

# **INSTRUCTION MANUAL**

**Soil temperature and humidity sensor**

**GPRS / 4G / NBloT / Lora / WiFi / Ethernet**

**VER 1.0**

# I PRODUCT INTRODUCTION

## 1.1 Product Overview

The wireless soil temperature and humidity sensor is a sensor that uses a wireless network for transmission. It does not require a special communication line and can rely on the ubiquitous mobile phone signal network. The product is excellent in waterproofing and can adapt to long-term field environment work.

This device supports multiple wireless working modes, including traditional GPRS, Ethernet, WIFI and 4G modes, as well as low-power modes such as the new Lora mode and NB-IOT mode. Supports city power DC power supply, and also supports battery power for Lora and NB connection.

This device measures soil temperature and humidity data in real time and transmits it using a wireless network. The network transmission of this product adopts a stable and reliable carrier network, mature technology and stable transmission, strong signal and wide coverage. At the same time, the device supports timing data collection and active upload to the server platform.

## 1.2 Primary Parameters

### 1.2.1 Probe parameter table

PARAMETERS	TECHNICAL SPECIFICATIONS
MEASURING RANGE	-40~80°C

<b>MEASURIMENT RESOLUTION</b>	0.1°C
<b>Temperature measurement accuracy</b>	±0.5°C
<b>Moisture measurement range</b>	0~100%
<b>Measurement resolution</b>	0.1%
<b>measurement accuracy</b>	Reading ± 3% (within 0 ~ 53%)
<b>Response time</b>	1s
<b>Protection class</b>	Fully embedded or all probes inserted into the test medium

## 1.3 Equipment And Communication Parameters

### 1.3.1 GRPS Product Parameters

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<b>Parameters name</b>	<b>Parameters content</b>
<b>DC POWERED</b>	<b>12V-24V DC</b>
<b>PRODUCT POWER</b>	<b>&lt;0.4W</b>
<b>TRANSMISSION INTERFACE</b>	<b>GPRS wireless signal transmission</b>
<b>BAND SYSTEM</b>	<b>GSM</b>
<b>OPERATIONAL SUPPORT</b>	<b>China Mobile 、 2G signals from China Unicom</b>

### 1.3.2 4G Product Parameters

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<b>Parameters name</b>	<b>Parameters content</b>
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<b>DC POWERED</b>	<b>12V-24V DC</b>
<b>PRODUCT POWER</b>	<b>&lt;0.4W</b>
<b>TRANSMISSION INTERFACE</b>	<b>4G wireless signal transmission</b>
<b>BAND SYSTEM</b>	<b>FDD-LTE, TDD-LTD, TD-SCDMA, UMTS, EV-DO, CDMA, GSM</b>
<b>OPERATIONAL SUPPORT</b>	<b>China Mobile 、 China Unicom 、 China Telecom's 4G、 3G 、 2G full Netcom</b>

### 1.3.3 NB-LOT Product Parameters

<b>Parameters name</b>	<b>Parameters content</b>
<b>POWER SUPPLY</b>	<b>Battery-powered / DC-powered(12V-24V DC)</b>
<b>BATTERY SERVICE LIFE</b>	<b>≥ 1 year (Customizable higher by default)</b>
<b>TRANSMISSION INTERFACE</b>	<b>NB-LOT interface</b>
<b>BAND SYSTEM</b>	<b>NB-LOT/2G</b>
<b>OPERATIONAL SUPPORT</b>	<b>China Mobile 、 China Unicom 、 China Telecom NB-LOT</b>

### 1.3.4 Lora Product Parameters

<b>Parameters name</b>	<b>Parameters content</b>
<b>POWER SUPPLY</b>	<b>Battery-powered / DC-powered</b>
<b>BATTERY SERVICE LIFE</b>	<b>≥ 1 year (Customizable higher by default)</b>

<b>WORKING BAND</b>	<b>433/470/868/915MHz BAND</b>
<b>TRANSMISSION DISTANCE</b>	<b>800 meters (default) ~ 4500 meters (theoretical limit)</b>
<b>SIGNALING PROTOCOL</b>	<b>Lora-Wan or proprietary protocol</b>

### 1.3.5 WIFI Product Parameters

<b>Parameters name</b>	<b>Parameters content</b>
<b>DC POWERED</b>	<b>12V-24V DC</b>
<b>MAXIMUM POWER CONSUMPTION</b>	<b>&lt;0.6W</b>
<b>TRANSMISSION INTERFACE</b>	<b>WIFI</b>
<b>WIFI BAND</b>	<b>2.4G</b>
<b>DNS DYNAMIC RESOLUTION</b>	<b>Support</b>

### 1.3.6 Ethernet Product Parameters

<b>Parameters name</b>	<b>Parameters content</b>
<b>DC POWERED</b>	<b>12V-24V DC</b>
<b>POE POWERED</b>	<b>48V standard POE power supply (optional)</b>
<b>TRANSMISSION INTERFACE</b>	<b>RJ45 10M / 100M adaptive</b>
<b>LETTER OF AGREEMENT</b>	<b>Active reporting / TCP modbus</b>
<b>DNS DYNAMIC RESOLUTION</b>	<b>Support</b>

## II HARDWARE CONNECTIONS

## 2.1 Checking Before Installation

Check the list of devices before installation:

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Name	Number
HIGH-PRECISION SENSORS	1
ANTENNA	1 (4G / NB / LoRa) built-in
	1 (GPRS / WIFI) external
BATTERY (BATTERY VERSION)	1
12V WATERPROOF POWER SUPPLY (Power VERSION)	1 (Optional)
SIM IoT Card	1 (Optional)
Lora GATEWAY	1 (Optional)
WARRANTY CARD/CERTIFICATE OF CONFORMITY	1

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## 2.2 Product Appearance Dimensions

The following is the external dimensions of the sensor, which can be reasonably installed according to the size and structure, as shown in the figure:

(1) NB-IOT / LoRa power supply version



改图，加上相应尺寸，，同时体现出按键，如图



(2) 4G version



改图，加上尺寸，背景修改

(3) GPRS version



改图，加上相应尺寸，背景修改

(4) Power supply version of Ethernet



改图，加上尺寸，修改背景，

(5) Power supply version of Ethernet POE





改图，加上尺寸，修改背景，

## 2.3 SIM Card Installation

The device does not come with a SIM card by default. The user needs to install the SIM card device before use. When customers install the SIM card, please unscrew the four corners of the device to see the SIM card slot. Slot. After installing the SIM card, cover the front cover and tighten the screws.

Note: SIM cards are required for 2G, 4G, and NB-IoT devices.

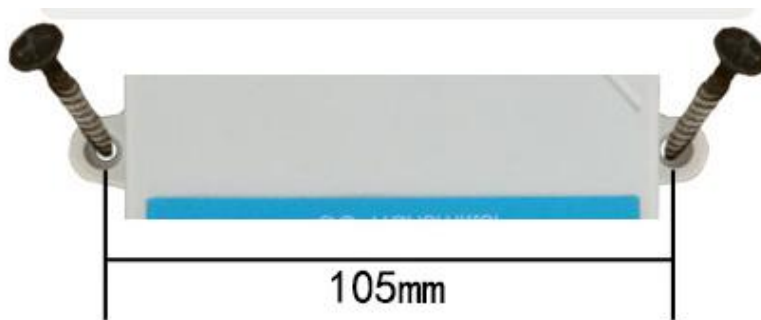
## 2.4 Equipment Interface And Installation

The product will choose to use the built-in antenna or external antenna according to the needs. When using the built-in antenna, the antenna is installed inside the casing, and the customer can use it without operating the power. If an external antenna is used, the antenna and the device are separated during transportation, please Screw the antenna to the device for installation.

When the device is DC-powered, the device is extended with a 10cm power

cord and the round port power connector is used, as shown in the figure below. If the device is battery powered, there will be no power cord.

Networked sensors are wall-mounted. The mounting holes are located in the middle of the two sides of the device. The mounting hole is less than 4mm and the hole distance is 105mm. It can be installed with 3mm self-tapping screws. As shown below.



## 2.5 Installation Description

The installation location needs to pay attention to the following:

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

2. The installation height is the sitting area of the human body or the environmental area where the main measurement is required.

Please also pay attention to the following precautions:

1. Avoid installation in areas where heat transfer is easy 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 light, keep away from windows and air-conditioning, heating and other equipment, and avoid directly facing windows and room doors.

3. Try to stay away from high-power interference equipment, so as not to affect the signal, such as inverter / motor.

## **III WIFI VERSION CONFIGURATION TOOL**

In the wifi environment, we provide a set of configuration tools for the sensor software, which can be used to easily configure the device using the network environment.

### **3.1 Basic Use Of Configuration Tools**

First you need to decompress our sensors into a separate folder, do not miss the files, please make sure that your computer's .Net version is 2.0 and above, and all versions of Win7SP1 and above are pre-installed. Win7 please install .Net2.0.

As shown in the figure below, the software interface is divided into the following parts. The left side is the device search and operation information display

area, and the middle is the configuration area. You can perform basic device configuration, sensor debugging, and firmware upgrade.

When using, click Search for a device. At this time, 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 you must first search for the device and double-click the device before each step, as shown below.



## 3.2 Sensor Network Configuration

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

### Proactive reporting settings

Server address type	You can choose to upload to the specified IP or specified domain name. Choose either IP or domain name.
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Target IP / domain name	The specified IP or domain name to upload to. The domain name cannot exceed 32 English characters.
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Destination port	The specified port to upload to.
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Main communication mode TCP protocol or UDP protocol for active upload.

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## IV ETHERNET VERSION CONFIGURATION TOOL

Our company provides a matching "Ethernet software configuration and debugging tool", which can conveniently use a computer to set up Ethernet sensors, modify network information, and read sensor values.

### 4.1 Basic Software Use and Equipment Search

First you need to decompress our sensors into a separate folder, do not miss the files, please make sure that your computer's .Net version is 2.0 and above, and all versions of Win7SP1 and above are pre-installed. Win7 please install .Net2.0.





The software interface is divided into the following parts. As shown in the figure, the device search and operation information display area is on the left, and the configuration area is in the middle. The basic configuration of the device, sensor debugging and firmware upgrade can be performed.

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



You can modify the specified parameters. After modifying the parameters, click.

## 4.2 Search Sensor Network Configuration

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

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### Basic network settings

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**Device name** It is used by customers to mark their own device names and modify them by themselves. The length is not more than 10 Chinese characters or 20 English.

**Device IP** The static IP of the Ethernet sensor itself. Use this IP 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.

### TCPmodbus settings

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start up TCPmodbs      After ticking this option, the device works in TCPmodbus slave mode. TCPmodbus and active upload can only choose one

Local TCPmodbus port      The TCP port number to listen on.

#### Proactive reporting settings

Server address type      You can choose to upload to a specified IP or a specified domain name.

Target IP / Domain Name      Choose either IP or domain name.

Destination port      The specified IP or domain name to upload to. The domain name cannot exceed 14 English characters.

Master communication mode      The specified port to upload to.

### 4.3 Sensor Parameter Setting

You can set some parameters 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.

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TCPmodbus configuration settings

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TCPmodbus slave address	You can set the slave address of TCPmodbus, the range is 0-253, where 254 is the broadcast address.
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greement type      You can choose the type of active upload protocol. 0 means not actively uploading, 1 means actively uploading using the system default protocol, 2 means actively uploading using other protocols.

Reporting interval	Reporting interval of active upload, unit is 1s, range is 1-65535 seconds.
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## 4.4 Switch Between Active Upload And TCPmodbus mode

The system works by default in TCP modbus mode. If you need to switch to the active upload mode, please follow the steps below, and pay attention to the order of the steps. Otherwise, the configuration will fail.

① Set the reporting protocol to 1 on the sensor debugging page, and modify the reporting interval to your desired interval.

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

If you need to switch back to TCPmodbus mode, please follow the steps below, pay attention to the order of the steps, otherwise the configuration will fail.

① On the sensor configuration page, select the option to enable TCPmodbus to save the configuration.

② Set the reporting protocol to 0 on the sensor debugging page.

## **V DEVICE DATA ON THE CLOUD**

### **5.1 Introduction to Jingxun Cloud**

Jingxun Cloud, a universal IoT cloud platform developed by Jingxun Changtong, based on industry solutions, solves the problem of traditional cloud platforms that focus on light links and light experience. Based on the links, it upgrades the display effect and style of the previous paragraph and integrates more than ten The industry interface template is a set of IoT systems that integrates solutions, data collection, early warning release, remote control, and data analysis. Jingxun Cloud provides data recording, query, export, comparison and other functions, mainly providing customers with a one-stop joining service at the application layer.

### **5.2 Jingxun Cloud Advantage**

(1) Stability: High stability, the overall system availability is greater than 99.7%, the database application availability is greater than 99.8%, and it is regularly maintained.

(2) Ease of operation: Provide friendly user management and use circles

(3) Reliability: When designing the system, ensure the reliability of the system by selecting excellent products and adopting necessary technical means

(4) Compatibility: Other company's products are based on our server agreement, and the data can also be viewed on our platform.

(5) "Thousands of people": It has a privatized deployment and provides two entrances, normal entrance and neutral entrance. After entering from the neutral entrance, the interface information that customers see is the information set by customers

(6) WeChat Mini Program: You can use mobile WeChat to easily and conveniently view device status, data, and device binding locations.

### **5.3 Sensor Data Query**

When you purchase a sensor with a report function, you can remotely view the data through Jingxin Cloud Server, which is convenient and fast.

The sensor device establishes a connection with Jingxin Cloud Server through the 4G / NB-IOT network module, and reports the data to the Cloud Server according to the default frequency (frequency adjustable).

You only need to log in to the server with the registered Jingxun Cloud account, and then use the unique "identity ID" of each host to query the device's data.

At the same time, the platform also has an alarm function. You only need to set the alarm value through the platform, and the monitoring data exceeds the alarm value. The platform will notify you via SMS or QQ mailbox, making it easier and faster to monitor the data.

Note: You can contact our after-sales staff to understand the specific functions of the platform.