JXCT®

JXBS-3001-EC

Soil EC Sensor User Manual

Analog Output (4-20mA/0-5V/0-10V)
Version: 2.0
Date: 2020-01-05
Status: Released

www.jxct-iot.com

I. BRIEF INTRODUCTION

1.1 Product Overview

The soil conductivity sensor is suitable for measuring the total salt content (conductivity) of the soil. The soil conductivity sensor greatly facilitates the customer system's assessment of soil conditions. .

Compared with the German original high-accuracy sensor, the precision is high, the response is fast, and the output is stable. Suitable for all kinds of soil. Can be buried in soil for a long time, resistant to long-term electrolysis, corrosion resistance, vacuum potting, completely waterproof.

1.2 Primary Parameters

TABLE 1 Primary Parameters

PARAMETERS	TECHNICAL SPECIFICATIONS
POWER SUPPLY	12-24V DC
EC MEASUREMENT RANGE	0-10000us/cm
EC RESOLUTION	10us/cm
STORAGE ENVIRONMENT	-45℃-115℃
RESPONSE TIME	<1s
INSTALLATION METHOD	All buried or probes are inserted into the measured medium
PROTECTION LEVEL	IP68
POWER CONSUMPTION	<1.15W
CURRENT OUTPUT TYPE	4-20mA
CURRENT OUTPUT LOAD	≤600 Ω
VOLTAGE OUTPUT TYPE	0-5V/0-10V
VOLTAGE OUTPUT LOAD	≤250 Ω
WORKING PRESSURE RANGE	0.9-1.1atm

1.3 System frame Diagram

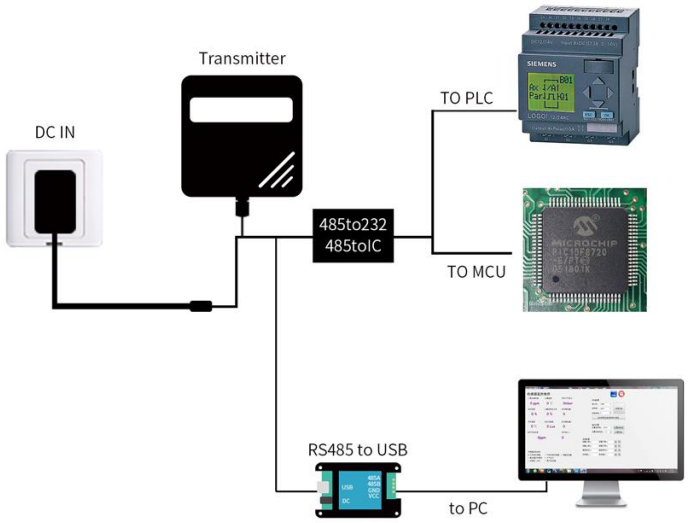


FIGURE 1 SINGLE-ENDED

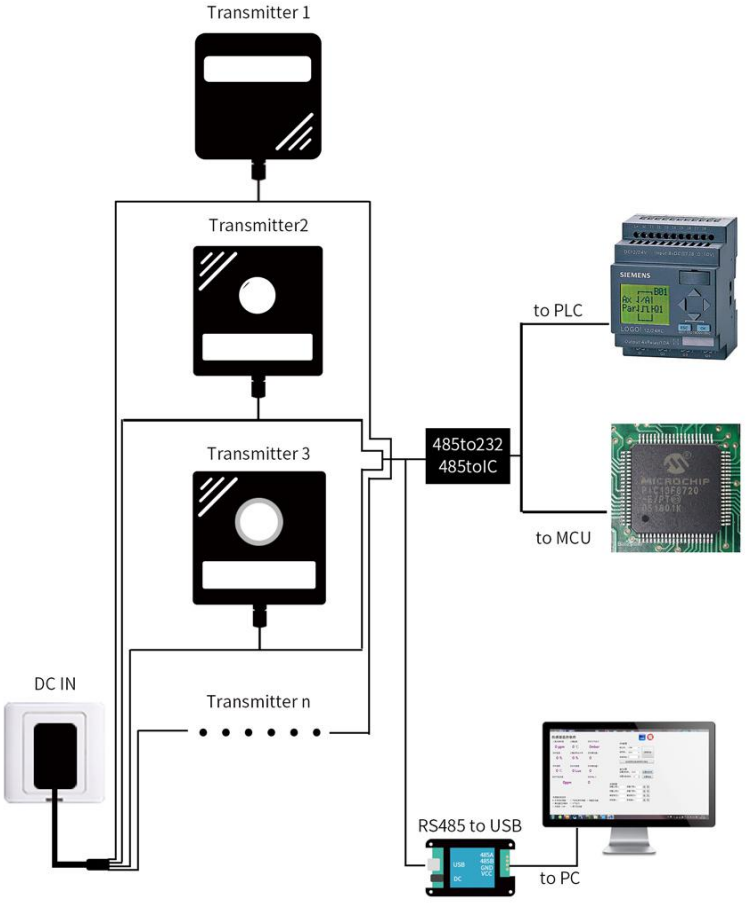


FIGURE 2 MUTIPLE-ENDED

II. HARDWARE CONNECTIONS

2.1 CHECKING BEFORE INSTALLATION

Check the list of devices before installation:

TABLE 2 List of Devices

Name	Number
THE SENSOR DEVICE	1
12V POWER ADAPTER (Optional)	1
WARRANTY CARD / CERTIFICATE	1

2.2 Interface Description

The power interface is wide-voltage power input 12-24V. Analog products should pay attention to the positive and negative signal lines. Do not reverse the positive or negative of the current/voltage signal lines.

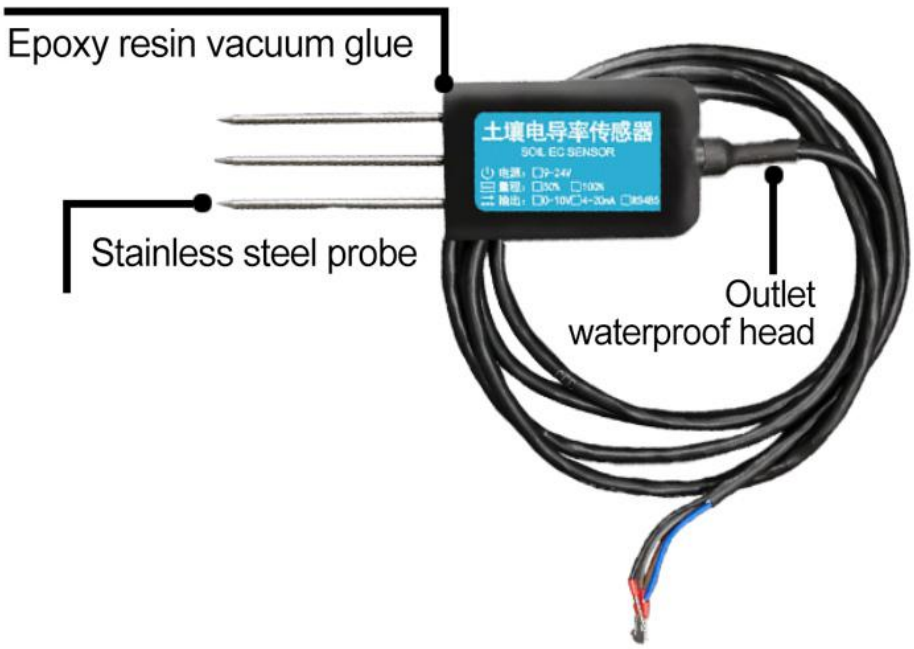


FIGURE 3 PHYSICAL PICTURE

TABLE 3 Wiring Sequence

	Line Color	Description
Power	Brown	Power supply Positive (12-24V DC)
	Black	Power supply Negative
Communication	White	Voltage/current output Positive
	Gray	Voltage/current output Negative
	Blue	NC
	Yellow	NC

We provide default cable length of 1.5meters, you can extend the cable yourself according to your needs.

2.3 Speed measurement method

Select the appropriate measurement site, avoid the stones, ensure that the steel needle does not hit a hard object, throw the topsoil at the required depth of measurement, keep the underlying soil tightness, grip the sensor vertically into the soil, insert It is not possible to shake left and right. It is recommended to measure multiple times within a small area of a measurement point to obtain the average value.

2.4 Buried method

Dig a pit with a diameter of >20cm vertically and insert the sensor steel needle horizontally into the wall of the pit at a predetermined depth. After the pit is buried tightly and stable for a period of time, it can be measured and recorded for several days, months, or even longer.

2.5 Precautions

1, steel needle must be fully inserted into the soil.

2. Avoid direct sunlight on the sensor and cause excessive temperature. Use caution in the field against lightning strikes.

3, do not violently bend the steel needle, do not force pull the sensor leads, do not beat or violently hit the sensor.

4, sensor protection grade IP68, the sensor can be soaked in water.

5, due to the presence of radio frequency electromagnetic radiation in the air, it should not be in a state of power in the air for a long time.

III. WIRING INSTRUCTIONS

3.1 Typical four-wire wiring

Analog sensor wiring is simple, just connect the wire to the designated port of the device. The device supports 3-wire wiring.

The following figure shows the voltage sensor connection mode. The power line (brown line and black line) of the sensor is connected to the power supply; the yellow (gray) color line of the sensor is the signal that is connected to the acquisition device. Positive, yellow (gray) The voltage of the line is the output voltage; the blue line of the sensor is the signal that the signal is being connected to the voltage acquisition device, and the voltage of the blue line is the reference voltage, which is consistent with the voltage of the black line being 0V.

3.1 Typical Three-wire Connection Mode

For a typical three-wire connection, the blue line, the yellow line, and the gray color are omitted. In the sensor, the gray line and the black line are short-circuited, so the gray line can be omitted.

For the three-wire current connection mode, after the power supply lines (brown and black wires) of the sensor are connected to the power supply, it is only necessary that the white signal of the sensor is connected to the signal of the current acquisition device.

Soil conductivity sensor

current output system (4-20ma)

fist step

Connect the sensor with a 12V-24V

power adapter

second step

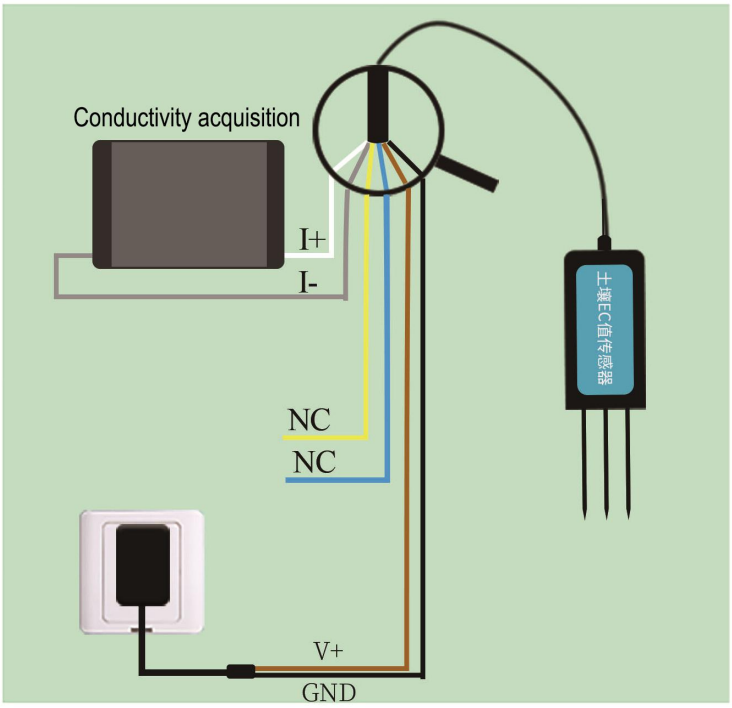
Correctly select the multimeter range

or connect an analog signal collector

third step

Calculate the formula

$P_{电导率}=625*(I_{电压}-4)$ μS/cm



For the three-wire voltage connection method, after the power cables (brown wires and black wires) of the sensors are connected to the power supply, the white wires of the sensors need only to be connected to signals of the voltage acquisition equipment.

Soil conductivity sensor

Voltage output system(0-10V/0-5V)

fist step

Connect the sensor with a 12V-24V power adapter

second step

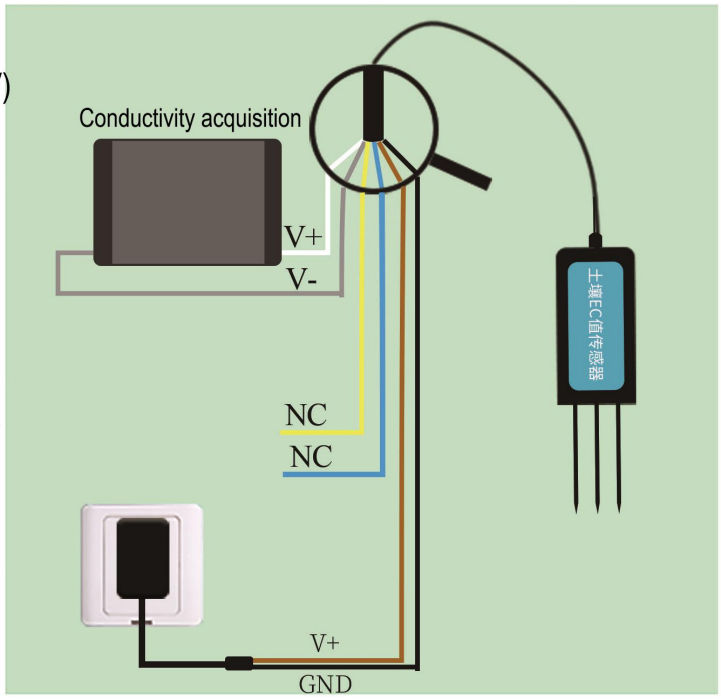
Correctly select the multimeter range or connect an analog signal collector

third step

Calculate the formula

0-10V：$P_{电导率}$=V（电压）μS/cm

0-5V：$P_{电导率}$=2V（电压）μS/cm



IV. ANALOG PARAMETERS MEANING AND CONVERSION

4.1 Analog 4-20mA Current Loop

Current value	EC
4mA	0us/cm
20mA	10000us/cm

The formula is P_{EC} = (I (current) -4mA) *625us/cm

Where I is in mA.

For example, the data Iout+ collected in the current situation is 8.25 mA, and the soil conductivity value calculated at this time is 2652.25 us/cm.

4.2 Analogue 0-10V Voltage Output

Voltage value	EC
0V	0us/cm
10V	10000us/cm

The formula is P_{EC}= V (voltage) us/cm

Where V is in mV.

For example, the data Vout+ collected in the current situation is 3515 mV, and the soil conductivity value calculated at this time is 3515 us/cm.

4.3 Analogue 0-5V voltage output

Voltage value	EC
0V	0us/cm
5V	10000us/cm

The formula is P_{EC}= V (voltage) * 2us/cm

Where V is in mV.

For example, the data Vout+ collected in the current situation is 4228 mV. At this time, the soil conductivity value is calculated as 8456 us/cm.