



**VIS Spectrophotometer
MS-SP200-1100
User Manual**

MARSHALL

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Preface

1. Safety

This instruments are designed according to the following safety documents: 《IEC 61010 — 1: 2001》 (Which is: 《Measurement, Control and Laboratory Electric Equipments Safety Requirement》 Part 1) and 《IEC 60601 — 1: 1988》 (Which is: 《Electric Apparatus of Medical Treatment》 Part 1).

2. About the Instrument

Scanning Series UV/Vis Spectrophotometer is an electrical test instruments which is widely used in the laboratories.

- Use Frequency: Intermittence
- Excessive Voltage (Current): No
- Pollution Class: Class 1

3. Symbols



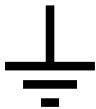
Caution, Danger!



Caution, High Voltage!



Caution, Hot!



Ground



Fuse



Recall, this instrument will be called back by the appointed Electrical Treatment Department or by the original Manufacturer when wasted.

Chapter 1. Summary

Scanning Series UV/Vis Spectrophotometer have the characters of wide range of wavelength, high sensitivity, powerful function, easy to use, simple structure and pretty figure. Besides these, the large LCD, High Precise A/D and easy to store RAM makes the instrument much more superior than other originals. It is widely used in Chemistry, Pharmaceuticals, Biochemical, metallurgy, Light Industry, Textile, Material, Environments, Medical, Education and some other fields. It is one of the most important instruments in Quality Control and an essential in normal laboratories.

1. Working Principle and Structure

Different matter has different but special absorbance wavelength point. Also, when at the fixed wavelength point, the absorbance has some relation to the substance's (Always transparent Solution) concentration and its thickness. The relation can be concluded as the following Formula which is called Lambert-Beer Law.

$$T = I/I_0$$

$$A = KCL = -\log I/I_0$$

A	Absorbance
C	Concentration of the Solution
K	Absorbance Coefficient of the Solution
L	The length of the Solution in the light path
I	The intensity of the light focused on the A/D after it permeate the solution to be measured.
I ₀	The intensity of the light focused on the A/D after it permeate the Solution.

Note:

When test, the solvent is usually taken as the Reference Solution and its Transmittance is considered as 100%T. While the Transmittance of the sample to be tested is a relative value which is got comparing to that of the Reference.

2. Main Specifications

- Wavelength Range: 200-1020nm
- Stray Light: ≤0.1%T @ 220nm, 360nm
- Bandwidth: 4nm
- Photometric Range: 0-200%T,-0.301-3.0A
- Wavelength Accuracy: ±1.8nm
- WL. Repeatability: 0.2nm
- Photometric Accuracy: ±0.5%T
- Stability: 0.002A/h @ 500nm
- Display: 128×64 Dots Matrix LCD
- Data Output: USB, Parallel

Chapter 2. Install Instrument

1. Environment Required

To ensure the best performance, the following conditions are required:

- The best working temperature range is 16-35°C and the humidity is 45-80%.
- Keep it as far as possible away from the strong magnetic or electrical fields or any electrical device that may generate high-frequency fields.
- Set the unit up in an area that is free of dust, corrosive gases and strong vibrations.
- Remove any obstructions or materials that could hinder the flow of air under and around the instrument.
- The power requirement is 220±22V @ 50±1Hz or 110±11V @ 60±1 Hz.
- Use the appropriate power cord and plug into a grounded outlet.
- If the local voltage is not stable enough, a manostat is required.
- Be away from direct sunlight.

Voltage Confirmation



Be sure to set the instrument's voltage switch at your local power supply, or severe damage may occur!

2. Installation

Step 1: Check the packing list

Unpack the contents, check the materials with the Packing List. Any damage or Lost found, please contact us or the local dealer.

Step 2: Position

Place the instrument on the stable table carefully.

Step 3: Install printer (Optional)

Make sure the printer is power off. link the printer's data cable to the Instrument's parallel port.

Step 4: Link the power cord

Make sure the instrument's power switch is in the Off condition, link the power cord to the instrument and insert another end in the socket provided with a protective earth contact.

Step 5: Switch on the power

Check again. make sure that all the links are right. Switch on the power. Then the instrument begins to self-test. After self-test and 15 minutes' pre-warm, it can work.

Chapter 3. Introduction of the Instrument

1. Introduction

Appearance of the instrument (Fig. 3-1):



Fig. 3-1

- 1 —Lid of the room
- 2 —Cell Holder
- 3 —Operation Panel
- 4 —Rod
- 5 —Power Switch
- 6 —Power Socket
- 7 —Fan
- 8 —USB Port
- 9 —Print Port

2. Operation Panel

Operation panel of Scanning UV/Vis Spectrophotometer(Fig.3-2):

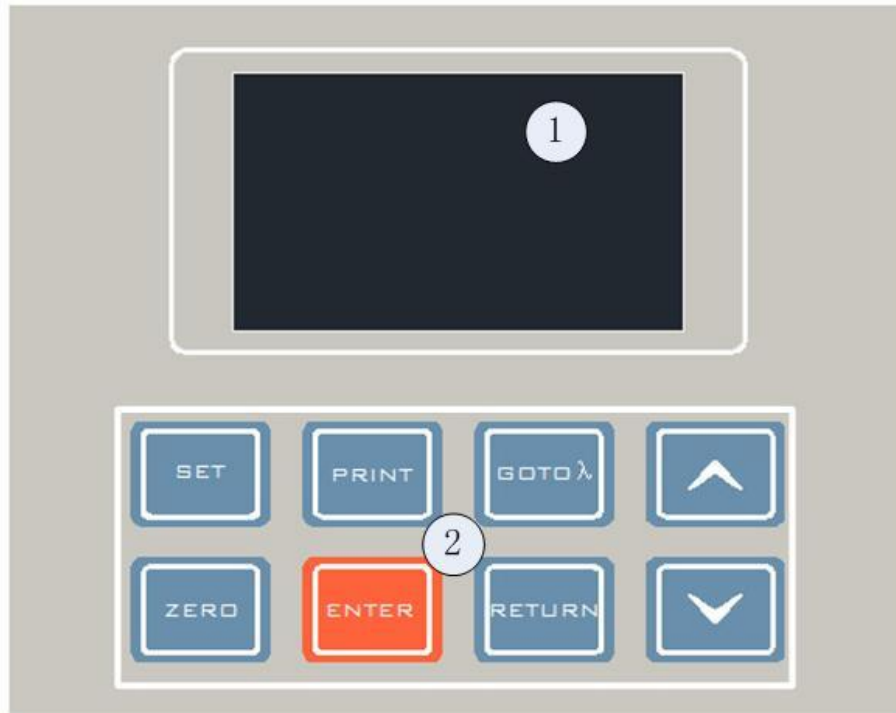


Fig. 3-2

- 1 —LCD Displayer
- 2 —Keypad

3. Keypad Description



Setup



Print



Clear



Up, down key, change test mode, plus or minus wavelength.



Wavelength



Zero



Confirm



Return

Chapter 4. Instrument Operation

1. Software System

Instrument is consist of four modes: A Mode, T Mode, C Mode and F Mode.

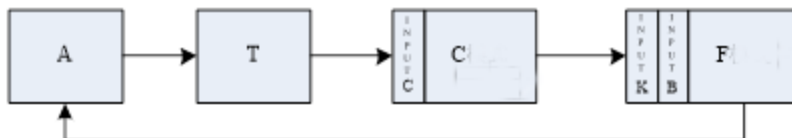


Fig. 4-1

2. Basic Operation

- **Select Test Method**

Press up, down key to change the test mode.

- **Set Wavelength**

Press GOTO λ to setup wavelength, wavelength can be adjusted by up and down key, the wavelength value will display on the screen, the minimum value is 0.1nm.

- **Set Parameters**

The instrument will guide to input concentration or k, b, which can be changed by up and down key, press ENTER to confirm and save the value.

- **Calibrate Zero**

Press ZERO can calibrate zero.

- **Calibrate 100%T**

Put the Reference in the light path, press ZERO to calibrate 100%T/0Abs.

- **Print the Test Result**

In the test interface, press PRINT to print the test result.

3. Before Measurement

- **Self-check**

Remove all the blocks in the light path and close the lid of the compartment. Switch on the power supply to begin the self-test.

- **Pre-warming**

After self-test, the instrument goes into pre-warm state. For accurate test, at least 30 minutes of warm up is required.

- **Check the Cuvettes**

The cuvettes must be clear and there's no remains of the samples on the surface of it. Only Silicon (Quartz) cuvettes are permitted to be used in the range of less 300nm.

4. Measurement

1) Test Abs.

Step 1, Choose "A" by up and down key. (Fig. 4-1)

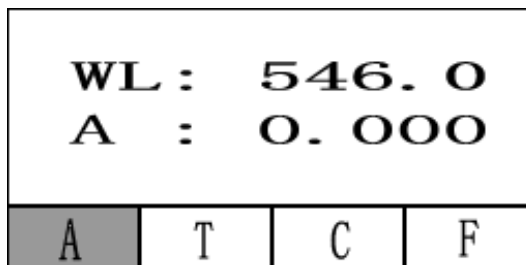


Fig. 4-1

Step 2, Press GOTO λ , up and down key to choose the wavelength you need, ENTER to confirm.

Step 3, Put the Reference in the light path and press ZERO to calibrate 100% T/OAbs.

Step 4, Sample Measurement, put the sample to be measured in the light path, then the result displays on the screen automatically. (Fig. 4-2)

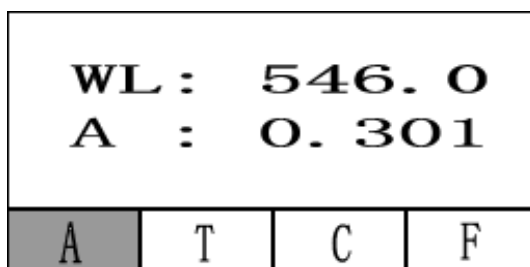


Fig. 4-2

Step 5, Press PRINT to print the test result.

Step 6, Repeat Step 4, 5 to test other samples.

2) Test Transmittance

Step 1, Choose "T" by up and down key. (Fig. 4-3)

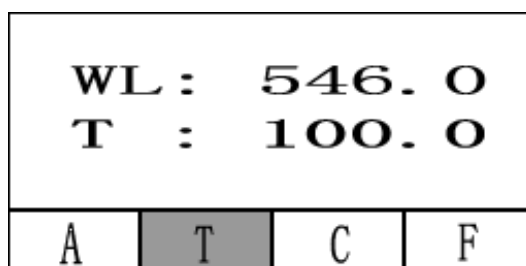


Fig. 4-3

Step 2, Press GOTO λ , up and down key to choose the wavelength you need, ENTER to confirm.

Step 3, Put the Reference in the light path and press ZERO to calibrate 100% T/0Abs.

Step 4, Sample Measurement, put the sample to be measured in the light path, then the result displays on the screen automatically.

Step 5, Press PRINT to print the test result.

Step 6, Repeat Step 4, 5 to test other samples.

3) Test Concentration when standard sample concentration is known

Step 1, In “C” Mode, setup the test wavelength.

Step 2, Press SET, put the Reference in the light path, press ZERO. (Fig. 4-5)

Step 3, Input the Conc. following the guide, adjust by up and down key followed with ENTER to confirm. (Fig. 4-6)

Step 4, Put the Standard Sample in the light path following the guide, ENTER to confirm. (Fig. 4-7)

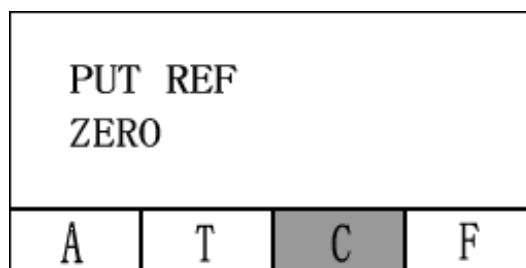


Fig. 4-5

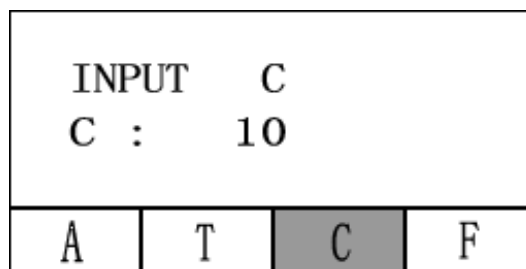


Fig. 4-6

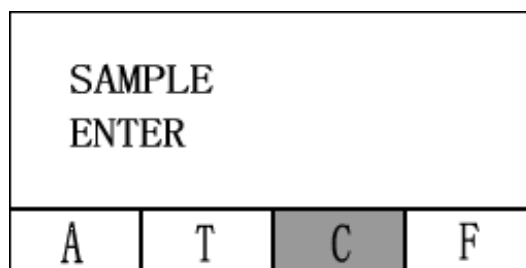


Fig. 4-7

Step 5, Put the “Sample” in the light path, read the Conc. value. (Fig. 4-8)

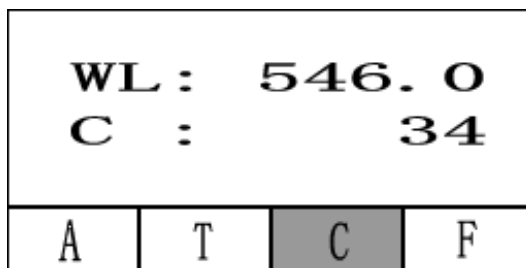


Fig. 4-8

Step 6, Press PRINT to print the test result.

Step 7, Repeat Step 5, 6 to test other samples.

4) Test Concentration when standard curve is known

Step 1, Choose “F” Mode by up and down key.

Step 2, Press GOTOλ, input the test wavelength by up and down key.

Step 3, Press SET, input the Value K, B, ENTER to confirm. (Fig. 4-9)

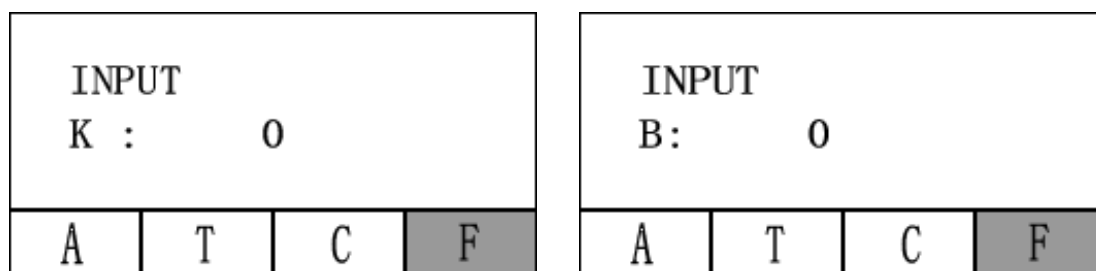


Fig. 4-9

Step 4, Put “Reference” in the light path, ZERO to blank.

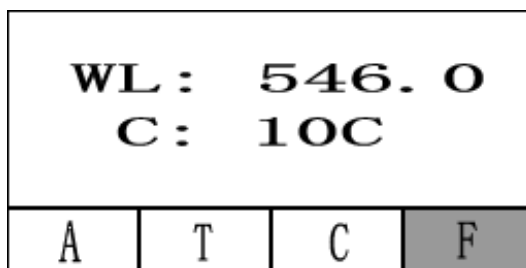


Fig. 4-10

Step 5, Put the “Sample” in the light path, read the Conc. value. (Fig. 4-10)

Step 6, Press PRINT to print the test result.

Step 7, Repeat Step 5, 6 to test other samples.

Chapter 5. Instrument Maintenance

To keep the instrument work in good condition, constant maintain is needed.

1. Daily Maintain

(1) Check the Room

After measurement, the cuvettes with sample solutions should be taken out of the compartment in time. Or the volatilization of the solution would make the mirror go moldy. Users must pay more attention to the corrosive sample and liquid easy to volatilize. Any solution remains in the compartment should be wipe off immediately.

(2) Surface Clean

The cover of the instrument is with paint. Please use wet towel to wipe off the drips on the surface immediately. Organic solution is forbidden to be used to clean the cover. Please wipe off the dirt on the cover timely.

(3) Clean the Cuvettes

After every test or after a solution change, the cuvettes should be cleaned carefully, or the remains on the surface would cause measuring error.

2. Troubleshooting

(1) Dark Current Error when Self-check

Possible Cause

- Open the lid of the compartment during the course of self-test.

Solution

Close the lid of the compartment and switch on the power again.

(2) No Response After Power On

Possible Cause

- Bad contact in power supply
- Fuse melt

Solution

Improve the contact
Replace a new fuse

(3) Printer Not Work, Printer Error

Possible Cause

- No power supply
- Bad contact in power supply
- Bad contact of the data cable

Solution

Switch on the power supply
Improve the contact
Improve the contact

(4) No Stable Reading

Possible Cause

- No enough pre-warm
- Glass cuvettes used in UV Range
- No stable Sample
- Much higher sample concentration

Solution

Increase the pre-warm time
Use Silicon Cuvettes.
Improve the sample
Dilute the sample

- | | |
|--|-----------------------------|
| ▪ Low voltage or unstable power supply | Improve the power condition |
| ▪ Lights defect | Replace a new lamp |
| ▪ Light used up | Replace a new lamp |

(5) Worse Repeatability

- | Possible Reason | Solution |
|---------------------|--------------------|
| ▪ Unstable sample | Improve the sample |
| ▪ Cuvettes polluted | Clean the cuvettes |

(6) Incorrect Reading

- | Possible Reason | Solution |
|----------------------------------|--------------------------------------|
| ▪ Dark Current Error | Re-get the dark current |
| ▪ Worse matching of the cuvettes | Improve the matching of the cuvettes |

3. Spare parts replacement

(1) Replace the Fuse



Danger!

Be sure to switch off the power and unplug the socket before replacement!

Step 1, Tools Preparation

Prepare a 3×75 Flat Blade screwdriver.

Step 2, Switch Off the Power Supply

Switch off the power supply, and unplug the socket.

Step 3, Take Out the Fuse Seat

Take out the fuse seat by the screwdriver(Fig.5-1).

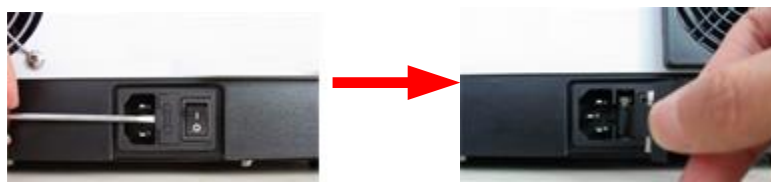


Fig. 5-1

Step 4, Replace a New Fuse

Pick out the spare fuse and replace it to the working position(Fig.5-2).

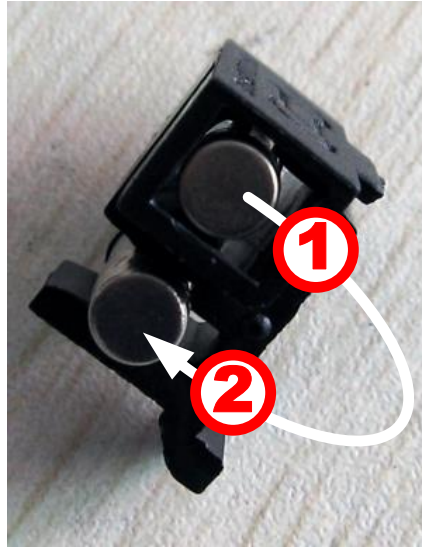


Fig. 5-2

Step 5, Reset the Fuse Seat

Replace the fuse seat in the power socket.

Step 6, Switch On the Power

Plug the socket and switch on the power.

(2) Replace Lamps



High temperature !

Wait 20 minutes before open the lamp chamber after power off to avoid scald!

Step 1, Tools Preparation

Prepare a 6×150mm Cross Blade screwdriver and a pair of glove.

Step 2, Power Off

Switch off the power supply and unplug the socket.

Step 3, Open the Cover

Unscrew the 4 screws indicated in Fig.5-3(Each side with 2 screws) and remove the cover.

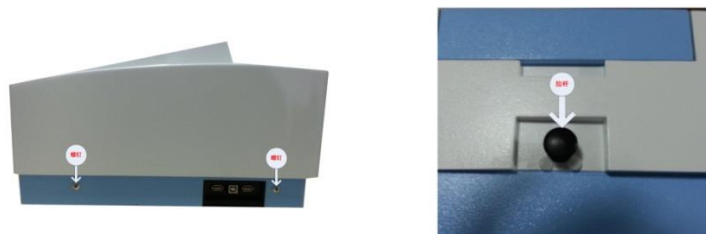


Fig. 5-3

Step 4, Open the Cover of the Light Chamber

Unscrew the 2 screws on the light chamber cover and remove it(Fig.5-4).



Fig. 5-4

Step 5, Replace the D2 Lamp

Unscrew the 2 screws on the D2 Flange (No.1 in Fig. 5-5), unplug the connector in the power board (No. 2) and remove the D2 lamp. Draw on the cotton glove and replace a new lamp. Fix the 2 screws and plug the connector again.



Fig. 5-5

Step 6, Replace W Lamp



Remember the direction of the filament before pull out the W lamp. Be sure that the new lamp's filament is in the same direction as before.

Pull out the defected W lamp and draw on the cotton glove. Insert the new W lamp as deep as possible on the lamp seat. Be sure to keep the filament in the same direction as the old one face.

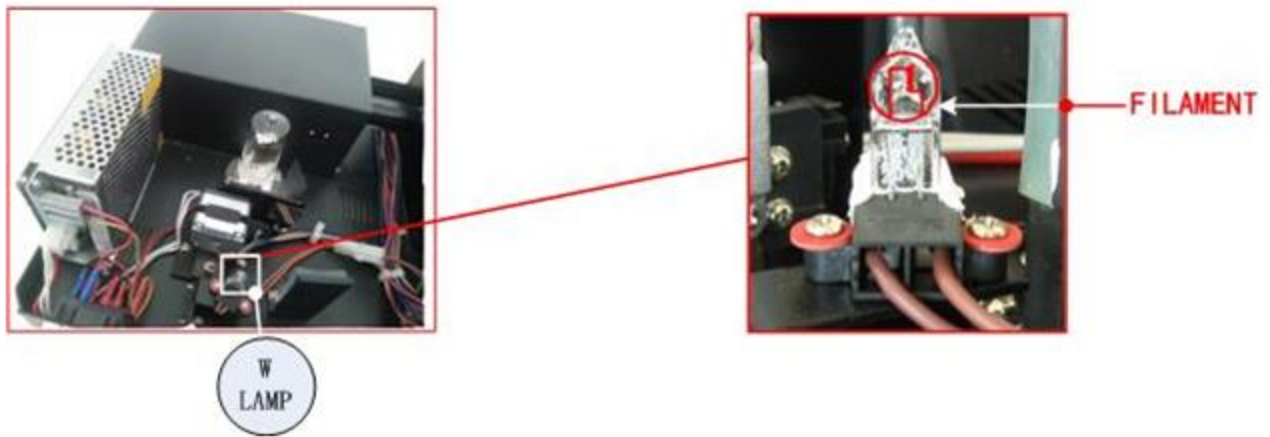


Fig. 5-6

Step 7, Adjust the Position of the W Lamp

Switch on the power,(the Switch Mirror should be placed to the position as Fig. 5-7 indicates). Observe the entrance facula, and it should be in the center of the entrance hole(Fig.5-7). If the facula deviate to Left or Right, then loosen the No.1 screws in Fig. 5-8 and move the lamp seat to Left or Right until it focus on the center of the slot. Then fix the screws. If the facula deviate to Up and Down, then loosen the No.2 screws in Fig. 5-8 and move the lamp seat Up and Down until the facula focus on the center of the slot. Then fix the No. 2 screws again.

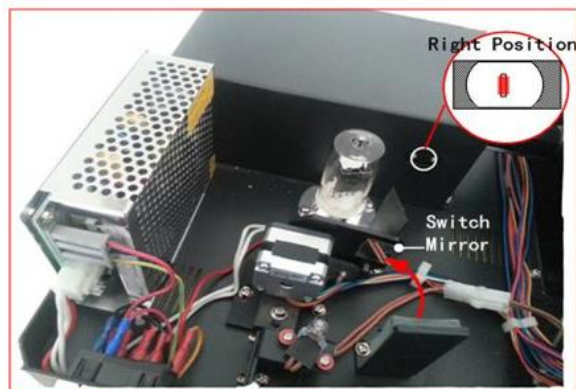


Fig. 5-7

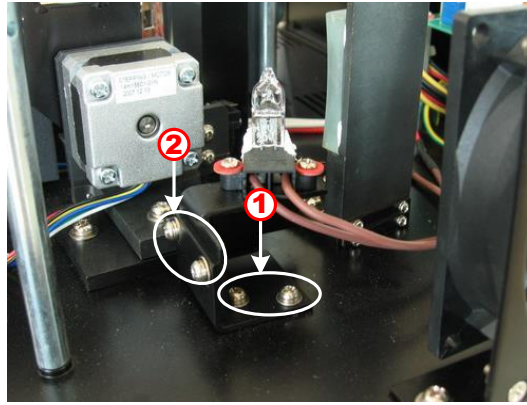


Fig. 5-8

Step 8, Finish

Reset the cover of the light chamber and fix the screws. Reset the cover of the instrument and fix the screws. Recover the Pole in the compartment, then the course finished.

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