ZXSDR R8860

CDMA Remote Radio Unit-8860

Installation Manual

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LEGAL INFORMATION

Revision History

Revision No.	Revision Date	Revision Reason
R1.0	08/30/2010	First Edition
R1.1	12/30/2010	Modify Style sheetDrop the content of installing Wave TrapDrop the content of installing Sun shield
R1.2	01/20/2011	Waterproof processing must be performed on all the outdoor metal connectors of the RRUs.
R1.3	02/20/2011	Add installing PIMDC Drop the Floor Stand-mounted Installation ModeDrop the Simplified Cabinet Integrated Installation Mode

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Declaration of RoHS Compliance

To minimize the environmental impact and take more responsibility to the earth we live, this document shall serve as formal declaration that ZXSDR R8860 manufactured by ZTE CORPORATION are in compliance with the Directive 2002/95/EC of the European Parliament - RoHS (Restriction of Hazardous Substances) with respect to the following substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr (VI))
- PolyBrominated Biphenyls (PBB's)
- PolyBrominated Diphenyl Ethers (PBDE's)

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The ZXSDR R8860 manufactured by ZTE CORPORATION meet the requirements of EU 2002/95/EC; however, some assemblies are customized to client specifications. Addition of specialized, customer-specified materials or processes which do not meet the requirements of EU 2002/95/EC may negate RoHS compliance of the assembly. To guarantee compliance of the assembly, the need for compliant product must be communicated to ZTE CORPORATION in written form. This declaration is issued based on our current level of knowledge. Since conditions of use are outside our control, ZTE CORPORATION makes no warranties, express or implied, and assumes no liability in connection with the use of this information.

FCC & IC STATEMENT

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

This Class[A] digital apparatus complies with Canadian ICES-003.

Note:

Working with the equipment while in operation, may expose the technician to RF electromagnetic fields that exceed FCC rules for human exposure. Visit the FCC website at www.fcc.gov/oet/rfsafety to learn more about the effects of exposure to RF electromagnetic fields.

Changes or modifications to this unit not expressly approved by the party responsible for compliance will void the user's authority to operate the equipment. Any change to the equipment will void FCC and IC grant.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the FCC and IC Rules. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

RF Exposure Information for PMR

The product generates RF electromagnetic energy during transmit mode.

This radio is designed for and classified as “Occupational Use Only”, meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is NOT intended for use by the “General Population” in an uncontrolled environment.

This radio has been tested and complies with the FCC RF exposure limits for “Occupational Use Only”.

In addition, the product complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

1. FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
2. tAmerican National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
3. American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields– RF and Microwave.
4. The following accessories are authorized for use with this product. Use of accessories other than those (listed in the instruction) specified may result in RF exposure levels exceeding the FCC requirements for wireless RF exposure.

About This Manual

Purpose

ZXSDR R8860 is an outdoor remote RF unit. Composing an integrated BTS, ZXSDR R8860 and ZXSDR R8860 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 operation activities ZXSDR R8860.

- Engineering technicians
- Equipment installation engineers
- Equipment commissioning engineers

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:

- ZXSDR R8860 hardware structure
- Basic software knowledge

What is in This Manual

This manual contains the following chapters:

Chapter	Summary
Chapter 1 Safety Description	Describes safety precautions during ZXSDR R8860 installation or operation maintenance as well as meanings of various safety symbols.
Chapter 2 Installation Overview	Describes the ZXSDR R8860 installation flows and installation precautions.
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	Summary
Chapter 6 Hardware Installation Inspection	Describes the inspection methods of cabinet and cables after installation completion.
Chapter 7 Power on and off	Describes the methods and precautions of ZXSDR R8860 power on and off .

Conventions

ZTE documents employ the following typographical conventions.

Typeface	Meaning
Italics	References to other Manuals and documents.
“Quotes”	Links on screens.
Bold	Menus, menu options, function names, input fields, radio button names, check boxes, drop-down lists, dialog box names, window names.
CAPS	Keys on the keyboard and buttons on screens and company name.
	Note: Provides additional information about a certain topic.
	Checkpoint: Indicates that a particular step needs to be checked before proceeding further.
	Tip: Indicates a suggestion or hint to make things easier or more productive for the reader.

Mouse operation conventions are listed as follows:

Typeface	Meaning
Click	Refers to clicking the primary mouse button (usually the left mouse button) once.
Double-click	Refers to quickly clicking the primary mouse button (usually the left mouse button) twice.
Right-click	Refers to clicking the secondary mouse button (usually the right mouse button) once.

Contents

Chapter 1
Safety Description

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1.1 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:

- This device may not cause harmful interference.
- 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.

The equipment is intended for installation in RESTRICTED ACCESS LOCATIONS.

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 4m between the radiator& your body.

1.2 Safety Symbols

Table 1-1 lists safety symbols. They are to prompt the user of the safety precautions to be observed during ZXSDR R8860 operation and maintenance.

Table 1-1 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.

1.3 Safety Instructions

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

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 devices.

  → 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 objects 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 of shutting off power supply before installing or disconnecting a power cable.

→ Before connecting the power cable, make sure that the connecting cable and its label are appropriate for the actual installation requirements.

- **Drilling Holes**

 **Warning!**

It is not allowed to drill chassis holes without permission.

→ Unqualified drilling could damage wiring and cables inside the chassis. Additionally, metal pieces inside the chassis created by the drilling could result in a short circuit. Use insulation protection gloves and first move cables inside a chassis away when drilling is necessary on a chassis.

→ 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

Caution!

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 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.
- The antistatic wrist strap used must be subject to regular check. Do not replace the cable of an antistatic wrist strap with any other cables.
- Do not contact static-sensitive modules 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.
- Modules should only contact materials such as an antistatic bag. Keep modules 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 module near a strong DC magnetic field, such as the cathode-ray tube of a monitor. Keep the module at least 10 cm away.

Hoisting Heavy Objects

Warning!

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

- Ensure the hoister can meet hoisting requirements when disassembling heavy equipment, or moving and replacing equipment.
- The installation personnel 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.

Unplugging/Plugging a Module

- Never plug a module with excessive force, to ensure that the pins on the backplane do not get deformed.
- Plug the module right into the slot and make sure module circuit faces do not contact each other lest any short circuit may occur.
- Keep hands off the module circuit, components, connectors and cable trough when holding a module.

Rack Mount Safety Instructions

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Other Safety Instructions

Note:

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

- Perform an airtight test before RRU delivery, and prohibit disassembling the RRU on site.

- 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.
- Due to that RRU is in high temperature during running, the RRU should be installed in some regions out of operators' reach or strictly restricted.
- Contact ZTE office if you have any question, to ensure your safety.

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Chapter 2
Installation Overview

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2.1 Components to be Installed

For ZXSDR R8860, the following components will be installed:

- ZXSDR R8860 cabinet and components

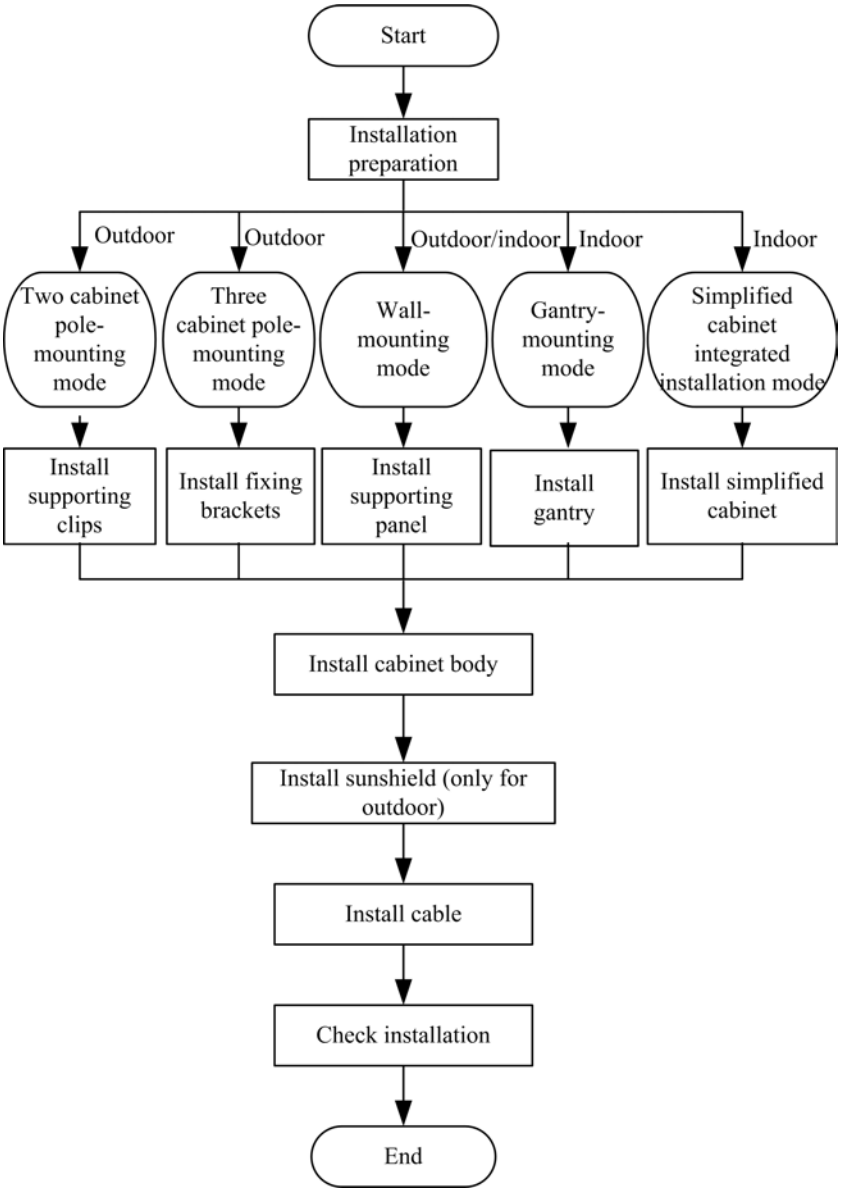
> **Note:**
>
> The inner cables and functional modules/boards in the cabinet are already installed before equipment delivery.

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

2.2 Installation Flow

The installation flow of ZXSDR R8860 is demonstrated in Figure 2-1 . However, it is not required to strictly follow the steps showed in this flow. The actual installation procedures depend on the requirements on site.

Figure 2-1 Installation Flow



2.3 Installation Preparation

2.3.1 Engineering Condition Inspection

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
  1. 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.
  2. 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.

2.3.2 Tools and Instruments Preparation

Table 2-1 shows tools and meters list required during installation.

Table 2-1 Tool and Meter List

Cate-gory	Name	Example
Special-purpose tools	One feeder connector knife	
	One 75 Ω coaxial cable stripper	
	One multi-functional crimping pliers	
	One multimeter	
	One standing wave ratio tester	
	One earth resistance tester	
Punch-ing tools	One electric percussion drill	
	Several auxiliary percussion drill bits	

Cate-gory	Name	Example
	One vacuum cleaner	
	Power connector board (providing at least 3 two-phase sockets and 3 three-phase sockets, with the current capacity larger than 15 A)	
General-purpose tools	Cross screwdrivers (4”, 6” and 8” each)	
	Flathead screwdrivers (4”, 6” and 8” each)	
	Adjustable wrenches (6”, 8”, 10” and 12” each)	
	Dual-purpose wrenches (17” and 19” each)	
	One set of socket wrenches	
	One paper knife	
	5 kg nail hammer	
	One 300 W iron and one 40 W iron	

Cate-gory	Name	Example
	One set of inner-hexagon wrench	
	Solder wires	
Mea-sure-ment tools	One 50 m (164 feet) tape measure	
	One 5 m (16 feet) steel tape	
	One angle instrument	
	One compass	

Cate-gory	Name	Example
	One level bar	
	One plumb	
Protec-tion tools	Antistatic wrist strap	
	slip-proof gloves	
	Safety helmet	
Clamp tools	One hacksaw (with several saw blades)	
	One pair of sharp-nose pliers (8″)	
	One pair of diagonal pliers (8″)	
	One pair of round-nose pliers (8″)	
	One pair of vices (8″)	

Cate-gory	Name	Example
	One set of needle files (medium-sized)	
	Nippers	
	One paint brush	
	One pair of scissors	
	One hot air blower	
	One solder removal tool	
	One hydraulic crimper	
	One crowbar	
Auxiliary tools	Pulley set	
	Rope	

Category	Name	Example
	Ladder	
Meters	Spectrum analyzer (required in certain special cases)	
	BTS tester	
	Field strength tester (required in certain special cases)	

2.3.3 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*

2.3.4 Unpacking Acceptance

2.3.4.1 Counting Goods

Context

The representative of customer and the project supervisor must be present on site when counting received goods. If either party is not present, transporter must be responsible for the intactness of the goods.

Steps

1. Check the Delivery Checklist of ZTE Corporation. Check the total number of the goods and the intactness of the packing boxes. Check the packing list to see if the place of arrival is the actual installation place. If the goods are intact, unpack and inspect them.

   NOTE **Note:**

   It is recommended to unpack the goods about 30 minutes after receipt, because there is a possibility of moisture content due to temperature variations.

2. The equipment inspection list and *unpacking acceptance report* are present in the first packing carton. Firstly, open first the 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, fill in the *Unpacking Acceptance Feedback Table* and contact ZTE promptly.

   – End of Steps –

2.3.4.2 Crate Unpacking

Prerequisites

Prepare the appropriate tools such as straight screwdriver, pliers, and crowbar.

Context

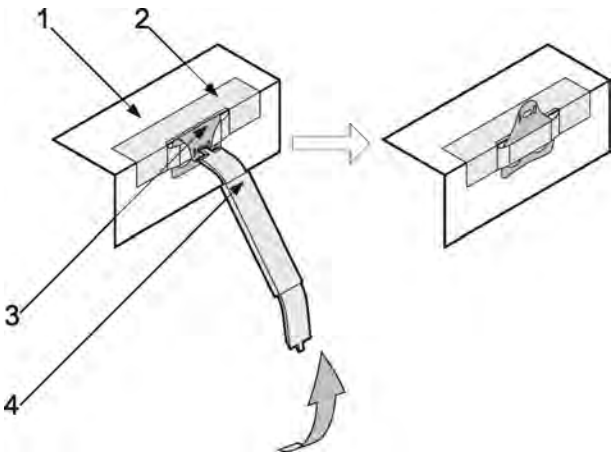
Perform the following steps to open the crate:

Steps

1. Insert a flathead screwdriver or nail hammer into the metal latch of the cover board of the crate, and move the flathead screwdriver or nail hammer to loosen the iron sheet.

Then use the crowbar or pincers to put the metal latch in the straight direction, as shown in Figure 2-2.

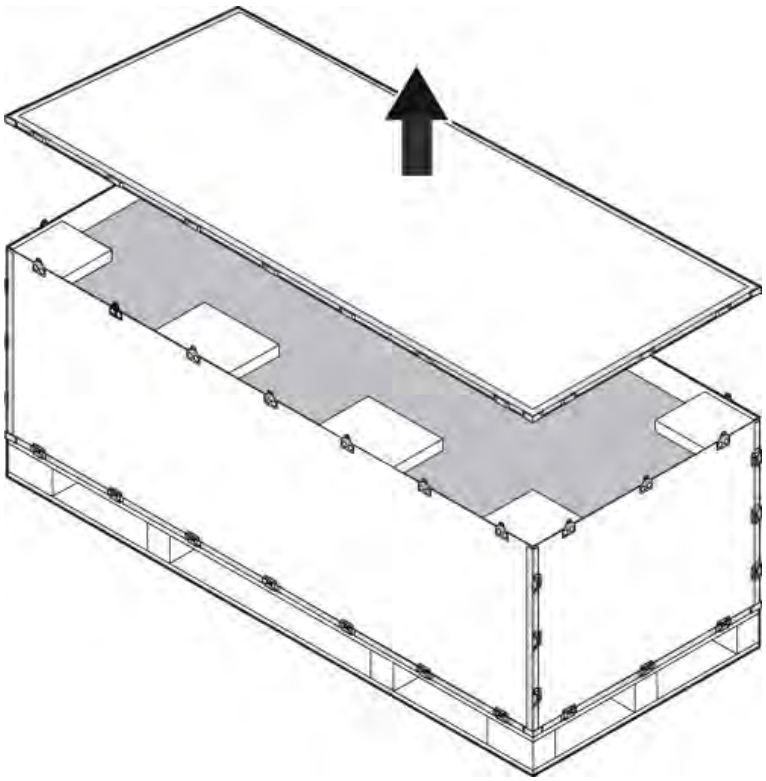
Figure 2-2 Putting the Mental Latch in Straight Direction



1. Mental sheet
2. Cover board
3. Mental latch
4. Flathead screwdriver or nail hammer

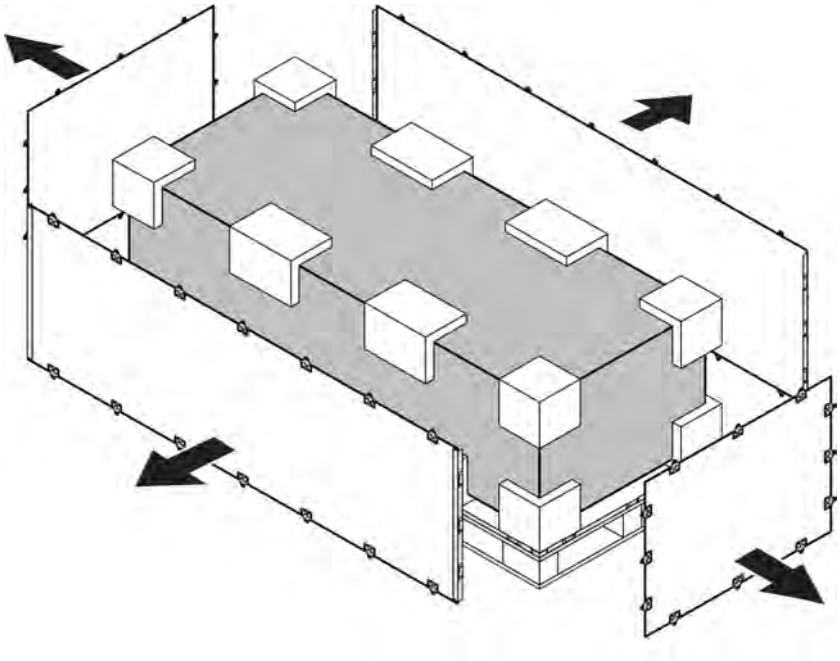
2. Use the tools to put all the metal latches on the cover board of the crate, and then remove the cover board of the crate, as shown in Figure 2-3.

Figure 2-3 Removing Cover Board



3. Put the other metal latches on the four sides of the crate, remove the boards and take out the equipment from the crate, as shown in Figure 2-4.

Figure 2-4 Removing Other Boards



– End of Steps –

2.3.4.3 Carton Unpacking

Prerequisites

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

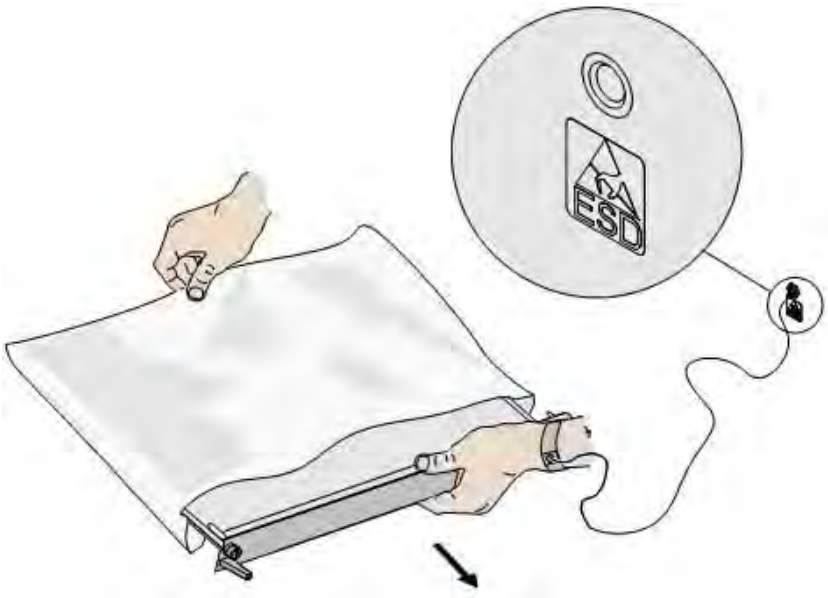
Context

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.
5. Take out the antistatic packing bag.
6. Open the antistatic packing bag to take out the electronic equipment components, as shown in Figure 2-5.

Figure 2-5 Taking Out Component with an Antistatic Wrist Strap



NOTE **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 –

2.3.4.4 Goods Acceptance and Handover

Context

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

Steps

1. **Acceptance**
   Based on the name, category and number mentioned on the shipping list, carefully check the goods piece by piece. Make sure that all goods meet the following conditions:
   a. There is no bubbly, peeling, nick and filth mark on the surface of the chassis.
   b. The oil paint on the chassis surface is intact.
   c. All clamping screws are tight and intact.

d. All components are properly installed in position.

e. The inspected goods are placed by category.

2. **Handover**

After completing the unpacking procedure, representative of customer and project supervisor should approve and sign the *Unpacking for Inspection Report*. Both parties should have a copy of Unpacking for Inspection Report.

– End of Steps –

Chapter 3
Cabinet Installation

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3.1 Engineering Indices

Table 3-1 describes the engineering indices of ZXSDR R8860.

Table 3-1 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 ℃ to 55 ℃-40 ℉ to 131 ℉
Work Humidity	5% RH ~ 95% RH
Power Consumption of Normal Work Under -48V DC Power Supply	● 1 Carrier → Output Power: 20W/C/S → Power Consumption: 160 W ● 2 Carrier → Output Power: 20W/C/S → Power Consumption: 200 W ● 3 Carrier → Output Power: 20W/C/S → Power Consumption: 250 W

The technical indices of the indoor DC lightning box, exemplified by JD40K085C20H2–K1Z, are listed in Table 3-2, which is subject to the actual field technical specifications for practical application.

Table 3-2 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 ℃ to 70 ℃
Working Humidity	≤ 95% RH

The technical indices of the external AC-to-DC conversion lightning box, exemplified by GPAD501M54-1A, are listed in Table 3-3, which is subject to the actual field technical specifications for practical application.

Table 3-3 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℃+65℃
Working Humidity	5%95%

3.2 Pole-mounted Installation Mode

3.2.1 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 R8860are listed inTable 3-4

Table 3-4 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 R8860are listed in Table 3-5

Table 3-5 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
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 3-6

Table 3-6 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 3-1 illustrates pole anchor clamp components. Figure 3-2 illustrates pole fixing bracket components.

Figure 3-1 Pole Anchor Clamp Components

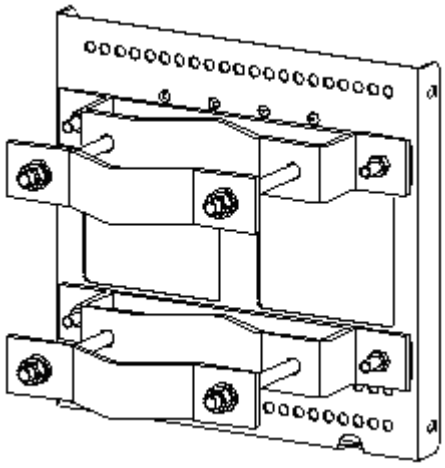
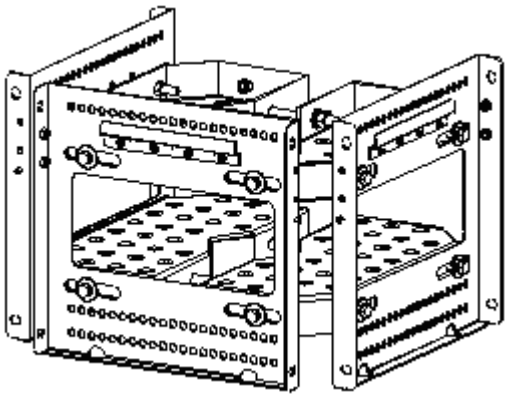


Figure 3-2 Pole Fixing Bracket Components



Note:

The pole anchor clamp components shown in Figure 3-1 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 3-5

3.2.2 Installing Single Cabinet on Pole (Pole–Mount)

Context

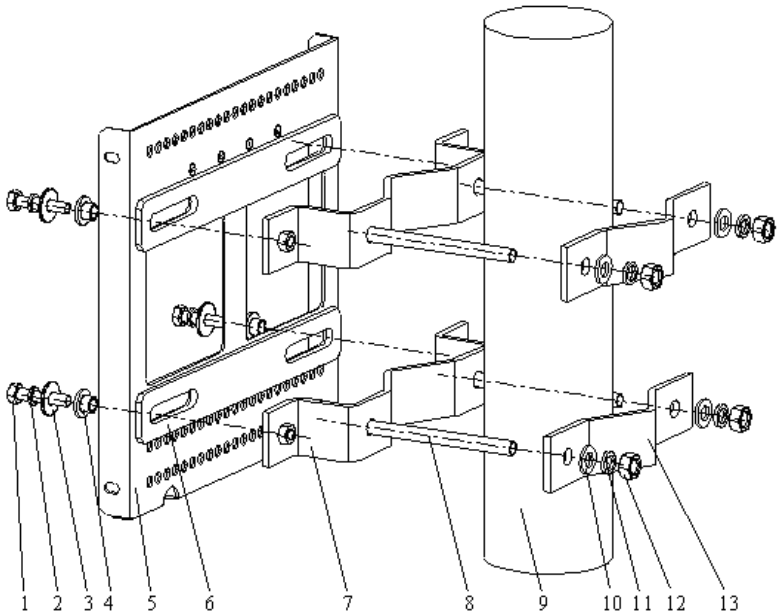
This topic describes the method to fix a single ZXSDR R8860 cabinet on a pole.

Steps

1. Install pole anchor clamp components.
   a. Fix anchor clamps onto the pole, and align the anchor clamp holes and screw the bolts a bit;
   b. Adjust the space between the clips based on the screw's position of supporting panel, and fix the supporting panel on the clips with M8 bolts and tighten it properly;
   c. Screw down M10 bolts tightly.

   Figure 3-3 illustrates the installation of anchor clamp components.

Figure 3-3 Pole-Mount Installation (1)

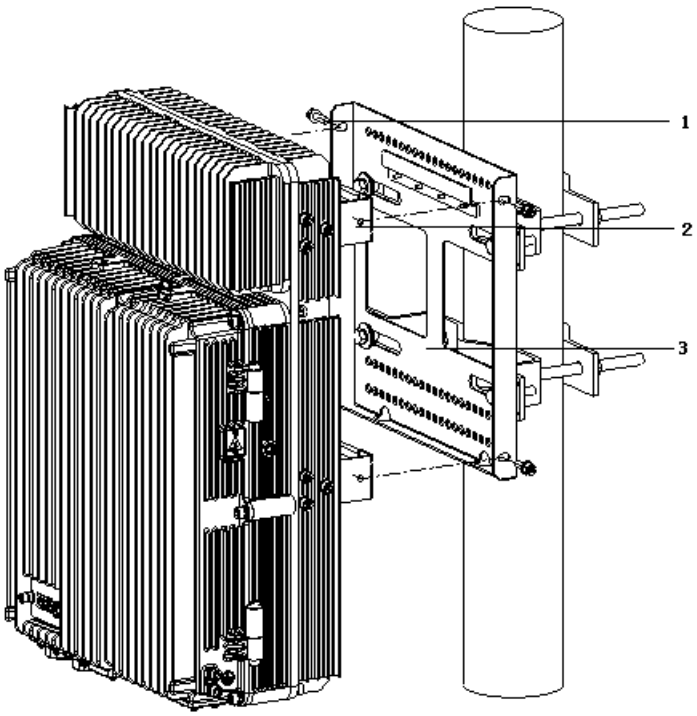


1. M8×40 hexagon head bolt
2. Standard spring washer
3. Big flat washer
4. Insulation flange

5. Supporting panel
6. Insulation board
7. Long anchor clamp
8. M10×120 hexagon head bolt (full thread)
9. Pole
10. Flat washer
11. Standard spring washer
12. I-type common M10 hexagonal nut
13. Short anchor clamp

2. Mount the ZXSDR R8860 cabinet on the supporting panel and fasten the cabinet with four M6X20 hexagon socket cap screws as shown in Figure 3-4

Figure 3-4 Pole-Mount Installation (2)



1. M6 Screw
2. Retaining board
3. Supporting panel

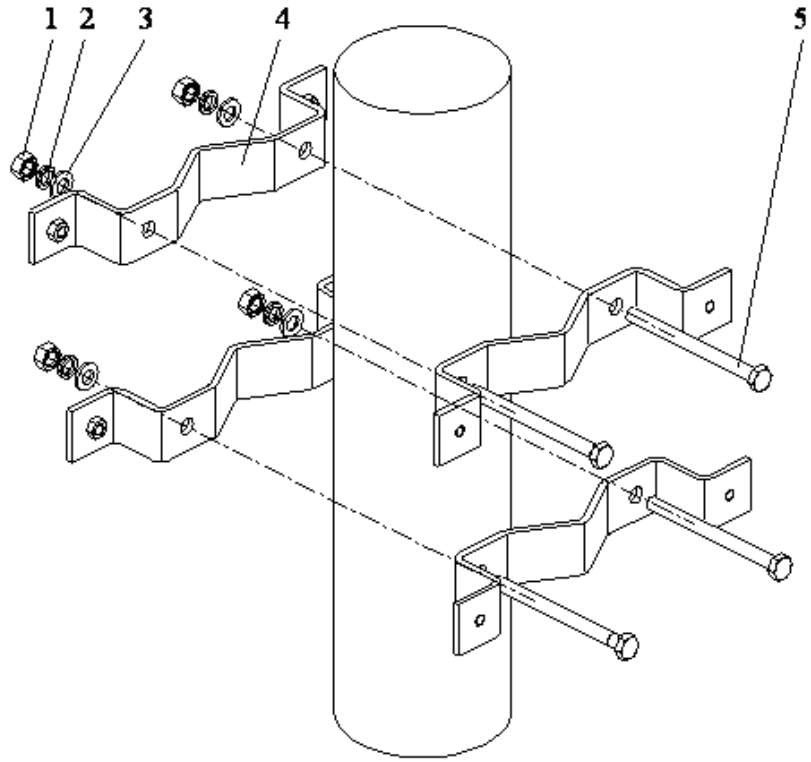
– End of Steps –

3.2.3 Installing Two ZXSDR R8860 Pole-mount Cabinets

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 3-5.

Figure 3-5 Pole-mount Installation (1)



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

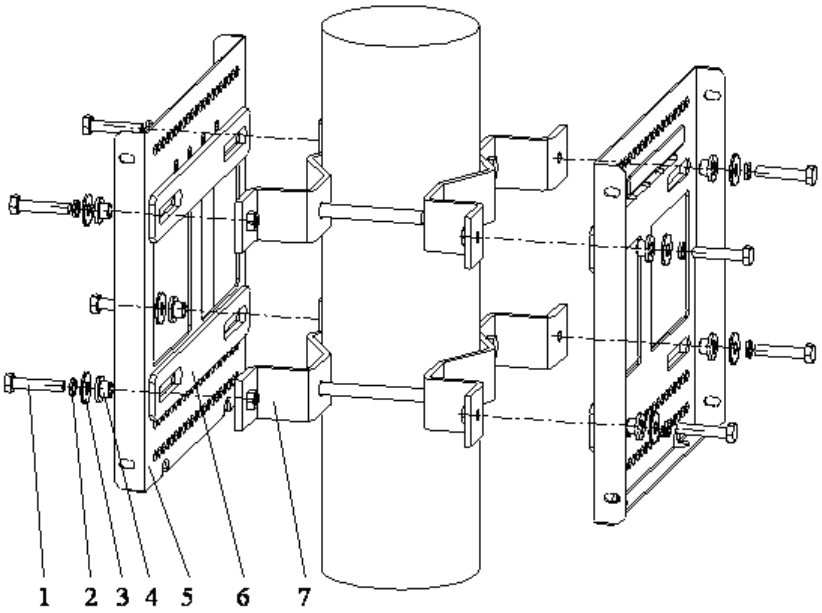
Tip:

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 3-6.

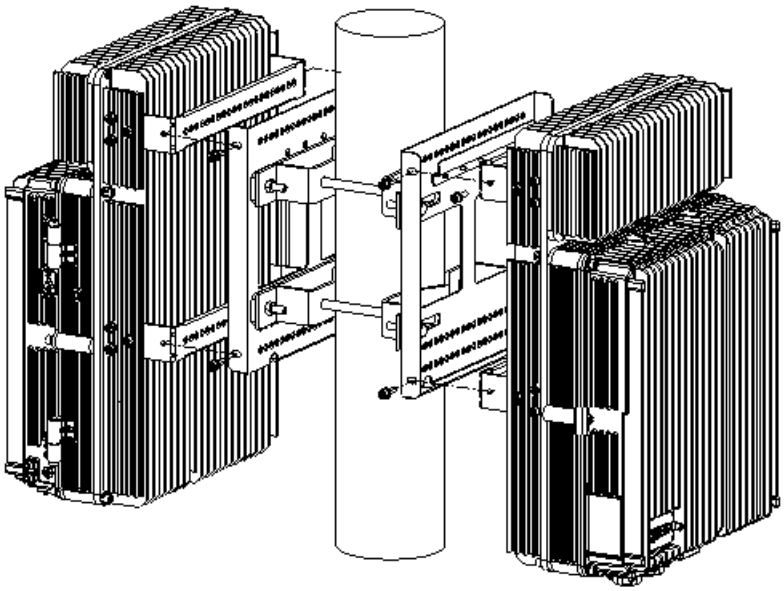
Figure 3-6 Pole-mount Installation (2)



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

3. Mount the two ZXSDR R8860 cabinets on the supporting panel and fasten the cabinet with four M6×20 hexagon socket cap screws as shown in Figure 3-7.

Figure 3-7 Pole-mount Installation (3)



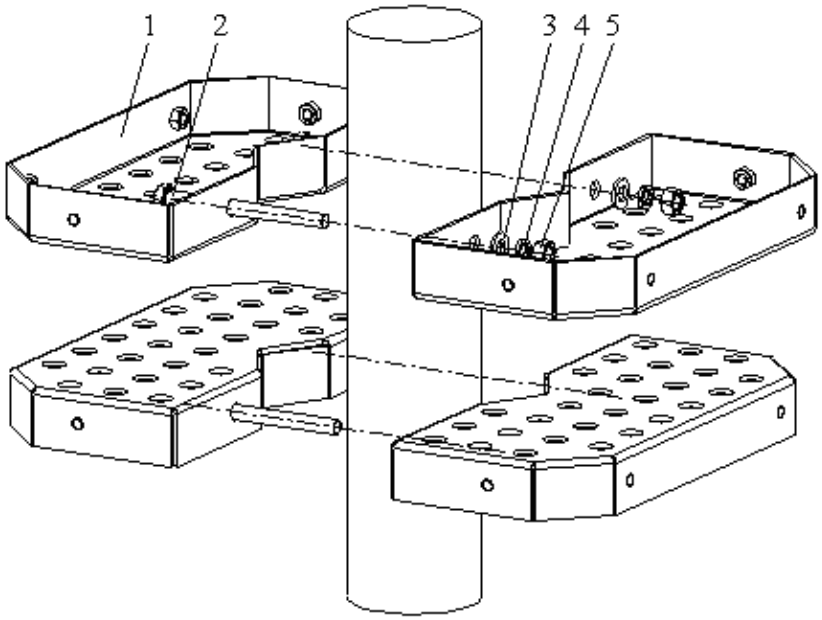
– End of Steps –

3.2.4 Installing Three ZXSDR R8860 Cabinets on Pole

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 3-8.

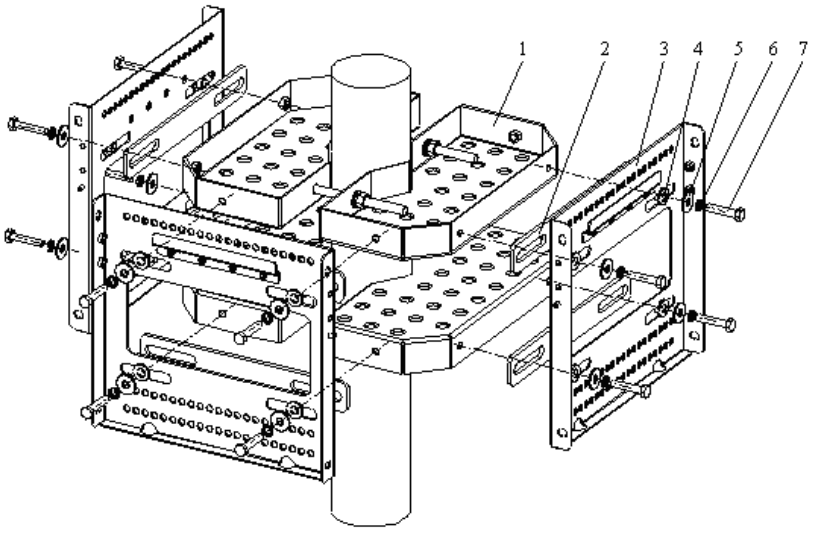
Figure 3-8 Pole-mount Installation (1)



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

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 3-9. Fix three supporting panels on the fixing brackets with M8 bolts. Screw the fixing brackets with M10 bolts.

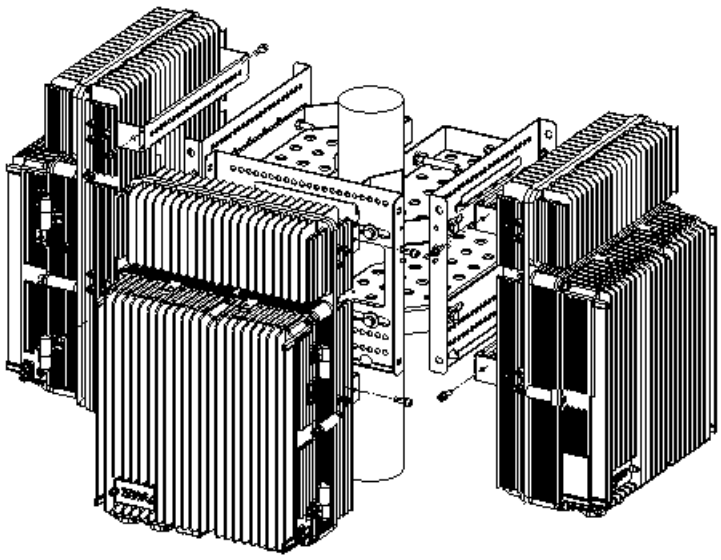
Figure 3-9 Pole-mount Installation (2)



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

3. Mount the ZXSDR R8860 cabinets on the supporting panels and fasten the cabinets with M6×20 hexagon socket cap screws as shown in Figure 3-10.

Figure 3-10 Pole-mount Installation (3)



Tip:

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

– End of Steps –

3.3 Wall-mounted Installation Mode

3.3.1 Components Used in Wall-Mount Installation

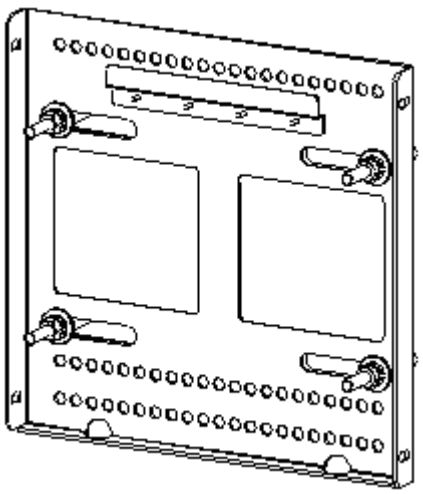
The components used in wall-mount installation are listed in Table 3-7

Table 3-7 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 3-11 . The hole marking design template is shown in Figure 3-12.

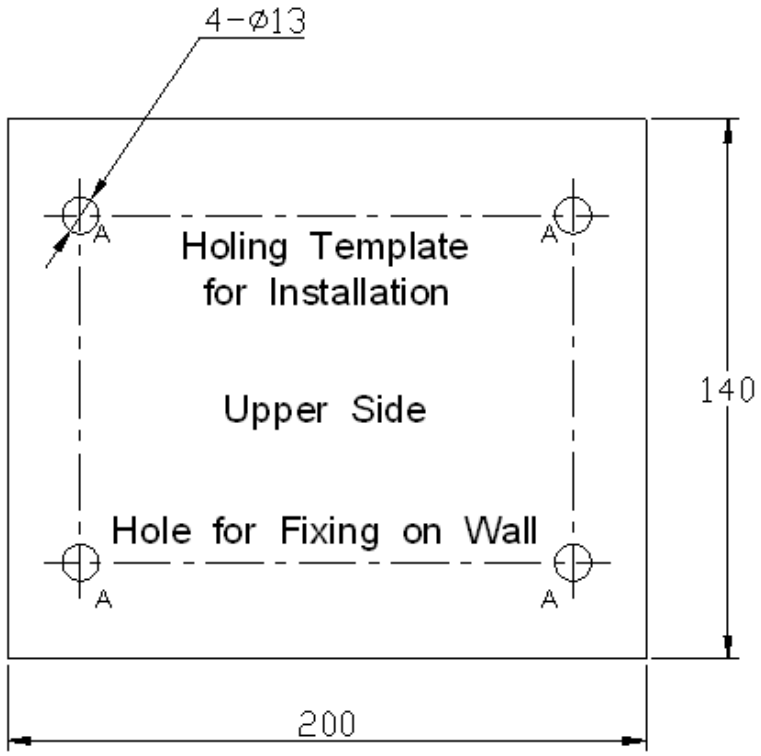
Figure 3-11 Supporting Panel



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 3-12 Hole Marking Design Template (Unit: mm)

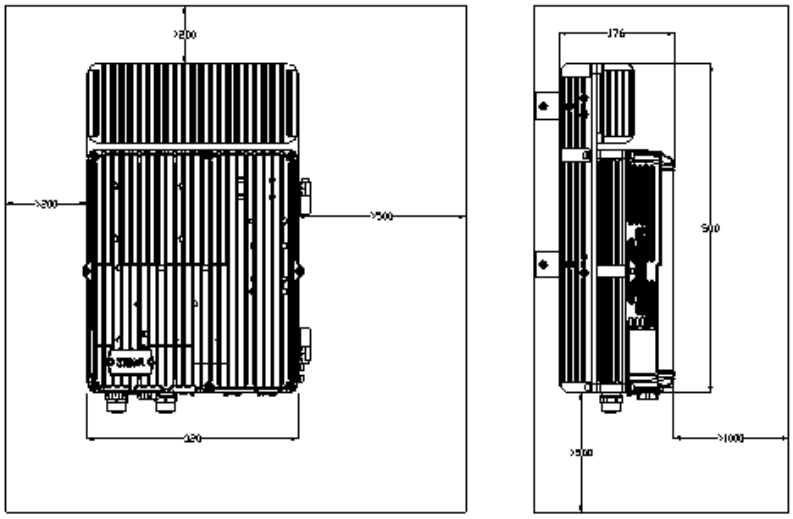


3.3.2 Installing Cabinet on Wall (Wall-Mount)

Context

Figure 3-13 illustrates the space requirement (Unit: mm) for wall-mount installation.

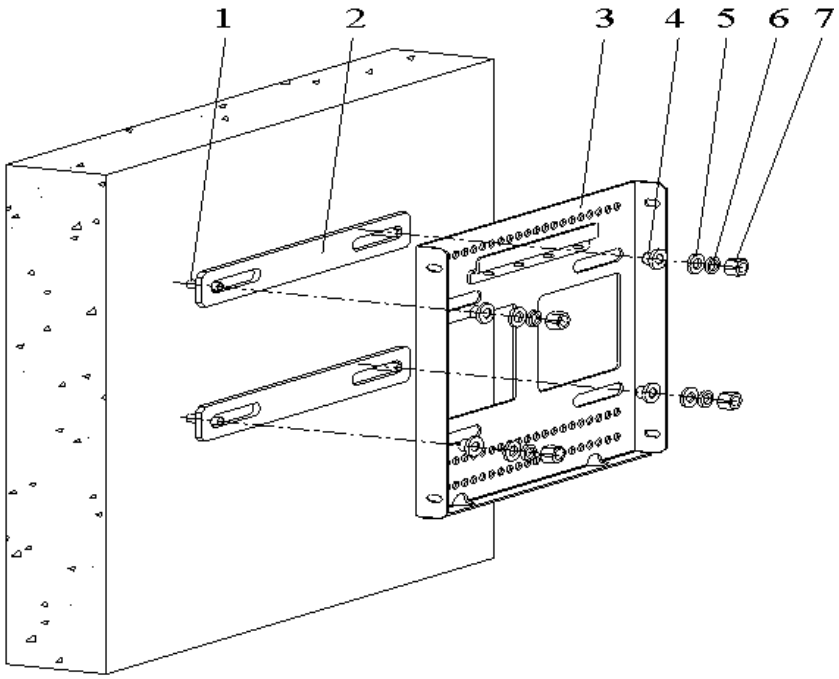
Figure 3-13 Space Requirement for Wall-mount Installation (Unit: mm)



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 3-14

Figure 3-14 Supporting Panel Installation on Wall

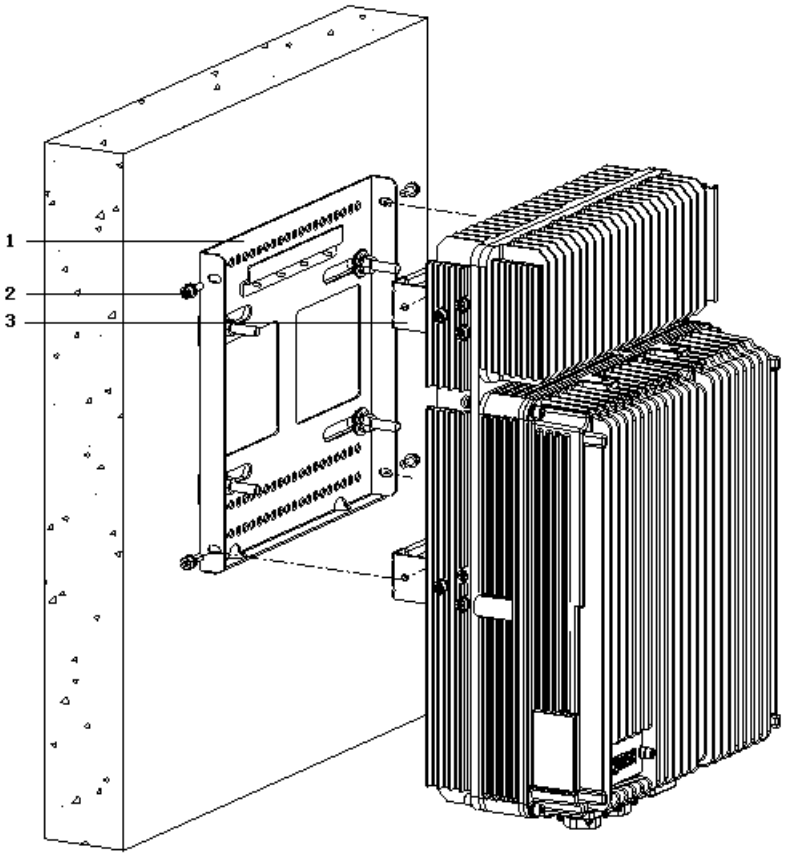


1. M8×80 expansion bolt
2. Insulation board
3. Supporting panel
4. Insulation flange
5. Big flat washer 8
6. Standard spring mat 8
7. M8 nut

l

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 3-15.

Figure 3-15 Mounting Cabinet



1. Supporting panel
2. M6 safeguard screw
3. Retaining board

– End of Steps –

Chapter 4
External Cable Installation

Table of Contents

4.1 External Cable Layout

The connection relationship of ZXSDR R8860 external cables is described in Table 4-1.

Table 4-1 ZXSDR R8860 External Cable Connection Relationship

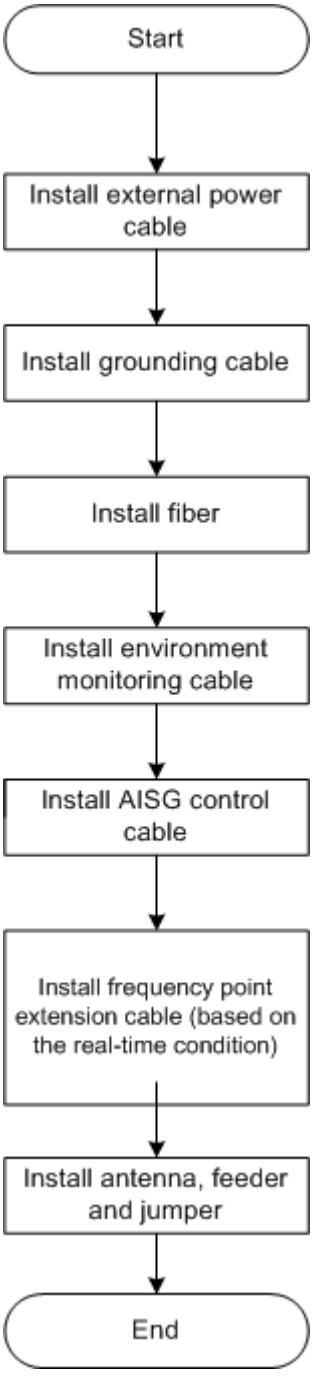
Name	Connection Relationship	Description
Power cable	Connects the ZXSDR R8860power interface (DC IN) to the power supply equipment interface	One end is the aviation plug and the other end is reserved for power cable made on site. The length of cable is based on the engineering survey.
Grounding cable	Connects one ZXSDR R8860ground 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^2. The color of grounding cable is yellow and green. Copper lugs are crimped at both ends of the ZXSDR R8860 grounding cable.

Name	Connection Relationship	Description
Optical Fiber	There are two types of ZXSDR R8860fiber: BBU connection /ZXSDR R8860 cascading.	There are two types of ZXSDR R8860optical fiber: one used in BBU connection and the other used in cascading between ZXSDR R8860s.
Environment monitoring cable	Connects the ZXSDR R8860environment 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 R8860debugging 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 theZXSDR 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).

4.2 External Cable Installation Flow

Figure 4-1 lists the installation flow of external cable. This flow can be adjusted based on the real-time condition.

Figure 4-1 External Cable Installation Flow



4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape

Overview

Waterproof processing must be performed on all the outdoor metal connectors of the RRUs. The connectors include: the grounding cable connector, feeder connector, optical fiber connector, power cable connector, and dry contact connecting cable connector.

In 1+3+3 plaster and tape waterproof processing, the waterproofing self-adhesive insulated tape (plaster for short) + electrical insulated tape (tape for short) + UV-stabilized cable fasteners on two ends are adopted. This is 1+3+3 waterproof processing, namely, 1 layer of tape + 3 layers of plaster + 3 layers of tape. Figure 4-2 shows the plaster and tape.

Figure 4-2 Appearance of the Plaster and Tape

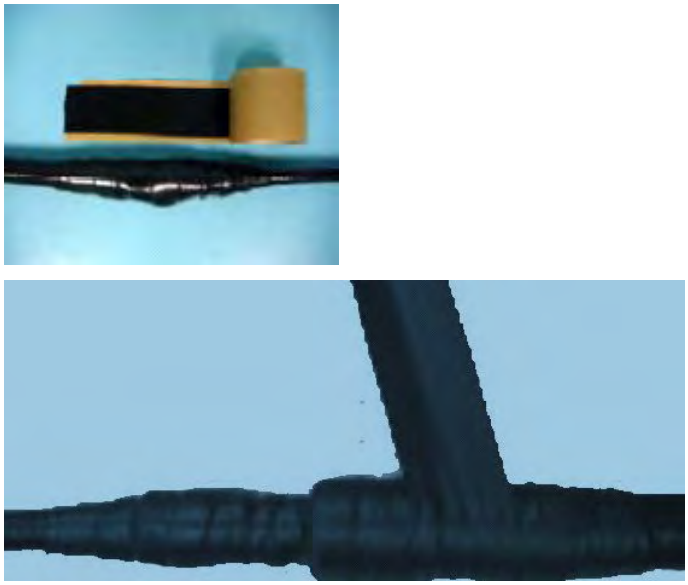
Operation Procedure

1. Clean the connectors and the part of the cable surfaces that is to be sealed.
2. To simplify removal of the 1+3+3 waterproof material as a whole in future maintenance, wrap a layer of tape with the strength of unwrapping the tape from bottom to top, overlapping each turn 50 percent, as shown in Figure 4-3.

Figure 4-3 Wrapping a Layer of Tape

3. Unwrap the plaster, and peel the paper backing. Then, extend the plaster to one to two times the original size, face the sticky side (from which side the paper backing is removed) to the connector or cable, and then apply three layers of plaster, from bottom to top, from top to bottom, and from bottom to top. Overlap each turn 50 percent. Use your fingers to mold the plaster so that the plaster between three layers is well bond, as shown in Figure 4-4.

Figure 4-4 Wrapping Three Layer of Plaster



4. With the strength of unwrapping the tape, wrap three layers of tape, from bottom to top, from top to bottom, and from bottom to top, overlapping each turn 50 percent. Use your fingers to mold the tape so that the plaster and tape are well bond, as shown in Figure 4-5.

Figure 4-5 Wrapping a Layer of Tape

5. On the two end, tightly bind UV-stabilized cable fasteners to the tape (under which there are plaster layers) to prevent removal of the tape, as shown in Figure 4-6.

Figure 4-6 Binding Cable Fasteners

Note

1. Wrap the tape with the strength of unwrapping the tape (that is, the strength of naturally unwrapping the tape). The tape should not be extended.
2. Extend the plaster to one to two times the original size while wrapping.
3. Overlap each turn of the tape and plaster at least 50 percent.
4. The directions of the plaster and tape should be the same. The direction must be good for fastening the screw. This prevents shrink of the extended plaster from loosening the connector.
5. On the two ends, overlap the plaster and tape for one turn (when changing the wrapping direction).
6. After wrapping, use your fingers to mold the plaster so that the plaster between the layers is well bond.
7. The wrapping length of the tape must be (about 10 mm) longer than that of plaster, especially on the cable end. Ensure that the plaster is over the tape so that the 1+3+3 waterproof material can be removed as a whole in future maintenance with cables undamaged.
8. After wrapping, cut the plaster and tape with the scissors or knife. Do not break the plaster or tape directly with your hands.
9. Bind the cable fasteners to the tape (under which there are plaster layers) to prevent removal of the tape or shrink of the plaster if the cable fasteners are loosened.

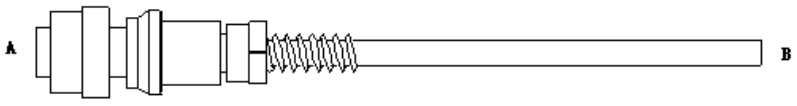
4.4 Installing Power Cable

Context

The ZXSDR R8860 cabinet adopts -48 V DC/220V AC 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 4-7 shows the structure of power cable.

Figure 4-7 Power Cable structure



The AC and DC power cables are the same in appearance but different in core color and quantity, as described in Table 4-2 and Table 4-3.

Table 4-2 Color and Specification of DC Power Cable

Color	Specification
Blue	-48V
Black	-48V GND

Table 4-3 Color and Specification of AC Power Cable

Color	Specification
Blue	N
Black or Kelly	PE
Brown	L

Steps

1. Connect End A of power cable with DC/AC IN interface located at the bottom of ZXSDR R8860.
2. Strip the protective coat of End B and connect it with the DC/AC 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.
6. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

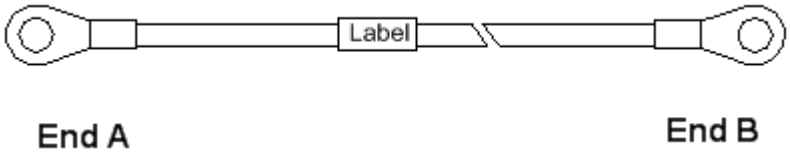
– End of Steps –

4.5 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 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 4-8.

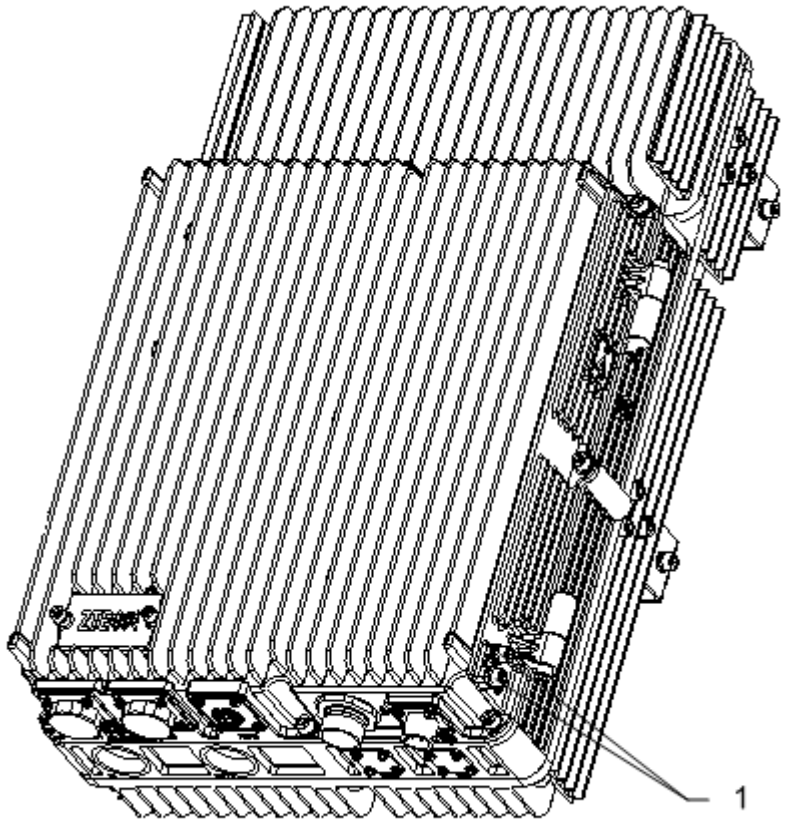
Figure 4-8 Grounding Cable Structure



Steps

1. Cover and fix a copper lug on the a grounding bolt of the ZXSDR R8860 cabinet, as shown in Figure 4-9.

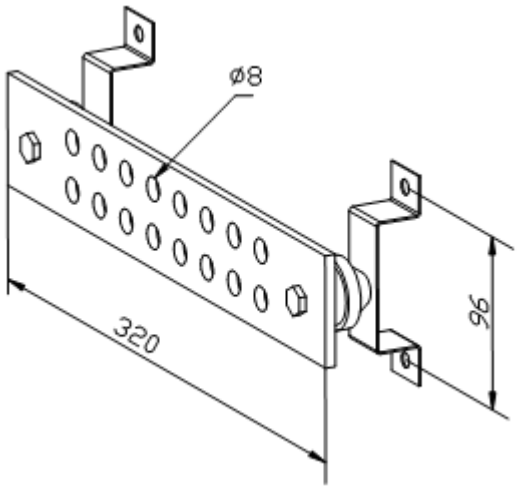
Figure 4-9 ZXSDR R8860 Grounding Bolt



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 4-10.

Figure 4-10 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 Ω.
5. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.6 Installing Fiber between BBU and RRU

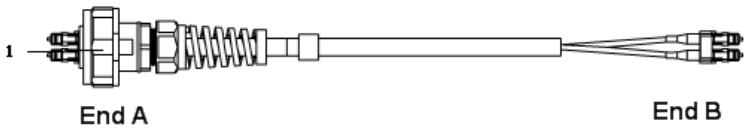
Prerequisites

The ZXSDR R8860 cabinet must be installed and fixed successfully.

Context

Figure 4-11 shows fiber connection between ZXSDR R8860 and BBU.

Figure 4-11 Fiber Connection between ZXSDR R8860 and BBU



1. Outdoor Seal Component

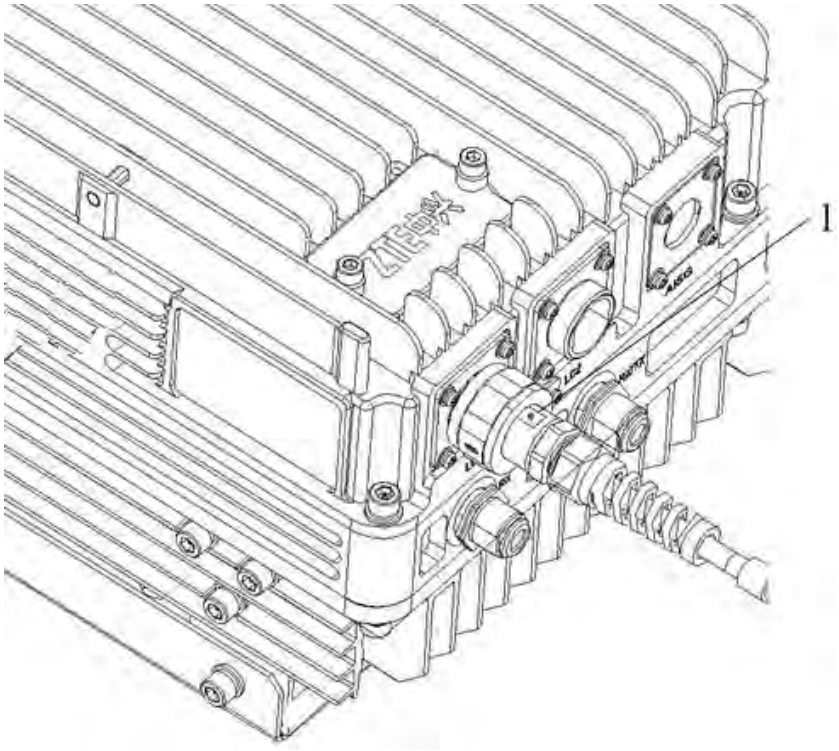
While connecting a BBU to ZXSDR R8860, make sure that the baseband RF fiber interface (LC1/2) of the ZXSDR R8860 is connected to the optical interface connector of the BBU.

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 4-12

Figure 4-12 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.
6. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.7 Installing Fiber between RRU and RRU

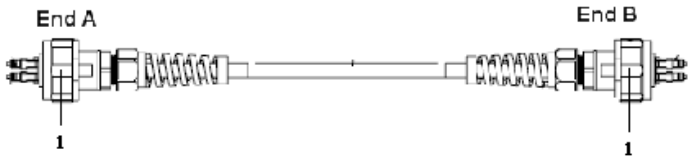
Prerequisites

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

Context

Figure 4-13 shows fiber connection between ZXSDR R8860s.

Figure 4-13 Fiber Connection between ZXSDR R8860s



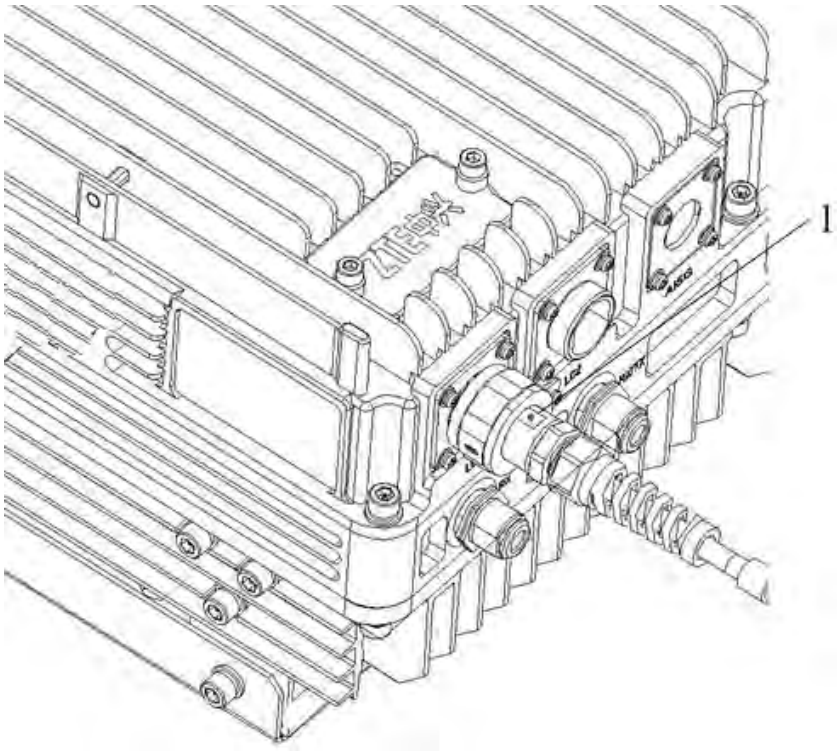
1. Outdoor Seal Component

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 4-14.

Figure 4-14 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.
5. Screw down the outdoor seal component at End A for waterproofing.

6. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.8 Installing Environment Monitoring Cable

Prerequisites

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 4-15 shows the appearance of environment monitoring cable.

Figure 4-15 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 4-16

Figure 4-16 Aviation Jack Appearance

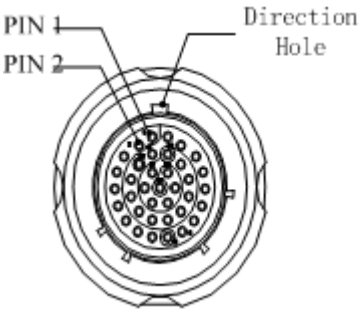


Table 4-4 describes the connector pins.

Table 4-4 Cable Pin Description

Pin	Core-Cable Color	Signal Description
15/16	White and blue/blue	Dry contact 4 -/+

Pin	Core-Cable Color	Signal Description
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.
4. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.9 Installing AISG Control Cable

Context

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

Figure 4-17 shows the structure of the AISG control cable.

Figure 4-17 AISG Control Cable Structure

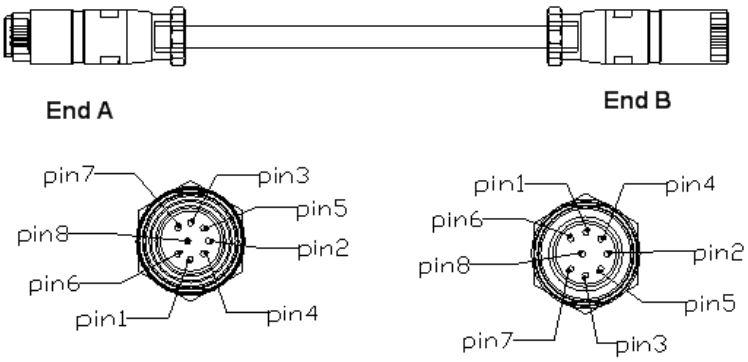


Table 4-5 describes the serial No. meaning of AISG control cable.

Table 4-5 AISG Control Cable Description

Serial No.	Name	Meaning
1	TRX_ANT_485_+	RS485+

Serial No.	Name	Meaning
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.
3. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.10 Installing Frequency Point Extension Cable

Prerequisites

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

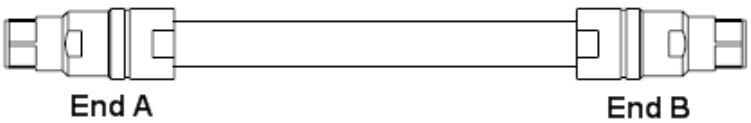
Context

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 4-18 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 4-18 Frequency Point Extension Cable



Steps

1. Connect End A of the frequency point extension cable to the frequency point extension interface RXIN of oneZXSDR 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.
4. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.11 Installing Jumper

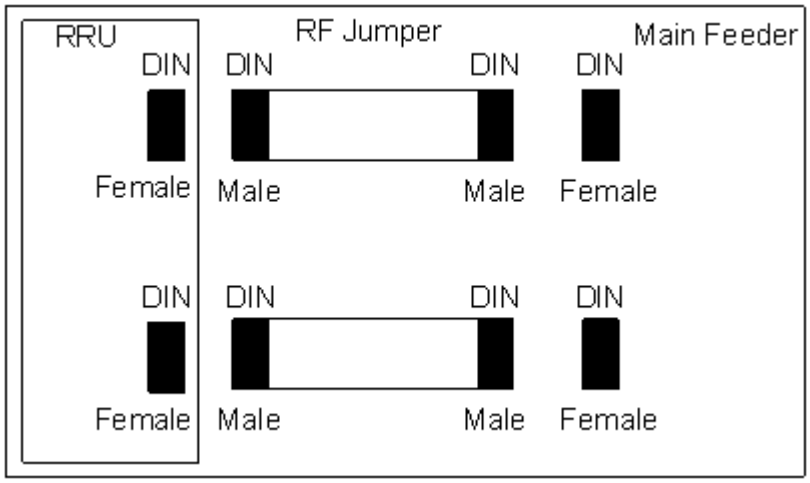
Context

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 4-19.

Figure 4-19 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.

4. Performing outdoor connector waterproof processing, refer to 4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape.

– End of Steps –

4.12 Installing PIMDC

4.12.1 PIMDC echnical Indices

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

- Breaks away from the power supply system permanently to avoid short circuit in electric network when malfunctioned or failed.
- Adopts special voltage-sensitive modules with overcurrent and overheat protection, high surge current and low residual voltage.
- Equips remote signalling alarm interface. (The remote dry contact is normally closed at normal condition . When some parts failed or power is cuted off, the remote signalling dry contact turns to be normally open from normally closed.)
- The enclosure is made of aluminum die-casting metal and its protection degree reaches the demand of IP55. It can be installed outdoor for long term use and has good flame retardance.

Engineering Technical Indices

Table 4-6 describes the engineering technical indices of PIMDC.

Table 4-6 Engineering Technical Indices of PIMDC

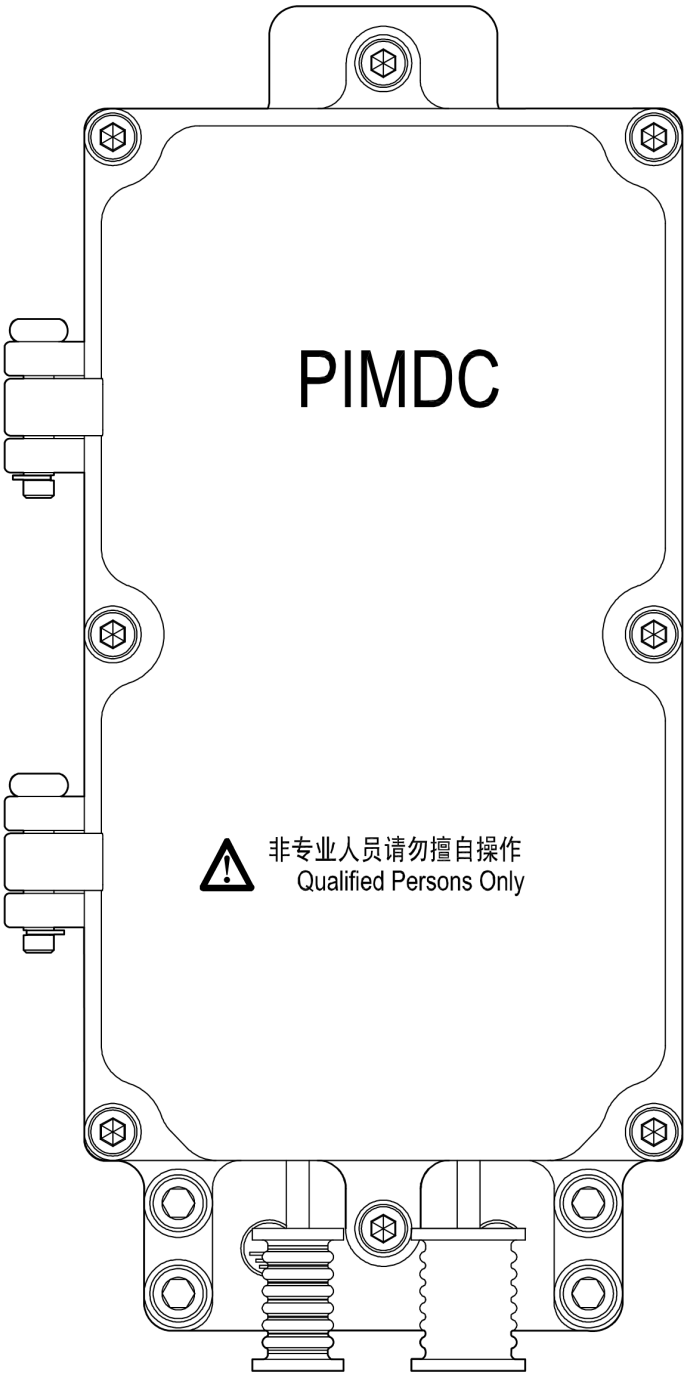
Nominal Operating Voltage Un	DC -48V	**Connection Type**	In Series
Max. Continuous Operating Voltage Uc	DC -75V	**Protection Model**	Differential and Common Mode
Nominal Discharge Current In 8/20μs	20kA	**Response Time**	≤25ns
Max. Discharge Current Imax 8/20μs	40kA	**Lead Area Clamped by the Power Connecting Terminal**	2.5mm² 10mm²
Protection Level Up In	≤180V	**Lead Area Clamped by Dry Contact Terminal**	0.15mm² 1.3mm²
Rated Load Current IL	18A	**Operating Temperature**	-40℃ +70℃
Load Side Impact Capacity 8/20μs	8kA	**Operating Humidity**	10 95 25oC
Enclosure	Die-casting Aluminum Spray Paint	**Altitude**	≤3000m

Degree of Protection	IP55	**Weight**	1.2 kg

4.12.2 PIMDC Appearance

PIMDC Appearance is shown in Figure 4-20.

Figure 4-20 PIMDC Appearance



4.12.3 PIMDC Installation Description

Inatallation

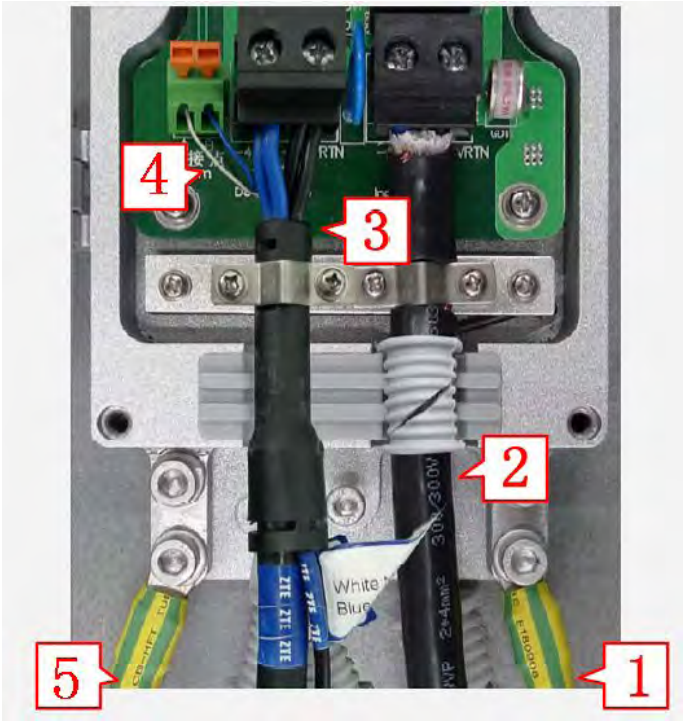
Fasten the PIMDC on one side of the ZXSDR R8860 mounting bracket using two screws, as shown in Figure 4-21.

Figure 4-21 Installing PIMDC

Connecting Cables

Open PIMDC cabinet, Connect the PIMDC cables, as shown inFigure 4-22.

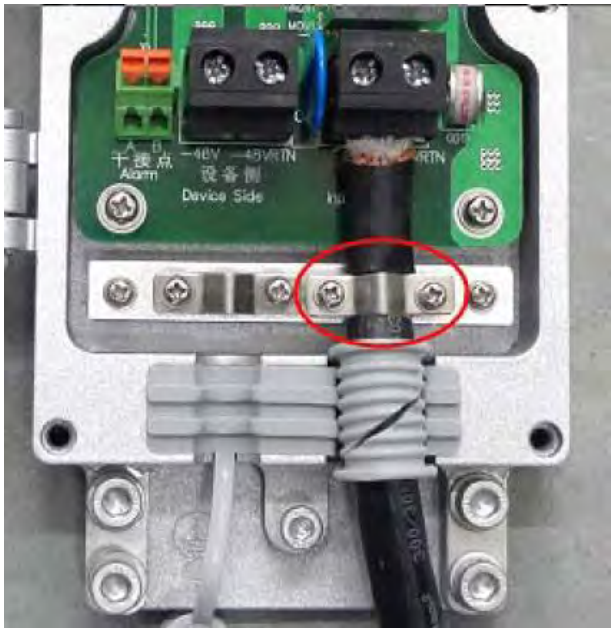
Figure 4-22 PIMDC Connection



1. Ground cable between the PIMDC and the RRU
2. Input power cable of the PIMDC
3. Input power cable of the RRU
4. Dry contact cable
5. Ground cable of the PIMDC

1. Connect ground cable of the PIMDC, the ground cable of the PIMDC is shown inFigure 4-22 "5".
2. Connect the A-end to the "Input Side" of the PIMDC through the waterproof plastic ring: connect the blue cable to -48V port and connect the black cable to -48VRTN port (the input power cable of the PIMDC is shown in Figure 4-22 "2".)
3. Fasten the power cable with a latch. Note: This latch should stay contact with the shielded layer of the power cable, as shown inFigure 4-23.

Figure 4-23 Connect Power Input Cable



4. Connect the A-end of the output power cable (as shown in Figure 4-22 "3".) to the device side on the PIMDC: connect the blue cable to -48V port and connect the black cable to -48VRTN port, as shown inFigure 4-24.
5. Connect the white and blue dry contact cables (as shown in Figure 4-22 "4".) to the "Alarm" ports, as shown inFigure 4-24.

Figure 4-24 Connecting Output Power Cable and Dry Contact Cables

6. Connect ground cable between the PIMDC and the RRU (as shown inFigure 4-22 "1") to RRU.
7. Performing outdoor connector waterproof processing, refer to *4.3 Specifications of 1+3+3 Waterproof Processing with Plaster and Tape*.

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Chapter 5
Main Antenna Feeder System Installation

Table of Contents

5.1 Main Antenna Feeder System Structure

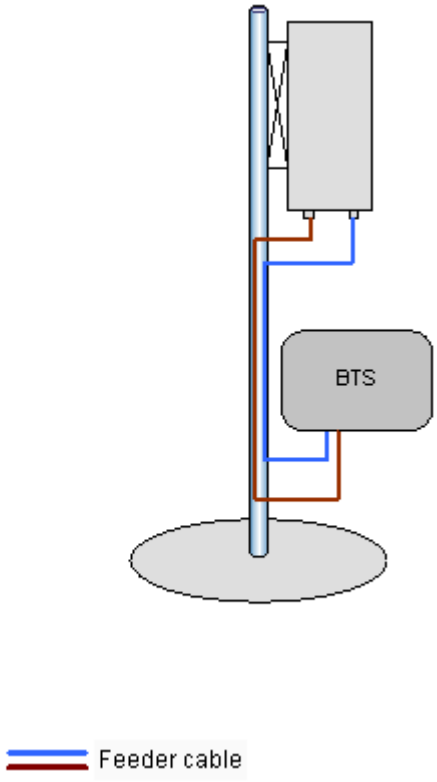
The typical configurations of ZXSDR R8860 main antenna feeder system described below includes:

- ZXSDR R8860 configured with common antenna
- ZXSDR R8860 configured with common antenna and AISG dual tower amplifier
- ZXSDR R8860 configured with electrically tuned antenna (1)
- ZXSDR R8860 configured with electrically tuned antenna (2)
- ZXSDR R8860 configured with electrically tuned antenna, AISG dual tower amplifier

ZXSDR R8860 configured 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 5-1.

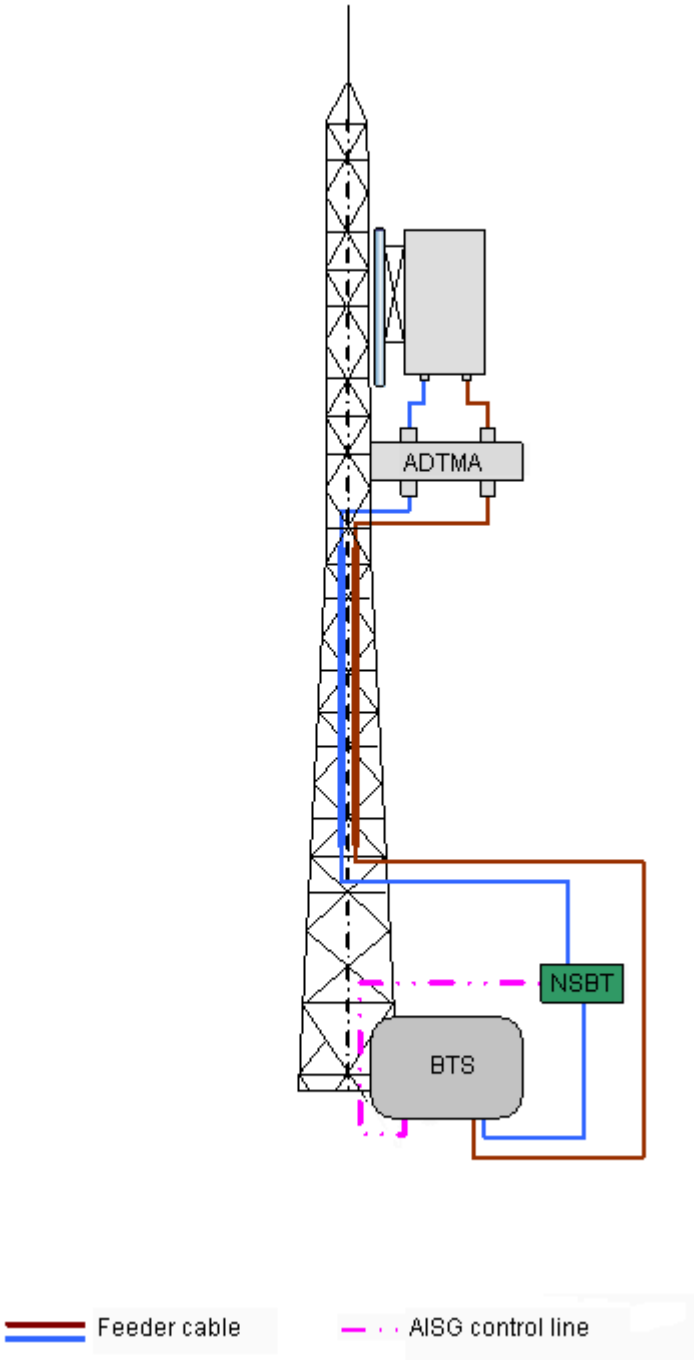
Figure 5-1 ZXSDR R8860 Configured with Common Antenna



ZXSDR R8860 configured with common antenna and AISG dual tower amplifier

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 5-2.

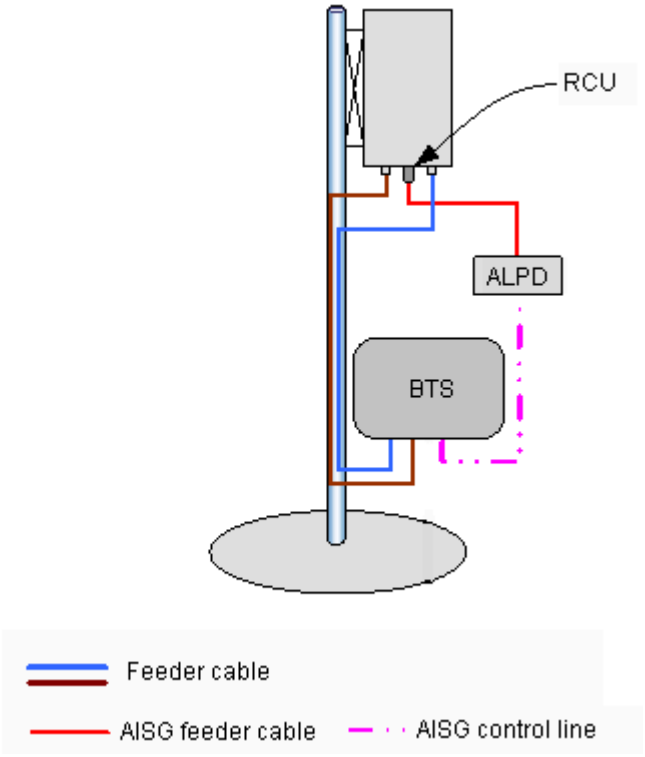
Figure 5-2 ZXSDR R8860 Configured with Common Antenna, AISG Dual Tower Amplifier



ZXSDR R8860 configured with electrically tuned 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 5-3.

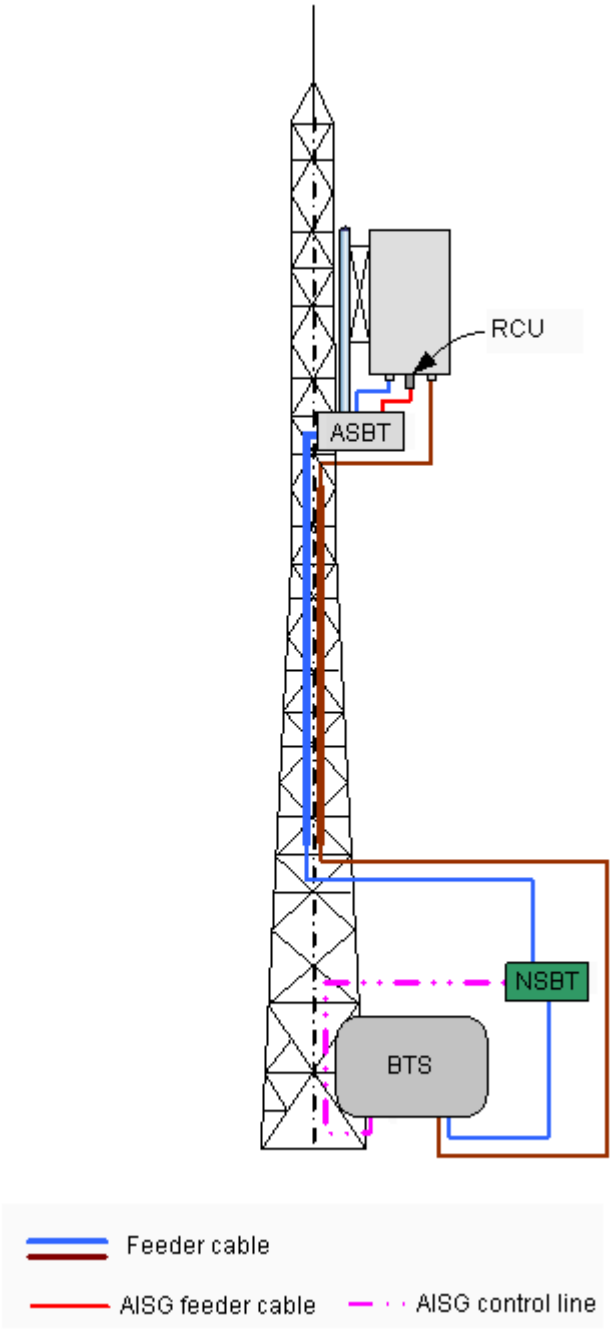
Figure 5-3 ZXSDR R8860 Configured with Electrically Tuned Antenna (1)



ZXSDR R8860 configured with electrically tuned antenna (2)

In this configuration, generally ZXSDR R8860is 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 5-4.

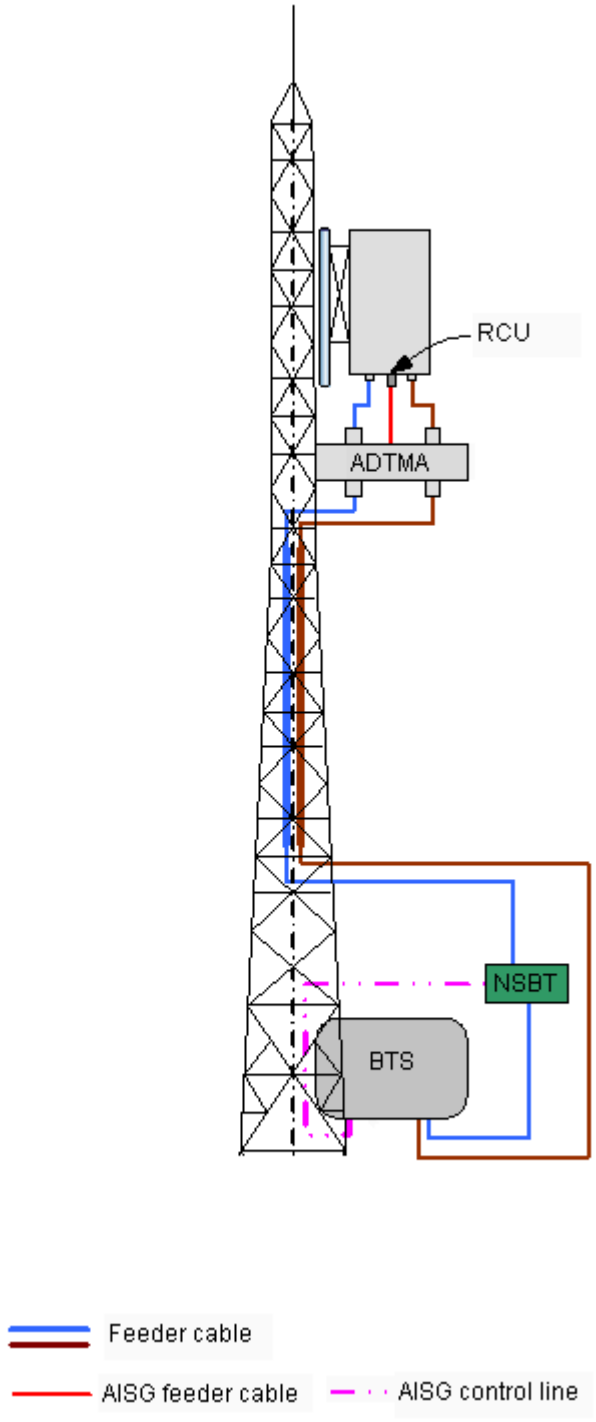
Figure 5-4 ZXSDR R8860 Configured with Electrically Tuned Antenna (2)



ZXSDR R8860 configured with electrically tuned antenna, AISG dual tower amplifier

In this configuration, generally ZXSDR R8860is 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 5-5.

Figure 5-5 ZXSDR R8860 Configured with Electrically Tuned Antenna and AISG Dual Tower Amplifier



5.2 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.

  → 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 these items accord with requirements in engineering design.

- 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 engineer need to consult with operator engineers, and determine the route of feeder.

- 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 passerby 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

  Special tools and instruments for main feeder connector making and 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

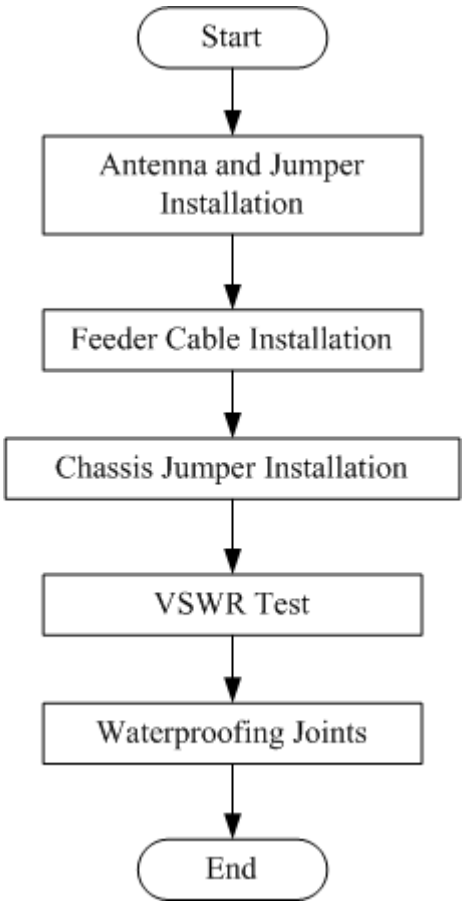
- Other tools

  Tools for lifting, e.g. Ladder

5.3 Main Antenna Feeder System Installation Flow

Figure 5-6 shows the installation flow of main antenna feeder system.

Figure 5-6 Main Antenna Feeder System Installation Flow



5.4 Antenna Installation

5.4.1 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° ~ 10°

- **Antenna direction**

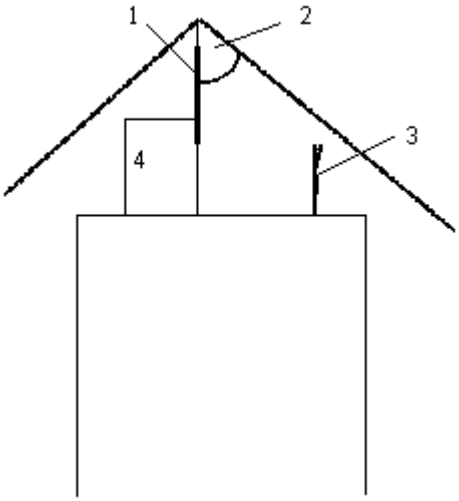
  Antenna direction depends on the antenna azimuth. If two antennas in one sector, must share the same azimuth.

5.4.2 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 5-7.

Figure 5-7 Antenna Installation Position



1. Lightning rod
2. 45° Lightning protection area
3. Antenna
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.

5.4.3 Installing Directional Antenna

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:

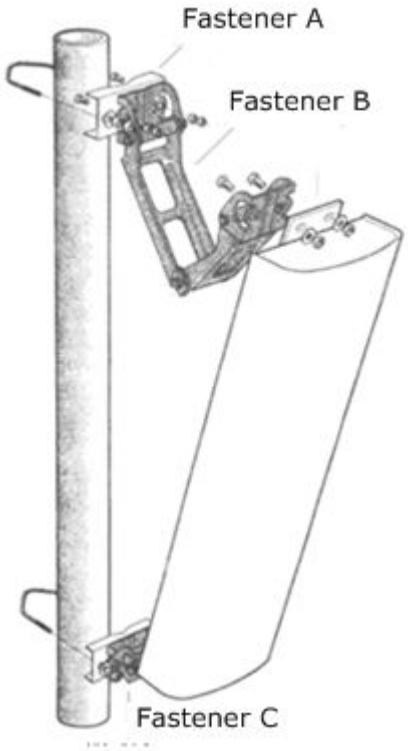
Steps

1. Firstly assemble fastener "C" onto the upper and lower ends of antenna as shown in Figure 5-8, then mount fasteners "B" and "A" to complete the initial installation of the directional antenna.

Note:

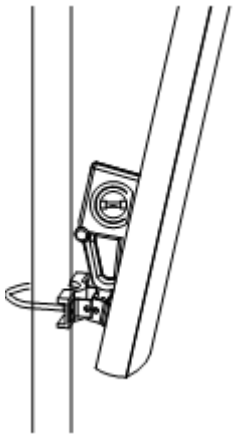
- All accessories must be installed with spring and plain washers.
- Usually the antenna fastening accessories and the angle adjustment device accessories have already been installed on the antenna before fixing into the tower.

Figure 5-8 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 slide downward.
3. Adjust the antenna's azimuth.
   a. Determine the azimuth of the antenna by using a compass, and determine the installation direction according to the engineering design drawing.
   b. Turn the antenna slightly to adjust it's face direction as shown in Figure 5-8. 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°).
   c. After adjusting the azimuth of the antenna, tighten the fastener "A".
4. Adjust the antenna's downtilt
   a. Adjust the downtilt of the measurement meter to obtain the required angle according to the engineering design.
   b. 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 5-9.

Figure 5-9 Antenna Downtilt Adjustment



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

– End of Steps –

Result

The directional antenna is installed.

5.4.4 Installing Omni Antenna

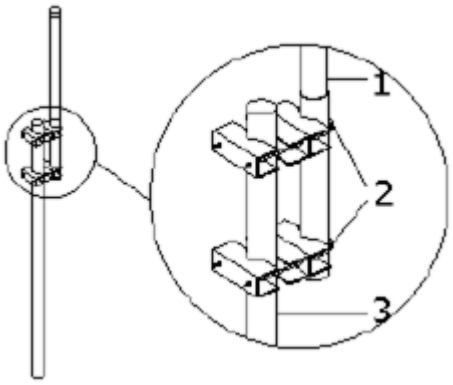
Context

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 5-10. Do not fasten the clips whether too tightly or loosely. If fastened too tight, the jacket may be damaged; if fasten too loosely, the weight-bearing and wind-resistance requirements cannot be met.

Figure 5-10 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.

5.4.5 Connecting 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. The above measures highly reduce 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.
   a. Wrap the waterproof adhesive tapes lower side of connectors. Keep wrapping direction same as the one that the jumper is tightened.
   b. 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 up to 50 mm (2 inches) away from jumper connector position.

c. Grip the tape with your hands to make the tape tightly adhered.

d. 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.

5.5 Feeder Installation

5.5.1 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 **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.

5.5.2 Installing Feeder on Top of Building

Prerequisites

The supporting pole and antenna is installed.

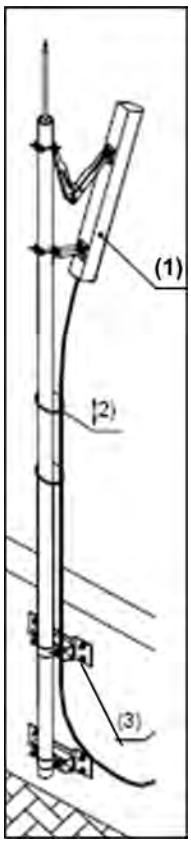
Context

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 5-11.

Figure 5-11 Feeder Fixing



1. Antenna
2. Feeder
3. Supporting clips

NOTE **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.

5.5.3 Installing Feeder on Tower

Prerequisites

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 antistatic 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.

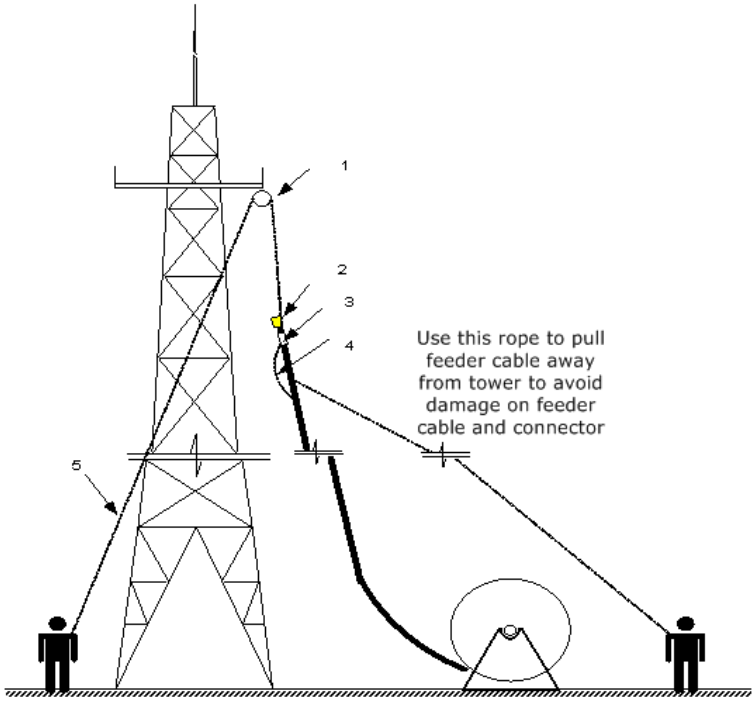
   Warning!

   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 5-12

Figure 5-12 Hoisting Feeder To Tower



1. Pulley block
2. Feeder head wrap
3. Feeder label
4. Knot position in the upward rope
5. Downward rope

– End of Steps –

Result

The feeder is hoisted on the tower successfully.

5.5.4 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).

5.5.5 Fixing Main Feeder

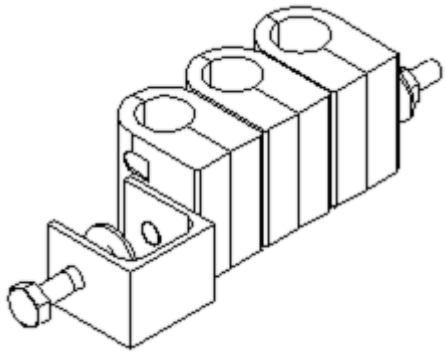
Context

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 5-13 shows the appearance of triple feeder clip.

Figure 5-13 Triple Feeder Clip Appearance



NOTE **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.

5.5.6 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:

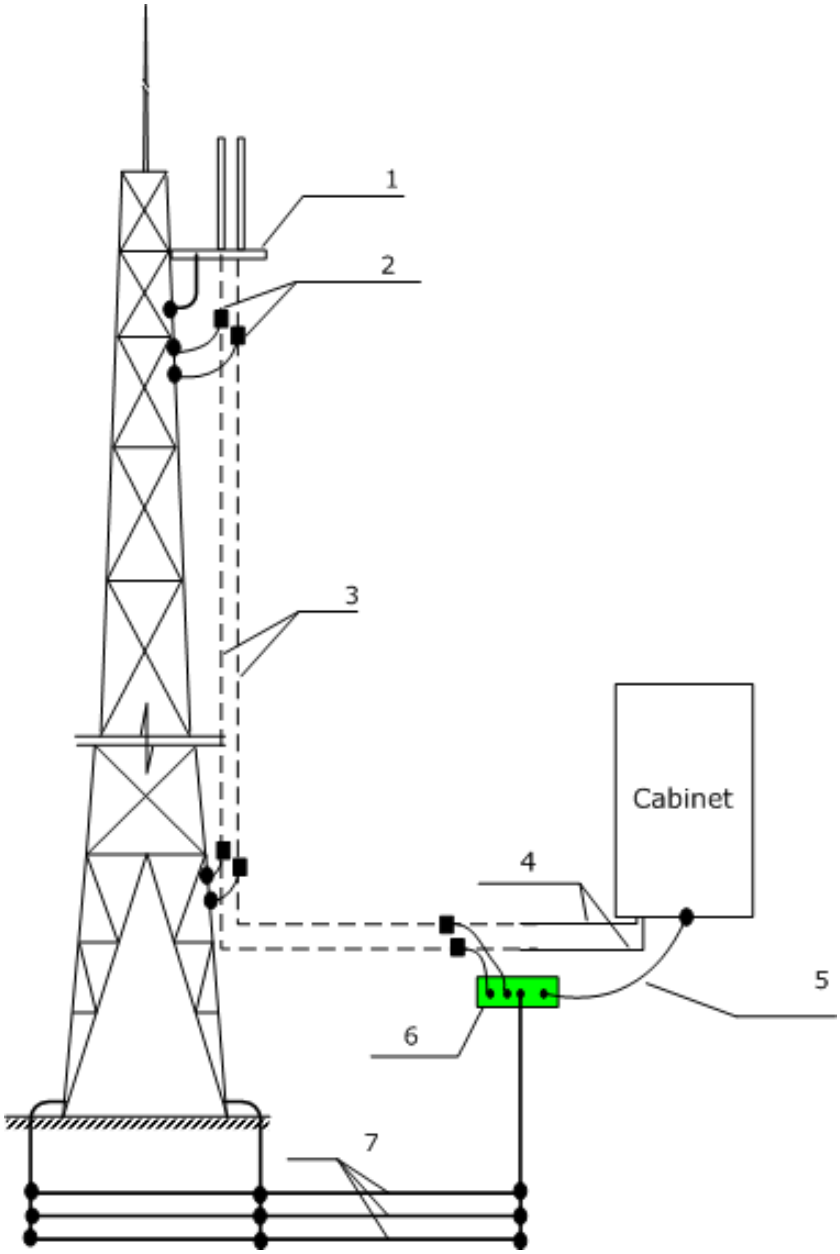
→ Tower platform

→ 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 5-14.

Figure 5-14 Feeder Grounding Schematic Diagram



1. Tower platform
2. Feeder grounding clip
3. Feeder
4. Cabinet jumper
5. Grounding cable
6. Grounding busbar
7. Ground grid

- 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.

5.5.7 Installing Feeder Grounding Clips

The feeder grounding clips installation of the 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 antenna 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

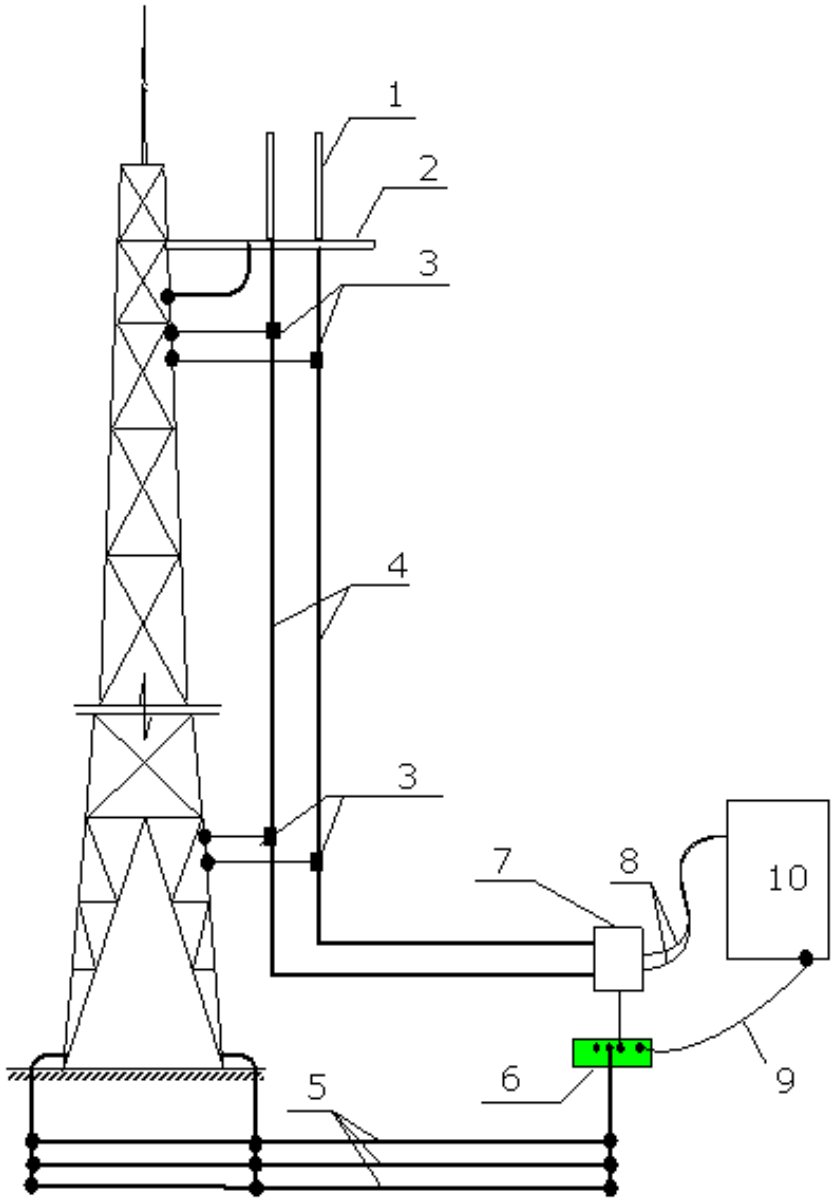
  When the feeder cable is longer than 60 m (197 feet), install a grounding clip on the feeder cable at every 20 m (66 feet) distance.

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

  Antenna poles and iron tower need to be grounded reliably.

Figure 5-15 illustrates grounding system in tower installation.

Figure 5-15 Grounding System



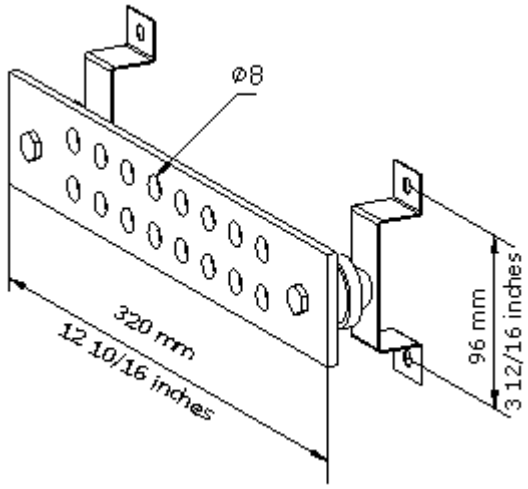
1. Antenna
2. Iron tower platform
3. Feeder grounding clip
4. Feeder cable
5. Grounding grid
6. Grounding bar
7. Lightning arrester
8. Chassis jumper
9. 35 mm² (2 AWG) grounding cable
10. ZXSDR R8860 chassis

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 5-16 illustrates the structure of the grounding bar.

Figure 5-16 Grounding Bar Structure



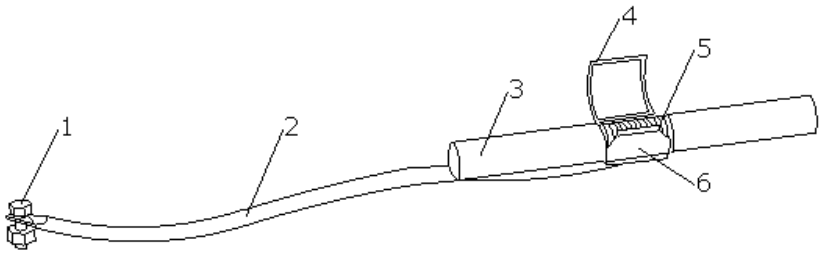
Installation Steps

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 5-17 illustrates structure of grounding clip.

Figure 5-17 Grounding Clip



1. Grounding end
2. Grounding cable
3. Feeder cable
4. Grounding spring lock
5. Feeder external copper core
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 angel 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 **Note:**

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

5.5.8 Connecting Jumper and Feeder

Prerequisites

Feeder connector and jumper connector is prepared.

Context

The following procedures 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.

5.6 Installing Feeder Hermetic-window

Context

Installation requirements are described as follows:

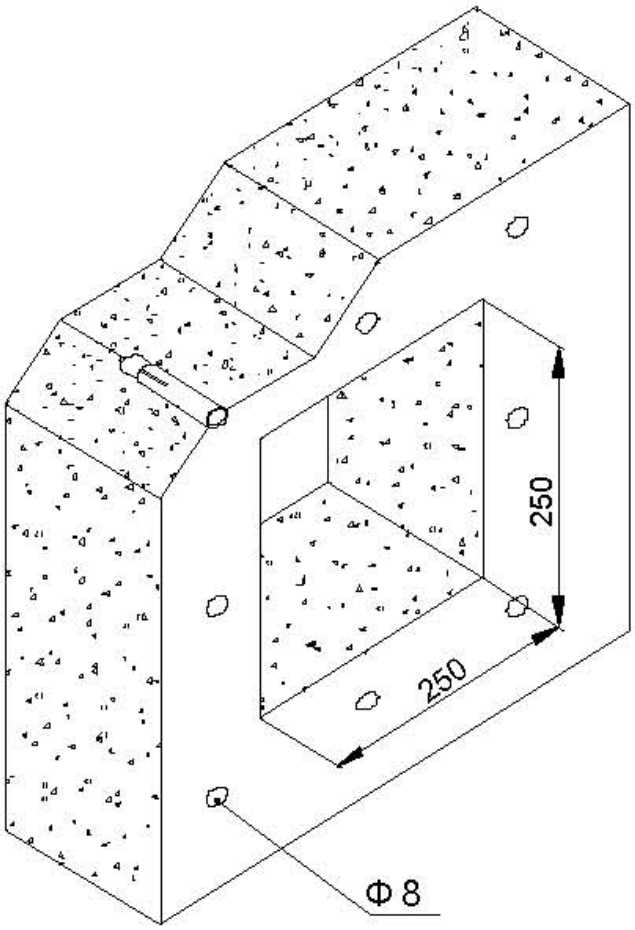
- The installation position of hermetic window should be close to a cable tray possibly.
- The hermetic window can be mounted against an indoor wall or outdoor wall and the side of protuberant metal circles must put towards outdoors
- If the feeder enters into a room from a roof, the hermetic window 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

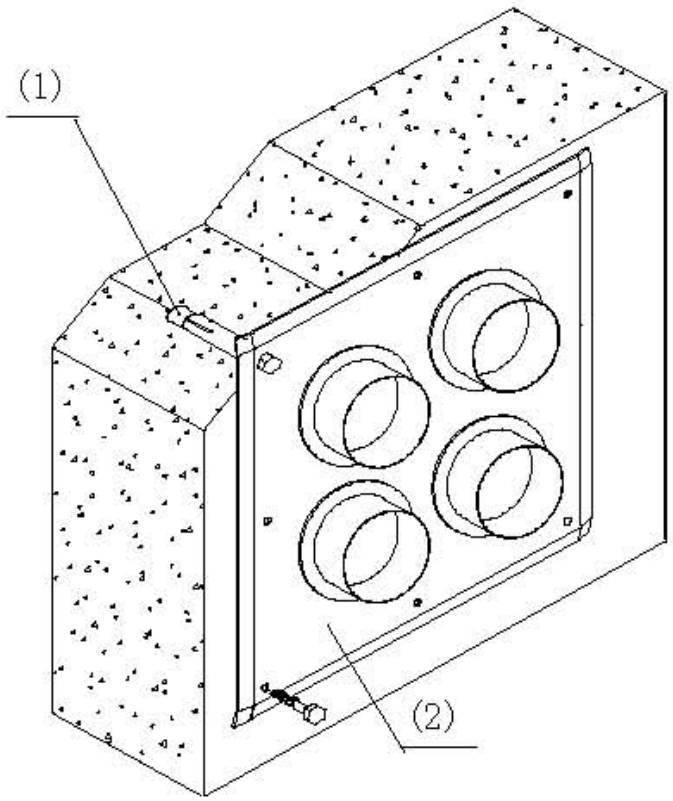
1. According to the requirements of engineering design drawing and the dimension of hermetic window, make sure the installation position of hermetic window on the wall and at the same time mark hole positions of expansion bolts and a hollow room left for the hermetic window.
2. Cut a 250mm×250mm square big hole and then drill eight holes of expansion blots with a percussive drill, as shown in Figure 5-18.

Figure 5-18 Installation Hole Positions (Unit: mm)



3. Fix a feeder hermetic-window panel with expansion bolts, as shown in Figure 5-19. While installing expansion bolts, first put a flat washer and then a spring washer.

Figure 5-19 Hermetic Window Installation



1. M8×80 expansion bolt
2. Feeder hermetic-window panel

– End of Steps –

5.7 Feeder Indoor Ingoing

5.7.1 Feeder Indoor Arrangement Principle

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

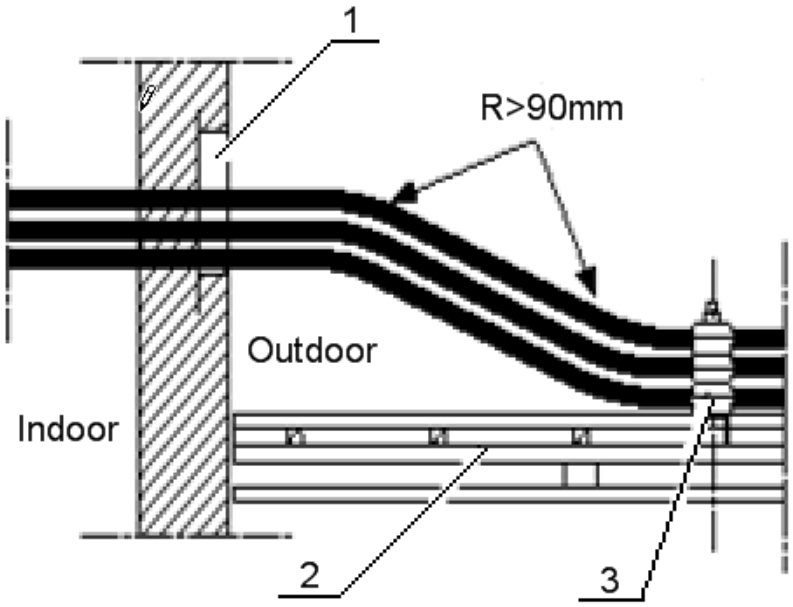
- There are four big holes on a 12–hole feeder hermetic-window. Every big hole has three small holes, every of which a feeder passes through.
- According to the serial No. on the engineering labels attached on the feeder, lay out the feeder through three small holes in the same big hole clockwise or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

5.7.2 Leading Main Feeder into Room

Context

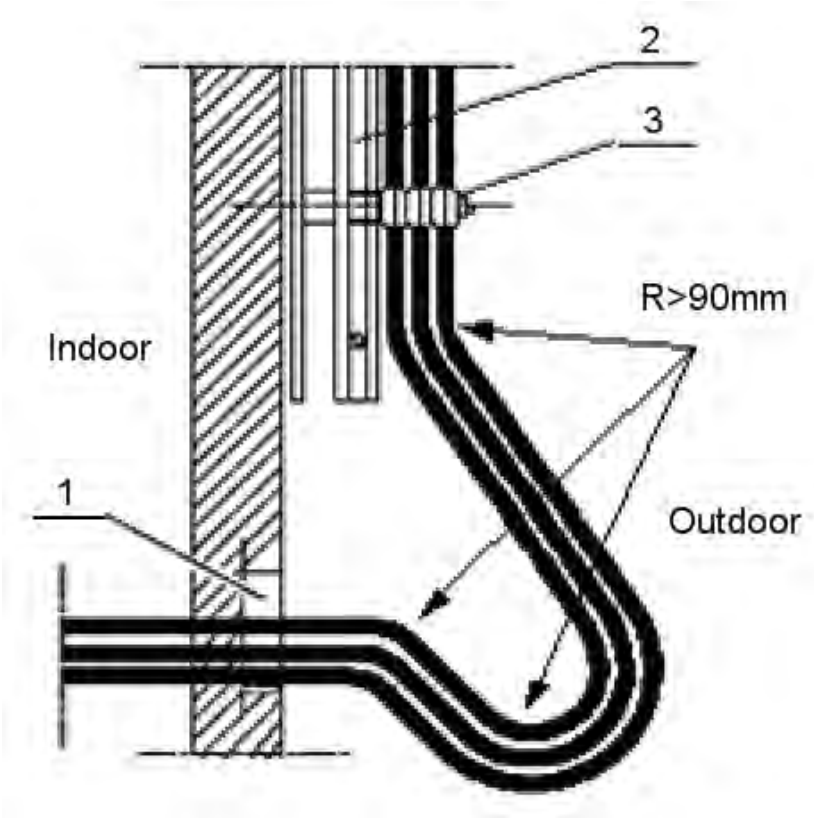
Figure 5-20 and Figure 5-21 show two common modes of main feeder into a room. While the main feeder is entering into the equipment room, do not bring water into the equipment room.

Figure 5-20 Feeder into Room Mode (1)



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

Figure 5-21 Feeder into Room Mode (2)



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

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 –

5.7.3 Installing Top-equipment Jumper

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 outsides 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.

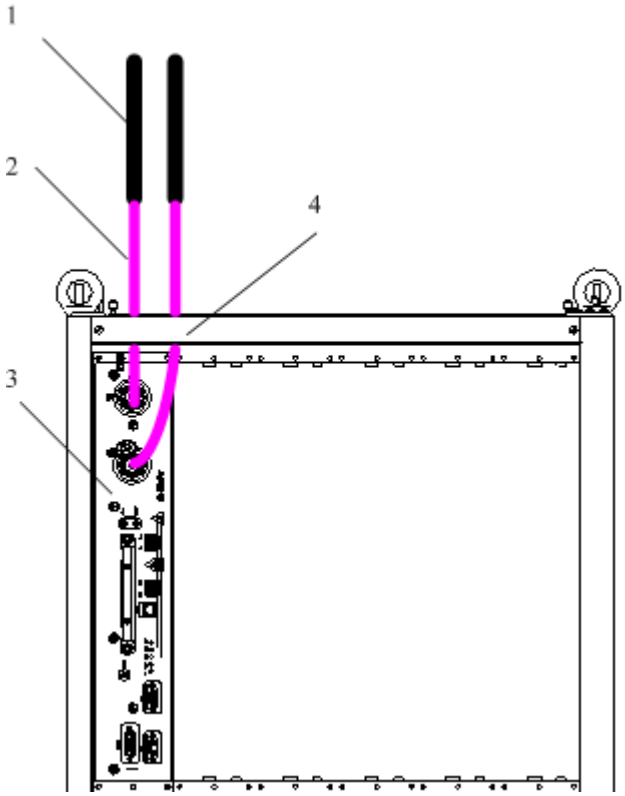
Steps

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 5-22 shows the installation process.

Figure 5-22 Antenna, Feeder and Jumper Installation



1. Feeder
2. Jumper
3. RSU
4. Wiring slot

4. Affix jumper engineering labels.

– End of Steps –

5.8 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≥1.5	Unqualified
SVWR 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 –

5.9 Performing Outdoor-Connector Waterproof Processing

Context

The waterproof processing for outdoor connectors adopts the “1+3+3” mode to warp “one layer PVC insulating tape + three layer waterproof insulating tape + three layer PVC insulating tape”.

The waterproof insulating tape is as shown in Figure 5-23.

Figure 5-23 Waterproof Insulating Tape

The PVC adhesive tape is as shown in Figure 5-24, used to protect connectors from damage as well as waterproof tape from aging.

Figure 5-24 PVC Adhesive Tape

Steps

1. Clean the feeder connectors and feeder grounding clips.
2. Wrap a layer of PVC insulating tape.
   a. Clean out dust and stain on the feeder connector or feeder grounding kit.
   b. As shown in Figure 5-25, wrap the feeder with the PVC insulating tape in an overlapping way from lower to upper, and the upper adhesive tape should cover a half of the lower adhesive tape. The extended width of adhesive tape is not over 1/2 longer than the former width, or else it destroys molecular structure of adhesive tape due to extension too much.

Figure 5-25 Wrapping a Layer of PVC Insulating Tape

3. Wrap three layers of waterproof insulating tape.
   a. Expand the waterproof insulating 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 kit.
   b. 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 should cover a half of the lower adhesive tape, as shown in Figure 5-26.

Figure 5-26 Wrapping Three Layers of Water Insulating Tape (the First Layer)

Note:

The wrapping direction should be towards the direction of connector screwed down. Prohibit wrapping in a reverse direction.

c. While wrapping to the 20~50 mm position off the connector , repeat it for twice and the sequence respectively is: from upper to lower as shown in Figure 5-27 and from lower to upper as shown in Figure 5-28.

Figure 5-27 Wrapping Three Layers of Water Insulating Tape (the Second Layer)

Figure 5-28 Wrapping Three Layers of Water Insulating Tape (the Third Layer)

d. After wrapping the waterproof insulating tape, press the adhesive tape at the binding with hands and make it affixed tightly.

4. Wrap three layer of PVC insulating tape.

   Two ends of PVC insulating tape must be 20mm longer than the upper layer of waterproof insulating tape. Bind the feeder in an overlapping way from lower to upper, and the upper adhesive tape should cover a half of the lower adhesive tape, as shown in Figure 5-29. Repeat it for twice and the sequence respectively is: from upper to lower as shown in Figure 5-29 and from lower to upper as shown in Figure 5-30. Make sure proper stretch strength during wrapping.

Figure 5-29 Wrapping Three Layers of PVC Insulating Tape (the First Layer)

Figure 5-30 Wrapping Three Layers of PVC Insulating Tape (the Second Layer)

5. After finishing wrapping, fasten two wrapped ends with black fasteners, as shown in Figure 5-31.

Figure 5-31 Fastening

– End of Steps –

5.10 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 5-32 and its structure as shown in Figure 5-33.

Figure 5-32 Feeder Hermetic-window Dimension (Unit: mm)

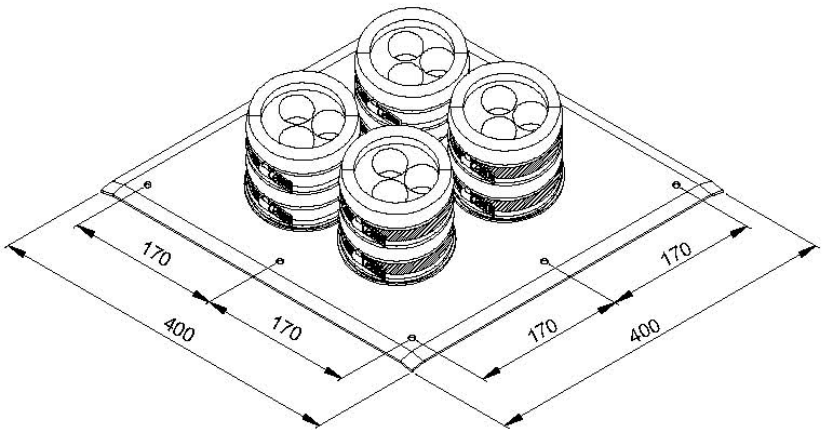
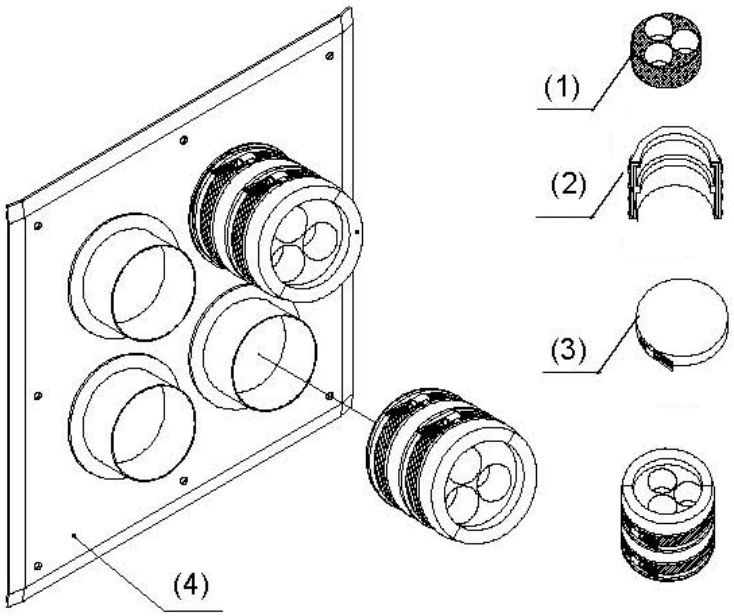


Figure 5-33 12 Feeder Hermetic-window Structure



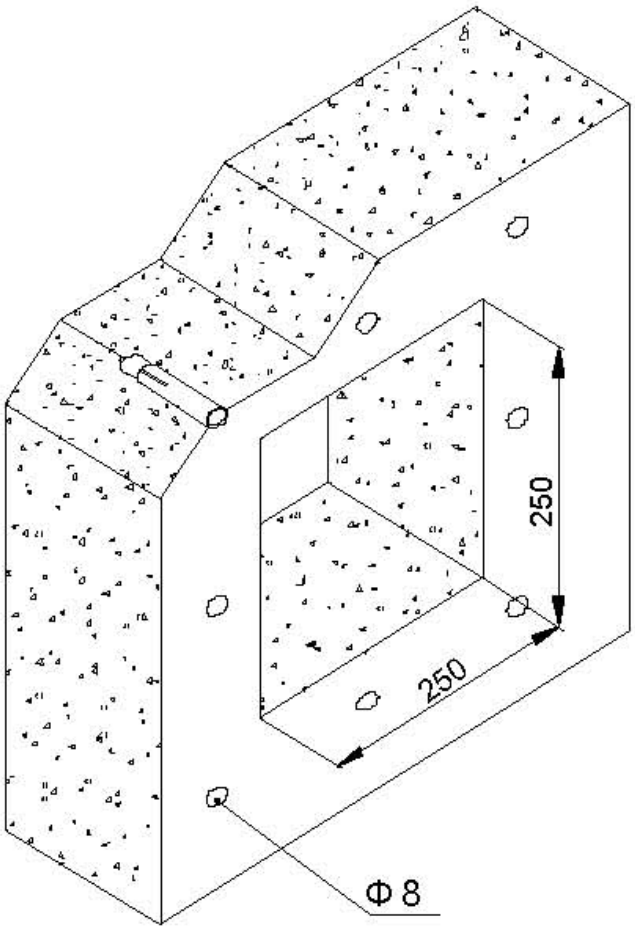
Installation requirements:

- 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 he 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 blots with a percussive drill, as shown in Figure 5-34.

Figure 5-34 Installation Hole Positions (Unit: mm)

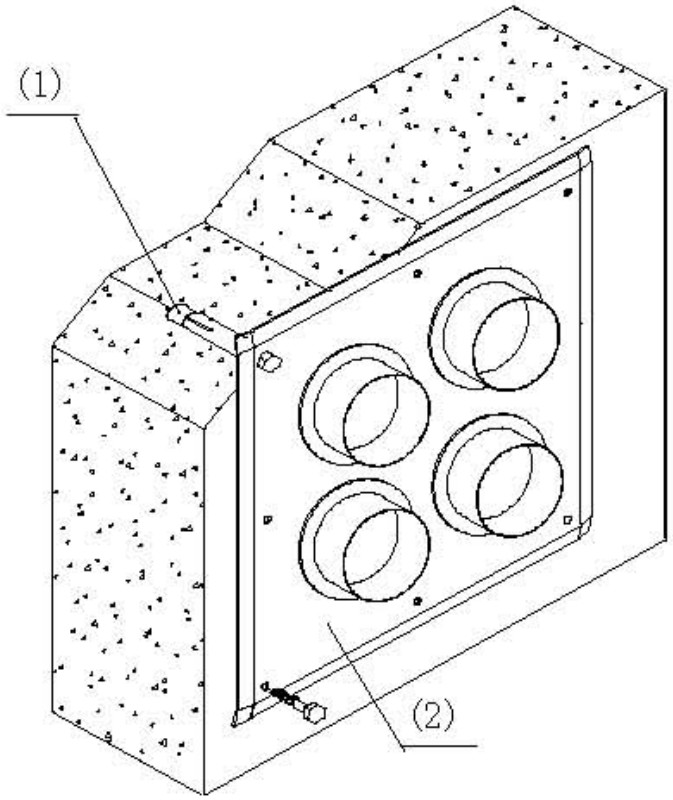


3. Fix a feeder hermetic-window panel with expansion bolts, as shown in Figure 5-35.

   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 5-35 Feeder Hermetic-window Installation



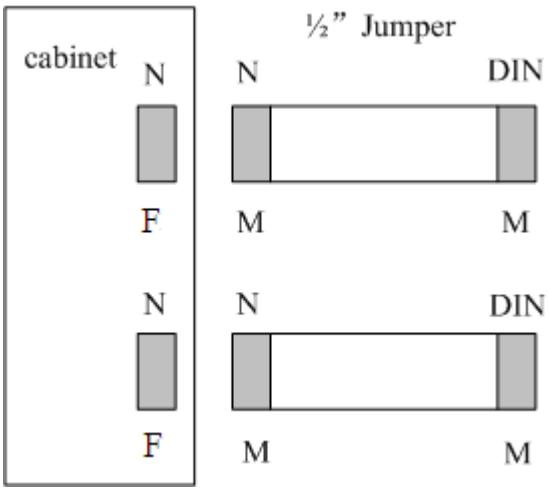
1. M8×80 expansion bolt
2. Feeder hermetic-wind ow panel

– End of Steps –

5.11 Chassis Jumper Installation Description

The ZXSDR R8860 chassis is equipped with two N type female connectors. These connectors are connected to N type male connectors of 1/2" jumpers. The chassis jumper connection is as shown in Figure 5-36.

Figure 5-36 Chassis 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 to the chassis. 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 chassis and M type connector of jumper should be connected with M type interface of the chassis.

5.12 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, including:

- 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.

Chapter 6
Hardware Installation Inspection

Table of Contents

6.1 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 –

6.2 Checking Cable Installation

6.2.1 Cables Installation General Specification

Optical Fiber

Note:

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 that 0.3 dB.
- The return loss is less than 45 dB.
- If optical fiber is to be used outdoor, then
  1. Take waterproof and anti- ultraviolet protection measures.
  2. 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 6-1 illustrates the connection relationship of both ends. Make sure to enclose End A connection by black cannula completely after connecting.

Table 6-1 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 6-1) 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 6-2 shows the connection relationship of End A.

Table 6-2 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	

6.2.2 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 –

6.2.3 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 atleast greater than 90 mm. Whereas for optical fiber that is to be laid indoors, minimal twist radius should be atleast 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 –

6.3 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 –

Chapter 7
Power on and off

Table of Contents

7.1 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.

7.2 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 onZXSDR 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 –

7.3 Power OFF

Context

Perform the following steps to power OFF the ZXSDR R8860.

Steps

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

– End of Steps –

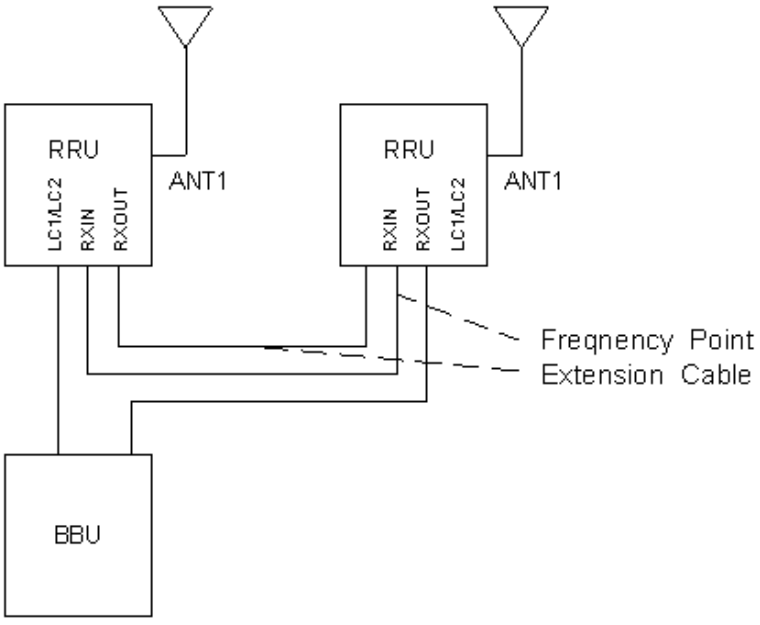
Appendix A
Cabinet-combined Installation

Table of Contents

A.1 Components Used in Cabinet-combining Installation

By combining cabinets, the ZXSDR R8860 can support 8 carrier sectors. Figure A-1 shows the connection for combining two ZXSDR R8860 cabinets.

Figure A-1 ZXSDR R8860 Cabinet-combined Installation Connection



1. Frequency Point Extension Cable

Note:

The RRU in Figure A-1 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**); while selecting the wall-mount installation, refer to **Components Used in Wall-mount Installation**; while selecting the gantry-mount installation, refer to **Components Used in Gantry-mount Installation**.
2. Two frequency point extension cables are prepared.

A.2 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:
   a. 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.
   b. 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 –

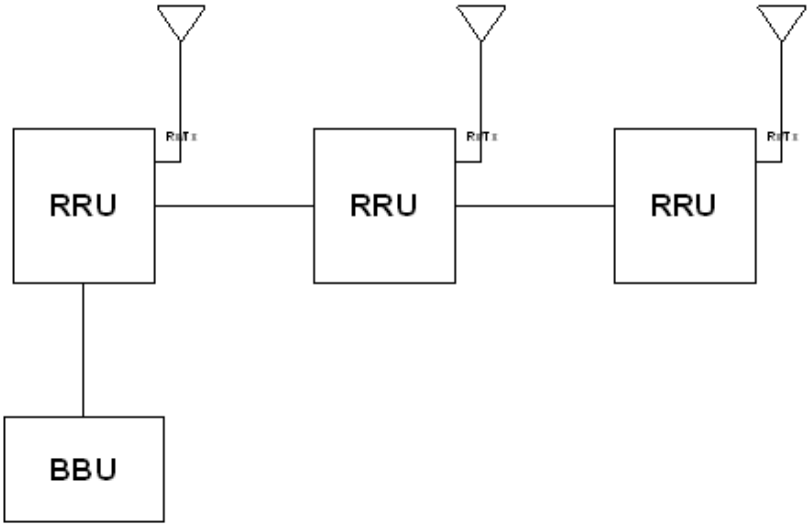
Appendix B
Cascading Cabinet Installation

Table of Contents

B.1 Components Used in Cascading Installation

Multiple ZXSDR R8860 cabinets can be connected in series by using optical fibers, forming a chain network. Figure B-1 shows the cascaded cabinets.

Figure B-1 Cascaded Cabinet Connection



Note:

The RRU in Figure B-1 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.

B.2 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 B-2 shows the optical fiber to connect cabinet in cascade.

   Figure B-2 ZXSDR R8860 Optical Fiber for Cascaded Cabinet

   Following is the connection scheme.

   a. Connect End A of optical fiber to the LC1/LC2 interface of one ZXSDR R8860.

   b. 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.

Appendix C
OAU

Table of Contents

C.1 OAU Appearance and Interface

Appearance

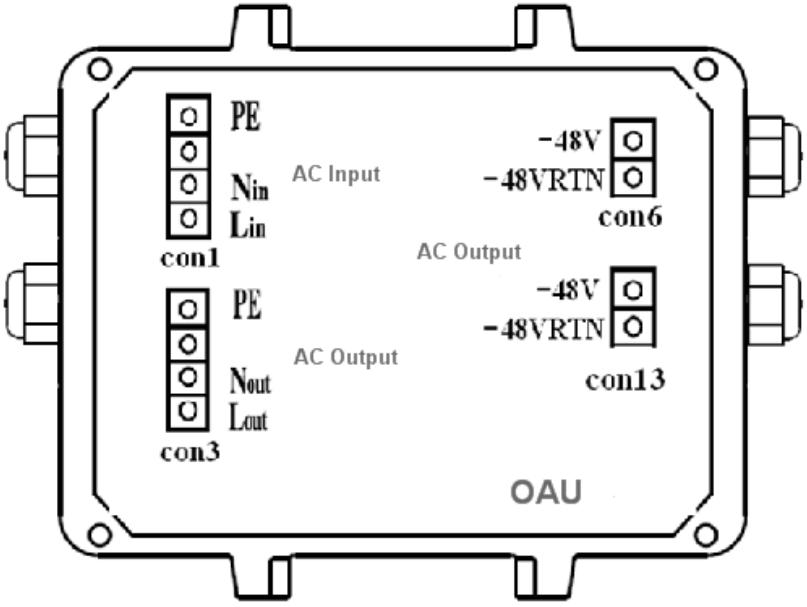
The appearance of OAU is as shown in Figure C-1.

Figure C-1 OAU Appearance

Interface

The interfaces of OAU is as shown in Figure C-2.

Figure C-2 OAU Interfaces



C.2 Installing OAU in Pole-mount Mode

Prerequisites

Unpacking and acceptance for outdoor AC unit (OAU) is eligible.

Context

The OAU pole-mount mode can adopt anchor clamp assemblies or fixing bracket assemblies. The anchor clamp assemblies are as shown in Figure C-3 and the fixing bracket assemblies are as shown in Figure C-4.

Figure C-3 Anchor Clamp Assemblies

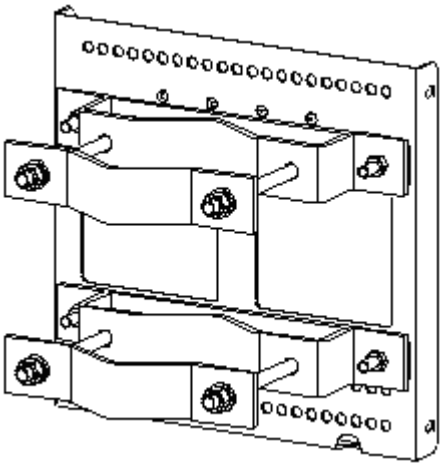
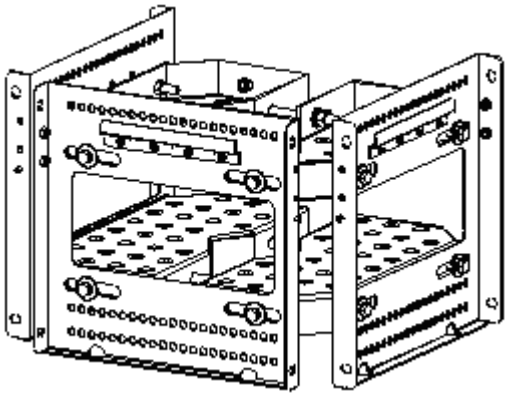


Figure C-4 Fixing Bracket Assemblies

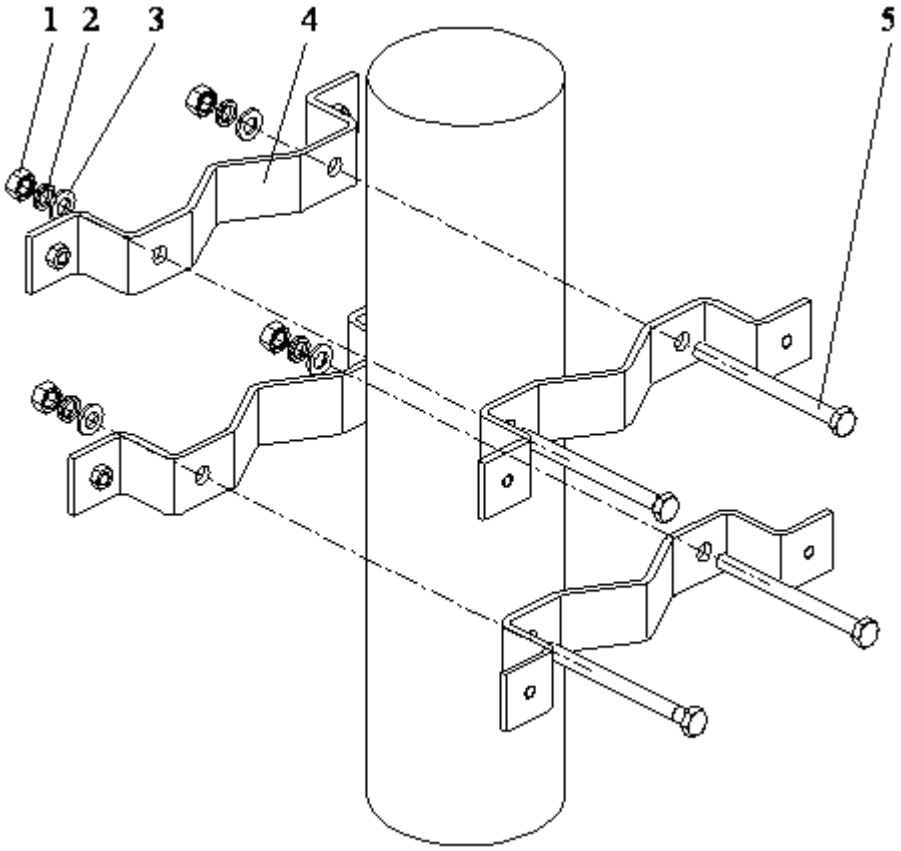


Steps

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 C-5 and the fixing brackets are as shown in Figure C-6.

Figure C-5 Two Sets of Anchor Clamp Assemblies



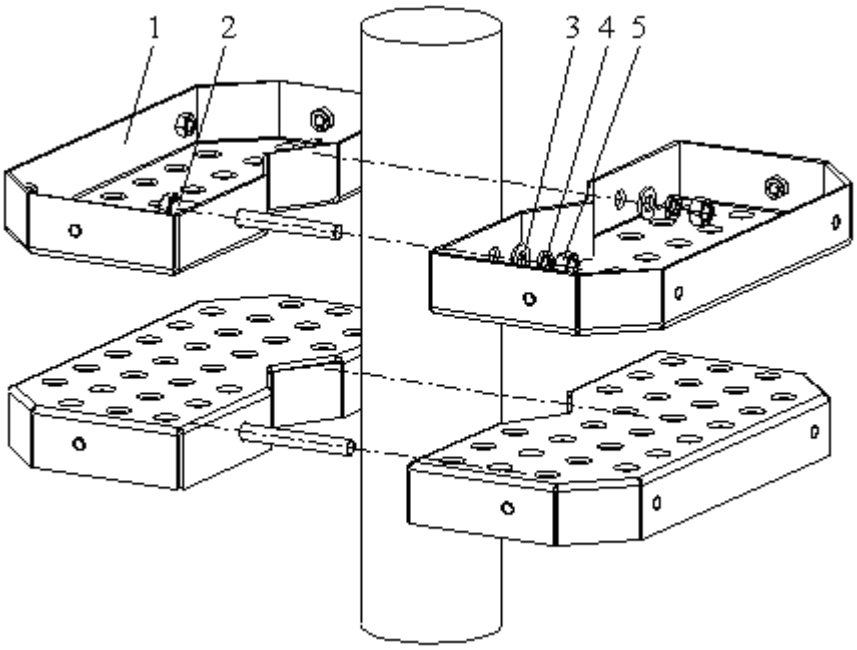
1. I-type common M10 hexagonal nut
2. Standard spring washer 10
3. Flat washer 10
4. Long anchor clamp
5. M10×120 hexagon head bolt (full thread)

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.

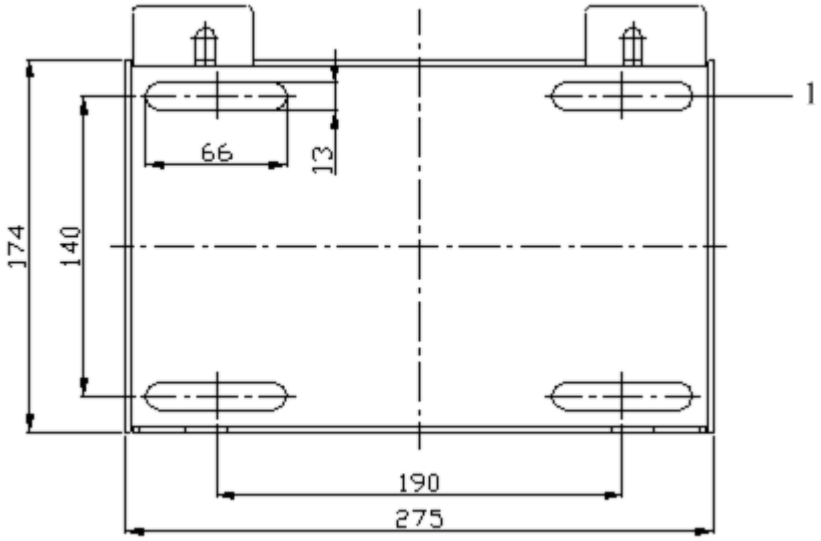
Figure C-6 Two Sets of Fixing Bracket Assemblies



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

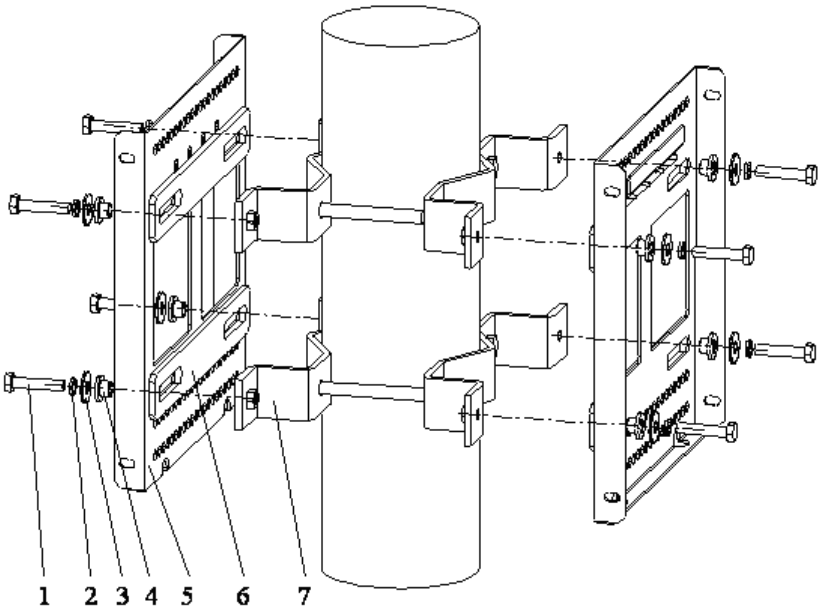
2. Install the bracket of OAU.
   The bracket is as shown in Figure C-7. Install the brackets onto the pole instead of the supporting panels as shown in Figure C-8 and Figure C-9. Screw down the brackets.

Figure C-7 OAU Bracket



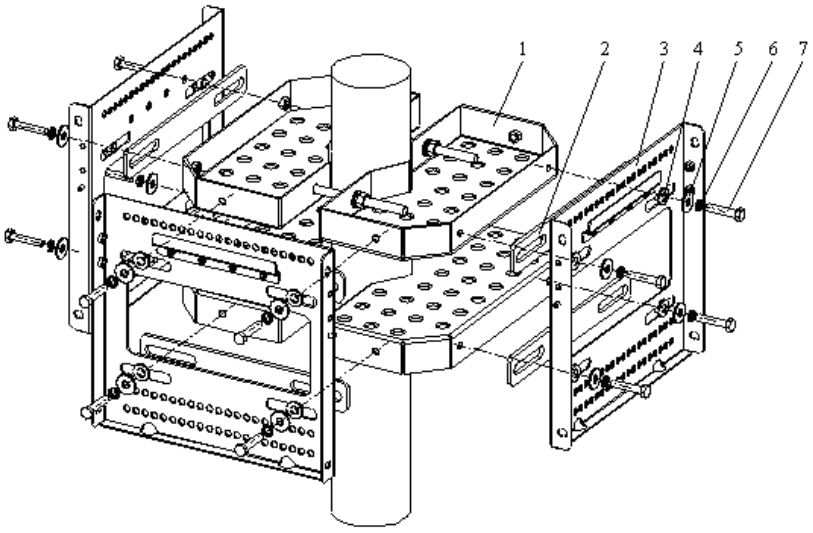
1. Installation pole

Figure C-8 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 C-9 Three Sets of Supporting Panels

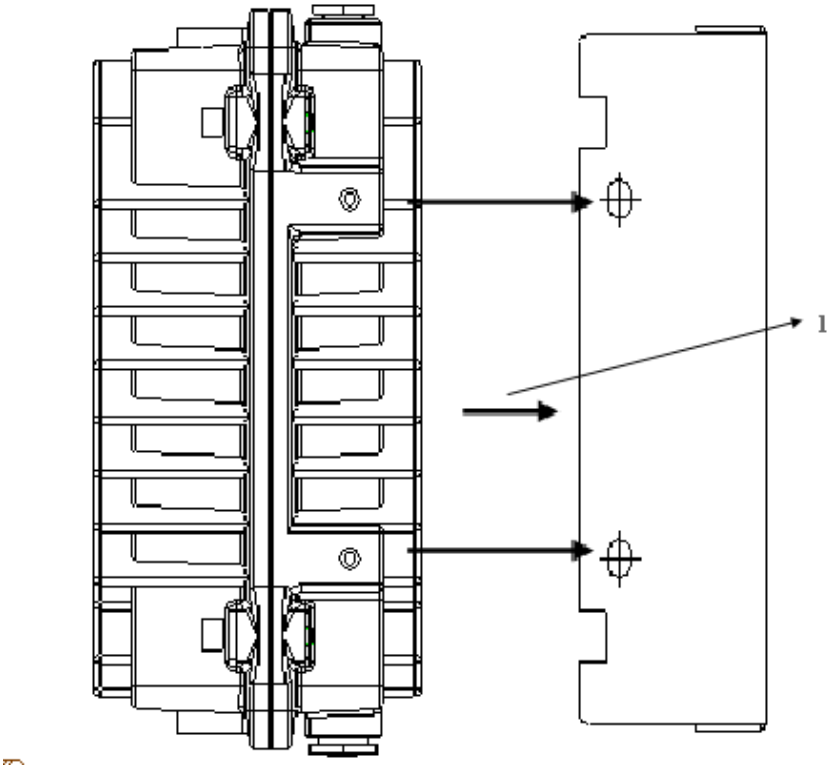


1. Fixing bracket
2. Insulation board
3. Supporting panel
4. Insulation flange
5. Big flat washer 8
6. Standard spring washer 8
7. M8×40 hexagon head bolt

3. Install the OAU.

   a. As shown in the Figure C-10, fasten the OAU to the brackets with the M6 hexagon head screws according to the arrowhead direction.

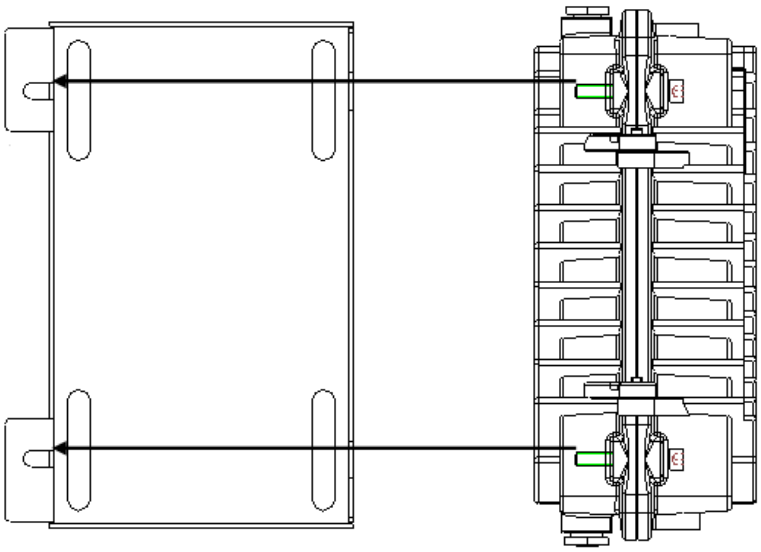
Figure C-10 OAU Installation (1)



1. Installation direction

b. As shown in the Figure C-11, 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 C-11 OAU Installation (2)



– End of Steps –

C.3 Installation OAU in Wall-mount Mode

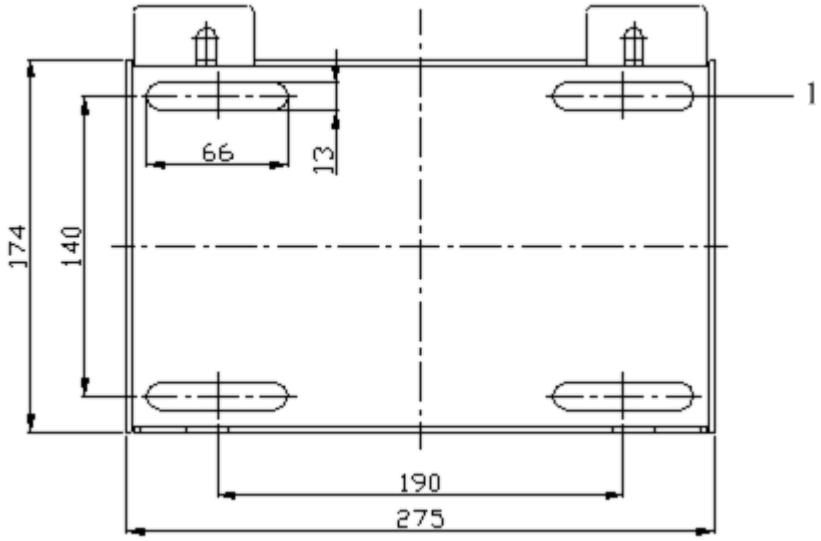
Prerequisites

Unpacking and acceptance for outdoor AC unit (OAU) is eligible.

Steps

1. Install a rack.
   a. As shown in the Figure C-12, 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 C-12 OAU Rack



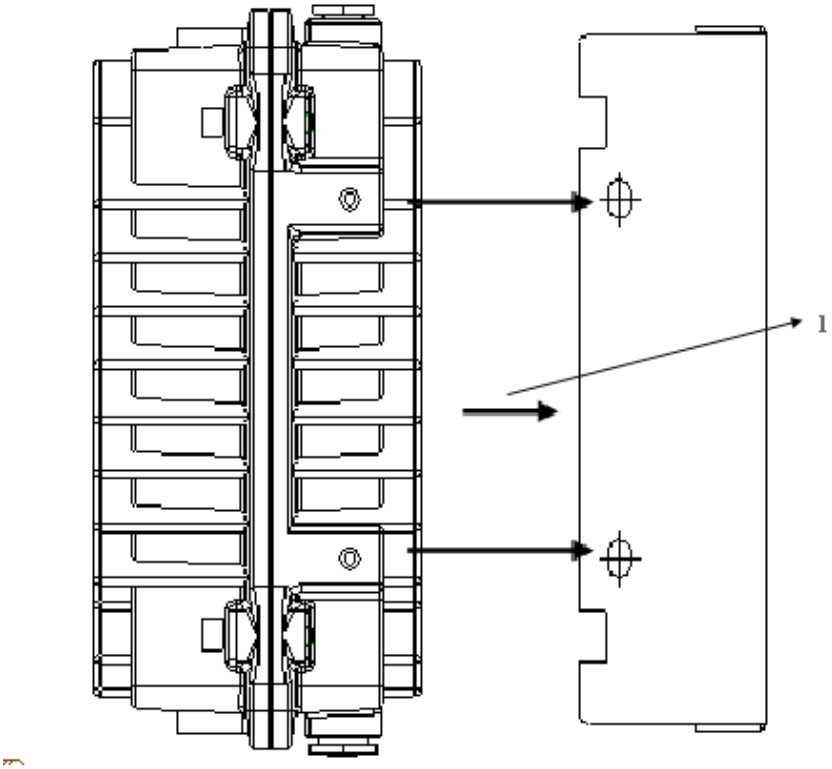
1. Installation hole

b. 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.

a. As shown in the Figure C-13, fasten the OAU to the brackets with the M6 hexagon head screws according to the arrowhead direction.

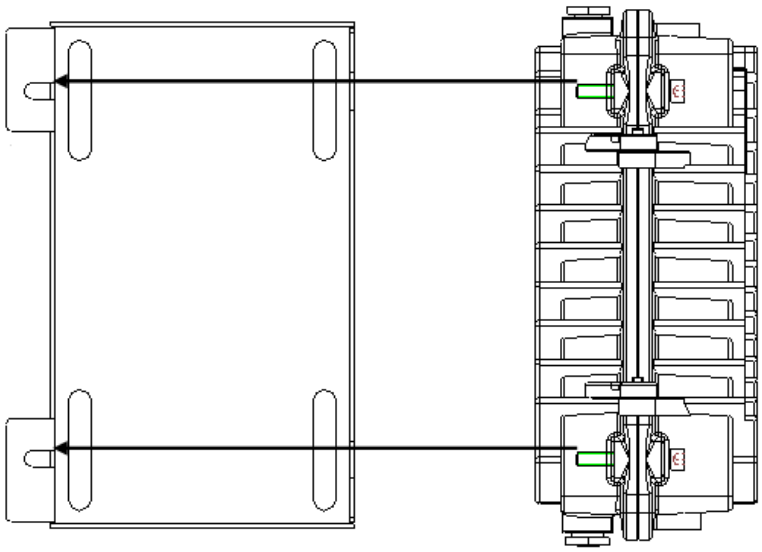
Figure C-13 OAU Installation (1)



1. Installation direction

b. As shown in the Figure C-14, 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 C-14 OAU Installation (2)



– End of Steps –

C.4 Installing OAU Cable

Prerequisites

The OAU installation is completed.

Context

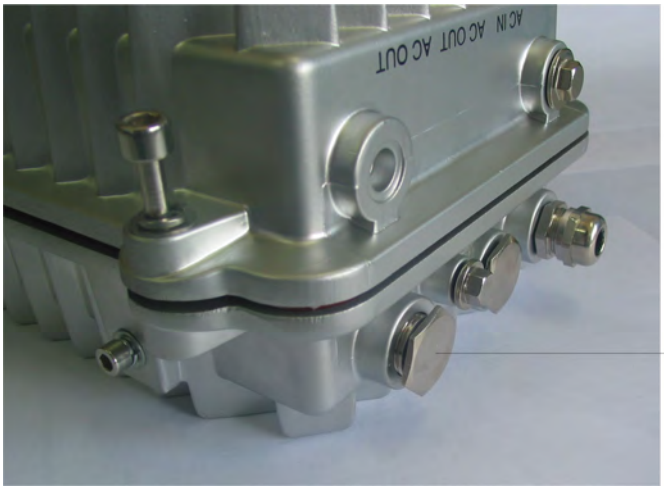
The OAU can provide -48V power supply for one ZXSDR B8200 C100 and one ZXSDR R8860 at the same time.

If the OAU is installed outsides, 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

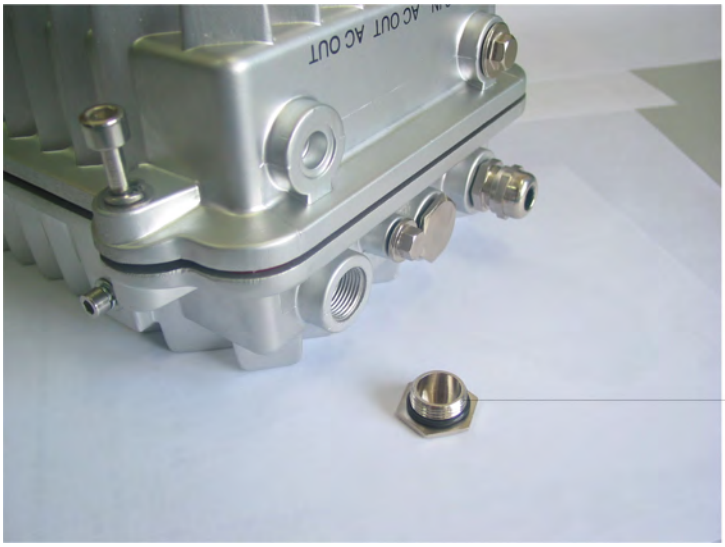
1. Install a waterproof end cap.
   a. Referring to the Figure C-15 and Figure C-16, loosen off the waterproof end cap.

Figure C-15 Waterproof End Cap



1. Waterproof end cap

Figure C-16 Loose off Waterproof End Cap



1. Waterproof end cap

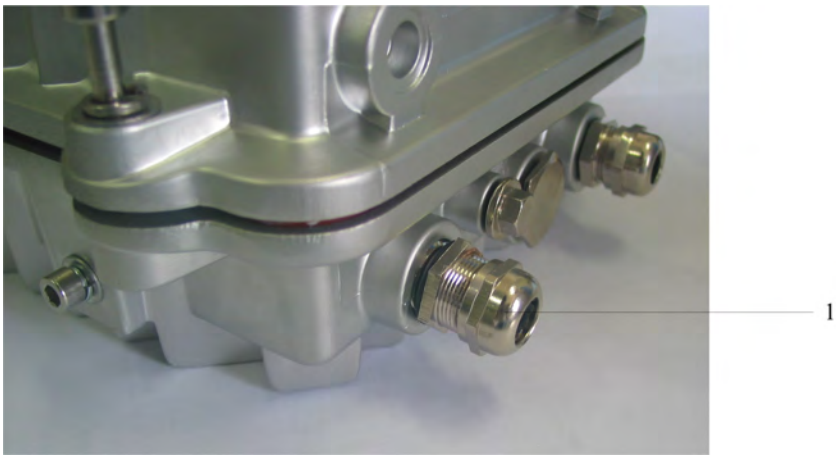
b. Remove the waterproof end cap and loose off the nut of waterproof end cap, as shown in Figure C-17.

Figure C-17 Waterproof End Cap Structure

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

c. Install the waterproof end cap onto the OAU and screw down it, as shown in Figure C-18.

Figure C-18 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 C-19.

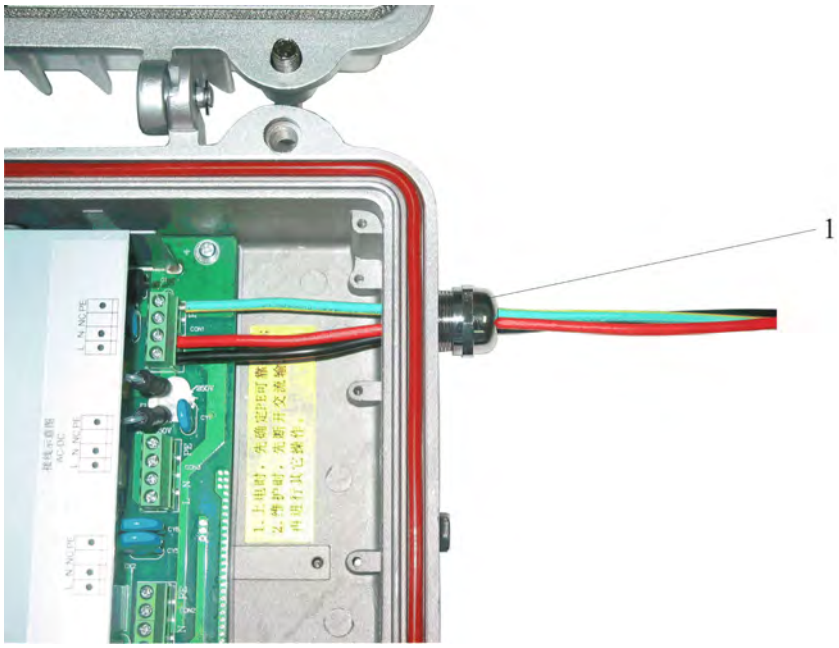
Caution!

a. 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.

b. Before power on, first confirm the PE cable grounding well. During maintenance, first disconnect the AC input and then perform other operation.

c. 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 C-19 AC Power Cable Connection



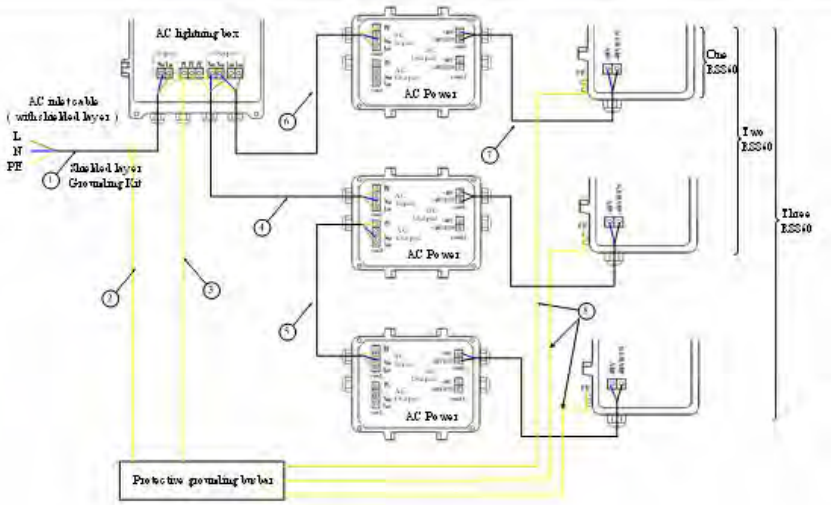
1. Waterproof end cap

Note:

The cable color decides on site.

3. Connect one AC lightning box, three OAUs and three ZXSDR R8860, as shown in Figure C-20. For the connection between OAU and ZXSDR B8200 C100, please refer to the Figure C-20.

Figure C-20 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 –

Appendix D
OLP48-2

Table of Contents

D.1 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 D-1 describes the engineering technical indices of outdoor DC lightning box.

Table D-1 Engineering Technical Indices

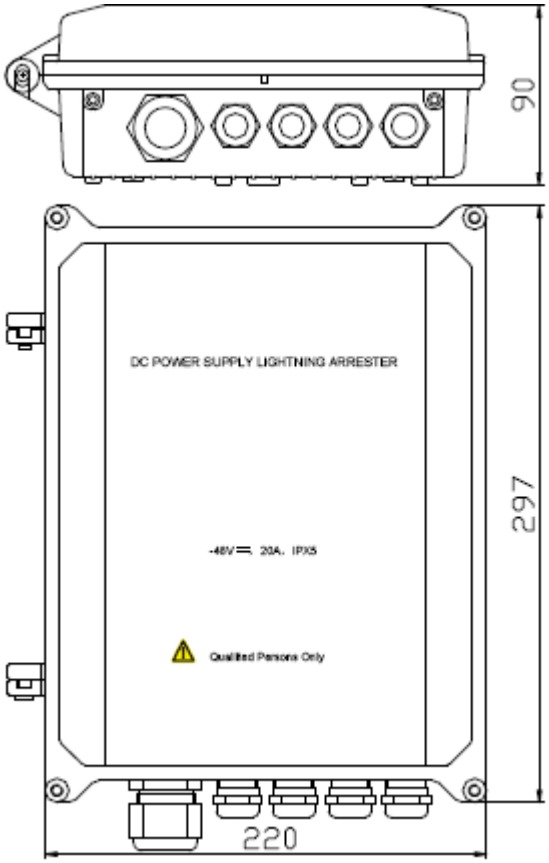
Item	Index
Dimension	H×W×D: 297mm×220mm×90mm
Nominal work voltage	–48VDC
Maximum continuous running voltage	–75VDC
Work temperature	-40℃+70℃
Work humidity	10% RH~95% RH25℃
Altitude	≤3000m

D.2 OLP48-2 Appearance and Interface

Appearance

Figure D-1 shows the appearance of outdoor DC lightning box.

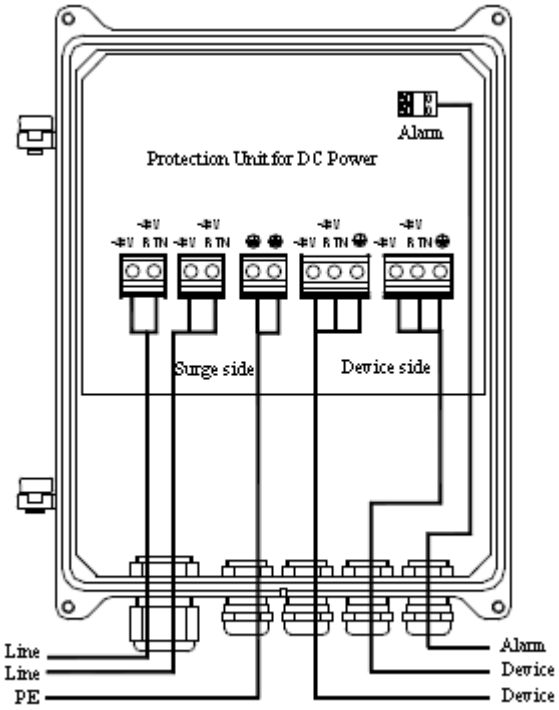
Figure D-1 Outdoor DC Lightning Box Appearance



Interface

Figure D-2 shows the interfaces of outdoor DC lightning box.

Figure D-2 Outdoor DC Lightning Box Interface

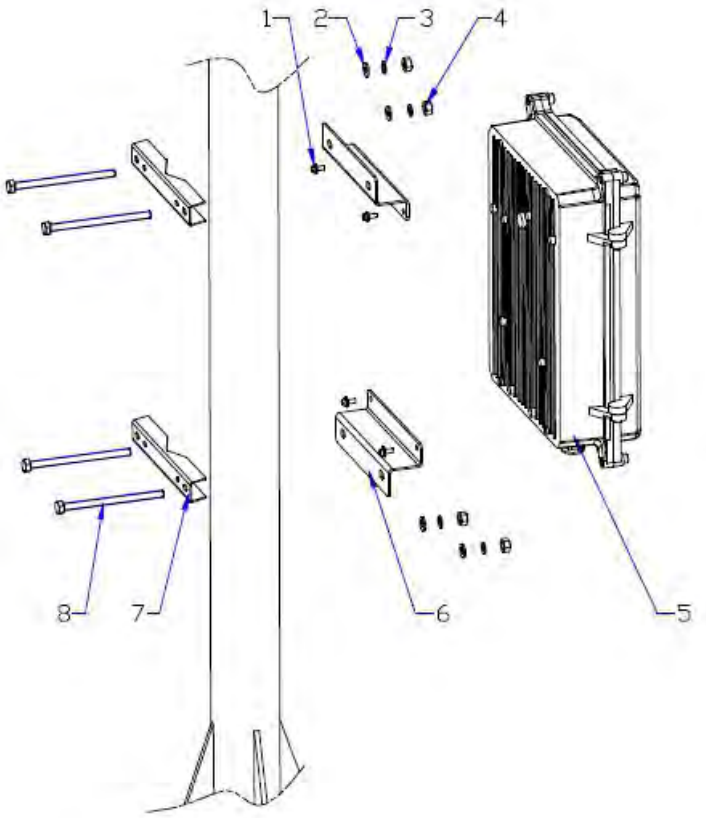


D.3 OLP48-2 Installation Description

Installation

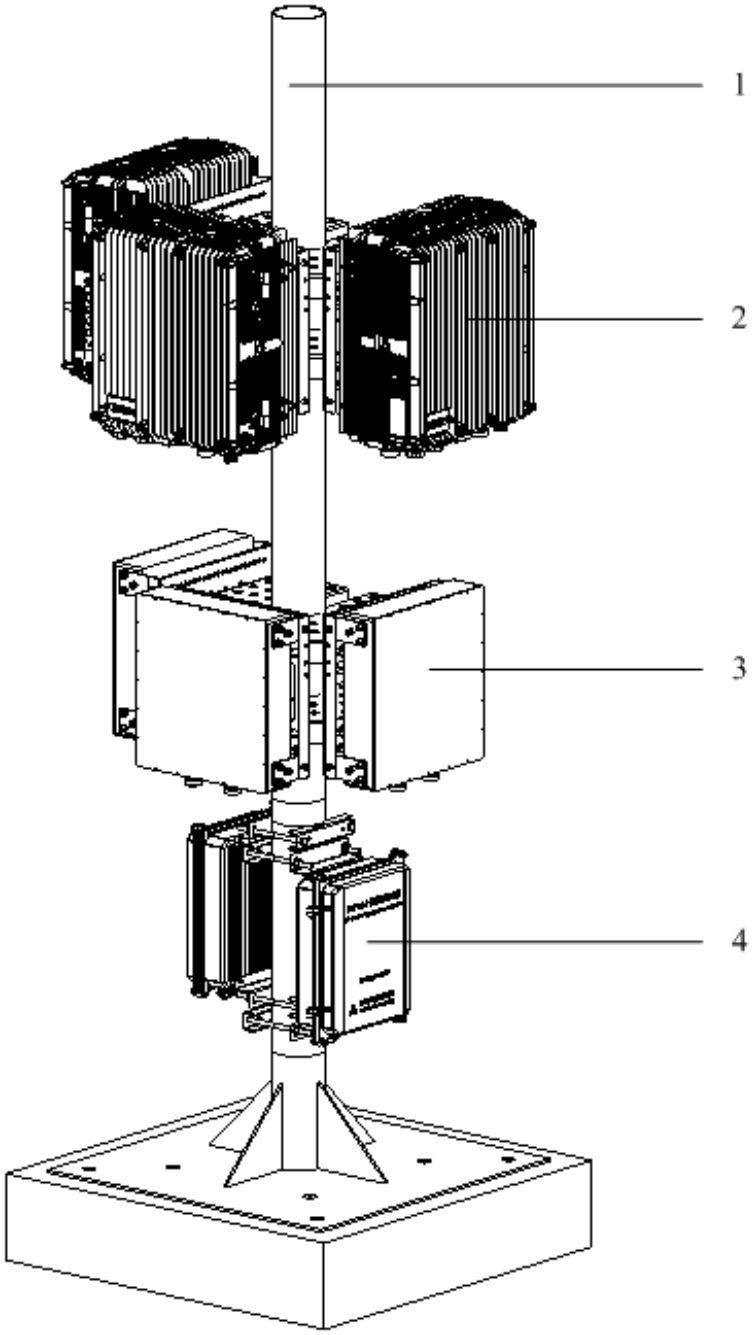
Figure D-3 illustrates parts to provide for pole installation of outdoor DC lightning box. Figure D-4 shows the appearance after installation completion.

Figure D-3 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 D-4 Outdoor DC Lightning Pole Installation

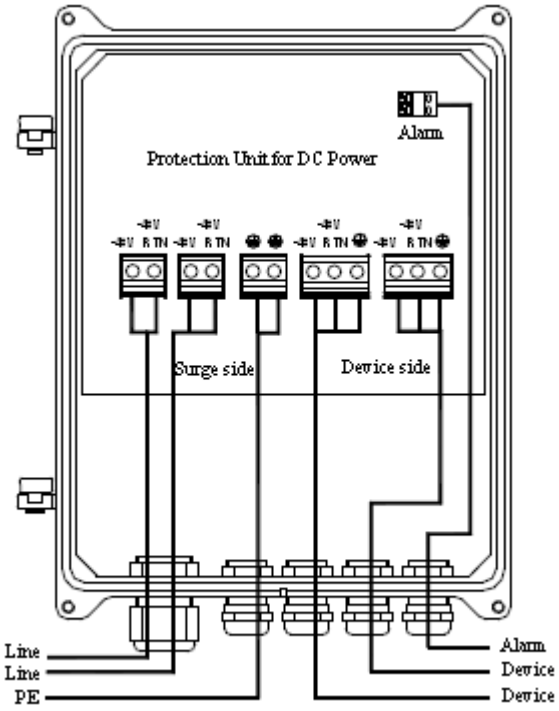


1. Pole
2. ZXSDR R8860
3. Wave trap
4. Outdoor DC lightning box

Cable Connection

Take apart a cabinet and connect cables as shown in Figure D-5. Connect one outdoor DC lightning box with one (or two) RRU , as shown in Figure D-6.

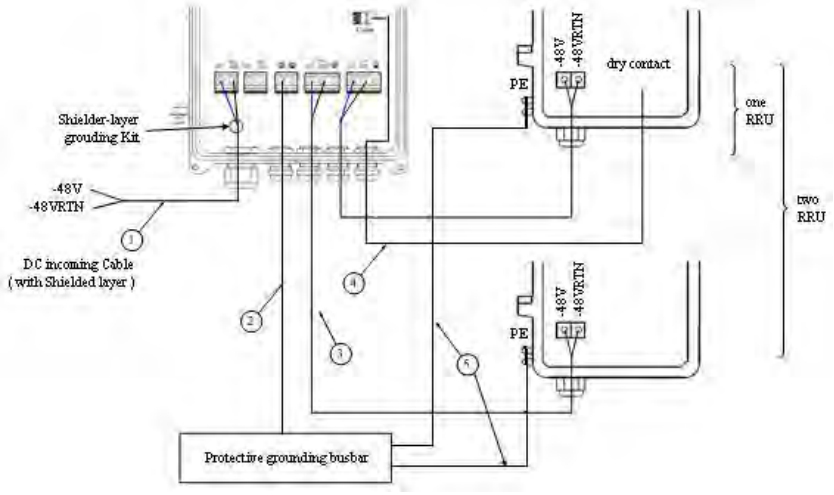
Figure D-5 Outdoor DC Lightning Box Interfaces



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 D-6 Outdoor DC Lightning Connection



1. DC power cable (two-core outdoor shielded power cable; the shielded layer is grounding inside the lighting 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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Appendix E
ILP48-3

Table of Contents

E.1 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 lighting 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 E-1 describes the engineering technical indices of indoor DC lightning box.

Table E-1 Engineering Technical Indices

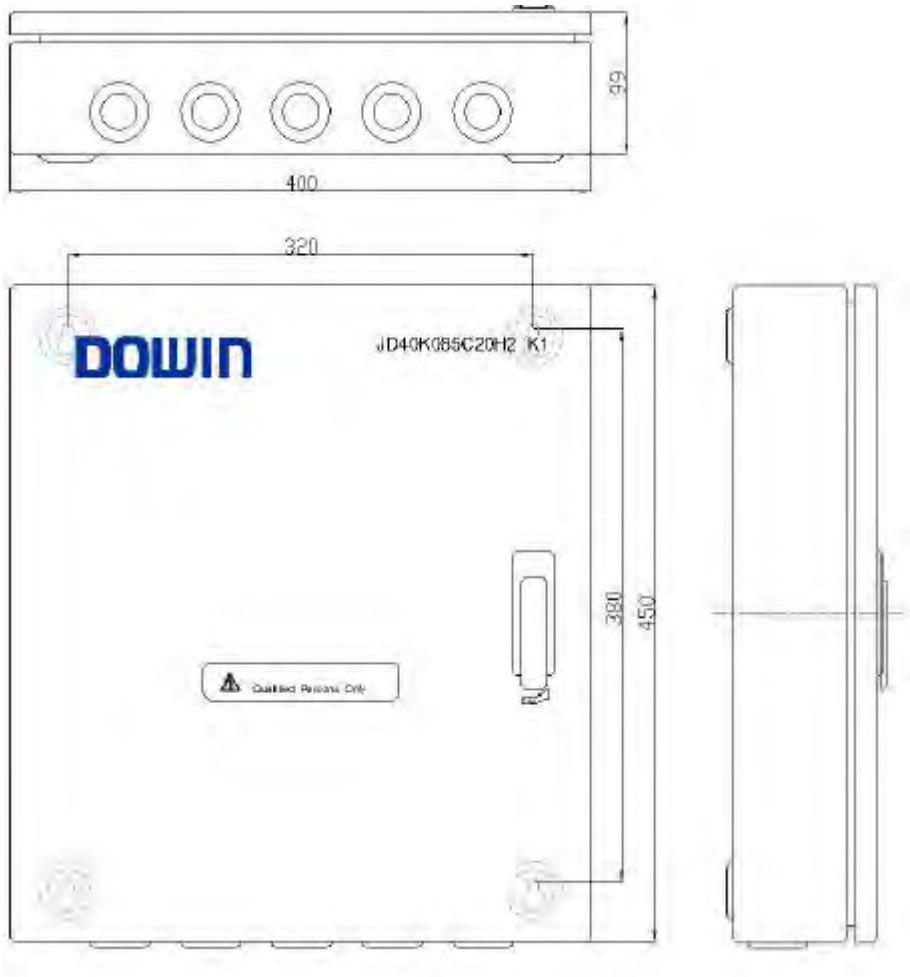
Item	Index
Dimension	H×W×D: 450mm×400mm×100mm (not include the height of lock on the upper cover)
Nominal work voltage	–48VDC
Maximum continuous running voltage	–75VDC
Work temperature	-5℃+70℃
Work humidity	≤95% RH

E.2 ILP48-3 Appearance and Interface

Appearance

Figure E-1 shows the appearance of indoor DC lightning box.

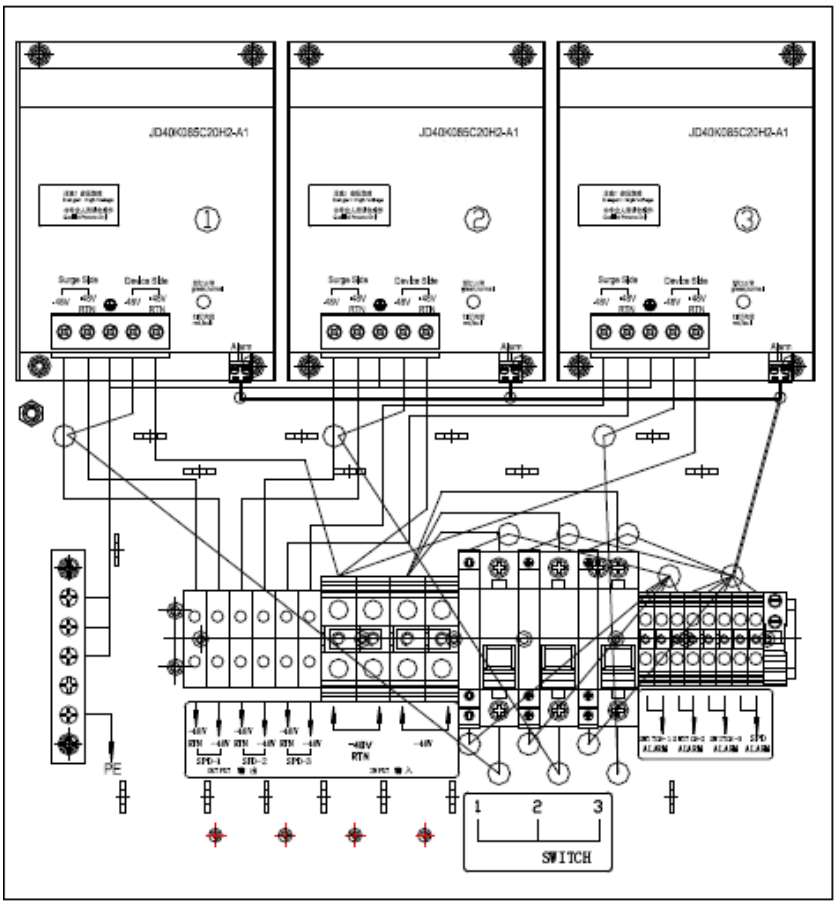
Figure E-1 Indoor DC Lightning Box Appearance



Interface

Figure E-2 shows the interfaces of indoor DC lightning box.

Figure E-2 Indoor DC Lightning Box Interfaces



E.3 ILP48-3 Installation Description

Installation

The indoor DC lighting 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.

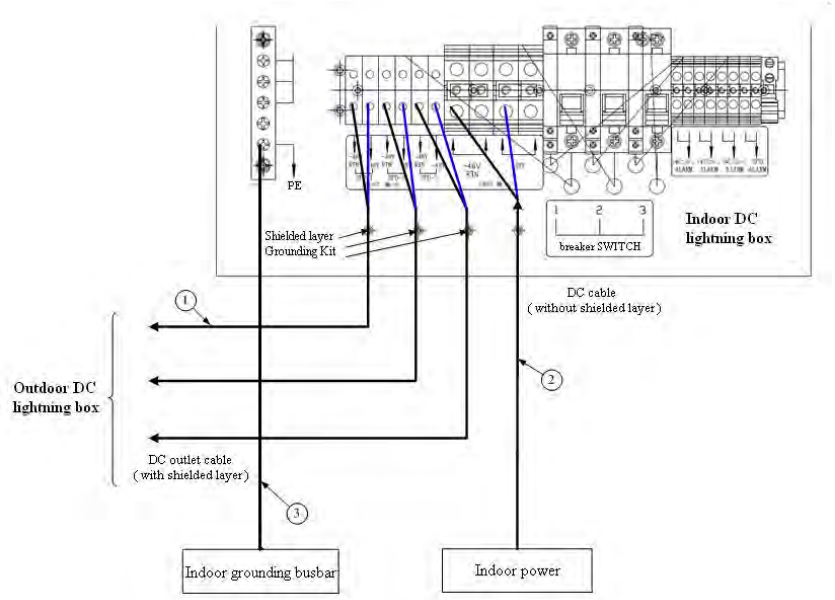
Cable Connection

Figure E-3 illustrates cable connection of lightning box.

Caution!

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

Figure E-3 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 lighting 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)

Appendix F
AC Lightning Arrester

Table of Contents

F.1 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 F-1 describes the engineering technical indices of AC lightning box.

Table F-1 Engineering Technical Indices

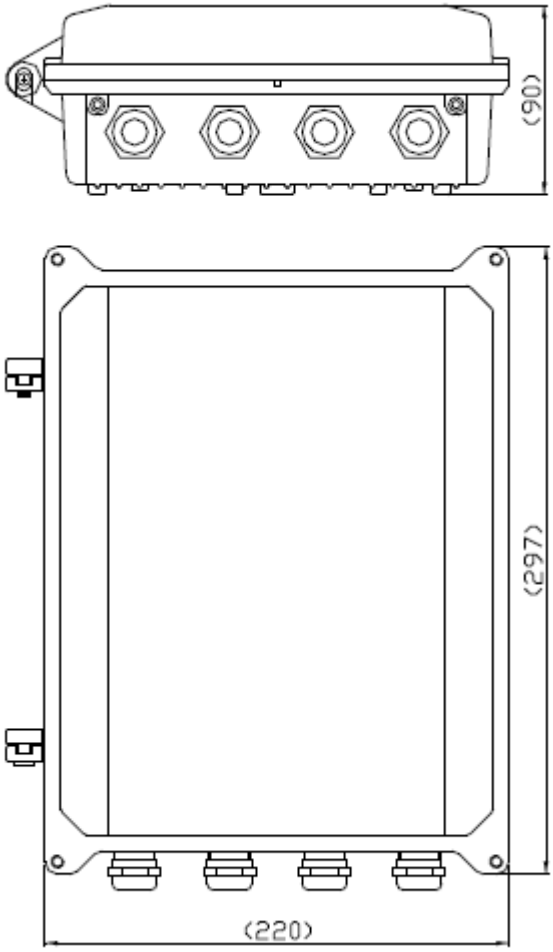
Item	Index
Dimension	H×W×D: 297mm×220mm×90mm
Rating work voltage	110/220~240V AC50/60Hz
Maximum continuous running voltage	385V AC
Work temperature	-40℃+70℃
Work humidity	10%RH~95% RH25℃
Altitude	≤3000m

F.2 AC Lightning Appearance and Interface

Appearance

Figure F-1 illustrates the appearance of AC lightning box.

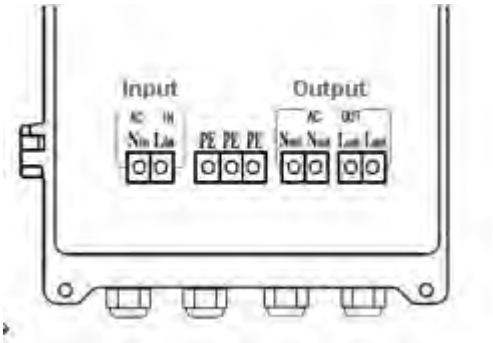
Figure F-1 AC Lightning Box Appearance



Interface

Figure F-2 illustrates the interfaces of AC lightning box.

Figure F-2 AC Lightning Box Interface



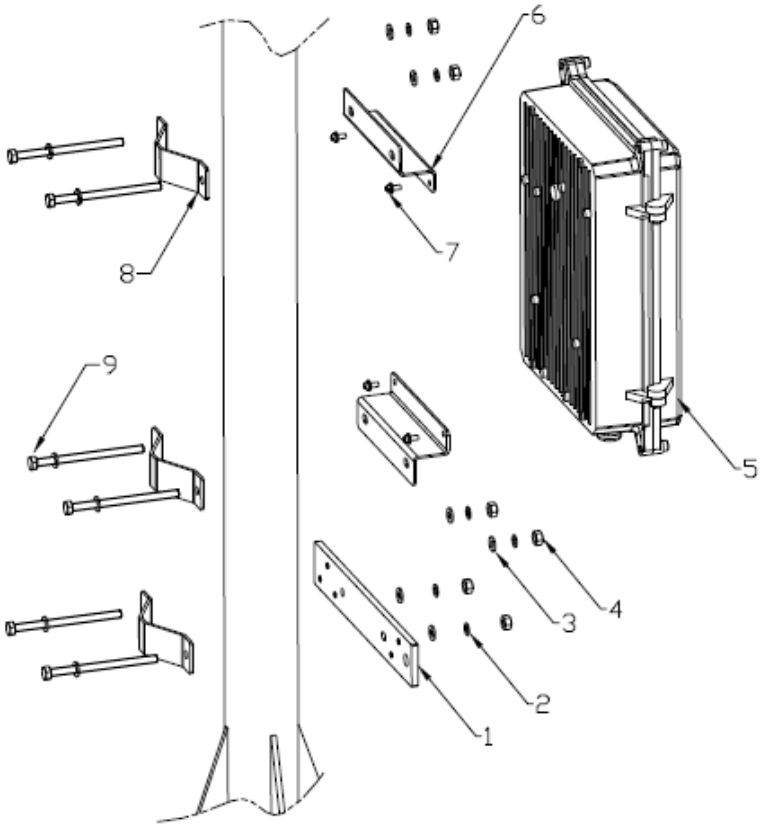
F.3 AC Lightning Installation Description

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

Installation

Figure F-3 illustrates parts to provide for pole installation of AC lightning box. Figure F-4 shows the appearance after installation completion.

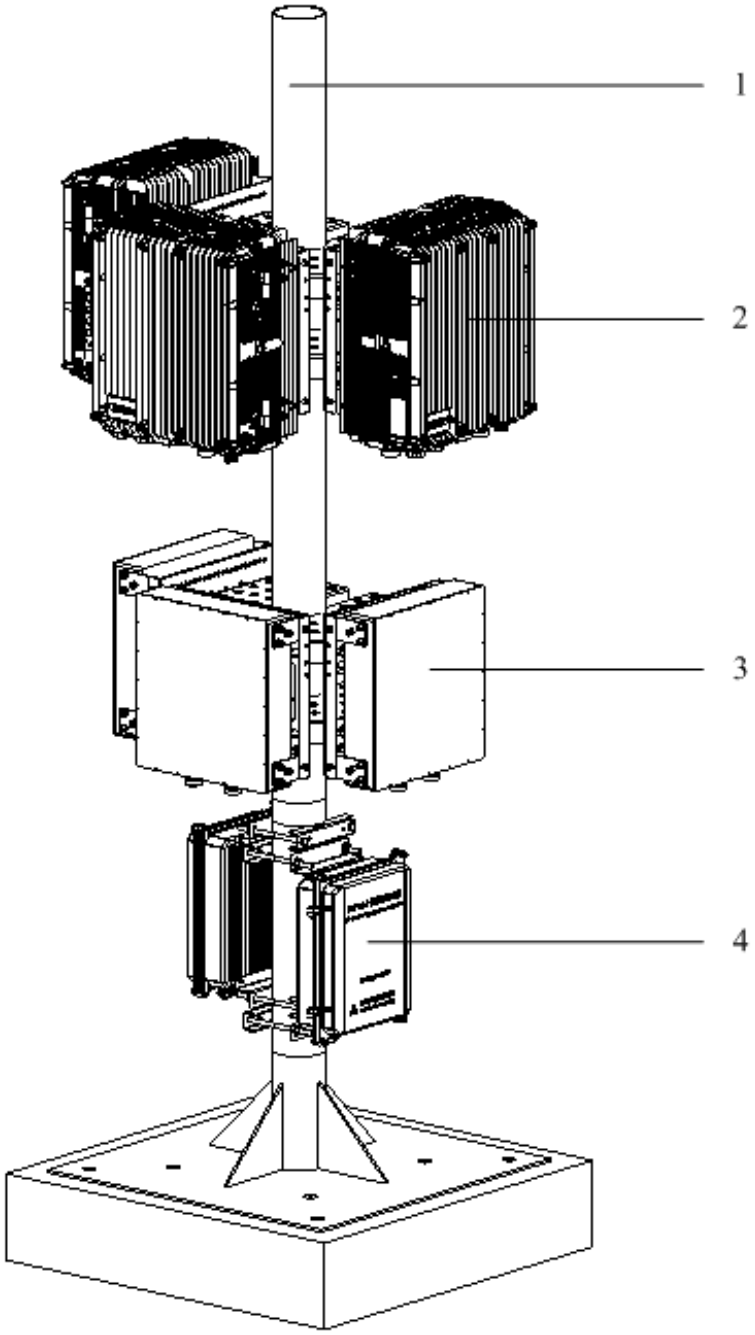
Figure F-3 AC Lightning Box Installation Parts



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 F-4 AC Lightning Pole Installation



1. Pole
2. ZXSDR R8860
3. Wave trap
4. AC lightning box

Cable Connection

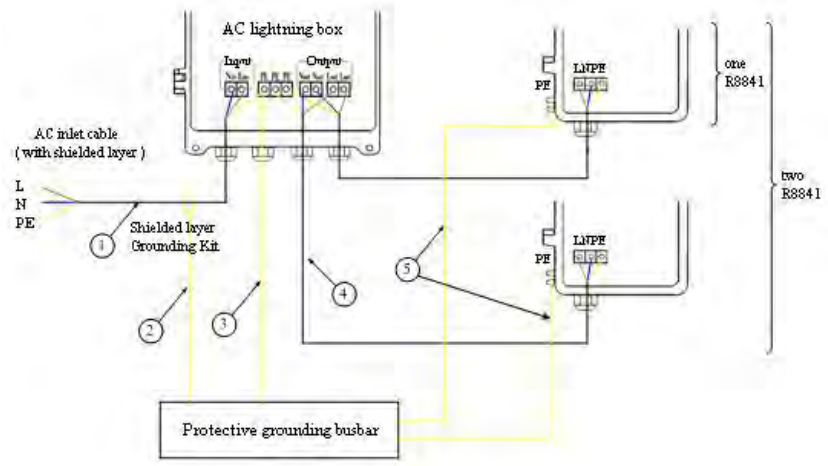
Unpack a cabinet and connect cables.

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, as shown in Figure F-5.

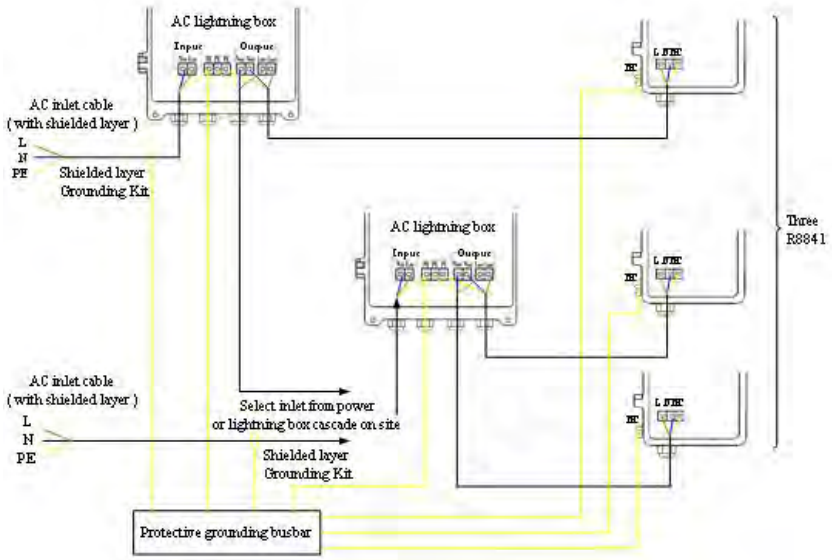
Figure F-5 One AC Lightning Box and One (or two) R8841 Cable Connection



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, as shown in Figure F-6.

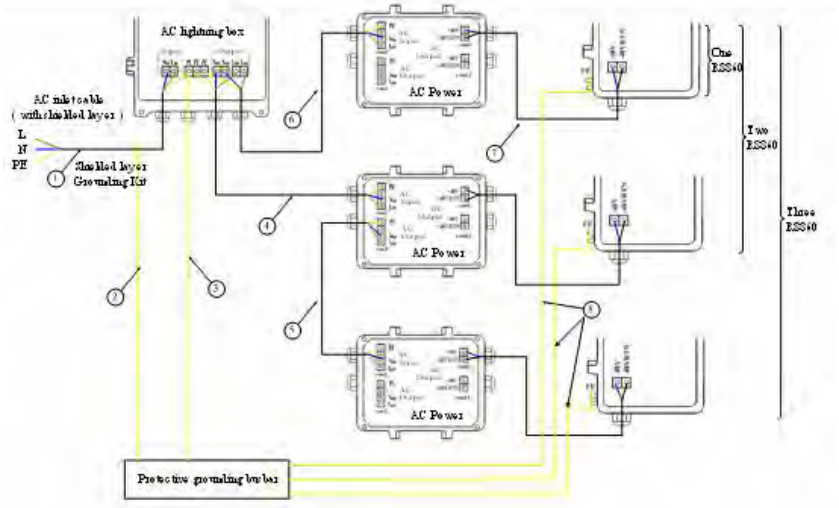
Figure F-6 Two AC Lightning Box and Three R8841 Cable Connection



- Cable type refers to Figure F-6.

Connect one AC lightning box, three OAUs with three R8860, as shown in Figure F-7.

Figure F-7 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)

F.4 Installing Shielded Grounding Kit

Prerequisites

The shielded power cable is installed.

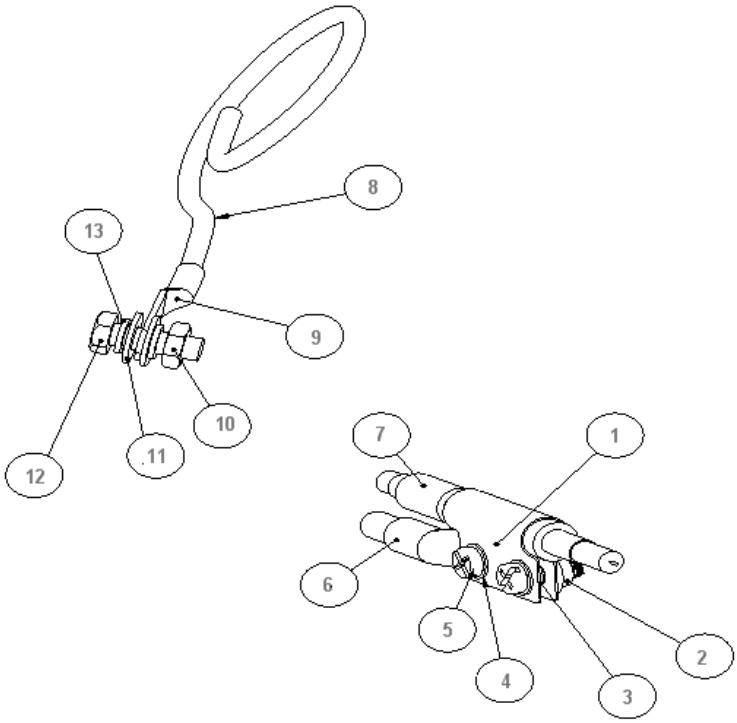
Context

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 F-8. Figure F-9 and Figure F-10 illustrate various grounding kits adopted for different diameters.

Figure F-8 Shielded Grounding Kit Structure



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

Figure F-9 Grounding Body 1 (adoptable for 6mm$_2$ two-core outdoor power cable)

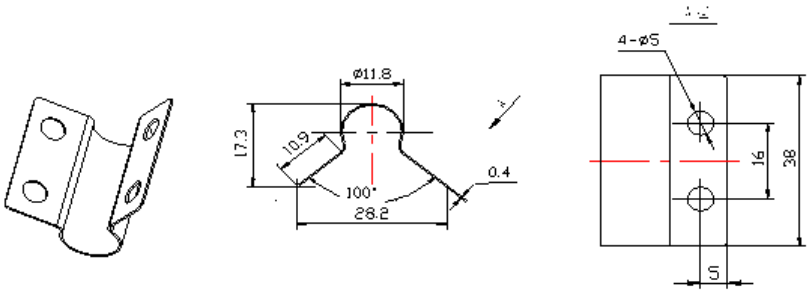
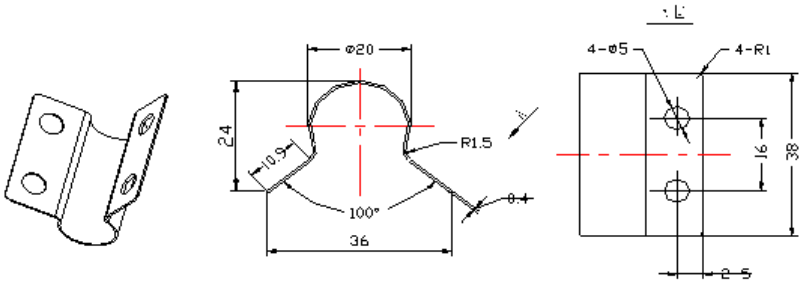
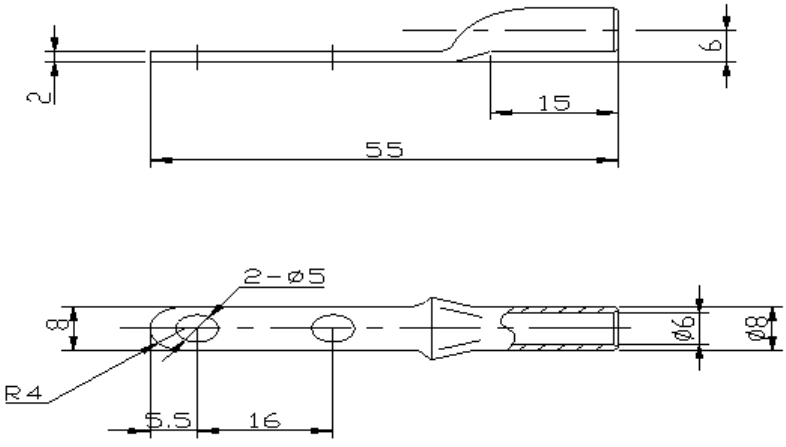


Figure F-10 Grounding Body 2 (adoptable for 16mm$_2$ two-core outdoor power cable)



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 F-11.

Figure F-11 Connecting Terminal (dual-hole)



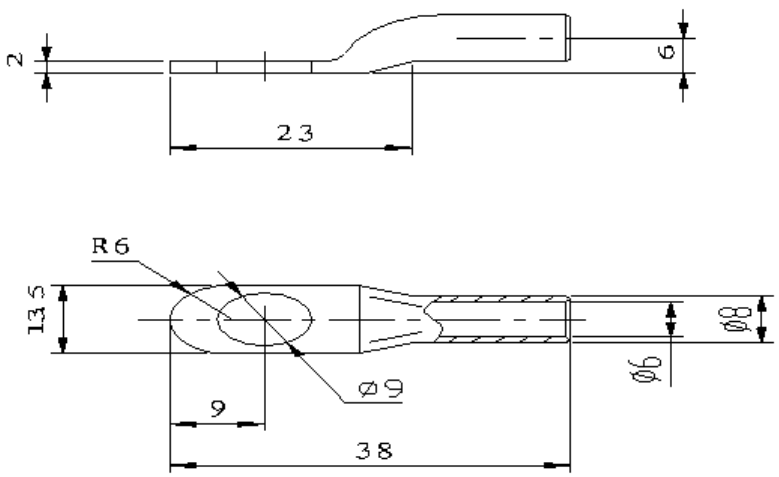
3. Perform waterproof processing for the junction between grounding kit and power cable. The methods are described as follows:

   a. Wrap waterproof self-adhesive tape and then wrap PVC adhesive tape.

b. 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 connecting 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 F-12.

Figure F-12 Connecting Terminal (single-hole)



– End of Steps –

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Appendix G
PDM

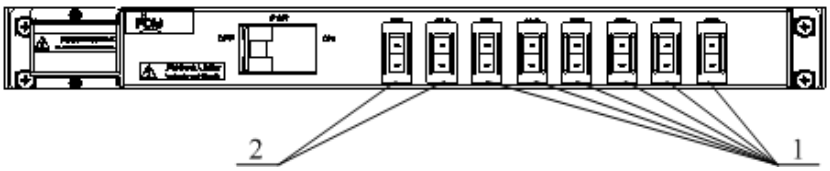
Table of Contents

G.1 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.

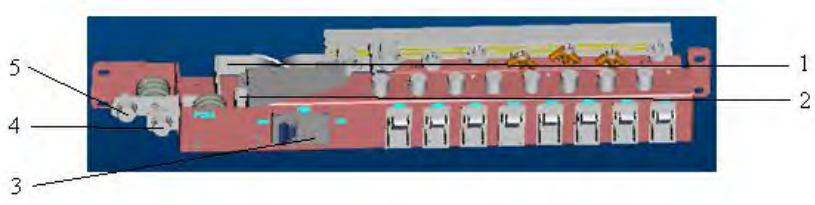
Figure G-1 and Figure G-2 illustrate the appearance and interfaces of PDM.

Figure G-1 Power Distribution Box Plane



1. BBU power switch
2. RRU power switch

Figure G-2 Power Distribution Box



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

G.2 Installing PDM

Context

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

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.

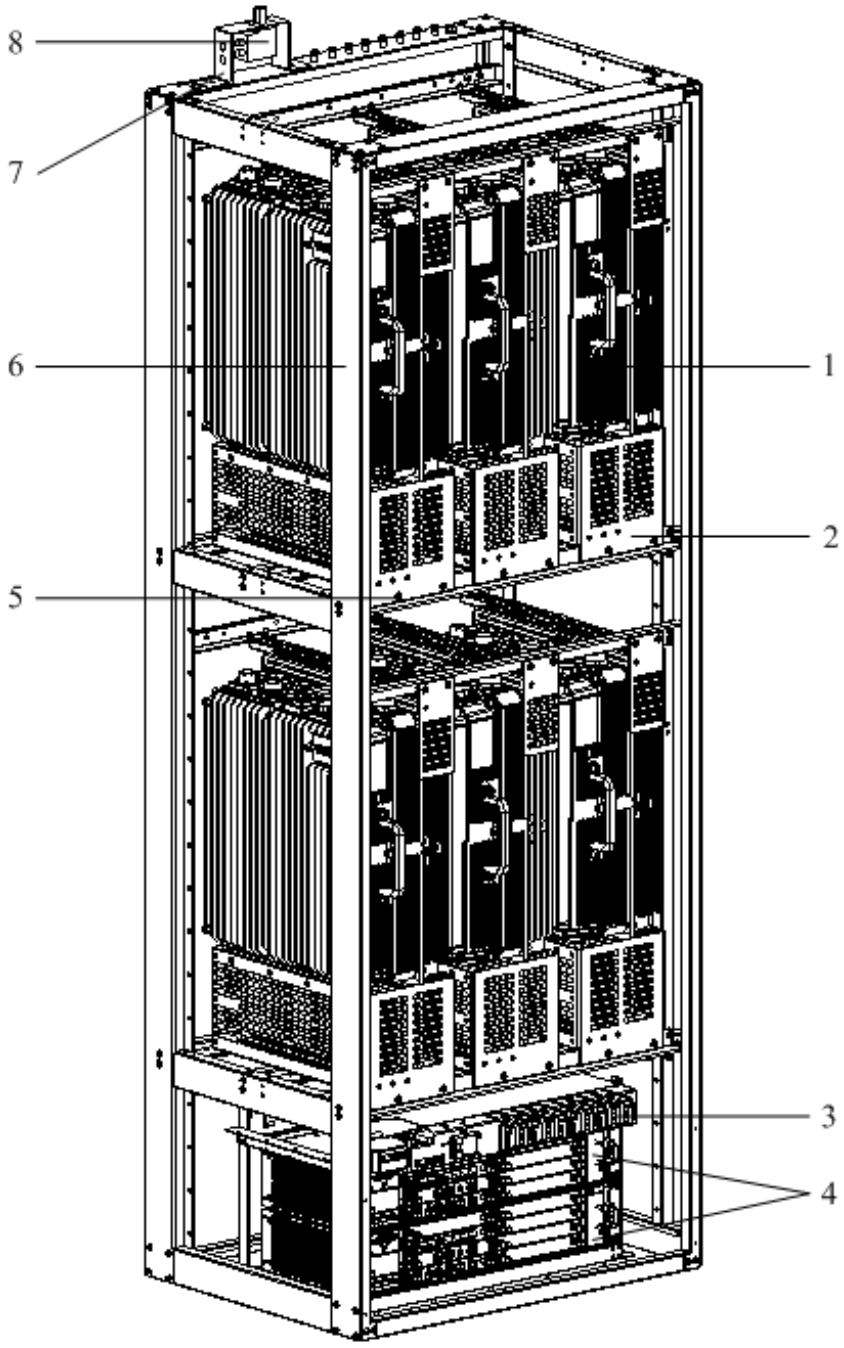
   Connect an end of internal cable to the OFF end of power switches and wrap adhesive tape, as shown in Figure G-3.

Figure G-3 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 G-4.

Figure G-4 PDM Installation to a Simplified Cabinet



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

Figure G-5 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 –

Figures

Tables

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Glossary

AISG
- Antenna Interface Standards Group

BBU
- BaseBand Unit

BSC
- Base Station Controller

BTS
- Base Transceiver Station

RF
- Radio Frequency

VSWR
- Voltage Standing Wave Ratio