TBG-2088S

Online Turbidity Analyzer

User Manual

Shanghai BOQU Instrument Co.,Ltd.

Catalog

Introduction

TBG-2088S Industrial Online Turbidity Analyzer is a brand-new online intelligent digital instrument independently developed and manufactured by BOQU Instrument. This turbidity Analyzer communicates with the sensor through RS485 (ModbusRTU), which has the characteristics of rapid communication and accurate data. Complete functions, stable performance, easy operation, low power consumption, safety and reliability are the outstanding advantages of this TB Analyzer.

The turbidity analyzer works with digital and optical tubidity sensor ,which can be widely used in industrial application such as thermal power generation, chemical industry, metallurgy, environmental protection, pharmaceutical, biochemical, food and tap water.

Technical Features

1) Extremely quickly and precision turbidity sensor.

2) It's suitable for harsh application and free-maintenance,save cost.

3) Provide one way of 4-20mA output for turbidity.

4) Digital TB Sensor provide precision and online measurement.

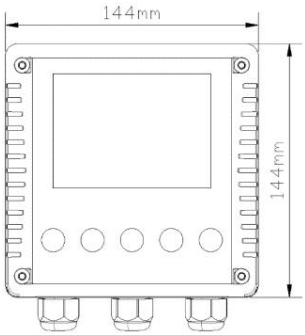
5) With data recording function,user easy to check history data and history curve.

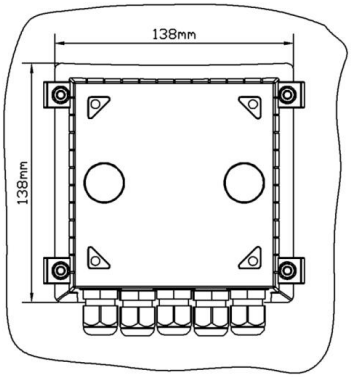
Technical Specification

Specifications	Details
Name	Online Turbidity Analyzer
Shell	ABS plastic
Power Supply	90 – 260V AC 50/60Hz
Output	One 4-20mA output tunnel,RS485
Relay	5A/250V AC 5A/30V DC
Size	144×144×104mm
Weight	0.9kg
Protocol	Modbus RTU
Range	0~100.00, 0-1000 NTU
Accuracy	±2%FS
Waterproof Level	IP65

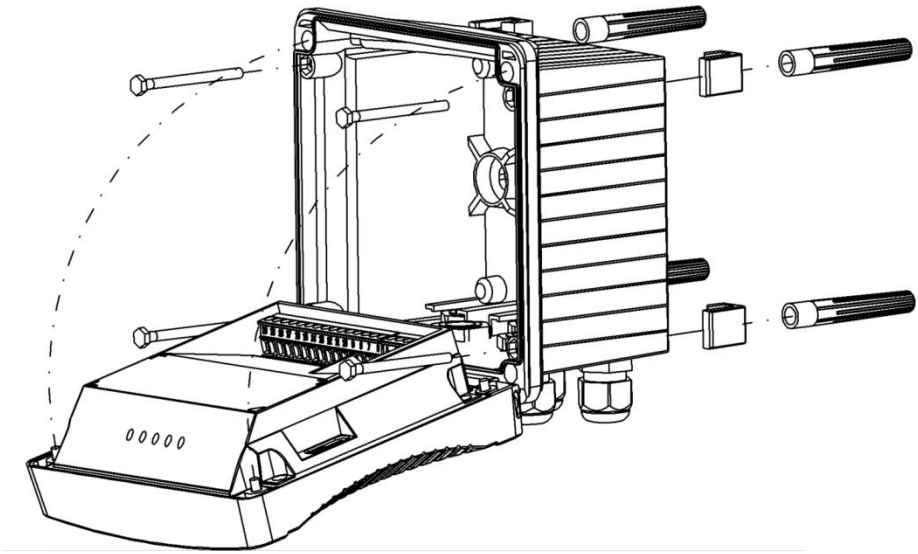
Installation and Wiring

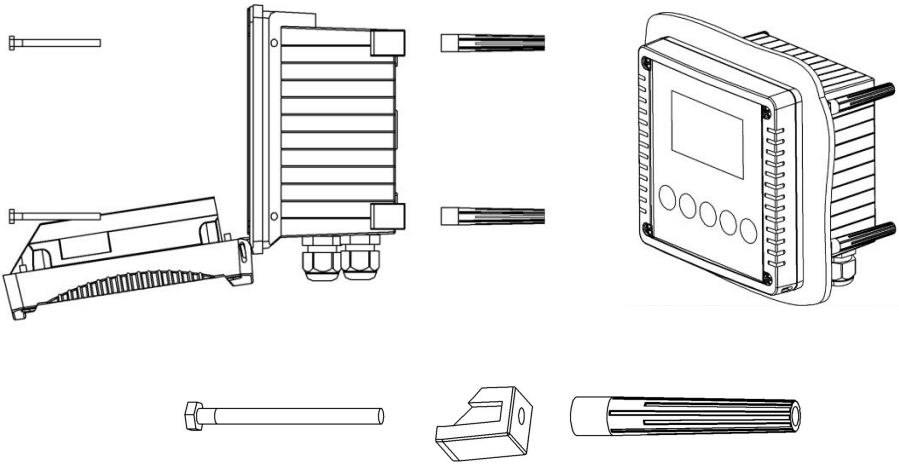
SIZE



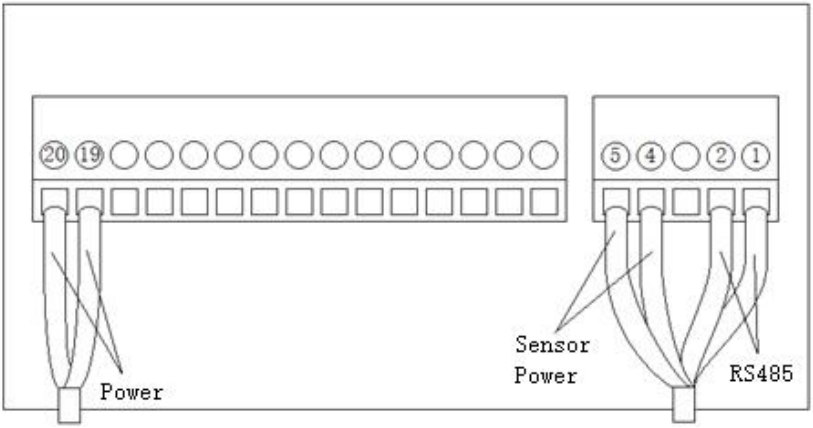


Installation





Wiring



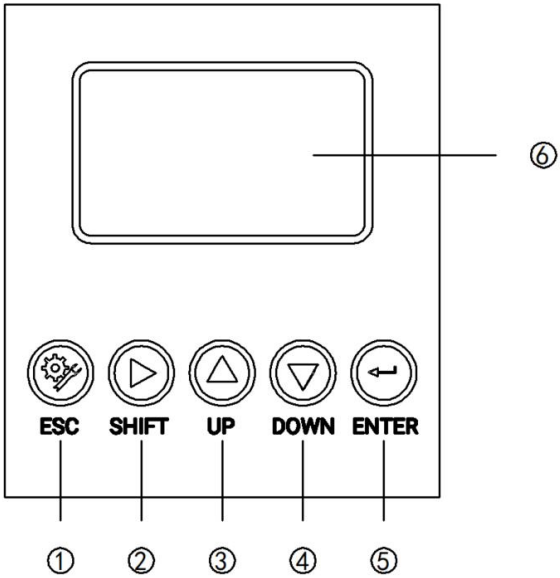
20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
AC_L	AC_N	COM	REL_H	REL_L	X2	X1	Io2	GND2	Io1	485_B	485_A	lin2	GND1	lin1	V+	V-	NC	M_B	M_A
Power		Relay			Relay-C		4-20mA			COM		Sensor-I			Sensor				

POWER:90-260VAC 50/60Hz
4-20mA:Isolation MAX.Load 500 ohm
Relay:5A/250VAC 5A/30VDC

Operation Interface

There are 2 modules in the main panel of the turbidity measuring instrument, LED LCD display module and button module.

Users can set and adjust the parameters of the instrument through the 5 buttons on the panel.



Picture 1 Operation Interface

① Set/Exit button

② Select/Shift button

③ Up button

④ Down button

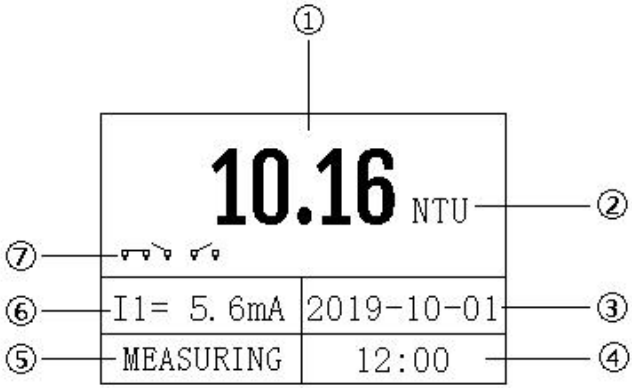
⑤ Confirm button

⑥ LED screen

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.



Picture 2 Main interface

① Measurement value

② Unit

③ Real-time date

④ Real time

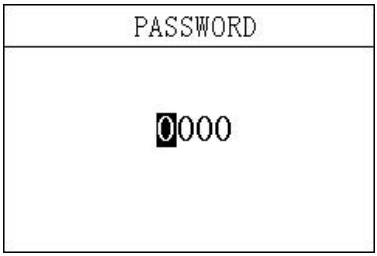
⑤ Measurement status

⑥ 4-20mA corresponding value of turbidity

⑦ Relay status

Setting

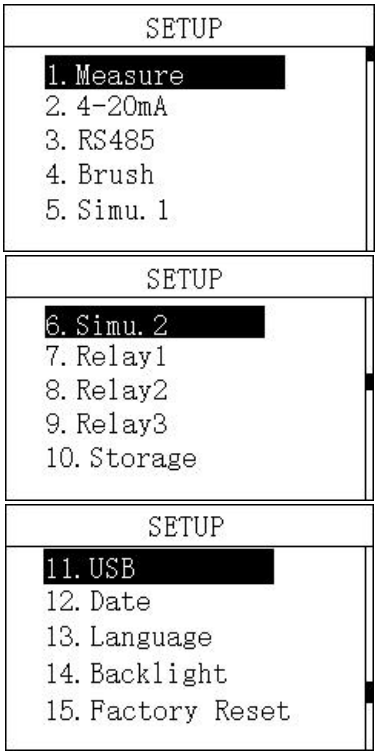
Press “Set/Exit Button” to enter the password input interface.



Picture 3 Password

Enter settings:

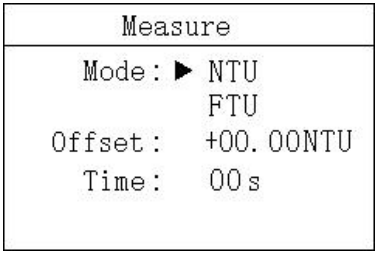
Enter the password "3700" to enter the setup menu.



Picture 4 Setting Menu

3.1 Unit

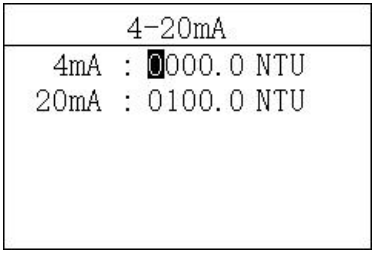
In this menu, users can change the measurement method NTU/FTU, and at the same time can adjust the offset to make the measurement accurate.



Picture 3.1 Uint

3.2 4-20mA

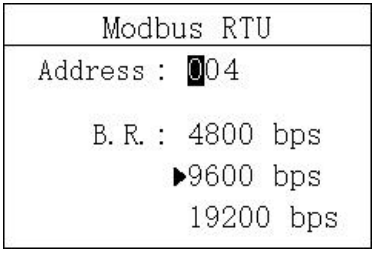
In this menu, users can change the corresponding value of 4-20mA and set the corresponding effective range.



Picture 3.2 4-20mA

3.3 ModbusRTU communication

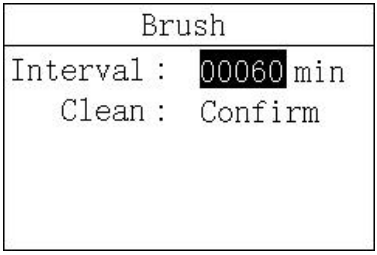
In this menu, users can change the communication address and rate.



Picture 3.3 ModbusRTU communication

3.4 Brush

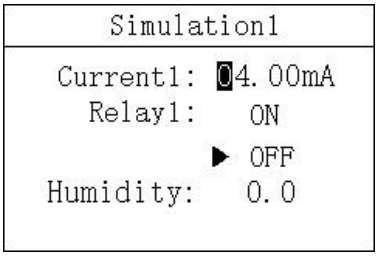
In this menu, users can set the scraping time. The default is 60 minutes, and users are generally not advised to change it at will.



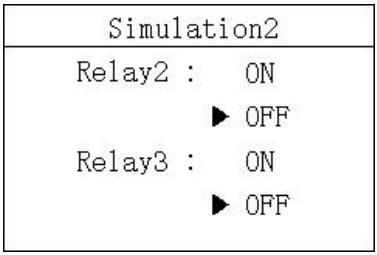
Picture 3.4 Brush

3.5 Simulation

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.



Picture 3.5.1 Simulation1



Picture 3.5.2 Simulation2

3.6 Relay1

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.

```
Relay1
Func. :    ON
         ▶ OFF
High :0100.00NTU
Hyst. :0010.00NTU
Delay :  030 S
```

Picture 3.6 Relay1

3.7 Relay2

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.

```
Relay2
Func. :    ON
         ▶ OFF
Low :0010.00NTU
Hyst :0001.00NTU
Delay :  030 S
```

Picture 3.7 Relay2

3.8 Relay3

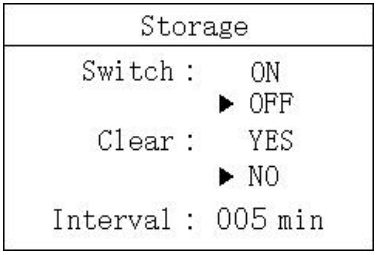
In this menu, users can set the relay 3 function, set the cleaning time and cleaning cycle.

```
Relay3
Func. :    ON
         ▶ OFF
Period:  001.0h
Clean:  010s
```

Picture 3.8 Relay3

3.9 Storage

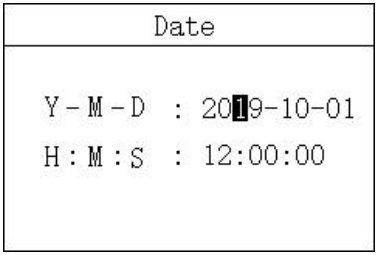
In this menu, users can set the storage function (default on), clear storage memory and recording interval.



Picture 3.9 Storage

3.10 Date&Time

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



Picture 3.10 Date&Time

3.11 Language

Users can choose English or Chinese according to need.

Picture 3.11 Language

3.12 Backlight

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.

```
Backlight
Func.: ▶ ON
         Delay 30S
Bright:    3
Contrast:  2
```

Picture 3.12 Backlight

3.13 Factory data reset

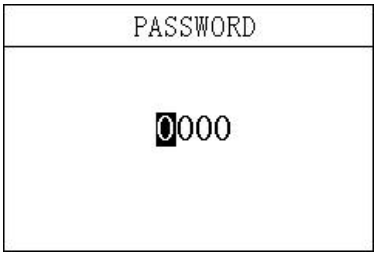
In this menu, users can restore the current output and relay to the factory parameters.

```
Factory Reset
Restore: ▶ Current
           Relay1
           Relay2
           Relay3
           All
```

Picture 3.13 Factory data reset

Calibration

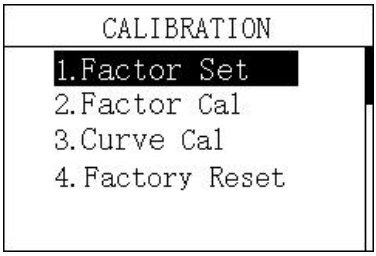
Press "ESC" to enter the password input interface.



Picture 5 Password

Enter calibration menu:

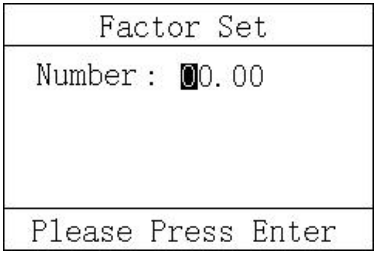
Enter the password "3900" to enter the calibration menu.



Picture 6 Calibration menu

4.1 Factor Set

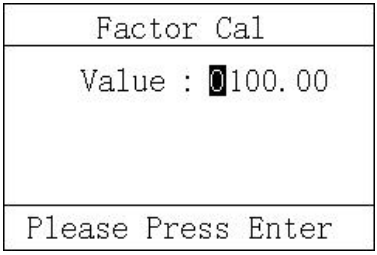
In this menu, users can manually set factor value which affect measurement value.



Picture 4.1 Factor Set

4.2 Factor Calibration

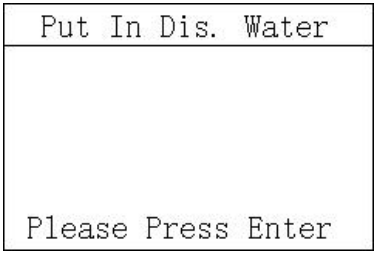
In this menu, the user can perform single-point calibration of the electrode, and the ‘Value’ is the standard solution concentration value.



Picture 4.2 Factor Calibration

4.3 Curve Calibration

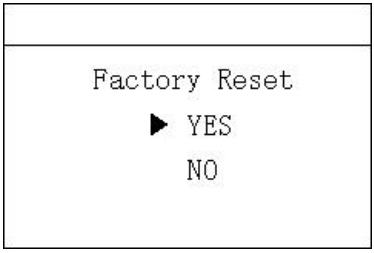
Follow the prompts for two-point calibration.



Picture 4.3 Curve Calibration

4.4 Factory data reset

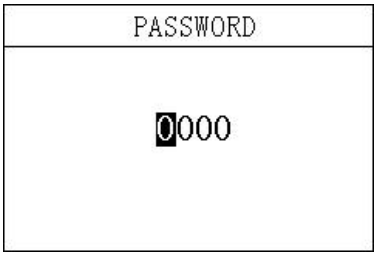
In this menu, users can restore the calibration parameters to the factory parameters.



Picture 4.4 Factory data reset

History Data Display

Press "ESC" to enter the password input interface.

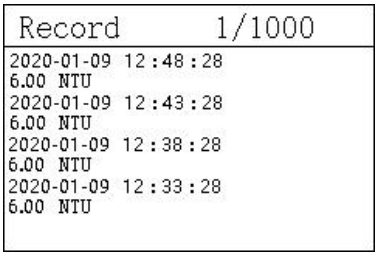


Picture 7 Password

Enter History Data Display:

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

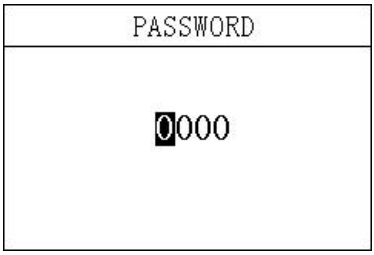
Press the up and down keys to switch the display. It can store up to 1000 records and overwrite automatically if reach maximum.



Picture 8 History

Waveform Display

Press "ESC" to enter the password input interface.

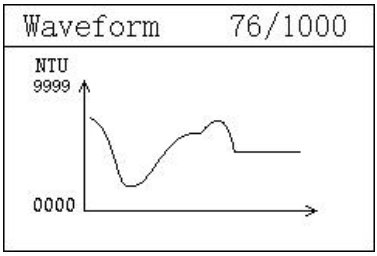


Picture 9 Password

Enter Waveform Display:

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

Press the up and down keys to switch the display.



Picture 10 Waveform Display

Appendix

Communication protocol

Communication parameters:

Baudrate:4800, 9600, 19200(9600default)

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

Function code: 03

Device address: Turbidity analyzer defaults to 4

Register definition:

Register address(Dec)	Definition	R/W	Remarks
0，1	Turbidity	R	×1 NTU，FP32 AB CD
8	RTU Address	R/W	Modbus communication address，TB defaults 4.
9	Baudrate	R/W	4800，9600，19200，9600 as default

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:

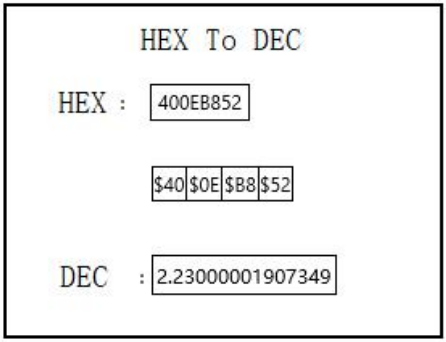
Address + Func. + Data length + Data + CRC check code (Hex)

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



Electrode parameter table of Online Turbidity Analyzer

Power Supply	12VDC
Range	0.01-100 NTU / 0.01-4000 NTU
Ambient temperature Range	0-40.0℃
Accuracy	Less than ±5% of the measured value (or ±0.1 NTU whichever is greater)
Withstand Pressure	≤0.4MPa
Waterproof Level	IP68/NEMA6P

Sensor Installation：