AE-VIS721

Visible Spectrophotometer

Operating Manual

Please read this manual carefully before operating the instrument.

Content

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Section 1 General Safety Information

This instrument is intended for laboratory use only.This product conforms to the "Class A" standards for electromagnetic emissions intended for laboratory equipment applications. It is possible that emissions from this product may interfere with some sensitive appliances when placed nearby or in the same circuit as those applications. The user should be aware of this potential and take appropriate measures to avoid interference.

1.1 Precautions

1. Do not use near flammable materials.
2. Always inspect this instrument for damaged components before use.
3. Always connect the system to the correct AC power source.
4. Always connect the correct instrument (printer or computer only) via the serial port connector.
5. Do not pour liquid into the sample chamber. Thorough clean-up is needed after each spill
6. Do not place objects on this device.
7. This equipment has no customer-serviceable components, do not open the unit.

Section 2 Product Description

2.1 Packing List

This Visible Spectrophotometer is shipped with the following components. Upon receiving your instrument, please check that all items listed below were shipped.

Items Quantity

Items Name	Quantity
Visible Spectrophotometer	1
Operating Manual	1
5cm optical path cuvette rack	1 installed in the mahchine
10mm rectangle cuvette	1 (4 pcs)
Halogen Tungsten Lamp	1
Power Cable	1
Fuse	1

2.2 Identification of System Components

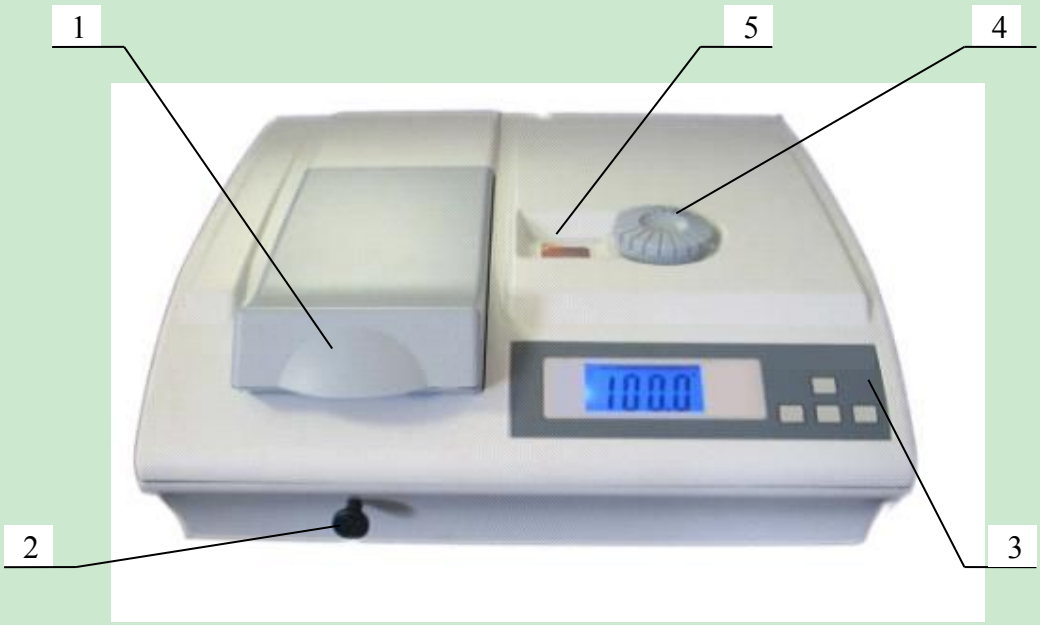

Fig. 1 Front View of the AE-VIS721 Visible Spectrophotometer

1. Sample Chamber Cover.
2. Cuvette Spring.
3. Control Panel.
4. Wavelength Calibration.
5. Wavelength Scales.

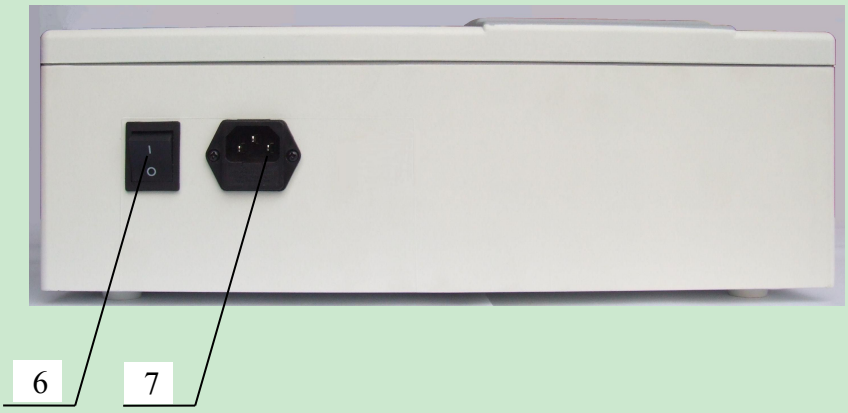

Fig. 2 Rear view of the AE-VIS721 Visible Spectrophotometer

6. Universal Power Input Module and ON/OFF Switch.
7. Power Plug.

Fig. 3 View of the sample chamber.

8. Filter Lever
9. Detector Compressive Bar.
10. Cuvette Rack

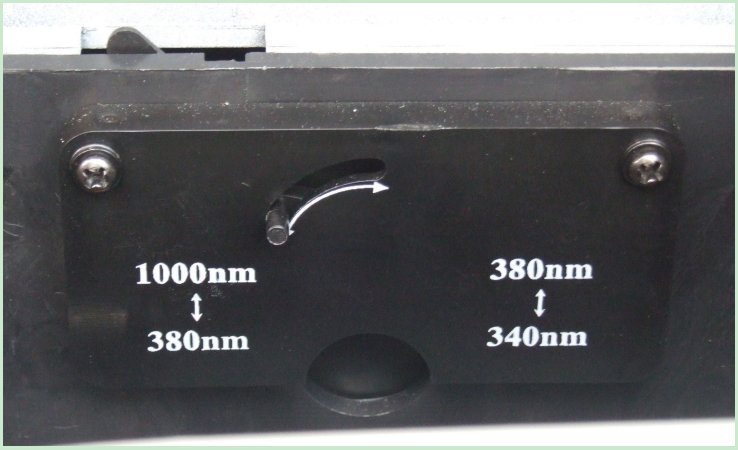

Fig. 4 View of the filter lever & indication scopes.

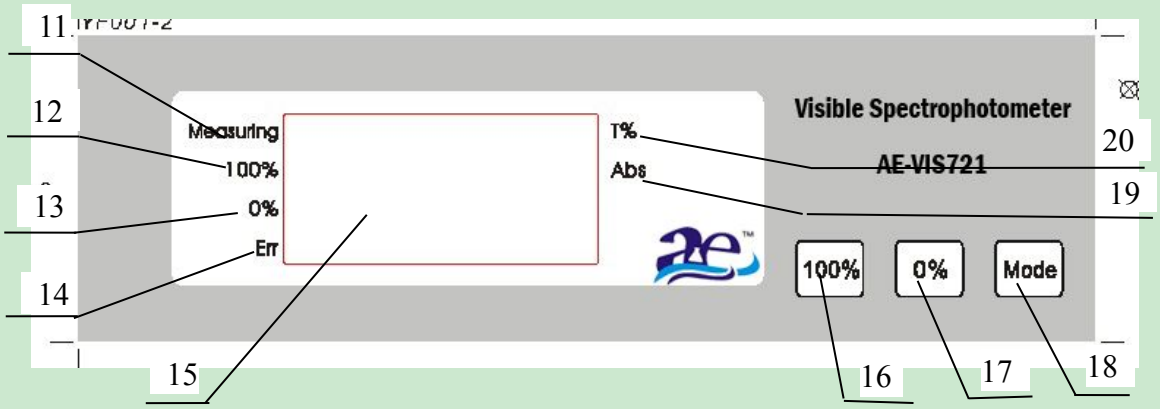

Fig. 5 View of the control panel.

11. Measuring.
12. Calibration 100%.
13. Calibration 0%.
14. Error
15. Data Display
16. CAL 100%
17. CAL 0%
18. Mode
19. Absorbency (Abs.)
20. Transmittance Ratio (T%)

Section 3 Installation

3.1 Environmental Requirements

To insure correct operation and stable performance over an extended period of time, install the Spectrophotometer in a location which meets the following conditions:

- Operating Temperature: (5～35)℃。
- Operating Humidity Range:≤85%RH；
- Not exposed to direct sun light.
- Not subject to direct or continuous vibration.
- Not subject to intense magnetic or electromagnetic fields.
- Area free from corrosive gases or other corrosive substances.
- Area with very little dust or other airborne particles.
- Allow a 10cm minimum space around the instrument for proper air flow.

3.2 Power On and Initial Display

When you turn on instrument, it will go through a selfdiagnostic routine during which it tests the lamp, optical components, power supply and other components. If boot up is successful and no errors are detected, the Home screens will be displayed.

Section 4 Introduction

4.1 Application

AE-VIS721 Visible Spectrophotometer is a standard instrument which based on the principle of spectrophotometery. This instrument can be measured the transmittance ratio & absorbency of samples within 340~1000nm wavelength ranges. It can be widely applied to clinical sanitation, biochemistry, environment protection, food inspection, petrochemical, tertiary institution, basic teaching experiment,etc.

4.2 Characteristics

- ✧ Adoption of new single-chip microcomputer system, completely functions, compact in size, easily maintained.
- ✧ 4 digital LCD Display.
- ✧ With flame retardant & insulation materials as a skin. Novel in design, easily & safely operation.
- ✧ Advanced optical system design, sealed grating monochromator. With scientific mouldproof & eliminate of stray light technology so that its longevity, stray light, stability indicator, measuring accuracy are apparently improved.
- ✧ To be avoid energy plummeting after reflector was burnt, it has adopt lens to gathering light.
- ✧ With a professional lamp holder so that it can not be replaced the optical circuit of halogen tungsten lamp.
- ✧ Automatic calibration 0%(T),100%(T) & absorbency 0(A).

4.3 Specifications

Optical System: Single beam,1200 diffraction grating.
Wavelength Range: 340nm～1000nm.
Spectrum Bandwidth: 4nm.
Light Source: 20W/12V Halogen Tungsten Lamp
Wavelength Accuracy: ±1nm
Wavelength Repeatability: ≤0.5nm

Transmittance Accuracy: ±0.5%（T）
Transmittance Repeatability: 0.2%（T）
Stray Light: ≤0.2%（T）（360nm，JB400）
Photometric Range: 0～100%(T),-0.050～3.000(A)
Power Supply: 220V±22V　　50Hz±1Hz
Rating Voltage: 30W
Size: 380×370×160mm
Weight: Net:4.5 kg Gross:6 kg

Section 5 Operating Instructions

5.1 Operating Procedures

5.1.1 Warm-up & Preheating

Switch on power supply, it is a normal state when buzzer alarmed once and self-check is completed. It will enter to "T%" mode, display will show random values and pointer will be appeared in the right of display at the same time.

Electrical components needs to heat balance after warm-up instrument. Normally, it can be carried out stable operation after preheating 30mins. If halogen tungsten lamb is used for a long time or transmission ratio is unstable, it can be properly increased preheating time. If there is urgent situation, it would be decreased preheating time and increased the calibration times of "CAL 0% or 100%" accordingly.

5.1.2 Wavelength Calibration

Rotate "Wavelength CAL" to calibrate wavelength. It should be vertically aimed at scale lines and regulated scales from short-wave to long-wave so that remove required wavelength to suitable scale lines. If it go beyond, please re-clockwise rotate to origin position in order to ensure overcome mechanical space and wavelength accuracy.

5.1.3 Filters Calibration

To be reduce the interference of stray light and improve the accuracy of photometric measurements, filter lever should be placed in optical path of 340nm-380nm scopes.Filter lever has been located on the left inside sample chamber.(Fig.3,4). There are wavelength scopes on both side of filter lever. While pull it to 340nm-380nm scope, it figure out working in 340nm-380nm wavelength range, pointer indicates filter have already joined optical path. When pull it to 380nm-1000nm range, it indicate that instrument working in 380nm-1000nm wavelength range and filter exit to optical path.

Note:
When filter lever located in 340nm-380nm and worked in 380nm-1000nm position by reason of energy is not enough or unable to working, therefore, it is necessary to calibrate filter position immediately after calibration wavelength.

5.1.4 Cuvette Rack Calibration

Standard cuvette have four slots, it can be changed its position when pull cuvette rack. The closest position of tester is "0" position, following are "1", "2", "3", while pull out the "1", "2", "3" position, the spring has a sense of positioning, please gently push it so that ensure correct positioning. Forward spring is the same treatment. Open the sample used for the first time should be room to build, while pulling side to observe the location of the sample slot and the length of his rod, the establishment of a sense of the initial position. Testing samples should be placed on the reference 0 position (when the air clinging to the reference sample) All samples shall be wipe the external tank after each Add frame, and remember their location.

5.1.5 Measuring Mode Selection

It will be shifted by the mode of “T%” & “Abs” when pressed “Mode” for each times. Meanwhile, pointer which is appeared in the display. As a result of the measuring mode should be selected firstly before start to testing, while warm-up instrument, it will enter to "T%" mode automatically.

5.1.6 Calibration 100% (or 0A)

Calibration "100% " steps as follows. In the transmission test mode, pull cuvette rack so that the reference samples (air, distilled water or a specific reference solution) aimed at the optical path, then cover the sample chamber cover. Press "100%", instrument will began to calibrate 100% automatically. After calibrated, it will show "100.0" in the display. Meanwhile, the calibrate processing is completed and successed. If it do not show "100.0" , then press it once again.

Calibrate absorbance "0A" in the same way, but must be tested under "Abs" mode. After calibrated, it will show "0.000" in the display. Calibration 100% and 0% procedures are the same.

If there is drift in "T%" mode, it can be adjusted 100% and re-adjusted to 100% or 0%. If the instrument drift under "Abs", it can be adjusted the absorbency of 0A. To adjust 0%, it must return to transmittance adjustment test mode. In the concentration of the test mode, direct-reading instruments have found drift, but also must return to transmittance adjustment test mode. After adjustment, press"Mode" to get to the original test methods.

When reset wavelength, you must re-adjust to 100% or 0%. Generally, it should be calibrated100% firstly, then calibrate 0%. Calibrate processing will affect each other sometimes, so that it should be check whether its changed automatically or not. If any difference, please reset it or calibrate for several times.

5.1.7 Calibration 0%

"0%" operation method as follows. In "T%" mode, open the sample chamber cover, then press "0%" , apparatus automatically calibrate 0%. After adjustment, display will show "0.0", meanwhile, calibrate is the successed and finished. If display greater than "0.0" , it should be calibrated once agian. Under normal circumstances, calibrate 0% or 100% should be used totally.

Section 6 Maintenances & Repairs

6.1 General Maintenance

It is only necessary to keep the external surfaces clean and free from dust. The sample area should always be kept clean and any accidental spillage should be wiped away immediately.

To give added protection when not in use, the unit should be disconnected from the mains supply and covered with the optional dust cover.
For longer term storage or re-shipment it is recommended that the unit be returned to the original packing case.

6.2 Light Source Replace

The only routine maintenance which may be required is the replacement of the light source if this fails. Failure should be suspected if the lamp failure indicator appears on the display. This can be confirmed by looking in the sample chamber.

WARNING: Disconnect the unit from the mains supply prior to replacing the lamp. Care should be taken when removing the lamp from the holder. Ensure the lamp is cool prior to handling.

1. Access to the tungsten halogen lamp can be gained via the lamp access panel, located at the rear of the unit.
2. Slacken off the thumbscrew from the lamp access panel located at the rear of the instrument.
3. Remove the old lamp from the holder. The lamp is a plug-in fit and should be removed by gently easing it from the holder.

4. Carefully remove the replacement lamp from the packaging, ensuring the glass portion of the lamp is not touched.
5. Insert the lamp into the holder, as illustrated, ensuring it is fully pushed home.

6.3 Fuse replace

Unplugging the power cord, using the appropriate tools in the socket below the mouth like a prized slots, fuses and fuse blocks will be able to come out, replacement is very convenient.

6.4 Error Indications.

E r r 1：Main control board and photocell communication are not connect tightly.
E r r 2：Press “0%” while under “Abs” mode.

6.5 Repairs.

Problem	Cause	Solution
1. Unit does not power up	1、Power switch is damaged. 2、Bad power cord. 3、Fuse damaged. 4、Power switch in off position 5、Internal power broken. 6、No power from outlet.	1、Replace power switch. 2、Replace. 3、Replace fuse. 4、Check power switch on back of unit. 5、Replace power switch. 6、Check power source.
2. Indication value difficult to read	1、Preheating time is not enough. 2、AC power supply is not stability. 3、Lamb aging. 4、Have strong quake source. 5、Components are not connect tightly.	1、Increase preheating time. 2、Add regulator. 3、Replace. 4、Increase quake-proof protection. 5、Insert components.
3. Can not find energy.	1、Less light source. 2、Protect door is open. 3、Cuvette located in wrong position 4、Filter is located in a wrong place. 5、Receiver no signal output.	1、Light is broken. 2、Come back to protect door position. 3、Place cuvette in a correct place. 4、Exit filter. 5、Return factory to repair it.
4. Cannot CAL 100%	1、Lamp aging 2、Cuvette located in wrong position	1、Replace. 2、Put it in correct position.
5. Optical measurement is abnormal.	1、Sample processing method is wrong 2、Cuvette placed in a wrong place.	1、Reset processing methods. 2、Clear up wrong placed methods.
6. Wavelength resolution decline.	1、Wavelength scale is not connect tightly. 2、Scale line removement.	1、Orientation or lock tightly scale line. 2、Orientation or lock tightly scale line.