



COD_{Cr}-1400 Chemical Oxygen Demand (COD) Online Automatic Analyzer



Hebei Create instrumentation Technologies Co., Ltd.



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Operation manual

V2.0

Hebei Create instrumentation Technologies Co., Ltd.

Foreword

Thank you for using the COD-1400 Chemical Oxygen Demand (COD) Online Automatic Analyzer manufactured by CREATEC!

Proper installation and parameter setting would give maximum performance and advantage of this instrument for your good usage. So please carefully read this manual before installation.

The water quality online analyzer is a precise electrochemical analysis & Control Integration System, which should be operated by technicians with relevant professional knowledge.

Please contact technical backup of CREATEC when you meet any problems during installation and usage.

Check the actual product with complete set after you receive the package, and contact us if any missing or damage.

Our serious promise:

1. The indicator's quality guarantee is one year from the date of purchasing. During this period, if the meter has quality problems, manufacturer is responsible for maintenance for free or replacement.

2. We provide lifelong maintenance service for the product whatever you purchase from us or distributors.

3. If the damage of the meter is caused by the following reasons, it is out of the maintenance service:

A).The meter is burned caused by misconnection with high voltage power supply or soggy.

B).The meter is refitted or misused without permission.

C).The meter is damaged under the condition out of use environment.

D).The relevant damage caused by choosing the wrong type.

E).The physical damage caused by ultimate load

F).The meter is out of operation caused by improper storage and transportation

G).Consumable material is out of maintenance service.

Advancing with the times is the natural law of enterprise development. the product will be improved and updated at any time. Without notice for matters that do not involve the installation. Please make the object as the standard.

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1 Special Statements for Safety Precautions

1.1 General

Please carefully read this manual before boot operation and operate in strict accordance with the instructions. Especially pay attention to all instructions on risk and cautious problem. Please don't repair or do disassemble any components without authorization. Otherwise it may cause serious injury to operators and serious damage to the instrument. For disassembling instruments by yourself, the company will no longer provide free services.



1.2 Electric Shock and Burn Prevention

- 1.2.1 Be sure to disconnect the power supply before maintenance or repair;
- 1.2.2 Power connection in accordance with the rules of local or national rules;
- 1.2.3 As far as possible using a ground fault breaker;
- 1.2.4 Under the condition of the join operation, operation unit must be grounded.

1.3 Chemicals Risk Prevention

Some chemicals required for this equipment are toxic and corrosive substances, when dealing with these products, please refer to the related contents of reagent chapter, and take some precautions.

1.4 Signs

	Indicating special attention.
	Indicating chemical hazard risk exists, only trained person with operation qualification on premise of wearing the appropriate protective closing can treat the chemical drug or maintain the equipment chemical drug delivery system.



Indicating eyeshield equipment must be worn.

Note: Based on the principle of advancing with the times, the product will be timely updated to the latest science and technology, the current equipment is based on random file.

2 Technical Specifications

2.1 Range of measurement: (30-1000) mg/L COD_{Cr}.or can be customized

2.2 Accuracy: ≥ 50 mg/L, less than $\pm 10\%$; < 50 mg/L, less than ± 5 mg/L.

2.3 Repeatability: less than $\pm 5\%$;

2.4 Measurement period: the minimum measurement period is 50 minutes, according to the actual water samples, digestion time can be modified in (10 ~ 45) min.

2.5 Sampling period: time interval ((1~999)min arbitrary and adjustable) and hourly measuring model.

2.6 Calibrating period: adjustable at any interval and any time within (1~99) days.

2.7 Maintenance period: Usually monthly, about 30 mins every time.

2.8 Output: (4~20)mA current output, RS232(Convertible RS485)

2.9 Environmental requirement:adjustable indoor temperature, proposal temperature(20~28) °C; humidity $\leq 90\%$ RH (no condensation) .

2.10 Power Supply: AC (220 $\pm 10\%$) V, 50/60Hz。

2.11 Dimension: Length 550×width 440×height 1520mm

2.12 Other: data is not lost for abnormal alarm and power failure;

Touch screen display and input instructions;

If abnormal reset and power supply after power failure, the instrument will automatically discharge the residual reactants and automatically return to work status.

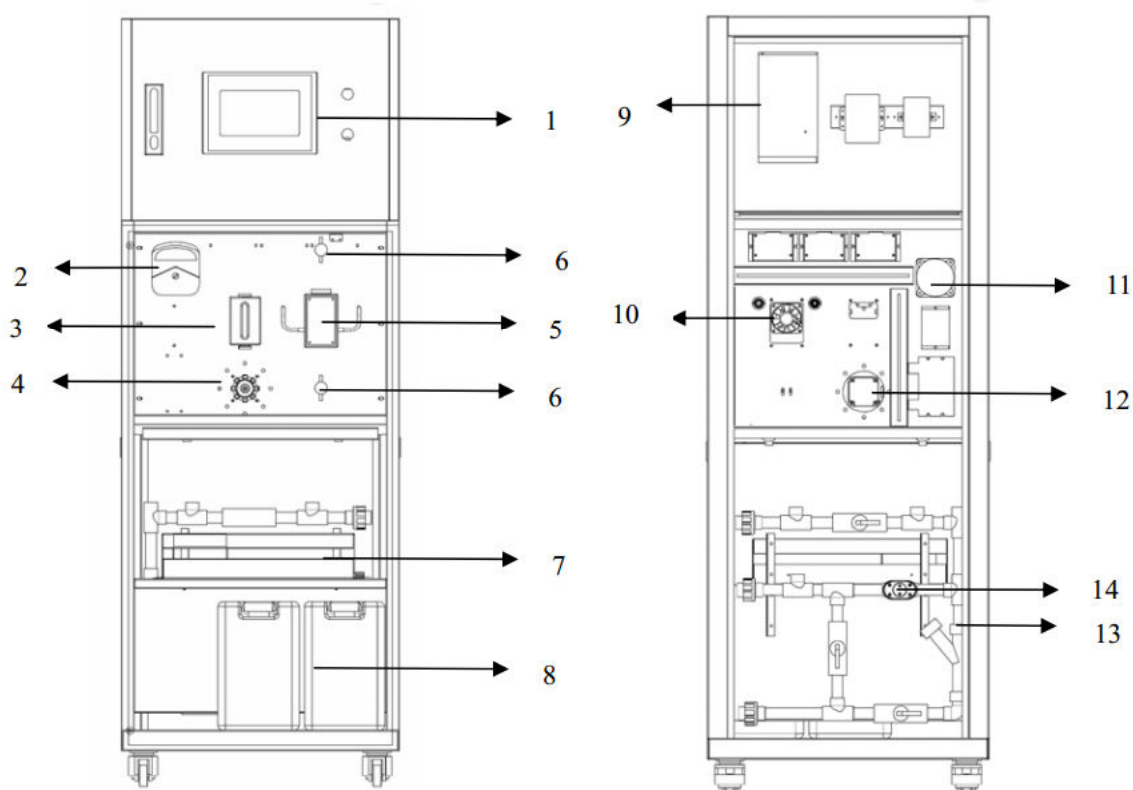
3 System Overview

3.1 Application

The method is suitable for wastewater with the COD range of (30 ~ 1000) mg/L and the chloride concentration of less than 3.5g/L Cl⁻. According to the actual requirements of the user, the analyzer can be applied to wastewater with the chlorine concentration of less than 10g/L Cl⁻ by adjusting the reagents dosage.

3.2 Instrument Components and System Description

Compared with similar products, the unique design makes this product have a lower failure rate, lower maintenance and lower reagent consumption and higher cost performance.



Components and parts list

Components and parts list			
Serial No.	Name	Serial No.	Name
1	Touch screen	8	Waste liquid tank
2	Peristaltic pump	9	Power module
3	Metering tube	10	Fan
4	Multi-way valve	11	Peristaltic pump motor
5	Dissolution Room	12	Multi-way valve motor
6	High-pressure valve	13	Filter system
7	Reagent stand	14	Flow meter

System function:

1—Selector valve component: Select reagent sampling sequence;

2—Metering components: Accurate measurement of reagents is achieved through the visual optoelectronic system, quantitative error of the peristaltic pump due to wear is overcome; At the same time, precise quantification of trace reagents is achieved, each dose of only 1.5 ml, which greatly reduces the usage amount of reagents.

3—Sample components: Negative pressure suction of peristaltic pump, there is always an air buffering area between reagent and pump pipe, which avoids the corrosion of pump pipe;

4—Sealed digestion components: High temperature and high pressure digestion system, it speeds up the reaction process and overcomes the corrosion of corrosive gases in the exposed system to the equipment;

5—Reagent tube: The use of modified PTFE transparent tube, diameter greater than 1.5mm, reducing the blocking probability of water sample particle.

3.3 Basic Principle

The mixture of water sample, potassium dichromate digestion solution, silver sulfate solution (the silver sulfate as a catalyst can be more effective oxidation of straight chain fat compounds), and concentrated sulfuric acid is heated to 165°C. The color of the organic matter in dichromate ion oxidation solution will change. the analyzer detects the change in color, and converts this change into COD value to output. The amount of dichromic acid consumed is equivalent to the amount of oxidizable organic matter.

The reductive inorganic matter in water samples, such as nitrite, sulfide and ferrous ions, will react with potassium dichromate and affect measurement result. the amount of potassium dichromate consumed

by them will be credited to the measurement results and make measurements on the high side.

The interference of chloride ions in the water sample can be eliminated by the addition of mercuric sulfate, because the chloride ions can form very stable mercury chloride with the mercury ions.

3.4 Detecting Steps

1. Rinsing the measuring water sample, reagent volume container and the digestion tube with the new water sample.

2. Opening the peristaltic pump. The water sample does not directly contact with the peristaltic pump tubing, and there is an air buffer area between the pump tubing and the water sample. The volume of the sample handling is controlled by a visual measurement system.

3. Opening the peristaltic pump to add reagents (mercury sulfate, potassium dichromate, sulfuric acid including catalyst), the volume of the reagent is also controlled by the visual measurement system.

4. Mixing water samples and reagents by bubbling.

5. After tightening the digestion tube cover, the solution is heated to 165 °C by heating metal wire, digestion time is controlled by the automatic measuring system.

6. The solution is discharged by peristaltic pump after being cooled.

7. In user-defined measurement cycle, the analyzer will use the built-in calibration standard solution and cleaning solution to automatically calibrate and clean.

4 Unpacking and Installation

4.1 Unpacking

The product has been rigorously inspected before delivery. Please thoroughly check the transport container and analyzer at the time of unpacking to prevent damage to the equipment or loose parts during transporting. Carefully record all circumstances of the equipment, if necessary, contact the supplier.

4.2 Installation

4.2.1 Monitoring Substation Construction

Monitoring the substation construction should be built near the sample as far as possible to reduce transmission delay.

Monitoring substation area should be greater than 10m². The ground floor for placing the instrument should be flooring, the ground must be level, anticorrosive and without vibration. The instrument on the ground should be higher above 300mm than the sampling port to ensure no convex or concave in the middle of the pipeline.

Monitoring substation is forbidden to set up in flammable and explosive place.

The wall side near the sewage drainage (Refer to figure 4.3) should be opened corresponding hole according to the requirements of the first chapter 4.2.3.2.2 to , and the required pipelines should be laid in advance (Refer to figure 4.5).

Color plate is currently the most used room, with the advantages of fast construction, cheap, generous appearance and no decoration.

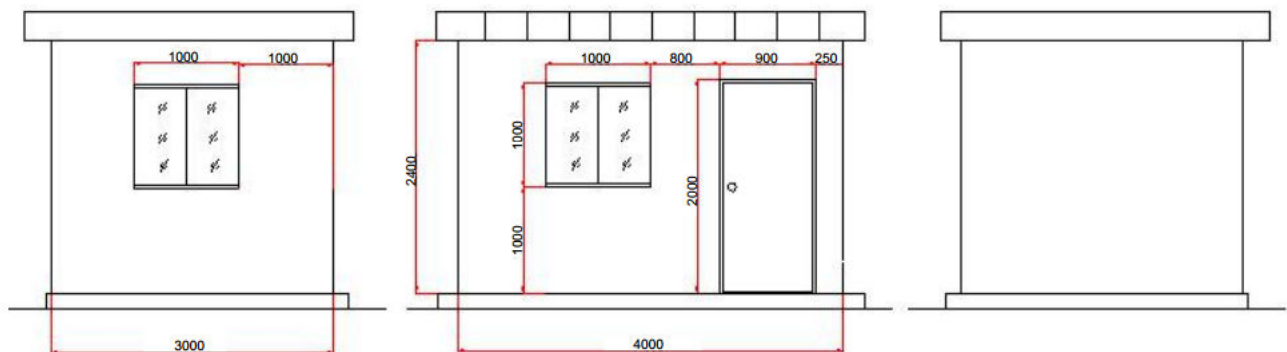


Fig. 4.1 Suggested size chart of color plate monitoring substation

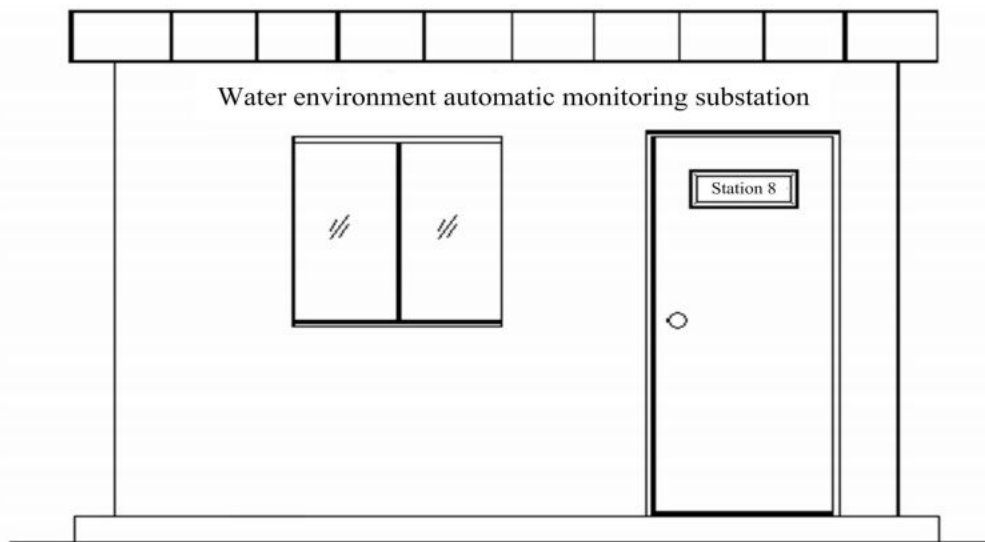


Fig. 4.2 Suggested legend of color plate monitoring substation

4.2.2 Indoor Requirements of Monitoring Substation

4.2.2.1 Power Supply

Single-phase Alternating Current: Power voltage: AC (220 ± 10%) V ,5A, Frequency: (50 ± 5%)Hz,Power:1000w,good grounding. Five three-socket and two two-socket should be equipped at least and fixed at 1.2 meters high, or two multi-functional power strips are equipped to expand joint the water pump, computer and other electrical equipments.

For the areas where voltage is unstable and often de-energized, it is recommended to use a power-matched AC power regulator to protect the instrument.

4.2.2.2 Indoor Requirements

Indoor lighting should be able to illuminate the positive side (40W fluorescent lamp);

Dry, ventilated and meet the equipment operation environment (air conditioning should be equipped to keep the constant temperature in (5-30) °C), avoid direct sunlight;

Avoid strong electromagnetic interference;

Avoid strong corrosive gas.

Equip with the hand sink to wash your hands with maintenance.

4.2.3 Installation

4.2.3.1 Placement of the Instrument

The right and left side of the instrument keep the distance of ≥ 600 mm, the front keeps the distance

of $\geq 1000\text{mm}$.

Usually instrument installation workstation is as shown in the figure below:

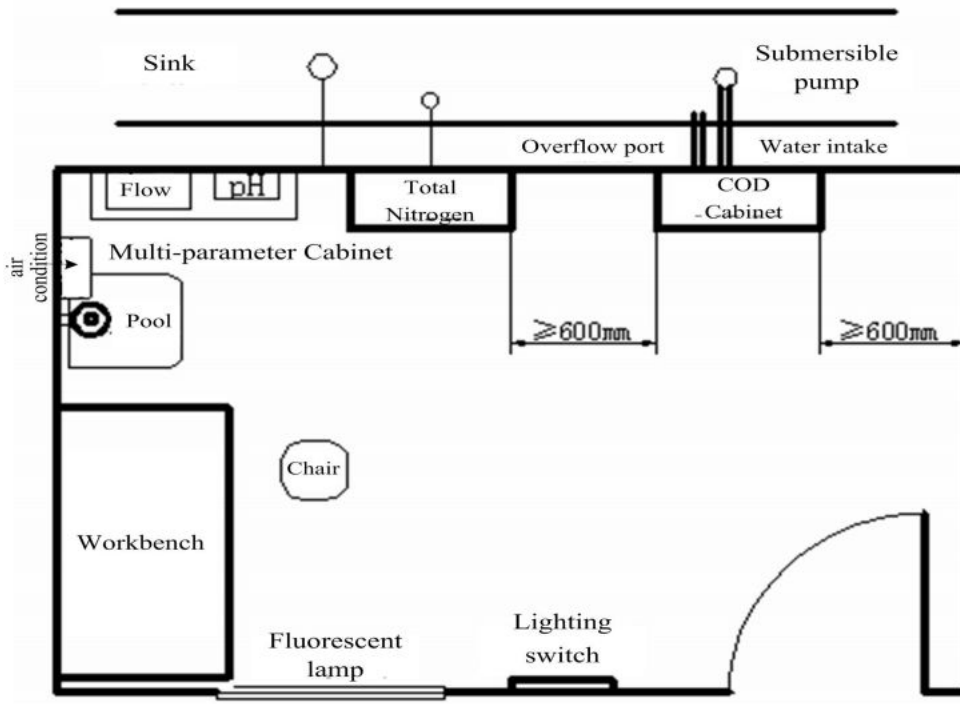


Fig. 4.3 Workstation installation (proposal) plane sketch

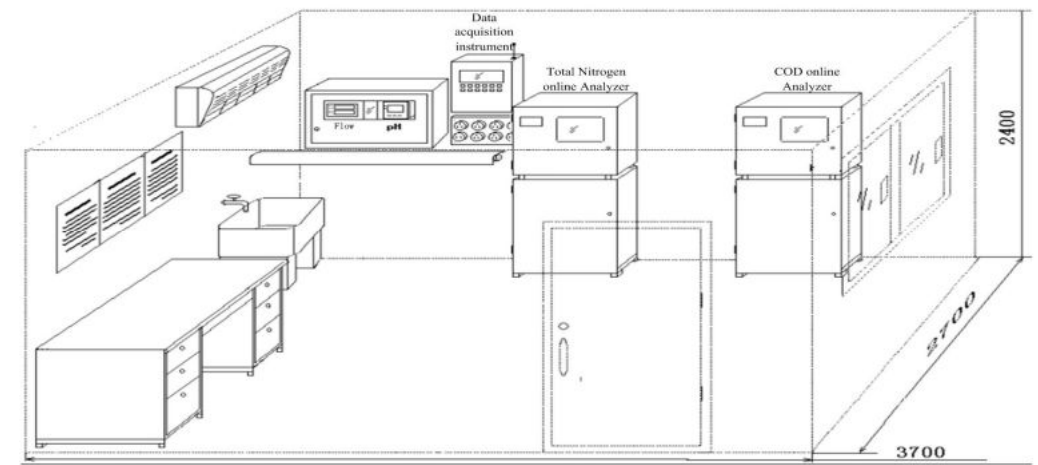


Fig. 4.4 Workstation installation (proposal) 3D sketch

4.2.3.2 Pump selection, the layout of pump and pipeline

4.2.3.2.1 Pump selection

Pumps that deliver water samples from the sampling point to the instrument, its power shall make that the flow rate of the measured water to the instrument is not less than 50 liters per minute and not more than 200 liters per minute, usually 350W to 550W pumps. Whether the use of anti-corrosive pump or not should be based on the corrosion of water samples.

4.2.3.2.2 The layout of pump and pipeline

The place from sampling point to the instrument installation should be pre-installed water pump, threading pipe, water inlet pipe, outlet pipe and overflow pipe. The connected pipeline should use hard pipes of hard polyvinyl chloride plastic, ABS engineering plastics or steel (in the water quality of the alkaline can not metal pipe), stainless steel and other materials based on the specific conditions. In order to facilitate the connection with the equipment, it is recommended that the best use of rigid PVC pipe.

Requirements:

- ① The instrument should be placed above the wall of the water tank, the pipeline from the instrument to the water tank is sloping decline, minimizing the number of pipe elbow, and the middle of the pipelines should not have convex or concave place to avoid water in the pipeline and to facilitate the emptying of the inlet pipe and anti-freezing in winter.
- ② Pipeline installation process should be very careful. The inside of the pipeline should be clean and no sundries diameter greater than 2mm, so as not to damage the sewage pump or plug the pipeline. The pipeline port should be blocked well with clean object before installation to prevent the sundries.
- ③ For the sampling position of submersible pump, its water flow should be laminar flow, the pump will not suck the air, and the water was aerosol-like (that is, the water contains a lot of bubbles). It will make the measurement results inaccurate or the instrument alarm if the aerosol enters into the instrument. The reason of producing aerosols in open channel drainage system is mainly that the water flow in placing submersible pump is falling from height, and coerced a large number of bubbles into water.
- ④ If you are using a submersible pump, a layer of stainless steel filter should be wrapped outside the original filter cover of submersible pump, diameter of filter hole is between 1.0-2.0mm. Pre-installed pipes should be sealed to the port, so as to avoid particles and debris.
- ⑤ Submersible pumps and water intake should be easy to maintain, for example, if large area of thin film wraps the water pump, it can be easily removed.
- ⑥ The burial depth of the pipeline in the northern region is suggested to bury in the frozen soil layer, if necessary, heat tapes are added in the surface of the pipeline to prevent the pipeline freeze or low temperature in the machine room.
- ⑦ Electrical connection methods for sewage pump:

The rear panel of the instrument has a sewage pump control power interface, which can directly control the opening of $\leq 550\text{w}$ sewage pump.

When the sewage pump power $> 550\text{w}$, AC relay with corresponding power should be added to the external of the instrument, controlling the connection by the sewage pump control interface in the rear panel, and controlling the open of sewage pump by controlling AC relay coils.

Note: high-power sewage pump (especially $\geq 750\text{w}$ sewage pump) can not be directly connected to the sewage pump control interface, otherwise, the fuse inside the instrument is easy to burn out. The sewage pump should be immersed in water as much as possible.

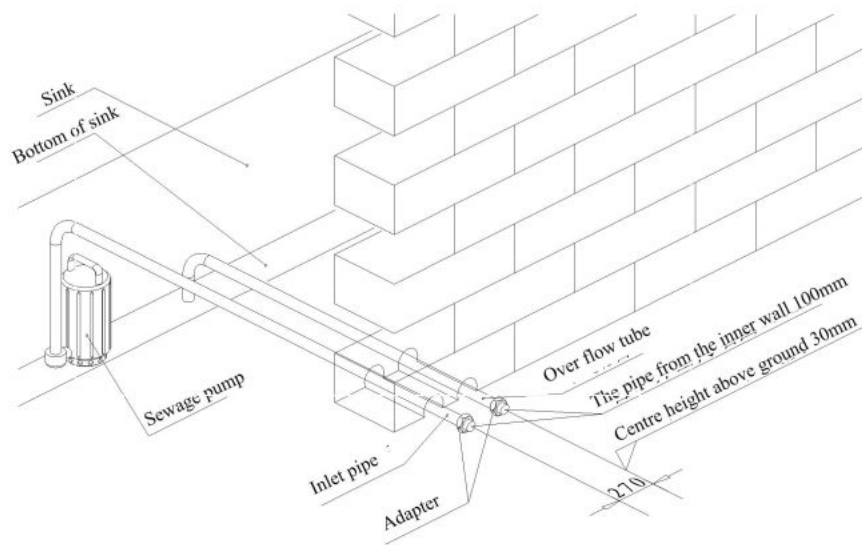


Fig. 4.5 Pipe installation diagram

Description: four pipes should be equipped when installation, four DN15, respectively used for water inlet, water outlet pipe, threading pipe and overflow pipe.

Name	Recommend caliber	Standard pipe	Recommended material
Water inlet	$\geq \text{DN15}$	$\geq 1/2''$	Rigid PVC or PP
Water outlet	$\geq \text{DN15}$	$\geq 1/2''$	Rigid PVC or PP
Threading pipe	$\geq \text{DN15}$	$\geq 1/2''$	Rigid PVC or PP
Overflow pipe	$\geq \text{DN15}$	$\geq 1/2''$	Rigid PVC or PP

4.2.3.2.3 Installation

Please refer to the following diagram for pipe installation. By adjusting the internal control valve and external control valve, so that the DN15 pipe flows smoothly, until the flow in sampling tube just overflows (but don't make the water pressure in sampling tube too large and spray).

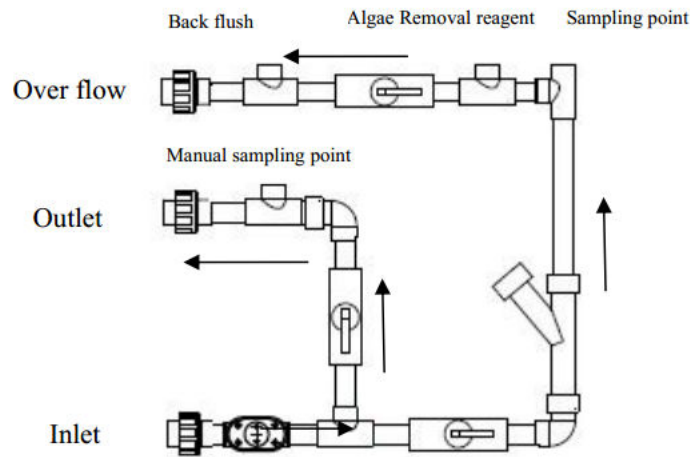


Fig. 4.6 The principle diagram of pipe installation

4.2.3.3 Electrical connection

The circuit connection of the instrument is mainly for the power line and submersible pump line connection. The instrument has been connected as shown in the figure before delivery, the power line and submersible pump power cord can be inserted into the corresponding sockets.

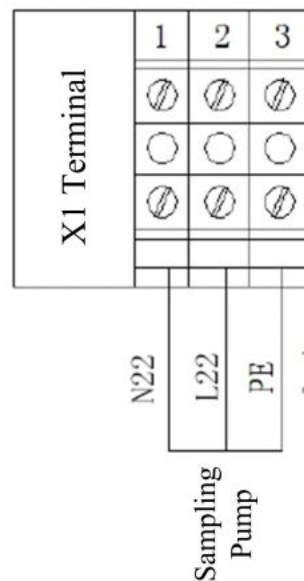


Fig. 4.7 Electric Wiring Diagram

Notes: After completing installation, please start up after standing 24 hours. You first check the fastening joints, please hand fastening if any loosening. Before starting, please check whether the peristaltic pump tube is installed smoothly. If it does not run for more than three days, please make the peristaltic tube loose.

5 Reagent



Danger! As a safety precaution, chemical reagents should be prepared by professionals. Please try to comply with the rules of special occupational labor protection and take the following protective measures:

Wear safety clothing (lab coat);

Wear safety eye patch/face mask;

Wear rubber gloves;

Solution should be prepared strictly in accordance with the configuration method, to prevent the production of crystals and affecting the measured value;


The whole dispensing process in this chapter can only use glass or PTFE material products.

5.1 Mercury Sulfate Solution (Reagent 1)

	Basic material	Demand quantity
A	Sulfuric acid 95-98% AR	100ml
B	Mercury sulfate(II) AR	25g

Configuration method:

Add 400ml distilled water to 1L measuring cup, stir with magnetic stirrer, carefully add 100 ml of matter A during the mixing, then add 25g mercury sulfate after solution is cooled, finally transfer into a thin glass bottle as standby after the reagent dissolves.



Danger warning:

Inhalation and skin contact and swallowing can cause severe poisoning.

With danger of cumulative effects.

Serious burns will be caused.

It is s very harmful to aquatic organisms, and may cause long-term adverse effects to the aquatic environment.

Emergency measures:

If the solution enters into your eyes, immediately rinse your eyes with plenty of water and seek medical advice.

If the solution is in contact with your skin, immediately rinse with plenty of water.

Wear suitable protective clothing, gloves and eye patch/face mask.

If there is an accident or you feel uncomfortable, please seek medical attention immediately.

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

5.2 Chromic Reagent Solution (Reagent2)

	Basic material	Demand quantity
A	Sulfuric acid 95-98% AR	100ml
B	Potassium dichromate AR	2.5g

Configuration method:

Add 350ml distilled water to 1L beaker, stir with magnetic stirrer, carefully add 100 ml of matter A during the mixing, stir until the solution is cooled to ambient temperature, then continue to stir and add 5g of material B, transfer into 500ml volumetric flask after potassium dichromate is completely dissolved, and shake up after constant volume with distilled water to the volumetric flask, finally store in a thin glass bottle as standby.



Danger warning:

Inhalation and skin contact and swallowing can cause severe poisoning.

With danger of cumulative effects.

Serious burns will be caused.

It is s very harmful to aquatic organisms, and may cause long-term adverse effects to the aquatic environment.

Emergency measures:

If the solution enters into your eyes, immediately rinse your eyes with plenty of water and seek

medical advice.


If the solution is in contact with your skin, immediately rinse with plenty of water.

Wear suitable protective clothing, gloves and eye patch/face mask.

If there is an accident or you feel uncomfortable, please seek medical attention immediately.

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

5.3 Silver Sulfate Solution (Reagent 3)

	Basic material	Demand quantity
A	Sulfuric acid 95-98% AR	1000ml
B	Silver sulfate AR	10g
Configuration method: Claim 2 piece of 5 grams of silver sulfate is added into a bottle of sulfuric acid (specifications: 95%-98%, 500ml/bottle), which can be used after being placed two days, shaking several times to promote the silver sulfate dissolved, so that the bottle concentration is uniform.		
 Danger warning: Skin contact and swallowing can cause serious burns.		
Emergency measures: If the solution enters into your eyes, immediately rinse your eyes with plenty of water and seek medical advice. If the solution is in contact with your skin, immediately rinse with plenty of water. Wear suitable protective clothing, gloves and eye patch/face mask. If there is an accident or you feel uncomfortable, please seek medical attention immediately.		

5.4 Sample 1 Standard Solution (0mg/L)

	Basic material	Demand quantity
A	Sulfuric acid 95-98% AR	1 ML

Configuration method:

The matter A is carefully added to 1000ml of distilled water, mix well and bottling for use.

5.5 Stock Solution for Standard Sample (1000mg/L)

	Basic material	Demand quantity
A	Sulfuric acid 95-98% AR	0.5ml
B	Potassium hydrogen phthalate AR	0.8502g

Configuration method:

Add 500ml distilled water to 1000ml beaker, carefully add matter A and matter B during the stirring, after being completely dissolved, transfer into 1000ml volumetric flask and constant volume, then mix and store in a glass bottle as standby. The COD value of the solution should be 1000mg/L, please put it in the 105 degrees oven for 2 hours before using potassium hydrogen phthalate.

5.6 Sample 2 Standard Solution (200mg/L)

COD concentration value used by the Instrument before delivery is 200mg/L, diluted by the above stock solution, the specific operation is as follows:

Taking 200 ml of COD standard sample stock solution (1000mg / L) with pipette into a 1000ml volumetric flask, diluting with distilled water to the volumetric flask marking, making it a 200mg/L standard solution. It is recommended to prepare when the instrument is calibrated.

5.7 The Use and Preservation of Reagents

5.7.1 Use: Use only in a well-ventilated place.

5.7.2 Preservation: protected from light. Store in the place where only professional or approved personnel can get.

5.8 Stability and Reactivity

The following reaction should be paid attention to when preparing the reagents: Reaction with organic matter. Reaction with alkali. Sudden thermal response after water adding.

Hazardous substances may produced when preparing the reagents: sulphur trioxide, mercury gas, chromium trioxide.

The effluent of the COD analyzer is corrosive, it must be processed by special disposal company.

5.9 The Placement of the Reagent

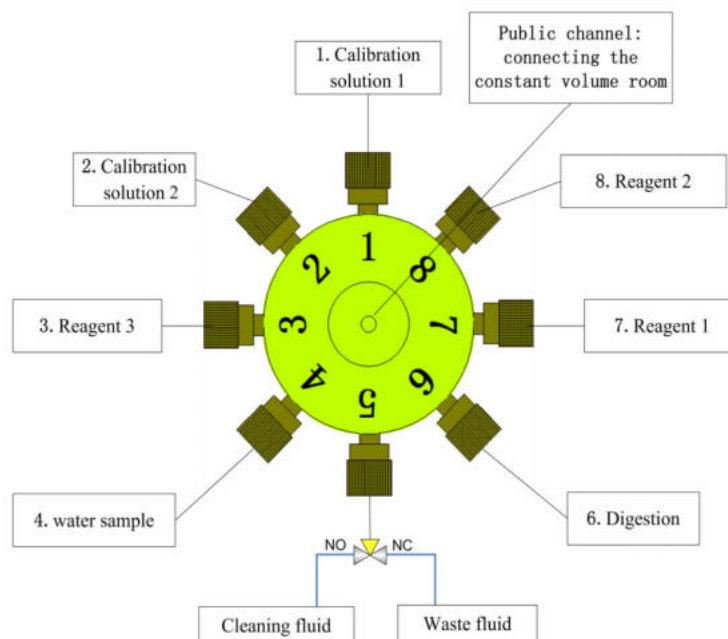
Just to be on the safe side, please place the reagent to the instrument according to the following requirements:

Wear safety clothing (lab coat);

Wear safety eye patch/face mask;

Wear rubber gloves;

Correspondingly place the reagent bottle according to the label on the hose or the figure below, pay special attention when pulling out or inserting the horse from the reagent bottle to prevent the hose shaking and making the toxic reagents on the hose wall splash to the surrounding objects. Remember to wipe away the splashed reagent droplets in time.



Standard solution 1:Distilled water

Standard solution 2:200mg/L

Reagent 1:Mercury sulfate

Reagent 2:Potassium dichromate

Reagent 3:Silver sulfate

5.10 Effluent Treatment

The effluent of the COD analyzer is corrosive and toxic, it must be processed by special disposal company or as the following method.

All the effluent is collected into a large capacity acid and alkali resistant wide mouth container. The ferrous sulphate is added in batches and stirred until the solution becomes green, and the end point could be indicated with a ferroin indicator. Then add a little excess. And then adjust the pH value in the 8 to 10 with sodium hydroxide, the addition of excessive sodium sulfide, stirring for a while, and then standing for separation, the supernatant can be directly discharged. The residue is filtered and then stored after being washed and dried.

6 Operation



Ensure that all reagent has been correctly placed in position when instrument starts.

6.1 Initialization

In the initial operation and after reagent replacement, the reagent concentration greatly fluctuates or the instrument is abnormal, or after the maintenance, when there is no reagent in all inlet tubes, it is generally necessary to perform this operation; When the instrument is decommissioned for more than 3 days, it is recommended that all the reagent inlet tubes are inserted into the distilled water and the operation is initiated to rinse the instrument.

When the instrument is in standby mode, enter the setting interface, start the "initial liquid" "start" button, and complete.

6.2 Calibration

The instrument performs a calibration procedure after it has been initially operated and initialized, or at the set calibration time.

In the instrument standby state, you can start the calibration process after entering the setup interface and the instrument clock reaches the set calibration time.

6.3 Measurement



Before measuring instrument, please ensure that the instrument has been performed initialization and calibration.

In the standby state, after entering the setting interface, starting the "measurement once" "start" can immediately start the measurement program; in the instrument standby state, the measurement program can be started when the instrument clock reaches the set sampling measurement time,

6.4 Touch Screen Introduction

The instrument adopts the industrial touch display technology, the user can both view the measurement data and set the parameters through this touch screen.

6.4.1 Data Setting Method

When you set or modify the parameters, lightly touch the data, the screen will automatically pop up an input keyboard, enter the corresponding number or letter, press the Enter key, the data is modified. When data is entered incorrectly, re-enter it.

6.4.2 Instruction Input and Effective Display

It is on state when the background of the button is blue, it is off state when the background is transparent, if the button is alternate type switch, that is, press a time for open, then press again for closing. Follow the prompts to go to the appropriate page.

6.4.3 Screen Operation

6.4.3.1 System Process

Instrument is turned on, the screen will automatically be transferred to system process.

CREATEC

COD_{Cr}-1400 Online Automatic Analyzer

Hebei Create Instrumentation Technologies CO., Ltd.

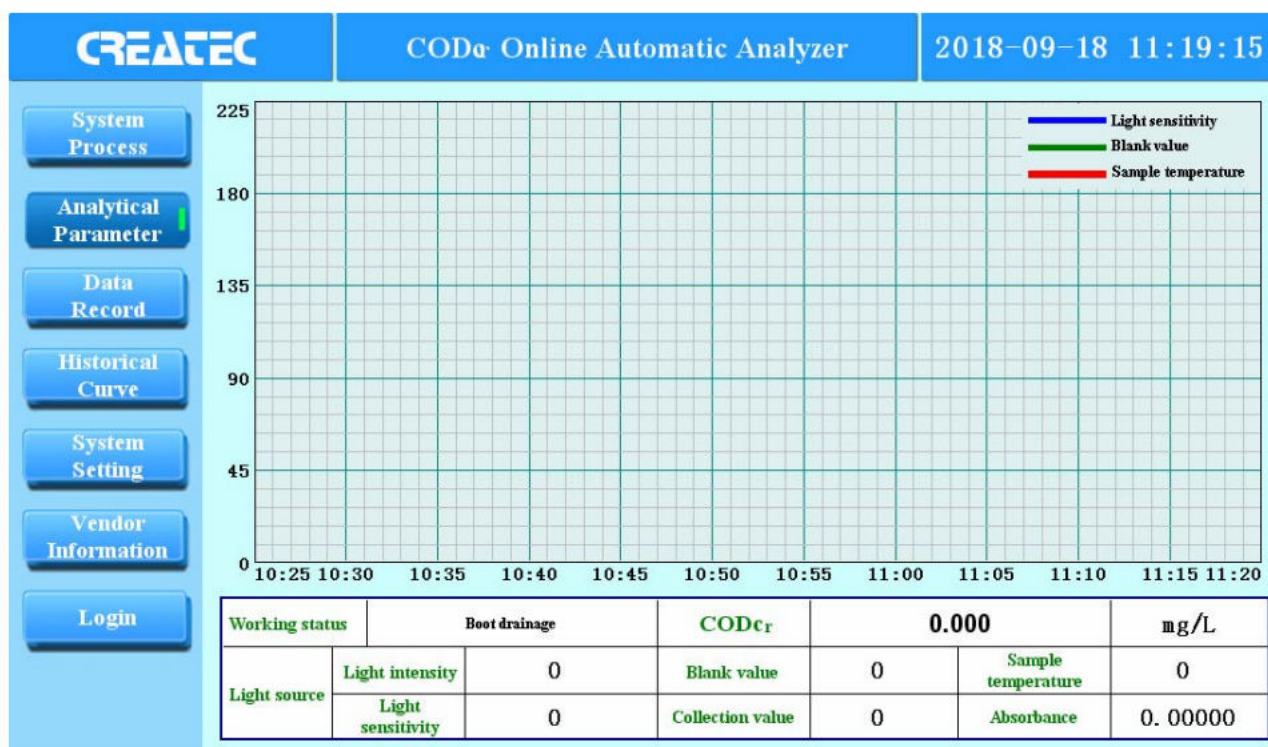
CREATEC CODE Online Automatic Analyzer 2018-11-23 10:20:04

System Process | **Analytical Parameter** | **Data Record** | **Historical Curve** | **System Setting** | **Vendor Information** | **Login**

Peristaltic pump, Algicide, Tap water, Sample water, Digestion colorimetry, Distilled water, Cleaning solution, Wastewater, **Pause**

Current state: **Boot drainage** **COD_{Cr} :** **0.000** **mg/L**

6.4.3.2 Analysis parameters



See the meaning of each parameter in the table below.

Name	Function
Work status	Showing the current step
Light intensity	Showing the current detecting light intensity
Light sensitivity	Showing the current signal strength detected by photoelectric sensor, shown in blue in the chart on the right side, detection range of 0 to 10.
Blank value	Showing the signal strength detected by electric sensor when completed the zero action, shown in green in the curve chart.
Collecting value	Showing the signal strength detected by electric sensor in the calculation of concentration absorbance.
Sample temperature	Showing the current detected sample temperature, shown in red in the curve chart.
Absorbance	Showing the absorbance value by completing the absorbance calculation.
COD _{Cr}	Showing concentration value by completing the concentration calculation.
Curve icon	Using red and green line represents the data change trend of light source and sensor.

6.4.3.3 Data recording

CREATEC COD_{cr} Online Automatic Analyzer 2018-09-18 11:22:33

NO.	Alarm Description	Alarm Value	Start Time
1	Multiple valve unit communication failure!	1	2018-09-18 11:22:33
2	Fixed capacity room communication failure!	1	2018-09-18 11:22:33
3	Measurement error!	1	2018-09-18 11:22:33
4	Digestion error!	1	2018-09-18 11:22:33
5	Analog input error!	1	2018-09-18 11:22:33
6	DIDO M error!	1	2018-09-18 11:22:33
7	Multiple valve unit communication failure!	1	2018-09-18 11:22:33
8	Fixed capacity room communication failure!	1	2018-09-18 11:22:33
9	Measurement error!	1	2018-09-18 11:22:33
10	Digestion error!	1	2018-09-18 11:22:33
11	Analog input error!	1	2018-09-18 11:22:33
12	DIDO M error!	1	2018-09-18 11:22:33
13	Digestion error!	1	2018-09-18 11:22:33
14	Analog input error!	1	2018-09-18 11:22:33

Time form: YYYY-MM-DD HH: MM: SS

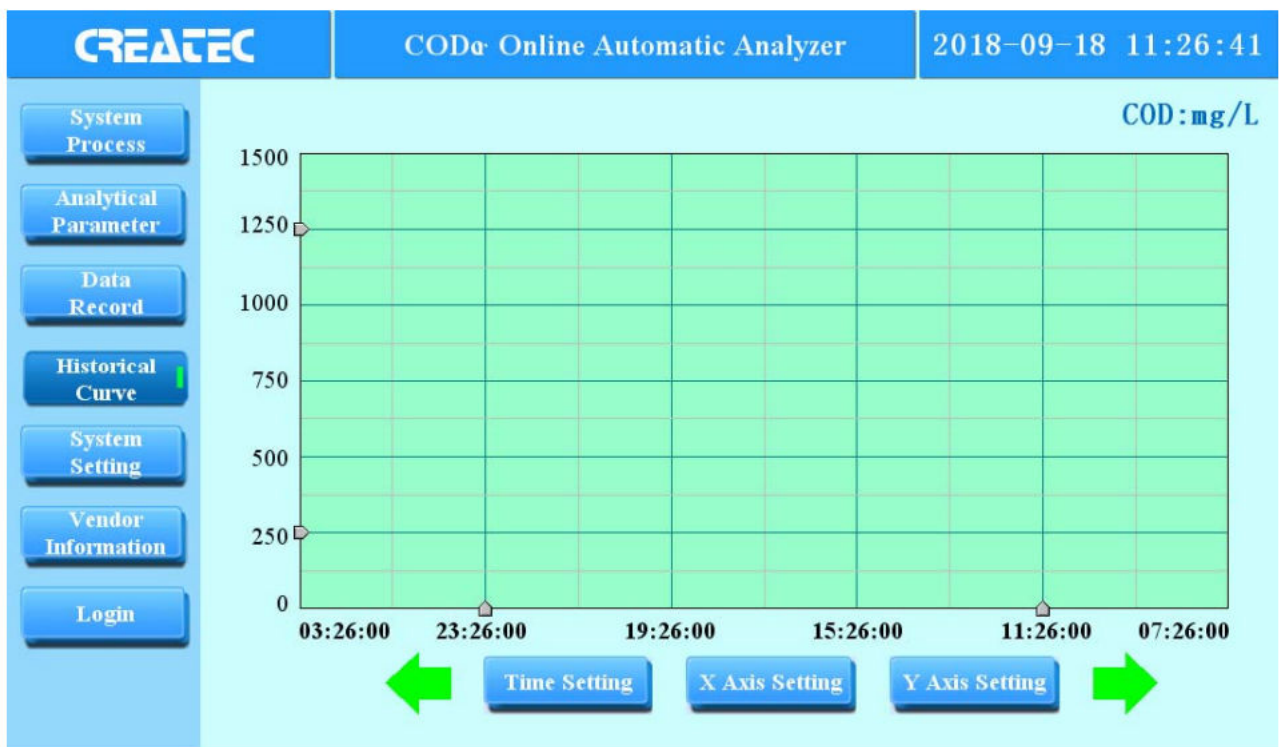
Start time: 2013-7-19 08: 30: 00

End time: 2013-7-19 08: 34: 00

Export selection:



System Log | Historical Record | Alarm Record | Alarm Confirmation | Data Export | Setting

6.4.3.4 Historical curve



Historical curve will intuitively show the fluctuation level of water sample.

6.4.3.5 System settings

CREATEC		COD _x Online Automatic Analyzer		2018-09-18 11:27:15	
<ul style="list-style-type: none"> System Process Analytical Parameter Data Record Historical Curve System Setting Vendor Information Login 		System Setting			
		Time Setting  2018 - 9 - 18  11 : 27 : 6 <input type="button" value="Confirm"/>		Display Setting <input type="button" value="Normally On"/> <input type="button" value="Delay Out"/> Delay time: 600 S <input type="button" value="中文"/> <input type="button" value="English"/> <input type="button" value="Confirm"/>	
		Communication Setting Communication way: <input type="button" value="Modbus"/> <input type="button" value="Wireless Mode"/> Communication address: 1 <input type="button" value="Confirm"/>		Inventory Cycle Inventory cycle: 10 S <input type="button" value="Confirm"/>	

You can change the time in the system settings, input the set time, and click on confirmation. When the time on the upper right is successfully modified, return to the main menu for other operation.

6.4.3.6 Parameter settings

Parameter setting appears after login.

6.4.3.6.1 Basic parameters

CREATEC		COD _x Online Automatic Analyzer		2018-11-23 10:47:02	
<ul style="list-style-type: none"> Basic Parameter Curve Calibration Measurement Setting Return 		Parameter Setting--Basic Parameter			
		Alarm Setting HH Ultra limit alarm: 9999 H High limit alarm: 9999 <input type="button" value="Confirm"/>		Function Setting High temperature protection: 180 °C Refrigerator selection: <input type="text"/> <input type="button" value="Confirm"/>	
		Range Selection Measurement range auto switch: <input checked="" type="checkbox"/> Range setting: Low chlorine low range ▼ <input type="button" value="Confirm"/>		Transmission Setting 4mA Corresponding value: 0.0 mg/L 20mA Corresponding value: 100.0 mg/L <input type="button" value="Confirm"/>	

There are three ranges to be selected for the instrument, and the range selection is effective only when the instrument is in the waiting state. Chlorine ion content of less than 1500 mg/L, COD value of (0-250) mg/L, please use the "low chlorine low range" function; Chloride ion content of higher than 1500 mg / L, but less than 4000 mg/L, COD value of (250-1000) mg/L, please use the "low chlorine high range" function; Chloride ion content of greater than 4000mg/L, COD value of (250-1000) mg/L, please use the "high chlorine high range" function.

Automatic measuring range switch;For optional function, when the system is in standby mode, automatic switch of measuring range is selected. If the water sample exceeds the range selected, the measuring range will be automatically jumped and retested. After the completion of the test, the measuring range selection bar will become the measuring range after automatic jump.

High temperature protection function is to facilitate the control of heating temperature and to prevent temperature over the limit, it is generally set to 180 °C.

6.4.3.6.2 Curve calibration

Curve calibration is divided into automatic and manual calibration. You need to manually enter the Sample 2 concentration, and the Sample 1 concentration will automatically be calculated according to the concentration of 1 Sample. Automatic calibration is also divided into timing calibration and interval calibration, timing calibration needs to enter the month-day and hour-minute, the instrument will automatically start calibration reaching the set time. Interval calibration needs to input the interval time, for example, the instrument will automatically starts calibration when the last calibration time interval arrives. You need to manually select the calibration point for manual calibration, and select the next calibration point after calibration is completed.

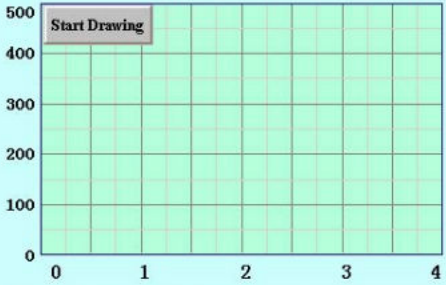
Parameter Setting--Curve Calibration

Calibration way:

Manual calibration:

Correction coefficient: Corrected value:

Calibration result: a=
 b=
 r=



Calibration point	Liquid concentration	Absorbance
Zero point	0.0 mg/L	0.00000
Standard sample 1	0.0 mg/L	0.00000
Standard sample 2	0.0 mg/L	0.00000

Name	Function
a	The slope of calibration curve
b	The intercept of calibration curve
r	The correlation coefficient of calibration curve
Begin to draw	Calculation of the calibration curve based on the input concentration and absorbance value, and drawing the calibration curve in the curve of the window

Instrument display value=Actual measurement value×Correction coefficient+Corrected value.

6.4.3.6.3 Measurement setting

The measurement setting is divided into automatic measurement and manual measurement.

Automatic measurement can be divided into the hourly and interval measurement. If choosing interval measurement, the instrument enters the standby mode after completion of a test cycle, and restart the next test after this parameter set time.

CREATEC COD_{cr} Online Automatic Analyzer 2018-09-18 11:31:45

Parameter Setting--Measurement

Digestion time: Minute

Measurement way: **Automatic Default** Manual Operation

Automatic measurement: **Hourly Measurement** Interval Measurement

Measurement interval: Minute

Hourly measurement:

CREATEC COD_{cr} Online Automatic Analyzer 2018-09-18 11:32:14

Parameter Setting--Measurement

Digestion time: Minute

Measurement way: **Automatic Default** **Manual Operation**

Automatic measurement: **Hourly Measurement** Interval Measurement

Measurement interval: Minute

Hourly measurement:

After choosing manual operation, the instrument automatically enters the manual operation interface, the instrument is in a state of commissioning test to separately debug test the parts on the equipment, under this condition, any automatic program on the instrument will not be able to start.

Basic Parameter

Curve Calibration

Measurement Setting

Return

Parameter Setting--Manual Measurement

Valve of sample 1: <input type="button" value="ON"/>	Valve of sample water: <input type="button" value="ON"/>	High-pressure valve: <input type="button" value="ON"/>
Valve of sample 2: <input type="button" value="ON"/>	Sampling pump: <input type="button" value="ON"/>	Triple valve: <input type="button" value="ON"/>
Valve of reagent 3: <input type="button" value="ON"/>	Peristaltic pump: <input type="button" value="Take out high level"/>	
Valve of reagent 2: <input type="button" value="ON"/>	Peristaltic pump: <input type="button" value="Take out low level"/>	
Valve of reagent 1: <input type="button" value="ON"/>	Peristaltic pump: <input type="button" value="Drain"/>	
Digestion: <input type="button" value="ON"/>	Cooling: <input type="button" value="ON"/>	Measure one time: <input type="button" value="Start"/>
Valve of wastewater: <input type="button" value="ON"/>	Heating: <input type="button" value="ON"/>	Initial liquid inlet: <input type="button" value="Start"/>

Manual and automatic measurement, only one is effective. After the end of the test by maintenance personnel, please be sure to select the "automatic default" state, otherwise the instrument will always be in the "manual" state.

When the instrument is de-energized, the instrument remains the state of power outage after power-on again, regardless of whether the instrument is in "manual operation" or "automatic default" before power outage.

In the "manual operation" state, you can manually select the corresponding valve position. All of the above eight valve positions, only one can be effective.

When you need to check whether a valve position is normal, you can generally choose the corresponding valve position, such as chromium reagent, and select "high level pumping" or "low level pumping" in the page to see if the corresponding reagent can be pumped smoothly; or start "drainage" to see if there is a very smooth bubble discharging in the corresponding reagent tube.

In the manual debugging test, it is strictly forbidden to extract mercury sulfate and silver sulfate, which will lead to the public pipeline crystallization plugging. The following cases are strictly prohibited:

Select "silver sulfate"—start "high level pumping" (low level pumping)—select "effluent valve"—start "drainage"—select "mercury sulfate"—start "high level pumping" (low level pumping)

The above operation, since the silver sulfate is left in the common pipe after the rapid reverse rotation, mercuric sulphate will be precipitated in the public pipe if absorbing mercuric sulfate at this time, and it

will be blocked in the case of severe.

The above operation is only one example, any of the above similar precipitation operation should be avoided.

The correct operation of the above example is to choose any reagent other than mercury sulfate after the fast reverse, first rinse the pipeline, and then select the mercury sulfate.

When there is residual liquid to manually empty in the system, perform the following cycle:

Manual operation——digestion valve——high level pumping——effluent valve selection after pump stop—— Open the three-way valve —— drainage —— Close the three-way valve —— digestion valve selection after pump stop

Repeat in this way,until emptying.

In manual mode, start the electric heating in this page, and check whether the heater is working correctly.

When there is no liquid in heating tube, it is forbidden to heat above 100 °C.

Heating time is from the set temperature, the heating and digestion time is generally set in 8 ~ 15min, for most water samples, the general time is 10min.

After initial loading reagent or replacing reagent, the need for initial liquid inlet.

6.4.3.7 Login password

CREATEC CODc Online Automatic Analyzer 2018-11-23 17:56:28

CREATEC 河北科瑞达仪器科技股份有限公司

System Process
Analytical Parameter
Data Record
Historical Curve
System Setting
Vendor Information
Login

User login [Close]

Please enter password:

1000

Logout Login

Add.: No.368 North Xinshi Road, Shijiazhuang, Hebei, China
Web: <http://www.createc.cn>
Phone: (86)0311-83056195/83056196

You can enter engineering user interface by inputting 1000.

The engineering user can perform "parameter setting" operation. Password can be changed in the current

interface after login.

The screenshot shows the CREATEC web interface. At the top, the logo 'CREATEC' is on the left, 'COD_{cr} Online Automatic Analyzer' is in the center, and the date and time '2018-09-18 11:43:08' are on the right. Below the header is a navigation menu with buttons for 'System Process', 'Analytical Parameter', 'Data Record', 'Historical Curve', 'System Setting', 'Parameter Setting', 'Vendor Information', and 'Logout'. The main content area features a background image of a building with the text 'CREATEC 河北科瑞达仪器科技股份有限公司'. Overlaid on this is a dialog box with two panes: 'User login' and 'Password Modification'. The 'User login' pane has a 'Please enter password:' label, a text input field containing '0000', and 'Logout' and 'Login' buttons. The 'Password Modification' pane has a 'Please enter password:' label, a text input field containing '1000', and a 'Confirm' button. Below the dialog box, the address 'Add.: No.368 North Xinshi Road, Shijiazhuang, Hebei, China', website 'Web: http://www.createc.cn', and phone number 'Phone: (86)0311-83056195/83056196' are listed, along with a QR code.

6.4.3.8 Vendor Information

The screenshot shows the 'Vendor Information' page of the CREATEC web interface. The header and navigation menu are identical to the previous screenshot. The main content area features a background image of the same building. Below the image, the address 'Add.: No.368 North Xinshi Road, Shijiazhuang, Hebei, China', website 'Web: http://www.createc.cn', and phone number 'Phone: (86)0311-83056195/83056196' are listed, along with a QR code.

7 Trouble Shooting

The instrument will be buzzing alarm for abnormality, and interrupt all running programs, and then reset after the exclusion of equipment failure, the instrument can resume normal operation.

Symptom	Possible causes	Trouble shooting methods
Reagent 1 low level	No corresponding samples Pipeline air leakage	Supply the corresponding reagent
Reagent 2 low level		Replace the blocking pipeline or reconnect the leakage connector
Reagent 3 low level		Ensure 2 outlets of immersible pump smooth
Sample 1 low level		Check whether the peristaltic pump can work normally, when abnormal, please check the connection cables or replace the pump driver.
Sample 1 low level		Peristaltic pump driver connection is loose Peristaltic pump or pump pipe or corresponding drivers damage
No water flow alarm	Pipeline blockage Selector valve failure Circuit board breakdown	Check whether each channel of the selector valve is open, if it is blocked, please check whether the corresponding channel is blocked, if yes, please replace the selector valve, if not, please check the connection or replace the valve driver. Check or replace the circuit board relay
Fan error	Poor contact of the fan wire Cooling fan is bad Thermocouple or temperature transmitter damage Circuit board breakdown	Check whether the fan wire is loose Replace the fan Check or replace thermocouple, temperature transmitter Check or replace the circuit board
Liquid inlet/drainage error	Pipeline blockage (water suspended matter and silver sulfate solution are not completely dissolved) Selector valve failure Metering photoelectric fault Peristaltic pump and the corresponding accessories damage or loose connection circuit board is damaged, the electromagnetic valve is mismatched or damaged	Replace the blocking pipeline, replace the dissolved silver sulfate solution Check whether each channel of the selector valve is open, if it is blocked, please check whether the corresponding channel is blocked, if yes, please replace the selector valve, if not, please check the connection or replace the valve driver. Check whether the metering photoelectric signal is normal, or change the photoelectric metering devices

		<p>Check whether the peristaltic pump can work normally, when abnormal, please check the connection cables or replace the pump driver.</p> <p>Check or replace the circuit board, electromagnetic valve, etc</p>
Ultra high temperature limit alarm	<p>Heating ring damage or loose connection</p> <p>Thermocouple, temperature transmitter or A/D damage</p>	<p>Check heating ring and connection, replace the heater when there is a problem</p> <p>Check or replace thermocouple, temperature transmitter, etc</p>
Photoelectric abnormality	<p>Power outage and restart, PC screen shows measuring faults</p> <p>Measuring photoelectric system damage or loose connection</p> <p>Metering photoelectric system damage or loose connection</p>	<p>Check the lines between photocell and light source in measuring part or replace the board</p> <p>Check if all the photoelectric signal is normal</p> <p>Check the devices and connection of the abnormal photoelectric circuit</p>
Great fluctuation in measurement data	<p>Large temperature fluctuations</p> <p>High ambient temperature</p> <p>Unstable heating temperature</p> <p>Reagent pollution</p> <p>Other hardware failure</p>	<p>Install air-conditioner</p> <p>Reconnect, replace temperature transmitter or heater</p> <p>Replace reagent</p> <p>Contact the maintenance department</p>

8 Daily Maintenance

8.1 Regularly check and add all reagents.

8.2 Regularly check the waste liquid stock in the bottle and promptly remove, do not cause waste overflow.

8.3 Regularly check the submersible pump inlet and outlet and ensure the smooth.

8.4 Regularly check the clean degree of the metering tube.

8.5 Reagents preparation must be in accordance with the instructions of the configuration method, otherwise it may produce black insoluble crystal in the heater, or cause equipment pipeline blockage in severe case.

8.6 If the instrument is not used for more than three days, please separate each line from the reagent and rinse it.

8.7 Consumables

Consumable Items	Time
Reagent	12 times /24h/1month
Peristaltic pump hose	1-3 months