NBL-WQ-FUV-200 Online Full Spectrum Multi-Parameter Sensor User Manual

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User Notes

- Please read this manual carefully before use and save it for reference.
- Please follow the operating procedures and precautions in this manual.
- When receiving the instrument, please carefully open the package and check whether the instrument and accessories are damaged due to shipping. If any damage is found, please inform the manufacturer and distributor immediately, and keep the package for return.
- When the instrument fails, do not repair it yourself. Please contact the maintenance department of the manufacturer directly.

Content

I. Working principle

Any substance will absorb certain wavelengths of light. Therefore, by measuring how much these substances absorb light of a specific wavelength, the amount of that substance dissolved in the water can be accurately measured. The NBL-WQ-FUV-200 online full-spectrum multi-parameter sensor uses a xenon lamp as a light source, which can emit light of all wavelengths from near-ultraviolet to near-infrared. It collects full-range spectral information through a micro-fiber spectrometer. In addition, it uses a specific algorithm to compensate for the attenuation of the optical path and can Eliminate the interference of particulate suspended impurities to a certain extent, thereby achieving more stable and reliable measurement.

Features:

- No reagents required, no pollution, economical and environmentally friendly
- Installation is more convenient and water quality monitoring can be carried out online continuously
- Can measure COD, BOD, TOC, color, turbidity and other parameters
- Automatically compensate for turbidity interference
- Small drift, fast response, and more accurate measurement
- Excellent stability even for long-term monitoring
- Maintenance-free, long service life, low cost of use
- Digital sensor, RS-485 interface, Modbus/RTU protocol
- Low power consumption design, anti-interference design

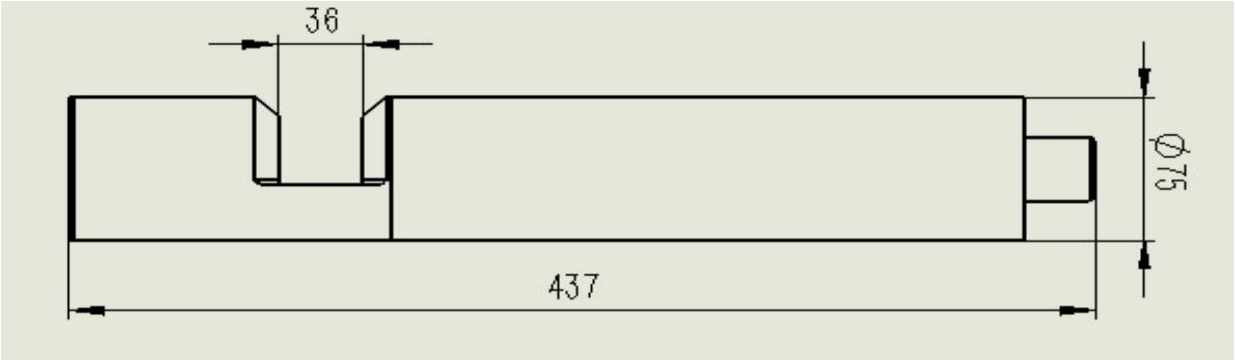
II. Technical performance and specifications

1. Technical parameters

Model	NBL-WQ-FUV-200				
Measurement principle	full spectrum absorption method				
Measuring range	COD	Chroma	TOC	Turbidity	BOD
	0～200mg/L equiv. KHP	0～500Hazen	0～150mg/L	0～400NTU	0～150mg/L
COD accuracy	±5%F.S.				
COD resolution	0.1mg/L				
Colorimetric accuracy	±5%F.S.				
Chroma resolution	0.1 Hazen				
TOC accuracy	±5%F.S.				
TOC resolution	0.1mg/L				
Turbidity accuracy	±5%F.S.				
Turbidity resolution	0.1NTU				
BOD accuracy	±5%F.S.				
BOD resolution	0.1mg/L				
Calibration method	Spectral calibration				
output method	RS-485（Modbus/RTU）				
power supply	12～24VDC				
Power consumption	0.2W@12V				
working conditions	0～45℃、<0.1MPa				

storage temperature	-5～65℃
Protection level	IP68
Installation method	Immersion installation
Cable length	5 meters, other lengths can be customized
Sensor housing material	316L stainless steel

2. Dimensional drawing



Note: The sensor connector is M16-5 core waterproof connector male

III. Installation and electrical connection

1. Installation

1）When hanging the sensor, avoid the sensor from hitting the wall or other water conservancy facilities due to water flow. If the water flow is strong, secure the sensor.

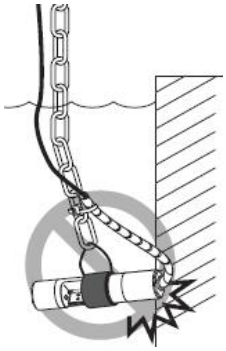
2）Install the sensor no more than 2 meters deep from the water surface.

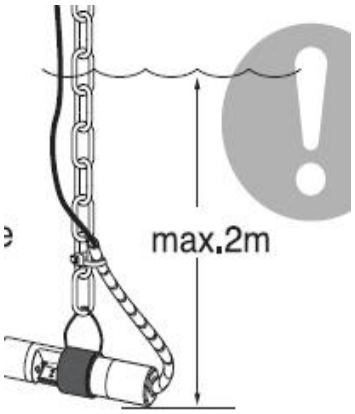
3）Taking into account the fluctuation of water level, submerge the sensor 30cm below the lowest possible water level.

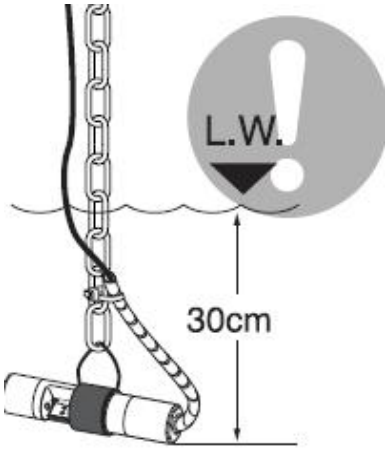
4）The sensor is placed in the water where there are no air bubbles.

5）It is recommended to install a cable protection sleeve on the sensor cable. The sensor is

placed horizontally and firmly fixed, with the measurement area facing the direction of the water flow.







2. Electrical connection

The cable is a 4-core twisted pair shielded wire, and the line sequence is defined as follows:

- Red wire—power cord (12~24VDC)
- Black wire—ground wire (GND)
- Blue wire—485A
- White wire—485B

The wiring sequence should be carefully checked before powering on to avoid unnecessary losses caused by wiring errors.

Wiring instructions: Considering that cables are immersed in water (including seawater) or exposed to the air for a long time, all wiring locations are required to be waterproofed, and user

cables should have certain anti-corrosion capabilities.

IV. Maintenance and maintenance

1. Maintenance schedule and methods

1.1 Maintenance schedule

To ensure accurate measurement, cleaning is very important. Regular cleaning of the sensor will contribute to the stability of the data.

Maintenance tasks	Recommended maintenance frequency
Calibrate the sensor (if required by the competent authority)	Carry out according to the maintenance schedule required by the competent authority
Maintain and inspect self-cleaning brushes	Return to the factory for inspection and maintenance every 18 months Self-cleaning brush

Note: The maintenance frequency in the above table is only a recommendation. Maintenance personnel are required to clean the sensor according to the actual usage of the sensor.

1.2 Maintenance methods

1) Sensor outer surface: Clean the outer surface of the sensor with tap water. If there are still debris remaining, wipe it with a damp soft cloth. For some stubborn dirt, you can add some household detergent to the tap water to clean it.

2) Check the sensor cable: The cable should not be tightened during normal operation, otherwise it is easy to break the internal wires of the cable, causing the sensor to not work properly.

3) Check whether the measurement window of the sensor is dirty and whether the cleaning brush is normal.

4) Check whether the sensor cleaning brush is damaged.

5) After 18 months of continuous use, it needs to be returned to the factory to replace the dynamic sealing device.

1.3 Things to note

The sensor contains sensitive optical and electronic components. Make sure the sensor is not subject to severe mechanical impact. There are no user-serviceable parts inside the sensor.

2. Calibration of sensors

Before use, place the sensor into deionized water to ensure that the optical path is completely submerged in water and there are no bubbles. Send a spectrum calibration command to complete the calibration.

3. Precautions

- Prevent the sensor from being exposed to sunlight
- Please do not touch the sensor with your hands
- Avoid bubbles adhering to the sensor surface during measurement and calibration
- Avoid any direct mechanical stress (pressure, scratches, etc.) on the sensor during use.

4. Frequently asked questions and solutions

Question	Possible Reason	Solution
The operation interface cannot connect or does not display the measurement results.	Controller and cable connection error	Reconnect the controller and cables
	Cable failure	Please contact us
The measured value is too high, too low or the value continues to be unstable.	The sensor window is attached to a foreign object	Clean the sensor window surface
	Sensor self-cleaning damaged	Replace cleaning brush

V. Quality and service

1. Quality assurance

- The quality inspection department has standardized inspection procedures, advanced and complete testing equipment and means, and strictly follows the inspection procedures. It conducts 72-hour aging tests and stability tests on the products, and does not allow any unqualified products to leave the factory.
- The consignee will directly return batches of products with a defective rate of 2%, and all costs incurred will be borne by the supplier. For consideration criteria, refer to the product description provided by the supplier.
- Ensure supply quantity and shipping speed.

2. Accessories and spare parts

This product includes:

- 1 sensor
- 1 copy of instruction manual
- 1 certificate of conformity

3. After-sales service commitment

Our company provides after-sales service for this machine within one year from the date of sale, but does not include damage caused by improper use. If repair or adjustment is needed, please send it back, but the freight will be borne by you. When sending it back, make sure it is well packaged to avoid shipping. If the instrument is damaged during the journey, our company will repair the damage to the instrument free of charge.

Appendix Data Communications

1. Data format

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

Parameters such as baud rate can be customized.

2. Information frame format

a) Read data instruction frame

64	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

64	03	xx	xx……xx	xx xx
Address	Function code	Bytes	Answer data	CRC check code(low byte first)

c) Write data command frame

64	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 as write data command frame)

64	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	Type of data	Number of registers	interview method
0x0000	Colorimetry measurements	Int	2 (4 bytes)	Read (0x03)
0x0004	COD measurement value	Int	2 (4 bytes)	Read (0x03)
0x0008	BOD measurement value	Int	2 (4 bytes)	Read (0x03)
0x000C	TOC measurement value	Int	2 (4 bytes)	Read (0x03)

0x0010	UV254 measurement value	Int	2 (4 bytes)	Read (0x03)
0x0014	Turbidity measurement	Int	2 (4 bytes)	Read (0x03)
0x0018	Colorimetry measurements	Float	2 (4 bytes)	Read (0x03)
0x1024	COD measurement value	Float	2 (4 bytes)	Read (0x03)
0x001C	BOD measurement value	Float	2 (4 bytes)	Read (0x03)
0x0020	TOC measurement value	Float	2 (4 bytes)	Read (0x03)
0x0024	UV254 measurement value	Float	2 (4 bytes)	Read (0x03)
0x0028	Turbidity measurement	Float	2 (4 bytes)	Read (0x03)
0x2002	Device address	Int	1 (2 bytes)	Read(0x03)/ Write(0x06)

1. Command example

a) Measurement instructions:

Function: Read the COD value and temperature value of the sensor; the unit of COD value is mg/L, and the unit of temperature is ℃.

Request frame: 64 03 00 00 00 04 4D FC

Response frame: 64 03 08 03 62 00 01 00 B9 00 01 54 2C

Reading example:

Chroma value	COD value
03 62 00 01	00 B9 00 01

For example: the chroma value 03 62 represents the hexadecimal reading chroma value, 00 01 represents the chroma with 1 decimal point, and the converted decimal value is 86.6.

COD value 00 B9 represents the COD value in hexadecimal reading, 00 01 represents the COD value with 1 decimal point, and the converted decimal value is 18.5.

b) Calibration instructions:

Spectral calibration

Function: Calibrate the sensor reference spectrum; spectrum calibration should be performed after the spectrum has stabilized for a period of time.

Request frame: 64 06 10 00 00 00 84 FF

Response frame: 64 06 10 00 00 00 84 FF

c) Change device ID address:

Function: Change the Modbus device address of the sensor.

Change the sensor address 100 to 01. The example is as follows:

Request frame: 64 06 20 02 00 01 EB FF

Response frame: 64 06 20 02 00 01 EB FF

2. Error response

If the sensor cannot correctly execute the host computer command, it will return information in the following format:

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