



# Industrial Online COD Analyzer

## Model:CODG-3000 User Manual



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# Chapter One Special statement on safety precautions

## 1.1 General provisions

Please read this manual carefully before running in the boot, and in strict accordance with the manual operation, with particular attention to all relevant risk and careful description of the problem, please do not attempt to repair any component disassembly instruments, otherwise may cause serious damage to the operator and severe damage to the instrument.

## 1.2 Electric shock and burn prevention

- 1.2.1 You must disconnect the power supply before maintenance or repair;
- 1.2.2 The power connection in accordance with local and national rules;
- 1.2.3 As far as possible use the ground of fault circuit breaker;
- 1.2.4 The operation unit is connected to ground under connection operation conditions.

## 1.3 The prevention of dangerous chemicals

Part of the chemical equipment needed for toxic and corrosive substances in the treatment of these drugs, please refer to the manual reagent related content in the chapter and take some preventive measures.

## 1.4 Mark

	For that special attention.
	Indicate the existence of chemical hazard risk, equipment maintenance and chemical delivery system or chemical treatment can only trained with operation qualification person.
	That required to wear eye protection equipment.

Note: the performance of this product is constantly improving. Subject to change without notice

## Chapter Two Technical specifications

2.1 Methods: according to the national standard GB11914-89 «water quality - Determination of chemical oxygen demand - dichromate» .

2.2 Measuring range: 10-10000 mg/L COD.

2.3 Percent of accuracy:  $\geq 100\text{mg/L}$ , not exceeding  $\pm 10\%$ ;  $< 100\text{mg/L}$ , not exceeding  $\pm 8\text{mg/L}$ .

2.4 Repeatability:  $\geq 100\text{mg/L}$ , not exceeding  $\pm 10\%$ ;  $< 100\text{mg/L}$ , not exceeding  $\pm 6\text{mg/L}$ .

2.5 Measuring cycle: minimum measuring period of 30 minutes, according to actual water samples, can be modified at 5 ~ 120min arbitrary digestion time.

2.6 Sampling period: the time interval (40 ~ 9999min adjustable) and the whole point of measurement mode.

2.7 Calibration cycle: 1~99 days, any interval, any time adjustable.

2.8 General maintenance period: once a month, each about 30 min.

2.9 Reagent for value-based management: Less than 5 yuan/samples.

2.10 Output: RS-232.

2.11 Environmental requirement: Temperature adjustable interior, it is recommended temperature  $+5 \sim 28^\circ\text{C}$ ; humidity  $\leq 90\%$  (no condensing) .

2.12 Power: AC230 $\pm 10\%$ V, 50 $\pm 10\%$ Hz, 5A.

2.13 Size: high 1570 x wide 500 x deep 450mm.

2.14 Others: abnormal alarm and power failure will not lose data;

Touch screen display and command input;

Abnormal reset and power off after the call, the instrument automatically discharge the residual reactants inside the instrument, automatically return to work.

# Chapter Three System survey

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## 3.1 Application

This method is suitable for chemical oxygen consumption in the range of  $10 \sim 5000\text{mg/L}$  and less than  $3.0\text{g/L Cl-}$  of the concentration of chloride waste water.

## 3.2 Systems definition

The unique design, making the products than similar products with lower failure rate, lower maintenance, lower consumption of reagents and more cost-effective.

- 1—Select valve assembly: reagent sampling sequence;
- 2—The measurement component: through the visual system to achieve accurate measurement of photoelectric reagent, overcome the peristaltic pump pump due to quantitative error caused by abrasion; at the same time to achieve a precise quantitative trace reagent, each dose was 1.5 ml, greatly reducing the amount of reagents used.
- 3—Sample components: peristaltic pump suction, there is an air buffer between the reagent and the pump, avoid the tubing corrosion;
- 4—Sealed digestion module: high temperature and high pressure digestion system to speed up the reaction process, to overcome the open system corrosive gas volatilization of equipment corrosion;
- 5—Reagent tube: imported modified PTFE transparent hose, diameter greater than 1.5mm, reduce the water particle blocking probability.

## 3.3 Electric component

Panasonic used to control the imported PLC and other components, reducing the environmental disturbance and equipment failure.

### 3.4 Fundamental principles

Water samples of potassium dichromate digestion solution, mercury sulfate (mercury sulfate can eliminate the interference of chloride ion in water, because of the formation of very stable mercuric chloride and mercury ions of chloride ions), silver sulfate solution (silver sulfate as catalyst can be effectively oxidized straight chain fatty compounds) heating the liquid mixture to 165°C, organic dichromate ion oxidation in the solution after the color change, change the color of the analyzer, and this change is converted into COD values. The amount of output is equivalent to the consumption of dichromate ion organic matter oxidation amount.

Reduction of inorganic substances in water, such as nitrite, sulfide and ferrous ions, and potassium dichromate reaction, affect the measurement results, they consume the amount of potassium dichromate will be credited to the measurement results, the measurement result is high.

### 3.5 The detection step

1. Wash water measurement with new water volume, reagent containers and digestion in vitro.
2. Open the peristaltic pump sampling. The water is not in direct contact with the peristaltic pump, there is an air pump and water samples in the buffer. The sample volume is controlled by a visual measurement system.
3. Turn on the peristaltic pump, add reagents (mercury sulfate, silver sulfate, potassium bichromate solution), and the volume of the reagent is also controlled by a visual measurement system.
4. Through the bubbling water and mixed reagent.
5. Tighten the digestion tube cover, a heating wire solution is heated to 165 °C, the digestion time is automatically controlled by the measurement system.
6. The solution is cooled by a peristaltic pump discharge solution.
7. In the measurement period defined by the user, The standard solution and analyzer can automatically adjust the cleaning solution and cleaning using the built-in calibration.

# Chapter Four Unpacking and installation

## 4.1 Unpacking

Products have been tested in the factory , Please check thoroughly transport containers and analyzer in unpacking, to prevent equipment damage during transport or loose parts , Carefully record all the equipment and contact the supplier make properly resolve if it necessary.

## 4.2 Installation

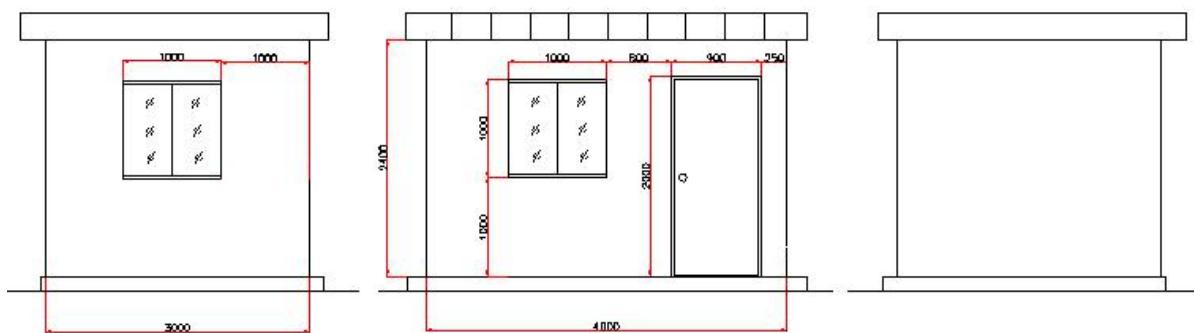
### 4.2.1 The construction of monitoring sub station

The monitoring sub station should be built in the near sample source (discharge or channel) position to reduce delay analysis.

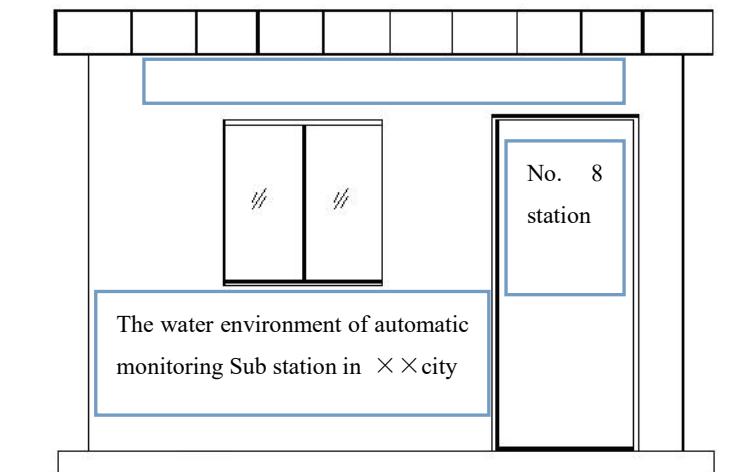
The monitoring sub station area should be greater than  $10 \text{ m}^2$ 。The instrument was placed on the ground should be tiled, and the level of requirements for ground leveling, corrosion resistance, no vibration.The instrument should be higher than the ground sampling port 300mm above the ground, to ensure that the cloth pipe shall not be convex or concave.

The monitoring sub station near the sewage side wall ( refer to 4.3), According to section 4.2.3.2.2 required to open the corresponding hole, and pre laid pipe required( refer to 4.5).

The most widely used is the color plate, color plate has the advantages of construction speed, low cost, beautiful appearance and no decorative .



Picture 4.1 Color steel plate monitoring station recommended size map



Picture 4.2 Steel plate monitoring sub station proposed text map

## 4.2.2 The monitoring sub station indoor requirements

### 4.2.2.1 Power supply

single phase alternating current : supply voltage : 220V±15%AC ,5A , supply frequency : 50Hz±5%,Power of supply: 1000w, **good grounding shall be provided.** It has at least 5 sockets of three eyes and 2 sockets for two eyes and fixed at 1.2 meters high or equiped with two multifunctional power supply boards, which can be used for expansion pumps, computers and other electrical equipment.

For the voltage instability and frequent power outages, AC power regulator recommends the use of power and to protect the equipment.

### 4.2.2.2 Room requirements

Indoor lighting should be able to irradiate instrument positive (40W fluorescent lamp);

Dry, ventilated and equipment to meet the operating environment (temperature should be equipped with air conditioning, keep constant temperature at 5-30 Deg. C) and avoid direct sunlight;

To avoid strong electromagnetic interference;

To avoid strong corrosive gases.

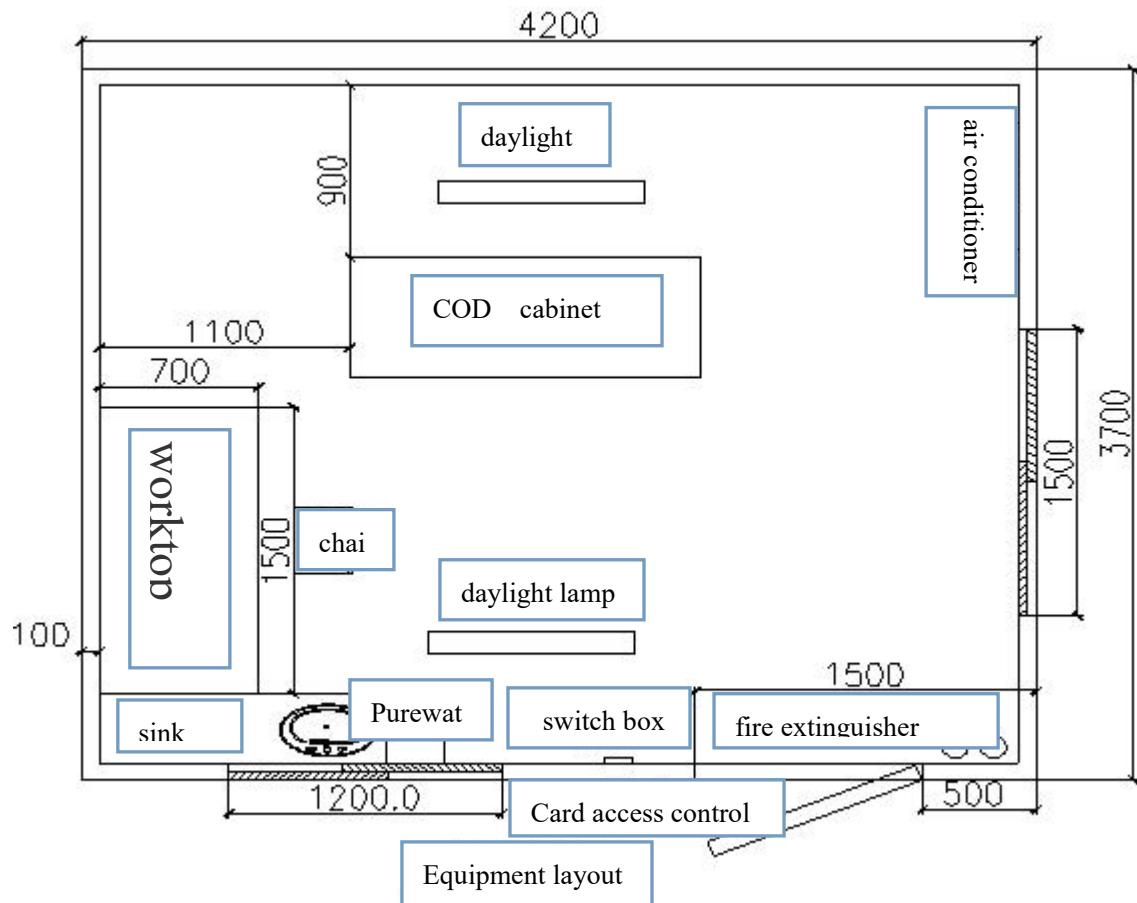
Hand wash basins are available for hand washing during maintenance.

## 4.2.3 Installation

### 4.2.3.1 The placement of instruments

Instrument size width x Height xDeep= 550×1500×450 (mm) , the requirement of the instrument about keep more than 600mm space, 1000mm space or keep ahead.

The instrument is usually installed workstation as shown below:



Picture 4.3 The workstation installation (recommended) plane sketch map

#### 4.2.3.2 Pump selection, piping layout and installation

##### 4.2.3.2.1 Pump selection

Water pump for conveying water sample from sampling point, Its power shall make the flow rate of the water transported to the instrument not less than 50L/min and not more than 200L/min. Usually the sampling point and instrument distance less than 20 meters chose the 350W submersible pump and chose 550-750W when distance greater than 20 meters ,In addition, should also be based on the corrosion of water to consider whether the use of corrosion-resistant pump.

##### 4.2.3.2.2 Arrangement of pumps and piping

The water pump, threading pipe, water sample inlet pipe, water outlet pipe and overflow pipe shall be installed in advance from the sampling point to the instrument installation.The connecting pipe shall be made of rigid PVC plastic, ABS engineering plastics or steel (in the water quality with acid alkaline place, not metal pipe), stainless steel and other rigid pipe material.To facilitate connection with the equipment, it

is recommended that the pipe be preferably made of a rigid PVC pipe.

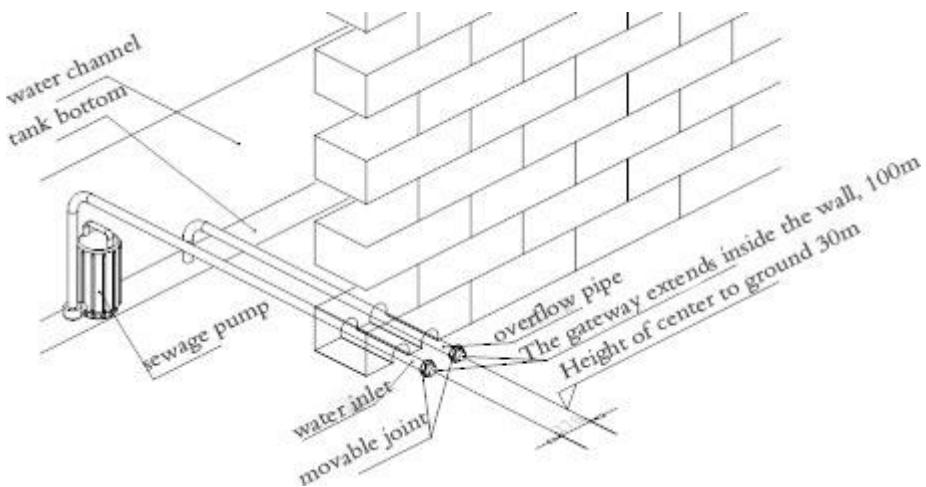
requirement:

- ① Place the instrument should be higher than the ground water tank wall, pipe from the instrument to the sink is a slope down to minimize the number of pipe elbow, pipe and midway should not be raised or sunken place, avoid water pipe, water inlet pipe for emptying and anti freezing in winter.
- ② The installation of the pipeline should be very careful, the installation of the pipeline should be clean, not more than 2mm diameter of debris, so as not to damage the sewage pump or plug the pipe. The pipe mouth is blocked with clean things before the instrument is installed so as not to enter the sundries.
- ③ Where the submersible pump is located, the flow should be laminar and the water pumping should not be dissolved in air (water contains a large number of bubbles). The aerosol entering the instrument will make the measurement result inaccurate or make the instrument alarm. Aerosol causes drainage system, mainly submersible pump placed water is falling from height and a lot of bubbles into the water coerced formation.
- ④ If the submersible pump is used, the outside of the original filter screen of the submersible pump is coated with a stainless steel filter screen and the diameter of the filter hole is between 1.0-2.0mm. The pre installed piping shall be sealed so as to avoid entry of particles.
- ⑤ Submersible pump and intake should be easy to maintain, encountered such as larger film wrapped water pump can be easily removed.
- ⑥ Connection method of sewage pump electric appliance:

The instrument panel has sewage pump control power supply interface, can directly control the open sewage pump is less than 500W.

**When the sewage pump power is above 500W, the AC relay corresponding to the power is added to the external of the instrument and the control circuit of the AC relay is controlled by the sewage pump of the rear panel of the instrument to control the opening of the sewage pump.**

**Note: not high power (especially the sewage pump sewage pump more than 750W) directly connected to the sewage pump control interface, otherwise the instrument internal fuse is easy to burn. The sewage pump should be immersed in the water as much as possible.**

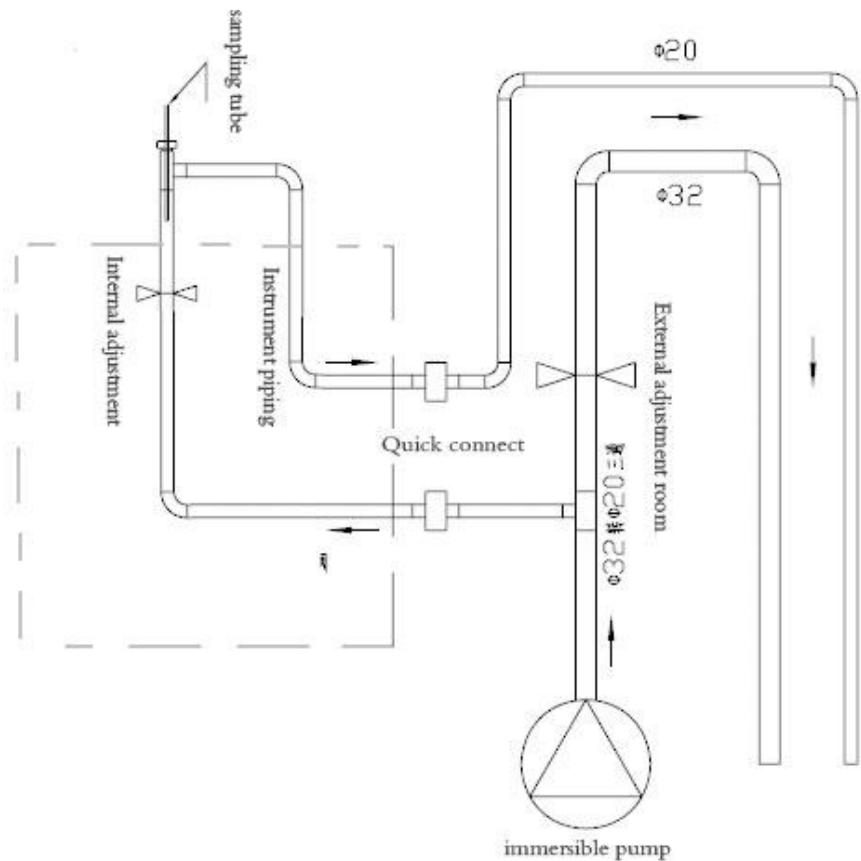


Picture 4.4 Schematic diagram of pipe installation

**Note: the actual installation of piping, should have 4 lines,2 lines Φ32,1 lines Φ80 (the root tube is short, need to wear a strong set of Φ 5 ~ φ10mm diameter nylon rope, in order to facilitate the installation of equipment in line with; This tube is longer, prior to the laying of 3×0.75 m<sup>2</sup> square meters of rubber cable used in water supply pump, such as the need to install the meter, pH meter and other equipment, please according to the requirements of pre paved with such equipment, line) 1 Phi 25, respectively for the water inlet pipe, outlet pipe, threading pipe and the overflow pipe.**

#### 4.2.3.2.3 Installation

Pipeline installation please refer to the following diagram. When installed, by adjusting the internal and external control valve control valve, the phi 25 tube flow smoothly, inside the sampling tube (but not just water overflow until the sampling tube water pressure spray).



Picture 4.5 Piping installation principle diagram

#### 4.2.3.3 Electrical connection

The circuit connection of the instrument is mainly for the connection of the power line and the submersible pump line, as shown in the diagram, it can be reliably connected with the instrument.



# Chapter Five Reagent

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**Dangerous!** To be on the safe side, chemical reagent should be prepared by professionals. Please follow the following protection measures when preparing reagents:

**Put on a safety suit (lab work clothes);**

**Wear a safety mask or mask;**

**wearing rubber gloves;**

In this chapter, the entire dispensing process can only be made using glass or polytetrafluoroethylene material.

## 5.1 Zero point standard solution (0)

	basic material	requirements
A	sulphuric acid 95-98% analytical reagent	1 ml.

disposition method:

Add the substance A to 1000 ml of distilled water. Mix and bottle.

## 5.2 COD standard solution (500)

	basic material	requisite amount
A	sulphuric acid 95-98% analytical reagent	0.5 ml.
B	Potassium biphthalate analytical reagent	0.4251 grams

configuration method:

Add 350 ml of distilled water to the 500 ml beaker, and carefully add the substance A and the substance B during the mixing. When completely dissolved, transfer the solution to a volumetric flask of

500 ml, and allow it to be mixed and then bottled. The value of this COD solution should be 1000mg/L. Before using potassium phthalate two, place it in an oven and bake at 105 degrees. The standard liquid for temporary use is refrigerated in the refrigerator. The standard liquid in the equipment is changed once a month.

### 5.3 Masking agent solution (reagent A)

	basic material	requisite amount
A	sulphuric acid 95-98% analytical	50 ml.
B	mercuric sulfate(II) analytical reagent	a part

disposition method:

A material B put 0.5 liters to the measuring cup, slowly add 350 ml of distilled water, using a magnetic stirrer to stir, stir them carefully during the to add 50 ml of substance A, when mercury sulfate is completely dissolved, add distilled water to 0.5 liters. Use filter (sintered glass filter) filter after the stand-by. No insoluble matter into the equipment within the reagent bottle.



A reminder of danger:

Inhalation, skin contact and swallowing can cause severe poisoning.

The risk of cumulative effects.

Can cause severe burns.

Harmful to aquatic life and may cause long-term adverse effects on the aquatic environment.

Emergency measures:

If you enter the eye, immediately flush your eyes with plenty of water and seek medical attention.

If it is in contact with the skin, immediately with plenty of water.

Wear appropriate protective clothing, gloves and goggles and masks.

If an accident or discomfort occurs, seek medical attention immediately.

These substances and containers must be disposed of in the manner of hazardous waste and should not be discharged directly into the environment.

## 5.4 Oxidizer solution (reagent B)

	basic material	requisite amount
A	sulphuric acid 95-98% analytical	50 ml.
B	potassium bichromate analytical reagent	a part

disposition method:

Add 700 ml of distilled water to 1 liters of the measuring cup, stirring during the magnetic stirrer, to carefully add 100 ml of substance A, keep stirring until the solution is cooled to ambient temperature, at the same time to continue to stir in the solution into a substance to be completely dissolved B, potassium dichromate, add distilled water to 1 liters. Use filter (sintered glass filter) filter after the stand-by. No insoluble matter into the equipment within the reagent bottle.



A reminder of danger:

Inhalation, skin contact and swallowing can cause severe poisoning.

The risk of cumulative effects.

Can cause severe burns.

Harmful to aquatic life and may cause long-term adverse effects on the aquatic environment.

Emergency measures:

If you enter the eye, immediately flush your eyes with plenty of water and seek medical attention.

If it is in contact with the skin, immediately with plenty of water.

Wear appropriate protective clothing, gloves and goggles and masks.

If an accident or discomfort occurs, seek medical attention immediately.

These substances and containers must be disposed of in the manner of hazardous waste and should not be discharged directly into the environment.

## 5.5 Catalyst solution (reagent C)

	basic material	requisite amount
A	sulphuric acid 95-98% analytical	500 ml.
B	silver sulfate analytical reagent	a part

disposition method:

Add 500 ml to 0.5 liter A material measuring cup, stirring during a magnetic stirrer, carefully add to the solution of a B material, to be completely dissolved after bottling, set aside. No insoluble matter into the equipment within the reagent bottle.



A reminder of danger:

Skin contact and swallowing can cause severe burns.

Emergency measures:

If you enter the eye, immediately flush your eyes with plenty of water and seek medical attention.

If it is in contact with the skin, immediately with plenty of water.

Wear appropriate protective clothing, gloves and goggles and masks.

If an accident or discomfort occurs, seek medical attention immediately.

## 5.6 Use and preservation of reagents

5.6.1 Use: only in a well ventilated place.

5.6.2 Storage: keep away from light. Some should be stored in cold storage. It should be kept only where professional or authorized personnel can get it.

## 5.7 stability and reactivity

When preparing reagents, pay attention to the following reactions: reaction with organic substances, reaction with alkali, sudden thermal reaction after adding water.

Hazardous substances that may arise when preparing reagents: three sulfur oxides, mercury gas, and three chromium oxide.

## 5.8 Reagent placement

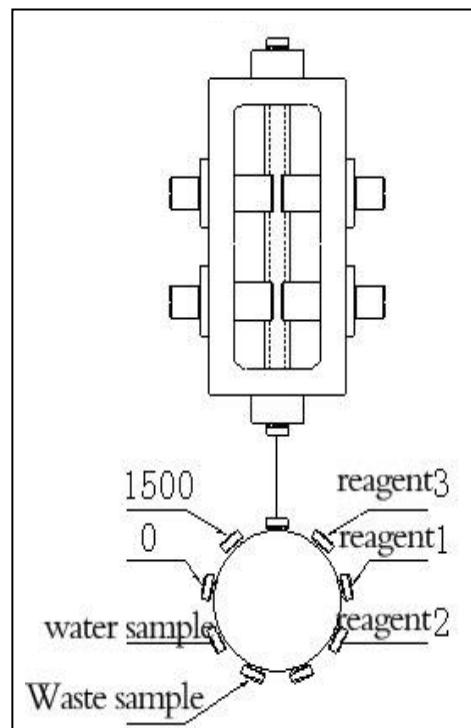
To be on the safe side, place the reagents in the instrument as per the following items:

Put on a safety suit (lab work clothes);

Wear a safety mask or mask;

wearing rubber gloves;

As shown in the hose on the label or below, the corresponding position in the reagent bottle, extract or insert the hose from the bottle, should pay special attention to prevent the hose hose jitter wall corrosion toxic reagent splashed around the object, be sure to promptly wipe off splashing out of the liquid reagent.



## 5.9 liquid waste disposal

The waste liquid of the COD analyzer is corrosive and toxic and must be disposed of by special waste treatment companies or handled in accordance with the following methods.

All the waste to a collection of large capacity and high pH wide mouth container, to which the batch addition of ferrous sulfate, and keep stirring until the solution turns green, available ferroin indicator indicating the end point, and then adding a little excess, and sodium hydroxide to adjust pH value 8 ~ 10, which added to the excess sodium. Stir for a moment, then static separation, the supernatant can be discharged directly. Residue by filtration, washing and drying and then recovered after preservation.

## Chapter Six Instrument operation

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**When the instrument is started, make sure that all reagents are properly placed.**

### 6.1 Instrument initialization

Instrument initialization condition:

- (1)、Initial operation of instrument;
- (2)、The reagent concentration fluctuates greatly after reagent replacement;
- (3)、When the instrument is checked and repaired, no reagent is found in the tubes of all sampling tubes;
- (4)、When the equipment outage time is greater than 3 days, it is recommended to insert all reagent sampling tubes into distilled water, and perform the operation to flush the instrument.

Instrument initialization method: when the instrument is in standby state, after entering the setting interface, start the initial liquid button, and then finish it immediately.

### 6.2 Calibration

After the initial operation of the instrument, and after the initial operation of the instrument, or at the set calibration time, the instrument performs calibration procedures.

After the device is in standby mode, the "immediate calibration" can be started immediately after entering the setting interface, and the calibration program can be started immediately. When the instrument is in standby mode, the instrument clock reaches the set calibration time, and the calibration program can

also be started.

### 6.3 Clean

Use hot acid solution to clean the entire contact area of the water sample until the end of the water sample tube. It is recommended that the instrument be cleaned for 10 days to prevent the crystallization of the reagent in the pipe and to affect the measurement or blockage of the hose.

After the device is in standby mode, the "immediate cleaning" can be started immediately after entering the setting interface, and the cleaning program can be started immediately. In the standby state of the instrument, the instrument clock reaches the set cleaning time, and the cleaning program can also be started.

### 6.4 Measurement



before the instrument runs, please make sure that the instrument has been completed, initialized and calibrated.

After the instrument is in standby mode, the "immediate measurement" can be started immediately after entering the setting interface, and the measurement program can be started immediately. The measuring program can also be started at the standby state of the instrument and when the instrument clock reaches the set sampling and measuring time.

### 6.5 The introduction of touch screen

This instrument adopts industrial touch screen technology, Users can view measurement data or set parameters through this touch screen.

#### 6.5.1 The data setting method

When you set or modify the parameters, tap the data, the screen will automatically pop up an input keyboard, enter the corresponding number or letter, press the Enter key, the data that is modified. When the data entry error is cleared by "CLR", re-enter.

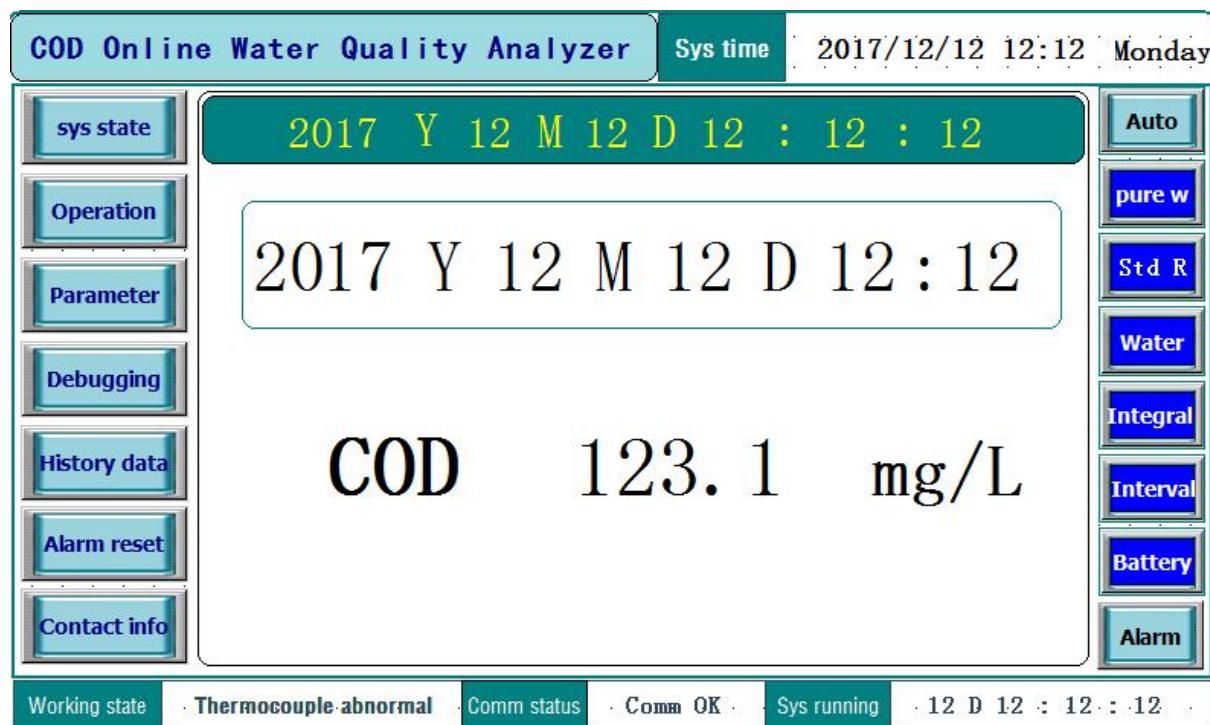
## 6.5.2 Command input and display effect

Button blue background is open, the background is transparent when the switch is closed, the button is an alternate switch, that is, click on, open, and then click to close. Press the "last", "next" or "return" to enter the appropriate page.

## 6.5.3 Screen operation

### 6.5.3.1 Data presentation

After the instrument is turned on, the screen will automatically transfer to the home page A.



**The main pages A**

The latest time of measurement is 17 years, at 12:12 on December 12th, The COD measurement at this time is 123.1mg/L. At present, Beijing time is 17 years, December 15th 12:12:12.

Press the historical data button to enter the page B to query the historical data;

Press the settings button to enter the page D for system settings;

Press the "monitor" button to enter the monitoring page P to monitor the system operation;

When the instrument alarms, the "normal" column is displayed as "abnormal". Press this button to

enter the page C to see the alarm abnormal information.

### 6.5.3.2 View or query historical data

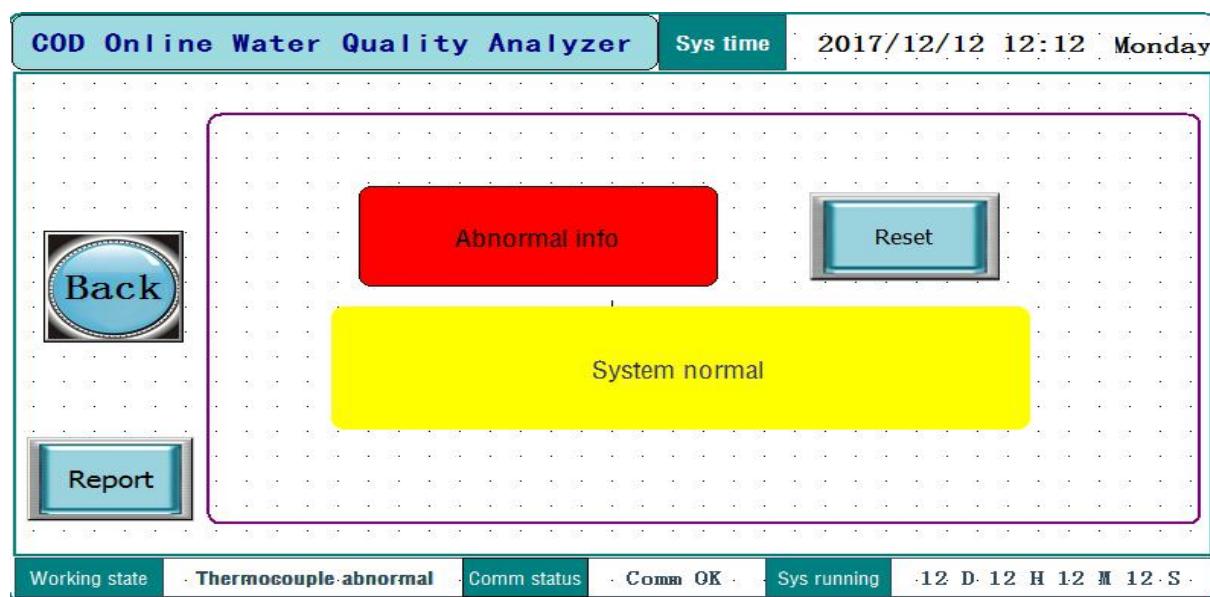
pages B

Press the "on page" or "next page" key to check the item by item;

Press the export record key to download history data to the storage device via the USB;

Press the return key to return to the home page A.

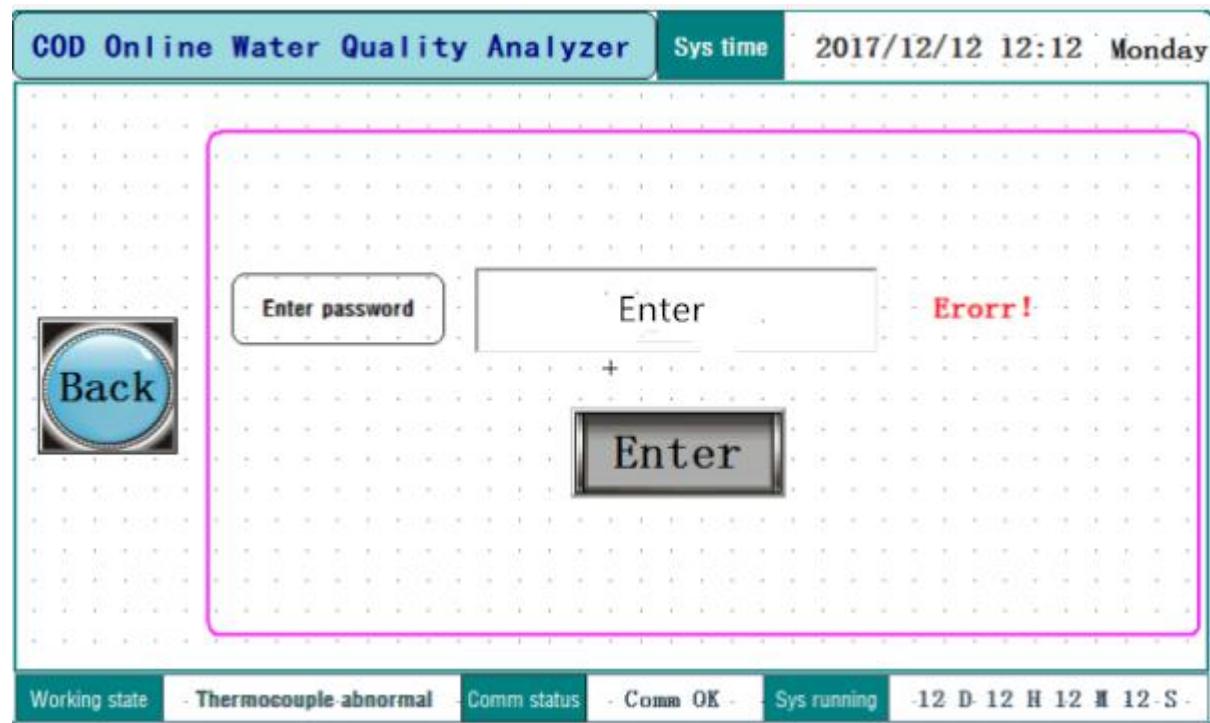
### 6.5.3.3 View abnormal display



pages C

After cleaning the instrument, Press reset and continue for 3 seconds to clear the abnormal information, and then press the return key to return to the home page A.

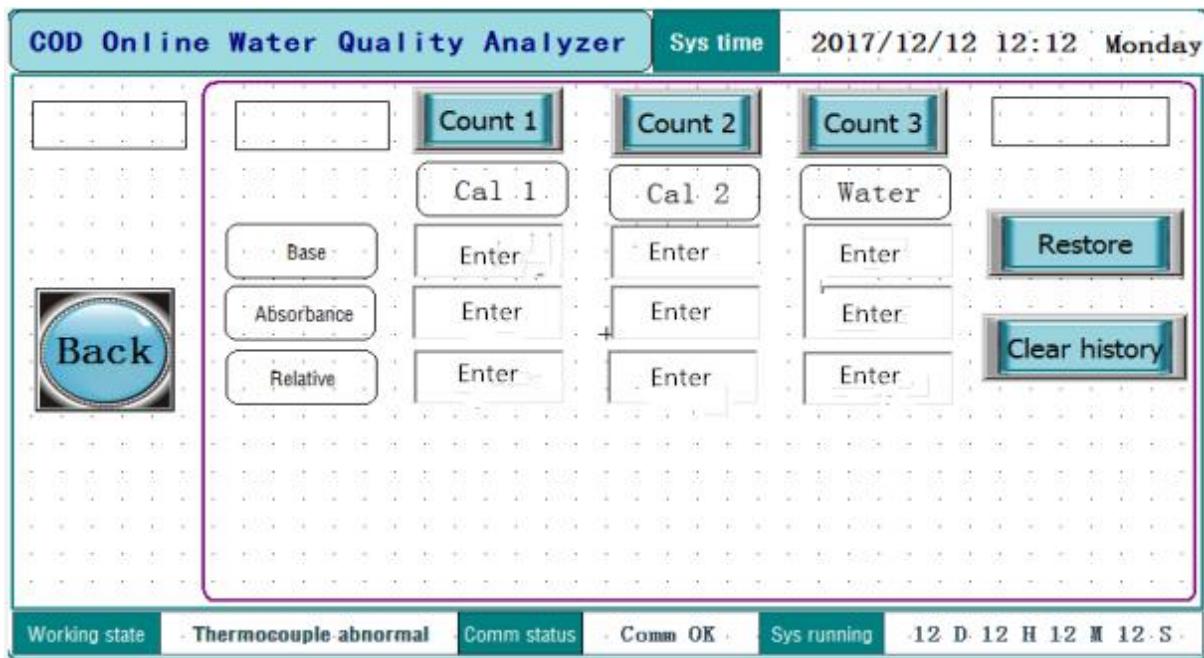
#### 6.5.3.4 User Settings



pages D

In the page "D", touch the "enter box", use the pop-up keyboard to enter the correct password, press "enter" to enter the page E, **The default password for the device is "1", and the "1231" password is different. The menu is different.**

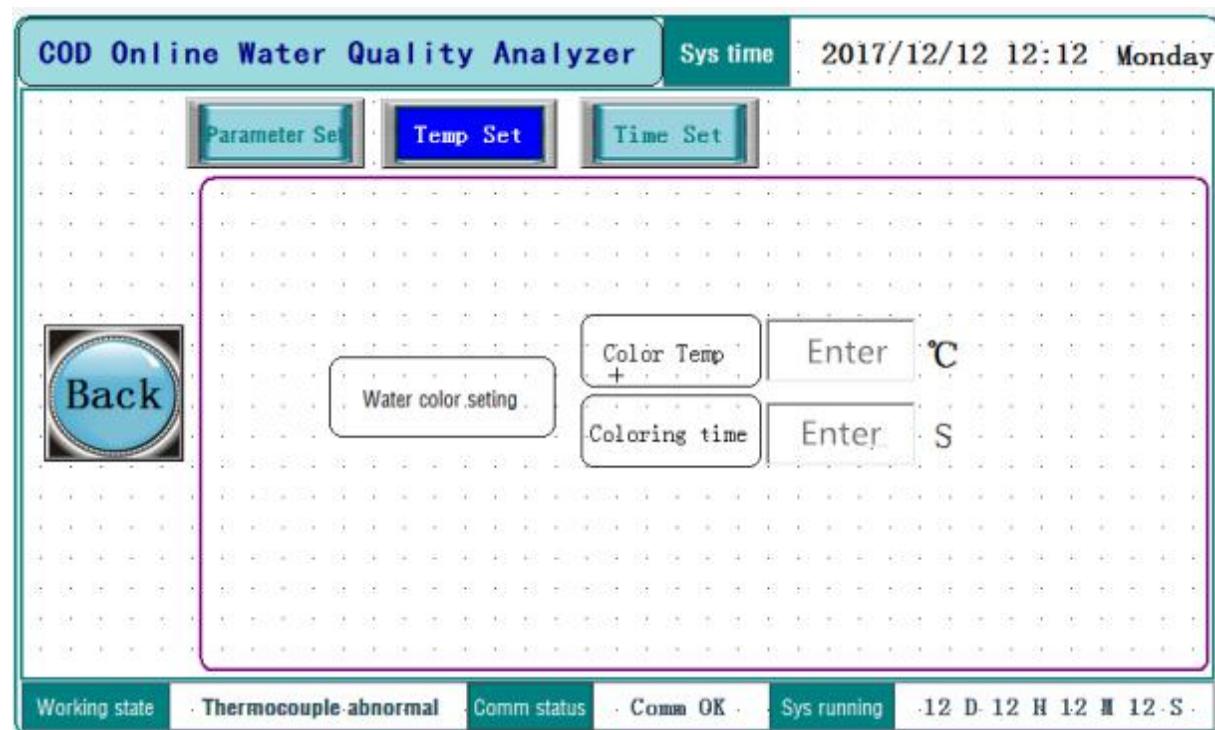
#### **6.5.3.4.1 standard solution/Alarm value/temperature/timing**



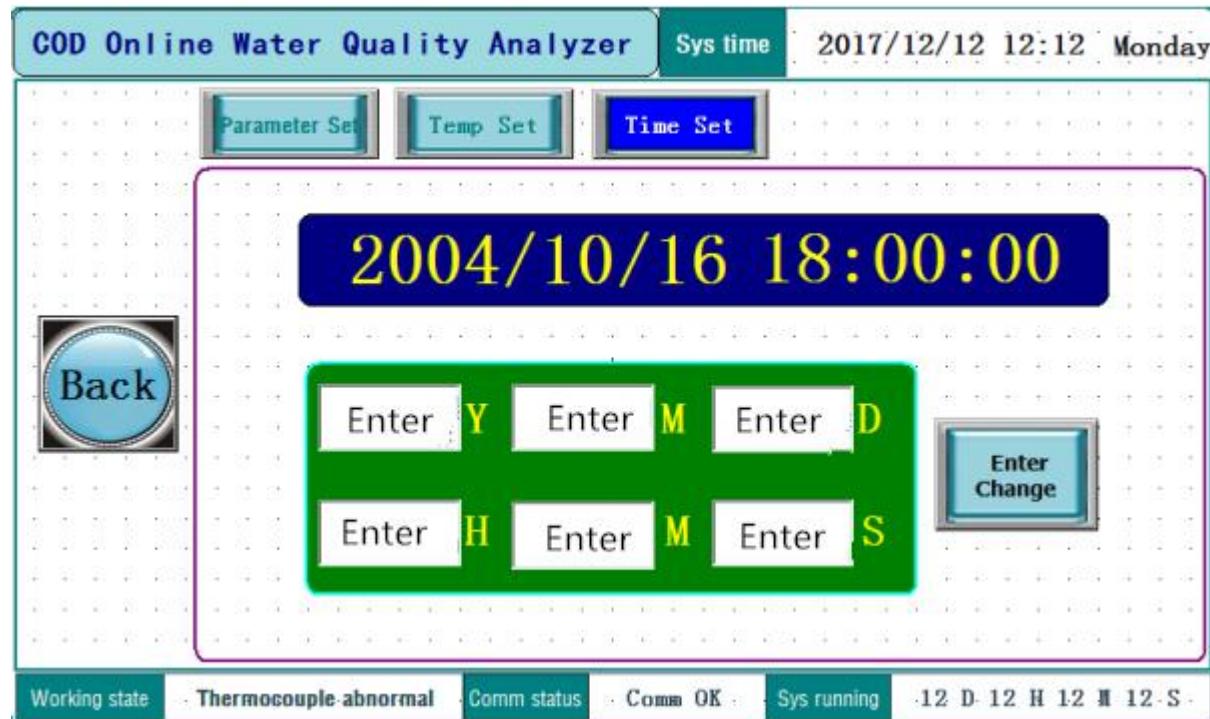
pages F

Touch the data, use the pop-up keyboard to enter the modified value, press the "carriage return" to end:

Press the temperature setting button to enter the page G, press the time setting button to enter the page E, and press the return key to return.



Pages G



Pages H

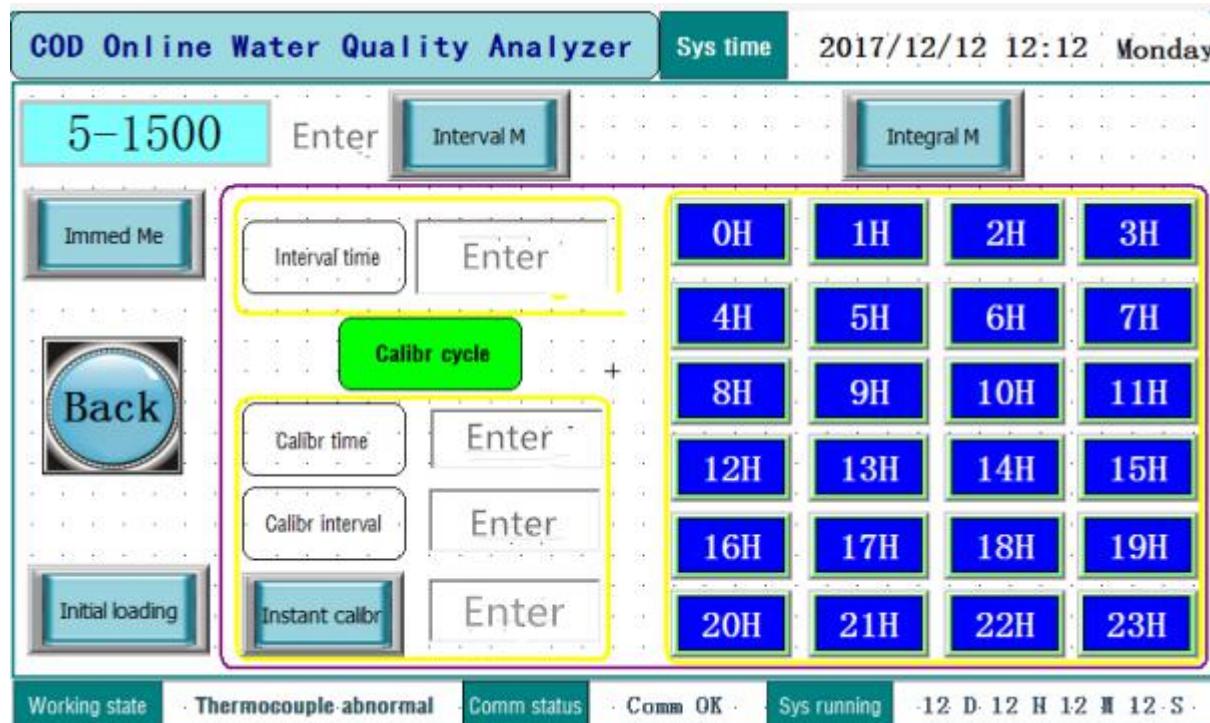
Touch the "enter box" button and use the pop-up keyboard to enter the modified value;

When the time has been changed, press "confirm, modify", save the settings, and press "carriage return" to finish;



At the end of the setup, be sure to press the "end" key to return to page A to prevent incorrect operation.

#### 6.5.3.5 range selection/immediate measurement/initial loading/calibration period/Sampling period setting



Pages E

"5-1500" represents the current device selection range, you can touch the right output box, use the pop-up keyboard to enter the "digital number" to select the corresponding range

number	range
0	5-1500
1	100-5000
2	300-10000

When the instrument is in standby mode, press "instant measurement" for 3 seconds and start the measurement immediately;

When the instrument is in standby mode, press "initial fluid" for 3 seconds and start initialization immediately; Generally only in the installation, commissioning and replacement reagents used, the daily measurement does not use this function.

Two sampling periods, "interval time" and "point measurement", are chosen, which can be chosen according to the requirements.



**The whole point measurement and interval measurement can only be effective and can not be effective at the same time.**

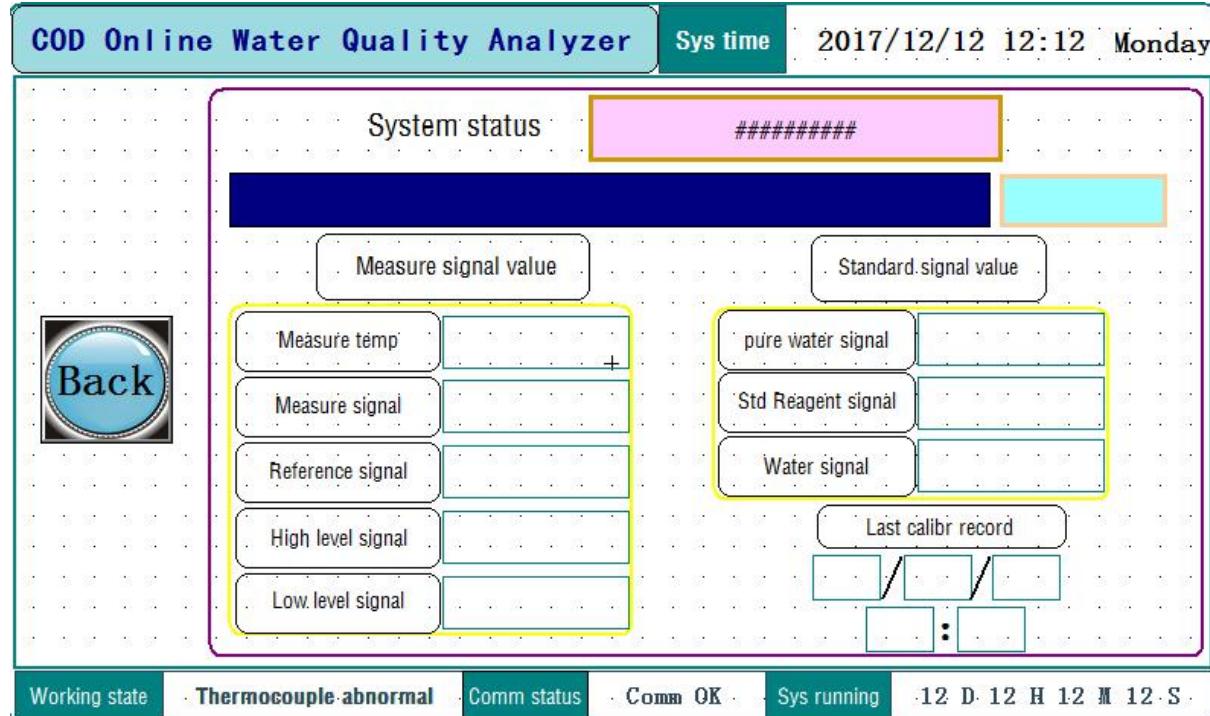
Touch the "calibration interval" input box, use the pop-up keyboard to enter the modified value, press the "carriage return" to end;

The instrument standby mode, press the "immediate" calibration. The general calibration procedure starts immediately after replacing the reagent, or large deviation in the measurement data, enable the "immediate" calibration, automatic calibration cycle is recommended for 3 days, when the calibration interval is set to 99 days, the instrument will cancel the automatic calibration function. The "immediate calibration" the input box said calibration methods, generally choose 3 according to the "end" return to the page A.



At the end of the setup, be sure to press the "end" key to return to page A to prevent incorrect operation.

#### 6.5.3.6 System real-time state monitoring



Page I

Press the "system status" button to enter the monitor page to display the status of the instrument and the system temperature. If the instrument is running, the system status bar will display the appropriate

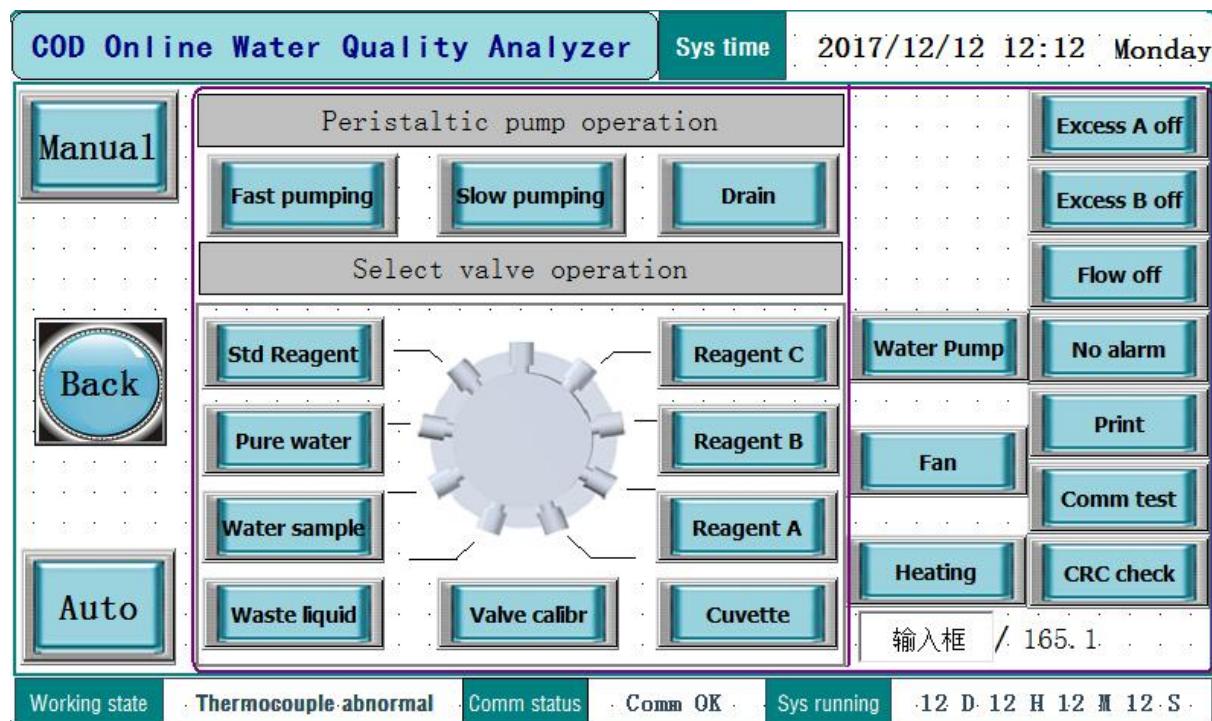
operation, And in the following process bar, show the percentage of the completion of the process, the process bar can only roughly reflect the entire measurement and analysis cycle process, and the actual completion of the progress may be a certain deviation;

The display device is related to the photoelectric signal, and in the standby state, the measuring signal of the general device is 2000~2200,The high or low signal is at 1000~1100; the instrument will stop running when either of the high or low signal is within 600.

The calibration signal value shows the final calibration result and the calibration time;

Press the return key to enter the home page A.

#### 6.5.3.7 General Debugging



Page J

Press the "general debugging" to enter the debug page J,

Press the manual debugging button for 3 seconds, and the instrument goes into the debug test state to debug individual parts of the device individually. In this state, any automatic program on the instrument will not start ;

Touch the "automatic measure" button, the instrument is in the state of automatic measurement. The manual, state can only have an effective measure. When maintenance personnel after the end of commissioning tests, be sure to press the "back" before the "measurement" state, otherwise the instrument will remain in the "manual" state.

When the instrument is powered off, the instrument is placed in the "measuring" state automatically after the power is switched on, regardless of whether the instrument is "manual" or "measured" before the power is cut off.



When the instrument alarm, if directly on the page in the C "reset" operation, the instrument will automatically determine the residual liquid in the instrument and shall be excluded; if the alarm, reset in the instrument before entering the J page to choose "manual", and then the instrument reset, then the residual liquid the instrument will not be automatic emptying, at this time, in the "manual" mode, manual removal of residual liquid.



After debugging, select "measure" and press "return" to enter the home page A.

After the end of the setup, you must press "return" to enter the home page "A" in case of human error.

#### 6.5.3.7.1 Selection valve test

In the "manual" state, you can manually select the corresponding valve position, all eight valve positions can only have one of the valve position valid.

When you need to check a valve position is normal, the general can select the appropriate valve position, such as chromium reagent, and then start the pump "fast forward" or "slow forward" on page W, see whether the corresponding reagent can smoothly inhalation; or start the "fast reversal", see whether there is a corresponding reagent tube smooth air bubble discharge.

Page 2 in Y said equipment washing fluid into the liquid number, the value can be in 1 ~ 4, the greater the value, the equipment within the residual effect of liquid on the measurement results is small, but it will increase the amount of a standard, generally set at 1 or 2 can be recommended.



When the actual temperature is higher than 80 degrees, the valve position can not be selected manually. At this time, the temperature can only be reduced to below 80 degrees or the fan can be forced to cool below 50 degrees.

In manual commissioning, the extraction of mercury sulfate and silver sulfate at intervals is strictly prohibited, which can result in the crystallization of the common piping. Such as: strictly prohibit the operation of the next case:

The above operation, because after the rapid reversal of the end, the public pipes are residual silver

sulfate, at this time, if the absorption of mercury sulfate, mercury sulfate will be in the public pipe precipitation, serious will be blocked.

The above operation is only one of them, and any above similar precipitation may be operated and shall be avoided.

The correct operation of the above example is that after the rapid reversal, select any reagent other than mercury sulfate, first rinse the pipe again, and then select mercury sulfate.



For these reasons, it is recommended that general users and unskilled engineers strictly prohibit manual use of the above functions.

When there are residues in the system that need to be evacuated manually, execute the following loop:

Manual - digestion valve - fast forward - pump stop, select waste valve - fast reverse - pump stop, and then select the digestion valve.....

So cycle until emptying.

#### **6.5.3.7.2 Peristaltic pump test**

Manual mode, in this page start fast forward, slow forward or fast reverse, check the peristaltic pump action is correct.

#### **6.5.3.7.3 Fan or submersible pump test**

In manual mode, start the fan on this page and check that the fan is working properly.

In manual mode, start the submersible pump on this page, check whether the submersible pump works correctly, or whether the corresponding terminal has AC220V output.

When installing the equipment in the field, it is necessary to start the submersible pump manually to adjust the pressure in the sampling tube.

Valve calibration: generally only used in the production of debugging, or use after replacing the selector valve. In manual mode, first select the "valve calibration", when the "valve calibration" background is blue, and then hand hold down the "valve calibration" does not let go, until you hear a "KaKa" sound in the valve, please let go, at this time, the valve is adjusted to complete. Under normal circumstances, do not often use this function.

#### **6.5.3.7.4 Heater test and digestion condition setting**

In manual mode, start the heater on this page and check that the heater is working properly.

When heating the tube without liquid, it is forbidden to be heated to over 100 centigrade.

On the temperature of the actual temperature and lower temperature as the heating temperature control, is set between 150 to 165°C.

Heating time is from the temperature to set the temperature when the timing, the need for heating digestion time, generally set at 8 ~ 15min can be, for most water samples, generally set at 10min is appropriate.

Time delay of sampling, the sampling time of arrival, the submersible pump start the work, work 20 seconds (not less than 3S in any set time), the instrument before starting work, the main function is to prevent water samples behind.

## Chapter Seven Breakdown maintenance

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When the instrument is abnormal, it will beep and alarm and interrupt all the running programs, and then reset the instrument until the equipment is out of order, so that the instrument can resume its normal operation.

Abnormal information	Reason		Take action
Thermocouple anomaly	The actual temperature is greater than 500	Temperature transmitter or A/D damage The temperature transmitter or A/D conversion line is loose	Reconnect the connection between the A/D, temperature transmitter, and thermocouple 22 If it still cannot be ruled out, replace the temperature transmitter, thermocouple or A/D
	The actual temperature is about 200	Thermocouple or A/D damage Thermocouple and temperature transmitter are loose	
Reagents not found1	There is no corresponding sample Pipe leak		Complement the reagents Replace the clogged pipe or reconnect the leak joint
Reagents not found2	Peristaltic pump drive connection loose Peristaltic pump or pump or the corresponding drive damage		Make sure the 2 outlets of the submersible pump are clear
Reagents not found3	Pipe blockage Selector valve fault		Check whether the positive and negative work of peristaltic pump is normal or not. Please check
Fail to pick up the			

mark 一	The circuit board relay is damaged	the connection, relay or replace the pump driver when abnormal
Fail to pick up the mark 二		Check the selection valve whether the flow is clear, not clear, please check the corresponding channel is blocked, plug, please change the selection valve, when not blocked, please check the connection or replace the valve drive
Do not use water to		Check or replace circuit board relay
Condensation fault	Cooling fan bad Ambient temperature is too high Damage of thermocouple or temperature transmitter The circuit board relay is damaged Pipe blockage Selector valve fault Measuring photoelectric fault Peristaltic pump and its accessories damaged or loose connections Circuit board relay, electromagnetic valve, relay damage	Check or replace the fan Lower the ambient temperature Check or replace thermocouple and temperature transmitter Check or replace circuit board relay
feed liquor/Drain error	Cooling fan bad Ambient temperature is too high Damage of thermocouple or temperature transmitter The circuit board relay is damaged Pipe blockage Selector valve fault Measuring photoelectric fault Peristaltic pump and its accessories damaged or loose connections Circuit board relay, electromagnetic valve, relay damage	Replace clogged lines Check the selection valve whether the flow is clear, not clear, please check the corresponding channel is blocked, plug, please change the selection valve, when not blocked, please check the connection or replace the valve drive Check whether the photoelectric signal is normal, otherwise replace the photoelectric metering device Check whether the positive and negative work of peristaltic pump is normal or not. Please check the connection, relay or replace the pump driver when abnormal Check or replace circuit board relay, solenoid valve, solid state relay

Follow the front page

Error information	Reason	Take action
Heater exception	Temperature setting is less than 100 The heating wire is damaged or the connection is loose Solid state relay damage Thermocouple, temperature transmitter or A/D damage	The temperature setting should be higher than 150 Check heating wire and wiring and replace heater when there is a problem Check or replace the heating solid state relay Check or replace thermocouple, temperature transmitter, etc.
Photoelectric anomaly	High chlorine water samples were measured under low chlorine condition, and the precipitate in the heater was serious when heating Measure damage to photoelectric system or loose wiring Measuring photoelectric system damage or loose connection	For high chlorine water samples, measures should be taken to measure them Check all photoelectric signals are normal Check abnormal optoelectronic circuits, devices, and wires
Measurement data fluctuates greatly	The environment temperature fluctuates greatly High ambient temperature The heating temperature is not stable Reagent contamination Other hardware faults	Install air-conditioning Reconnect and replace the temperature transmitter or heater Reagent replacement Contact maintenance department

## Chapter Eight General maintenance

8.1 Check and supplement the reagents regularly.

8.2 Regularly check the waste liquid in the stock of liquid waste, and promptly deal with, exclude, do not cause waste liquid overflow.

8.3 Check the inlet and outlet of the submersible pump regularly and make sure it is smooth.

8.4 Regularly check the cleanliness of measuring tube, high or low signal when the measured signal any way less than 600, please perform immediate cleaning, such as cleaning after the measurement tube is still not cleaned up, please shut down after the metering tube remove manual brushing.

8.5 When the reagent is configured, it must be carried out according to the configuration method of this manual. Otherwise, the black insoluble crystals may be produced in the heater, which will cause the blockage of the equipment piping when it is serious.