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ZTS-3001-TR-*-N01

Five-pin soil sensor

Product Manual

1 Overview

The five-pin soil sensor is stable in performance, high in sensitivity, fast in response and stable in output, suitable for all kinds of soils. It is an important tool to observe and study the occurrence, evolution, improvement and water-salt dynamics of saline soil. By measuring the dielectric constant of soil, it can directly and stably reflect the real moisture content of various soils. The volume percentage of soil moisture that can be measured is a method of measuring soil moisture according to the present international standard. Can be buried in the soil for a long time, resistance to long-term electrolysis, corrosion resistance, vacuum sealing, completely waterproof.

2 Features

(1) compact design of the sensor.
(2) high precision, fast response and good interchangeability.
(3) good sealing, can be directly buried in the soil for use, and not subject to corrosion.
(4) the influence of soil quality is small and the application area is wide.
(5) accurate measurement, reliable performance, ensure normal work, high data transmission efficiency.

3 Scope of application

Suitable for soil moisture monitoring, scientific experiment, water-saving irrigation, greenhouse, flowers and vegetables, grassland and pasture, soil rapid measurement, plant culture, sewage treatment, precision agriculture and other occasions of temperature and humidity, conductivity, PH test.

4 Product information

4.1 technical parameters

Measurement parameters: soil electrical conductivity (EC value) , temperature, water, PH, N, P, K

The measuring range: 0-20000 μs/cm, -40-80 ° C, 0-100% , 3-9 ph, 1-1999 mg/kg (mg/L)

The measurement accuracy was ± 2% , ± 0.5 ° C, ± 2% within 0.50% , ± 3% within 50-100% , ± 0.3 ph, ± 2% FS

Resolution: 1 μs/cm, 0.1 ° C, 0.1% , 0.1,1 mg/kg (mg/L)

Output Signal: RS485(ModBus-RTU protocol)

Supply voltage: 4.5-30V DC

Working Range: 一30 ° C 一70 ° C

Stability Time: 1 second after electrification

Response time: < 1 second

4.2 physical parameters

The probe length was 55mm, φ3mm

Probe material: 316L stainless steel

Sealing materials: ABS Engineering Plastics, epoxy, waterproof grade IP68

Cable specifications: standard with 2 meters (can be customized other cable length, up to 1200 meters)

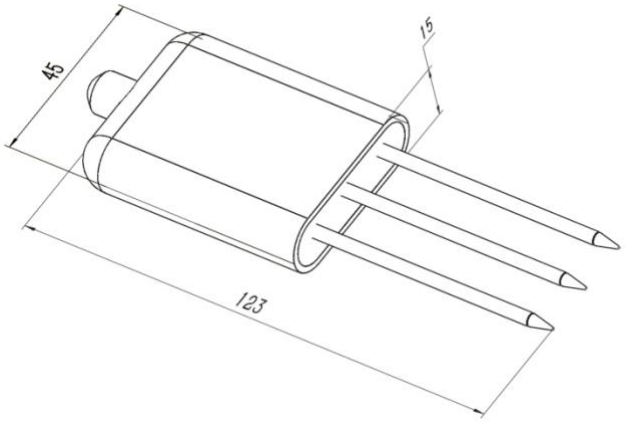
Load capacity: voltage output: output resistance ≤250 ω; current output: ≤600 ω

4.3 product selection

ZTS -					Company code name
	3001 -				
		TR -			Soil detection shell
			Thnpkph -		Temperature moisture NPK PH transmitter
			Ecthnpkph -		Conductivity temperature moisture nitrogen phosphorus potassium PH transmitter
			Thph -		Temperature moisture PH transmitter

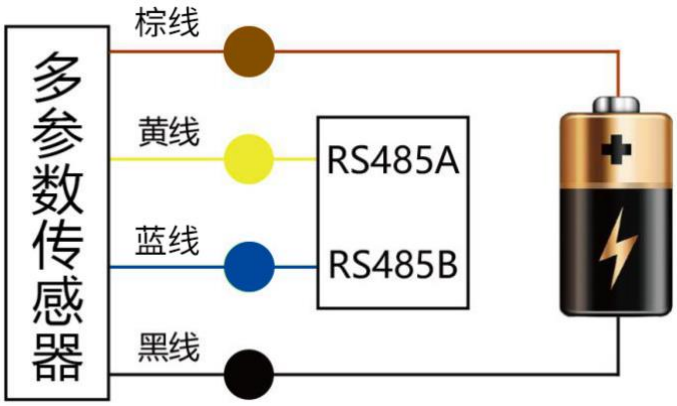
			Ecthph -		Conductivity temperature moisture PH transmitter
				N01	RS485(Modbus-RTU protocol)

5 Shape specifications



6 Use methods

The soil conductivity sensor can be connected to a variety of differential input data acquisition devices, data acquisition cards, remote data acquisition modules and other equipment, wiring instructions as follows:



7 Data conversion method

RS485 signal (default address 01) :

Standard Modbus-RTU protocol, baud rate: 4800; parity bit: none; data bit: 8; stop bit: 1

7.1 change of Address

For example: change the address of a sensor with address 1 to 2, host → Slave

Original address	Function codes	Start register high	Start register low	The starting address is high	The starting address is low	CRC16 is low	CRC16 high
0X01	0X06	0X07	0XD0	0X00	0X02	0X08	0X86

If the sensor receives correctly, the data is returned in the same way.

Note: If you forget the original address of the sensor, you can use the broadcast address 0XFF instead, using 0XFF host can only receive a slave, and the return address is still the original address, can be used as an address query method.

7.2 enquire data

Register address

Register address	PLC or configuration address	Content	Operation	A description of the definition
0000h	40001(decimal)	Moisture Content	Read only	Real-time value of moisture content (10 times larger)
0001H	40002(decimal)	Temperature value	Read only	Real-time temperature (10 times larger)
0002H	40003(decimal)	Conductivity	Read only	Real-time value of electrical conductivity
0003H	40004(decimal)	Ph	Read only	PH real-time (up tenfold)
0004H	40005(decimal)	Nitrogen content	Read only	Actual nitrogen content

0005H	40006(decimal)	Phosphorus content	Read only	Actual phosphorus content
0006H	40007(decimal)	Potassium content	Read only	Actual potassium content
07D0H	42001(decimal)	Device address	Read and write	1 ~ 254(factory default 1)
07D1H	42002(decimal)	Baud rate of equipment	Read and write	Zero is 2400 One is 4800 Two is 9600

Query conductivity temperature water PH sensor (address 1) data, host → slave

Address	Function codes	Start register address is high	The start register address is low	Register length is high	Low register length	CRC16 is low	CRC16 high
0X01	0X03	0X00	0X00	0X00	0X04	0X44	0X09

If the sensor receives correctly, return the following data, from machine to host

Address Code	Function codes	Returns valid Number of bytes	Water value	Temperature value	Conductivity value	Ph	Check Code Low bytes	Check Code High Byte
0x01	0x03	0x08	0x020x92	0xFF 0x9B	0x030xe8	0x000x38	0x57	0xB6

Temperature calculation:
When the temperature is lower than 0 ° C, the temperature data is uploaded in the form of complement code.
Temperature: FF9B H (hexadecimal) = -101 = > temperature = -10.1 ° C
Moisture calculation:
Moisture: 292h (hexadecimal) = 658 = > humidity = 65.8%, that is, soil volumetric moisture content is 65.8% .
Conductivity calculations:
Conductivity: 3E8 H (hexadecimal) = 1000 conductivity = 1000 US/cm

PH calculation:
PH: 38H (hexadecimal) = 56 = > PH = 5.6

8 Notes on usage

Warning

Failure to connect in sequence may result in damage to the equipment and the instrument connecting the equipment.

When the input power supply exceeds the maximum access power supply of the device, the device will be damaged.

Attention

Please read this manual before use.

Do not attempt to insert the probe into stone or hard soil to avoid damaging the probe.

When removing the sensor from the soil, do not pull the cable directly.

When the sensor probe is inserted into the soil/matrix, it should be sufficient to reduce the operation error and improve the measurement accuracy.

9 Product Warranty

The warranty period of this product is one year. From the date of shipment, within 12 months, due to sensor quality problems (non-human damage) caused by failure, the company is responsible for free maintenance or replacement, after the warranty period only cost.