W504-A

Online Optical Dissolved Oxygen Sensor

User Manual

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Preface

Dear customer

Thank you for choosing Yantai Winmore's instrument. Reading the entire manual before use is highly recommended for operation and maintenance the instrument and out of unnecessary trouble. Please observe the operating procedures and precautions in this manual.

To make sure the effective after-sales protection provided by the instrument, please do not use any operation or maintenance other than which mentioned in the manual.

Due to non-compliance with the precautions specified in this manual, any fault and loss caused shall not be covered by the warranty, and the manufacturer shall not bear any relevant responsibility. If you have any questions, please contact our after-sales service department or representative.

Carefully unpack the instrument and accessories from the shipping container, and inspect for possible damage during shipping. Check received parts with items on the packing list. If any parts or materials are damaged or missing, please contact Yantai Winmore customer service or the authorized distributor immediately.

Save all packing materials until you are sure that the instrument functions properly. Any damaged or defective items must be returned in their original packaging materials.

Overview

Winmore optical dissolved oxygen sensor measures dissolved oxygen using the principle of oxygen dynamic luminescence quenching technique. When blue light excites sensor film, the sensing film emits red light. The phase difference between the blue excitation and returned red emission is measured, and the result is used to calculate DO concentration.

Features

Membraneless, no electrodes design

No oxygen consumption

Flow Independent

Automatic temperature compensation

No H2S Interference

Low Drift, fast response, and more accurate

Low Maintenance, low operating cost

Easy sensor cap replacement

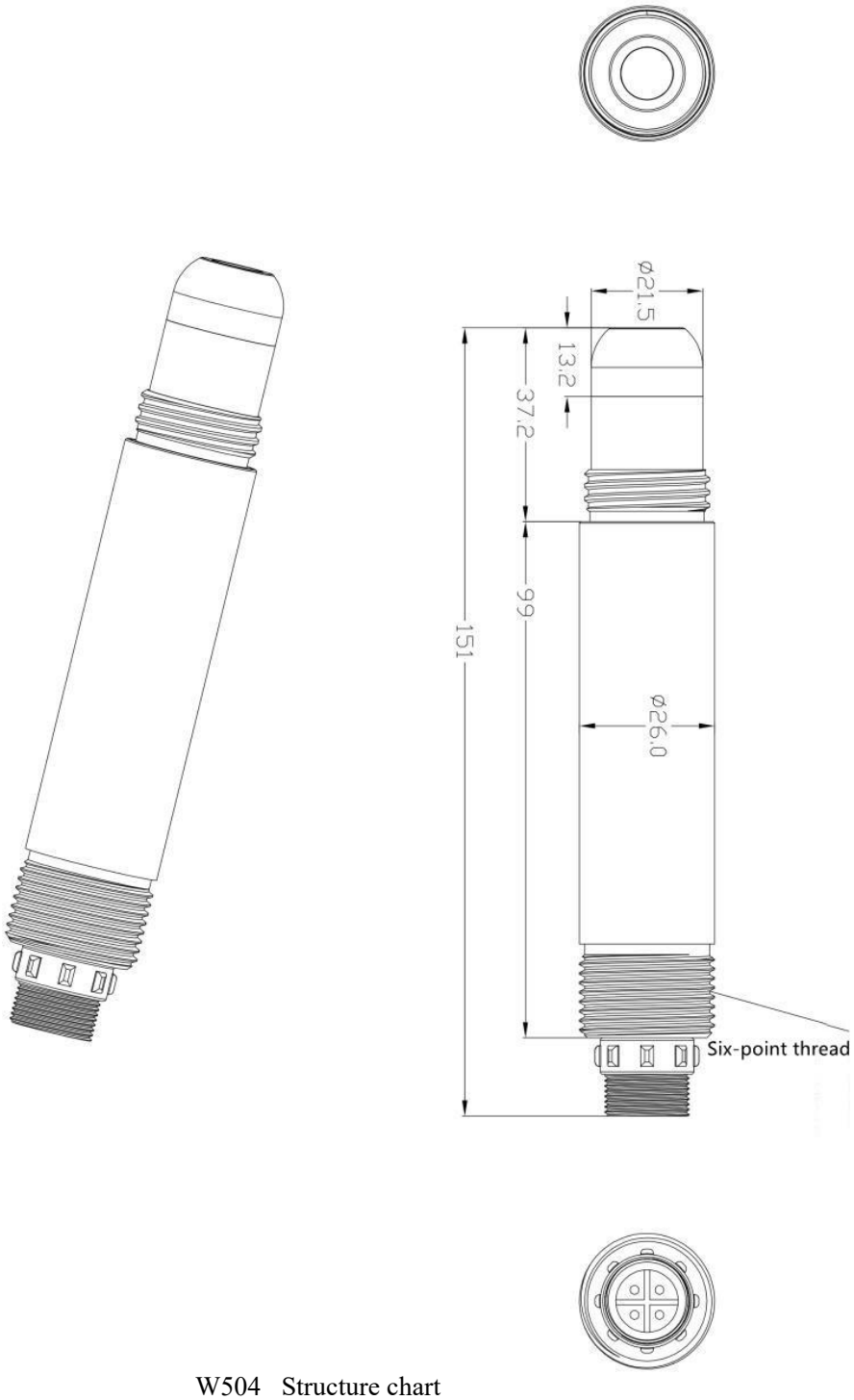
RS-485; MODBUS protocol compatible

Introduction:

Structure chart：

Dimension

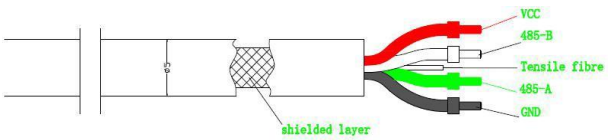
26 x151 mm(Φ x L)



W504 Structure chart

Cable Definition

1. Power Supply Requirements
   Power Supply DC 8-26V ±10%, Current <50mA
2. Sensor Cable
   4 wire AWG-24 or AWG-26 shielding wire. OD=5mm



1, Red—Power (VCC)
2, White—485 Date_B (485_B)
3, Green ---485 Date_A (485_A)
4, Black --- Ground (GND)
5, Bare wire-----shield

Technical Specifications

Item	Specifications
Range	0-20mg/L or 0-200% Saturation
Response Time	10 sec
Housing IP Rating	IP68
Accuracy	±1%
Drift	<1% per year
Working Temperature Range	0 ~ 50℃
Temperature Accuracy	±0.2℃
Interface	Support RS-485, MODBUS protocols
Construction	3/4 inch NPT
Power Requirements	DC 6~12V +/-5%, current <50mA
Temperature Sensor Type	NTC
Sensor OD	26mm
Sensor Length	177.5 mm
Cable Length	10m standard; 5m, 15m, and 30m optional
Calibration	Support one point and two-points calibration
Sensor Cap Lifetime	1 Year（at normal use）
Body Materials	Titanium

The above technical specifications are tested under standard solution in laboratory environment.

Installation

Part List

Item	Number	Note
W504-A Sensor	1	
Cable	1	10m
Protective cover	1	
Rubber protective cap	1	

Before use

1) Take off the protect cap: Please take off the protect cap of optical dissolved oxygen sensor, before installation and keep them properly for future use. Meanwhile, tighten the protective cover.

Sensor Installation

(1) **Wiring and power supply:**

1) The female and male connector of sensor cable should be screwed tightly to avoid moisture incursion

2) Do not use the sensor cable to pull the sensor! It is required to install sensor in a secure and stable mounting bracket.

3) Make sure power supply voltage is correct before power on.

(2) **Sensor installation:**

4) It is recommended to install the sensor vertically with electrodes facing down.

5) Considering water level change, the sensor should be installed 30cm below water level. The sensor should not be installed no more than 2m below water surface for maintenance purpose.

6) The sensor must be securely installed to avoid damage caused by water flow and other things.

Calibration

PC tool name: SmartPC(DO).exe.

Calibration Solution Preparation

Preparation for zero oxygen environment: take 200mL distilled water and pour it into the prepared beaker, then add anhydrous sodium sulfite, add and stir at the same time, until anhydrous sodium sulfite is insoluble and solid crystallization occurs, then the standard solution can be regarded as close to 0 oxygen.

Preparation for 100% oxygen environment: Prepare 1 beaker, take 200mL purified water (or distilled water) and pour it into the cup, add to the air pump, and fully aerate the solution (at least 30 minutes).

Note: If the field conditions really do not allow, the sensor can be directly put into the air (calibration accuracy will be slightly deviated).

Calibration (take 2-point calibration as an example)

Restore user calibration data by default, K=1, B=0(see modbus documentation for details).

Take the sensor out of the zero oxygen, wipe the sensor measurement end face with a paper towel, put the sensor into 100% environment (air), read the value of dissolved oxygen, wait for the data to stabilize, the value is close to 1 (Saturation is 100%), and record the value as Y. Place the sensor in the prepared zero-point solution, immerse the front end of the sensor completely in the solution, read the value of dissolved oxygen, and wait for the data to stabilize, with the value approaching 0.01 (Saturation is 1%), for example

Dissolved oxygen = 0.015, recorded as X.

Record K and B values according to the following formula:

K=(1-0)/(Y-X), B= - KX

Write K, B values to the sensor.

(See modBus documentation)

Our Sensor has also developed pc-based calibration software for W504 dissolved oxygen sensor. You only need to connect the probe to the calibration software through the computer interface, and you can easily complete the calibration of the sensor according to the software prompts.

Appliances and raw materials required

Anhydrous sodium sulfite powder

Distilled water or deionized water (Watsons distilled Water)

Beakers, gloves, stirring rod, air pump

Maintenance

Maintenance Schedule

Unlike traditional electrical chemical sensors, optical DO sensors require low maintenance. There are no need for frequent solution filling and calibrations.

Maintenance task	Frequency
Sensor cleaning	Every 30 days
Sensor and sensor cap inspection	Every 30 days
Sensor cap replacement	Every one year
Calibration（if required of agency)	Calibration based on required schedule

Maintenance

• **Clean the sensor surface：** Wash the outer surface of sensor with tap water, if there is still residue, using soft brush, for some stubborn dirt, household detergent can be added in tap water to clean.

• **Clean the cap outer surface：** Remove the protective cover , flush the dirt on the light window of the sensor with clean water, and finally put the cover on; If you need to wipe it, please wipe it gently with a soft cloth and do not scratch it forcefully. Otherwise, once the fluorescent film is scratched, the sensor will not work properly

• **Clean the cap inner surface:**

If water vapor or dust gets inside the fluorescent cap, the cleaning steps are as follows:

1) Remove the fluorescent cap

2) Rinse the inner surface of the fluorescent cap with tap water

3) For dirt containing fat and oil, wash it in warm water with household detergent

4) Rinse the inner surface of the fluorescent cap with deionized water

5) Gently dry all surfaces with a clean flannelless cloth and place in a dry place to allow water to completely evaporate

• **Check the cable:** inspect the sensor cable if there is damage.

• **Store the cap:** Regular electrode maintenance requires cap to be stored in a protective cover with a damp sponge and checked and watered regularly, so as to keep the fluorescent film in a moist state for a long time. If the sensor fluorescent cap

head is dry for a long time, the measurement results will drift, and it needs to be soaked in water for 48 hours before continuing to work.

Attention

Protect the inner surface of the fluorescent cap from sun exposure.
Do not touch the fluorescent film with your hands.
Avoid applying any mechanical stress (pressure, scratch, etc.) directly to the fluorescent film during use.

Trouble Shooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the W504-A sensor. If your symptom is not listed, or if none of the solutions solves your problem, please contact us.

Table 5-1 Troubleshooting

ERROR	POSSIBLE CAUSE	SOLUTION
No data displayed on controller (if sensors are connected)	Connection issue	Reconnect sensor to controller
	Cable failure	Contact customer service
	Bad sensor cap or loose sensor cap	Reinstall sensor cap or replace
Unstable DO reading	Dirty sensor cap	Clean sensor cap
	Damaged sensor cap	Replace sensor cap
	Sensor cap expired	
	Hardware failure	Contact customer service
Bad Temperature reading	Bad connection	Reconnect sensor to controller
	Dirty temperature sensor	Contact customer service

Quality Assurance

Warranty period:
Sensor warranty period is 1 year
Electrode warranty period is 4 months (Non-chemical environment, Non industrial wastewater).

If there are defects found during the warranty period, Yantai Winmore promises to repair or replace the defective products, or return the payment of product except the charge for the first time for transport and related formalities. In the warranty period, repair or replacement of any product will only enjoy the rest of the original warranty.
After receiving feedback for the product quality problems from the customer, Winmore will confirm whether the product need repair within two weeks; It can't be returned without approval to repair the product.

This warranty does not include the following：
1) Damage caused due to force majeure, natural disasters, social unrest, war (published or unpublished), terrorism, civil war or any government forced.
2) Damage caused due to improper use, negligence, accident, or caused by the improper application and installation.
3) Freight for the product shipped back to Yantai Winmore.
4) Freight for parts or products express or express delivery within the warranty.
5) Travel expense for repair in local in warranty.

The quality assurance includes all content of products provided by Winmore.
It constitutes the final, complete and exclusive statement about the quality guarantee, no person or agent is authorized in the name of Winmore to develop other warranty.
As described above, the remedial measures such as repair, replacement or return the payment for product is not in violation of the warranty, and it aim at our own products only. Based on the strict liability or other legal theory, Winmore is not responsible for defects or any other damage due to careless operation, including the subsequent damage with a causal connection between these situations.