AGRICULTURE PLANTING

☑ ONE-STOP SOLUTION ☑ ONE-STOP SERVICE

SOIL MOISTURE AND EC SENSOR

HUNAN MACSENSOR COMPANY LIMITED

User Manual of MTD50 Soil Moisture and Electrical Conductivity Sensor (4~20mA)

Table of Contents

1. Product Introduction

1.1 Product Overview

The sensor has stable performance and high sensitivity, and is an important tool for observing and studying the occurrence, evolution, improvement and water-salt dynamics of saline soil. By measuring the dielectric constant of the soil, it can directly and stably reflect the true moisture content of various soils. It can measure the mass percentage of soil moisture and is a soil moisture measurement method that meets the current international standards. The output signal is a standard 4-20mA current.

1.2 Scope of Application

Suitable for soil moisture monitoring, scientific experiments, water-saving irrigation, greenhouses, flowers and vegetables, grassland and pastures, soil rapid testing, plant cultivation, sewage treatment, precision agriculture and etc.

1.3 Main Technical Specifications

DC power supply (default)	DC12-30V
Power consumption	1.2W
Working temperature	-40 - +80℃
Conductivity parameter	Range: 0-10000us/cm Resolution: 10us/cm; Precision:±3%;
Soil moisture parameters	Range:0-100% Resolution: 0.03% when moisture is 0-50%, 1% when moisture is 50-100% Precision: 2% when moisture is 0-50%, 3% when moisture is 50-100%
Conductivity temperature compensation	Built-in temperature compensation sensor, compensation range 0-50℃
Ingress Protection Level	IP68
Probe material	Specially made anti-corrosion electrode
Sealing material	Black flame retardant epoxy resin
Default cable length	2 m, customize

Dimensions	45*14*135mm
Electrode length	70mm
Output signal	4-20mA
Load capacity	≤600Ω

1.4 Product Features

(1) It can also be used for the conductivity of water and fertilizer integrated solutions, and other nutrient solutions and substrates.

(2) The electrode is made of specially treated alloy material, which can withstand strong external impact and is not easily damaged.

(3) Completely sealed, resistant to acid and alkali corrosion, and can be buried in soil or directly into water for long-term dynamic testing.

(4) With high precision, fast response and good interchangeability, probe insertion design ensures accurate measurement and reliable performance.

2. Usage and Precautions

Since the electrode directly measures the conductivity of the soluble salt ions in the soil, the soil cliometric water content must be more than about 20% when the soluble ions in the soil can accurately reflect the conductivity of the soil. In the long-term observation, the measured value after irrigation or rainfall is closer to the true level. If performing a quick test, water the soil to be tested first, and then perform measurement after the water is fully penetrated.

If you are measuring on a hard surface, you should drill a hole first (the hole diameter should be less than the probe diameter), then insert it into the soil and compact the soil before measuring; the sensor should be protected from severe vibration and shock, let alone knock with hard objects. Because the sensor is a black package, the sensor will heat up rapidly (up to 50℃) under strong sunlight. In order to prevent excessive temperature from affecting the temperature measurement of the sensor, please pay attention to shading and protection when using in the field or outdoors. .

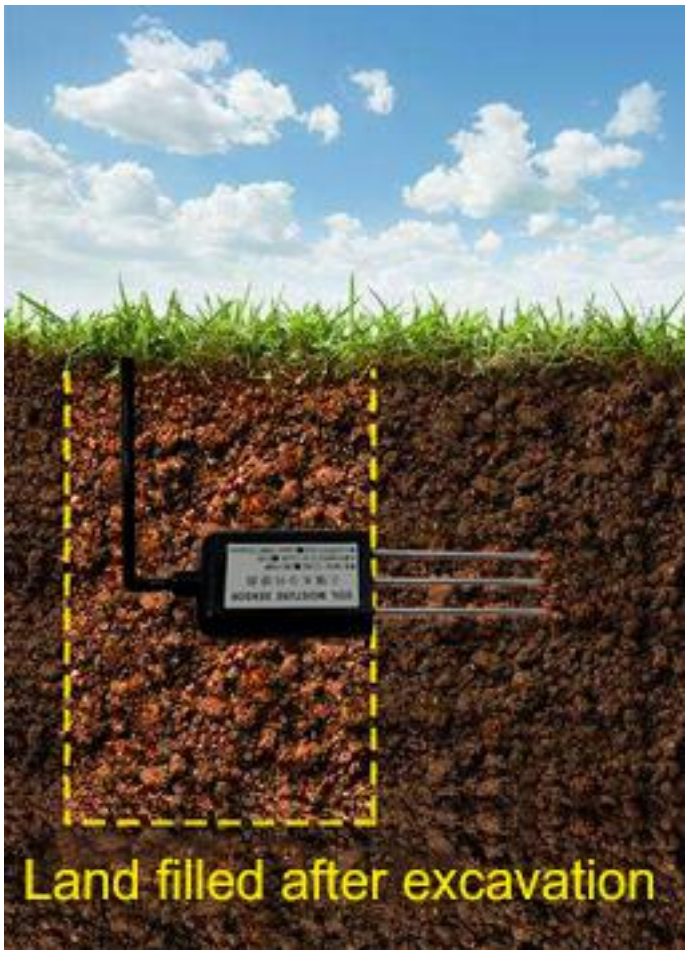
2.1 Quick Test Method:

Select a suitable measurement location, avoid rocks, to ensure that the steel needle does not touch hard objects, throw away the surface soil according to the required measurement depth, maintain the original tightness of the soil below, hold

the sensor vertically and insert it into the soil. Do not shake from side to side when inserting. It is recommended to measure multiple times for average value within a small range of a measuring point.

2.2 Underground Measurement:

Dig a pit with a diameter over 20cm vertically, insert the sensor needle horizontally into the pit wall at a predetermined depth according to the measurement needs, and fill the pit tightly. After a period of stability, it can be used for several days, months or even longer. Measure and record.



2.3 Notes:

1. Steel needles must be fully inserted into the soil during measurement.
2. Avoid strong direct sunlight which causes excessive temperature. Pay attention to lightning protection in the field.
3. Do not bend the steel needle violently. Do not pull the sensor out of the wire forcefully, or hit the sensor violently.
4. The sensor protection grade is IP68, and the sensor can be soaked in water.
5. Due to the presence of radio frequency electromagnetic radiation in the air, it is not suitable to stay in the air for a long time with electricity.

3.Equipment Installation Instruction

3.1 Are-installation Check

Equipment List

■1 soil moisture and temperature sensor

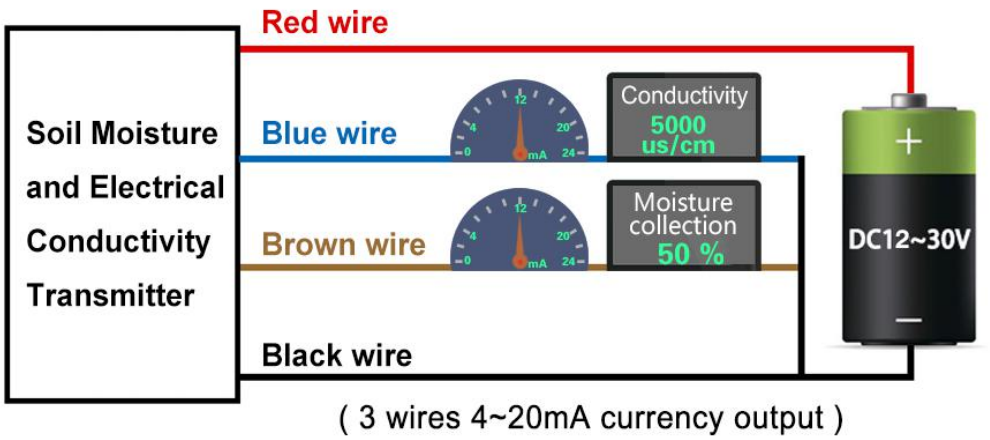
■Certificate of conformity, warranty card, wiring instruction and etc.

3.2 Port Definition

Wide voltage power input of 10~30V DC acceptable. The equipment comes standard with 2 independent analog outputs.

3.3 Wiring

Wire Color	Description	Remarks
Red	Positive Power	12~30V DC
Black	Negative power supply, negative conductivity signal, negative moisture signal	GND
Brown	Positive moisture signal	To the ground
Blue	Positive conductivity signal	To the ground



4. Calculation Method

For example, the range is 0-10000us/cm, 4~20mA output, when the output signal is 12mA, calculate the current conductivity. The span of this conductivity range is 10000, expressed by a 16mA current signal, 10000/16mA=625/A, that is, the current 1mA represents the conductivity of 625, the measured value is 12mA-4mA=8mA, 8mA*625=5000us/cm. That is, the current conductivity is 5000us/cm.

5. Common Problems and Solutions

No output or output error

Possible reasons:

1) The PLC calculation occurs error caused by the corresponding error of the range. Please refer to the technical specifications in Part 1 for the range.

2) The wiring method or the wiring sequence is wrong.

3) The distance between the sensor and the collector is too far, causing signal disturbance.

4) The PLC acquisition port is damaged.

5) The equipment is damaged.

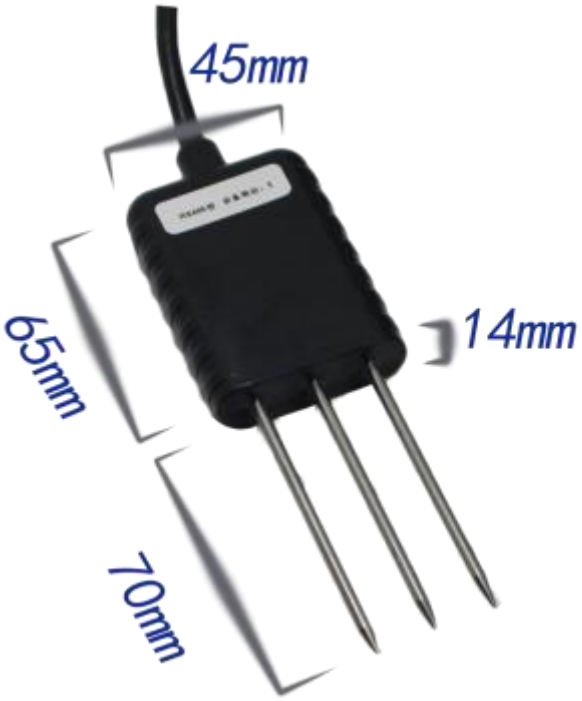
6. Document History

V1.0 Document Created

V1.1 Wiring Method and Common Problems and Solutions added

V2.0 Document Updated

7. Dimensions



HUNAN MACSENSOR COMPANY LIMITED
TEL: +86-731-89975645
FAX: +86-731-89975645
E-mail: info@macsensor.com
www.macsensor.com