AAU3940

Hardware Maintenance Guide

Issue   01

Date   2015-01-15

Huawei Technologies Co., Ltd.

Address:	Huawei Industrial Base
	Bantian, Longgang
	Shenzhen 518129
	People's Republic of China
Website:	http://www.huawei.com
Email:	support@huawei.com

About This Document

Overview

This document describes routine maintenance for an AAU3940 such as equipment maintenance and power-on and power-off operations. It also describes how to replace the AAU, modules in it, and optical modules.

Product Version

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

Product Name	Solution Version	Product Version
DBS3900	● SRAN10.0 and later ● RAN17.0 and later ● eRAN8.0 and later	V100R010C00 and later

Intended Audience

This document is intended for:

● Base station installation personnel

● System engineer

● Site maintenance personnel

Organization

1 Changes in AAU3940 Hardware Maintenance Guide

This chapter describes changes in *AAU3940 Hardware Maintenance Guide*.

2 Routine Hardware Maintenance Items

Routine hardware maintenance for an AAU improves reliability of the AAU. You are advised to perform routine hardware maintenance yearly.

3 Powering On and Powering Off an AAU

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

4 Replacing an AAU

This section describes how to replace a faulty AAU. Replacing an AAU interrupts all the services carried by the AAU and causes alarms.

5 Replacing the Optical Module

You must disconnect the fiber optic cable from an optical module before replacing the optical module. Disconnecting the fiber optic cable interrupts transmission of CPRI signals.

Conventions

Symbol Conventions

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

Symbol	Description
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
⚠ NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
📖 NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

General Conventions

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

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.

Convention	Description
Italic	Book titles are in *italics*.
`Courier New`	Examples of information displayed on the screen are in Courier New.

Command Conventions

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

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	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 Hardware Maintenance Guide

This chapter describes changes in *AAU3940 Hardware Maintenance 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 (2013-10-30)

This is a draft.

2 Routine Hardware Maintenance Items

Routine hardware maintenance for an AAU improves reliability of the AAU. You are advised to perform routine hardware maintenance yearly.

⚠ **DANGER**

While working at heights, be careful not to drop any tools, equipment, or other objects. Falling objects may cause serious injury or death. Always wear a helmet and avoid standing in the danger area.

The items in the following checklist are not mandatory but strongly recommended.

Table 2-1 AAU routine hardware maintenance items

No.	Item
1	All AAUs are intact and securely installed, with all modules in the AAUs securely installed.
2	All RF cables are free from wear, cuts, cracks, or other damage.
3	All RF cable connectors are sealed and waterproofed properly.
4	All RF cable conduits are in good condition.
5	All power cables are free from wear, cuts, cracks, or other damage.
6	All power cable connectors are in good condition.
7	All power cable conduits are in good condition.
8	All shield layers of power cables are in good condition.
9	All power cables are sealed properly.
10	All CPRI fiber optic cables are free from wear, cuts, cracks, or other damage.
11	All screws on the cover plate of the maintenance cavity are tightened.

No.	Item
12	All RET cables (optional) are free from wear, cuts, cracks, or other damage.
13	All RET cable (optional) connectors are sealed properly.

If any of the statements in the checklist cannot be complied with, perform the following corrective actions:

1. Tighten all connections.

2. Report any other faults found during the checking, because further repairs on towers can be performed only by trained and technically-qualified field engineers.

3 Powering On and Powering Off an AAU

About This Chapter

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

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

3.2 Powering off an AAU
An AAU can be powered off in two ways: normal power-off and emergency power-off. You must power off the AAU in a normal situation such as moving the equipment or anticipating a territorial blackout. You must also power off the AAU in an emergency such as a fire, smoke, or water damage.

3.1 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 3-1 Process of powering on an AAU
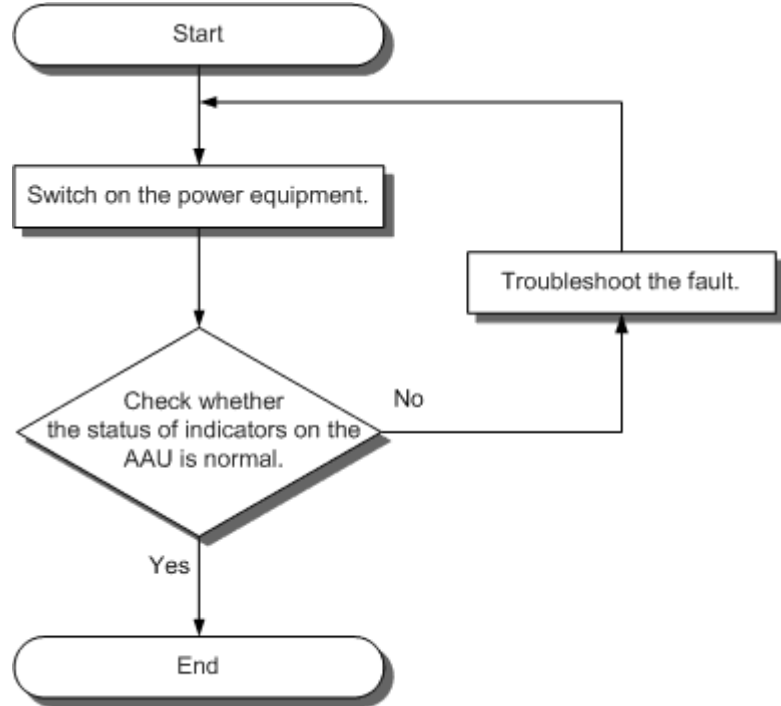
IPU01C0002

📖**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*.

3.2 Powering off an AAU

An AAU can be powered off in two ways: normal power-off and emergency power-off. You must power off the AAU in a normal situation such as moving the equipment or anticipating a territorial blackout. You must also power off the AAU in an emergency such as a fire, smoke, or water damage.

Procedure

- **Normal power-off**

  1. Set the corresponding circuit breaker on the power equipment for the AAU to OFF.

- **Emergency power-off**

⚠ **NOTICE**

Emergency power-off may damage the AAU. Therefore, do not perform an emergency power-off in normal cases.

1. Shut off the external input power of the power equipment for the AAU.

2. If time permits, set the corresponding circuit breaker on the power equipment for the AAU to OFF.

----End

4 Replacing an AAU

This section describes how to replace a faulty AAU. Replacing an AAU interrupts all the services carried by the AAU and causes alarms.

Prerequisites

- The following tools and materials are available: an ESD wrist strap or a pair of ESD gloves, a flat-head screwdriver, a Phillips screwdriver, a torque screwdriver, a hex key, and an ESD box or bag.
- The new component is intact, and its hardware version is the same as that of the component to be replaced.

Procedure

Step 1 Put on an ESD wrist strap or ESD gloves.

⚠ NOTICE

Take proper ESD protection measures, for example, put on an ESD wrist strap or ESD gloves, to prevent electrostatic damage to the boards, modules, or electronic components.

Step 2 Instruct the U2000 administrator to block the faulty AAU by running the **BLK BRD** command.

Step 3 Power off the AAU. For detailed operations, see **3.2 Powering off an AAU**.

Step 4 Remove cables from the faulty AAU.

1. **Optional:** If the AAU is installed on a pole top, remove the landscaping cover, as shown in the following figure. Skip this step if the AAU is installed on a pole or wall.

Figure 4-1 Removing the landscaping cover from the AAU
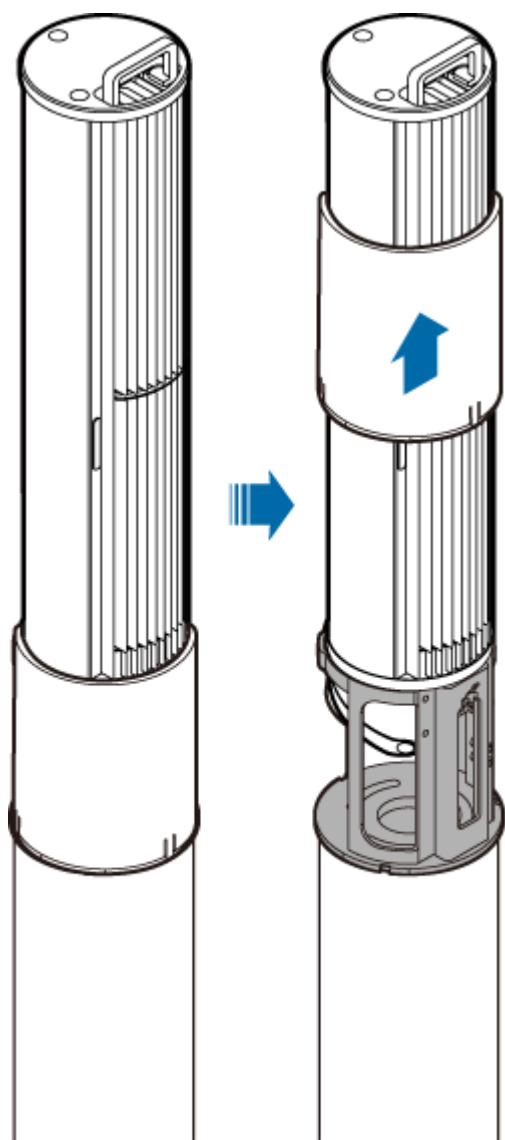
HIS16C0022

2. Loosen the screws on the cover of the maintenance cavity, and open the cover.

3. Record cable connections on the AAU and remove all cables, including the power cable, CPRI fiber optic cable, and PGND cable.

    □NOTE

    ● If the AAU is installed on a pole or a wall, the PGND cable connects to the ground bolt on the attachment plate. In this case, remove the PGND cable.

    ● If the AAU is installed on a pole top, the PGND cable connects to the ground bolt on the mounting support. In this case, do not remove the PGND cable.

4. Use an M6 inner hexagon torque screwdriver to tighten the screws on the maintenance cavity, and close the cover.

Step 5 Remove the faulty AAU.

- If the AAU is installed on a pole or wall, use a torque screwdriver to loosen the captive bolts on the attachment plate and remove the AAU with both hands, as shown in **Figure 4-2**.
- If the AAU is installed on a pole top, use a torque screwdriver to loosen the four bolts securing the AAU, and remove the AAU with both hands, as shown in **Figure 4-3**.
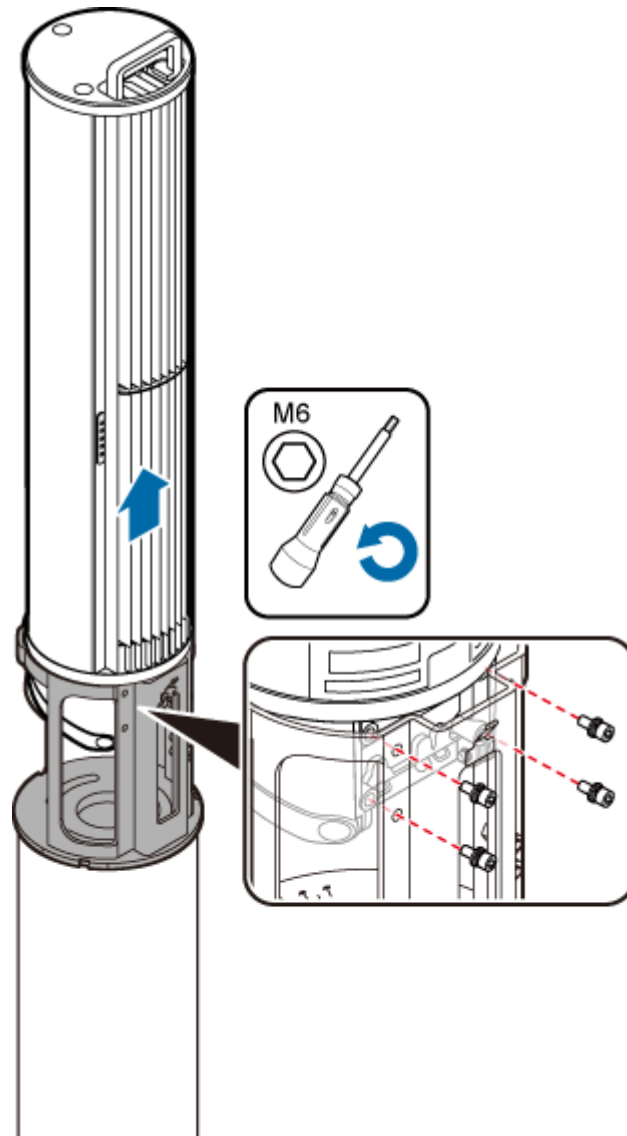
Figure 4-2 Removing an AAU from a Pole or Wall
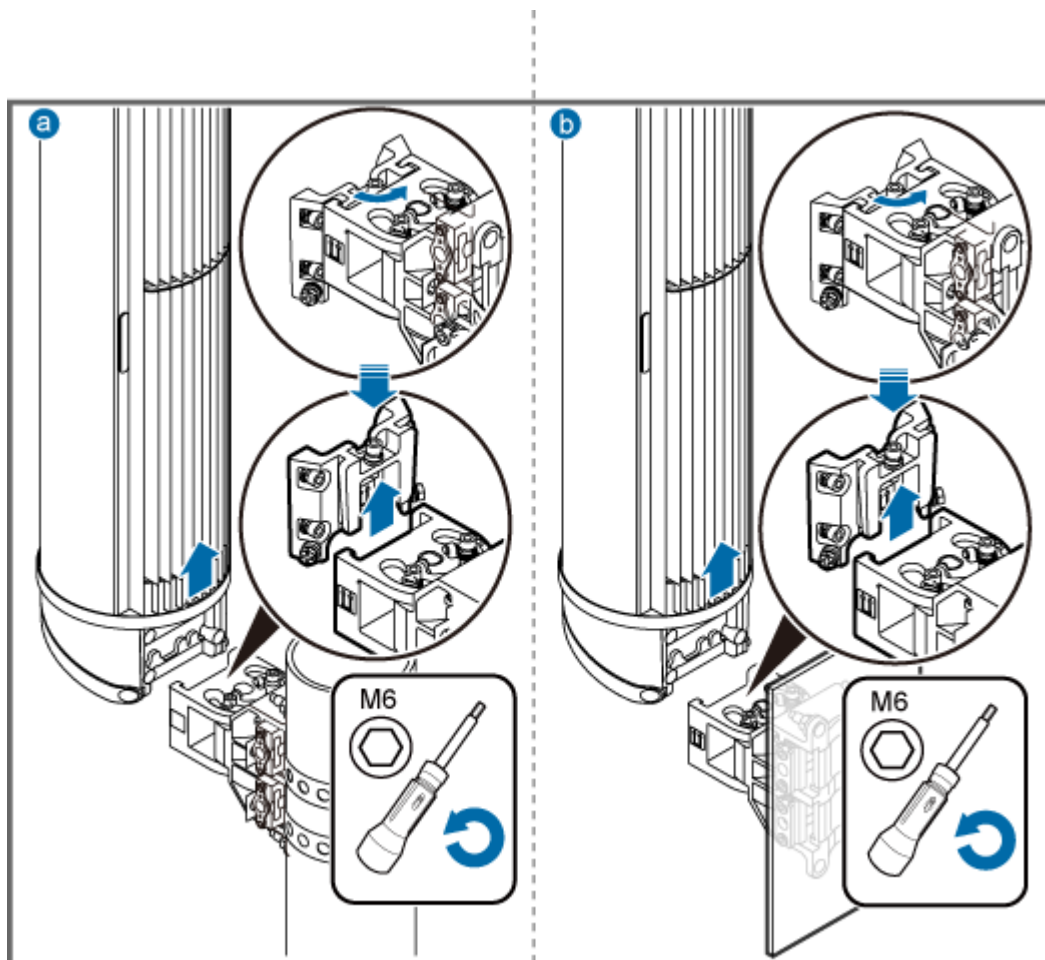
HIU01C00001

a: Pole installation scenario   b: Wall mounting scenario

Figure 4-3 Removing an AAU from a Pole Top

HIS16C0023

Step 6 Install a new AAU.

- In the pole installation or wall mounting scenario:

    1. Place the attachment plate on the maintenance cavity of the AAU, and use a torque screwdriver to tighten the screws to 7 N·m (61.95 lbf·in.), as shown in **Figure 4-4**.

    2. Insert the attachment plate at the bottom of the AAU to the dovetail groove on the mounting bracket, and use a torque screwdriver to tighten the captive screws to 7 N·m (61.95 lbf·in.), as shown in **Figure 4-5**.
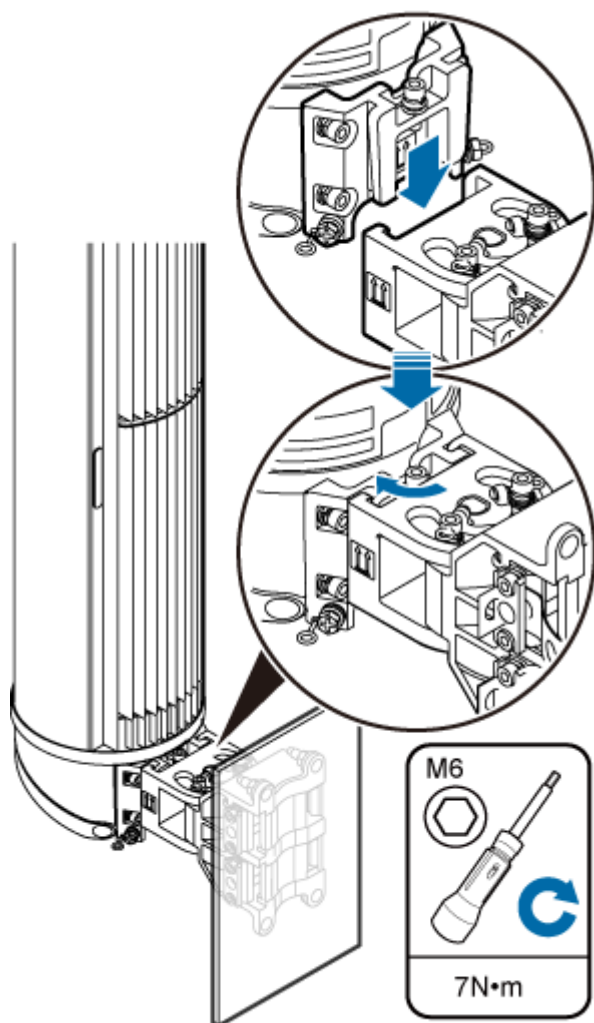
Figure 4-4 Installing the attachment plate
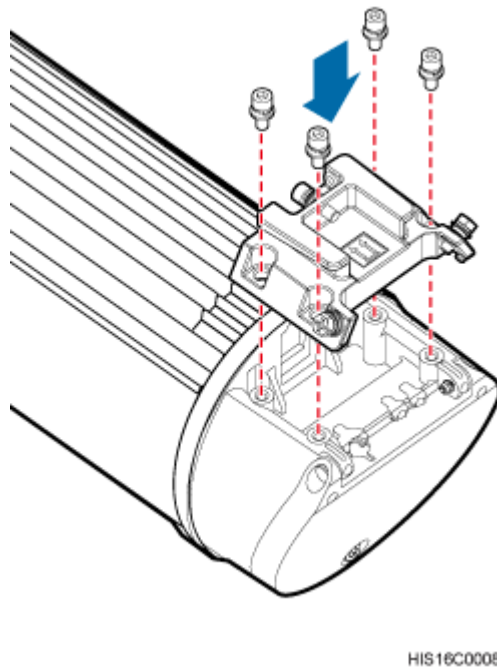
HIS16C0008

☐ **NOTE**

The following figure shows the installation in the wall mounting scenario, installing an AAU on a pole is the same.
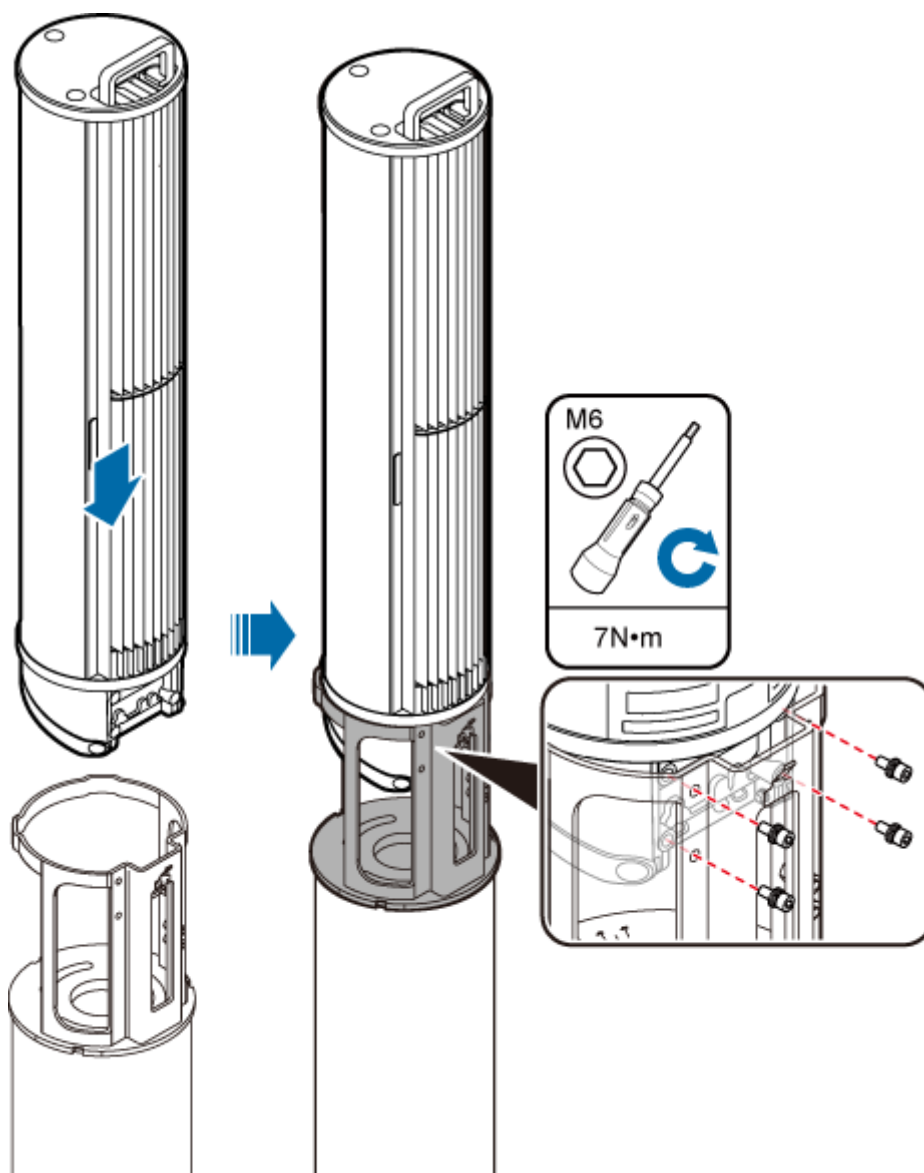
Figure 4-5 Securing the AAU

HIS16C0013

- In the pole top installation scenario:

  1. Hold the AAU tightly with both hands and insert it into the mounting bracket on the pole top, and use four M6 hexagon socket-head cap bolts to secure the AAU to 7 N·m (61.95 lbf·in.), as shown in the following figure.

  2. Install the landscaping cover.

Figure 4-6 Installing an AAU on a pole top

HIS16C0017

Step 7 Install AAU cables.

1. Open the cover for the maintenance cavity of the AAU.

2. Reconnect cables to the AAU according to the previous record, and ensure that waterproof blocks are inserted into vacant ports.

3. Close the cover for the maintenance cavity of the AAU.

Step 8 Set the corresponding circuit breaker on the power equipment for the AAU to ON.

📖**NOTE**

The status of indicators on an AAU that works normally is as follows:

- RUN indicator: blinking
- ALM indicator: steady off
- ACT indicator: steady on

For details about indicators, see section "Ports and Indicators" in *AAU3940 Hardware Description*.

Step 9 Take off the ESD wrist strap or ESD gloves, and pack up all tools.

Step 10 Inform the remote engineer that the AAU has been replaced.

----End

Follow-up Procedure

- Place the replaced component into an ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new module.
- Complete the fault form with detailed information about the replaced component.
- Contact the local Huawei office to handle the faulty component.

5 Replacing the Optical Module

You must disconnect the fiber optic cable from an optical module before replacing the optical module. Disconnecting the fiber optic cable interrupts transmission of CPRI signals.

Prerequisites

- To confirm the type of a faulty module, perform the following steps:
    - Run the **DSP BTSOPTMODULE** command on the BSC LMT.
    - Run the **DSP OPTMODULE** command on the NodeB LMT.
    - Run the **DSP SFP** command on the eNodeB LMT.
    - Identify the type of the faulty module according to the values of **Rate**, **Wavelength**, and **Transmission mode** in the output information of the command, and obtain a new optical module of the same type as the faulty one. The type of a new optical module is identified by the label on the new module. The following figure shows the label on an optical module.

    Figure 5-1 Label on an optical module
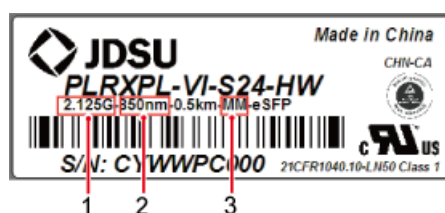
    | (1) Maximum rate | (2) Wavelength | (3) Transmission mode |

- The type and number of optical modules to be replaced are confirmed, and new optical modules are ready.
- Required tools and materials are available, including an ESD box or bag, and ESD gloves.

Context

- Optical modules are inserted into the RX TX CPRI0 and RX TX CPRI1 ports on an AAU.

- Optical modules are hot-swappable.
- It takes about five minutes to replace an optical module on the AAU, which involves disconnecting the fiber optic cable, removing the faulty optical module, inserting a new optical module, reconnecting the fiber optic cable, and waiting for CPRI links to restore.

Procedure

Step 1 Put on an ESD wrist strap or a pair of ESD gloves.

⚠ **NOTICE**

Take proper ESD protection measures, for example, put on an ESD wrist strap or a pair of ESD gloves, to prevent electrostatic damage to the boards, modules, or other electronic components.

Step 2 Record the connections of the optical module and fiber optic cable.

Step 3 Press the latch on the optical connector, and then remove the connector from the faulty optical module, as shown in the following figure.

Figure 5-2 Removing the cables

⚠ **CAUTION**
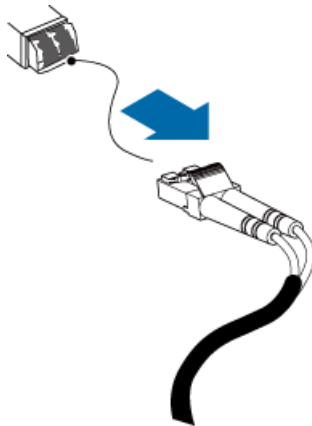
Do not look into the optical module without eye protection after removing the fiber optic cable from the optical module.

Step 4 Lower the puller on the faulty optical module, and then pull the puller until the optical module is removed from the AAU.

Step 5 Install a new optical module into the AAU according to the label on the module.

📖**NOTE**

The optical modules to be installed must match CPRI rates.

Step 6 Insert the optical connector into the new optical module.

Step 7 Check the transmission of CPRI signals by observing the status of CPRI0 and CPRI1 indicators. For details about the status of the indicators, see the ports and indicators on an AAU of related manuals of RRU hardware descriptions.

Step 8 Take off the ESD wrist strap or ESD gloves, and pack up all tools.

----End

Follow-up Procedure

- Place the replaced component into an ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new module.
- Complete the fault form with detailed information about the replaced component.
- Contact the local Huawei office to handle the faulty component.