Technician Manual

Ver. 1.18

Automatic Chemistry Analyzer

DW-TC6090

DRAWELL

Artist of Science

Please read the manual before installation and operation.

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CONTENT

Chapter 1 Analyzer Introduction

1.1 System Structure

DW-TC6090 biochemistry analyzer is composed of analyzing module and operation unit.

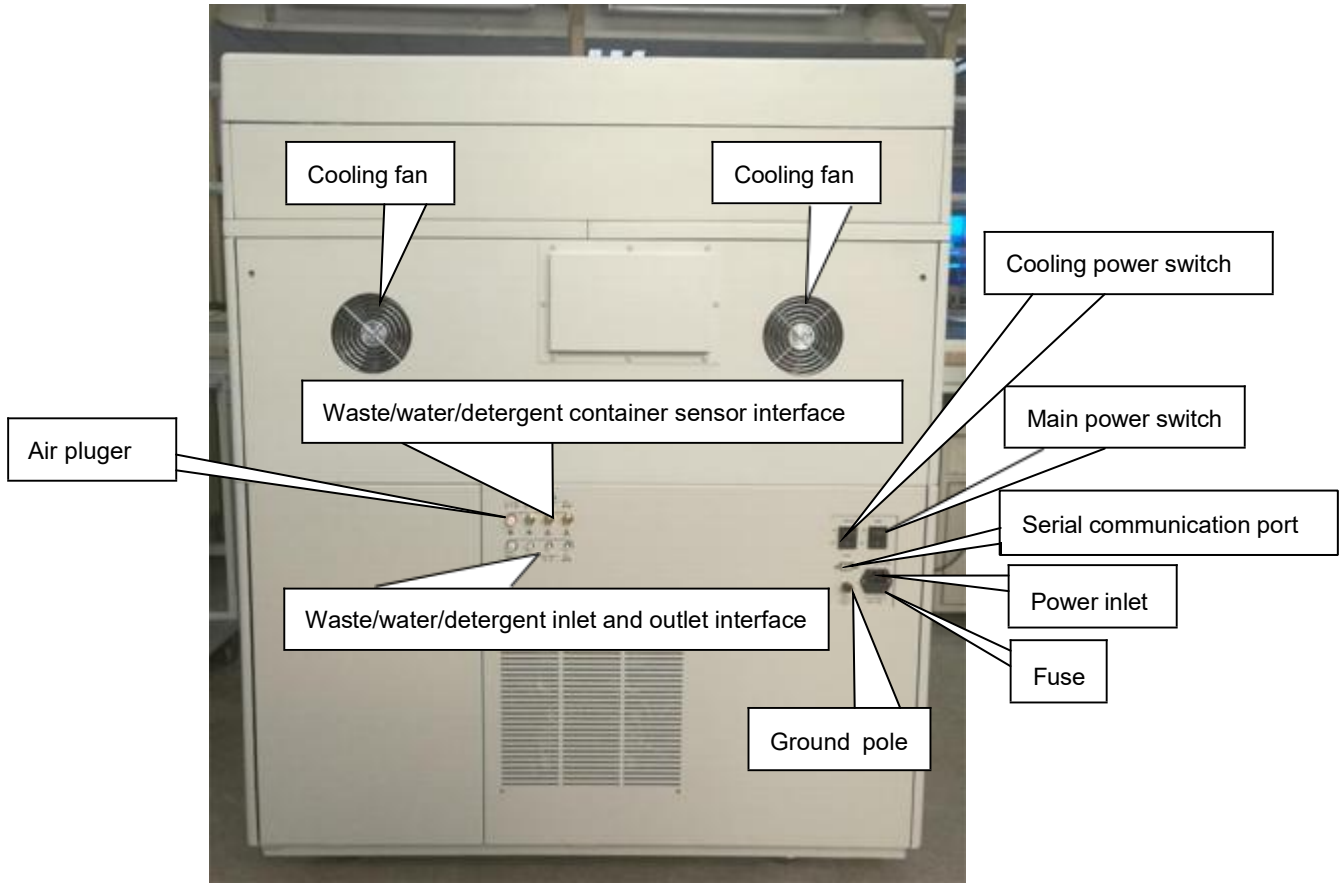
1.1.1Appearance pic of Analyzer

（Front view）

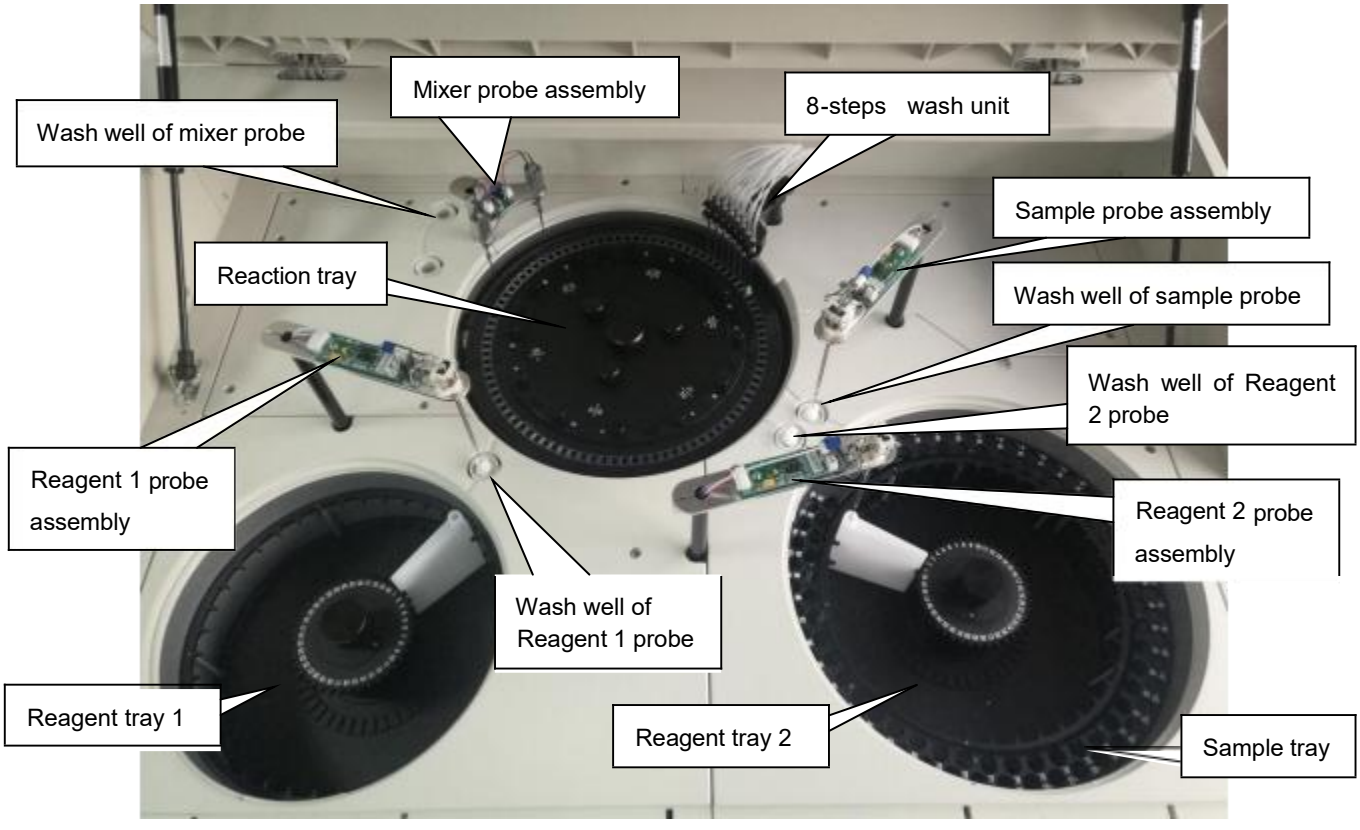
（Planform view of the closing analyzer"s upper cover）

(Left View)

（Right View）



(Rear View)

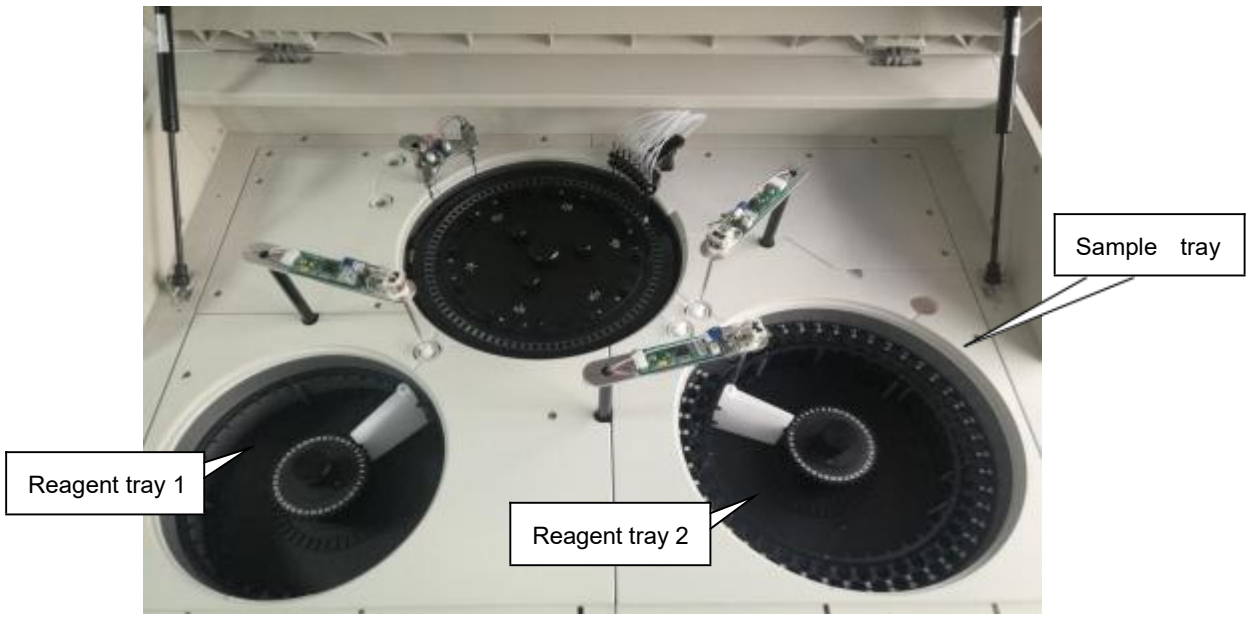


（Planform view of the opening analyzer"s upper cover）

1.1.2 Composition of Analyzer

DW-TC6090"s main units consists of sample tray assembly, reagent tray 1 assembly,reagent tray 2 assembly, reaction tray assembly, temperature control system, optics system etc.

1.1.2.1 Sample Tray Assembly And Reagent Tray Assembly



（Sample tray assembly and reagent tray assembly pic）

- Function and Composition

Sample tray assembly and reagent tray assembly including sample tray, reagent tray 1, reagent tray 2 ,sample and reagent dispenser system, mixer system and related mechanical parts.Their functions are that aspirate and dispense samples and reagents into cuvettes which are controlled by software.

Sample Tray

- Specification

There are 93 sample positions in sample tray. Our company supply one-off serum cup which the volume is 2ml.

Reagent Tray

- Specification

There are 40 reagent positions in both reagent tray 1 and reagent tray 2. Our company supply reagent bottle which the volume is 48ml.

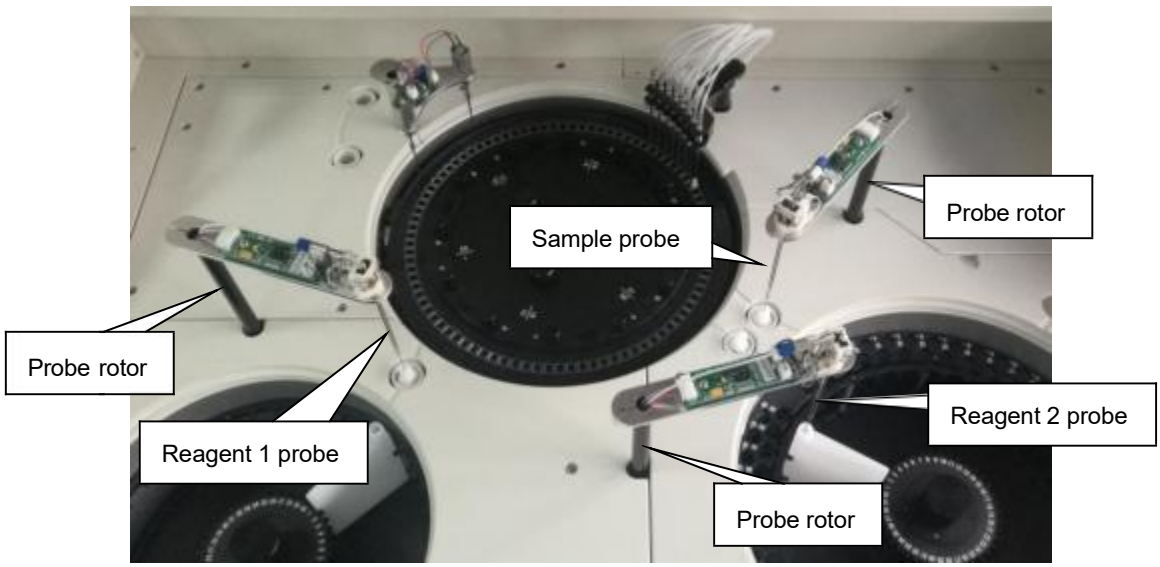
It must be noticed to make the bottom of reagent bottle on the same level with bottom of reagent tray ,don"t make different height .

⚠ Attention

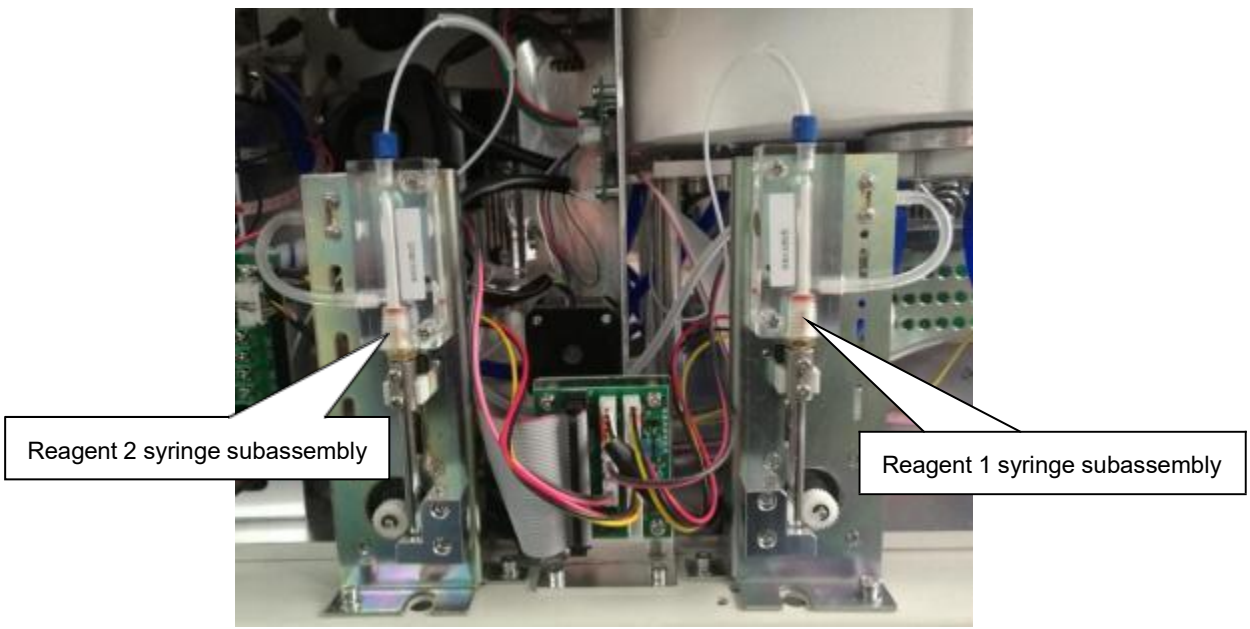
● Don"t load/unload sample cup or reagent bottle when the sample/reagent tray is running.

● Sample cup is one-off consumable. It can"t be reused.

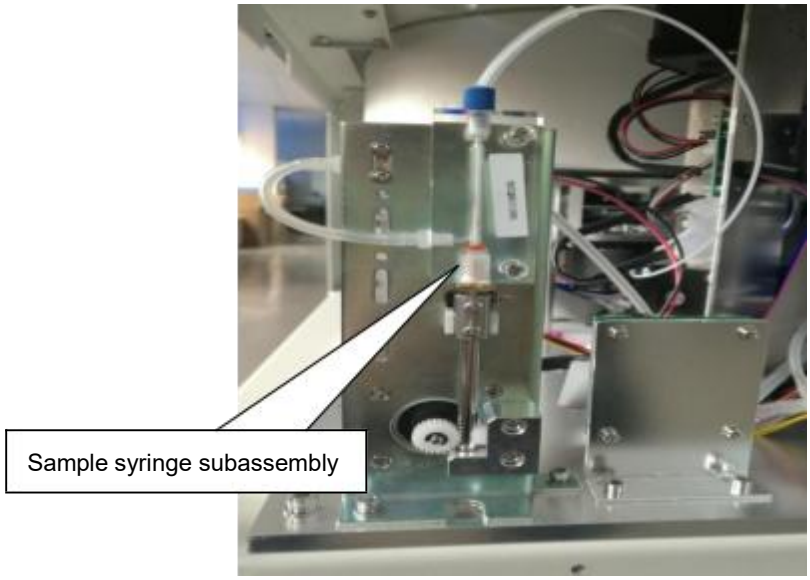
Sample/Reagent Dispenser System， Injection system



（Sample probe and reagent probe mechanical assembly pic）



（Reagent syringe assembly pic）



（Sample syringe assembly pic）

● Function and Composition

Sample and reagent dispenser system is consist of sample probe, reagent probe, rotor mechanical assembly, reagent syringe assembly, sample syringe assembly, carry sample or reagent to reaction cuvette.

● Specification

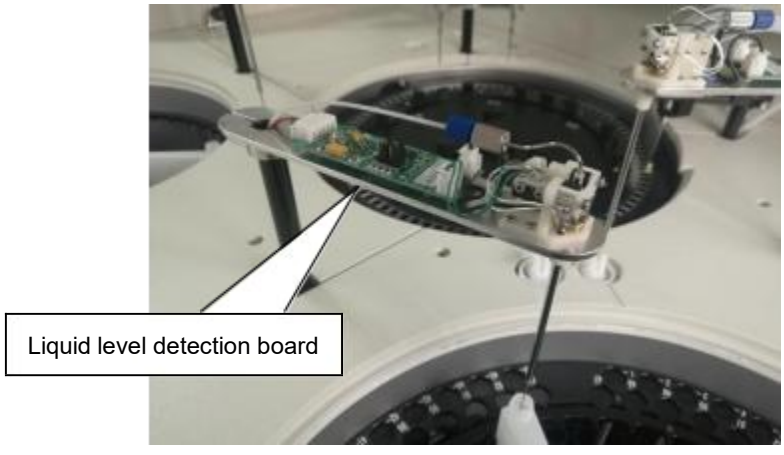
Sample volume range： 1~50ul.

Reagent volume range： 10~400ul.

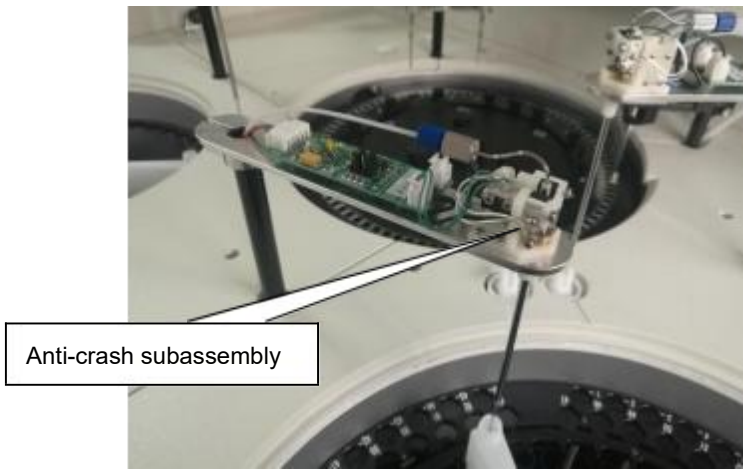
● Motion Specification

Sample/reagent dispenser mechanical system： it moves again and again with the sequence which is sample/reagent tray→reaction tray→wash well and finish adding sample or reagent into the reaction cuvette.

Liquid level detection： sample probe or reagent probe has auto liquid level detection function， it is suitable for different liquid level height sample or reagent.



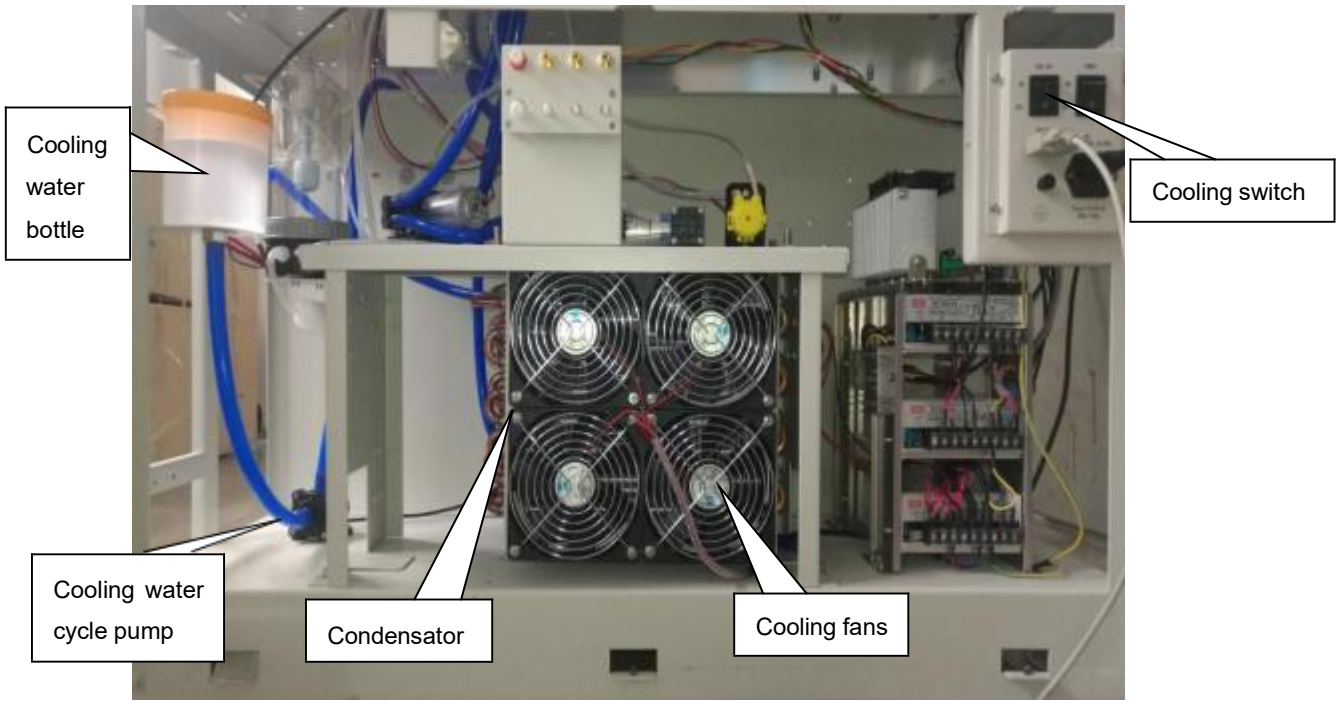
Crash protection (vertical & horizontal)： When the probe is crashed in horizontal or vertical direction,the system will alarm.



Reagent refrigeration system：

● Function

Reagent refrigeration system starts to work when the cooling switch is on .



Mixer System

● Function

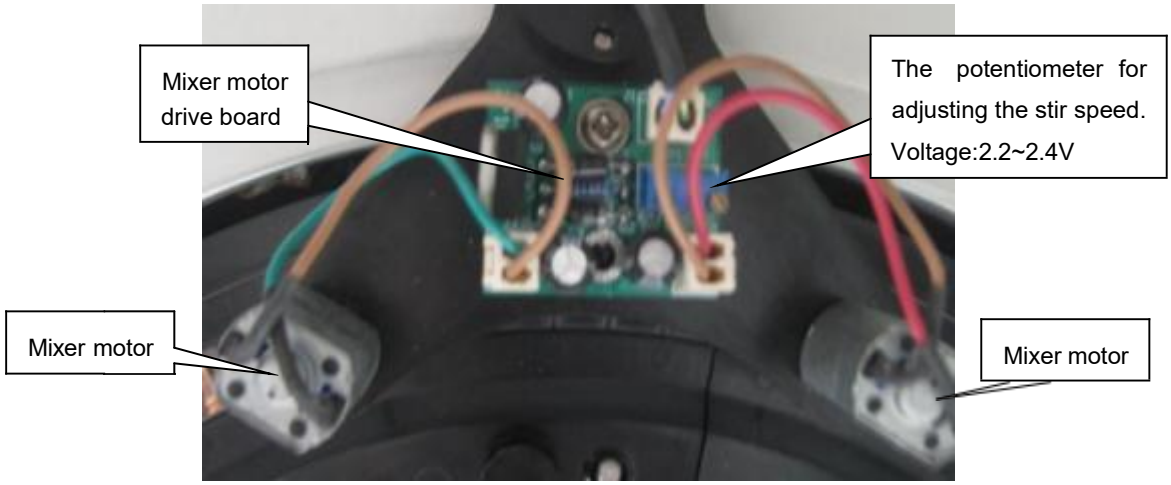
It is used to stir the reaction liquid (reagents and sample) in reaction cuvette to make them react completely.

● Motion

When stirring is finished, the mixer moves automatically to its wash well for cleaning.

For single-reagent test, the sample mixer starts to work once sample is dispensed.

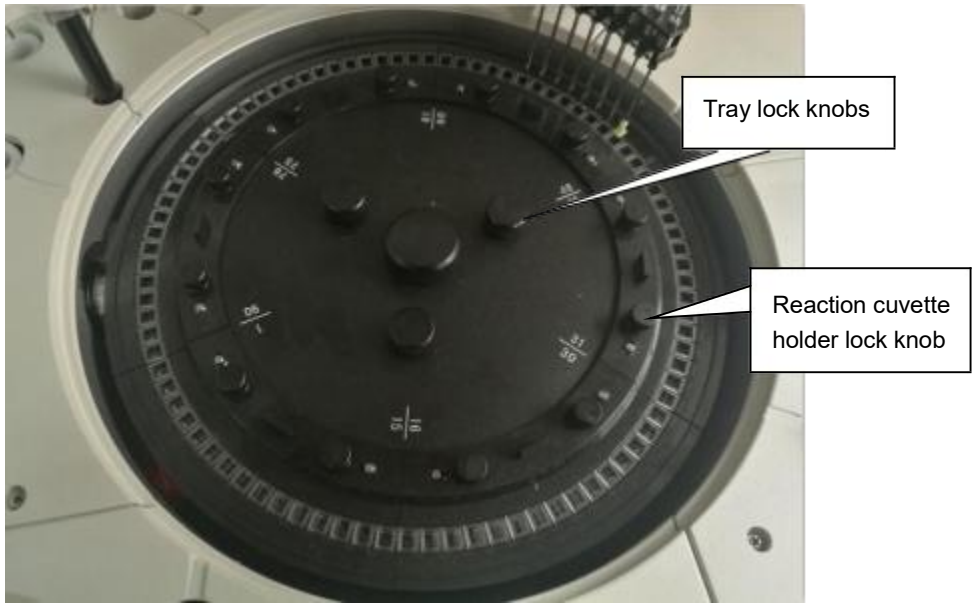
For double-reagent test, the reagent mixer starts to work once R2 is dispensed.



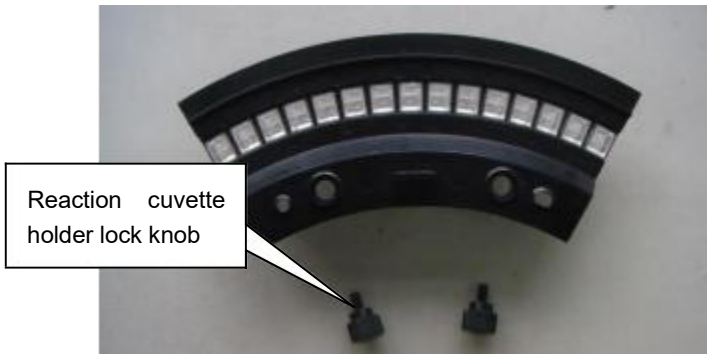
⚠ Attention

When the analyzing unit is in operation, do not place any part of your body or any obstacle in the route of the arm moves. Otherwise, it may lead to personnel injury or equipment damage.

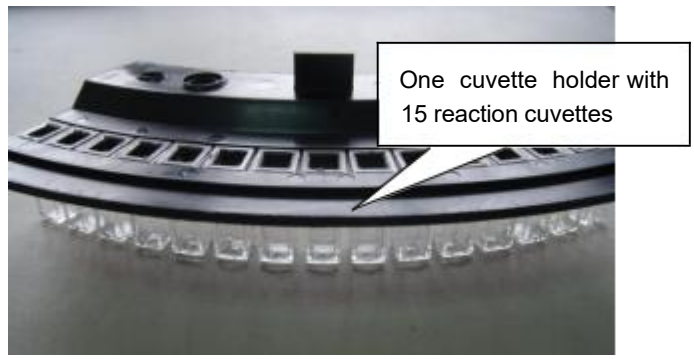
1.1.2.2 Reaction Tray Assembly and Temperature Control System



(Reaction tray assembly pic)



(Reaction cuvette holder pic)



(Reaction cuvette pic)

● Composition and Function

Reaction tray assembly is consist of reaction tray and temperature control parts.

Reaction tray is used to load reaction cuvettes. Reaction cuvette is as reaction liquid place,meanwhile,it is as colorimetric measurement optics device .When reaction cup pass through the optics route,the analyzer measures absorbance of reaction liquid.

Temperature control is used to offer a homothermal environment for reaction.

● Specification

Reaction tray：using 6 reaction cuvette holders to load total 90 reaction cuvettes,each holder loads 15 reaction cuvettes.

Temperature control parts ： via heating loop and temperature sensor to make the reaction temperature is in the 37±0.1 C.

Reaction cup size ： 5mm×6mm×25mm (L×D×H),optical path 6.1mm.

● Motion

Reaction tray only make clockwise rotation.Reaction tray make appointed reaction cuvette stop in adding sample position,adding reagent position and measure optical axis position.

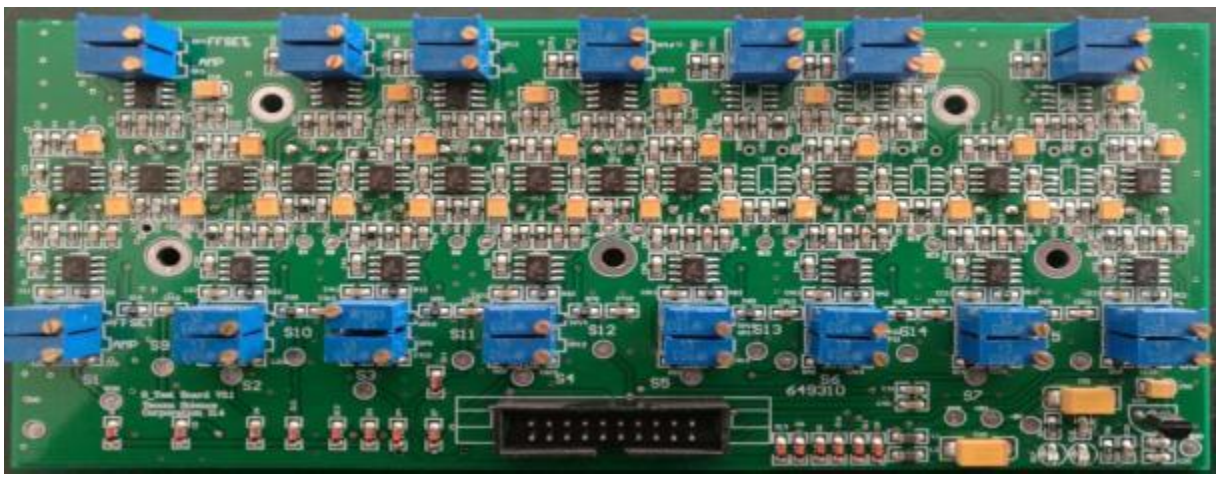
1.1.2.3 Photometric System

● Composition

Photometric system includes tungsten-halogen lamp,reaction cuvette (colorimetric cup),optical fiber,optical filter,signal process board and so on.

● Specification

15 wavelengths, which are：340nm、405nm、450nm、510nm、546nm、578nm、620nm、660nm 、690nm 、380nm 、600nm 、750nm 、420nm 、480nm 、520nm.



(15 wavelengths signal process board)

Wavelength precision ： ±1.5nm；

Photometry range ： 0.0000-4.0000ABS；

Optical source:12V, Tungsten-halogen ,20W；

Chapter 2 Installation

⚠ Attention

The system should be installed by our authorized personnel only, and you should prepare a proper site for installation.

If you need to move the system to another site, please contact our Customer Service Department or your local distributor, who are the appropriate people for the moving job.

2.1 Unpacking

When you receive the system, carefully inspect the package. If you see any signs of mishandling or damage, file a claim immediately with our Customer Service Department or your local distributor.

After opening the package, check the delivered goods against the packing list as well as the appearance of the system. If you find anything missing or damaged, alert our Customer Service Department or your local distributor immediately.

2.2 Installation Environment Requirements

⚠ Attention

Make sure the system is installed in a place meeting the following requirements. Otherwise, it will not perform as promised.

2.2.1 Installation Environment Requirements

⊙ The system is for indoor use only.

⊙ The bearing platform (or ground) should be level (gradient less than 1/200).

⊙ The bearing platform (or ground) should be able to bear 30Kg weight.

⊙ The installation site should be well ventilated.

⚠ Attention

The system radiates heat while operating. A well-ventilated environment helps keep

the room temperature stable. Use ventilation equipment if necessary. But if so, be sure not to expose the system to the direct draft that may lead to unreliable results.

⊙ The installation site should be free of dust as much as possible.

⊙ The installation site should not be in direct sun.

⊙ The site should not be near a heat or draft source.

⊙ The installation site should be free of corrosive gas and flammable gas.

⊙ The bearing platform (or ground) should be free of vibration.

⊙ The site should not be disturbed by large noise or power supply.

⊙ The system should not be placed near brush-type motors and electrical contacts that are frequently turned on and off.

⊙ Do not use such devices as mobile phones or radio transmitters near the system. Electromagnetic waves generated by those devices may interfere with operation of the system.

2.2.2 Power Requirements

⊙ Power supply: AC 100-240V, 50/60Hz, with voltage fluctuation of ±10%.

⊙ Three-wire power cord, which should be grounded properly.

⊙ The system should be connected to a properly-grounded power socket.

⊙ The distance between the power socket and the system should be less than 2.5 meters.

⊙ Ground voltage must be configured.

⊙ The equipment"s maximum output is 1000 W, customizable with 2000W on-line UPS.

⚠ Warning

Make sure the power socket is grounded correctly. Improper grounding may lead to electric shock and/or equipment damage.

Be sure to connect the system to a power socket that meets the upon-mentioned requirements and has a proper fuse installed.

2.2.3 Temperature and Humidity Requirements

Ambient temperature: 10-35 centigrade, with fluctuation less than ±2 centigrade/H.

Relative humidity: ≤90%RH , without condensation.

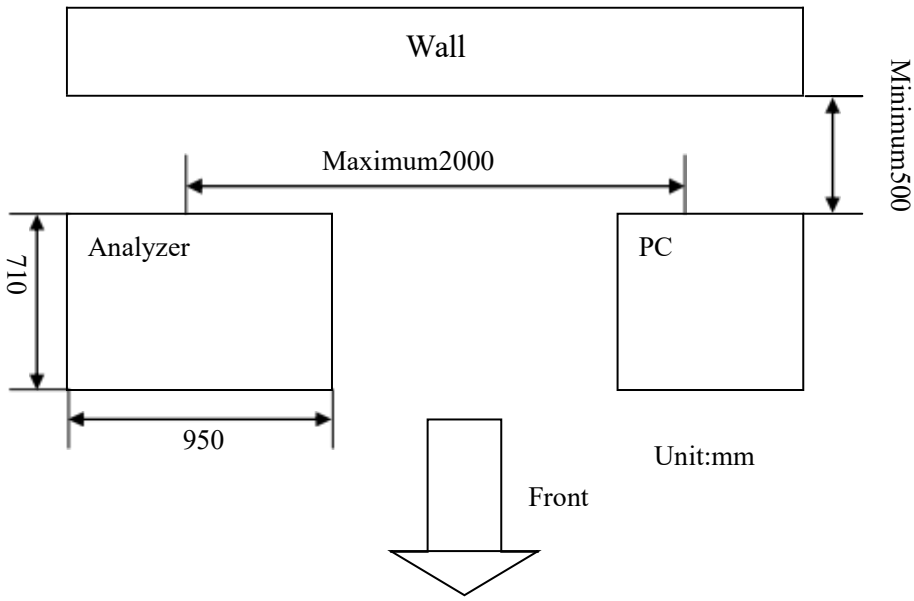
⚠ Attention

Operating the system in an environment other than the specified may lead to unreliable test results.

If the temperature or relative humidity does not meet the upon-mentioned requirements, be sure to use air-conditioning equipment.

2.2.4 Space Requirements

The system should be installed and used meeting the space and accessibility requirements as shown below.



(The dimensions of Space Requirements)

2.3 Installation Process

1. Make sure that in the hospital, there is a proper installation area with qualified environments.

2. Confirm installation reagent& QC.

3. In the installation place, unpack the package, check the goods according the packing-list and ask customer to inspect&accept.

4. Place the analyzer on the proper location.

5. Install computer, printer and then test the printer whether it can work normally.

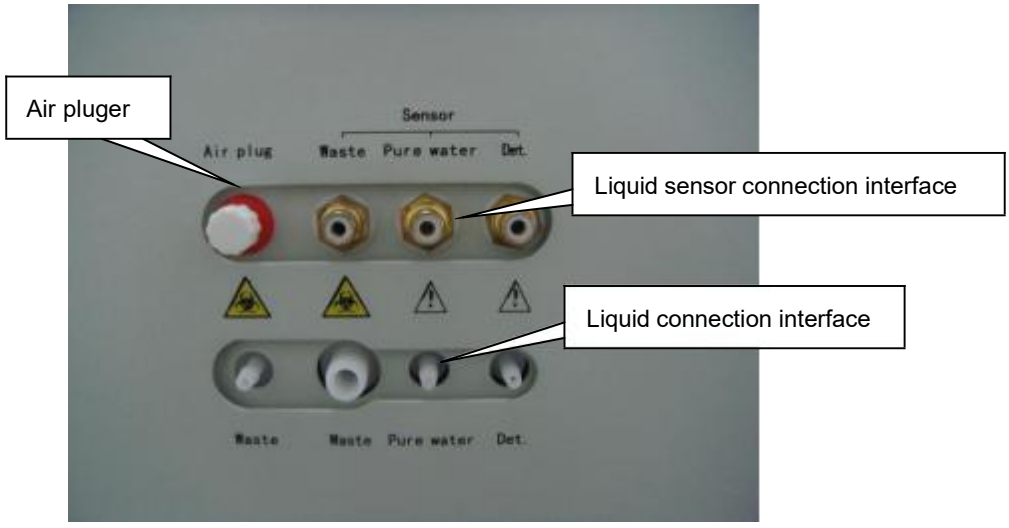
⚠ Attention

DW-TC6090 software can be used in the Windows XP ,Win7 ,Win8 and Win 10 operating system.

6. Inspect the equipment appearance to see whether it is OK. Open the top cover, check whether sample probe and reagent probe assembly, reaction tray assembly and other assembly are OK, removing related protective foam .

7. Holding the sample/reagent probe assembly arm, pull several times up and down & left and right respectively at wash well position, reaction cup position, reagent position, sample position and other positions around, to see whether the movement resistance is uniform and smooth in all directions.

8. Connect serial port communication cable, equipment power line, ground wire, distilled water bucket with filled , detergent bucket,waste-liquid bucket and related sensor cables.



Note:when install the machine,please put water,detergent, waste bucket on the lower level place than machine.otherwise water will flow out from machine.

9. Check whether 90 reaction cuvettes are damaged in the reaction tray or not. Please observe whether all reaction cuvettes" height are at the same level on the reaction tray. Remark: the reaction tray is consisted by 6 connected cup holders and each holder is loaded by 15 reaction cuvettes.

10. Please open the power switch as follow sequence: analyzer power switch→computer power switch→external printer power switch；

11. Copy the Chemistry analyzer installation software from installation memory disk into the computer"s hard disk D drive or E drive.

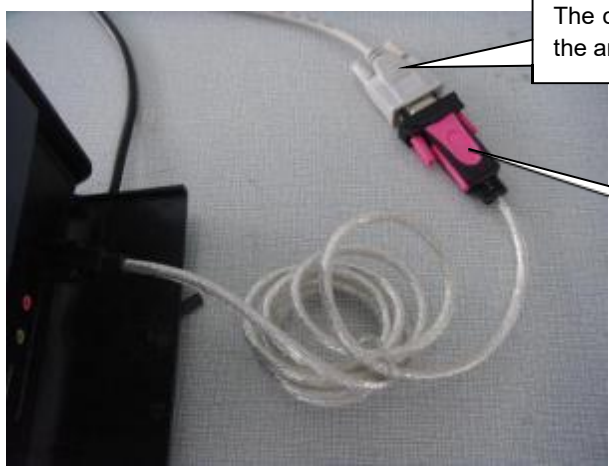
⚠ Attention

① C drive is infected more easily by computer virus than another drives.

② There is a piece of USB to serial port converter in the accessories of machine,and if there is not 9-pins serial port in the computer,the converter should be used,otherwise it is not needed.

Refer the following steps to install the converter.

Step1: there are two ports in the USB converter.one is USB port.the other is male 9-pins serial port.

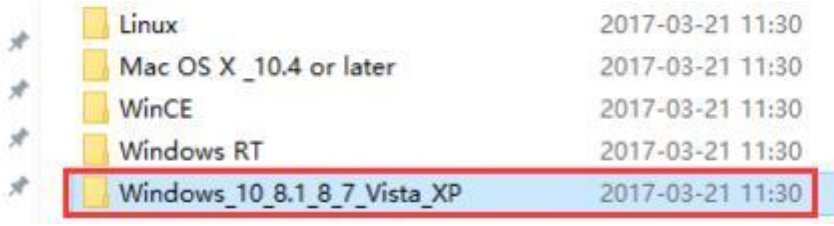


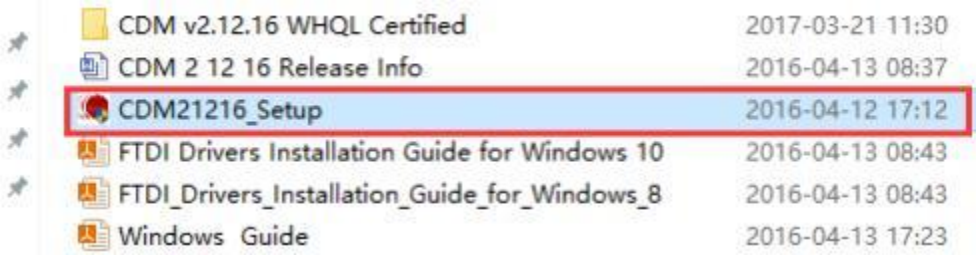
Step 2: connect the serial cable with male 9-pins port of converter,and connect the USB port of converter with computer.

Step 3: The computer will indicate the new hardware is found.

Step 4: Insert installation memory disk and open it. Then open the“USB TO RS232”, select one folder according to the system of computer. For example, Windows 10.

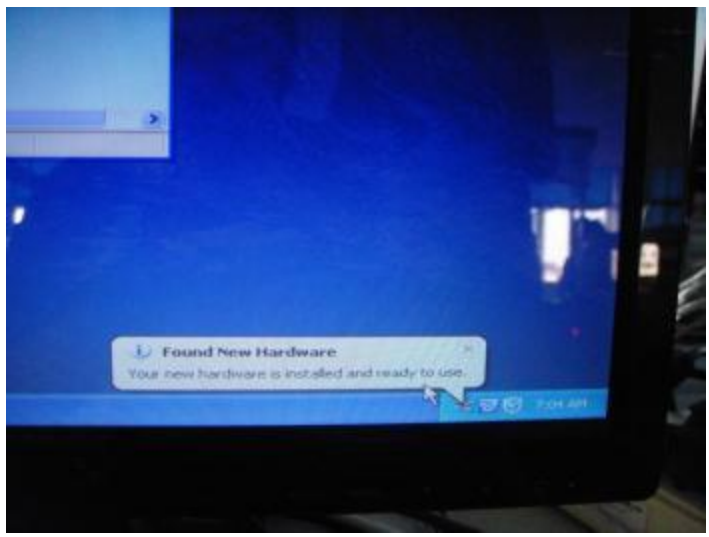
Click the application of Setup,





Step 5: The screen will see the following picture. Click “Extract” to install the driver. Then always click next button to perform next process.

Step 6: Finish the driver installation.



Step 7: After install the driver of converter,enter the hardware information menu which is in the control panel to check whether the added com number is 1 to 3 or not.if not,it should be done to modify it through advanced properties menu of the added com port.

12. There are four folders in the installation memory disk , one folder is "TC_BIO_II(English)" which is operating software folder, another folder is "PIC" .there are three factory setting menu pictures in this folder.the next folder is "Install Package" which is running environment installation program. The last folder is "USB TO RS232" which is USB serial convertor cable driver program.

⚠ Attention

① There is some important factory setting information in the memory disk, if you change the computer or reinstall the windows operating system,you should set some menu again.so you should keep the installation memory disk carefully.

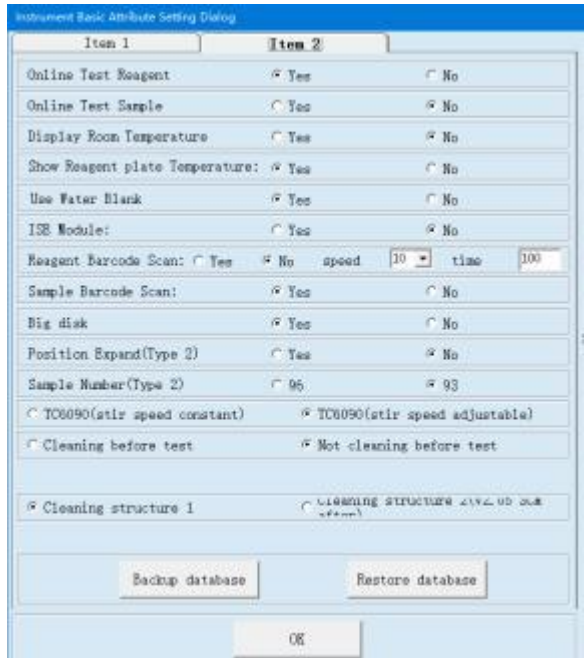
② Each machine have own factory setting pictures,so it is necessary to keep each machine"s installation memory disk.

13. Open the "Install Package" folder and install this program through click setup icon. Note:this program is very important, if you don"t install this program,you cannot open chemistry software.and you can ignore some indication information during install this program.

14. Open the "TC_BIO_ Ⅱ" folder and double click the icon of DW-TC6090 application program which is  . Then select user is "aaa" and ignore password .click "OK" to enter the software operation interface.

Note: In the original software, the default user have two names.One is Admin,the password is Admin. The other is aaa, the password need not be inputted.

15. Enter “Maintenance”→ “Character Setup” → input password“777”,set up related parameters.

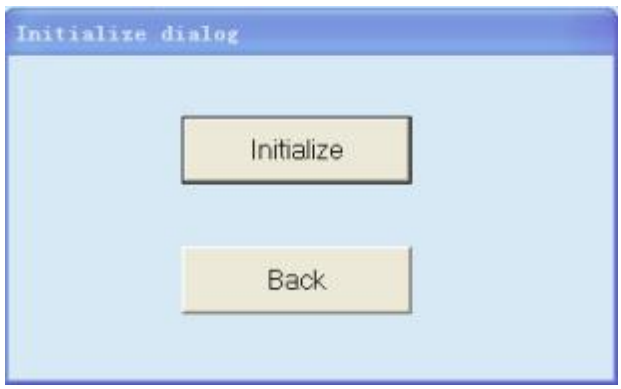


Parameter	Meaning
Name	The name is input by service engineer
Type	The service engineer set the instrument Type Type 1: TC 6030 Type 2: TC 6090 Type 3: TC 6060 Type 4: TC 200 Type 5: TC 220 （With independent mixer） If wrong type is selected, machine can not work normally. Please restart the software after selecting the machine type.
Language	English and Chinese are available here. “Debug” is used to locate the position of every menu name in Data Base. Two other languages are reserved, and you need to edit language data base before using them.
Font	Please select corresponding Front available in your country, otherwise it will cause display problem.
Serial port	The serial port between analyzer and computer, which is usually set by engineer
Auto Print	Select NO Only
Test order	When you select the option “ sample first”, the analyzer will carry out the test according to

	the sample sequences; When you select the option " item first", the analyzer will carry out the test according to the item sequences
Start program	After selection of "yes, the instrument will wash all cuvettes automatically once switching on of the instrument, then detect temperature and pressure
End program	After selection of "yes, the instrument will wash all cuvettes automatically once switching on of the instrument, then dispense distilled water into cuvettes
Liquid alarm	The liquid alarm can be used only when selection of "yes", please select "no" if the liquid alarm is not furnished.
Impose test reagent	After selection of "yes, the instrument will carry out detection of reagent volume, if you need to skip this detection, please select "no"
Permit blank test	If select YES, when machine tests there is no reagent, it will do test as usual, not stop automatically.
Whether monitoring cooling state	If select YES, it will display the cooling state temperature. Because this function needs hardware support. If there is no cooling function, please select NO.
Online test reagent	Click "yes",in the course of testing, after sipping reagent , it will show balance reagent volume on time.
Online test sample	After selection of "yes, if sample is in shortage, the analyzer will pause testing the residual items under the sample.
Display room temperature	If select YES, it will display the room temperature. Because this function needs hardware support, if main control panel single chip version before V2.07, please select NO.
Show Reagent plate temperature	The reagent plate temperature can be displayed only when selection of "yes", please select "no" if the refrigerating function of reagent plate is not furnished.
Use water blank	After selection of "yes", the signal value of testing cuvettes is saved as blank value of the absorbance. After selection of "no", the default signal value of the cuvette the analyzer detect is saved as blank value of the absorbance
ISE module	Because this function needs hardware support. If there is no ISE function, please select NO.
Reagent/ Sample Bar code Scan	Because this function needs hardware support. If there is no bar code function, please select NO.
Big disk	Select YES Only. Small disk is suitable for early machine.
Position Expand	Select NO Only. Position Expand is suitable for early machine.

Sample Number	Select 93 Only. 96 is suitable for early machine.
DW-TC6090 stir speed	Select the stir speed constant or adjustable.
Cleaning before test or not	Select cleaning before test or not.
Cleaning structure	Because this function needs hardware support, if main control panel single chip version before V2.05, please select 1. Otherwise,please select 2.

16. Click “Initialize” to observe the Initialization status of each parts and the lamp should focus the light point into the NO.86 cuvette. Otherwise you should adjust the reaction tray position.

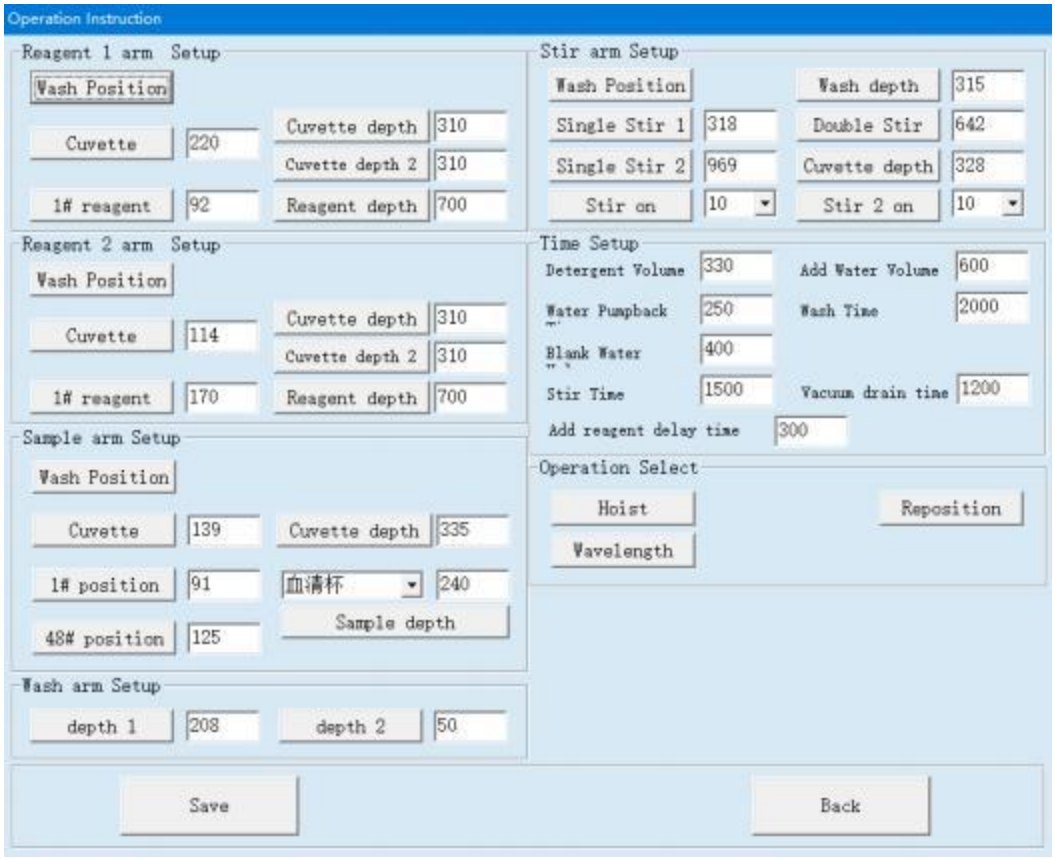


17. Make the water tank fill with distilled water .

⚠ Attention

If the water tank can"t be injected water, please unscrew the air plug which is on the rear panel of analyzer about 20 seconds.Screw the air plug tightly when the water arrives at proper level in the water tank.

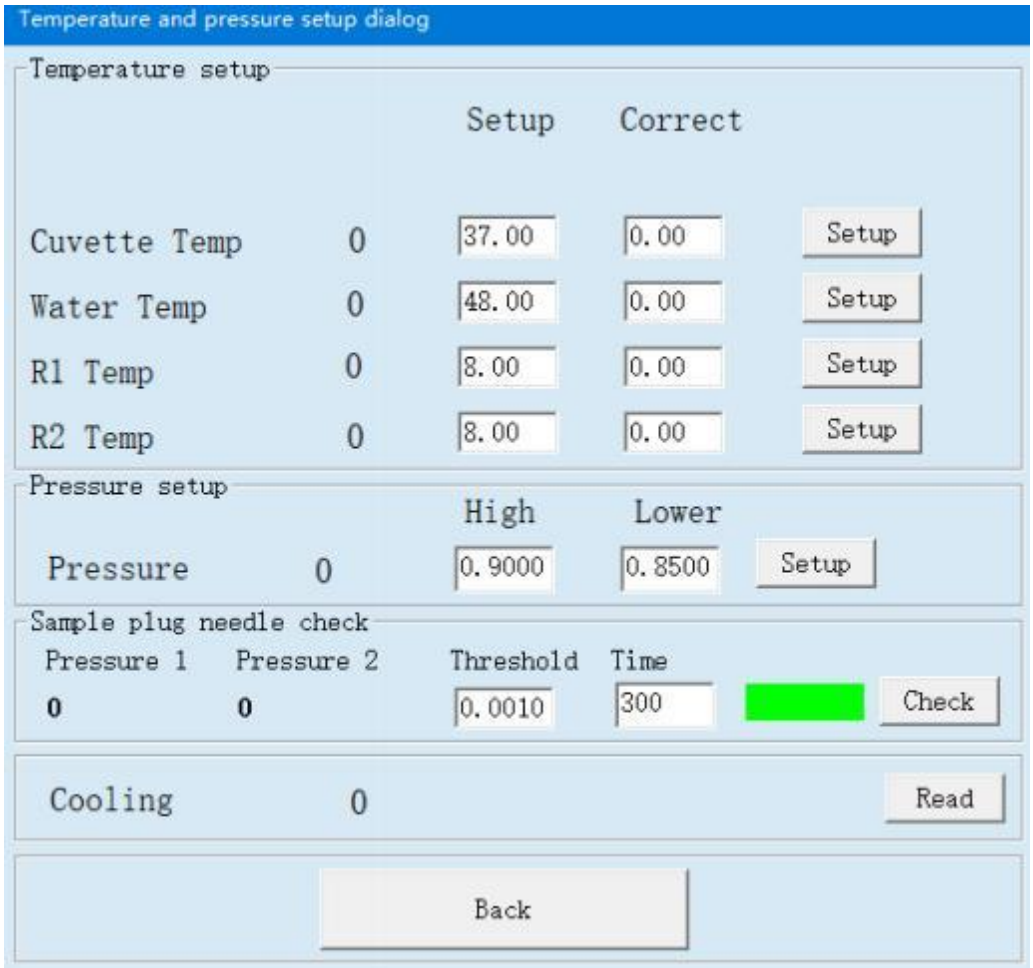
18. Input password “999” to enter “Parameter Setup” menu. Then confirm the setting values are same with factory picture or not. And also enter wavelength menu to confirm the setting values are same with factory picture or not.



⚠ Attention

There are 5 probes in the DW-TC6090,1 sample probe, 2 reagent probes,2 mixer probes. Arm or Stir setup volume are used to adjust the probes position. If the position is not good,engineer should adjust it according chapter 5.6 and 5.8.

19. Enter “Temperature and Pressure” menu. Then confirm the setting values are same with factory picture or not .



20. Enter “Cuvette” menu,then perform washing all cuvettes three times.

21. Click “Add water” and then click “Test Cuvette” to get the signal value of all cuvettes , observe each wavelength signal value ,it should be between 30000-60000, If the signal value is lower than 30000 or more than 60000, please check related wavelength cuvette. Click “Save Cuvette” and then empty water of cuvettes by click “Pump water” .

22. First setup parameters of ALT(Rate),TC(Endpoint),UREA(Two points),then do some tests with QC and clinic samples,check whether the results are correct and repeatable.

23. To give operators training, make sure that operators know and can operate followings procedures:

① Daily test process

② Parameter setup, Calibration and QC

③ Test methods, including Rate, Endpoint and Two points.

④ Daily analyzer maintenance

⑤ Replace sample probe,reagent probe, mixer, light source and reaction cuvettes.

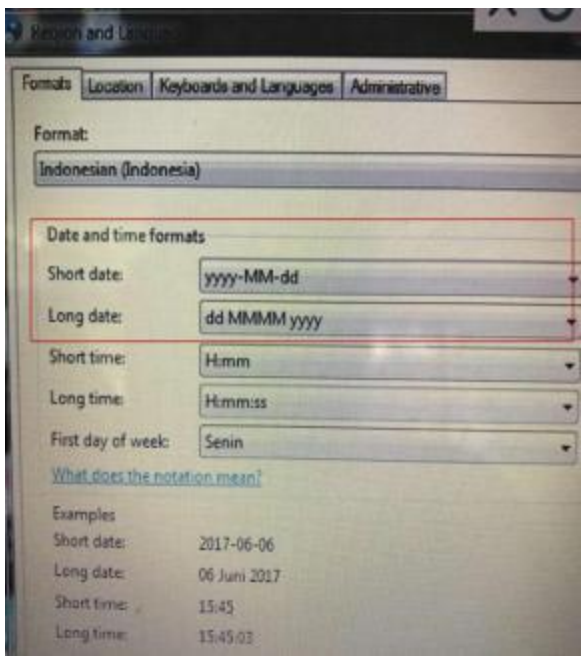
⑥ Printout format setup

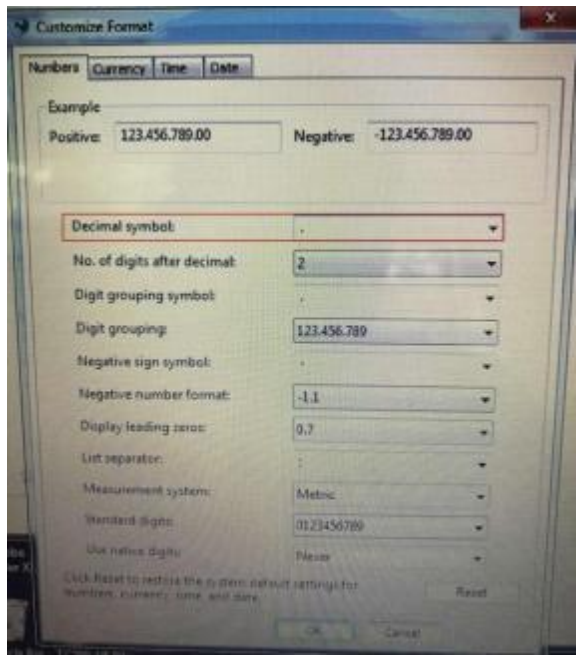
⑦ Other menus setup

24. Fill in installation report of Inspection and Acceptance, ask hospital to make signature with officer seal and leave business card to them.

25. Complete Installation

Notice： The date and time formats in computer should be set according to the shown picture. And the decimal symbol should be decimal “ .” , not comma “,” .

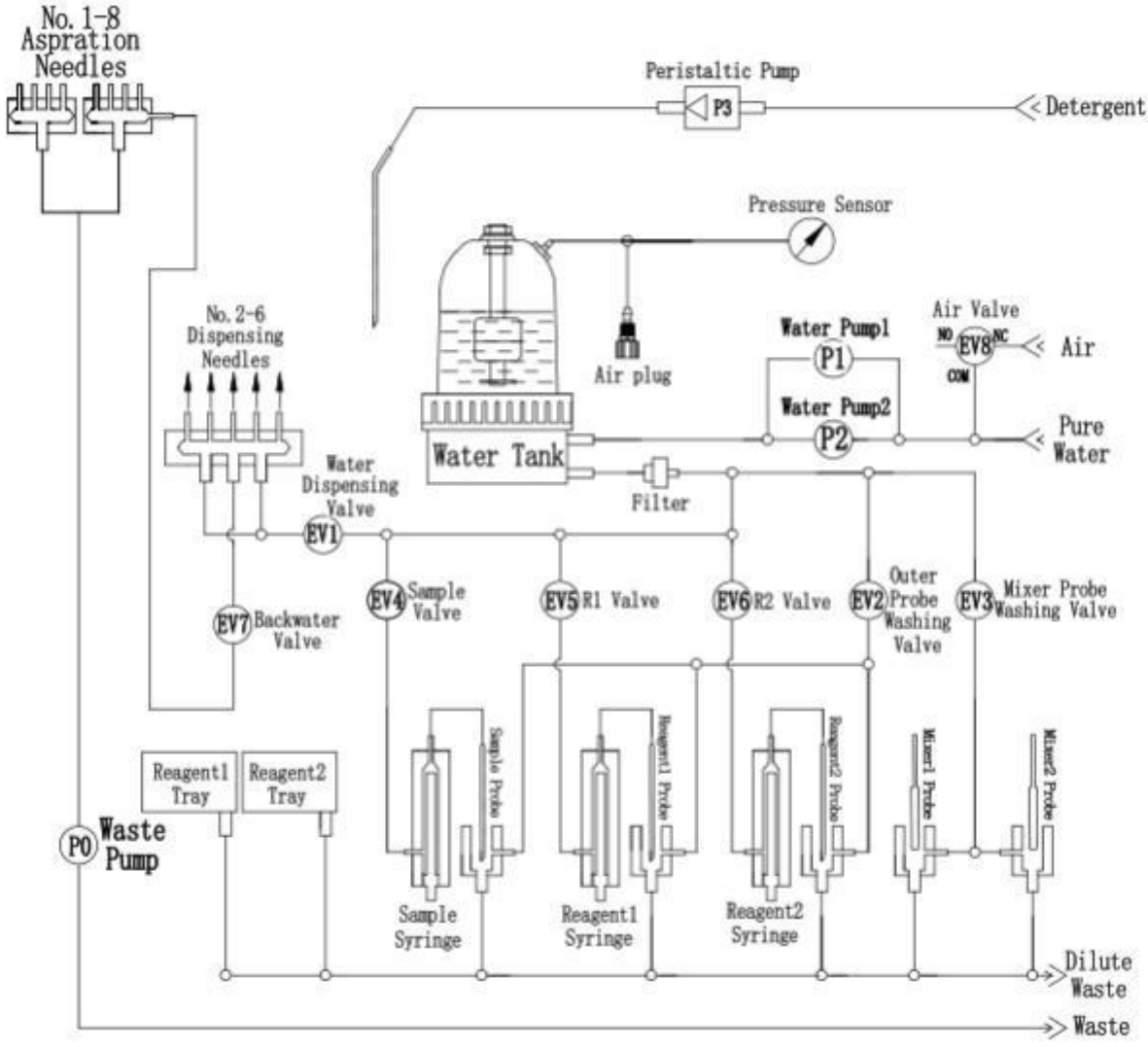




Chapter 3 Fluidic System

3.1 DW-TC6090 Analyzer Fluidic System

3.1.1 Fluidic diagram of DW-TC6090



3.1.2 Fluidic system steps instruction

1． Water pump draw distilled water into water tank, if inside water is not enough, it will automatically draw distilled water from water bucket. when water level of water tank reaches the height enough, air valve will open to take in air. Then when the pressure and water level reach enough level and keep constant, water pumps will stop working. The

water level of water tank is controlled by inner float switch， and the pressure is controlled by pressure sensor which is on the fluidic controller board.

2． The cleaning movement of reaction cuvettes.

2.1 When 8-steps wash needles go down the bottom of reaction cuvettes, long wash needles drain the liquid by the waste pump from cuvettes to waste bucket.

2.2 Peristaltic pump works, then detergent will be dispensed into the reaction cuvettes for cleaning through No.1 short wash needle during 8-steps are washing cuvettes.

2.3 Water dispensing valve works, pressure of water tank makes warm water flow through water filter and dispense into reaction cuvettes through No.2 – No.6 short wash needles. The rinse block needles (with white silicon wiper) goes upon the reaction cuvettes,the backwater valve drains back the water of front end pipeline completely to prevent water dropping from the needles during waste pump working.

2.4 Water aspiration needles No.1-8 aspirate water at the bottom of reaction cuvettes, and pump the distilled water from reaction cuvettes.

3. Reagent probe aspirating reagent and rinsing process:

Reagent probe rotates upon reagent bottle, and reagent syringe goes down to aspirate certain volume of reagent, then the probe rotates upon reaction cuvette, and then goes down into it, and reagent syringe goes up to dispense reagent into reaction cuvette. Then the probe goes up and rotates to wash well, outer probe washing valve .Reagent valve will be opened, water which is from water tank cleans the inner side,outer side of reagent probe and the inner side of reagent syringe.

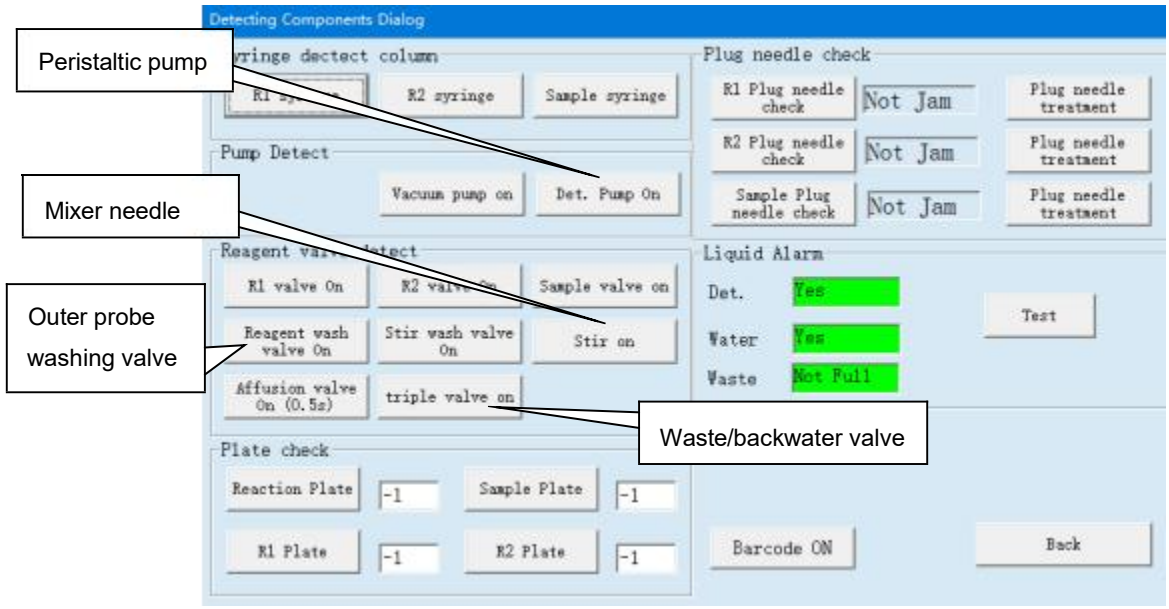
4. Sample probe aspirating sample and rinsing process:

Sample probe rotates upon sample cup position, and sample syringe goes down to aspirate certain volume of sample, then the probe rotates upon the reaction cuvettes, and then goes down into it, and sample syringe goes up to dispense sample into reaction cuvette. Then the probe goes up and rotates to wash well, outer probe washing valve and sample valve will be opened, water which is from water tank cleans the inner side,outer side of sample probe and the inner side of sample syringe.

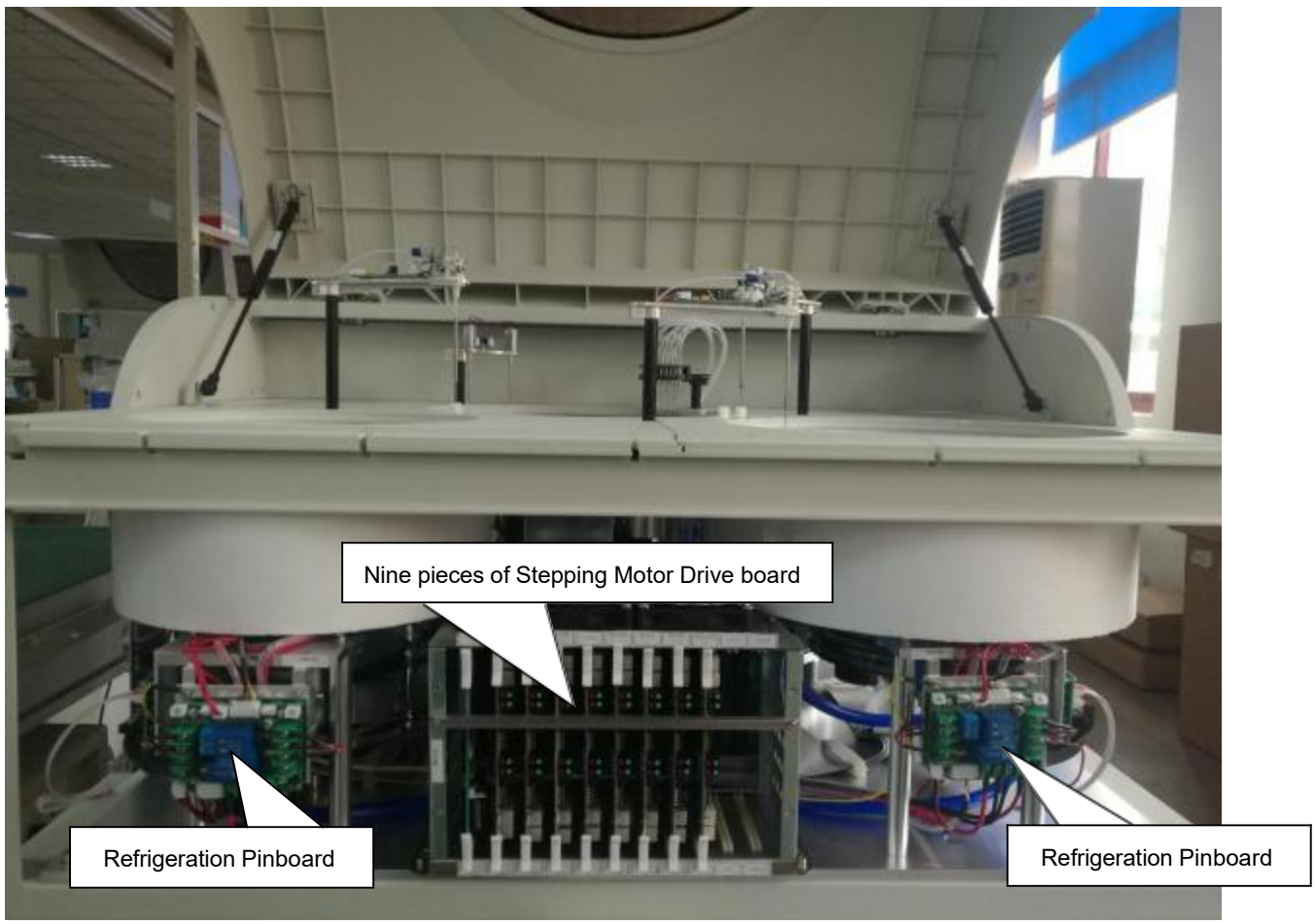
5. Mixer probe makes mixture and rinsing process:

Mixer probe rotates upon reaction cuvette, and goes down into it to make mixture for reagent and sample. then the mixer probe goes up and rotates to wash well, outer probe

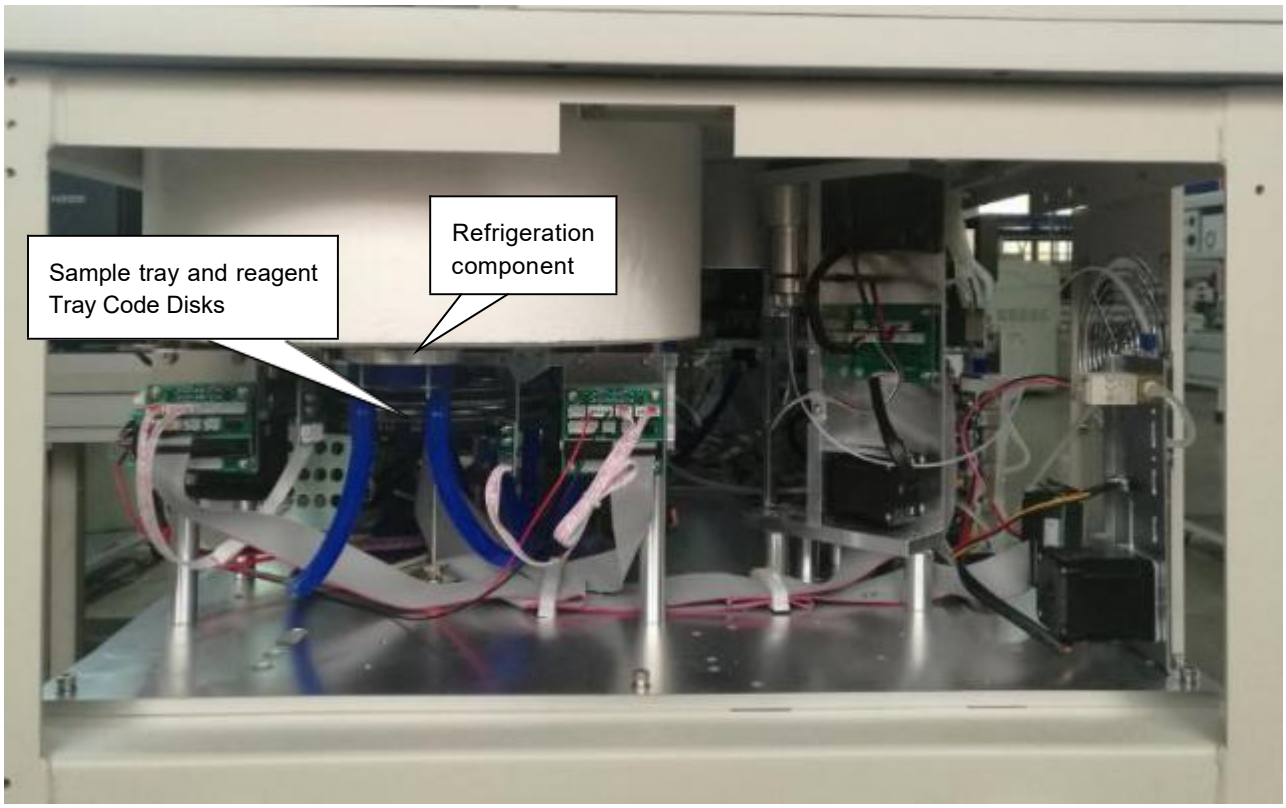
washing valve will be opened, water which is from water tank cleans the outer side of mixer probe.



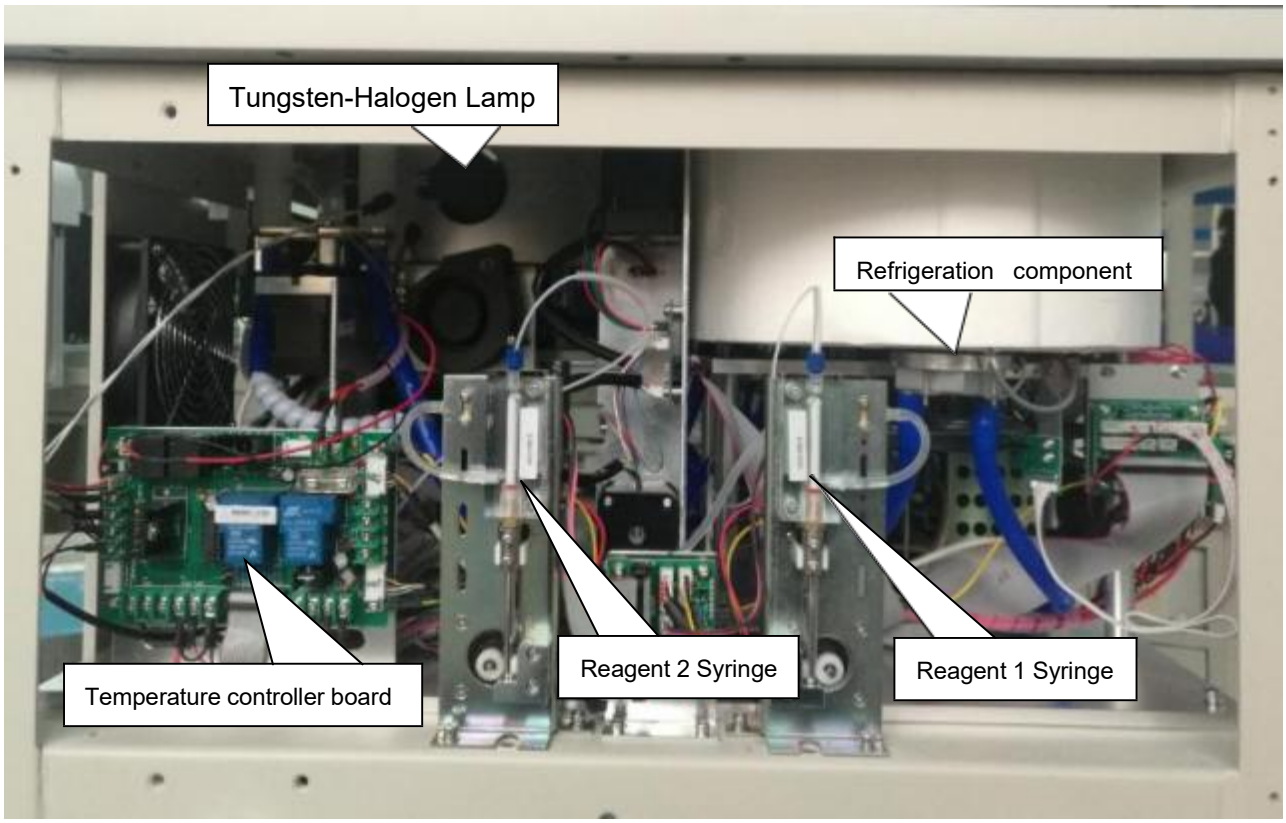
3.1.2 View Pictures of Analyzer Parts



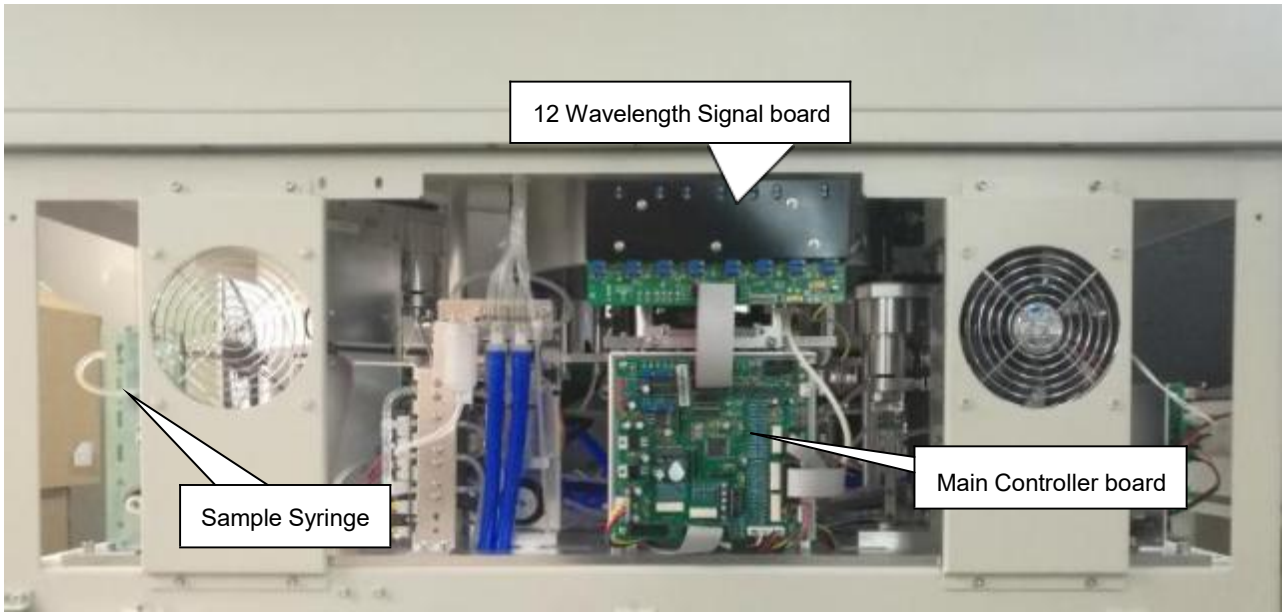
（Front View）

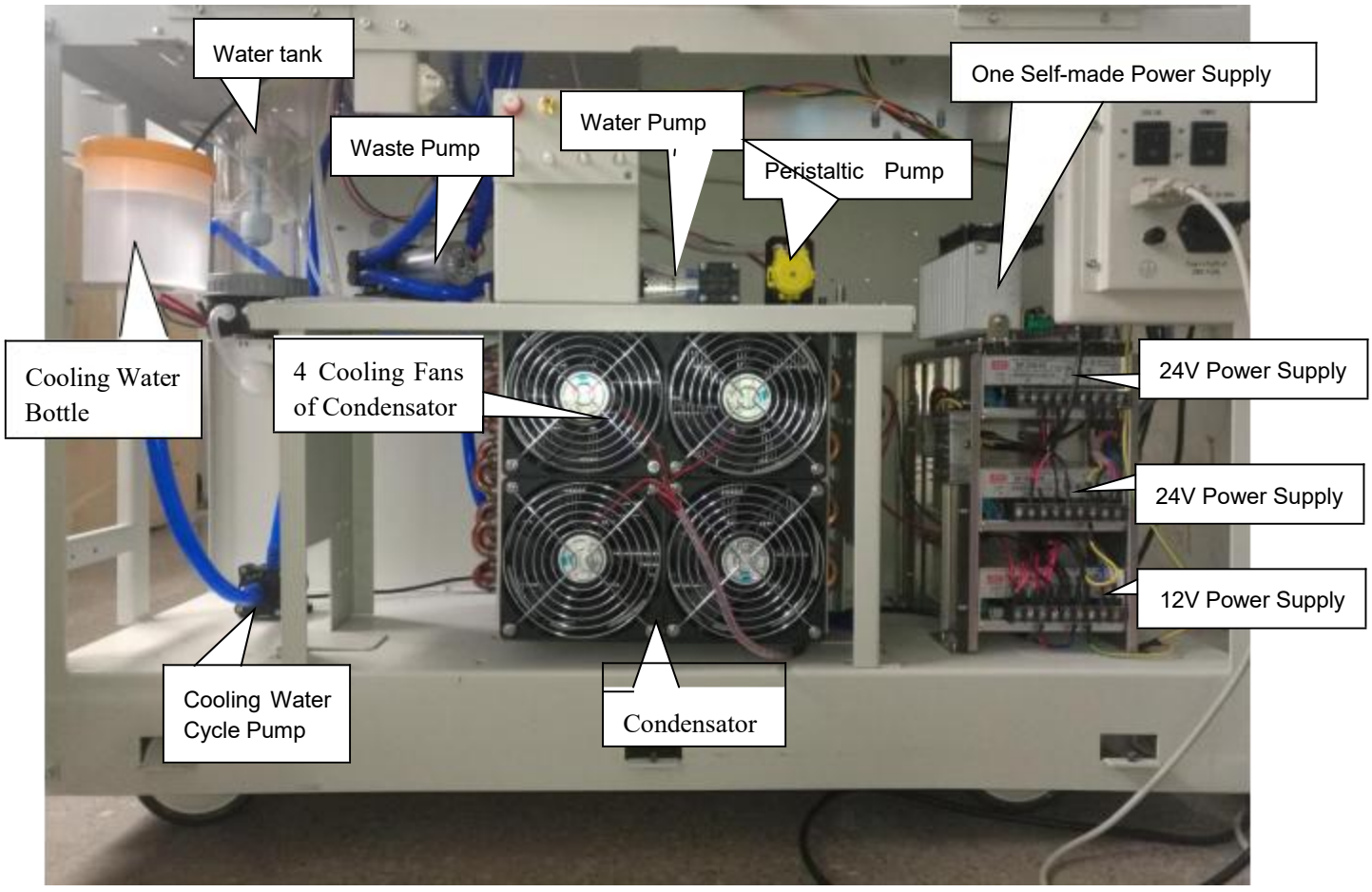


（Right View）



（Left View）


12 Wavelength Signal board
Sample Syringe
Main Controller board


Water tank
Waste Pump
Water Pump
Peristaltic Pump
One Self-made Power Supply
Cooling Water Bottle
4 Cooling Fans of Condensator
24V Power Supply
24V Power Supply
12V Power Supply
Cooling Water Cycle Pump
Condensator

（Rear View）

Chapter 4 Hardware Structure

4.1 Sample tray and reagent tray

- There are 93 sample positions in the sample tray .
- There are 40 reagent positions in both reagent tray 1 and reagent tray 2.
- Refrigeration system is consisted by four refrigeration semiconductors,four Refrigeration component, Condensator,Cooling Water Cycle Pump,Cooling Water Bottle, and four cooling fans of Condensator. One side with words of semiconductor is cold side.The hot side of semiconductor is pasted with heat dissipator. The cold side of semiconductor is pasted with side of reagent tray.

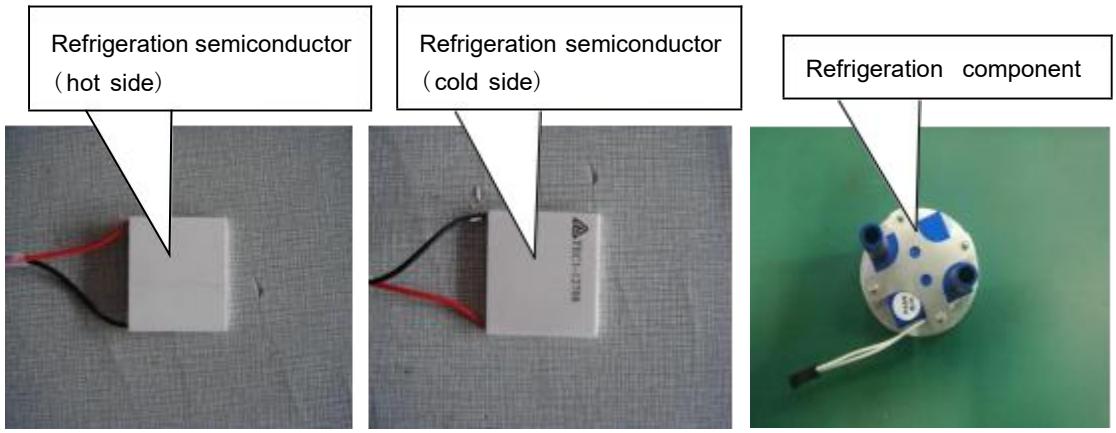
  Cooling fan release the heat which come from the hot side of semiconductor.
- Sample positions and reagent positions are controlled by code disks and optical sensors.

  Temperature control of reagent tray: two refrigeration semiconductors which are on the side of tray to make cool.

  Temperature sensor and temperature controller board control temperature of reagent tray below 8 centigrade degree.

  The type of stepping motor which control the sample/ reagent tray rotation is 23HY109-20B2.

  The size of rotation synchronous belts are 212MXL(width 6mm).



4.2 Reaction tray and drive assembly

Reaction tray has 90 cuvettes which supported by six cuvette holders,each holder has 15 cuvettes. It is forbidden to touch the transparent surface of cuvette.

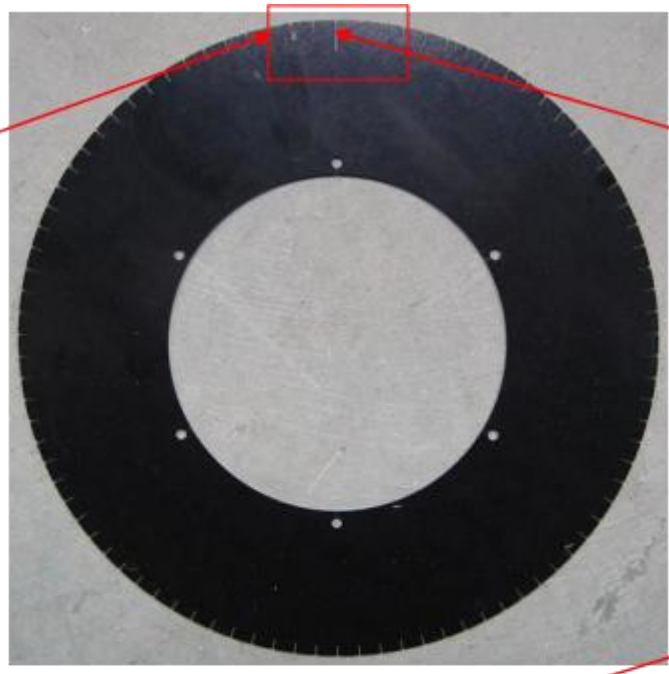
Cuvette position is controlled by code disk(90 slots) and optical sensor group.

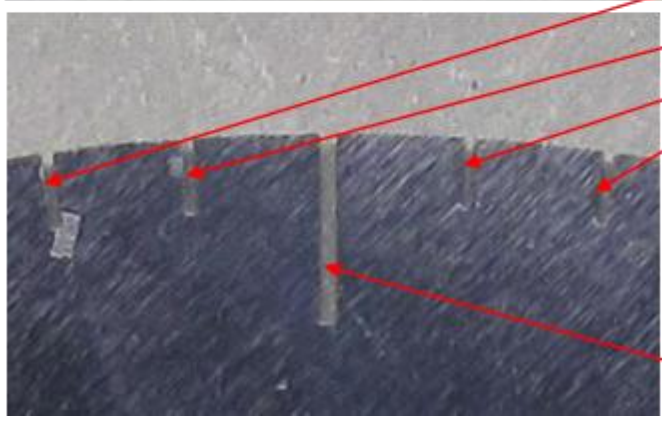
Temperature control of reaction tray: the heating loop which is on the bottom of incubation groove heats the incubation groove.

Temperature sensor and temperature controller board control temperature of reaction tray in about 37℃.

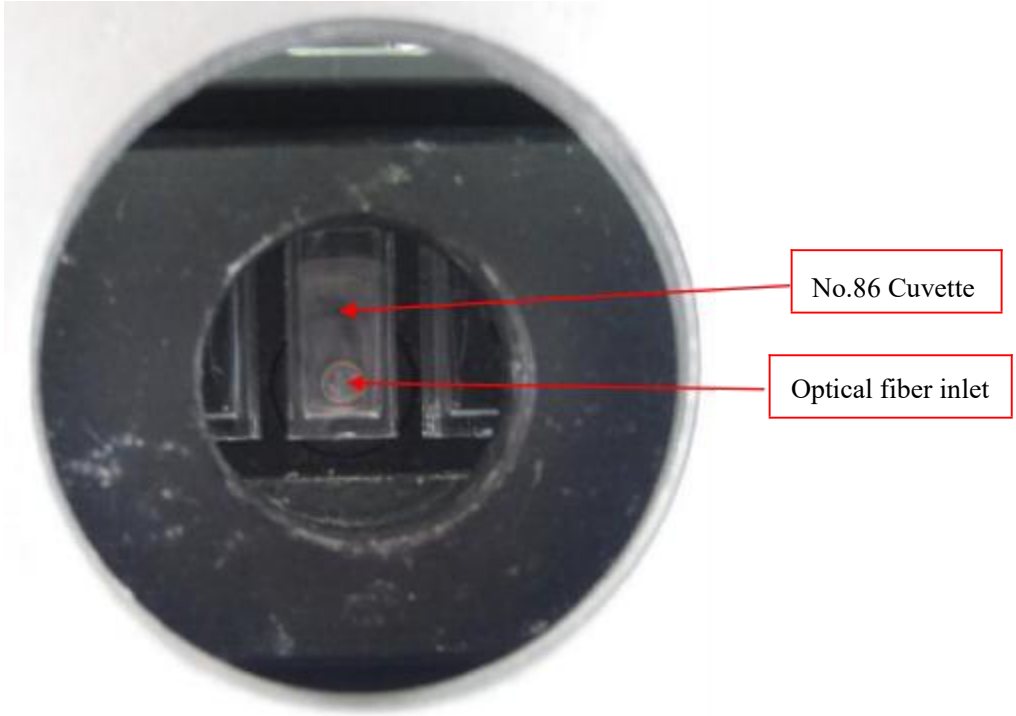
The type of stepping motor which control the reaction tray rotation is 23HY109-20B2.

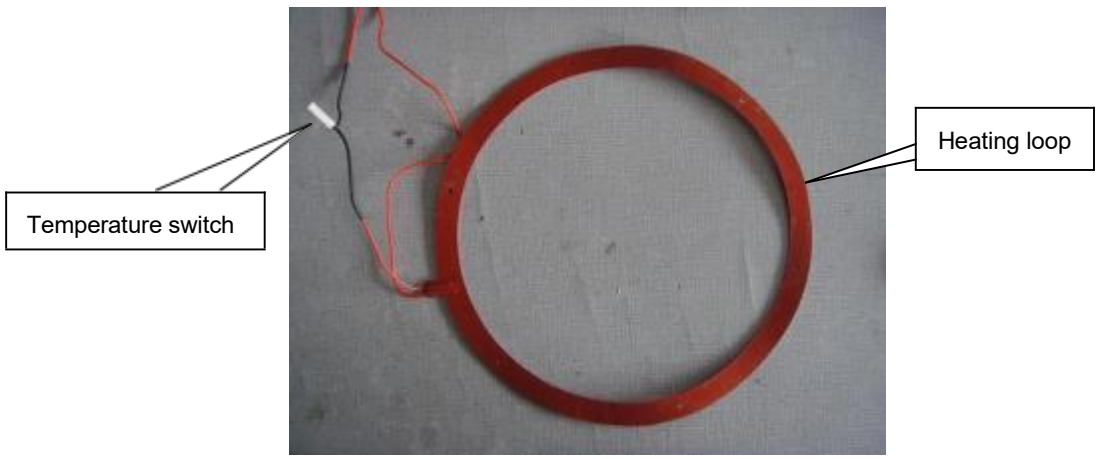
The size of rotation synchronous belt is 218MXL(width 6mm).

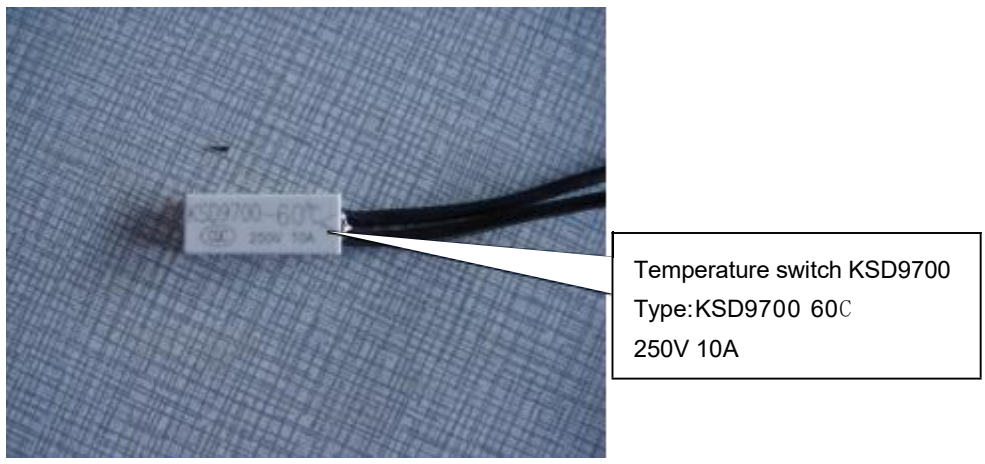


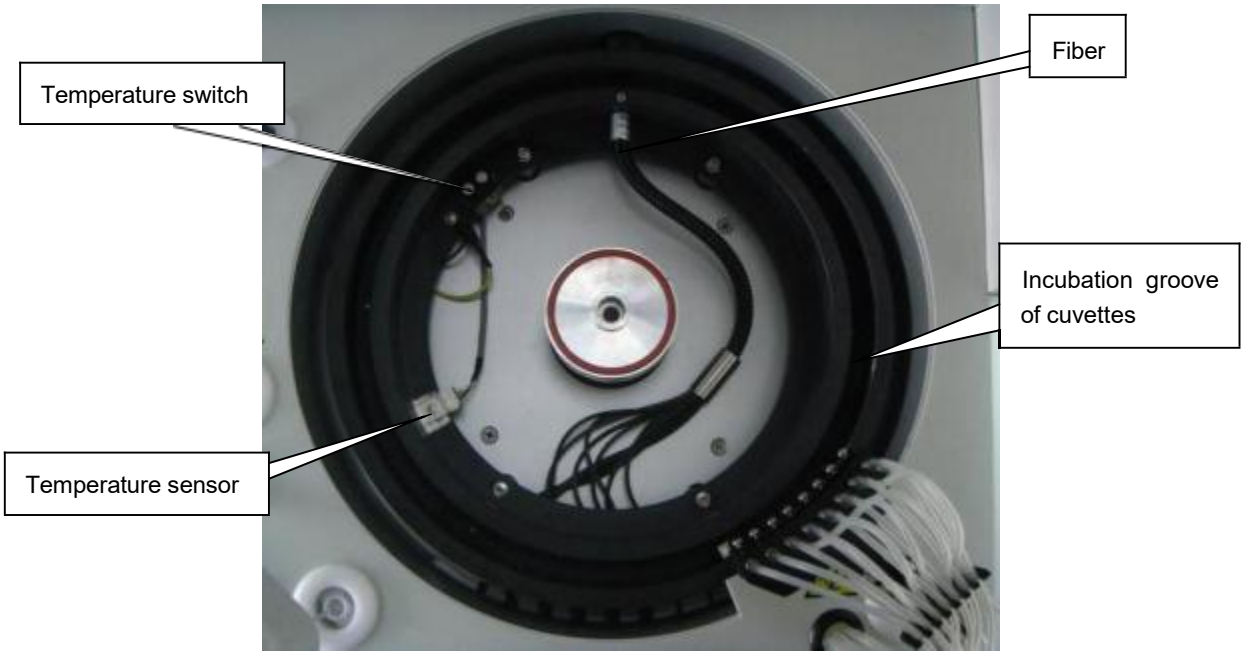


When you click initialization which is in the operation software, the reaction tray rotates until the initialization slot of code disk is detected by optical sensor. The light of tungsten-halogen lamp focus the middle of NO.86 cuvette.





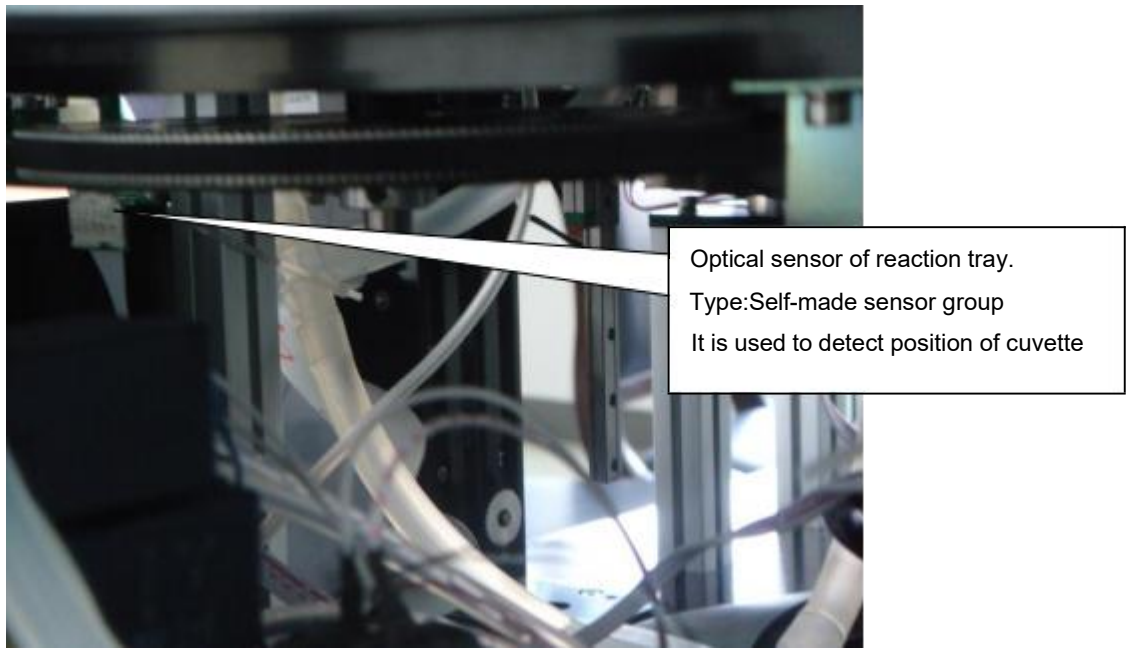




4.3 Optical Sensor

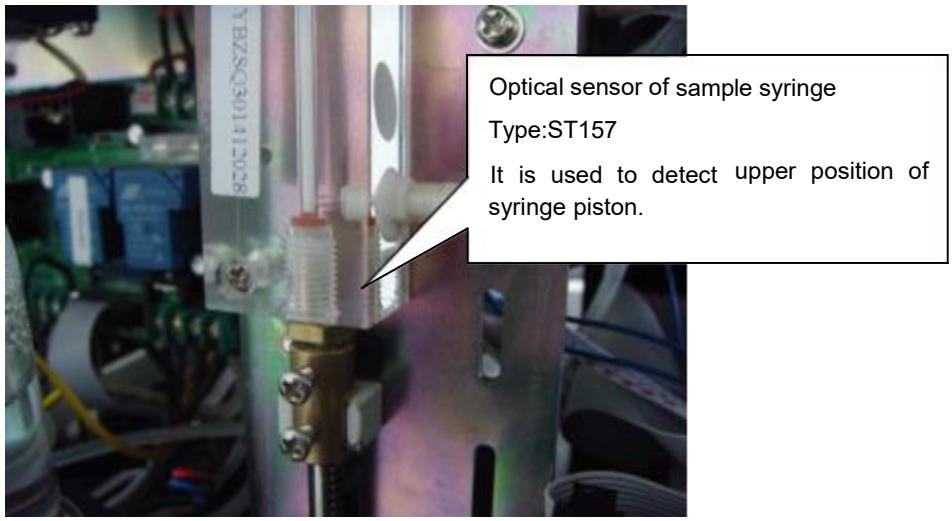
Optical sensor is used to make main controller board knows the position of mechanical part movement. If the optical sensor is not working well,the corresponding mechanical part movement will be in disorder.

1.Optical sensor of reaction tray rotation

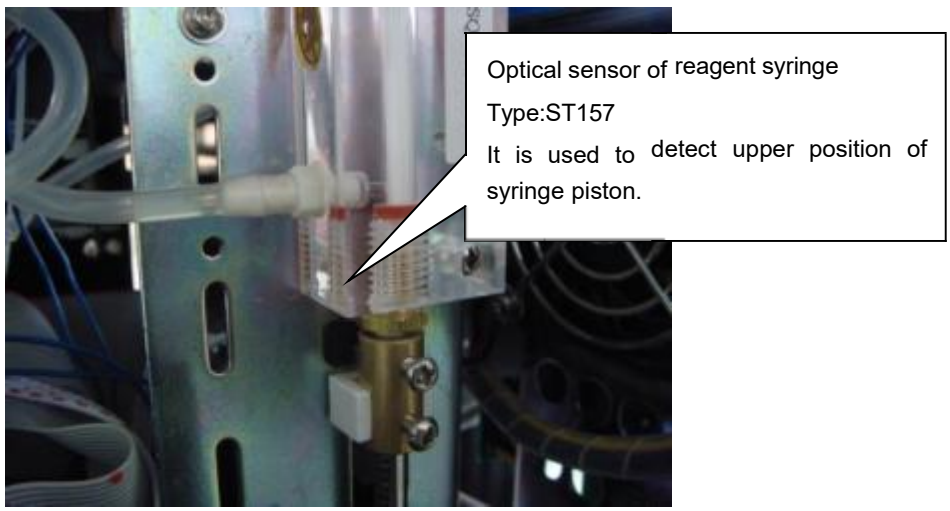


(Optical sensor of reaction tray.)

2.Optical sensor of sample/reagent syringe vertical movement

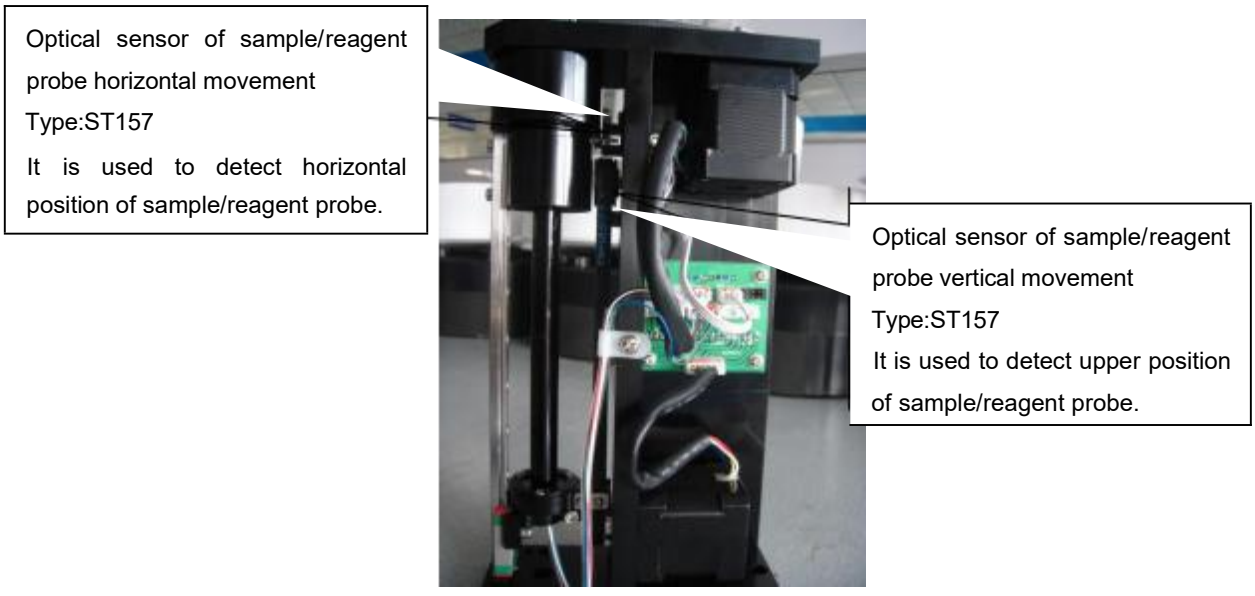


(Optical sensor of sample syringe)

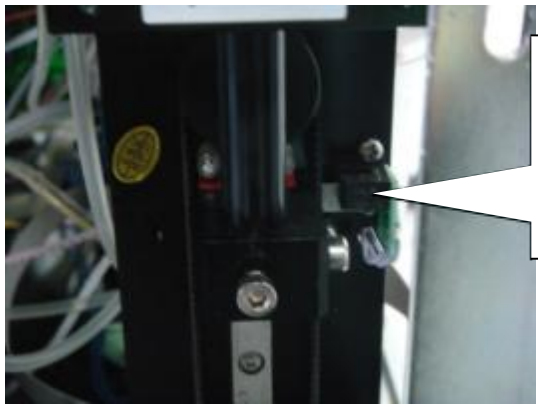


(Optical sensor of reagent syringe)

3.Optical sensor of sample/reagent probe vertical and horizontal movement.



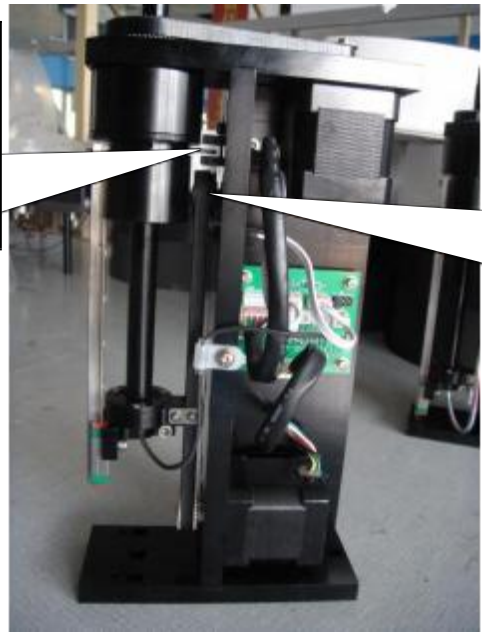
4.Optical sensor of washing unit vertical movement



Optical sensor of washing unit vertical movement
Type:ST135
It is used to detect upper position of washing unit.

5. Optical sensor of mixer probe vertical and horizontal movement.

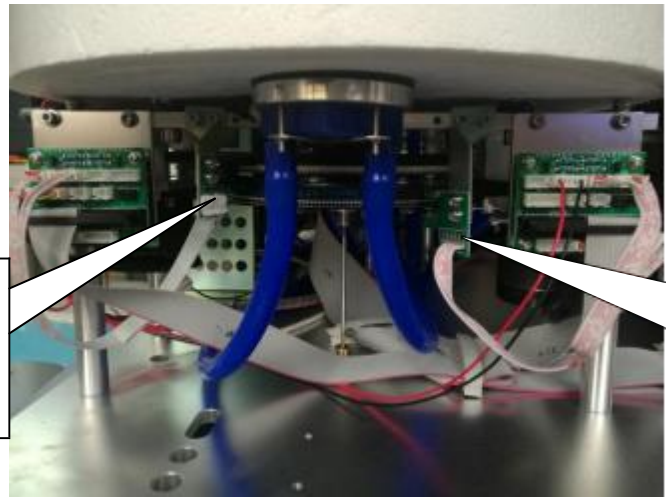
Optical sensor of mixer probe horizontal movement
Type:ST157
It is used to detect horizontal position of mixer probe.



Optical sensor of mixer probe vertical movement
Type:ST157
It is used to detect upper position of mixer probe.

6.Optical sensors of sample tray and reagent tray rotation

Optical sensor of sample tray.
Type:Self-made sensor group
It is used to detect position of sample.



Optical sensor of reagent tray.
Type:Self-made sensor group
It is used to detect position of reagent.

4.4 Sample/Reagent probe and drive assembly

Specification：

The type of stepping motor which control the probe to be up and down or left and right is 17HD432Y-22B.

The type of Optical Sensor is ST157,it is used to detect the position of the probe movement.

The size of up and down synchronous belt is 140MXL(width 6mm).

The size of left and right synchronous belt is B115 MXL(width 6mm).

Sample/reagent probe assembly drive sample/reagent probe to move up and down, left and right, and make sample/reagent probe to the corresponding reagent position, sample position, reaction cuvette position ,wash well position.

4.5 Mixer probe and drive assembly

Specification：

The type of stepping motor which control the mixer probe to be vertical movement is 17HD432Y-22B.

The type of stepping motor which control the mixer probe to be horizontal movement is 17HD432Y-22B.

The type of detection Sensor is ST157,it is optical switch,it is used to detect vertical or horizontal position of the probe.

The size of vertical synchronous belt is 140MXL(width 6mm).

The size of horizontal synchronous belt is B115MXL(width 6mm).

It is used to stir the reaction liquid (reagents and sample) in reaction cuvette to make them react completely.

4.6 Sample/reagent syringe and drive assembly

Specification：

The type of stepping motor which control the syringe to be up and down is 17HA403Y-18B.

The type of Optical Sensor is ST157, it is used to detect the up or down position of the syringe.

Sample/reagent syringe is used to aspirate the proper amount of sample or reagent , the amount is determined by software settings through singlechip program which controls stepping motor.

4.7 8-steps washing unit and drive assembly

Specification：

The type of stepping motor which control the washing arm to be up and down is 23HY109-20B7.

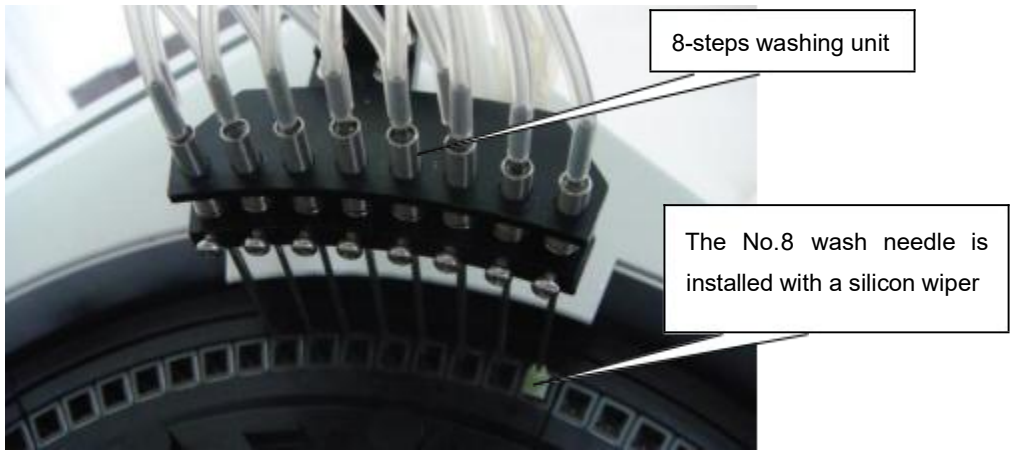
The size of up and down synchronous belt is 130MXL(width 6mm).

The type of Optical Sensor is ST135, it is used to detect the up or down position of the washing arm.

Washing unit is used to wash cuvettes and keep cuvettes clean, make the reaction result more accurate.

There are 14 wash needles on the washing unit. Five short needles are used to dispense distilled water into cuvettes,one short needle is used to dispense detergent into cuvettes. Eight long needles are used to aspirate waste liquid from cuvettes. One long needle with silicon wiper is used to clean cuvette surface.

The No.8 wash needle is installed with a silicon wiper.



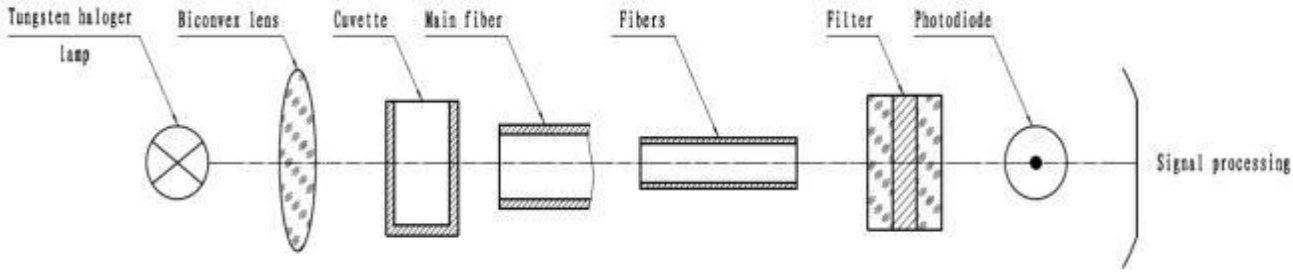
4.8 Photometric System

Photometric system includes tungsten-halogen lamp,reaction cuvette,optical fiber,light filter,signal process board and so on.

The lamp gives out the lights and the lights go into the cuvettes of the reaction tray, transmit through the cuvettes and separated by light filters to be specific wavelengths, and then go to the signal process board. the light signal are converted to electric signal through photodiod .the electric signal is amplified and converted to the A/D conversion circuit, and then sent to the main controller board,which will submit the absorbance to the PC for calculation.

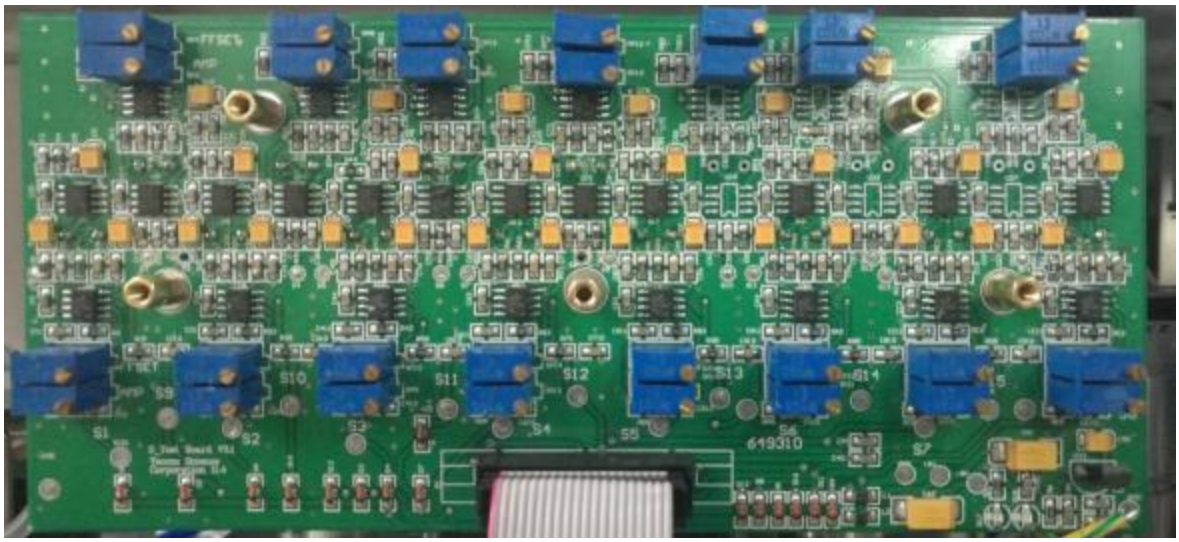
The absorbance is taken when the reaction cuvette rotates to the corresponding optical path.

Photometric Principle figure:

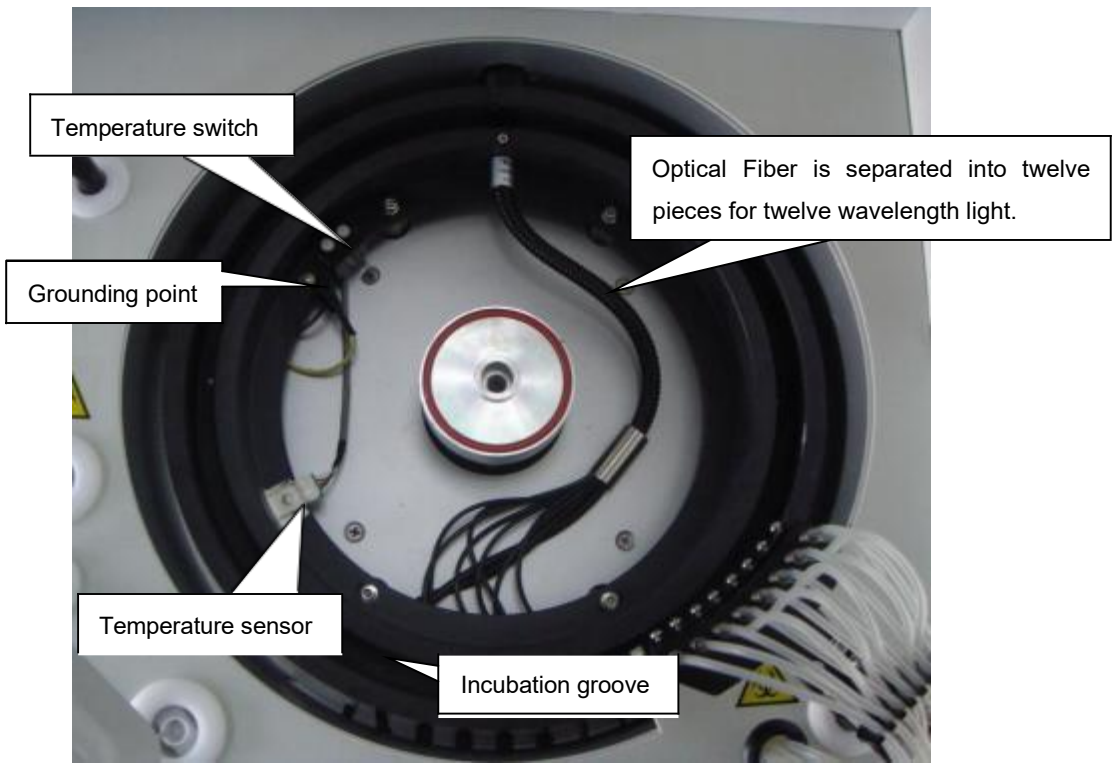


（Tungsten-halogen Lamp）

（The bracket of light filters）



（The twelve wavelength signal process board）



4.9 Temperature control process of Reaction Tray

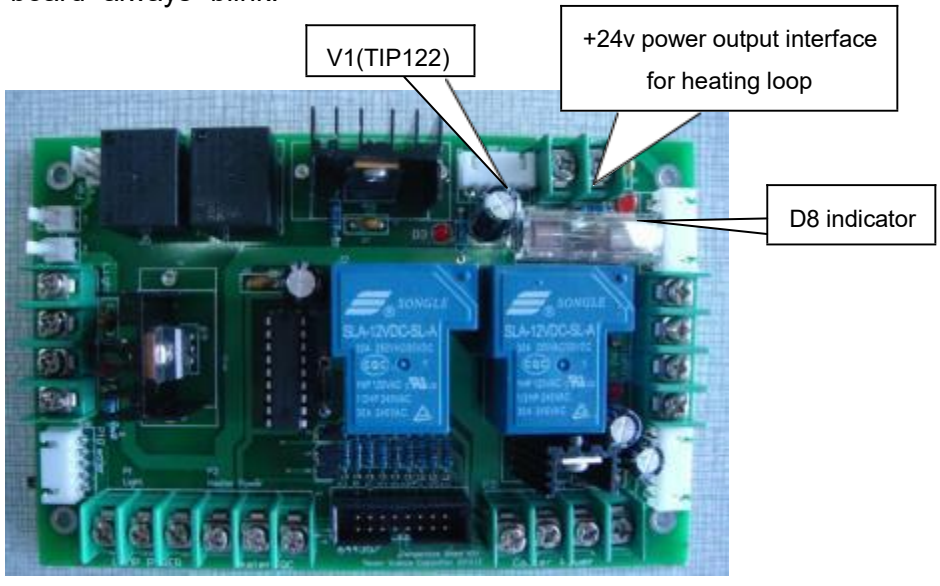
Temperature control assembly of reaction tray includes:heating loop, temperature switch(KSD9700),temperature sensor(LM95071).

Temperature switch will cut off ,when temperature of reaction tray reaches to be more than 60 centigrade, avoiding too hot.

Temperature sensor (LM95071) is surface mounted IC,when install it,it should be done to daub some heat transfer silicone on the induction side and don"t fix so tight that damage the chip.

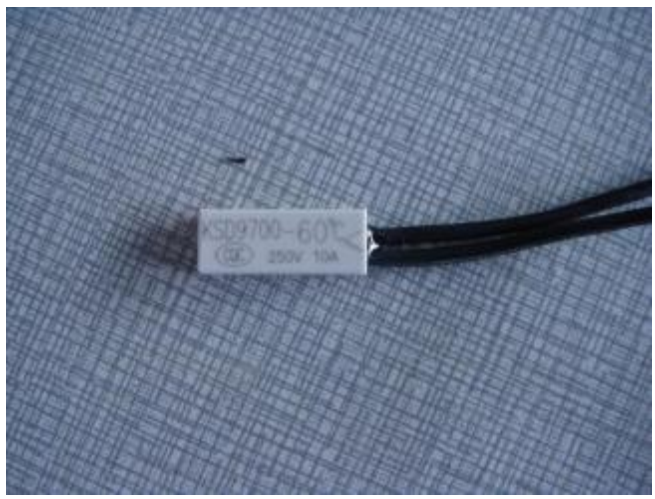
The process of temperature control:

When temperature sensor(LM95071) of reaction tray transmits the temperature signal to main controller board, The main controller board makes temperature signal compare with temperature setted up by software. If temperature of reaction tray is lower than the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V1) breakover,DC 24V power will load to the heating loop, the heating loop will heat the reaction groove,the D8 indicator of temperature controller board always lights. If temperature of reaction tray reaches to the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V1) cut off, the heating loop stops heating, the D8 indicator of temperature control board always blink.



(Temperature Controller Board)

（Heating loop）



（Temperature switch. KSD9700）

（Temperature sensor.LM95071 ）

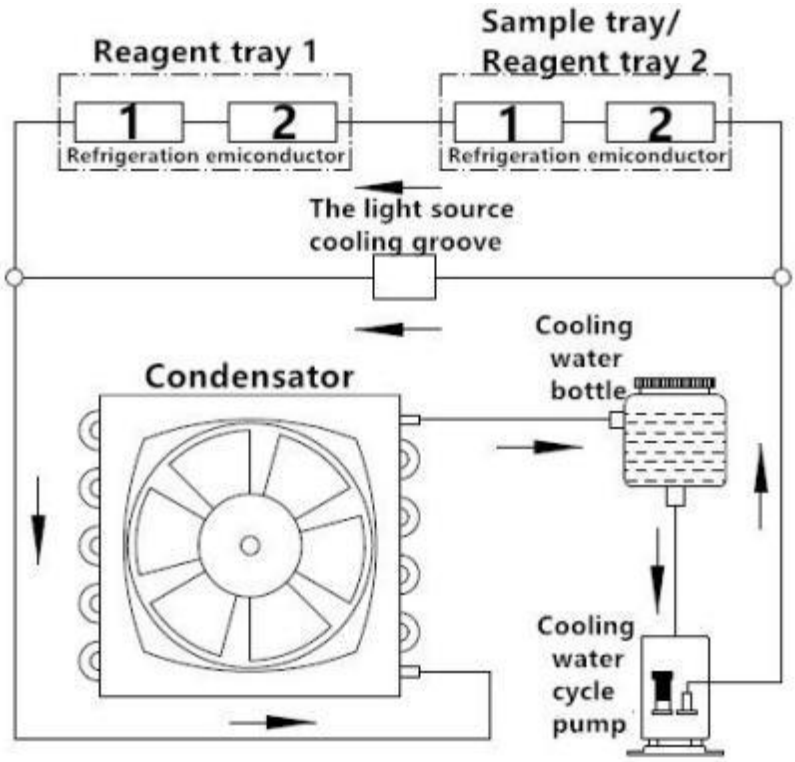
4.10 Temperature control process of Reagent Tray

Temperature control assembly of reagent tray includes: four refrigeration semiconductors, Condensator, Cooling Water Cycle Pump, Cooling Water Bottle, and four cooling fans of Condensator, temperature sensor(LM95071).

Water cooling system procedure:

1, Pure water is injected from the cooling water bottle,then through the cooling water cycle pump and takes away the heat from the two refrigeration semiconductors at the bottom of the reagent tray .

2, The pure water gets into the bottom of the condensator, through the condensator at the back of four cooling fans for cooling, achieves the purpose of recycling .



(Fluidic diagram of cooling system)

Water cooling system injection procedure:

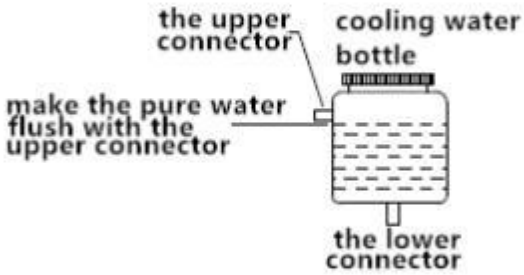
1, prepare pure water for about 1000ml;

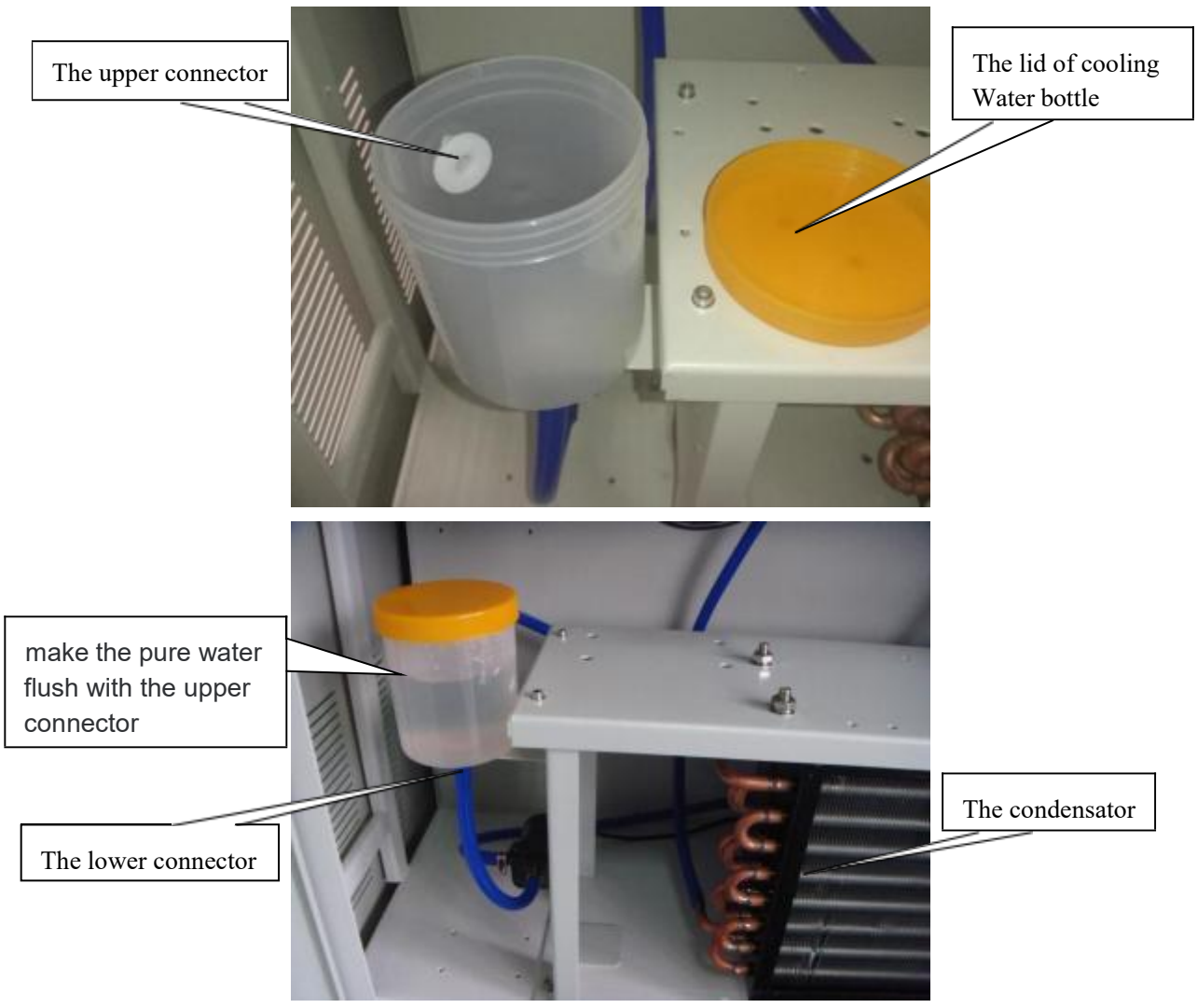
2, turn on the power supply of the instrument to start the cooling water cycle pump.

Keep in mind: don"t turn on the cooling switch of the instrument before operation

4, open the lid of the cooling water bottle, pour about 1000ml of pure water into the bottle slowly, and observe that the liquid slowly fills the entire water cooling system, and circulates throughout the water cooling system.

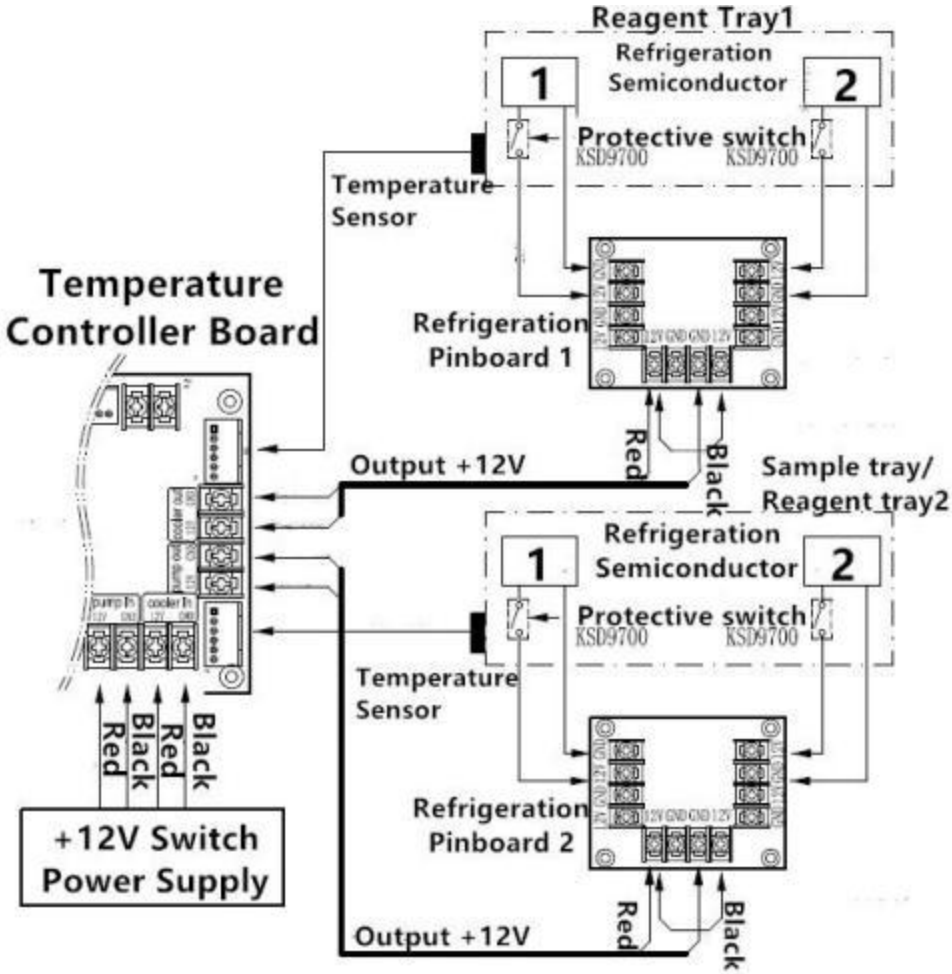
The pure water is added to the cooling water bottle position as shown below：





The process of temperature control:

When temperature sensor(LM95071) of reagent tray transmits the temperature signal to main controller board, The main controller board makes temperature signal compare with temperature setted up by software. If temperature of reagent tray is more than the temperature setted up by software, then main controller board transmits signal to temperature controller board,DC12V power will load to the refrigeration pinboard. The two indicator lamps are lighting on this pinboard. D7 indicator of temperature controller board always lights. If temperature of reaction tray is lower than the temperature setted up by software, then main controller board transmits signal to temperature controller board, DC 12V power will stop supplying to the refrigeration pinboard, then two indicator lamps are off on this pinboard. D7 indicator of temperature control board always blink.



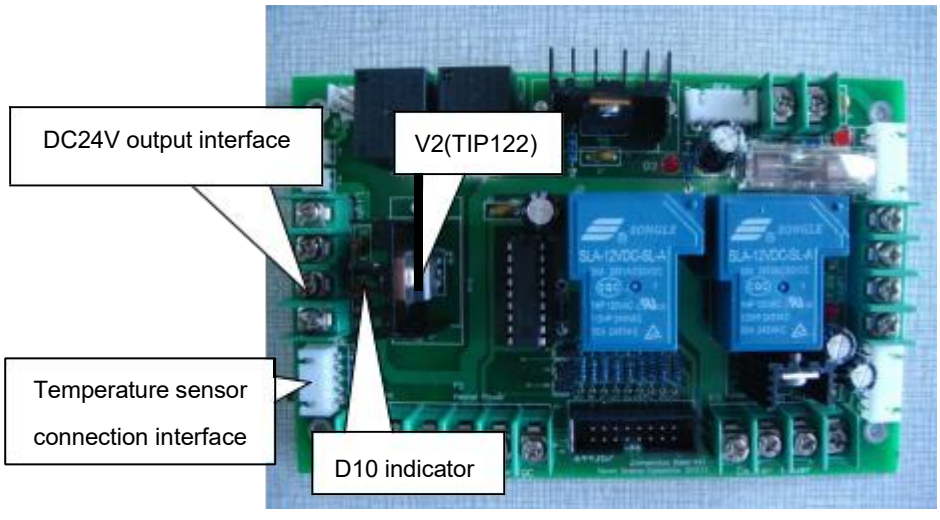
4.11 Water Temperature Control process of water tank

Water Tank temperature control Assembly include water tank,temperature switch(KSD9700),temperature sensor(LM95071), and calefaction stick.

When the water temperature of tank is higher than 60℃,the temperature switch will be automatically cut off in case of overheating.

The process of temperature control:

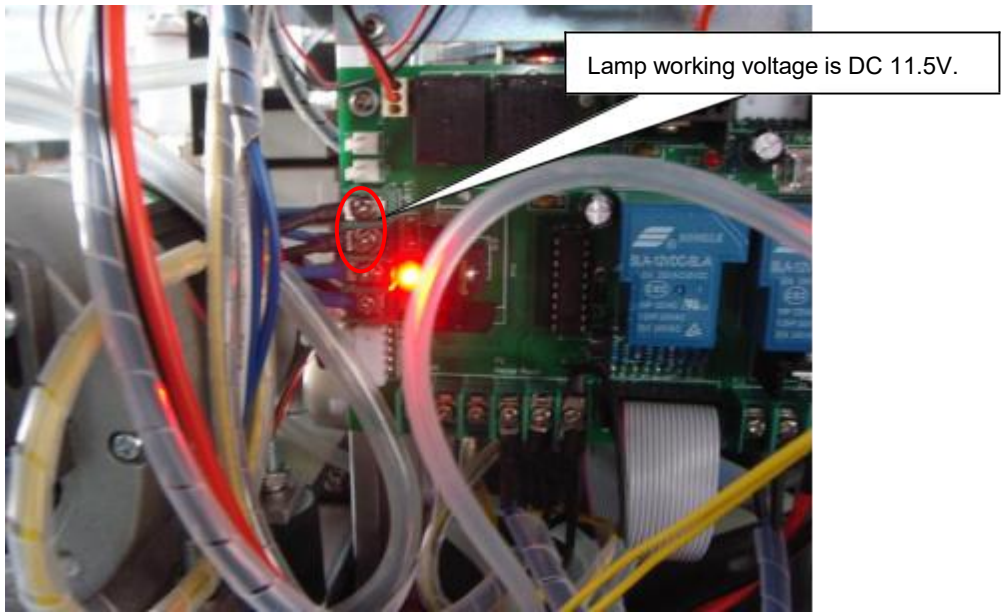
When temperature sensor(LM95071) of water tank transmits the temperature signal to main controller board, The main controller board makes temperature signal compare with water temperature setted up by software. If water temperature is lower than the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V2) breakover, 24V power will load to the calefaction stick, it will heat water,the D10 indicator of temperature controller board always lights. If water temperature reaches to the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V2) cut off, the calefaction stick stops heating, the D10 indicator of temperature controller board always blink.



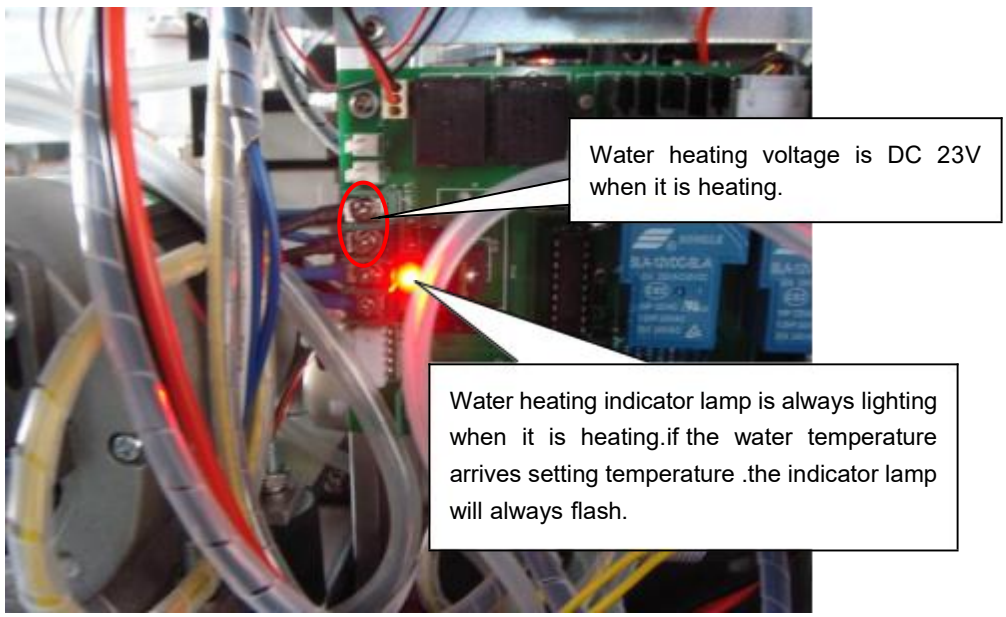
4.12 Working Voltage Measurement Detail on the Temperature Controller Board

When turn on the TC6060 machine,working voltages of temperature controller board is checked as following:

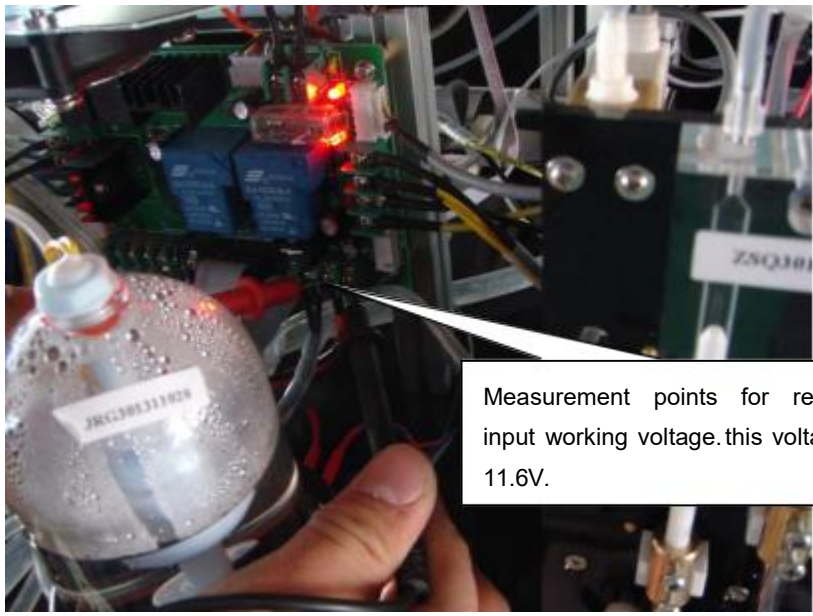
1. Halogen lamp working voltage measurement .



2. Water tank heating voltage measurement.

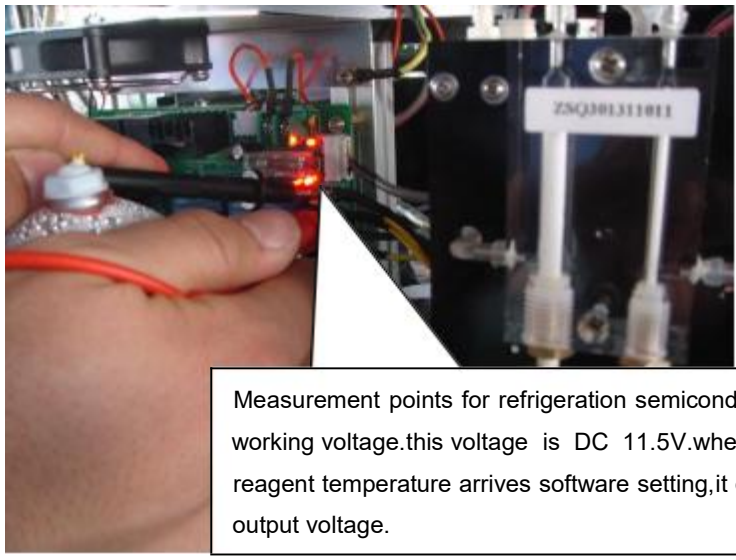


3. Refrigeration input working voltage measurement .



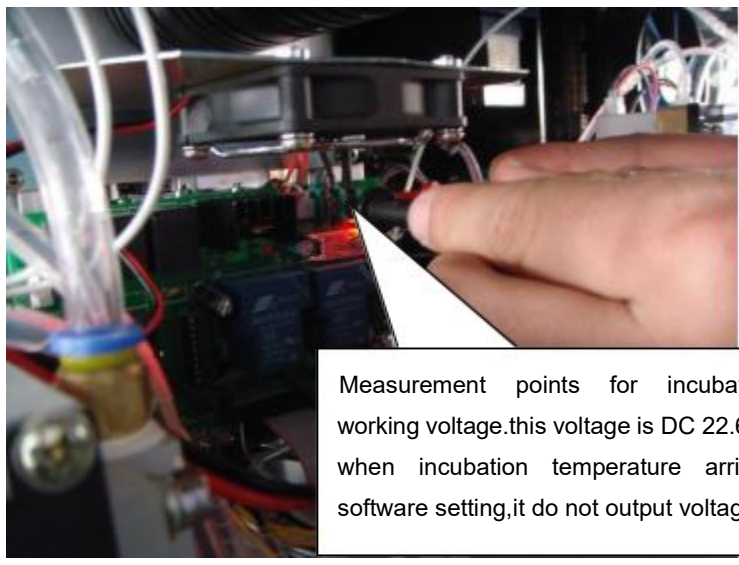
Measurement points for refrigeration input working voltage. this voltage is DC 11.6V.

4. Refrigeration pinboard working voltage measurement.



Measurement points for refrigeration semiconductor working voltage.this voltage is DC 11.5V.when the reagent temperature arrives software setting,it don"t output voltage.

5. Reaction tray incubation working voltage measurement



Measurement points for incubation working voltage.this voltage is DC 22.6V. when incubation temperature arrives software setting,it do not output voltage.

4.13 System Power Supply

DW-TC6090 system power supply consists of three switching power supplys （SP-320-12、 SP-320-24 、SP-320-24）and self-made power supply subassembly.

Switch power supply（SP-320-12）output DC12V, provide for temperature controller board and input of Refrigerating reagent tray .

Switch power supply（SP-320-24）output two groups DC24V, provide for self-made power supply subassembly and temperature control board respectively.

DC24 voltages input the temperature controller board,and it provides power supply for below functions:

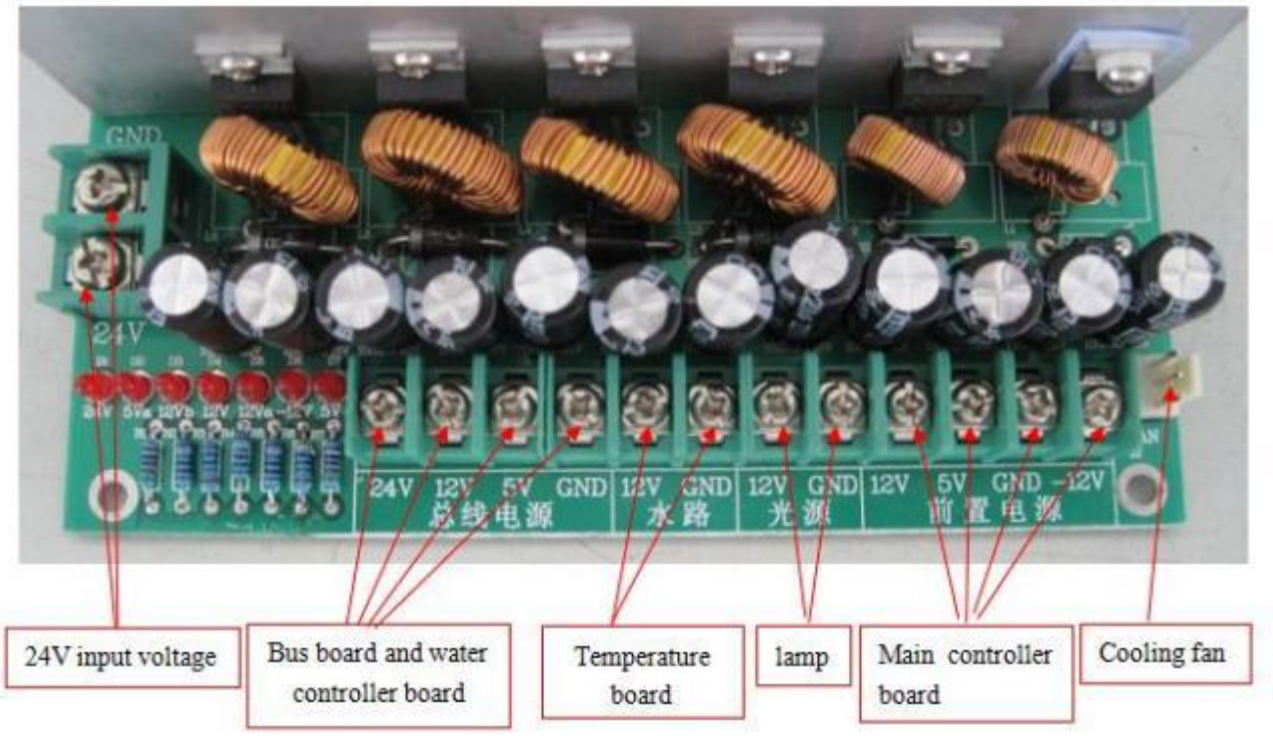
1. Water tank heating
2. Reaction Tray incubation
3.Waste pump working voltage

Self-made power supply subassembly „s output power supply provides for below:

1. Bus board power supply：DC+5V 、DC+12V 、DC +24V
2. Temperature controller board power supply ： DC +12V
3. Halogen lamp power supply：DC +12V
4. Main controller board power supply ： DC +5V ， DC -12V ， DC +12V

(SP-320-12 Switch Power Supply)

(SP-320-24 Switch Power Supply)



(Self-made Power Transformer)

4.14 Circuit board function description

4.14.1 Main controller board function

Main controller board achieves the following functions:

(1) Communicate with PC and execute command which is from chemistry software;

(2) Collect signal from the signal process board;

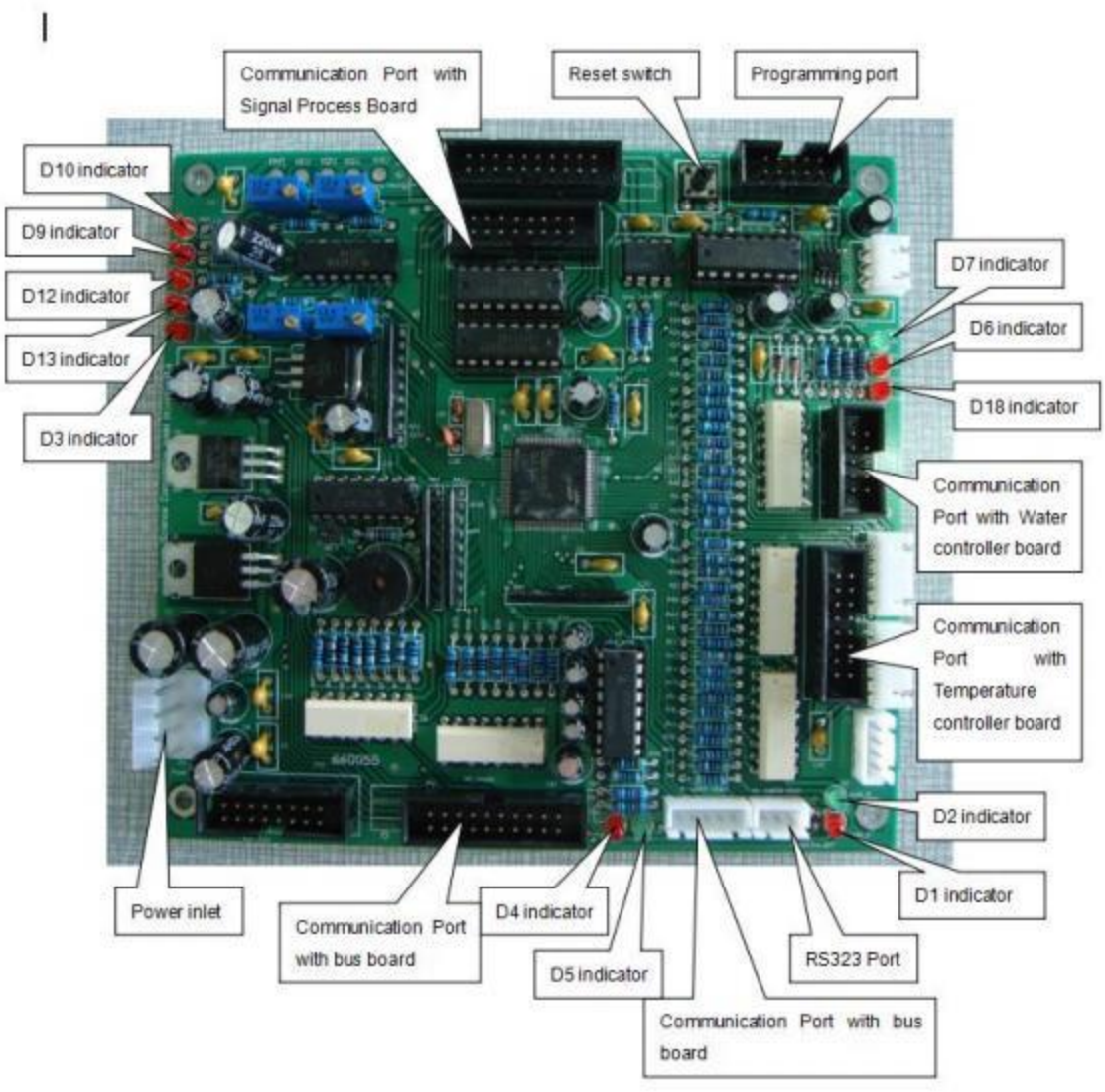
(3) Indicate the reaction tray rotation position;

(4) Detect the signal of distilled water level sensor and waste level sensor;

(5) Communicate with the Bus board ；

(6)Communicate with temperature controller board and send control command；

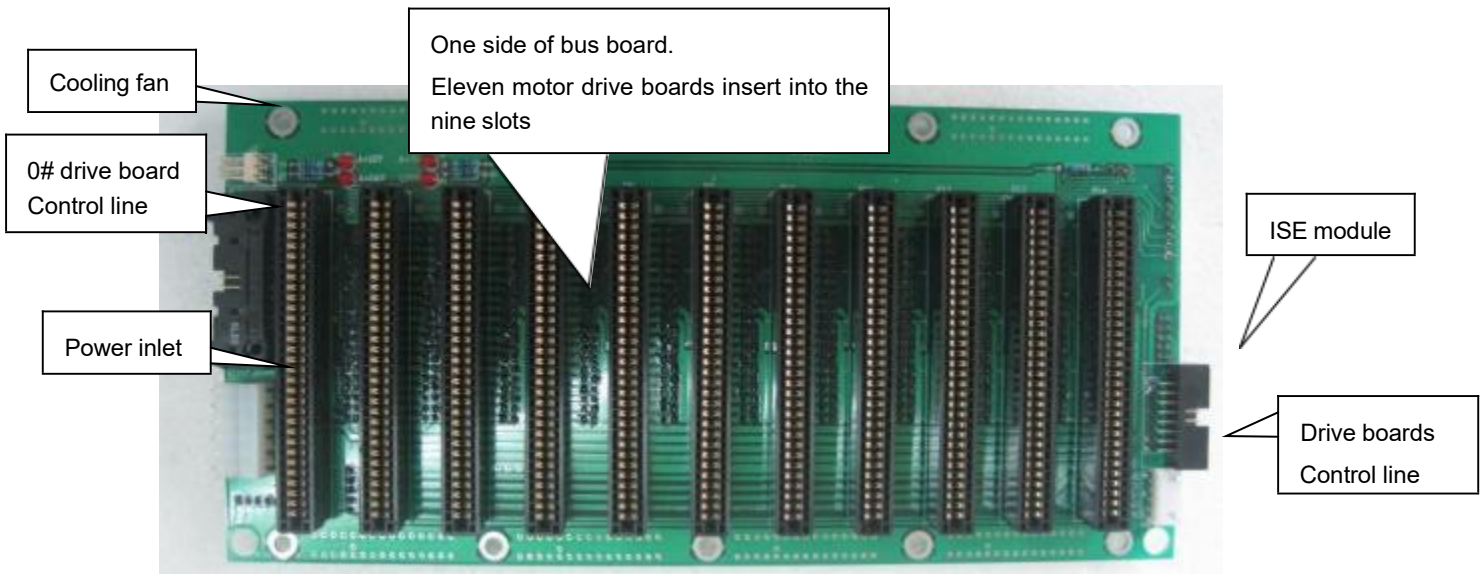
(7) Communicate with water controller board and send control command.

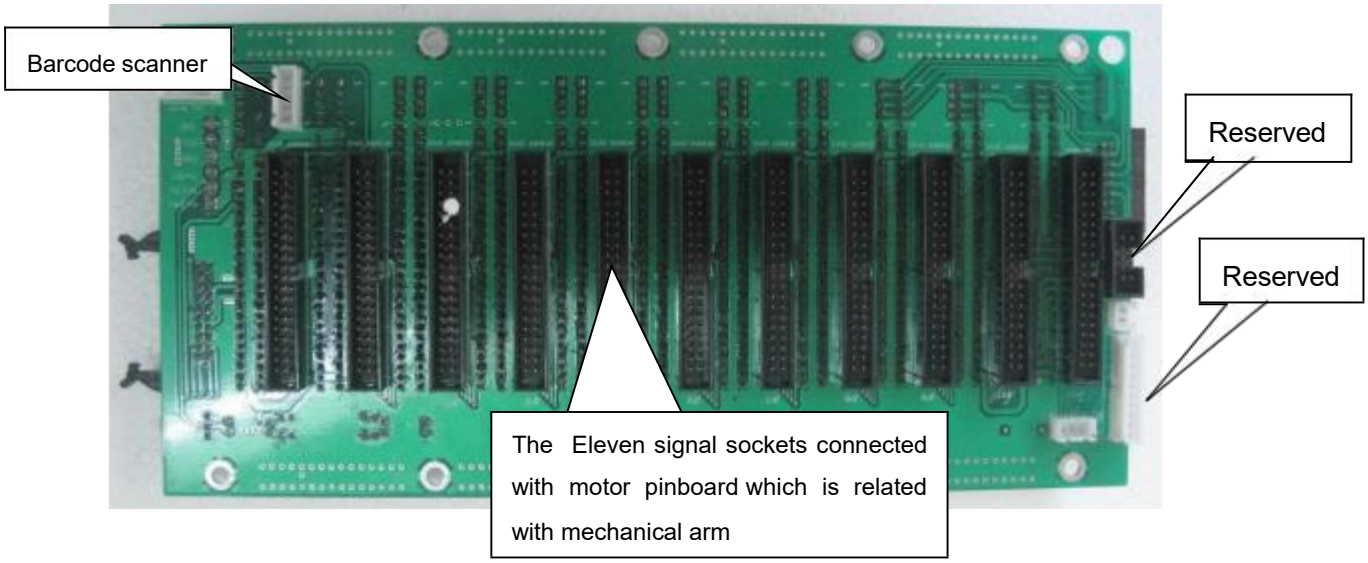


Indicator	Meaning Description
D1indicator	Main controller board send data to computer
D2 indicator	Computer send data to main controller board
D3 indicator	Power supply
D4 indicator	Bus board send data to main controller board
D5 indicator	Main controller board send data to Bus board
D6 indicator	When the reaction tray stop on the initialization position,it is bright
D7 indicator	When the reaction tray is rotating, it is blinking
D9 indicator	Plug needle check (R1 reagent needle);Gain adjustment is W2 potentiometer.
D10 indicator	Plug needle check (Sample needle);Gain adjustment is W1 potentiometer.
D12 indicator	Plug needle check (R2 reagent needle);Gain adjustment is W3 potentiometer.
D13 indicator	Reserved. Gain adjustment is W4 potentiometer.
D18 indicator	Singlechip program is running

4.14.2 Bus board

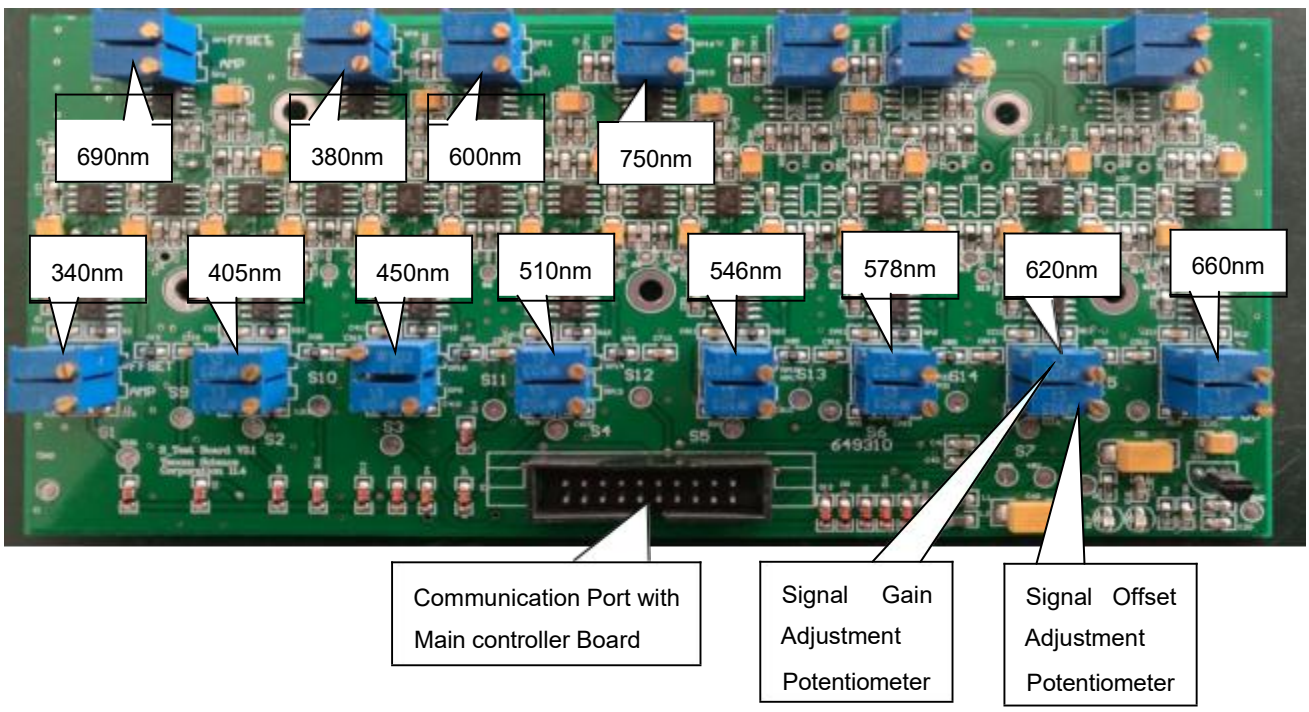
Eleven motor drive boards insert into slots which are on the bus board. The bus board collects and send mechanical motor position signal to the main controller board. The main controller board send back command to bus board according software operation.





4.14.3 Signal Process Board

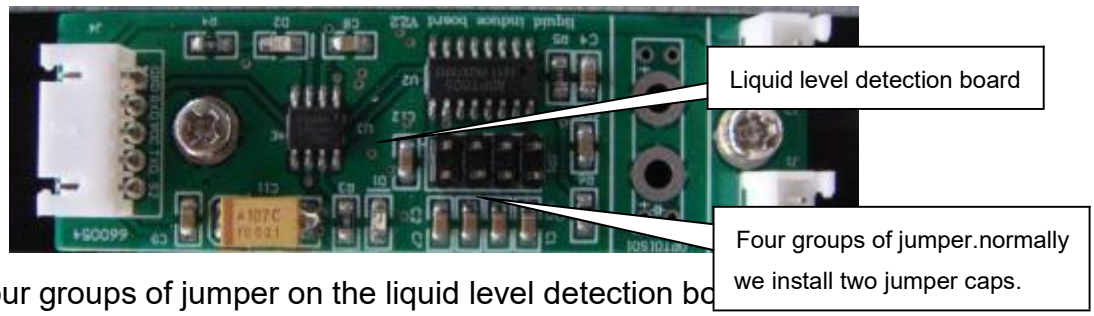
Signal Process Board Function: the light signal are converted to electric signal through photodiod. The electric signal is amplified and converted to the A/D conversion circuit, and then sent to the main controller board,which will submit the absorbance to the PC for calculation.



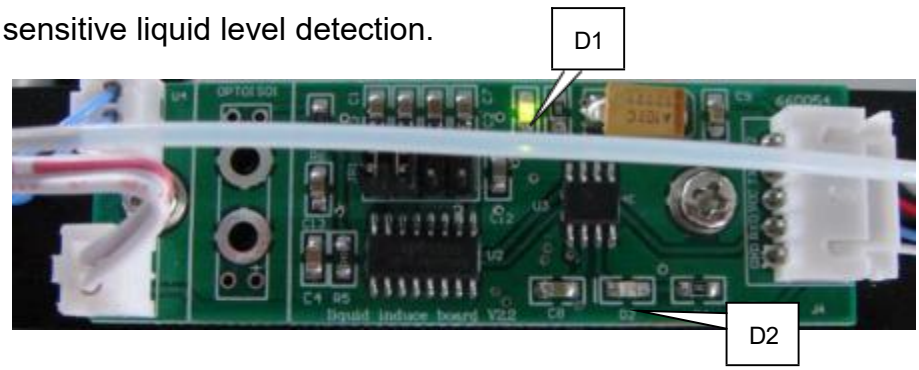
(View of the Signal Process Board)

4.14.4 Liquid Level Detection Board

When aspirating samples/reagents and dispensing into reaction tray, the chemistry analyzer requires the probe to dip into the liquid for a specific depth(2mm below the liquid level), so as to avoid carryover that has impacts on test results, and to avoid air aspiration when the reagent/sample is insufficient. Also when washing the probe in wash well, probe also need to stay at a special depth to wash the inner side and outer side.When the sample/reagent probe touches the sample/reagent level, there will be a change in the capacitance. As the capacitance changes, the phase changes.The phase discriminator then outputs a voltage variation,which will be filtered by a low-pass filter. After that, a band-pass filter takes the variation and reshapes it to pulse signals, which are finally transmitted to the main controller board.

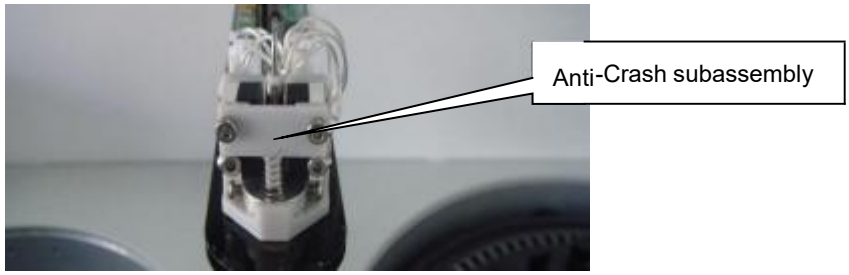


There are four groups of jumper on the liquid level detection bo
level detection can be adjusted through add or remove jumper cap.more jumper caps cause more sensitive liquid level detection.



When the machine is standby,the D1 is always bright.and D2 is always black.

If the sample/reagent probe touch the liquid,the D1 and D2 blink quickly.



When the probe is crashed in horizontal or vertical direction,the anti-crash subassembly will be active,and it sends signal to motor drive board and make sample/reagent probe arm stop running. The error message will be appeared.

4.14.5 Temperature Controller Board

Temperature Controller Board function

1. Control temperature of reaction tray

When temperature sensor(LM95071) of reaction tray transmits the temperature signal to main controller board, The main controller board makes temperature signal compare with temperature which is setted up by software. If temperature of reaction tray is lower than the temperature which is setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V1) breakover,DC 24V power will load to the heating loop, the heating loop will heat the reaction groove,the D8 indicator of temperature controller board always lights. If temperature of reaction tray reaches to the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V1) cut off, the heating loop stops heating, the D8 indicator of temperature control board always blink.

2. Control water temperature of water tank

When temperature sensor(LM95071) of water tank transmits the temperature signal to main controller board, The main controller board makes temperature signal compare with water temperature setted up by software. If water temperature is lower than the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V2) breakover,24V power will load to the calefaction stick, it will heat water,the D10 indicator of temperature controller board always lights. If water temperature reaches to the temperature setted up by software, then main controller board transmits signal to temperature controller board,making TIP122(V2) cut off, the calefaction stick stops heating, the D10 indicator of temperature controller board always blink.

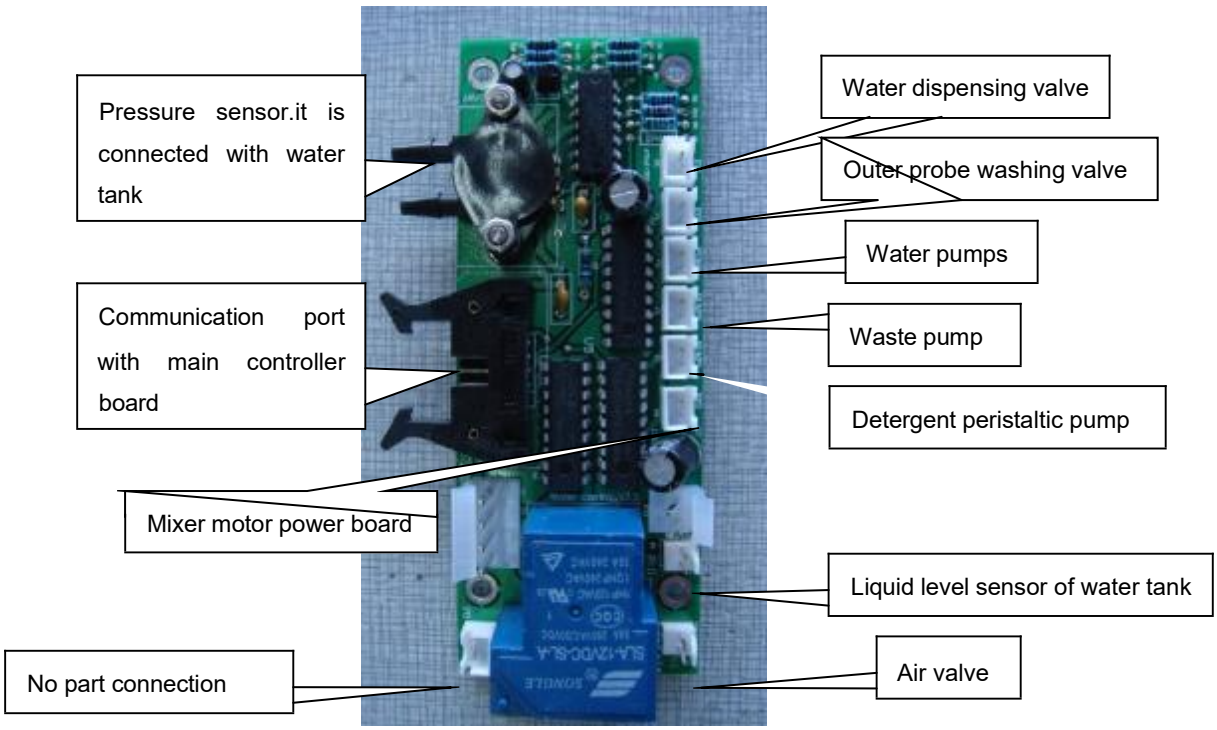
3. Control refrigeration working voltage

When temperature sensor(LM95071) of reagent tray transmits the temperature signal to

main controller board, The main controller board makes temperature signal compare with temperature setted up by software. If temperature of reagent tray is more than the temperature setted up by software, then main controller board transmits signal to temperature controller board,DC12V power will load to the refrigeration pinboard, then two indicator lamps are lighting on this pinboard.then two cooling fans are running ,D7 indicator of temperature controller board always lights. If temperature of reaction tray is lower than the temperature setted up by software, then main controller board transmits signal to temperature controller board, DC 12V power will stop supplying to the refrigeration pinboard, then two indicator lamps are off on this pinboard.then two cooling fans are stop running, D7 indicator of temperature control board always blink.

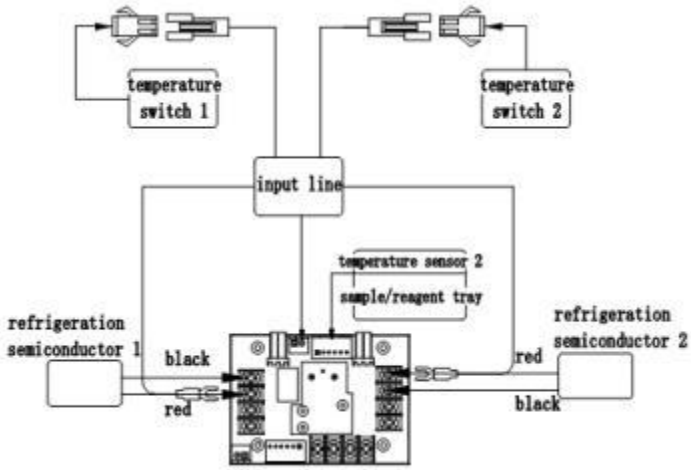
4.14.6 Water Controller Board

This board is connected with valve,pump and control their working condition according command which is from main controller board.



4.14.7 Reagent Refrigeration Pinboard

Reagent refrigeration pinboard connects with two refrigeration semiconductor.

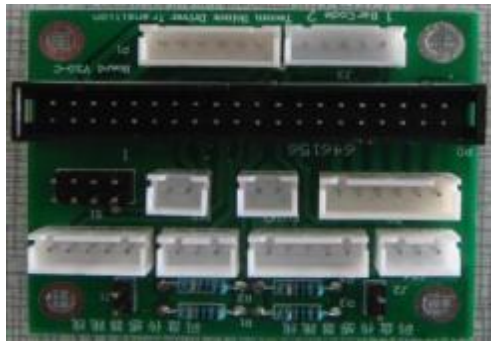


4.14.8 Mechanical Arm Subassembly Pinboard

This board is used to build communication between bus board with optical sensor or stepping motor of mechnical arm subassembly.

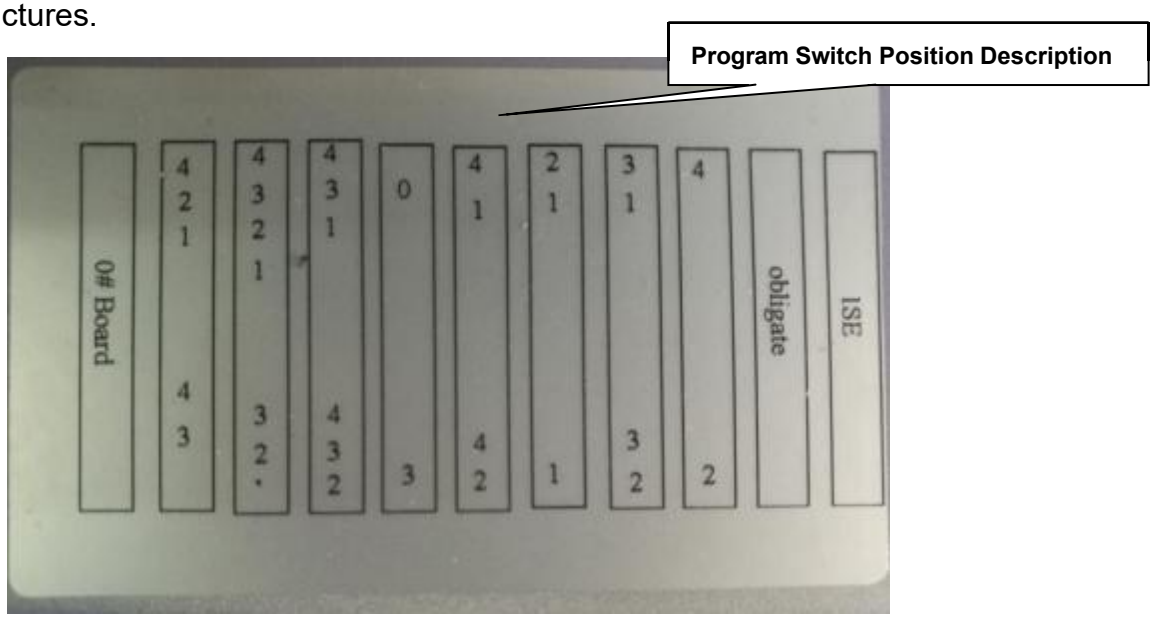
There are two kinds of arm subassembly pinboard.different arm pinboard has different interface connection and jumper setting.when we replace or remove it,we must record jumper position of pinboard. It is very important .otherwise corresponding arm subassembly movement will be disordered.

The pinboard has only one side with interface ports as following picture.

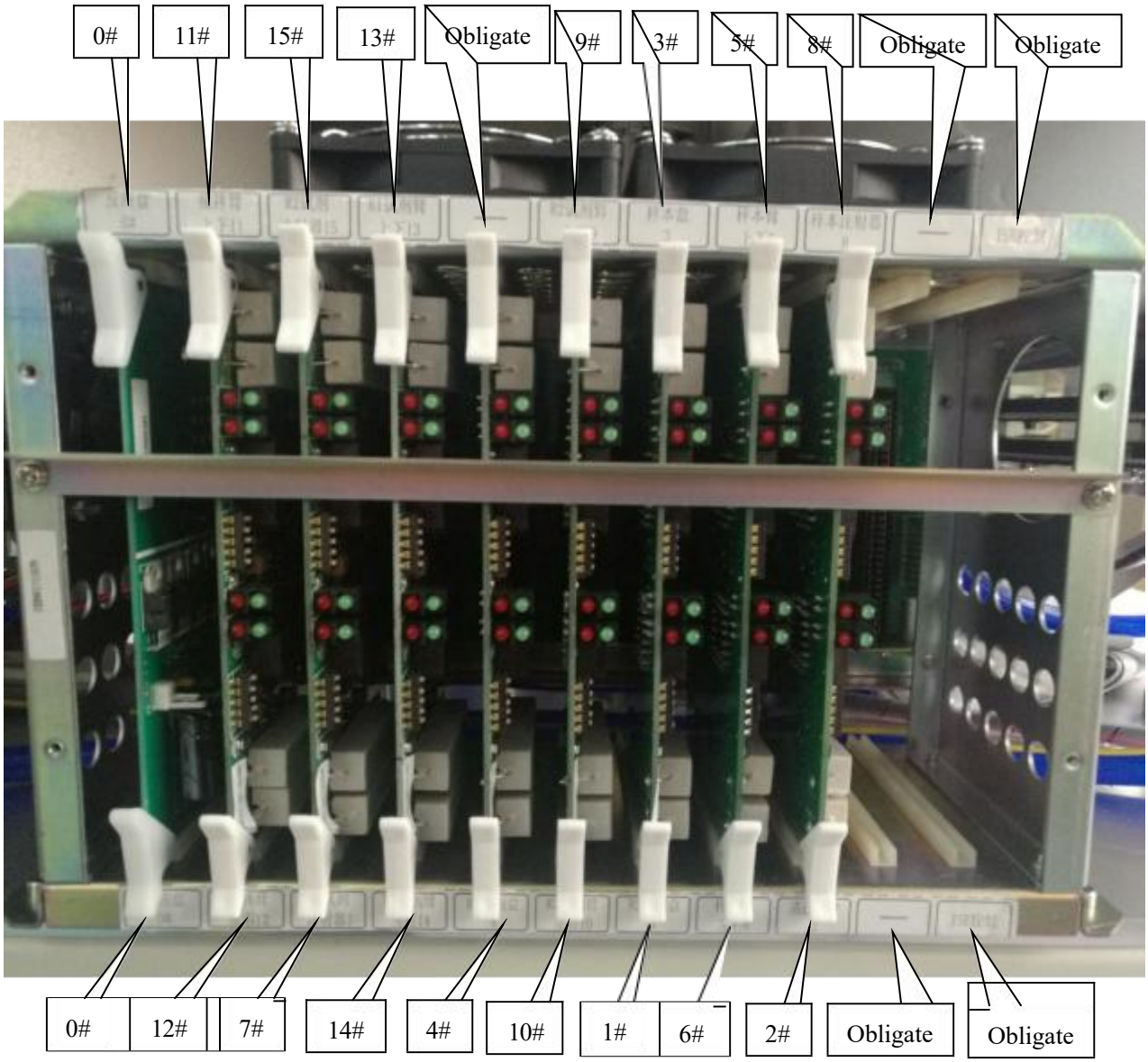


4.14.9 Stepping Motor Drive Board

This board is used to drive the corresponding stepping motor according command from main controller board. There are seven pieces motor drive boards,see the following pictures.



Program Switch	0#	11#	15#	13#	Obligate	9#	3#	5#	8#	obligate	obligate
K2-5	Reaction tray motor Drive board	off	off	off	off	off	off	off	off		ISE module
K2-4		on	on	on	off	on	off	off	on		
K2-3		off	on	on	off	off	off	on	off		
K2-2		on	on	off	off	off	on	off	off		
K2-1		on	on	on	off	on	on	on	off		
K1-5		off	off	off	off	off	off	off	off		
K1-4		on	off	on	off	on	off	off	off		
K1-3		on	on	on	on	off	off	on	off		
K1-2		off	on	on	off	on	off	on	on		
K1-1		off	off	off	off	off	on	off	off		
	0#	12#	7#	14#	4#	10#	1#	6#	2#	obligate	obligate



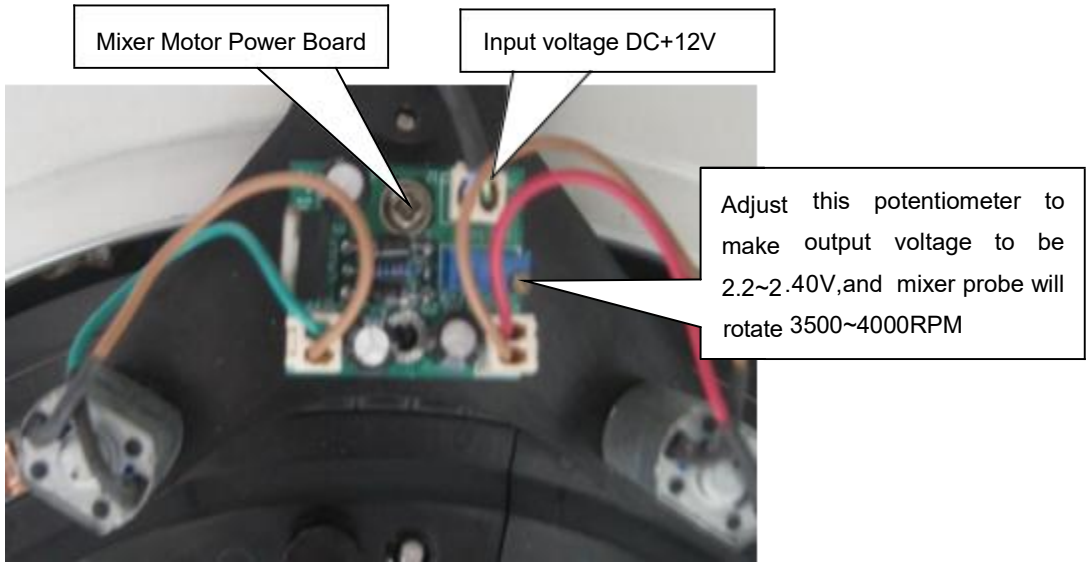
Nine stepping motor drive boards have own program switch position except the board which drives the rotation stepping motor of reaction tray.

When you replace motor drive board, you should notice the program switch position. Otherwise the corresponding motor movement will be abnormal.

When the stepping motor movement problem is occurred, the error message will appear and give “Motor Number is error” .in the following table,it is shown that the motor number is related with motor function.

Stepping Motor Number	Function and description
Motor 0	Drive reaction tray rotation
Motor 1	Drive reagent tray2 rotation
Motor 2	Drive 8-steps washing unit to be up or down
Motor 3	Drive sample tray rotation
Motor 4	Drive reagent tray1 rotation
Motor 5	Drive sample arm to be up or down
Motor 6	Drive sample arm to be left or right
Motor 7	Drive reagent 1 syringe to be up or down
Motor 8	Drive sample syringe to be up or down
Motor 9	Drive reagent 2 arm to be up or down
Motor 10	Drive reagent 2 arm to be left or right
Motor 11	Drive mixer arm to be up or down
Motor 12	Drive mixer arm to be left or right
Motor 13	Drive reagent 1 arm to be up or down
Motor 14	Drive reagent 1 arm to be left or right
Motor 15	Drive reagent 2 syringe to be up or down

4.14.10 Mixer Motor Power Board



The input voltage is DC+12V. Adjust this potentiometer to make output voltage to be 2.2~2.40V,and mixer probe will rotate 3500~4000RPM.

Chapter 5 Component Adjustment and Replacement

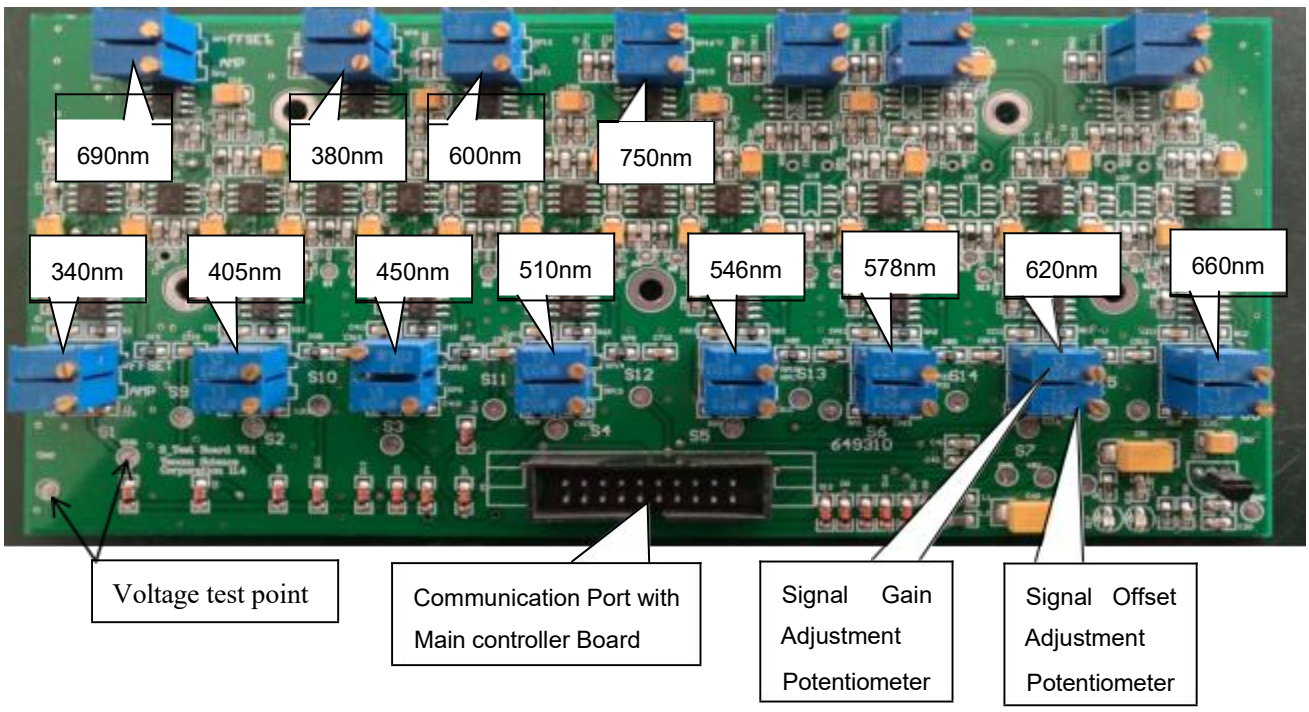
5.1 Signal process board voltage adjustment

1. Offset Voltage adjustment of the signal process board.Remove the power connector of Tungsten-Halogen Lamp and switch on the machine,then set the multimeter to DC 200mV grade. The black pen of the multimeter is connected to ground point, and the red pen measure the corresponding test points of wavelength, adjust the corresponding potentiometer of offset voltage adjustment to ensure the voltage to be 5~10mv.according this adjustment procedure,to adjust the offset voltage of all the wavelengths.

2. Gain voltage adjustment of the signal process board

Firstly initialize the machine,and add 400ul distilled water into the NO.86 reaction cuvette,waiting thirty minutes, set the multimeter to DC 20V grade. The black pen of the multimeter is connected to ground point, and the red pen measure the corresponding test point of wavelength, adjust the corresponding potentiometer of gain voltage adjustment to ensure the voltage to be 3.7~3.8V.

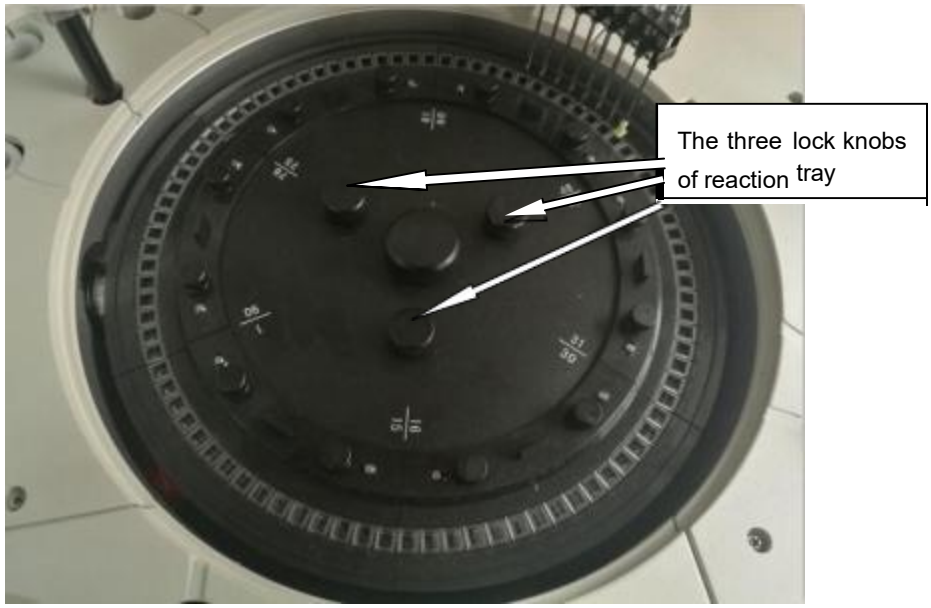
According this adjustment procedure,to adjust the gain voltage of all the wavelengths.



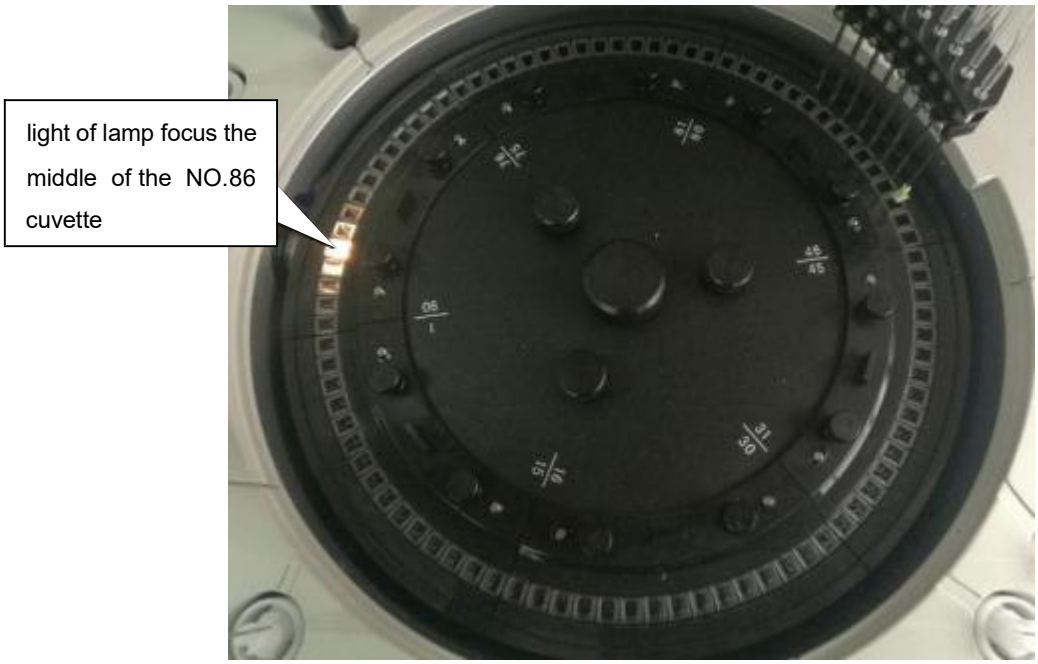
5.2 Reaction tray position adjustment

After initialize the machine,the light of lamp should focus on the middle of the NO.86 cuvette. If the reaction tray position is not suitable,it is necessary to adjust it as following steps.

1. Initialize the machine, then rotate the three lock knobs anticlockwise and remove it.



2.Rotate the reaction tray and make light of lamp focus the middle of the NO.86 cuvette.

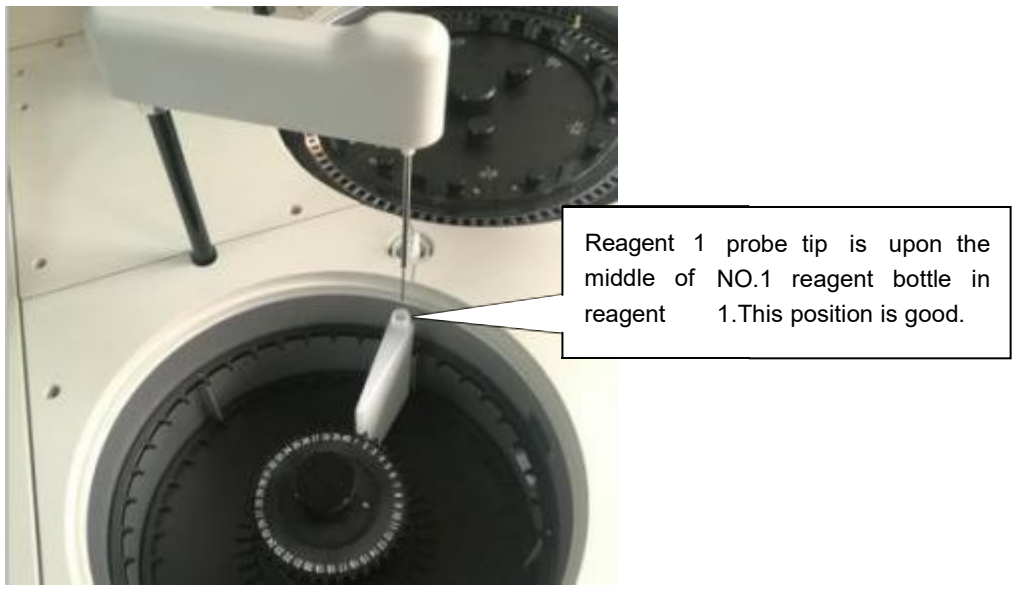


3.Tighten the three lock knobs clockwise and initialize the machine to confirm again.

5.3 Reagent/sample tray position adjustment

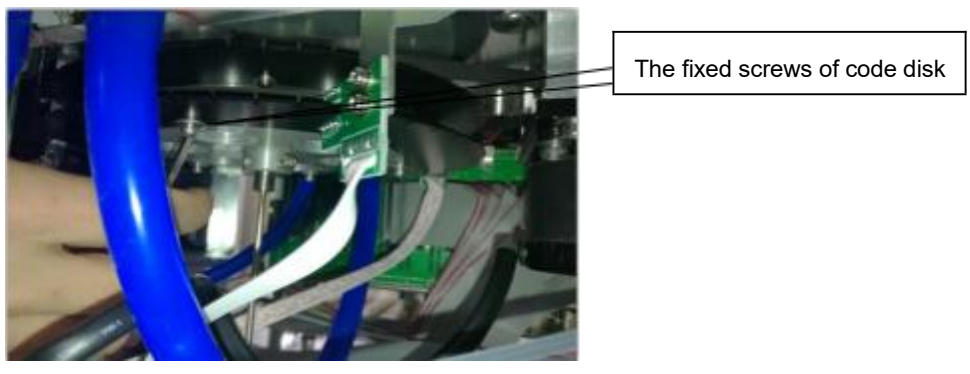
5.3.1 Reagent tray 1 position adjustment

Initialize the machine and enter parameter setup menu. Then click “1# reagent” button in Reagent 1 arm setup. If reagent 1 probe can arrive upon the middle of NO.1 reagent bottle in reagent tray 1. It means the position is good. Otherwise it is necessary to adjust as following steps.

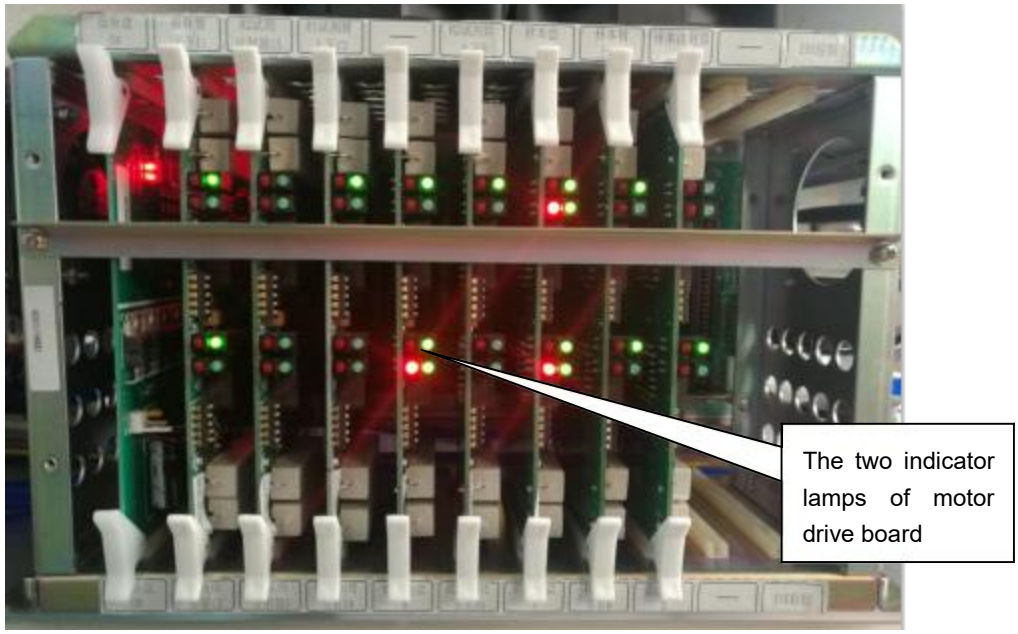


Adjustment procedure:

1. Initialize the machine.
2. Enter parameter setup menu.then click “1# reagent” button.Reagent probe tip is not upon the middle of NO.1 reagent bottle. This position is wrong.
3. Rotate reagent tray by hand and make NO.1 reagent bottle under reagent probe tip.
4. Loosen six fixed screws of code disk which is located on the bottom of reagent tray 1.



5. Rotate code disk and make the two indicator lamps are lighting.

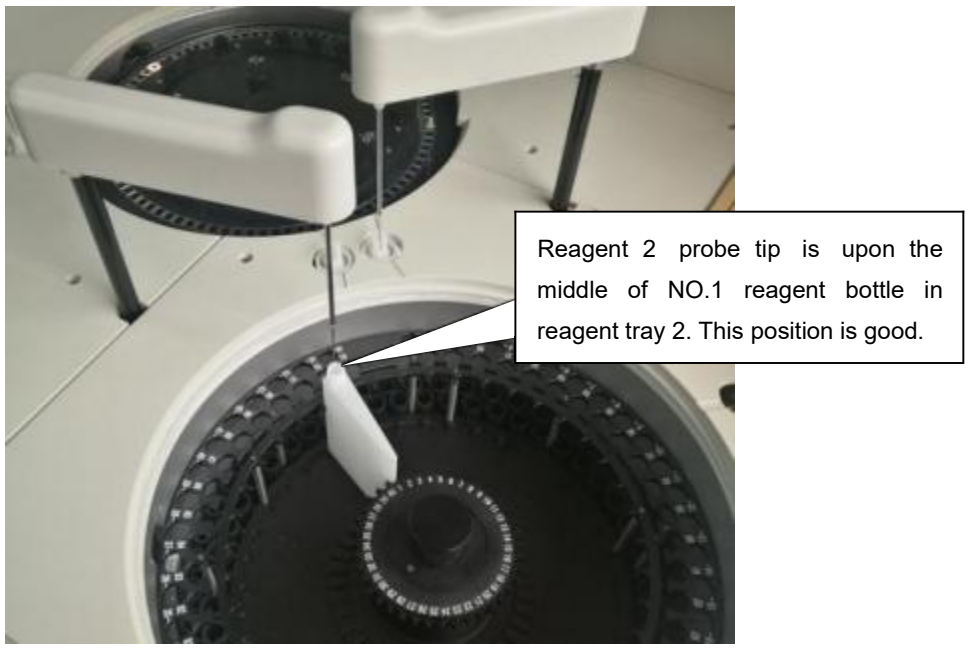


6. Tighten these six screws.

7. Initialize the machine and check whether the two indicator lamps are lighting and the reagent probe tip is upon the middle of No. 1 reagent bottle or not.

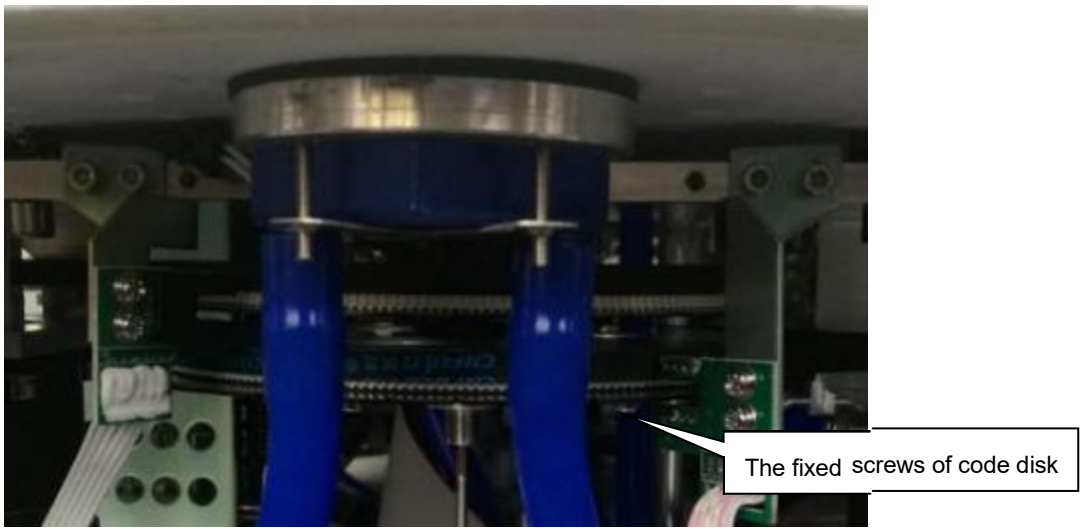
5.3.2 Reagent tray 2 position adjustment

Initialize the machine and enter parameter setup menu. Then click “1# reagent” button in Reagent 2 arm setup. If reagent 2 probe can arrive upon the middle of NO.1 reagent bottle in reagent tray 2. It means the position is good. Otherwise it is necessary to adjust as following steps.

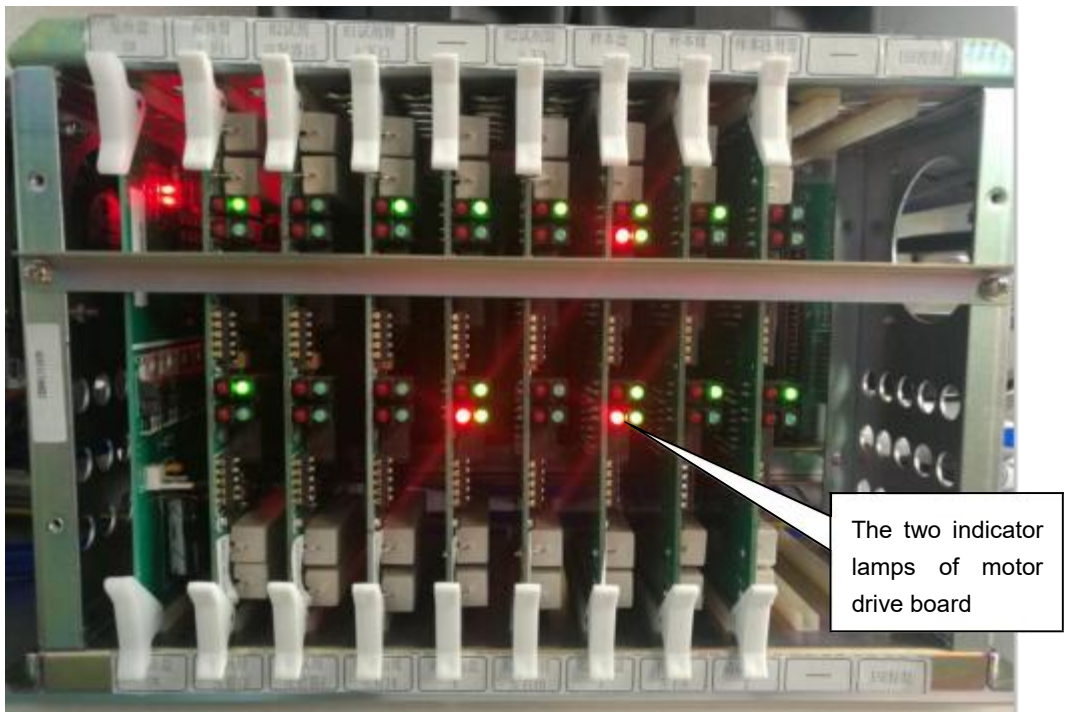


Adjustment procedure:

1. Initialize the machine.
2. Enter parameter setup menu.then click “1# reagent” button.Reagent probe tip is not upon the middle of NO.1 reagent bottle. This position is wrong.
3. Rotate reagent tray by hand and make NO.1 reagent bottle under reagent probe tip.
4. Loosen six fixed screws of code disk which is located on the bottom of reagent tray 1.



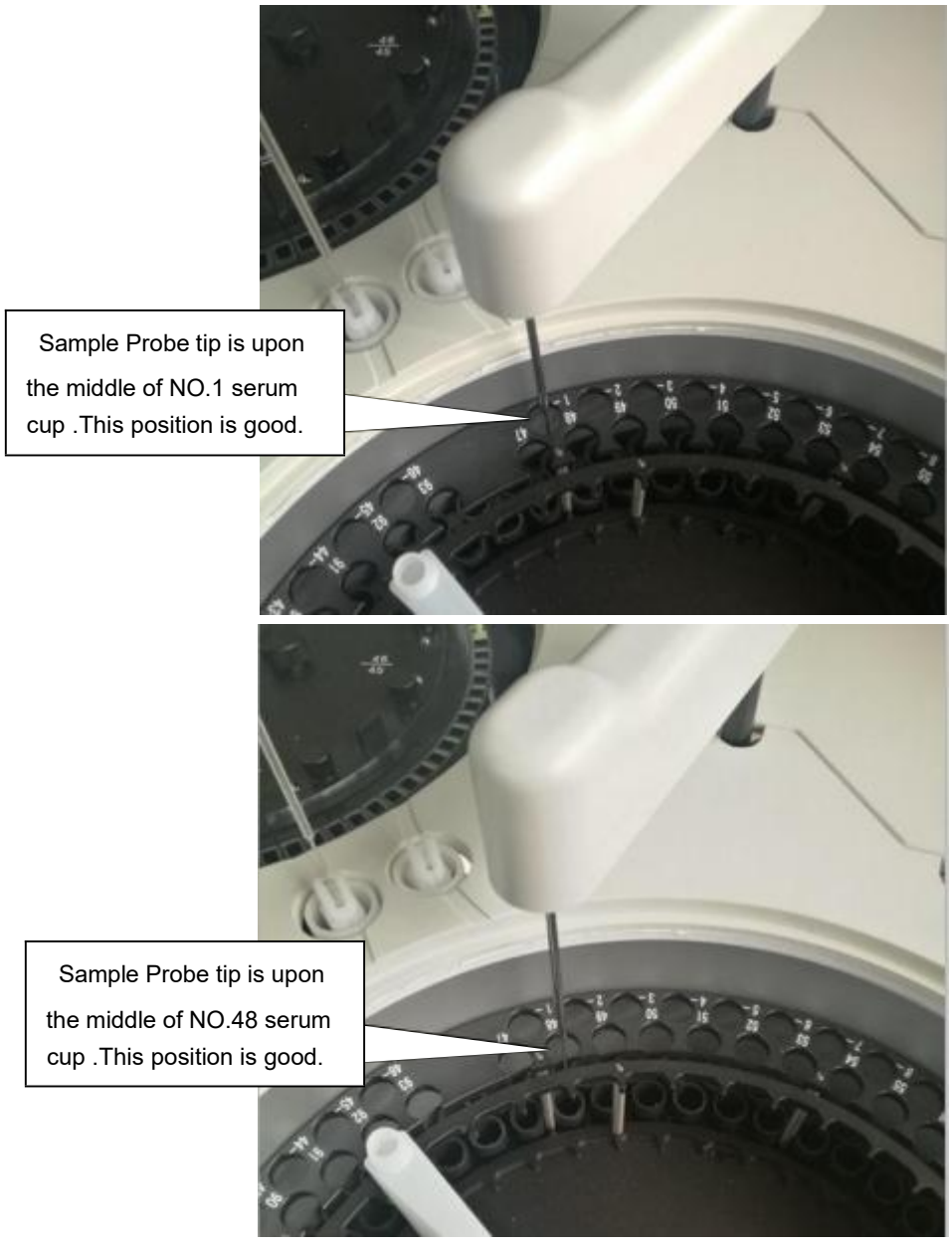
5. Rotate code disk and make the two indicator lamps are lighting.



6. Tighten these six screws.
7. Initialize the machine and check whether the two indicator lamps are lighting and the reagent probe tip is upon the middle of No. 1 reagent bottle or not.

5.3.3 Sample tray position adjustment

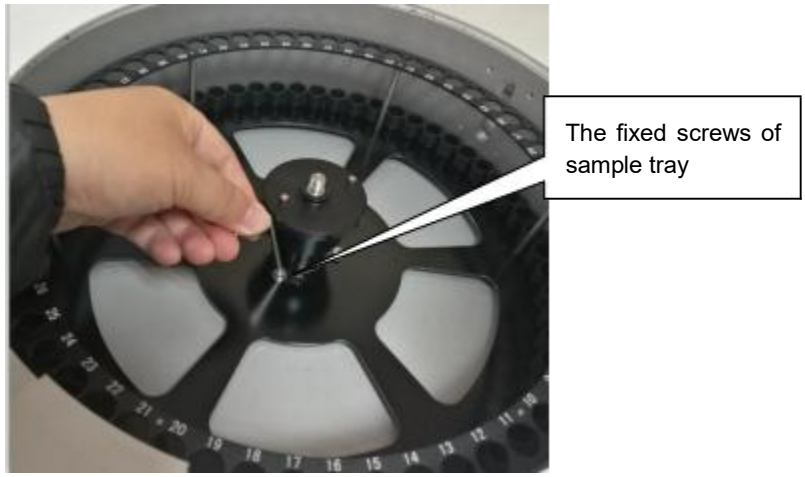
Initialize the machine and enter parameter setup menu. Click “1# position” button in sample arm setup. If the sample probe can arrive upon the middle of NO.1 serum cup. Then click “48# position” button in sample arm setup. If the sample probe can arrive upon the middle of NO.48 serum cup. It means the sample tray"s position is good. Otherwise it is necessary to adjust as following steps.



Adjustment procedure:

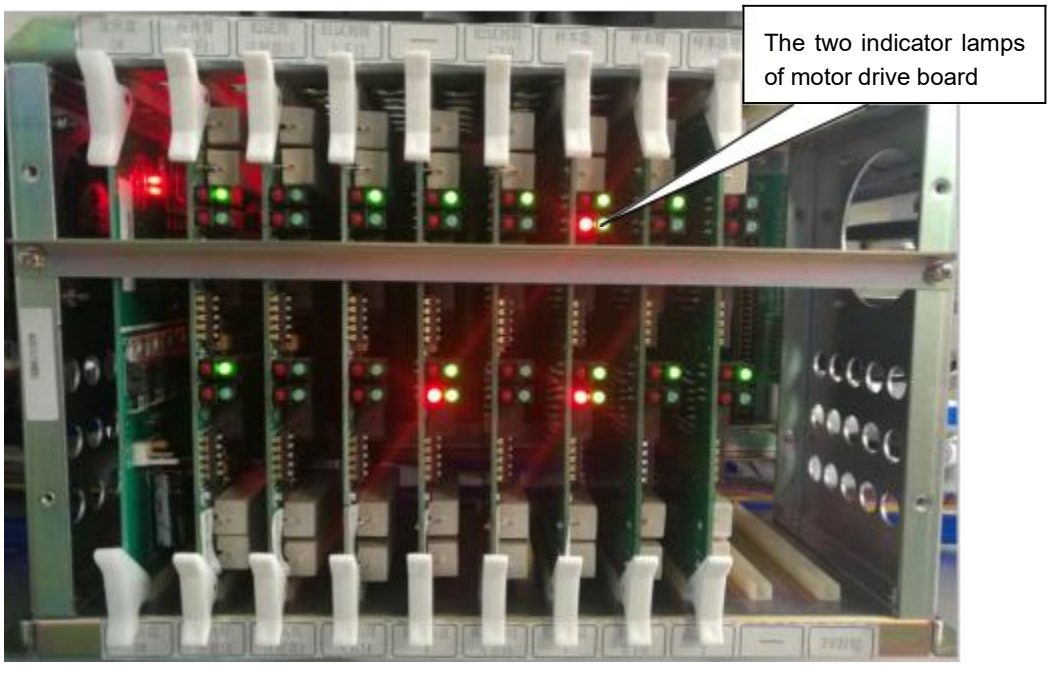
1. Initialize the machine.
2. Enter parameter setup menu. Then click “1# sample” button

3. Loosen three fixed screws of sample try.



4. Rotate sample tray by hand and make NO. 1 serum cup under sample probe tip. And tighten the three fixed screws.

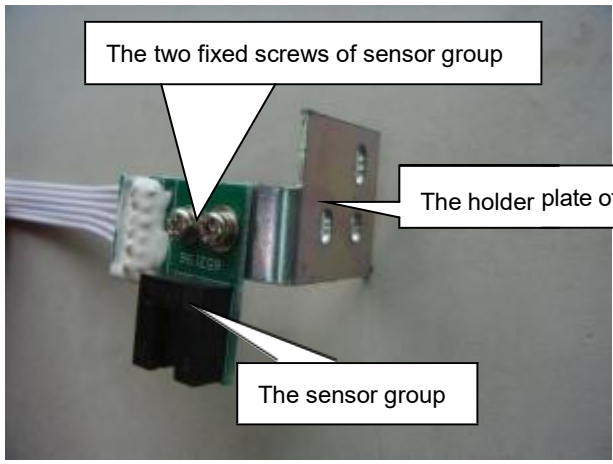
5. Make the two indicator lamps are lighting.



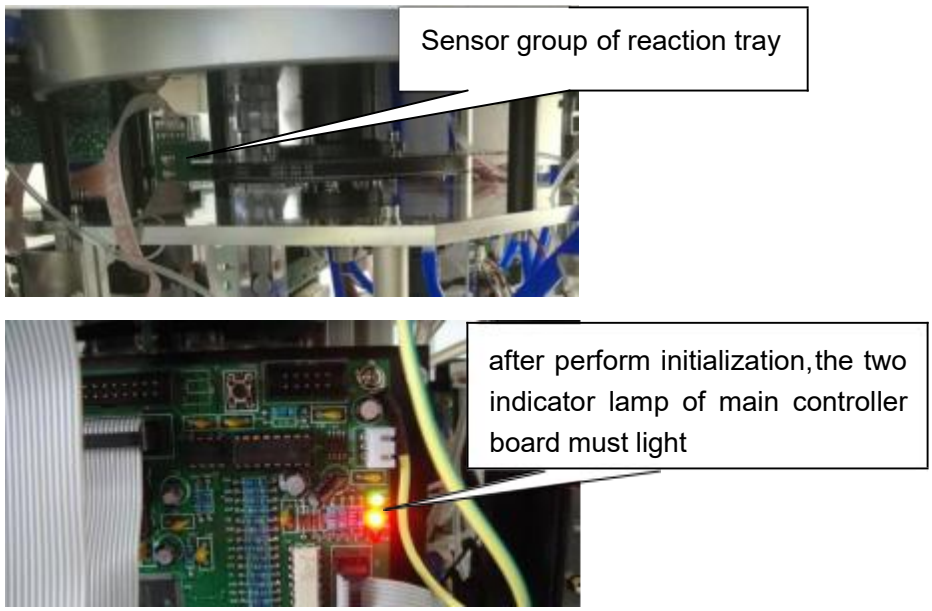
7. Initialize the machine and check whether the two indicator lamps are lighting and the sample probe tip is upon the middle of No. 1 serum cup or not.

5.4 Sensor group of reaction tray replacement

The sensor group of reaction tray is same with the sensor group of sample/reagent tray.



Normally after perform initialization,the two indicator lamp of main controller board must light as following pictures.

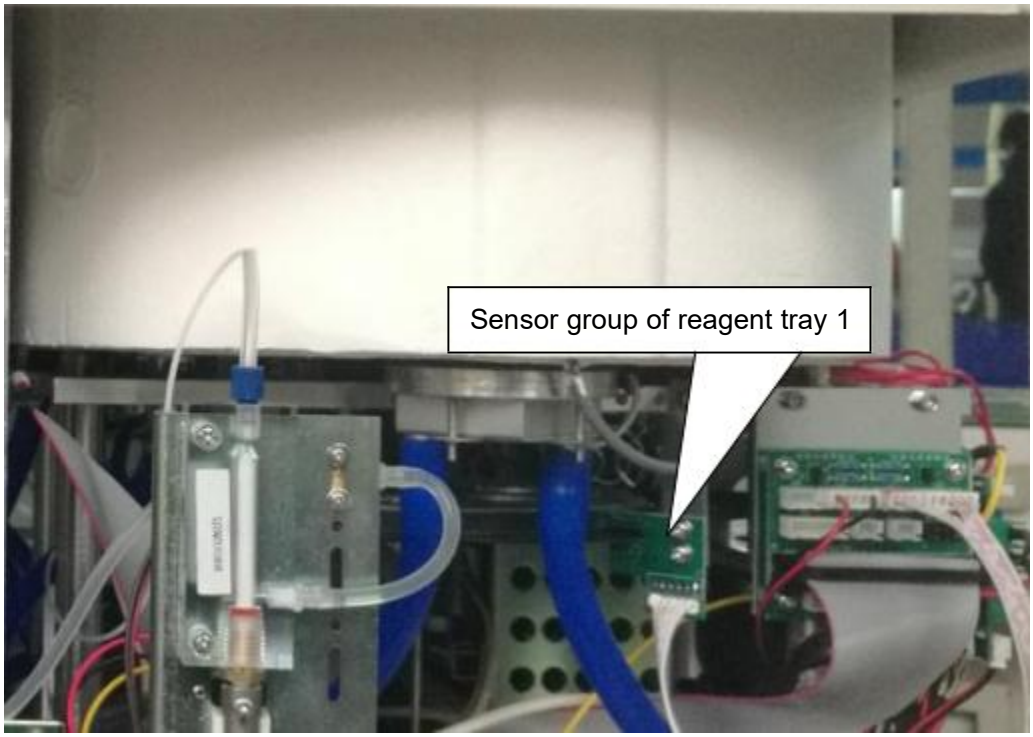


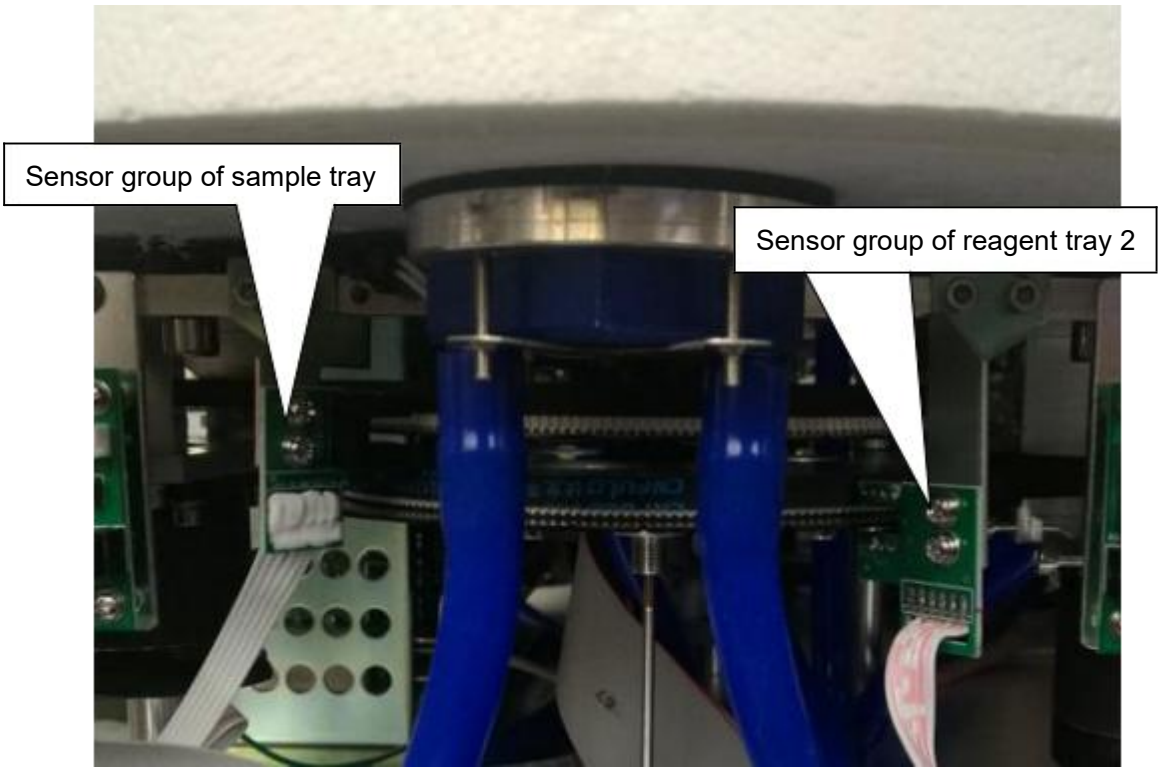
Replacement procedure:

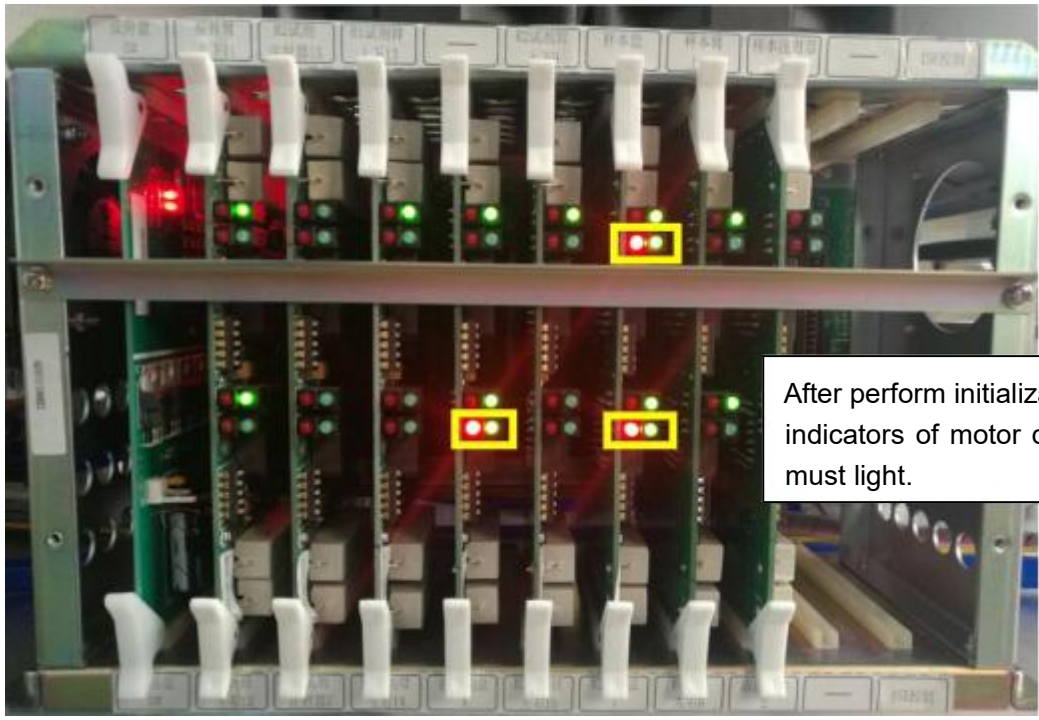
1. Switch off the machine.
2. Remove the two fixed screws of sensor group from holder plate,and then unplug communication connector from motor pinboard.
3. Install new sensor group and reconnect communication connector.
4. Switch on and initialize the machine.
5. Check whether the two indicator lamp are lighting or not.if lighting,replacement is finished.

5.5 Sensor group of sample/reagent tray replacement

Normally after perform initialization,the two indicator lamp of motor drive board must light as following pictures.







Replacement procedure:

1. Switch off the machine.
2. Remove the two fixed screws of sensor group from holder plate,and then unplug communication connector from motor pinboard.
3. Install new sensor group and reconnect communication connector.
4. Switch on and initialize the machine.
5. Check whether the indicators are lighting or not. If lighting,replacement is finished.

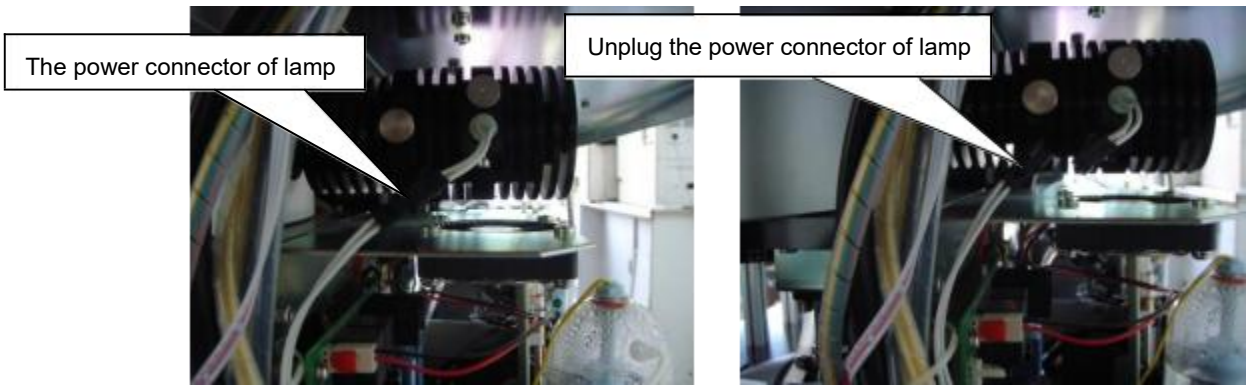
5.6 Tungsten-Halogen Lamp replacement

Steps

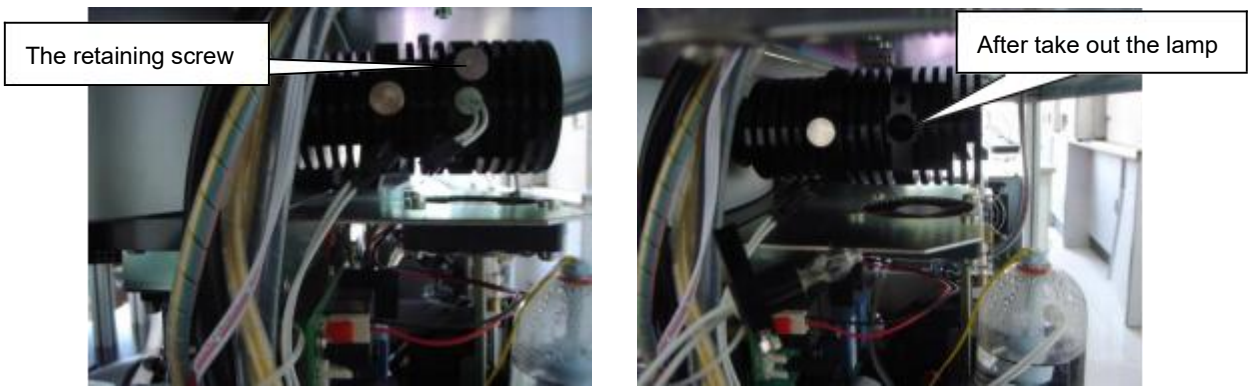
1.Switch off the machine.

2.Open right panel of machine.

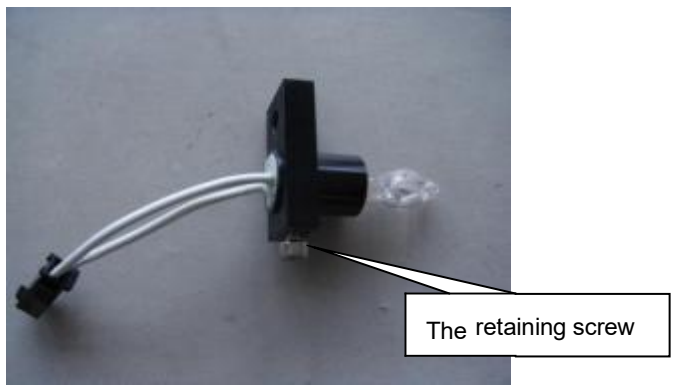
3.Unplug the power connector of lamp



4.Loosen and remove the retaining screw of lamp holder and then take out the lamp.



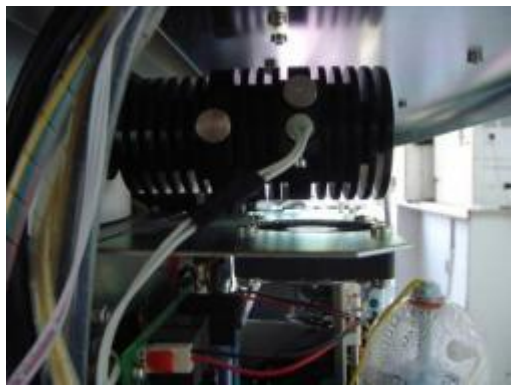
5.Loosen the retaining screw of lamp and then take out the lamp.



6. Put the new lamp into lamp hole and install the retaining screw of lamp.

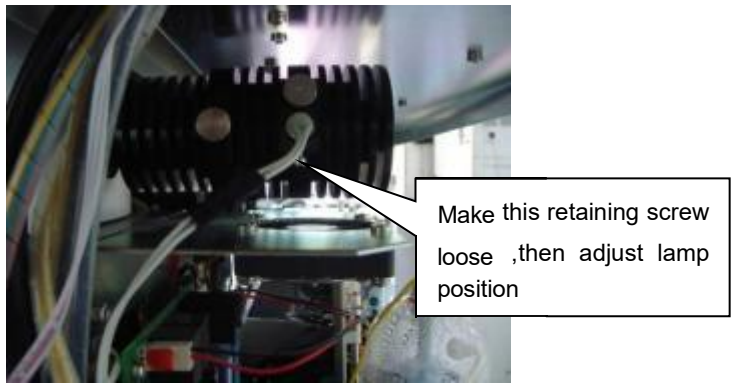
Note:donot tighten the screw for adjust lamp position following step.

7.Insert and tighten new lamp holder into the light focus subassembly,then switch on and initialize the machine.



8.Remove the cuvettes group which is from NO.76 to NO.90 .

9.Adjust lamp position and observe whether the light focus the middle of incubation groove hole or not. If it is,tighten the retaining screw of lamp.



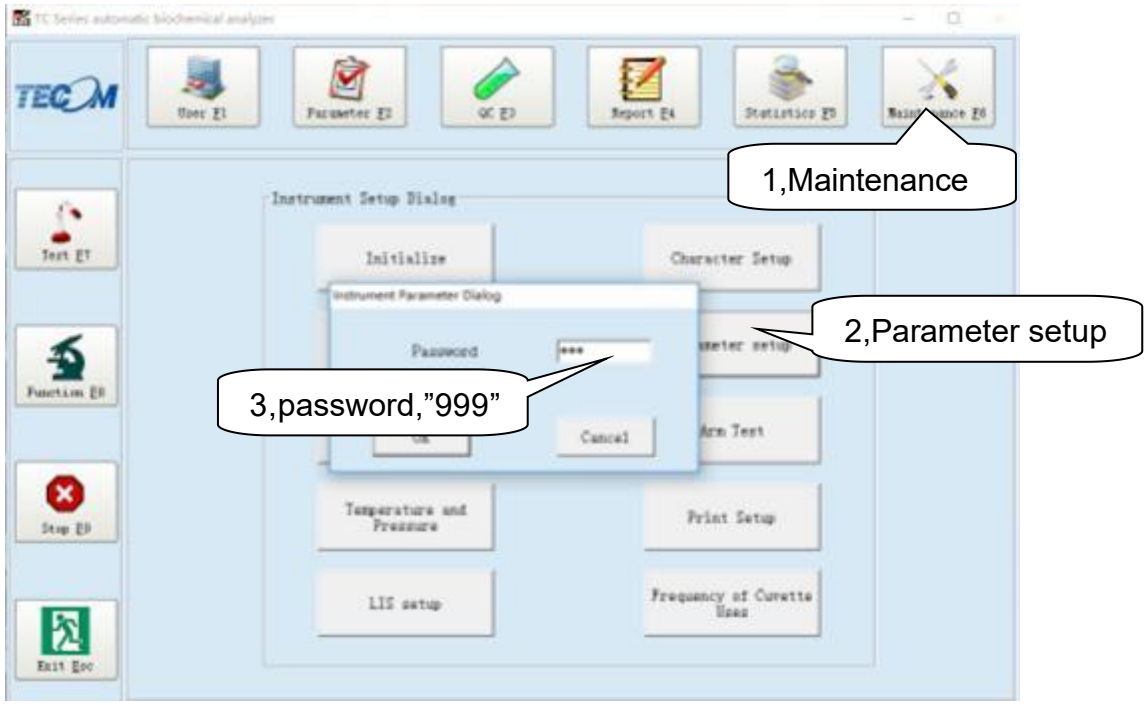
10. Adjust signal process board according 5.1 signal process board voltage adjustment.

11. Finish replacement.

5.7 Sample/reagent probe position adjustment

When login the operating software, click “maintenance” and select “Parameter setup” .

Then input password “999”, which is shown in the following picture.



Enter this menu, there are five setup columns. The wash arm setup column and time setup column are only filled in with factory value.

The reagent 1 arm setup column is used for adjusting reagent 1 probe position which is related with wash well,reagent position and cuvette position.

The reagent 2 arm setup column is used for adjusting reagent 2 probe position which is related with wash well,reagent position and cuvette position.

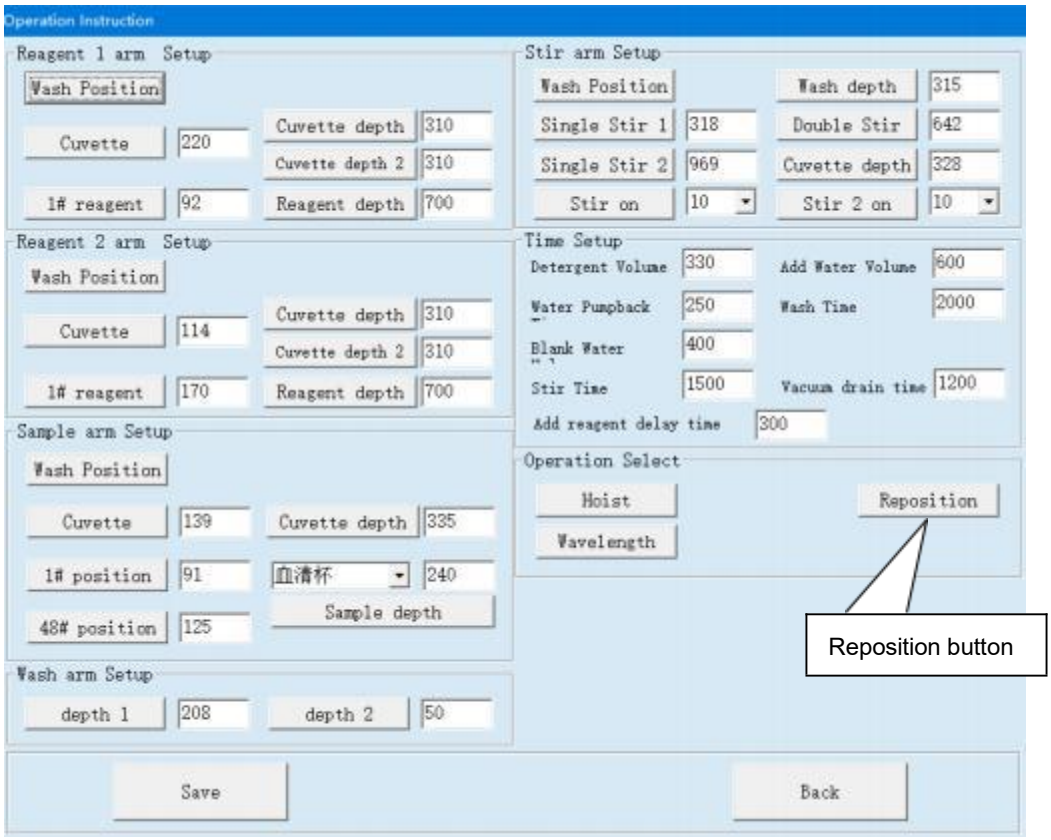
The sample arm setup column is used for adjusting sample probe position which is related with wash well,sample position and cuvette position.

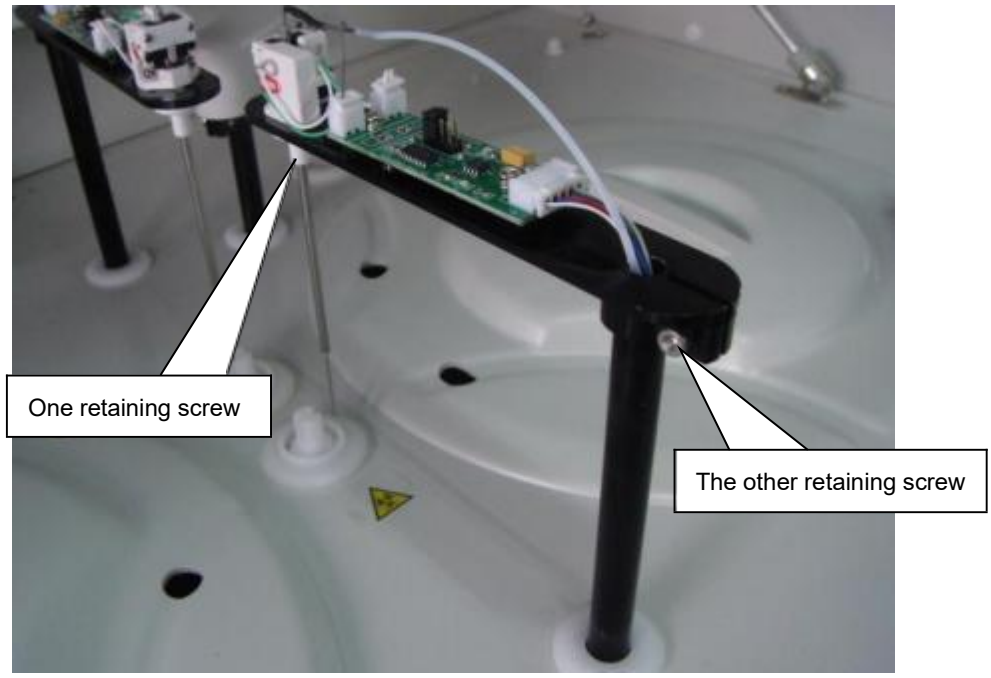
The stir arm setup column is used for adjusting mixer probe position which is related with wash well,cuvette position.

Note:It should be done to perform initialization before adjusting sample probe,reagent 1 probe,reagent 2 probe or mixer probe position.

5.7.1 Wash well position for sample/reagent probe

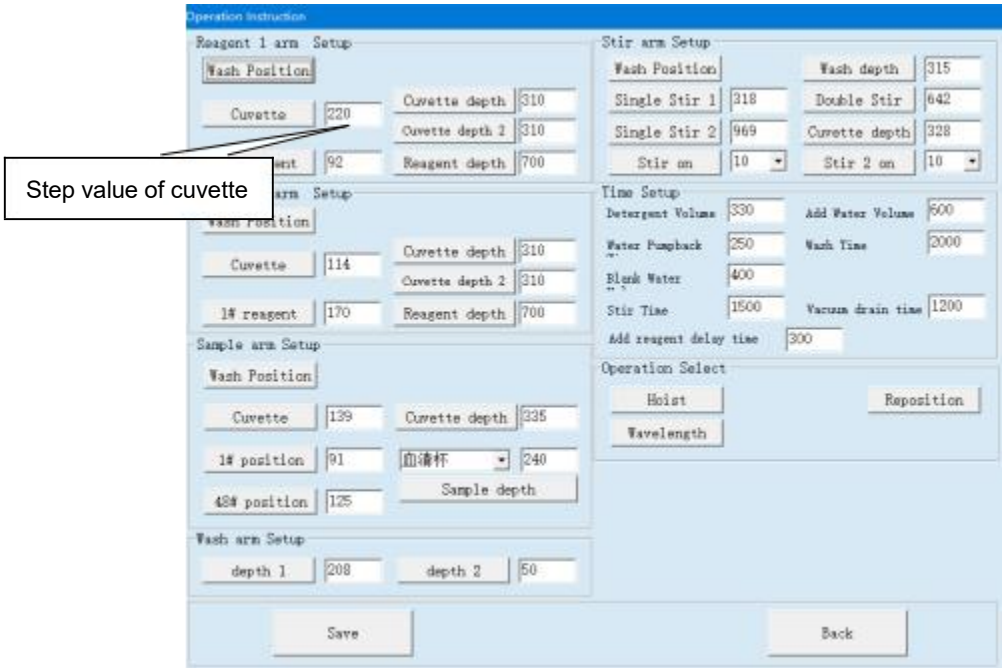
1.Click “Reposition”button,the probe tips should be upon the middle of wash wells. If not,adjust two retaining screws as following pictures.



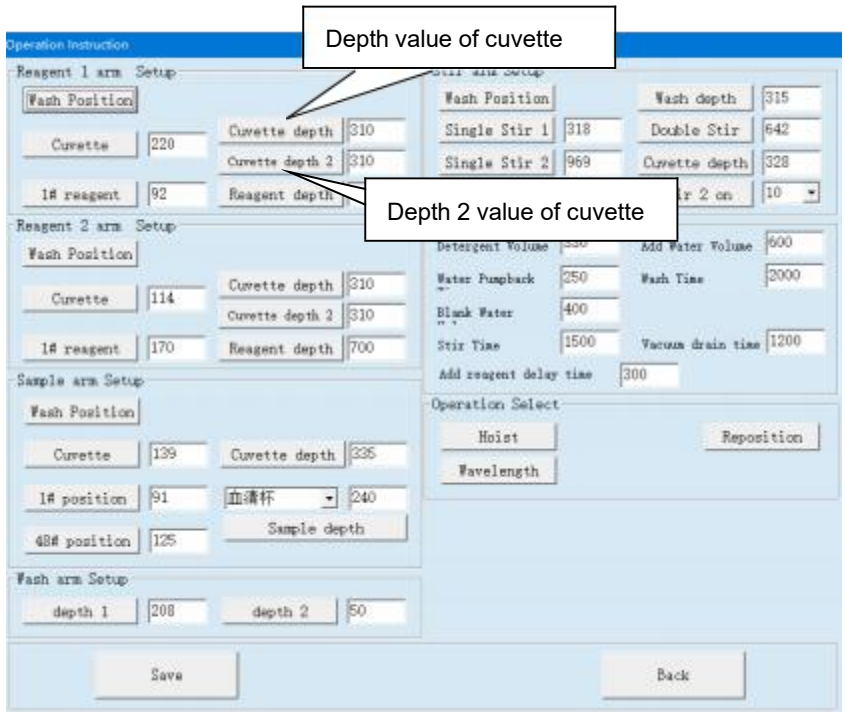


5.7.2 Cuvette position for reagent 1 probe

1. Click “Cuvette” button in “Reagent 1 arm Setup”, the reagent 1 probe rotates to the reaction tray. And the reagent 1 probe tip should be upon in the middle of NO.1 cuvette. If not, increase or decrease the step value.



2. Click “Cuvette depth” button ,then the reagent probe will insert into the NO. 1 cuvette.
3. Increase or decrease the depth value to make the reagent probe tip just touch the bottom of the NO.1 cuvette.



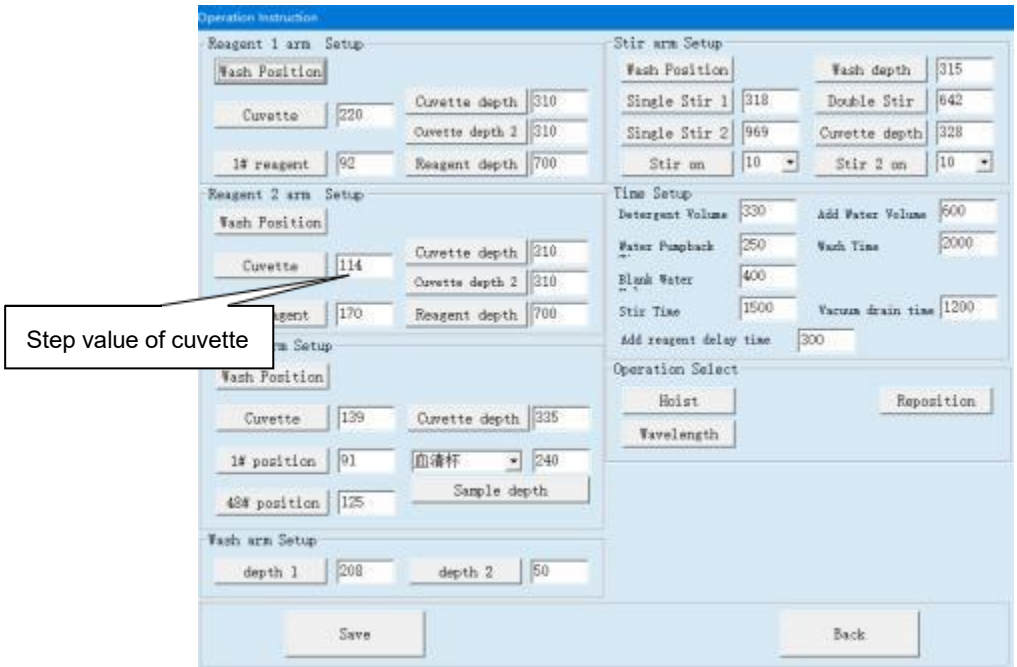
4. Use the depth value which is got from step 3 to subtract 10,and then fill in final depth value.

5. The setting value of “Cuvette depth2” is same with cuvette depth,so fill in same value.

6. Click “Reposition”button,and save,then finish the adjustment.

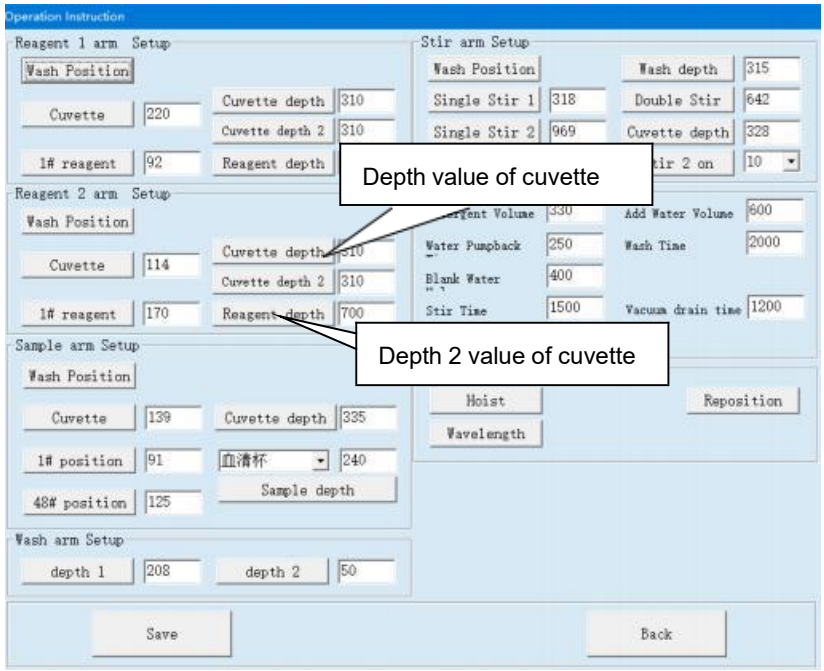
5.7.3 Cuvette position for reagent 2 probe

1. Click “Cuvette” button in “Reagent 2 arm Setup”, the reagent 2 probe rotates to the reaction tray. And the reagent 2 probe tip should be upon in the middle of NO.30 cuvette. If not, increase or decrease the step value.



2. Click “Cuvette depth” button ,then the reagent probe will insert into the NO.30 cuvette.

3. Increase or decrease the depth value to make the reagent probe tip just touch the bottom of the NO.30 cuvette.



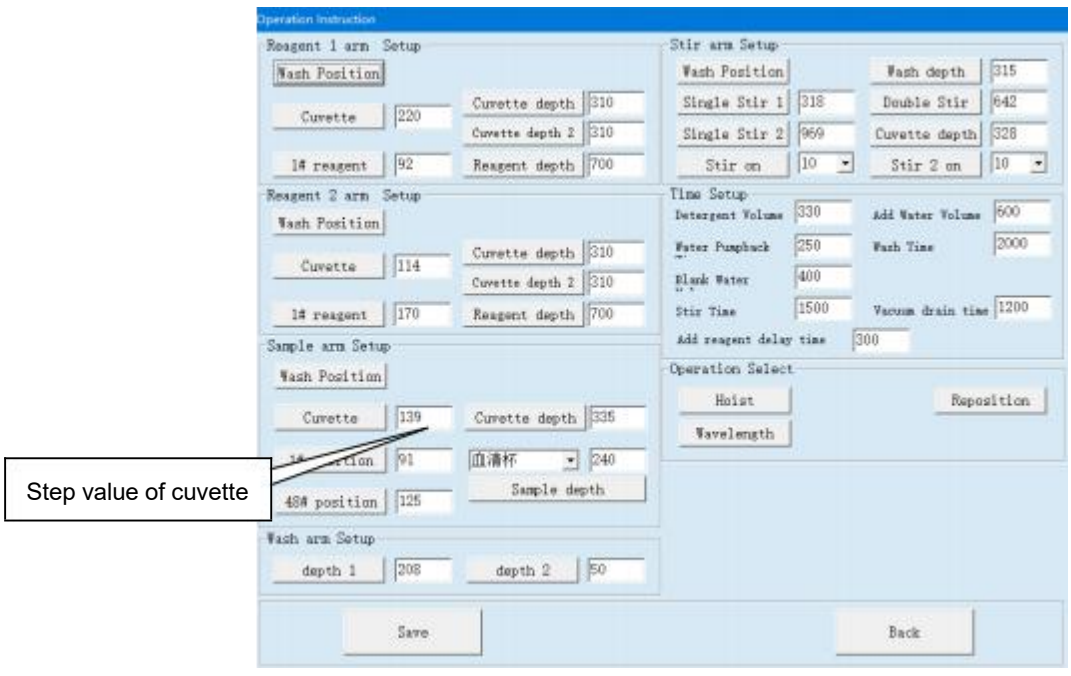
4. Use the depth value which is got from step 3 to subtract 10,and then fill in final depth value.

5. The setting value of “Cuvette depth 2” is same with cuvette depth,so fill in same value.

6. Click “Reposition”button,and save,then finish the adjustment.

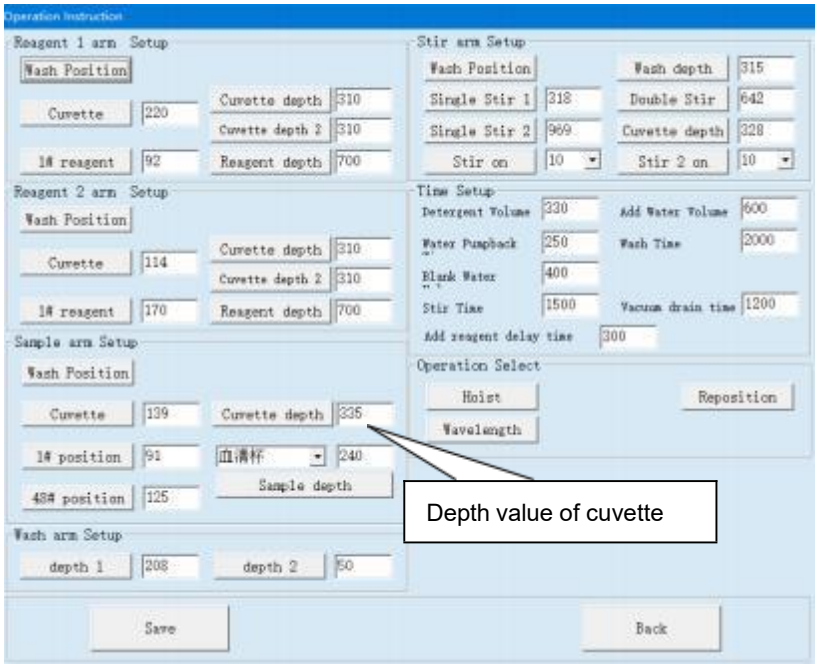
5.7.4 Cuvette position for sample probe

1. Click “Cuvette” button in “Sample arm Setup” , the sample probe rotates to the reaction tray. And the sample probe tip should be upon in the middle of NO.38 cuvette. If not,increase or decrease the step value.



2. Click “cuvette depth” button ,then the sample probe will insert into the NO.38 cuvette.

3. Increase or decrease the depth value to make the sample probe tip just touch the bottom of the NO.38 cuvette.

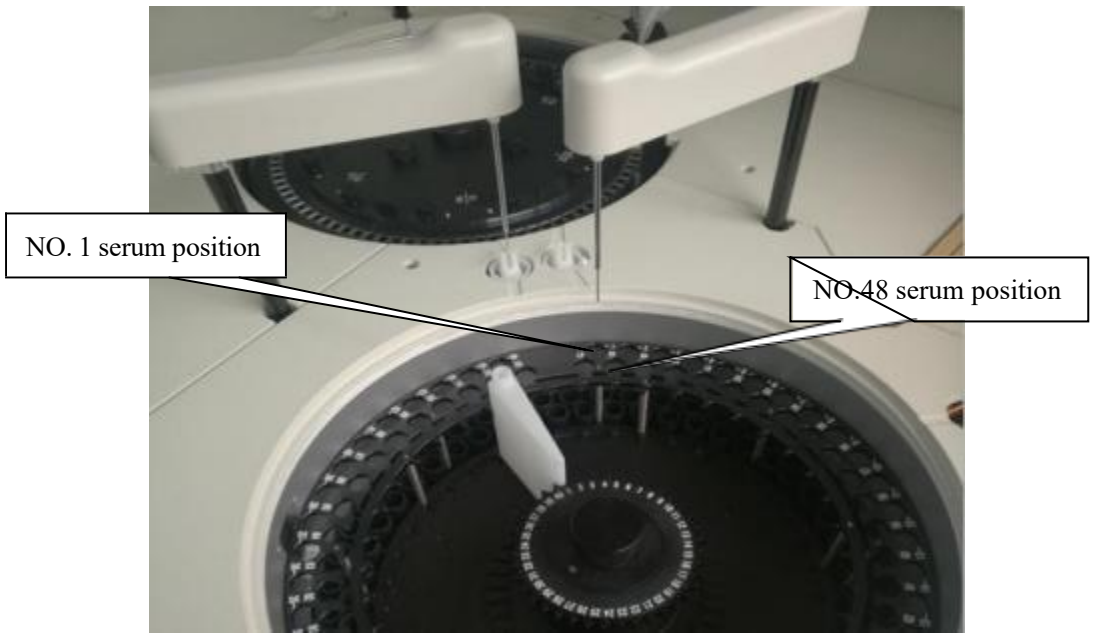


4. Use the depth value which is got from step 3 to subtract 10,and then fill in final depth value.

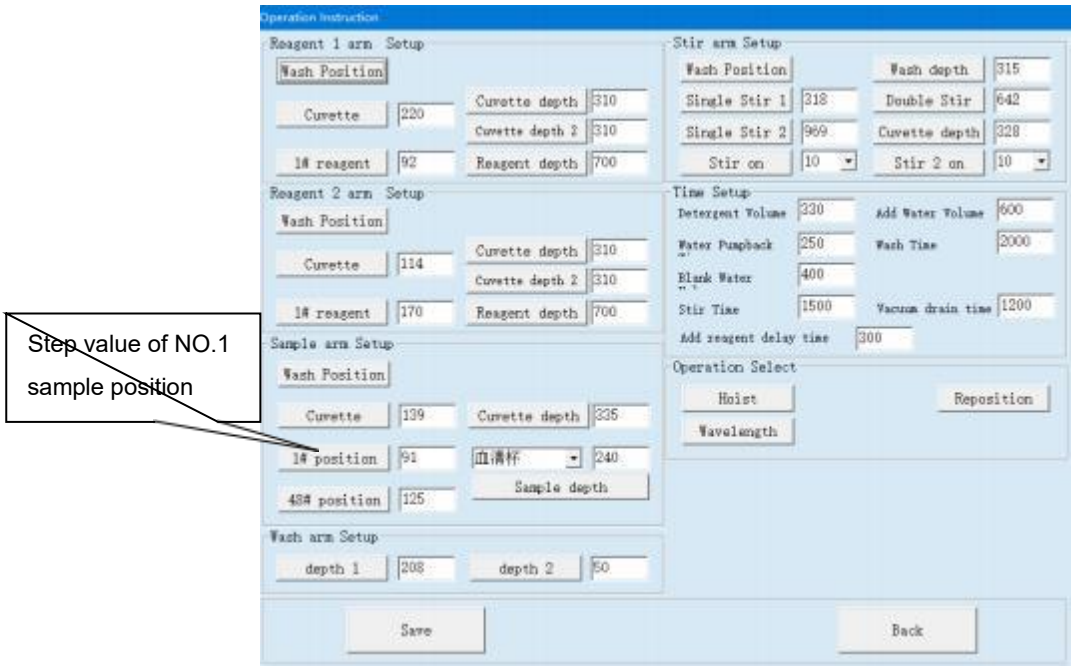
5. Click “Reposition” button,and save,then finish the adjustment.

5.7.5 Sample position for sample probe

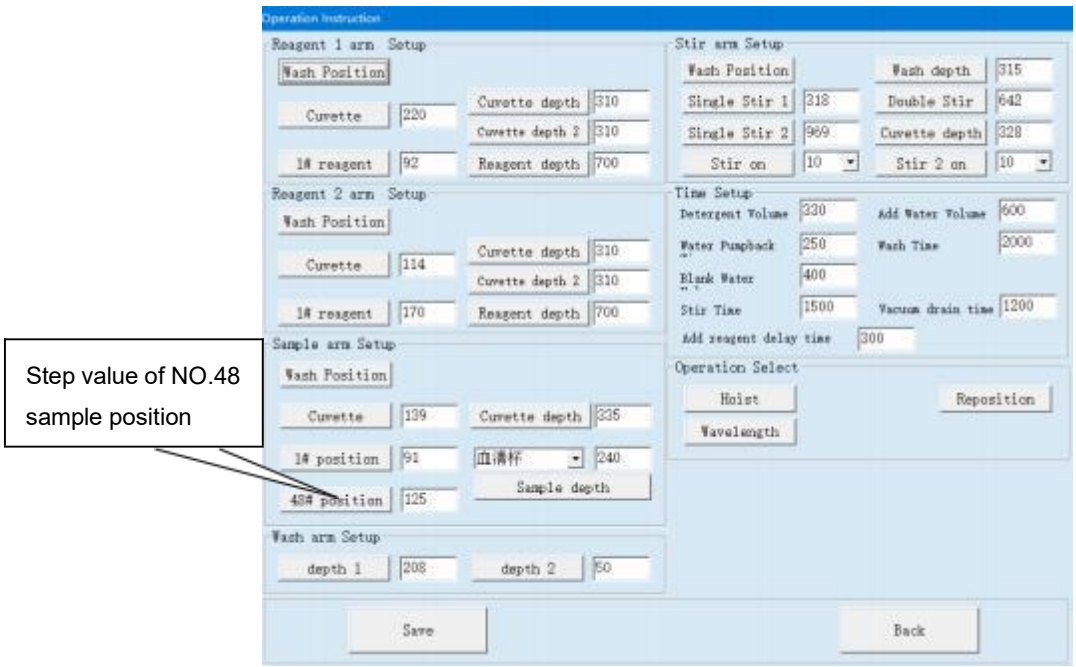
1. Put two empty serum cups on the NO.1 sample position and NO.48 sample position.



2. Click “1# position” button,the probe rotates to the sample tray.and the probe tip should be upon the middle of NO.1 serum cup. If not,increase or decrease the step value.

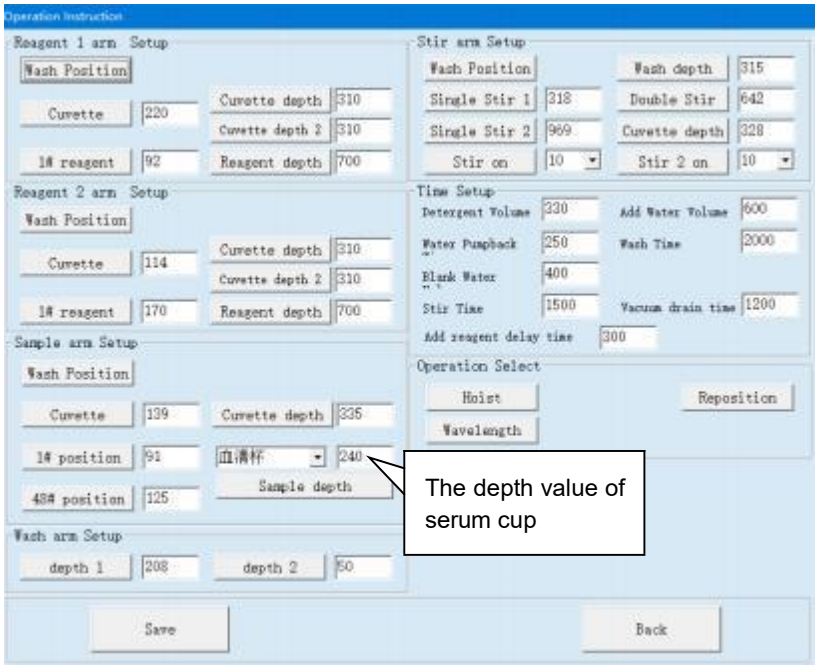


3. Click “48# position” button,the probe rotates to the sample tray.and the probe tip should be upon the middle of NO.48 serum cup. If not,increase or decrease the step value.



4. Click “serumcup depth” button ,then the probe will insert into the serum cup which is on the NO1.sample position.

5. Increase or decrease the depth value to make the probe tip just touch the bottom of the serum cup.



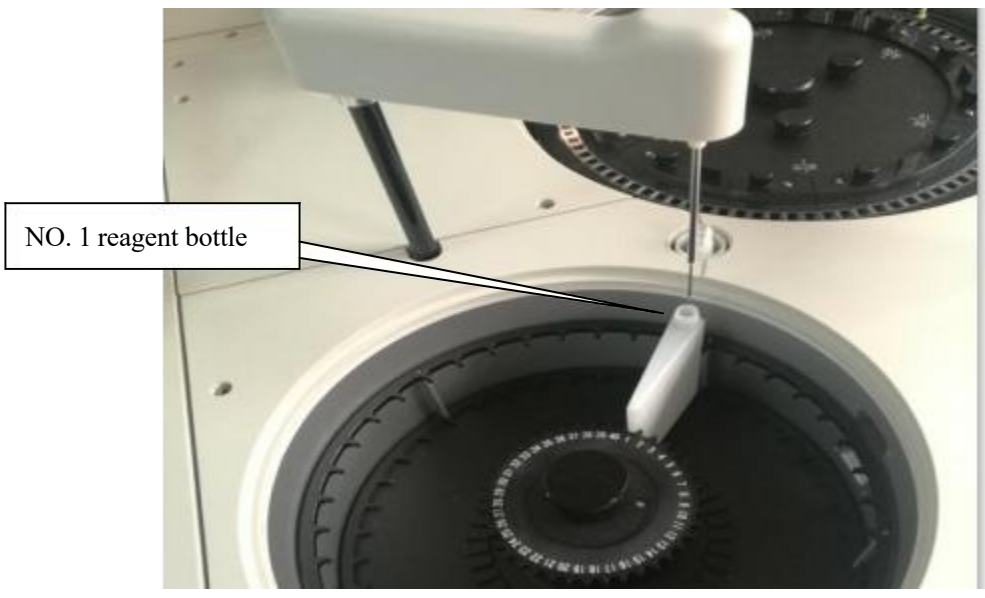
6. Use the depth value which is got from step 5 to subtract 2,and then fill in final depth value.

7. Click “Reposition”button,and save,then finish the adjustment.

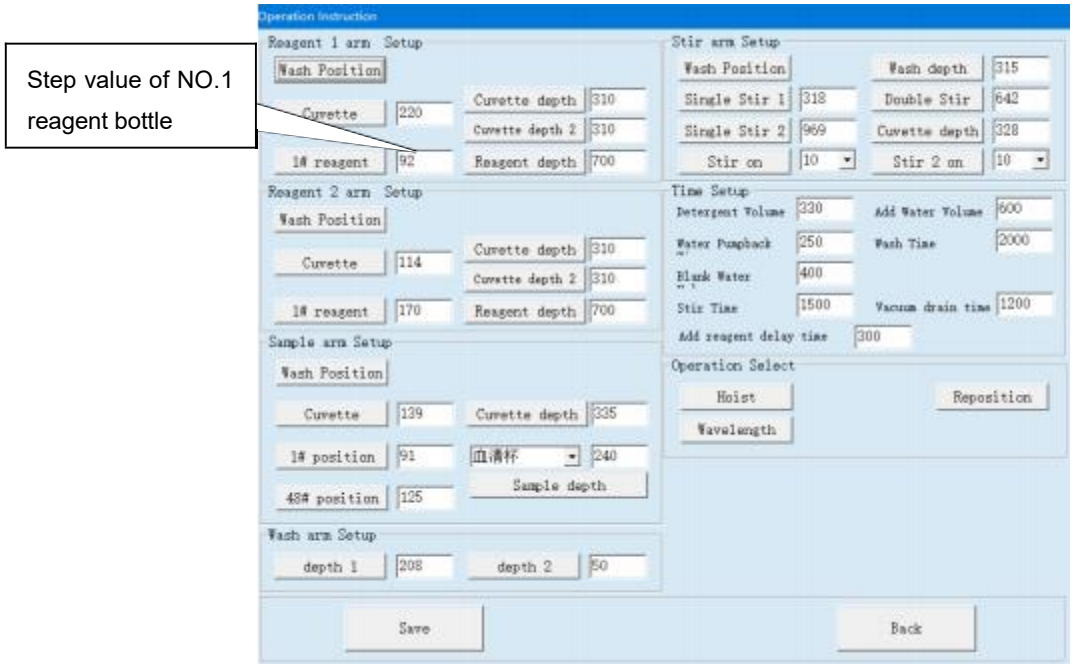
Note:our software allows customer to use tube. When customer uses tube,service engineer should adjust depth value for the tube according step 5 and step 6.and notice when they load new sample in the “test” menu,then should select correct “sample cup type” for this sample. Otherwise some wrong result will be occurred.

5.7.6 Reagent position for reagent 1 probe

1. Put one empty reagent bottle on the NO.1 reagent position in reagent tray 1.

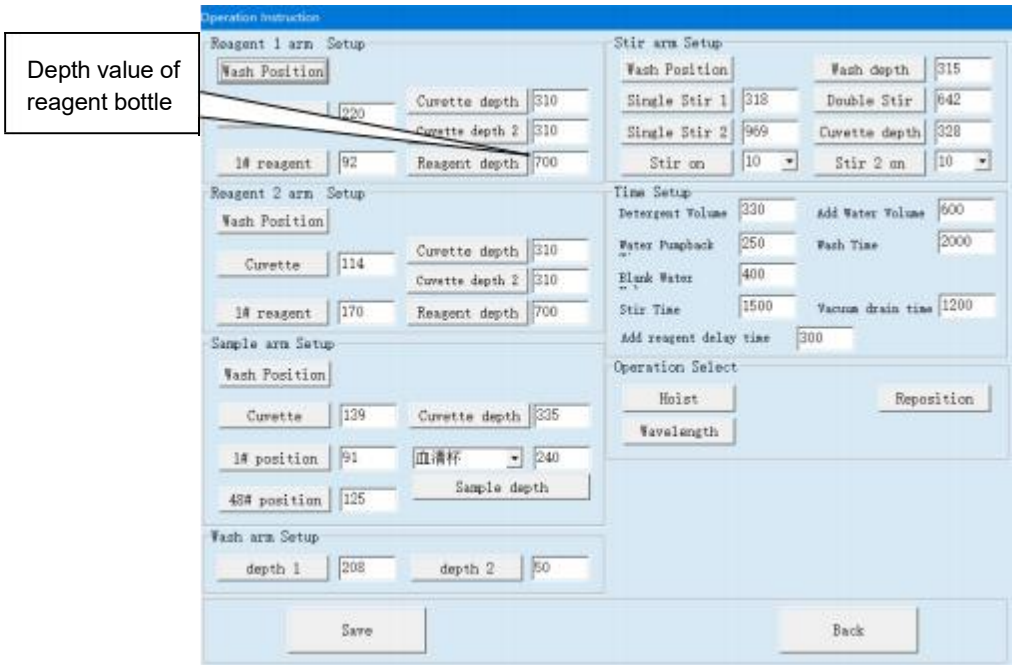


2. Click “1# Reagent”button,the probe rotates to the reagent tray1. And the probe tip should be upon the middle of NO.1 reagent bottle. If not,increase or decrease the step value.



3. Click “Reagent depth” button ,then the probe will insert into the NO. 1 reagent bottle.

4. Increase or decrease the depth value to make the probe tip just touch the bottom of the reagent bottle.

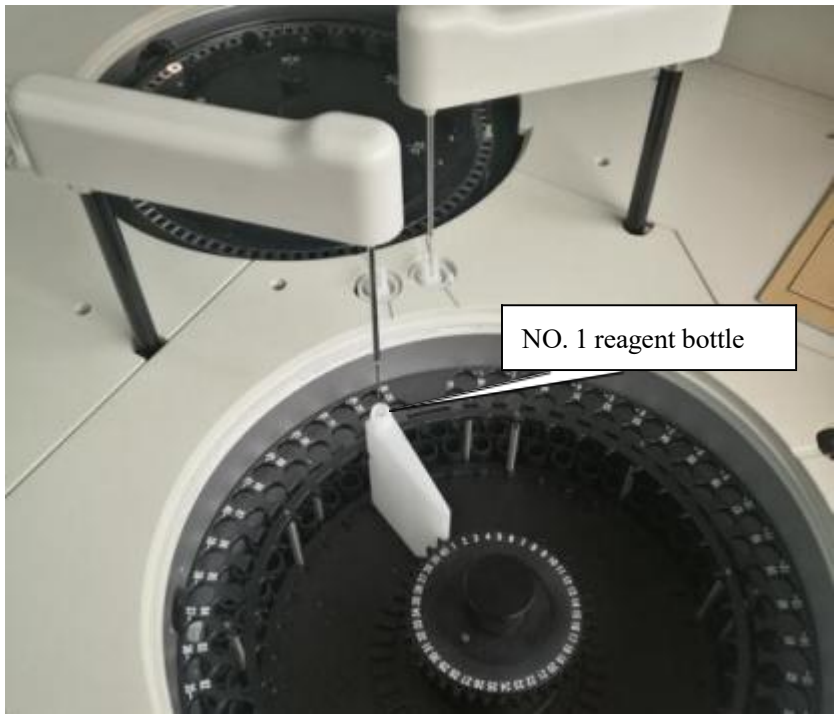


5. Use the depth value which is got from step 4 to subtract 2,and then fill in final depth value.

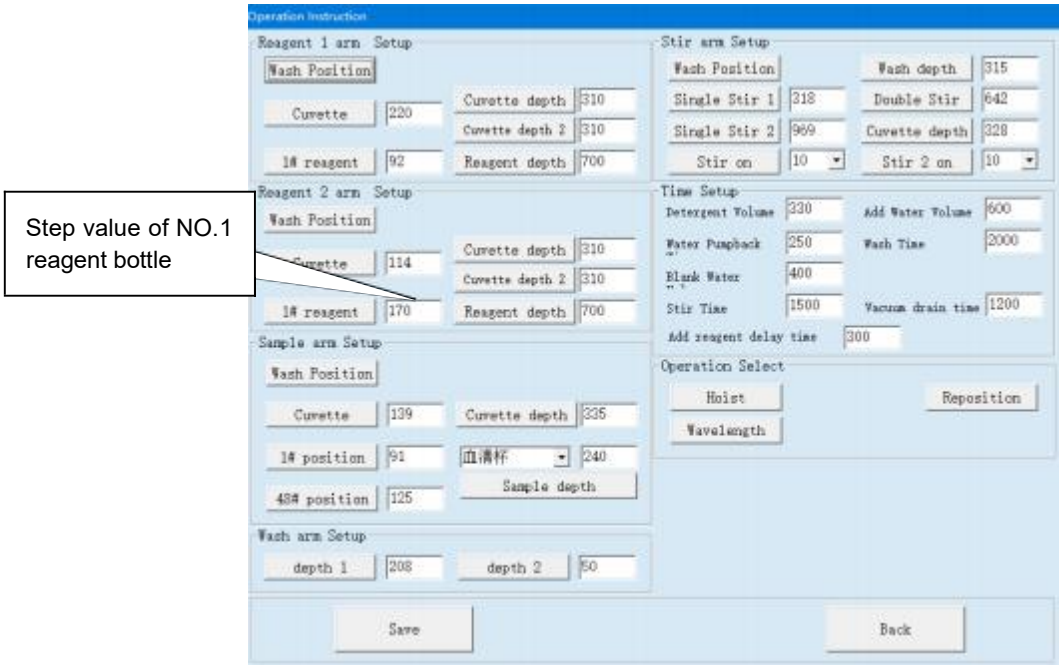
6. Click “Reposition”button,and save,then finish the adjustment.

5.7.7 Reagent position for reagent 2 probe

1. Put one empty reagent bottle on the NO.1 reagent position in reagent tray 2.

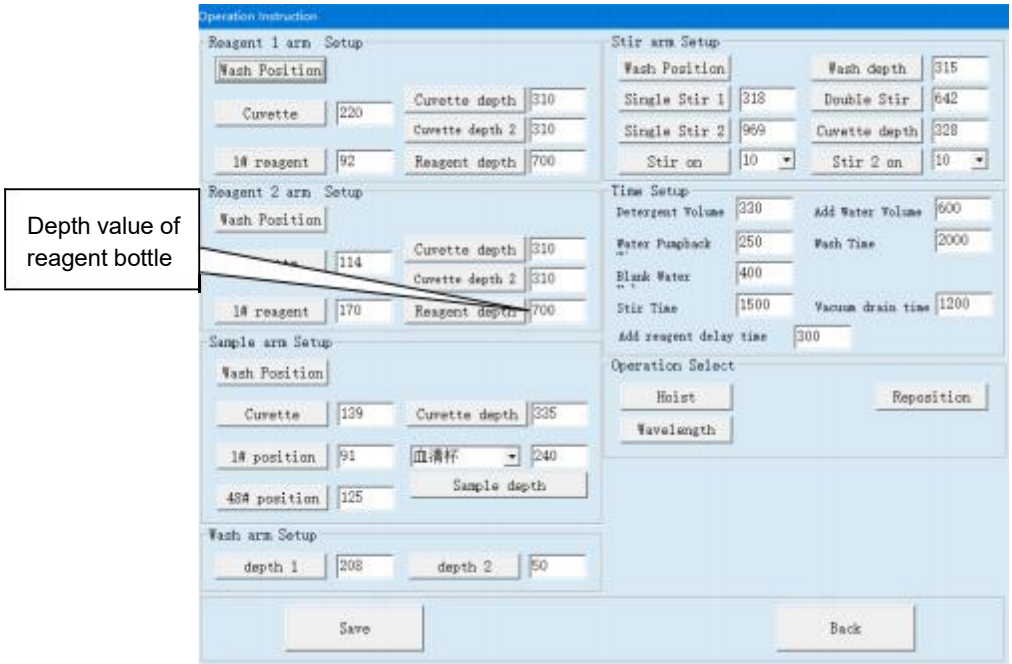


2. Click “1# Reagent”button,the probe rotates to the reagent tray2. And the probe tip should be upon the middle of NO.1 reagent bottle. If not, increase or decrease the step value.



3. Click “Reagent depth” button ,then the probe will insert into the NO. 1 reagent bottle.

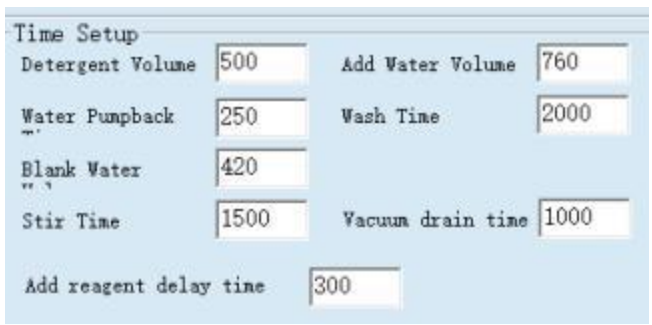
4. Increase or decrease the depth value to make the probe tip just touch the bottom of the reagent bottle.



5. Use the depth value which is got from step 4 to subtract 2,and then fill in final depth value.

6. Click “Reposition”button,and save,then finish the adjustment.

5.8 Wash Arm and Time Setup Meaning



Item	Meaning
Depth 1	Make wash needles just touch the bottom of cuvettes
	After wash needle aspirate liquid from cuvette ,the wash needles upwards move up and it will

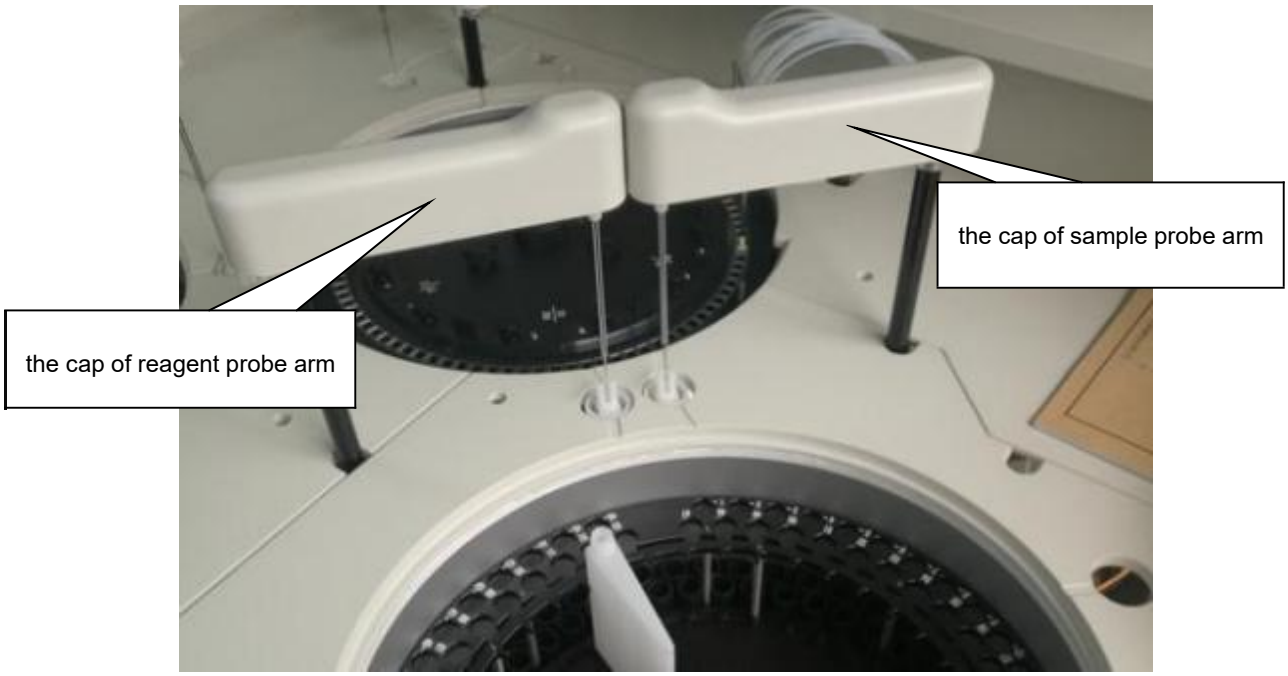
Depth 2	dispense water into cuvette. and then continuely upwards move up to be upper position. this distance is depth 2.
Detergent Volume	This unit is millisecond. it controls peristaltic pump working time to dispense detergent into cuvettes.
Add Water Volume	This unit is millisecond. it controls water dispensing valve working time to dispense water into cuvettes during wash cuvettes.
Water Pumpback	This unit is millisecond. it controls pump back water volume to avoid water drop during wash cuvettes.
Wash Time	This unit is millisecond. it controls internal and external sample/ reagent washing time in the washing well.
Blank Water	This unit is millisecond.it controls dispensing water volume into cuvettes.when we test cuvettes signal.
Stir Time	This unit is millisecond.it controls mixer time for reagent with sample.
Vacuum Drain Time	This unit is millisecond.it controls adding vacuum time for waste/vacuum bottle.and also controls drain time for waste/vacuum bottle.
Add Water Delay Time	This unit is millisecond.when reagent or sample is dispensed into cuvette .Sample/reagent probe will stay in the cuvette in this time.it is used to control sample/reagent dispensing accuracy.

5.9 Sample/reagent probe replacement

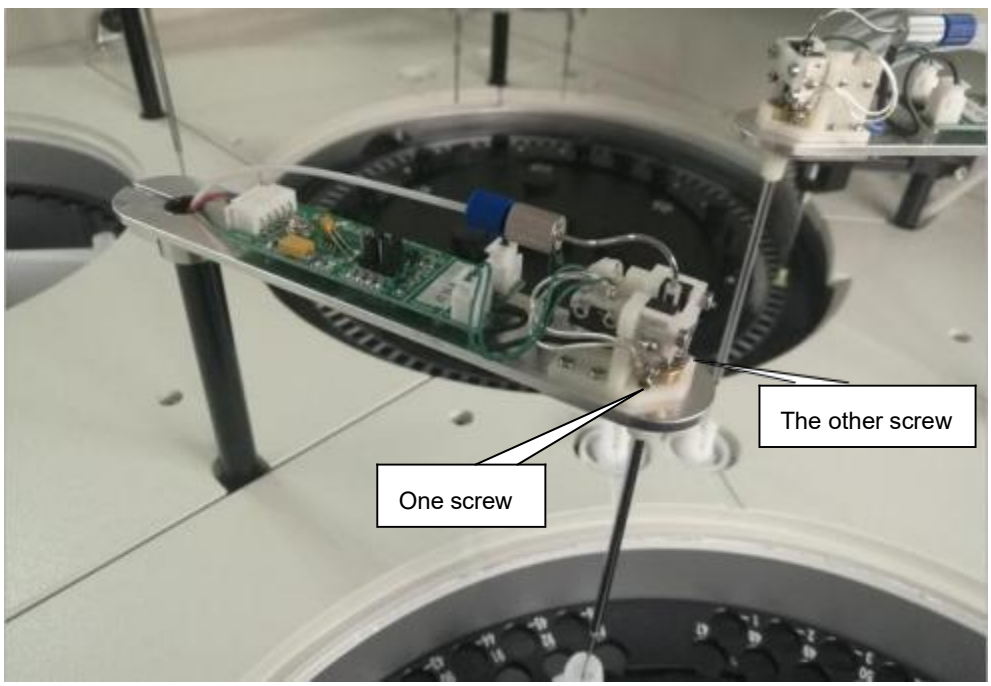
If the probe is bent or damaged, it must be replaced immediately. follow the procedure given below to replace the damaged or bent probe.

Steps:

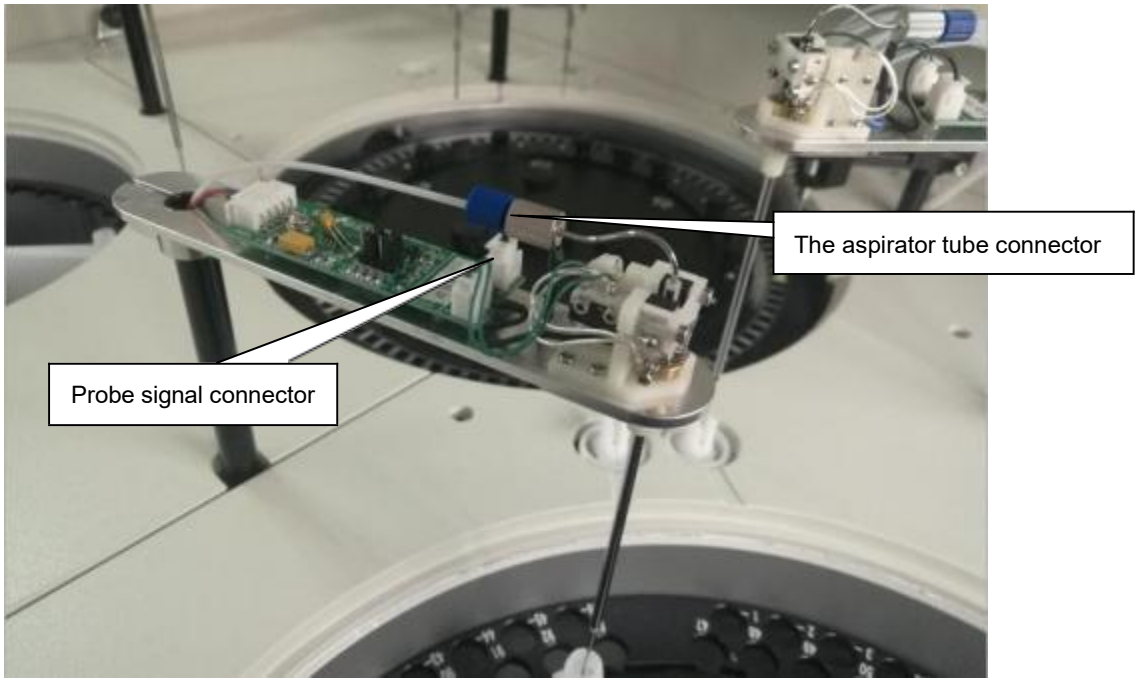
1. Switch off the machine.Remove the cap of sample/reagent probe arm.



2. Use a small screwdriver to loosen the two retaining screws on the probe.



3. Carefully unplug the aspirator tube connector and probe signal connector.



4. Slowly pull the probe away from the probe arm.

WARNING:

Store the removed probe in a safe place where it will neither endanger people working around the area not be damaged.

NOTE:

Exercise caution when pulling the probe away from the arm.

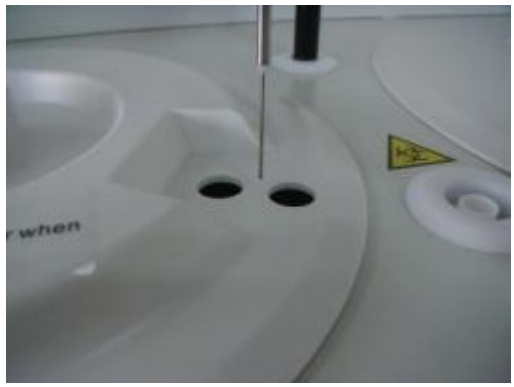
5. Install the new probe according reverse steps.

BIOHAZARD:

Dispose of the bent or damaged probe in accordance with your local or national guidelines for biohazard waste disposal.

6. Install sample/reagent tray cover and reaction tray cover.

7. Rotate probe and make it 2mm distance between surface of sample/reagent tray cover with probe tip like below picture.



8. Adjust probe position refer to chapter 5.7 sample/reagent probe position adjustment.

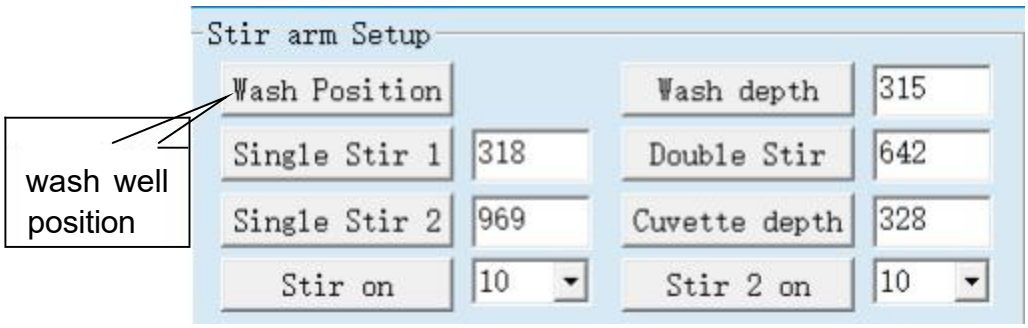
9.Replacement finished.

5.10 Mixer probe position adjustment

When login the operating software,click “maintenance” and select “parameter setup” .then input password”999” then enter this menu which is shown in the following picture.

The stir arm setup column is used for adjusting mixer probe position which is related with wash well,cuvette position.

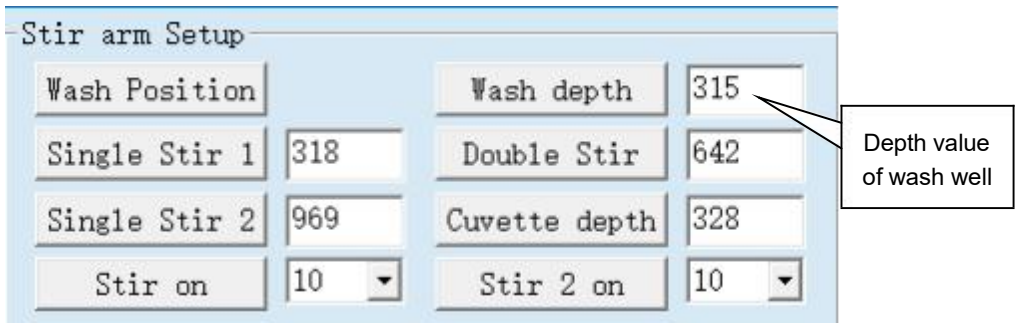
Note:before adjust mixer probe position,it should be done to perform initialization.



1.Click “Reposition”button,the two probe tips should be upon the middle of wash wells. If not, adjust retaining screws.

2.Click “wash depth” button , then the two probe wills insert into wash wells.

3.Increase or decrease the depth value to make the probe tips just touch the bottom of the wash well.



4.Use the depth value which is got from step 3 to subtract 10 and then fill in final depth value.

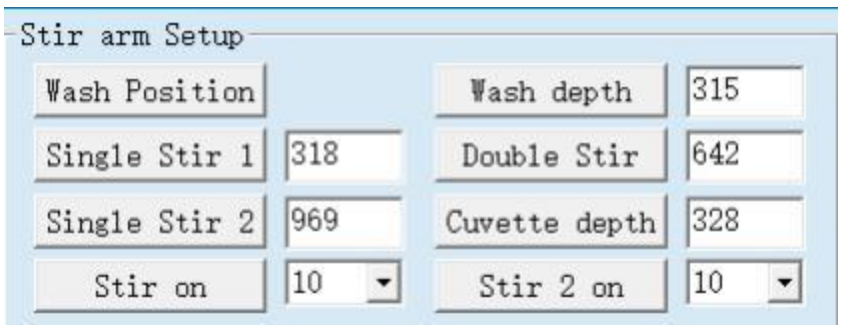
5. Click save and exit the menu then initialize the machine.

5.11 Cuvette position for mixer probes

1. Click “Single Stir 1” button, the probe 1 rotates to the reaction tray and the probe tip 1 should be upon in the middle of NO.82 cuvette. If not, increase or decrease the step value.

2. Click “Double Stir” button, the probe 1 rotates to the reaction tray and the probe tip 1 should be upon in the middle of NO.74 cuvette. The probe 2 rotates to the reaction tray and the probe tip 2 should be upon in the middle of NO.82 cuvette If not, increase or decrease the step value.

3. Click “Single Stir 2” button, the probe 2 rotates to the reaction tray and the probe tip 2 should be upon in the middle of NO.74 cuvette. If not, increase or decrease the step value.



4. Click “Cuvette depth” button, then the probe will insert into the corresponding cuvette.

5. Increase or decrease the depth value to make the probe tip just touch the bottom of the corresponding cuvette.

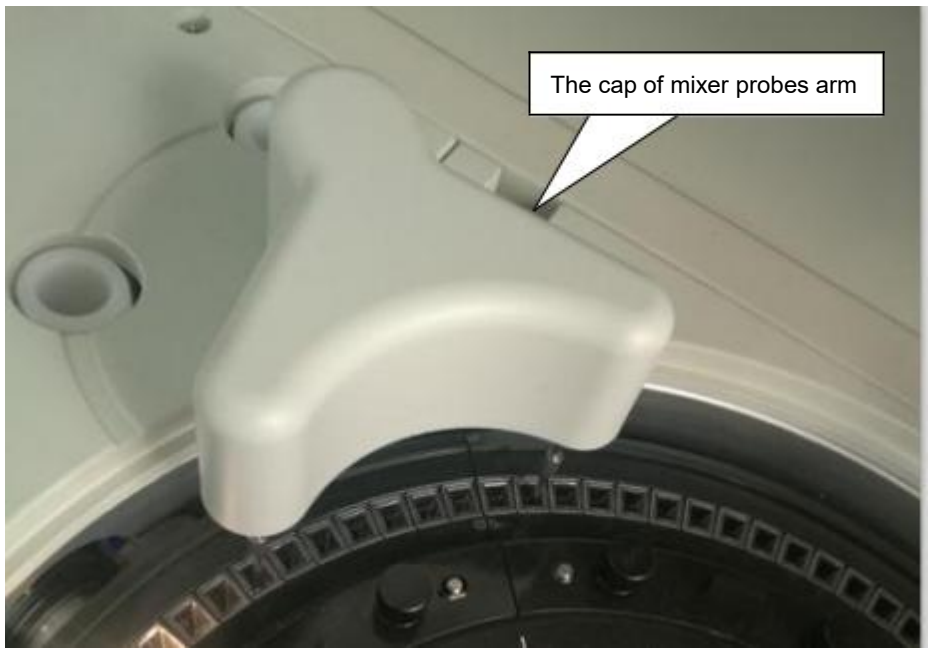
6. Use the depth value which is got from step 3 to subtract 10,and then fill in final depth value.

7. Click save and exit the menu then initialize the machine.

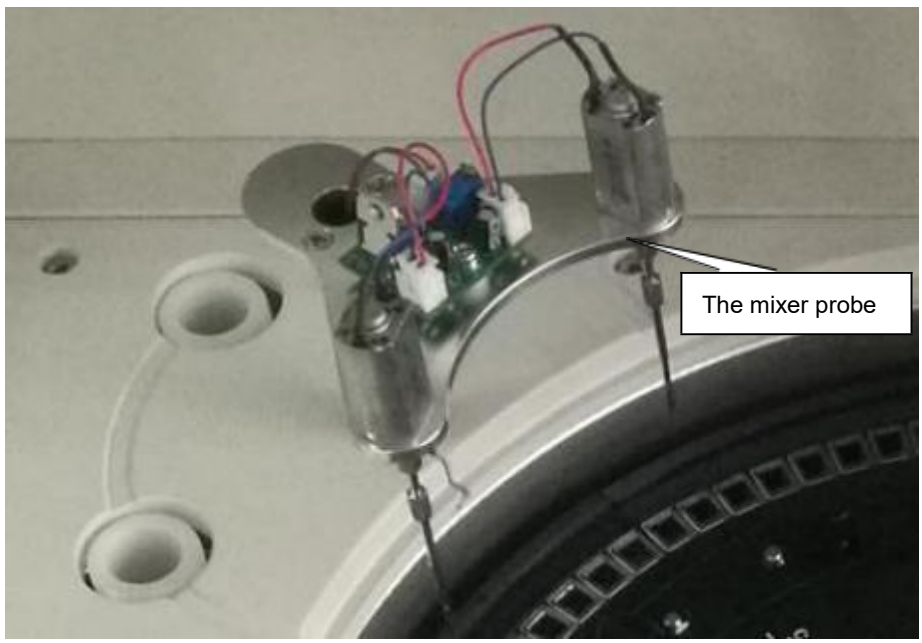
5.12 Mixer probes replacement

If the probe is bent or damaged, it must be replaced immediately. Follow the procedure given below to replace the damaged or bent probe.

1. Switch off the machine.Remove the cap of mixer probes arm.



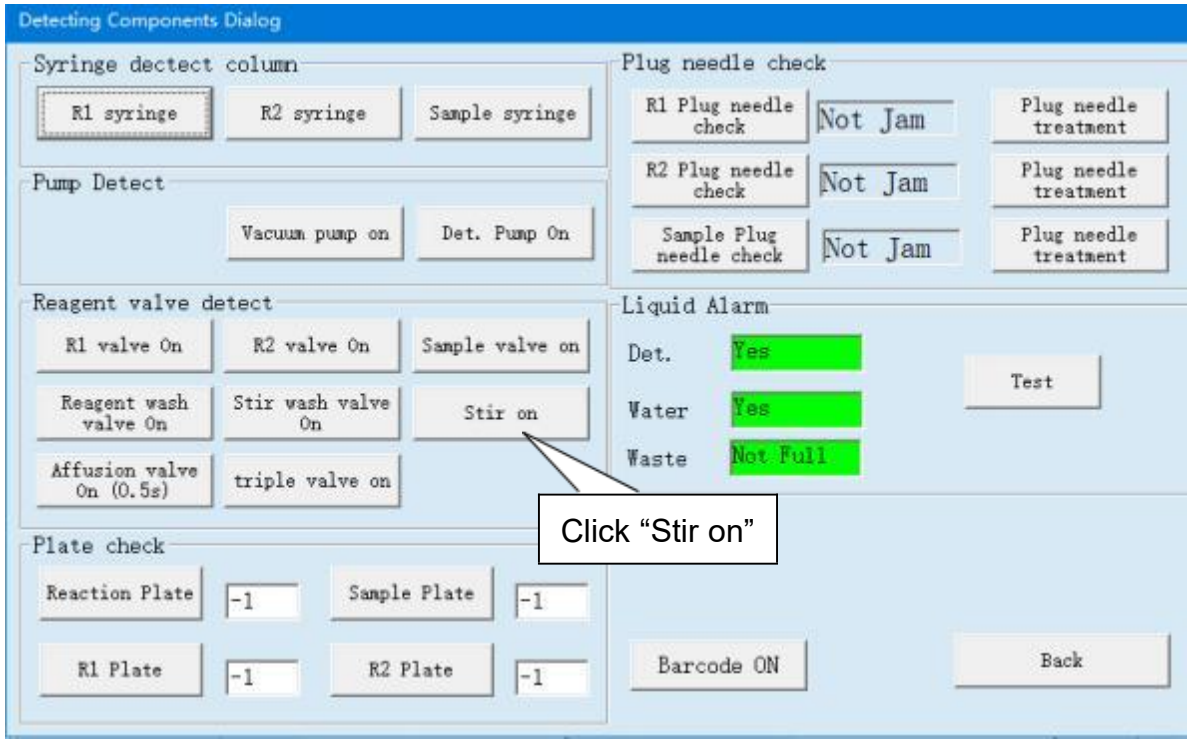
2. Remove the rotary knob of mixer probe and pull out the mixer probe carefully.



3. Install the new probe according reverse steps.

4. Switch on and initialize the machine.

5. Select maintenance menu and enter “Arm test” menu to click “Stir on” .



6. Observe mixer probes rotation condition. If it is rotating vertically, it means good. If it is rotating like arc,it means it must be readjusted.

7. Adjust mixer probe position refer to chapter5.10.

5.13 Synchronous belt replacement

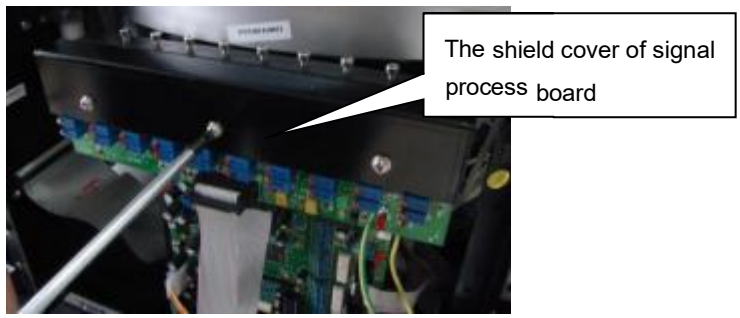
There are synchronous belts for the left/right and up/down of the sample probe arm ,reagent probe arm and 8-steps washing unit. It also exists for the reaction tray,mixer probe arm, sample tray ,reagent tray.

Function	Belt Size
Sample arm up/down	140MXL(width 6mm).
Sample arm left/right	B115MXL(width 6mm).
Reagent arm up/down	140MXL(width 6mm).
Reagent arm left/right	B115MXL(width 6mm).
8-steps washing unit up/down	130MXL(width 6mm).
Reaction tray rotation	218MXL(width 6mm).
Sample tray rotation	212MXL(width 6mm).
Reagent tray rotation	212MXL(width 6mm).
Mixer probe arm up/down	140MXL(width 6mm).
Mixer probe arm left/right	B115MXL(width 6mm).

5.14 Light filter replacement

Steps:

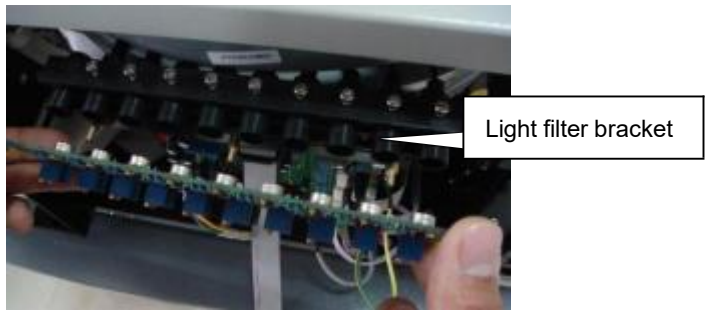
1. Switch off the machine.
2. Remove the front panel of machine.
3. Unscrew the three retaining screws which fix the shield cover of signal process board.



4. Unplug the signal connector of signal process board from main controller board.

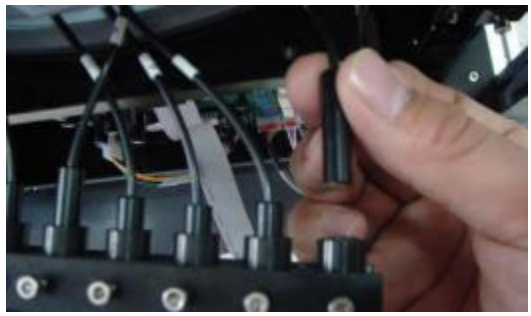
5. Unscrew the three retaining screws of signal process board.

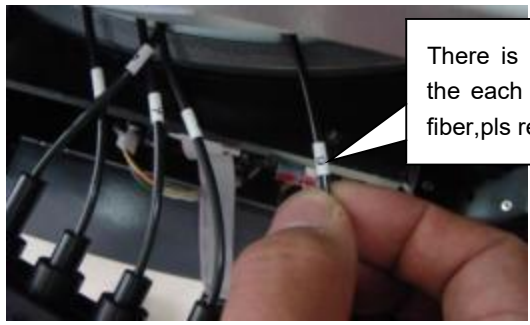
6. Carefully remove the signal process board and put it on the dry and clean place.



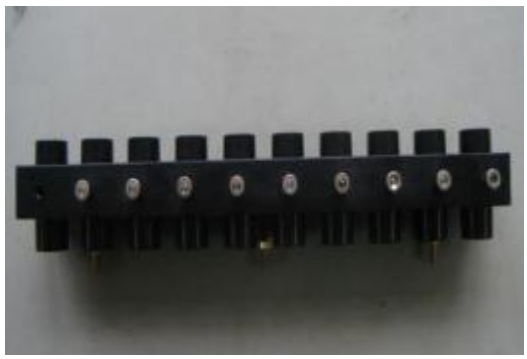
7. Remove the three fixed screws of light filter bracket.

8. Loosen nine fixed screws of fiber and then pull out all fibers carefully.

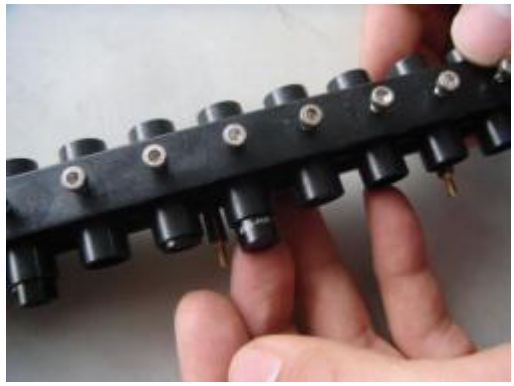




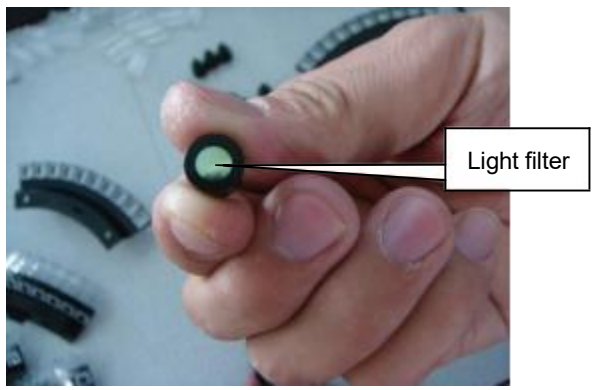
9. Take out light filter bracket.



10. Take out light filter from bracket.



Note:during take out filter,donot touch the surface of filter.



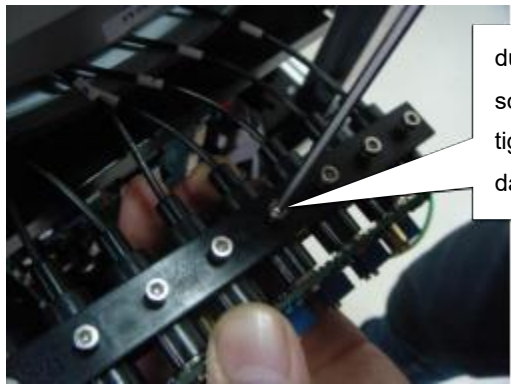
11. Replace with new light filter.

12. Install all components.

Note:

① During tighten the retaining screw of fiber,don"t screw too tightly,otherwise filter will be damaged by fracturing.

② During install signal process board ,push fiber head and make it is nearest with photodiod of signal process board.otherwise signal value of cuvettes will be affected.

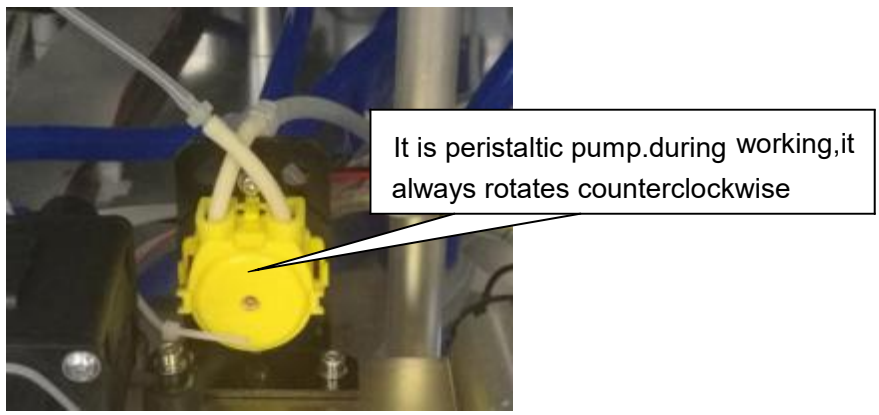


13.Adjust the signal process board according 5.1 signal process board voltage adjustment.

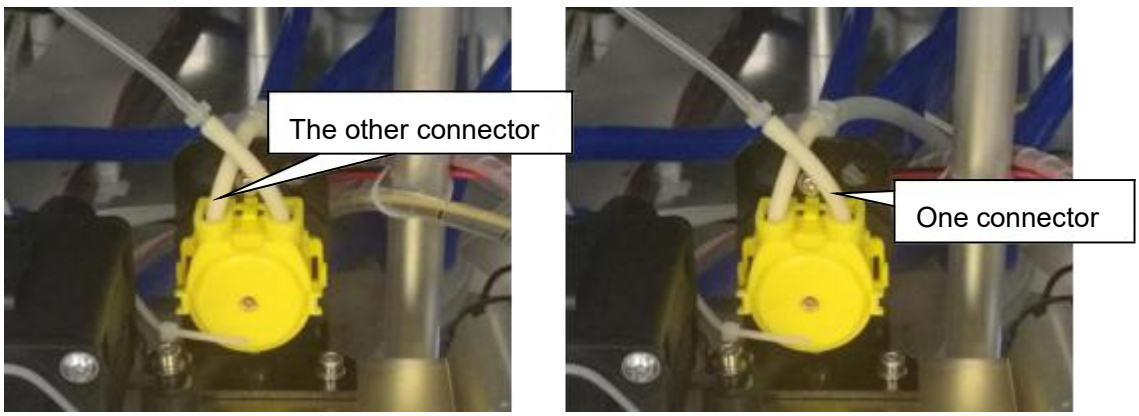
14. Finish adjustment.

5.15 Peristaltic Tube Maintenance or Replacement

Peristaltic pump is used to aspirate detergent for cuvettes cleaning and detergent is dispensed into cuvettes through No. 1 washing needle.if you find some detergent is not enough than previous,Please perform maintenance or replacement for the tube of peristaltic pump according following steps.

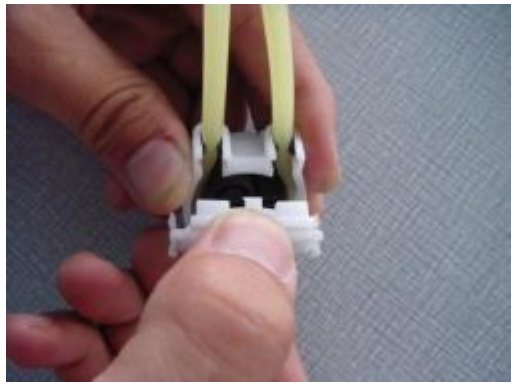


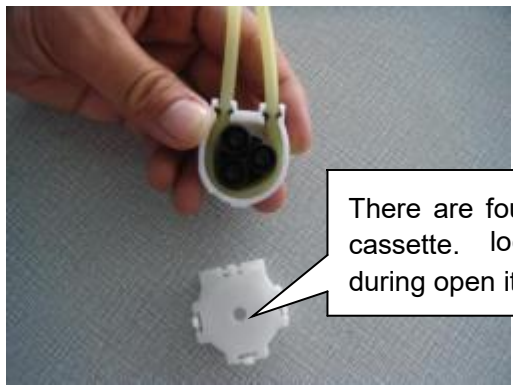
Step 1: Switch off the machine ,open the right panel of the machine,and then disconnect two connectors of the tube of peristaltic pump.



Step 2: Take out the cassette of the pump through press two clips.

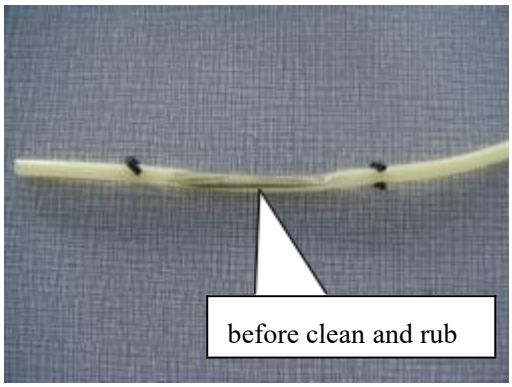
Step 3: Open the cassette carefully.

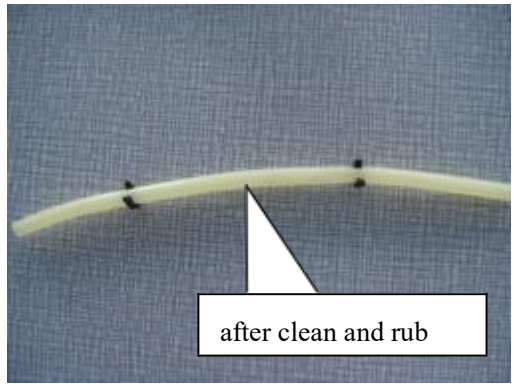




Step 4: Take out the peristaltic tube.

Step 5: If you find the tube was dirty or impressed,you should clean it with gauze and then rub it by hand.and the tube was broken,you can replace.

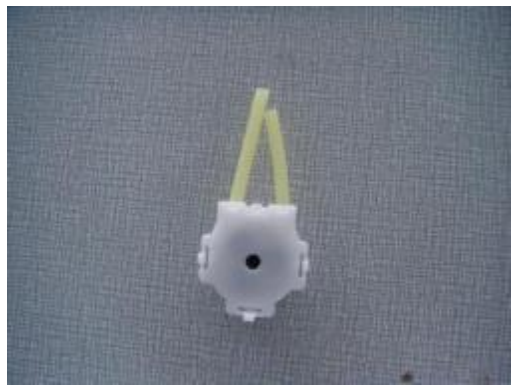




Step 6: Reinstall the tube using tool

Note: during this process ,don"t break the tube.

Step 7: Install the cap of cassette.



Step 8: Reinstall the cassette into the peristaltic motor,and reconnect the tube connectors.

Step 9: Maintenance and replacement of peristaltic tube is finished.

Chapter 6 Maintenance

6.1 Daily Maintenance

It is necessary to perform daily maintenance procedure to ensure reliable instrument performance.

6.1.1 Check the distilled water volume of water bucket

1. Verify the machine is not testing.
2. Check the level of distilled water. If fluid level is low, replace it as follows.

① Loosen off the cap on the distilled water bucket.

② Pour some newly-made distilled water in the bucket.

③ Fasten the cap on the distilled water bucket.

3. Check the tubing of distilled water whether there is some leakage or oppressed tubing or not.

6.1.2 Check waste solution

1. Verify the machine is not testing.
2. Check the level of waste solution. If the level is low, this procedure needn"t to be executed. If the waste solution is full, proceed to next step.

NOTE: It is recommended that you should execute this procedure every day.

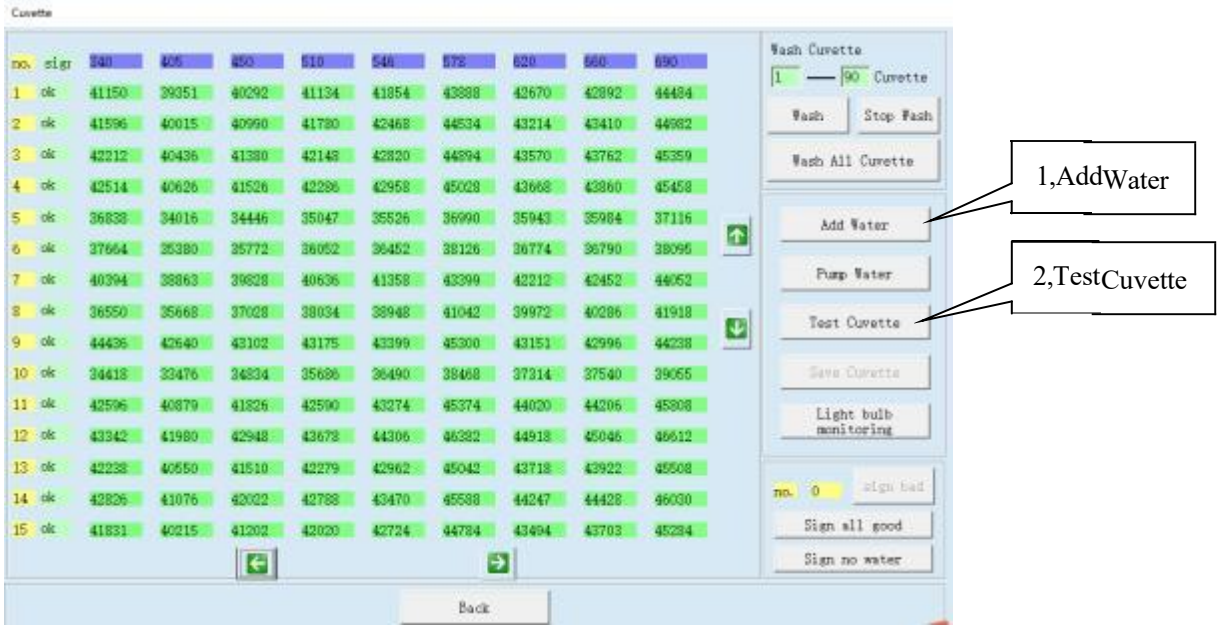
① Loosen offf the cap on the waste solution bucket.

② Empty the waste solution according to local legislation.

③ Place the cap on the waste bottle, and fasten it properly.

6.1.3 Check the signal value of all cuvettes

1. Enter the maintenance menu,select “cuvette” and click “add water” button.



2. Click “test cuvette”,then the machine automatically tests the signal value of all cuvettes.

3. In this menu,we set the minimum signal value is 30000 and maximum signal value is 65535.if the signal value of cuvette is less than 30000 or more than 65535.the software will mark red color on the corresponding cuvette number.the best signal value range of cuvette is from 30000 to 60000.

When you find the cuvette which is bad signal value.you should take out the cuvette,and observe what"s wrong with it.and clean it using wash solution or replace it.

6.1.4 Check sample/reagent probe clogging

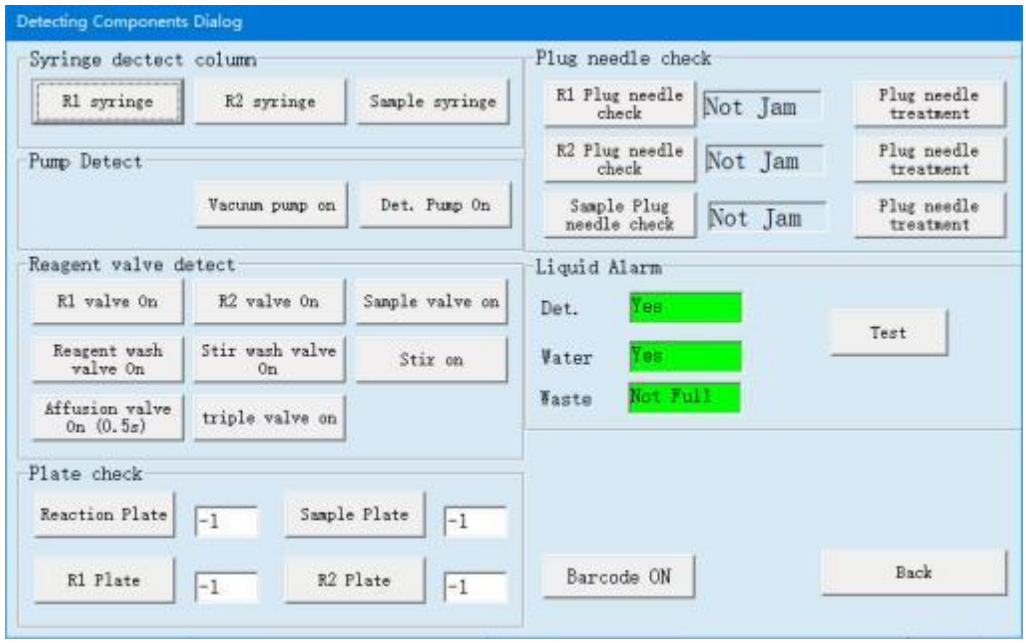
When the probe is clogged, the fluid flow will become abnormal and the sample/reagent volume which is aspirated is unstable.

1. Initialize the machine.
2. Enter maintenance menu and click “Arm test”
3. Click “Sample valve on” button,and then immediately observe the sample probe tip.
4. Click “R1 valve on” button,and then immediately observe the R1 probe tip.
5. Click “R2 valve on” button,and then immediately observe the R2 probe tip.

6. Click “Sample Plug needle check” button,and then observe the sample probe tip jam or not jam.

7. Click “R1 Plug needle check” button,and then observe the R1 probe tip jam or not jam.

8. Click “R2 Plug needle check” button,and then observe the R2 probe tip jam or not jam.



9. Normally very thin liquid flows out from probe.and the liquid column is straight.

Otherwise the probe is clogged , you can use a thin needle to unclog the probe from tip.

6.2 Weekly Maintenance

⚠WARNING:

The probe tip is sharp and can cause puncture wounds. To prevent injury, exercise caution when working around the probe.

☣BIOHAZARD:

Wear gloves and lab coat and, if necessary, goggles.Dispose of the used gauze in accordance with your local or national

guidelines for biohazard waste disposal.Dispose of the waste in accordance with your local or national guidelines for biohazard waste disposal and consult the manufacturer or distributor of the reagents for details.

6.2.1 Clean sample/reagent probe and mixer probe

1. Switch off the machine.
2. Take out the sample/reagent track from tray.
3. Pull the sample/reagent and mixer probe arm to the highest point by hand. Rotate the probe arms to move it to a position upon the convenient place to operate.
4. Pinch acid or alkaline detergent-soaked gauze with tweezers and gently clean the exterior of probes.
5. Pinch deionized water-soaked gauze to clean probes.
6. After cleaning, gently pull the probe arms to its highest point and rotate the probe arms to move the probes to a position upon the corresponding wash well.
7. Switch on the machine and perform initialization.

6.2.2 Clean wash wells

1. Switch off the machine.
2. Pull the sample probe,reagent probes and mixer arms to their highest points. Rotate the arms to move away from the wash well.
3. Clean the inside of wash well and the place around wash well with cotton swabs.

4. Pull the sample probe,reagent probes and mixer arms to their highest point and rotate them to be upon corresponding wash well.
5. Switch on the machine and perform initialization.

6.2.3 Clean sample tray and reagent trays

1. Switch off the machine.
2. Take out reagent bottles and sample cups from reagent trays and sample tray.
3. Wash sample try and reagent trays with clean water and wipe it dry with clean gauze.
4. Wash sample rack and reagent racks with clean water and wipe it dry with clean gauze.
5. Load the sample rack and reagent racks.

6.2.4 Clean the reaction tray

Using gauze moistened with distilled water, wipe the surface and around of the reaction tray.

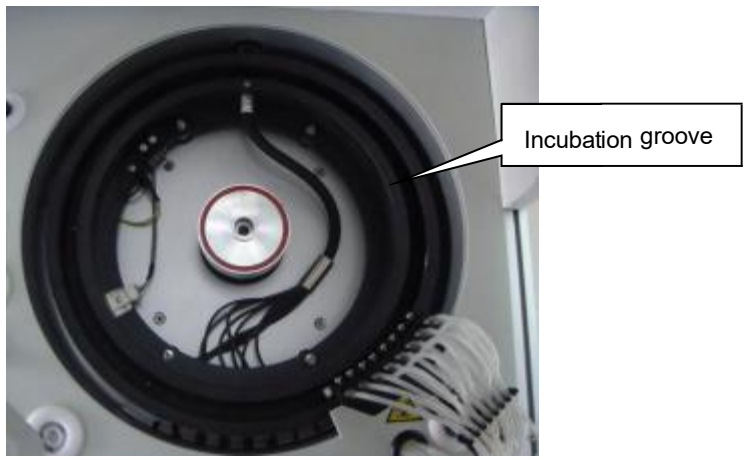
NOTE: Do not clean the reaction tray using gauze moistened with ethanol or detergent which may cause the permanent damage to cuvettes.

6.3 Monthly Maintenance

6.3.1 Clean incubation groove of reaction tray

1. Switch off the machine.
2. Remove all cuvettes holder from reaction tray and put it on a clear table.
3. Wipe the incubation groove using gauze.

NOTE: Do not scratch the light path when wipe the incubator.



4. Place the cuvette holders back into reaction tray.
5. Perform checking the signal value of all cuvettes.

6.3.2 Clean the panel of machine

1. Switch off the machine.
2. Wipe the panel of the machine with clean gauze (water or disinfector-dipped gauze if necessary).

6.3.3 Clean distilled water bucket

1. Switch off the machine.
2. Unscrew the cap of distilled water bucket(together with the distilled water tube and the sensor).

CAUTION:

After removing the cap (together with the tube and sensor), place it on a clean table.

3. Wash the bucket interior with deionized water. Use a clean brush to clean the interior if necessary.

4. Wash the water tube and the sensor with deionized water. Use clean gauze to wash them if necessary.

5. Wipe water off the bucket exterior, water tube and sensor cable with clean gauze.

6. Add fresh distilled water into water bucket.

7. Screw the cap (together with the tube and sensor) back onto the bucket until secure.

6.3.4 Clean waste solution bucket

BIOHAZARD:

Exercise caution and do not spill the waste onto other people or things.

1. Switch off the machine.

2. Unscrew the cap (together with the waste tube and the sensor).

BIOHAZARD:

After removing the cap of the waste tank (together with the waste tube and sensor), place it on an appropriate place to

avoid biohazard contamination.

3. Empty waste solution bucket.

4. Wash the bucket interior with clean water. Soak the bucket with disinfector if necessary.

5. Wash the waste tube and the sensor with clean water.

6. Wipe water off the bucket exterior, waste tube and sensor cable with clean gauze.

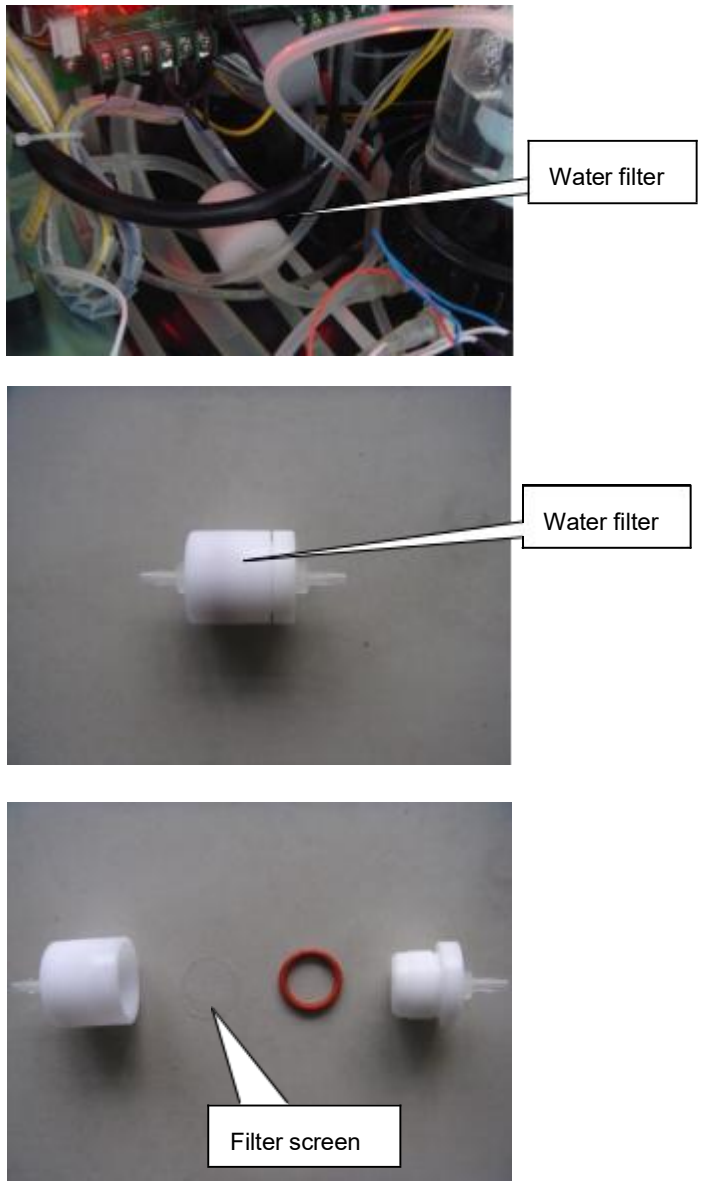
7. Screw the cap (together with the waste tube and sensor) back onto the bucket until secure.

CAUTION:

Ensure the waste tube is over the tank and not blocked, bent, or twisted. A blocked, bent or twisted waste tube may lead to wastewater overflow that may damage the analyzer.

6.3.5 Clean water filter

The water filter is connected with outlet of water tank.it is used to filtrate some dirty material from water tank.it is necessary to clean it monthly.otherwise it will be clogged and affect water flow.



Note:before remove water filter for cleaning.you must pinch the outlet tube of water tank in order to avoid water leakage.

DW-TC6090 Automatic Chemistry Analyzer Spare Parts Price

US$

System	P/N	Description	Qty	Price
PCB	PCB001	Main Controller Board	ea.	420.00
	PCB002	Signal Process Board	ea.	360.00
	PCB003	Universal Stepping Motor Drive Board	ea	93.00
	PCB004	Reaction Tray Stepping Motor Drvie Board	ea	65.00
	PCB005	Bus Board	ea	28.00
	PCB006	Liquid Level Detection Board	ea	53.00
	PCB007	Motor Pinboard	ea	12.00
	PCB008	Temperature Controller Board	ea	70.00
	PCB009	Water Controller Board	ea	45.00
	PCB010	Reagent Refrigeration Pinboard	ea	28.00
	PCB011	Mixer Motor Power Board	ea	10.00
	PCB012	Power Board of Cooling Water Cycle Pump	ea	15.00
Power Supply	PS001	Switch Power Supply（SP-320-24）	ea	135.00
	PS002	Switch Power Supply（SP-320- 12）	ea	130.00
	PS003	Self-made Power Supply	ea	60.00
	PS004	Power Transformer(24v-5v,10A)	ea	12.00
Photometer	PR001	Optical Fiber	ea	700.00
	PR002	Tungsten-Halogen Lamp	ea	40.00
	PR003	Tungsten-Halogen Lamp with Holder	ea	50.00
	PR004	Light Focus Subassembly	ea	120.00
	PR005	340nm Light Filter	ea	89.00
	PR006	405nm Light Filter	ea	70.00

System	P/N	Description	Qty	Price
	PR007	450nm Light Filter	ea	70.00
	PR008	510nm Light Filter	ea	70.00
	PR009	546nm Light Filter	ea	70.00
	PR010	578nm Light Filter	ea	70.00
	PR011	620nm Light Filter	ea	70.00
	PR012	660nm Light Filter	ea	70.00
	PR013	690nm Light Filter	ea	70.00
	PR014	380nm Light Filter	ea	70.00
	PR015	600nm Light Filter	ea	70.00
	PR016	750nm Light Filter	ea	70.00
	PR017	Photodiode of Signal Process Board	ea	7.00
Valve	**V001**	Two-Way Valve	ea	130.00
	V002	Three-Way Valve	ea	135.00
Pump	**PP001**	Peristaltic Pump Complete	ea	90.00
	PP002	Peristaltic Pump Cassette with Tube	ea	9.00
	PP003	Peristaltic Stepping Motor	ea	75.00
	PP004	Water Pump 1 (YLK pump)	ea	110.00
	PP005	Peristaltic Pump Tube	ea	6.00
	PP006	Vacuum Pump	ea	350.00
	PP007	Waste Pump (YLK pump)	ea	110.00
	PP008	Water Pump 2 (Nidec Pump DC12V)	ea	45.00
Syringe	**SE001**	Sample Syringe Cavity without Motor	ea	40.00
	SE002	Reagent Syringe Cavity without Motor	ea	46.00
	SE003	Sample Syringe Piston O-ring	ea	1.50
	SE004	Sample Syringe Nozzle O-ring	ea	1.00

System	P/N	Description	Qty	Price
	SE005	Reagent Syringe Piston O-ring	ea	1.50
	SE006	Reagent Syringe Nozzle O-ring	ea	1.00
	SE007	Sample Syringe Piston	ea	15.00
	SE008	Reagent Syringe Piston	ea	18.00
	SE009	Sample Syringe Guide Sleeve	ea	3.00
	SE010	Reagent Syringe Guide Sleeve	ea	3.00
	SE011	Retaining Nest	ea	1.00
	SE012	Sleeve between Piston with Gear Rack	ea	2.00
Motor	**M001**	23HY109-20B4 Stepping Motor	ea	79.00
	M002	17HD432Y-22B Stepping Motor	ea	76.00
	M003	17HA403Y- 18B Stepping Motor	ea	70.00
	M004	Complete Sample Probe Arm Subassembly	set	247.00
	M005	Complete Reagent Probe Arm Subassembly	set	247.00
	M006	Complete Mixer Probe Arm Subassembly	set	239.00
	M007	Complete 8-Steps Washing Arm Subassembly	set	185.00
	M008	Mixer Motor	ea	15.00
Motor Gear	**MG001**	Motor Gear of Sample Syringe	ea	5.00
	MG002	Motor Gear of Reagent Syringe	ea	5.00
	MG003	Motor Gear of Reaction Tray	ea	7.00
	MG004	Motor Gear of Sample Probe Horizontal Movement	ea	6.50
	MG005	Motor Gear of Sample Probe Vertical Movement	ea	8.00
	MG006	Motor Gear of Reagent Probe Horizontal Movement	ea	6.50
	MG007	Motor Gear of Reagent Probe Vertical Movement	ea	8.00
	MG008	Motor Gear of Mixer Probe Horizontal Movement	ea	6.50
	MG009	Motor Gear of Mixer Probe Vertical Movement	ea	8.00

System	P/N	Description	Qty	Price
	MG010	Motor Gear of 8-Steps Washing Unit	ea	8.00
	MG011	Motor Gear of Sample Tray	ea	7.00
	MG012	Motor Gear of Reagent Tray	ea	7.00
Cooling Fan	**CF001**	Cooling Fan of Lamp(CHB6012CB DC12V 0. 12A)	ea	5.00
	CF002	Cooling Fan of Machine Body(MDB1212UA DC12V 0.42A)	ea	8.00
	CF003	Cooling Fan of Boards Box(HDB0612MD DC12V 0. 12A)	ea	5.00
	CF004	Cooling Fan of Boards Box(SF0812HBS DC12V 0.22A)	ea	5.00
	CF005	Cooling Fan of Self-made Power Module (HDB0712MD DC12V 0.23A)	ea	5.00
Feed Belt	**F001**	92MXL(115B)(width 6mm)	ea	2.00
	F002	108MXL(width 6mm)	ea	2.00
	F003	130MXL(width 6mm)	ea	2.00
	F004	140MXL(width 6mm)	ea	2.00
	F005	212MXL(width 6mm)	ea	2.00
	F006	224MXL(width 6mm)	ea	2.00
Probe	**PE001**	Sample Probe with Liquid Detection Wire	ea	36.00
	PE002	Reagent Probe with Liquid Detection Wire	ea	36.00
	PE003	Single Long Washing Needle	ea	5.00
	PE004	Long&Short Washing Needle	ea	6.00
	PE005	Mixer Probe	ea	8.00
Refrigeration System	**RS001**	Refrigeration Semiconductor	ea	30.00
	RS002	Cooling Fan of Condensator (MDB1212UA DC12V 0.42A)	ea	8.00
	RS003	Cooling Water Cycle Pump	ea	80.00
	RS004	Condensator	ea	200.00
	RS005	Cooling Water Bottle	ea	10.00

System	P/N	Description	Qty	Price
Optical Sensor	OS001	Optical Sensor of Reaction Tray	ea	2.00
	OS002	Optical Sensor of Sample/reagent Syringe (ST157)	ea	1.00
	OS003	Optical Sensor of Sample/reagent Probe Vertical Movement (ST157)	ea	1.00
	OS004	Optical Sensor of Sample/reagent Probe Horizontal Movement (ST157)	ea	1.00
	OS005	Optical Sensor of Washing Unit (ST157)	ea	1.00
	OS006	Optical Sensor of Mixer Probe Vertical Movement (ST157)	ea	1.00
	OS007	Optical Sensor of Mixer Probe Horizontal Movement (ST157)	ea	1.00
	OS008	Optical Sensor of Sample/reagent Tray	ea	2.00
Tube	T001	Silicon Tube φ1.5×3.2	m	0.50
	T002	Silicon Tube φ3×6	m	1.00
	T003	Silicon Tube φ8×12	m	1.00
	T004	Silicon Tube φ8×12 Blue Color	m	1.80
	T005	Silicon Tube φ10×14 Blue Color	m	2.00
	T006	Silicon Tube φ2×4	m	1.00
	T007	Silicon Tube φ1.2×3	m	0.50
	T008	Sample/reagent Aspirator Teflon Tube φ0.8×1.6	m	1.50
Others	OR001	Reaction Cuvette	ea	1.00
	OR002	Serum Cup(pack of 1000)	ea	26.00
	OR003	White Reagent Bottle	ea	3.00
	OR004	Yellow Reagent Bottle	ea	3.50
	OR005	Reaction Cuvette Holder	ea	6.00
	OR006	Direct Serial (RS232) Communication Cable	ea	3.00
	OR007	USB To Serial Port Convertor Cable	ea	10.00
	OR008	Complete Water Tank Subassembly	ea	65.00
	OR009	Water Tank Base Subassembly	ea	40.00

System	P/N	Description	Qty	Price
	OR010	O-ring of Water Tank	ea	2.50
	OR011	Water Tank Glass Cover Subassembly	ea	23.00
	OR012	Separatory Liquid Block	ea	6.00
	OR013	Water Filter of Water Tank Outlet	ea	8.00
	OR014	Water Filter Screen	ea	2.00
	OR015	O-ring of Water Filter	ea	1.00
	OR016	Waste/ vacuum Plastic Bottle	ea	18.00
	OR017	O-ring of Waste/ vacuum Plastic Bottle	ea	2.50
	OR018	Cover of Waste/ vacuum Plastic Bottle	ea	16.00
	OR019	O-ring of Waste/ vacuum Plastic Bottle Cover	ea	2.50
	OR020	Temperature Sensor of Reaction Tray	ea	6.00
	OR021	Temperature Sensor of Reagent Tray	ea	6.00
	OR022	Temperature Sensor of Water Tank	ea	6.00
	OR023	Probe Crash Protection Subassembly	ea	28.00
	OR024	Incubation Groove	ea	100.00
	OR025	Water Container Sensor Subassembly	ea	40.00
	OR026	Waste Container Sensor Subassembly	ea	35.00
	OR027	Detergent Container Sensor Subassembly	ea	40.00
	OR028	Heating Loop	ea	35.00
	OR029	Temperature Protective Switch（KSD9700 250V 10A 60℃）	ea	5.00
	OR030	Heating Loop with Temperature Protective Switch	ea	42.00
	OR031	Water Calefaction Stick	ea	10.00
	OR032	Water Calefaction Stick with Temperature Protective Switch	ea	16.00
	OR033	Silicon Washing Wiper	ea	0.5
	OR034	Reagent 1 Tray	ea	63.00

System	P/N	Description	Qty	Price
	OR035	Sample/reagent2 Tray	ea	125.00
	OR036	Lock Screw of Sample/reagent Tray	ea	5.00
	OR037	T/Y Connector	ea	1.00
	OR038	Water Container (10L)	ea	8.00
	OR039	Waste Container (10L)	ea	8.00
	OR040	Washing Needle Spring	ea	0.50
	OR041	Detergent Container (500ml)	ea	5.00
	OR042	Communication Chip of Main Controller Board	ea	4.00
	OR043	Temperature Protective Switch（TB02-KABD 2A 60C)	ea	5.00
	OR044	Hydraulic Rod of Upper Cover	ea	15.00
	OR045	Cover of Reaction Tray	ea	20.00
	OR046	Cover of Sample Tray	ea	15.00
	OR047	Cover of Reagent Tray	ea	15.00
	OR048	Air Buffer Bottle	ea	9.00
	OR049	Sample/reagent Probe Arm Cover	ea	25.00
	OR050	Mixture Probe Arm Cover	ea	21.00

DW-TC6090 Preventive Maintenance Kit

No.	PN	Part Description	RRP	Qty
1	**PR003**	Tungsten-Halogen Lamp with Holder	6 Months	2PCS
2	**PP002**	Peristaltic Pump Cassette with Tube	6 Months	1PCS
3	**SE003**	Sample Syringe Piston O-ring	6 Months	1PCS
4	**SE004**	Sample Syringe Nozzle O-ring	6 Months	1PCS
5	**SE005**	Reagent Syringe Piston O-ring	6 Months	2PCS
6	**SE006**	Reagent Syringe Nozzle O-ring	6 Months	2PCS
7	**SE007**	Sample Syringe Piston	2 Years	1PCS
8	**SE008**	Reagent Syringe Piston	2 Years	2PCS
9	**SE009**	Sample Syringe Guide Sleeve	6 Months	1PCS
10	**SE010**	Reagent Syringe Guide Sleeve	6 Months	2PCS
11	**F001**	92MXL（115B）(width 6mm)	2 Years	1PCS
	F002	108MXL(width 6mm)	2 Years	1PCS
12	**F003**	130MXL(width 6mm)	2 Years	1PCS
13	**F004**	140MXL(width 6mm)	2 Years	1PCS
14	**F005**	212MXL(width 6mm)	2 Years	1PCS
15	**F006**	224MXL(width 6mm)	2 Years	1PCS
16	**PE001**	Sample Probe with Liquid Detection Wire	1 Year	1PCS
17	**PE002**	Reagent Probe with Liquid Detection Wire	1 Year	2PCS
18	**PE005**	Mixer Probe	1 Year	2PCS
19	**RS001**	Refrigeration Semiconductor	2 Years	4PCS
20	**T008**	Sample/reagent Aspirator Teflon Tube	1 Year	3PCS
21	**OR001**	Reaction Cuvette	3 Months	90 PCS
22	**OR013**	Water Filter of Water Tank Outlet	6 Months	1PCS
23	**OR033**	Silicon Washing Wiper	3 Months	1PCS
24	MG001	Motor Gear of Sample Syringe	1 Year	1PCS
25	MG002	Motor Gear of Reagent Syringe	1 Year	2PCS

Total Price: 550.5 USD

Note:

1. RRP is replacement requirement period.

Contents of this list is available for one machine.

Appendix B Diagram

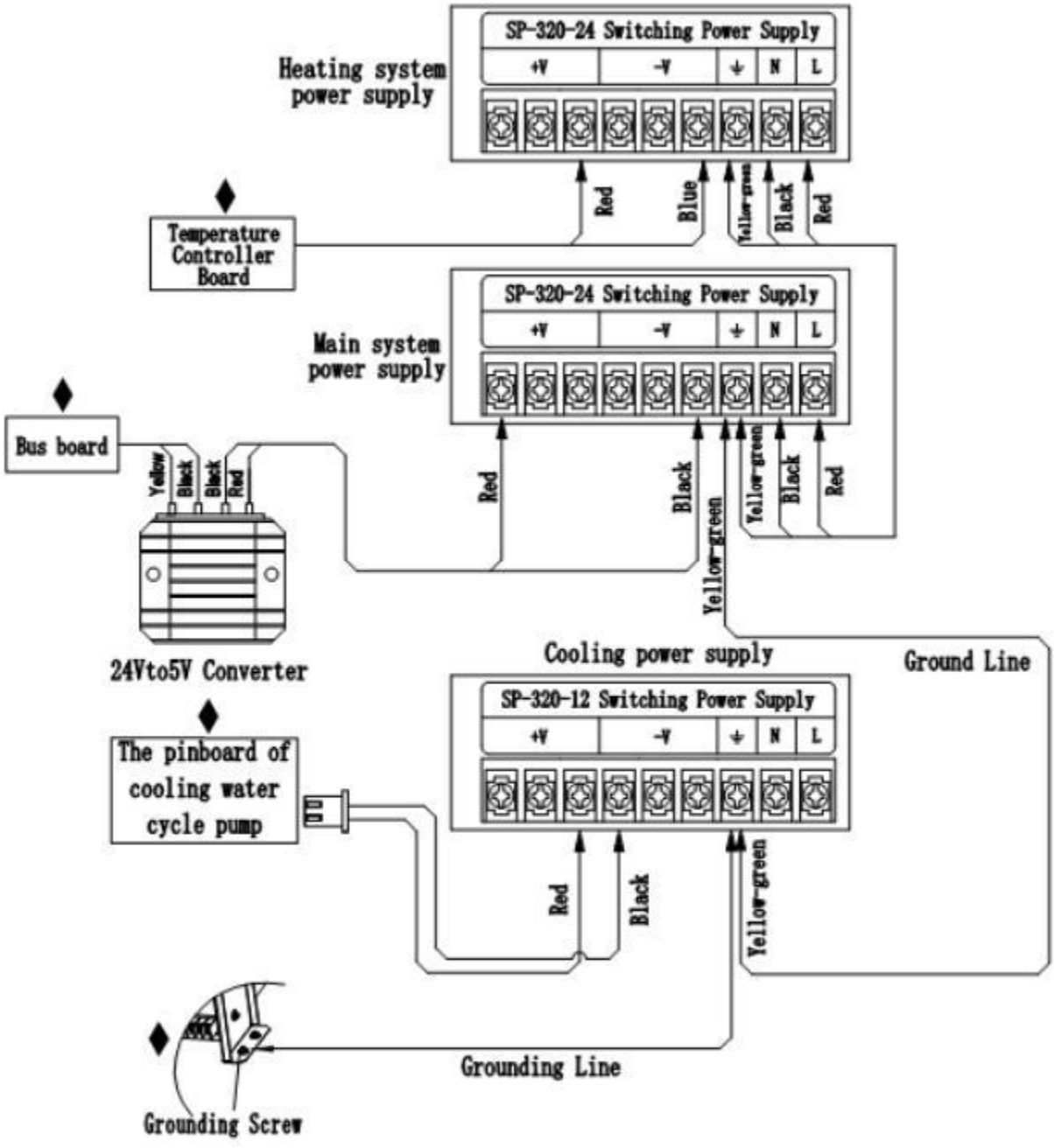


Figure B-1 Power Line Distribution

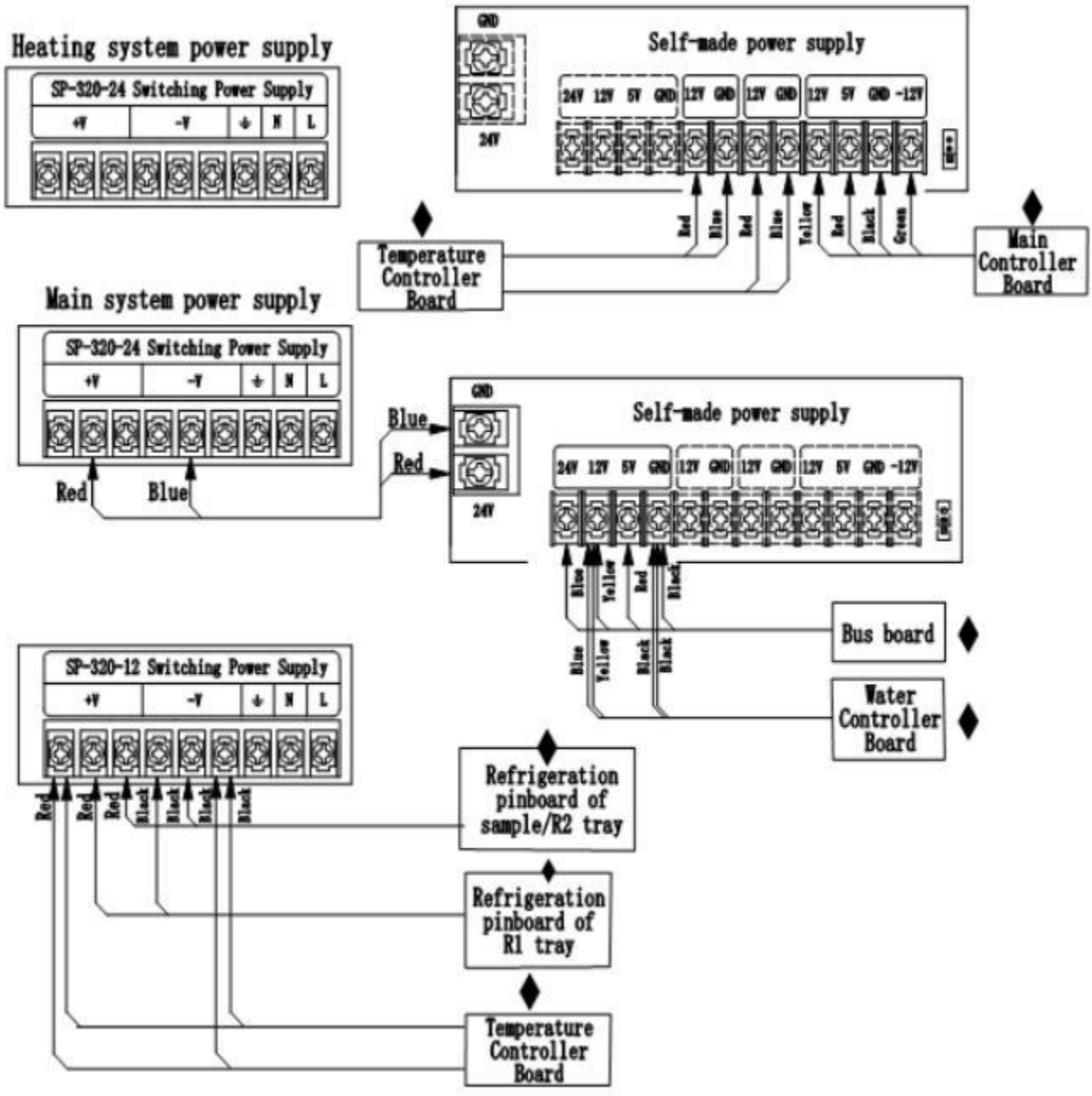


Figure B-2 Power Line Distribution

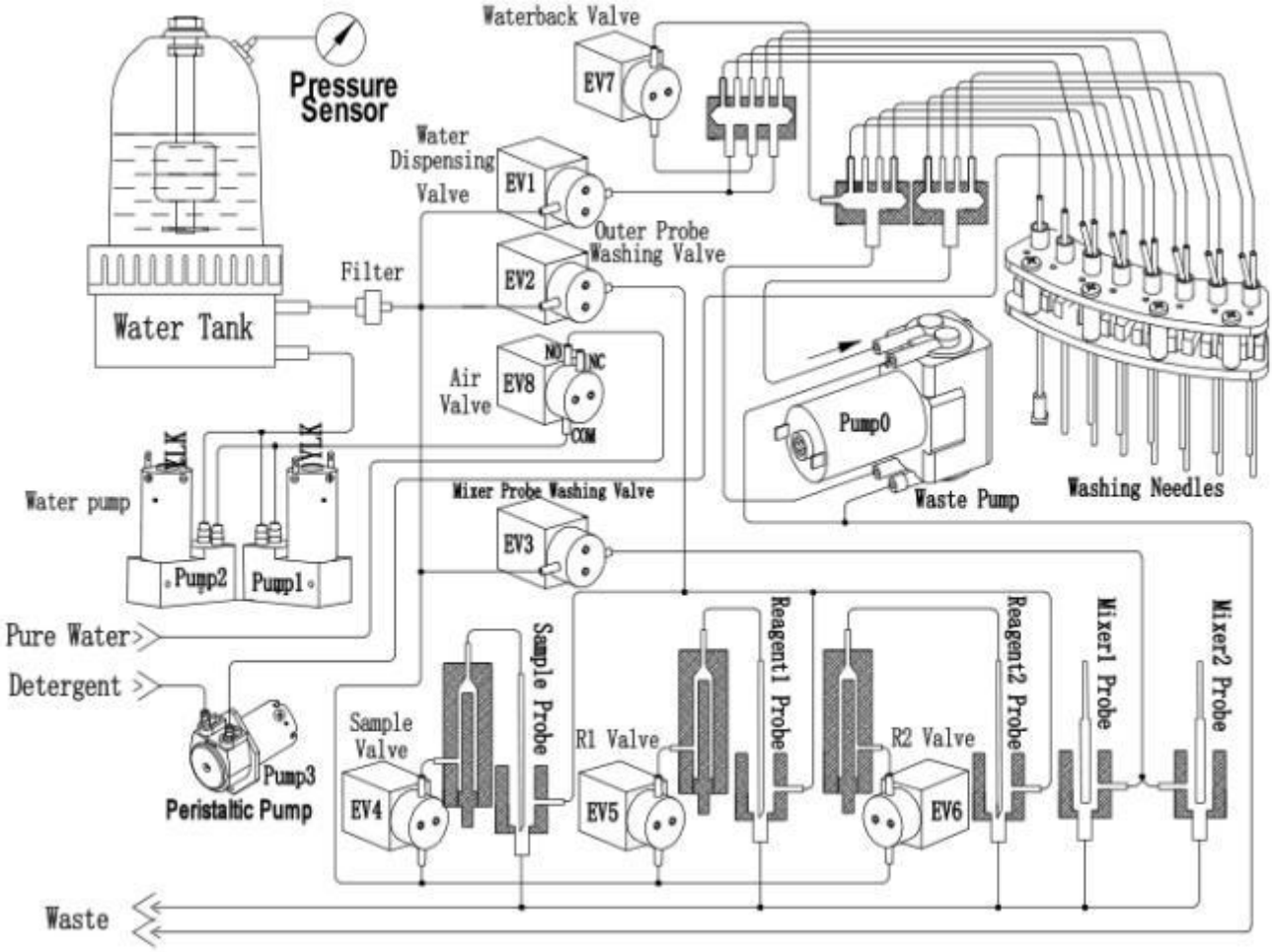


Figure B-3 Tube Connection

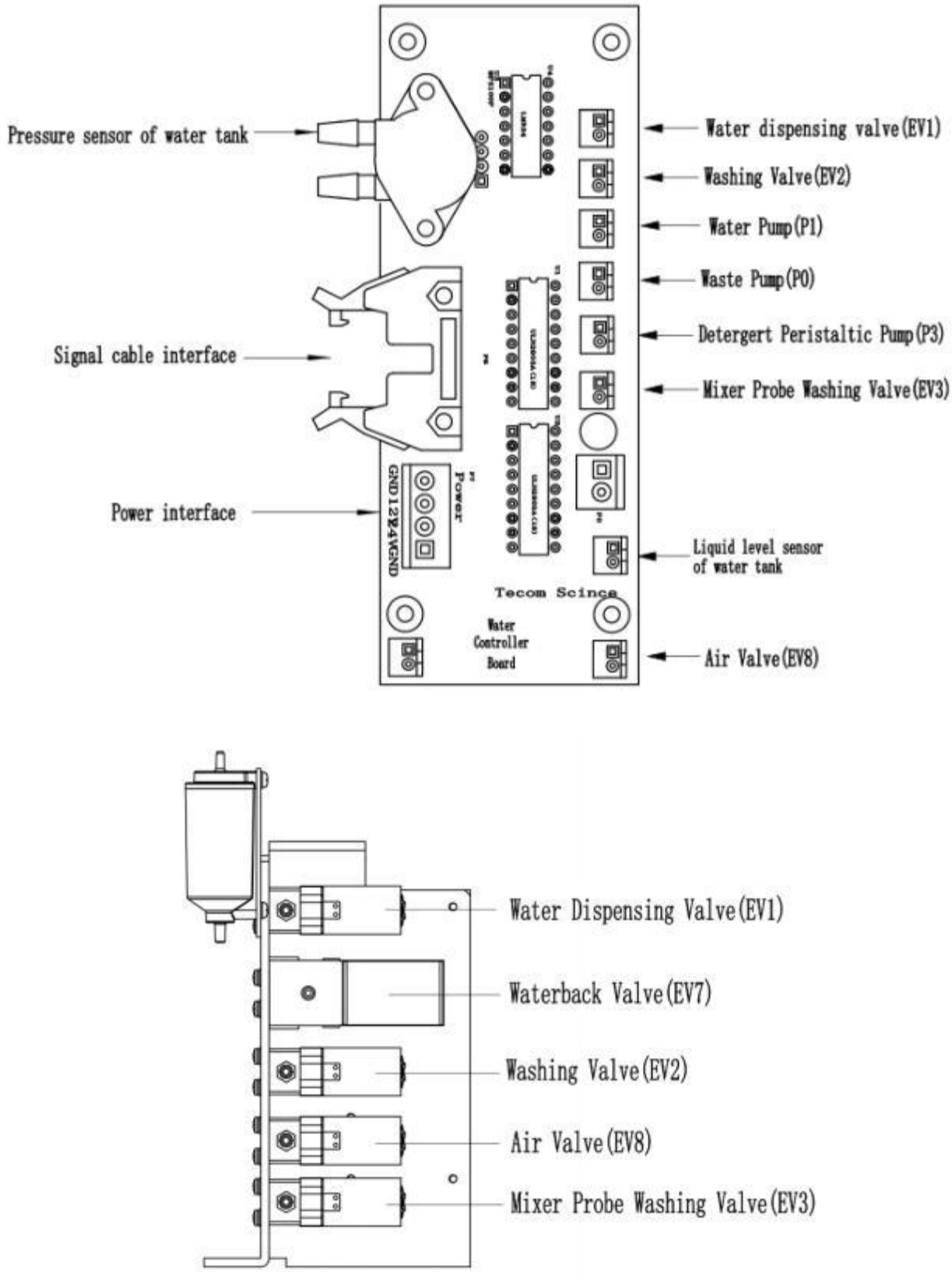


Figure B-4 Water Controller Board Connection

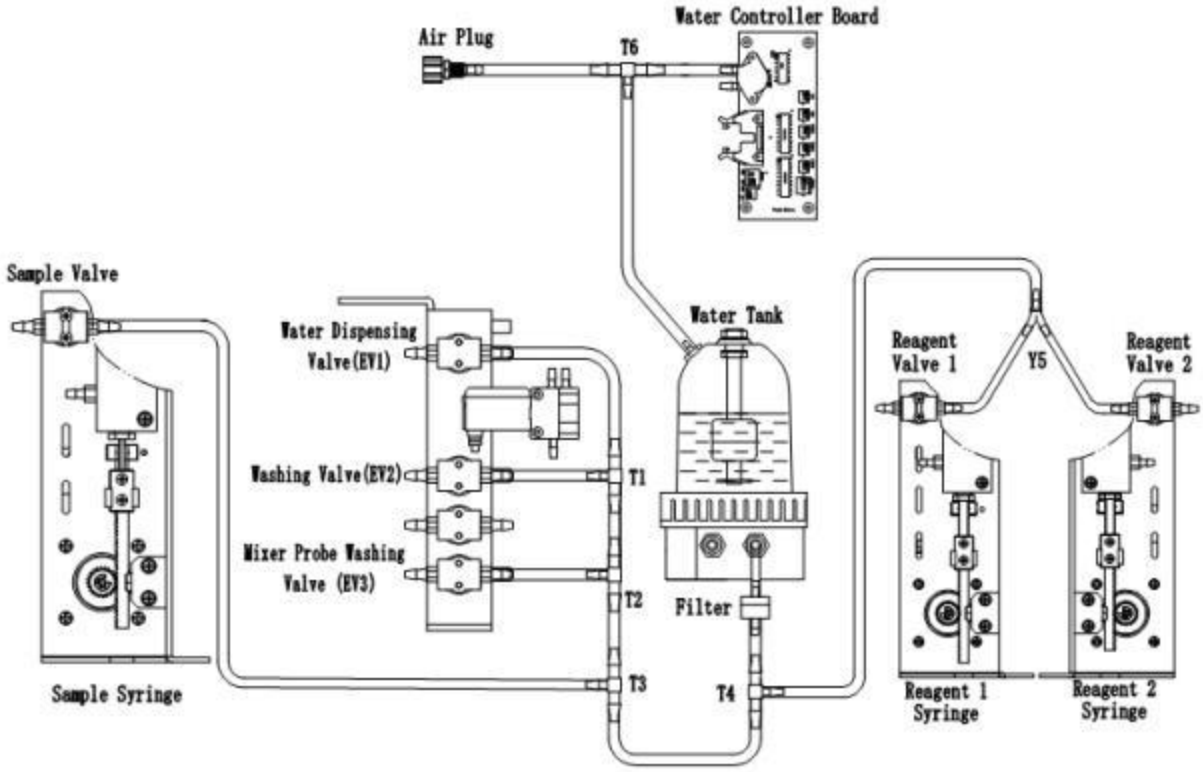


Figure B-5 Tube Connection

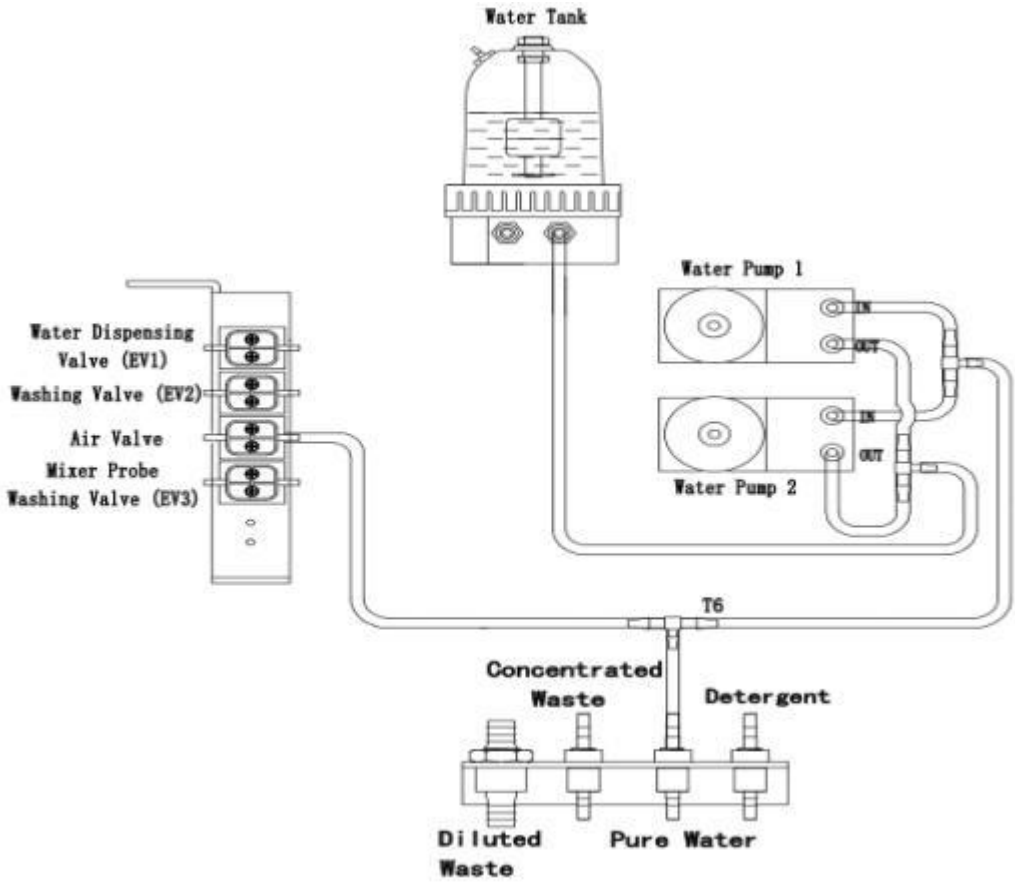


Figure B-6 Tube Connection

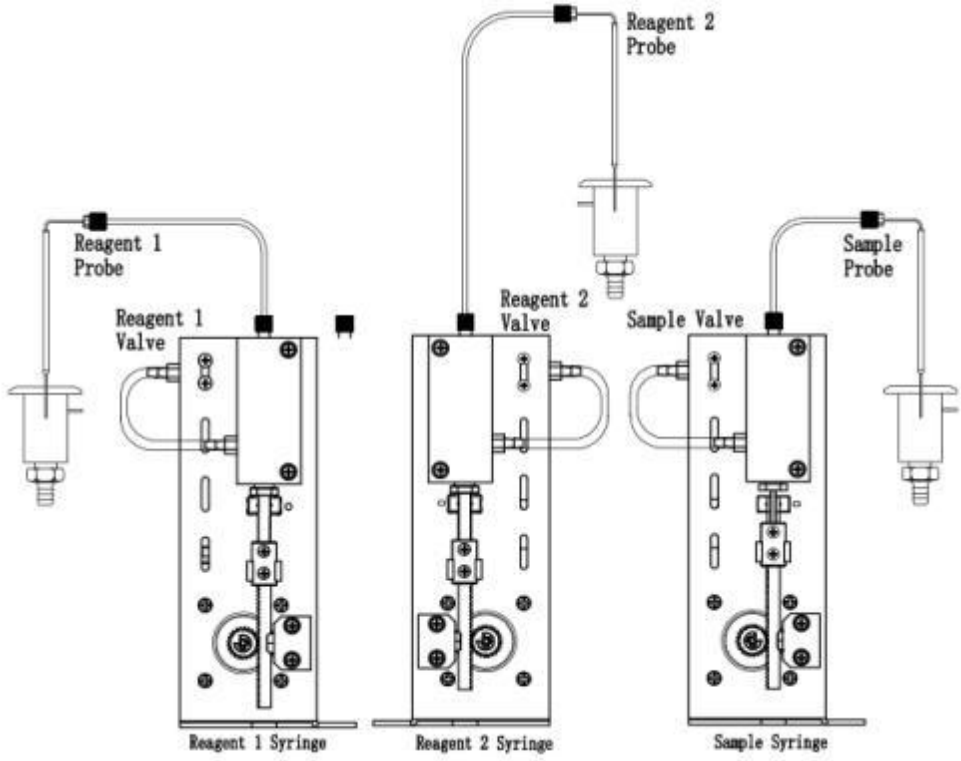


Figure B-7 Tube Connection

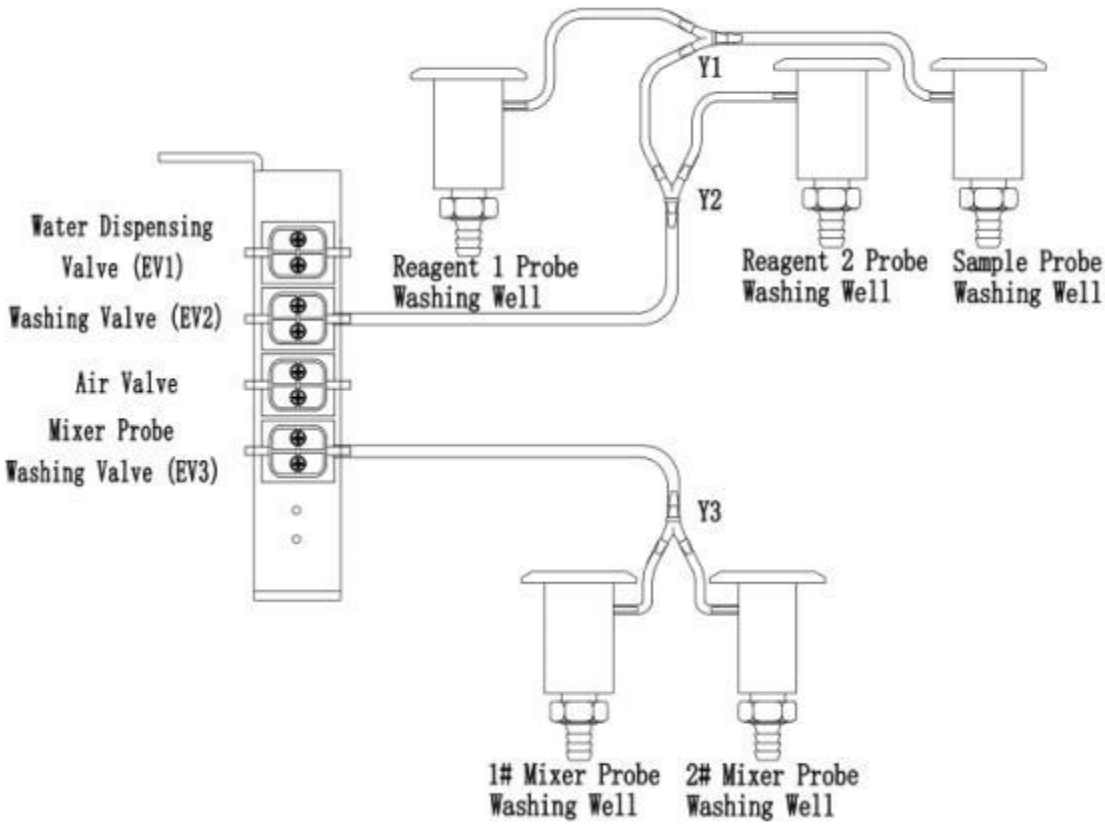


Figure B-8 Tube Connection

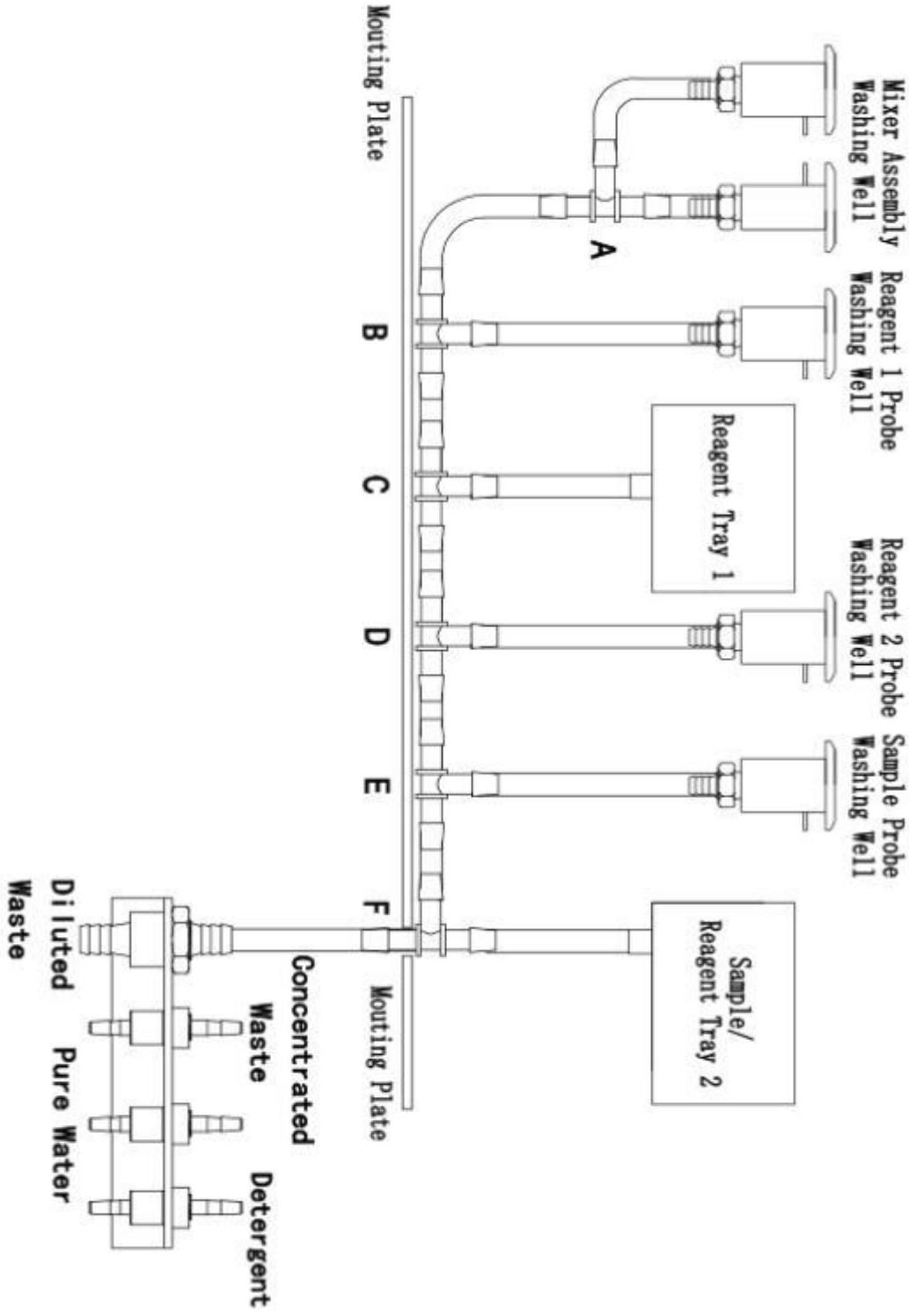


Figure B-9 Tube Connection

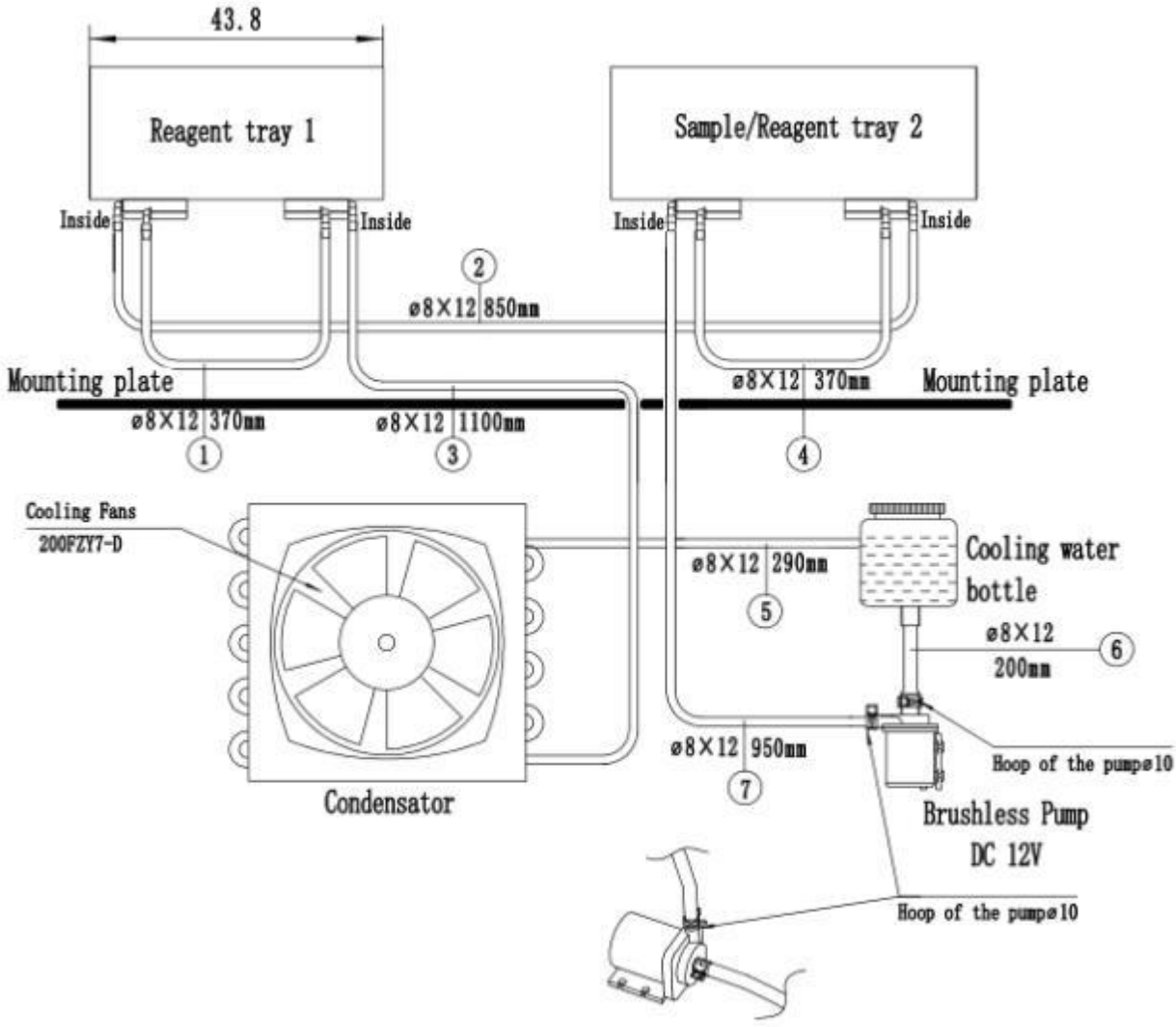


Figure B-10 Tube Connection

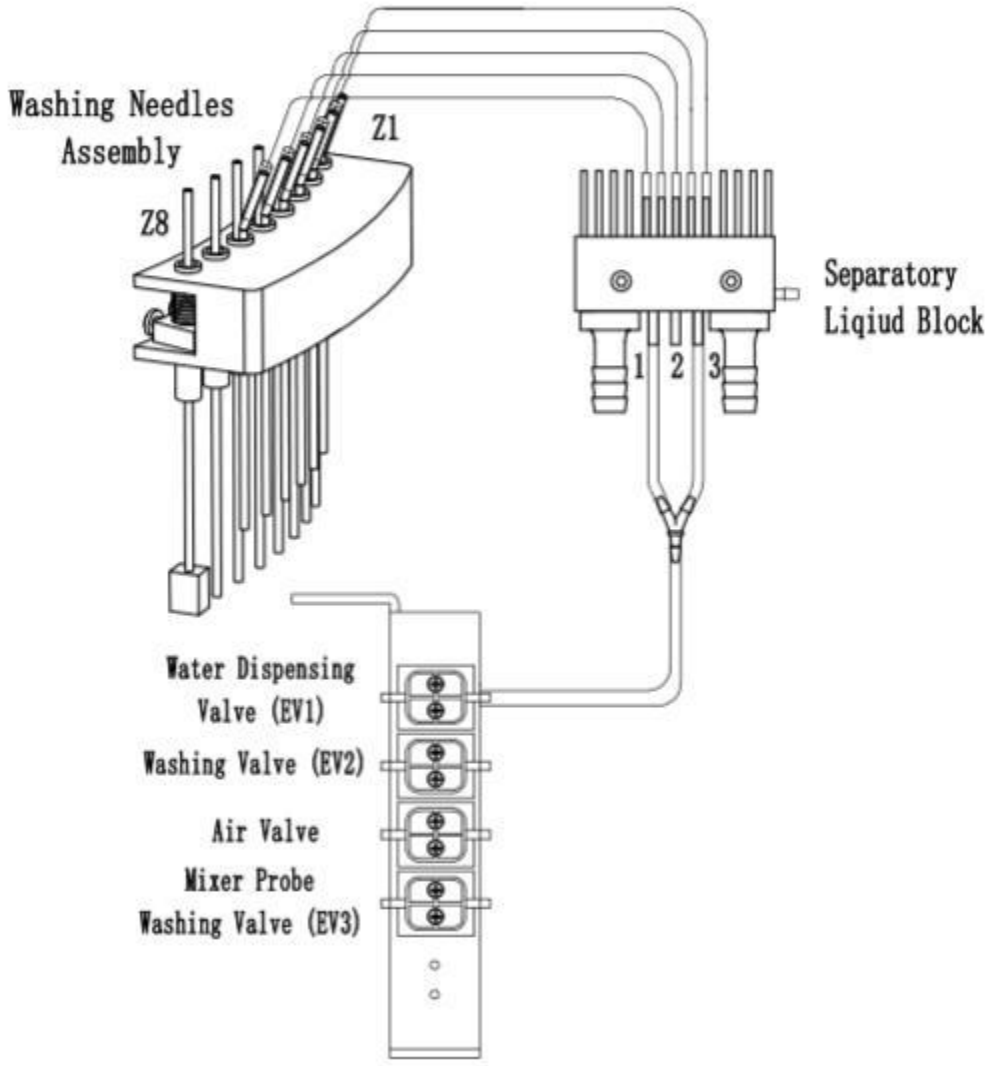


Figure B-11 Tube Connection

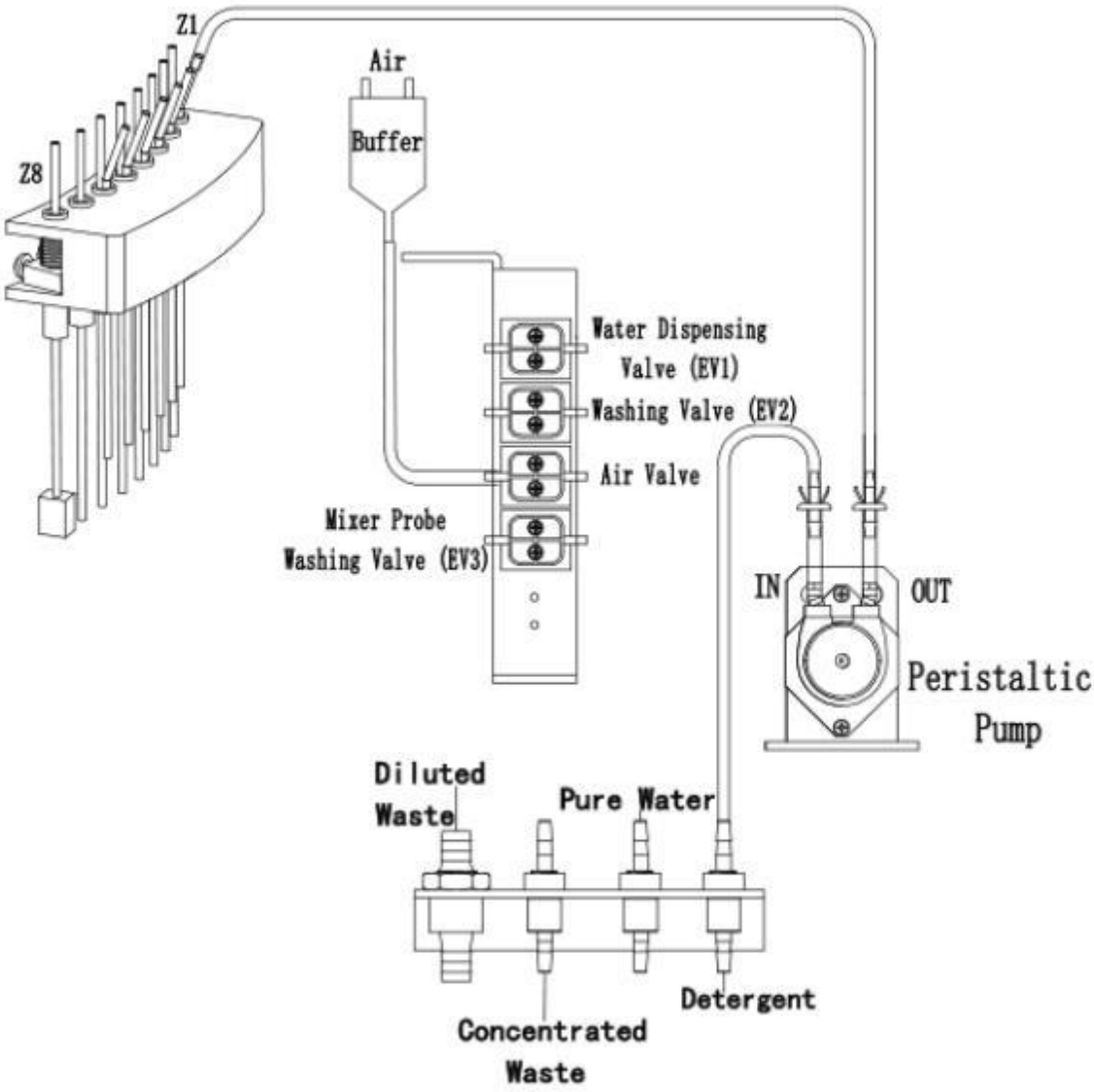


Figure B-12 Tube Connection

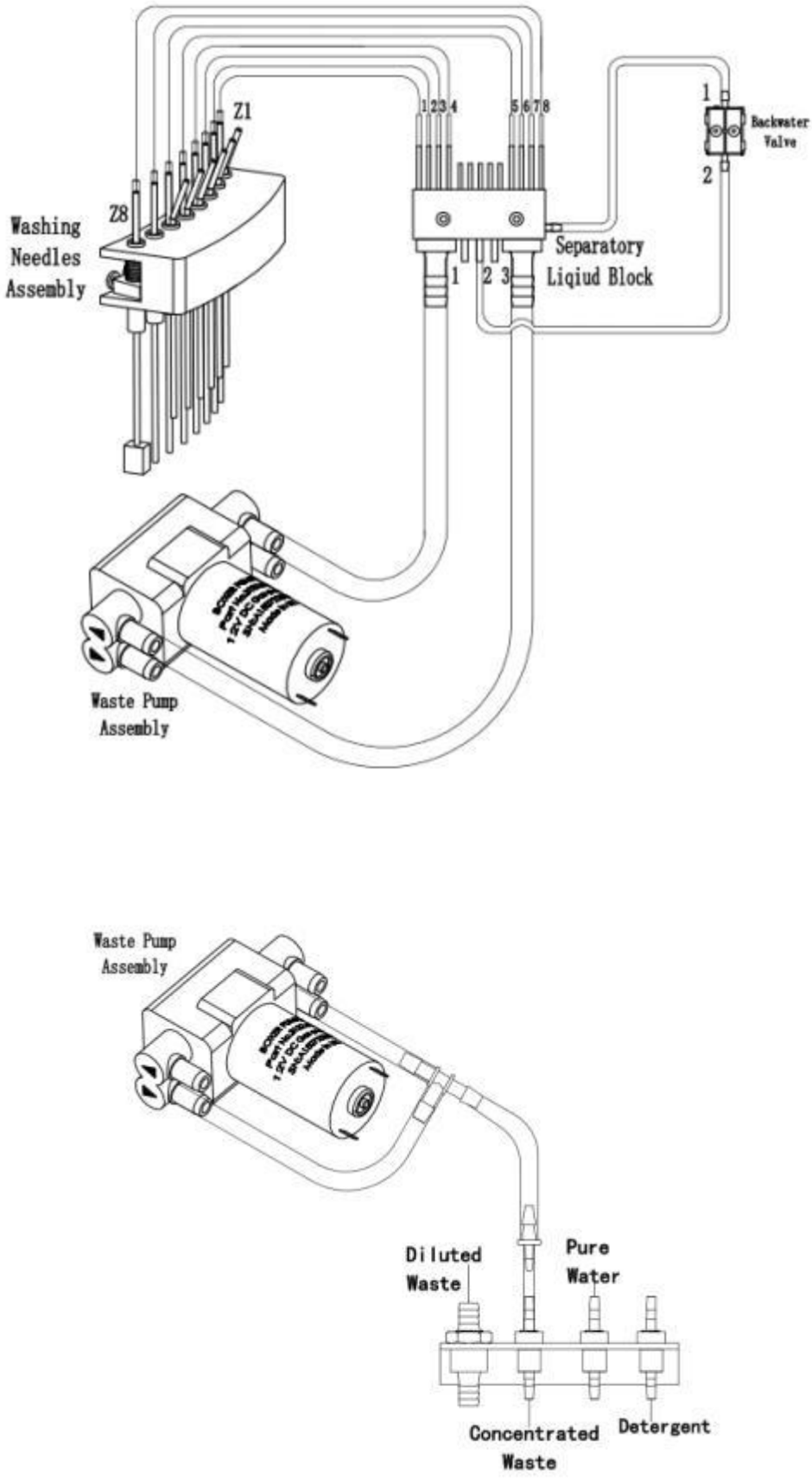


Figure B-13 Tube Connection

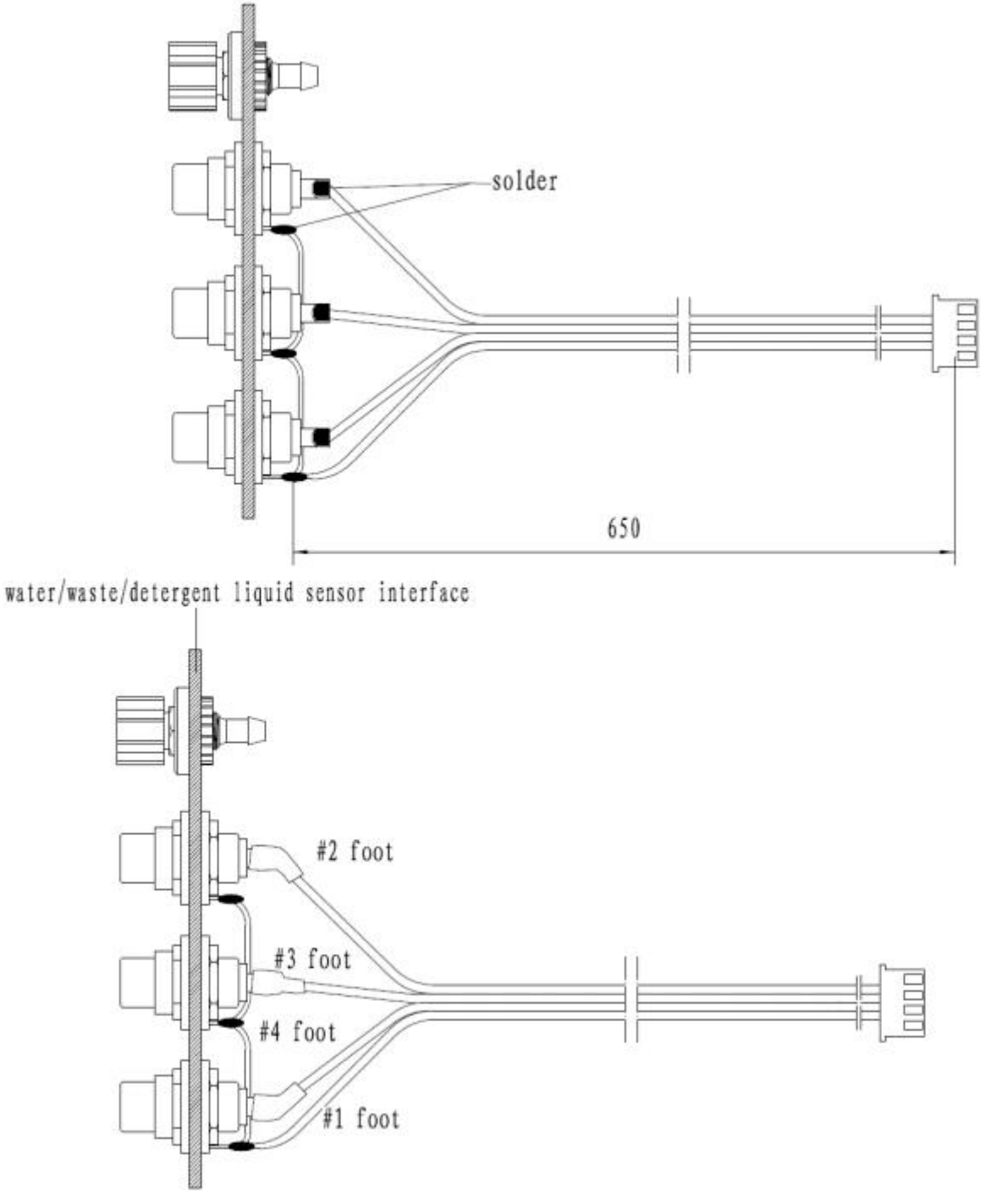


Figure B-14 Liquid Sensor Cable Socket

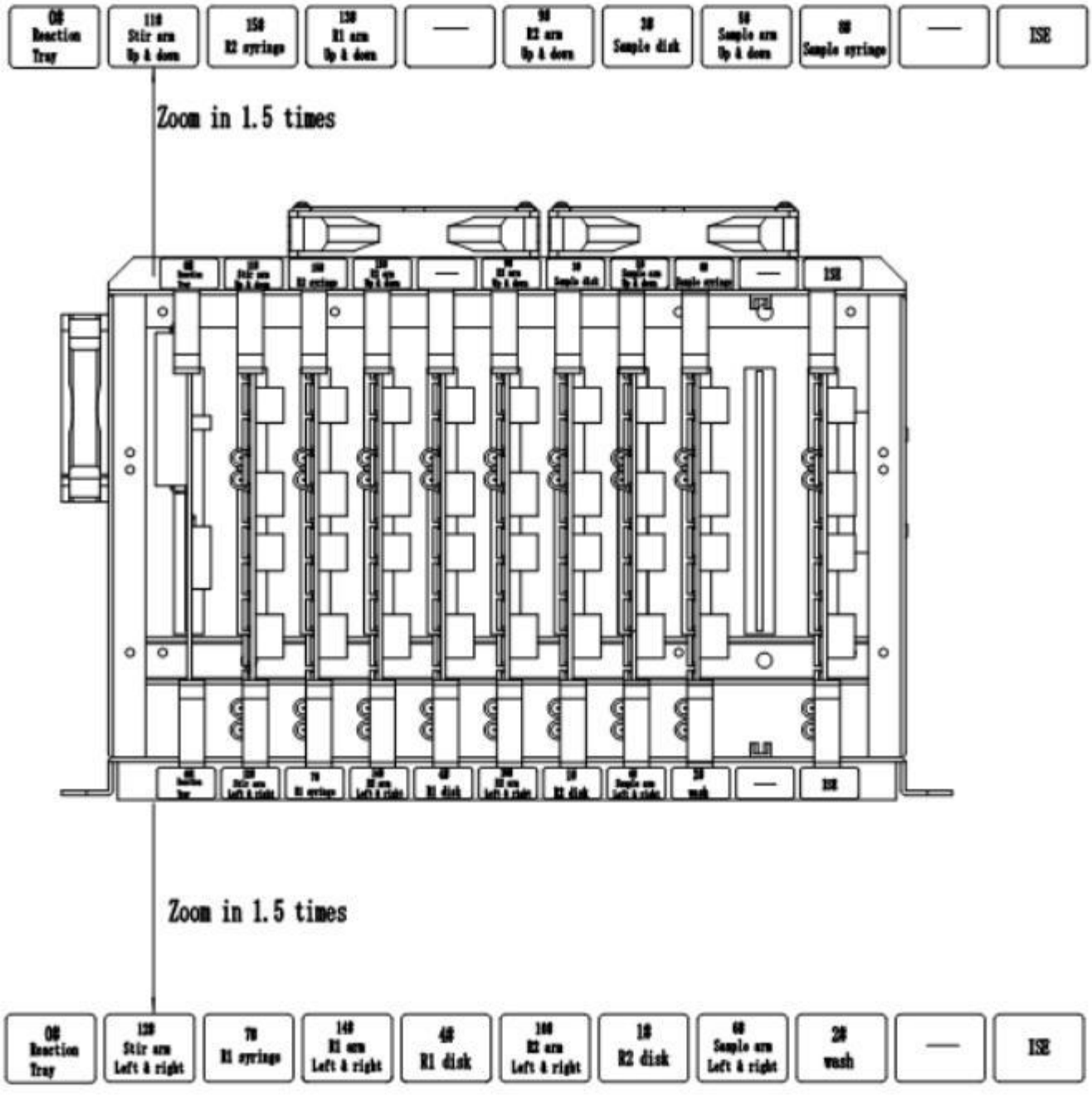


Figure B-15 Bus Board Connection

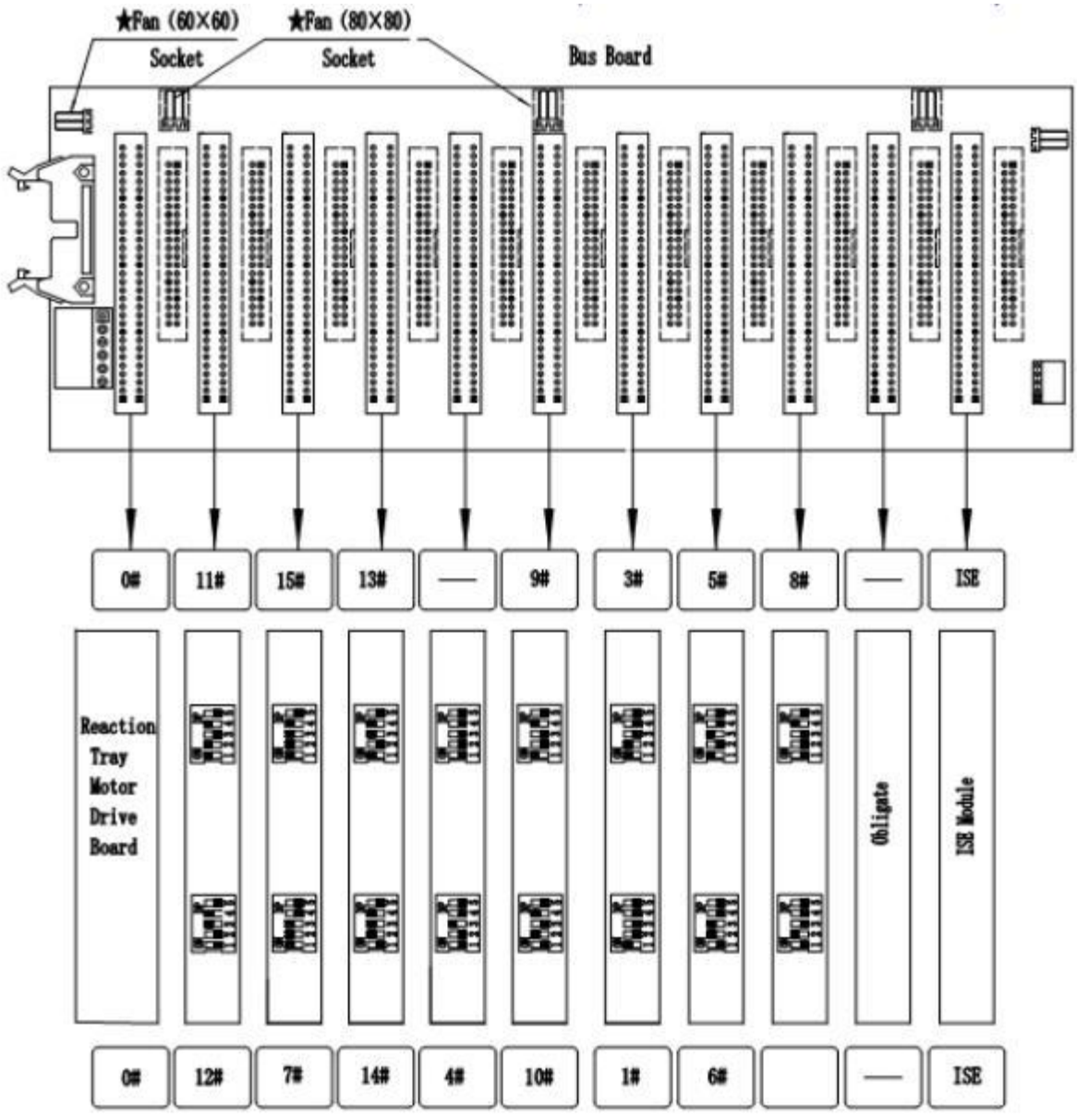


Figure B-16 Bus Board Connection

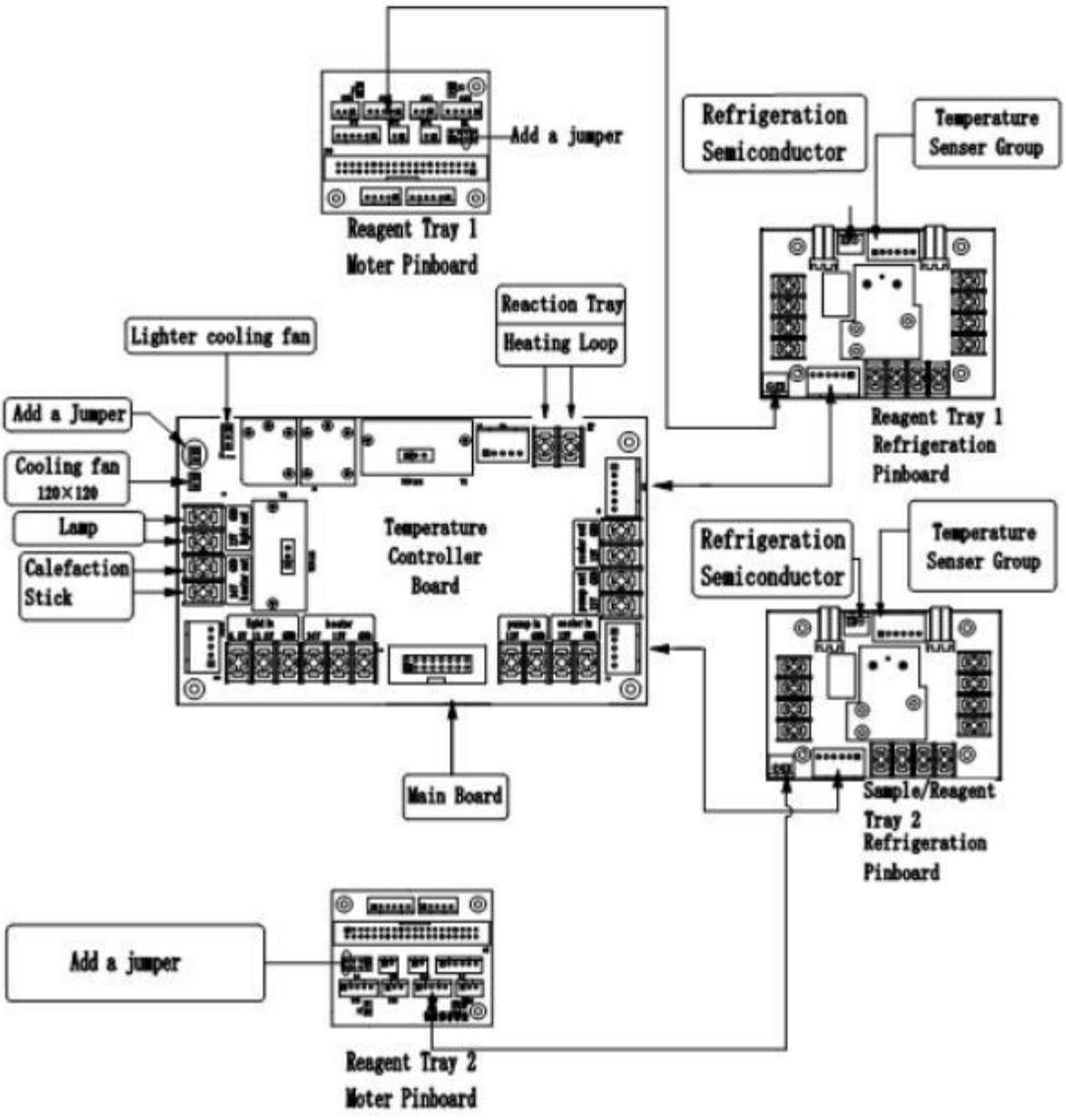


Figure B-17 Temperature Controller Board Connection

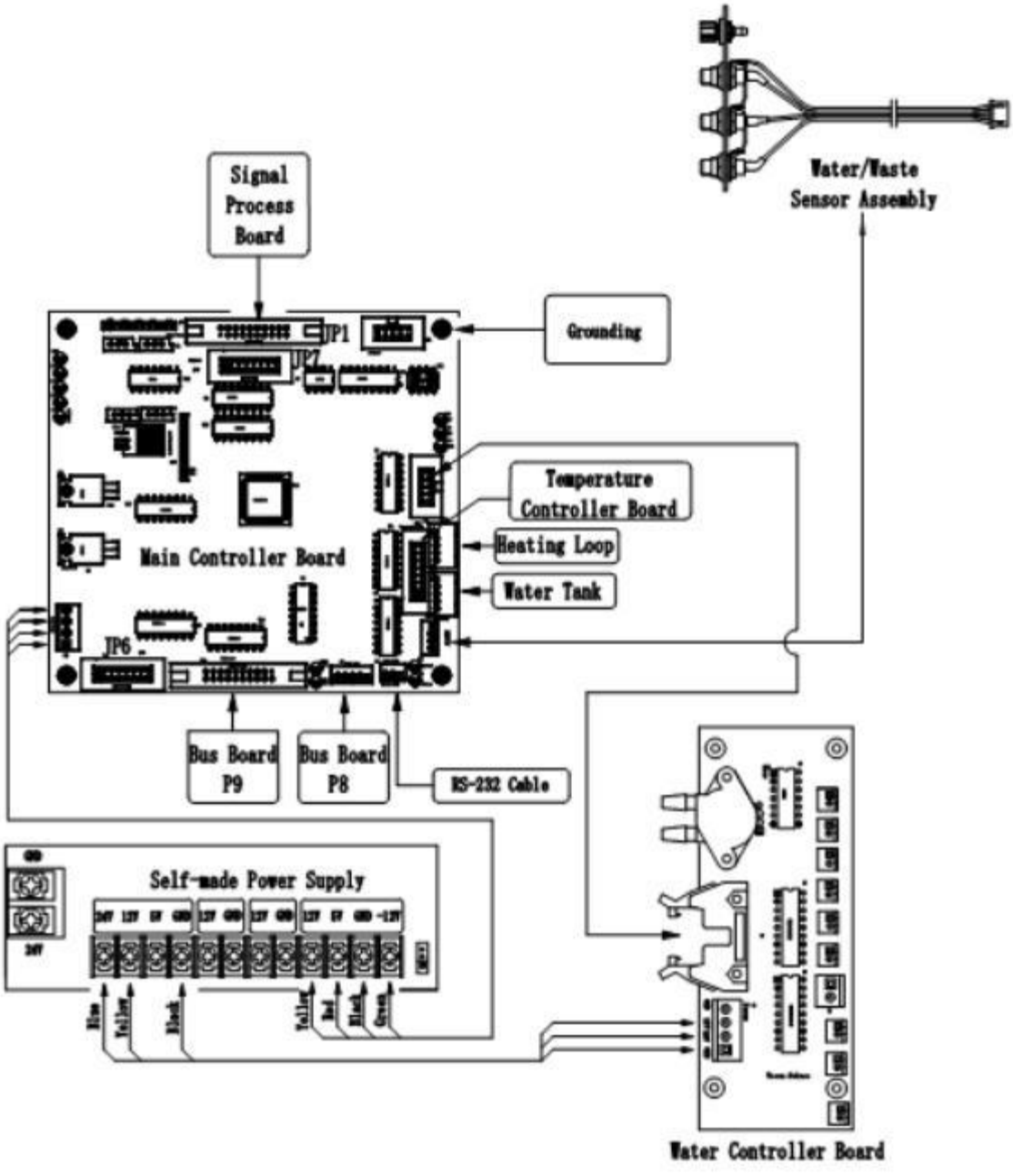


Figure B-18 Main Controller Board Connection

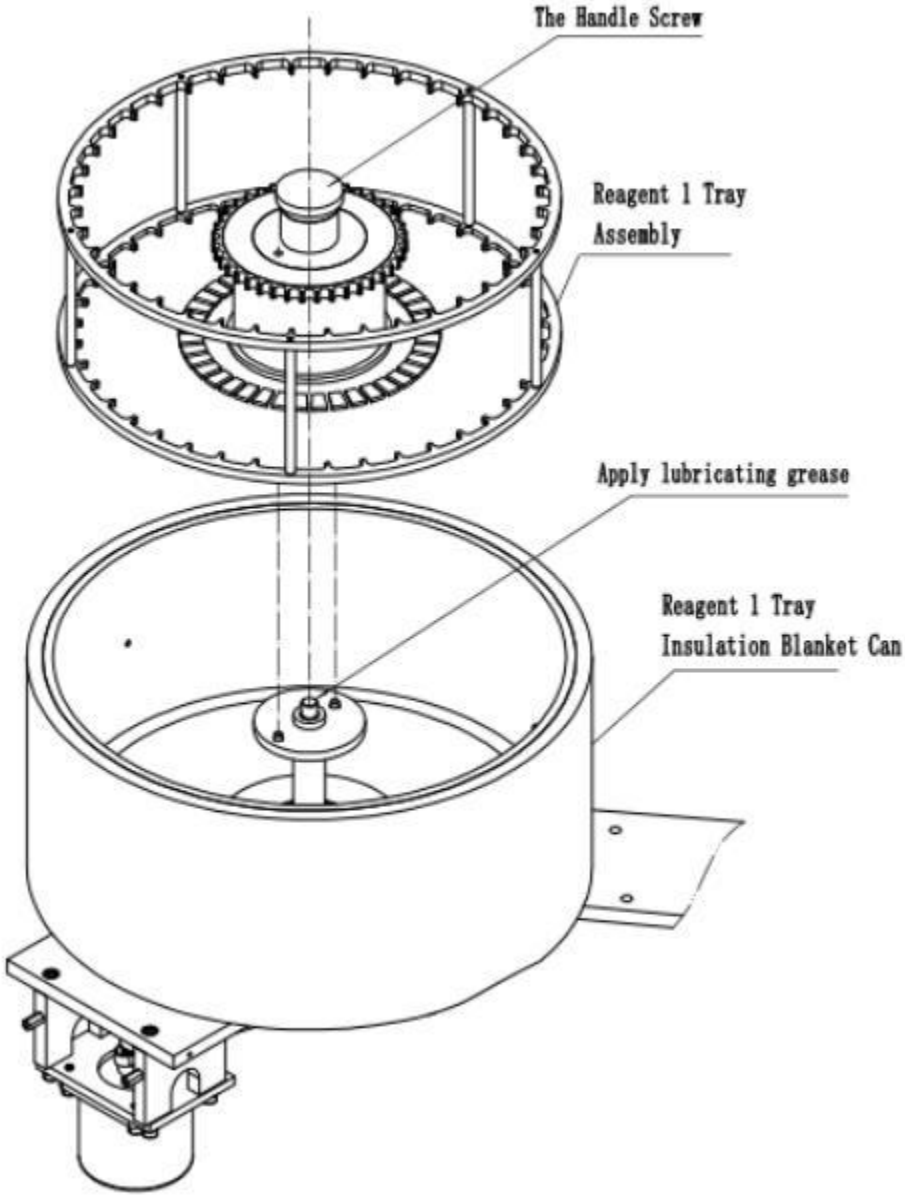


Figure B-19 Reagent 1 Tray

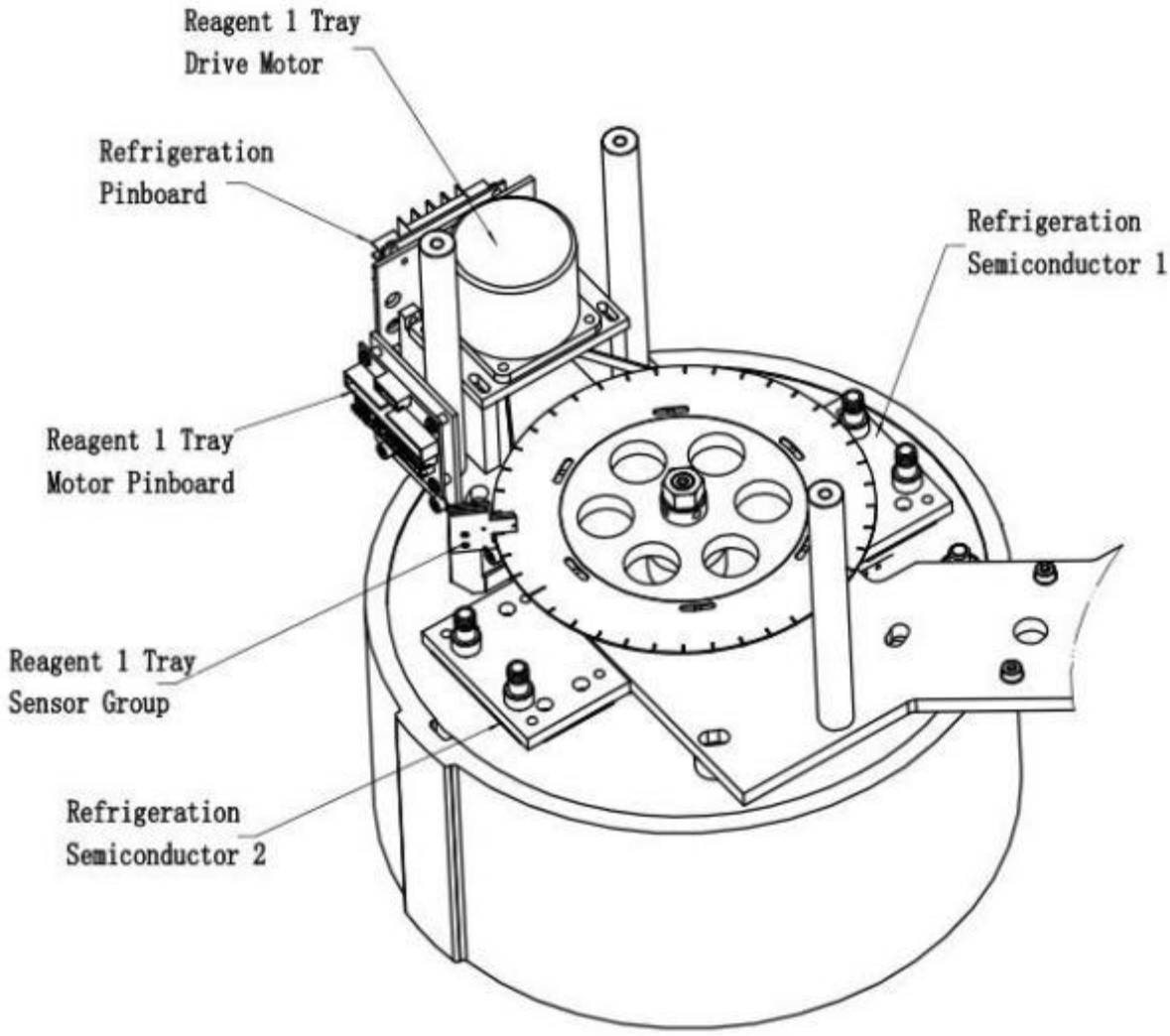


Figure B-20 Reagent 1 Tray

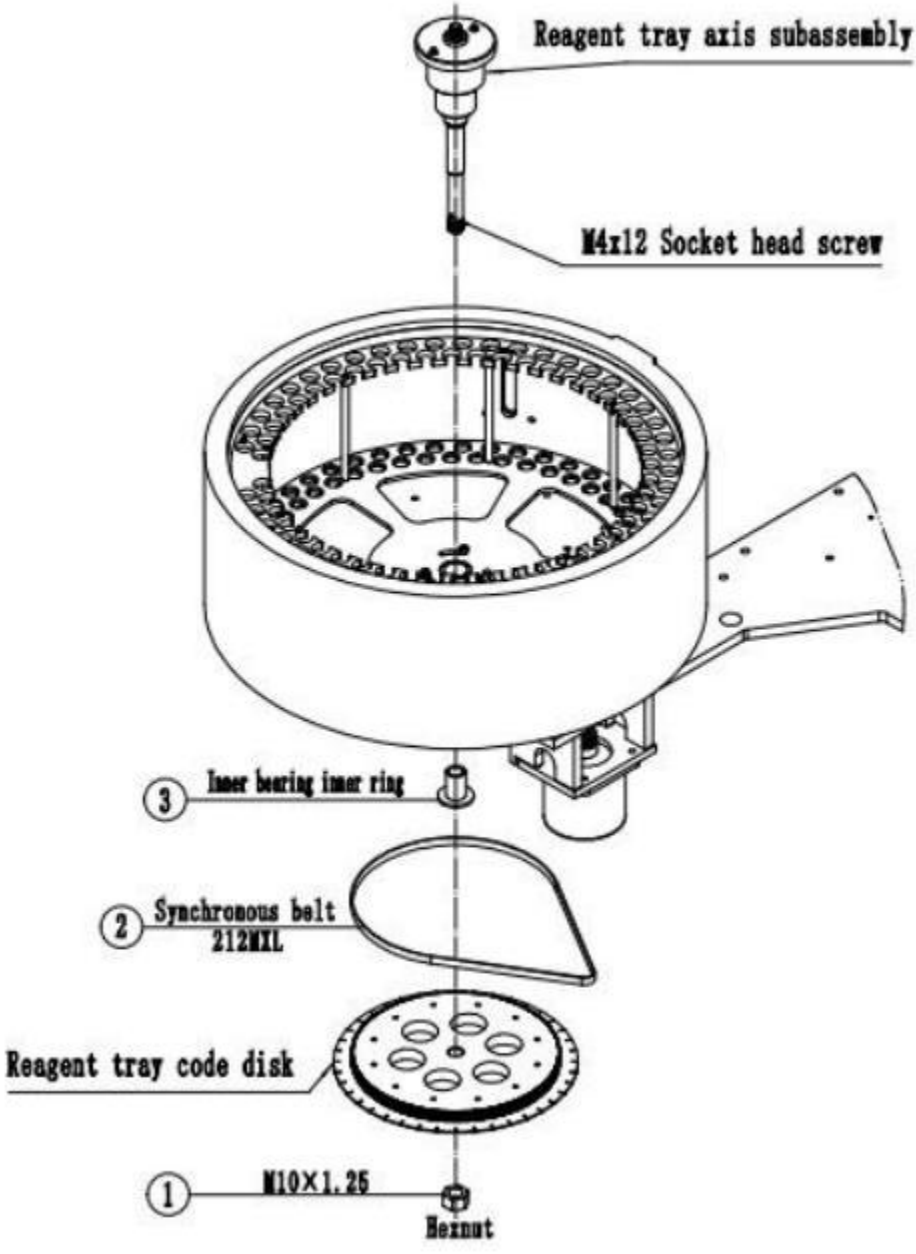


Figure B-21 Sample/Reagent 2 Tray

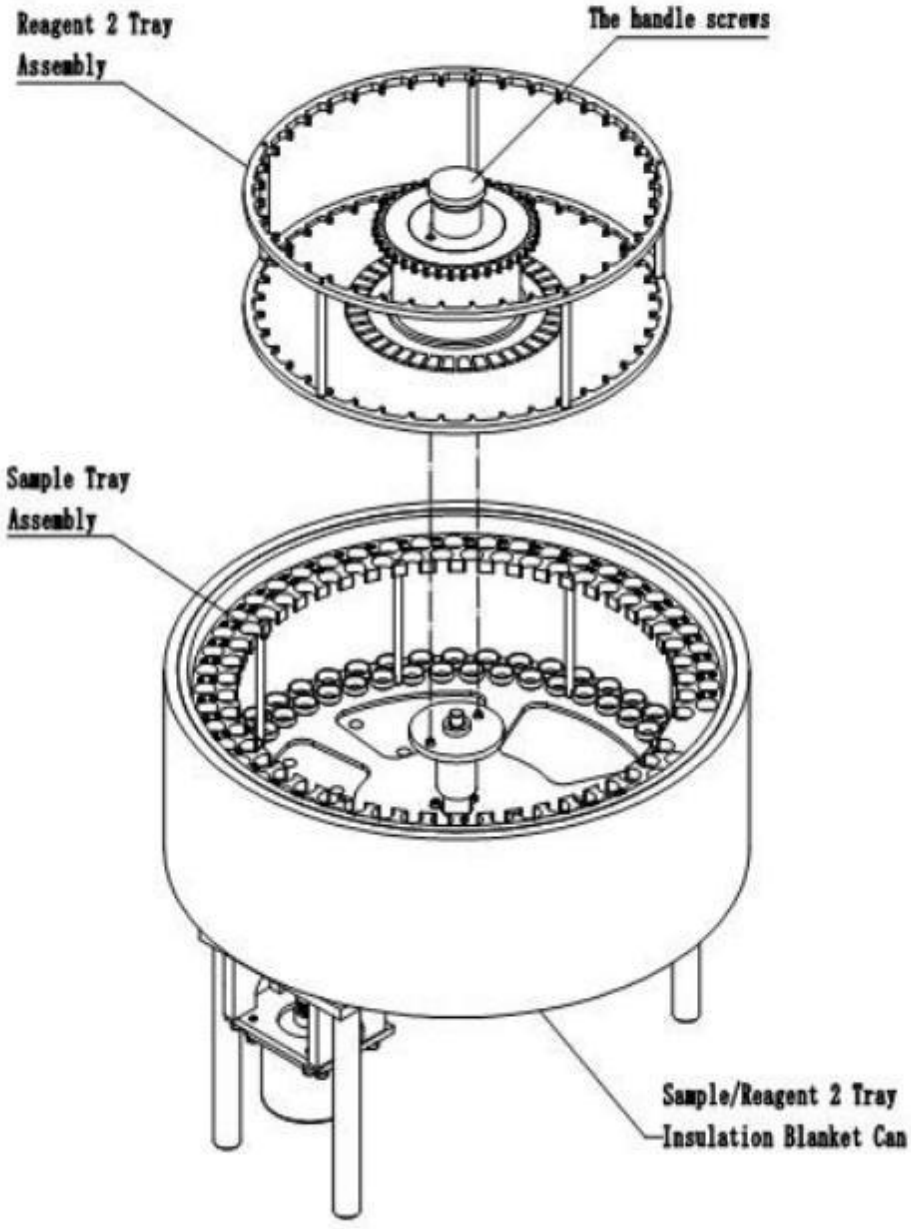


Figure B-22 Sample/Reagent 2 Tray

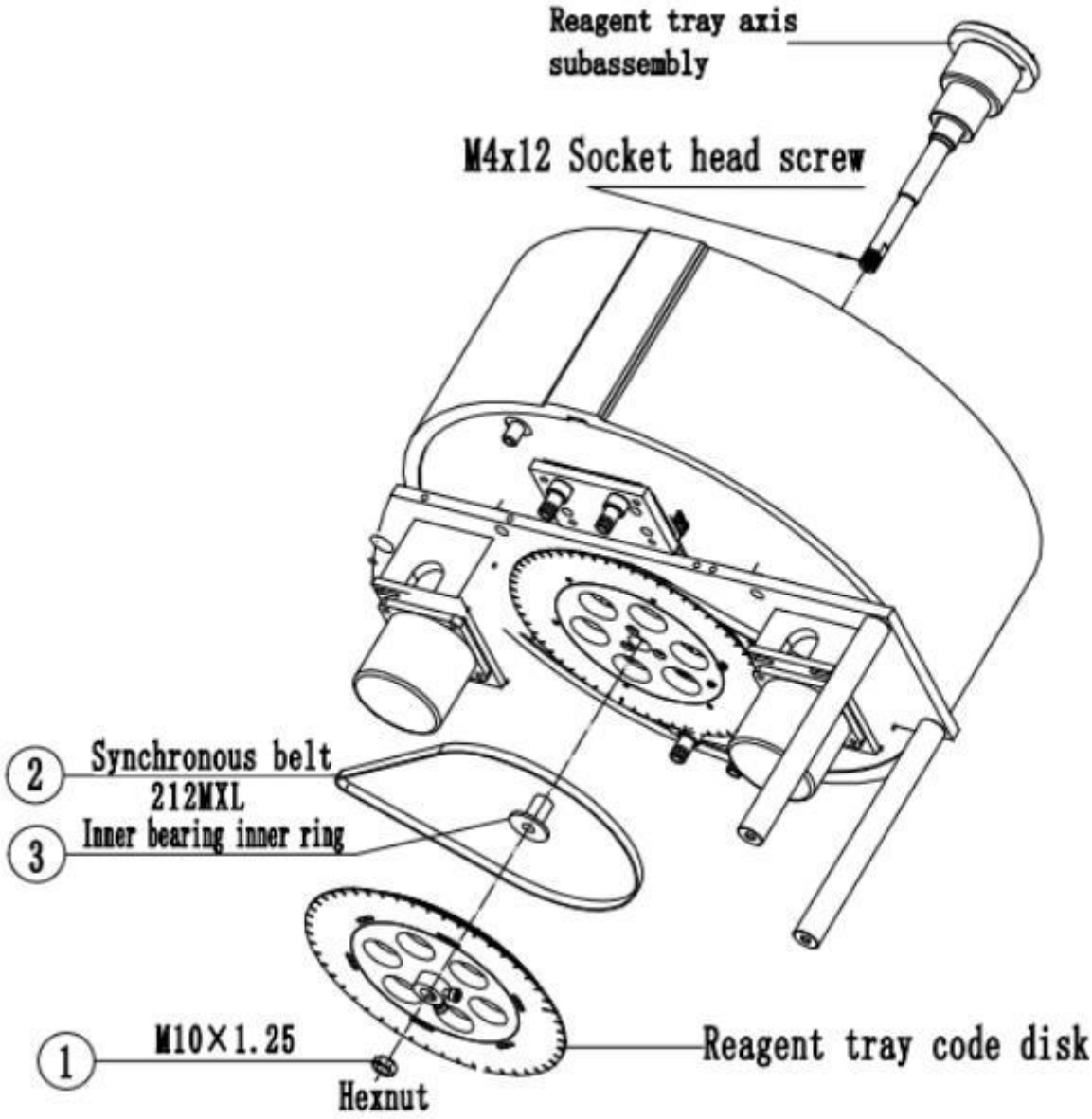


Figure B-23 Sample/reagent Tray

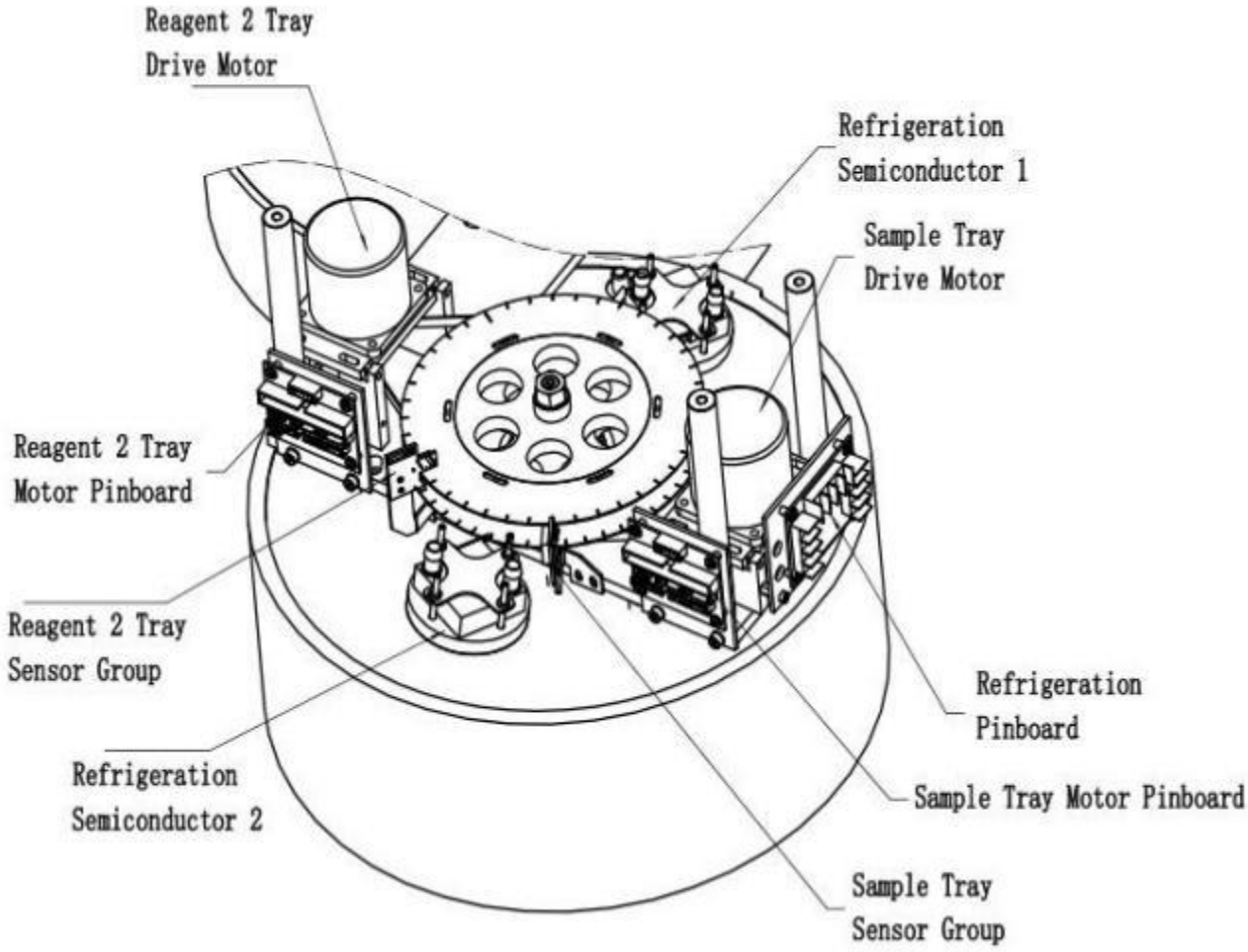


Figure B-24 Sample/Reagent 2 Tray

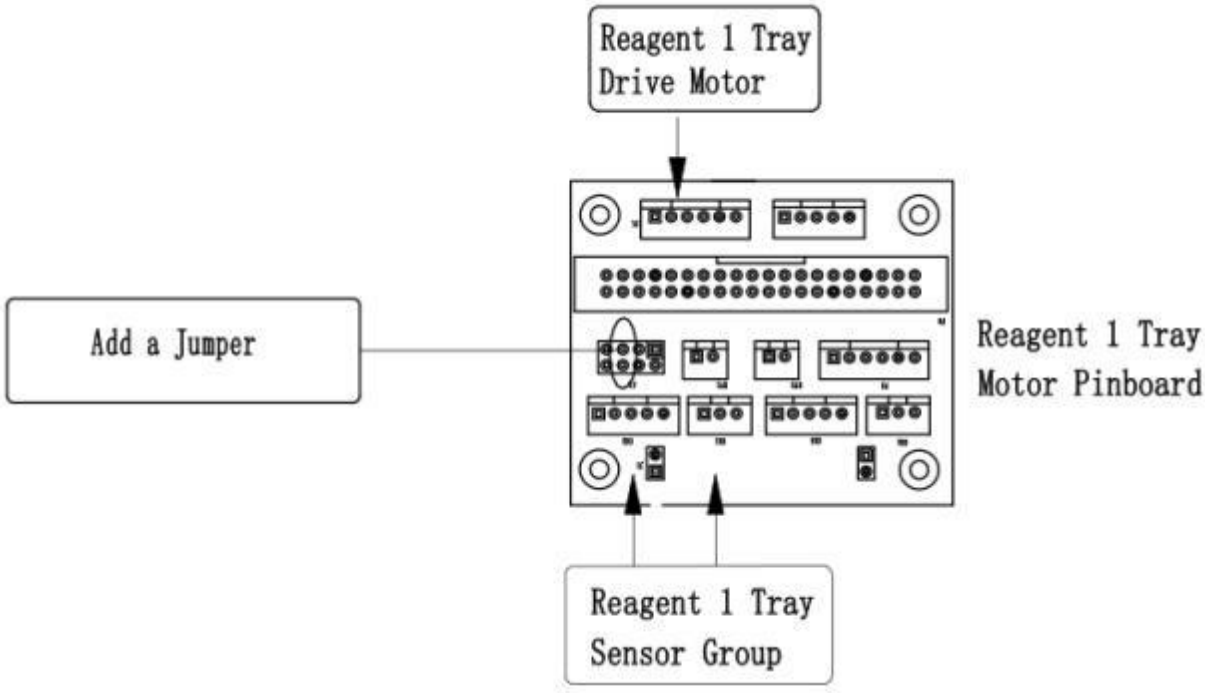


Figure B-25 Reagent 1 Tray pinboard

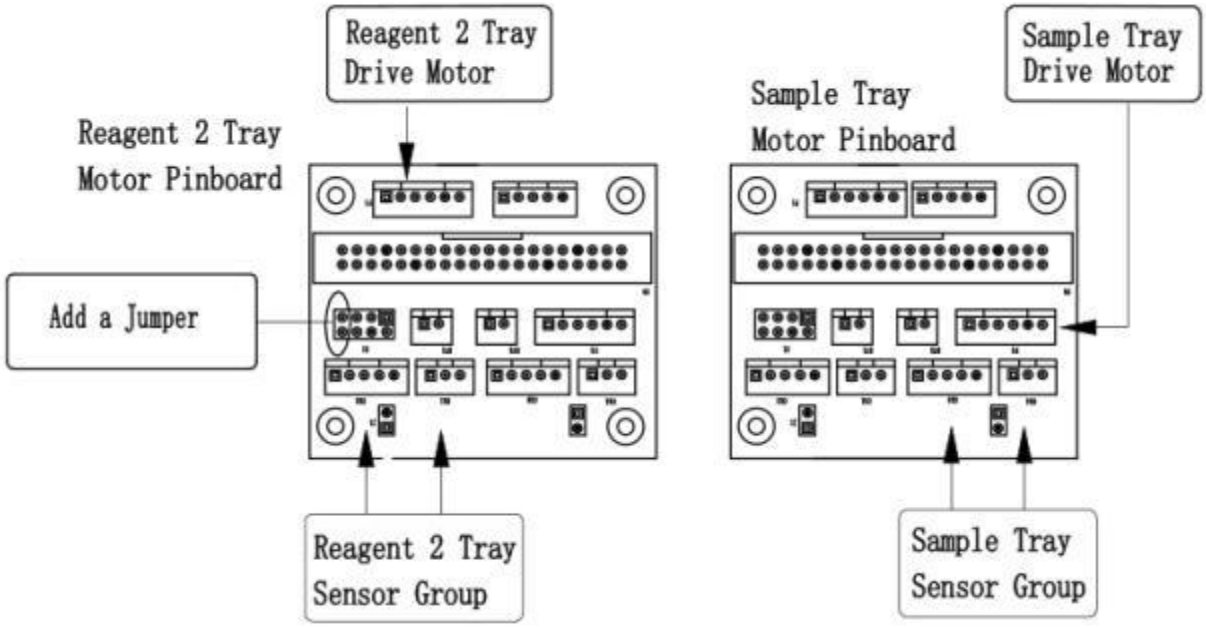


Figure B-26 Sample/Reagent 2 Tray motor pinboard

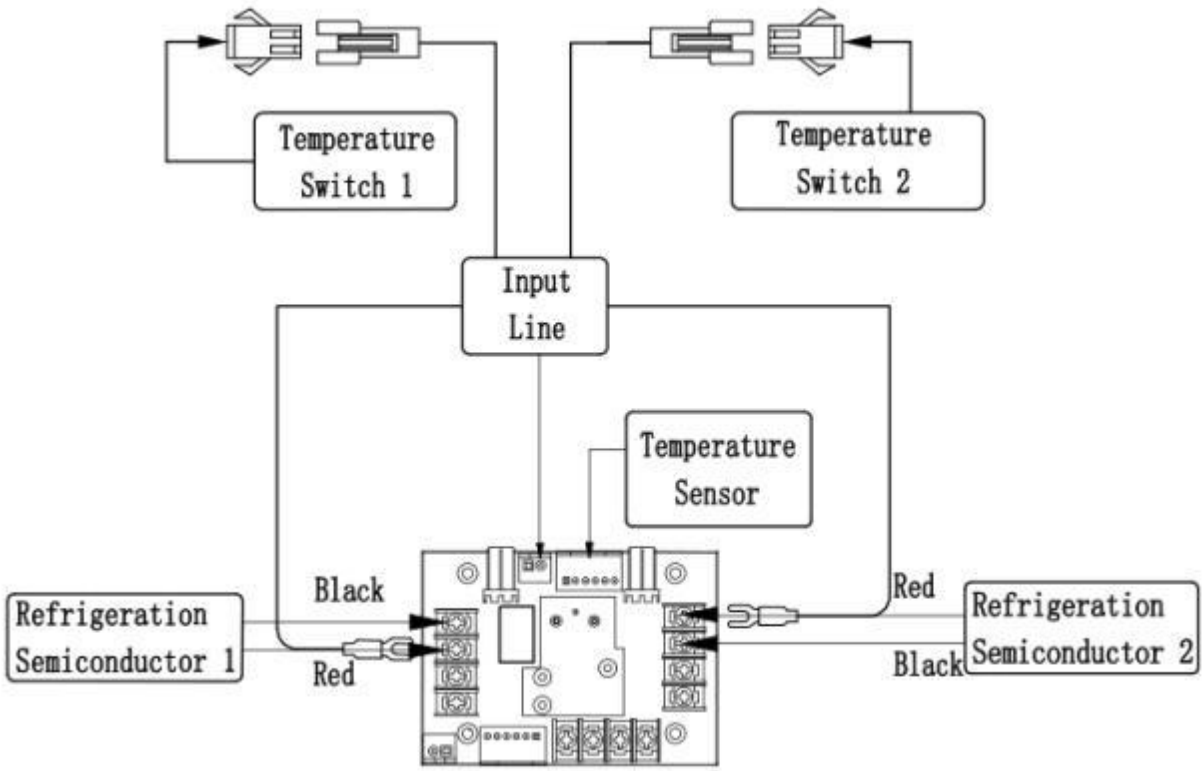


Figure B-27 Refrigeration pinboard

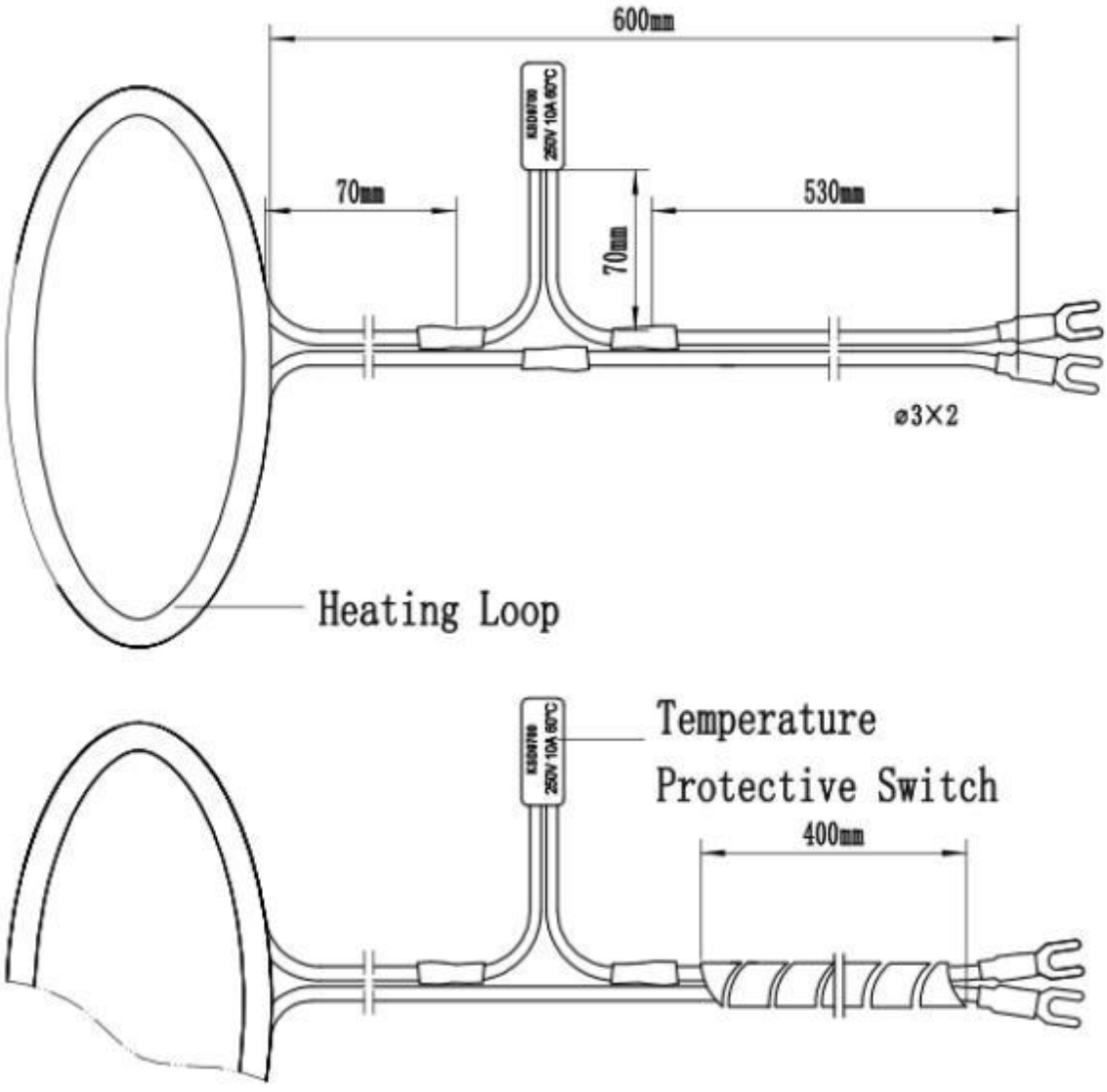


Figure B-28 Heating Loop

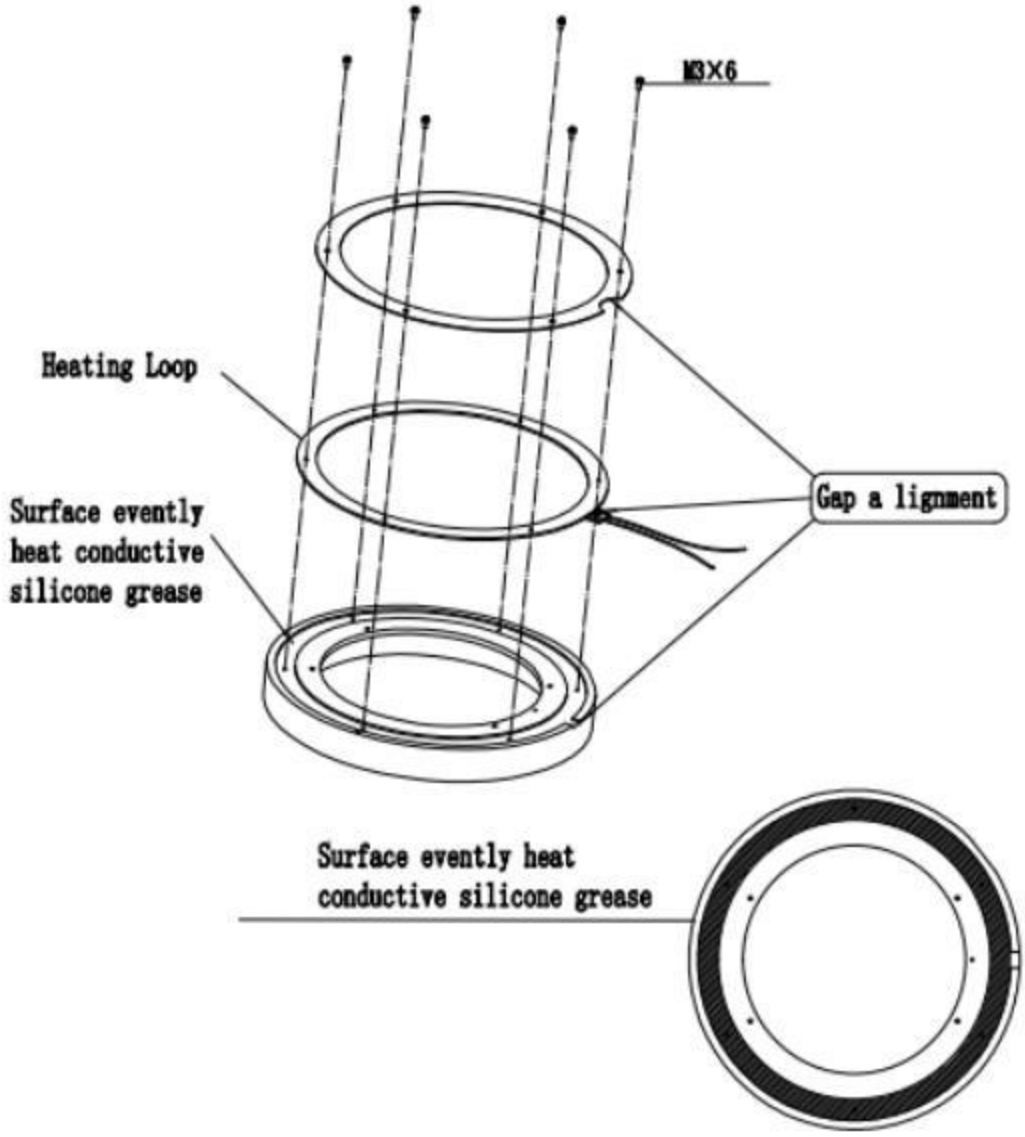


Figure B-29 Heating Loop Assembly

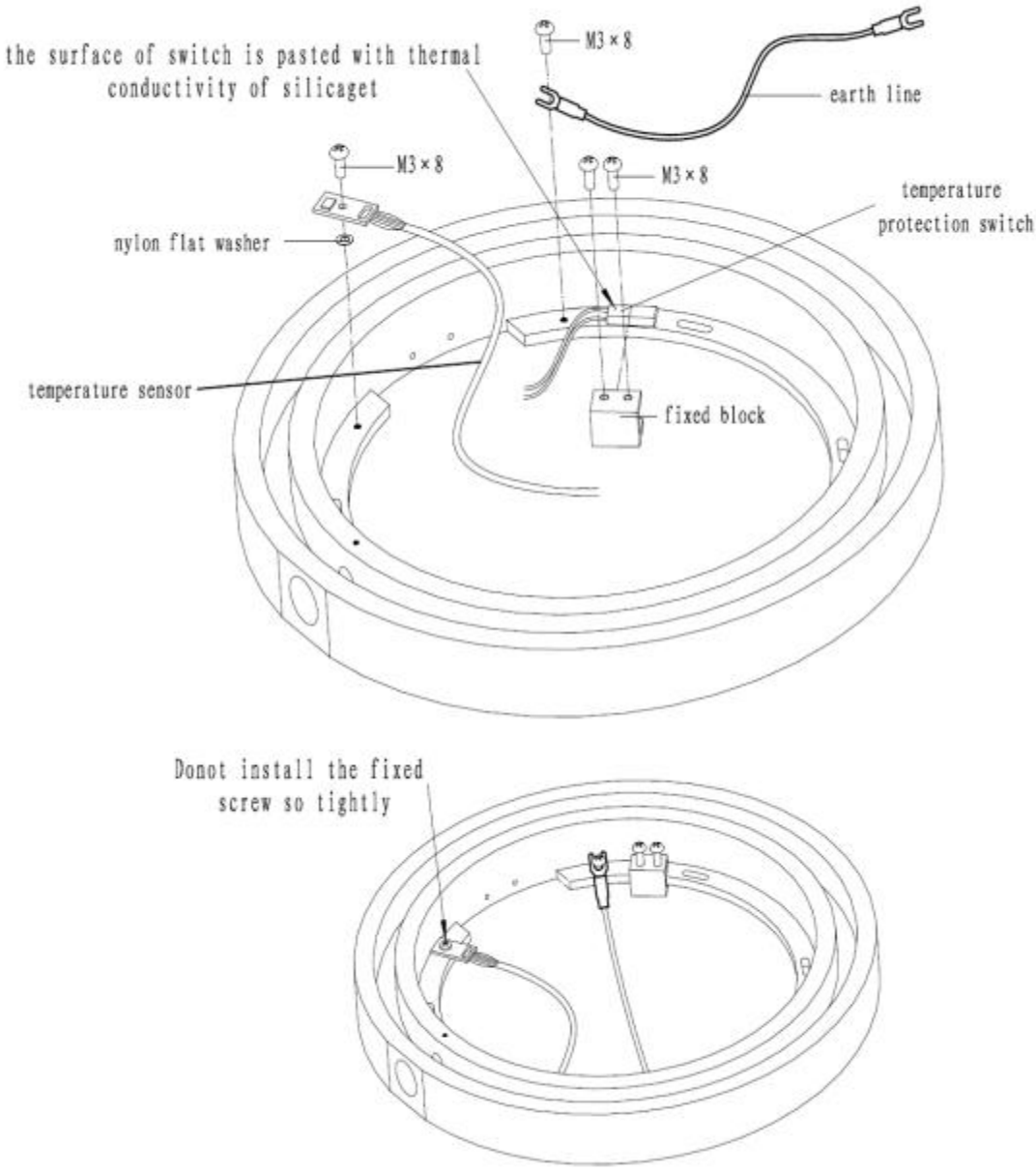


Figure B-30 Incubation Groove

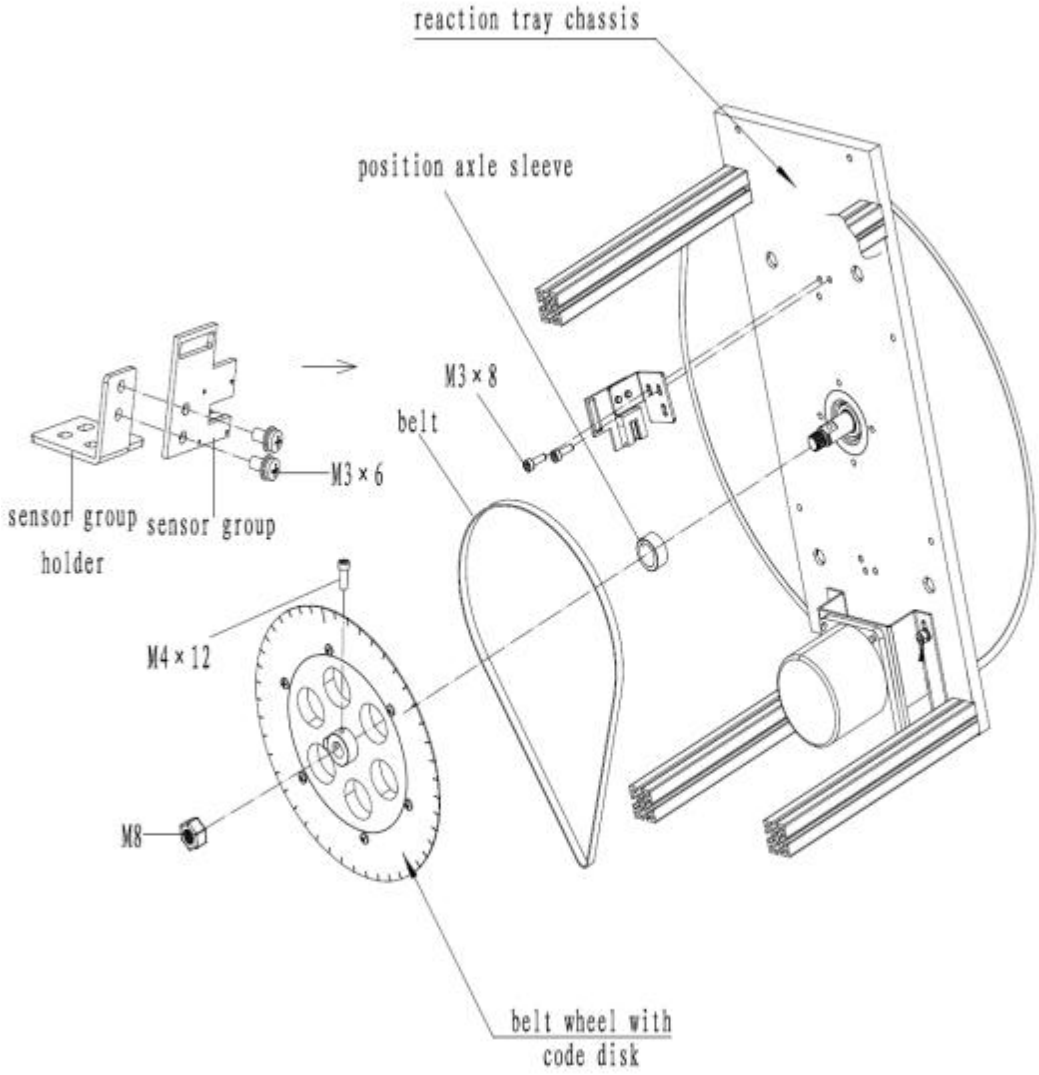


Figure B-31 Reaction Tray

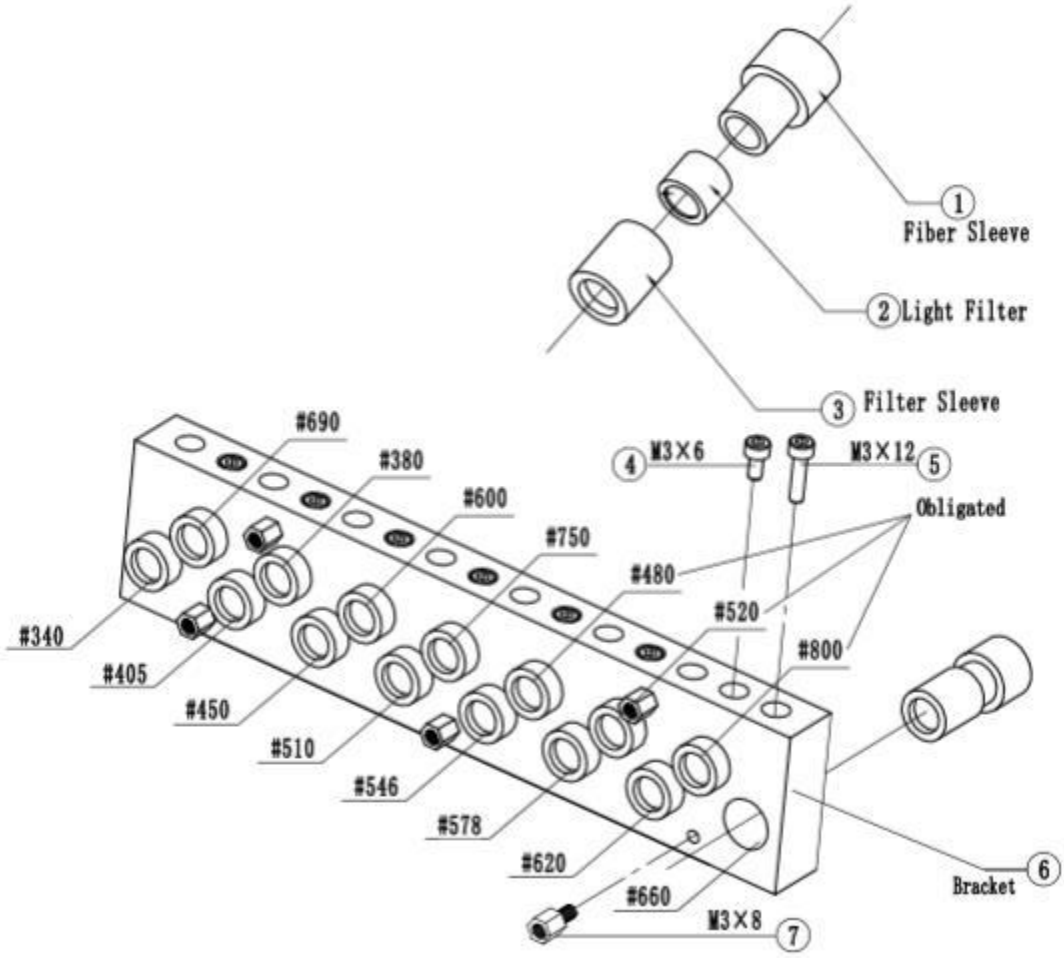


Figure B-32 Light Filters

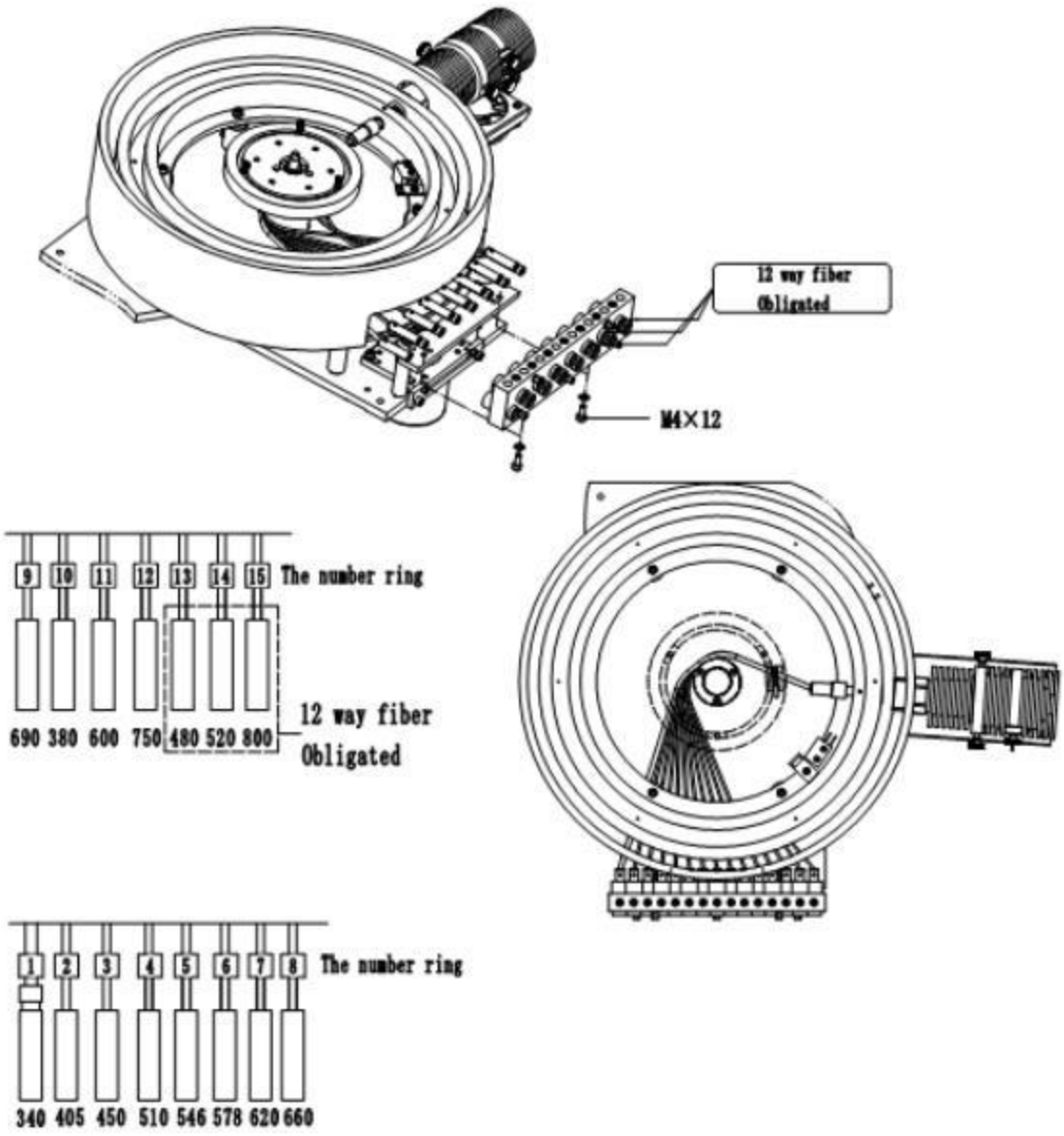


Figure B-33 Light Filters

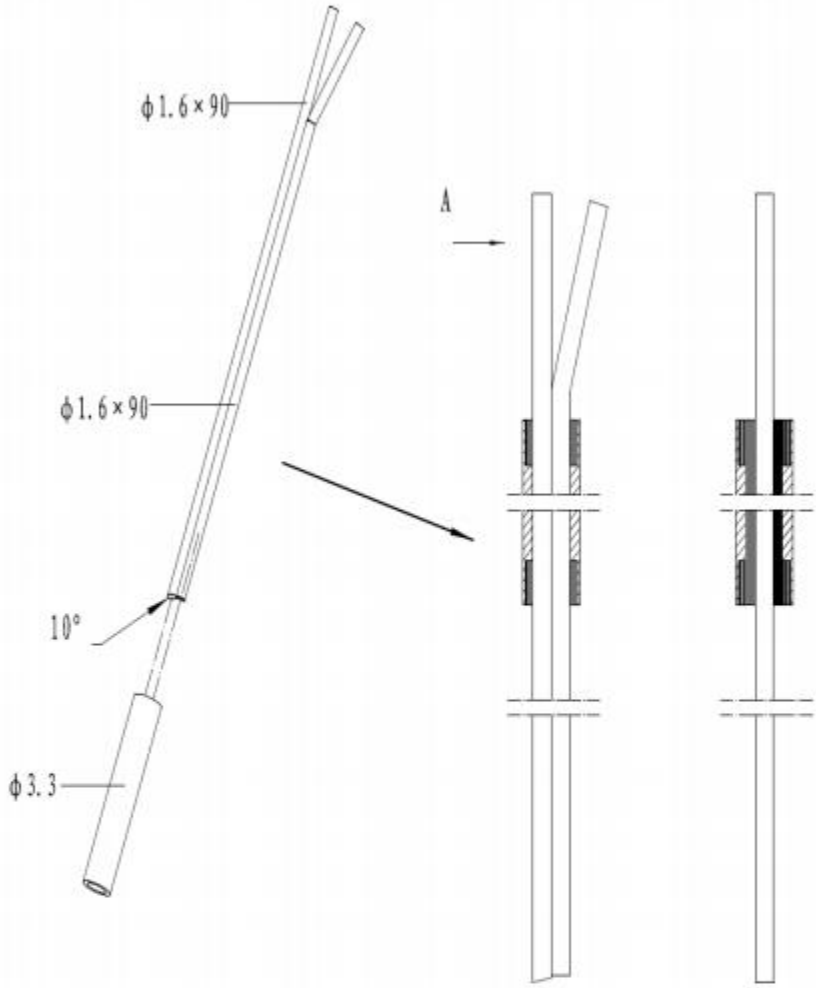


Figure B-34 Washing Needles

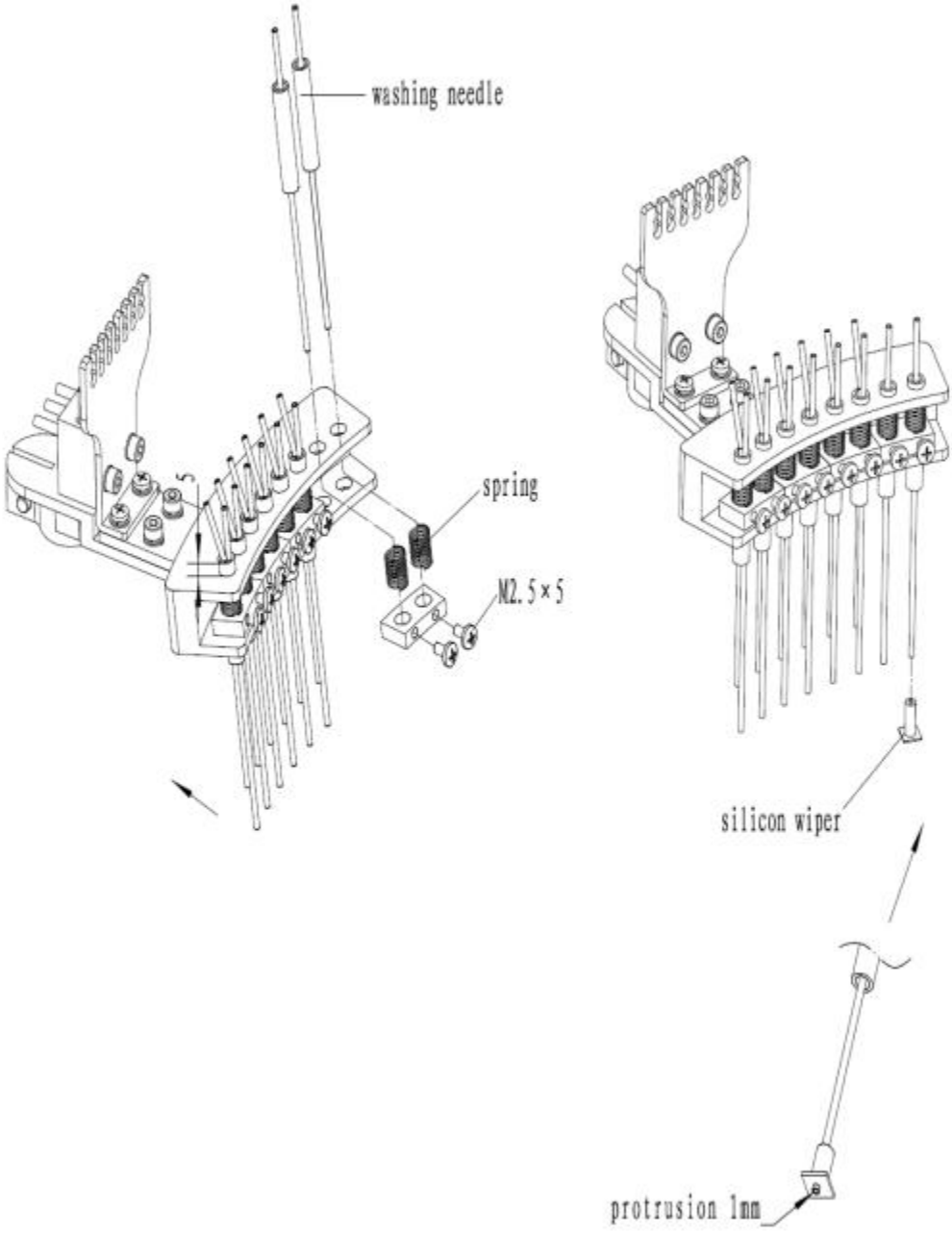


Figure B-35 Washing Needles

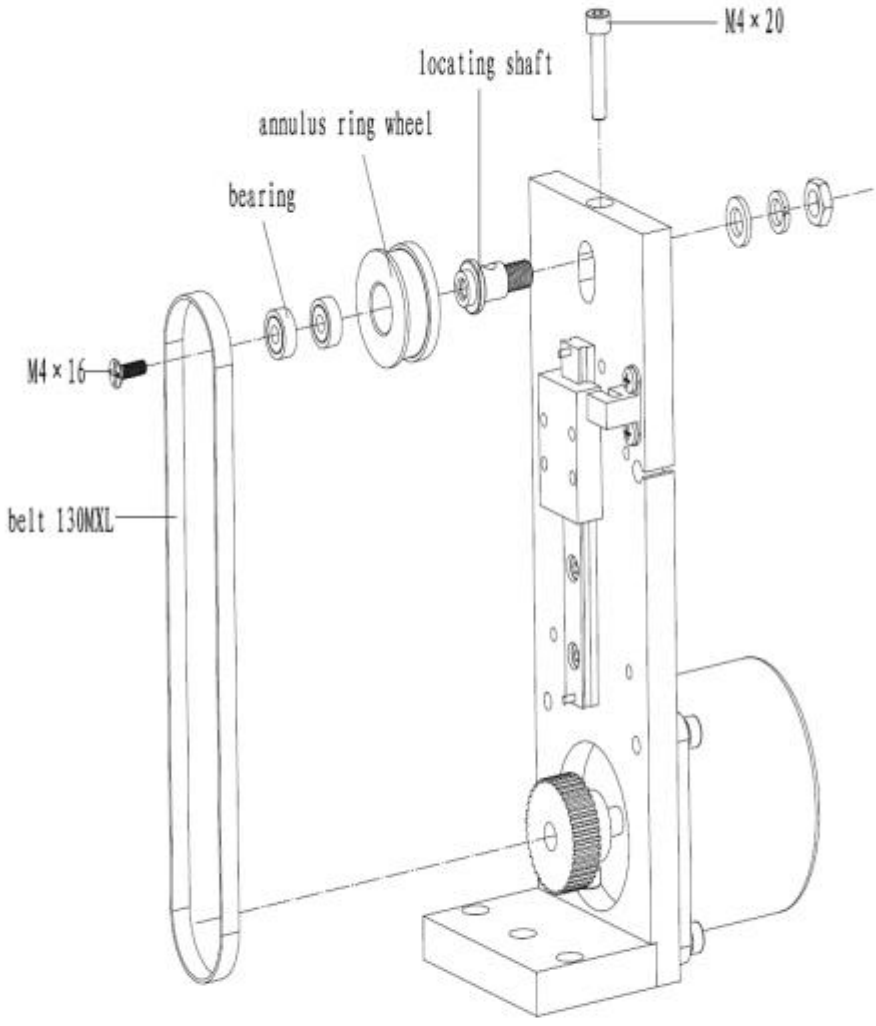


Figure B-36 Washing Arm Motor Assembly

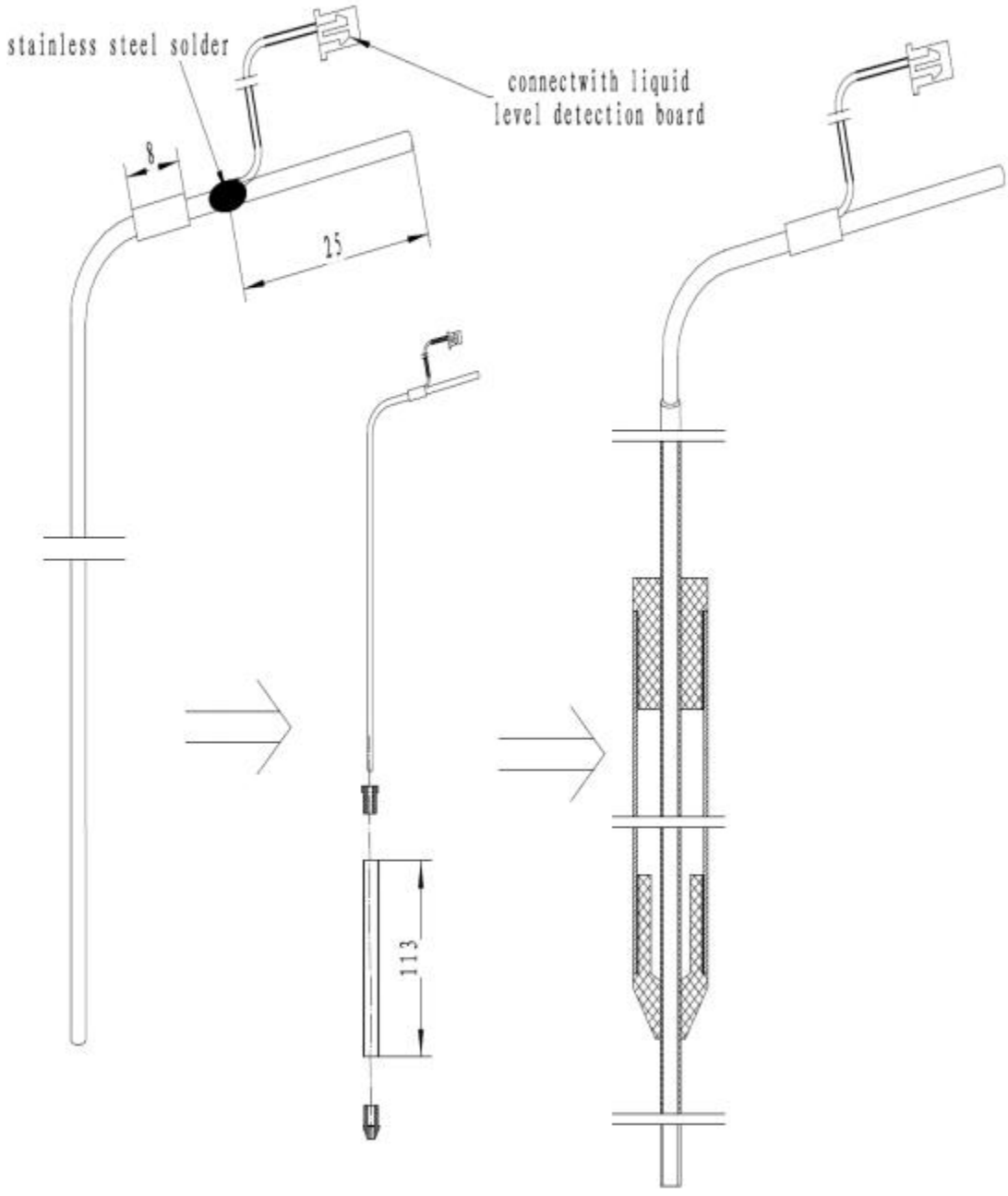


Figure B-37 Sample/reagent Probe Assembly

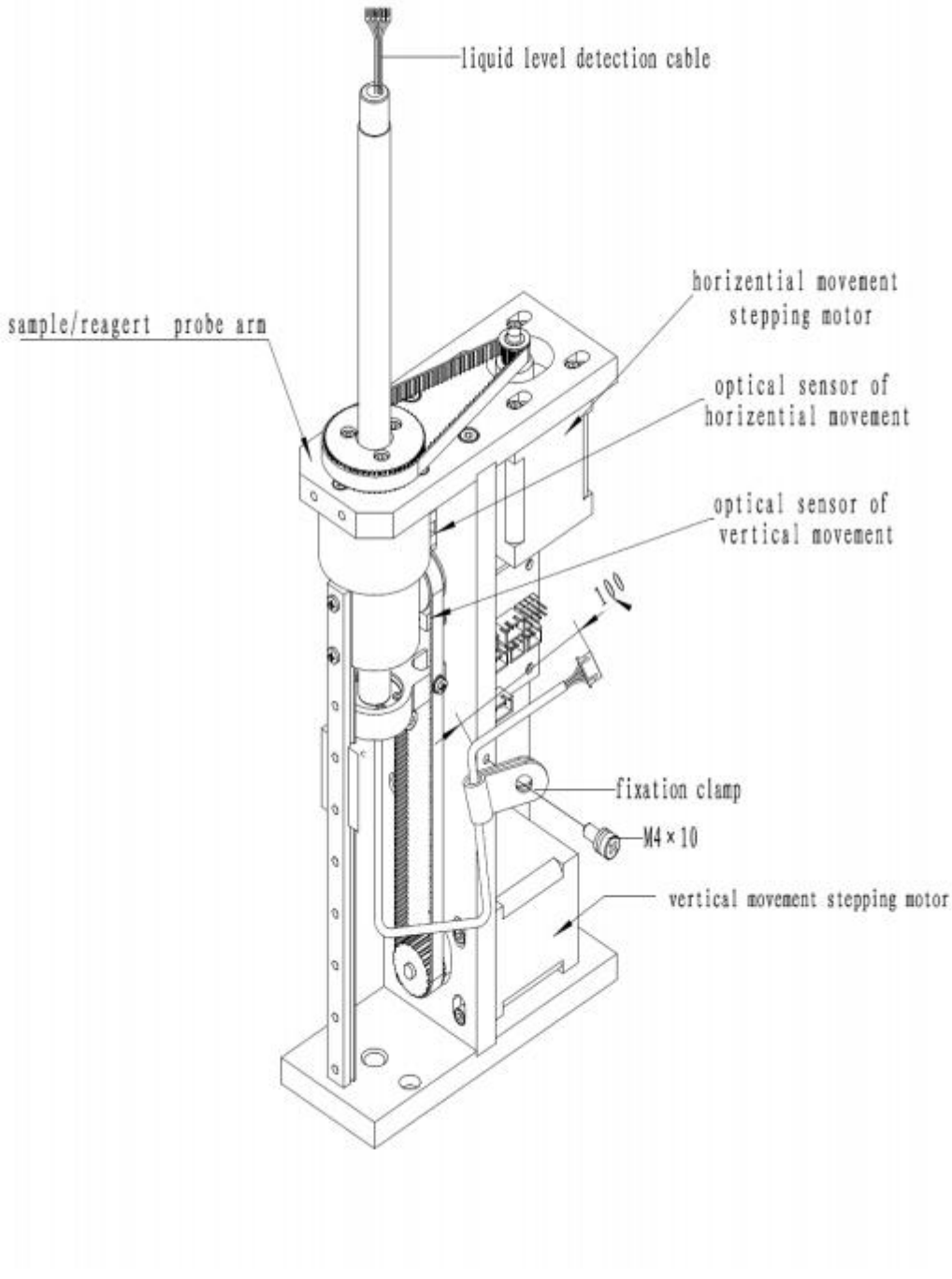


Figure B-38 Sample/reagent Probe Arm Subassembly

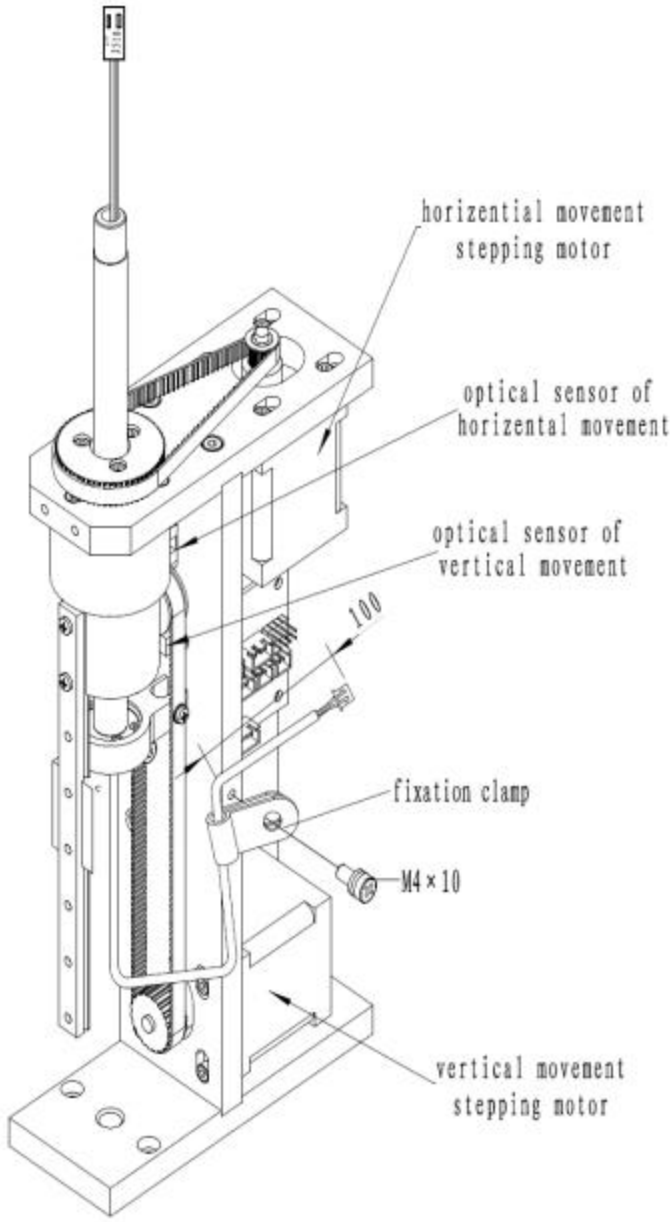


Figure B-39 Mixer Probe Arm Subassembly

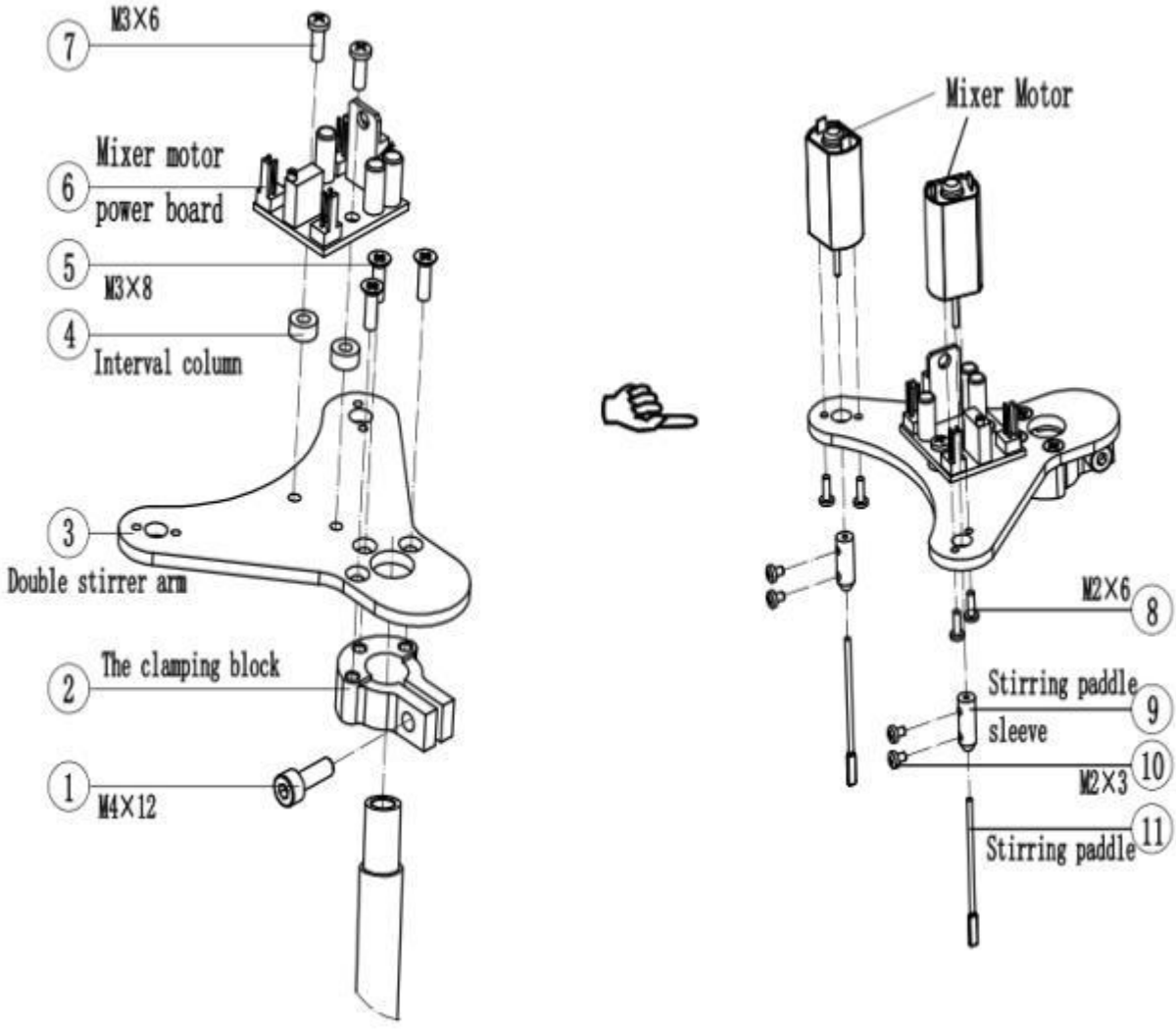


Figure B-40 Mixer Probe Arm Parts

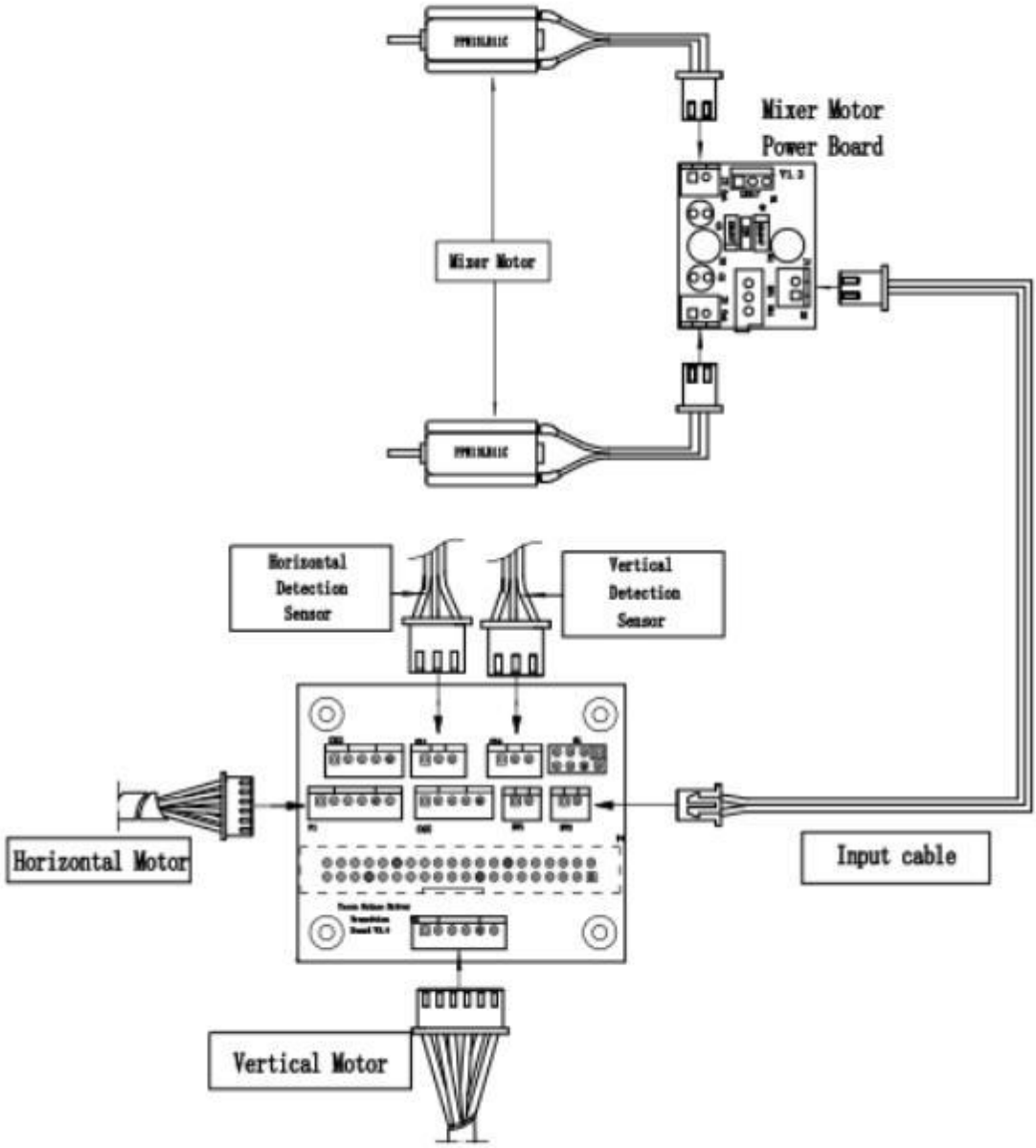


Figure B-41 Mixer Probe Arm Subassembly Connection

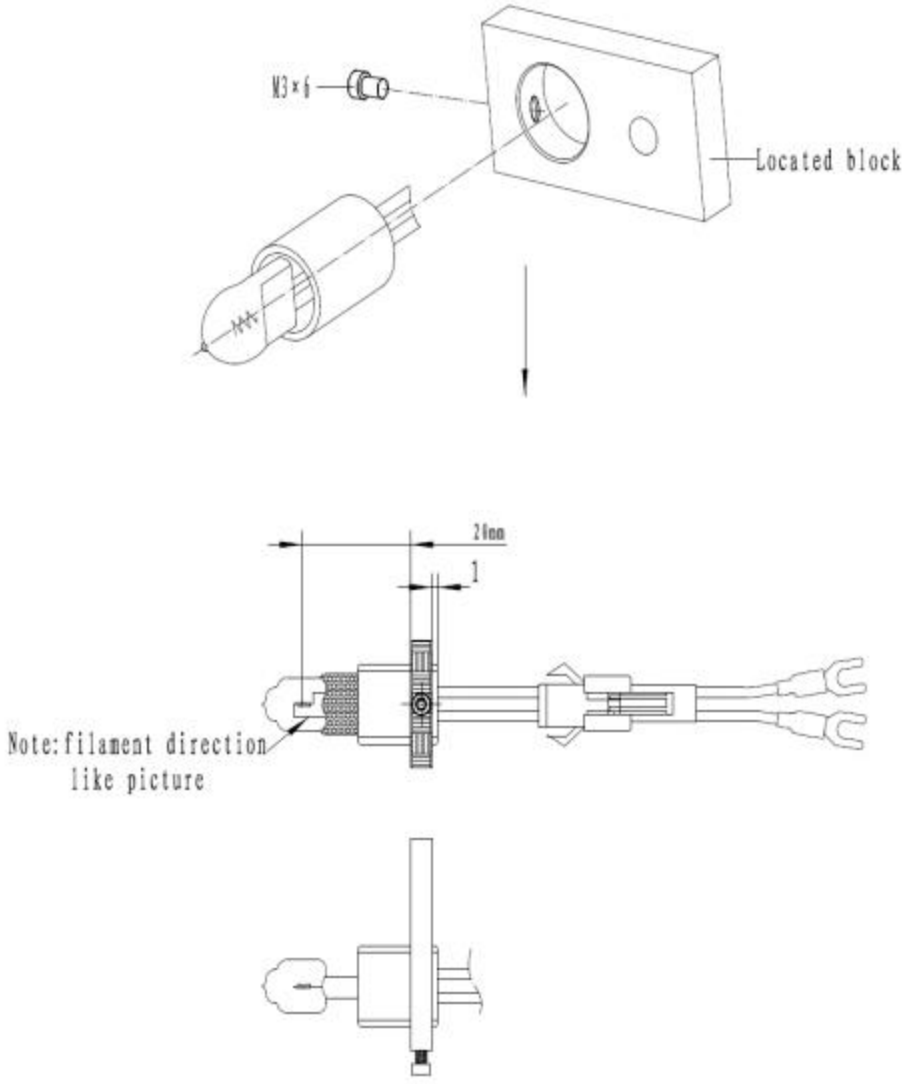


Figure B-42 Halogen Lamp Assembly

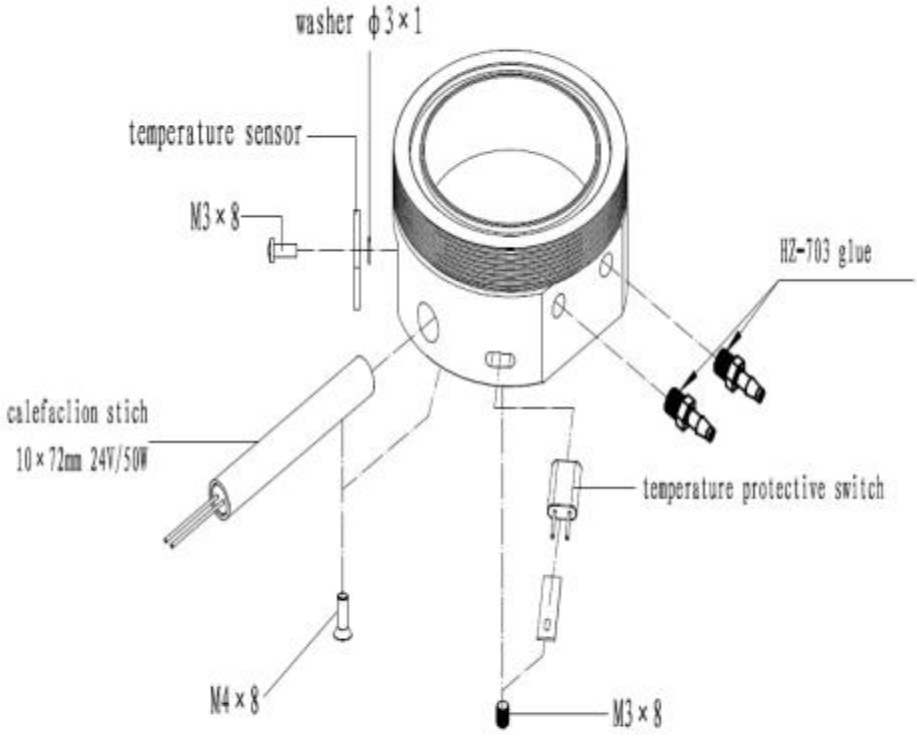


Figure B-43 Water Tank Bottom

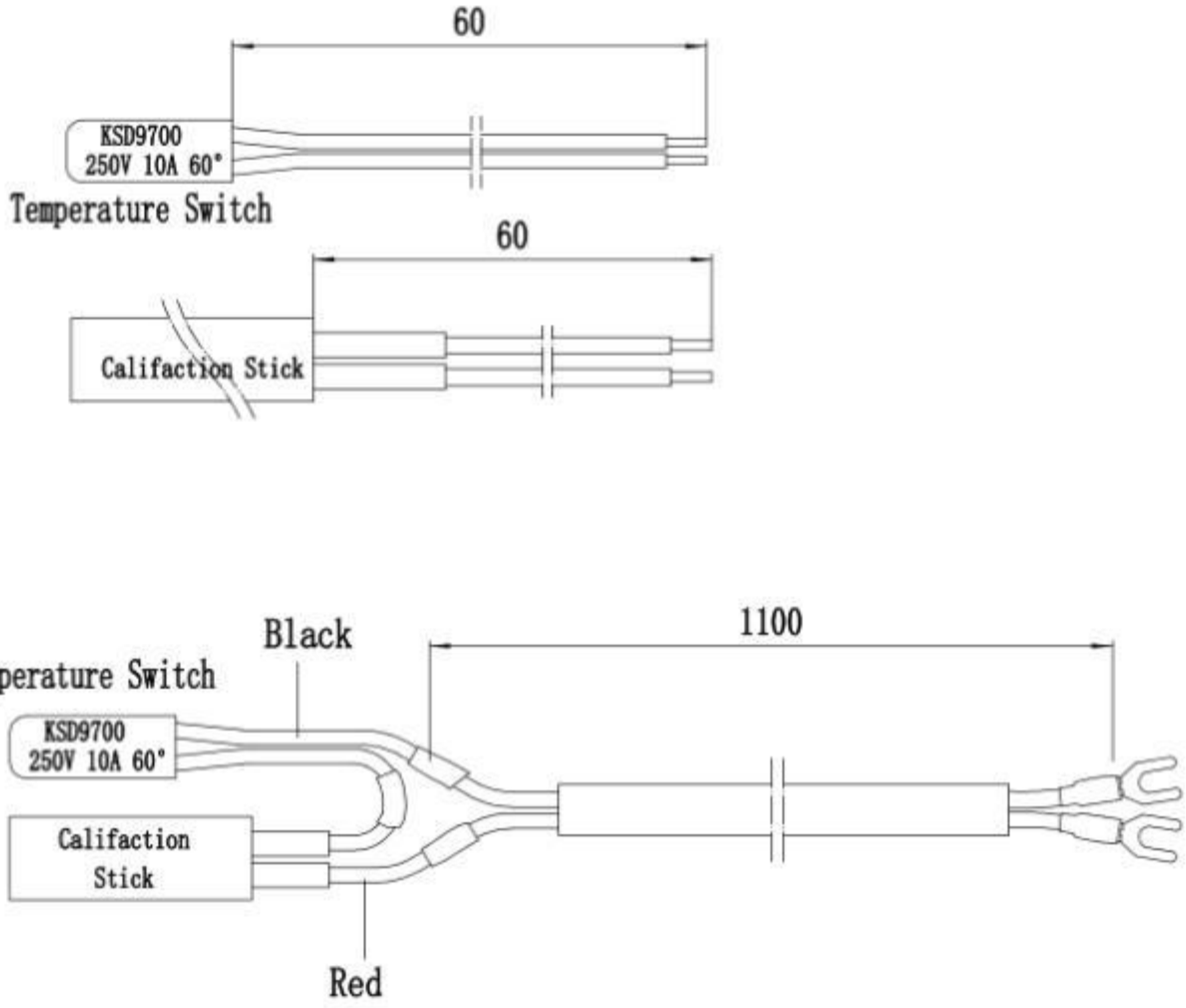


Figure B-44 Calefaction Stick

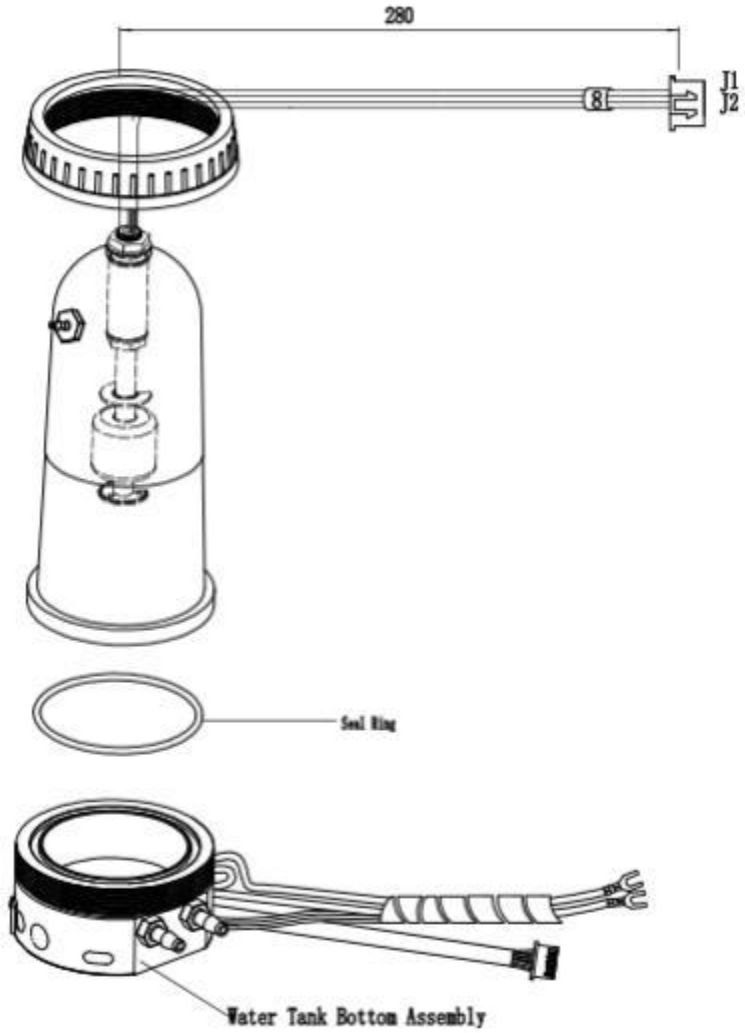


Figure B-45 Water Tank

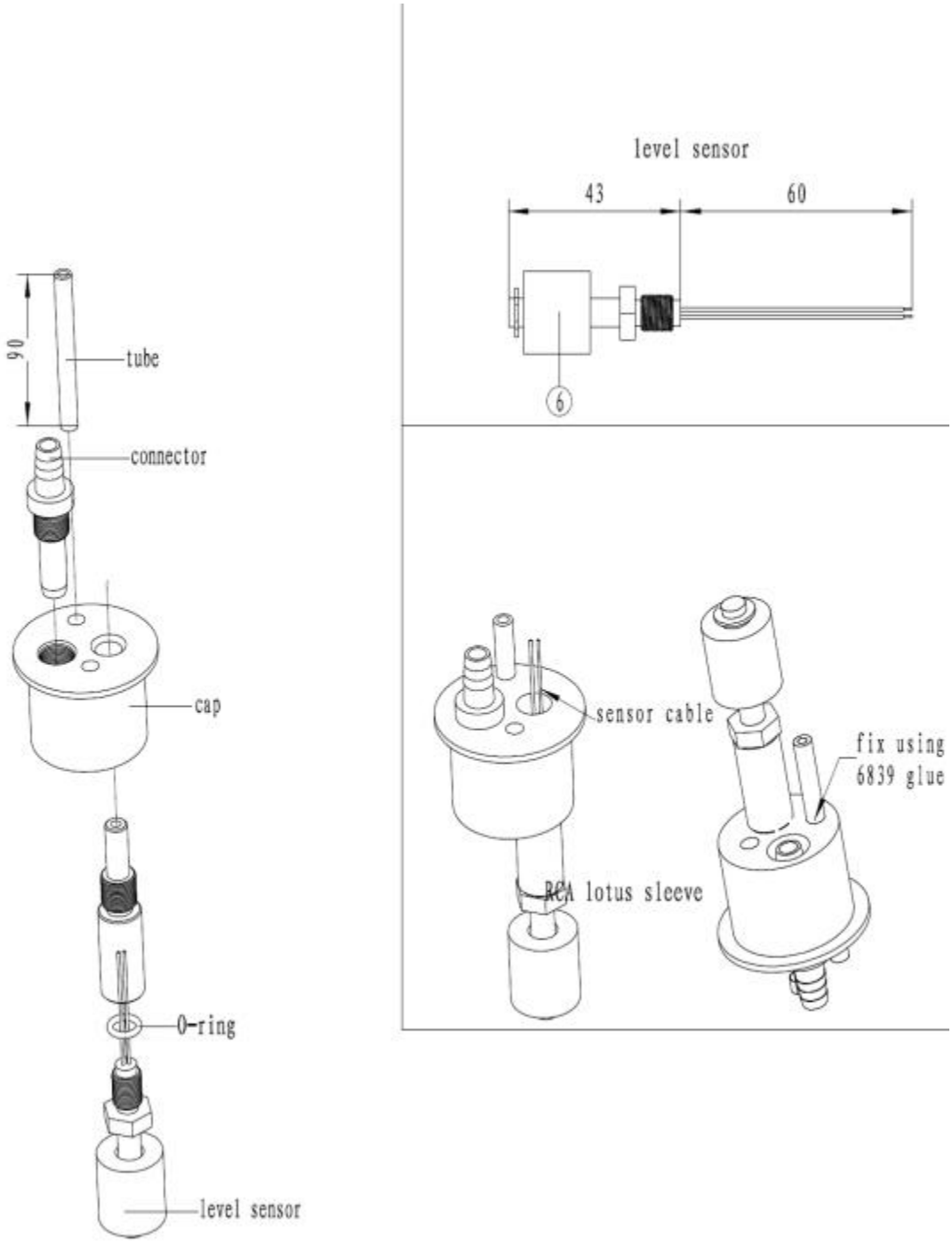


Figure B-46 Waste Sensor Subassembly

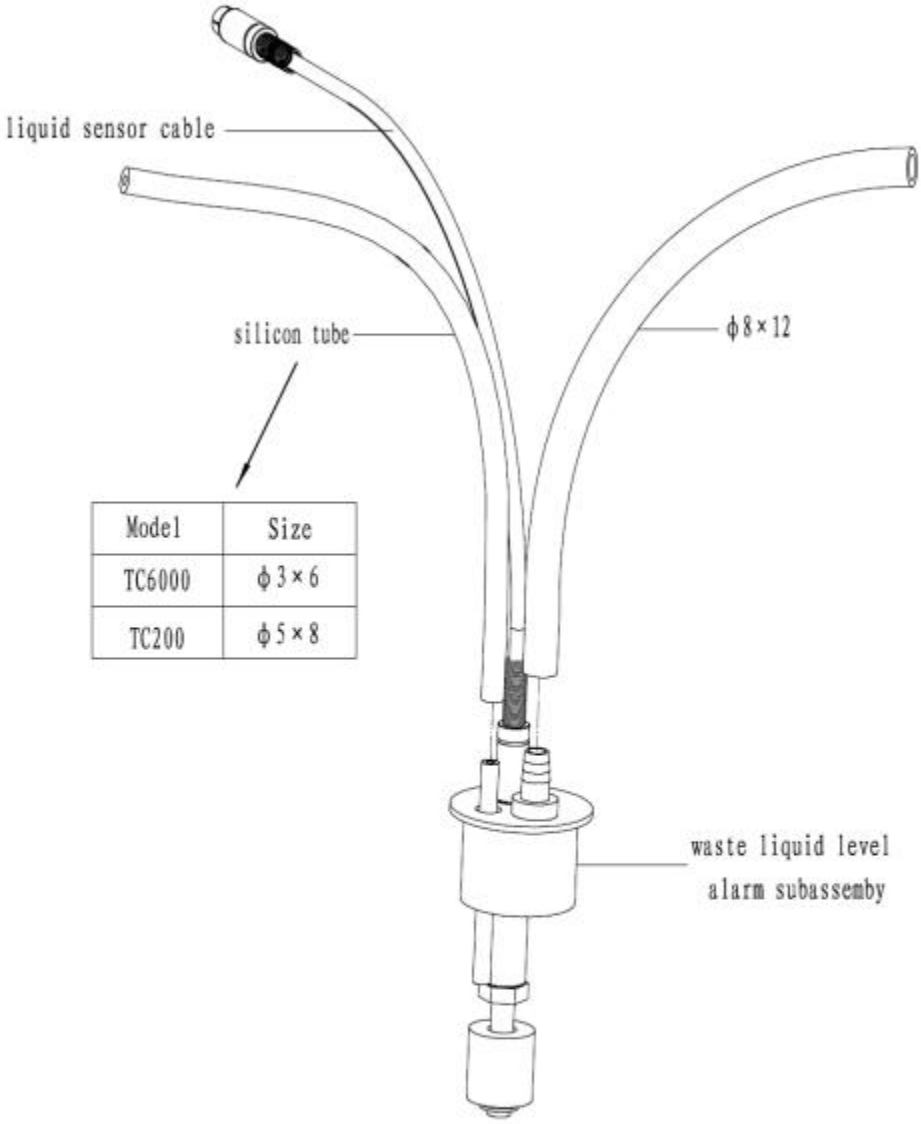


Figure B-47 Waste Sensor Subassembly

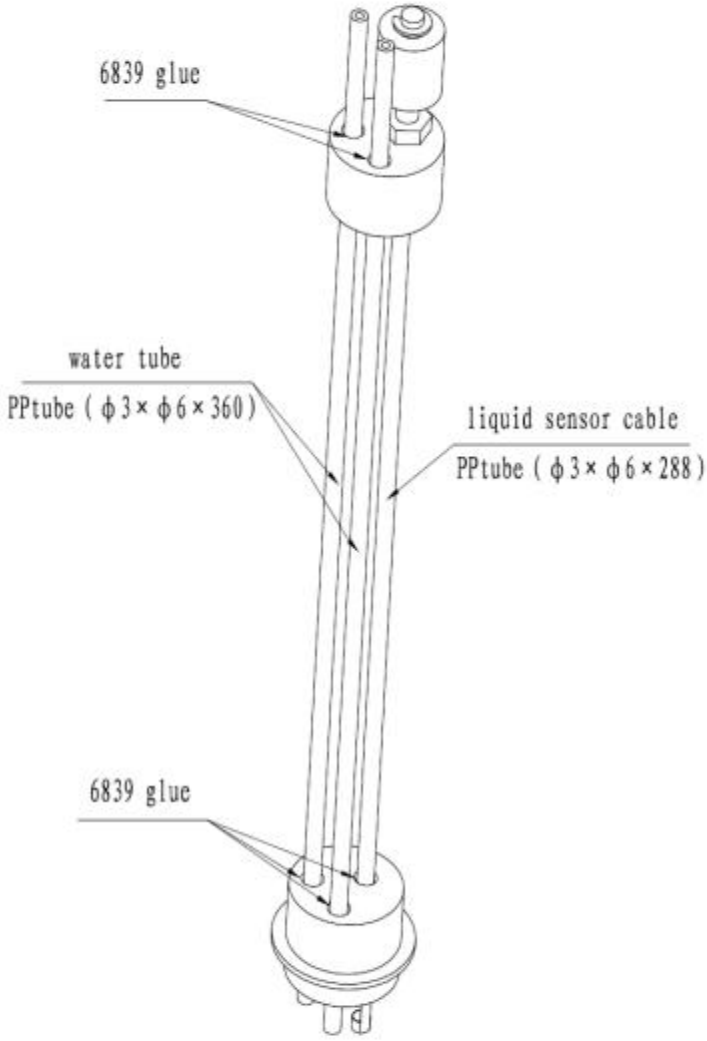


Figure B-48 Water Sensor Subassembly

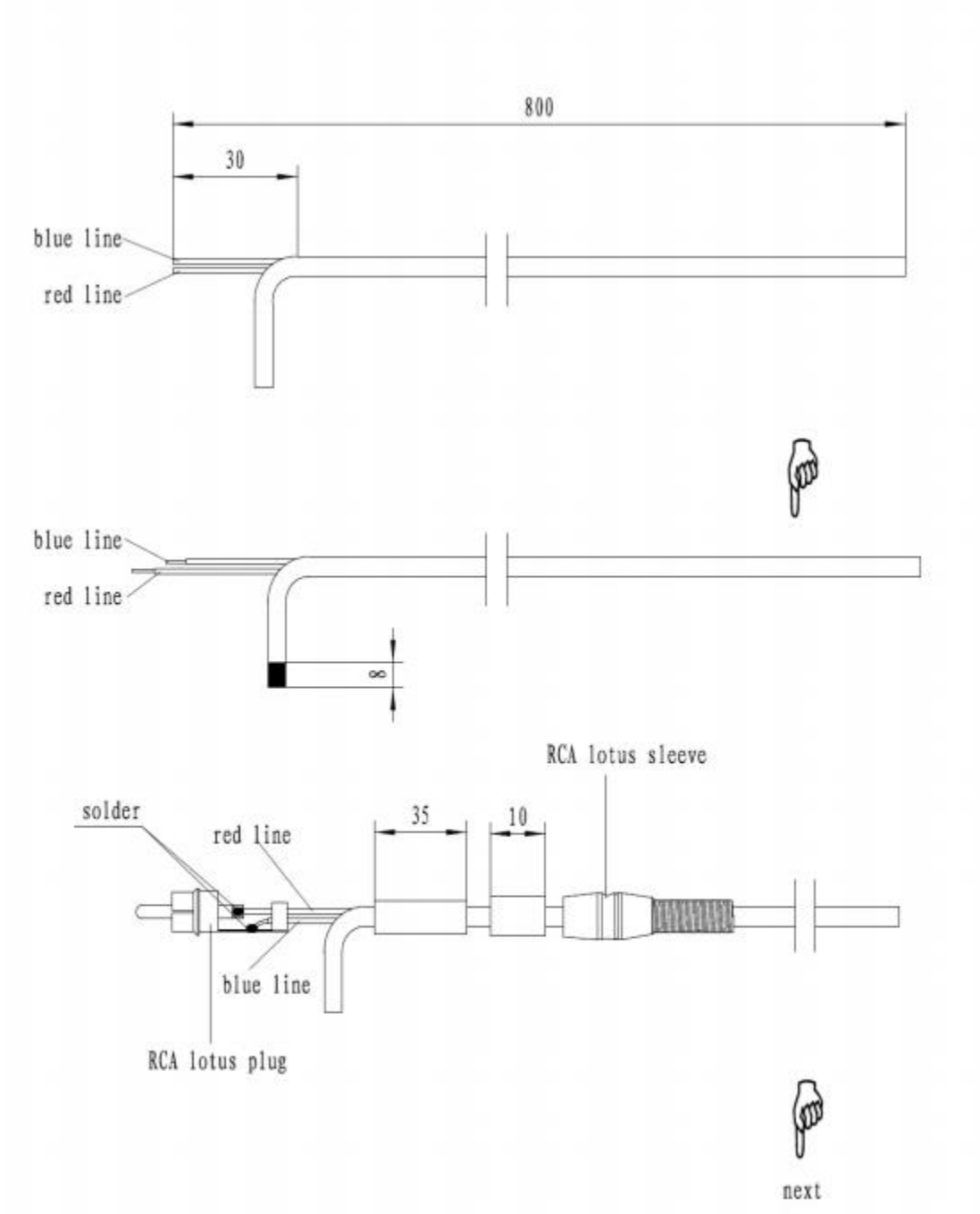


Figure B-49 Detergent Sensor Cable Assembly

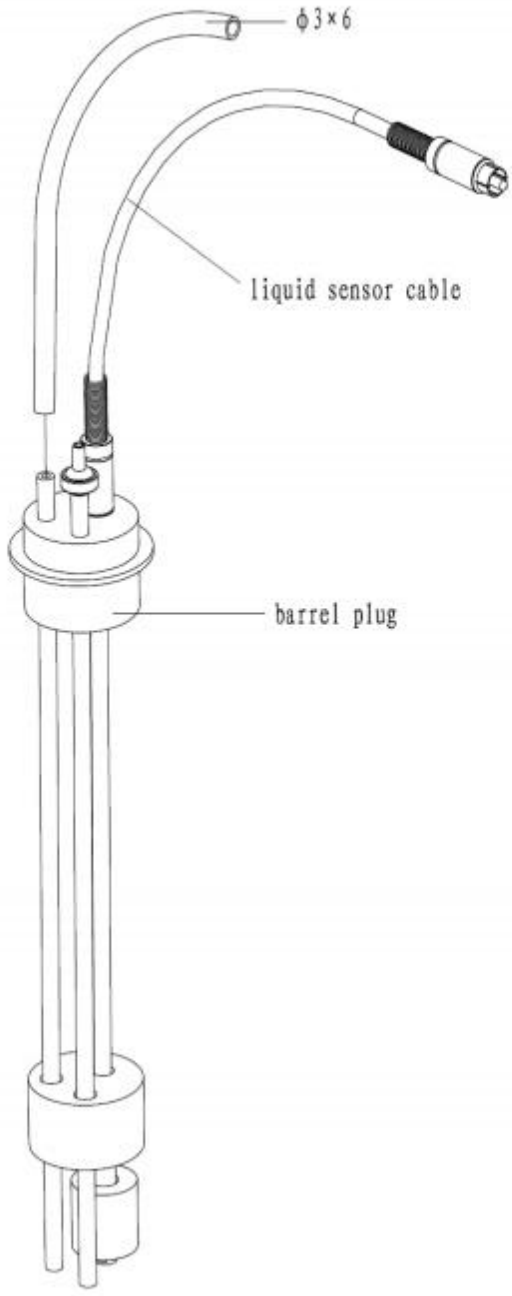


Figure B-50 Water Sensor Subassembly

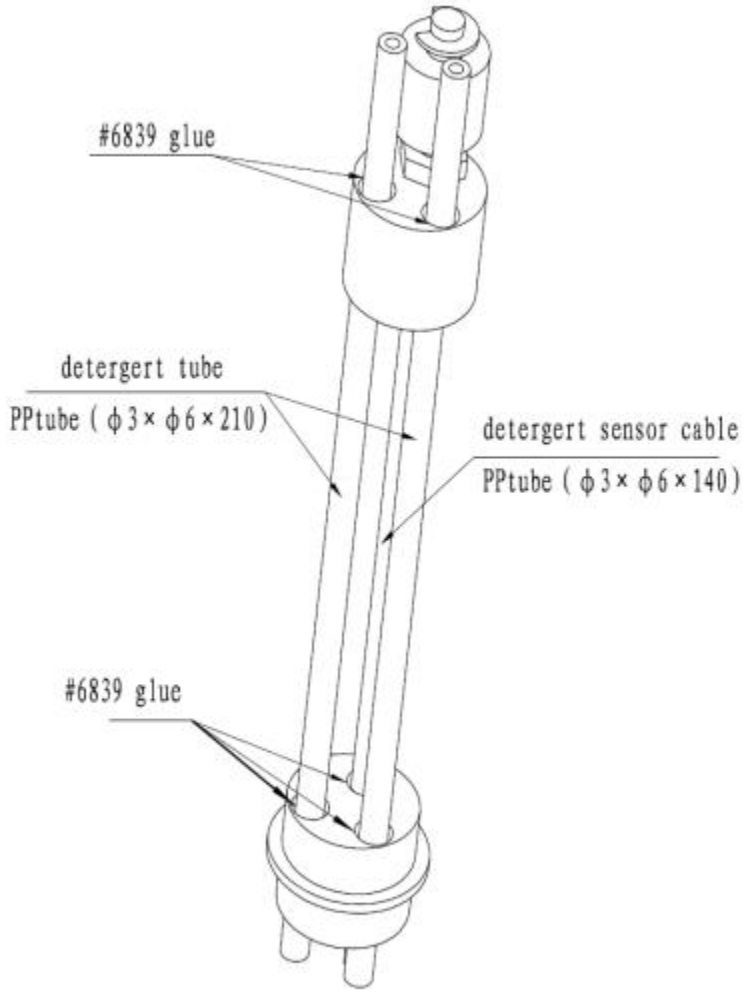


Figure B-51 Detergent Sensor Subassembly

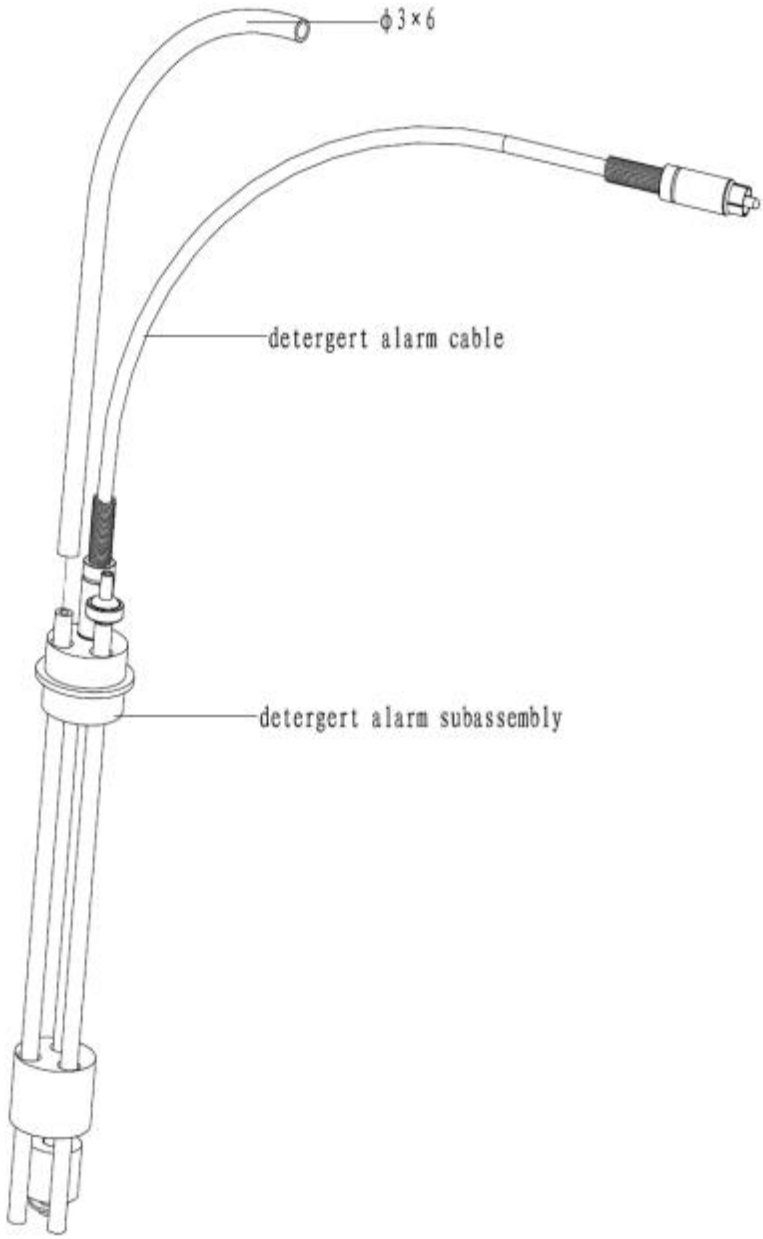


Figure B-52 Detergent Sensor Subassembly

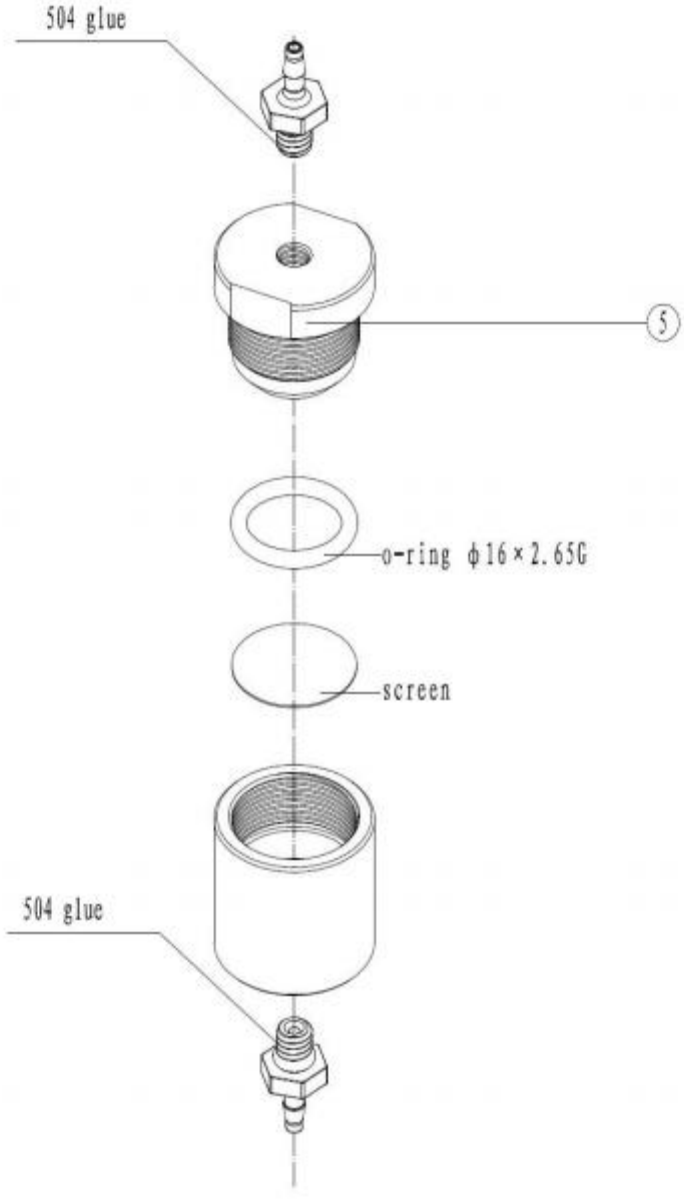


Figure B-53 Water Filter

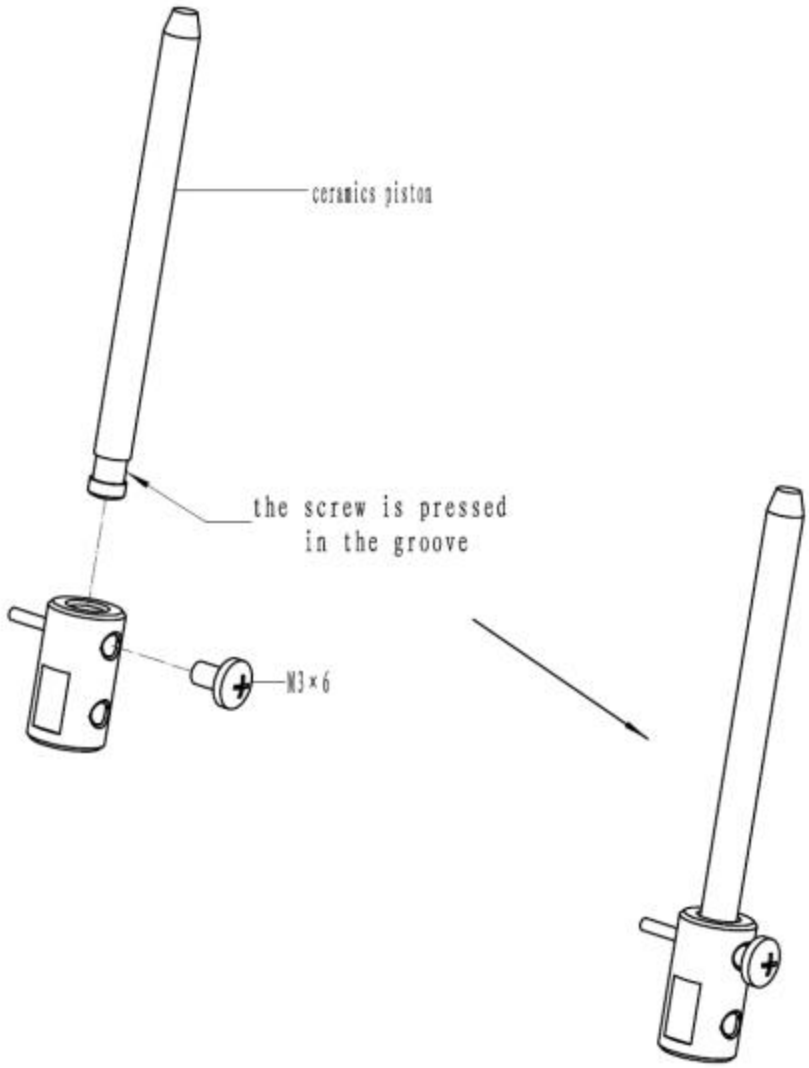


Figure B-54 Sample Syringe Piston

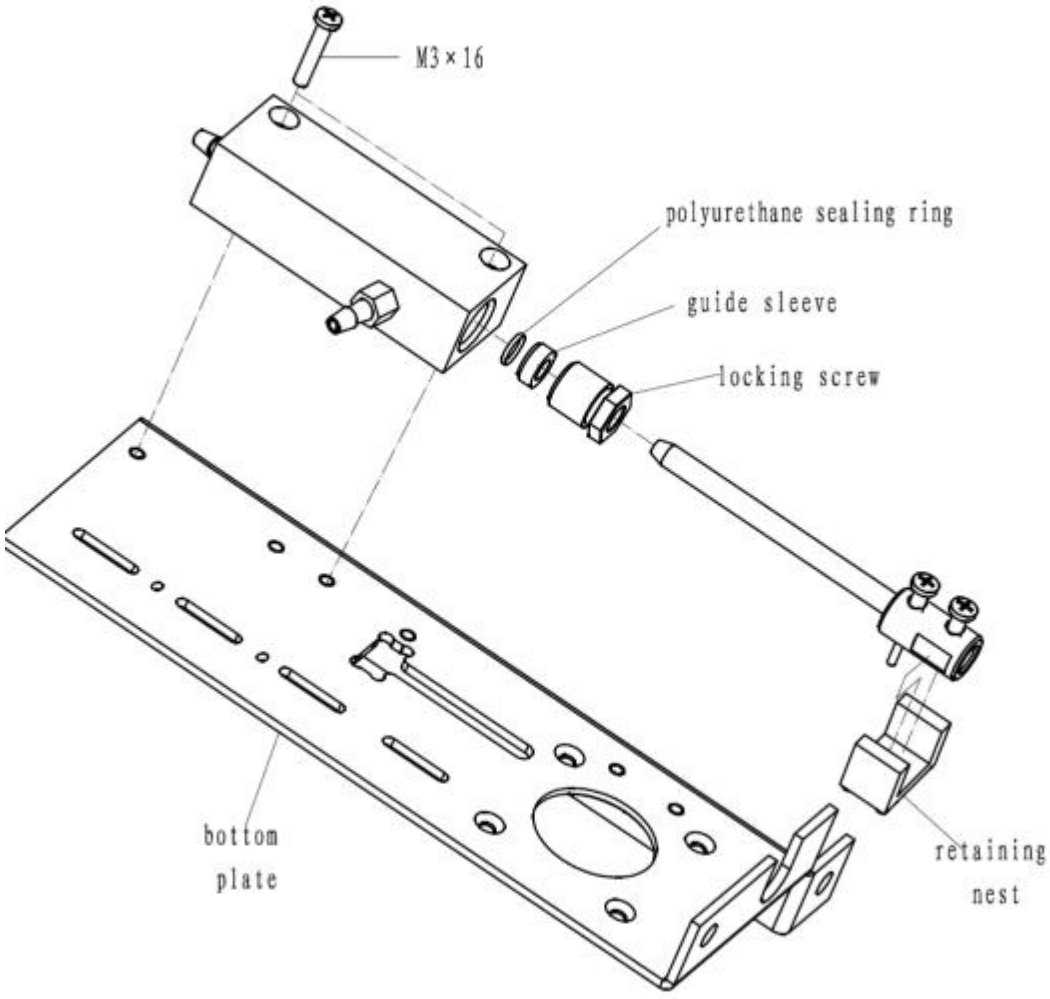


Figure B-55 Reagent Syringe

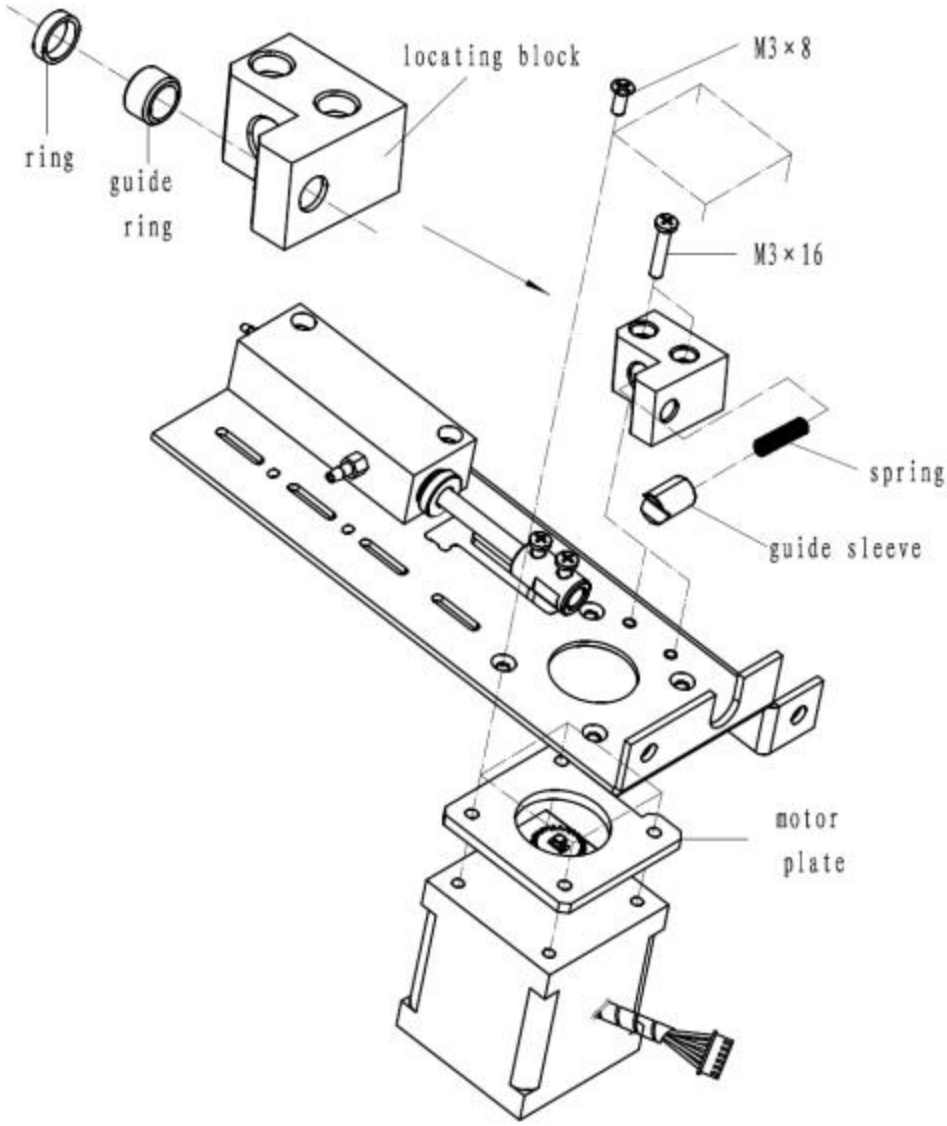


Figure B-56 Reagent Syringe Subassembly

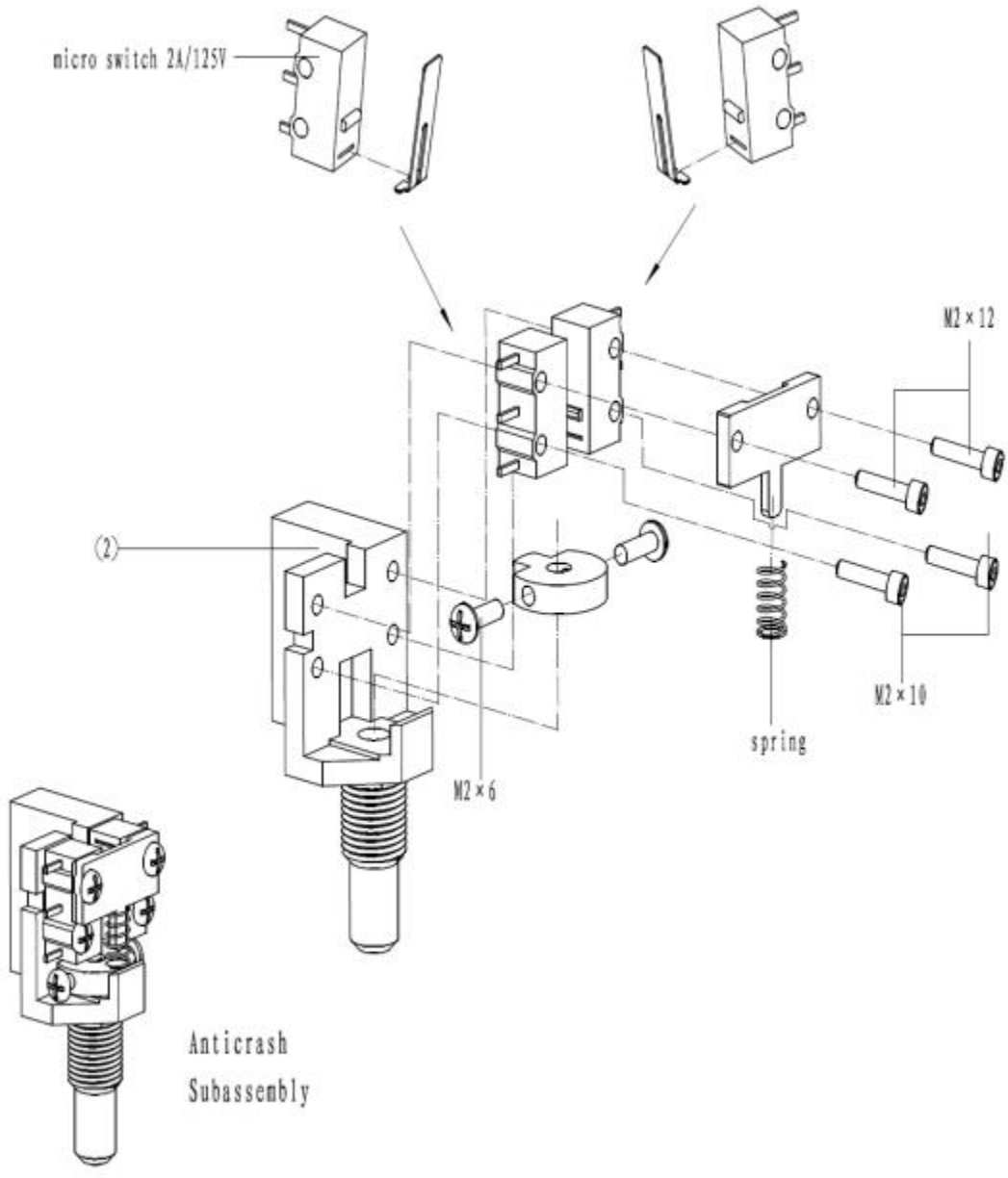


Figure B-57 Anticrash Subassembly

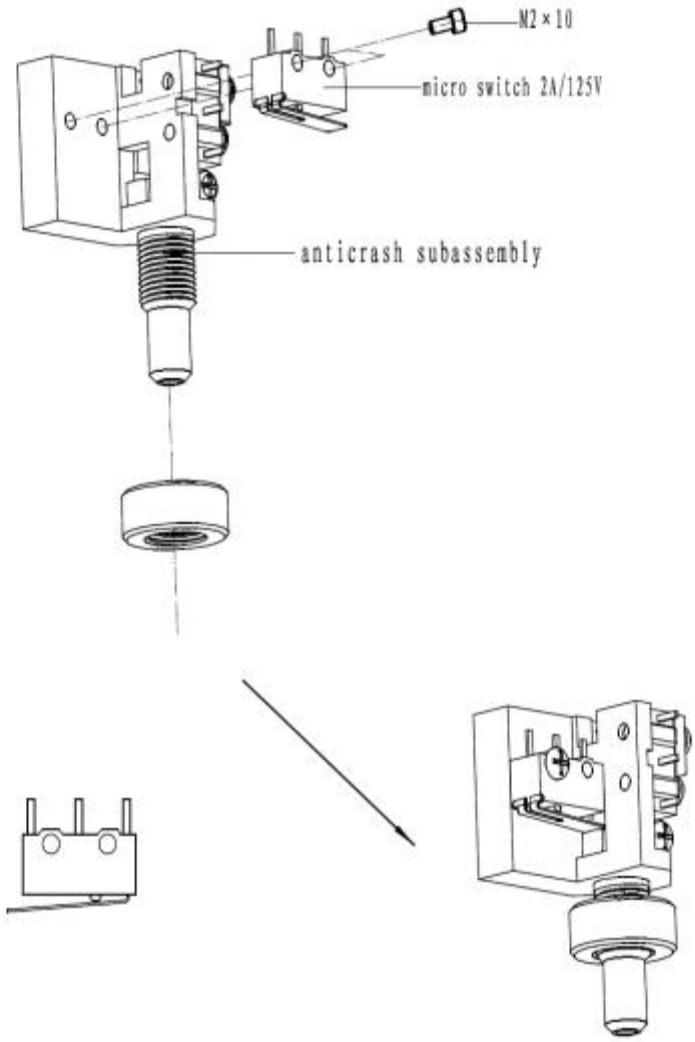


Figure B-58 Anticrash Subassembly

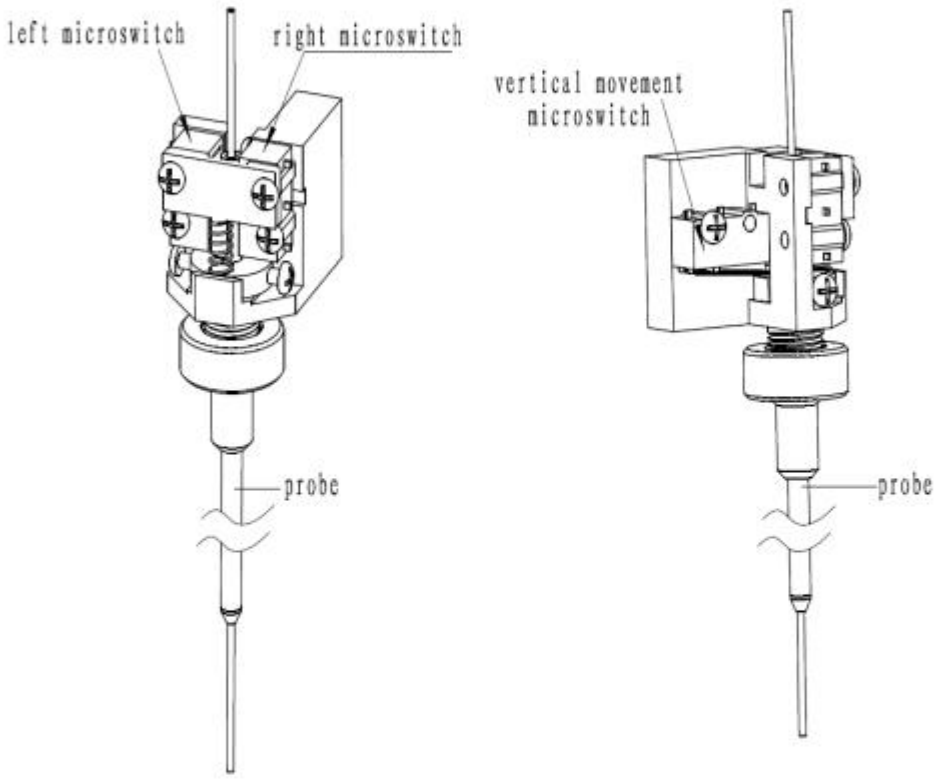


Figure B-59 Anticrash Subassembly

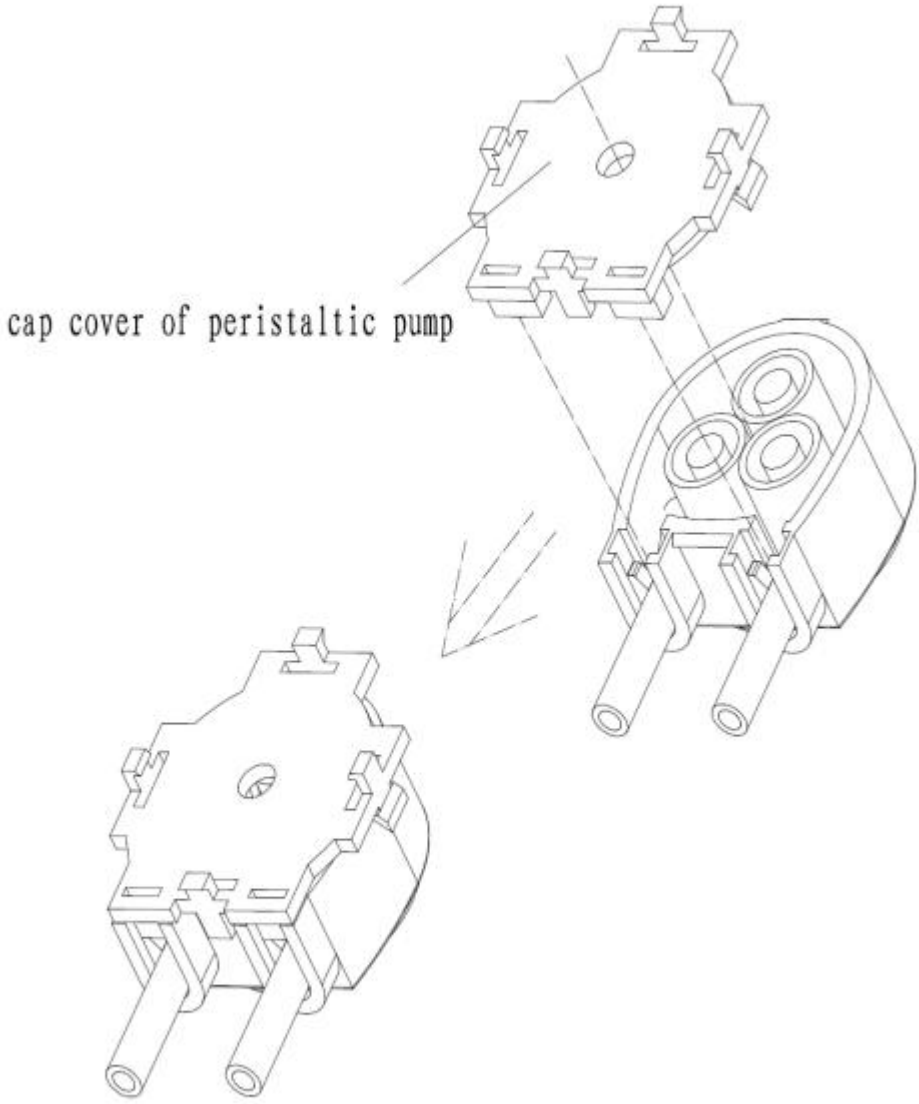


Figure B-60 Cassette of Peristaltic Pump

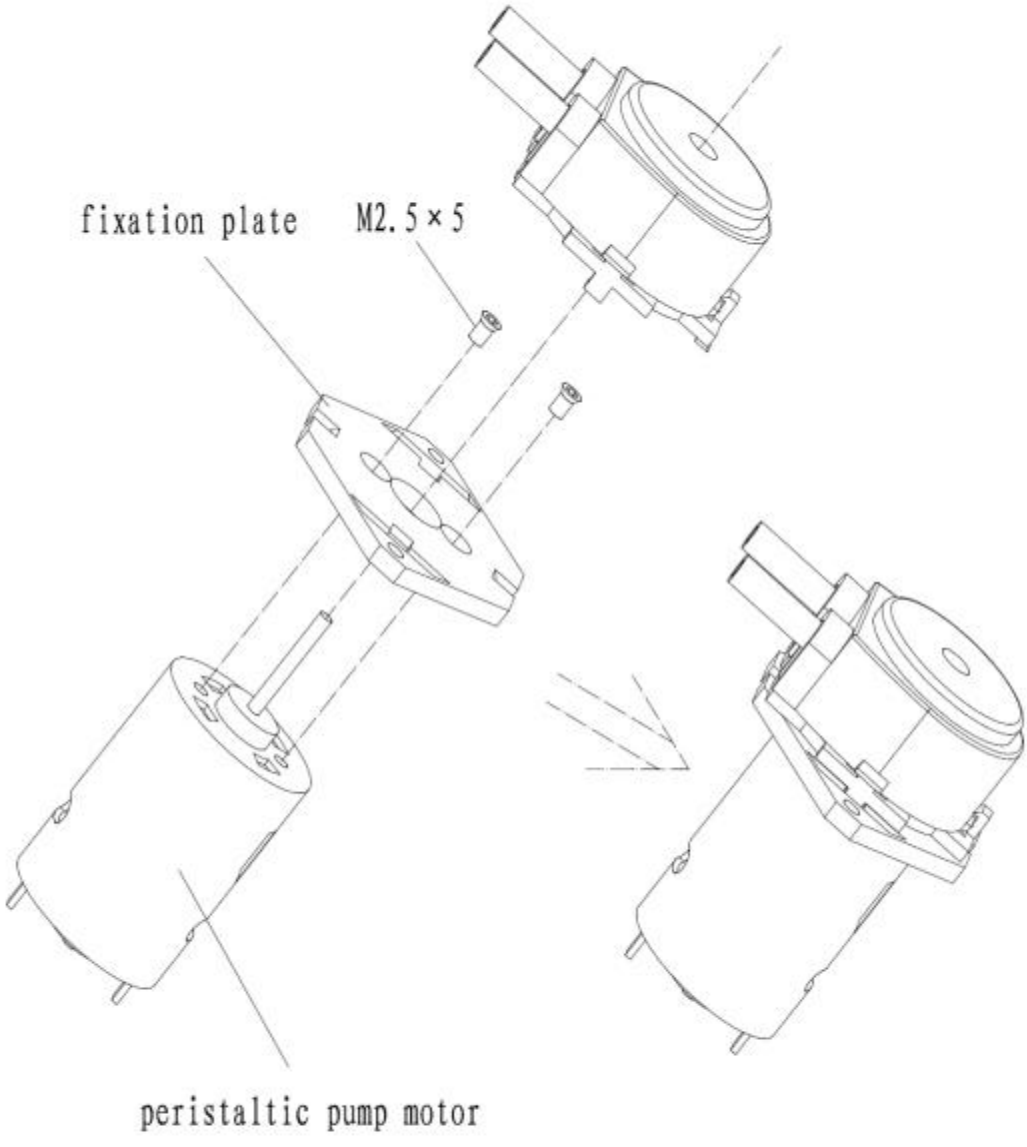


Figure B-61 Peristaltic Pump

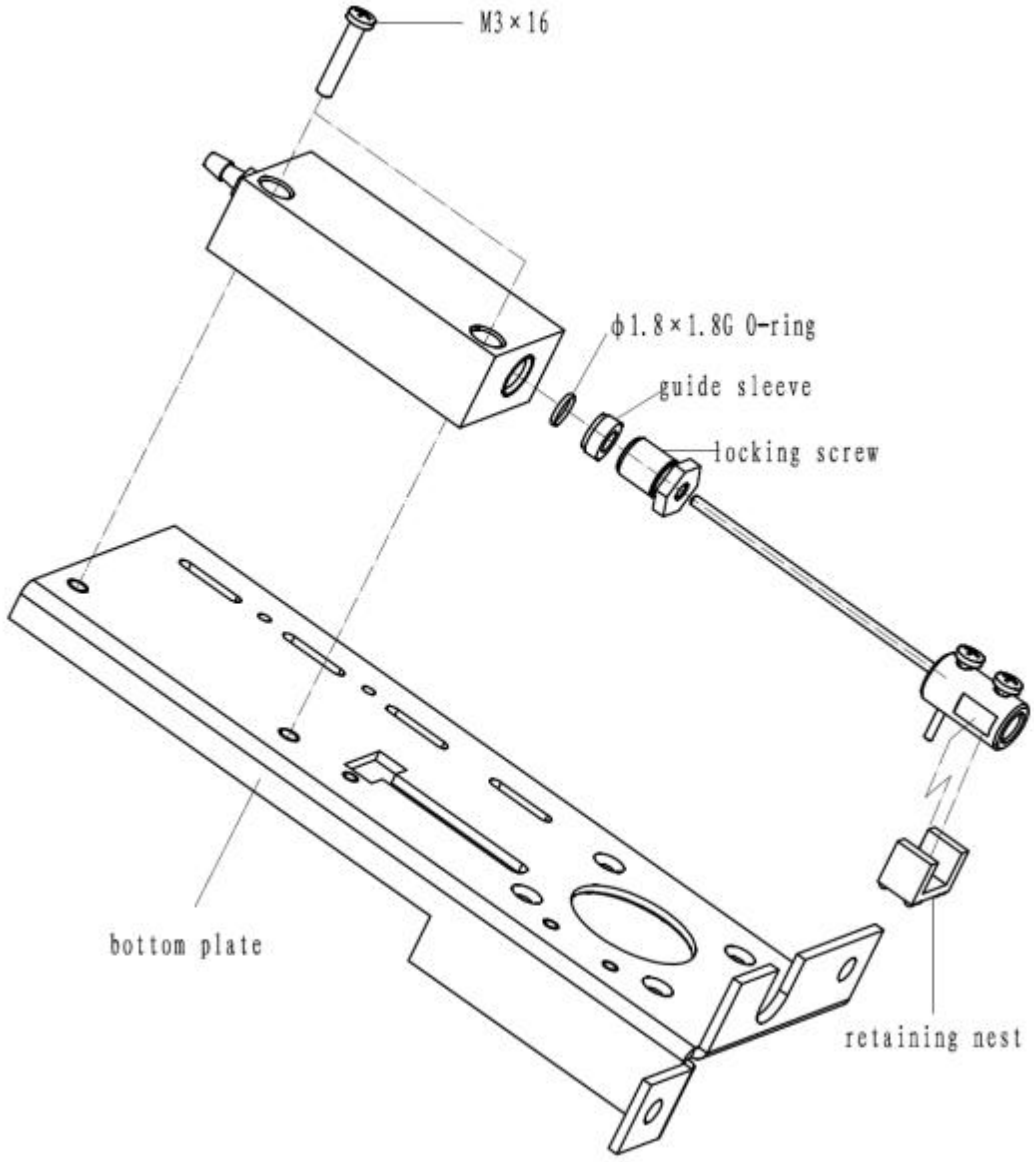


Figure B-62 Sample Syringe Subassembly

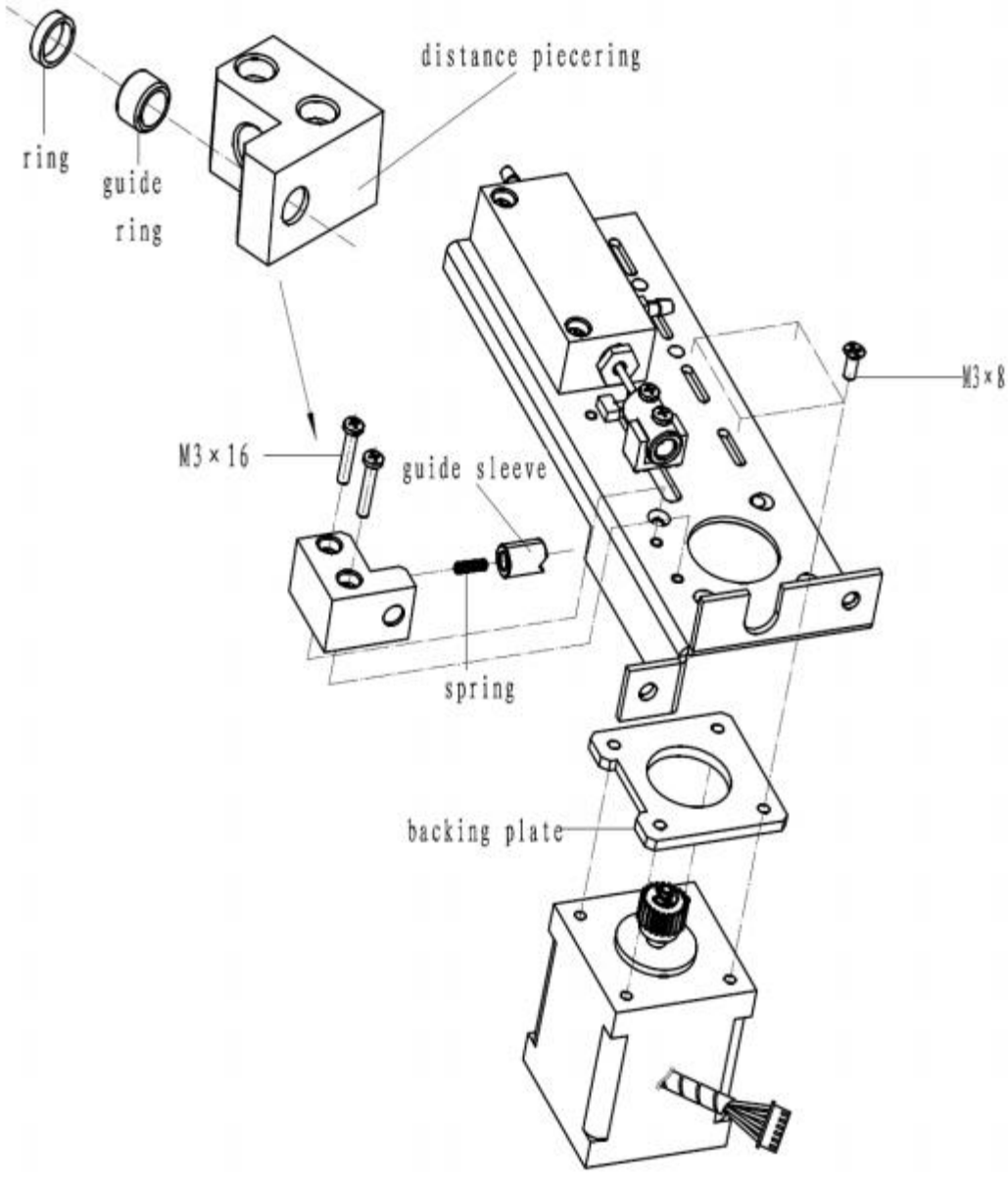


Figure B-63 Sample Syringe Subassembly

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