

INSTRUCTION MANUAL FOR SPECTROPHOTOMETER

UV2200

UV2000

V2200

V2000



Before operating the unit, please read this manual thoroughly and retain it for future reference.

PREFACE

We are grateful for your purchase of our spectrophotometer. This instrument is intended to be utilized for research, development, quality control, etc. primarily in fields of optical materials, semiconductors, new materials, electronics and so on through qualitative and quantitative analyses of samples diverse in kind and size.

This instrument is intended for purpose of photometric analysis. Do not use it for any other purpose.

This instruction manual has been prepared for users of how to handle this instrument.

This instrument is designed for use by persons having a basic knowledge of chemical analysis. Other persons should operate the instrument in presence of someone who has such basic knowledge. Remember that improper use of this instrument, chemicals, or samples would result not only in wrong analytical data but in consequences adverse to safety.

It is requested to carefully read through this manual to enable using this instrument properly for a long time.

For installation/maintenance of this instrument, read instruction manual carefully to attain a full understanding of instructions. Be sure to observe cautionary instructions. Keep this manual handy for easy reference when necessary.

INTRODUCTION TO THIS INSTRUCTION MANUAL

This manual is made up of 5 sections: Product specifications; Outside view and internal structure; Installation; Operation; Maintenance and inspection.

This instruction manual describes operating instructions and precautions for this spectrophotometer.

Before using this instrument, be sure to read through this instruction manual. First of all, read "SAFETY SUMMARY" included at beginning of this manual for ensuring safety in operation of spectrophotometer mainframe.

AFTER-SALES SERVICE

After-sales service

For after-sales service of the instrument, contact local sales representative. For ordering a replacement part, its name and number need be specified.

Before using this manual, keep the following in mind.

1. No part of this publication may be transmitted or reproduced in any form or by any means without prior written permission of Publisher.
2. If the instrument incurs damage due to usage contrary to one instructed in this manual, manufacturer will not take any responsibility. So customer must operate the instrument in correct way.
3. This manual is neither for warranting enforcement of industrial property rights and other rights nor for assenting to license of enforcement.

Caution: Contents of this instruction manual are subject to change without prior notice for further improvement of the product, etc.

IMPORTANT

1. PRECAUTIONS ON ELECTROMAGNETIC WAVE INTERFERENCE

1.1 Possible electromagnetic wave interference caused by this instrument

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

To prevent this, use specified system connection cables in strict accordance with the instrument manual. The instrument is designed to minimize possible electromagnetic wave interference caused by it if 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, user is encouraged to try to correct interference by one or more of 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 radio/TV receiver is connected.

1.2 Possible electromagnetic wave interference affecting by 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 specified system connection cables in strict accordance with instruction manual. The instrument is designed to minimize possible electromagnetic wave interference affecting it if specified cables are connected properly.

However, there is no guarantee that electromagnetic wave interference will not occur in this instrument. If the instrument does occur electromagnetic wave interference, which can be determined by turning on and off possible sources of electromagnetic wave interference nearby, user is encouraged to try to correct interference by one or more of following measures:

- Reorient the instrument.
- Increase separation between the instrument and possible sources of electromagnetic wave interference.
- Increase separation between 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.

2. WARRANTY ON PRODUCT

This instrument is warranted to operate according to specifications given in instruction manual, provided it is used in accordance with instructions described in manual.

- (1) Scope of Warranty
 - (a) Any parts which prove to be defective in design or workmanship during 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 time of replacement.
- (2) Warranty Period

One year from date of initial delivery.
Consumables such as tungsten lamp and Deuterium lamps are excluded from warranty.
- (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 warranty period.

 - (a) Failure due to operation at a place not meeting 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 electric circuits or deterioration of 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 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) Consumables, and failure of parts that have reached the end of specified useful life.
 - (j) Failure of parts excluded from warranty in instruction manual or other documents.
 - (k) 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.
 - (l) Failure of the hardware, or damage to system software, application software, data or hard disk due to computer virus infection.

- (m) Failure of personal computer connected with instrument, or damaged to system software, application software, data or hard disk due to power interruption or momentary power voltage drop caused by lightning or the like.
 - (n) Failure of personal computer connected with instrument, or damage to the system software, application software, data or hard disk due to disconnection of main power to personal computer without taking specified normal shutdown procedure.
- (5) Disclaimer of Warranty
- (a) Any express warranties other than explicit conditions indicated in (1) are excluded from this warranty. 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.
 - (b) 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.

3. OTHER PRECAUTIONS

3.1 Handling of chemicals and samples

- (1) 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.
- (2) Reagents, standard solutions and accuracy – control samples shall be handled, stored and discarded as instructed by respective supplies.

3.2 Notice on instruction manuals

- (1) Information contained in instruction manuals furnished with the instrument is subjected to change without notice for product improvement.
- (2) This manual is copyrighted by our company with all rights reserved.
- (3) No part of this manual may be reproduced or transmitted in any form or by any means without our express written permission.

3.3 Trademark Acknowledgements

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SAFETY SUMMARY

PRECAUTIONS ON SAFETY

Before using this spectrophotometer, be sure to read following safety instructions carefully.



GENERAL SAFETY GUIDELINES

- Follow all operating procedures provided in this manual.
- Maintenance of the product shall be carried out by qualified service personnel therefore.
- Be sure to observe warnings indicated on product and in instruction manual. Failure to do so could result in personal injury or damage to the product.
- The hazard warnings which appear on warning labels on the product or in manual have one of the following alert headings consisting of an alert symbol and signal word WARNING and CAUTION.



WARNING : Indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.



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

“NOTICE” and “Note” are heading words which do not concern personal safety directly.

NOTICE: Used to indicate an instruction for preventing damage to the product.

NOTE: Used to indicate an instruction for ensuring correct use of the product and accurate analysis therewith.

- Do not modify the product, replace parts that are not user – serviceable, use non – specified parts, nor remove safety devices, as it could be hazardous.
- Maintenance should be referred to our qualified service personnel.
- Do not perform any operation or action other than described in the instruction manual. When it doubt, please contact our sales representative or service office nearest you.



SAFETY SUMMARY



GENERAL SAFETY GUIDELINES (Con'd)

- When using a chemical for analytical operation, be sure to provide proper ventilation in the laboratory room as per local requirements. Inadequate ventilation could endanger human
- Keep in mind that the hazard warning in manual or on the product cannot cover every possible case, as it is impossible to predict and evaluate circumstances beforehand.
Be alert and use your common sense.



WARNING

This instruction manual contains the following cautious instructions.

- **Electric Shock in Contact with Dangerous High Voltage.**
In contact with power supply voltage, you may receive an electric shock to cause fatal or serious injury.
Before connecting power cord, make sure that the unit is turned off.
- **Electric Shock in Contact with Dangerous High Voltage.**
In contact with Deuterium lamp power supply voltage (120 V), you may receive an electric shock to cause fatal or serious injury.
Before connecting Deuterium lamp power cord, make sure that the unit is turned off.



CAUTION

- **Burn in Contact with High Temperature**
Deuterium lamp and tungsten lamp reach a high temperature.
They can burn you if touched.
Before replacing or adjusting lamp, turn off the unit and wait until it cools down sufficiently.
- **Fatigue on Long Use**
Watching the screen in the same posture for a long time accumulates fatigue in your eyes or body. For long use, take a 10 to 15 minutes recess every hour for your health.
- **Oxygen Deficiency due to Presence of Nitrogen**
(when using Ultra Violet region measurement system)
If nitrogen purging is carried out for long hours in a narrow room without operating an exhaust duct, oxygen concentration in room will decrease and an oxygen deficiency could result.
Be sure to operate an exhaust duct or else open a window during purge for ventilation purposes.



SAFETY SUMMARY

REMARKS ON SAFETY OF SPECTROPHOTOMETER

Electricity

- (1) Confirm power supply to spectrophotometer.
Fluctuation in voltage or noise on power line would not only affect spectrophotometer mainframe adversely but also cause an accident.
- (2) Be sure to provide grounding connection along with power connection.
- (3) High – voltage circuits are used inside spectrophotometer. Do not open any other cover than necessary for operation.

Fire

Avoid smoking and using a fire in the vicinity of spectrophotometer.

Data Backup

Data may become unusable in case of instrument failure or misoperation.

It is recommended to transfer data from hard disk to a flash disk periodically. Transfer of data is called backup.

To avoid misoperation, secure a free space of 100MB or so on the hard disk as a software work area at all times.

Computer Virus

If programs or data has suddenly been destroyed, if an unexpected operation takes place or if an abnormal display appears on screen, your personal computer may have been infiltrated by a computer virus. Computer virus is a rogue program that secretly invades a personal computer and operates it willfully while destroying memorized data.

A program for eliminating the virus is called vaccine program.

There is a possibility of contamination with a program including a computer virus, or by using an exchangeable recording medium such as a flash disk that contains a computer virus. Also, it is possible to transmit the virus from one personal computer to another via communication or recording media. So avoid using a program or recording medium that might include a virus.

Carry out check using a vaccine program if there is a possibility of contamination with a virus. But depending on type of vaccine program, it may be impossible to eliminate virus.

It is therefore recommended to back up contents of hard disk beforehand.

Power Failure

A power failure or momentary voltage drop of power supply due to lightning, etc. may cause failure of personal computer used with the instrument and also damages system software, application software and other data. To avoid such problems, **it is recommended to use an AC uninterruptible power source.**

Personal Computer (PC)

Do not turn off PC power supply alone. If PC power supply is turned off during access to hard disk or flash disk, PC may be damaged and data or software stored in it may be destroyed. To turn off PC power supply, be sure to complete spectrophotometer control and data processing program before taking shutdown procedure for system software.

PRECAUTIONS ON HANDLING

1. CAUTION ON SAFETY

Be sure to entrust internal checks of the instrument to a serviceman for ensuring safety.

Do not gaze at light source (Tungsten and Deuterium lamps) directly. Particular attention must be paid to Deuterium lamp because it radiates intense ultraviolet rays.

2. CAUTION ON USE

Optical parts are fragile. Besides, control and data processing sections comprise high – density electronics. Therefore, precautions below must be taken without fail.

- (1) Avoid giving shock or vibration to optical parts. Do not breathe on optical parts or touch them with bare hands.
- (2) For removing dust from optical parts, blow it off by using a hand sprayer which jets out clean dry air. Do not wipe them with a cloth or the like.
- (3) The operating temperature must be within 5⁰C to 35⁰C. However, optimum condition is restricted to a range to 20⁰C to 25⁰C. Hence, installation in an air – conditioned room is recommended.
- (4) Operating humidity must be within 45 to 85%.
- (5) Atmosphere must not be filled with acidic, alkaline or other metal-corroding vapor.
- (6) Avoid a location filled with vapor of organic solvent (particularly benzene and thinner).
- (7) Avoid direct sunlight. (Otherwise optical performance might deteriorate. Do not locate the instrument near a window whenever possible.)
- (8) Do not allow strong vibrations nor shocks beyond a level which can be sensed by the human body. (Otherwise delicate adjustment mechanism might run out of order.)
- (9) Protect the instrument cover from excessive heat (beyond 70⁰C) radiated from a gas burner, heater, oven or the like.
- (10) The instrument must be located away from equipment which generates a strong electric field (such as an electric welding machine, high-frequency electric furnace and pole transformer).
- (11) Dusty environment is unallowable. (Otherwise adequate optical performance might not be ensured.)
- (12) Line voltage must not fluctuate suddenly (otherwise noise might increase). Its fluctuation must be within $\pm 10\%$.
- (13) Do not turn on/off frequently power supply to a motor (stirrer, vibrator, etc.) without a noise - preventive device in same power line as the instrument's.
- (14) The installation plane must be level and capable of bearing a weight of about 25Kg or more.
- (15) Minimum power requirements are 90VA. But a higher power capacity (1KVA or more) must be prepared in order to allow another instrument to share power line.
- (16) Fluctuation of power frequency must be within +0.3 to –1.0% of rated frequency (50 or 60 Hz).

3. CAUTION ON STORAGE OF INSTRUMENT

3.1 Checks upon Completion of Measurement

- (1) Turn off the unit and disconnect power from line power outlet.
- (2) Contamination of the sample compartment is inevitable. There might be a chance of an undesired trouble occurring due to ingress of foreign material or dust. To prevent this, check sample compartment for contamination as frequently as possible.
- (3) Take off cell holder component, and clean it.
Loosen cell holder handle with anticlockwise, and pull it out. Open sample compartment cover. Loosen 2 pcs of M4 Screws which are used to fix cell holder component, you can take off cell holder component.
To mount cell holder component, please set wavelength value to 546.0 nm, and there is a light beam with bright green color in sample compartment. Be sure the green light beam must enter into the middle aperture of cell holder, and you can mount cell holder component with 2 pcs of M4 screws.
- (4) Cleaning of lenses
For cleaning, wipe lenses with soft paper or cloth using a 1:1 mixture of alcohol and ether.
First of all, your hands must be clean.
- (5) Put dust-preventive cover or a protective sheet of a proper size on the instrument.

<p>Caution: In case an organic solvent is placed in sample compartment, it must be taken out of compartment. Never leave it inside. Wash the rectangular sample cells with petroleum-ether, dry them with gently paper and then put them into the colorimetric box after using.</p>

3.2 Precautions for Long-Term Storage

- (1) Protect the instrument from high temperature (70⁰C or higher), low temperature (-20⁰C or lower), high humidity (80% or higher), and strong vibrations throughout storage.
- (2) Be sure to put dust-preventive cover or a sheet cover on the instrument.
- (3) Protect the instrument interior from acidic, alkaline or other harmful gases.
- (4) Avoid a location under a strong magnetic field.
- (5) A dusty location is inappropriate for storage.
- (6) During storage, the instrument must be free from direct sunlight.

Table of Contents

Section	Title	Page
1	Product specifications	1
1.1	Technical specifications	1
1.2	Standard configurations	1
1.3	UV-Solution software (Optional)	1
2	OUTSIDE VIEW AND INTERNAL STRUCTURE	2
2.1	Front – right view	2
2.2	Rear view	2
2.3	Internal structure	3
2.3.1	Internal structure of VIS spectrophotometer.....	3
2.3.2	Internal structure of UV-VIS spectrophotometer.....	3
2.4	Optics schematic diagrams	4
2.4.1	Optics schematic diagrams of VIS spectrophotometer.....	4
2.4.2	Optics schematic diagrams of UV-VIS spectrophotometer.....	4
3	INSTALLATION	5
3.1	Power requirements	5
3.1.1	Line voltage.....	5
3.1.2	Frequency.....	5
3.1.3	Power capacity.....	5
3.2	Conditions for installation	5
3.2.1	Installation area.....	5
3.2.2	Installation plane.....	5
3.2.3	Environment at place for installation.....	5
3.3	Check of contents	6
3.3.1	Check of packing.....	6
3.3.2	Check against standard configurations.....	6
3.4	Connection of power cord	6
3.5	Check after installation	6
3.6	Initialization	6
3.6.1	Description of item to be tested.....	7
3.6.2	Initializing interface.....	7
3.6.3	Main interface.....	8
4	OPERATION	9
4.1	Function of each key on main interface	9
4.2	Absorbance measurement mode	10
4.2.1	Testing directly without measurement data list.....	10
4.2.1.1	Setting wavelength value.....	10
4.2.1.2	Blanking (Adjusting 0.000Abs).....	10
4.2.1.3	Testing.....	10
4.2.2	Testing with measurement data list.....	10
4.2.2.1	Setting wavelength value.....	10
4.2.2.2	Blanking (Adjusting 0.000Abs).....	10
4.2.2.3	Testing.....	11
4.2.2.4	Clearing all data.....	11

Table of Contents

Section	Title	(cont'd) Page
4.3	Transmittance measurement mode	11
4.3.1	Testing directly without measurement data list.....	11
4.3.1.1	Setting wavelength value.....	11
4.3.1.2	Blanking (Adjusting 100.0%T).....	11
4.3.1.3	Testing.....	11
4.3.2	Testing with measurement data list.....	12
4.3.2.1	Setting wavelength value.....	12
4.3.2.2	Blanking (Adjusting 100.0%T).....	12
4.3.2.3	Testing.....	12
4.3.2.4	Clearing all data.....	12
4.4	Coefficient method	13
4.4.1	Reading concentration value directly.....	13
4.4.1.1	Setting wavelength value.....	13
4.4.1.2	Blanking (Adjusting 0.000A).....	14
4.4.1.3	Inputting known concentration value.....	14
4.4.1.4	Reading unknown sample concentration value directly.....	14
4.4.2	Testing concentration factor “K” with known concentration value.....	15
4.4.2.1	Setting wavelength value.....	15
4.4.2.2	Blanking (Adjusting 0.000A).....	15
4.4.2.3	Inputting known concentration value.....	15
4.4.2.4	Getting concentration factor “K” with known concentration value.....	16
4.4.3	Setting coefficient curve with known coefficient value.....	16
4.4.3.1	Setting coefficient value.....	16
4.4.3.2	Saving coefficient curve.....	16
4.4.3.3	Clearing all coefficient curve.....	17
4.4.4	Testing with coefficient curve.....	17
4.4.4.1	Opening coefficient curve.....	17
4.4.4.2	Testing.....	18
4.4.4.2.1	Testing directly without measurement data list.....	18
4.4.4.2.1.1	Setting wavelength value.....	18
4.4.4.2.1.2	Blanking (Adjusting 0.000A).....	18
4.4.4.2.1.3	Testing.....	18
4.4.4.2.2	Testing with measurement data list.....	19
4.4.4.2.2.1	Selecting concentration unit.....	19
4.4.4.2.2.2	Setting wavelength value.....	19
4.4.4.2.2.3	Blanking (Adjusting 0.000Abs).....	19
4.4.4.2.2.4	Testing.....	19
4.4.4.2.2.5	Clearing all data.....	19

Table of Contents

Section	Title	(cont'd) Page
4.5	Standard curve method	19
4.5.1	Creating standard curve	21
4.5.1.1	Selecting concentration unit	21
4.5.1.2	Setting wavelength value	21
4.5.1.3	Inputting concentration value of standard sample	21
4.5.1.4	Inputting standard sample name	22
4.5.1.5	Blanking (Adjusting 0.000Abs)	22
4.5.1.6	Getting absorbance value of standard sample	22
4.5.1.7	Displaying standard curve	23
4.5.1.8	Revising standard sample information	23
4.5.1.9	Saving standard curve	23
4.5.1.10	Clearing all standard curve	24
4.5.2	Testing with standard curve	24
4.5.2.1	Opening standard curve	24
4.5.2.2	Entering measurement data list of standard curve	25
4.5.2.3	Setting wavelength value	25
4.5.2.4	Blanking (Adjusting 0.000A)	25
4.5.2.5	Testing	25
4.5.2.6	Inputting unknown sample name	26
4.5.2.7	Clearing all data	26
4.6	Option	27
4.6.1	Option of VIS spectrophotometer	27
4.6.1.1	Operation version	27
4.6.1.2	Date and time	27
4.6.1.3	Initialize machine	27
4.6.1.4	Default setting	27
4.6.1.5	Language	27
4.6.2	Option of UV-VIS spectrophotometer	28
4.6.2.1	Operation version	28
4.6.2.2	Date and time	28
4.6.2.3	Initialize machine	28
4.6.2.4	Default setting	28
4.6.2.5	Language	28
4.6.2.6	Lamp switch wavelength	28
5	MAINTENANCE AND INSPECTION	29
5.1	Message during initialization	29
5.2	Troubleshooting guide	31
5.3	Replace lamp and fuse	33
5.3.1	Replacement of deuterium lamp	33
5.3.2	Replacement of tungsten lamp	34
5.3.3	Replacement of fuse	35

1. Product specifications

1.1 Technical specifications

Model	V2000	V2200	UV2000	UV2200
Monochromator			C-T type, 1200 L/mm grating	
Detector			Silicon detector	
Display			4.3" color LCD, touch screen	
Wavelength calibration			Automatic at start	
Wavelength display			0.1 nm	
Light source				Deuterium discharge tube(1000h), Tungsten lamp(2000h, 20W/12V)
Lamp change point	/			Can be set, 294 nm - 365 nm
Wavelength range		325-1100 nm		200-1100 nm
Slit width		4 nm	2 nm	4 nm
Wavelength accuracy		±2.0 nm	±1.5 nm	±1.5 nm
Wavelength repeatability		1.0 nm	0.8 nm	1.0 nm
Measurement range		0 ~ 200%T, -0.301 ~ 3.000Abs, -9999 ~ 9999C, -9999 ~ 9999F		
Photometric accuracy		±0.5 %T	±0.3 %T	±0.5 %T
Photometric repeatability		0.2 %T	0.2 %T	0.2 %T
Stray light		0.5 %T (at 360 nm)	0.3 %T (at 360 nm)	0.5 %T (at 220nm and 360 nm)
Baseline flatness	/	≤±0.004 Abs (With UV-Solution)	/	≤±0.004 Abs (With UV-Solution)
Stability		≤0.002 Abs / half hour (at 500 nm, after 2 hours energization)		
Data output			Digital, USB port	
Power		220V ± 10% 50Hz 75VA / 110V ± 10% 60Hz 75VA		220V ± 10% 50Hz 90VA / 110V ± 10% 60Hz 90VA
Standard sample holder			4-position sample holder	
Actual dimensions		470 W X 380 D X 225 H mm, (18.6 W x 15.0 D x 8.9 H in)		
Shipping dimensions		650 W X 539 D X 370 H mm, (25.6 W x 21.3 D x 14.6 H in)		
Net weight		10.0 Kg (22.0 lbs)	10.0 Kg (22.0 lbs)	10.5 Kg (23.1 lbs)
Gross weight		14.0 Kg (30.8 lbs)	14.0 Kg (30.8 lbs)	14.5 Kg (31.9 lbs)

1.2 Standard configurations ("●" means this item is standard configurations; "/" means this item is not standard configurations)

Item	Quantity	V2000	V2200	UV2000	UV2200
Instrument	1	●	●	●	●
Power cord	1	●	●	●	●
Quartz cell (10 mm path length)	2	/	/	●	●
Glass cell (10 mm path length)	4	●	●	●	●
Fuse	2	●	●	●	●
Instruction manual for instrument	1	●	●	●	●

1.3 UV-Solution software (Optional) ("●" means this item can be configured with this instrument; "/" means this item cannot be configured with this instrument)

Item	Quantity	V2000	V2200	UV2000	UV2200
UV-Solution Software disk	1	/	●	/	●
Instruction manual for software	1	/	●	/	●
USB cable	1	/	●	/	●
Watch dog	1	/	●	/	●

2. OUTSIDE VIEW AND INTERNAL STRUCTURE

2.1 Front – right view



Figure 2 – 1 Front – right view

- 1) Sample Compartment cover
- 2) Cell Holder Handle
To use to change cell holder position.
- 3) Screw
Used to fix the cover.
- 4) 4.3" LCD touch screen
Used to display the information of the instrument.

2.2 Rear view

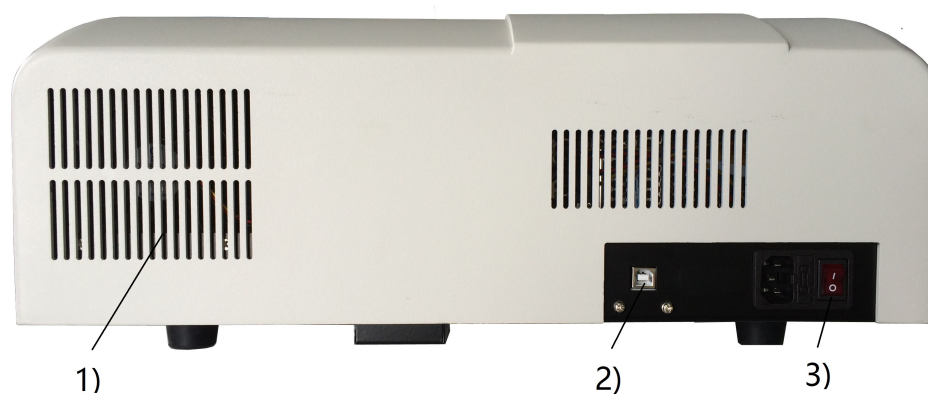


Figure 2 – 2 Rear view

- 1) Fan
- 2) USB port
Used to link with PC.
- 3) Power switch

2.3 Internal structure

2.3.1 Internal structure of VIS spectrophotometer

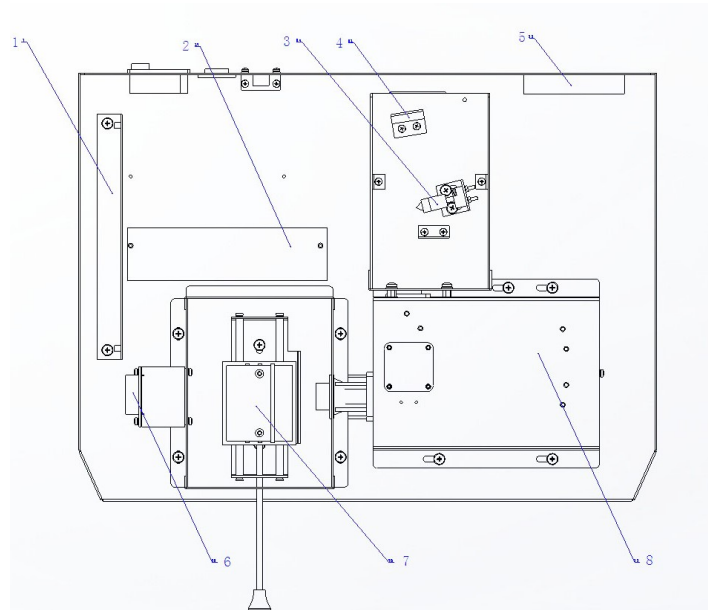


Figure 2 – 3 Internal structure of VIS spectrophotometer

- 1) Main board
- 2) Switch power supply for mainboard and tungsten lamp
- 3) Tungsten lamp(12V/20W)
- 4) Toroidal mirror
- 5) Fan
- 6) Pre-amplifier circuit board
- 7) Sample holder
- 8) Monochromator

2.3.2 Internal structure of UV-VIS spectrophotometer

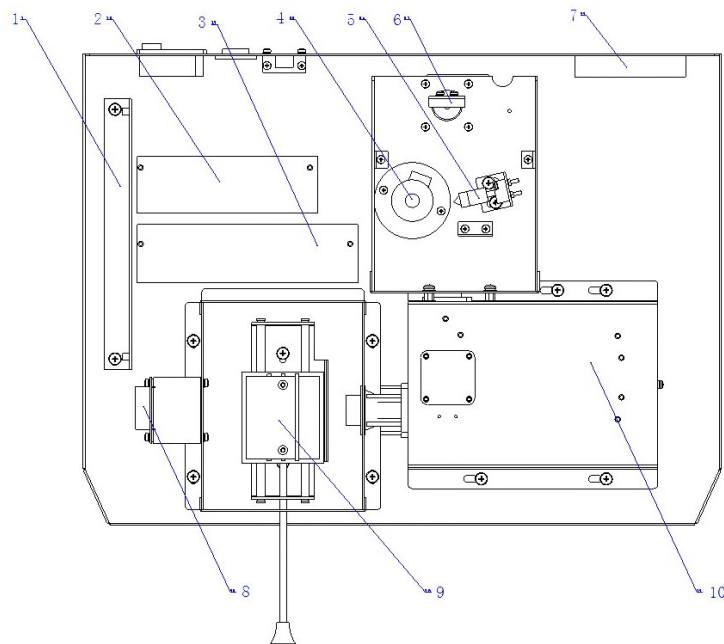


Figure 2 – 4 Internal structure of UV-VIS spectrophotometer

- 1) Main board
- 2) Switching power supply for deuterium lamp
- 3) Switching power supply for mainboard and tungsten lamp

- 4) Deuterium lamp(DD2.5Z)
- 5) Tungsten lamp(12V/20W)
- 6) Toroidal mirror
- 7) Fan
- 8) Pre-amplifier circuit board
- 9) Sample holder
- 10) Monochromator

2.4 Optics schematic diagrams

Monochromatic light emitted from monochromator has achieved an ultra-small stray light without degrading high resolution through series connecting that of monochromator grating. Monochromatic light is led into sample compartment, in which beam passes through reference and unknown sample. Beam transmitted through reference and sample is incident on detector, namely a solid silicon photodiode.

2.4.1 Optics schematic diagrams of VIS spectrophotometer

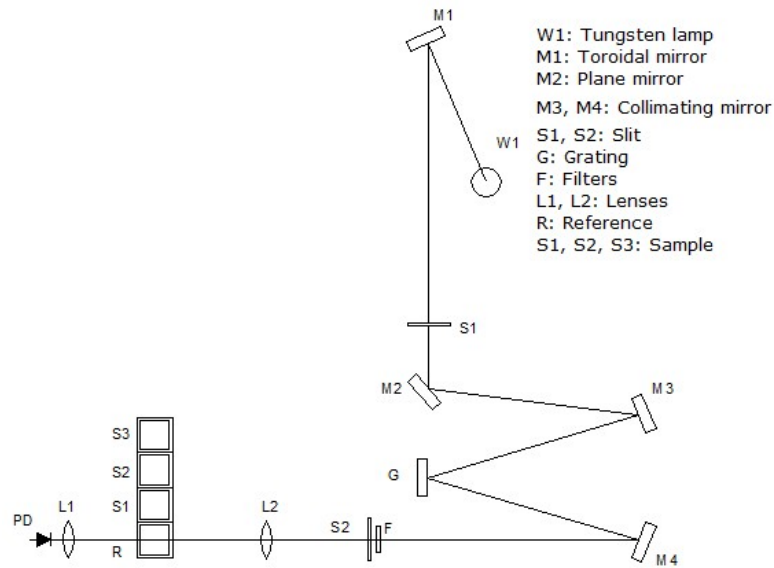


Figure 2 – 5 Optics schematic diagrams of visible spectrophotometer

2.4.2 Optics schematic diagrams of UV-VIS spectrophotometer

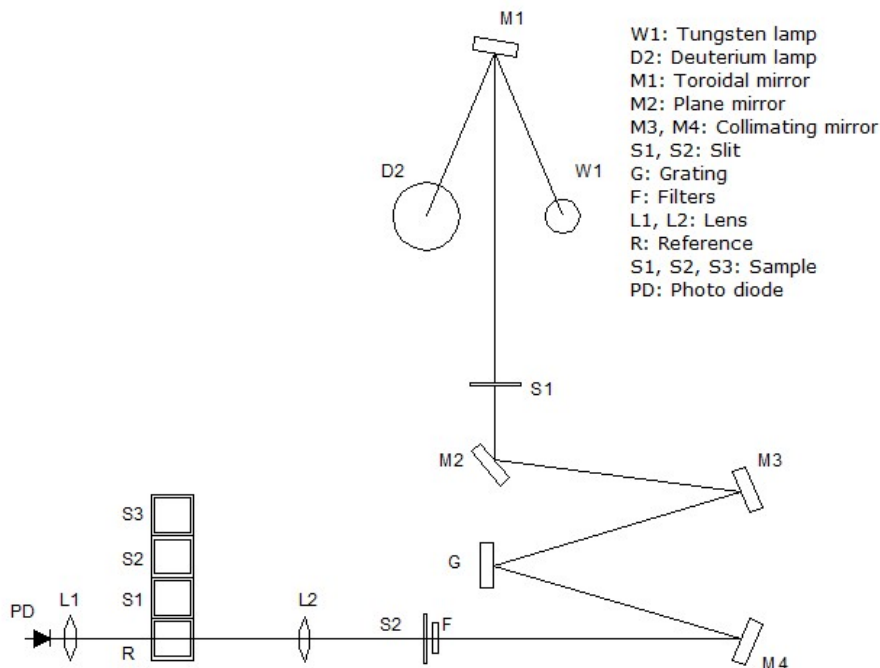


Figure 2 – 6 Optics schematic diagrams of UV-VIS spectrophotometer

3. INSTALLATION

3.1 Power requirements

- 3.1.1 Line voltage** 220V ± 10%
110V ± 10%
Fluctuation must be within ±10% of rated level.
- 3.1.2 Frequency** 50 or 60 Hz
Fluctuation must be within +0.3 to –1.0% of rated level.
- 3.1.3 Power capacity** Suggest to prepare 1KVA or more since power may be shared with another instrument.

3.2 Conditions for installation

- 3.2.1 Installation area** At back - side of the instrument, it is desirable to secure enough space (100mm or more) to emit heat.
- 3.2.2 Installation plane** Installation plane must be level and capable of bearing a weight of about 25Kg or more.

3.2.3 Environment at place for installation

- 1) Operating temperature
5⁰C to 35⁰C.
For stable measurement, room temperature should preferably be controlled within a range of 20⁰C to 25⁰C by an air-conditioner.
- 2) Operating humidity
45% to 85%
- 3) Storage temperature
-20⁰C to 70⁰C.
- 4) Atmosphere
 - a. Must be free from acidic, alkaline and other vapors which will corrode metals heavily.
 - b. Must not contain the vapor of organic solvent (particularly benzene and thinner) which will dissolve coating.
- 5) Other general cautions
 - a. Avoid direct sunlight and provide as large a distance as possible from a room window.
 - b. A strong vibration or shock that can be felt by human body must not be transmitted to the instrument.
 - c. Avoid vicinity of heat generating apparatus such as a gas burner, electric heater or oven in order to prevent instrument cover being heated (beyond 70⁰C).
 - d. Avoid vicinity of instruments which generate a strong electric field (such as an electric welding machine, high frequency furnace and pole transformer).
 - e. Dusty environment is unallowable.
 - f. The line voltage must be free from wide and sudden fluctuations.
 - g. Do not turn on and off frequently electric instruments (stirrer, vibrator, etc.) which are not provided with a noise –

preventive device in same power line as for the instrument.

Caution: Optical parts are very fragile, and control section incorporates high – density electronic circuit components which function as a computer. To protect these parts, above cautions must be observed strictly.

3.3 Check of contents

3.3.1 Check of packing Please ensure packing is intact before unpacking, if packing is damaged please connect transportation department.

3.3.2 Check against standard configurations

After unpacking (Suggest to keep the paperboard container), check the contents of delivery against standard configurations. If any part is lost or damaged or fall short of specifications, or if you have a question, please report to the agent.

Warning: Use of proper hardware and accessories is required as specified. Proper installation according to instructions is required. Improper installation may result in serious personal injury.

3.4 Connection of power cord

Plug power cord into power inlet.

Caution: Be sure to turn off the unit before plugging in power cord.

3.5 Check after installation

Installation must have been completed according to instruction given above. Before proceeding to measurement, however, reconfirm that installation has been made correctly. Please confirm following contents.

- 1) There is no abnormality at installation location.
- 2) The line voltage is confirmed and set correctly.
- 3) The cords are connected correctly.
- 4) Connection of power cord is right.
- 5) After confirming 1) to 4), check if anything is set in sample compartment so as to block beam or if there is any other anomaly.

Note: After checking inside of sample compartment, please ensure sample compartment cover is closed properly.








3.6 Initialization

After completion of all confirmations in above steps, system is allowed to be energized by following procedures.

The instrument will emit a slight click sound when it is turned on, and tungsten lamp is ignited simultaneously. After about several seconds, the unit will emit another slight click sound, and deuterium lamp is ignited.

3.6.1 Description of item to be tested

The instrument begins to initialize, there are several items need to be diagnosed, including [CPU chipset], [Filter], [Lamp change], [Initial position of wavelength step motor], [Tungsten lamp positioning], [Deuterium lamp positioning], [Wavelength accuracy positioning].

	[CPU chipset]: Check of CPU chipset of mainboard.
	[Filter]: Check of filter optoelectronic switch and filter step motor
	[Lamp change]: Check of lamp change step motor.
	[Initial position of wavelength step motor]: Check of wavelength step motor and wavelength optoelectronic switch.
	[Tungsten lamp positioning]: Check of tungsten lamp energy, to search the correct position of tungsten lamp.
	[Deuterium lamp positioning]: Check of deuterium lamp energy, to search the correct position of deuterium lamp.
	[Wavelength accuracy positioning]: Check of "0" grade light of grating, and then check of the 656.1nm light of deuterium lamp.

Note: [Lamp change], [Tungsten lamp positioning], and [Deuterium lamp positioning] are only valid with UV-VIS spectrophotometer, and these three items are invalid for VIS spectrophotometer.

3.6.2 Initializing interface

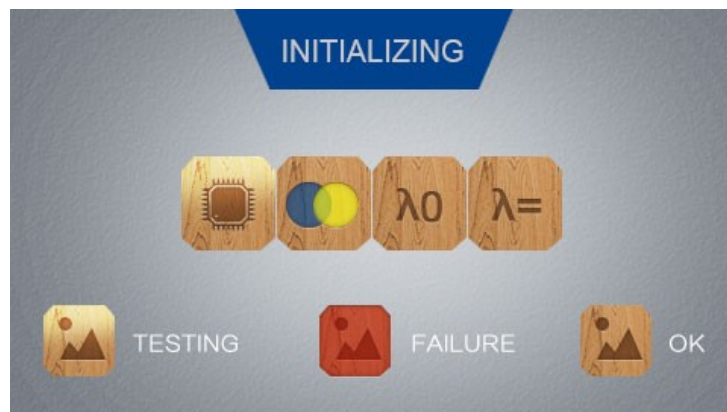


Figure 3 – 1 Initializing interface of VIS spectrophotometer

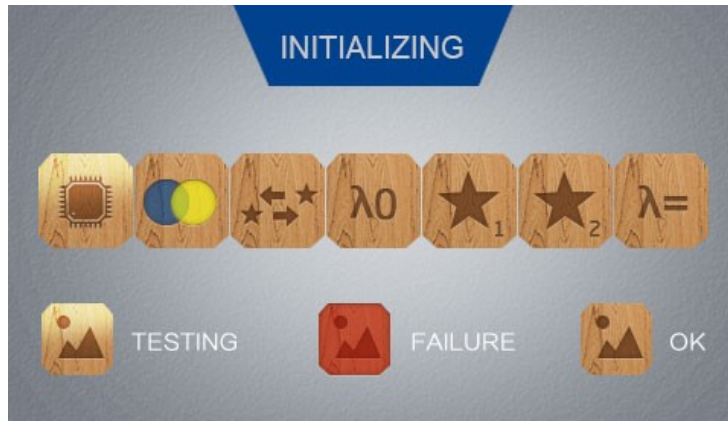





Figure 3 – 2 Initializing interface of UV-VIS spectrophotometer

Note:	
 TESTING	Icon color turns high-lighted means this item is on testing status.
 FAILURE	Icon color turns red means there is something wrong with this item. Please refer to troubleshooting guide.
 OK	Icon color turns normal brightness means that this item is OK.

3.6.3 Main interface

After finished initialization, main interface displays as below, this signifies that the instrument is ready for measuring.

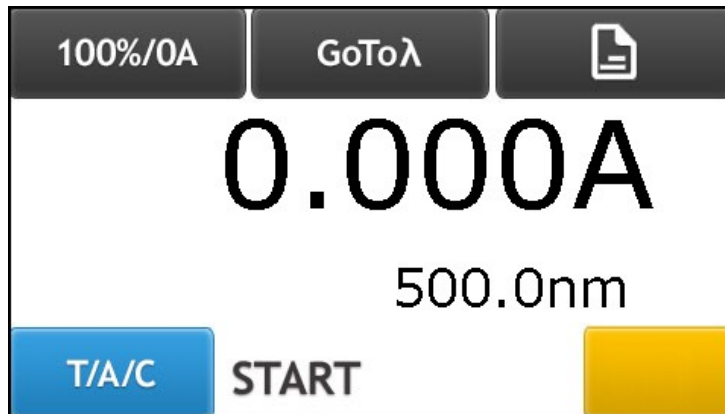


Figure 3 – 3 Main interface

4. OPERATION

After finished initialization, main interface displays as below, this signifies that the instrument is ready for measuring.

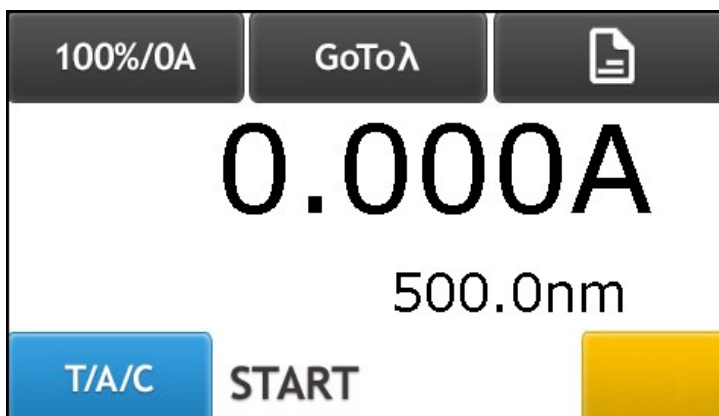


Figure 4 – 1 Main interface

There are three measuring modes:





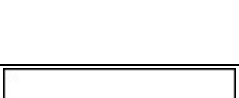

- Transmittance mode (T mode),
- Absorbance mode (A mode),
- Concentration mode (C mode).

Note:

Concentration mode (C mode) includes coefficient method and standard curve method.

Standard curve method is invalid for V2000 and UV2000.

4.1 Function of each key on main interface

	< 100%/0A > key: Press this key to adjust 0.000Abs or 100%T. Please put reference (blank) to optical path before press this key.
	< GoToλ > key: Press this key to open numerical value interface, and can input wavelength value.
	< Option > key: Press this key to enter option interface.
	< T/A/C > key: Press this key to enter T mode, A mode and C mode in turn. Also, press this key to return to previous measurement mode interface if current interface is measurement data list interface.
	< START > key: Press this key to enter measurement data list interface of measurement mode.
	There is no function with this key, and this key is located on bottom right corner of main interface.

4.2 Absorbance measurement mode

Press < T/A/C > key to select A mode, and enter absorbance measurement mode interface.

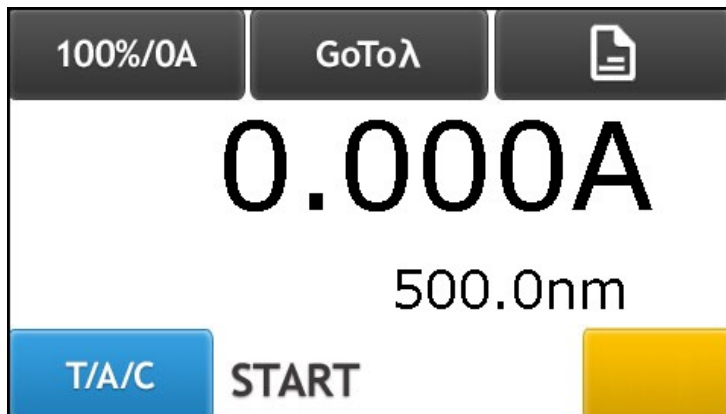


Figure 4 – 2 Absorbance measurement mode interface

4.2.1 Testing directly without measurement data list

4.2.1.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.2.1.2 Blanking (Adjusting 0.000Abs)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.2.1.3 Testing

Put unknown sample in optical path with cell holder handle, and you can get absorbance value directly.

4.2.2 Testing with measurement data list

In absorbance measurement mode interface, press < START > key to enter absorbance measurement data list interface.



Figure 4 – 3 Absorbance measurement data list interface

4.2.2.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.2.2.2 Blanking (Adjusting 0.000Abs)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.2.2.3 Testing

Put unknown sample in optical path with cell holder handle, press < START > key to test, and measurement result will be displayed on data list. There are 200 measurement result can be stored in this instrument, and you can browse data list with < UP > key and < DW > key.

No.	WL.	Abs.
001	500.0nm	0.483

Figure 4 – 4 Absorbance measurement data list interface

4.2.2.4 Clearing all data

Press < No. > which is displayed at the top left corner of measurement data list, and will open clearing all data interface, press < Yes > option to clear all data, and system will return to previous interface simultaneously, select < No > option to return to previous interface.

In absorbance measurement data list interface, press < T/A/C > key to return to main interface.

Notice: All data of absorbance measurement mode will be cleared.

4.3 Transmittance measurement mode

Press < T/A/C > key to select T mode, and enter transmittance measurement mode interface.

100%/0A	GoToλ	Document Icon
100.0%		
500.0nm		
T/A/C	START	Yellow Button

Figure 4 – 5 Transmittance measurement mode interface

4.3.1 Testing directly without measurement data list

4.3.1.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.3.1.2 Blanking (Adjusting 100.0%T)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 100.0%T.

4.3.1.3 Testing

Put unknown sample in optical path with cell holder handle, and you can get transmittance value directly.

4.3.2 Testing with measurement data list

In transmittance measurement mode interface, press < START > key to enter transmittance measurement data list interface.



Figure 4 – 6 Transmittance measurement data list interface

4.3.2.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.3.2.2 Blanking (Adjusting 100.0%T)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 100.0%T.

4.3.2.3 Testing

Put unknown sample in optical path with cell holder handle, press < START > key to test, and measurement result will be displayed on data list. There are 200 measurement result can be stored in this instrument, and you can browse data list with < UP > key and < DW > key.



Figure 4 – 7 Transmittance measurement data list interface

4.3.2.4 Clearing all data

Press < No. > which is displayed at the top left corner of measurement data list, and will open clearing all data interface, press < Yes > option to clear all data, and system will return to previous interface simultaneously, select < No > option to return to previous interface.

In transmittance measurement data list interface, press < T/A/C > key to return to main interface.

Notice: All data of transmittance measurement mode will be cleared.

4.4 Coefficient method

Coefficient method is a simplification of standard curve method. You can create a standard curve “ $C=K \times A+B$ ” by inputting known slope “K” and known intercept “B” directly. There are 50 coefficient curve can be stored in this instrument, and you can open one of these 50 coefficient curve to test concentration of unknown sample. Also you can get “K” coefficient value with known concentration value, then you can test concentration value of unknown sample directly, or enter measurement data list to test concentration value of unknown sample.

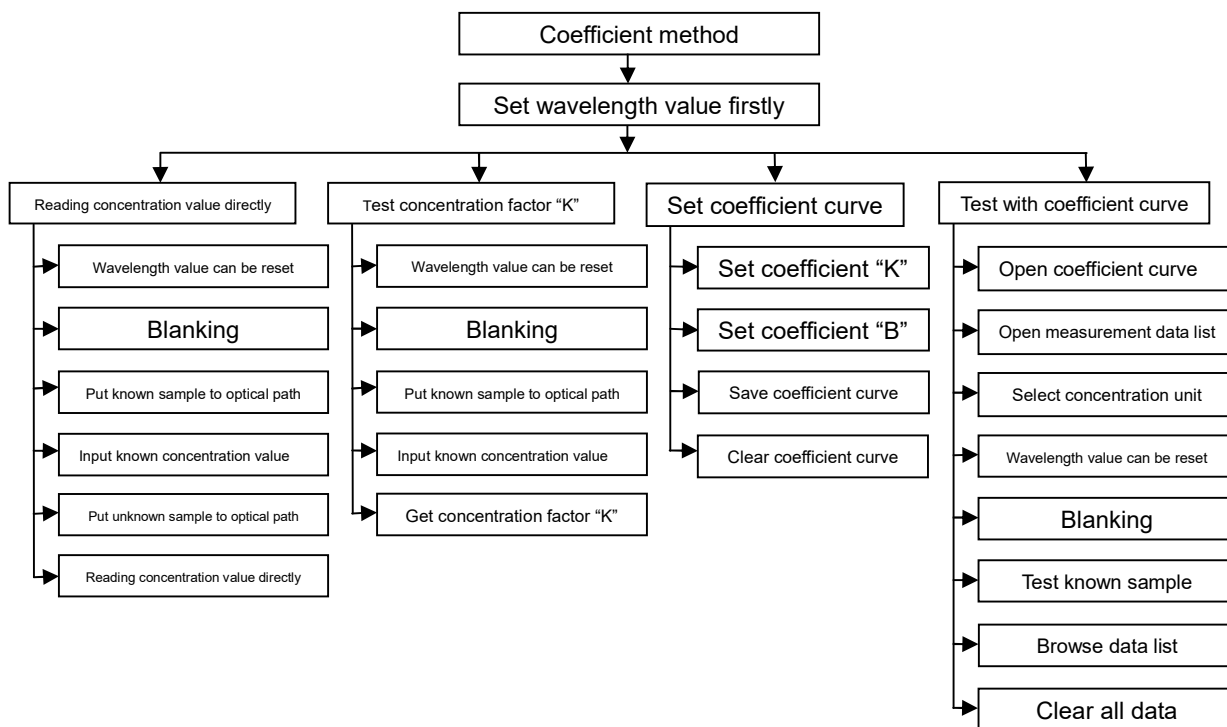


Figure 4 – 8 Sketch of coefficient method

4.4.1 Reading concentration value directly

With sample which concentration value is know already, you can read unknown sample concentration value directly. Press < T/A/C > key to enter coefficient method interface.

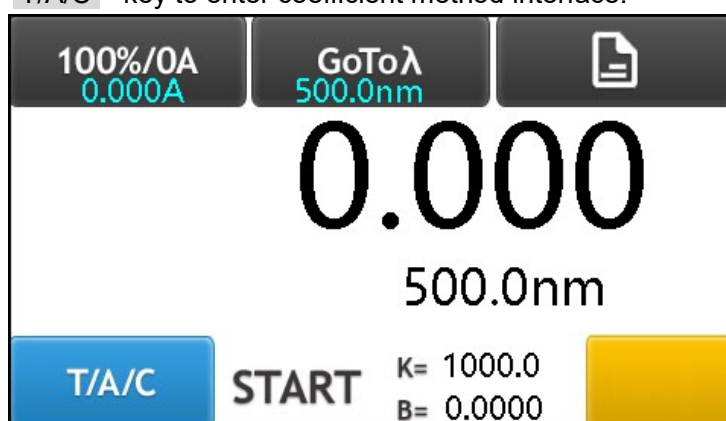


Figure 4 – 9 Coefficient method interface

4.4.1.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.4.1.2 Blanking (Adjusting 0.000A)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.4.1.3 Inputting known concentration value

Put sample which concentration value is known in optical path with cell holder handle, absorbance value of this sample will be displayed at the top left corner of coefficient method interface automatically. Then press concentration value area of screen, and will open Arabic numeral pop-up window, please input the known concentration value, press < OK > option to return to coefficient method interface. And you will get coefficient "K=" value in coefficient method interface.

Without inputting concentration value and press < OK > option or < Cancel > option, you can also return to coefficient method interface.

For example: Known concentration value is 200mg/L, please input 200 with Arabic numeral pop-up window.

By the way, absorbance value 0.483A of this known sample will be displayed at the top left corner of coefficient method interface, and coefficient factor "K" will be displayed after "K=". (K=414.07)

Note: The range of concentration value is from -9999 to 9999.

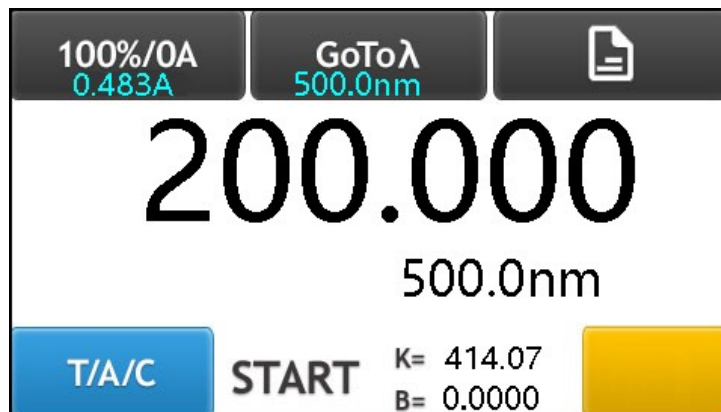


Figure 4 – 10 Coefficient method interface after inputting known concentration value

4.4.1.4 Reading unknown sample concentration value directly

Put unknown sample in optical path with cell holder handle, concentration value (170.650 mg/L) of this sample will be displayed at concentration value area of screen.

By the way, absorbance value (0.412A) of this unknown sample will be displayed at the top left corner of coefficient method interface.



Figure 4 – 11 Reading unknown sample concentration value directly

4.4.2 Testing concentration factor “K” with known concentration value

Press < T/A/C > key to enter coefficient method interface.

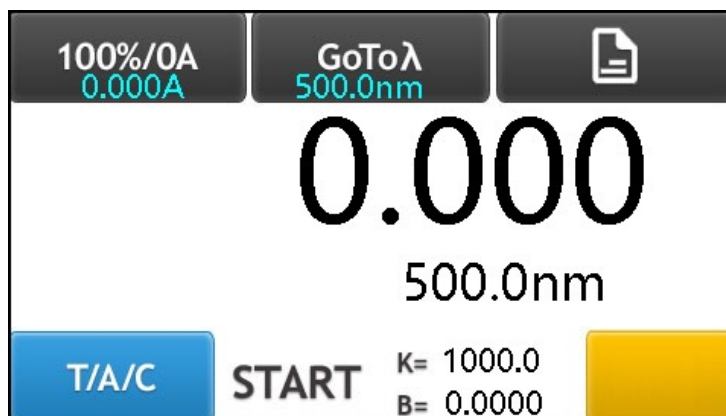


Figure 4 – 12 Coefficient method interface

4.4.2.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.4.2.2 Blanking (Adjusting 0.000A)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.4.2.3 Inputting known concentration value

Put sample which concentration value is known in optical path with cell holder handle, absorbance value of this sample will be displayed at the top left corner of coefficient method interface automatically. Then press concentration value area of screen, and will open Arabic numeral pop-up window, please input the known concentration value, press < OK > option to return to coefficient method interface. And you will get coefficient “K=” value in coefficient method interface.

Without inputting concentration value and press < OK > option or < Cancel > option, you can also return to coefficient method interface.

For example: Known concentration value is 200mg/L, please input 200 with Arabic numeral pop-up window.

By the way, absorbance value 0.483A of this known sample will be displayed at the top left corner of coefficient method interface.

Note: The range of concentration value is from -9999 to 9999.

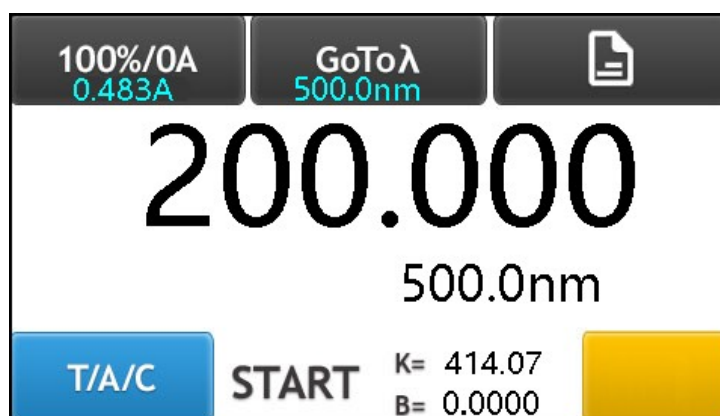


Figure 4 – 13 Coefficient method interface after inputting known concentration value

4.4.2.4 Getting concentration factor “K” with known concentration value

Coefficient factor “K” will be displayed after “K=”. (K=414.07)

4.4.3 Setting coefficient curve with known coefficient value

4.4.3.1 Setting coefficient value

In coefficient method interface, press “K=” and “B=” to enter setting coefficient value interface.



Figure 4 – 14 Setting coefficient value interface

In setting coefficient value interface, press “K=” will open Arabic numerals pop-up window to set “K” value. Input known “K” value with Arabic numeral key <0>, ...<9> and <.>, press <OK> option to set “K” value and return to set coefficient value interface. Without inputting “K” value and press <OK> option or <Cancel> option, you can also return to set coefficient value interface.

In setting coefficient value interface, press “B=” will open Arabic numerals pop-up window to set “B” value. Input known “B” value with Arabic numeral key <0>, ...<9> and <.>, press <OK> option to set “B” value and return to set coefficient value interface. Without inputting “B” value and press <OK> option or <Cancel> option, you can also return to set coefficient value interface.

Note:

The range of coefficient “K” value and “B” value is from -9999 to 9999.

4.4.3.2 Saving coefficient curve

In setting coefficient value interface, press <Save> key to enter saving coefficient curve interface, and you can save coefficient curve after input coefficient “K” and coefficient “B”. There are 50 coefficient curve can be stored in this instrument.

No.	FileName	No.	FileName
1		5	
2		6	
3		7	
4		8	

Cancel UP DW Save

Figure 4 – 15 Saving coefficient curve interface

Press sequence number **1**, **2**, **3**, ..., **8**, ..., which is displayed in the sheet, and “**” will be displayed in front of the sequence number, this means this sequence number is selected.

No.	FileName	No.	FileName
** 1		5	
2		6	
3		7	
4		8	

Cancel
UP DW
Save

Figure 4 – 16 Selecting sequence number of file

Under such circumstances, press the empty data cell of FileName which is on the same row of the sequence number, and will pop-up Arabic numerals window, and you can input filename with Arabic numerals (For an example, filename is 1111), press < **OK** > option to save coefficient curve name and return to previous interface. Without inputting coefficient curve name and press < **OK** > option or press < **Cancel** > option, you can also return to previous interface.

Note: Eight digital numbers can be inputted for FileName.

After inputting coefficient curve name and return to saving coefficient curve interface, press < **Save** > key to save this coefficient curve just created, and will return back to set coefficient value interface. Press < **Cancel** > key to return to set coefficient value interface without saving any coefficient curve.

No.	FileName	No.	FileName
** 1	1111	5	
2		6	
3		7	
4		8	

Cancel
UP DW
Save

Figure 4 – 17 Saving coefficient curve name

4.4.3.3 Clearing all coefficient curve

In opening coefficient curve interface, press < **No.** > which is displayed at the top left corner of opening coefficient curve interface, and will open clearing all data interface, press < **Yes** > option to clear all coefficient curve, and system will return to previous interface simultaneously, select < **No.** > option to return to previous interface.

Notice: All coefficient curves will be cleared.

4.4.4 Testing with coefficient curve

4.4.4.1 Opening coefficient curve

In setting coefficient value interface, press < **Open** > key to enter opening coefficient curve interface. You can browse these coefficient curves with < **UP** > key and < **DW** > key.

No.	FileName	No.	FileName
1	1111	5	
2		6	
3		7	
4		8	

Cancel UP DW Open

Figure 4 – 18 Opening coefficient curve interface

Press sequence number 1, 2, 3, ..., 8, ..., which is displayed in the sheet, and “**” will be displayed in front of the sequence number, this means this sequence number is selected.

No.	FileName	No.	FileName
** 1	1111	5	
2		6	
3		7	
4		8	

Cancel UP DW Open

Figure 4 – 19 Selecting coefficient curve

Under such circumstances, press < Open > key to open this coefficient curve just selected, and will return back to set coefficient value interface, then press < Exit > key to return to coefficient method interface.

4.4.4.2 Testing

4.4.4.2.1 Testing directly without measurement data list

With coefficient curve just be opened, and you can test unknown sample concentration value directly in coefficient method interface.

4.4.4.2.1.1 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.4.4.2.1.2 Blanking (Adjusting 0.000A)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.4.4.2.1.3 Testing

Put unknown sample in optical path with cell holder handle, and you can get concentration value directly on the screen.

4.4.4.2.2 Testing with measurement data list

In coefficient method interface, press < START > key to enter measurement data list interface to test unknown sample.



Figure 4 – 20 Measurement data list interface of coefficient method

4.4.4.2.2.1 Selecting concentration unit

Press < Conc. > which is displayed at the top right corner of measurement data list, and will open selecting concentration unit interface, a little rectangle “□” is displayed in front of current concentration unit. Please select desired concentration unit, and will return to previous interface automatically.

4.4.4.2.2.2 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.4.4.2.2.3 Blanking (Adjusting 0.000Abs)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.4.4.2.2.4 Testing

Put unknown sample in optical path with cell holder handle, press < START > key to test, and measurement result will be displayed on data list. There are 200 measurement result can be stored in this instrument, and you can browse data list with < UP > key and < DW > key.

4.4.4.2.2.5 Clearing all data

Press < No. > which is displayed at the top left corner of measurement data list, and will open clearing all data interface, press < Yes > option to clear all data, and system will return to previous interface simultaneously, select < No > option to return to previous interface.

In measurement data list interface, press < T/A/C > key to return to coefficient method interface.

Notice: All measurement data of coefficient curve will be cleared.

4.5 Standard curve method

You can create a standard curve with several standard samples which concentration are known, and test unknown sample with created standard curve.

Note:
Standard curve method is invalid for V2000 and UV2000.
The maximum number of standard sample is 12.

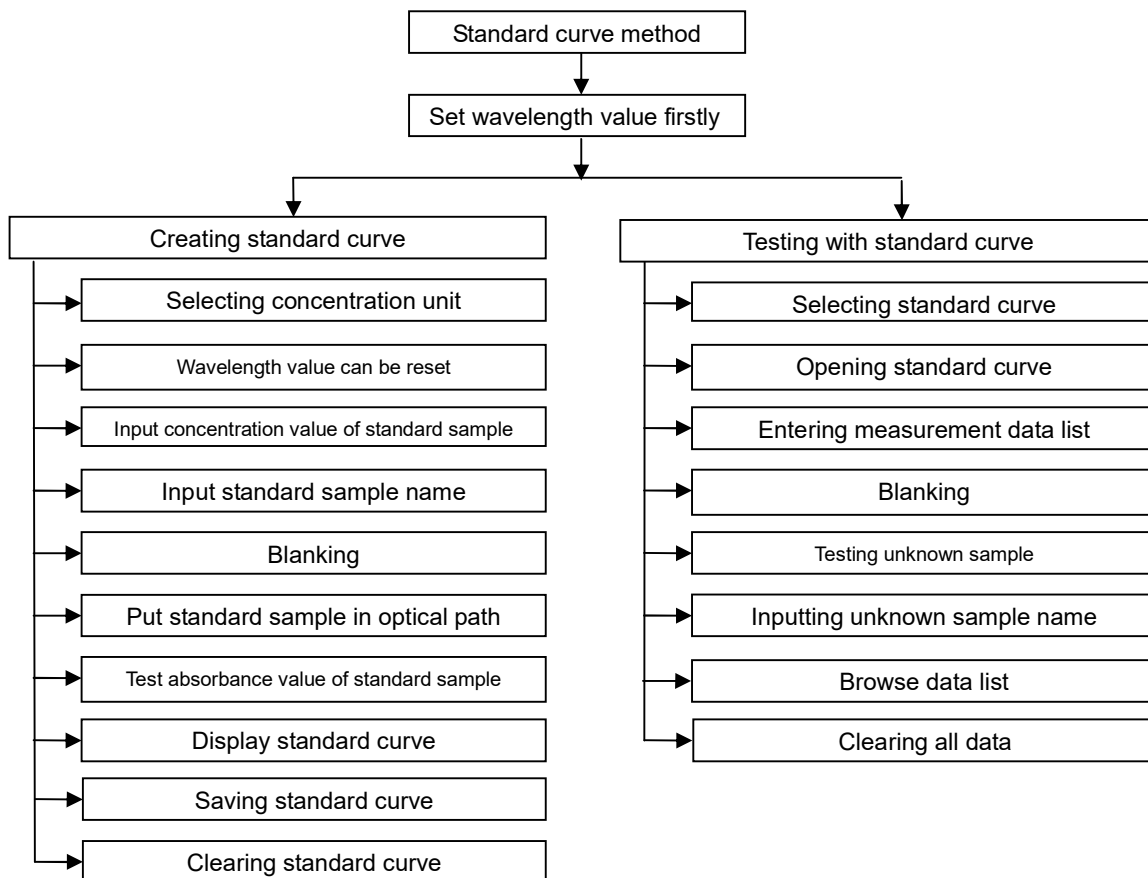


Figure 4 – 21 Sketch of standard curve method

Press < T/A/C > key to enter standard sample interface of standard curve method.



Figure 4 – 22 Standard sample interface of standard curve method



< Display standard curve > key: Press this key to display standard curve.



< STD > key: Press this key to enter standard sample interface, and you can get absorbance value of different standard sample, and input concentration value of each standard sample.



< UKN > key: Press this key to enter measuring unknown sample interface.

4.5.1 Creating standard curve

4.5.1.1 Selecting concentration unit

Press < Conc. > which is displayed at the top middle of measurement data list, and will open selecting concentration unit interface, a little rectangle “□” is displayed in front of current concentration unit. Please select desired concentration unit, and will return to previous interface automatically. For an example, the concentration unit is g/L.

4.5.1.2 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.5.1.3 Inputting concentration value of standard sample

There are 12 standard sample can be stored in this instrument, and you can browse these standard sample with < UP > key and < DW > key.

Press sequence number 1, 2, 3, ..., 12 which is displayed in the sheet, a little square “□” is displayed in front of sequence number, this means this sequence number is selected.

No.	Name	g/L	Abs.
□ 1		100.000	
2			
3			

Figure 4 – 23 Inputting concentration value of standard sample

For an example, there are three standard samples:

Name 11 with concentration value 100 g/L,

Name 22 with concentration value 200 g/L,

Name 33 with concentration value 300 g/L.

Press the empty data cell of concentration which is on the same row of the sequence number, and will pop-up Arabic numerals window, and you can input concentration value with Arabic numerals, then press < OK > key to save this concentration value just inputted, and will return back to previous interface. Press < Cancel > key to back to previous interface.

Note:

The maximum number of standard samples is 12.

The arrangement of standard sample concentration value must be with the order from small to large.

The sequence number of standard sample just inputted must be with the order from small to large.

4.5.1.4 Inputting standard sample name

There are 12 standard sample can be stored in this instrument, and you can browse these standard sample with < UP > key and < DW > key.

Press sequence number 1, 2, 3, ..., 12 which is displayed in the sheet, a little rectangle “□” is displayed in front of sequence number, this means this sequence number is selected.

For an example, there are three standard samples:

Name 11 with concentration value 100 g/L,

Name 22 with concentration value 200 g/L,

Name 33 with concentration value 300 g/L.

Press the empty data cell of Name which is on the same row of the sequence number, and will pop-up Arabic numerals window, and you can input standard name (For an example, input 11) with Arabic numerals, then press < OK > key to save this name just inputted, and will return back to standard curve method interface. Press < Cancel > key to back to standard curve interface.

Note: Eight digital numbers can be inputted for Name.

No.	Name	g/L	Abs.
□ 1	11	100.000	
2			
3			

Figure 4 – 24 Inputting standard sample name

Note:

The maximum number of standard samples is 12.

The arrangement of standard sample concentration value must be with the order from small to large.

The sequence number of standard sample just inputted must be with the order from small to large.

4.5.1.5 Blanking (Adjusting 0.000Abs)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.5.1.6 Getting absorbance value of standard sample

Put standard samples in optical path with cell holder handle in turn, and the concentration value must be with order from small to large.

For an example, if sequence number 1 is selected, and a little rectangle “□” is displayed in front of sequence number 1. Press < START > key to test absorbance value of standard sample 11, and absorbance value (0.094) will be displayed in the empty data cell of “Abs.” which is on the same row of the sequence number 1.

Absorbance value (0.094 Abs.) of standard sample11 will be displayed in the data list.

Absorbance value (0.185 Abs.) of standard sample22 will be displayed in the data list.

Absorbance value (0.293 Abs.) of standard sample33 will be displayed in the data list.



Figure 4 – 25 Getting absorbance value of standard samples

4.5.1.7 Displaying standard curve

Press < Display standard curve > key to display standard curve just created. You can get coefficient “K” value and coefficient “B” value. Also, you can get “R*R” value to judge the standard curve is right or false.



Figure 4 – 26 Displaying standard curve

4.5.1.8 Revising standard sample information

Press < Return > key or < STD > key to back to standard sample interface, and you can check or revise standard sample information.

4.5.1.9 Saving standard curve

In displaying standard curve interface, press < File > key to enter displaying coefficient value of standard curve interface.

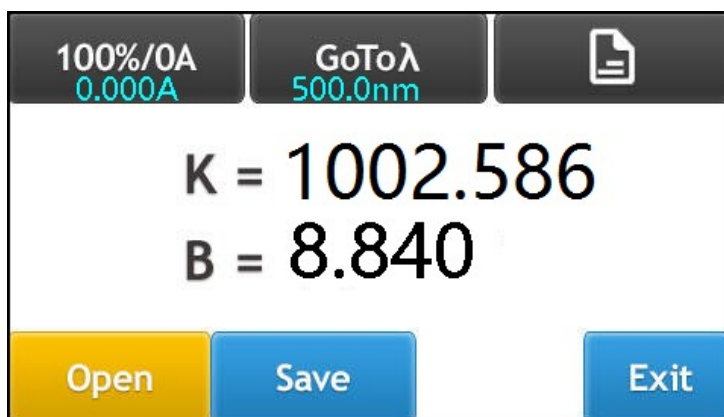


Figure 4 – 27 Displaying coefficient value of standard curve interface

Press < Save > key to save standard curve (Fro an example, standard curve name is 2222). There are 50 standard curves can be stored in this instrument. Please refer to section (4.4.3.2 Saving coefficient curve).

4.5.1.10 Clearing all standard curve

In opening standard curve interface, press < No. > which is displayed at the top left corner of opening standard curve interface, and will open clearing all data interface, press < Yes > option to clear all standard curve, and system will return to previous interface simultaneously, select < No > option to return to previous interface.

Notice: All standard curves will be cleared.

4.5.2 Testing with standard curve

4.5.2.1 Opening standard curve

Press < T/A/C > key to enter standard sample interface of standard curve. In standard sample interface, press < Displaying standard curve > key to enter displaying standard curve interface. In displaying standard curve interface, press < File > key to enter setting coefficient value interface. In setting coefficient value interface, press < Open > key to enter opening standard curve interface.

You can browse these coefficient curves with < UP > key and < DW > key.

No.	FileName	No.	FileName
1	2222	5	
2		6	
3		7	
4		8	

Cancel
UP
DW
Open

Figure 4 – 28 Opening standard curve interface

Press sequence number 1, 2, 3, ..., 8, ..., which is displayed in the sheet, and “**” will be displayed in front of the sequence number, this means this sequence number is selected.

No.	FileName	No.	FileName
** 1	2222	5	
2		6	
3		7	
4		8	

Cancel
UP
DW
Open

Figure 4 – 29 Selecting standard curve

Under such circumstances, press < Open > key to open this standard curve just selected, and standard curve will be displayed on screen.



Figure 4 – 30 Displaying standard curve

Opening standard curve is as same as opening coefficient curve, please refer to section (4.4.4.1 Opening coefficient curve).

4.5.2.2 Entering measurement data list of standard curve

In displaying standard curve interface, press < UKN > key to enter measurement data list interface of standard curve



Figure 4 – 31 Measurement data list interface of standard curve method

4.5.2.3 Setting wavelength value

Press < GOTOλ > key to enter setting wavelength value interface. Input desired wavelength value with Arabic numerals key < 0 >, ..., < 9 > and < . >, press < OK > option to go to wavelength value just be set, and return to previous interface. Without inputting wavelength value and press < OK > option or press < Cancel > option, you can return to previous interface.

4.5.2.4 Blanking (Adjusting 0.000A)

Put reference sample in optical path with cell holder handle, and press < 100%/0A > key to adjust 0.000A.

4.5.2.5 Testing

Put unknown sample in optical path with cell holder handle, press < START > key to test, and measurement result will be displayed on data list. There are 200 measurement result can be stored in this instrument, and you can browse data list with < UP > key and < DW > key.

100%/0A 0.483A		GoToλ 500.0nm		STD
No.	Name	Abs.	g/L	
01		0.483	493.09	

T/A/C START UP DW

Figure 4 – 32 Measurement data list interface of standard curve method

4.5.2.6 Inputting unknown sample name

Press the empty data cell of Name which is on the same row of the sequence number 01, and will pop-up Arabic numerals window, and you can input Name with Arabic numerals (For an example, sample name is 44), then press < OK > key to save this name just inputted, and will return back to standard curve method interface. Press < Cancel > key to back to standard curve interface.

Note: Eight digital numbers can be inputted for Name.

100%/0A 0.483A		GoToλ 500.0nm		STD
No.	Name	Abs.	g/L	
01	44	0.483	493.09	

T/A/C START UP DW

Figure 4 – 33 Measurement data list interface of standard curve method

4.4.5.7 Clearing all data

Press < No. > which is displayed at the top left corner of measurement data list, and will open clearing all data interface, press < Yes > option to clear all data, and system will return to previous interface simultaneously, select < No > option to return to previous interface.

In measurement data list interface, press < T/A/C > key to return to main interface.

Notice: All measurement data of standard curve will be cleared.

4.6 Option

4.6.1 Option of VIS spectrophotometer

In main interface, press < Option > key to enter option interface, press < EXIT > key to return to previous interface.

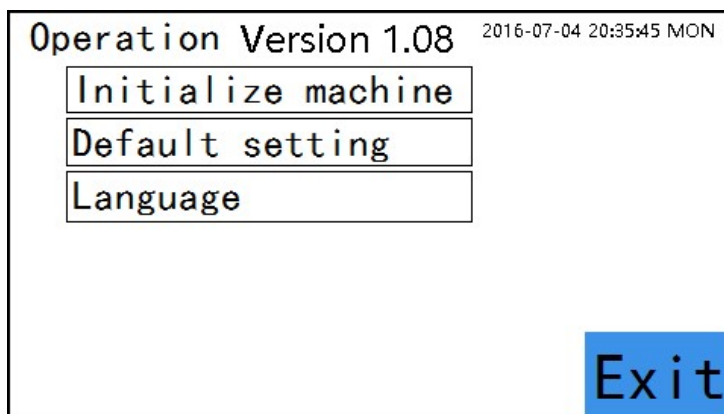


Figure 4 – 34 Option interface of VIS spectrophotometer

4.6.1.1 Operation version

You can get operation version of this instrument.

4.6.1.2 Date and time

Press time display at the top right corner of option interface, and will open setting date and time interface.

Time display format: 20YY-MM-DD HH-MM-SS MON

YY(Year), MM(Month), DD(Day)

HH(Hour), MM(Minute), SS(Second)

MON (Monday, day of the week)

4.6.1.3 Initialize machine

Press < Initialize machine > key, this instrument will be on initialization state automatically, please refer to section (3.6 Initialization).

4.6.1.4 Default setting

Press < Default setting > key to open clearing all data interface. Press < Yes > option to clear memory of this instrument, press < No > option to return to previous interface.

Clearing memory will take about 5 minutes.

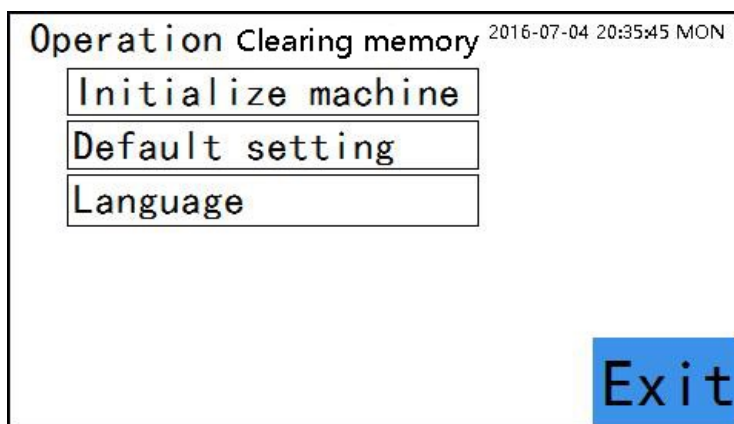


Figure 4 – 35 Clearing memory interface of VIS spectrophotometer

4.6.1.5 Language

Press < Language > key to switch language between English and simplified Chinese.

4.6.2 Option of UV-VIS spectrophotometer

In main interface, press < Option > key to enter option interface, press < EXIT > key to return to previous interface.

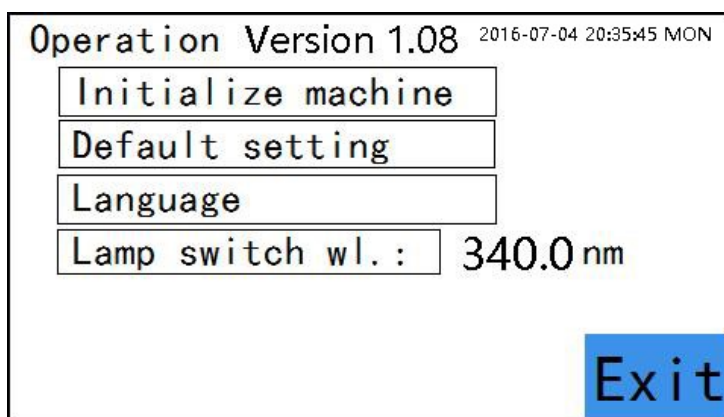


Figure 4 – 36 Option interface of UV-VIS spectrophotometer

4.6.2.1 Operation version

You can get operation version of this instrument.

4.6.2.2 Date and time

Press time display at the top right corner of option interface, and will open setting date and time interface.

Time display format: 20YY-MM-DD HH-MM-SS MON

YY(Year), MM(Month), DD(Day)

HH(Hour), MM(Minute), SS(Second)

MON (Monday, day of the week)

4.6.2.3 Initialize machine

Press < Initialize machine > key, this instrument will be on initialization state automatically, please refer to section (3.6 Initialization).

4.6.2.4 Default setting

Press < Default setting > key to open clearing all data interface. Press < Yes > option to clear memory of this instrument, press < No > option to return to previous interface.

Clearing memory will take about 5 minutes.

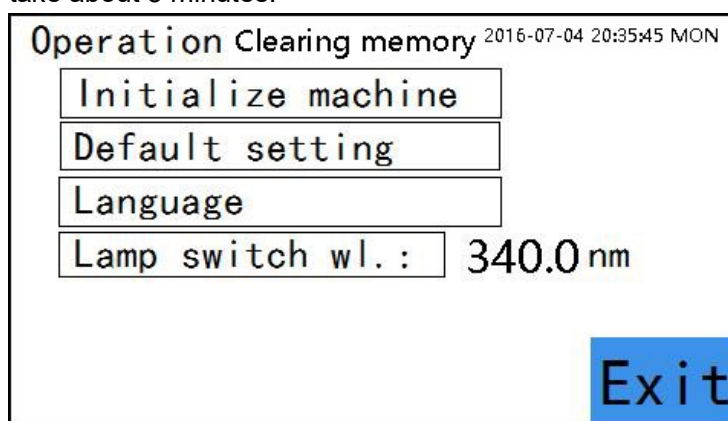


Figure 4 – 37 Clearing memory interface of UV-VIS spectrophotometer

4.6.2.5 Language

Press < Language > key to switch language between English and simplified Chinese.

4.6.2.6 Lamp switch wavelength

Lamps switch wavelength means switching point of deuterium lamp and tungsten lamp.

Press < Lamp switch wl. : > key to set switch wavelength of tungsten lamp and deuterium lamp.

Lamp switch wavelength range: 294nm – 365nm.

5. MAINTENANCE AND INSPECTION

5.1 Message during initialization

Turn on the instrument, and the instrument will be under initialization automatically. When initialization is completed, wavelength will be set to 500.0 nm.

During initialization, principle functions of the instrument will be automatically checked. If any function is found to be abnormal, an error message will be displayed to notify abnormal location.

Table 5 – 1 Errors reported during the initialization for VIS spectrophotometer

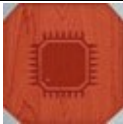



Function	Message	Cause	Corrective Measure
CPU chipset		CPU chipset is defective	Contact service agent. Replace mainboard.
Filter		Filter self-checking error, the following points for reference a. Connector plug of filter optoelectronic switch is loosened b. Filter optoelectronic switch is damaged c. Filter component is loosened d. Connector plug of filter step motor line is loosened e. Filter step motor contains error f. Driver IC of step motor is damaged	Contact service agent a. Reconnect connector plug of filter optoelectronic switch b. Replace optoelectronic switch c. Fix filter component d. Reconnect connector plug of filter step motor e. Replace filter step motor f. Replace driver IC of step motor
Initial position of wavelength step motor		Initial position of wavelength step motor error, the following points for reference a. Connector plug of wavelength optoelectronic switch is loosened b. Wavelength optoelectronic switch is damaged c. Connector plug of wavelength step motor line is loosened d. Wavelength step motor contains error e. Driver IC of step motor is damaged	Contact service agent a. Reconnect connector plug of wavelength optoelectronic switch b. Replace wavelength optoelectronic switch c. Reconnect connector plug of wavelength step motor d. Replace wavelength step motor e. Replace driver IC of step motor
Wavelength accuracy positioning		Wavelength accuracy positioning error, the following points for reference a. Something block light in sample compartment b. Tungsten lamp is not lighted. c. Tungsten lamp spot does not enter into slit d. Connector plug of pre-amp board is loosened e. Position of filter component is changed.	Contact service agent a. Adjust sample holder position and take off the subject b. Please check tungsten lamp, power supply, connector plug. c. Adjust tungsten lamp spot to enter into slit d. Reconnect connector plug of pre-amp board. e. Adjust filter component. Note: During initialization, blank part of filter component must be symmetrical with slit.

Table 5 – 2 Errors reported during the initialization for UV-VIS spectrophotometer








Function	Message	Cause	Corrective Measure
CPU chipset		CPU chipset is defective	Contact service agent. Maintain or replace mainboard.
Filter		Filter self-checking error, the following points for reference a. Connector plug of filter optoelectronic switch is loosened b. Filter optoelectronic switch is damaged c. Filter component is loosened d. Connector plug of filter step motor line is loosened e. Filter step motor contains error f. Driver IC of step motor is damaged	Contact service agent a. Reconnect connector plug of filter optoelectronic switch b. Replace optoelectronic switch c. Fix filter component d. Reconnect connector plug of filter step motor e. Replace filter step motor f. Replace driver IC of step motor
Lamp change		Lamp change error a. Connector plug of lamp change step motor is loosened b. Lamp change step motor contains error c. Driver IC of step motor is damaged	Contact service agent a. Reconnected connector plug of lamp change step motor b. Replace step motor c. Replace driver IC of step motor
Initial position of wavelength step motor		Initial position of wavelength step motor error, the following points for reference a. Connector plug of wavelength optoelectronic switch is loosened b. Wavelength optoelectronic switch is damaged c. Connector plug of wavelength step motor line is loosened d. Wavelength step motor contains error e. Driver IC of step motor is damaged	Contact service agent a. Reconnect connector plug of wavelength optoelectronic switch b. Replace wavelength optoelectronic switch c. Reconnect connector plug of wavelength step motor d. Replace wavelength step motor e. Replace driver IC of step motor

Table 5 – 2 Errors reported during the initialization for UV-VIS spectrophotometer (cont'd)

Function	Message	Cause	Corrective Measure
Tungsten lamp positioning		<p>Failure to check tungsten lamp energy, the following points for reference</p> <ul style="list-style-type: none"> a. Something block light in sample compartment b. Tungsten lamp is not lighted. c. Tungsten lamp spot does not enter into slit d. Connector plug of pre-amp board is loosened e. Pre-amp board is damaged f. Connector plug of lamp change step motor is loosened g. Lamp change step motor contains error h. Driver IC of step motor is damaged i. Position of filter component is changed. 	<p>Contact service agent</p> <ul style="list-style-type: none"> a. Adjust sample holder position and take off the subject b. Please check tungsten lamp, power supply, connector plug. c. Adjust tungsten lamp spot to enter into slit d. Reconnect connector plug of pre-amp board. e. Maintain or replace pre-amp board f. Reconnected connector plug of lamp change step motor g. Replace step motor h. Replace driver IC of step motor i. Adjust filter component. <p>Note: During initialization, blank part of filter component must be symmetrical with slit.</p>
Deuterium lamp positioning		<p>Failure to check Deuterium lamp energy, the following points for reference</p> <ul style="list-style-type: none"> a. Something block light in sample compartment b. Deuterium lamp is not lighted. c. Deuterium lamp spot does not enter into slit 	<p>Contact service agent</p> <ul style="list-style-type: none"> a. Adjust sample holder position and take off the subject b. Please check deuterium lamp, power supply, connector plug. c. Adjust deuterium lamp spot to enter into slit
Wavelength accuracy positioning		<p>Wavelength accuracy positioning error, the following points for reference</p> <ul style="list-style-type: none"> a. Something block light in sample compartment b. Luminous intensity of deuterium lamp is low 	<p>Contact service agent</p> <ul style="list-style-type: none"> a. Adjust sample holder position and take off the subject b. Check or replace deuterium lamp

5.2 Troubleshooting guide

Strictly observe cautions below on troubleshooting.

<p>Cautions:</p> <ol style="list-style-type: none"> 1. Be sure to disconnect power plug from the instrument before switch line voltage selecting terminal section. 2. Do not look at the light source lamp directly. Wear sunglasses or the like if you look at it directly.

If trouble occurs in the instrument, reference must be made to “Table 5 – 3 Troubleshooting.”

Table 5 – 3 Troubleshooting

Symptom	Possible Cause	Correction
1. 4.3" LCD screen cannot be activated by turning on POWER switch.	<ul style="list-style-type: none"> a. Power cord is not connected. b. Without power supply. c. The unit is turned off. d. Power fuse is blown. e. Power switch is damaged. f. Connector plug of LCD is loosened g. LCD contains error. h. Switch power supply is damage. i. Connector plug of switch power supply is loosened. j. Mainboard contains error. 	<ul style="list-style-type: none"> a. Connect cord. b. Check power supply. c. Turn on the unit. d. Renew fuse. e. Replace power switch. f. Reconnected connector plug of LCD. g. Replace LCD. h. Replace switch power supply. i. Reconnected connector plug of switch power supply. j. Maintain or replace mainboard.
2. Displaying value increase or decrease to the single direction continuously.	<ul style="list-style-type: none"> a. Short of warm – up time. b. Instrument is affected with damp. 	<ul style="list-style-type: none"> a. Warm-up time should be at least 30 minutes. b. Reduce the level of humidity in the test environment.
3. Difficult to adjust 100%T/0.000A	<ul style="list-style-type: none"> a. Something block light in sample compartment b. Absorbance value difference between reference and air is more than 0.4Abs. c. Pre-amp board contains error. d. Toroidal mirror is blurred. e. Position of filter component is changed. f. Luminous intensity of lamp is low 	<ul style="list-style-type: none"> a. Adjust sample holder position and take off the subject b. Replace reference with lower concentration value. c. Maintain or replace pre-amp board. d. Replace toroidal mirror. e. Adjust filter component. <p>Note: During initialization, blank part of filter component must be symmetrical with slit.</p> <ul style="list-style-type: none"> f. Check or replace lamp.
4. Display value is unstable	<ul style="list-style-type: none"> a. Instrument is affected with damp. b. Power line is not ground securely. c. Power supply is unstable. d. High temperature, undesired vibration, direct sunlight near the instrument. e. Use glass cell at ultraviolet region. f. Sample is volatile liquid. g. Luminous intensity of lamp is low h. Pre-amp board contains error. i. Optical system shifts position caused by vibration. 	<ul style="list-style-type: none"> a. Warm-up time should be at least about 30 minutes. Reduce the level of humidity in the test environment. b. Ground power line securely. c. Check power supply. d. Improve environment to meet the instrument. e. Use quartz cell at ultraviolet region. f. Use cell cover. g. Check or replace lamp. h. Maintain or replace pre-amp board. i. Align optical system.
5. Measurement data deviation is large	<ul style="list-style-type: none"> a. Cell is blurred. b. Cells matching error is too large. c. Liquid sample will vary with the change of time or temperature. d. Prepared sample contains error. e. Instrument is unstable. 	<ul style="list-style-type: none"> a. Clear cell. b. Replace new cells. c. Testing must be in strict accordance with the test procedures d. Prepare sample again. e. Maintain instrument.

5.3 Replace lamp and fuse

Warning:

- Never attempt to replace lamp and fuse when the unit is turned on.
- Be sure to wait for 20 minutes after turning off the unit. (Until the light source lamp is cooled down adequately.)
- When looking directly at Deuterium lamp, wear ultraviolet ray shielding glasses since this lamp emits intense ultraviolet rays.
- Before checking lamp status after replacement, secure an adequate distance from light house.
- Before replace fuse, please turn off the unit and take off power cord.
- Fuse must meet correct specifications.

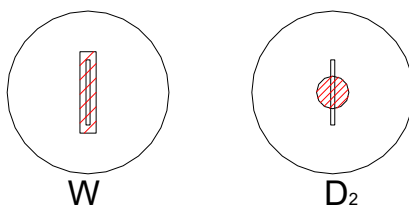


Fig. 5 – 1 Light Source spot focused on Slit

5.3.1 Replacement of deuterium lamp

Notice:

- When replacing new lamp, wear clean gloves in order to protect its tube wall from contamination such as fingerprint. Pay particular attention to the standout portion of Deuterium lamp.
- With the light house open, you must pay adequate attention not to touch the inner electric components directly by hand nor allow a foreign material to touch them or enter the inside.
- Please remember the order of 3 deuterium lamp lines.
- Please remember light window direction of deuterium lamp.
- To turn on the unit, must wait for about 5 minutes after replace deuterium lamp.

- (1) Be sure to wait for 20 minutes after turning off the unit. (Until the light source lamp is cooled down adequately.)
- (2) Loosen M4 screws (2 pcs each at left and right side of the instrument cover), and take off instrument cover.
- (3) Loosen M3 screws (1 pcs each at left and right side of the light source cover), and take off light source cover.
- (4) Loosen 3 pieces screws which are mounted on switch power supply for deuterium lamp, take off 3 deuterium lines.
Please remember the order of 3 deuterium lamp lines.
- (5) Loosen 2 pieces of M3 screws which are used to mount deuterium lamp, take off deuterium lamp.
- (6) Mount new deuterium lamp to meet correct direction with 2 pieces of M3 screws.
Please wear clean gloves in order to protect its tube wall from contamination such as fingerprint.
Pay particular attention to the standout portion of Deuterium lamp.

- (7) Mount 3 deuterium lamp lines on the switch power supply of deuterium lamp with correct order.
- (8) Turn on the unit, and observe the deuterium lamp spot which is focus on the slit.
After replacement of deuterium lamp, sometimes the high and low position of toroidal mirror needs to be adjusted. The deuterium lamp spot which is focus on the slit must be centered in the high and low direction, adjust it to meet condition shown in **Fig 5 – 1 (right side)**.
- (9) After adjustment, tighten all screws securely.

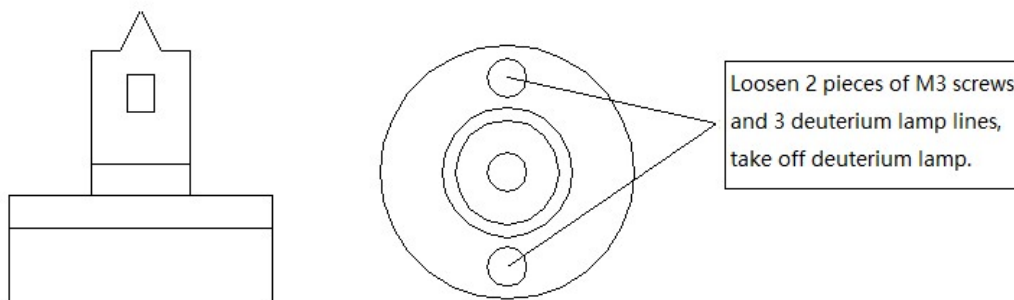


Fig. 5 – 2 Deuterium lamp component

5.3.2 Replacement of tungsten lamp

- (1) Be sure to wait for 20 minutes after turning off the unit. (Until the light source lamp is cooled down adequately.)
- (2) Loosen M4 screws (2 pcs each at left and right side of the instrument cover), and take off instrument cover.
- (3) Loosen M3 screws (1 pcs each at left and right side of the light source cover), and take off light source cover.
- (4) Take off damaged tungsten lamp, and replace new tungsten lamp (12V/20W).
Please wear clean gloves in order to protect its tube wall from contamination such as fingerprint.
- (5) Turn on the unit, and observe the tungsten lamp spot which is focus on the slit.
 - a. For VIS spectrophotometer:
After replacement of tungsten lamp, sometimes the position of tungsten lamp stand, the high and low position of tungsten lamp set, and the high and low position of toroidal mirror need to be adjusted. The tungsten lamp spot which is focus on the slit must be strictly symmetrical with slit, adjust it to meet condition shown in **Fig 5 – 1 (left side)**.
 - b. For UV-VIS spectrophotometer:
After replacement of tungsten lamp, sometimes the position of tungsten lamp stand and the high and low position of tungsten lamp set need to be adjusted. The tungsten lamp spot which is focus on the slit must be strictly symmetrical with slit, adjust it to meet condition shown in **Fig 5 – 1 (left side)**.
- (6) After adjustment, tighten all screws securely.

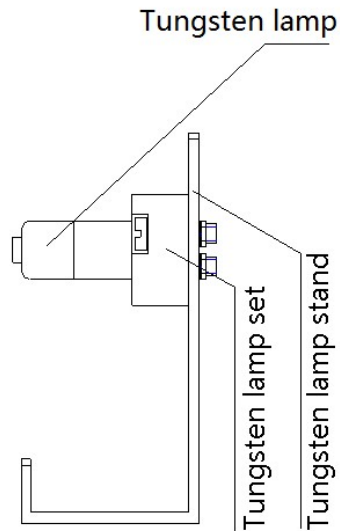


Fig. 5 – 3 Tungsten lamp component

5.3.3 Replacement of fuse

Warning:

- Before replace fuse, please turn off the unit and take off power cord.
- Fuse must meet correct specifications.

If fuse is damaged, please replace fuse following as below:

- (1) Turn off the unit.
- (2) Take off the power cord.
- (3) Take off fuse set from power switch.
- (4) Take off damaged fuse from fuse set, and replace new fuse.
Specifications of fuse: 250V / 3.15A / 5x20
- (5) Mount the fuse set into the power switch.

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