

Version number: **Rev. 2.0**

Please read this instruction manual
carefully before using the product

Soil sensing transmitters

(4G/LoRa Standard Version)

WE-T214 Instruction Manual



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Chapter 1 Product Overview:

1.1 Overview

The WE-T214 is a high-performance multi-parameter transmitter designed for measuring soil temperature, humidity, and conductivity. The device uses 4G/LoRa communication technology to achieve long-distance and high-reliability data transmission. The power supply mode is DC12-24V DC power supply, which meets the strict requirements of stable operation in industrial sites.

The transmitter has the characteristics of high sensitivity, accurate measurement, stable operation, low power consumption, strong weather resistance, and convenient operation, and can conduct real-time monitoring and accurate analysis of the temperature, humidity and conductivity of the soil on site. Through 4G/LoRa communication technology, data is transmitted over long distances, and the data is uploaded to the equipment management platform and third-party customer platforms of Shidian Technology to complete the real-time collection, comprehensive analysis, data storage and visual display of multiple soil parameters.

The transmitter adopts a split structure of body and probe, and provides a variety of installation methods according to the different soil characteristics and installation conditions of the site, which is widely suitable for fine management and environmental monitoring needs in agriculture, forestry, horticultural planting and other fields.



1.2 Features

- The PC web page can monitor the three indicators of soil (soil temperature, soil moisture, and soil conductivity) at any time
- Power supply: wide voltage DC9-30V power supply, lithium battery 19000mAh, Solar panel 40W20AH
- Operating temperature range (-20~70)° C



- Fully sealed waterproof design with IP67 protection
- High-gain antenna and multiple verification mechanisms ensure always-on
- It supports high-definition LCD display, with LED indicators and buttons, and can check temperature, humidity, conductivity, etc. in real time on the spot.

1.3 Technical parameters

表1 Parameter table

Input	
Measure variables	Soil temperature, soil moisture, soil conductivity
Measurement range	Soil temperature: $(-40\sim 85)^{\circ}\text{C}$ Soil moisture: 0~100% Soil conductivity: 0~20mS/cm
Performance parameters	
Accuracy	Soil temperature: $\pm 0.5^{\circ}\text{C}$ ($0\sim 40^{\circ}\text{C}$) $\pm 1.5^{\circ}\text{C}$ ($-40\sim 85^{\circ}\text{C}$) Soil moisture: 3% Soil conductivity: 3% FS
resolution	Soil temperature: 0.1°C Soil moisture: 0.1% Soil conductivity: 0.01mS/cm
Signal transmission	LoRa network communication It supports the 410.125~490.125MHz frequency band The maximum transmit power is 22dbm, the maximum -147dbm reception sensitivity, and the signal coverage capability is 5KM in the open viewing distance
	4G network communication It supports MQTT, HTTP, and WES cloud service protocols Region: EMEA/Australia/New Zealand LTE FDD: B1/3/5/7/20/28 GNSS:GPS/GLONASS/BDS/Galileo/QZSS LTE-FDD (Mbps): 10 (downlink) / 5 (uplink).
Sampling period	It can be set in 1min~18 hours
Reporting cycle	It can be set in 1min~18 hours
Positioning cycle	It can be set in 1min~18 hours
Electrical specifications	
Power supply	9~30DC, typical 24V
	Lithium battery, 19000mAh



	Solar Panel, 40W20AH
environmental conditions	
Work environment	Transmitter Host: Temperature: $(-20\sim70)^{\circ}\text{C}$, Relative Humidity: 5%~95% Transmitter Probe: Temperature: $(-40\sim85)^{\circ}\text{C}$
Storage temperature	Transmitter host: $(-40\sim85)^{\circ}\text{C}$ Transmitter probe: $(-40\sim85)^{\circ}\text{C}$
Protection level	Transmitter host: IP67 Transmitter probe: IP68
Main unit size, weight	121*51.4*78 mm 190g (main unit does not include antenna and cable)
Wire length and connection	Probe Wire: 0.5m + 0.5m waterproof screw cap connector connection Power cord: 0.5m + 0.5m waterproof screw cap connector connection
How the host is installed	Guide rails, hoops, wall mounting, snap rings
Probe mounting method	Horizontal buried installation

1.4 System principle

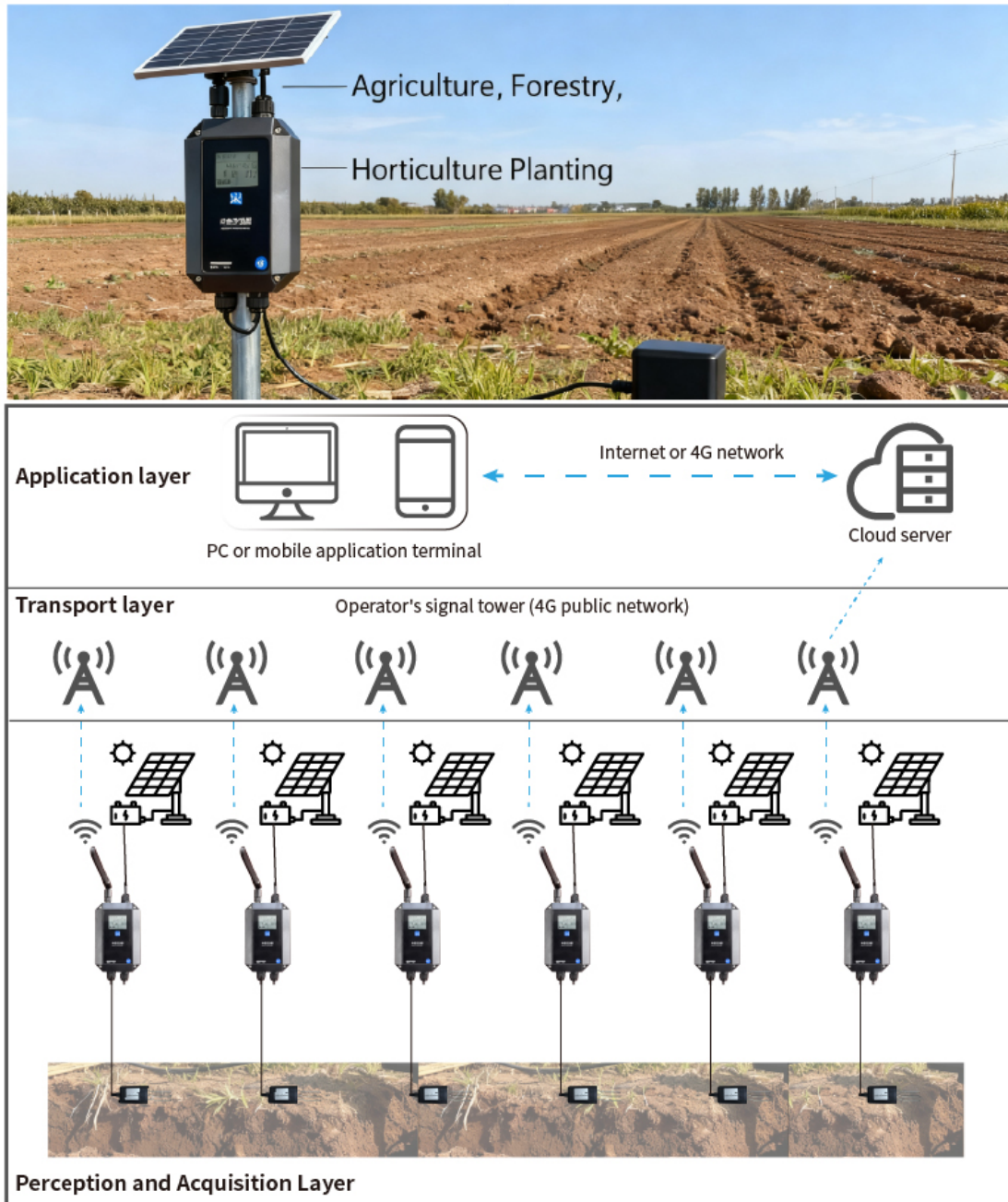
The measurement principle of the soil temperature and humidity conductivity three-in-one transmitter is that the sensor emits a high-frequency electromagnetic wave into the soil through a probe, and the probe and soil together form a capacitor, so as to obtain the soil dielectric constant. The calibration curve stored in the sensor converts the measured dielectric constant value into volumetric moisture content to accurately determine soil moisture. Conductivity is measured based on the conductivity of dissolved salt ions in the soil.

The soil temperature and humidity conductivity 3-in-1 transmitter generally consists of a soil temperature and humidity conductivity 3-in-1 sensor and a transmitter, which are connected by cables. When the sensor collects the soil temperature, humidity and conductivity values on site, it is transmitted to the transmitter through the cable.



Chapter 2 App Description:

2.1 Applying topology diagrams



Product application topology



2.2 Application scenarios

This soil sensor transmitter adopts the innovative structure of body and probe split, with the fully sealed anti-corrosion probe design and flexible adaptation installation system, it can provide probe insertion type, shallow buried type, deep drilling type and other installation solutions according to different soil characteristics such as sandy, clayey, saline-alkali and complex installation conditions such as plains, hills, deserts, etc., which can be deployed without large-scale



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excavation and minimize the damage to the soil structure. Its strong environmental adaptability and multi-parameter monitoring capabilities enable it to play a central role in various soil scenarios, widely serving the needs of refined management and environmental monitoring:

- Deep adaptation of core scenarios
 1. **Soil monitoring of cultivated land:** In wheat, corn and other fields, sensors can be buried in the key layer of the root system of 20-30cm, collect soil moisture, temperature, conductivity and nitrogen, phosphorus and potassium nutrient data in real time, and link the irrigation system through wireless transmission to achieve "water supply on demand", and at the same time guide variable fertilization according to fertility changes, such as a farm in Shandong, China, after applying such equipment, the water saving rate reaches 25% and the yield increases by 18%.
 2. **Desert soil monitoring:** In view of the harsh environment of desert drought and wind and sand, the sensor adopts a sand prevention and burial installation design, and its acid and alkali resistant shell can be buried in the sand layer for a long time, continuously monitor soil moisture content and salinity dynamics, construct a moisture change model to predict drought risk, provide data support for vegetation restoration such as sea buckthorn and shuttlecock, and significantly improve the survival rate of planting.
 3. **Soil monitoring of garden companies:** In urban parks, green belts and other scenarios,



garden companies accurately capture the differences in soil temperature and humidity in different regions through distributed deployment of sensors, and horticulturists adjust the irrigation frequency and water volume according to the data to avoid plants from wilting due to uneven dryness and wetness, while reducing water waste by more than 25%, taking into account ecological benefits and ornamental value.

4. **Soil monitoring of garden plant transfer:** Before and after plant transplanting, quickly detect the soil pH, organic matter content and humidity of the original growth site and the new planting site with the help of a handheld portable probe to ensure that the soil environmental parameters of the two places match, and adjust the maintenance plan based on the dynamic monitoring data during the seedling delay period, so that the survival rate of landscape seedlings transplanted can be increased by more than 30%.
5. **Tomato orchard soil monitoring:** In greenhouse tomato planting, sensors frequently monitor the temperature, humidity and EC value (conductivity) of the 10-20cm soil layer, and trigger the salt drainage system in time when the salinity exceeds the standard to avoid soil compaction and crop root burning.
6. **Soil monitoring of olive tree plantations:** According to the characteristics of the deep root system of olive trees, the probe is buried in the 30-40cm soil layer by using deep drilling installation, continuously tracking changes in soil moisture and pH, and formulating irrigation plans based on phenological period data, effectively improving the sugar content and oil yield of olive fruits, and helping the development of the high-quality olive oil industry.

- More scenarios are fully covered

In addition to the above scenarios, the sensor is also widely used in: soil moisture monitoring in mine greening areas to ensure the growth of restored plants such as centipede grass; At the saline-alkali land improvement site, real-time tracking of conductivity changes and optimization of improvement plans; In the substrate cultivation of greenhouses, the water content of the substrate is monitored to achieve precise integrated management of water and fertilizer. In the scientific research and experimental field, multi-parameter data is collected simultaneously to support soil ecological research. From farmland to desert, from gardens to laboratories, wherever there is soil, it can provide "accurate, efficient, and low-cost" monitoring solutions.



Chapter 3 Appearance dimensions

3.1 Appearance introduction



Product appearance diagram

3.2 Dimension description



Product dimensions



Chapter 4 Device local operation

4.1 Interface display instructions



Serial number	Description
1	System time
2	Battery level
3	Humidity units
4	Temperature units
5	Conductivity unit
6	Conductivity measurements
7	Humidity measurements
8	Alarm information
9	Temperature measurements



4.2 Instructions for operating the buttons on the side of the host

operation	Description
Click	Light up the screen and backlight Switch pages



4.3 Indicator Light Description

Com indicator: Flashing green, indicating that it has been reported once



Chapter 5 Bluetooth configuration

5.1 Configuration Overview

Using the desktop Bluetooth configuration tool SerialTest, you can configure the device reporting cycle, sampling cycle, positioning period, positioning timeout, and APN through AT commands. (Note: The computer must support Bluetooth)

PC Bluetooth Configuration Tool, Download Link:

http://linponasserver.quickconnect.cn/d/s/15ksM8c1kqgrNtabHCC7RDvZSfwuULuR/YhxOYiX8_9leRxUTPWQLgrmc9n_02Xz-1L6A_N91uww

表2 The AT directive is defined in the table below:

directive	Instruction description	Syntax	Syntax description	Examples and descriptions
PERIOD	Set and query the parameters of the device reporting period and sampling period	Test instructions: AT+PERIOD=?	Test the instruction and return parameter help information	Example: AT+PERIOD=?<CR><LF> Response: <4G>, <sensor>OK Parameter description: <4G>: Reporting cycle <Sensor>: Sampling period
		Set up instructions: AT+PERIOD=<4G>, <sensor>	Set the reporting and sampling periods	Example: AT+PERIOD=300, 120<CR><LF> Response: OK
		Query Instructions: AT+PERIOD?	Query the current reporting period and sampling period	Example: AT+PERIOD?<CR><LF> Response: AT+PERIOD=300, 120<CR><LF>OK
LOCATE	Set and query the device positioning period and positioning	Test instructions: AT+LOCATE=?	Test the instruction and return parameter help information	Example: AT+LOCATE=?<CR><LF> Response: <period>, <timeout>OK Parameter description: <period>: Positioning period <timeout>: Locate the timeout
		Set up	Set the	Example:



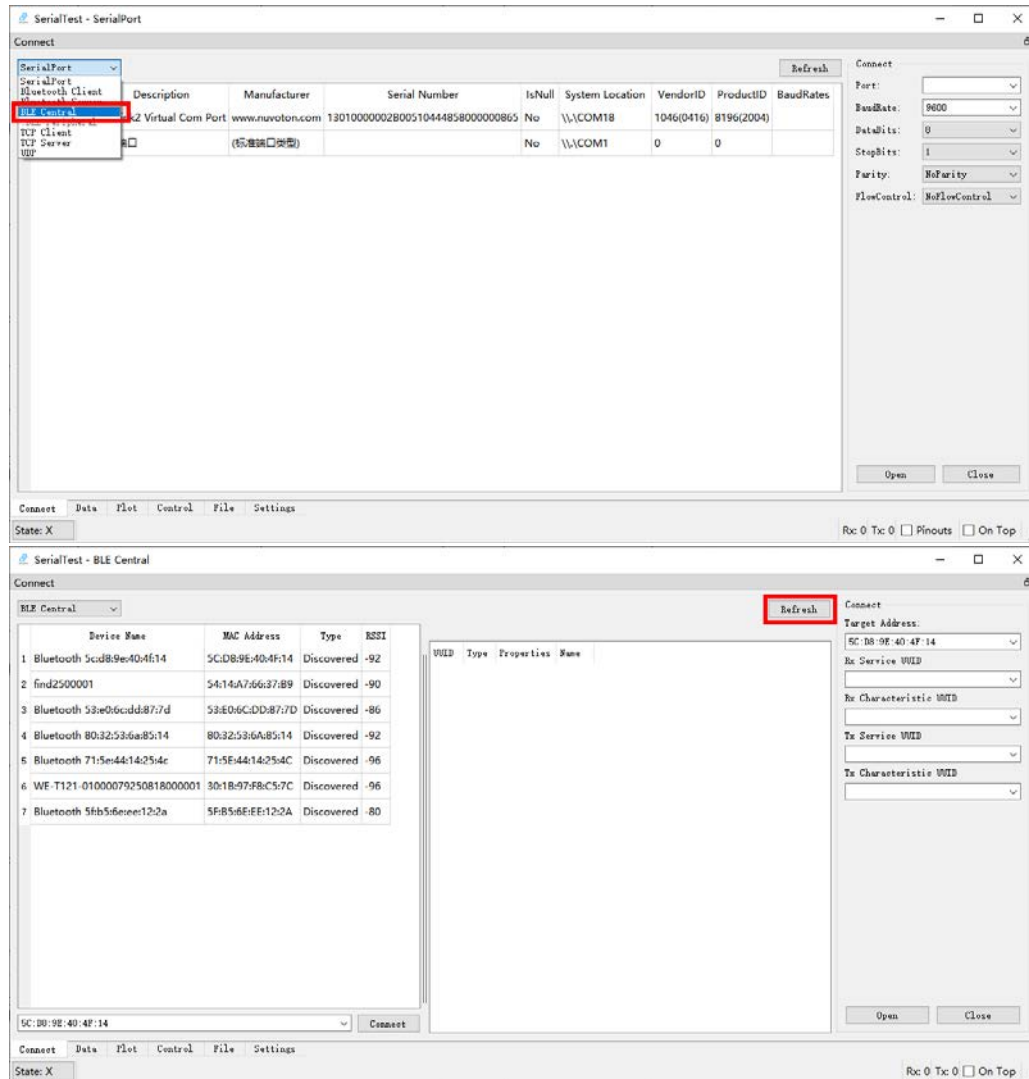
	timeout parameter s	instruction s: AT+LOCATE=< 4G>,<sensor >	positioning period and positioning timeout	AT+LOCATE=600,60<CR><LF> Response: OK
		Query Instruction s: AT+LOCATE?	Query the current positioning period and the positioning timeout	Example: AT+LOCATE?<CR><LF> Response: AT+LOCATE=600,60<CR><LF>OK
APN	Set and query the APN parameter s of the device	Test instruction s: AT+APN=?	Test the instruction and return parameter help information	Example: AT+APN=?<CR><LF> Response: <apn>,<username>,<password>,<aut hentication>OK Parameter description: <apn>: The name of the access point. String type. <username>: The PDP- authenticated username. String type. If not required, you can set it to an empty string <password>: The password for the license of the PDP authentication. String type. If not required, you can set it to an empty string < authentication>: Authentication method (0-3) 0: No authentication (default). 1 : PAP (Password Authentication Protocol) 2: CHAP (Challenge-Handshake Authentication Protocol) 3: PAP or CHAP (as determined by the network)
		Set up instruction s: AT+APN=<apn >,<username >,<password >,<authenti cation>	Set APN	Example: AT+APN="cmnet","","",0<CR><L F> Response: OK



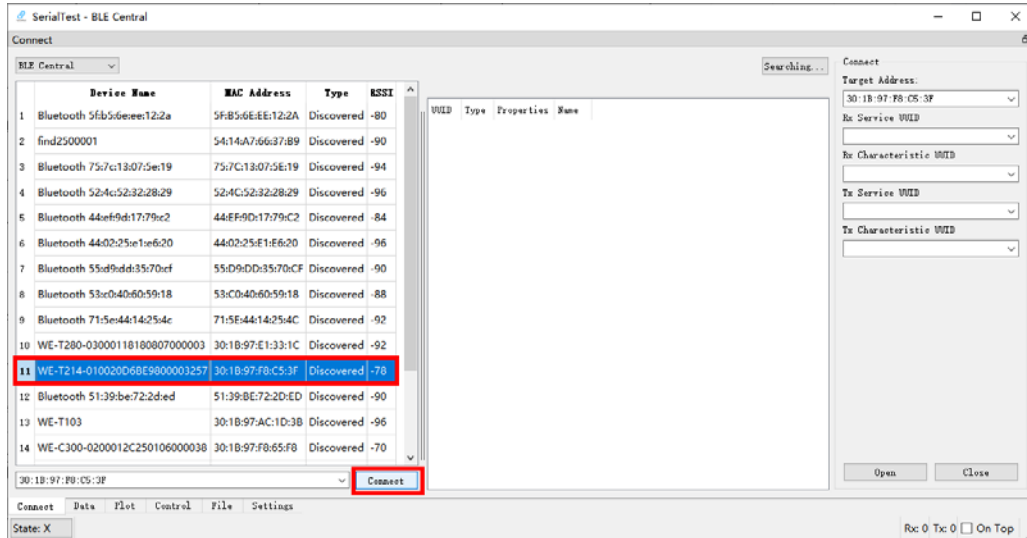
		Query Instruction: AT+APN?	Query the current APN	Example: AT+APN?<CR><LF> Response: AT+APN="cmnet", "", "", 0<CR><LF>OK
--	--	-------------------------------	-----------------------	---

5.2 Operation Examples

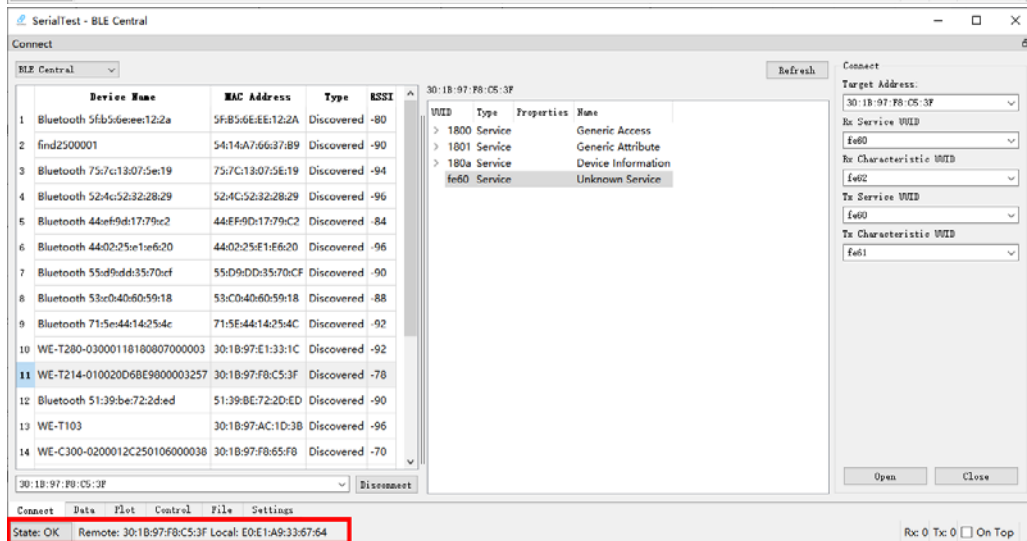
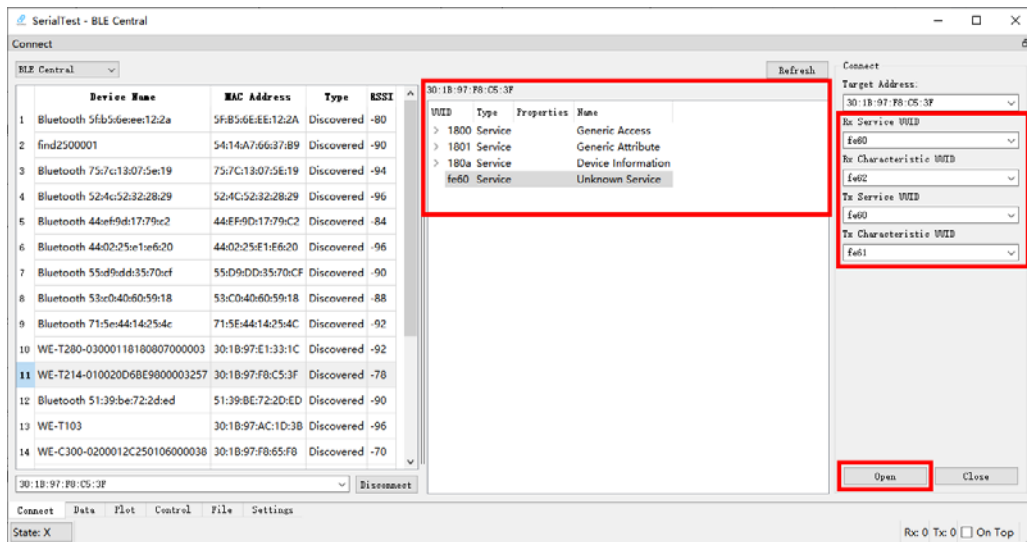
(1) Open the Bluetooth configuration tool SerialTest, select BLE Central, and click Refresh to search for Bluetooth devices.



(2) Select the searched device and tap Connect to connect the Bluetooth device.

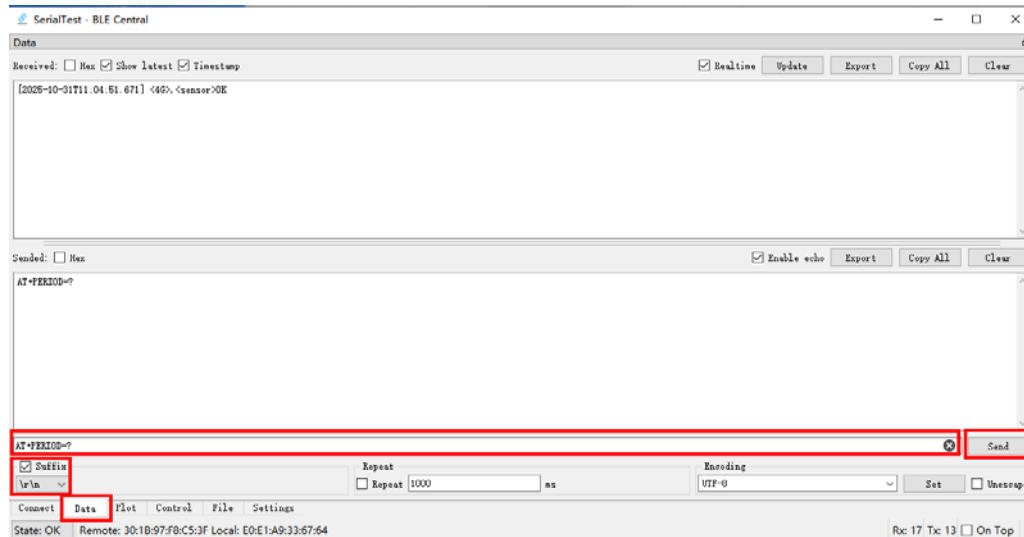


(3) After the device service is loaded, select the receive and send service on the right side of the interface, and select the option as shown in the figure below. Then click Open to open the service and wait for the State to show OK.



(4) Click Data to enter the sending and receiving interface. Fill in the AT

command you need to use in the send box and click Send. You can see your sent instructions in the Sent area, and you can see the received response data in the Received area. If you check Suffix and select \r\n, you can omit the <CR><LF> when sending AT commands.





Chapter 6 Data reporting

6.1 Data Examples

```
{"id":"23000003","IMEI":"861943070438360","time":"2025/10/27  
10:02:35","humidity":30.9,"temperature":23.5,"EC":1.25,"longitude":121.389961,"latitude":31.1  
66670}
```

6.2 Data Definition Table

element	Definition	Note:
id	Device number, no duplicates	Numbers, 8 characters
IMEI	International Mobile Equipment Identity Number	4G module
time	The time when the message was generated	local time
humidity	Humidity measured by the sensor	
temperature	The temperature measured by the sensor	
EC	Conductivity measured by the sensor	
longitude	Longitude	GPS coordinates
latitude	Latitude	GPS coordinates



Chapter 7 Installation instructions:

7.1 Sensor Probe Installation Conditions

① When installing a 3-in-1 transmitter for soil temperature and humidity conductivity, the soil temperature and humidity probe should be installed in a position that represents the average condition of the entire area you want to monitor for the best measurement results. Avoid choosing atypical locations such as ridges, ditches, manure nests, under trees or irrigation entrances.

② When installing the soil temperature and humidity probe, the surface should be cleared of weeds, gravel, straw and other debris to expose the original soil for installation.

③ When installing a soil temperature and humidity probe, make sure that there is no gap between the probe and the soil in the hole wall.

④ If the temperature, humidity, and conductivity values of the deep soil are measured, the soil needs to be drilled to a depth equal to the depth of the soil layer that needs to be monitored. If backfilling is required, the original soil removed during drilling should be used, and the gaps around the sensor should be carefully filled and lightly compacted to ensure that it is consistent with the natural soil environment.

7.2 Sensor probe installation note

① It is forbidden to press the sensor directly into hard or gravelly soil with brute force. This can cause the probe to bend or become damaged

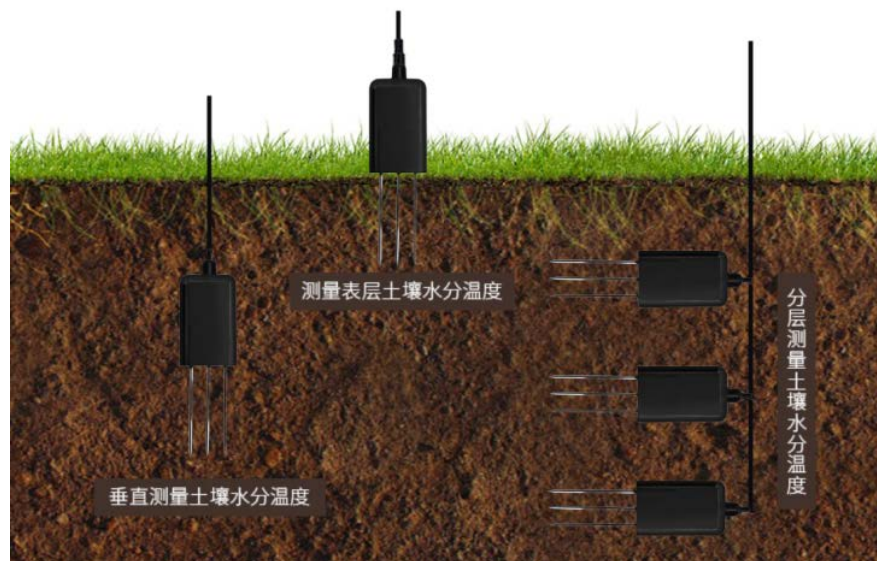
② If the sensor is installed in any slightly hard soil, pre-drilled holes are required.

③ The sensor installation depth should correspond precisely to the depth specified by the crop root layer or monitoring plan you are concerned about.

④ During installation and use, wear, puncture and scratching of the wire should be eliminated. If there are the above problems on site, protective measures should be taken for the conductor.

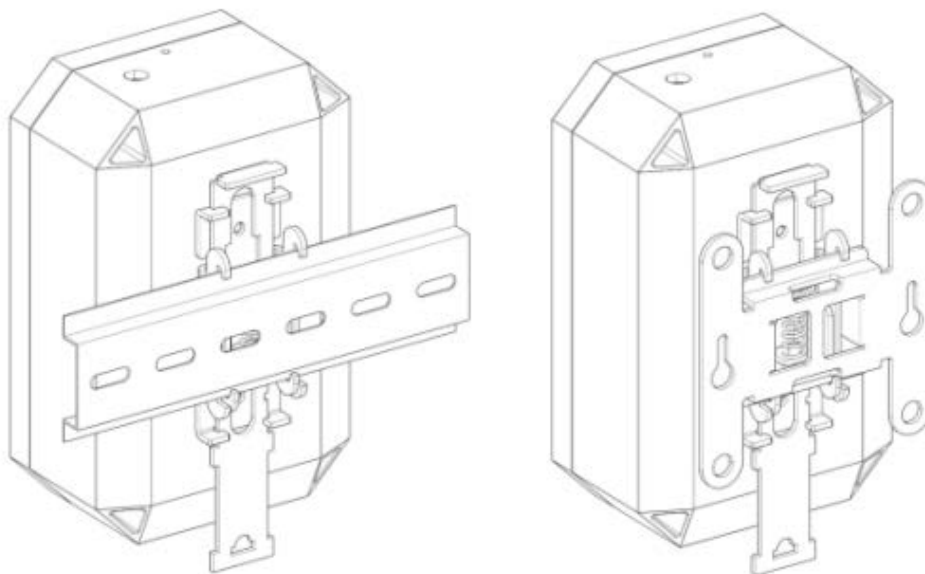
7.3 Schematic diagram of equipment installation

① The schematic diagram of the sensor probe installation is as follows:

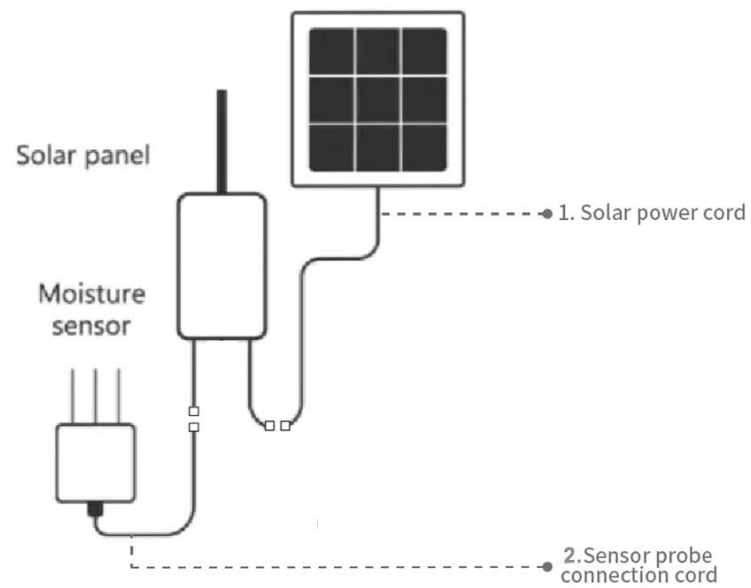


② Transmitter host installation

First, use 2 black screws to fix the clamp on the back of the main unit, then use 4 expansion screws to fix the wall mounted card to the wall near the measurement point, and finally snap the main unit to the wall mounted card. The installation diagram is as follows.



7.4 Schematic diagram of equipment wiring





Chapter 8 Troubleshooting

The table below lists the possible problems and solutions of the soil temperature and humidity conductivity 3-in-1 transmitter, if your problem is not listed or the solution cannot deal with your problem, please contact our company.

表3 Common fault analysis and troubleshooting

Fault phenomenon	Cause analysis	Elimination methods
The meter is not displayed	Not connected to power	Detect the power interface
	The solar cells run out	Charge the solar battery
The collection value is abnormal	The probe connection is disconnected	Check if the field host is properly connected to the probe
Unable to receive data	APN misconfiguration	Detect device APN
	Whether the SIM card is installed correctly	Install the SIM card correctly
	Whether you are in the Wi-Fi service area	Contact your network operator to set up your network or check the signal strength of your local 4G network
The card is unreadable	The card is not inserted/the card is not charged/the card is bound	Reinsert Check card fee renewal The card is unbound



Chapter 9 Packing list

After opening the box, check the contents of the package before you begin. If you find that the model and quantity are wrong, or if there is physical damage to the appearance, please contact us. The contents of the product packaging can be found in:

Boxed list

Serial number	Illustration	Name	quantity	unit	Note:
1		Transmitter host	1	stage	
2		Soil temperature, humidity, conductivity 3-in-1 probe	1	Branch	
3		Antenna	1	roots	
4		Back-mounted card holder	1	Branch	
5		Screw mounting pallets	1	block	
6		Install the screw package	1	package	

Note: Customized products may be slightly different from standard products, please refer to the order.



Chapter 10 Boxed data

Boxed style

Type	Size: (mm)	weight (kg)	per box quantity (Unit)	Illustration
Single unit packaging (Sample)	275*195*100	0.700	1	
Single unit packaging (Standard)	380*240*80	0.751	1	
Shipping Package (10 units per carton)	450*400*500	7.81	10	



Chapter 11 Warranty card

Device model		Date of purchase	
Customer unit name			
Customer contacts		Contact number	
Maintenance Records:			
Signature of the customer unit			

Warranty:

1. Warranty period: The equipment provides a 3-year warranty period from the date of delivery to the customer, and the contract shall prevail for other agreed or customized products; Non-customized products support 7-day no-reason returns (except for damaged products).
2. Warranty service: If there is a quality problem with the product during the warranty period, the company provides unconditional three-guarantee service, that is, free repair, replacement or return.
3. Disclaimer: Equipment damage or failure caused by the following situations is not within the scope of warranty and three-guarantee service: failure to follow the user manual; force majeure (such as natural disasters, fires, wars, etc.); dismantling, repairing or modifying without authorization; Factors within the scope of non-protective functions such as water ingress



and exposure to salt of the equipment; The appearance of the device is damaged.

4. Freight rules: The freight costs incurred by the normal warranty during the warranty period shall be borne by both parties, and the freight of equipment maintenance or return and replacement outside the warranty scope shall be borne by the customer.
5. Other Notes: The final interpretation of these terms belongs to Hainan Shidian Technology Co., Ltd.



Chapter 12 Disclaimer

We believe that we should try to ensure that the document description is accurate when publishing. Considering the technical complexity of the product and the differences in the working environment, it is still difficult to exclude individual inaccurate or incomplete descriptions, so this document is for user reference only. Our company reserves the right to make changes to the product without notifying the user, and our company does not make any legal commitments

Chapter 13 Copyright notice

The components and devices mentioned in this document are all references to the materials published by their copyright holders, and their modifications and publishing rights belong to their copyright holders.

- This manual is an instruction manual for various functions, wiring methods, operation methods, etc. of the product.
- Please read this manual carefully before operation, use this product correctly, and avoid unnecessary losses caused by incorrect operation.
- If there are any changes to the contents of this manual due to function upgrades, please refer to the newly released document.
- We strive to be correct in the content of this manual, so if you find an error, please contact us.
- The content of this manual is strictly prohibited from reprinting or copying.
- After you finish reading, please keep it in a place where it is easy to access it at any time for easy reference.

The final interpretation of this manual is the property of the Company.

Chapter 14 Version information

version	Modify time	Modified by	Modify the content
Rev.1.0	2025-11-10	David Liu	Create original documents
Rev.2.0	2026-01-12	Janine Liang	Modified to become a standard version model