SILICA/PHOSPHATE ANALYZER

INSTRUCTION MANUAL

January 2009

TO THE READER:

The information contained in this manual is the most up-to-date information available when printed. Maybe your manual is a version out of date if any inconformity between the manual and the practical performance is found. In this case, please contact our company or local agency.

If used not complying with the specified instruction and requirement, the normal quality shall be damaged.

Our company reserves the right to amend or change the software and hardware of the instrument specified in this manual.

Thank you for your cooperation.

Content

1 Safety instruction

Please read this manual completely and carefully before unpacking, installation or operation. Give special attention to parts marked “danger” and “warning”, otherwise serious injury or damage will be incurred to the operators or the instrument.

To avoid any damage of this instrument, do use and install the instrument in accordance with this manual.

About dangerous information:

Due to various dangerous situations, this manual uses marks (danger, warning and note) to indicate different dangerous situations.

Danger:

Indicating a potential or critical hazard situation which will result in serious injury and death if not avoided.

Warning:

Indicating a hazard situation may incur damage.

Note:

Information calls for special attention.

Danger

- Keep power off when connecting wires to avoid electric shock and confirm the required voltage grade to avoid any damage of the instruments.

- Do not change the internal setting. The company shall bear no responsibility incurred from authorized change.

- The humidity of the working environment shall not exceed the allowable value. Splash is forbidden to avoid internal short cut and damage of the instrument.

Warning

This instrument is only applied to 220V/50Hz power supply.

Turn off the power before internal inspection.

Do not pull the cable to avoid electrical shock due to damaged cable.

Note

Avoid shaky environment during installation and take easy daily inspection and maintenance into account.

Check the complete wiring connection and protection of the system periodically. Perform all necessary inspection to remove all potential faults.

Only authorized engineer or agencies of our company are entitled to repair the system only with components officially authorized by the factory. Any unauthorized repair may result in damage and injury, and also may incur invalidity of the quality guarantee, influence on normal operation, electrical integrity or CE standard.

2 Overview

This instrument is a wall-mounting type, including sampling system, unloading system, feeding system, measurement unit, analysis unit, and connections for external remote control and touch display.

3 Operating principle

3.1 Measuring principle

The Analyzer analyzes phosphate in water sample according to pre-set time interval. The whole process includes flushing, sampling, measuring, storing and displaying, all of which are completed under the control of microcontroller. The as-prepared solution will first be injected into measuring room through high precision pump and then fully mixed with water sample by the mixer inside the measuring room, during which the phosphate in water sample undergoes chemical reaction to form Molybdenum blue compounds with blue color. The concentration of phosphate is calculate based on the absorbance of monochromatic light that travels through the Molybdenum blue water sample recorded by the microcontroller.

3.2 Reagent and standard solution

Danger:
Do wear goggle and protective clothing when preparing the reagent.

Note:
Do comply with this manual to prepare reagent 1 and 2 with standard concentration.

4. Functions

The microcontroller mounted in the transducer is designed to handle the signal collection of measurement unit, calculation of sample water concentration, and to control washing, sample feeding, solution feeding, stirring, and unloading of waste, as well as control of human-machine interface, display of measurement information, system alarming, inspection of warning, sending alarming signal and supervision of photometer system.

Note:
The setting data is still saved in the microcomputer in case of shutdown or power-off.

Following functions are provided:

- Current channel process information
- Displaying final reading of each channel
- Reference of historic data, including table and curve chart
- Measurement range management
- System warning and alarming management
- Simulating output management
- Checking remaining reagent and standard solution and providing alarming on/off management automatically and manually.
- Recording measurement data automatically and graphic display of reading
- Calibrating reading based on standard calibration setting
- Setting of factory password of the system

4.1 Measurement and control

The user can set measurement range, current output, alarming setting and output within the allowable range.

4.2 Reliability of work and measurement

Once the concentration of phosphate in the sample water is more or less than the set measurement range, the alarming relay will send alarming signal and record the alarming information automatically.

Before analysis, the instrument will perform zero calibration automatically to compensate the error incurred from turbidity of sample water or stain of the measurement vessel. If the error exceeds the given factory setting value, the instrument will start alarming and stop analysis circle.

The instrument will automatically inspect remainder of reagent 1, 2 and standard solution. If lower than the warning line, the instrument will send warning sound to remind the user adding reagent or standard solution; if the flow of reagent or standard solution is stopped, the instrument will immediately stop measurement process and send alarming sound. The preset interval will be cancelled till the flow returning normal situation. Then the instrument will return normal measurement automatically.

> Note:
> The instrument shall save each alarming and warning information.

4.3 Information storage

After measuring, the instrument will save the measurement values (including channel number, concentration and time). The data will not loss even in case of shutdown or power-off. The period of validity of the data is about 10 years.

The instrument offers many setting functions, such as measurement range, output range, alarming range and sampling interval. The setting information will be permanently saved in the instruction even in case of shutdown or power-off.

5 Operation

Start automatic measuring after power-on

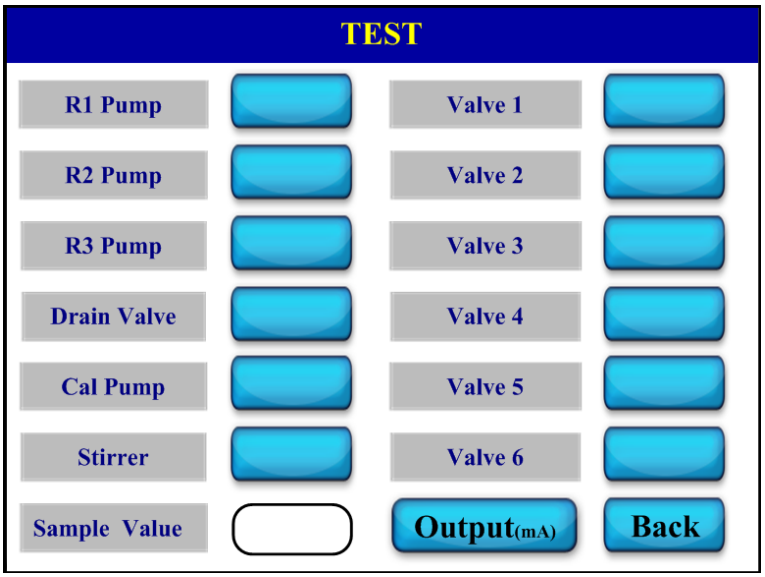
> Warning:
> Double check carefully whether the instrument is connected according to wiring drawing before power on.

5.1 Test

When testing pump, valve and mixer, the submenu shall be tested by the instrument.

5.1.1 Test of control and measurement

Menu of test:



Method to enter this menu:

Select TEST in MAIN MENU to enter menu of test

Note of status:

ON: start the device

OFF: shut off the device

Note of the device:

R1 Pump: Pump for reagent 1

R2 Pump: Pump for reagent 2

R3 Pump: Pump for reagent 3

Flush Pump: washing pump

Cal Pump: calibration pump

Stirrer: stirring pump

Sample Value: value measured by sensor

Valve 1: valve for water sample 1

Valve 2: valve for water sample 1

Valve 3: valve for water sample 1

Valve 4: valve for water sample 1

Valve 5: valve for water sample 1

Valve 6: valve for water sample 1

Functional buttons:

Output(mA): enter current output testing screen

Back: Return to previous menu, the main menu

Operation instructions:

Press the corresponding buttons behind the device to switch between ON/OFF state

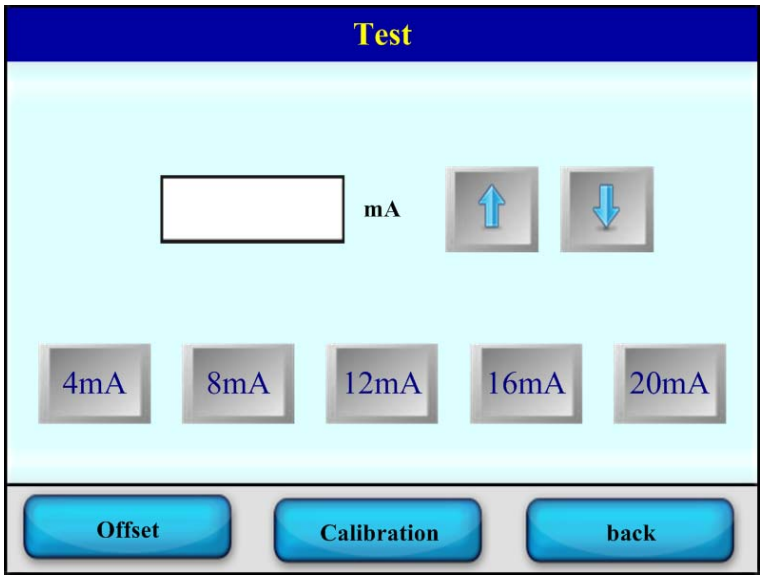
5.1.2 Test of current signal output module

Enter current output testing sub-menu to check whether the current output is correct.

Method to enter the menu:

Select “TEST” on Main Menu, enter “TEST” sub-menu, and then select “Output(mA)” into current output testing sub-menu.

Current output testing sub-menu:



Note of Parameters:

mA display/input box: displaying current output value, range: 4.00 – 20.00

Function buttons:

4mA: input shortcut button, directly enter 4.00mAb

8mA: input shortcut button, directly enter 8.00mA

12mA: input shortcut button, directly enter 12.00mA

16mA: input shortcut button, directly enter 16mA

20mA: input shortcut button, directly enter 20mA

↑: not available now

↓: not available now

Offset: Screen jumping function button, jump to current output offset setting sub-menu

Calibration: Screen Jumping function button, jump to current output calibration sub-menu

Back: Screen Jumping function button, return to previous menu

Operation instructions:

1) Directly press input shortcut button, input testing current value

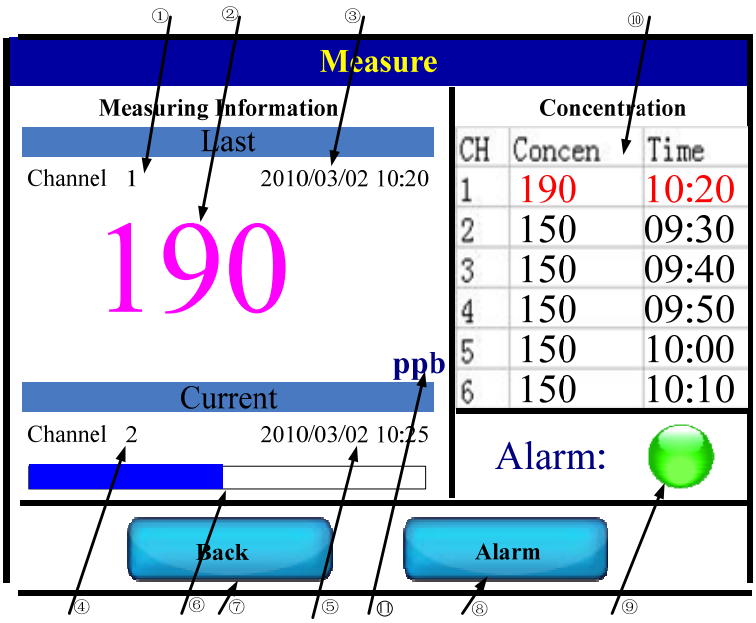
2） Select function button “↑”、“↓” to slightly tune output current value, 0.01 mA each step

3）Press current display/input box, automatically pop up keyboard, enter the current value, press “OK” to confirm, then press “back” to return to the current menu.

5.2 Measurement of instrument

Enter measurement state after setting the instrument

Main measurement screen:



Attention：If the menu is not used over 10 min, it will automatically return to measurement mode unless in the calibration and maintenance mode.

Note of parameters:

① water sample n（1～6）: the name of water sample completed in last cycle

②nominal water concentration: the concentration of water sample concentration measured in last cycle

③ time: the time when the measurement of last water sample ends

④ water sample n（1～6）: the number of water sample under measurement

⑤ time（YYYY/MM/DD HH:MM）: Current instrument system time

⑥Analyzing state: flushing, sampling, conditioning. Scroll bar shows the analysis process

⑦ Function button: return to previous menu, main menu

⑧ Function button: return to next menu, instrument alarming and warning information menu

⑨ instrument alarming and warning reminder light: Red when alarming and Green when no alarming.

When there is alarming information, reminder light serves as function button, press it to enter next instrument alarming and warning menu

⑩ data information: the latest measurement data information of 6 water samples

CH（1～6）: number of water sample

Concen: concentration of water sample, the default unit is ppb

Time: time of measurement; format: HH:MM

⑪ measurement unit

Operation instruction: Manual operation of this screen is not needed under normal circumstances. When alarming is on, press ⑨ alarming light to check and turn off alarming

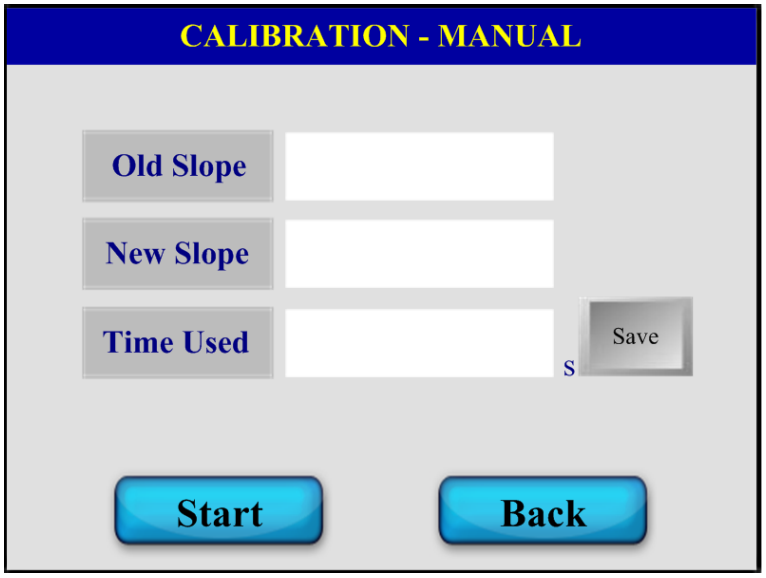
5.3 Calibration

Two types of calibration methods are provided: manual and automatic

5.3.1 Manual calibration

When manual calibration is needed for the instrument, enter manual calibration sub-menu

Manual calibration sub-menu:



Method to enter the menu:

Select “CALIBRATION” button on MAIN MENU, enter CALIBRATION menu and then select “Manual Calibration” button to enter Manual calibration sub-menu

Note of parameters:

Old Slope: last calibration slope

New Slope: slope after calibration

Time Used: time used for manual calibration. Unit: second

Function buttons:

Save: Save the slope of manual calibration

Start: Start manual calibration

Back: Return to previous menu

Operation Instruction:

1) First press function button “Start” to start manual calibration

2) Wait for the completion of manual calibration, parameter “New Slope” displays the slope after calibration; “Time Used” displays the time used for manual calibration

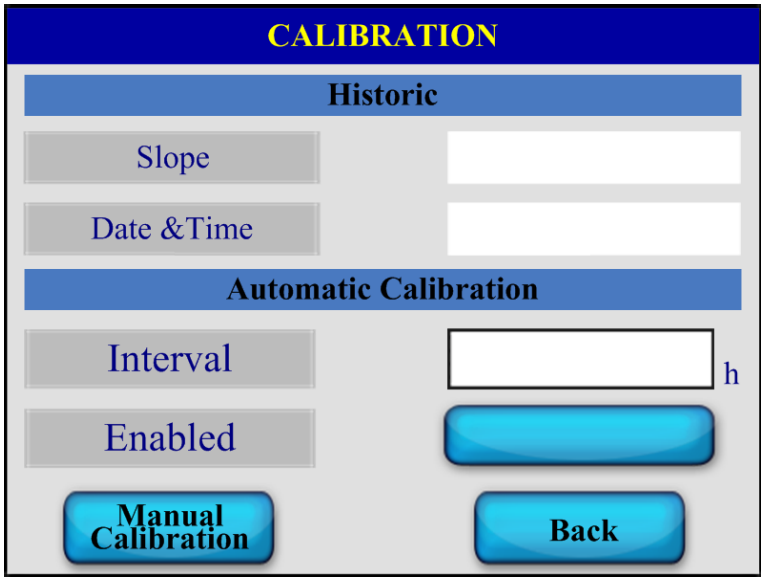
3）If you need to save the calibration data, press the “Save” button to confirm, otherwise it will not be saved.

5.3.2 Setting of automatic calibration

When automatic calibration is needed for the instrument, enter automatic calibration sub-menu

> Attention：After Enabling the automatic calibration setting, the instrument will be periodically calibrated according to the set automatic calibration time interval.

Automatic calibration setting sub-menu:



Method to enter the menu: Select “CALIBRATION” button to enter automatic calibration

setting sub-menu

Note of parameters:

Slope: last calibration slope

Date & Time: Date and time of last calibration

Interval: Automatic calibration time input box. Unit: hour

Enabled: Automatic calibration enabling button..

ON: automatic calibration on; OFF: automatic calibration off

Function buttons:

Manual Calibration: Enter manual calibration sub-menu

Back: Return to previous menu

Operation instructions:

1) Press parameter “Interval” input box, automatically pop up keyboard, input automatic calibration time interval, press “OK” to confirm, Press “Back” to return to current screen

2）Then press parameter “Enabled” right button to switch between ON/OFF states. ON: Turn on automatic calibration, OFF: Turn off automatic calibration

Automatic calibration sub-menu:

Method to enter the menu:

When automatic calibration is enabled, the instrument will automatically jump to automatic calibration sub-menu, users do not need to switch operations manually

Note of parameters:

Old Slope: last calibration slope

New Slope: slope after calibration

Time Used: time used for manual calibration. Unit: second

Function button:

Cancel: Cancel calibration

Operation instructions:

1) The instrument will automatically jump to automatic calibration sub-menu according to set automatic calibration time interval

2) Wait for the completion of manual calibration, parameter “New Slope” displays the slope after calibration; “Time Used” displays the time used for manual calibration

3）If users do not need this calibration or the calibration data, they have to press “Cancel” button before the completion of calibration, otherwise the calibration data will be saved.

5.4 Instruction setting

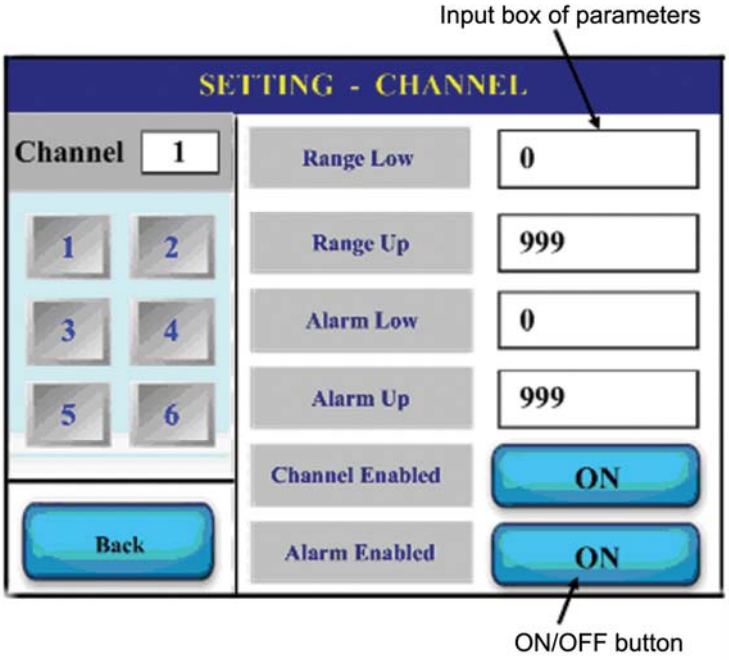
5.4.1 Setting of channel

When the measuring range, upper and lower alarming limit, alarming enabling, channel enabling of any or all channels need to be set, enter channel setting sub-menu to set values.

Channel setting sub-menu:

Method to enter the menu:

Select “Setting” button on MAIN MENU, enter SETTING sub-menu, select “Channel”



button to enter “SETTING - CHANNEL” sub-menu

Note of parameters:

Channel: number of channel n（1～6）, displaying currently set channel number

Range Low: Lower limit of measuring range. The unit must be ppb. For example, when the lower limit is 1 ppm, then input 1000ppb here.

Range Up: Upper limit of measuring range. The unit must be ppb

Alarm Low: Lower alarming limit. The unit must be ppb.

Alarm Up: Upper alarming limit. The unit must be ppb.

Channel Enabled: Channel enabling. ON: Turn on channel. OFF: Turn off channel.

Alarm Enabled: Alarm enabling. ON: Turn on Alarming. OFF: Turn off alarming.

Attention：
The measuring range must meet the relative size relationship with set lower and upper limits.

Attention：
All the units for lower and upper limits of measuring range and alarming are ppb. 1ppm=1000ppb

Function button:

1 ～ 6: number button

Back: Return to previous menu

Operation instructions:

1) First input the number of channel to be set by function number button n（1～6）.

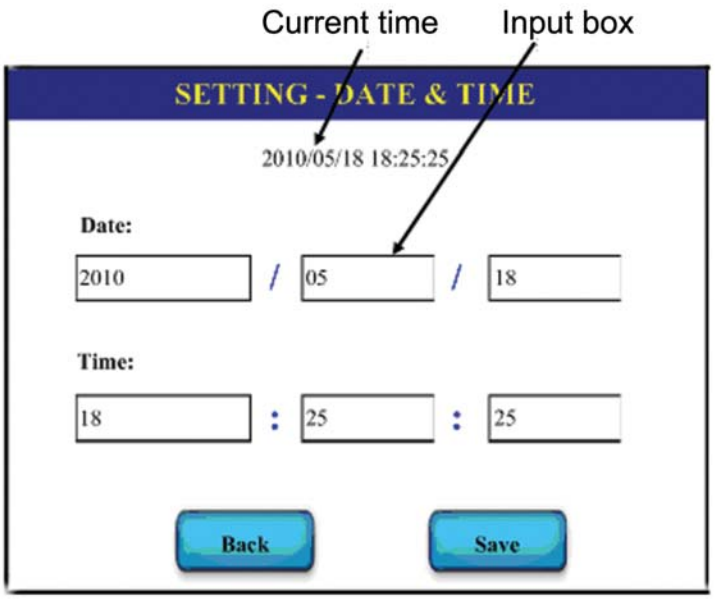
2)Then press parameter display/input box, automatically pop up keyboard, input corresponding parameter in the keyboard, press “OK” to confirm, press “Back” button to return to current menu.

3) Press “Channel Enabled” and “Alarm Enabled” to switch ON/OFF

5.4.2 Setting of time

When the date and time of instrument need to be set, enter date and time setting menu.

System date/time setting sub-menu



Method to enter the menu:

Select “SETTING” button in MAIN MENU, enter SETTING menu, Select “Date & Time” button to enter “SETTING – DATE & TIME” sub-menu.

Note of parameters:

Date: Setting Date input box, format YYYY/MM/DD

Time: Setting Time input box, format HH:MM:SS

Function button:

Save: save button, after finishing inputting system date and time, press this button to save the setting

Back: Return to previous menu

Operation instructions:

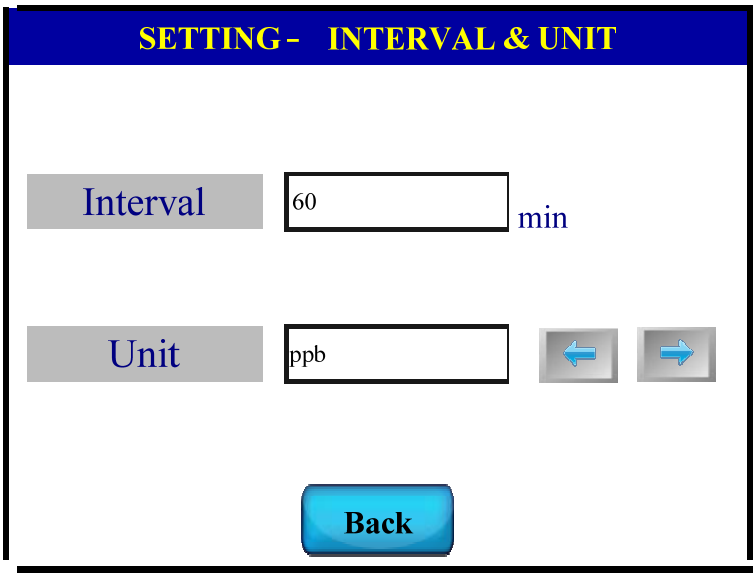
1) First press corresponding input box, automatically pop up keyboard, input corresponding parameter in the keyboard, press “OK” to confirm, press “Back” button to return to current menu.

2）After completion of inputting Date and Time parameters, press “Save” function button, setting successfully, otherwise the setting will not be saved.

5.4.3 Setting of measuring unit and sampling interval

When the measuring unit and sampling interval need to be set, enter this sub-menu.

Sampling interval and measuring unit setting sub-menu:



Method to enter the menu:

Select “SETTING” button on MAIN MENU, enter SETTING menu, selec “Interval & Unit” button, enter “SETTING – Interval & Unit” sub-menu。

Note of parameters:

Interval: Automatically sampling time interval input box. Unit: minute

Unit: Displaying measuring unit. Unit: ppb/ppm.

Function button:

Back: Return to previous menu

←: Left adjusting button. Adjust unit ppb/ppm

→: Right adjusting button. Adjust unit ppb/ppm

Operation instructions:

1)First press parameter Interval input box, automatically pop up keyboard, input corresponding parameter in the keyboard, press “OK” to confirm, press “Back” button to return to current menu. The instrument saves the setting automatically.

2）Press function buttons“←”and“→” to select parameter “Unit” ppb/ppm. The instrument saves the setting automatically.

5.5 Adding and renewing reagent

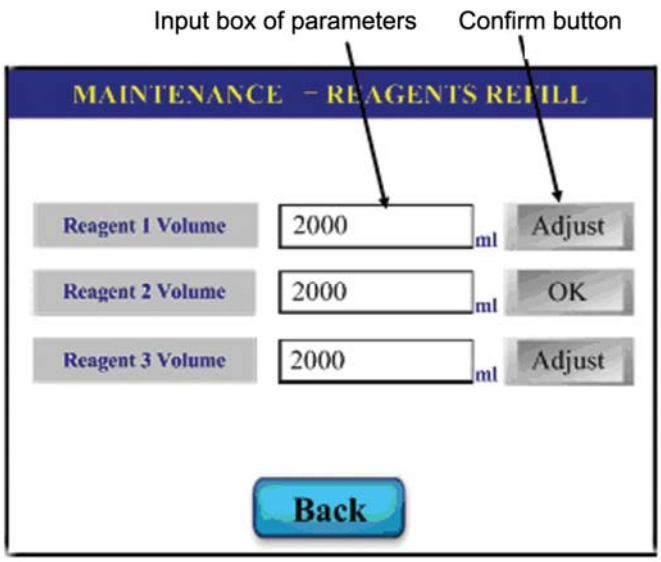
Enter this menu to renew reagent.

> Note:
> If the instrument is alarming, turn off measuring water sample channel before adding agent

Method to enter the menu:

Select “MAINTENANCE” on Main Menu, enter MAINTENANCE menu, Select” Reagents Refill” to enter “MAINTENANCE – REAGENTS REFILL” sub-menu。

Reagent renewing sub-menu:



Note of parameters:

Reagent 1 Volume: The volume of Reagent 1 to be added

Reagent 2 Volume: The volume of Reagent 2 to be added

Reagent 3 Volume: The volume of Reagent 3 to be added

Function button:

Adjust/OK: Reagent n Volume confirmation button , n（1 ～ 3)

Back: Return to previous menu.

Operation instructions:

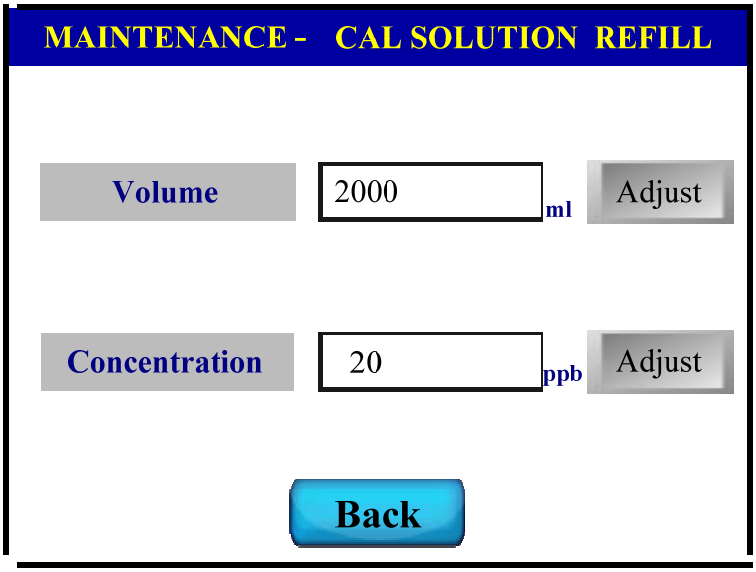
1)Adding reagent n（1～3）, press corresponding reagent adding volume box, automatically pop up keyboard, input adding volume(unit: mL), press “OK” to confirm, press “Back” to return to current menu.

2)Then press “Adjust” button, when it changes from “Adjust” to “OK”, the adding succeeds.

5.6 Adding and renewing standard solution

Enter standard solution renewing sub-menu to add/renew standard solution volume or to change standard solution concentration.

Standard solution renewing sub-menu:



Method to enter the menu:

Select “MAINTENANCE” on Main Menu, enter MAINTENANCE menu, Select” Cal Solution Refill” to enter “MAINTENANCE –CAL SOLUTION REFILL” standard solution renewing sub-menu。

Parameters:

Volume: Volume of standard solution renewed

Concentration: Concentration of Standard solution. Enter the concentration of standard solution if it changes.

> Note:
> The unit for the volume of standard solution renewed is mL.
> The unit for the concentration of standard solution renewed is ppb.

Function button:

Adjust/OK: Volume and Concentration confirmation button。

Back: return to previous menu

Operation instructions:

1) Adding reagent standard solution, press adding volume input box, automatically pop up keyboard, input adding volume(unit: mL), press “OK” to confirm, press “Back” to return to current menu.

2) Then press “Adjust” button, when it changes from “Adjust” to “OK”, the adding succeeds. Otherwise, the adding fails.

When the concentration of standard solution is changed and need to be renewed, operate as following:

1) Press concentration input box, automatically pop up keyboard, input concentration value（unit: ppb）, press “OK” to confirm, press “Back” to return to current menu.

2) Then press “Adjust” button, when it changes from “Adjust” to “OK”, the change of concentration succeeds. Otherwise, it fails.

5.7 Setting of offset

Enter offset setting sub-menu to set offset values of measuring data.

Offset setting sub-menu:

Method to enter the menu:

Select “MAINTENANCE” on Main Menu, enter MAINTENANCE menu, select “Factory” to enter “MAINTENANCE – FACTORY” offset setting sub-menu。

Parameters:

Offset: Offset input box

Operation instructions:

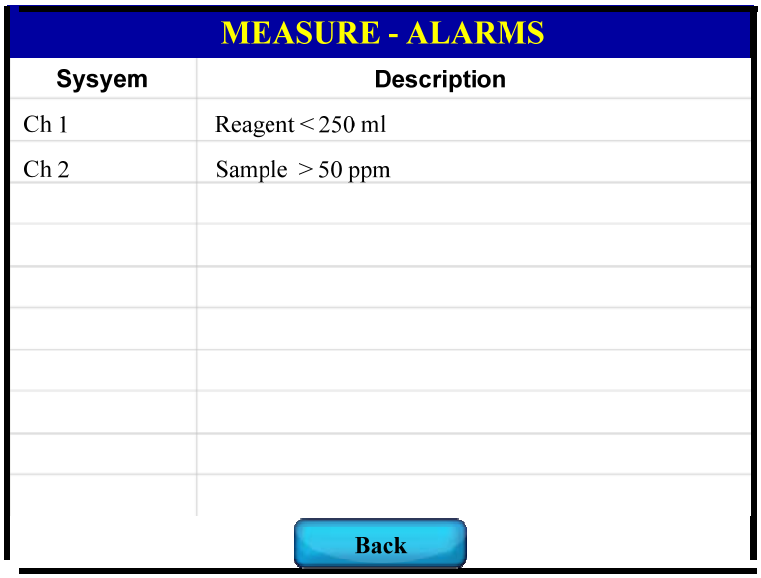
1) Press offset input box, automatically pop up keyboard, input offset value（with “+/-”）, press “OK” to confirm, press “Back” to return to current menu.

2) The data will be saved automatically and not be lost in case of instrument shut-down or power-off.

5.8 Review of alarming information

Enter alarming sub-menu to check alarming and warning information when the instrument is alarming during use.

Alarming information sub-menu:



Method to enter the menu:

Select “MEASURE” on Main Menu, enter MEASURE menu, select “Alarm” function button to enter “MEASURE – ALARMS” alarming viewing sub-menu.

> Note: When the instrument alarming is on, please check the alarming information and operate on time. Under the MEASURE page, directly press “Alarming information reminder light” to enter alarming viewing screen

Note of parameters:

System: Warning and alarming unit

Description: Description of warning and alarming

Function button:

Back: return to previous menu

Operation instructions:

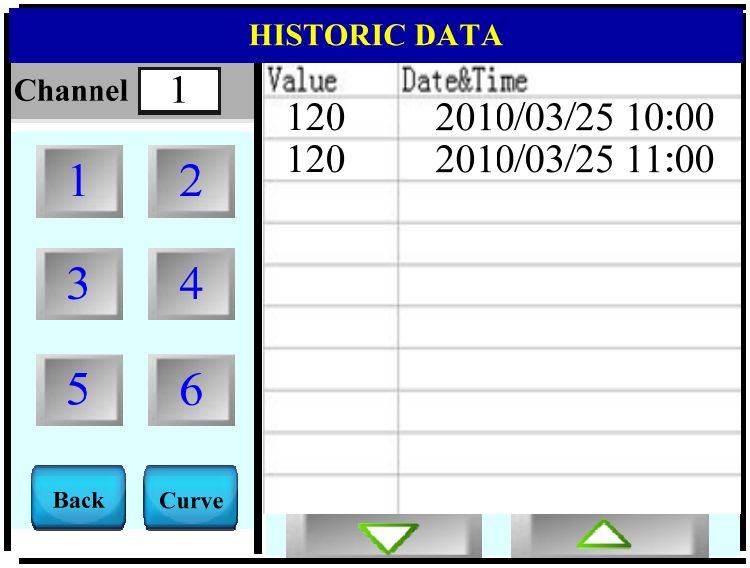
1) When the instrument is not alarming, directly press “Alarm” function button on MEASURE page to enter alarming viewing menu.

2）When the instrument is alarming on MEASURE page, press “Alarming information reminder light” to enter alarming viewing screen

5.9 Reference of historic data

Enter historic date sub-menu to view historic measuring data.

Historic data viewing sub-menu:



Method to enter the menu:

Select “HISTORIC DATA” on Main Menu, enter “HISTORIC DATA” sub-menu。

Note of parameters:

Channel: number of channel n（1 ～ 6）, showing the number of current viewing water sample.

Value: the concentration value of historic data, with unit of ppb

Date & Time: The time when the historic concentration data in the corresponding line was measured with the format of YYYY/MM/DD HH:MM

Function button:

1 ～ 6: Number button

Curve: Enter historic curve menu

↑: Page up

↓: Page down

Back: return to previous menu。

Operation instructions:

1) Select the number n（1 ～ 6）of water sample to be viewed through number button

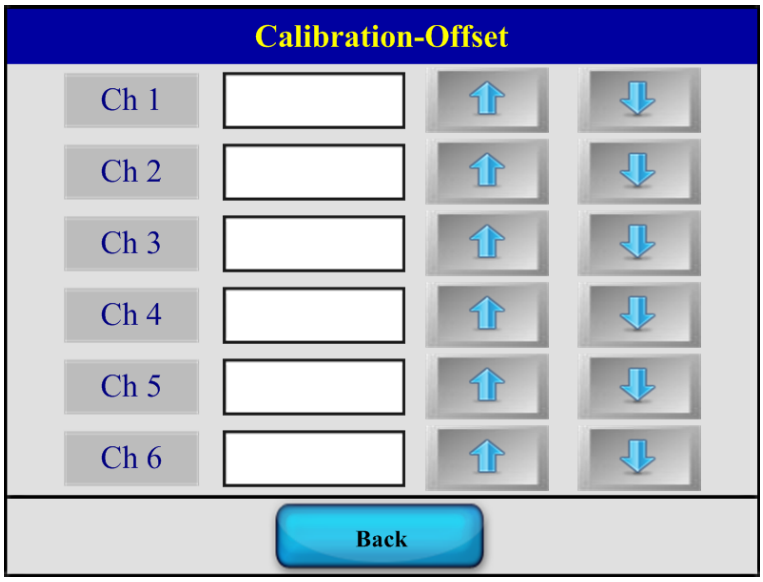
2) Press“↑” or“↓” button to view data page by page

3) Press “Curve” function button to view data curve of current channel.

5.10 adjustment of current output signal

Enter current output offset setting sub-menu when slight offset is needed for instrument current output.

Current output offset setting sub-menu:



Method to enter the menu:

1) Select “TEST” on Main Menu, Enter instrument “TEST” sub-menu；

2）Select “Output(mA)”, enter current output testing sub-menu；

3）Select “Offset”, enter keyboard;

4）input password, press “OK”；

5）After logging in, enter current output offset setting sub-menu “Calibration - Offset”.

Note of parameters:

Ch1: Offset value input/display box for channel 1

Ch2: Offset value input/display box for channel 2

Ch3: Offset value input/display box for channel 3

Ch4: Offset value input/display box for channel 4

Ch5: Offset value input/display box for channel 5

Ch6: Offset value input/display box for channel 6

Function button:

↑: Finely increasing offset button

↓: Finely decreasing offset button

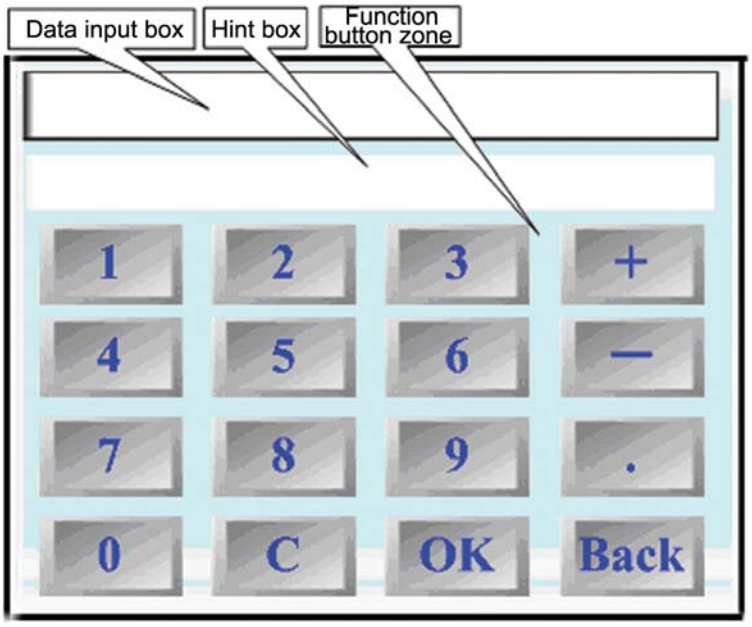
Operation instructions:

The default offset value is 0 at the beginning. Press finely tuning function button “↑” or “↓” to adjust the corresponding channel offset value with a tuning range of “-20~20”. Current signal output will make a real-time adjustment according to the change of offset value. Meanwhile, users can check whether the adjustment is done through measuring the current output using an ammeter. One unit change in offset corresponds to about 0.003 mA change of real current.

Note: The default offset value is 0 and not allowed to be modified arbitrary. It can only be operated by corresponding technicians.

5.11 Operation of keyboard

Keyboard:



Note of parameters:

Input box: display of inputting data

Hint box: Remind information, including parameters, range, significant number and so on

Function button:

“0 - 9”: Number and symbol button

“.”: Decimal point

“+”: Sign button, positive

“-”: Sign button, negative

C: Canceling button

OK: Confirming button

Back: Return button

Operation instructions:

1) Input data through number and symbol buttons according to hint.

2）Press “C” to cancel if typing wrong number, return to 1）to start over.

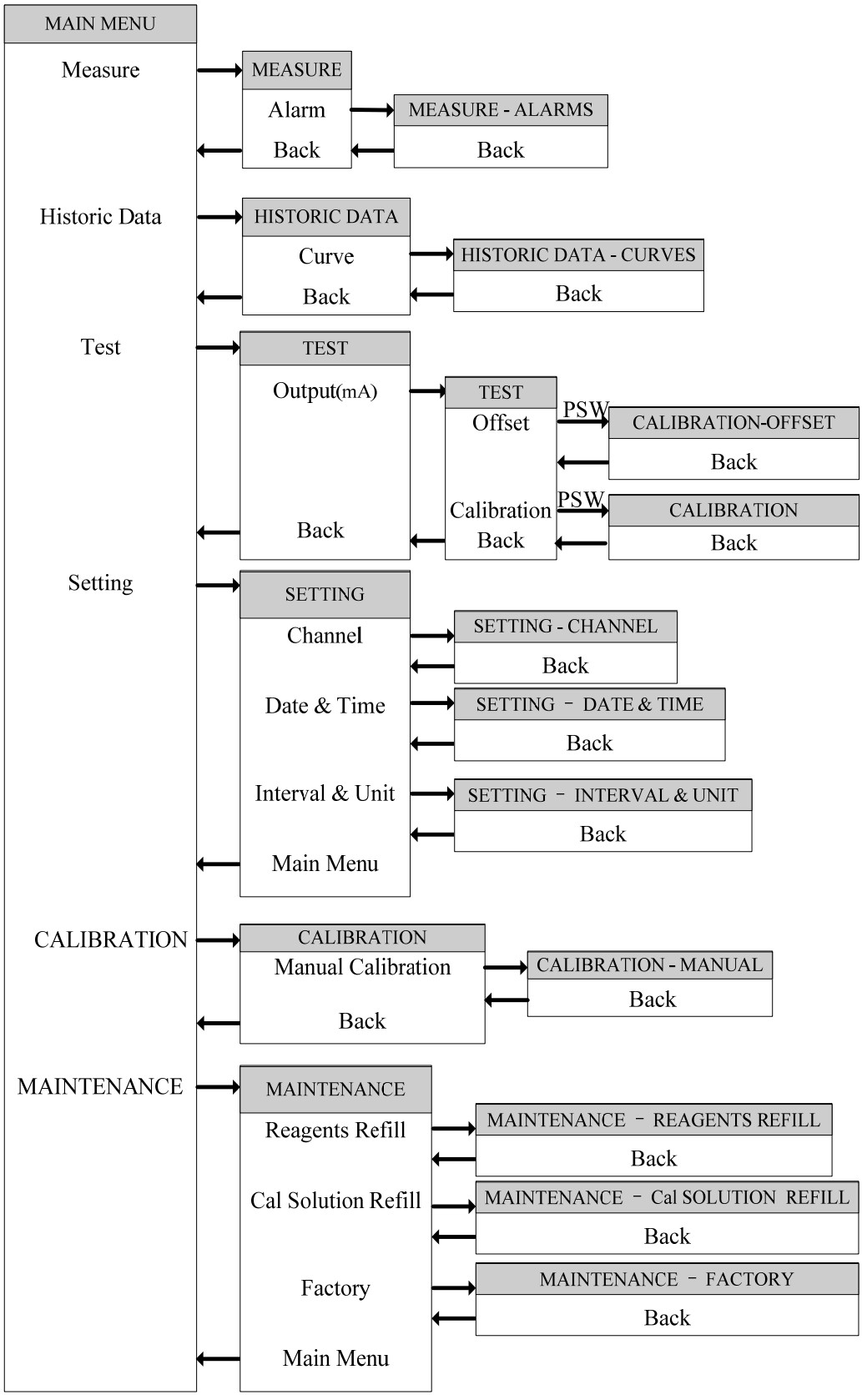
3）Press “OK” to confirm

4）If the hint shows the inputting is wrong, return to 1) to start over

5）If the hint shows “success!”, press “Back” button to return

Note:
1）When users need keyboard, just click parameter input box. The instrument will automatically pop up keyboard and provide hint, including type, range and significant figures of parameters;
2) The keyboard will hide the password input, that is, displaying “*”;
3）The device will automatically check the validity and accuracy of parameters set by users after they press “OK” button to save them . If the data is valid and accurate, the instrument will save it automatically. Otherwise, the instrument shows error and the data will not be saved this time.

6 Menu of human-machine interface


MAIN MENU
Measure
MEASURE
Alarm
Back
MEASURE - ALARMS
Back
Historic Data
HISTORIC DATA
Curve
Back
HISTORIC DATA - CURVES
Back
Test
TEST
Output(mA)
Back
TEST
Offset
Calibration
Back
PSW
CALIBRATION-OFFSET
Back
PSW
CALIBRATION
Back
Setting
SETTING
Channel
Date & Time
Interval & Unit
Main Menu
SETTING - CHANNEL
Back
SETTING - DATE & TIME
Back
SETTING - INTERVAL & UNIT
Back
CALIBRATION
CALIBRATION
Manual Calibration
Back
CALIBRATION - MANUAL
Back
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The display of the instrument adopts HMI true color touch screen human-machine interface method. The human-machine interface menu flow graph is shown as below.

human-machine interface (HMI) is in accordance with streamline operation method, with title reflecting content and button reflecting menu flow.

> Note:
> The flow graph offers function button for menu switch. The content displayed shall be reviewed in the menu.

7 Maintenance

7.1 Adding reagent

Set the instrument as test status before adding reagent. After adding, reset the volume parameter and make sure no bubble in the output pipe. Then return the instrument to automatic operating status.

7.2 Replacing pump line

In normal situation, replace once per half a year. Two pipes shall be replaced for each time.

Under test status, replace old pipe with new one. Close the pump shield. Make sure no bubble in the output pipe. Then return the instrument to automatic operating status.

7.3 Long term shutdown

If shutdown exceeds 1 week, we suggest the pipeline and measurement unit be cleaned.

1）prepared 250ml deionized water.

2）dip 2 reagent pipe in the beaker then flush them.

3）make all enabled channel OFF to stop the instrument.

4）choose “TEST” in MAIN MENU to clean each valve and pipeline

5）empty measurement unit

6）shut off the power

7）take the pipe out from the vessel

Note: Do note reverse the pipe.

When long-term shutdown exceeds 6 weeks, you should clean old reagent and prepare new reagent to restart.

7.4 Others

The instrument requires no special maintenance. Only clean with a non-corrosive soft cloth.

> Danger：
> Do not clean the wires and connections with wet cloth.

8 Specification

The instrument meets following standards:

- Anti-EMI EN 50082-2 and EN 50082-1
- Electromagnetic radiation EN 50081-1 and EN 50081-1
- Low voltage standard IEC 61010-1

Instrument analysis:

Measured value PO4-3: phosphate

Type	
Measurement range	0.01-9.99mg/l
Resolution	0.002mg/l
Accuracy	1% of full range
Repeatability	±0.02mg of measured value/l or 0.5% of full range
Sampling interval	１－９９ minutes
Analysis duration	About 10 min
Sample water consumption	25ｍＬ/ each analysis (excluding cleaning)
Reagent volume	500mLx2
Reagent consumption	About 3ml／hr

Sample water:

Number of channels 1～6

Measurement circle < 12min/channel

Sample water flowrate 15 ～ 20 L/h during sampling process

Sample water pressure 0.2 ～ 6 bar (3 ～ 87 psi, 2 ～ 60 kPa)

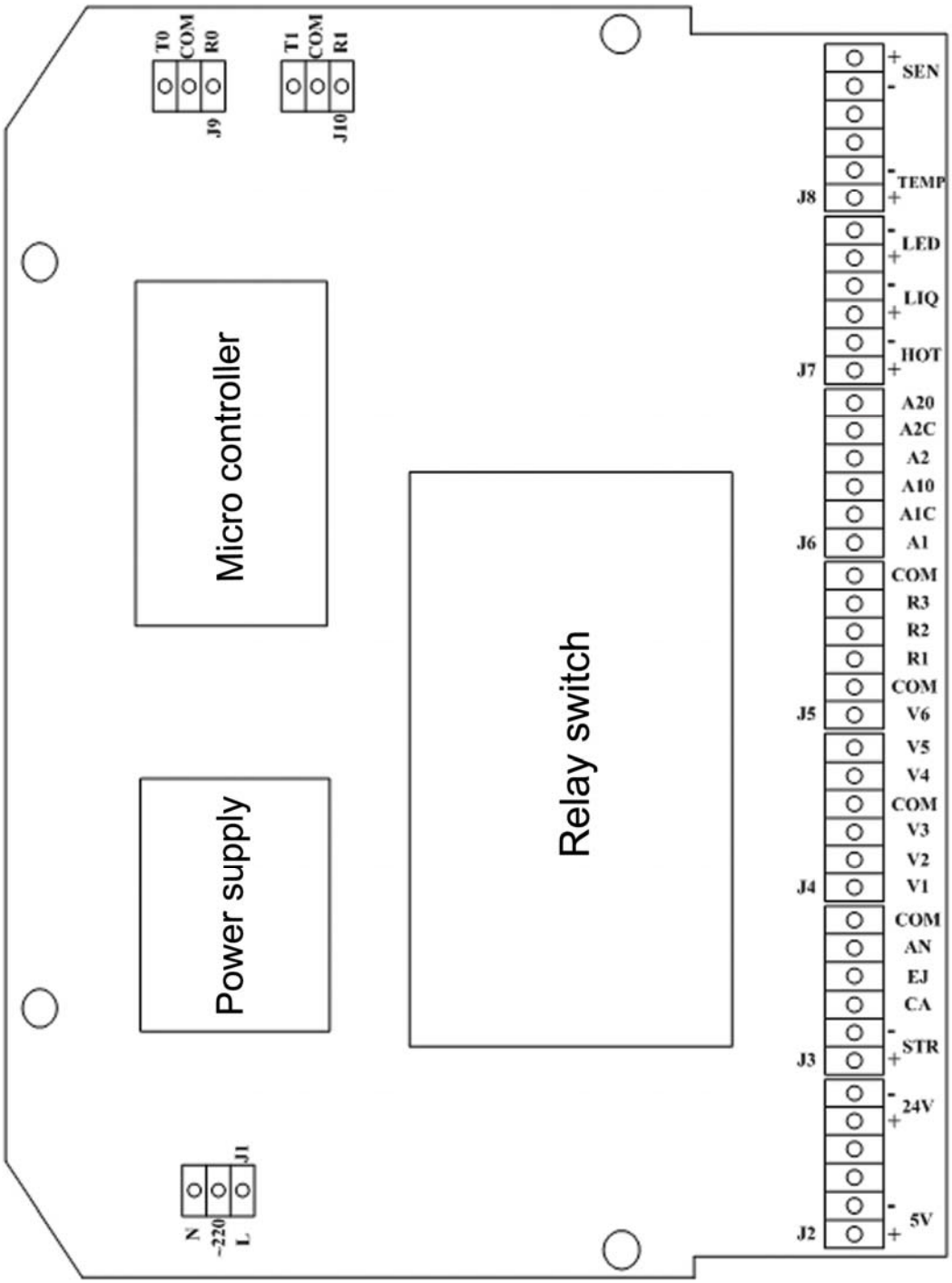
Sample water temperature 5 ～ 35 ºC

9 Technical data

Current output	0/4-20mA Max. load 500Ω
Display	touch human-machine interface
Relay	alarming ×1 contact capacity 230V/50Hz 1A
	Limit ×1contact capacity 230V/50Hz 1A
Power supply	230V/50Hz
Power	16VA
Medium temperature	5 ～35 Cº
Ambient temperature	-5 ～ 45 Cº
Height	≤ 2000m
Relative humidity	10 ～ 80%
Dimension	600×400×160（h×l×w, in cm）
Weight	about 10kg
Protection level	IP6
Power supply cable	1.5mm^2

10 Wiring instruction

10.1Wiring drawing of measurement display unit



J1: power port of the instrument, 220V/50Hz AC

J2: power port, 5V DC and 24V DC, give attention to positive and negative poles

J3: ports of stirring machine, calibration pump, unloading valve and feeding valve

+ STR –: ports of stirring machine

CA, COM: ports of calibration pump

EJ, COM: ports of unloading valve

AN, COM: ports of feeding valve

J4, J5: ports of multiple water sample valve and reagent pump

V1, COM: port of channel 1 water sample valve

V2, COM: port of channel 2 water sample valve

V3, COM: port of channel 3 water sample valve

V4, COM: port of channel 4 water sample valve

V5, COM: port of channel 5 water sample valve

V6, COM: port of channel 6 water sample valve

R1, COM: port of reagent pump 1

R2, COM: port of reagent pump 2

R3, COM: port of reagent pump 3

J6: output port of alarming relay

A1: public contact of system alarming relay

A1C: normally closed contact of system alarming relay

A1O: normally open contact of system alarming relay

A2: public contact of measurement alarming relay

A2C: normally closed contact of measurement alarming relay

A2O: normally open contact of measurement alarming relay

J7: sending port of photometer signal

+ Hot-, +LIQ- : preserved ports

+LED- : positive and negative ports of sending end

J8: receiving port of photometer signal

+Temp-: preserved port

-Sen+: positive and negative ports of receiving end

J9: port of touch screen

T1: sending port

COM: port of grounding lead

R1: receiving port

J10: connecting port of current signal plate

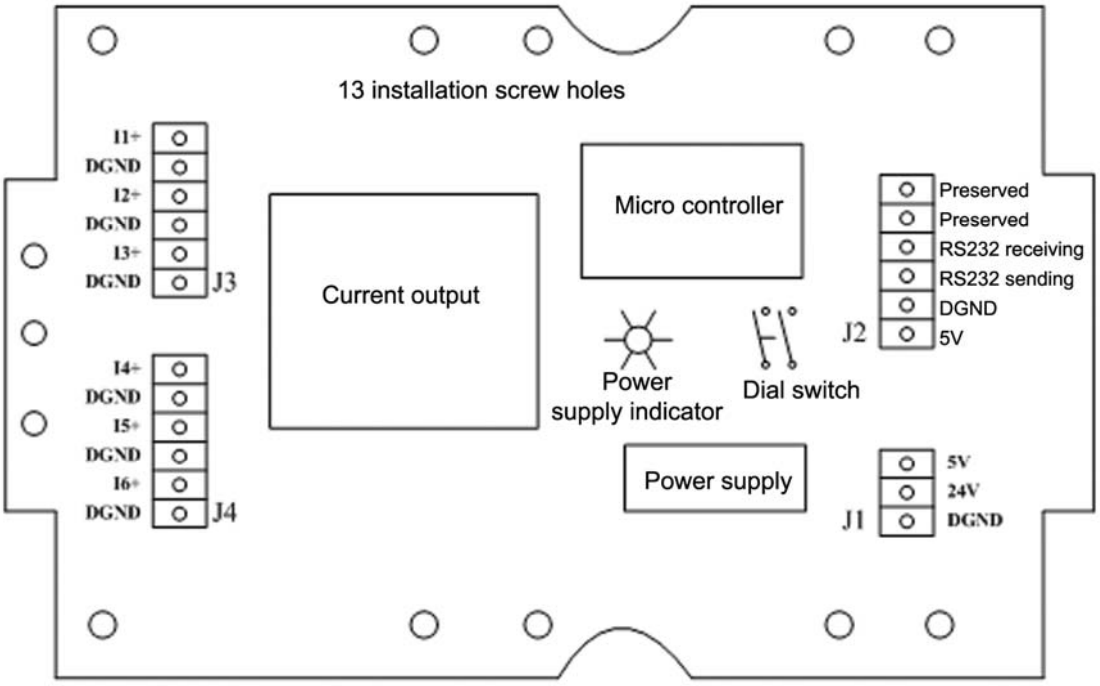
T1: sending port

COM: port of ground lead

R1: receiving port

10.2 Wiring drawing of current signal output plate

Wiring drawing of current signal output plate:



Wiring note:

Connector J1: 24V DC power supply, 5V DC power supply

Identification: （marked in PCB plate）

Pin1	Pin2	Pin3
DGND	24V	5V

Connector J2: 5V DC, RS232 ports

Identification: （marked in PCB plate）

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
5V	DGND	TO-PC RS232 sending	RO-PC RS232 receiving	Preserved	Preserved

Connector J3: current output of channel 1-3

Identification: （marked in PCB plate）

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6

I1+ Channel 1 output	DGND	I2+ Channel 2 output	DGND	I3+ Channel 3 output	DGND

Connector J4: current output of channel 4-5

Identification: （marked in PCB plate）

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
I4+ Channel 4 output	DGND	I5+ Channel 5 output	DGND	I6+ Channel 6 output	DGND

Note： read this manual carefully before using. The installation and commissioning of circuit board shall be performed by professional technicians. Do not use it in abnormal environment. Comply with installation instruction during wiring to avoid static damage. Do not plug or pull connector when power on.

11 Fault diagnosis

Problem	Issue	Solution
Start/stop	Instrument stops	System alarming: correct according to hint（refer to alarming information） Measuring enabled channel
	The main power is cut off	Connect the instrument with main power Check fuse
Pump	Can not run	Check the pump: start pump respectively under TEST menu and check the flowrate. Replace pump(refer to replacing pump of maintenance)
	Irregular operation	The instrument may stop running in the case of not cleaning pipeline. Add water during the pump is operating. Replace pump(refer to replacing pump of maintenance)
Pipeline	Defect pipeline	Replace pipeline
	Blocked pipeline	Replace pipeline
electromagnetic valve	Leakage	Take off, check and clean
	Can not open	Sticked spool. Take off and clean.
	Can not close	Sticked spring. Take off and clean.
Calibration	Pollution	Disassemble and clean
	Flow rate decreases	Check and adjust flowrate. Replace when pipeline is blocked.
	Wrong setting of standard solution concentration	Resetting
	Wrong concentration of the standard solution	Prepare new standard solution
	Wrong lab analysis of concentration of standard solution	Check PO4 concentration of lab standard solution
	Wrong, invalid or polluted chemical product	Wrong purity or new supplier or cleaning reagent bottle

Reagent	Wrong connection sequence of reagent bottle	Reorganize processes
	wrong connection of reagent pipe	Check flow chart
	Wrong concentration	Prepare new reagent
	Wrong, invalid or polluted chemical product	Wrong purity or new supplier or cleaning reagent bottle
	Wrong ratio when adding reagent	Check the operation of pump
	White deposit in reagent pipe（ANSA）	Clean the pipeline and embed it into ammonia water.