Operation Manual

AutoMAX-200

Fully Auto Biochemistry Analyzer

Manufacturer
Avecon Healthcare Pvt. Ltd
Plot No. 338, Sector-2, Industrial Growth Centre Saha, Haryana, India-133104

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Preface

Thank you for purchasing biochemistry analyzer.

This manual introduces safety and the correct use of biochemical analyzer, read it carefully before use.

Product Name: Fully Auto Biochemistry Analyzer

Type/Model: AutoMAX-200

Applicable Software Code: B2.0

Scope of application: Quantitative analysis of clinical chemical components in serum, plasma, urine, cerebrospinal fluid and other samples.

Manufacturer: Avecon Healthcare Pvt. Ltd

Address: Plot No. 338, Sector 2, Industrial Growth Centre, Saha, Haryana (India)-133104

Customer Service department: Avecon Healthcare Pvt. Ltd.

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Precautions in using this manual

- Before using the biochemistry analyzer please read this manual thoroughly and understands it for relevant operation instructions.
- Without permission, can't copy and duplicate any manual chapters.
- Please keep this manual properly for convenient use.

Whom and what this manual is for

This manual is written for clinical laboratory professionals, explain how to operate biochemical analyzer

- Intended User

People who received professional training will available to read this user manual to learn more information about analyzer. It is necessary to read it carefully before using.

- Purpose

Help user to understand the performance of analyzer well and operate machine well.

Safety symbol marks used in this manual

Ensure to understand well of below signs, it is important to you!

When you see...	Then...
Warning	This signs is warning you that a wrong operation will cause serious injury.
Caution	This sign is warning you that machine system was damaged or in an unreliable situation.
Note	This sign warning you some important information that requires your Note.
Biohazard	This sign warning you that will cause a potentially biohazardous condition.

Labels used on the System

The labels attached to the panels of the system use symbols to clarify the meaning of the text. The list below shows the symbols that are used on the analyzer.

Symbol	Meaning
	Serial number
	Biohazard Warning: risk of potentially biohazardous infection
|	ON(main power)
○	OFF(main power)
~	Alternating current
IVD	In vitro diagnostic medical device
	Date of manufacture
	Manufacturer

	Use by
	Temperature limitation
	Atmospheric limitation
	Humidity limitation
	Separate collection of electronic and electrical appliances
EC REP	Authorized representative in the European Community
CE	The device is in full compliance with the regulation IVDR/746

Warranty

- Professional use only.
- 1 year warranty since purchase date, except below conditions:
  - Damage cause of natural calamities, such like flood, fire etc.
  - Wrong operation.
  - Consumables and accessories.
  - Damage cause of customer open or repair machine without authorization.
  - Damage cause of aspirating strong corrosive materials.
  - Wrong operation cause software crash.

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1. Safety cautions and installation environments

1.1. Safety cautions

For safety and effective use, please obey the following conditions.

■ Prevention of Breakage and Flammability

Warning

- Analyzer must be installed in right place and good conditions refer to the manual.
- Analyzer has to be installed in an unsuitable environment, please contact technical support first.
- It is forbidden that removing any screws and fasteners on the rear panel of machine during instrument normal operation.
- Before operation, please close protective barrier and do not open the protective barrier during operation.
- Tool for removing instrument protective barrier and/or enclosure guarding, which is kept by the equipment management department.
- The analyzer must be used in the condition of good grounding, and should be independent power supply, input voltage should be in accordance with the requirements of the instrument.
- Do not use wet hands to touch power, otherwise there is a risk of electric shock.
- Don't trample, twist, pull wires and cables, and if the wires and cables break off the fire.
- Before cutting off the total power supply equipment switch, non-professional repair personnel do not open the back cover and side cover.
- If there is a liquid into the instrument internal or internal pipe leakage, please immediately close the total power supply, and promptly contact the company's after-sales service personnel.
- When the instrument works, do not touch the sample probe, reagent probe and mixing rod and other moving parts. Do not hand into the open parts, otherwise damage may cause physical injury or instrument.
- When changing the light source, cut off the power supply, and wait for the light source to cool down.
- Should be strictly in accordance with the User's Manual for regular maintenance and maintenance of the instrument, otherwise it may cause the instrument malfunction or impact the accuracy and precision of the instrument test.

- To ensure that the use of the fully-automatic biochemical analyzer under the conditions specified in the user manual; if the condition is not used, the instrument may not run properly, the measurement results will be unreliable, and may damage the instrument components or cause damage to the body.
- Do not use combustible dangerous goods around the instrument.
- In order to avoid the fault caused by the moving biochemical analyzer, please contact our after sale service department.
- Please use the equipment in a manner specified by the manufacturer, or the protection provided by the equipment may be impaired.
- Please use mains power cord only provided by manufacturer. It is not allowed to use mains supply cord with inadequate rating.

■ Preventing infection

Biohazard

- Inappropriately handling test solution, waste solution may lead to biohazardous infection. Do not touch the test solution, waste solution with your hands. Wear gloves and lab coat, and goggles if necessary.
- In case your skin contacts the test solution or waste solution, follow standard laboratory safety procedure and consult a doctor.
- Discarded or faulted medical devices in accordance with local regulations require the first disinfection, and then harmless treatment.

■ Preventing Personal Injury Caused by Lamp house

Warning

- Light sent by the lamp house may hurt your eyes. Do not stare into the lamp when the system is in operation.
- If you want to replace the lamp, first switch off the MAIN POWER and then wait at least 15 minutes for the lamp to cool down before touching it. Do not touch the lamp before it cools down, or you may get burned.

■ Precautions on use

For getting best test results, please obey the following conditions.

Note

- Please don't shaking or touch machine when it is working; otherwise will influence test result.
- Quality control is necessary to use for checking machine in good work condition or not.
- Daily maintenance is very important. Unstable test results and short service life most cause of carelessness.
- Process calibrator, controls and reagent please refer to their instruction.
- Volume of sample and reagent, corrected value of wavelength and incubation time must accord with the instruction of reagent kits , calibrator kits or control kits.
- Any doubts of operation, please read user manual first.
- The samples cannot be mixed with fibrin, impurities and other insoluble substances.

1.2. Installations environments

Caution

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

1.2.1. Installation environment conditions

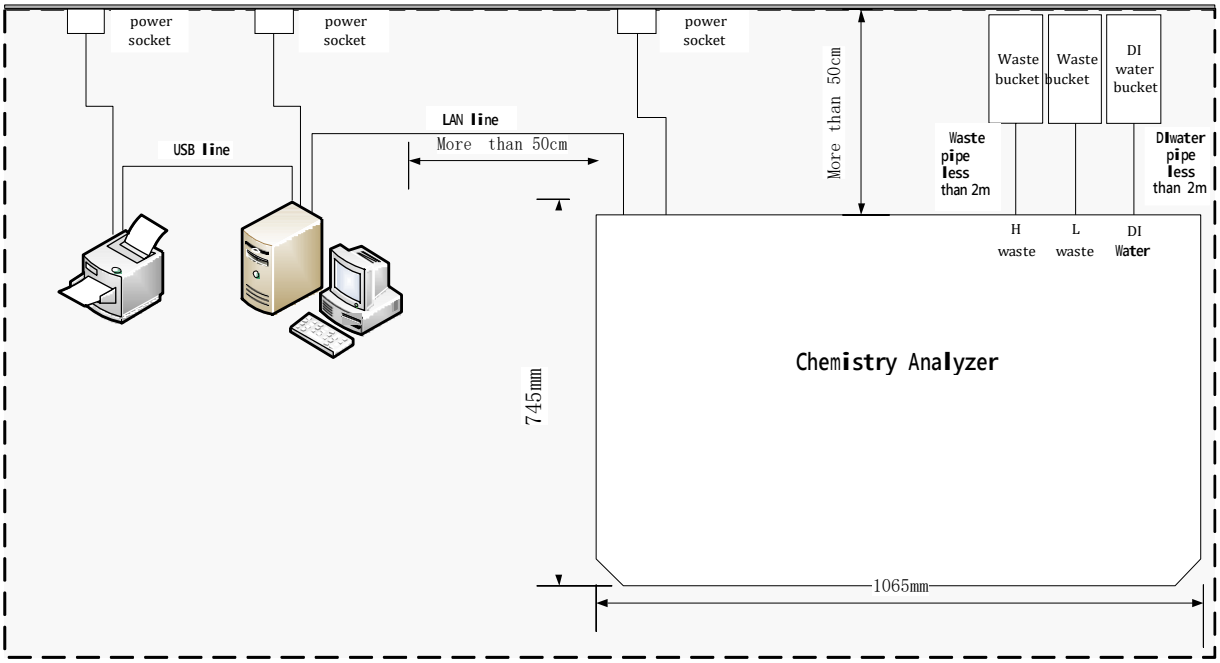
- The instrument is for indoor use only.
- The bearing platform should be level (gradient less than 1/200).
- The carrying capacity of the bearing platform should be more than 200 kg.
- The bearing platform should be free of shaking.
- The installation site should be well ventilated.

Caution

The instrument radiates heat while operating. A well ventilated environment helps keep the room temperature stable. Use ventilation equipment if necessary.

- 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 site should not be disturbed by large noise or power supply.
- The instrument 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 instrument. Electromagnetic waves generated by those devices may interfere with operation of the instrument.
- The altitude height of the installation site should be lower than 2000 meters.

Instrument setting diagram



Caution

The equipment connected to the analyzer interfaces, e.g. computer, must be complied with the requirement of current edition of IEC 60950-1 or EN 60950-1.

Caution

Chemical analyzer and computer, printer cannot be connected in the same power socket.

1.2.2. Temperature, Humidity and Atmospheric pressure Conditions

- Temperature limitation: 10℃~30℃, with fluctuation less than ±2℃/H.
- Humidity limitation: 30%RH - 80%RH, without condensation.
- Atmospheric limitation: 86KPa~106 KPa.

Caution

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

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

1.2.3. Power Requirements

- Power supply: AC 230V, 50Hz (AutoMAX-200-1); AC 110V,50/60Hz(AutoMAX-200--2).
- Power: 500VA.
- The distance between the power socket and the system should be less than 2.5 meters.

Warning

To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.

Warning

Mains plug or appliance coupler is intended to be used as isolation device from the supply mains. Please always make mains plug or appliance coupler easily to operate.

1.2.4. Liquid requirements

Distilled water: electrical conductivity less than 1μs/cm.

2. System description

2.1. Outline of functions

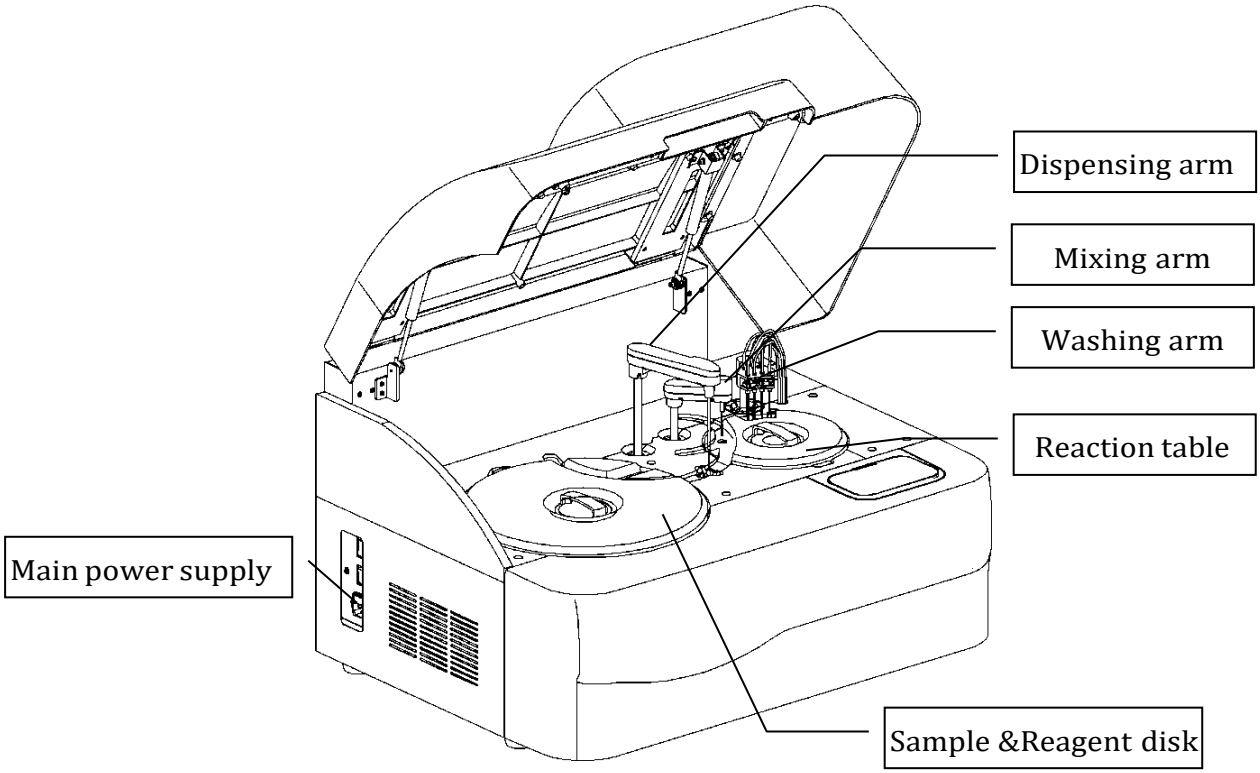
The instrument is biochemistry analyzer for in vitro diagnostic use in clinical laboratories and designed for in vitro quantitative determination of clinical chemistries in serum, plasma, urine or cerebrospinal fluid samples.

Caution

Some samples may not be analyzed on the instrument based on parameters the reagents claim capable of testing. Consult the reagent manufacturer or distributor for details

2.2. Appearance of instrument

AutoMAX-200 structure is as follows.



2.2.1. Reagent disk

Reagent container: outer ring 16ml, inner ring 32ml;

Reagent disk: 80 reagent position;

Reagent refrigerating system can keep cool about 8℃ when room temperature is 25℃for 24 hours

2.2.2. Sample disk

There are 40 sample positions in the sample disk.

2.2.3. Reaction table

The reaction disk is single circle, with a total of 44 semi-permanent plastic cuvettes, light path length is 6mm;

Reaction volume: 150μL~350μL;

Automatic cleaning of reaction cuvette: automatic cleaning and drying of reaction cuvette at the end of each test for next using.

Reaction table temperature: 37±0.1℃

2.3. Technical parameters

Machine type: Random access, open reagent & locked reagent (optional)

Test speed: Constant 200 tests/hour (mono reagent or double reagent)

Test principle: Colorimetric method, Turbidimetric

Test method: 1 point end, 2 point end, Fixed-Time, Kinetics

Calibration type: Linear & nonlinear

Sample cup type: Micro cup & test tube

Sample volume: 2-30μL, step by 0.1μL

Reagent volume: 20-300μL, step by 1μL

Reaction volume: 150μL -350μL

Reaction time: 10 minutes

Temperature: Peltier pad incubation system, reaction temperature (37℃±0.1 ℃)

Cuvette washing: 2*6 steps automatic washing

Size: AutoMAX-200: 745mm*540mm*530mm

Chemistry analyzer net weight: AutoMAX-200

65Kg Sound level: ≤40dB

Absorbance accuracy: 0.5±0.025, 1.0±0.07

Absorbance stability: ≤0.01

Absorbance repeatability: ≤1.5%

Clinical batch precision: ALT≤3%, Urea≤2.5%, TP≤2%.

3. Installation

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

3.1. Unpacking

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

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, contact our Customer Service Department or your local distributor immediately.

3.2. Connection

- Connect power cable from analyzer right side to power socket.
- Connect LAN cable from analyzer back side to operation computer LAN port.
- Connect DI water tube to DI water bucket.
- Connect H waste tube to waste bucket or direct to Drain Facilities.
- Connect L waste tube to waste bucket or direct to Drain Facilities.
- Connect DI water liquid sensor form DI water bucket to analyzer back side if necessary.
- Connect Waster liquid sensor form waster bucket to analyzer back side if necessary.

Caution

To ensure that no foreign body in the joint is required before connecting line.

The waste pipe cannot be bent, otherwise it will cause poor drainage.

Biohazard

Waste liquid handled in accordance with the local law, cannot be directly discharged.

Warning

Biochemical analyzer power supply line area shall not be less than 1 mm^2

4. Software installation and uninstall

4.1. Software installation environment conditions

4.1.1. Computer configuration requirements

CPU more than 2GHz;

Internal storage more than 4G;

Hard disk more than 500G;

Display more than 1024*768 pixels;

4.1.2. Operation system requirements

Win XP, Win 7, Win8, Win10 operation system. Please use the professional version or ultimate version.

4.2. Software installation procedure

Insert CD with the machine into the computer CD-ROM;

Running “setup.exe”;

The installation is completed, connect console computer and analyzer with LAN line, then running “BioAnalyzer2AT” in desktop.

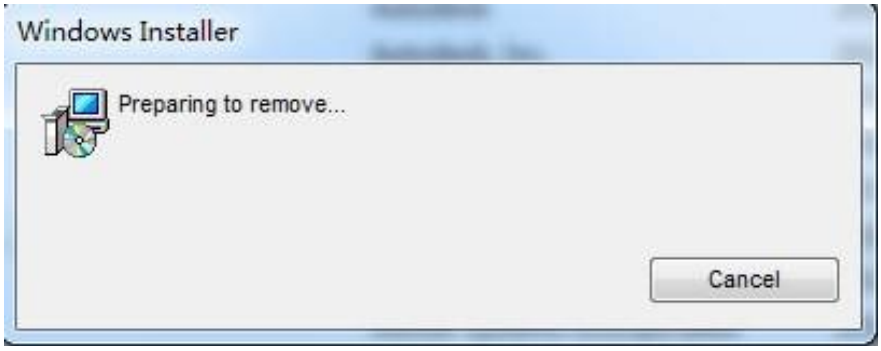
Note

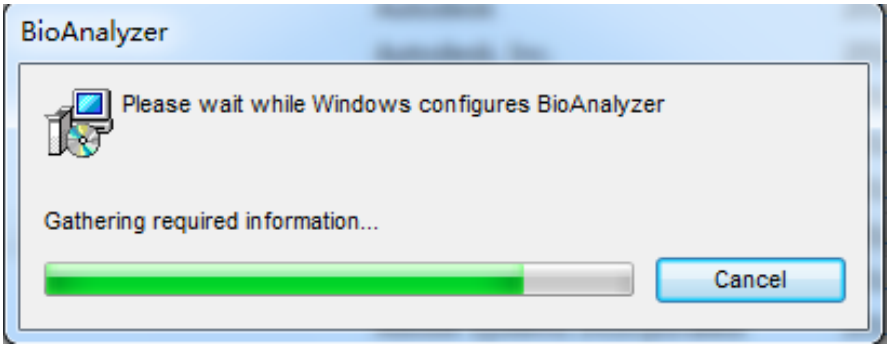
Please refer to “Auto Chemistry Analyzer Software Installation Manual.doc” in the software installation package for details.

4.3. Software uninstall procedure

Click "start" - "control panel" - "program" - right click "BioAnalyzer" - click "uninstall".

After the uninstall will display the following interface:





After the end of the scroll bar, uninstall successfully.

4.4. Data backup

Open the root directory of the analyzer software (default: D:/BioApp/App) , copy "Bio.mdf" and "Bio_1.ldf" database for backup. When you need to query the database data, you need to back up the original database, and then copy the backupdatabase to the new install root directory of the “Bio Analyzer 2AT" software.

5. Basic operation

5.1. General operating procedure

Preparing for analysis	Checking before power on ↓ Powering on ↓ Starting operation software ↓ Setting up the analyzer ↓ Preparing the reagents ↓ Air purge
Starting analysis	Programming Calibrators ↓ Programming QC ↓ Programming routine samples ↓ Editing test results ↓ Print test reports
Finishing analysis	Powering off ↓ Checking

Warning

Only use control, standard and reagents within their expiration date.

5.2. Preparing for analysis

5.2.1. Checking before powering on

You should do the following operations before starting the analyzer.

- Check the power supply and make sure it can supply proper voltage for the analyzer.
- Check the TCP/IP connections among the analyzing unit and computer. Make sure the connections are right and secure.
- Check the DI water bottle and liquid sensor connection well.
- Check the waste tube and liquid sensor connection well.
- Check the recycle liquid is sufficient.

5.2.2. Set IP address

You should set the console computer IP address as 192.168.2.123 before running software first time.

- Use “ip setting tool.exe” to set IP address automatically
- Manually set IP address

Note

Please refer to “ip setting method of control computer.doc” in the software installation package for details.

5.2.3. Powering on

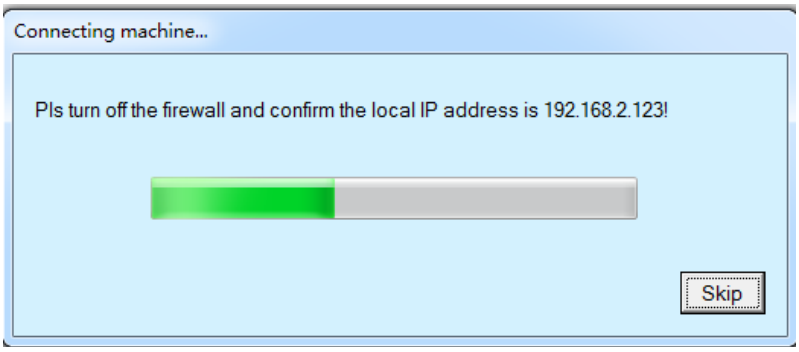
Power on the analyzer in the sequence presented below:

- Switch on the main power;
- Switch on the Device power;
- Switch on the Cooler power if necessary

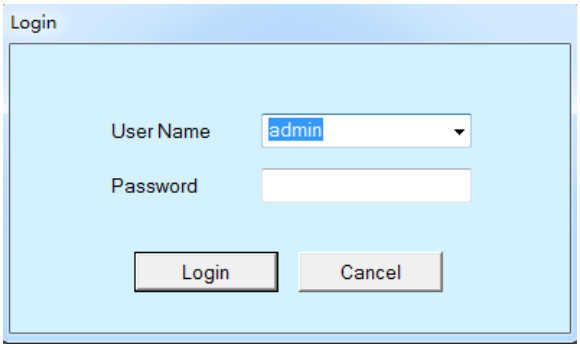
5.2.4. Starting the operation software

- Start the Windows operating system. Then double click

to start operating software
- System check the communication with the analyzer first. The connecting machine dialog box of the operating software is displayed if communication check work is in progress. If you need not to connect with the analyzer, you can click the Skip button.



- The *Login* dialog box of the operating software is displayed. Enter the username and password, and then select ***Login***.



5.2.5. Setting up the analyzer

The analyzer will not function properly unless it is properly set up.

You must complete all the following settings if this is the first time the analyzer being used.

Before requesting the tests, you must finish the following settings:

- Reagent settings: Select *Reagent→ Reagent settings*, and enter test parameters following the reagent package insert. Refer *6.1.1 Reagent settings* for details.
- Reagent status: Select *Reagent→ Reagent status*, and set up the reagent bottle information. Refer *6.1.2 Reagent status* for details.
- *QC settings:* Select *QC→QC settings*, and set up controls information. Refer *6.4.2 QC settings* for details.
- System settings: Select *System*, and set up profile, calculated test, Print Test, Dictionary, User, Report format, Test Order and LIS. Refer *6.6 System setting* for details.

5.2.6. Preparing the reagents

Load reagent bottles to their assigned positions on the reagent disk, and then open the bottles.

5.2.7. Air purge

Execute “Air purge” in maintenance window when you do analysis first time.

Air bubbles come into dispensing tube, Execute Air purge to get rid of those air bubbles. The flow path is filled with new water. Refer *6.5Maintenance* for details.

5.3. Starting analysis

5.3.1. Programming Calibrators

When using the system for the first time, you must run calibrations following these steps:

- Select ***Calibration→ Calibration register*** and register calibration for desiredtests. Refer to ***6.3.1 Calibration*** *register* for details.
- After registering calibrations, you should load corresponding calibrators to their assigned positions on the sample disk.
- Select the *Start Cond.* to start running the calibrators. Refer to *6.7 Starts Cond.* for details
- To view calibration results. Select ***Calibration→ Calibration*** *results* and select atest from the list. Refer to ***6.3.2 Calibration results*** for details.

5.3.2. Programming QC

It is recommended to run quality controls for each test every day and check if the system is running normally and steadily.

- Select ***QC→QC register*** and register QC for desired tests. Refer to6.4.**1*QC register*** for details.
- After registering QC, you should load corresponding QC to their assigned positions on the sample disk.
- Select the *Start Cond.* to start running the calibrators. Refer to 6.7*StartCond.*for details
- To view QC results. Select *QC→QC results* and select a test from the list. Refer to *6.4.3 QC results* for details.

Warning: Rated opening and closing

Exposure to the risk of injury

The instrument must be built on the cover. If you want to open the cover, please wait for the instrument to stop the movement.

Caution

The samples cannot be mixed with fibrin, impurities and other insoluble substances

5.3.3. Programming routine samples

Follow this procedure to analyze routine samples:

- Select ***Test → Sample register*** and register samples for desired tests. Refer to6.2.**1*Sample register*** for details.

- After registering sample, you should load corresponding sample to their assigned positions on the sample disk.
- Select the ***Start Cond.*** to start running the samples. Refer to 6.7 ***Start Cond.*** fordetails
- To view sample results. Select ***Test → Sample results*** and select a sample fromthe list. Refer to **6.2.2 *Sample results*** for details.

5.3.4. Editing test results

When analysis is finished, you can edit the test results if needed

To edit results of one or more sample runs, you can select ***Test → Sample results***.Then select the Sample NO. Which you want to edit and the ***Edit Sample*** button toedit desired test result on the popup dialog box. Refer to *6.2.2 sample results* for details.

5.3.5. Print test reports

Select ***Test → Sample results*** then select desired test results and click the ***Print* button**. Refer to ***6.2.2 sample results*** for details.

5.4. Finishing analysis

5.4.1. Powering off

When all analysis is finished, the system is in standby status.

After exiting the Windows operating system, switch off the Device power.

The refrigerator still functions after switching off the Device power. To shut down the refrigerator, switch off the cooler power and main power.

5.4.2. Checking

If the MAIN POWER is placed to OFF, take the reagents from the reagent disk and put them into an external refrigerator.

Remove the calibrators, controls and samples from the sample disk.

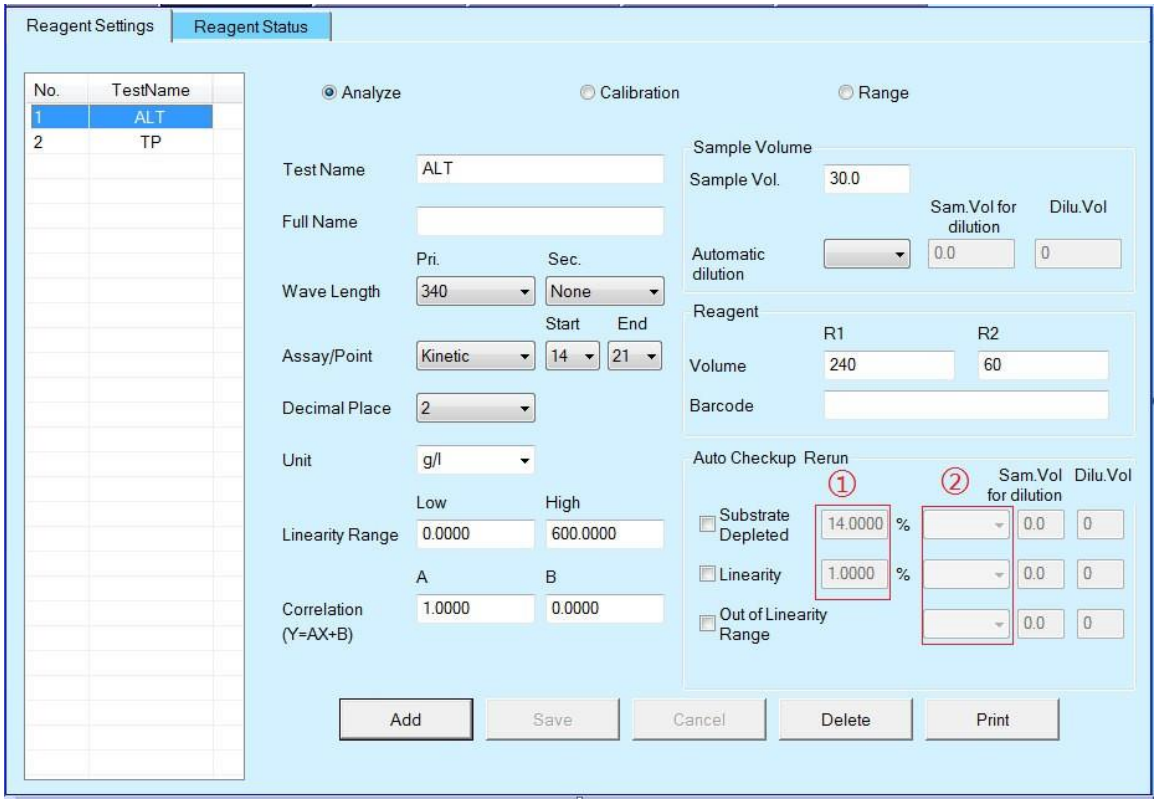
Check the surface of the analyzing unit for stains and wipe them off with clean soft cloth, if any.

Check the waste bucket and empty it if necessary.

6. Advanced operation

6.1. Reagent

6.1.1. Reagent settings



This screen allows you to set an assay code, photometric point, measuring wavelength, sample volume and reagent volume and other chemistry parameters.

You can edit the test configuration which you have set or add a new reagent test in this screen.

- Add: Click this button to add a new reagent test.
- Save: Click this button to save the configuration after adding or updating the reagent parameters setting.
- Delete: Delete the test you have set.
- Test name: Input a photometric test name to be used for screen display within 7 characters.
- Full name: input full name for printout in report format. It can be void.
- Wavelength: Select a primary wavelength in the left box and a secondary wavelength in the right box.
- For single-wavelength photometry, select “None” in the Secondary wavelength list box.

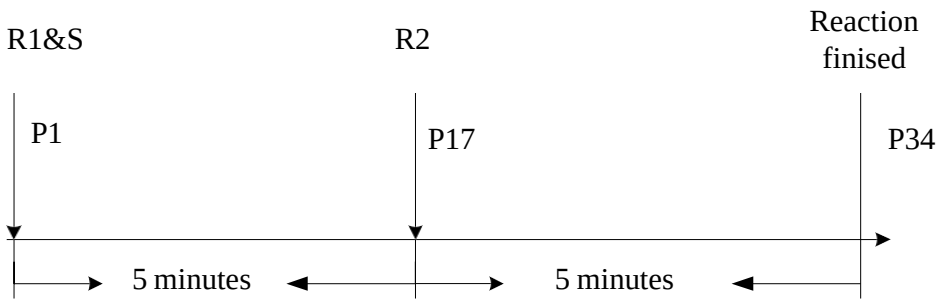
- Assay/Point: Select an assay mode (1point end, 2point end, Fixed-time, Kinetic); then Input photometric points. AutoMAX-200 test cycle is 18 seconds, cycle number is 34.

For the 1 point end method, the point refers to the end of the reaction. Only the end points need to be inputted.

For the 2 point end method, the start point refers to the R1 and sample mixture. The end point refers to the end of the reaction.

For the Kinetic or Fixed-time method, the start and end point refers to the interval between the points when the reaction becomes stabilized.

When entering the reaction time in period, please refer to the following reaction procedure.



Warning

For more details about assay and point setup, please refer to appendix 1 Test Method explanation.

- Decimal Place: Select the number of decimal place of test result (0,1,2,3,4).
- Unit: Select or input the test result unit.
- Linearity range: Input linearity range of test result.
- Correlation factor: Input instrument factors (A: gradient, B: intercept) for correcting the result of the measurement.
- Sample volume:

  Sample Vol.: It refers to the sample volume to be dispended for the reaction. It ranges from 2 to 30μL.

■ When automatic sample dilution function is used:
Left box: Select the sample dilution ratio.
Sam. Vol for dilution: It refers to the volume of the sample to be aspirated when auto diluting. It ranges from 2 to 30μL.
Dilu. Vol. : Input a dilution volume when dilution ratio is selected as Custom. The total volume of liquid must be brought to 150μL or more due to stirring.

- Reagent:

■ Volume: For R1 and R2, input a reagent volume. After addition of R1, R2 is added in about 3minutes.

Input a reagent volume in a range of 20 to 300μL. Input "0" when reagent pipetting is not desired. The minimum volume that allows absorbance measurement is 150μL.

- Barcode: Input the code number of the reagent bottle .For the reagent bottle without barcode, the bottle code need not be input.

- Auto Checkup Rerun

Substrate Depleted:

① combox: Input the percentage of substrate depleted.

② combox: It refers to the dilution ratio to the dilute the sample when auto rerunning.

Sam. Vol. for dilution: It refers to the volume of the sample to be aspirated when auto rerunning. It ranges from 2 to 30μL.

Dilu. Vol. : Input a dilution volume when dilution ratio is selected as Custom.

Unselected the check box means that the check is not performed.

The substrate depleted limit range is anywhere from 0% to 100%, and the default is 50%.

Linearity:

① combox: Input the percentage of Linearity.

② combox: It refers to the dilution ratio to the dilute the sample when auto rerunning.

Sam. Vol. for dilution: It refers to the volume of the sample to be aspirated when auto rerunning. It ranges from 2 to 30μL.

Dilu. Vol. : Input a dilution volume when dilution ratio is selected as Custom.

Unselected the check box means that the check is not performed.

The linearity limit range is anywhere from 0% to 50%, and the default is 1%.

Out of Linearity Range:

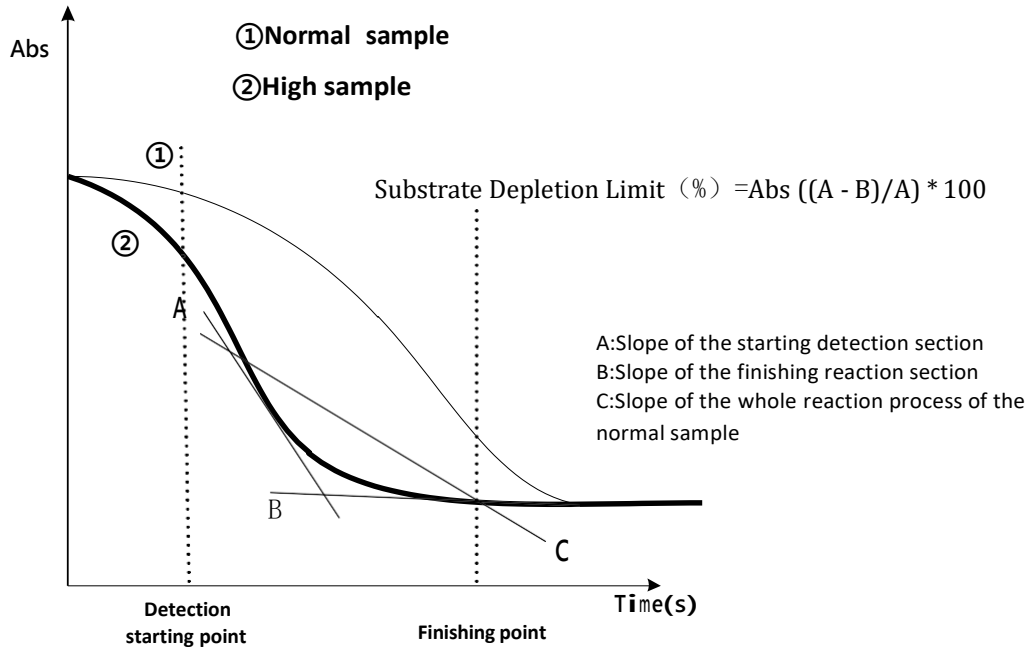
② combox: It refers to the dilution ratio to the dilute the sample when auto rerunning.

Sam. Vol. for dilution: It refers to the volume of the sample to be aspirated when auto rerunning. It ranges from 2 to 30μL.

Dilu. Vol. : Input a dilution volume when dilution ratio is selected as Custom.

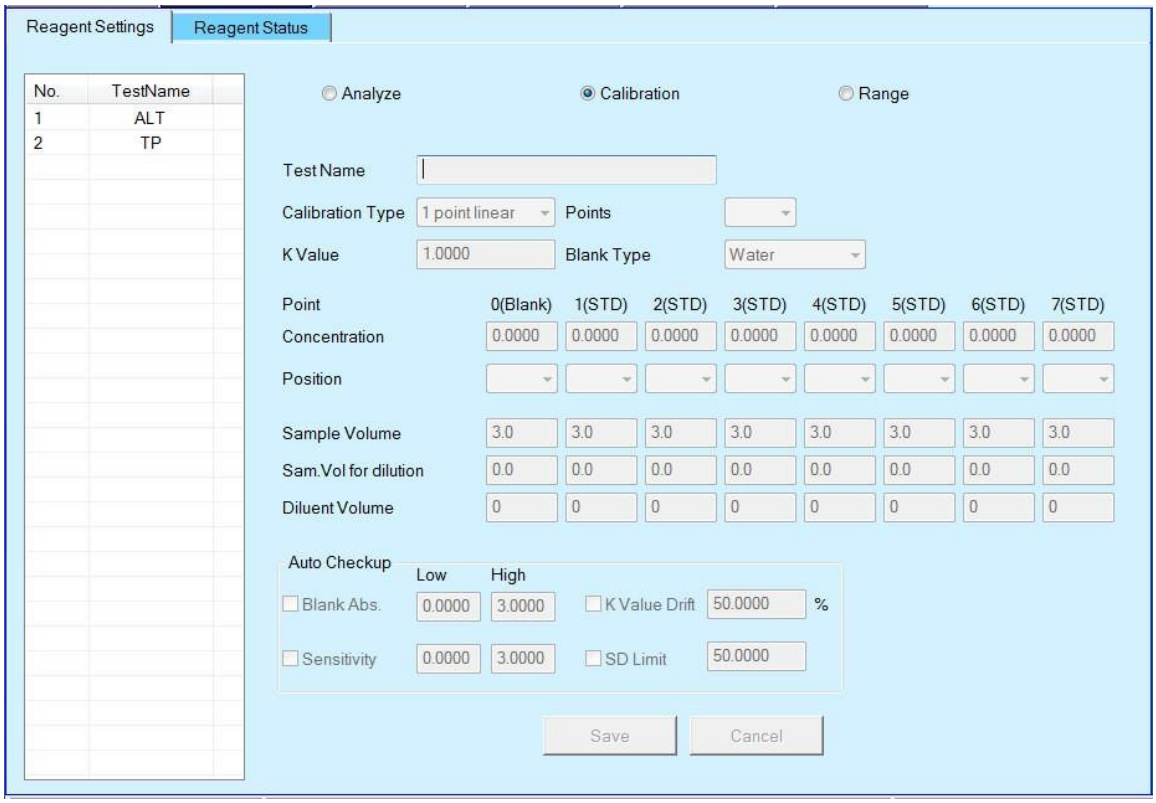
Unselected the check box means that the check is not performed.

Check rules:
The curve of substrate depleted is as follows:



Substrate Depleted: The double reagent test is checked starting with the addition of R2, the single reagent test is checked starting with the addition of the R1+S.
The slope of the starting check (slope of 3 first point) is defined as A and the slope of 3 last point is defined as B. The substrate depletion limit(%) = Abs ((A - B)/A) * 100.
If the substrate depletion limits of the reaction exceed predestined limit, the test substrate is depleted in advance. If substrate depleted is enabled, the alarm (SUBDE) is attached to the result. If substrate depleted is enabled and the automatic rerun dilution ratio for substrate depletion is set, the automatic rerunning is triggered at the same time that the alarm (SUBDE) is attached to the sample result.
Linearity: 1, The absolute value of the ratio that the slope coefficient A of the starting section minus slope coefficient B of the finishing reaction section to the slope C of the whole reaction process , which is the linearity limit of the test. The linearity limit (%) = Abs((A-B)/C)* 100.
If the linearity limits of the reaction exceed predestined limit, the test has exceeded linearity limits. If linearity is enabled, the alarm (LINE) is attached to the result. If linearity is enabled and the automatic rerun dilution ratio for linearity is set, the automatic rerunning is triggered at the same time that the alarm (LINE) is attached to the sample result.
2, If the overall absorbance points in whole reaction process are more than 8, collecting 6 points at the beginning section and the finishing section of reaction. If the overall absorbance points in whole reaction process are between 4 and 8, collecting 3 points at the beginning and finishing section of reaction. N represents the number of collecting points.

3, Slope coefficient A of the beginning reaction section = Slope of the beginning reaction section (the N-1 point from the starting point to the starting point) *N; Slope coefficient B of the finishing reaction section = Slope of the finishing reaction section (the N-1 point from the finishing point to the finishing point) *N;

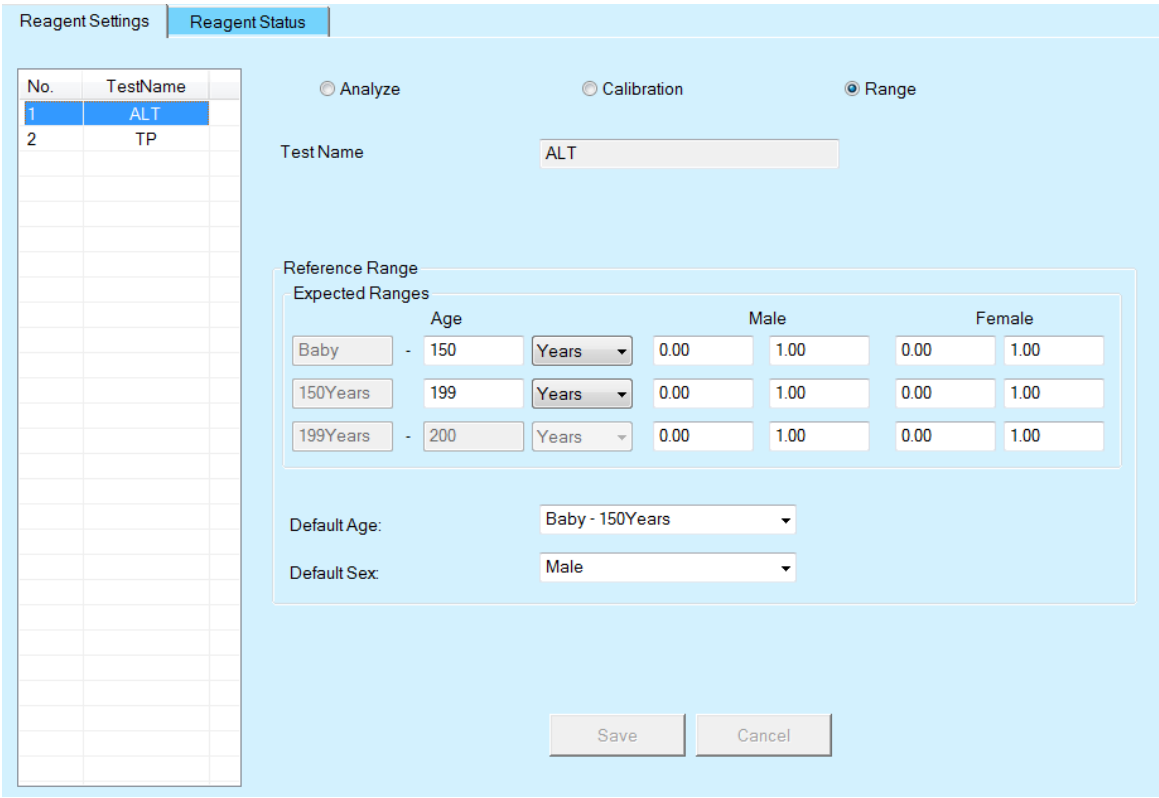


- Calibration type: Select a calibration type.
- Points: Input the number of standard solutions to be used for calibration (1 to 8)
- K value: Input K value when calibration type is 1 point linear.
- Concentration: Input concentration of standard solution. When preparing multiple dilution lines with a single standard solution, input concentration after dilution.
- Position: For point 0, select water blank or reagent blank. For point 1-7, select a position of standard solution on sample disk.
- Sample volume: Input a sample volume of standard solution. When diluting the standard solution with the sample dilution function, input a sample volume before dilution.
- Sam. Vol for dilution: It refers to the volume of the sample to be aspirated when auto diluting. It ranges from 2 to 30μL.

  To avoid dilution, input ”0”.
- Diluent volume: Input a diluent volume when the standard solution is diluted with the sample dilution function.

  The total volume of sample and diluent must be brought to 150μL or more due to

stirring.
To avoid dilution, input"0".



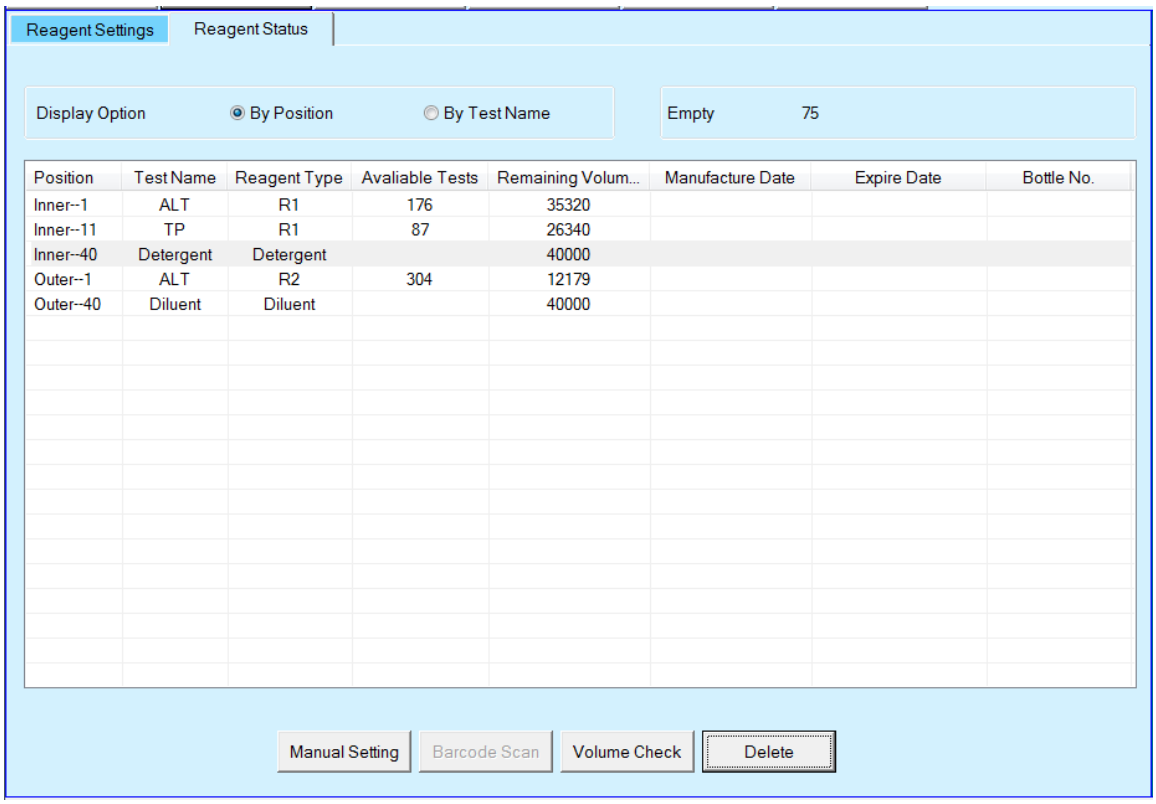
Input the test result range, if the final result is out of the range, it will be marked L or H in the result list and report.

Reference Ranges: Set expected ranges in 3 age blocks each for male and female. Input an upper limit of age (baby to 200) for application of the specific range, unit of age (Years, Months or Days) and upper and lower limits of the specific range in this order from the left.
The specific range at the 3rd stage is applied to the age exceeding the input one at the 2nd stage.

Default Age: set the default age for sample if its age is not input in Test windows->Sample results->Sample edit.

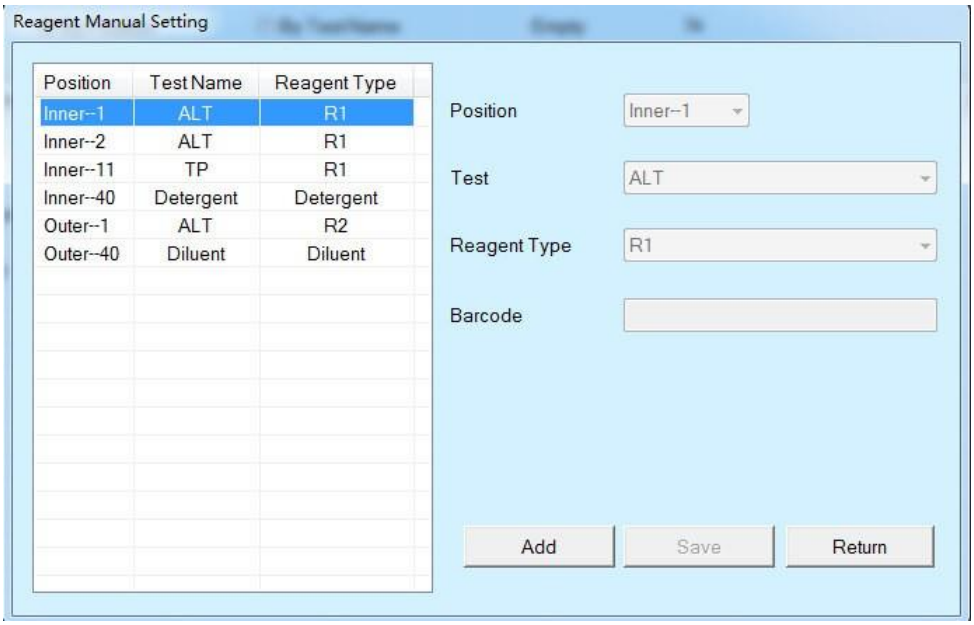
Default Sex: set the default sex for sample if its sex is not input in Test windows->Sample results->Sample edit.

6.1.2. Reagent status



This screen allows you to set the reagent bottle information after Reagent settings, and then load reagent bottles to their assigned positions on the reagent disk.

- Display option: Choose a display order of below reagent list;
- Empty: Display how many positions are idle of reagent disk;
- Reagent information list: Information on the reagent bottle loaded in the reagent disk is displayed.
  - Position: The reagent bottle loading reagent disk number is displayed.
  - Test name: The test name, diluent are displayed;
  - Reagent Type: The reagent type (R1, R2), diluent, detergent are displayed;
  - Available Tests: The number of available tests that has been calculated from the remaining volumes of all the reagents to be used is displayed.
  - Remaining Volume(UL):The remaining volume of reagent is displayed.
  - Manufacture Date: The manufacture date of reagent is displayed.
  - Expire Date: The expire date of reagent is displayed.
  - Bottle No.: The number of reagent bottle is displayed.
- Manual setting button: Click this button to open the Reagent Manual Setting window.
  In this window, you can register bottle information for a reagent bottle. Refer below for details.
- Delete button: Click this button to open the Delete window.
  In this window, you can delete manually registered reagent bottle information.

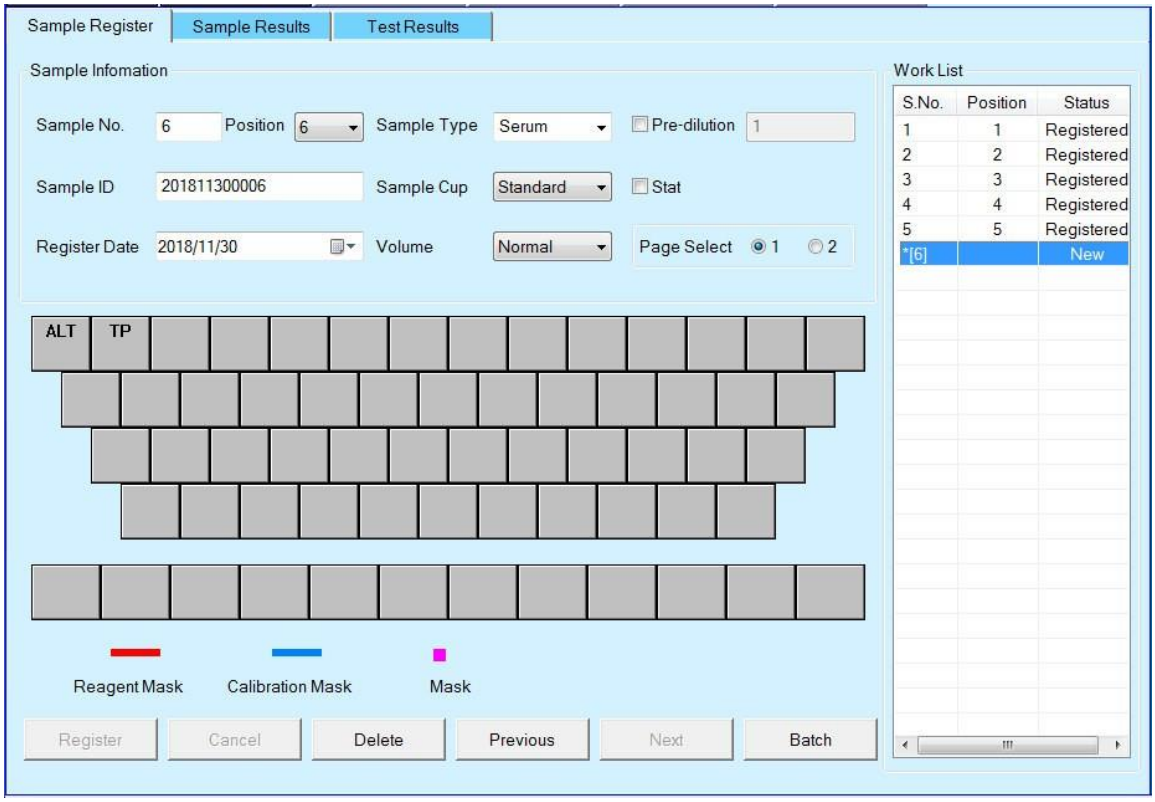


Follow this procedure to set the reagent information

- Position: Select a position;
- Test: Select a test;
- Reagent type: Select singe reagent or double reagent of this test;
- Barcode: Display the input barcode of the reagent.
- Add: Add a new reagent test.
- Save: Click this button to save configuration of reagent.
- Return button: Click this button to return Reagent status window.

6.2. Test

6.2.1. Sample register



This window allows you to register tests for routine and emergency samples.

- Sample information:
  - Sample No.: Input a sample number, it is also the test sequence of samples except emergency;
  - Position: Select a position number on sample disk (AutoMAX-200:1-40);
  - Sample type: Select a sample type;
  - Pre-dilution: If the sample has already diluted before register, select this check box and input dilution factor in right box, the test result will multiply this factor automatically;
  - Sample ID: Input a sample ID number;
  - Sample cup: Select a sample type (Standard Cup or Micro Cup).For use of a test tube, select Standard Cup;
  - Stat: Select the check box if the sample is emergency, and it has highest test priority;
  - Register Date: Select the register date of the sample, the default is current operation system date;
  - Volume: Select a sample volume(Normal);
  - Page select: Select test key pages 1 and 2.
- Test keys:

Use these keys for test selection.
When a test key is selected, it is highlighted in blue.
The keys on the top to the fourth row are available as test keys.
The bottom (fifth)row contains profile keys for grouped tests registered in the *System setting*/*Profile* settings window.

Reagent mask: Indicates that automatic masking has been made such a condition as insufficient remaining volume of reagent.

Calibration mask: Indicates that automatic masking has been made such a condition as insufficient remaining volume of standard solution.

Mask: Indicates that masking is provided in the *global menu*/*Start Condition* window.

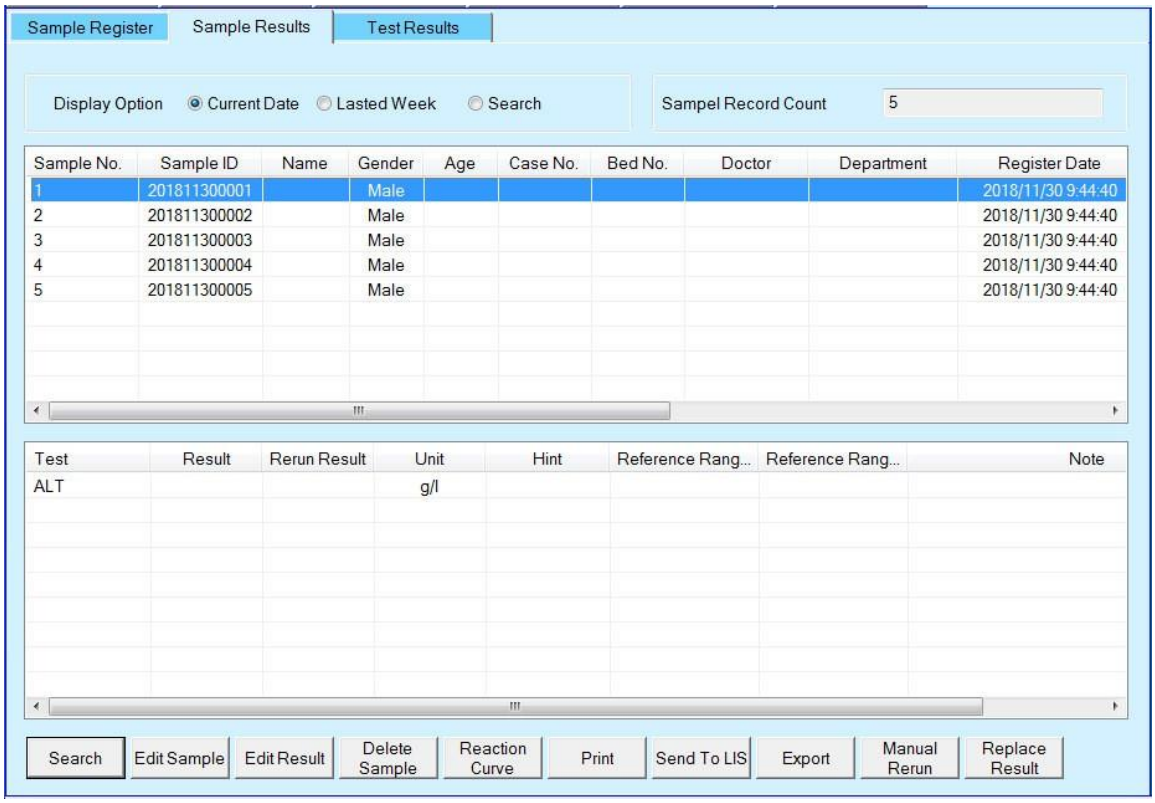
- Work list: Display the registered sample after clicking register button.

  S.No.: Display the sample number of registered sample after clicking register button.

  Position: Display the position on sample disk of registered sample after clicking register button.

  Status: Display the status (Registered, New) of the sample.
- Register button: Click this button to save test selection information, update the work list and increment the sample number by one so that test selection can be made for the next sample.
- Cancel button: Click this button to cancel any modification of the window.
- Delete button: Click this button to open Delete samples window. In this window, you can delete samples has already registered.
- Previous button: Click this button to display test selection information on the previous sample.
- Next button: Click this button to display test selection information on the next sample.
- Batch button: Clicking this button opens the Batch Test Selection window.
  To register the same test, sample type, sample cup, sample volume, for two or more samples, select a test for the first sample for collective entry and click the OK button instead of the Register button.

6.2.2. Sample Results



This screen allows you to check/edit the respective measurement results of routine samples, view the reaction process, and print out the report.

- Display option: Select a condition for listing.
  - Current date: Only the Information on all samples registered on current day is displayed.
  - Lasted Week: Only the information on all samples registered on lasted week is displayed.
  - Search: Only the information on the sample specified in the Search window is displayed.
- Sample record count: The number of samples registered in the selected data source is displayed.
- Search button: Click this button to open Search sample window.

  In this window, you can set a search condition for the sample to be displayed in the sample list.
- Edit Sample button: Click this button to open Edit sample window.

  In this window, you can edit sample information.
- Edit Result button: Click this button to open Edit result window.

  In this window, you can edit measurement results.
- Delete result/sample button: Click this button to open delete result window.

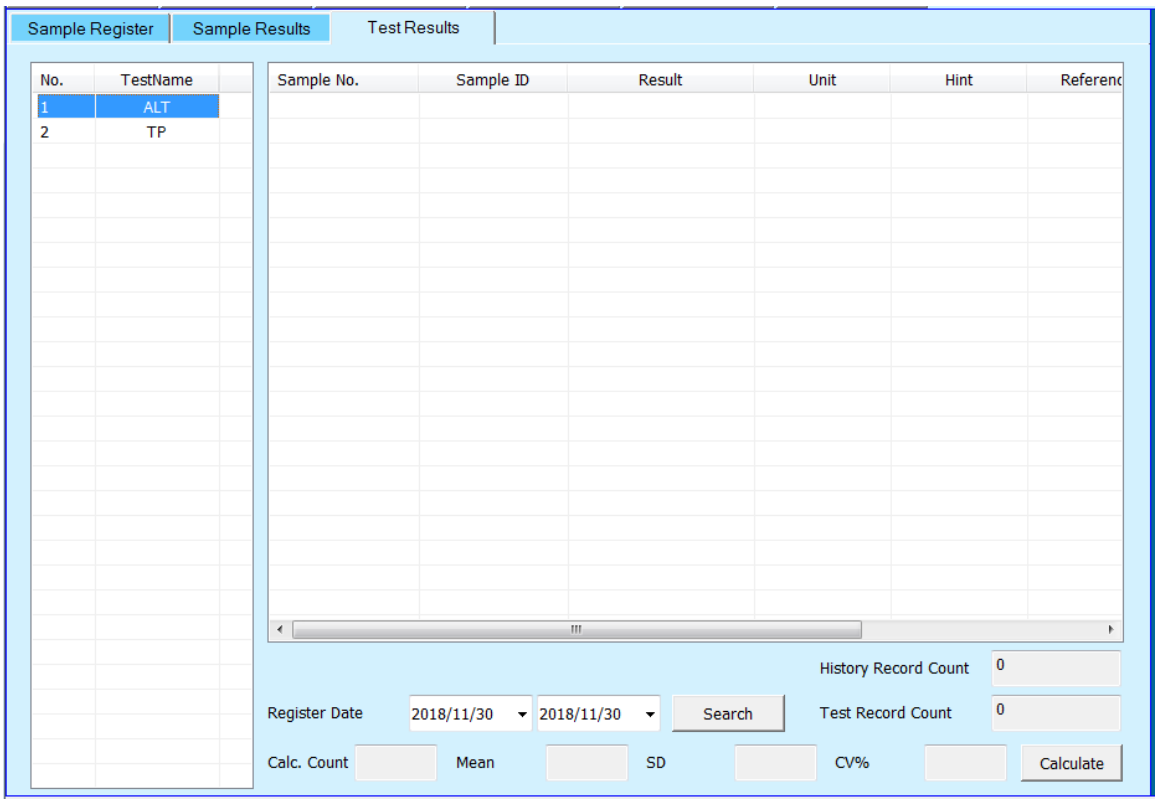
  In this window, you can delete selected sample or result.
- Reaction curve button: Click this button to open reaction curve window.

In this window, you can view reaction curve of selected sample tests.

- Print button: Click this button to print one or more selected samples results
- Send To LIS: Send the results of selected sample to LIS system.
- Export: Export the results of selected sample to file in your installation directory.
- Manual Rerun: Rerun sample test manually.
- Replace Result: Click this button to open Replace result window.

  In this window, you can replace the sample results with the rerun results.

6.2.3. Test Result



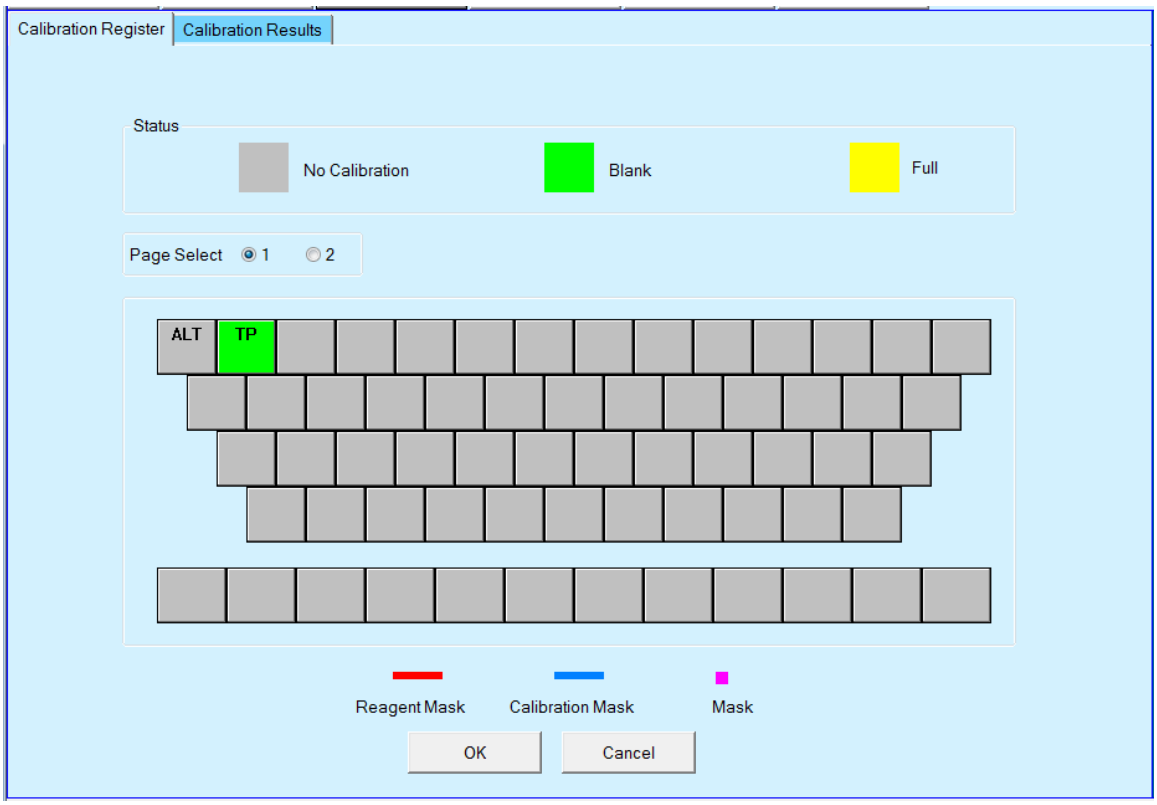
This screen allows you to view the history test count and results of the sample, and calculate the Mean, SD, CV value of the test results.

- Register Date: Select the start and terminal register date that you prepare for searching.

  The first date is the beginning date and the second is terminates.
- Search: Click this button to query the sample test results which meet the registered date condition.
- History Record Count: The total number of history test record is displayed.
- Test Record Count: The number of test record that meet the registered date condition is displayed.
- Calculate: Select the sample test result, then click this button to calculate the Mean, SD and CV value.

6.3. Calibration

6.3.1. Calibration register



This window allows you to register calibration for reagent blank and full(reagent blank and all standard solution).

- Status:

Gray: The test has no calibration.

Green: The test only does reagent blank calibration.

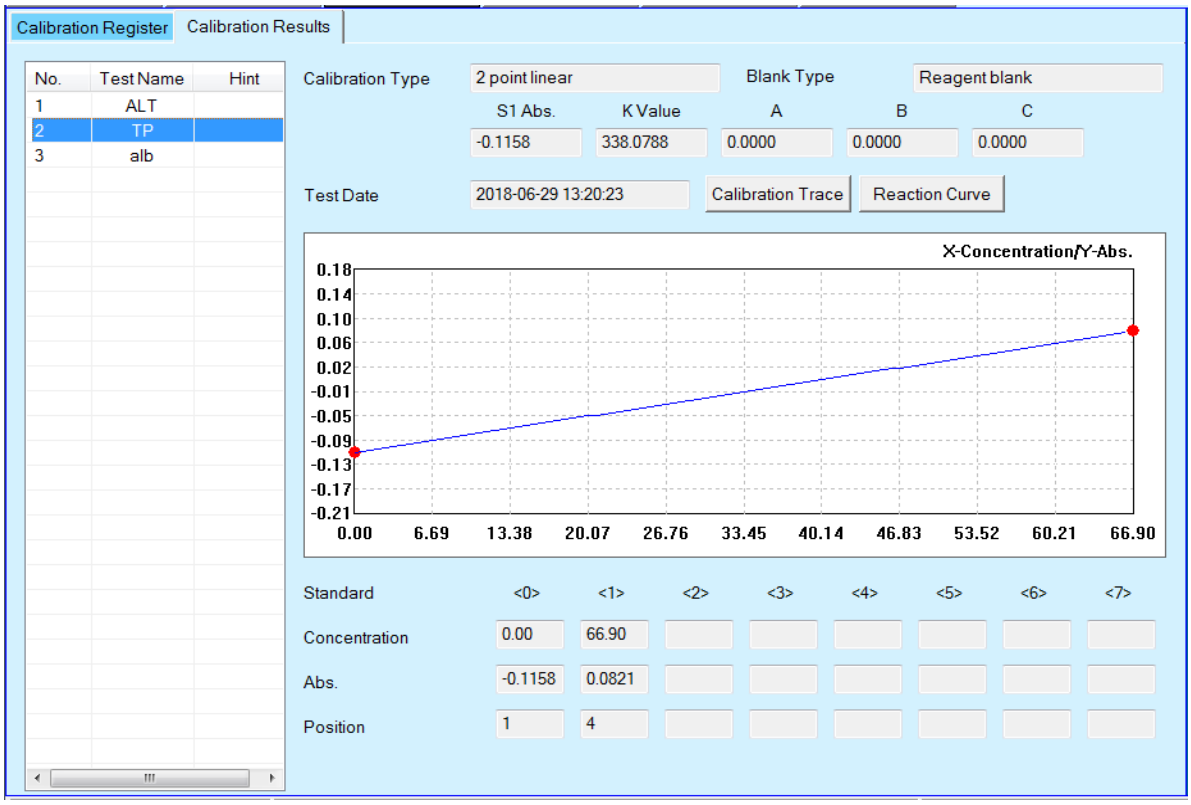
Yellow: The test does calibration including blank and standard solution.

- Test keys:

Click the test keys to select the calibration status, a manual switchover is made by clicking test key, if define water blank in Reagent/Reagent settings window, there is no blank status switchover.

- OK button: Click this button to save the configuration.
- Cancel button: Click this button to cancel any modification.

6.3.2. Calibration results



This screen allows you to view the calibration results, the reaction curve of each standard solution, and the calibration curve.

- Calibration type: Display the selected test calibration type defined in *Reagent/Reagent settings* window.
- Blank type: Display the selected test blank type defined in *Reagent/Reagent settings* window.
- S0 Abs: Display the absorbency of reagent blank, if you selected water for Blank Type in *Reagent/Reagent settings* window, here displays 0.
- K value: Display the K value of standard curve.
- A, B, C: Display the parameters of standard curve for non-linearity calibration.
- Test date: Display the latest and effective calibration test date.
- Calibration Trace: Click this button to open calibration trace window.

In this window, you can view the history calibration result.

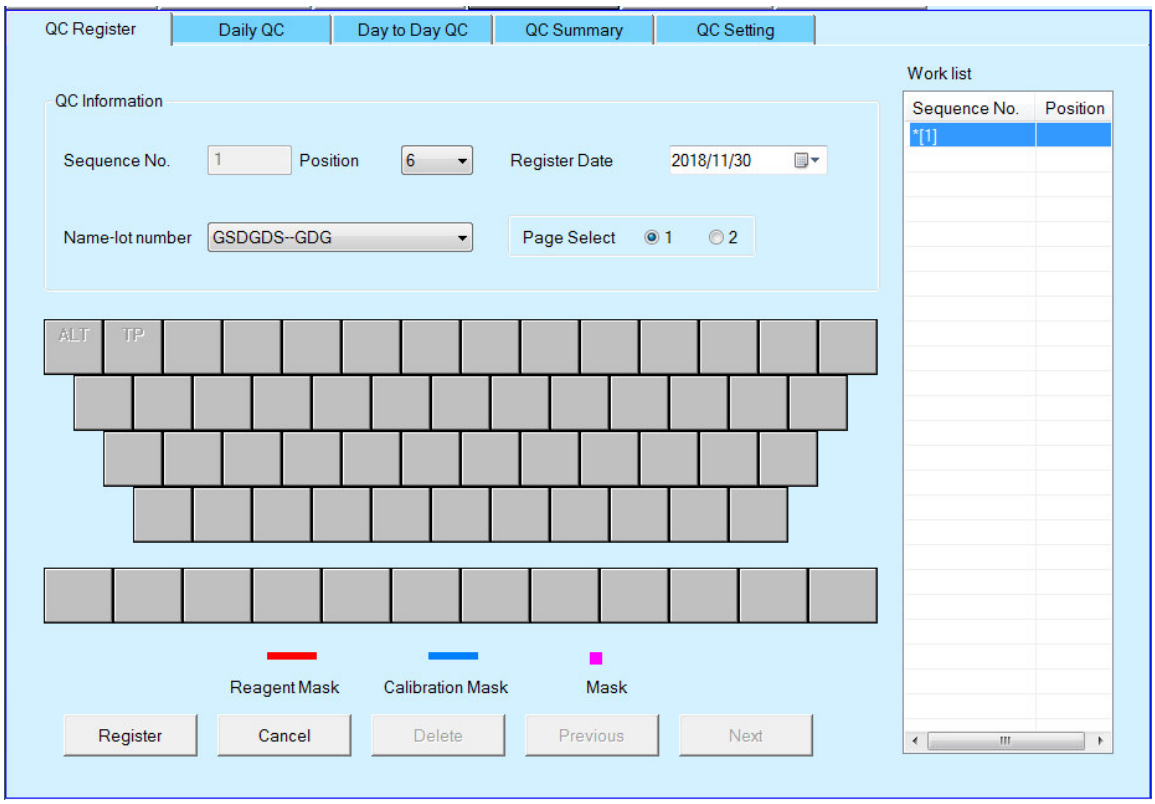
- Reaction curve button: Click this button to open reaction curve window.

In this window, you can view the reaction curve of each standard solution.

- Calibration curve: Display the Calibration curve after calibration.
- Standard, Concentration, Abs, Position: Display each standard concentration, absorbency and position on sample disk.

6.4. QC

6.4.1. QC register

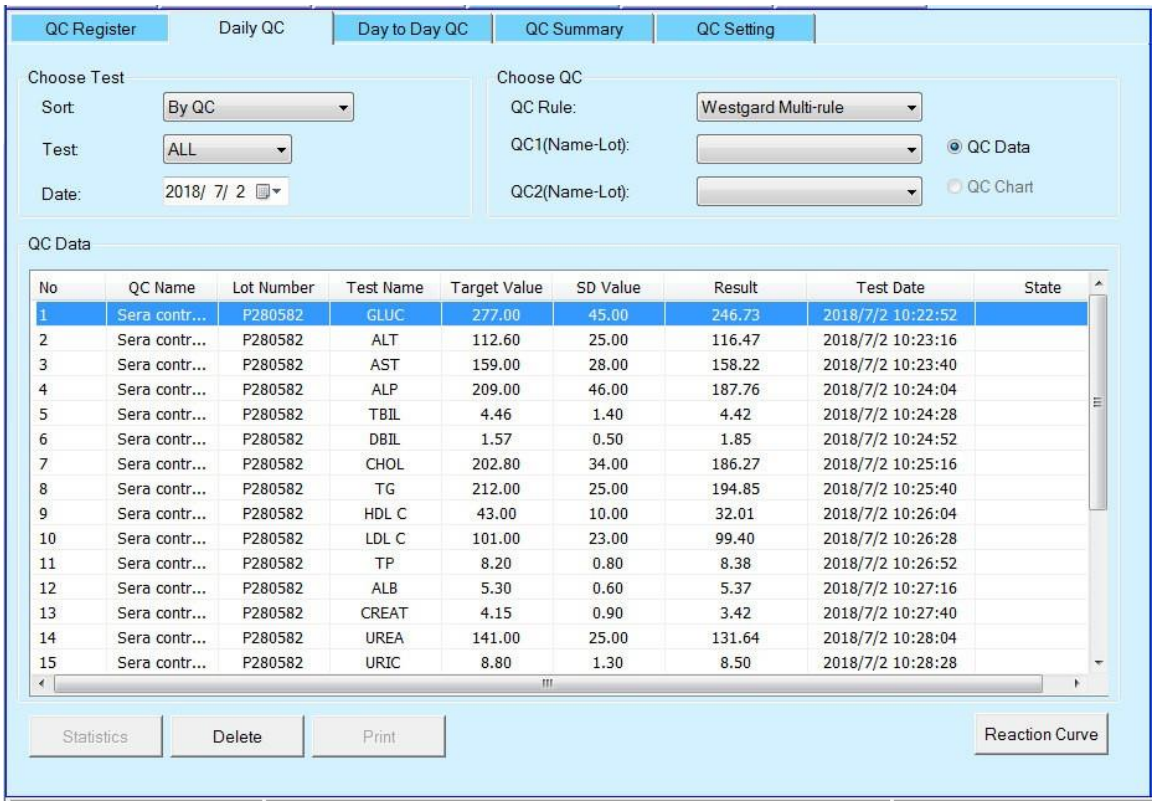


This window allows you to register QC tests for QC.

- QC information:
  - Sequence No.: Input a sequence number, it is also the test sequence of QC;
  - Position: Select a position number on sample disk;
  - Register date: Select the register date of the sample, the default is current operation system date;
  - Name-lot number: Select the QC name and lot number that prepare for testing.
  - Page selected: Select test key pages 1 and 2.
- Test keys: Use these keys for test selection.
  When a test key is selected, it is highlighted in blue.
- Register button: Click this button to save test selection information, update the work list and increment the sequence number by one so that test selection can be made for the next QC.
- Cancel button: Click this button to cancel any modification of the window.
- Delete button: Click this button to open Delete samples window. In this window, you can delete samples has already registered.
- Previous button: Click this button to display test selection information on the previous QC.

- Next button: Click this button to display test selection information on the previous QC.

6.4.2. Daily QC



No	QC Name	Lot Number	Test Name	Target Value	SD Value	Result	Test Date	State
1	Sera contr...	P280582	GLUC	277.00	45.00	246.73	2018/7/2 10:22:52	
2	Sera contr...	P280582	ALT	112.60	25.00	116.47	2018/7/2 10:23:16	
3	Sera contr...	P280582	AST	159.00	28.00	158.22	2018/7/2 10:23:40	
4	Sera contr...	P280582	ALP	209.00	46.00	187.76	2018/7/2 10:24:04	
5	Sera contr...	P280582	TBIL	4.46	1.40	4.42	2018/7/2 10:24:28	
6	Sera contr...	P280582	DBIL	1.57	0.50	1.85	2018/7/2 10:24:52	
7	Sera contr...	P280582	CHOL	202.80	34.00	186.27	2018/7/2 10:25:16	
8	Sera contr...	P280582	TG	212.00	25.00	194.85	2018/7/2 10:25:40	
9	Sera contr...	P280582	HDL C	43.00	10.00	32.01	2018/7/2 10:26:04	
10	Sera contr...	P280582	LDL C	101.00	23.00	99.40	2018/7/2 10:26:28	
11	Sera contr...	P280582	TP	8.20	0.80	8.38	2018/7/2 10:26:52	
12	Sera contr...	P280582	ALB	5.30	0.60	5.37	2018/7/2 10:27:16	
13	Sera contr...	P280582	CREAT	4.15	0.90	3.42	2018/7/2 10:27:40	
14	Sera contr...	P280582	UREA	141.00	25.00	131.64	2018/7/2 10:28:04	
15	Sera contr...	P280582	URIC	8.80	1.30	8.50	2018/7/2 10:28:28	

This screen allows you to query daily QC results, display QC information, and QC chart.

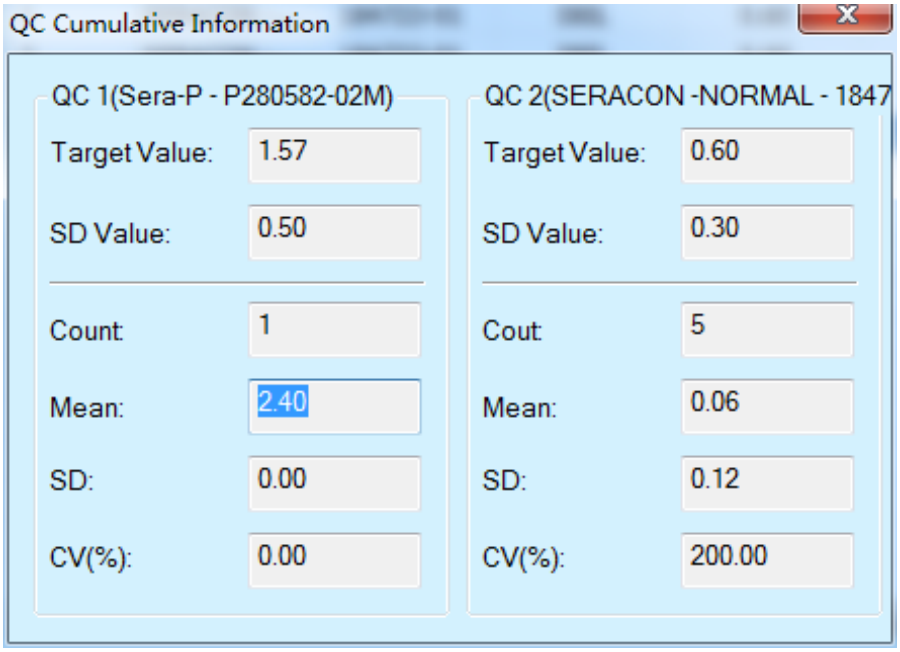
- Choose Test：
  - Sort: Select a sort way that you prepare for viewing QC data.
  - Test: Select a test name that you prepare for querying.
  - Date: Select a test date for the quality control results that you prepare for searching, the default value is current operation system date.
- Choose QC：
  - QC Rule: Select a quality control rule.
  - QC1(Name-Lot): Select the first quality control name that you prepare for searching.
  - QC2(Name-Lot): Select the second quality control name that you prepare for searching.
- QC Data: Select this option to show QC data on the interface.
- QC Chart: Select this option to show QC chart on the interface.

Only if you select the Test name and QC(Name-Lot), you can view QC chart.

- QC Data：
  - QC Name: Display the QC name.

- Lot Number: Display the QC lot number.
- Test Name: Display the test name.
- Target Value: Display the target value of selected QC that defined in *QC/QC setting* window;
- SD Value: Display the SD value of selected QC that defined in *QC/QC setting* window;
- Result: Display the quality control test result.
- Test Date: Display the quality control test date.
- State: Display the quality control state.

- Statistics: Click this button to open QC Cumulative Information window.



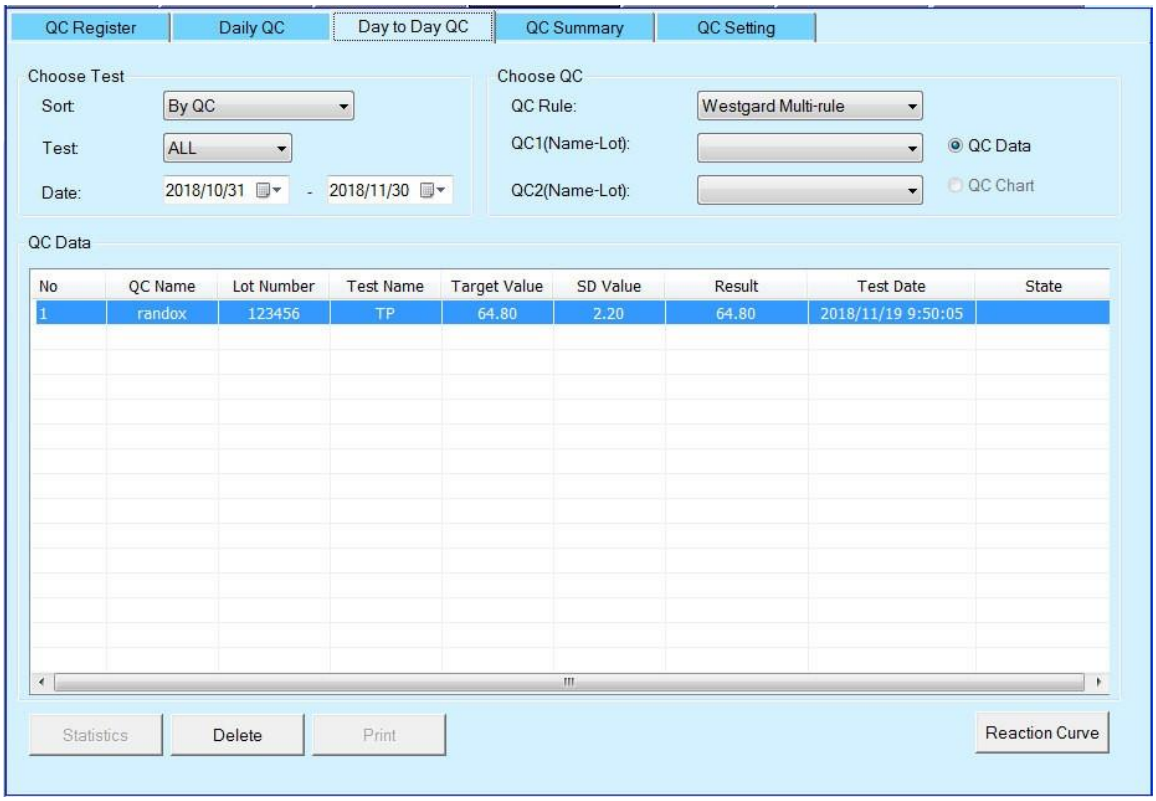
In this window, you can view QC cumulative information and compare two different lot No. QC results.

- Target Value: Display the target value of selected QC that defined in *QC/QC* setting window;
- SD Value: Display the SD value of selected QC that defined in *QC/QC setting* window;
- Count: Display the counts of selected QC test.
- Mean: Display QC result mean value that automatic calculated;
- SD: Display QC result SD value that automatic calculated;
- CV(%): Display QC result CV(%) value that automatic calculated;

- Delete: Click this button to delete the selected QC in the QC Data list.
- Print: Click this button to open Print window for printing the current QC chart.

  In this window, you can choose Print Preview or Print directly.
- Reaction Curve: Click this button to open Reaction curve for checking the reaction curve of QC test.

6.4.3. Day to Day QC



This dialog allows you to query day to day QC results, display QC information, and QC chart.

- Choose Test：
  - Sort: Select a sort way that you prepare for viewing QC data.
  - Test: Select a test name that you prepare for querying.
  - Date: Select the start and terminal date of the quality control result that you prepare for searching.

  The first date is the beginning date and the second is terminates.

- Choose QC：
  - QC Rule: Select a quality control rule.
  - QC1(Name-Lot): Select the first quality control name that you prepare for searching.
  - QC2(Name-Lot): Select the second quality control name that you prepare for searching.
- QC Data: Select this option to show QC data on the interface.
- QC Chart: Select this option to show QC chart on the interface.

Only if you select the Test name and QC (Name-Lot), you can view QC chart.

- Statistics: Click this button to open QC Cumulative Information window.

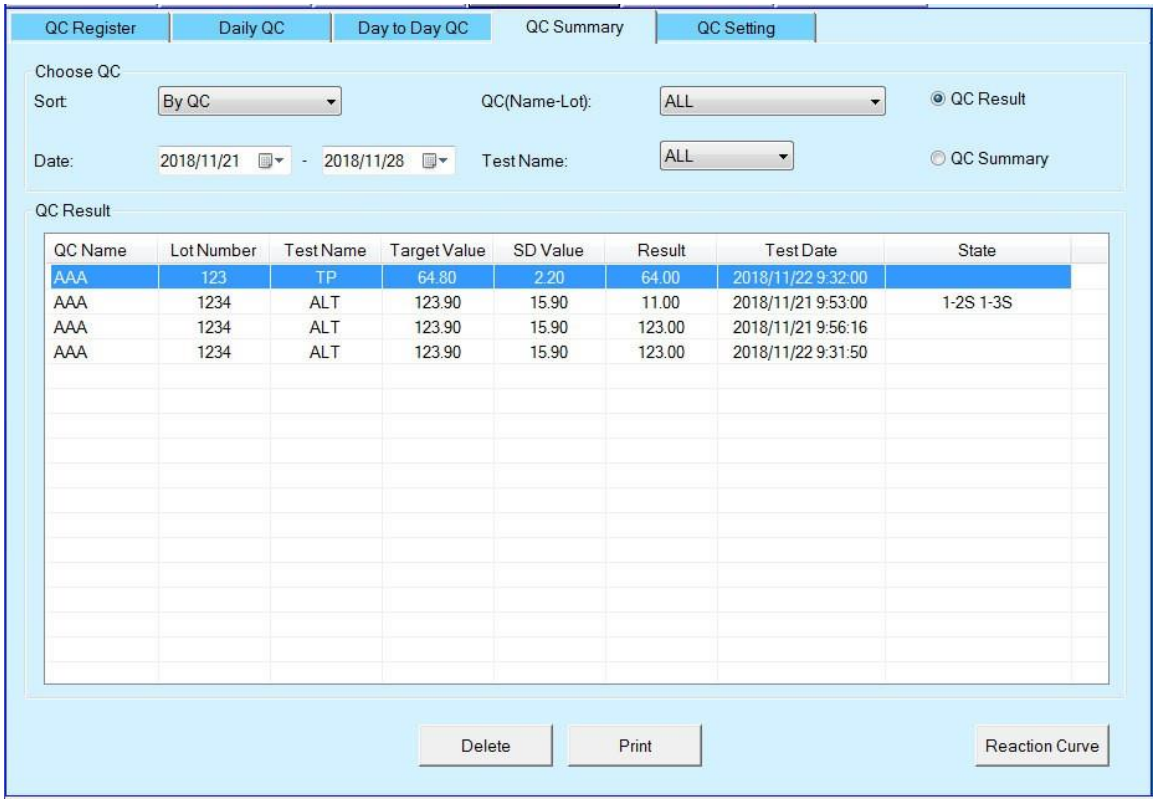
In this window, you can view QC cumulative information.

- Delete: Click this button to delete the selected QC in the QC Data list.
- Print: Click this button to open Print window for printing the current QC chart.

In this window, you can choose Print Preview or Print directly.

- Reaction Curve: Click this button to open Reaction curve for checking the reaction curve of QC test.

6.4.4. QC Summary



This screen allows you to query QC result and QC summary.

- Choose Test:
  - Sort: Select a sort way that you prepare for viewing QC results.
  - QC (Name-Lot): Select the quality control solution that you prepare forsearching.
  - Date: Select the start and terminal date of the quality control result that you prepare for searching.

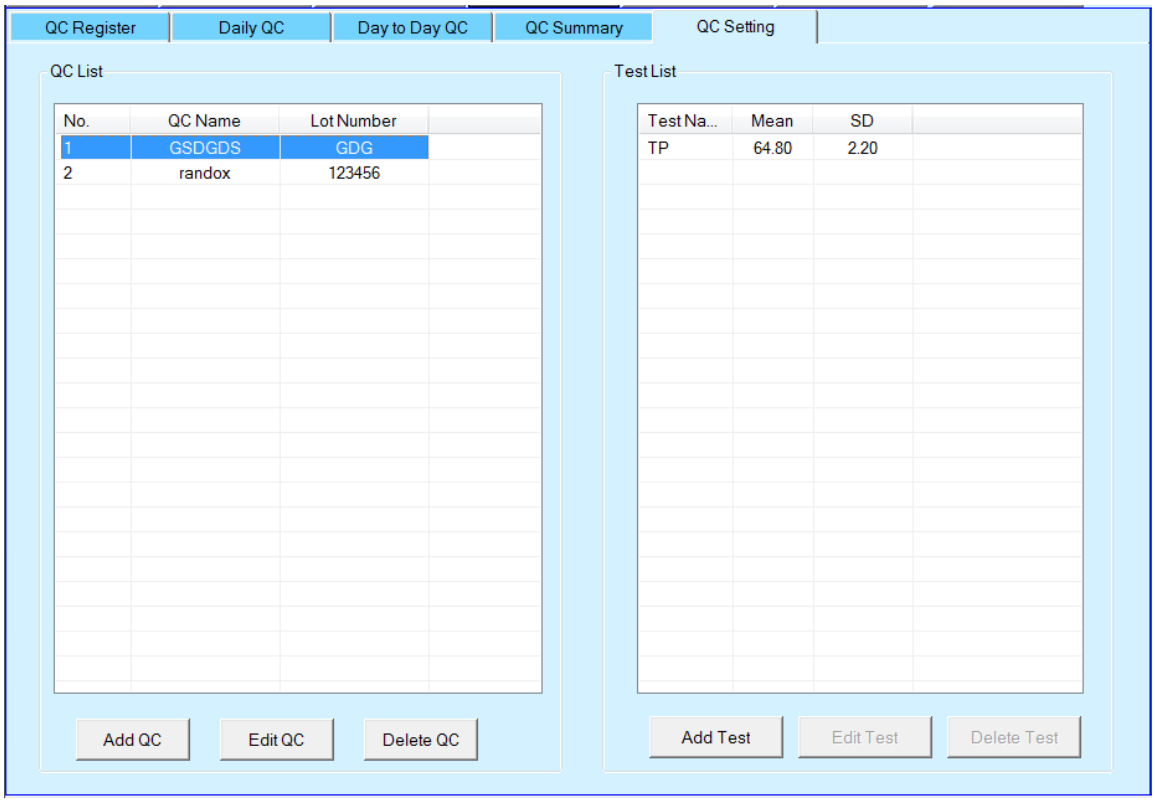
  The first date is the beginning date and the second is terminates.

  - Test Name: Select a test name that you prepare for searching.
- QC Result: Select this option to show specified QC test results of the specified QC solution on the interface.
- QC Summary: Select this option to show QC summary information of the specified QC solution on the interface.
- Delete: Click this button to delete the selected QC in the QC Result list.
- Print: Click this button to open Print window for printing the current displayed QC results or QC summary information.

  In this window, you can choose Print Preview or Print directly.

- Reaction Curve: click this button to open Reaction Curve window for checking the reaction curve of QC test.

6.4.5. QC Setting



This screen allows you to setup QC information and QC test information. Setup the target and SD value for QC results processing.

- QC list: Display the QC information.
- Test list: Display the QC test information.
- Add QC button: Click this button to open Add QC window.

In this window, you can add a new QC with lot number to the QC list.

- Edit QC button: Click this button to open Edit QC window.

In this window, you can edit the information of selected QC in the QC list.

- Delete QC button: Click this button to delete the selected QC in the QC list.
- Add test button: Click this button to open Add test window.

In this window, you can select tests and set up target values for the QC selected in the QC list.

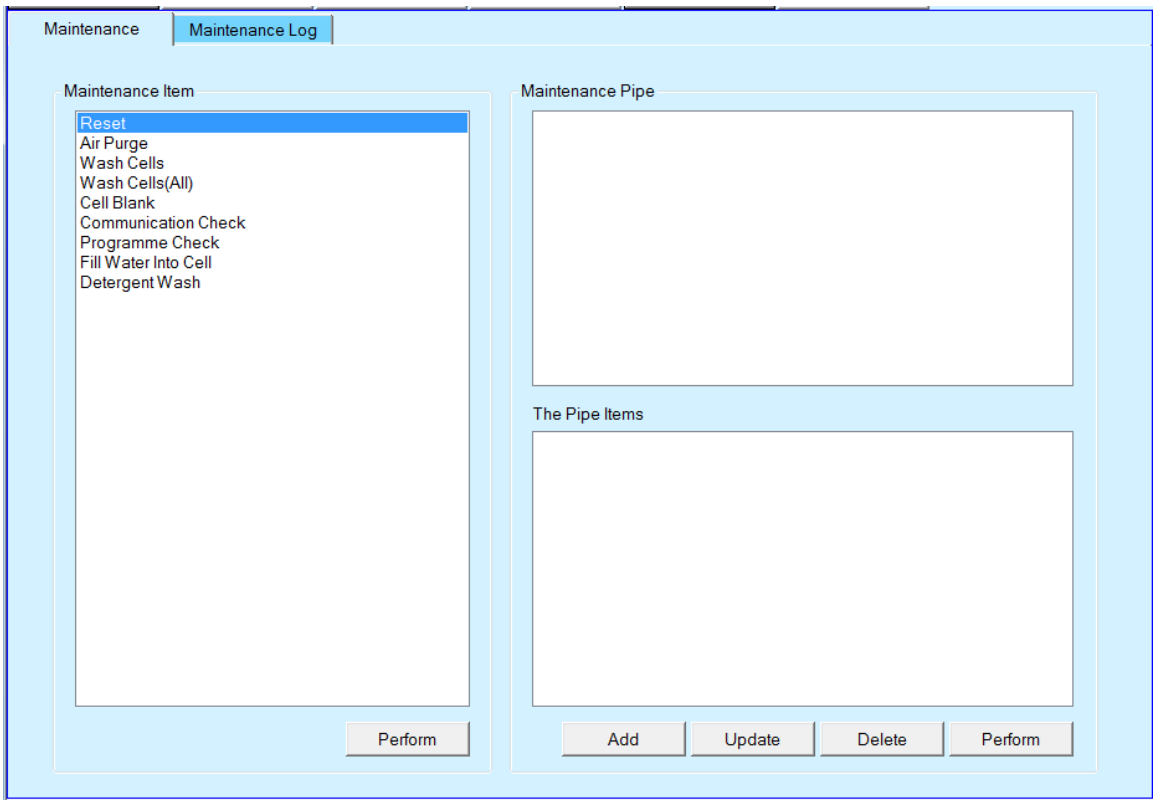
- Edit test button: Click this to open Edit test window.

In this window, you can edit the information of selected test in the test list.

- Delete test button: Click this button to delete the selected test in the test list.

6.5. Maintenance

6.5.1. Maintenance



This page allows you to execute a maintenance item such as Air purge and wash cells, and to set and execute a maintenance pipe. For addition, updating or deletion of a maintenance pipe.

- Maintenance Item: A list of maintenance items is displayed.

For execution of a maintenance item, select it from the list and click the Perform button.

- Perform button: Click this button to open the Perform Maintenance Item window.

In this window, you can execute the maintenance item selected from the Maintenance Item list.

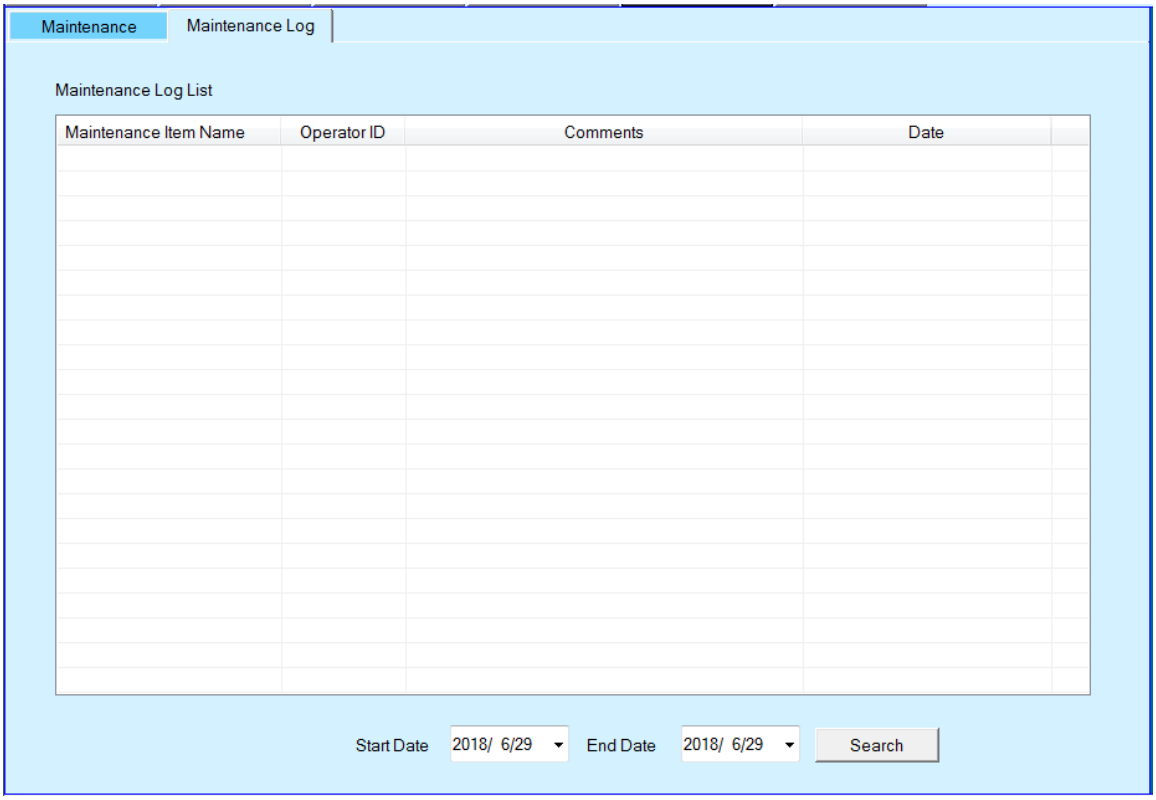
- Maintenance Pipe: A list of registered maintenance pipe names is displayed.

For execution of a maintenance pipe, select it from the Maintenance Pipe list and click the Perform button.

- The Pipe Items: A list of maintenance items registered in the maintenance pipe selected from the Maintenance Pipe list is displayed.
- Add button: Click this button to open the Add Pipe window.
  In this window, you can register the name and details of a maintenance pipe.

- Update button: Click this button to open the Update Pipe window.
  In this window, you can update the name and details of the maintenance pipe selected from the Maintenance Pipe list.
- Delete button: Click this button to delete the name and details of the maintenance pipe selected from the Maintenance Pipe list.
- Perform button: Click this button to open the Perform Maintenance Pipe window.
  In this window, you can execute the maintenance pipe selected from the Maintenance Pipe list.

6.5.2. Maintenance log

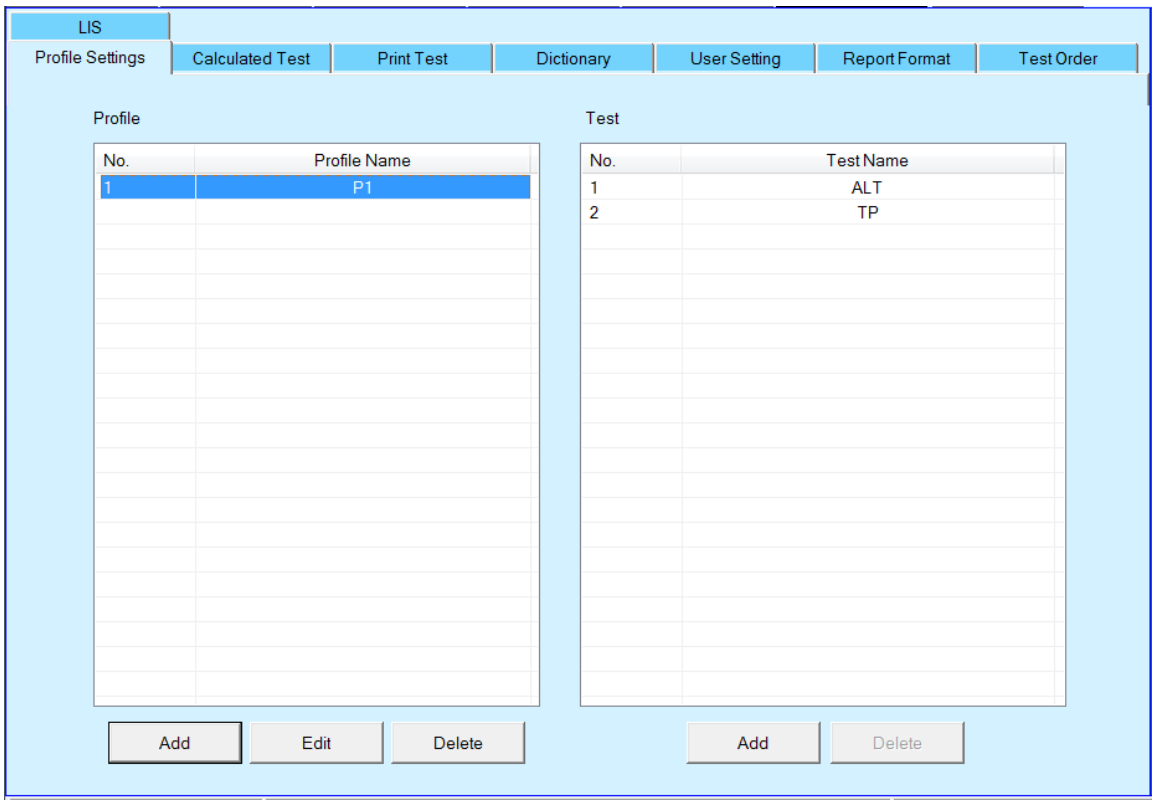


This window allows you to view the maintenance log.

- Maintenance Log list:
  - Maintenance item name: Display Maintenance item name that has already done.
  - Operator ID: Display the operator ID that execute maintenance.
  - Comments: Display the comments that define in Maintenance/perform window.
  - Date: Display the execute date.
- Start date: select the start date prepare for searching.
- End date: select the end date prepare for searching.
- Searching button: Click this button to display the maintenance log within the date range.

6.6. System setting

6.6.1. Profile setting



This window allows you to register a group of tests in a test key to be used for test registration.

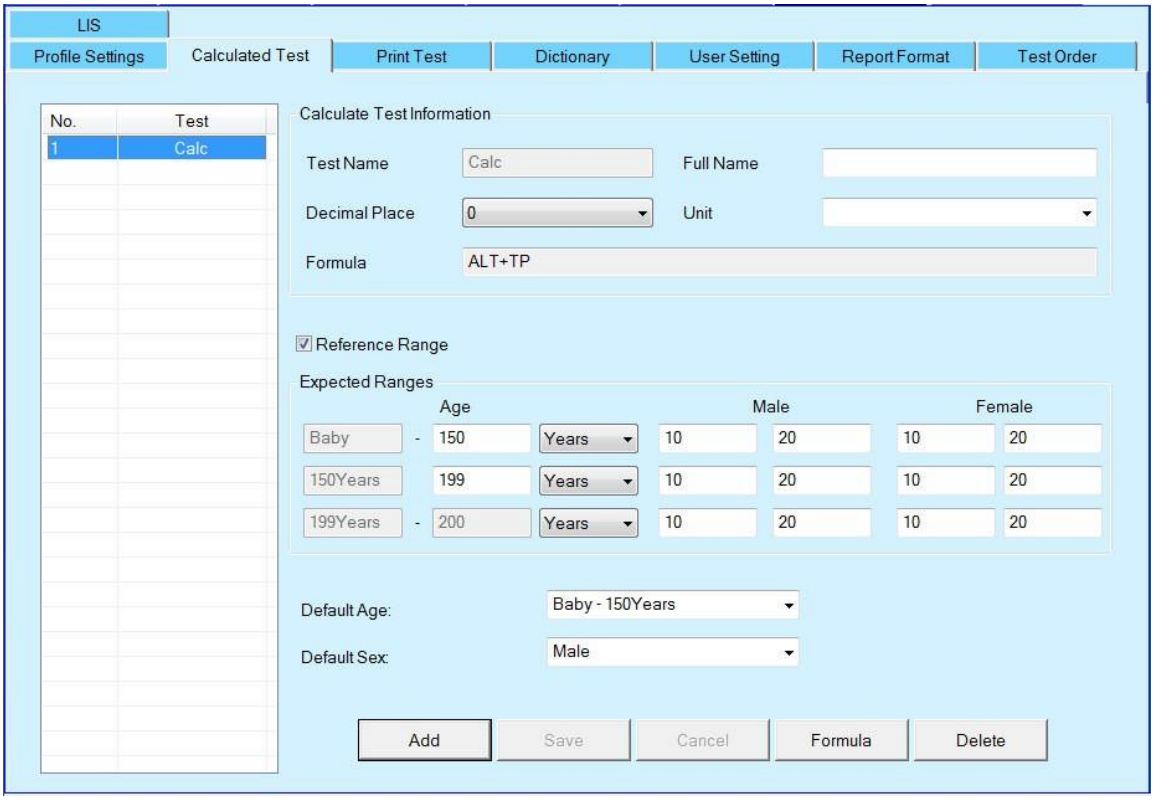
- Profile list:
  - Add button: Click this button to open Add profile window.

  In this window, you can add a profile in the profile list.
  - Edit button: Click this button to open Edit profile window.

  In this window, you can edit the name of selected profile in the profile list.
  - Delete button: Click this button to delete selected profile in the profile list.
- Test list:
  - Add button: Click this button to open Add test button.

  In this window, you can specify tests to be registered in the profile selected in the profile list.
  - Delete button: Click this button to delete test selected in the test list.

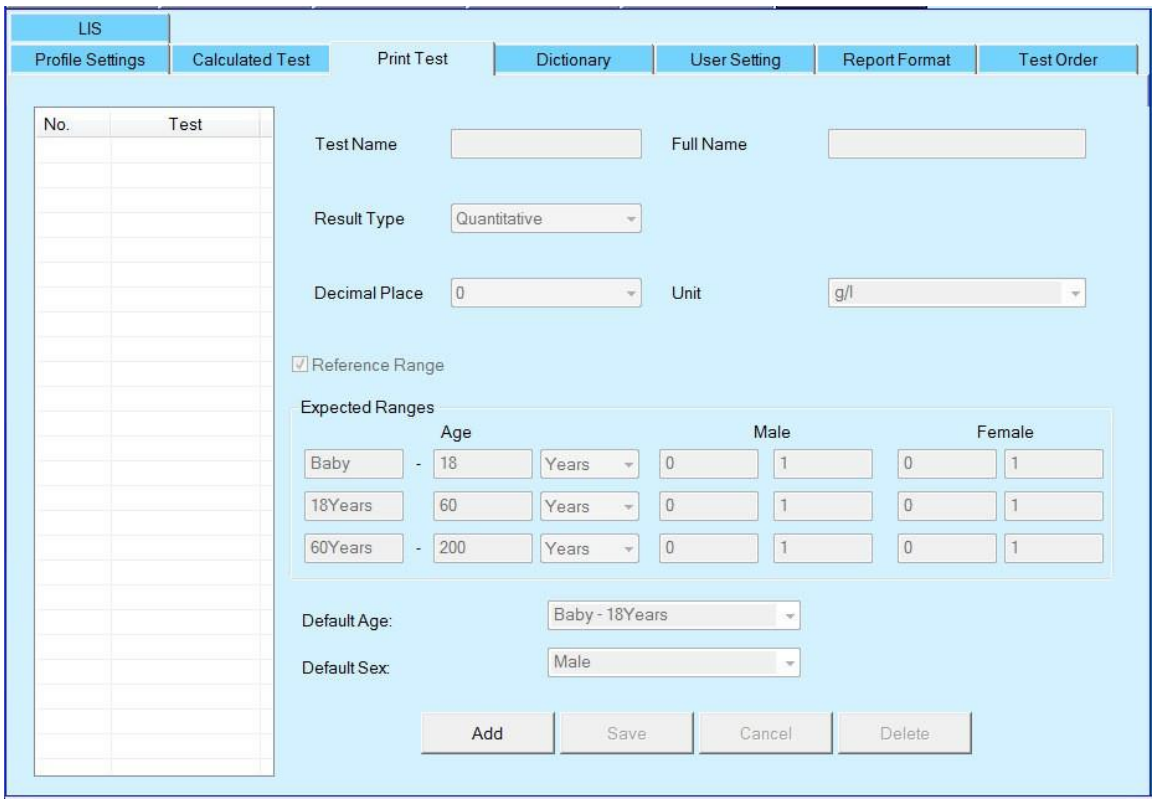
6.6.2. Calculated test



This screen allows you to set a calculation formula for calculation from the result of measurement with the instrument.

- Calculate test information:
  - Test name: Input the name of calculate test;
  - Full name: Input full name for printout in report format. It can be void.
  - Decimal Place: Select the number of decimal place of test result (0,1,2,3,4).
  - Unit: Selected or Input the result unit.
  - Formula: Display the calculated formula. After click the Formula button to open the Formula Calculator window and input a calculation formula.
- Reference range: Input the result reference range. It is optional.
- Add button: Click this button to prepare adding a new calculate test.
- Save button: Click this button to save the configuration after adding or updating.
- Cancel button: Click this button to cancel the modification of this window.
- Formula button: Click this button to open Formula window. In this window, you can setup a calculated formula for the test.
- Delete button: Click this button to delete the selected calculated test.

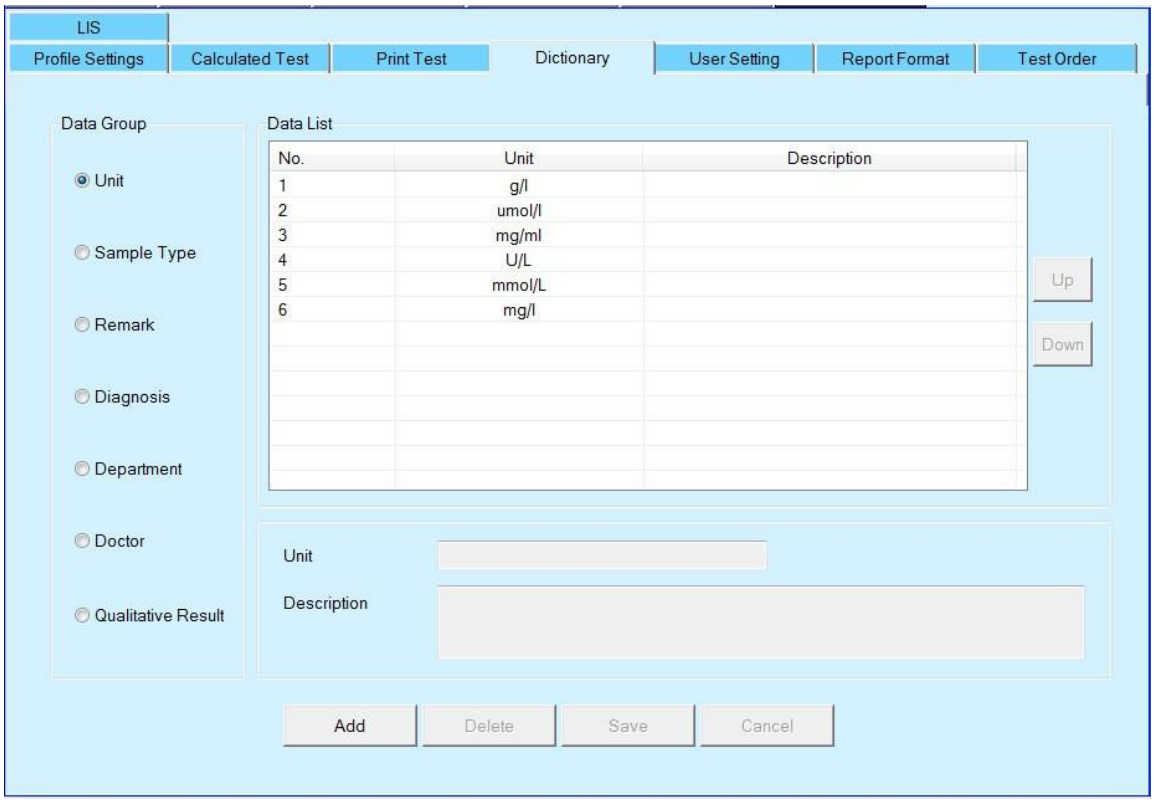
6.6.3. Print Test



This window allows you to add additional print test and print them on the test report as needed.

- Print test information:
  - Test Name: Input the name of print test;
  - Full Name: Input full name for printout in report format. It can be void.
  - Result Type: Select Quantitative or Qualitative.
  - Decimal Place: Select the number of decimal place of test result (0,1,2,3,4).
  - Unit: Selected or Input the result unit.
- Reference range: Input the result reference range. It is optional.
- Add button: Click this button to prepare adding a new calculate test.
- Save button: Click this button to save the configuration after adding or updating.
- Cancel button: Click this button to cancel the modification of this window.
- Delete button: Click this button to delete the selected calculated test.

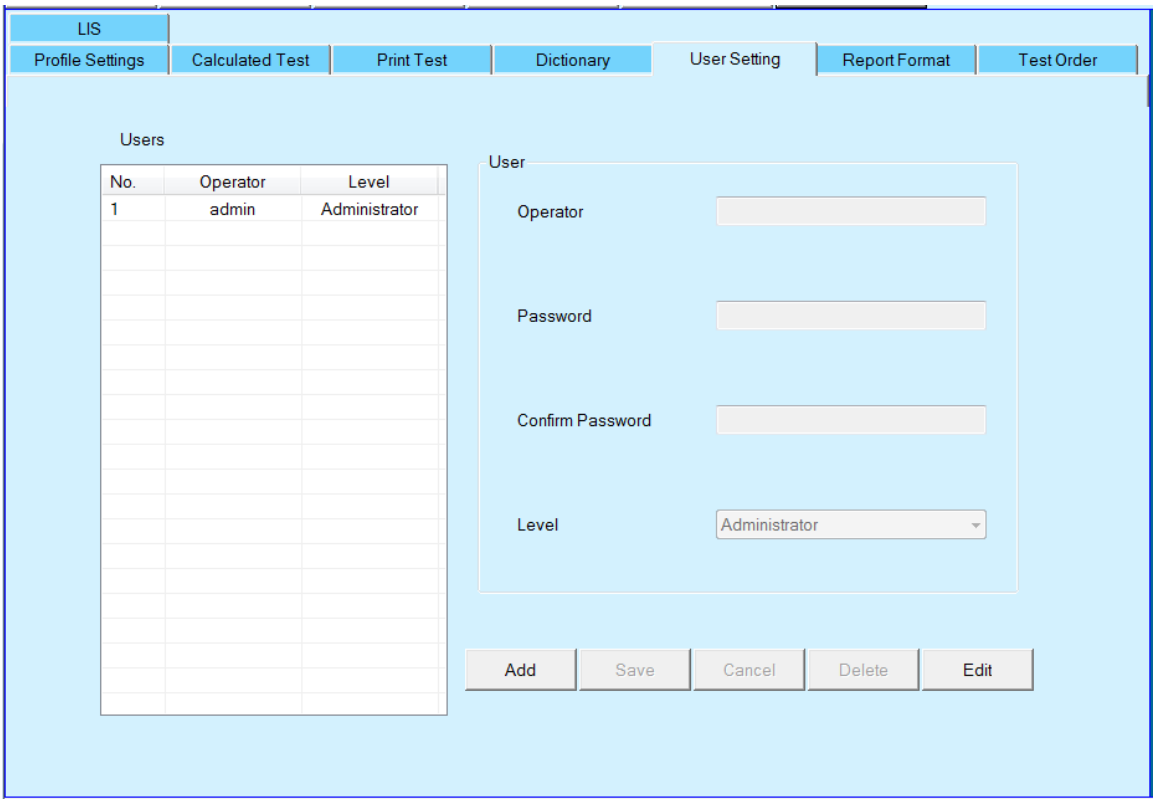
6.6.4. Dictionary



This window allows you to setup the data list that can be selected in some other window.

- Data group: Choose a data style in this group.
- Add button: Click this button to prepare adding a new element. After clicking this button, then input a new element such as a new unit and description(it can be void), then click save button to add in the data list.
- Delete button: Click this button to delete the selected data in the data list.
- Save button: Click this button to save the configuration.
- Cancel button: Click this button to cancel any modification.

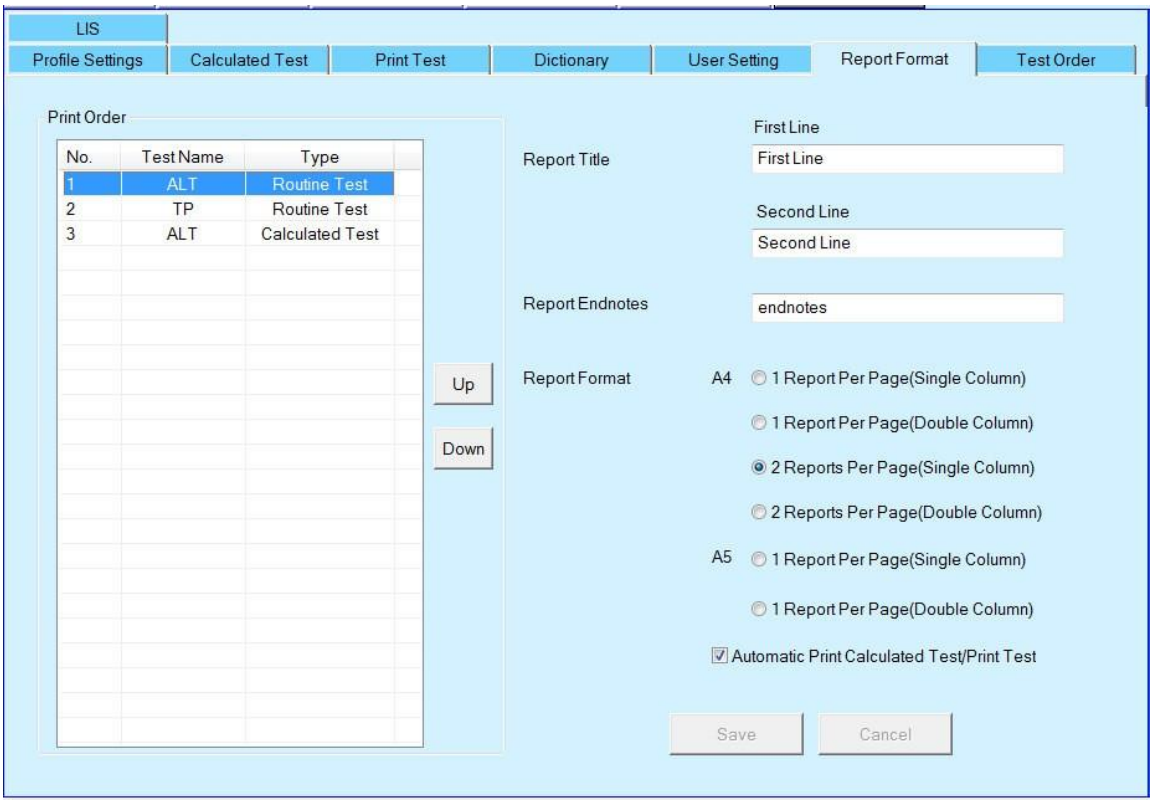
6.6.5. User Setting



This window allows you administrate the operator of the software.

- User information: Input user information after clicking add button.
  - Operator: Input operator name.
  - Password: Input password.
  - Confirm password: Input password again.
  - Level: Select the operator authority
- Add button: Click this button to prepare add a new User.
- Save button: Click this button to save the user in users list after inputting user information.
- Delete button: Click this button to delete selected user in users list.
- Cancel button: Click this button to cancel any modification.
- Edit: Click this button to modify password.

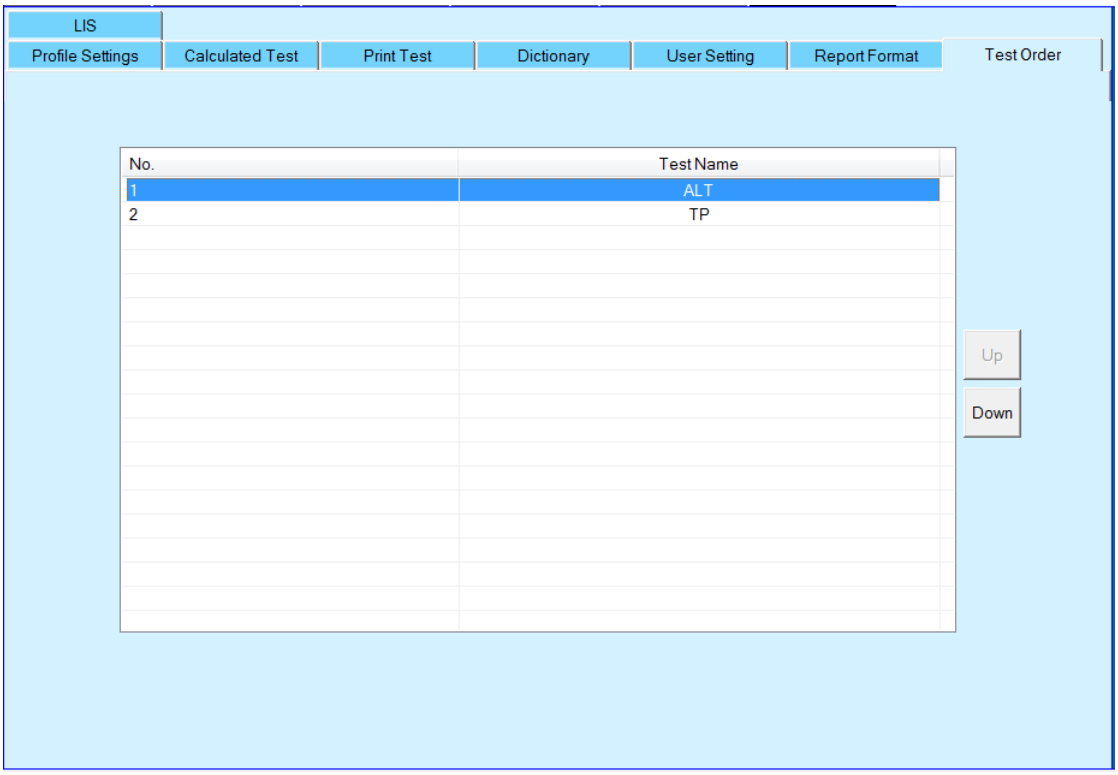
6.6.6. Report format



This screen allows you to set conditions for printout of the measurement result in report format.

- Print order: Display the print order in report.
- Report title: Input a head of report, include first and second line of the head.
- Report endnotes: Input endnotes of report.
- Report format: Selected print report format and automatic print calculated test or not.
- Save button: Click this button to save configuration.
- Cancel button: Click this button to cancel any modification.

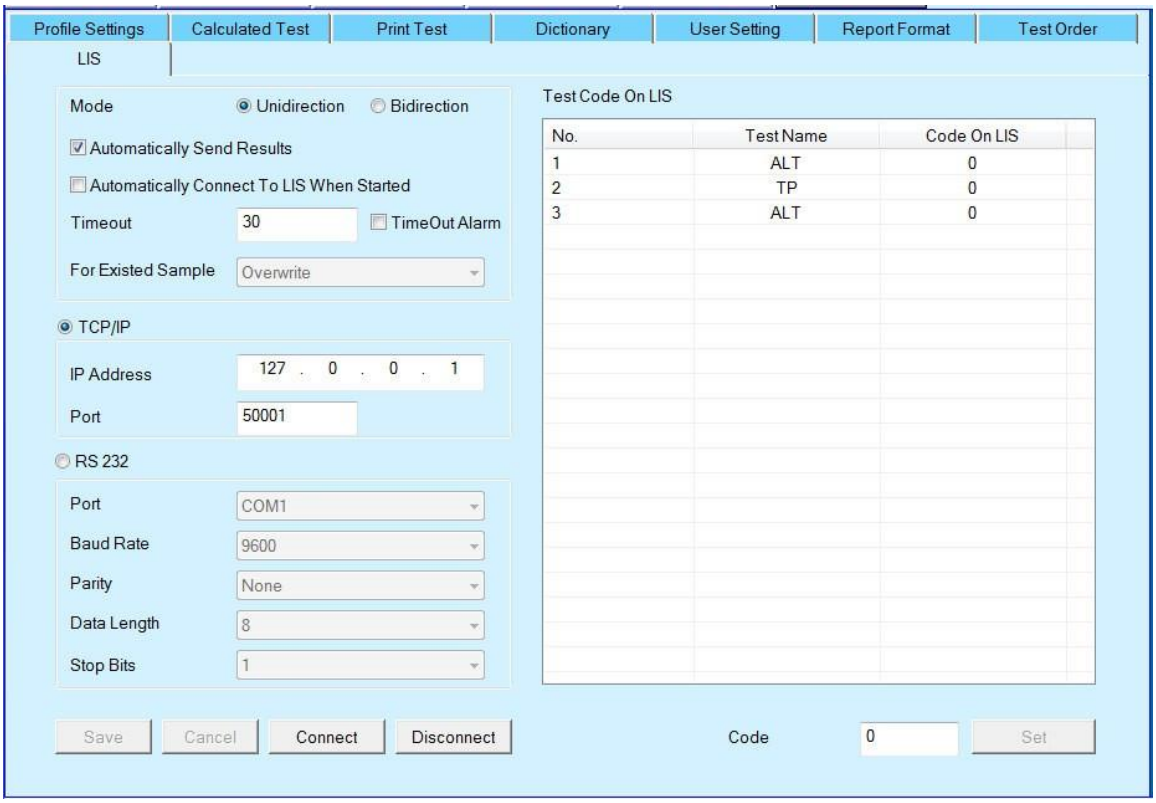
6.6.7. Test order



This window allows you to set the test order to prevent carryover of different reagent. This order is also the display order on the test keys.

Click “Up” or “Down” button to reorder.

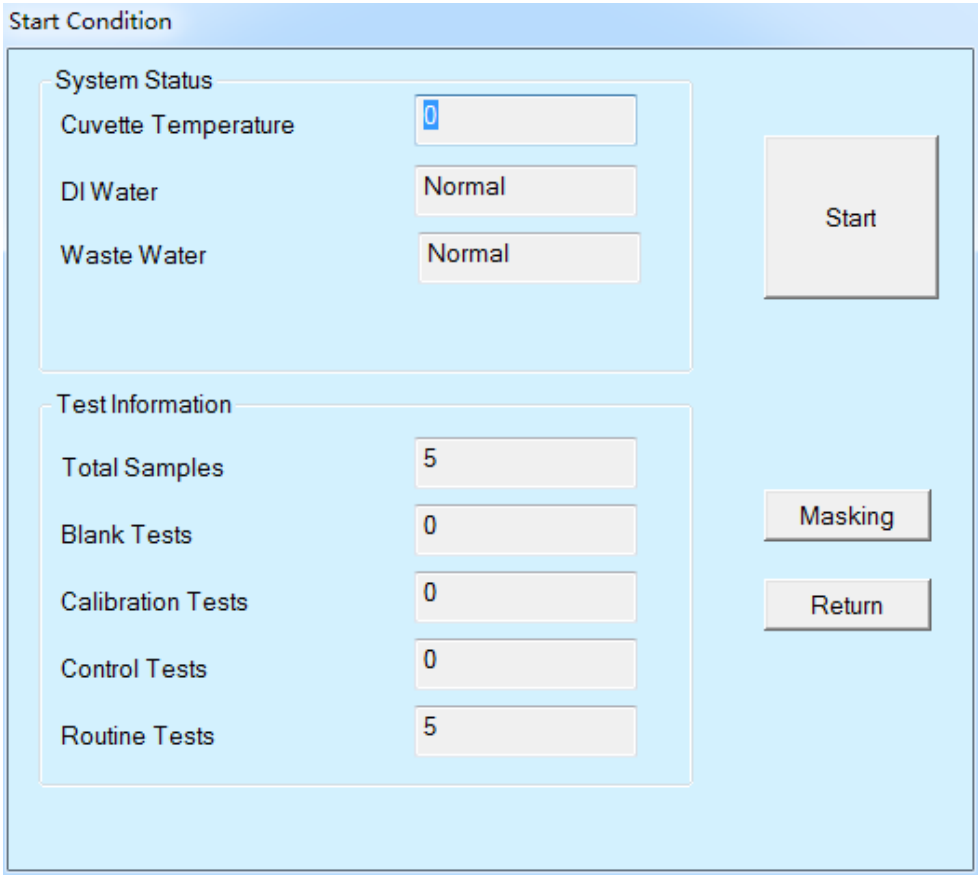
6.6.8. LIS



This window allows you to setup the basic parameters of LIS.

This system sends the results to LIS by LAN lines or RS232 interface, and it exchange sample data and result data with the LIS server by HL7 protocol. You can setup transfer mode unidirection or bidireciton by TCP/IP or RS232 interface in this window.

6.7. Start condition



This window allows you to set analysis start conditions. When starting analysis, check the analysis start conditions and then click the Start button.

- Cuvette temperature: Display the real-time temperature of reaction cells.
- DI water: Display the DI water status, normal or insufficient.
- Waste Water: Display the waste water status, normal or full.
- Total samples: Display total samples number of registered.
- Blank tests: Display the blank tests number of registered.
- Calibration tests: Display calibration tests number of registered.
- Control tests: Display QC tests number of registered.
- Routine tests: Display routine sample tests number of registered.

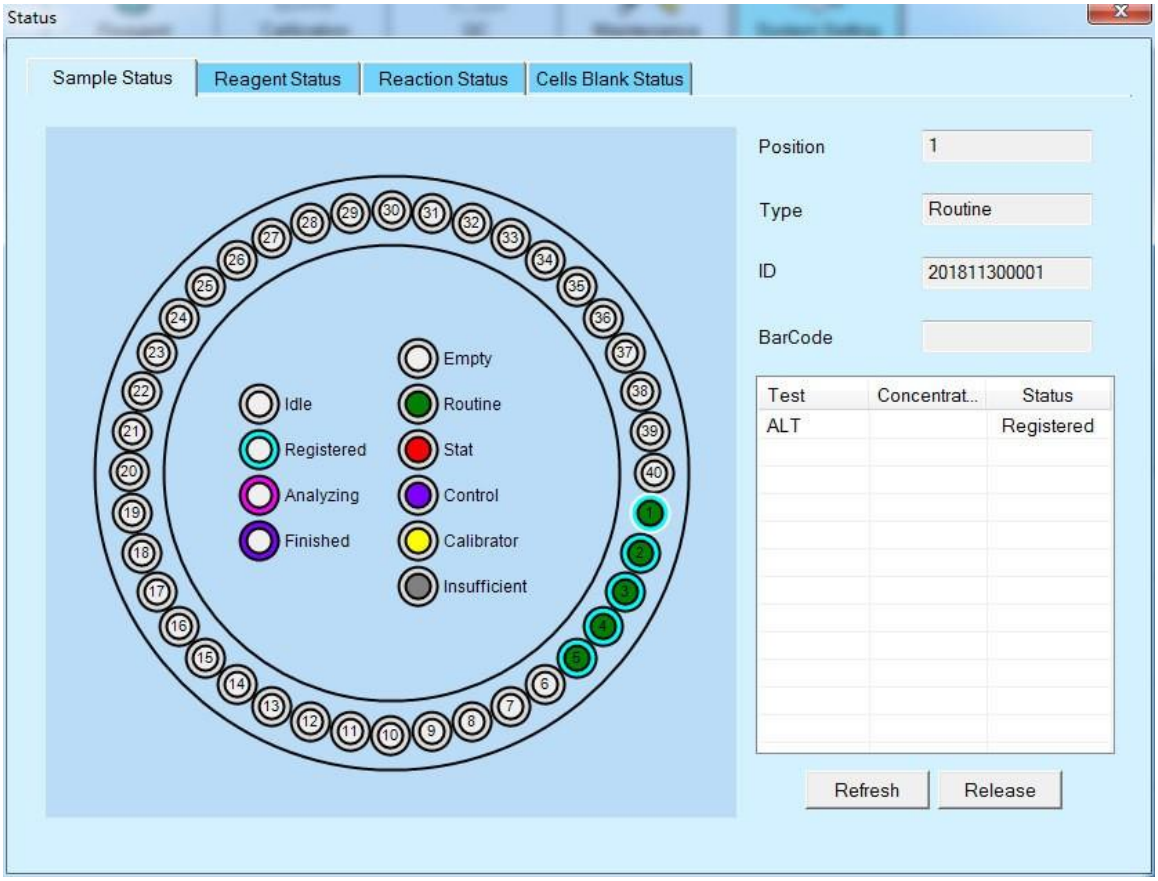
6.8. Sample stop and stop

: Click this button, the analyzer will stop sampling after confirmation, continue testing. And you can continue sampling by click start condition button.

: Click this button, the analyzer will stop doing anything immediately after confirmation.

6.9. Status

6.9.1. Sample status



This window allows you to view sample disk status in any time, and release the sample position after finishing test. Click a position to display its information on the right.

The AS-280 sample number is 40.

- Idle: The position is idle. Nothing is to be analyzed
- Registered: The position has already registered by sample, calibrator or QC.
- Analyzing: The position is being analyzed by sample, calibrator or QC.
- Finished: The position has already finished test by sample, calibrator or QC.
- Empty: The position is blank, Nothing is placed.
- Routine: The position is placed by routine sample.
- Stat: The position is placed by emergency sample.
- Control: The position is placed by QC.
- Calibrator: The position is placed by calibrator.
- Insufficient: The liquid is insufficient in this position.

  If it is sample, system will mask all tests of this sample, and alarm in Alarm window.

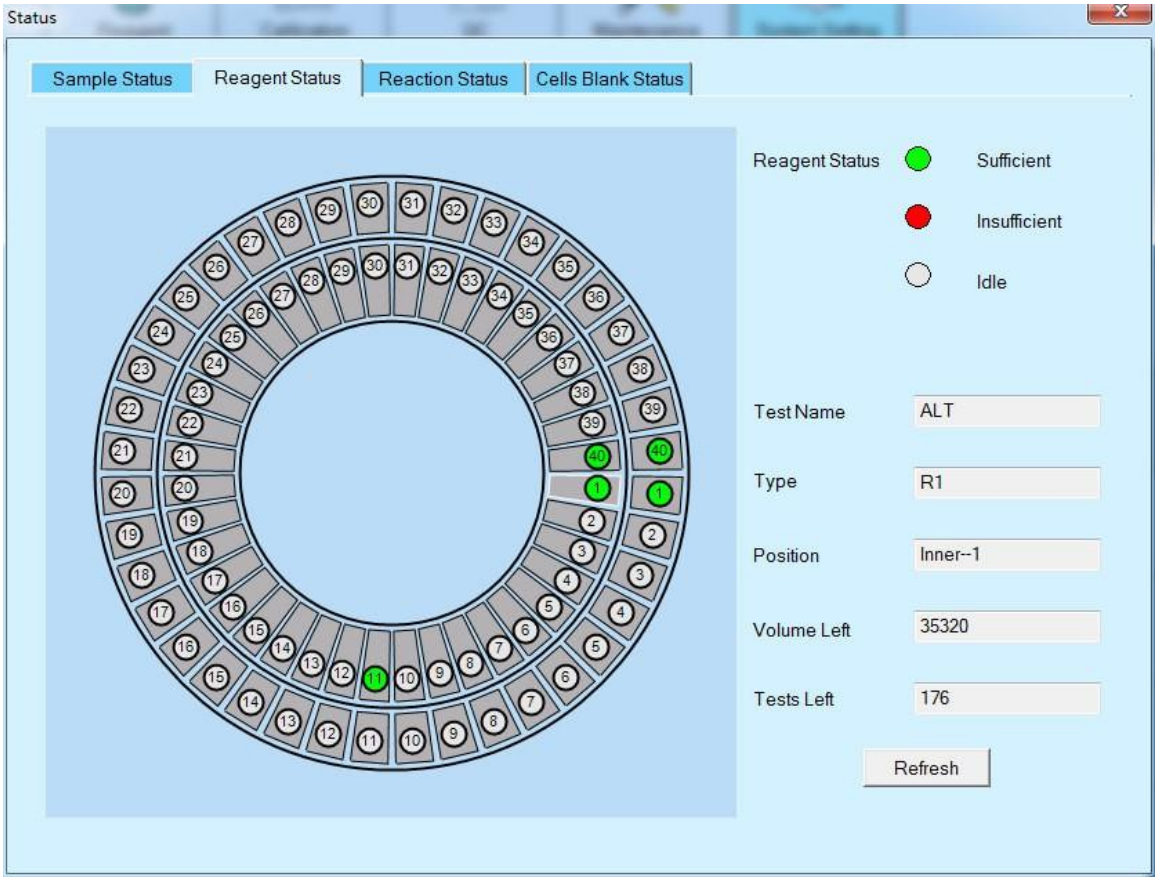
  If it is QC, system will mask all tests of this QC, and alarm in Alarm window.

If it is calibrator, system will mask all tests of this reagent, and alarm in Alarm window.

After filling liquid, clicking Refresh button, system will do those tests again.

- Refresh button: Click this button to refresh the liquid volume after filling, system will continue analyzing the tests.
- Release button: Click this button to release the position, otherwise, it cannot be registered by new sample, QC or calibrator.

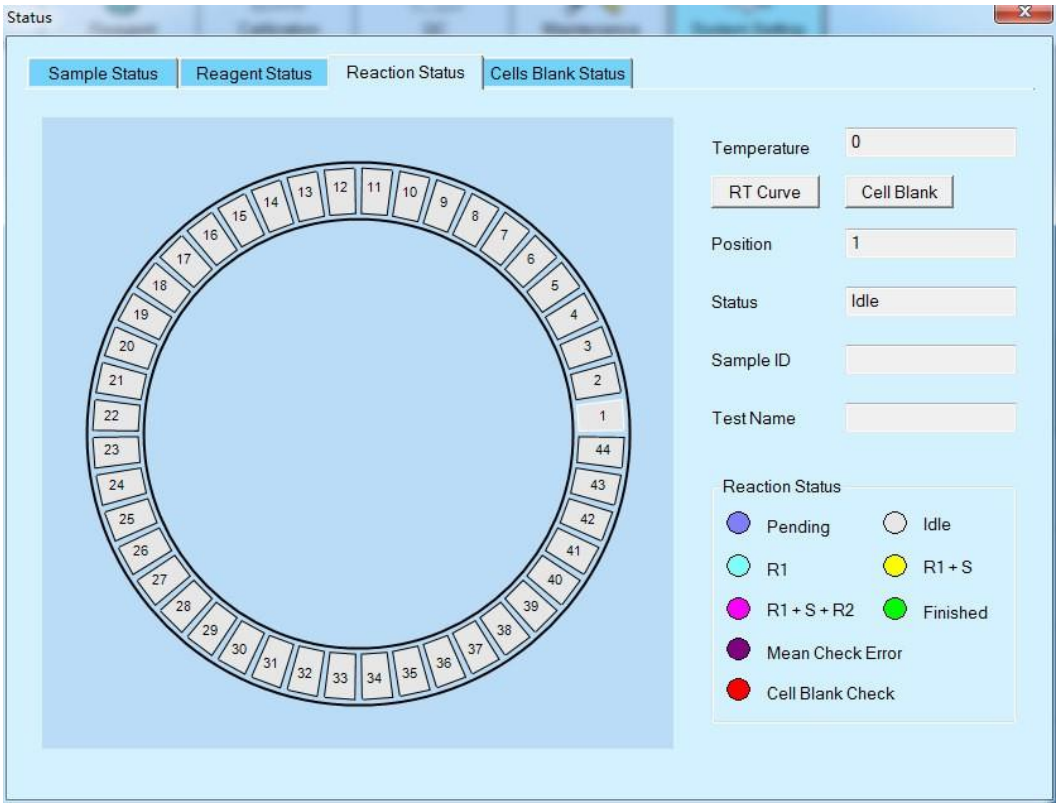
6.9.2. Reagent status



This window allows you to view reagent disk status in any time. Click a position to display its information on the right. The AutoMAX-200 reagent number is 80.

- Reaction status:
  - Sufficient: The reagent is sufficient.
  - Insufficient: The reagent is insufficient, and system will mask all tests of this reagent. After filling reagent, clicking Refresh button, system will do it again.
  - Idle: The position is blank.
- Test name: Display the test name of selected position.
- Type: Display the reagent type, only R1 or R1&R2
- Position: Display the selected position number.
- Volume left: Display the volume left of reagent bottle that auto calculated.
- Tests left: Display the available tests left of reagent bottle that auto calculated.
- Refresh button: Click this button to refresh the reagent volume after filling, system will continue analyzing the tests.

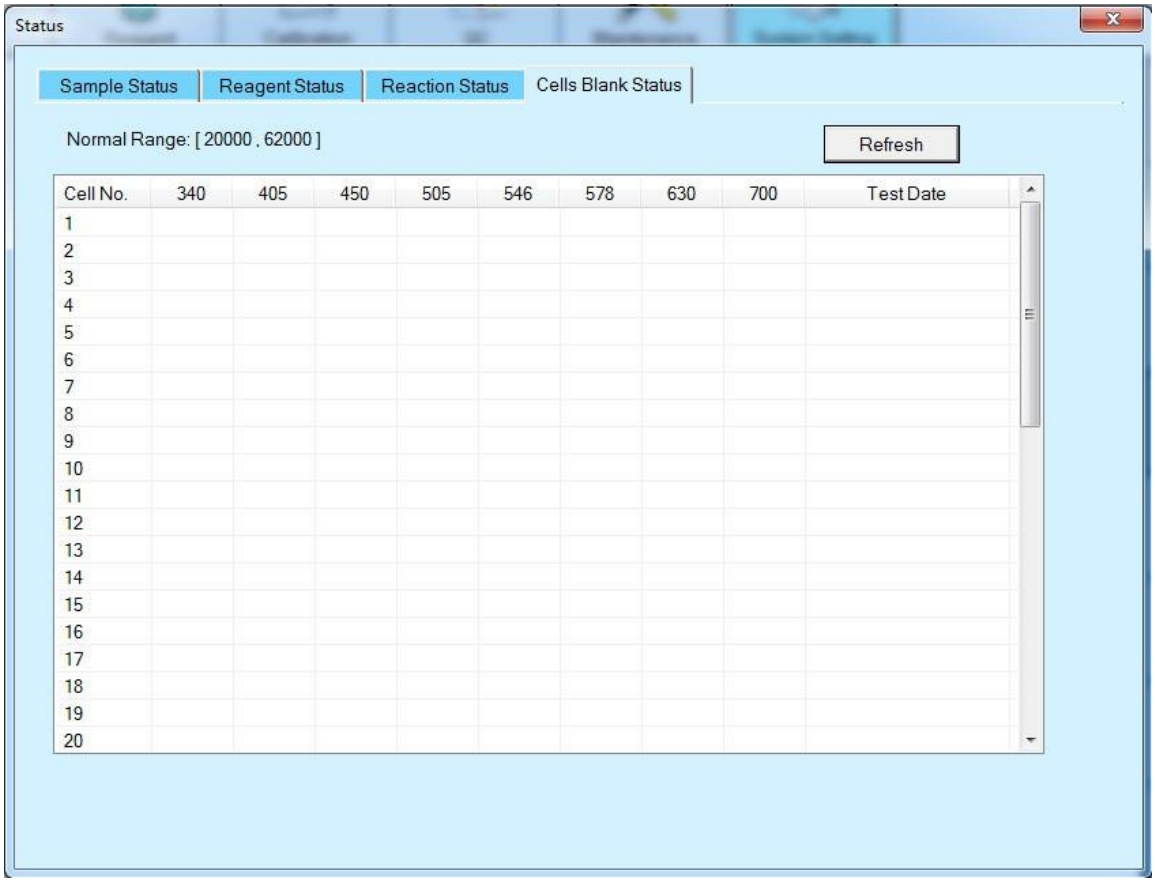
6.9.3. Reaction status



This window allows you to view reaction table status in any time. Click a position to display its information on the right.

- Temperature: Display the real-time temperature of reaction table.
- Cell blank button: Click this button to open Cell blank window.
  In this window, you can view selected cell blank that latest10 times
- Position: Display the selected position number.
- Sample ID: Display the selected sample ID.
- Test name: Display the selected reaction test name.
- Reaction status:
  - Pending: The cell is washed and unoccupied.
  - Idle: The cell is clean, cell bank checking passed.
  - R1: Dispensing first reagent.
  - R1+S: Dispensing sample.
  - R1+S+R2: Dispensing second reagent.
  - Finished: Measurement is finished with results calculated.
  - Mean check error: The cell is abnormal because of mean check error. System will abandon this cell in running statue.
  - Abs. check error: The cell is abnormal because of Abs. check error. System will abandon this cell in running statue.

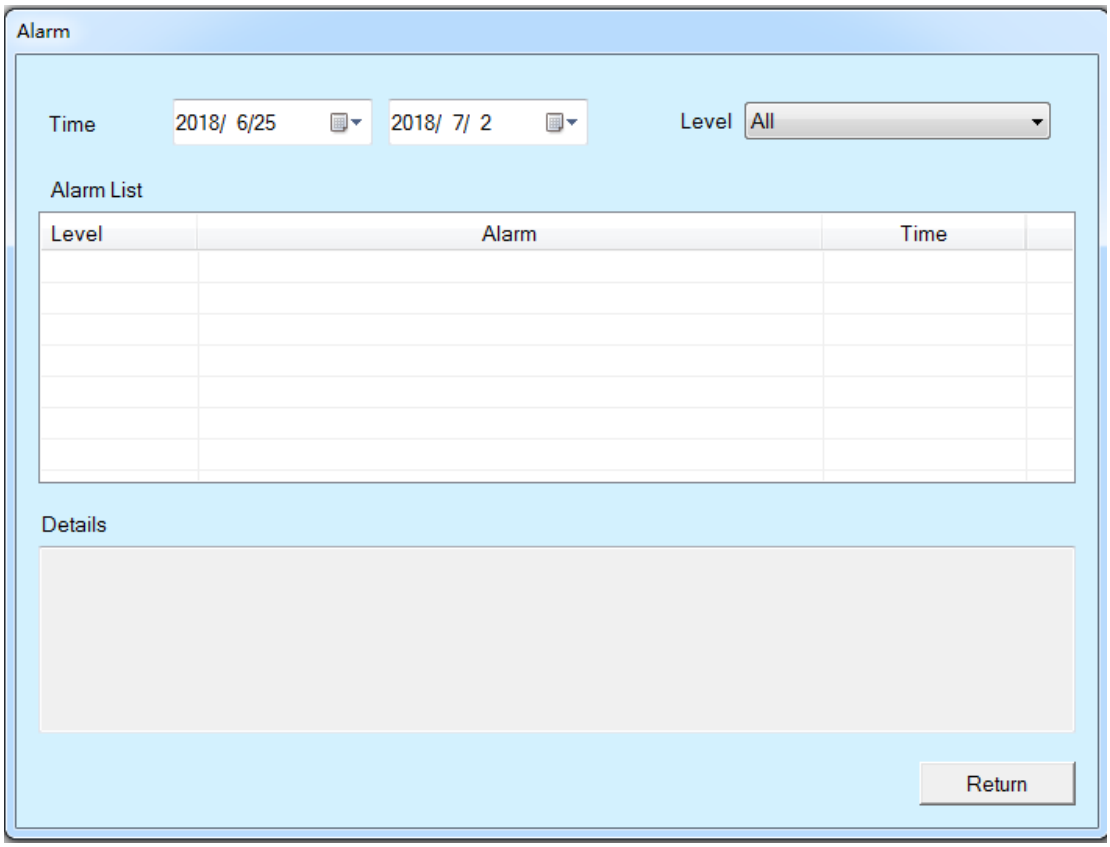
6.9.4. Cell Bank Status



This window allows you to view all cells blank status in any time.

You can click refresh button to refresh cells blank status.

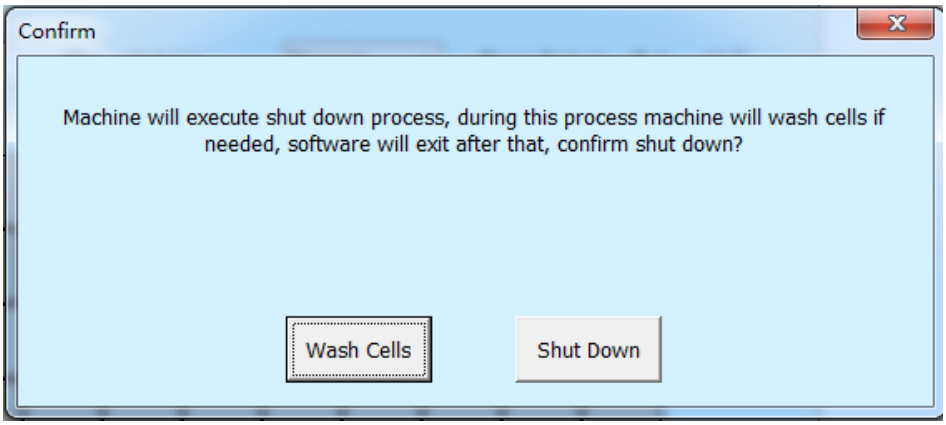
6.10. Alarm



If an alarm is caused by any trouble, this window displays the detailed explanation of the alarm (alarm level, alarm name and occurrence time) and the cause and remedy for it. Close the window after checking the details of the alarm and taking necessary measures.

- Time: Select the start time and end time for searching.
  - Level: Select a level of instrument alarms that you prepare for searching: warning, S.STOP (sampling stop), STOP (stop), All.
- Alarm list: The following are displayed for each alarm.
  - Level: Instrument alarms are classified into four levels; warning, S.STOP (sampling stop), STOP (stop)
  - Alarm: Display alarm name.
  - Time: Display Occurrence time of alarm
- Details: For the alarm selected in the alarm list, the detailed description and remedial measures are displayed.
- Return button: Click this button to close this window.

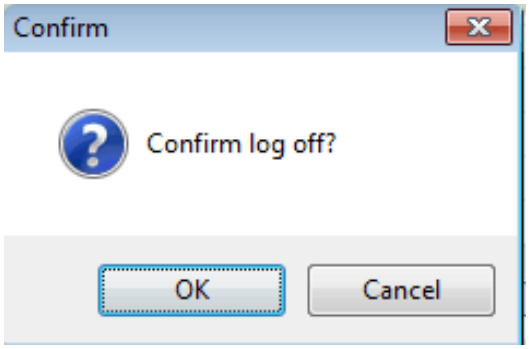
6.11. Shut down



Click "Shut down" button to execute shut down machine.

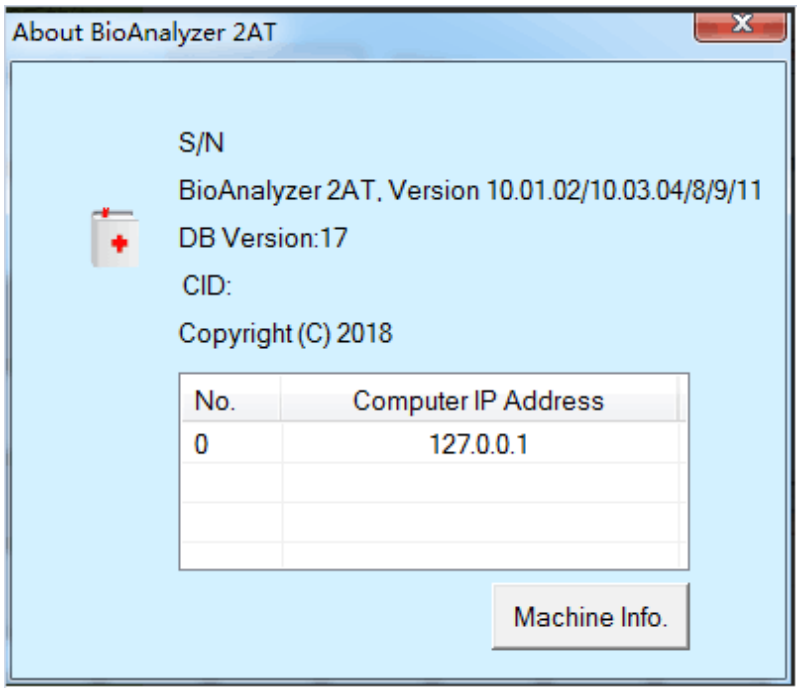
- Wash Cells: Click this button to exit software after washing cells.
- Shut Down: Click this button to shut down machine immediately.

6.12. Log off



Click "Log off" button to open Confirm window, click "OK" to logout the current user, or click "Cancel" to exit log off.

6.13. About



Click About button to display product name, software version, IP address, manufacturer information ect.

Click Machine Info. to open Machine Info. window. When you open the software at the first time, you have to input authorization key to activate the machine.

7. Service and maintenance

Warning

Before service and maintenance, you shall pull out mains plug from mains Socket-outlet.

The following maintenance is operated by the operator.

Warning

Do not sprinkle water, reagents, cleaning liquid and other liquid on the instrument's mechanical or electrical parts, so as not to cause damage to the instrument.

In the course of the operation, please do not contact with the absorption mechanism, application of sample and reagent mechanism, mixing mechanism, reaction cuvette cleaning mechanism, otherwise there is a risk of infection or injury.

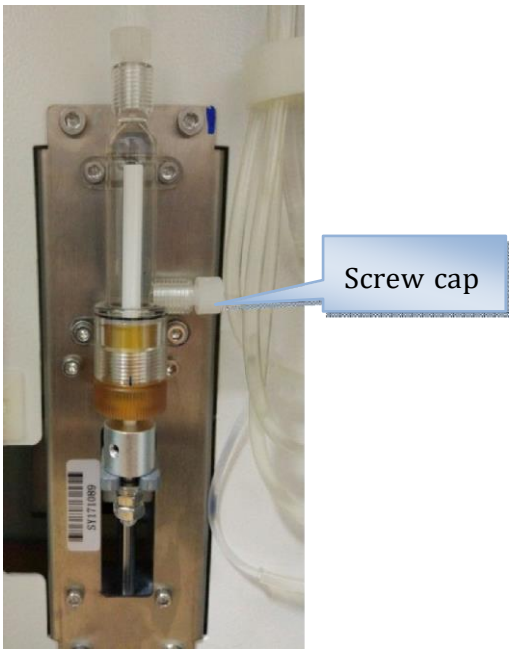
In the maintenance work, the operator should take preventive measures, need to take protective gloves, wear overalls. Otherwise it may be exposed to pollution, pollution of the liquid and the infection, or contact with corrosive liquid and damage the skin. If there is contamination or corrosive liquid accidentally touching the body, immediately wash water and disinfection.

7.1. Executing Air purge

Execute Air purge in maintenance window. When you do analysis first time or the analyzer is long time in standby, Air bubbles will come into dispensing tube, Execute Air purge to get rid of those air bubbles, the flow path is filled with new water.

7.2. Checking Syringe

You will see the syringes on the bottom of analyzer. Check whether the syringe leaks. if leaks, tighten the screw cap. If still leaks, please contact technical support. once time a week.



7.3. Sample probe and reagent probe

In the inside and outside of the probe has been polluted, easy attachment serum, reagent, water droplets, and needle is easy to plug, thus affecting the results of the test instrument. Therefore need to regularly check and timely cleaning.

(1) , 3 times daily automatic infusion.

(2), Cleaning the probe tip once a week

(a) Pull off plug from socket.

(b) After unloading the sample disk and reagent disk, the probe is transferred to the sample plate and reagent plate.

(c) A cotton swab dipped in alcohol, and wipe the outer wall of the probe.

(d) A cotton swab dipped in pure water to wipe the outer wall of the probe.

(e) Once again, click on the maintenance of the reset button, the sample probe, reagent probe automatically restored to the initial position.

Warning: Flammable

Alcohol is easy to burn, use must be very carefully, in the vicinity of the instrument do not place more than 20ml.

Biohazard

Wear gloves when cleaning sample and reagent probe, such as skin contact to sample and reagent probe, need to use alcohol wash immediately, follow standard laboratory safety procedure and consult a doctor.

7.4. Reaction table

If the reaction cuvette is contaminated, it may cause the test results are not accurate. In addition, the reaction cuvette after a long time of use will occur, so should be regularly cleaned of the reaction cuvette, and check the cell blank , when the cell blank abnormal alarm, should be promptly replaced reaction cuvette. once time a week.

(1) , Cleaning of the reaction cuvette

In the maintenance menu, click "wash cells (All)".

(2), Executive cell blank

(a) Pull off plug from socket;

(b) In the maintenance menu, click the "cell blank";

(c) After cell blank abnormal alarm, washing reaction cuvette again, and then retest cell blank, if also abnormal alarm after washing, should replace the reaction cuvette.

(3) , Replacing the reaction cuvette

(a) Pull off plug from socket;

(b) Wear good gloves, remove the screws.

(c) Rotate the reaction table with hand, then remove the reaction cuvette in sequence.

(d) Replacing the new reaction cuvette, note that the cuvette wall is not scratched.

(e) Turn on the power switch of the analyzer.

(f) In the maintenance menu， click the "cell blank" twice.

Caution

If an emergency stop occurs during the testing process, the reaction cuvette should be cleaned by hand.

Caution

Absolutely not to use organic solvents (benzene, alcohol, etc.) to scrub or soak the reaction cuvette.

7.5. The mixing bar

If the mixing bar is contaminated, it will cause cross contamination, which will affect the accuracy and precision of the test results. So should be cleaned regularly. In addition, if the mixing bar is bent, it should be replaced. Once a week.

(1) , Use a sponge dipped in alcohol to wipe the mixing bar;

(2) , Use a sponge dipped in pure water to wipe the mixing bar.

Caution

Do not bend the mixing bar in the process of wiping.

Warning: Flammable

Alcohol is easy to burn, use must be very carefully, in the vicinity of the instrument do not place more than 20ml.

Biohazard

Wear gloves when cleaning the mixing bar, such as skin contact to sample and reagent probe, need to use alcohol wash immediately, follow standard laboratory safety procedure and consult a doctor.

7.6. Reagent and sample tank

Reagent and sample tank will be samples, reagents and dust pollution, so should be cleaned once a month.

(1), Remove the reagent table and wipe the inside of the reagent with gauze.
(2), Remove the sample disk and wipe the inside of the sample with gauze.

7.7. Instrument surface

After the end of the day, use gauze dipped in alcohol wipe the surface of the instrument.

Warning：Flammable

Alcohol is easy to burn, use must be very carefully, in the vicinity of the instrument do not place more than 20ml.

8. Troubleshooting

This chapter describes the various types of instruments that may occur, and analyze the causes of failure and provide the appropriate processing method.

Biohazard

- Inappropriately handling test solution, waste solution may lead to biohazardous infection. Do not touch the test solution, waste solution with your hands. Wear gloves and lab coat, and goggles if necessary.
- In case your skin contacts the test solution or waste solution, follow standard laboratory safety procedure and consult a doctor.

Caution

The basis for troubleshooting maintenance, must turn off the power, pull off plug from socket. Under the condition of the starting state, there is a risk of electric shock and damage to electrical components, must be completed by the professional staff.

The instrument must use the power supply voltage, otherwise, damage caused by the instrument of our company is not responsible.

Note

In case of failure analysis of samples, the analysis results may be incorrect. If there is a failure in the process of sample analysis, we must analyze the sample after the fault is eliminated.

Warning: Touch

Hand touched rotating fan will be injured.
Instrument MAIN POWER in the ON state, do not touch the fan, if you want to clean the fan, please be sure to instrument MAIN POWER in OFF state.

8.1. The fault phenomenon and treatment

The following operation is done by the operator.

Error phenomenon	Probable causes→ Correction actions
Instrument doesn't work or no lighting of the power indicator	1. Socket loose or contact undesirable → Reconnect and fixed socket and the power cable. 2. Power cable loose or contact undesirable→ Reconnect and fixed power cable.
Communication error	1. NET cable loose or contact undesirable→ Reconnect and fixed net cable. 2. Strong electromagnetic interference→Re plug the net port on operation computer side and restart operation software.
Dispensing probe drop water	1. Air bubble come into dispensing tube→Execute Air purge in maintenance window
Water overflow in washing station	1. Waste bottle is full→Empty the water solution. 2. The waste tubing is bent or clogged→Rehandle the waste tubing and ensure it is nether bent nor clogged.
Mean check error of reaction cell	1. The cell is dirty→Execute Wash Cells in maintenance window. 2. There are too much scratch on cell surface→ Replace a new reaction cell.
Abs. check error of reaction cell	1. The cell is dirty→Execute Wash Cells in maintenance window 2. There are too much scratch on cell surface→ Replace a new reaction cell.
Dispensing probe liquid sensor is abnormal	1. The ground connection of power socket is not well →ensure the ground connection well.

8.2. Component replacement

The following operation is done by the supplier service staff.

Warning

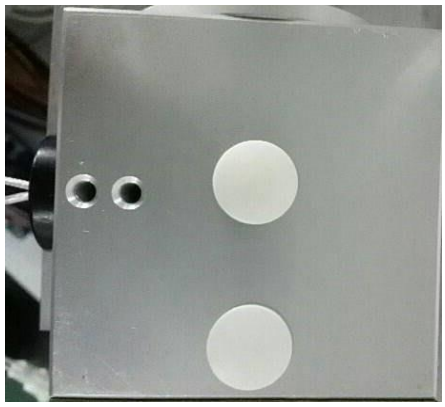
Before service and maintenance, you shall pull out mains plug from mains ocket-outlet.

8.2.1. Replace lamp

After the confirmation of the lamp is damaged or light lamp is used for two years, it is required to be replaced, and the following steps are as follows:

- Pull off plug from socket 1 minutes later;
- Open the front panel of the instrument panel and the upper panel to find the lamp power supply adapter and disconnect;

- Screw the lamp with the tool and remove the lamp;



- Put the new lamp into the lamp holder, with the tools to fix the lamp;
- Connect the lamp power adapter;
- Install the instrument front panel and front panel.

Warning: Scald

Immediately touch the lamp glass will be burned
If you need to replace the lamp, please put the instrument MAIN POWER in the OFF state, and after the lamp cooling.

8.2.2. Replace probe

When replace the sample&reagent probe, do it like the following the steps:

- First open the lid on the probe;

- Plug pins off the red and black;
- Unscrew the screws of the fixed pin;
- Remove the hose from the probe and remove the probe,;
- Put on the new probe, set up the hose;
- Tighten the screws of the fixed pin;
- The plug pins of the socket is inserted into the red and black.
- Cover the lid.

Warning: Infected • Touch

Contact with the filling mechanism, mixing mechanism, cleaning mechanism of the risk of infection or injury.

Maintenance checks when the body is in a state of stop. Please wear rubber gloves. If the sample and reagent are splashed on the skin, rinse with water immediately and disinfect. If necessary, please call the doctor.

8.2.3. Replace reaction cuvette

Reaction cuvette due to dirt contamination or wear, in the reaction cuvette blank detection, if the continuous secondary reaction cuvette blank absorbance alarm and after cleaning is still not improve, it is recommended to replace the cuvette.

8.2.4. Replace fuse

- Remove the fuse from the instrument accessory bag;
- Turn off the power supply, and pull off the power plug;

- Unplug the power cord from the host power outlet, and take out the fuse holder from the power outlet;
- The damaged fuse removed, and the new fuse into the fuse holder, and then plug the fuse plug back into the power socket;
- Connect the power plug.

Caution

The operators use the same fuse, otherwise easy to cause the instrument to be unable to work normally or damage the instrument.

Rating and characteristics of fuses

Voltage	Fuse
（AutoMAX-200-1）230V	F5AL250V
（AutoMAX-200-2）110V	F5AL250V

8.3. List of parts supplied by the manufacturer

Main board	Stepper motor	Waste liquid pipe
Motor board	Waste sensor	Distilled water pipe
Liquid detection board	Distilled water sensor	Lamp
Reaction cuvette	Power cord	LAN line
Waste bottle	Reagent bottle	Probe

8.4. Inspection items after instrument maintenance

Serial number	Inspection items	Conte nt	Specifications
1	Power supply	Determine conditions: The power supply voltage of theinstrument is the same as the working voltage. Measuring equipment: A multimeter	（ AutoMAX-200-1） AC230V±10%50Hz 1000VA （AutoMAX-200-2） AC110V±10% 50/60Hz 1000VA
2	Ground	Metal housing protective earthreliability.	
3	Waster pipe	Waste pipe shall not be bent, and shall not be allowed into the wasteliquid。	
4	Place	To confirm the space of the interiorspace and Chemical analyzer。	
5	Water leakage	Drainage is smooth, there is noequipment caused by leakage.	
6	Action of each part	To confirm the action of each part.Cleaning mechanism Mixing mechanism Additive mechanism	

		Syringe Reaction plate Reagent plate Sample plate Other mechanical parts	
7	DC power supply confirmation	Determination condition: DC power check Measuring equipment: Multimeter	
8	Reaction temperature	Check the temperature change of the software interface	37±0.1℃
9	Reagent plate temperature	Reagent plate should be refrigeration	
10	Cell blank	Executive cell blank in the maintenance interface	
11	Performance detection	Test ALT TP item, repeat 20 times.	ALT：CV value is less than2.5% TP：CV value is less than1.5%
12	Appearance	A) Instrument should not bump scratch, appearance, local deformation and other defects; B) The connection of the fasteners shall be firm and reliable, and shall not be loose and fall off.	

8.5. List of tools

Name	Specifications	Number
Allen key	1.5	1
Allen key	2	1
Allen key	2.5	1
Allen key	3	1
Allen key	4	1
Allen key	5	1
Allen key	6	1
Phillips Screwdriver	PH0	1
Phillips Screwdriver	PH1	1
Phillips Screwdriver	PH2	1

Caution

Tools for removing instrument protective barrier and/or enclosure guarding, which is kept by the equipment management department.

9. Transportation and Storage

9.1. Transportation

Biochemistry analyzer in packaging, in order to the requirements of the contract of transport, the transport process must prevent subject to severe shock, rain and exposure. Biochemistry analyzer shall not be mixed with toxic, harmful and corrosive substances.

The transportation conditions of the biochemistry analyzer were: temperature limitation -40℃～ 50℃, humidity limitation 5%~93%, atmospheric limitation 86kPa ～ 106kPa.

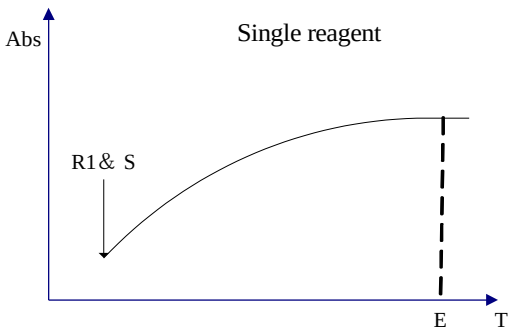
9.2. Storage

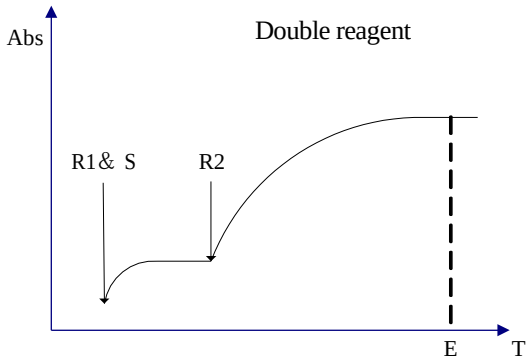
The storage conditions of the biochemistry analyzer were: temperature limitation -40℃～ 50℃, humidity limitation 5%~93%, atmospheric limitation 86kPa~106kPa, no corrosive gas, good ventilation environment. Shall not be mixed with toxic, harmful and corrosive substances.

10. Appendix 1 Calculation Method

10.1. 1 point end

1 point end assay in which absorbance is measured at a designated photometric point (specific time point when reaction reach balance) after addition of reagents. Below figure explains the 1point end assay.





(a) Reagent setting screen input:

Assay/Point: input (1 ≤ Point end E

E≤34)

(b) Calculation of absorbance:

$$A_X = \frac{A_E + A_{E-1}}{2}$$

(c) Calculation of concentration (Calibration type is linear):

$$C_X = \{K \times (A_X - B) + C_1\} \times IFA + IFB$$

Cx: concentration of standby sample

C1: Concentration of standard 1 solution (reagent blank)

K: Factor

B: Absorbance of blank

IFA and IFB: Instrument constants, representing slope and intercept

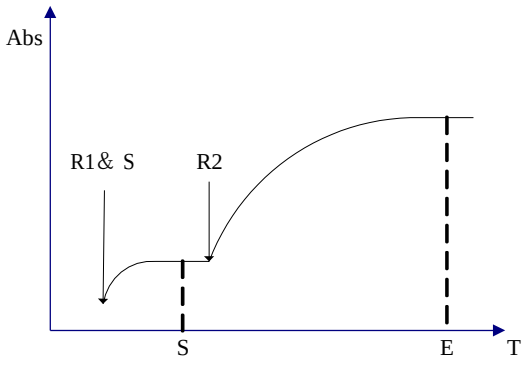
(d)Analytical items

TP, ALB, etc.

10.2. 2 point end (Sample Blank)

2 point end assay in which measurement is made twice at different points to obtain the difference in absorbance. One point is measured as the reaction initial, the other point is measured when the reaction reach endpoint or balance. The

difference between the absorbance of two photometric points is used for calculation sample concentration. Below figure explains the 2 point end assay:



(a)Reagent setting screen input:

Assay/Point: input 1≤S≤17 | 2 Point end | S | E

<E≤34 (b)Calculation of

absorbance

The difference between the average of absorbance at measurement point E and E-1 and that at measurement point S and S-1 is used.

$$A_X = \frac{(A_E + A_{E-1}) - k(A_S + A_{S-1})}{2}$$

$$k = \frac{S + \sum_{j=1}^{a} Rj}{S + \sum_{i=1}^{b} Ri}$$

a: No. of reagents at A_S measurement

b: No. of reagents at A_E measurement

(c) Calculation of concentration(Calibration type is linear):

$$C_X = \{K \times (A_X - B) + C_1\} \times IFA + IFB$$

Cx: concentration of standby sample

C1: Concentration of standard 1 solution(reagent blank)

K: Factor

B: Absorbance of blank

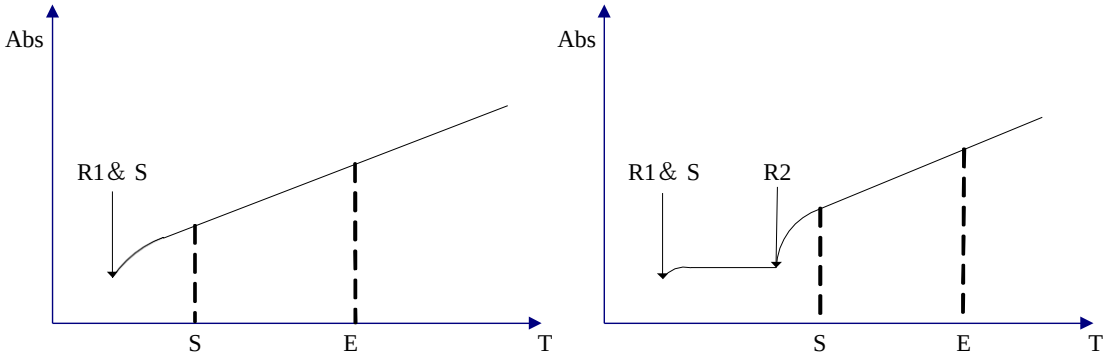
IFA and IFB: Instrument constants, representing slope and intercept

(d)Analytical items

CRP, ASO, RF etc.

10.3. Fixed-time

Measurement is made twice at different measurement points (The two point are neither measured initial nor endpoint) to determine the change in absorbance in order to calculate sample concentration. Below figure explains the Fixed-time assay.



(a)Reagent setting screen input:

Assay/Point: input | Fixed-time | S | E |

Single reagent: 1≤S＜E≤34

Double reagent: 1≤S＜17≤E≤34

(b)Calculation of absorbance:

The difference between the measurement point E and that at measurement point S

$$A_X = A_E - A_S$$

(c) Calculation of concentration (Calibration type is linear):

$$C_X = \{K \times (A_X - B) + C_1\} \times IFA + IFB$$

Cx: Concentration of standby sample

C1: Concentration of standard solution 1(reagent blank)

K: Factor

B: Absorbance of blank

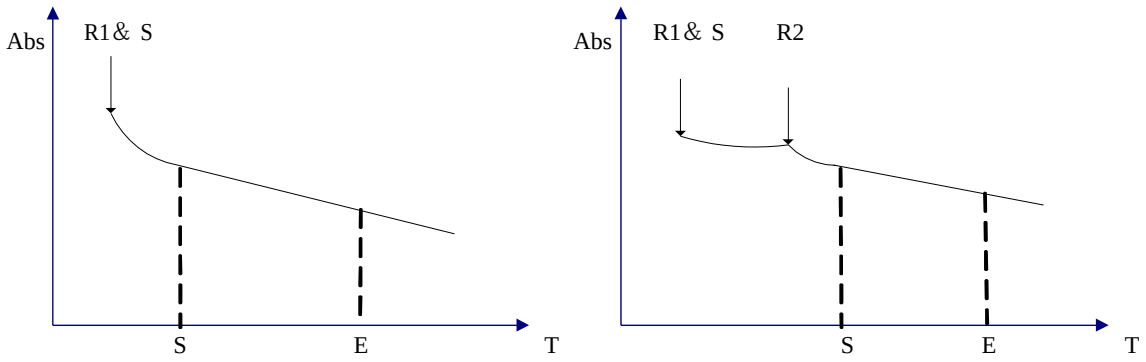
IFA and IFB: Instrument constants, representing slope and intercept.

(d)Analytical items

BUN, CRE etc.

10.4. Kinetic

The concentration or activity level is obtained from the change in absorbance between the specified measurement points. Below figure explains the Kineticassay.



(a)Reagent setting screen input:

Assay/Point: input | Kinetic | S | E |

Single reagent: 1≤S＜E≤34

Double reagent: 1≤S＜17≤E≤34

(b)Calculation of absorbance

The change in absorbance per minute between measurement point S and E is obtained by the least squares method

$$A_X = \Delta A_{S-E} / \min$$

(c) Calculation of concentration (Calibration type is linear):

$$C_X = \{K \times (A_X - B) + C_1\} \times IFA + IFB$$

Cx: Concentration of standby sample

C1: Concentration of standard solution 1(reagent blank)

K: Factor

B: Absorbance of blank

IFA and IFB: Instrument constants, representing slope and intercept.

(d)Analytical items

AST, ALT, etc.

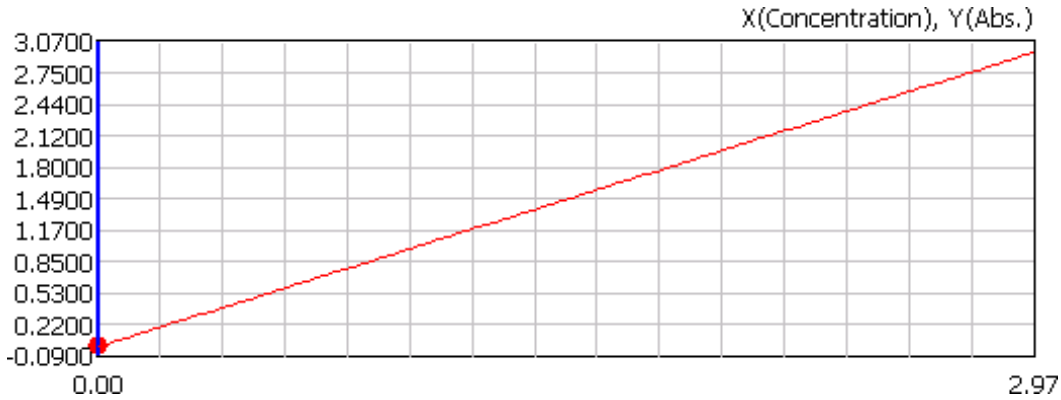
11. Appendix 2 Calibration type

Noun explanation:

- Calculated value: The value that calculated automatically by machine.
- Measured value: The value that measured by machine
- Input value: The value that inputted by user.
- Ax:
  - For end point assay, it is the absorbance measured when using single wavelength, the absorbance difference between primary and secondary wavelength when using double wavelength.
  - For kinetics assay, it is the absorbance change per minute of testing time.
  - For fixed time assay, it is the absorbance difference between last point and first point during testing time.
  - For 2 point end assay, it is the absorbance difference between first step(sample) and second step(sample blank).

For more details, please refer to appendix 1 calculation method.

11.1. 1 point linear



- Calibration formula

$$C_X = K \times (A_X - B)$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

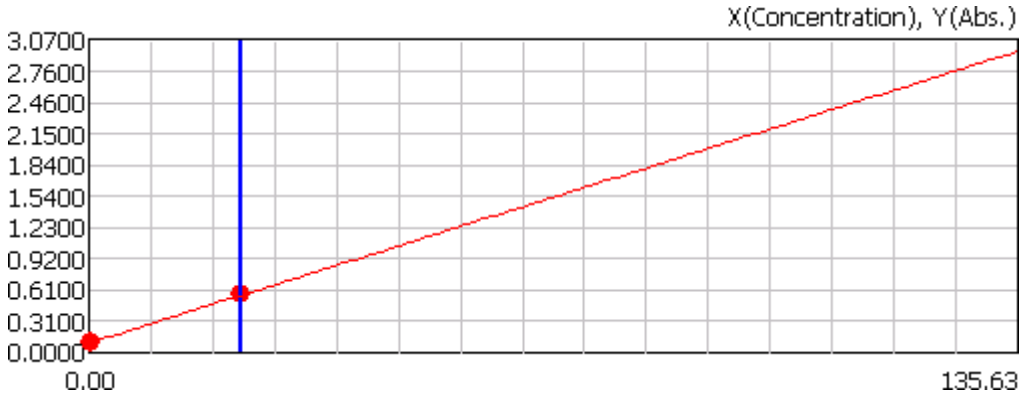
B : (measured value) the Ax of Reagent blank, If the blank is water, it is zero.

K : (input value) the value that inputted on Reagent setup dialog box.

- Screen display

B, K will be displayed on Calibration Result screen.

11.2. 2 point linear



- Calibration formula

$$C_X = K \times \left(A_X - B \right)$$

$$K = \frac{C_1}{A_1 - B}$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

B : (measured value) the Ax of Reagent blank, If the blank is water, it is zero.

K: (calculated value) the value that calculated after calibration.

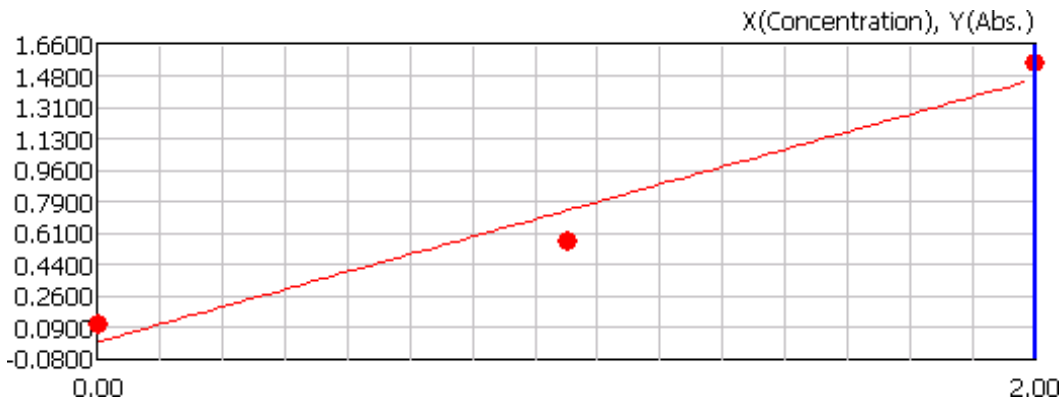
C_1 : (input value) the concentration of standard 1.

A_1: (measured value) the Ax of standard 1.

- Screen display

B, K will be displayed on Calibration Result screen.

11.3. Multi point linear



- Calibration formula

$$B = \overline{A} - \frac{X \times \overline{Cr}}{Y}$$

$$K = \frac{Y}{X}$$

$$X = \sum_{i=0}^{n-1} \left(Cri - \overline{Cr} \right) \times \left(Ai - \overline{A} \right)$$

$$Y = \sum_{i=0}^{n-1} \left(Cri - \overline{Cr} \right)^2$$

$$\overline{A} = \left(\sum_{i=0}^{n-1} Ai \right) / n$$

$$\overline{Cr} = \left(\sum_{i=0}^{n-1} Cri \right) / n$$

$$C_X = K \times \left(A_X - B \right)$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

B : (calculated value) the parameters of calibration formula.

K : (calculated value) the parameters of calibration formula.

C_{ri} : (input value) the concentration of standard i.

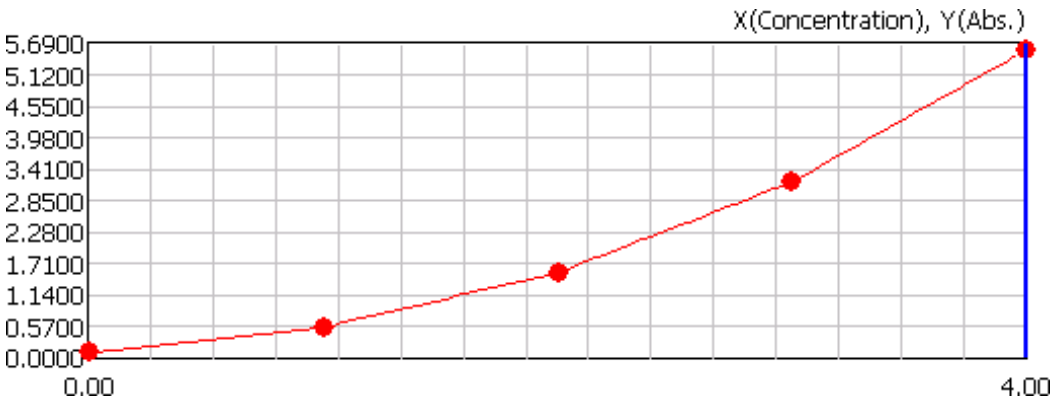
A_i : (measured value) the Ax of standard i.

n : (input value) the points of standard that inputted on Reagent setup dialog. It must be within 3-8.

- Screen display

B, K will be displayed on Calibration Result screen.

11.4. Line graph



- Calibration formula

$$C_X = K_N \times (A_X - A_N) + C_N$$

$$K_N = \frac{C_{N+1} - C_N}{A_{N+1} - A_N}$$

$$N = [0, n-2]$$

C_x: (calculated value) the concentration of samples.

A_x: (measured value) the Ax of samples.

A_{N+1}: (measured value) the Ax of standard n+1.

A_N: (measured value) the Ax of standard n.

C_{N+1}: (input value) the concentration of standard n+1.

C_N: (input value) the concentration of standard n.

K_N: (calculated value) the parameters of calibration formula.

n: (input value) the points of standard that inputted on Reagent setup dialog. It must be within 3-8.

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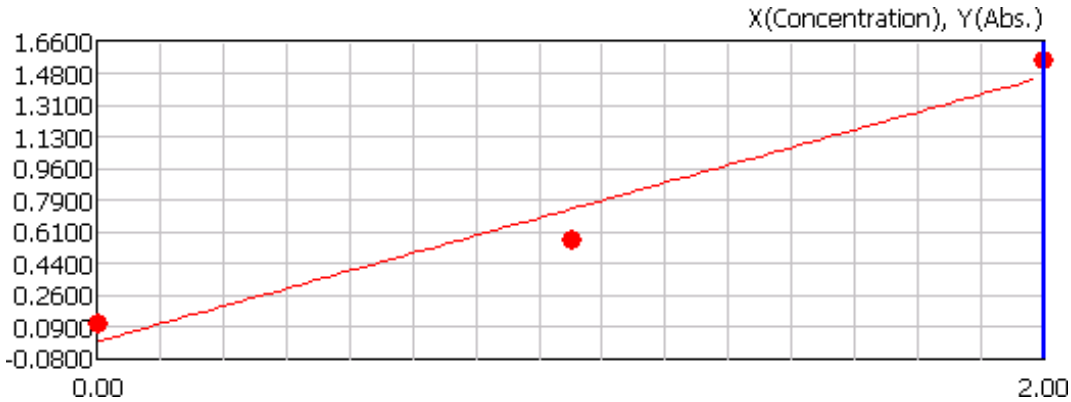
11.5. Logit-Log 3P



- Calibration formula

$$A_X = B + \frac{K}{1 + aC_x}$$

C_x: (calculated value) the concentration of samples.

A_x: (measured value) the Ax of samples.

B : (calculated value) the parameters of calibration formula.

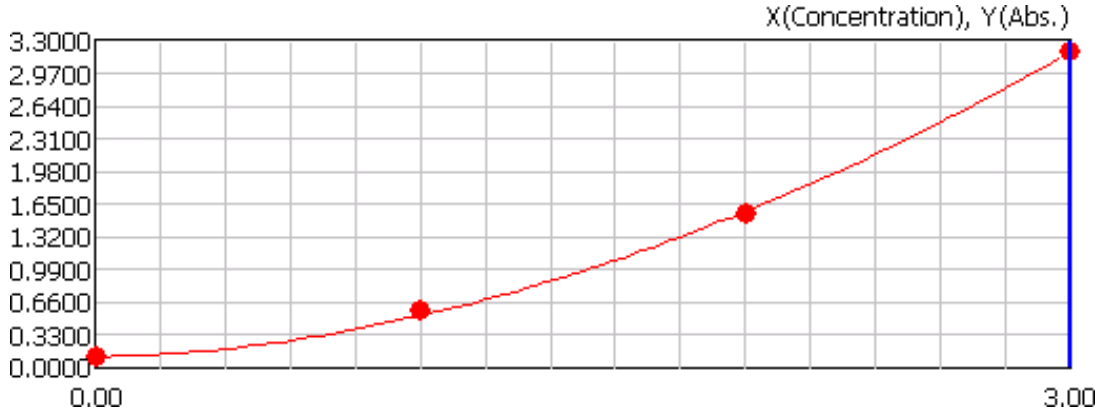
K : (calculated value) the parameters of calibration formula.

a : (calculated value) the parameters of calibration formula.

- Screen display

B, K, a will be displayed on Calibration Result screen.

11.6. Logit-Log 4P



- Calibration formula

$$A_X = B + \frac{K}{1 + aC_x^b}$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

B : (calculated value) the parameters of calibration formula.

K : (calculated value) the parameters of calibration formula.

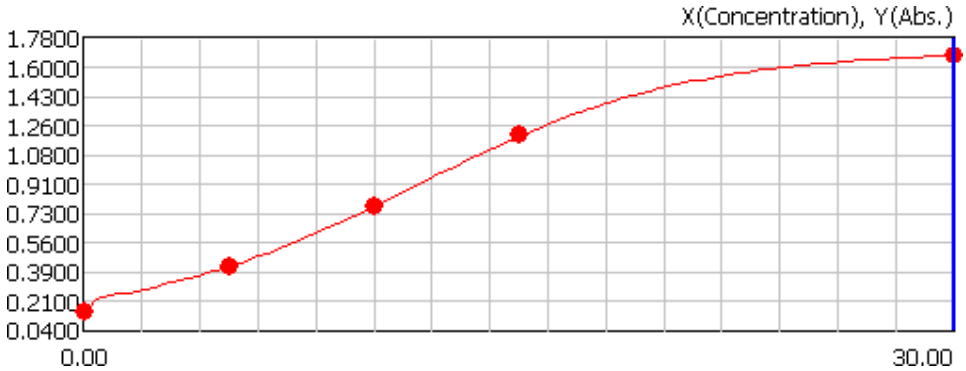
a : (calculated value) the parameters of calibration formula.

b : (calculated value) the parameters of calibration formula.

- Screen display

B, K, a, b will be displayed on Calibration Result screen.

11.7. Logit-Log 5P



- Calibration formula

$$Ax = B + \frac{K}{1 + \exp(-a - b \times \ln C_x - c \times C_x)}$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

B : (calculated value) the parameters of calibration formula.

K : (calculated value) the parameters of calibration formula.

a : (calculated value) the parameters of calibration formula.

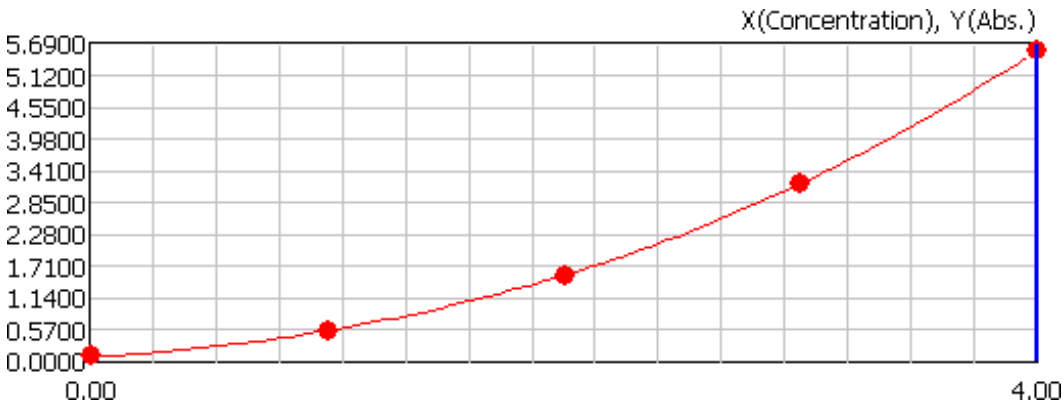
b : (calculated value) the parameters of calibration formula.

c : (calculated value) the parameters of calibration formula.

- Screen display

B, K, a, b, c will be displayed on Calibration Result screen.

11.8. Exponential



- Calibration formula

$$Ax = B + K \times \exp\left\{ a \times (\ln C_x) + b \times (\ln C_x)^2 + c \times (\ln C_x)^3 \right\}$$

C_x : (calculated value) the concentration of samples.

A_x : (measured value) the Ax of samples.

B :(calculated value) the parameters of calibration formula.

K :(calculated value) the parameters of calibration formula.

a :(calculated value) the parameters of calibration formula.

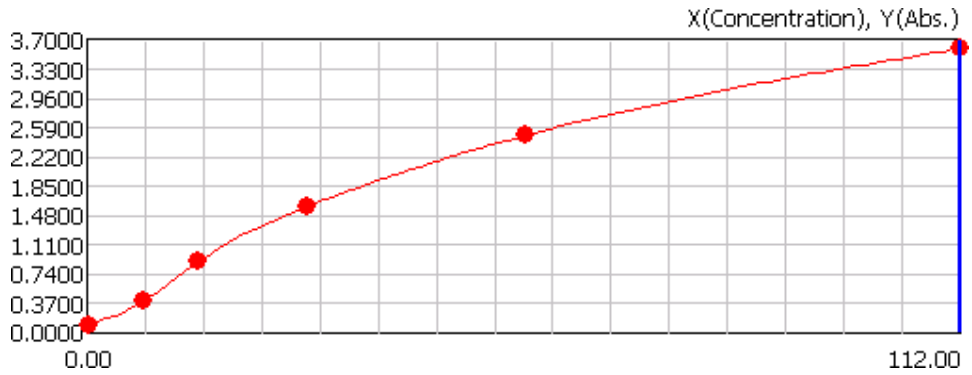
b :(calculated value) the parameters of calibration formula.

c : (calculated value) the parameters of calibration formula.

- Screen display

B, K, a, b, c will be displayed on Calibration Result screen.

11.9. Spline



- Calibration formula

$$Ax = a(I) + b(I) \times \left(C_X - C(I) + c(\mathrm{I})\right) \times \left(C_X - C(I)^2\right) + d(\mathrm{I}) \times \left(\mathrm{C}_{\mathrm{X}}\text{-}\mathrm{C}(\mathrm{I})\right)^3$$

$I = [0, n-2]$

C_x: (calculated value) the concentration of samples.

A_x: (measured value) the Ax of samples.

$C(I)$:(input value) the concentration of standard I.

K_N: (calculated value) the parameters of calibration formula.

a(I):(calculated value) the parameters of calibration formula.

b(I):(calculated value) the parameters of calibration formula.

c(I):(calculated value)the parameters of calibration formula.

d(I):(calculated value)the parameters of calibration formula.

n: (input value)the points of standard that inputted on Reagent setup dialog. It must be within 5-8.