Ethernet Type Rainfall Sensor Instruction Manual

JXBS-6001-YL

Ver1.0

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CHAPTER1 PRODUCT BRIEF INTRODUCTION

1.1 Product Overview

The Ethernet-type rain sensor is a sensor that uses Ethernet to transmit rainfall. It measures rainfall concentration in real time and uses a network cable for transmission. The device supports two forms: active upload and TCP Modbus. This series of products make full use of the existing Ethernet network to achieve unlimited distance data collection and transmission and centralized control.

1.2 Functions and Features

This product uses a high-sensitivity sensor with stable signal and high precision. It has the characteristics of wide measurement range, good linearity, good waterproof performance, convenient use, easy installation, and long transmission distance.

This product is widely used in computer room monitoring systems, security engineering, medical and health monitoring, energy consumption monitoring systems, smart home systems and other systems.

1.3 Main Parameters

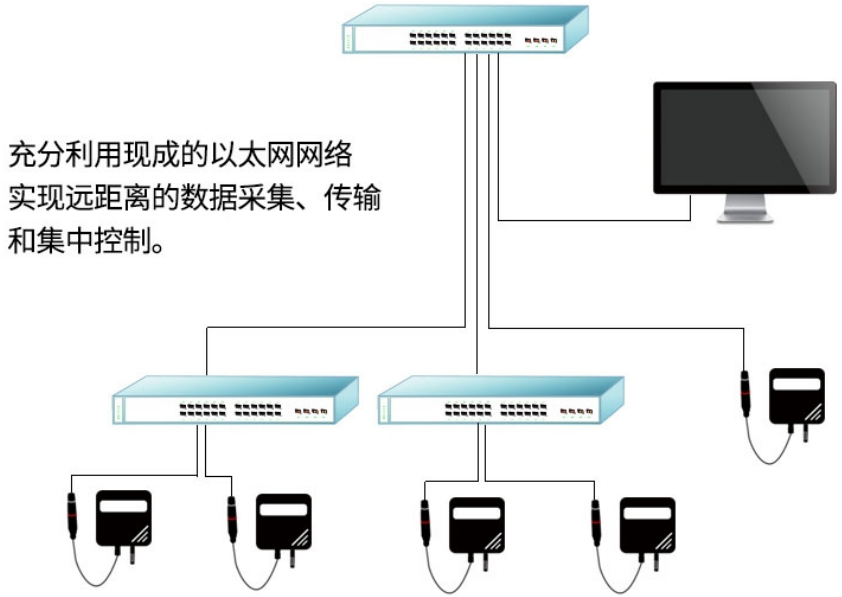
Name of parameter	Parameter content
DC power supply	12V-24V DC
POE power supply	48V standard POE power supply (optional)
Transmission interface	RJ45 10M/100M adaptive

Communication Protocol	Active report/TCP modbus
DNS dynamic resolution	Support

1.4 Rainfall Parameters

Parameters	Technical index
Rainfall measurement range	0-30mm/min
Allowable current	5mA
Rainfall accuracy	0.2mm
Warranty	Complete machine 2 years (probe warranty 1 year)
Response time	Generally less than 15 seconds
Baud rate	2400/4800/9600
Power consumption	<1W
Operating temperature	-30-50℃(-20-40℃ continuous)
Working humidity environment	15-90%RH
Pressure range	Standard atmospheric pressure ± 10 %
Dimensions	110×85×44mm^3

1.5 System framework diagram



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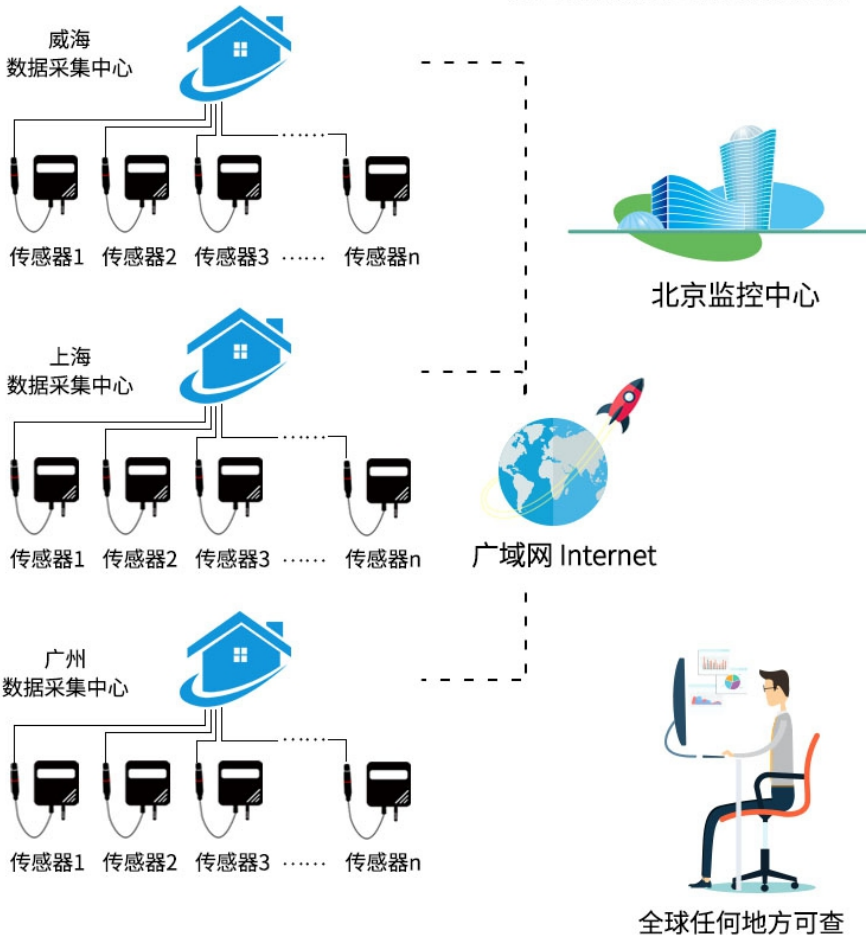


CHAPTER2 HARDWARE CONNECTION

2.1 Check Before Equipment Installing

Please check the equipment list before installing the equipment:

Name	Quantity
High precision sensor	1
12V waterproof power supply	1(option)
Warranty card/certificate	1

2.2 Interface description

The equipment is divided into ordinary DC power adapter power supply type and POE centralized power supply type. The specific interfaces are as follows.

	Style	Description
Power supply	Round mouth DC head	12-24V DC power supply
Network port	RJ45 interface	Connect 10/100M network cable

As shown in the figure above, it is a normal power supply version, which is divided into a DC port power supply port and a waterproof RJ45 network cable port.

The sensor of the ordinary power supply mode needs to be connected to the DC power supply when the network cable is connected. The default 50cm wire is provided at the factory.

	Style	Description
Network port	RJ45 interface	Connect 10/100M network cable standard POE network cable

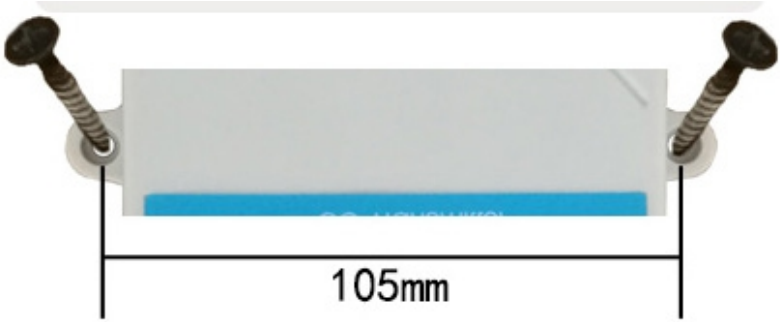
As shown in the figure above, it is a POE power supply version with a waterproof RJ45 port. When POE power supply, the network sensor has only one network interface, you only need to insert the POE network cable into the network port.

Note that this device only supports standard 48V national standard POE switches, and does not support 24V non-standard switches. If you have special requirements, please contact the manufacturer. This POE power supply is compatible with two power supply modes, 1236 and 4578.

2.3 Installation

This product is equipped with a default RJ45 waterproof connector for outdoor use. As shown in the figure below, please pass the network cable through the waterproof head, then press the crystal head, then insert the network cable and tighten the waterproof connector.

If you have no requirements for waterproofing, you can simply plug in the finished network cable and use it without using the waterproof protective cover.



The wall-mounted “王”-shaped shell is wall-mounted. The installation holes are located in the middle of both sides of the device. The installation hole diameter is less than 4mm, and the hole spacing is 105mm. It can be installed with 3mm self-tapping screws.

2.4 Installing Matters

The installation location needs to pay attention to the following:

1. The transmitter should be placed as vertically as possible to ensure that the sensor is below the transmitter when installing on the wall (the font on the transmitter is in the positive direction);

2. The installation height is the human sitting height or the environmental area where measurement is mainly required.

At the same time, please pay attention to the following precautions:

1. Avoid installing in areas that are easy to transfer heat and will directly cause a temperature difference with the area to

be measured, otherwise the temperature and humidity measurement will be inaccurate.

2. Install in an area with stable environment, avoid direct sunlight, stay away from windows, air conditioning, heating and other equipment, and avoid directly facing windows and doors.

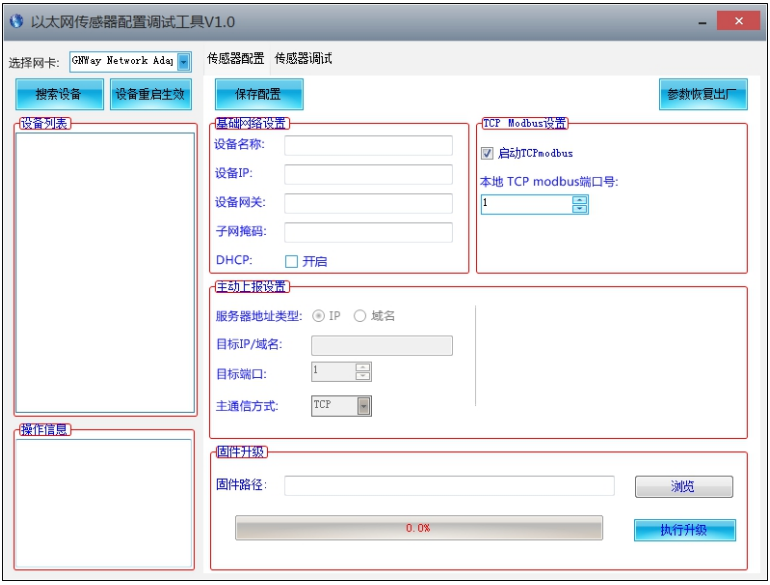
3. Keep away from high-power interference equipment as far as possible to avoid inaccurate measurement, such as inverters/motors.

CHAPTER3 CONFIGURATION SOFTWARE INSTALLATION AND USAGE

Our company provides the supporting "Ethernet Software Configuration and Debugging Tool", which can conveniently use the computer to set up the Ethernet sensor, modify the network information, and read the sensor value.

3.1 Basic Software Usage and Device Search

First of all, you need to unzip our sensor to a separate folder. Don’ t miss the files. Please make sure that the .Net version of your computer is 2.0 and above. Win7SP1 and above are all pre-installed with .Net2.0 version, XP or earlier Please install .Net2.0 for Win7.



The software interface is divided into the following parts, as shown in the figure, the left side is the device search and operation information display area, and the middle is the configuration area, which can carry out basic device configuration, sensor debugging and firmware upgrade.

Please note that you must first select the correct network card when using it, especially when your computer has a wired network card and a wireless network card. Then click Search Device, all online devices will be displayed in the device list, and then double-click the device you need to access in the device list to get the current basic configuration of the device. Please note that before each step, you must first search for the device and double-click the device, as shown in the figure

below.

You can modify the specified parameters, after modifying the parameters, click

3.2 Sensor network configuration

The basic settings of the equipment mainly include the following aspects:

Basic network settings	
Device name	Customers use to mark their own equipment names, modify them by themselves, and the length is no more than 10 Chinese characters or 20 English.
Device IP	The static IP of the Ethernet sensor itself, this IP is used when DHCP is not checked.
Device gateway	The gateway of the Ethernet sensor itself, use this gateway when DHCP is not checked.

Subnet mask	The subnet mask of the Ethernet sensor itself. Use this subnet mask when DHCP is not checked.
DHCP	Automatically search for IP, it will automatically obtain IP, gateway, and subnet mask according to the router in your network. If DHCP is not enabled in the router, a static IP will be used after 1 minute.
	TCPmodbus settings
start up TCPmodbs	After checking this option, the device works as a TCPmodbus slave. TCPmodbus and active upload can only choose one
Local TCP modbus port	The listening TCP port number.
	Proactively report settings
Server address type	You can choose to upload to a designated IP or a designated domain name. Choose one of IP format or domain name format.
Target IP/domain name	The specified IP or domain name to be uploaded to. The length of the domain name cannot exceed 14 English.
Destination port	The specified port to be uploaded to.
Main communication mode	TCP protocol or UDP protocol used for active upload.

3.3 Sensor Parameter Setting

Some parameters can be set on the sensor debugging page. Note that when setting these parameters, the device must work in TCP modbus mode, and cannot work in active upload mode.

TCPmodbus configuration settings

TCPmodbus slave address	The slave address of TCPmodbus can be set, ranging from 0-253, where 254 is the broadcast address.
Protocol type	You can choose the active upload protocol type, 0 means not uploading actively, 1 means uploading actively using the system default protocol, 2 means uploading actively using other protocols.
Reporting interval	The reporting interval of active upload, the unit is 1s, and the range is 1-65535 seconds.

3.4 Switch between active upload and TCPmodbus mode

The system works in TCP modbus mode by default. If you need to switch to the active upload mode, please follow the steps below. Pay attention to the sequence of steps not to be disordered, otherwise the configuration will fail.

①Set the reporting protocol to 1 on the sensor debugging page, and modify the reporting interval to the interval you expect.

②On the sensor configuration page, uncheck the option to start TCPmodbus, set the active report setting, and save the configuration.

If you need to switch back to TCPmodbus mode, please follow the steps below, paying attention to the sequence of steps not to be disordered, otherwise the configuration will fail.

①On the sensor configuration page, check the option to start TCPmodbus and save the configuration.

②Set the reporting protocol to 0 on the sensor debugging

page.

CHAPTER4 Communication Protocol(TCP modbus)

4.1 TCP modbus Basic Communication Protocol

TCP Modubs is composed of two parts, consisting of MBAP header and PDU data packet.

The MBAP data header contains the following parts:

Area	Length	Description	Client (Host)	Server (Slave)
Transmission flag	2 bytes	The serial number during MODBUS request and response transmission is generally incremented by 1 for each transmission.	Generated by the client	Copy the value when answering
Protocol sign	2 bytes	Modbus protocol defaults to 0	Generated by the client	Copy the value when answering
Length	2 bytes	The length of the remaining part	Generated by the client	Generated by the server when responding
Unit flag	1 byte	Slave flag (slave address)	Generated by the client	Copy the value when answering

Among them, the PDU data composition is as follows,

compared with the Modbus-RTU protocol, the check code is missing.

Function code	Register address start	Regisiter length
1byte	2 bytes	2 bytes

Slave machine response frame structure:

Function code	Effective bytes	First data area	Second data area	Nth data area
1 byte	2 bytes	2 bytes	2 bytes	2 bytes

4.2 Register Address

Register address	PLC configuration address	Content	Oprating
0000H	40001	Rainfall (Unit 0.2mm)	Read only
0100H	40101	Device address (0-252)	Read and write
0101H	40102	Baud rate (2400/4800/9600)	Read and write

4.3 Communication Protocol Example and Explanation

4.3.1 Read the Rainfall Value of Device Address 0x01

Interrogation frame

Transmission flag	Protocol sign	Length	
0x00 0x01	0x00 0x00	0x00,0x06	
Unit flag	Function code	Initial address	Data length
0x01	0x03	0x00,0x00	0x00,0x01

Response frame (for example, the value of rain is 18.9mm)

Transmission flag	Protocol sign	Length	
0x00 0x01	0x00 0x00	0x00,0x05	
Unit flag	Function code	Effective bytes	Rainfall value
0x01	0x03	0x02	0x00 0xBD

Rainfall:

00BDH (hexadecimal)=189=>rainfall=18.9mm

CHAPTER5 ACTIVE ESCALATION PROTOCOL

5.1 Active Reporting Method

The device can actively report in the TCP or UDP mode, and the reporting is in the Client mode. The TCP uses the long connection form, and the device has the KeepAlive mechanism. It will actively maintain the connection with the service area and perform unlimited disconnection reconnections.

5.2 Basic Composition of the Protocol

The basic components of the agreement are as follows:

Frame header (2) + version (1) + device ID (6) + transmission Session (4) + command byte (1) + length (2) + content (n) + checksum (1)

The frame header is 2 bytes, which is fixed as 0xfe 0xdc.

The device version number is 1 byte, which is 0x01 in this protocol.

The device ID is 6 bytes and is fixed inside the factory.

Each device has a unique device ID. Customers can use this ID to distinguish different devices.

The transmission session is 4 bytes, designated by the device, and incremented by 1 each time it is sent to identify the transmission sequence of the device.

See below for command byte, length and content.

The checksum is 1 byte. The checksum is not used in this protocol and is fixed at 0 here.

5.3 Proactive Reporting Protocol

The command byte, length, and content of the actively reported command are as follows.

Command byte	**Length**	**Content**
0x03	0x30（48）	Refer to the data report content below

Data report content:

Data 1 content (4 bytes)	**Data 2 content (4 bytes)**	**..**	**Data 12 content (4 bytes)**

5.4 Proactively Report Protocol Examples

Among them, fe dc is the fixed frame header, 01-bit version number, the unique id of the device is ab4ea325, the session of this instruction is 00000005, and the length of this data is 0030, which is 48 bytes.

The first number uploaded is 00000050, which means that the current rainfall content is 8.0mm, the remaining 11 sets of data are all used for 00000000, and the last 00-bit checksum.