TBG-2088S/P

Industrial Turbidity Analyzer

User Manual

Shanghai BOQU Instrument Co.,Ltd

Content

Chapter 1 Product Overview

1.1. Overview

Turbidity online analyzer, which integrates digital turbidity sensor, intelligent turbidity online analyzer, and waterway into a complete machine. View and manage data on the turbidity analyzer, perform calibration and other operations; the system collects water quality and turbidity online Analysis, remote data transmission, database and calibration functions are integrated, which provides great convenience for water turbidity data collection and analysis.

The turbidity sensor part has its own defoaming tank, which can make the water sample enter the turbidity measuring tank after defoaming. This instrument requires less water samples and has strong real-time performance. A small water sample flows through the defoaming tank and then enters the measuring tank, and the water sample is always kept flowing. When the water sample passes through the circulation device, the instrument collects the turbidity of the water sample, and it can also be connected to the central control room or the upper computer through digital communication.

1.2. System Features

1. Through the integrated design, users can reduce the construction work of the turbidity sensor waterway, only need to connect one water inlet pipe and one water outlet pipe to measure;

2. The sensor comes with a defoaming tank to ensure the accuracy of turbidity measurement;

3. View and control through the turbidity online analyzer, RS485 data output, convenient to connect with the central control room or upper computer for integration and control, and configure 4-20mA output and relay control output at the same time to meet the needs of a variety of field control applications;

4. Equipped with digital electrodes, plug and play, simple installation and maintenance;

5. Turbidity intelligent sewage discharge, without manual maintenance or reducing the frequency of manual maintenance;

1.3. Applicable Environment

Turbidity monitoring of swimming pool water, drinking water, and secondary water supply of pipe network etc.

1.4 Technical Specification

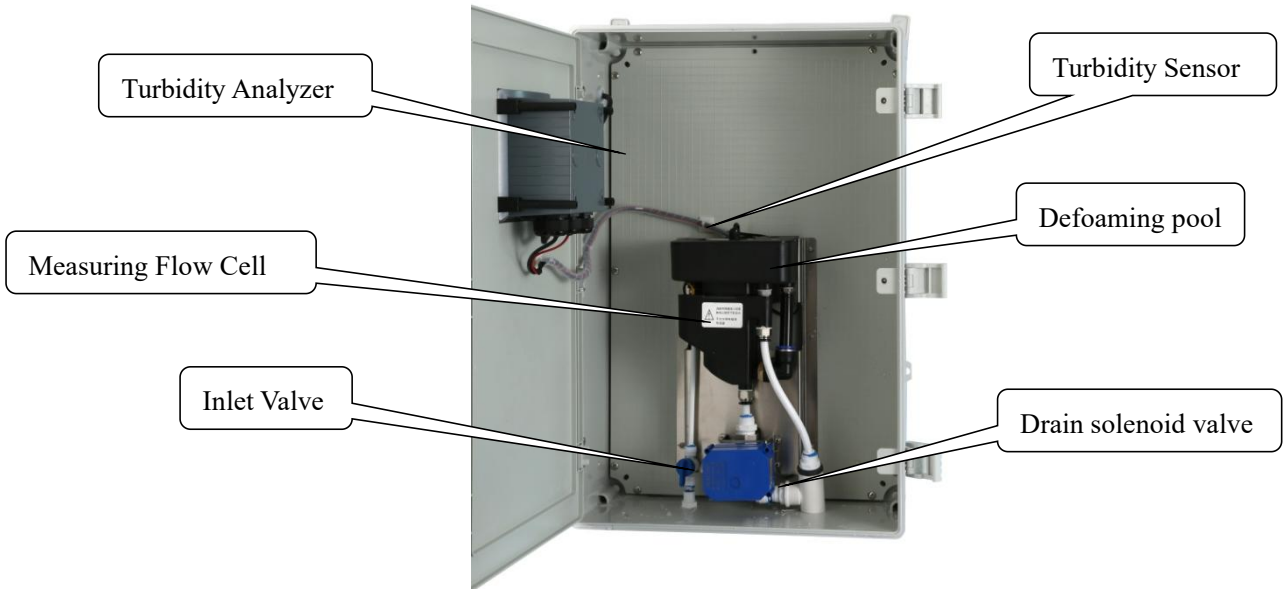
Specifications	Details
Name	Online Turbidity Analyzer
Measuring range	0-20NTU, 0-200 NTU
Resolution	0.001NTU, 0.01NTU
Accuracy	±2% or ±0.02NTU(Take the larger value)
Communication interface	ModBusRS485
Output signal	4-20mA
Relay	5A/250V AC, 5A/30V DC
Power Supply	85V ~ 265V AC 50/60Hz
Power Consumption	< 20W
Inlet diameter	6mm (2 points quick connector)
Drainage diameter	16mm (quick connector)
Working environment	temperature: (0-50)℃;
Storage environment	Relative humidity: ≤85% RH (non-condensing)
Cabinet size	600mm×400mm×230mm (height×width×depth)

Chapter 2 Product Appearance And Structure

2.1 Product Appearance

Turbidity analyzer: real-time display of measurement data, and can be set and calibrated by pressing the button.

2.2. Internal Structure



The instrument is equipped with: digital turbidity electrode, turbidity analyzer, defoaming pool and measuring pool, waterway, etc. The internal wiring of the instrument has been connected and the sensor has been installed. The power cord and communication output line of the instrument are on the upper left side of the instrument, and the water inlet and outlet ports are on the bottom side of the instrument. Before using, customers only need to plug in the power cord and connect the inlet and outlet water pipes.

Chapter 3 Installation And Wiring

3.1. Installation Requirements

1. Choose a spacious, ventilated and dry indoor environment for the installation location of the instrument

2. The instrument should be fixed at a position slightly higher than the drainage water level (300mm above the ground level is the most suitable height) to facilitate smooth drainage.

3. There should be enough space for personnel to operate around the instrument to facilitate subsequent maintenance and calibration.

4. The level of the drainage pipe of the instrument should be lower than the level of the water outlet of the instrument, and the total length of the outlet pipe should not exceed 3 meters, and there should be no blockage at the end.

5. The water inlet and outlet pipes of the instrument all use quick-plug connectors, and the water inlet pipe has a matching adapter. The user can match other adapters according to the actual situation on the site, but the final pipeline connected to the water inlet of the instrument cannot be changed.

6. Incoming water pressure: ≤0.3 Mpa

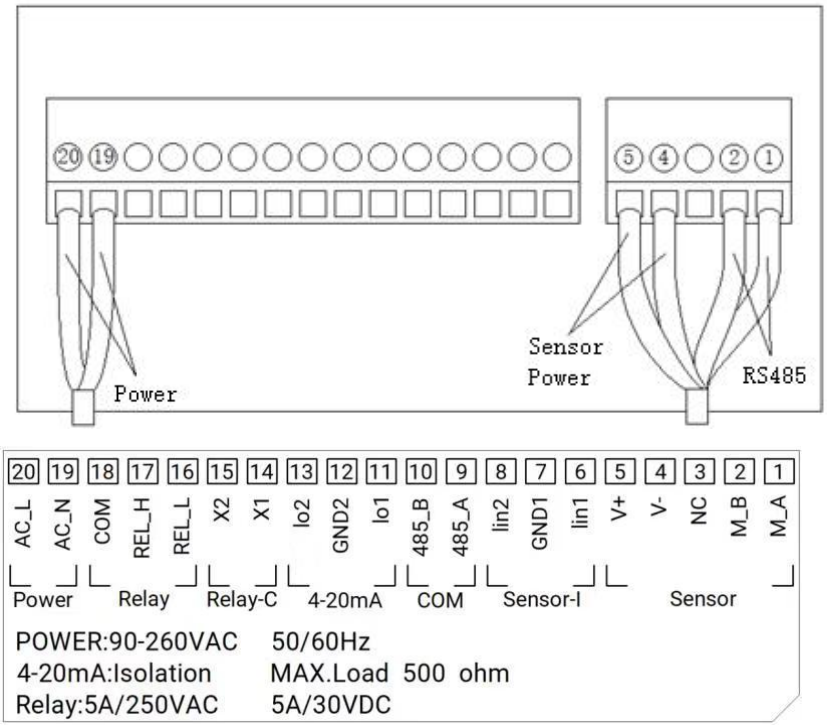
7. Flow requirement: ≤ 300 mL/min

8. Anti-interference preventive measures: Do not share a power supply with motors, frequency converters and other high-power equipment.

9. Water and electricity measurement:

10. After the instrument is powered on, open the water inlet valve, and the water sample enters the flow cell. After the water level of the flow cell reaches a certain height, the water sample flows out from the drain.

3.2. Wiring Instructions



Chapter 4.Operation

4.1. Operation Panel

The main panel of the turbidity analyzer has 2 modules, the LED liquid crystal display module and the button module.

The user can set and adjust the parameters of the instrument through the 5 keys on the panel.

① Set/ESC button

② Select/Shift button

③ Up button

④ Down button

⑤ Confirm button

⑥ LED screen

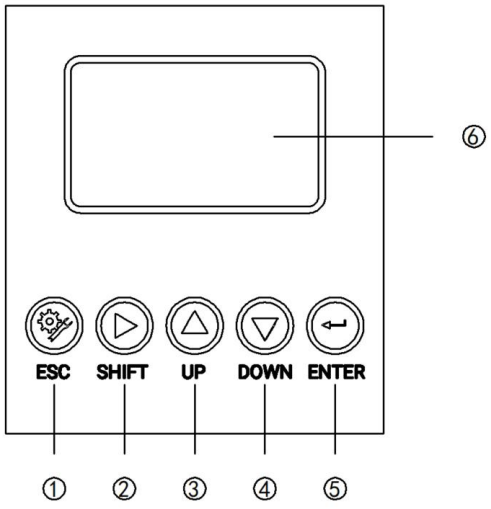


Figure 1 Operation Interface

4.2 Measurement Interface

Enter the main measurement interface after the start-up animation.

When the instrument is working normally, the LED display shows the following content.

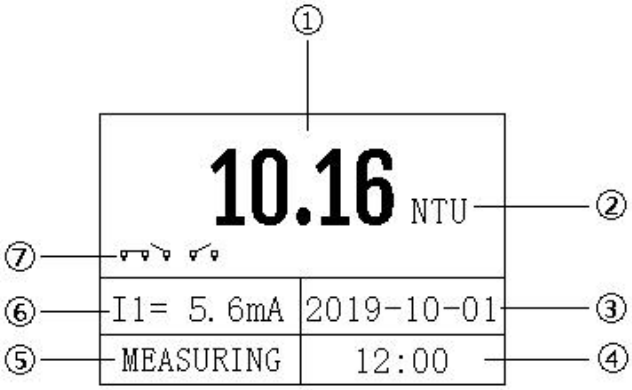


Figure 2 Main interface

① Measurement value

② Unit

③ Real-time date

④ Real time

⑤ Measurement status

⑥ 4-20mA corresponding value of turbidity

⑦ Relay status

4.3 Setting

Press “Set/ESC Button” to enter the password input interface.

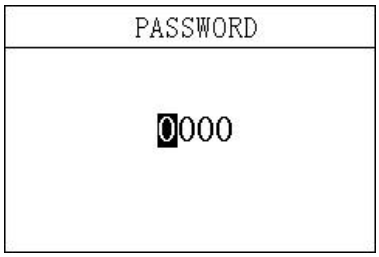


Figure 3 Enter Password

Enter settings:

Enter the password "3700" to enter the setup menu.

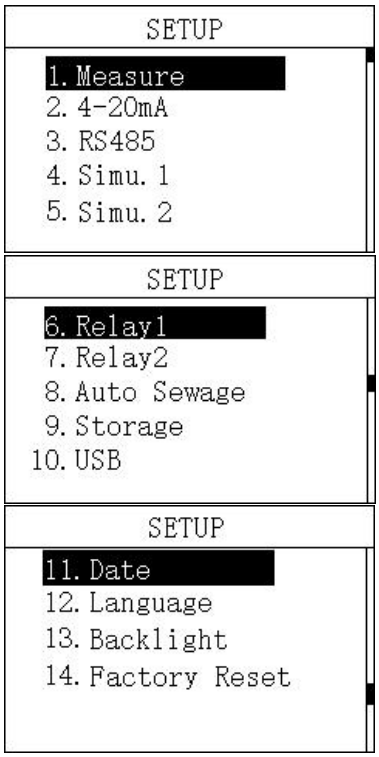


Figure 4 Setting menu

4.3.1 Unit

In this menu, users can change the measurement method NTU/FTU, and at the same time can adjust the offset to make the measurement accurate.

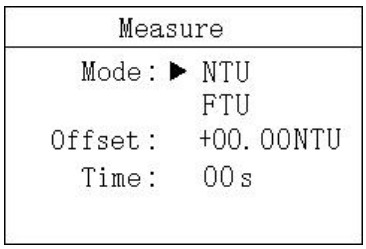


Figure 4.1 Unit

4.3.2 4-20mA

In this menu, users can change the corresponding value of 4-20mA and set the corresponding effective range.

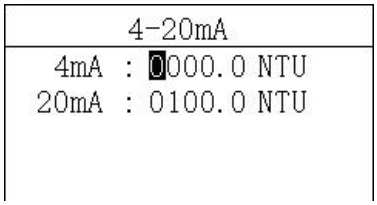


Figure 4.2 4-20mA

4.3.3 ModbusRTU Communication

In this menu, users can change the communication address and rate.

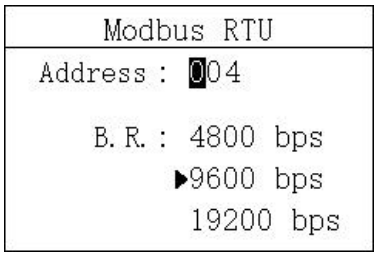


Figure 4.3 ModbusRTU communication

4.3.4. Simulation Detection

In this menu, users can simulate the 4-20mA current output. The current output can be verified by simulating the measurement of the IO1 (measured value) and IO2 (temperature) ports. The release relay is closed. The relay is simulated and verified.

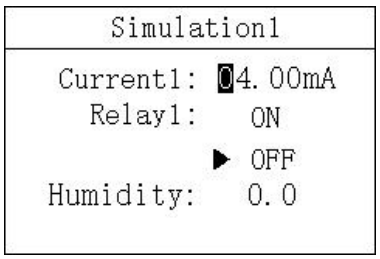


Figure 4.4 Simulation1

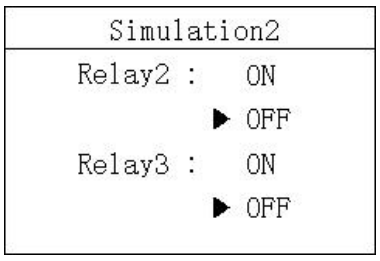


Figure 4.5 Simulation2

4.3.5 Relay1 Setting

In this menu, users can switch the relay 1 function, set the parameter alarm upper limit value, alarm return difference value, and alarm delay time.

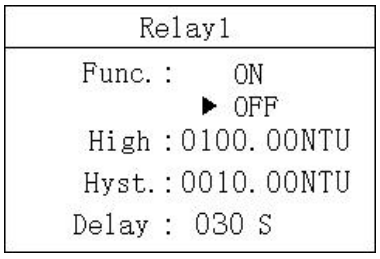


Figure 4.6 Relay1 Setting

4.3.6 Relay2 Setting

In this menu, users can switch the relay 2 function, set the parameter alarm lower limit value, alarm return difference value, and alarm delay time.

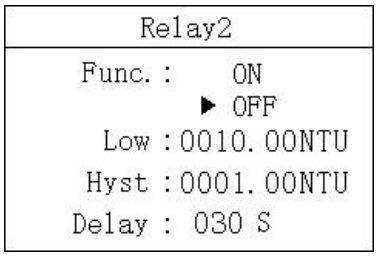


Figure 4.7 Relay2 Setting

4.3.7. Automatic Sewage Setting

In this menu, users can switch the automatic drainage function (default on), set the drainage cycle (the shortest cycle is 1 day, the longest cycle is 30 days, if the setting exceeds 30 days, it will automatically change to 10 days) and manually perform a sewage discharge .

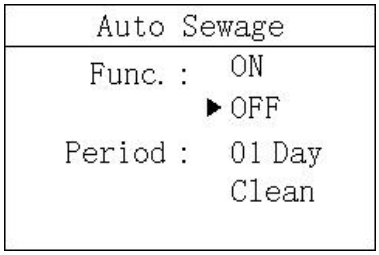


Figure 4.8 Auto Sewage

The duration of each sewage discharge is 3 minutes (cannot be changed), which will be displayed in the main interface, during which the measurement will be suspended.

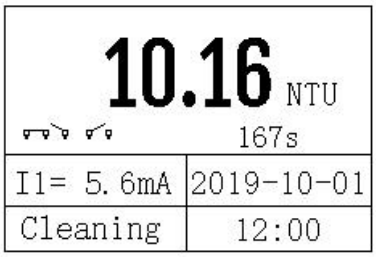


Figure 4.9 Auto Sewage display

4.3.8 Storage Setting

In this menu, users can set the storage function (default on), clear storage memory and recording interval.

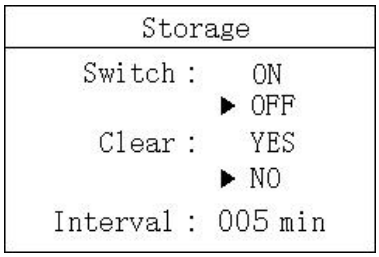


Figure 4.10 Storage Setting

4.3.9 Date&Time Setting

In this menu, users can change date and time according to different time zone.

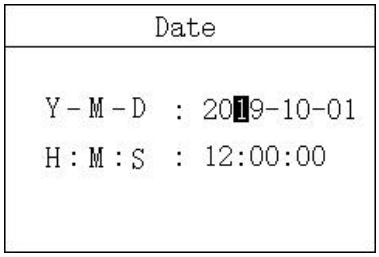


Figure 4.11 Date&Time Setting

4.3.10 Language Setting

Users can choose English or Chinese according to need.

Figure 4.12 Language Setting

4.3.11 Backlight Setting

In this menu, users can change the backlight mode of the LCD screen. The backlight can be always on or delayed off (the default is delayed off), the backlight brightness can be changed (brightness level 1-5, brightness increases), and the contrast can be changed.

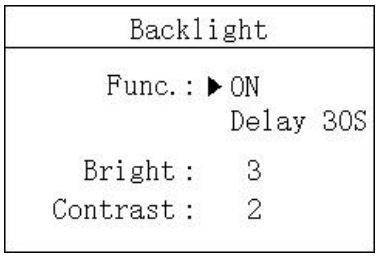


Figure 4.13 Backlight Setting

4..3.12 Factory Data Reset Setting

In this menu, users can restore the current output and relay to the factory parameters.

Figure 4.14 Factory data reset

4.4 Calibration

Press "ESC" to enter the password input interface.

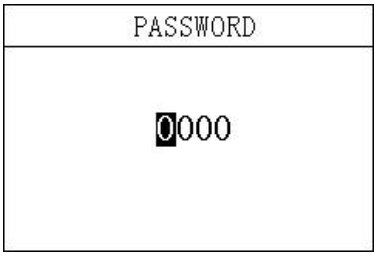


Figure 5 Enter Password

Enter calibration menu:

Enter the password "3900" to enter the calibration menu.

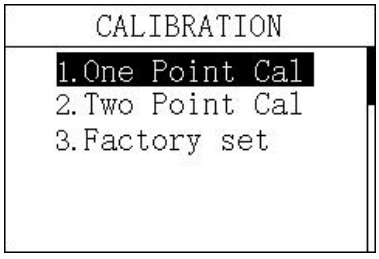


Figure 6 Calibration Menu

4.4.1 One Point Calibration

Add a solution of known concentration, when the measured value on the left is stable, modify the value on the right to the concentration of the solution and press the enter key.

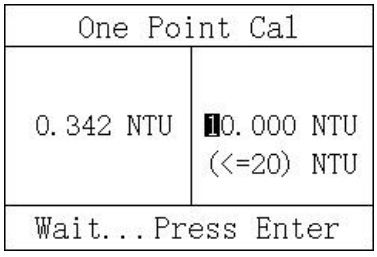


Figure 7 One Point Calibration

4.4.2 Two Point Calibration

The method is the same as one point calibration, adding solutions with different concentrations (the concentration of the solution used at the first point must be less than the second point).

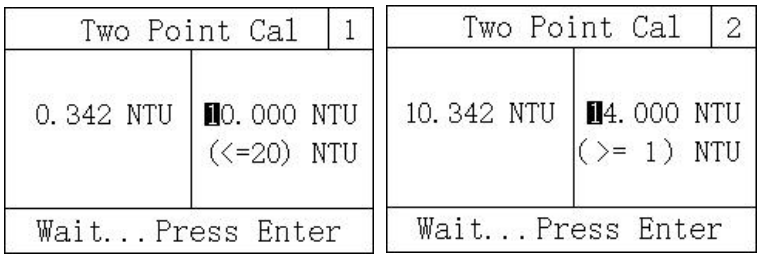


Figure 8 Two Point Calibration

4.4.3 Factory Setting

In this menu, users can restore the calibration parameters to the factory parameters.

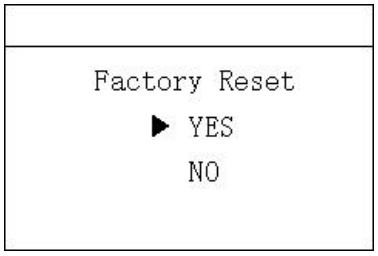


Figure 9 Factory Setting

4.5 History Data Display

Press "ESC" to enter the password input interface.

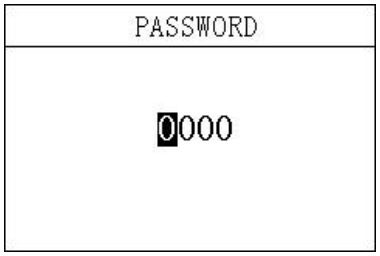


Figure 10 Enter Password

Enter History Data Display:

Enter the password "1300" to enter the History Data Display.

Press the up and down keys to switch the display. It can store up to 1000 records and overwrite automatically if reach maximum.

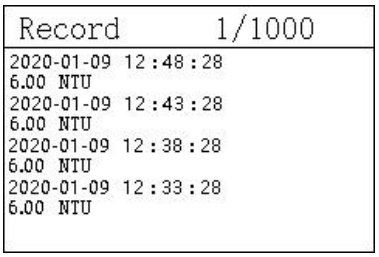


Figure 11 History Data

4.6 Waveform Display

Press "ESC" to enter the password input interface.

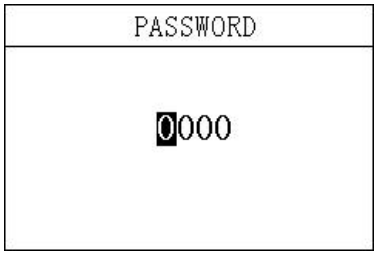


Figure 12 Password

Enter Waveform Display:

Enter the password "1400" to enter the Waveform Display.

Press the up and down keys to switch the display.

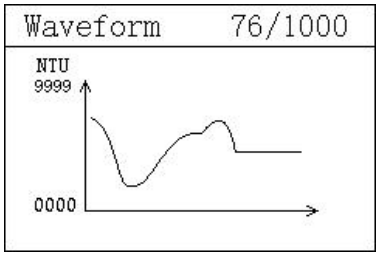


Figure 14 Waveform Display

Chapter 5 Common Faults And Approach

No	Failure phenomenon	Approach
1	Analyzer has no display	Check whether the power supply has power; Whether the power cord is in good contact;
2	The instrument displays that the sensor cannot be searched	Check whether the electrode wiring of the instrument is correct; Check whether the electrode connection is good.
3	Large differences in measurement data	Check whether there are obvious changes in the measured water sample, including relevant conditions such as water quality and flow rate. If there is any abnormality, please use a portable or laboratory instrument for comparison. Check whether there is any water sample in the measuring cell and it circulates normally. Check whether the drain valve is closed.
4	Water emerges from the cover of the defoaming tank	Check whether the inlet water flow rate is too large. Adjust the opening of the inlet valve to reduce the inlet water flow rate.
5	The overflow of the measuring tank is not flowing smoothly or some joints are leaking water	Check whether the water outlet is blocked by foreign matter and whether the drain pipeline is unblocked. Check whether the water outlet pipe outside the box is too high, resulting in poor drainage.

Chapter 6 Matters Needing Attention

When using it for the first time, hang the instrument securely, connect the inlet and outlet pipes, and then power on. If the instrument needs to be moved or transported, the water inlet valve needs to be closed before the instrument is powered off, enter the automatic sewage setting interface of the turbidity analyzer setting menu, and select manual sewage to open the sewage solenoid valve once to discharge the water sample in the sensor measuring pool. It is empty to prevent the liquid from leaking to the outside during the handling or transportation of the instrument and cause the electronic parts to get damp.

If the instrument is not used for a long time, it is also recommended to manually empty the water sample in the measuring cell to avoid long-term residue of the water sample, which may cause scaling on the inner wall of the measuring cell.

Chapter 7 MODBUS Communication Protocol

7.1. Communication Parameters

Baud rate: 4800, 9600, 19200 (default is 9600)

Serial data format: 8N1 (8 data bits, no parity, 1 stop bit)

Function code: 03

Device address: The turbidity controller defaults to 4

7.2 Register Definition

Register address(Dec)	Definition	R/W	Remarks
0, 1	Turbidity	R	×1 NTU，FP32 AB CD, High and low bytes are not reversed
8	RTU Address	R/W	Modbus communication address，Turbidity defaults 4.
9	Baud rate	R/W	4800，9600，19200，9600 as default

7.3 Examples of communication formats:

Data reading instruction

Addr. + Func. + Register start address + Number of Registers read + CRC check code (Hex)

e.g. Tx:04 03 00 00 00 02 C4 5E

Address	Func.	Register start address	Number of Registers read	CRC check code
04	03	0000	0002	C45E

Data return instruction:

Address + Func. + Data length + Data + CRC check code (Hex)

e.g. Rx:04 03 04 40 0E B8 52 28 CD

Address	Func.	Data length	TB value	CRC check code
04	03	04	400EB852	28CD

The transmission data format is FP32 AB CD, the conversion sequence is 400EB852.

Convert the hexadecimal number 400EB852 to decimal through a floating-point number converter, resulting in a value of 2.23