



ZETA[®] Low-Power Wide Area Networks

APZC-SDR01 User Manual

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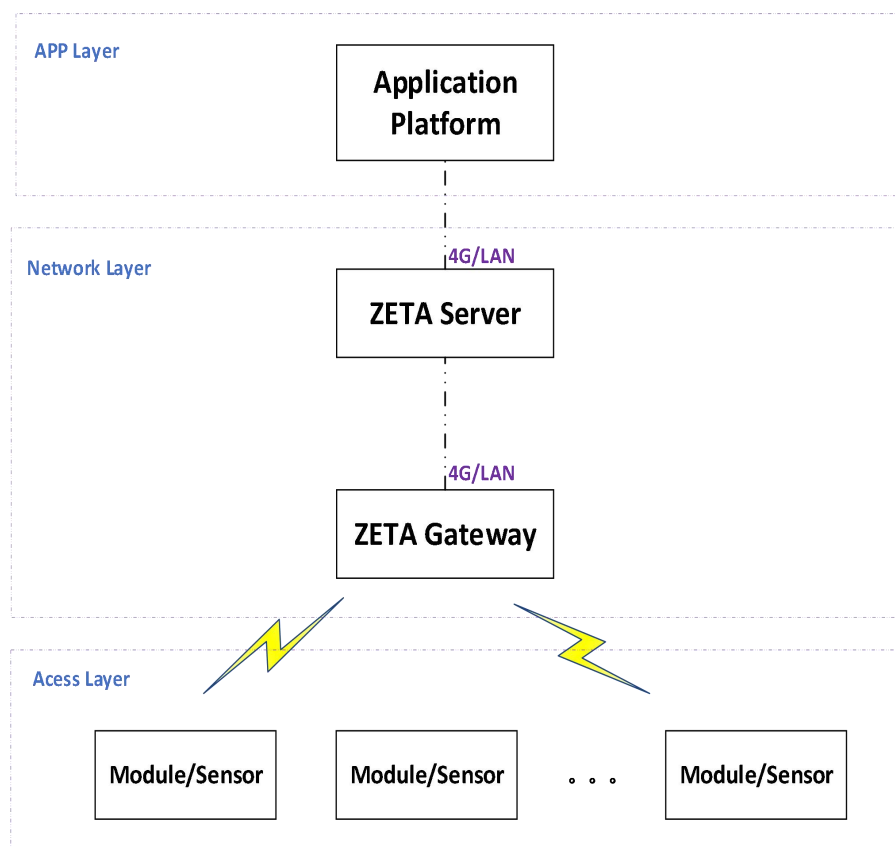
1 Abstract

This document applies to the ZETA Outdoor SDR Gateway (Model: APZC-SDR01) instructional use. This document serves as a maintenance instruction document for the Gateway and is used to instruct field personnel how to install and use the Gateway.

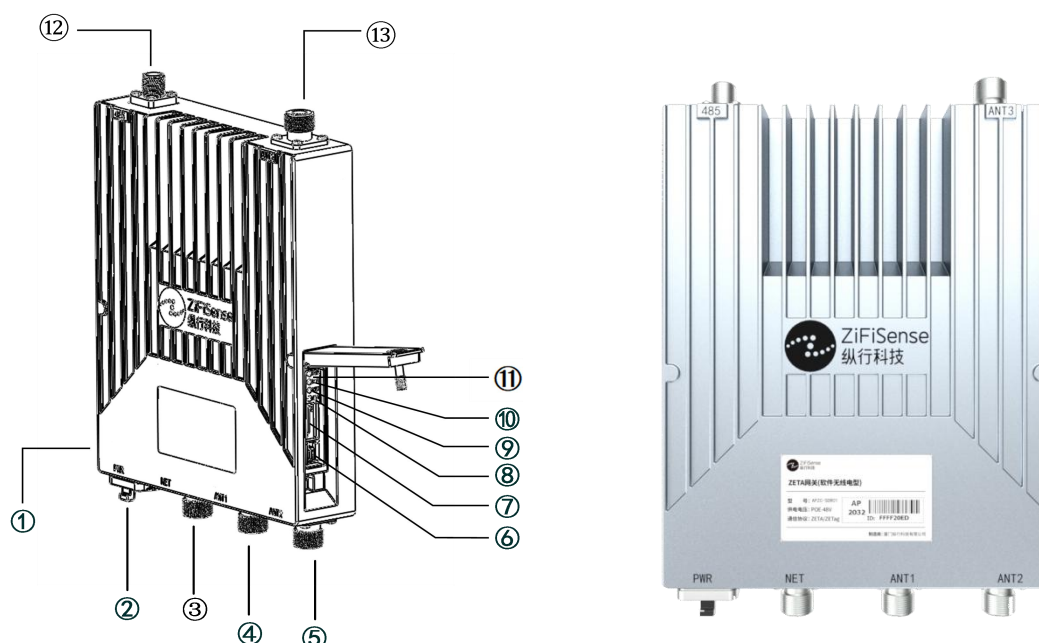
2 Product Description

2.1 Product Overview

Built-in Adv-MFSK® modulation method, supports high-capacity concurrency, good scalability, high flexibility, and adaptable rate, and carries the ZETA-C® protocol, which can be applied to fast and frequent downlink polling scenarios;The gateway supports RS485 or RS232 interface, which is compatible with scenarios of electric power Internet of Things.



2.2 Interfaces



No.	Name	Description
1	Ground	Connect to Ground
2	Power	Power and network data interface
3	NET	4G Antenna Port
4	ANT1	ZETA RF Antenna 1
5	ANT2	ZETA RF Antenna 2
6	Debug Port	USB Debug Port
7	SIM	SIM Card Slot
8-11	LED Light	RF/NET/RUN/PWR Status Indicator
9	LED Light	Network Status Indicator
12	Data Port	RS485 or RS232
13	ANT3	ZETA RF Antenna 3

No.	LED	Colour	State	Status
⑪	PWR	Red	Normal power supply	Light on
			Power supply abnormal	Light off
⑩	RUN	Green	Normal Operation	Flash (200ms)
			Abnormal operation	Light on
			Upgrading	Flash (1s)
⑨	NET	Green	Good signal	Flash (200ms)
			Weak signal	Light on
			Network connecting	Flash (1s)
⑧	RF	Green	RF operates normally	Flash (200ms)
			Abnormal RF operation	Light off

2.3 Specification

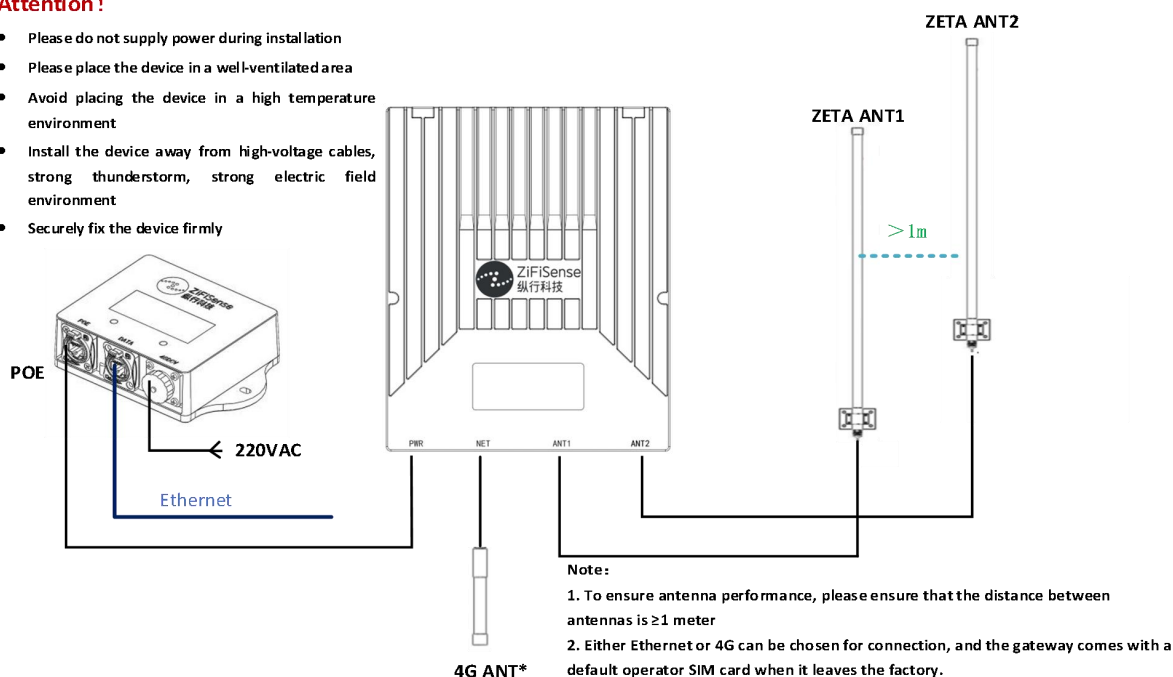
Wireless	Protocol	ZETA-C & ZETA-P/ZETA-S Dual-mode
	Support Frequency	920-925MHz/863-870MHz
	Modulation	Adv-MFSK [®]
	Tx Power	≤20dBm@920MHz ≤14dBm@868MHz
	Sensitivity	-122±2dBm@8kbps -130dBm±2dBm@300bps
	Antenna	1.75/0.8m FRP Antenna 1*4G Antenna
Electrics	Power supply	POE / 220VAC / ±48VDC
	Power	≤15W
Function	Supports noise scanning, remote OTA	
Physical Features	Size	225*180*42mm
	Material	ADC12 Alloy
	Installation	Pole Clamp, Nail Wall
	Protection	IP66
Environment	Operate temp	-20℃~55℃
	Storage temp	-40℃~75℃

3 Quick Guide

3.1 Quick start installation diagram

Attention !

- Please do not supply power during installation
- Please place the device in a well-ventilated area
- Avoid placing the device in a high temperature environment
- Install the device away from high-voltage cables, strong thunderstorm, strong electric field environment
- Securely fix the device firmly



3.2 Quick procedure

3.2.1 Platform account

Platform account is assigned by ZiFiSense for customers without registration, please contact technical support to get it.

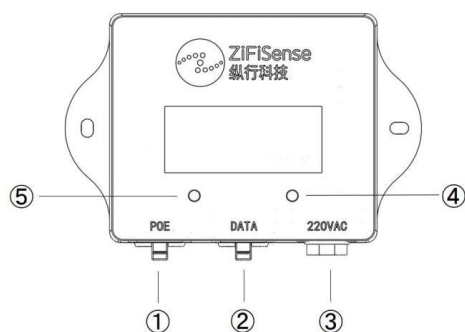
3.2.2 Log in/out

Enter the ZETAManagement Platform URL in your browser and enter your username, password and verification code on the login screen.

3.2.3 Initial power-up

The gateway is powered on when it is connected to the power supply. At this time, you can check whether the status of the device is normal through the power indicator, and the power supply provides 220V AC or 48V DC adapter, each of which is described below.

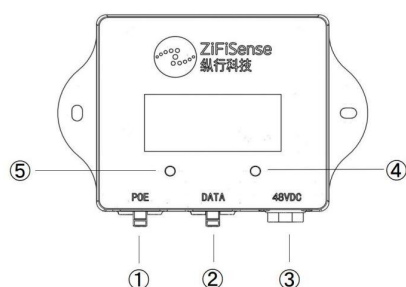
➤ 220V AC Power indicator



- ①Power output + data interface
- ②Network data interface
- ③Power input interface
- ④Power input indicator
- ⑤Power output indicator

No.	LED	Indicator	Color	Description	Status
④	INPUT	Power input indicator	Yellow	Input power supply is normal	Always bright
⑤	OUTUT	Power output indicator	Red	Input power supply is normal	Always bright

➤ 48V DC Power indicator



- ①Power output + data interface
- ②Network data interface
- ③Power input interface
- ④Power input indicator
- ⑤Power output indicator

No.	LED	LED	Indicator	Color	Description
④	INPUT	Power input indicator	Red	Input power supply is normal (power cord positive connection)	Always bright
			Green	Input power supply is normal (power cord is reversed)	Always bright
⑤	OUTUT	Power input indicator	Red	Output power supply is normal (power cord positive connection)	Always bright
			Green	Output power supply is normal (power cord is reversed)	Always bright

After the device is powered on, the device operation status can also be checked through the Power/Master/Network Connection/Antenna Operation indicator. Among them, the device status indicator is described as follows.

Note: The status indicator is on the side of the gateway, you need to open the cover, if not open the cover please login to the platform directly to check the status.

No.	LED	LED	Indicator	Color	Description
①	PWR	Power indicator	Red	Normal	Always bright
				Abnormal	Light off
②	RUN	Main control operation indicator	Green	Normal	Fast Flash (200ms)
				Abnormal	Always bright
				In upgrading	Slow Flash (1s)
③	NET	Network connection indicator	Green	Strong network signal	Fast Flash (200ms)
				Weak network signal	Always bright
				In connecting	Slow Flash (1s)
④	RF	RF operation indicator	Green	Normal	Fast Flash (200ms)
				Abnormal	Light off

3.3 RS485/232 interface definition

One end of RS485/RS232 uses M12-D code finished wire, and the other end should be wired according to the definition in the table below. It is recommended to connect the shielding ground and GND simultaneously.

No.	Colour	Description
1	Brown	RS485_A
2	White	RS485_B
3	Green	GND
4	Yellow	RS232_RX
5	Grey	RS232_TX
6	Black	Ground



4 Device Installation

4.1 Installation Note

4.1.1 Installation Environment

- ✓ It is strictly forbidden to install device in harsh environments that are not conducive to AP work, such as long-term high temperature, dusty, harmful gas, flammable, explosive, susceptible to electromagnetic interference (large radar stations, transmitting radio stations, substations), unstable voltage, high vibration or strong noise
- ✓ The device installation environment should be kept properly dry, and device installation in places prone to water accumulation, seepage, dripping and condensation is strictly prohibited. It is also not recommended to install the device near the sea (less than 500m from the sea), while avoiding the direction where the sea breeze is blowing
- ✓ In the engineering design, the address that meets the environmental design requirements of communication device engineering should be selected according to the technical requirements of communication network planning and communication device, taking into account climate, hydrology, geology, electricity, traffic and other factors

4.1.2 Relocation Safety

- ✓ Avoid moving the device frequently after it has been installed
- ✓ Turn off all power and disconnect power cords and other cables before moving or handling

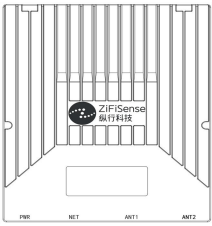
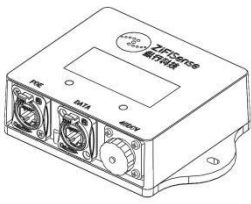
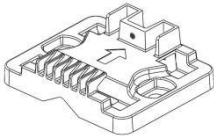
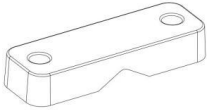
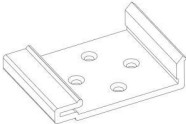
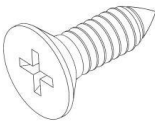
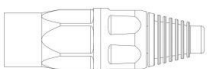
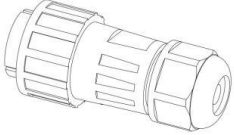
4.1.3 Electrical Safety

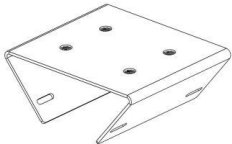
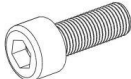
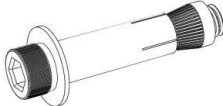
- ✓ When carrying out electrical operations, the regulations and codes of the location must be observed and the staff concerned must have the appropriate qualifications for the operation
- ✓ Check carefully for potential hazards in the work area, such as whether the floor is wet
- ✓ Before installation, know the location of the emergency power switch in the room where it is located and cut off the power switch when an accident occurs
- ✓ Do not put the device in a wet place or allow liquids to enter the device
- ✓ AP working place should preferably not be shared with the grounding device of electric device and lightning protection grounding device, and be as far away as possible
- ✓ Keep away from strong power wireless device such as wireless transmitter, radar transmitter, high frequency and high current, microwave oven

4.2 Pre-installation preparation

4.2.1 Inventory of device and accessories

Before installing the device, please check whether the accessories are complete according to the delivery list, the following is the standard accessories list (**Note: The following list is for general delivery, the actual delivery (whether or not the contents of accessories are included) may vary slightly and should be subject to the order contract. Please check your goods carefully according to the packing list or order contract. If you have any questions or errors, please contact the seller**) .

		
1*Gateway	1*Power Module	1* Mounting bracket 1
		
1* Mounting bracket 2	2* T-bolts	2* Nuts
		
1* Guide rail clips	4* Self-tapping screws	2* Network port connector
		
1* Power Connector	(1-2)* RF Antenna	1*4G Antenna

		
2*Antenna mounting backplane	8* Hexagon socket screws	2*Feeder Lines
		
4* Stainless steel cable ties	2* Expansion screw (optional)	

4.2.2 Provide your own installation tools

Before the installation of the device, the customer is required to provide the following installation tools and auxiliary materials:

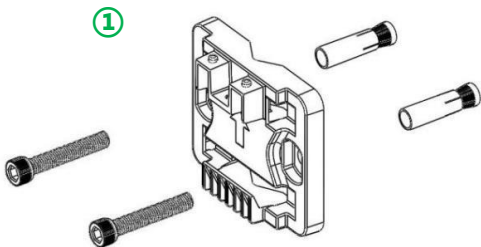
Tools	Amount	Description
Crossed screwdriver	1	mounting gateway brackets, antennas, hoops, etc.
Single screwdriver	1	mounting gateway brackets, antennas, hoops, etc.
No.10 open-end wrench	1	fixing screws and nuts
Waterproof tape	1	gateway interface waterproofing
Waterproof mastic	1	gateway interface waterproofing
Electrician's knife	1	Cute waterproof tape and mastic
Outdoor Super Category 5 Network Cables	1	For device power (length to be determined by the actual alignment required)
Crystal Head	1	Need to pass the network cable through the waterproof plug, and then make the network cable connector
Network cable crimper	1	For PoE network cable production
Waterproof casing	several	For protection of exposed network cables (power cables)

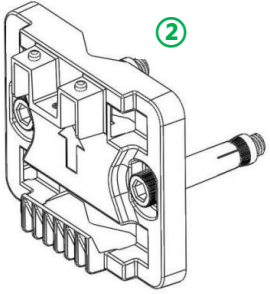
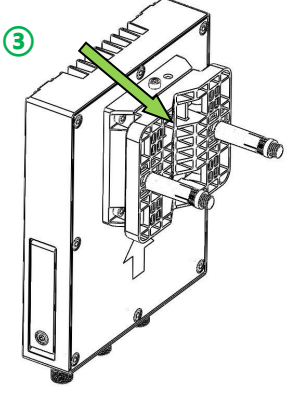
Expansion screws	several	wall mounting
Impact Drill	1	wall mounting
Tool Pliers	1	For screwing the earth wire
Strapping	several	For alignment fixing

4.3 Installation steps

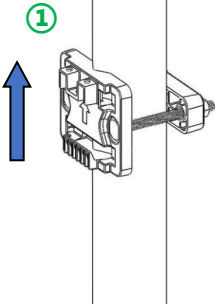
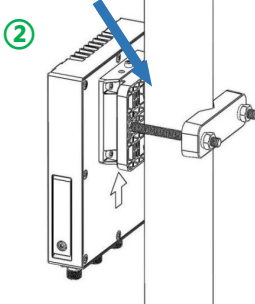
Steps	Name	Description
1	Main body mounting	Nail wall bracket/Holding bar installation
2	ZETA Antenna installation	ZETA Antenna mounting, interface protection
3	4G/Network cable installation	4G/Ethernet
4	Power supply installation	Power supply installation, interface protection
5	Gateway Grounding	Gateway grounding to prevent lightning strikes
6	Dust cap waterproof	Unused interface is waterproofed by dust caps

4.3.1 Step1: Main body mounting

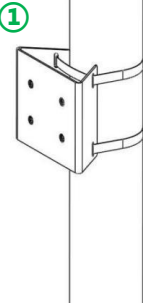
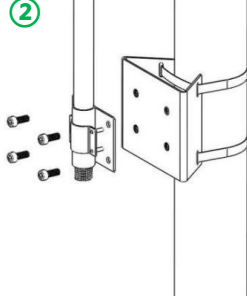
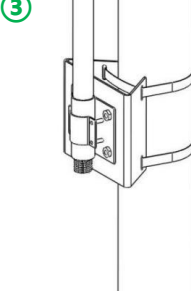
Opt1: Nail wall bracket	
	1) Pan the mounting bracket 1 to the target position on the wall, and after marking the position of the 4 screw holes on the wall with a marker (the connection of adjacent holes should be vertical), remove the mounting plate. 2) Drill four 60mm deep holes in the screw holes marked on the wall with a 12mm drill bit.

 1) Tap the 4 expansion bolts into the 4 drilled holes, rotate and tighten the screws and then remove the screws. 2) Attach the mounting bracket 2 to the wall with 4 screws.	 Hang the gateway on the mounting bracket 1 and tighten the hexagonal screws.
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Opt1: Holding bar

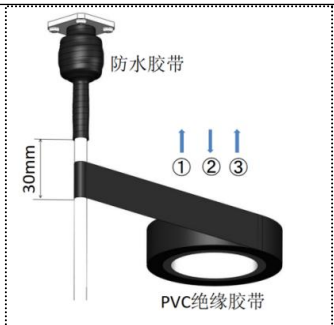
 Lock the mounting bracket 1 and mounting bracket 2 to the holding bar with bolts and nuts (note that the arrow of mounting bracket 1 is installed facing upward).	 Hang the gateway on the mounting bracket 1 and tighten the hexagonal screws.
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4.3.2 Step2: ZETA Antenna Installation

1) Antenna accessories installation		
		

Tie the antenna backplane to the holding bar with two stainless steel.	RF antenna with four M6 hexagonal screws locked in the backplane, note that the antenna interval ≥ 1 m	Lock the screws to complete the installation of antenna accessories
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2) Antenna interface waterproof treatment

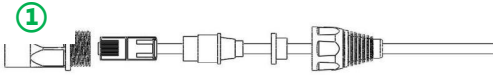
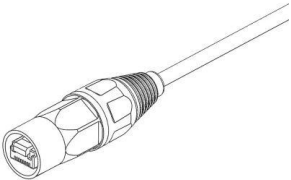
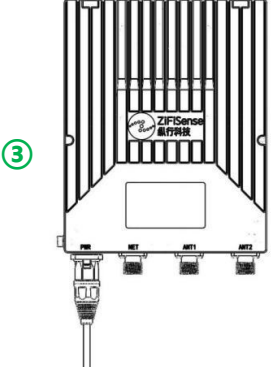
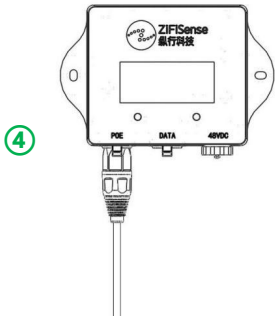
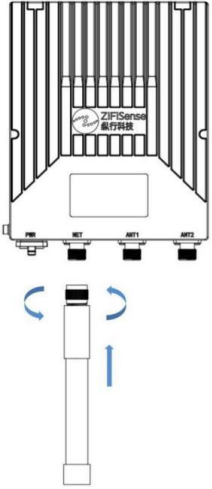
	Wrap three layers of waterproof tape Start winding from the bottom 50mm of the antenna connector to the top of the connector, first from bottom to top layer by layer, then from top to bottom layer by layer, and finally from bottom to top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the bottom tape by hand to ensure the waterproof.
	Wrap three layers of PVC insulation tape Wrap from 30mm below the waterproof tape to the top of the connector, first from the bottom to the top layer by layer, then from the top to the bottom layer by layer, and finally from the bottom to the top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the tape at the bottom by hand to ensure that it is waterproof.
	Tie the wire buckle at 3mm~5mm from the end of the PVC insulation tape to prevent the tape from aging.

Notice:

- When winding waterproof tape, the tape needs to be stretched evenly so that its length is twice the original length.
- When winding PVC insulation tape, the tape should not be stretched.
- When winding the tape layer by layer, the upper layer covers more than 1/2 of the next layer, and each layer should be pulled tight and compacted to avoid wrinkles and gaps.
- Completely bond and self-fuse to avoid loosening.
- Make sure that the adhesive side of the tape is covered with the tape already wrapped.
- A margin of 3mm to 5mm is required when cutting the cable tie fastener.

4.3.3 Step3: 4G antenna / network cable installation

Install 4G antenna when the system solution uses 4G backhaul, and install network cable when the system solution uses Ethernet local deployment backhaul.

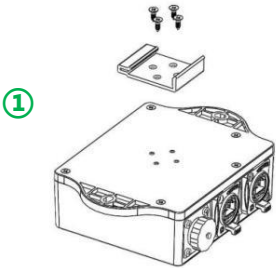
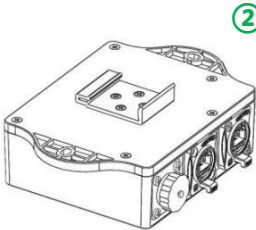
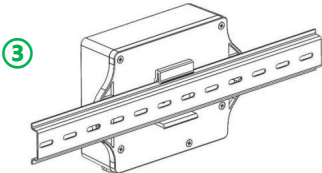
1) Network cable installation	
 Pass the unpressed end of the crystal head through the waterproof plug and tail of the connector	 Snap the crystal head into the connector head and rotate the connector head and tail to tighten.
 Plug the connector into the gateway PWB terminal.	 After the other end of the network cable is fitted with a connector, plug it into the POE terminal of the power module.
2) 4G Antenna Installation	
 Screw the 4G antenna vertically down and counterclockwise	

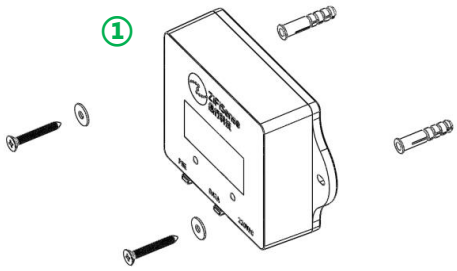
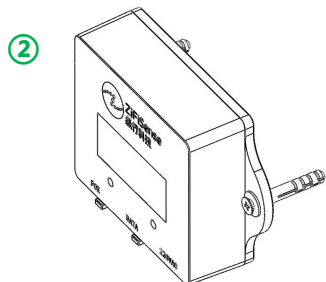
4.3.4 Step4: Power supply installation

Power supply installation is divided into the main body of the power supply installation and power cord installation, power cord interface protection three parts, including the main body of the power supply installation to provide rail and nail wall installation methods.

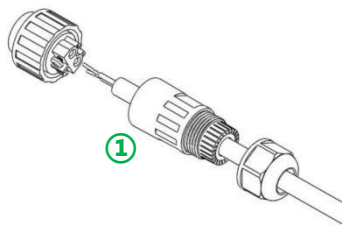
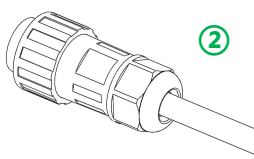
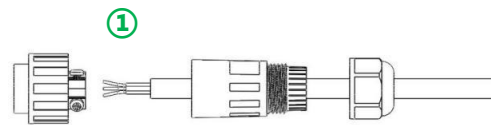
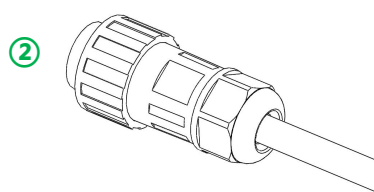
The power supply part provides +48V DC adapter or 220V AC adapter model, equipped with DC power cord or AC power cord two installation instructions, including power cord cable specification requirements: cable diameter 6 ~ 11.5mm, single line square line 0.5 ~ 4mm².

1) The steps and methods of power supply body installation are as follows.

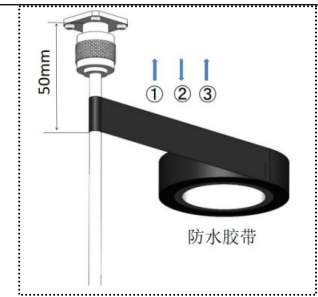
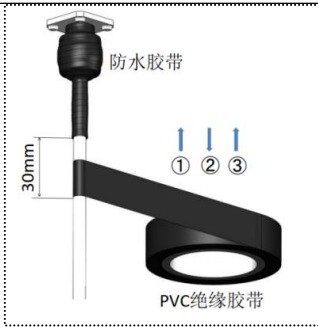
Opt1: Guide rail installation	
 Lock the rail clips to the power module back cover with 4 self-tapping screws.	 Locking screw fixing.
 Secure the power module to the U-rail.	
Opt2: Nail wall installation	

 1) pan the power module to the target location on the wall and mark the location of the 2 screw holes on the wall with a marker; 2) Drill 2 holes 40mm deep in the marked screw holes on the wall with an 8mm drill bit; 3) hammering 2 expansion screws into the 2 drilled holes;	 Locking the power module to the wall with 2 screws + spacers
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2) The power cord installation steps and methods are as follows.

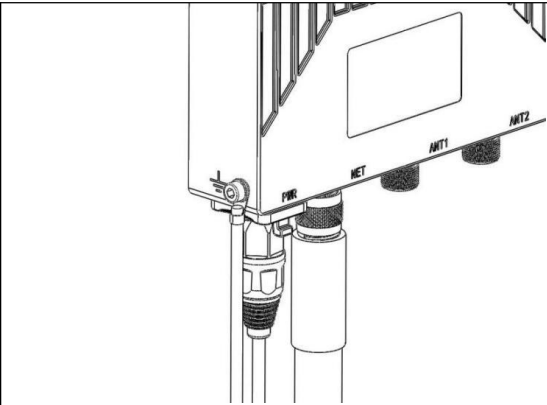
DC Power Installation	
 Pass the power cable through the waterproof head after stripping the core, positive->L, negative->N.	 Rotate and tighten the three parts of the connector
AC Power Installation	
 Strip the power cord after the core through the waterproof head, fire -> L, zero -> N, ground -> ground.	 Rotate and tighten the three parts of the connector

3) The steps for waterproofing the power data terminals are as follows.

	Wrap three layers of waterproof tape Start winding from the bottom 50mm of the antenna connector to the top of the connector, first from bottom to top layer by layer, then from top to bottom layer by layer, and finally from bottom to top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the bottom tape by hand to ensure the waterproof.
	Wrap three layers of PVC insulation tape Wrap from 30mm below the waterproof tape to the top of the connector, first from the bottom to the top layer by layer, then from the top to the bottom layer by layer, and finally from the bottom to the top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the tape at the bottom by hand to ensure that it is waterproof.
	Tie the wire buckle at 3mm~5mm from the end of the PVC insulation tape to prevent the tape from aging.
Notice: ● When winding waterproof tape, the tape needs to be stretched evenly so that its length is twice the original length. ● When winding PVC insulation tape, the tape should not be stretched. ● When winding the tape layer by layer, the upper layer covers more than 1/2 of the next layer, and each layer should be pulled tight and compacted to avoid wrinkles and gaps. ● Completely bond and self-fuse to avoid loosening. ● Make sure that the adhesive side of the tape is covered with the tape already wrapped. A margin of 3mm to 5mm is required when cutting the cable tie fastener.	

4.3.5 Step5: Gateway Grounding

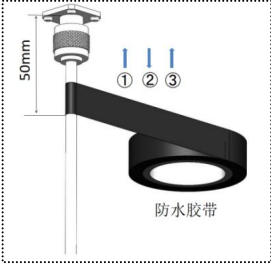
Gateway grounding requirements and steps
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- **Requirements:**
- Grounding cable cross-sectional area required 6mm², grounding terminal OT6-5
- **Steps:**
- 1) Fix the grounding terminal at the joint of the antenna and tighten it with tool pliers
 - 2) The other end of the grounding wire is connected to the end of the lightning protection network in the field construction area, pay attention to the whole process to ensure the connection with the metal

4.3.6 Step6: Dust cap waterproof

Do not remove the dust cap from the antenna connector that is not in use or is not in use for a while. The operation steps are as follows.

	Confirm that the dust cap has not been removed;
	Wrap three layers of waterproof tape Start winding from the bottom 50mm of the antenna connector to the top of the connector, first from bottom to top layer by layer, then from top to bottom layer by layer, and finally from bottom to top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the bottom tape by hand to ensure the waterproof.
	Wrap three layers of PVC insulation tape Wrap from 30mm below the waterproof tape to the top of the connector, first from the bottom to the top layer by layer, then from the top to the bottom layer by layer, and finally from the bottom to the top layer by layer. Cut the tape after all three layers are wrapped. When each layer is finished, pinch the tape at the bottom by hand to ensure that it is waterproof.

	Tie the wire buckle at 3mm~5mm from the end of the PVC insulation tape to prevent the tape from aging.
Notice: ● When winding waterproof tape, the tape needs to be stretched evenly so that its length is twice the original length. ● When winding PVC insulation tape, the tape should not be stretched. ● When winding the tape layer by layer, the upper layer covers more than 1/2 of the next layer, and each layer should be pulled tight and compacted to avoid wrinkles and gaps. ● Completely bond and self-fuse to avoid loosening. ● Make sure that the adhesive side of the tape is covered with the tape already wrapped. A margin of 3mm to 5mm is required when cutting the cable tie fastener.	

5 FAQ

When the device is commissioned, if the gateway is powered up and no online prompt is seen on the platform:

- Check the power supply, make sure the gateway power supply is normal
- Check the antenna, whether the antenna is connected correctly and whether it is properly screwed
- Check the network cable, check whether the network cable is normally connected
- Check the SIM card, whether it is inserted normally
- Check the status light, check whether the indicators are normal
- Check the platform device status, in the (device management - gateway management) list, check whether the current device status is "online"
- Check whether the heartbeat packet (once every 3 minutes) data of the gateway is normal
- If it still does not work, you can re-power the gateway device and start it again to see if it is restored

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Connected Intelligence, Anytime Anywhere

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.