

Kacise Online Controller Manual



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1.Introduction

The Kacise online controller is an online monitoring device that combines multiple parameter monitoring functions. The device can automatically identify different types of digital sensors of our company, including dissolved oxygen probe, turbidity probe, COD, pH probe, conductivity salinity probe, sludge concentration probe, chlorophyll, ammonia nitrogen, ORP, blue-green algae and oil in water probe, with built-in air pressure sensor, which is truly simple and easy to use.

The device supports one RS485 output and one 4-20mA output, photoelectric isolation, and strong anti-interference ability. One RS485 digital output is convenient for users to network. Two isolated relay outputs, users can set the relay function to control the switch state and switch cycle of the device.

It is mainly applicable to the following occasions: sewage treatment, environmental monitoring, raw water testing and fermentation.

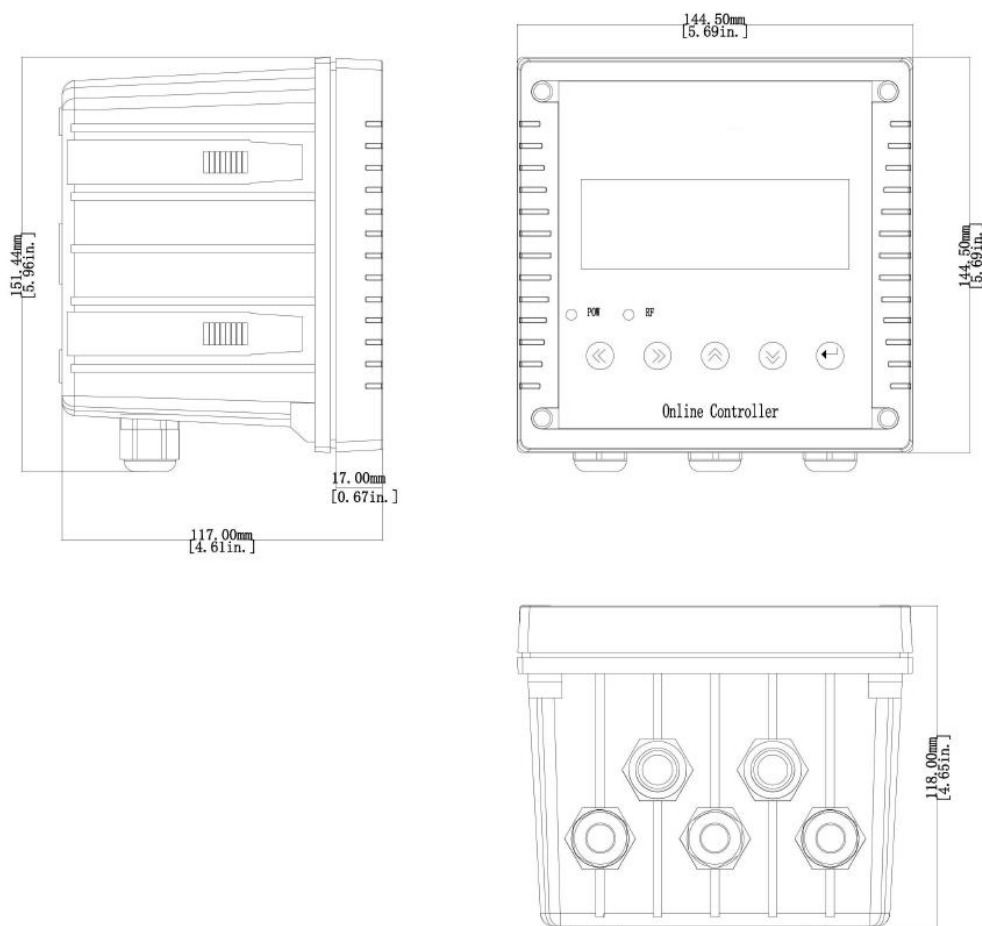
2.Features

- Automatic identification, plug and use, supports our digital sensors;
- One 4-20mA output, one RS485 digital output;
- With relay control, users can set the alarm upper and lower limits and cycle;
- Industrial standard, output isolation, strong anti-interference ability.

3.Technical Parameters

Model	KWC-100
Dimensions	Height*width*thickness=151.44mm*144.5mm*117mm
Display	77*53mm
Weight	0.8kg
Operating Temperature	0-55℃ must avoid direct sunlight
Protection Level	ABS casing, IP65
Environmental Humidity	≤80%
Power Supply	110-220VAC
Transmitter Output	1 isolated 4-20mA output, 1 digital output, two relay outputs
Temperature/Pressure Compensation	Automatic
Sensor Type	Support digital sensors, such as: COD, ammonia, dissolved oxygen, conductivity salinity, turbidity, pH, ORP, chlorophyll, blue-green algae, oil in water, transparency, chromaticity, depth and low-range turbidity, etc.
Installation Method	Wall-mounted or panel-mounted (opening size 138*138mm)

4.Dimension



5.Installation

5.1 Backplane connection introduction



In the diagram, P1, P2, P3, and P4 are connectors, pre-wired at the factory for foolproof operation. To use, you only need to connect the corresponding terminals for AC_IN, Relay1, Relay2, 4-20mA, Sensor, and Host.

“AC_IN” is the 220V input terminal.

“Relay1” and “Relay2” are the relay input terminals. The relays are normally closed by default.

“4-20mA” is the “4 to 20mA” output terminal.

“Sensor” is the sensor input terminal.

“Host” is the host computer communication input terminal.

Detailed information is described in the table below:

No.	Mark	Description	Note
1	AC-N	AC power supply (neutral line)	
2	AC-L	AC power supply (live line)	
3	GND	Equipment ground, needs to be connected to the earth	
4	Relay1 NC	Normal closed	
5	Relay1 CO	Relay common end	
6	Relay1 NO	Normal open	
7	Relay2 NC	Normal closed	
8	Relay2 CO	Relay common end	
9	Relay2 NO	Normal open	
10	Sensor GND	Connect probe GND	
11	Sensor 485A	Connect probe 485 interface A signal line	
12	Sensor 485B	Connect probe 485 interface B signal line	
13	12V	Connect probe power supply	Suitable for all probes
14	mA-	4-20mA output negative pole	
15	mA+	4-20mA output positive pole, current output	
16	HOST 485A	Connect Modbus bus interface A signal line	
17	HOST 485B	Connect Modbus bus interface B signal line	
18	HOST GND	Ground	

Install in sequence: sensor, 4-20mA output cable and AC power. After it is fully assembled, power it on.

5.2 Wiring

Color	Definition
Black	GND
Green	485_A
White	485_B
Red	VCC
Bare wire (brown)	Shield

6.Power On

The Online Controller is used as an online monitoring device, and the power switch is not set temporarily. Connect the power cable to the Online Controller power connector when the power is turned on. When the power plug is connected to the mains, the device starts to work. The power indicator is on. The device enters the measurement interface and starts to collect various parameters normally and displays it.

Measurement interface

This device enables automatic identification of optical sensor types. The device connects different types of sensors into different measurement interfaces.

6.1 Dissolved oxygen measurement interface

Figure (a) shows the dissolved oxygen value (mg/L), temperature (°C) and air pressure (kPa) measured by the dissolved oxygen probe in the current environment.

Press and hold the Up (↑) key for 5 seconds and release it. The dissolved oxygen display unit can be switched to percentage (%SAT). Figure (b) shows the dissolved oxygen value (%SAT), temperature (°C) and air pressure (kPa) measured by the dissolved oxygen probe (i.e. DO probe) in the current environment.

D0			D0		
5.67	mg/L		90.67	%SAT	
100.67	kPa		100.67	kPa	
24.76	°C		24.76	°C	

Figure (a)

Figure (b)

6.2 COD measurement interface

Figure (a) shows the COD value and temperature (°C) measured by the COD probe in the current environment.

As shown in Figure (b), press and hold the Up (↑) key for 5 seconds and release it to switch the display to TOC.

COD			TOC		
6.78	mg/L		2.23	mg/L	
100.67	kPa		100.67	kPa	
23.24	°C		23.24	°C	

Figure (a)

Figure (b)

6.3 BOD measurement interface

Figure(a) shows the COD value and temperature (°C) measured by the BOD probe in the current environment.

As shown in Figure(b), press and hold the Up (↑) key for 5 seconds to switch the display to BOD.

COD		BOD	
6.78	mg/L	2.23	mg/L
100.67	kPa	100.67	kPa
23.24	°C	23.24	°C

Figure (a)

Figure (b)

6.4 PH measurement interface

Displays the pH and temperature (°C) measured by the pH probe in the current environment.

pH	
6.78	
100.67	kPa
23.24	°C

6.5 Turbidity measurement interface

Displays the turbidity and atmospheric pressure (kPa) measured by the turbidity probe (ie TUR probe) in the current environment.

TUR	
2.87	NTU
100.67	kPa
23.24	°C

6.6 Conductivity measurement interface

Figure (a) shows the conductivity value (uS/cm) and temperature (°C) measured by the conductivity probe in the current environment. If it is a high range, the unit is mS/cm.

As shown in Figure (b), press and hold the Up (↑) key for 5 seconds to switch the display to salinity.

CT		Salinity	
200.01	uS/cm	0.87	ppt
100.67	kPa	100.67	kPa
23.24	°C	23.24	°C

Figure (a)

Figure (b)

6.7 Chlorophyll measurement interface

Shows the chlorophyll value (ug/L) and temperature (°C) measured by the chlorophyll probe in the current environment.

CHL	
200.01	ug/L
100.67	kPa
23.24	°C

6.8 Oil in water measurement interface

Shows the oil value (ppm) and temperature (°C) in water measured by the oil in water probe in the current environment.

OIW	
15.01	ppm
100.67	kPa
23.24	°C

6.9 Sludge concentration measurement interface

Shows the value (mg/L) and temperature (°C) measured by the sludge concentration probe in the current environment.

Sludge	
15.01	mg/L
100.67	kPa
23.24	°C

6.10 Ammonia nitrogen measurement interface

Figure (a) shows the ammonia nitrogen (mg/L) and temperature (°C) measured by the ammonia nitrogen probe in the current environment.

As shown in Figure (b), press and hold the UP (↑) key for 5 seconds to switch the display to pH.

NH4N	
15.01	mg/L
100.67	kPa
23.24	°C

NH4N	
4.6	
100.67	kPa
23.24	°C

Figure (a)

Figure (b)

6.11 Blue-green algae measurement interface

Shows the blue-green algae and temperature (°C) measured by the blue-green algae probe in the current environment. Cells/mL is abbreviated as cs/mL.

BGA	
20000.00	cs/mL
100.67	kPa
23.24	°C

6.12 ORP measurement interface

Shows the ORP value (mV) and temperature (°C) measured by the ORP probe in the current environment.

ORP	
15.01	mV
100.67	kPa
23.24	°C

6.13 Transparency sensor interface

Shows the transparency value (cm) and temperature (°C) measured by the transparency probe in the current environment.

TRANS	
15.01	cm
100.67	kPa
23.24	°C

6.14 Chroma sensor interface

Shows the chroma value (Hazen) and temperature (°C) measured by the chroma probe in the current environment.

COLOR	
15.01	Hazen
100.67	kPa
23.24	°C

6.15 Depth sensor interface

Shows the depth value (m) and temperature (°C) measured by the depth probe in the current environment.

DEPTH	
15.01	m
100.67	kPa
23.24	°C

6.16 Low-range turbidity sensor interface

Shows the turbidity value (NTU) and temperature (°C) measured by the turbidity probe in the current environment.

TUR	
0.87	NTU
100.67	kPa

6.17 Temperature switching display interface

Press and hold the DOWN (↓) key for 5 seconds and then release it, the temperature will switch to °F. The following figure shows the display interface after switching.

Salinity	
2.87	ppt
100.67	kPa
73.24	°F

7. Setting interface

7.1 Main menu

Press the Setup key to enter the main menu, and press the UP (↑)/DOWN (↓) keys to switch the main menu function keys, including: Barometric, Calibration, 4-20mA, Salinity, Alarm, Relay, Reset.

7.2 Barometric Settings

Barometric setting is to calibrate the built-in air pressure sensor of the transmitter, which is a one-point calibration.

In the main menu interface, press Enter to enter the Barometric setting interface. Figure (a) shows the Barometric setting interface. Press up/down to adjust the value, press esc/enter to switch the input position, and enter the current standard Barometric value. Taking the current Barometric of 101 as an example, Figure (b) shows the display after entering 101kpa Barometric.

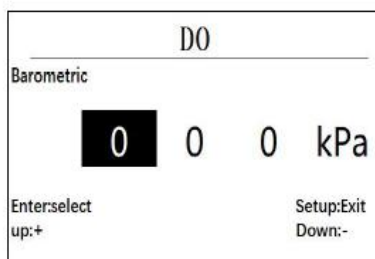


Figure (a)

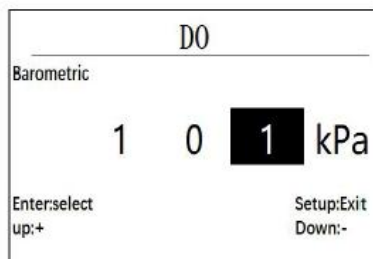


Figure (b)

Press the enter key to set successfully, and the screen will display (c), and then return to the function selection interface; if the setting fails, the screen will display Fail, as shown in (d).

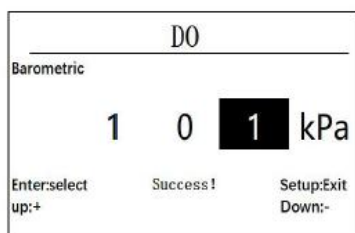


Figure (c)

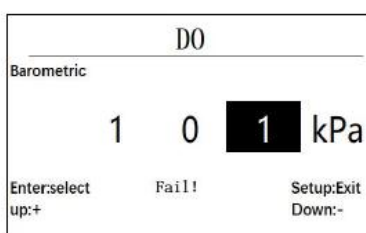


Figure (d)

7.3 Calibration settings

7.3.1 Calibration function selection interface

There are two ways to enter the calibration interface.

Method 1: In the measurement data display interface, press the Cal key to enter the calibration selection interface.

Method 2: In the function selection interface, select the Calibration function and press the enter key to enter the calibration selection interface. Figure (a) shows the calibration selection interface.

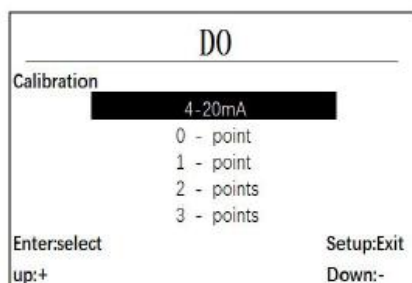


Figure (a)

In the calibration selection interface, there are 5 options as shown in Figure (a), including 4 to 20 mA calibration, zero calibration, one-point calibration, two-point calibration, and three-point calibration. When different probes are connected, the selectable calibration functions will be automatically identified. If the non-selectable function is automatically skipped during the switching process.

7.3.2 4-20mA calibration interface

Move the selection bar to the 4-20mA option and press Enter to enter the 4-20mA calibration interface.

Figure (b) shows the 4mA calibration input, and Figure (d) shows the 20mA calibration input.

In Figure (b), enter the actual current value measured, use UP (↑)/DOWN (↓) to adjust the input value, and press Enter/Esc to switch the input position, as shown in Figure (c). Take the measured 3.95mA as an example.

Press Enter to enter 20mA input, as shown in Figure (d). In this interface, the actual output current value is measured, and the measured value of 19.08 is used as an example for input. Figure (e) is the interface after input.

Press Enter to confirm the calibration. If successful, it will display Success and return to the previous menu. If failed, it will display Fail and will not return to the previous menu.

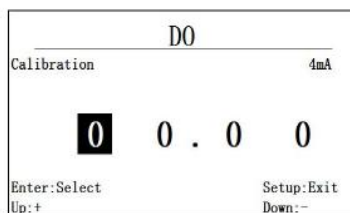


Figure (b)

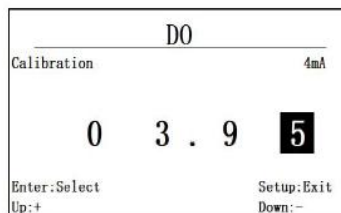


Figure (c)

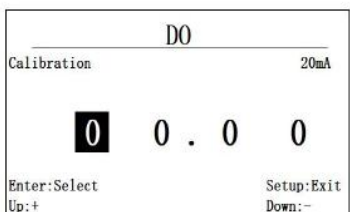


Figure (d)

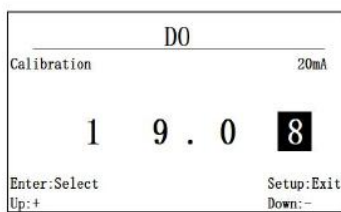


Figure (e)

7.3.3 Dissolved oxygen calibration

(1) Calibration selection

Dissolved oxygen supports one-point calibration and two-point calibration. The other options cannot be selected.

(2) One-point calibration

Select the 1-point calibration option to enter the calibration interface, as shown in Figure (f). Enter the target value to be calibrated in this interface. For 1-point calibration, it is recommended to set the dissolved oxygen target value to 100% sat. Press UP/DOWN to adjust the value, and press enter/esc to confirm or exit.

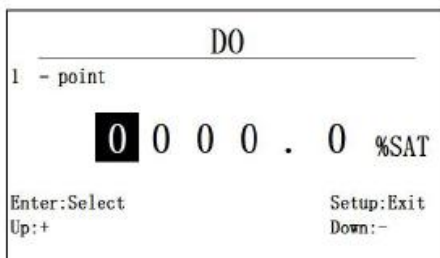


Figure (f)

Press Enter to proceed to the next step. Figure (g) shows the calibration interface. Place the DO probe in the standard solution corresponding to the input value. After the data stabilizes, press Enter to confirm. If the calibration is successful, it will prompt Success!. If the calibration fails, it will prompt Fail!. The calibration value will automatically return to the initial value.

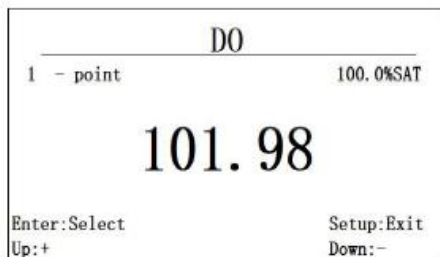


Figure (g)

(3) Two-point calibration

Select the two-point calibration function option to enter the two-point calibration interface. First enter the first calibration point for calibration, as shown in Figure (h). Calibrate at the same point. After completion, press Enter to confirm. Enter the second calibration point for calibration, as shown in Figure (i). Place the DO probe in the standard solution corresponding to the input value. After the data stabilizes, press Enter to confirm. Similarly, if the calibration is successful, it will display Success. If the calibration fails, it will display Fail. **For two-point dissolved oxygen calibration, it is recommended to select 100% SAT for the first point and 0% SAT for the second point.**

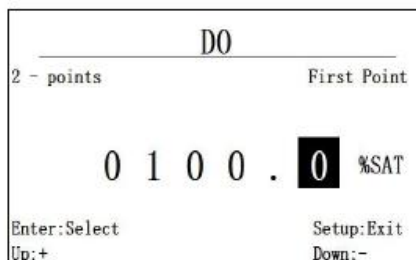


Figure (h)

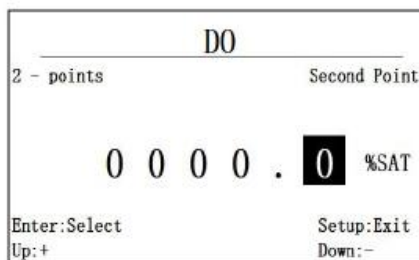


Figure (i)

7.3.4 Conductivity calibration

(1) Calibration selection

The conductivity probe supports two types of calibration, one-point and two-point calibration. If it is a low-range probe, it is recommended to use a 146.5uS/cm standard solution for calibration. If it is a high-range probe, it is recommended to use a 1413uS/cm standard solution for calibration.

(2) One-point calibration

After selecting the one-point calibration function, enter the one-point calibration standard value input interface, as shown in Figure (a) below.

After the input is completed, 146.5uS/cm is used as the standard for calibration. For one-point calibration, the calibration value cannot use zero value. Press Enter to enter the calibration data display interface, as shown in Figure (b) below.

Put the conductivity probe into the corresponding input value standard solution. After the data is stable, press Enter to end the calibration and press Esc to exit the calibration. If the calibration is successful, success! will be prompted; if the calibration fails, Fail! will be prompted, and the calibration value will automatically return to the initial value.

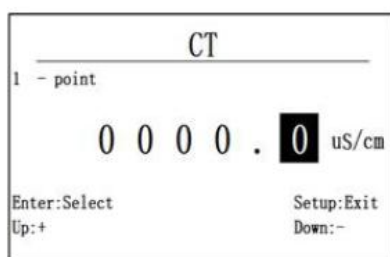


Figure (a)

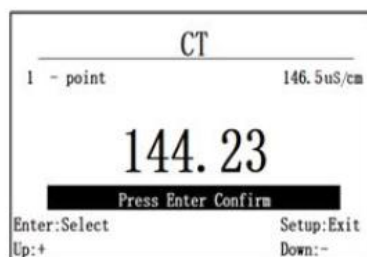


Figure (b)

(3) Two-point calibration

After selecting the two-point calibration function, first enter the one-point calibration value input. Here, the first point takes 0 as an example. First enter the first point 0, as shown in Figure (c). Calibrate at the same point. After completion, press Enter to confirm. Enter the second calibration point for calibration, as shown in Figure (d). Press Enter to enter the second point calibration data display interface. Place the conductivity probe in the standard solution corresponding to the input value. After the data stabilizes, press Enter to end the calibration. Same as the one-point calibration, if the calibration is successful, it will display Success! If the calibration fails, it will display Fail!.

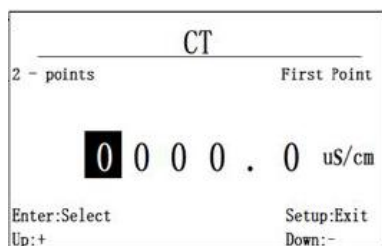


Figure (c)

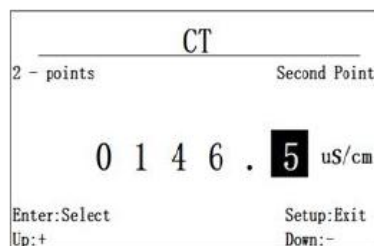


Figure (d)

7.3.5 Turbidity calibration

(1) Calibration selection

The turbidity probe supports three calibration methods: zero-point calibration, one-point calibration and two-point calibration. Through the calibration function selection menu, you can select one-point calibration and two-point calibration.

(2) Zero-point calibration

When the zero-point calibration function is selected, the zero-point calibration interface is entered, as shown in Figure (a).

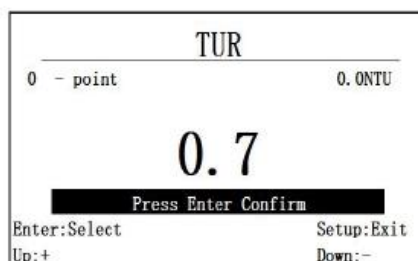


Figure (a)

Place the turbidity probe in the corresponding 0 NTU standard solution. After the data shown in Figure (a) stabilizes, press Enter to complete the calibration. Press Esc to exit the calibration. If the calibration is successful, it will prompt Success!. If the calibration fails, it will prompt Fail! and the calibration value will automatically return to the initial value.

(3) One-point calibration

On the function selection interface, select one-point calibration and enter the one-point calibration interface. Enter the target value to be calibrated. One-point calibration cannot be calibrated with zero value. Take 100NTU input as an example. Use UP (↑)/DOWN (↓) to adjust the input value and Enter/Select to enter and exit, as shown in Figure (b).

Press Enter to enter the turbidity one-point calibration data display interface. As shown in Figure (c), place the turbidity probe in the standard solution corresponding to the input value. After the data stabilizes, press Enter to complete the calibration. As with the zero-point calibration, if the calibration is successful, Success! will be displayed. If the calibration fails, Fail! will be displayed.

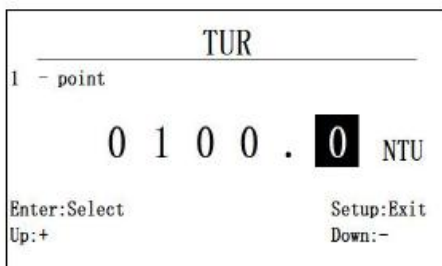


Figure (b)

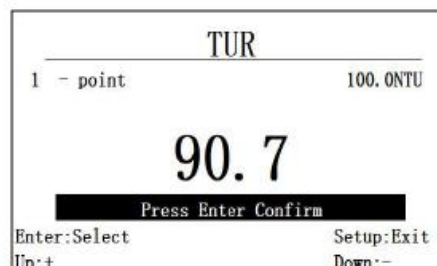


Figure (c)

(4) Two-point calibration

After selecting the two-point calibration function, first enter the two-point calibration and enter the calibration value of the first calibration point. Take the first calibration standard value 0 as an example, as shown in Figure (d). After completing the same-point calibration, press Enter to confirm and enter the second calibration point. Take 100NTU as an example, as shown in Figure (e). Place the turbidity probe in the standard solution corresponding to the input value, wait for the data to stabilize, and press Enter to end the calibration. If the calibration is successful, it will display Success! as in the zero-point calibration. If the calibration fails, it will display Fail!

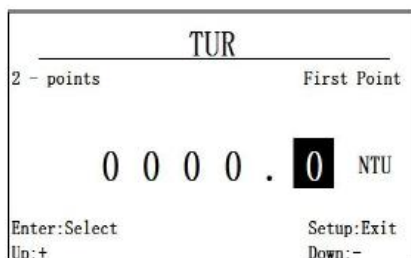


Figure (d)

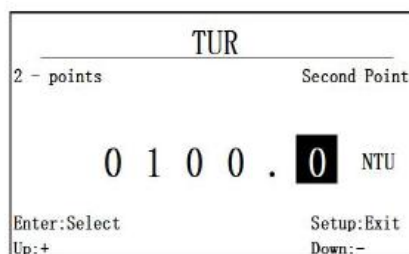


Figure (e)

7.3.6 Chlorophyll calibration

(1) Calibration selection

The chlorophyll probe supports two calibration modes, one-point calibration and two-point calibration. You can select one-point calibration and two-point calibration through the calibration function selection menu.

(2) One-point calibration

After selecting the one-point calibration function, enter the one-point calibration value input interface, as shown in Figure (a). Take 100ug/L as the calibration input as an example. Use Enter/ESC to switch the input position, and use UP (↑)/DOWN (↓) to adjust the value. Press the Enter key to enter the one-point calibration data display interface, as shown in Figure (b).

Put the chlorophyll probe into the corresponding input value standard solution. After the data stabilizes, press the Enter key to end the calibration. Press ESC to exit the calibration. If the calibration is successful, it will prompt success!. If the calibration fails, it will prompt Fail!. The calibration value will automatically return to the initial value.

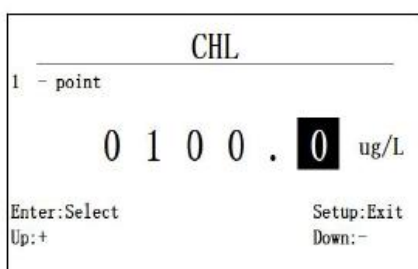


Figure (a)

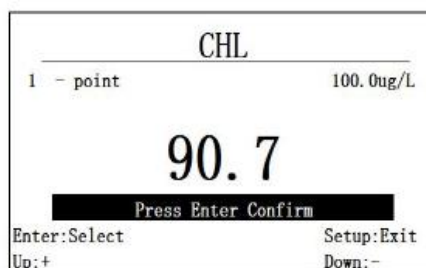


Figure (b)

(3) Two-point calibration

After selecting the two-point calibration, enter the first calibration point input interface of the two-point calibration. Take the first calibration standard value 0 as an example to enter, as shown in Figure (c). For the same-point calibration, after completing it, press the Enter key to enter the second calibration value input interface of the chlorophyll two-point calibration. Take 100ug/L as an example for the calibration input, as shown in Figure (d). Place the chlorophyll probe in the standard solution corresponding to the input value, wait for the data to stabilize, and press the Enter key to end the calibration. As with the same-point calibration, if the calibration is successful, Success! is displayed. If the calibration fails, Fail! is displayed.

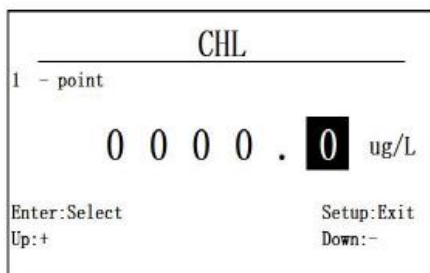


Figure (c)



Figure (d)

7.3.7 Sludge concentration calibration

(1) Calibration selection

Sludge concentration supports two calibration methods, one-point calibration and two-point calibration.

(2) One-point calibration

After selecting one-point calibration, enter the calibration value input interface of one-point calibration, as shown in Figure (a). Taking 100 mg/L as an example, press Enter/ESC to switch the input position, and UP (↑)/DOWN (↓) to modify the input value. Press Enter to enter the value display interface of one-point calibration, as shown in Figure (b).

Put the sludge concentration probe into the standard solution corresponding to the input value, wait for the data to stabilize, press Enter to end the calibration, and press ESC to exit the calibration. If the calibration is successful, it will prompt success!, if the calibration fails, it will prompt Fail!, and the calibration value will automatically restore to the initial value.

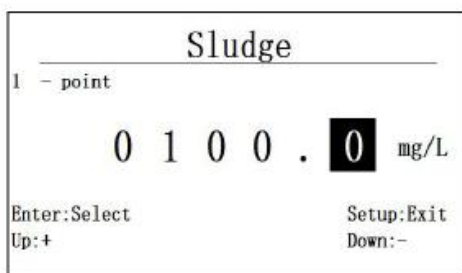


Figure (a)

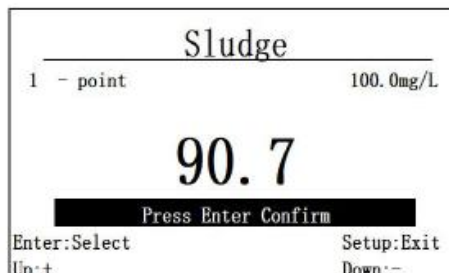


Figure (b)

(3) Two-point calibration

Select the two-point calibration function to enter the first calibration point calibration value input interface of the two-point calibration of sludge concentration. Press the Enter key to enter the first point data display interface of the two-point calibration, as shown in Figure (c). Here, the first calibration point is 0. Calibrate at the same point. After completion, press the Enter key to enter the next calibration point calibration value input interface. Here, 100 mg/L is input as the second calibration point, as shown in Figure (d). Put the sludge concentration probe into the standard solution corresponding to the input value, wait for the data to stabilize, and press Enter to complete the calibration. Calibrate at the same point. If the calibration is successful, Success! will be displayed. If the calibration fails, Fail! will be displayed.

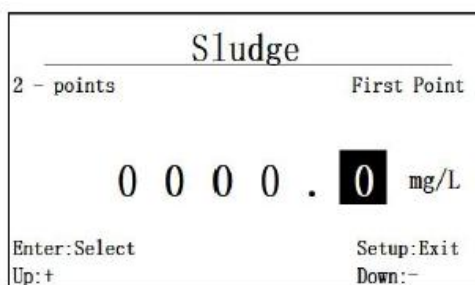


Figure (c)

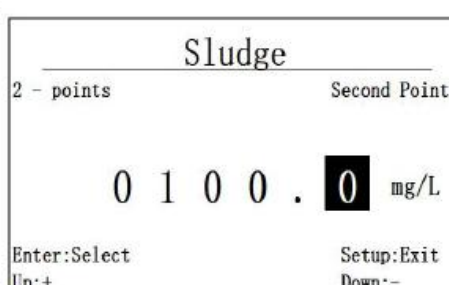


Figure (d)

7.3.8 Ammonia nitrogen calibration

(1) Calibration selection

The ammonia nitrogen probe supports ammonium ion and pH calibration. There are one-point calibration and two-point calibration for ammonium ion calibration, and three-point calibration for pH calibration. One-point calibration, two-point calibration and pH calibration can be selected through the calibration function selection menu.

(2) One point calibration

Select the one-point calibration function and press Enter to enter the NH₄⁺ one-point calibration calibration value input interface, as shown in Figure (a). For one-point calibration, it is recommended to set the target value to 1 mg/L. Enter/ESC switches the input position and enters the exit function. UP (↑)/DOWN (↓) is to adjust the input value. Press Enter to enter the one-point calibration data display interface, as shown in Figure (b).

Put the ammonia nitrogen probe into the standard solution corresponding to the input value, wait for the data to stabilize, press Enter to complete the calibration, and press ESC to exit the calibration. If the calibration is successful, it will prompt success! If the calibration fails, it will prompt Fail! The calibration value will automatically return to the initial value.

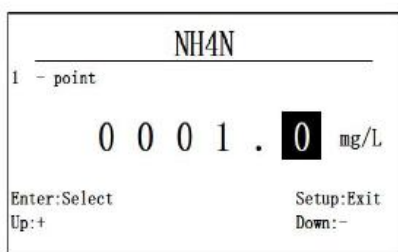


Figure (a)



Figure (b)

(3) Two-point calibration

After selecting the two-point calibration function, enter the first calibration point input of the two-point calibration of the ammonia nitrogen probe, as shown in Figure (c). Here, the first calibration point is 1mg/L as an example. For the same-point calibration, after completion, press the Enter key to enter the second calibration value input interface of the two-point calibration of ammonia nitrogen. Take 10mg/L as an example for the calibration input, as shown in Figure (d). Place the ammonia nitrogen probe in the corresponding standard solution, wait for the data to stabilize, and press Enter to complete the calibration. For the same-point calibration, if the calibration is successful, it will display Success! If the calibration fails, it will display Fail! The standard solution for the two calibration points should preferably have a 10-fold gradient.

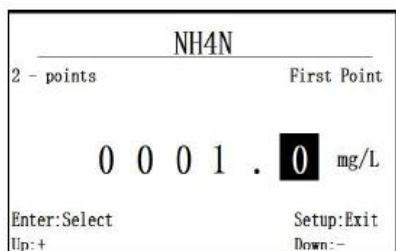


Figure (c)

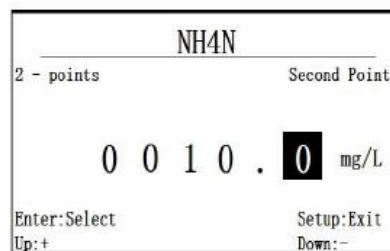


Figure (d)

(4) pH calibration

See Section 7.3.12.

7.3.9 Blue-green algae calibration

(1) Calibration selection

The blue-green algae sensor only supports two-point calibration.

(2) Two-point calibration

Enter the first calibration point input interface of the two-point calibration of the blue-green algae sensor, as shown in Figure (a). Take the 100 cells/ml point as an example for input. Press Enter/ESC to switch the input position and confirm to exit calibration. Press UP (↑)/DOWN (↓) to adjust the input calibration value. Press Enter to confirm and enter the first data display interface of the two-point calibration, as shown in Figure (b).

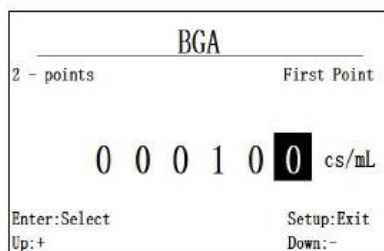


Figure (a)



Figure (b)

Place the blue-green algae probe in the standard solution corresponding to the input value, wait for the data to stabilize, and press Enter to proceed to the next step. If you need to exit, press ESC to exit. After pressing Enter, enter the second calibration point input interface of the blue-green algae two-point calibration, as shown in Figure (c). Take 54600cs/mL as an example for the second calibration point of blue-green algae. Press Enter to enter the second calibration point data interface, place the probe in the corresponding standard liquid, and the interface is shown in Figure (d). After the displayed data stabilizes, press Enter to complete the calibration, and press ESC to exit. If the calibration is successful, it will prompt success! If the calibration fails, it will prompt Fail!, and the calibration value will automatically restore to the initial value.



Figure (c)



Figure (d)

7.3.10 Oil in water calibration

(1) Calibration selection

The oil in water sensor supports two calibration modes: one-point calibration and two-point calibration, which can be selected in the menu.

(2) One-point calibration

After selecting the one-point calibration function, enter the one-point calibration value input interface, as shown in Figure (a). Taking 100ppm as an example, press Enter/ESC to select the input position and enter and exit the function, and Up (↑)/Down (↓) to adjust the input value. Press Enter to enter the oil in water one-point calibration display interface, as shown in Figure (b).

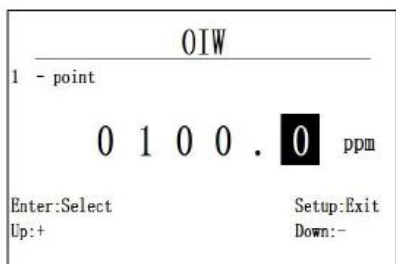


Figure (a)

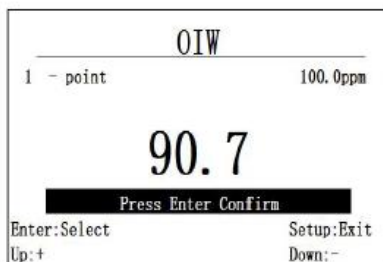


Figure (b)

Place the oil-in-water sensor in the corresponding liquid, wait until the data is stable, press Enter to complete the calibration, and press ESC to exit the calibration. If the calibration is successful, it will prompt success!, if the calibration fails, it will prompt Fail!, and the calibration value will automatically return to the initial value.

(3) Two-point calibration

After selecting the two-point calibration in the oil-in-water calibration, first enter the calibration value input interface of the first calibration point of the oil-in-water two-point calibration, and enter the zero point as the first calibration point, as shown in Figure (c). Calibrate at the same point, and press Enter after completion to enter the calibration value input interface of the next calibration point, taking 100ppm as an example, as shown in Figure (d). Place the probe in the corresponding standard liquid, wait for the data to display stable, and press Enter to complete the calibration. Calibrate at the same point, if successful, it will display Success!, otherwise it will display Fail!.

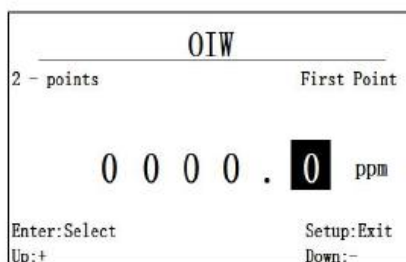


Figure (c)

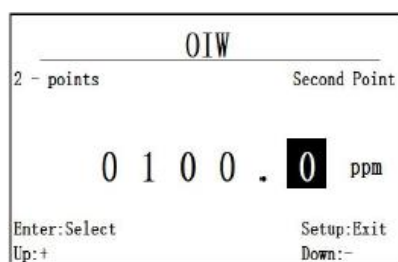


Figure (d)

7.3.11 COD calibration

(1) Calibration selection

The COD sensor supports two calibration modes, one-point calibration and two-point calibration, which can be selected in the menu.

(2) One-point calibration

After selecting one-point calibration, enter the one-point calibration value input interface, as shown in Figure (a). Taking 100mg/L as an example, press Enter/ESC to select the input position and enter and exit the function, and Up (↑)/Down (↓) to adjust the input value. Press Enter to enter the COD one-point calibration display interface, as shown in Figure (b).

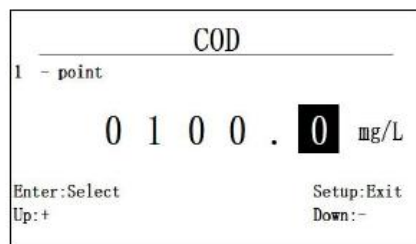


Figure (a)

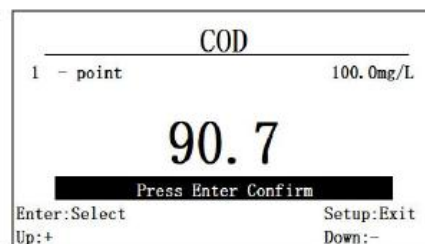


Figure (b)

Place the COD sensor in the corresponding liquid, wait for the data to stabilize, and press Enter to complete the one-point calibration. If the calibration is successful, it will prompt Success! If the calibration fails, it will prompt Fail! and the calibration value will automatically return to the initial value.

(3) Two-point calibration

After selecting the two-point calibration, first enter the first calibration point input of the COD two-point calibration, and enter the zero point as the first calibration point, as shown in Figure (c). Calibrate at the same point. After completion, press Enter to enter the calibration value input interface of the next calibration point. Take 100mg/L as an example, as shown in Figure (d). Put the COD probe into the corresponding standard solution, wait for the data to display stable, and press Enter to complete the calibration. If the calibration at the same point is successful, it will display Success! Otherwise, it will display Fail!

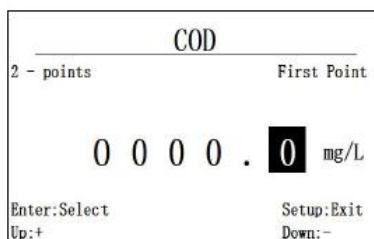


Figure (c)

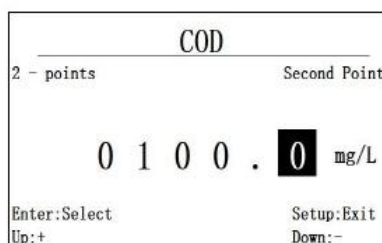


Figure (d)

7.3.12 pH calibration

(1) Calibration selection

The pH sensor only supports 3-point calibration, and the three calibration point solutions must be fixed at 4.01, 6.86 and 9.18.

(2) Three-point calibration

After selecting the three-point calibration, enter the first calibration point of the three-point calibration, as shown in Figure (a). After waiting for the data to stabilize, press Enter to enter the second calibration point and place the probe in the second calibration solution of 6.86, as shown in Figure (b). After waiting for the data to stabilize, press Enter to enter the third calibration point and place the probe in the third standard solution, as shown in Figure (c). After the data stabilizes, press Enter to complete the calibration. If the calibration is successful, it will display Success!, otherwise it will display Fail!.

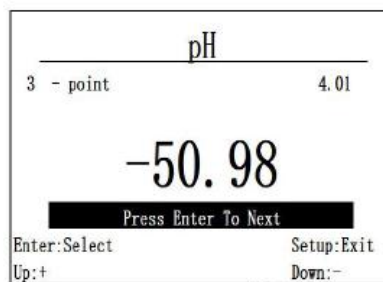


Figure (a)

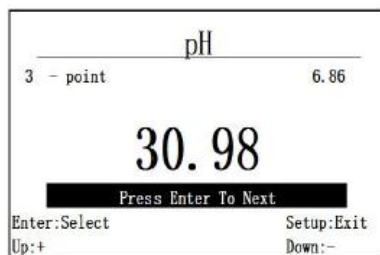


Figure (b)

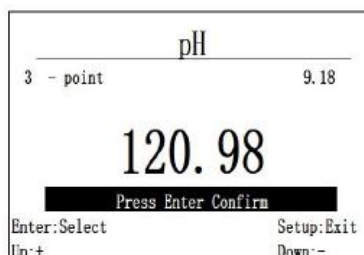


Figure (c)

7.3.13 ORP Calibration

ORP is not user calibrated.

7.4 4-20mA settings

7.4.1 Function entry

In the main menu, switch to 4-20mA to enter the 4-20mA settings interface.

7.4.2 Instructions for use

As shown in Figure (a), the first interface to enter is the 4mA corresponding setting interface. Adjust the positive and negative values of the input value. Use the Enter key and the ESC key to adjust the input position. Up (↑)/Down (↓) can adjust the size of the input value.

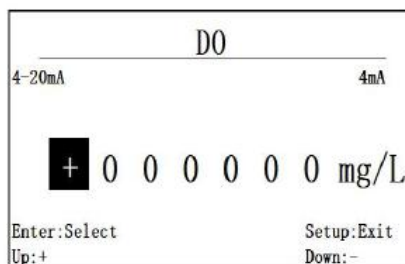


Figure (a)

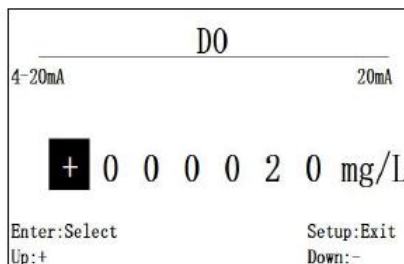


Figure (b)

After the 4mA input is completed, enter the 20mA setting interface as shown in Figure 4-20mA.

As shown in Figures (a) and (b), the default setting of 4-20mA is 4mA corresponds to 0 and 20mA corresponds to 20. When connecting different probes, you need to reset it and save it when the power is turned off.

The setting of 4-20mA needs to be set within the measurement range of the sensor. 4mA corresponds to the low value and 20mA corresponds to the high value. When the setting exceeds the range, as shown in Figure (c), an error will be prompted.

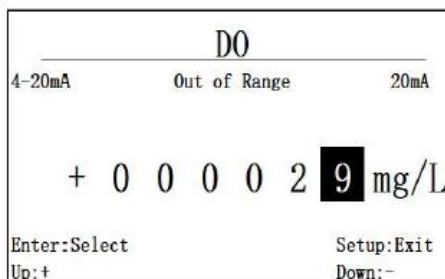


Figure (c)

As shown in Figure (c), when setting the dissolved oxygen 4-20mA to correspond to 0 and 29mg/L, pressing Enter will not complete the setting and will prompt Out of Range. If the setting is successful, it will automatically return to the previous menu.

7.4.3 Setting range description

The 4-20mA setting needs to be set within the measurable range. The specific measurement range is as follows:

Measurement parameters	Measuring range
Dissolved oxygen sensor	0-20mg/L
Conductivity sensor	Low range 0.01-5mS/cm; High range 0-100mS/cm
Turbidity sensor	0-1000NTU
Chlorophyll sensor	0-500µg/L
Sludge concentration sensor	Low range 0-4000mg/L, High range 0-50000mg/L
Ammonia nitrogen sensor	0-100mg/L/0-1000mg/L

Blue-green algae sensor	0-300000cells/mL
Oil in water sensor	0-50ppm
COD sensor	0-500mg/L
pH sensor	0-14
ORP sensor	-1999~1999mV
Transparency sensor	0-500cm
Colorimeter sensor	0-500Hazen
Depth sensor	0m-2m...100m
Low range turbidity	0-10NTU

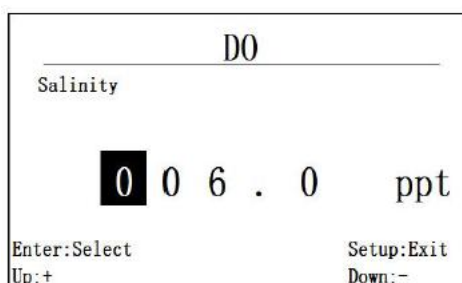
7.5 Salinity setting

7.5.1 Function entry

From the main menu, switch to Salinity to enter the salinity adjustment menu, which is saved after power off.

After entering, the currently set salinity value will be displayed, as shown in the figure below. The default salinity value is 0ppt.

When the conductivity probe is connected, the salinity setting is invalid.



The screen displays 'DO' at the top. Below it, 'Salinity' is shown. The main display area shows '006.0 ppt'. At the bottom, there are two rows of controls: 'Enter:Select' and 'Up:+' on the left, and 'Setup:Exit' and 'Down:-' on the right.

7.5.2 Operation Instructions

As shown in the figure above, Enter/ESC switches the input position, and Up (↑)/Down (↓) adjusts the input value.

Press Enter to complete the input. Success will display Success and automatically return to the previous menu. Failure will display Fail and will not return.

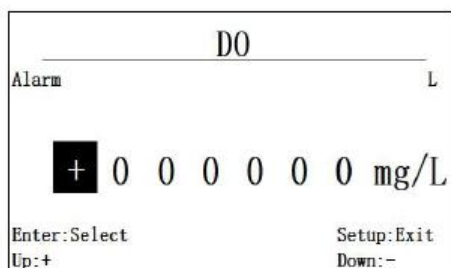
7.6 Warning setting

7.6.1 Function entry

From the main menu, switch to select Alarm to enter the warning setting interface.

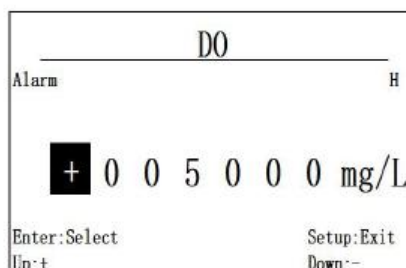
7.6.2 Operation instructions

As shown in Figure (a), the first thing to enter is the warning lower limit operation. You can adjust the positive and negative values. Press Enter/ESC to switch the input position. Press Up (↑)/Down (↓) to adjust the input range. After confirming the lower limit, press Enter to enter the upper limit input. The upper limit input interface is shown in Figure (b). The operation method is the same as above.



The screen displays 'DO' at the top. Below it, 'Alarm' is shown with 'L' on the right. The main display area shows '+000000 mg/L'. At the bottom, there are two rows of controls: 'Enter:Select' and 'Up:+' on the left, and 'Setup:Exit' and 'Down:-' on the right.

Figure (a)



The screen displays 'DO' at the top. Below it, 'Alarm' is shown with 'H' on the right. The main display area shows '+005000 mg/L'. At the bottom, there are two rows of controls: 'Enter:Select' and 'Up:+' on the left, and 'Setup:Exit' and 'Down:-' on the right.

Figure (b)

The default value of the Alarm range is 0 for the lower limit and 5000 for the upper limit. When a new sensor is connected, the Alarm range needs to be reset and saved after power off. If the setting is successful, it will automatically return to the previous menu.

7.6.3 Setting range

The alarm value needs to be set within the sensor's measurement range, which is the same as the 4-20mA range.

7.6.4 Alarm display

If the current measurement value is less than the warning value range, the lower limit prompt will appear as shown in (c).

If the current measurement value exceeds the upper warning limit, a prompt will appear as shown in Figure (d).

D0	Alarm L
6.95	mg/L
100.67	kPa
23.24	℃

Figure (c)

D0	Alarm H
6.95	mg/L
100.67	kPa
23.24	℃

Figure (d)

7.7 Relay settings

7.7.1 Function entry

From the main menu, switch to Relay to enter the relay function settings.

7.7.2 Operation instructions

The factory default state of the relay is off. Press the Cal key to adjust the function options and automatically store them. In addition to off, the relay also has the following 4 options, as shown in Figures (a) to (d), namely alarm L, alarm H, alarm, and timing.

D0	
Relay	
Relay No. 1:	alarm L
Relay No. 2:	off
Enter:Select	Cal:Switch
Up:+	Down:-

Figure (a)

D0	
Relay	
Relay No. 1:	alarm H
Relay No. 2:	off
Enter:Select	Cal:Switch
Up:+	Down:-

Figure (b)

D0	
Relay	
Relay No. 1:	alarm
Relay No. 2:	off
Enter:Select	Cal:Switch
Up:+	Down:-

Figure (c)

D0	
Relay	
Relay No. 1:	timing
Relay No. 2:	off
Enter:Select	Cal:Switch
Up:+	Down:-

Figure (d)

The transmitter has two relays. You can switch the upper and lower relays by pressing Up (↑)/Down (↓). You can switch to the second relay setting by pressing Up (↑)/Down (↓) as shown in Figure (e).

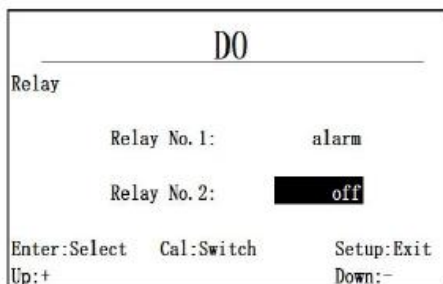


Figure (e)

7.7.3 Function description

Off: The relay is in the normally closed state

Alarm L: The current relay is used for the lower limit alarm. When the measured value exceeds the lower limit, the relay is normally open.

Alarm H: The current relay is used for the upper limit alarm. When the measured value exceeds the upper limit, the relay is normally open.

Alarm: The current relay is used for the upper and lower limit alarms. When the measured value exceeds any of the upper and lower limits, the relay is normally open, otherwise it is normally closed.

Timing: The default setting is to open once every 60 minutes, and the opening time is 60 seconds. When the timing option is selected, press Enter to enter the timing time setting interface. The displayed value is the current setting value, as shown in Figure (f).

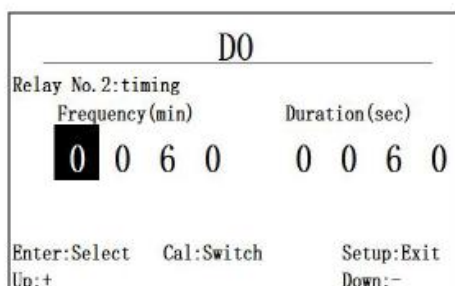


Figure (f)

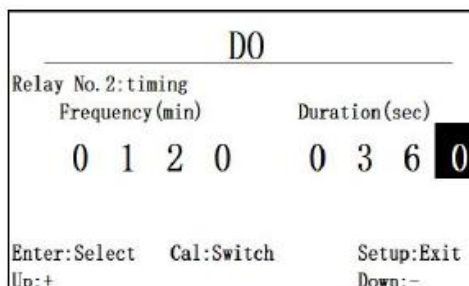


Figure (g)

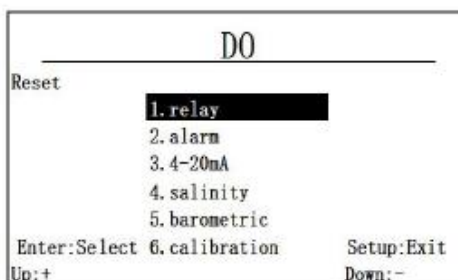
As shown in Figure (f), Enter/ESC switches the input position, Up (↑)/Down (↓) are the keys for adjusting the value. When it switches to Figure (g), press Enter to confirm the modification of the timing time and automatically return to the previous menu.

7.8 Restore settings

Through the main menu, switch to Reset and press Enter to enter the recovery interface.

As shown in the figure below, this menu includes the recovery of the following functions: relay, warning value, 4-20mA, salinity, air pressure, sensor calibration value. When the product is not connected to the sensor, the calibration option is not selectable.

After selecting the function, press Enter to restore. UP (↑) / Down (↓) to switch functions. After Enter, if the recovery is successful, Success! will be displayed. If the recovery fails, Fail! will be displayed.



8.Modbus (optional)

Register address	0x1800
Number of registers	1
Data type	USHORT
Operation	Read/Write
Default value	0 (9600)
Supported values	0 to 6

Register value	0 (default)	1	2	3	4	5	6
Baud rate (bps)	9600	2400	9600	14400	19200	38400	115200

8.1 Transmitter external output

The online controller can also receive Modbus RTU protocol commands from the host computer and output sensor data. (Or connect to a wireless module for network communication) The protocol frame format is as follows.

Request frame

The format of the request frame for obtaining the measured value is as follows:

Definition	Address Field	Function Code	Start Address		Number Of Registers		CRC	
byte	0	1	2	3	4	5	6	7
content	0x01	0x03	0x26	0x00	0x00	0x06	0xCE	0x80

Response frame

The format of the transmitter response frame is as follows: Remarks: Data 1, Data 2, Temperature value: Small endian storage mode, floating point number

Definition	Address field	function code	Byte	Register Value			CRC	
Byte	0	1	2	3~6	7~10	11~14	15	16
Content	0x01	0x03	0x0C	Data 1	Data 2	Temp. value		

Depending on the type of probe being connected, Data 1 and Data 2 represent different values, as follows:

Probe	Data 1	Data 2
DO	DO value (mg/L)	Saturation (%)
COD	COD value (mg/L)	TOC /BOD value (mg/L)
pH	pH value	mV value
Turbidity	Turbidity value (NTU)	0
Conductivity (salinity) probe	Conductivity (uS/cm)	Salinity value (ppt)
Chlorophyll probe	Chlorophyll (ug/L)	0
Oil in water probe	Oil in water (ppm)	0
Sludge concentration	Sludge concentration (mg/L)	0
Blue-green algae	Blue-green algae value (ce11s/mL)	pH
Ammonia nitrogen	Ammonia nitrogen value (mg/L)	0
ORP	ORP value (mv)	0

Transparency	Transparency value (cm)	0
Color	Color value (Hazen)	0
Depth	Depth value (m)	0
Low range turbidity	Turbidity value (NTU)	0

For example, the temperature value is 26.397 ° C, the dissolved oxygen value is 4.801 mg / L, the saturation value is 59.935%, the transmitter response frame is as follows:

Definition	Address field	function code	Byte	Register Value			CRC	
Byte	0	1	2	3~6	7~10	11~14	15	16
Content	0x01	0x03	0x0C	4.801	59.935	26.397	0x41	0XD7

The temperature value and the dissolved oxygen value byte are distributed as follows:

DO value (mg/L) (3~6)				Saturation (%) (7~10)				Temperature Value (11~14)			
0xCB	0xA1	0x99	0x40	0x71	0xBD	0x6F	0x42	0x0E	0x2D	0xD3	0x41

8.2 Transmitter Address (read/write)

0x3000H	Transmitter address (read and write)	1	2 bytes in total 00~01: device address The setting range is 1~254 For example, if the acquired data is 02 00 (low bit first, it means the address is 2) Take address 15 as an example, then write 0F 00 (low bit first) to the corresponding address. When the current device address is unknown, FF can be used as the general device address to query the current device address
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8.3 Key function list

KEY	Long /short press	Function
SETUP/ESC	Short press	Enter the main menu/return to the previous menu; input position back when editing data
CAL	Short press	Enter the calibration interface; switch relay function under the Relay menu
UP(↑)	Long press	Switch the dissolved oxygen unit display, COD/TOC, COD/BOD, conductivity/salinity, etc.
UP(↑)	Short press	Switch options; adjust the value when editing data
DOWN(↓)	Long press	Switch the temperature unit display
DOWN(↓)	Short press	Switch options; adjust the value when editing data
ENTER	Short press	Confirm the operation; input position forward when editing data