Temperature and Moisture Sensor

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 and GS1 to achieve remote monitoring, report generation and other functions.

Main Parameters

Communication Parameters	
Working Voltage	DC5V~DC12V
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	0～100%
Measuring Accuracy	±3%（0-50%）；±5%（>50%）
Probe Length	50mm
Probe Diameter	Φ3.5
Lead Length	3 meters
Measuring Theory	Frequency Domain（FDR）

Measurement Parameters（Temperature）	
Measuring Range	-40℃～85℃
Measuring Accuracy	<±0.4℃
Probe Length	50mm
Probe Diameter	Φ3.5
Lead Length	3meters

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. Any communication cannot start from a slave.

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 MODUBS RTU protocol standards.

4.The default baud rate is 9600 and the address is 0xC2.

Query Message from Master(Read)							
Address	Function Code	Starting Address MSB	Starting Address LSB	No. Of Registers MSB	No. Of Registers LSB	CRC16 LSB	CRC16 MSB
0xFE	0x03						

Response									
Address	Function Code	Byte Count	Data 1 MSB	Data 1 LSB	Data 2 MSB	Data 2 LSB	...	CRC16 LSB	CRC16 MSB
0xFE	0x03								

Query Message from Master(Write)							
Address	Function Code	Starting Address MSB	Starting Address LSB	Data MSB	Data LSB	CRC16 LSB	CRC16 MSB
0xFE	0x06						

Response							
Address	Function Code	Starting Address MSB	Starting Address LSB	Data MSB	Data LSB	CRC16 LSB	CRC16 MSB
0xFE	0x06						

Internal Message Information					
Register Address HEX:	Content	Read-Write	Numerical range	Applicable function code	Numerical meaning
00	Moisture	Read Only	0-1000	3/4	0.0%-100.0%， Accuracy 0.1%
01	Temperature	Read Only	-400~+800	3/4	-40.0 ℃ ~80.0 ℃ ， Accuracy 0.1℃
04	Moisture Original AD Value	Read Only	0-65535	3/4	Moisture original AD value
05	Reserved	Read Only	0	3/4	
06	Device identifier no.1	Read Only	0-65535	3/4	User - defined device id1
07	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 1-2stop bit
0X204	Send Stop Bit	Read-Write	0,1	3/4/6/16	0-1stop bit 1-2stop 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

*The baud rate code starts at 0 and the actual baud rate is：300、600、1200、...、115200

E.g.：The baud rate code is 05, that is, the baud rate is set to 9600bit/s

Product Application

①Do not directly put the sensor in a high temperature environment.

②The built-in tear invalid sticker, sensor once disassembled, It’ s not returnable.