BOECO
Germany

# S-200/S-220/S-300
# Spectrophotometer

# INSTRUCTION MANUAL

Version V1.1

# S-200/S-220/S-300 Spectrophotometer

Thank you for your purchase of S-200/S-220/S-300 spectrophotometer. In order to ensure proper use and your safety, please read this manual carefully and keep it well before using the instrument.

Information contained in this manual is subject to change without notice for product appearance and technical data. Enquiries are welcome.

# IMPORTANT

## Precautions on Electromagnetic Wave Interference

### (1 )Possible Electromagnetic Wave Interference Caused by This Instrument

When this instrument is used in a residential area or an adjacent area thereto, it may cause interference to radio and television reception.

To prevent this, use the specified system connection cables in strict accordance with the instruction manual.

The instrument is designed to minimize possible electromagnetic wave interference caused by it if the specified cables are connected properly.

However, there is no guarantee that electromagnetic wave interference will not be caused by the instrument.

If the instrument does cause interference to radio or television reception, which can be determined by turning off and on the instrument, the user is encouraged to try to correct the interference by one or more of the following measures:

- Increase separation between the instrument and radio/TV receiver.
- Connect the instrument to an outlet on a circuit different from that to which the radio/TV receiver is connected.

### (2 )Possible Electromagnetic Wave Interference Affecting This Instrument

If this instrument is used near an intense electromagnetic source, interference noise may be given to the instrument to incur an adverse effect on its performance or functionality.

To prevent this, use the specified system connection cables in strict accordance with the instruction manual.

The instrument is designed to minimize possible electromagnetic wave interference affecting it if the specified cables are connected properly.

However, there is no guarantee that electromagnetic wave interference will not occur in this instrument.

If the instrument does incur electromagnetic wave interference, which can be determined by turning on and off possible sources of electromagnetic wave interference nearby, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the instrument.
- Increase separation between the instrument and possible sources of electromagnetic wave interference.
- Increase separation between the power cable of the instrument and possible sources of electromagnetic wave interference.
- Connect the instrument to an outlet on a circuit different from that to which possible sources of electromagnetic wave interference are connected.
- Confirm that any other device connected with the instrument is not

affected by electromagnetic wave interference.

## Warranty on Product

The Model S-200/S-220/S-300 spectrophotometer is warranted to operate according to the specifications given in the instruction manual, provided it is used in accordance with the instructions described in the manual.

**(1) Scope of Warranty**

(a) Any parts which prove to be defective in design or workmanship during the warranty period will be repaired without charge.

(b) A substitute part may be used for repair, or replacement with an equivalent product may be made instead of repair.

(c) Such system components as a personal computer and printer to be updated frequently for improvement may not be available in original versions at the time of replacement.

**(2) Warranty Period**

One year from the date of initial installation.

**(3) Availability of Technical Support Service**

Technical support service for this instrument is available within regular working hours on workdays predetermined by us.

**(4) Limitations and Exclusions on Warranty**

Note that this warranty is void in the following cases, even if they occur within the warranty period.

(a) Failure due to operation at a place not meeting the installation requirements specified by us

(b) Failure due to power supply voltage/frequency other than specified by us or due to abnormality in power supply

(c) Corrosion or deterioration of the tubing due to impurities contained in reagent, gas, air or cooling water supplied by the user

(d) Corrosion of the electric circuits or deterioration of the optical elements due to highly corrosive atmospheric gas

(e) Failure due to use of hardware, software or spare parts other than supplied by us

(f) Failure due to improper handling or maintenance by the user

(g) Failure due to maintenance or repair by a service agent not approved or authorized by us

(h) After disposal of this instrument, or after its resale without our approval

(i) Failure due to relocation or transport after initial installation

(j) Failure due to disassembly, modification or relocation not approved by us

(k) Consumables, and failure of parts that have reached the end of specified useful life

(l) Failure of parts excluded from the warranty in the instruction manual or other documents

(m) Failure due to acts of God, including fire, earthquake, storm, lightning, social disturbance, riot, crime, insurrection, war (declared or undeclared), radioactive pollution, contamination with harmful substances, etc.

(n) Failure of the hardware, or damage to the system software, application software, data or hard disk due to computer virus infection

(o) Failure of the personal computer connected with the instrument, or damage to the system software, application software, data or hard disk due to power interruption or momentary power voltage drop caused by lightning or the like

(p) Failure of the personal computer connected with the instrument, or damage to the system software, application software, data or hard disk due to disconnection of main power to the personal computer without taking the specified normal shutdown procedure

**(5) Disclaimer of Warranty**

(a) Any express warranties other than the explicit conditions indicated in (1) are excluded from this warranty.

(b) Any other implied warranties of merchantability and fitness for a particular purpose are not included in this warranty. No liability is assumed for direct or indirect damages arising out of explicit or implied warranties.

(c) Oral or written information or advice given by our dealers, distributors, agents or employees without our express permission shall not create a warranty or in any way increase the scope of this warranty.

## Installation, Relocation and After-sale Technical Service

Installation of this instrument shall be carried out by or under supervision of qualified service personnel of Boeckel + Co (GmbH + Co) KG or its authorized service agent.

Before installation of the instrument, the user shall make preparations for satisfying the installation requirements in accordance with the instruction manual.

If relocation of the instrument becomes necessary after initial installation (delivery), please notify your local sales representative or nearest service office of Boeckel + Co (GmbH + Co) KG.

## Disposal this instrument

When you discard equipment, please check and discard a related statute etc. or ask the service section of Boeckel + Co (GmbH + Co) KG.

## Other Precautions

**(1) Handling of Chemicals and Samples**

(a)The user is responsible for following relevant legal standards and regulations in handling, storage and discarding of chemicals and samples used in analytical operations of this instrument.

(b) Reagents, standard solutions and accuracy-control samples shall be handled, stored and discarded as instructed by the respective suppliers.

**(2) Notice on Instruction Manuals**

(a)Information contained in the instruction manuals furnished with the instrument is subjected to change without notice for product improvement.

# SAFETY SUMMARY

## CAUTION

**For your safety please read the following precautions carefully before using the instrument.**

### General Safety Guidelines

- For safe handling of this product, please follow the instruction procedure in the manual for this product.
- Pay special attention to follow all the hazard warnings on the product and in the manual. Failure to do so can cause injury to you or damage to the product.
- After installation, please do not move the equipment. A vibration might affect the adjustment of the product.
- The hazard warnings, which appear on the warning labels on the product or in the manual, have one of the following alert headings consisting of an alert symbol and a signal word, DANGER, WARNING, or CAUTION.

**DANGER:** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. (It does not apply to this equipment.)

**WARNING:** Indicates a potentially hazardous situation that, if not avoided, can result in death or series injury.

**CAUTION:** Indicates a hazardous situation that, if not avoided, will or can result in minor to moderate injury, or serious damage to the product.

**:** The alert symbol shown precedes every signal word for hazard warnings, and appears in safety related descriptions in the manual.

In addition, the following “Attention” and “Note” are not directly related to the safety of a person:

△ Attention: It is used to present warnings, which are not directly related to personal injury hazards. It is used to indicate prevention against damage to the equipment.

◇ Note: This is used to indicate instructions that enable you to operate the equipment accurately and perform accurate measurements.

# SAFETY SUMMARY (Continued)

## General Safety Guidelines (Continued)

**Before using**

- Before using this product, please make sure you read and understand the instructions.
- Please keep this manual in a safe and easily accessible place so that you can use it when necessary.
- Please make sure to use this product properly and follow the instructions as specified in this manual.
- Please make sure to understand and follow the instructions regarding safety in this manual.
- If you do not follow the instructions in this manual, an inaccurate analysis may result or bodily injury may occur.
- Because of danger, please make sure not to modify or alter the product, make sure not to use unspecified parts, and make sure not to operate the equipment by removing/defeating the safety device(s).
- When using chemicals, please make sure to ventilate the room well. If there is not enough ventilation, it may be hazardous to your health.
- Although we have carefully considered the instructions written on the products and manuals, it is possible for an unexpected event to occur. When operating the equipment, aside from following the instructions, be very cautious.

# SAFETY SUMMARY (Continued)

## General Safety Guidelines (Continued)

**Precautions for Installation • Maintenance • Relocation and After Sale Technical Service**

- Before installation, confirm that there are no missing items or standard accessories. If there is something missing or damaged, or you have noticed any problems, please contact our nearest representative.
- Operating the equipment without a standard part can damage the equipment and cause safety concerns. If that occurs, please follow the instruction of the installer.
- Installation of this instrument shall be carried out by or under supervisions o personnel of Boeckel + Co (GmbH + Co) KG or its authorized service agent
- When relocation of this instrument becomes necessary after initial installation (delivery), please notify your local Boeckel + Co (GmbH + Co) KG sales representative or nearest Boeckel + Co (GmbH + Co) KG service office. Technical support service for this instrument is available from service agent approved or authorized by Boeckel + Co (GmbH + Co) KG within regular working hours or workdays.
- Please do not perform any other operations that are not included in the manual. If any problem occurs with the equipment, please contact the agent from whom you purchased it or the service department of Boeckel + Co (GmbH + Co) KG.

# SAFETY SUMMARY (Continued)

## ⚠ WARNING: Poisoning from Organic Solvent Gas

**Handling Organic Solvents**

- The organic solvent vapor may be harmful to your health.

## ⚠ WARNING: Eye Injury from Organic Solvents

**Handling Organic Solvents**

- Please wear protective glasses when using organic solvents. If the organic solvent should get into your eye, flush your eye immediately under running water for at least 5 minutes while keeping your eyelids open. See a physician for appropriate treatment.

# SAFETY SUMMARY (Continued)

## ⚠ WARNING: Electrical Shocks from Improper Grounding

- When wiring the personal computer, power supply for the thermostatic cell holder and the like, please make sure to use the 3-prong wire (with ground) provided.

## ⚠ WARNING: Electrical Shock from Contact

- High voltage is used inside of the equipment, be sure to turn off the unit before connecting the power cord.

## ⚠ CAUTION: Burns from high Temperature

- The lamp will become very hot during operation.
- Make sure that the instrument is switch off, the power cord is pulled off and the D2 lamp and the tungsten lamp is cooled off when replacing the lamp.

## ⚠ CAUTION: Fatigue due to Prolonged Work

- Viewing the display in your work can cause eye and physical fatigue if you continue to work in the same posture for extended periods.
- When working with the display for a prolonged period, for your health, make sure to take breaks for 10 to 15 minutes every hour in order to rest your eyes and body.

## ⚠ CAUTION: Indoor ventilation

- If using UV zero detection system in a small room for a long time, it may cause indoor nitrogen concentration increases and the oxygen concentration drops, which will affect human health.
- Please install exhaust fan or open the windows frequently to maintain good indoor ventilation.

# SAFETY SUMMARY (Continued)

**Electricity**

(a) The voltage for the Spectrophotometer system and personal computer must be a single-phase AC 100V to 240V; Variations in the voltage and noise generated in the power line will cause adverse effects on the spectrophotometer and may also cause accidents.

(b) Please make sure that grounding is provided together with the power supply wires, and make sure that it is connected with a grounding resistance of less than 4Ω. Defective grounding may not only cause lower resistance against noise from the outside but it can also cause the Mass Spectrometer and personal computer to generate static electricity, which may involve the danger of electrical shocks.

(c) A high voltage circuit is used inside the Spectrophotometer. Do not open the covers when this circuit is operational because of the danger from electrical shock.

**Fire Extinguishers**

(a) Do not smoke or use fire within 3 meters of the Spectrophotometer

(b) Make sure to keep a fire extinguisher near the Spectrophotometer at all times. Obtain an ABC Powder extinguisher that can be used for normal fires, oil fires, and electrical fires.

## Functional characteristics

This series includes 2 models. S-200 is visible spectrophotometer, S-220/S-300 is UV-VIS spectrophotometer.

## Feature

| | |
|---|---|
| Small and beautiful appearance | 4.3 inches, 480×272 resolution, TFT colorful liquid crystal touch screen<br>size: like A3 paper, 400(W)×280(D)×160(H) mm<br>weight: 4 kg |
| Easy operation | One-button operation interface into the measurement function<br>High-speed wavelength move, arrive to any specified wavelength within 1 second<br>For S-200 spectrophotometer, when sampling interval is 0.2nm, its scanning speed is 2400nm/min.<br>Unique application method manager changes the original function-oriented operation method and user sample measurement method operation mode. |
| Energy saving and environmental protection | High conversion efficiency switching power supply, 100-240V AC voltage input, and complete riddance of low grid voltage<br>S-200 spectrophotometer uses 2000 hours lifetime imported halogen lamp<br>S-220/S-300 spectrophotometer uses low-power, high brightness and $10^9$ times lifetime pulses xenon lamp |
| More ports | Serial printer port for thermal printer<br>USB port for PC<br>SD card port saves data and measurement methods<br>Options port for connecting and controlling several options |
| More options | Auto 5-cell holder<br>Auto sample sipper<br>Flow cuvette holder<br>10, 20, 30, 50, 100mm rectangular long-path cuvette holder<br>Micro-cuvette holder<br>Tube holder (only for S-200)<br>Electronic thermostat TC cuvette holder (only for S-220/S-300) |

## The instrument

SD card slot →

### Keypad


The instrument uses touch display screen, all operation can be by touch screen. Two shortcut key further enhance easy operation.

BACK. Return to the previous menu.

MEASURE. Begin to a new measurement.

## Operation environment

| | |
|---|---|
| Power | Voltage: AC 100V-240V, Frequency: 50/60Hz±1Hz, Capacity: more than 200W<br>Grounding line resistance of 10Ω or less is required<br>The input power mutations, without interference from other large electrical equipment |
| Operating temperature | 5-35℃<br>In order to perform a measurement under the most stable condition, we recommend that the instrument is used in an air conditioned room of 20-25℃.<br>Storage temperature:-20-55℃ |
| Operating humidity | Less than 85%.<br>We recommend that the instrument is used under 30% ~ 70% humidity.<br>Storage humidity: less than 85%。 |
| Workbench | Width: more than 550mm, Depth: more than 400mm, Load bearing: more than 15kg, horizontal and reliable workbench.<br>If there are other auxiliary devices, it is necessary to enlarge workbench area.<br>More than 200mm space at the both sides of the instrument, avoid being close to the wall.<br>Height of the instrument: about 160mm. In order to easy operation, please choose suitable workbench. |
| Connect with other equipment | Connect with PC (additional optional software and computer). Indirect specify type thermal printer (options) and other accessories.<br>When main unit connects with above equipments, please switch off the power of the main unit and other equipments.<br>All grounding cords are in good condition and can be connected with the grounding line of the main unit. |

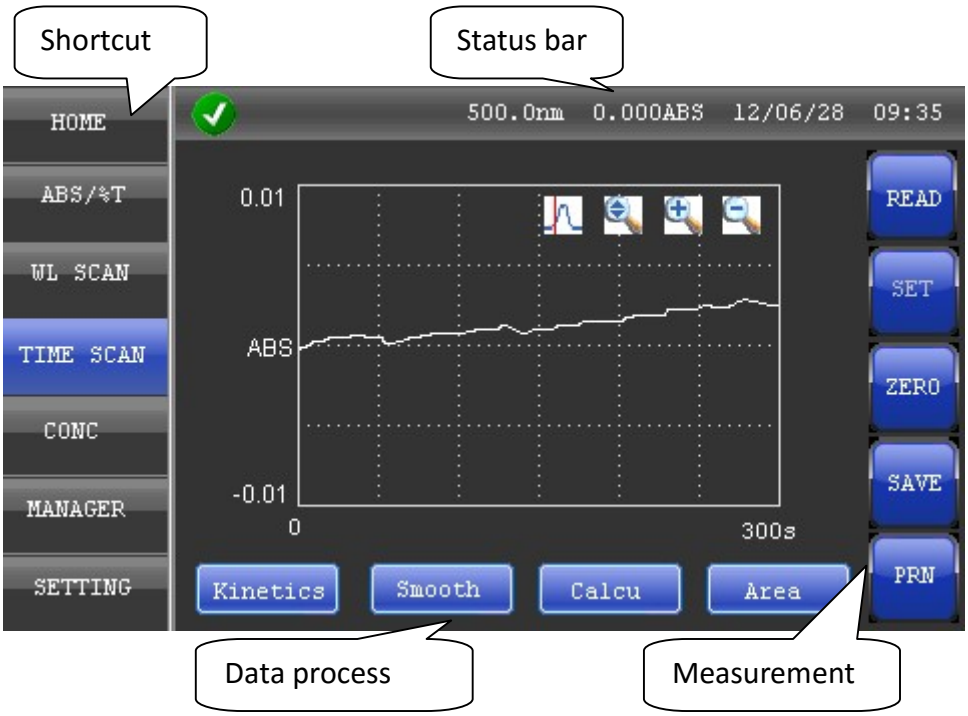
## Specification ( Ⅰ )

| **S-200** | |
|---|---|
| Wavelength range | 320-1100nm |
| Wavelength controlled variable | 0.2nm |
| Wavelength accuracy | ±1nm |
| Wavelength repeatability | ≤0.5nm |
| Transmittance accuracy | ±0.5％T (NIST 930 Filter) |
| Transmittance repeatability | 0.2％T |
| Baseline flatness | ±0.002Abs (330-1090nm) |
| Noise level | ≤0.001Abs (500nm ) |
| Baseline stability | ≤0.001Abs/h (500nm, 2 hours after warm up ) |
| Spectral bandwidth | 6nm±1.2nm |
| Stray light | ≤0.5％T |
| Wavelength scan speed | 2400nm/min (0.2nm sampling interval, without filter switchover) |
| Wavelength move speed | To any specified position within 1 second |
| Light source | WI lamp |
| Detector | silicon photodiode |
| Display screen | 4.3 inches, 480×272 colorful touch LCD screen |
| Printer | specified 80-column thermal printer (series port) |
| Metering mode | Single beam |
| Dimension (W×D×H) | 400×280×160mm |
| Weight | About 4 kg |
| Power requirement | AC, 100-240V, (50/60Hz) |
| Power consumption | 100VA |
| Communication ports | Serial printer port connects thermal printer<br>USB port connects PC<br>SD card port saves data and measurement methods<br>Accessories port connects and controls several options |
| Optional Accessories | Auto 5-cell holder<br>Auto sample sipper<br>Flow cuvette holder<br>10, 20, 30, 50, 100mm long-path cuvette holder<br>Micro-cuvette holder<br>Tube holder |

## Specification (Ⅱ)

| **S-220/S-300** | |
|---|---|
| Wavelength range | 190-1000nm |
| Wavelength controlled variable | 0.2nm |
| Wavelength accuracy | ±2nm |
| Wavelength repeatability | ≤1nm |
| Transmittance accuracy | ±1％T (NIST 930 Filter) |
| Transmittance repeatability | 0.5％T |
| Baseline flatness | ±0.005Abs (200-990nm) |
| Noise level | ≤0.005Abs (250nm) |
| Baseline stability | ≤0.005Abs/h (250nm, after 2 hours warm up) |
| Spectral bandwidth | 5nm±1nm |
| Stray light | ≤0.5％T |
| Wavelength scan speed | 300nm/min (0.2nm sampling interval, without filter switchover) |
| Wavelength move speed | To any specified position within 1 second |
| Light source | pulsed-xenon lamp |
| Detector | silicon photodiode |
| Display screen | 4.3 inches, 480×272 colorful touch LCD screen |
| Printer | specified 80-column thermal printer (series port) |
| Metering mode | Single beam |
| Dimension (W×D×H) | 400×280×160mm |
| Weight | About 4 kg |
| Power requirement | AC, 100-240V, (50/60Hz) |
| Power consumption | 100VA |
| Communication ports | Serial printer port connects thermal printer<br>USB port connects PC<br>SD card port saves data and measurement methods<br>Accessories port connects and controls several options |
| Optional Accessories | Auto 5-cell holder<br>Auto sample sipper<br>Flow cuvette holder<br>10, 20, 30, 50, 100mm long-path cuvette holder<br>Micro-cuvette holder<br>Electronic thermostat TC cuvette holder |

## The operation interface




**Shortcut** appear on every interface and can quickly switch to different measurement functions.

**Measurement** appear on every measure interface for basic measurement and setting

**Data Process** appear on scan interface. For the results of the scan data processing and according to different scanning characteristic, automatically vary corresponding processing ways.

**Graph display** buttons appear only in scan interface for graphical display changes

**Status bar** show in every interface to display current time, wavelength and readings in transmission or absorbance

Clicking the **wavelength** in the **Status bar**, it will go to the setting screen for wavelength setup.

Clicking the **reading** in the **Status bar**, it will go to the large display measurement interface to achieve simple transmittance and absorbance read function.

The value in the status bar of S-200 is real-time reading value of current wavelength.

The value in the status bar of S-220/S-300 is the last time measured value.

## Word input keyboard


This keyboard appears when there is a need for word input, for example, sample name, user and document name.

Close the keyboard


Clear


Switching lowercase, digit and sign

Enter

## Numeric input


Numeric input appears at the area where can input digit, for example, wavelength value and scanning time.

## Main Menu


Function of each key

| | |
| --- | --- |
| ABS/%T: | Photometric (single/ multiple wavelength) |
| WL SCAN: | Wavelength scan |
| TIME SCAN: | Time scan |
| CONC: | Concentration measurement |
| MANAGER: | File manger – Saved data & Saved method |
| SETTING: | System Setting |

## Large display measure


The large display can be used to measure single wavelength's absorbance or transmission. Click the value in the status bar in any screen can enter the large character measure mode.

%T: Absorbance or transmission mode
ZERO: Blank sample
READ: Start a new measurement (only for S-220/S-300 spectrophotometer)
PRINT: Print results


Click wavelength in the status bar, input wavelength, the instrument will go to the select wavelength for measurement. (GOTO λ function)

## Single/Multiple wavelength measurement

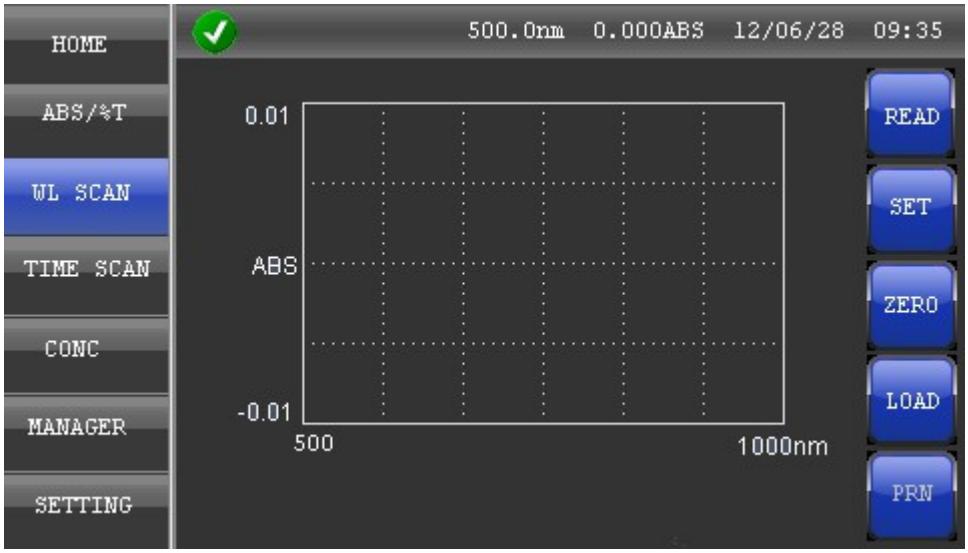

Photometry function can measure up to 6 selected wavelength's absorbance or transmission. Each measurement file can store up to 200 results.

READ: Start measurement
SET: Parameter setting
ZERO: Blank sample
LOAD: Load data files or method files
PRN: Print results

## Single/Multiple wavelength measurement setting


DATA MODE: %T or ABS mode
PATHLENGTH: Cuvette pathlength
SAMPLE NAME: Sample name input (less than 8 characters)
WL NUMBER: Wavelength number (up to 6)
WL1~WL6: Measured wavelength selection
OK: Confirm setting
Save: Save parameter

## Wavelength Scan



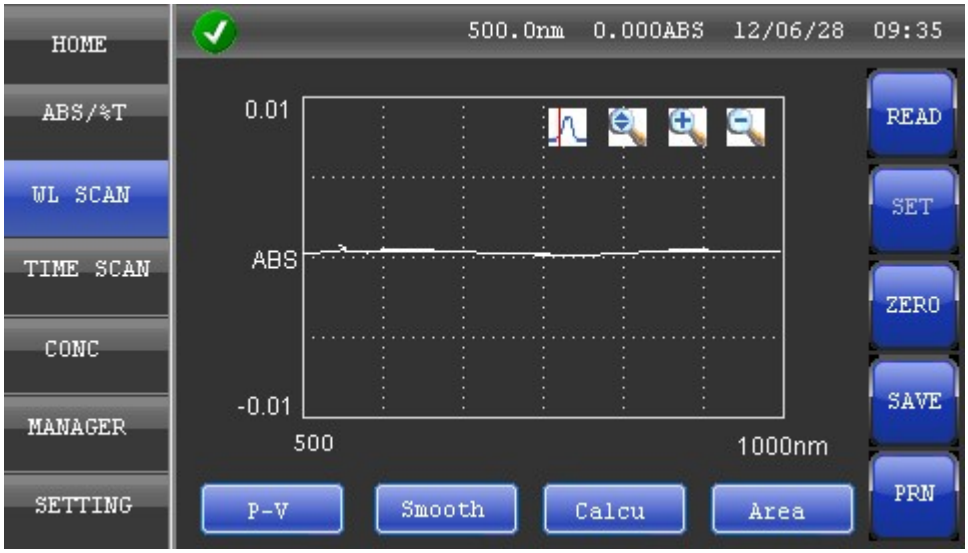

Wavelength scan allow scanning the sample transmission, absorbance and energy (for service purpose).

READ: Start measurement
SET: Parameter setting
ZERO: Blank sample
LOAD: Load data files or method files
PRN: Print results

## Wavelength scan parameter setting


DATA MODE: %T or ABS mode
SAMPLE NAME: Sample name input (less than 8 characters)
PEAK THRESHOL: Select Y-axis Peak threshold setting
START WL(nm): Starting wavelength
END WL(nm): End wavelength
INTERVAL(nm): Scan interval. Select from AUTO, 0.2nm, 0.5nm, 1nm, 2nm, 5nm. AUTO- scan range < 500nm, time interval is 0.5nm. scan range > 500nm, time interval is 1nm.
Y-MAX: Y-axis maximum value of scan graph
Y-MIN: Y-axis minimum value of scan graph.
PATHLENGTH: Cuvette pathlength
OK: Confirm setting
Save: Save parameter

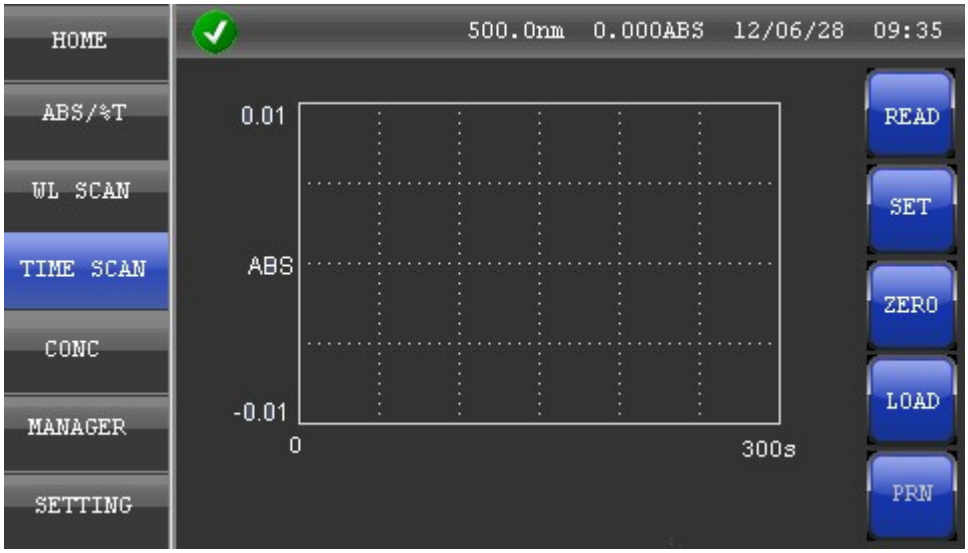
## Wavelength scan results and data processing




Data processing icons

| | |
|---|---|
| P-V: | Peak and valley value. The determination value is based on the set threshold. |
| Smooth: | Smoothing function < 6 smoothness |
| Calcu: | Calculation function including Addition, subtraction, multiplication and division |
| Area: | Peak area calculation function. According to the setting wavelength range, calculate peak area |
|  | Wavelength tracking. Display wavelength and value |
|  | Graph auto zoom button. |
|  | Zoom in |
|  | Zoom out |

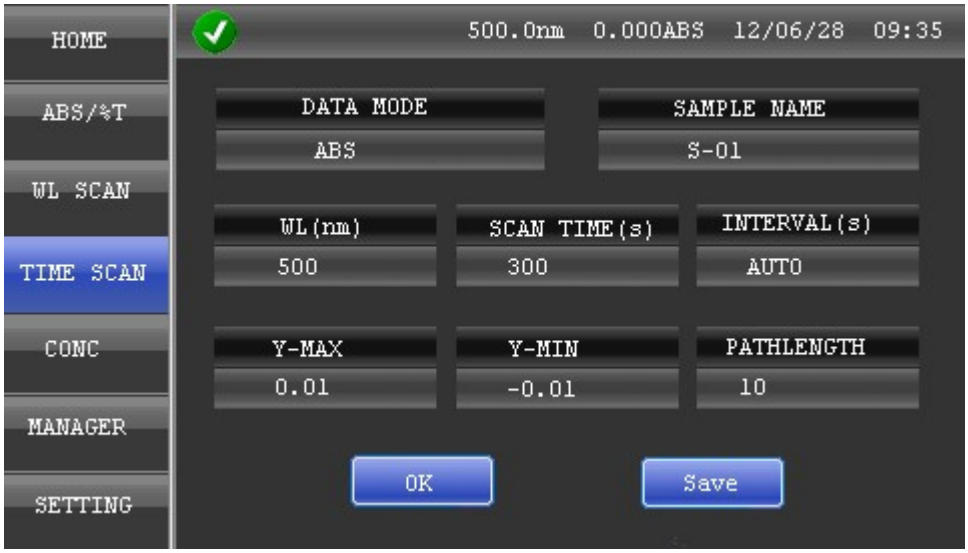
## Time scan




Time scan can scan the sample transmission, absorbance with a specific wavelength and within set time.

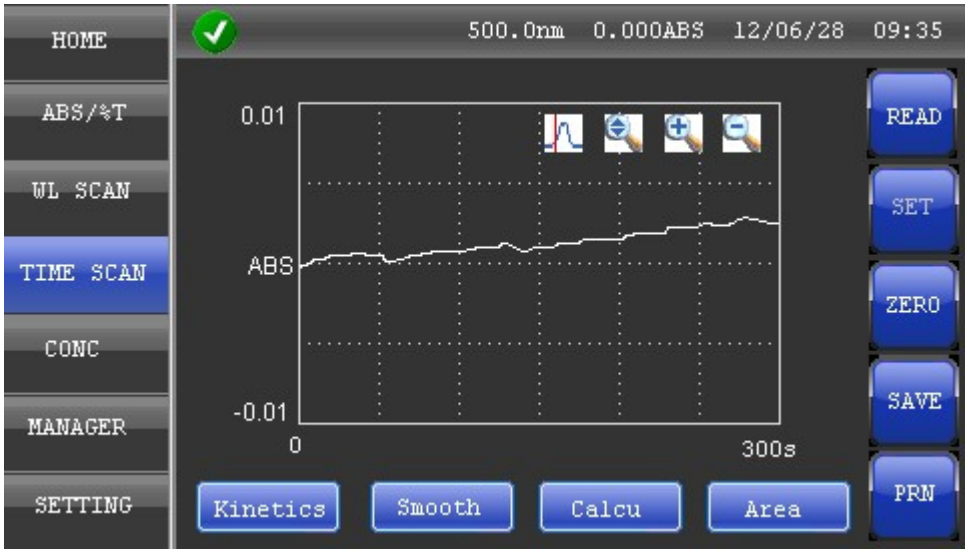
READ: Start measurement
SET: Parameter setting
ZERO: Blank sample
LOAD: Load data files or method files
PRN: Print results

## Time scan parameter setting




DATA MODE: %T or ABS mode
SAMPLE NAME: Sample name input (less than 8 characters)
WL(nm): Scanning wavelength
SCAN TIME(s): Scan time. (unit: s). more than 60s, max: 60000s
INTERVAL(s): Scan interval. Select from AUTO, 0.5s, 1s, 2s, 5s, 10s, 100s. AUTO interval, when scan time is < 1000s, scan interval is 1s. When scan time is 1000-2000s, scan interval is 2s. When scan time is 5000-20000s, scan interval is 10s. When scan time is > 20000s, scan interval is 100s.
Y-MAX: Y-axis maximum value of scan graph
Y-MIN: Y-axis minimum value of scan graph.
PATHLENGTH: Cuvette pathlength
OK: Confirm setting
Save: Save parameter

## Time scan results and data processing




Data processing icons

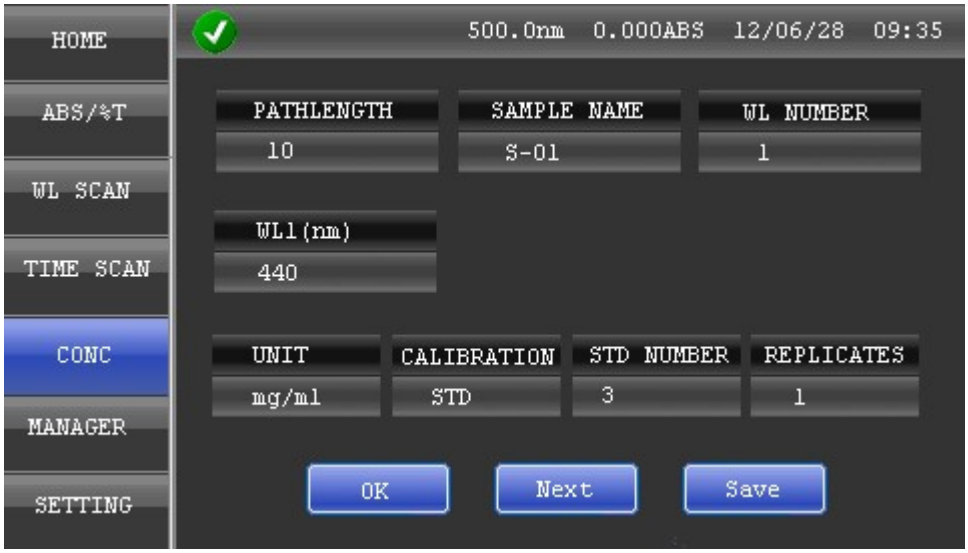
| | |
|---|---|
| Kinetics: | Dynamics calculation function. According to setting time range, make dynamics calculation |
| Smooth: | Smoothing function < 6 smoothness |
| Calcu: | Calculation function, including Addition, subtraction, multiplication and division |
| Area: | Peak area calculation function. According to the setting wavelength range, calculate peak area |
|  | Time tracking. Display time and value |
|  | Graph auto zoom button. |
|  | Zoom in |
|  | Zoom out |

## Concentration measurement


Concentration of specified wavelength can be measured. Up to 3 wavelengths can be chosen. Up to 9 standard and 5 replicates can be recorded. Standard curve and its K-factor value are displayed. The standard curve data can be input for known concentration curve. Standard curve can be saved in the SD card. Each file can store up to 200 results.

| | |
|---|---|
| READ: | Start measurement |
| SET: | Parameter setting |
| ZERO: | Blank sample |
| LOAD: | Load data files or method files |
| PRN: | Print results |

## Concentration measurement setting (I)




PATHLENGTH: Cuvette pathlength
SAMPLE NAME: Sample name input
WL NUMBER (nm): wavelength number (up to 3)
WL1~ WL3 (nm): Measured wavelength selection
UNIT: Sample's unit display
CALIBRATION: Concentration calculation method. Select measurement with standard sample for fresh standard curve or input with standard curve K-factor.
STD NUMBER: Number of Standard sample. Up to 9 sample.
REPLICATES: Standard samples replicates number. Up to 5 replicates
OK: Confirm setting
Next: Next page
Save: Save parameter

## Concentration measurement setting (II)


When selected measurement with standard sample for fresh standard curve- CALIBRATION , select STD, a setup page will be shown.

STD1~STD9: input the known calibration standard value

## Concentration measurement setting (III)


When selected measurement with input standard curve K-factor- CALIBRATION , select K-factor, a setup page will be shown.

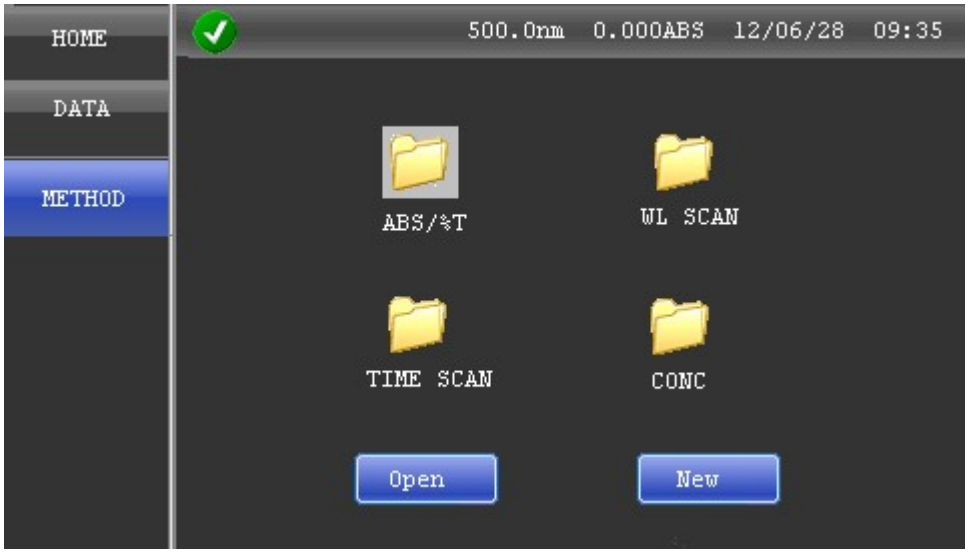
K1: Slope value of standard curve

K0: Offset value of standard curve

OK: Confirm setting

BACK: Previous page

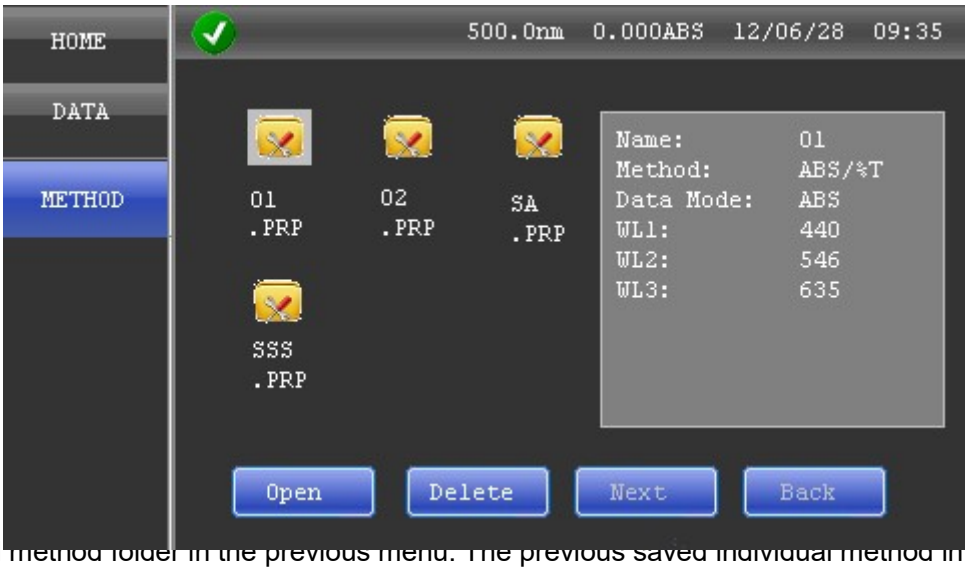
## File manager – Method (I)




Method Manager is designed for managing all method files. SD card must be inserted for storing and opening the files.

| | |
| --- | --- |
| ABS/%T: | Saved Photometric methods folder |
| WL SCAN: | Saved Wavelength scan methods folder |
| TIME SCAN: | Saved Time scan methods folder |
| CONC: | Saved Concentration measurement methods folder |
| Open: | Open measure method |
| New: | Renew selected measure method |

## File Manager – Method (II)



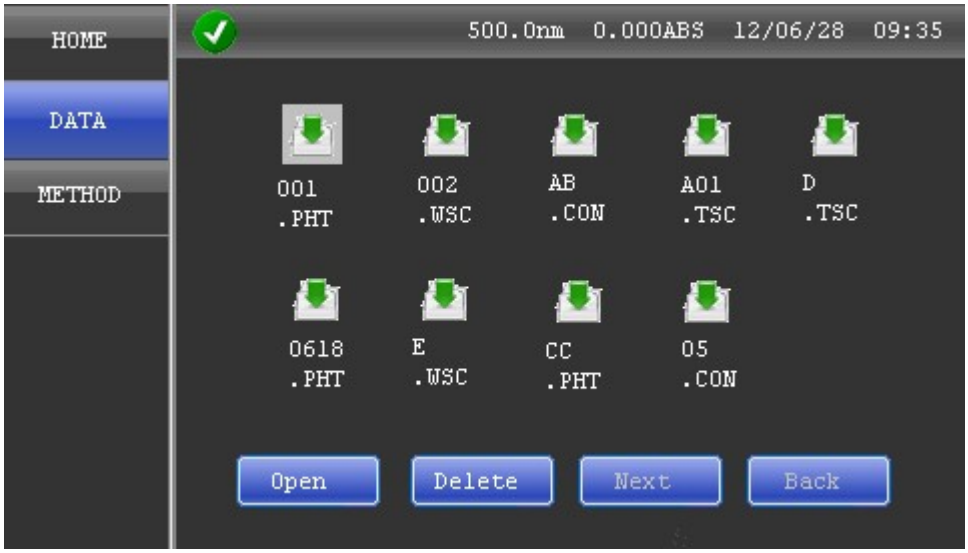

After selected method folder in the previous menu. The previous saved individual method in the corresponding method's folder

| | |
|---|---|
| Open: | Open selected method file |
| Delete: | Delete selected method file |
| Next: | Next page |
| Back: | Previous page |

Method file type

| | |
|---|---|
| *. PRP | Photometric method file |
| *. PRW | Wavelength scan method file |
| *. PRT | Time scan method file |
| *. PRC | Concentration measurement method file |

## File Manager - Data



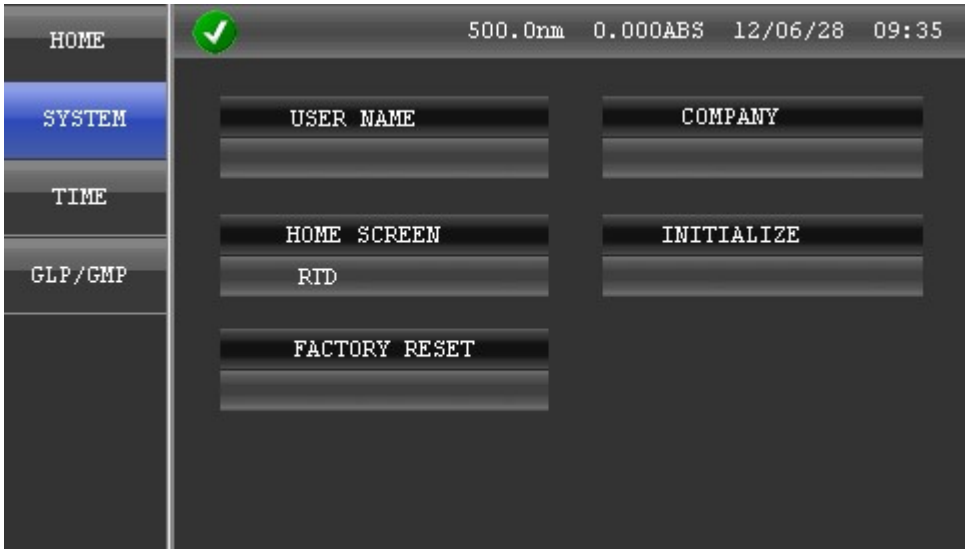

Data manager function is designed for managing all data files. SD card must be inserted for storing and opening the files.

| | |
| --- | --- |
| Open: | Open selected method file |
| Delete: | Delete selected method file |
| Next: | Next page |
| Back: | Previous page |

Data document type

| | |
| --- | --- |
| *. PHT | Photometric data file |
| *. WSC | Wavelength scan data file |
| *. TSC | Time scan data file |
| *. CON | Concentration data file |

## System setting




USER NAME: Input user name. (Less than 20 characters)

COMPANY: Input company name. (Less than 20 characters)

HOME SCREEN: Select the function showed in home page.
RTD: Zoom in photometric.
ABS/%T: Photometric function.
WL SCAN: Wavelength scan.
TIME SCAN: Time scan interface.

INITIALZE: System startup i.e. self checking. During the process, the sample chamber must keep closing.

FACTORY RESET: Restored to factory default settings. Sample name, operation name and company name in any interface will be empty.

## Time setting


There is a power-off storage function (~ 96 hours), the user may need to reset time after this period. Setting data did not affect.

## GLP/GMP performance self-check

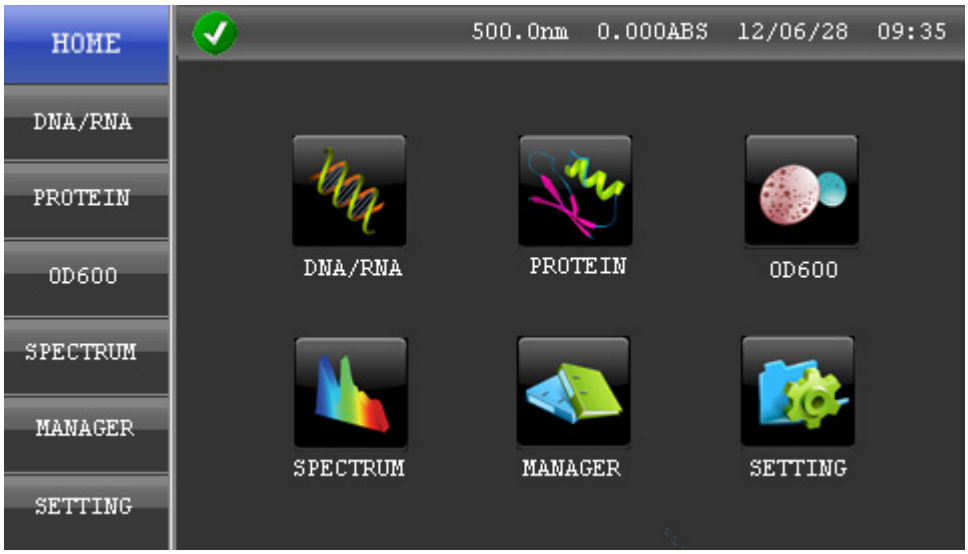

GLP/GMP is used to validate instrument's performance.

| | |
| --- | --- |
| NOISE: | Equipment background noise level test |
| STABILITY: | Stability test, for best result need to preheat for 2 hours |
| BASELINE FLATNESS: | Baseline flatness test |
| HARDWARE: | Hardware self-check, including PCB, lamp |
| Print: | Print test result |

## S-300 interface

S-300 is only for analysis of nucleic acids and proteins. Besides the special function measure interface, it also own measure functions of traditional spectrophotometer.

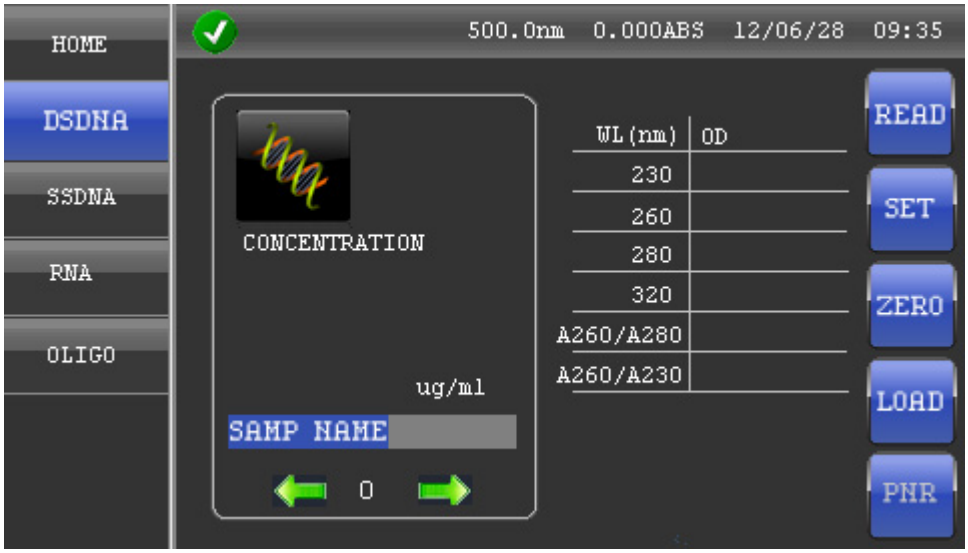
## S-300 mian interface




Click the icon, enter into corresponding measure interface.

| | |
| --- | --- |
| DNA/RNA | nucleic acids analysis |
| PROTEIN | protein determination |
| OD600 | Bacterial cell culture measurement |
| SPECTRUM | Traditional spectrophotometer function |
| MANAGER | measure method manager including data-saved |
| SETTING | parameter setting |

## S-300 nucleic acids analysis interface

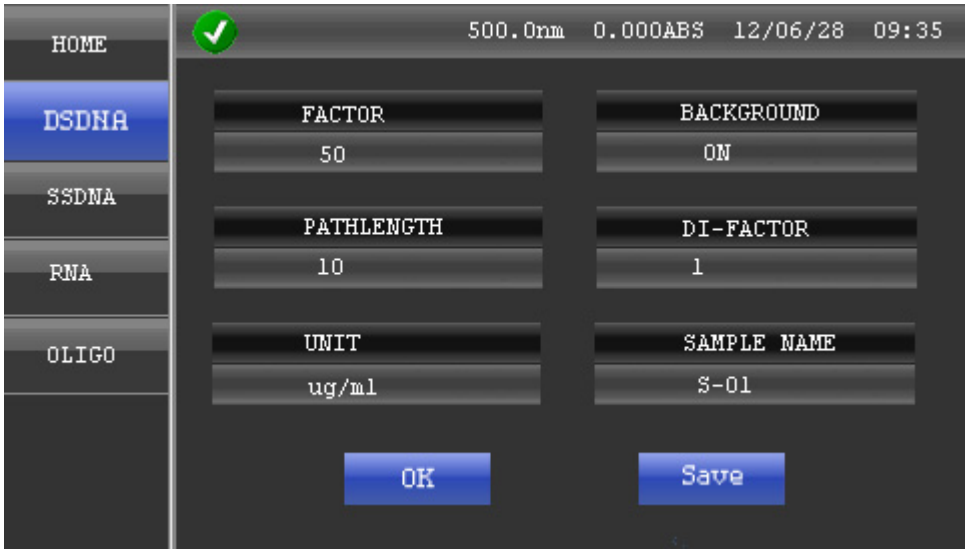



There are 4 methods in the DNA/RNA nucleic acids analysis interface, dsDNA, ssDNA, RNA, OLIGO. Click button to select measure method.

Measure buttons

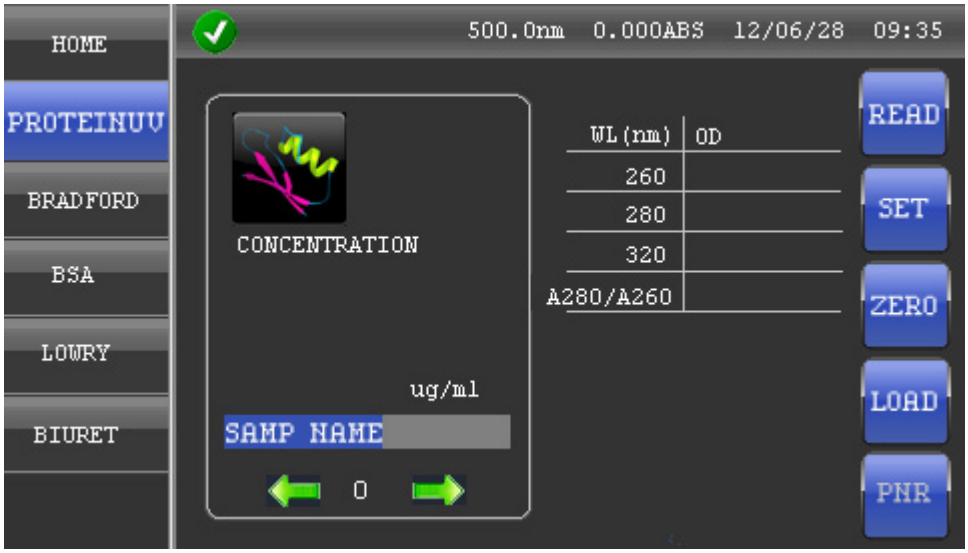
| | |
|---|---|
| READ | being to measure |
| SET | parameter setting |
| ZERO | zero absorbance ( blank sample) at all setting wavelength point |
| LOAD | load original measure results or measure method document |
| PRN | print data |

## S-300 nucleic acids parameter setting interface




| | |
|---|---|
| FACTOR | regulate parameters |
| BACKGROUND | background calibration |
| PATHLENGTH | optical length of cuvette（optical length is less than 10mm） |
| DI-FACTOR | dilution factor |
| UNIT | concentration units |
| SAMPLE NAME | sample name |
| OK | Finish parameter setting, back to measure interface automatically |
| Save | save parameter (SD card) |

## S-300 protein analysis interface




There are 5 analysis methods in protein determination interface, PROTEINUV, BRADFORD, BSA, LOWRY, BIURET. Click button to select measure methods.

**PROTEINUV functions**

Measure buttons

| | |
|---|---|
| READ | begin to measure |
| SET | parameter setting |
| ZERO | zero absorbance ( blank sample) at all setting wavelength point |
| LOAD | load original measure results or measure method document |
| PRN | print data |

## S-300 protein analysis interface
## PROTEINUV parameter setting interface

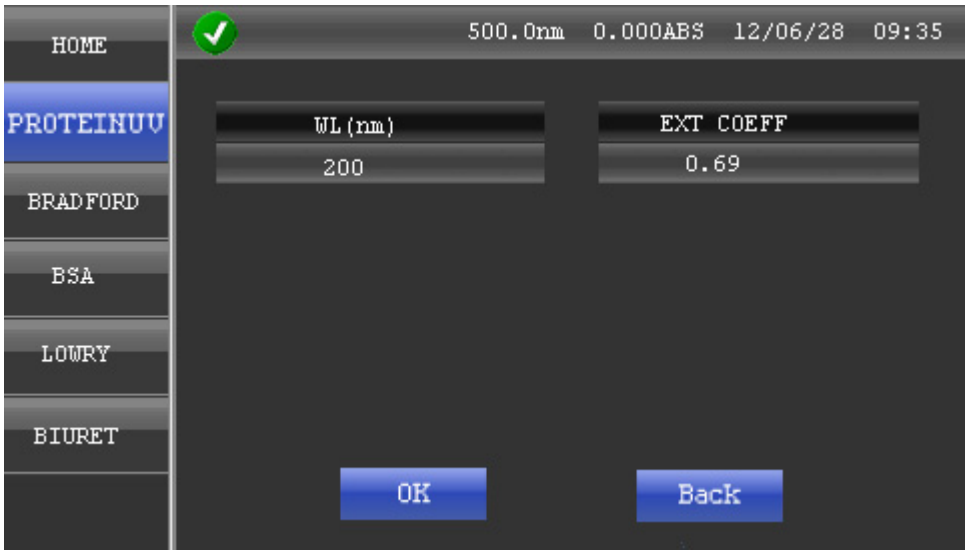

| | |
|---|---|
| A280 FACTOR | correction factor at 280nm position |
| A260 FACTOR | correction factor at 260nm position |
| PATHLENGTH | optical length of cuvette（optical length is less than 10mm） |
| BACKGROUND | background calibration |
| PROTEIN | select measure methods |
| DI-FACTOR | dilution factor |
| UNIT | concentration units |
| SAMPLE NAME | sample name |
| OK | Finish parameter setting, back to measure interface automatically |
| Save | save parameter (SD card) |

**S-300 protein analysis interface**

**Select parameter of MOLAR EXT C (self-defining) protein measure method in PROTEINUV parameter setting interface**

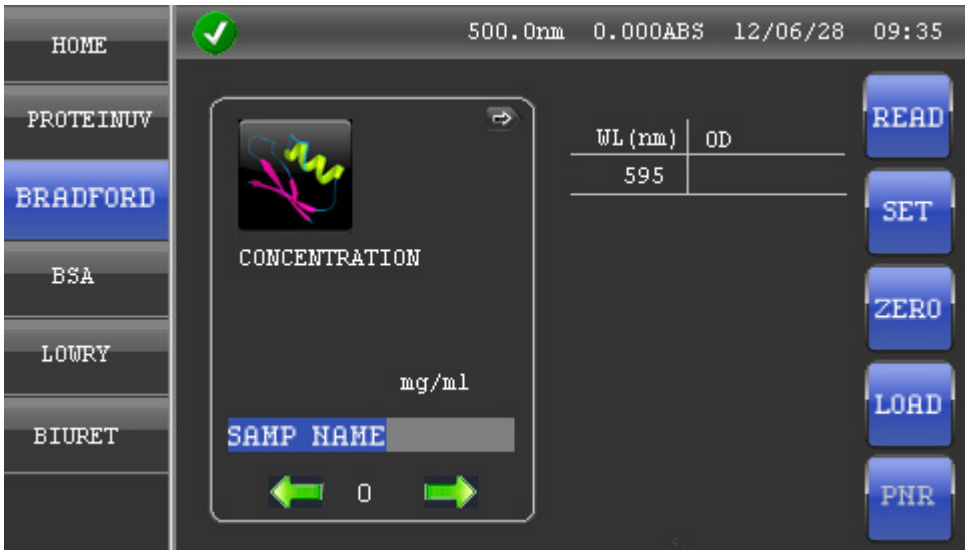

| | |
|---|---|
| WL(nm） | Wavelength value |
| MOLAR EXT C | Molar extinction coefficient correction factor |
| MOLECULAR W | Molecular weight. According to the two correction factors, calculate correction factor at A280 FACTOR automatically |
| OK | Finish parameter setting, back to measure interface automatically |
| Back | Back to the prior parameter setting interface |

**S-300 protein analysis interface**
**Select parameter of EXT COEFF (self-defining) protein measure method in PROTEINUV parameter setting interface**




| | |
|---|---|
| WL(nm) | Wavelength value |
| EXT COEFF | Extinction coefficient correction factor. According to the correction factors, calculate correction factor at A280 FACTOR automatically |
| OK | Finish parameter setting, back to measure interface automatically |
| Back | Back to the prior parameter setting interface |

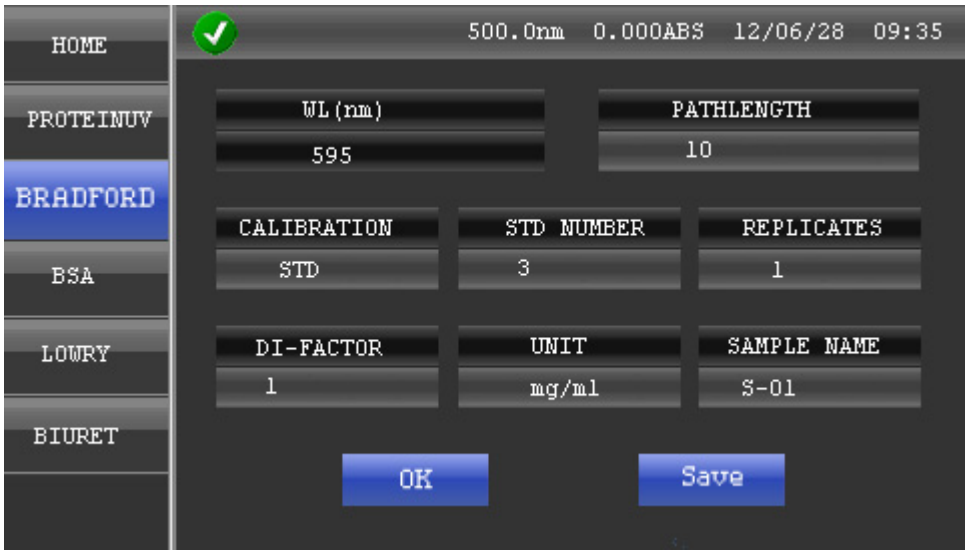
## S-300 protein analysis interface
## BRADFORD measure interface




Measure buttons

| | |
|---|---|
| READ | begin to measure |
| SET | parameter setting |
| ZERO | zero absorbance (blank sample) at all setting wavelength point |
| LOAD | load original measure results or measure method document |
| PRN | print data |

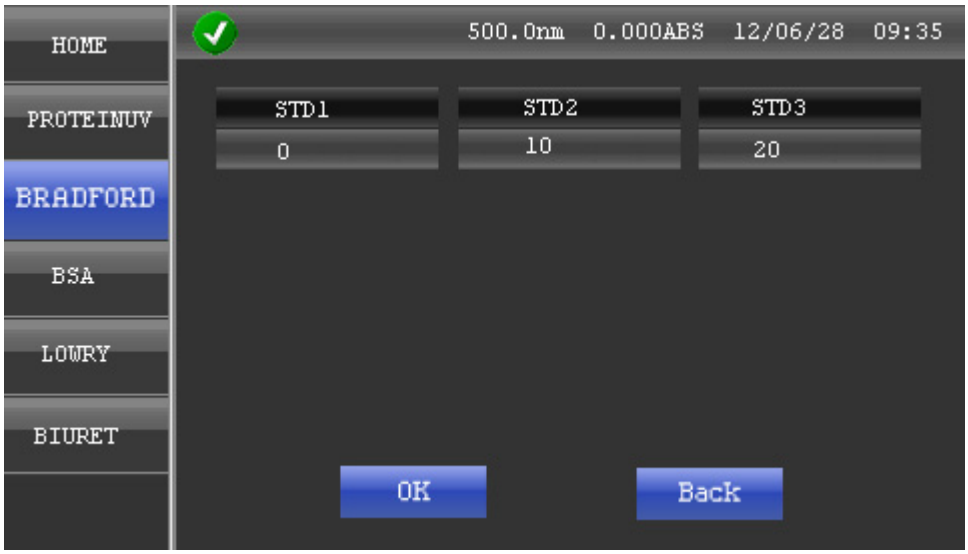
## S-300 protein analysis interface
## BRADFORD parameter setting interface




| | |
|---|---|
| WL(nm) | Wavelength value |
| PATHLENGTH | optical length of cuvette（optical length is less than 10mm） |
| CALIBRATION | concentration regression way |
| STD NUMBER | concentration standard sample number |
| REPLICATES | measure times |
| DI-FACTOR: | dilution factor |
| UNIT | concentration units |
| SAMPLE NAME | sample name |
| OK | Finish parameter setting, back to measure interface automatically |
| Save | save parameter (SD card) |

**S-300 protein analysis interface**

**CALIBRATION ( concentration ) standard sample setting interface in BRADFORD parameter setting interface**

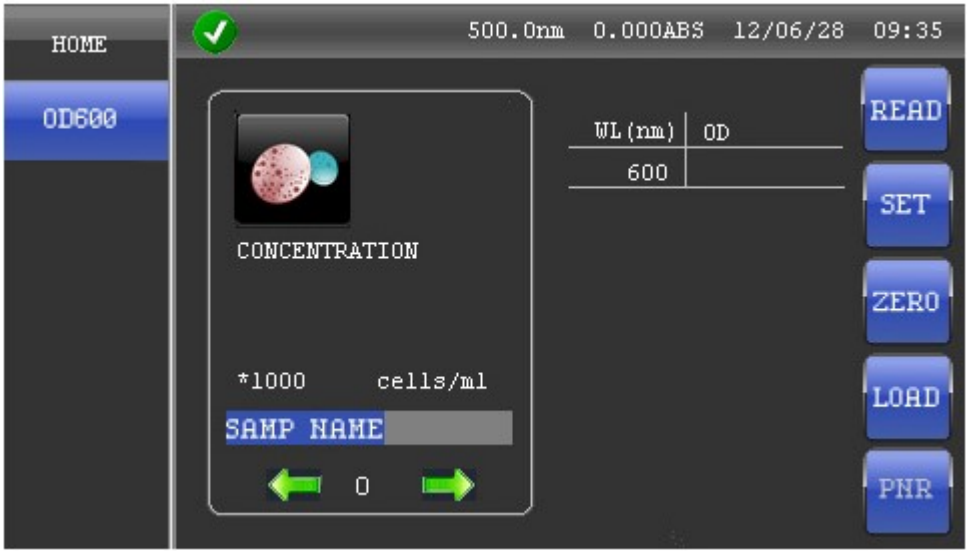



STD1~3 standard sample concentration setting（According to the number of concentration in the upper layer interface, it will display corresponding setting）

OK Finish parameter setting, back to measure interface automatically

Save save parameter (SD card)

## S-300 bacterial cell culture measurement interface
## OD600 measure interface




Measure buttons

| | |
| --- | --- |
| READ | begin to measure |
| SET | parameter setting |
| ZERO | zero absorbance (blank sample) at all setting wavelength point |
| LOAD | load original measure results or measure method document |
| PRN | print data |

## S-300 bacterial cell culture measurement interface

## OD600 parameter setting interface ( I )


| | |
| --- | --- |
| WL(nm) | Test wavelength |
| PATHLENGTH | optical length of cuvette (optical length is less than 10mm) |
| UNIT | concentration units |
| SAMPLE NAME | sample name |
| OK | Finish parameter setting, back to measure interface automatically |
| Save | save parameter (SD card) |

## S-300 bacterial cell culture measurement interface

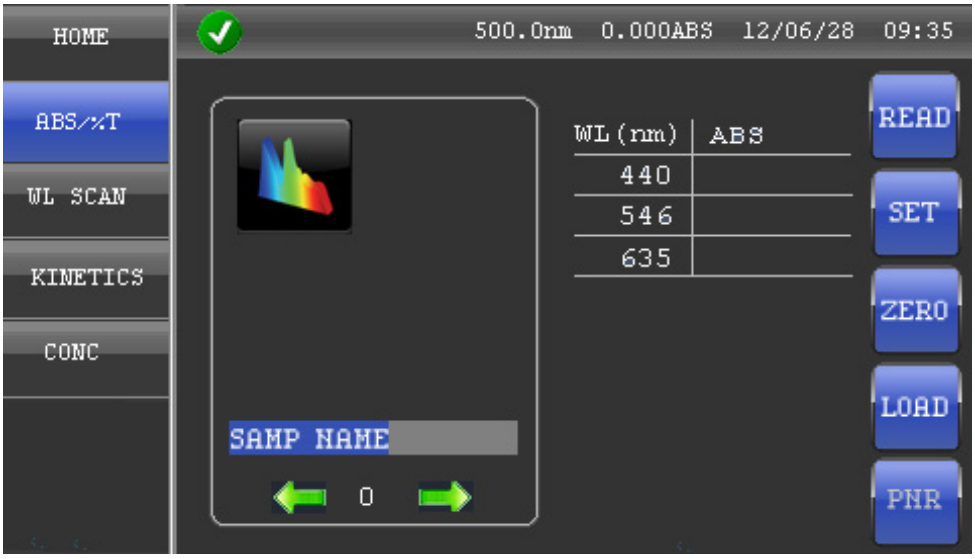
## OD600 parameter setting interface ( II )


When select UNIT cells/ml, it will display above parameter setting interface

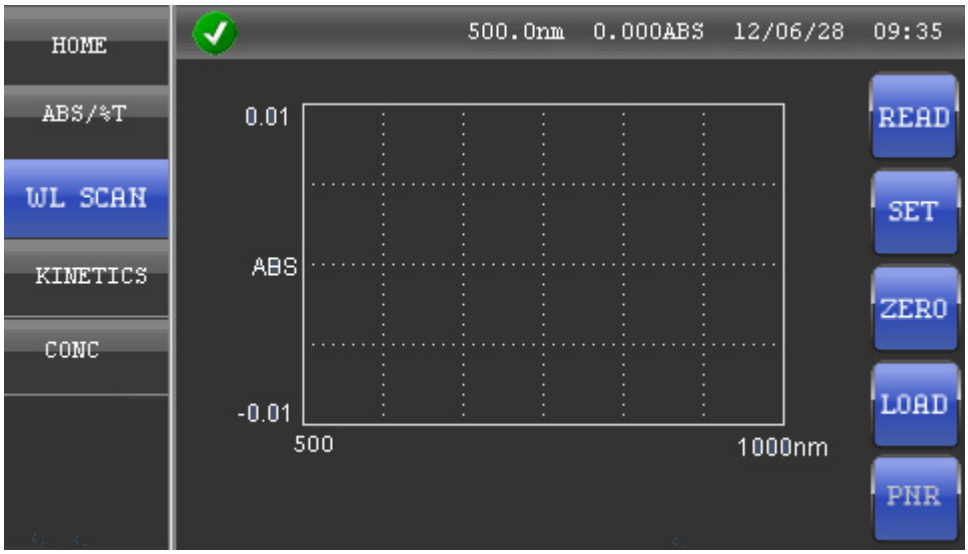
| | |
| --- | --- |
| WL(nm) | Test wavelength |
| PATHLENGTH | Optical length of cuvette (optical length is less than 10mm) |
| UNIT | Concentration units |
| SAMPLE NAME | Sample name |
| FACTOR | Correction factor |
| MULTIPLIER | Multiple |
| OK | Finish parameter setting, back to measure interface automatically |
| Save | Save parameter (SD card) |

**S-300 spectrum interface**

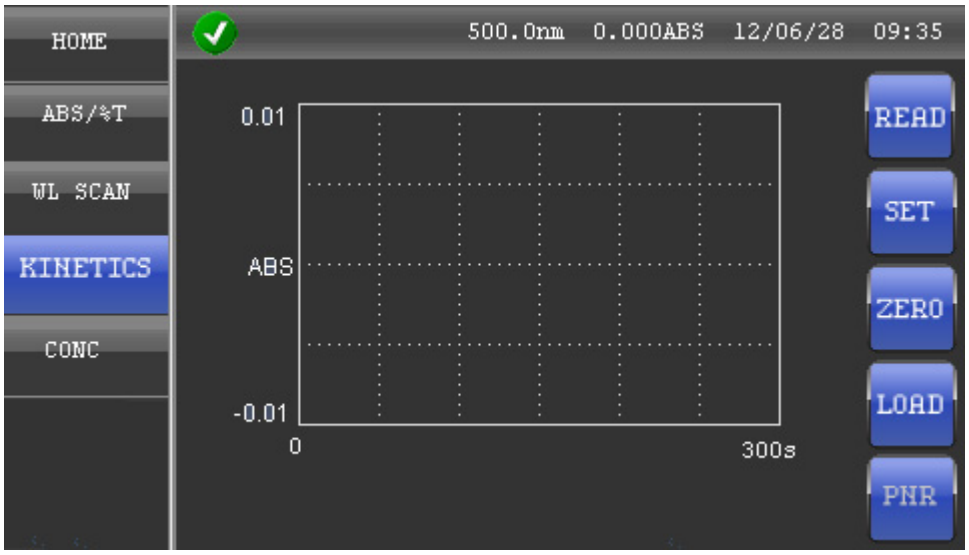
**ABS/%T given wavelength photometry direct-reading measure interface**



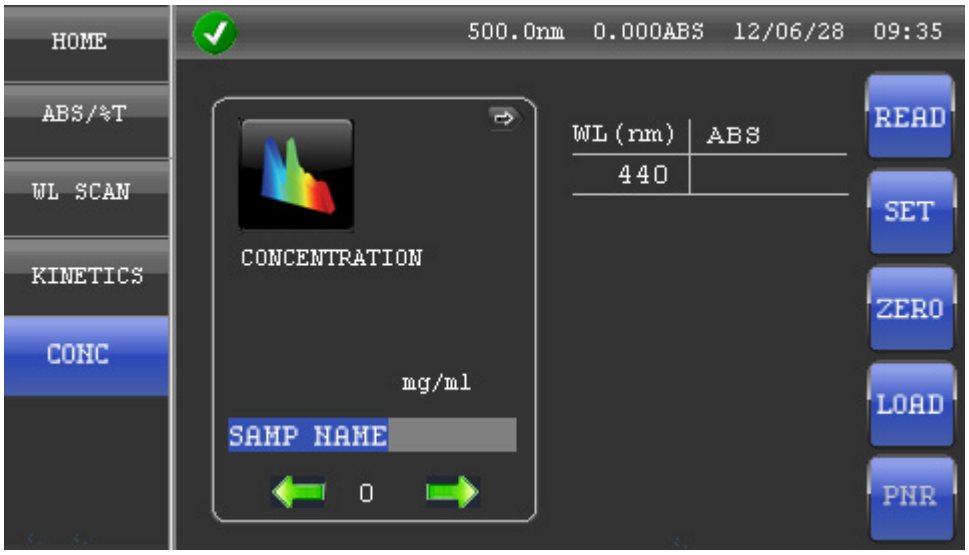

**Wavelegnth scan interface**



**S-300 spectrum interface**
**KINETICS dynamics measure interface**




**CONC concentration regression and measure interface**



# Accessories installation for S-200/S-220/S-300

# CONTENTS

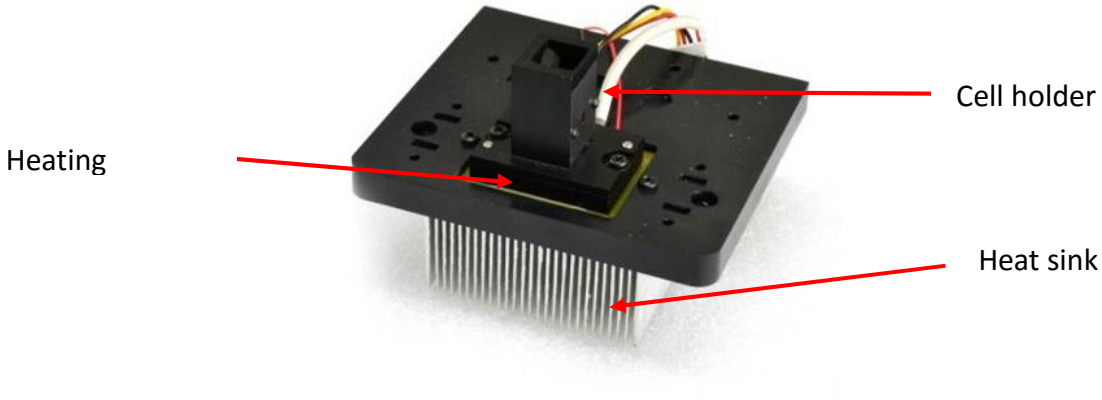
The instrument can automatically recognize three accessories with the auto sample sipper, auto 5-cell holder, thermostatic cell holder (Only for S-220/S-300).

**Remark: When installing accessories, the power of the instrument must turn off.**

## Thermostatic Cell Holder (Part No.: 000A-XB10-0000)

### Overview

The thermostatic cell holder is used to control and maintain the temperature of the sample to be measured. It is usually used for incubate or temperature sensitive sample.




Thermostatic Cell Holder

### Description

The thermostatic cell holder is composed of a peltier heating element, a heat sink for cooling of the heating element, a fan for ventilation and a holder for 10mm path length cell. The power is supplied from the main unit DC24V output. The temperature setting is controlled by main unit on-board software or UV Detective PC software (if connected). Water circulation is not required.

### Applicable models

The accessory can be used in spectrophotometers model S-220/S-300.

### Application

The accessory can be used to measure the transmittance or absorbance of a sample at different temperatures. It can also be used to monitor the change of transmittance or absorbance over time at a designated temperature. Typical application is to measure the enzymatic activity at body temperature 37°C.

### Specifications

| Thermostatic Cell Holder |
|---|

| Item | Specifications | Remark |
|---|---|---|
| Temperature setting range | 20- 40°C | |
| Temperature setting interval | 0.1°C | |
| Temperature accuracy | ±0.1°C | |
| Applicable cell | 10mm pathlength cell | Any cell with external dimension of 12.5 x 12.5mm can be used. |

**Operating Environment**

The thermostatic cell holder generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300 Spectrophotometer.

**Unpacking**

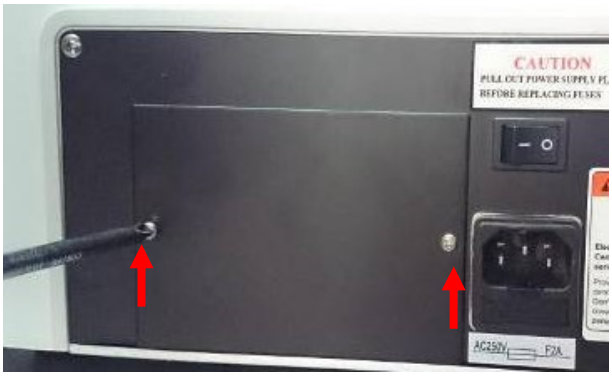
Unpack the box and take out the items inside. Check all items are available.

**Installation**

- Take out the thermostatic cell from the package.

- Make sure the main power of the instrument is off.

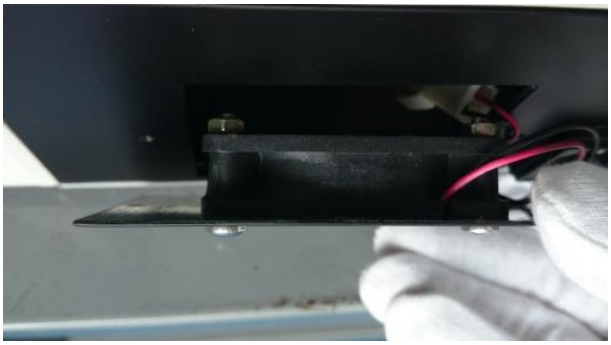
- Dismantle the back cover with screwdriver




- Take the socket of the fan.

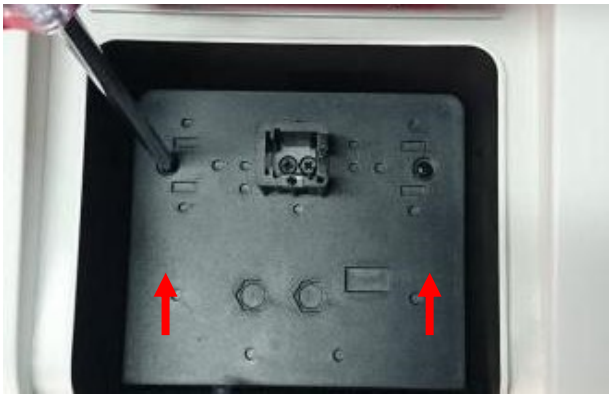
- Connect it to the socket of the main unit.

- Insert the fan into the main unit

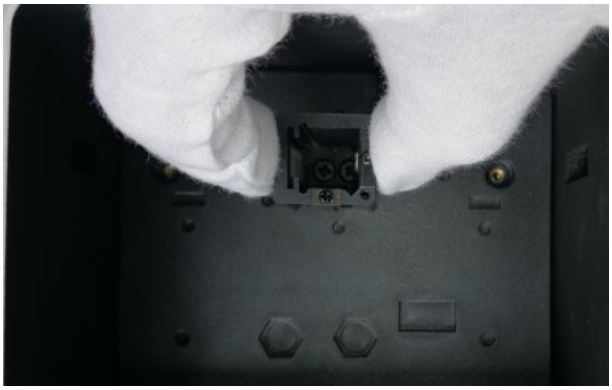



- Tighten the screws.

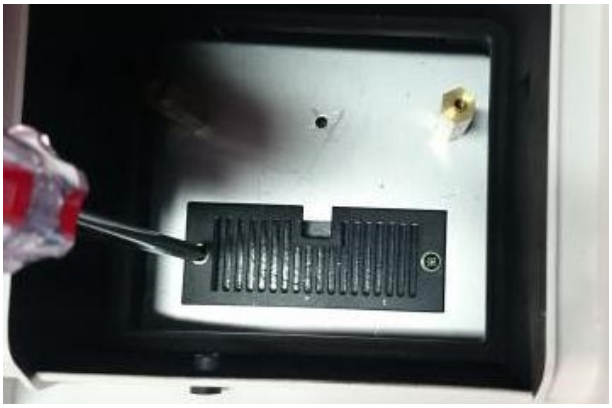

- Open the sample compartment cover and remove the screws of the standard cell holder.



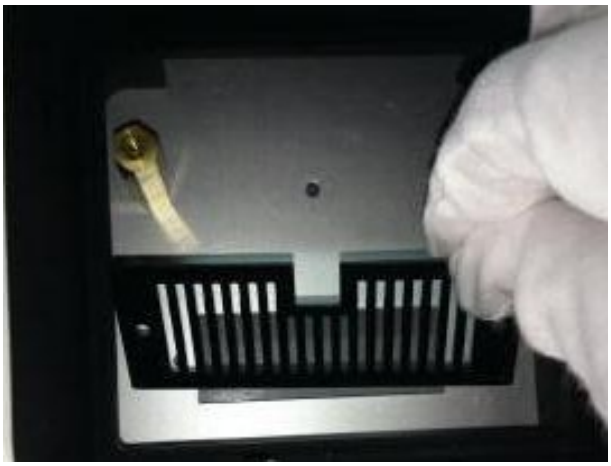
- Remove the standard cell holder



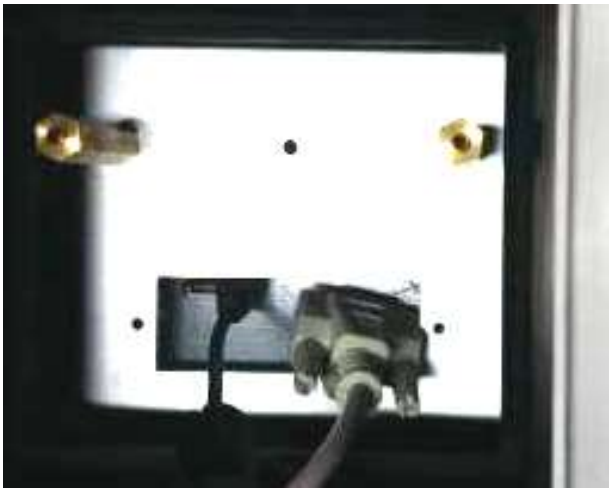
- Remove the screw of the bottom plate

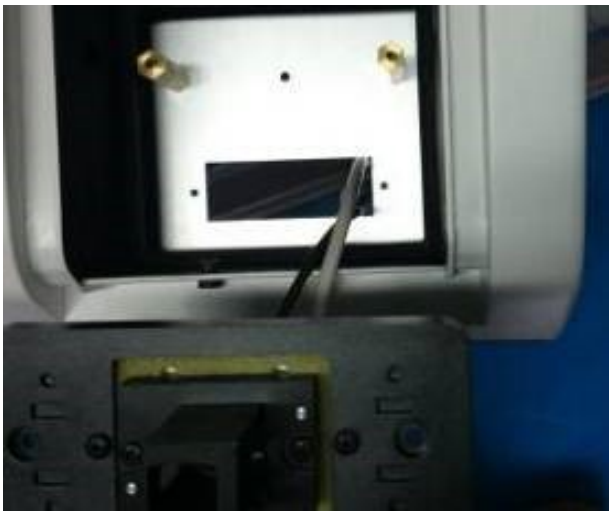


- Remove the bottom plate



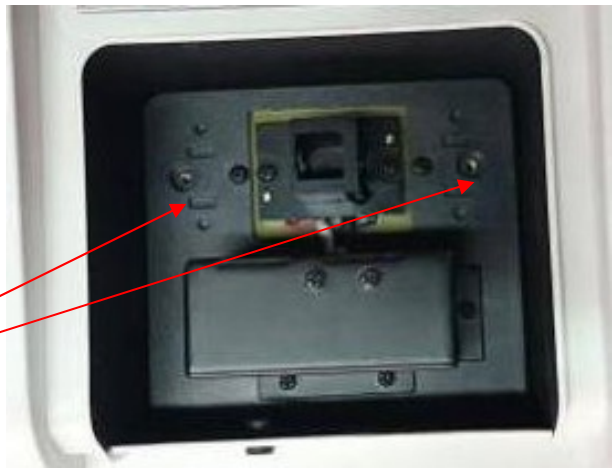
- Pass the power and data cable through the hole.



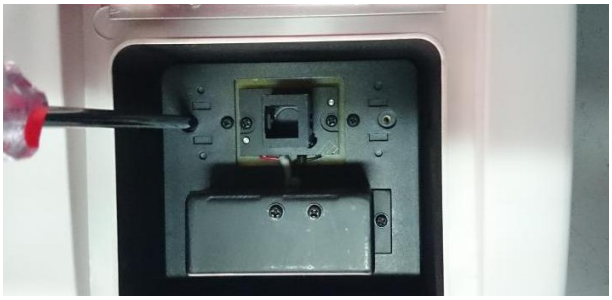


- Place the thermostatic cell holder into the sample compartment.

- Locate and align the holes for fixing screws.




- Tighten the fixing screws



- Close the sample compartment. Connect the data cable to the accessory port and the power cable to the DC24V socket at the back of the instrument. Tighten the screw of the socket


- Power on the instrument. The actual temperature is now displaying at the top-left of the home screen.

**Operation**

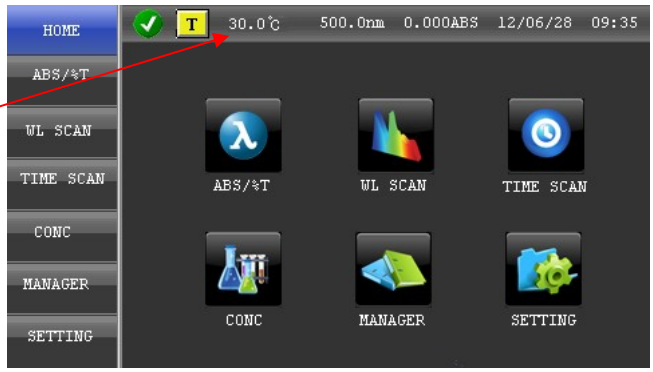
The thermostatic cell holder can be controlled by the instrument on-board user interface or UV Detective. You can turn on or off of the temperature control and set the temperature.

**On-board Interface**

Turn on the instrument and you can see the actual cell holder temperature showing on the top-left of the screen. Touch the temperature will enter the temperature setting interface. Default setting of the Temp Control is off. To set the temperature, please touch Temp Control on the right side to turn it on. Then touch the Temperature on the left side and then enter the temperature via the virtual keyboard. Touch Enter and the setting will be effective. You can see the actual temperature is changing to your setting temperature. When the actual temperature reaches to the setting temperature, place the cell containing sample and you can start to measure as normal measurement.

- Touch the Temperature of at the top-left screen and enter the temperature setting screen.

Touch this




- Turn the temperature on and set the temperature (20-40℃)

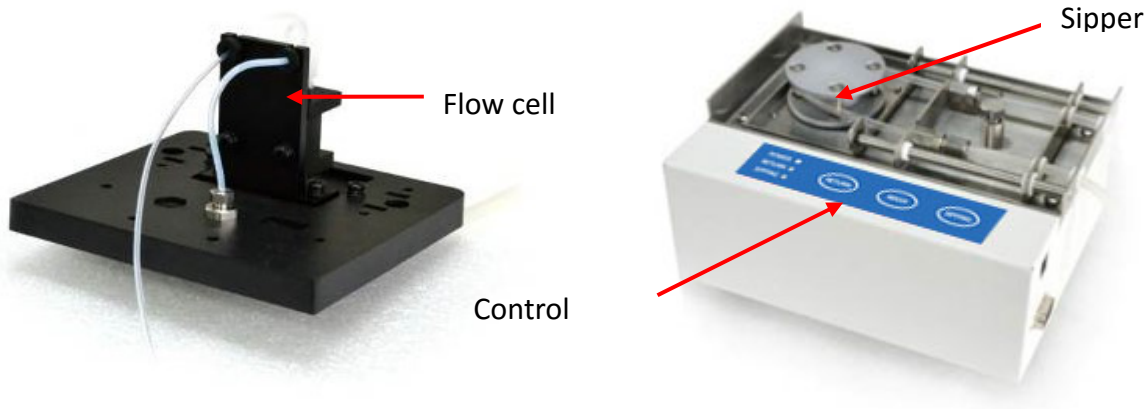

TEMPERATURE (℃): Setting control temperature

TEMP CONTROL: Turn on or off temperature control function

# Auto Sipper Cell Holder (Part No.: 000B-XB10-0000)

**Overview**

The auto sipper is used to sip sample solution from a test tube and the sample will flow through the flow cell. The measurement will start automatically. It is usually used for easy/fast sample analysis from any container/sources.




Auto Sipper

**Description**

The auto sipper is composed of a sipper pump unit and a flow cell. The power is supplied from the main unit DC24V output. The sipper setting is controlled by main unit on-board software or UV Detective PC software (if connected). The sipping actions (Sip, Wash and Return) are performed on the control panel on the sipping pump.

**Applicable models**

The accessory can be used in spectrophotometers model S-220/S-300 and S-200.

**Application**

The accessory can be used to measure transmittance or absorbance of a sample from a test tube, a beaker or other container. It can also be used for remote sampling. Typical application is to measure large amount (< 200) of environmental or water samples.

**Specifications**

| Auto Sipper | | |
|---|---|---|
| Item | Specifications | Remark |
| Flow cell volume | 150µL | |
| Flow cell pathlength | 10mm | |

| | |
|---|---|
| Sip Time setting range | 1-60sec |
| Delay time setting range | 0-200 sec |
| Purge time setting range | 0-60 sec |

**Operating Environment**

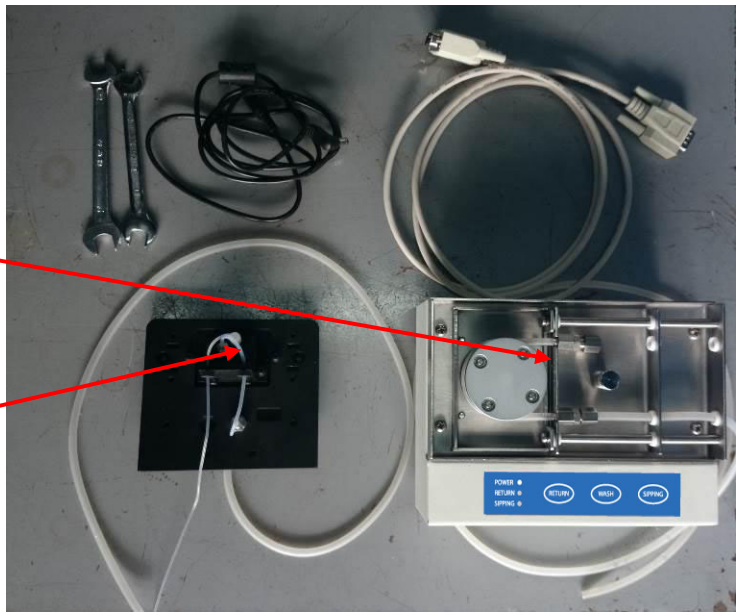
The auto sipper generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300/S-200 Spectrophotometer.

**Unpacking**

Unpack the box and take out the items inside. Check all items are available.

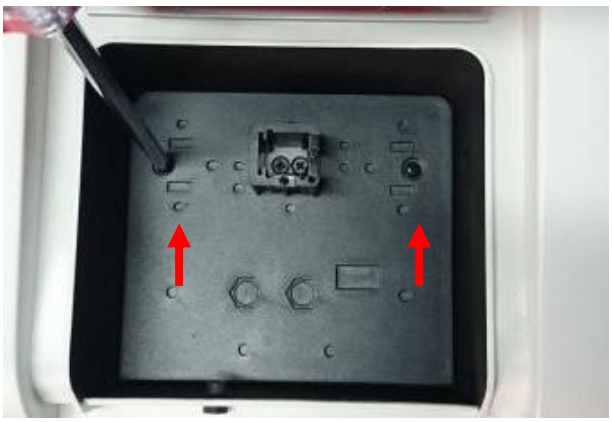
**Installation**

- Take out the auto sipper from the package

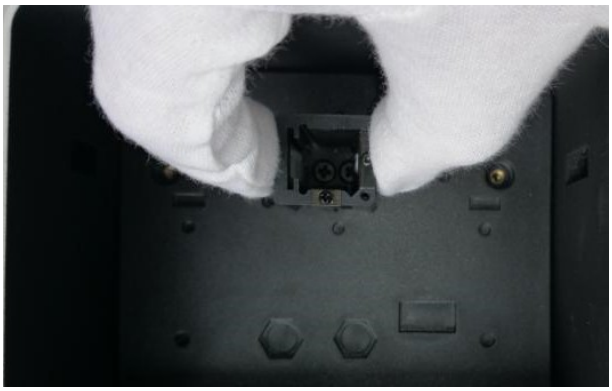



- Make sure the main power of the instrument is off.

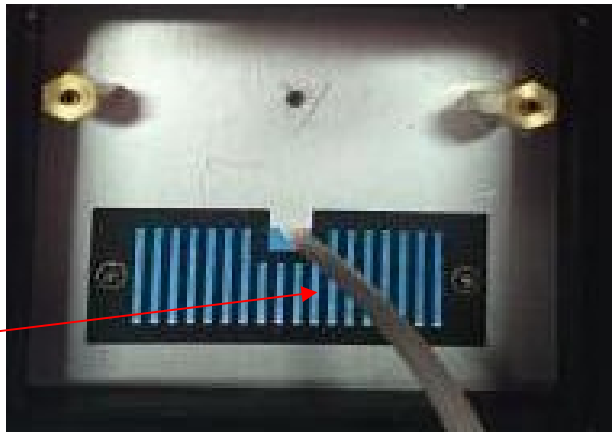
- Open the sample compartment cover and remove the screws of the standard cell holder.

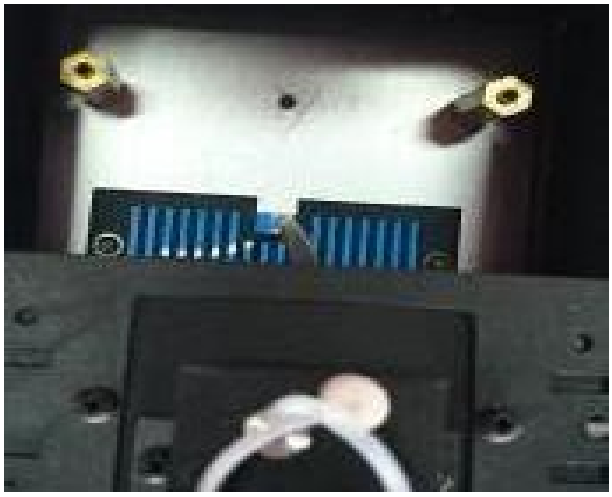


- Remove the standard cell holder

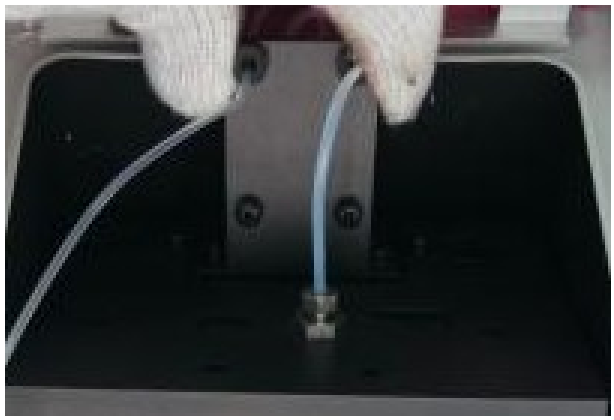


- Pass the hose from flow cell through the hole of the bottom plate



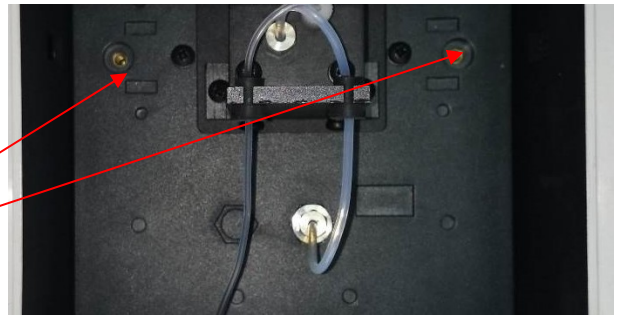


- Place the flow cell into the sample compartment.



- Locate and align the holes for the fixing screws

Holes for fixing



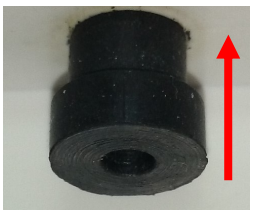
- Tighten the fixing screws

- Pull out the black rubber plug of sample compartment and then insert the rubber plug for auto sipper

Original rubber For auto sipper

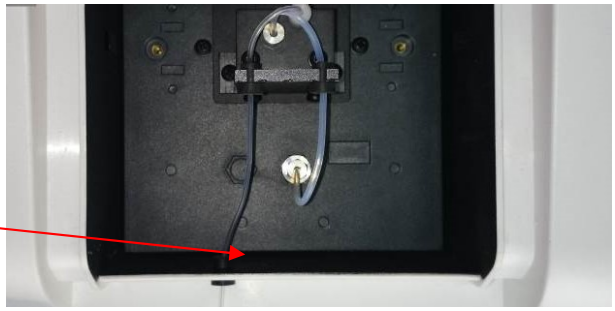
Pull out the original rubber Insert the rubber plug for auto

.



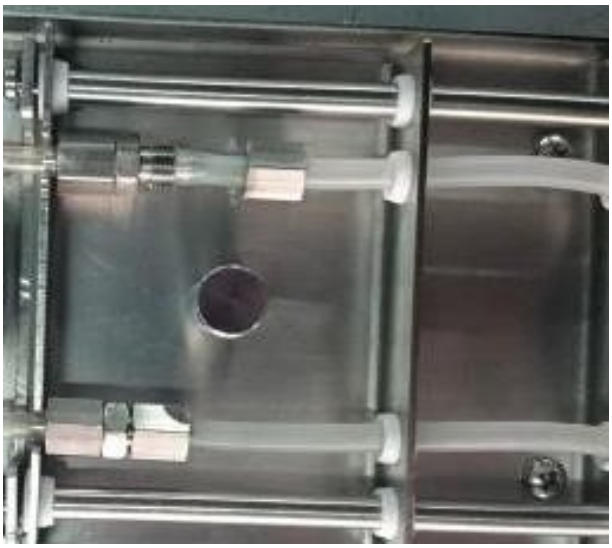
- The sipper hose passes the black rubber plug and close the sample compartment cover

Rubber

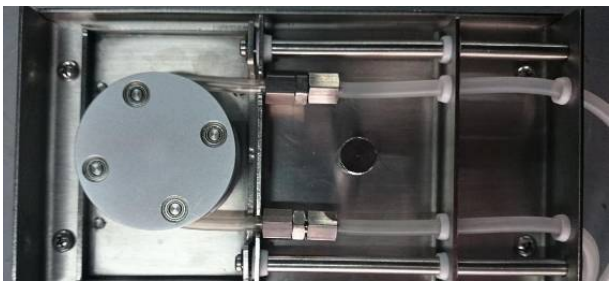


- Connect the sipper hose to the pump passing the hole.

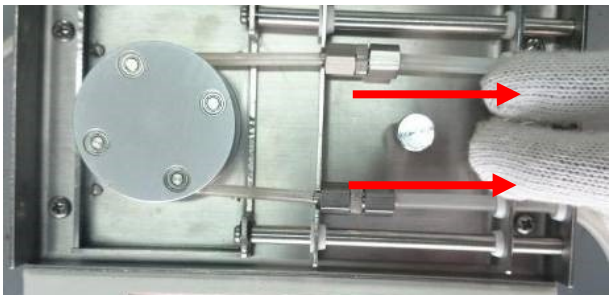
- Insert the hose to the joint.



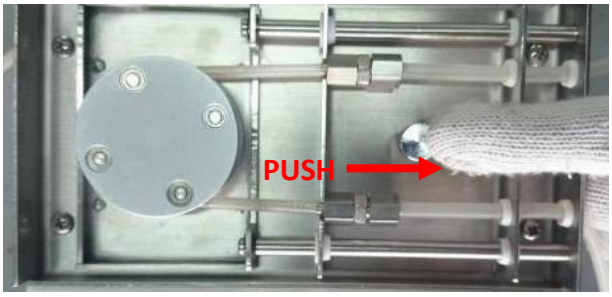
- Tighten the nut by a wrench



- Pull the plate towards panel until a rattling sound is heard.



- Push the button to release plate if the auto sipper does not work. Repeat above step again.




- Connect the power cable and data cable to the sipper pump. Tighten the socket to the port.

- Close the sample compartment. Connect the data cable to the accessory port and the power cable to the DC24V socket at the back of the instrument. Tighten the screw of the socket.

- Power on the instrument. The sipper button is now displaying at the top-left of the home screen.

Sipper


**Operation**

The auto sipper setting can input from the instrument on-board user interface or UV Detective. You can set the sip time, delay time and the purge time.

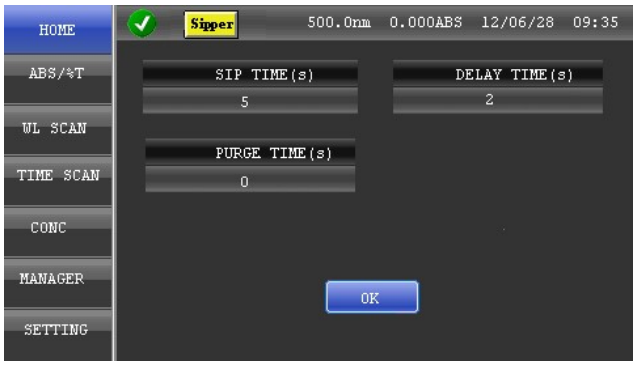
**On-board Interface**

Turn on the instrument and you can see the Sipper button showing on the top-left of the screen. Touch the Sipper button will enter the sipper setting interface. Default setting of the Sip Time is 20 seconds. To set the sip time, touch the Sip Time button and then enter the time via the virtual keyboard. To set delay time, touch the Delay Time button and then enter the delay time via the virtual keyboard. To set the purge time, touch the Purge Time button then enter the purge time via the virtual keyboard. Touch the Home button and continue with other settings.

- Touch the Sipper button at the top-left screen and enter the sipper setting screen.

Touch this

- Touch the Sip Time, Delay Time or Purge Time to set the time for sipper.




SIP TIME (s ): sample sipper time (Unit: s)

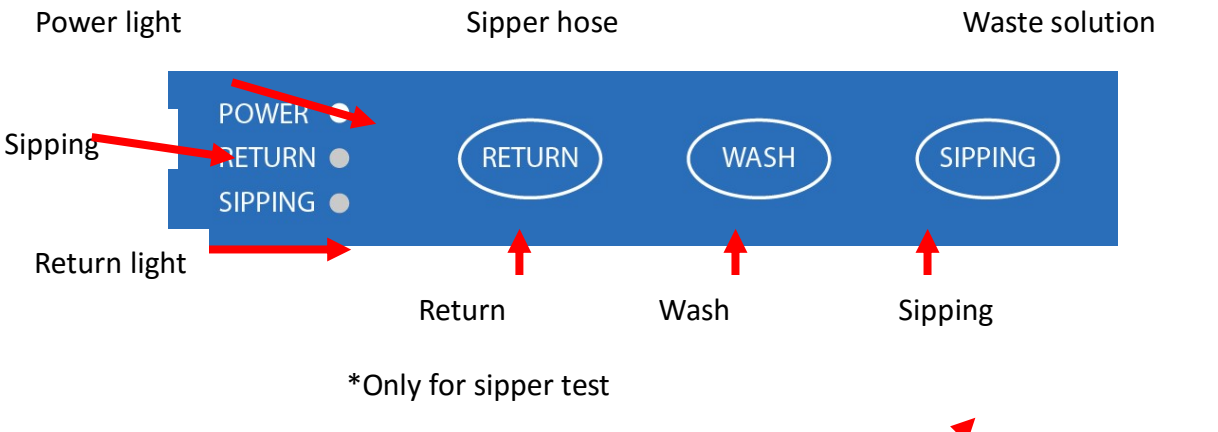
DELAY TIME (s ): delay time between sample sipper and measure

PURGE TIME (s ): purge air after finish measurement.

This is used to separate the two samples in the tubing. In order to recycle sample or avoid cross contamination.

**Procedure**

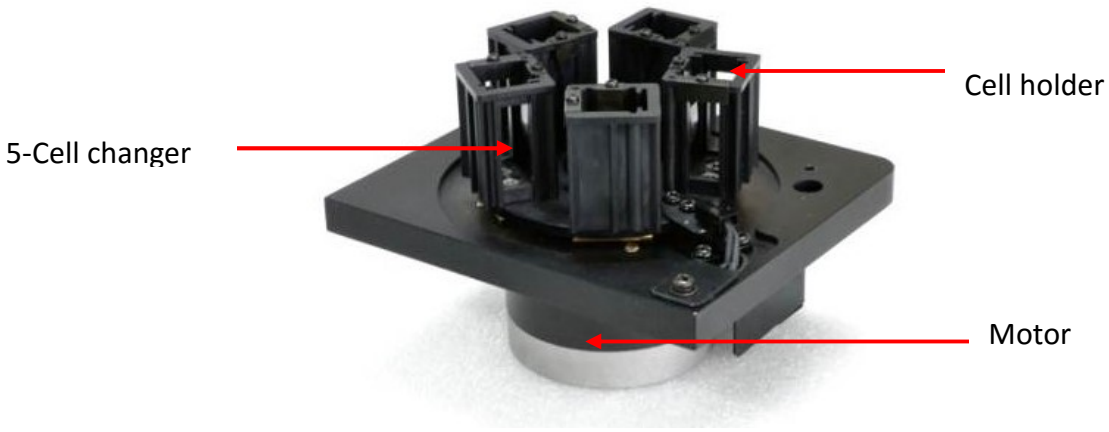
1. Touch the “ZERO” button to perform set zero of the instrument.
2. Place the sipper hose to the test tube (or other sample container).
3. Press “SIPPING” button on the control panel of the sipper pump.
4. The sample solution will be sip into the flow cell.
5. Press the “ READ” button and the measurement will take place
6. After measurement, place the sipper hose to the washing solution and the press “WASH” button.
7. Repeat above steps for others samples.



# Automatic 5-Cell Changer (Part No.: 000C-XB10-0000)

**Overview**

The Automatic 5-Cell holder is used to hold up to 5 cells with sample and measure each by sequence. It is usually used for fast detection for batch samples.




Automatic 5-Cell Changer

**Description**

The automatic 5-cell change is composed 5 cell holder arranged in circular manner. A motor is built with the accessory for automatic changing of the cell holder to measure position. Each cell holder can hold one 10mm path length cell. The power is supplied from the main unit DC24V output. The cell holder changing is controlled by main unit on-board software or UV Detective PC software (if connected).

**Applicable models**

The accessory can be used in spectrophotometers model S-220/S-300 and S-200.

**Application**

The accessory can be used to measure the transmittance or absorbance from a batch of maximum 5 samples without the need to change the cell by hand. It can also be used to monitor the change of transmittance or absorbance over time from multiple samples such as slow chemical reaction at different initial concentration. Typical application is to place the blank and 3 standard solutions in the cell changer for standardization and quantitation calculation.

**Specifications**

| Automatic 5- Cell Changer |
|---|

| Item | Specifications | Remark |
|---|---|---|
| No. of cell holder | 5 | |
| Cell changing mechanism | Automatic by software | |
| Applicable cell | 10mm pathlength cell | Any cell with external dimension of 12.5 x 12.5mm can be used.<br>Micro cell is not supported |

**Operating Environment**

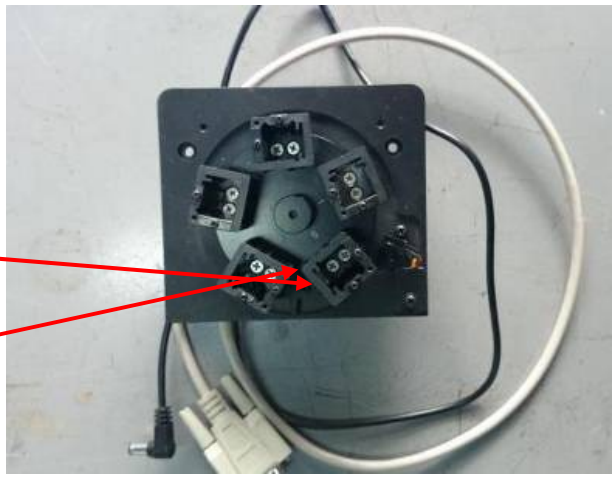
The automatic 5-cell changer generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300/S-200 Spectrophotometer.

**Unpacking**

Unpack the box and take out the items inside. Check all items are available.

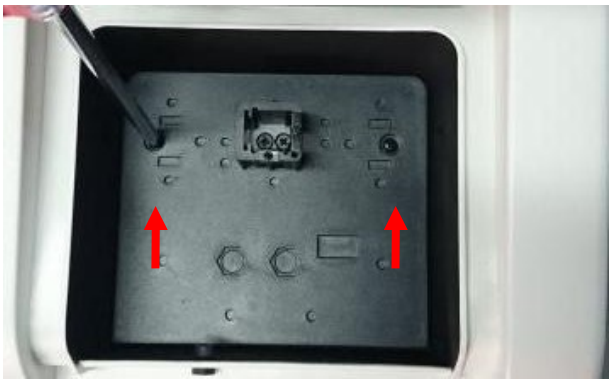
**Installation**

- Take out the automatic 5-cell changer from the package

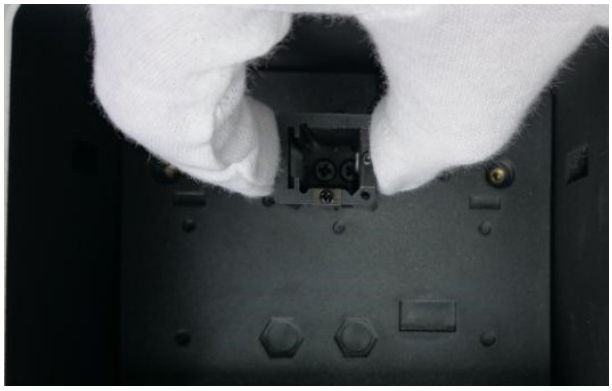



- Make sure the main power of the instrument is off.

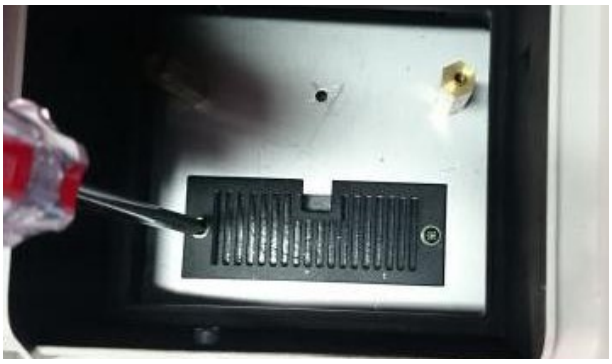
- Open the sample compartment cover and remove the screws of the standard cell holder.



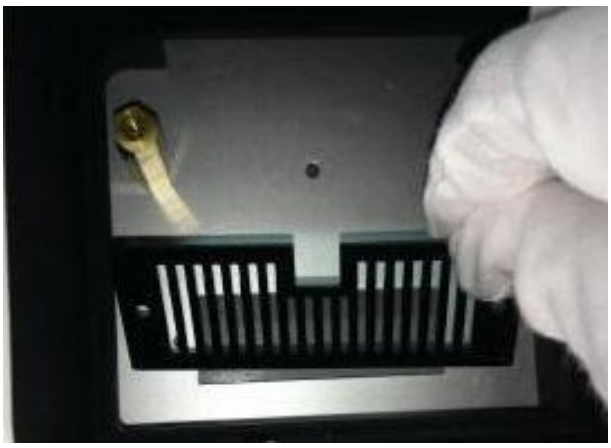
- Remove the standard cell holder



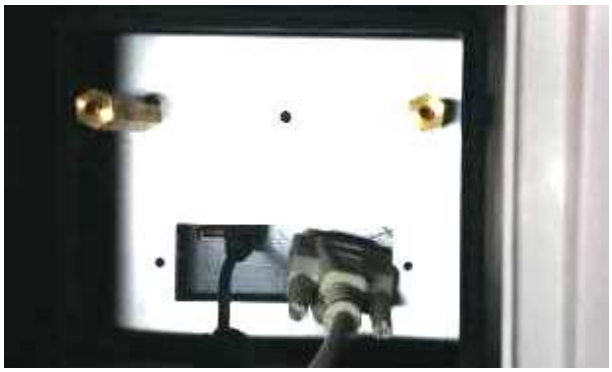
- Remove the screw of the bottom plate



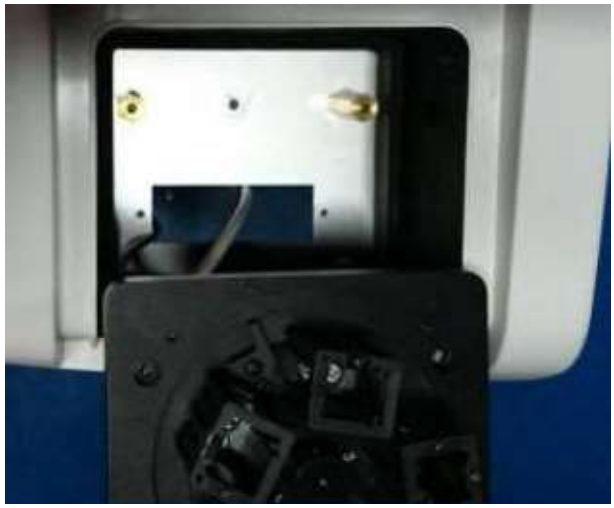
- Remove the bottom plate



- Pass the power and data cable through the hole.

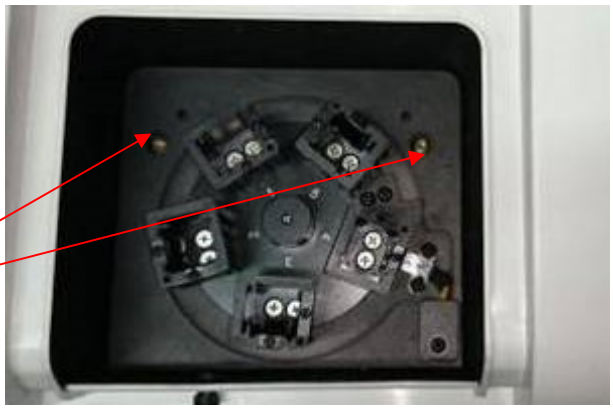


- Place the automatic 5-cell holder into the sample compartment.



- Locate and align the holes for fixing screws.

Holes for fixing



- Tighten the fixing screws

- Close the sample compartment. Connect the data cable to the accessory port and the power cable to the DC24V socket at the back of the instrument. Tighten the screw of the socket


- Power on the instrument. The 5-cell changer button is now displaying at the top-left of the home screen and showing the current position.

5-Cell


**Operation**

The automatic 5-cell changer can be controlled by the instrument on-board user interface or UV

Detective. You can change the current cell holder position.

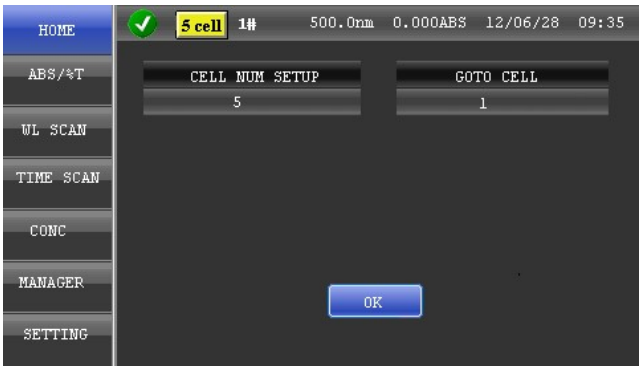
**On-board Interface**

Turn on the instrument and you can see the 5-cell button and the current cell holder position showing on the top-left of the screen. Touch the 5-cell button will enter the cell holder position setting interface. Default setting is position #1. To change the cell position, touch the GOTO CELL button and enter the cell holder position via the virtual keyboard. Place the cell containing sample and you can start to measure as normal measurement.

- Touch the 5-Cell bottom at the top-left screen and enter the 5-cell setting screen.

Touch this


- Touch GOTO CELL to change the current cell holder position




CELL NUM SETUP: Cuvette position to be measured (1 to 5 )

GOTO CELL Select specific cuvette position

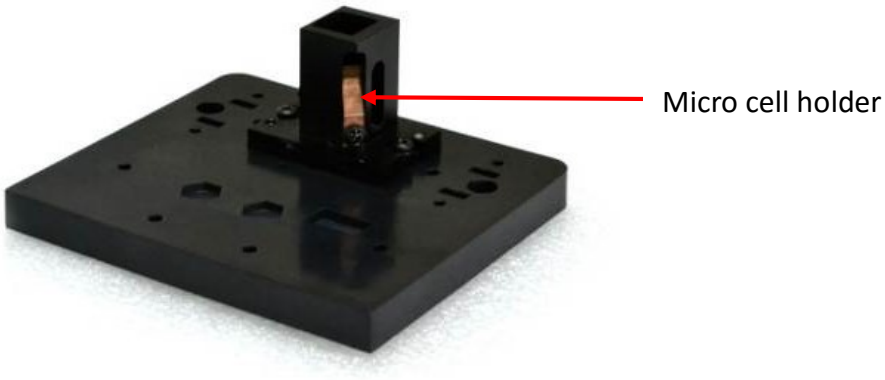
# Micro Cell Holder (100µL) (Part No.: 000D -XB10-0000)

# Micro Cell Holder (50µL) (Part No.: 000H -XB10-0000)

**Overview**

The Micro cell holder (100µL and 50µL) is used to hold micro cell of volume down to 100µL or 50µL. It is usually used for measuring trace amount of sample or precious sample.

100µL micro cell




Micro Cell Holder

**Description**

The micro cell holder is designed to use micro cell of sample volume down to 100µL or 50µL.

**Applicable models**

The accessory can be used in spectrophotometers model S-220/S-300 and S-200.

**Application**

The accessory can be used to measure the transmittance or absorbance from a sample of trace volume of precious sample. Typical application is to measure the concentration of DNA or RNA samples which are very precious and thus only trace amount of sample is available for measurement.

**Specifications**

| Micro Cell Holder | | |
|---|---|---|
| Item | Specifications | Remark |
| Micro sample volume | 100µL or 50µL | |
| Beam height | 15mm | |
| Applicable cell | 100µL or 50µL micro cell | |

**Operating Environment**

The micro cell holder generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300/S-200 Spectrophotometer.

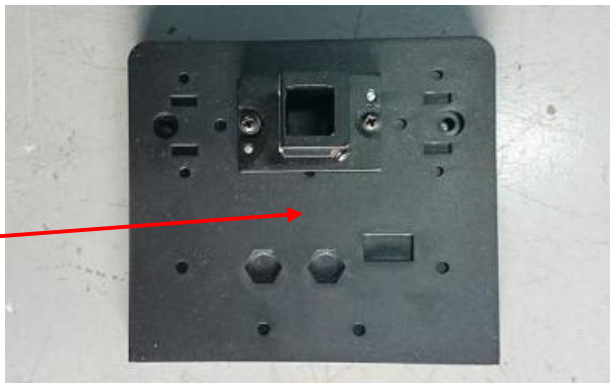
**Unpacking**

Unpack the box and take out the items inside. Check all items are available.

**Installation**

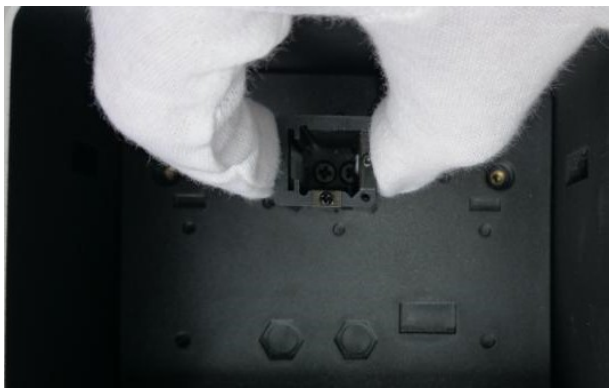
- Take out the micro cell holder from the package

Micro cell holder



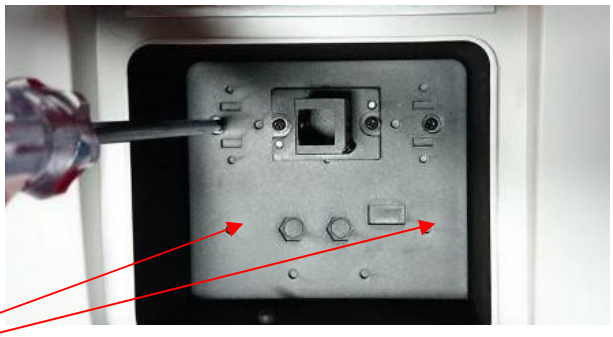
- Open the sample compartment cover and remove the screws of the standard cell holder.

- Remove the standard cell holder



- Place the micro cell holder into the sample compartment.

- Locate and align the holes for fixing screws. Tighten the fixing screws



Holes for fixing

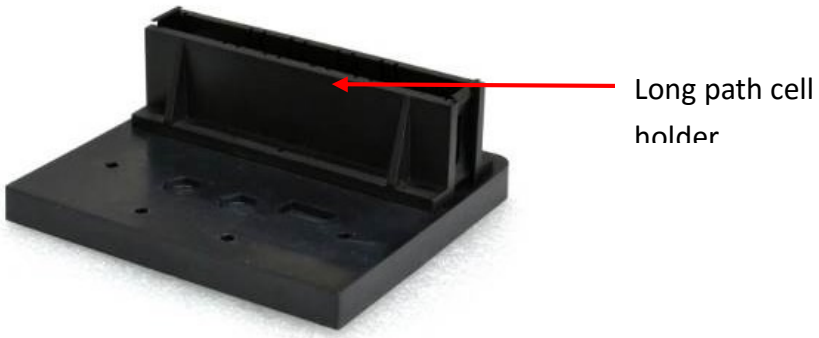
**Operation**

Place a micro cell containing the sample into the micro cell holder. Close the sample compartment lid and measure the transmittance or absorbance from the on-board software of UV Detective software.

# Long Path Cell Holder (100mm) (Part No.: 000F-XB10-0000)

**Overview**

The long path cell holder is used to hold various long path length cell from 10mm up to 100mm cell. It is usually used for very dilute samples.




Long Path Cell Holder

**Description**

The micro cell holder is designed to use cell of path length ranges from 10mm, 20mm, 30mm, 40mm, 50mm and 100mm.

**Applicable models**

The accessory can be used in spectrophotometers model S-220/S-300 and S-200.

**Application**

The accessory can be used to measure the transmittance or absorbance from a sample of dilute concentration of the analyte. According to Beer's Law, the absorbance of a sample can be increased if the path length is increased. This is useful when the analyte concentration is too low to detect at 10mm path length. Typical application is to measure trace of contaminant such as silica in purified water or environmental samples.

**Specifications**

| Long Path Cell Holder | | |
|---|---|---|
| Item | Specifications | Remark |
| Path length | 10, 20, 30, 40, 50, 100mm | |
| Applicable cell | Cell of path length 10, 20, 30, 40, 50, 100mm | |

**Operating Environment**

The long path cell holder generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300/S-200 Spectrophotometer.

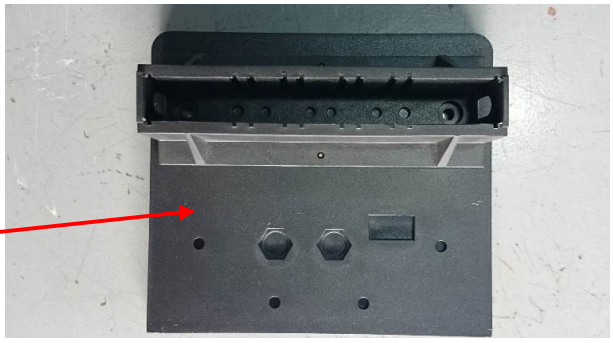
**Unpacking**

Unpack the box and take out the items inside. Check all items are available.

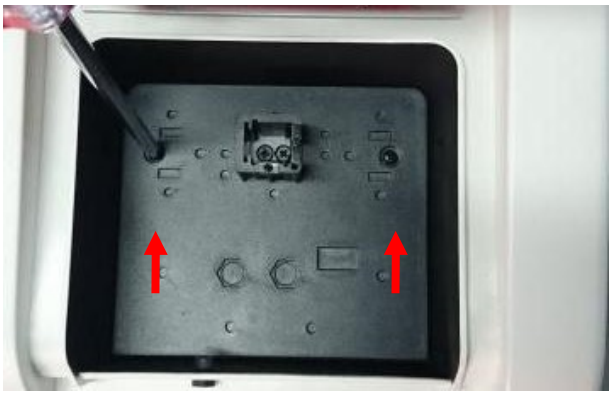
**Installation**

- Take out the long path cell holder from the package

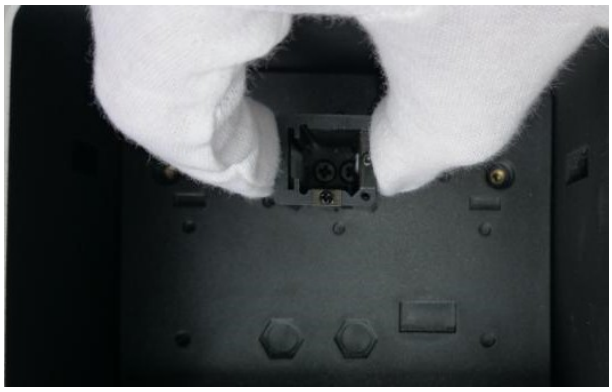
Long path cell holder



- Open the sample compartment cover and remove the screws of the standard cell holder.



- Remove the standard cell holder



- Place the long path cell holder into the sample compartment.

- Locate and align the holes for fixing screws. Tighten the fixing screws

Holes for fixing

**Operation**

Place a long path cell containing the sample into the long path cell holder. Close the sample compartment lid and measure the transmittance or absorbance from the on-board software of UV Detective software.

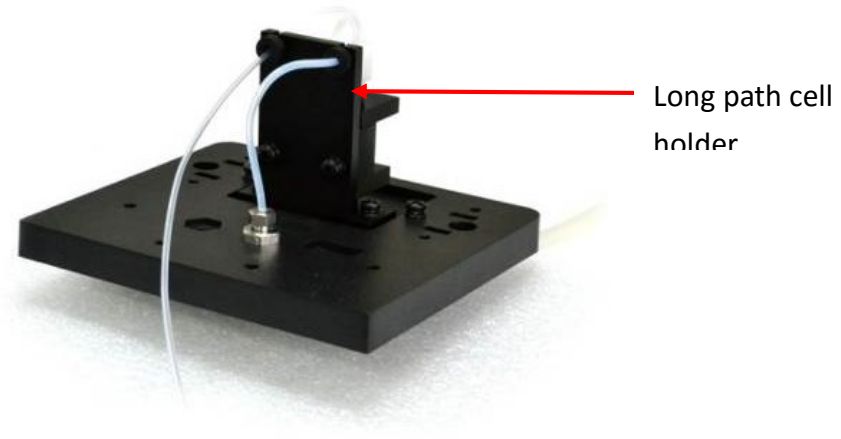
- Adjust the spring position to fit different path length cell

Take out the spring.
Insert into the proper position

# Flow Cell Holder (Part No.: 000G-XB10-0000)

**Overview**

The flow cell holder path cell holder is used to allow sample solution to flow from though and measure continuously.




Long Path Cell Holder

**Description**

The flow cell holder is composed of a flow though cell with volume 150μL, inlet and outlet tube. External pump such as peristaltic pump is needed.

**Applicable models**

The accessory can be used in spectrophotometers model S-220/S-300 and S-200.

**Application**

The accessory can be used to measure the transmittance or absorbance from a sample solution flowing through the flow cell. This is usually use for on-line measurement or remote measurement of a sample not suitable to use with cuvette. Typical application is to measure change of transmittance for fraction collection purpose such as liquid chromatography or continuous flow centrifugation.

**Specifications**

| Long Path Cell Holder | | |
|---|---|---|
| Item | Specifications | Remark |
| Flow cell volume | 150μL | |
| Wavelength range | 200-900nm | |

| | |
|---|---|
| Cell material | Quartz |
| Max. flow rate | 10mL/min |

**Operating Environment**

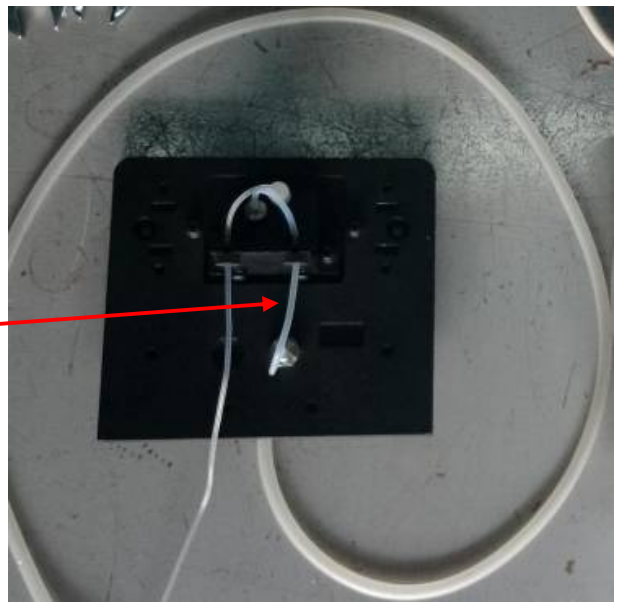
The long path cell holder generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-220/S-300/S-200 Spectrophotometer.

**Unpacking**

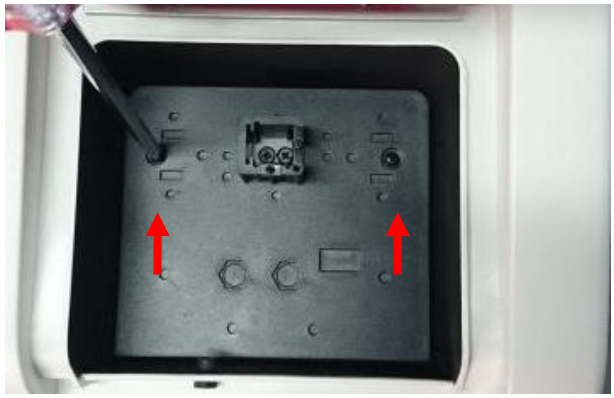
Unpack the box and take out the items inside. Check all items are available.

**Installation**

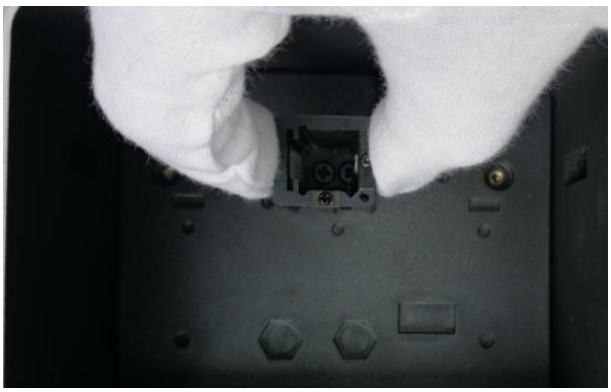
- Take out the flow cell holder from the package



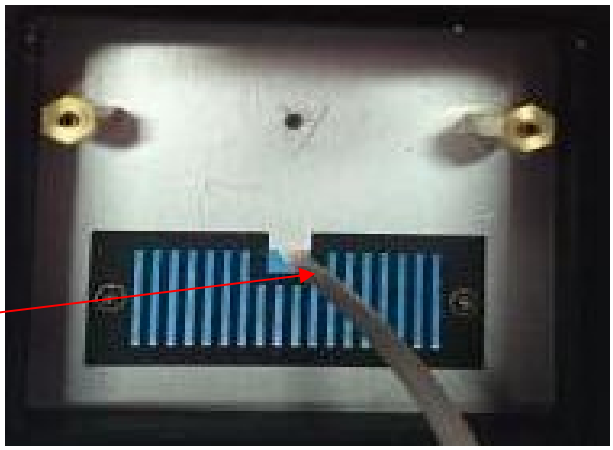

- Open the sample compartment cover and remove the screws of the standard cell holder.



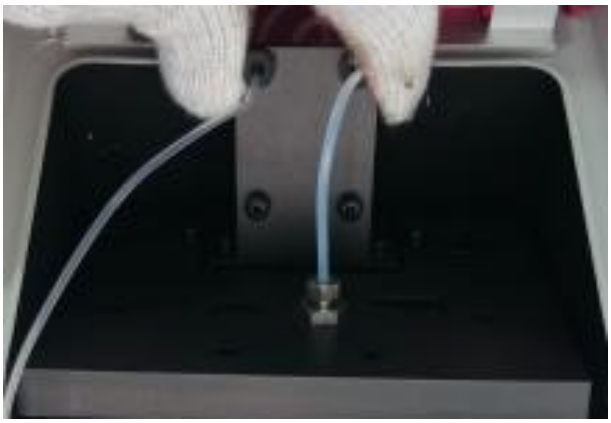
- Remove the standard cell holder



- Pass the hose from flow cell through the hole of the bottom plate

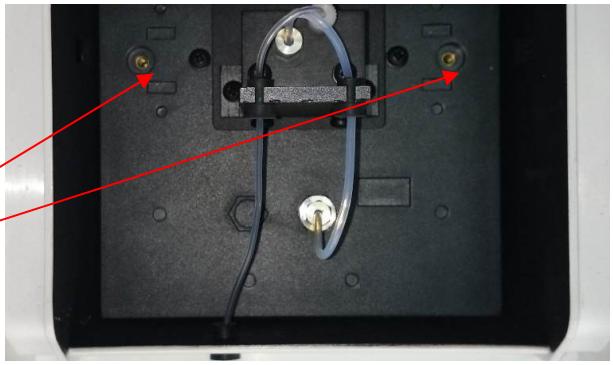



- Place the flow cell into the sample compartment.



- Locate and align the holes for the fixing screws

Holes for fixing



- Tighten the fixing screws

- Pull out the black rubber plug of sample compartment and then insert the rubber plug for auto sipper

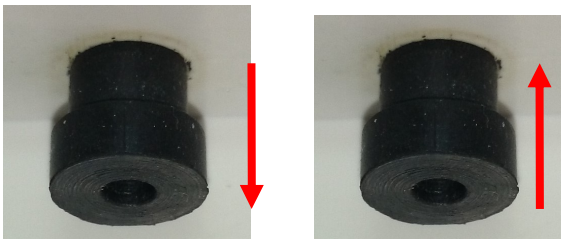
Original rubber

For auto sipper

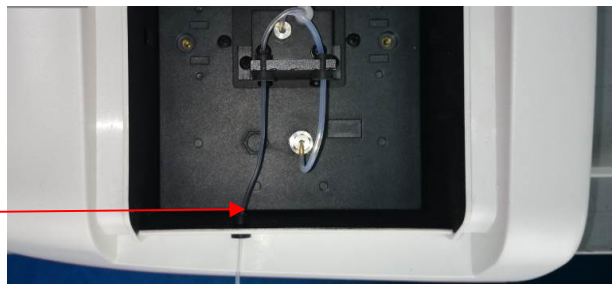
Pull out the original rubber

Insert the rubber plug for auto

.



- The sipper hose passes the black rubber plug and close the sample compartment cover




**Operation**

Connect the inlet tube to a peristaltic pump or other external pump. Feed the sample solution to the flow cell. Measure the transmittance or absorbance from the on-board software of UV Detective software.

# Test Tube Holder (Part No.: 000E-VIS20-0000)

**Overview**

The test tube holder is used for the direct measurement of samples in a test tube with no need to transfer to a cuvette.

Test tube holder

**Description**

The test tube holder is composed of a spring mechanism which can adjusts and accepts test tubes with diameters from 9-22mm automatically. And it has a high ceiling cover accommodates even the tallest test tube.

**Applicable models**

The accessory can be used in spectrophotometers model S-200.

**Application**

The accessory can be used to measure the transmittance or absorbance directly from a test tube, which is very convenient.

**Specifications**

| Test Tube Holder | | |
|---|---|---|
| Item | Specifications | Remark |
| Tube size | | |
| Diameter | 9-22mm | |
| Length | 70-150 | |
| Beam height | 21.5mm | |

**Operating Environment**

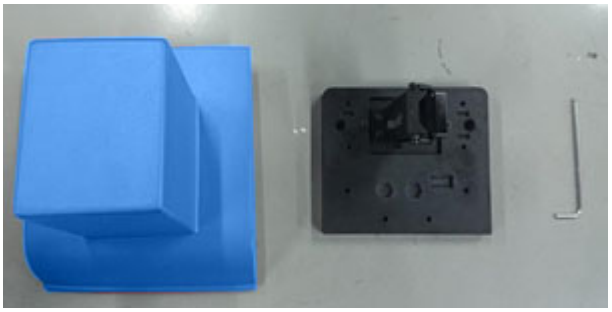
The test tube holder generally operates under the same environmental conditions as those specified in the manual of the Boeckel + Co (GmbH + Co) KG S-200 Spectrophotometer.

**Unpacking**

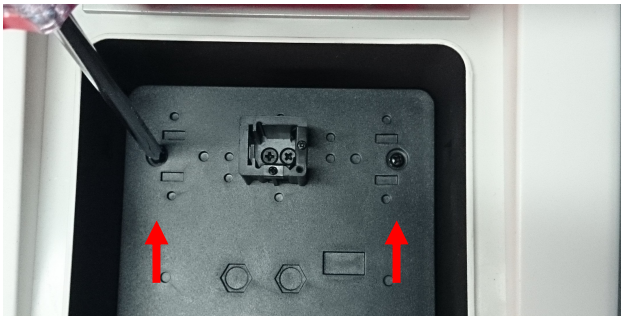
Unpack the box and take out the items inside. Check all items are available.

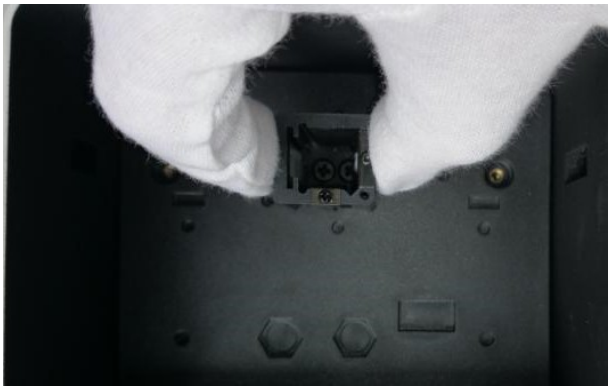
**Installation**

- Take out the test tube holder and the accessory from the package

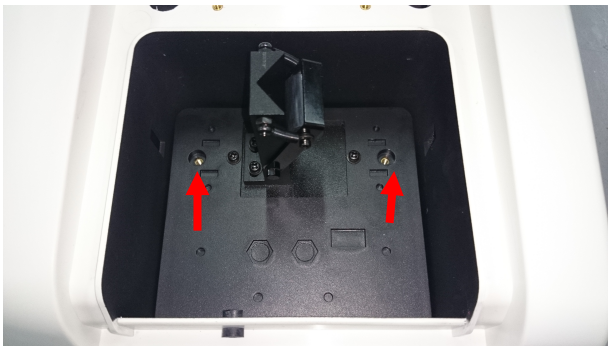


- Open the sample compartment cover and remove the screws of the standard cell holder.

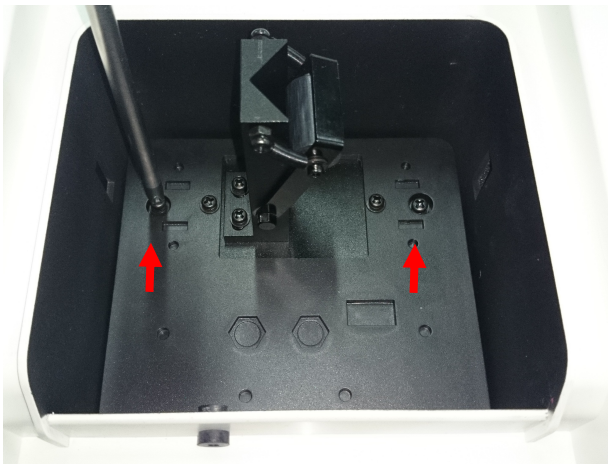




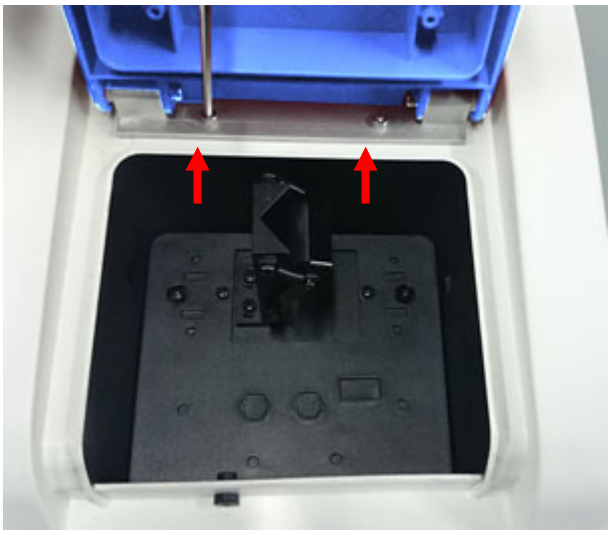
- Put the test tube holder in the sample chamber and flat it by inserting the two position pins in the holes.

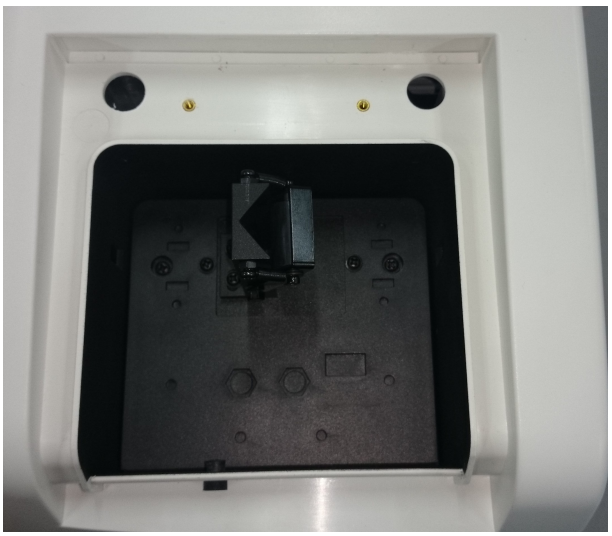


- Load and tighten the fixing screws.

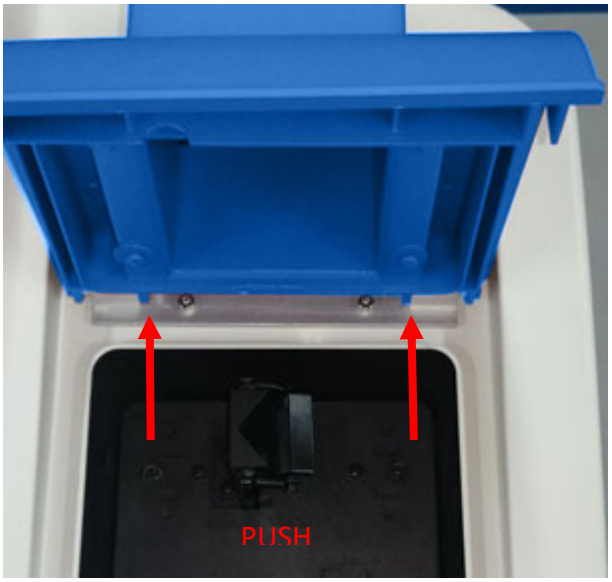


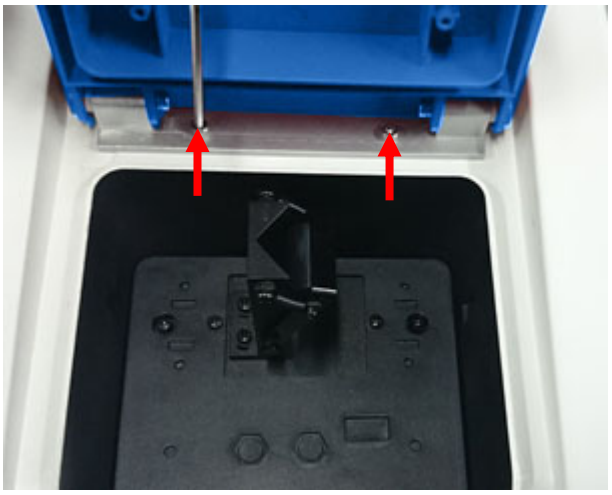
- Remove the turn door using the allen wrench in the accessory.





- Install the turn door in the accessory. Load the fixing screw and push back the turn door, then you can tighten the fixing screw by allen wrench.



**Operation**

Place a test tube containing the sample into the test tube holder directly. Close the sample compartment lid and measure the transmittance or absorbance from the on-board software of UV Detective software.