



- **EXC200**
- A cost-effective choice for clinical laboratories

Contents

- 01 Overview
- 02 Analysis Principle
- 03 Installation
- 04 Maintenance
- 05 Mechanical Structure
- 06 Hydraulic System
- 07 Trouble Shooting

01

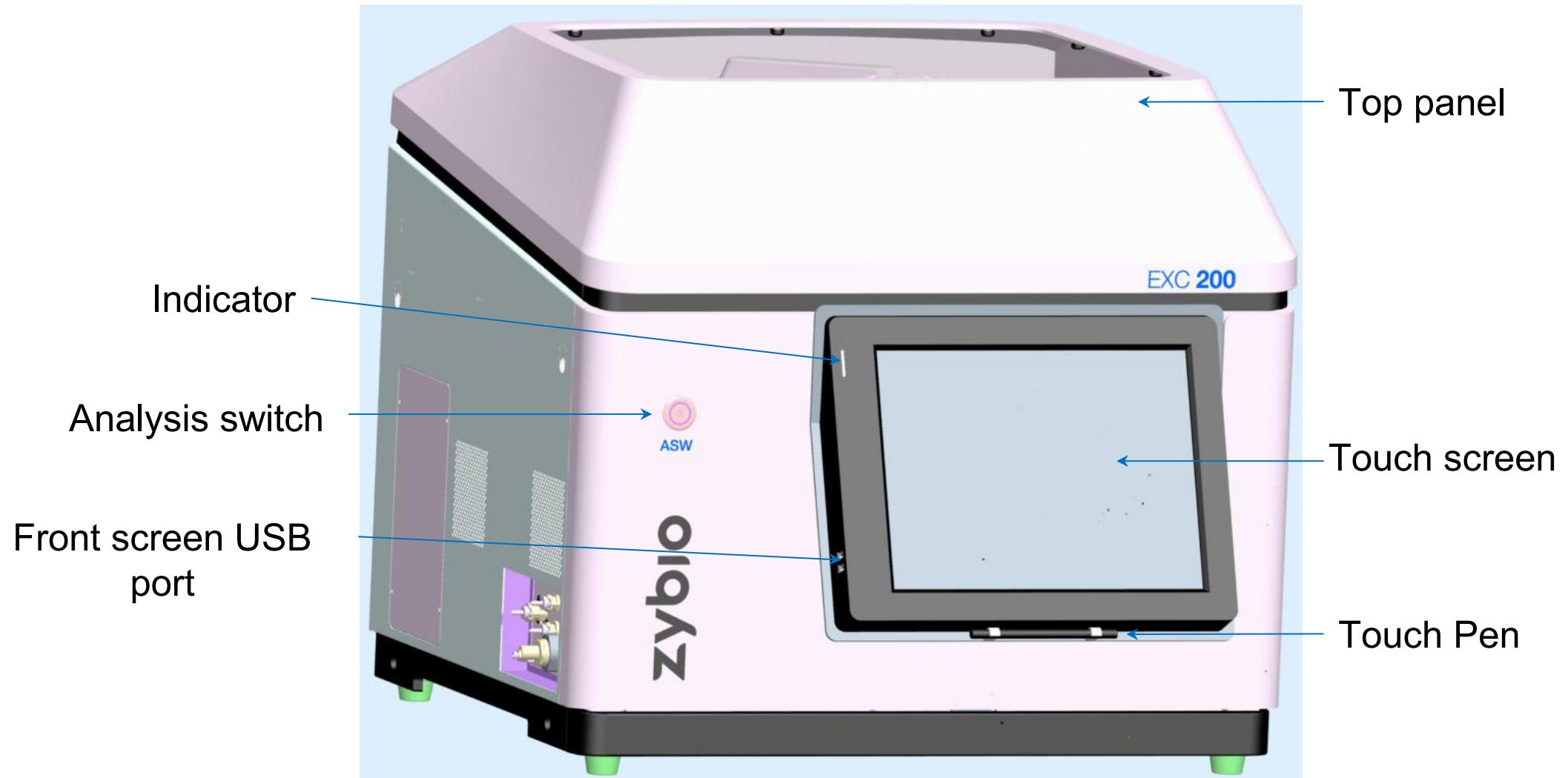
Overview

EXC200 introduction

Fully automatic desktop biochemical analyzer



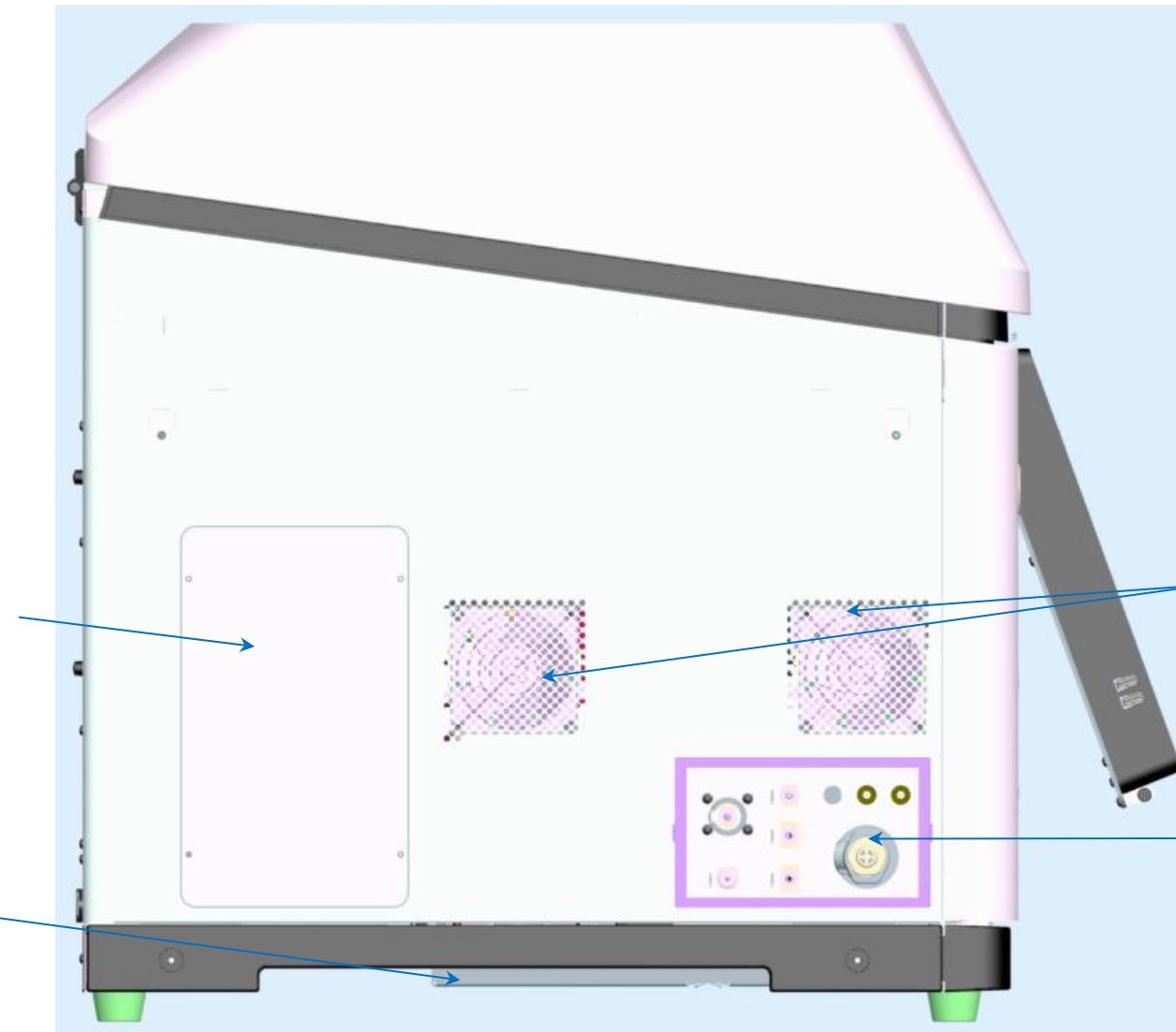
Instrument front view



Instrument left view

Syringe maintenance wicket

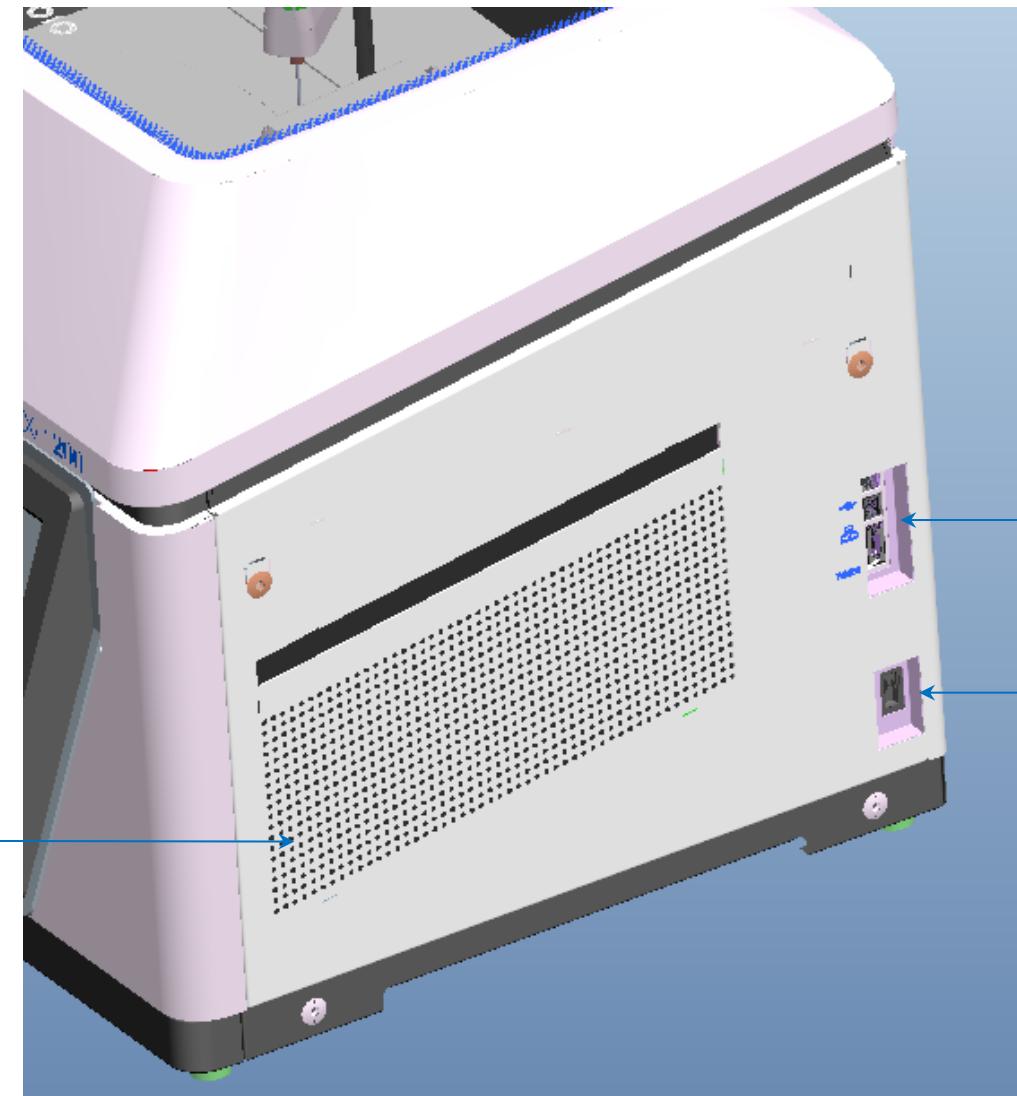
Carrying handles



Cooling fan outlet

Inlet/outlet &
sensors of external
liquid

Instrument right view



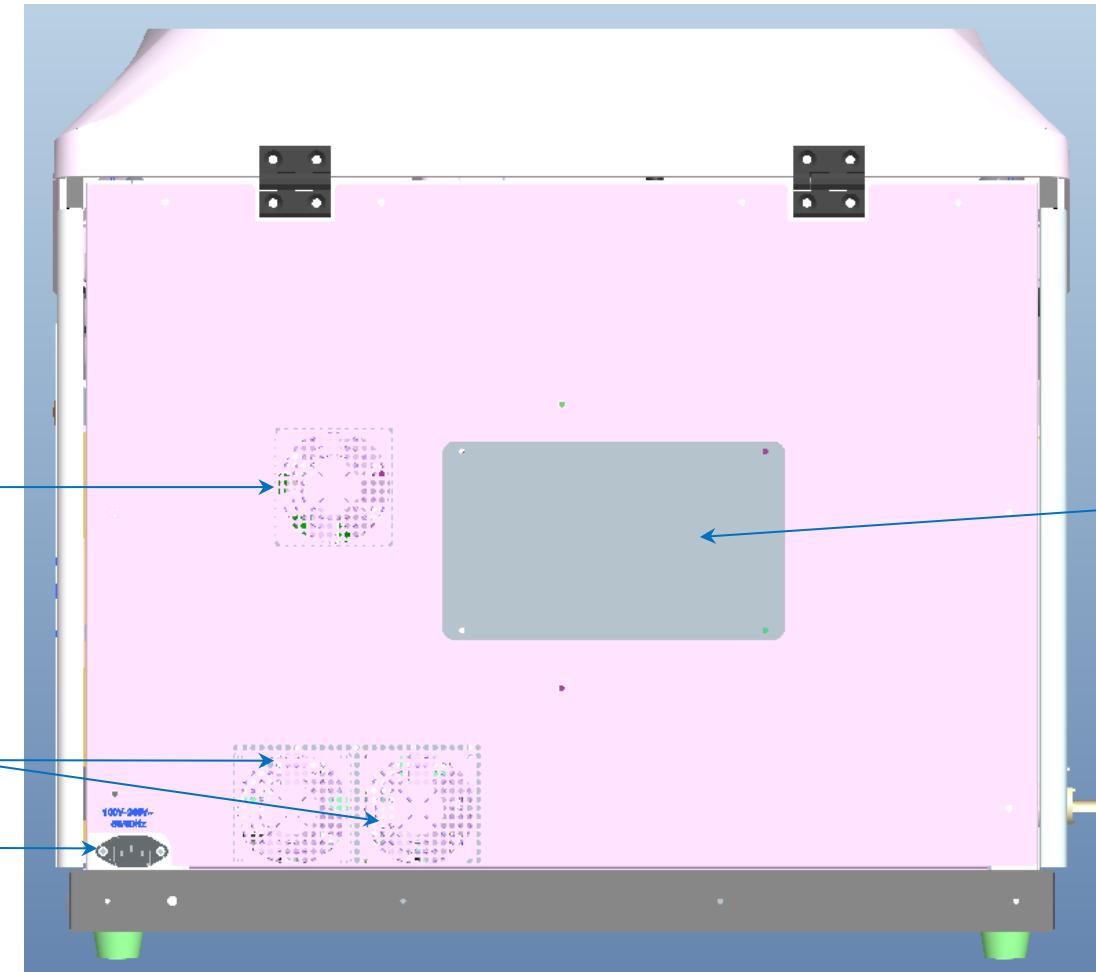
PCB board
cooling inlet

LAN port, USB port
and serial port

Main switch

Instrument rear view

Main cooling outlet
Power supply cooling outlet
Power socket

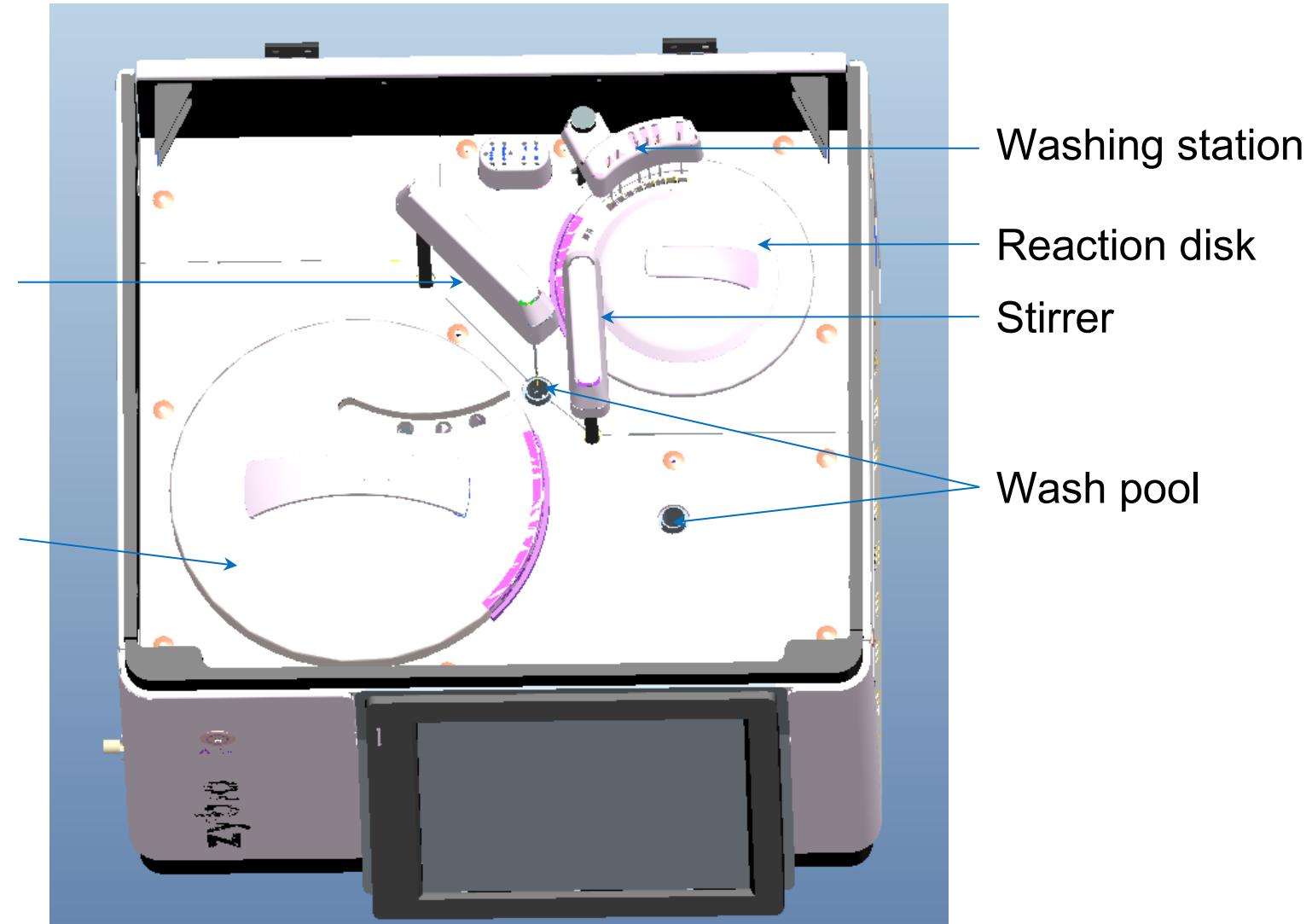


Rear maintenance wicket

Instrument top view

Reagent/Sample probe

Reagent/Sample disk



Overvie



- Throughput: 240 T/H for single reagent; 160 T/H for double reagents
- Random access, STAT function
- Water consumption: 5L/H
- Advanced rear spectrophotometry, (340-800)nm, in total 12 wavelengths
- Open system
- Bilateral LIS connection

Overview



- Multiple sample type: Plasma, Serum, Urine and CSF
- Reagent: ready for use
- Sample positions : 40 (including STAT positions)
- Reagent positions: 40
- Cuvettes: 63
- Sample volume : 2 μ l-50 μ l
- Minimum reaction volume: 90 μ l
- Reaction temperature: 37±0.2°C

Overview



- Basic Principle : Colorimetric assay ; turbidimetry
- Test Method : End-point assay, Fixed time assay
Kinetic assay(rate assay)
- Software operation : Win 10
- Dimension(mm) : 710mm*705mm*635mm
- Weight : <75kg
- Power Supply : 100-240V, 50/60HZ
- Power : <500VA

Testable items

Liver function(19)

ALT AST ALP ALB TP TBIL DBIL GGT TBA
ADA PA CG CHE 5'-NT AFU mAST GLDH LAP

Renal function(11)

UREA UA CREA CysC RBP α 1-MG UTRF β 2-MG
NGAL NAG mALB

Blood lipid(10)

CHOL TG HDL-C LDL-C ApoA1 ApoB ApoE
Lp(a)

sI DL-C NEFA

Glucose homeostasis(7)

GLU HbA1c GSP GA LAC β -HB Insulin

Cardiac Markers(8)

LDH LDH1 CK CK-MB α -HBDH MYO cTnI IMA

Cardiovascular(5)

ACE hs-CRP HCY MPO MP-PLA2

Rheumatism(3)

ASO RF anti-CCP

Ion(7)

Ca Mg P CO₂ Fe Zn Cu

02

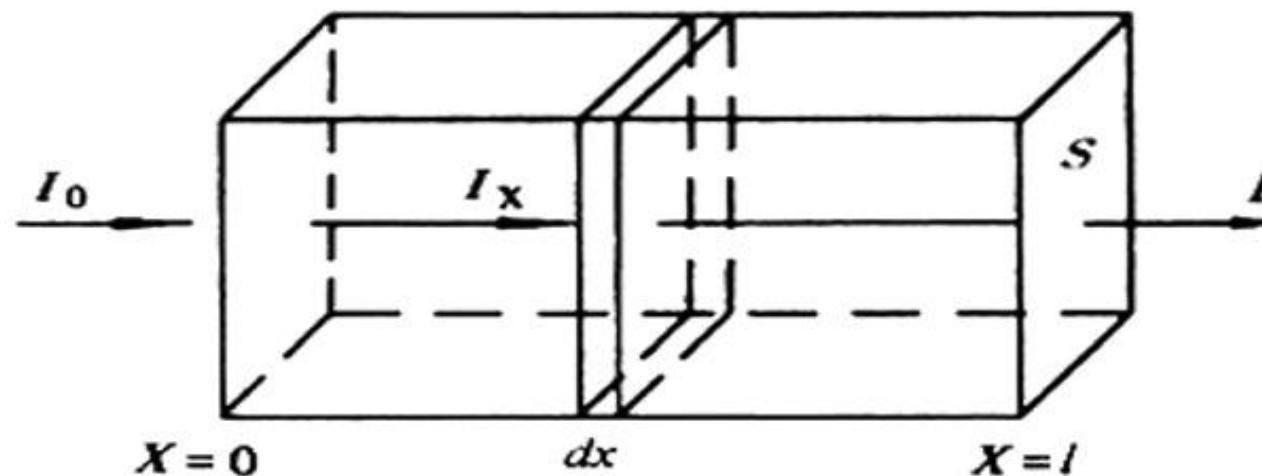
Analysis Principle

Lamber-Beer law : Fundamental law of absorption

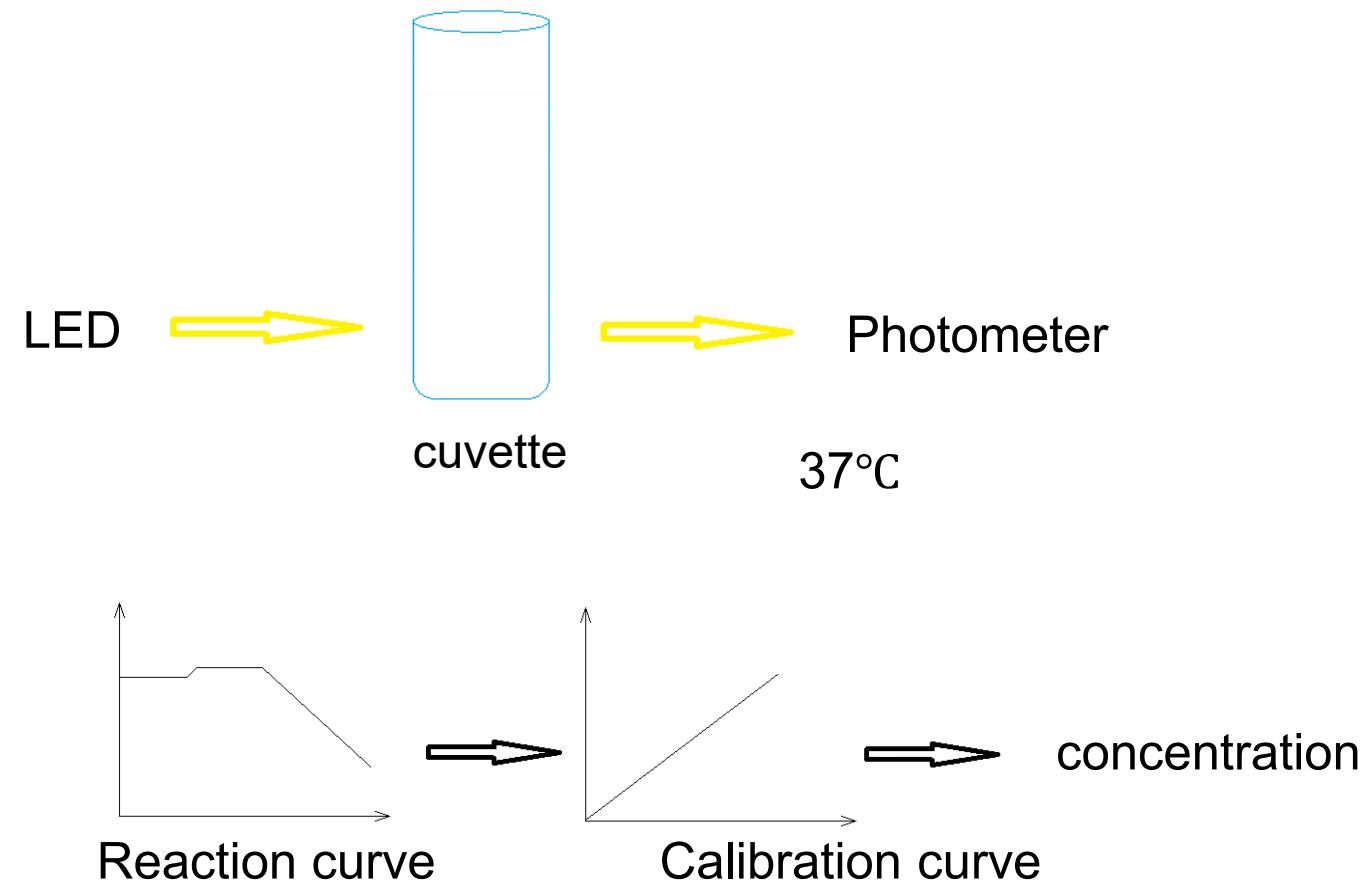
spectroscopy

- Lamber law : $A \propto l$, $A \propto C$
- $A = \lg(1/T) = \lg(I/I_0) = \epsilon b c$

A beam of light passes through a reaction system, get absorbance “A” , “A” is proportional to the thickness of the absorption layer , and also the proportional to the concentration of reaction solution.



Principle and analysis steps



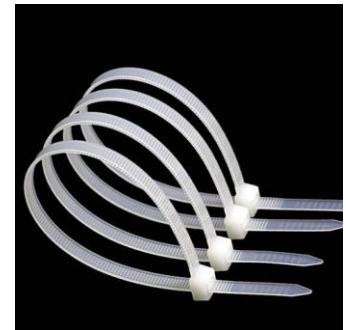
03

Installation

Pre-installation preparation

Installation tools

- Allen wrench
- Scissor
- Cross screwdriver
- Straight screwdriver
- Fixing belt (4x150mm 10 strips)
- Gloves
- Pincer pliers



Environment requirements

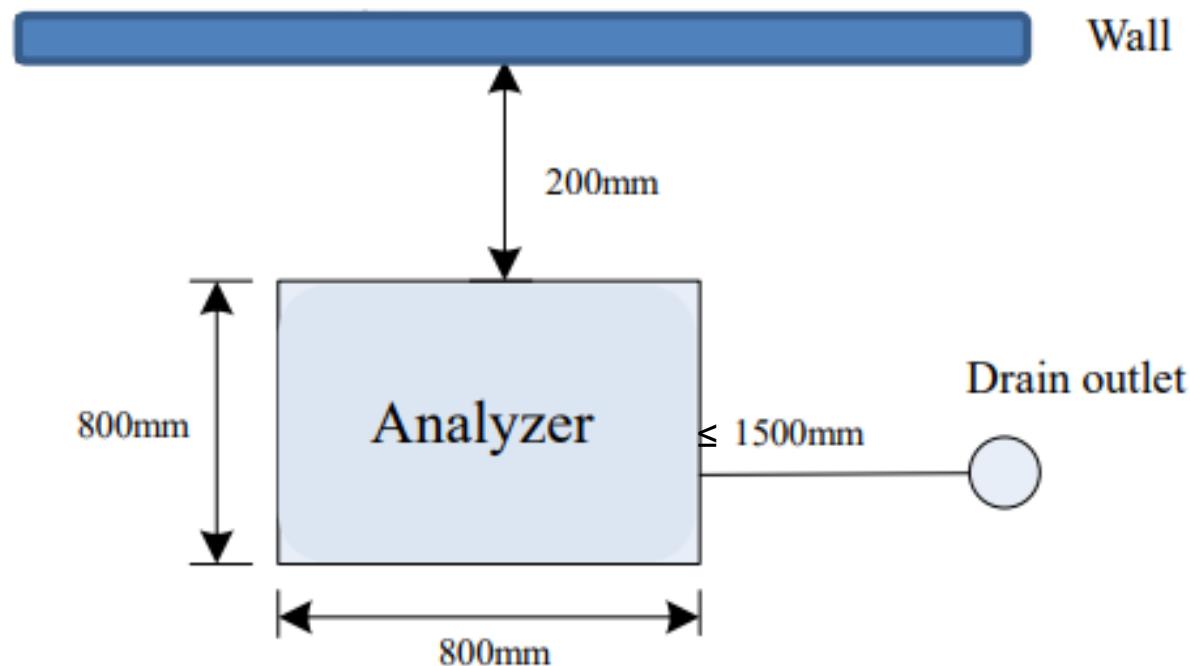
Operating conditions

- Ambient temperature range: 10°C ~ 30°C
- Relative humidity range: 30% ~ 85%, no condensation
- Atmospheric pressure range: 70.0kPa ~ 106.0 kPa
- Stay away from magnetic interference
- Avoid direct exposure to strong light
- **Good grounding environment(0-5V)**
- The installation table or ground should be flat
(Slope < 1/200)
- Altitude: < 3000 meters
- Indoor use only
- The installation table should bear a weight of at least about 100kg
- Good ventilate
- Dust-free environment
- Be away from heating and windy outlet
- No corrosive and flammable gas
- No vibration on the table (or ground)
- No loud noise and power interference
- If room temperature out of requirements, air conditioners needed

Environment requirements

Space requirement

Please install the instrument as space requirement of below figure:



Environment requirements

Power and grounding

- AC 100-240V, 50/60HZ, Good Grounding (Grounding resistance < 10mΩ $|0 < U < 5 \text{ v}|$)
- Power input: $\leq 500\text{VA}$
- Please grounding power supply correctly. Incorrect grounding may cause electric shock, hardware damage, and instrument failure.

Water supply requirements

General requirements

- Water quality should meet the requirements of CLSI Grade II water; resistance is greater than 1MΩ. CM, the silicate content is less than 0.1mg/L;
- Water supply: not less than 5L/h;
- Temperature: Water temperature 5-32°C.

Water supply method

- Built-in water inlet pump: Supply instrument water via water inlet pump, **external water source cannot be under pressure.**
- Water supply tank **cannot exceed the height of water inlet of analyzer**, and the length of water pipe should not exceed 1.5 meters.

Drainage requirements

General requirements

- The waste tube should place without bending or protrusion
- The waste liquid discharge cannot be blocked

Waste discharge method

- **Connect waste tank:** The waste tank must be lower than instrument placed level, ensure **the waste tank cap is lower than waste outlet of the instrument.**
- **Connect the waste tube:** The distance between waste tank port and instrument discharge port **should not exceed 1.5 meters**, the waste tube shall not be laid flat on the same level as the drainage outlet of instrument.

Instrument installation

Unpacking Check

- Check all the packing cases before unpacking, include: 1 tank case, 1 concentrated detergent case, 1 instrument wooden case (Note: There are **3 accessory packages in the wooden case**).

- All the instrument packages had passed strict inspection by Zybio company before transportation. After you receive the instrument, **please check the items carefully as below before opening the box**:
 - 1. If outer packing has inverted or deformation, if tilting prevention label turn red or not.
 - 2. If outer packing has obvious marks of wet water or not.
 - 3. If the outer packaging is obviously impacted or not.
 - 4. If the package has been opened or not.
 - **If find any abnormal sign please take photo or video of it, then contact assigned engineer of Zybio.**
 - 5. Check appearance of all devices carefully, to see if have cracks, bruises or deformation or not.

Instrument installation

Unpacking

- 1. Push the wooden box to a suitable position, ensure there is enough space to open it. And ensure there is enough space for two people to lift out the instrument.
- 2. Wear **protective gloves**, disassemble the **tongue buckle** (by a vise) which connecting upper cover & side plate. Remove the upper cover of the wooden box, then remove the front side panel—left side panel—rear side panel—right side panel



Figure of After remove box cover

If find any abnormal sign please take photo or video of it, then contact assigned engineer of Zybion.

Instrument installation

Unpacking

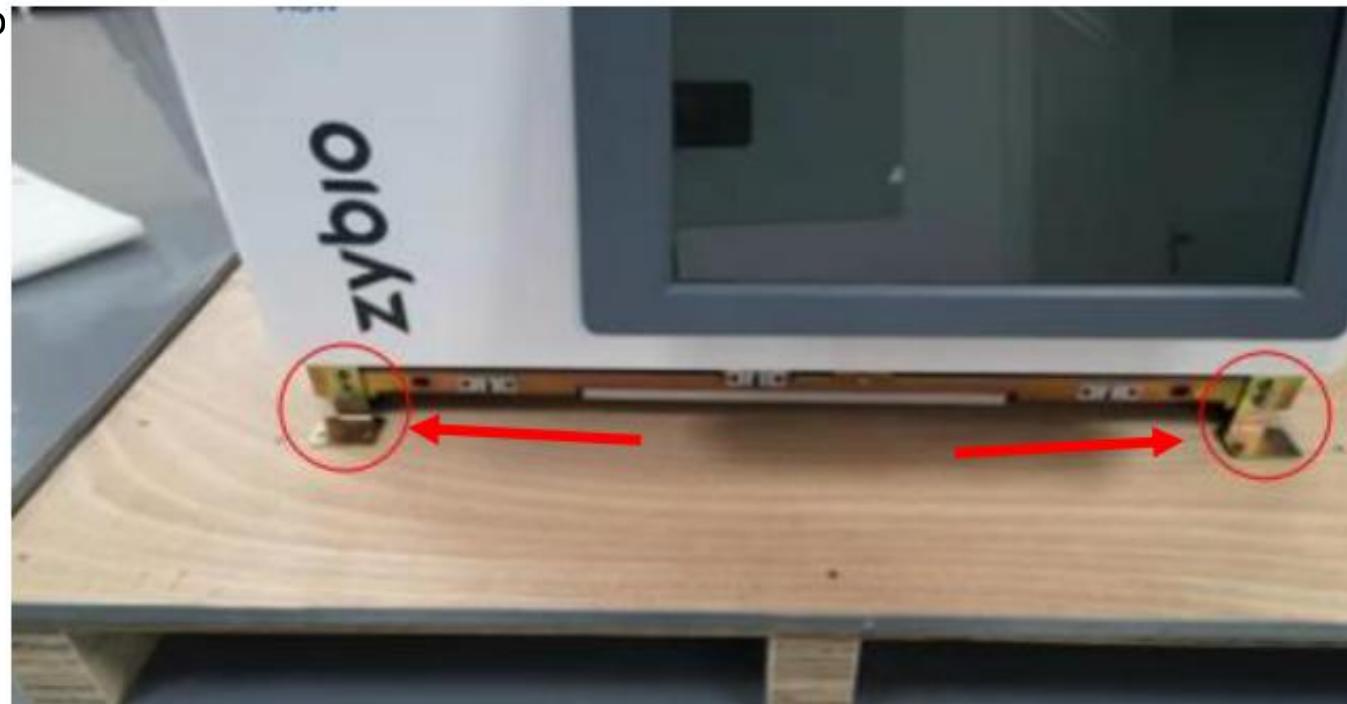
- 3. Remove instrument PE bag, take out desiccant, remove **trim strip** from instrument front case.



Instrument installation

Unpacking

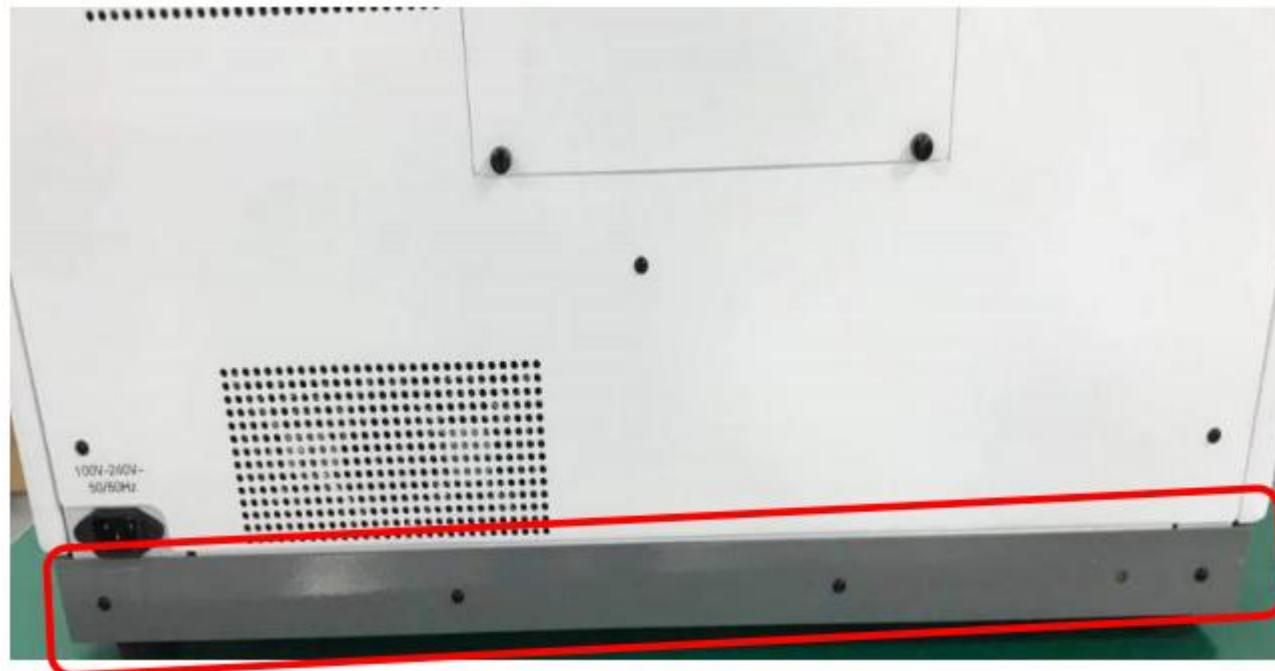
- 4. Remove fixing bracket, unscrew M8×35 Allen screws of four fixing brackets (at the bottom) by **M8 Allen wrench**. Then unscrew 2 M4×10 Allen screws on the side of the fixing bracket by **M4 Allen wrench**, then take out the fixing b



Instrument installation

Unpacking

- 5. Carry and placing the instrument on work table gently, pay attention to safety.
- 6. Install back the front trim strip to the front panel of instrument. Then take out the rear trim strip from foam, install it by M3x8 cushion screw (which place in accessories box #3).



Instrument installation

Unpacking

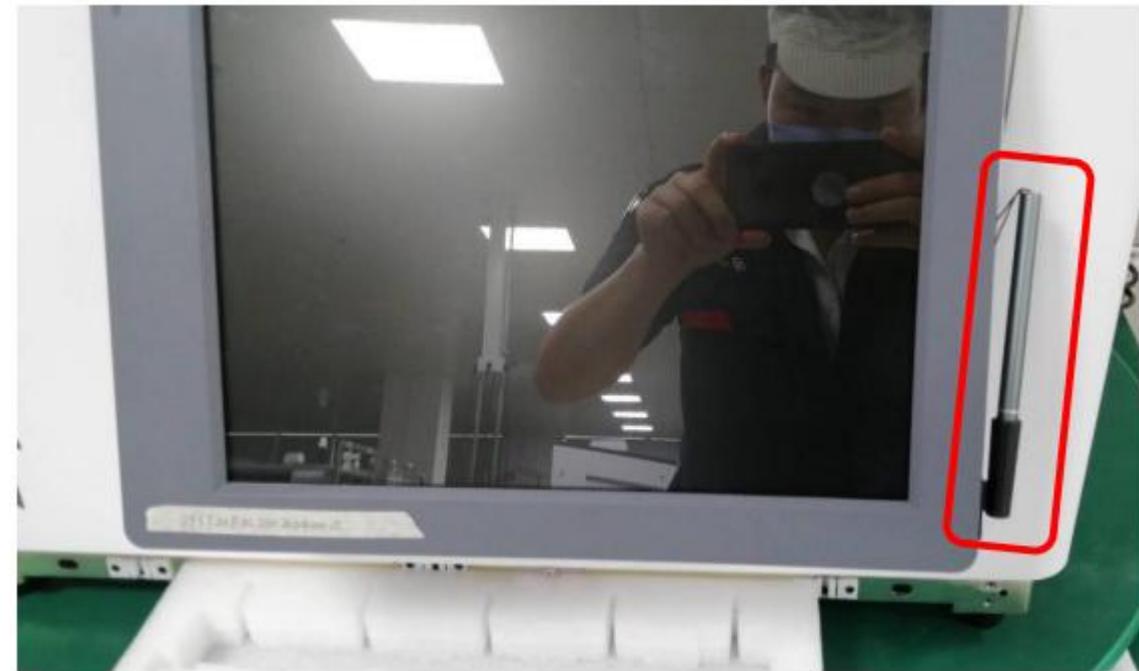
- 7. Take out the capacitive touch pen from accessory box# 3 and stick the pen holder on the right side of monitor, then place the capacitive touch pen in the pen holder. Figure shown as below:



Stick pen holder

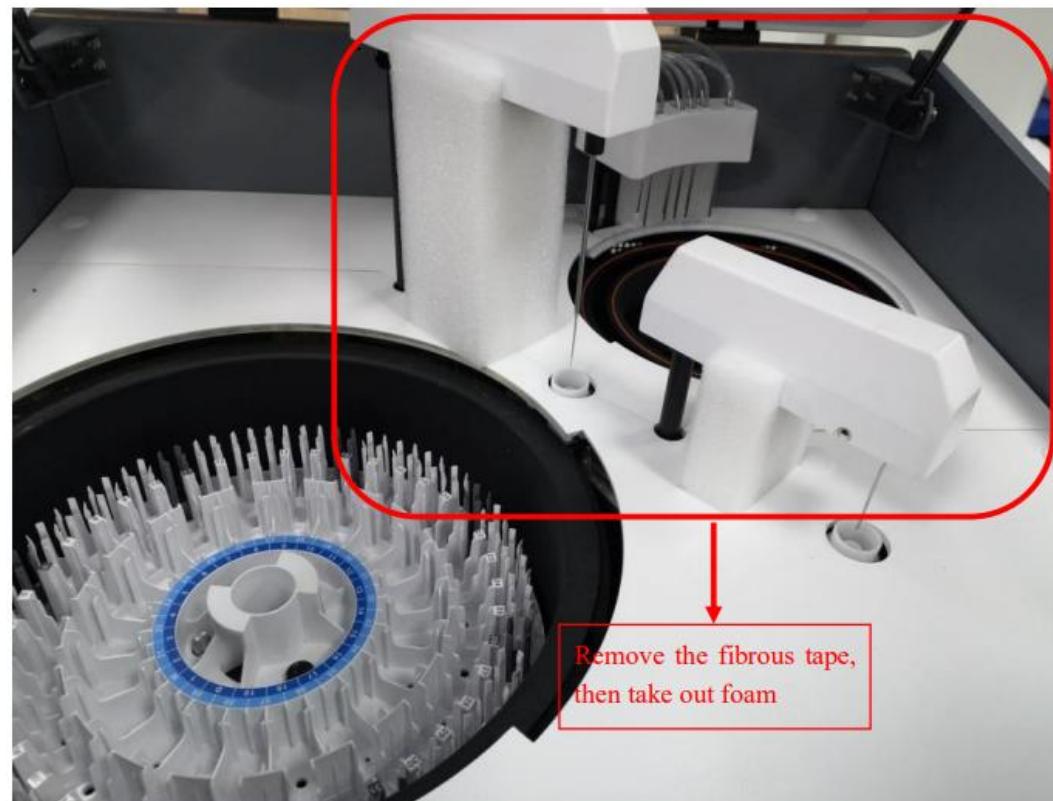


Capacitive touch pen



Instrument installation

- Open the upper cover of instrument, remove the adhesive tape & the protective foam of needle module & Stirring rod gently (Stirring rod come first)



Whole machine connection

- 1. Take out the **purified water tank** from waste tank packing box, take out C043 and C046 labeled pipeline from Accessory box #3; and take out purified water tank floater assembly from Accessory box #2;



Purified water tank



Tube of purified water



Inlet float sensor

Whole machine connection

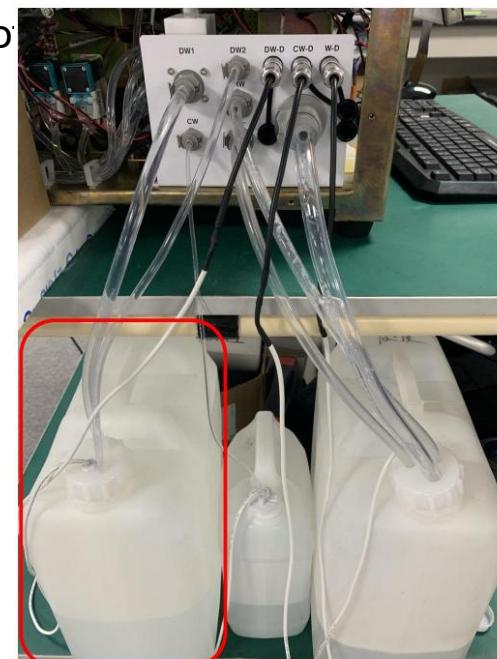
Pipeline connection on the left of the instrument is shown in the figure as below:

- 2. Fill the purified tank with purified water, place it under analyzer.
- Note: The purified water tank can't place on the table of analyzer; insert C043 labeled tube into "DW1" connector of analyzer, insert C046 labeled tube into "DW2" connector of analyzer. Connect the other end of these two tubes to purified wa

"DW - D" c



o o



the float sensor to

Whole machine connection

- 3. Take out waste tank from waste packing box, and take out C051, C053, C055 labeled tube from Accessory box #3. Take out the waste tank float assembly from Accessory box #2;



Waste tank



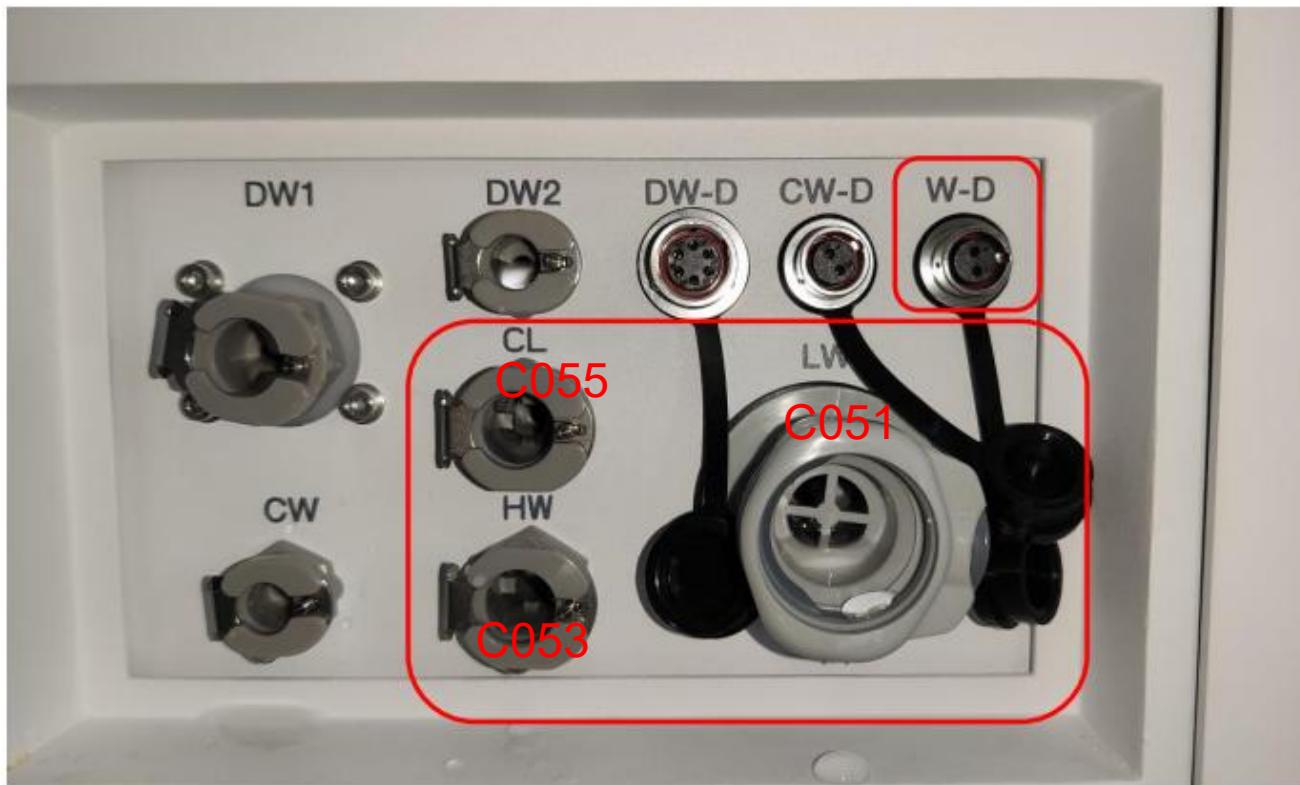
Waste Tube



Waste float
sensor

Whole machine connection

- 4. Connect C051 labeled waste tube to "LW" quick-plug connector, connect C053 labeled waste tube to "HW" quick-plug connector, connect C055 labeled waste tube to "CL" quick-plug connector.



Whole machine connection

- 5. Drain Waste Method 1: If there is a **sewage outlet** for waste liquid, connect the waste liquid drain pipe to the corresponding joint on the side of the instrument, and insert the other end of the waste liquid pipe directly into the sewage outlet for waste liquid (length of the pipeline shall be cut according to the distance);
- Drain Waste Method 2: If there is no sewage outlet for waste liquid, tighten **liquid float assembly** on the waste tank, connect float sensor cable to **W-D connector**, and insert other end of those three waste liquid pipe to waste tank accordance with pipeline diameter respectively (length of the pipeline shall be cut according to the distance, pipe C051 can't be bent directly or in u-shaped bending, otherwise it will lead to liquid seal, then cause waste liquid flow backward).

Whole machine connection

- 6. Take out concentrated detergent from cleaning packing box, take out C048 labeled pipe from Accessory box #3; take out its float sensor assembly from Accessory box #2.



Cleaning floater assembly



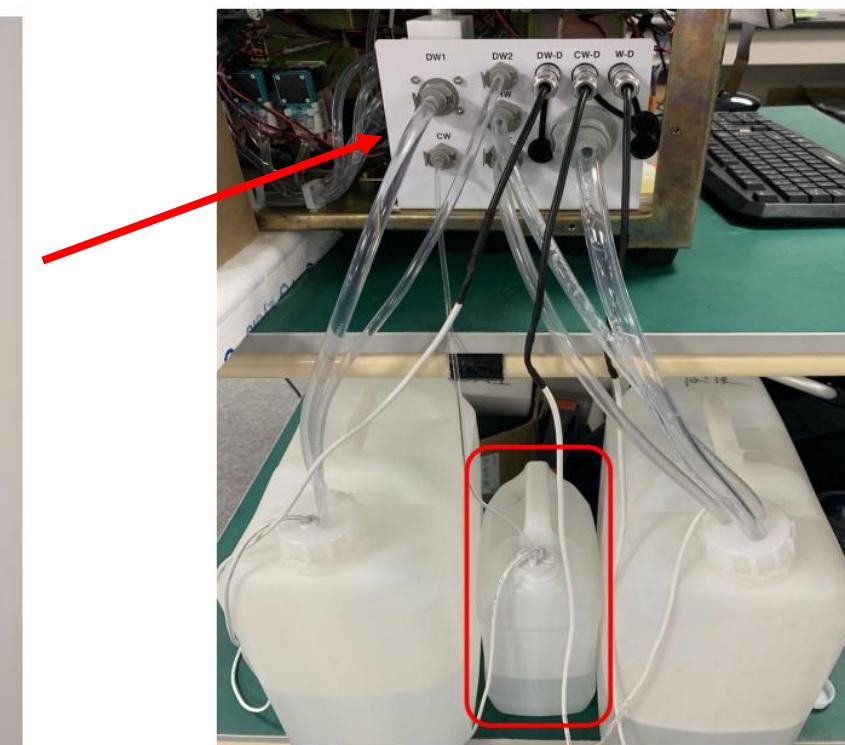
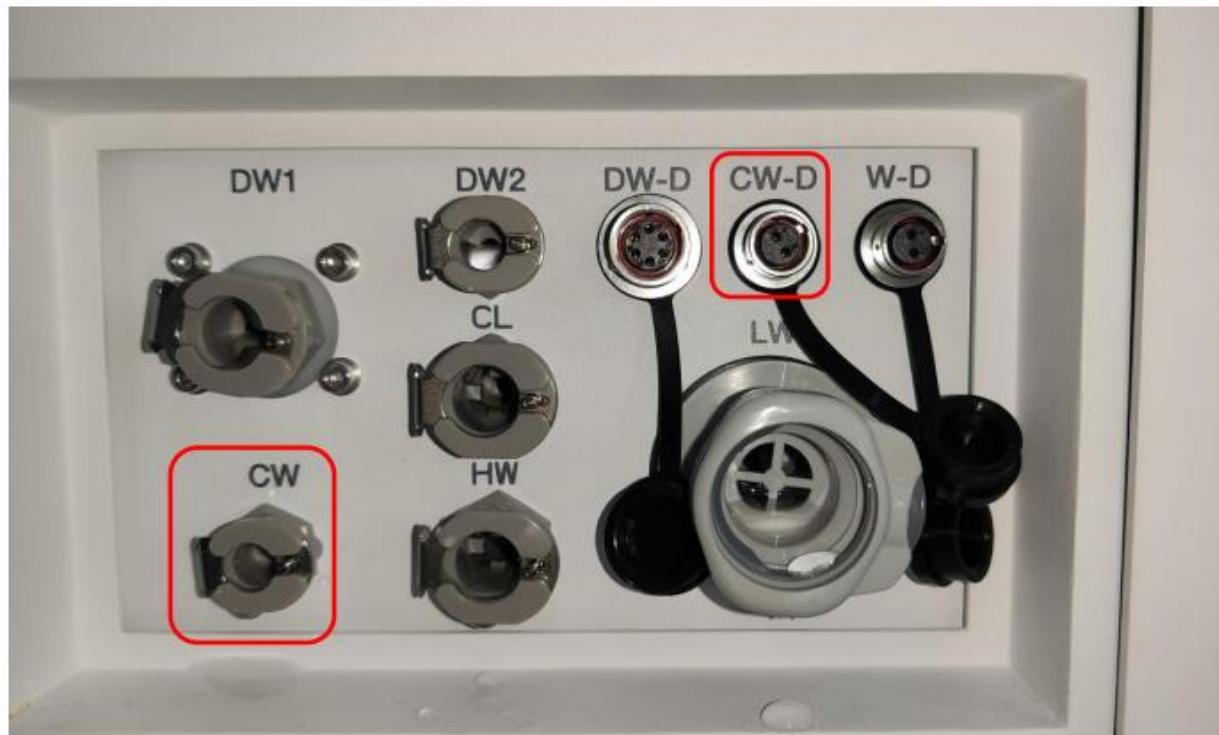
Concentrated detergent inlet pipe



Concentrated detergent

Whole machine connection

- 7. Connect the float sensor and pipeline to the "CW-D" connector and "CW" quick-plug connector on left side of the instrument, screw the Concentrated detergent float sensor into the bottle.



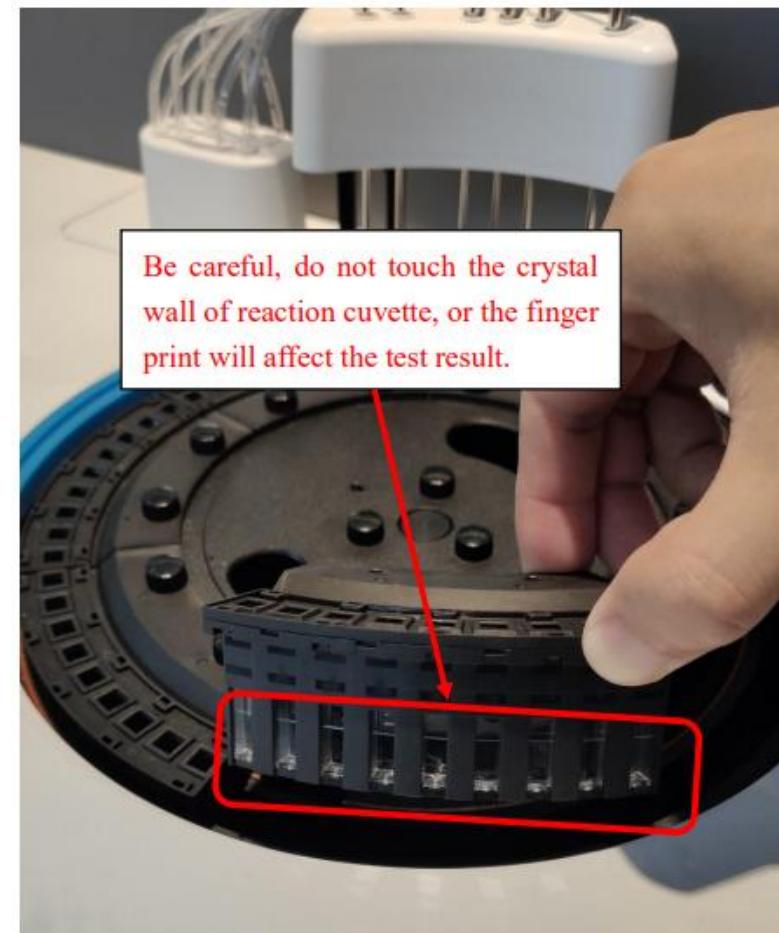
Whole machine connection

- 8. Pipeline connection:

Label	Signification	Function
DW1	Distilled water	Distilled water inlet, supply distilled water For instrument
DW2	Distilled water	Connected to distilled water suction tube, flow back distilled water automatically
CW	Concentrated detergent	Connect to concentrated detergent tube, supply Concentrated detergent
HW	High concentration waste	Drain waste for reaction cuvette
CL	Condense water	Drain condense water for reagent disk
LW	Low concentration waste	Drain waste for wash pool
DW-D	Distilled water float sensor	Distilled water level detection
CW-D	Concentrated detergent float sensor	Concentrated detergent level detection
W-D	Waste liquid float sensor	Waste liquid level detection

Whole machine connection

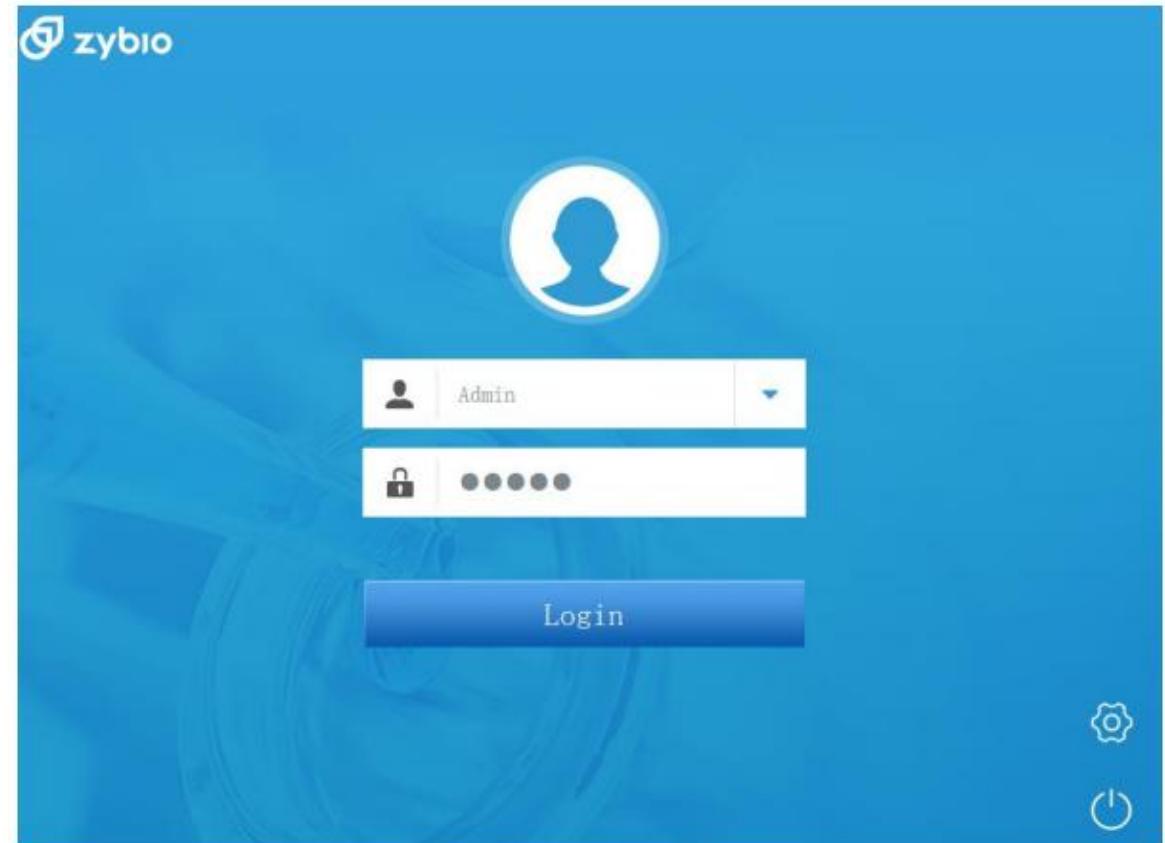
- 9. Take out 7 sets of reaction cup assembly from the accessory bag (1 extra set for backup). Be careful, do not touch crystal of the reaction cup; Press the reaction cup assembly on the reaction plate body, and then fix the reaction cup assembly on the reaction tray main unit with 14 thumbscrews, picture as on the right.



Whole unit test

Bootup initialization

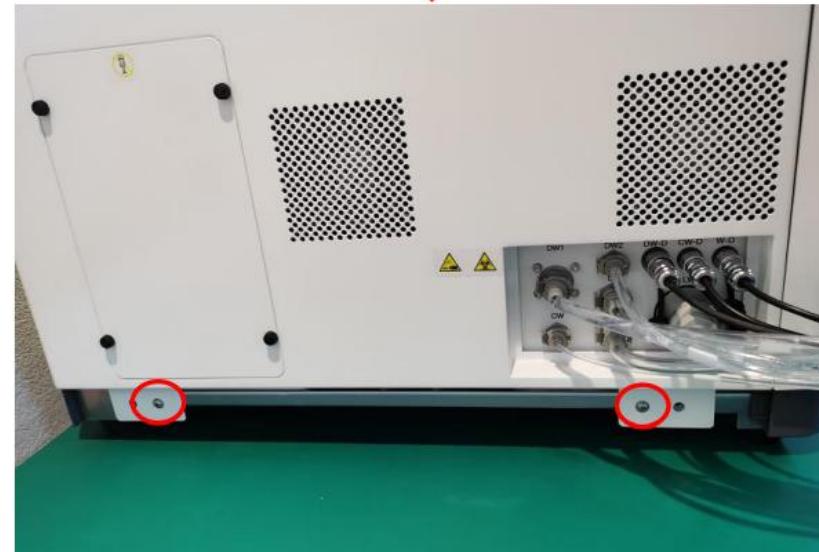
- 1. Before starting up, confirm that purified water tank and concentrated detergent tank are full, then waste liquid tank is empty.
- 2. After confirmation, turn on the main **power switch** on the right-side panel of instrument, then turn on the **analysis switch** on the front panel, and waiting around 45 seconds.
- 3. Log in with authority:
- User name: Engineer
- Password: zybio888



Whole unit test

Exclude bubble and hydraulics priming

- 1. After log in, first please disassemble the left-side panel by removing 6 screws at these 6 positions in the picture on the right.



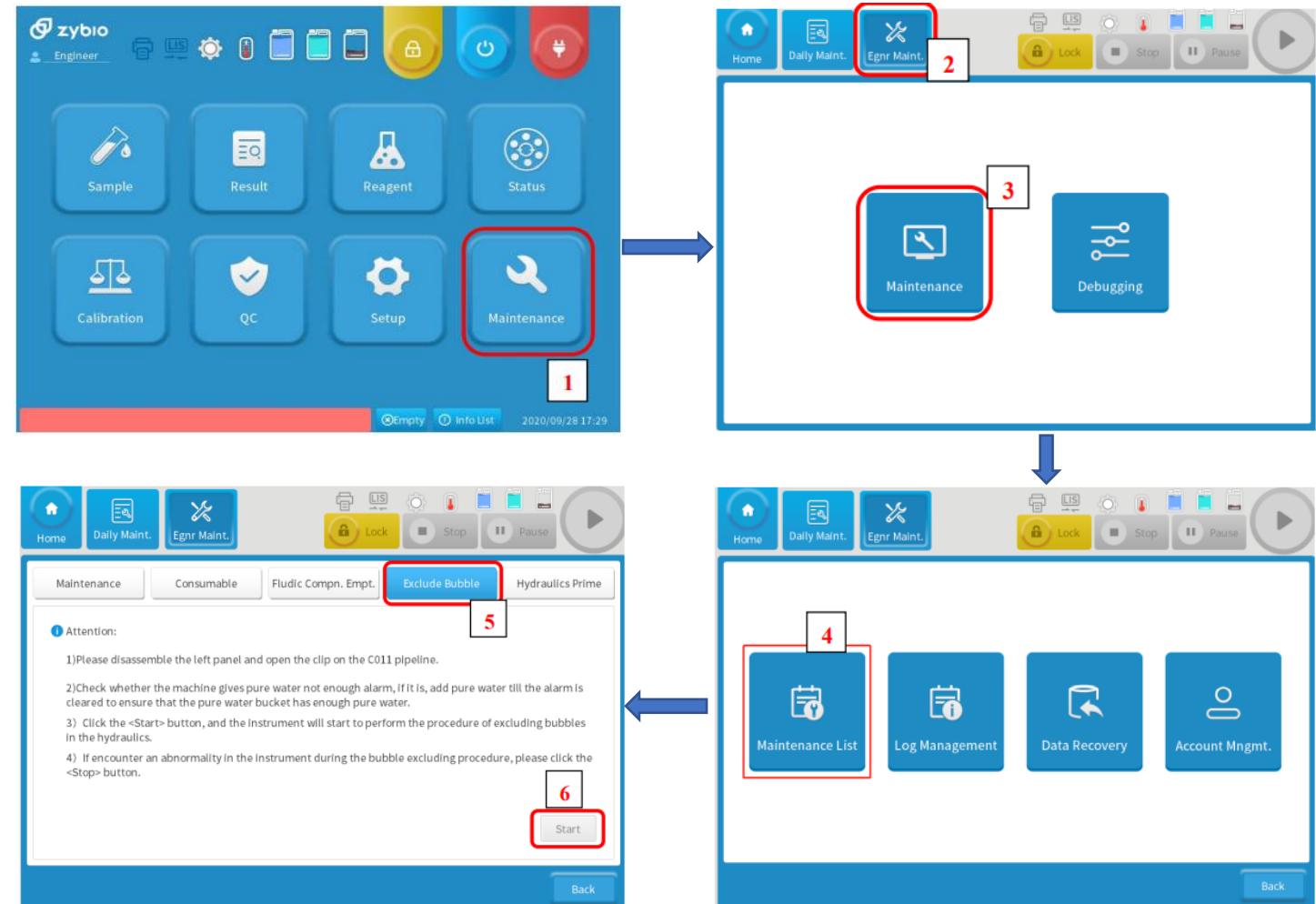
Whole unit test

- 2. No need to unplug the pipeline on the left side panel, just open left-side panel to make your hand can reach and **open the clip on the C011 pipeline**. Please see the figure on the right:



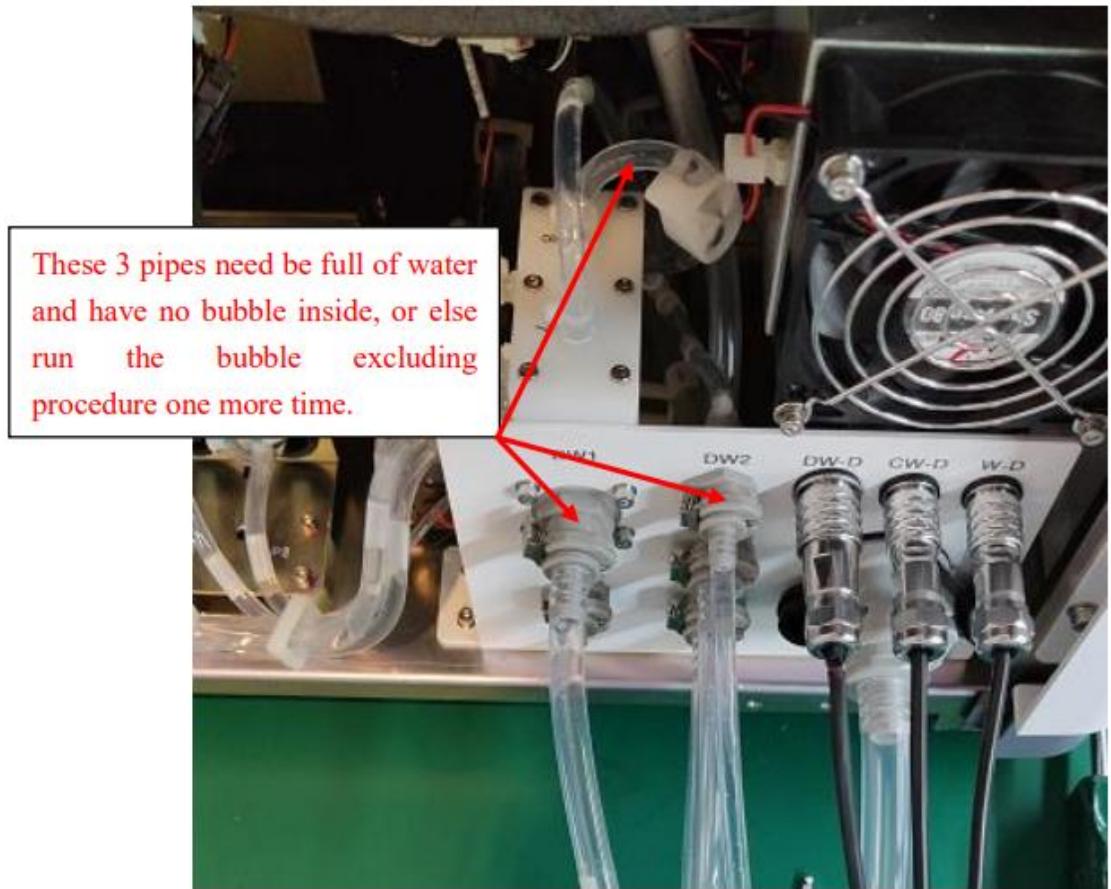
Whole unit test

- 3. Go to [Maintenance]→[Engineer Maintenance]→[Maintenance]→[Maintenance List]→[Exclude Bubble], ensure purified water tank remaining sufficient water, and then click [Start] to proceed the bubble excluding procedure.



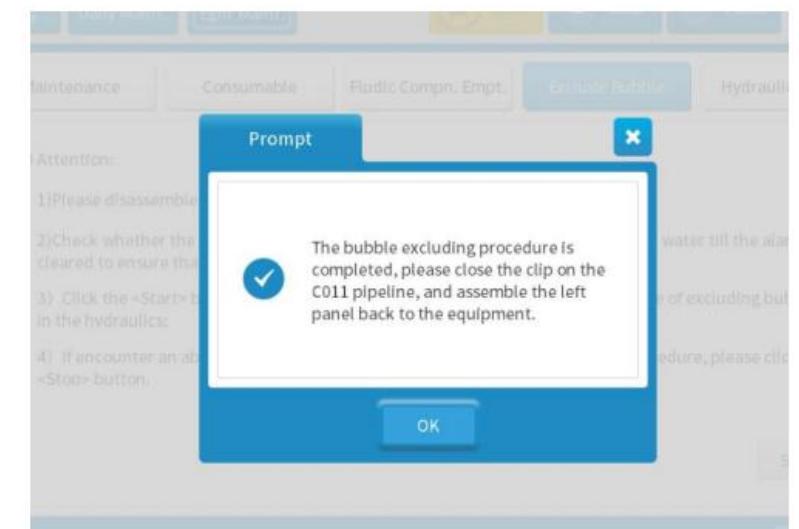
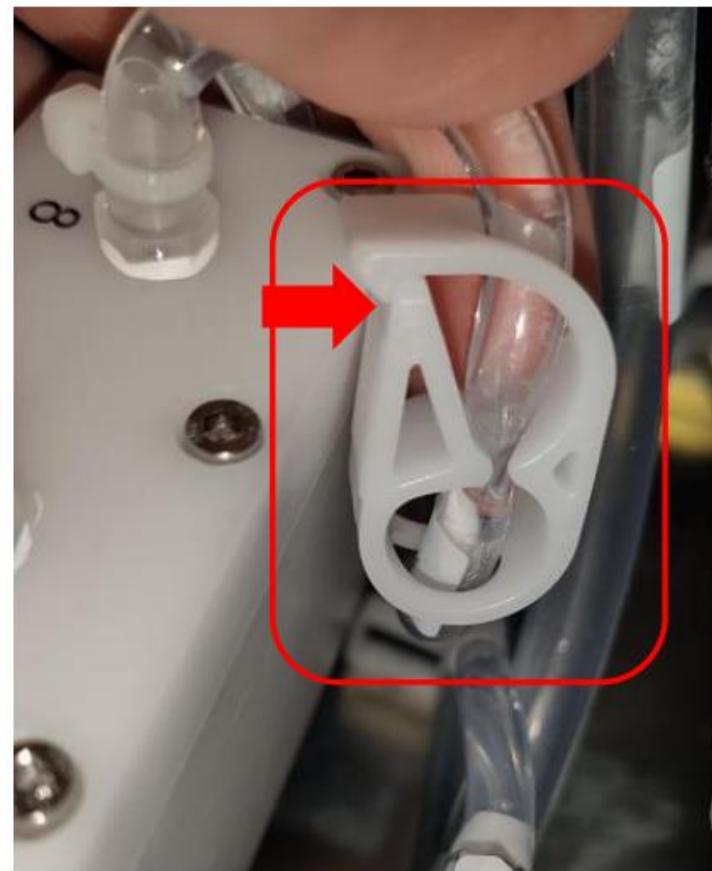
Whole unit test

- 4. After confirm the clip is opened, click [OK] to start procedure, and wait the next prompt pop up on the screen. After the next prompt pop on the screen, please check if the pipe connect to **DW1** port & the pipe connect to **DW2** port & the pipe related to **the clip** are all full of water and no bubble. If there is bubble, please check if any of these 3 pipes is loose or cracked, run the bubble excluding procedure one more time.



Whole unit test

- 5. After checking, follow the prompt to close the clip on the C011 pipeline, and click OK.



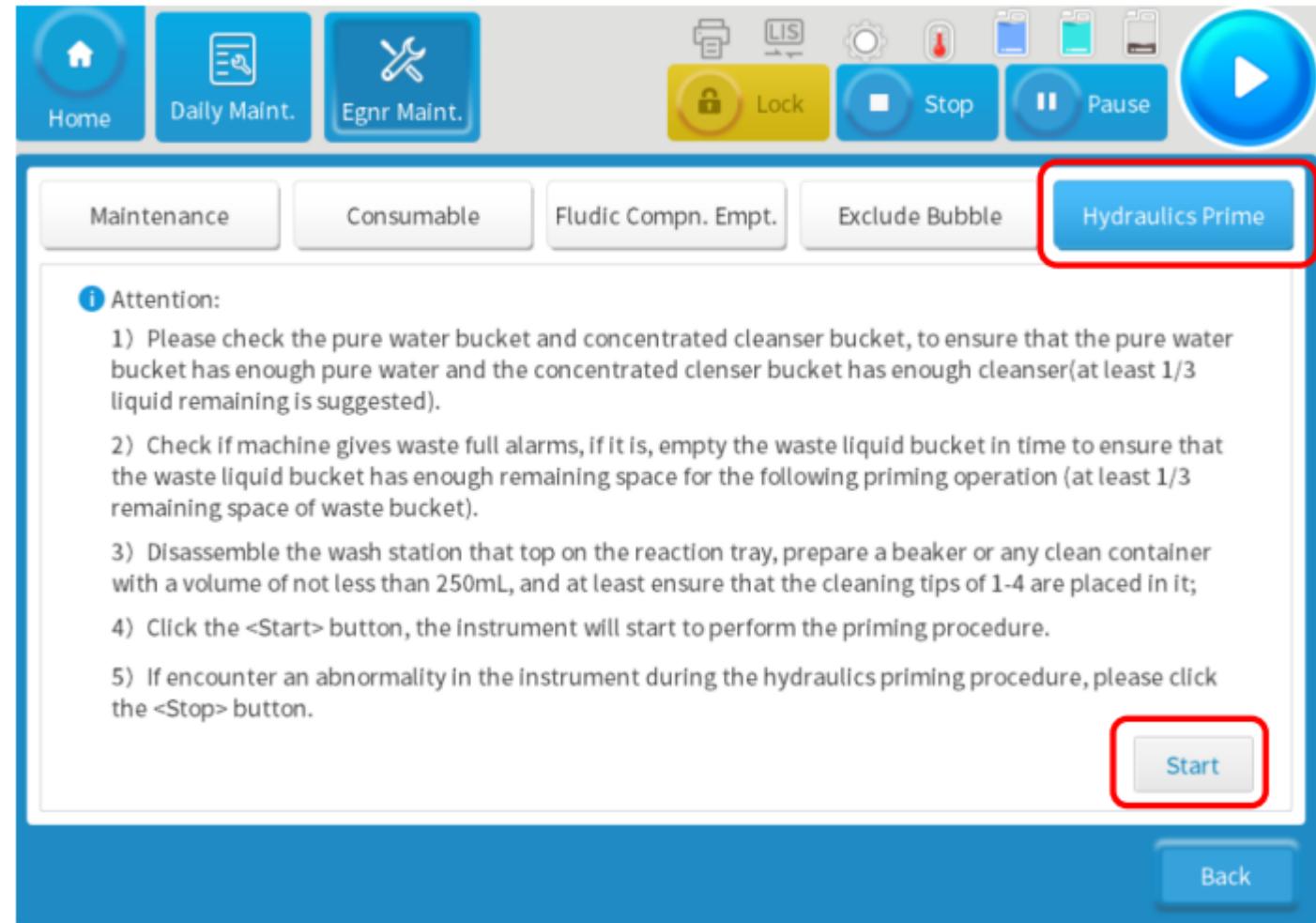
Whole unit test

- 6. After bubble excluding and close the clip on the C011 pipeline, assemble back the left-side panel.
- 7. Please disassemble the **wash station** and put the cleaning needles to a beaker or clean container which capacity no less than 250ML, please refer to the following picture. In the next procedure, all the needles of wash station will dispense water continuously.



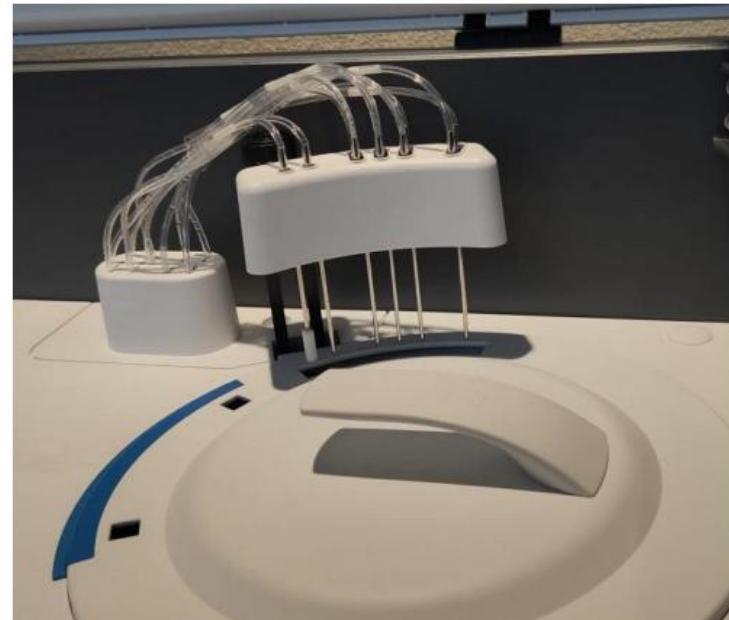
Whole unit test

- 8. Click Hydraulics prime: Ensure the purified water and concentrated detergent sufficient, $\geq 1/3$ remaining. Ensure the waste tank has enough cubage for the following priming procedure. After checking, click [start] and confirm [OK] to wait 2 minutes till next prompt pop up on the screen.



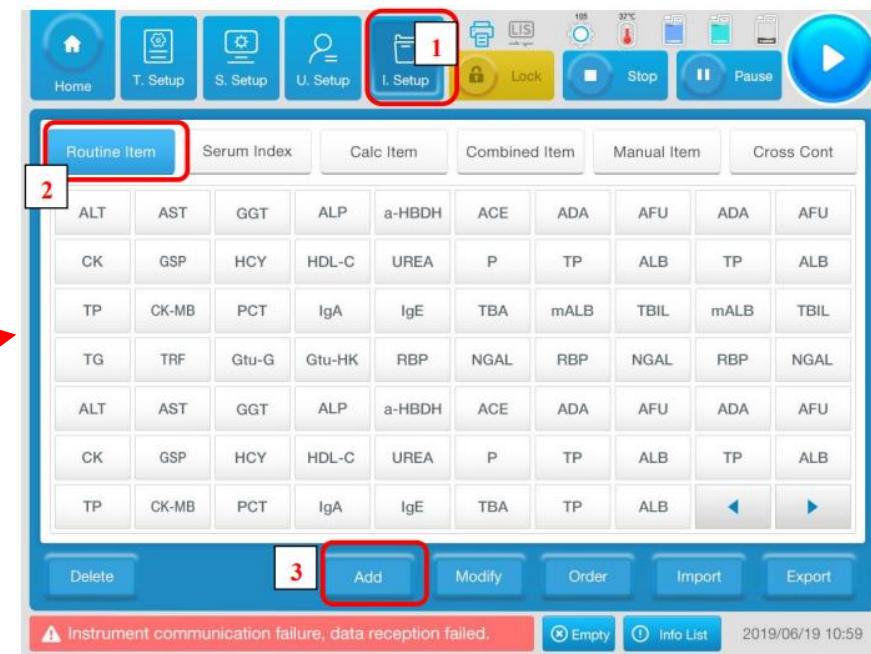
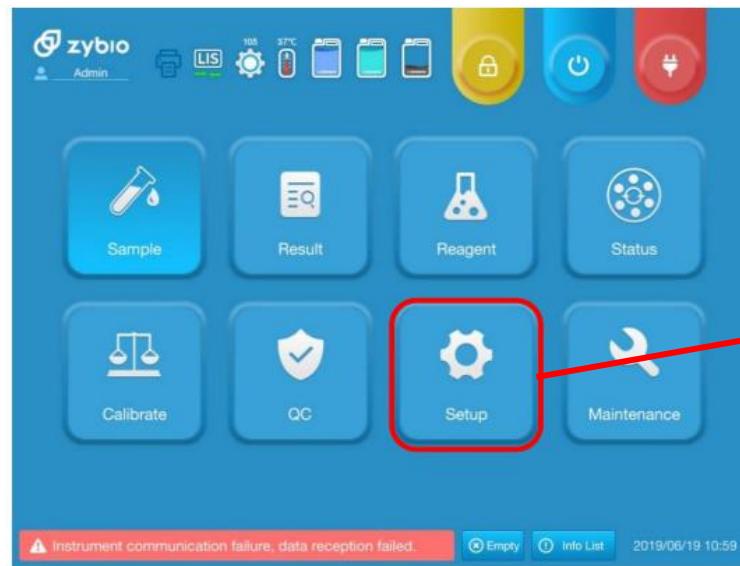
Whole unit test

- 9. After Hydraulics priming, please assemble back the wash station. Turn off the machine and restart the machine again under **Admin** authority.



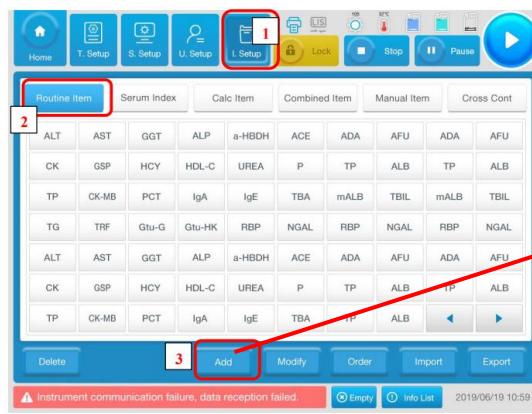
Item parameter setup

Log in and get into software interface.



Click the corresponding button following the numerical order as shown in the picture.

Item parameter setup

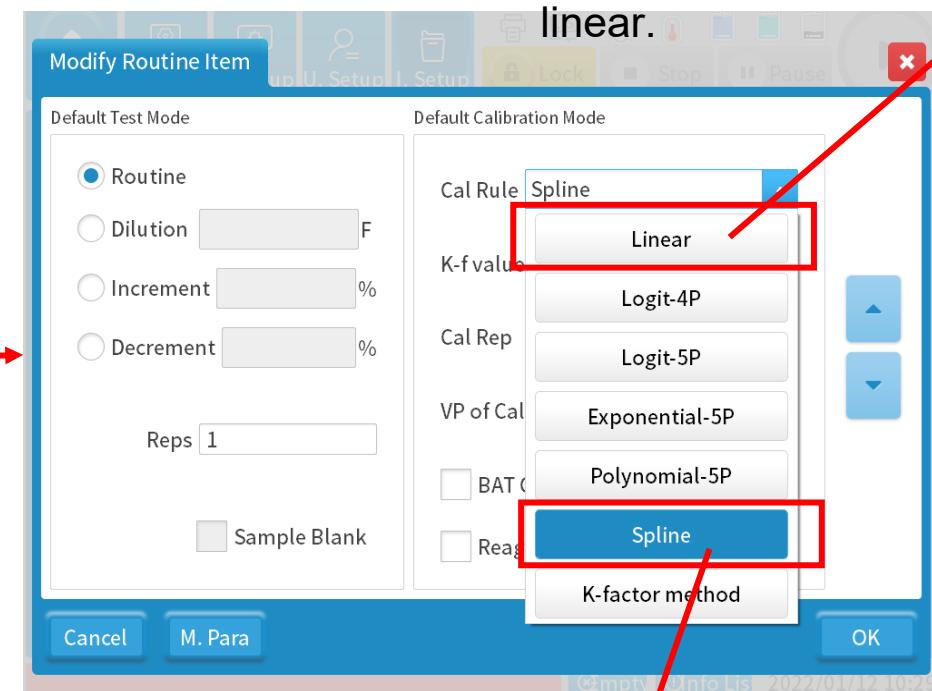


The accuracy is determined from the values of the linear range. Usually, the number of decimal places is one more than the linear range.

Input item information according to IFU of reagent.

Refer to the documentation **EXC200 Item Setting Guide** to set these parameters.

Item parameter setup

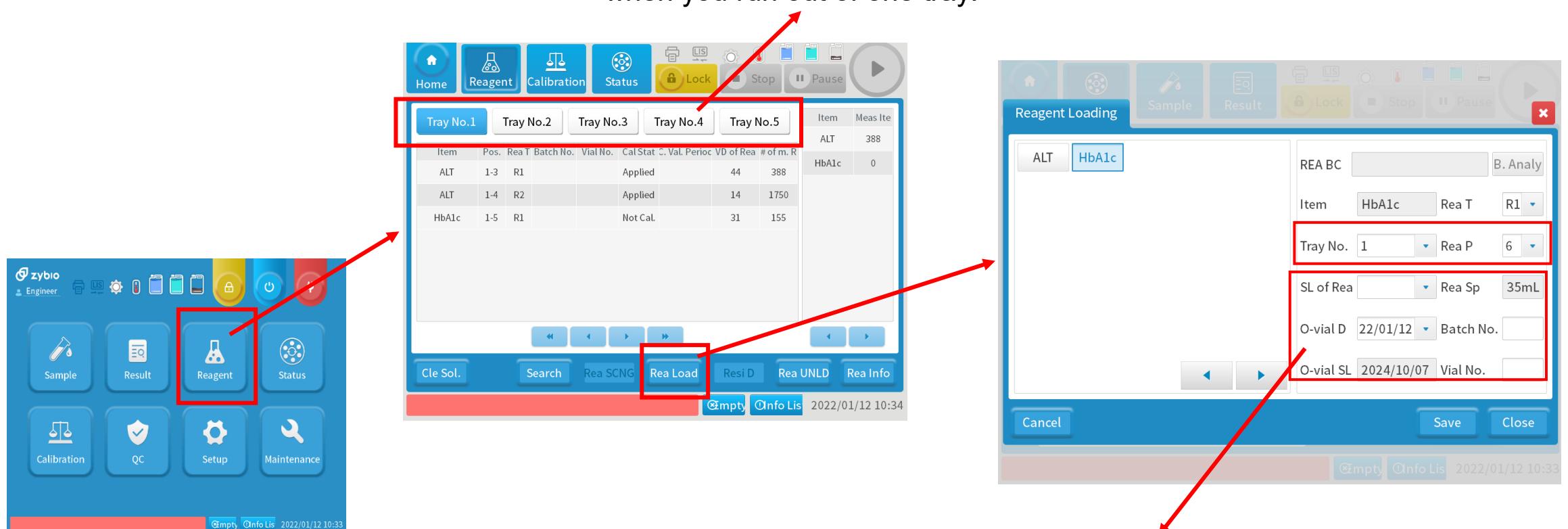


Choose Linear for two-point calibration. It means if there are two calibrators, choose linear.

Choose Spline for more than two-point calibration. It means if there are more than 2 calibrators, choose spline.

Reagent position setup

Every tray has 20 positions. You can choose another when you run out of one tray.



zybio
Engineer

- Sample
- Result
- Reagent**
- Status
- Calibration
- QC
- Setup
- Maintenance

Empty Info Lis 2022/01/12 10:33

Home Reagent Calibration Status Lock Stop Pause

Tray No. 1 Tray No. 2 Tray No. 3 Tray No. 4 Tray No. 5

Item	Pos.	Rea T.	Batch No.	Vial No.	Cal Stat	C. Val.	Period	VD of Rea	# of m. R
ALT	1-3	R1			Applied	44	388	HbA1c	0
ALT	1-4	R2			Applied	14	1750		
HbA1c	1-5	R1			Not Cal.	31	155		

Cle Sol. Search Rea SCNG Rea Load Resi D Rea UNLD Rea Info

Empty Info Lis 2022/01/12 10:34

Reagent Loading

ALT HbA1c

REA BC B. Analy

Item HbA1c Rea T R1

Tray No. 1 Rea P 6

SL of Rea Rea Sp 35mL

O-vial D 22/01/12 Batch No.

O-vial SL 2024/10/07 Vial No.

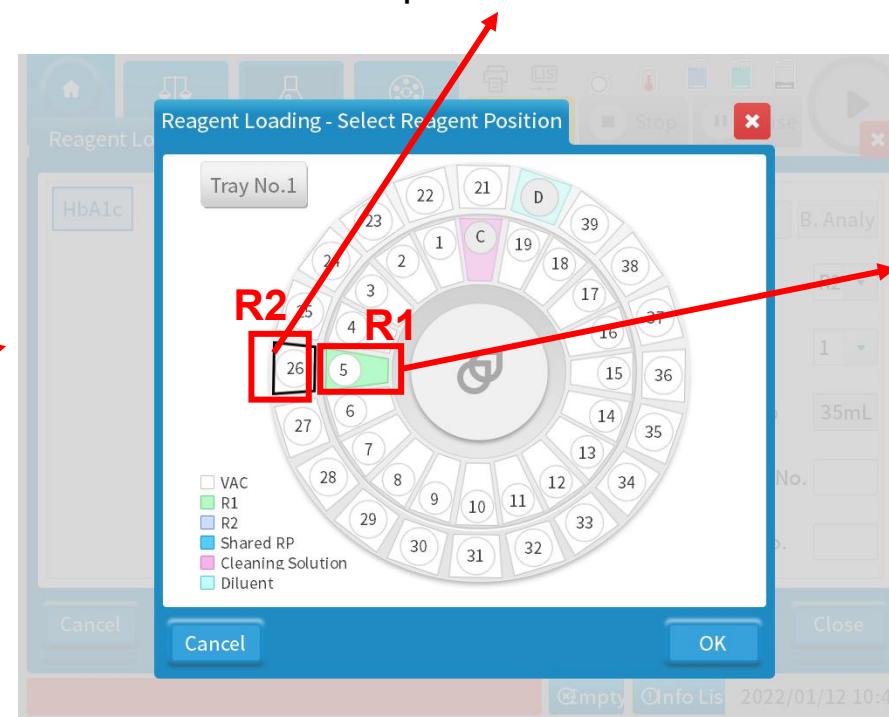
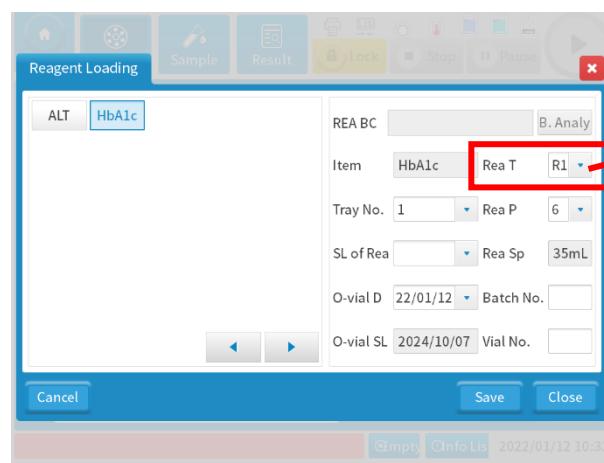
Cancel Save Close

Empty Info Lis 2022/01/12 10:33

Input reagent information according to IFU of reagent.

Reagent position setup

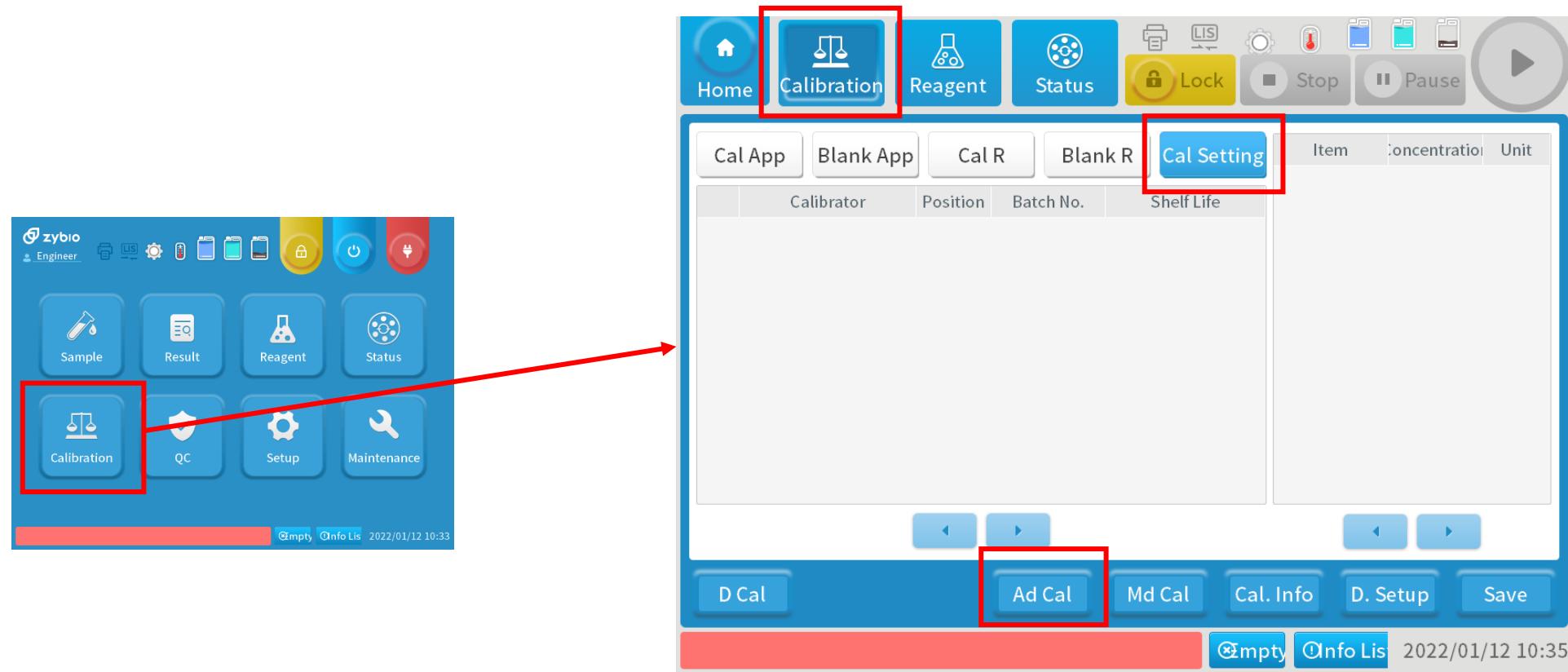
The outer circle position is for R2. Generally, for convenience, we can put R2 next to R1.



The inner circle position is for R1.

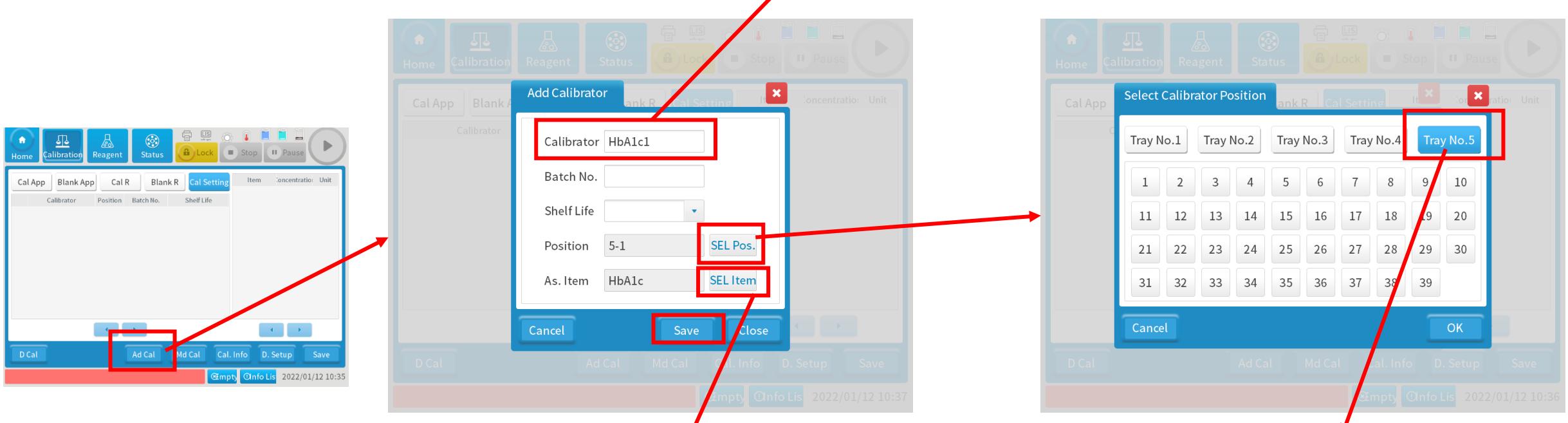
Select the position on Reagent/Sample tray.

Calibration



Click the corresponding button following the numerical order as shown in the picture.

Calibration



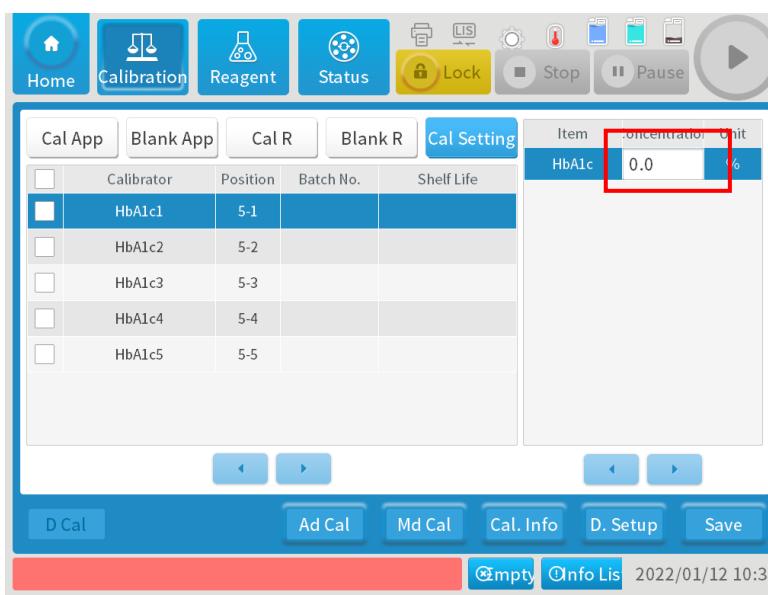
Input calibrator name.

Input associated test items of calibrator, then click [Save].

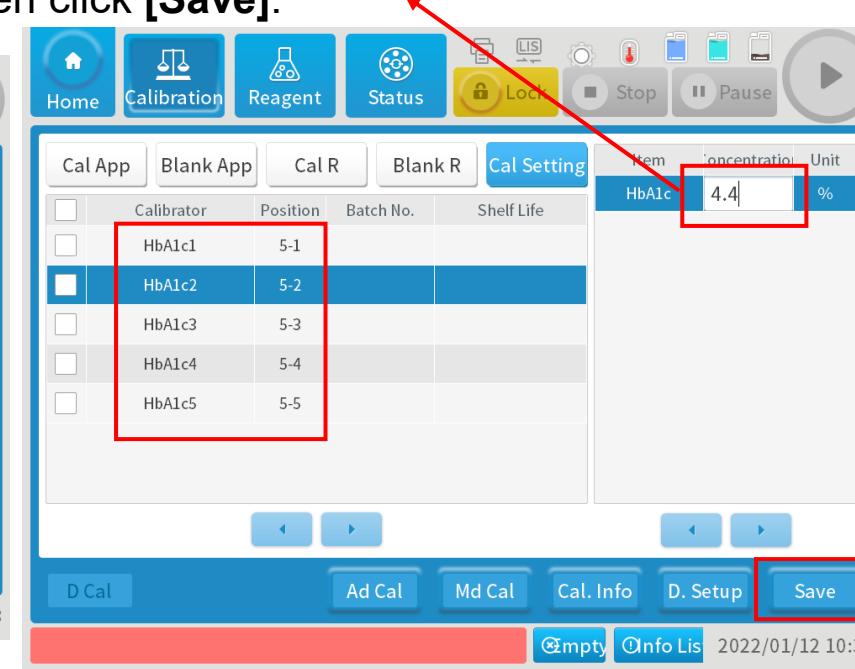
Generally, recommend you choose calibrator position on Tray NO.5.

Calibration

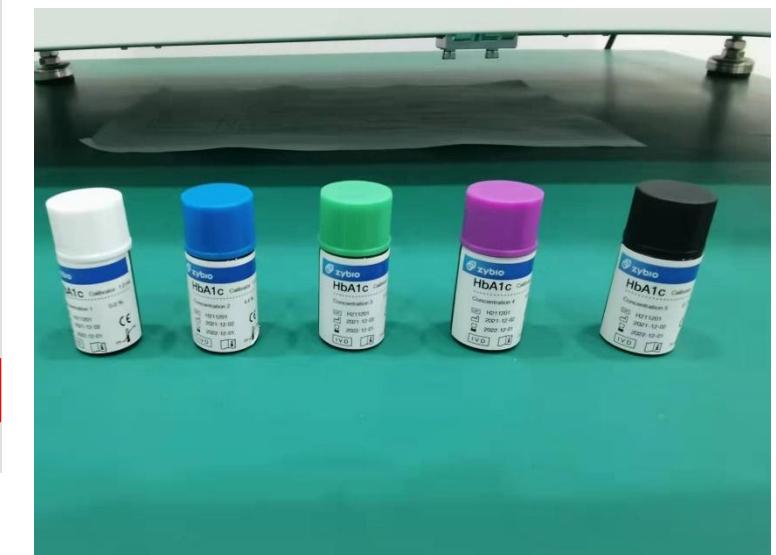
Set the calibrator concentration according to the calibrator specification (concentration parameter), and then click **[Save]**.



Calibrator	Position	Batch No.	Shelf Life
HbA1c1	5-1		
HbA1c2	5-2		
HbA1c3	5-3		
HbA1c4	5-4		
HbA1c5	5-5		

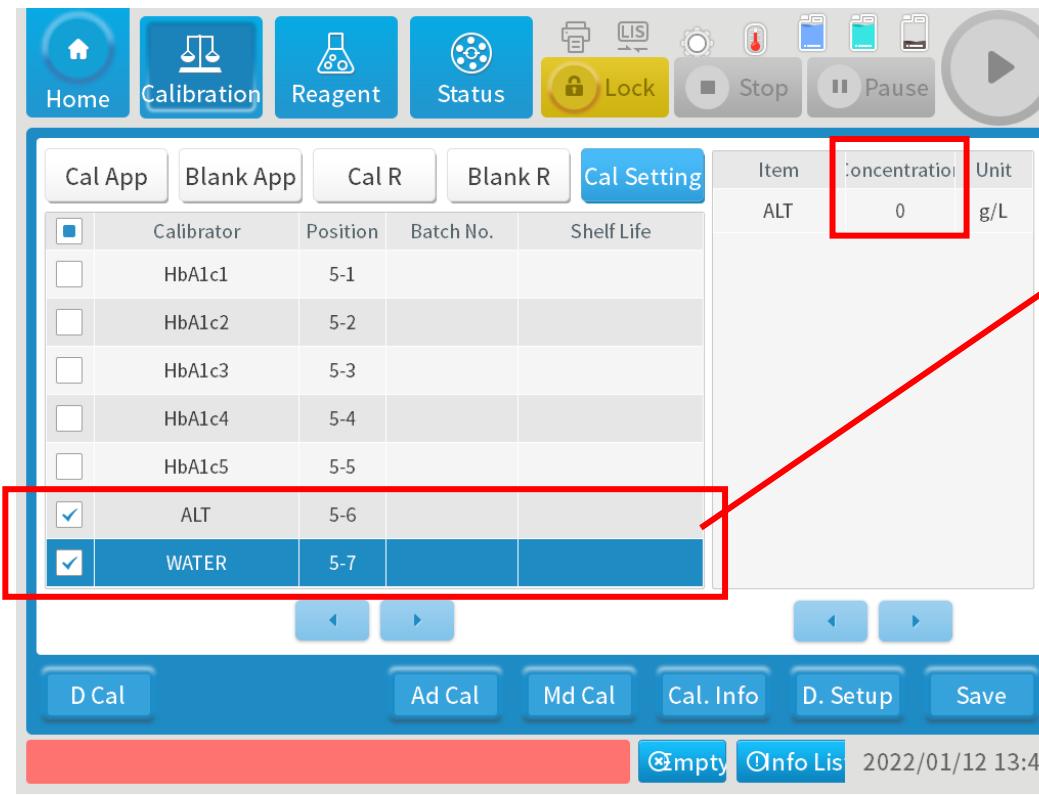


Calibrator	Position	Batch No.	Shelf Life
HbA1c1	5-1		
HbA1c2	5-2		
HbA1c3	5-3		
HbA1c4	5-4		
HbA1c5	5-5		



As many calibrators as there are, we need to add the corresponding number of calibrators. For example, there are five calibrators, we need add five calibrators.

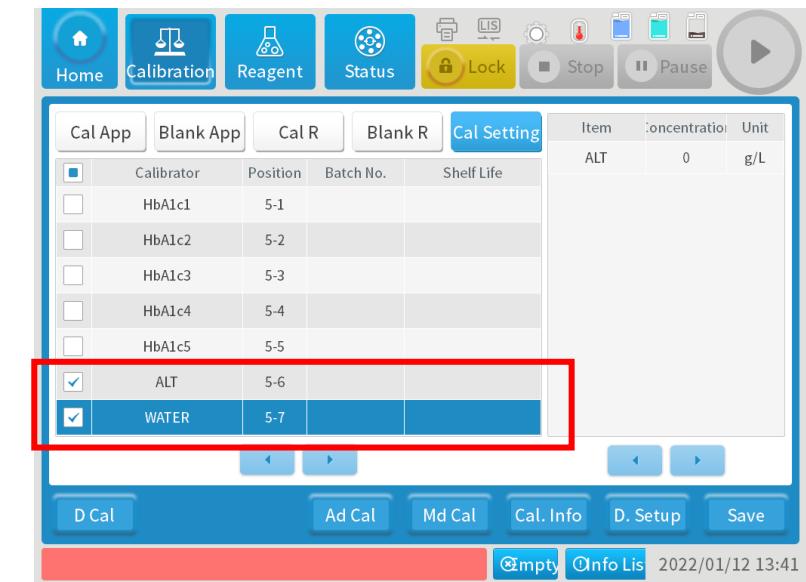
Calibration



The screenshot shows the 'Cal Setting' tab selected in the top navigation bar. Below it is a table listing calibration items. The 'WATER' row is highlighted with a red box. To the right, a detailed view shows the item 'ALT' with a concentration of '0' and unit 'g/L'. The status bar at the bottom indicates 'Empty' and the date '2022/01/12 13:41'.

Item	Concentration	Unit
ALT	0	g/L

If there is one calibrator for the item, we need add water as one calibrator. It's concentration is 0.

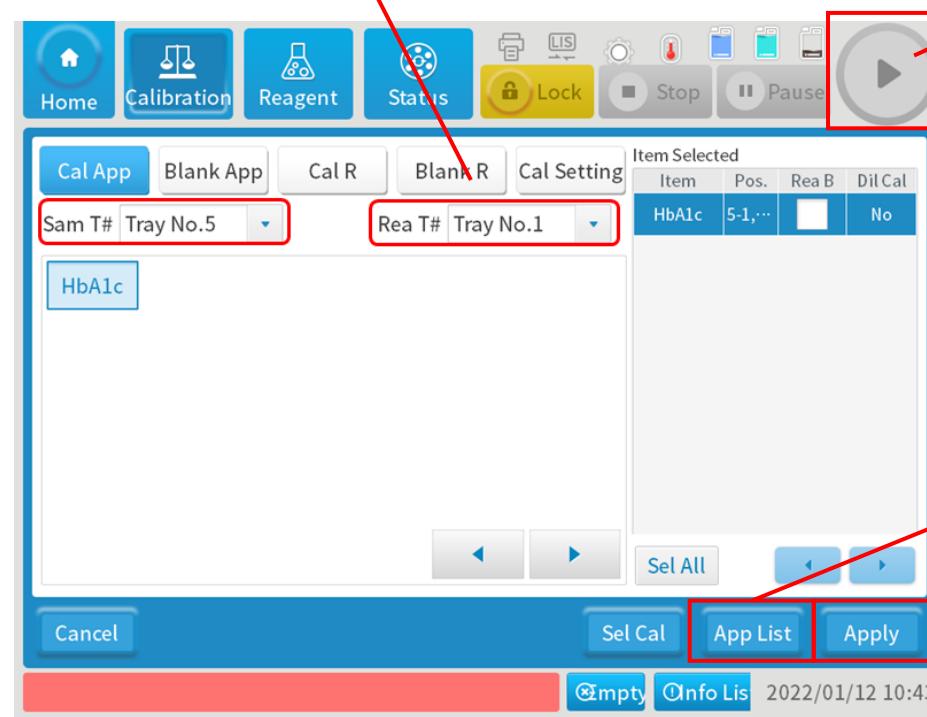


The screenshot shows the 'Cal Setting' tab selected. The calibration list now includes both 'ALT' and 'WATER' entries, each with a checked checkbox. The status bar at the bottom indicates 'Empty' and the date '2022/01/12 13:41'.

Item	Concentration	Unit
ALT	0	g/L

Calibration

Choose the corresponding tray of sample and reagent, select calibrating item, and then click **[Apply]**.



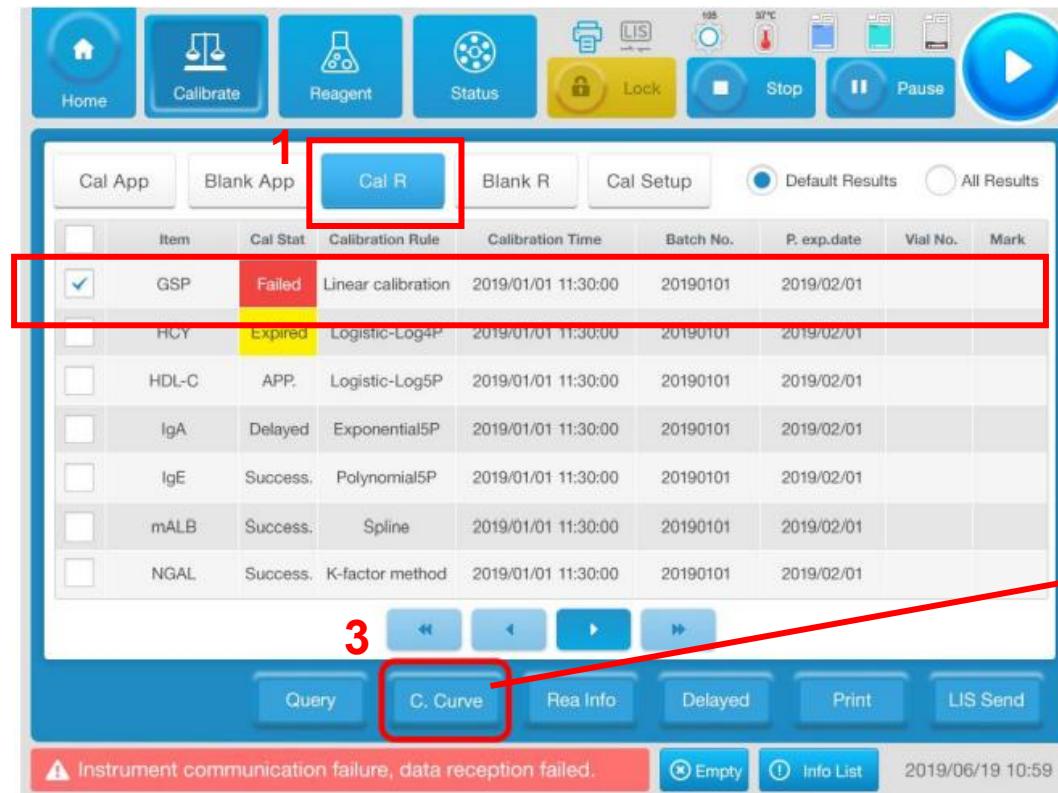
Click it to start test.



When finish the application, view Application checklist in application list interface.

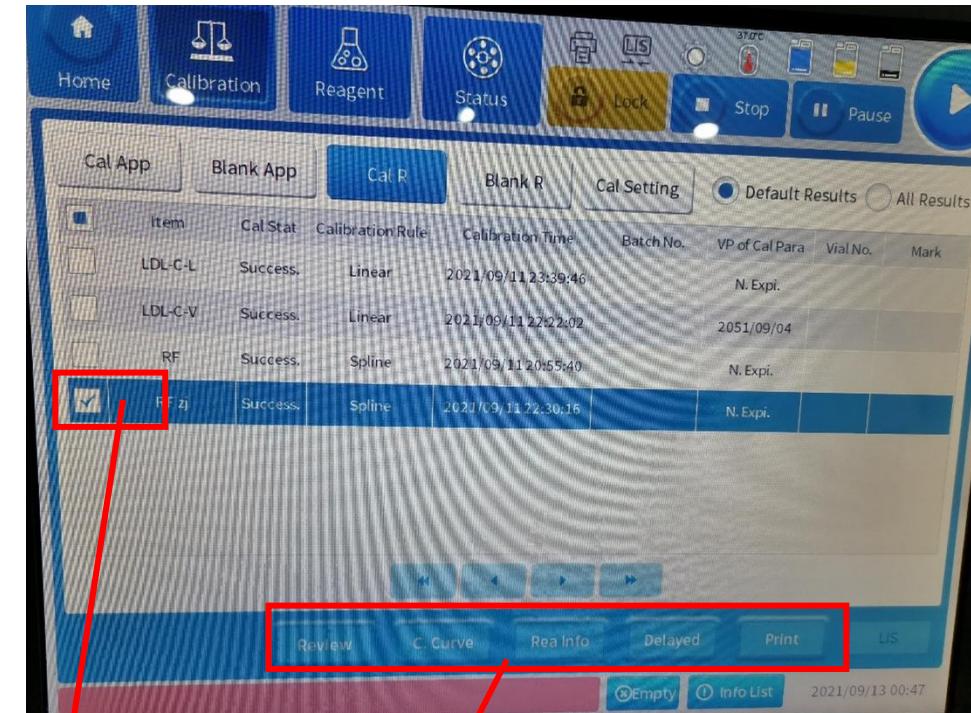
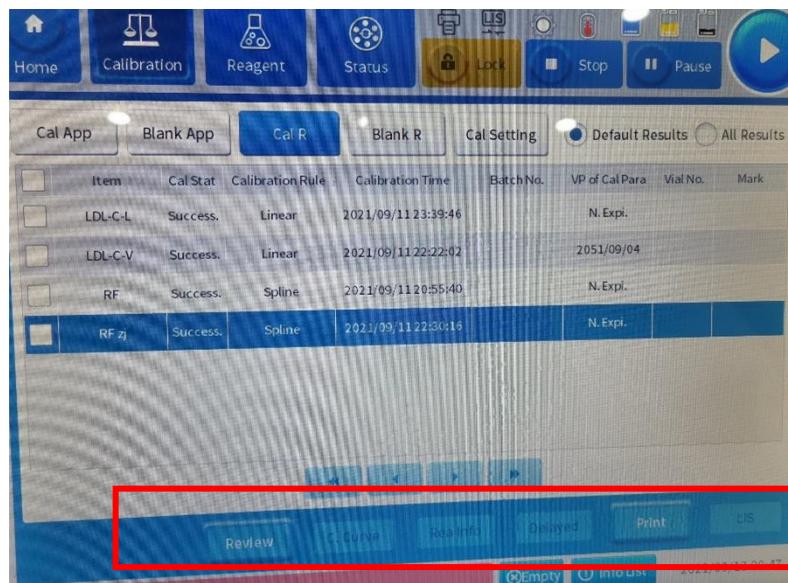
Note: Place the calibration reagent in the position which has been set, ensure corresponding reagent volume are sufficient and sample/calibrator volume must be more than 200 ul.

Calibration



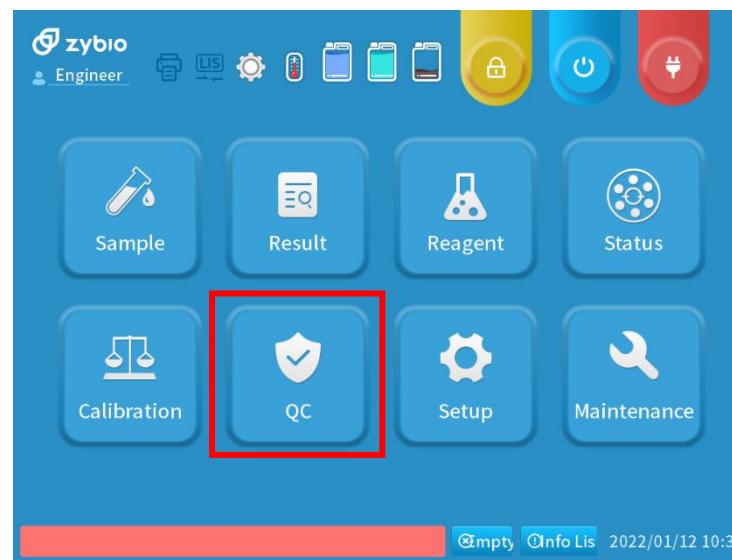
Finish test running, click [**Cal R**] to enter the calibration results research interface to check calibration results, select relevant date, item then click [**C. Curve**] to check the calibration curve.

Calibration



Remember check the blank, otherwise you can't select these buttons.

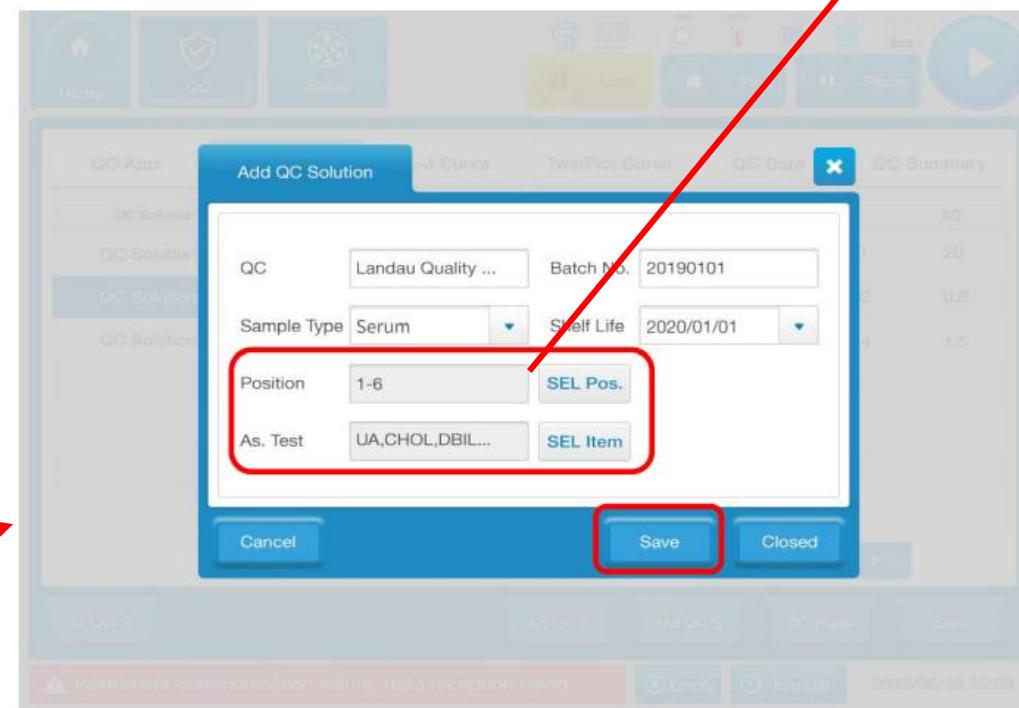
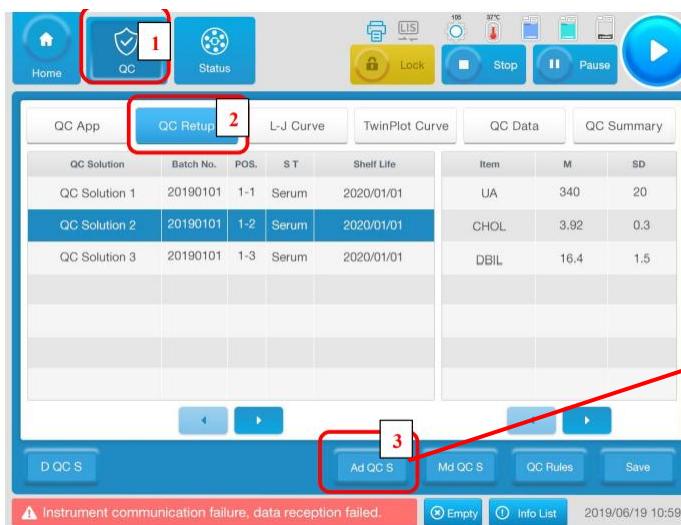
QC



Click [QC] => [QC Setup] => [Ad QC S] on the main interface

QC

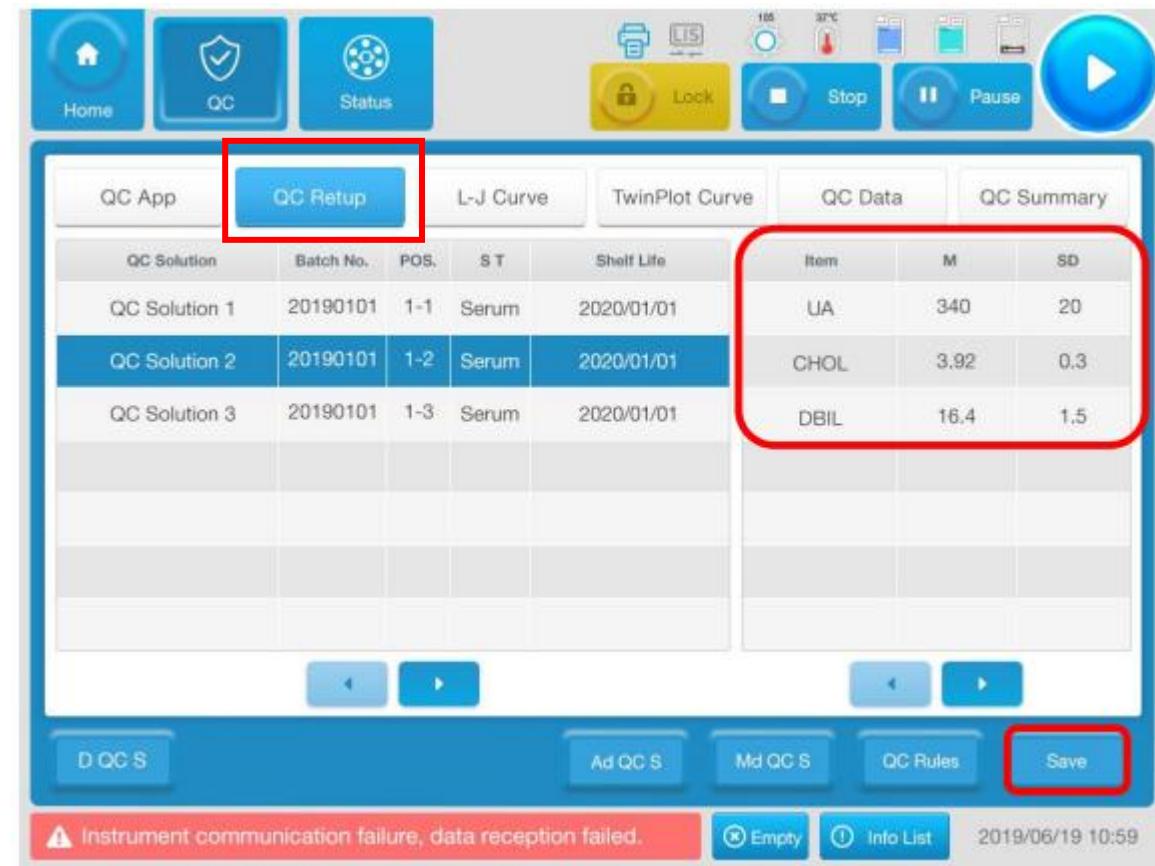
For the QC position, recommend select the same tray with calibrator.



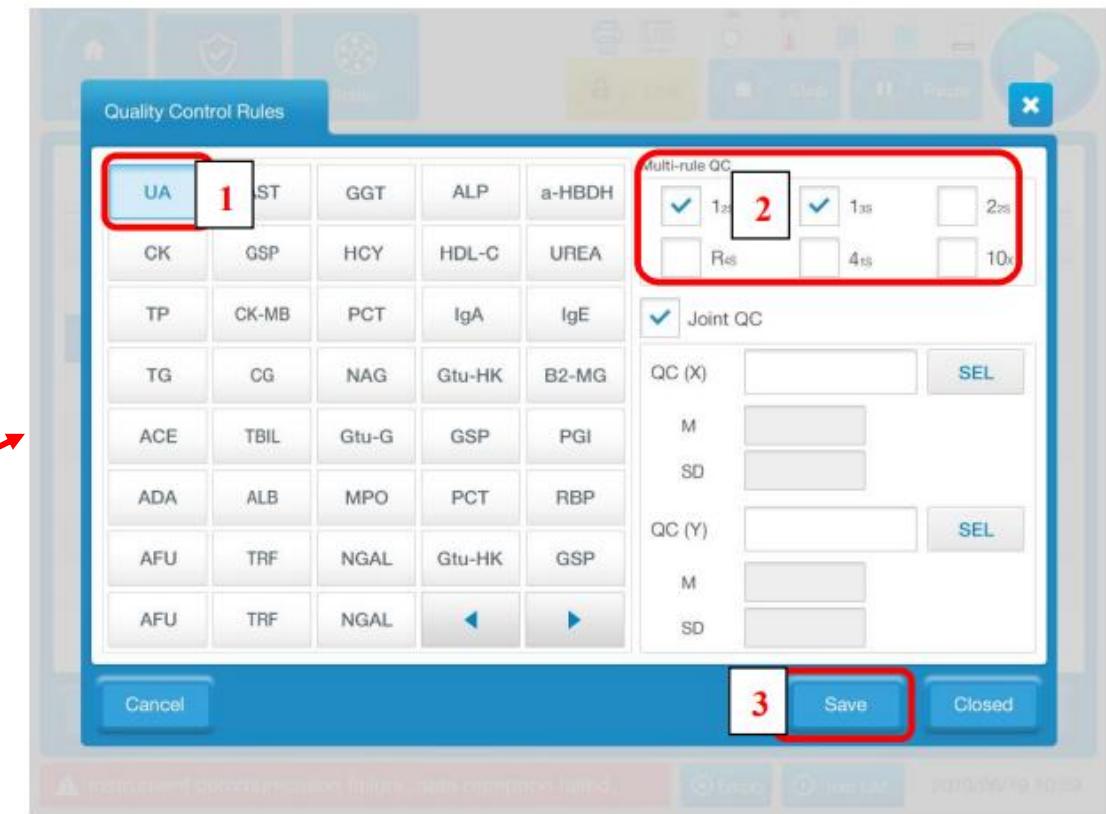
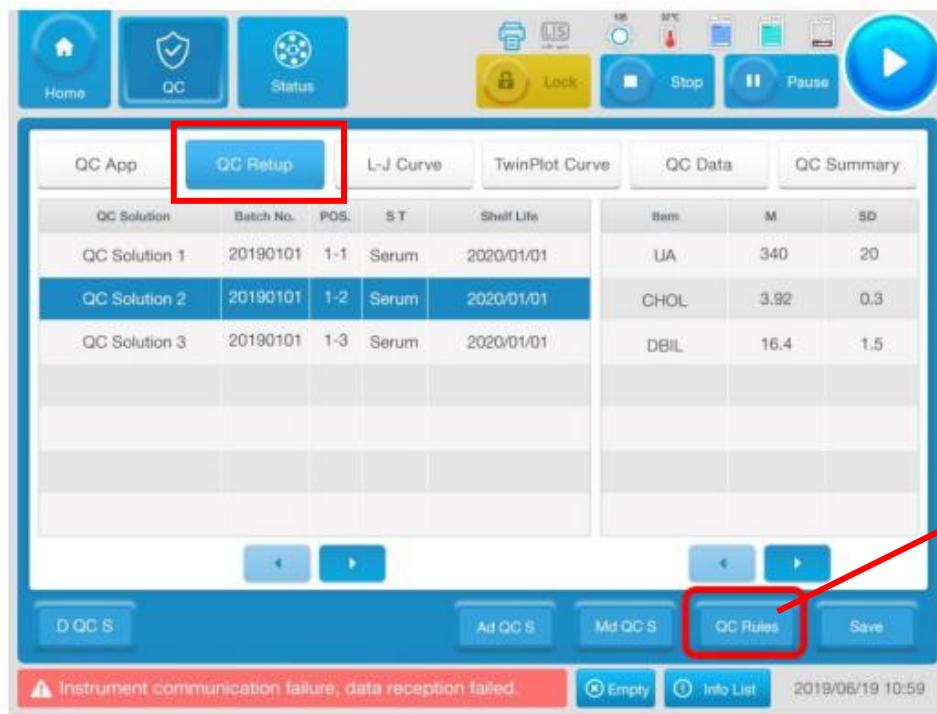
Input QC data according to QC instruction, select position and relative item, click **[Save]** to finish.

QC

Set mean value and standard deviation of QC (for which include item and methodology in detailed) according to the packing insert of QC, then click **[Save]** to finish setting.



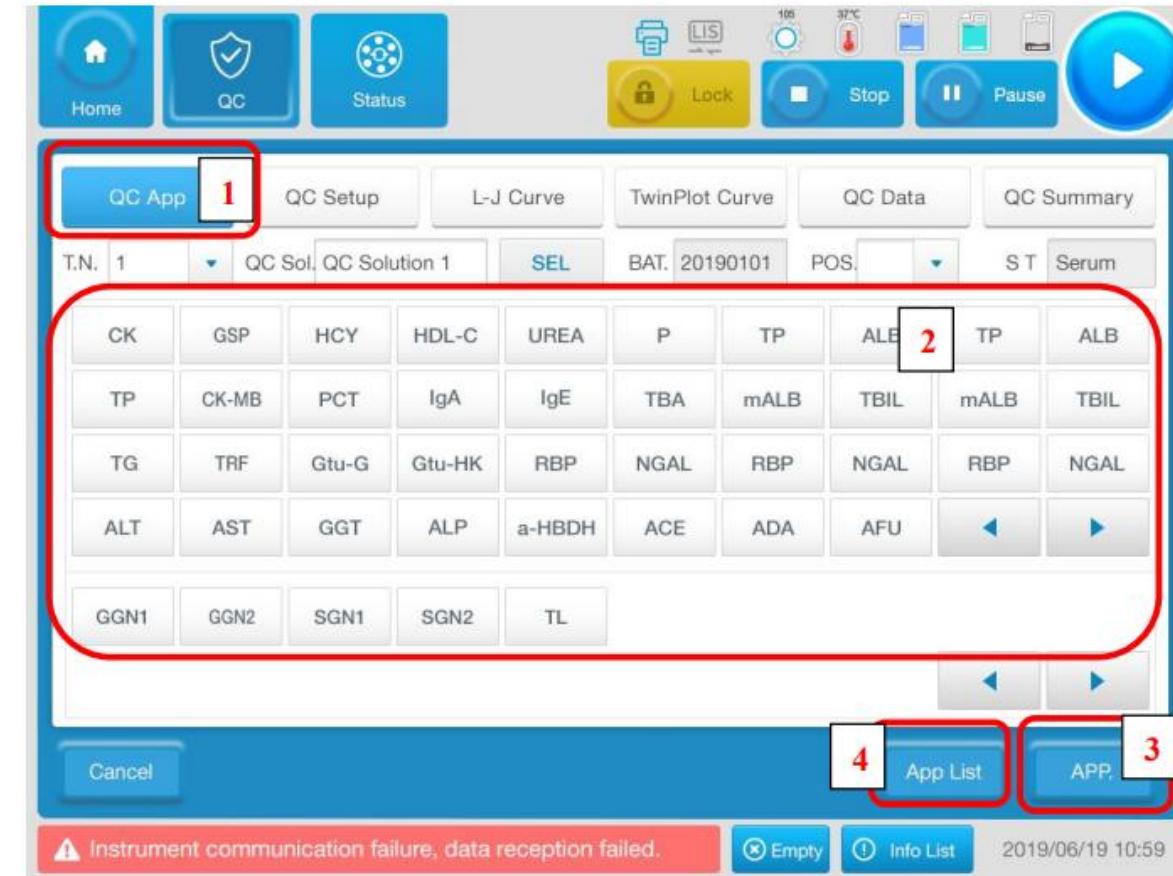
QC



Click the corresponding button according to the numerical sequence.

QC

Click [QC App], choose item name, and then click [App] to apply this item. And can view the application list by click [APP List] button.



Place QC reagent in set position, and ensure sufficient volume for corresponding reagent.

QC



Finish QC test running, click [QC] in main interface=> [L-J Curve] to check the QC curve.

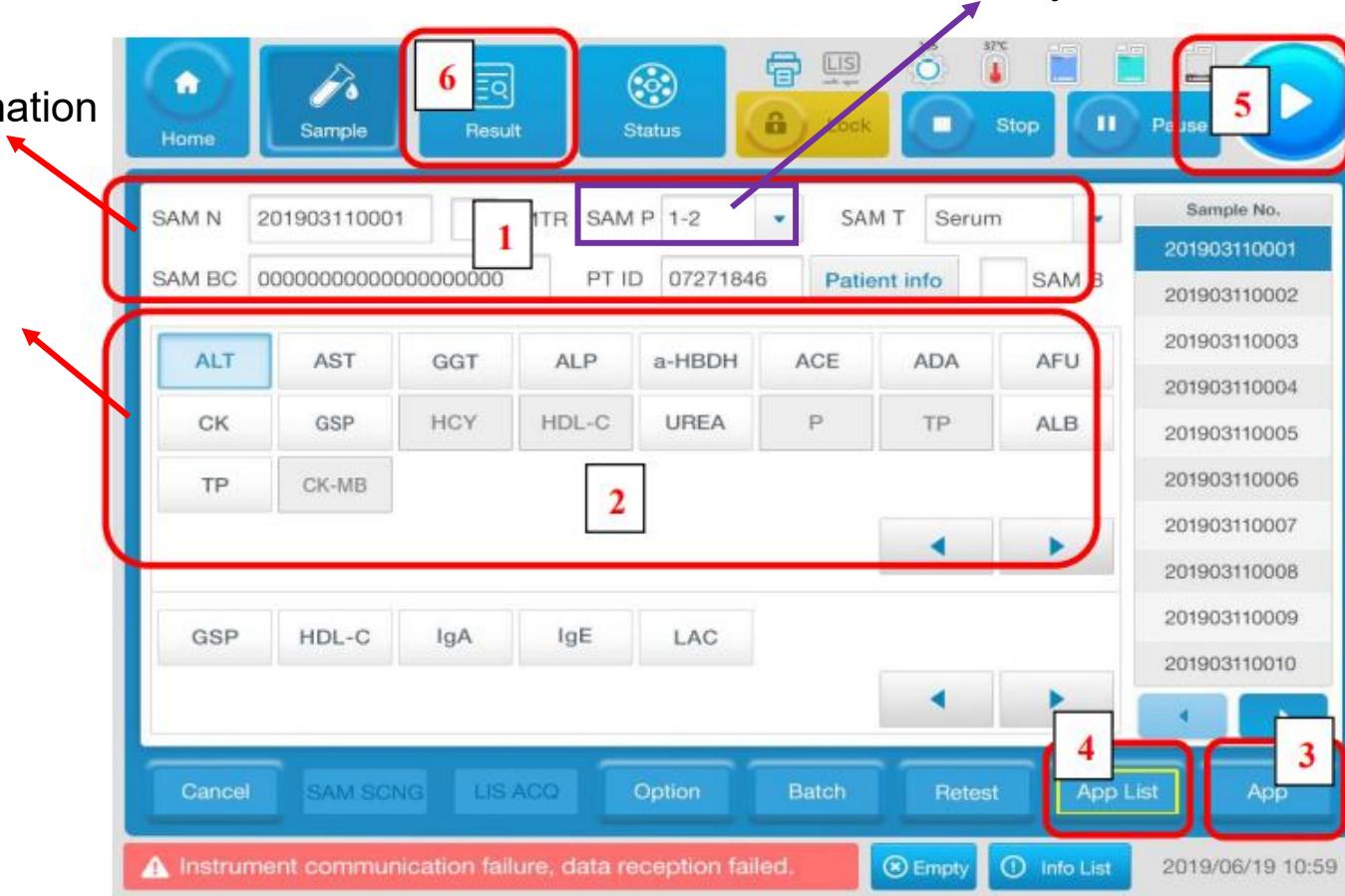
Sample test

Finish sample test, view the results in [Result]

interface.

Input the patient information

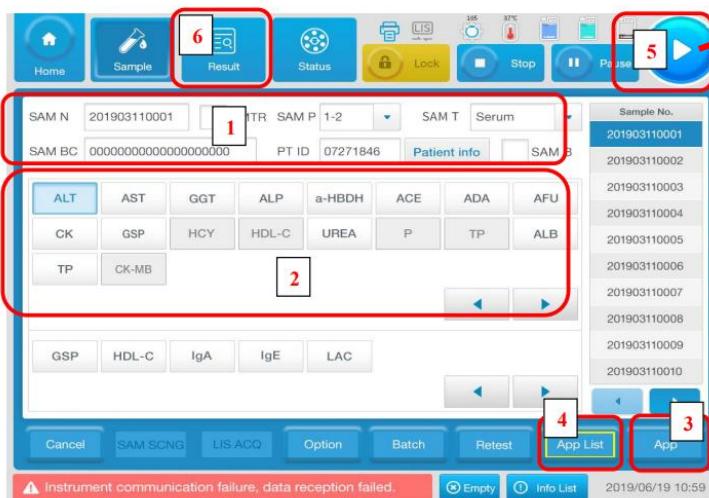
For the sample position, recommend select the same tray with calibrator, so they can run together.



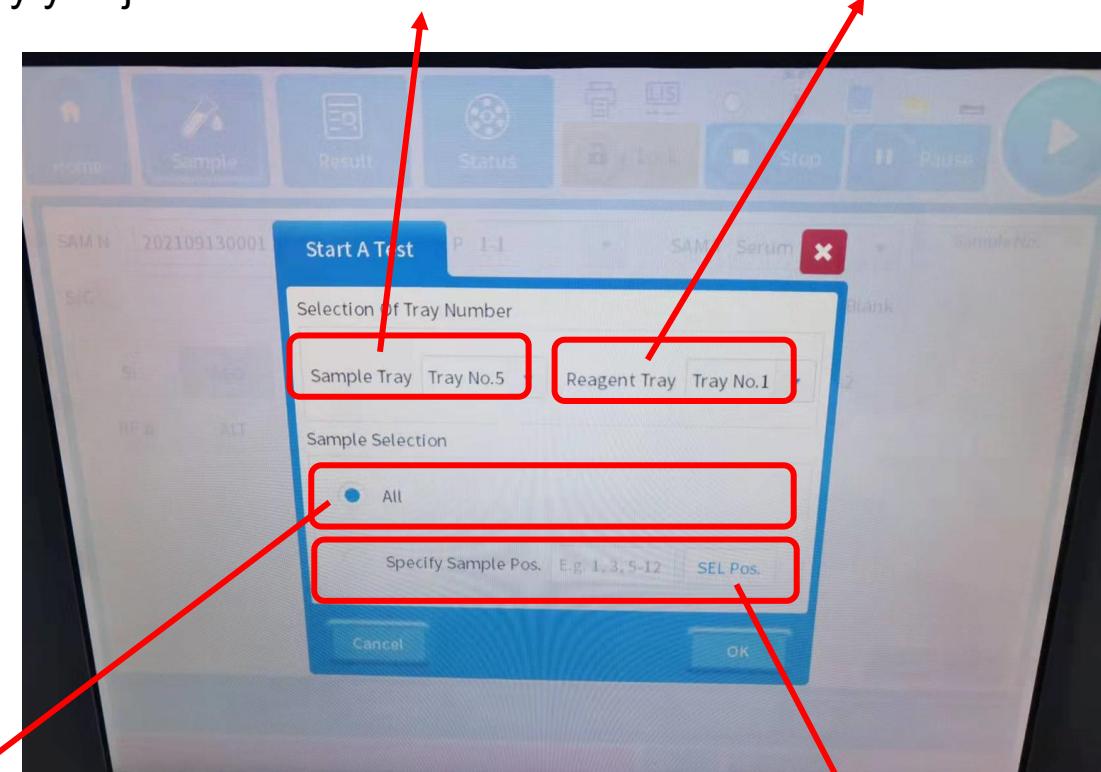
Apply the items for this sample, confirm item name and relevant reagent position are well set.

Sample test

Click start button, we can get this interface.



Choose the set calibrator/QC/sample tray, remember the reagent tray you just set and select it.

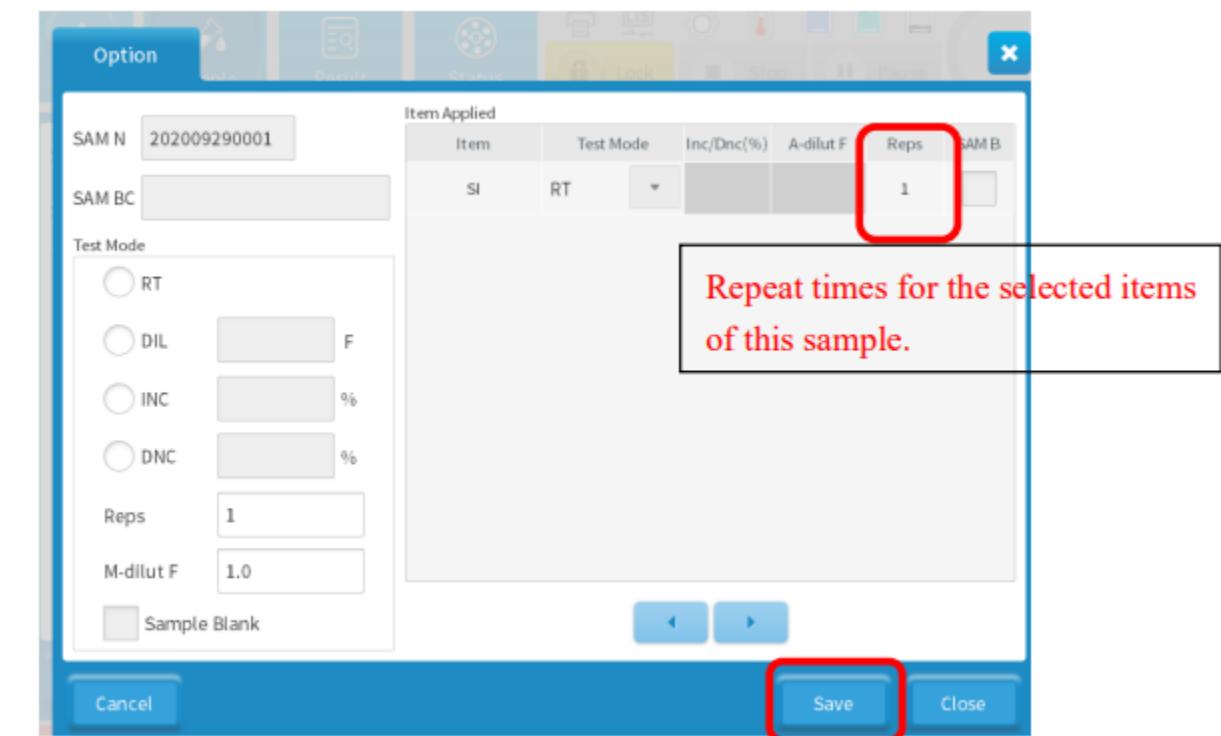
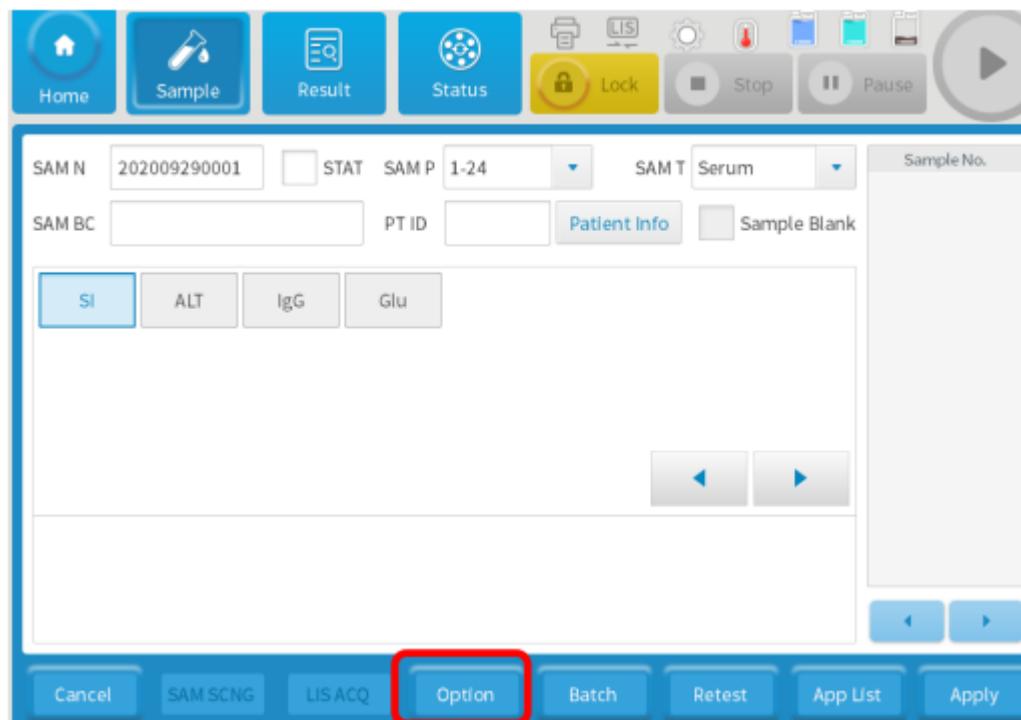


Choose it, the machine will do all the test on the tray you select.

You can also choose the specify position on the tray.

Sample test

Tips: Click option could select how many times repeat for this test, it can help check the repeatability for this item.
Tips: Calibration, QC, sample test can be applied together, then run together in one batch.



04

Maintenance

Maintenance

Clean reagents/serum drops on the analyzer surface timely. In order to ensure the performance of instrument, it is recommended to perform daily, weekly, monthly, quarterly, semi-annual, and annual maintenance as following table:

◆ Daily:

1. Clean the **instrument surface**, confirm **tubing connections** of purified water tank & cleaning solution tank & waste liquid tank
2. Check whether reagent/sample **probe**, cleaning **needle**, **plunger pump** leaking
3. Check whether relevant probe/needles liquid input/output normally, check and clean the wash pool

◆ Weekly:

1. Intensive cleaning
2. Clean the reagent/sample disk
3. Check and clean exterior of cleaning needle & stirrer
4. Reaction cuvettes (dirty) detection- cuvettes contamination detection (include light source detection)

◆ Monthly:

Clean reagent/sample probe, cleaning needle, stirrer and wash pool

Note: Clean all exterior of probe/needles by a dust-free cloth dipped with alcohol

Maintenance:

◆ Quarterly :

1. Clean all fans, clean air strainer
2. Cleaning purified water filter
3. Clean the inlet/out of fluid **confluence module**
4. Cleaning the tubing of cleaning needles to the fluid **confluence module**
5. Check whether cuvettes scratched or dirty, and clean inwall and outwall of cuvettes
6. Check whether the lamp is normal
7. Check whether the screwed connectors of probe or plunger pump are loosen
8. Check whether there are bubbles on the glass tube of **plunger pump**
9. Check whether reagent / sample probe & cleaning needle blocked
10. Clean and lubricate guide shaft, spline shaft of reagent / sample probe & stirrer
11. Clean and lubricate driving guide rail of cleaning needle guide shaft of sample **plunger pump** and screw

Maintenance:

◆ **Half yearly:**

1. Clean the reaction cuvette holder
2. Instrument internal and all sensors dust removal
3. Replace peristaltic pump head
4. Change lamp(Light source)
5. Replace purified water filter
6. Replace reaction cuvettes (plastic cuvettes), soak and clean inwall & outwall of reaction cuvette
7. Cleaning purified water tank
8. **Cleaning the branch waste tube and general waste tube of wash pool**
9. Cleaning the inlet of purified water

◆ **Yearly:**

05

Mechanical Structure

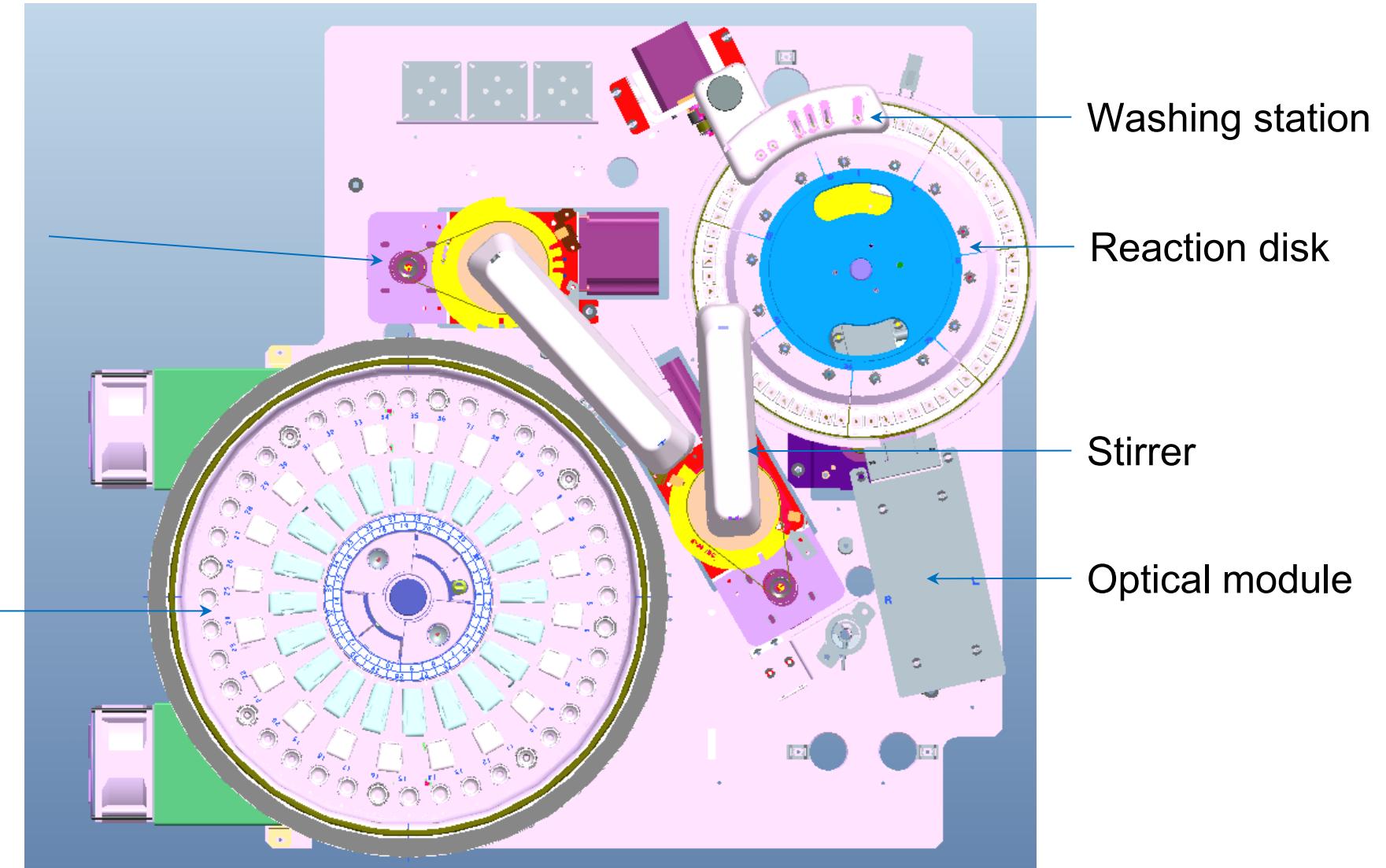
Functional modules

EXC200 analyzer functional modules include :

- 1. Reaction disk**
- 2. Reagent/Sample disk**
- 3. Stirrer**
- 4. Wash pool**

Reagent/Sample probe

Reagent/Sample disk



Reaction disk module include:

Reaction disk

Reaction cuvettes

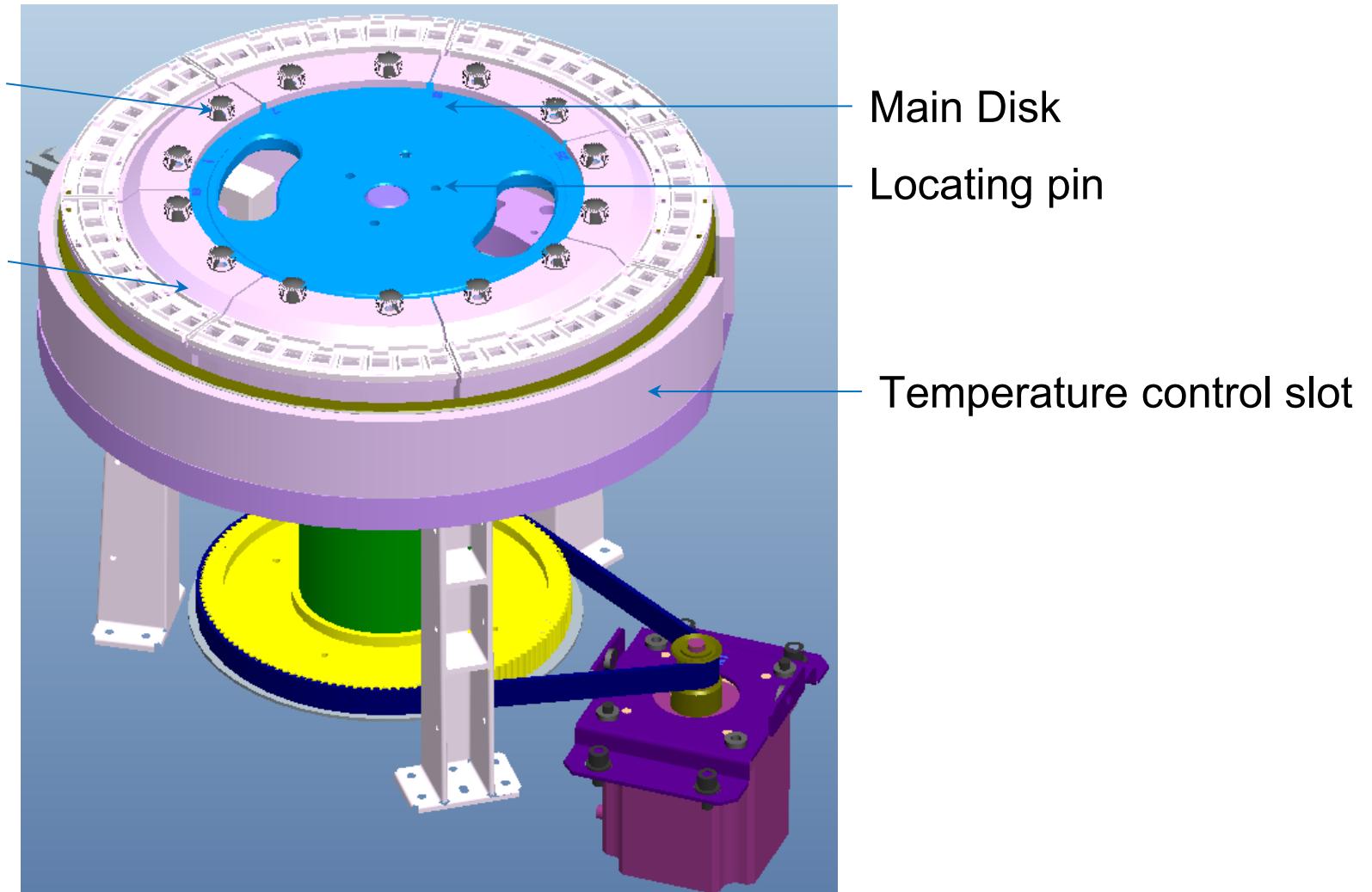
Temperature control slot

Key point :

Positioning accurate of main disk assemble

Fixing
screw

Cuvettes mounting
rack

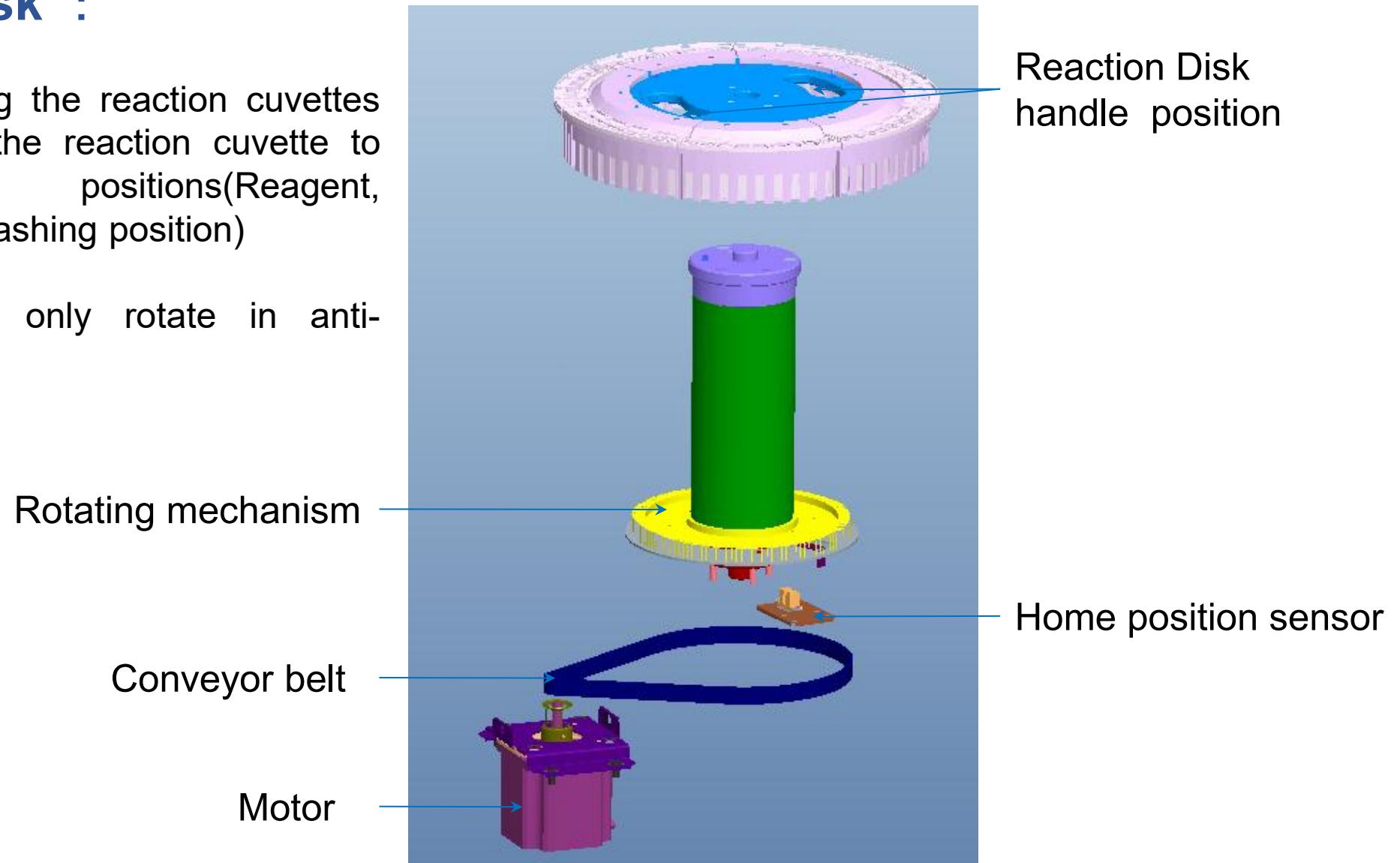


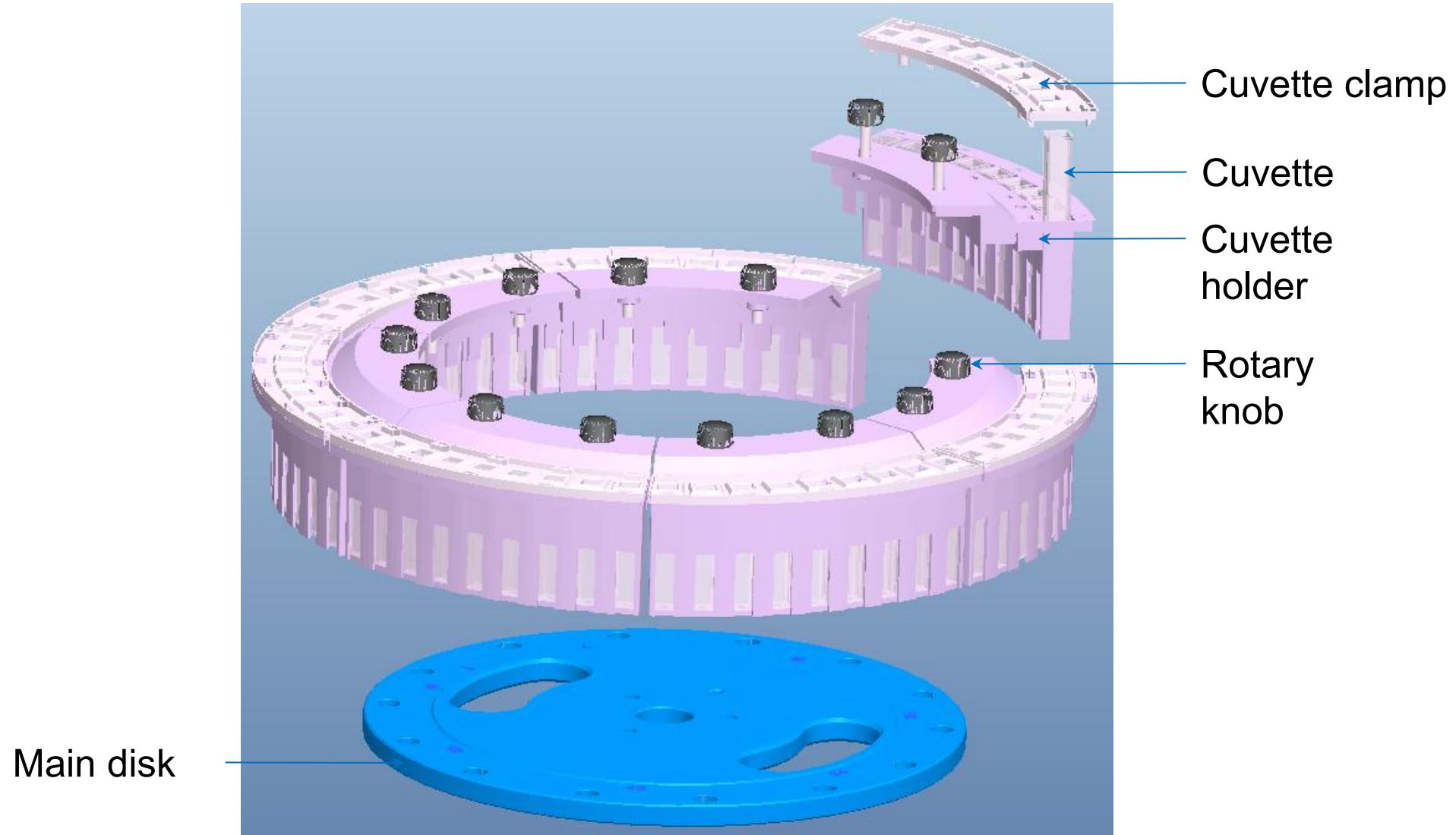
Reaction Disk :

Function : Placing the reaction cuvettes and transferring the reaction cuvette to corresponding positions(Reagent, sample, mixing, washing position)

Feature :

Disk structure , only rotate in anti-clockwise





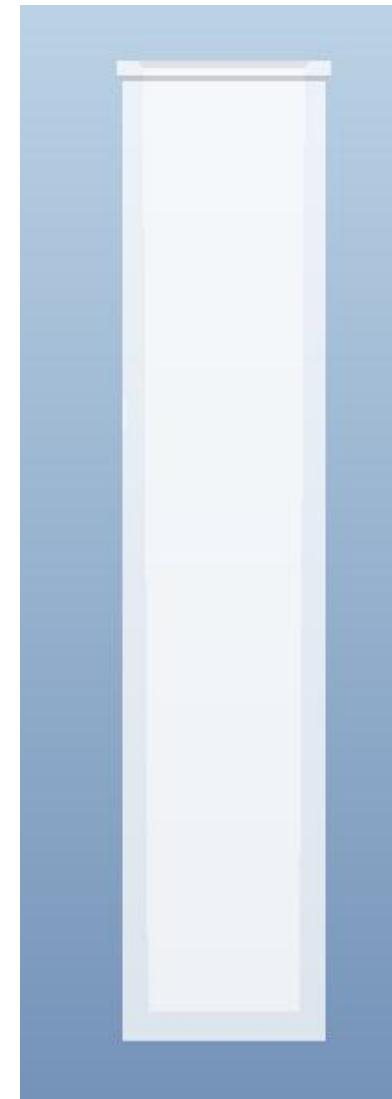
Reaction cuvette :

Function : As a container for reaction and colorimetric measurements, totally 63 positions;

Feature : Ultraviolet quartz cuvettes , good transmittance, reusable;

Key point :

Cuvette illuminating surface free from scratch, dirt and so on



Reagent/Sample disk include:

Reagent/Sample disk

Cooling system

Reagent/sample probe

Reagent/sample Liquid injection module

Reagent/Sample disk :

Function :

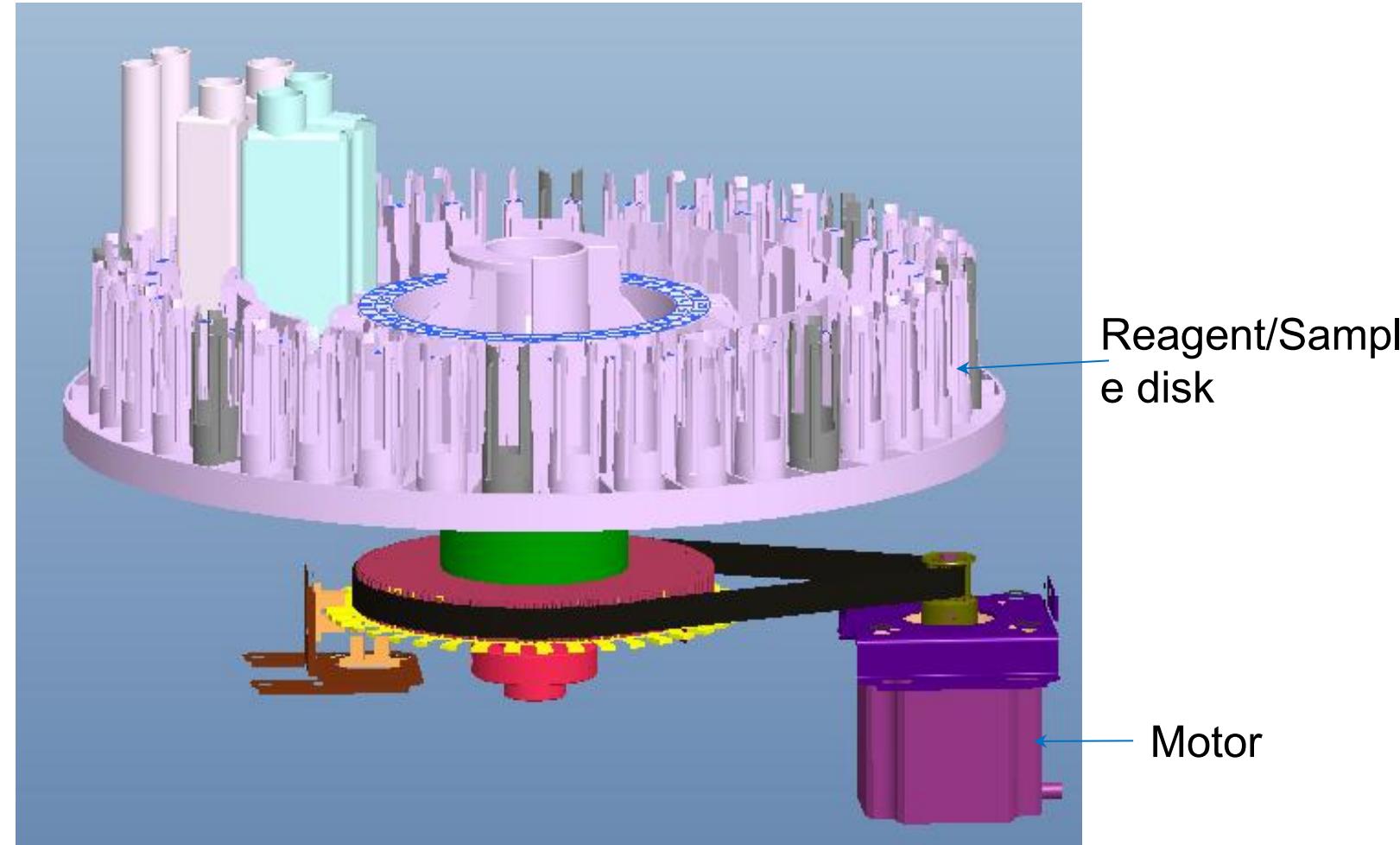
1. Loading reagent bottles/sample tubes
2. Transfer reagent bottle/sample tubes to sampling positions

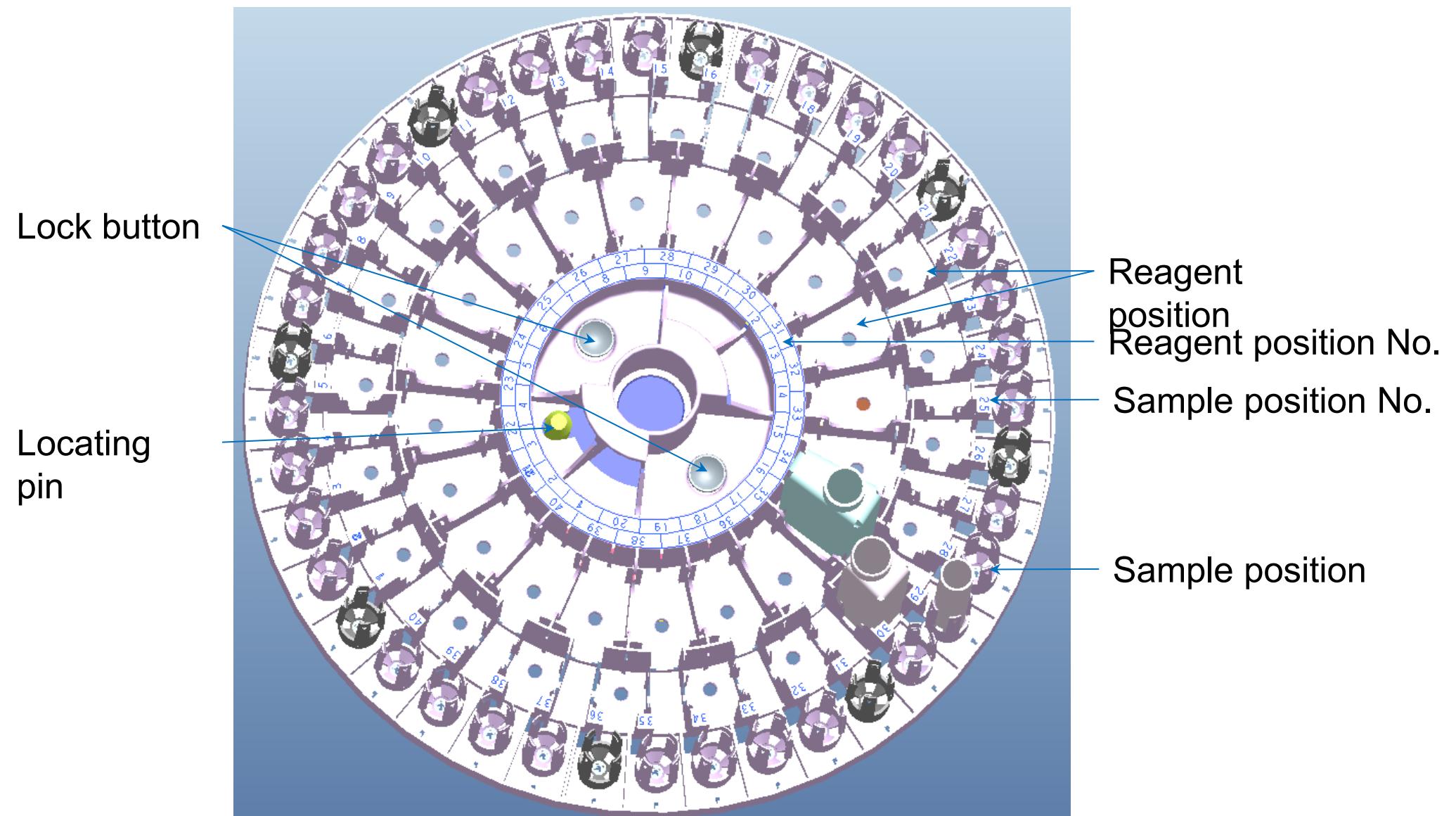
Feature : Sample and reagent are loading in one disk, and adopt disk type structure design.

Specification:

Outer circle for sample position, 40 in total ; Middle & inner circles for reagent, 40 in total(middle & inner circle 20 positions for each)

Key point : Assemble positioning accurate





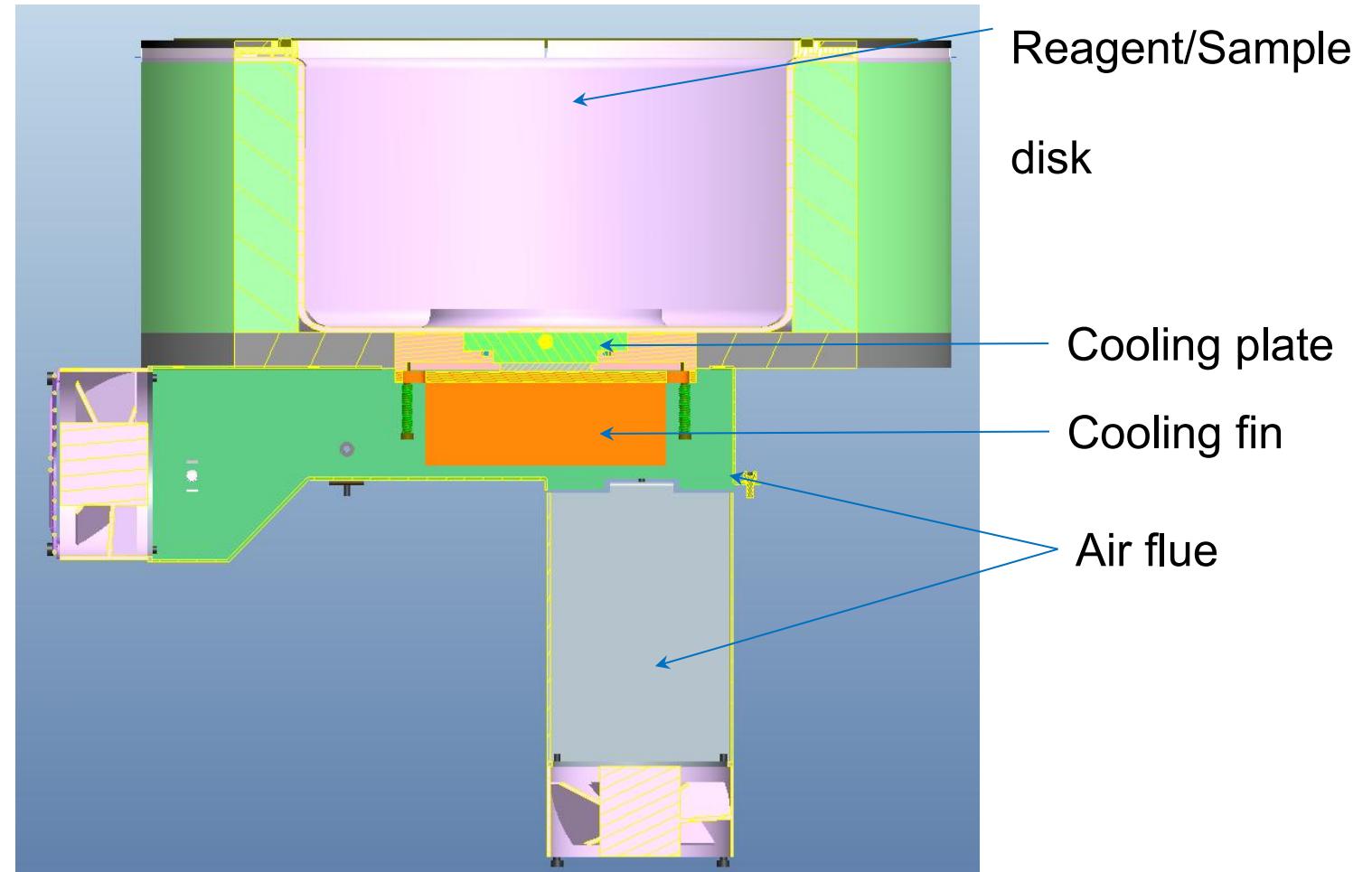
Cooling system :

Function :

Ensure reagents in a low temperature environment to keep reagent in good performance and reduce its volatilization

Feature :

Air cooling, stable, 24 hours non-stop refrigerating, low failure rate and low maintenance cost

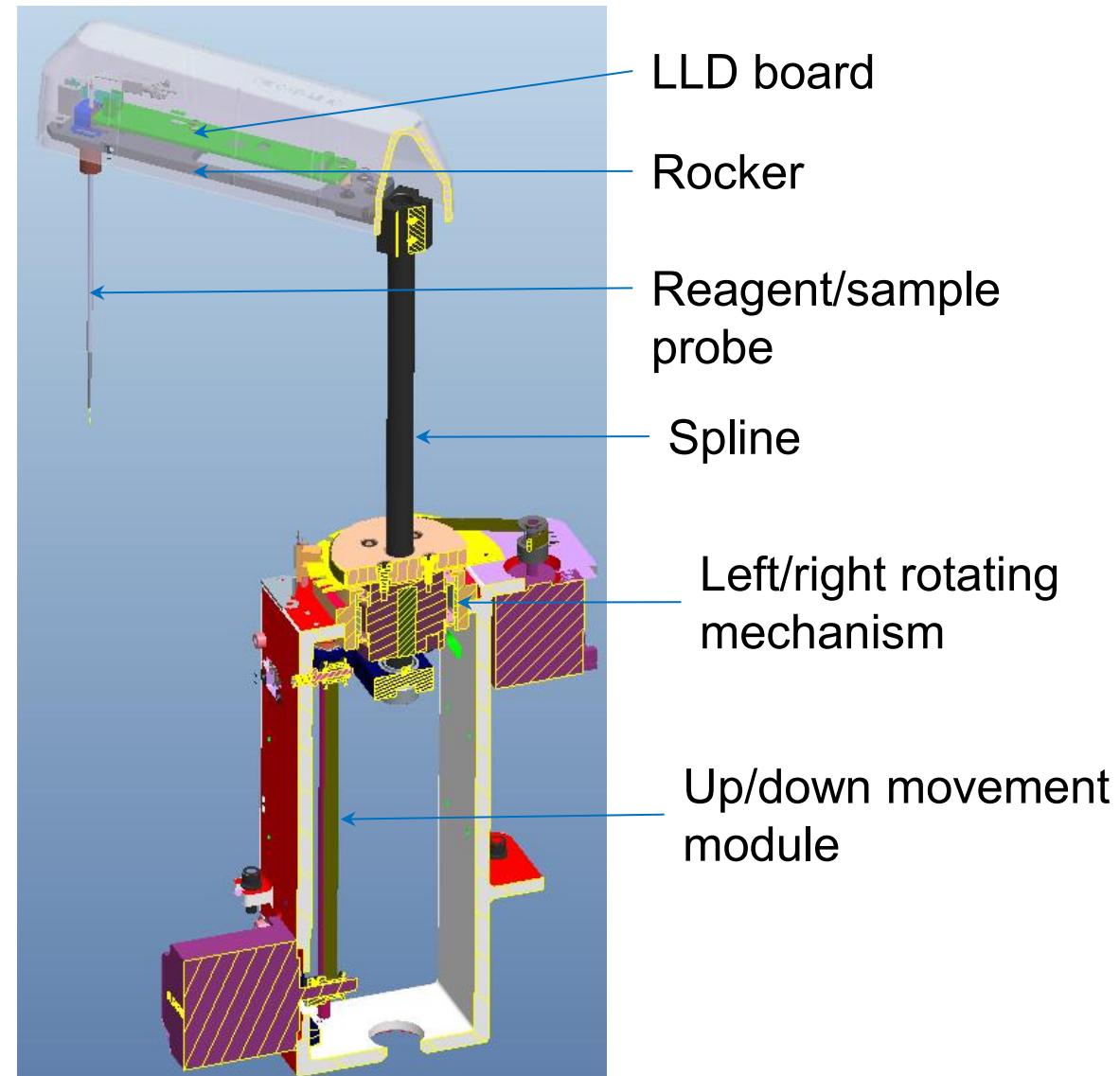


Reagent/sample probe module :

Function: Aspirate reagents/samples from reagent bottle/sample tube, and then dispense to quartz cuvettes (colorimetric cuvettes)

Vertical anti-collision: Detect whether any obstacles in the vertical direction or not. If there is a collision, the automatic protection system will be enabled to prevent reagent/sample from damage.

Liquid level detection and volume tracking:
Detect the liquid level in the sample tube automatically and determine depth of the descend according to the volume of liquid aspiration



Reagent/sample plunger pump :

Function:

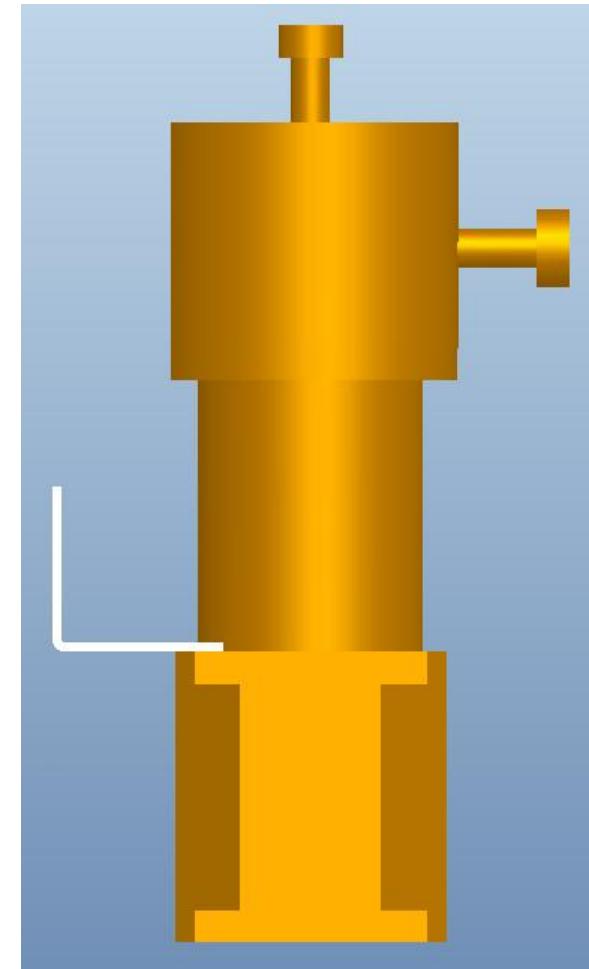
Aspirate reagent/sample to reaction cuvettes

Specification :

500 μ L

Features:

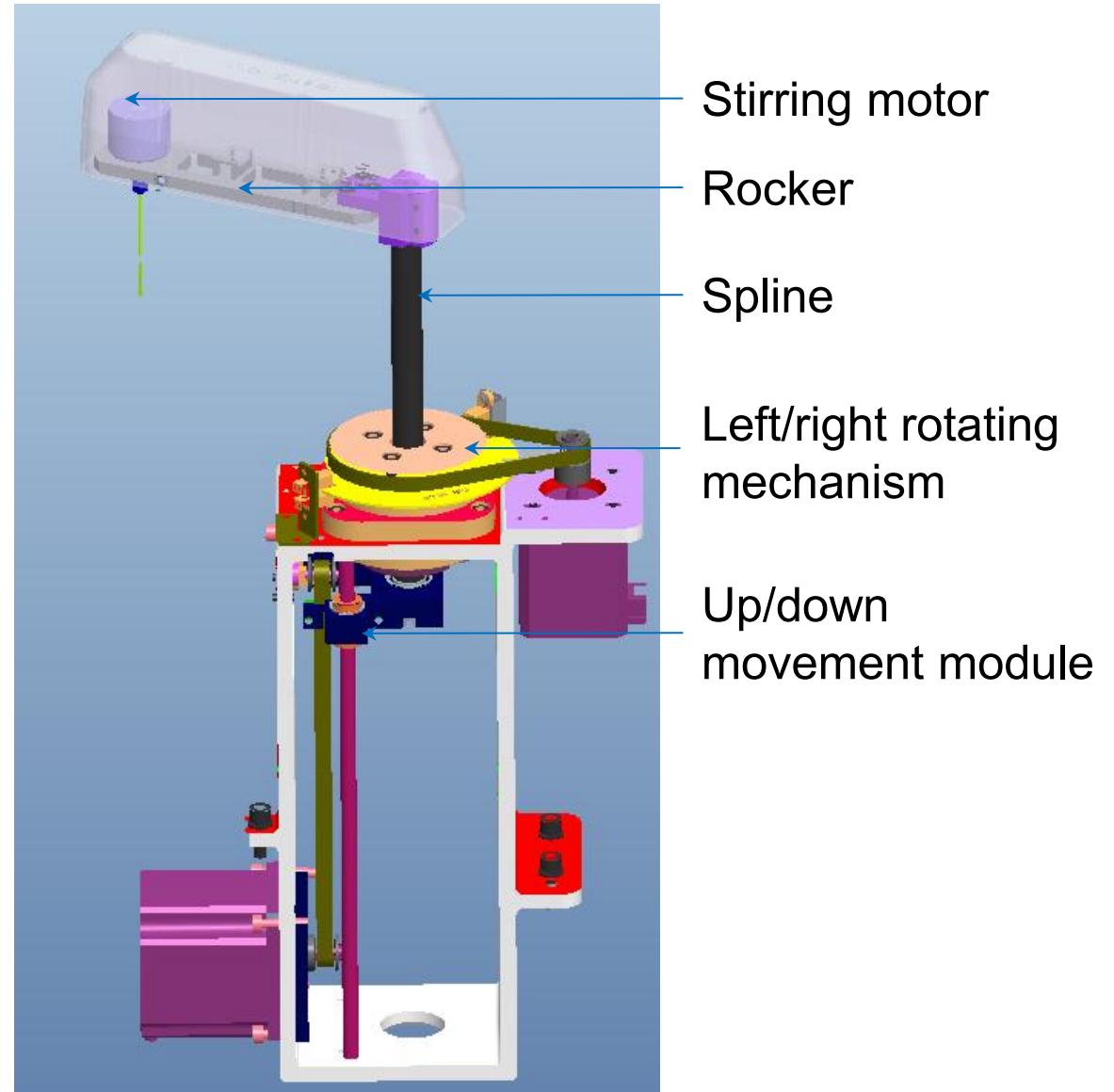
Stable, low failure rate



Stirring module :

Function: mixing reagent/sample in ultraviolet quartz cuvette (colorimetric cuvette)

Features: high performance Stirring motor import **from Japan**



Washing station :

Function: clean ultraviolet plastic cuvette after test, suck out reaction liquid, inject purified water & wash buffer into plastic cuvette, then do the draining.

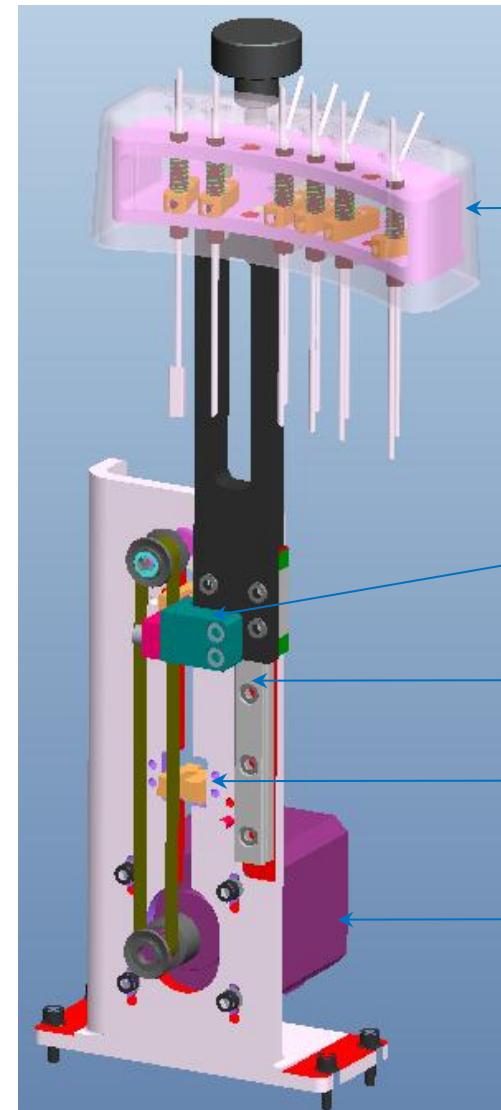
Specification : 6 Steps automatic cleaning

6 cleaning probes in total

Step 1-2 aspirate and inject purified water mixed with concentrated wash buffer

Step 3-4 suck out the purified water which injected from the previous step, injects purified water one more time.

Step 5-6 fully suck out residual water droplets in ultraviolet plastic cuvette.



Cleaning probes
No.1~6 from right to left

Up/down movement
module

Guide rail

Sensor

Motor

Other system structures

EXC200 Other system structures include :

Hydraulic system structure

Circuit system structure

Optical system structure

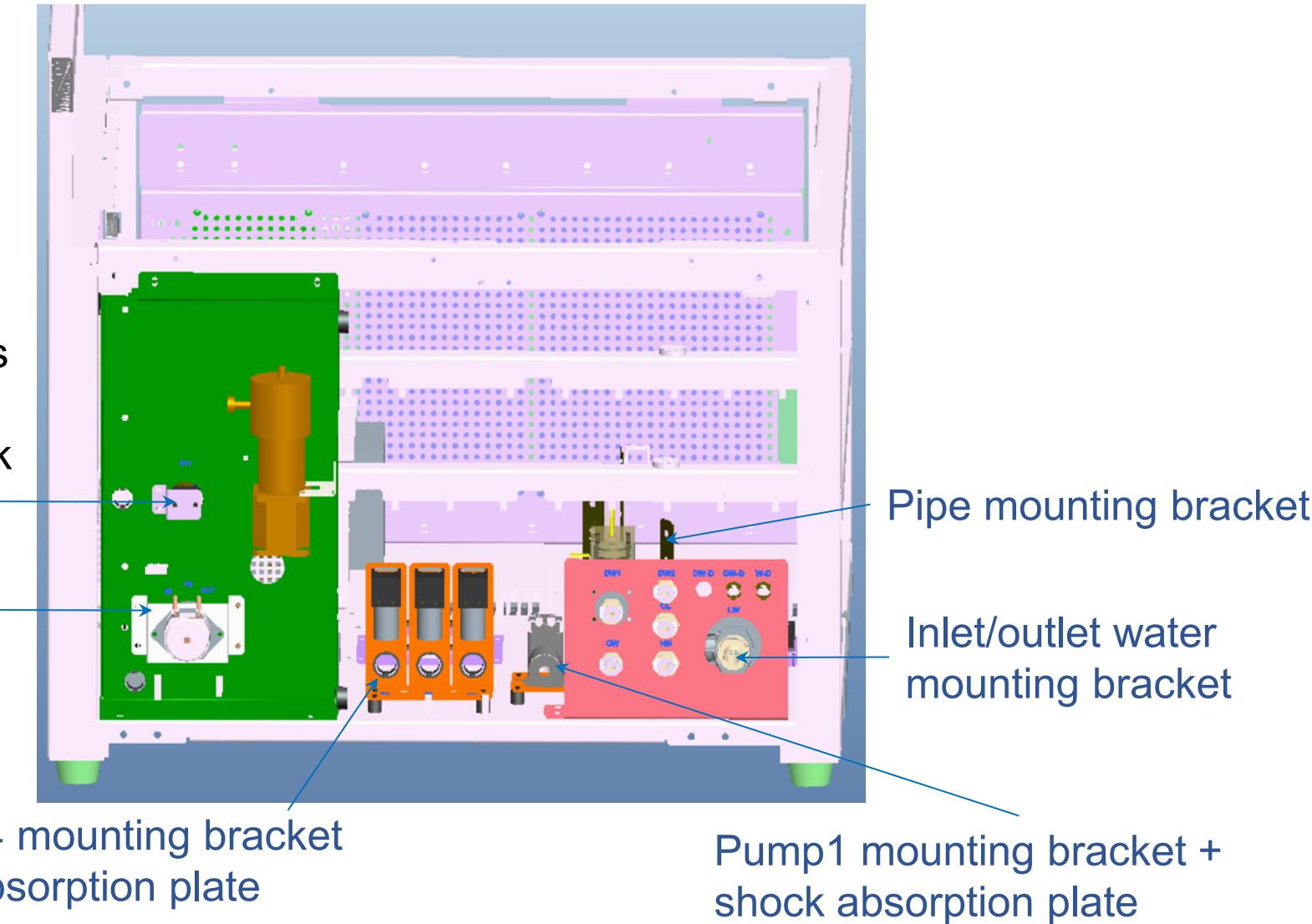
Hydraulic system structure :

Function: assemble each component according to hydraulic diagram

Include some kinds of pumps, valves and connectors, such as mounting bracket and the corresponding shock absorption parts

SV1 mounting bracket

Peristaltic pump mounting bracket



Circuit system structure :

Function: assemble all kinds of hardware components;

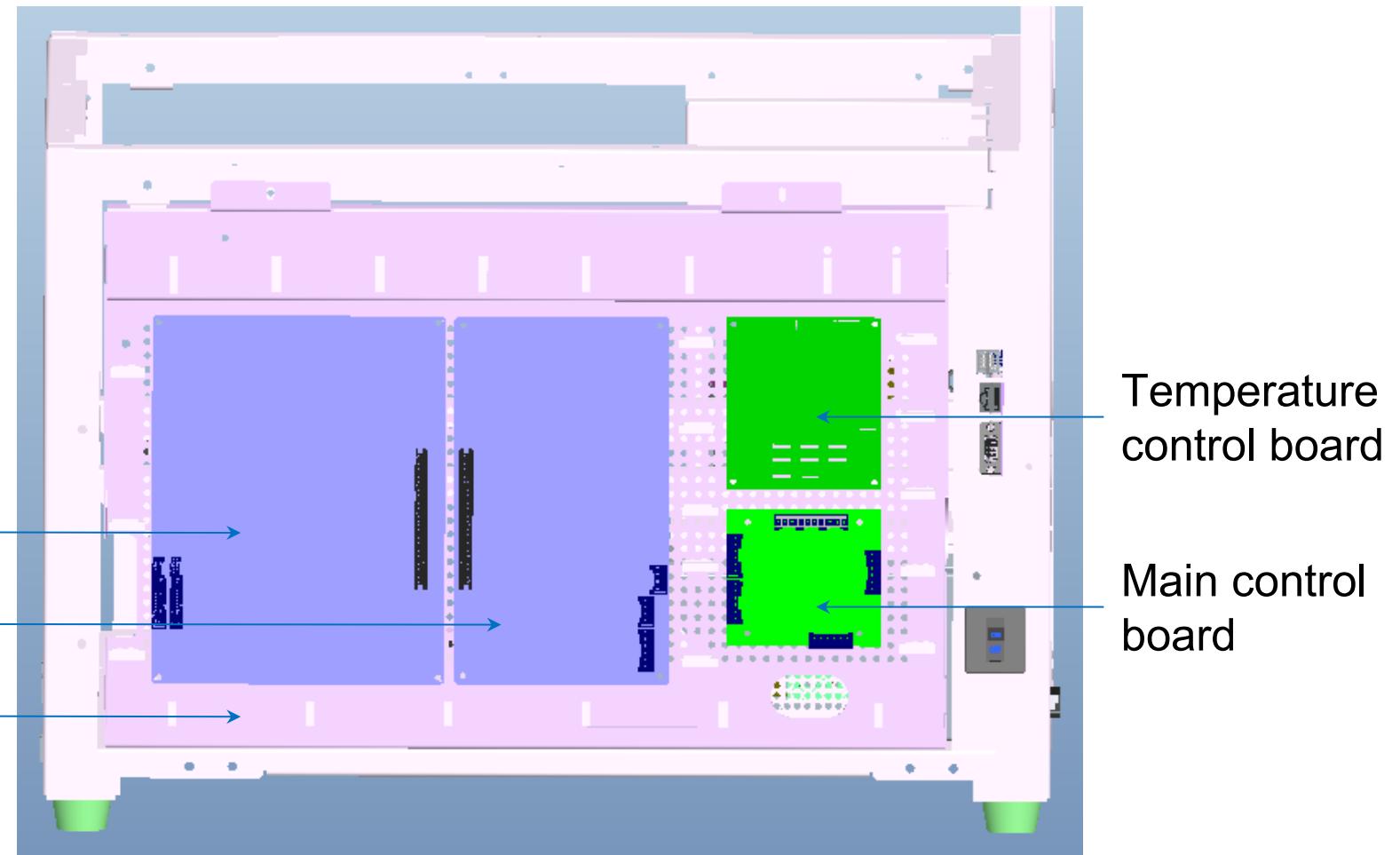
Mainly include PCBA, power supply assembly , cooling fans, and also include cover of other components / bracket

Note: pay attention to grounding and cable connection

Motor driver board

Sensors board

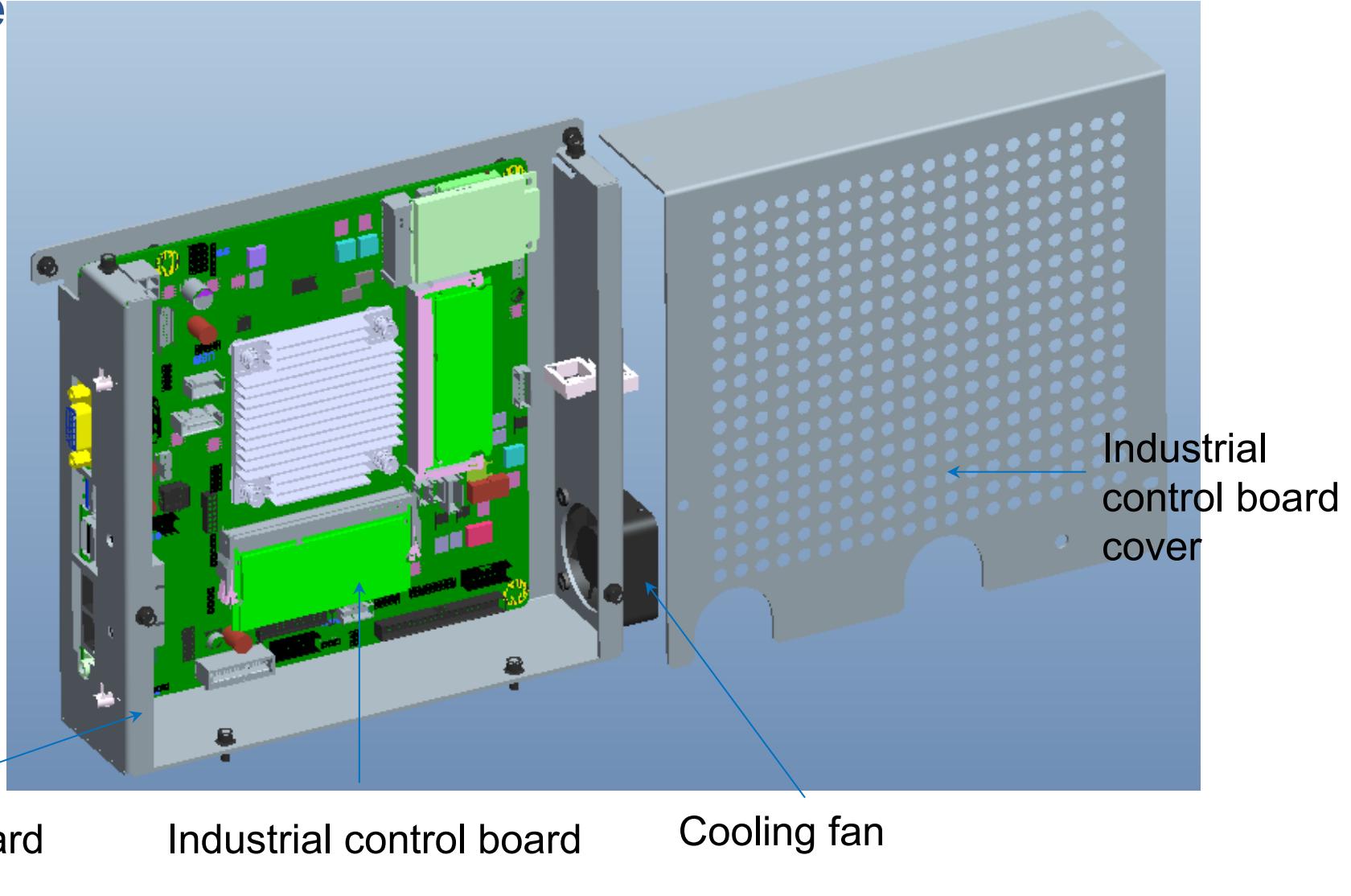
PCB baseplate



Circuit system structure

:

Industrial control board



Circuit system structure :

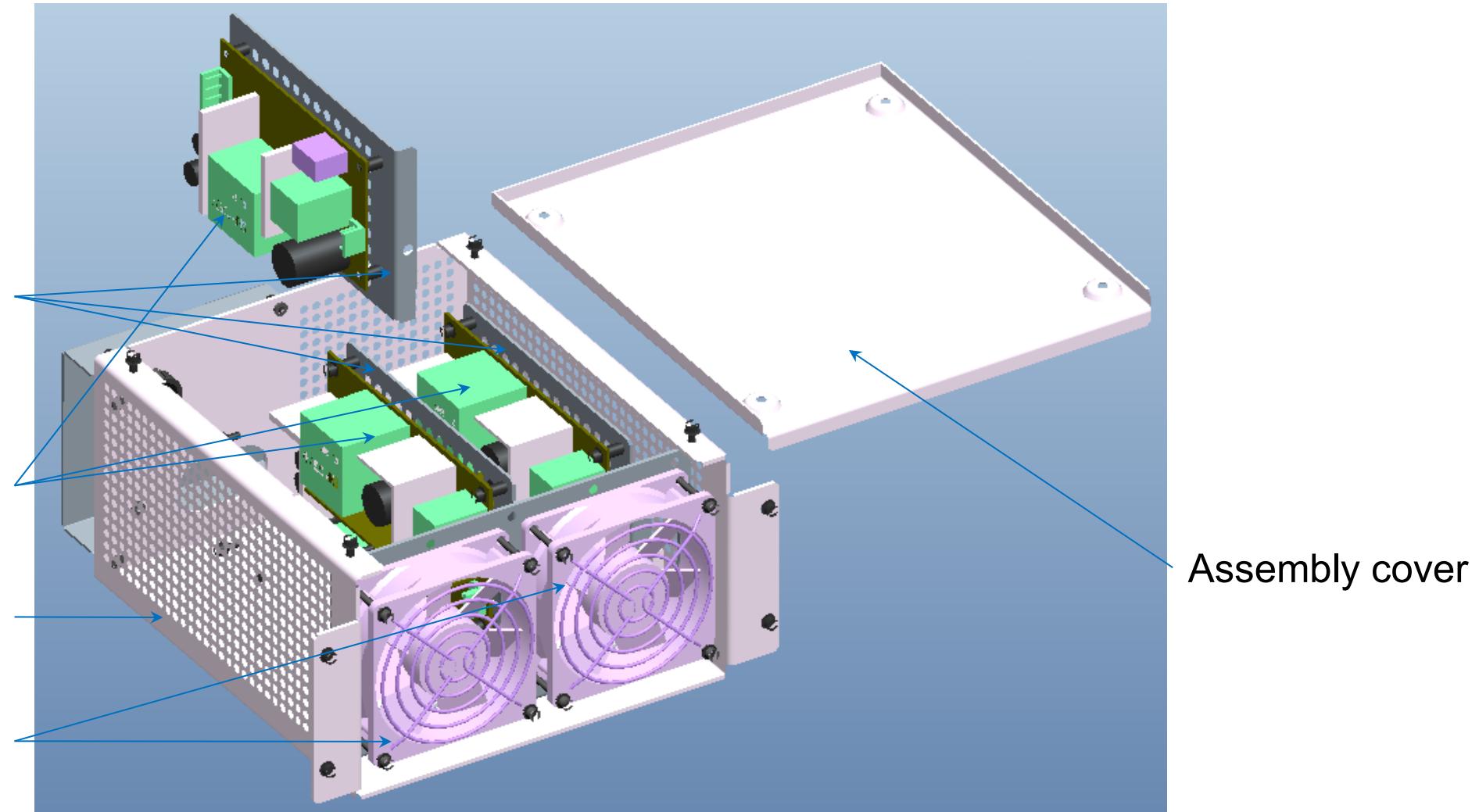
Power assembly

Power supply assembly mounting plate

Power supply assembly

Assembly box

Cooling fans



Optical system structure :

Function: Measure the absorbance of the reaction liquid in ultraviolet plastic cuvette

Specification :

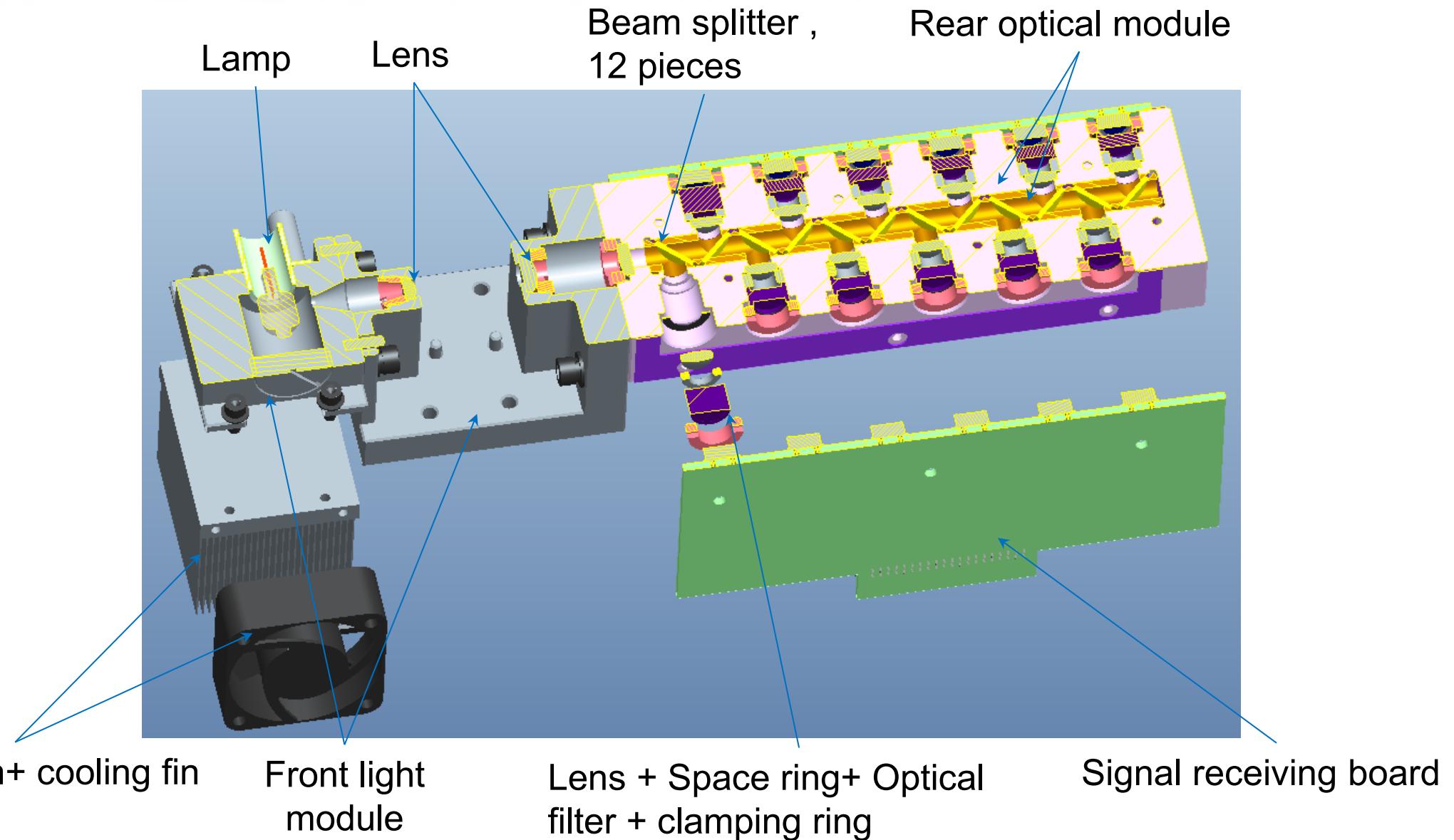
Wavelength : 340nm~900nm, wavelength optional

Number of wavelengths: Measure one or more wavelengths simultaneously

Wavelength accuracy: $\pm 2\text{nm}$

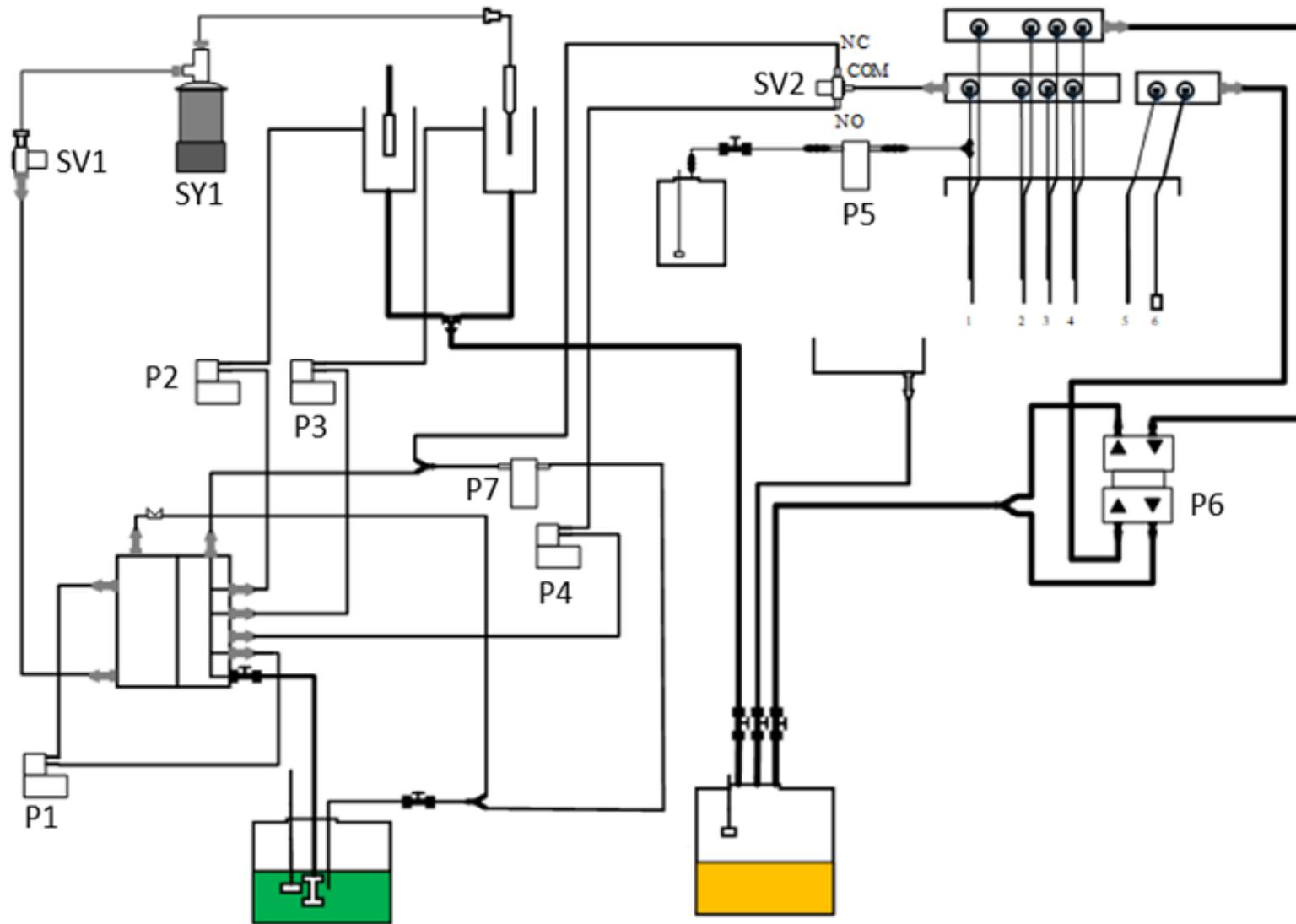
Half wave width: less than 12nm

Detector: Photodiode array

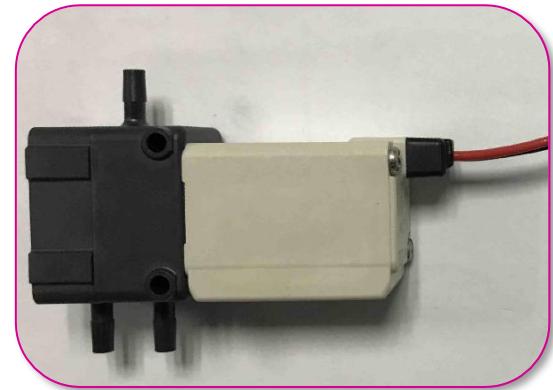
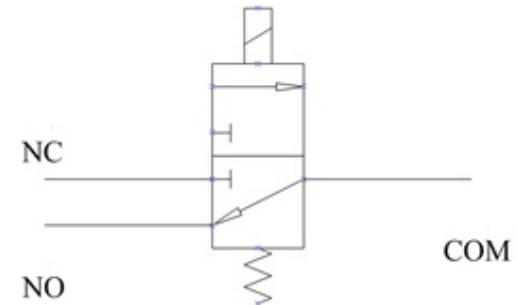
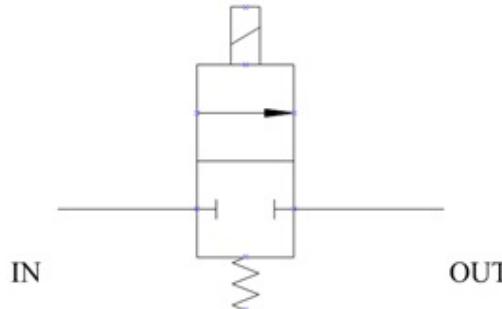


06

Hydraulic System



Hydraulic system component	
Code	Name
P1	Liquid pump
P2	Stirrer cleaning pump
P3	Probe cleaning pump
P4	Reaction disk cleaning pump
P5	Peristaltic pump
P6	Waste pump
P7	Suction pump
SV1	Probe cleaning valve
SV2	Suction valve
SY1	Plunger pump



Probe cleaning valve

SV1

2-way solenoid valve:

- In and Out port will connect when the valve is energized
- In and Out port will disconnect when the valve is de-energized

Suction valve SV2

3-way solenoid valve

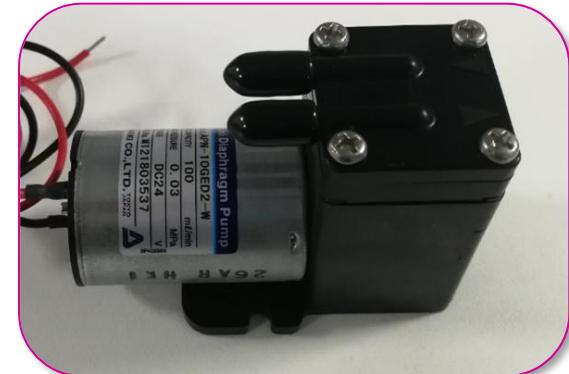
- NC** : normal closed (connect to COM if the valve is energized)
- NO** : normal open (connect to COM if the valve is de-energized)
- COM** : common port



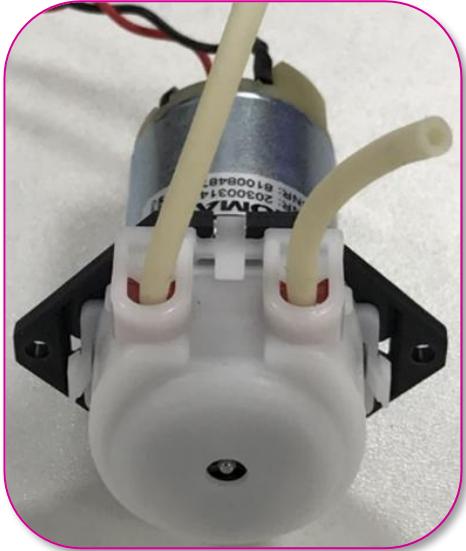
Plunger pump SY1



Liquid pump P2 P3
P4



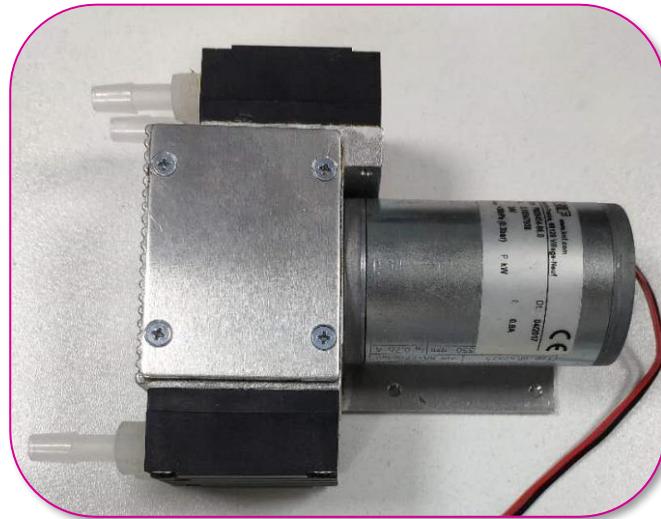
Liquid pump P1



Peristaltic pump P5



Vacuum pump P7



**Waster pump
P6**



**Sample/Reagent
probe**



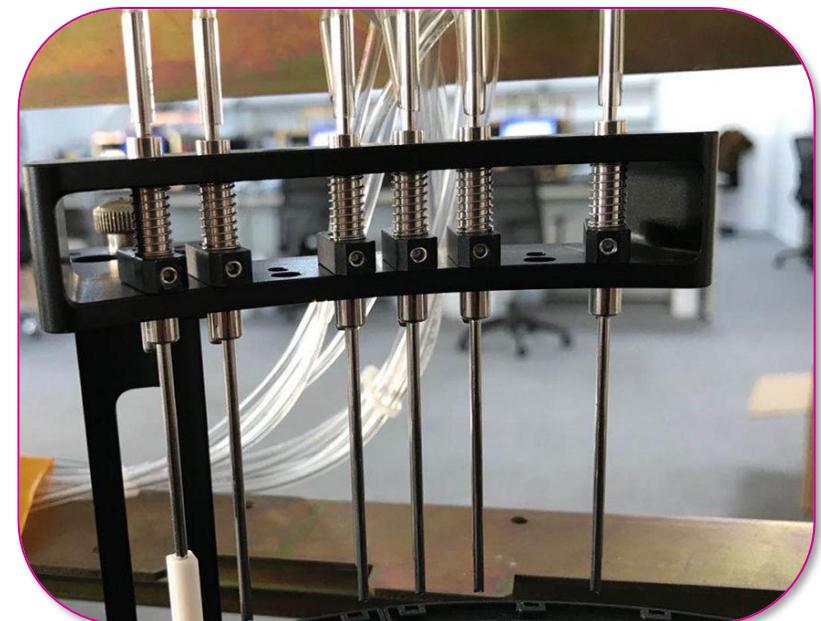
Stirrer

6-Steps automatic cleaning

Step 1 aspirate the reaction liquid and injects purified water mixed with concentrated wash solution;

Steps 2 to 4 suck out the purified water injected in the previous steps and inject purified water again;

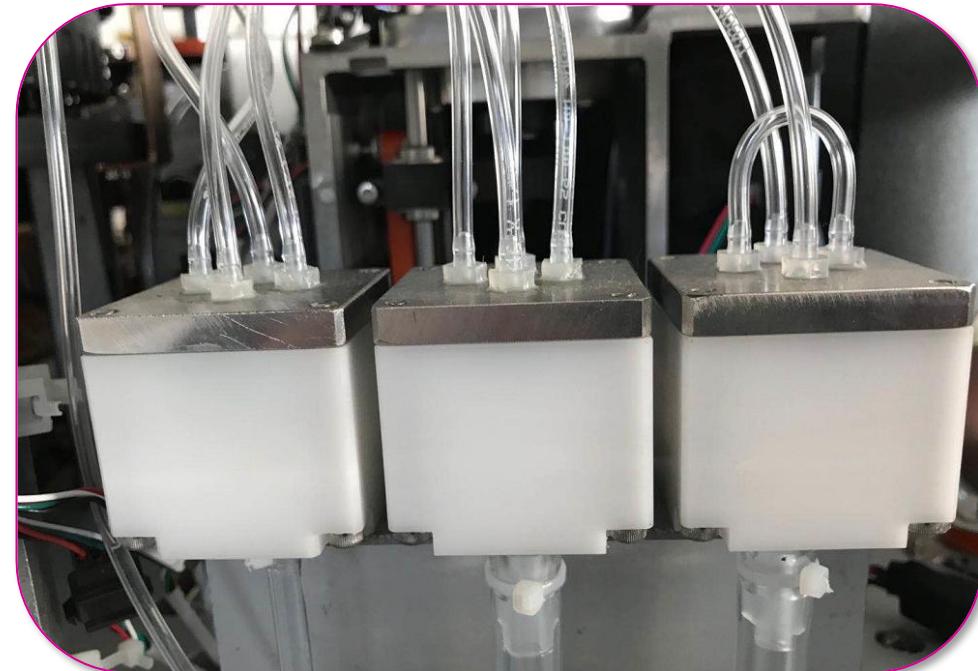
Steps 5 and 6 suck out the residual water droplets in the plastic cuvette.



Cleaning probe group(Wash station)



Confluence



Confluence



Wash pool



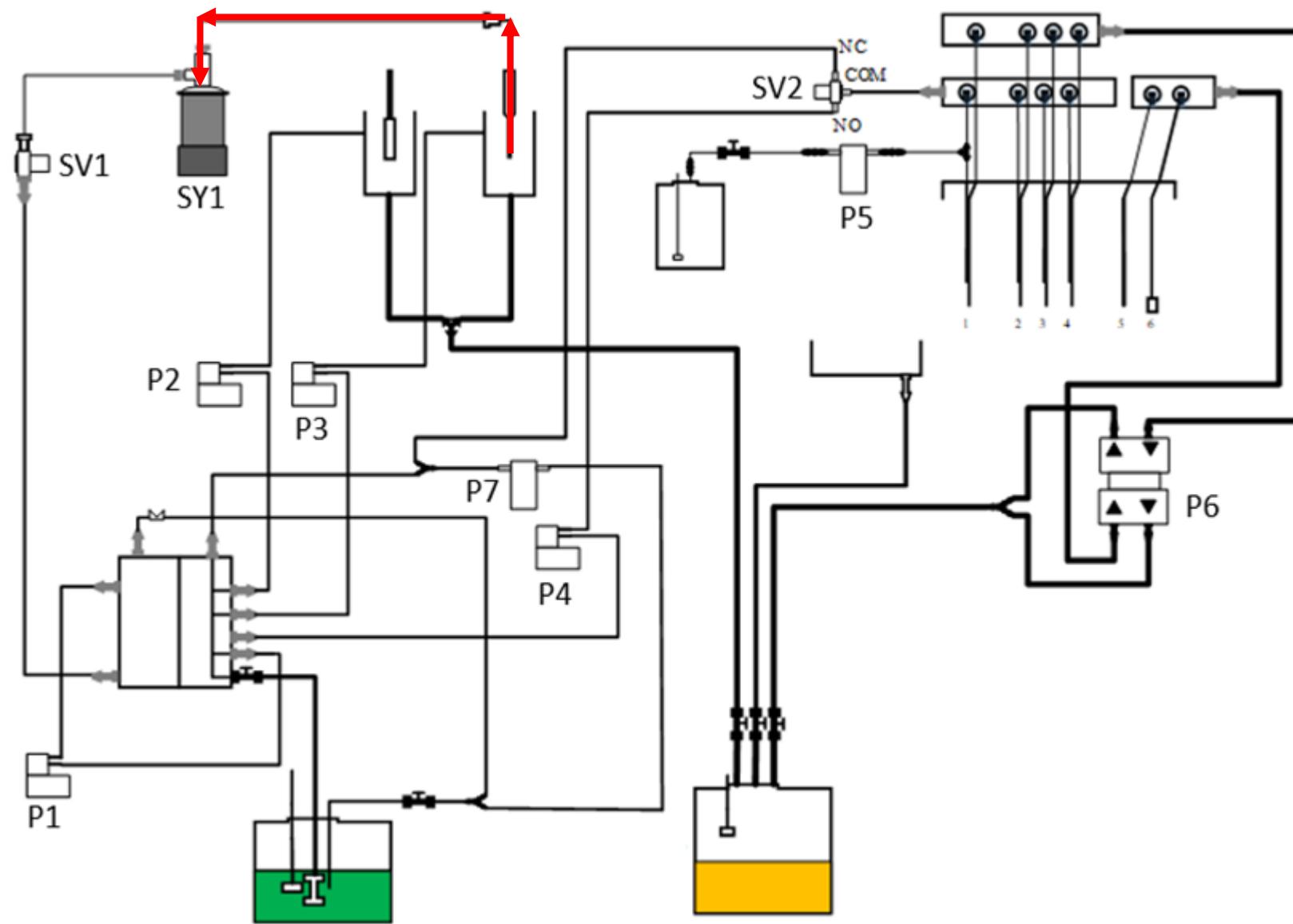
Filter

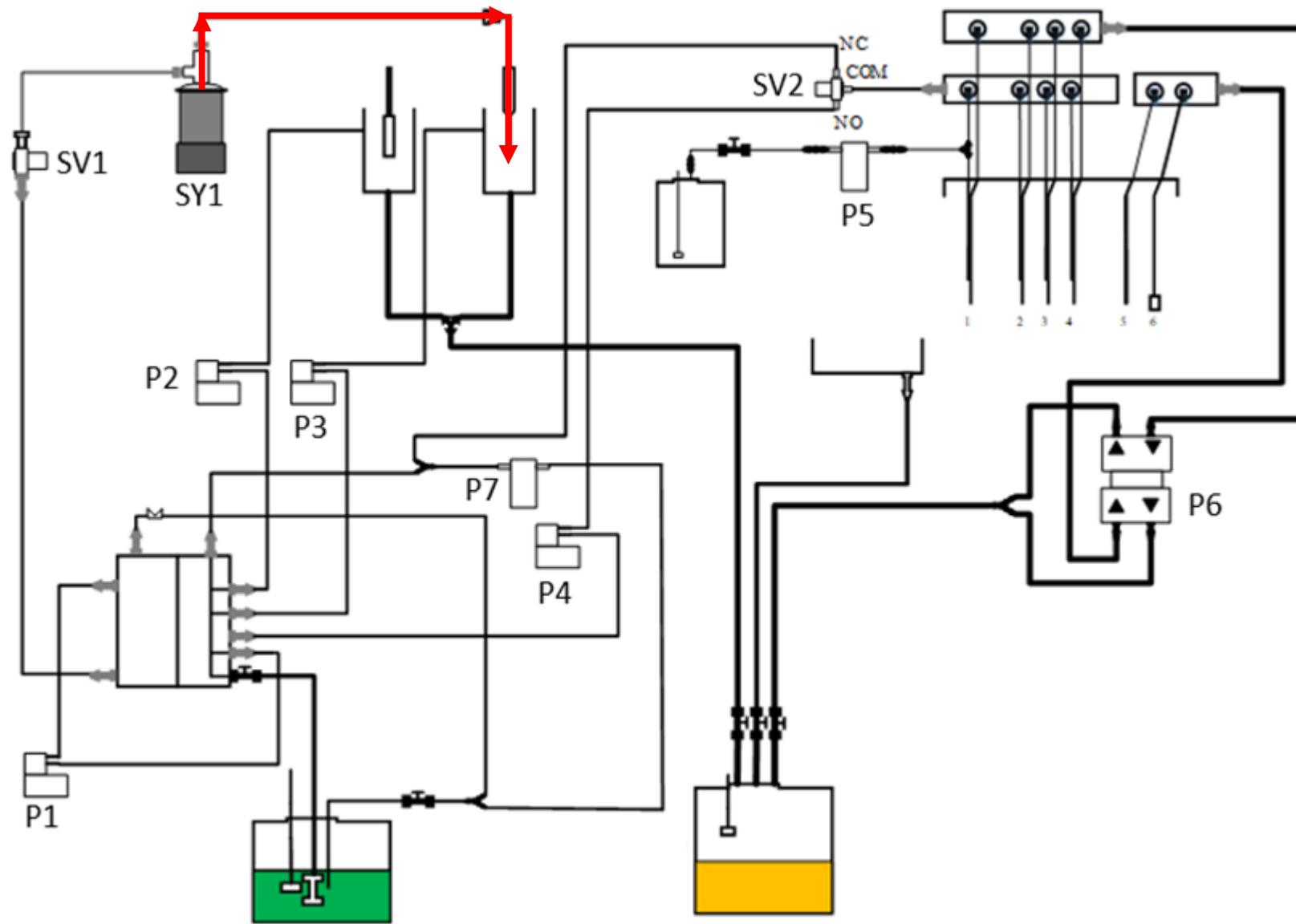


**Purified water floater
sensor**

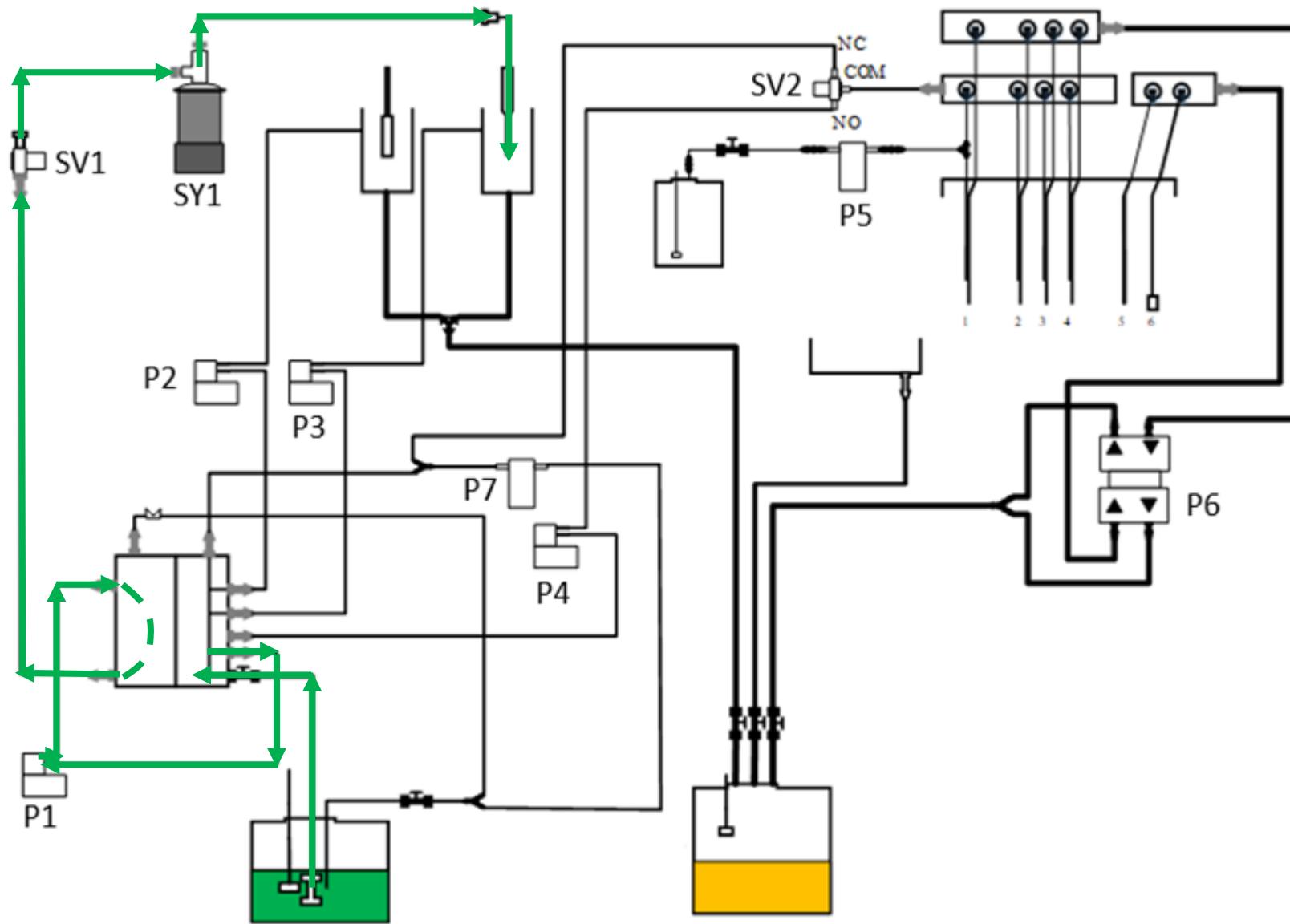


**Waste floater
sensor**

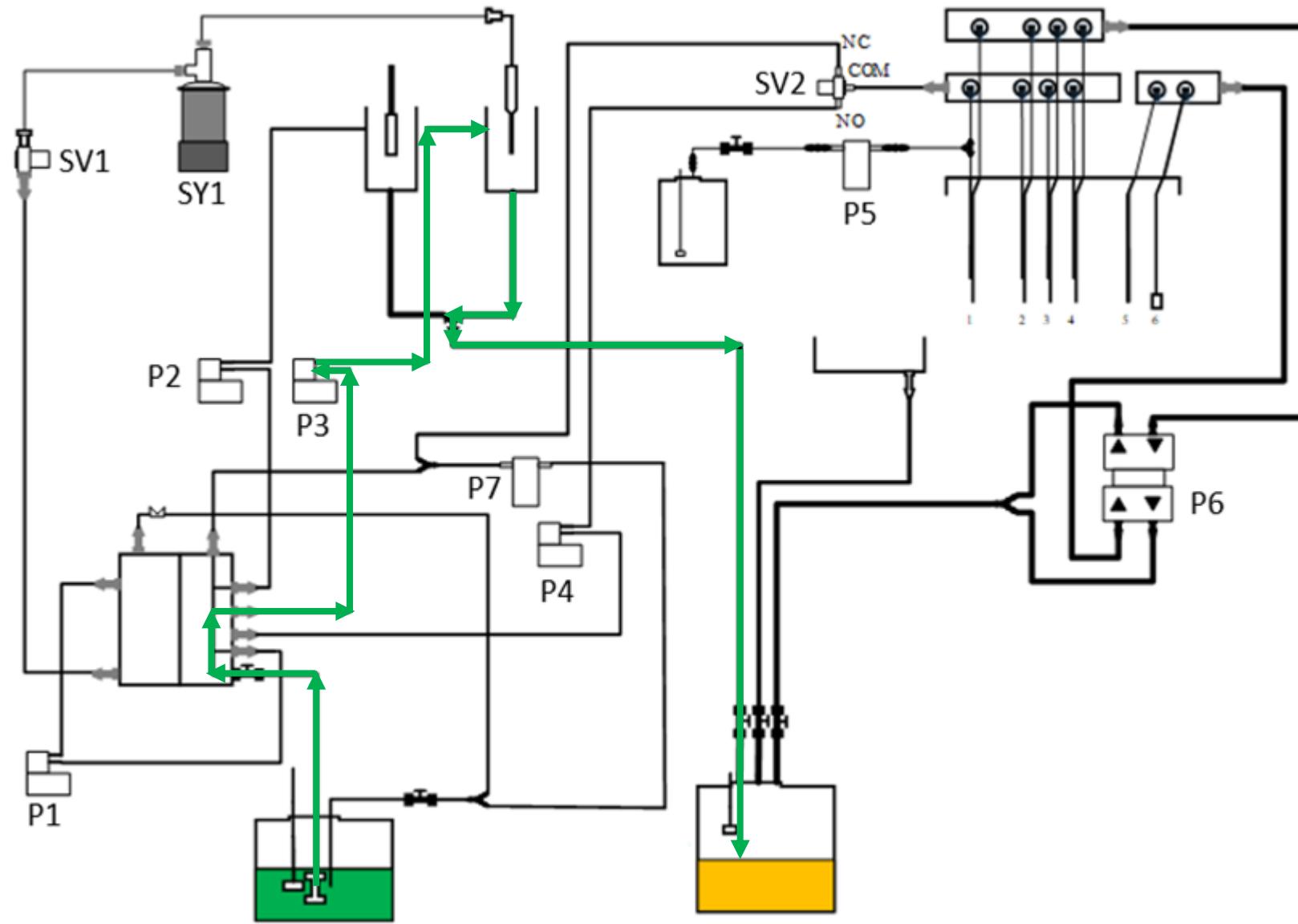


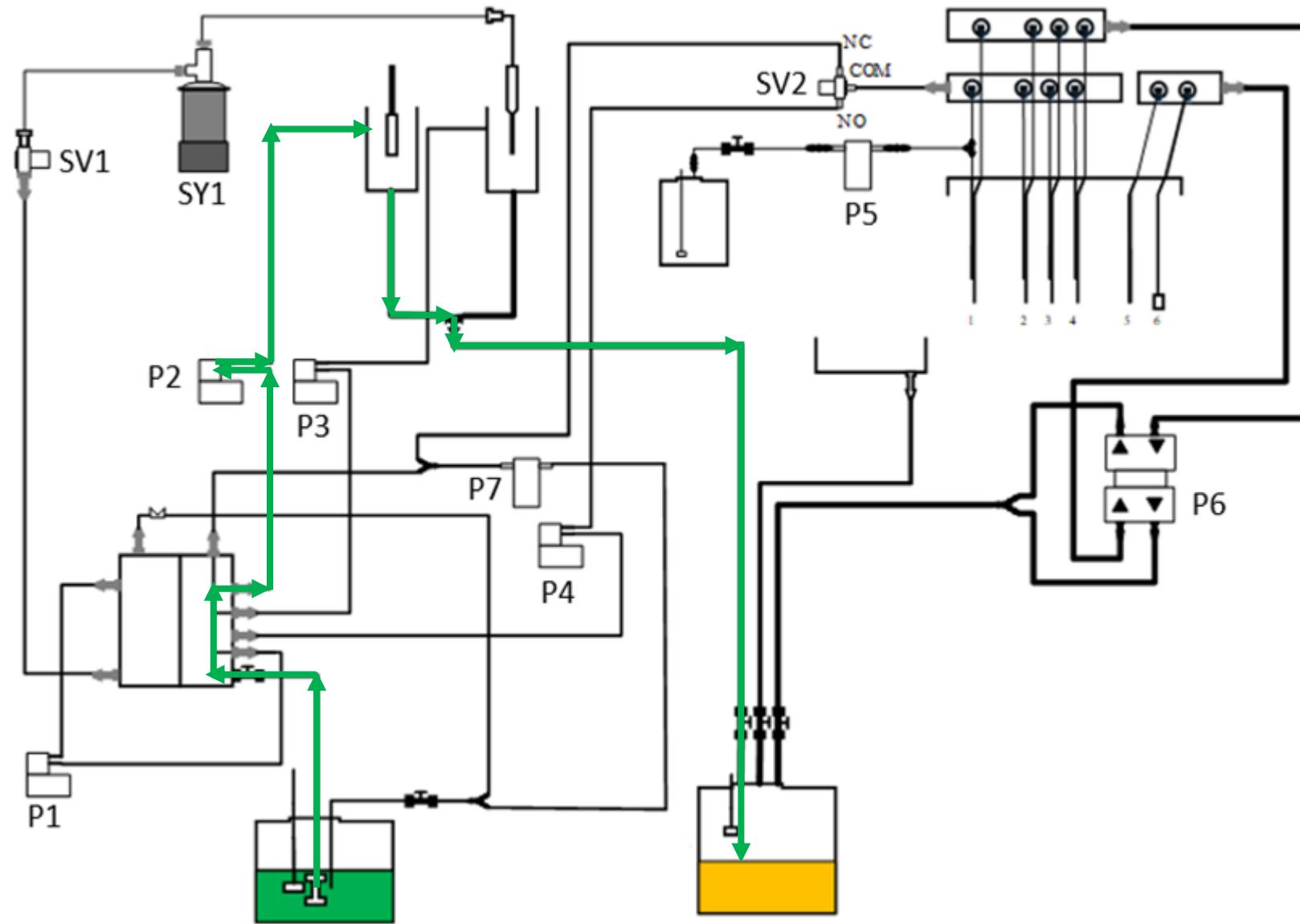


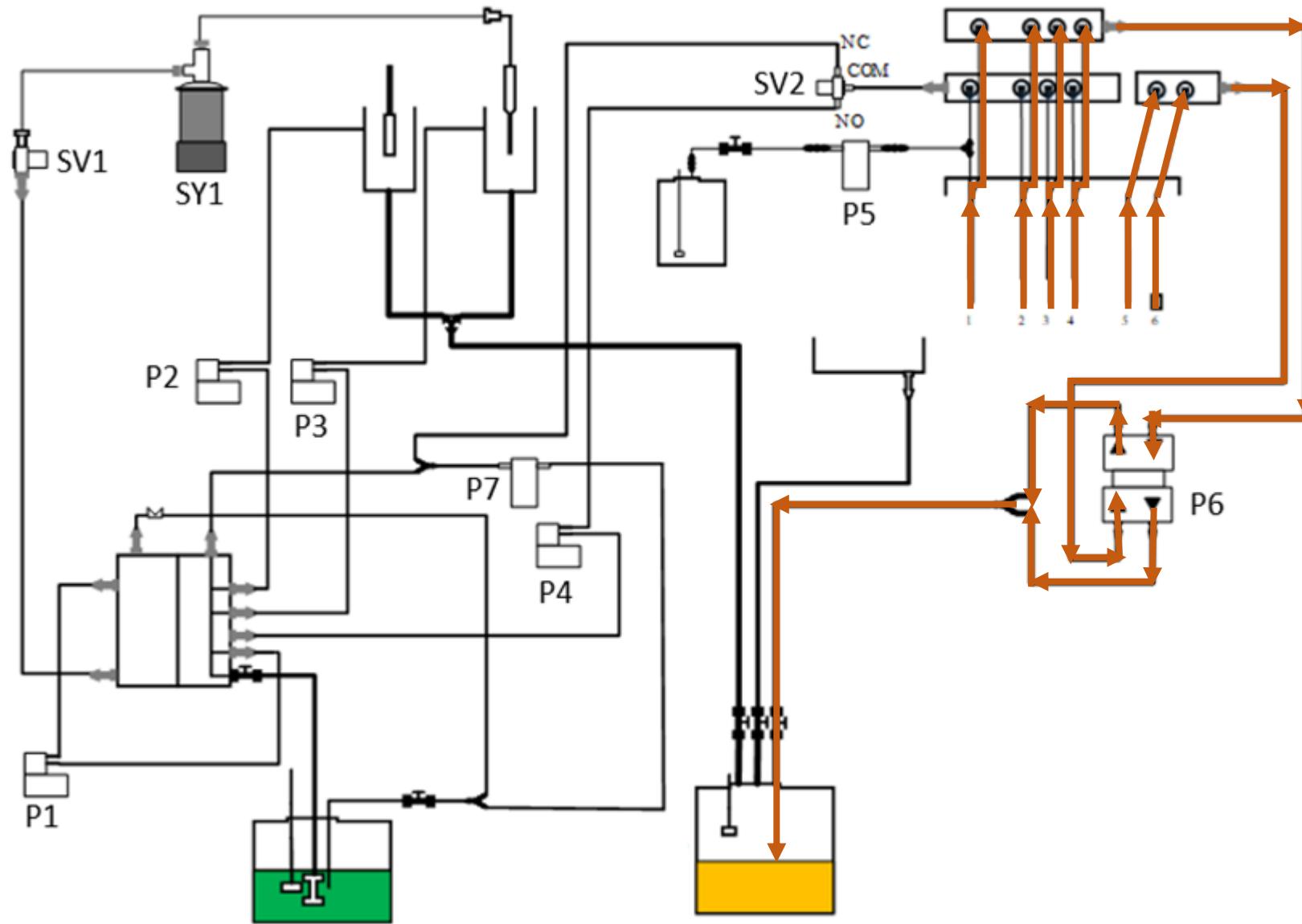
Cleaning sample probe interior

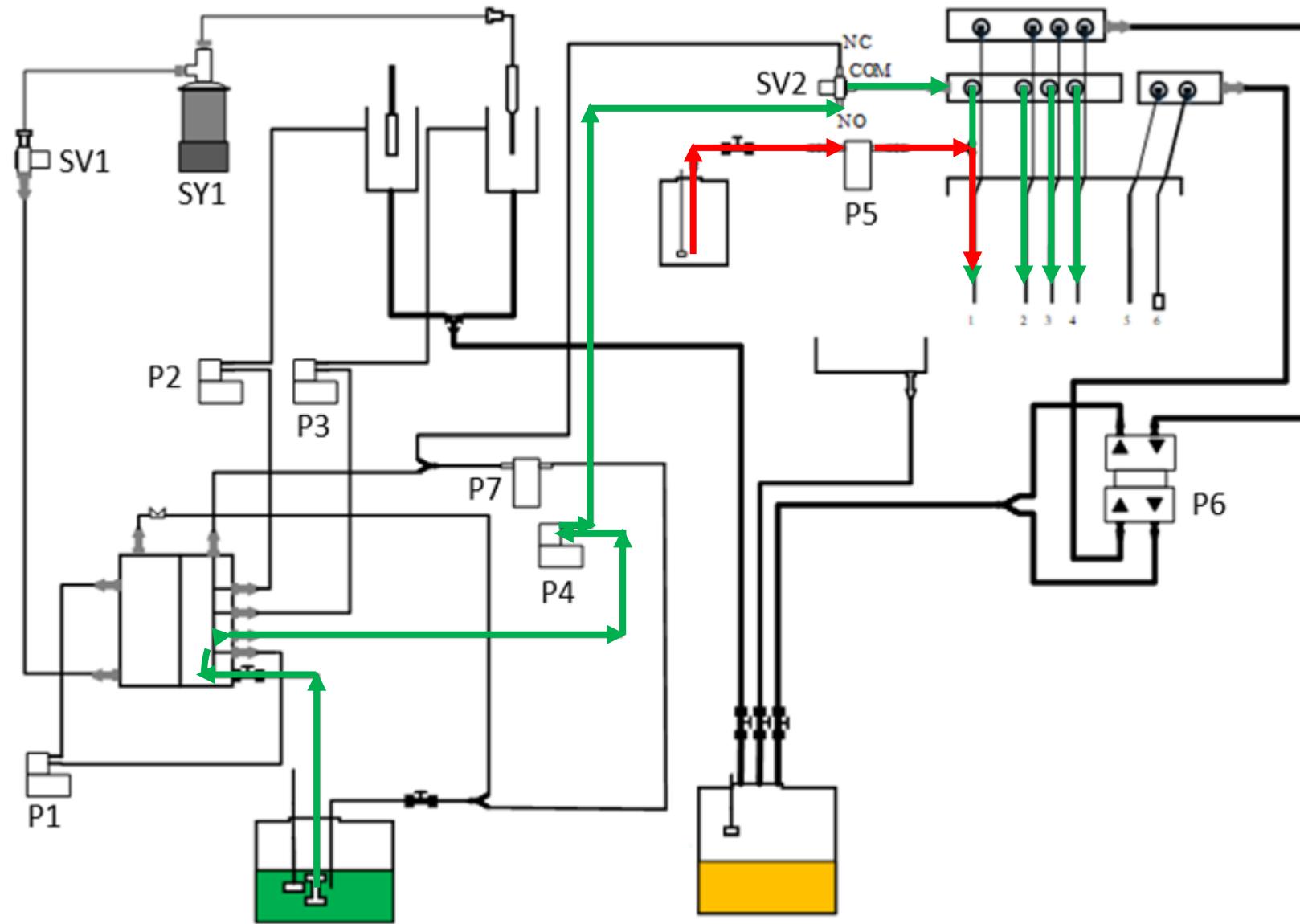


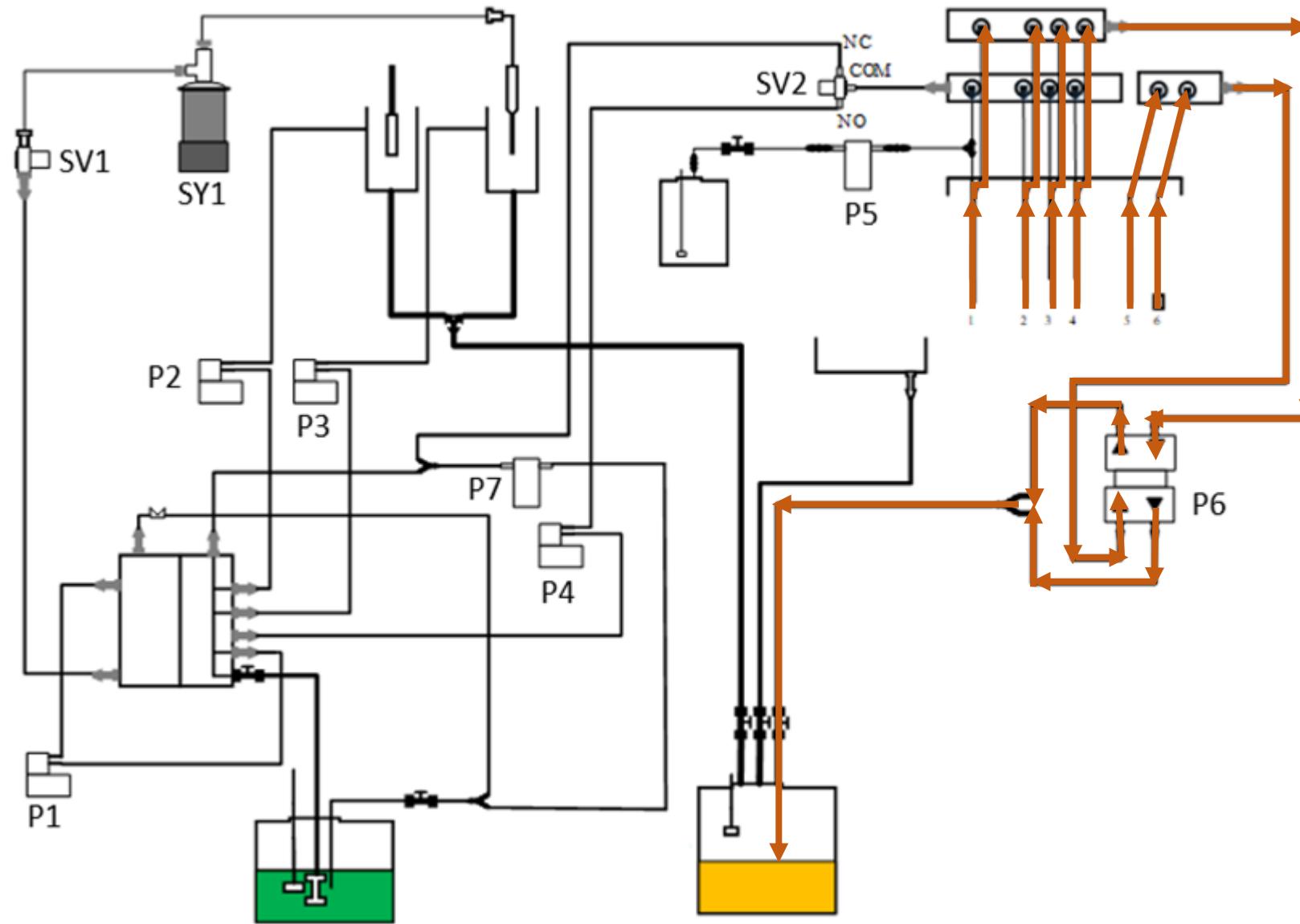
Cleaning sample probe exterior



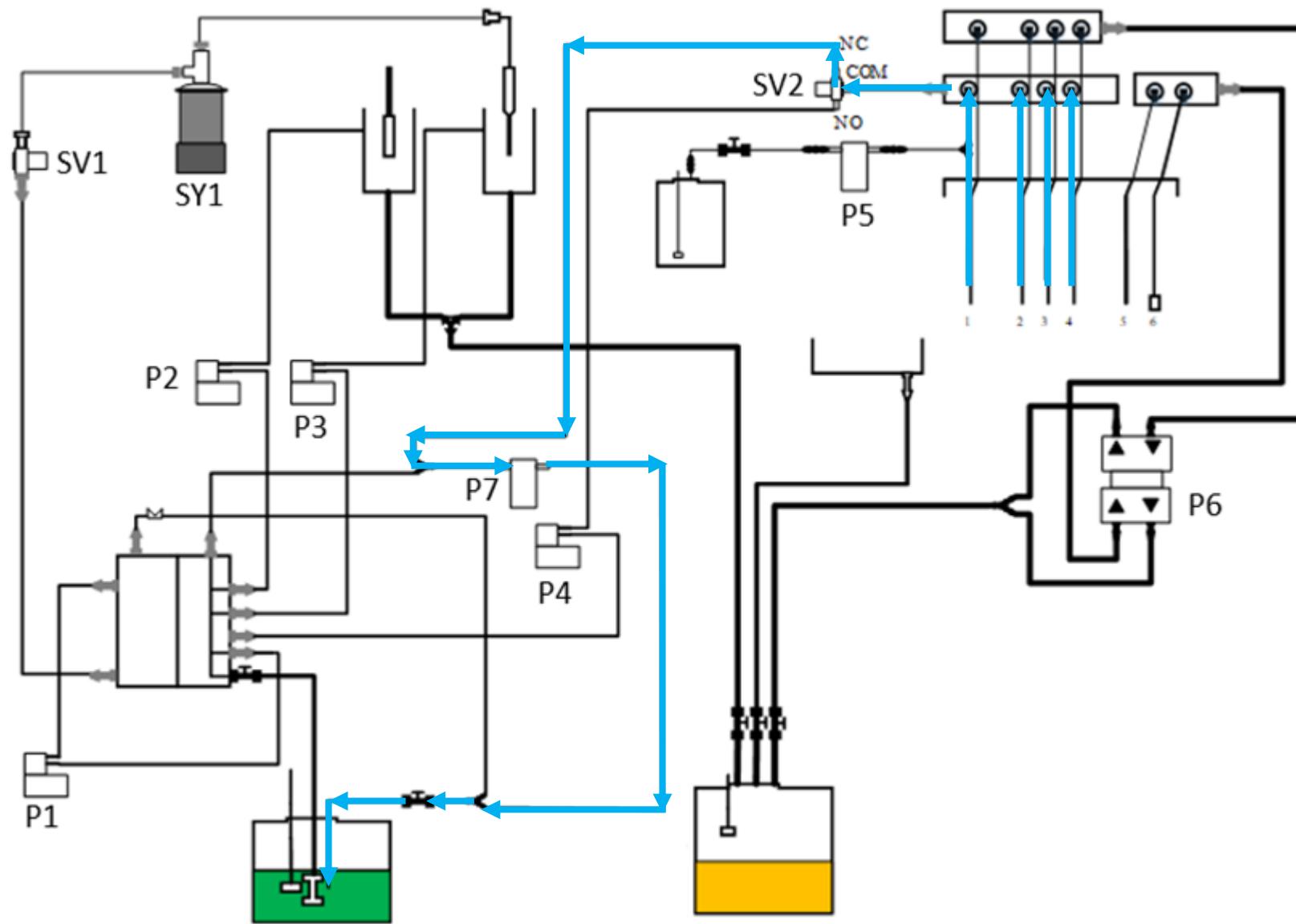


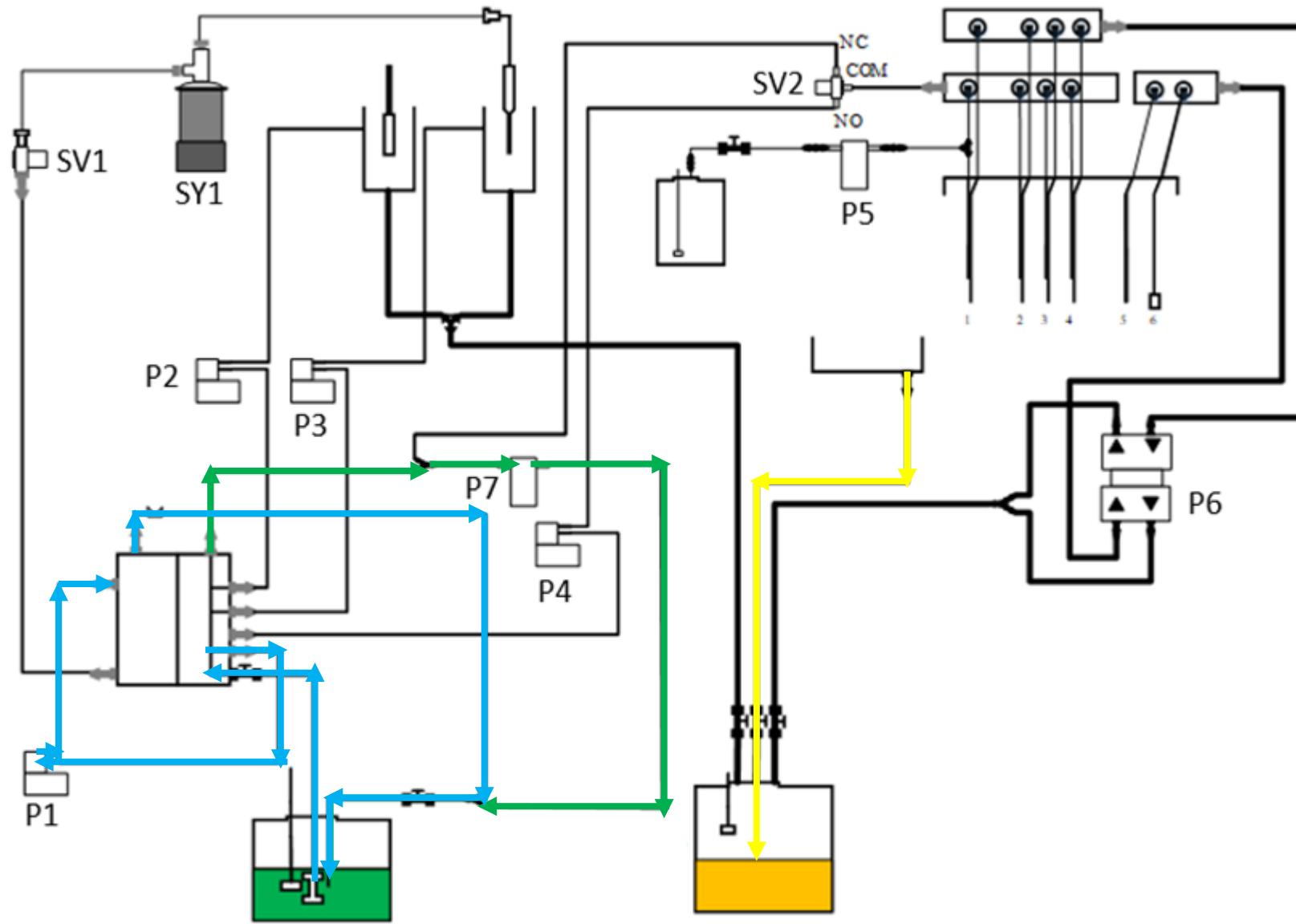






Pump back purified water from cleaning probe





07

Trouble Shooting

Too weak light

◆ **Fault phenomenon :**

1. Light source is too weak;
2. Dirty cuvette.

◆ **Causes :**

1. The interior /exterior of cuvettes are dirty, such as liquid overflow from reaction disk to cuvettes;
2. Cuvettes damaged;
3. AD resistance configuration too low;
4. Lamp aging or damaged.

◆ **Solution :**

1. Check the interior /exterior surface of **cuvette**, do the cleaning if cuvettes are dirty;
2. Check whether there is any liquid dropping from cleaning needles or liquid overflow from the reaction disk, and ensure that **wash station** injection and drainage are normal;
3. If AD value is too low, configure the resistance value according to debugging process. If the configuration is not successful, light source is defective, replace it.

Too bright light

Fault phenomenon :

1. Cuvette blank test out of range;
2. Light source intensity is too high.

◆ Causes:

1. Cuvette damaged;
2. AD resistance configuration too high;
3. Lamp aging or damaged.

◆ Solution :

1. If cuvette damaged, replace it;
2. If light source configuration is too high, reconfigure the AD value according to the debugging process;
3. If AD value cannot be configured, and AD value of some channels exceeds 32000, then lamp is aging, replace the lamp.

Liquid level detection issue (Probe touch the bottom of bottle /)

◆ Fault phenomenon :

Insufficient reagents or samples.

◆ Causes:

1. Liquid drop hanging on sampling probe;
2. The sampling probe is stuck;
3. Liquid level detection board defective.

◆ Solution:

1. If the sampling probe is filled with water, ensure the tightness for the tubing of sampling probe, dry the probe by cotton swab, then assemble it back;
2. Replace the **sampling probe**. If the fault phenomenon disappears, then the problem from the sampling probe . Replace it;
3. Replace the **liquid level detection board**. If the fault phenomenon disappears , then the problem from the liquid level detection board. Replace it.

Needle

◆ **Fault phenomenon :**

Reagent/sample probe collided in vertical direction.

◆ **Causes :**

1. The reagent/sample probe is not above the wash pool before start up, the movement is blocked;
2. Insufficient reagents, samples, and acid & alkali cleaning solutions;
3. Reagent/sample probe stuck in probe sleeve;
4. Signal transmission error due to abnormal power supply.

◆ **Solution:**

1. Check if the collision caused by insufficient reagents/samples. If yes, replace the reagents/samples and refresh software status/re-enter the reagent information ;
2. If reagent/sample probe movement is blocked, shut down analyzer, move the probe above the wash pool, and restart the analyzer ;
3. If the reagent/sample probe stuck in probe sleeve, readjust the position of the sliding sleeve , clean rusty spot from the surface of the probe ;
4. Turn off the machine, move the reagent/sample probe and stirrer above the wash pool, and restart the analyzer

Reaction disk

◆ Cause:

1. There is crystals inside the tube of cleaning needles, and aspirating needles is blocked;
2. **Fluid confluence module leaking or blocked;**
3. Too much liquid injected from cleaning needles;
4. **Suction pump damaged.**

◆ Solution:

1. Clean the cleaning needle(Wash station), check whether the fluid **confluence module** is blocked;
2. Enter debugging interface of software, execute the combined cleaning command, confirm the liquid flow speed from output side of cleaning needle;
3. Check whether the **suction pump** works normally or not. If the **suction pump** damaged, liquid will drop from cleaning needle.

Unable to apply sample

Cause :

1. Insufficient or expired reagents;
2. Uncalibrated or expired calibration.

Solution:

1. Check the actual remaining volume & status of reagents;
2. Confirm that whether reagents had calibrated or whether calibration already expired.

THANK YOU

•**Zybio Inc.**, Floor 1 to Floor 4, Building 30, No.6 of Taikang Road,
•Block C of Jianqiao Industrial Park, Dadukou District, Chongqing, China 400082
•Tel: +86 (0)23 6865 5509 Fax: +86 (0)23 6869 9779
•Email: info@zybio.com Website: www.zybio.com