

## Product Introduction

This product adopts modbus-rtu protocol, and the computer can monitor the temperature through the communication mode of RS485 interface. Cooperate with WS1 Pro and GS1 series product to monitor the data on computer platform or mobile APP, and generate soil moisture and temperature report through the platform.

The soil temperature and moisture sensor measures soil moisture content based on frequency domain reflection method. We think of the soil as a capacitance containing a medium, according to transmission line theory, the circuit due to the load impedance mismatch appear under a certain frequency resonant migration, reflection amplitude value is not the same at the same time, through comparing the difference of reflection wave and the incident wave amplitude value, measure the capacitance of the multiple reflection wave caused by the changes, and then measure the soil moisture content. The probe shell is made of ABS, which has good resistance to acid and alkali corrosion. The shell is completely wrapped and can reach the IP68 waterproof level, which means that the probe can be continuously measured in water.



## Use Case Scenarios

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

## Features

1. RS485 Interface.
2. High precision, wide range, good consistency.
3. Super stability and anti-interference.
4. Wide voltage input, DC5-12V.
5. Standard MODBUS RTU protocol.
6. Cooperate with WS1 Pro to achieve remote monitoring report generation and other functions.

## Product Specification

Specification	
Model	UB-STH-N1
Working Voltage	DC5V~12V
Output Interface	Micro USB / 3.5mm Audio
Communication Methods	RS485
Communication Protocol	MODBUS RTU
Communication Address	1-255 (can be customized)
Baud Rate	300 bit/s,600 bit/s, 1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s, 19200bit/s, 38400bit/s, 43000 bit/s, 56000 bit/s, 57600 bit/s,115200 bit/s (can be customized)
Standby Current	≤20mA
Measuring Range	Temperature: -40°C ~ 85°C; Humidity: 0 ~ 100%

## Soil Temperature and Moisture Probe User Guide

Measuring Accuracy	Temperature: $\pm 0.4^{\circ}\text{C}$ ; Humidity: $\pm 3\%$ (0-50%), $\pm 5\%$ (>50%)
Probe Length	50mm
Probe Diameter	$\Phi 3.5$
Lead Length	3 meters

### Communication Protocol

1. All communication circuits shall follow the master/slave mode. In this way, data can be transferred between one primary station (e.g., PC) and multiple sub-stations. No communication should start from a substation.
2. The information transmission mode is asynchronous, byte format is 1 start bit, 8 data bits, and 1 stop bit, no check.
3. Compliance with MODBUS RTU protocol standards.
4. The default baud rate is 9600 and the address is 0xFE.

#### Query Message from Master (Read)

Address	Function Code (Read)	Starting Address Hi	Starting Address Lo	No.of Registers Hi	No.of Registers Lo	CRC16 LSB	CRC16 MSB
0xFE	0x03	RegAddr_H	RegAddr_L	Data_H	Data_L	CRC16_L	CRC16_H

#### Response Message from Slave

Address	Function Code (Read)	Byte Count	Data1 MSB	Data1 LSB	Data2 MSB	Data2 LSB	...	CRC16 LSB	CRC16 MSB
0xFE	0x03	BytesLenth	Data1_H	Data1_L	Data2_H	Data2_L	...	CRC16_L	CRC16_H

#### Query Message from Master (Write)

Address	Function Code (Write)	Starting Address Hi	Starting Address Lo	No.of Registers Hi	No.of Registers Lo	CRC16 LSB	CRC16 MSB
0xFE	0x06	RegAddr_H	RegAddr_L	Data_H	Data_L	CRC16_L	CRC16_H

#### Response Message from Slave

Address	Function Code (Write)	Starting Address Hi	Starting Address Lo	No.of Registers Hi	No.of Registers Lo	CRC16 LSB	CRC16 MSB
0xFE	0x06	RegAddr_H	RegAddr_L	Data_H	Data_L	CRC16_L	CRC16_H

#### Internal Message Information

Register Address (hex)	Content	Read/Write	Numerical Range	Function Code	Numerical Meaning
0x00	Moisture	Read Only	0-1000	3/4	0.0%-100.0%, Accuracy 0.1%
0x01	Temperature	Read Only	-400~800	3/4	-40.0~80.0°C, Accuracy 0.1°C
0x04	Moisture Original AD Value	Read Only	0-65535	3/4	Moisture original AD value
0x05	Reserved	Read Only	0	3/4	
0x06	Device identifier No.1	Read Only	0-65535	3/4	User - defined device id1

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0x07	Device Identifier No.2	Read Only	0-65535	3/4	User - defined device id2
0x64	Station Address	Read-Write	1-255	3/4/6/16	Factory set as 254
0x65	Baud Rate	Read-Write	0-5	3/4/6/16	0-1200 1-2400 2-4800 3-9600(Default) 4-19200 5-38400
0x66	Calibration Value	Read-Write	0-100	3/4/6/16	
0x202	Parity Check	Read-Write	0,1,2	3/4/6/16	0-no check,Default 1-odd parity check 2-even parity check
0x203	Receive Stop Bit	Read-Write	0,1	3/4/6/16	0-1stop bit, Default 1-2 stop bit
0x204	Send Stop Bit	Read-Write	0,1	3/4/6/16	0-1stop bit,1-2 stop bit, Default
0x205	Reserved	Read Only	0	3/4/6/16	
0x206	Response Interval	Read-Write	0-255	3/4/6/16	0-2550 millisecond, unit 10 millisecond
0x207	Reserved	Read Only	0	3/4/6/16	
0x208	Reserved	Read Only	0	3/4/6/16	
0x209	Device Identifier No.1	Read-Write	0-65535	3/4/6/16	User - defined device id1
0x20B	Product serial No.1	Read Only	0-65535	3/4	
0x20C	Product serial No.2	Read Only	0-65535	3/4	Reserved
0x20D	Product serial No.3	Read Only	0-65535	3/4	Reserved

### Product Application

1. Do not directly put the sensor in a high temperature environment.
2. The built-in tear invalid sticker, sensor once disassembled, It' s not returnable.