SOIL TEMPERATURE AND HUMIDITY SENSOR

MP-508C

MANUAL

INTRODUCTION & PRINCIPLE

MP-508C soil temperature and humidity sensormeasure soil humidity and soil temperature at the same time. It has the advantages of convenient carrying, sealing and high precision. Soil moisture is a soil volume moisture measuring instrument developed based on FDR principle, which can connect directly with the control instrument, but also connect various data collectors, handheld terminals, etc. For scientific research or irrigation management, the stainless steel probe of the sensor can be inserted into the soil surface or soil profile to quickly measure the soil temperature and humidity, and the 508c probe can be permanently buried in the ground and connected to a data recorder for long-term measurement.

Frequency domain reflectometry (FDR) is a method to measure the soil

moisture content by measuring the frequency change caused by the change of the dielectric constant of the sensor in the soil, which is transformed into the voltage or current relationship corresponding to the soil moisture content. It has the characteristics of high accuracy, fast, accurate, continuous fixed-point measurement, no radioactivity and no disturbance to soil.

It can be widely used in soil moisture monitoring, water-saving irrigation, greenhouse control, fine agriculture, road monitoring, hydrometeorology and other fields

FEATURES：

*Short thermal response time and less dynamic error;
*Small diameter and unlimited length;
*High accuracy and good consistency;
*Imported probe element, reliable and stable performance

COMMUNICATION PROTOCOL

Sensor default station number：0x00FF
Baud rate：9600
Data bit：8
Stop bit：1
Check bit：None
Flow control：None

A、Read station number command (fixed command)

Device address Function code Start register address No. of registers CRC check
00 03 0001 0001 CRCloCRChi
Respond
Device address Function code Data length Data CRC check
00 03 02 00xx CRCloCRChi（XX=01-ff）
Example
Read station number
Command 00 03 00 01 00 01 D4 1B
Respond 00 03 02 00 FF C5 C4

B、Write station number：

Device address Function code Start register address No.of registers
Data length Data(new data) CRC check
00 10 0001 0001 02 00xx CRCloCRChi（XX=0X01-0XFF）
Respond
Device address Function code Start register address No.of registers CRC check
00 10 0001 0001 CRCloCRChi

Example

Command 00 10 00 01 00 01 02 00 33 EA 04

Respond 00 10 00 01 00 01 51 D8

C、Read data (Host computer)

Device address Function code Start register address No. of registers CRCcheck

xx 03 0000 00XX CRCloCRChi

Data respond

Device address Function code Data length Data CRC check

xx 03 XX XXXXXXXX CRCloCRChi

Example

Command FF 03 00 00 00 02 D1 D5

Respond FF 03 04 **01 2C(soil T) 11 94(soil RH) A1 61**

Note：The number of instruction replies is in hexadecimal format.

04(Decimal system4)is data length of sensor。 A1 61 is CRC check

2 element sequence : soil humidity, soil temperature.

Soil humidity =（0x01*256+0x2C）/10 = 30 %VOL

Soil temperature =（0x11*256+0x94）/100-20 = 25 ℃

TECHNICAL SPECIFICATION

◆Structure: 4-pin

◆Measuring range：-20~80℃ 0~100%（m3/m3）

◆Response time：＜1s

◆Accuracy：±1℃（25℃）；±2%（0～50%（m3/m3，25℃

◆Output：RS485modbus

◆Working Voltage：DC12~24V

◆Working Current：40ma（DC12V）

◆Power Consumption：DC12V <=0.6W

◆Measuring range：990% of the influence is in the cylinder with diameter of 2.5cm and length of 6cm around the central probe

◆Sealing material：ABS（ abrasive tools）

◆Size：133*40mm（probe：60mm）

◆Standard line length：2.5m

◆Stabilization time：About 10s after power on

◆Output lead wire：suggestion< 500m

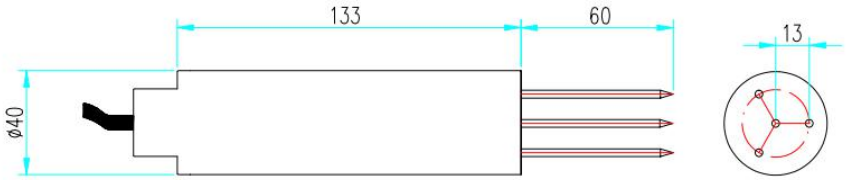
◆Ingress Protection：IP65

WIRING METHOD

RS485 output sensor is equipped with 2.5m 4-core cable as standard. Users can customize the cable with appropriate length as required. The cable specification is 0.2mm² 4-core shielded cable, and the wiring color is defined as below:

RS485	
Red	Positive pole
Black	Negative pole
Green	A
Blue	B

SIZE



INSTALLATION

1.The steel pin of the sensor is completely inserted into the soil to be tested, and the sensor can not be shaken when inserting, prevent the sensor probe from being affected；

2.The sensor can be used for multi-layer observation and the establishment of soil moisture monitoring station；

3.When it is felt that there is hard substance in the soil, please select the tested point again to prevent damaging the sensor probe.

4.Do not insert the probe into the hard soil to avoid damaging the probe; during the measurement, the density of the soil shall be as uniform as possible;

5.When moving the sensor out of the soil, do not directly pull the cable; after use, clean and dry the probe to keep it clean

6. If the measurement point is not selected properly, it may lead to unpredictable measurement error (> 10% vol). Rough installation will lead to the breakage of stainless steel pin of sensor and affect the measurement accuracy. The following aspects must be paid attention to during installation:: (1) Abnormal holes or pores. If there are holes or air holes in the sensor's sensing range, the measurement error will

be caused, especially when plugging and unplugging the sensor, it is necessary to avoid repeated operation at the same position; (2) Installation angle. In different applications, sensors can be installed in different ways, usually in two ways: horizontal installation and vertical installation. The distribution of water in soil medium is affected by many factors such as space and time. The reasonable installation of sensor must eliminate these influences to the greatest extent. When the sensor is installed vertically, it measures the average value of water content in the sensing area of nearly 6 cm; （3）Sampling points. The selection of sampling points must be carefully considered. In addition to the two points mentioned above, there are many other factors affecting the measurement accuracy of the sensor, which can be listed as follows: changes in soil density and composition, gravel, plant roots, earthworm loosening effect, soil drainage state, water volatilization of the soil surface, etc.

7．Due to the different water sources, the water quality will change accordingly. The output value of the measurement voltage will fluctuate within a range when the sensor is placed in a single pure water sample. This measurement value can only be used as a reference value and cannot be used to judge the measurement accuracy of the sensor.

WARRANTY & SERVICE

Warranty commitment: the warranty period is 12 months from the delivery period (except for the product problems caused by the failure to operate according to the corresponding technical requirements or other human behaviors).

After sales commitment: users can consult relevant technical problems by phone and get clear solutions. If it is a quality problem, it can be returned to the factory for maintenance or replacement.

Service Phone：0310-8033736