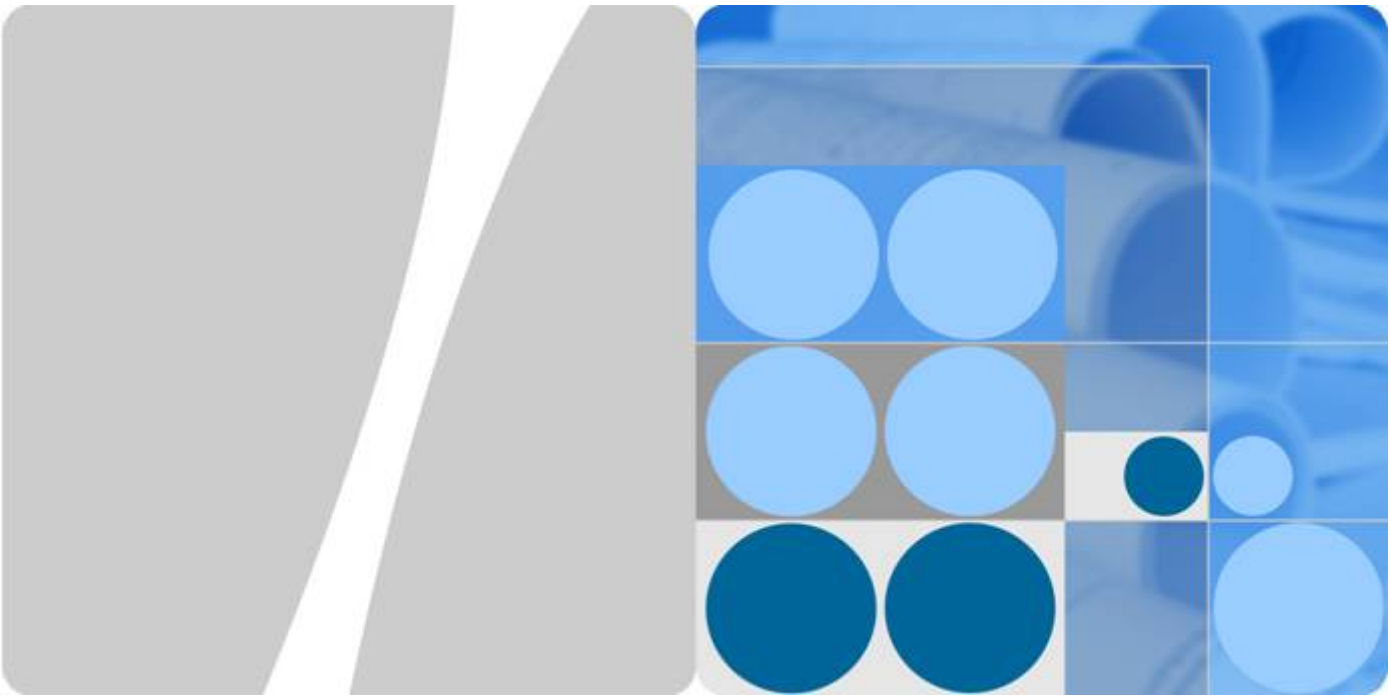

AAU3940

Installation Guide

Issue 01

Date 2015-01-15

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About This Document

Overview

This document describes procedures for installing an active antenna unit 3940 (AAU3940, which is shortened to AAU in this document) and its cables. It also provides the checklists for hardware installation.

Product Version

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

Product Name	Solution Version	Product Version
DBS3900	● SRAN9.0 and later ● RAN16.0 and later ● eRAN7.0 and later	V100R009C00 and later

Intended Audience

- System engineers
- Installation personnel
- Maintenance engineers

Organization

1 Changes in AAU3940 Installation Guide

This section describes changes in *AAU3940 Installation Guide*.

2 Overview

Before installing an AAU, you must be familiar with its installation options and installation clearance requirements.

3 Installation Preparations

This chapter lists the tools and instruments that must be obtained before the installation. It also specifies the skills that the onsite personnel must have.

4 Unpacking Check

Unpack and check the delivered equipment to ensure that all materials are included and intact.

5 Installation Process

This chapter describes the process of installing an AAU.

6 (Optional) Installing an ODM

This section describes the procedure and precautions for installing an ODM.

7 Preprocessing the AAU Maintenance Cavity

Before installing an AAU, take power terminals out of its maintenance cavity and install optical modules.

8 Lifting an AAU

Before installing an AAU on a pole, you need to lift the AAU to the installation position on the pole.

9 Installing an AAU

This chapter describes the procedures for installing an AAU in different scenarios.

10 Installing AAU Cables

This section describes the procedure and precautions for installing AAU cables.

11 Closing a Maintenance Cavity

After all installation procedures are complete, you need to close the AAU maintenance cavity.

12 (Optional) Installing a Cord Cover for an ODM

This section describes a procedure for installing a cord cover for an ODM after all cables are installed.

13 Adjusting the Horizontal Azimuth of an Antenna

This section describes the procedure for adjusting the horizontal azimuth of an antenna based on coverage requirements after all cables are installed.

14 Installation Checklist

This section describes the checklist for AAU hardware installation.

15 Powering on an AAU

This section describes the procedure and precautions for powering on an AAU.

16 Appendix

This chapter describes auxiliary operations during an AAU installation process.

Conventions

Symbol Conventions

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

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	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.
	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**.

Convention	Description
Italic	Command arguments are in *italics*.
[ ]	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 AAU3940 Installation Guide

This section describes changes in *AAU3940 Installation Guide*.

01 (2015-01-15)

This is the first commercial release.

Compared with issue Draft A (2014-10-30), no information is added to or deleted from this issue.

Compared with issue Draft A (2014-10-30), this issue includes the following changes.

Topic	Change Description
Entire document	Some figure updates caused by the structure modification of the AAU.

Draft A (2014-10-30)

This is a draft.

2 Overview

About This Chapter

Before installing an AAU, you must be familiar with its installation options and installation clearance requirements.

2.1 Installation Scenario
An AAU can be installed independently or can be installed together with an ODM04A (ODM for short) on a pole, a wall, or the top of a pole.

2.2 Installation Clearance Requirements
This section describes installation clearance requirements in different scenarios.

2.3 AAU Mounting Kits
This section describes mounting kits for installing AAUs on a pole, a wall, and the top of a pole.

2.4 ODM Description
This section describes functions and specifications of an ODM.

2.5 Surge Protection Requirements
When an AAU is installed on a pole or the top of a pole, the AAU must meet the surge protection requirements. Otherwise, surge protection measures must be taken.

2.1 Installation Scenario

An AAU can be installed independently or can be installed together with an ODM04A (ODM for short) on a pole, a wall, or the top of a pole.

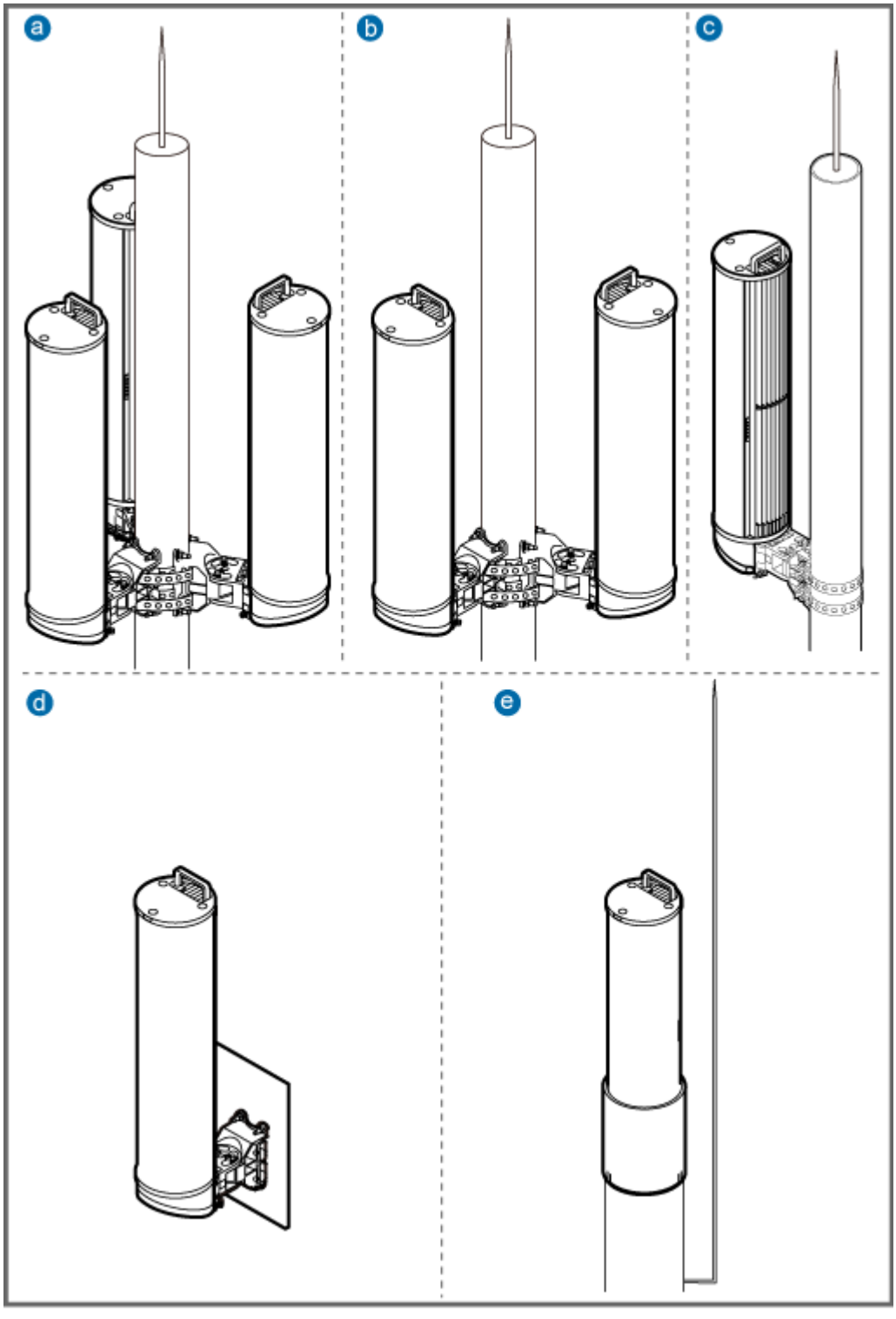
Installation Scenario Description

NOTE

An AAU has been camouflaged and the second camouflaging is not allowed in principle. If the second camouflaging must be performed, you need to contact Huawei technical engineers for assessment.

The following figure shows scenarios in which AAUs are installed independently.

Figure 2-1 Scenario in which AAUs are installed independently



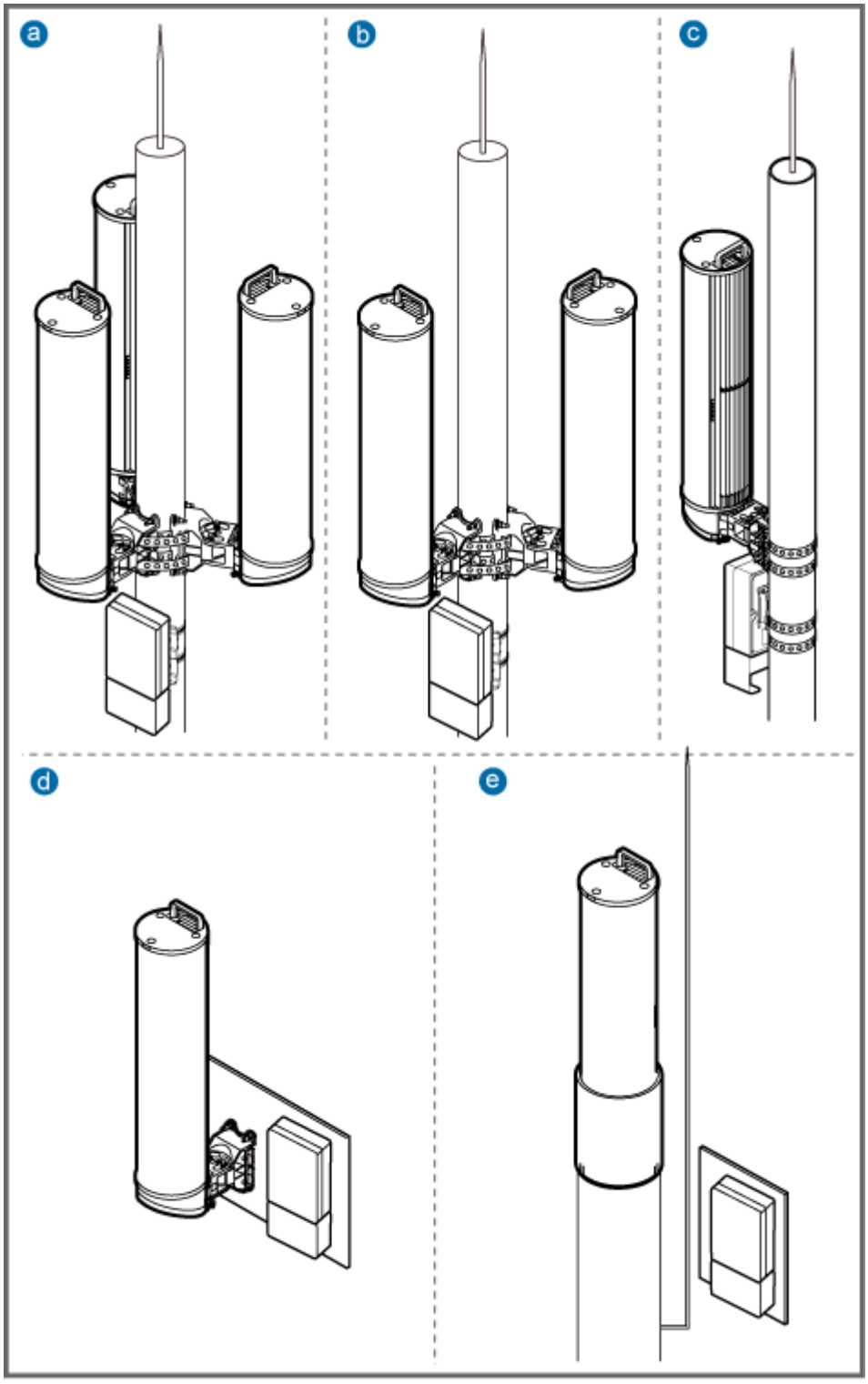
a: Scenario in which three AAUs are installed on a pole	b: Scenario in which two AAUs are installed on a pole	c: Scenario in which one AAU is installed on a pole
d: Scenario in which an AAU is installed on a wall	e: Scenario in which an AAU is installed on the top of a pole	-

The following figure shows scenarios in which AAUs are installed together with ODMs.

NOTE

AAUs can also be installed together with optical distribution frames (ODFs). This document uses ODMs as examples.

Figure 2-2 Scenarios in which AAUs are installed together with ODMs



a: Scenario in which three AAUs are installed together with an ODM on a pole

b: Scenario in which two AAUs are installed together with an ODM on a pole

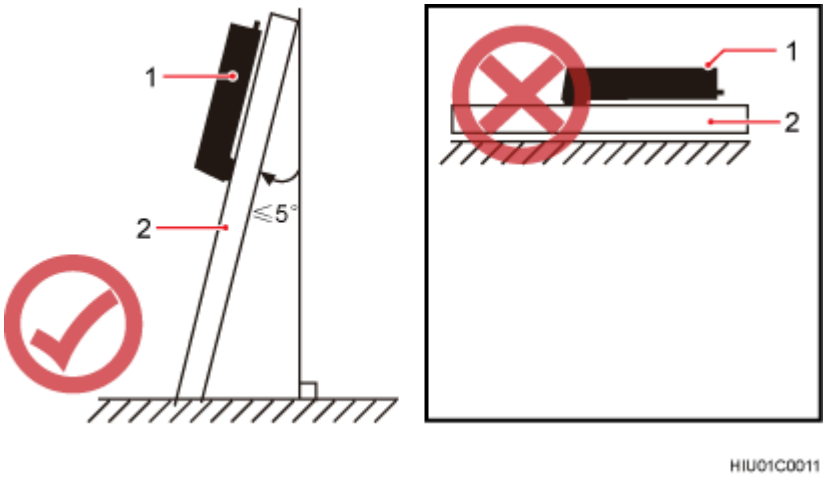
c: Scenario in which an AAU is installed together with an ODM on a pole

d: Scenario in which an AAU is installed together with an ODM on a wall	e: Scenario in which an AAU is installed on the top of a pole and an ODM is installed on a wall	-

NOTICE

In all scenarios, AAUs are installed together with their bottoms facing downwards. The vertical deviation angle of a support must be less than or equal to 5 degrees, as shown in the following figure.

Figure 2-3 Vertical deviation angle of an AAU



(1) AAU (2) Support (pole, top of a pole, or wall)

Requirements of Installation Scenarios

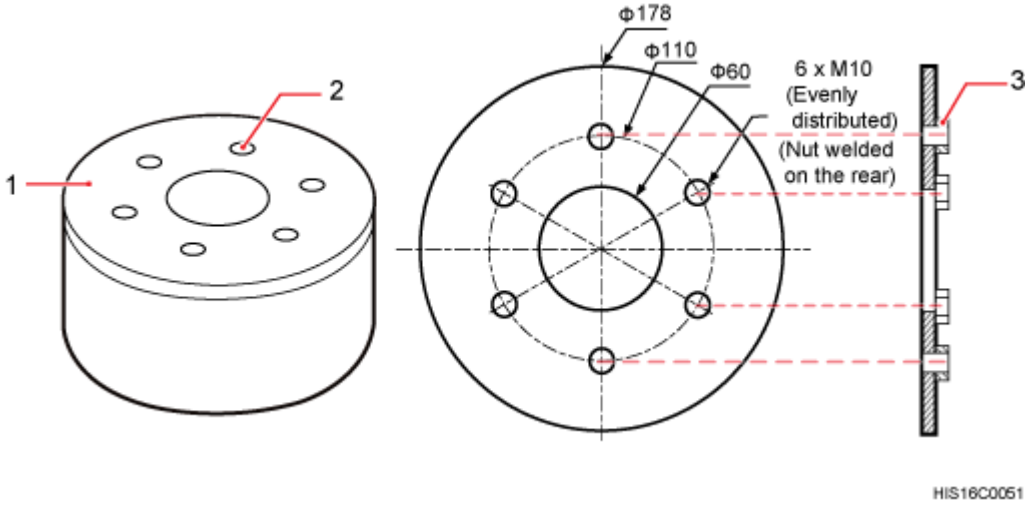
The following table describes the requirements for poles, walls, and tops of poles in the preceding installation scenarios.

Table 2-1 Requirements of installation scenarios

Installation Scenario	Requirements
One AAU is installed on a pole.	● The part of a pole for installing an AAU should have a diameter of 60 mm to 300 mm (2.36 in. to 11.81 in.) and the recommended wall thickness of a pole is greater than or equal to 4 mm (0.16 in.). ● If the part of a pole for installing an AAU has a diameter greater than 300 mm (11.81 in.), an auxiliary pole is required for installing the AAU.
Two AAUs are installed on a pole.	● Two AAUs are installed back to back in most cases. ● The recommended wall thickness of a pole is greater than or equal to 4 mm (0.16 in.). ● When AAUs are installed on the same level, the part of a pole for installing the AAUs should have a diameter of 80 mm to 230 mm (3.15 in. to 9.06 in.). When AAUs are installed on different levels, the parts of a pole for installing the AAUs should have a diameter of 60 mm to 230 mm (2.36 in. to 9.06 in.). ● If the part of a pole for installing AAUs has a diameter greater than 230 mm (9.06 in.), an auxiliary pole is required for installing the AAUs.
Three AAUs are installed on a pole.	● The recommended wall thickness of a pole is greater than or equal to 4 mm (0.16 in.). ● When AAUs are installed on the same level, the part of a pole for installing the AAUs should have a diameter of 80 mm to 230 mm (3.15 in. to 9.06 in.). When AAUs are installed on different levels, the parts of a pole for installing the AAUs should have a diameter of 60 mm to 230 mm (2.36 in. to 9.06 in.). ● If the part of a pole for installing AAUs has a diameter greater than 230 mm (9.06 in.), an auxiliary pole is required for installing the AAUs.
AAUs are installed on a wall.	A wall should have a load-bearing capacity of 80 kg (176.37 lb).
An AAU is installed on the top of a pole.	● The recommended wall thickness of a pole is greater than or equal to 4 mm (0.16 in.). ● A flange plate must be installed on the top of a pole for attaching an AAU to the pole. ● The recommended thickness of a flange plate is greater than or equal to 6 mm (0.24 in.). ● To achieve neat installation, it is recommended that the diameter of a pole be the same as that of a flange plate.

The method of connecting a flange plate to the top of a pole is determined by customers. The following figure shows the design specifications of ports on a flange plate for connecting an AAU.

Figure 2-4 Design specifications of ports on a flange plate



(1) Flange plate (2) Screw hole (3) Nut

2.2 Installation Clearance Requirements

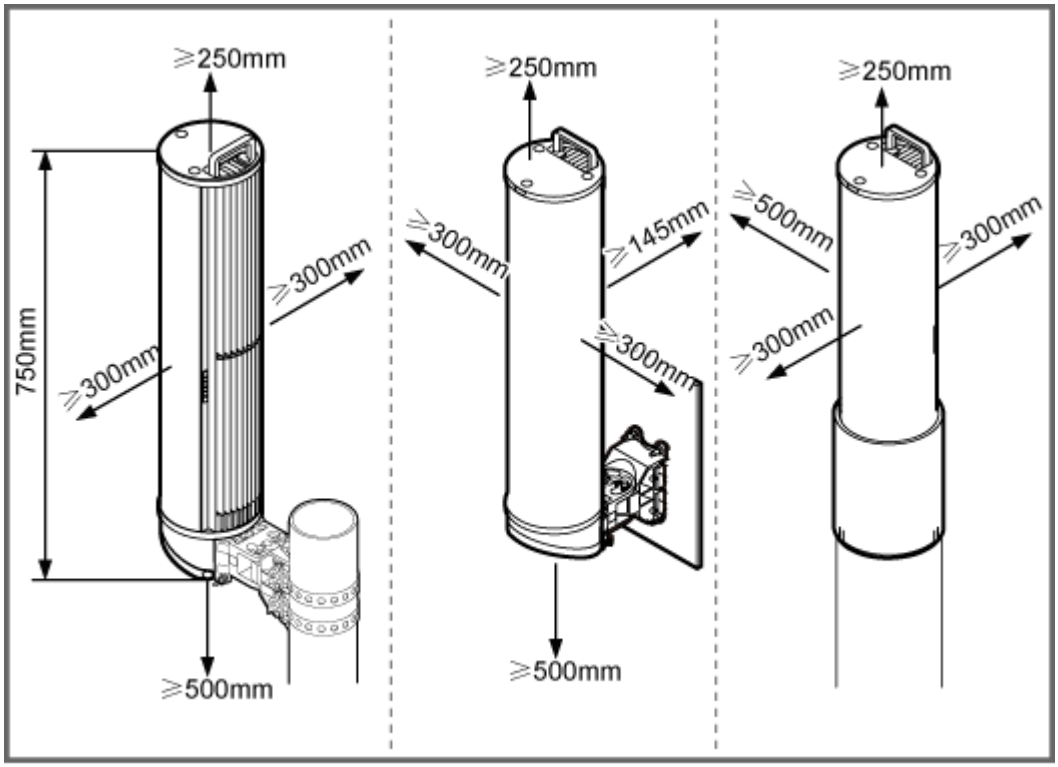
This section describes installation clearance requirements in different scenarios.

The following figure shows the clearance requirements for installing an AAU.

NOTE

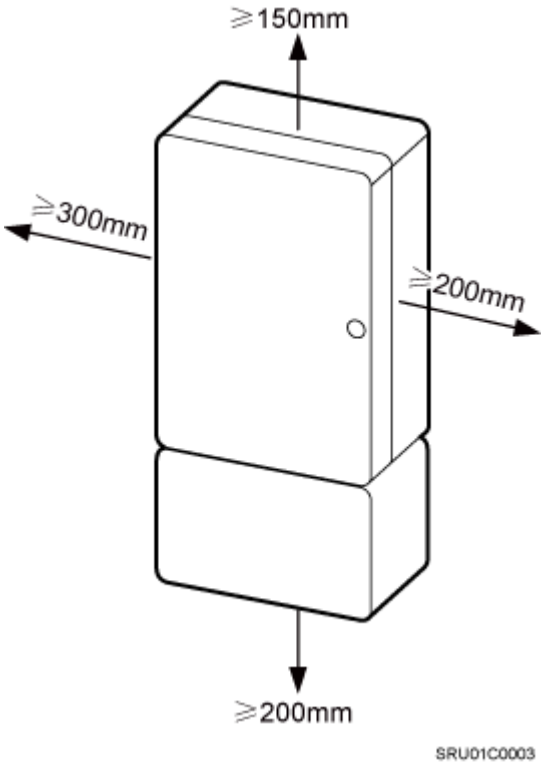
The following figure shows the clearance requirements for independently installing an AAU. When an AAU is installed together with an ODM, the clearance requirements are different.

Figure 2-5 AAU installation clearance requirements



The following figure shows the clearance requirements for installing an ODM.

Figure 2-6 ODM installation clearance requirements



2.3 AAU Mounting Kits

This section describes mounting kits for installing AAUs on a pole, a wall, and the top of a pole.

Mounting Kits for an AAU Installed on a Pole or Wall

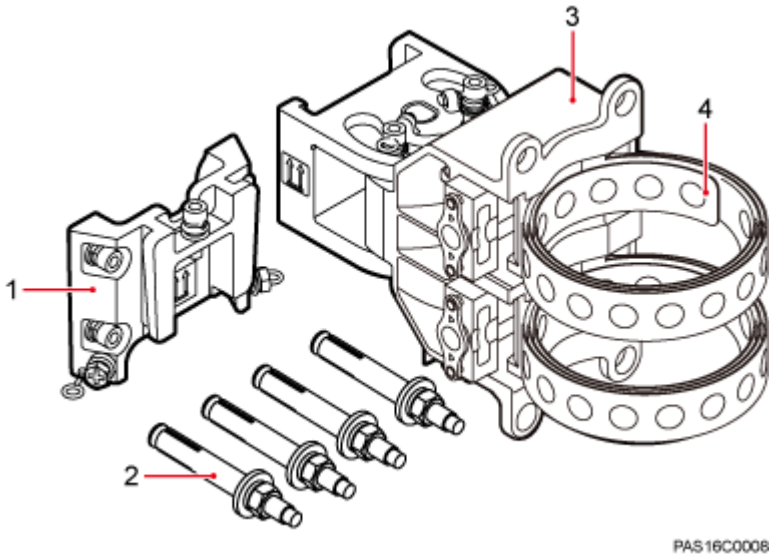
The same mounting kits are used for installing an AAU on a pole and installing an AAU on a wall. However, the procedure for installing an AAU on a pole is different from that for installing an AAU on a wall. The following figure shows the mounting kits for an AAU.

NOTE

When an AAU is installed on a pole or wall, the main bracket and attachment plate are required.

- When an AAU is installed on a pole, M8x80 expansion anchor bolts are not required.
- When an AAU is installed on a wall, steel belts are not required. Therefore, you need to remove the steel belts from mounting kits.

Figure 2-7 Mounting kits for an AAU installed on a pole or wall

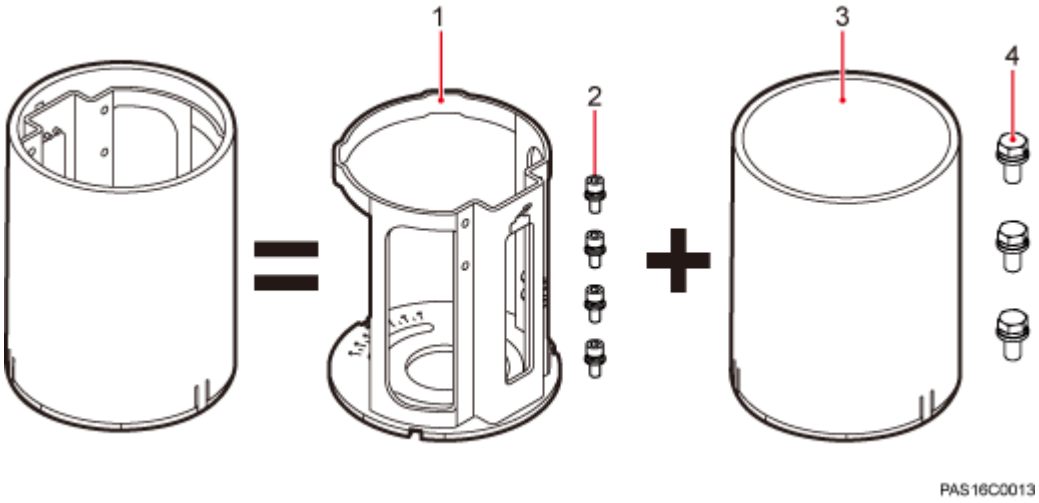


(1) Attachment plate (2) M8x80 expansion anchor bolt (3) Main mounting bracket (4) Steel belt

Mounting Kits for an AAU Installed on the Top of a Pole

Mounting kits for installing an AAU on the top of a pole include a support and a landscaping cover, as shown in the following figure.

Figure 2-8 Mounting kits installing for an AAU on the top of a pole



(1) Support (2) M6x16 bolt (3) Landscaping cover (4) M10x30 bolt

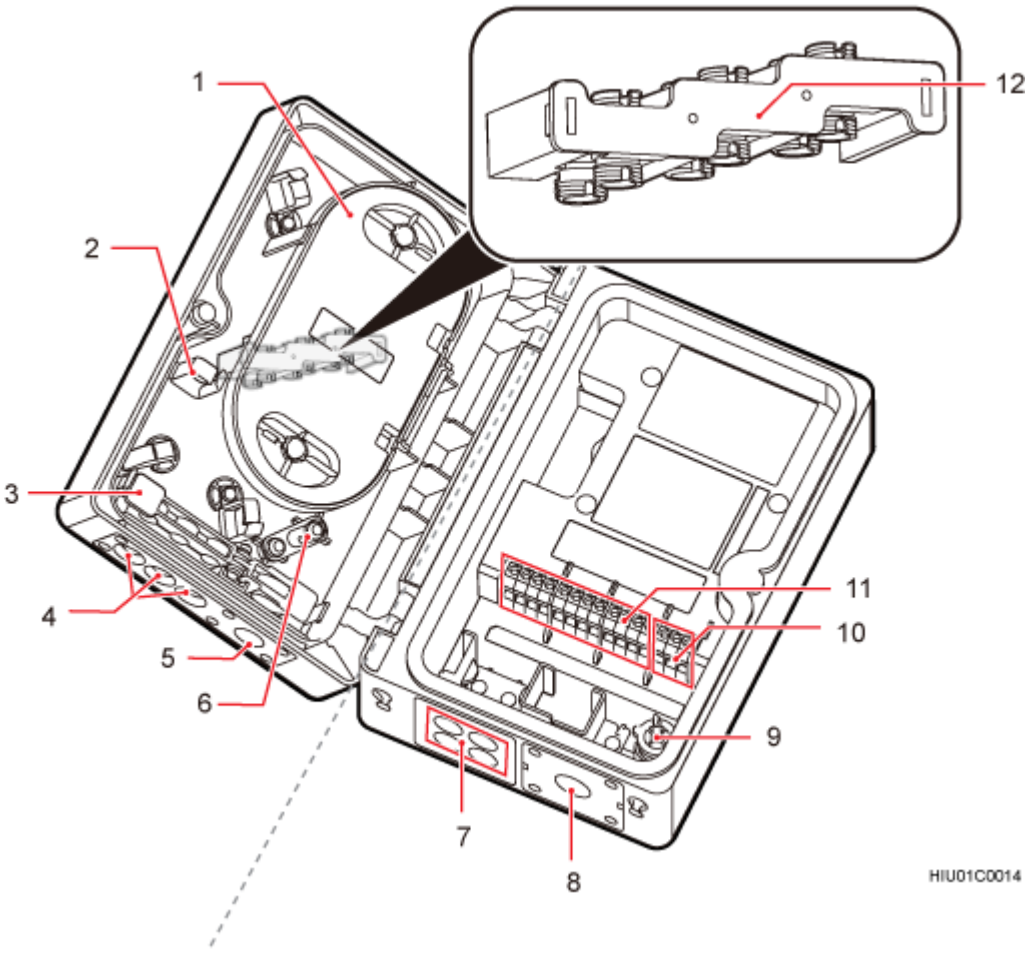
2.4 ODM Description

This section describes functions and specifications of an ODM.

Function

The ODM is an auxiliary low-power AC device for providing power distribution and fiber distribution. The ODM cover provides fiber distribution and the ODM provides power distribution. The following figure shows the structure of an ODM.

Figure 2-9 ODM structure



(1) Splicing tray	(2) Fiber holder	(3) Clip	(4) Holes for output fiber optic cables
(5) Hole for the input fiber optic cable	(6) Hanger for the trunk fiber optic cable	(7) Cable holes for the output power cables	(8) Cable hole for the input power cable
(9) Screwdriver	(10) Terminal block for input power cables	(11) Terminal block for output power cables	(12) Pigtail adapter

Specification

The following table describes the specifications of an ODM.

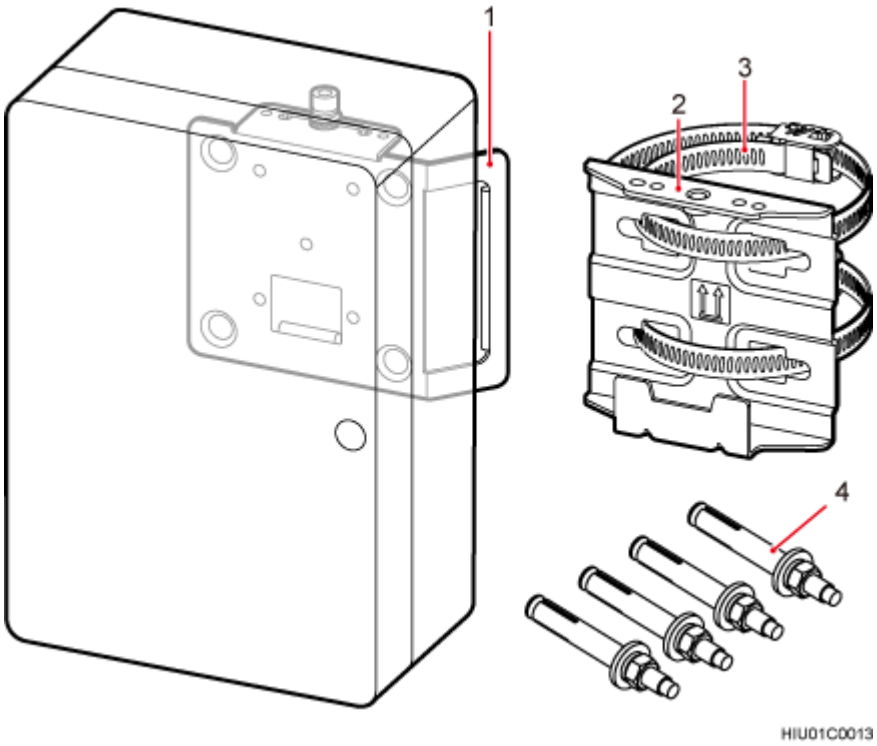
Table 2-2 ODM specifications

Item	Specifications
Dimensions (H x W x D)	232 mm x 158 mm x 96.5 mm (9.13 in. x 6.22 in. x 3.80 in.)
Upper-level circuit breaker	20 A
Support power	1650 W
Power supply capacity	One AC power input and four AC power outputs (Each power output is less than or equal to 400 W.)
Fiber division capacity	One trunk fiber optic cable and three pairs of breakout fiber optic cables (six breakout fiber optic cables)
Cable specifications	● Cross-sectional area of an input power cable: 1.5 mm^2 to 4 mm^2 (0.002 $in.^2$ to 0.006 $in.^2$). External diameter of an input power cable: 8.3 mm to 15mm (0.33 in. to 0.59 in.) ● Cross-sectional area of an output power cable: 1.5 mm^2 to 2.5 mm^2 (0.002 $in.^2$ to 0.004 $in.^2$). External diameter of an output power cable: 8.3 mm to 13.5 mm (0.33 in. to 0.53 in.) ● External diameter of an input fiber optic cable: 9.8 mm to 11 mm (0.39 in. to 0.43 in.) ● External diameter of an output fiber optic cable: 7.0 mm (0.28 in.)

Mounting Kits

The following figure shows the mounting kits for an ODM.

Figure 2-10 Mounting kits for an ODM



(1) Attachment plate (2) Mounting bracket (3) Steel belt (4) Expansion bolt

2.5 Surge Protection Requirements

When an AAU is installed on a pole or the top of a pole, the AAU must meet the surge protection requirements. Otherwise, surge protection measures must be taken.

A direct lightning strike protection measure must be taken (that is, a lightning rod is installed) if AAU installation meets the following conditions:

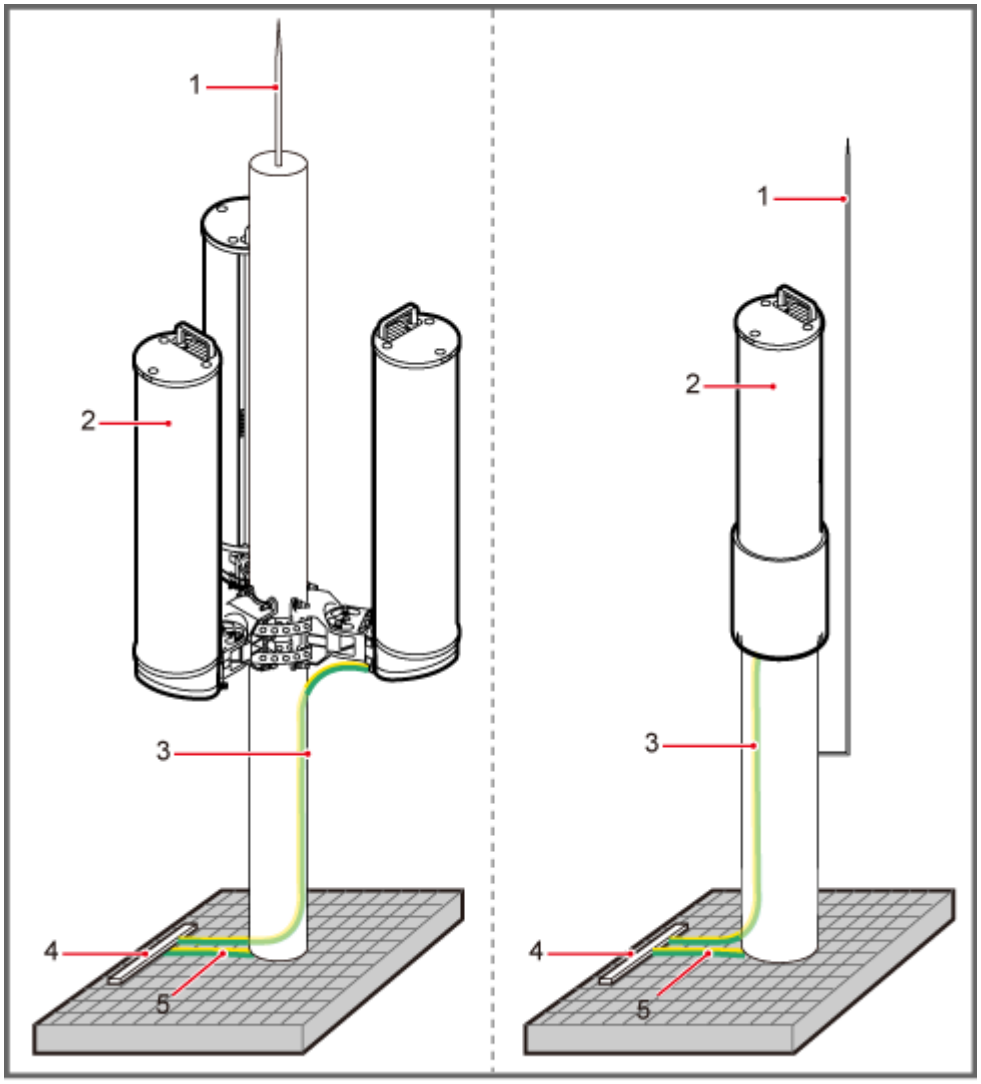
- When the AAU is installed on a pole or the top of a pole, the distance between the top of the pole and the top of the AAU is less than 30 cm (0.98 ft).
- The AAU is not installed within the protection range of the lightning rod.

When a lightning rod is installed near the AAU installation position, the following conditions must be met:

- The distance between the lightning rod and the top of the AAU must be greater than 30 cm (0.98 ft).
- The lightning rod must be properly connected to the onsite ground grid.
- The AAU PGND cable must be routed along the inner side of the pole and is connected to the ground bar of the onsite ground grid.
- In addition to the above conditions, the lightning rod installation must meet other building surge protection requirements.

The following figure shows AAU installation scenarios in which surge protection measures are taken.

Figure 2-11 AAU installation scenarios in which surge protection measures are taken



(1) Lightning rods (2) AAUs (3) AAU PGND cables

(4) Ground bars of ground girds (5) PGND cables for metal poles -

3 Installation Preparations

About This Chapter

This chapter lists the tools and instruments that must be obtained before the installation. It also specifies the skills that the onsite personnel must have.

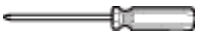
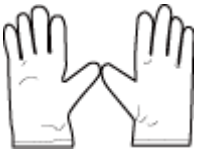
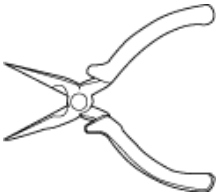
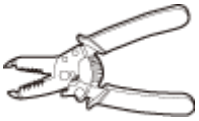
3.1 Documents

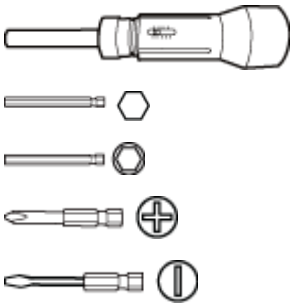
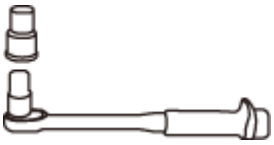
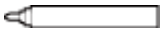
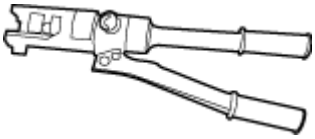
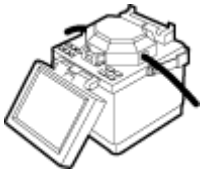
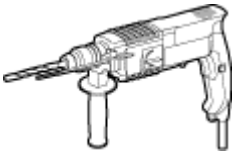
This section lists the documents that must be obtained before the installation.

- Before the installation, familiarize yourself with related information in the following documents:
  - AAU3940 Hardware Description
  - Safety Information
- During the installation, refer to the following document:
  - Installation Reference

3.2 Tools and Instruments

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

Heat gun 	Phillips screwdriver (M3 to M6) 	Flat-head screwdriver (M3 to M6) 
ESD gloves 	Needle-nose pliers 	Wire stripper 
Utility knife 	Cable cutter 	Adjustable wrench (size ⩾ 32 mm or 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 	Torque socket 
Multimeter 	Marker (diameter ⩽ 10 mm or 0.39 in.) 	Measuring tape 
Hex key 	Fixed pulley 	Lifting sling 
Hydraulic pliers 	Fiber fusion splicer 	Geologic compass 
Hammer drill 		

3.3 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.

The customer must pay attention to the following points before the installation:

- The customer's technical engineers must be trained by Huawei and be familiar with the installation and operation methods.

- The number of onsite personnel depends on the engineering schedule and installation environment. Generally, four to five onsite personnel are necessary.

4 Unpacking Check

Unpack and check the delivered equipment to ensure that all materials are included and intact.

Context

NOTE

When transporting, moving, or installing equipment or components,

- Prevent them from colliding with doors, walls, shelves, or other objects.
- Avoid touching their unpainted metal surfaces with sweat-soaked or dirty gloves or bare hands.

NOTICE

Power on an AAU within 24 hours after unpacking it.

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 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 case is intact	Go to **Step 3**.

If...	Then...
The outer packing is severely damaged or soaked	Find out the cause and report the situation 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 articles tally with those on the packing list	Sign the *Packing List* with the customer.
There are any goods missing, incorrectly delivered, or damaged	Report the situation 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.

Step 4 Take the recording form out of the carton containing antennas and fill in the form according to the actual situation.

NOTICE

Ensure that the RET SN on the antenna's name plate is consistent with that in the recording form.

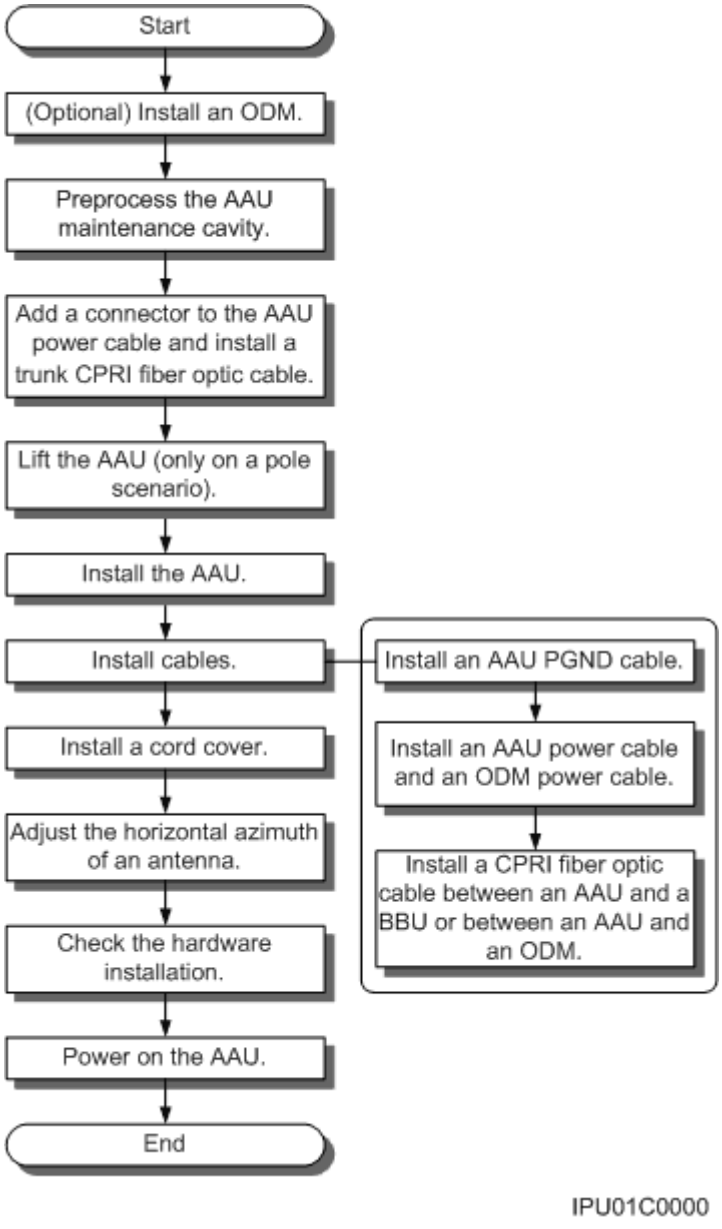
----End

5 Installation Process

This chapter describes the process of installing an AAU.

The following figure shows the installation process.

Figure 5-1 Installation process



6 (Optional) Installing an ODM

This section describes the procedure and precautions for installing an ODM.

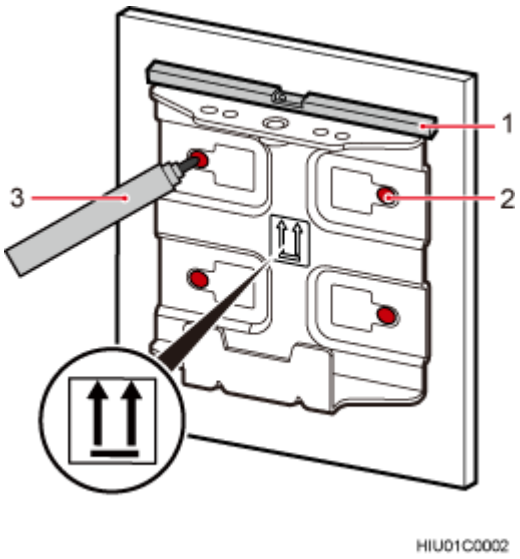
Context

The part of a pole for installing the mounting bracket of an ODM should have a diameter of 114 mm to 380 mm (4.489 in. to 14.96 in.).

Procedure

- **Installing an ODM on a wall**
  1. Determine a position for installing an ODM on a wall, use a level to adjust the position to ensure that the mounting bracket will be placed horizontally, and use a marker to mark anchor points, as shown in the following figure.

     Figure 6-1 Determining a position for installing an ODM

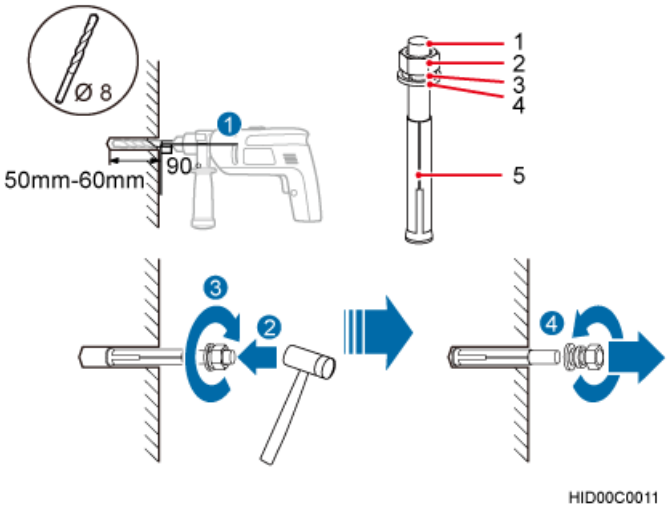
     (1) Level (2) Screw hole (3) Marker

2. Drill holes at the anchor points and install expansion bolts in the holes, as shown in the following figure.
   a. Use a hammer drill with a Φ8 bit to drill holes vertically at the marked anchor points. Ensure that the depth of each hole ranges from 50 mm to 60 mm (1.97 in. to 2.36 in.).
   b. Use a vacuum cleaner to clear the dust inside and around the holes, and measure the distances between holes. If any of the holes is beyond the acceptable range, mark a new anchor point and drill a new hole.
   c. Tighten an expansion bolt slightly and place it vertically into each hole.
   d. Use a rubber mallet to pound the expansion bolt until it goes into the hole completely. Ensure that a 20 mm (0.79 in.) part of the expansion bolt is left outside the wall.
   e. Remove the M6x60 bolt, nut, spring washer, and flat washer in sequence.

CAUTION

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

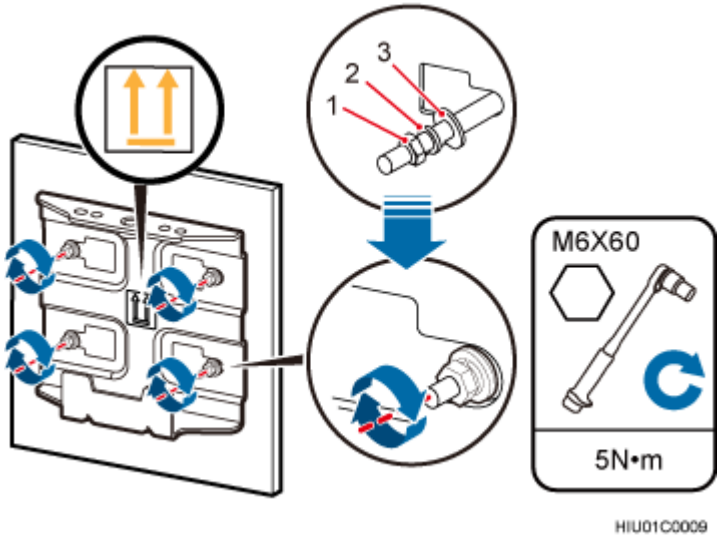
Figure 6-2 Drilling a hole and inserting an expansion bolt assembly



(1) M6x60 bolt (2) Nut (3) Spring washer (4) Flat washer (5) Expansion tube

3. Place the mounting bracket against the installation position on the wall, and use four M6x60 bolts to tighten the mounting bracket to 5 N·m (44.25 lbf·in.), as shown in the following figure.

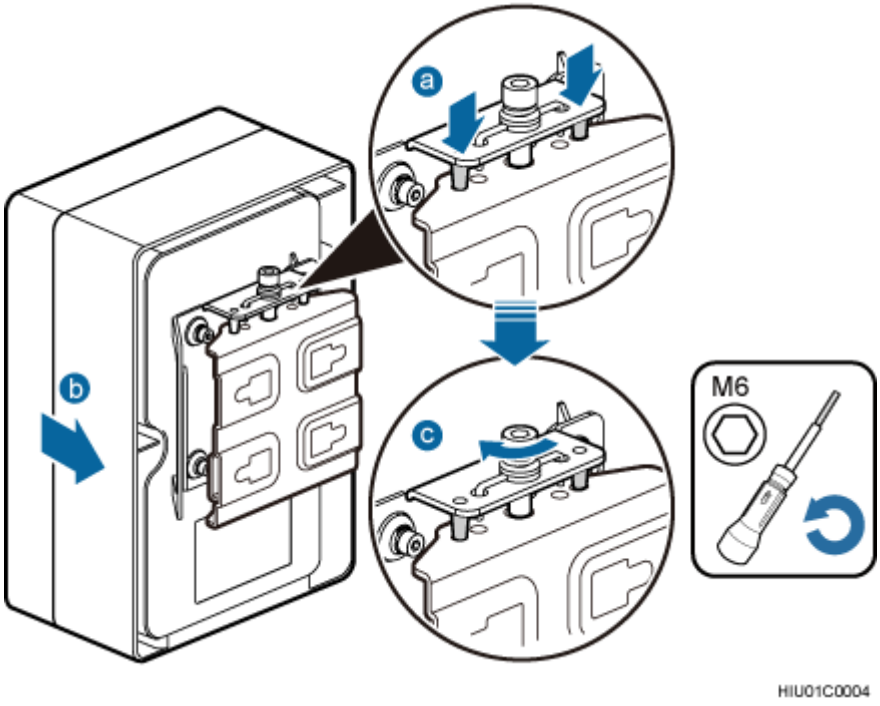
Figure 6-3 Tightening a mounting bracket to the installation position on a wall



(1) Nut (2) Spring washer (3) Flat washer

4. Fit the two dowels on the top of the ODM backplane into the mounting bracket, and push the ODM case until it is attached onto the mounting bracket, as shown by illustrations a and b in the following figure.
5. Use a double-headed inner hexagon tool to tighten the screw on the top of the attachment plate clockwise to 7 N·m (61.95 lbf·in.), as shown by illustration c in the following figure.

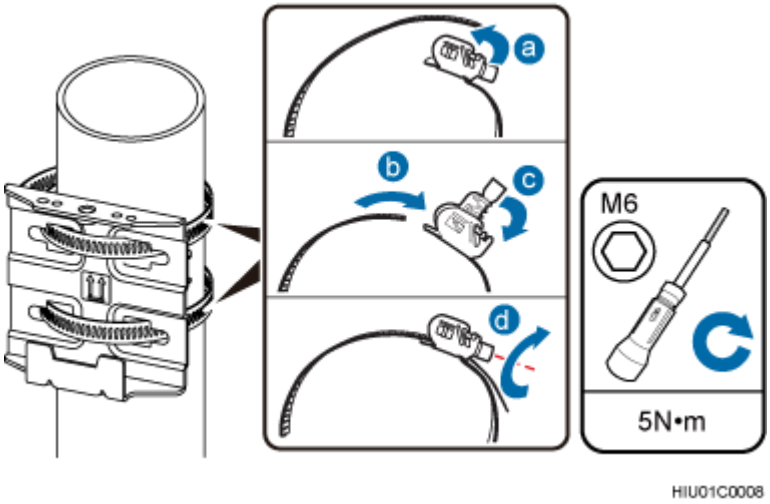
Figure 6-4 Installing an ODM to a mounting bracket



- **Installing an ODM on a pole**

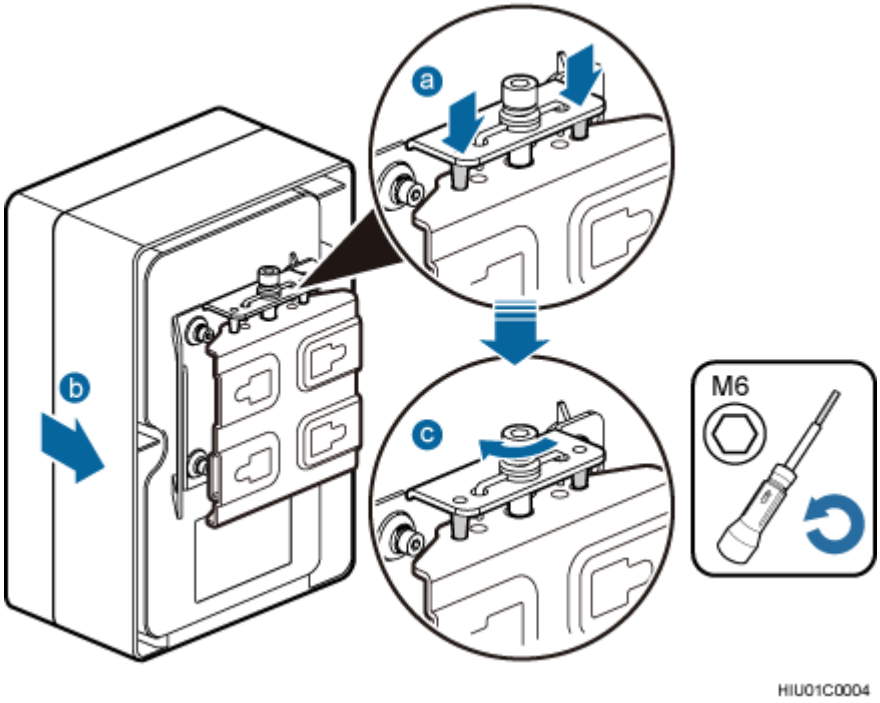
1. Determine a position for installing an ODM on a pole, attach a mounting bracket to the installation position on the pole, put the steel belts through the mounting bracket, and wind the steel belts round the pole for one circle, as shown by illustrations a, b, and c in the following figure.
2. Use an M6 inner hexagon wrench to tighten the bolts on the two steel belts alternately to secure the mounting bracket to 5 N·m (44.25 lbf·in.), as shown by illustration d in the following figure.

Figure 6-5 Securing a mounting bracket to a pole



3. Fit the two dowels on the top of the ODM backplane into the mounting bracket, and push the ODM case until it is attached onto the mounting bracket, as shown by illustrations a and b in the following figure.
4. Use a double-headed inner hexagon tool to tighten the screw on the top of the attachment plate clockwise to 7 N·m (61.95 lbf·in.), as shown by illustration c in the following figure.

Figure 6-6 Installing an ODM to a mounting bracket



----End

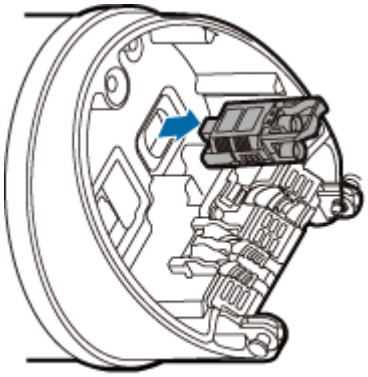
7 Preprocessing the AAU Maintenance Cavity

Before installing an AAU, take power terminals out of its maintenance cavity and install optical modules.

Procedure

Step 1 Use an M6 inner hexagon torque screwdriver to loosen the screw on the maintenance cavity and open the maintenance cavity. Then take out of power terminals, as shown in the following figure.

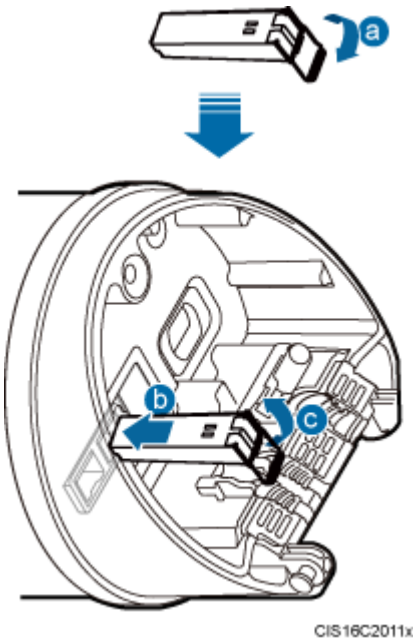
Figure 7-1 Taking out of power terminals



Step 2 Prepare power cables according to the instructions in **16.2 Adding a Tool-Less Female Connector (Pressfit Type) to an AAU Power Cable on the AAU Side**

Step 3 Lower the puller of the optical module, insert the optical module into the CPRI port on the AAU, and raise the puller, as shown in the following figure.

Figure 7-2 Installing the optical module

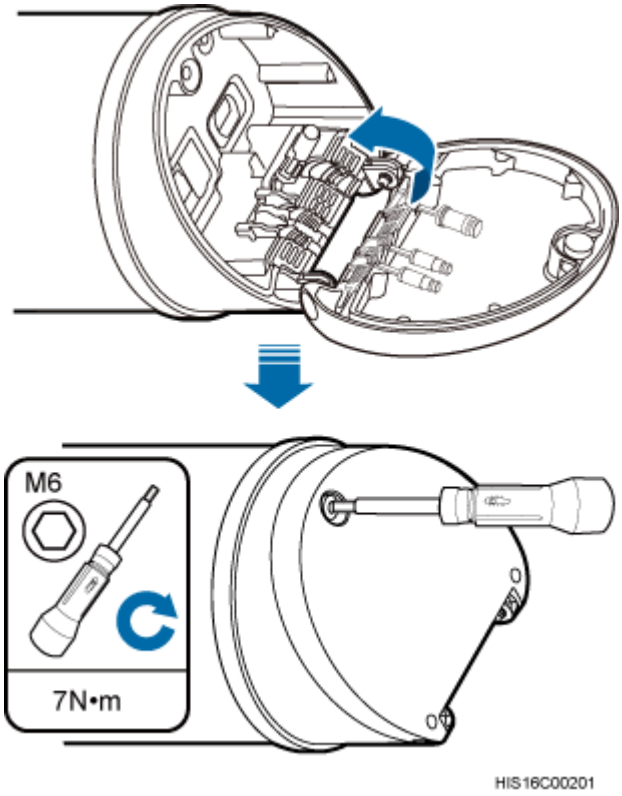


NOTICE

The performance of an optical module may deteriorate if it is exposed to the air for more than 20 minutes. Therefore, insert a fiber optic cable into an unpacked optical module within 20 minutes.

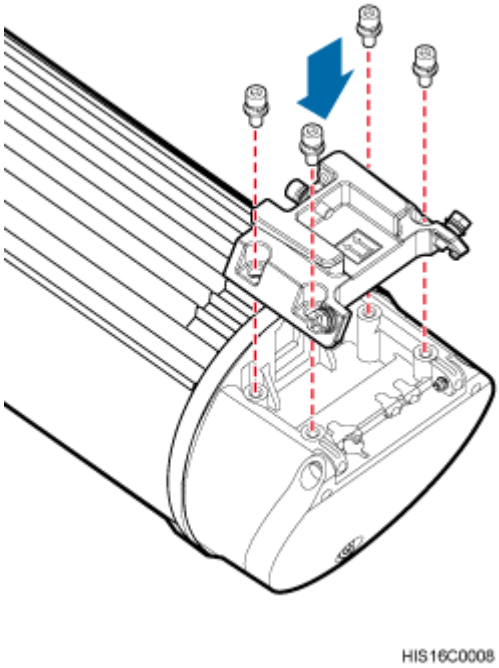
Step 4 Use an M6 inner hexagon torque screwdriver to tighten the screw on the maintenance cavity to 7 N·m (61.95 lbf·in.), as shown in the following figure.

Figure 7-3 Closing a maintenance cavity



Step 5 Install the attachment plate on the maintenance cavity of the AAU to be installed, and use an M6 inner hexagon torque screwdriver to tighten the screws to 7 N·m (61.95 lbf·in.), as shown in the following figure.

Figure 7-4 Installing an attachment plate



----End

8 Lifting an AAU

Before installing an AAU on a pole, you need to lift the AAU to the installation position on the pole.

Prerequisites

You have preprocessed the AAU maintenance cavity. For detailed operations, see **7 Preprocessing the AAU Maintenance Cavity**.

Context

It is recommended that a tail-lift truck be used to lift installation personnel and equipment to the installation position. If there is no tail-lift truck, a reliable and safe scaffold can be used.

NOTICE

Do not work at heights when you meet any of the following situations:

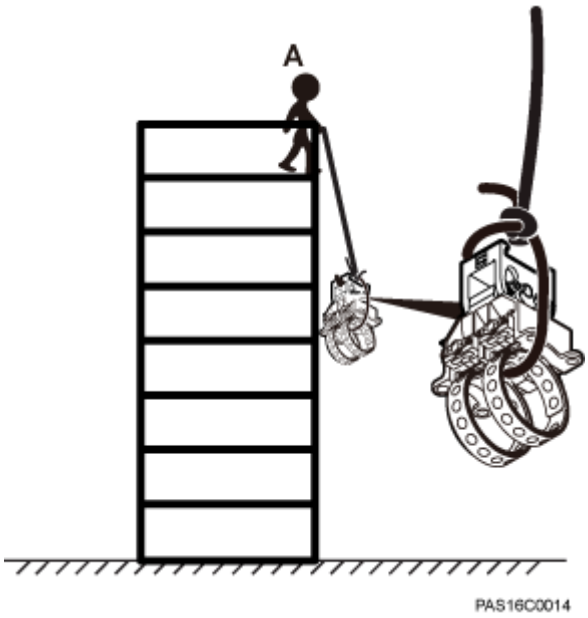
- Thunder, lightning, rain, or wind greater than force 6 occurs.
- Water remains on the surface of the steel tube.
- There may be other danger.

After the above situations are eliminated, the Huawei security director and related technical personnel must check all devices to be used before work start.

Procedure

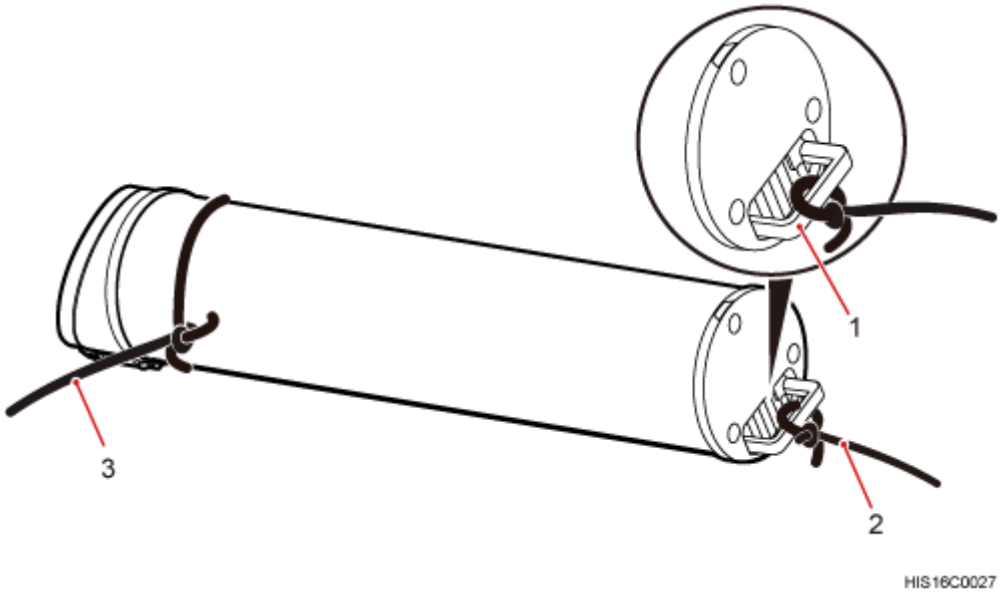
Step 1 Installation person A lifts and places the bound mounting kits to the scaffold platform, as shown in the following figure.

Figure 8-1 Lifting mounting kits



Step 2 Use the lifting sling to bind the handle on the top of the AAU and use the traction sling to bind the lower part of the AAU, as shown in the following figure.

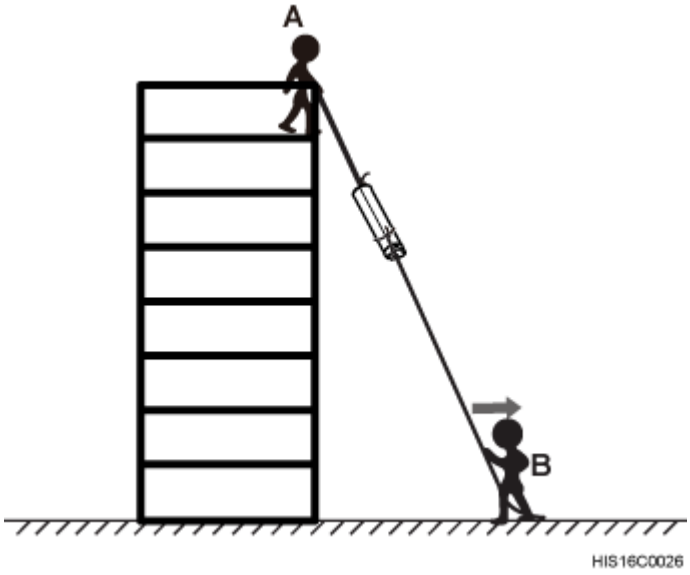
Figure 8-2 Binding an AAU



(1) Handle on the top (2) Lifting sling (3) Traction sling

Step 3 Installation person A climbs up onto the scaffold and then lifts and places the AAU on the scaffold platform, and installation person B pulls the traction sling outwards to prevent the AAU from colliding with the scaffold, as shown in the following figure.

Figure 8-3 Lifting an AAU



----End

9 Installing an AAU

About This Chapter

This chapter describes the procedures for installing an AAU in different scenarios.

9.1 Installing an AAU on a Pole
This section describes the procedure and precautions for installing an AAU on a pole.

9.2 Installing an AAU on the Top of a Pole
This section describes the procedure and precautions for installing an AAU on the top of a pole.

9.3 Installing an AAU on a Wall
This section describes the procedure and precautions for installing an AAU on a wall.

9.1 Installing an AAU on a Pole

This section describes the procedure and precautions for installing an AAU on a pole.

Prerequisites

- You have preprocessed the AAU maintenance cavity. For detailed operations, see **7 Preprocessing the AAU Maintenance Cavity**.
- You have lifted the AAU and mounting kits to the installation position on the pole. For detailed operations, see **8 Lifting an AAU**.

Context

NOTICE

Do not work at heights when you meet any of the following situations:

- Thunder, lightning, rain, or wind greater than force 6 occurs.
- Water remains on the surface of the steel tube.
- There may be other danger.

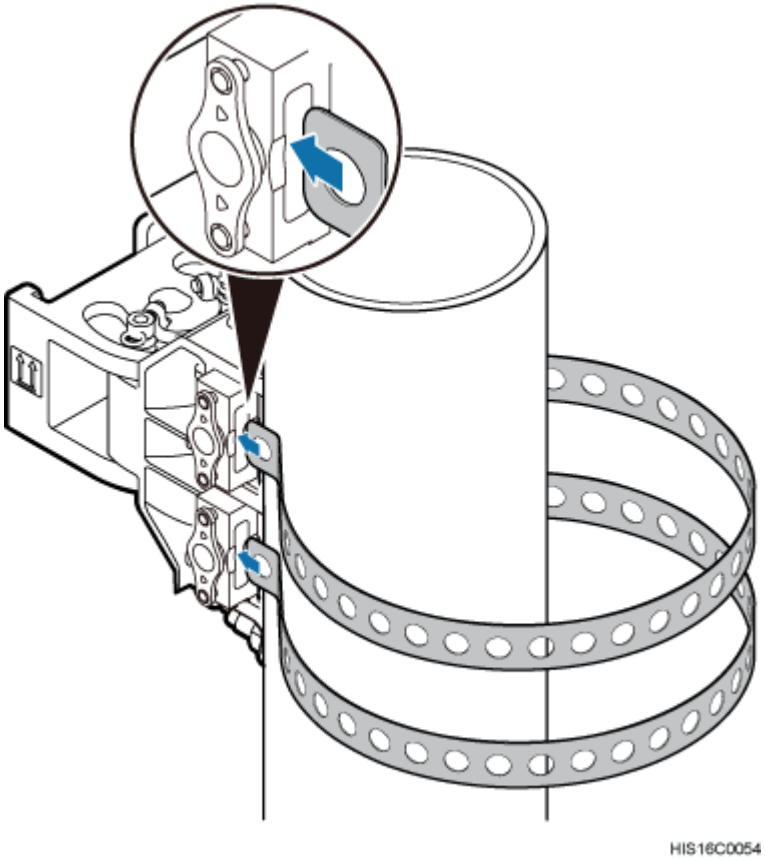
After the above situations are eliminated, the Huawei security director and related technical personnel must check all devices to be used before work start.

Procedure

Step 1 Determine a position for installing the mounting kits on a pole.

Step 2 Attach the mounting kits to the installation position on the pole, wind each steel belt round the pole for one circle, and put the steel belt through the sliding block of the mounting kits, as shown in the following figure.

Figure 9-1 Putting the steel belt through the sliding block

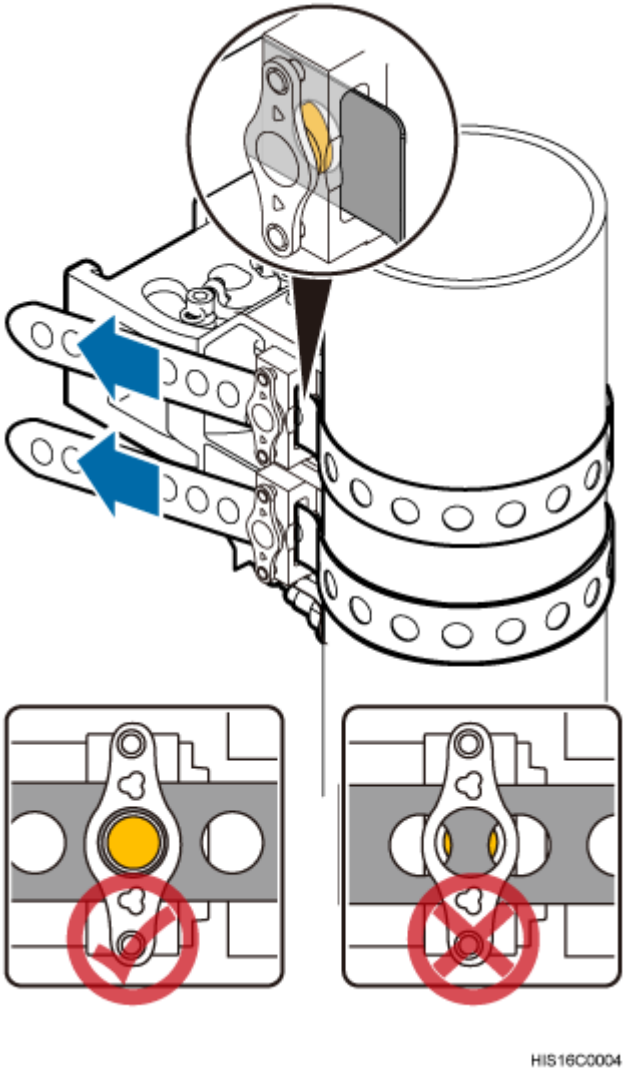


Step 3 Pull the steel belts to align the holes on the steel belts with those on the sliding blocks, as shown in the following figure.

NOTE

If the pin on a sliding block is located between two holes on a steel belt after the belt is securely attached to the pole, slightly loosen the steel belt so that the pin goes through a hole on the steel belt.

Figure 9-2 Installing the main mounting bracket

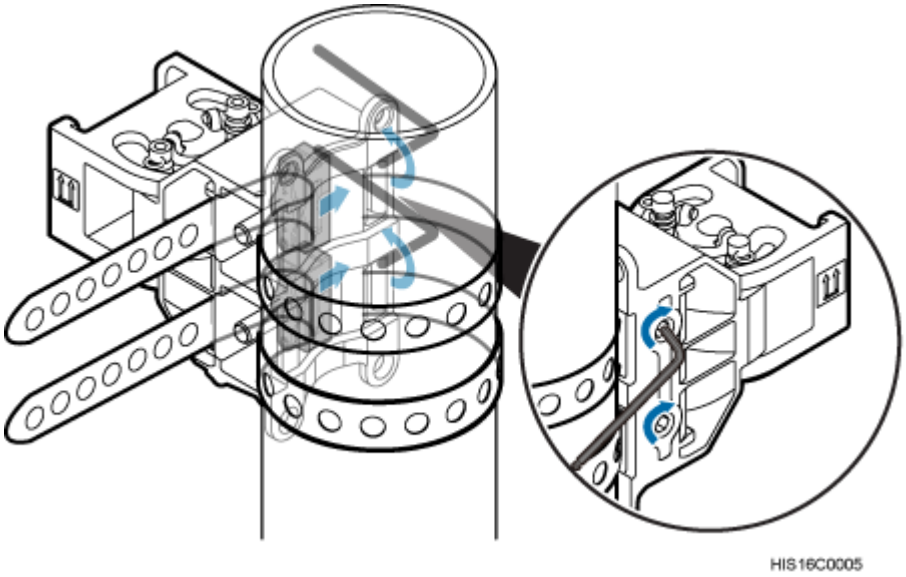


Step 4 Use an M10 inner hexagon wrench to tighten the bolts on the two steel belts alternately to secure the main mounting bracket to 28 N·m (247.8 lbf·in.), as shown in the following figure.

NOTE

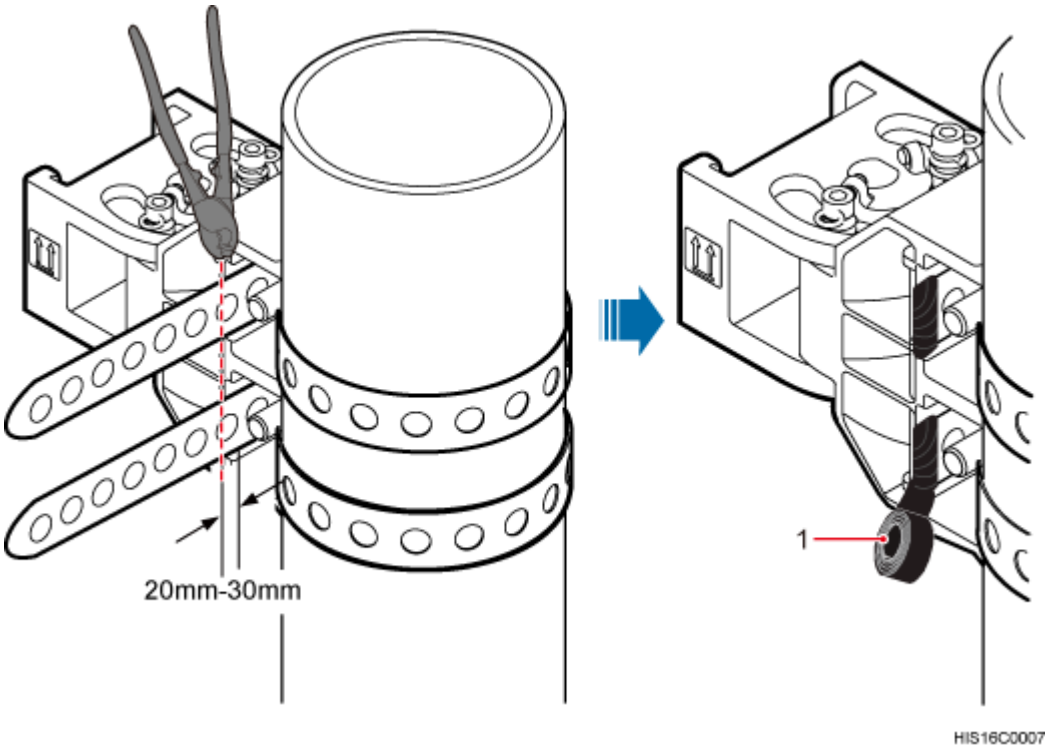
Tighten the bolts clockwise to slide a sliding block on a steel belt towards bolt heads and securely attach the steel belt.

Figure 9-3 Securing a main mounting bracket



Step 5 Use a cable cutter to cut off the excess of steel belts and reserve a slack of 20 mm to 30 mm (0.79 in. to 1.18 in.), and wrap insulation tape around the ends of the belts to prevent personal injury, as shown in the following figure.

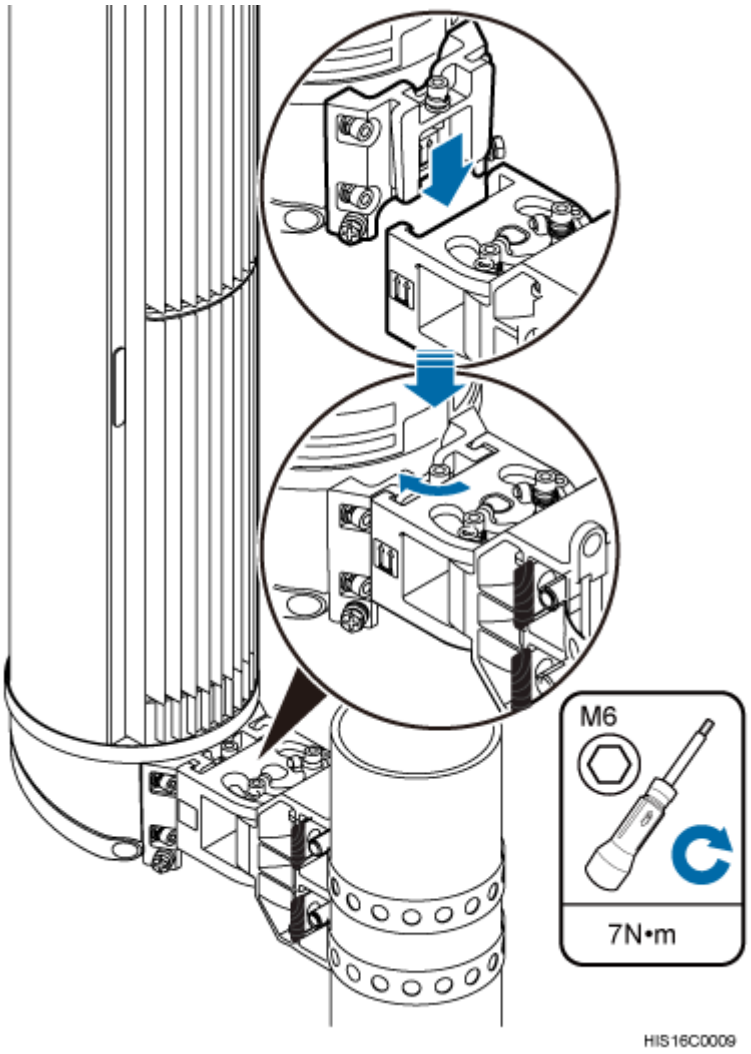
Figure 9-4 Cutting off the excess of steel belts and wrapping insulation tape



(1) Insulation tape

Step 6 Attach the AAU to the main mounting bracket, and use an M6 inner hexagon screwdriver to tighten the screw on the main mounting bracket to 7 N·m (61.95 lbf·in.), as shown in the following figure.

Figure 9-5 Installing an AAU on a main mounting bracket



Step 7 **Optional:** Install the second AAU.

NOTICE

Before installing the second AAU, ensure that the mounting kits for the first AAU have been securely installed.

1. Put the steel belts of the mounting kits for the second AAU through the evading holes of the mounting kits for the first AAU, as shown in the following figure.
2. Install the mounting kits for the AAU according to steps **Step 3** to **Step 5**.

3. Install the AAU to the mounting kits according to **Step 6**.

Step 8 **Optional:** Install the third AAU.

NOTICE

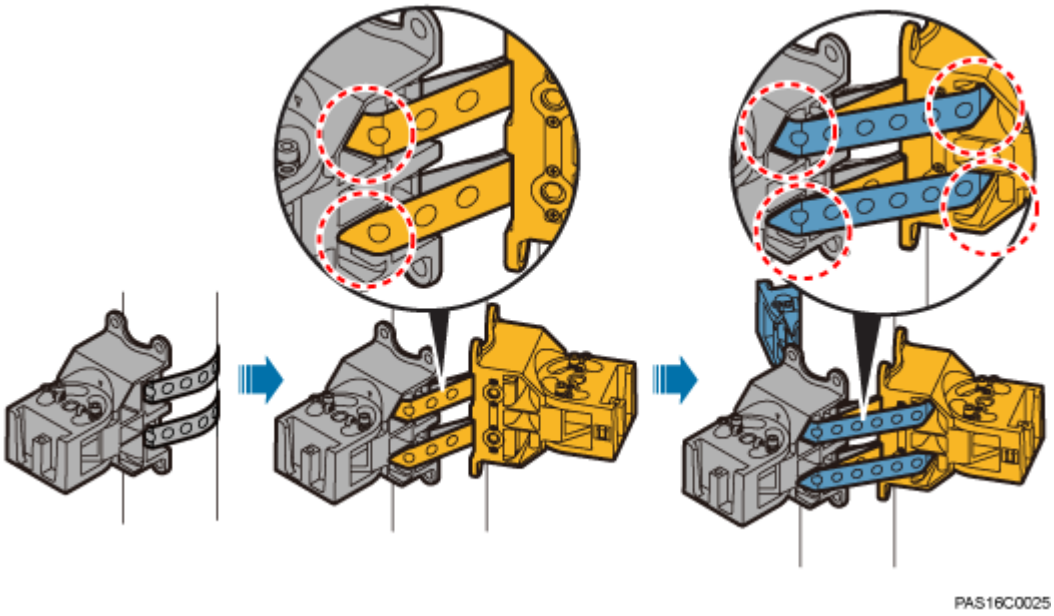
Before installing the third AAU, ensure that the mounting kits for the first and second AAUs have been securely installed.

1. Put the steel belts of the mounting kits for the third AAU through the evading holes of the mounting kits for the first and second AAUs, as shown in the following figure.
2. Install the mounting kits for the AAU according to steps **Step 3** to **Step 5**.
3. Install the AAU to the mounting kits according to **Step 6**.

NOTE

In the above figure, holes in dashed red circles are evading holes.

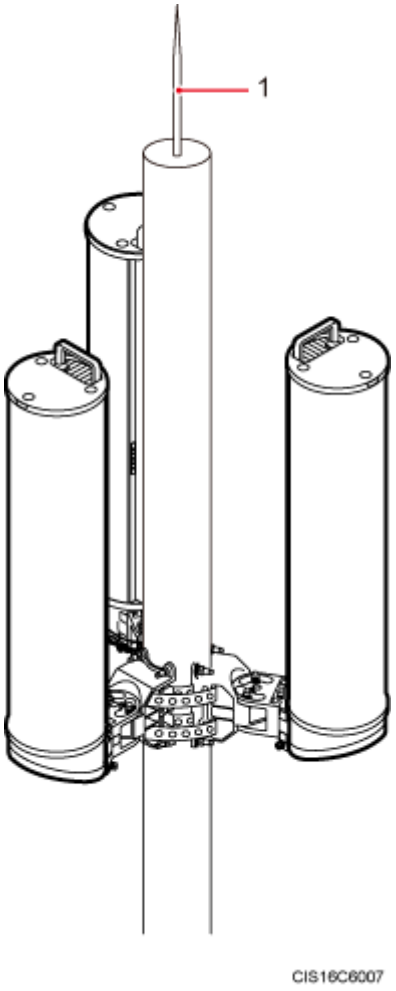
Figure 9-6 Putting the steel belts through the evading holes



NOTE

The following figure shows three AAUs installed on a pole.

Figure 9-7 Three AAUs installed on a pole



(1) Lightning rod

----End

9.2 Installing an AAU on the Top of a Pole

This section describes the procedure and precautions for installing an AAU on the top of a pole.

Prerequisites

- You have preprocessed the AAU maintenance cavity. For detailed operations, see **7 Preprocessing the AAU Maintenance Cavity**.

Context

NOTICE

Do not work at heights when you meet any of the following situations:

- Thunder, lightning, rain, or wind greater than force 6 occurs.
- Water remains on the surface of the steel tube.
- There may be other danger.

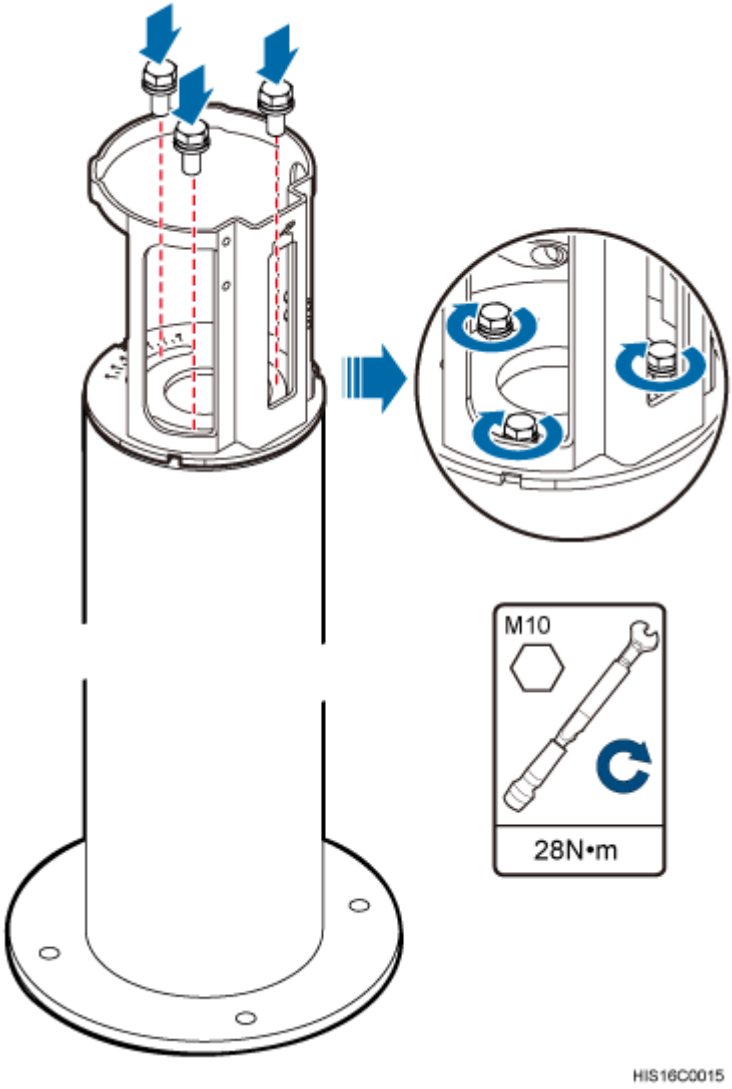
After the above situations are eliminated, the Huawei security director and related technical personnel must check all devices to be used before work start.

Procedure

Step 1 Lift the landscaping cover and remove it. Keep the landscaping cover for later installation.

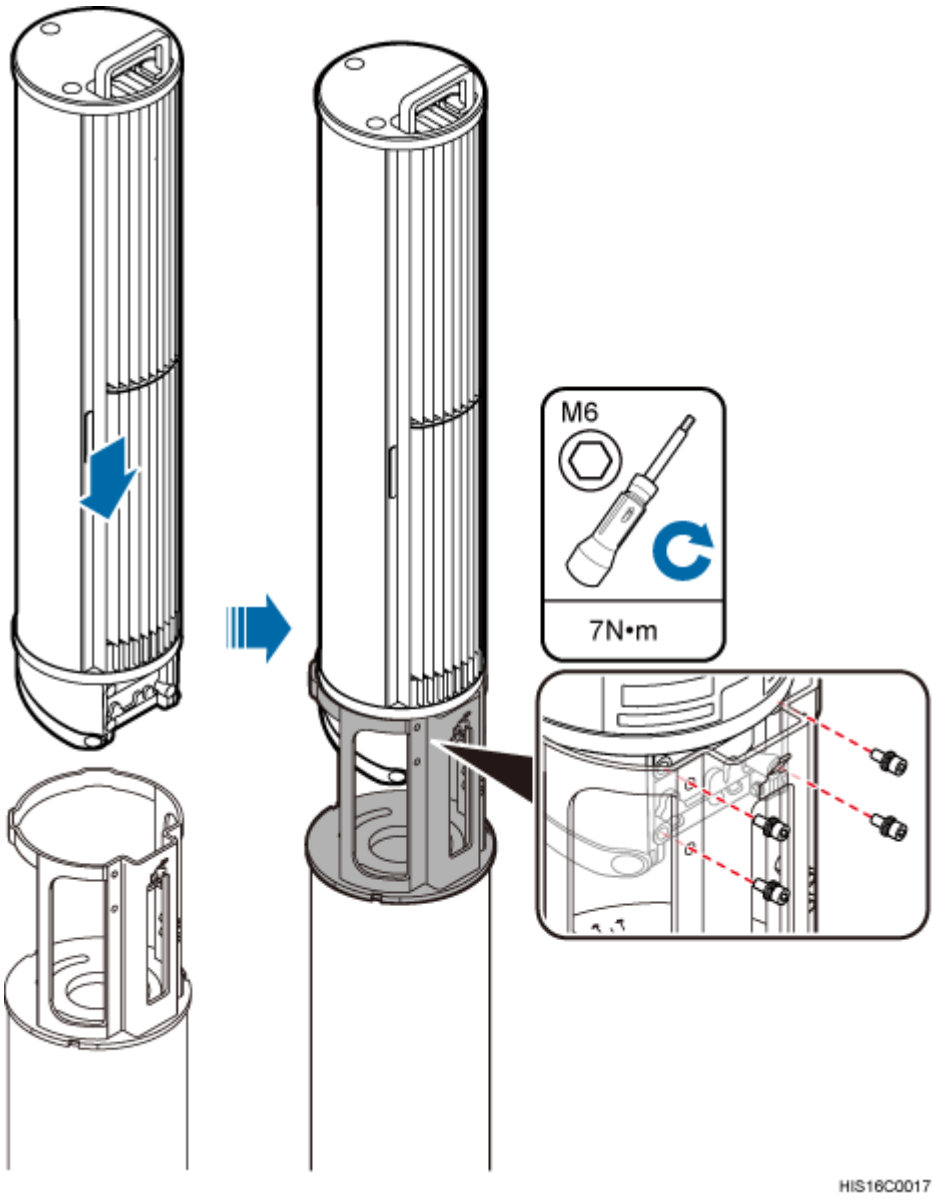
Step 2 Use a torque wrench to tighten three M10 screws to 28 N·m (247.8 lbf·in.) so that the mounting bracket is secured to the top of a pole, as shown in the following figure.

Figure 9-8 Securing a mounting bracket



Step 3 Put the AAU on the mounting bracket on the top of a pole with both hands, and tighten four M6 inner hexagon bolts to secure the AAU, a shown in the following figure.

Figure 9-9 Installing an AAU



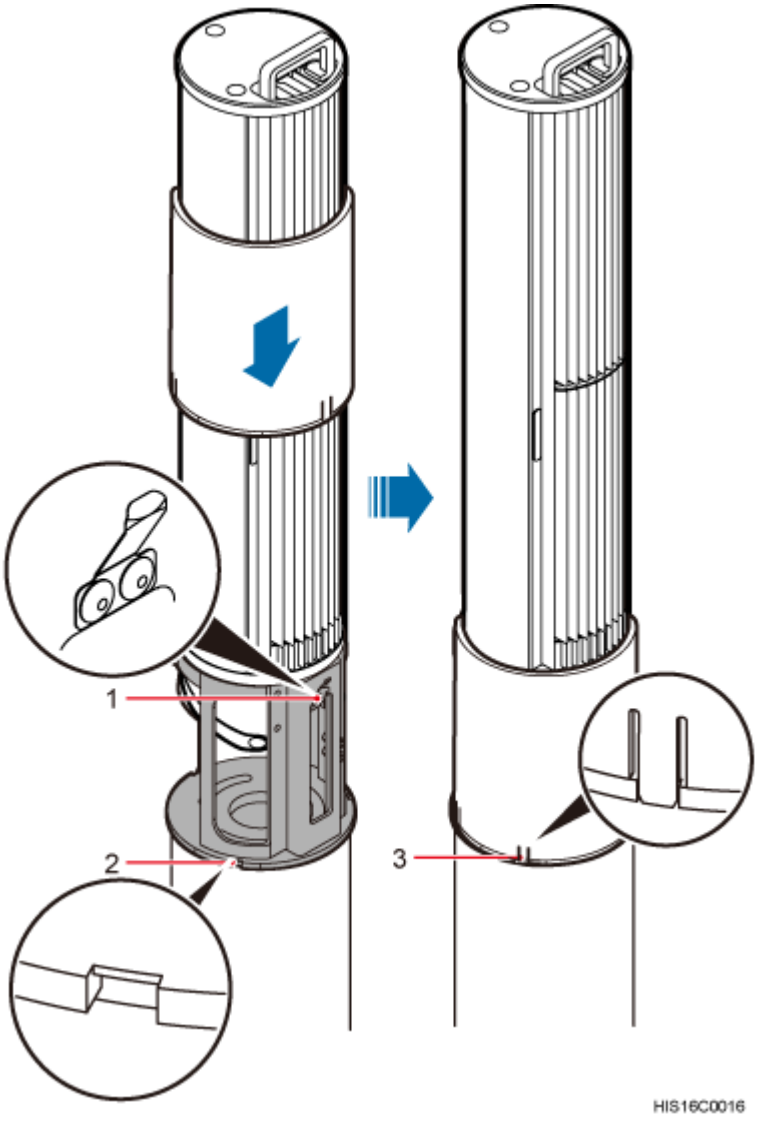
Step 4 Install the removed landscaping cover.

NOTE

It is recommended that the landscaping cover be installed after cables are connected.

1. Put the landscaping cover on the AAU, and press the elastomer on the mounting bracket when the landscaping cover reaches the top of the mounting bracket so that it can slide down.
2. Ensure that the three support braces of the landscaping cover slide into the troughs on the bottom of the mounting bracket.

Figure 9-10 Installing a landscaping cover



(1) Elastomer (2) Trough (3) Support brace

----End

9.3 Installing an AAU on a Wall

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

Prerequisites

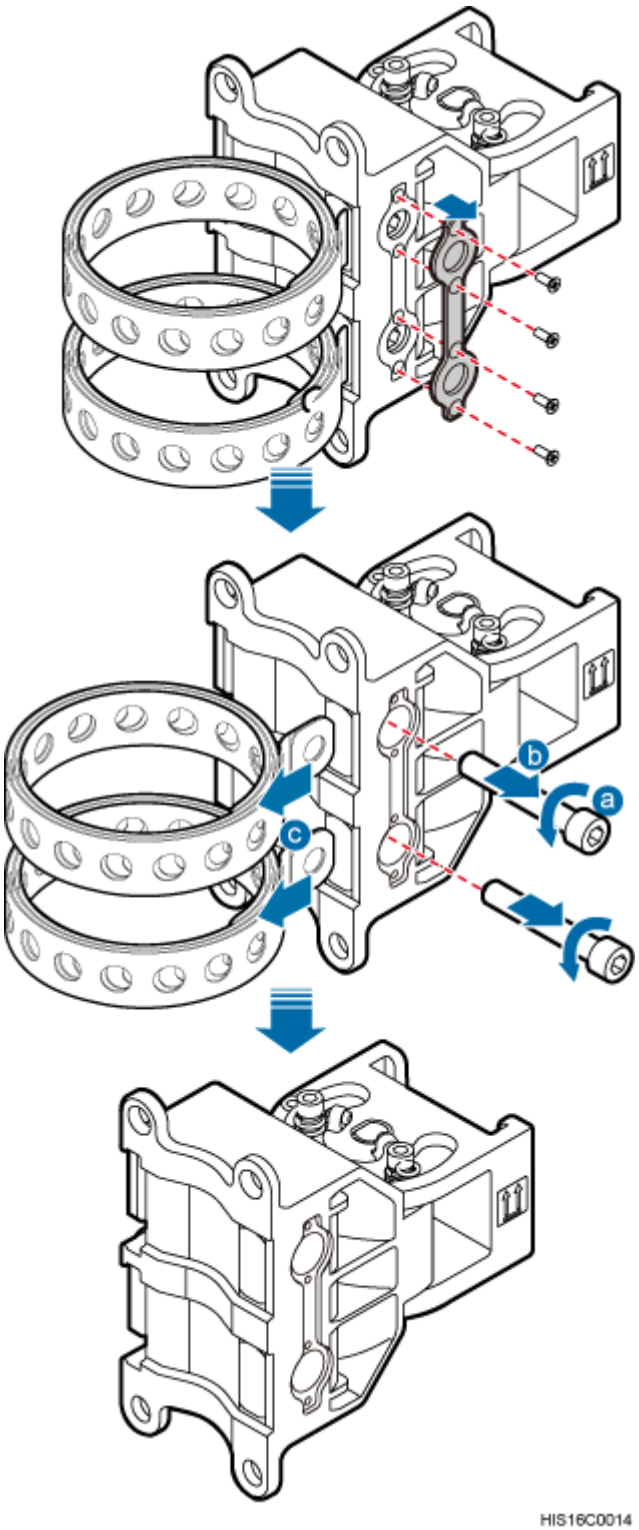
- You have preprocessed the AAU maintenance cavity. For detailed operations, see **7 Preprocessing the AAU Maintenance Cavity**.

Procedure

Step 1 Remove the steel belts from mounting kits, as shown in the following figure.

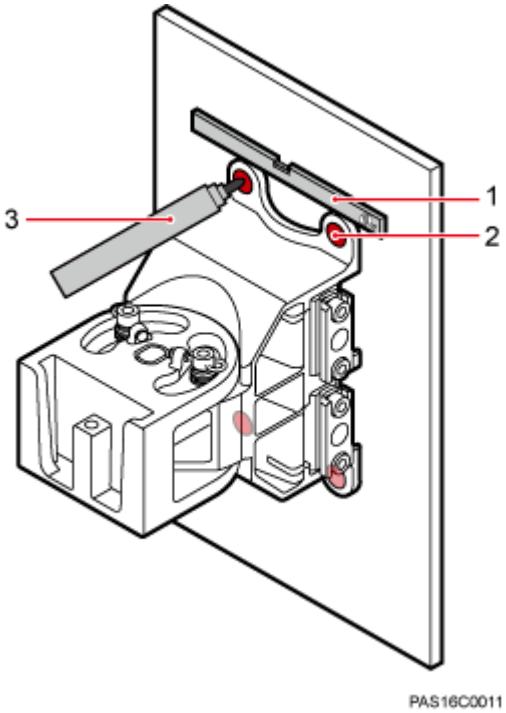
1. Use a Phillips screwdriver to remove four screws from the cover plate.
2. Use an M6 inner hexagon wrench to remove the bolts from the steel belts.
3. Remove the steel belts from the mounting kits.

Figure 9-11 Removing steel belts



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 the following figure.

Figure 9-12 Marking anchor points



(1) Level (2) Screw hole (3) Marker

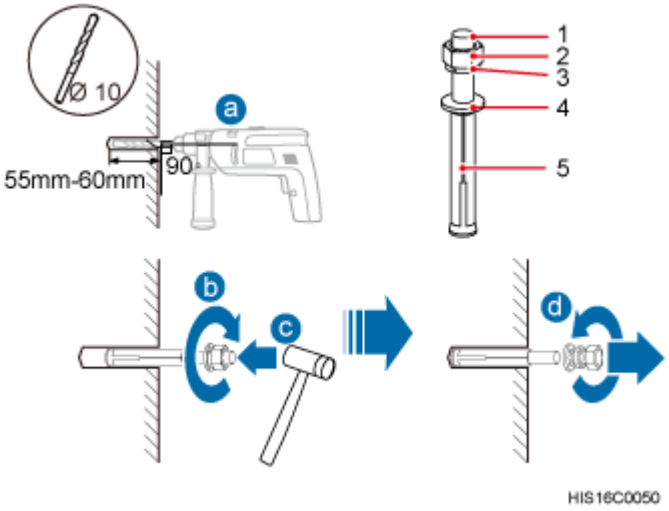
Step 3 Drill holes at the anchor points, and then insert expansion anchor bolts, as shown in the following figure.

1. Use a hammer drill with a Φ10 bit to drill holes vertically at the marked anchor points. Ensure that the depth of each hole ranges from 55 mm to 60 mm (2.17 in. to 2.36 in.).
2. Use a vacuum cleaner to clear the dust inside and around the holes, and measure the distances between holes. If any of the holes is beyond the acceptable range, mark a new anchor point and drill a new hole.
3. Tighten the expansion anchor bolts slightly and place one vertically into each hole.
4. Use a rubber mallet to hit the expansion bolt until the expansion tube completely enters the hole.
5. Remove the nut, spring washer, and flat washer in sequence.

CAUTION

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

Figure 9-13 Drilling a hole and inserting expansion anchor bolts



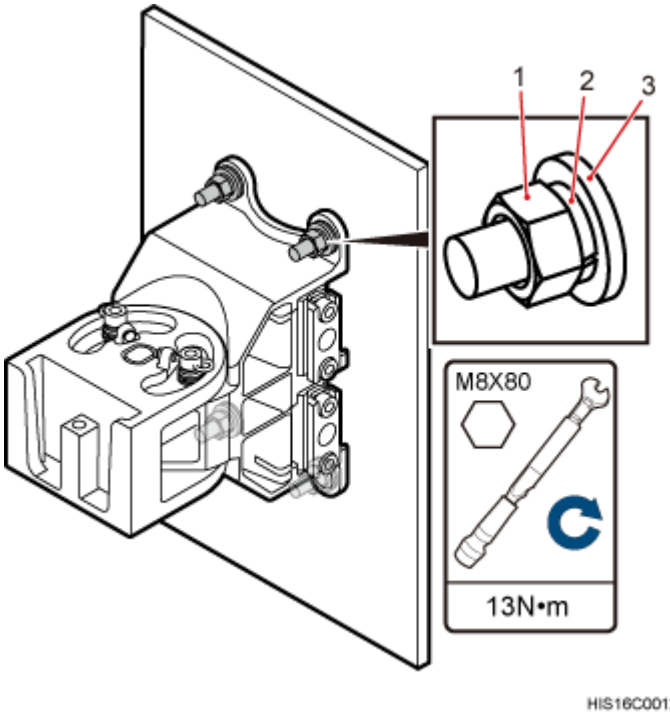
(1) M8x80 bolt (2) Nut (3) Spring washer (4) Flat washer (5) Expansion tube

NOTICE

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

Step 4 Place the main mounting bracket against the wall, use a torque wrench to tighten four M8 bolts to 13 N·m (115.06 lbf·in.) and so that the main mounting bracket is securely installed on the wall, as shown in the following figure.

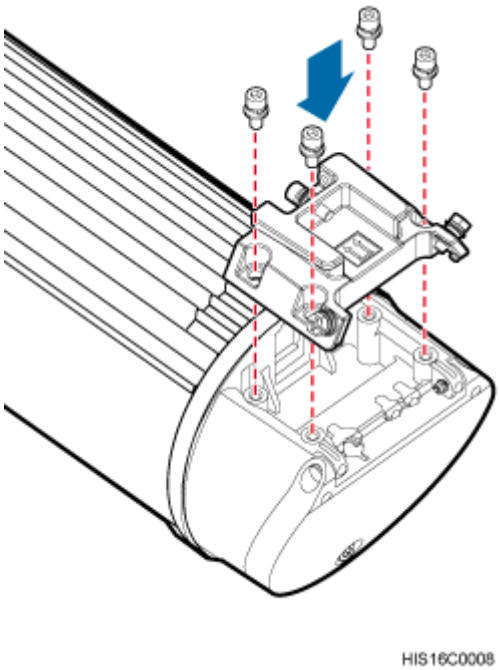
Figure 9-14 Installing the main mounting bracket



(1) Nut (2) Spring washer (3) Flat washer

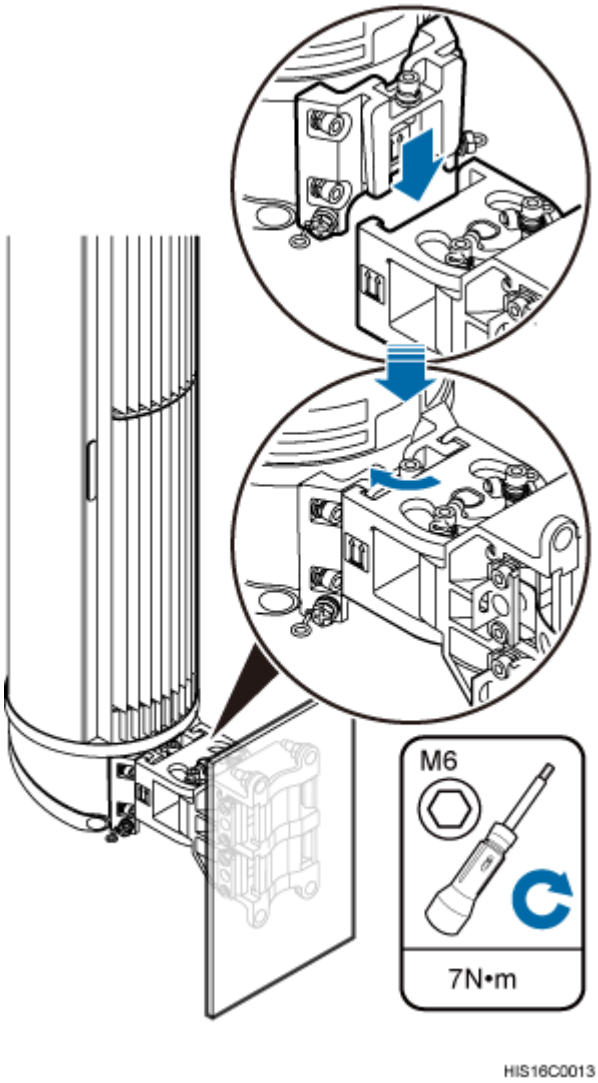
Step 5 Install the attachment plate on the maintenance cavity of the AAU to be installed, and use an M6 inner hexagon torque screwdriver to tighten the screws to 7 N·m (61.95 lbf·in.), as shown in the following figure.

Figure 9-15 Installing an attachment plate



Step 6 Attach the AAU to the main mounting bracket, and tighten the bolts on the main mounting bracket, as shown in the following figure.

Figure 9-16 Installing an AAU on a main mounting bracket



----End

10 Installing AAU Cables

About This Chapter

This section describes the procedure and precautions for installing AAU cables.

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

10.2 Installing an AAU PGND Cable
This section describes the procedure and precautions for installing an AAU PGND cable.

10.3 Installing an AAU Power Cable
This section describes the process and precautions for installing an AAU power cable.

10.4 Installing an ODM Power Cable
This section describes the process and precautions for installing an ODM power cable when an ODM is configured.

10.5 Installing a Trunk CPRI Fiber Optic Cable Between an ODM and a BBU
This section describes the procedure for installing a trunk CPRI fiber optic cable between an ODM and a BBU when an ODM is configured.

10.6 Installing a CPRI Fiber Optic Cable Between an AAU and a BBU or Between an AAU and an ODM
If no ODM is configured, a CPRI fiber optic cable is directly connected to a BBU. If an ODM is configured, a CPRI fiber optic cable is connected to the ODM.

10.1 Cabling Requirements

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

NOTE

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

General Cabling Requirements

Bending radius requirements

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

Cable binding requirements

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

Security requirements

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

Indoor cabling requirements

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

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

Outdoor Cabling Requirements

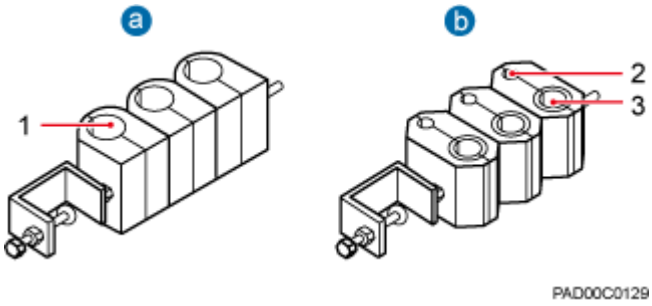
- After being connected to a ground clip on power cables, a ground cable must be routed downwards to prevent water from entering the equipment to which the power cables connect.
- Protect outdoor cables against potential damage. For example, put the cables through tubes.
- The cables to be protected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

NOTE

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

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

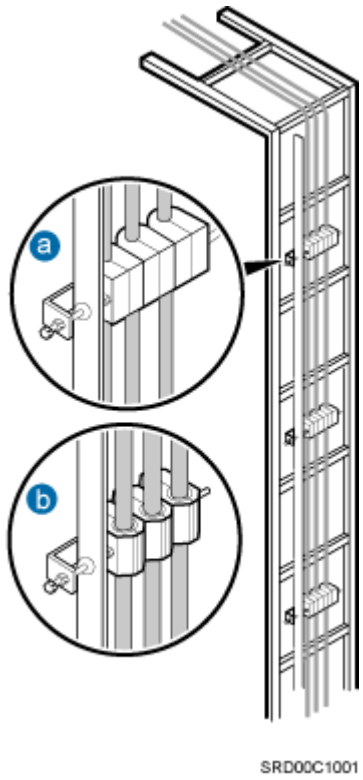
Figure 10-1 Exterior of the clips



(1) Cable hole for feeders (2) Cable hole for fiber optic cables (3) Cable hole for power cables

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

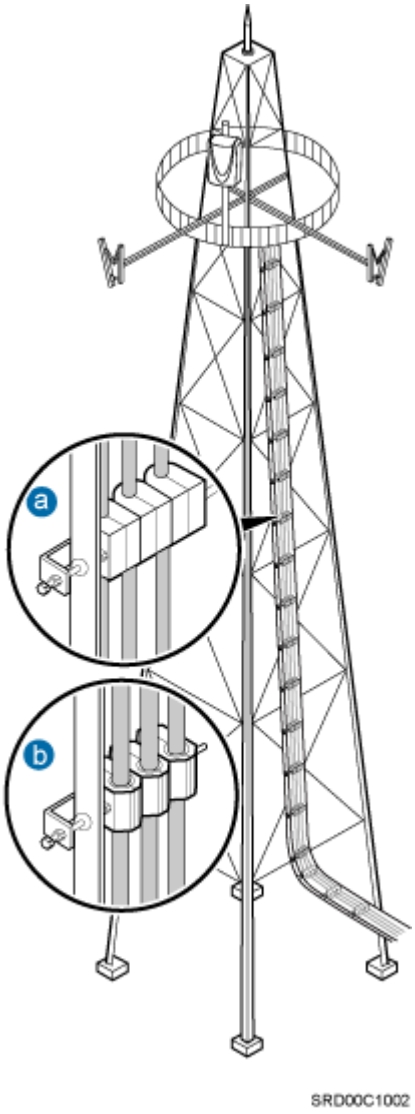
Figure 10-2 Cables secured on a cable tray



(1) 3-hole clip (2) 6-hole clip

The following figure shows the cables secured on a tower.

Figure 10-3 Cables secured on a tower



(1) 3-hole clip (2) 6-hole clip

Special Cabling Requirements

Cabling of power cables

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

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

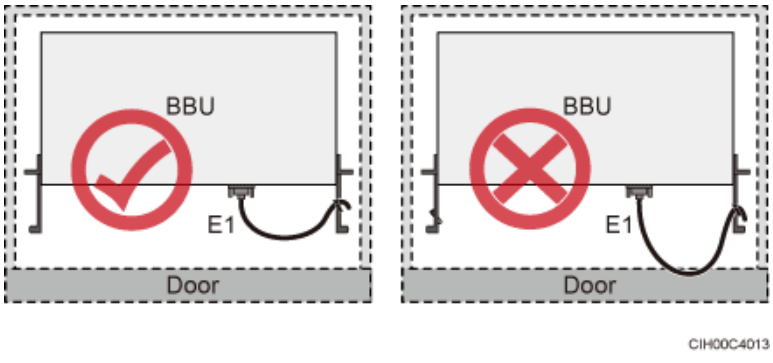
Cabling of PGND cables

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

Cabling of E1 cables

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

Figure 10-4 E1 cables routed in the cabinet

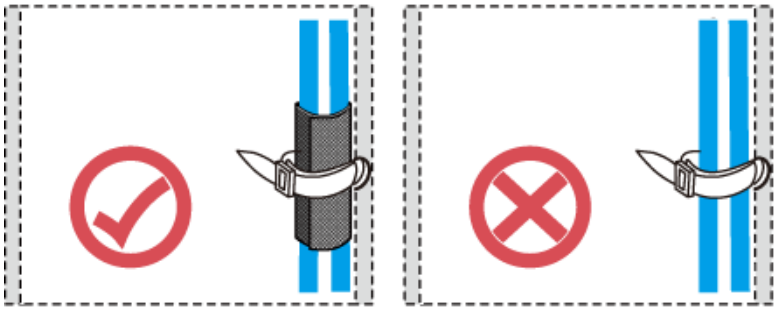


Cabling of fiber optic cables

- At least three people are required for laying out fiber optic cables. The cabling activities of fiber optic cables are allowed only when qualified personnel and communication facilities are available.

- The operating temperature of fiber optic cables ranges from -40ºC to +60ºC (-40ºF to +140ºF). If the actual temperature is beyond this range, take protective measures or select another route.
- Do not circle and twist cables.
- Do not bind a fiber optic cable at the position where it bends.
- Do not stretch, step on, or place heavy objects on fiber optic cables. Keep the fiber optic cables away from sharp objects.
- When fiber optic cables are routed, the excess of the fiber optic cables must be coiled around special devices, such as a fiber coiler.
- An unarmored fiber optic cable must be bound using binding straps. If a fiber optic patch cord needs to be secured in a cabinet or a piece of equipment, use binding straps to bind it and then use cable ties to secure the binding straps to the cabinet or equipment. Ensure that the fiber optic cables can flexibly move in the cable ties. Do not bend the fiber optic cables sharply. The following figure shows how to bind the fiber optic cables correctly.

Figure 10-5 Binding fiber optic cables



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

Figure 10-6 CPRI fiber optic cables routed in the cabinet (1)

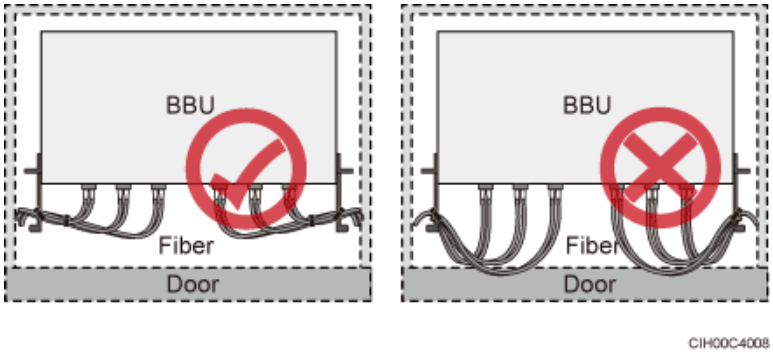


Figure 10-7 CPRI fiber optic cables routed in the cabinet (2)

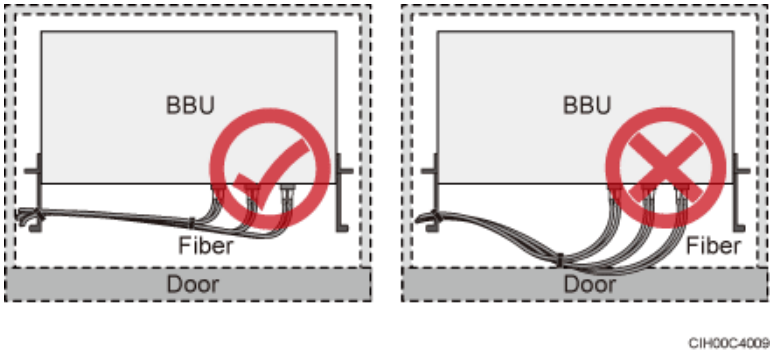
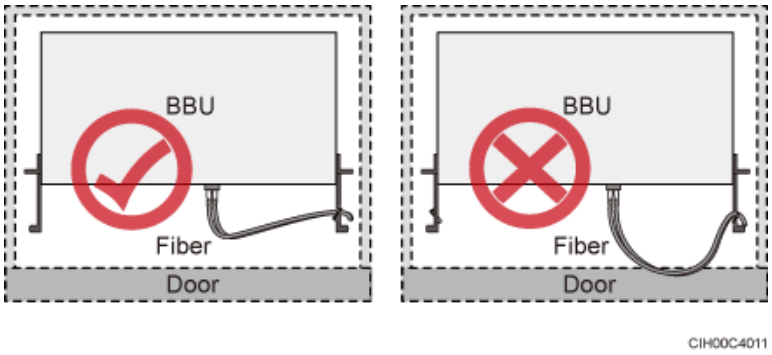


Figure 10-8 FE/GE fiber optic cables routed in the cabinet



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

10.2 Installing an AAU PGND Cable

This section describes the procedure and precautions for installing an AAU PGND cable.

Context

The following table lists the specifications of an AAU PGND cable.

Table 10-1 Specifications of an AAU PGND cable

Cable	End Connecting to the AAU	End Connecting to the Ground Bar	Color
AAU PGND cable	OT terminal (M6, 16 mm^2 or 0.025 $in.^2$)	OT terminal (M8, 16 mm^2 or 0.025 $in.^2$)	Green and yellow

Procedure

Step 1 Prepare a PGND cable.

1. Cut the cables to the length suitable for the actual cable route.
2. Add OT terminals to both ends of the cables according to the instructions in Assembling the OT Terminal and the Power Cable.

Step 2 Install the PGND cable.

1. Connect one end of the PGND cable with an M6 OT terminal to the ground bar of the mounting kits for the AAU (shown by ⏚), and use a torque wrench to tighten the ground bolt to 4.8 N·m (42.48 lbf·in.).

   Figure 10-9, **Figure 10-10**, and **Figure 10-11** show the methods of installing PGND cables when an AAU is installed on a pole, when an AAU is installed on a wall, and when an AAU is installed on the top of a pole, respectively.

Figure 10-9 Installing a PGND cable when an AAU is installed on a pole

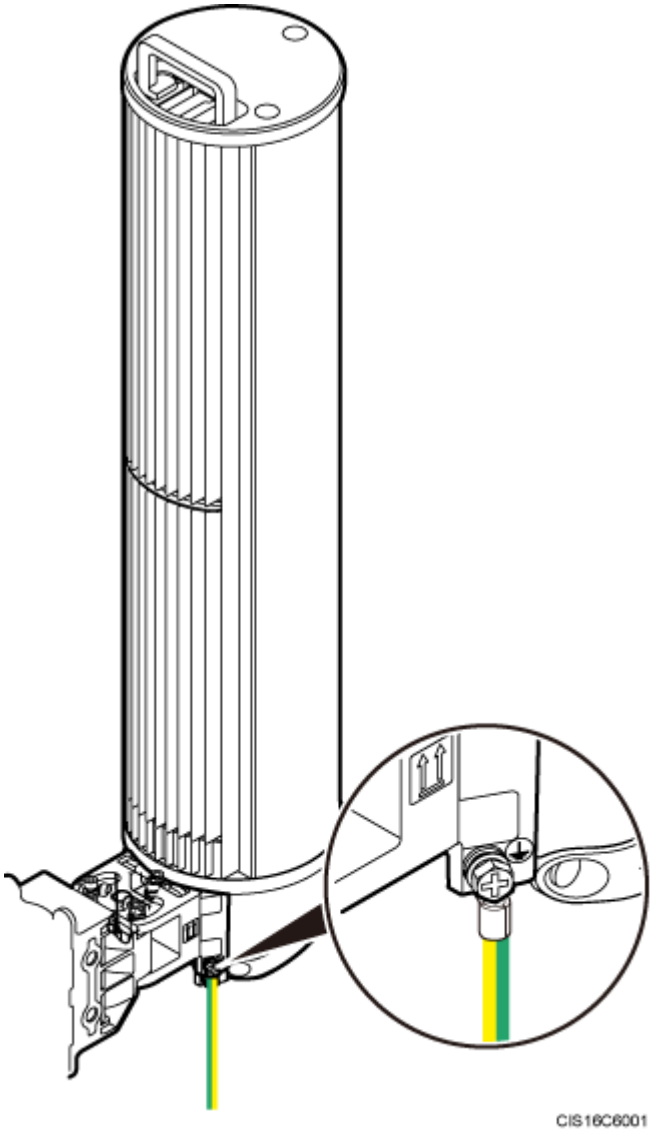


Figure 10-10 Installing a PGND cable when an AAU is installed on a wall

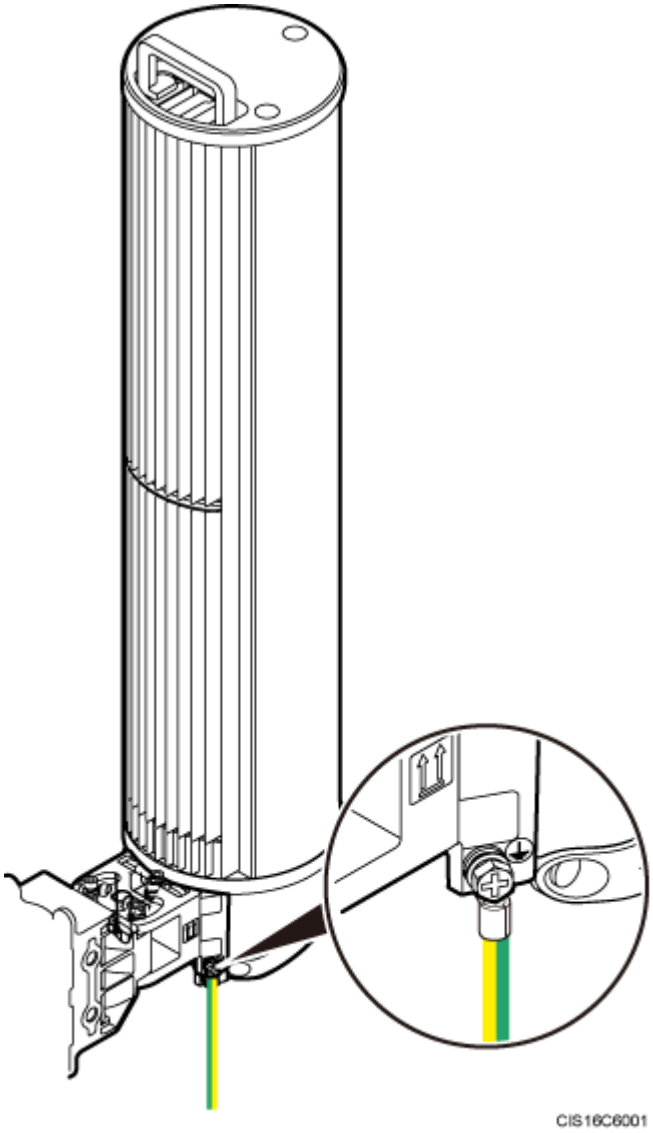
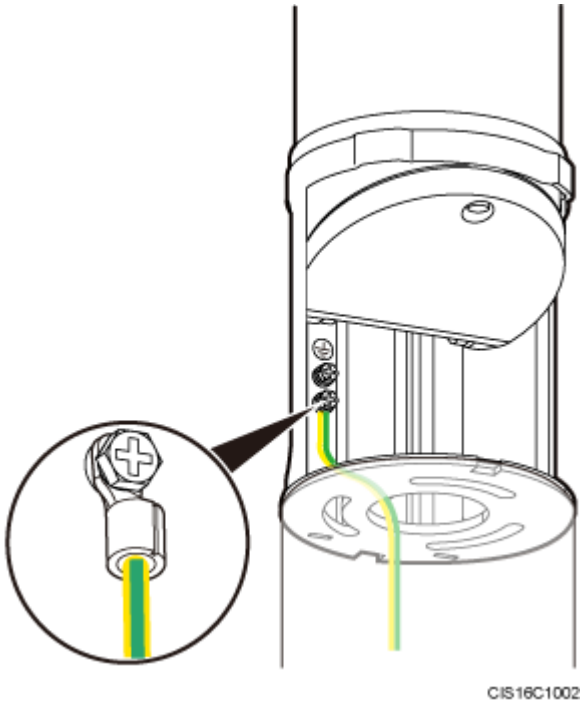


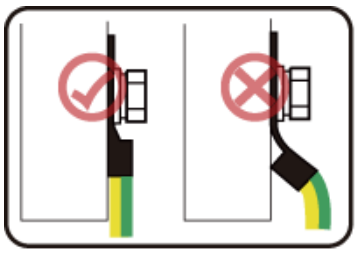
Figure 10-11 Installing a PGND cable when an AAU is installed on the top of a pole



NOTE

When installing a PGND cable, tightly press the OT terminal in the correct direction, as shown in the following figure.

Figure 10-12 Installing an OT terminal correctly

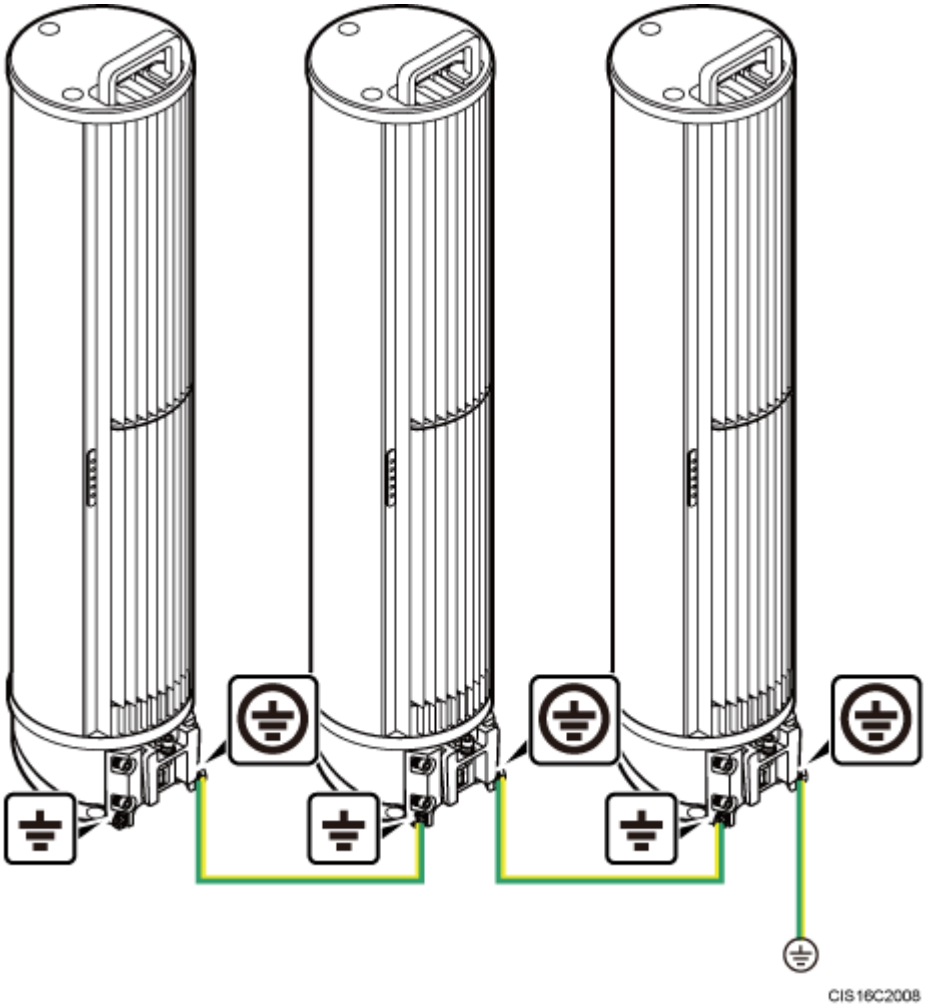


2. Connect the other end of the PGND cable with an M8 OT terminal to the external ground bar.

Step 3 **Optional:** When two or three AAUs are installed on a pole, equipotential cable(s) are required.

The following figure shows the method of installing equipotential cables between AAUs.

Figure 10-13 Installing equipotential cables when multiple AAUs are installed on a pole



Step 4 Lay out the cables according to the instructions in Cabling Requirements, and use cable ties to bind them.

Step 5 Label the installed cables according to the instructions in Attaching a Sign Plate Label.

----End

10.3 Installing an AAU Power Cable

This section describes the process and precautions for installing an AAU power cable.

Prerequisites

The AAU maintenance cavity has been opened.

Context

The following table describes AAU power cables used in different scenarios.

Table 10-2 AAU power cables

Scenario	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
No ODM is configured.	Tool-less female connector (pressfit type)	POWER-IN port on an AAU	Depending on the power equipment	Power equipment
An ODM is configured.	Tool-less female connector (pressfit type)	POWER-IN port on an AAU	Cord end terminal	L, N, and PE terminals near the OUTPUT silkscreen on the ODM

CAUTION

AAU power cables must be routed and protected according to the local laws and regulations, industry standards, and operators' standards.

CAUTION

When installing an AAU power cable for a running base station, connect the cable to the AAU before connecting it to the power system. An incorrect sequence or reverse connection of the power cable will cause damage to the AAU or injuries to the human body.

Procedure

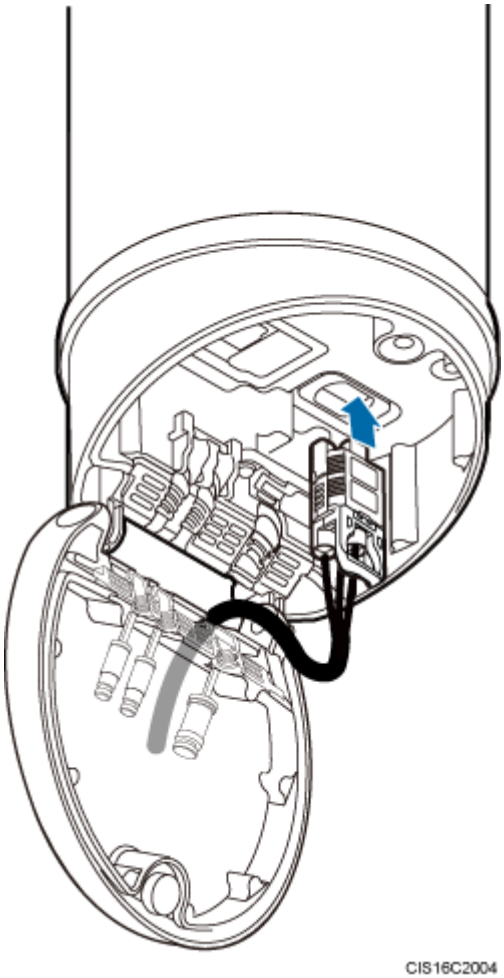
- **Protecting an AAU power cable using a tube**
  1. Cut the cable to the length suitable for the actual cable route.
  2. Before adding connectors to the cable, put the cable through a PVC corrugated pipe or metal tube. The length of the PVC corrugated pipe or metal tube depends on the length of the cable. Waterproof the PVC corrugated pipe or metal tube, and ground both ends of the metal tube.
- **Preparing an AAU power cable**
  1. Add a tool-less female connector (pressfit type) to the AAU's AC power cable. For details, see **16.2 Adding a Tool-Less Female Connector (Pressfit Type) to an AAU Power Cable on the AAU Side**.
  2. Add the corresponding connector to the end of the AAU power cable connected to power equipment according to the type of the port on the power equipment.

- If no ODM is configured, add the corresponding connector to the power cable according to the type of the port on the power equipment.
- If an ODM is configured, add cord end terminals to the end of the power cable connected to the ODM according to the instructions in Assembling the Cord End Terminal and the Power Cable.

- **Connecting an AAU power cable to an AAU**

1. Route an AAU power cable into the maintenance cavity through the rear of the maintenance cavity.
2. Connect one end of the AAU power cable with a tool-less female connector (pressfit type) to the power port on the AAU, as shown in the following figure.

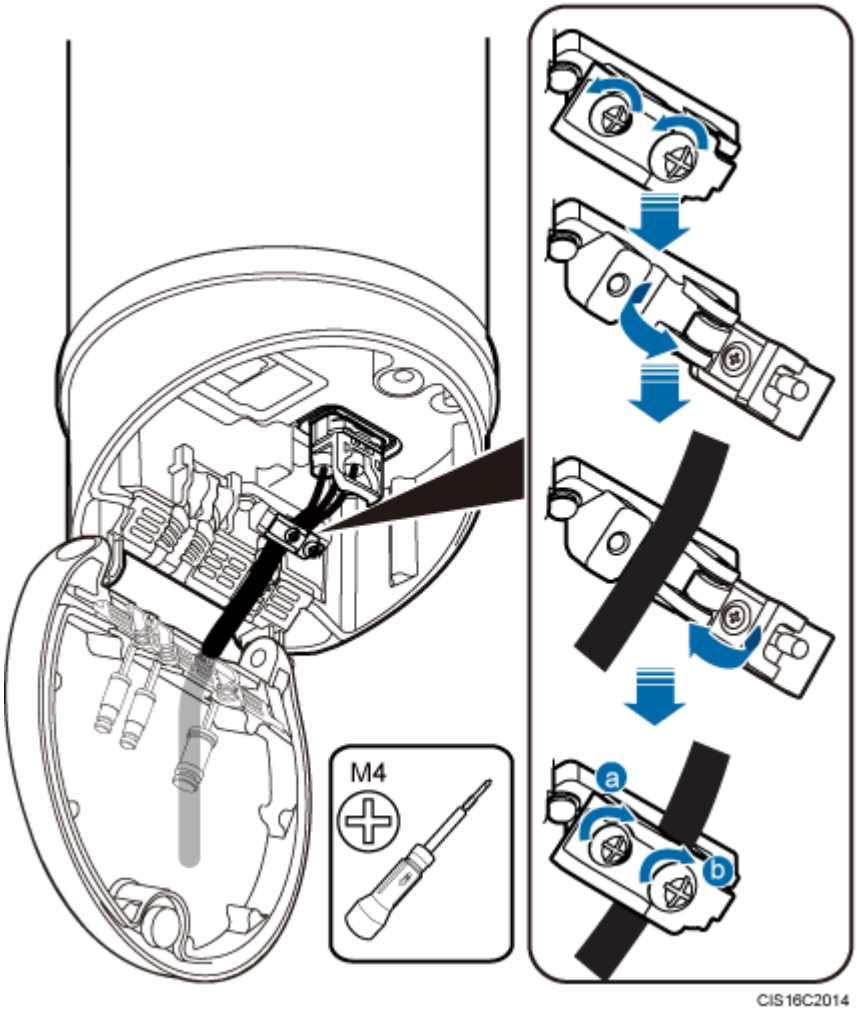
Figure 10-14 Connecting an AAU power cable to an AAU



3. Use a clip to secure the power cable, as shown in the following figure.
   a. Use an M4 screwdriver to loosen two screws in sequence to open the power cable clip.
   b. Put the power cable through the clip and waterproof trough, and close the clip.

c. Use an M4 torque screwdriver to tighten the screws indicated by a and b in the following figure to 1.4 N·m (12.39 lbf·in.) in sequence.

Figure 10-15 Securing a power cable



- **Connecting an AAU power cable to power equipment**

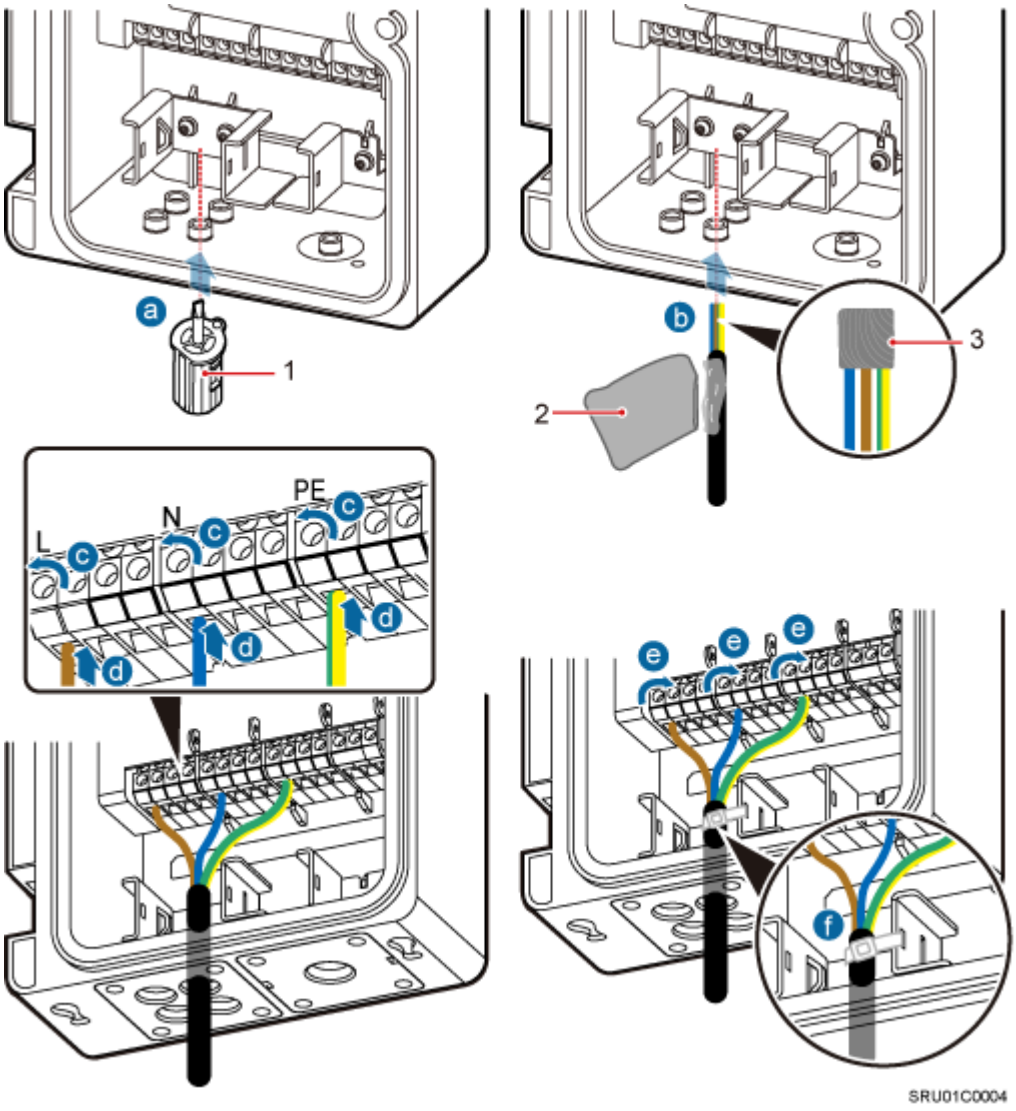
If...	Then...
No ODM is configured	Connect the other end of the AAU power cable to the corresponding port on external power equipment.
An ODM is configured	Perform the following operations.

1. Use a screwdriver to pierce silica gel in the cable holes near the OUTPUT silkscreen on the ODM, as shown by illustration a in the following figure. Do not pierce silica

gel in the cable holes through which no cables are routed because silica gel is required to provide the waterproof function.

2. Use insulation tape to wrap cord end terminals of the power cable to prevent sharp edges of the cord end terminal from damaging silica gel.
3. Apply petroleum jelly to the power cable, and then route the power cable through a cable hole.
4. Use the screwdriver delivered with the ODM to loosen screws on the terminals to which the power cable is to be connected, and connect the terminals on the power cable to the corresponding terminals, as shown by illustrations c and d in the following figure.
5. Tighten the screws on the terminals of the power cable, as shown by illustration e in the following figure.
6. Securely bind the power cable to the binding bracket, as shown by illustration f in the following figure.

Figure 10-16 Connecting an AAU power cable to an ODM



(1) Screwdriver delivered with the ODM (2) Petroleum jelly (3) Insulation tape

- Lay out the cables according to the instructions in Cabling Requirements, and use cable ties to bind them.
- Label the installed cables according to the instructions in Attaching a Cable-Tying Label.

----End

10.4 Installing an ODM Power Cable

This section describes the process and precautions for installing an ODM power cable when an ODM is configured.

Context

The following table describes the ODM power cable connections.

Table 10-3 ODM power cable connections

Cable	One End		The Other End	
	Connector	Installation Position	Connector	Installation Position
ODM power cable	Cord end terminal	L, N, and PE terminals near the INPUT silkscreen on the ODM	Depending on the power equipment	External power equipment

Procedure

Step 1 Prepare an ODM power cable.

- Add a cord end terminal to the end of the power cable connected to the ODM side according to the instructions in Assembling the Cord End Terminal and the Power Cable.
- Add a connector to the other end of the ODM power cable connected to power equipment according to the type of the port on the power equipment.

Step 2 Loosen the M4 captive screw from the ODM case and open the ODM case.

Step 3 Use a screwdriver to pierce silica gel in the cable holes near the INPUT silkscreen on the ODM.

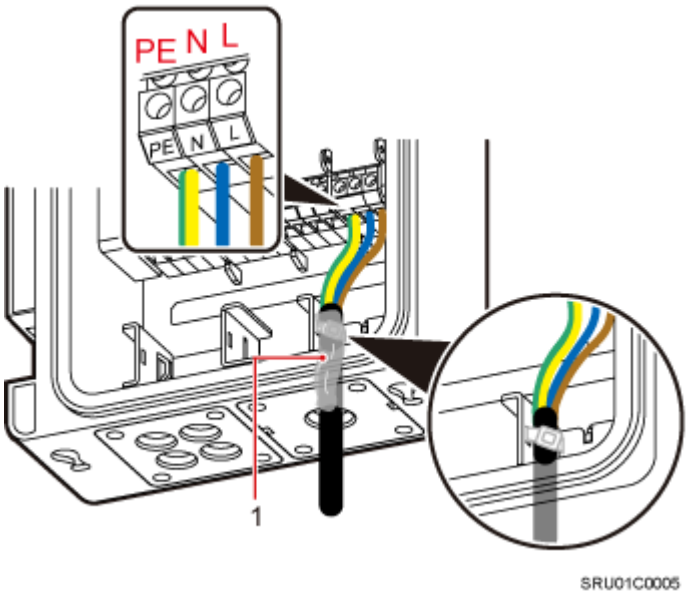
Step 4 Use insulation tape to wrap cord end terminals of the power cable to prevent sharp edges of the cord end terminal from damaging silica gel.

Step 5 Apply petroleum jelly to the power cable, and then route the power cable through a cable hole.

Step 6 Connect one end of the power cable to the L, N, and PE terminals near the INPUT silkscreen, and use a torque screwdriver to tighten the screws to 0.8 N·m (7.08 lbf·in.), as shown in the following figure.

Step 7 Securely bind the power cable to the binding bracket, as shown in the following figure.

Figure 10-17 Installing an ODM power cable



Step 8 Connect the other end of the ODM power cable to the external power equipment.

Step 9 Lay out the cables according to the instructions in Cabling Requirements, and use cable ties to bind them.

Step 10 Label the installed cables according to the instructions in Attaching a Cable-Tying Label.

----End

10.5 Installing a Trunk CPRI Fiber Optic Cable Between an ODM and a BBU

This section describes the procedure for installing a trunk CPRI fiber optic cable between an ODM and a BBU when an ODM is configured.

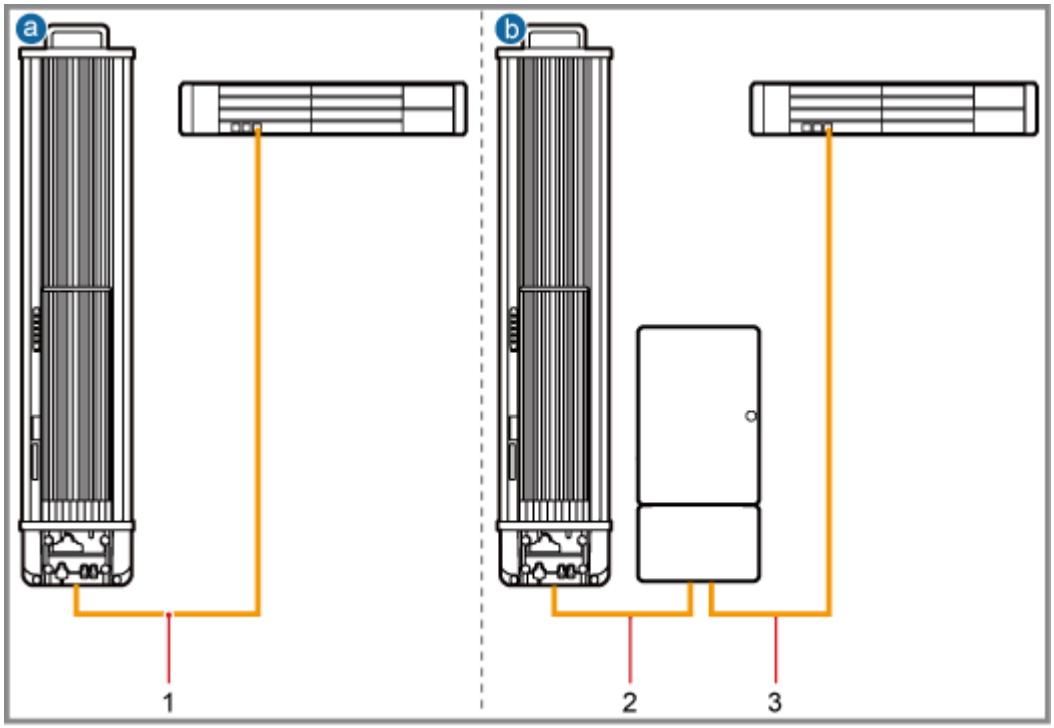
Prerequisites

A fiber fusion splicer is available.

Context

A CPRI fiber optic cable to be installed is shown by illustration 3 in the following figure.

Figure 10-18 Installing CPRI fiber optic cables



(1) CPRI fiber optic cable between an AAU and a BBU

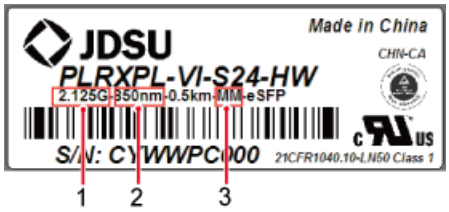
(2) CPRI fiber optic cable between an AAU and an ODM

(3) CPRI fiber optic cable between an ODM and a BBU

NOTE

- The single-mode optical module is labeled as SM and the multimode optical module is labeled as MM.
- The puller of a single-mode optical module is blue and the puller of a multimode optical module is black or gray.
- The following figure shows the label on an optical module.

Figure 10-19 Label on an optical module



(1) Maximum rate

(2) Wavelength

(3) Transmission mode

NOTICE

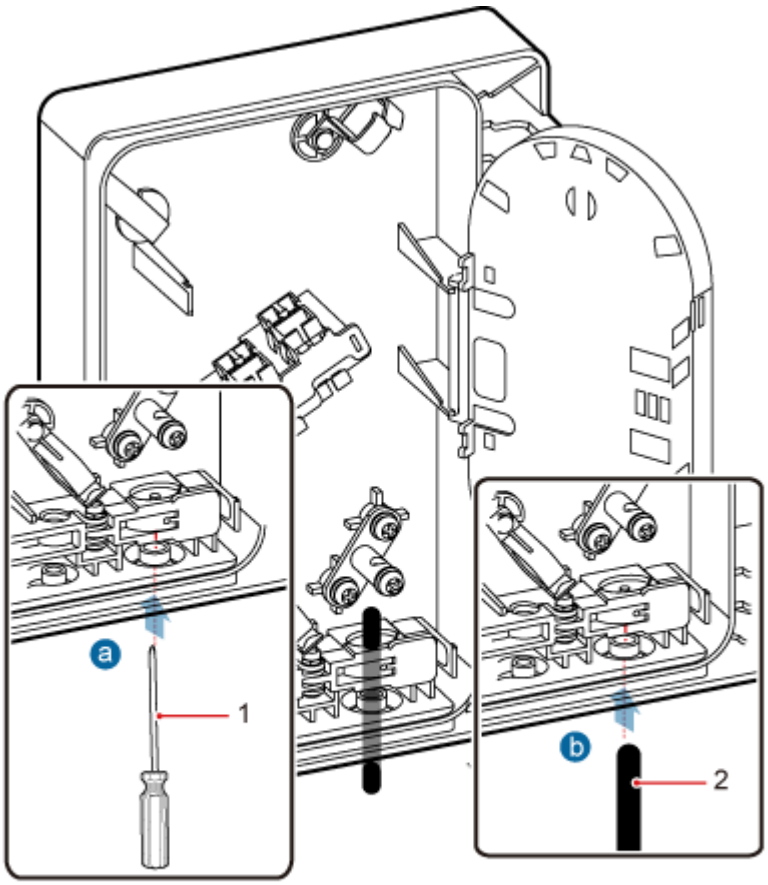
The performance of an optical module may deteriorate if it is exposed to the air for more than 20 minutes. Therefore, insert a fiber optic cable into an unpacked optical module within 20 minutes.

Procedure

- **Stripping a trunk fiber optic cable and pigtails**

  1. Use a screwdriver to pierce silica gel in the cable hole on the ODM for the trunk fiber optic cable, as shown by illustration a in the following figure.
  2. Route a trunk fiber optic cable through the cable hole, as shown by illustration b in the following figure.

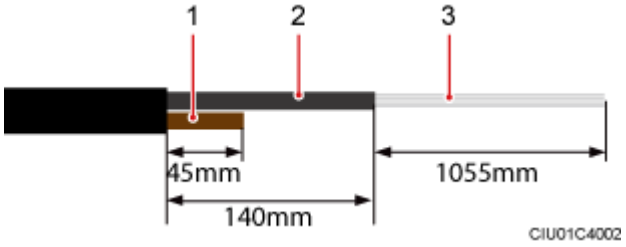
     Figure 10-20 Routing a trunk fiber optic cable through a cable hole



     (1) Screwdriver (2) Trunk fiber optic cable

  3. Strip a specified length of sheath off the trunk fiber optic cable, as shown in the following figure.

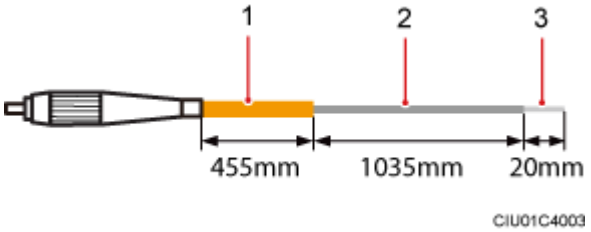
Figure 10-21 Stripping a specified length of sheath off a trunk fiber optic cable



(1) Strength member (2) Core wire (3) Bare fiber

4. Strip a specified length of sheath off the pigtail, as shown in the following figure.

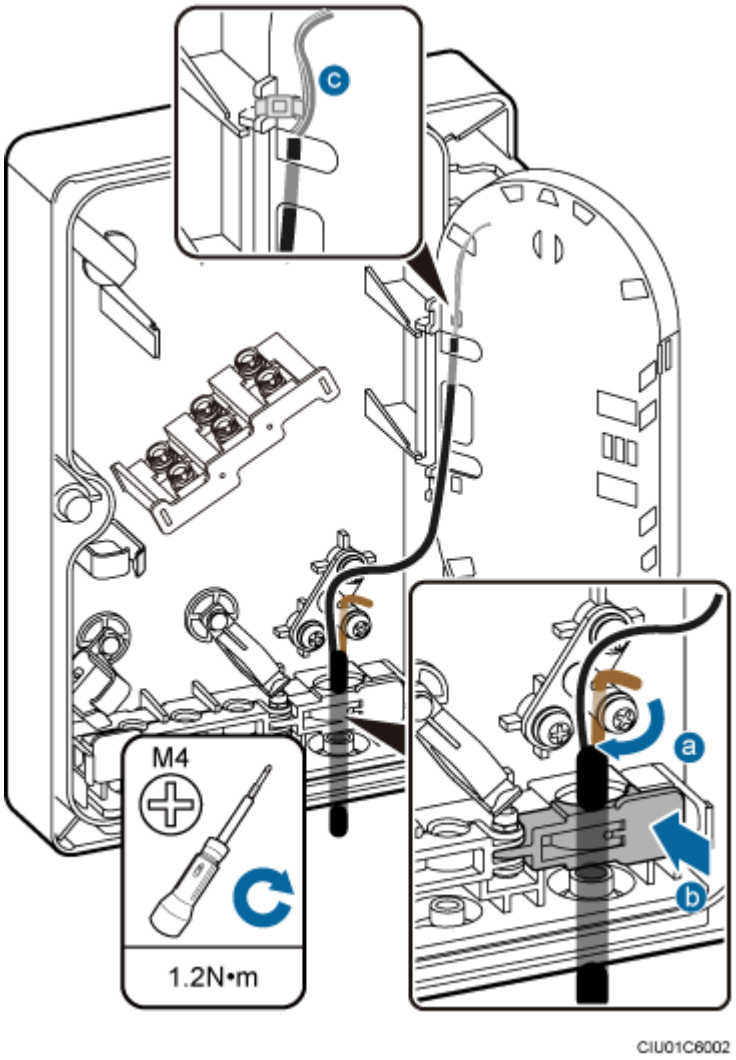
Figure 10-22 Stripping a specified length of sheath off a pigtail



(1) Sheath (2) Core wire (3) Bare fiber

- **Installing a trunk fiber optic cable**
  1. Route the strength member through the hanger, bend the strength member, and tighten the screw on the hanger to 1.2 N·m (10.62 lbf·in.), as shown by illustration a in the following figure.
  2. Use a finger to press the clip until it snaps into place, as shown by illustration b in the following figure.
  3. Route the core wire of the trunk fiber optic cable through the cable hole in the splicing tray, and use a cable tie to fasten the core wire, as shown by illustration c in the following figure.

Figure 10-23 Installing a trunk fiber optic cable



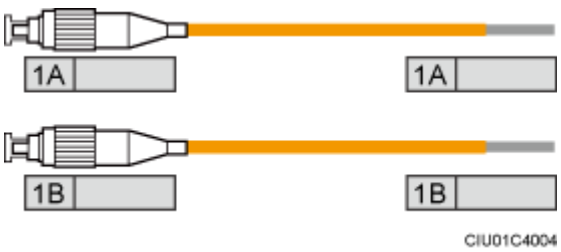
- **Installing a pigtail**

  1. Attach labels delivered with the splicing tray in the ODM to both ends of the pigtails to be installed.

     NOTE

     The following figure shows the first group of labeled pigtails.

Figure 10-24 First group of labeled pigtails

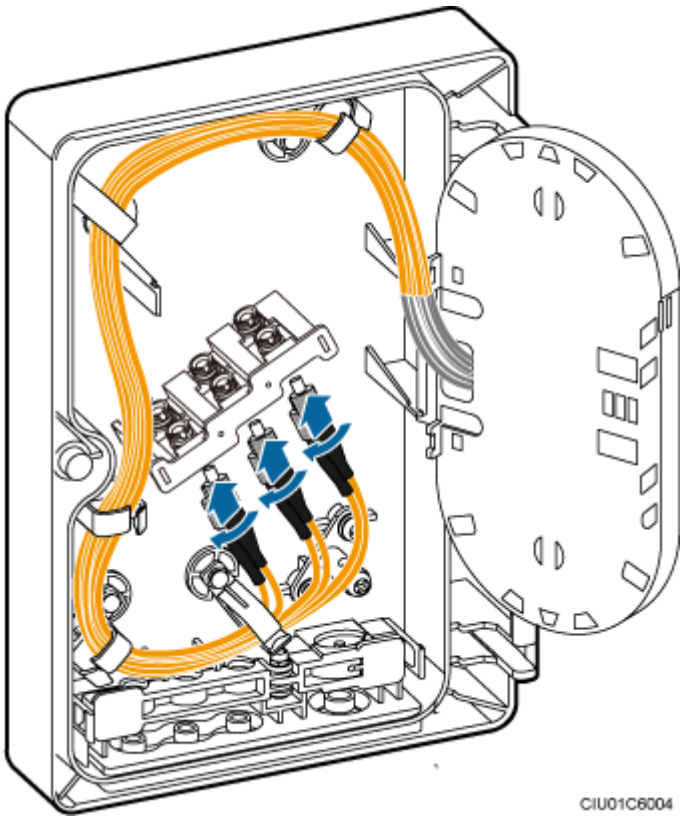


2. Insert the end of the pigtails with FC connectors to the adapter delivered with the ODM, coil the fiber optic cable clockwise, and route the fiber optic cable through the cable hole in the splicing tray, as shown in the following figure.

   NOTE

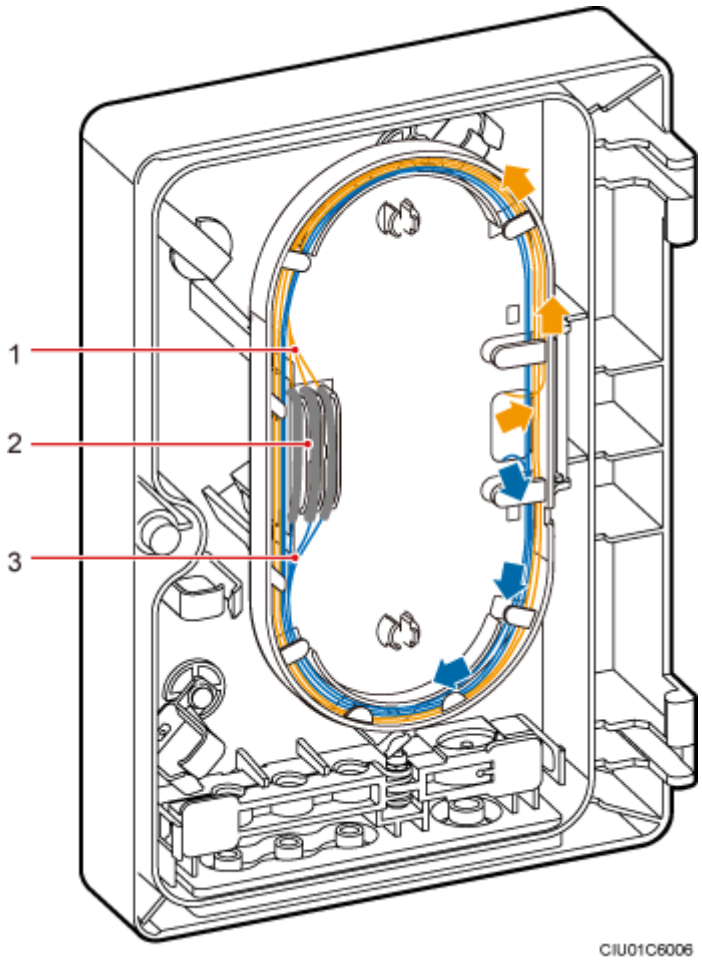
   This section uses FC connectors as examples. SC or LC connectors can be added to pigtails.

Figure 10-25 Connecting pigtails and coiling the fiber optic cable



- **Splicing fiber and coiling the fiber optic cable**
  1. Put the heat shrink tubing onto the bare fiber at one end of the trunk fiber optic cable.
  2. Use cloth dipped in detergent to clean the ends of the trunk fiber optic cable and pigtails, and ensure that the spliced area is cleaned.
  3. Use a fiber fusion splicer to splice the trunk fiber optic cable and pigtails.
  4. Move the heat shrink tubing to the fiber splice point so that the tubing shrinks, and install a protective cover to the trough to protect the fiber splice point.
  5. Coil the trunk fiber optic cable counterclockwise and the pigtails clockwise in the splicing tray, as shown in the following figure.

Figure 10-26 Coiling the spliced fiber optic cable

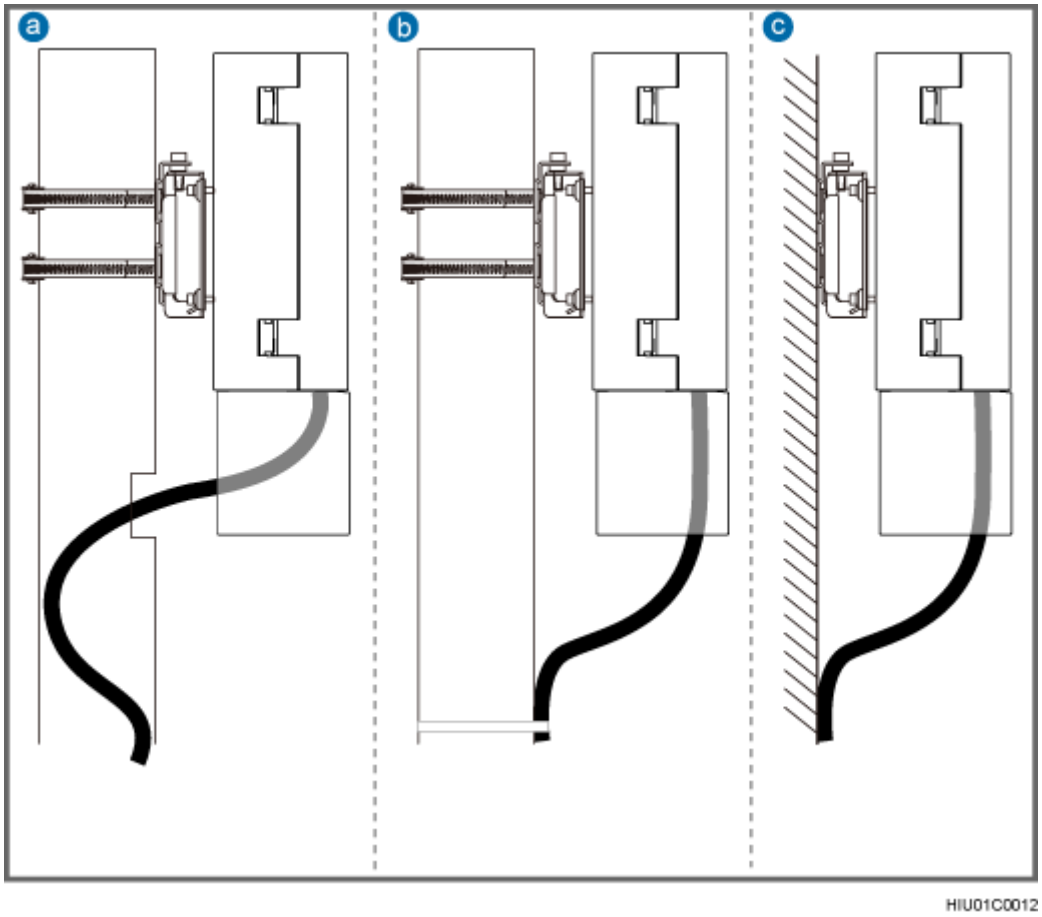


(1) Trunk fiber optic cable (2) Heat shrink tubing (3) Pigtail

NOTICE

To open the ODM case for maintenance, a minimum of 40 mm (1.57 in.) fiber optic cable is reserved outside the ODM case, as shown in the following figure.

Figure 10-27 Reserving slack of a CPRI fiber optic cable



a: Scenario in which a pole is used (routing a cable along the inner side of the pole)

b: Scenario in which a pole is used (routing a cable along the outer side of the pole)

c: Scenario in which a wall is used

- Lay out the cables according to the instructions in Cabling Requirements, and use cable ties to bind them.
- Label the installed cables according to the instructions in Attaching an L-Shaped Label.

----End

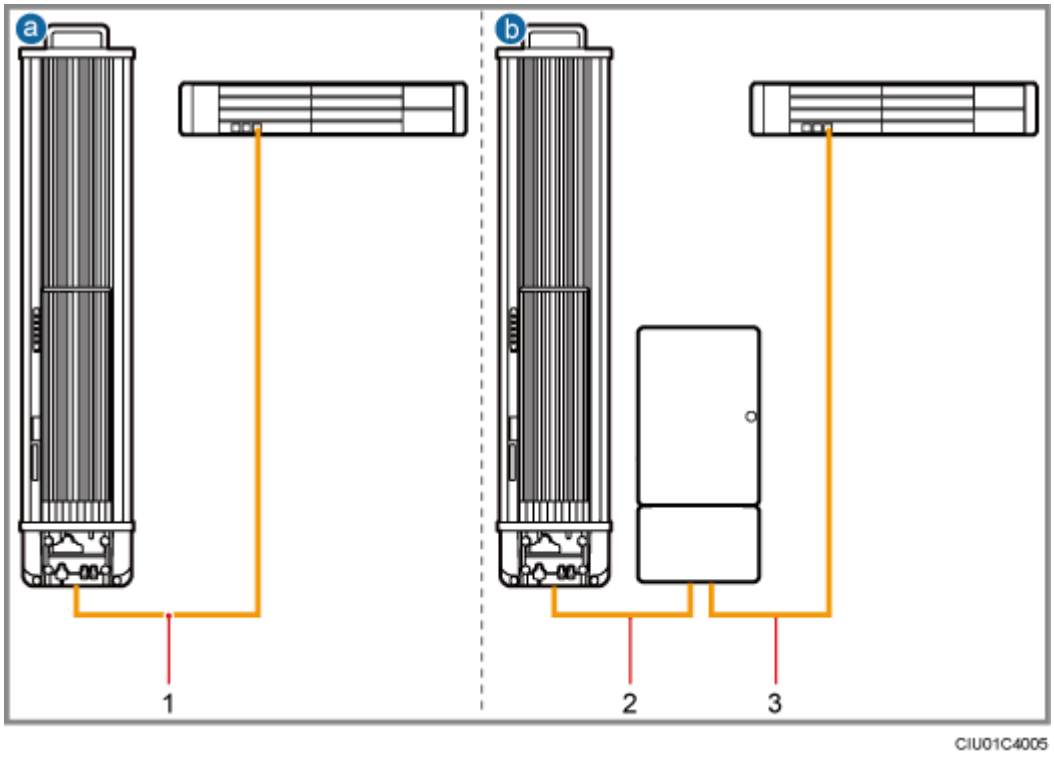
10.6 Installing a CPRI Fiber Optic Cable Between an AAU and a BBU or Between an AAU and an ODM

If no ODM is configured, a CPRI fiber optic cable is directly connected to a BBU. If an ODM is configured, a CPRI fiber optic cable is connected to the ODM.

Context

A CPRI fiber optic cable to be installed is shown by illustration 1 or 2 in the following figure.

Figure 10-28 Installing CPRI fiber optic cables



(1) CPRI fiber optic cable between an AAU and a BBU

(2) CPRI fiber optic cable between an AAU and an ODM

(3) CPRI fiber optic cable between an ODM and a BBU

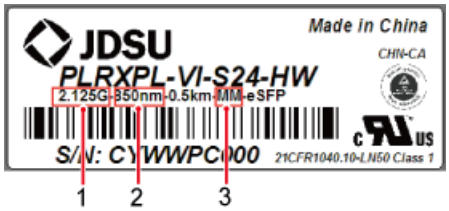
NOTICE

The optical modules to be installed must match the rates of their corresponding CPRI ports.

NOTE

- The single-mode optical module is labeled as SM and the multimode optical module is labeled as MM.
- The puller of a single-mode optical module is blue and the puller of a multimode optical module is black or gray.
- The following figure shows the label on an optical module.

Figure 10-29 Label on an optical module



(1) Maximum rate

(2) Wavelength

(3) Transmission mode

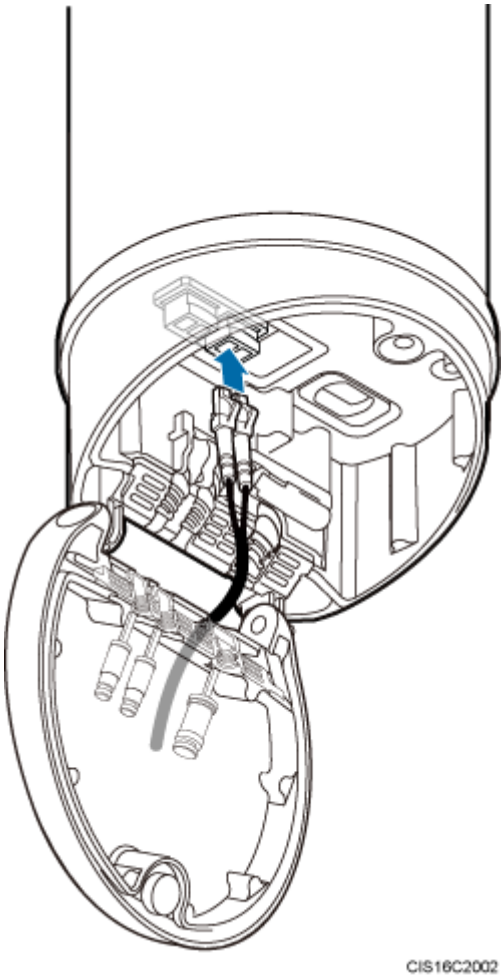
NOTICE

The performance of an optical module may deteriorate if it is exposed to the air for more than 20 minutes. Therefore, insert a fiber optic cable into an unpacked optical module within 20 minutes.

Procedure

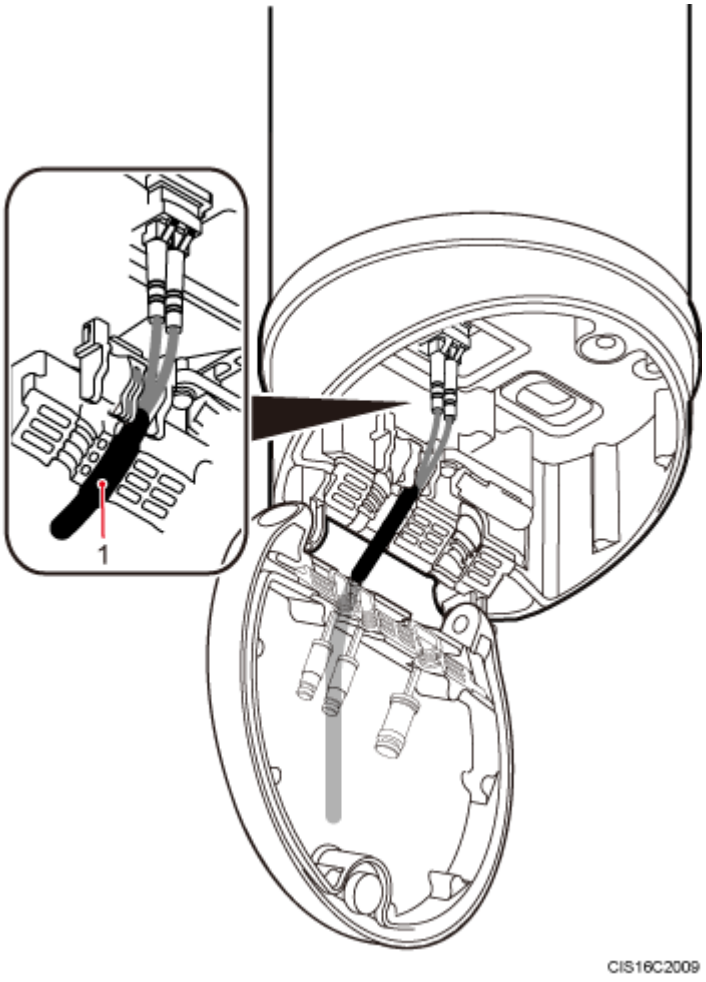
- **Connecting a CPRI fiber optic cable to an AAU**
  1. Route a CPRI fiber optic cable into the maintenance cavity through the rear of the maintenance cavity.
  2. Insert the optical connector into the optical module, as shown in the following figure.

     Figure 10-30 Connecting a CPRI fiber optic cable to an AAU (a)

  3. Press the fiber concentrator into the waterproof trough, as shown in the following figure.

Figure 10-31 Connecting a CPRI fiber optic cable to an AAU (b)



(1) Fiber concentrator

- **Installing a CPRI fiber optic cable between a BBU and an ODM**

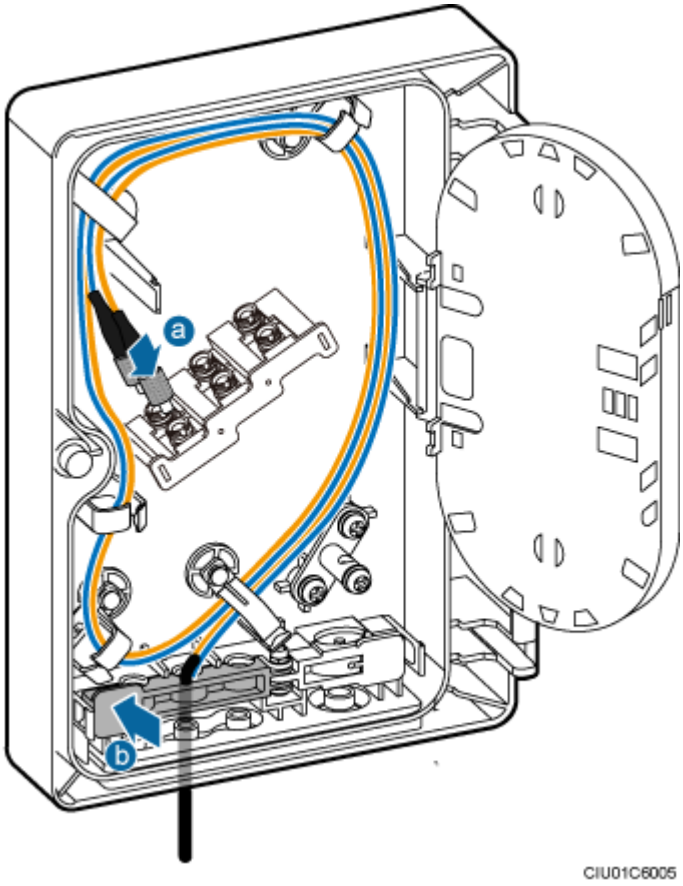
If...	Then...
The CPRI fiber optic cable is to be connected the BBU	Insert the other end of the fiber optic cable into the optical module on the BBU side.
The CPRI fiber optic cable is to be connected to the ODM	Perform the following operations.

1. Use a screwdriver to pierce silica gel in the cable hole on the ODM for the output fiber optic cable.
2. Route the other end of the fiber optic cable with an FC connector through the cable hole, coil the fiber optic cable counterclockwise, and connect the fiber optic cable to

the corresponding port on the fiber adapter, as shown by illustration a in the following figure.

3. Use a finger to press the clip until it snaps into place, as shown by illustration b in the following figure.

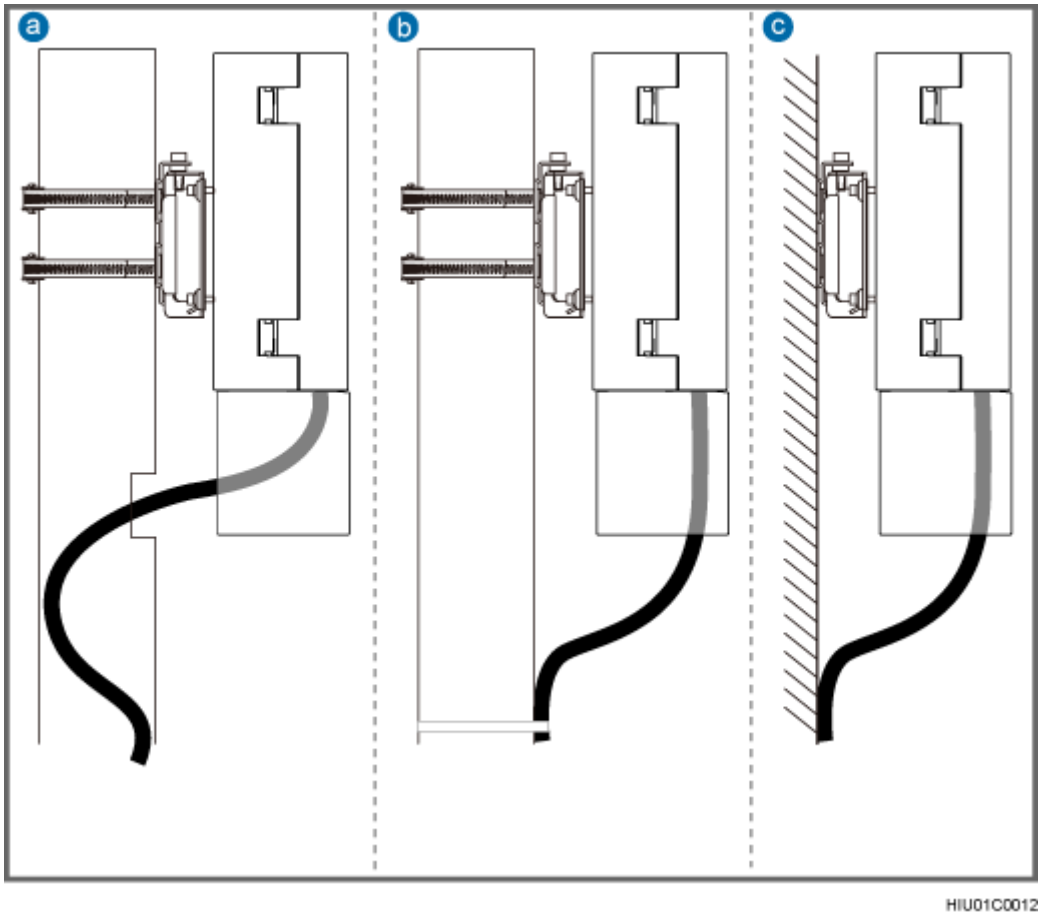
Figure 10-32 Connecting a CPRI fiber optic cable to an ODM



NOTICE

To open the ODM case for maintenance, a minimum of 40 mm (1.57 in.) fiber optic cable is reserved outside the ODM case, as shown in the following figure.

Figure 10-33 Reserving slack of a CPRI fiber optic cable



a: Scenario in which a pole is used (routing a cable along the inner side of the pole)

b: Scenario in which a pole is used (routing a cable along the outer side of the pole)

c: Scenario in which a wall is used

- Lay out the cables according to the instructions in Cabling Requirements, and use cable ties to bind them.
- Label the installed cables according to the instructions in Attaching an L-Shaped Label.

----End

Follow-up Procedure

After all cables for the ODM are installed, close the ODM case and tighten the M4 screw on the cover.

11 Closing a Maintenance Cavity

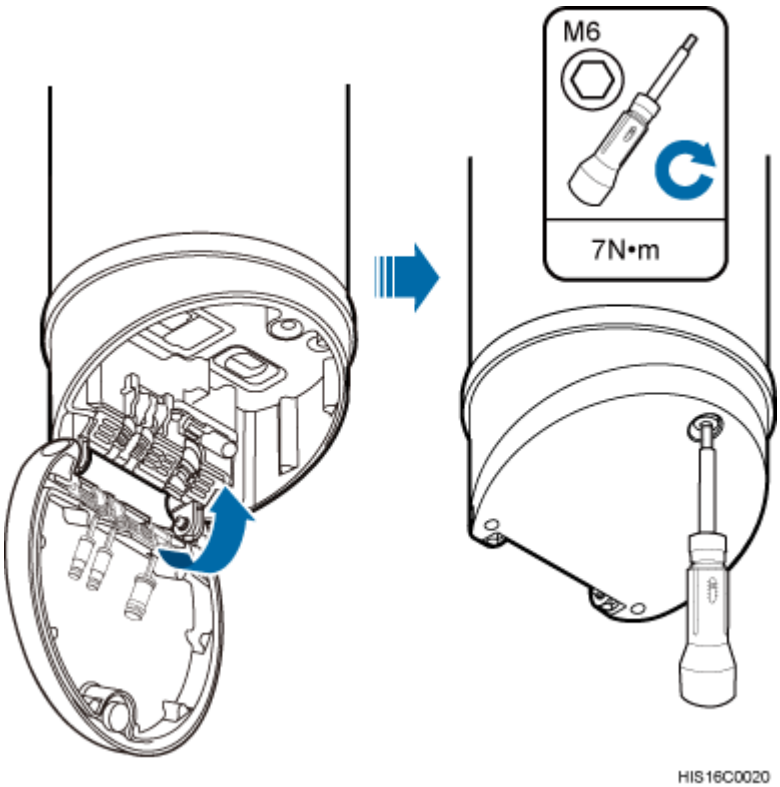
After all installation procedures are complete, you need to close the AAU maintenance cavity.

Procedure

Step 1 Use waterproof blocks to seal vacant waterproof troughs in the maintenance cavity.

Step 2 Use an M6 inner hexagon torque screwdriver to tighten the screw on the maintenance cavity, as shown in the following figure.

Figure 11-1 Closing a maintenance cavity



----End

12 (Optional) Installing a Cord Cover for an ODM

This section describes a procedure for installing a cord cover for an ODM after all cables are installed.

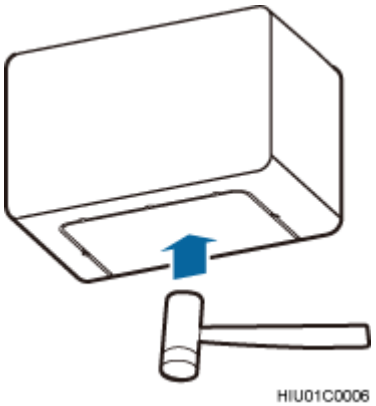
Prerequisites

- An ODM has been installed.
- All cables for the ODM have been installed.

Procedure

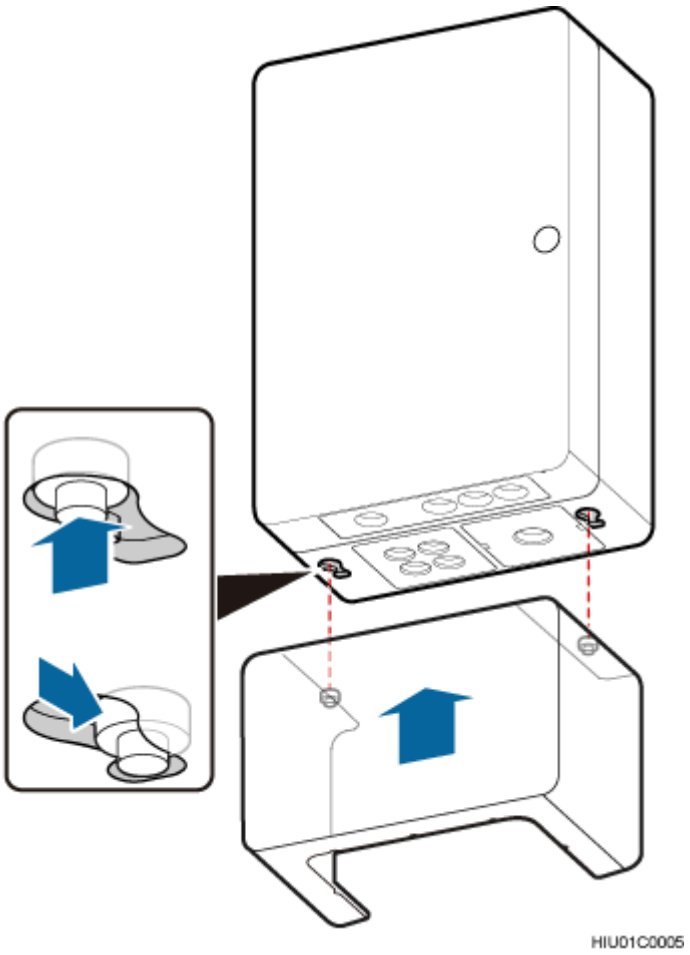
Step 1 **Optional:** When an ODM is installed on a wall or ODM cables are routed along the outer side of a pole, remove the part from the bottom of a cord cover, as shown in the following figure. If cables are routed along the inner side of a pole, skip this step.

Figure 12-1 Removing a part



Step 2 Lift the cord cover so that the two round dowels on the top of the cord cover are inserted into the holes on the bottom of the ODM, and push the cord cover upwards, as shown in the following figure.

Figure 12-2 Installing a cord cover



----End

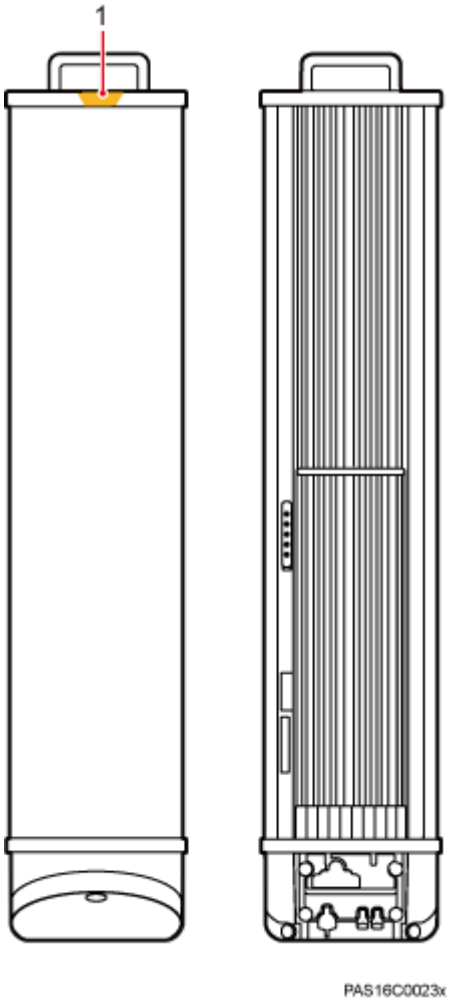
13 Adjusting the Horizontal Azimuth of an Antenna

This section describes the procedure for adjusting the horizontal azimuth of an antenna based on coverage requirements after all cables are installed.

Context

The normal line of an antenna is located on the front of the antenna, as shown in the following figure. Before adjusting the horizontal azimuth of an antenna, determine the direction towards which the antenna faces according to the normal line.

Figure 13-1 Normal line of an antenna

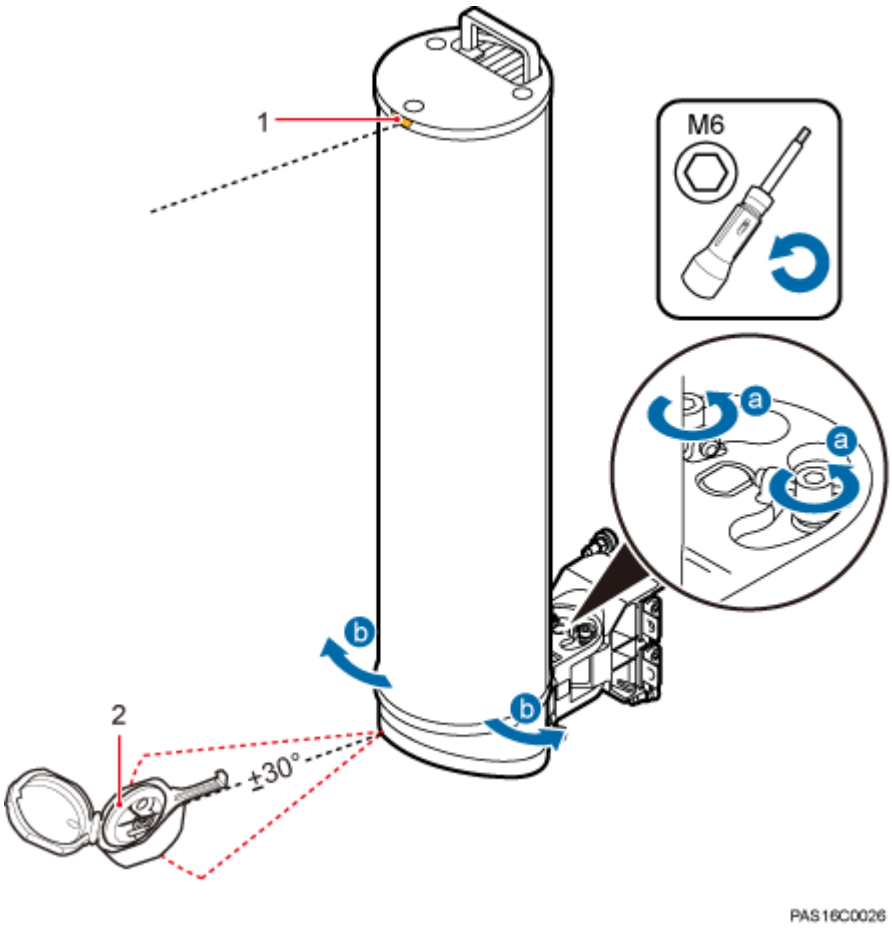


(1) Normal line of an antenna

Procedure

- **Adjusting the horizontal azimuth of an antenna installed on a pole or wall**
  1. Loosen the screws on the angle adjusting component, and rotate the angle adjusting component based on the coverage requirements, as shown in the following figure.

Figure 13-2 Adjusting the horizontal azimuth of an antenna (1)

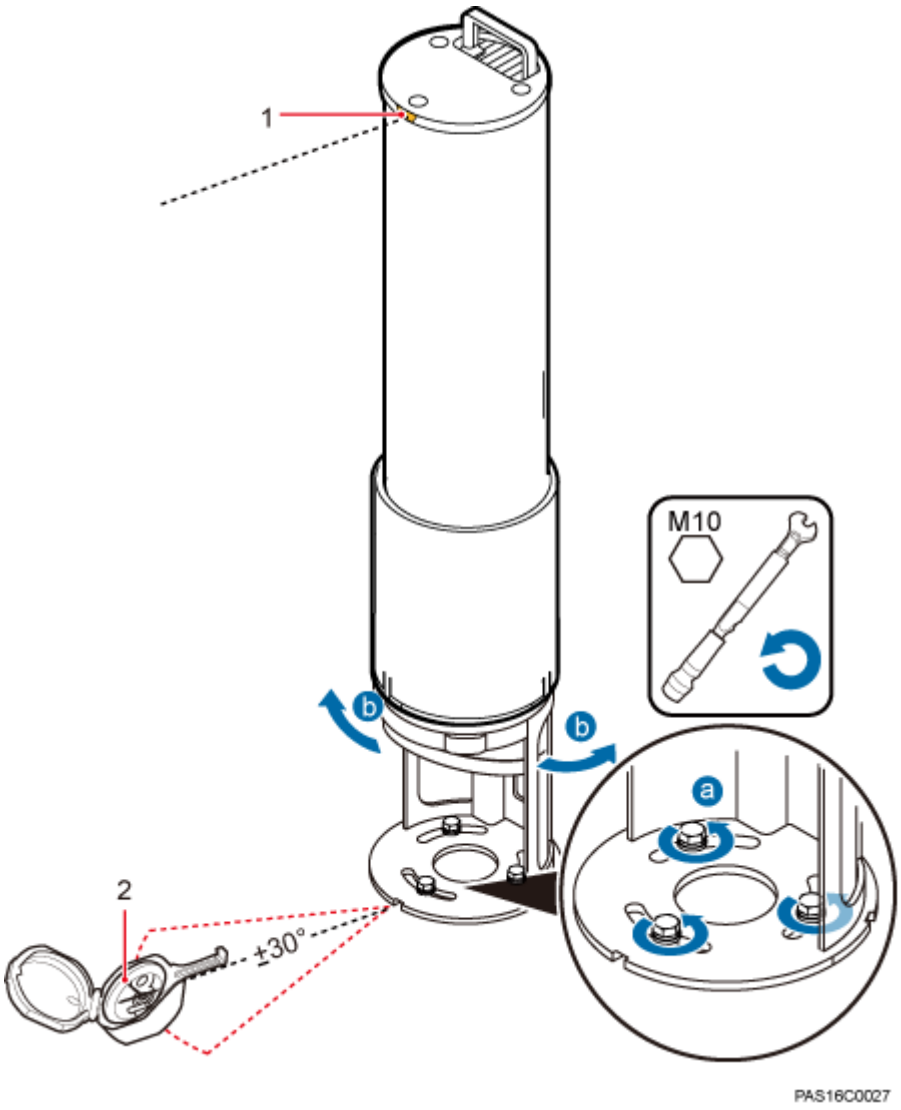


(1) Normal line of an antenna (2) Geologic compass

2. Tighten the screws on the angle adjusting component to 6 N·m (53.1 lbf·in.).

- **Adjusting the horizontal azimuth of an antenna installed on the top of a pole**
  1. Lift the landscaping cover until it is stuck above the elastomer.
  2. Loosen the screws on the mounting bracket, and rotate the mounting bracket based on the coverage requirements, as shown in the following figure.

Figure 13-3 Adjusting the horizontal azimuth of an antenna (2)



(1) Normal line of an antenna (2) Geologic compass

3. Use a torque wrench to tighten the screws on the mounting bracket to 28 N·m (247.8 lbf·in.).

----End

14 Installation Checklist

This section describes the checklist for AAU hardware installation.

The following table describes the checklist for AAU hardware installation.

Table 14-1 Hardware installation checklist

No.	Item
1	The installation position of each device strictly complies with the engineering design and meets clearance requirements. Sufficient space is reserved for equipment maintenance.
2	An AAU is securely attached to an attachment plate, and the attachment plate is securely attached to mounting kits.
3	A fiber concentrator is pressed into the waterproof trough in the maintenance cavity.
4	The screw on the cover plate for the maintenance cavity at the bottom of the AAU is tightened to the torque recommended in this document.
5	Waterproof blocks are securely installed in vacant cable troughs of the maintenance cavity, and the cover plate for the cabling cavity is securely installed.
6	There are no connectors or joints on each power cable or PGND cable.
7	The terminals at both ends of each power cable or PGND cable are securely crimped.
8	None of power cables and PGND cables can be short-circuited or reversely connected. In addition, these cables are not damaged or broken.
9	Power cables and PGND cables are separately bound.
10	The building surge protection ground and the antenna surge protection ground are separately performed.
11	The connectors of each signal cable are intact and securely connected.
12	Mounting kits are securely installed.

No.	Item
13	Labels are correct, legible, and complete at both ends of each cable, such as feeders and jumpers.

15 Powering on an AAU

This section describes the procedure and precautions for powering on an AAU.

Context

DANGER

- Before powering on a base station, check that the positive and negative wires of all power cables are correctly connected. Any incorrect power cable connection may cause damage to equipment or unexpected injuries of human body.
- Exercise caution when performing a power-on check, which involves high voltage operations. Direct contact with the input voltage or indirect contact with the input voltage using a damp object may be fatal.

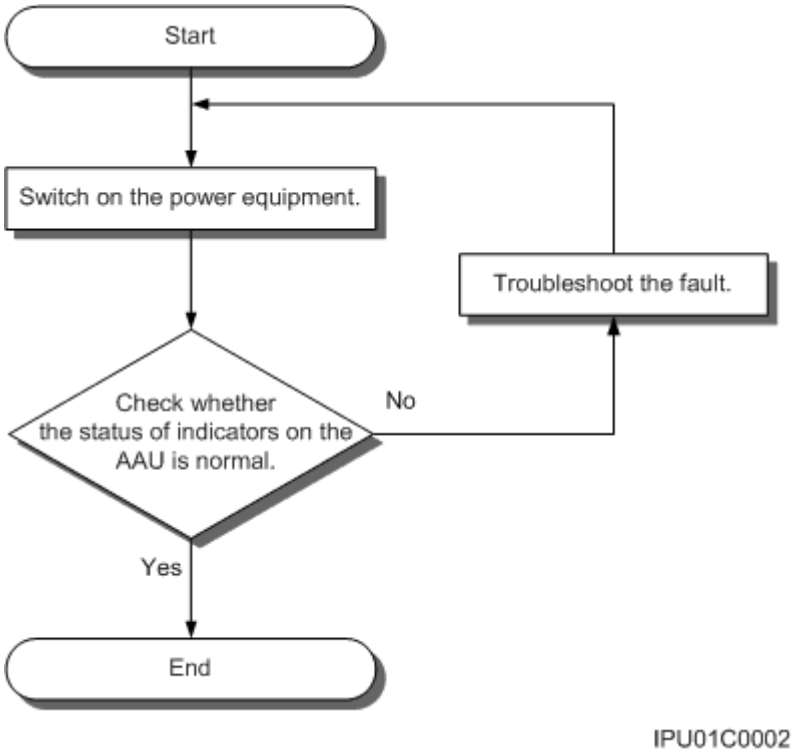
NOTICE

- After unpacking the RU, you must power on it within 24 hours. If you power off the RU for maintenance, you must restore power to the RU within 24 hours.
- Keep a minimum of 7.35 m (24.11 ft) away from the front of the AAU after the RU is powered on and the AAU starts working.

Process

The following figure shows the process of powering on an AAU.

Figure 15-1 Process of powering on an AAU



NOTE

- The normal input voltage of an AAU is 220 V AC and should range from 200 V AC to 240 V AC.
- When an AAU is working properly, the RUN indicator is blinking (on for 1s and off for 1s), and the ALM indicator is steady off. For details about indicators, see *AAU3940 Hardware Description*.

16 Appendix

About This Chapter

This chapter describes auxiliary operations during an AAU installation process.

16.1 Assembling the OT Terminal and the Power Cable
There are two types of OT terminal: one-hole OT terminal and two-hole OT terminal. This section describes the procedure for adding an OT terminal to a power cable by taking a one-hole OT terminal as an example.

16.2 Adding a Tool-Less Female Connector (Pressfit Type) to an AAU Power Cable on the AAU Side
This section describes the procedure for adding a tool-less female connector (pressfit type) to an AAU power cable on the AAU side.

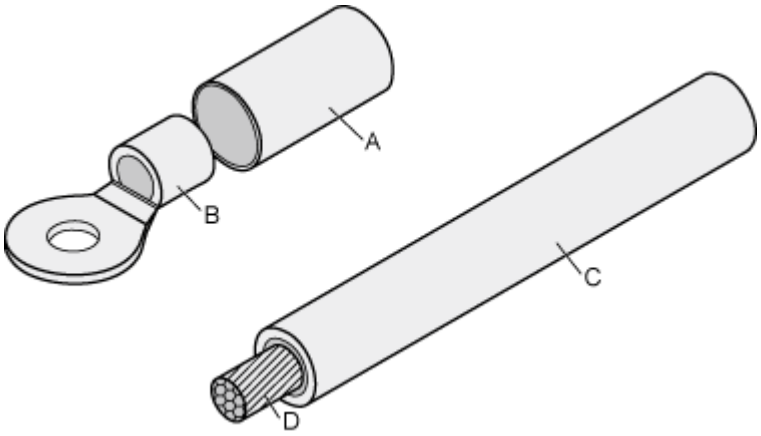
16.1 Assembling the OT Terminal and the Power Cable

There are two types of OT terminal: one-hole OT terminal and two-hole OT terminal. This section describes the procedure for adding an OT terminal to a power cable by taking a one-hole OT terminal as an example.

Context

Figure 16-1 shows a one-hole OT terminal and materials related to a power cable.

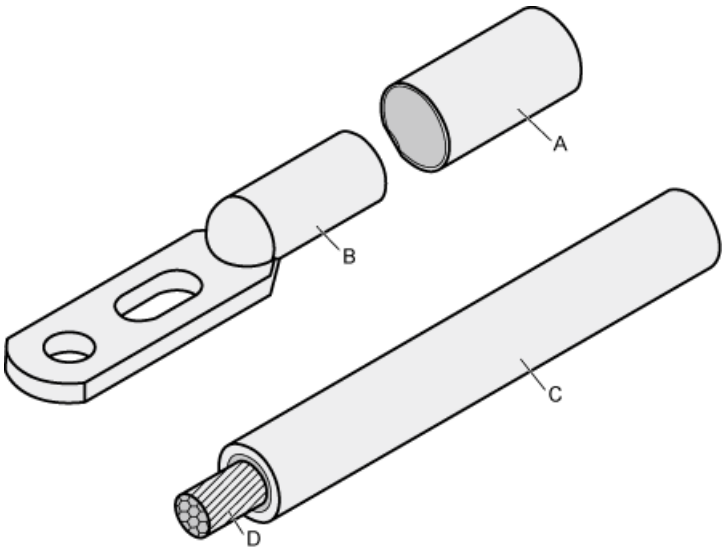
Figure 16-1 one-hole OT terminal and materials related to a power cable



A heat shrink tubing B. one-hole OT terminal with a bare crimping terminal C. Insulation layer of a power cable D. Conductor of a power cable

Figure 16-2 shows a two-hole OT terminal and materials related to a power cable.

Figure 16-2 two-hole OT terminal and materials related to a power cable

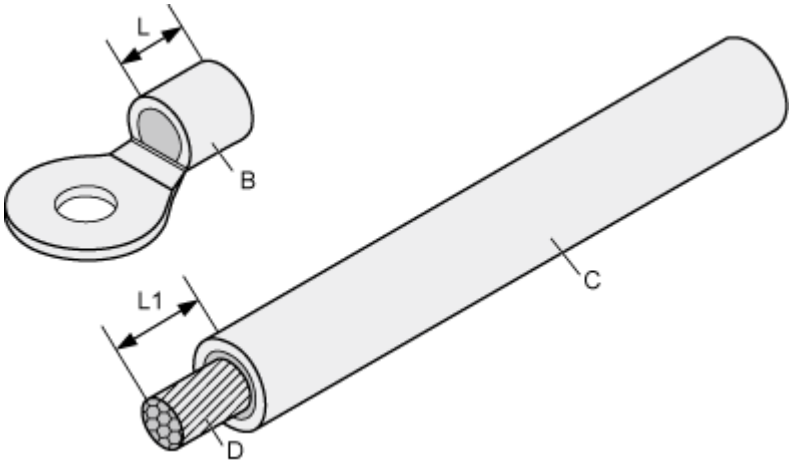


A heat shrink tubing B. two-hole OT terminal with a bare crimping terminal C. Insulation layer of a power cable D. Conductor of a power cable

Procedure

Step 1 Based on the cross-sectional area of the cable conductor, strip a part of the insulation layer. The L1-long conductor is exposed, as shown in **Figure 16-3**. The recommended values of L1 are listed in **Table 16-1**.

Figure 16-3 Stripping a power cable (OT terminal)



NOTICE

- When you strip a power cable, do not damage the conductor of the cable.
- If the bare crimping terminal is not provided by Huawei, the value of L1 is 1 mm to 2 mm greater than the value of L.
- Add OT terminals to the power cable immediately after stripping a length of insulation jacket off a power cable. Otherwise, the bare wires may distract from the center of the cable, which affects the installation of OT terminals.
- If the bare wires distract and OT terminals cannot be installed, cut off the bare wires, strip another length of insulation jacket off the cable, and add OT terminals to the cable.

Table 16-1 Mapping between the cross-sectional area of the conductor and the value of L1

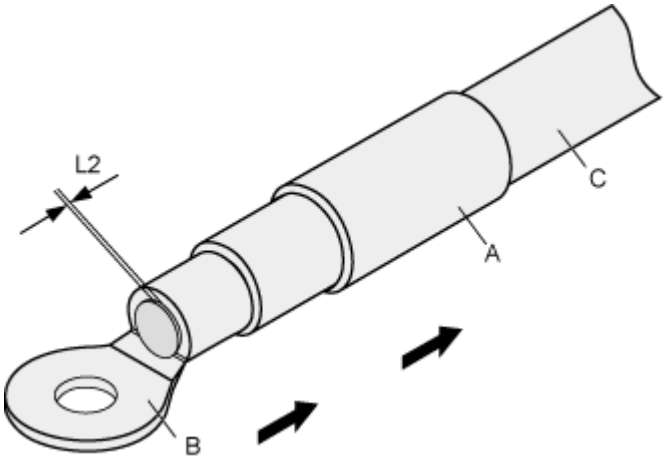
Cross-Sectional Area of Conductor	Value of L1	Cross-Sectional Area of Conductor	Value of L1
1 mm^2	7 mm	10 mm^2	11 mm
1.5 mm^2	7 mm	16 mm^2	13 mm
2.5 mm^2	7 mm	25 mm^2	14 mm
4 mm^2	8 mm	35 mm^2	16 mm
6 mm^2	9 mm	50 mm^2	16 mm

NOTE

If you are proficient in assembling OT terminals and power cables, you can obtain the value of L1 by comparing the part to be crimped with the power cable.

Step 2 Put the heat-shrinkable (A) tube onto the bare crimping terminal, as shown in **Figure 16-4**.

Figure 16-4 Putting the heat shrink tubing onto the bare crimping terminal



Step 3 Put the OT terminal onto the exposed conductor, and ensure that the OT terminal is in good contact with the insulation layer of the power cable, as shown in **Figure 16-4**.

NOTICE

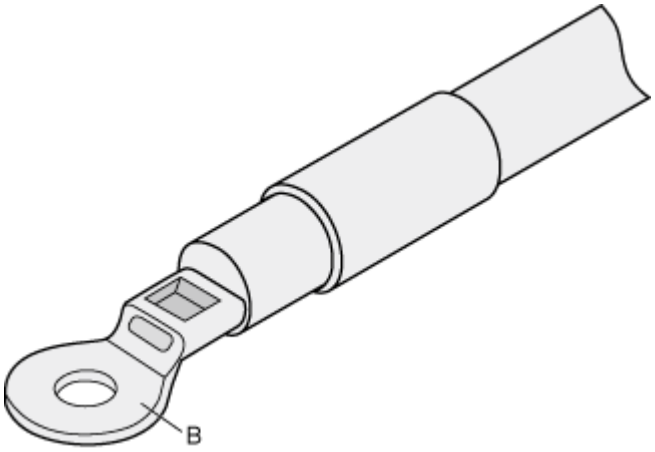
After the conductor is fed into the OT terminal, the protruding part of the conductor, or L2 in **Figure 16-4**, must not be longer than 2 mm.

Step 4 Crimp the joint parts of the bare crimping terminal and the conductor, as shown in **Figure 16-5**.

NOTE

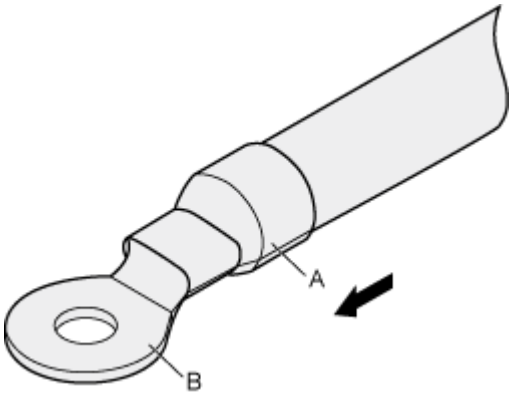
The shapes of crimped parts may vary with the crimping dies.

Figure 16-5 Crimping the joint parts of the bare crimping terminal and the conductor



Step 5 Push the heat shrink tubing (A) towards the connector until the tube covers the crimped part, and then heat the tube by using a heat gun, as shown in **Figure 16-6**.

Figure 16-6 Heating the heat shrink tubing



NOTICE

When you heat the heat shrink tubing, do not heat it with too much time.

----End

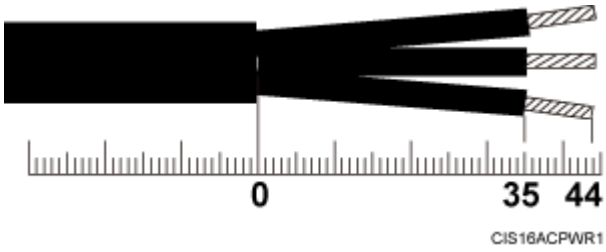
16.2 Adding a Tool-Less Female Connector (Pressfit Type) to an AAU Power Cable on the AAU Side

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

Context

The following figure shows the cable diagram on the label for an AAU power cable.

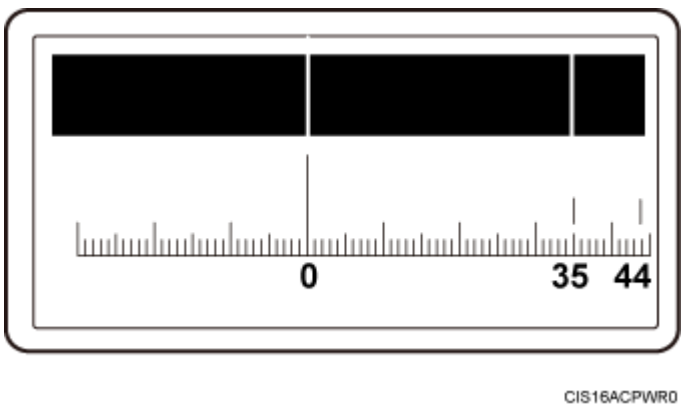
Figure 16-7 Cable diagram on the label for an AAU power cable



Procedure

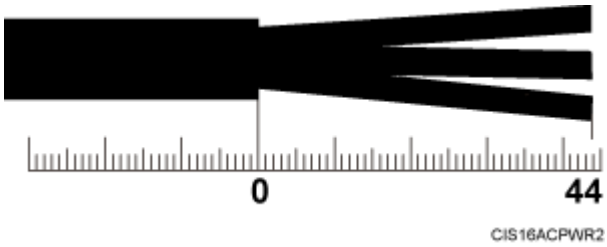
Step 1 Determine the length of the power cable for different operations based on the cable diagram on the label for a power cable, as shown in the following figure.

Figure 16-8 Determining the length of a power cable



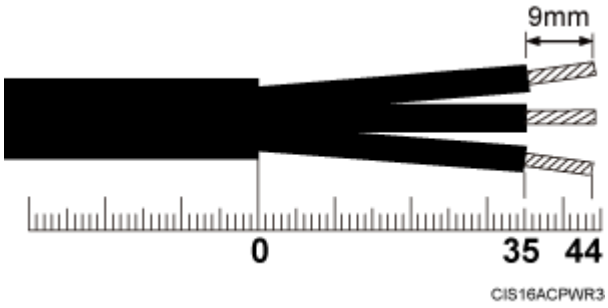
Step 2 Strip a specified length of sheath off the power cable, as shown in the following figure.

Figure 16-9 Stripping a specified length of sheath



Step 3 Strip the sheath off each core wire, as shown in the following figure.

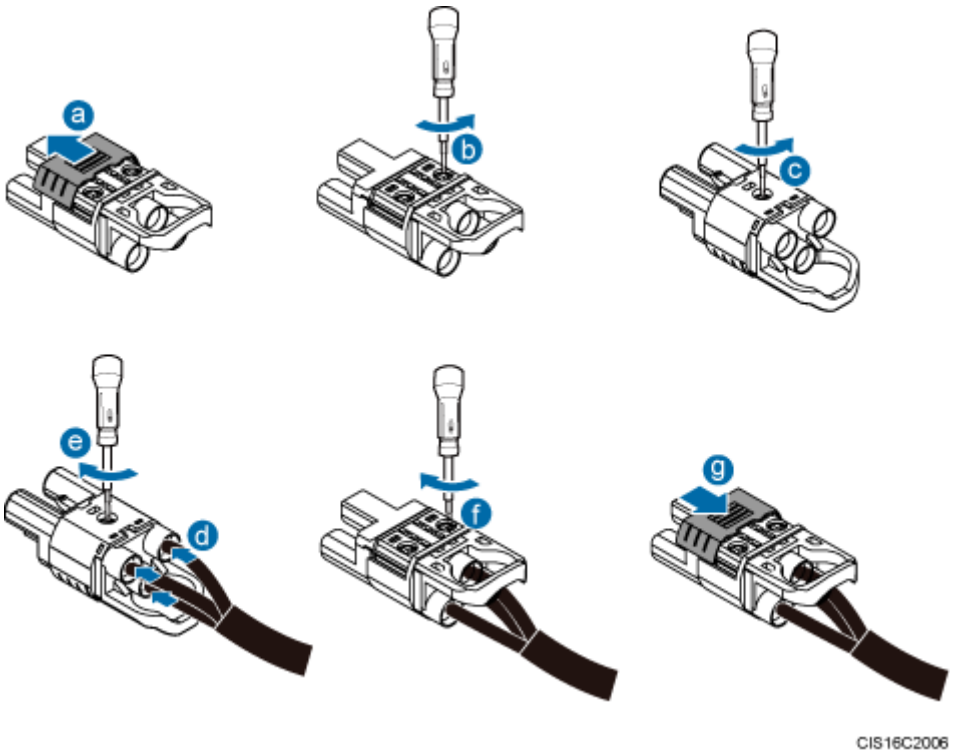
Figure 16-10 Stripping the sheath off each wire



Step 4 Add a tool-less female connector (pressfit type) to three core wires, as shown in the following figure.

1. Slide the sliding block on the connector outwards along the direction shown by the arrow.
2. Use an M3 Phillips torque screwdriver to loosen the two screws.
3. Use the M3 Phillips torque screwdriver to loosen the one screw on the other side.
4. Connect the brown core wire to the L port, the blue core wire to the N port, and the green and yellow core wire to the PE port. Then, use the M3 Phillips torque screwdriver to tighten the screws to 0.5 N·m (4.425 lbf·in.), as shown in the following figure.
5. Slide the sliding block on the connector inwards along the direction shown by the arrow.

Figure 16-11 Adding a tool-less female connector (pressfit type) to core wires



----End