RK520-02 Soil Moisture, Temperature & EC Sensor

Revision Time	Reviser	Current Version	Remarks
20250428	SUN	V5.0	

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User Notice

Please read this manual carefully before use to ensure safe and optimal operation. Retain this manual for future reference.

Pre-Use Instructions

- Carefully review this manual and follow all operational and safety guidelines to prevent malfunctions and hazards.

Unpacking Inspection

- Upon receipt, carefully inspect the sensor device and accessories for any shipping damage.
- If damage is detected:
- Immediately notify the manufacturer and distributor.
- Retain all packaging materials for return or replacement processing.

Parts List

Item	Quantity	Remarks
Sensor	1	
Cable	1	The length depends on the order

1. Product Introduction

RK520-02 Soil Moisture, Temperature & EC Sensor is integrated the moisture, temperature & EC measurement.The stainless steel probe is inserted into soil surface or soil profile to test quickly. The product with temperature compensation to ensure the accuracy of measurement. The probe can be permanently embedded underground and be connected to a data logger for unlimited testing.

2. Product Features

- High precision
- Fast response
- Suitable for saline-alkali soil
- Can work long-term immersion
- Soil properties affect little
- Directly buried in soil
- Widely used

3. Specification

Item	Technical Specification		
	Moisture	Temperature	EC
Range	0-50%,0-100%	-30℃-+70℃	0-5000us/cm,10000us/cm, 20000us/cm
Accuracy	±2%(0-50%) ±3%(51-100%)	±0.5℃	±3%FS
Resolution	0-50%:0.03%, 50-100%:1%	0.1°C	0.01mS/cm
Output Signal	Analog Voltage 0-2V,RS485 Modbus RTU, SDI-12		
Supply	3.6-30VDC, 5-24VDC(SDI-12)		
Power Consumption	6mA@12VDC		
Measurement Technique	Moisture by FDR and EC by AC excitation		
Installation	Surface or buried installation		
Effective Measurement	With the center of the probe diameter is 70mm, high 70mm cylinder		
Housing	ABS		
Dimensions	45*15*145mm(probe:3*Ø3*70mm)		
Operating Temperature	-40℃-+80℃		
Ingress Protection	IP68		
Storage	-20-60℃@20%-90%RH		
Probe Material	316L stainless steel		
Sensor Sealed	Epoxy resin		

4. Electrical Connections

Connector(Cable)	RS485	Voltage
Red	V+	V+
Black	V-	V-
Yellow	RS485A	EC
Green	RS485B	Humi
Brown		Temp

5. Output Types & Formulas

Voltage Type(0-2V)	F=V / 2 × (Max Range - Min Range) + Min Range

F:Current measurement parameters;

V: Transmitter output voltage in V

6. Product Dimensions

Unit：mm

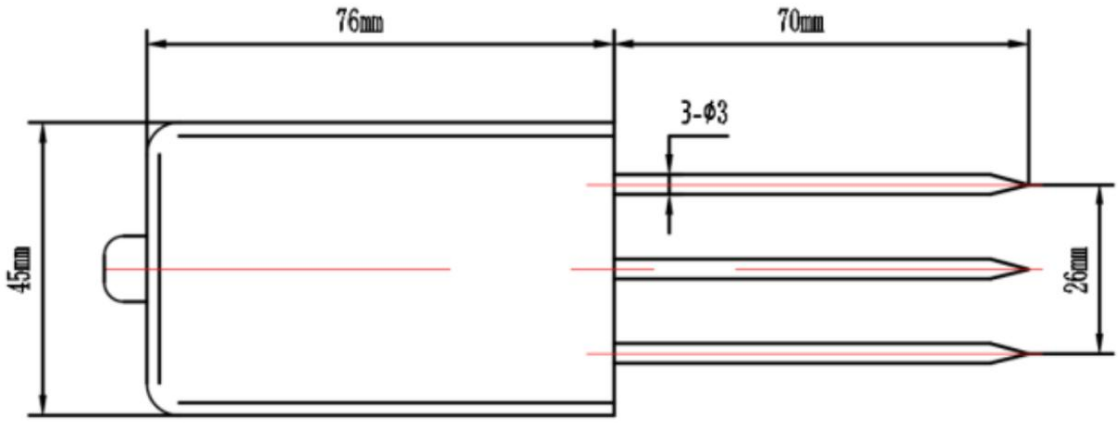

Figure 6.1
Dimensional Specifications

7. Communication Protocol（MODBUS-RTU）

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x01 (Factory Default)

7.1 Read Real-time Data

Client sends:

01 03 00 00 00 03 05CB

Return:

01 03 06 01 16 03 E8 01 1E 688F

7.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x01)	0x01
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X06	6bytes
4	Data block	2	Temperature value	0x0116(27.8℃)
5	Data block	2	Moisture value	0x03E8(100%)
6	Data block	2	EC value	0x011E(0.28mS/cm)
7	Check block	2		0x68 0x8F

Note:If the data≧0x8000,for example:0xFF05,according to the following method to calculate:0xFF05-0xFFFF-0x01=(65285)D-(65535)D-(1)D=(-251)D,-251/10=-25.1(℃)

7.2 Modify Slave Address

Client sends:(Change slave address from 01H to 02H)

ID	Function code	Address_H	Address_L	Date_H	Date_L	CRC_L	CRC_H
0x01	0x06	0x02	0x00	0x00	0x02	0x09	0xB3

Response:

ID	Function code	Address_H	Address_L	Date_H	Date_L	CRC_L	CRC_H
0x01	0x06	0x02	0x00	0x00	0x02	0x09	0xB3

Note:If you forget the original address, you should use the broadcast address(FEH) (ensure that no other devices on the bus at this time).

8. Installation Guidelines

- Choose a suitable measurement location, ensure that the electrode does not touch hard objects such as rocks.
- Excavate the surface soil according to the required measurement depth, maintain the original tightness of the soil below, firmly grip the sensor body and insert it vertically into the soil. During insertion, do not shake it back, forth, left, or right to ensure close contact with the soil.

8.1 Installation Method

- Underground measurement method: Dig a pit with a diameter greater than 20 centimeters vertically according to the required depth, and then insert the sensor steel needle horizontally into the pit wall at the predetermined depth.
- Fill and compact the pit to ensure that the electrode is in close contact with the soil.

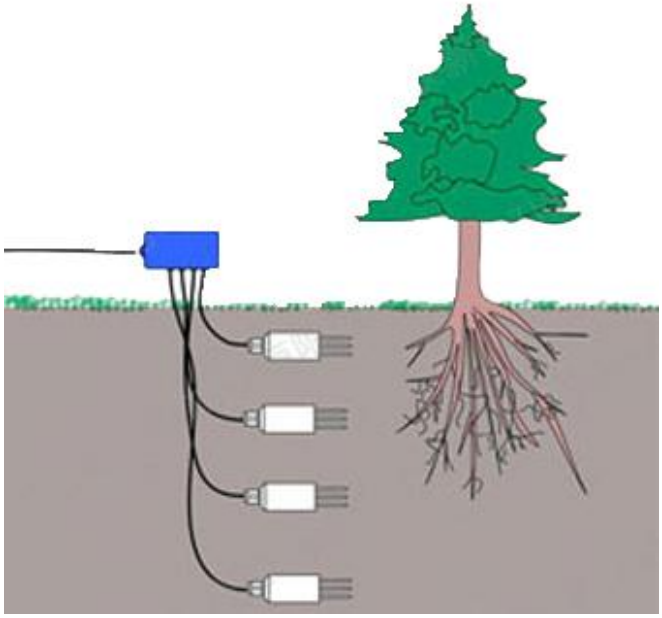

Figure 8.1.1 Installation Diagram

9. Precautions

Powered Wiring Prohibition

- Do not connect wires while powered. Only energize the sensor after confirming correct wiring.

Component Modification Restriction

- Do not alter factory-soldered components or pre-connected wires.

Precision Handling Requirement

The sensor is a precision device. Avoid:

- Unauthorized disassembly
- Do not touch internal components to prevent product damage

  Note: Unauthorized modifications void the warranty.

10. Troubleshooting

Incorrect Output Signals (Analog/RS232/RS485):

- Verify wiring correctness and secure connections.
- Check if the serial port is occupied or malfunctioning.
- Confirm serial port settings (baud rate, data/stop bits) match device requirements.

Persistent Issues:

- Contact the manufacturer if the above steps fail to resolve the problem.

11. Product Maintenance

Maintenance and Safety

- Regularly clean and inspect the sensor to maintain performance.
- Do not expose the sensor to extreme temperatures, moisture, or corrosive substances unless explicitly specified.
- Unauthorized disassembly, modification, or repairs may void the warranty and lead to malfunctions.

Troubleshooting Protocol

- In case of malfunction, refer to the troubleshooting section of this manual.
- Do not attempt unauthorized disassembly or repairs.
- Contact the manufacturer's after-sales department directly for technical support.

12. Warranty Terms

This product comes with a one-year warranty, starting from the date of delivery.Within twelve months, the Company shall be responsible for free repair or replacement of any failure caused by sensor quality issues(non-human damage). Fees will be charged for repairs or replacements after the warranty period expires.

CE Complies with applicable CE directives.

Manual subject to change without notice.

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