

JNC

UV Chemical Oxygen Demand

COD1500



V1.03

Catalogue

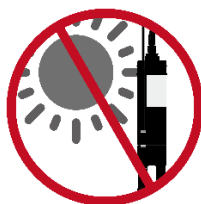
Precautions.....	3
PART 1.Product Description.....	4
1-1 Product Specifications.....	4
1-2 Product Size (mm)	5
1-3 Product Features	5
1-5 Product Application Site	6
1-6 Wiring Instructions.....	6
1-7 Hardware description	7
1-8 Equipment Installation Instructions	7
PART 2.Modbus Table	7
2-1 Analog output (03 、16)	7
PART 3.Maintenance and Cleaning	13
3-1 Maintenance and Cleaning	13
PART 4.Calibration Process	14
4-1 WQS-Utility Application.....	14
4-2 Device Page	16
4-3 Calibration Page	17
PART 5.Troubleshooting	22
Revision history	23
About us.....	23

! Precautions

Dear customer, we are glad that you are using our products. In order to maintain the service life of the product and your good experience, please read the following content before operating!

Operational matters:

1. The sensor is only suitable for operation and monitoring in aquatic environments. Do not place it in non-aquatic locations to avoid malfunction or damage.
2. When the sensor is not in use, it should be placed in a container filled with regular water. Avoid exposing it to direct sunlight to prevent abnormal data readings.
3. When installing the sensor, it should be mounted in a **fixed position**, to avoid strong water flow that could cause the sensor to collide with walls or surrounding structures.
4. To prevent impurities in the water from settling on the sensing surface and causing abnormal readings, it is recommended to install the sensor in a **horizontal position** with the measuring opening facing downward (Refer to [1-8 Device Installation Instructions](#)).
5. Avoid placing the device near equipment that generates bubbles (such as aeration outlets) to ensure accurate data readings.
6. Please follow the wiring functions indicated on the sensor casing and match them with the corresponding wire colors. Incorrect wiring may result in the device malfunctioning.
7. The sensor should be cleaned regularly to maintain optimal monitoring quality. A recommended **maintenance interval is once every two to three weeks**.
8. When installing the sensor, it is recommended to position it at least 30 centimeters below the water surface to ensure the reliability of the readings.



禁止曝曬



禁止非水域監測



小心碰撞



注意綠色標記



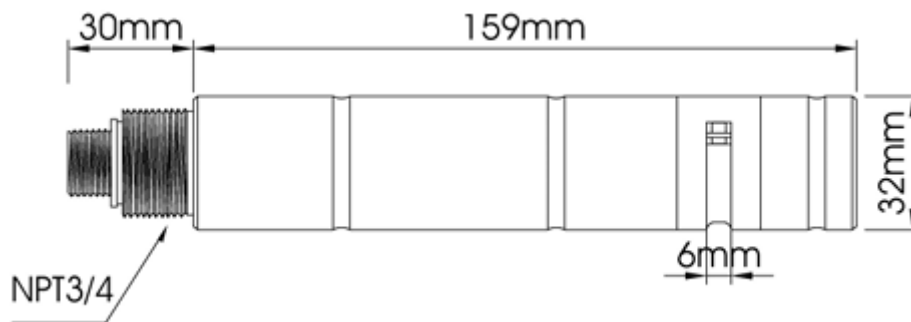
注意定期清潔

PART 1.Product Description

1-1 Product Specifications

Model	COD1500	
Power supply	Auto Cleaning	DC 12~24V
Power consumption	Auto Cleaning	2.4W
	No Auto Cleaning	1.2W
COD	Measurement range	0 ~ 1500mg/L
	Accuracy	± 5%
	Resolution	0.01 mg/L
TOC	Measurement range	0~750 mg/L
	Resolution	0.01 mg/L
Turbidity	Measurement range	0 ~ 4000NTU
	Accuracy	± 5% F.S.
	Resolution	0.01 NTU
Temperature	Measurement range	0 ~ 50°C(No freezing)
Response time	≤ 2 seconds	
Flow rate	Less than 3 m/s	
Supply voltage	≤ 3bar	
Calibration method	One-point or two-point calibration	
Communication method	RS-485 Modbus RTU	
Shell material	316L	
Physical conditions	Product dimensions (mm)	Ø32*L189mm
	Cable length	10M
	Waterproof rating	IP68

1-2 Product Size (mm)



1-3 Product Features

- **Measurement Principle:**Ultraviolet (UV) absorption method, measuring the degree of absorption of 254 nm wavelength UV light by organic substances. Complies with the Environmental Protection Administration (EPA) announced method NIEA W518.51C. Various organic substances dissolved in water absorb ultraviolet light. By measuring the absorption of 254 nm UV light by organic matter, the chemical oxygen demand (COD) in water can be determined. Additionally, suspended solids (SS) are detected using a 530 nm light beam, with automatic compensation for turbidity and color interference.
- UV254 LED light source with long lifespan and low drift; optical filter design minimizes interference and ensures stability.
- Capable of simultaneously measuring parameters such as COD, TOC, turbidity, and temperature.
- COD values can be measured without any chemical reagents, causing no

environmental pollution.

- The sensor features automatic turbidity compensation, ensuring stable performance without environmental interference.
- Compact size with built-in automatic cleaning to effectively prevent biofouling. Cleaning frequency is adjustable, and the system performs an automatic cleaning upon startup.
- Equipped with RS-485 digital output, compliant with the Modbus RTU protocol.
- The sensor features low power consumption and an anti-interference internal circuit design.

1-5 Product Application Site

Applicable to freshwater and marine aquaculture monitoring, wastewater treatment plants, surface water monitoring, drinking water treatment plants, reservoir and lake monitoring, and marine hydrology.

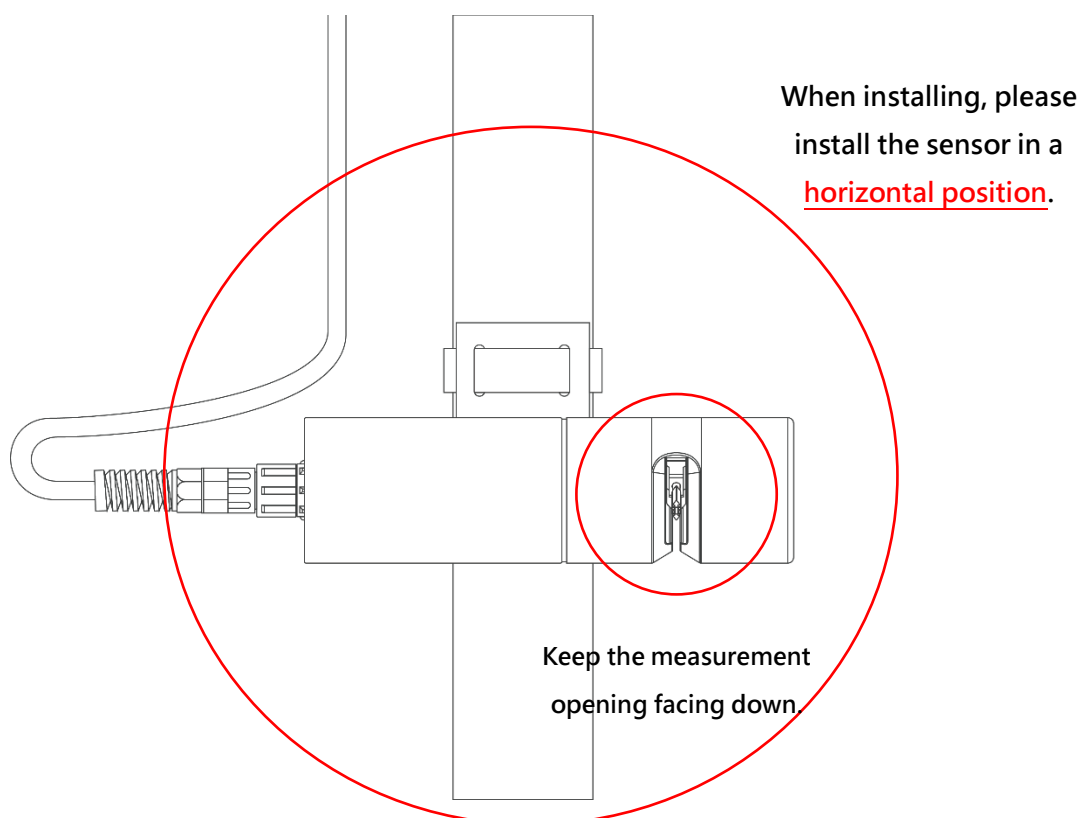
1-6 Wiring Instructions

Wire color	Wiring Function
RED	DC12~24
BLACK	GND
GREEN	RS-485(D+)
WHITE	RS-485(D-)

1-7 Hardware description

Setting Name	Description
Device ID	Default Station Number: 66
Device Baudrate	Default Baudrate: 9600 bps
Auto Cleaning	Default Auto Cleaning Interval: Once every 60 minutes

1-8 Equipment Installation Instructions



PART 2.Modbus Table

2-1 Analog output (03 ∙ 16)

Function 03 to Read/ Function 16 to Write					
Address	Setting Value	Item	Type	R/W	Remarks
0x1100	404353	Set COD Calibration Parameters (Float low word)	FLOAT	R/W	Gain Value
0x1101	404354	Set COD Calibration Parameters (Float high word)			
0x1102	404355	Set COD Calibration Parameters	FLOAT	R/W	Gain Value

		(Float low word)			
0x1103	404356	Set COD Calibration Parameters (Float high word)			
0x1200	404609	Turbidity Real-Time Value (Float low word)	FLOAT	R	Unit : NTU
0x1201	404610	Turbidity Real-Time Value (Float high word)			
0x1B00	406913	Set whether to perform automatic cleaning upon startup	INT16	R/W	00: Off 01: On
0x2600	409729	Temperature Real-Time Value (Float low word)	FLOAT	R	Unit : °C
0x2601	409730	Temperature Real-Time Value (Float high word)	FLOAT	R	
0x2602	409731	COD Real-Time Value (Float low word)	FLOAT	R	Unit : mg/L
0x2603	409732	COD Real-Time Value (Float high word)	FLOAT	R	
0x2606	409735	TOC Real-Time Value (Float low word)	FLOAT	R	Unit : mg/L
0x2607	409736	TOC Real-Time Value (Float high word)	FLOAT	R	
0x3000	412289	Method to Modify Station Number	INT16	R/W	
0x3100	412545	Enable Automatic Cleaning	INT16	W	
0x3200	412801	Set Automatic Cleaning Interval	INT16	R/W	

Function 03 to Read/ Function 16 to Write

Address	Setting Value	Item	Type	R/W	Remarks
0x3400	413313	Set Turbidity Calibration Parameters (Float low word)	FLOAT	R/W	Gain Value
0x3401	413314	Set Turbidity Calibration Parameters (Float high word)			
0x3402	413315	Set Turbidity Calibration Parameters (Float low word)	FLOAT	R/W	Gain Value
0x3403	413316	Set Turbidity Calibration Parameters (Float high word)			

2-1-1 Float Read Real-Time Value (Function 03)

Example: Read the real-time **COD temperature** value as a float, and value is 25.10869 °C

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		16 CRC Code	
Host Command	42	03	26	00	00	02	C1	B0
Number of Bytes	1	1	2		2		2	

Content	Device Station Number	Function	Data Bytes	Sensor Data			
Slave Response	42	03	04	9A	DE	C8	41
Number of Bytes	1	1	1	4			

16 CRC Code	
51	E5
2	

2-1-2 Float Real-Time Value Description (Function 03)

In the slave response, the sensor data can be seen as "9A DE C8 41"

By swapping the low bytes "C8 41" to the front and the high bytes "9A DE" to the back, the result becomes "C8 41 9A DE". Then, by swapping the low and high bytes, it becomes "41 C8 DE 9A". After converting this to Float, the result is 25.10869, which corresponds to a temperature of 25.10869°C.

You can refer to online conversion tools. : <https://gregstoll.com/~gregstoll/floattohex/>

2-1-3 Modify Station Number (Function 10)

Example: The default station number is 66 (0x42). Change the station number to 01 (0x01).

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	30	00	00	01	02
Number of Bytes	1	1	2		2		1

Write Value		16 CRC Code	
01	00	B2	F0
2		2	

2-1-4 Set COD Calibration Parameters (Function 10)

Example: Calibration Formula

$COD(\text{final}) = K \times COD + B$, where **K (gain)** and **B (offset)** are calibration parameters.

Set K (gain) = 0.9 and B (offset) = 0.5.

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	11	00	00	04	08
Number of Bytes	1	1	2		2		1

Write in the K value				Write in the B value				16 CRC Code	
66	66	66	3F	00	00	00	3F	54	8D
4				4				2	

2-1-5 Enable automatic cleaning function on startup(Function 10)

Example:Set the sensor to automatically execute the auto-cleaning function when powered on.

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	1B	00	00	01	02
Number of Bytes	1	1	2		2		1

Write in the value		16 CRC Code	
01	00	29	F2
2		2	

2-1-6 Set the automatic cleaning interval(Function 10)

Example:The device is preset to perform automatic cleaning every 30 minutes,change the interval to 10 minutes (time unit: minutes).

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	32	00	00	01	02
Number of Bytes	1	1	2		2		1

Write in the value		16 CRC Code	
0A	00	96	00
2		2	

2-1-7 Enable automatic cleaning(Function 10)

Example:Enable automatic cleaning; the number of bytes written is 0.

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	31	00	00	00	00
Number of Bytes	1	1	2		2		1

16 CRC Code	
06	50
2	

2-1-8 Set turbidity calibration parameters (Function 10)

Example: Calibration Formula

Turbidity(final) = $K \times \text{COD} + B$, where K (gain) and B (offset) are calibration parameters.

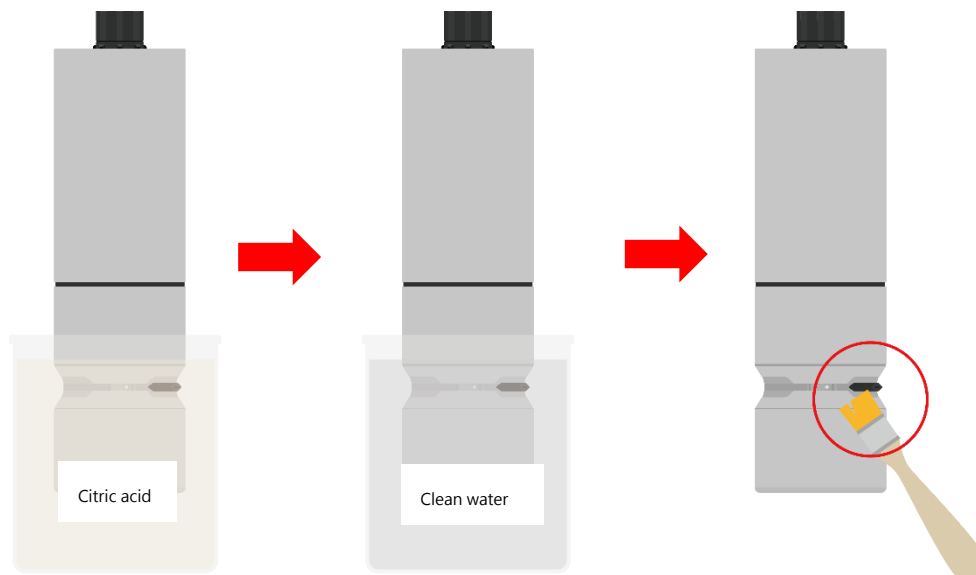
Set K (gain) = 0.8 and B (offset) = 0.6.

Content	Device Station Number	Function	Starting Address		Number of Data (Words)		Number of Byte
Host Command	42	10	34	00	00	04	08
Number of Bytes	1	1	2		2		1

Write in the K value				Write in the B value				16 CRC Code	
CD	CC	4C	3F	9A	99	19	3F	94	84
4				4				2	

PART 3. Maintenance and Cleaning

3-1 Maintenance and Cleaning



Use a glass container to dilute citric acid solution with a 10:1 ratio, and let it sit for at least 10 minutes.

Immerse the sensor in water and rinse it with clean water.

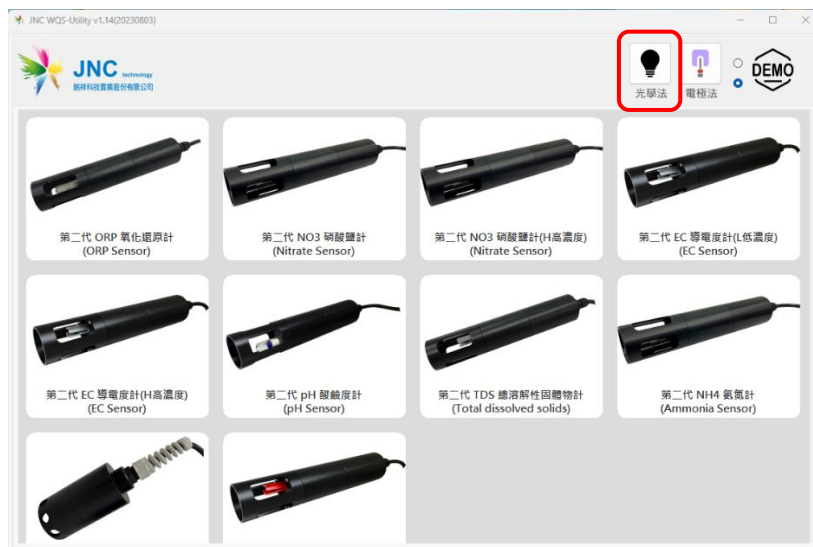
Carefully clean the sensor head with a soft brush, and pay extra attention to cleaning the interior of the sensor slot.

PART 4. Calibration Process

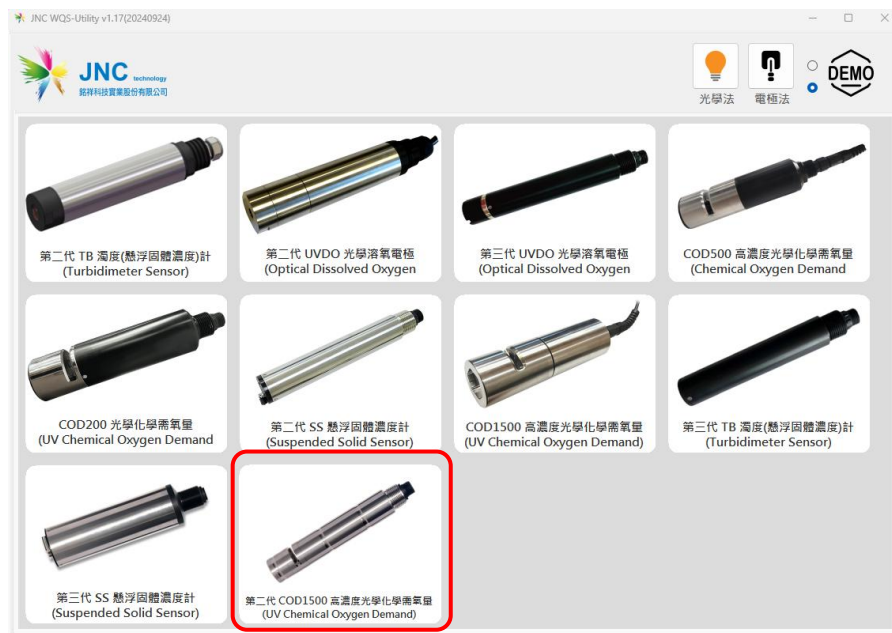
4-1 WQS-Utility Application

Versions v1.14 (inclusive) and later support COD1500 product reading and setting.

4-1-1 Open the WQS-Utility software



After opening the WQS-Utility software, click the "Optical Method" icon in the top-right corner of the Sensor Type section.



After entering the Optical Method Sensor Overview, click on the device to be calibrated, "COD1500," as shown in the image above.

4-1-2 Communication page



After clicking the COD1500 button, you will enter the communication page, and below is a description of the listed items:

1. Communication Port:

Please select the USB-to-RS485 port name that is connected to the sensor. You can find it by searching for "Device Manager" in Windows, then checking under the "Ports (COM & LPT)" section.

2. Baud Rate:

The default baud rate for this device is **9600**. If it has been changed, please select the updated baud rate accordingly.

3. ID:

The default device ID is **66**. If it has been changed, please select the updated ID accordingly. If the ID is forgotten, you can use the "**Forgot ID**" function to search for it.

After completing the above selections, click the **red arrow** to proceed to the next step.

4-2 Device Page



The following is a description of the COD1500 main page:

1. COD:

COD Real-time Value

2. TEMP:

Temperature Real-time Value

3. Setting:

If you need to adjust the station number or baud rate, enter the desired values and click "Set" to apply the changes. **Note: After setting, the device must be power cycled (turned off and on again) for the changes to take effect.**

4. Gain Value:

Display COD Calibration Parameters

5. Offset:

Display COD Calibration Parameters

4-3 Calibration Page

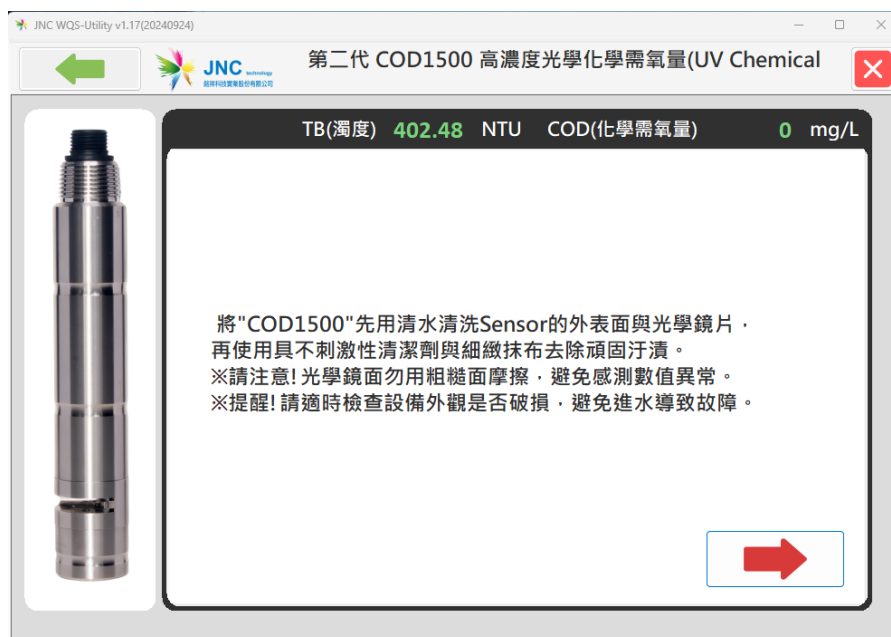


Click the "Calibration Page" button.

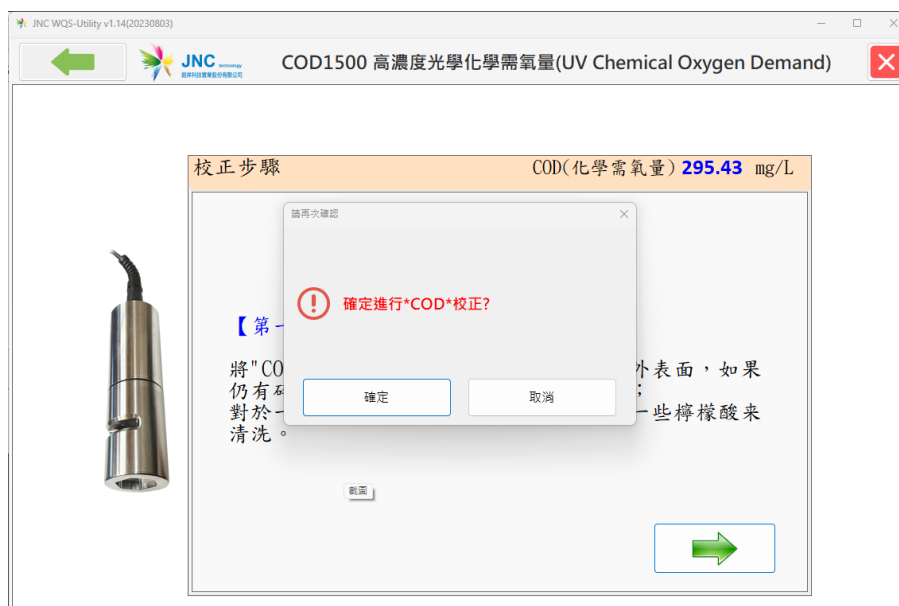


After selecting the "Confirm" button, you will enter the Calibration Page.

4-3-1 Step 1



Please follow the instructions in "Step 1" to clean the sensor. You may also refer to the procedures outlined in [Section 3: Maintenance and Cleaning](#) for detailed guidance. Once cleaning is complete, proceed to the next step.



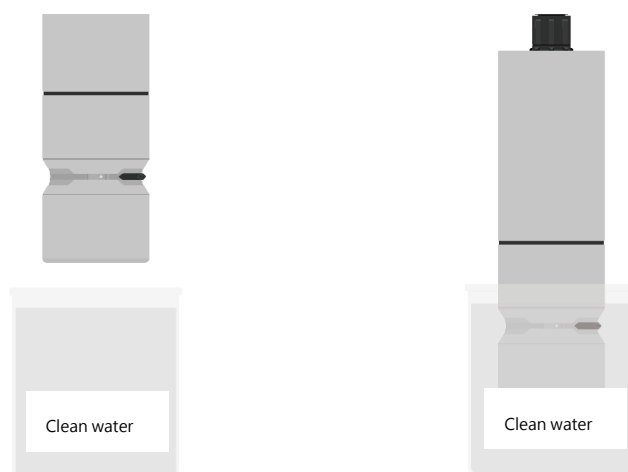
Please confirm once again whether you wish to proceed with COD calibration. If **Yes**, click the "**Confirm**" button.

4-3-2 Step 2



Step 2: Clean Water Calibration

Please follow the provided instructions carefully to proceed with the operation.



▲ The image above illustrates the instructions for Step 2.

4-3-3 Step 3



Step 3: High-Point Calibration

Use a standard solution to perform the high-point calibration. You may purchase the 500 mg/L calibration solution from our company if needed.

This demonstration uses a 500 mg/L standard solution for calibration. Please follow the on-screen or manual instructions to complete this step.



After wiping the COD1500 sensor dry, immerse it into the calibration solution.

Immerse the COD1500 sensor in the 500 mg/L calibration solution for more than 3 minutes to ensure the reading stabilizes.

▲ The image above illustrates the instructions for Step 3.

4-3-4 Calibration Complete



After calibration is complete, you will see the calibrated values displayed in the top-right corner of the calibration page. Once confirmed, click the "Check" (✓) icon to save and finalize the calibration.

PART 5.Troubleshooting

Abnormality Type	Cause of Failure	Solution
Communication Abnormality	Power Supply or Wiring Abnormality	Please follow 1-6 wiring instructions and physically check if the connections are correct.
	Port Connection Abnormality	Please use "Device Manager" to select "Ports" and check the USB-to-RS485 port name.
No Change in Values	Auto-Cleaning Brush Abnormality	Please check if the brush is tangled with foreign objects.Re-power the device and check if the automatic cleaning brush head is functioning. If it fails to rotate or rotates abnormally, please contact our company.
Real-time Value Abnormally High or Low	Maintenance and Cleaning Required	Please refer to "Section 3: Maintenance and Cleaning" for execution.
	Device Calibration Required	Please refer to "Section 4: Calibration Process" for execution.

Revision history

Version	Revision Date	Revision Description	Maintenance Personnel
V1.00	2023/06/13	First version	denny
V1.01	2023/10/16	Update manual style, add maintenance and calibration process	bin
V1.02	2024/01/02	Add cover page and tab styles	bin
V1.03	2025/05/16	Update for the second generation of COD	ming

About us

717 No. 33, Lane 428, Section 3, Wenhua Road, Rende District, Tainan City Tax ID 28529427

Tel : +886-6-311-0008

<https://www.jnc-tec.com.tw>

Fax : +886-6-311-0522

Email : jnc.jnc@msa.hinet.net

This note indicates that the company reserves the right to make changes to the content without prior notification.



ISO 9001