V-1100D

SPECTROPHOTOMETER

USER'S MANUAL

Ver. 1.0.0

Contents

Safety 1

General 1

Electrical 1

Warning 1

Working Principle.....2

Unpacking Instructions 3

Specifications.....3

Installation 4

Instrument Introduction.....4

Appearance.....4

Operating Panel.....5

Button Description.....6

Instrument Operation.....6

Local Software Structure..... 6

Basic operation.....6

Measurement.....7

Measure the Absorbance.....7

Measure the Transmittance.....8

Two-points Method.....9

Coefficient Method.....10

Troubleshooting.....12

Safety:

The safety statements in this manual comply with the requirements of the HEALTH AND SAFETY AT WORK ACT, 1974.

Read the following before installing and using the instrument and its accessories. The V-1100D should be operated by appropriate laboratory technicians.

General:

The apparatus described in this manual is designed to be used by properly trained personnel in a suitable equipped laboratory. For the correct and safe use of this apparatus it is essential that laboratory personnel follow generally accepted safe procedures in addition to the safety precautions called for in this manual.

The covers on this instrument may be removed for servicing. However, the inside of the power supply unit is a hazardous area and its cover should not be removed under any circumstances. There are no serviceable components inside this power supply unit. For V-1100D, avoid touching the high voltage power supply at all times.

Some of the chemicals used in spectrophotometer are corrosive and/or inflammable and samples may be radioactive, toxic, or potentially infective. Care should be taken to follow the normal laboratory procedures for handling chemicals and samples.

Electrical:

The power requirement of V-1100D is from 85V to 265V. Make sure that the local power supply is within this range.

The power cord shall be inserted in a socket provided with a protective earth contact. The protective action must not be negated by the use of an extension cord without a protective conductor.

Warning:

Any interruption of the protective conductor inside or outside the apparatus or disconnection of the protective earth terminal is likely to make the apparatus dangerous. Intentional interruption is prohibited.

Whenever it is likely that the protection has been impaired, the apparatus shall be made inoperative and be secured against any unintended operation.

NEVER touch or handle the power supply on V-1100D due to the high voltage.
The protection is likely to be impaired if, for example, the apparatus

- Shows visible damage
- Fails to perform the intended measurements
- Has been subjected to prolonged storage under unfavorable conditions
- Has been subjected to severe transport stresses

Working Principle:

The spectrophotometer consists of five parts:

1) Halogen or deuterium lamp to supply the light;
2) A Mono-chromator to isolate the wavelength of interest and eliminate the unwanted second order radiation;
3) A sample compartment to accommodate the sample solution;
4) A detector to receive the transmitted light and convert it to an electrical signal;
5) A digital display to indicate absorbance or transmittance. The block diagram (Fig 1-1) below illustrates the relationship between these parts.

Block diagram for the Spectrophotometer

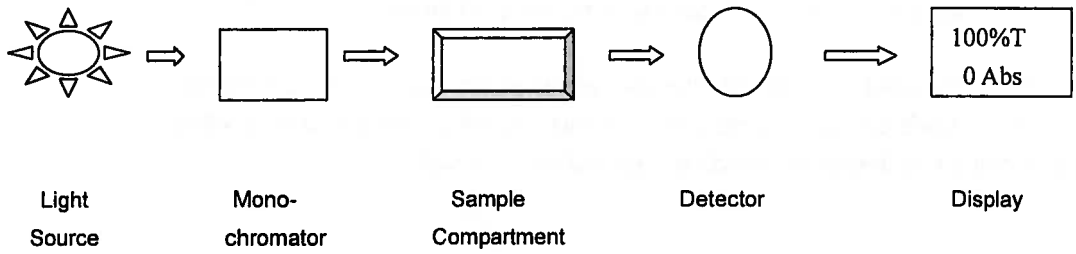


Fig1-1

In your spectrophotometer, light from the lamp is focused on the entrance slit of the monochromator where the collimating mirror directs the beam onto the grating. The grating disperses the light beam to produce the spectrum, a portion of which is focused on the exit slit of the monochromator by a collimating mirror. From here the beam is passed to a sample compartment through one of the filters, which helps to eliminate unwanted second order radiation from the diffraction grating. Upon leaving the sample compartment, the beam is passed to the silicon photodiode detector and causes the detector to produce an electrical signal that is displayed on the digital display.

Unpacking Instructions:

Carefully unpack the contents and check the materials against the following packing list to ensure that you have received everything in good condition.

Packing List

Description	Quantity
• *Spectrophotometer*	*1*
• *Mains Lead*	*1*
• *Cuvettes*	*1 Set of 4, glass*
• *Manual*	*1*

Specifications:

Model	V-1100D
Wavelength Range	325-1000nm
Spectral Bandwidth	4nm
Optical System	Single Beam, Grating 1200lines/mm
Wavelength Accuracy	±2nm
Wavelength Repeatability	1nm
Wavelength Resolution	0.5nm
Photometric Accuracy	±0.5%T
Photometric Repeatability	±0.3%T
Photometric Range	-0.3-3A, 0-200%T
Stray Light	0.3%T@360nm
Stability	±0.004A/h @500nm
Display	Graphic LCD (128X64 dots)
Keyboard	4 Button keypad
Photometric Mode	T, A, C, F
Detector	Photodiode
Sample Compartment	Standard 10mm path length cuvette holder Can accommodates 100mm path length cuvette with optional holder
Light Source	Tungsten lamp
Output	USB Port Parallel Port (printer)
Power Requirement	AC 85V ~ 265V
Dimensions (W x D x H)	480 x 360 x 160mm
Weight	10 kg

Installation:

1) After carefully unpacking the contents, check the materials with the packing list (pag. 3) to ensure that you have received everything in good condition.
2) Place the instrument in a suitable location away from direct sunlight.
3) In order to have the best performance from your instrument, keep it as far as possible from any strong magnetic or electrical fields or any electrical device that may generate high-frequency fields.
4) Set the unit up in an area that is free of dust, corrosive gases and strong vibrations.
5) Remove any obstructions or materials that could hinder the flow of air under and around the instrument.
6) Use the appropriate power cord and plug into a grounded outlet.
7) Turn on the instrument of V-1100D, it begins to self test. After that and 20 minutes' pre-warm, you can take any readings.

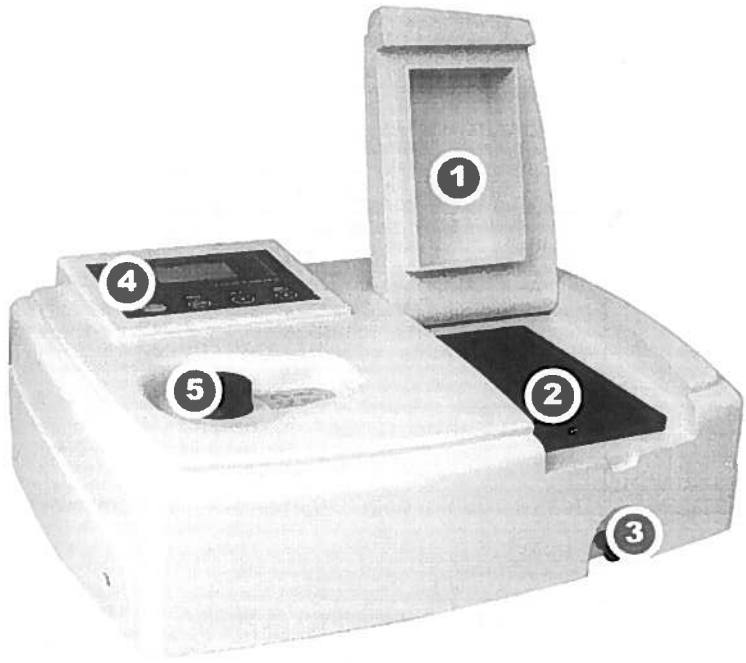
NOTE:

This symbol means Caution, Risk of Danger.

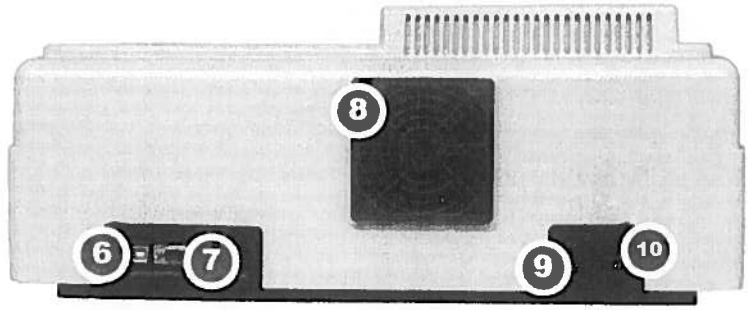
Instrument Introduction

1. Appearance

Please See Figure 3-1:



Main View



Backside

Fig. 3-1

1 — Lid of the compartment
2 — Cell Holder
3 — Pole
4 — Operating Panel
5 — Wavelength Knob
6 — USB Port
7 — Print Port
8 — Fan Cover
9 — Power Socket
10— Power Switch

2. Operating Panel

Please see the panel of V-1100D (Fig. 3-2)

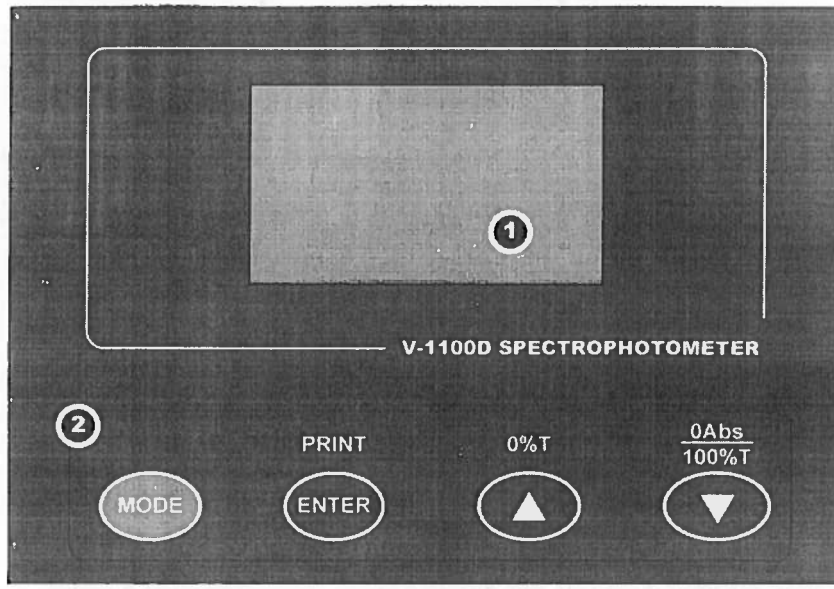


Fig. 3-2

1 — LCD (128 X 64)
2 — Key Button

3. Button Description

MODE Switch the Photometric Mode

ENTER Confirm/Print

▼ Decrease Number/Set Zero

▲ Increase Number/Set 100%T

Instrument Operation

1. Local Software Structure

Please see Fig. 4-1:

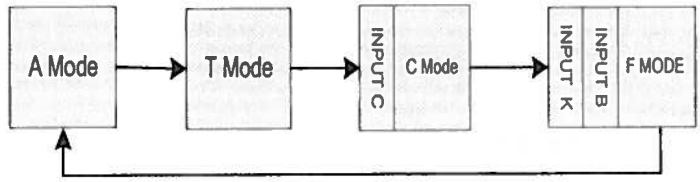


图 4-1

2. BASIC OPERATION

1) Select Test Mode

Press MODE to select the test mode.

2) Set Wavelength

Turn the Wavelength Setting Knob to select the wavelength you want, the wavelength Value can be displayed on the screen in real-time.

3) Input the Coefficient

When the system prompts you to input C, k or b, press ▲ or ▼ button to change the value till it displays the one you want, then press ENTER to confirm.

Note: The system will memorize your last input all the time until you input another value.

4) Calibrate Zero

Close the lid of the compartment and press ▼ to calibrate Zero.

5) Calibrate 100%T

Pull the Reference in the light path, press ▲ to calibrate 100%T。

6) Print the result

Press the Button of ENTER to print the test result.

Measurement

1. Measure the Absorbance

1) Press MODE to choose A mode (Fig.4-1)；

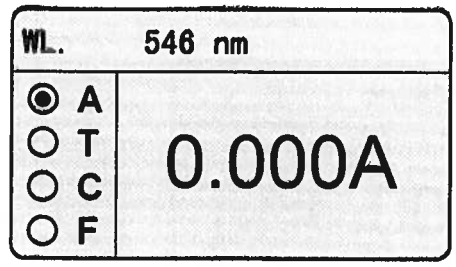


Fig. 4-1

2) Turn the wavelength knob till it displays the wavelength value you want.

3) Pull the Reference in the light path, press ▲ to set 100%T (Fig.4-2)；

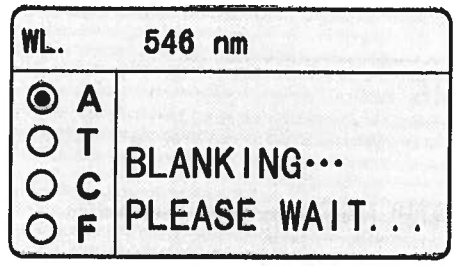


Fig. 4-2

4) Pull the unknown concentration sample in the light path, then record the displayed value (Fig. 4-3)。

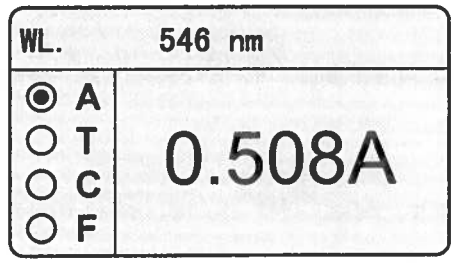


Fig. 4-3

5) Press ENTER to print the test result;

6) Repeat Step 4) and step 5) to test other unknown concentration samples.

2. Measure the Transmittance

1) Press MODE to choose the mode of "T" (Fig. 4-4);

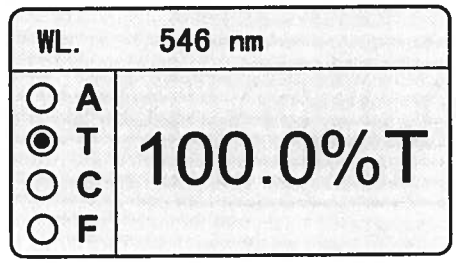


Fig. 4-4

2) Turn the Wavelength Knob to set the wavelength at the point you want;

3) Pull the Reference in the light path, press ▲ to calibrate 100%T (Fig. 4-5);

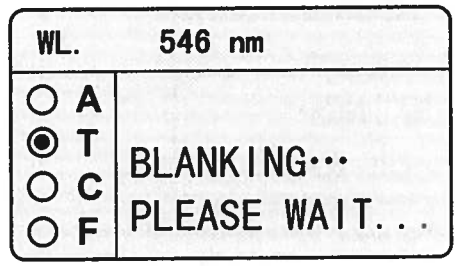


Fig. 4-5

4) Pull the Unknown Concentration Sample in the light path, then the value displayed on the screen is the one you need. (Fig. 4-6)。

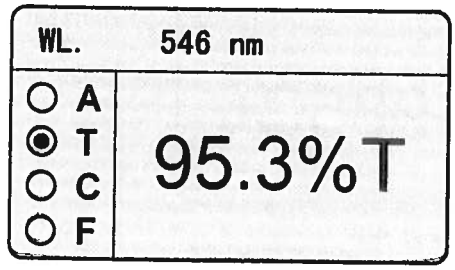


Fig. 4-6

5) Press ENTER to print the test result;

6) Repeat step 4 and step 5 to test other samples.

3. Two-point Method

If you have known a Standard Sample's concentration, and you want to know another sample's concentration, you can use this method.

1) Choose "A" or "T" Mode and turn the wavelength knob to set the wavelength.

2) Pull the Reference into the light path, press ▲ to get 100%T;

3) Pull the Standard sample into the light path and press MODE to choose "C"mode.

4) Press ▲ or ▼ to input the Standard Sample's Concentration, press ENTER to confirm. (Fig. 4-7)

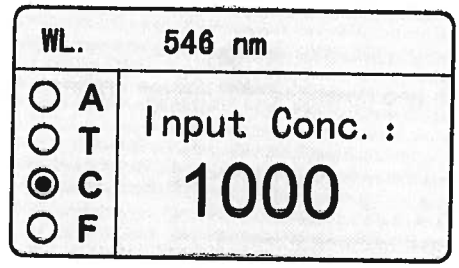


Fig. 4-7

5) Pull the unknown concentration sample in the light path, then its concentration displays on the screen. (Fig.4-8);

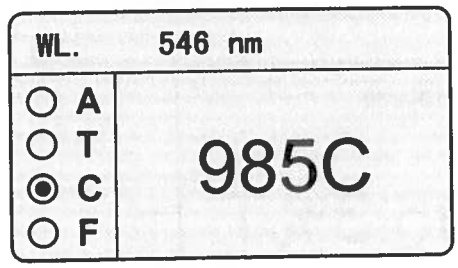


Fig. 4-8

6) Press ENTER to print the test result.

7) Repeat step5) and step 6) to test other samples.

4. Coefficient Method

1) Turn the Wavelength Knob to set the wavelength at the point you need.

2) Press MODE to choose "F" Mode.

3) Press ▲ or ▼ to set the coefficient value of K and B, followed with ENTER pressed to confirm. (Fig. 4-9) Then you can test the samples as the following steps.

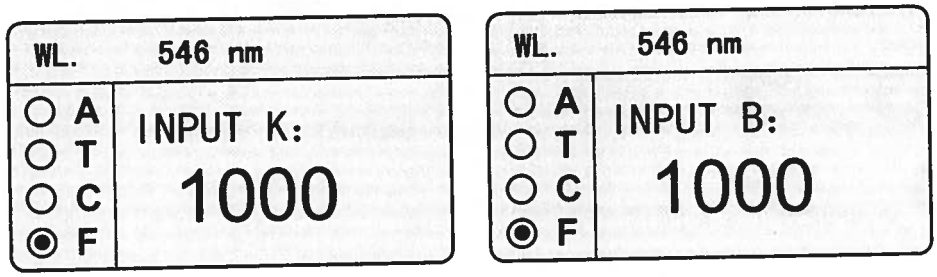


Fig. 4-9

4) Pull the Reference in the light path and press ▲ to set 100%T (Fig. 4-10);

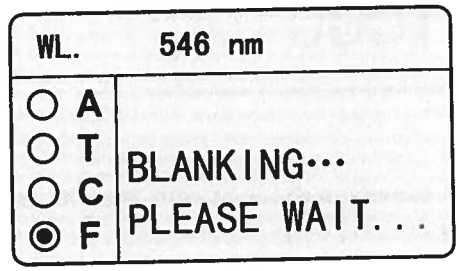


Fig. 4-10

5) Pull the samples in the light path. Then its concentration will be displayed on the

screen. automatically (Fig.4-11)

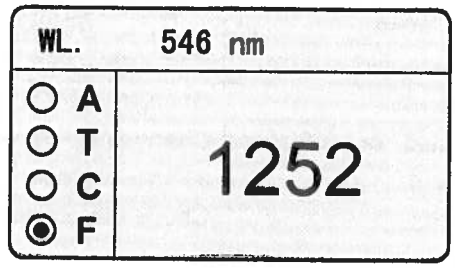


Fig. 4-11

6) Press ENTER to print the test result.

7) Repeat step 5) and step 6) to measure other samples.

Troubleshooting

PROBLEM	Possible Cause	Solution
No functioning after power is on .	Power cord not connected to outlet	Plug instrument in
	Dead Power outlet	Change to a different outlet
	Internal fuse melted or defective electronic component	Change fuse or call an authorized service engineer
Instrument cannot set 100%T (0A)	Light beam blocked: Holder misaligned	Check sample holder
	Lamp is old or defective	Replace lamp
	Lamp is off alignment	Readjust the lamp
	Defective electronic component	Call an authorized service engineer
unstable display	Insufficient warm up time	warm up at least 20 minutes
	Poor grounding	Check ground connection
	Excessive vibration, strong air current near light source ,or strong external light.	Improve working conditions
	Lamp old or defective	Replace with a new lamp
	Unstable power supply	equip a manostat to make the voltage stable
	Defective or dirty detector or defective electronic component	Call an authorized service engineer
incorrect readings obtained	Insufficient sample volume	Fill cuvette with more samples
	Wrong wavelength setting Failed to blank (0A/100%T)	Check analytical procedure and wavelength setting.
	Stray sample preparation vapors	Prepare sample away from instrument. Use proper ventilation
	Bubbles or particles in solution	Check sample preparation and analytical procedure
	Instrument out of electronic calibration	Call an authorized service engineer