

# CHLO-206A Online Chlorophyll Sensor

## User Manual



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## User Notes

- Please read the instructions carefully before using and save it for reference.
- Please follow the instructions and precautions.
- When receiving the instrument, please open the packaging carefully, inspect equipment's damage level in case of transportation, if you found spoiled equipment, please immediately notify the manufacturer and distributor, and retain the packaging, in order to send back to processing.
- When the instrument is in trouble, please don't repair it by yourself, please directly contact the maintenance department of the manufacturer.

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## I 、 Operational principle

The chlorophyll sensor uses leading optical technology, integrated design, high efficiency power management, rugged structure, stable sensor performance, maintenance-free and frequent calibration, and can be used online for a long time. It can be used for research, investigation and monitoring of rivers, lakes, ponds, marine surveys, aquaculture, drinking water sources, algae and phytoplankton conditions.

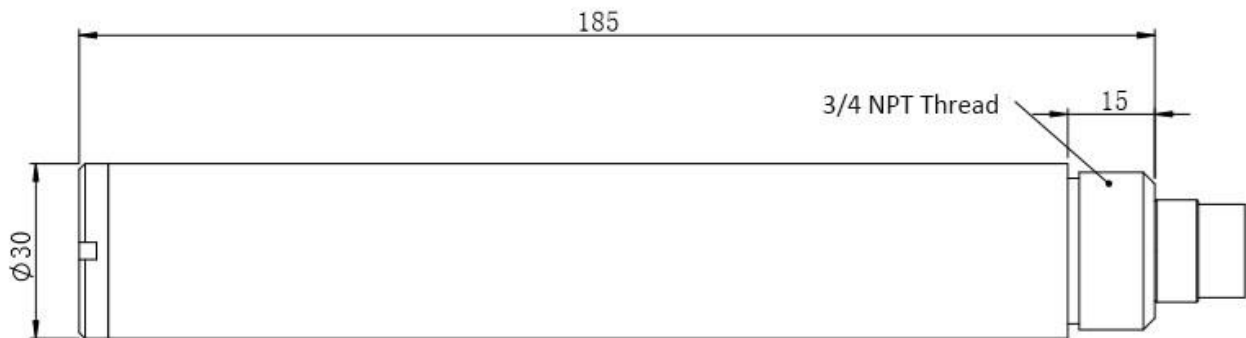
- 0~400ug/L
- Resolution: 0.1ug/L
- 0~50 ° C; IP68 protection, water depth within 20 meters
- Built-in temperature sensor
- Support RS-485, Modbus/RTU protocol
- Convenient, fast, stable and easy to maintain

## II 、 Technical performance and specifications

### 1. Technical parameters

<b>Model</b>	CHLO-206A
<b>Measuring range</b>	0~400ug/L
<b>Resolution</b>	0.1 ug/L, 0.1°C
<b>Precision</b>	±3%, ±0.3°C
<b>Calibration method</b>	Two-point calibration
<b>Protection level</b>	IP68
<b>Deepest depth</b>	Underwater 20 meters
<b>Temperature range</b>	0~50°C
<b>Sensor interface</b>	RS-485(Modbus/RTU)
<b>Power information</b>	12~24VDC
<b>Power consumption</b>	0.2W@12V
<b>Cable length</b>	5 meters, other lengths can be customized
<b>Shell material</b>	POM

## 2、 Dimensional drawing



## III、 Installation and electrical connection

### 1. Installation

Installation distance requirements: keep more than 3cm with the side wall and 10cm or more with the bottom.

### 2. Electrical connection

- a) Red line - power cord (12 ~ 24V)
- b) Black line - ground (GND)
- c) Blue line - 485A
- d) white line - 485B
- e) bare wire - shielded wire

After wiring is completed, it should be carefully checked to avoid incorrect connections before powering up.

Cable specification: Considering that the cable is immersed in water (including sea water) for a long time or exposed to the air, the cable has certain corrosion resistance. Cable outer diameter  $\Phi 6$  mm, all interfaces have been waterproofed.

## IV、 Maintenance

### 1. Maintenance procedures and methods

### 1.1 Maintenance schedule

The cleanliness of the measurement window is very important to maintain accurate readings.

Maintenance task	Recommended maintenance frequency
Calibrate the sensor (if required by the competent authority)	According to the maintenance schedule required by the competent authority

### 1.2 Maintenance methods

- Sensor outer surface: Clean the outer surface of the sensor with tap water. If there is still debris left, wipe it out with a soft, damp cloth. For some stubborn dirt, add some household washing liquid to the tap water to clean it.
- Check the cable of the sensor: the cable should not be tightened during normal operation, otherwise the cable inside the cable will be broken and the sensor will not work properly.
- Check the sensor's measurement window for dirt.

### 1.3 Notes

The **sensors** contains sensitive optical and electronic components. Make sure the probe is not subject to severe mechanical shock. There are no parts inside the probe that require user maintenance.

## 2. Sensor calibration

- a) Zero calibration: Take an appropriate amount of distilled water in a brown beaker and place the sensor vertically in the solution. The front end of the sensor is at least 10 cm from the bottom of the beaker. After 3 to 5 minutes, the value is stabilized and zero calibration is performed. The instructions refer to the appendix.
- b) Slope calibration: Place the sensor probe in the standard solution. The front end of the sensor is at least 10 cm away from the bottom of the beaker. After 3 to 5 minutes, the slope is calibrated after the value is stabilized. The instructions refer to the appendix.

## 3. Frequently Asked Questions

Error	Possible reason	Solution
The operation interface cannot be connected or the measurement result is not displayed.	The measured value is too high, too low or the value is continuously unstable.	Reconnect controller and cable
	Cable failure	Please contact us

The measured value is too high, too low or the value is continuously unstable.	The sensor window is attached by a foreign object	Cleaning the sensor window surface
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## V 、 Quality and service

### 1. Quality assurance

- The quality inspection department has standardized inspection procedures, advanced and perfect testing equipment and means, and strictly in accordance with the regulations, to do 阿 a 72-hour aging test and stability test on the product, and not to allow one unqualified product to leave the factory.
- The receiving party directly returns the product batch with a failure rate of 2%, and all the costs incurred are borne by the supplier. The reference standard refers to the product description provided by the supplier.
- Guarantee the quantity of goods and the speed of shipment.

### 2. Accessories and spare parts

This product includes:

- 1 Sensor 1
- 1 copy of the instruction manual
- 1 certificate

### 3. After-sales service commitment

The company provides local after-sales service within one year from the date of sale, but does not include damage caused by improper use. If repair or adjustment is required, please return it, but the shipping cost must be conceited. Damaged on the way, the company will repair the damage of the instrument for free.

## Appendix data communication

### 1. Data format

The default data format for Modbus communication is: 9600, n, 8, 1 (baud rate 9600bps, 1 start bit, 8 data bits, no parity, 1 stop bit).

### 2. Information frame format

a) Read data instruction frame

06	03	xx xx	xx xx	xx xx
Address	Function code	Register address	Number of registers	CRC check code (low byte first)

b) Read data response frame

06	03	xx	xx.....xx	xx xx
Address	Function code	Bytes	Answer data	CRC check code (low byte first)

c) Write data instruction frame

06	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code(low byte first)

d) Write data response frame (same data command frame)

06	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code (low byte first)

### 3. Register address

Register address	Name	Instruction	Number of registers	Access method
40001 (0x0000)	Measured value + temperature	Four double-byte integers are measured, measured decimal and temperature decimal places.	4 (8 bytes)	Read
44097 (0x1000)	Zero calibration	Calibrated in distillation, the write data is 0; the read data is zero offset. (It can also be	1 (2 bytes)	Write/Read



		calibrated in a standard solution of 0-100 ug/L. The calibration method is based on the slope calibration)		
44101 (0x1004)	Slope calibration	It was calibrated in a known standard solution (100 ug/L - 400 ug/L), and the written data was the actual value of the standard solution $\times 10$ ; the read data was the slope value $\times 1000$ .	1 (2 bytes)	Write/Read
44113 (0x1010)	Temperature correction	Calibrated in solution, the written data is the actual temperature value $\times 10$ ; the read data is the temperature calibration offset $\times 10$ .	1 (2 bytes)	Write/Read
48195 (0x2002)	Sensor address	The default is 6, writing data range 1-127.	1 (2 bytes)	Write/Read
48225 (0x2020)	Reset sensor	The calibration value is restored to the default value and the write data is 0. Note that the sensor needs to be calibrated again after resetting.	1 (2 bytes)	Write

#### 4. Command example

##### a) Start measurement instructions

Function: Obtain the chlorophyll value and temperature of the measuring probe; the unit of temperature is Celsius, and the unit of chlorophyll is ug/L.

Request frame: 06 03 00 00 00 04 45 BE

Response frame: 06 03 08 01 02 00 01 00 B0 00 0190 48

Example of reading:

Chlorophyll value	Temperature value
01 02 00 01	00 B0 00 01

For example: chlorophyll value 01 02 means hexadecimal reading chlorophyll value, 00 01 means chlorophyll value with 1 decimal point, converted to decimal value 25.8.

The temperature value 00 B0 represents the hexadecimal reading temperature value, and 00 01

represents the temperature value with a decimal point converted to a decimal value of 17.6.

b) Calibration instruction

Zero calibration

Function: Set the zero calibration value of the sensor chlorophyll; here the zero calibration is performed in distilled water;

Request frame: 06 06 10 00 00 00 8C BD

Response frame: 06 06 10 00 00 00 8C BD

Slope calibration

Function: Set the slope calibration value of the sensor chlorophyll; here the slope value is based on the actual standard solution value x10, with 400ug/L as an example for calibration;

Request frame: 06 06 10 04 0F A0 C8 F4

Response frame: 06 06 10 04 0F A0 C8 F4

c) Set the device ID address:

Function: set the MODBUS device address of the electrode;

Change the device address 06 to 01, with the following example:"

Request frame:: 06 06 20 02 00 01 E3 BD

Answer frame:06 06 20 02 00 01 E3 BD

## 5. Error response

If the sensor does not correctly execute the host command, it will return the following format information:

Definition	Address	Function code	Code	CRC check
Data	ADDR	COM+80H	xx	CRC 16
Number of bytes	1	1	1	2

a) CODE: 01 –Function code error

03 – Data is wrong

b) COM: The received function code