870007

Inline Dissolved Oxygen Analyzer

User Manual

Sper Scientific Instruments

Catalog

Introduction

Industrial Inline Dissolved Oxygen Analyzer offers excellent functionality, stable performance, easy operation, low power consumption along with the highest safety and reliability.

The dissolved oxygen analyzer 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 dissolved oxygen sensor.

2) It is suitable for harsh application and maintenance-free.

3) Provides two ways of 4-20mA output for dissolved oxygen and temperature.

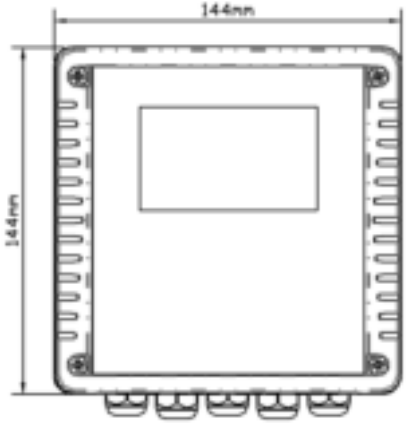
4) With data recording function, user easy to check history data and history curve.

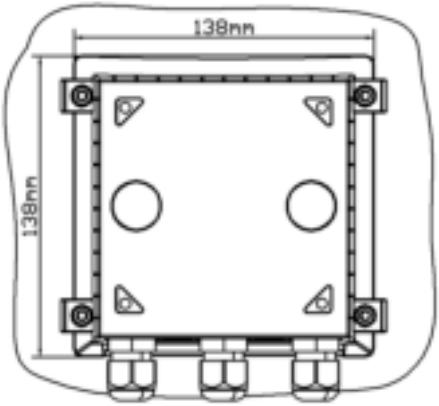
Technical Specifications

Specifications	Details
Name	Inline Dissolved Oxygen Analyzer
Shell	ABS plastic
Power Supply	90V ~ 260V AC 50/60Hz
Power Consumption	4W
Output	Two 4-20mA output tunnels, RS485
Relay	5A/250V AC 5A/30V DC
Size	144mm×144mm×104mm
Weight	0.9kg
Protocol	Modbus RTU
Range	0.00 mg/L ~20.00 mg/L 0.00 % ~200.00 % -10.0 ℃ ~100.0 ℃
Accuracy	±1%FS ±0.5℃
Waterproof Level	IP65
Storage Environment	-40℃~70℃ 0%~95%RH (non-condensing)
Working Environment	-20℃~50℃ 0%~95%RH (non-condensing)

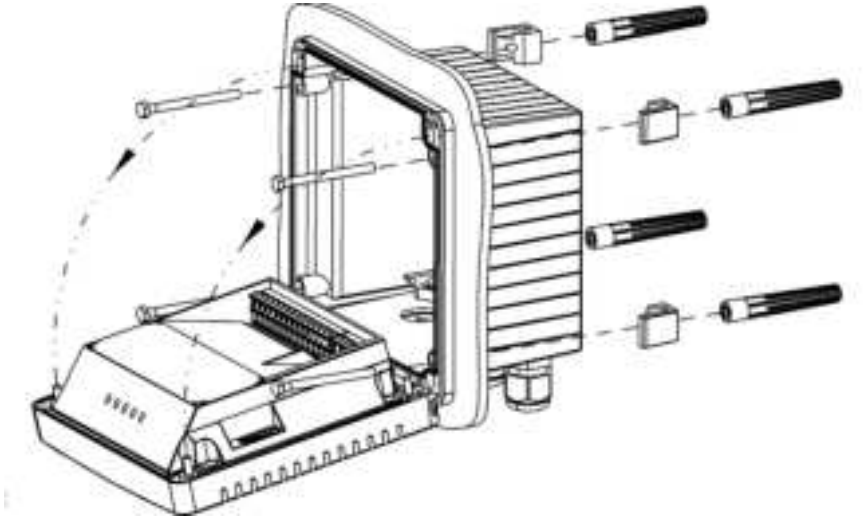
Installation and Wiring

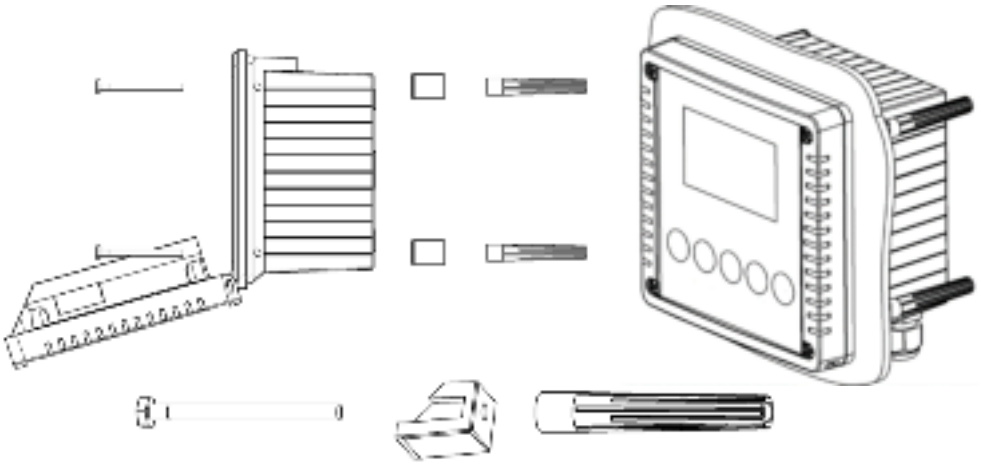
SIZE



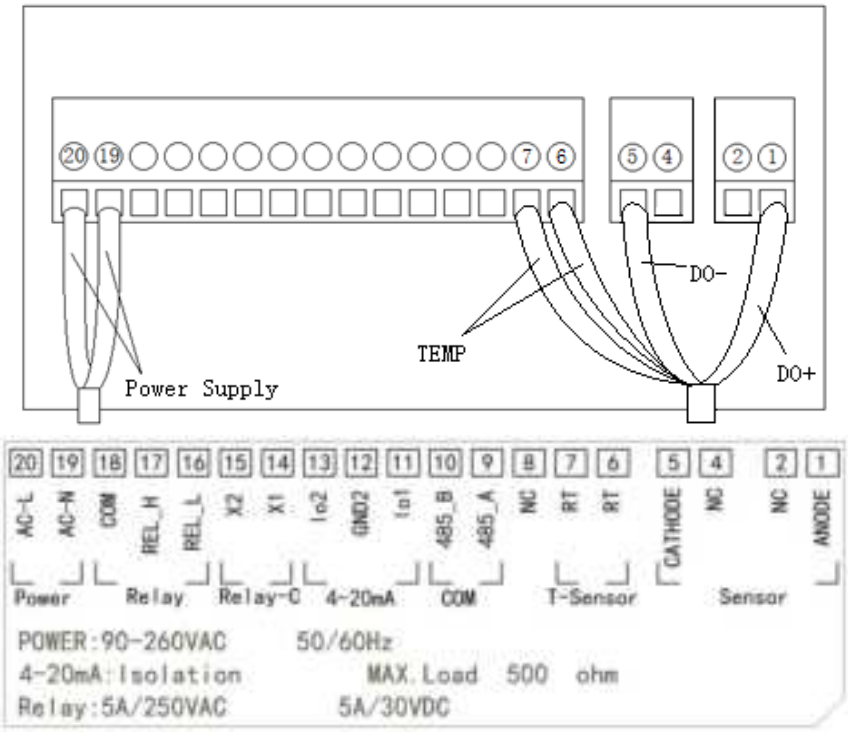


Installation





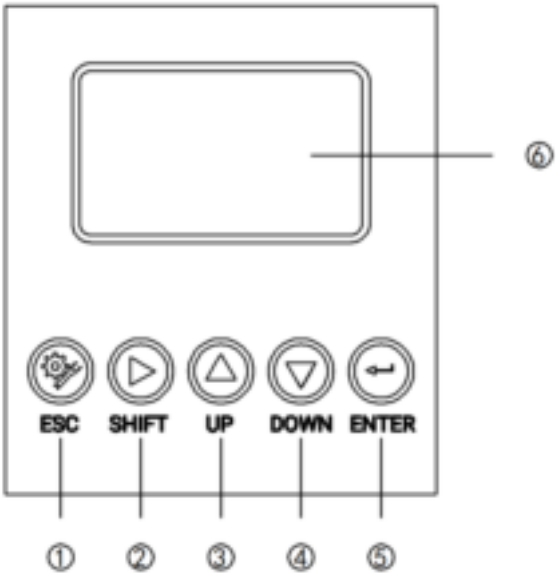
Wiring


20 19 7 6 5 4 2 1
DO-
TEMP
DO+
Power Supply
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 2 1
AC-L
AC-N
COM
REL_H
REL_L
X2
X1
Io2
GND2
Io1
485_B
485_A
NC
RT
RT
CATHODE
NC
NC
ANODE
Power
Relay
Relay-C
4-20mA
COM
T-Sensor
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 dissolved oxygen 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.



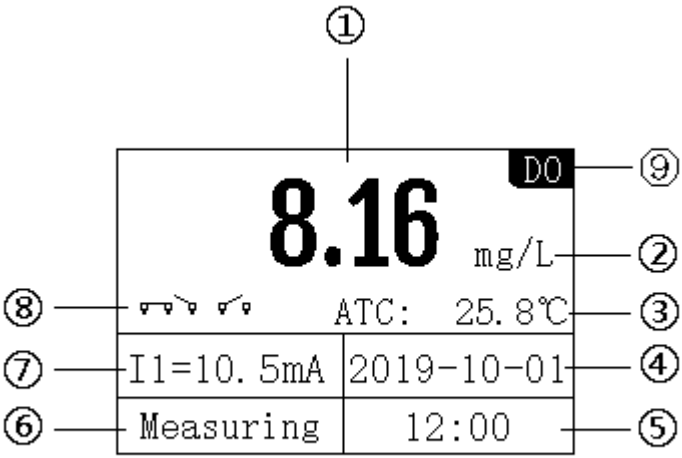
Picture 1 Operation Interface

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 Temperature

④ Real-time date

⑤ Real time

⑥ Measurement status

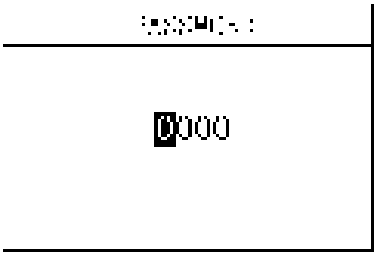
⑦ 4-20mA corresponding value of dissolved oxygen

⑧ Relay status

⑨ Mode

Setting

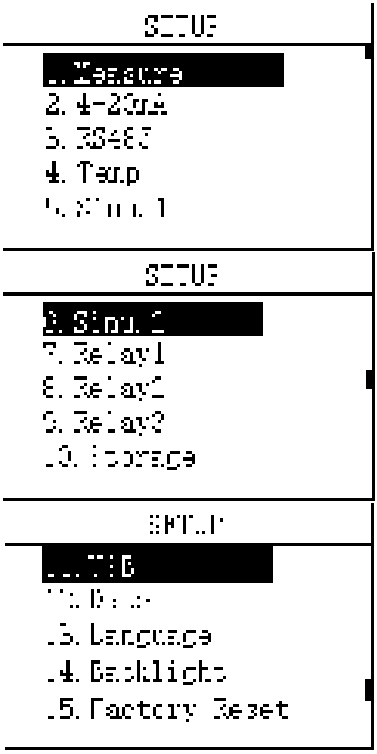
Press “Set/Exit Button” to enter the password input interface.



Picture 3 Password

Enter settings:

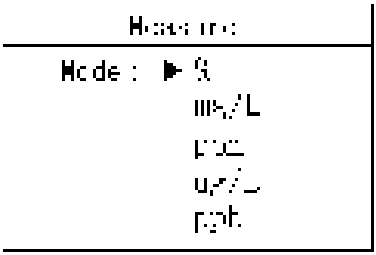
Enter the password "3700" to enter the setup menu.



Picture 4 Setting Menu

3.1 Unit

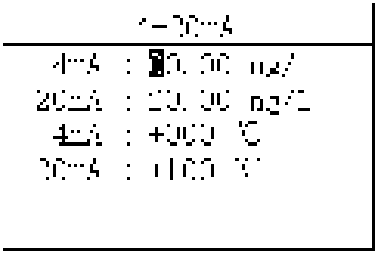
In this menu, users can change the measurement method.



Picture 3.1 Unit

3.2 4-20mA

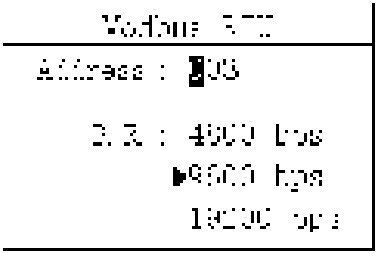
In this menu, users can change the corresponding value of 4-20mA and set the corresponding effective range.



Picture 3.2 4-20mA

3.3 ModbusRTU communication

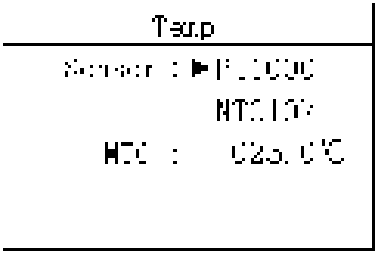
In this menu, users can change the communication address and rate.



Picture 3.3 ModbusRTU communication

3.4 Temperature

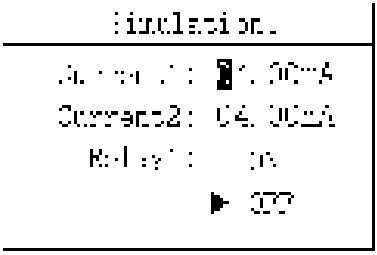
In this menu, users can set the temperature offset and manually set the temperature.



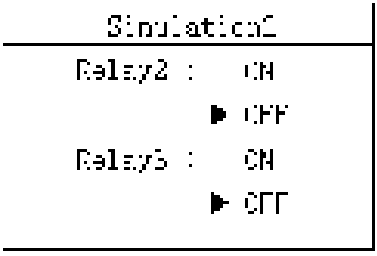
Picture 3.4 Temperature

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.



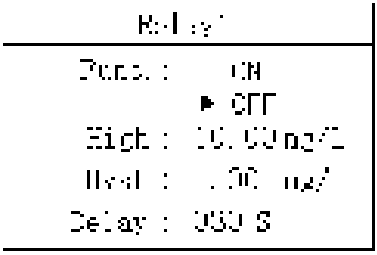
Picture 3.5.1 Simulation1



Picture 3.5.2 Simulation2

3.6 Relay1

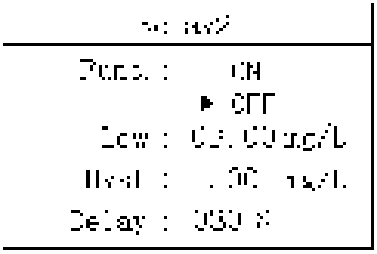
In this menu, users can switch the relay 1 function, set the parameter alarm upper limit value, alarm return difference value, and alarm delay time.



Picture 3.6 Relay1

3.7 Relay2

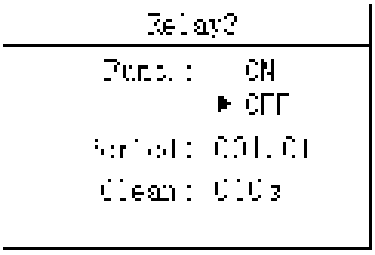
In this menu, users can switch the relay 2 function, set the parameter alarm lower limit value, alarm return difference value, and alarm delay time.



Picture 3.7 Relay2

3.8 Relay3

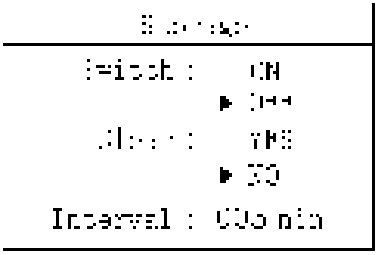
In this menu, users can set the relay 3 function, set the cleaning time and cleaning cycle.



Picture 3.8 Relay3

3.9 Storage

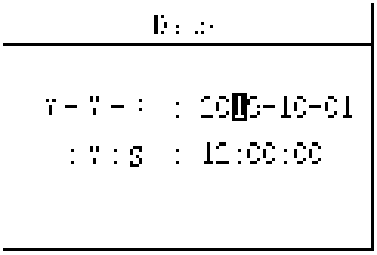
In this menu, users can set the storage function (default off), clear storage memory and recording interval.



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

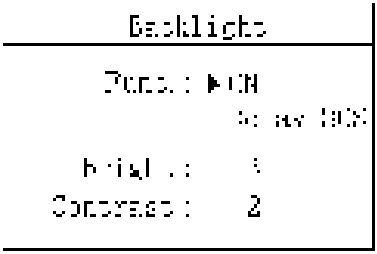
3.11 Language

Users can choose English or Chinese according to need.

Picture 3.11 Language

3.12 Backlight

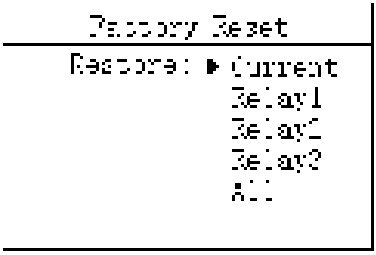
In this menu, users can change the backlight mode of the LCD screen. The backlight can be always on or delayed off (the default is delayed off), the backlight brightness can be changed (brightness level 1-5, brightness increases), and the contrast can be changed.



Picture 3.12 Backlight

3.13 Factory data reset

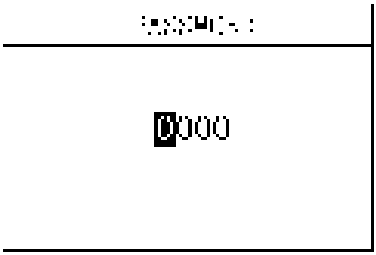
In this menu, users can restore the current output and relay to the factory parameters.



Picture 3.13 Factory data reset

Calibration

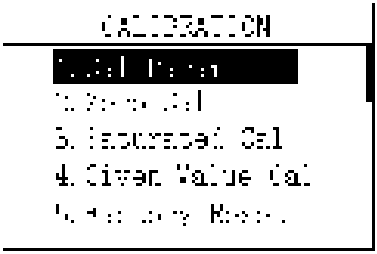
Press "ESC" to enter the password input interface.



Picture 5 Password

Enter calibration menu:

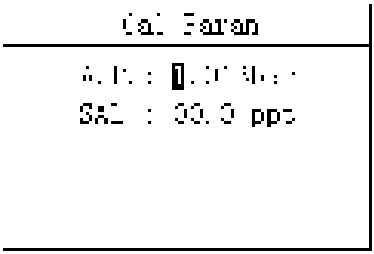
Enter the password "3900" to enter the calibration menu.



Picture 6 Calibration menu

4.1 Parameter Calibration

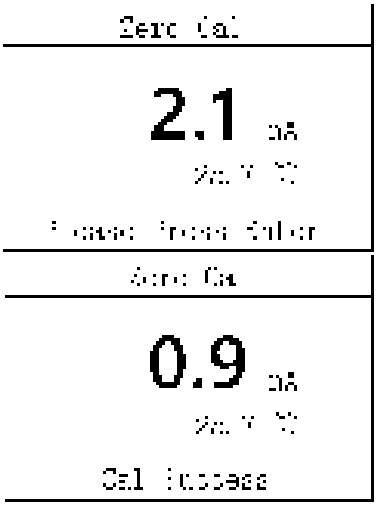
In this menu, users can manually change the parameters of atmospheric pressure and salinity.



Picture 4.1 Parameter Calibration

4.2 Zero Calibration

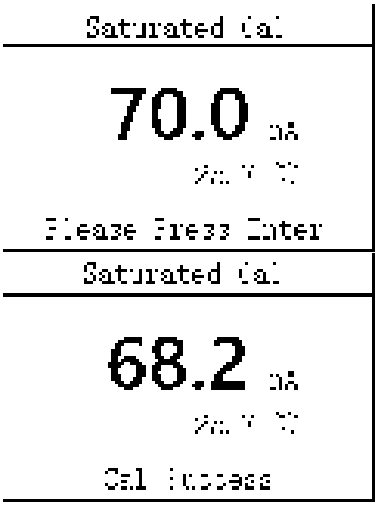
In this menu, users shall put the electrode into anaerobic water. When the value comes stable, press ‘Enter’ buttom.



Picture 4.2 Zero Calibration

4.3 Saturated Calibration

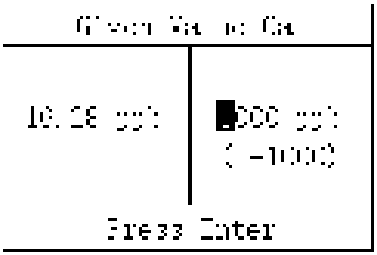
In this menu, users shall put the electrode into air. When the value comes stable, press ‘Enter’ buttom.



Picture 4.3 Saturated Calibration

4.4 Given Value Calibration

Put the electrode in the measuring liquid of known concentration, set it to the ppb value of the solution of known concentration, and press the confirm key.



Picture 4.4 Given Value Calibration

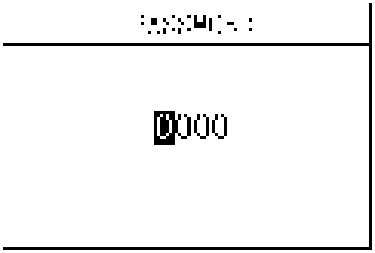
4.5 Factory data reset

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

Picture 4.5 Factory data reset

History Data Display

Press "ESC" to enter the password input interface.

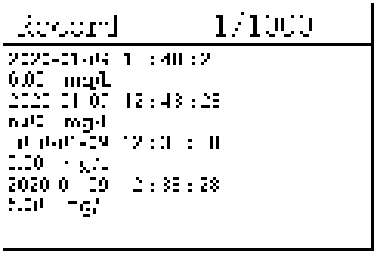


Picture 7 Password

Enter History Data Display:

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

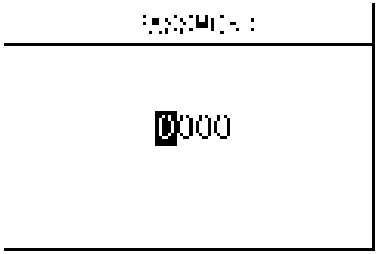
Press the up and down keys to switch the display. It can store up to 1000 records and overwrite automatically if reach maximum.



Picture 8 History

Waveform Display

Press "ESC" to enter the password input interface.

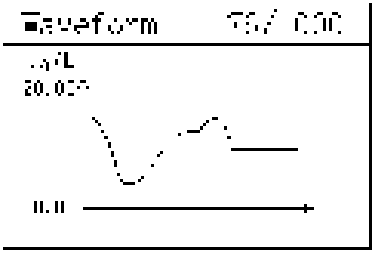


Picture 9 Password

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: Dissolved oxygen analyzer defaults to 3

Register definition:

Register address(Dec)	Definition	R/W	Remarks
0	Temp	R	×0.1℃，sint16
1	DO	R	×0.01mg/L，uint16
2	nA	R	×0.01nA，uint16
3	Saturation	R	×0.1%，uint16
8	RTU Address	R/W	Modbus communication address，DO defaults 3.
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:03 03 00 01 00 01 D4 28

Address	Func.	Register start address	Number of Registers read	CRC check code
03	03	0001	0001	D428

Data return instruction:

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

e.g. Rx:03 03 02 00 DF 80 1C

Address	Func.	Data length	DO value	CRC check code

03	03	02	00DF	801C

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual value contains 2 decimal places, then the actual value is 223×0.01= 2.23

Electrode parameter table of Online Dissolved Oxygen Analyzer

Type	DOG-209FA
DO Range	0.00mg/L~20.00mg/L
Temperature Range	0.0℃~60.0℃
Accuracy	3%，±0.5℃
Withstand pressure	0.06MPa
Waterproof level	IP68/NEMA6P
Polarization time	60min
Deviation	±＜0.1mg/L

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