RK500-04 Dissolved Oxygen Sensor

Revision Time	Reviser	Current Version	Remarks
20250427	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.
- 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

RK500-04 Dissolved Oxygen (DO) Sensor design based on the principle of fluorescence and high performance through oxygen membrane, with short response time, measurement accuracy, stable performance, etc. It can be widely used in chemical fertilizer, metallurgy, environmental protection water treatment engineering, pharmaceutical, biochemical, food, aquaculture and water such as continuous monitoring of dissolved oxygen in the solution.

2. Product Features

- On-line & real-time monitoring
- With temperature compensation
- High accuracy
- Simple operation and high reliability
- No external module, a whole design
- Long service life
- Dissolved oxygen and temperature
- measurement at the same time (RS485)
- No requirement for liquid velocity
- Not affected by ions

3. Specifications

Type	A		B	C
	Economy		Performance	Strong anti-corrosion
Application	Farming,freshwater Aquaculture,river channels etc		Industrial control, general sewage, environmental	Mariculture,strongly corrosive sewage, complex scenes
Sensor	DO	Temperature	DO	Temperature
Range	0-20mg/L	0-60℃	0-20mg/L, 0-50mg/L	0-60℃
Accuracy	0.3mg/L	±0 .5℃	0.2mg/L	±0 .5℃
Resolution	0.01mg/L	0.1℃	0.01mg/L	0.1℃
Repeatability	0.01 mg/L		0.05 mg/L	
Response Time	T90<100S		T90<40S	
Stability	Drift <0.3mg/L/ year		Drift <0.2mg/L/ year	
Material	Fluorescent cap:316 L, other: ABS		All stainless steel 316 L	Fluorescent cap: titanium alloy, other: gray nylon plus fiber
Principle	Fluorescent			
Temperature Compensation	Thermal resistance			
Thread	Lower: NPT3/4, Upper:NPT3/4			
Installation Method	Pipe or dip (IP68)			
Operating Temperature	-5 - +60℃			
Working Pressure	0.8Mpa			
Supply	7-28VDC			
Power Consumption	<0.2W			
Output	RS-485 & 4~20mA at the same time			
Ingress Protection	IP68			
Dimension	Φ16*162mm			
Cable Length	5m default, other length customizable			
Weight(Probe)	0.7kg			
Storage	-20-80℃			

4. Electrical Connection

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

5. Output Types & Formulas

Current Type	DO=(I-4)/(20-4)*Max_Range

I: Transmitter output current in mA;

6. Product Dimensions

Unit:mm

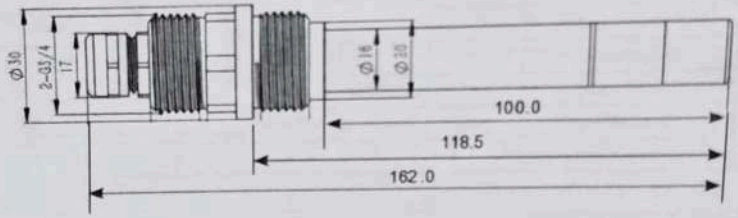

Figure 6.1 Dimension Specification

7. Communication Protocol（MODBUS-RTU）

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x0A (Factory Default)

7.1 Read Real-time Data

Client sends:

0A 03 00 00 00 06 C4B3

Return:

0A 03 0C 40 F2 8D 18 42 C8 C2 C2 41 F1 5C 29 F5 E6

7.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x0A)	0x0A
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X0C	12bytes
4	Data block	4	DO (Floating point)	0x40F28D18(7.57mg/L)
5	Data block	4	Saturation(Floating point)	0x42C8C2C2(100%)
6	Data block	4	Temperature (Floating point)	0x41F15C29(30.17℃)
7	Check block	2		0xF5 0xE6

7.2 Modify Slave Address

Client sends:(Change slave address from 0AH to 01H.)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x0A	0x06	0x00	0x14	0x00	0x01	0x09	0x75

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x0A	0x06	0x00	0x14	0x00	0x01	0x09	0x75

7.3 Test and Calibration Instructions

Place the electrode in the testing environment and wait for the data to stabilize before calibrating(Avoid attaching bubbles to the surface of the fluorescent film).

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.

7.5 Air Calibration

Use function code 06 to write the command to register address 0x1A to complete the calibration operation.Place the electrode in the air and wait for it to stabilize for about 180 seconds (do not expose the dissolved oxygen film head to direct sunlight). After the value stabilizes, send an air calibration command to the electrode.

Client sends:

Slave id	Function code	Address_H	Address_L	Air Calibration Start		CRC_L	CRC_H
0x0A	0x06	0x00	0x1A	0x00	0x01	0x68	0xB6

7.6 Zero Oxygen Calibration

Use function code 06 to write the command to register address 0x1C to complete the calibration operation.Place the electrode in anaerobic water (or nitrogen) and wait for it to stabilize for about 180 seconds. After the data stabilizes, send a calibration command to the electrode.(Please use with caution without zero oxygen conditions)

Client sends:

Slave id	Function code	Address_H	Address_L	Zero Calibration Start		CRC_L	CRC_H
0x0A	0x06	0x00	0x1C	0x00	0x01	0x88	0xB7

8. Installation Guidelines

- The installation point should avoid stagnant water flow areas and prevent bubbles from adhering to the surface of the sensor membrane (bubbles can cause readings to be higher).
- Stay away from aeration devices, chemical dosing points, or areas where aerosols may be generated.

8.1 Installation Method

Directly into the liquid,adopt submersible mounting bracket.

Figure 8.1.1 Mounting Bracket(Length=1m)

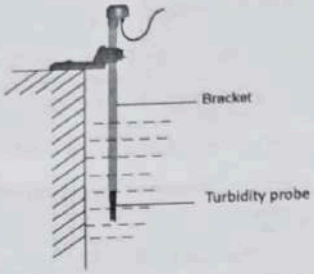

Figure 8.1.2 Probe Submersible Installation

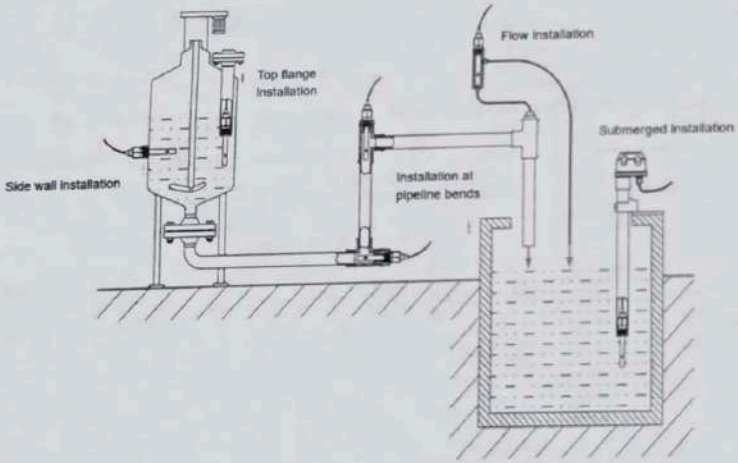

Figure 8.1.3 Typical Installation Method

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.
- Do not touch the fluorescent film with your hands.

Instructions for Use

- Do not move the fluorescent film head during use.
- Avoid applying any mechanical stress (pressure, scratches, etc.) directly to the fluorescent film.
- Avoid exposing the inner surface of the fluorescent film head to sunlight

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.
- Rinse the outer surface of the sensor with clean water. If there is still dirt residue, wipe it with a damp soft cloth. For stubborn dirt, add some detergent to the water to clean it.
- If there is dirt on the surface of the fluorescent film head, please rinse with clean water or gently wipe with a soft cloth. Pay attention to the force during cleaning to avoid scratching the measurement area and affecting the measurement accuracy.
- It is recommended to replace the fluorescent cap once every 1-2 years, and the fluorescent cap is not within the scope of the warranty.
- 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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