RRU3201 Installation Guide V100R001

Contents

Safety Information

■ Following All Safety Precautions

Before any operation, read the instructions and precautions in this document carefully to minimize the possibility of accidents.

The Danger, Caution, and Note items in the documents do not cover all the safety precautions that must be followed. They only provide the generic safety precautions for operations.

When operating Huawei products and equipment, you must comply with safety precautions and special safety instructions related to corresponding equipment provided by Huawei. The safety precautions in the document are related to only Huawei products. Huawei is not liable for any consequence that results from the violation of universal regulations for safety operations and safety codes on design, production, and equipment use.

■ Complying with the Local Safety Regulations

When operating the device, comply with the local safety regulations. The safety precautions provided in the documents are supplementary. You must comply with the local safety regulations.

■ Qualified Personnel Only

The personnel in charge of installation and maintenance must be trained and master the correct operating methods and safety precautions before beginning work.

■ Symbols

⚠ WARNING	*This symbol indicates that casualty or serious accident may occur if you ignore the safety instruction.*
⚠ CAUTION	*This symbol indicates that serious or major injury may occur if you ignore the safety instruction.*
📖 NOTE	*This symbol indicates that the operation may be easier if you pay attention to the safety instruction.*

■ Safety of Personnel

- The high voltage power supply provides power for running the system. Direct contact with the high voltage power supply or contact through damp objects may result in fatal danger.
- Non-standard and improper high voltage operations may result in fire and electric shock.
- In a thunderstorm, do not perform operations on high voltage and AC power supply facilities or on a steel tower and mast.
- Ground the device before powering on the device. Otherwise, the personnel and device are in danger.
- Power off the device before performing operations on the power supply equipment.
- High power radio-frequency signals are harmful to human body. Before installing or maintaining an antenna on a steel tower or mast with a large number of transmitter antennas, the operator should coordinate with all parties to ensure that the transmitter antennas are shut down.
- When handling optical fibers, do not stand close to, or look into the optical fiber outlet with unaided eyes.
- Protect yourself when drilling holes. Flying dust may hurt your eyes or you may inhale the dust.
- Power off the batteries before connecting the cables to the batteries. Otherwise, casualties may occur.
- When working at a height, be cautious about falling objects.

■ Device Safety

- Check the electrical connection of the device before operation and ensure that the device is reliably grounded.
- The static electricity generated by the human body may damage the electrostatic sensitive components on the circuit board, such as the large-scale integrated circuit (LIC). Wear an ESD wrist strap or ESD gloves when performing the operation.
- When working on batteries, take measures to prevent short circuits in the batteries and electrolyte spill/loss. The electrolyte may erode metal and boards, or even cause rust of the equipment or short circuits in the boards.
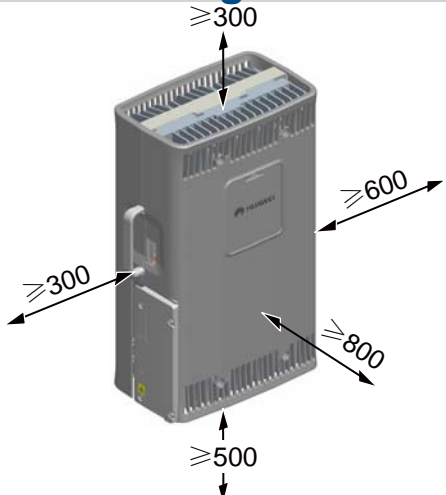
Installation Tools

|		
Percussion drill（Ø14）	ESD gloves	Vacuum cleaner
Heat gun	Cross screwdriver（M3~M6)	Straight screwdriver（M3~M6)
Claw hammer	Knife	Cable peeler
Power cable crimping pliers	Wire cutter	Adjustable wrench (with the diameter of at least 32mm)
Level bar	Torque screwdriver	Combination wrench (21mm~21mm)for pole installation (17mm~17mm) for wall installation
Multimeter	Marking pen (with the diameter of no more than 10mm)	Long measuring tape

Space Requirements (Unit: mm)

a RRU Dimensions

285

170

485
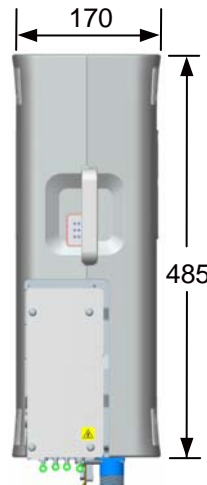
b Recommended Clearance for a Single RRU

≥300

≥600

≥300

≥800

≥500

c Minimum Clearance for a Single RRU

200

400

100

600

300
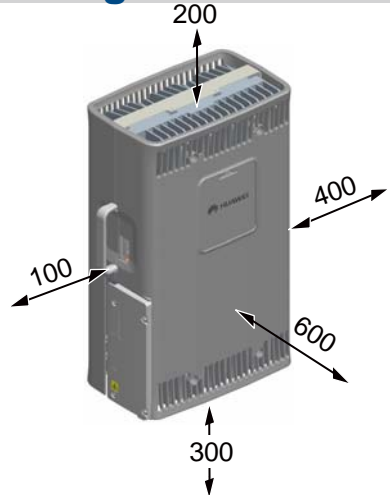
d Recommended Clearance for Multiple Centralized RRUs
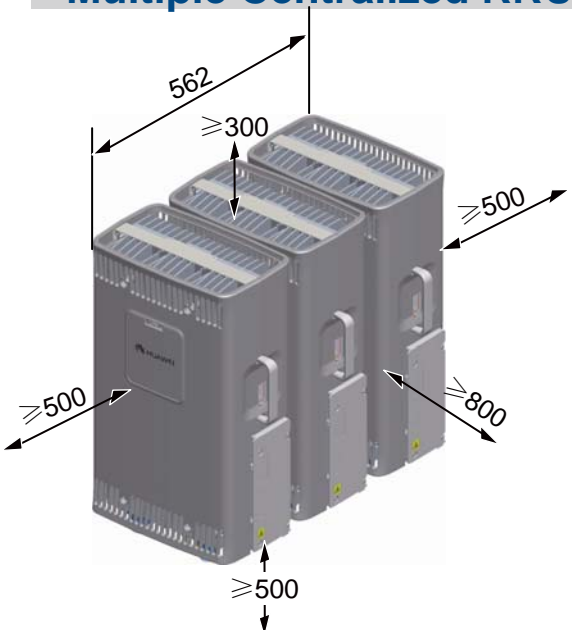
562

≥300

≥500

≥500

≥800

≥500

e Minimum Clearance for Multiple Centralized RRUs

562

200

300

300

800

300

Installation Modes

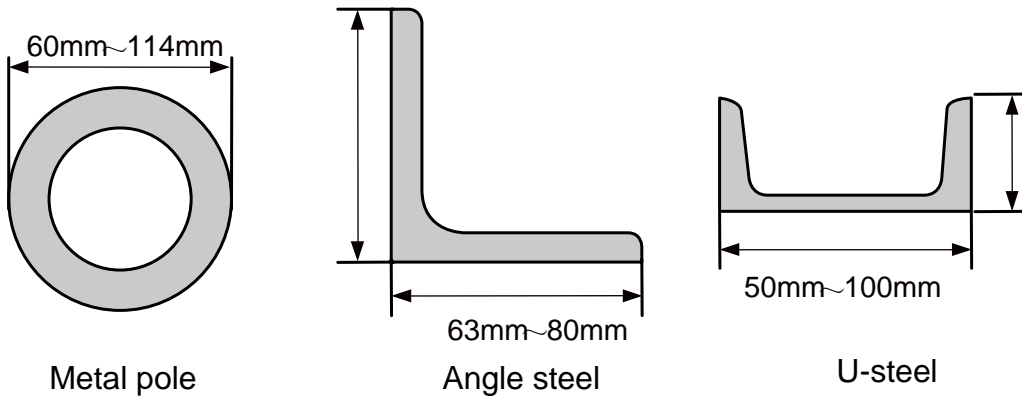| On a metal pole | On a wall | On an angle steel | On a U-steel |
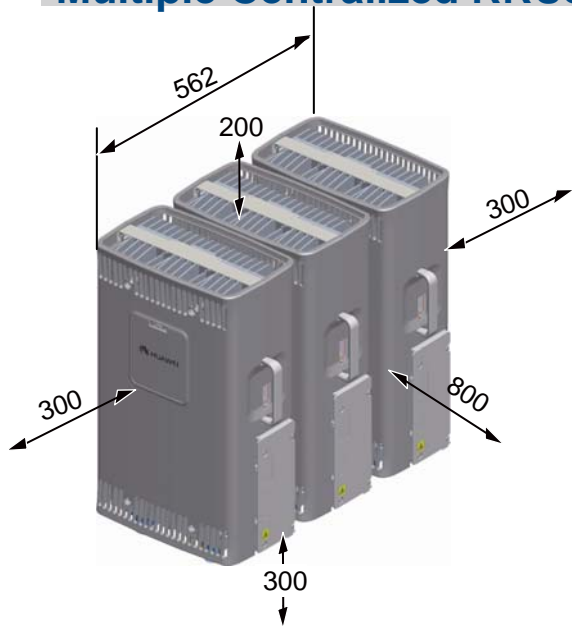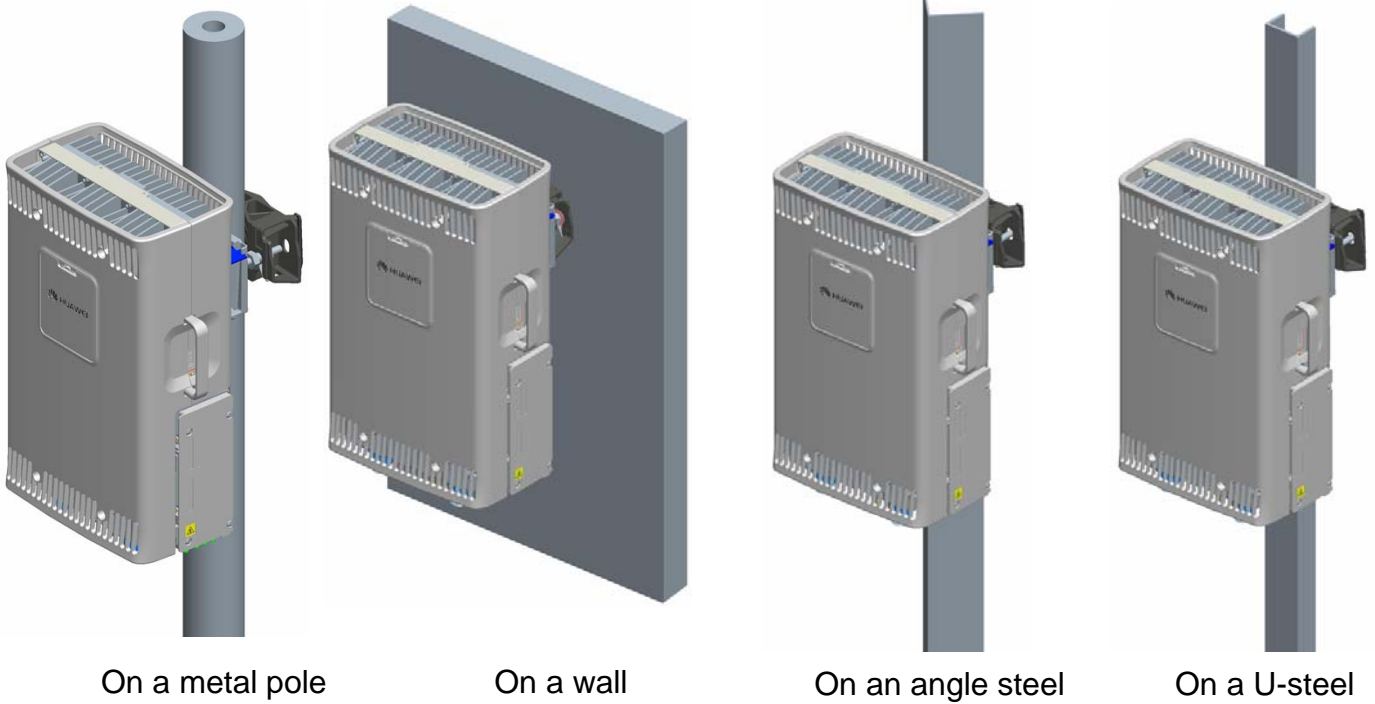
📖 **NOTE**

The following figure shows the specifications of the metal pole, angle steel, and U-steel where the RRU is installed.

60mm~114mm
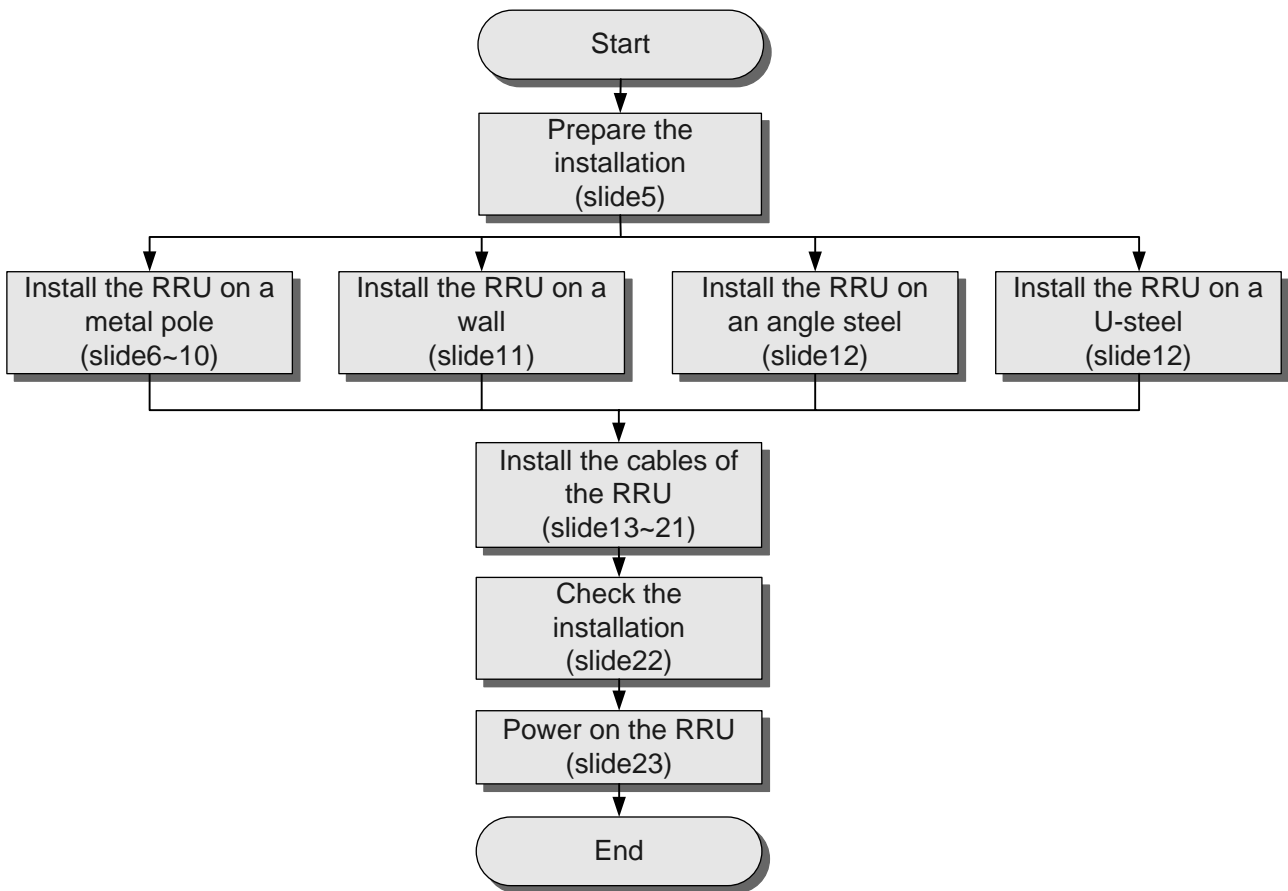
63mm~80mm

50mm~100mm

| Metal pole | Angle steel | U-steel |

The RRU can be installed on the tower. For details,

The following figures show the installations of multiple RRUs on the metal poles.

Installation Procedure

```
                    ┌──────────────┐
                    │    Start     │
                    └──────┬───────┘
                           ▼
                  ┌─────────────────┐
                  │   Prepare the   │
                  │   installation  │
                  │    (slide5)     │
                  └────────┬────────┘
        ┌──────────┬───────┼───────────┬──────────┐
        ▼          ▼       ▼           ▼          ▼
```

Install the RRU on a metal pole (slide6~10)	Install the RRU on a wall (slide11)	Install the RRU on an angle steel (slide12)	Install the RRU on a U-steel (slide12)

```
                  ┌─────────────────┐
                  │ Install the cables of
                  │    the RRU      │
                  │  (slide13~21)   │
                  └────────┬────────┘
                           ▼
                  ┌─────────────────┐
                  │   Check the     │
                  │  installation   │
                  │   (slide22)     │
                  └────────┬────────┘
                           ▼
                  ┌─────────────────┐
                  │ Power on the RRU│
                  │   (slide23)     │
                  └────────┬────────┘
                           ▼
                    ┌──────────────┐
                    │     End      │
                    └──────────────┘
```

Components Delivered with the RRU

expansion bolt

M10x110 Bolt

Main fixture

Auxiliary fixture

Fixture assembly for installing the RRU

Cover plate

Front of the RRU

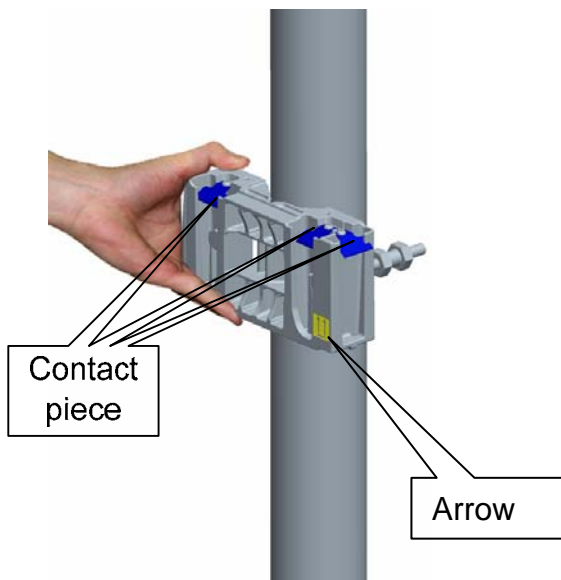Attachment plate

Back of the RRU
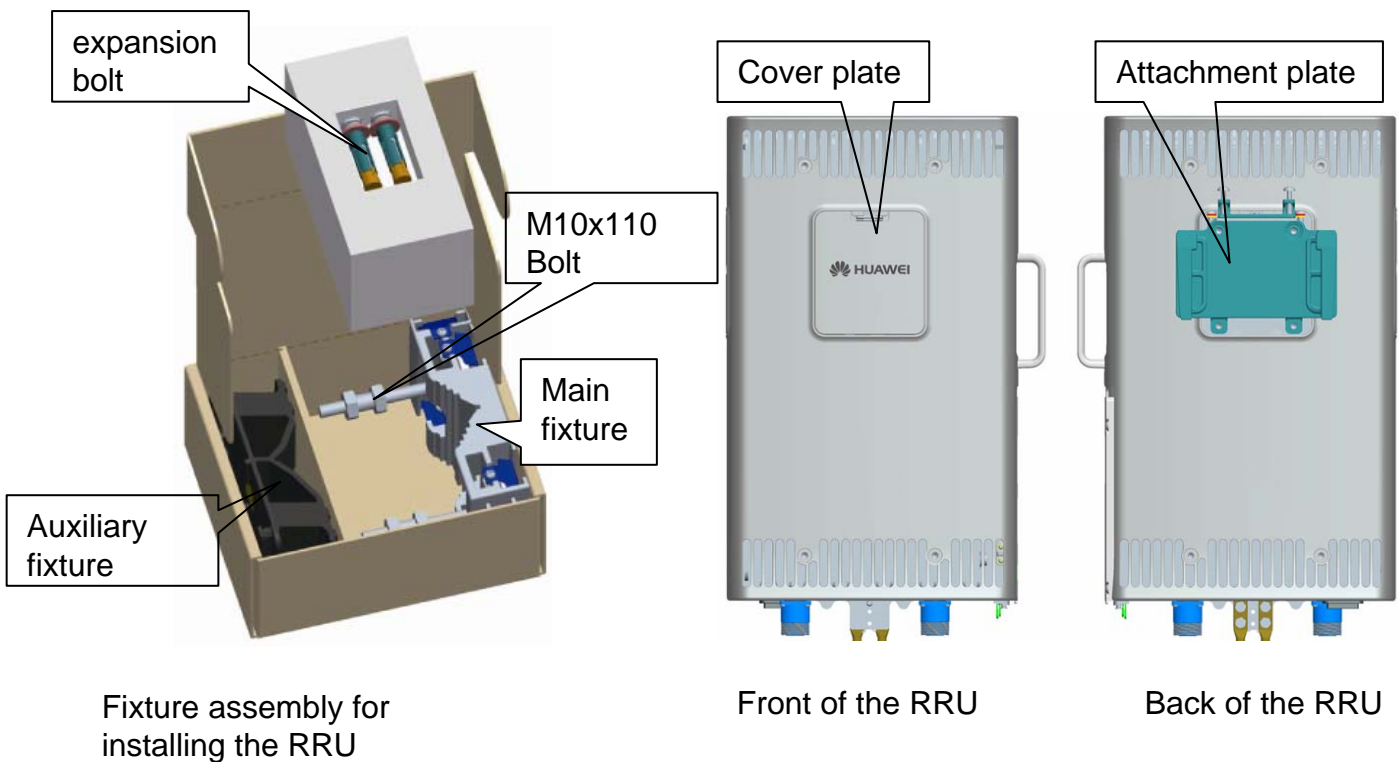
Installing the RRU on a Metal Pole

a Installing a Single RRU in Ordinary Mode

① Install the main fixture.

⚠ CAUTION

1. Before installing the main fixture, ensure that the contact piece on the fixture is fixed.

2. When installing the main fixture, keep the arrow on the main fixture upward.

📖 NOTE

It is recommended that the bottom of the main fixture be 1200 mm to 1600 mm above the ground for easy maintenance.

Contact piece

Arrow

② Install the auxiliary fixture between the nuts of the dual-nut bolt assembly on the main fixture.

Ensure that the arrow on the auxiliary fixture is upward.

Installation position for the auxiliary fixture.
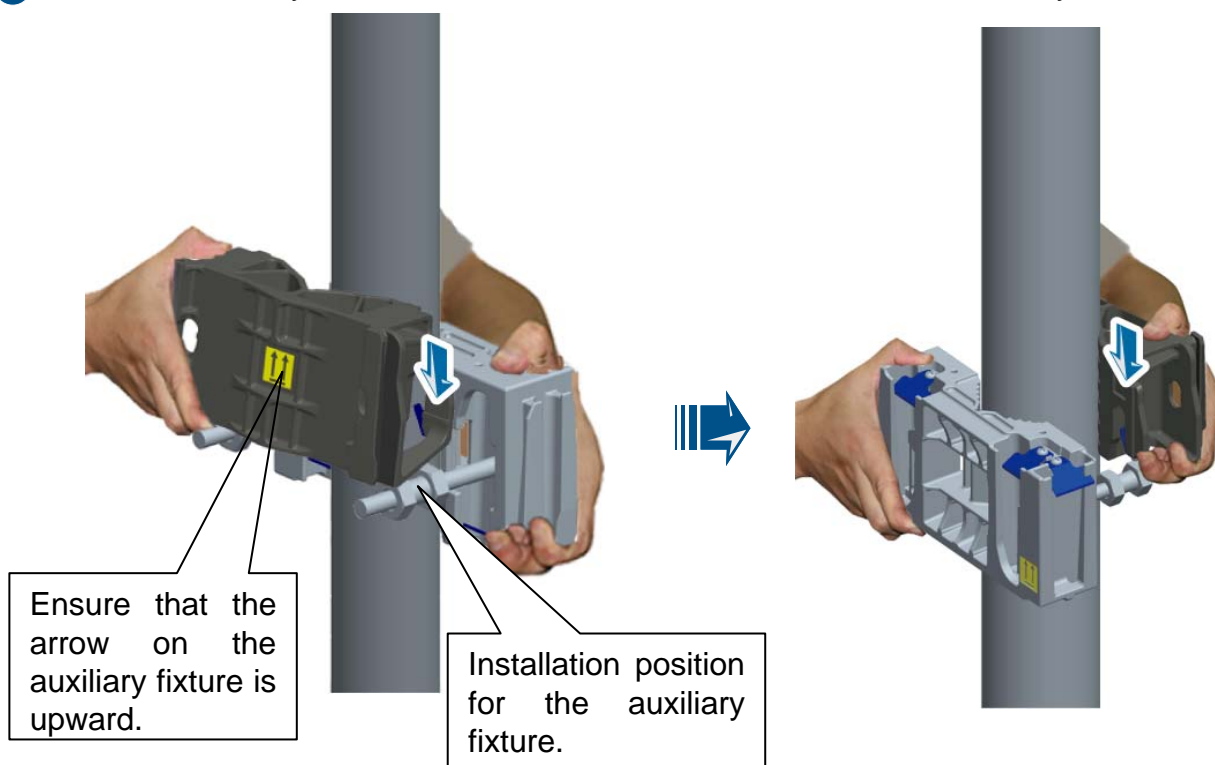
◎—🗝 窍门

You may fit one end of the auxiliary fixture on one dual-nut bolt assembly before installation. And then fit the other end on the other dual-nut bolt assembly during the installation.
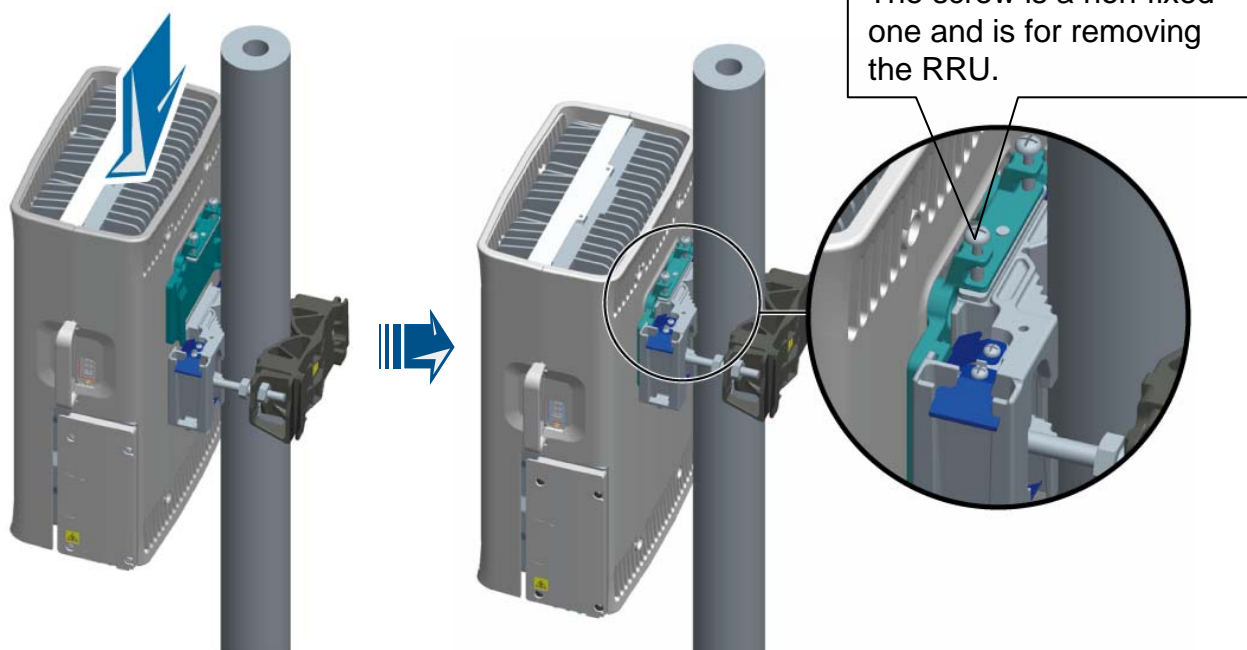
Installing the RRU on a Metal Pole

③ Use an adjustable wrench (21 mm) to tighten the nut. In this way, the main and auxiliary fixtures are securely mounted on the pole.

> ⚠ **CAUTION**
>
> When tightening the nuts, ensure that the two dual-nut bolt assemblies are tightened simultaneously. The fastening torque is 35 N• m to 40 N• m.

④ Install the RRU on the main fixture.

The screw is a non-fixed one and is for removing the RRU.

> ⚠ **CAUTION**
>
> The RF port at the bottom of the RRU does not have load bearing capacity.
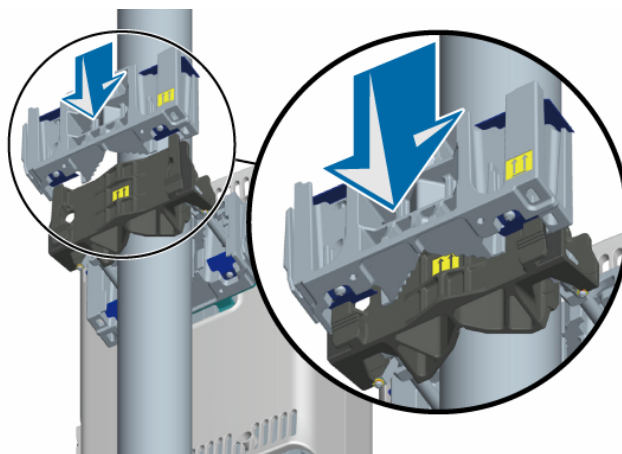> Do not place the RRU on the ground on its bottom during the installation.

Installing the RRU on a Metal Pole

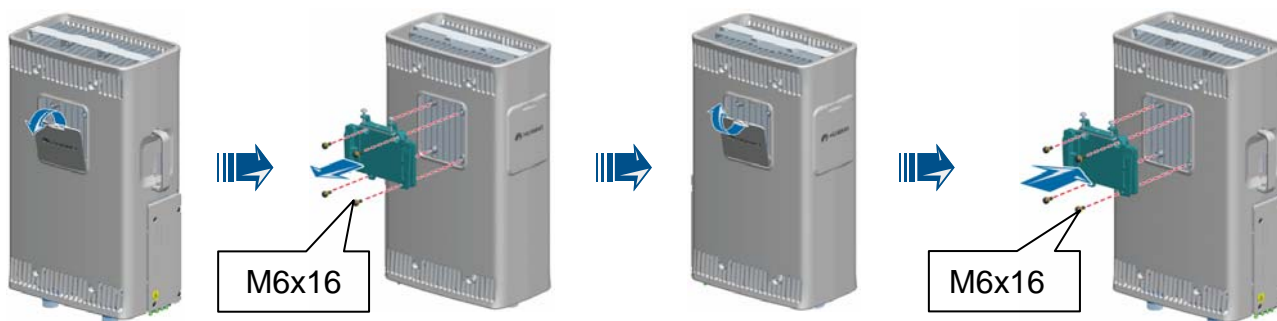## b Installing Two RRUs in Back-To-Back Mode

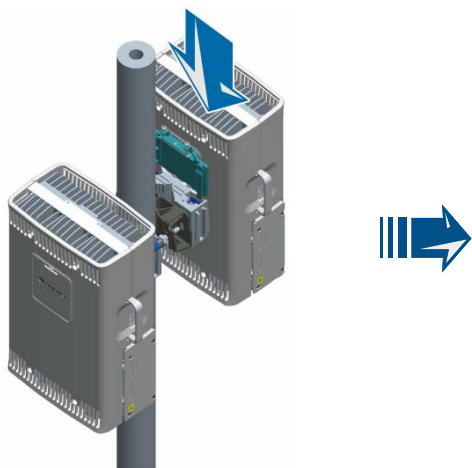**1** Install an RRU first. For details, see page 6 Installing a Single RRU in Ordinary Mode.

2 Install the main fixture of another RRU. Ensure that the main and auxiliary fixtures are perfectly fitted.

3 Reinstall the cover plate and attachment plate on the second RRU to interchange their positions.
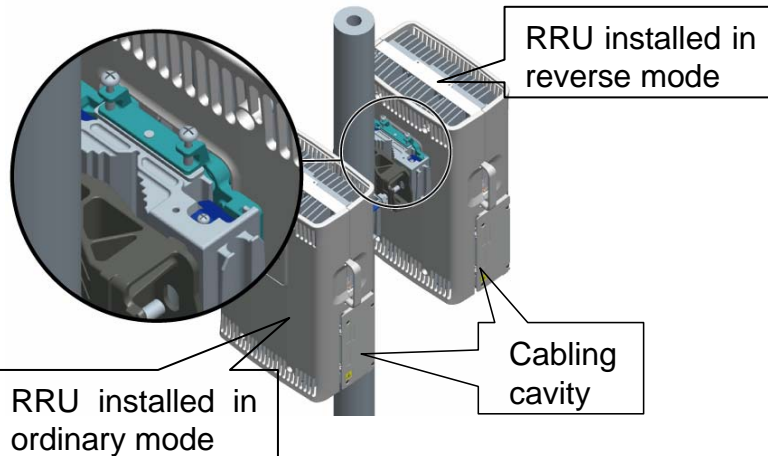
M6x16

M6x16
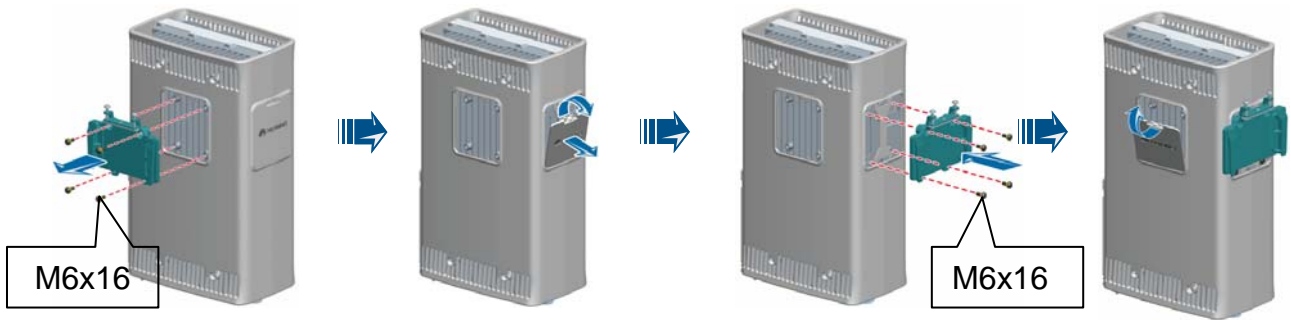
4 Install the second RRU on the main fixture.

NOTE

Ensure that the cabling cavities of the two RRUs face the same direction when installing the RRUs.

RRU installed in reverse mode
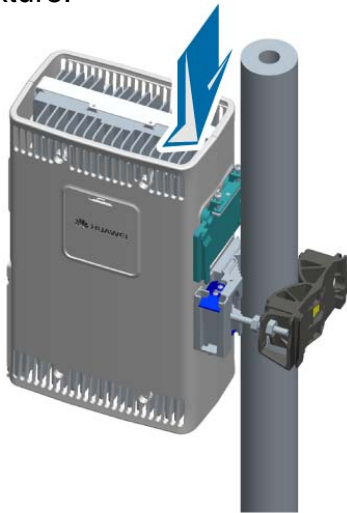
RRU installed in ordinary mode

Cabling cavity

Installing the RRU on a Metal Pole

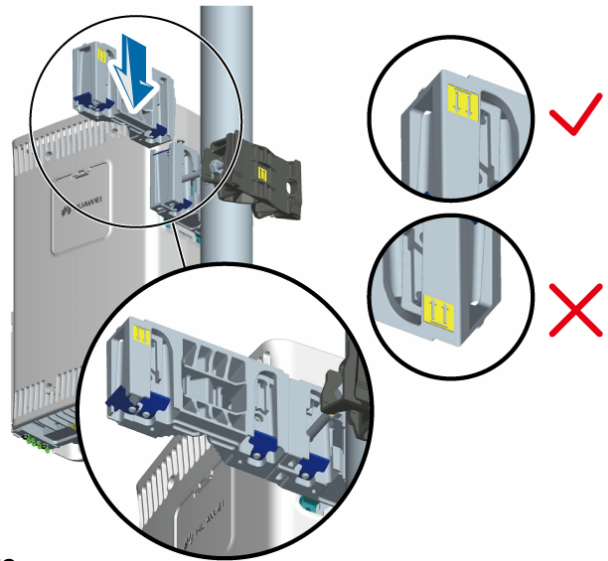## c   Installing Multiple RRUs in Centralized Mode

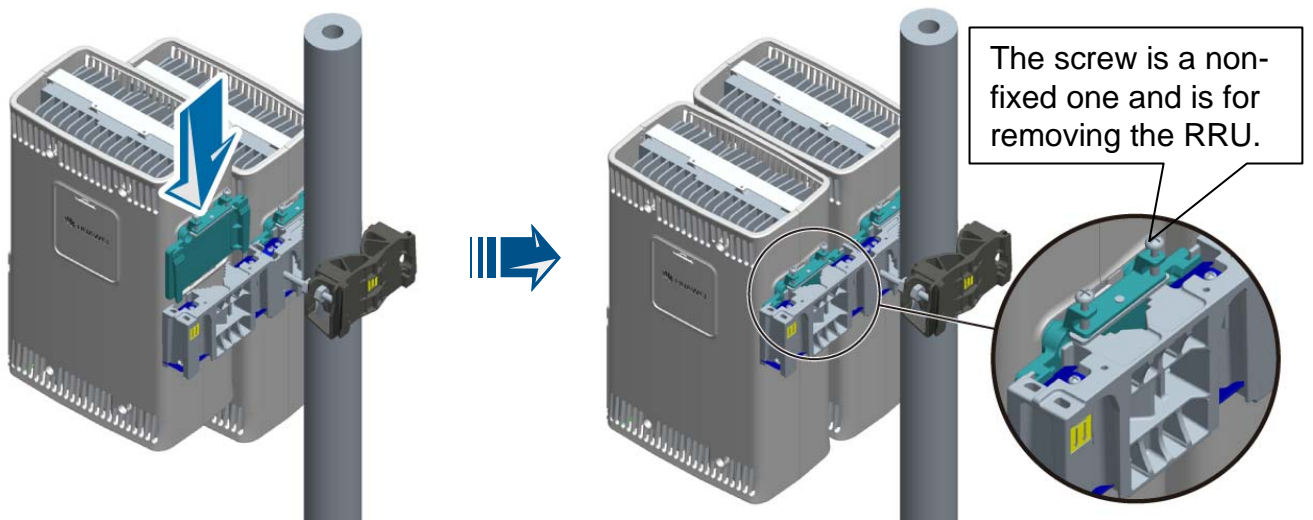① Reinstall the attachment plate on the back and cover plate on one side to interchange their positions.

M6x16

M6x16

② Install an RRU on a main fixture.
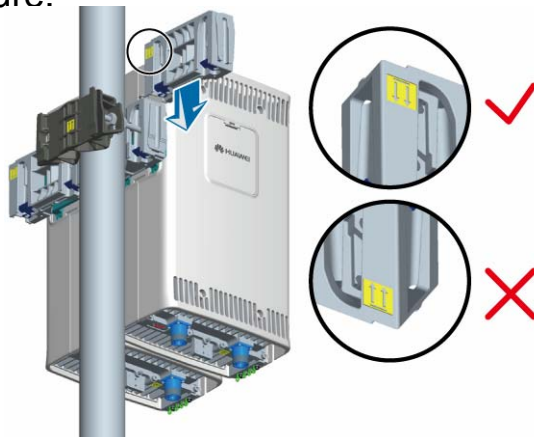
③ Install another main fixture.

④ Install another RRU on the second main fixture.

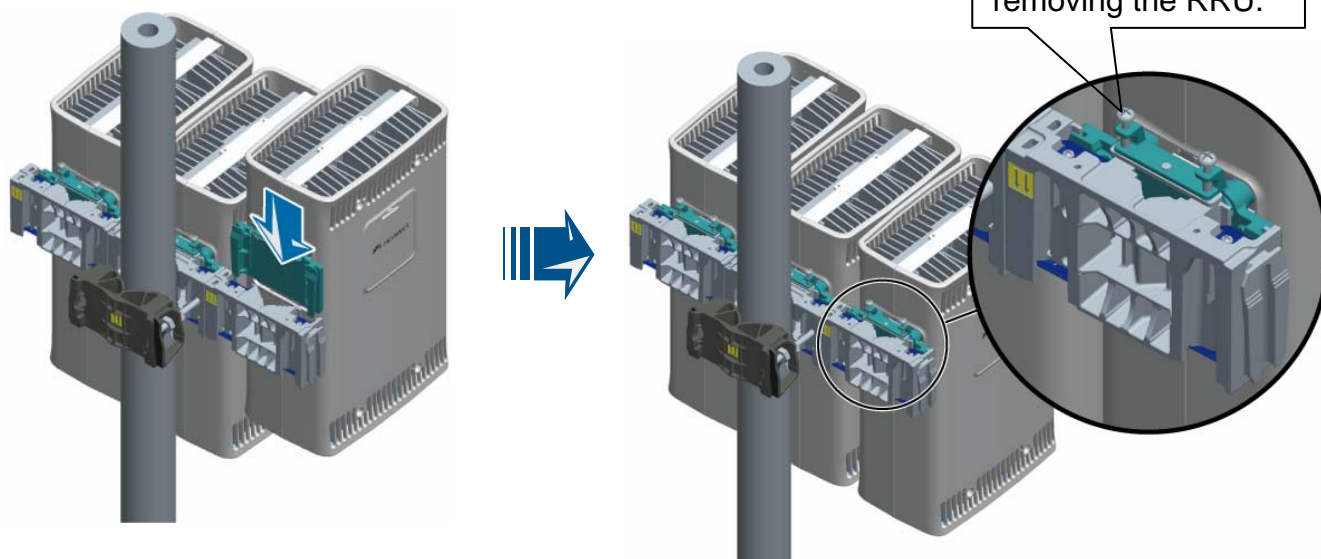The screw is a non-fixed one and is for removing the RRU.

Installing the RRU on a Metal Pole

Installing Multiple RRUs in Centralized Mode

❺ Install a third main fixture.

❻ Install a third RRU on the third main fixture.

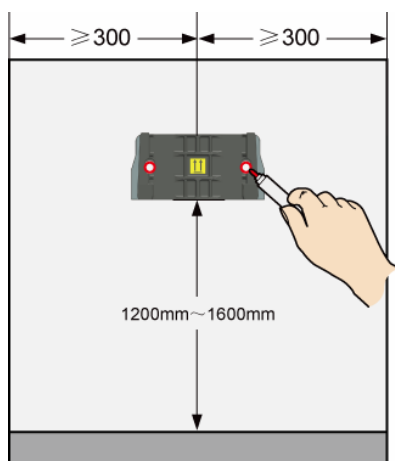The screw is a non-fixed one and is for removing the RRU.

📖 **NOTE**

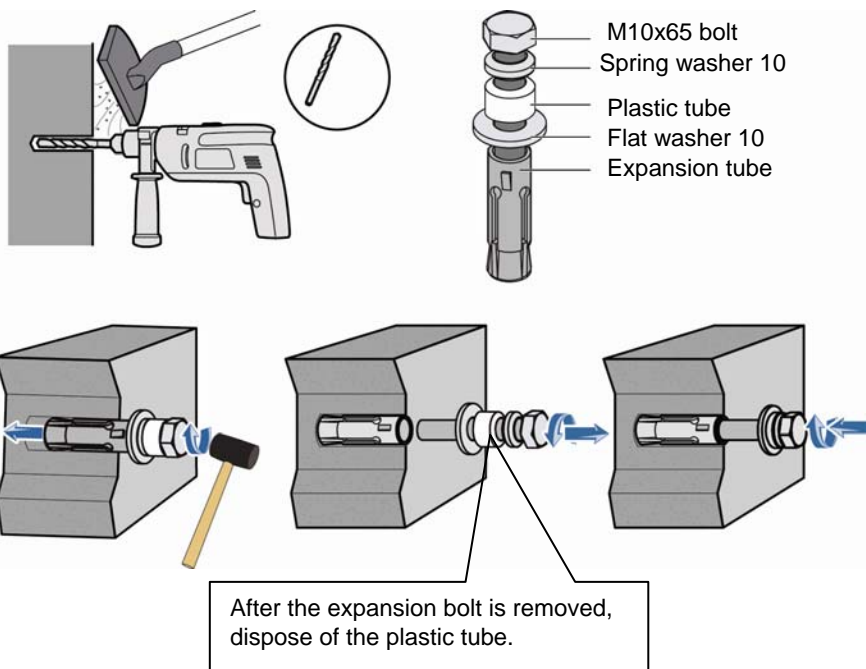The following figures show the installation positions for a fourth RRU.

Installing the RRU on a Wall

1 Place the auxiliary fixture on the wall at the installation position and then mark the anchor points by using a marking pen.

2 Drill holes at the anchor points and then install the expansion bolt assemblies.

- M10x65 bolt
- Spring washer 10
- Plastic tube
- Flat washer 10
- Expansion tube

After the expansion bolt is removed, dispose of the plastic tube.

📖 **NOTE**

It is recommended that the bottom of the auxiliary fixture be 1200 mm to 1600 mm above the ground.

⚠ **CAUTION**

Do not hammer the bolt entirely into the expansion tube, and leave 20 mm to 30 mm of the bolt outside the wall.

⚠ **CAUTION**

When RRUs are installed on a wall, the specifications of the wall are as follows:
1. When a single RRU is installed on the wall at the back, the wall must have the load capacity of 1.25 kN bolt stress;
2. When a single RRU is installed on the wall at the side, the wall must have the load capacity of 2.0 kN bolt stress.
3. When three RRUs are installed on the wall at the side, the wall must have the load capacity of 6.0 kN bolt stress.

3 Fit the auxiliary fixture on the expansion bolts downward, and then tighten the bolts by using a combination wrench (17 mm).
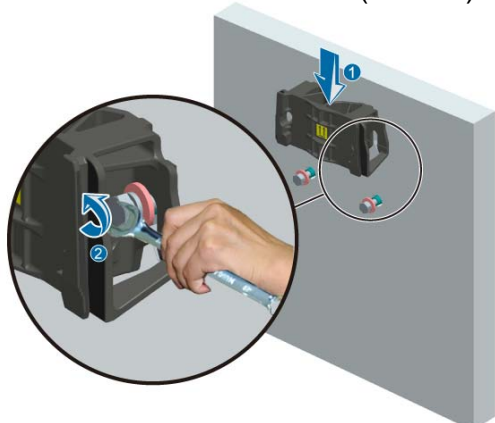
4 Install the main fixture.

5 Install the RRU.

Installing the RRU on a U-Steel

U-steel

C

A

D

B

Four installation modes

A

B

C

D
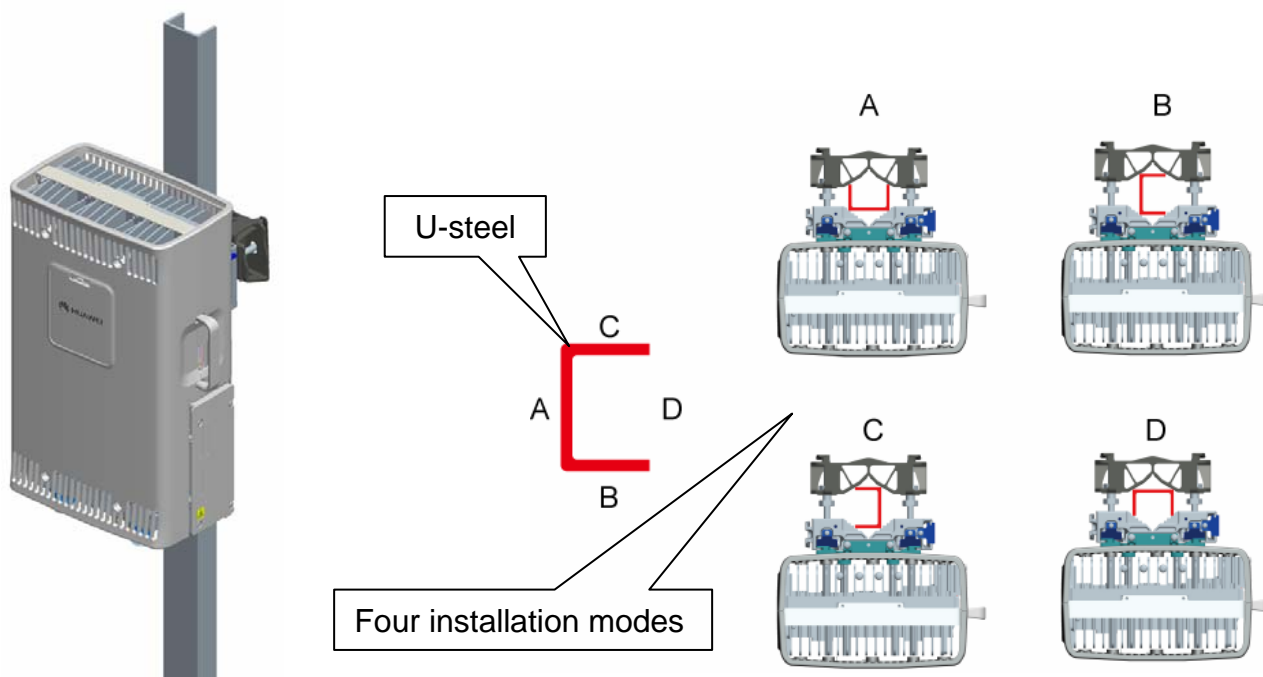
> 📖 **NOTE**
> The procedure for installing the RRU on a U-steel is the same as that for installing the RRU on a metal pole.

Installing the RRU on an Angle Steel
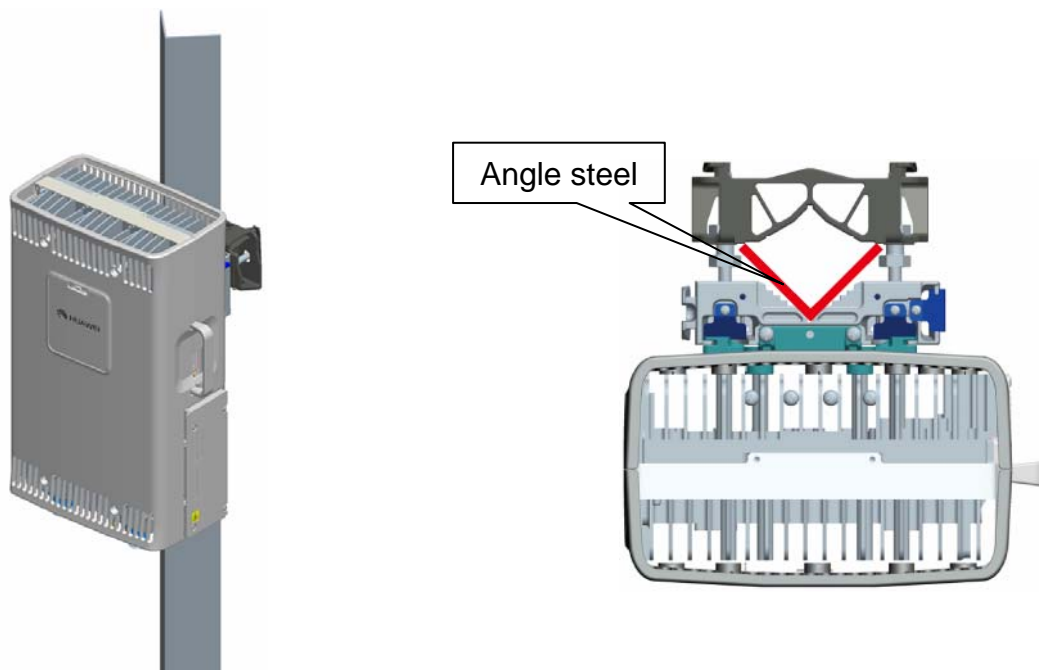
Angle steel

> 📖 **NOTE**
> The procedure for installing the RRU on an angle steel is the same as that for installing the RRU on a metal pole.

Installing the RRU Cables

a   Cable Connections of a Single RRU

① —— PGND cable
② —— Feeder jumper
③ —— Power cable
④ —— CPRI optical cable
⑤ —— Alarm cable
⑥ —— AISG multi-wire cable
⑦ —— Feeder
⑧ —— AISG extension cable
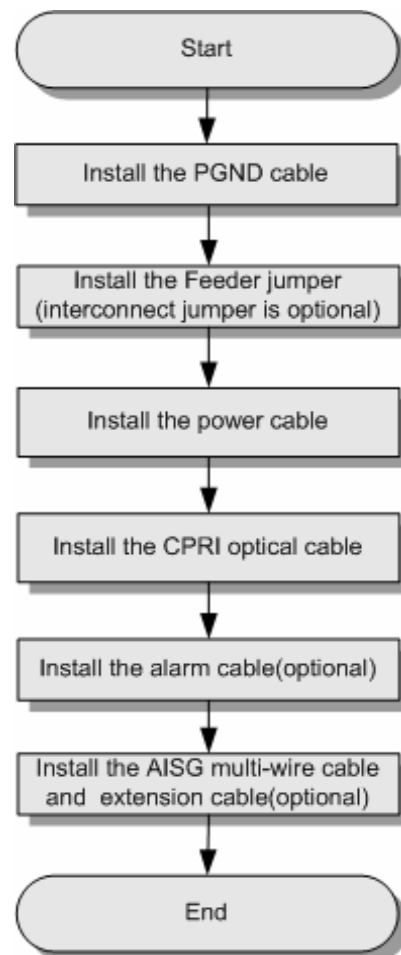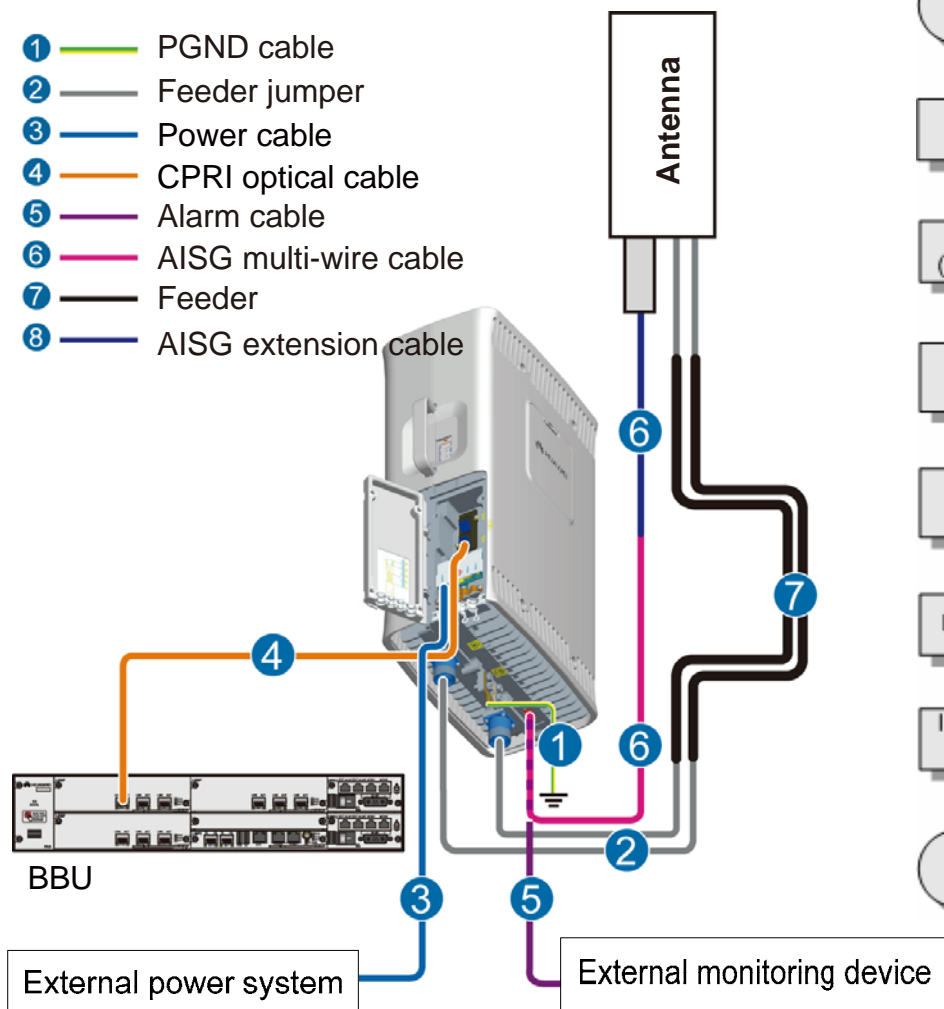
NOTE

The RET/MON port on the RRU is multi-functional, and can be installed with either AISG multi-wire cable or alarm cable. When the length of the AISG multi-wire cable is not enough, you can choose the optional AISG extension cable.

Installing the RRU Cables

b Cable Connections of Multiple RRUs

① —— PGND cable
② —— Feeder jumper
③ —— Power cable
④ —— CPRI optical cable
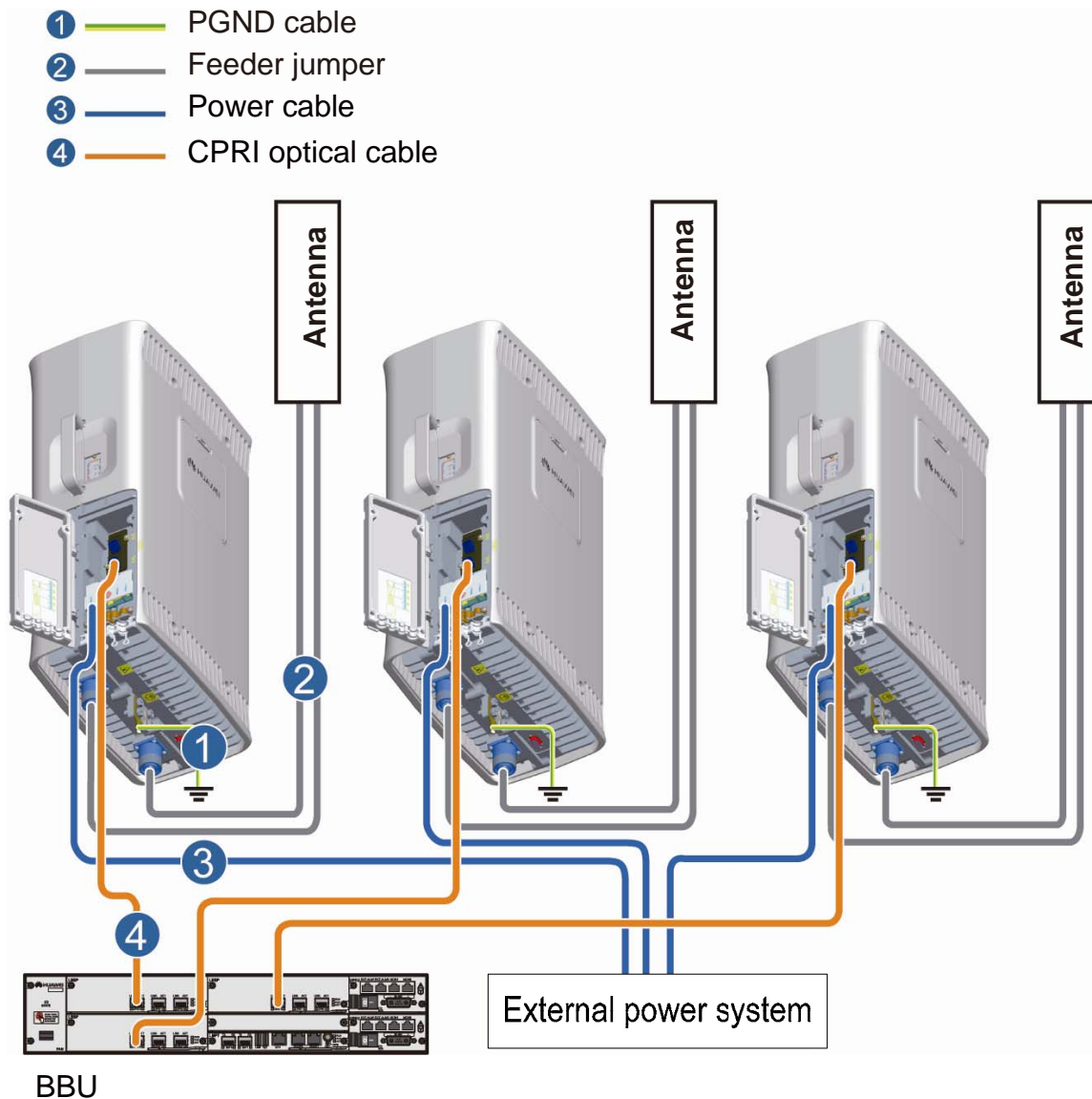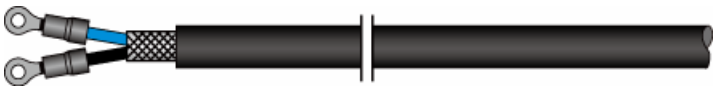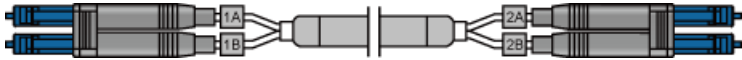
📖 **NOTE**

For detail information of the cable, see Cable List on Page 15 and 16.
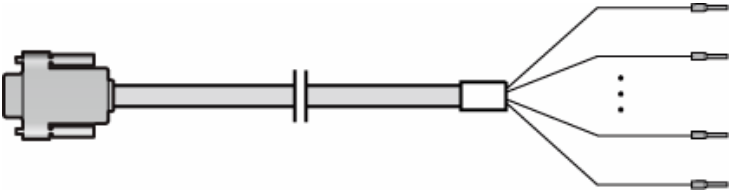
Installing the RRU Cables

c Cable List

Cable	Connector Type	Connected to…
PGND cable	OT terminal	Grounding bolt on the RRU
	OT terminal	Nearest grounding bar
Antenna jumper	DIN male connector	Ports labeled ANT_TX/RXA and ANT_RXB on the RRU
	DIN male connector	Feeder or antenna
Power cable	Two OT terminals	The blue OT terminal is connected to socket labeled NEG(-)0 in the RRU cabling cavity. And the black OT terminal is connected to socket labeled RTN(+)0.
	Bare wire	External power supply
CPRI optical cable	DLC connector	The connectors labeled 1A and 1B are connected to port labeled CPRI_W on the RRU
	DLC connector	The connectors labeled 2A and 2B are connected to port labeled CPRI0, CPRI1 or CPRI2 on the LBBP board of the BBU.

Installing the RRU Cables

c Cable List

Cable	Connector Type	Connected to…
AISG extension cable	Standard AISG male connector	Standard AISG female connector of the AISG multi-wire cable
	Standard AISG female connector	Standard AISG male connector of the RCU
AISG multi-wire cable	Waterproof DB9 connector	Port labeled RET/MON on the RRU
	Standard AISG female connector	Standard AISG male connector of the AISG extension cable or RCU
Alarm cable	DB9 male connector	Port labeled RET/MON at the bottom of the RRU
	Eight cord end terminals	External alarm devices

Installing the RRU Cables

d   Opening and Closing the Cover Plate of the RRU Cabling Cavity

• Open the cover plate of the RRU cabling cavity

• Close the cover plated of the RRU cabling cavity

14 kgf.cm

> ⚠ **CAUTION**
>
> 1. The screw on the cover plate is tightened until the fastening torque is 14 N.m.
>
> 2. The screws on the cover plate are tightened in the order shown in the preceding figure.

e   Cabling Cavity of the RRU

Cable trough for the optical cable

Cabling cavity

Cover plate of The cabling cavity

Cable trough for the Power cable

Waterproof filler
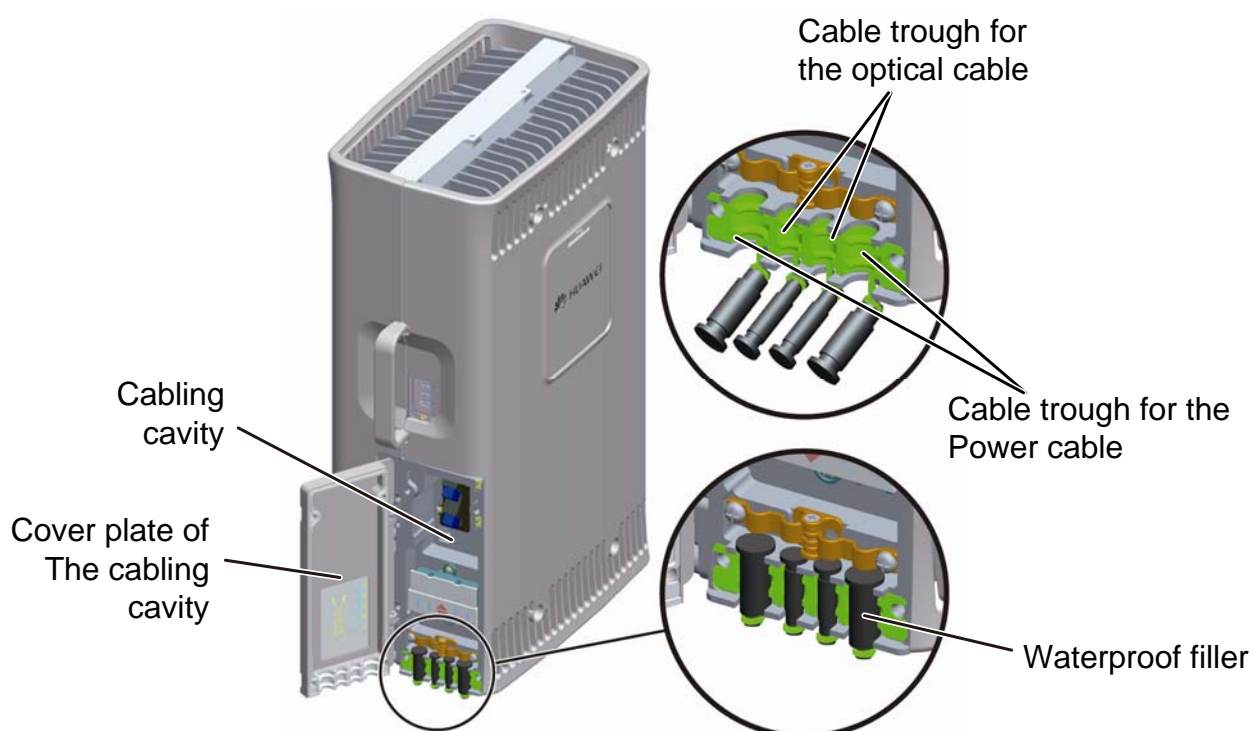
f Cable Connections of the RRU

Shielding layer of the power cable

Strap

First wrap the joint with the waterproof tape, and then wrap the joint with the PVC insulating tape.

Grounding bolt

OT terminal

PGND cable

1 PGND cable

2 Feeder jumper

3 Power cable

4 CPRI optical cable

5 AISG extension cable
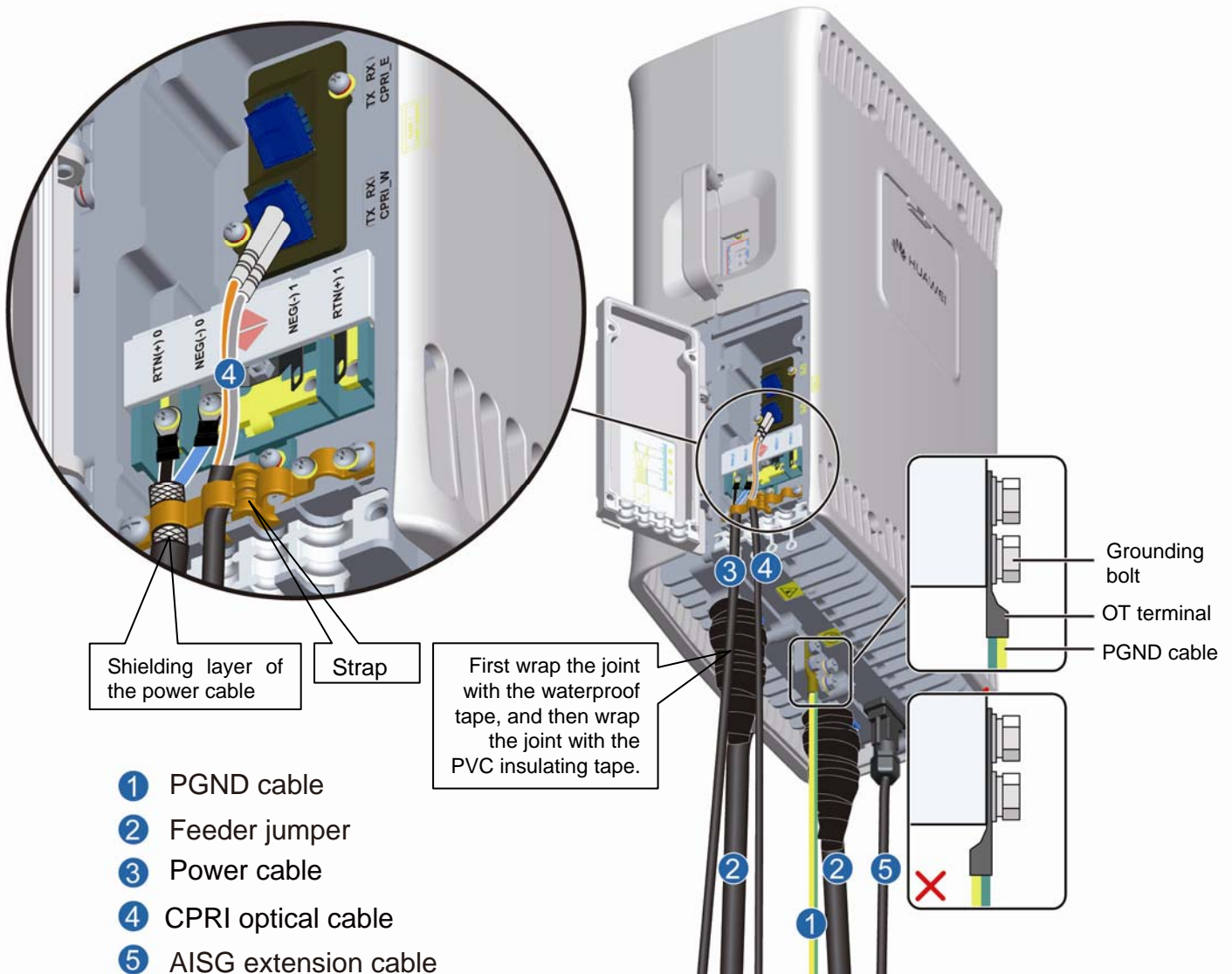
⚠ **CAUTION**

1. Press the strap on the exposed shielding layer of the power cable tightly. Ensure that the lower edge of the exposed shielding layer does not exceed the position shown in the figure.
2. The shielding layer of the power cable at the end connecting to the power

📖 **NOTE**

The tape is wrapped spirally upwards, downwards, and then upwards again in three layers. For every two adjacent tape layers, the tape on the upper layer overlaps about half the width of the tape on the lower layer.

For details on how to add the OT terminals to the power cable, see pages 26 to 27
Adding OT Terminals to the Power Cable of the RRU.

Installing the RRU Cables

g **RRU+APM30/APM30H**

Shielding layer

RRU Power cable

PGND cable
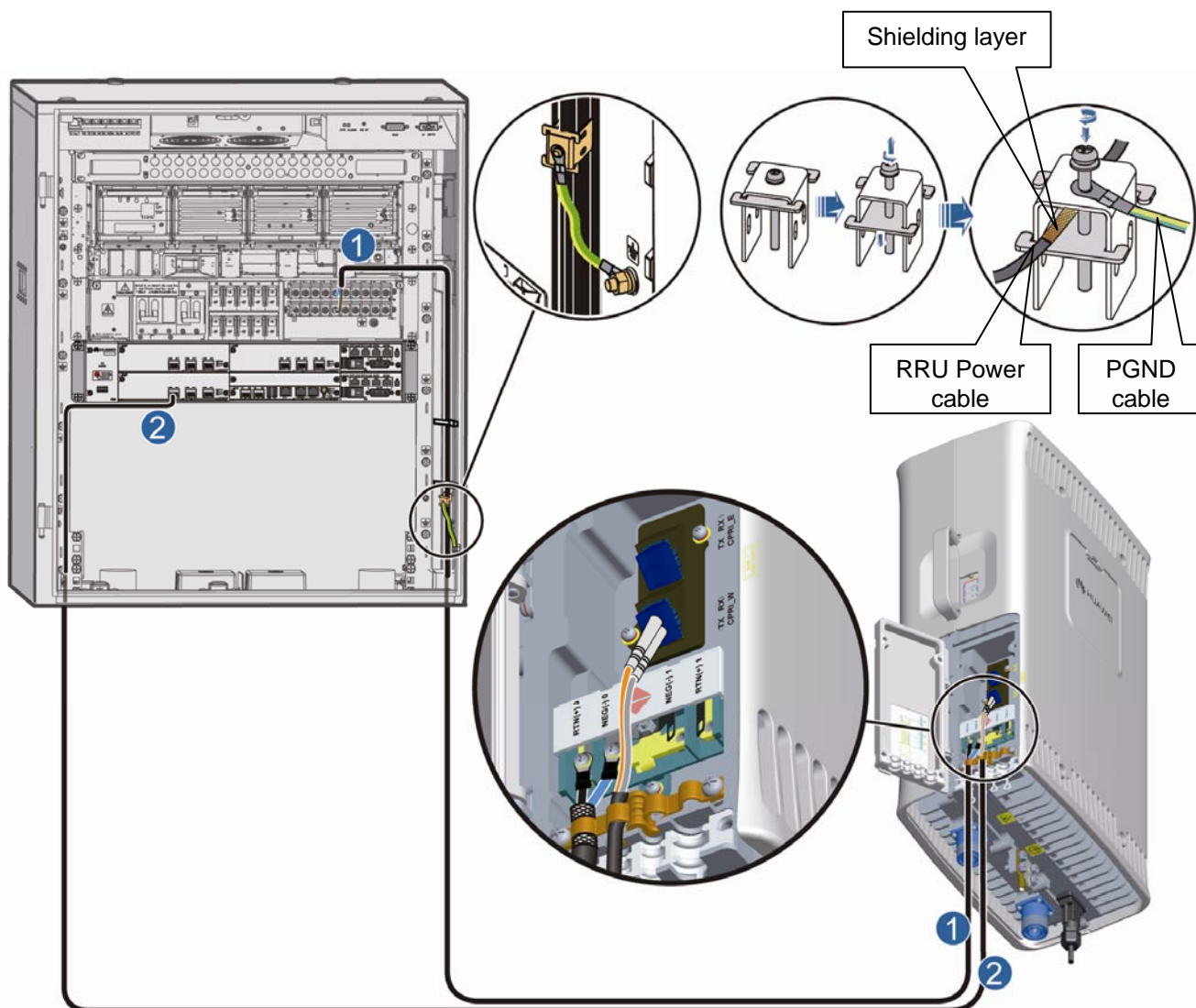
① RRU power cable

② CPRI optical cable

📖 **NOTE**

1. The RRU power cable is connected to one group of the LOAD4 to LOAD9 terminals of the PDU.
2. Strip the jacket off the RRU power cable for a small part, press the exposed shielding layer on the strap, and then connect the PGND cable on the strap to the nearest grounding bolt on the side in the APM30/APM30H.

Installing the RRU Cables

h RRU+APM30（+24V）

Shielding layer

RRU Power cable
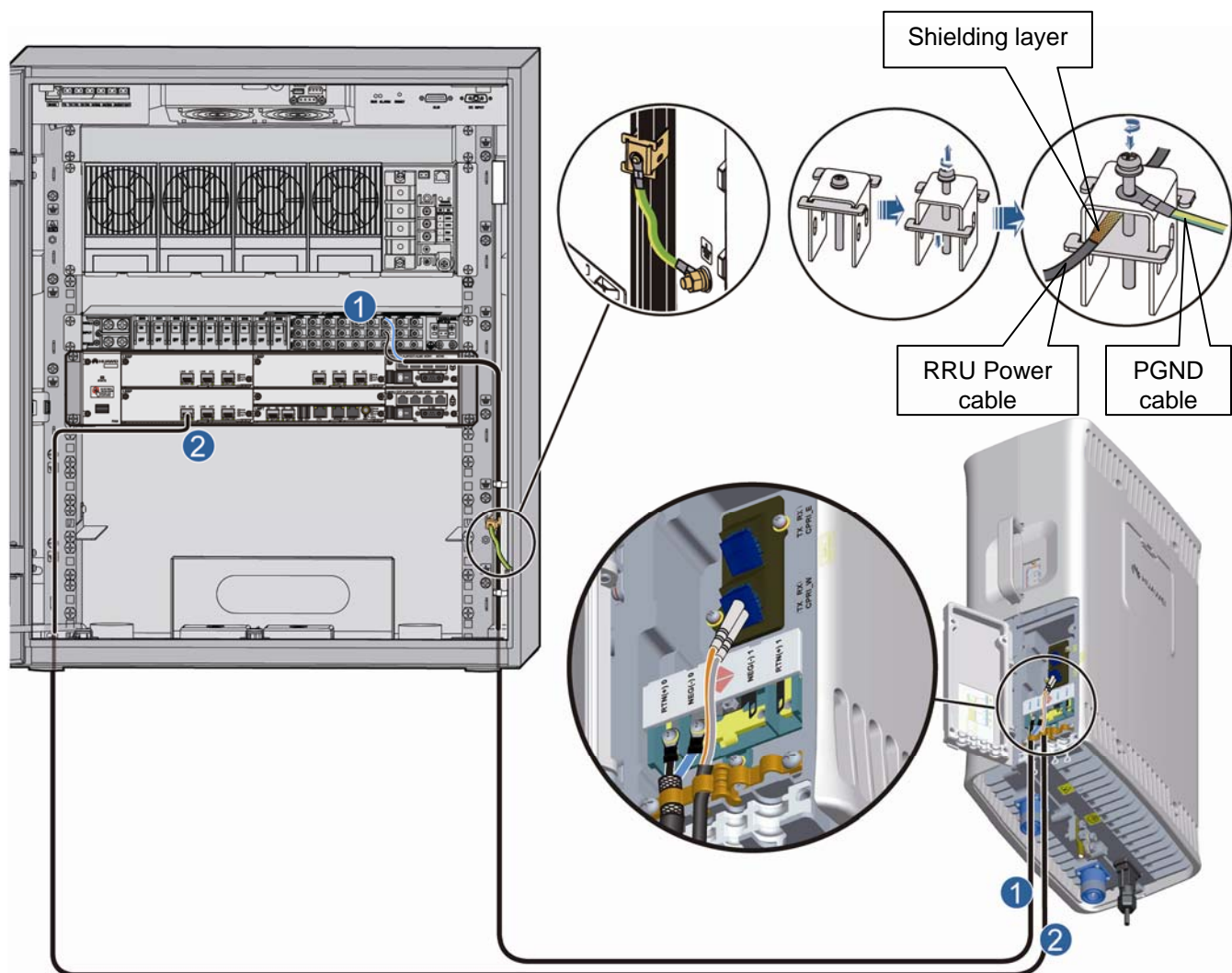
PGND cable

① RRU power cable

② CPRI optical cable

> 📖 **NOTE**
>
> 1. Strip the jacket off the RRU power cable for a small part, press the exposed shielding layer on the strap, and then connect the PGND cable on the strap to the nearest grounding bolt on the side in the APM30.
>
> 2. The RRU power cable is connected to one group of the LOAD0 to LOAD5 terminals of the DCDU-03C.

Installing the RRU Cables

i RRU+TMC

LOAD0

Shielding layer of the RRU power cable
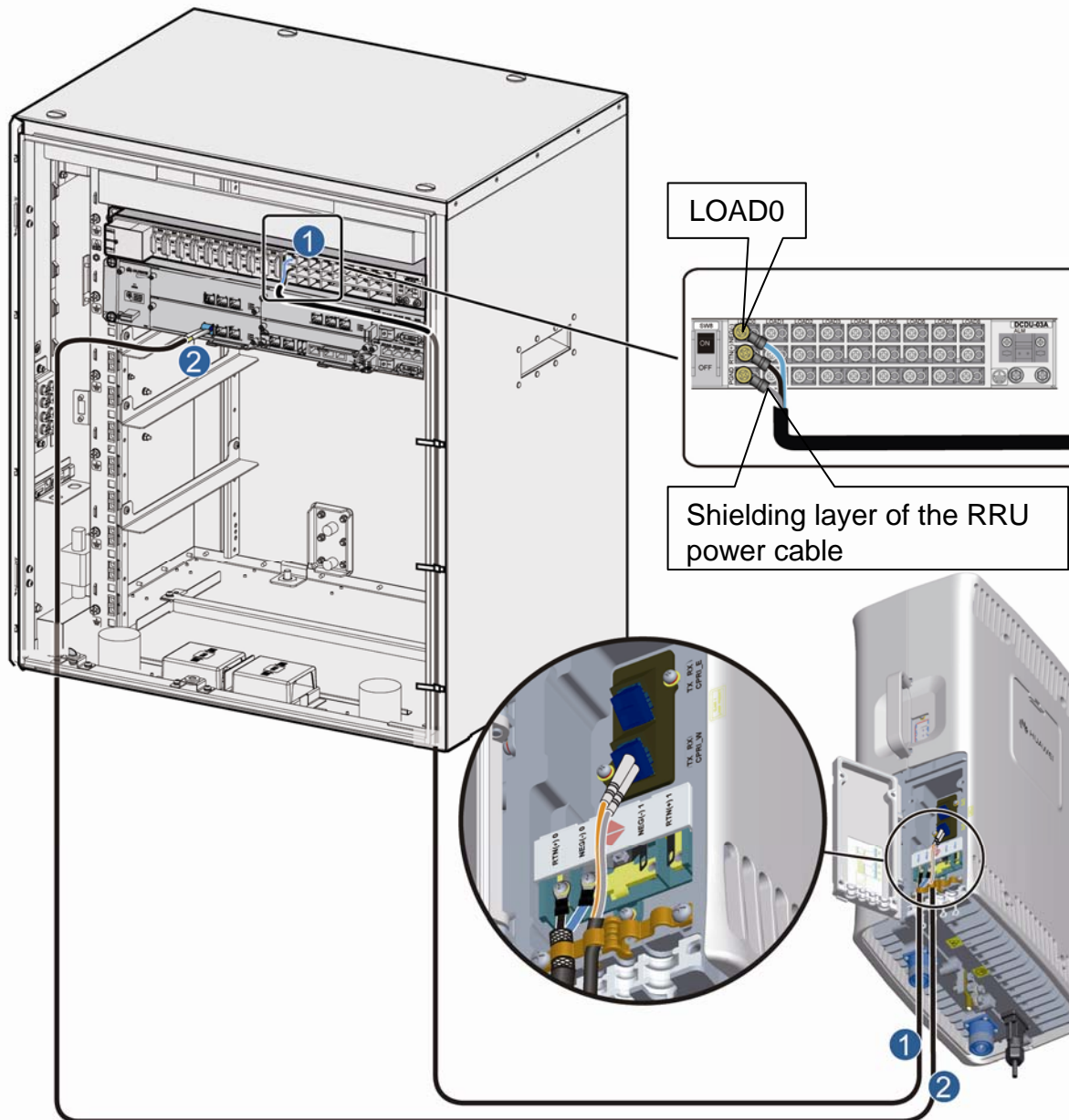
① RRU power cable

② CPRI optical cable

📖 **NOTE**

1. When connecting the RRU power cable to the DCDU-03C, you must add an OT terminal to the shielding layer. Then, fix the OT terminal to the corresponding PGND terminal of the DCDU-03C. For details on how to add an OT terminal, see pages 26 to 27 Adding OT Terminals to the Power Cable of the RRU.
2. The RRU power cable is connected to one group of the LOAD0 to LOAD5 terminals of the DCDU-03C.

RRU Hardware Installation Checklist

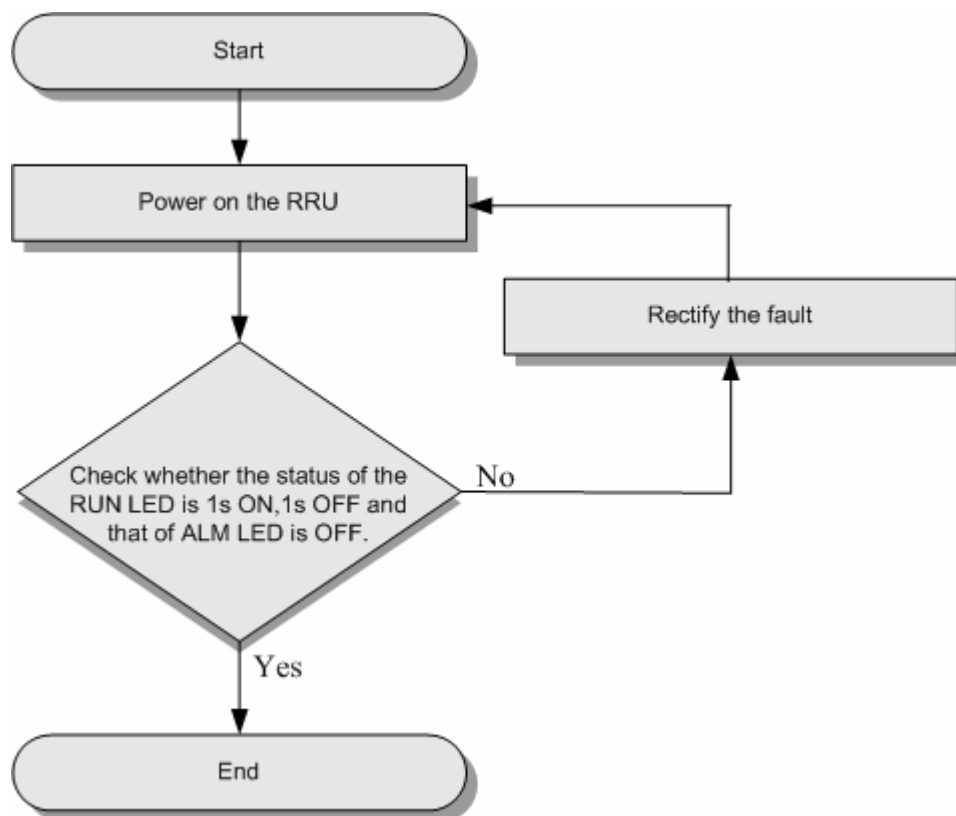| No.	Items
1	The position for each equipment conforms to the engineering design and meets the space requirement. Sufficient space is reserved for equipment maintenance.
2	The RRU is properly installed.
3	The cover plate is fastened to the RRU cabling cavity.
4	Waterproof check: The empty cable troughs in the cabling cavity of the RRU are waterproofed. The cover plate is tightly buckled on the cabling cavity of the RRU. The RF ports that are not connected with RF cables are capped and waterproofed.
5	No joint lies in the middle of the power cable or the PGND cable.
6	The lugs at both ends of the power cable or the PGND cable are securely soldered or crimped.
7	The power cable and PGND cable are not short-circuited or reversely connected and are not damaged or broken.
8	The working grounding and protection grounding of the base station and the lightning protection grounding of the building share one group of grounding conductors.
9	The connectors of signal cables are intact.
10	All labels, tags, and nameplates are correct, legible, and complete. All the labels at both ends of the cables, jumpers and feeders are legible.
11	Set the power switch to OFF and check the input voltage (-48 V DC power supply: -36 V DC to -57 V DC. AC power supply: 150 V AC to 300 V AC). Set the power switch to ON and check the RUN LED (the RUN LED is ON for 1s and OFF for 1s).

Powering On the RRU

```
        ┌─────────────────┐
        │      Start      │
        └─────────────────┘
                 │
                 ▼
     ┌──────────────────────┐          ┌──────────────────────┐
     │   Power on the RRU    │◄────────┤   Rectify the fault   │
     └──────────────────────┘          └──────────────────────┘
                 │                                 ▲
                 ▼                                 │
          ╱────────────╲                           │
        ╱  Check whether  ╲        No               │
       ╱ the status of the ╲──────────────────────┘
       ╲ RUN LED is 1s ON,1s╱
        ╲OFF and that of ALM╱
         ╲ LED is OFF.    ╱
          ╲────────────╱
                 │ Yes
                 ▼
        ┌─────────────────┐
        │      End        │
        └─────────────────┘
```

⚠ **CAUTION**

The RRU should be powered on in 24 hours after being unpacked. The power off duration of the RRU cannot exceed 24 hours during maintenance.

Reference
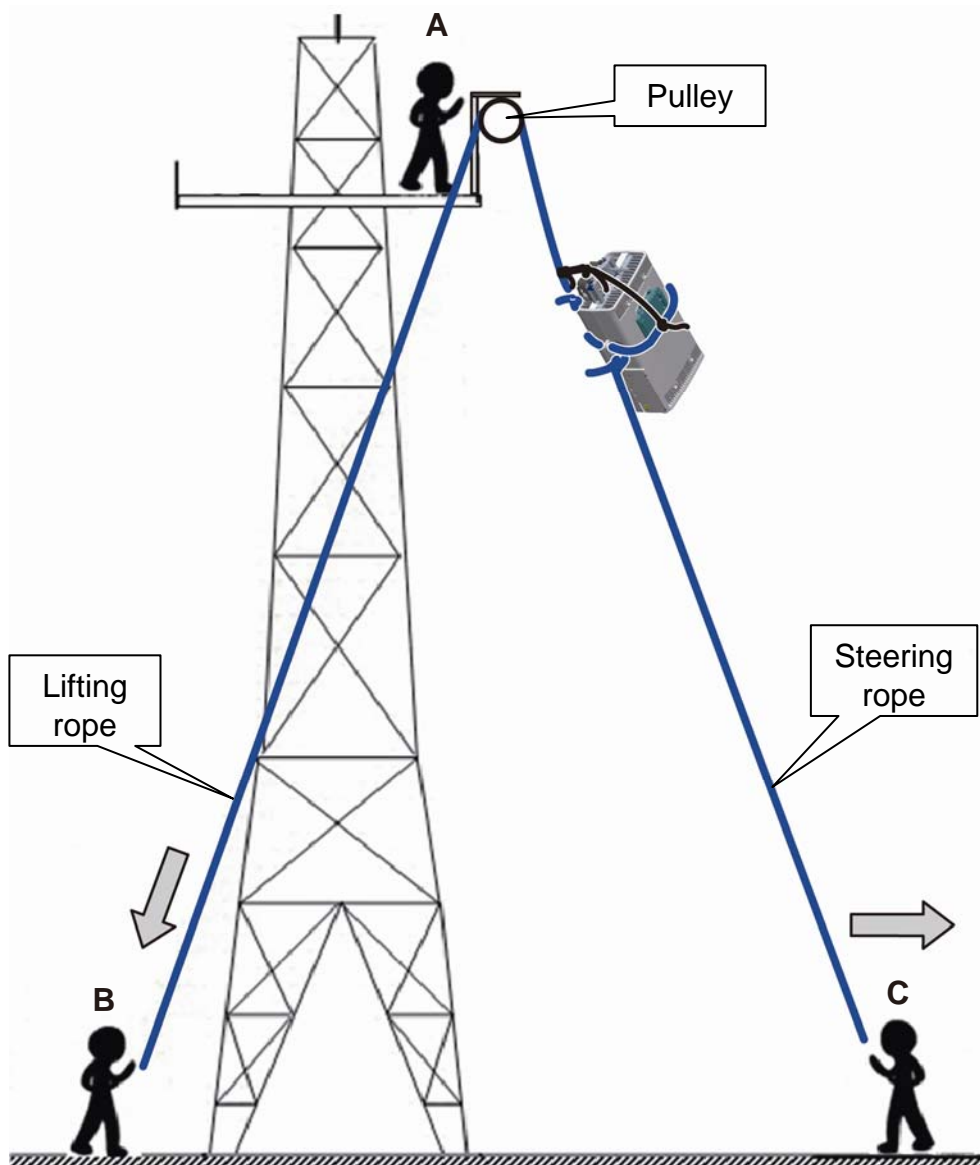
Lift the RRU and installation components to the tower.

1 Tie one end of a rope to the installation components and the other end to the rope for binding the RRU.
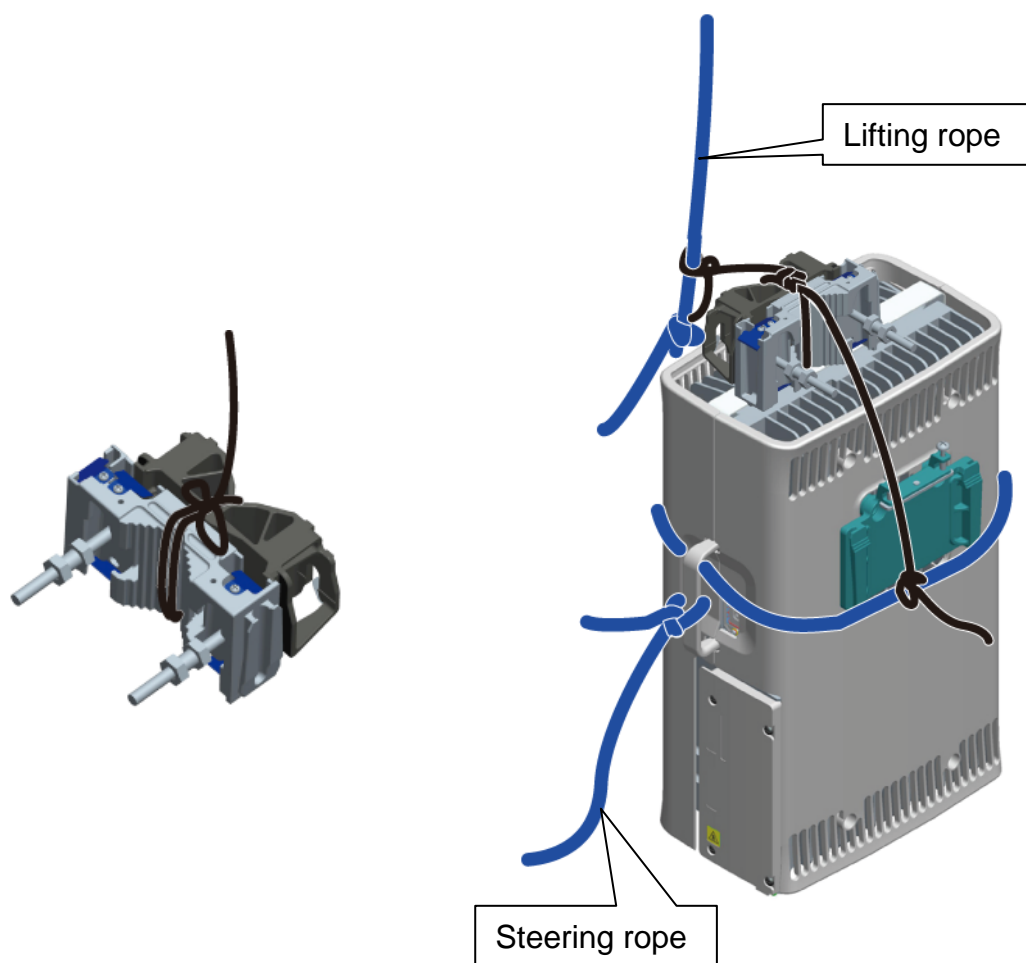
Lifting rope

Steering rope

Reference

Lift the RRU and installation components to the tower.

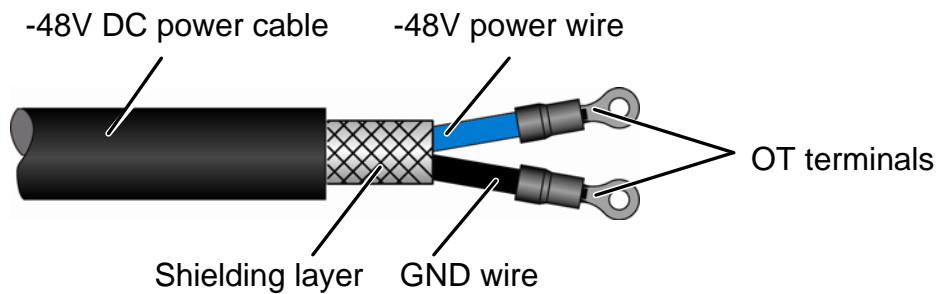❷ Lift the RRU and installation components to the tower.

📖 **NOTE**

1. Installer A climbs onto the tower. Then, fixes the pulley to the support of the tower platform and leads the lifting rope through the pulley.
2. Installer C uses a lifting rope to bind the RRU and installation components as shown in the preceding figure and then ties a knot in the steering rope at the handle of the RRU.
3. Installer B pulls the lifting rope downwards, and at the same time, installer C pulls the steering rope away from the tower to prevent the RRU and installation components from colliding with the tower.
4. Installers A holds the RRU and installation components and unties the ropes
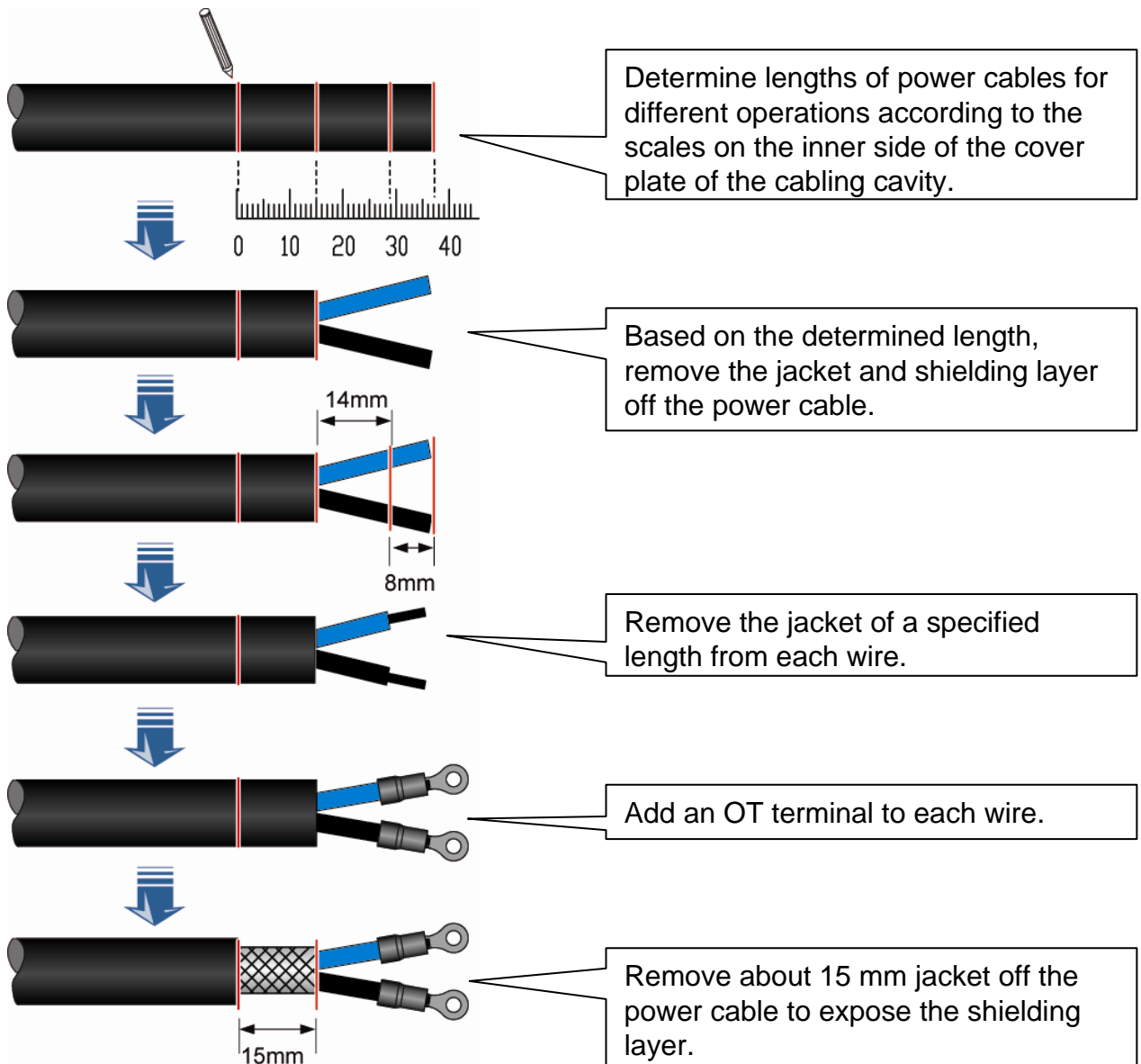
Reference

b   Adding OT Terminals to the Power Cable of the RRU

❶ OT terminals on the power cable:

-48V DC power cable   -48V power wire

OT terminals

Shielding layer   GND wire

To assemble the OT terminals, perform the following steps:

Determine lengths of power cables for different operations according to the scales on the inner side of the cover plate of the cabling cavity.

0   10   20   30   40

Based on the determined length, remove the jacket and shielding layer off the power cable.

14mm

8mm

Remove the jacket of a specified length from each wire.

Add an OT terminal to each wire.

15mm

Remove about 15 mm jacket off the power cable to expose the shielding layer.

Reference

b   Adding OT Terminals to the Power Cable of the RRU

② Assemble an OT terminal on the power cable at the end connecting to the power supply device.
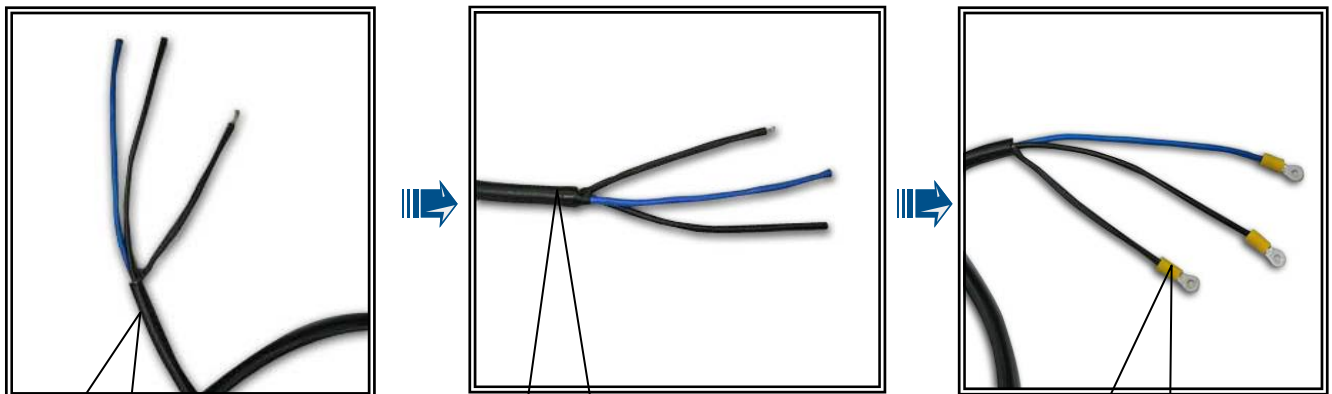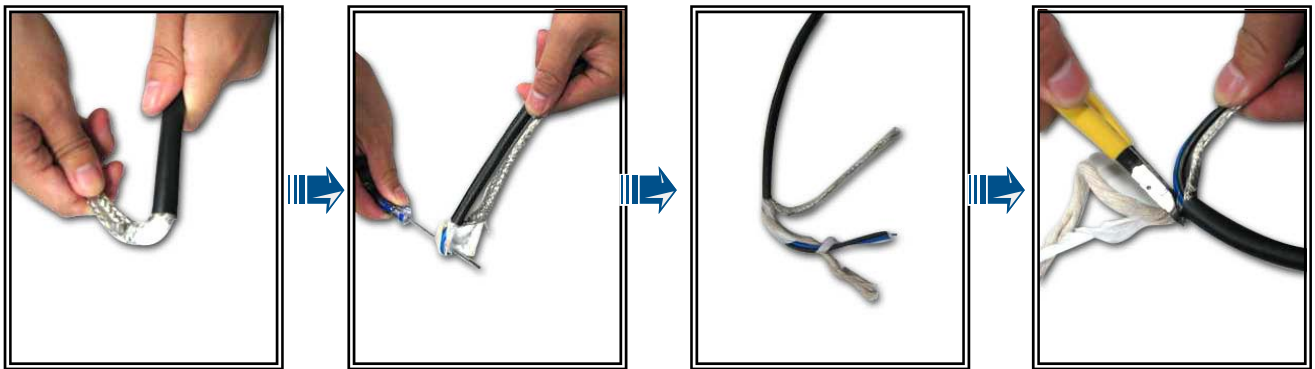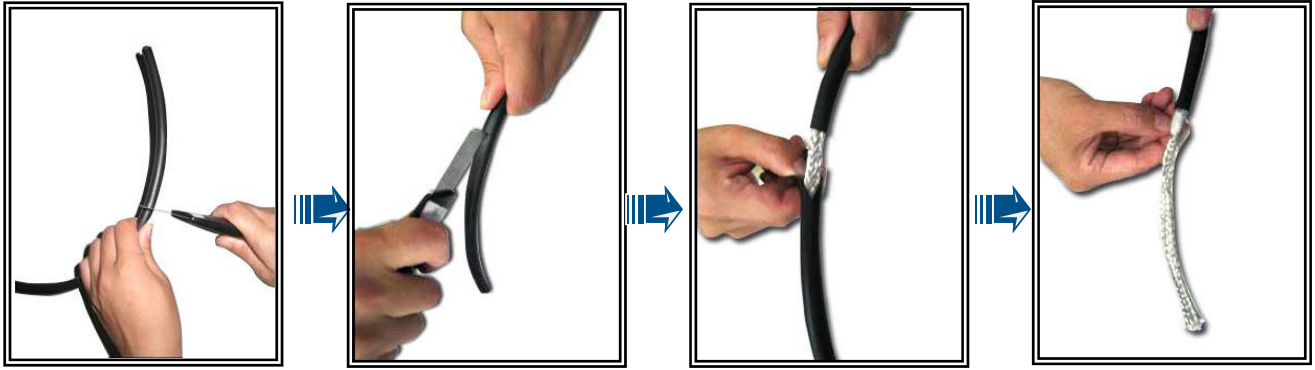
Heat-shrinkable tube

PVC insulating tape

OT terminal on the shielding layer

Reference

c   Pin Assignment of the RRU AISG Extension cable

Pin of the AISG male connector	Pin of the AISG female connector	Wire Color	Wire Type	Instruction
X1.1	X2.1	White/blue	Twisted pair	+12V
		Blue		
X1.7	X2.7	White/orange	Twisted pair	DC Return A
		Orange		
X1.3	X2.3	White/green	Twisted pair	RS485 B
X1.5	X2.5	Green		RS485 A
X1.6	X2.6	White/brown	Twisted pair	+24V
		Brown		

d   Pin Assignment for the Wires of the RRU Alarm Cable

DB9 waterproof Connector	Pin Name	Wire Color	Wire Type	Cord End Terminal	Label
X1.2	SWITCH_INPUT0+	White/blue	Twisted pair	X2	SWITCH_INPUT0+
X1.4	GND	Blue		X3	GND
X1.7	SWITCH_INPUT1+	White/orange	Twisted pair	X4	SWITCH_INPUT1+
X1.4	GND	Orange		X5	GND
X1.6	RS485_TX-	White/green	Twisted pair	X6	APM RX-
X1.8	RS485_TX+	Green		X7	APM RX+
X1.3	RS485_RX-	White/brown	Twisted pair	X8	APM TX-
X1.5	RS485_RX+	Brown		X9	APM TX+