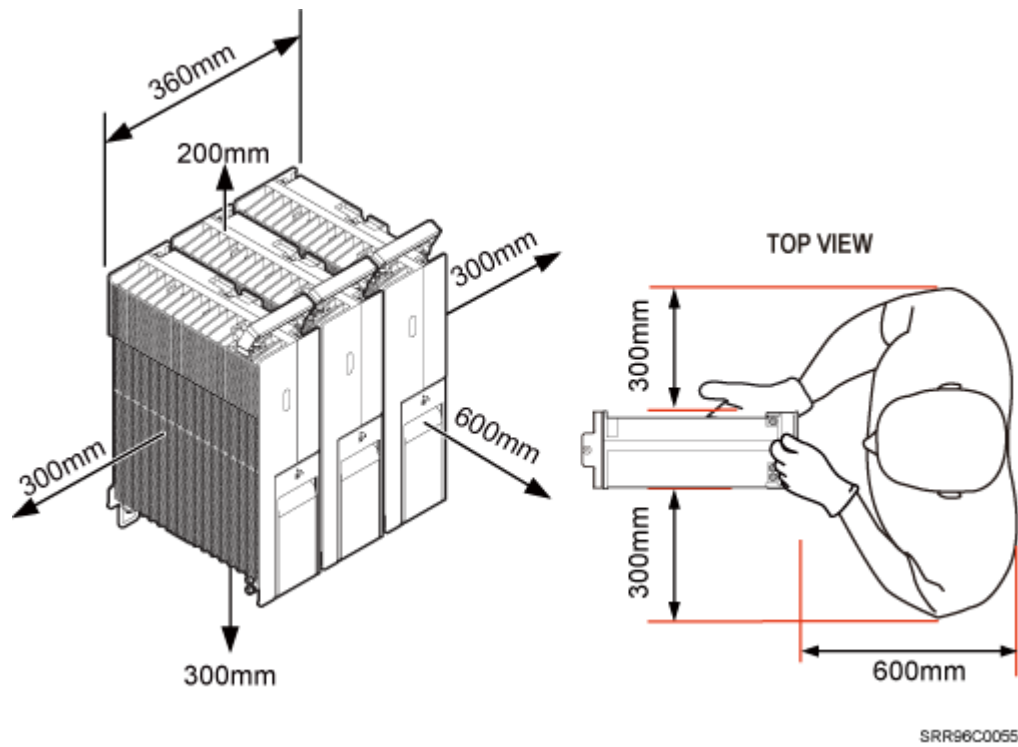


SRR96C0054

## Minimum Clearances for Three or More RRUs Installed in Centralized Mode

**Figure 3-27** shows the minimum clearances for three or more RRUs installed in centralized mode.

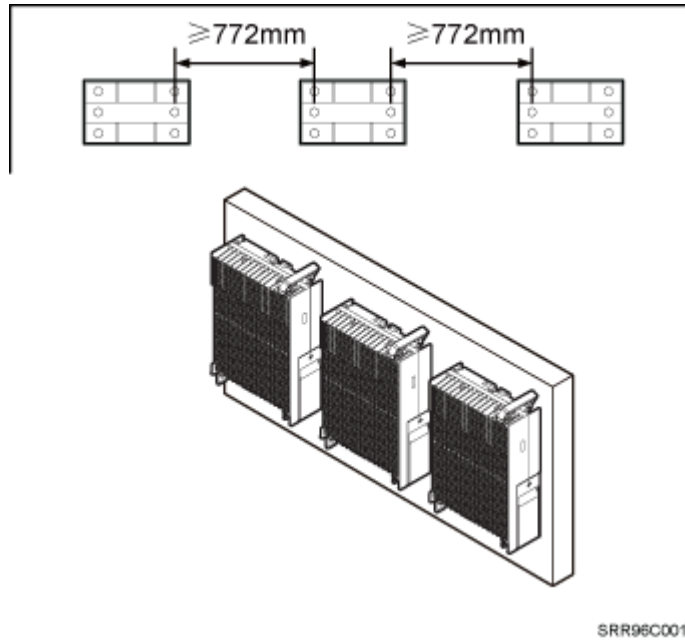
**Figure 3-27** Minimum clearances for three or more RRUs installed in centralized mode



## Recommended Clearances for Three or More RRUs Installed in Standard Mode on a Wall

**Figure 3-28** shows the recommended clearances for three or more RRUs installed in standard mode on a wall.

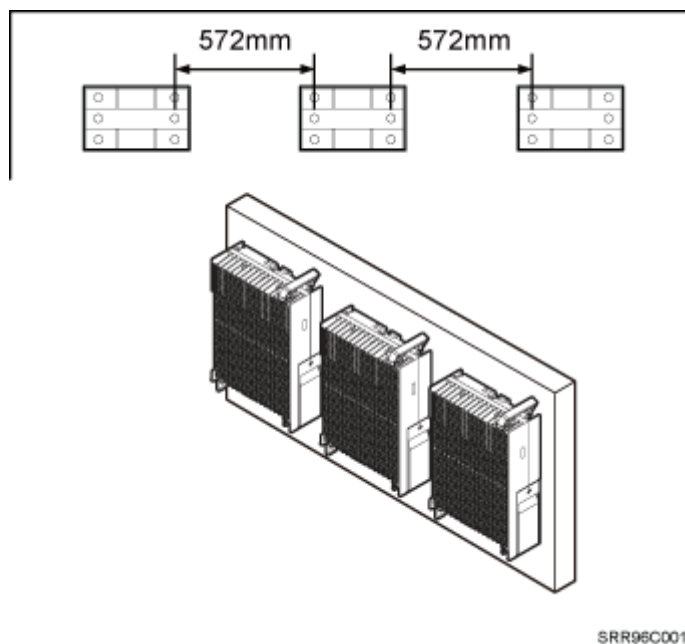
**Figure 3-28** Recommended clearances for three or more RRUs installed in standard mode on a wall



## Minimum Clearances for Three or More RRUs Installed in Standard Mode on a Wall

**Figure 3-29** shows the minimum clearances for three or more RRUs installed in standard mode on a wall.

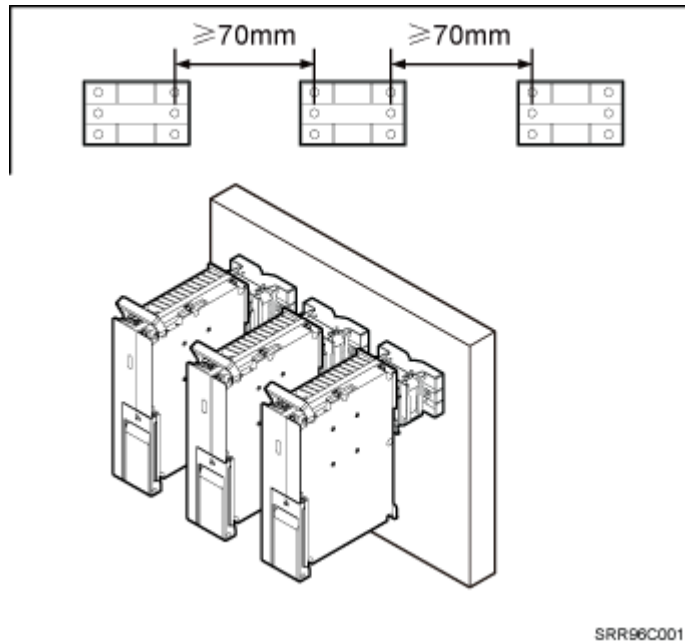
**Figure 3-29** Minimum clearances for three or more RRUs installed in standard mode on a wall



## Recommended Clearances for Three or More RRUs Installed in Side-Mounted Mode on a Wall

**Figure 3-30** shows the recommended clearances for three or more RRUs installed in side-mounted mode on a wall.

**Figure 3-30** Recommended clearances for three or more RRUs installed in side-mounted mode on a wall



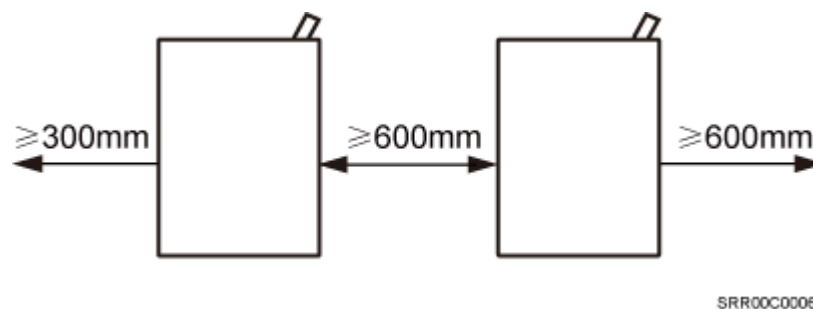
### 3.5.3 Installation Spacing Between RRUs

This section describes the horizontal and vertical spacing between RRUs.

#### Recommended Horizontal Spacing Between RRUs

**Figure 3-31** shows the recommended horizontal spacing between RRUs.

**Figure 3-31** Recommended horizontal spacing between RRUs

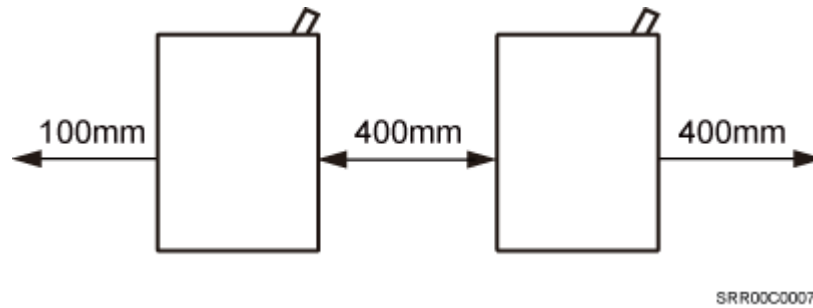




## Minimum Horizontal Spacing Between RRUs

Figure 3-32 shows the minimum horizontal spacing between RRUs.

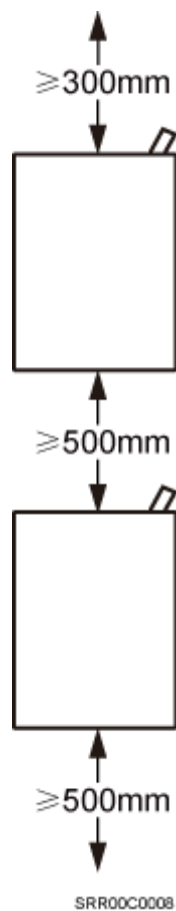
Figure 3-32 Minimum horizontal spacing between RRUs



## Recommended Vertical Spacing Between RRUs

Figure 3-33 shows the recommended vertical spacing between RRUs.

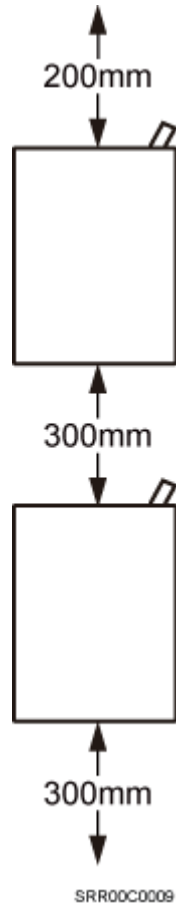
Figure 3-33 Recommended vertical spacing between RRUs



## Minimum Vertical Spacing Between RRUs

**Figure 3-34** shows the minimum vertical spacing between RRUs.

**Figure 3-34** Minimum vertical spacing between RRUs



# 4 Unpacking the Equipment

This chapter describes how to unpack and check the delivered equipment to ensure that all the materials are included and intact.

## Context

### NOTE

When transporting, moving, or installing the equipment, components, or parts, you must:

- Prevent them from colliding with doors, walls, shelves, or other objects.
- Wear clean gloves, and avoid touching the equipment, components, or parts with bare hands, sweat-soaked gloves, or dirty gloves.



### NOTICE

- After a cabinet or an BBU is unpacked, it must be powered on within 7 days.
- After an RRU is unpacked, it must be powered on within 24 hours.

## Procedure

**Step 1** Check the total number of articles in each case according to the packing list.

If ...	Then ...
The total number tallies with the packing list	Go to <a href="#">Step 2</a> .
The total number does not tally with the packing list	Find out the cause and report any missing articles to the local Huawei office.

**Step 2** Check the exterior of the packing case.

If ...	Then ...
The outer packing is intact	Go to <a href="#">Step 3</a> .
The outer packing is severely damaged or soaked	Find out the cause and report it to the local Huawei office.

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

If ...	Then ...
Types and quantity of the article tally with those on the packing list	Sign the <i>Packing List</i> with the customer.
Either shipment shortage, wrong shipment or damaged articles.	Report to the local Huawei office.



## CAUTION

- To protect the equipment and prevent damage to the equipment, you are advised to keep the unpacked equipment and packing materials indoors, take photos of the stocking environment, packing case or carton, packing materials, and any rusted or eroded equipment, and then file the photos.
- Verify that the insulation layers of all RRU cables are intact. If the insulation layers are damaged or broken, water will penetrate into the cables, which may cause damages to RRUs or human injury.

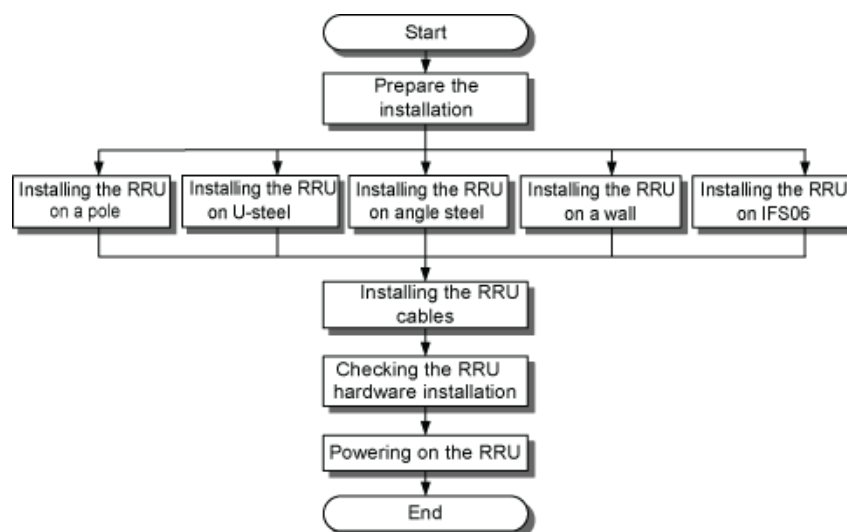
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# 5 Installation Process

The installation process involves installing an RRU and RRU cables, checking the RRU hardware installation, and powering on an RRU.

**Figure 5-1** shows the installation process.

**Figure 5-1** Process of installing an RRU



IPR42C0001

# 6 Hoisting an RRU and Related Cables onto a Tower

---

## About This Chapter

This section describes the procedure for hoisting an RRU and related cables onto a tower and the precautions that must be taken.

### [6.1 Hoisting an RRU onto a Tower](#)

This section describes the procedures and precautions for hoisting an RRU and its mounting kits onto a tower. In tower-mounted scenarios, the RRU can be installed on a pole, U-steel, or angle steel.

### [6.2 Hoisting Fiber Optic Cables onto a Tower](#)

This section describes the procedure for hoisting fiber optic cables onto a tower and the precautions that must be taken.

### [6.3 Hoisting Power Cables onto a Tower](#)

This section describes the procedure for hoisting power cables onto a tower and the precautions that must be taken.

## 6.1 Hoisting an RRU onto a Tower

This section describes the procedures and precautions for hoisting an RRU and its mounting kits onto a tower. In tower-mounted scenarios, the RRU can be installed on a pole, U-steel, or angle steel.

### Prerequisites

When the RRU is powered by an AC/DC power module, you need to install the AC/DC power module onto the RRU before hoisting them onto a tower. For detailed operations, see *AC/DC Power Module User Guide* or *OPM15M User Guide*.



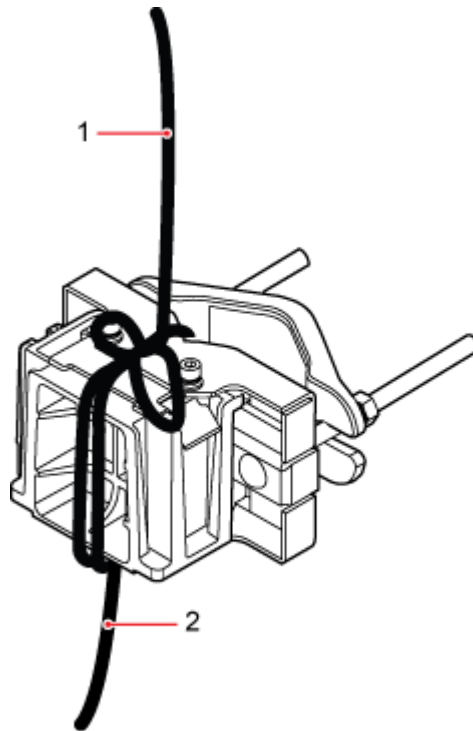
### NOTICE

- Do not stand the RRU upright because the RF ports cannot support the weight of the RRU.
  - Place a foam pad or cardboard under the RRU to protect the RRU housing from damage during the installation.
- 

### Procedure

- Step 1** After climbing up to the tower, technician A secures the fixed pulley to the tower platform support and leads the lifting sling through the fixed pulley.
- Step 2** Technician C binds the mounting kits using the lifting sling and traction sling on the ground, as shown in [Figure 6-1](#). Then technician B pulls the lifting sling downwards, and technician C pulls the traction sling outwards to protect the mounting kits from colliding with the tower.

Figure 6-1 Binding mounting kits for the RRU



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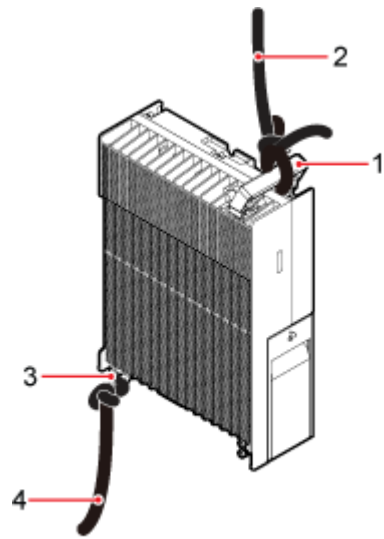
(1) Lifting sling

(2) Traction sling

- Step 3** Technician A catches the mounting kits and then unties the slings.
- Step 4** Install the mounting kits. For detailed operations, see steps 1 to 3 in [7.2.1 Installing a Single RRU](#).
- Step 5** Technician C binds the RRU using the lifting sling and traction sling, as shown in [Figure 6-2](#). The binding methods in [Figure 6-3](#) and [Figure 6-4](#) are incorrect.



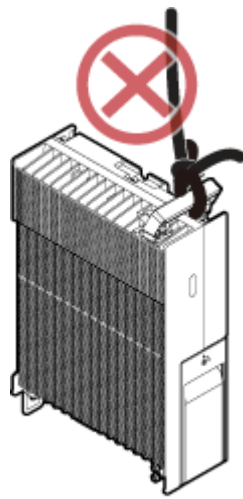
Figure 6-2 Binding the RRU



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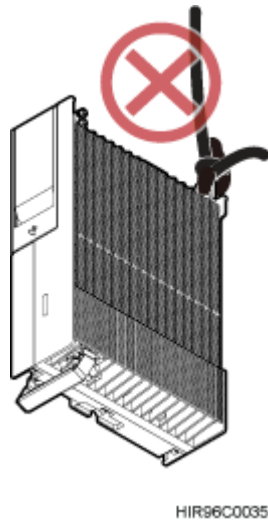
- (1) Handle      (2) Lifting sling      (3) Traction eye      (4) Traction sling

Figure 6-3 Incorrect binding method (1)



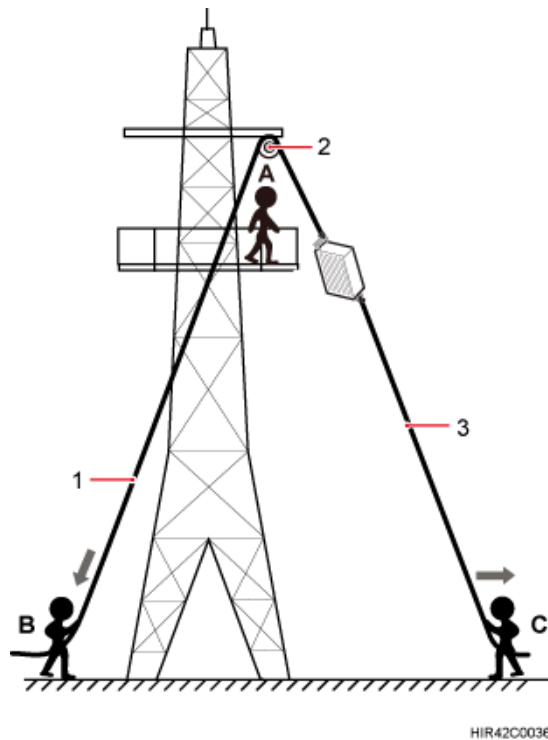
HIR96C0034

Figure 6-4 Incorrect binding method (2)



**Step 6** Hoist the RRU onto the tower, as shown in [Figure 6-5](#). Technician B pulls the lifting sling downwards, and technician C pulls the traction sling outwards to protect the RRU from colliding with the tower.

Figure 6-5 Hoisting the RRU onto the tower



(1) Lifting sling

(2) Fixed pulley

(3) Traction sling

---

 **NOTICE**

- The load-bearing capacity of each sling must be greater than 200 kg (441 lb) and the diameter of each sling must be less than 25 mm (0.98 in.).
  - When hoisting each device onto a tower, protect them from colliding with the tower.
  - Hoist the RRU onto the tower before it is installed on a pole, angle steel, or U-steel.
  - Do not hoist any thing by the traction eye.
- 

**Step 7** Technician A catches the RRU hoisted onto the tower.

**Step 8** Technician A installs the RRU onto the main bracket and uses an inner hexagon torque screwdriver to tighten the captive screw into the hole of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.). For detailed operations, see steps 4 and 5 in [7.2.1 Installing a Single RRU](#).

**Step 9** Untie the lifting sling and traction sling.

 **NOTE**

The procedure for hoisting the RRU and its mounting kits onto the tower is for your reference only.

----End

## 6.2 Hoisting Fiber Optic Cables onto a Tower

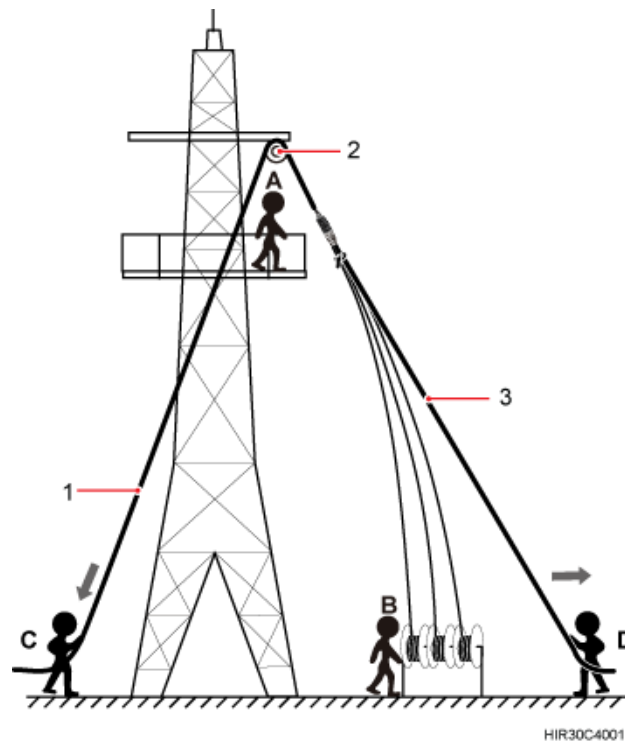
This section describes the procedure for hoisting fiber optic cables onto a tower and the precautions that must be taken.

### Context

Cabling requirements for power cables are met. For details, see [8.1 Cabling Requirements](#).

### Procedure

**Step 1** Hoist the fiber optic cables onto the tower, as shown in [Figure 6-6](#).

**Figure 6-6** Hoisting fiber optic cables onto the tower

(1) Lifting sling

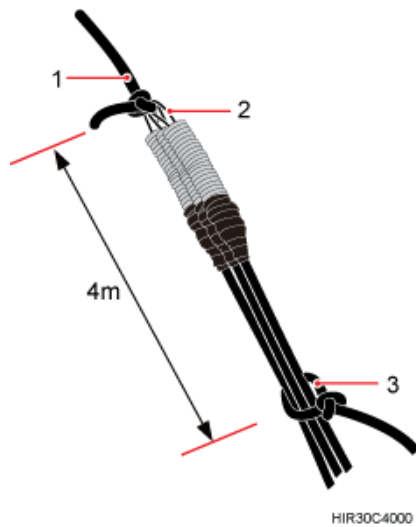
(2) Fixed pulley

(3) Traction sling

## NOTICE

Before hoisting fiber optic cables onto the tower, connect the fiber optic cables to the RRU or BBU based on the labels on both ends of the cables and determine the hoisting direction.

1. After climbing up to the tower, installation engineer A secures the fixed pulley to the tower platform support and leads the lifting sling through the fixed pulley.
2. Installation engineer B places the fiber coiler for coiling fiber optic cables on the fiber spools, and installation engineer D lead the lifting sling through the stretch sling of the fiber optic cables and use the other sling as a traction sling to secure the cables 4 m (13.12 ft) away from the lifting sling, as shown in [Figure 6-7](#).

**Figure 6-7** Binding fiber optic cables

(1) Lifting sling

(2) Stretch sling

(3) Traction sling

## NOTICE

Do not remove the stretch sling and protection pipe or bind fiber optic cables using one sling, as shown in [Figure 6-8](#).

**Figure 6-8** Incorrect binding method

3. Installation engineer B rotates the fiber spools at the speed of 5 m (16.4 ft) to 15 m (49.21 ft) per minute to coil the fiber optic cables.
4. Installation engineer C pulls the lifting sling downwards, and installation engineer D pulls the traction sling outwards to protect the fiber optic cables from colliding with the tower.

**Step 2** Secure the fiber optic cables to the tower vertically using cable clips.

**Step 3** Remove the lifting sling, traction sling, and protection pipe.

 **NOTE**

The procedure for hoisting the fiber optic cables onto the tower is for your reference only.

----End

## 6.3 Hoisting Power Cables onto a Tower

This section describes the procedure for hoisting power cables onto a tower and the precautions that must be taken.

### Context

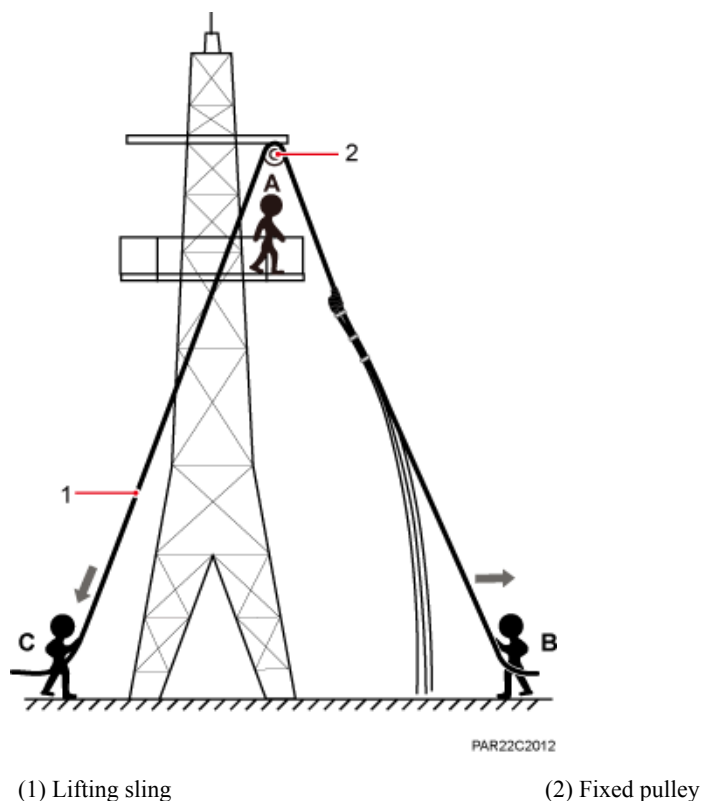
Cabling requirements for power cables are met. For details, see [8.1 Cabling Requirements](#).

The procedure for adding a connector to the RRU power cable on the RRU side is done under the tower.

### Procedure

**Step 1** Hoist the power cables onto the tower, as shown in [Figure 6-9](#).

**Figure 6-9** Hoisting power cables onto the tower

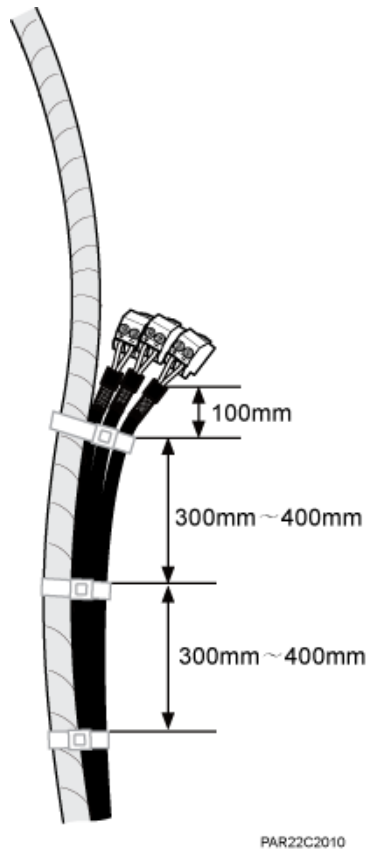


1. After climbing up to the tower, installation engineer A secures the fixed pulley to the tower platform support and leads the lifting sling through the fixed pulley.
2. Installation engineer B secures three cable ties to the power cable connector, and then secures the power cable to the lifting sling, as shown in [Figure 6-10](#).

 **NOTE**

The connector on the power cable in the figure is only an example. The actual connector may vary according to the situation.

**Figure 6-10** Binding cable ties

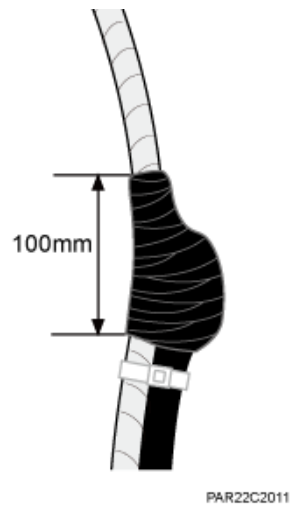


3. Installation engineer B wraps the power cable connector with a layer of PVC insulation tape, as shown in [Figure 6-11](#).

 **NOTE**

Wrap the PVC insulation tape from 30 mm (1.18 in.) away from one end of the connector until it reaches the other end of the connector. The total length of the wrapped connector is 100 mm (3.94 in.).

**Figure 6-11** Wrapping the PVC insulation tape



4. Installation engineer C pulls the lifting sling downwards, and installation engineer B pulls the other end of the lifting sling outwards to protect the power cables from colliding with the tower.

**Step 2** Secure the power cables to the tower vertically using cable clips.

**Step 3** Remove the cable ties, PVC insulation tape, and lifting sling.

**NOTE**

The procedure for hoisting the power cables onto the tower is for your reference only.

**---End**



# 7 Installing the RRU

---

## About This Chapter

This chapter describes the procedure for installing the RRU. The procedure for installing the RRU varies depending on installation options.

### [7.1 Mounting Kits for an RRU](#)

This section describes the bracket assembly and the attachment plate for an RRU.

### [7.2 Installing the RRU on a Pole](#)

One or more RRUs can be installed on a pole.

### [7.3 Installing an RRU on U-steel](#)

This section describes the procedure and precautions for installing an RRU on U-steel. An RRU can be installed on U-steel secured on the ground or a tower. Each piece of U-steel allows only one RRU to be installed in standard mode.

### [7.4 Installing an RRU on Angle Steel](#)

This section describes the procedure and precautions for installing an RRU on angle steel. An RRU can be installed on angle steel secured on the ground or a tower. Each piece of angle steel allows only one RRU to be installed in standard mode.

### [7.5 Installing an RRU on a Wall](#)

This section describes the procedure and precautions for installing an RRU on a wall.

### [7.6 Installing an RRU on an IFS06](#)

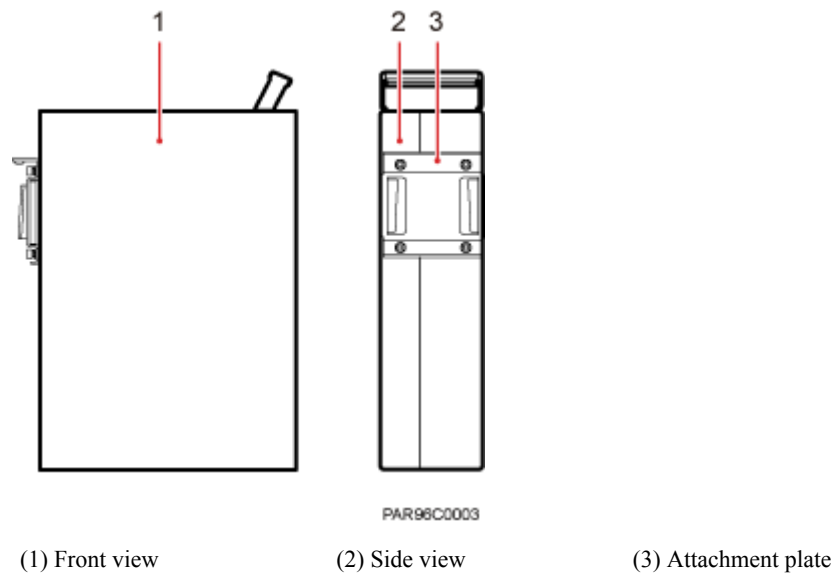
This section describes the procedure and precautions for installing an RRU on an IFS06.

## 7.1 Mounting Kits for an RRU

This section describes the bracket assembly and the attachment plate for an RRU.

**Figure 7-1** shows the front and side of an RRU.

**Figure 7-1** Front and side view of an RRU

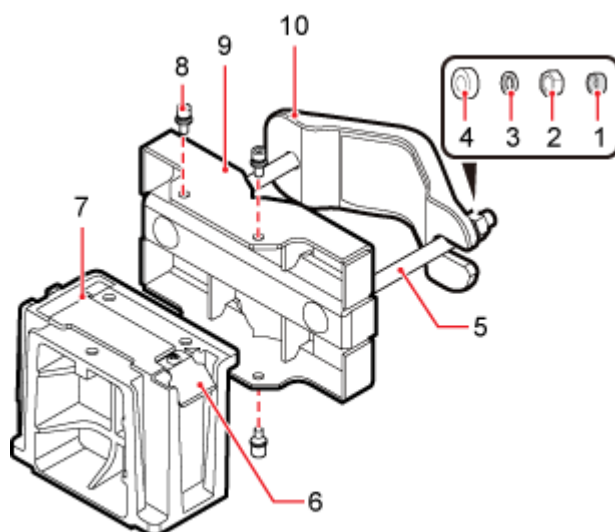


**NOTE**

When the operator faces the RRU whose handle and cabling cavity are on the right-hand side, the side facing the operator is the front of the RRU.

**Figure 7-2** shows the bracket assembly for an RRU.

Figure 7-2 12 L blade RRU mounting kit



PIR42C0004

- |                                     |                      |                         |                               |                        |
|-------------------------------------|----------------------|-------------------------|-------------------------------|------------------------|
| (1) Plastic cap                     | (2) Standard M10 nut | (3) Spring washer       | (4) Thick flat washer         | (5) Square-neck bolt   |
| (6) Hoist clamp on the main bracket | (7) Main bracket     | (8) Inner hexagon screw | (9) Pole installation bracket | (10) Auxiliary bracket |

## 7.2 Installing the RRU on a Pole

One or more RRUs can be installed on a pole.

### 7.2.1 Installing a Single RRU

This section describes the procedure and precautions for installing a single RRU on a pole.

#### Prerequisites

Before you install an RRU on a pole secured on a tower, the RRU and its mounting brackets are hoisted onto the tower. For details, see [6.1 Hoisting an RRU onto a Tower](#).

The hoist clamp on the main bracket is secured properly.

---

#### NOTICE

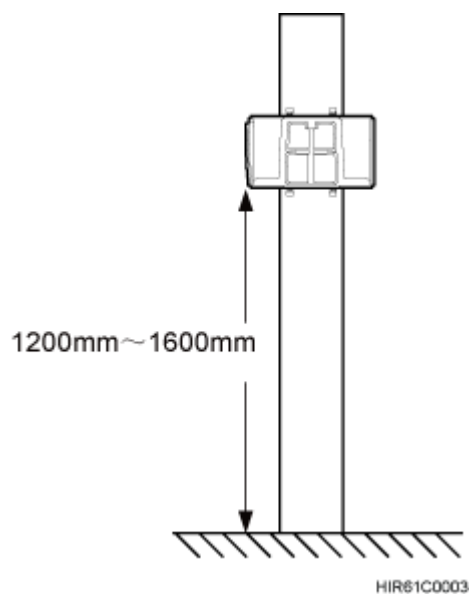
- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
  - Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.
-

## Procedure

**Step 1** Determine a position for installing the mounting brackets.

- If the RRU is installed on a tower, determine a position for installing the mounting brackets according to the instructions in [3.5.1 Clearance for a Single RRU](#).
- If the RRU is installed on the ground, determine a position for installing the mounting brackets according to [Figure 7-3](#).

**Figure 7-3** Distance between the mounting brackets and the ground

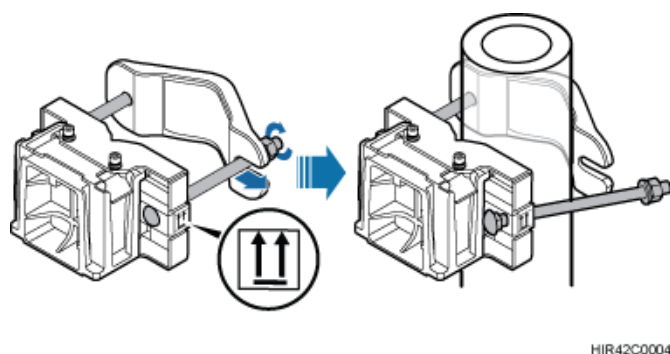


 **NOTE**

As shown in the figure above, it is recommended that the mounting kits be installed at a position 1200 mm (47.24 in.) to 1600 mm (59.06 in.) high above the ground. If the space is insufficient, only the [3.5 Installation Clearance Requirements of an RRU](#) needs to be provided.

**Step 2** Install the RRU mounting brackets, as shown in [Figure 7-4](#).

**Figure 7-4** Installing the RRU mounting brackets



**NOTE**

Ensure that the arrows on the mounting brackets are pointing up.

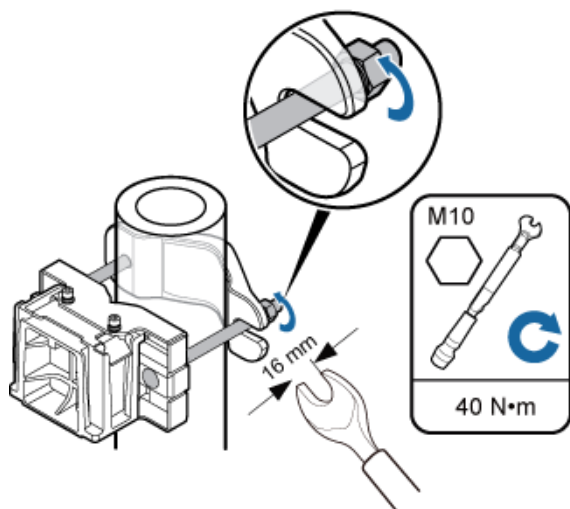
1. Adjust the position of the nut and remove the square-neck bolt at the open end from the slot on the auxiliary bracket.
2. Slide the mounting brackets onto the pole horizontally and insert the square-neck bolt into the slot.

**Step 3** Use a 16 mm (0.63 in.) M10 torque wrench to tighten the nuts to 40 N·m (354.03 lbf·in.) so that the mounting brackets are secured onto the pole, as shown in [Figure 7-5](#).

**NOTICE**

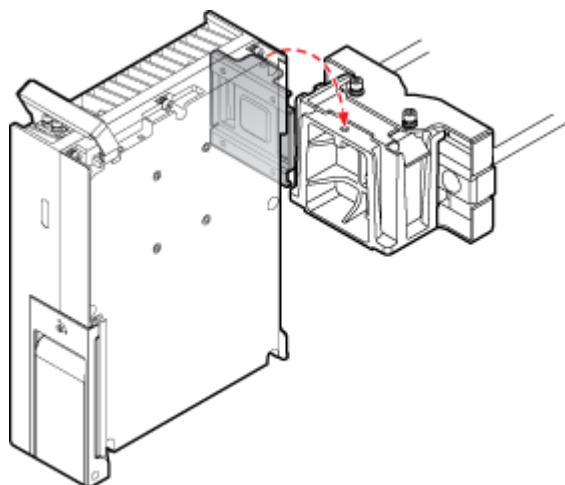
Tighten the nuts on the two square-neck bolts simultaneously. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

**Figure 7-5** Securing the RRU mounting brackets



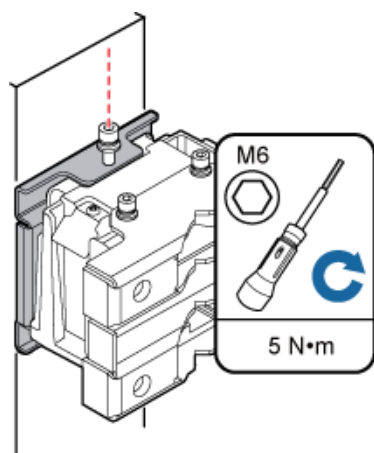
HIR42C0005

**Step 4** Install the RRU onto the main bracket, as shown in [Figure 7-6](#).

**Figure 7-6** Installing the RRU onto the main bracket

HIR96C0056

- Step 5** Use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-7](#).

**Figure 7-7** Securing the captive screw into the connection hole

HIR42C0011

----End

## 7.2.2 Installing Two RRUs

This section describes the procedure and precautions for installing two RRUs on a pole.

### Prerequisites

The hoist clamp on the main bracket is secured properly.

---

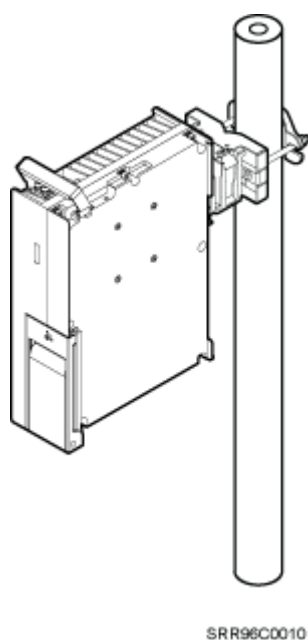
 **NOTICE**

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
  - Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.
- 

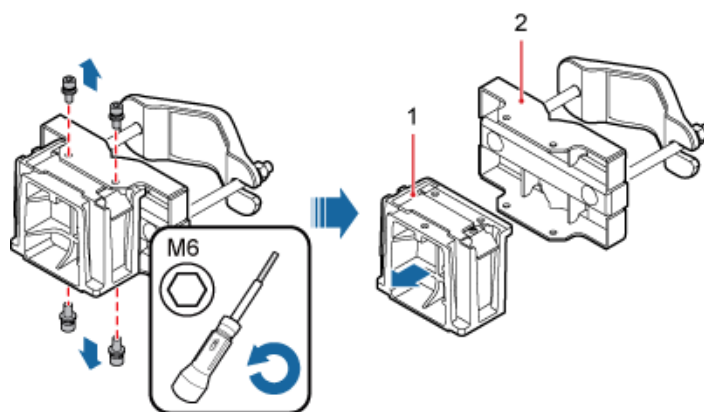
## Procedure

- Step 1** Install the first RRU onto the main bracket, as shown in [Figure 7-8](#). For details, see [7.2.1 Installing a Single RRU](#).

**Figure 7-8** Installing the first RRU onto the main bracket



- Step 2** Use an M6 inner hexagon screwdriver to loosen the four hex socket screws from the main bracket and pole installation brackets on the second set of mounting brackets, and remove the main bracket, as shown in [Figure 7-9](#).

**Figure 7-9** Removing the RRU main bracket

HIR42C0038

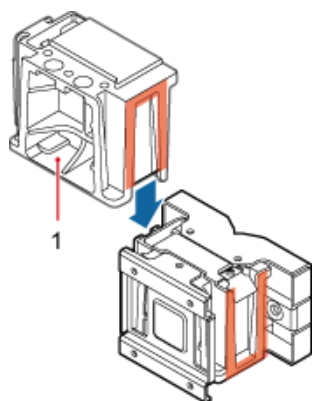
(1) Main bracket

(2) Pole installation bracket

**Step 3** Install the removed main bracket on one side of the first main bracket, as shown in [Figure 7-10](#).

## NOTICE

The second main bracket must be installed, with the open ends of U-shaped slots on both sides facing downwards.

**Figure 7-10** Installing the second main bracket

HIR42C0008

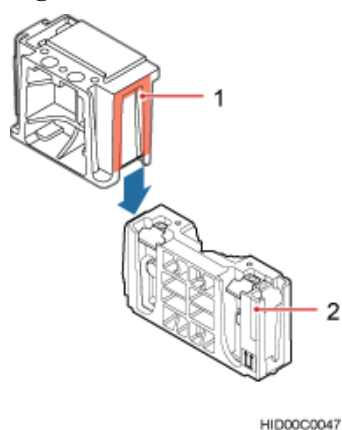
(1) Removed main bracket

## NOTE

The main mounting bracket for installing a blade RRU can connect to the main mounting bracket for installing a common RRU in the scenarios of adding RRUs, as shown in [Figure 7-11](#).



**Figure 7-11** Connect to the main mounting bracket for installing a common RRU

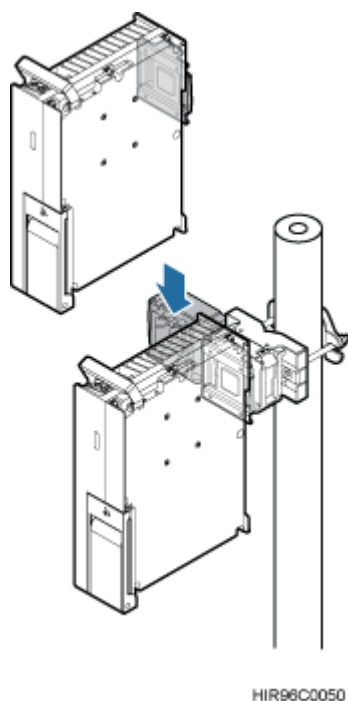


(1) Main mounting bracket for a blade RRU

(2) Main mounting bracket for a common RRU

**Step 4** Install the second RRU onto the main bracket, as shown in [Figure 7-12](#).

**Figure 7-12** Installing the second RRU onto the main bracket

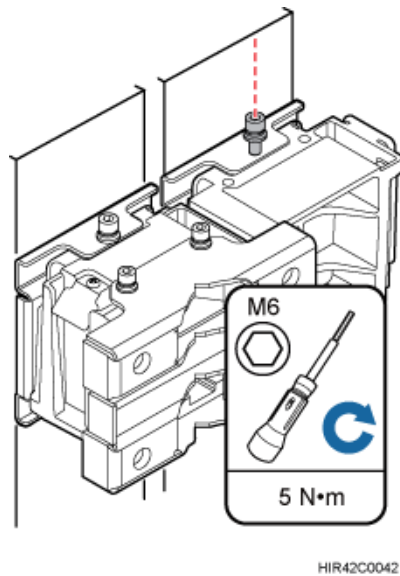



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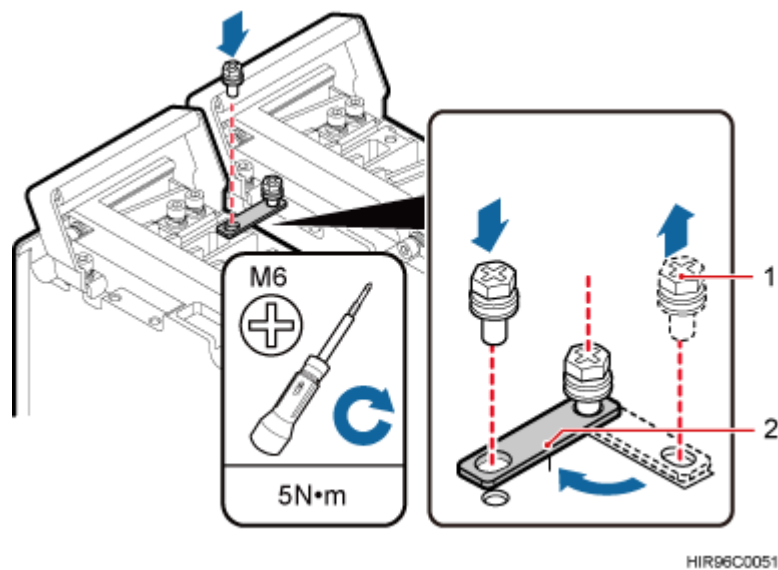
 **NOTICE**

After installing each RRU on its main bracket, use an inner hexagon torque screwdriver to tighten the captive screw into the holes of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-13](#)

---

**Figure 7-13** Securing the captive screw into the connection hole

**Step 5** Install the sheet metal tab for fixing the neighboring RRUs, as shown in [Figure 7-14](#).

**Figure 7-14** Installing the sheet metal tab

(1) Screw

(2) Sheet metal tab

1. Use an M6 Phillips screwdriver to loosen the screw on the sheet metal tab farther from the handle of the second RRU and remove the screw.
2. Use an M6 Phillips screwdriver to loosen the screw on the sheet metal tab closer to the handle of the second RRU. Then, rotate the sheet metal tab to align the vacant hole in the sheet metal tab with a hole on the top of the first RRU.

3. Insert the removed screw into the hole on the top of the first RRU and use an M6 torque screwdriver to tighten the screw to 5 N·m (44.25 lbf·in.).

---End

## 7.2.3 Installing Three or More RRUs

This section describes the procedure and precautions for installing three or more RRUs on a pole.

### Prerequisites

The hoist clamp on the main bracket is secured properly.



### NOTICE

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
- Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.

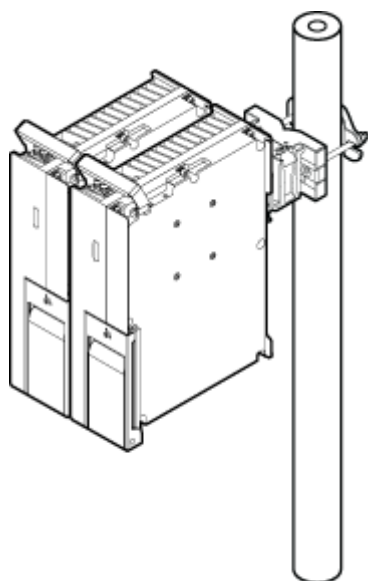
### Context

A pole supports three, four, or six RRUs. The procedures for installing them are the same. The following provides an example for the procedure of installing four RRUs on a pole.

### Procedure

- Step 1** Install two RRUs, as shown in [Figure 7-15](#). For detailed installation process, see [7.2.2 Installing Two RRUs](#).

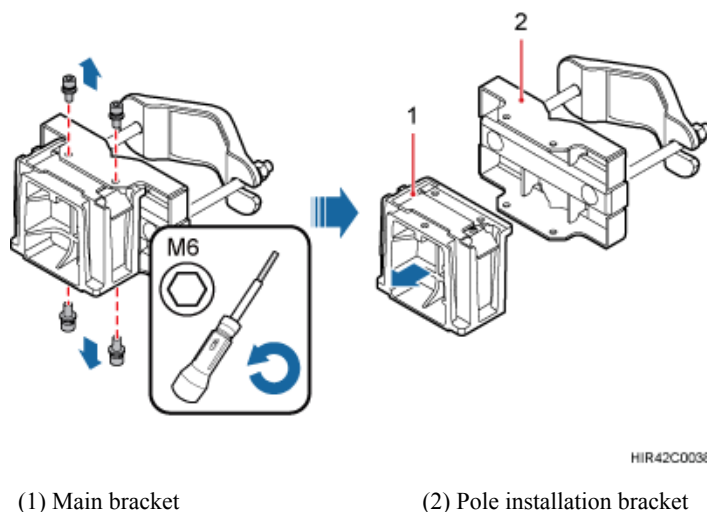
**Figure 7-15** Two RRUs installed on a pole



SRR98C0011

**Step 2** Use an M6 inner hexagon screwdriver to loosen the four hex socket screws from the main bracket and pole installation brackets on the second set of mounting brackets, and remove the main bracket, as shown in [Figure 7-16](#).

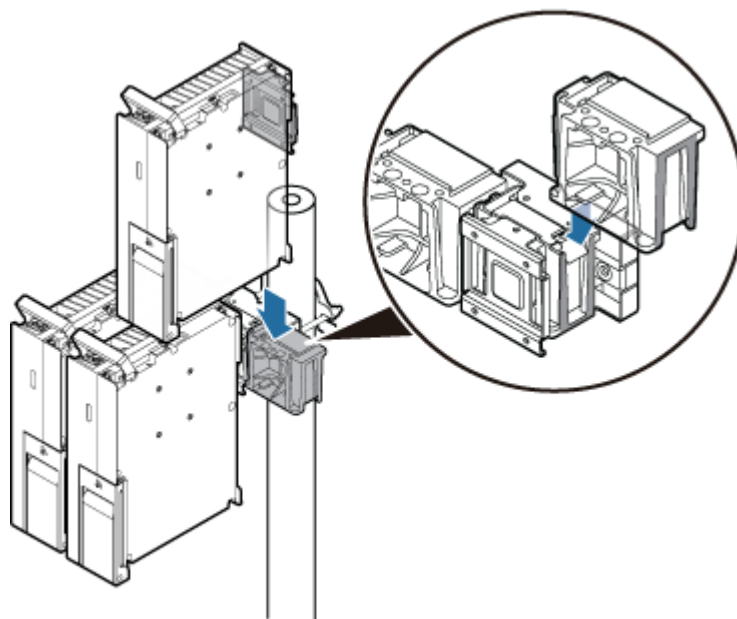
**Figure 7-16** Removing the RRU main bracket



**Step 3** Install the third main bracket and install the third RRU onto the third main bracket. Then, use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket for the RRU to 5 N·m (44.25 lbf·in.), as shown in [Figure 7-17](#).

## NOTICE

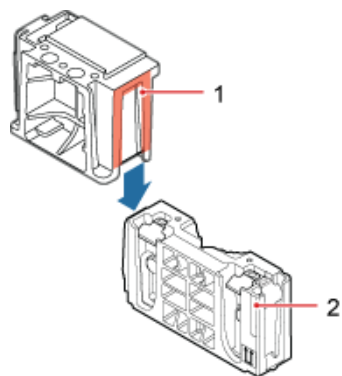
The third main bracket must be installed, with the open ends of U-shaped slots on both sides facing downwards.

**Figure 7-17** Installing the third RRU onto the third main bracket

HIR96C0055

**NOTE**

The main mounting bracket for installing a blade RRU can connect to the main mounting bracket for installing a common RRU in the scenarios of adding RRUs, as shown in [Figure 7-18](#).

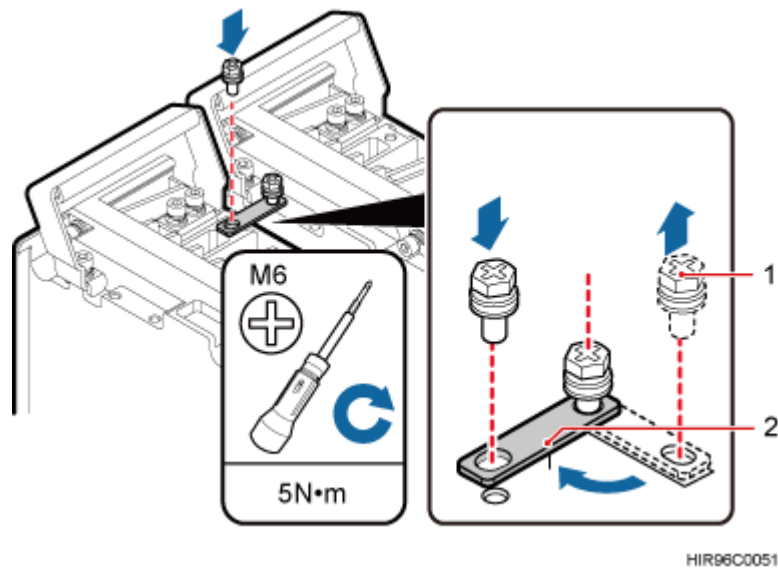
**Figure 7-18** Connect to the main mounting bracket for installing a common RRU

HID00C0047

(1) Main mounting bracket for a blade RRU

(2) Main mounting bracket for a common RRU

**Step 4** Install the sheet metal tab for fixing the neighboring RRUs, as shown in [Figure 7-19](#).

**Figure 7-19** Installing the sheet metal tab

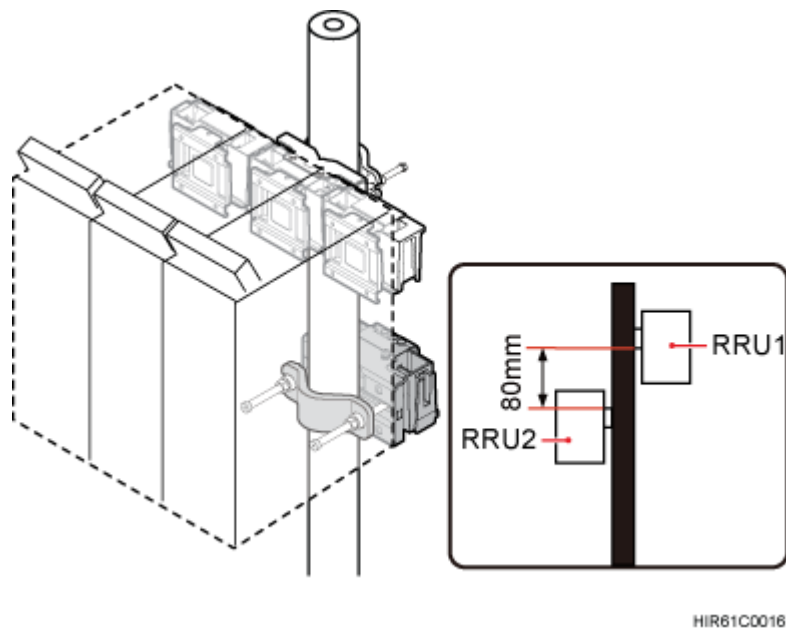
(1) Screw

(2) Sheet metal tab

1. Use an M6 Phillips screwdriver to loosen the screw on the sheet metal tab farther from the handle of the first RRU and remove the screw.
2. Use an M6 Phillips screwdriver to loosen the screw on the sheet metal tab closer to the handle of the first RRU. Then, rotate the sheet metal tab to align the vacant hole in the sheet metal tab with a hole on the top of the third RRU.
3. Insert the removed screw into the hole on the top of the third RRU and use an M6 torque screwdriver to tighten the screw to 5 N·m (44.25 lbf·in.).

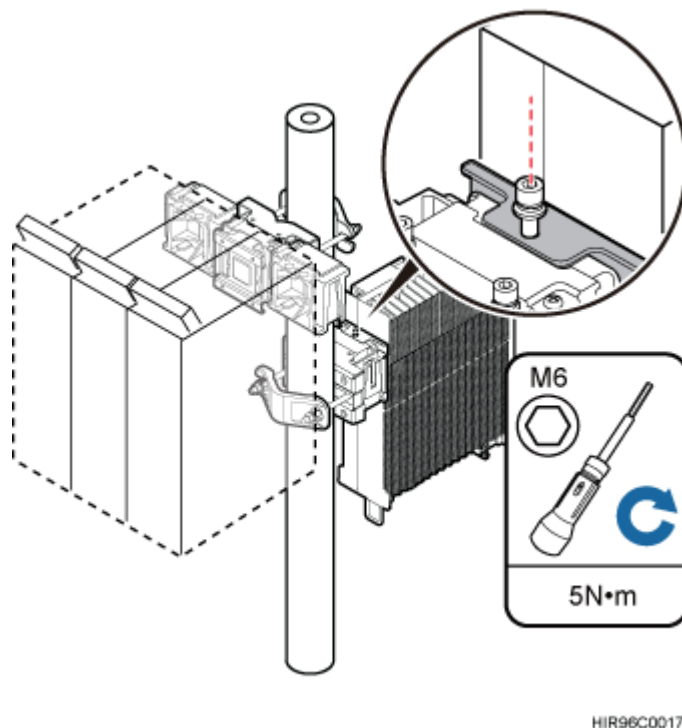
**Step 5** Install the second set of RRU mounting brackets at least 80 mm (3.15 in.) above or below the first set of RRU mounting brackets, as shown in [Figure 7-20](#).

**Figure 7-20** Installing the second set of RRU mounting brackets



- Step 6** Install the fourth RRU onto the fourth main bracket, use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-21](#).

**Figure 7-21** Installing the fourth RRU on the fourth main bracket



---

---End

## 7.3 Installing an RRU on U-steel

This section describes the procedure and precautions for installing an RRU on U-steel. An RRU can be installed on U-steel secured on the ground or a tower. Each piece of U-steel allows only one RRU to be installed in standard mode.

### Prerequisites

Before you install an RRU on U-steel secured on a tower, the RRU and its mounting brackets are hoisted onto the tower. For details, see [6.1 Hoisting an RRU onto a Tower](#).

The hoist clamp on the main bracket is secured properly.



### NOTICE

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
  - Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.
- 

### Context

[Figure 7-22](#) shows the top view of an RRU installed on U-steel.



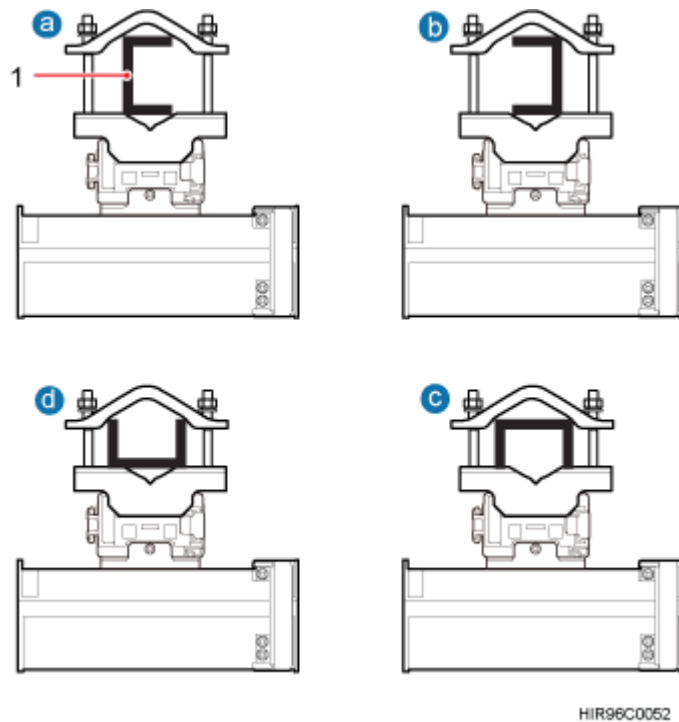
### NOTICE

When the width of the narrower edges of the U-steel is less than 40 mm (1.57 in.), only the a and b modes are supported.

---



Figure 7-22 Top view of an RRU

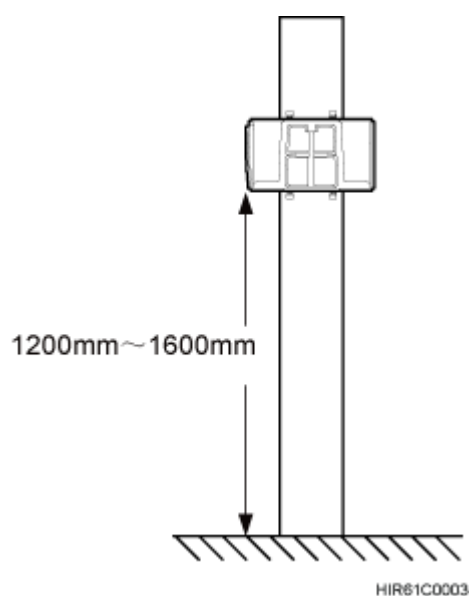


(1) U-steel

## Procedure

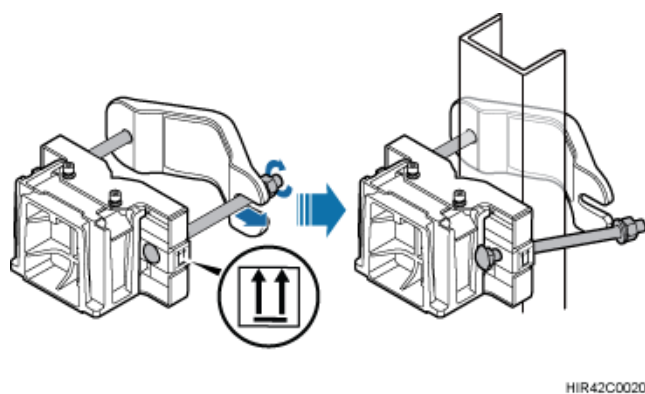
**Step 1** Determine a position for installing the mounting brackets.

- If the RRU is installed on a tower, determine a position for installing the mounting brackets according to the instructions in [3.5.1 Clearance for a Single RRU](#).
- If the RRU is installed on the ground, determine a position for installing the mounting brackets according to the instructions in [Figure 7-23](#).

**Figure 7-23** Distance between the mounting brackets and the ground**NOTE**

As shown in the figure above, it is recommended that the mounting kits be installed at a position 1200 mm (47.24 in.) to 1600 mm (59.06 in.) high above the ground. If the space is insufficient, only the [3.5 Installation Clearance Requirements of an RRU](#) needs to be provided.

**Step 2** Install the RRU mounting brackets, as shown in [Figure 7-24](#).

**Figure 7-24** Installing the RRU mounting brackets**NOTE**

Ensure that the arrows on the mounting brackets are pointing up.

1. Adjust the position of the nut and remove the square-neck bolt at the open end from the slot on the auxiliary bracket.
2. Slide the mounting brackets onto the U-steel horizontally and insert the square-neck bolt into the slot.

- Step 3** Use a 16 mm (0.67 in.) M10 torque wrench to tighten the nuts to 40 N·m (354.03 lbf·in.) so that the mounting brackets are secured onto the U-steel, as shown in [Figure 7-25](#).

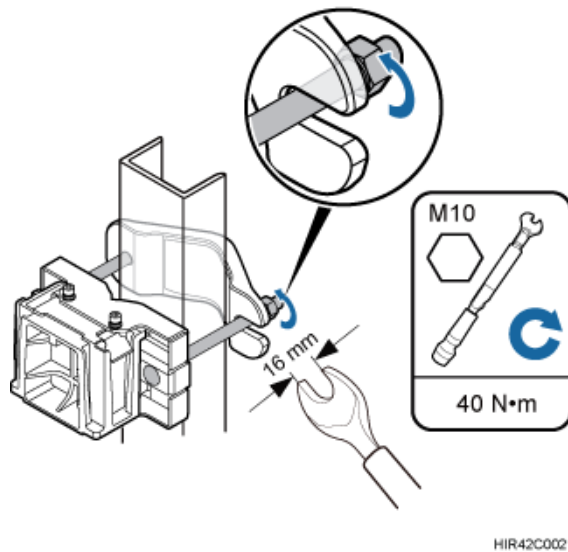
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 **NOTICE**

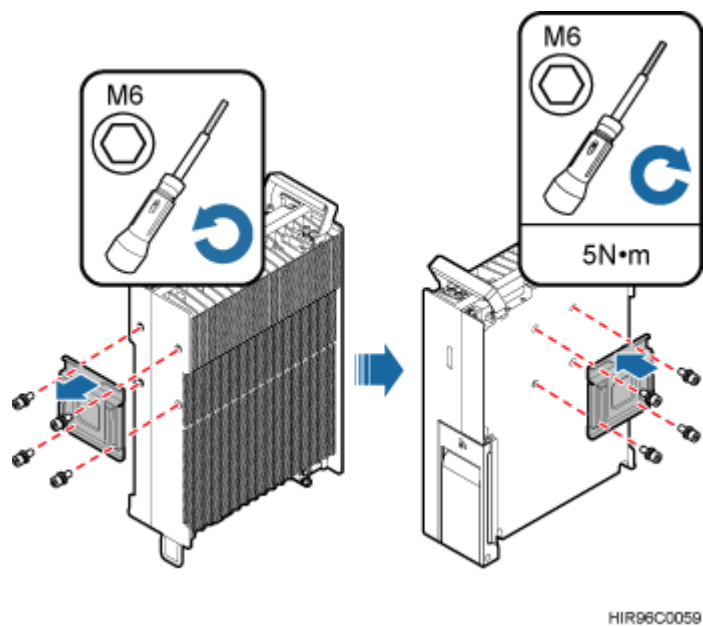
Tighten the nuts on the two square-neck bolts simultaneously. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

---

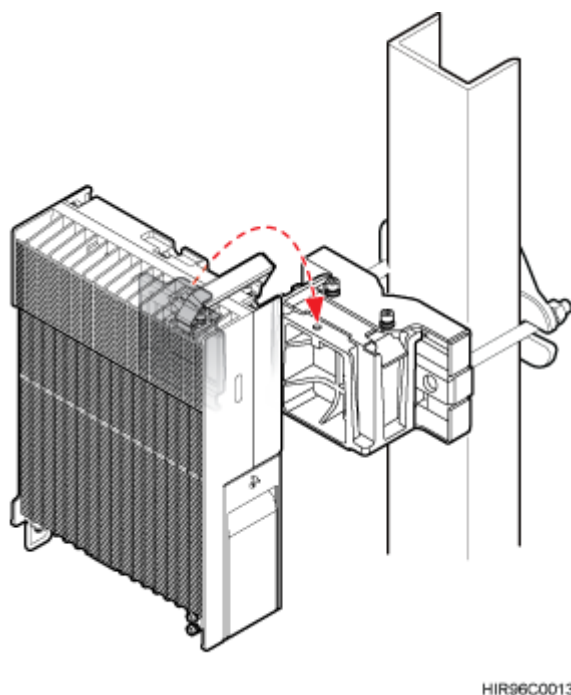
**Figure 7-25** Securing the RRU mounting brackets



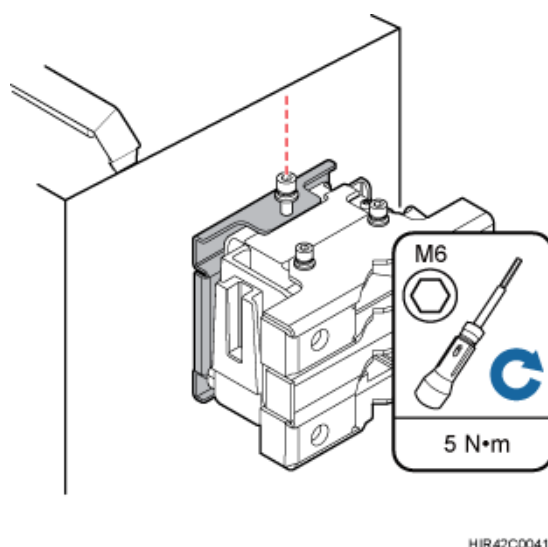
- Step 4** Use an inner hexagon torque screwdriver to remove the attachment plate from one side of the RRU, reinstall the attachment plate onto the rear of the RRU, and tighten the four stainless screws to 5 N·m (44.25 lbf·in.), as shown in [Figure 7-26](#).

**Figure 7-26** Installing the attachment plate onto the rear of the RRU

**Step 5** Install the RRU onto the main bracket, as shown in [Figure 7-27](#).

**Figure 7-27** Installing the RRU onto the main bracket

**Step 6** Use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-28](#).

**Figure 7-28** Securing the captive screw into the connection hole

---End

## 7.4 Installing an RRU on Angle Steel

This section describes the procedure and precautions for installing an RRU on angle steel. An RRU can be installed on angle steel secured on the ground or a tower. Each piece of angle steel allows only one RRU to be installed in standard mode.

### Prerequisites

Before you install an RRU on U-steel secured on a tower, the RRU and its mounting brackets are hoisted onto the tower. For details, see [6.1 Hoisting an RRU onto a Tower](#).

The hoist clamp on the main bracket is secured properly.

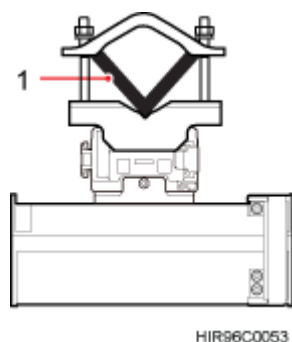


### NOTICE

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
- Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.

### Context

[Figure 7-29](#) shows the top view of an RRU installed on angle steel.

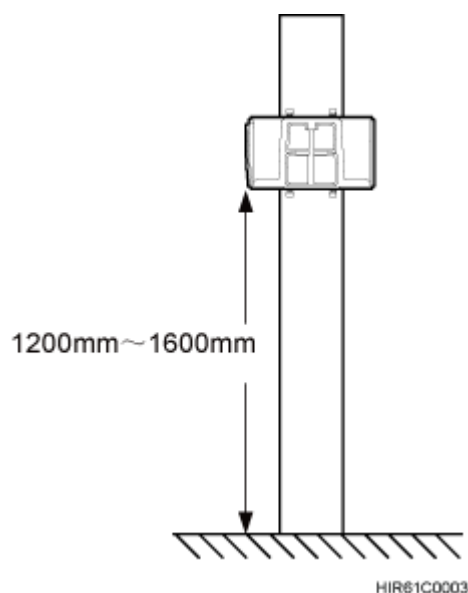
**Figure 7-29** Top view of an RRU

(1) Angle steel

## Procedure

**Step 1** Determine a position for installing the mounting brackets.

- If the RRU is installed on angle steel secured on a tower, determine a position for installing the mounting brackets according to the instructions in [3.5.1 Clearance for a Single RRU](#).
- If the RRU is installed on angle steel secured on the ground, determine a position for installing the mounting brackets according to [Figure 7-30](#).

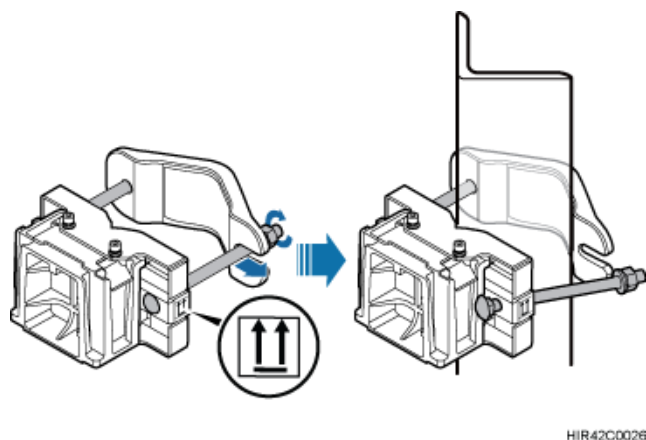
**Figure 7-30** Distance between the mounting brackets and the ground

### NOTE

As shown in the figure above, it is recommended that the mounting kits be installed at a position 1200 mm (47.24 in.) to 1600 mm (59.06 in.) high above the ground. If the space is insufficient, only the [3.5 Installation Clearance Requirements of an RRU](#) needs to be provided.

**Step 2** Install the RRU mounting brackets, as shown in [Figure 7-31](#).

**Figure 7-31** Installing the RRU mounting brackets



 **NOTE**

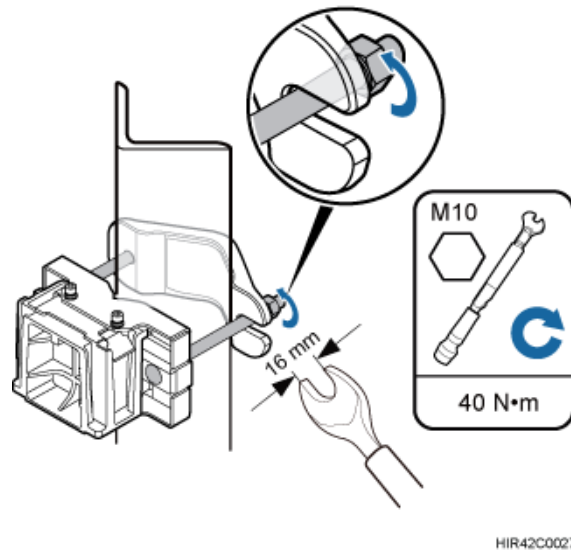
Ensure that the arrows on the mounting brackets are pointing up.

1. Adjust the position of the nut and remove the square-neck bolt at the open end from the slot on the auxiliary bracket.
2. Slide the mounting brackets onto the angle steel horizontally and insert the square-neck bolt into the slot.

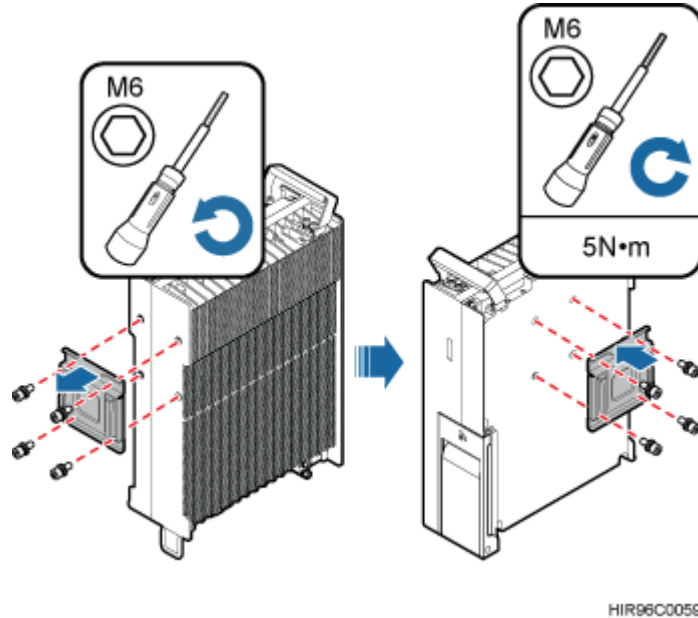
**Step 3** Use a 16 mm (0.67 in.) M10 torque wrench to tighten the nuts to 40 N·m (354.03 lbf·in.) so that the mounting brackets are secured onto the angle steel, as shown in [Figure 7-32](#).

 **NOTICE**

Tighten the nuts on the two square-neck bolts synchronously. After the main and auxiliary brackets are secured properly, measure the spacing between the brackets on both sides and ensure that the spacing is the same on the two sides.

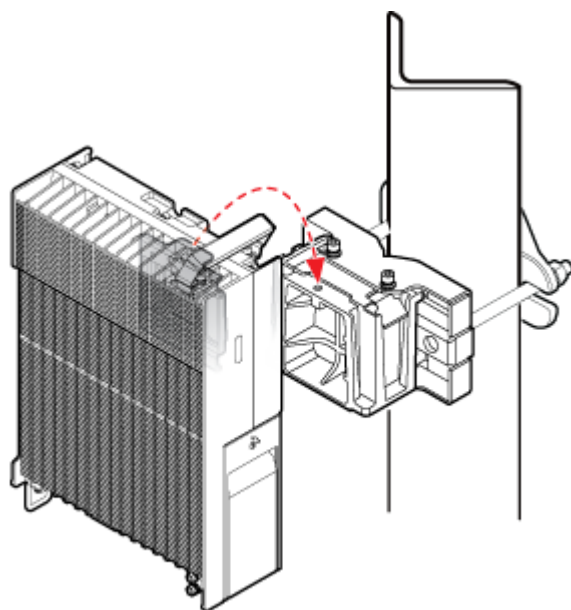
**Figure 7-32** Securing the RRU mounting brackets

- Step 4** Use an inner hexagon torque screwdriver to remove the attachment plate from one side of the RRU, reinstall the attachment plate onto the rear of the RRU, and tighten the four stainless screws to 5 N·m (44.25 lbf·in.), as shown in [Figure 7-33](#).

**Figure 7-33** Installing the attachment plate onto the rear of the RRU

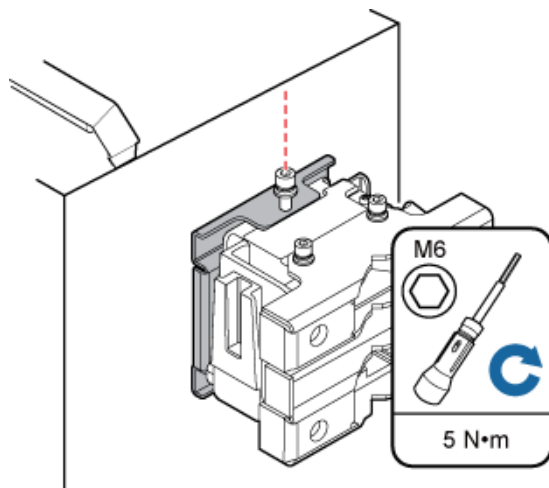
- Step 5** Install the RRU onto the main bracket, as shown in [Figure 7-34](#).



**Figure 7-34** Installing the RRU onto the main bracket

HIR96C0054

- Step 6** Use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-35](#).

**Figure 7-35** Securing the captive screw into the connection hole

HIR42C0041

**---End**

## 7.5 Installing an RRU on a Wall

This section describes the procedure and precautions for installing an RRU on a wall.

### Prerequisites

The hoist clamp on the main bracket is secured properly.

### NOTICE

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
- Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.

### Context

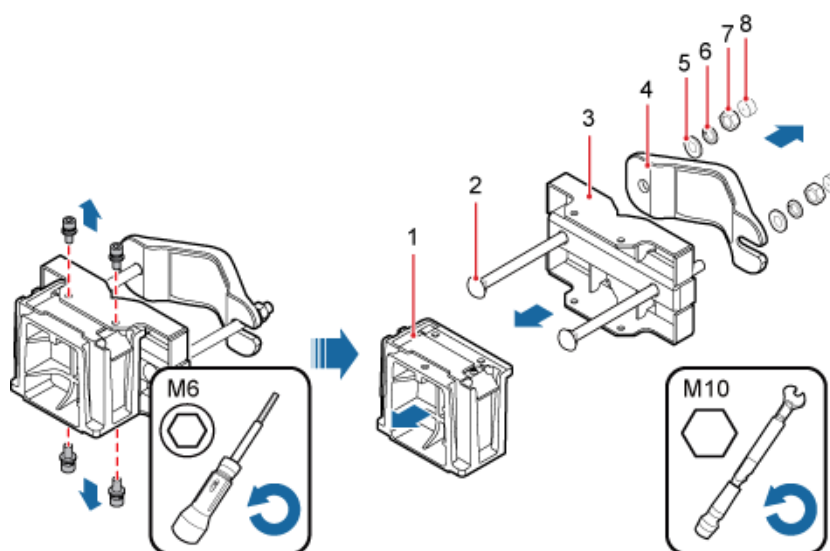
The wall on which RRUs are installed must meet the following requirements:

- For each RRU, the wall must be able to bear a weight four times heavier than the RRU's weight and the bolts' pulling force of 1.25 kN (281.25 lbf) vertical to the wall.
- Expansion bolts must be tightened to 30 N·m to ensure that the bolts work properly and the wall remains intact.

### Procedure

**Step 1** Disassemble the RRU mounting brackets, as shown in [Figure 7-36](#).

**Figure 7-36** Disassembling the RRU mounting brackets



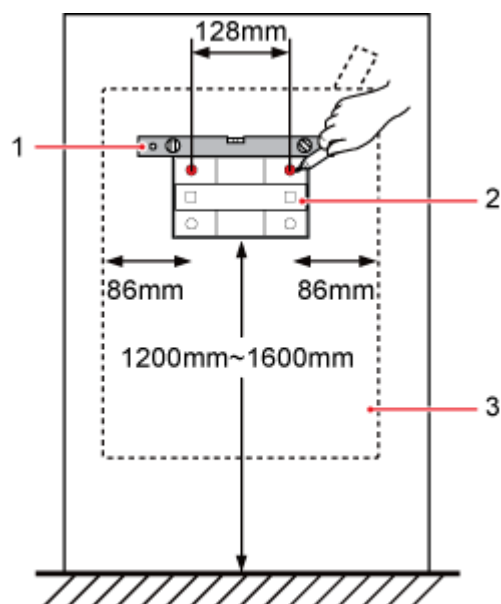
HIR42C0040

- |                  |                      |                               |                       |
|------------------|----------------------|-------------------------------|-----------------------|
| (1) Main bracket | (2) Square-neck bolt | (3) Pole installation bracket | (4) Auxiliary bracket |
| (5) Flat washer  | (6) Spring washer    | (7) Nut                       | (8) Plastic screw cap |

1. Use an M6 inner hexagon torque screwdriver to remove the four inner hexagon screws on the pole installation bracket, and remove the main bracket from the pole installation bracket.
2. Use an M10 torque wrench to loosen the nuts on the two square-neck bolts, and remove the plastic screw cap, nuts, spring washers, flat washers, square-neck bolts, and pole installation bracket from the auxiliary bracket.

**Step 2** Place the pole installation bracket against the wall, use a level to verify that the pole installation bracket is placed horizontally, and then mark anchor points with a marker, as shown in [Figure 7-37](#).

**Figure 7-37** Marking anchor points



SRR61C0018

(1) Level

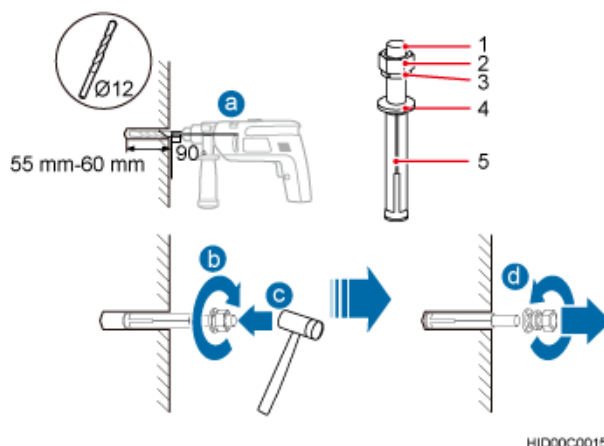
(2) Pole installation bracket

(3) RRU

**NOTE**

As shown in the figure above, it is recommended that the pole installation bracket be installed at a position 1200 mm (47.24 in.) to 1600 mm (59.06 in.) high above the ground. If the space is insufficient, only the [3.5 Installation Clearance Requirements of an RRU](#) needs to be provided.

**Step 3** Drill holes at the anchor points, and then insert expansion anchor bolts, as shown in [Figure 7-38](#).

**Figure 7-38** Drilling holes and inserting expansion anchor bolts

(1) M10×80 bolt      (2) Nut      (3) Spring washer      (4) Flat washer      (5) Expansion sleeve

1. Use a hammer drill with a  $\Phi 12$  bit to drill holes vertically at the marked anchor points with the depth ranging from 55 mm (2.17 in.) to 60 mm (2.36 in.), use a vacuum cleaner to clear the dust out from inside and around the holes, and measure the distances between holes. If any of the hole is beyond the acceptable range, mark a new anchor point and drill a new hole.

### NOTICE

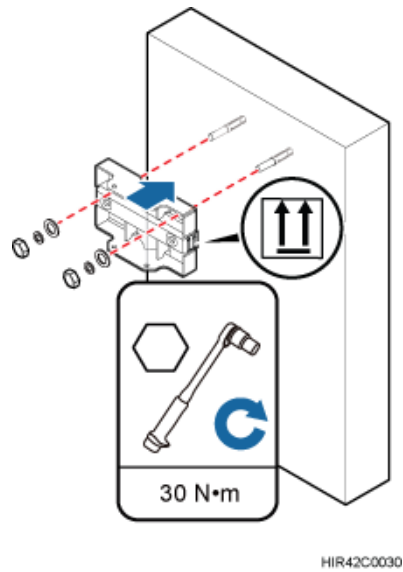
Take proper safety measures to protect your eyes and respiratory tract against the dust before drilling holes.

2. Tighten the expansion anchor bolts slightly and place one vertically into each hole.
3. Use a rubber mallet to pound the expansion anchor bolt until it goes into the hole completely.
4. Tighten and then loosen the expansion bolt, and remove the M10 bolt, spring washer, and flat washer in sequence.

### NOTICE

After dismantling an expansion anchor bolt, ensure that the top of the expansion sleeve is on the same level as the wall. Otherwise, the device cannot be installed on the wall evenly and securely.

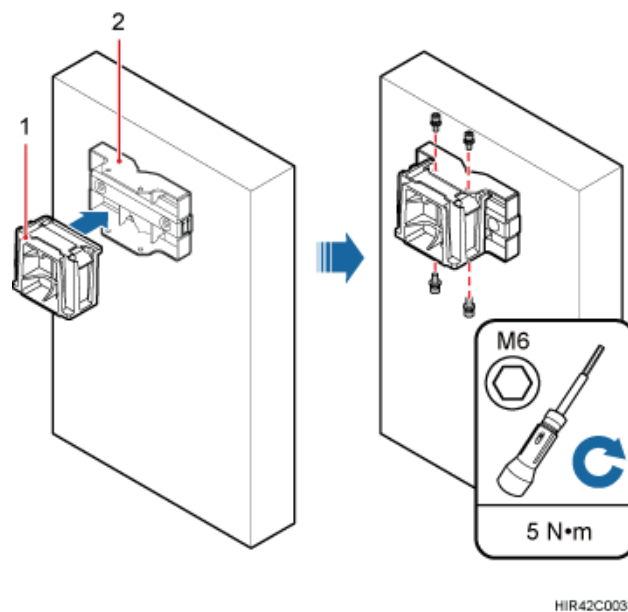
- Step 4** Install the pole installation bracket on the expansion anchor bolts, place the flat washers, spring washers, and nuts through the expansion anchor bolts in sequence, and then use a 16 mm (0.63 in.) torque socket to tighten the nuts to 30 N·m (265.52 lbf·in.), as shown in [Figure 7-39](#).

**Figure 7-39** Installing the pole installation bracket on the expansion anchor bolts

## NOTICE

Ensure that the arrows on the pole installation bracket are pointing up.

- Step 5** Install the main bracket onto the pole installation bracket using four M6x16 inner hexagon screws, and use an inner hexagon torque screwdriver to tighten the inner hexagon screws to 5 N·m (44.25 lbf·in.) so that the main bracket and pole installation bracket are firmly secured, as shown in [Figure 7-40](#).

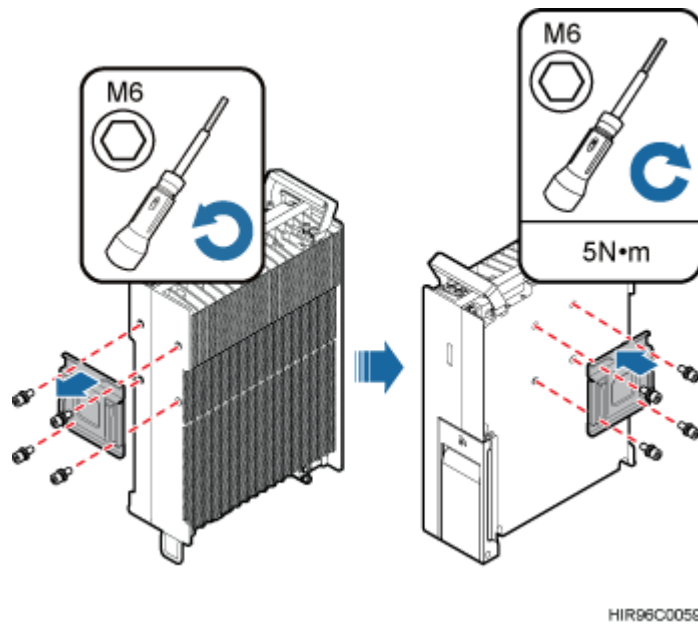
**Figure 7-40** Installing the main bracket

(1) Main bracket

(2) Pole installation bracket

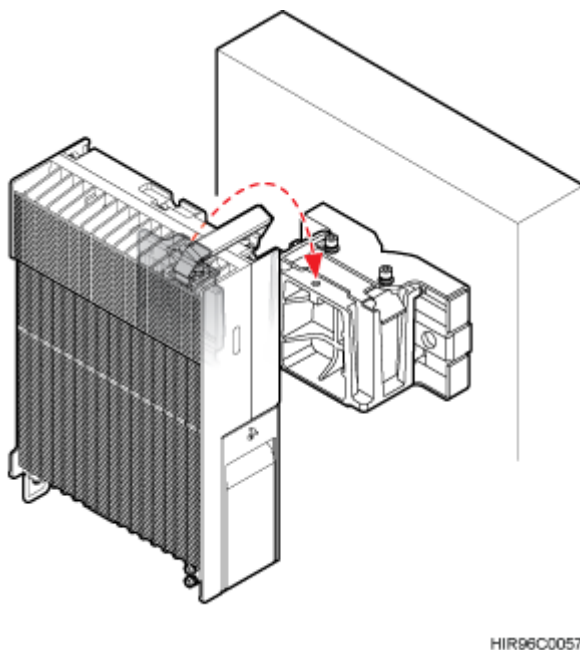
**Step 6** Use an inner hexagon torque screwdriver to remove the attachment plate from one side of the RRU, reinstall the attachment plate onto the rear of the RRU, and tighten the four stainless screws to 5 N·m (44.25 lbf·in.), as shown in [Figure 7-41](#).

**Figure 7-41** Installing the attachment plate onto the rear of the RRU



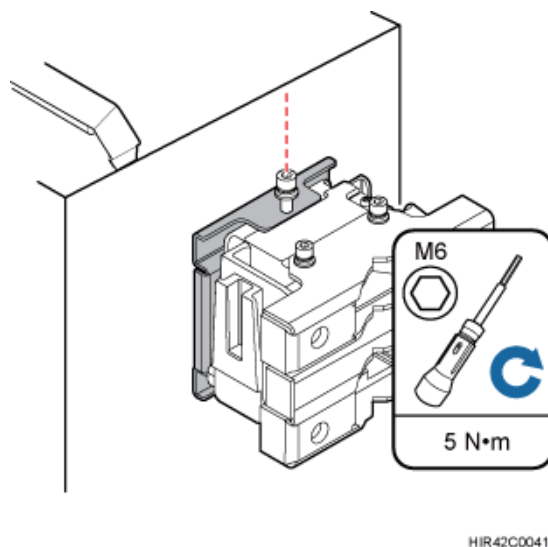
**Step 7** Install the RRU onto the main bracket, as shown in [Figure 7-42](#).

**Figure 7-42** Installing the RRU onto the main bracket



- Step 8** Use an inner hexagon torque screwdriver to tighten the captive screw into the holes on the top of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-43](#).

**Figure 7-43** Securing the captive screw into the connection hole



----End

## 7.6 Installing an RRU on an IFS06

This section describes the procedure and precautions for installing an RRU on an IFS06.

### Prerequisites

The hoist clamp on the main bracket is secured properly.

---

### NOTICE

- Do not stand an RRU upright because the RF ports cannot support the weight of the RRU.
  - Place a foam pad or cardboard under an RRU to protect the RRU housing from damage during the installation.
- 

### Context

- The upper and lower adjustable beams on an IFS06 can be moved up and down to fit for heights of RRUs.
- RRUs can be installed on an IFS06 when the ambient temperature is higher than or equal to the lowest operating temperature of the RRUs and at least 5°C (41°F) lower than the

highest working temperature of the RRU. In this scenario, the IFS06 supports at least three RRUs. The IFS06 supports a maximum of six RRUs when the ambient temperature is higher than or equal to the lowest operating temperature of the RRUs and at least 10°C (50°F) lower than the highest operating temperature of the RRU.

**NOTE**

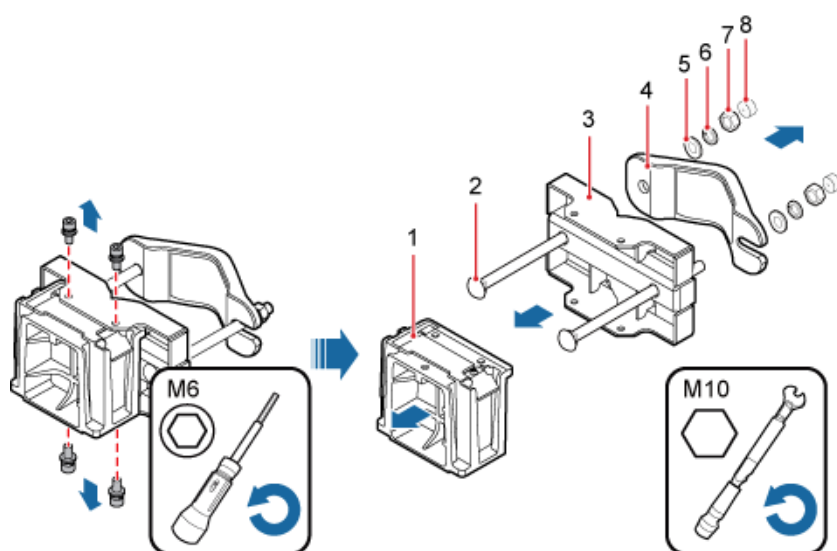
For details about the operating temperature of the RRUs, see section "Technical Specifications of RRUs" in *3900 Series Base Station Technical Description*.

- Install RRUs in the sequence from bottom to top and from left to right.
- This section describes how to install an RRU in height-unrestricted scenarios. The procedure for installing an RRU in height-restricted scenarios is the same as that in height-unrestricted scenarios.
- When installing the pole installation bracket, you need to use the M10x50 bolts delivered with the IFS06.
- Rubber washers are easily compressed or broken, whereas do not need to be replaced.

## Procedure

**Step 1** Disassemble the RRU mounting brackets, as shown in [Figure 7-44](#).

**Figure 7-44** Disassembling the RRU mounting brackets



HIR42C0040

- |                  |                      |                               |                       |
|------------------|----------------------|-------------------------------|-----------------------|
| (1) Main bracket | (2) Square-neck bolt | (3) Pole installation bracket | (4) Auxiliary bracket |
| (5) Flat washer  | (6) Spring washer    | (7) Nut                       | (8) Plastic screw cap |

1. Use an M6 inner hexagon torque screwdriver to remove the four inner hexagon screws on the pole installation bracket, and remove the main bracket from the pole installation bracket.
2. Use an M10 torque wrench to loosen the nuts on the two square-neck bolts, and remove the plastic screw cap, nuts, spring washers, flat washers, square-neck bolts, and pole installation bracket from the auxiliary bracket.



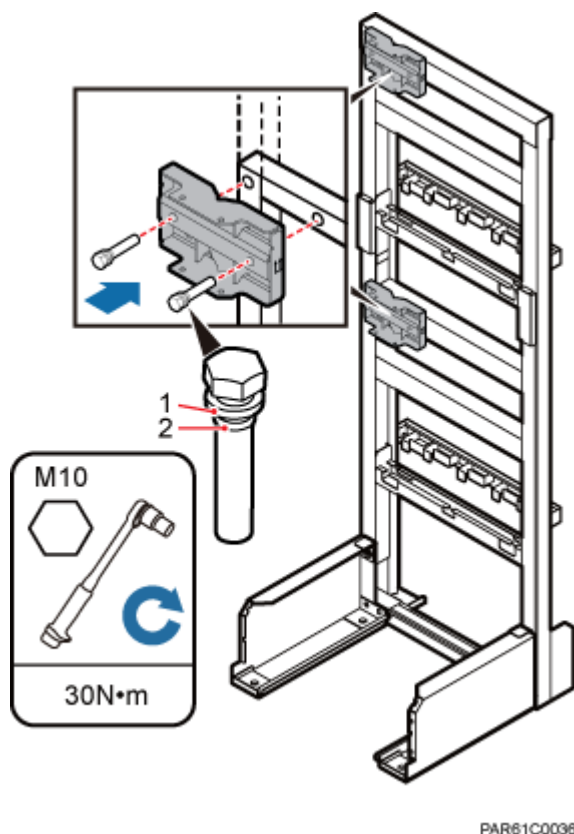
- Step 2** Use the M10x50 bolts delivered with the IFS06 to secure the pole installation bracket to the IFS06, and then use an M10 torque socket wrench to secure the bolts to 30 N·m (265.52 lbf·in.).

 **NOTICE**

Ensure that the arrows on the pole installation bracket are pointing up.

Install the pole installation bracket, as shown in [Figure 7-45](#).

**Figure 7-45** Installing the pole installation bracket in height-unrestricted scenarios

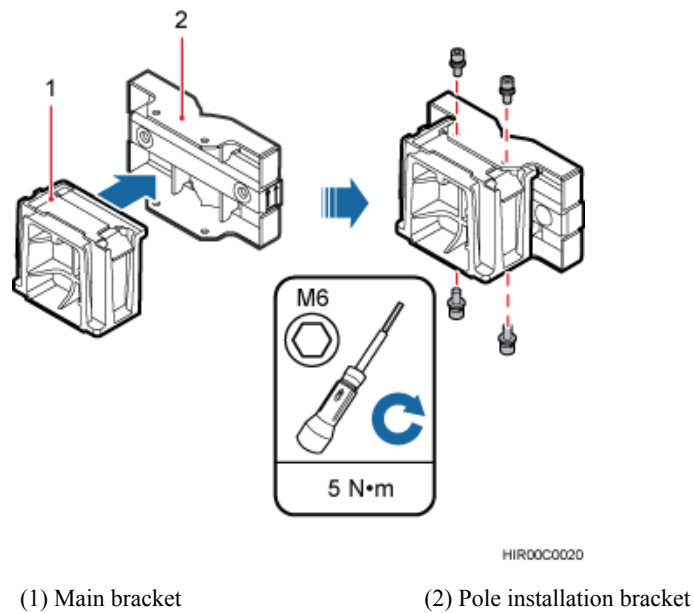


PAR61C0036

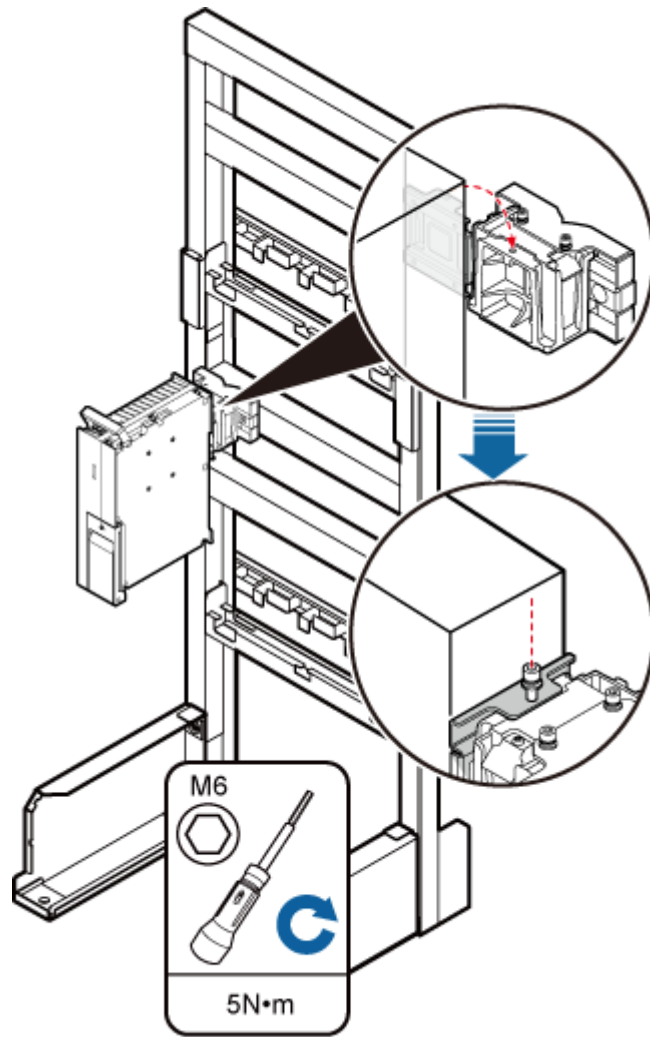
(1) Spring washer

(2) Rubber washer

- Step 3** Attach the main bracket to the pole installation bracket, and use an inner hexagon screwdriver to tighten four M6x16 screws to 5 N·m (44.25 lbf·in.) so that the main bracket and pole installation bracket are firmly secured, as shown in [Figure 7-46](#).

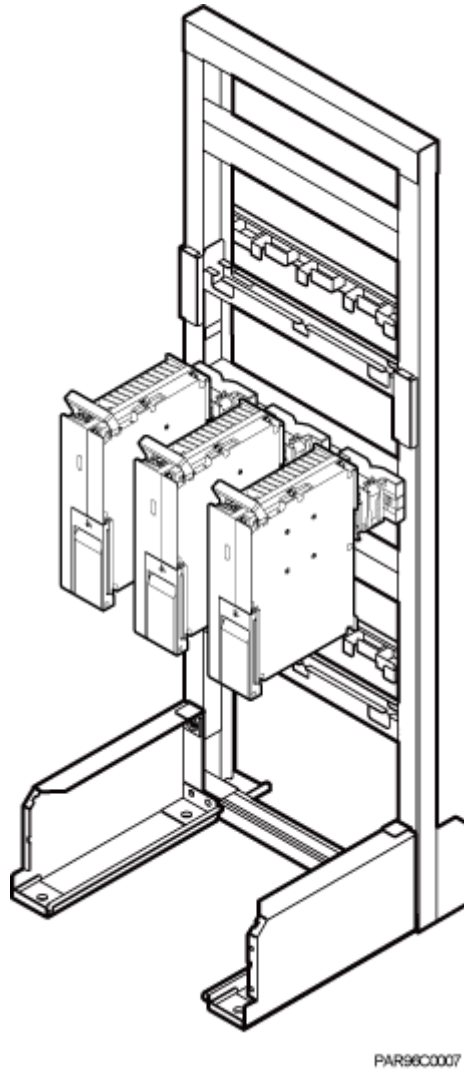
**Figure 7-46** Installing the main bracket

**Step 4** Attach the RRU to the main bracket, and then use an inner hexagon screwdriver to tighten the captive screw into the holes of the attachment plate and main bracket to 5 N·m (44.25 lbf·in.) so that the attachment plate and main bracket are firmly secured, as shown in [Figure 7-47](#).

**Figure 7-47** Installing the RRU onto the main bracket

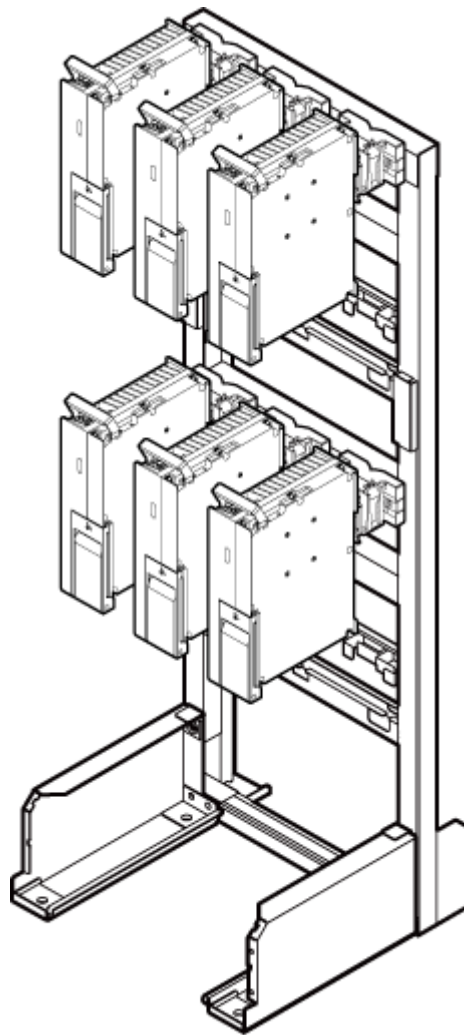
HIR86C0060

**Step 5** Install the RRUs on the lower level from left to right, as shown in [Figure 7-48](#).

**Figure 7-48** Installing RRUs on the lower level

**Step 6 Optional:** Optional: When the ambient temperature is equal to or higher than the lowest operating temperature of the RRU and at least 10°C (10°F) lower than the highest operating temperature of the RRU, repeat the preceding steps to install the RRUs on the higher level, as shown in [Figure 7-49](#).

**Figure 7-49** Installing RRUs on the higher level



PAR96C0010

---End

# 8 Installing RRU Cables

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## About This Chapter

This chapter describes the procedure for installing RRU cables.

### [8.1 Cabling Requirements](#)

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

### [8.2 RRU Cable Connections](#)

This section describes RRU cable connections.

### [8.3 Installing RRU Cables](#)

This chapter describes the procedure for installing RRU cables.

### [8.4 RRU Cables](#)

This section describes RRU cable connections.

### [8.5 Installing an RRU PGND Cable](#)

This section describes the procedure for installing an RRU PGND cable.

### [8.6 Installing an RRU RF Jumper](#)

This section describes the procedure for installing an RRU RF jumper.

### [8.7 Installing an RRU AISG Multi-Wire Cable and AISG Extension Cable](#)

This section describes the procedures for installing an RRU AISG multi-wire cable and AISG extension cable.

### [8.8 Installing an RRU Alarm Cable](#)

This section describes the procedure for installing an RRU alarm cable.

### [8.9 Opening the Cover Plate of an RRU Cabling Cavity](#)

This section describes the procedure for opening the cover plate of an RRU cabling cavity.

### [8.10 Installing a CPRI Optical Cable](#)

This section describes the procedure for installing a CPRI optical cable.

### [8.11 Installing an RRU Power Cable](#)

This section describes the procedure for installing an RRU power cable.

### [8.12 Closing the Cover Plate of an RRU Cabling Cavity](#)

This section describes the procedure for closing the cover plate of an RRU cabling cavity.

## 8.1 Cabling Requirements

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

### NOTE

If a cable listed below is not required, skip the cabling requirements of the cable.

### General Cabling Requirements

#### Bending radius requirements

- The bending radius of a 7/8" feeder must be greater than 250 mm (9.84 in.), and the bending radius of a 5/4" feeder must be greater than 380 mm (14.96 in.).
- The bending radius of a 1/4" jumper must be greater than 35 mm (1.38 in.). The bending radius of a super-flexible 1/2" jumper must be greater than 50 mm (1.97 in.), and the bending radius of an ordinary 1/2" jumper must be greater than 127 mm (5 in.).
- The bending radius of a power cable or PGND cable must be at least three times its diameter.
- The bending radius of a fiber optic cable is at least 20 times of its diameter, and the bending radius of a breakout cable is at least 30 mm (1.18 in.).
- The bending radius of an E1/T1 cable must be at least three times its diameter.
- The bending radius of a signal cable must be at least five times its diameter.

#### Cable binding requirements

- Cables of the same type must be bound together.
- Different types of cables must be separately laid out and bound, with a minimum distance of 30 mm (1.18 in.) from each other.
- The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.
- The cable ties must face the same direction, and those at the same horizontal line must be in a straight line.
- The excess of the indoor cable ties is cut off. The excess of 5 mm (0.197 in.) of the outdoor cable ties is reserved, and the cut surfaces are smooth without sharp edges.
- After cables are installed, labels or nameplates must be attached to the cables at their ends, curves, and interconnection positions.

#### Security requirements

- When routing cables, avoid sharp objects, for example sharp edges on the wall. If necessary, use tubes to protect the cables.
- When routing cables, keep the cables away from heat sources and use heat insulation materials to insulate the cables from the heat sources.
- Reserve a proper distance (0.1 m or 3.937 in. is recommended) between equipment and cables especially at the cable curves to protect the cables and equipment.

#### Indoor cabling requirements

- Route each cable into the room through the feeder window.



- Reserve drip loops for all cables outside the feeder window before routing them into the room. Ensure that the radiuses of the drip loops are greater than or equal to the minimum bending radiuses of the cables.
- When routing a cable into the room, ensure that a person is assisting you in the room.
- Apply waterproof treatment to the feeder window.

## Outdoor Cabling Requirements

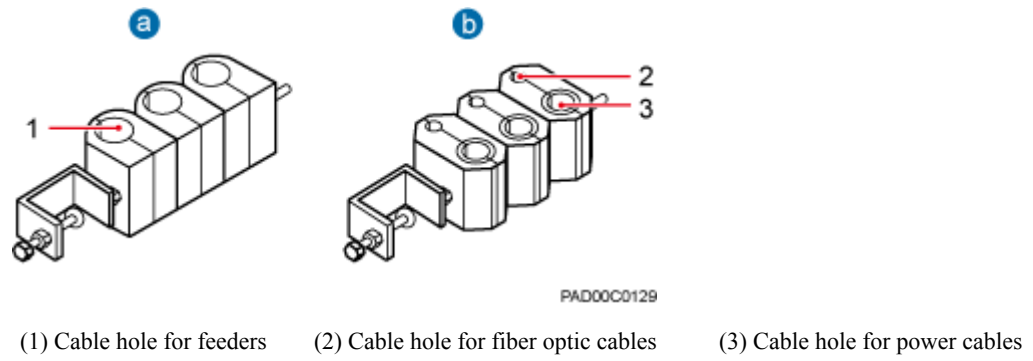
- After being connected to a ground clip on power cables, a ground cable must be routed downwards to prevent water from entering the equipment to which the power cables connect.
- Protect outdoor cables against potential damage. For example, put the cables through tubes.
- The cables to be protected include AC power cables, transmission cables, and cables laid out underground.
- When routing cables through tubes on the ground below the cabinet, put a 30 mm to 50 mm (1.18 in. to 1.97 in.) length of the tubes into the base of the cabinet but do not put the tubes into the cabinet. Use waterproof tape or waterproof silicon gel to block both ends of the tubes and use sheet metal tabs to secure the tubes to the cable holes in the base.
- When routing cables through tubes along a metal cable trough below the cabinet, do not put the tubes into the base of the cabinet but cover the cable trough and connect the tubes to the cable holes in the base.
- When routing RRU cables, ensure that the highest positions of the routes of all RRU cables (except RF cables and AISG cables) must be lower than the bottom of the RRU.
- Use clips to secure cables outdoors. For the method of installing a clip, see the installation guide delivered with the clip.
- Arrange cables neatly along the routing direction and use clips to secure the cables.
- Determine the positions where the clips are installed according to the actual situation. For example, 7/8" feeders are secured with clips at an interval of 1.5 m to 2 m (4.92 ft to 6.56 ft), CPRI fiber optic cables and power cables are secured with clips at an interval of 1 m to 1.5 m (3.28 ft to 4.92 ft). Ensure that the clips are evenly spaced and in the same direction.
- When fastening cables with a clip, ensure that the cables are aligned neatly and are routed through the holes in the clip. Do not stretch the cables too tightly.

### NOTE

There are two types of clips: 3-hole clip and 6-hole clip, which are described as follows:

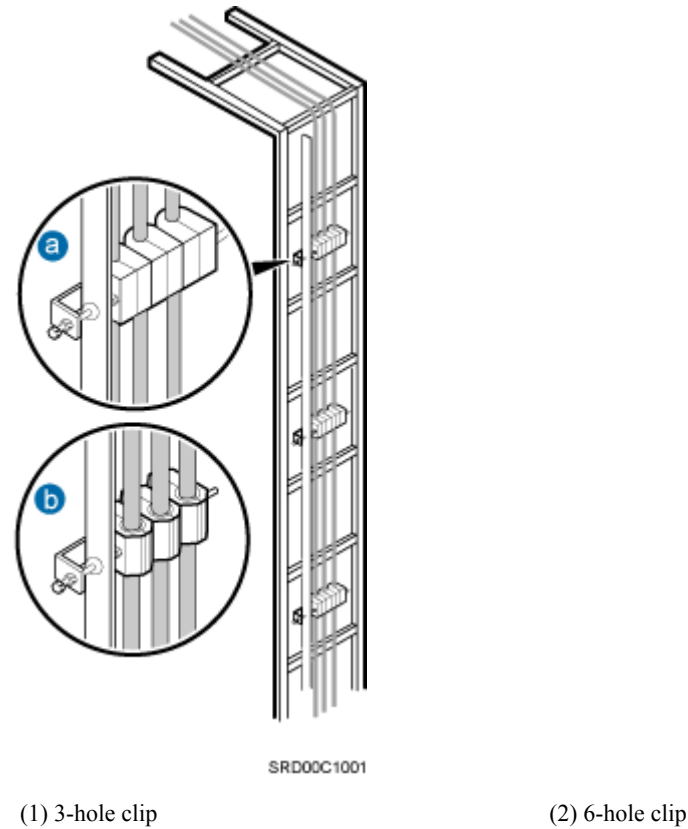
- A 3-hole clip is shown by illustration a in the following figure. It is often used to fasten feeders.
- A 6-hole clip is shown by illustration b in the following figure. It is often used to fasten power cables and CPRI fiber optic cables.

**Figure 8-1** Exterior of the clips



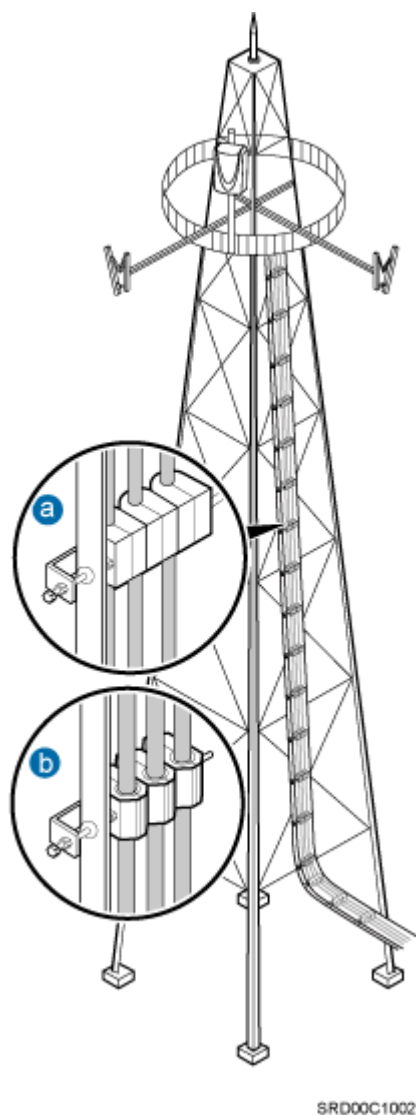
The following figure shows the cables secured on a cable tray.

**Figure 8-2** Cables secured on a cable tray



The following figure shows the cables secured on a tower.

Figure 8-3 Cables secured on a tower



(1) 3-hole clip

(2) 6-hole clip

## Special Cabling Requirements

### Cabling of power cables

- Power cables must be installed in the position specified in engineering design documents.
- If the length of power cables is insufficient, replace the cables rather than adding connectors or soldering joints to lengthen the cables.
- Cables can only be laid out under well-planned instructions. The cabling activities of fiber optic cables are allowed only when qualified personnel and communication facilities are available.
- Do not circle and twist cables.

- After routing a DC power cable onto the platform on a tower, route it along the shortest path to the rails surrounding the platform, and route it along the inside of the rails.
- After routing a DC power cable close to the equipment on a tower, use clips to secure the power cable onto a pole or the rails surrounding the platform. Ensure that there is no excessively long distance between the equipment and the position where the power cable is secured.

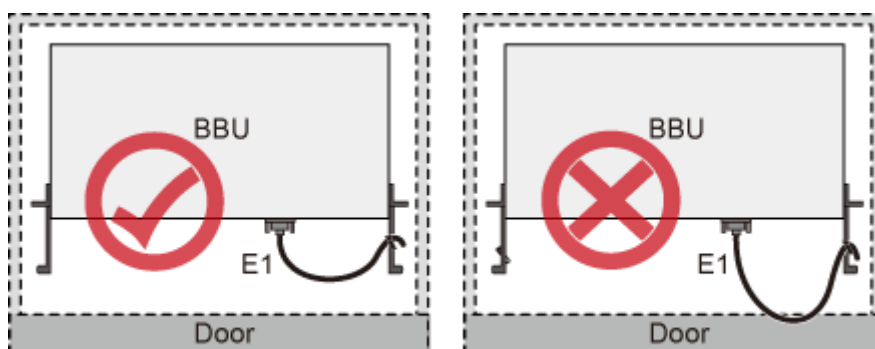
#### Cabling of PGND cables

- PGND cables for a base station must be connected to the same group of ground bars.
- PGND cables must be buried in the ground or routed indoors.
- The external conductor of the coaxial wire and the shield layer of the shielded cable must have proper electrical contact with the metal surface of the equipment to which they are connected.
- PGND cables and signal cables must be installed separately. A certain distance must be reserved between them to prevent interference from each other.
- Switches or fuses must not be installed on the PGND cables.
- Other devices must not be used for electrical connections of the PGND cables.
- All the metal parts in the housing of the equipment must be reliably connected to the ground terminal.

#### Cabling of E1 cables

- E1 cables must not cross power cables, PGND cables, or RF cables when laid out. If transmission cables are laid out with power cables, PGND cables, or RF cables in parallel, the spacing between them must be greater than 30 mm (1.18 in.).
- E1 cables are lined up straight and bound neatly with cable ties.
- Sufficient slack is provided for E1 cables at turns.
- E1 cables must not be pressed by the door of the cabinet when routed, as shown in the following figure.

**Figure 8-4** E1 cables routed in the cabinet

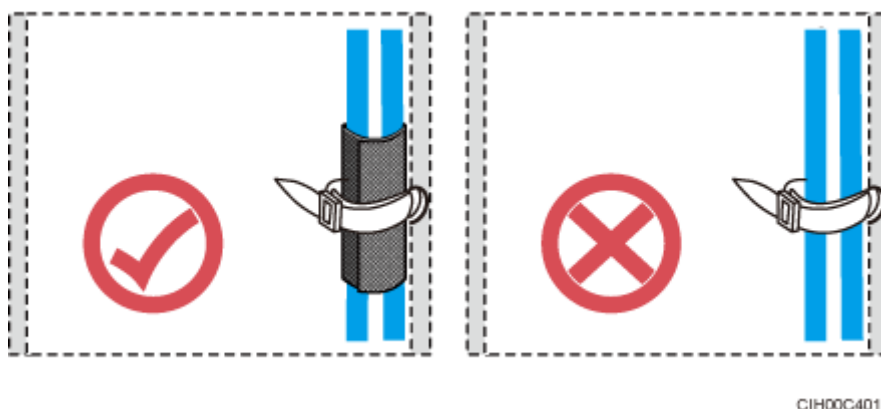


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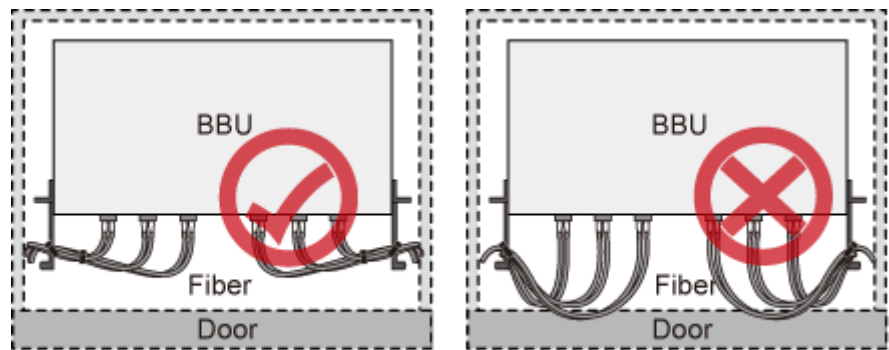
#### Cabling of fiber optic cables

- At least three people are required for laying out fiber optic cables. The cabling activities of fiber optic cables are allowed only when qualified personnel and communication facilities are available.
- The operating temperature of fiber optic cables ranges from  $-40^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $+140^{\circ}\text{F}$ ). If the actual temperature is beyond this range, take protective measures or select another route.
- Do not circle and twist cables.
- Do not bind a fiber optic cable at the position where it bends.
- Do not stretch, step on, or place heavy objects on fiber optic cables. Keep the fiber optic cables away from sharp objects.
- When fiber optic cables are routed, the excess of the fiber optic cables must be coiled around special devices, such as a fiber coiler.
- An unarmored fiber optic cable must be bound using binding straps. If a fiber optic patch cord needs to be secured in a cabinet or a piece of equipment, use binding straps to bind it and then use cable ties to secure the binding straps to the cabinet or equipment. Ensure that the fiber optic cables can flexibly move in the cable ties. Do not bend the fiber optic cables sharply. The following figure shows how to bind the fiber optic cables correctly.

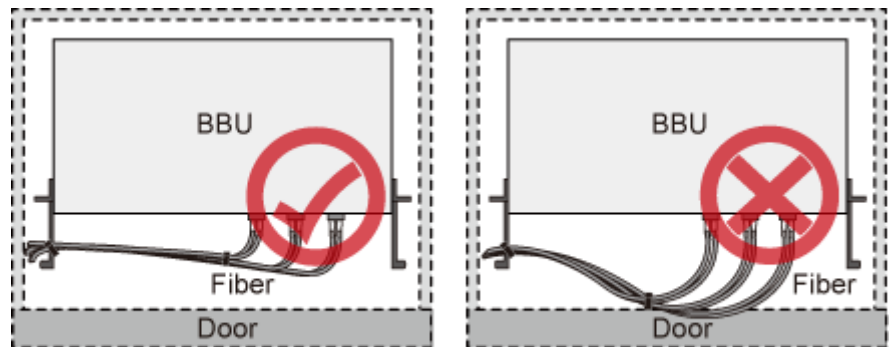
**Figure 8-5** Binding fiber optic cables



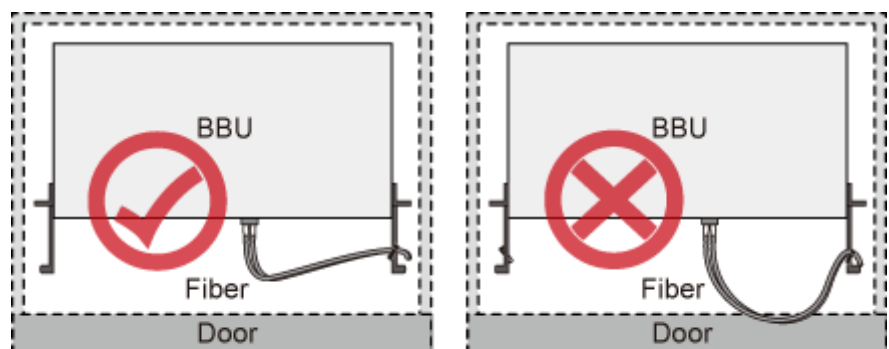
- When coiling fiber optic cables, apply even strength. Do not bend the fiber optic cables with force.
- Unused optical connectors must be covered with dustproof caps.
- The fiber optic cables must not be pressed by the door of the cabinet when routed, as shown in the following figures.

**Figure 8-6** CPRI fiber optic cables routed in the cabinet (1)

CIH00C4008

**Figure 8-7** CPRI fiber optic cables routed in the cabinet (2)

CIH00C4009

**Figure 8-8** FE/GE fiber optic cables routed in the cabinet

CIH00C4011

- After routing a fiber optic cable onto the platform on a tower, route it along the shortest path to the rails surrounding the platform, and route it along the inside of the rails.

- After routing a fiber optic cable close to the equipment on a tower, use clips to secure the fiber optic cable onto a pole or the rails surrounding the platform. Ensure that there is no excessively long distance between the equipment and the position where the cable is secured.
- Coil the excess of the fiber optic cables near the equipment on the tower before securing the cables on the tower.

## 8.2 RRU Cable Connections

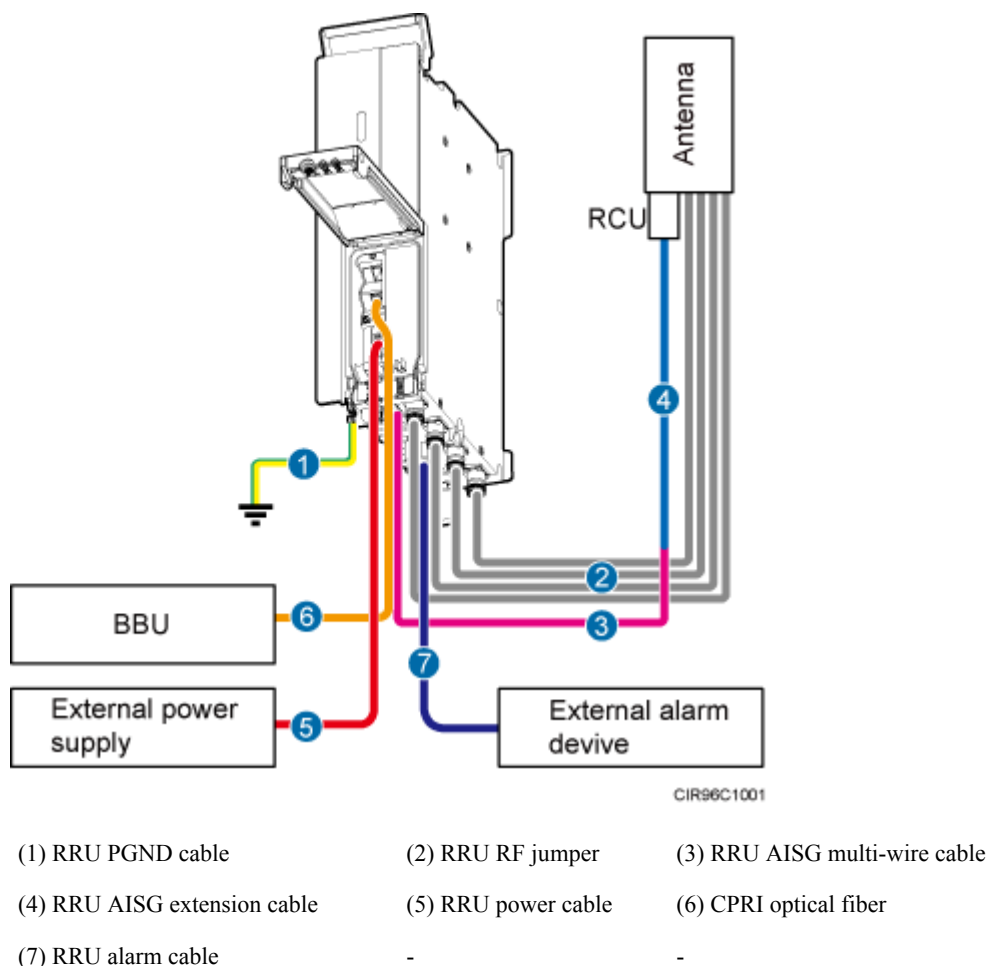
This section describes RRU cable connections.

### NOTE

The RRU does not support power cable cascading.

**Figure 8-9** shows the cable connections of a single-mode RRU.

**Figure 8-9** Cable connections of a single-mode RRU



**Figure 8-10** shows the cable connections of a multimode RRU.

Figure 8-10 Cable connections of a multimode RRU

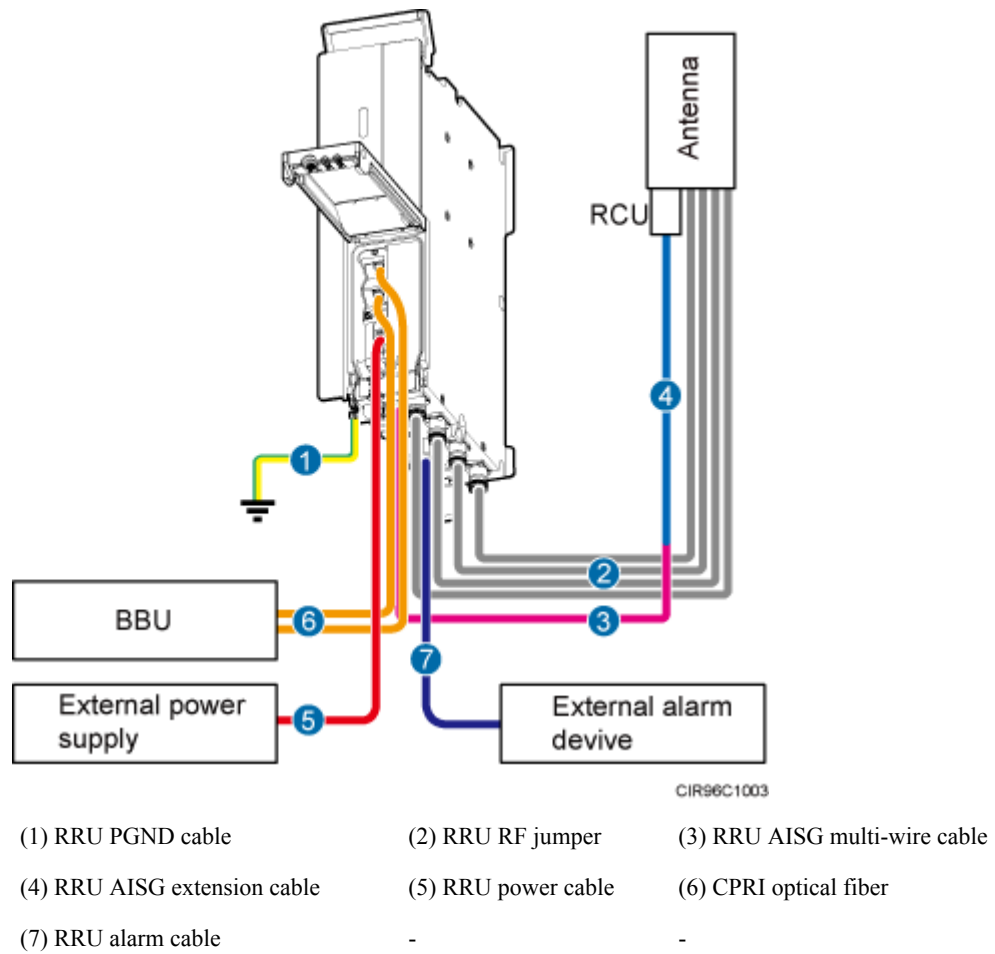
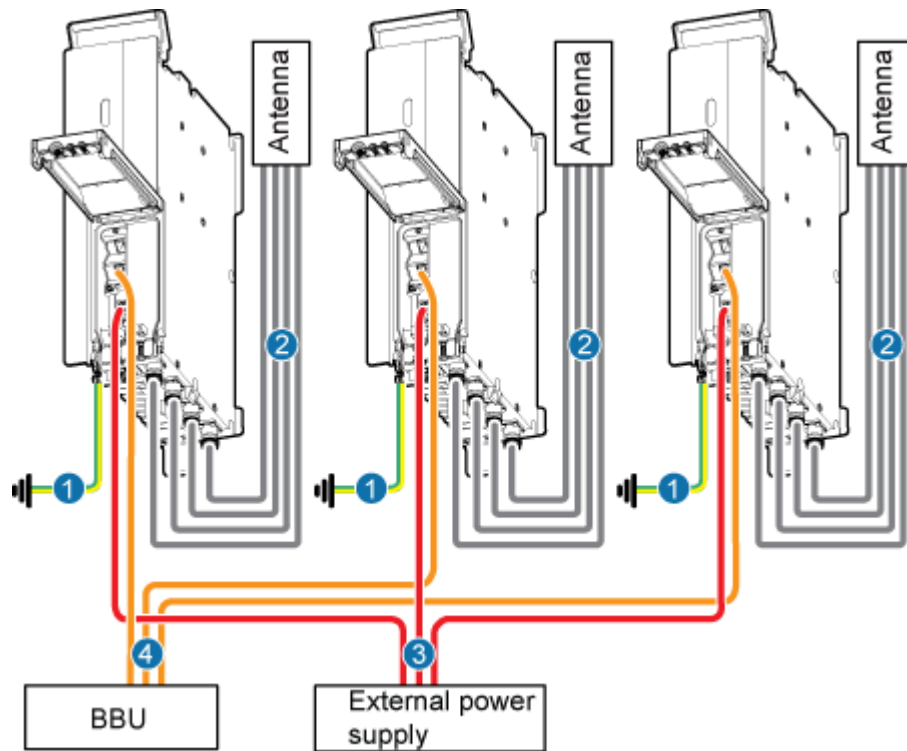


Figure 8-11 shows the cable connections of multiple single-mode RRUs.



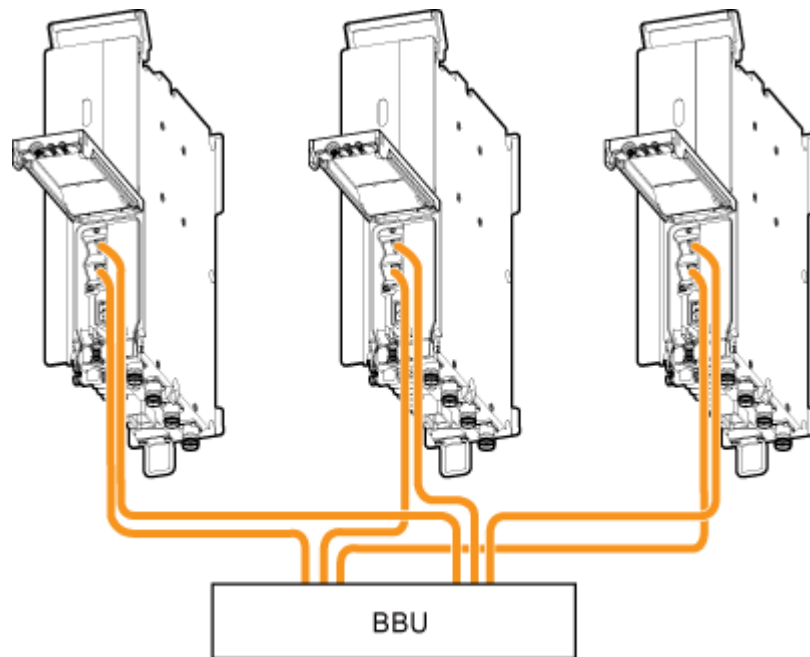
**Figure 8-11** Cable connections of multiple single-mode RRUs



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- |                        |                   |                     |
|------------------------|-------------------|---------------------|
| (1) RRU PGND cable     | (2) RRU RF jumper | (3) RRU power cable |
| (4) CPRI optical fiber | -                 | -                   |

**Figure 8-12** shows the cable connections of multiple multimode RRUs.

**Figure 8-12** Cable connections of multiple multimode RRUs

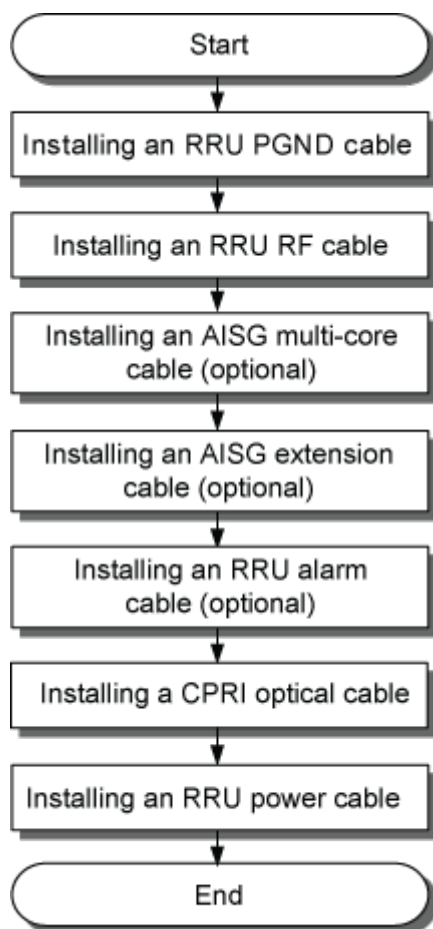
CIR96C1005

## 8.3 Installing RRU Cables

This chapter describes the procedure for installing RRU cables.

**Figure 8-13** shows the procedure for installing RRU cables.

Figure 8-13 Procedure for installing RRU cables



IPR48C0002

## 8.4 RRU Cables

This section describes RRU cable connections.

**Table 8-1** lists RRU cables.

**Table 8-1** RRU cables

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
RRU PGND Cable	OT terminal (M6, 16 mm <sup>2</sup> or 0.025 in. <sup>2</sup> )	Ground terminal on the RRU	OT terminal (M8, 16 mm <sup>2</sup> or 0.025 in. <sup>2</sup> )	Ground terminal on the ground bar

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
RRU Power Cable	Tool-less female connector (pressfit type)	NEG(-) and RTN(+) ports on the RRU	Depending on the power supply equipment	External power equipment
RRU Alarm Cable	DB15 male connector	EXT_ALM port on the RRU	Cord end terminal	External alarm device
CPRI Fiber Optic Cable	DLC connector	CPRI0 port on the RRU	DLC connector	CPRI port on a board in the BBU
RRU RF Jumper	4.3-10 straight male connector	RF ports on the RRU	4.3-10 straight male connector	Antenna system
RRU AISG Multi-Wire Cable	DB9 waterproof male connector	RET port on the RRU	Standard AISG female connector	Standard AISG male connector on the RCU or on the AISG extension cable
RRU AISG Extension Cable	Standard AISG male connector	Standard AISG female connector on the AISG multi-wire cable	Standard AISG female connector	Standard AISG male connector on the RCU

## 8.5 Installing an RRU PGND Cable

This section describes the procedure for installing an RRU PGND cable.

### Context

The cross-sectional area of an RRU PGND cable is 16 mm<sup>2</sup> (0.025 in.<sup>2</sup>). The cable has an M6 OT terminal at one end and an M8 terminal at the other end.



### **DANGER**

Install RRU PGND cables by strictly following the following operations. Otherwise, damage to the RRU or personal injury may occur.

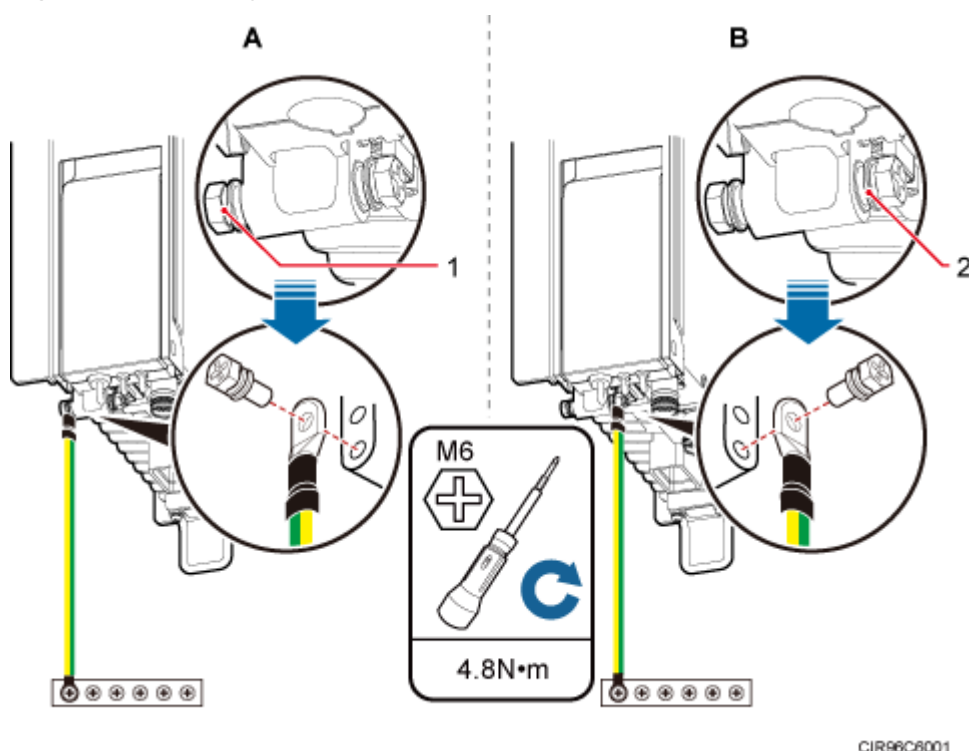
## Procedure

**Step 1** According to the actual cable route, cut the PGND cable into a proper length to prepare an RRU PGND cable. Then, add an OT terminal at each end of the cable according to the instructions in Assembling the OT Terminal and the Power Cable.

**Step 2** Install the RRU PGND cable.

Connect the M6 OT terminal of the RRU PGND cable to a ground terminal at the RRU bottom and the M8 OT terminal to the external ground bar, as shown in [Figure 8-14](#).

**Figure 8-14** Installing an RRU PGND cable

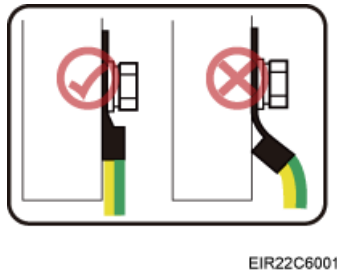


CIR96C8001

(1) Ground terminal 1	(2) Ground terminal 2
-----------------------	-----------------------

### NOTE

- Select a ground terminal according to site conditions. When RRUs are installed in standard mode, ground terminal 1 is recommended, as shown in A of [Figure 8-14](#). When RRUs are installed in side-mounted mode, ground terminal 2 is recommended, as shown in B of [Figure 8-14](#).
- When the RRU PGND cable uses OT terminals with two holes, use two screws to tighten the OT terminals. Therefore, when installing a PGND cable on a ground terminal, remove the screws on the other ground terminal before installing the RRU.
- Crimp OT terminals in correct positions, as shown in [Figure 8-15](#).

**Figure 8-15** Correct position of an OT terminal

EIR22C6001

**Step 3** Label the installed cable according to the instructions in Attaching a Cable-Tying Label.

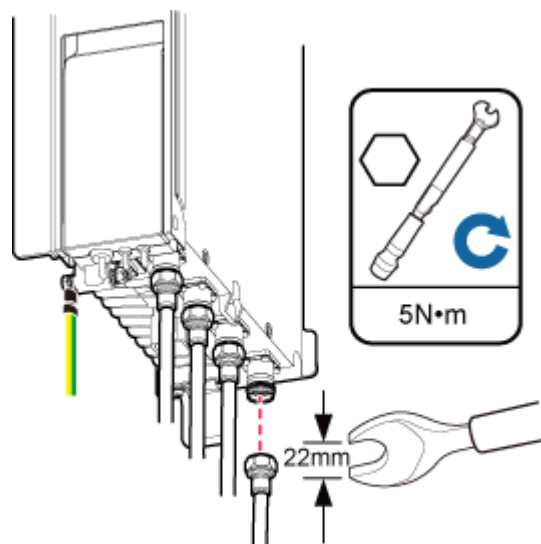
----End

## 8.6 Installing an RRU RF Jumper

This section describes the procedure for installing an RRU RF jumper.

### Procedure

**Step 1** Connect the 4.3-10 straight male connector on the RRU RF jumper to the antenna port, and use a torque wrench to tighten the connector to 5 N·m (44.25 lbf·in.), as shown in [Figure 8-16](#).

**Figure 8-16** Installing an RRU RF jumper

CIR96C5001

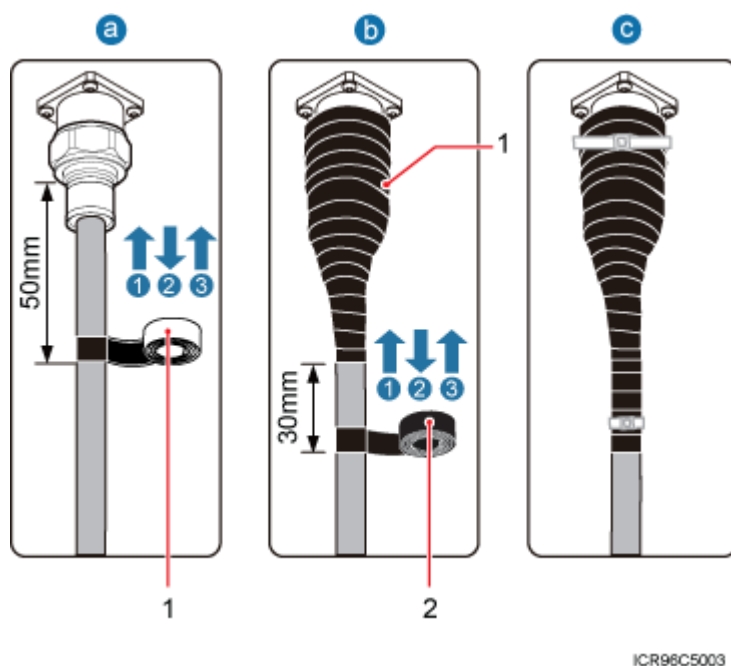
## NOTICE

On AC-powered electric railways, such as high-speed railways, when leaky cables are connected to RRUs installed in tunnels, high-voltage-resistance DC blocks must be installed between RRU RF jumpers and the leaky cables to protect the RRUs against damage.

**Step 2** Connect the other end of the RF jumper to the external antenna system.

**Step 3** Waterproof the connectors of the RF jumper by referring to [Figure 8-17](#).

**Figure 8-17** Waterproofing a connector of the RF jumper



(1) Waterproof tape	(2) PVC insulation tape
---------------------	-------------------------

### NOTE

- Before wrapping waterproof tape, stretch the tape evenly until the length of the tape becomes twice its original length.
  - Do not stretch the PVC insulation tape when wrapping the PVC insulation tape.
  - Wrap each layer of tape around the connector tightly and neatly, and ensure that each layer of tape overlaps more than 50% of the preceding layer. Ensure that neighboring layers are stuck to each other.
  - Ensure that the adhesive surface of the tape overlaps the lower layer.
  - When cutting off the cable ties, reserve a redundant length of 3 mm (0.12 in.) to 5 mm (0.2 in.).
1. Wrap three layers of waterproof tape on the connector, first from bottom up, then from top down, and finally from bottom up. Start wrapping the connector at a position 50 mm (1.97 in.) away below the bottom of the connector to the top of the connector, first from bottom

up, then from top down, and finally from bottom up. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.

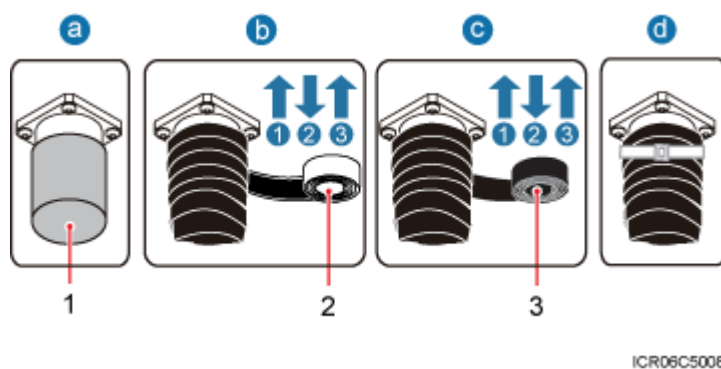
2. Wrap three layers of PVC insulation tape. Start the wrapping at a position 30 mm (1.18 in.) away below the bottom of the waterproof tape to the top of the connector, first from bottom up, then from top down, and finally from bottom up. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
3. Start binding cable ties to the cable at a position 3 mm (0.12 in.) to 5 mm (0.2 in.) away from one end of the PVC insulation tape.

**Step 4** Check the dustproof caps on antenna connectors. In outdoor scenarios, dustproof caps must be waterproofed, as shown in [Figure 8-18](#).

## NOTICE

Do not remove dustproof caps from vacant antenna connectors.

**Figure 8-18** Waterproofing a dustproof cap



(1) Dustproof cap

(2) Waterproof tape

(3) PVC insulation tape

## NOTE

- Before wrapping waterproof tape, stretch the tape evenly until the length of the tape becomes twice its original length.
- Do not stretch the PVC insulation tape when wrapping the PVC insulation tape.
- Wrap each layer of tape around the connector tightly and neatly, and ensure that each layer of tape overlaps more than 50% of the preceding layer. Ensure that neighboring layers are stuck to each other.
- Ensure that the adhesive surface of the tape overlaps the lower layer.
- When cutting off the cable ties, reserve a redundant length of 3 mm (0.12 in.) to 5 mm (0.2 in.).

1. Verify that dustproof caps are not removed.
2. Wrap three layers of waterproof tape on the connector, first from bottom up, then from top down, and finally from bottom up. Wrap each connector with three layers of waterproof tape, from bottom up, then from top down, and finally from bottom up. Do not cut the tape until all the three layers of the tape are already wrapped. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.



3. Wrap three layers of PVC insulation tape. Wrap each connector with three layers of waterproof tape, from bottom up, then from top down, and finally from bottom up. Do not cut the tape until all the three layers of the tape are already wrapped. Cut off the redundant tape after three layers are wrapped. Wrap each layer of tape around the connector tightly.
  4. Start binding cable ties to the cable at a position 3 mm (0.12 in.) to 5 mm (0.2 in.) away from one end of the PVC insulation tape.
- Step 5** Route the cables according to the instructions in [8.1 Cabling Requirements](#), and then use cable ties to bind the cables.
- Step 6** Label the installed cables according to the instructions in [Attaching a Sign Plate Label](#).
- Step 7** Attach color-coding to the installed RF jumper according to the instructions in [Attaching the Color Ring](#).
- End

## 8.7 Installing an RRU AISG Multi-Wire Cable and AISG Extension Cable

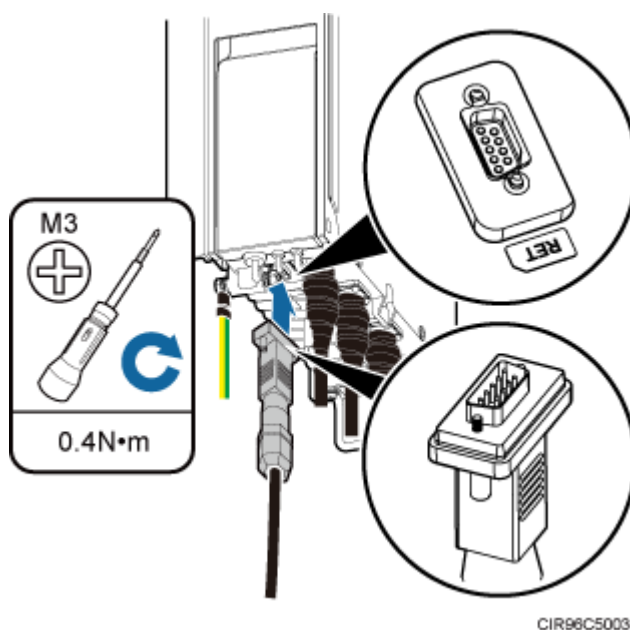
This section describes the procedures for installing an RRU AISG multi-wire cable and AISG extension cable.

### Context

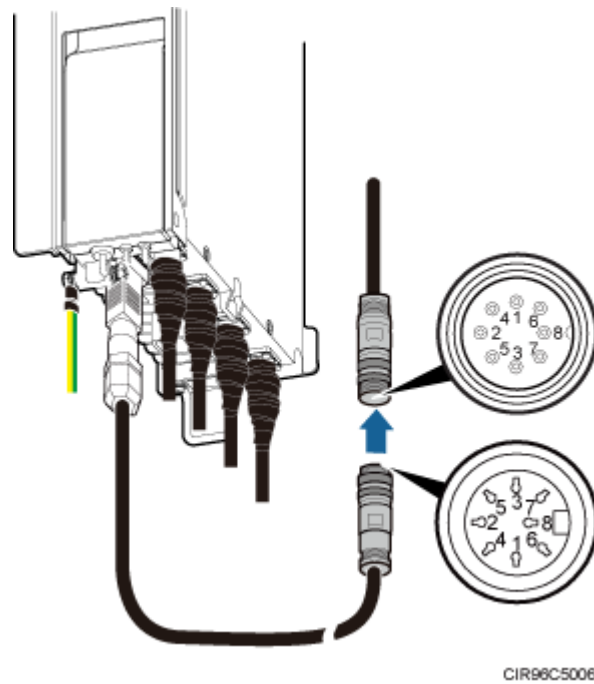
When the distance between an RRU and a Remote Control Unit (RCU) is longer than 5 m (16.4 ft.), an AISG multi-wire cable is not long enough to connect the RRU and the RCU. In this case, an AISG extension cable is used to extend the AISG multi-wire cable.

### Procedure

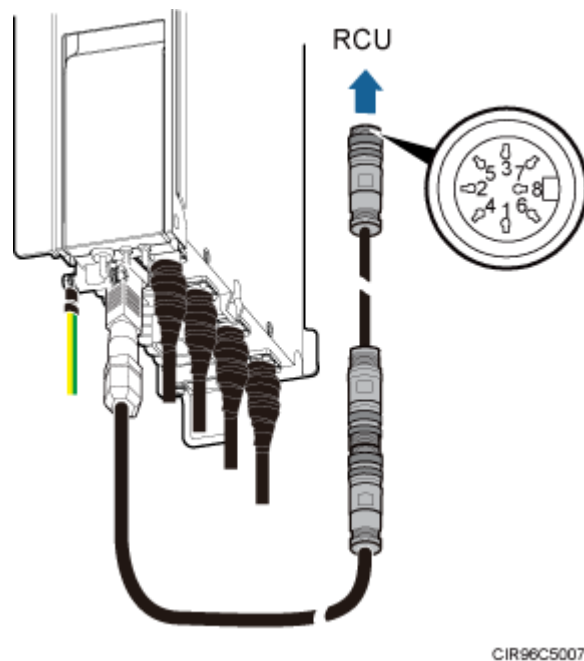
- Install an AISG multi-wire cable that is not configured with an AISG extension cable.
  1. Use an M3 flat-head screwdriver to loosen the screws on the dustproof cap on the RET port and remove the dustproof cap.
  2. Link the waterproofed DB9 connector at one end the AISG multi-wire cable to the RET port on the RRU bottom, as shown in [Figure 8-19](#).

**Figure 8-19** Installing an RRU AISG multi-wire cable

3. Use an M3 Phillips screwdriver to tighten the posts on both sides of the waterproof DB9 connector to 0.4 N·m (3.54 lbf·in.).
  4. Connect the other end of the cable to the standard AISG male connector on the RCU.
  5. Route the cables according to the instructions in [8.1 Cabling Requirements](#), and then use cable ties to bind the cables.
  6. Label the installed cables according to the instructions in [Attaching an L-Shaped Label](#).
- Install an AISG multi-wire cable that is configured with an AISG extension cable.
    1. Use an M3 flat-head screwdriver to loosen the screws on the dustproof cap on the RET port and remove the dustproof cap.
    2. Link the waterproofed DB9 connector at one end of the AISG multi-wire cable to the RET port on the RRU bottom, and link the other end to the standard AISG male connector of the AISG extension cable, as shown in [Figure 8-20](#).

**Figure 8-20** Installing an RRU AISG multi-wire cable

3. Use an M3 Phillips screwdriver to tighten the posts on both sides of the waterproof DB9 connector to 0.4 N·m (3.54 lbf in.).
4. Connect the other end of the AISG extension cable to the standard AISG male connector on the RCU, as shown in [Figure 8-21](#).

**Figure 8-21** Installing an RRU AISG extension cable

5. Route the cables according to the instructions in [8.1 Cabling Requirements](#) and then use cable ties to bind the cables.
6. Label the installed cables according to the instructions in [Attaching an L-Shaped Label](#).

----End

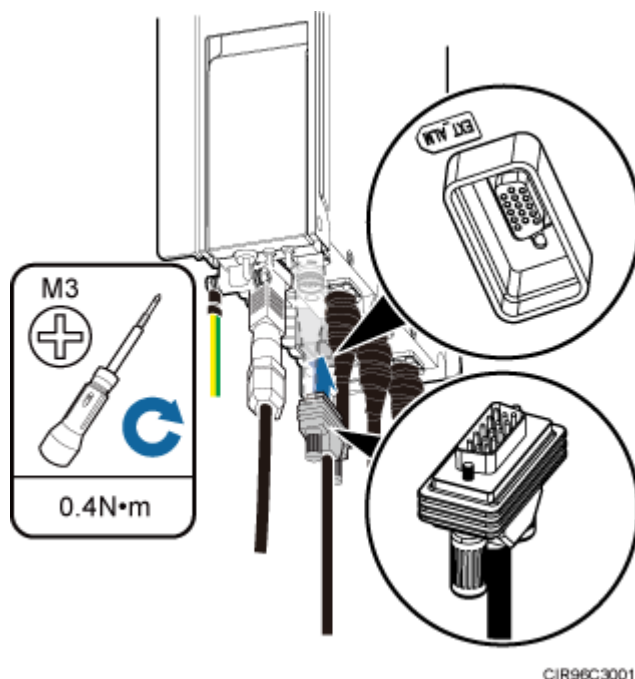
## 8.8 Installing an RRU Alarm Cable

This section describes the procedure for installing an RRU alarm cable.

### Procedure

- Step 1** Use an M3 Phillips screwdriver to loosen the screws on the dustproof cap on the EXT\_ALM port and remove the dustproof cap.
- Step 2** Connect the waterproof DB15 connector at one end of the RRU alarm cable to the EXT\_ALM port on the RRU, as shown in [Figure 8-22](#).

**Figure 8-22** Installing an RRU alarm cable



#### NOTE

Install the waterproof DB15 male connector on the RRU alarm cable with caution, preventing the pin assignment from being damaged.

- Step 3** Use an M3 Phillips screwdriver to tighten the posts on both sides of the waterproof DB15 male connector to 0.4 N·m (3.54 lbf·in.).

**Step 4** Connect the eight cord end terminals at the other end to external alarm devices.

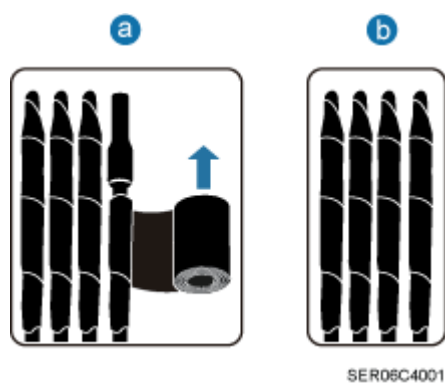
 **NOTE**

- Remove insulated protective tubes from the cord end terminals before connecting the cord end terminals to devices, as shown in [Figure 8-23](#).
- Use insulating adhesive tapes to wrap cord end terminals that are not in use and fix them at a proper position based on the onsite situations. This prevents false alarm reporting and equipment damage due to contact of exposed cables. [Figure 8-24](#) shows the method for handling cord end terminals not in use.

**Figure 8-23** Removing insulated protective tubes from the cord end terminals



**Figure 8-24** Method for handling cord end terminals that are not in use



**Step 5** Route the cables according to the instructions in [8.1 Cabling Requirements](#), and then use cable ties to bind the cables.

**Step 6** Label the installed cables according to the instructions in [Attaching an L-Shaped Label](#).

----End

## 8.9 Opening the Cover Plate of an RRU Cabling Cavity

This section describes the procedure for opening the cover plate of an RRU cabling cavity.

### Procedure

**Step 1** Wear ESD gloves.

---

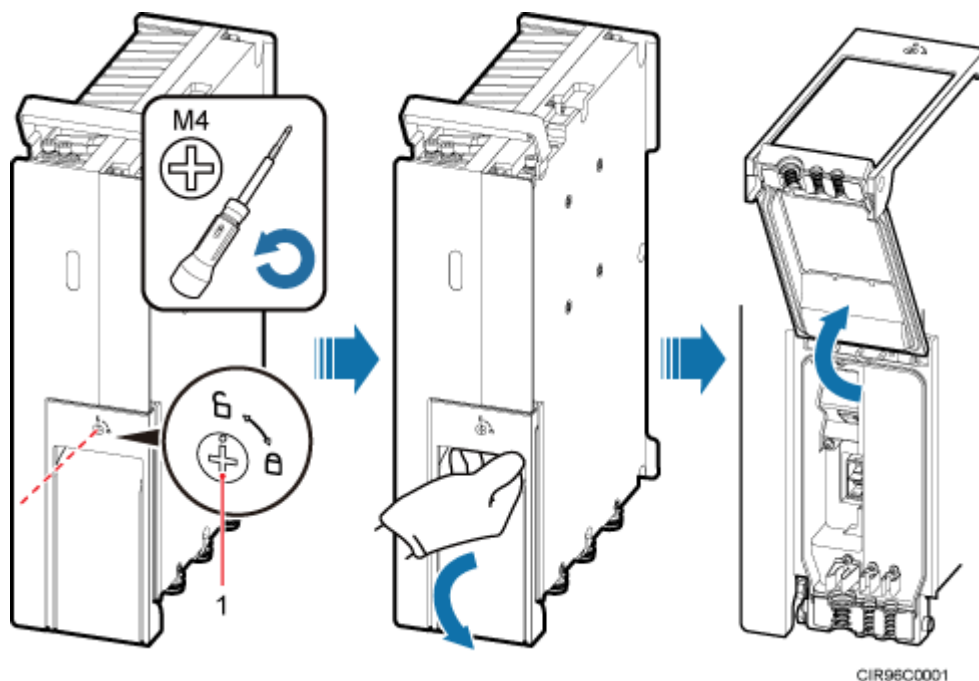
### NOTICE

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

---

**Step 2** Use an M4 Phillips screwdriver to rotate the locking screw on the cover plate on the cabling cavity 90 degrees and pull the handle outwards to open the RRU cabling cavity, as shown in [Figure 8-25](#).

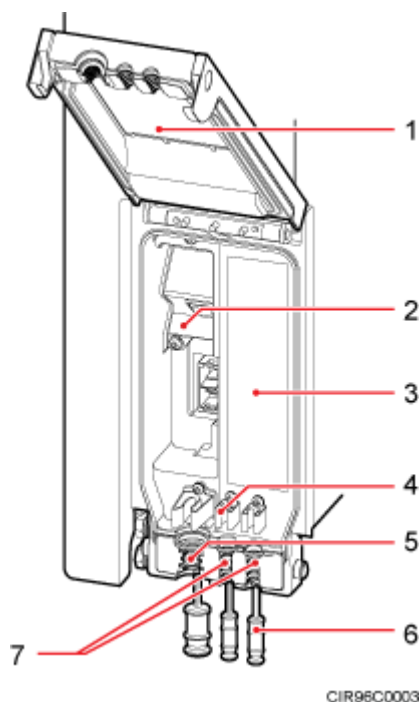
**Figure 8-25** Opening the cover plate of the RRU cabling cavity



(1) Locking screw

[Figure 8-26](#) shows the internal structure of the cabling cavity.

Figure 8-26 RRU cabling cavity



- |                                       |                        |   |
|---------------------------------------|------------------------|---|
| (1) Cover plate of the cabling cavity | (2) Cabling cavity     | (3) Label for preparing the power cable |
| (4) Cable clip                        | (5) Power cable trough | (6) Waterproof block                    |
| (7) Optical cable trough              | -                      | -                                       |

**Step 3** Remove the waterproof block.

**NOTE**

Remove only the waterproof blocks for the cables to be installed.

----End

## 8.10 Installing a CPRI Optical Cable

This section describes the procedure for installing a CPRI optical cable.

### Prerequisites

Before the installation, single-mode optical modules can be distinguished from multimode optical modules in either of the following ways:

- SM and MM labels on an optical module: SM indicates a single-mode optical module, and MM indicates a multimode optical module.
- Color of the puller on an optical module: Blue indicates a single-mode optical module, and black or gray indicates a multimode optical module.

---


**NOTICE**

The optical modules to be installed must match CPRI rates.

---

## Context

- A CPRI optical cable transmits CPRI signals between a BBU and an RRU.

## Procedure

- Step 1** Lower the pullers of two optical modules, insert one optical module into the CPRI0 port on the RRU and the other optical module into the CPRI port on the BBU, and raise the pullers, as shown in [Figure 8-27](#).

**Figure 8-27** Installing an optical module



ICR06C4002

---


**NOTICE**

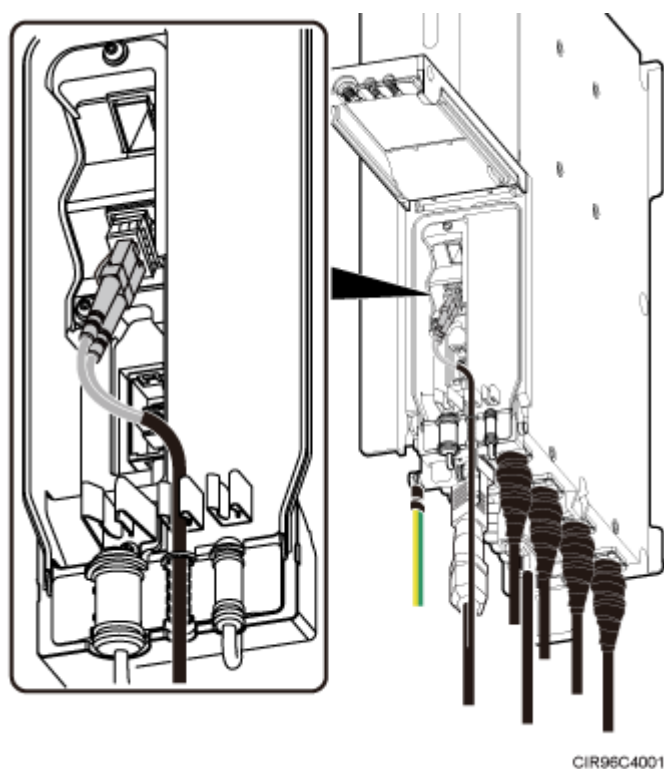
The performance of an optical module that is exposed to the air for more than 20 minutes may be abnormal. Therefore, you must insert a fiber optic cable into an unpacked optical module within 20 minutes.

---

- Step 2** Connect the end labeled 1A and 1B of the optical cable to the optical module on the RRU side, as shown in [Figure 8-28](#).



Figure 8-28 Installing a CPRI optical cable



## NOTICE

To avoid any damage to optical cables, the cables connected to the RRU must be installed according to the installation process. For details about the installation process, see [8.3 Installing RRU Cables](#).

- Step 3** Connect the end labeled 2A and 2B of the optical cable to the optical module on the BBU side.
- Step 4** Route the cables according to the instructions in [8.1 Cabling Requirements](#), and then use cable ties to bind the cables.
- Step 5** Label the installed cables according to the instructions in Attaching an L-Shaped Label.

---End

## 8.11 Installing an RRU Power Cable

This section describes the procedure for installing an RRU power cable.

### Prerequisites

- A tool-less female connector (pressfit type) is added to the RRU power cable on the RRU side. For details, see [11.1 Adding a Tool-Less Female Connector \(Pressfit Type\) to the RRU Power Cable on the RRU Side](#).

- A connector or OT terminals are added to the RRU power cable on the power device side. For details, see *DBS3900 Installation Guide*.

## Context

If a power device provided by the customer is used, the recommended specification of the circuit breaker on this power device is 20 A to 30 A.

**Table 8-2** describes the RRU power cable.

**Table 8-2** RRU power cable

Cable	On the RRU Side	On the Power Device Side	Power Device	Color
RRU power cable	Tool-less female connector (pressfit type)	Tool-less female connector (pressfit type)	EPU	A cable with a black jacket and two wires inside <ul style="list-style-type: none"> <li>● North American standards: The RTN(+) wire is black and the NEG(-) wire is blue.</li> <li>● European standards: The RTN(+) wire is brown and the NEG(-) wire is blue.</li> </ul>
			DCD U-11 B	
		EPC5 connector	DCD U-12 B	



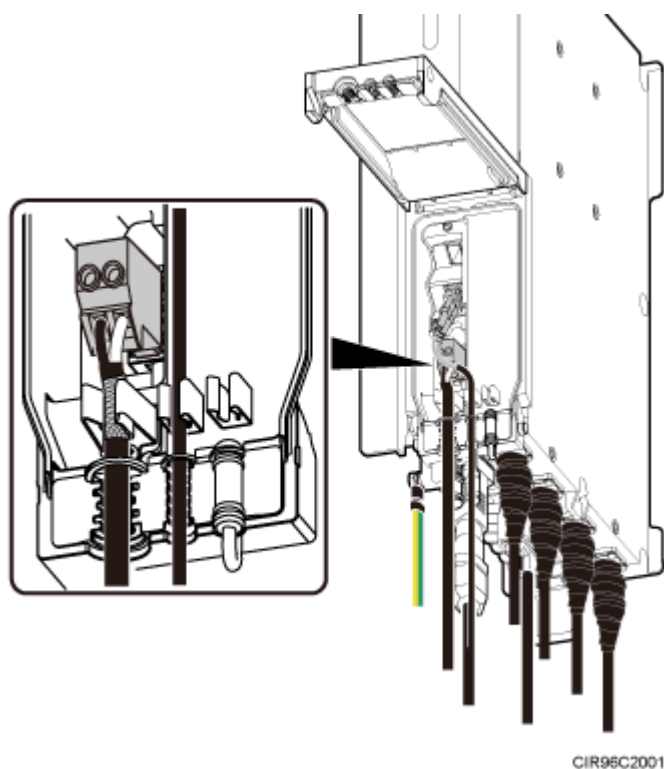
## CAUTION

- Before installing the RRU power cable, ensure that the upper-level circuit breaker is switched off and the power cable has no voltage.
- A drip loop is required for the position between the RRU port and the cable, preventing rain from damaging the RRU.
- When installing the RRU power cable, connect the power cable to the RRU connector first and then to the power equipment connector. Incorrect connection sequence or reverse connection of positive and negative poles may damage the RRU or cause personal injury.

## Procedure

- Step 1** Connect the tool-less female connector (pressfit type) at one end of the RRU power cable to the power supply socket on the RRU, as shown in **Figure 8-29**.

Figure 8-29 Installing an RRU power cable



## NOTICE

Ensure that the exposed shield layer of the power cable is properly tightened using the clip.

**Step 2** Connect the connector at the other end of the RRU power cable to the corresponding position on the power device.

### NOTE

- A DCDU-11B/DCDU-12B can supply power to a maximum of six RRUs. Ensure that the RRU power cable is connected to one of **LOAD0** to **LOAD5** ports on the DCDU-11B/DCDU-12B.
- One EPU can supply power to a maximum of six RRUs. Ensure that the RRU power cable is connected to one of **RRU0** to **RRU5** ports on the EPU.
- When the RRU power cable is connected to the EPU, the blue core wire in the tool-less female connector (pressfit type) is connected to the upper port on the EPU, and the black/brown core wire is connected to the lower port on the EPU.

**Step 3** Route the cables according to the instructions in [8.1 Cabling Requirements](#), and then use cable ties to bind the cables.

**Step 4** Label the installed cables according to the instructions in [Attaching a Cable-Tying Label](#).

----End

## 8.12 Closing the Cover Plate of an RRU Cabling Cavity

This section describes the procedure for closing the cover plate of an RRU cabling cavity.

### Procedure

- Step 1** Fasten the cables using clips, as shown in [Figure 8-30](#).

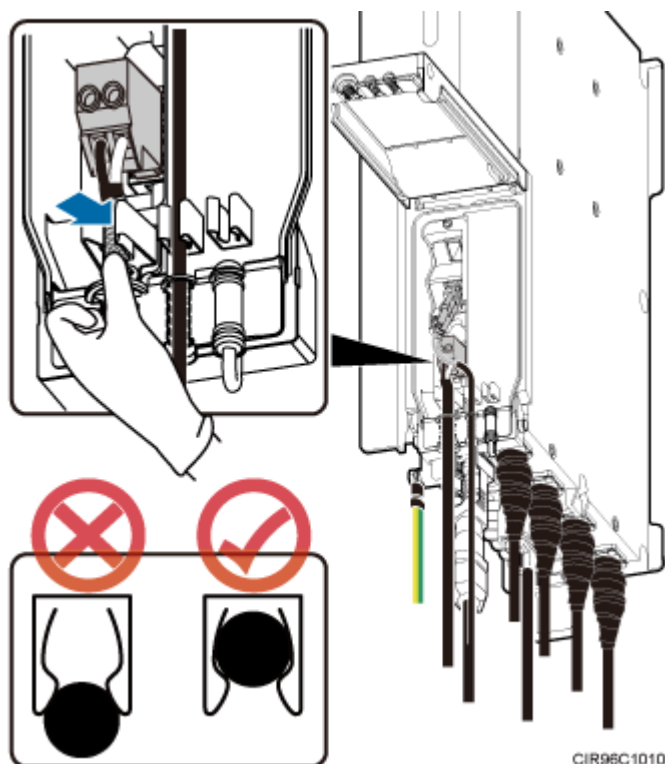
---

#### NOTICE

Ensure that the exposed shield layer of the power cable is properly tightened using the clip.

---

**Figure 8-30** Fastening cables using clips



- Step 2** Insert waterproof blocks into vacant cable troughs in the cabling cavity, as shown in [Figure 8-31](#).

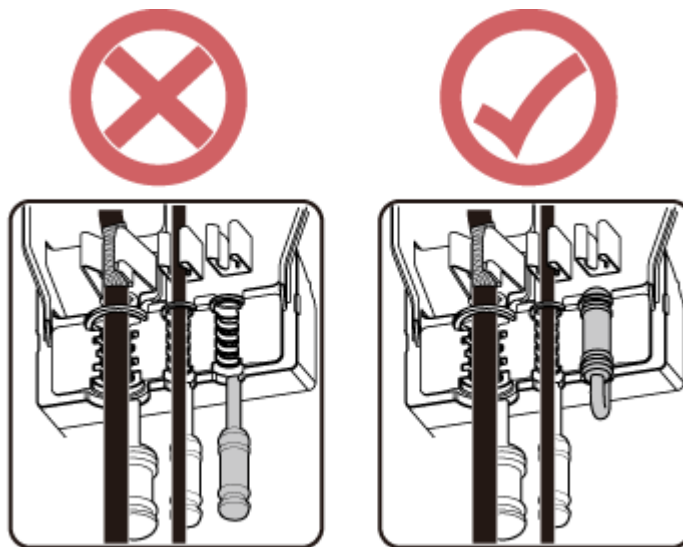
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#### NOTICE

Ensure that cables and waterproof blocks are properly inserted into troughs.

---

**Figure 8-31** Correct placement of waterproof blocks



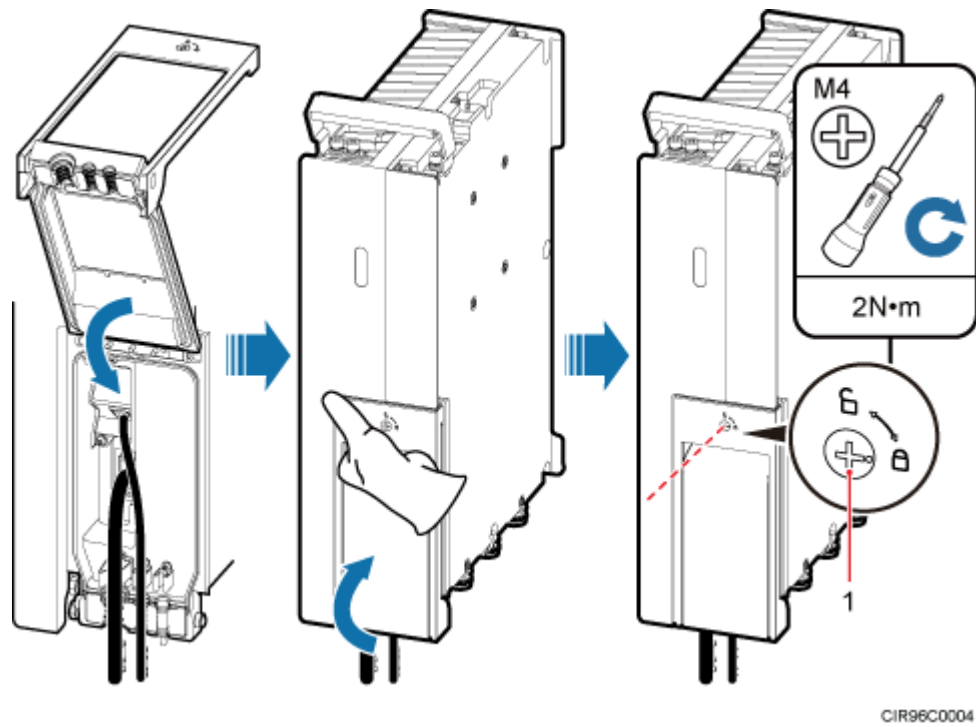
EIR96C1003

- Step 3** Push the handle to close the cover plate on the cabling cavity and use an M4 torque screwdriver to rotate the locking screw on the cover plate on the cabling cavity 90 degrees to ensure that the cover plate is locked, as shown in [Figure 8-32](#).



## NOTICE

The RRU cabling cavity must be securely tightened to prevent water.

**Figure 8-32** Closing the cover plate of an RRU cabling cavity

**Step 4** Take off the ESD gloves, and pack up all the tools.

----End

# 9 Checking the RRU Hardware Installation

After an RRU is installed, check the hardware installation.

**Table 9-1** provides the checklist for the RRU hardware installation.

**Table 9-1** Checklist for the RRU hardware installation

SN	Item
1	The position for each device conforms to the engineering drawing and meets the space requirement. Sufficient space is reserved for equipment maintenance.
2	The RRU is securely installed.
3	The cover plate is securely installed on the RRU cabling cavity.
4	Waterproof blocks are securely installed in vacant cable troughs of the RRU cabling cavity, and the cover plate for the cabling cavity is securely installed. In addition, vacant RF ports are covered with dustproof caps and the caps are tightened.
5	There are no connectors or joints on each power cable or PGND cable.
6	The terminals at two ends of each power cable or PGND cable are securely soldered or crimped.
7	None of power cables and PGND cables can be short-circuited or reversely connected. In addition, these cables are not damaged or broken.
8	Power cables and PGND cables are separately bound from other cables.
9	The protection grounding of the RRU and the surge protection grounding of the building share one group of ground conductors.
10	The connectors of each signal cable are intact and securely linked, and these cables are not damaged or broken.
11	Labels are correct, legible, and complete at both ends of each cable, feeder, and jumper.
12	All ground cables are properly grounded.

# 10 Powering On an RRU

---

After all the devices are installed, check the power-on status of an RRU.



## NOTICE

After you unpack an RRU, you must power on it within 24 hours. If you power off the RRU for maintenance, you must restore power to the RRU within 24 hours.

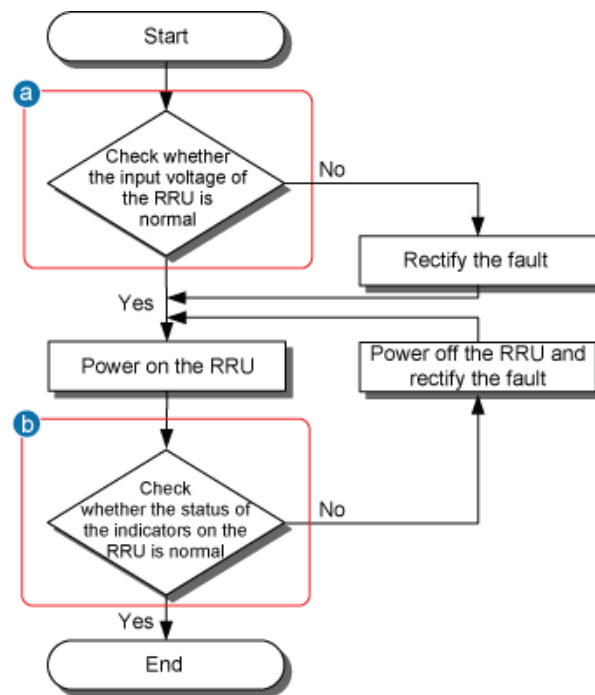
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[Figure 10-1](#) shows the RRU power-on check process.



For details about how to power on an RRU, see [Powering On an RRU](#). For details about how to power off an RRU, see section "Powering-Off the RRU" in *RRU Maintenance Guide*.



**Figure 10-1** RRU power-on check process

IPR06C0003

(a) The normal input voltage of an RRU is -48 V DC. The voltage of the external power supply should range from -36 V DC to -57 V DC.

(b) The RUN indicator on the RRU is on for 1s and off for 1s. The ALM indicator is steady off.

# 11 Appendix

---

## About This Chapter

### [11.1 Adding a Tool-Less Female Connector \(Pressfit Type\) to the RRU Power Cable on the RRU Side](#)

This section describes the procedure for adding a tool-less female connector (pressfit type) to the RRU power cable on the RRU side.

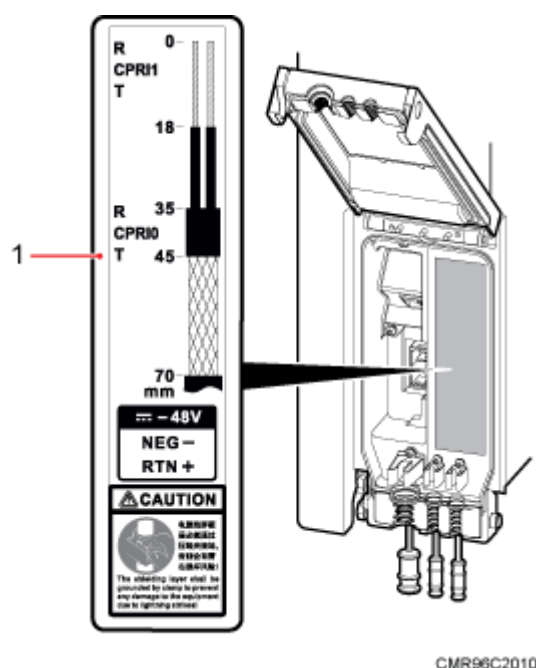
## 11.1 Adding a Tool-Less Female Connector (Pressfit Type) to the RRU Power Cable on the RRU Side

This section describes the procedure for adding a tool-less female connector (pressfit type) to the RRU power cable on the RRU side.

### Context

**Figure 11-1** shows the cable diagram on labels.

**Figure 11-1** Cable diagram on labels



(1) Cable diagram on labels

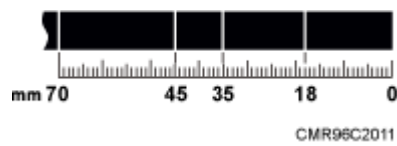


### NOTICE

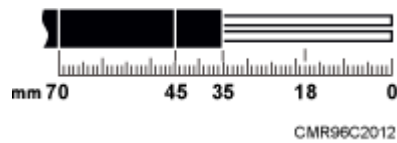
Prepare a Tool-Less Female Connector (Pressfit Type) to the RRU Power Cable on the RRU Side by strictly following the following operations. Otherwise, damage to the RRU or personal injury may occur.

### Procedure

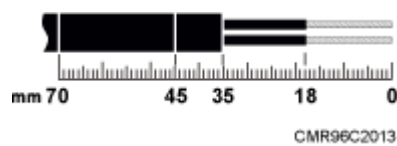
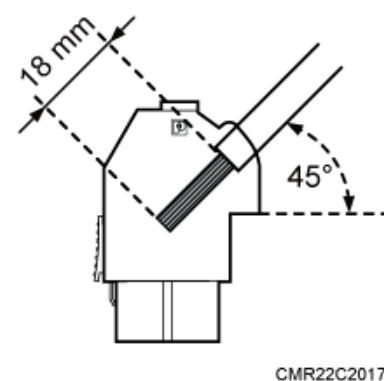
- Step 1** Determine the length of the power cable for different operations based on the labels, as shown in **Figure 11-2**.

**Figure 11-2** Determining the length of the power cable

**Step 2** Strip the specified length of the sheath off the power cable, as shown in [Figure 11-3](#).

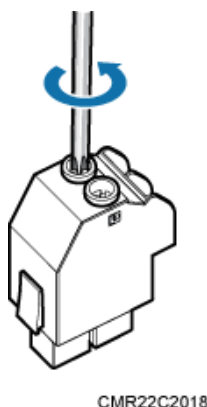
**Figure 11-3** Stripping the specified length of sheath

**Step 3** Strip a specified length of sheath off each core wire. The length must be consistent with the length of the notch in the tool-less female connector (pressfit type), as shown in [Figure 11-4](#).

**Figure 11-4** Stripping the sheath off each core wire**Figure 11-5** Matched length

**Step 4** Add a tool-less female connector (pressfit type) to two core wires.

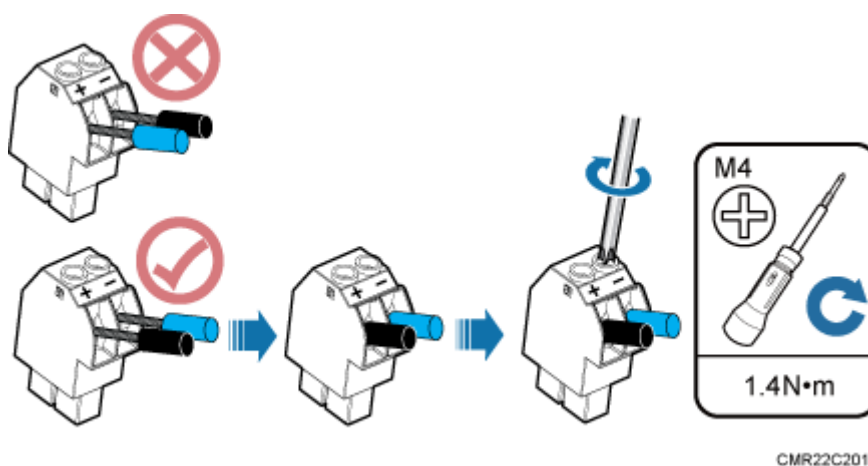
1. Tighten the screws using a Phillips screwdriver, as shown in [Figure 11-6](#).

**Figure 11-6** Tightening screws

2. Connect the blue core wire labeled NEG(-) to the - port and the black/brown core wire labeled RTN(+) to the + port on the tool-less female connector (pressfit type), and then tighten the screws using a Phillips screwdriver, and then use a torque screwdriver to tighten the M4 screws to 1.4 N·m (12.39 lbf·in.), as shown in **Figure 11-7**.

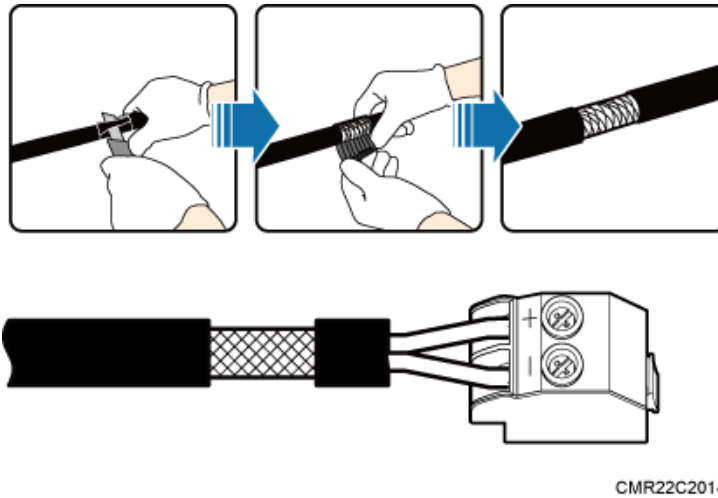
## DANGER

Do not reversely connect the positive and negative poles. Reverse connection of positive and negative poles may result in equipment malfunctions or personal injury. Therefore, check the power cable connection before powering on the RRU.

**Figure 11-7** Adding a tool-less female connector (pressfit type) to two core wires

3. After the core wires are installed, ensure that each core wire is securely installed after being dragged with a torque of 30 N·m and all copper wires are inserted in the connector terminal socket.

**Step 5** Strip the specified length of the sheath off the power cable to expose the intact shield layer, as shown in **Figure 11-8**.

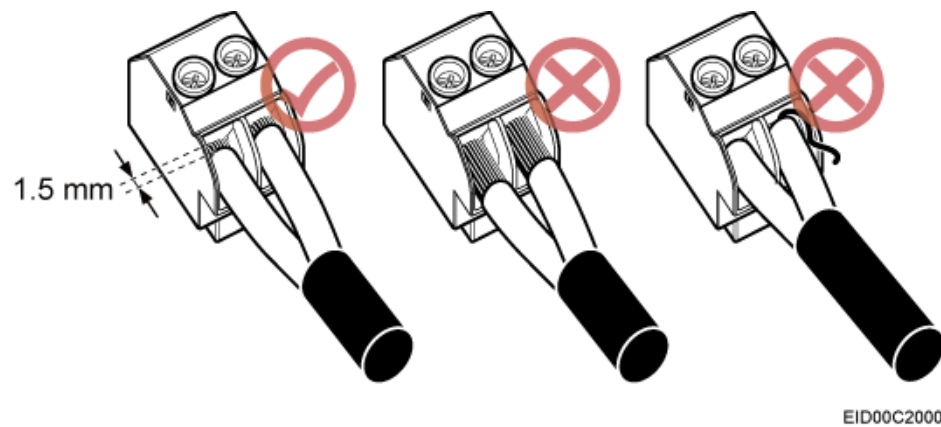
**Figure 11-8** Stripping the sheath off the power cable

---

 **NOTICE**

Each core wire is exposed outside the tool-less female connector (pressfit type) for 1.5 mm (0.059 [in.]), as shown in [Figure 11-9](#).

---

**Figure 11-9** Inserting core wires into the tool-less female connector (pressfit type)

---End