



# **ZXSDR R8860**

## **CDMA Remote Radio Unit-8860**

### **Installation Manual**

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# Preface

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**Purpose** ZXSDR R8860 is an outdoor remote RF unit. Composing an integrated BTS, ZXSDR R8860 and BBU implement wireless transmission within coverage areas, control of wireless channel as well as communication with BSC.

This manual provides basic installation guide for engineering personnel who perform ZXSDR R8860 hardware installation. At the same time, it serves for the reference material for the personnel responsible for operation and maintenance.

**Intended Audience** This document is intended for engineers and technicians who perform installation activities on ZXSDR R8841 C804 remote radio unit.

**Prerequisite Skill and Knowledge** To use this document effectively, users should have a general understanding of ZXSDR R8860 equipment and its components. Familiarity with the following is helpful:

- cdma2000 fundamental
- ZXSDR R8860 hardware structure

**What is in This Manual** This manual contains the following chapters and appendixes:

Chapter	Summary
Chapter 1 Safety Instruction	Describes precautions in ZXSDR R8860 installation or operation maintenance as well as the meanings of various safety symbols.
Chapter 2 Installation Overview	Describes the requirements for ZXSDR R8860 installation personnel, the installation flows and installation preparation.
Chapter 3 Cabinet Installation	Describes four installation modes of ZXSDR R8860 cabinet and installation situations.
Chapter 4 External Cable Installation	Describes the installation methods of various ZXSDR R8860 external cables.
Chapter 5 Main Antenna Feeder System Installation	Describes the installation flows and installation methods of ZXSDR R8860 main antenna feeder system.
Chapter 6 Hardware Installation Inspection	Describes the inspection methods of cabinet and cables after installation completion.

<b>Chapter</b>	<b>Summary</b>
Chapter 7 Power on and off	Describes the methods and precautions of ZXSDR R8860 power on and off .
Appendix A Cabinet- combined Installation	Describes the method of ZXSDR R8860 cabinet-combined installation.
Appendix B Cascading Cabinet Installation	Describes the method of ZXSDR R8860 cascading cabinet installation.
Appendix C Outdoor AC UnitOAU	Describes technical indices, appearance interfaces, installation introduction and cable connection of OAU.
Appendix D Outdoor DC Lightning Box (OLP48-2)	Describes technical indices, appearance interface and installation introduction of outdoor DC lightning box.
Appendix E Indoor DC Lightning Box (ILP48-3)	Describes technical indices, appearance interface and installation introduction of indoor DC lightning box.
Appendix F AC Lightning Box	Describes appearance interfaces and cable connection of AC lightning box.
Appendix G Power Distribution Box (PDM)	Describes appearance, interface and installation introduction of PDM.



# Chapter 1

## Safety Description

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## Safety Specifications Guide

These safety instructions must be considered as supplementary for local safety regulations. The priority must be given to local safety regulations if there is any conflict between the two.

The maintenance personnel must have the knowledge of safety operations and maintenance with required qualification and technical background.



### Warning:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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All the operation and maintenance personnel must follow the safety precautions and instructions provided by ZTE Corporation to avoid any accident.



### Note:










ZTE Corporation does not bear any liabilities incurred because of violation of the universal safety operation requirements, or violation of safety standards for designing, manufacturing and using the equipment.

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# Safety Symbols

[Table 1](#) lists safety symbols. They are to prompt the user of the safety precautions to be observed during ZXSDR R8860 operation and maintenance.

**TABLE 1 SAFETY SYMBOLS DESCRIPTION**

Safety Symbols	Meaning
	No smoking: Smoking is forbidden
	No flammables: No flammables can be stored.
	No touching: Do not touch.
	Universal alerting symbol: General safety attentions.
	Electric shock: Risk of electric shock.
	Electrostatic: The device may be sensitive to static electricity.
	Microwave: Beware of strong electromagnetic field.
	Laser: Beware of strong laser beam.
	Scald: Beware of scald.

Amongst these safety symbols, the universal alarm symbols are classified into three levels: danger, warning, and caution. The formats and meanings of the three levels are described as below:



**Danger:**

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury of people, or equipment damages and breakdown.



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, could result in serious injuries, equipment damages or interruption of part services.

## Safety Instructions

This section describes the safety instructions related to electrical safety, antistatic, heavy objects and boards.

### Electrical Safety Instructions

The following are the electrical safety instructions about tools, high voltage, power cables, holes and lightning:

- **Tools**

Use special tools rather than common tools for high-voltage and AC operations.

- **High Voltage**



#### **Danger:**

High voltage is hazardous. Direct or indirect contact with high voltage or main supply using a wet object could result in death.

- ▶ Strictly follow local safety rules to install AC power equipments.
- ▶ Installation staff must be qualified for performing high-voltage and AC operations.
- ▶ Do not wear any watch, hand chain, bracelet, ring or any other conductive object during such operations.
- ▶ Prevent moisture from accumulating on the equipment during operations in a damp environment.

- **Power Cable**

**Warning:**

Never install or uninstall power cables while they are live. Otherwise, the power cable, when contacting a conductor, may result in sparks or electric arc causing a fire or even damage to eyes.

- ▶ Make sure to shut off power supply before installing or disconnecting a power cable.
- ▶ Before connecting the power cable, make sure that the connecting cable and its label is appropriate for the actual installation requirements.

**■ Drilling Holes****Warning:**

It is not allowed to drill cabinet holes without permission.

- ▶ Unqualified drilling could damage wiring and cables inside the cabinet. Additionally, metal pieces inside the cabinet created by the drilling could result in a shorted circuit board. Use insulation protection gloves and move cables within the cabinet away first when drilling is necessary on a cabinet.
- ▶ Protect eyes during drilling as dust or flying debris may damage eyes.
- ▶ Clean any debris in time after drilling.

**■ Lightning****Danger:**

Do not perform high-voltage, AC, iron tower or mast operations in a thunderstorm.

Thunderstorms would give rise to a strong electromagnetic field in the atmosphere. Therefore, the equipment must be grounded and protected in time against lightning strikes.

**Antistatic Safety Instructions****Electrostatic:**

Static electricity produced by human body can damage static-sensitive components on circuit board, such as large-scale integrated circuits.

- Friction caused by human body activities is the root cause of electrostatic charge accumulation. Static voltage carried by a human body in a dry environment can be up to 30 kV, and can remain in there for a long time. An operator with static

electricity may discharge electricity through a component when he/she touches the conductor and causing damage.

- Wear an antistatic wrist strap (the other end of wrist strap must be well grounded) before touching the equipment or holding a plug-in board, circuit board, Integrated Circuit (IC) chip or other devices, to prevent human static electricity from damaging sensitive components.
- A resistor over 1 M $\Omega$  should be connected in series on the cable between the antistatic wrist strap and the grounding point, to protect the operator against accidental electric shock. Resistance over 1 M $\Omega$  is low enough to discharge static voltage.
- The antistatic wrist strap used must be subject to regular check. Do not replace the cable of an antistatic wrist strap with any other cable.
- Do not contact static-sensitive boards with any object that easily generates static electricity. For example, friction of package bag, transfer box and transfer belt made from insulation plastic may cause static electricity on components. Discharge of static electricity may damage components when they contact a human body or the ground.
- Board should only contact materials such as antistatic bag. Keep boards in antistatic bags during storage and transportation.
- Discharge static electricity of the test device before use, that is, ground the test device first.
- Do not place the board near a strong DC magnetic field, such as the cathode-ray tube of a monitor. Keep the board at least 10 cm away.

### Hoisting Heavy Objects



#### Warning:

When hoisting heavy objects, ensure that nobody is standing or walking under the hoisted object.

### Unplugging/Plugging a Board

- Ensure the hoister can meet hoisting requirements when disassembling heavy equipment, or moving and replacing equipment.
- The operator must be duly trained and qualified for hoisting operations.
- Hoisting tools must be inspected and complete before service.
- Make sure that hoisting tools are fixed firmly on a sufficiently secured object or wall before the hoisting operation.
- Give brief oral instructions during hoisting operations to prevent any mishap.
- Never plug a board with excessive force, to ensure that the pins on the backplane do not get deformed.
- Plug the board right into the slot and make sure board circuit faces do not contact each other lest any short circuit may occur.
- Keep hands off the board circuit, components, connectors and cable trough when holding a board.

**Other Safety  
Instructions****Note:**

Do not perform maintenance or debugging independently, unless a qualified person is present.

- Replacing any parts or making any changes to the equipment might result in an unexpected danger. Therefore, be sure not to replace any parts or perform any changes to the equipment unless authorized otherwise.
- Contact ZTE office if you have any question, to ensure your safety.

## Chapter 2

# Installation Overview

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## Components to be Installed

For ZXSDR R8860, the following components will be installed:

- ZXSDR R8860 cabinet and components



### Note:

The inner cables and functional modules/boards in the cabinet are already installed before equipment delivery.

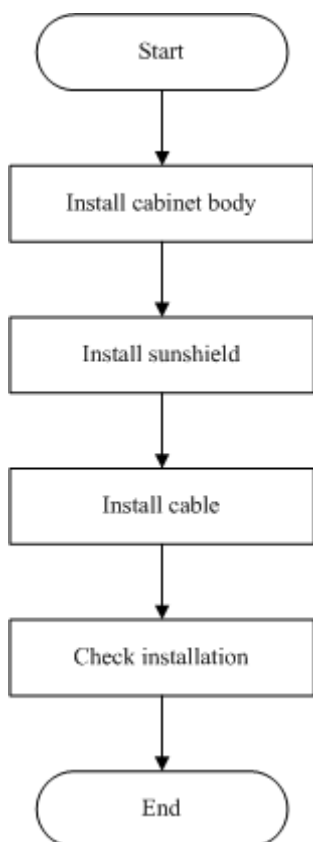
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- Sunshield (used for the outdoor ZXSDR R8860 installation)
- Cables
- Antenna feeder system including antenna, jumpers and feeder

## Installation Flow

The installation flow of ZXSDR R8860 is demonstrated in [Figure 1](#). However, it is not required to strictly follow the steps showed in this flow. The actual installation procedures depend on the on site requirements.

FIGURE 1 INSTALLATION FLOW



## Installation Preparation

### Engineering Condition Inspection

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Before installing devices, follow the requirements of *Environment Acceptance Report* and check installation environment. The following content is just as a reference.

#### Installation Position Inspection

ZXSDR R8860 installation position should accord with the requirements of engineering design, the specified requirements as follows:

- Avoid dusty, harmful-gas or explosive-goods environment;
- Avoid the places with big shock or strong noise;
- Far away substation;
- Far away pollution source;
- Avoid an industrial boiler and heating boiler;
- Far away high-power wireless interference source.

#### Temperature and Humidity Inspection

ZXSDR R8860 temperature and humidity in work environment should meet the requirements, as shown in



- Power Supply Inspection** The requirements of ZXSDR R8860 power supply are described as follows.
1. DC power supply: ZXSDR R8860 is -48 V DC power supply and the voltage of power supply is -40 V DC~-57 V DC.
  2. Indirect AC power supply: adopt an outdoor AC unit (OAU); the OAU can provide 220V AC power supply for one ZXSDR B8200 C100 and one ZXSDR R8860 at the same time.
- Lightning Inspection** The ZXSDR R8860 lightning requirements are described as follows.
- Outdoor Installation
    - i. For DC power supply, configure an outdoor DC lightning box OLP48-2. If the DC power is exported from the equipment room, the length of power cable is more than 10 m (less than 50 m) and the output end of indoor DC power is not configured with B-level or above lightning devices, it is required to configure an indoor DC lightning box ILP48-3 in the equipment room.
    - ii. For indirect AC power supply, it is required to configure an AC lightning box (ZXPCS combined arrester).
  - For indoor installation, if the power cable is distributed outdoors, configure the power lightning box according to the conditions of outdoor installation.
- Grounding Inspection** ZXSDR R8860 adopts an associated grounding mode. The value of grounding resistance is not more than 5 ohm.
- Other Inspections**
1. The corollary devices or components should accord with the requirements of ZXSDR R8860 engineering design drawing.
  2. The transmission devices interconnected with BBU should have been prepared.

## Tools and Instruments Preparation

[Table 2](#) shows tools and meters list required during installation.

**TABLE 2 TOOL AND METER LIST**

Category	Name
Special-purpose tools	One feeder connector knife
	One wire stripper
	One crimping pliers
	One multi-functional crimping pliers Earth resistance tester
Concrete drilling tools	One electric percussion drill
	Auxiliary and sample bits
	One vacuum cleaner
	Power socket (two-phase and three-phase socket, with current capacity greater than 15 A)

Category	Name
General-purpose tools	Cross screwdrivers (4", 6" and 8" each)
	Flathead screwdrivers (4", 6" and 8" each)
	Adjustable wrenches (6', 8', 10' and 12')
	Dual-purpose spanners (17" and 19" each)
	One set of socket wrench
	5 kg (11 lb) nail hammer
	One 300 W iron
	One 40 W iron
	Solder wires
	Hot blower
	Oil paint brush
	Pliers
	Scissor
	Paper knife
Measurement tools	One 50 m (164 feet) tape measure
	One 5 m (16 feet) steel tape
	One 400 mm (16 inches) level bar
	One angle meter
	One compass
	Plumb
Protection tools	Antistatic wrist strap
	Safety helmet
	Pair of gloves
Clamp tools	One hacksaw (with several saw blades)
	One pair of sharp-nose pliers (8")
	One pair of diagonal pliers (8")
	One pair of slip joint pliers (8")
	One pair of vices (8")
	Crowbar
Auxiliary tools	Chain wheel
	Rope
	Ladder
	Forklift

## On-site Documents

ZXSDR R8860 installation needs the following technical documents to be ready.

- *ZXSDR R8860 Engineering Exploration Report*
- *ZXSDR R8860 Environment Acceptance Report*

ZXSDR R8860 manual kit includes:

- *ZXSDR R8860 Commissioning and Configuration Manual*
- *ZXSDR R8860 Operation and Maintenance Manual*
- *ZXSDR R8860 Technical Manual*

## Unpacking Acceptance

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### Counting Goods

- Prerequisite** The transported cargo should have reached the installation site.
- Context** The representative of customer and the project supervisor must be present on site during counting of goods received. If any party is not present at that time, transporter must hold the responsibility for any discrepancies in goods.
- The steps involved in counting goods are as follows:
- Steps**
1. Check Delivery Checklist of ZTE Corporation. Check total number of goods, intactness of packing boxes, and check whether arrival place is the actual installation place against packing list number attached to packing boxes. If goods are intact, start to unpack and inspect them.



**Note:**

It is recommended to unpack the goods after about 30 minutes of receiving the cargo, since there is a possibility of moisture content due to temperature variations if any.

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2. Equipment inspection list and *unpacking acceptance report* are present in the first packing carton. Firstly, open first packing carton and take out the *Unpacking Acceptance Report* to check whether the goods received are in accordance with the inspection list.
3. During the counting and unpacking inspection process, if any material is found short, or goods damaged, then fill-in *Unpacking Acceptance Feedback Table* and contact ZTE promptly.

**END OF STEPS.**

---

### Crate Unpacking

- Prerequisite** Prepare the appropriate tools such as straight screwdriver, pliers, and crowbar.
- Context** Perform the following steps to open the crate:

- Steps**
1. Insert a straight screwdriver into the slit between crate and front cover board to make it loose; then insert crowbar to unclench cover board.
  2. Pull the cover board out from the crate.
  3. Remove the other boards of the crate.

**END OF STEPS.**

---

## Carton Unpacking

**Prerequisite** Prepare the appropriate tools such as straight screwdriver, diagonal pliers, and paper knife.

**Context** Perform the following steps to unpack the carton:

- Steps**
1. Use diagonal pliers to cut packing straps.
  2. Use a paper knife to cut adhesive tape along the slits on carton cover, avoid damaging goods inside.
  3. Open the carton, and remove the foam board.
  4. Check the goods within the carton.



**Note:**

- ▶ Avoid damaging the antistatic bag (It can be used in the future for storage of spare parts) during unpacking.
  - ▶ While the equipment is moved to a hotter and damper place, wait for 30 minutes before unpacking the equipment. Otherwise, moisture may condense on the surface of the equipment and cause damage.
  - ▶ Properly dispose of recycle desiccants.
- 

**END OF STEPS.**

---

## Acceptance and Goods Handover

**Context** Perform this procedure for accepting goods, and handing them over to operators.

**Steps**

1. **Acceptance**

Based upon the name, category and number mentioned on the shipping list, carefully check the goods piece by piece. Make sure that goods fulfil the following conditions:

- i. Make sure that there are no bubbly, peeling, nick and filth mark on the surface of the chassis.
- ii. Ensure that oil paint on the chassis surface is intact.
- iii. Ensure clamping screws are tight and intact.
- iv. All the components are properly installed at their respective positions.

v. Lay down the inspected goods according to categories.

2. **Handover**

After completing the unpacking procedure, representative of customer and project supervisor should approve and sign *Unpacking for Inspection Report*. Each party should have a copy of Unpacking for Inspection Report. If the goods are still under the supervision of the operator even after acceptance, then goods will not be handed over to the operator until both parties sign on the report.

**END OF STEPS.**

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## Chapter 3

# Cabinet Installation

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## Engineering Indices

[Table 3](#) describes the engineering indices of ZXSDR R8860.

**TABLE 3 ZXSDR R8860 ENGINEERING INDICES**

Item	Indices
Overall Dimension	Width x Height x Depth: 320mm x 500mm x 172mm
Upper Enclosure Dimension	Width x Height x Depth: 320mm x 370mm x 72mm
Lower Enclosure Dimension	Width x Height x Depth: 320mm x 500mm x 100mm
Weight	< 22 kg
Power	-48V DC; -40V~-57 V 220V AC: 150 V ~ 285 V / 45 Hz ~ 65 Hz (via external AC-to-DC conversion lightning box)
Work Temperature	-40 °C to 55 °C -40 °F to 131 °F
Work Humidity	5% RH ~ 95% RH
Power Consumption of Normal Work Under -48V DC Power Supply	<ul style="list-style-type: none"><li>■ 1 Carrier<ul style="list-style-type: none"><li>- Output Power: 20W/C/S</li><li>- Power Consumption: 170 W</li></ul></li><li>■ 2 Carrier<ul style="list-style-type: none"><li>- Output Power: 20W/C/S</li><li>- Power Consumption: 200 W</li></ul></li><li>■ 3 Carrier<ul style="list-style-type: none"><li>- Output Power: 20W/C/S</li><li>- Power Consumption: 230 W</li></ul></li></ul>

The technical indices of the indoor DC lightning box, exemplified by JD40K085C20H2-K1Z, are listed in [Table 4](#), which is subject to the actual field technical specifications for practical application.

**TABLE 4 JD40K085C20H2-K1Z DC LIGHTNING BOX TECHNICAL INDICES**

Item	Index
Dimensions	Width x Height x Depth: 400 mm x 450 mm x 100 mm (The height of top cover box lock excluded)
Nominal Working Voltage	-48V
Installation Mode	Indoor wall-mount installation
Working Temperature	-5 °C to 70 °C
Working Humidity	≤ 95% RH

The technical indices of the external AC-to-DC conversion lightning box, exemplified by GPAD501M54-1A, are listed in [Table 5](#), which is subject to the actual field technical specifications for practical application.

**TABLE 5 GPAD501M54-1A EXTERNAL AC-TO-DC CONVERSION LIGHTNING BOX TECHNICAL INDICES**

Item	Index
Dimensions	Width x Height x Depth: 217 mm x 288 mm x 127 mm
Weight	4.65 kg
Input Voltage	Min. value: 150V Typical value: 220V Max. value: 285V
Input Frequency	Min. value: 45Hz Typical value: 50Hz Max. value: 65Hz
Installation Mode	Pole-mount and wall-mount installation
Working Temperature	-40°C +65°C
Working Humidity	5% 95%

## Installation Mode Instruction

According to different installation environments, there are three modes of ZXSDR R8860 installation:

- Pole-mount installation
- Wall-mount installation
- Gantry-mount installation
- Simplified-cabinet integrative Installation



# Pole-mounted Installation Mode

## Components Used in Pole-mount Installation

The main components used in pole-mount installation include:

- Pole anchor clamp components;
- Pole fixing bracket components.

The pole anchor clamp components are used for pole-mount installation of one or two ZXSDR R8860s. The pole fixing bracket components are used for pole-mount installation of three ZXSDR R8860s.

The main pole anchor clamp components used in pole-mount installation for single ZXSDR R8860 are listed in [Table 6](#)

**TABLE 6 MAIN COMPONENT LIST 1**

Name	Quantity
Short anchor clamp	2
Long anchor clamp	2
Standard spring washer 10	4
M10×120 hexagon head bolt (full thread)	4
I-type common M10 hexagonal nut	4
Flat washer 10	4
Standard spring washer 8	4
M8×40 hexagon head bolt	4
Big washer 8	4

The main pole anchor clamp components used in pole-mount installation for two ZXSDR R8860 are listed in [Table 7](#)

**TABLE 7 MAIN COMPONENT LIST 2**

Name	Quantity
Long anchor clamp	4
Standard spring washer 10	4
M10×120 hexagon head bolt (full thread)	4
M10×80 hexagon head bolt (full thread)	4

Name	Quantity
I-type common M10 hexagonal nut	4
Flat washer 10	4
Standard spring washer 8	8
M8×40 Hexagon head bolt	8
Big washer 8	8

The main pole fixing bracket components used in pole-mount installation for three ZXSDR R8860 are listed in [Table 8](#)

**TABLE 8 MAIN COMPONENT LIST 3**

Name	Quantity
Pole fixing bracket	4
Standard spring washer 10	4
M10×120 hexagon head bolt (full thread)	4
I-type common M10 hexagonal nut	4
Flat washer 10	4
Standard spring washer 8	12
M8×40 hexagon head bolt	12
Big washer 8	12

[Figure 2](#) illustrates pole anchor clamp components. [Figure 3](#) illustrates pole fixing bracket components.

**FIGURE 2 POLE ANCHOR CLAMP COMPONENTS**

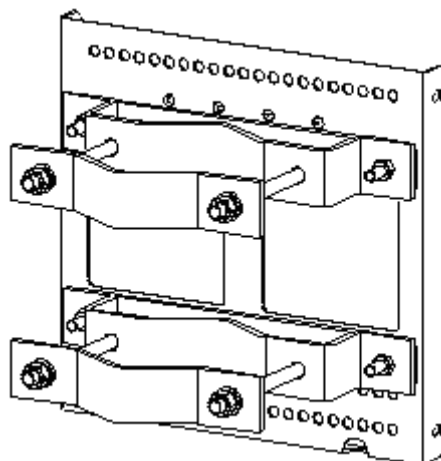
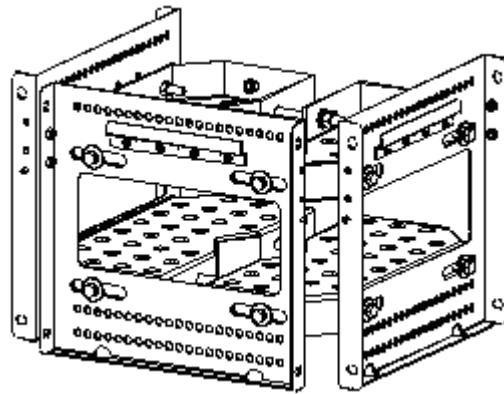


FIGURE 3 POLE FIXING BRACKET COMPONENTS

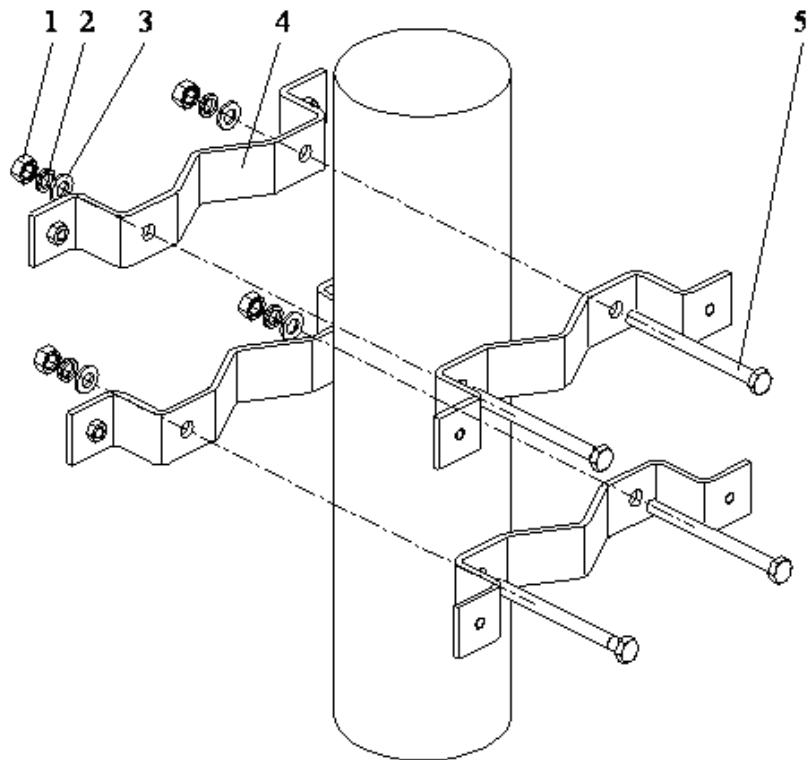
**Note:**

The pole anchor clamp components shown in [Figure 2](#) is adopted in one pole-mount installation. The pole anchor clamp components used in two pole-mount installation only changes two short anchor clamps into two long anchor clamps, the specific list described in [Table 7](#)

## Installing Two ZXSDR R8860 C806 Pole-mount Cabinets (Without Wave Trap)

- Steps**
1. Fix anchor clamps back to back onto the pole, and align the holes and screw down a bit with bolts. Adjust space between anchor clamps based on the screws' position of supporting panel as shown in [Figure 4](#).

FIGURE 4 POLE-MOUNT INSTALLATION (1)



- |                                    |  |
|------------------------------------|--|
| 1. I-type common M10 hexagonal nut | 4. Long anchor clamp                       |
| 2. Standard spring washer 10       | 5. M10×120 hexagon head bolt (full thread) |
| 3. Big flat washer 10              |  |

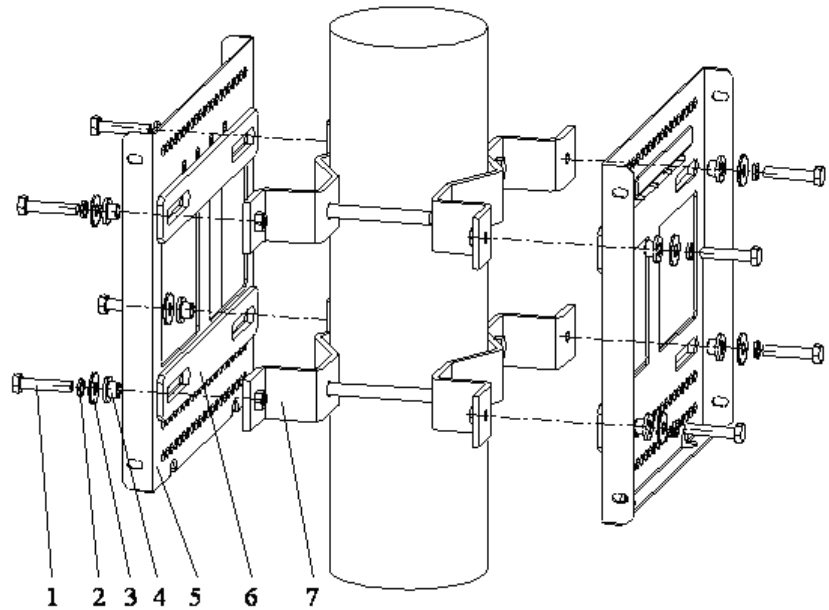
**Tip:**

During two ZXSDR R8860 cabinet installation, the suggested pole diameter is 60 to 120 mm and there are two kinds of bolt lengths:

- ▶ Use the bolt of length 80 mm for pole diameter of 60 mm to 90 mm;
- ▶ Use the bolt of length 120 mm for pole diameter of 90 mm to 120 mm.

2. Fix two supporting panels on the anchor clamp with M8 bolts and screw M10 bolts tightly, as shown in [Figure 5](#).

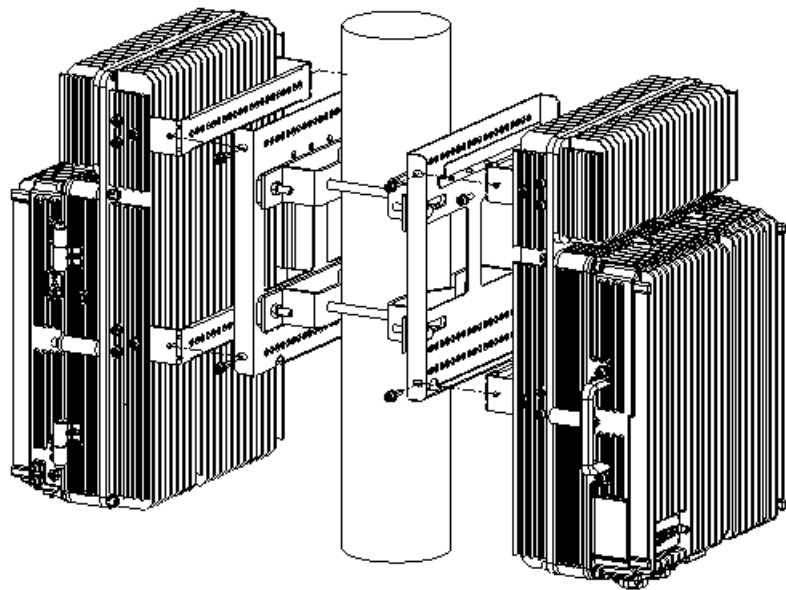
FIGURE 5 POLE-MOUNT INSTALLATION (2)



- |                             |                      |
|-----------------------------|----------------------|
| 1. M8×40 Hexagon head bolt  | 5. Supporting panel  |
| 2. Standard spring washer 8 | 6. Insulation board  |
| 3. Big flat washer 8        | 7. Long anchor clamp |
| 4. Insulation flange        |                      |

3. Mount the two ZXSDR R8860 cabinets on the supporting panel and fasten the cabinet with four M6X20 hexagon socket cap screws as shown in [Figure 6](#).

FIGURE 6 POLE-MOUNT INSTALLATION (3)



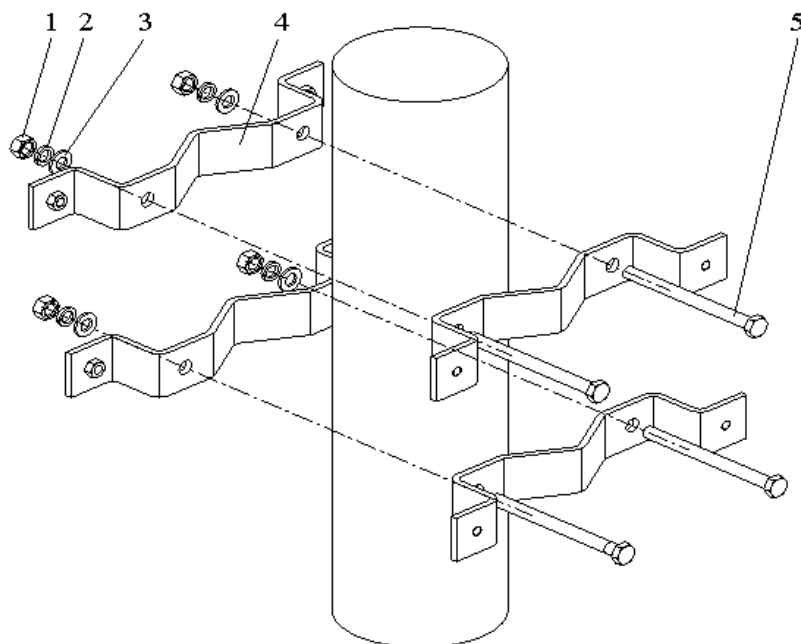
**END OF STEPS.**

## Installing Two ZXSDR R8860 C806 Pole-mount Cabinets (With Wave Trap)

**Context** While installing the ZXSDR R8860 C806 pole-mount installation with two wave traps, adopt anchor clamps; for the pole-mount installation of three wave traps, adopt fixing brackets.

- Steps**
1. Fix anchor clamps back to back onto the pole, align the holes and screw down a bit with bolts. Adjust space between anchor clamps as shown in [Figure 7](#).

**FIGURE 7 POLE-MOUNT INSTALLATION (1)**



1. I-type common M10 hexagonal nut
2. Standard spring washer 10
3. Flat washer 10
4. Long anchor clamp
5. M10×120 hexagon head bolt (full thread)

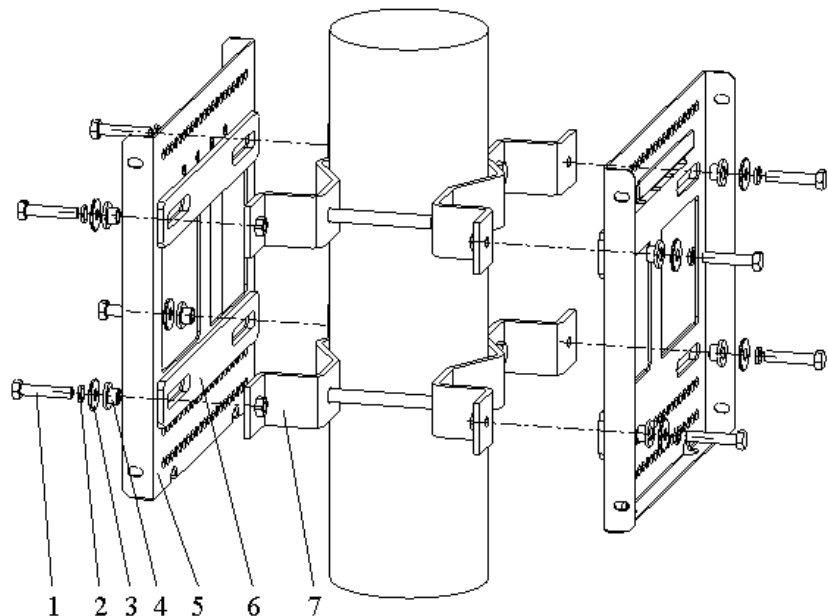
 **Tip:**

During two ZXSDR R8860 installation, the suggested pole diameter is 60 to 120 mm and there are two kinds of bolt lengths:

- ▶ Use the bolt of length 80 mm for pole diameter of 60 mm to 90 mm.
- ▶ Use the bolt of length 120 mm for pole diameter of 90 mm to 120 mm.

2. Fix two supporting panels on the anchor clamps with M8 bolts and screw down M10 bolts, as shown in [Figure 8](#).

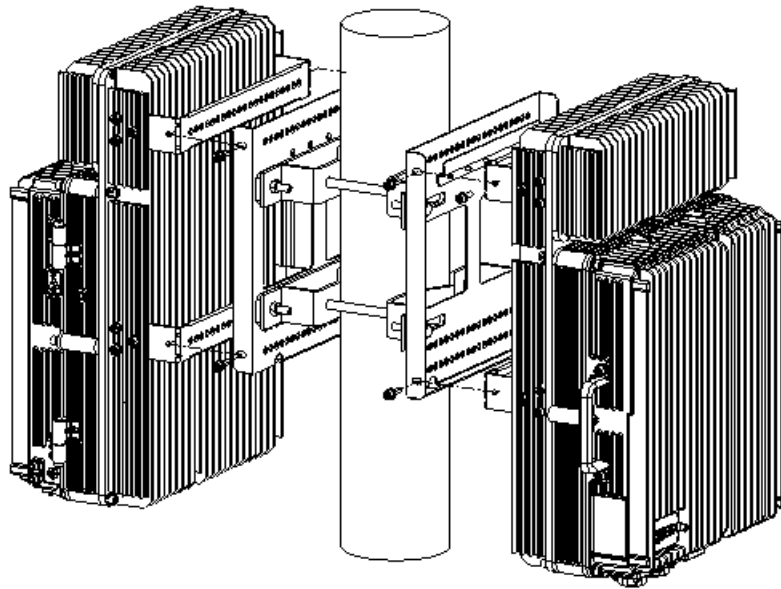
**FIGURE 8 POLE-MOUNT INSTALLATION (2)**



- |                             |                      |
|-----------------------------|----------------------|
| 1. M8×40 hexagon head bolt  | 5. Supporting panel  |
| 2. Standard spring washer 8 | 6. Insulation board  |
| 3. Big flat washer 8        | 7. Long anchor clamp |
| 4. Insulation flange        |                      |

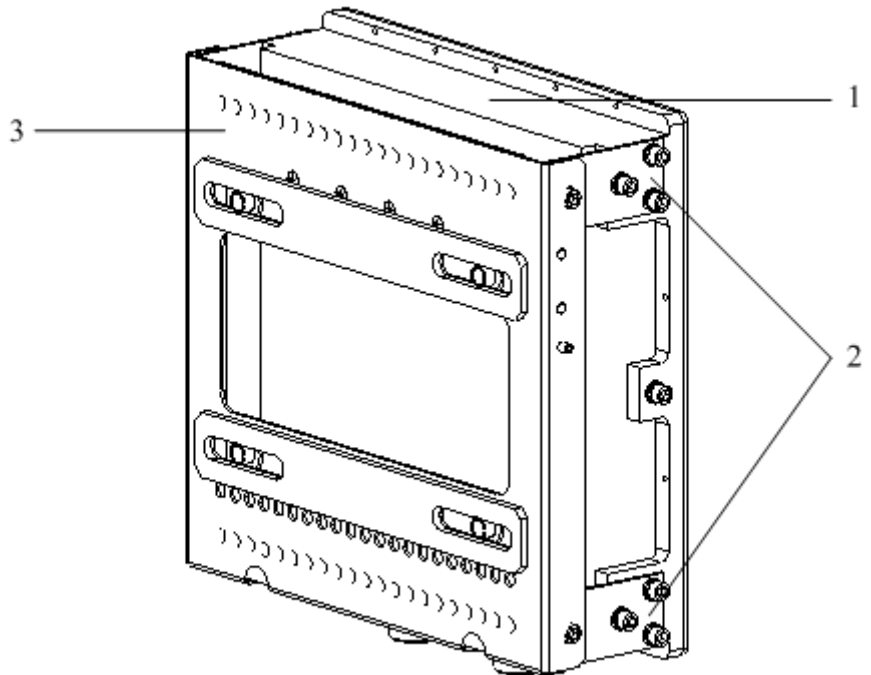
3. Repeat the **Step1~Step2** to install two anchor clamps and two supporting panels.
4. Mount the two ZXSDR R8860 cabinets onto the supporting panels and fasten the cabinet with four M6X20 hexagon socket cap screws as shown in [Figure 9](#).

**FIGURE 9 POLE-MOUNT INSTALLATION (3)**



5. Mount the two wave traps onto the supporting panels and fasten them to the supporting panels with four M6X20 hexagon socket cap screws as shown in [Figure 10](#).

**FIGURE 10 WAVE TRAP INSTALLATION**



- |                |                     |
|----------------|---------------------|
| 1. Wave trap   | 3. Supporting panel |
| 2. Fixing beam |                     |

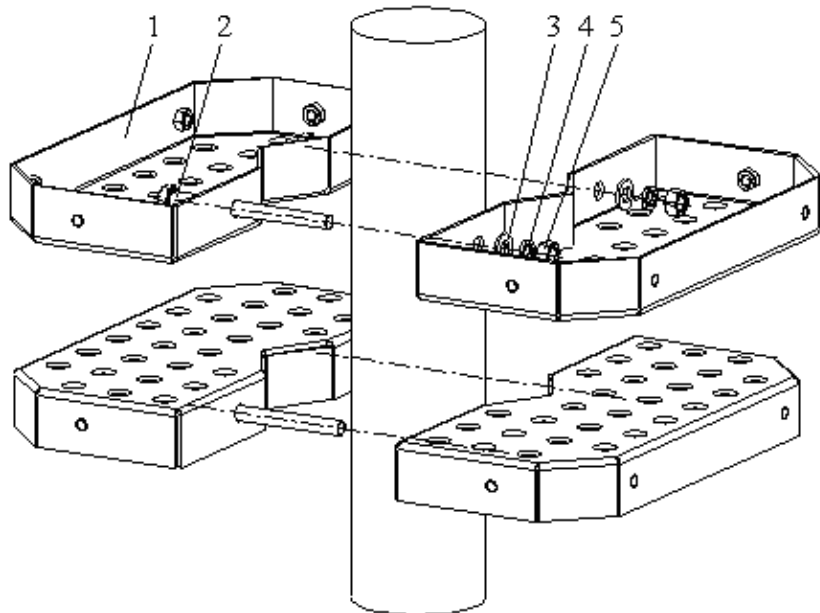


**END OF STEPS.**

## Installing Three ZXSDR R8860 C806 Cabinets on Pole (Without Wave Trap)

- Steps** 1. Fix the two sets of fixing brackets onto the pole and align the holes and screw it a bit with bolts, as shown in [Figure 11](#)

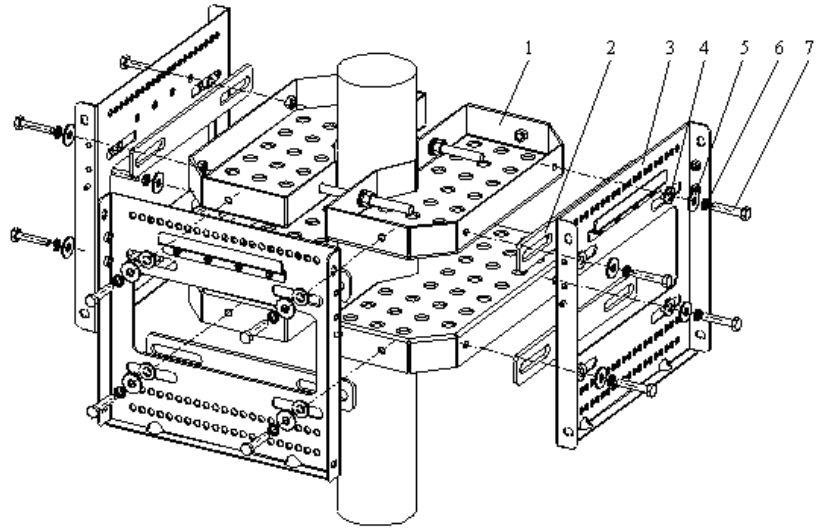
**FIGURE 11 POLE-MOUNT INSTALLATION (1)**



- |  |                                    |
|--|------------------------------------|
| 1. Fixing Bracket                          | 4. Flat washer 10                  |
| 2. M10×120 hexagon head bolt (full thread) | 5. I-type common M10 hexagonal nut |
| 3. Standard spring washer 10               |                                    |

2. Adjust space between the fixing brackets based on the screws' position of insulation boards at the back of supporting panels as shown in [Figure 12](#). Fix three supporting panels on the fixing brackets with M8 bolts. Screw the fixing brackets with M10 bolts.

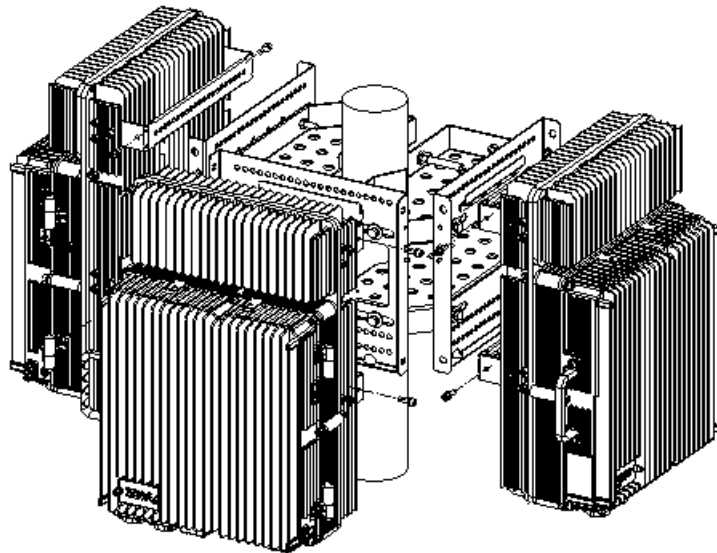
FIGURE 12 POLE-MOUNT INSTALLATION (2)



- |                      |                             |
|----------------------|-----------------------------|
| 1. Fixing bracket    | 5. Big flat washer 8        |
| 2. Insulation board  | 6. Standard spring washer 8 |
| 3. Supporting panel  | 7. M8×40 Hexagon head bolt  |
| 4. Insulation flange |                             |

3. Mount the ZXSDR R8860 cabinets on the supporting panels and fasten the cabinets with M6X20 hexagon socket cap screws as shown in [Figure 13](#).

FIGURE 13 POLE-MOUNT INSTALLATION (3)



**Tip:**

The side without fixing bracket can be located along the wall.

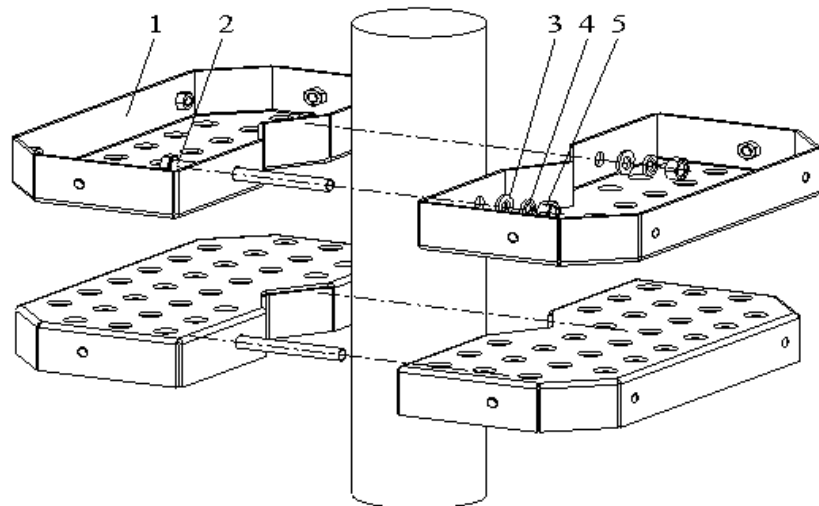
**END OF STEPS.**

## Installing Three ZXSDR R8860 C806 Cabinet on Pole (With Wave Trap)

**Context** While installing the ZXSDR R8860 C806 pole-mount installation with two wave traps, adopt anchor clamps; for the pole-mount installation of three wave traps, adopt fixing brackets.

- Steps**
1. Fix the two sets of fixing brackets onto the pole and align the holes and screw it a bit with bolts, as shown in [Figure 14](#).

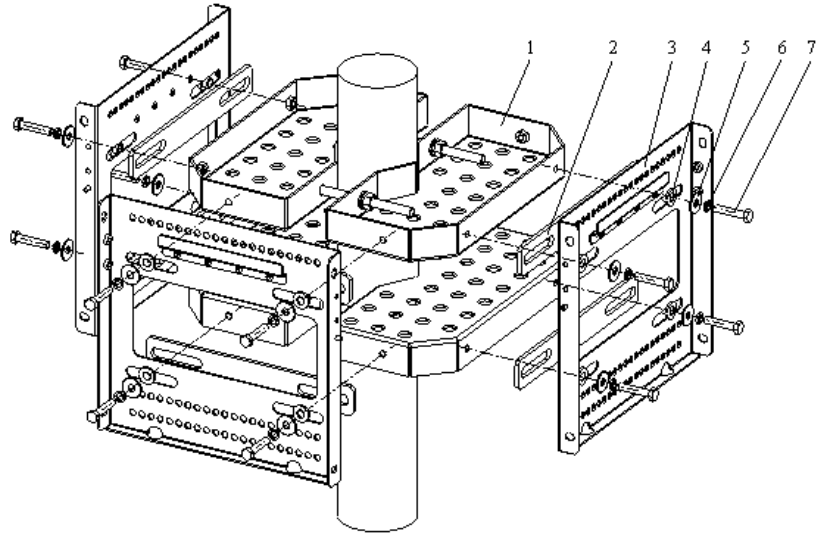
**FIGURE 14 POLE-MOUNT INSTALLATION (1)**



- |  |                                    |
|--|------------------------------------|
| 1. Fixing Bracket                          | 4. Flat washer 10                  |
| 2. M10×120 hexagon head bolt (full thread) | 5. I-type common M10 hexagonal nut |
| 3. Standard spring washer 10               |                                    |

2. Adjust space between the fixing brackets based on the screws' position of insulation boards at the back of supporting panels as shown in [Figure 15](#). Fix three supporting panels on the fixing brackets with M8 bolts. Screw down the fixing brackets with M10 bolts.

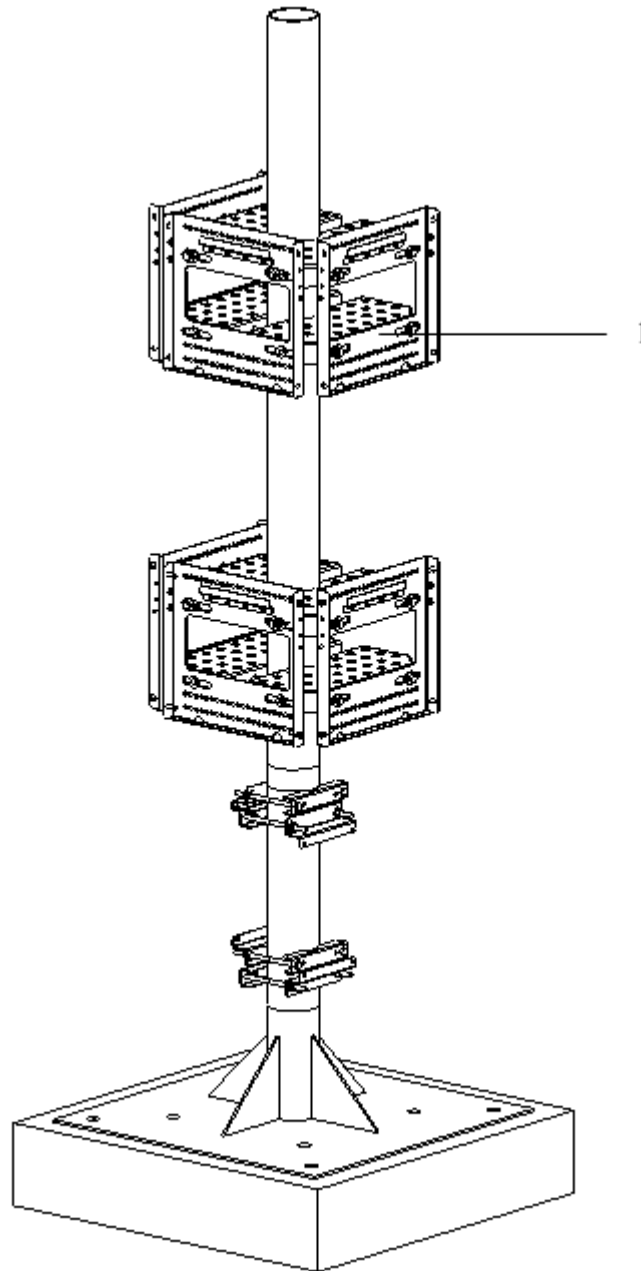
FIGURE 15 POLE-MOUNT INSTALLATION (2)



- |                      |                             |
|----------------------|-----------------------------|
| 1. Fixing bracket    | 5. Big flat washer 8        |
| 2. Insulation board  | 6. Standard spring washer 8 |
| 3. Supporting panel  | 7. M8×40 Hexagon head bolt  |
| 4. Insulation flange |                             |

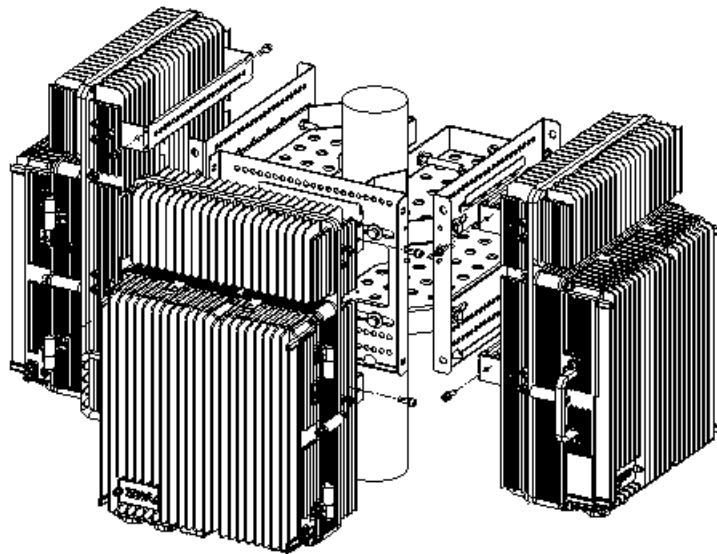
3. Repeat the **Step1~Step2** to install two sets of fixing brackets and three sets of supporting panels, as shown in [Figure 16](#).

FIGURE 16 POLE-MOUNT INSTALLATION (3)



1. Supporting panel

4. Mount the ZXSDR R8860 cabinets on the supporting panels and fasten the cabinets with M6X20 hexagon socket cap screws as shown in [Figure 17](#).

**FIGURE 17 POLE-MOUNT INSTALLATION (4)**

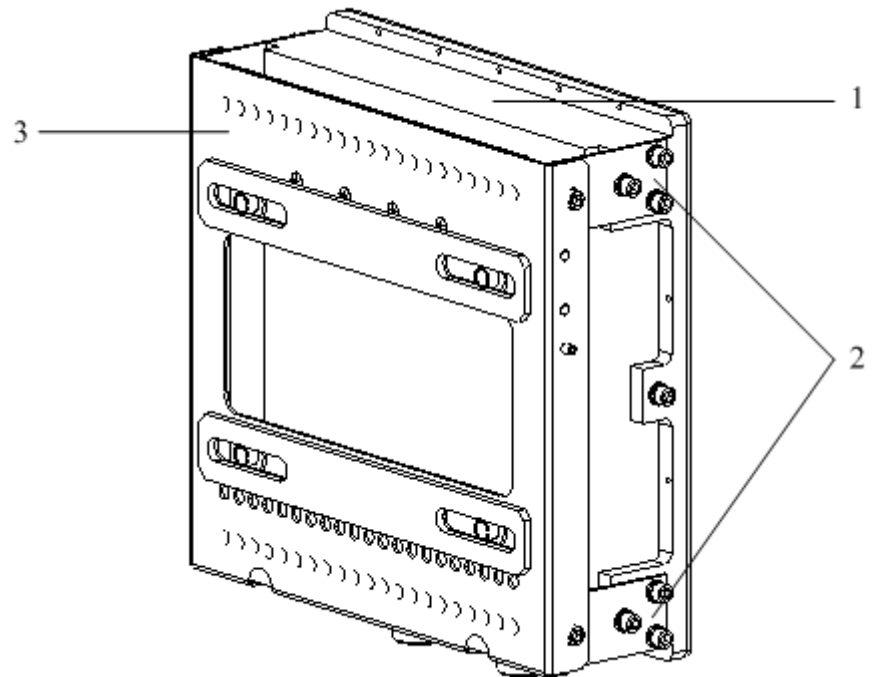
---

**Tip:**

The side without fixing bracket can be located along the wall.

---

5. Mount the wave traps onto the supporting panel and fasten it to the supporting panel with four M6X20 hexagon socket cap screws, as shown in [Figure 18](#).

**FIGURE 18 WAVE TRAP INSTALLATION**

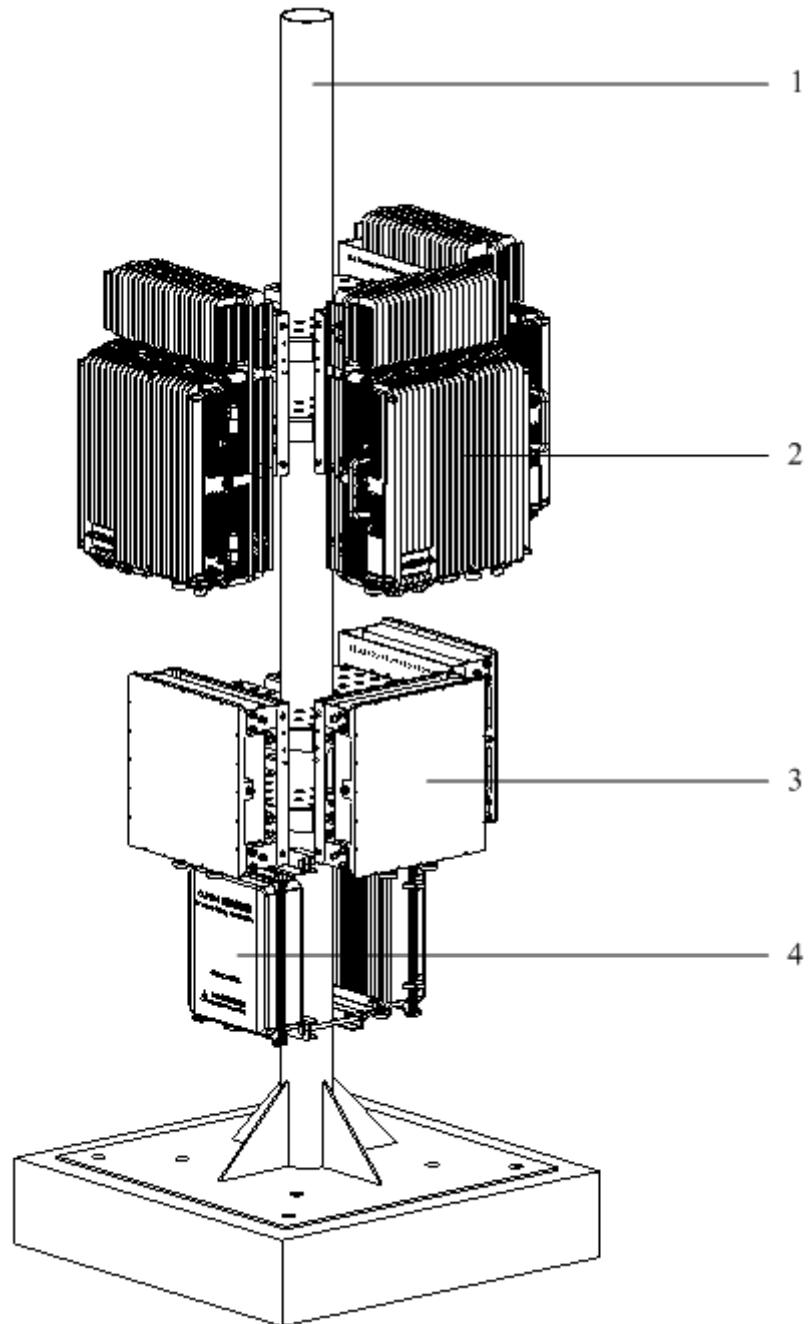
1. Wave trap
2. Fixing beam

3. Supporting panel

**END OF STEPS.**

**Example** After installation completed, the appearance is as shown in [Figure 19](#).

FIGURE 19 INSTALLATION COMPLETION



1. Pole
2. ZXSDR R8860
3. Wave trap
4. Lightning Box



**Note:**

In [Figure 19](#), an outdoor DC lightning box or an AC lightning box can be adoptable. The application and installation for both refer to Appendix C and Appendix E.

## Wall-mounted Installation Mode

### Components Used in Wall-Mount Installation

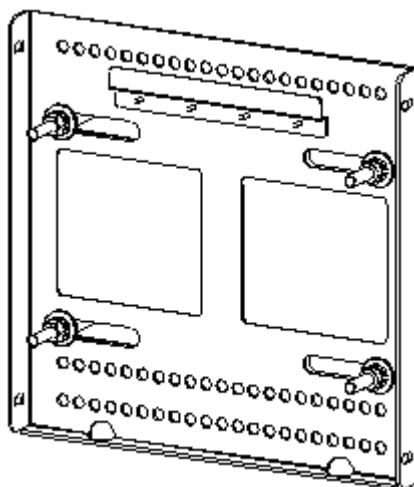
The components used in wall-mount installation are listed in [Table 9](#)

**TABLE 9 MAIN COMPONENTS**

Name	Quantity
Supporting panel	1
Drill template	1
M8×80 expansion bolt	4
Big washer 8	4

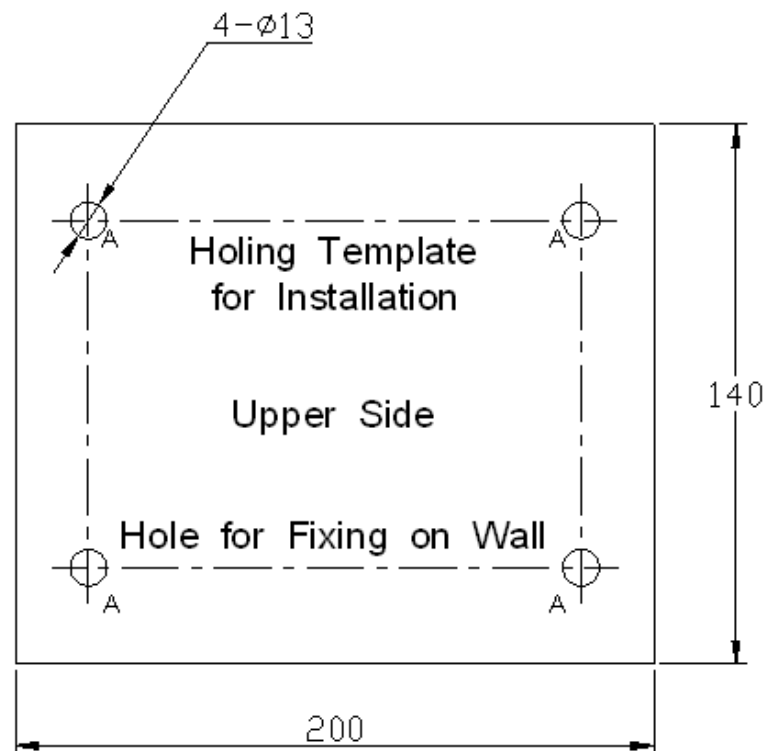
The supporting panel is shown in [Figure 20](#) . The hole marking design template is shown in [Figure 21](#).

**FIGURE 20 SUPPORTING PANEL**



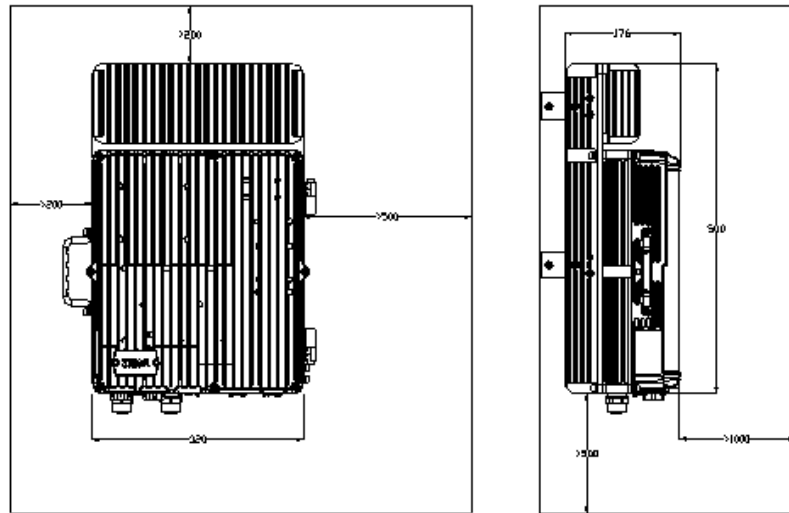
**Note:**

The supporting panel, as the common component in ZXSDR R8860 installation, is used in the wall-mount, pole-mount and gantry-mount installation modes.

**FIGURE 21 HOLE MARKING DESIGN TEMPLATE (UNIT: MM)**

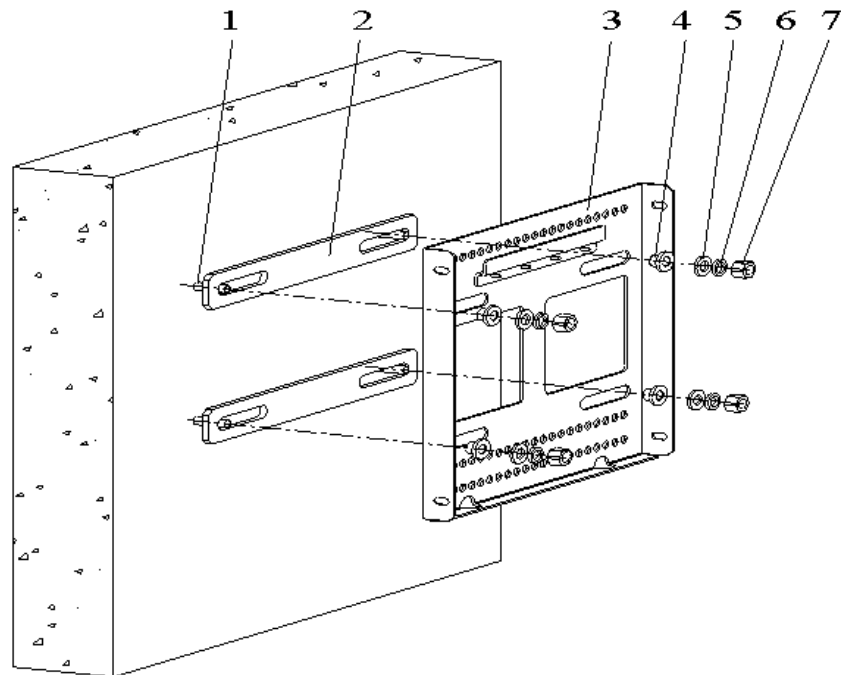
## Installing Cabinet on Wall (Wall-Mount)

**Context** [Figure 22](#) illustrates the space requirement (Unit: mm) for wall-mount installation.

**FIGURE 22 SPACE REQUIREMENT FOR WALL-MOUNT INSTALLATION (UNIT: MM)**

- Steps**
1. Firstly mark the hole positions on the wall with hole design template. Drill the marked points about 60 mm with percussive drill and install the expansion bolts.
  2. Fix the supporting panel on the wall with bolts as shown in [Figure 23](#)

FIGURE 23 SUPPORTING PANEL INSTALLATION ON WALL

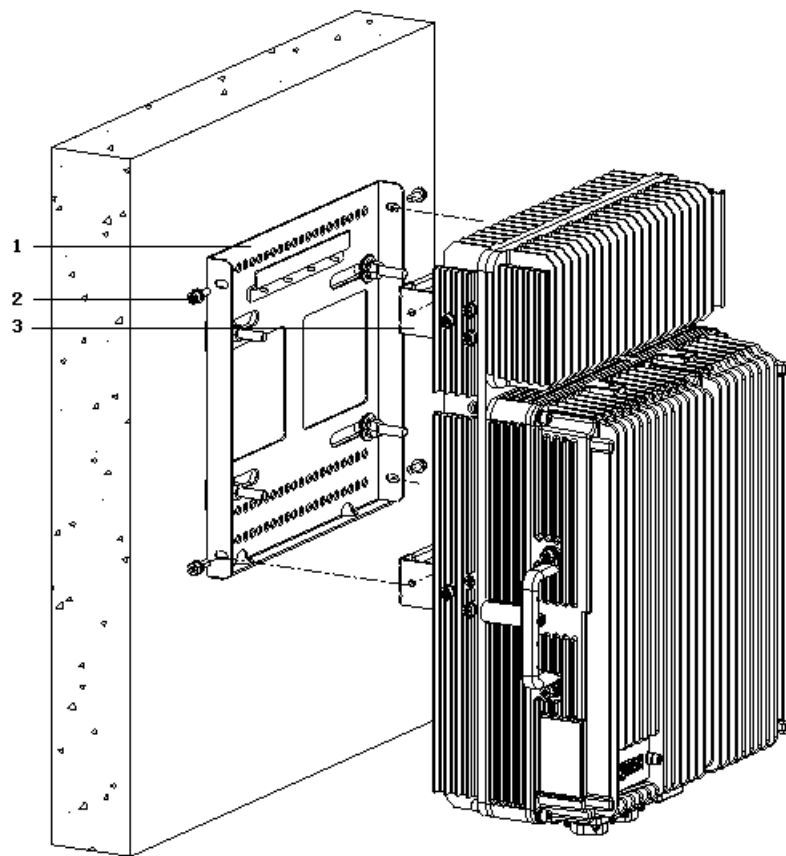


- |                         |                          |
|-------------------------|--------------------------|
| 1. M8×80 expansion bolt | 5. Big flat washer 8     |
| 2. Insulation board     | 6. Standard spring mat 8 |
| 3. Supporting panel     | 7. M8 nut                |
| 4. Insulation flange    |                          |

|

3. Mount the ZXSDR R8860 cabinet onto the supporting panel, and fasten the cabinet with four M6X20 hexagon socket cap screws as shown in [Figure 24](#).

FIGURE 24 MOUNTING CABINET



1. Supporting panel
2. M6 safeguard screw

3. Retaining board

**END OF STEPS.**

---

## Floor Gantry-mounted Installation Mode

### Components Used in gantry-mount Installation

---

The components used in gantry-mount installation includes a gantry and supporting panels. The quantity of supporting panels is consistent with that of ZXSDR R8860s. For every ZXSDR R8860 cabinet, one supporting panel is required.

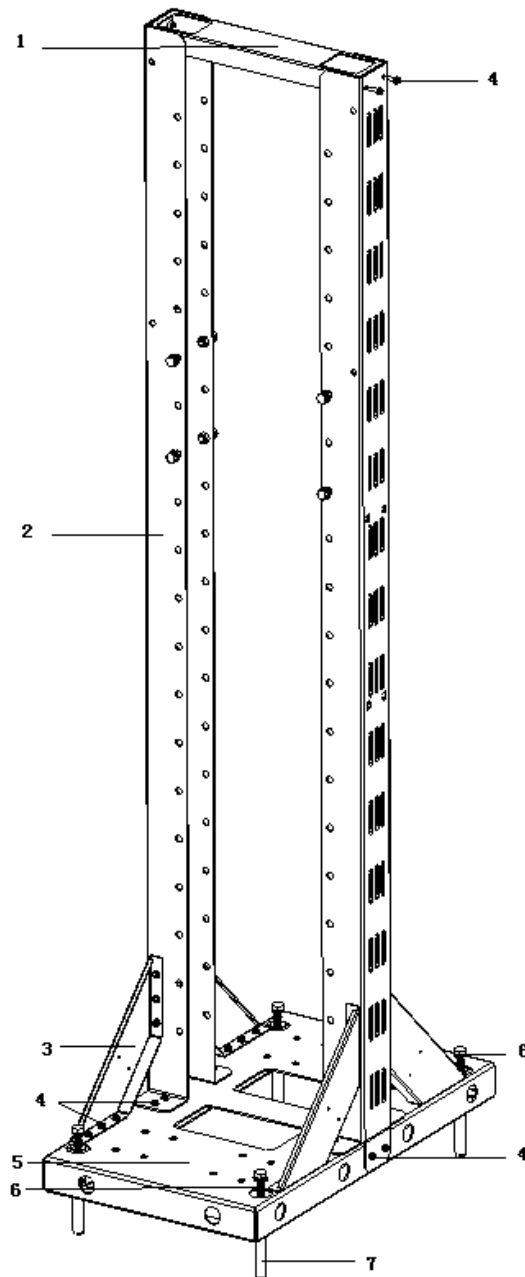
[Table 10](#) lists some components of gantry.

**TABLE 10 MAIN COMPONENTS**

<b>Name</b>	<b>Quantity</b>
Gantry	1
M5X16 screw	24
M10X40 tapping screw	6
M10X100 expansion bolt	4

[Figure 25](#) shows the appearance of gantry.

FIGURE 25 GANTRY APPEARANCE



1. Cover plate
2. Upright column
3. Tilted support
4. M5X16 screw
5. Base plate
6. M10X40 tapping screw
7. M10X100 expansion bolt

**Note:**

Adopt the M10X100 expansion bolt while installing the gantry on a concrete base plate; adopt the M10X40 tapping screw while installing the gantry inside a bunker.

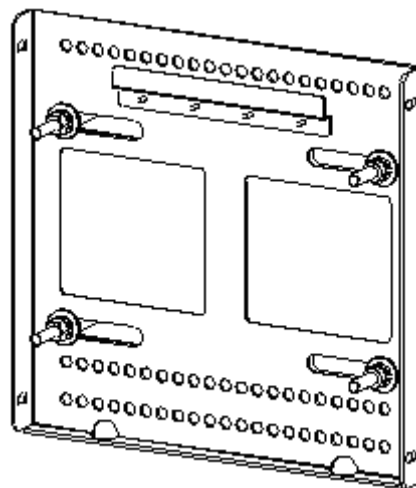
[Table 11](#) lists some components of supporting panel.

**TABLE 11 MAIN COMPONENTS**

Name	Quantity
Supporting panel	1
M8×80 expansion bolt	4
Big washer 8	4

[Figure 26](#) shows the appearance of supporting panel.

**FIGURE 26 SUPPORTING PANEL**





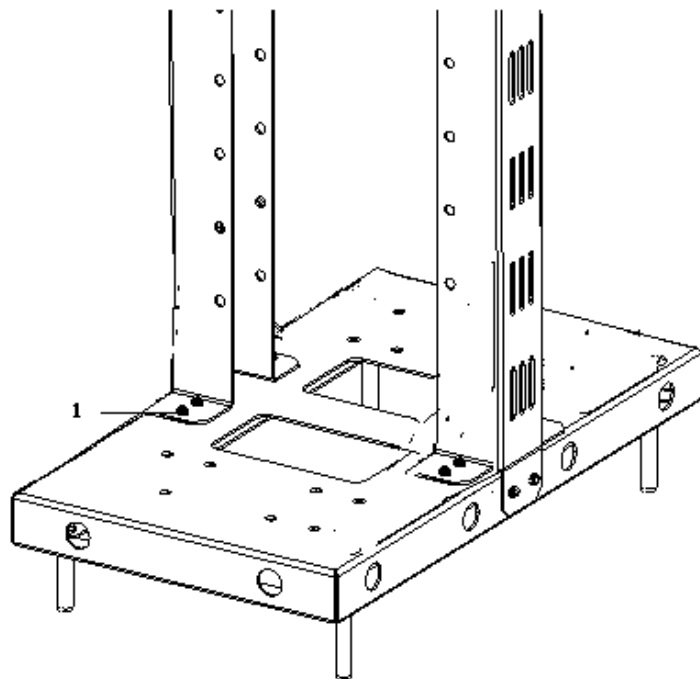
**Note:**

The supporting panel, as the common component in ZXSDR R8860 installation, is used in the wall-mount, pole-mount and gantry-mount installation modes.

## Installing Cabinet on Gantry (Without Wave Trap)

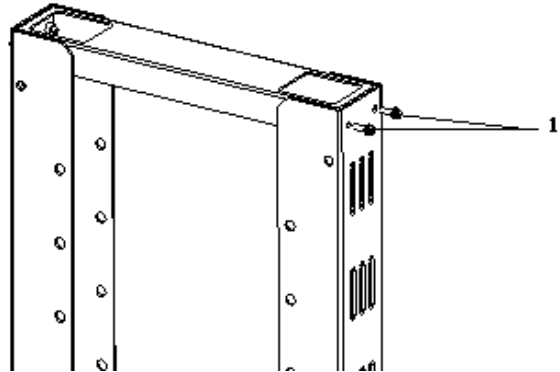
- Steps**
1. Assemble the gantry
    - i. Fix the upright column upon the base plate with the M5X16 screws, as shown in [Figure 27](#).

**FIGURE 27 FIX UPRIGHT COLUMN AND BASE PLATE**



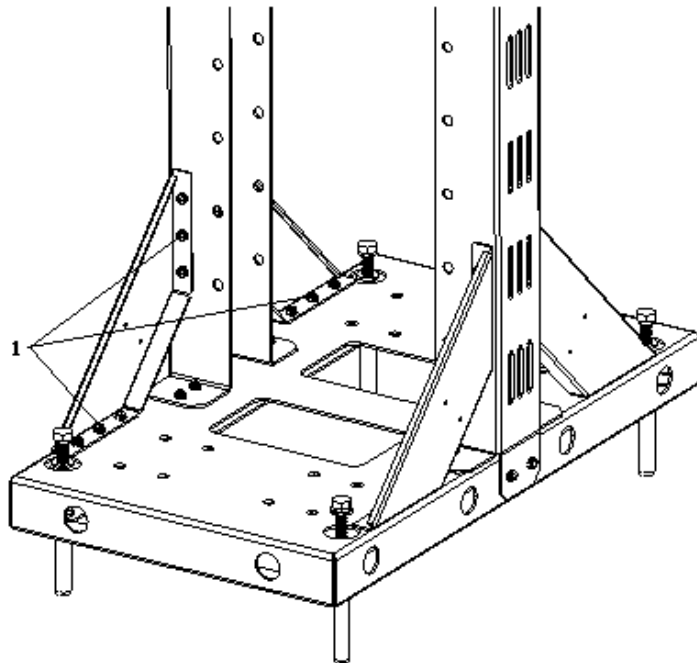
1. M5X16 screw

- ii. Fasten the junction between upright column and cover plate with the M5X16 screws, as shown in [Figure 28](#).

**FIGURE 28 FASTEN UPRIGHT COLUMN AND COVER PLATE**

1. M5X16 screw

- iii. Fasten the tilted support with the M5X16 screws, as shown in [Figure 29](#)

**FIGURE 29 FASTEN TILTED SUPPORT**

1. M5X16 screw

2. Install the gantry

According to the specified installation position in the engineering design drawing, drill the marked holes and install the expansion bolts.

**Note:**

Adopt the M10X100 expansion bolt while installing the gantry on a concrete base plate; adopt the M10X40 tapping screw while installing the gantry inside a bunker.

---

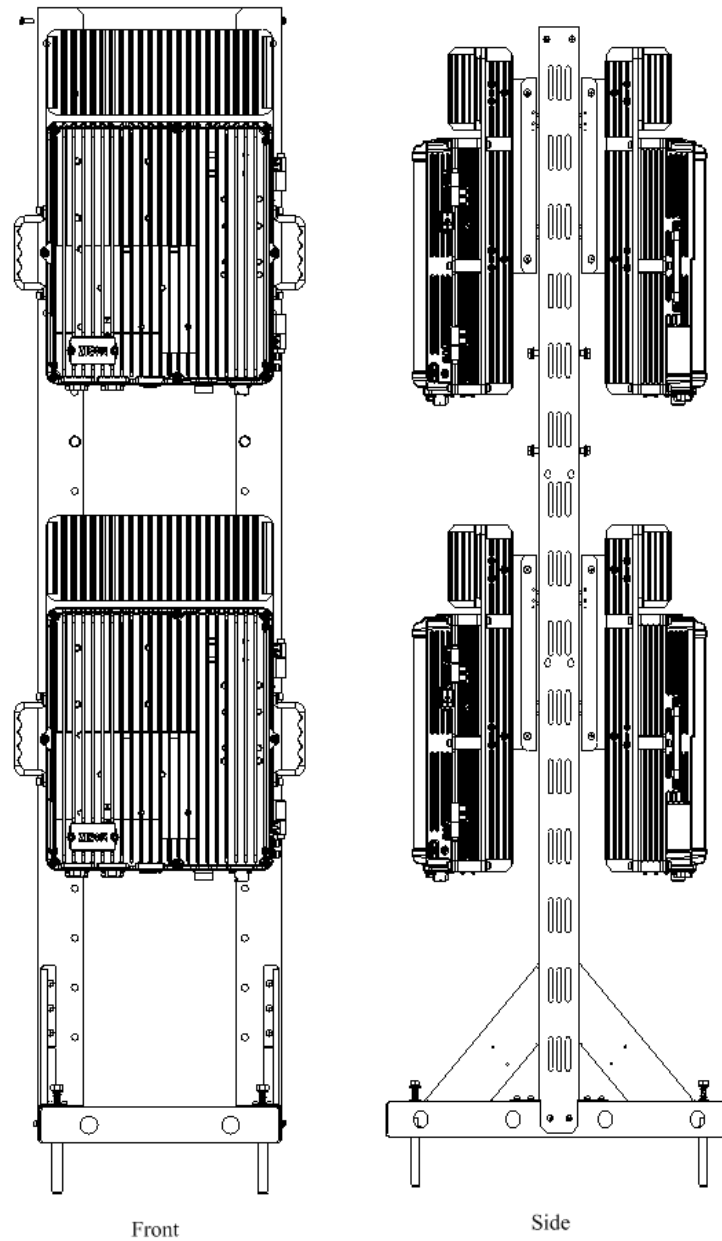
3. Install the ZXSDR R8860
  - i. Fasten the supporting panels onto the proper positions of gantry with bolts.
  - ii. Mount the ZXSDR R8860 cabinets onto the supporting panels, and fasten the cabinets with four M6X20 hexagon socket cap screws.

**END OF STEPS.**

---

**Example** The appearance after installation completion is as shown in [Figure 30](#).

**FIGURE 30 ZXSDR R8860 INDOOR GANTRY-MOUNT INSTALLATION APPEARANCE (ONLY RRU INSTALLED)**

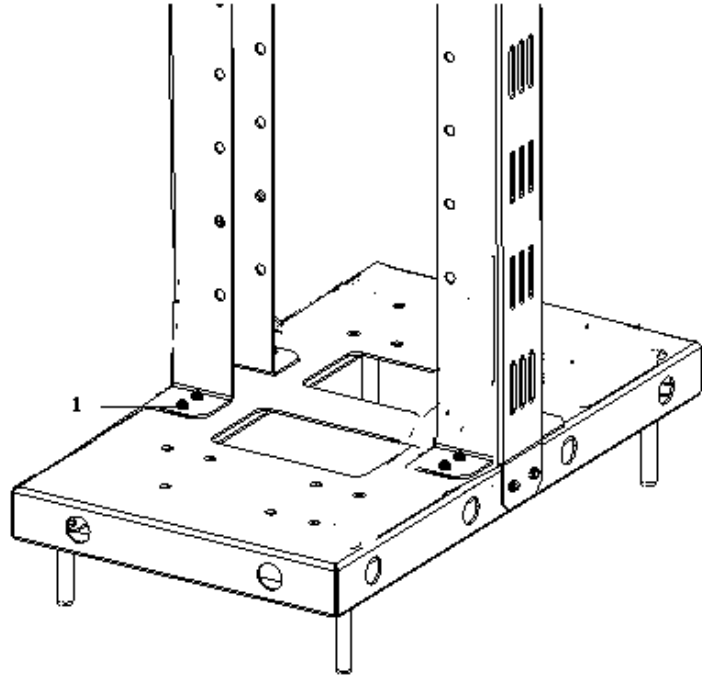


## Installing Cabinet on Gantry (With Wave Trap)

- Steps** 1. Assemble the gantry.

- i. Fix the upright column upon the base plate with the M5X16 screws, as shown in [Figure 31](#).

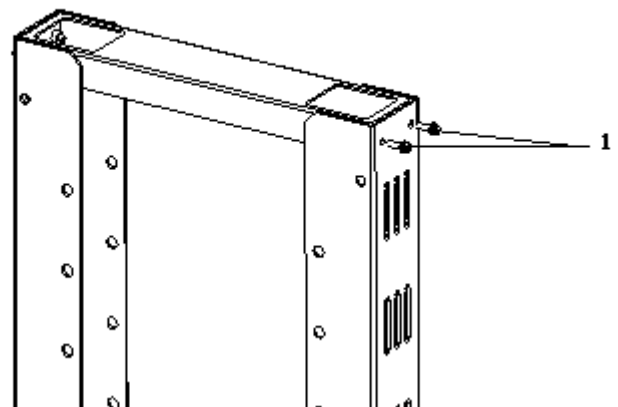
**FIGURE 31 FIX UPRIGHT COLUMN AND BASE PLATE**



1. M5X16 screw

- ii. Fasten the junction between upright column and cover plate with the M5X16 screws, as shown in [Figure 32](#).

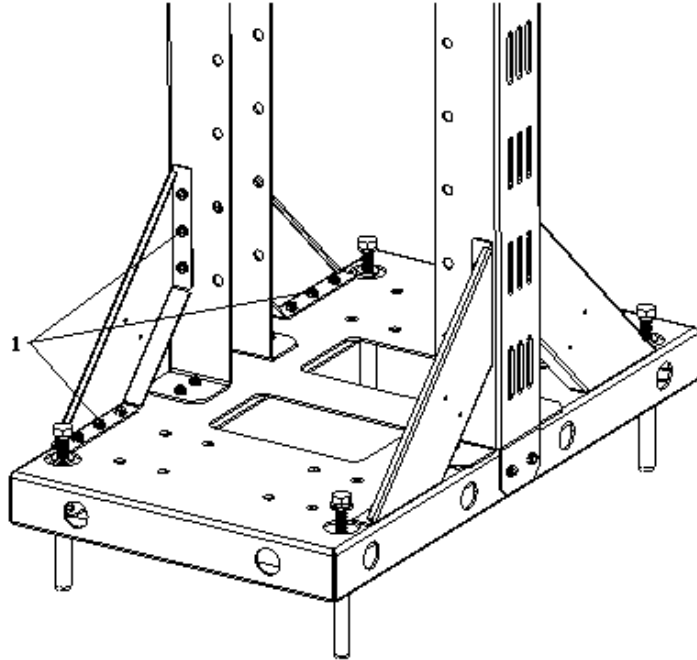
**FIGURE 32 FASTEN UPRIGHT COLUMN AND COVER PLATE**



1. M5X16 screw

- iii. Fasten the tilted support with the M5X16 screws, as shown in [Figure 33](#).

**FIGURE 33 FASTEN TILTED SUPPORT**



1. M5X16 screw

2. Install the gantry.

According to the specified installation position in the engineering design drawing, drill the marked holes and install the expansion bolts.

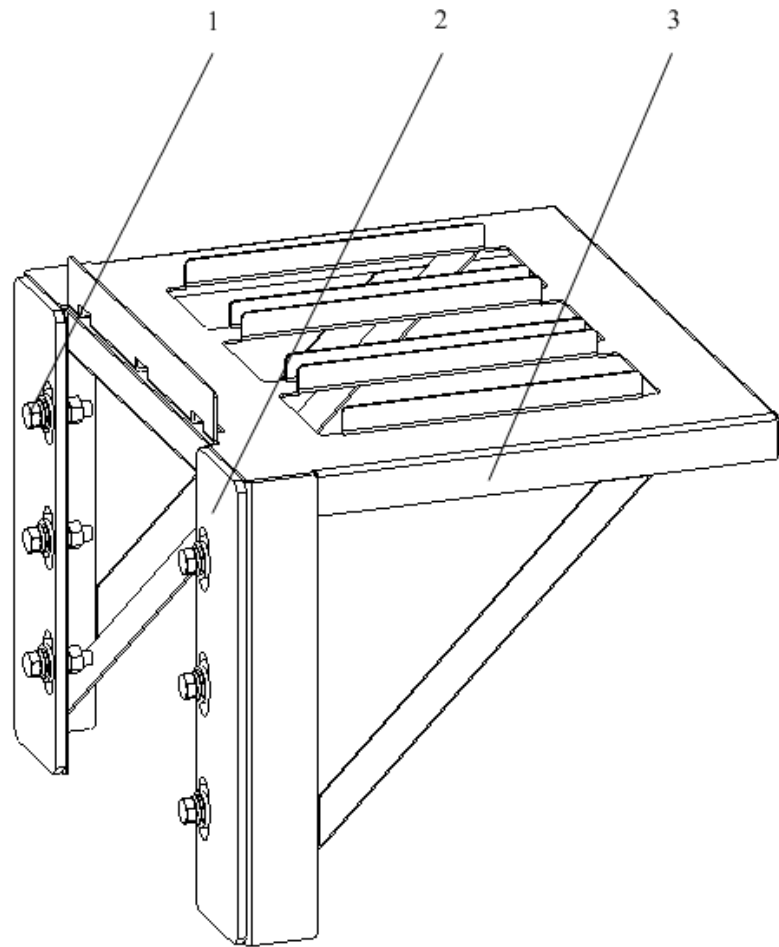
 **Note:**

Adopt the M10X100 expansion bolt while installing the gantry on a concrete base plate; adopt the M10X40 tapping screw while installing the gantry inside a bunker.

3. Install the supporting bracket of wave trap.

The supporting bracket of wave trap is as shown in [Figure 34](#). Fasten the supporting bracket onto the gantry with M8 bolts, as shown in [Figure 35](#).

FIGURE 34 SUPPORTING BRACKET

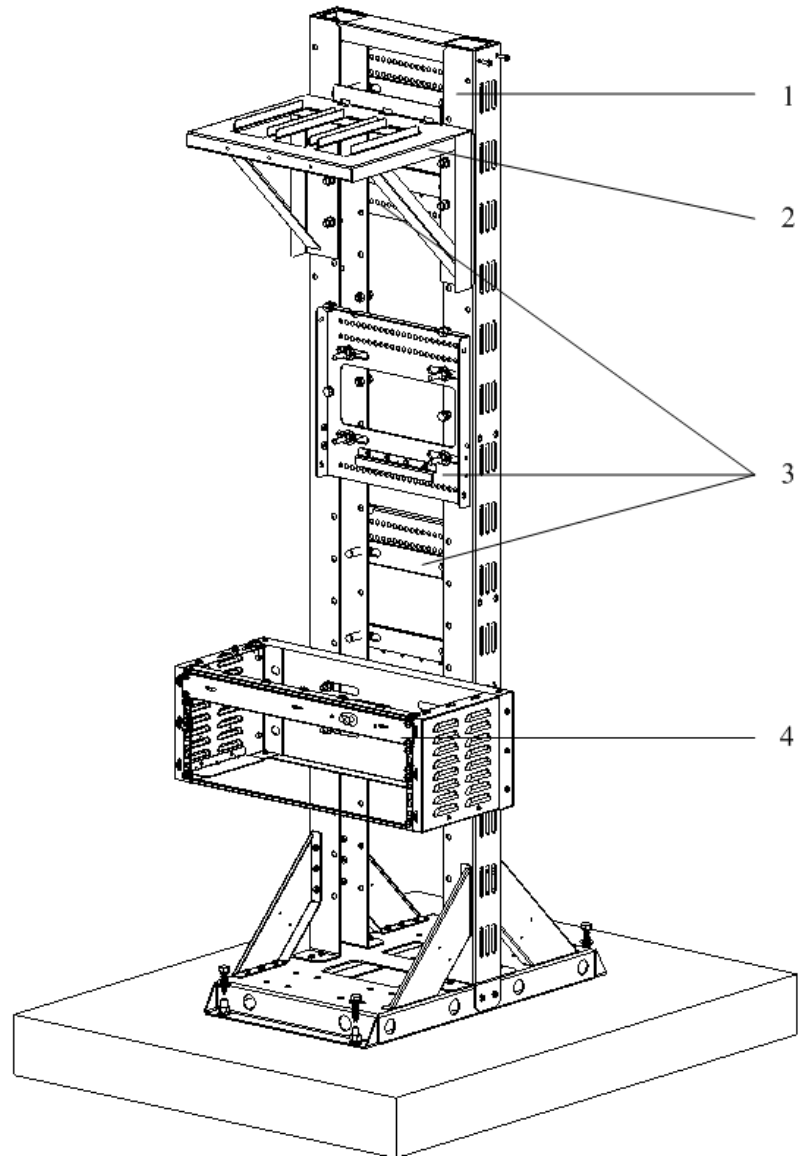


1. M8 bolt
2. Insulation board

3. Supporting bracket

4. Install the ZXSDR R8860.
  - i. Fasten the supporting panels onto the proper positions of gantry with bolts, as shown in [Figure 35](#).

FIGURE 35 SUPPORTING BRACKET AND WALL-MOUNT ASSEMBLIES

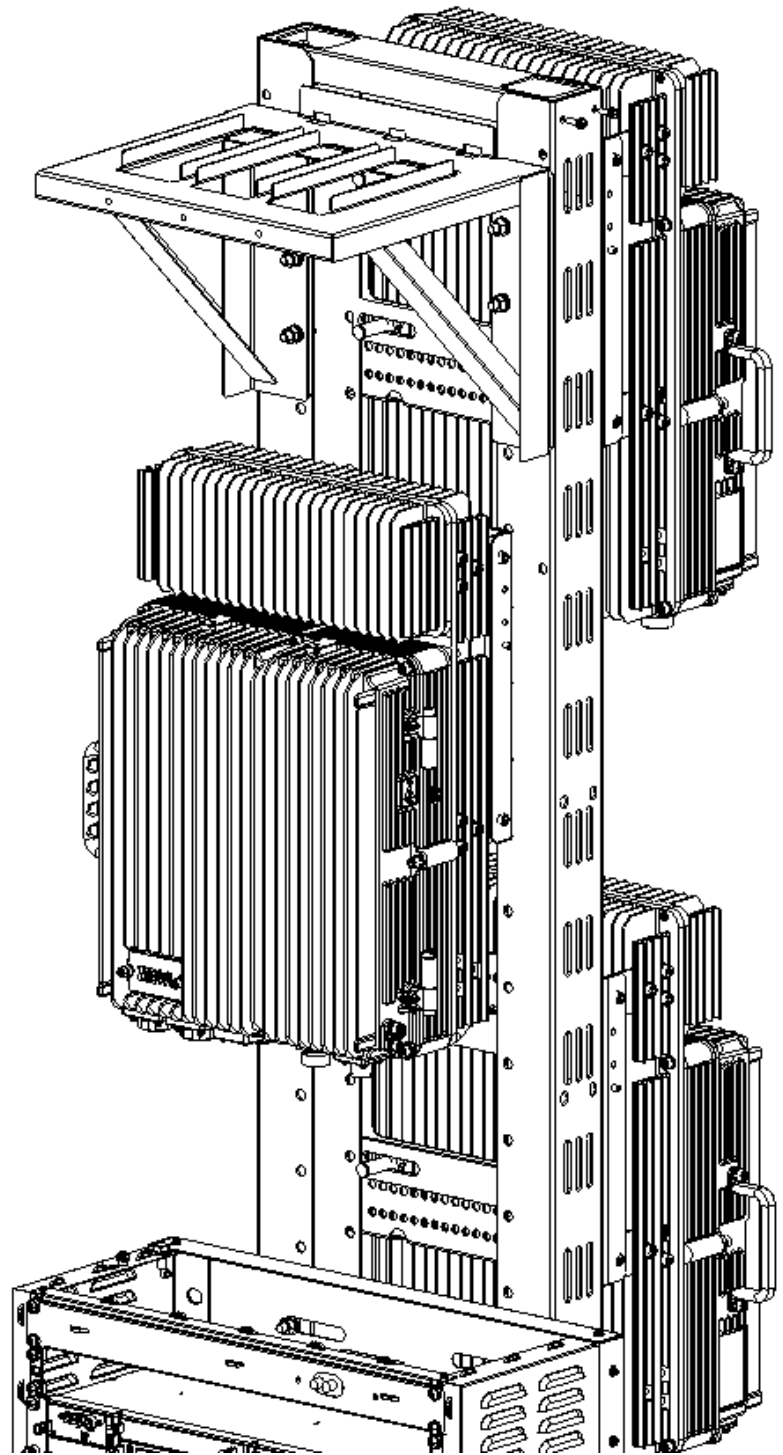


- |                       |                         |
|-----------------------|-------------------------|
| 1. Gantry             | 3. Supporting panel     |
| 2. Supporting bracket | 4. BBU wall-mount frame |

- ii. Mount the ZXSDR R8860 cabinets onto the supporting panels, and fasten the cabinets with four M6X20 hexagon socket cap screws, as shown in [Figure 36](#).



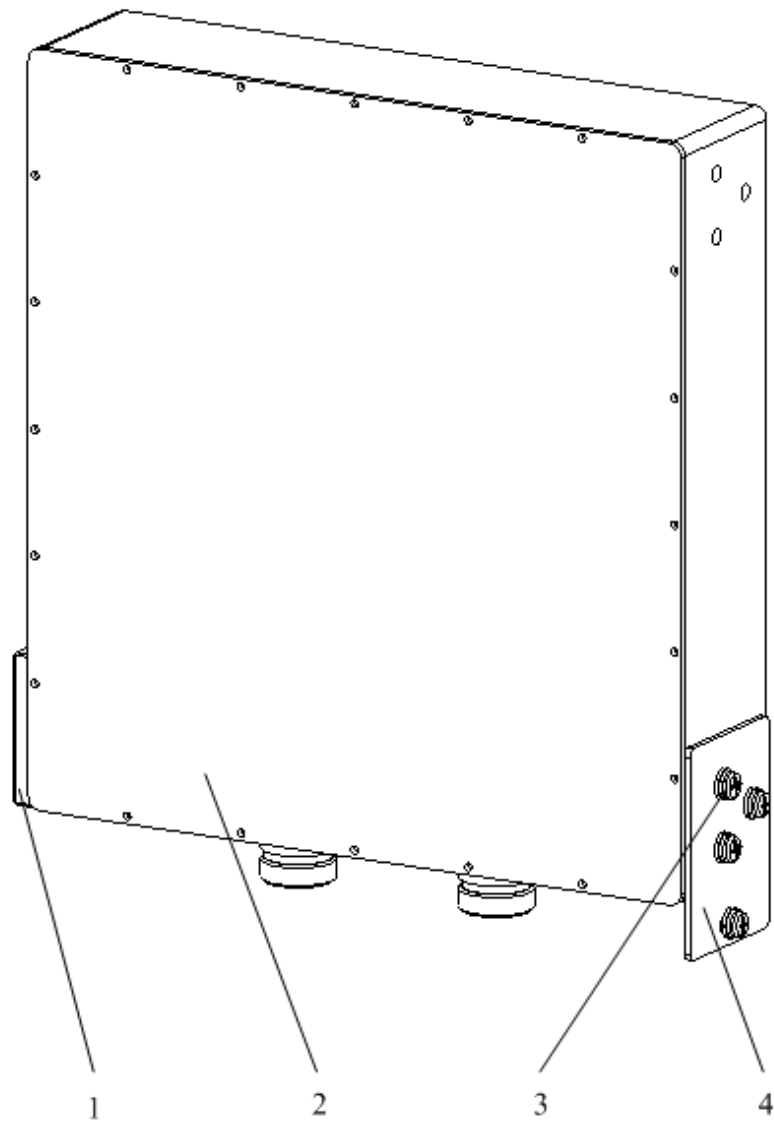
FIGURE 36 ZXSDR R8860 INSTALLATION



5. Install the wave trap.

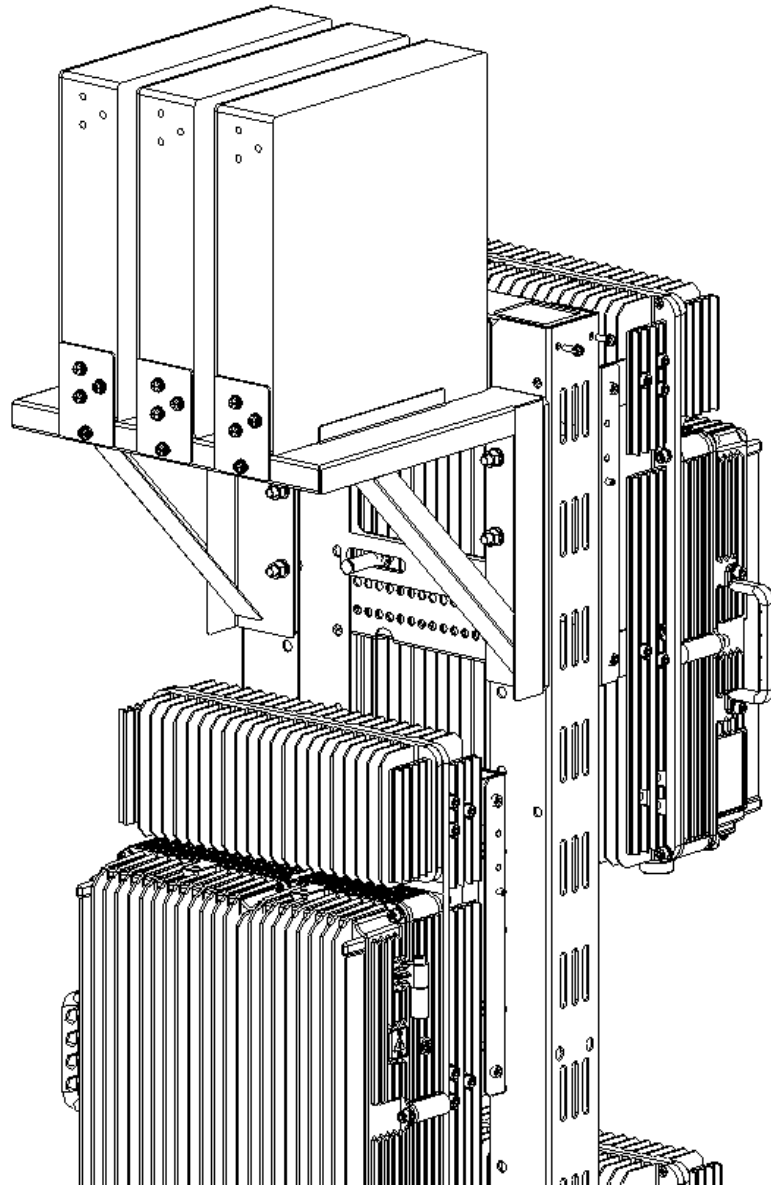
The appearance of wave trap is as shown in [Figure 37](#). Insert the wave trap into the supporting bracket and fasten them with M6 bolts, as shown in [Figure 38](#).

FIGURE 37 WAVE TRAP



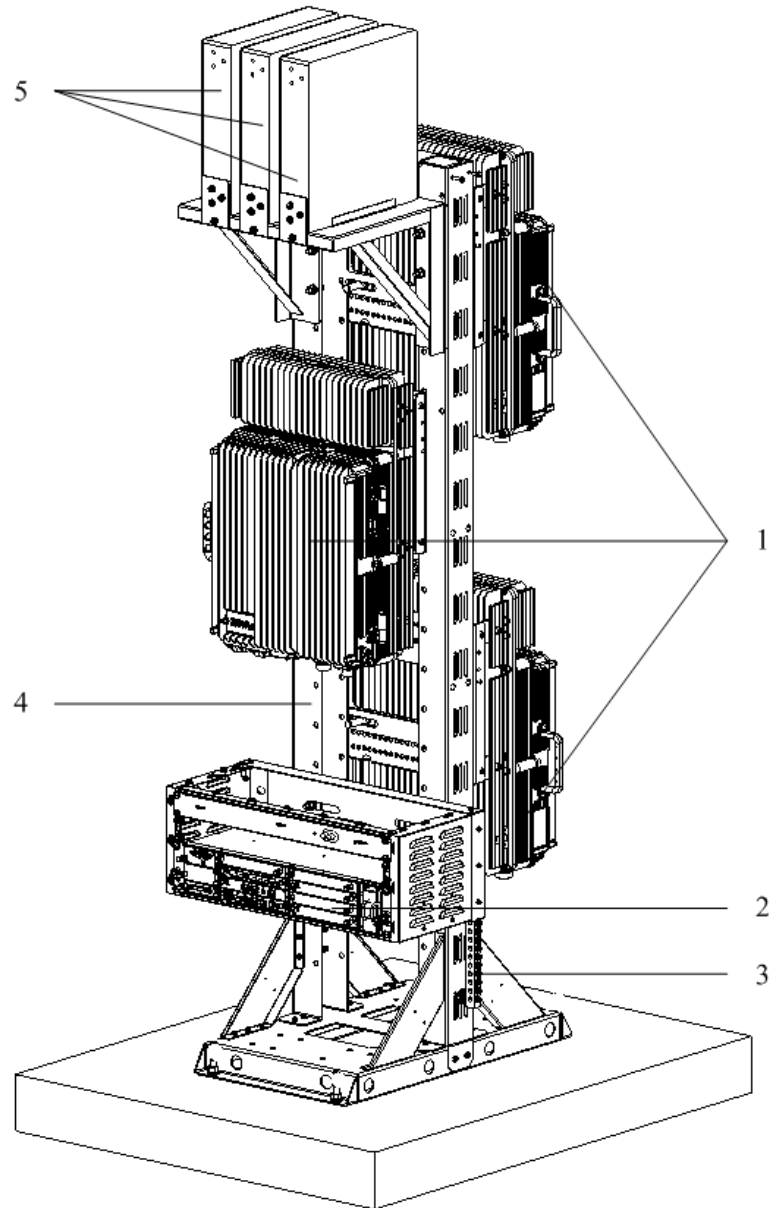
1. Guide block
2. Wave trap
3. M6 bolt
4. Front baffle

FIGURE 38 WAVE TRAP INSTALLATION

**END OF STEPS.**

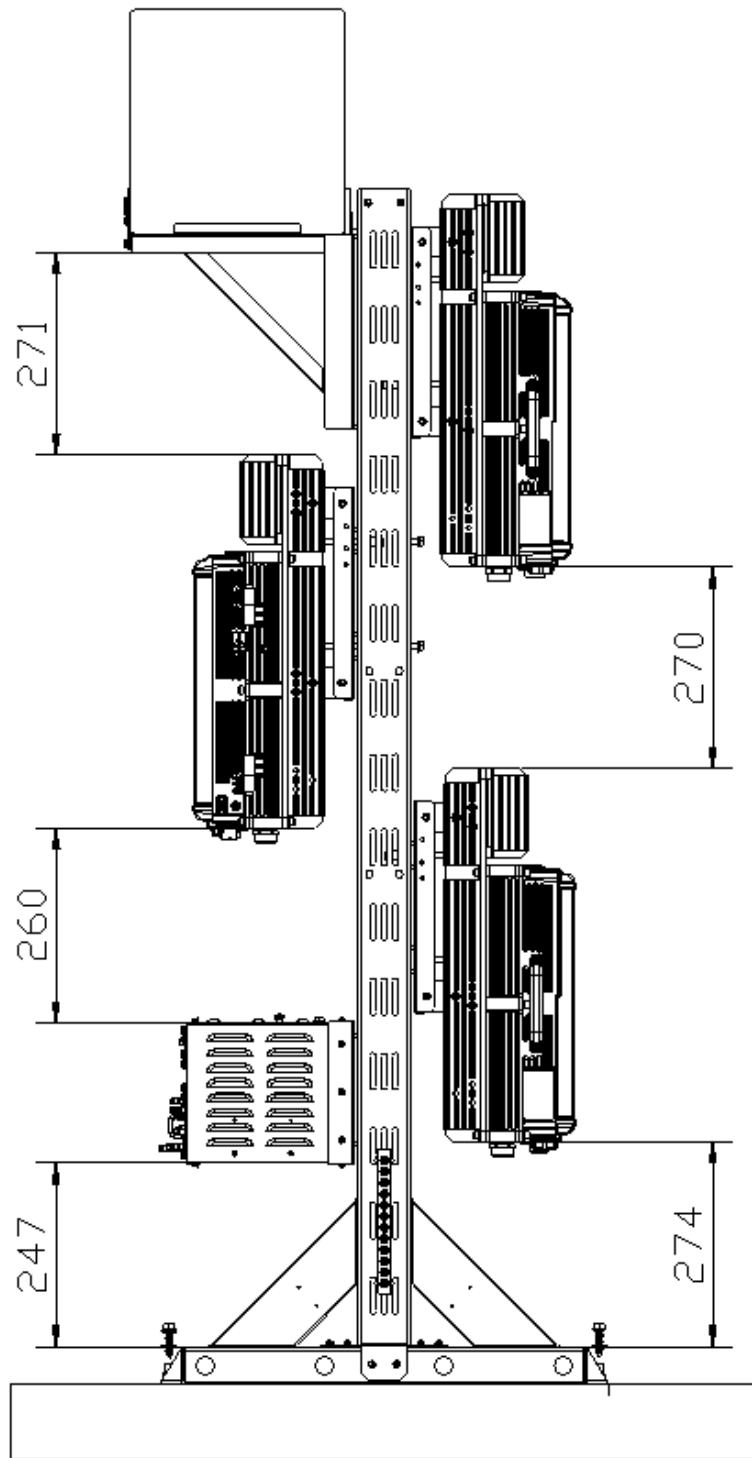
**Example** The ZXSDR R8860 gantry-mount integrated installation is completed. The profiles are as shown in [Figure 39](#) and [Figure 40](#).

FIGURE 39 GANTRY-MOUNT INTEGRATED INSTALLATION



1. ZXSDR R8860
2. ZXSDR B8200 C100
3. Grounding copper bar
4. Gantry
5. Wave trap

FIGURE 40 GANTRY-MOUNT INTEGRATED INSTALLATION (SIDE)



# Simplified Cabinet Integrated Installation Mode

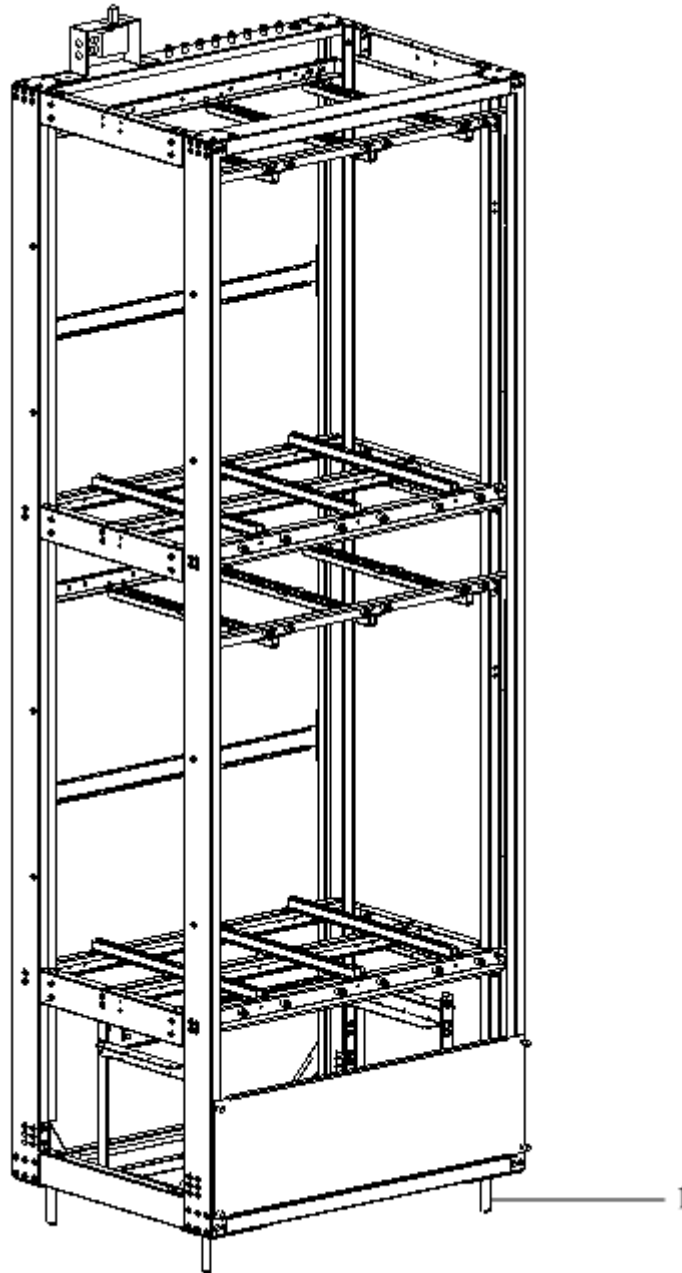
## Components Used in Integrated Installation

---

The ZXSDR R8860 for integrated installation needs the following components: a simplified cabinet, an upper fixing frame and a lower fixing frame.

The dimension of simplified cabinet is 1650×600×450 (H×W×D; unit: mm), as shown in [Figure 41](#).

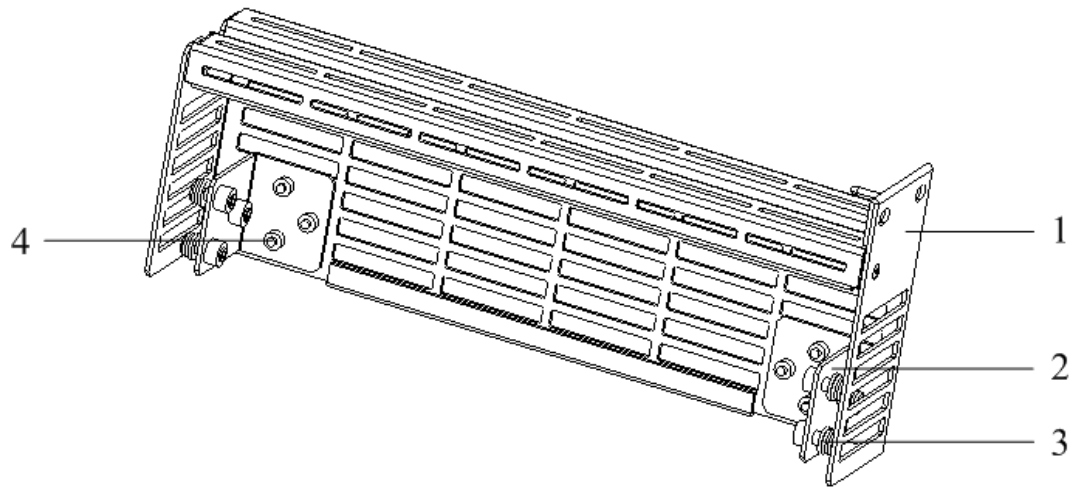
FIGURE 41 SIMPLIFIED CABINET APPEARANCE



1. M10×100 expansion bolt

The upper fixing frame is as shown in [Figure 42](#).

FIGURE 42 UPPER FIXING FRAME

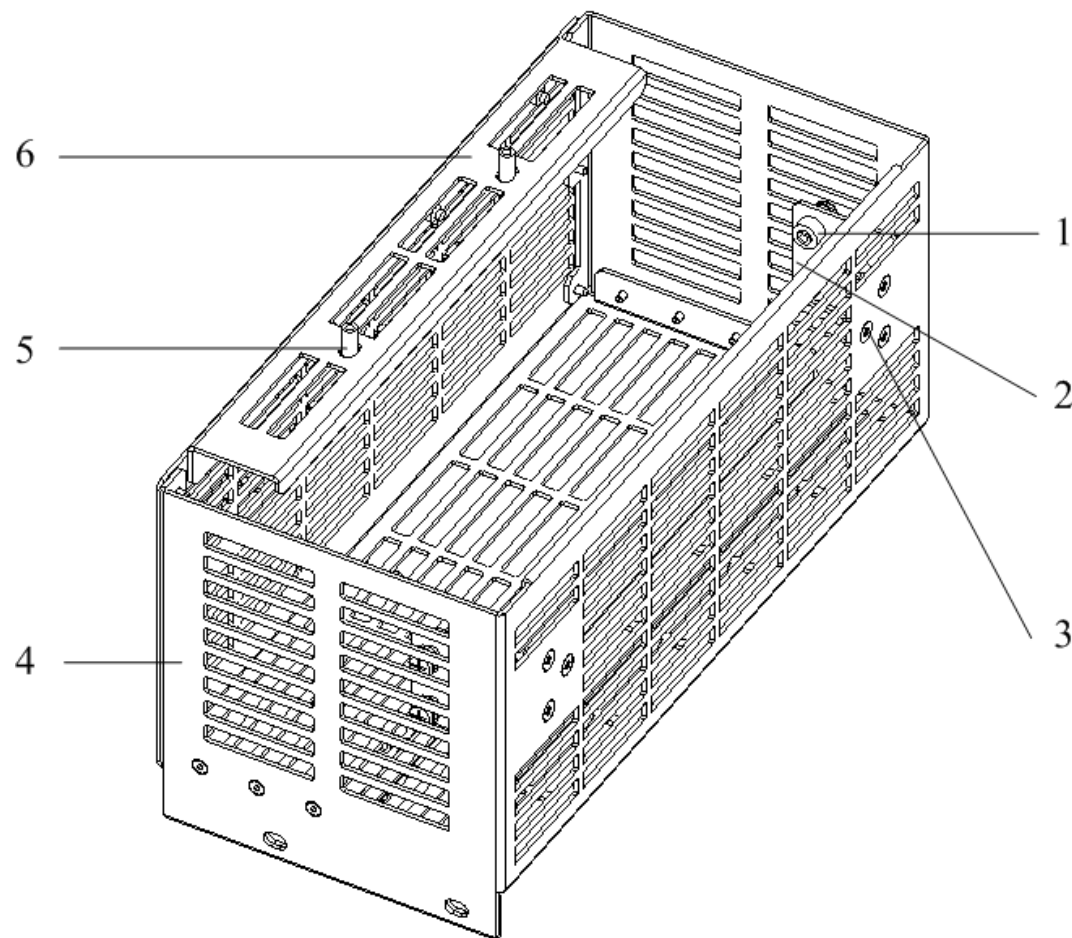


- |                       |                         |
|-----------------------|-------------------------|
| 1. Upper fixing frame | 3. M6×16 pan—head screw |
| 2. Supporting panel   | 4. M4×12 pan—head screw |

The upper fixing frame is as shown in [Figure 43](#).



FIGURE 43 LOWER FIXING FRAME



- |                         |                         |
|-------------------------|-------------------------|
| 1. M6×16 pan—head screw | 4. Lower fixing frame   |
| 2. Supporting panel 1   | 5. M6×16 pan—head screw |
| 3. M4×12 pan—head screw | 6. Supporting panel 2   |

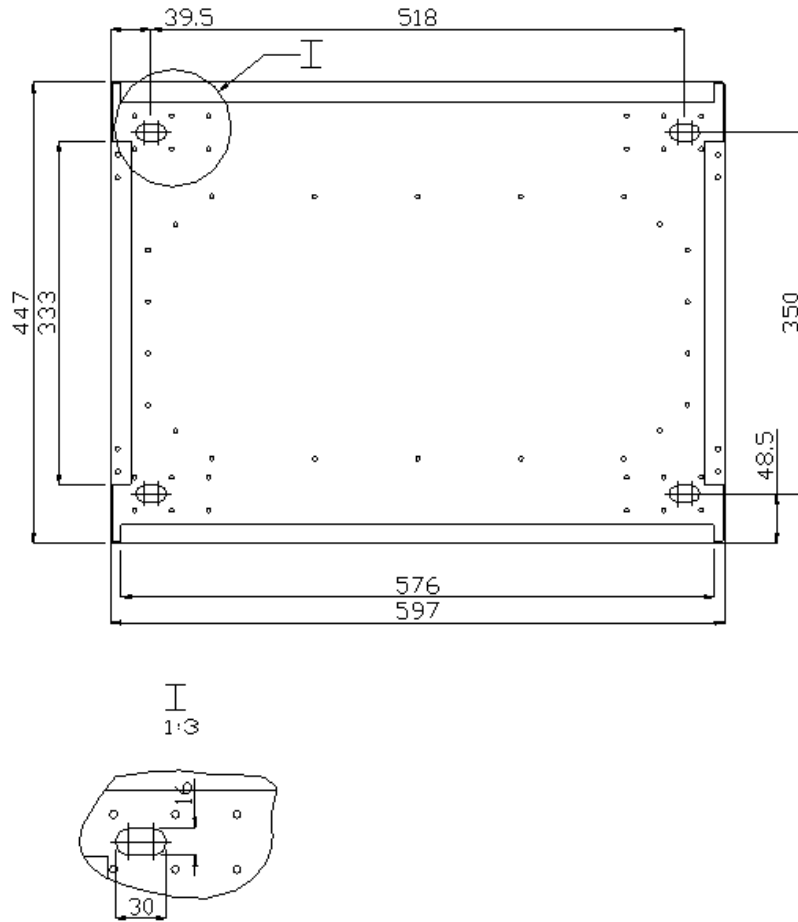
## Installing Integrated Cabinet

**Prerequisite** Unpacking and acceptance for the ZXSDR R8860 and the simplified cabinet meet requirements.

**Steps** 1. Install the simplified cabinet.

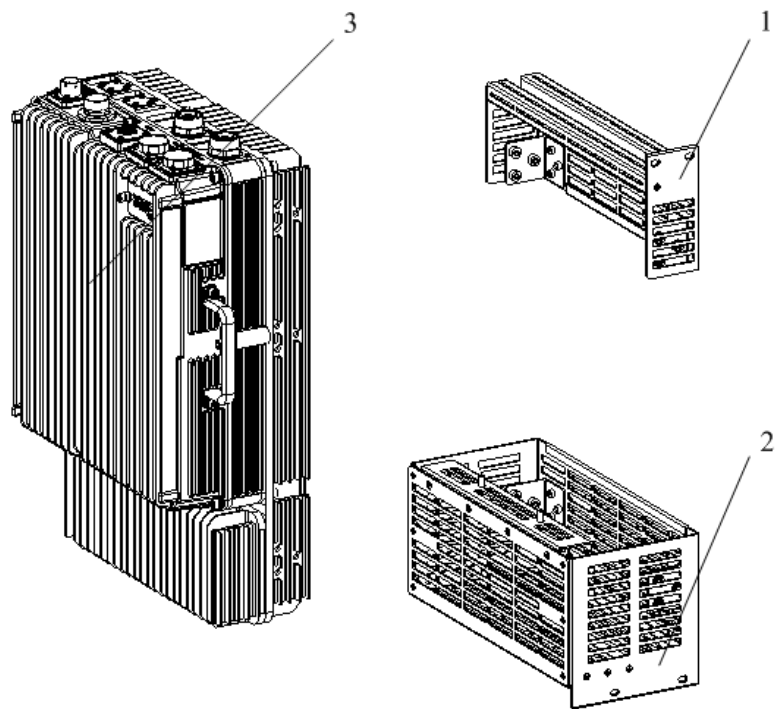
According to an installation position in the engineering design document, drill holes on the indoor floor. The hole positions and the dimension are as shown in . Fasten the cabinet on the floor with M10×100 expansion bolts.

**FIGURE 44 HOLE POSITIONS AND DIMENSION**



2. Install the ZXSDR R8860.  
shows all assemblies for ZXSDR R8860 integrated-cabinet installation.

FIGURE 45 ZXSDR R8860 ASSEMBLIES



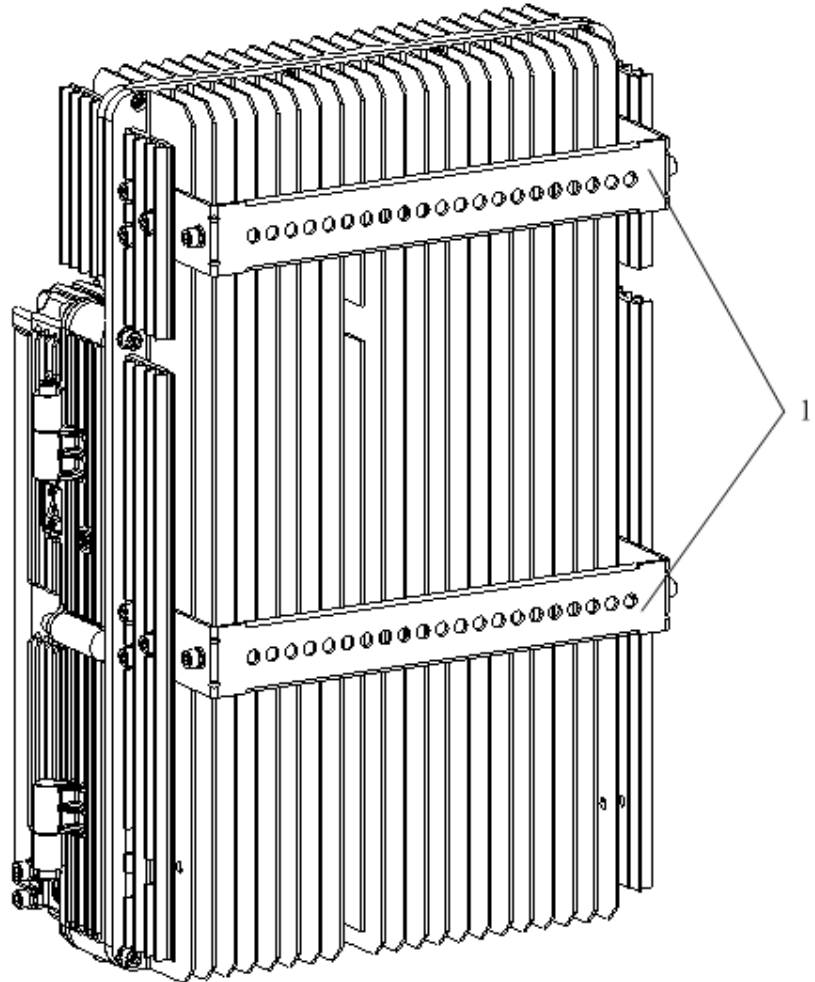
1. Upper fixing frame
2. Lower fixing frame

3. ZXSDR R8860

- i. Remove the fixing beams of ZXSDR R8860.

The ZXSDR R8860 carries two fixing beams used for wall-mount and pole-mount installations, as shown in . Remove the fixing beams.

FIGURE 46 ZXSDR R8860 FIXING BEAM

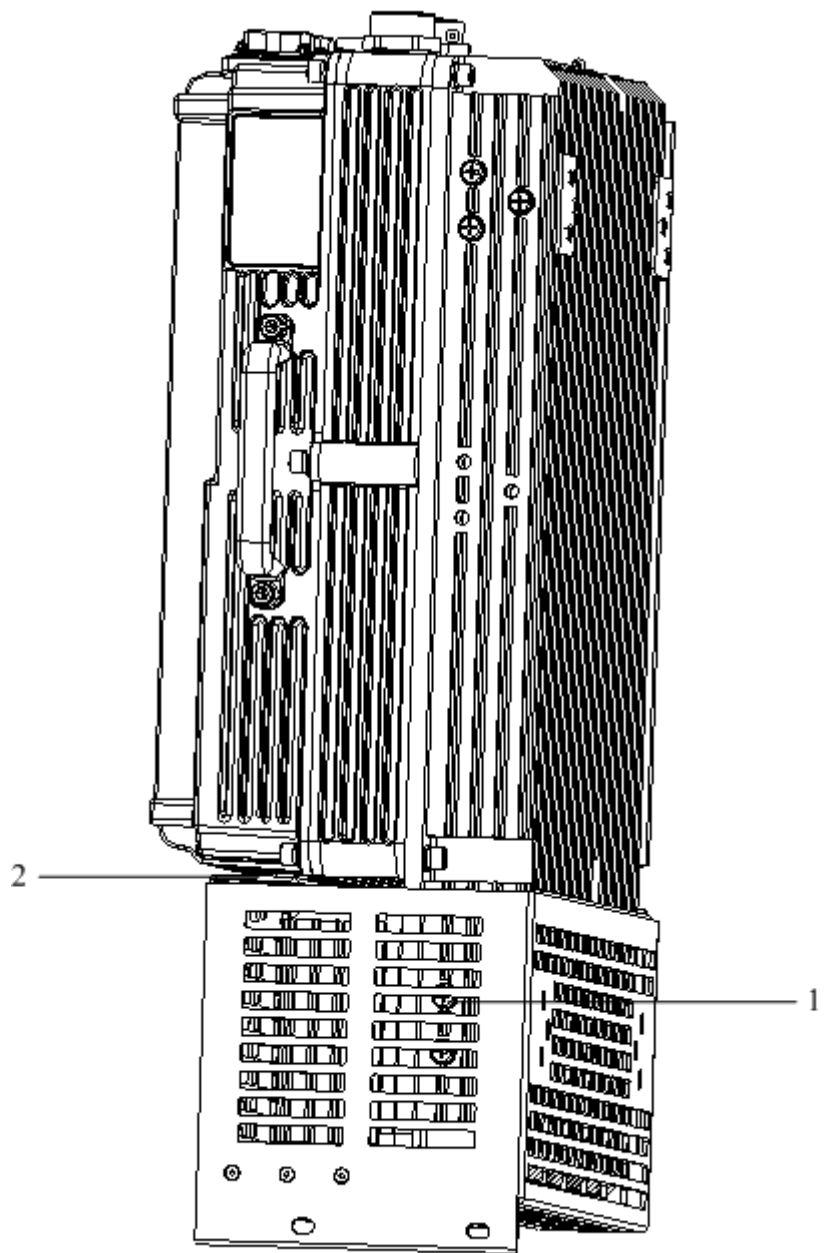


1. Fixing beam

ii. Install the lower fixing frame.

Insert the ZXSDR R8860 to the lower fixing frame. Fasten the supporting panel 2 with the ZXSDR R8860 by M6×12 pan-head screws and fasten the supporting 1 with ZXSDR R8860 by M6×16 pan-head screws, as shown in .

FIGURE 47 LOWER FIXING FRAME INSTALLATION



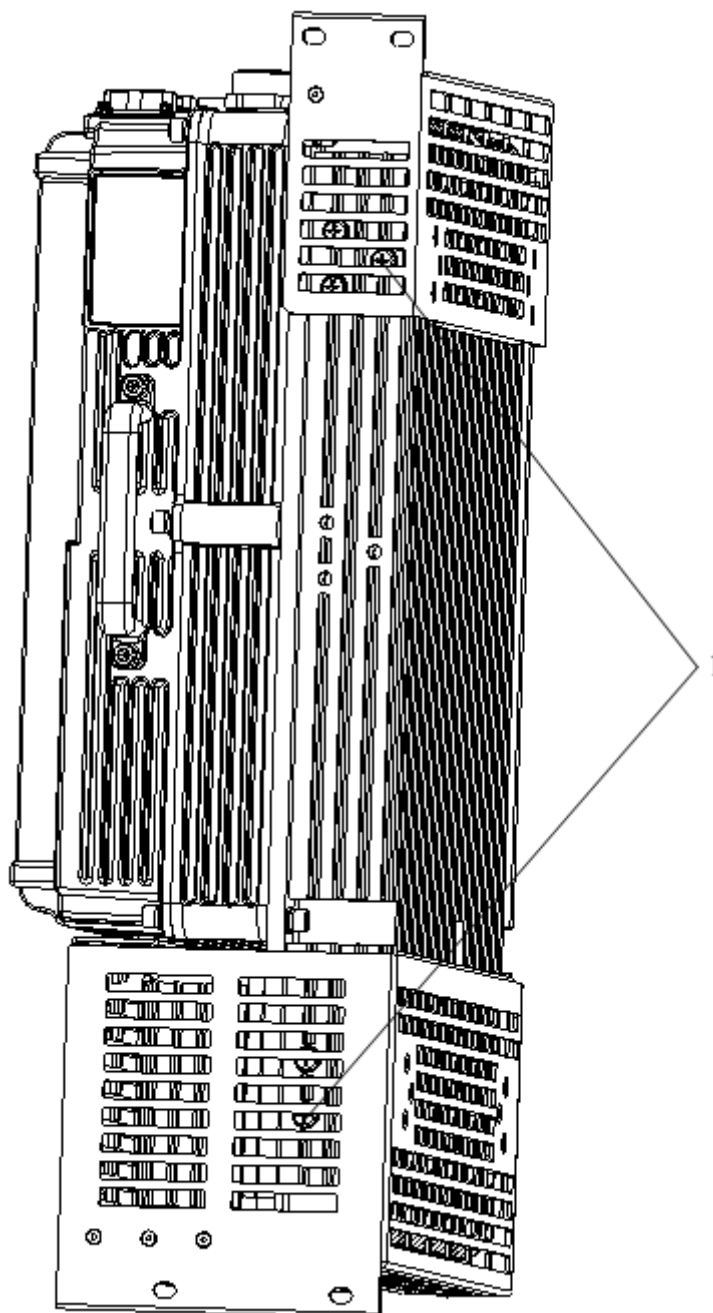
1. Pan-head screw M6×16

2. Pan-head screw M6×12

iii. Install the upper fixing frame.

Insert the ZXSDR R8860 to the lower fixing frame. Fasten the supporting panel of upper fixing frame with the ZXSDR R8860 by M6×16 pan-head screws , as shown in .

**FIGURE 48 ZXSDR R8860 INSTALLED WITH UPPER AND LOWER FIXING FRAME**

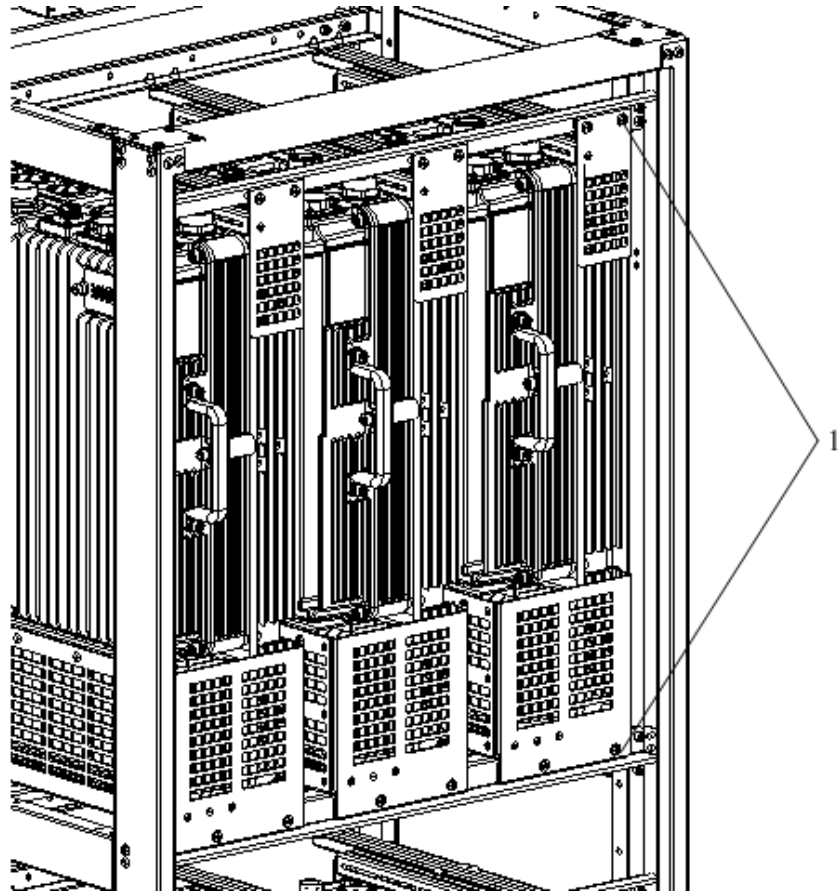


1. M6×16 pan-head screw

3. Install the ZXSDR R8860 to the simplified cabinet.

Align the guidance channel on the ZXSDR R8860 installed with the upper and lower fixing frames to the rail on the simplified cabinet. Then slide the ZXSDR R8860 slowly into the simplified cabinet and fasten them with four M6×16 pan-head screws, as shown in .

FIGURE 49 ZXSDR R8860 INSTALLATION TO SIMPLIFIED CABINET

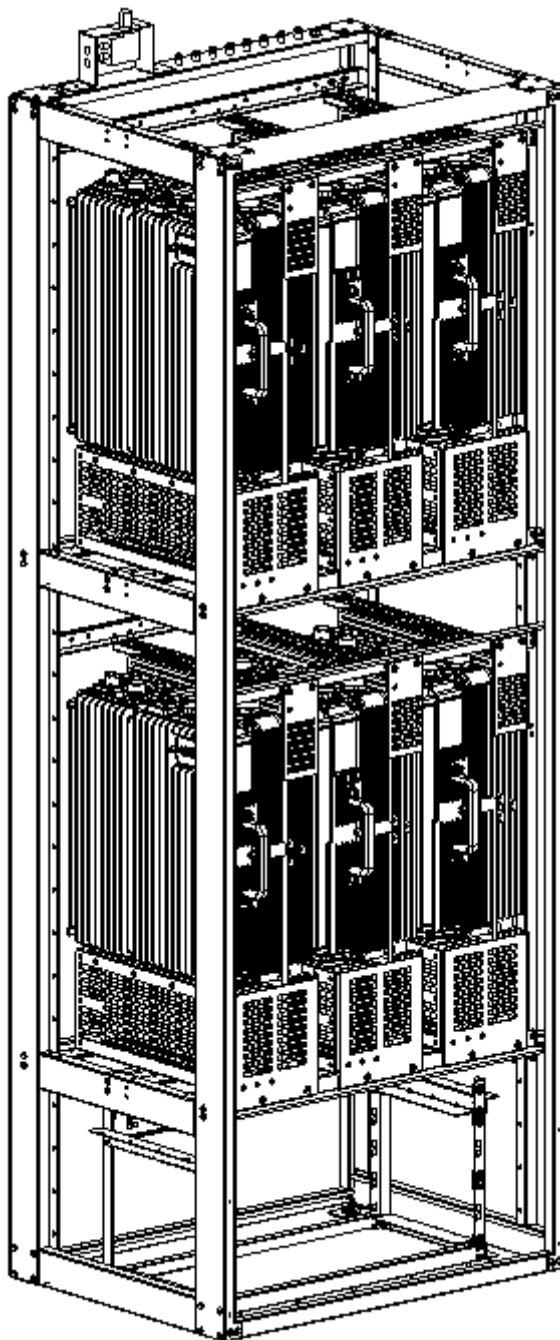


1. M6×16 pan-head screw

4. Install other ZXSDR R8860s.

Repeat the **Step2~Step4** to install other ZXSDR R8860s into the simplified cabinet. When six ZXSDR R8860s are installed completely, the appearance is as shown in .

FIGURE 50 ZXSDR R8860 INSTALLATION COMPLETION



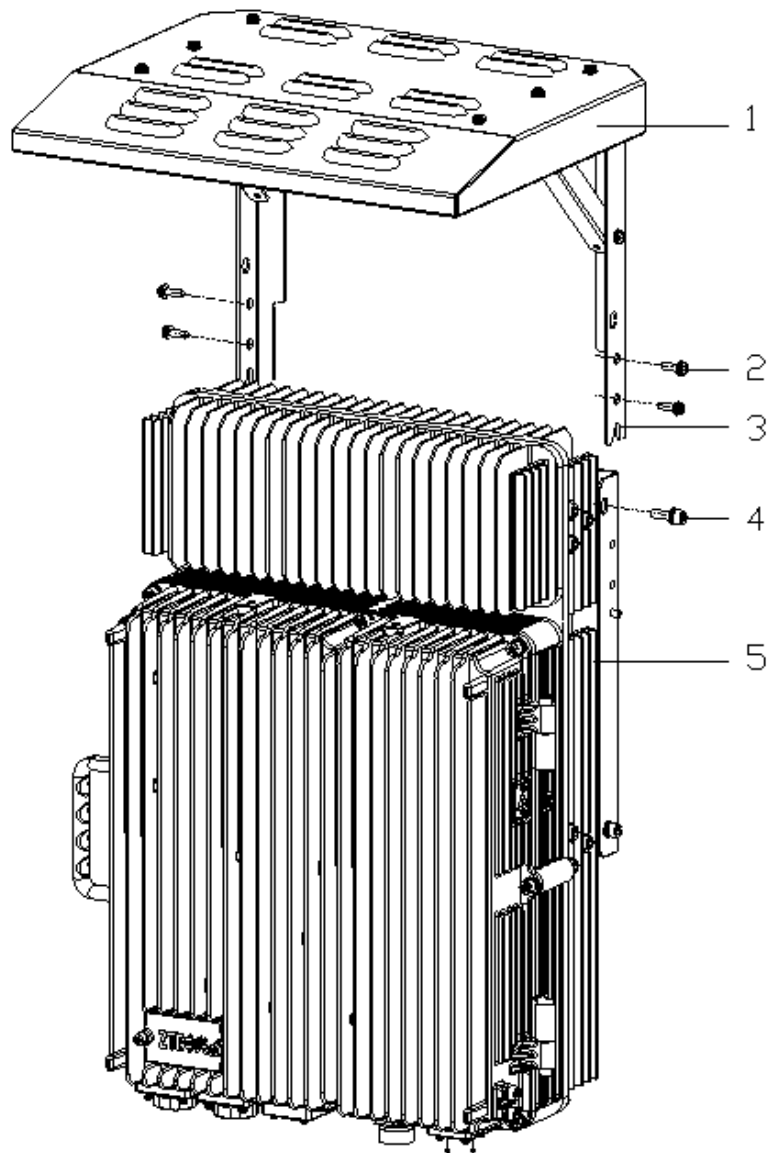
**END OF STEPS.**



# Installing Sun shield

**Context** The components used for installing sun shade must be prepared. shows the sun shade to be installed.

**FIGURE 51 SUN SHIELD STRUCTURE**



- |  |                        |
|--|------------------------|
| 1. Sun shield  | 4. M6 screw            |
| 2. M5 screw  | 5. ZXSDR R8860 cabinet |
| 3. Fixing position (wedged onto the bolt at the side of the common part for wall mounting) |                        |

**Steps** 1. Assemble the sun shade on site and fix the bracket to the shield.

2. Unscrew the two M6 screw at the side top of the cabinet and insert the bolts at both sides of the wall-mounting common part to the sun shade.
3. Screw the two M6 screws and four M5 screws on both sides of the cabinet and tighten them.

**END OF STEPS.**

---

## Chapter 4

# External Cable Installation

---

### Table of Contents:

External Cable Layout .....	67
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Installing Fiber between RRU and RRU .....	73
Installing Environment Monitoring Cable .....	75
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Installing Jumper .....	78

## External Cable Layout

The connection relationship of ZXSDR R8860 external cables is described in [Table 12](#).

**TABLE 12 ZXSDR R8860 EXTERNAL CABLE CONNECTION RELATIONSHIP**

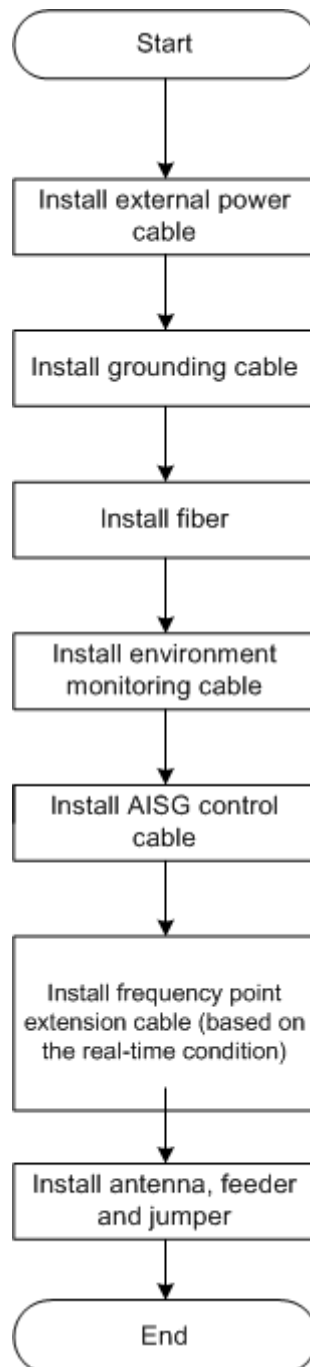
Name	Connection Relationship	Description
Power cable	Connects the ZXSDR R8860 power interface (DC IN) to the power supply equipment interface	One end is the aviation plug and the other end is reserved for power cable made on site. The length of cable is based on the engineering survey.

Name	Connection Relationship	Description
Grounding cable	Connects one ZXSDR R8860 ground bolt to the copper bar	The grounding cable is made up of strands of flame-retardant wire. The cross sectional area of ZXSDR R8860 grounding cable is 10 mm <sup>2</sup> . The color of grounding cable is yellow and green. Copper lugs are crimped at both ends of the ZXSDR R8860 grounding cable.
Optical Fiber	There are two types of ZXSDR R8860 fiber: BBU connection /ZXSDR R8860 cascading.	There are two types of ZXSDR R8860 optical fiber: one used in BBU connection and the other used in cascading between ZXSDR R8860s.
Environment monitoring cable	Connects the ZXSDR R8860 environment monitoring interface MON to the external monitoring components or the dry contact.	A end of the environment monitoring cable is PIN design. B end, with 3m length in total, needs making based on the on-site engineering.
AISG control cable	Connects the ZXSDR R8860 debugging interface (AISG) to the control interface of electrical-adjustment antenna.	AISG is used for control of the electrical-adjustment antenna.
Frequency point extension cable	Interconnects the ZXSDR R8860 RXin/RXout interfaces.	The frequency point extension cable usually adopts the finished 1/2" jumper with 2m length. The jumper can be self-made based on the real-time condition on site. A and B ends of jumper are N connectors (male).
Antenna, feeder and jumper	Connects the ZXSDR R8860 to the main feeder.	The RF jumper usually adopts the finished 1/2" jumper with 2m length. The jumper can be self-made based on the real-time condition on site. The end of jumper is N connector (male) and the other end is DIN connector (female).

# External Cable Installation Flow

Figure 52 lists the installation flow of external cable. This flow can be adjusted based on the real-time condition.

**FIGURE 52 EXTERNAL CABLE INSTALLATION FLOW**

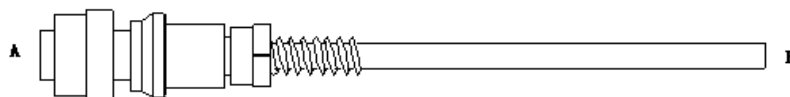


# Installing Power Cable

**Context** The ZXSDR R8860 cabinet adopts -48 V DC for power supply. End A is the aviation plug and End B is reserved for self-made power cable on site. The length of power cable is according to the engineering survey.

ZXSDR R8860 [Figure 53](#) shows the structure of power cable.

**FIGURE 53 POWER CABLE STRUCTURE**



[Table 13](#) describes the colors and specifications of inside core cable.

**TABLE 13 COLOR AND SPECIFICATION**

Color	Specification
Blue	-48V
Black	-48V GND



**Note:**

1. If the two-core cable is adopted, the blue core cable stands for -48 V and the black core cable stands for -48 V GND;
2. If the four-core cable is adopted, the two blue core cables connected in parallel stand for -48 V and the black core cables connected in parallel stand for -48 V GND.

- Steps**
1. Connect End A of power cable with DC IN interface located at the bottom of ZXSDR R8860.
  2. Strip the protective coat of End B and connect it with the DC input power source according to colors of the inside core cable.
  3. Make waterproof protection of End B.
  4. Attach labels at both ends of the power cable.
  5. Fix the power cable.

**END OF STEPS.**

# Installing Grounding Cable

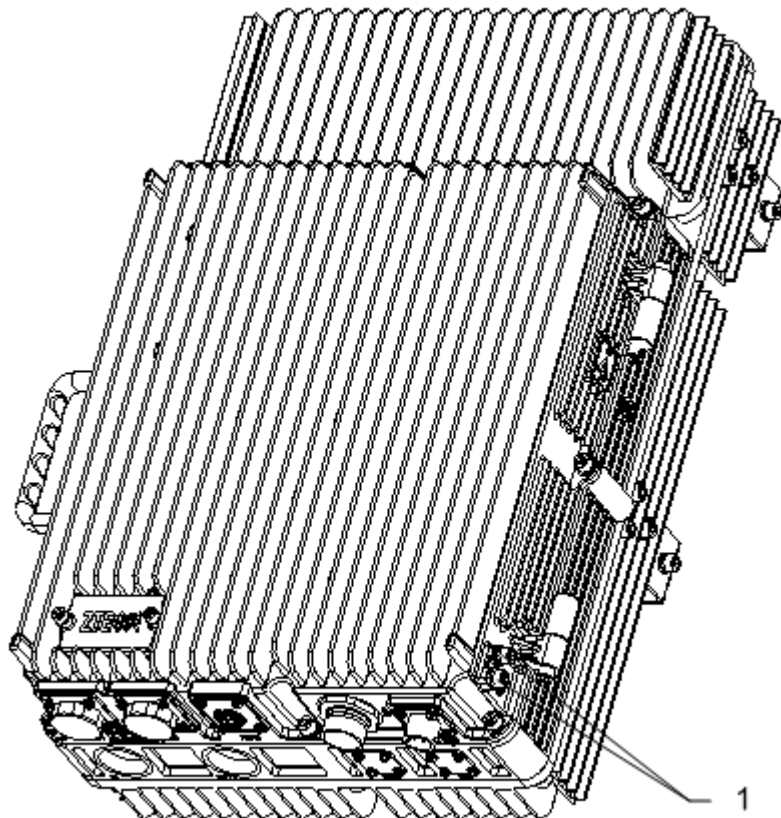
**Context** The grounding cable is made up of strands of flame-retardant wire. The cross sectional area of ZXSDR R8860 grounding cable is  $10 \text{ mm}^2$ . The color of grounding cable is yellow and green. Copper lugs are crimped at both ends of the ZXSDR R8860 grounding cable, as shown in [Figure 54](#).

**FIGURE 54 GROUNDING CABLE STRUCTURE**



- Steps** 1. Cover and fix a copper lug on the a grounding bolt of the ZXSDR R8860 cabinet, as shown in [Figure 55](#).

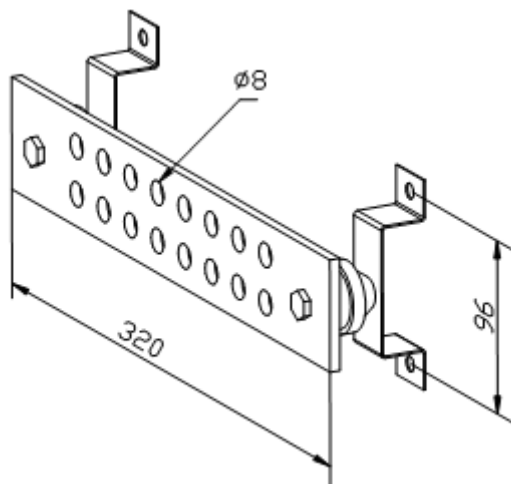
**FIGURE 55 ZXSDR R8860 GROUNDING BOLT**



1. Grounding bolt

2. Connect the other copper lug to the earth-networking copper bar and fix it with a bolt, as shown in [Figure 56](#).

**FIGURE 56 EARTH-NETWORK COPPER BAR (UNIT: MM)**



3. Attach the label on the grounding cable.
4. Measure the grounding resistance and make sure it less than  $5 \Omega$ .

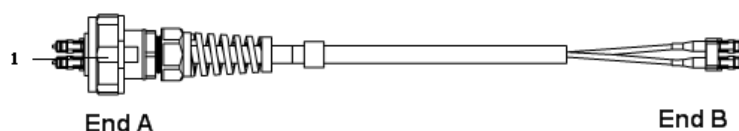
**END OF STEPS.**

## Installing Fiber between BBU and RRU

**Prerequisite** The ZXSDR R8860 cabinet must be installed and fixed successfully.

**Context** [Figure 57](#) shows fiber connection between ZXSDR R8860 and BBU.

**FIGURE 57 FIBER CONNECTION BETWEEN ZXSDR R8860 AND BBU**



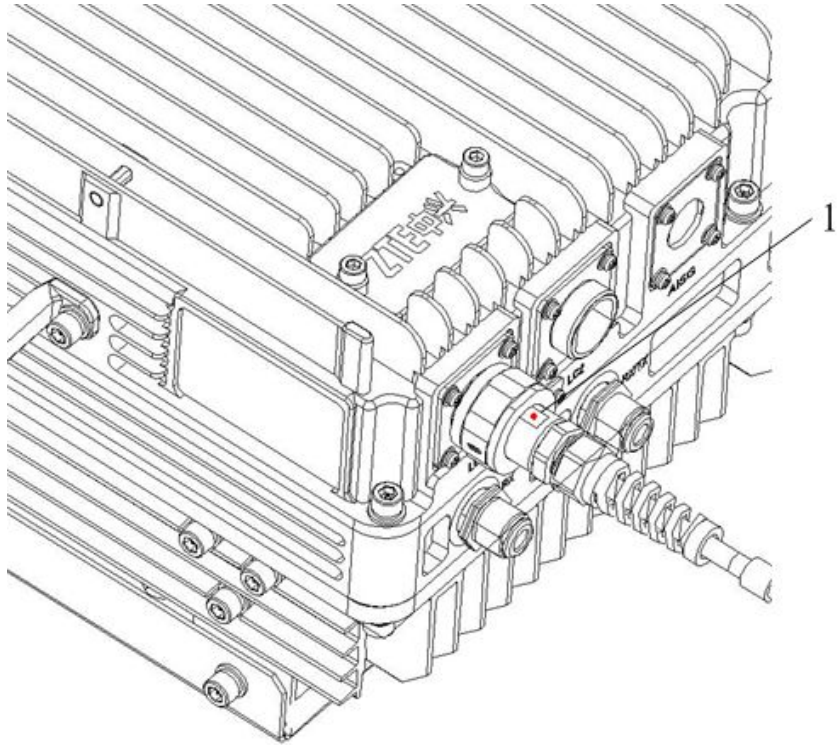
1. Outdoor Seal Component

While connecting a [BBU](#) to ZXSDR R8860, make sure that the base-band RF fiber interface (LC1/2) of the ZXSDR R8860 is connected to the optical interface connector of the BBU.



- Steps**
1. Attach labels at both ends of the fiber.
  2. Adjust the side of End A with the color mark and insert the ZXSDR R8860 fiber interface, and screw down the nuts, as shown in [Figure 58](#)

**FIGURE 58 OPTICAL FIBER INSTALLATION**



1. Color mark

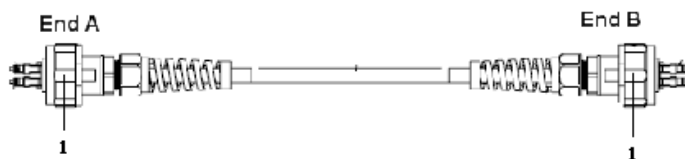
3. Connect End A of the fiber to the base band RF fiber interface (LC1/2) of the ZXSDR R8860.
4. Connect End B of the fiber, which is a DLC connector, to the BBU optical connector.
5. Screw down the outdoor seal component at End A for waterproofing.

**END OF STEPS.**

## Installing Fiber between RRU and RRU

**Prerequisite** The cascading ZXSDR R8860 cabinets must be installed and fixed successfully.

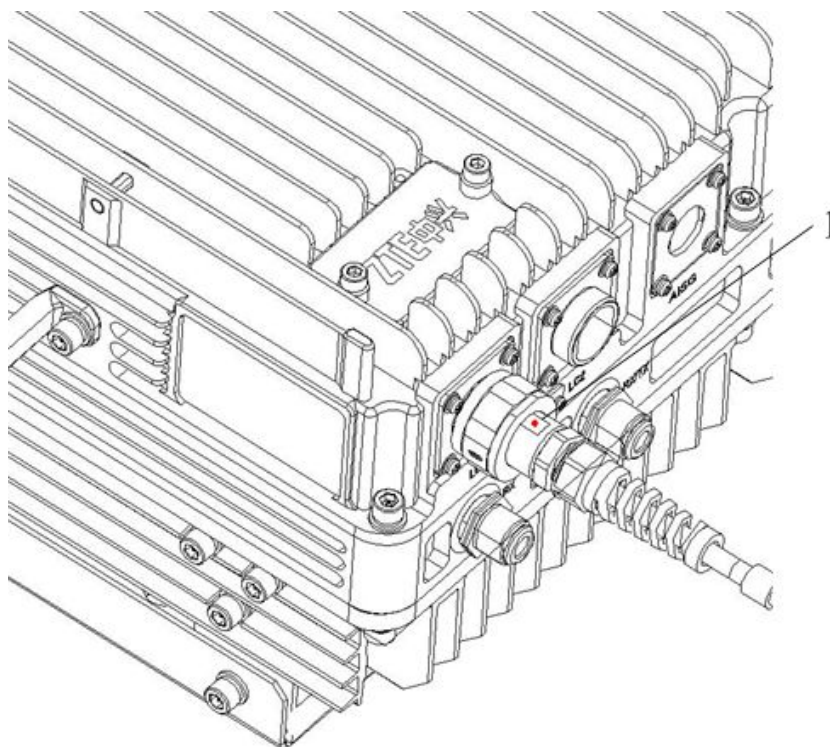
**Context** [Figure 59](#) shows fiber connection between ZXSDR R8860s.

**FIGURE 59 FIBER CONNECTION BETWEEN ZXSDR R8860s**

1. Outdoor Seal Component

While interconnecting the ZXSDR R8860s, make sure that the two baseband RF fiber interfaces (LC1/2) of the ZXSDR R8860 are connected.

- Steps**
1. Attach labels at both ends of the optical fiber.
  2. Adjust the side of End A with the color mark and insert the ZXSDR R8860 fiber interface, and screw down the nuts, as shown in [Figure 60](#).

**FIGURE 60 OPTICAL FIBER INSTALLATION**

1. Color mark
3. Connect End A of the optical fiber to the base band RF fiber interface (LC1/2) of the ZXSDR R8860.
4. Connect End B of the optical fiber to the other base band RF fiber interface (LC1/2) of the ZXSDR R8860.

- Screw down the outdoor seal component at End A for waterproofing.

**END OF STEPS.**

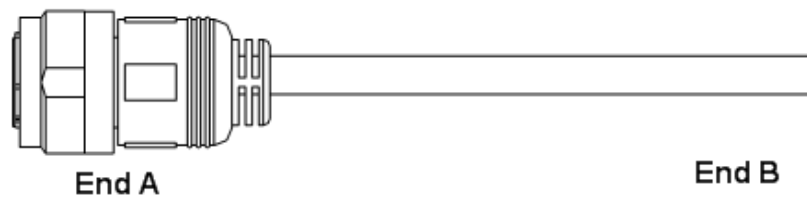
## Installing Environment Monitoring Cable

**Prerequisite** The ZXSDR R8860 cabinet must be installed and fixed successfully.

**Context** The environment monitoring cable provides a 485 interface, used for ZXSDR R8860 environment monitoring. In addition, the cable also provides four extension accesses for external dry contact monitoring.

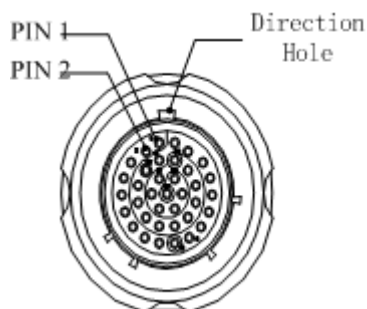
End A is the 37 PIN connector, and End B is made by on-site engineering. The total length is 3m. [Figure 61](#) shows the appearance of environment monitoring cable.

**FIGURE 61 ENVIRONMENT MONITORING CABLE**



The connector, connecting the environment monitoring cable to the ZXSDR R8860, adopts 37-core aviation jack. The connector accords with the GJB599 specification. The connector appearance is as shown in [Figure 62](#)

**FIGURE 62 AVIATION JACK APPEARANCE**



[Table 14](#) describes the connector pins.

**TABLE 14 CABLE PIN DESCRIPTION**

Pin	Core-Cable Color	Signal Description
15/16	White and blue/blue	Dry contact 4 -/+
17/18	White and orange/orange	Dry contact 3 -/+
19/20	White and green/green	Dry contact 2 -/+
21/22	White and brown/brown	Dry contact 1 -/+
23/24	Red and blue/blue	RS485 receive
25/26	Red and orange/orange	RS485 transmit

- Steps**
1. Connect End A to the MON interface located at the bottom of ZXSDR R8860.
  2. Connect End B with external monitoring devices or dry contacts.
  3. Attach the label at End B.

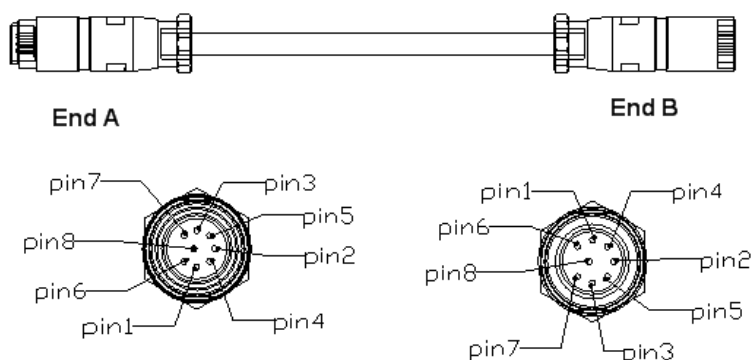
**END OF STEPS.**

## Installing AISG Control Cable

**Context** The AISG control cable is used for control of the electrical adjustment antenna.

[Figure 63](#) shows the structure of the AISG control cable.

**FIGURE 63 AISG CONTROL CABLE STRUCTURE**



[Table 15](#) describes the serial No. meaning of AISG control cable.

**TABLE 15 AISG CONTROL CABLE DESCRIPTION**

Serial No.	Name	Meaning
1	TRX_ANT_485_+	RS485+
2	TRX_ANT_485_-	RS485-
3,4	TRX_ANT_28V	28V
5,6	TRX_ANT_28VGND	28VGND
7,8	NC	Null

- Steps**
1. Connect End A to the ZXSDR R8860 debugging interface (AISG) and screw down the bolt;
  2. Connect End B to the control interface of electrical adjustment antenna and screw down the bolt.

**END OF STEPS.**

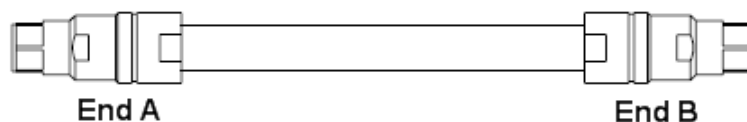
## Installing Frequency Point Extension Cable

**Prerequisite** The two ZXSDR R8860 cabinets to be combined must be installed and fixed successfully.

**Context** After the combination of cabinets, the ZXSDR R8860 can support 8 carrier sectors at most.

The two ZXSDR R8860 cabinets are connected through their connecting interfaces such as RXin and RXout by two frequency point extension cables. [Figure 64](#) shows the structure of the frequency point cable. End A and End B are N connectors (male).

The 2M 1/2" jumper is often used for the frequency point extension cable. It may be prepared on site if necessary.

**FIGURE 64 FREQUENCY POINT EXTENSION CABLE**

- Steps**
1. Connect End A of the frequency point extension cable to the frequency point extension interface RXIN of one ZXSDR R8860;
  2. Connect End B to RXout of the other ZXSDR R8860;

3. Connect the remaining RXin/RXout interfaces of the two combined cabinets with the other frequency point extension cable.

**END OF STEPS.**

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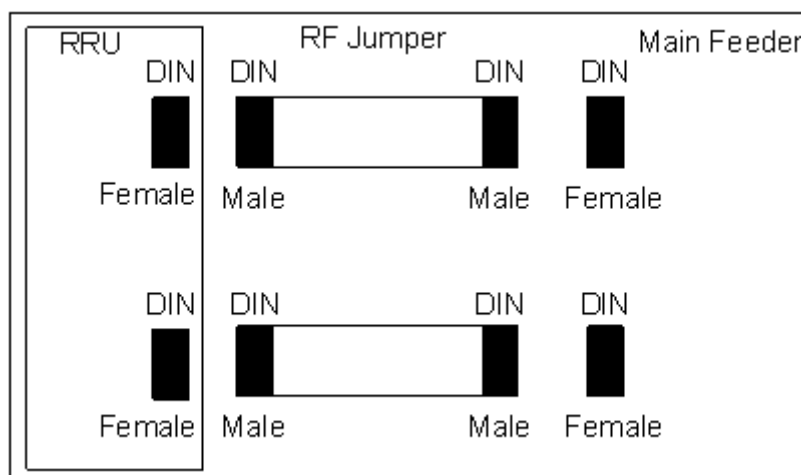
## Installing Jumper

**Context** One end of RF jumper connects with the main feeder and the other end connects with the antenna feeder interface of ZXSDR R8860 cabinet. Before installing the RF jumper, the main feeder is installed.

The RF jumper adopts the 1/2" jumper with a 2m length. The jumper can also be self-made according to the on-site condition.

The installation position of RF jumper is as shown in [Figure 65](#).

**FIGURE 65 RF JUMPER INSTALLATION**



Perform the following steps to install the RF jumper.

- Steps**
1. Connect the DIN connector (male) of RF jumper with the DIN connector (female) of main feeder.
  2. Connect the DIN connector (male) of RF jumper with the DIN connector (female) of ZXSDR R8860 cabinet.
  3. Seal the connectors with waterproof adhesive tapes and PVC tapes.

**END OF STEPS.**

---

## Chapter 5

# Main Antenna Feeder System Installation

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## Main Antenna Feeder System Structure

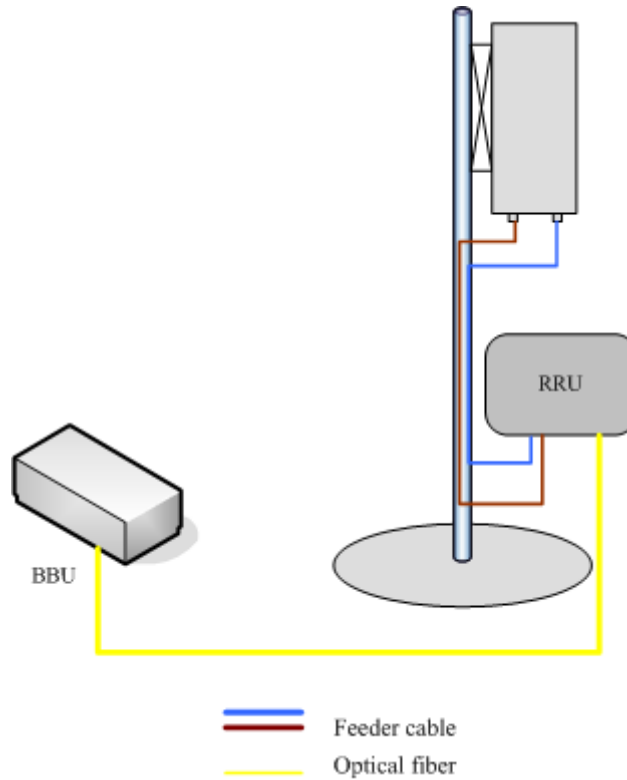
The typical configurations for ZXSDR R8860 main antenna feeder system described below includes:

- ZXSDR R8860 configuration with common antenna
- ZXSDR R8860 configuration with common antenna, AISG dual power amplifier
- ZXSDR R8860 configuration with electronic adjustment antenna(1)
- ZXSDR R8860 configuration with electronic adjustment antenna(2)
- ZXSDR R8860 configuration with electronic adjustment antenna, AISG dual power amplifier

### **ZXSDR R8860 configuration with common antenna**

In this configuration, generally ZXSDR R8860 installation position is near antenna and they are all installed on the building top. ZXSDR R8860 is connected to the antenna by 1/2"feeder directly, occasionally 5/4"or 7/8"feeder is adopted, as shown in [Figure 66](#).

FIGURE 66 ZXSDR R8860 CONFIGURED WITH COMMON ANTENNA



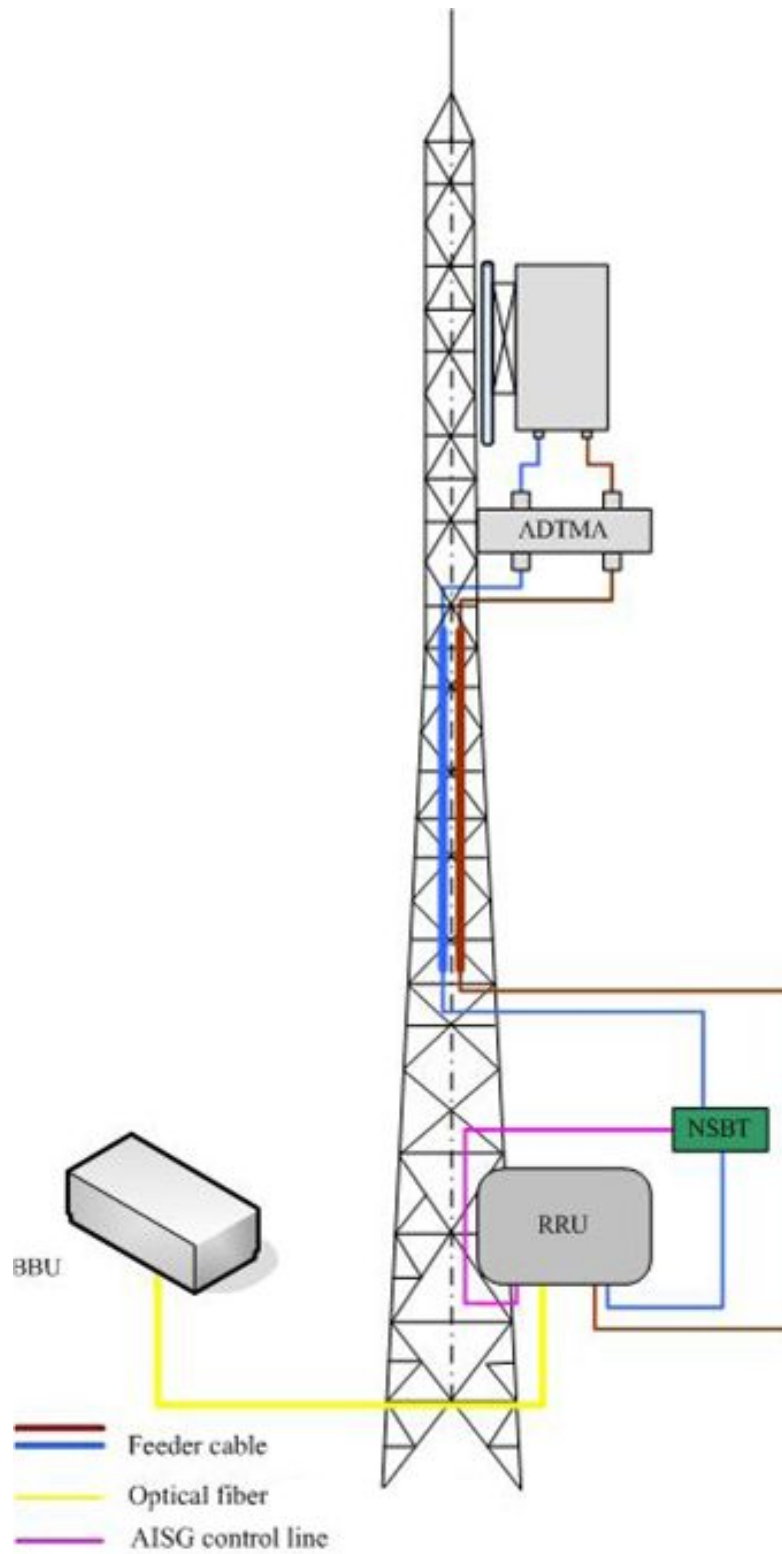
**ZXSDR R8860 configuration with common antenna,**

In this configuration, generally ZXSDR R8860 is installed on the tower. ZXSDR R8860 is connected to the antenna by 5/4" or 7/8" feeder, as shown in [Figure 67](#).



**AISG dual power amplifier**

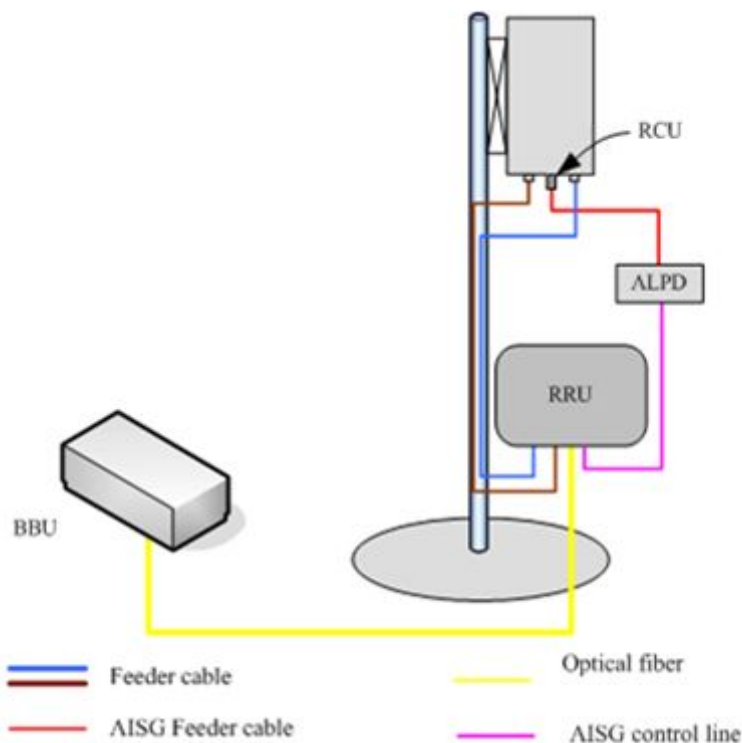
**FIGURE 67 ZXSDR R8860 CONFIGURATION WITH COMMON ANTENNA, AISG DUAL POWER AMPLIFIER**



**ZXSDR R8860 configuration with electronic adjustment antenna (1)**

In this configuration, generally ZXSDR R8860 installed near the antenna on the building top. ZXSDR R8860 is connected to the antenna by 1/2"feeder directly, occasionally 5/4"or 7/8"feeder is adopted, as shown in [Figure 68](#).

**FIGURE 68 ZXSDR R8860 CONFIGURATION WITH ELECTRONIC ADJUSTMENT ANTENNA (1)**

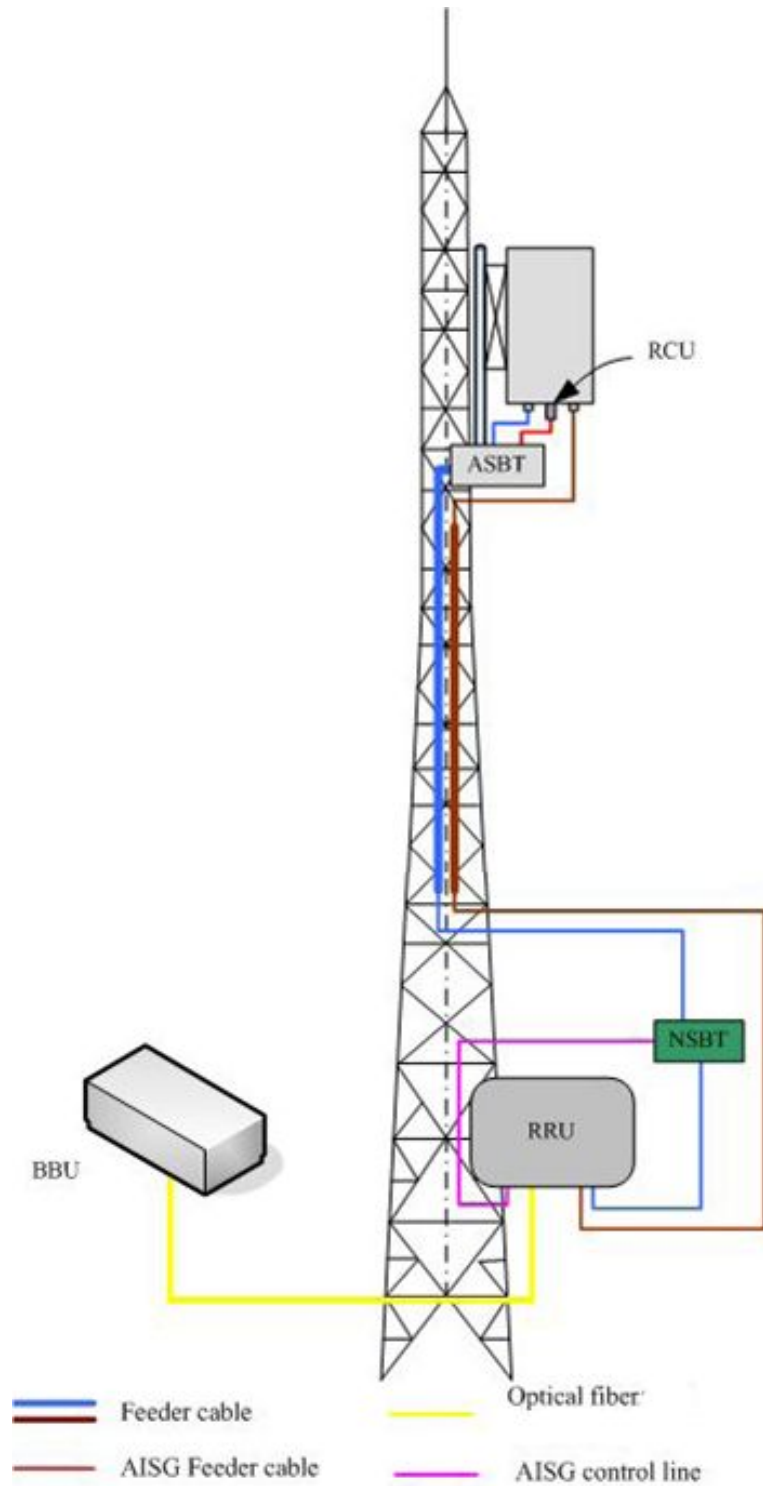


**ZXSDR R8860 configuration with electronic adjustment antenna (2)**

In this configuration, generally ZXSDR R8860 is installed near the top of the tower. ZXSDR R8860 is connected to the antenna by 5/4"or 7/8"feeder is adopted, as shown in [Figure 69](#).

adjustment  
antenna (2)

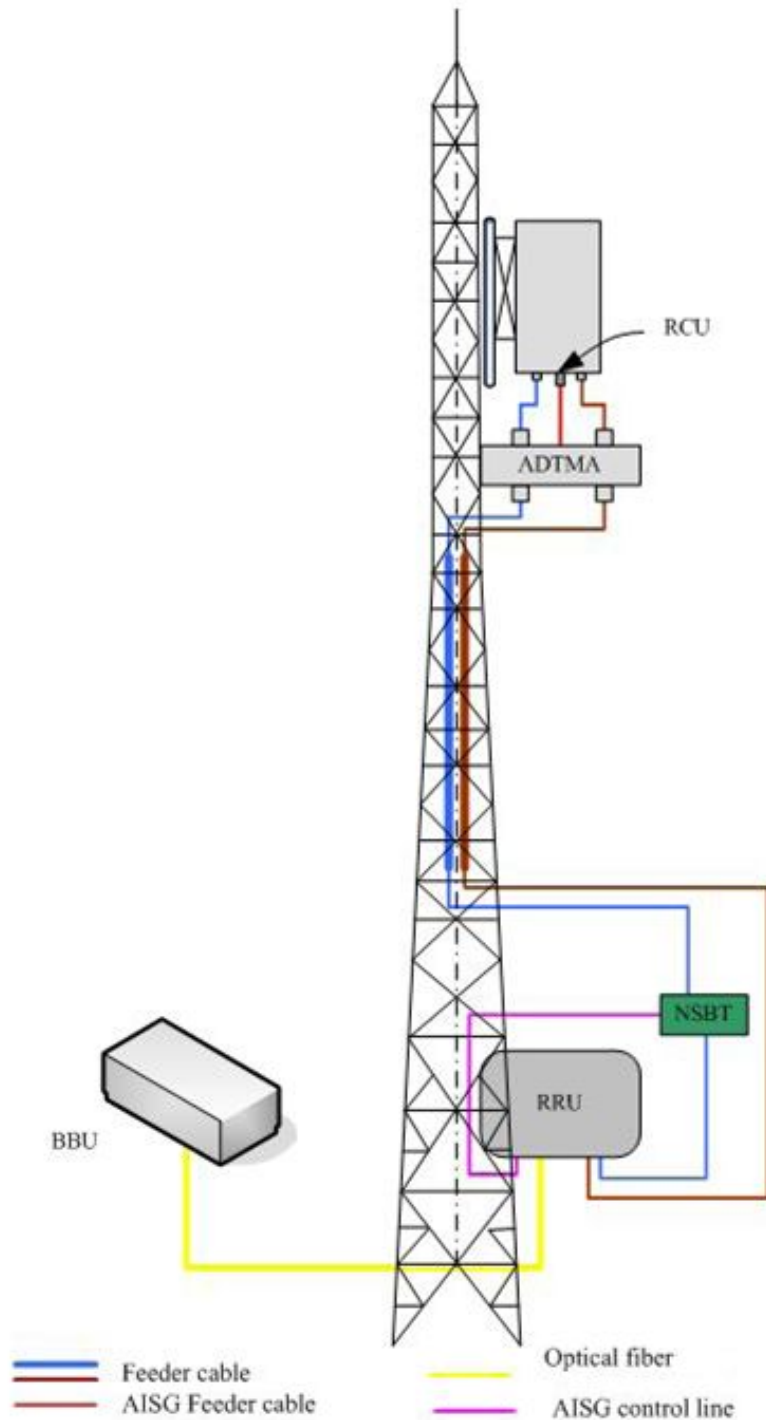
**FIGURE 69 ZXSDR R8860 CONFIGURATION WITH ELECTRONIC  
ADJUSTMENT ANTENNA (2)**



**ZXSDR R8860 configuration with electronic adjustment antenna , AISG dual power amplifier**

In this configuration, generally ZXSDR R8860 is installed near the top of the tower. ZXSDR R8860 is connected to the antenna by 5/4" or 7/8" feeder is adopted, as shown in [Figure 70](#).

**FIGURE 70 ZXSDR R8860 CONFIGURATION WITH ELECTRONIC ADJUSTMENT ANTENNA. AISG DUAL POWER AMPLIFIER**



# Main Antenna Feeder System Installation Preparation

Proper antenna installation is very important to ZXSDR R8860 system reliable operation. Before installation, make sure that installation staff is qualified and the following requirements are satisfied.

## Personnel Requirement

Normally, supervisors are in charge of direction and supervision, whereas installation personnel carry out the installation.

### ■ Installation Supervisor

The requirements for the installation supervisor are as follows:

- ▶ Familiar with all materials, tools and operation methods.
- ▶ They are in charge of assigning different work to the proper employee who is good at the operation, especially while working on the iron tower.



### Note:

Safety is the most important consideration when assigning work.

---

### ■ Installation Personnel

The requirements for the installation personnel are as follows:

- ▶ Installation employees are required to install antenna system skillfully under the direction of supervisor.
- ▶ Employees on tower must be qualified and in good physical state.
- ▶ Installation after drinking is forbidden.

## Environment Requirement

Pay attention to following items and check whether they satisfy requirements in engineering design. Normally, they are completed by the network operator (carrier).

### ■ Lightning protection and grounding

ZXSDR R8860 is usually located outdoors. The grounding stake and outdoor lightning-protecting grounding cables are installed by the operator, and the supervisor should confirm lightning-protecting grounding cables are installed properly.

### ■ Pole and supporting rack

Accomplish installation of antenna supporting rack and pole according to project design requirement. The stability of the supporting rack and pole should be in accordance with the design requirement.

### ■ Feeder layout

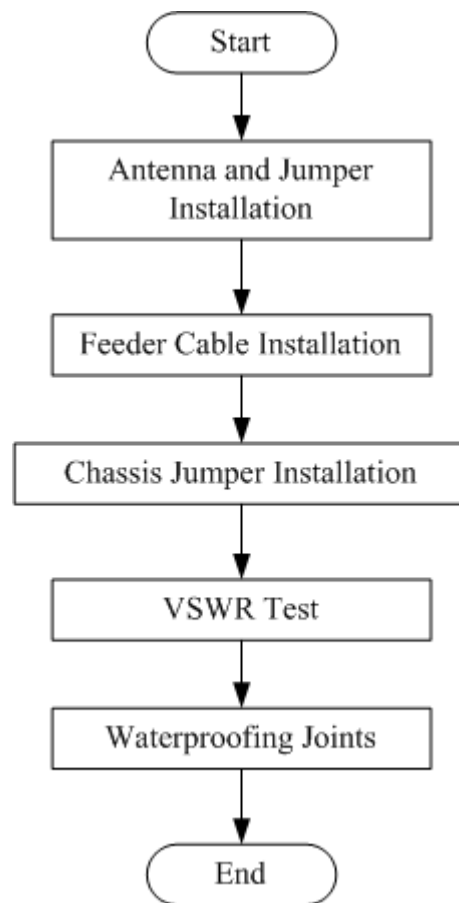
Field engineers need to determine route of main feeder with operator engineers before installation.

- Electronic power environment
  - ZXSDR R8860 antenna and feeder system can not be installed too near to public electric power cables.
- Safety Precautions** Ensure the following precautions before antenna installation:
- Take necessary measures for personal and equipment safety.
  - Personnel under tower must wear safety helmets.
  - Personnel on tower must wear safety belt.
  - Never climb tower with loose clothes and wet/slippery shoes.
  - During active antenna adjustment, wear radiation-shielding clothing and turn off power amplifier to avoid radiation effects.
  - If possible, install in sunny and windless days. Installation is forbidden in rain, strong wind, thunder and lightning.
  - Make caution brand in engineering field and keep passengers away from engineering field, especially kids.
  - When working on tower, put unused tools in a tool bag and prevent them from dropping down from tower to hurt people.
- Tools Requirement** The following tools are required for main antenna feeder system installation:
- Measure tools  
Compass, multimeter, angle meter, and tape measure
  - Special tools  
Main feeder connector manufacturing, special tools and instruments for test
  - Regular tools  
Adjustable wrench, sharp-nose pliers, diagonal pliers, hacksaw (with several saw blades)
  - Protection tools  
Safety helmet, safety belt, safety rope, gloves, radiation-shielding clothes, multiple power socket and sealed canvas tool bag
  - Other tools  
Tools for lifting, e.g. Ladder

## Main Antenna Feeder System Installation Flow

[Figure 71](#) shows the installation flow of main antenna feeder system.

FIGURE 71 MAIN ANTENNA FEEDER SYSTEM INSTALLATION FLOW



## Antenna Installation

### Antenna Installation Technical Specifications

---

The antenna technical specifications and their description is given below.

- **Antenna height**  
The installation height of antenna is determined by network planning design.
- **Antenna azimuth**  
The azimuth of the antenna is determined by network planning design.
- **Antenna downtilt**  
The downtilt angle of the antenna is determined by network planning design. Usually the down tilt angle is  $0^{\circ} \sim 10^{\circ}$
- **Antenna direction**

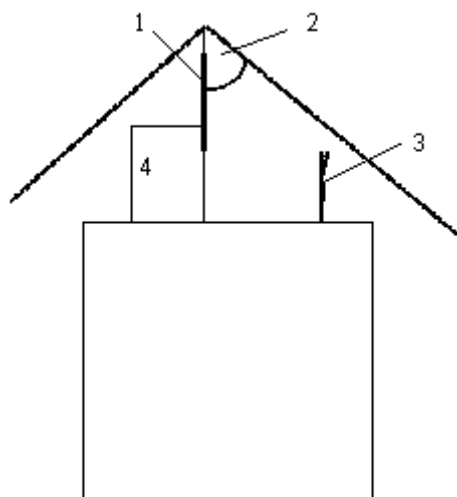
Antenna direction depends on the antenna azimuth. If two antennas in one sector, must share the same azimuth.

## Antenna Installation Position

The antenna installation position must be in accordance with project design. If the installation position needs any modification, the project supervisor must negotiate with operator's representative.

The antenna installation position needs to take care fore lightning protection as shown in [Figure 72](#).

**FIGURE 72 ANTENNA INSTALLATION POSITION**



- |                                  |                    |
|----------------------------------|--------------------|
| 1. Lightning rod                 | 3. Antenna         |
| 2. 45° Lightning protection area | 4. Grounding cable |

Following are lightning protection requirements to install an antenna:

- The antenna should be installed with in 45° coverage area of lightning rod.
- If there is no special lightning protection arrangement like the above, install the lightning protection system onto the antenna pole.
- Make sure that the lightning rod is well grounded.

## Directional Antenna Installation

**Context** The directional antenna installation procedure is given below.



**Note:**

The following steps describe the installation process as a reference for installation personnel. During the on-site installation process, please carefully read the installation manual provided with the antenna, and carry out the installation according to the actual condition.

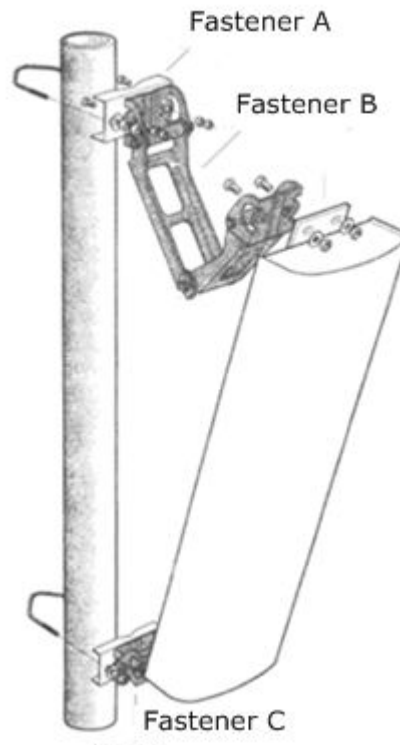
Perform the following steps to install a directional antenna:

- Steps**
1. Firstly assemble fastener "C" onto the upper and lower ends of antenna as show in [Figure 73](#), then connect fasteners "B" and "A" to complete the initial installation of the directional antenna.

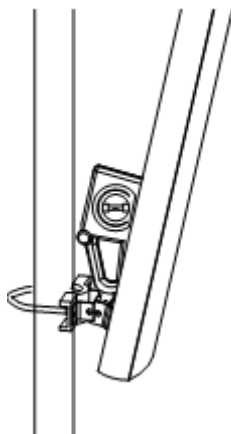
**Note:**

- ▶ All accessories must be installed with spring and plain washers.
- ▶ Usually the antenna fastening accessories and the angle adjustment device accessories have already been installed on the antenna before fixing into the tower.

**FIGURE 73 DIRECTIONAL ANTENNA INSTALLATION**



2. Attach the antenna along with fixtures onto the pole. Do not tighten the screws too tightly to allow easy adjustment of the direction and downtilt of the antenna. However, degree of tightness must be high enough to ensure that the antenna does not slid downward.
3. Adjust the antenna's azimuth.
  - i. Determine the azimuth of the antenna by using a compass, and determine the installation direction according to the engineering design drawing.
  - ii. Turn the antenna slightly to adjust its face direction as shown in [Figure 73](#). At the same time, measure the direction of the antenna with a compass until the error comes within the engineering design requirements (generally not more than 5°).
  - iii. After adjusting the azimuth of the antenna, tighten the fastener "A".
4. Adjust the antenna's downtilt
  - i. Adjust the downtilt of the measurement meter to obtain the required angle according to the engineering design.
  - ii. Turn the top of the antenna slightly, and loose or fast the antenna at its top. Adjust the downtilt angle of the antenna till the measurement meter's bubble comes to be centered as shown in [Figure 74](#).

**FIGURE 74 ANTENNA DOWNTILT ADJUSTMENT**

- iii. After adjusting the downtilt of the antenna, tighten the fastener "B".

**END OF STEPS.**

---

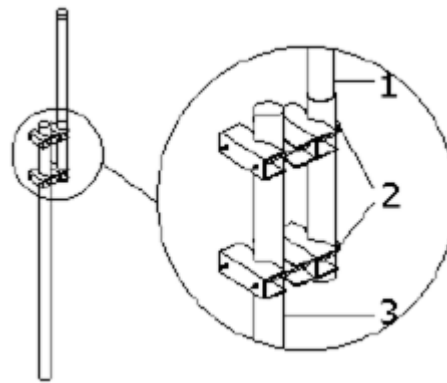
**Result** The directional antenna is installed.

## Omni Antenna Installation

**Context** Perform following steps to install an Omni directional antenna:

- Steps**
1. Determine the installation position.
  2. Seal the antenna's lower part (jumper) with the jacket and place the antenna as much close to the supporting pole.
  3. Ensure that the top of the jacket slightly higher than the top of supporting pole.
  4. Fasten the antenna onto the supporting pole with two fixing clips as shown in [Figure 75](#). Do not fasten the clips whether too tightly or loosely. If fastened too tightly, the jacket may be damaged; if fasten too loosely, the weight-bearing and wind-resistance requirements cannot be met.

**FIGURE 75 OMNI DIRECTIONAL ANTENNA INSTALLATION**



1. Antenna
2. Fixing clips

3. Antenna pole

5. Measure the verticality of the antenna, and ensure that antenna is vertical.
6. After ensuring the verticality tighten the fixing clips firmly.
7. After the antenna is installed onto the support, fix the antenna support onto the tower.

**END OF STEPS.**

**Result** The Omni directional antenna is installed.

## Connect Jumper and Antenna

**Context** Perform the following steps to connect jumper with antenna.

 **Note:**

The antenna jumper can be connected before the antenna mounted onto the pole, and needed to take the waterproof measurements. This highly reduces the work time, provide good connection, and improves water prevention quality.

- Steps**
1. Connect the jumper connector to the antenna port, and tighten it properly.
  2. Seal the jumper connector and antenna port for waterproof treatment.
    - i. Wrap the waterproof adhesive tapes lower side of connectors. Keep wrapping direction same as the one that the jumper is tightened.
    - ii. While wrapping, extend the adhesive tapes to double their length. Note that every wrapping layer must be overlapped the previous layer by half the width of the tape Wrapping must be extended upto 50 mm (2 inches) away from jumper connector position.
    - iii. Grip the tape with your hands to make the tape tightly adhered.
    - iv. Wrap PVC tapes on top of the waterproof adhesive tape. During the process, make sure the upper layer overlaps the lower layer by half the width of the tape.

**END OF STEPS.**

**Result** The jumper is connected with antenna.

## Feeder Installation

### Feeder Cutting Principle

Determine length of the feeder according to final feeder route, and cut the feeders according to the length required of each feeder.

 **Note:**

If the feeder length is less than 10 meters, use 1/2" feeder; if the feeder length is 10 ~ 30 meters, use 7/8" feeder and if the feeder length is more than 30 meters, use 5/4" feeder.

Following are the typical feeder cutting scenario observed on-site:

- **If the antenna feeder system is to be installed on the building roof**

1. Measure the length of main feeder for each sector according to the final feeder route.
  2. Add an appropriate margin (1 m (3.3 feet) ~ 2 m (6.6 feet)) to the measured lengths when cutting the feeders.
  3. After cutting one main feeder, attach the temporary labels at both ends of the feeder, such as ANT0 and ANT2. Attach the formal labels to the feeder after it is installed.
  4. Carry the cut feeders to the roof of the building, and make sure they are not squeezed or damaged during the process.
- **If the antenna feeder system is to be installed on an iron tower**
    1. Hoist one end of the feeder to the top of the tower by using a pulley block and pulling rope. Before hoisting, make the upper main feeder connector.
    2. The personnel on the tower must cut the feeder according to the distance from the point where the feeder enters the room to the lightning arrester rack, with an appropriate margin reserved. Make a temporary label for the lower part. Attach the formal labels to the feeder after it is installed.

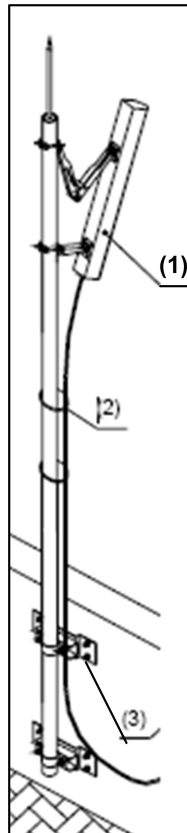
**Caution:**

At the end of feeder cutting process, attach label at both ends. Temporary labels can also be attached to the middle of the feeder during the feeder cutting process. Make sure that all labels are consistent with the actual situation. Otherwise, the feeder may not be connected correctly and the sectors may not correspond to the feeder.

## Feeder Installation on Top of Building

- Prerequisite** The supporting pole and antenna is installed.
- Context** Perform the following steps to install the main feeder on top of building:
- Steps**
1. Firstly determine the final main feeder route.
  2. Cut the main feeder according to the determined length on the final route.
  3. Arrange the main feeder in good order without crossing.
  4. Prepare the connectors and jumpers.
  5. Lay the feeders according to the laying principle.
  6. Lay the main feeder along to the supporting pole as shown in [Figure 76](#).

FIGURE 76 FEEDER FIXING



1. Antenna
2. Feeder

3. Supporting clips

### Note:

- ▶ Make sure that the feeder laid is tightened.
- ▶ The bending radius of the feeder is no less than 20 times of main feeder radius. The radius of single bend is no less than 90 mm (3.54 inches), and the repeated bend radius is minimum 200 mm (7.9 inches).

7. Connect feeder with the antenna.

### END OF STEPS.

**Result** The feeder is successfully installed on the top of building.

## Feeder Installation on Tower

**Prerequisite** Ensure that the labels are attached at about 0.3 m (1 feet) away from main feeder at both ends, and are correct.

**Context****Caution:**

- Hoist the main feeder with care to avoid damaging it's sheath. If any part of sheath is damaged, then it may cause the entire feeder to be discarded.
- Take care for personnel safety when hoisting the feeders.

---

The feeder installation involves the followings steps:

**Steps**

1. Wrap the main feeder connector with a piece of flax or an anti-static plastic bag filled with foam, and then bind it tightly with cable ties.
2. Knot and fix the cut feeder cable with hoisting rope at two points. One is 0.4 m (1.5/16 feet) away from the feeder connector and the other one is 3.4 m (11.2/16 feet) away.

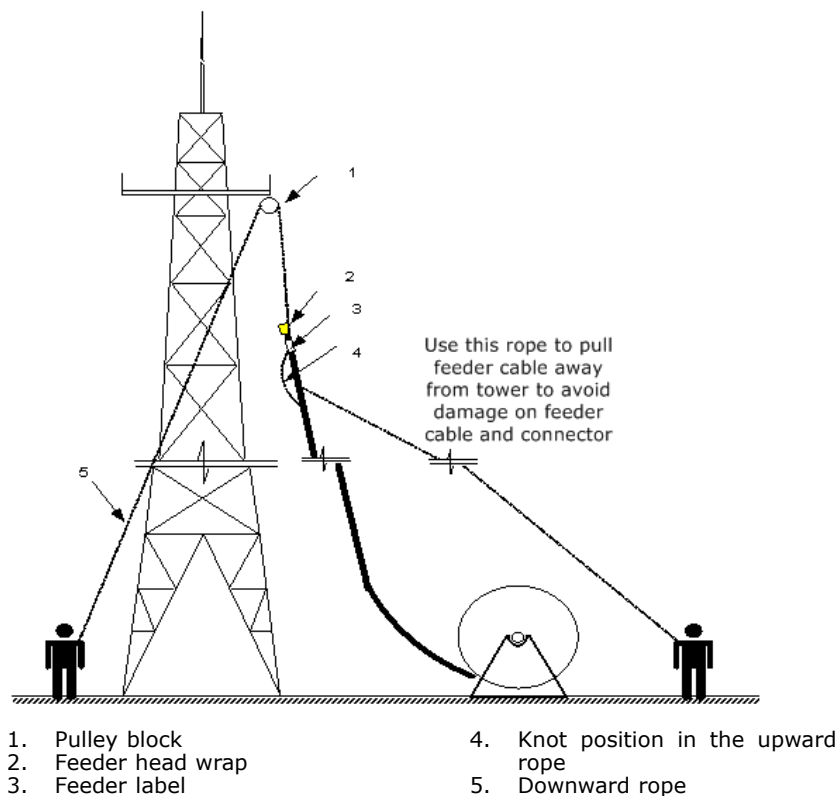
**Warning:**

Avoid feeder and it's connector from colliding with the iron tower.

3. After hoisting main feeder cables to the tower top, fix upper end of cable at multiple points to prevent it from slipping down the tower.

The feeder hoisting is shown in [Figure 77](#)

FIGURE 77 HOISTING FEEDER TO TOWER

**END OF STEPS.**

**Result** The feeder is hoisted on the tower successfully.

## Feeder Layout Principles

The feeder should be laid in accordance with the following principles:

- The main feeder must be laid in good order and without crossings.
- The feeder route must be determined before connecting the main feeder. Mark the actual feeder route on a drawing to avoid reworks due to crossings.
- The minimum bending radius of the main feeder should be greater than 20 times of the main feeder radius. The bending radius of a single bend should be greater than 90 mm (3.54 inches). The minimum bending radius of repeated bends is 200 mm (8 inches).
- If more than one triple feeder clips are used in feeder routing, then maximum distance between triple feeder clips should be not more than 1.65 m (5.41 feet).

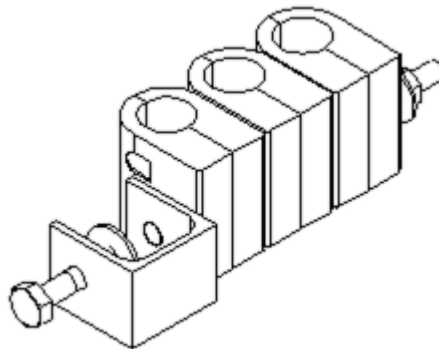


## Feeder Fixing Procedures

**Context** Perform the following steps to fix the main feeder:

- Steps**
1. Firstly arrange the main feeder in a good order.
  2. Fasten main feeders from top downward with the triple feeder clips after arranging the main feeders. [Figure 78](#) shows the appearance of triple feeder clip.

**FIGURE 78 TRIPLE FEEDER CLIP APPEARANCE**



**Note:**

Do not fasten feeders at both ends simultaneously.

3. Keep main feeders straight and in a good order without any bulges between the triple feeder clips.
4. Tighten the triple feeder clips firmly.

**END OF STEPS.**

**Result** The feeder fixing is completed.

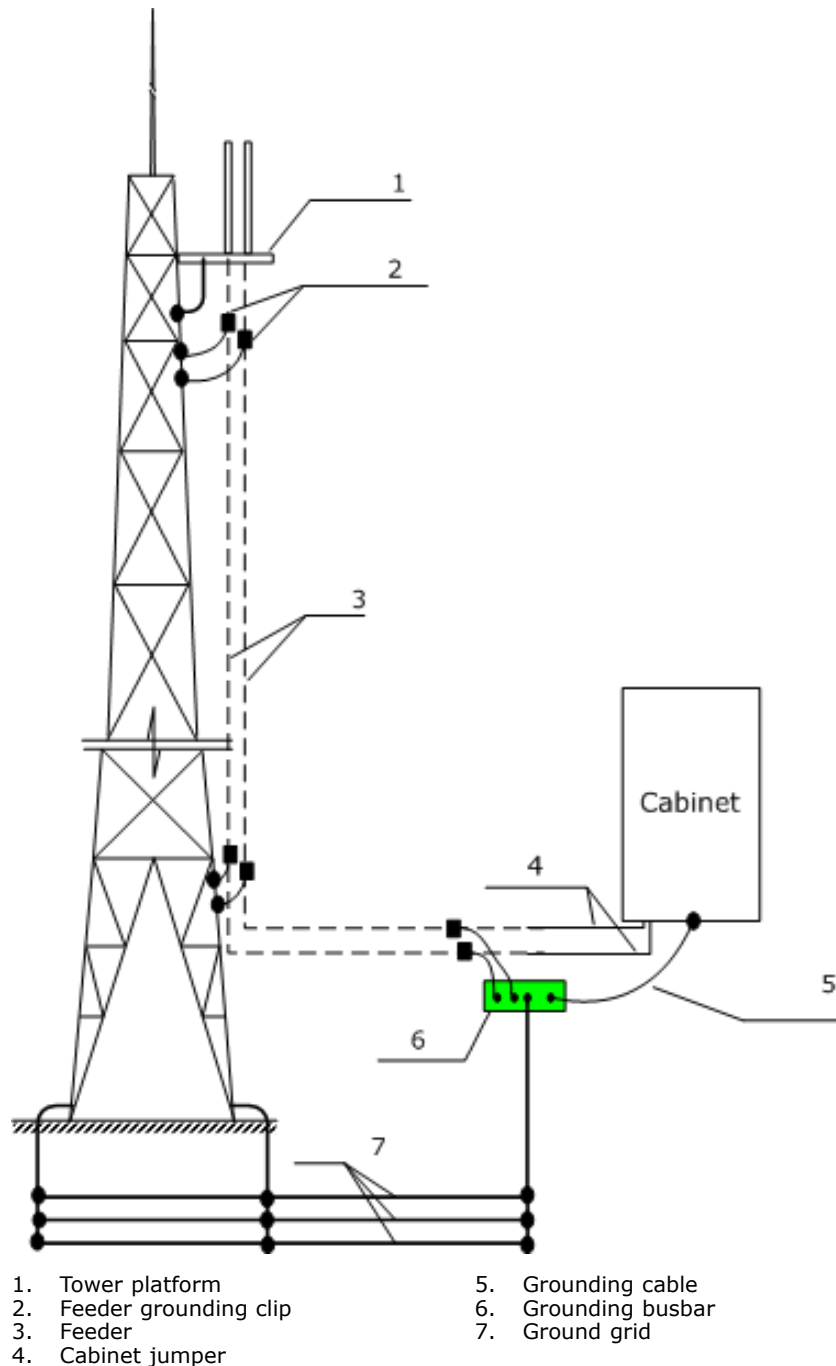
## Feeder Grounding Principle

The grounding principles of main feeder is as follows:

- To install main antenna feeder system on tower, main feeder must be installed with feeder grounding clips at least in three places:
  - ▶ Tower platform
  - ▶ The place where the main feeder leaves the tower
  - ▶ The place before where the main feeder is connected to the chassis

When the main feeder is over 60 m (197 feet) in length, feeder grounding clips must be added in the middle. Generally, a grounding clip must be installed on the feeder every 20 m (65.6 feet), as shown in [Figure 79](#).

**FIGURE 79 FEEDER GROUNDING SCHEMATIC DIAGRAM**



- To install the main antenna feeder system on the roof, its antenna support and cable rack must be welded to the lightning protection grid of the building. The main feeder must be grounded at three places:

- ▶ The place where feeder leaves the pole
- ▶ The place where feeder leaves the roof
- ▶ The place before where the main feeder is connected to the jumper of the chassis.
- The outdoor wiring ladder of the main feeder must be grounded.

## Feeder Grounding Clips Installation

The feeder grounding clips installation of ZXSDR R8860 is described below.

### Grounding Requirements

Ensure the following grounding requirements while installing feeder grounding clips:

#### ■ Roof installation mode

In roof installation, the following items must be grounded to build grounding network:

- ▶ Main antennas system
- ▶ Antenna pole
- ▶ Outdoor cabling rack or cabling ladder

Ground the main feeder cable at one position, where it leaves antenna pole. If the feeder cable is rather long, add grounding points according to feeder length.

#### ■ Tower installation mode

Usually at least two feeder grounding clips are required to be installed in tower installation mode. Ground the feeder cable at the following positions:

- ▶ Where it leaves antenna installation pole
- ▶ Where it leaves iron tower

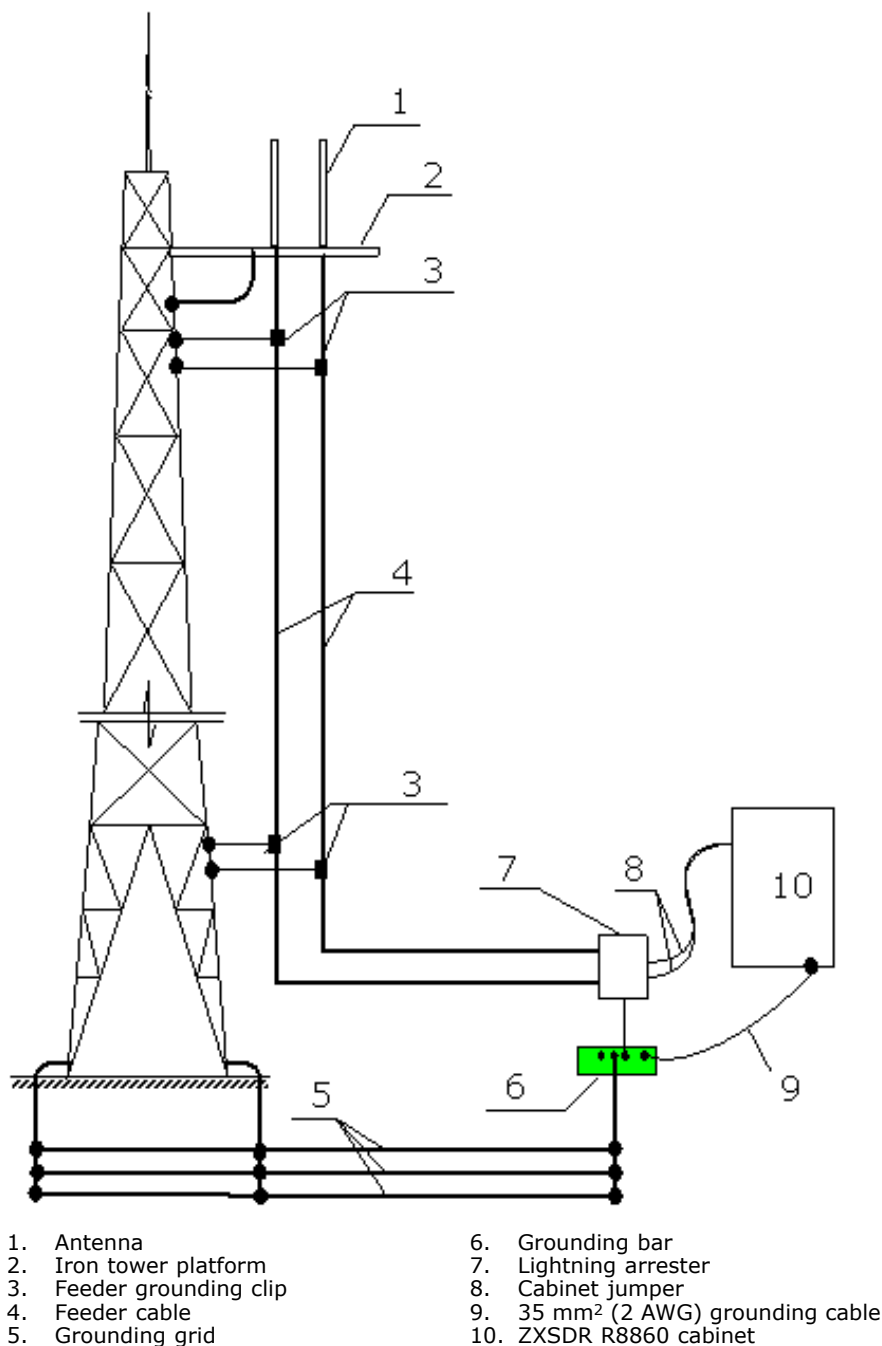
When the feeder cable is longer than 60 m (197 feet), install a grounding clip on the feeder cable at every 20 m (66 feet) distance.

If outdoor cabling rack or outdoor cabling ladder is used, ground it reliably.

Antenna poles and iron tower need to be grounded reliably.

[Figure 80](#) illustrates grounding system in tower installation.

FIGURE 80 GROUNDING SYSTEM

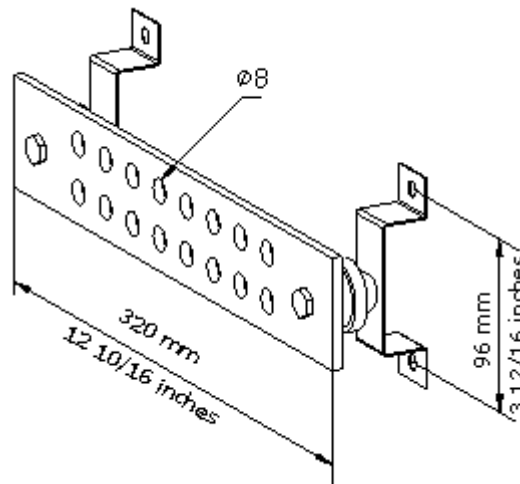


**Grounding Bar Introduction**

Grounding grid and grounding bar are usually installed by the operator employees. And the grounding bar is required to be installed where the engineering design determines with expansion bolts.

[Figure 81](#) illustrates the structure of the grounding bar.

FIGURE 81 GROUNDING BAR STRUCTURE

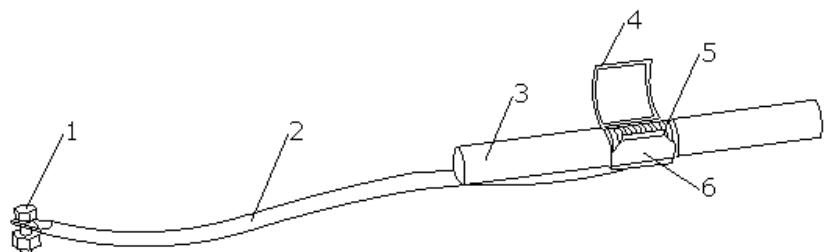


**Installation Steps** Perform the following steps to install grounding clip.

1. Prepare required tools including paper knife, flat head screwdrivers, and wrench and sharp-nose pliers.
2. Peel off 7/8" sheath according to size of grounding clip at the positions.

[Figure 82](#) illustrates structure of grounding clip.

FIGURE 82 GROUNDING CLIP



- |                    |                                 |
|--------------------|---------------------------------|
| 1. Grounding end   | 4. Grounding spring lock        |
| 2. Grounding cable | 5. Feeder external copper core  |
| 3. Feeder cable    | 6. Grounding cable copper piece |

3. Clamp the feeder external conductor with grounding cable copper sheet and locking spring plate.
4. Lay grounding cable facing to the grounding network. Avoid bending or folding. And keep the included angle between grounding cable and feeder cable less than 15°.
  - ▶ In tower installation mode, grounding cable is installed downwards and finally connected to tower
  - ▶ In roof installation mode, grounding cable is installed in the same direction with feeder cables.
5. Make joint of grounding clip and feeder waterproof using waterproof adhesive tapes, then use insulation tapes to cover the joint.

6. Connect the grounding end of the grounding clip to the grounding network.
  - ▶ Connect it to the main tower body in tower installation mode.
  - ▶ Connect it to the grounded cabling rack in roof installation mode.

When connecting, remove the paint and oxide at connection place within a radius of 13 mm (8/16 inches) around the joint, and daub the place with antioxidant cream to ensure good electric contact. After connecting, paint the joint with anticorrosive paint.

**Note:**

Do not install grounding clip in case of any lightning strike.

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## Connect Jumper and Feeder

---

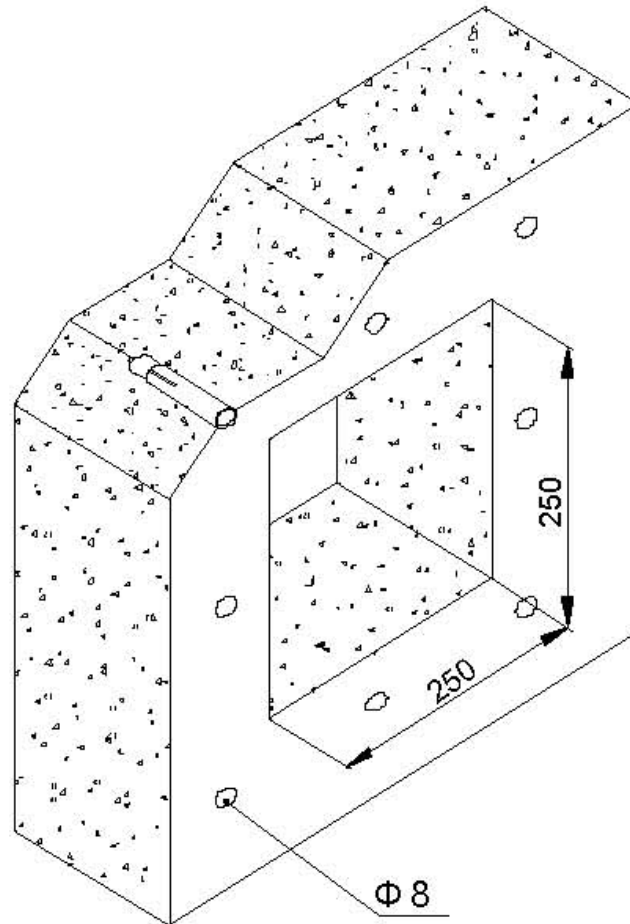
- Prerequisite** Feeder connector and jumper connector is prepared.
- Context** The following procedure detail the feeder and jumper connection.
- Steps**
1. Fix the 1/2 inch jumper connector with the feeder connector, and screw them tightly.
  2. Seal the connectors with waterproof adhesive tapes and PVC tapes.
- END OF STEPS.**
- 
- Result** The jumper is connected with the feeder successfully.

## Installing Feeder Hermetic-window

- Context** Installation requirements are described as follows:
- The installation position of hermetic window should be close to a cable tray possibly.
  - The hermetic window can be mounted against an indoor wall or outdoor wall and the side of protuberant metal circles must put towards outdoors
  - If the feeder enters into a room from a roof, the hermetic window can be mounted on the roof and the side of protuberant metal circles must put towards outdoors.
- The follow describes the steps of 12 hole hermetic window installed against the wall.

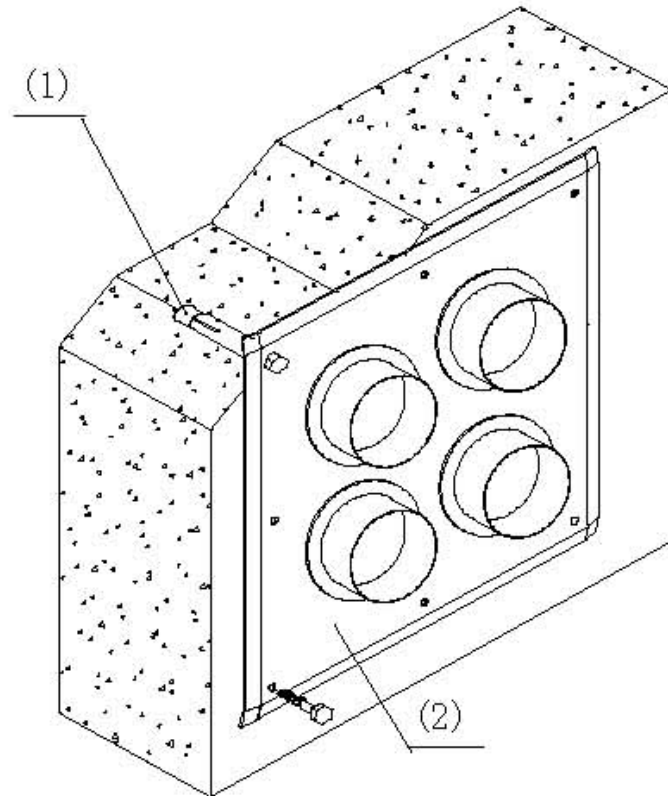
- Steps**
1. According to the requirements of engineering design drawing and the dimension of hermetic window, make sure the installation position of hermetic window on the wall and at the same time mark hole positions of expansion bolts and a hollow room left for the hermetic window.
  2. Cut a 250mm×250mm square big hole and then drill eight holes of expansion bolts with a percussive drill, as shown in [Figure 83](#).

**FIGURE 83 INSTALLATION HOLE POSITIONS (UNIT: MM)**



3. Fix a feeder hermetic-window panel with expansion bolts, as shown in [Figure 84](#). While installing expansion bolts, first put a flat washer and then a spring washer.

FIGURE 84 HERMETIC WINDOW INSTALLATION



1. M8×80 expansion bolt

2. Feeder  
panel

hermetic-window

**END OF STEPS.**

## Feeder Indoor Ingoing

### Feeder Indoor Arrangement Principle

The arrangement principles of feeder into a room comply with the following:

- There are four big holes on a 12-hole feeder hermetic-window. Every big hole has three small holes, every of which a feeder passes through.
- According to the serial No. on the engineering labels attached on the feeder, lay out the feeder through three small holes in the same big hole clockwise or anticlockwise.

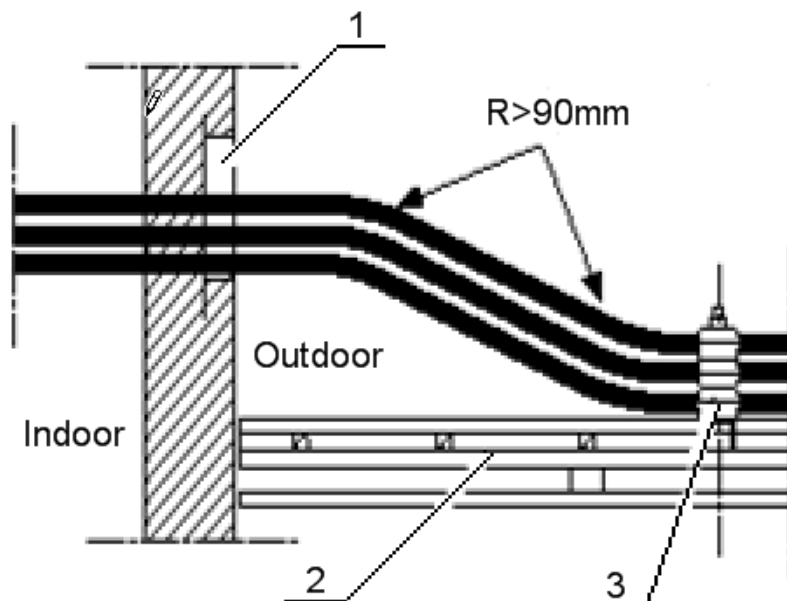


- Feeder layout in the hermetic window should be convenient for capacity expansion. Do not modify the initial feeder layout in the hermetic window during capacity expansion, and only allow adding feeder or modify jumper connection of cabinet.
- Feeder layout in the hermetic window should be convenient for layout on a cable tray and connection to a cabinet. The feeder should be parallel and not crossed during routing and connecting.

## Leading Main Feeder into Room

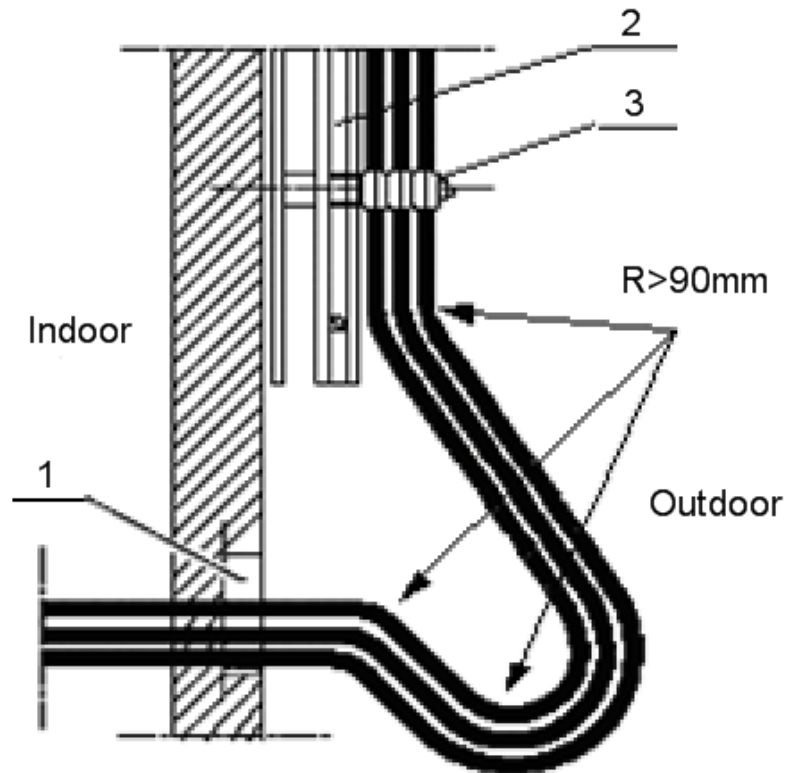
**Context** [Figure 85](#) and [Figure 86](#) show two common modes of main feeder into a room. While the main feeder is entering into the equipment room, do not bring water into the equipment room.

**FIGURE 85 FEEDER INTO ROOM MODE (1)**



1. Feeder window
2. Cable tray
3. Feeder kit

FIGURE 86 FEEDER INTO ROOM MODE (2)



- |                  |               |
|------------------|---------------|
| 1. Feeder window | 3. Feeder kit |
| 2. Cable tray    |               |

- Steps**
1. Unscrew a fastness hoop of feeder window to proper extent. Pull out sealing covers of small holes that the feeder passes through.
  2. Lead the main feeder into the equipment room. When the main feeder enters into an indoor cable tray from an outdoor cable tray, it is necessary for two installation personnel's cooperation respectively indoors and outdoors. In this way, avoid damaging the main feeder and other indoor devices by improper force during installation. Screw down the fastness hoop until the main feeder is pull to the specified position.
  3. Cut the main feeder. Before and after cutting, make sure temporary labels on the main feeder intact.

---

 **Note:**

According to detailed equipment environment (for example, cabinet installation position, jumper length on the cabinet top, arrester configuration or arrester rack installation position), the bending radius requirement of main feeder and the beautiful requirement of cable layout in the equipment room, select a cutting position of main feeder cable.

---

4. Make an indoor connector of main feeder.
  5. Connect the main feeder with an arrester.
- 

 **Note:**

- ▶ For an arrester without ground cable, during installation, connect the arrester to the main feeder directly.
  - ▶ For an arrester with an arrester rack, during installation, adjust every main feeder carefully. Make sure a screw fastener connected well which connects the main feeder connector with the arrester.
- 

**END OF STEPS.**

---

## Installing Top-equipment Jumper

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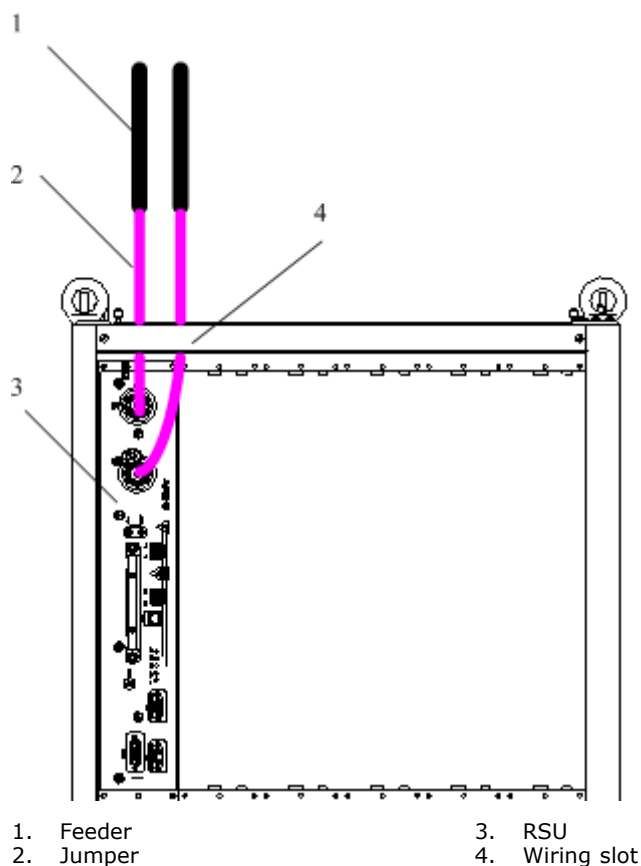
**Context** The requirements of jumper installation are as follows:

- Jumper layout from cabinet top to cable tray should be parallel and orderly, but not crossed.
- During routing, the jumper must pass through the cable tray inner to its upper side. Prohibit jumping the cable tray outside directly.
- The bending of jumper is reasonable and natural. Suggest that the bending radius of jumper should be twenty times more than its diameter.
- During layout from cabinet top to cable tray, the tensile strength for the jumper should be moderate.
- The jumper should be bound with every rail of cable tray. The directions of all wire fasteners keep consistent and after binding, the wire fasteners are cut flatly.
- Labels must be affixed to all indoor jumpers at a 100 mm distance from both ends of jumper.

- Steps**
1. The jumper passes through a wiring slot on the top of cabinet.
  2. Connect a DIN connector of feeder to an ANT interface of RSU.
  3. Connect the other DIN connector of jumper to a DIN connector of feeder.

Figure 87 shows the installation process.

**FIGURE 87 ANTENNA, FEEDER AND JUMPER INSTALLATION**



4. Affix jumper engineering labels.

**END OF STEPS.**

## Performing Antenna Feeder System Test

- Steps**
1. After unpacking, check whether a surface of antenna and antenna connectors are undamaged.
  2. After connecting antenna and jumper, and screwing down the connector, check the SVWR with a SVWR tester.

If	Then
SVWR $\geq$ 1.5	Unqualified
SVWR $\leq$ 1.5	Qualified

**Note:**

During measuring, move an antenna or change the position of antenna. If the SVWRs in all directions are unqualified, it indicates that the antenna is faulty. If the SVWRs in some directions are unqualified, check the antenna after the whole antenna and feeder system installed completely.

**END OF STEPS.**

## Performing Outdoor-connector Waterproof Processing

**Prerequisite** While an overall installation of antenna feeder system is completed and gets through a test, perform waterproof processing for a connector between outdoor jumper and tower top amplifier as well as a connector between jumper and feeder immediately.

**Context** There are two types of adhesive tapes for waterproof processing: waterproof insulation adhesive tape, as shown in [Figure 88](#), and PVC adhesive tape, as shown in [Figure 89](#).

**FIGURE 88 WATERPROOF INSULATION ADHESIVE TAPE**



**FIGURE 89 PVC ADHESIVE TAPE**

- Steps**
1. Clean out dust and stain on the feeder connector or feeder grounding clip.
  2. Expand the waterproof insulation adhesive tape and strip off release paper. The adhesive tape sticks to the connector or the feeder which is 20–50 mm away from the lower end of grounding clip .
  3. Extend the adhesive tape to up to 1/2 – 3/4 of the former width, in order to keep a certain extension strength. Bind the feeder in an overlapping way from lower to upper and the upper adhesive tape covers a half of the lower adhesive tape, as shown in [Figure 90](#).

**FIGURE 90 WATERPROOF INSULATION ADHESIVE TAPE WRAP**

**Caution:**

The extended width of adhesive tape is not over 1/2 than the former width, or else destroy molecular structure of adhesive tape due to extension too much.

4. While wrapping to the connector, repeat it for twice and the sequence respectively is: from upper to lower and from lower to upper.
5. After wrapping the waterproof insulation adhesive tape, press the adhesive tape at the binding with hands make it affixed tightly.
6. Wrap a layer PVC adhesive tape around the waterproof insulation adhesive tape to avoid abrasion and aging.
7. Wrap the PVC adhesive tape in an overlapping mode, similar to the waterproof insulation adhesive tape. The overlapping rate is about 1/2 . Wrap three layers in total, and the sequence respectively is: from lower to upper, from upper to lower and from lower to upper. Make sure proper stretch strength during wrapping.

**END OF STEPS.**

**Result** The appearance of connector after processing is as shown in [Figure 91](#).

**FIGURE 91 CONNECTOR AFTER PROCESSING**



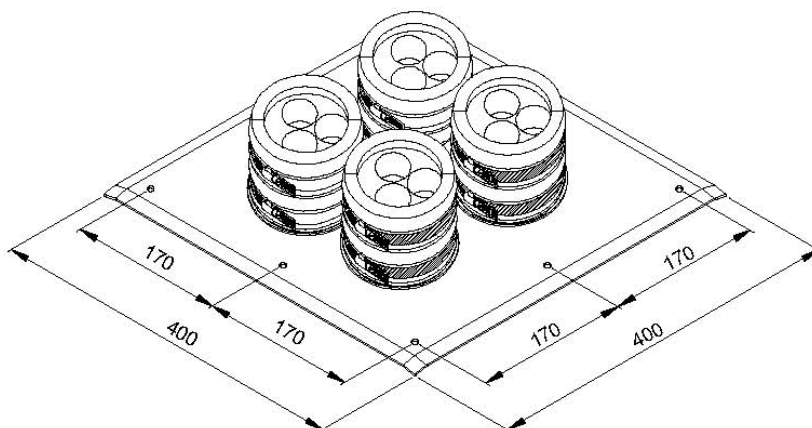
## Performing Feeder Hermetic-window Waterproof Processing

**Context** There are two types of feeder hermetic-window:

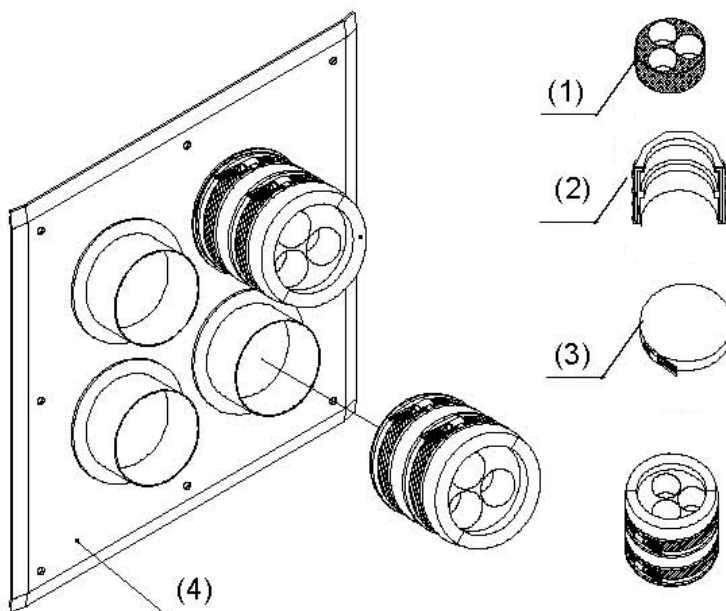
- 12 hole feeder hermetic-window
- 27 hole feeder hermetic-window

Normally, adopt the 12 hole feeder hermetic-window, its dimension as shown in [Figure 92](#) and its structure as shown in [Figure 93](#).

**FIGURE 92 FEEDER HERMETIC-WINDOW DIMENSION (UNIT: MM)**



**FIGURE 93 12 FEEDER HERMETIC-WINDOW STRUCTURE**



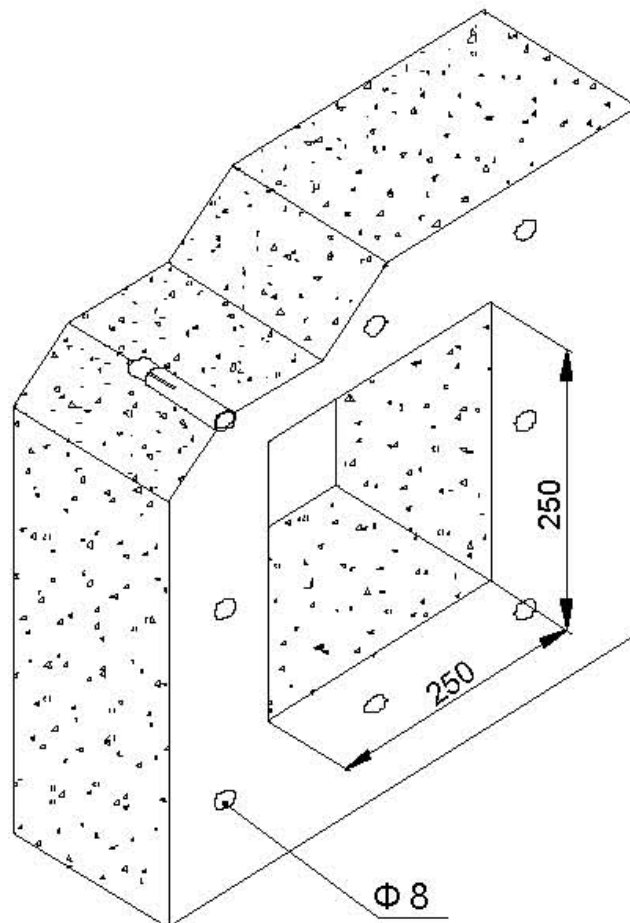
Installation requirements:

- The installation position of hermetic window should be close to a cable tray.



- The hermetic window can be mounted against an indoor wall or outdoor wall and the side of protuberant metal circles must put towards outdoors.
  - If the feeder enters into a room from a roof, the hermetic window can be mounted against the roof and the side of protuberant metal circles must put towards outdoors.
- Steps**
1. According to the requirements of engineering design drawing and the dimension of hermetic window, make sure the installation position of hermetic window on the wall and at the same time mark hole positions of expansion bolts and a hollow room left for the hermetic window.
  2. Cut a 250mm×250mm square big hole and then drill eight holes of expansion bolts with a percussive drill, as shown in [Figure 94](#).

**FIGURE 94 INSTALLATION HOLE POSITIONS (UNIT: MM)**

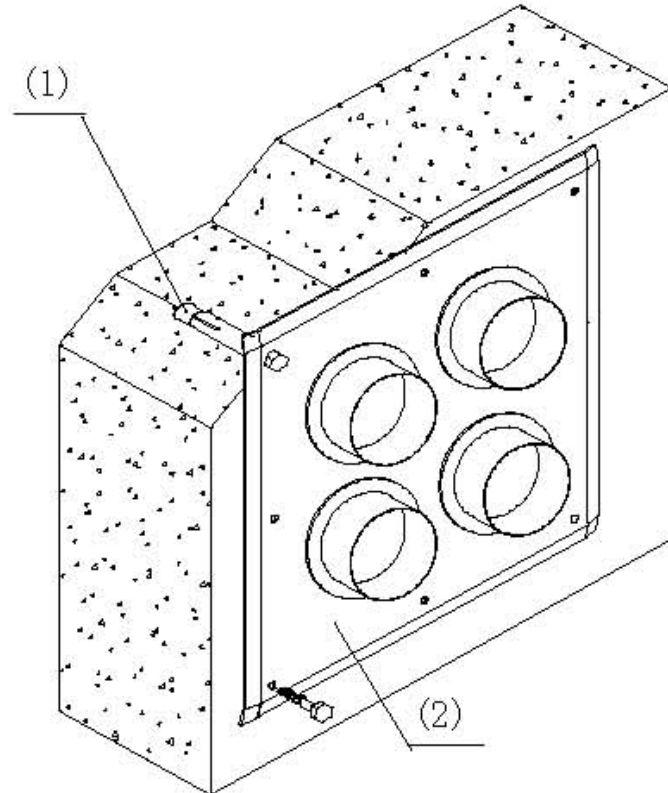


3. Fix a feeder hermetic-window panel with expansion bolts, as shown in [Figure 95](#).

While installing expansion bolts, a flat washer and a spring washer must be installed in turn.

A sealing washer and a sealing cover may be installed together with feeder entering into the room.

**FIGURE 95 FEEDER HERMETIC-WINDOW INSTALLATION**



1. M8×80 expansion bolt

2. Feeder hermetic-window panel

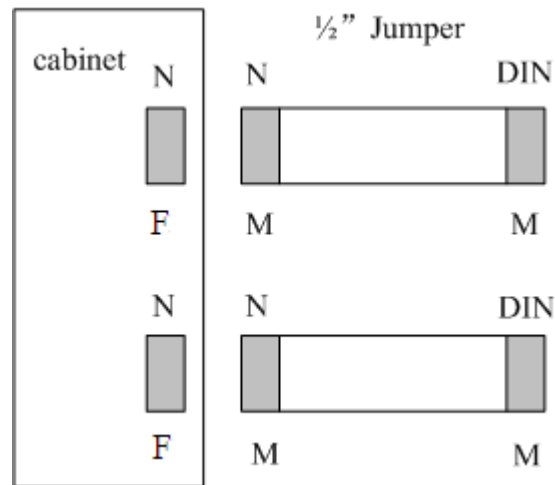
**END OF STEPS.**

---

## Cabinet Jumper Installation Description

The ZXSDR R8860 cabinet is equipped with two N type female connectors. These connectors are connected to N type male connectors of 1/2" jumpers. The cabinet jumper connection is as shown in [Figure 96](#).

FIGURE 96 CABINET JUMPERS



DIN means that the connector type is DIN.

N means that the connector type is N.

"M" indicates male connector and "F" indicates female connector.

Connect the jumper with the cabinet. Make sure to connect the respective connectors with similar types, such as N type connector of jumper should be connected with N type interface of the cabinet and M type connector of jumper should be connected with M type interface of the cabinet.

## VSWR Test

After the installation of all antenna feeders and jumpers, conduct [VSWR](#) test. The VSWR must be less than 1.3. Otherwise, check all main antenna and feeder system, that includes:

- Check whether the antenna feeders, connectors, and jumpers are intact.
- Ensure that the connection between all parts are proper.
- Check whether the antenna feeder installation is perfect.

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## Chapter 6

# Hardware Installation Inspection

---

### Table of Contents:

Checking Cabinet Installation .....	117
Checking Cable Installation .....	117
Checking Main Antenna System Installation .....	120

## Checking Cabinet Installation

- Steps**
1. Ensure that the cabinet installation position complies with the engineering design drawing.
  2. Erect cabinet firmly so as to resist an earthquake measuring up to 7.0 on Richter scale.
  3. Ensure that horizontal and vertical error is less than 3 mm.
  4. Ensure that cabinet surface is clean and tidy and covered well by oil paint. All parts of the cabinet are complete and all marking on the cabinet are correct, clear and complete.
  5. Ensure all screws are fixed tight with flat washers or spring washers.

**END OF STEPS.**

---

## Checking Cable Installation

### Cables Installation General Specification

---

Optical Fiber



The length of optical fiber is decided by engineering survey (1 Tx, 1 Rx).

The technical specifications of optical fiber are as follows:

- The optical fiber is a single mode with End B adopting two DLC/PC connectors.
- The insertion loss is less than 0.3 dB.
- The return loss is less than 45 dB.
- If optical fiber is to be used outdoor, then
  - ▶ Take waterproof and anti- ultraviolet protection measures.
  - ▶ Make sure that working temperature is in between -40 to 80°C.
- The sheath of optical fiber is black in color with a diameter of 7 mm. Under the sheath, there are two cores optical wires (yellow and blue color) with substantial amount of protection padding.
- The maximum distance between core optical wires (including both DLC/PC connectors) and sheathed optical fiber is 350 mm.
- ZTE supplies 15 m, 25 m, 35 m, 50 m, 70 m, 100 m, and 130 m long fiber cables.
- The 20 mm long black Pyrocondensation cannula should be added in between optical core wires and sheathed optical fiber.
- The label attached at both ends should satisfy the requirements of *ZTE Cable Designing Criteria – Label Designing and Usage Requirements*.

**AISG Cable** The following are the technical specification of AISG cable:

- [Table 16](#) illustrates the connection relationship of both ends. Make sure to enclose End A connection by black cannula completely after connecting.

**TABLE 16 CONNECTION RELATIONSHIP**

Serial Number	Signal Definition	End A Pin Number	End B Pin Number	Connected Cable
1	485+	Pin 3	Pin 1	-
2	485-	Pin 5	Pin 2	-
3	28V	Pin 6	Pin 3, 4	Two cables from Pin6 of A end are welded to Pin 3 and 4 of B end.
4	28VGND	Pin 7	Pin 5, 6	Two cables from Pin7 of A end are welded to Pin 5 and 6 of B end.

- The Pin 6 and Pin 7 (See [Table 16](#)) are needed to be welded with two cables.

- The End A connector should be equipped with metal dust-proof cover
- The labels printing and pasting should satisfy the requirements of *Q/ZX04.113.4 Cable Designing Criteria – Label Designing and Usage Requirements*.

**Monitoring Cable** The following are the technical specification of monitoring cable:

- The End A is a 37-pin female connector.
- End B is an open end without any connector. The connector at the End B should be prepared on-site according to the on-site requirements.
- Make sure that connector at the End A is properly welded.
- The label attached at both ends should satisfy the requirements of *ZTE Cable Designing Criteria – Label Designing and Usage Requirements*.
- [Table 17](#) shows the connection relationship of End A.

**TABLE 17 CONNECTION RELATIONSHIP**

End A (Pins)	Color	Signal Definition
15/16	White/blue	Dry contact 4 - / +
17/18	White/orange	Dry contact 3 - / +
19/20	White/green	Dry contact 2 - / +
21/22	White/brown	Dry contact 1 - / +
23/24	Red/blue	485 Rx - / +
25/26	Red/orange	485 Tx - / +
Other Pins are free	Other core wires are free	

## Power and Grounding Cables Installation Check

**Context** Ensure the power and grounding cables installation is done in accordance with the following checks:

- Steps**
1. The power and grounding cables are laid separately from other cables. If the power and grounding cables are to be laid parallel with other cables, then at least a distance of 20 cm is maintained between them.
  2. The cable labels are intact on both sides of power and grounding cables. The labels are attached at almost 2 cm from cable copper lug.
  3. Entire power and grounding cables are made from one material with no connections in between.
  4. A single grounding point on the grounding busbar just connects to a piece of equipment.
  5. Copper lugs on both ends of power and grounding cables are soldered or pressed firmly.

6. The shortest route between the grounding cables and grounding busbar is adopted.
7. Power and grounding cables at connecting terminals and lug handles are properly insulated using either insulated tapes or heat shrink tubes.
8. The redundant length of power and grounding cables is cut to avoid wrapping each other.

**END OF STEPS.**

---

## Optical Fiber Installation Check

---

**Context** The fiber cable installation should meet the following specifications:

- Steps**
1. Do not fold optical fiber at 90°. For optical fiber that is to be laid outdoors, minimal twist radius should be at least greater than 90 mm. Whereas for optical fiber that is to be laid indoors, minimal twist radius should be at least greater than 30 mm.
  2. After installation, any surplus optical fiber should be put back in the fiber card for convenience.
  3. During installation, minimize optical fiber twist and turn, as much as possible.
  4. The binding force should be proper to ensure that binding gaps are less 0.5 m.
  5. Make sure that labels at both ends of optical fiber are intact and clear.

**END OF STEPS.**

---

## Checking Main Antenna System Installation

- Steps**
1. Ensure the height of antenna is consistent with the network planning, and the installation position is consistent with the engineering design drawing.
  2. Ensure the azimuth and down-tilt of the antenna is consistent with the engineering design drawing.
  3. Ensure the antenna is within the protection area of lightning rod.
  4. Ensure the VSWR not more than 1.5
  5. Ensure proper connection between antenna and jumper as well as between jumper and main feeder correct.



6. Make sure that the jumper and antenna at the junction keep straight within 30cm at least.

**END OF STEPS.**

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## Chapter 7

# Power on and off

---

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Power ON .....	123
Power OFF .....	123

## Power on Preparation

**Context** Make sure that following conditions are fulfilled before powering-on ZXSDR R8860:

- Steps**
1. Make sure that input power supply is within the acceptable range.
  2. Make sure that power cable connected to ZXSDR R8860 cabinet is properly grounded.

**END OF STEPS.**

---

**Result** The preparation to power on the cabinet is successfully completed.

## Power ON

**Context** Perform the following steps to power-on the ZXSDR R8860.

- Steps**
1. There is no power switch ON the ZXSDR R8860 cabinet. Close the external power switch to power on ZXSDR R8860.
  2. During power ON, if some abnormal phenomena occurs, disconnect the external power switch or the plug immediately, and check the reason.

**END OF STEPS.**

---

## Power OFF

**Context** Perform the following steps to power OFF the ZXSDR R8860.

**Steps** There is no power switch on the ZXSDR R8860 cabinet. Disconnect the external power switch to power off ZXSDR R8860.

**END OF STEPS.**

---

# Cabinet-combined Installation

---

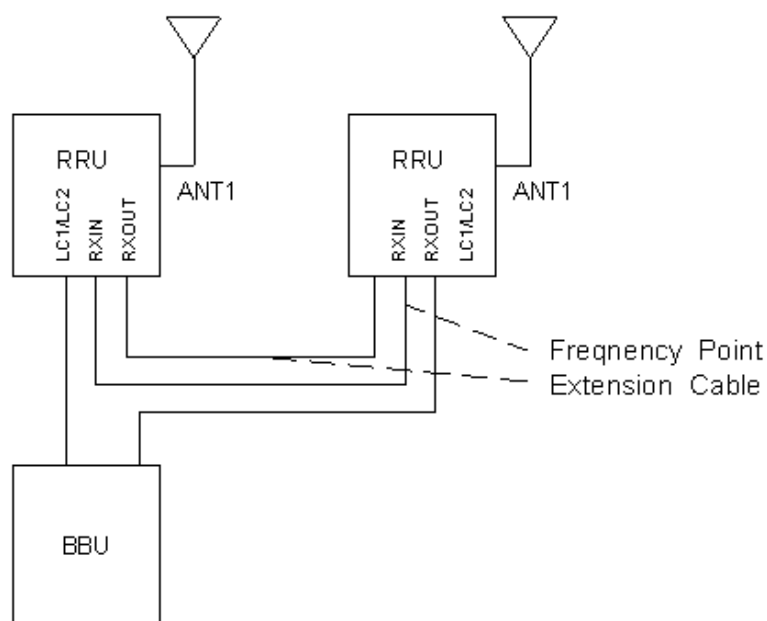
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## Components Used in Cabinet-combining Installation

By combining cabinets, the ZXSDR R8860 can support 8 carrier sectors. [Figure 97](#) shows the connection for combining two ZXSDR R8860 cabinets.

**FIGURE 97 ZXSDR R8860 CABINET-COMBINED INSTALLATION CONNECTION**



1. Frequency Point Extension Cable



**Note:**

The RRU in [Figure 97](#) means the ZXSDR R8860.

The description of cabinet-combined connection are as follows:

1. Two ZXSDR R8860 cabinets are connected by two frequency point extension cables.
2. Two ZXSDR R8860 cabinets provides mutual receiving diversity for each other. Each ZXSDR R8860 is equipped with of a pair of antenna to transmit and receive signals.

The components used in the cabinet-combined installation are described as follows:

1. While selecting the pole-mount installation, refer to [Components Used in Pole-mount Installation](#) ([Components Used in Pole-mount Installation](#)); while selecting the wall-mount installation, refer to [Components Used in Wall-Mount Installation](#) ([Components Used in Wall-mount Installation](#)); while selecting the gantry-mount installation, refer to [Components Used in gantry-mount Installation](#) ([Components Used in Gantry-mount Installation](#)).
2. Two frequency point extension cables are prepared.

# Performing Cabinet-combination

- Steps**
1. Select a proper installation mode (pole-mount installation, wall-mount installation and gantry-mount) according to the actual conditions to install two ZXSDR R8860.
  2. Connect the two frequency point extension cables as described below:
    1. Connect End A of a frequency point extension cable to the RXin interface of a ZXSDR R8860 and End B to the RXout of the other ZXSDR R8860.
    2. Connect End A of the other frequency point extension cable to the RXout of the ZXSDR R8860 and End B to the RXin of the other ZXSDR R8860.

**END OF STEPS.**

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## Appendix **B**

# Cascading Cabinet Installation

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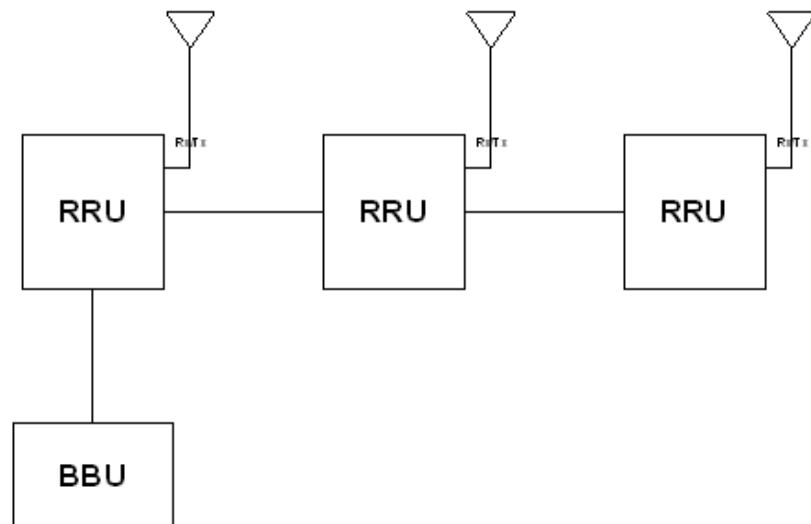
### Table of Contents:

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## Components Used in Cascading Installation

Multiple ZXSDR R8860 cabinets can be connected in series by using optical fibers, forming a chain network. [Figure 98](#) shows the cascaded cabinets.

**FIGURE 98 CASCADED CABINET CONNECTION**



**Note:**

The RRU in [Figure 98](#) means ZXSDR R8860.

1. One ZXSDR R8860 is connected to another ZXSDR R8860 or to BBU by optical fibers. Each ZXSDR R8860 provides two optical ports that are identified by LC1 and LC2 respectively.
2. Generally, the LC1 serve to connect the BBU or the upper level ZXSDR R8860 while the LC2 to connect the lower level ZXSDR R8860.

The components used in the cascading installation are described as follows:

1. While selecting the pole-mounted installation, refer to [Components Used in Pole-mount Installation](#); while selecting the wall-mounted installation, refer to [Components Used in Wall-mount Installation](#); while selecting the gantry-mount installation, refer to [Components Used in Gantry-mount Installation](#).
2. Connect the optical fiber.

## Performing Cabinet Cascading

- Steps**
1. Select a proper installation mode (pole-mount or wall-mount ) to install the ZXSDR R8860 cabinet.
  2. Use optical fibers to connect cabinets in cascade.

[Figure 99](#) shows the optical fiber to connect cabinet in cascade.

**FIGURE 99 ZXSDR R8860 OPTICAL FIBER FOR CASCADED CABINET**



Following is the connection scheme.

- i. Connect End A of optical fiber to the LC1/LC2 interface of one ZXSDR R8860.
- ii. Connect End B of optical fiber to the LC1/LC2 interface of the other ZXSDR R8860.

**END OF STEPS.**

**Result** The cascaded cabinets are installed successfully.

## OAU

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OAU Appearance and Interface .....	132
OAU Pole Installation .....	134
OAU On-wall Installation.....	140
OAU Cable Installation .....	143

## OAU Technical Indices

The outdoor AC unit (OAU) is AC/DC power. One OAU can provide -48V AC for one ZXSDR R8860 and one ZXSDR R8860 C806 at the same time to realize indirect AC power supply for ZXSDR R8860 and ZXSDR R8860 C806 .

### Technical Indices

The OAU is AC/DC large-power power with single-circuit output. The OAU possesses high voltage-regulation precision, high output efficiency and a large range of input voltage. It provides under-voltage protection for input and short circuit protection, overcurrent protection and overtemperature protection. In addition, the OAU has D-level lightning function by itself, adopts dustproof and waterproof design, and supports outdoor pole and on-wall installation.

[Table 18](#) describes the technical indices of OAU.

**TABLE 18 ENGINEERING TECHNICAL INDICES**

Item	Indices
Dimension	H×W×D: 127mm×217mm×288mm
Work temperature	-40°C+65°C (when the temperature is up to 60°C, the load of power can be decreased by 20%)
Work humidity	5% RH~95% RH

[Table 19](#) describes input characters of OAU.

**TABLE 19 OAU INPUT CHARACTERS**

Item	Unit	Minimum Value	Typical Value	Maximum Value
Input voltage range	Vac	150	220	285

Item	Unit	Minimum Value	Typical Value	Maximum Value
Startup voltage range	Vac	150		280
Input frequency	Hz	45	50	65
Startup impulse current	A			10

[Table 20](#) describes output characters of OAU.

**TABLE 20 OAU OUTPUT CHARACTERS**

Item	Unit	Minimum Value	Typical Value	Maximum Value
Output voltage range	Vdc	-52	-54	-56
Output current	A	8	10	12
Voltage regulation precision				±2
Load regulation rate				±1
Output power	W		540	

## OAU Appearance and Interface

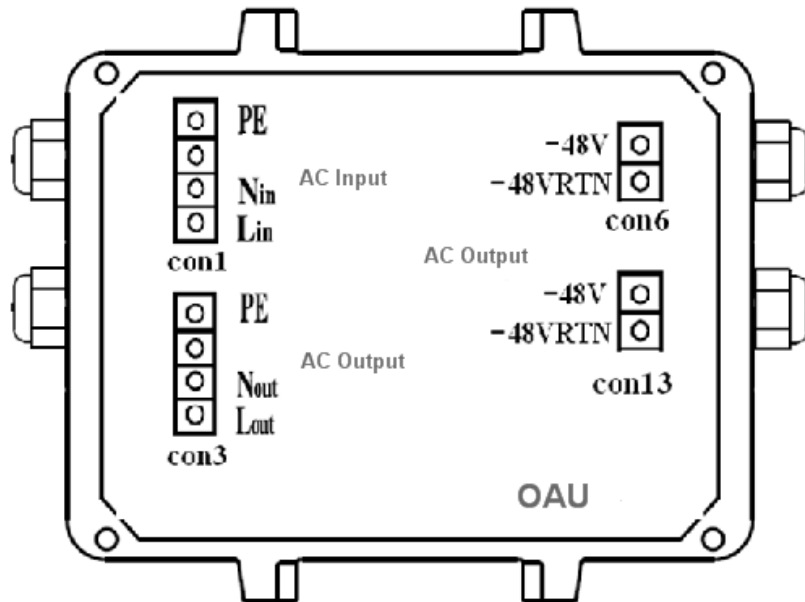
**Appearance** The appearance of OAU is as shown in [Figure 100](#).

FIGURE 100 OAU APPEARANCE



**Interface** The interfaces of OAU is as shown in [Figure 101](#).

FIGURE 101 OAU INTERFACES

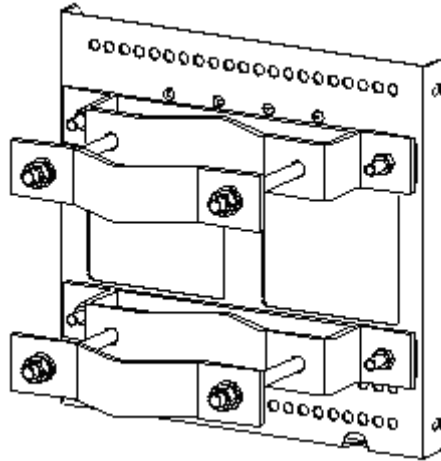


# OAU Pole Installation

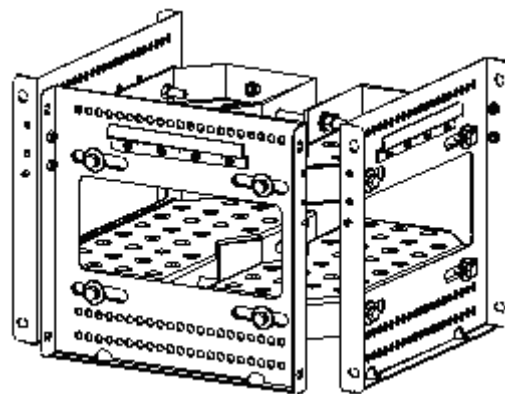
**Prerequisite** Unpacking and acceptance for outdoor AC unit (OAU) is qualified.

**Context** The OAU pole-mount mode can adopt anchor clamp assemblies or fixing bracket assemblies. The anchor clamp assemblies are as shown in [Figure 102](#) and the fixing bracket assemblies are as shown in [Figure 103](#).

**FIGURE 102 ANCHOR CLAMP ASSEMBLIES**



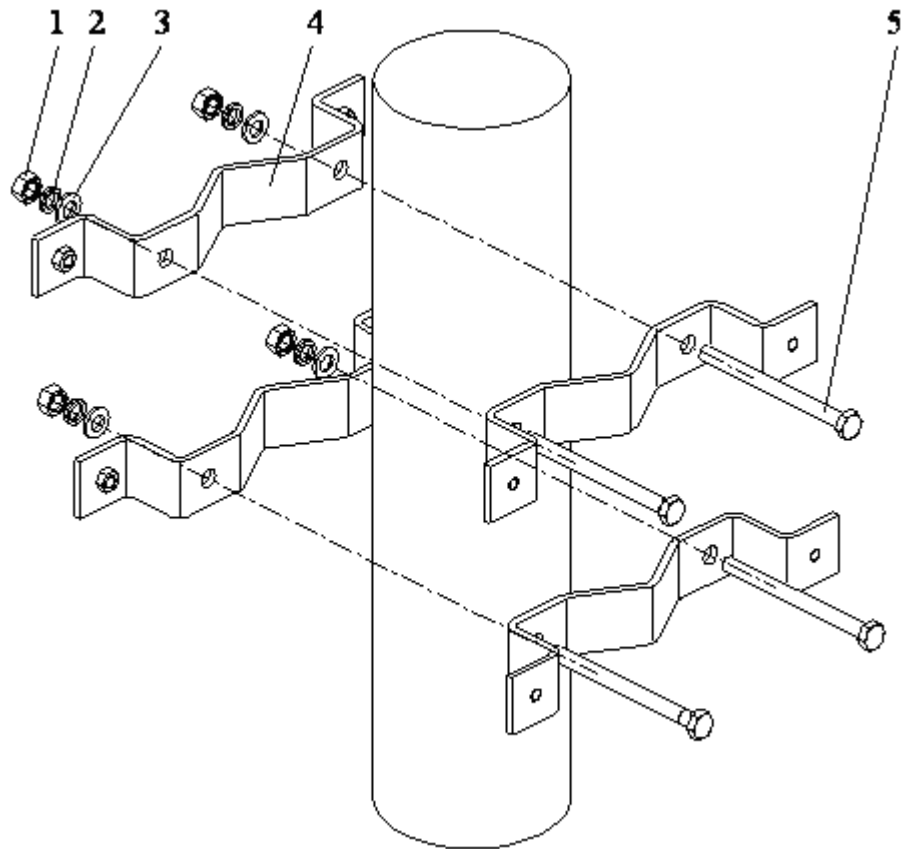
**FIGURE 103 FIXING BRACKET ASSEMBLIES**



- Steps**
1. Install the anchor clamp assemblies or the fixing bracket assemblies.

Install two sets of anchor clamp assemblies or two sets of fixing brackets onto the pole and screw down a bit with bolts. The anchor clamp assemblies as shown in [Figure 104](#) and the fixing brackets are as shown in [Figure 105](#).

FIGURE 104 TWO SETS OF ANCHOR CLAMP ASSEMBLIES



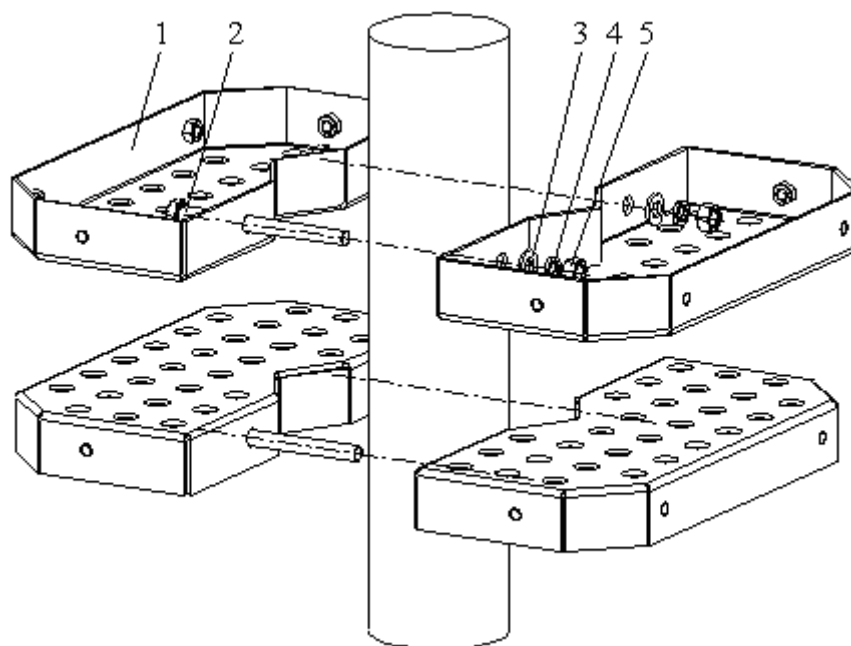
1. I-type common M10 hexagonal nut
2. Standard spring washer 10
3. Flat washer 10
4. Long anchor clamp
5. M10×120 hexagon head bolt (full thread)

**Tip:**

During two ZXSDR R8860 installation, the suggested pole diameter is 60 to 120 mm and there are two kinds of bolt lengths:

- ▶ Use the bolt of length 80 mm for pole diameter of 60 mm to 90 mm.
- ▶ Use the bolt of length 120 mm for pole diameter of 90 mm to 120 mm.

**FIGURE 105 TWO SETS OF FIXING BRACKET ASSEMBLIES**



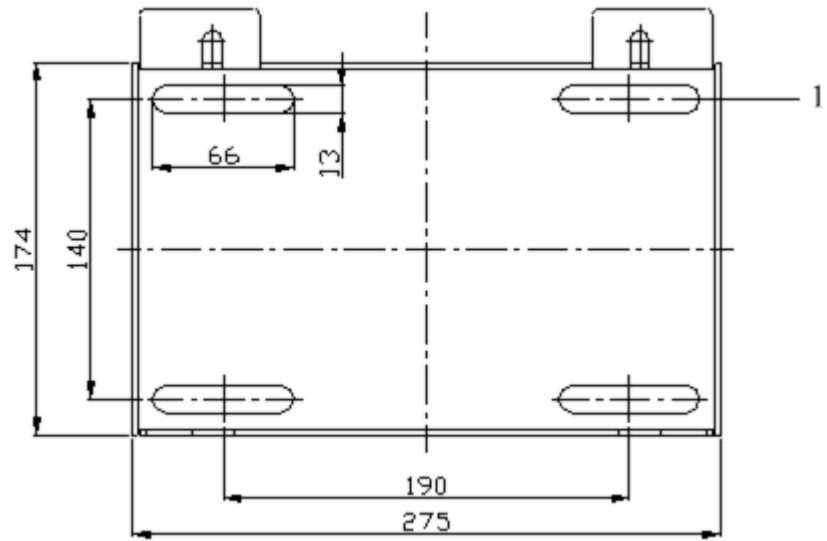
- |  |                                    |
|--|------------------------------------|
| 1. Fixing Bracket                          | 4. Flat washer 10                  |
| 2. M10×120 hexagon head bolt (full thread) | 5. I-type common M10 hexagonal nut |
| 3. Standard spring washer 10               |                                    |

2. Install the bracket of OAU.

The bracket is as shown in [Figure 106](#). Install the brackets onto the pole instead of the supporting panels as shown in [Figure 107](#) and [Figure 108](#). Screw down the brackets.

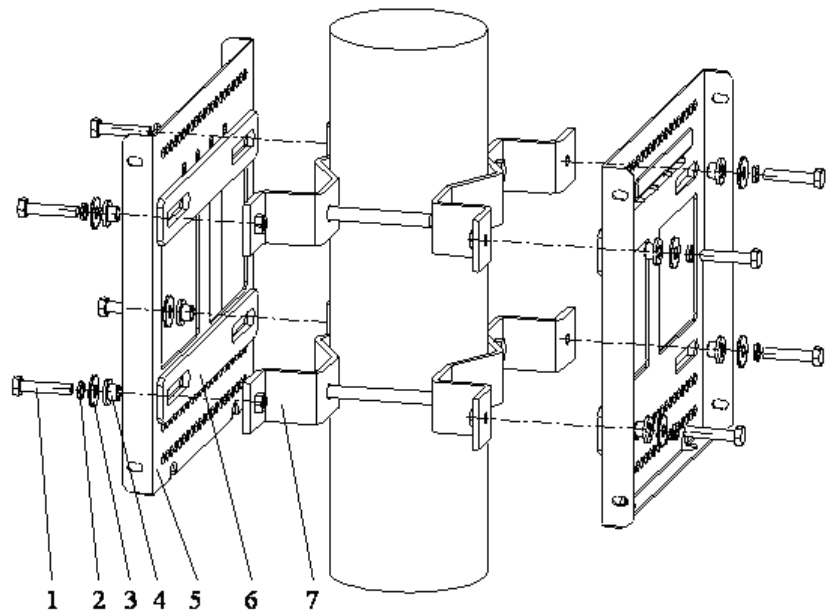


FIGURE 106 OAU BRACKET



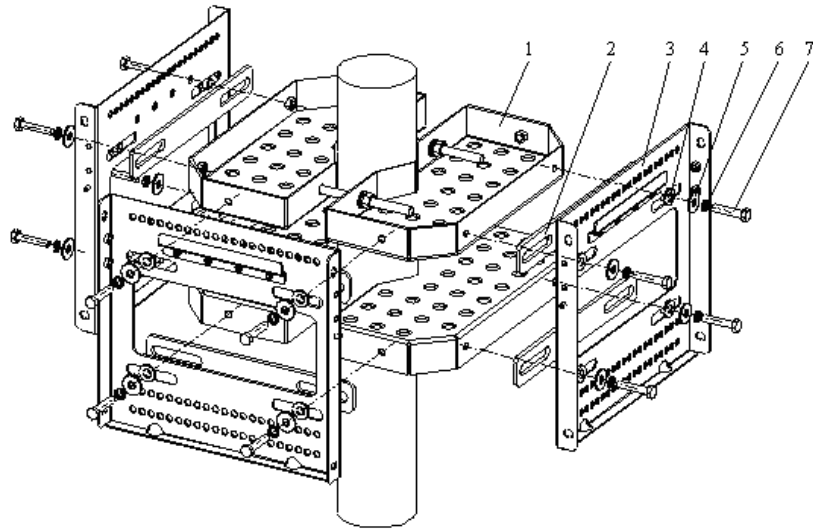
1. Installation pole

FIGURE 107 TWO SETS OF SUPPORTING PANELS



1. M8×40 hexagon head bolt
2. Standard spring washer 8
3. Big flat washer 8
4. Insulation flange
5. Supporting panel
6. Insulation board
7. Long anchor clamp

FIGURE 108 THREE SETS OF SUPPORTING PANELS

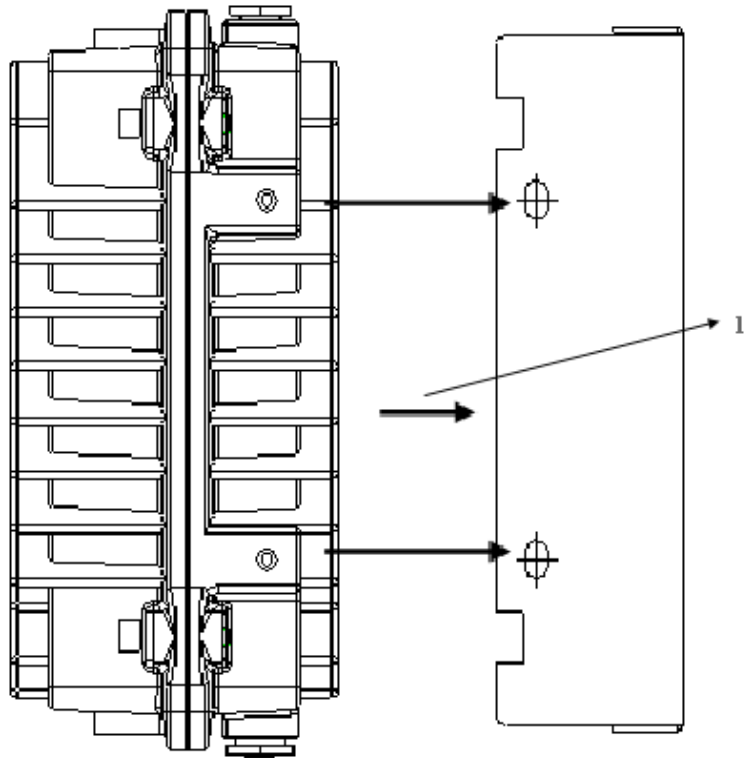


- |                      |                             |
|----------------------|-----------------------------|
| 1. Fixing bracket    | 5. Big flat washer 8        |
| 2. Insulation board  | 6. Standard spring washer 8 |
| 3. Supporting panel  | 7. M8×40 hexagon head bolt  |
| 4. Insulation flange |                             |

3. Install the OAU.

- i. As shown in the [Figure 109](#), fasten the OAU to the brackets with the M6 hexagon head screws according to the arrow-head direction.

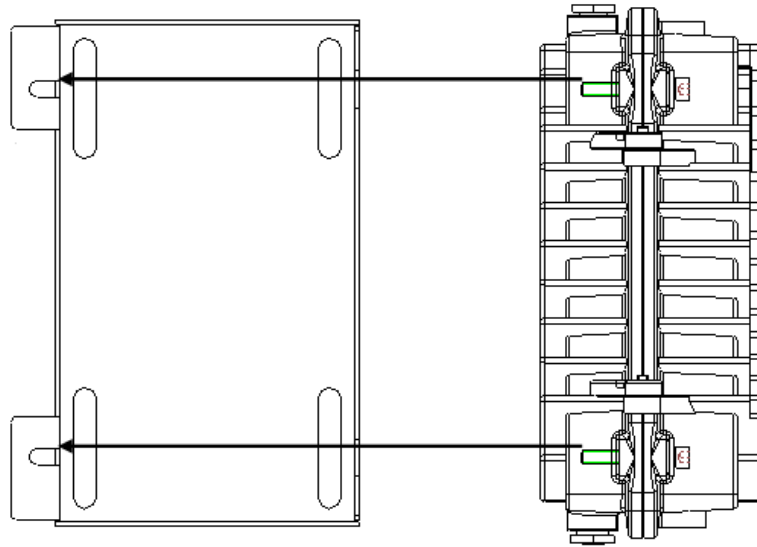
FIGURE 109 OAU INSTALLATION (1)



1. Installation direction

- ii. As shown in the [Figure 110](#), connect the OAU, flat washer, spring washer and M8 nut with the M8 hexagon head screws according to the arrowhead direction. Screw down the M8 nut at the back of bracket in order to fasten the OAU and the bracket.

FIGURE 110 OAU INSTALLATION (2)



**END OF STEPS.**

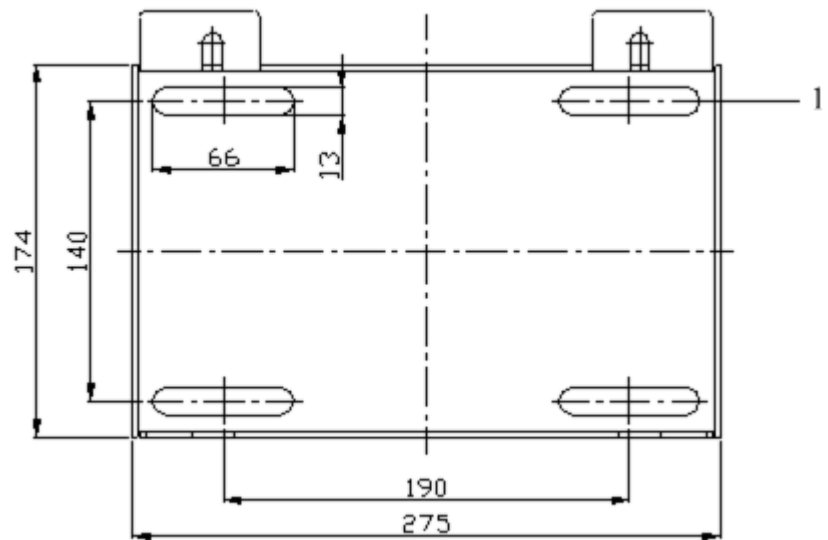
---

## OAU On-wall Installation

**Prerequisite** Unpacking and acceptance for outdoor AC unit (OAU) is qualified.

- Steps**
1. Install a rack.
    - i. As shown in the [Figure 111](#), drill holes with M10 drill on the wall and knock the M8 expansion pipes into the holes. Make sure the expansion bolts erected with the wall.

FIGURE 111 OAU RACK



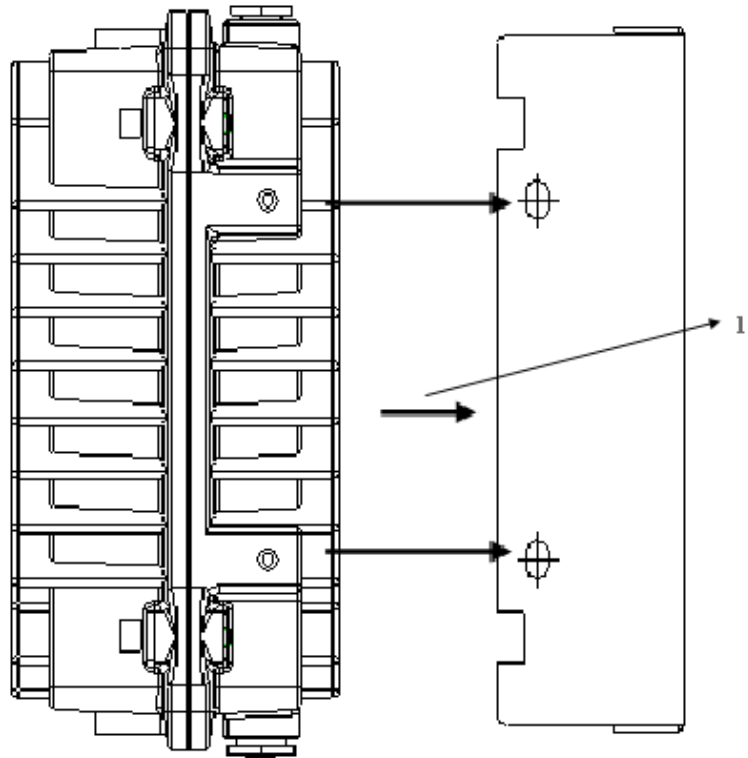
1. Installation hole

ii. Align installation holes on the bracket to extension pipes on the wall. After hanging the bracket, rotate the self-drilling screw assembled with a big flat washer and a spring washer into the expansion pipe. Screw down the bolt with a wrench.

2. Install the OAU.

i. As shown in the [Figure 112](#), fasten the OAU to the brackets with the M6 hexagon head screws according to the arrow-head direction.

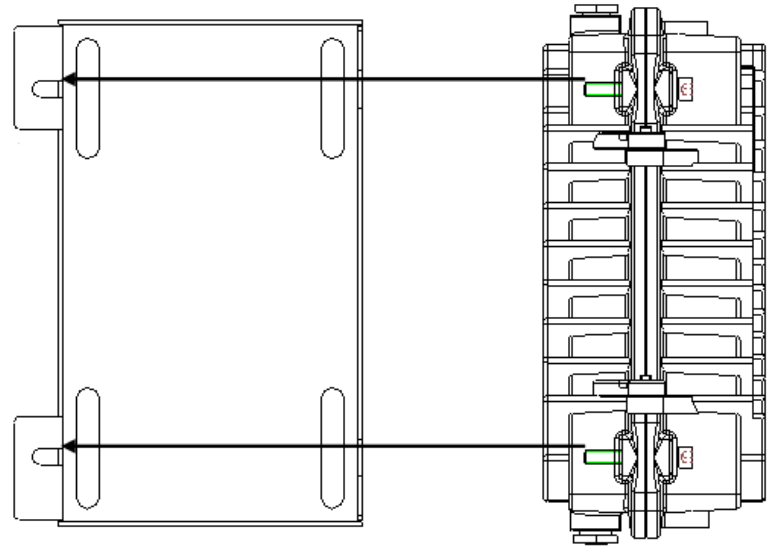
FIGURE 112 OAU INSTALLATION (1)



1. Installation direction

- ii. As shown in the [Figure 113](#), connect the OAU, flat washer, spring washer and M8 nut with the M8 hexagon head screws according to the arrowhead direction. Screw down the M8 nut at the back of bracket in order to fasten the OAU and the bracket.

FIGURE 113 OAU INSTALLATION (2)



**END OF STEPS.**

---

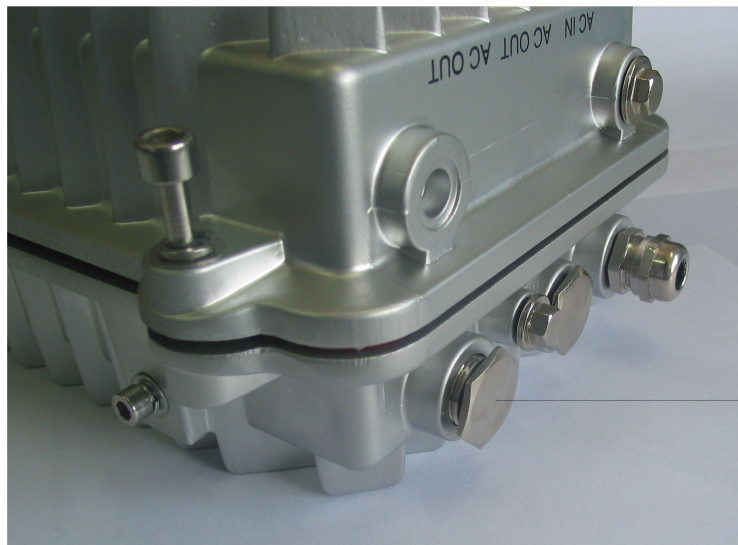
## OAU Cable Installation

**Prerequisite** The OAU installation is completed.

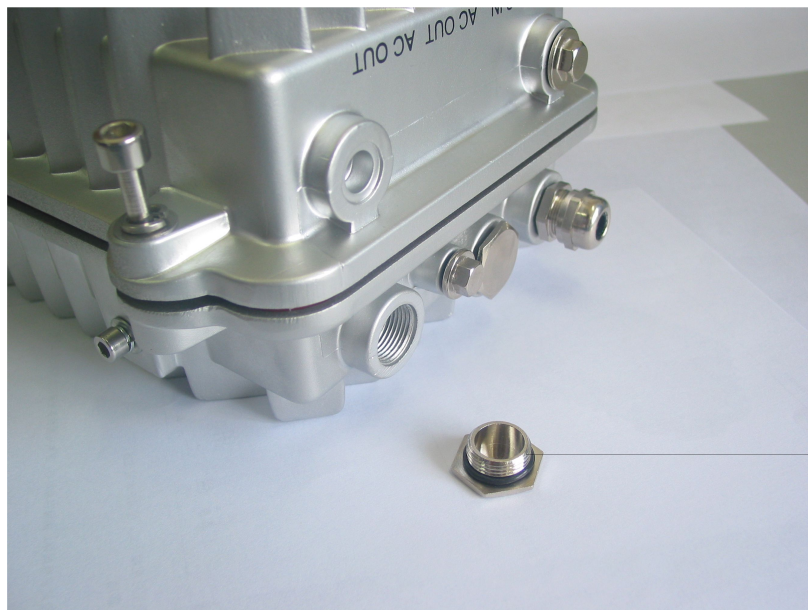
**Context** The OAU can provide -48V power supply for one ZXSDR B8200 C100 and one ZXSDR R8860 C806 at the same time.

If the OAU is installed outdoors, it is required to configure an AC lightning box. For indoor installation, if the AC power cable is distributed outdoors, it is also required to configure an AC lightning box.

- Steps**
1. Install a waterproof end cap.
    - i. Referring to the [Figure 114](#) and [Figure 115](#), loosen off the waterproof end cap.

**FIGURE 114 WATERPROOF END CAP**

1. Waterproof end cap

**FIGURE 115 LOOSE OFF WATERPROOF END CAP**

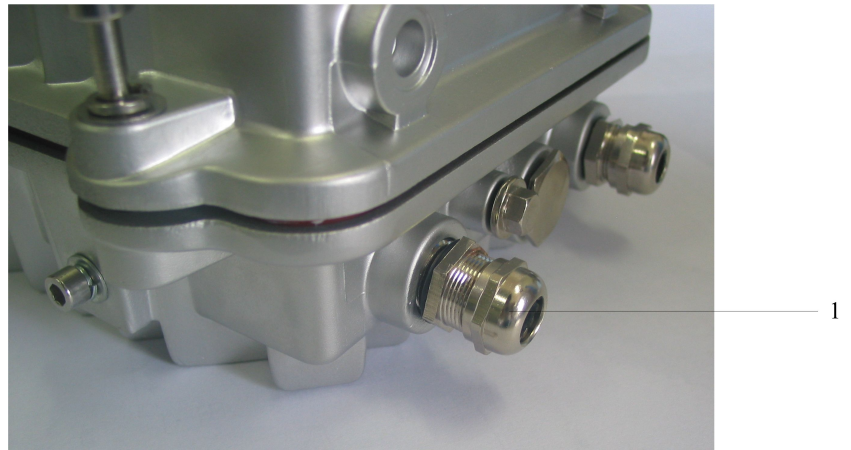
1. Waterproof end cap
- ii. Remove the waterproof end cap and loose off the nut of waterproof end cap, as shown in [Figure 116](#).



**FIGURE 116 WATERPROOF END CAP STRUCTURE**

1. Nut
2. Waterproof ring
3. Waterproof end cap

- iii. Install the waterproof end cap onto the OAU and screw down it, as shown in [Figure 117](#).

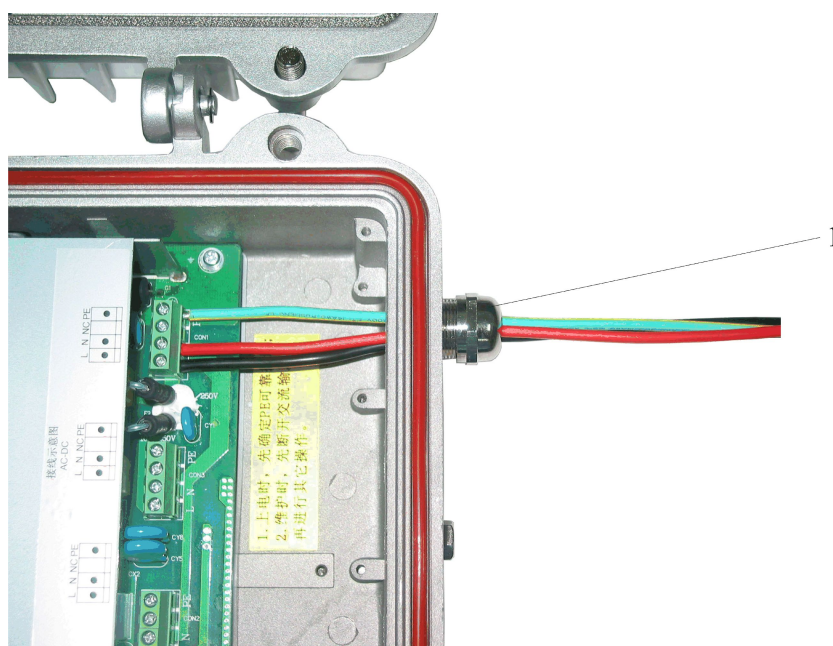
**FIGURE 117 WATERPROOF END CAP INSTALLATION**

1. Waterproof end cap

2. Disassemble the OAU and connect the AC power cable with the DC power cable. The connection of AC cable is as shown in [Figure 118](#).

**Caution:**

1. While connecting the AC power cable, first connect the PE cable, N cable and L cable. For disconnecting, the sequence is opposite, first the L cable, N cable and finally PE cable.
2. Before power on, first confirm the PE cable grounding well. During maintenance, first disconnect the AC input and then perform other operation.
3. After cut off the power, wait for four minutes at least until the capacity discharge enough and then perform maintenance operation for the OAU.

**FIGURE 118 AC POWER CABLE CONNECTION**

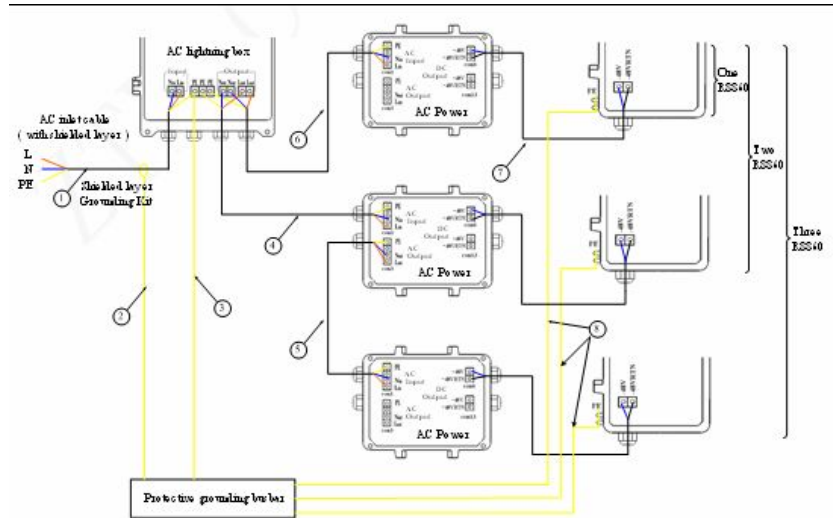
1. Waterproof end cap

**Note:**

The cable color decides on site.

3. Connect one AC lightning box, three OAUs and three ZXSDR R8860 C806, as shown in [Figure 119](#). For the connection between OAU and ZXSDR B8200 C100, please refer to the [Figure 119](#).

**FIGURE 119 ONE AC LIGHTNING BOX, THREE OAUs AND THREE R8860 CABLE CONNECTION**



1. AC power cable (For outdoor installation, three-core outdoor aluminum-foil shielding power cable; for indoor installation, PVC sheath power cable; the cable length depends on survey on site.)
2. Grounding cable of grounding kit (with 1.5 m long)
3. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1 m)
4. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
5. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
6. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
7. DC power cable (four-core, with 2 m long)
8. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1 m)

**END OF STEPS.**

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## Appendix **D**

# OLP48-2

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## OLP48-2 Technical Indices

The outdoor DC lightning box (OLP48-2) is used for surge protection of ZXSDR R8860. The following describes its characters:

- Adopt protective circuit for two ports, with low residual voltage and good protective performance.
- Adopt the temperature-control broken-circuit technology to avoid fire hazards.
- Adopt pressure-sensitive parallel connection to endure sustaining lightning strike.
- Adopt an alarm report function for remote monitoring.

### Engineering Technical Indices

[Table 21](#) describes the engineering technical indices of outdoor DC lightning box.

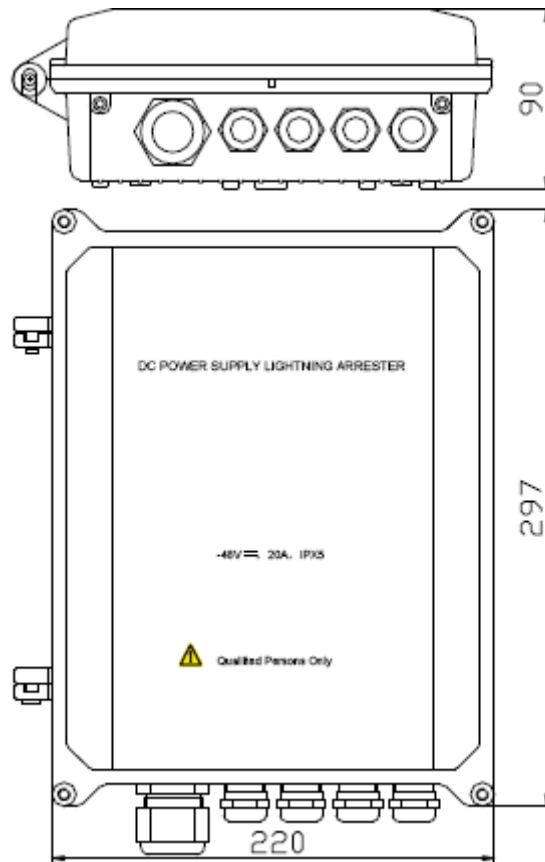
**TABLE 21 ENGINEERING TECHNICAL INDICES**

Item	Index
Dimension	H×W×D: 297mm×220mm×90mm
Nominal work voltage	-48VDC
Maximum continuous running voltage	-75VDC
Work temperature	-40°C +65°C
Work humidity	10% RH~95% RH 25°C

## OLP48-2 Appearance and Interface

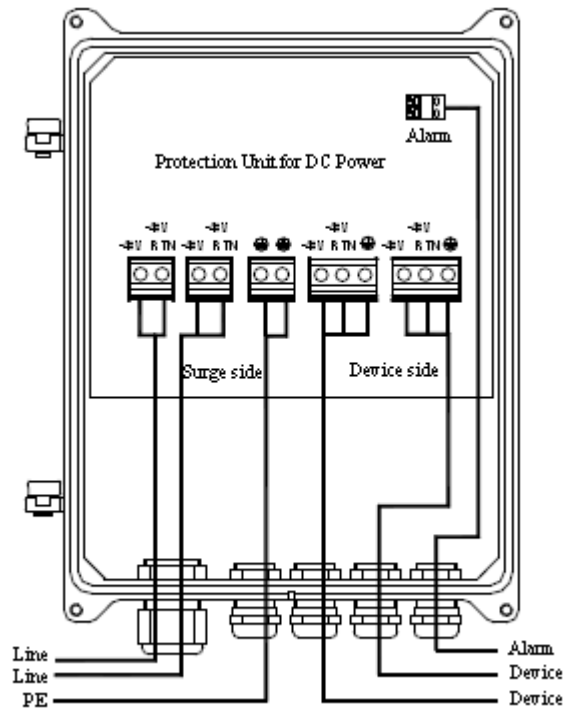
**Appearance** [Figure 120](#) shows the appearance of outdoor DC lightning box.

FIGURE 120 OUTDOOR DC LIGHTNING BOX APPEARANCE



**Interface** [Figure 121](#) shows the interfaces of outdoor DC lightning box.

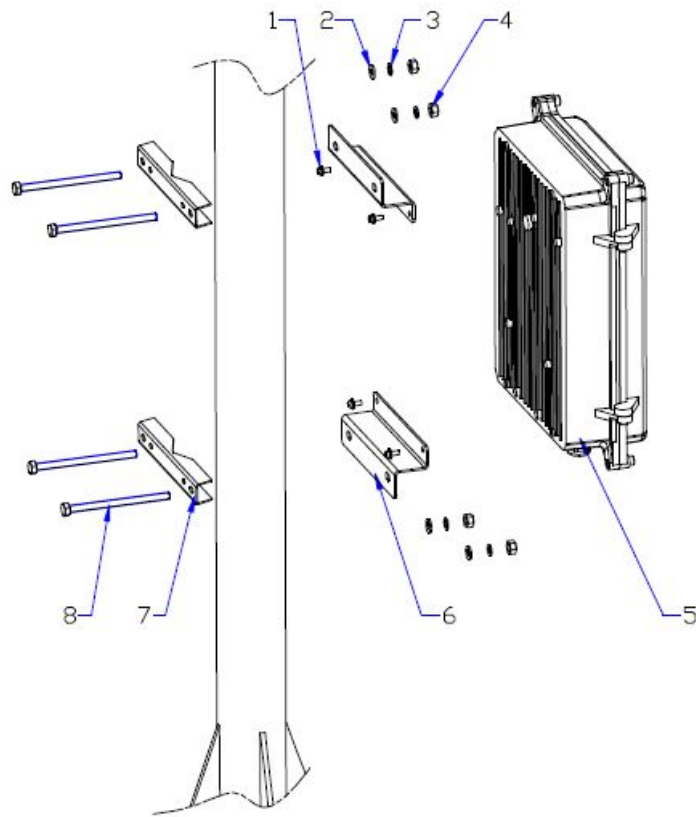
FIGURE 121 OUTDOOR DC LIGHTNING BOX INTERFACE



## OLP48-2 Installation Description

**Installation** [Figure 122](#) illustrates parts to provide for pole installation of outdoor DC lightning box. [Figure 123](#) shows the appearance after installation completion.

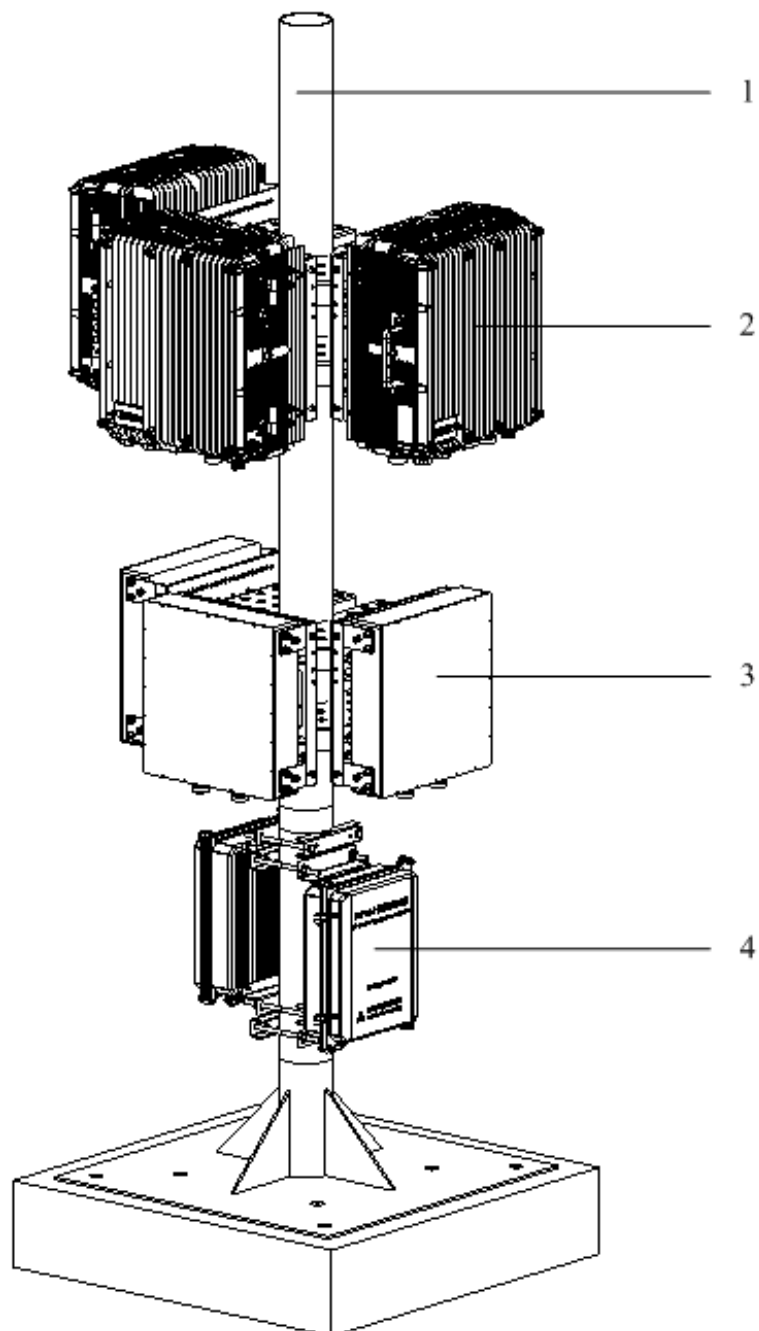
FIGURE 122 INSTALLATION PARTS



1. Combined bolt M4×10
2. Plain washer 8
3. Spring washer 8
4. Nut M8
5. Outdoor DC lightning box
6. OLPM support (1)
7. OLPM support (2)
8. Hexagon bolt M8×140



FIGURE 123 OUTDOOR DC LIGHTNING POLE INSTALLATION

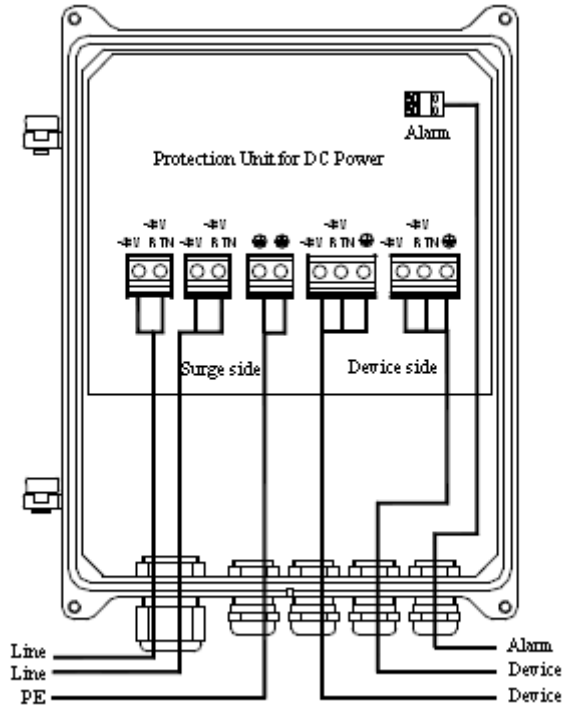


1. Pole
2. ZXSDR R8841 C804

3. Wave trap
4. Outdoor DC lightning box

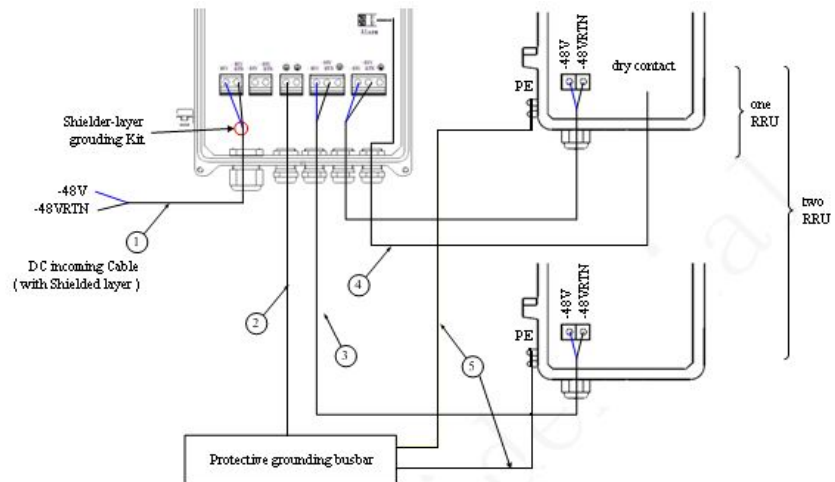
**Cable Connection** Take apart a cabinet and connect cables as shown in [Figure 124](#). Connect one outdoor DC lightning box with one (or two) RRU , as shown in [Figure 125](#).

FIGURE 124 OUTDOOR DC LIGHTNING BOX INTERFACES



**Caution:**

1. While connecting cables of lightning box, it is required to put the cable through the hole of waterproof connector at the bottom of box.
2. First connect the ground cables and then connect other cables. While disconnecting, finally remove the ground cable.

**FIGURE 125 OUTDOOR DC LIGHTNING CONNECTION**

1. DC power cable (two-core outdoor shielded power cable; the shielded layer is grounding inside the lightning box; the cable length depends on the on-site survey)
2. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1 m)
3. DC power cable (four-core with 2 m long)
4. Data cable (eight-pair twisted-pair outdoor data cable with 3 m long)
5. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1.5 m)

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## ILP48-3

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## ILP48-3 Technical Indices

For ZXSDR R8860 outdoor installation, if the DC power is exported from the equipment room and the output port of indoor DC power is not configured with a B-level or above lightning devices, it is required to install an indoor DC lightning box (ILP48-3) at the side of equipment room.

The indoor DC lightning box contains three individual DC -48V DC lightnings. Their characters are described as follows:

1. Adopt the temperature-control broken-circuit technology to avoid fire hazards.
2. Adopt an alarm report function for remote monitoring.
3. Adopt double-color indicators to directly and clearly indicate working status

### Engineering Technical Indices

[Table 22](#) describes the engineering technical indices of indoor DC lightning box.

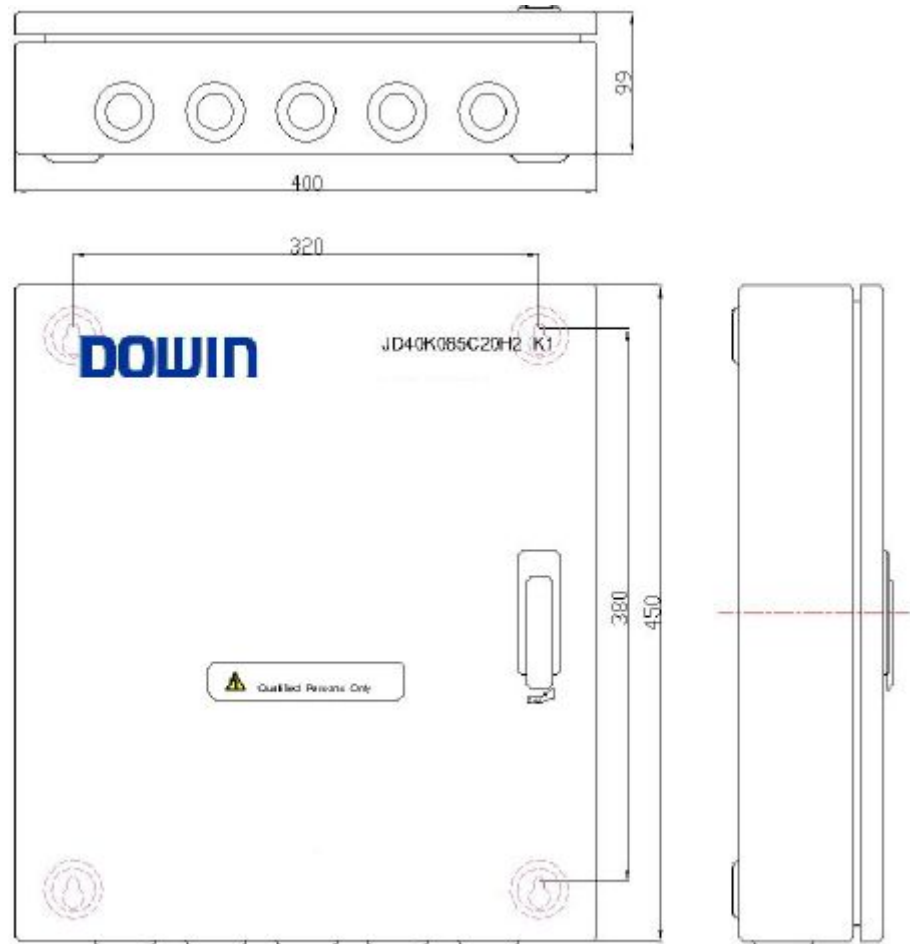
**TABLE 22 ENGINEERING TECHNICAL INDICES**

Item	Index
Dimension	H×W×D: 450mm×400mm×100mm (not include the height of lock on the upper cover)
Nominal work voltage	-48VDC
Maximum continuous running voltage	-75VDC
Work temperature	-5°C +70°C
Work humidity	≤95% RH

# ILP48-3 Appearance and Interface

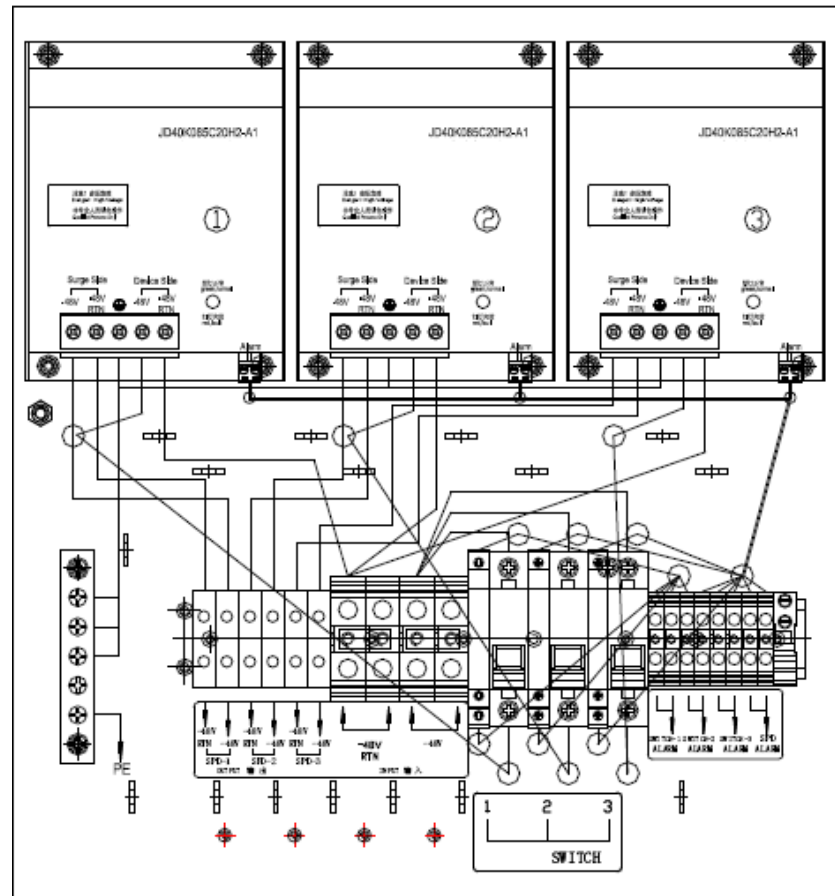
**Appearance** [Figure 126](#) shows the appearance of indoor DC lightning box.

**FIGURE 126 INDOOR DC LIGHTNING BOX APPEARANCE**



**Interface** [Figure 127](#) shows the interfaces of indoor DC lightning box.

FIGURE 127 INDOOR DC LIGHTNING BOX INTERFACES



## ILP48-3 Installation Description

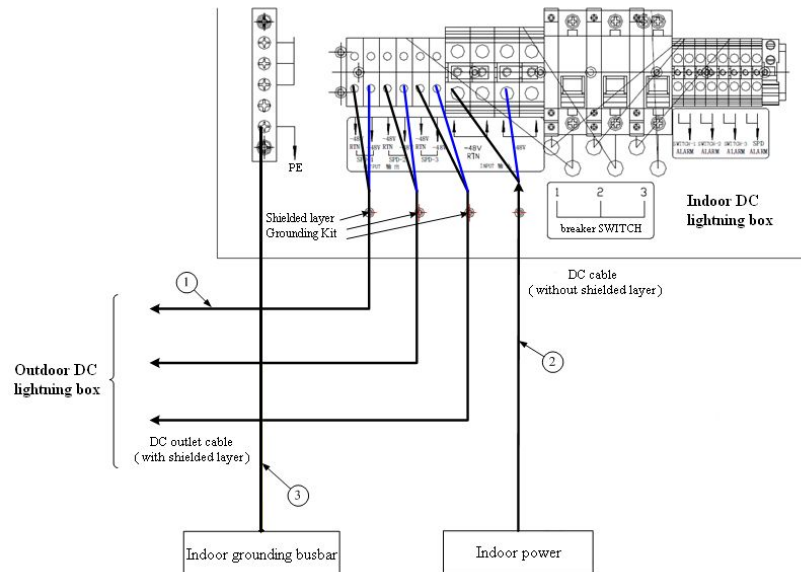
**Installation** The indoor DC lightning box adopts an on-wall installation mode. Drill hole on the wall of equipment room according to installation pole positions on the lightning box. Select four M6×60 (or more longer) expansion bolts to fasten the lightning box on the wall.

**Cable Connection** [Figure 128](#) illustrates cable connection of lightning box.

**Caution:**

First connect the grounding cable and then other cables. While disconnecting, finally remove the grounding cable.

**FIGURE 128 INDOOR DC LIGHTNING BOX CABLE CONNECTION (NOT CONNECT WITH REMOTE ALARM)**



1. DC power cable (two-core outdoor shielded power cable; the shielded layer is grounding inside the lightning box; the cable length depends on the on-site survey)
2. DC power cable (two-core outdoor shielded power cable; the cable length depends on the on-site survey)
3. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1.5 m)



## AC Lightning Arrester

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Shielded Grounding Kit Installation .....	168

## AC Lightning Technical Indices

The protective circuit of AC lightning consists of power protection and signal protection, respectively used for lightning surge protection of supply power and circuit interface.

The characters of power protection are described as follows:

- Adopt series protective circuit, with low residual voltage and good protective performance.
- Adopt the temperature-control broken-circuit technology to avoid fire hazards.
- Adopt pressure-sensitive parallel connection to endure sustaining lightning strike.

The characters of signal protection are described as follows:

- Large discharge current
- Low residual voltage and good protective performance
- Eight signal protection circuits

### Engineering Technical Indices

[Table 23](#) describes the engineering technical indices of AC lightning box.

**TABLE 23 ENGINEERING TECHNICAL INDICES**

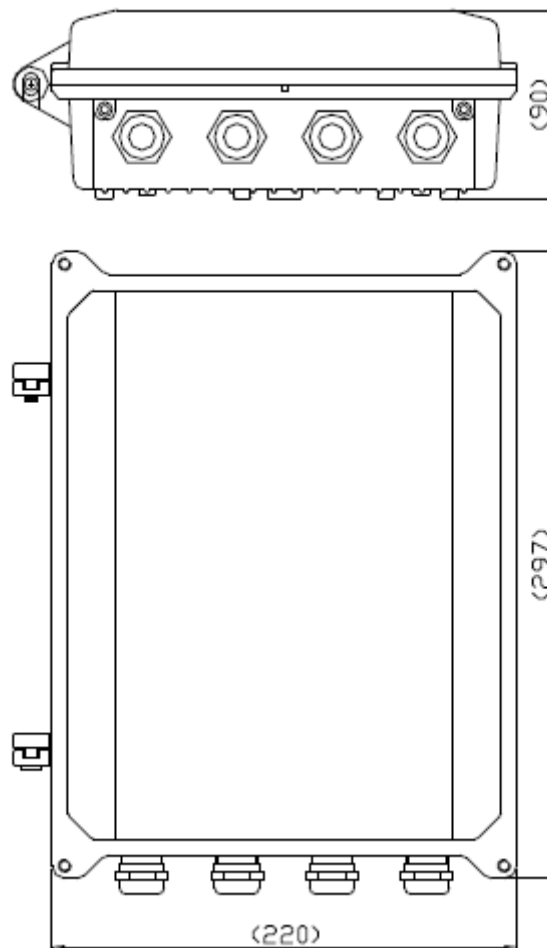
Item	Index
Dimension	H×W×D: 297mm×220mm×90mm
Rating work voltage	110/220~240V AC50/60Hz
Maximum continuous running voltage	385V AC
Work temperature	-40°C +70°C

Item	Index
Work humidity	10%RH~95% RH25°C
Altitude	≤3000m

## AC Lightning Appearance and Interface

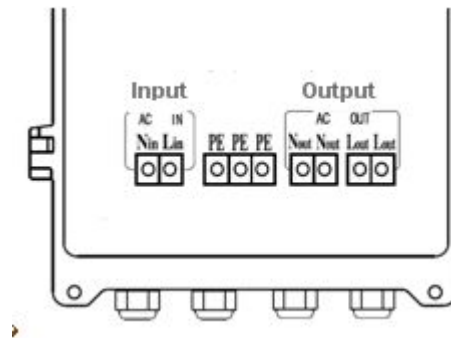
**Appearance** [Figure 129](#) illustrates the appearance of AC lightning box.

**FIGURE 129 AC LIGHTNING BOX APPEARANCE**



**Interface** [Figure 130](#) illustrates the interfaces of AC lightning box.

FIGURE 130 AC LIGHTNING BOX INTERFACE

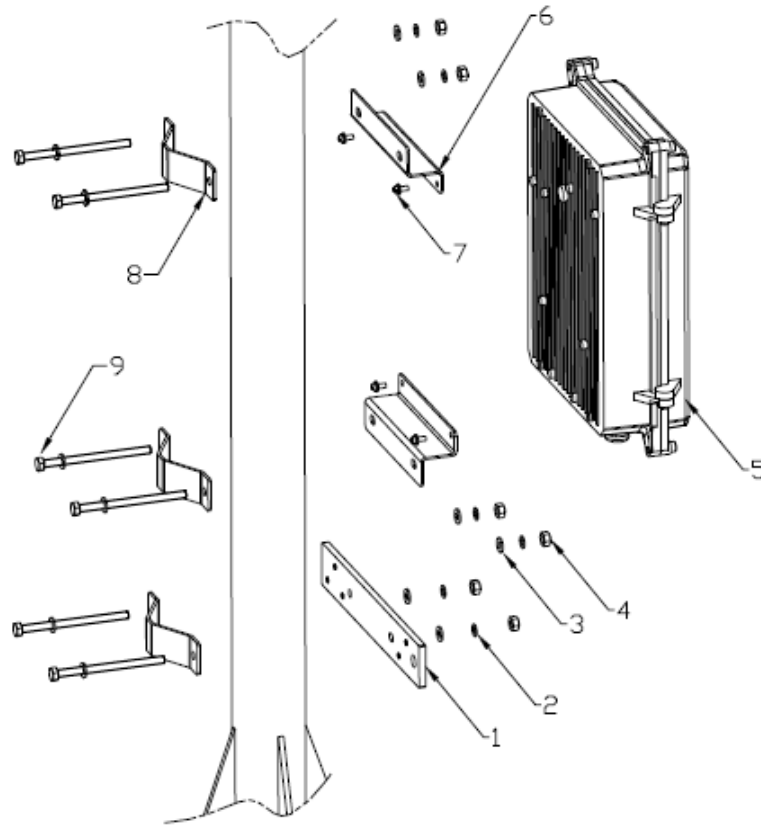


## AC Lightning Installation Description

When the ZXSDR R8841 C804 is installed outdoors, it is required to configure AC lightning box for AC power supply. When the ZXSDR R8860 C806 is installed outdoors, it is required to configure AC lightning box at the front of outdoor AC unit (OAU) for indirect AC power supply.

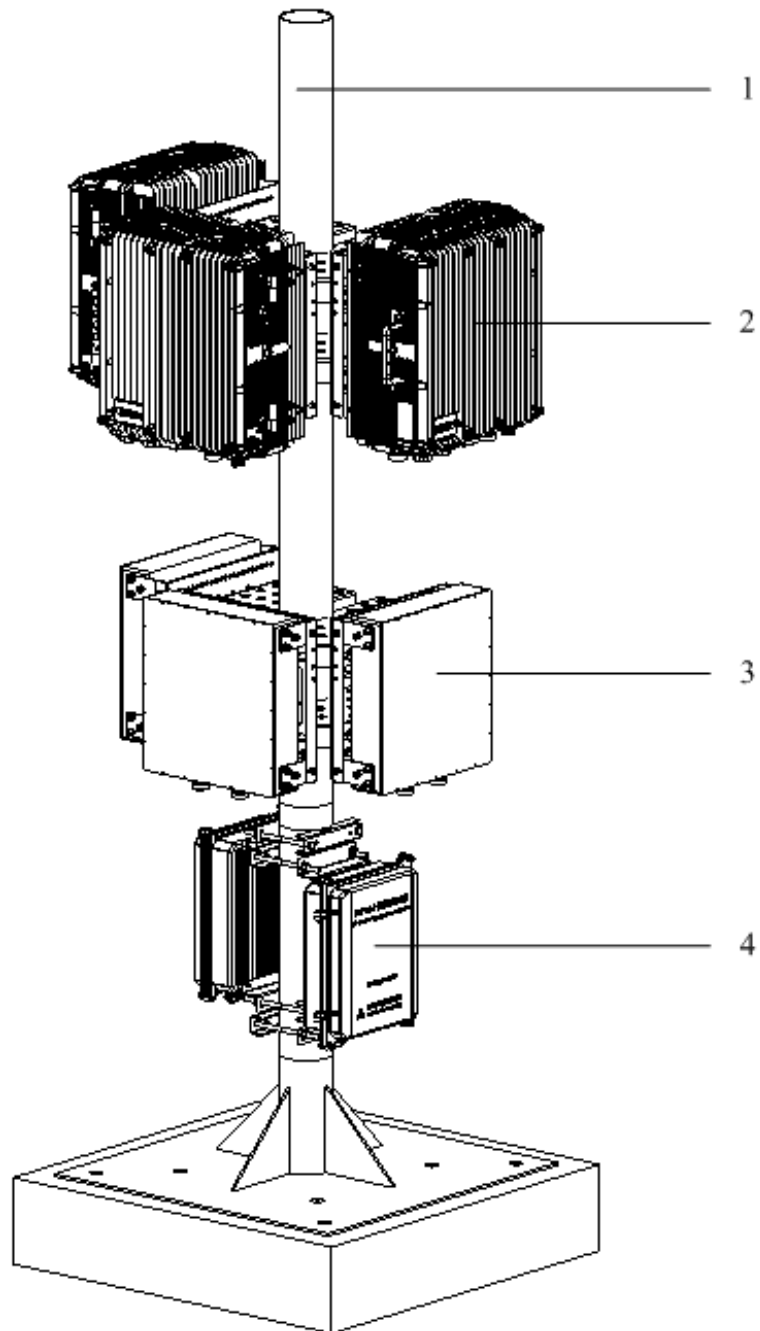
**Installation** [Figure 131](#) illustrates parts to provide for pole installation of AC lightning box. [Figure 132](#) shows the appearance after installation completion.

FIGURE 131 AC LIGHTNING BOX INSTALLATION PARTS



1. Grounding copper bar
2. Spring washer M6
3. Flat washer M6
4. Nut M6
5. AC lightning box
6. Installation support
7. Combined bolt M4×10
8. Fastener

FIGURE 132 AC LIGHTNING POLE INSTALLATION



1. Pole
2. ZXSDR R8841 C804

3. Wave trap
4. AC lightning box

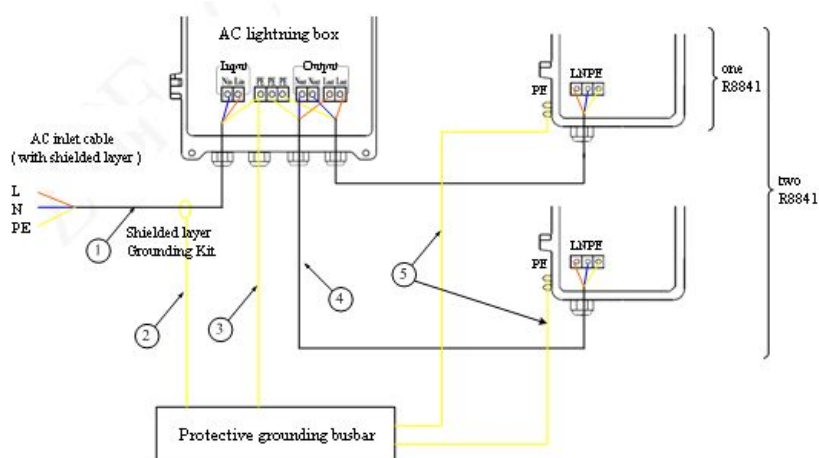
**Cable Connection**    Unpack a cabinet and connect cables.

**Caution:**

1. First connect the grounding cable and then other cables. While disconnecting, finally remove the grounding cable.
2. The cable to connect the lightning box must be put through a hole of waterproof connector at the bottom of box.
3. After connection completed and checked, screw down all waterproof connectors and wrap waterproof connectors and cables with waterproof adhesive tape.

Connect one AC lightning box with one (or two) ZXSDR R8841 C804, as shown in [Figure 133](#).

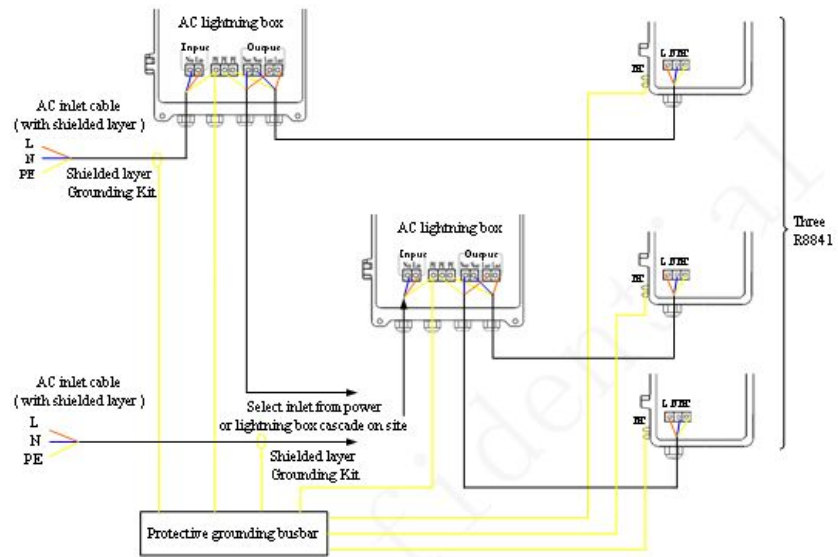
**FIGURE 133 ONE AC LIGHTNING BOX AND ONE (OR TWO) R8841 CABLE CONNECTION**



1. AC power cable (three-core outdoor braid and aluminum foil shielding cable; the cable length depends on on-site survey)
2. Grounding kit grounding cable (two-core power cable with 1.5 m long)
3. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1.5 m)
4. AC power cable (soft cable and the length depends on on-site survey)
5. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1.5 m)

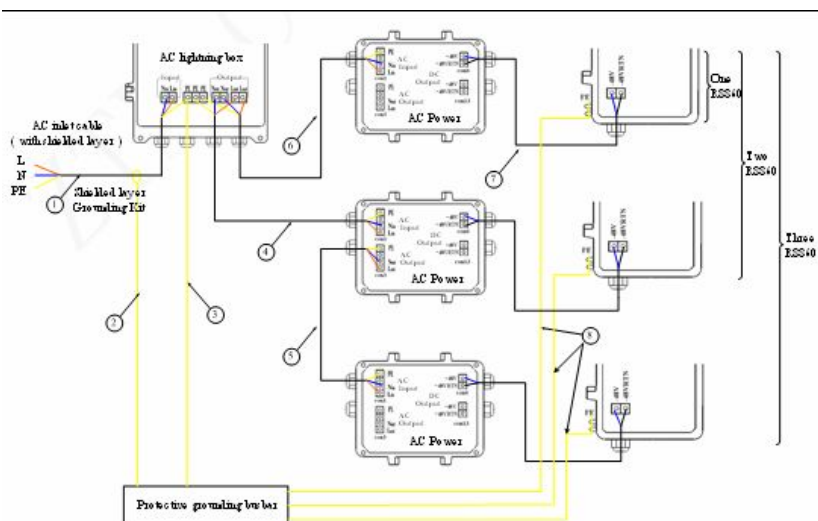
Connect two AC lightning box with three ZXSDR R8841 C804, as shown in [Figure 134](#).

**FIGURE 134 TWO AC LIGHTNING BOX AND THREE R8841 CABLE CONNECTION**



- Cable type refers to [Figure 134](#).

Connect one AC lightning box, three OAU with three ZXSDR R8860 C806, as shown in [Figure 135](#).

**FIGURE 135 ONE AC LIGHTNING BOX, THREE OAUs AND THREE R8860 CABLE CONNECTION**

1. AC power cable (For outdoor installation, three-core outdoor aluminum-foil shielding power cable; for indoor installation, PVC sheath power cable; the cable length depends on survey on site.)
2. Grounding cable of grounding kit (with 1.5 m long)
3. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1 m)
4. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
5. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
6. AC power cable (three-core outdoor aluminum-foil shielding power cable; the cable length depends on survey on site.)
7. DC power cable (four-core, with 2 m long)
8. Grounding cable (yellow-and-green fire-retardant cable; the length is less than 1 m)

## Shielded Grounding Kit Installation

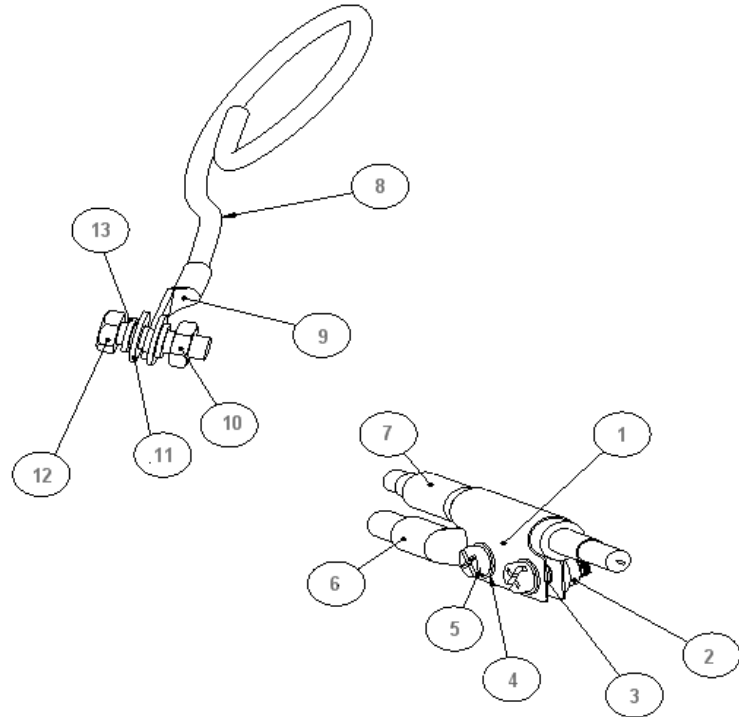
**Prerequisite** The shielded power cable is installed.

**Context** This sector only describes installation of shielded grounding kit of AC lightning box's power cable.

- Steps**
1. Select a proper installation position for grounding kit. Select an appropriate grounding kit according to diameter of power cable. Cut off sheath of power cable and fix the shielded layer of power cable with a grounding kit. The structure of grounding kit is as shown in [Figure 136](#). [Figure 137](#) and [Figure 138](#) illustrate various grounding kits adopted for different diameters.

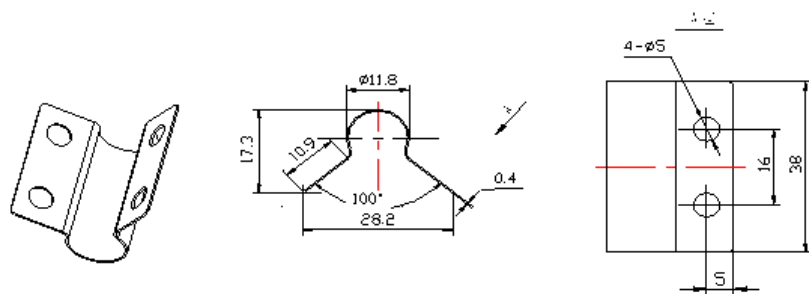


**FIGURE 136 SHIELDED GROUNDING KIT STRUCTURE**

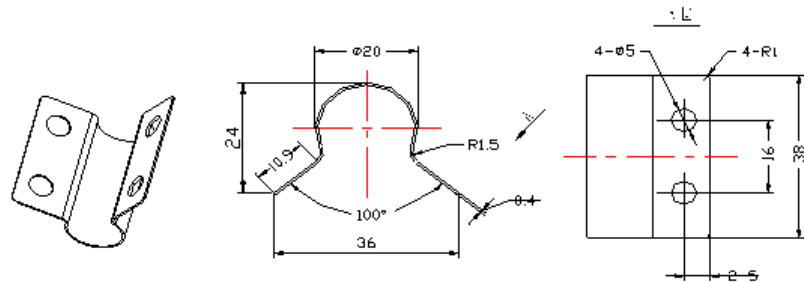


- |                                    |                                     |
|------------------------------------|-------------------------------------|
| 1. Grounding kit body              | 8. Grounding cable                  |
| 2. Squeeze screw                   | 9. Grounding terminal (single hole) |
| 3. O-type ring 4                   | 10. Hexagon nut 8                   |
| 4. Flat washer 4                   | 11. Flat washer 8                   |
| 5. Button headed screw M4×12       | 12. Hexagon bolt M8×25              |
| 6. Connecting terminal (dual-hole) | 13. Spring washer 8                 |
| 7. Shielded power cable            |                                     |

**FIGURE 137 GROUNDING BODY 1 (ADOPTABLE FOR 6MM<sup>2</sup> TWO-CORE OUTDOOR POWER CABLE)**

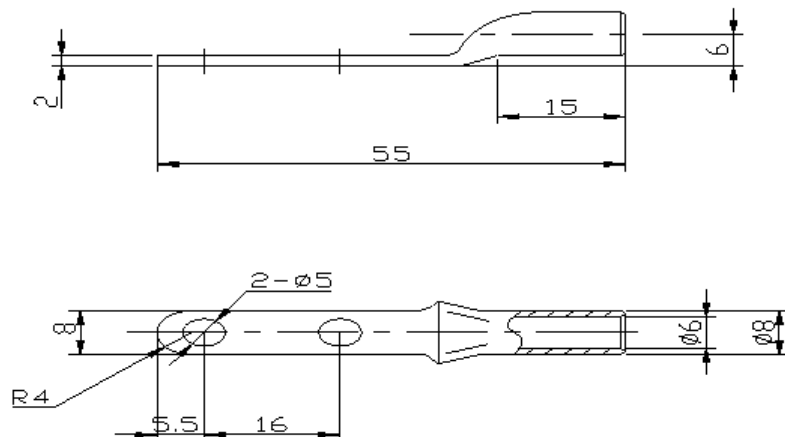


**FIGURE 138 GROUNDING BODY 2 (ADOPTABLE FOR 16MM<sup>2</sup> TWO-CORE OUTDOOR POWER CABLE)**



2. Screw down the dual-hole connecting terminal to fix on the body of grounding kit. Connect the connecting terminal with the grounding cable. Protect the junction between grounding cable and connecting terminal with thermoplastic sleeve. Pull the grounding cable towards the ground grid. The dual-hole connecting terminal is as shown in [Figure 139](#).

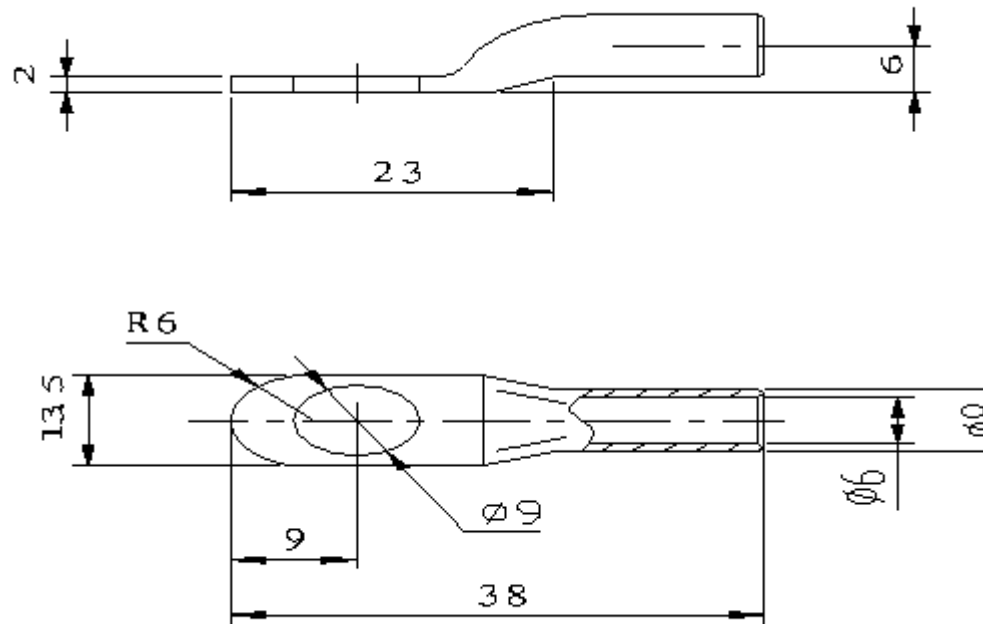
**FIGURE 139 CONNECTING TERMINAL (DUAL-HOLE)**



3. Perform waterproof processing for the junction between grounding kit and power cable. The methods are described as follows:
  - i. Wrap waterproof self-adhesive tape and then wrap PVC adhesive tape.
  - ii. While wrapping waterproof self-adhesive tape, first wrap layer by layer from down to up, then from up to down and finally from down to up again. The upper layer should cover half of the lower layer.
4. Fasten the single-hole connecting terminal at the other end of grounding cable to the grounding bar with M8×25 hexagon bolts. Clean away paint and oxid within 13 mm radius of con-

necting position, and cover antioxidation paste on it to make sure good electrical contact. After connection completed, cover a layer of antirust paint. The single-hole connecting terminal is as shown in [Figure 140](#).

**FIGURE 140 CONNECTING TERMINAL (SINGLE-HOLE)**



**END OF STEPS.**

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# PDM

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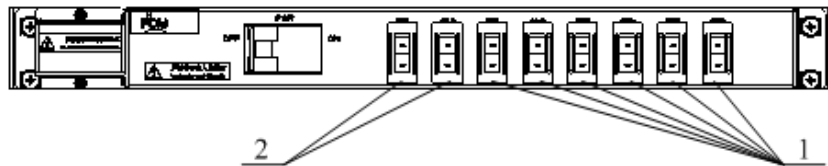
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## PDM Appearance and Interface

Power distribution module (PDM) is installed in a simplified cabinet to transfer DC power for ZXSDR R8860. Power on or off a single ZXSDR R8860 by control of switches on the PDM.

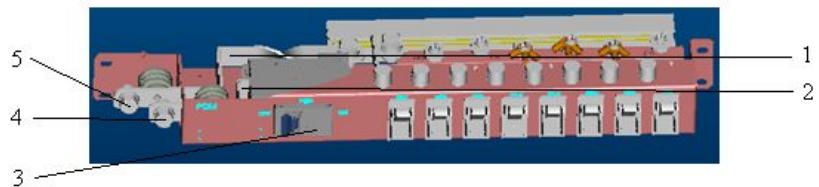
[Figure 141](#) and [Figure 142](#) illustrate the appearance and interfaces of PDM.

**FIGURE 141 POWER DISTRIBUTION BOX PLANE**



- 1. BBU power switch
- 2. RRU power switch

**FIGURE 142 POWER DISTRIBUTION BOX**



- 1. -48VGND output copper bar
- 2. -48V output copper bar
- 3. Power main switch
- 4. -48V
- 5. -48VGND

# PDM Installation

**Context** The power distribution module (PDM) is installed in an integrative cabinet to transfer DC power for ZXSDR B8200 C100, ZXSDR R8841 C804 or ZXSDR R8860 C806.

- Steps**
1. Check installation of power switches. The status of ON and OFF should be consistent with silkscreens on the PDM switch plane.
  2. Connect internal cables.

Connect an end of internal cable to the OFF end of power switches and wrap adhesive tape, as shown in [Figure 143](#)

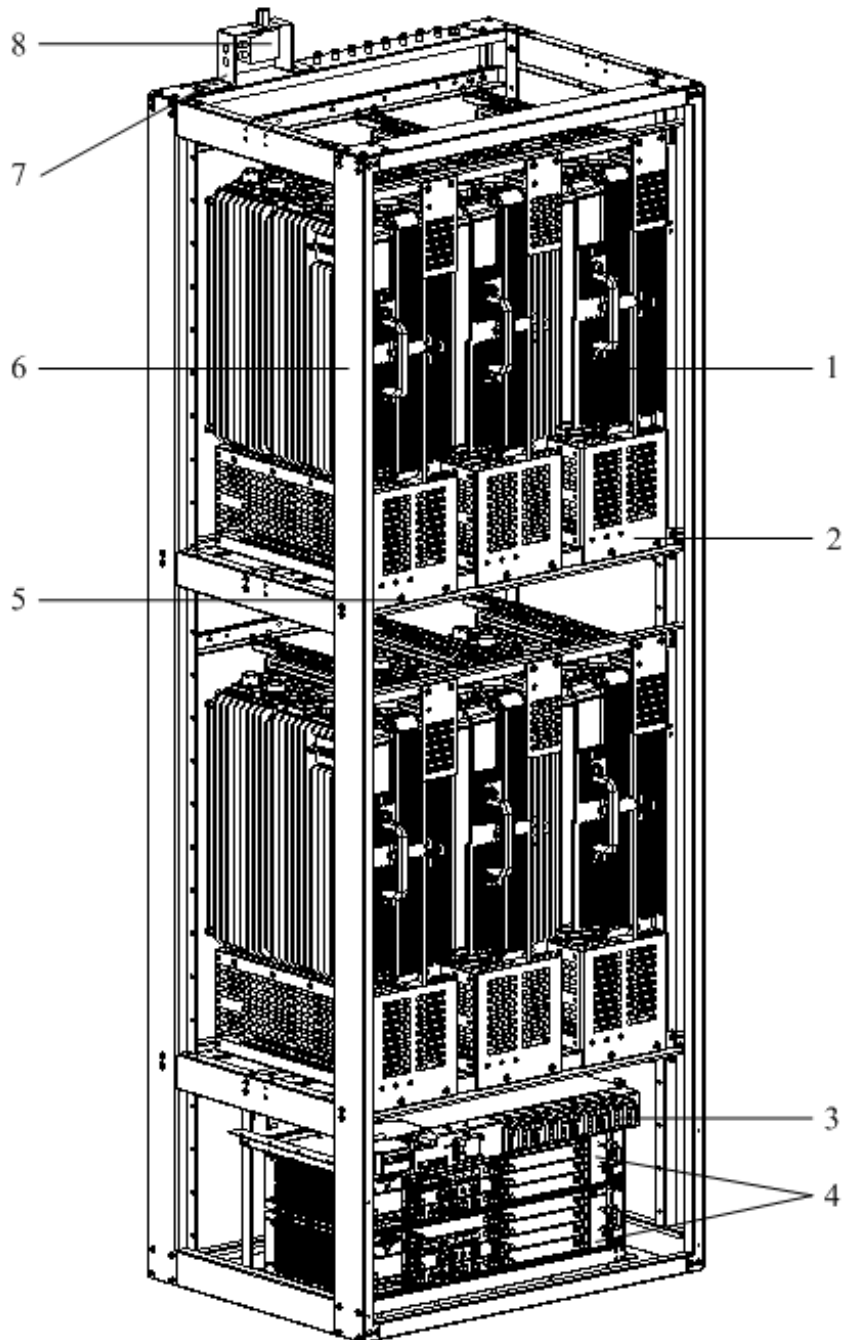
**FIGURE 143 INSIDE CABLE TO CONNECT WITH PDM**



1. Power switch
2. Connecting terminal
3. Internal cable

3. Install the PDM connected with internal cables to the simplified cabinet, as shown in [Figure 144](#).

FIGURE 144 PDM INSTALLATION TO A SIMPLIFIED CABINET



- |                                    |                             |
|------------------------------------|-----------------------------|
| 1. ZXSDR R8860 C806                | 5. Pan screw M6×16          |
| 2. ZXSDR R8860 C806 fixation shelf | 6. Simplified cabinet shelf |
| 3. PDM                             | 7. GPS arrester rack        |
| 4. ZXSDR B8200 C100                | 8. GPS arrester             |

4. Install the power cables of BBU and RRU. The power cable carries fasteners by itself, installed at a bayonet of PDM back, as shown in [Figure 145](#).

**FIGURE 145 BBU AND RRU POWER CABLE INSTALLATION**

1. PDM

2. Power cable

5. Connect the other end of internal cables to -48V connecting terminal. Connect the -48V end of BBU and RRU power cables to the ON end of switches. Connect the -48VGND end to the -48VGND connecting terminal. Then screw down bolts with a screwdriver.
6. Connect the input power cable carried by PDM self to the connecting terminal.

**END OF STEPS.**

---



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# List of Glossary

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**AISG - Antenna Interface Standards Group**

**BBU - BaseBand Unit**

**VSWR - Voltage Standing Wave Ratio**