

RK500-13 Online EC/Salinity/TDS Sensor User Manual



Revision Time	Reviser	Current Version	Remarks
20250422	SUN	V5.0	

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.
- Check that the packaging is intact and verify the product model matches the selected specifications.

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
Bracket	1	Optional

1. Product Introduction

RK500-13 EC/Salinity/TDS sensor uses advanced anti-polarization technology, internal signal isolation technology, and have strong anti-interference ability. Stable measurement, accurate, maintenance-free, easy to install. Mainly used in aquaculture, water source testing, sewage treatment, environmental monitoring and so on.

2. Product Features

- On-line & real-time measurement
- Graphite electrode and nylon fiber shell
- High accuracy
- Electromagnetic isolation
- Strong resistance to corrosion
- Polarization resistance
- High temperature resistance
- Integral design without external transmitter
- Three parameters can be measured at the same time

3. Specifications

Item		Technical Specification			
		EC		Salinity/TDS	
Type		A	B	C	D
Main Material		ABS shell+graphite electrode	Nylon fiber+316 electrode	Nylon fiber+graphite electrode	316L+PEEK
Screw Thread		Lower: NPT3/4		Upper: NPT3/4, Lower: NPT3/4	NPT3/4(D1,D2)
Pressure Resistance		0.8MPa	1.0MPa	1.0MPa	2.0MPa
Temperature Compensation		Automatic (Temperature 0-60°C)			Automatic (Temperature 0-100°C)
Output Signal②		4-20mA & RS485 at the same time			4-20mA & RS485 at the same time;4~20mA(two-wire)
Supply		7-30VDC, 22-28VDC(4~20mA two-wire)			
Range ①	EC	0~500μs/cm, 0~5000μs/cm, 0~10000μs/cm, 0~200000μs/cm (any range of 0-300ms/cm can be customized, 1ms/cm = 1000μs/cm)			
	Salinity /TDS	0-250ppm,0-2500ppm, 0-10000ppm etc., 1ppm(mg/L)=1000ppb(μg/L), 1%=10PPT=10000PPM			
	Temperature	0-60°C			
Accuracy		±1%FS			
Resolution		0.01			
Power Consumption		<0.2W			
Principle		Frequency conversion method			
Response Time		1s			
Output Signal②		4-20mA & RS485 at the same time			
Drift		≤0.3%FS/24h			
Measurement Environment		0°C-60°C(High temperature electrodes can be customized)			
Ingress Protection		IP68			
Storage		10-60°C@20%-90%RH			
Cable Length		Default:5m			

①The salinity range is half of the EC. ②4-20mA defaults to EC value

4. Electrical Connection

Connector(Cable)	Current	RS485
Red	V+	V+
Black	V-	V-
Yellow		RS485A
Green		RS485B
White	Signal+	

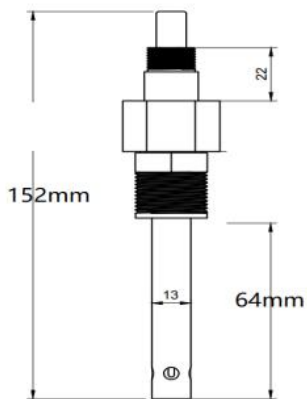
5. Output Types & Formulas

Current Type	$EC = (I - 4) / (20 - 4) * \text{Max_Range}$
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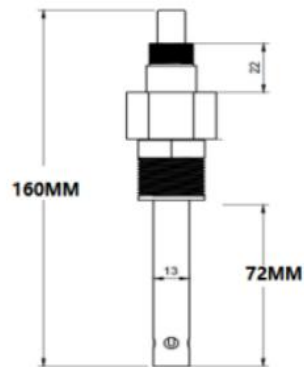
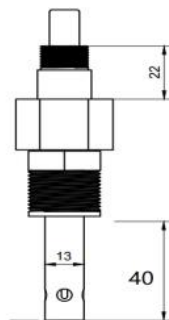
I: Transmitter output current in mA;

6. Product Dimensions

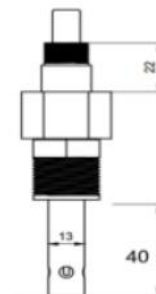
Unit:mm



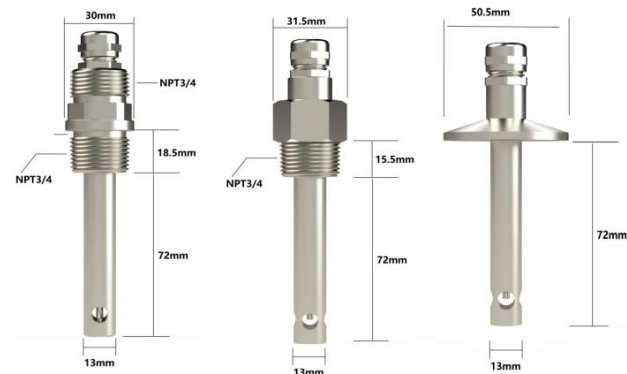
Type A



Type B



Type C



Type D

7. Communication Protocol(MODBUS-RTU)

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x04 (Factory Default)

7.1 Read Real-time Data

Client sends:

04 03 00 00 00 0A C598

Return:

04 03 14 3F 14 C5 68 41 89 A9 3F 41 9C 6F 60 43 91 48 C8 43 9F D0 0F 09 74

7.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x04)	0x04
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X14	20bytes
4	Data block	4	EC (Floating point)	0x3F14C568(0.58mS/cm)
5	Data block	4	Internal data	0x4189A93F
6	Data block	4	Temp (Floating point)	0x419C6F60(19.55℃)
7	Data block	4	TDS(Floating point)	0x439148C8(290.56mg/L)
8	Data block	4	Salinity (Floating point)	0x439FD00F(319PPM)
9	Check block	2		0x09 0x74

7.2 Modify Slave Address

Client sends:(Change slave address from 04H to 01H.)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x04	0x06	0x00	0x14	0x00	0x01	0x08	0x5B

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x04	0x06	0x00	0x14	0x00	0x01	0x08	0x5B

7.3 Test and Calibration Instructions

During testing and calibration, place the electrode in the corresponding standard solution, shake it slightly, and wait for the signal to stabilize before performing the calibration operation.

7.4 Product Calibration

The product currently supports two calibration methods:

7.4.1 Calibration via our host computer software – please contact our sales team to obtain the software.

7.4.2 Calibration via RS485 protocol.

One-Click Calibration

When it is inconvenient to disassemble the sensor after installation, and there is a difference between the known EC value of the liquid in the current environment and the actual reading of the sensor, the one-click calibration method can be used. At this time, the calibration value of the sensor needs to be converted into a positive floating-point number in IEEE 754 standard. Examples are as follows.

Client sends:(Use the one-click calibration function to set the current value to 1.413mS/cm,the calibration value is a positive floating-point number.)

Slave id	Function code	Address_H	Address_L	Reg Num		Bytes	Calibration Value	CRC_L	CRC_H
0x04	0x10	0x00	0x50	0x00	0x02	04	3FB4DD2F	0xB3	0xE1

Note:

- If the return command matches the sent command, it indicates that the calibration is successful.
- The default unit for the sensor's conductivity is mS/cm. When sending data, values should be transmitted in mS/cm. If the sensor unit is changed to μ S/cm, then the transmitted values must be in μ S/cm accordingly.

8. Installation Guidelines

- Regardless of the installation method used, please avoid bubbles in the conductivity cell.
- Stay away from other electrodes or metal components to prevent electrochemical corrosion or signal interference.
- Ensure that the sensor is completely immersed in the liquid and the electrode part is not exposed.

8.1 Installation Method

Directly into the liquid, adopt submersible mounting bracket.



Figure 8.1.1 Mounting Bracket(Length=1m)

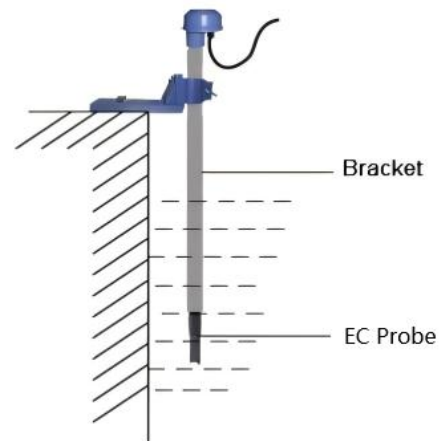


Figure 8.1.2 Probe Submersible Installation

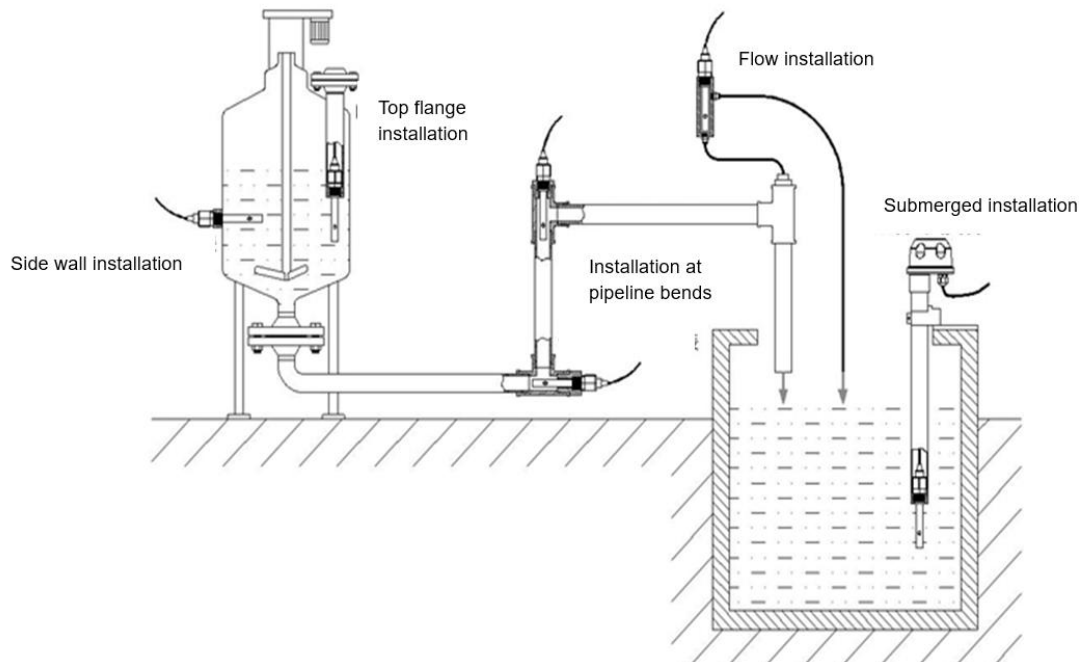


Figure 8.1.3 Typical Installation Method

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.
- According to the water quality conditions, the sensor electrodes should be regularly cleaned and can be gently scrubbed with a cotton swab in warm water.
- If there are strong adhesive deposits inside the conductive electrode, clean it with a dilute hydrochloric acid solution with a concentration of 20g/L, and then thoroughly rinse it with desalinated water.

- 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.

 Complies with applicable CE directives.

Manual subject to change without notice.

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