RRU3942&RRU3642

Installation Guide

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About This Document

Purpose

This document describes the process of installing DC RRU3942 and RRU3642 (referred to as RRU in this document).

Product Version

The following table lists the product version related to this document for RRU3942.

Product Name	Product Version
DBS3900	V100R004C00 and later versions
DBS3900 GSM	V100R013C00 and later versions
DBS3900 WCDMA	V200R013C00 and later versions
DBS3900 LTE	V100R005C00 and later versions

The following table lists the product version related to this document for RRU3642.

Product Name	Product Version
DBS3900	V100R008C00 and later versions
DBS3900 LTE	V100R006C00 and later versions

Intended Audience

This document is intended for:

Base station installation engineers

Organization

1 Changes in the RRU3942&RRU3642 Installation Guide

This chapter describes the changes in the *RRU3942&RRU3642 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 the 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

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.

Conventions

Symbol Conventions

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

Symbol	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	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.
NOTE	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.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
Italic	Book titles are in *italics*.
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
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.

Convention	Description
[ ]	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.
{ 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
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in **boldface**. For example, click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder**.

Keyboard Operations

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

Format	Description
Key	Press the key. For example, press **Enter** and press **Tab**.
Key 1+**Key 2**	Press the keys concurrently. For example, pressing **Ctrl**+**Alt**+**A** means the three keys should be pressed concurrently.
Key 1, **Key 2**	Press the keys in turn. For example, pressing **Alt**, **A** 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.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

Contents

1 Changes in the RRU3942&RRU3642 Installation Guide

This chapter describes the changes in the *RRU3942&RRU3642 Installation Guide*.

07 (2013-12-30)

This is the seventh official release.

Compared with issue 06 (2013-12-23), this issue includes the following change:

Topic	Change Description
3.4 Installation Scenarios	Modified the figure showing the U-steel specifications.

Compared with issue 06 (2013-12-23), this issue does not include any new information and no information is deleted from this issue.

06 (2013-12-23)

This is the sixth official release.

Compared with issue 05 (2013-06-26), this issue includes the following change:

Topic	Change Description
6.1 Hoisting an RRU onto a Tower	Optimized the procedure for hoisting an RRU onto a Tower.

Compared with issue 05 (2013-06-26), this issue does not include any new information and no information is deleted from this issue.

05 (2013-06-26)

This is the fifth official release.

Compared with issue 04 (2013-04-28), this issue includes the following change:

Topic	Change Description
8.10 Installing an RRU Power Cable	Added the power device DCDU-12B for the RRU.

Compared with issue 04 (2013-04-28), this issue does not include any new information and no information is deleted from this issue.

04 (2013-04-28)

This is the fourth official release.

Compared with issue 03 (2013-01-14), this issue includes the following new information:

● **7.6 Installing an RRU on an IFS06**

Compared with issue 03 (2013-01-14), this issue includes the following change:

Topic	Change Description
The whole document	Modified the figures showing the mounting kits for an RRU, which have been modified.
About This Document	Changed the document name from *RRU3942 Installation Guide* to *RRU3942&RRU3642 Installation Guide*.
2.2 Tools and Instruments	Modified the specifications of the hammer drill and wrench.
3.4 Installation Scenarios	Modified the installation scenarios of the RRU.
4 Unpacking the Equipment	Added requirements for checking the insulation layer of RRU cables.
7 Installing the RRU	Changed the procedures for installing the RRU in different scenarios because RRU mounting kits and attachment plates are redesigned.
8.1 Cabling Requirements	Added requirements for routes of RRU cables.

Compared with issue 03 (2013-01-14), no information is deleted from this issue.

03 (2013-01-14)

This is the third official release.

Compared with issue 02 (2012-09-15), this issue does not include any new information.

Compared with issue 02 (2012-09-15), this issue includes the following change:

Topic	Change Description
8.10 Installing an RRU Power Cable	Added the attention for installing the RRU power cable.

Compared with issue 02 (2012-09-15), no information is deleted from this issue.

02 (2012-09-15)

This is the second official release.

Compared with issue 01 (2012-04-25), this issue does not include any new information.

Compared with issue 01 (2012-04-25), this issue includes the following change:

Topic	Change Description
8.6 Installing an RRU RF Jumper	Optimized the procedure for waterproofing the connectors on an RRU RF jumper and the dustproof caps.
6.2 Hoisting Fiber Optic Cables onto a Tower	Optimized the procedure for hoisting.
6.3 Hoisting Power Cables onto a Tower	

Compared with issue 01 (2012-04-25), no information is deleted from this issue.

01 (2012-04-25)

This is the first official release.

Compared with draft B (2012-04-16), this issue does not include any modification.

Draft B (2012-04-16)

This is the draft.

Compared with issue draft A (2012-01-10), this issue does not include any new information.

Compared with issue draft A (2012-01-10), this issue includes the following change:

Topic	Change Description
3.4 Installation Scenarios	Optimized the contents in this document.

Compared with issue draft A (2012-01-10), no information is deleted from this issue.

Draft A (2012-01-10)

This is a draft.

2 Installation Preparations

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.
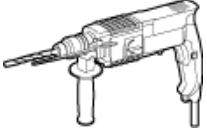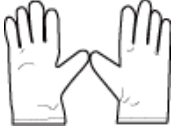
2.1 Reference Documents

Before the installation, you must be familiar with reference documents.
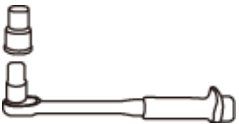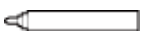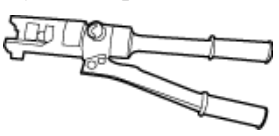
The following reference documents are required during RRU installation:

- RRU3942&RRU3642 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 φ12 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

Utility knife	Cable cutter	Adjustable wrench (size $\geqslant$ 32 mm [1.26 in.]) Torque wrench Size: 16 mm (0.63 in.) and 32 mm (1.26 in.) Combination wrench Size: 16 mm (0.63 in.) and 32 mm (1.26 in.)
Level	Torque screwdriver 5 mm 5 mm (M3 to M6) (M3 to M6)	Torque socket
Multimeter	Marker (diameter $\leqslant$ 10 mm [0.39 in.])	Measuring tape
Inner hexagon wrench	Fixed pulley	Lifting sling
Hydraulic pliers	-	-

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

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.

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 an RRU.

Figure 3-1 RRU exterior
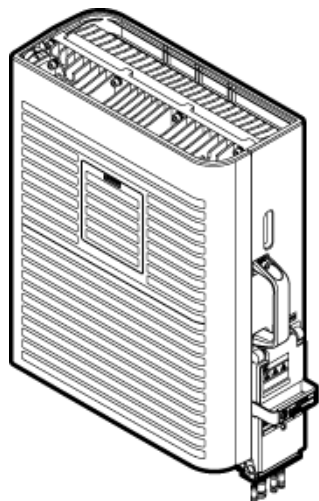
PIR24C0001

Figure 3-2 shows RRU dimensions.

Figure 3-2 RRU dimensions
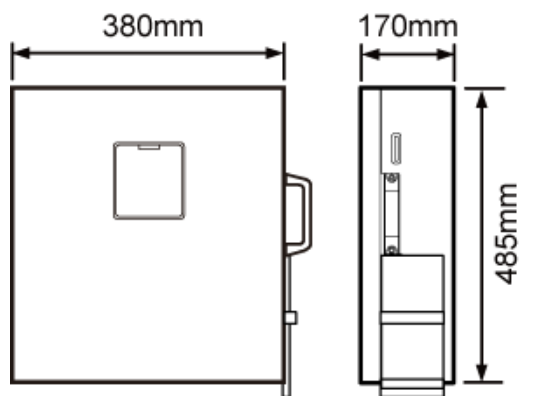
PIR24C0005

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 3-3 shows the ports on the RRU panels.

Figure 3-3 Ports on the RRU panels

PIR30C0002
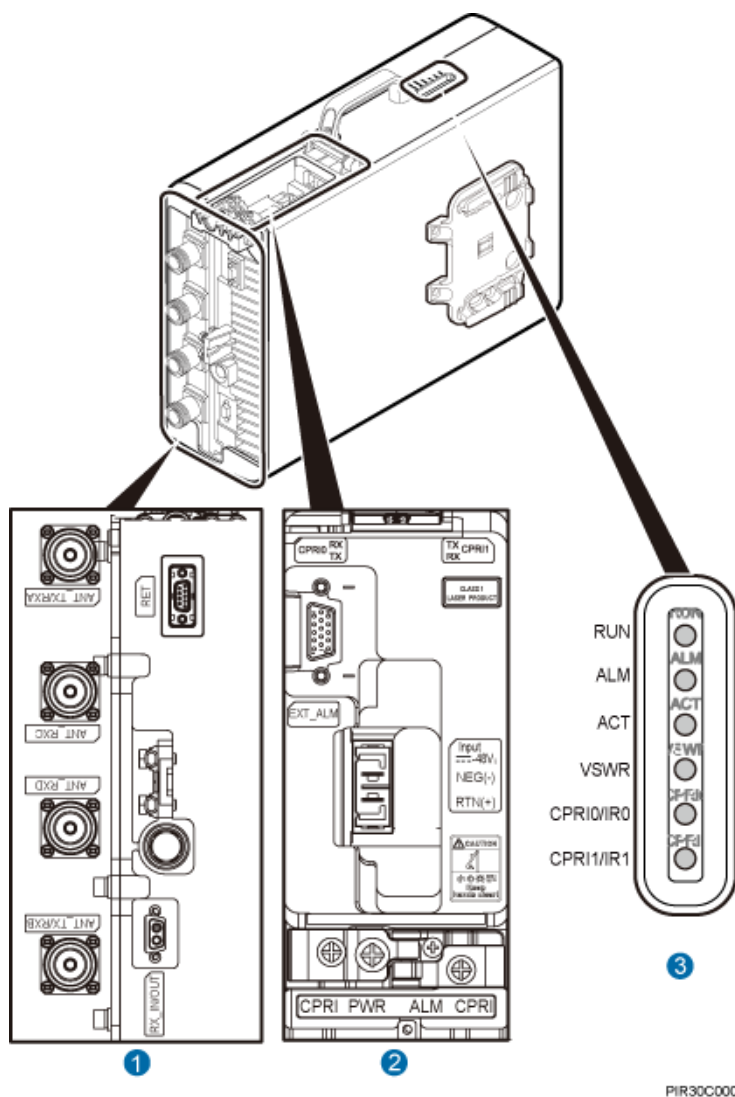
Table 3-1 describes ports and indicators on the RRU panels.

Table 3-1 Ports and indicators on the RRU panels

Item	Silkscreen	Description
(1) Ports at the bottom	ANT_TX/RXA	TX/RX port A, supporting RET signal transmission
	ANT_RXC	RX port C
	ANT_RXD Port	RX port D
	ANT_TX/RXB	TX/RX port B

Item	Silkscreen	Description
	RX_IN/OUT	Interconnection port
	RET	Communication port for the RET antenna, supporting RET signal transmission
(2) Ports in the cabling cavity	RTN(+)	Power supply socket
	NEG(-)	
	CPRI0	Optical/electrical port 0
	CPRI1	Optical/electrical port 1
	EXT_ALM	Alarm monitoring port used for monitoring one RS485 signal and two dry contact signals
(3) Indicators	RUN	See **3.3 RRU Indicators**.
	ALM	
	ACT	
	VSWR	
	CPRI0/IR0	
	CPRI1/IR1	

☷**NOTE**

- The port for transmitting RET signals is determined by the software.
- For the RRU3942, both CPRI0 and CPRI1 can be conected to the BBU. Use the CPRI0 by default in the single-mode scenario.
- For the RRU3642, CPRI0 is connected to the BBU and the CPRI1 is reserved. The RX_IN/OUT is not used.

Table 3-2 describes how to use RF ports for RRU3942.

Table 3-2 Usage of RF ports for RRU3942

Product Version	TX/RX Channel	Number of Used RF Ports	Usage	Remarks
● DBS3900 V100R004C00 ● DBS3900 GSM V100R013C00 ● DBS3900 GSM V300R013C00 ● DBS3900 WCDMA V200R013C00	1 x 2T2R	2	ANT_TX/RXA and ANT_TX/RXB are used together.	A single sector
● DBS3900 GSM V100R014C00 and later versions ● DBS3900 GSM V300R014C00 and later versions	1 x 1T2R	2	It is recommended that ANT_TX/RXA and ANT_RXC be used together. You can also use ANT_TX/RXB and ANT_RXD together.	A single sector
	1 x 2T2R	2	ANT_TX/RXA and ANT_TX/RXB are used together.	A single sector
	2 x 1T2R	4	ANT_TX/RXA and ANT_RXC are used for one sector; ANT_TX/RXB and ANT_RXD are used for the other sector.	Two sectors
● DBS3900 V100R007C00 and later versions ● DBS3900 WCDMA V200R014C00 and later versions ● DBS3900 LTE V100R005C00 and later versions	1 x 1T2R	2	It is recommended that ANT_TX/RXA and ANT_RXC be used together. You can also use ANT_TX/RXB and ANT_RXD together.	A single sector
	1 x 2T2R	2	ANT_TX/RXA and ANT_TX/RXB are used together.	A single sector
	2 x 1T2R	4	ANT_TX/RXA and ANT_RXC are used for one sector; ANT_TX/RXB and ANT_RXD are used for the other sector.	Two sectors

Product Version	TX/RX Channel	Number of Used RF Ports	Usage	Remarks
	1 x 2T4R	4	ANT_TX/RXA, ANT_TX/RXB, ANT_RXC, and ANT_RXD are used together for one sector, with ANT_TX/RXA and ANT_RXC combined and ANT_TX/RXB and ANT_RXD combined.	A single sector

Figure 3-4 shows the recommended usage of RF ports on an RRU3942 used for DBS3900 V100R004C00, DBS3900 GSM V100R013C00, DBS3900 GSM V300R013C00, or DBS3900 WCDMA V200R013C00.

Figure 3-4 Recommended usage of RF ports on an RRU3942 used for DBS3900 V100R004C00, DBS3900 GSM V100R013C00, DBS3900 GSM V300R013C00, or DBS3900 WCDMA V200R013C00
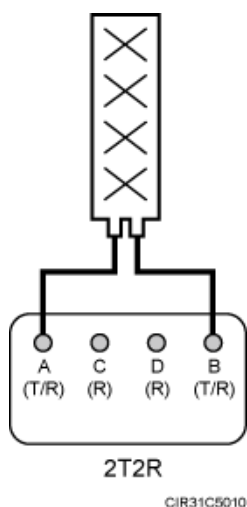
Figure 3-5 shows the recommended usage of RF ports on an RRU3942 used for DBS3900 GSM V100R014C00 and later versions or DBS3900 GSM V300R014C00 and later versions.

Figure 3-5 Recommended usage of RF ports on an RRU3942 used for DBS3900 GSM V100R014C00 and later versions or DBS3900 GSM V300R014C00 and later versions
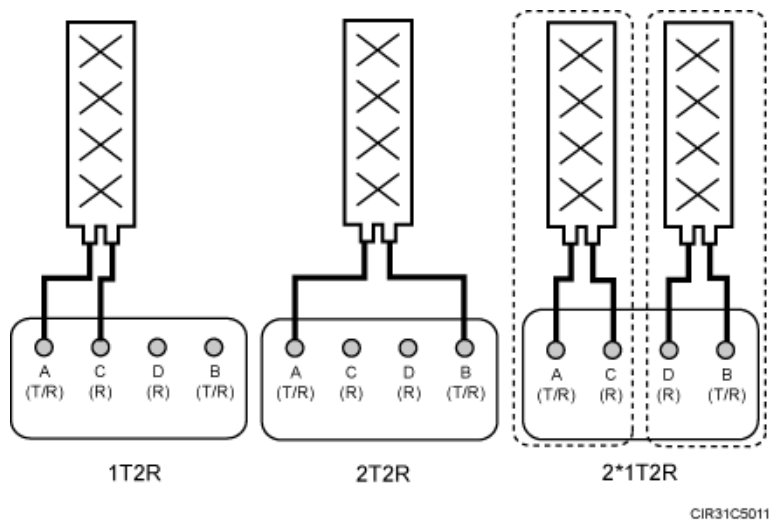
Figure 3-6 shows the recommended usage of RF ports on an RRU3942 used for DBS3900 V100R007C00 and later versions, DBS3900 WCDMA V200R014C00 and later versions, or DBS3900 LTE V100R005C00 and later versions.

Figure 3-6 Recommended usage of RF ports on an RRU3942 used for DBS3900 V100R007C00 and later versions, DBS3900 WCDMA V200R014C00 and later versions, or DBS3900 LTE V100R005C00 and later versions
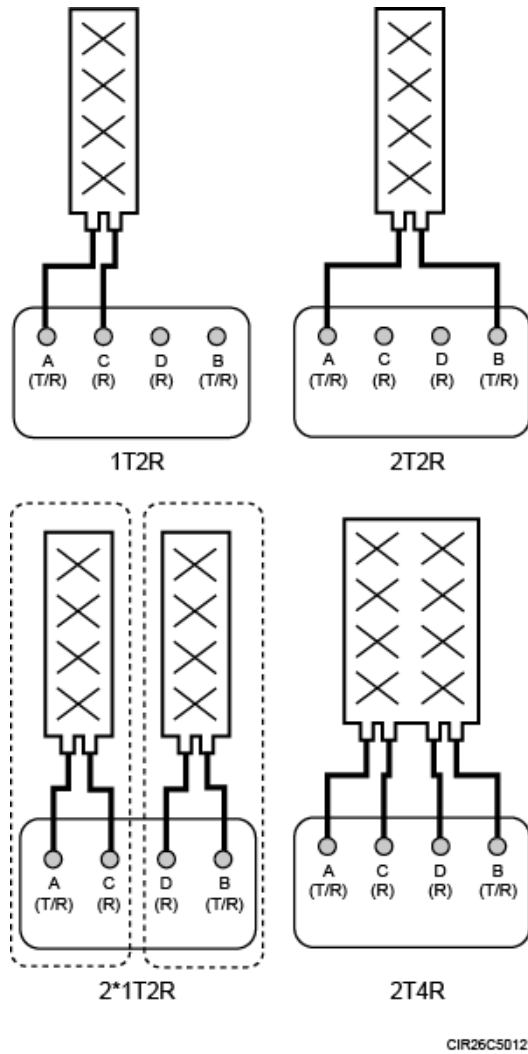
Table 3-3 describes how to use RF ports for RRU3642.

Table 3-3 Usage of RF ports for RRU3642

Product Version	TX/RX Channel	Number of Used RF Ports	Usage	Remarks
● DBS3900 LTE V100R006C00 and later versions	1 x 1T2R	2	It is recommended that ANT_TX/RXA and ANT_RXC be used together. You can also use ANT_TX/RXB and ANT_RXD together.	A single sector
	1 x 2T2R	2	ANT_TX/RXA and ANT_TX/RXB are used together.	A single sector
	2 x 1T2R	4	ANT_TX/RXA and ANT_RXC are used for one sector; ANT_TX/RXB and ANT_RXD are used for the other sector.	Two sectors
	1 x 2T4R	4	ANT_TX/RXA, ANT_TX/RXB, ANT_RXC, and ANT_RXD are used together for one sector, with ANT_TX/RXA and ANT_RXC combined and ANT_TX/RXB and ANT_RXD combined.	A single sector

Figure 3-7 shows the recommended usage of RF ports on an RRU3642 used for DBS3900 LTE V100R006C00 and later versions.

Figure 3-7 Recommended usage of RF ports on an RRU3642 used for DBS3900 LTE V100R006C00 and later versions
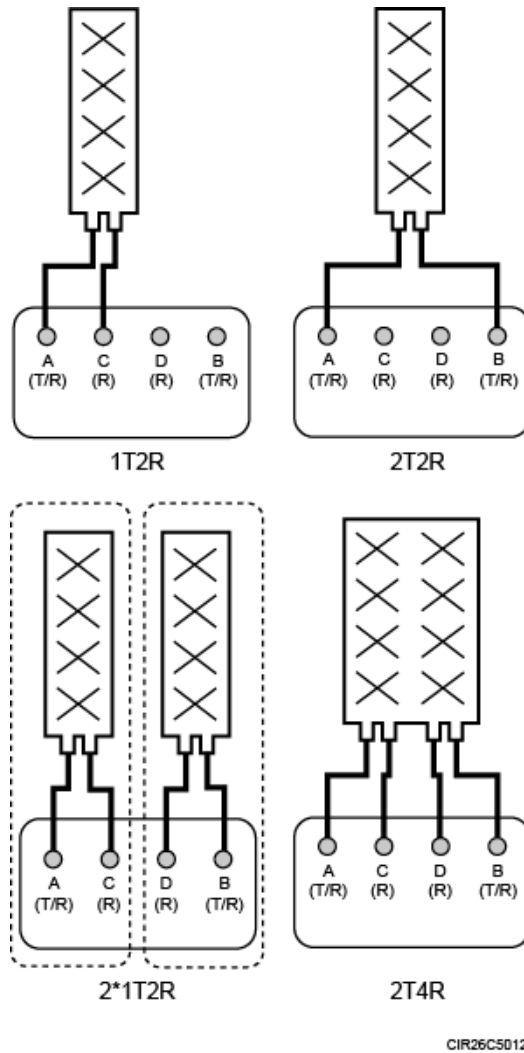
3.3 RRU Indicators

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

For detailed positions of RRU indicators, see **3.2 RRU Ports**.

Table 3-4 describes RRU indicators.

Table 3-4 RRU indicators

Indicator	Color	Status	Meaning
RUN	Green	Steady on	There is power supply, but the module is faulty.

Indicator	Color	Status	Meaning
		Steady off	There is no power supply, or the module is faulty.
		Blinking (on for 1s and off for 1s)	The board is functioning properly.
		Blinking (on for 0.125s and off for 0.125s)	Software is being loaded to the module, or the module is not started.
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 the faults on the related boards or ports. Therefore, you need to locate the fault before deciding whether to replace the module.
		Steady off	No alarm is generated.
ACT	Green	Steady on	The module is running properly with TX channels enabled or the software is being loaded without RRU running.
		Blinking (on for 1s and off for 1s)	The module is running properly 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 ANT_TX/RXB port.
		Steady on	VSWR alarms are generated on the ANT_TX/RXA port.
		Blinking (on for 0.125s and off for 0.125s)	VSWR alarms are generated on the ANT_TX/RXA and ANT_TX/RXB ports.
CPRI0/IR0	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.

Indicator	Color	Status	Meaning
CPRI1/IR1	Red or green	Steady green	The CPRI link is functioning properly.
		Steady red	An optical module fails to transmit or receive signals because the optical module is faulty or the fiber optic cable is broken.
		Blinking red (on for 1s and off for 1s)	The CPRI link is out of lock because of a failure in clock lock between two modes or mismatched data rates over CPRI ports.
		Steady off	The optical module cannot be detected, or the optical module is powered off.

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

Method of installation:

- 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 in **Figure 3-8**.

- On a tower, an RRU can be installed on a pole, angle steel, or U-steel. U-steel and angle steel support the standard or reverse installation of a single RRU only.

Figure 3-8 Requirements for the vertical deviation angle of an RRU
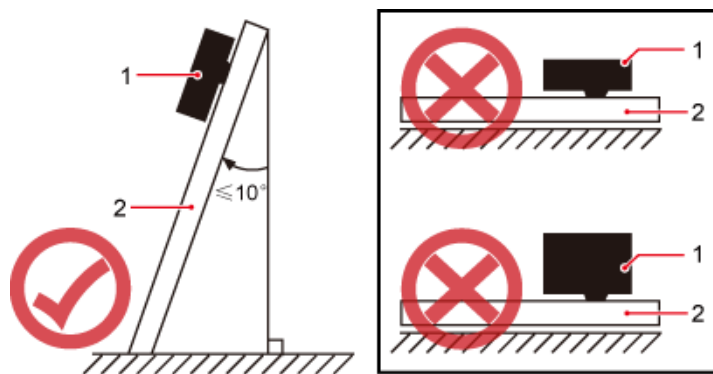
HIR06C0002

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

Installing an RRU on a Pole

Figure 3-9 shows the diameter of a pole for installing an RRU.

Figure 3-9 Diameter of a pole

60 mm - 114 mm
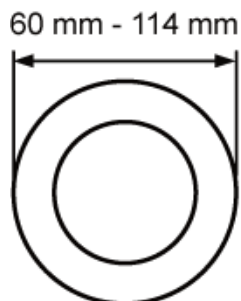
HIR06C0039

⚠ **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.
  - 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 wall of a pole is 3.5 mm (0.14 in.) or above.

A single RRU can be installed in either side-mounted or standard mode.**Figure 3-10** shows a single RRU installed on a pole.

Figure 3-10 A single RRU installed on a pole
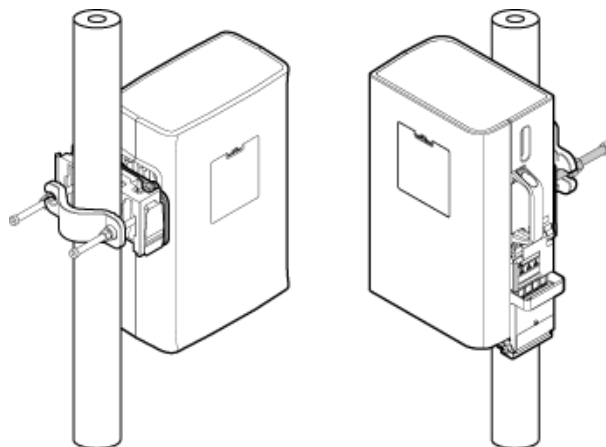
SRR08C0110

Two RRUs can be installed next to each other at the same level or vertically at different levels.**Figure 3-11** shows two RRUs installed on a pole.

Figure 3-11 Two RRUs installed on a pole
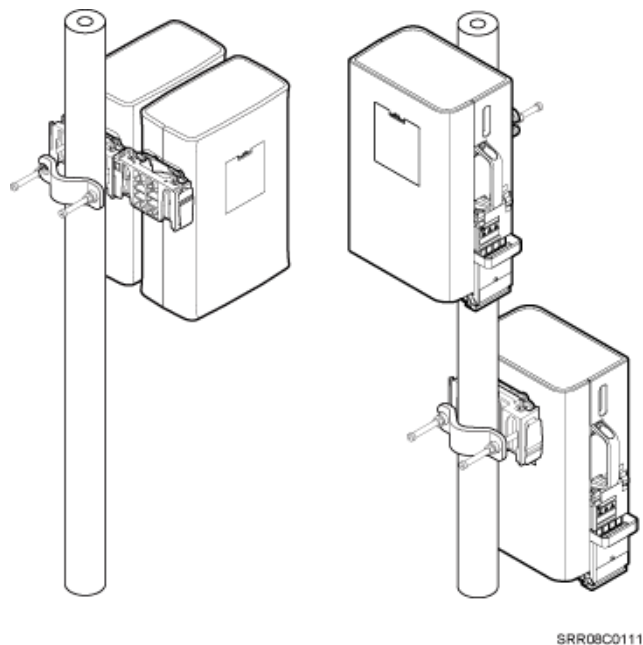
Figure 3-12, **Figure 3-13**, and **Figure 3-14** show three or more RRUs installed on a pole.

Figure 3-12 Three RRUs installed on a pole
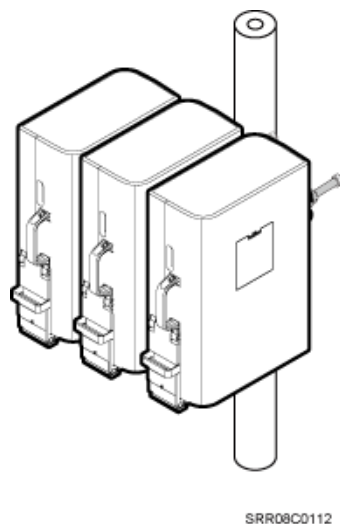
Figure 3-13 Four RRUs installed on a pole
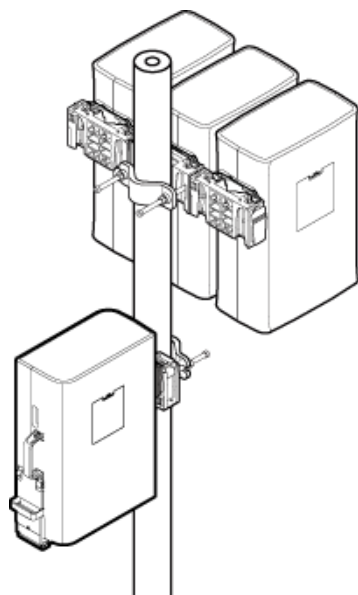
Figure 3-14 Six RRUs installed on a pole
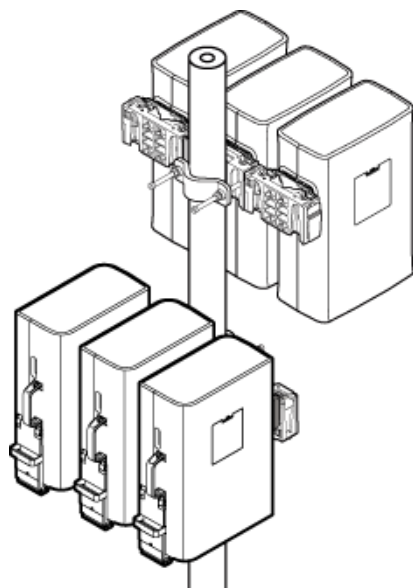
Installing an RRU on U-steel

Figure 3-15 shows U-steel specifications.

Figure 3-15 U-steel specifications
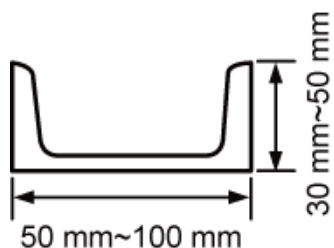
HIR06C0037

⚠ **NOTICE**

It is recommended that only one RRU be installed on one U-steel.

Figure 3-16 shows an RRU installed on U-steel.

Figure 3-16 RRU installed on U-steel
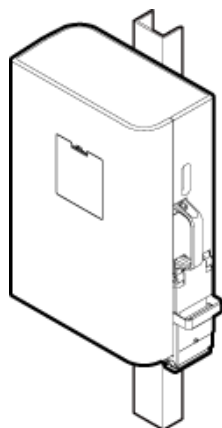
HIR12C0118

Installing an RRU on Angle Steel

Figure 3-17 shows angle steel specifications.

Figure 3-17 Angle steel specifications

![HIR06C0038]
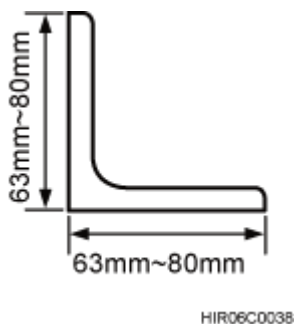
⚠ **NOTICE**

It is recommended that only one RRU be installed on one angle steel.

Figure 3-18 shows an RRU installed on angle steel.

Figure 3-18 RRU installed on angle steel

![HIR12C0124]
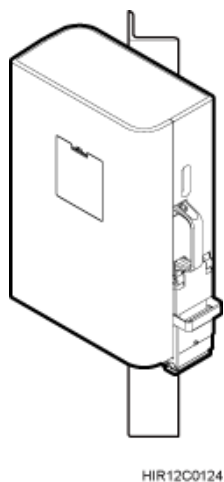
Installing an RRU on a Wall

The wall for installing RRUs must meet the following requirements:

● For each RRU, the wall must be able to bear a weight four times 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 15 N·m (132.76 lbf·in.) so that the bolts stay secured without damaging the wall.

⚠ **NOTICE**

The mounting brackets for multiple RRUs cannot be combined when the RRUs are installed on a wall in side-mounted mode, as shown in **Figure 3-19**.

Figure 3-19 Correct installation of mounting brackets for multiple RRUs

EIR06C0101
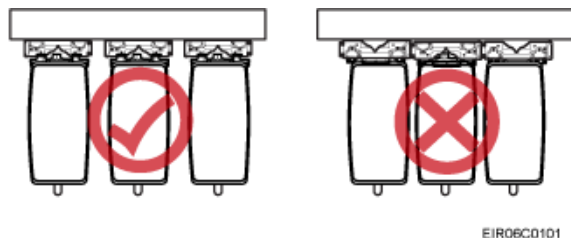
Figure 3-20 shows an RRU installed on a wall.

Figure 3-20 RRU installed on a wall

HIR12C0043
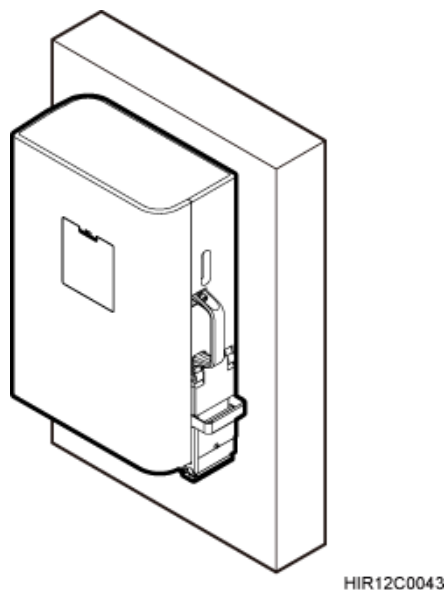
Installing an RRU on an IFS06

In an IFS06 scenario:

● 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 RRU and at least 5°C (41°F) lower than the highest operating temperature of the RRU. The IFS06 supports a maximum of six RRUs when the ambient temperature is higher than or equal to the lowest operating temperature

of the RRU 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 RRU, 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 3-21 and **Figure 3-22** show RRUs installed on an IFS06.

Figure 3-21 Three RRUs installed on an IFS06
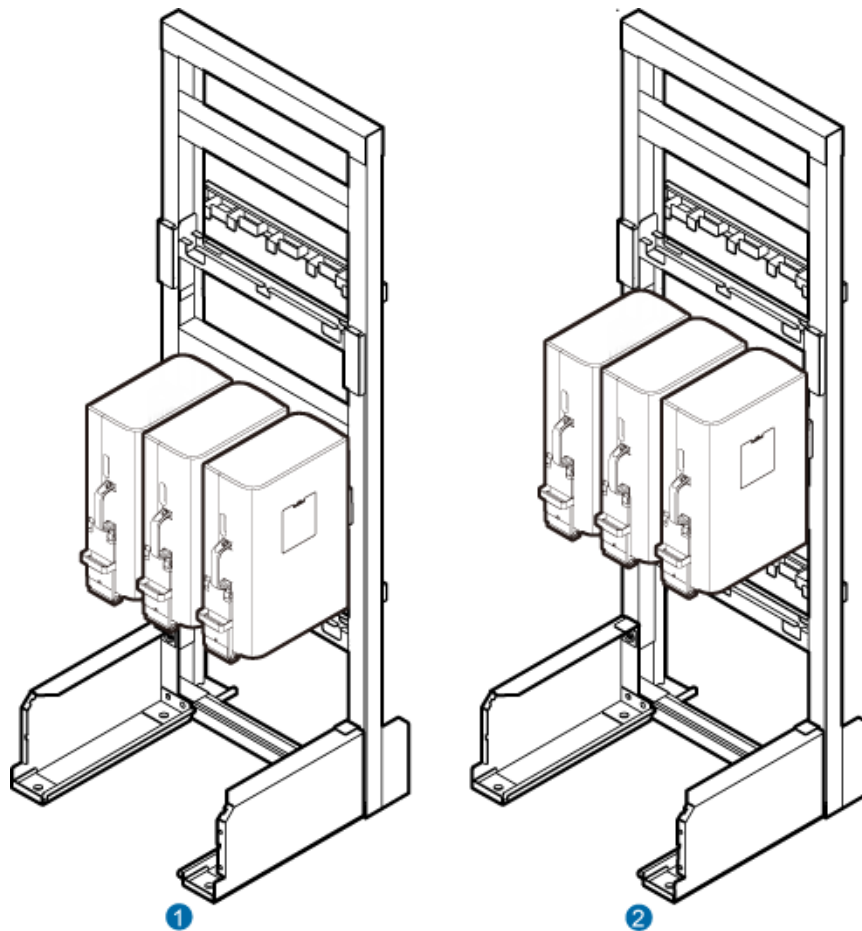
PAS02C0062

(1) Height-restricted scenario   (2) Height-unrestricted scenario

Figure 3-22 Six RRUs installed on an IFS06
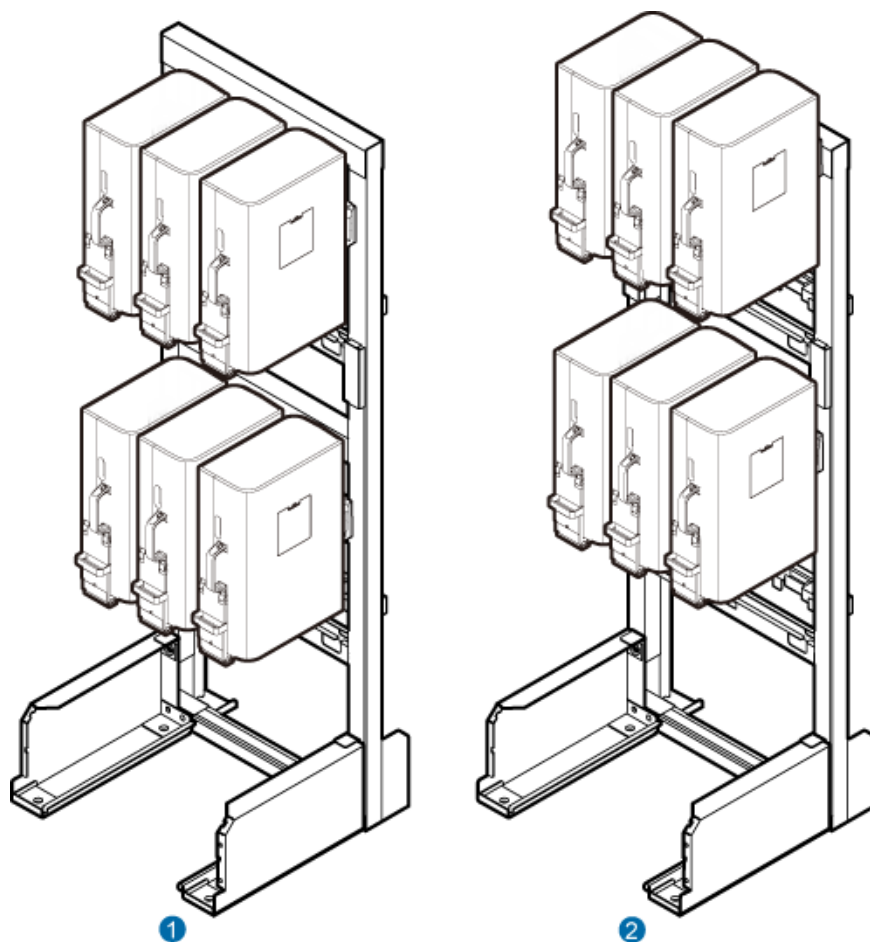
(1) Height-restricted scenario   (2) Height-unrestricted scenario

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 clearance for a single RRU.

NOTE

- The recommended clearance ensures normal running and provides an appropriate space for operation and maintenance (OM). If there is sufficient space, leave the recommended clearance after installing the equipment.
- The minimum clearance ensures normal running and heat dissipation, but OM 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 Clearance for a Single RRU

Figure 3-23 shows the recommended clearance for a single RRU.

Figure 3-23 Recommended clearance for a single RRU
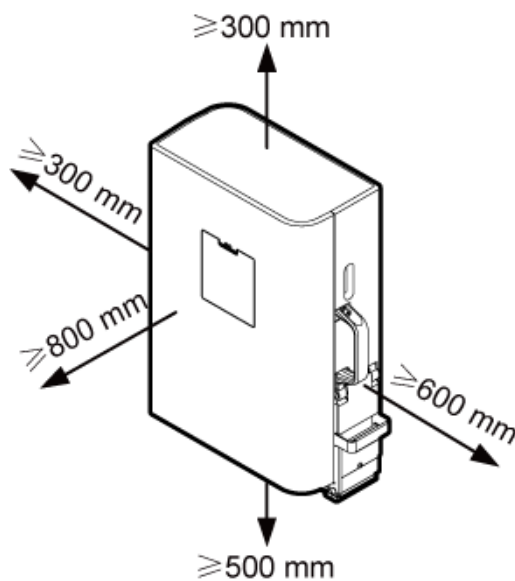
Minimum Clearance for a Single RRU

Figure 3-24 shows the minimum clearance for a single RRU.

Figure 3-24 Minimum clearance for a single RRU
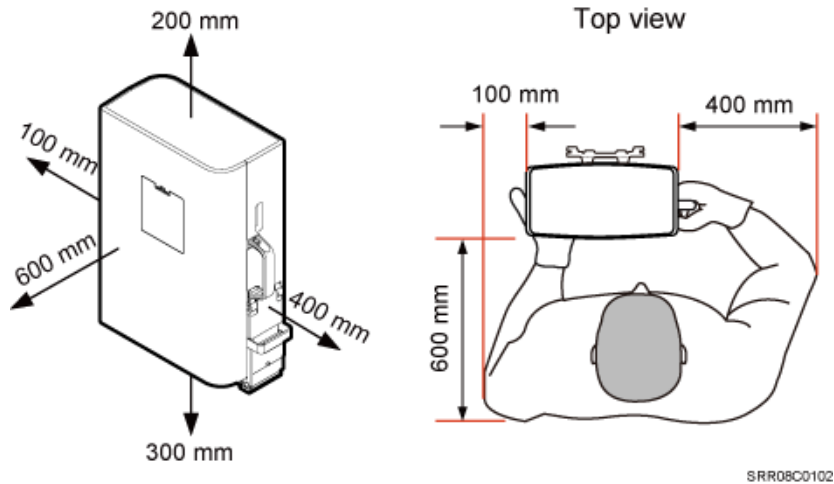
Minimum Clearance for a Single RRU on a Tower

Figure 3-25 shows the minimum clearance for a single RRU installed on a tower.

Figure 3-25 Minimum clearance for a single RRU on a tower
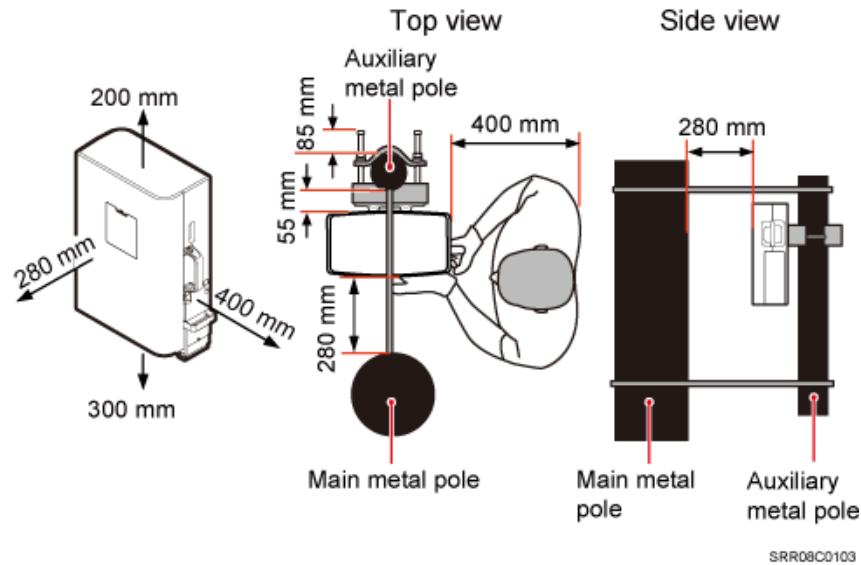
3.5.2 Clearances for Three or More RRUs

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

▢**NOTE**

- The recommended clearances ensure normal running and provide an appropriate space for operation and maintenance (OM). If there is sufficient space, retain the recommended clearances.
- The minimum clearances ensure normal running and heat dissipation but do not allow OM activities such as checking indicator status and opening the cabling cavity. If the installation space is insufficient, retain the minimum clearances after the installation.

Recommended Clearances for Three or More RRUs Installed on a Pole

Figure 3-26 shows the recommended clearances for multiple RRUs installed in centralized mode.

Figure 3-26 Recommended clearances for three or more RRUs installed on a pole
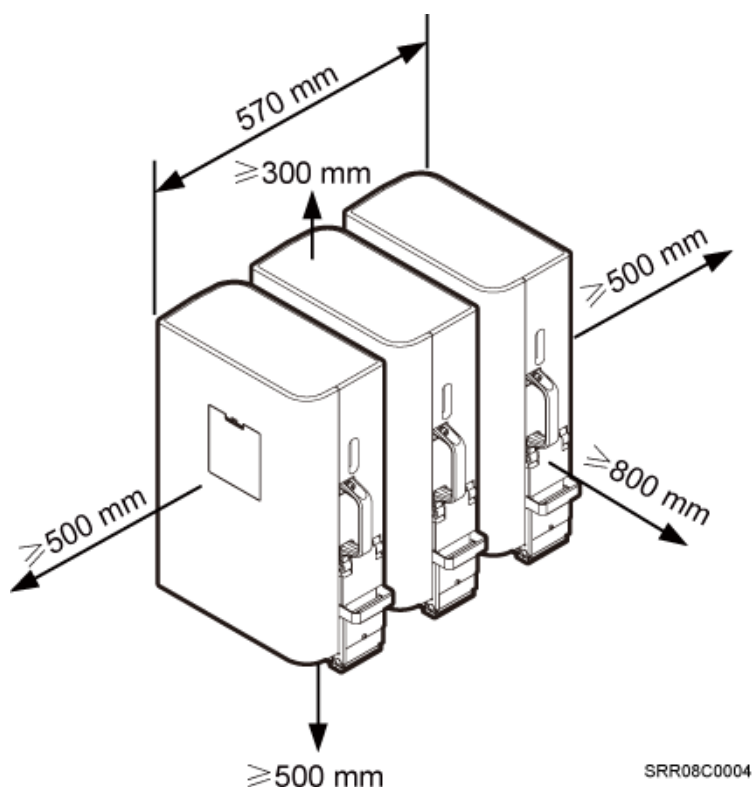
Minimum Clearances for Three or More RRUs Installed on a Pole

Figure 3-27 shows the minimum clearances for multiple RRUs installed in centralized mode.

Figure 3-27 Minimum clearances for three or more RRUs installed on a pole
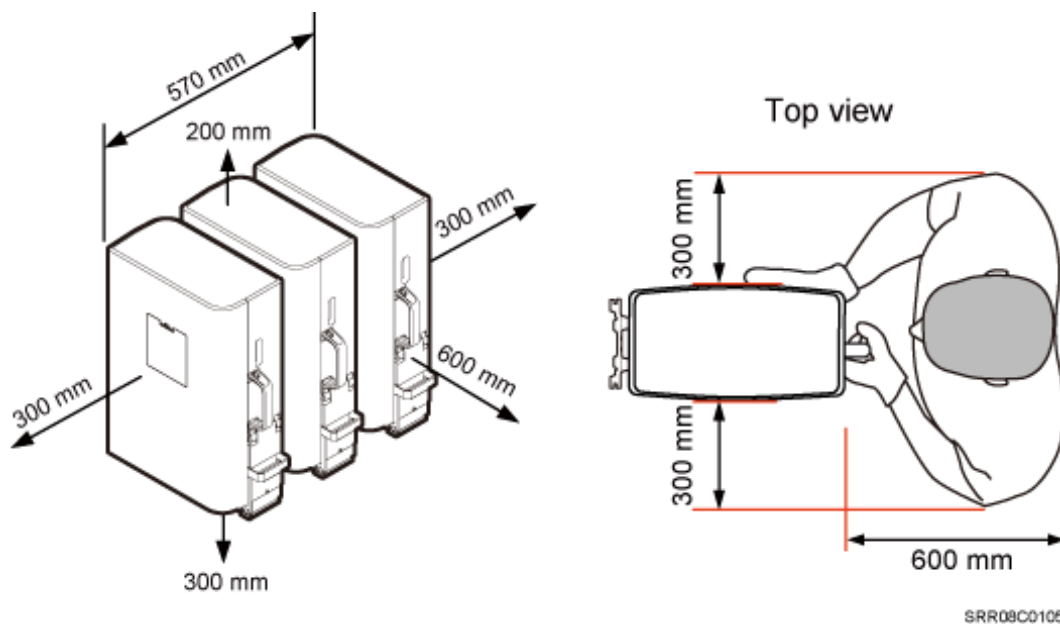
Recommended Clearances for Three or More RRUs Installed on a Wall in Standard Mode

Figure 3-28 shows the recommended clearances for multiple RRUs installed on a wall in standard mode.

Figure 3-28 Recommended clearances for three or more RRUs installed on a wall in standard mode
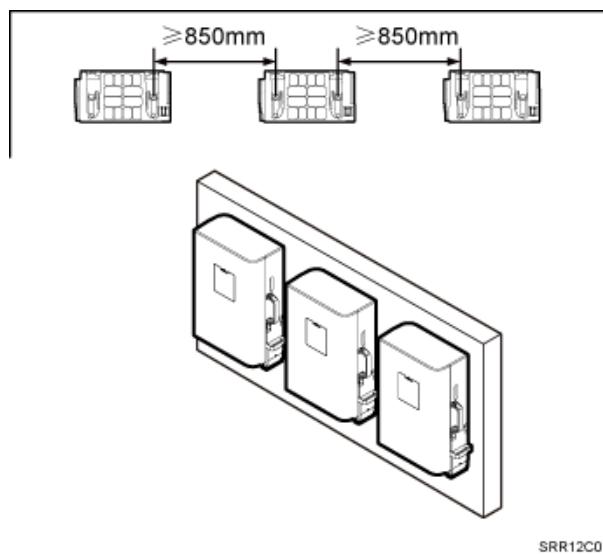
Minimum Clearances for Three or More RRUs Installed on a Wall in Standard Mode

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

Figure 3-29 Minimum clearances for three or more RRUs installed on a wall in standard mode
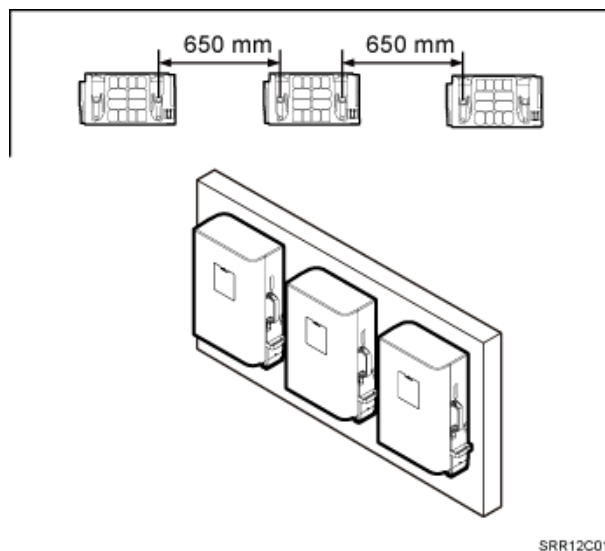
Recommended Clearances for Three or More RRUs Installed on a Wall in Side-Mounted Mode

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

Figure 3-30 Recommended clearances for three or more RRUs installed on a wall in side-mounted mode
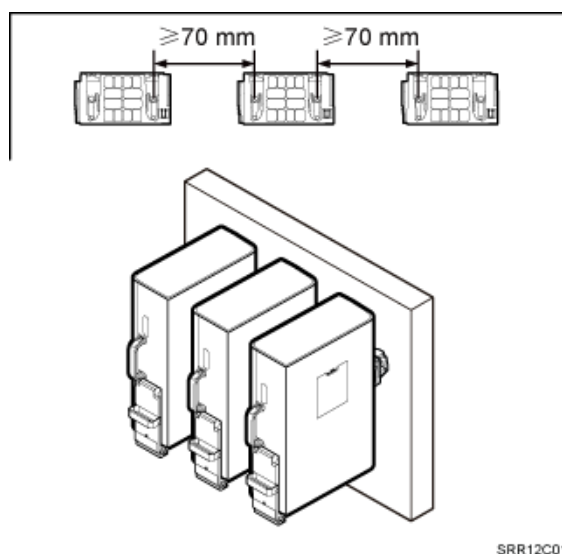
3.5.3 Installation Spacing Between RRUs

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
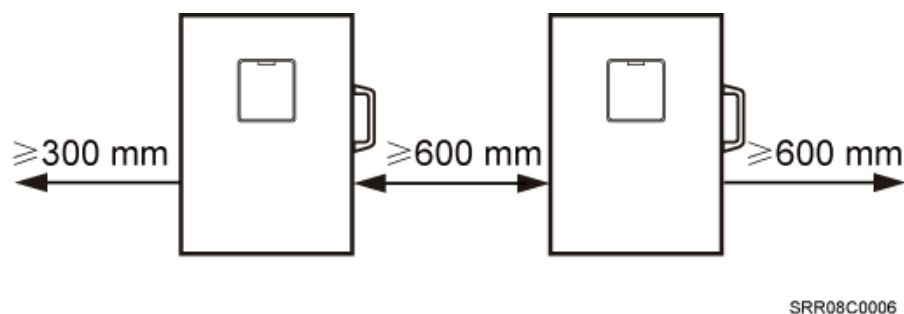
Minimum Horizontal Spacing Between RRUs

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

Figure 3-32 Minimum horizontal spacing between RRUs
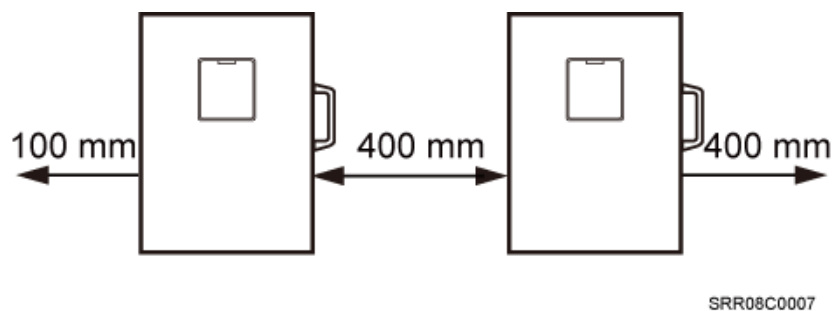
Recommended Vertical Spacing Between RRUs

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

Figure 3-33 Recommended vertical spacing between RRUs
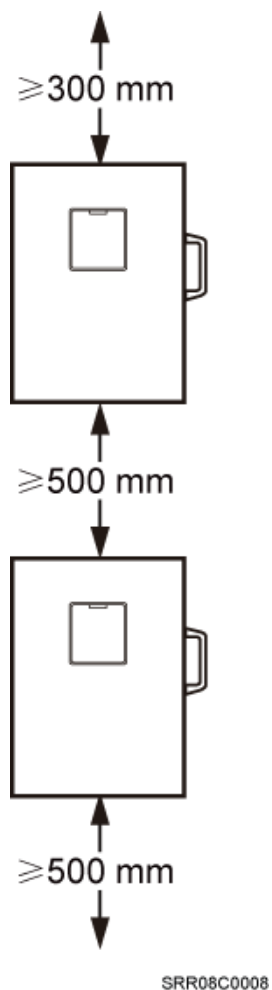
Minimum Vertical Spacing Between RRUs

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

Figure 3-34 Minimum vertical spacing between RRUs
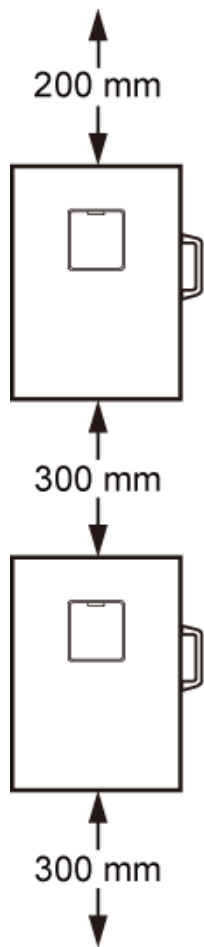
4 Unpacking the Equipment

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 **Step 2**.
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 **Step 3**.
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 *Packing List* 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.

----End

5 Installation Process

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

Figure 5-1 shows the process of installing an RRU.

Figure 5-1 Process of installing an RRU
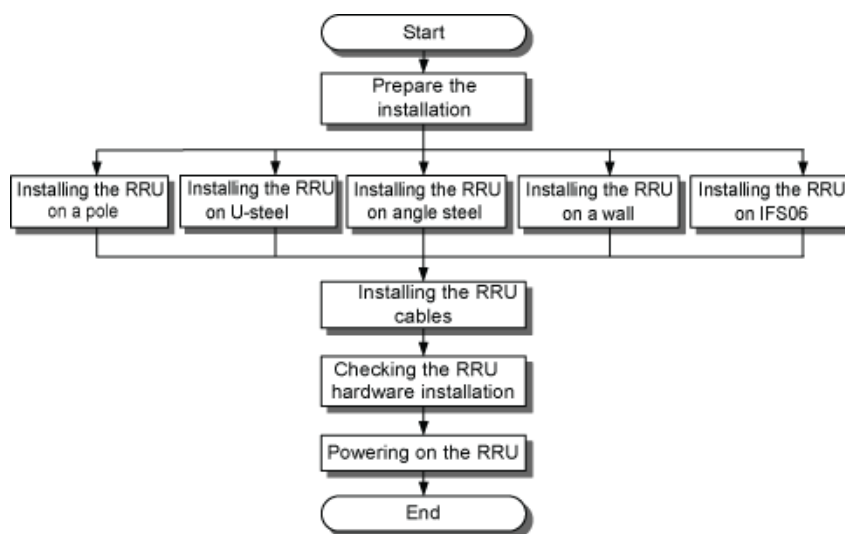
6 Hoisting an RRU and Related Cables onto a Tower

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.

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
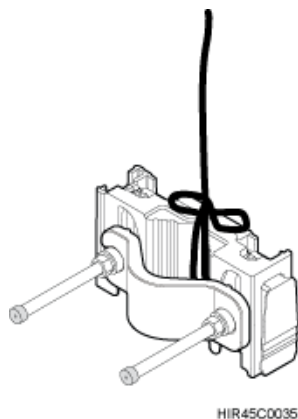
(1) Lifting sling	(2) Traction sling

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
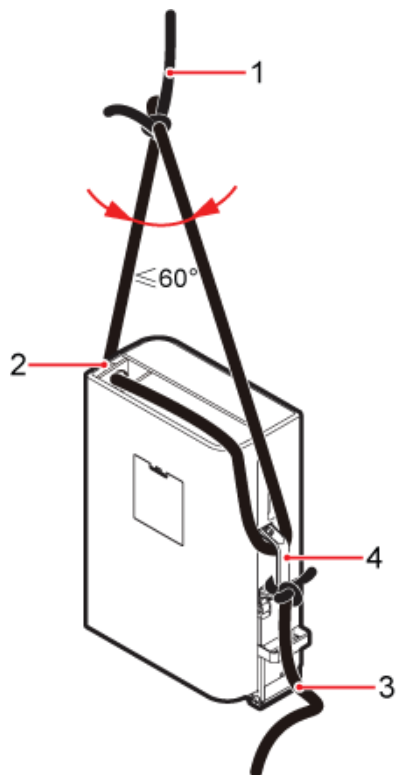
HIR20C0033

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

Figure 6-3 Incorrect binding method (1)

HIR20C0034
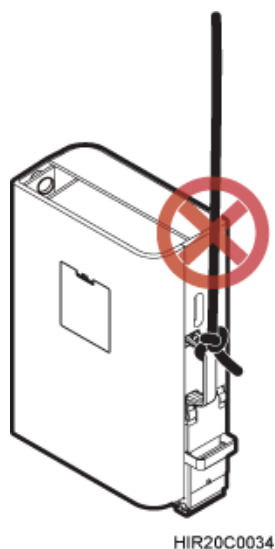
Figure 6-4 Incorrect binding method (2)

HIR20C0035
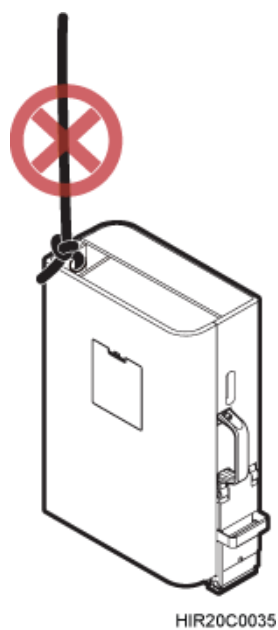
Step 6 Hoist the RRU onto the tower, as shown in **Figure 6-5**. Technician B pulls the lifting sling downwards, and technician C pulls the traction sling outwards to protect the RRU from colliding with the tower.

Figure 6-5 Hoisting the RRU onto the tower
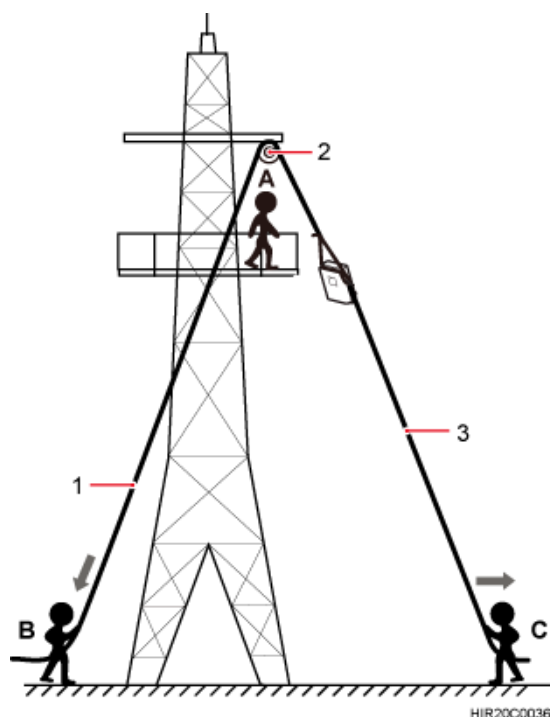
(1) Lifting sling	(2) Fixed pulley	(3) Traction sling

⚠ 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.). The angle at the top of the traction sling (by the knot) must be less than or equal to 60 degrees.

- When hoisting the RRU and mounting kits onto a tower, protect them from colliding with the tower and ground.

- Hoist the RRU onto the tower before it is installed on a pole, angle steel, or U-steel.

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
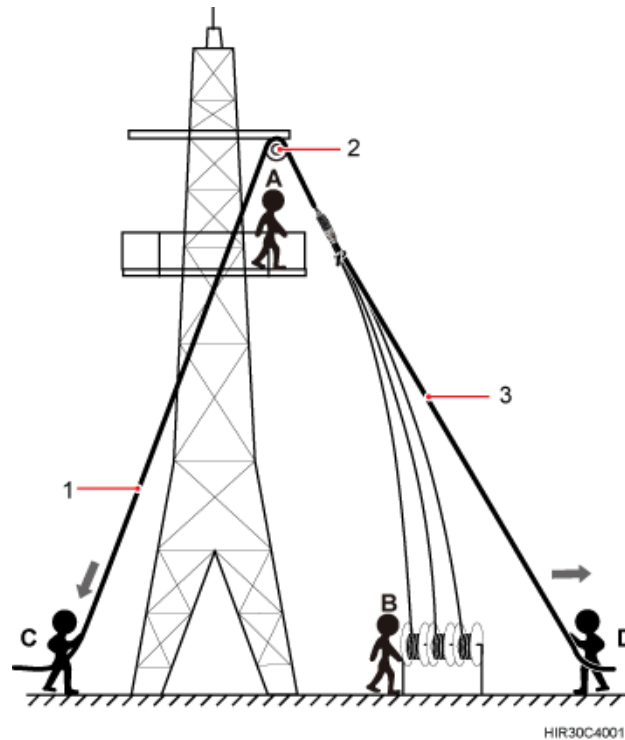
(1) Lifting sling	(2) Fixed pulley	(3) Traction sling

⚠ **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
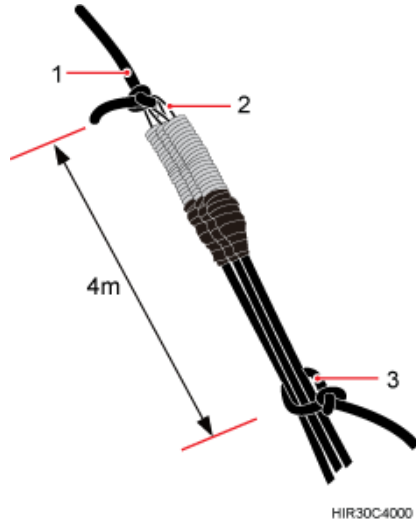
| (1) Lifting sling | (2) Stretch sling | (3) Traction sling |

⚠ **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

PAR22C2012

(1) Lifting sling	(2) Fixed pulley

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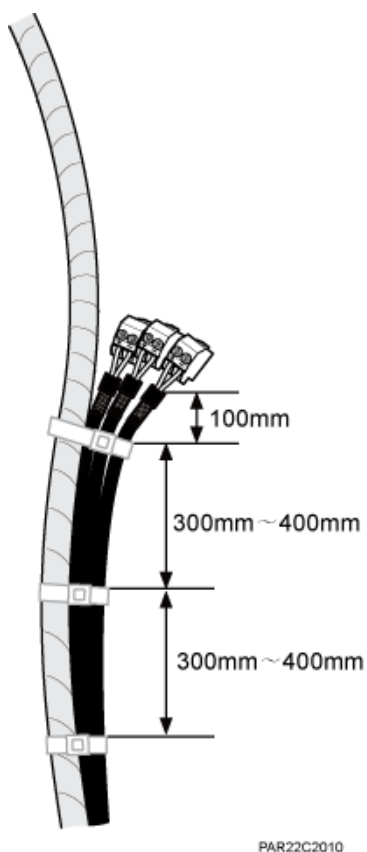
3. Installation engineer B wraps the power cable connector with a layer of PVC insulation tape, as shown in **Figure 6-11**.

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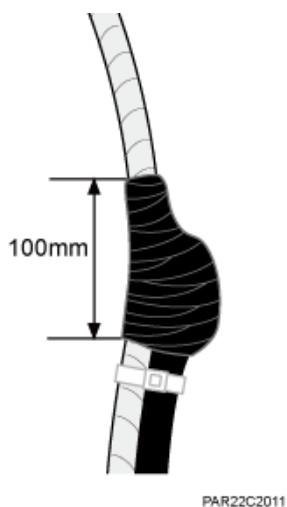
4. Installation engineer C pulls the lifting sling downwards, and installation engineer B pulls the other end of the lifting sling outwards to protect the power cables from colliding with the tower.

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.

Figure 7-1 shows the front and rear view of an RRU.

Figure 7-1 Front and rear view of an RRU

PAR24C0103
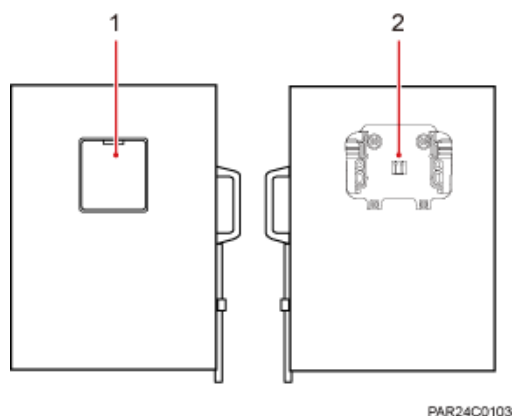
(1) Cover plate	(2) Attachment plate

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

Figure 7-2 Common RRU mounting kit

PIR45C0004
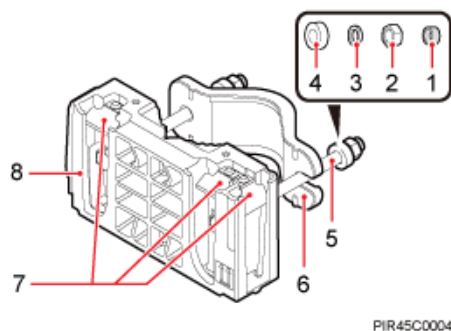
(1) Plastic cap	(2) Standard M10 nut	(3) Spring washer	(4) Thick flat washer
(5) M10x150 bolt	(6) Auxiliary bracket	(7) Hoist clamp on the main bracket	(8) Main bracket

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. A single RRU can be installed on a pole in standard or side-mounted mode.

Prerequisites

Before you install an RRU on a tower, the RRU and 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 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 Determine a position for installing the mounting bracket.

● If the RRU must be installed on a pole secured on a tower, see **3.5.1 Clearance for a Single RRU** to determine a position.

● If the RRU must be installed on a pole secured on the ground, see **Figure 7-3** to determine a position.

Figure 7-3 Distance between the mounting bracket and the ground
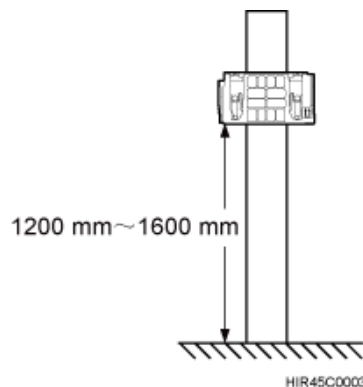
1200 mm～1600 mm

HIR45C0003

📖**NOTE**

It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

Step 2 Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in **Figure 7-4**.

Figure 7-4 Moving the bolt out of the trough

HIR45C0008
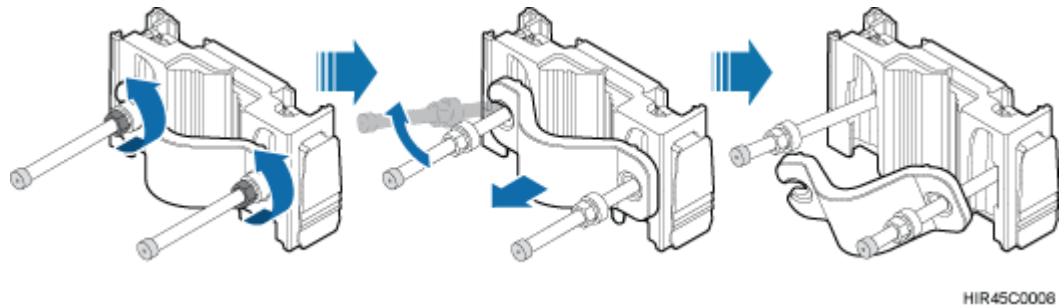
Step 3 Slide the main and auxiliary brackets onto the pole and fit a bolt into the trough, as shown in **Figure 7-5**.

Figure 7-5 Sliding the main and auxiliary brackets onto the pole
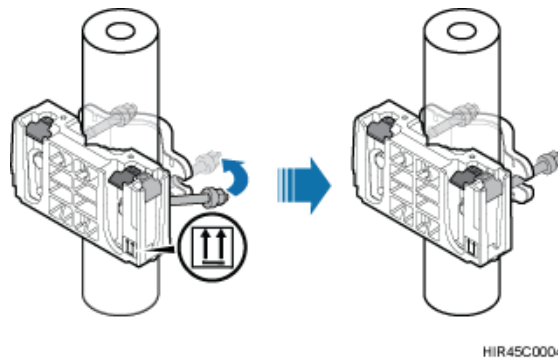
HIR45C0004

⚠ NOTICE

Ensure that the arrows on the main bracket are pointing up.

Step 4 Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N·m (354.03 lbf·in.) so that the main and auxiliary brackets are tightly secured onto the pole, as shown in **Figure 7-6**.

⚠ NOTICE

Tighten the nuts on the two bolts alternatively. 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 7-6 Securing the main and auxiliary brackets onto the pole
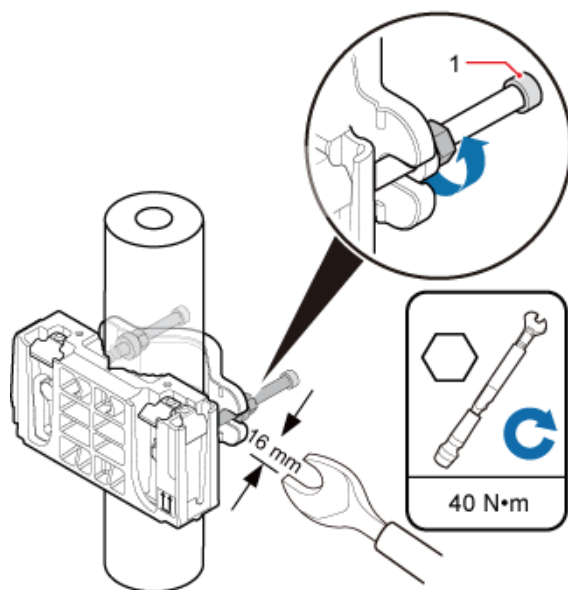
(1) Plastic cap

Step 5 **Optional:** If an RRU is to be installed in side-mounted mode, interchange the attachment plate and stainless steel screws at the rear of the RRU with the cover plate and plastic screws on one side of the RRU, as shown in **Figure 7-7**.

Figure 7-7 Interchanging the attachment plate at the rear of the RRU with the cover plate on one side of the RRU
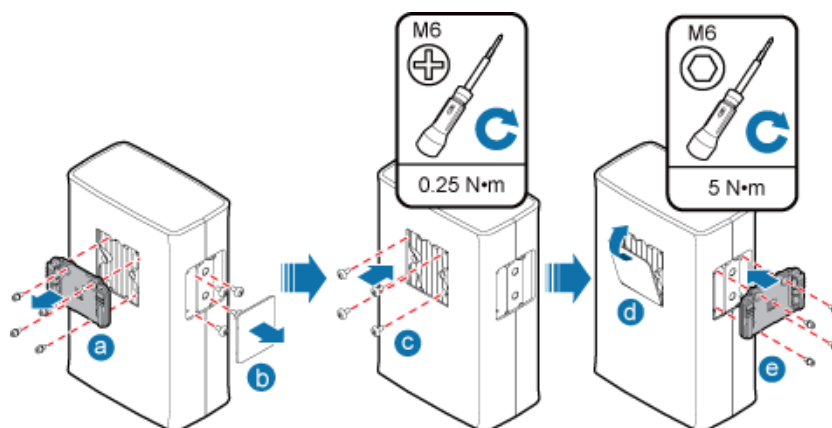
1. Use an inner hexagon screwdriver to remove the attachment plate from the rear of the RRU.

2. Remove the cover plate from one side of the RRU, and use a Phillips screwdriver to remove the plastic screws from the RRU.

3.   Install the plastic screws onto the rear of the RRU, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).

4.   Install the cover plate onto the rear of the RRU.

5.   Install the attachment plate onto the side of the RRU, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

Step 6   Install the RRU onto the main bracket, as shown in **Figure 7-8**.

☐**NOTE**

This section describes the standard installation of an RRU. The method is similar for side-mounted installation.

Figure 7-8 Installing the RRU onto the main bracket
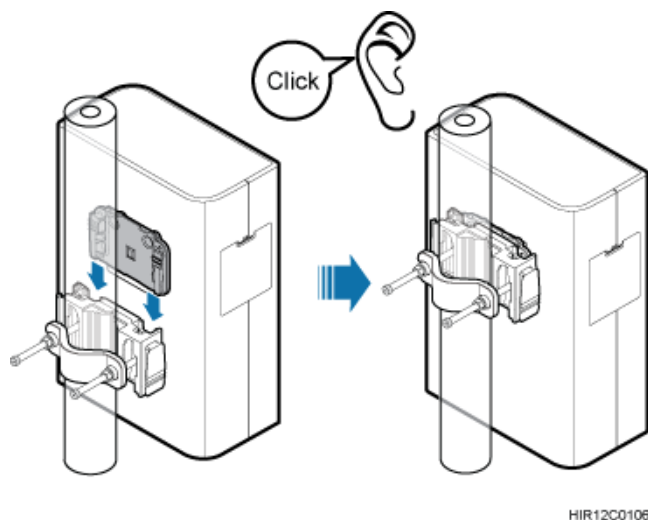
----End

7.2.2 Installing Two RRUs

This section describes the procedure and precautions for installing two RRUs on a pole. On a pole, two RRUs can be installed next to each other at the same level on a pole or vertically at different levels.

Prerequisites

The hoist clamp on the main bracket is secured properly.

⚠ **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

- Installing two RRUs next to each other at the same level (recommended)

  1. Install one pair of main and auxiliary brackets on a pole. For details, see **7.2.1 Installing a Single RRU**.

  2. Interchange the attachment plate and stainless steel screws at the rear of the RRU with the cover plate and plastic screws on one side of the RRU, as shown in **Figure 7-9**.

     Figure 7-9 Interchanging the attachment plate at the rear of the RRU with the cover plate on one side of the RRU

     HIR12C0111

     (a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the RRU.

     (b) Remove the cover plate from one side of the RRU, and use a Phillips screwdriver to remove the plastic screws from the RRU.

     (c) Install the plastic screws to the rear of the RRU, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).

     (d) Install the cover plate onto the rear of the RRU.

     (e) Install the attachment plate to the side of the RRU, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

  3. Install the first RRU onto the main bracket, as shown in **Figure 7-10**.

Figure 7-10 Installing the first RRU onto the main bracket
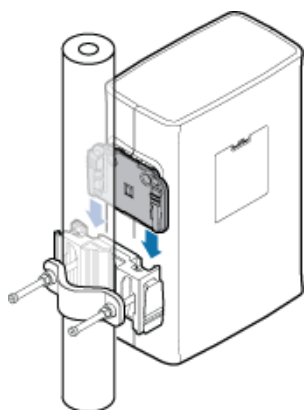
HIR08C0112

4. Install the second main bracket on one side of the first main bracket, as shown in **Figure 7-11**.

Figure 7-11 Installing the second main bracket
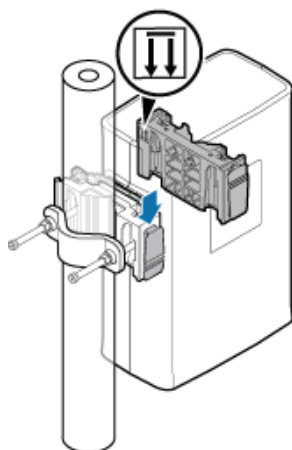
HIR08C0113

5. Install the second RRU on the second main bracket, as shown in **Figure 7-12**.

Figure 7-12 Installing the second RRU onto the second main bracket
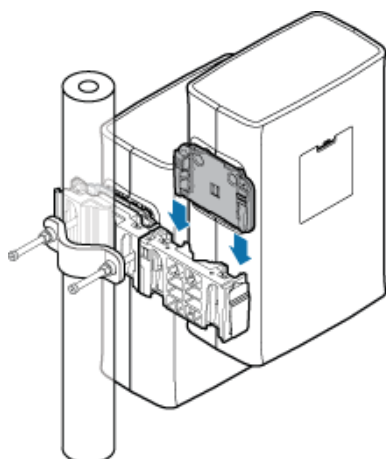
HIR08C0114

- Installing two RRUs independently

  1. Install the first RRU onto the main bracket, as shown in **Figure 7-13**. For details, see **7.2.1 Installing a Single RRU**.

Figure 7-13 Installing the first RRU onto the main bracket
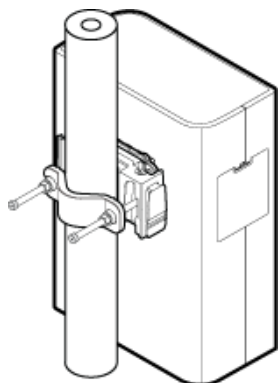
HIR12C0107

  2. Install the second set of RRU mounting brackets above or below the first set of RRU mounting brackets and maintain a space equal to or greater than the height of an RRU between the two sets of brackets, as shown in **Figure 7-14**.

Figure 7-14 Installing the second set of RRU mounting brackets

HIR12C0108
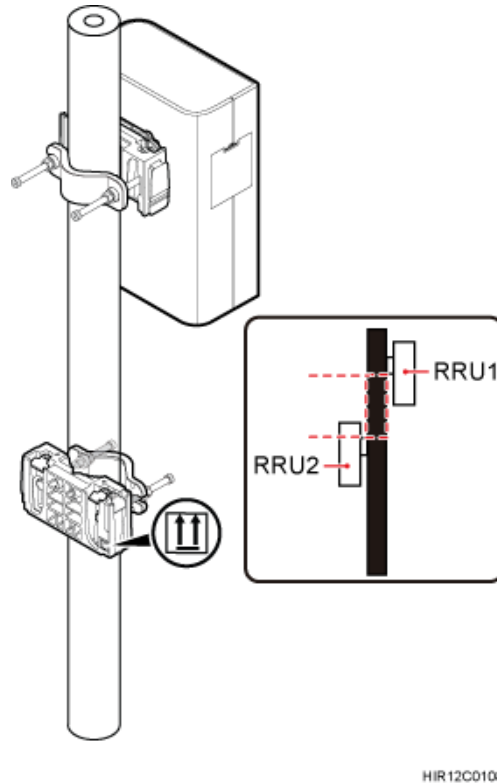
3. Interchange the cover plate and plastic screws on the front of the second RRU with the attachment plate and stainless steel screws at the rear of the second RRU, as shown in **Figure 7-15**.

Figure 7-15 Interchanging the cover plate on the front of the second RRU with the attachment plate at the rear of the second RRU
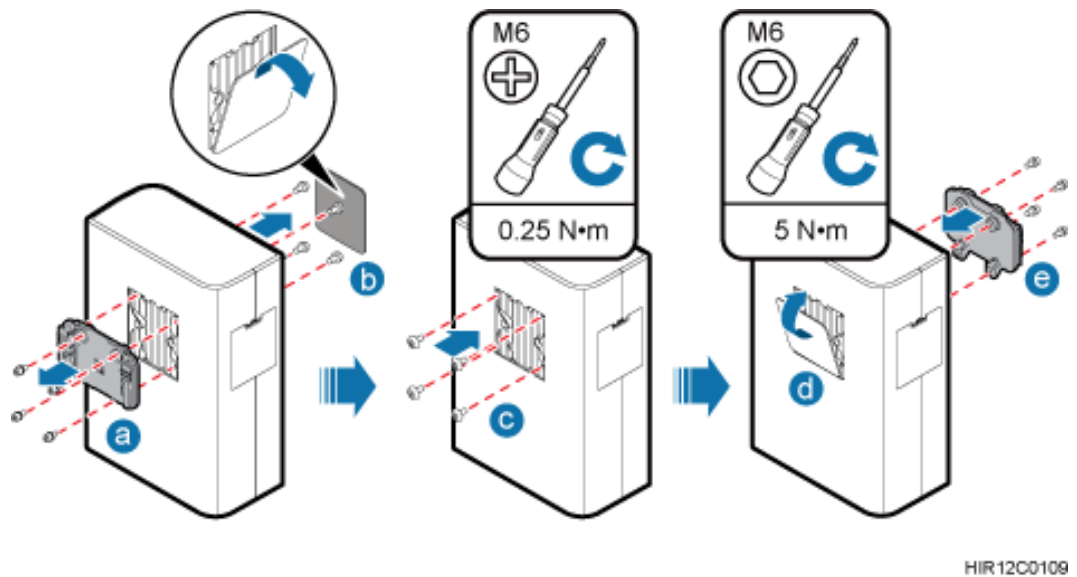
HIR12C0109

(a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the RRU.

(b) Remove the cover plate from the front of the RRU, and use a Phillips screwdriver to remove the plastic screws from the RRU.

(c) Install the plastic screws to the rear of the RRU, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).

(d) Install the cover plate onto the rear of the RRU.

(e) Install the attachment plate to the front of the RRU, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

4. Install the second RRU onto the main bracket, as shown in **Figure 7-16**.

    📖**NOTE**

    > When you install two RRUs vertically at different levels and in different directions on a pole, ensure that the cabling cavities of these two RRUs face the same direction.

Figure 7-16 Installing the second RRU onto the main bracket

HIR12C0110
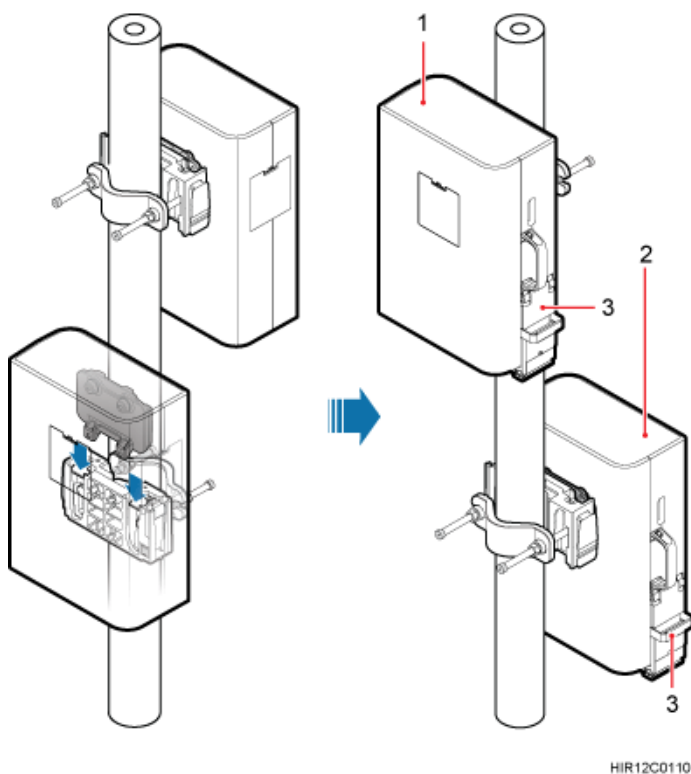
(1) RRU installed in standard mode   (2) RRU installed in reverse mode   (3) Cabling cavity

----End

7.2.3 Installing Three or More RRUs

The section describes the procedure and precautions for installing three or more RRUs on a pole. Before installing three or more RRUs together on a pole, move the attachment plates from the front of the RRUs to the side of the RRUs.

Prerequisites

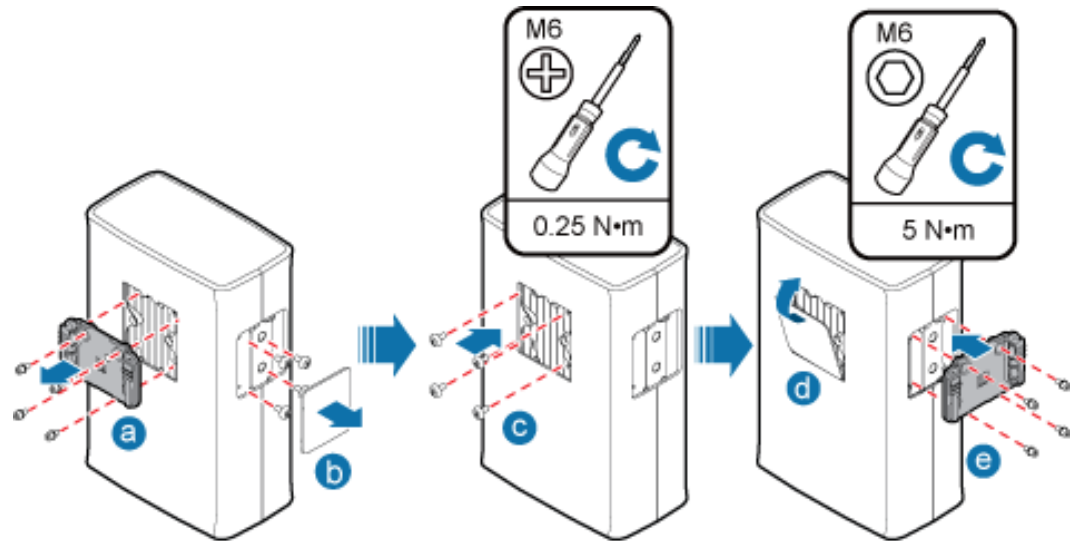The hoist clamp on the main bracket is secured properly.

⚠ 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.

Context

- A pole supports the installation of three, four, or six RRUs. The procedures for installing them are the same. Following is the procedure of installing four RRUs on a pole.

Procedure

Step 1 Install the two RRUs, as shown in **Figure 7-17**. For the installation procedure, see "Installing two RRUs next to each other at the same level" in **7.2.2 Installing Two RRUs**.

Figure 7-17 Two RRUs installed on a pole
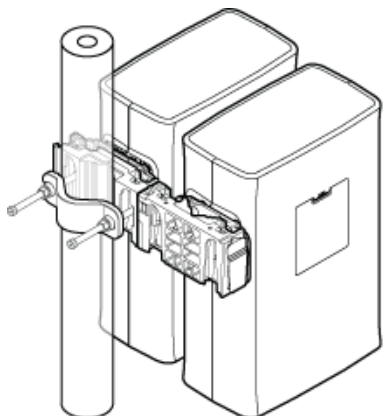
SRR08C0119

Step 2 Interchange the attachment plate and stainless steel screws at the rear of the RRU with the cover plate and plastic screws on one side of the RRU, as shown in **Figure 7-9**.

**Figure 7-18** Interchanging the attachment plate at the rear of the RRU with the cover plate on one side of the RRU

(a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the RRU.

(b) Remove the cover plate from one side of the RRU, and use a Phillips screwdriver to remove the plastic screws from the RRU.

(c) Install the plastic screws to the rear of the RRU, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).

(d) Install the cover plate onto the rear of the RRU.

(e) Install the attachment plate to the side of the RRU, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

Step 3 Install the third main bracket, and install the third RRU on the third main bracket, as shown in **Figure 7-19**.

⚠ **NOTICE**

When installing the third main bracket, ensure that the arrows on the main bracket are pointing down.

Figure 7-19 Installing the third RRU onto the third main bracket
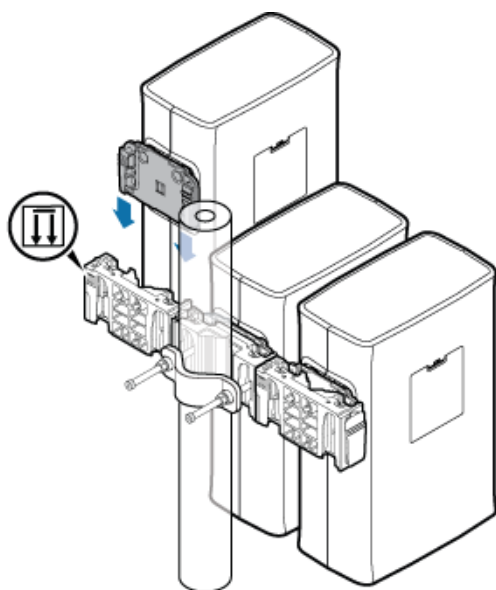
Step 4 Install the second set of RRU mounting brackets above or below the first set of RRU mounting brackets and maintain a space equal to or greater than the height of an RRU between the two sets of brackets, as shown in **Figure 7-20**.

Figure 7-20 Installing the second set of RRU mounting brackets
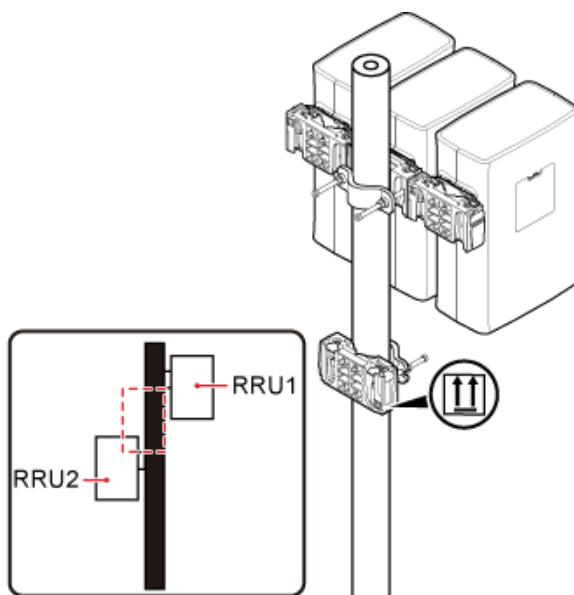
Step 5 Install the fourth RRU onto the fourth main bracket, as shown in **Figure 7-21**.

Figure 7-21 Installing the fourth RRU onto the fourth main bracket
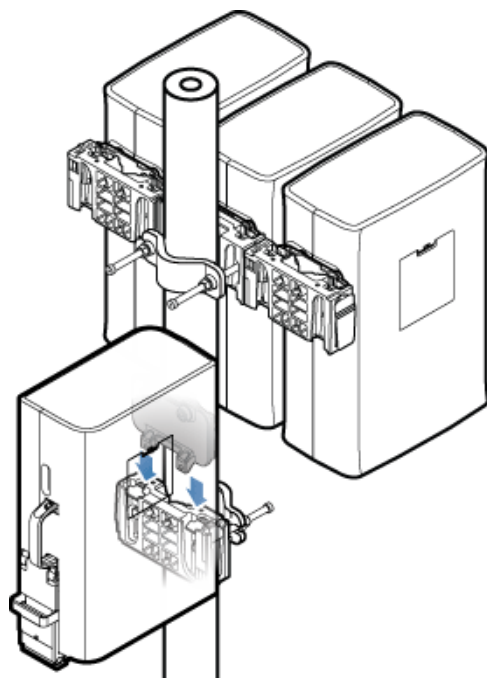
HIR08C0117

----End

7.3 Installing the RRU on U-steel

This section describes the procedure and precautions for installing the RRU on U-steel. U-steel can be installed either on the ground or a tower and only one RRU can be installed on a piece of U-steel. An RRU on U-steel is installed in standard mode by default.

Prerequisites

Before you install an RRU on a tower, the RRU and 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 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.

Context

Figure 7-22 shows the top view of the 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 the RRU

HIR45C0019
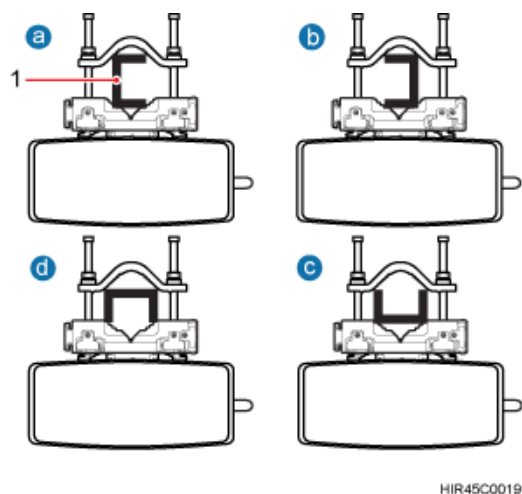
(1) U-steel

Procedure

Step 1 Determine a position for installing the mounting bracket.

- If the RRU must be installed on U-steel secured on a tower, see **3.5.1 Clearance for a Single RRU** to determine a position.
- If the RRU must be installed on U-steel secured on the ground, see **Figure 7-23** to determine a position.

Figure 7-23 Distance between the main bracket and the ground
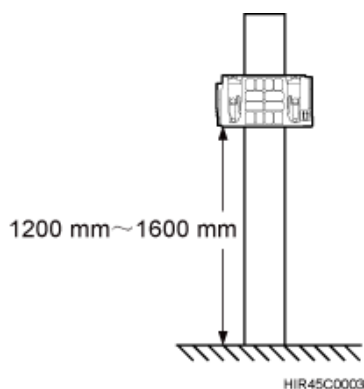
1200 mm～1600 mm

HIR45C0003

📖**NOTE**

> It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

Step 2 Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in **Figure 7-24**.

Figure 7-24 Moving the bolt out of the trough

HIR45C0008
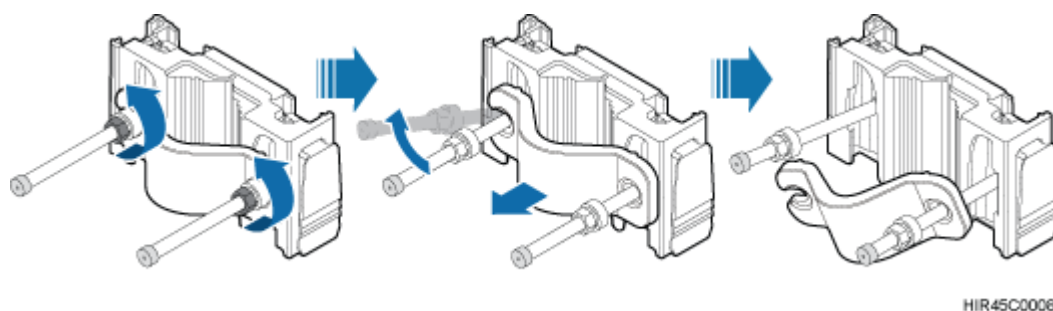
Step 3 Slide the main and auxiliary brackets onto the U-steel and fit a bolt into the trough, as shown in **Figure 7-25**.

Figure 7-25 Sliding the main and auxiliary brackets onto the U-steel
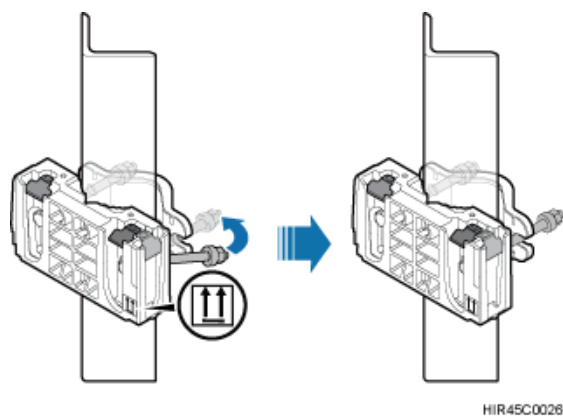
HIR45C0026

> ![NOTICE]
>
> Ensure that the arrows on the main bracket are pointing up.

Step 4 Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N·m (354.03 lbf·in.) so that the main and auxiliary brackets are tightly secured onto the U-steel, as shown in **Figure 7-26**.

> ![NOTICE]
>
> Tighten the nuts on the two bolts alternatively. 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 7-26 Securing the main and auxiliary brackets onto the U-steel
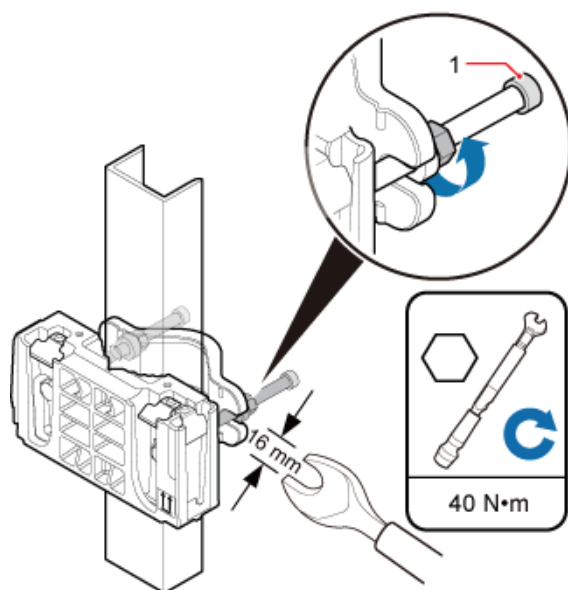
HIR45C0021

(1) Plastic cap

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
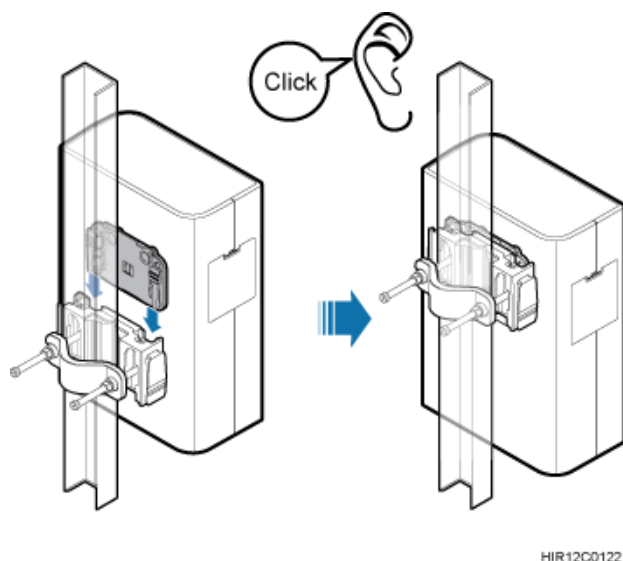
----End

7.4 Installing the RRU on Angle Steel

This section describes the procedure and precautions for installing the RRU on angle steel. Angle steel can be installed either on the ground or a tower and only one RRU can be installed on a piece of angle steel. An RRU on angle steel is installed in standard mode by default.

Prerequisites

Before you install an RRU on a tower, the RRU and 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 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.

Context

Figure 7-28 shows the top view of the RRU installed on angle steel.

Figure 7-28 Top view of the RRU
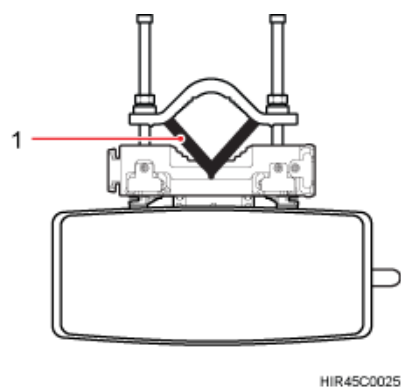
(1) Angle steel

Procedure

Step 1 Determine a position for installing the mounting bracket.

● If the RRU must be installed on angle steel secured on a tower, see **3.5.1 Clearance for a Single RRU** to determine a position.

● If the RRU must be installed on angle steel secured on the ground, see **Figure 7-29** to determine a position.

Figure 7-29 Distance between the mounting bracket and the ground
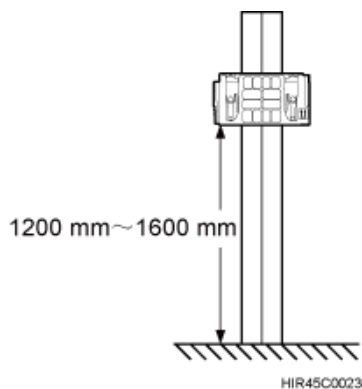
□**NOTE**

It is recommended that the mounting bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

Step 2 Loosen the two M10 nuts on the mounting brackets and move the M10x150 bolt out of the trough on the auxiliary bracket, as shown in **Figure 7-30**.

Figure 7-30 Moving the bolt out of the trough

HIR45C0006
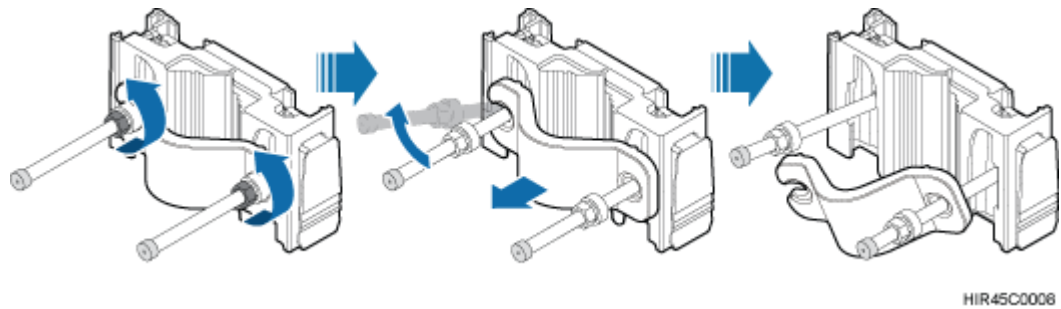
Step 3 Slide the main and auxiliary brackets onto the angle steel and fit a bolt into the trough, as shown in **Figure 7-31**.

⚠ **NOTICE**

Ensure that the arrows on the main bracket are pointing up.

Figure 7-31 Sliding the main and auxiliary brackets onto the angle steel
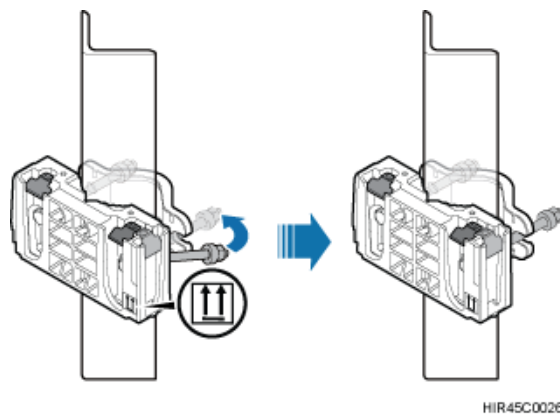
HIR45C0026

Step 4 Use a 16 mm (0.63 in.) torque wrench to tighten the two M10 nuts to 40 N·m (354.03 lbf·in.) so that the main and auxiliary brackets are tightly secured onto the angle steel, as shown in **Figure 7-32**.

⚠ **NOTICE**

Tighten the nuts on the two bolts alternatively. 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 main and auxiliary brackets onto the angle steel
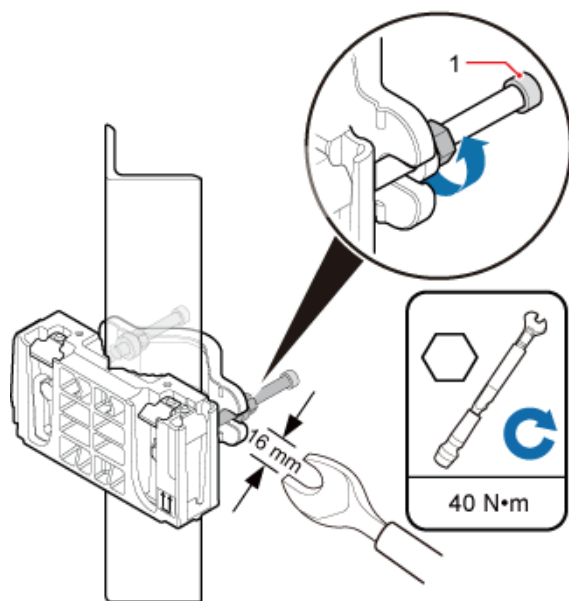
(1) Plastic cap

Step 5 Install the RRU onto the main bracket, as shown in **Figure 7-33**.

Figure 7-33 Installing the RRU onto the main bracket
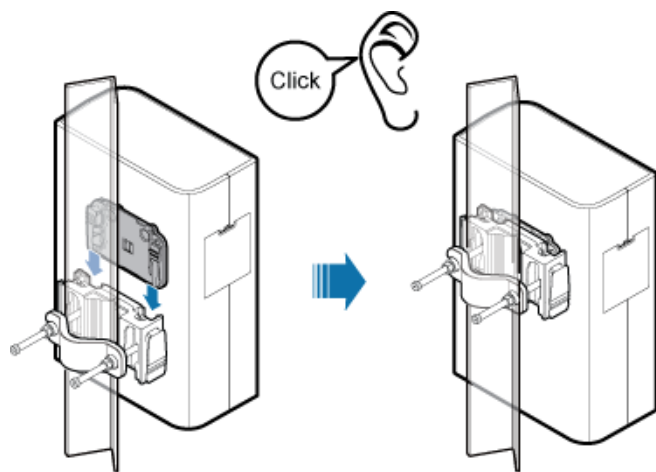
----**End**

7.5 Installing the RRU on a Wall

This section describes the procedure and precautions for installing the RRU on a wall. An RRU on a wall is installed in standard mode by default.

Prerequisites

The hoist clamp on the main bracket is secured properly.

⚠ **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.
- When installing RRUs on a wall, do not combine the mounting brackets for multiple RRUs together.

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 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 15 N·m (132.76 lbf·in.) so that the bolts stay secured without damaging the wall.

Procedure

Step 1 Remove the plastic cap, M10 nut, spring washer, thick flat washer, auxiliary bracket, and M10x150 bolt one by one. Reserve the main bracket for the wall-mounted installation.

Step 2 Place the main bracket against the wall, use a level to verify that the main bracket is placed horizontally, and use a maker to mark anchor points, as shown in **Figure 7-34**.

Figure 7-34 Marking anchor points
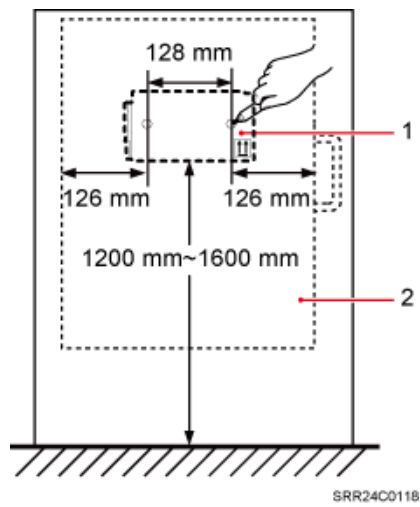
(1) Main bracket	(2) RRU

NOTE

It is recommended that the main bracket be 1,200 mm (47.24 in.) to 1,600 mm (62.99 in.) above the ground.

Step 3 **Figure 7-35** shows the expansion bolt assemblies. Drill holes at the anchor points, and then install expansion bolt assemblies, as shown in **Figure 7-36**.

Figure 7-35 Expansion bolt assembly
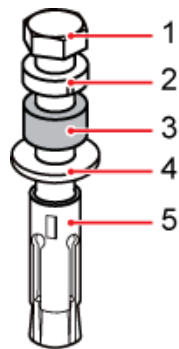
(1) M8x85 bolt	(2) Spring washer 8	(3) Plastic tube	(4) Flat washer 8	(5) Expansion tube

Figure 7-36 Drilling a hole and inserting an expansion bolt assembly
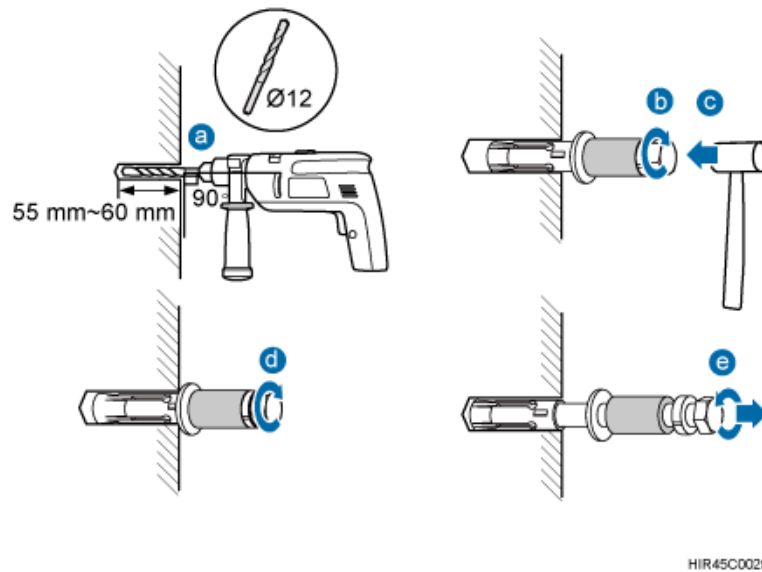
1. Use a hammer drill with a Φ12 bit to drill holes vertically at the marked anchor points. Ensure that the depth of each hole ranges from 55 mm (2.17 in.) to 60 mm (2.36 in.).

⚠ **NOTICE**

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

2. Tighten an expansion bolt slightly and place it vertically into each hole.

3. Hit the expansion bolt with a rubber mallet until the expansion tube completely enters the hole.

4. Partially tighten the expansion bolts clockwise.

5. Rotate the bolts counterclockwise to loosen them, and remove each M8x85 bolt, spring washer, plastic tube, and flat washer in sequence.

📖**NOTE**

> After removing the expansion bolts, dispose of the plastic tubes.

Step 4 Use the removed flat washers, spring washers, and two M8x85 expansion bolts to secure the main bracket onto the holes. Then use an M8 torque socket to tighten the expansion bolts with a torque of 15 N·m (132.76 lbf·in.), as shown in **Figure 7-37**.

⚠ **NOTICE**

Ensure that the arrows on the main bracket are pointing down.

Figure 7-37 Installing the main bracket

HIR45C0031
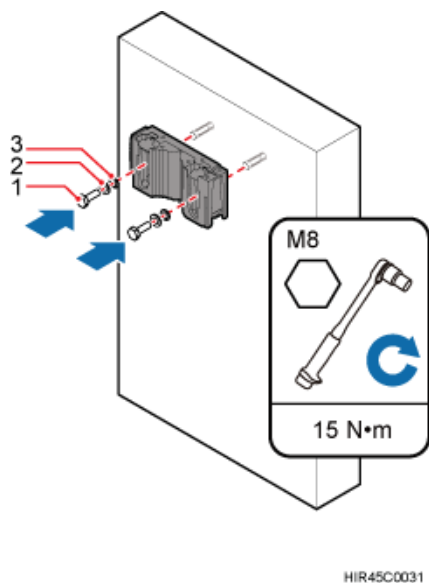
(1) M8x85 expansion bolt	(2) Spring washer	(3) Flat washer

Step 5 Install the RRU onto the main bracket, as shown in **Figure 7-38**.

Figure 7-38 Installing the RRU onto the main bracket

HIR12C0132
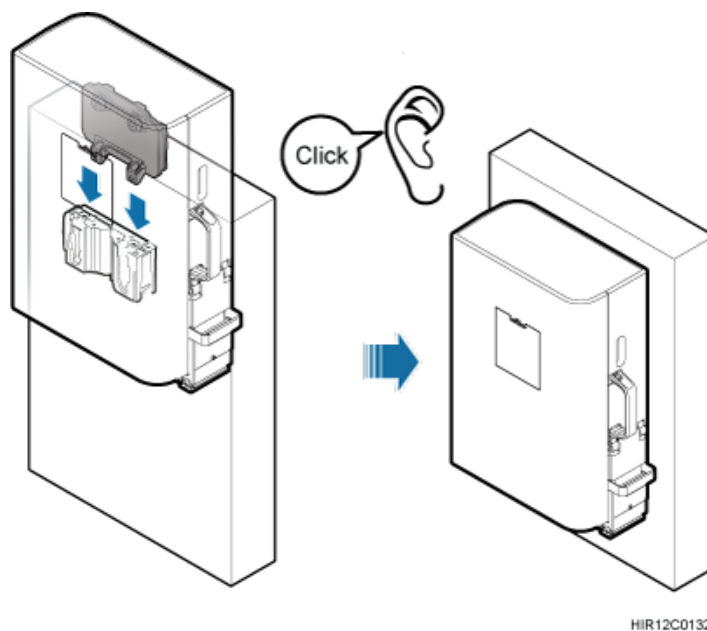
----End

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

  📖**NOTE**

  For details about the operating temperature of the RRU, 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 main 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 Remove the plastic cap, M10 nut, spring washer, thick flat washer, auxiliary bracket, and M10x150 bolt one by one. Reserve the main bracket on the IFS06.

Step 2 Use the M10x50 bolts delivered with the IFS06 to secure the main 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 main bracket are pointing up.

● Height-restricted scenarios

Use one finger to push and remove the rubber plugs on the beam and then install the main bracket, as shown in **Figure 7-39**.

Figure 7-39 Installing the main bracket in height-restricted scenarios
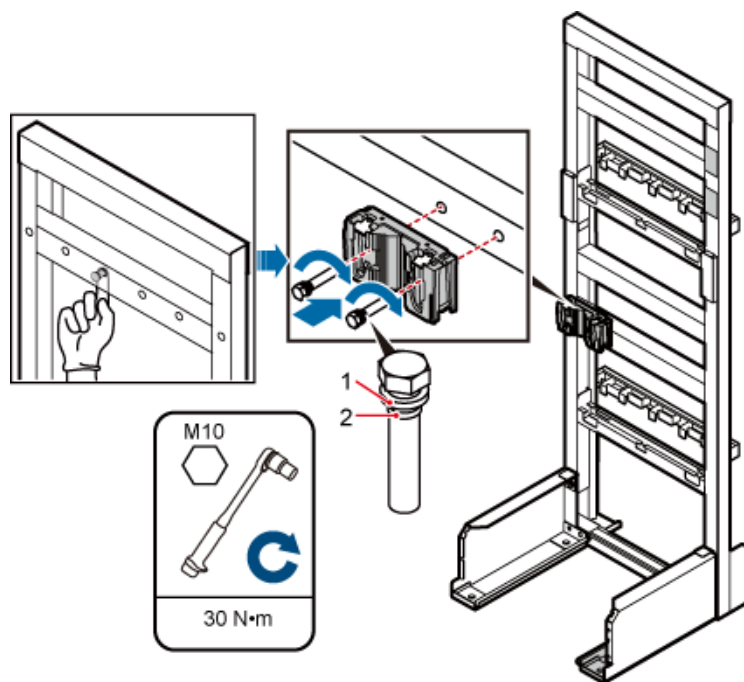
(1) Spring washer	(2) Rubber washer

● Height-unrestricted scenarios

Install the main bracket, as shown in **Figure 7-40**.

Figure 7-40 Installing the main bracket in height-unrestricted scenarios
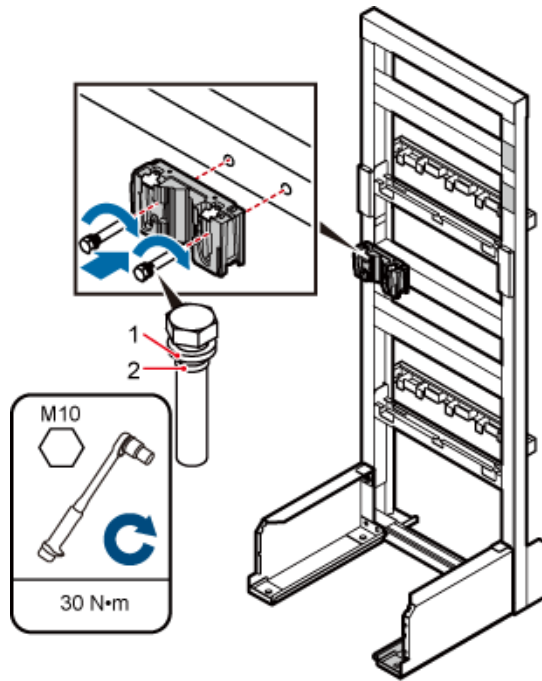
PAS02C0044

(1) Spring washer	(2) Rubber washer

Step 3 Interchange the attachment plate and stainless steel screws at the rear of the RRU with the cover plate and plastic screws on one side of the RRU, as shown in **Figure 7-9**.

Figure 7-41 Interchanging the attachment plate at the rear of the RRU with the cover plate on one side of the RRU

HIR12C0111

(a) Use an inner hexagon screwdriver to remove the attachment plate from the rear of the RRU.

(b) Remove the cover plate from one side of the RRU, and use a Phillips screwdriver to remove the plastic screws from the RRU.

(c) Install the plastic screws to the rear of the RRU, and use a torque screwdriver to tighten the screws to 0.25 N·m (2.21 lbf·in.).

(d) Install the cover plate onto the rear of the RRU.

(e) Install the attachment plate to the side of the RRU, and use a torque screwdriver to tighten the stainless steel screws on the attachment plate to 5 N·m (44.25 lbf·in.).

Step 4 Install the RRU onto the main bracket, as shown in **Figure 7-42**.

Figure 7-42 Installing the RRU onto the main bracket
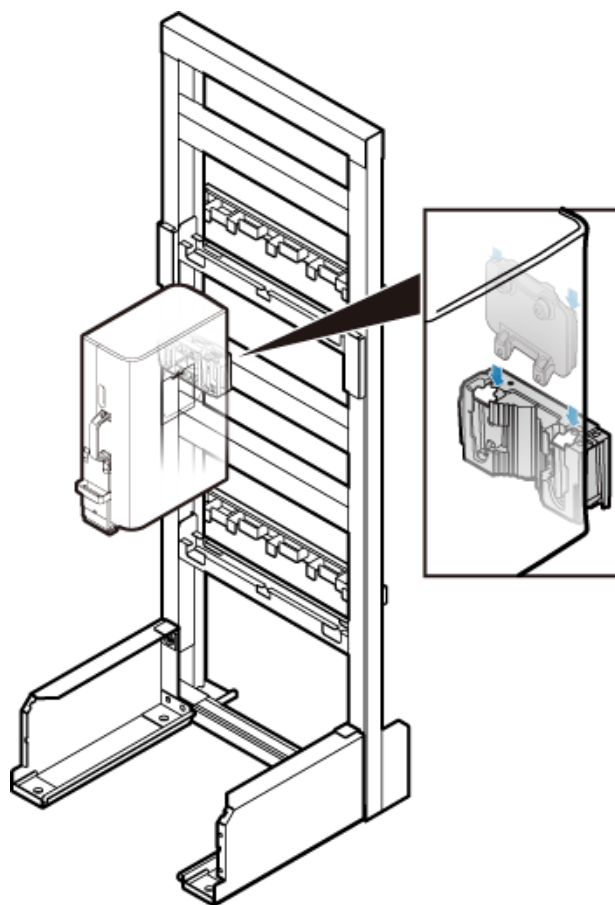
PAS02C0051

Step 5 Repeat the steps above to install RRUs on the lower level from left to right, as shown in **Figure 7-43**.

Figure 7-43 Installing RRUs on the lower level
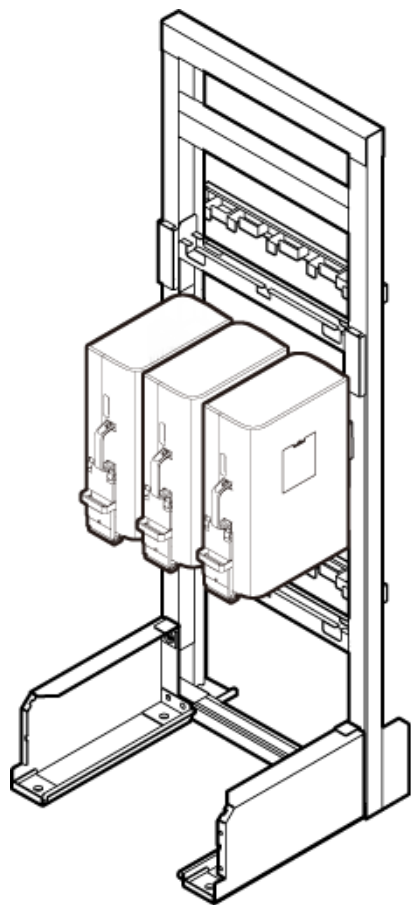
PAS02C0054

Step 6 **Optional:** When the ambient temperature is equal to or higher than the lowest operating temperature of the RRU and at least 10°C (50°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 7-44**.

Figure 7-44 Installing RRUs on the higher level
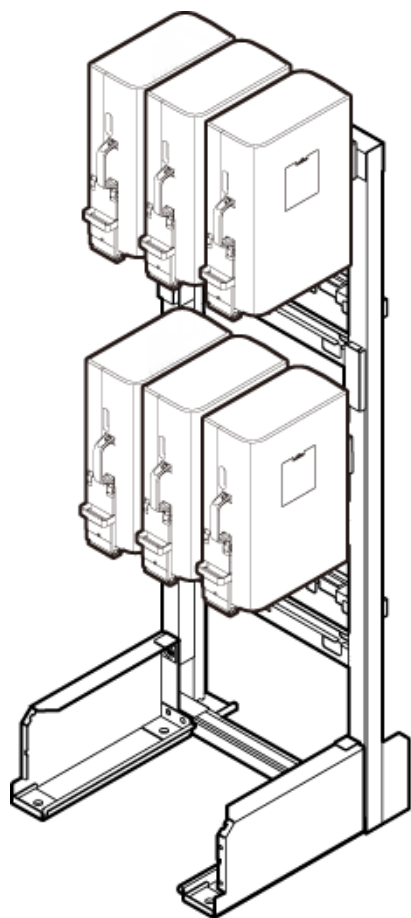
PAS02C0057

----End

8 Installing RRU Cables

About This Chapter

This chapter describes the procedure for installing RRU cables.

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

8.2 Cable Connections
This section describes the cable connections for a single RRU and multiple RRUs.

8.3 Installation Process
This section describes the process of installing RRU cables.

8.4 RRU Cable List
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 Inter-RRU RF Cable
This section describes the procedure for installing an inter-RRU RF cable.

8.8 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.

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

8.11 Installing a CPRI Fiber Optic Cable
This section describes the procedure for installing a CPRI fiber optic cable.

8.12 Installing an RRU Alarm Cable

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

8.13 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 routed according to the specified cabling requirements to prevent signal interference.

☷**NOTE**

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

General Cabling Requirements

Requirements for Bending Radius

- The bending radius of the 7/8" feeder must be more than 250 mm (9.84 in.), and the bending radius of the 5/4" feeder must be more than 380 mm (14.96 in.).

- The bending radius of the 1/4" jumper must be more than 35 mm (1.38 in.). The bending radius of the super-flexible 1/2" jumper must be more than 50 mm (1.97 in.), and the bending radius of the ordinary 1/2" jumper must be more than 127 mm (5 in.).

- The bending radius of the power cable or PGND cable must be at least three times the diameter of the cable.

- The bending radius of a fiber optic cable is at least 20 times the diameter of the fiber optic cable, and the minimum bending radius of the breakout cable at each end of the fiber optic cable is 30 mm (1.18 in.).

- The bending radius of the E1/T1 cable must be at least three times the diameter of the cable.

- The bending radius of the signal cable must be at least five times the diameter of the cable.

Requirements for Cable Binding

- The same types of cable must be bound together.

- Different types of cable must be separately routed with the minimum spacing of 30 mm (1.18 in.) and cannot be entangled.

- The cables must be bound tightly and neatly. The sheaths of the cables must not be damaged.

- Cable ties are installed in the same direction, and those at the same horizontal line must be in a straight line.

- The excess of indoor cable ties is trimmed off, and the excess of outdoor cable ties allows about 5 mm (0.2 in.), without remaining rough edges.

- Labels or nameplates must be attached to both ends, joints, or turns of cables after they are installed.

Security Requirements

- Cables should be placed away from sharp objects or wall burrs. If these positions are inevitable, protect the cables with protection pipes.

- Cables must be routed away from heat sources, or heat-insulation materials are added between cables and heat sources.

- Sufficient slack (recommended for about 0.1 m [0.33 ft]) is provided in cables at turns or the position close to a device, facilitating cable and device maintenance.

Indoor Cabling Requirements

- Cables are routed indoors through the feeder window.

- Drip loops must be made outside the feeder window, and the requirements for the minimum bending radius are met.

- When cables are routed indoors, engineers are required indoors for cooperation.

- The feeder window must be waterproofed.

Outdoor Cabling Requirements

- Cables routed outdoors must be led through a pipe when they may be damaged.

- AC power cables, transmission cables, and cables buried in the ground must be protected.

- If cables at the cabinet bottom need to be routed through a pipe along the ground, lead the pipe into the cabinet base for about 30 mm (1.18 in.) to 50 mm (1.97 in.), not into the cabinet. Block the pipe with waterproof tape or silicon gel, and secure the pipe to the cable hole at the cabinet bottom with metal piece.

- If cables at the cabinet bottom need to be routed through a pipe along the metal cable trough, do not lead the pipe into the cabinet base. The cable trough must be sealed and routed through the cable hole at the cabinet bottom.

- 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.

- Cables are secured with cable clips.

- Cables are routed neatly along the specified cabling direction and secured with cable clips.

- The positions for cable clips are determined onsite. For example, the cable clips for the 7/8" feeder are installed at the spacing of 1.5 m (4.92 ft) to 2 m (6.56 ft) in the same direction, and the cable clips for the power cables are installed at the spacing of 1.5 m (4.92 ft) to 2 m (6.56 ft) in the same direction.

- Cable clips must be vertical with cables, and the cables in a cable clip must be parallel.

- After routing cables neatly and correctly, tighten the screws on cable clips.

Secure cables on the cable tray, as shown in **Figure 8-1**.

Figure 8-1 Securing cables on the cable tray

SRD00C1001
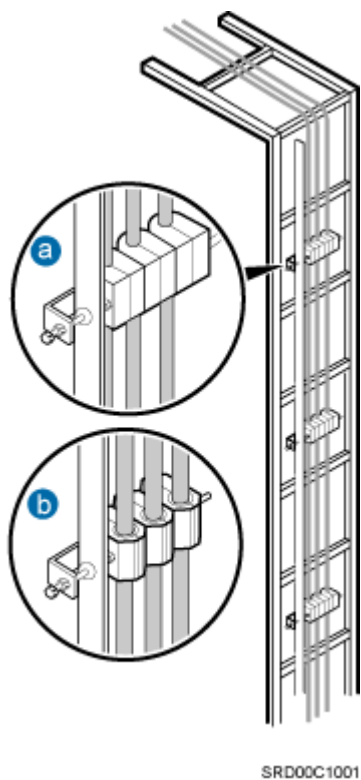
Secure cables on the tower, as shown in **Figure 8-2**.

Figure 8-2 Securing cables on the tower

SRD00C1002
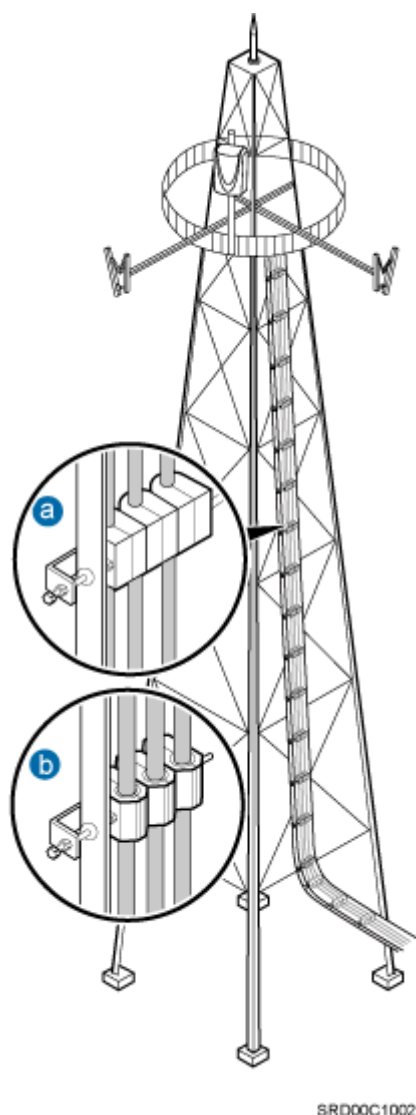
Special Cabling Requirements

Cabling Requirements for 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 must be routed by only qualified and trained personnel before all preparations are made.

● Cables are routed in an untangled and orderly fashion.

● If DC power cables need to be routed on the tower platform, lay out the cables on the guardrail with the shortest distance and route the cables along the guardrail.

● If DC power cables need to be routed close to a device on the tower, secure the cables to the guardrail or pole with cable clips. The device cannot be far away from the position for securing the cables.

Cabling Requirements for PGND Cables

● PGND cables for the base station must be connected to the same ground bar.

● PGND cables must be buried in the ground or routed indoors. They should not be routed overhead before they are led into the equipment room.

● The exterior 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 in an untangled and orderly fashion. A certain distance must be reserved between them to prevent interference from each other.

● Fuses or switches 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 Requirements for E1 Cables

● E1 cables must not cross power cables, PGND cables, or RF cables when routed. If transmission cables are routed 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 routed straightly and bound neatly with cable ties.

● Sufficient slack is provided in E1 cables at turns.

● E1 cables cannot be squeezed by the cabinet door when routed through the cabinet, as shown in **Figure 8-3**.

Figure 8-3 E1 cables routed through the cabinet
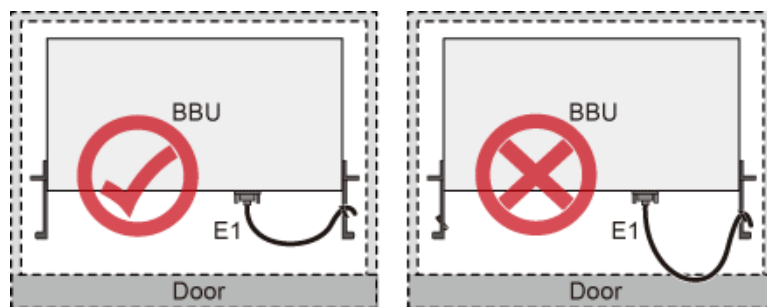
Cabling Requirements for Fiber Optic Cables

● Fiber optic cables must be routed by at least three qualified and trained personnel before all preparations are made.

● Fiber optic cables are used within the temperature range of -40°C to 60°C. If the current temperature is out of the range, make protection measures or route the cables again.

● Cables are routed in an untangled and orderly fashion.

- Do not bind fiber optic cables at turns.
- Do not stretch, step on, or place heavy objects on fiber optic cables. Keep the cables away from sharp objects.
- When fiber optic cables are routed, the excess of the 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 8-4 Binding fiber optic cables

CIH00C4014
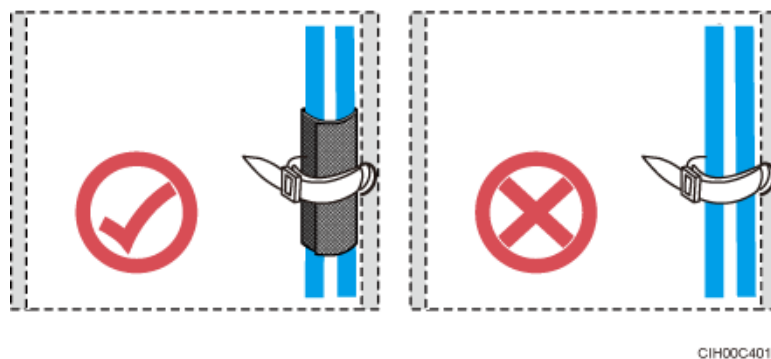
- When coiling fiber optic cables, apply even strength. Do not bend the cables with force.
- Vacant optical connectors must be covered with dustproof caps.
- Fiber optic cables cannot be squeezed by the cabinet door when routed through the cabinet, as shown in **Figure 8-5**, **Figure 8-6** and **Figure 8-7**.

Figure 8-5 CPRI fiber optic cables routed through the cabinet (1)
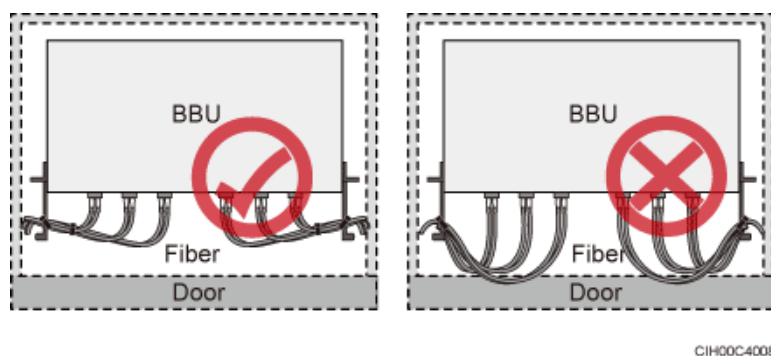
CIH00C4008

Figure 8-6 CPRI fiber optic cables routed through the cabinet (2)
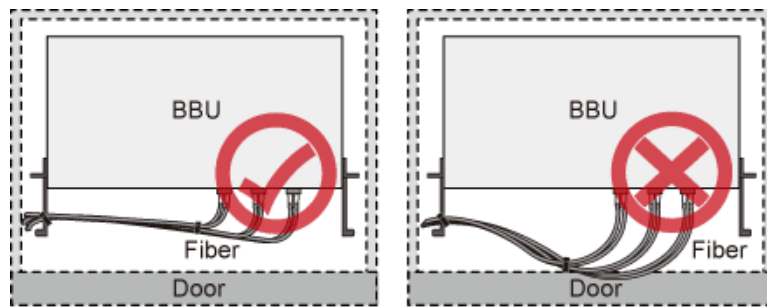
Figure 8-7 FE/GE cables routed through the cabinet
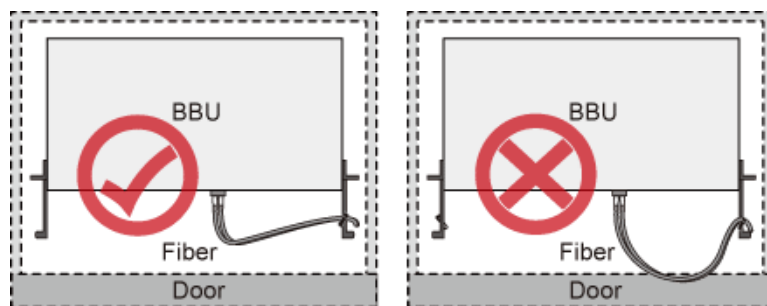
- If fiber optic cables need to be routed on the tower platform, lay out the cables on the guardrail with the shortest distance and route the cables along the guardrail.

- If fiber optic cables need to be routed close to a device on the tower, secure the cables to the guardrail or pole with cable clips. The device cannot be far away from the position for securing the cables.

- If the fiber optic cables close to a device are too long, coil the excess of the cables and secure them on the tower.

8.2 Cable Connections

This section describes the cable connections for a single RRU and multiple RRUs.

☐**NOTE**

- A lower-level RRU obtains power directly from the external power system, but not from an upper-level RRU using a power cable.

- The RRU3642 is a single-mode RRU. It only supports the cable connections shown in **Figure 8-8** and **Figure 8-10**.

- The RRU3642 does not support the inter-RRU cable connection shown in **Figure 8-12**.

Figure 8-8 shows the cable connections for a single RRU in the single-mode scenario.

Figure 8-8 Cable connections for a single RRU in the single-mode scenario

(1) PGND cable	(2) RRU RF jumper	(3) RRU AISG multi-wire cable
(4) RRU AISG extension cable	(5) RRU power cable	(6) CPRI fiber optic cable
(7) RRU alarm cable	-	-
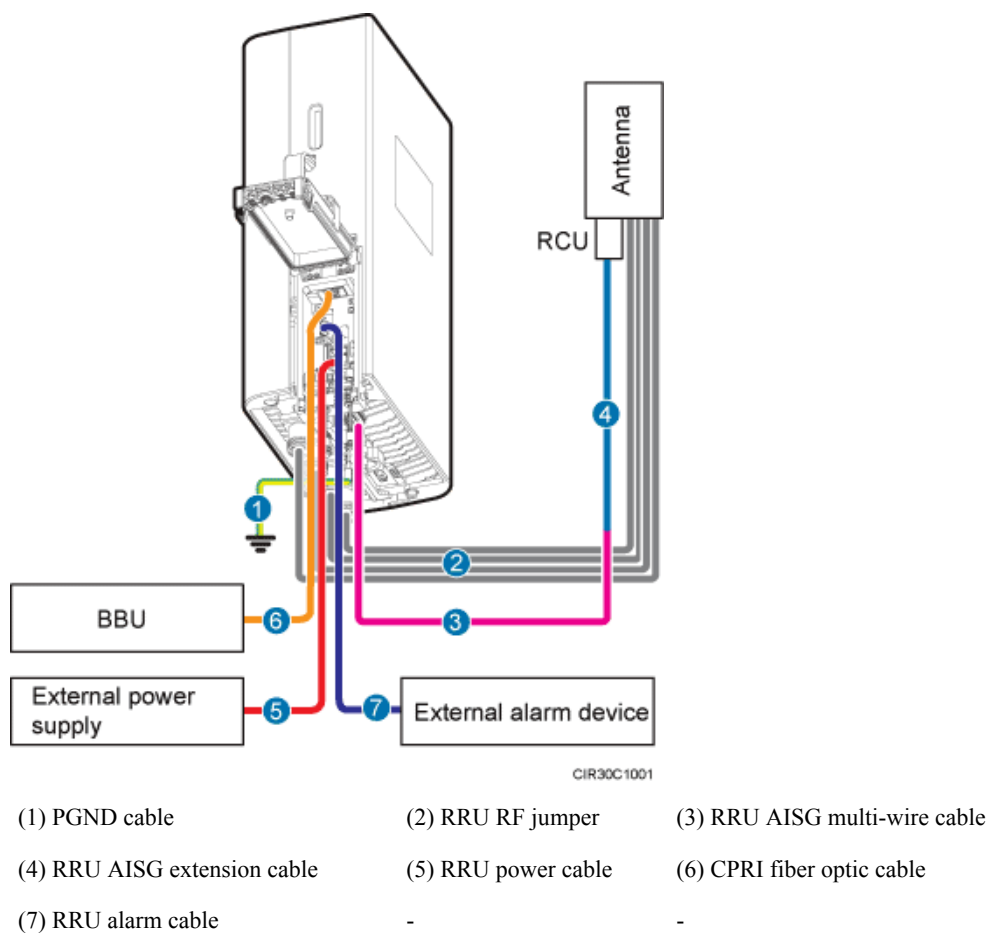
Figure 8-9 shows the cable connections for a single RRU in the multimode scenario.

Figure 8-9 Cable connections for a single RRU in the multimode scenario
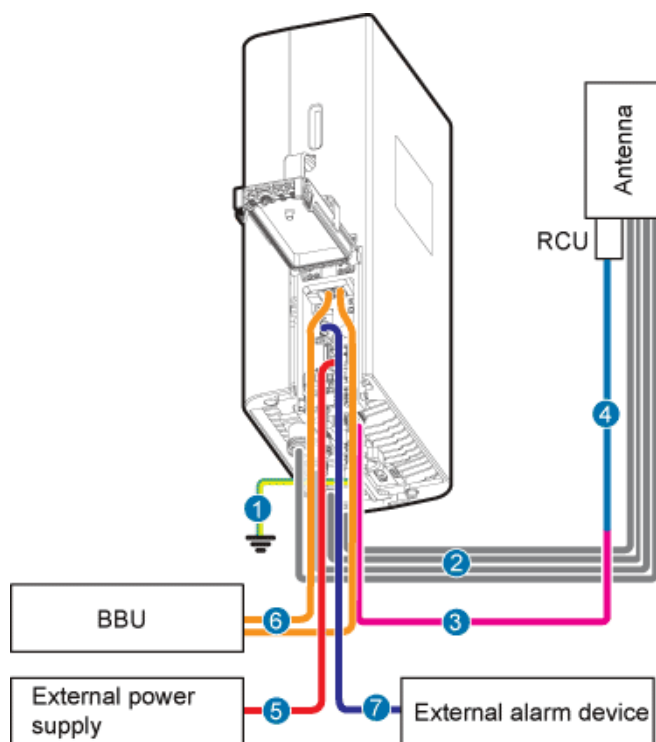
CIR30C1004

(1) PGND cable	(2) RRU RF jumper	(3) RRU AISG multi-wire cable
(4) RRU AISG extension cable	(5) RRU power cable	(6) CPRI fiber optic cable
(7) RRU alarm cable	-	-

Figure 8-10 shows the cable connections for multiple RRUs in the single-mode scenario.

Figure 8-10 Cable connections for multiple RRUs in the single-mode scenario
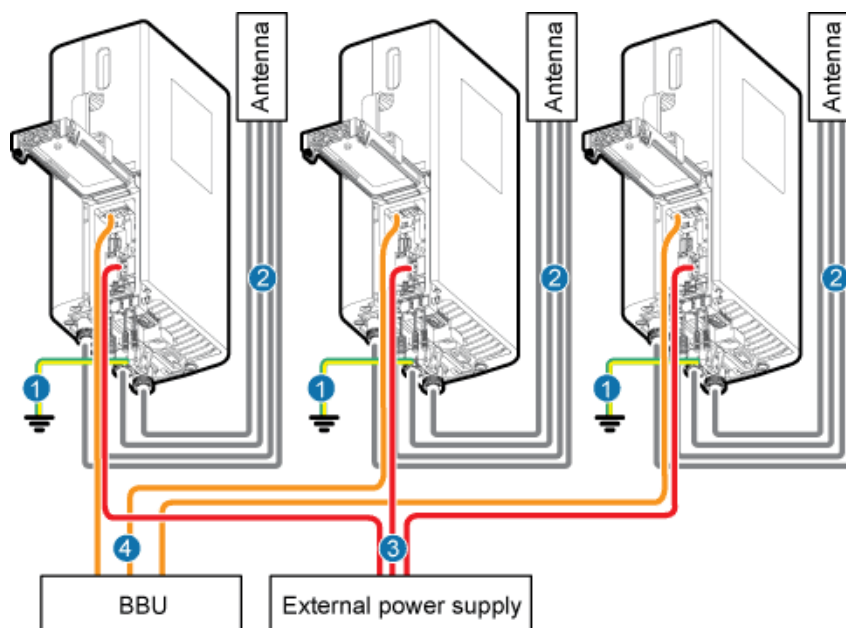
(1) PGND cable	(2) RRU RF jumper	(3) RRU power cable
(4) CPRI fiber optic cable	-	-

Figure 8-11 shows the CPRI fiber optic cable connections for multiple RRUs in the multimode scenario.

Figure 8-11 CPRI fiber optic cable connections for multiple RRUs in the multimode scenario
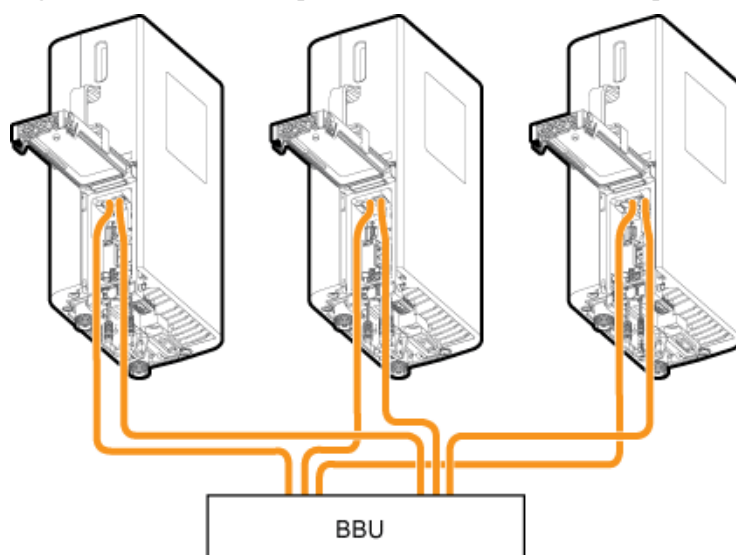
Figure 8-12 shows inter-RRU cable connections.

Figure 8-12 Inter-RRU cable connections

CIR30C1003
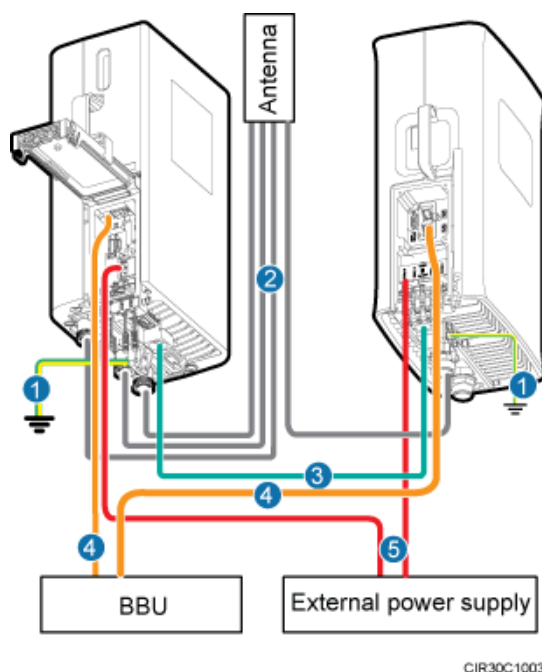
(1) PGND cable	(2) RRU RF jumper	(3) Inter-RRU RF cable
(4) CPRI fiber optic cable	(5) RRU power cable	-

📖**NOTE**

● An RRU3942 can be interconnected with an RRU3804 or RRU3801E in the same sector using RX_IN/ OUT ports.

● When an RRU3942 is interconnected with an RRU3804 or RRU3801E, the ANT_TX/RXA port on the RRU3942 and the ANT_TX/RXA port on the RRU3804 or RRU3801E must be connected to the same antenna.

● When an RRU3942 is interconnected with an RRU3804 or RRU3801E, the ANT_RXC port on the RRU3942 and the ANT_RXB port on the RRU3804 or RRU3801E do not need to be connected to an antenna.

8.3 Installation Process

This section describes the process of installing RRU cables.

Figure 8-13 shows the process of installing RRU cables.

Figure 8-13 Process of installing RRU cables
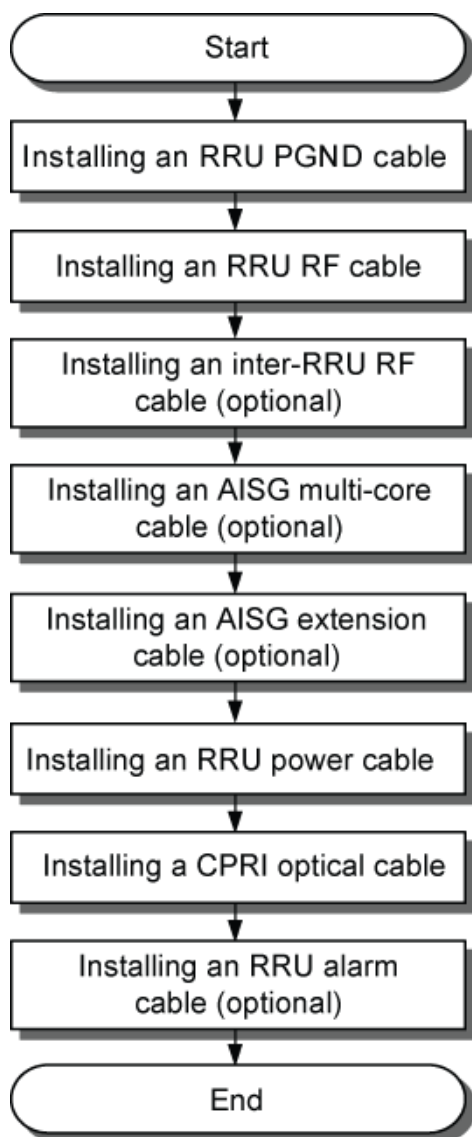
```
                    ┌──────────────────────┐
                   (        Start           )
                    └──────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an RRU PGND cable        │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an RRU RF cable          │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an inter-RRU RF          │
            │    cable (optional)                    │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an AISG multi-core       │
            │    cable (optional)                    │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an AISG extension        │
            │    cable (optional)                    │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an RRU power cable       │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing a CPRI optical cable     │
            └──────────────────────────────────────┘
                                │
                                ▼
            ┌──────────────────────────────────────┐
            │    Installing an RRU alarm             │
            │    cable (optional)                    │
            └──────────────────────────────────────┘
                                │
                                ▼
                    ┌──────────────────────┐
                   (        End             )
                    └──────────────────────┘

                            IPR14C0002
```

8.4 RRU Cable List

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^2 or 0.025 in.^{2})	Ground terminal on the RRU	OT terminal (M8, 16 mm^2 or 0.025 in.^{2})	Ground terminal on the ground bar
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 (RRU3942 working in multimode scenarios)	DLC connector	CPRI0 port on the RRU CPRI1 port on the RRU	DLC connector	CPRI port on a board in the BBU
CPRI Fiber Optic Cable (RRU3942, RRU3642 working in single-mode scenarios)	DLC connector	CPRI0 port on the RRU	DLC connector	CPRI port on a board in the BBU
RRU RF Jumper	DIN male connector	ANT_TX/ RXA, ANT_TX/ RXB, ANT_RXC, or ANT_RXD port on the RRU	DIN male connector	Antenna system
Inter-RRU RF Cable (RRU3942)	DB2W2 connector	RX_IN/OUT port on the RRU	DB2W2 connector	RX_IN/OUT port on the RRU
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

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
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^2 (0.025 in.^{2}). The cable has an M6 OT terminal at one end and an M8 terminal at the other end.

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 at one end of the PGND cable to the ground terminal at the RRU bottom and the M8 OT terminal at the other end to the external ground bar, as shown in **Figure 8-14**.

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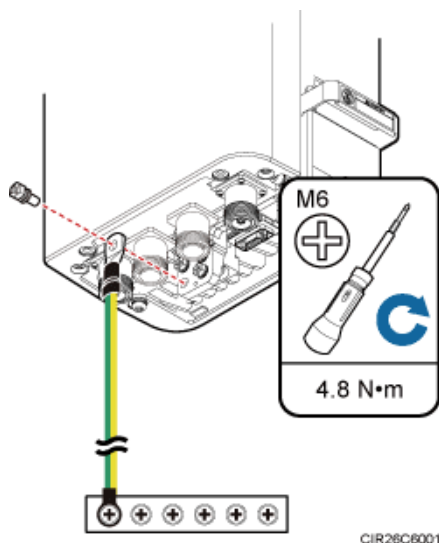
☐**NOTE**

Crimp OT terminals in correct positions, as shown in **Figure 8-15**.

Figure 8-15 Correct position of an OT terminal

EIR22C6001
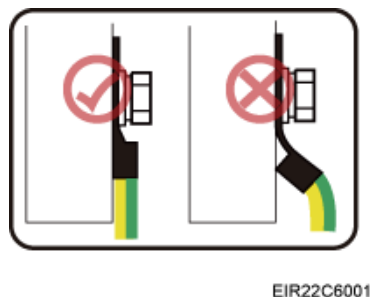
Step 3 Label the installed cables according to the instructions in Attaching a Cable-Tying Label.

----End

8.6 Installing an RRU RF Jumper

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

Procedure

Step 1 Connect the DIN male connector at one end of the RRU RF jumper to the ANT port on the RRU, and use a torque wrench to tighten the connector to 25 N·m (221.27 lbf·in.), as shown in **Figure 8-16**.

Figure 8-16 Installing an RRU RF Jumper

CIR26C5001

⚠ **NOTICE**

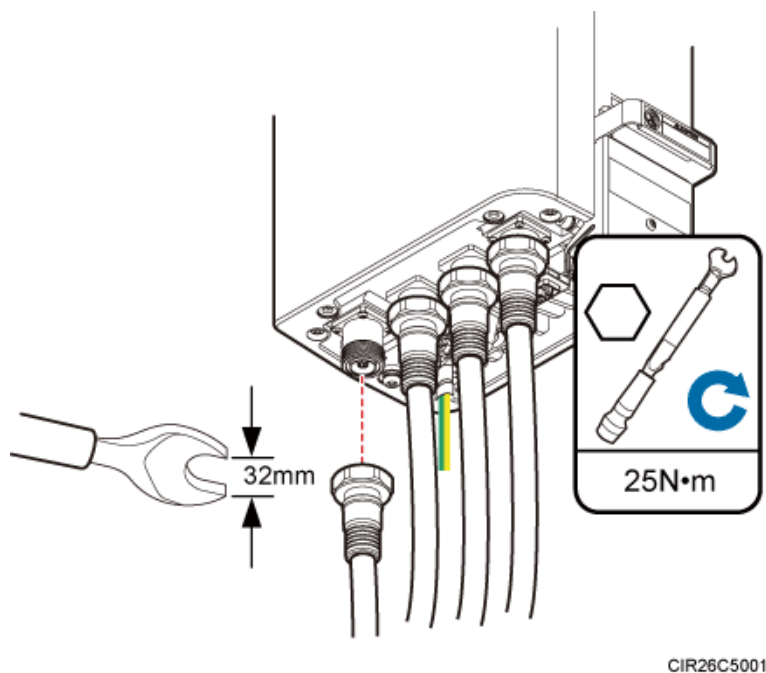On AC-powered electric railways, such as high speed railways, when leaky cables are connected to RRUs installed in tunnels, high-voltage-resistance DC blocks must be installed between RRU RF jumpers and the leaky cables to protect the RRUs against damage.

Step 2 Link 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
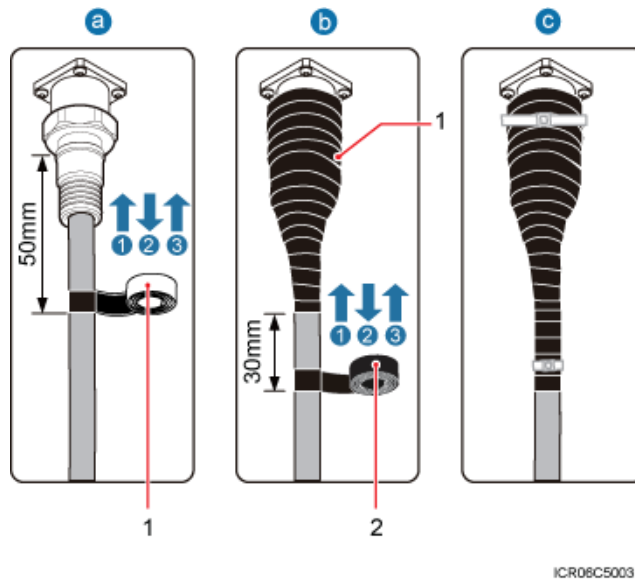
(1) Waterproof tape	(2) PVC insulation tape

□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

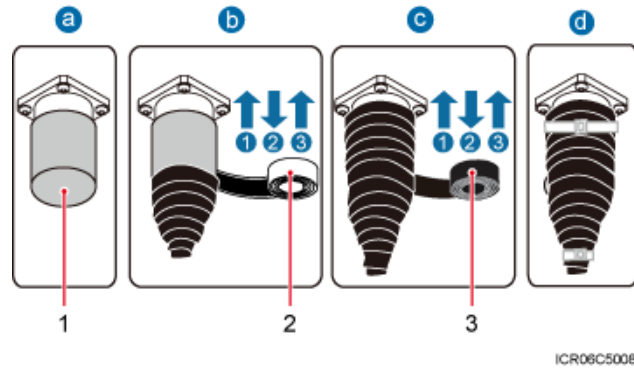| (1) Dustproof cap | (2) Waterproof tape | (3) PVC insulation tape |

📖 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 Inter-RRU RF Cable

This section describes the procedure for installing an inter-RRU RF cable.

Procedure

Step 1 Use an M3 flat-head screwdriver to loosen the screws on the dustproof cap on the RX_IN/OUT port and remove the dustproof cap.

Step 2 Connect the DB2W2 connector at one end of the RF cable to the RX_IN/OUT port of an RRU, and connect the other end to the RX_IN/OUT port of the other RRU, as shown in **Figure 8-19**.

Figure 8-19 Installing an inter-RRU RF cable

CIR30C5002
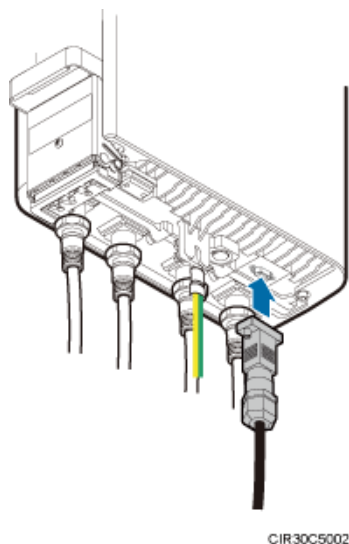
Step 3 Use an M3 Phillips screwdriver to tighten the posts on both sides of the DB2W2 connector to 0.4 N·m (3.54 lbf·in.).

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

8.8 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 8-20**.

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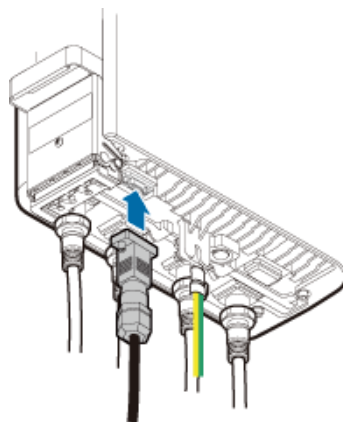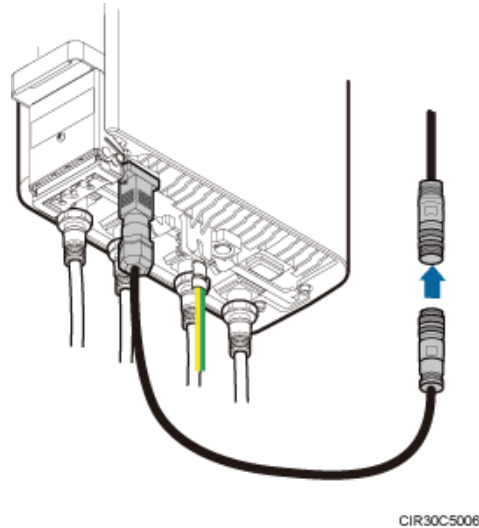

        CIR30C5003

    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 8-21**.

Figure 8-21 Installing an RRU AISG multi-wire cable

CIR30C5006

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 8-22**.

Figure 8-22 Installing an RRU AISG extension cable
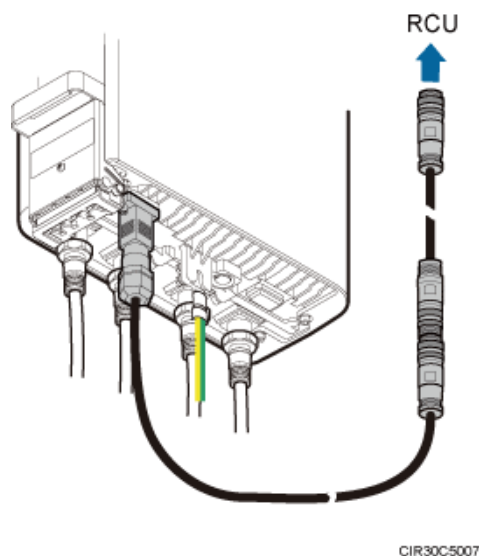
CIR30C5007

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

8.9 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 Loosen the protection screw on the cover plate of the RRU cabling cavity using an M4 Phillips screwdriver, and then lower the handle to open the cover plate, as shown in **Figure 8-23**.

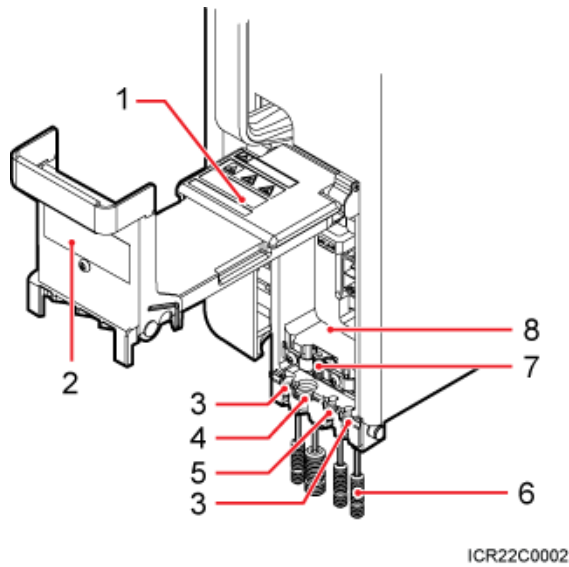**Figure 8-23** Opening the cover plate of the RRU cabling cavity
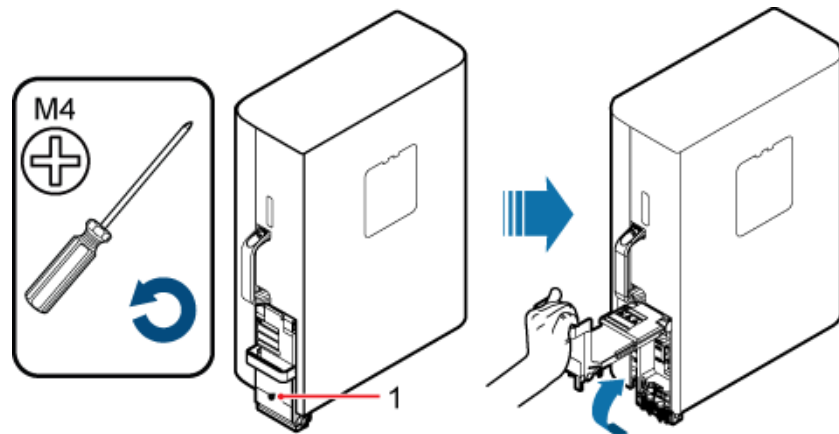
ICR08C0001

(1) Protection screw

Figure 8-24 shows the RRU cabling cavity.

Figure 8-24 RRU cabling cavity

ICR22C0002

(1) Cover plate	(2) Cable diagram on labels	(3) Cable trough for the fiber optic cable
(4) Cable trough for the power cable	(5) Cable trough for the alarm cable	(6) Waterproof block
(7) Clip	(8) Cabling cavity	-

Step 3 Loosen the screws on the clip using an M4 Phillips screwdriver, and open the clip, as shown **Figure 8-25**.

☐**NOTE**

Open the clip only for the associated cable.

Figure 8-25 Opening clips
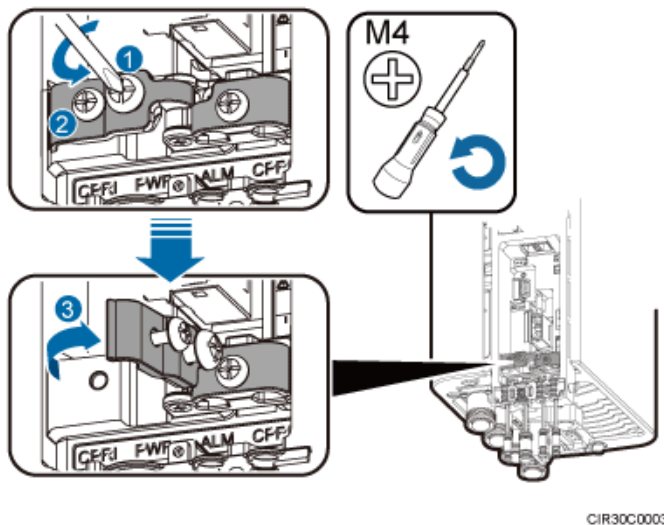
CIR30C0003

Step 4 Remove the waterproof block.

📖**NOTE**

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

----End

8.10 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 the *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 15 A to 30 A.

There are three types of RRU power cables in terms of cross-sectional areas: 5.3 mm^2 (0.008 in.^{2}) (10 AWG) and 8.2 mm^2 (0.013 in.^{2}) (8 AWG) complying with North American standards and 6 mm^2 (0.009 in.^{2}) complying with European standards.

Table 8-2 describes the RRU power cable.

Table 8-2 RRU power cable

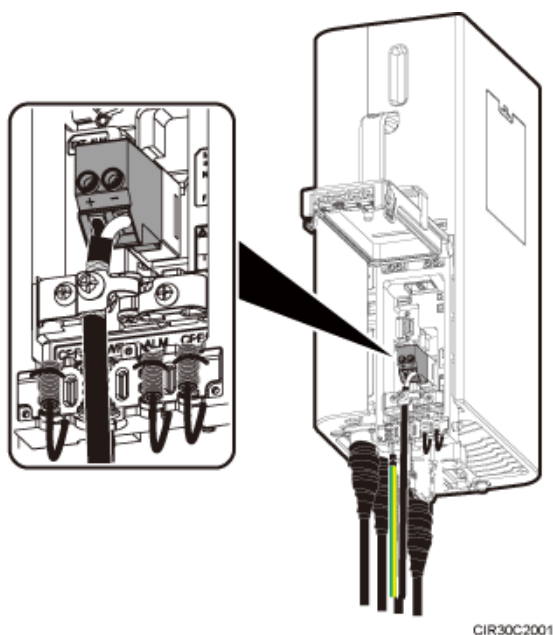| Cable	On the RRU Side	On the Power Device Side	Power Device	Color
RRU power cable	Tool-less female connector (pressfit type)	Tool-less female connector (pressfit type)	EPU	A cable with a black jacket and two wires inside ● North American standards: The RTN(+) wire is black and the RNEG(-) wire is blue. ● European standards: The RTN (+) wire is brown and the RNEG (-) wire is blue.
			DCDU-11B	
		EPC5 connector	DCDU-12B	

⚠ **CAUTION**

Ensure that the RRU power cable must be connected to the RRU first and then to the power device. The operations in the reverse sequence may cause component damage or 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 8-26**.

Figure 8-26 Installing an RRU power cable

CIR30C2001

⚠ **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 cable according to the instructions in **8.1 Cabling Requirements**, and then use a cable tie to bind the cable.

Step 4 Label the installed cable according to the instructions in Attaching a Cable-Tying Label.

----End

8.11 Installing a CPRI Fiber Optic Cable

This section describes the procedure for installing a CPRI fiber optic cable.

Prerequisites

Before the installation, single-mode optical modules can be distinguished from multi-mode 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 multi-mode optical module.

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

⚠ **NOTICE**

The optical modules to be installed must match CPRI rates.

Context

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

- For details about CPRI fiber optic cable connections, see section "CPRI Cable Connections" in the *BBU3900 Hardware Description* or *DBS3900 Hardware Description*.

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
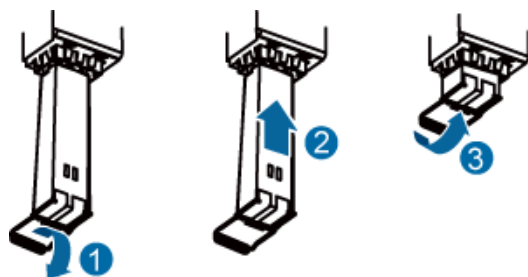
ICR06C4002

⚠ **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 an fiber optic cable into an unpacked optical module within 20 minutes.

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

Figure 8-28 Installing a CPRI fiber optic cable

CIR30C4001
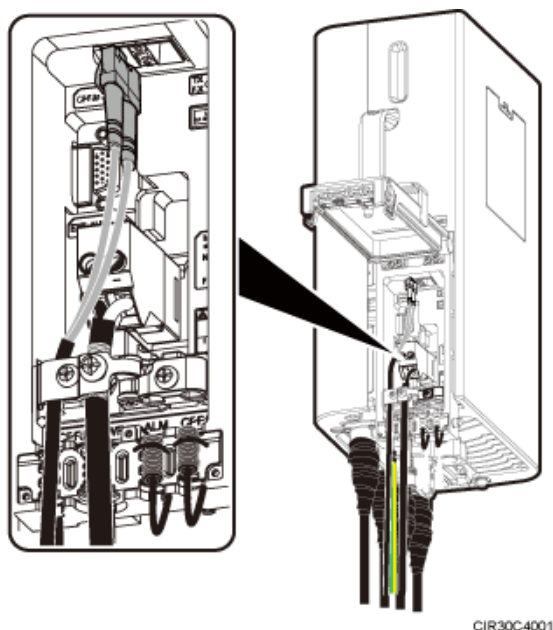
⚠ **NOTICE**

- To avoid any damage to fiber optic cables, the cables connected to the RRU must be installed according to the installation process. For details about the installation process, see **8.3 Installation Process**.
- If only one fiber optic cable is required, secure the fiber optic cable into the cable clip near the power cable to leave some slack at the bend.

Step 3 Connect the end labeled 2A and 2B of the fiber optic 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.
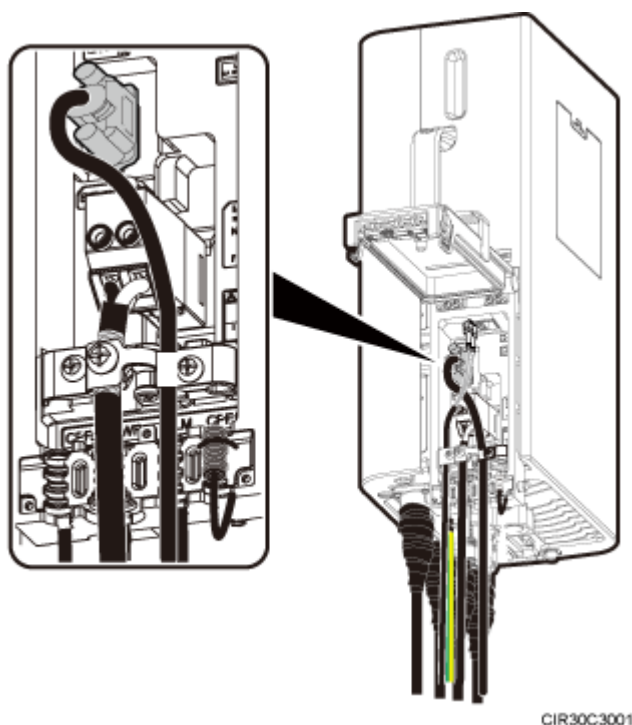
----End

8.12 Installing an RRU Alarm Cable

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

Procedure

Step 1 Connect the DB15 connector at one end of the RRU alarm cable to the EXT_ALM port on the RRU, as shown in **Figure 8-29**.

Figure 8-29 Installing an RRU alarm cable

CIR30C3001

Step 2 Connect the eight cord end terminals at the other end to external alarm devices.

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 an L-Shaped Label.

----End

8.13 Closing the Cover Plate of an RRU Cabling Cavity

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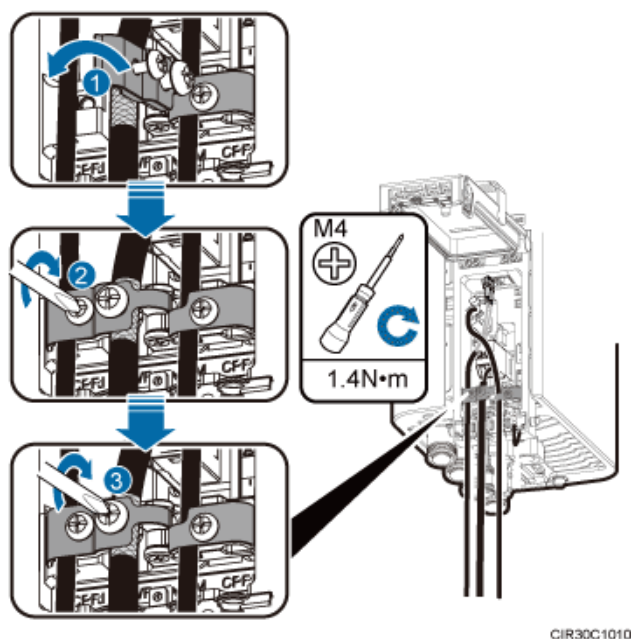
Procedure

Step 1 Close the clips for the installed cables. Use an M4 torque screwdriver to tighten the screws on each clip to 1.4 N·m (12.39 lbf·in.), as shown in **Figure 8-30**.

> ⚠ **NOTICE**
>
> Ensure that the exposed shield layer of the power cable is properly tightened using the clip.
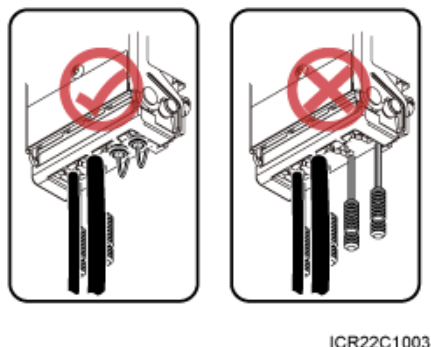
Figure 8-30 Closing clips

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

> ⚠ **NOTICE**
>
> Ensure that cables and waterproof blocks are properly inserted into troughs.

Figure 8-31 Correct placement of waterproof blocks

ICR22C1003

Step 3 Close the cover plate of the RRU cabling cavity. Use an M4 torque screwdriver to tighten the screws on the cover plate to 0.8 N·m (7.08 lbf·in.) in the sequence shown in **Figure 8-32**.

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

ICR08C1004
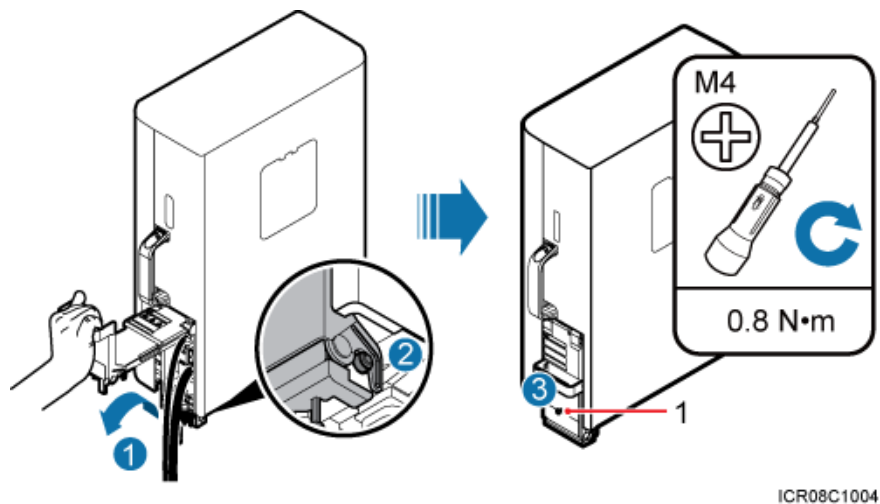
(1) Protection screw

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.

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.

Figure 10-1 shows the RRU power-on check process.

📖**NOTE**

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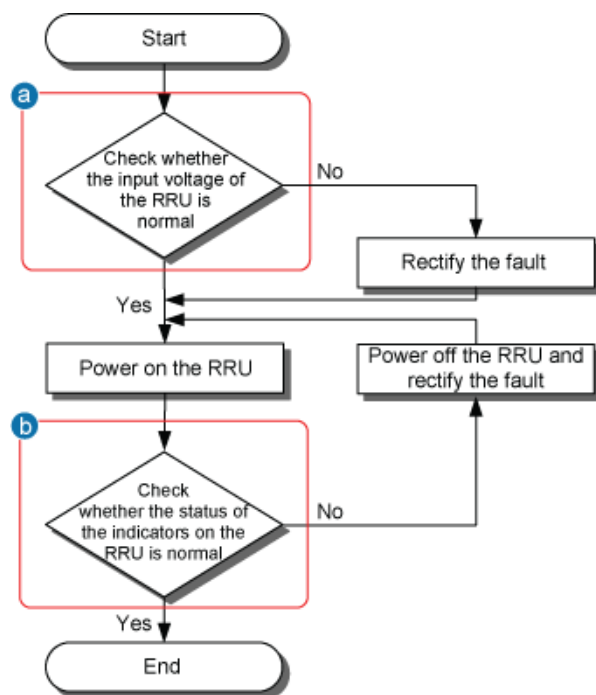
(a) The normal input voltage of an RRU is -48 V DC. The voltage of the external power supply should range from -36 V DC to -57 V DC.

(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

This section describes the procedure for adding an easy power receptacle (pressfit type) connector.

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
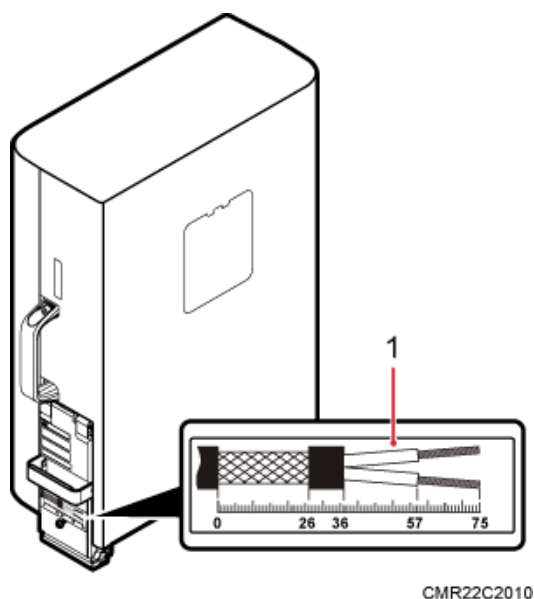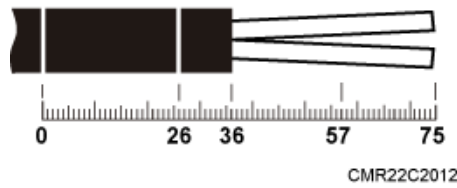

(1) Cable diagram on labels

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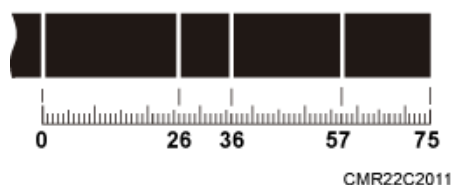
Step 2 Strip the specified length of the sheath off the power cable, as shown in **Figure 11-3**.

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**.

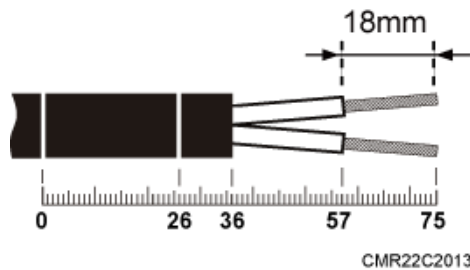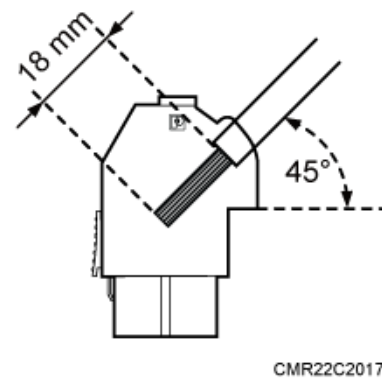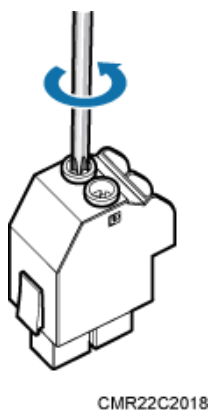**Figure 11-4** Stripping the sheath off each core wire

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

CMR22C2018

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, as shown in **Figure 11-7**.

Figure 11-7 Adding a tool-less female connector (pressfit type) to two core wires
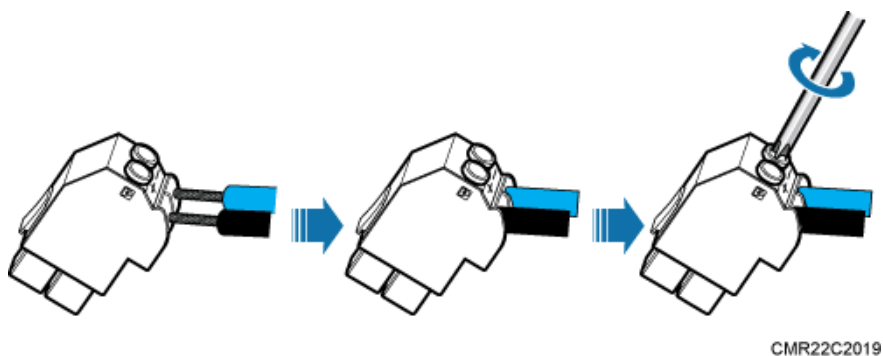
CMR22C2019

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**.

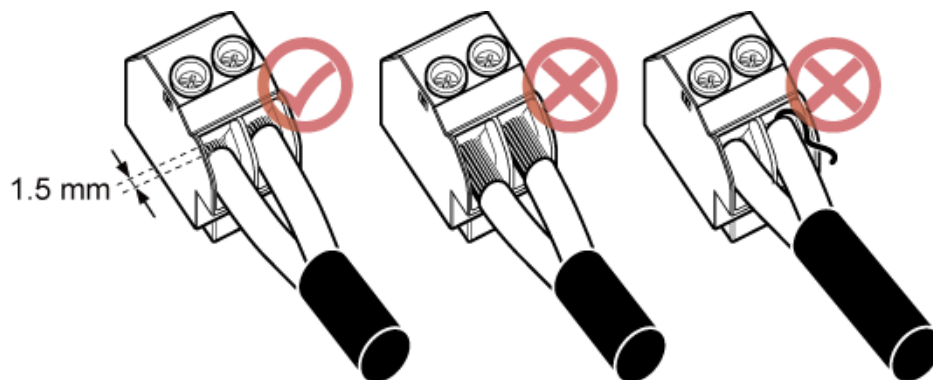**Figure 11-8** Stripping the sheath off the power cable
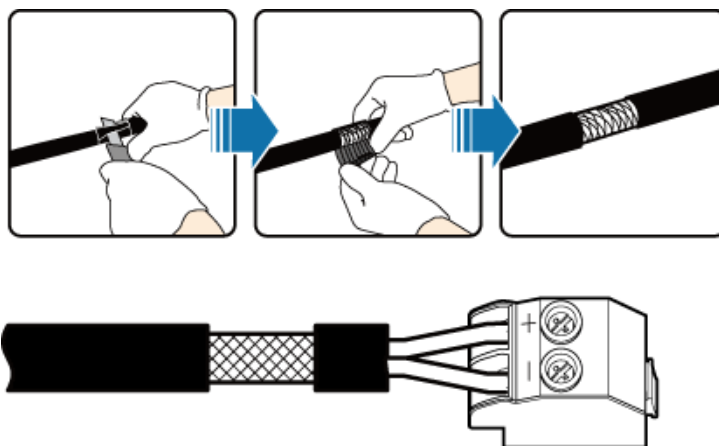
CMR22C2014

⚠ **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)

EID00C2000

----End