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Model V-530/550/560/570

UV/VIS Spectrophotometer

Hardware/Function Manual

JASCO

P/N:0302-0256B November 2000

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Safety Considerations

To ensure operation safety, this instrument must be operated correctly and maintained regularly according to schedule. Carefully read to fully understand all safety precautions in this manual before operating the instrument. This manual denotes precautions against actions that can result in hazardous situations or equipment damage by using the signal words **WARNING**, **CAUTION**, and *Note*.

(1) Safety symbols



Instruction manual symbol. If the product is marked with this symbol, refer to the instrument manuals to protect the instrument against damage.

WARNING! A ***WARNING*** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

CAUTION A **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Do not proceed beyond a ***WARNING*** or **CAUTION** notice until you understand the hazardous conditions and have taken the appropriate steps.

Note A *Note* provides additional information to aid the operator in obtaining optimal instrument performance.

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(2) Warning Label

Warning labels are attached at several locations on this instrument. Do not remove, deface or damage the warning labels. If a warning label peels off the instrument or becomes illegible, contact your local JASCO distributor for a replacement label. Be sure to indicate the part number on the label.

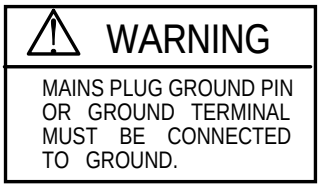
1) **Warning for FUSE** Fig.1 or Fig. 2



Part No.0822-xxxxA

Only use fuses of the designated rating to protect both operator and instrument from fire and other hazards. When replacing a fuse, refer to the hardware manual (4.4.1 Replacing the fuse). The warning labels that pertain to fuse ratings are located on the rear panel of the instrument.

2) **Warning for GROUND** Fig.1or Fig.2



Part No.0822-xxxxA

Be sure to ground the mains plug ground pin. Otherwise, ground the ground terminal on the rear panel of the instrument.

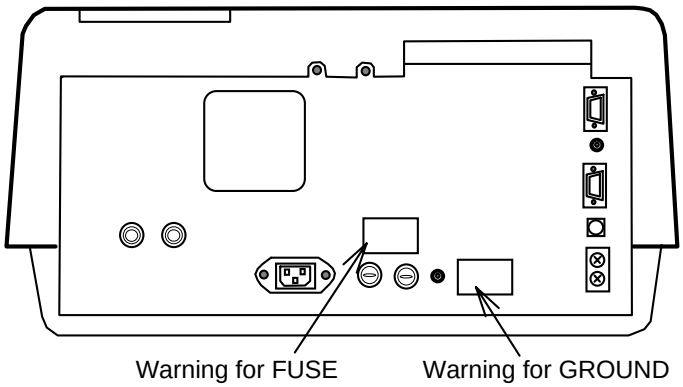


Fig. 1 Warning Labels on the V-530 Rear Panel

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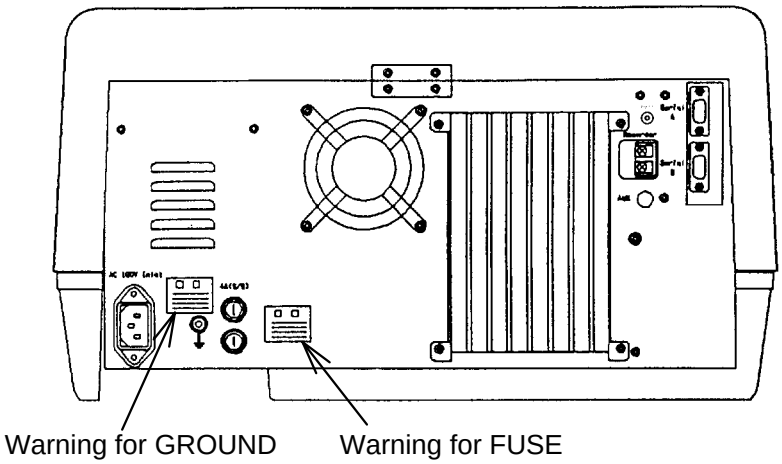


Fig. 2 Warning Labels on the V-550/560/570 Rear Panel

(2) Warning for carrying

These instruments weigh as follows:

V-530: 16.0 kg V-550: 30.5 kg

V-560: 32.0 kg V-570: 33.0 kg

When carrying the instrument, hold the carrying handle at the bottom of the instrument firmly (See Fig 3).

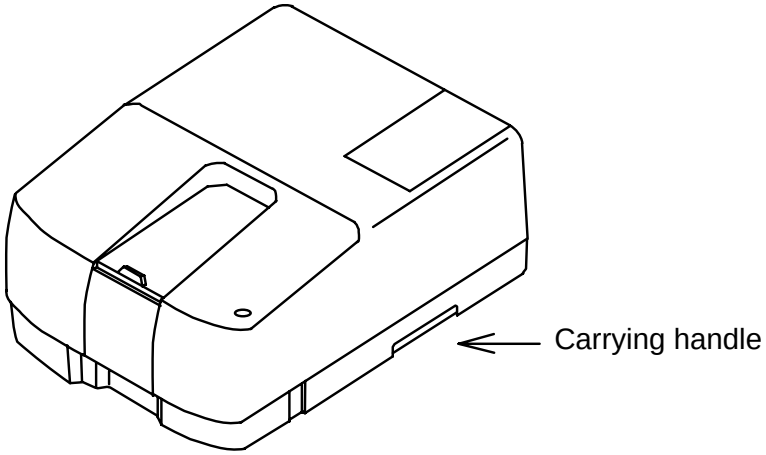


Fig 3 Example: V-550/560/570 side view

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Regulatory Statements

CE Notice

Marking with the symbol CE indicates compliance of this JASCO system to the EMC (Electromagnetic Compatibility) and Low Voltage Directives of the European Community. This symbol indicates that this JASCO system meets the relevant basic safety and health requirements of the EC Directive based on the following technical standards:

- EN55011 ---- "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment." ---- Group 1, Class A.

WARNING:	This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

- EN50082-1 ---- "Electromagnetic compatibility ---- Generic immunity standard Part 1: Residential, commercial, and light industry."
- IEC61000-4-2 ---- "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements." ---- Severity level 3.
- IEC61000-4-3 ---- "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiated electromagnetic field requirements." Severity level 2.
- IEC61000-4-4 ---- "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements." ---- Severity level 2.
- IEC1010-1: 1990 + Amd.1:1992 + Amd.2: 1995 ---- Safety requirements for electrical equipment for measurements, control and laboratory use.
- A "Declaration of Conformity" in accordance with the above standards has been made and is on file at JASCO EUROPE srl, Via Confalonieri 25, 22060 CREMELLA (Lc), Italy.

FCC Statement (for USA only)

Federal Communications Commission Radio Frequency Interference Statement

***WARNING*:**	This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Preface

This instruction manual serves as a guide for using this instrument. It is intended to instruct first-time operators on how to properly use the instrument, and to serve as a reference for experienced operators.

Before using the instrument, please read this instruction manual carefully, and make sure you fully understand its contents. This manual should be easily accessible to the operator at all times during instrument operation. When not using the instrument, keep this manual stored in a safe place. Should this instruction manual be lost, order a replacement from your local JASCO distributor.

This manual is made up of the following parts.

(1) Hardware manual
Describes the principles of operation, specifications, maintenance, and how to troubleshoot the instrument.
(2) Operation manual
Describes the configuration of the measurement program, functions, and operating procedures.
(3) Analysis manual
Describes the configuration of the Spectra Analysis and File Find program. (DS type)

Note: The operating procedure varies with the type of instrument. Operation is described by type. Read the portion relevant to your instrument.

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Installation Conditions

To ensure operation safety, observe the following conditions:

(1) Do not operate the instrument under voltage fluctuations exceeding 10% of the recommended line voltage. Otherwise, the instrument may not function properly.

(2) Use a three-prong electrical outlet with a ground.

(3) Operate the instrument in a temperature range of 10°~ 35°C.

(4) Operate the instrument in a humidity range of 35% ~ 85%(RH). If ambient humidity exceeds 85%(RH), condensation may deteriorate optical components.

(5) Operate the instrument in an atmospheric pressure range of 750 ~ 1060hPa.

(6) Avoid strong magnetic fields and sources of high frequency. The instrument may not function properly when near a strong magnetic field or high frequency source.

(7) Avoid vibration from vacuum pumps, electric motors, processing equipment and machine tools.

(8) Avoid dust and corrosive gas. Do not install the instrument where exposed to dust, especially in locations exposed to outside air or ventilation outlets that discharge dust particles.

(9) Do not install the instrument where exposed to direct sunlight.

(10) Ensure that no air conditioner blows air directly on the instrument. This may inhibit stable measurement.

Note:	*The above conditions do not ensure optimal performance of this instrument.*

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Servicing

To service your instrument, contact your local JASCO distributor. Also contact your JASCO distributor before moving the instrument to another location.
Consumable parts should be ordered according to part numbers from your local JASCO distributor. If a part number is unknown, give your JASCO distributor the model name and serial number of your instrument.

Do not return contaminated products and parts that may constitute health hazards to JASCO employees.

Notices

(1) JASCO SHALL NOT BE HELD LIABLE, EITHER DIRECTLY OR INDIRECTLY, FOR ANY CONSEQUENTIAL DAMAGE INCURRED AS A RESULT OF PRODUCT USE.
(2) PROHIBITIONS ON THE USE OF JASCO SOFTWARE
- COPYING SOFTWARE FOR PURPOSES OTHER THAN BACKUP
- TRANSFER OR LICENSING OF THE RIGHT TO USE SOFTWARE TO A THIRD PARTY
- DISCLOSURE OF CONFIDENTIAL INFORMATION REGARDING SOFTWARE
- MODIFICATION OF SOFTWARE
- USE OF SOFTWARE ON MULTIPLE WORKSTATIONS, NETWORK TERMINALS, OR BY OTHER METHODS (NOT APPLICABLE UNDER A NETWORK LICENSING AGREEMENT CONCLUDED WITH JASCO)

(3) THE CONTENTS OF THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE FOR PRODUCT IMPROVEMENTS.
(4) THIS MANUAL IS CONSIDERED COMPLETE AND ACCURATE AT PUBLICATION.
(5) THIS MANUAL DOES NOT GUARANTEE THE VALIDITY OF ANY PATENT RIGHTS OR OTHER RIGHTS.
(6) IN GENERAL, COMPANY NAMES AND PRODUCT NAMES ARE TRADEMARKS OR REGISTERED TRADMARKS OF THE RESPECTIVE COMPANIES.
(7) JASCO AND THE JASCO LOGO ARE REGISTERED TRADEMARKS OF JASCO CORPORATION.

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Limited Warranty

Products sold by JASCO, unless otherwise specified, are warranted for a period of one year from the date of shipment to be free of defects in materials and workmanship. If any defects in the product are found during this warranty period, JASCO will repair or replace the defective part(s) or product free of charge.

THIS WARRANTY DOES NOT APPLY TO DEFECTS RESULTING FROM THE FOLLOWING:

1) IMPROPER OR INADEQUATE INSTALLATION
2) IMPROPER OR INADEQUATE OPERATION, MAINTENANCE, ADJUSTMENT OR CALIBRATION
3) UNAUTHORIZED MODIFICATION OR MISUSE
4) USE OF CONSUMABLE PARTS NOT SUPPLIED BY AN AUTHORIZED JASCO DISTRIBUTOR
5) CORROSION DUE TO THE USE OF IMPROPER SOLVENTS, SAMPLES, OR DUE TO SURROUNDING GASES
6) ACCIDENTS BEYOND JASCO ' S CONTROL, INCLUDING NATURAL DISASTERS

This warranty does not cover the consumable parts listed below:

1) Deuterium lamp, tungsten lamp, xenon lamp and other light sources
2) Mirrors in the light source section, and cell windows
3) Fuses, batteries, glassware, chart paper and ink

The LC system only contains:

4) Plunger seals, needle seals, cell window gaskets, valve seals, disk seals and other seal materials
5) Tubing and fittings (e.g., ferrules, compression screws), and filters (e.g., inlet filters, line filters, other solvent filters)
6) Pre-columns and guard columns

THE WARRANTY FOR ALL PARTS SUPPLIED AND REPAIRS PROVIDED UNDER THIS WARRANTY EXPIRES ON THE WARRANTY EXPIRATION DATE OF THE ORIGINAL PRODUCT. FOR INQUIRIES CONCERNING REPAIR SERVICE, CONTACT YOUR JASCO DISTRIBUTOR AFTER CONFIRMING THE MODEL NAME AND SERIAL NUMBER OF YOUR INSTRUMENT.

JASCO Corporation
2967-5, Ishikawa-cho, Hachioji-shi
Tokyo 192-8537, JAPAN

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1 Specifications

The specifications of each model covered in this manual are given below. Refer to the Operations manual for software specifications.

1.1 V-530 UV/VIS Spectrophotometer Specifications

Optical system	Single monochromator UV/VIS region: 1200 lines/mm concave grating Rowland off-circle arrangement Double beam type
Resolution	2 nm
Light source	Deuterium lamp: 190 to 350 nm Halogen lamp: 330 to 1100 nm
Light source changeover wavelength	Any wavelength between 330 and 350 nm can be selected.
Wavelength range	190 to 1100 nm
Wavelength repeatability	±0.1 nm
Wavelength accuracy	±0.3 nm
Spectral bandwidth	2 nm fixed
Wavelength display	In increments of 0.1 nm
Photometric mode	Abs, %T. %R
Photometric range	-2.000 to 3.000 Abs (0 to 200 %T)
Photometric display	±10000 %T -2 to 5 Abs Four digits and (-)symbol
Photometric repeatability	±0.001 Abs (0 to 0.5 Abs) ±0.002 Abs (0.5 to 1 Abs)
Photometric accuracy	±0.002 Abs(0 to 0.5 Abs) ±0.004 Abs(0.5 to 1 Abs) ±0.3 %T Note: Tested with NIST SRM 930D
Response	Quick, Fast, Medium, Slow
Number of integrations	2, 8, 32, 128 times (1 datum/30msec)
Stray light	0.04 % (220 nm: NaI 10g/L aqueous solution; 340 nm: $NaNO_2$ 50g/L aqueous solution)
Wavelength scanning	40, 100, 200, 400, 1000, 2000, 4000 nm/min
Wavelength moving speed	8000 nm/min
Data pitch	0.1, 0.2, 0.5, 1, 2, 5, 10 nm/data (spectrum measurement) 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10 sec /data (time course measurement)
Baseline stability	±0.001 Abs/hour

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	(value obtained more than one hour after turning ON the power when temperature variation is within 5°C, wavelength: 250 nm, and response: Slow.)
Baseline flatness	±0.001 Abs (value obtained after baseline correction when temperature variation is within 5°C, wavelength: 200 to 1100 nm, response: Medium, and wavelength scanning: 100 nm/min.)
Detector	Silicon photodiode (S1337)
Power requirements	100, 115, 200, 220, 230, 240 V ±10 %, 130 W
Dimensions and weight	484(W)×435(D)×205(H) mm (excluding protrusions) 16 kg

Note: Photometric repeatability, photometric accuracy and baseline flatness are the values obtained more than one hour after the "Power" switch is turned ON.

1.2 V-550 UV/VIS Spectrophotometer Specifications

Optical system	Single monochromator UV/VIS region: 1200 lines/mm plane grating Czerny-Turner mount Double beam type
Resolution	0.1 nm
Light source	Deuterium lamp: 190 to 350 nm Halogen lamp: 330 to 900 nm
Light source changeover wavelength	Any wavelength between 330 and 350 nm can be selected.
Wavelength range	190 to 900 nm
Wavelength repeatability	±0.1 nm (at a spectral bandwidth of 0.5 nm)
Wavelength accuracy	±0.3 nm (at a spectral bandwidth of 0.5 nm)
Spectral bandwidth	0.1, 0.2, 0.5, 1, 2, 5, 10 nm L2, L5, L10 nm (low stray-light mode)
Wavelength display	In increments of 0.1 nm
Photometric mode	Abs, %T. %R, Sample, Reference
Photometric range	-2 to 3 Abs
Photometric display	0.0 to 200.0 %T -2 to 5 Abs Four digits and (-) symbol Displays up to 000.0 %T and 0.000 Abs
Photometric repeatability	±0.001 Abs (0 to 0.5 Abs)

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	±0.002 Abs (0.5 to 1 Abs)
Photometric accuracy	±0.002 Abs (0 to 0.5 Abs) ±0.004 Abs (0.5 to 1 Abs) ±0.3 %T Note: Tested with NIST SRM 930D
Response	Quick, Fast, Medium, Slow
Stray light	0.015 % (220 nm: NaI 10g/L aqueous solution; 340 nm: $NaNO_2$ 50g/L aqueous solution)
Wavelength scanning	10, 20, 40, 100, 200, 400, 1000, 2000, 4000 nm/min
Wavelength moving speed	8000 nm/min
Data pitch	0.025, 0.05, 0.1, 0.2, 0.5, 1, 2, 5,10 nm/data (spectrum measurement) 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 sec/data (time course measurement)
Baseline stability	±0.0004 Abs/hour (value obtained more than one hour after turning ON the power when temperature variation is within 5°C, wavelength: 250 nm, response: Slow, and spectral bandwidth: 2nm.)
Baseline flatness	±0.001 Abs (value obtained after baseline correction when temperature variation is within 5°C, wavelength: 200 to 850 nm, response: Medium, spectral bandwidth: 2 nm, and wavelength scanning: 100 nm/min)
Detector	Photomultiplier tube
Power requirements	100, 115, 200, 220, 230, 240 V ±10 %, 130 W
Dimensions and weight	460(W)×595(D)×260(H)mm (excluding protrusions) 30.5 kg

Note: Photometric repeatability, photometric accuracy and baseline flatness are the values obtained more than one hour after the "Power" switch is turned ON.

1.3 V-560 UV/VIS Spectrophotometer Specifications

Optical system	Double monochromator UV/VIS region: 600 lines/mm plane grating Czerny-Turner mount Double beam type
Resolution	0.1 nm

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Light source	Deuterium lamp: 190 to 350 nm Halogen lamp: 330 to 900 nm
Light source changeover wavelength	Any wavelength between 330 and 350 nm can be selected.
Wavelength range	190 to 900 nm
Wavelength repeatability	±0.1 nm (at a spectral bandwidth of 0.5 nm)
Wavelength accuracy	±0.3 nm (at a spectral bandwidth of 0.5 nm)
Spectral bandwidth	0.1, 0.2, 0.5, 1, 2, 5, 10 nm L2, L5, L10 nm (low stray-light mode)
Wavelength display	In increments of 0.1 nm
Photometric mode	Abs, %T. %R, Sample, Reference
Photometric range	-2 to 5 Abs
Photometric display	0.0 to 200.0 %T -2 to 5 Abs Four digits and (-) symbol Displays up to 000.0 %T and 0.000 Abs
Photometric repeatability	±0.001 Abs (0 to 0.5 Abs) ±0.002 Abs (0.5 to 1 Abs)
Photometric accuracy	±0.002 Abs (0 to 0.5 Abs) ±0.004 Abs (0.5 to 1 Abs) ±0.3 %T Note: Tested with NIST SRM 930D
Response	Quick, Fast, Medium, Slow
Stray light	0.0003 % (220 nm: NaI 10g/L aqueous solution; 340 nm: $NaNO_2$ 50g/L aqueous solution)
Wavelength scanning speed	10, 20, 40, 100, 200, 400, 1000, 2000, 4000 nm/min
Wavelength moving speed	8000 nm/min
Data pitch	0.025, 0.05, 0.1, 0.2, 0.5, 1, 2, 5,10 nm/data (spectrum measurement) 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 sec/data (time course measurement)
Baseline stability	±0.0004 Abs/hour (value obtained more than one hour after turning ON the power when temperature variation is within 5°C, wavelength: 250 nm, response: Slow, and spectral bandwidth: 2nm)
Baseline flatness	±0.001 Abs (value obtained after baseline correction when temperature variation is within 5°C, wavelength: 200 to 850 nm, response: Medium, spectral bandwidth: 2 nm, and wavelength scanning speed: 100 nm/min)
Detector	Photomultiplier tube
Power requirements	100, 115, 200, 220, 230, 240 V ±10 %, 130 W

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Dimensions and weight	460(W)×595(D)×260(H)mm (excluding protrusions) 32 kg

Note: Photometric repeatability, photometric accuracy and baseline flatness are the values obtained more than one hour after the "Power" switch is turned ON.

1.4 V-570 UV/VIS/NIR Spectrophotometer Specifications

Optical system	Single monochromator UV/VIS region: 1200 lines/mm plane grating NIR region: 300 lines/mm plane grating Czerny-Turner mount Double beam type
Resolution	0.1 nm (UV/VIS region) 0.5 nm (NIR region)
Light source	Deuterium lamp: 190 to 350 nm Halogen lamp: 330 to 2500 nm
Light source changeover wavelength	Any wavelength between 330 and 350 nm can be selected.
Detector changeover wavelength	Any wavelength between 750 and 900 nm can be selected.
Wavelength range	190 to 2500 nm
Wavelength repeatability	
UV/VIS region:	±0.1 nm (at a spectral bandwidth of 0.5 nm)
NIR region:	±0.4 nm (at a spectral bandwidth of 2.0 nm)
Wavelength accuracy	
UV/VIS region:	±0.3 nm (at a spectral bandwidth of 0.5 nm)
NIR region:	±1.5 nm (at a spectral bandwidth of 2.0 nm)
Spectral bandwidth	0.1, 0.2, 0.5, 1, 2, 5, 10 nm (UV/VIS region) L2, L5, L10 nm (low stray-light mode) 0.4, 0.8, 1, 2, 4, 8, 20, 40 nm (NIR region)
Wavelength display	In increments of 0.1 nm
Photometric mode	Abs, %T. %R, Sample, Reference
Photometric range	-2 to 3 Abs (UV/VIS region) -0.3 to 3 Abs (NIR region)
Photometric display	0.0 to 200.0 %T -2 to 5 Abs Four digits and (-) symbol Displays up to 000.0 %T and 0.000 Abs
Photometric repeatability	±0.001 Abs (0 to 0.5 Abs) ±0.002 Abs (0.5 to 1 Abs)
Photometric accuracy	±0.002 Abs (0 to 0.5 Abs)

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	±0.004 Abs (0.5 to 1 Abs) ±0.3 %T Note: Tested with NIST SRM 930D
Response	Quick, Fast, Medium, Slow
Stray light	
UV/VIS region:	0.015% (220 nm: NaI 10g/L aqueous solution; 340 nm: $NaNO_2$ 50g/L aqueous solution)
NIR region:	0.1% (1690 nm: CH_2Br_2 10 mm cell used)
Wavelength scanning speed	10, 20, 40, 100, 200, 400, 1000, 2000, 4000 nm/min
Wavelength moving speed	8000 nm/min(UV/VIS region) 32000 nm/min(NIR region)
Data pitch	0.025, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10 nm/data (UV/VIR spectrum measurement) 0.1, 0.2, 0.5, 1, 2 , 5, 10 nm/data (NIR spectrum measurement) 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 sec /data (time course measurement)
Baseline stability	±0.0004 Abs/hour (value obtained more than one hour after turning ON the power when temperature variation is within 5°C, wavelength: 250 nm, response: Slow, and spectral bandwidth: 2nm)
Baseline flatness	±0.001 Abs (value obtained after baseline correction when temperature variation is within 5°C, wavelength: 250 to 850 nm, response: Medium, spectral bandwidth: 2 nm, and wavelength scanning speed: 400 nm/min, wavelength: 850 to 2500 nm, spectral bandwidth: 8 nm,)
Detector	Photomultiplier tube Pbs photoconductive cell
Power requirements	100, 115, 200, 220, 230, 240 V ±10 %, 180 W
Dimensions and weight	
Main unit	460(W)×595(D)×260(H) mm (excluding protrusions) 33 kg
Pbs power supply unit	100(W)×170(D)×125(H) mm (excluding protrusions) 1.9 kg

Note: Photometric repeatability, photometric accuracy and baseline flatness are the values obtained more than one hour after the "Power" switch is turned ON.

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2 General Description of Instrument

2.1 V-530 Spectrophotometer Optical System

2.1.1 Optical System

The V-530 is designed to measure the absorption spectrum of a sample at wavelengths in the range 190 to 1100 nm. The light sources used in the V-530 are a deuterium(D_2) lamp (190 to 350 nm) for the UV region and a halogen (WI) lamp (340 to 1100 nm) for the VIS/NIR region. The light from the light source is converged and enters the monochromator. The light is dispersed by the grating in the monochromator and converges onto the exit slit. The light that has passed through the exit slit is monochromated. This light is split into two beams, one going to the sample to be measured and the other to the reference sample such as a solvent. The light that has passed through the sample and the reference sample is alternately incident upon the silicon photodiode.

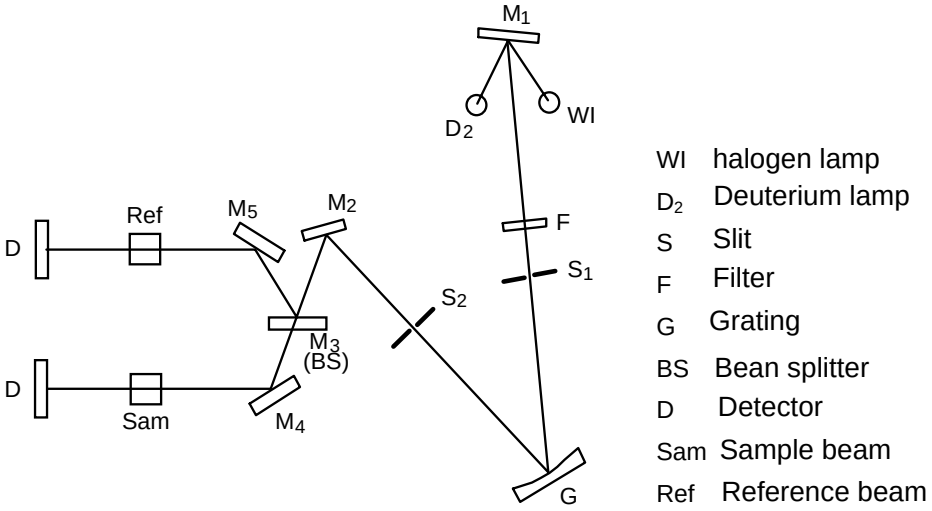


Fig 2.1 V-530 Optical system

2.1.2 Electrical System

The configuration of the electrical system used in the V-530 is shown in Fig 2.2. The light incident upon the silicon photodiode is converted into an electrical signal and, after being subjected to synchronous rectification, is converted into a digital signal and enters the microcomputer. The signal processed by the microcomputer is displayed on the display unit as digital data or a spectrum.

Actions such as light source changeover, wavelength drive, filter drive, etc. are controlled by the microcomputer.

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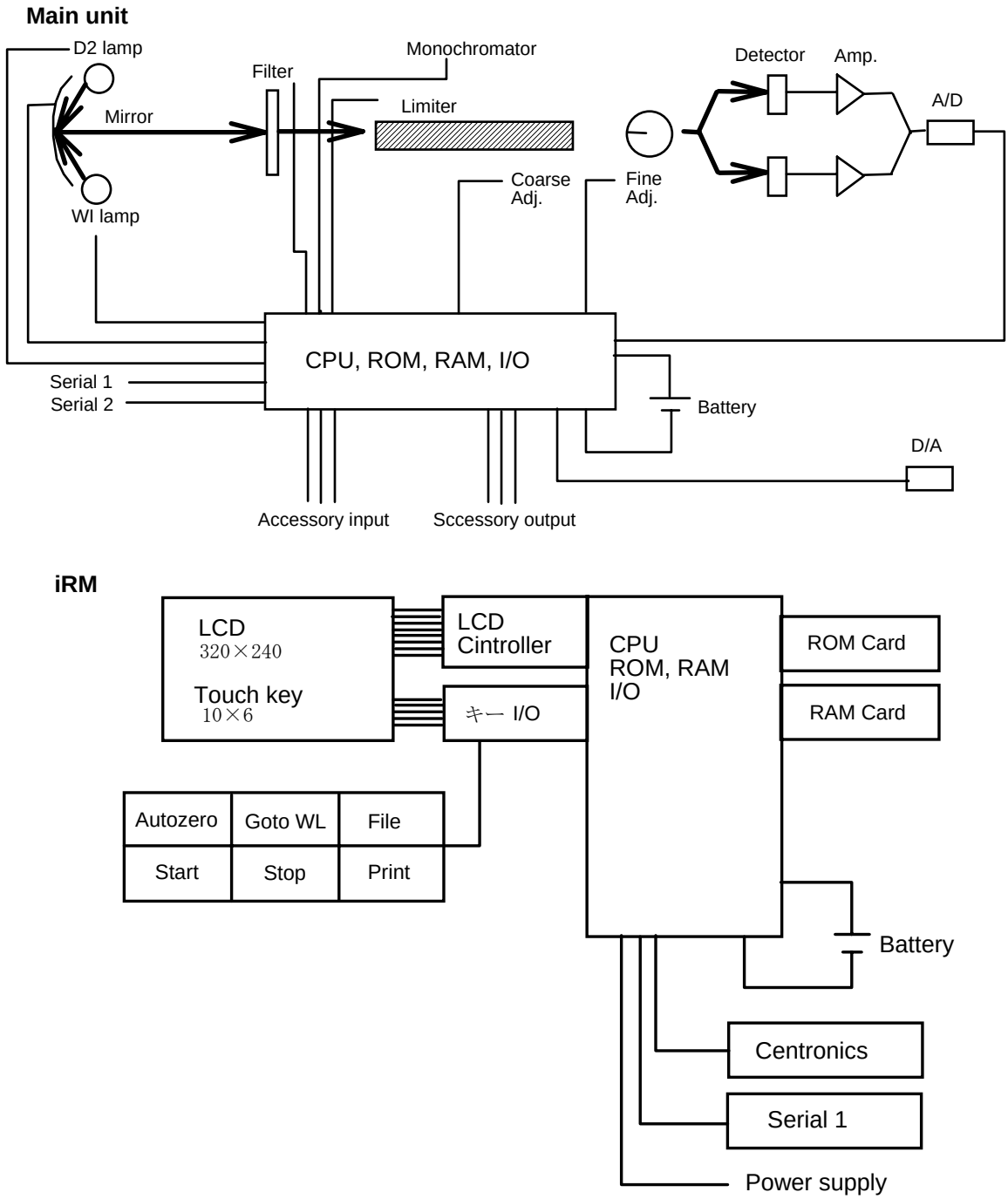


Fig. 2.2 V-530 Electrical system

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2.2 V-550/560/570 Spectrophotometers Optical System

2.2.1 Optical System

Figures 2.3 through 2.5 show the optical systems of the V-550, V-560 and V–570 spectrophotometers, respectively. The V-550 and V-560 measure the absorption spectrum of a sample at wavelengths in the range 190 to 900 nm and the V-570 measures the absorption spectrum of a sample at wavelengths in the range 190 to 2500 nm. In each model, the light sources used are a deuterium (D_2) lamp (190 to 350 nm) for use in the ultraviolet region and Halogen (WI) lamp (340 to 2500 nm) for use in the VIS/NIR region. The light from the light source is converged and enters the monochromator. It is dispersed by the grating in the monochromator and the light passing through the exit slit is monochromated. This light is split into two light paths by a sector mirror, one incident on the sample to be measured and the other on the reference sample such as a solvent. The light that has passed through the sample and reference sample is incident on the photomultiplier tube or Pbs photoconductive cell.

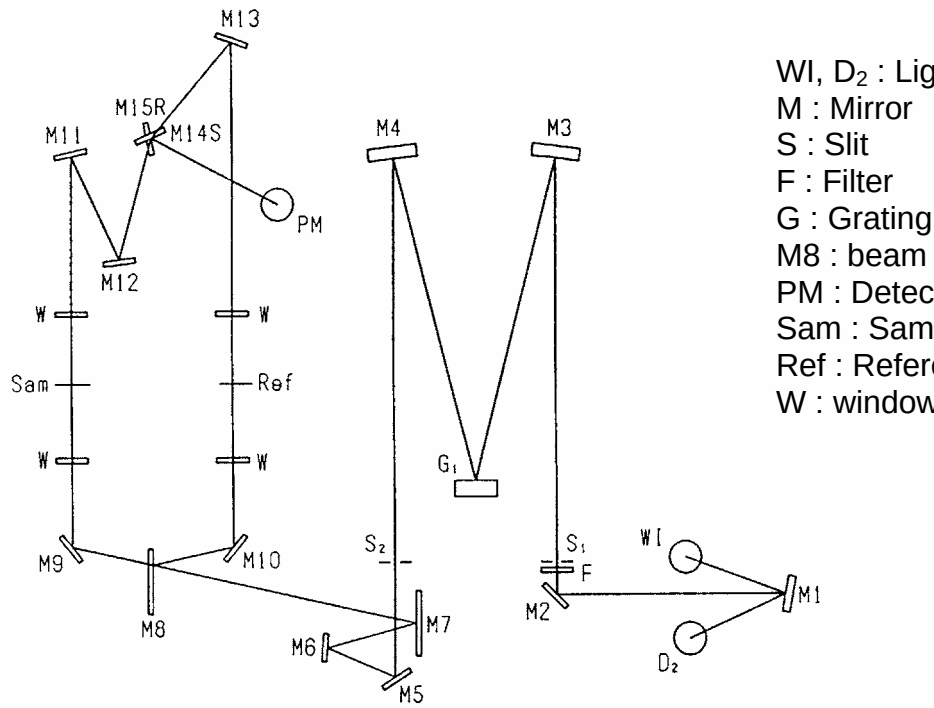
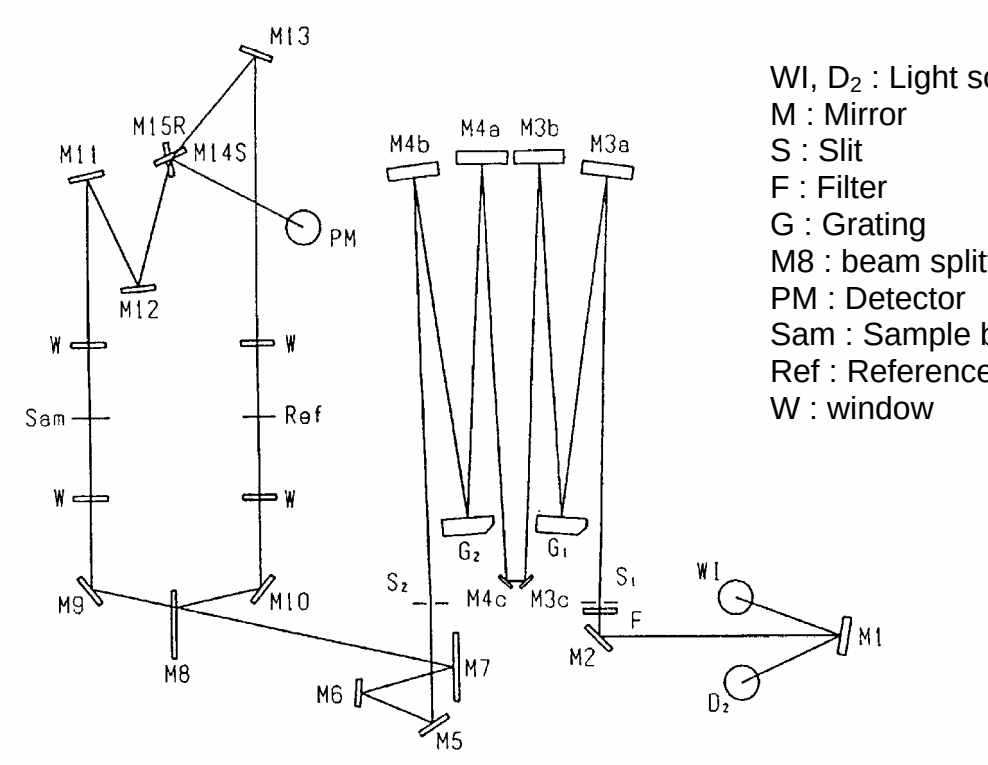


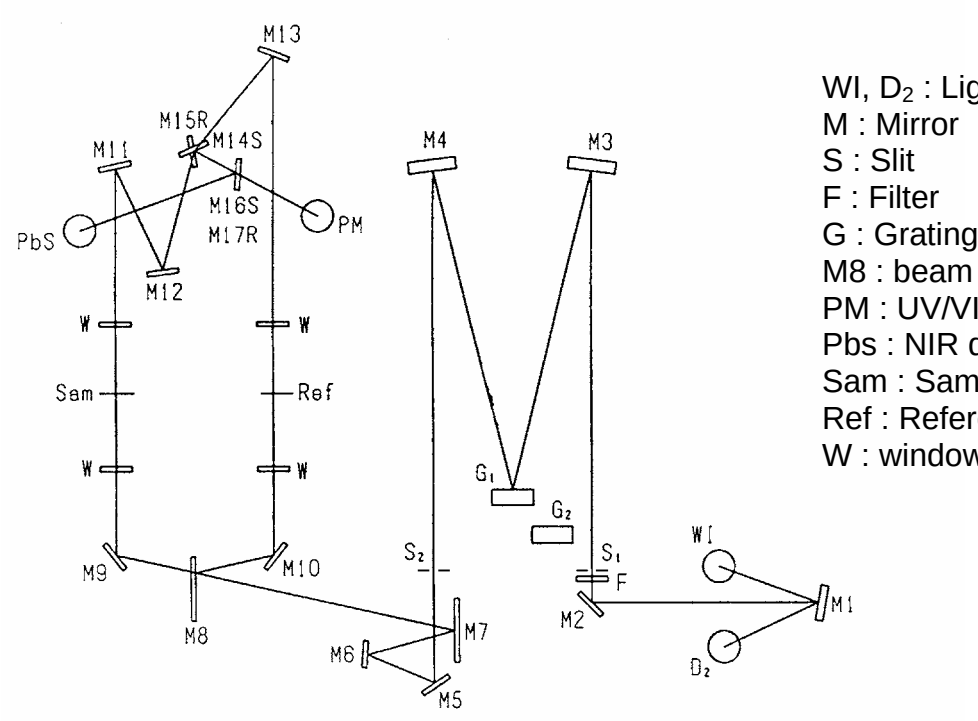
Fig 2.3 V-550 Optical system

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WI, D_2 : Light source
M : Mirror
S : Slit
F : Filter
G : Grating
M8 : beam splitter
PM : Detector
Sam : Sample beam
Ref : Reference beam
W : window

Fig 2.4 V-560 Optical system



WI, D_2 : Light source
M : Mirror
S : Slit
F : Filter
G : Grating
M8 : beam splitter
PM : UV/VIS Detector
Pbs : NIR detector
Sam : Sample beam
Ref : Reference beam
W : window

Fig 2.5 V-570 Optical system

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2.2.2 Electrical System

Figure 2.6 shows the configuration of the electrical system used in the V-550, V-560 and V-570. The light incident on the photomultiplier tube or Pbs photoconductive cell is converted into an electrical signal and, after being synchronously rectified, is converted into digital form and enters the microcomputer. The signal processed by the microcomputer is displayed on the output device as digital data or a spectrum.

Light source changeover, wavelength drive, slit drive, filter drive, etc. are controlled by the microcomputer.

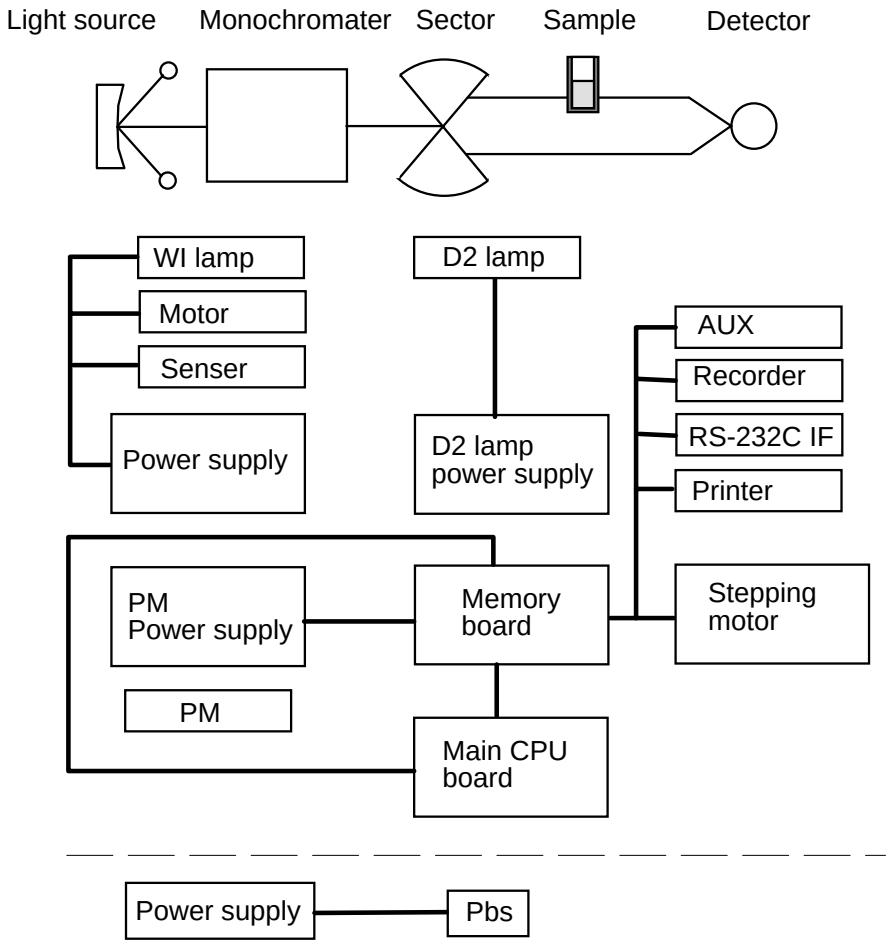


Fig 2.6 V-550/560/570 Electrical system

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3 Nomenclature and Functions of Components

3.1 V-530 Spectrophotometer: Overview

3.1.1 Overview

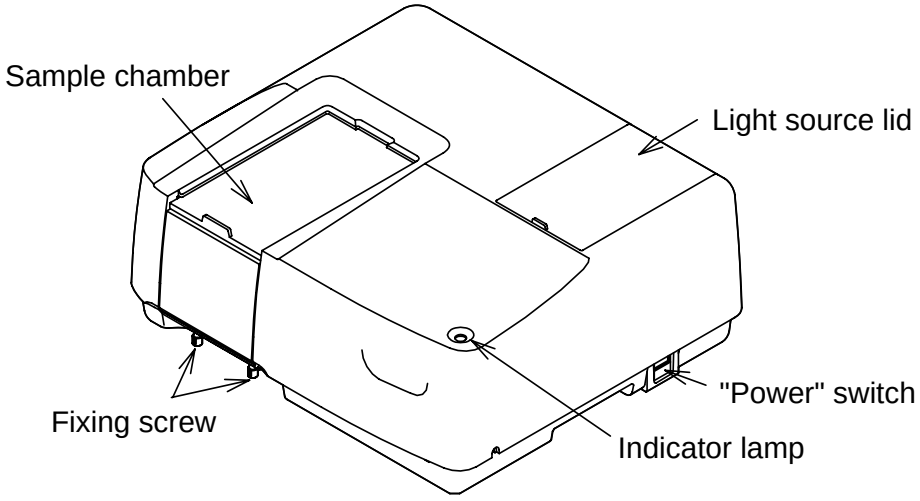


Fig. 3.1 Overview

Component	Function
Sample chamber	Slide the lid to open and gain access to the reference and sample cell holders. The cell holder closest to the front of the instrument is the sample cell holder.
Fixing screws	Fixes the sample chamber in position. To mount the optional sample chamber, loosen these screws and remove the standard sample chamber.
“Power” switch	The indicator lamp is lit when power is on.
Indicator lamp	
Light source lid	Lift to open and gain access to the light source.

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3.1.2 Rear Panel

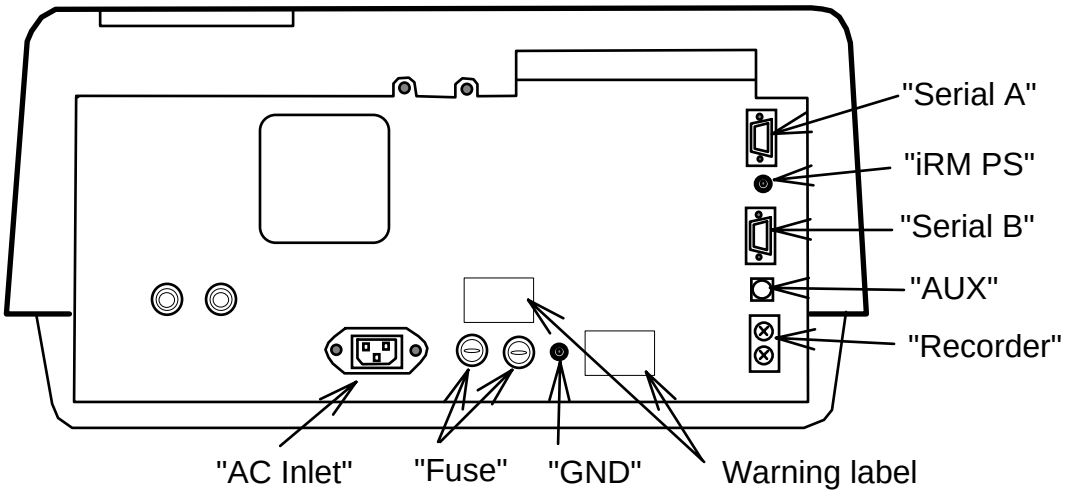


Fig. 3.2 V-530 rear panel

Component	Function
AC Inlet	Accepts the power cable.
GND	Grounding terminal
Fuse	Fuses for the main unit (two time-lag fuses)
iRM PS	Accepts the remote module power cable.
Printer	Connector for connecting the printer/plotter cable
Serial A	Connector for connecting the communication cable to DS or iRM
Serial B	Connector for connecting theRS-232C cable
Recorder	Terminal for analog output. The value specified by setting the ordinate is recorded in the range 0 to 1 V.
AUX	Auxiliary connector for connecting an accessory, such as a quick flow sampler.
Warning label	Warning labels for fuse and ground (see page ii)

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3.2 V-550/560/570 Spectrophotometers: Overview

3.2.1 Overview

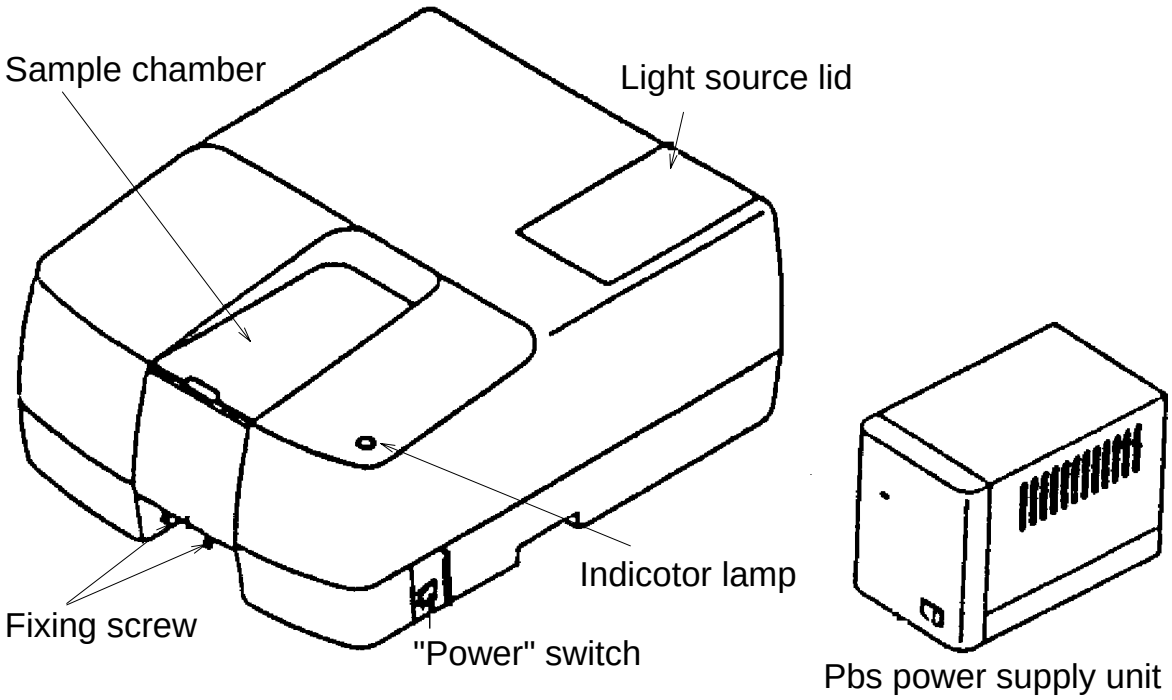


Fig. 3.3 V-550/560/570 overview

Component	Function
Sample chamber	Slide the lid to open and gain access to the reference and sample cell holders. The cell holder closest to the front of the instrument is the sample cell holder.
Fixing screws	Fix the sample chamber in position. To mount the optional sample chamber, loosen these screws and remove the standard sample chamber.
“Power” switch	The indicator lamp is lit when power is on.
Indicator lamp	
Light source lid	Lift to open and gain access to the light source.
Pbs power supply unit	<V-570 only> Power supply unit for the V-570 detector.

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3.2.2 Rear Panel

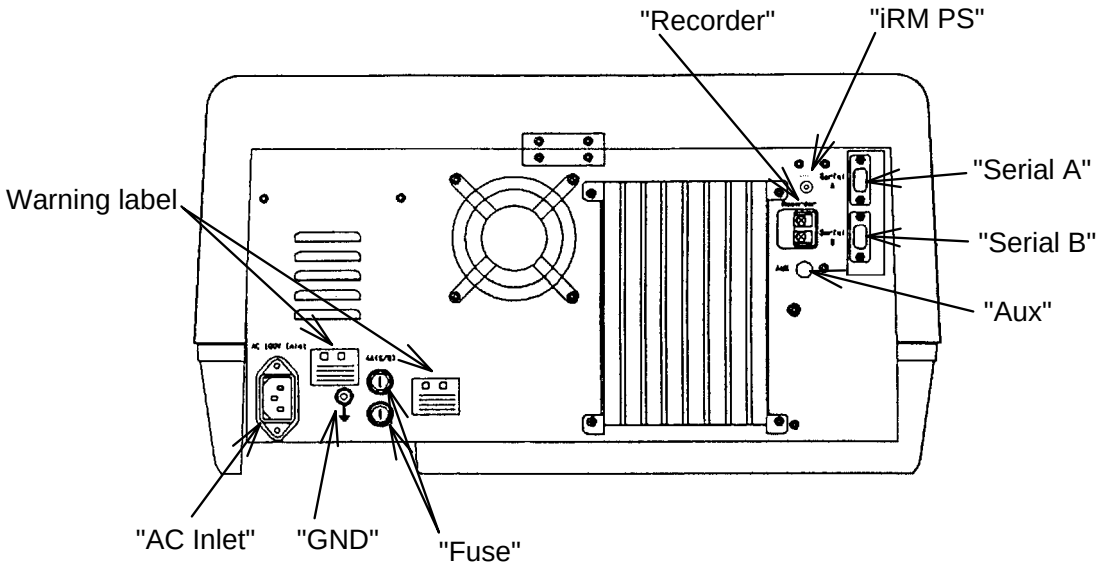


Fig. 3.4 V-550/560/570 Rear panel

Component	Function
AC Inlet	Accepts the power input cable.
GND	Ground terminal
Fuse	Fuses for the main unit (two time-lag fuses)
iRM PS	Accepts the remote module power cable.
Serial A	Connector for connecting the communication cable to DS or iRM
Serial B	Connector for connecting the RS-232C cable.
Recorder	Terminal for analog output. The value specified by setting the ordinate is recorded in the range 0 to 1 V.
AUX	Auxiliary connector for connecting an accessory, such as a quick flow sampler.
Warning label	Warning labels for fuse and ground (see page ii).

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3.3 Standard Sample Chamber

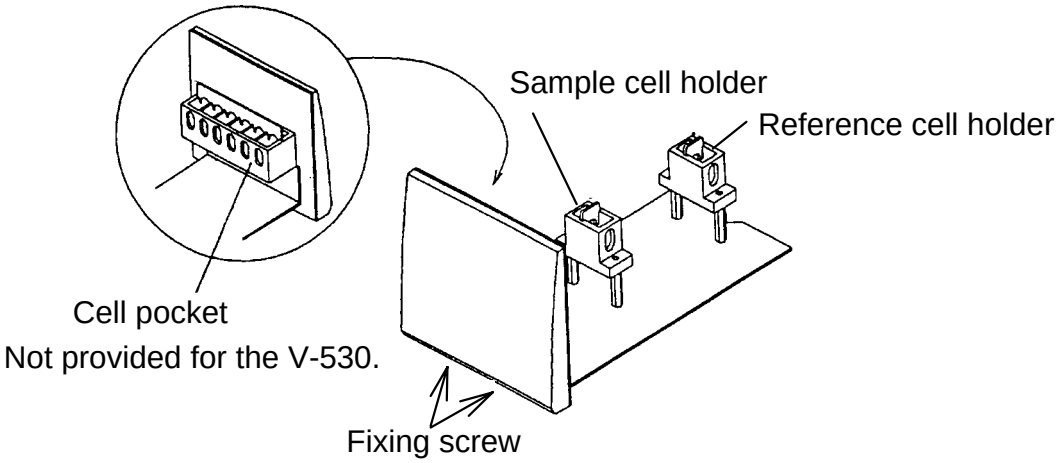


Fig. 3.5 Standard Sample Chamber

Component	Function
Fixing screws	Fix the sample chamber in position. To mount the optional sample chamber, loosen these screws and remove the standard sample chamber.
Sample cell holder	Mount the cell containing the sample here.
Reference cell holder	Mount the cell containing the reference solvent here.
Cell pocket	Holder in which cells can be placed temporarily. Not provided with the V-530.

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3.4 Intelligent Remote Module

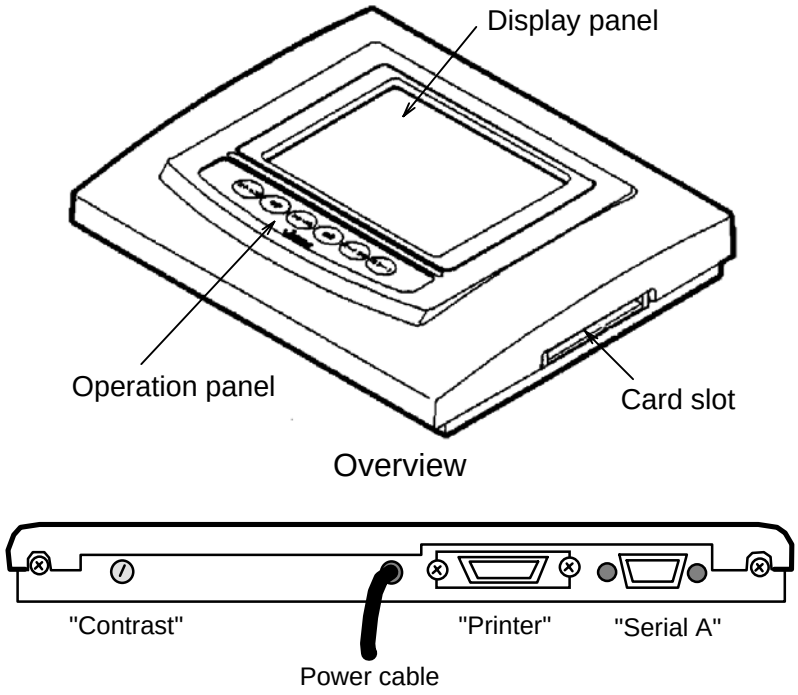


Fig. 3.6 Intelligent remote module

Component	Function
Display panel	320x240 pixel LCD. Displays wavelength, absorbance, measurement parameters, etc. Also used for selecting menus, and editing measurement parameters via the touch key pad.
Operation panel	Contains keys for operating the monochromator, printer, etc.
[Stop]	Press to stop measurement.
[Print]	Press to print out data, measurement parameters, etc.
[File]	Press to save/load parameters and data.
[GotoWL]	Press to move to a different wavelength.
[Autozero]	Press to “zero” absorbance (or 100%T).
[Start]	Press to start measurement.
Card slot	Accepts a memory card.
Rear panel	
Contrast	Turn to adjust the contrast of the display panel.
Power cable	Connects to the “iRM PS” connector on the rear of the main unit.
Printer	Connector for connecting a printer cable
Serial A	Connector for connecting Serial A on the rear of the main unit

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4 Maintenance

This section contains instructions on how to clean the sample chamber when a sample is spilt, how to run the performance check to see if the instrument is operating normally, and on replacing consumables.

Give consideration to the environment in which the instrument is to be operated. Keep the instrument and surrounding area clean so that the spectrophotometer may be used in a stabilized condition over a long period.

Note1: The operating procedure varies with the type of instrument. Operation is described by instrument type. Read the portion relevant to your instrument.

Note2: It is recommended that the validation program (optional) is used for the performance check.

4.1 Cautions for Routine Operation

(1) Before operating the instrument, allow the instrument to warm-up for at least 15 minutes after turning the power on.
(2) Do not place anything on the instrument.
(3) When measurement is complete, remove the sample from the sample chamber.

4.2 Cleaning the Sample Chamber

If a sample is spilt in the sample chamber, quickly wipe up the spillage with gauze or similar material, remove the sample chamber, and clean it using the following procedure.

CAUTION: Use ethanol to clean the sample chamber. Do not use other types of organic solvent as this may remove the instrument paint.

(1) Removing the sample chamber
   a) Open the sample chamber lid and loosen the two fixing screws on the front underside of the sample chamber by hand (see Fig. 3.1 or Fig. 3.3).
   b) Pull the sample chamber toward you a little and lift to remove the sample chamber holder along with the cell holders.

(2) Cleaning the sample chamber

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<<**When the sample is soluble in water**>>
Wipe up the spilt sample with gauze or similar material. Remove any trace of the spillage with gauze soaked in water. Finally, remove moisture content with gauze soaked in ethanol and allow to dry.

<<**When the sample is insoluble in water**>>
Wipe up the spilt sample with gauze or similar material. Remove any trace of the spillage with gauze soaked in ethanol and allow to dry.

(3) Remounting the sample chamber
a) Locate the sample chamber over the two positioning pins on the main unit and move it all the way to the back.
b) Ensure that light is incident upon the center of the cell holder. To check it visually, set the wavelength to 500 nm and place a piece of white paper in front of the cell holder.
c) Firmly tighten the two fixing screws and close the lid.

4.3 Performance Check: Data Station Type

A performance check should be **run** approx. once a month to ensure the **normal** instrument performance. If the instrument is not operating properly, conduct checks and take corrective action after referring to the troubleshooting chart in Section 5. After taking corrective action, run the performance check again to verify that the instrument has been restored to normal.

Note:	*This section provides a simple description of operating procedures. For details, refer to the Operations manual.*

Baseline flatness	Refer to Section 4.3.1
Wavelength repeatability	Refer to Section 4.3.2
Wavelength accuracy	Refer to Section 4.3.3

4.3.1 Baseline (Abs 0 line) Flatness

This check should be performed more than one hour after turning the instrument on.

(1) Start the [Spectrum Measurement] program from the [Spectra Manager] window.
(2) Click [Measurement]-[Spectrum Parameters...] and set parameters as follows:

V-530 measurement parameters V-550/560/570 measurement

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		parameters	
Photometric Mode	Abs	Photometric Mode	Abs
Response	Medium	Response	Medium
Scanning Speed	200 nm/min	Band Width	2.0 nm
Start	1000 nm	Scanning Speed	200 nm/min
End	200 nm	Start	850 nm
Data Pitch	1.0 nm	End	200 nm
Display	-0.005~+0.005	Data Pitch	1.0 nm
No of Cycles	1	Display	-0.005~+0.005
		No of Cycles	1

(3) Measure the baseline as follows.
   a) Click [Measurement]-[Baseline...]. The [Baseline Correction] dialog box appears.
   b) Click the <Measure...> button to display the [Baseline Measurement] dialog box.
   c) Make sure that the sample chamber is empty and then click the <Start> button. The baseline is measured and stored in the memory of the spectrophotometer.

Note: This data is used for correcting the baseline spectrum (0 Abs line) to be measured in (4) below.

(4) Measure baseline spectrum (0 Abs line) as follows. Click the <Start> button to measure the baseline spectrum (0 Abs line) using the above parameters with the sample chamber empty. A measurement example is shown in Fig 4.1.

(5) The baseline flatness is normal if the measurement result is within the following criterion.

<V-530 criterion>	Within ±0.001 Abs (1000 ~ 200 nm)
<V-550/560/570 criterion>	Within ±0.001 Abs (850 ~ 200 nm)

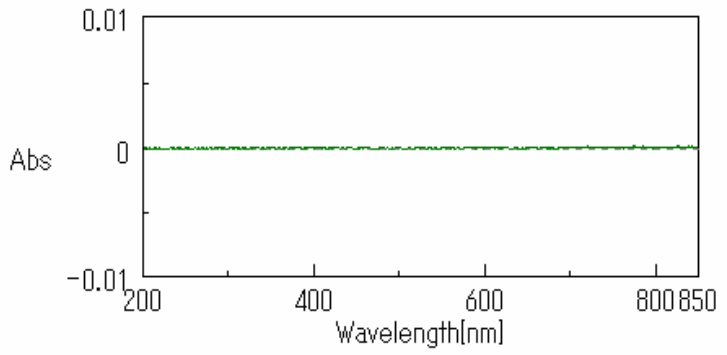


Fig 4.1 Baseline flatness (V-550/560/570)

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4.3.2 Wavelength Repeatability

To check wavelength repeatability, measure the spectrum of the Deuterium (D_2) lamp with an emission line at 656.1 nm three times repeatedly.

(1) Light the D_2 lamp as follows.

a) Start [Environment] from the [Spectra Manager] window. The [Environment] dialog box appears.

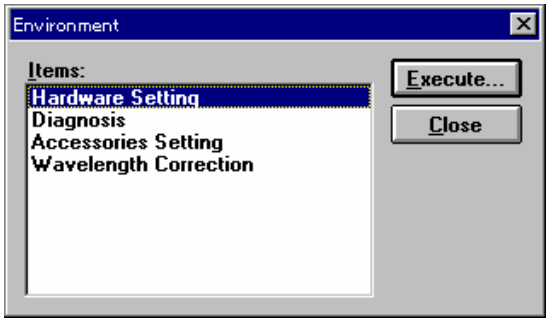


Fig. 4.2 [Environment] dialog box

b) Select [Hardware Setting] and then click the <Execute...> button. The following dialog box appears.

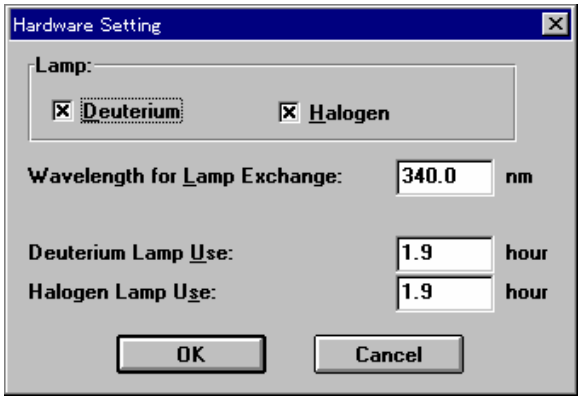


Fig. 4.3 [Hardware Setting] dialog box

c) Check the [Deuterium] box and uncheck the [Halogen] box.

d) Click <OK> to close the dialog box. Only the D_2 lamp is lit.

(2) Start [Spectrum Measurement] from the [Spectra Manager] window and set the following parameters.

V-530 Measurement parameters V-550/560/570 measurement

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		parameters	
Photometric Mode	Sample	Photometric Mode	Sample
Response	Fast	Response	Fast
Scanning Speed	40 nm/min	Band Width	0.5 nm
Start	658 nm	Scanning Speed	10 nm/min
End	654 nm	Start	658 nm
Data Pitch	0.1 nm	End	654 nm
Display	0~100	Data Pitch	0.025 nm
No of Cycles	3	Display	0~100
Cycle Time	1 sec	PMT Voltage	300 V
		No of Cycles	3
		Cycle Time	1 sec

Note: PMT voltage varies with the instrument. Set properly.

<**Automatic spectrum save parameters**>

[Auto Save] Select (Check)
[File name] Enter a filename (up to 5 characters)

(3) With the sample chamber empty, measure the spectrum of the D_2 lamp with an emission line at 656.1 nm three times.

(4) Start [Spectra Analysis] from the [Spectra Manager] window and overlay the three spectra in a View (refer to the "Spectra Analysis Operation Manual"). An example is shown in Fig 4.4.

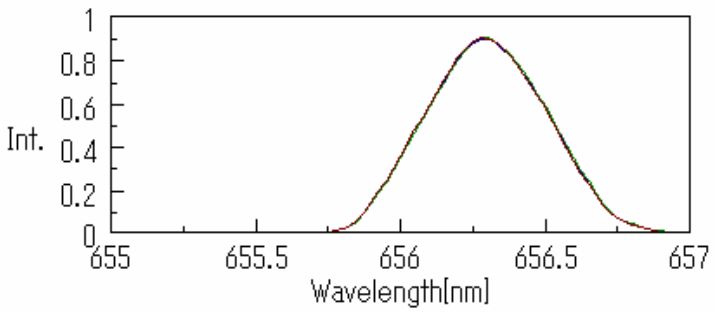


Fig. 4.4 D_2 lamp spectra with an emission line at 656.1 nm

(5) The wavelength repeatability is normal if it is within the following criterion.

Criterion: Within ±0.1 nm of the average value of the peaks of the spectrum with an emission line at 656.1 nm

(6) Display the [Environment] menu again and return to the original settings (i.e. check the [Deuterium] and [Halogen] boxes).

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4.3.3 Wavelength Accuracy

To check wavelength accuracy, measure the spectra of the D_2 lamp with an emission line at 656.1 nm and 486.0 nm.

(1) Light only the Deuterium lamp (see item (1) in Section 4.3.2).

(2) Start [Spectrum Measurement] from the [Spectra Manager] window and set the following parameters.

<<**Parameters for spectrum with an emission line at 656.1 nm**>>

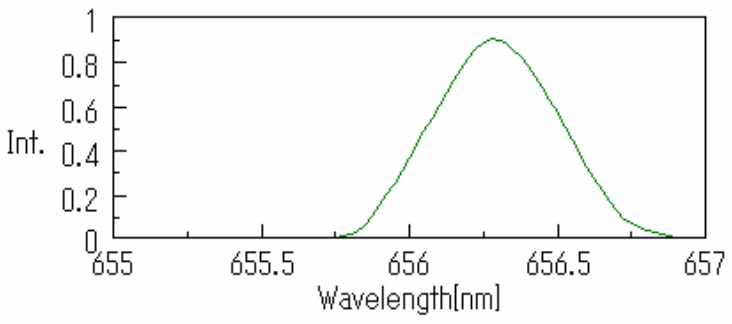
V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Photometric Mode	Sample	Photometric Mode	Sample
Response	Fast	Response	Fast
Scanning Speed	40 nm/min	Band Width	0.5 nm
Start	658 nm	Scanning Speed	10 nm/min
End	654 nm	Start	658 nm
Data Pitch	0.1 nm	End	654 nm
Display	0~100	Data Pitch	0.025 nm
No. of Cycles	1	Display	0~100
		PMT Voltage	300 V
		No. of Cycles	1

Note: PMT voltage varies with the instrument. Set properly.

<<**Parameters for spectrum with an emission line 486.0 nm**>>

Start 488 nm
End 484 nm
All other parameter settings are the same parameters as shown above.

(3) Measure the spectrum of the D_2 lamp with an emission line at 656.1 nm and at 486.0 nm with the sample chamber empty. Measurement examples are shown in Fig. 4.5 and Fig. 4.6.



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Fig. 4.5 D_2 lamp spectrum with emission line at 656.1 nm

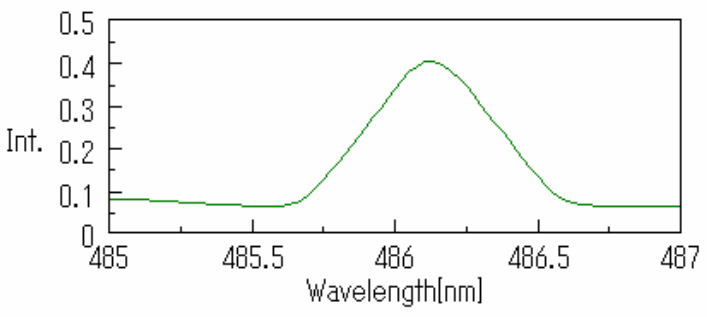


Fig. 4.6 D_2 lamp spectrum with emission line at 486.0 nm

(4) Wavelength accuracy is normal if the measurement result in within the following criteria.

<V-530 criteria>	Within 656.1 ± 0.5 nm
	Within 486.0 ± 0.5 nm
<V-550/560/570 criteria>	Within 656.1 ± 0.3 nm
	Within 486.0 ± 0.3 nm

(5) Display the [Environment] menu again and return to the original settings (i.e. check the [Deuterium] and [Halogen] boxes).

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4.4 Performance Check: Intelligent Remote Module Type

A performance check should be **run** approx. once a month to ensure the **normal** instrument performance. If the instrument is not operating properly, conduct checks and take corrective action after referring to the troubleshooting chart in Section 5. After taking corrective action, run the performance check again to verify that the instrument has been restored to normal.

Note:	*This section provides a simple description of operating procedures. For details, refer to the Operations manual.*

Baseline flatness	Refer to Section 4.4.1
Wavelength repeatability	Refer to Section 4.4.2
Wavelength accuracy	Refer to Section 4.4.3

4.4.1 Baseline (Abs 0 line) Flatness

This check should be performed more than one hour after turning the instrument on.

(1) Select [Spectrum] from the main menu and measure the baseline of the entire region after setting the following parameters. (Refer to Section 5-4 of the Operations manual.)

Response	Medium
Scanning speed	100 nm/min

This data is stored in the baseline memory.

Note:	*This data is used for correcting the baseline spectrum (0 Abs line) to be measured in (2) below.*

(2) Set the following parameter and measure the baseline spectrum (0 Abs line) with the sample chamber empty. (Refer to Section 5-3 of the Operations manual.) A measurement example is shown in Fig 4.1.

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Phtmtrc mode	Abs	Phtmtrc mode	Abs
Response	Medium	Response	Medium
Start WL	1000 nm	Band width	10 nm
End WL	200 nm	Start WL	850 nm
Data interval	1.0 nm	End WL	200 nm

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Scan. speed	200 nm/min	Data interval	1.0 nm
No. of Cycles	1	Scan. speed	200 nm/min
Lower scale	-0.005 or more	No. of Cycles1	
Upper scale	+0.005 Abs	Lower scale	-0.005 or more
		Upper scale	+0.005 Abs

(3) The baseline flatness is normal if the measurement result is within the following criterion.

<V-530 criterion>	Within ±0.001 Abs (1000 200 nm)
<V-550/560/570 criterion>	Within ±0.001 Abs (850 200 nm)

4.4.2 Wavelength Repeatability

Measure the spectrum of the deuterium(D_2) lamp with an emission line at 656.1 nm three times repeatedly to check its repeatability.

(1) Select [Envir] from the main menu to display the [Environment] menu.
(2) From the [Environment] menu, select [Other] to display the [Other] screen.
(3) Set the light source to [D2] (to light only the Deuterium lamp). (Refer to Section 9-7 of the Operations manual.)
(4) Select [Single Beam] from the [Environment] menu to display the [Single Beam] screen.
(5) Display the [Parameter] screen and set the following parameters.

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Phtmtrc mode	Sam	Phtmtrc mode	Sam
Response	Fast	Response	Fast
Start WL	658 nm	Band width	0.5 nm
End WL	654 nm	Start WL	658 nm
Data interval	0.1 nm	End WL	654 nm
Scan. speed	40 nm/min	Data interval	0.025 nm
No. of Cycles	3	Scan. speed	10 nm/min
Lower scale	0	No. of Cycles	3
Upper scale	100	Lower scale	0
		Upper scale	100
		HT Voltage	300 V

Note: PMT voltage varies with instrument. Set accordingly.

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(6) Measure the single beam spectrum with the sample chamber empty three times to obtain three D_2 lamp spectra with an emission line at 656.1 nm. A measurement example is shown in Fig 4.4.
(7) The wavelength repeatability is normal if it is within the following criterion.

Criterion: Within ±0.1 nm of the average value of the peak of the emission line spectrum at 656.1 nm

(8) Display the [Others] screen again and return to the original settings (WI and D2).

4.4.3 Wavelength Accuracy

Measure the spectra of the D_2 lamp with emission lines at 656.1 nm and at 486.0 nm and read the peak wavelength.

(1) Light only the Deuterium lamp by following items (1) to (3) in Section 4.4.2.
(2) Select [Single Beam] from the [Environment] menu to display the [Single Beam] screen. (Refer to Section 9-5 of the Operations manual.)
(3) Display the [Parameter] screen and set the following parameters.

<<Parameters for spectrum with an emission line 656.1 nm>>

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Phtmtrc mode	Sam	Phtmtrc mode	Sam
Response	Fast	Response	Fast
Start WL	658 nm	Band width	0.5 nm
End WL	654 nm	Start WL	658 nm
Data interval	0.1 nm	End WL	654 nm
Scan. speed	40 nm/min	Data interval	0.025 nm
No. of Cycles	1	Scan. speed	10 nm/min
Lower scale	0	No. of Cycles	1
Upper scale	100	Lower scale	0
		Upper scale	100
		HT Voltage	300 V

Note: PMT voltage varies with the instrument. Set accordingly.

<<Parameters for spectrum with an emission line 486.0 nm>>

Start WL 488 nm
End WL 484 nm
All other parameter settings are the same as shown above.

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(4) Measure the single beam spectrum with the sample chamber empty to obtain the emission line spectra of the D_2 lamp. Measurement examples are shown in Fig 4.5 and Fig. 4.6.
(5) Wavelength accuracy is normal if the measurement results are within the following criteria.

<V-530 criteria>	Within 656.1	0.5 nm
	Within 486.0	0.5 nm
<V-550/560/570 criteria>	Within 656.1	0.3 nm
	Within 486.0	0.3 nm

(6) Display the [Others] screen again and return to the original settings (WI & D2).

4.5 Replacement of Consumables

4.5.1 Replacement of Fuse

The instruments covered in this manual use 2A time-lag type fuses when using a 100 V voltage supply and 1A time-lag type fuses when using a 200 V voltage supply.

100 V to 120 V:	2A time-lag type fuse
200 V to 240 V:	1A time-lag type fuse

***WARNING*:** Only use fuses of the rated capacity to prevent injury to personnel and instrument overheating.

***WARNING*:** Always turn Off the “Power” switch and unplug the AC power cable from the outlet before replacing a fuse.

Use the following procedure when replacing a fuse.

(1) Turn off the power and unplug the AC power cable from the outlet.
(2) Insert a flat-headed screwdriver into the fuse holder at the rear of instrument (Fig. 4.7). Push and turn about 90° counterclockwise to remove the fuse holder and fuse.
(3) Remove the old fuse and insert a new fuse into the holder. Replace the fuse holder, and push and turn the holder 90° clockwise to lock.
(4) Plug the power cable into the electrical outlet and turn on the power to operate the unit.

If the fuse blows again soon after replacement, contact your local JASCO distributor.

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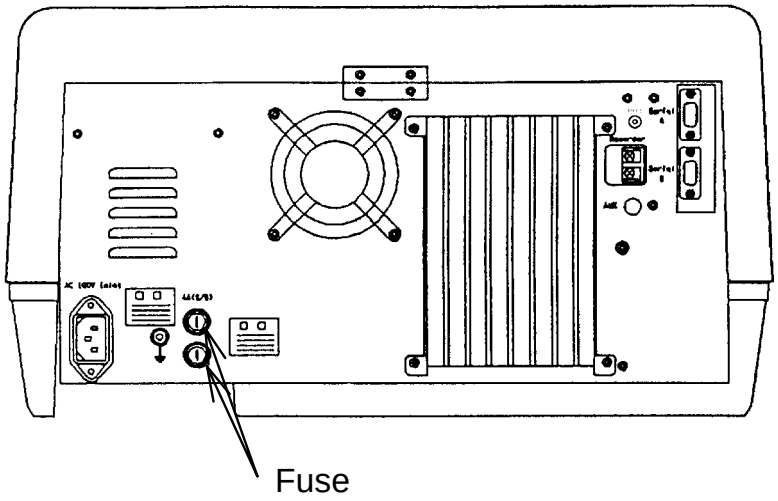


Fig. 4.7 V-550/560/570 rear panel

4.5.2 Lamp Replacement and Adjusting the Light Source Mirror

The lifetime of both the Deuterium(D_2) lamp and the Halogen (WI) lamp is approx. 1000 hours. After prolonged use, luminous energy decrease in turn causing the level of noise in the measured data to increase.

4.5.2.1 Lamp Replacement

WARNINGS:

(1) The lamp is hot when lit. Therefore, before replacing the lamp, switch off the light source and wait for at least 10 minutes.
(2) Before attempting to replace the lamp, turn off the power and remove the power cable from the outlet.

CAUTIONS:

(1) Loosen only the screws required for lamp replacement.
(2) When handling the lamp, ware clean, cloth gloves. Never handle the lamp with bare hands.
(3) Never touch the mirror or any other optical elements by hand.
(4) If the lamp surface is contaminated, clean it with gauze soaked in ethanol and wipe it with dry clean gauze.

<<**Replacement of Halogen(WI) lamp**>>

(1) Slide the outer lid of the light source unit to remove it and then remove the inner lid (Fig 4.8).

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(2) Pull out the Halogen lamp from the socket (Fig. 4.9 or Fig. 4.10).
(3) Insert a new Halogen lamp into the socket.
(4) For the DS type, adjust the light source mirror as described in Section 4.5.2.2. For the iRM type, adjust the light source mirror as described in Section 4.5.2.3.

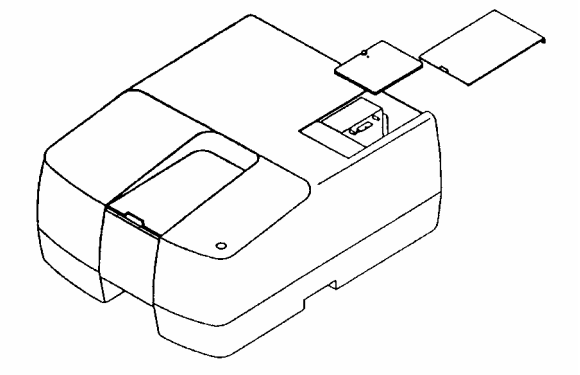


Fig. 4.8 Removal of light source lid (V-550/560/570)

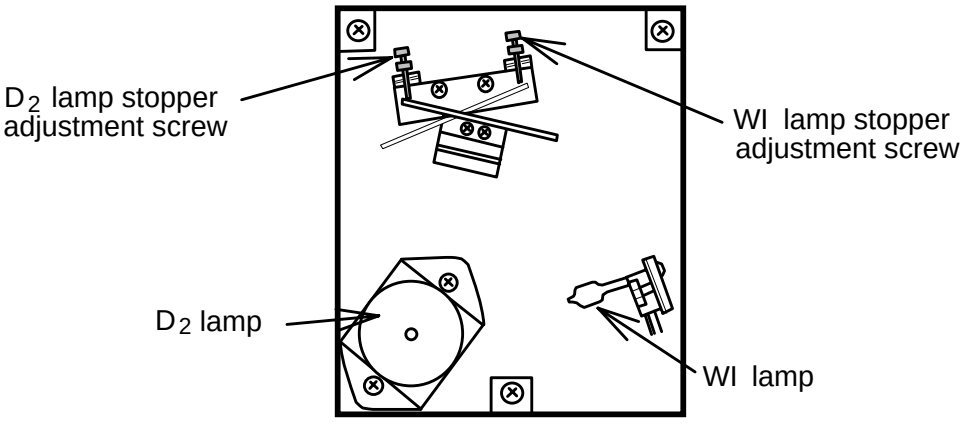


Fig. 4.9 Light source unit (V-530)

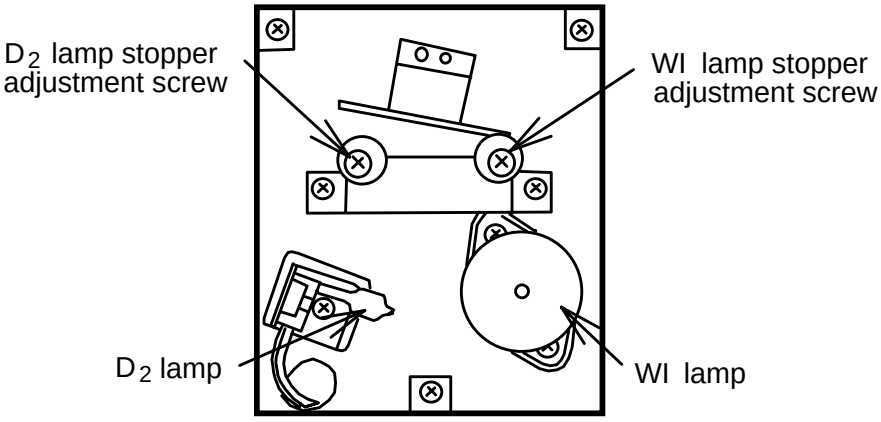


Fig. 4.10 Light source unit (V-550/560/570)

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<<**Replacement of Deuterium lamp**>>

(1) Slide the outer lid of the light source unit to remove it and then remove the inner lid (Fig 4.8).
(2) Pull out the Deuterium lamp from the socket (Fig. 4.9 or Fig. 4.10).
(3) Insert a new deuterium lamp into the socket.
(4) For the DS type, adjust the light source mirror as described in Section 4.5.2.2. With the iRM type, adjust the light source mirror as described in Section 4.5.2.3.

4.5.2.2 Adjustment of DS type light source mirror

When the light source is replaced, if the beam from the lamp is not incident upon the entrance slit, troubles will arise, such as lack of luminous energy, bend of the baseline, and deviation of the measurement value. Whenever the lamp is replaced, be sure to adjust the light source mirror.

WARNINGS:

(1) The lamp is hot when lit. Do not touch with bare hands.
(2) Wear glasses (ordinary glasses or sunglasses) during adjustment to protect your eyes from ultraviolet rays.
(3) Do not touch the wiring either with your hand or with a screwdriver. Contact with the wiring may cause electric shock.

CAUTION: Loosen only the screws required for adjustment.

<<**Adjustment of light source mirror for Halogen lamp**>>

(1) Turn on the instrument.
(2) Start [Time Course Measurement] from the [Spectra Manager] window and set the following parameters.

V-530 measurement parameters	
Photometric mode	Sample
Response	Fast
Wavelength	500 nm
Start Time	0 sec
End Time	60 sec
Data Pitch	5.00 sec

V-550/560/570 measurement parameters	
Photometric mode	Sample
Response	Fast
Band Width	2.0 nm
Wavelength	500 nm
Start Time	0 sec
End Time	60 sec
Data Pitch	5.00 sec
PMT Voltage	200 V

Note: PMT voltage differs with instrument. Set accordingly.

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CAUTION: Do not loosen screws other than the adjustment screw for the stopper.

(3) Turn the WI lamp stopper adjustment screw (Fig 4.9 or Fig, 4.10) and search for a position where the data value (value displayed on the CRT) is maximum.
(4) Replace the inner lid and outer lid of the light source unit.

<<**Adjustment of light source mirror for Deuterium lamp**>>
(1) Turn on the instrument.
(2) Start [Time Course Measurement] from the [Spectra Manager] window and set the following parameters.

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Photometric mode	Sample	Photometric mode	Sample
Response	Slow	Response	Slow
Wavelength	250 nm	Band Width	2.0 nm
Start Time	0 sec	Wavelength	250 nm
End Time	60 sec	Start Time	0 sec
Data Pitch	5.00 sec	End Time	60 sec
		Data Pitch	5.00 sec
		PMT Voltage	300 V

Note: PMT voltage varies with the instrument. Set accordingly.

CAUTION: Do not loosen screws other than the adjustment screw for the stopper.

(3) Turn the D_2 lamp stopper adjustment screw (Fig 4.9 or Fig, 4.10) and search for a position where the data value (value displayed on the CRT) is maximum.
(4) Replace the inner lid and outer lid of the light source unit.

4.5.2.3 Adjustment of iRM type light source mirror

When the light source is replaced, if the beam from the lamp is not correctly incident upon the entrance slit, troubles will arise, such as lack of luminous energy, bend of the baseline, and deviation of the measurement value. Whenever the lamp is replaced, be sure to adjust the light source mirror.

WARNINGS:
(1) The lamp is hot when lit. Do not touch with bare hands.
(2) Wear glasses (ordinary glasses or sunglasses) during adjustment to protect your eyes from ultraviolet rays.

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(3) Do not touch the wiring either with your hand or with a screwdriver. Contact with the wiring may cause electric shock.

CAUTION: Loosen only the screws required for adjustment.

<<**Adjustment of light source mirror for halogen lamp**>>

(1) Turn on the instrument.
(2) Select [Envir.] from the main menu to display the [Environment] menu.
(3) Select [Single Beam] from the [Environment] menu to display the single beam measurement screen. (Refer to Section 9-5 of the Operations manual.)
(4) Display the parameter screen and set parameters as shown below.

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Phtmtic mode	Sam	Phtmtrc mode	Sam
Response	Fast	Response	Fast
		Band Width	2.0 nm
		PMT Voltage	200 V

Note: PMT voltage varies with the instrument. Set accordingly.

(5) Return to the single beam measurement screen and set the wavelength to 500 nm using the [Goto WL] key on the operation panel.
(6) Turn the WI lamp stopper adjustment screw (Fig 4.9 or Fig, 4.10) and search for a position where the data value (value displayed on the CRT) is maximum.
(7) Replace the inner lid and outer lid of the light source unit.

<<**Adjustment of light source mirror for deuterium lamp**>>

(1) Turn on the instrument.
(2) Select [Envir.] from the main menu to display the [Environment] menu.
(3) Select [Single Beam] from the [Environment] menu to display the single beam measurement screen. (Refer to Section 9-5 of the Operations manual.)
(4) Display the parameter screen and set parameters as follows.

V-530 measurement parameters		**V-550/560/570 measurement parameters**	
Phtmtic mode	Sam	Phtmtrc mode	Sam
Response	Slow	Response	Slow
		Band Width	2.0 nm
		PMT Voltage	300 V

(5) Return to the single beam measurement screen and set the wavelength to 250 nm using the [Goto WL] key on the operation panel.
(6) Turn the D_2 lamp stopper adjustment screw (Fig 4.9 or Fig, 4.10) and search for a position where the data value (value displayed on the CRT) is maximum.
(7) Replace the inner lid and outer lid of the light source unit.

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5 Troubleshooting

If the spectrophotometer does not operate normally, the following causes are suspected:

- Erroneous operation
- Deterioration of consumable part or parts
- Instrument trouble

Possible causes and corrective actions against troubles are given below in the troubleshooting chart. In the event that the trouble cannot be corrected after following the actions given in the troubleshooting chart, contact your local JASCO distributor and provide the model name and serial number of your instrument together with a complete description of the problem.

When checking the instrument, observe the following warnings and cautions.

WARNINGS:

(1) Do not directly look at the light (ultraviolet light) emitted from the Deuterium lamp as this may injure your eye. Wear glasses (ordinary glasses or sunglasses) during adjustment.
(2) The lamp is very hot when lit. When the lamp is lit do not touch with bare hands. Before replacing the lamp, wait for at least 15 minutes after turning off the lamp until the lamp cools down.
(3) Before checking the electrical system, be sure to turn off the power switch.

CAUTIONS:

(1) Before plugging in the AC power cable, ensure that the power switch is in the Off position.
(2) Never touch the mirror or other optical elements with bare hands.

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Trouble symptom	Possible cause	Corrective action
The instrument does not operate at all.	1.Power cable not plugged in correctly. 2.Fuse blown.	1.Check if the power cable is securely plugged into the outlet. Replug the cable, if disconnected. 2.Remove the power cable from the outlet and check the fuse in the main unit Replace the fuse if blown. If the fuse blows immediatelyafter replacement,the electrical system is faulty. Contact your local JASCO distributor.
WI lamp does not light.	Lamp burnt out.	Check the WI lamp to see if it has burnt out. Replace the lamp with a new one if burnt out. (Refer to Section 4.5.2.)
D_2 lamp does light.	Lamp burnt out.	Check the lamp to see if it has burnt out. The D_2 lamp has burnt out if it does not light bluish white. **However, the filament will light for approx. 6 seconds after the lamp is turned**. Replace the lamp with a new one if burnt out. (Refer to Section 4.5.2.)
The baseline is curved greatly in excess of 1%.	Baseline correction is set to “Off”.	Check if baseline correction is set to “Off”. Set it to “On” if set to “Off” (Refer to the Operations manual.)

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Trouble symptom	Possible cause	Corrective action
When the light source is changed over from WI to D_2, the step height on the baseline is more than 1%.	1. Baseline correction is set to "Off".	1. Check if baseline correction is set to "Off". Set it to "On" if set to "Off".
	2. Poor adjustment of light source mirror.	2. Re-adjust the mirror referring to Section 4.5.2.2 or Section 4.5.2.3.
	3. Sample chamber not securely fitted. The beam may be incident upon the cell holder.	3. Set the sample chamber in the correct position.
The performance at wavelengths shorter than 320 nm is not stabilized.	D_2 lamp is "Off".	Set the D_2 lamp to "On" (Refer to the Operations manual.)
The performance at wavelengths longer than 400 nm is not stabilized.	WI lamp is "Off".	Set the WI lamp "On". (Refer to the Operations manual.)
Noise is high.	1. Light is not correctly incident upon the center of the entrance slit.	1. Check if light is correctly incident upon the center of the entrance slit. If not, adjust the light source mirror. (Refer to Section 4.5.2.2 or Section 4.5.2.3.)
	2. Spectral bandwidth is too small.	2. Increase the spectral bandwidth.
	3. The absorption of the solvent placed on the reference beam side is too high.	3. Replace the solvent with a suitable one.
	4. Lamp deteriorated.	4. Replace the lamp with a new one. (Refer to Section 4.5.2.)

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