User Guide

Product Introduction

The sensor uses the frequency domain reflection method to measure soil water content. By measuring the dielectric constant of the soil, and according to the transmission line theory, the effect of the change of capacitance on the change of reflected wave is measured, and then the soil water content is measured. The sensor housing is made of ABS with good resistance to acid and alkali corrosion and can reach IP68 waterproof rating.



Use Case Scenarios

It is widely used in homes, offices, flowers, farms and other places where soil temperature and humidity need to be measured.

Features

1. Imported sensors, high precision and fast response.
2. Stronger stability and anti-interference ability.
3. Wide voltage input, DC 5 ~ 24V.

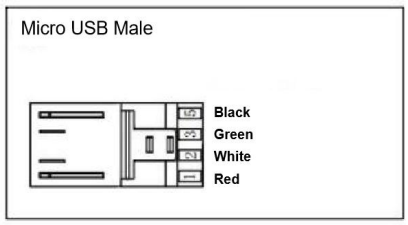
Product Specifications

Specifications	
Model	UB-STH-N1
Power Supply	DC 5 ~ 24V
Max Current	75mA (@5V), 155mA (@12V)
Measuring Range	Temperature: -40 ~ 85℃ Humidity: 0 ~ 100%
Accuracy	Temperature: ±0.5℃ Humidity: ±3% (@0 ~ 50%) ; ±5% (@50 ~ 100%)
Dimension	150 * 45 * 15mm
sensor Length	80mm
sensor Diameter	Φ3.5
Protection Level	IP68
Connector	Audio / Micro USB
Cable Length	3m
Communication Protocol	RS485 Modbus RTU Protocol
RS485 Address	0xFE
Baud Rate	1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s (default), 19200 bit/s

Wiring Instruction

Wiring Instruction				
RS485	VCC	B	A	GND
Micro USB	Red	White	Green	Black
Audio	Red	Green	White	Black

Micro USB



Audio



Measurement Area

Measurement area: Inside a 5cm diameter cylinder of equal height to the sensors, centred on the centre of the two sensors.



Quick Test Method

Select a suitable measurement site, avoid rocks and ensure that the steel needle does not touch hard objects. Throw away the top layer of soil according to the required measuring depth, keep the original tightness of the soil underneath, and insert the sensor vertically into the soil by holding it tightly. Do not shake the sensor from side to side when inserting it. It is recommended to take several measurements within a small area of one measurement point to find the average value.



Ground Penetration Method

Vertically dig a pit with a diameter of > 20cm. Insert the sensor pin horizontally into the pit wall at the established depth and fill the pit tightly. After a period of stabilisation, measurements and recordings can be made over a period of days, months or even longer.



Communication Rotocols

1. Communication Basic Parameters

Communication Basic Parameter	
Coding System	8-bit binary
Data Bit	8 bits
Parity Checking Bit	none
Stop Bit	1 bit
Error Checking	CRC Check
Baud Rate	1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s (default), 19200 bit/s

2. Data Frame Format

The Modbus-RTU communication protocol is used in the following format:

- Initial structure ≥ 4 bytes in time.
- Address code: 1 byte, default 0xFE.
- Function code: 1 byte, support function code 0x03 (read only) and 0x06 (read / write).
- Data area: N bytes, 16-bit data, high byte comes first.
- Error check: 16-bit CRC code.
- End structure ≥ 4 bytes of time.

Request					
Slave Address	Function Code	Register Address	No. of Registers	CRC LSB	CRC MSB
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Response							
Slave Address	Function Code	No. of Bytes	Content 1	Content 1	...	Content n	CRC
1 byte	1 byte	1 byte	2 bytes	2 bytes	...	2 bytes	2 bytes

3. Register Address

Register Address				
Address	Content	Register Length	Function Code	Description of Definitions
0x0000	Humidity	1	03	Unsigned integer data, divided by 10
0x0001	Temperature	1	03	Signed integer data, divided by 10
0x0064	Address	1	03/06	1 ~ 255
0x0065	Baud Rate	1	03/06	1:4800, 2:9600, 3:14400, 4:19200, 5:38400, 6:115200

NOTE

1. The steel needle must be fully inserted into the soil during measurement.
2. Avoid strong sunlight shining directly on the sensor and causing high temperature. Pay attention to the lightning protection when using in the field.
3. Do not violently bend the steel needle, do not pull the sensor lead wire, do not drop or hit the sensor violently.
4. Due to the presence of radio frequency electromagnetic radiation in the air, should not be in the air for a long time in the power state.