

UV-1700 UV-1650PC

Shimadzu UV-VIS Spectrophotometers



C
COMPACT

H
HIGH PERFORMANCE

A
APPLICATION ORIENTED

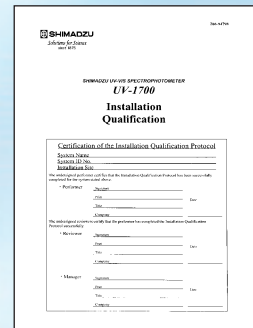
R
RELIABLE

M
MULTI-FUNCTIONAL

World-leading 1nm resolution is the best in its class

UV-1700

- Specifications (wavelength accuracy, resolution, photometric accuracy, etc.) and functions conform to the European, US, and Japanese pharmacopoeias.
- Hardware validation (9 items) as standard.
- Supports IQ/OQ *
- Compact design-
17 kg lightweight model can be easily moved by a single person.
- Simple operation with specialized function keys.
Ease of operation via clear interactive LCD display.
- Comprehensive functions for quantitative and qualitative analysis installed as standard can be extended using IC cards.
PC-compatibility using latest Windows software.
- Multi wavelength photometric measurement mode is standard.



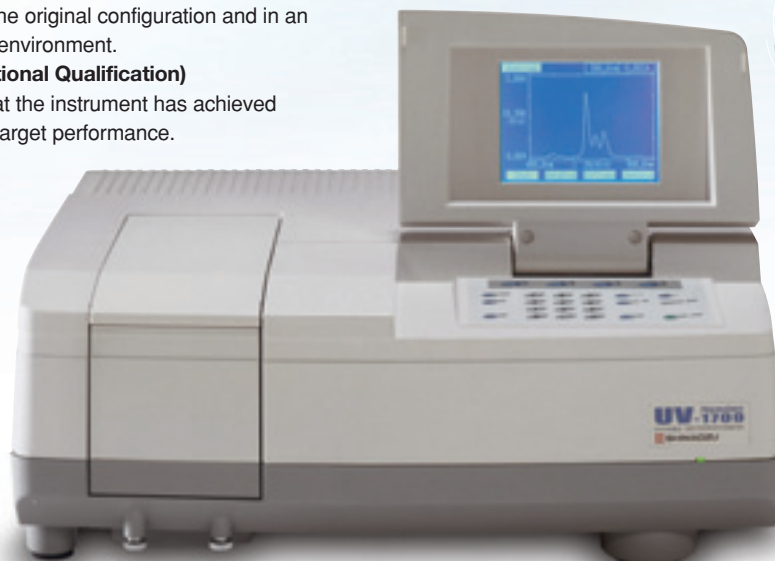
* IQ/OQ contains the following details that are checked and recorded at the time the equipment is installed. They are extremely important documents for compliance with FDA guidelines.

1. IQ (Installation Qualification)

Confirms that the instrument has been properly installed in the original configuration and in an appropriate environment.

2. OQ (Operational Qualification)

Confirms that the instrument has achieved the original target performance.



2 types to choose

Controlled by the most advanced PC software available

UV-1650PC

- All spectrophotometer functions are controlled from the PC.
- Supports the newest PC operating environment, Windows-NT*.
- Data is easily ported to commercial spreadsheet and word processing software.
- Necessary functions like spectrum, quantitation and kinetics are all included.
- GLP/GMP, multitasking, report layout, custom quantitation functions, etc. are all powerfully supported in the most advanced, technology-packed spectroscopy software, UVProbe.

Choose from!



* Windows-NT is the registered trademark of Microsoft Corp.



From photometric to multi-component quantitation, almost all of the functions required in the lab are built in.

Spectrum

A samples spectrum is recorded using wavelength scanning. Repeat scans let you follow sample changes over time. Zoom in on the finished spectrum for a better view, and then use the peak/valley pick function to select maxima and minima, and perform a wide variety of data processing functions.

Kinetics

Measure absorbance changes as a function of time, and obtain the enzymatic activity value. Select among single wavelength, multicell, double wavelength and rate measurement methods. Using the MMC-1600/1600C (8/16 cells) or the CPS-240A Cell Positioner (6 cells), multiple samples can be measured at the same time.

Multi-Component Quantitation

Quantitates up to 8 components mixed in a single sample. The calibration equation is determined using pure or mixed components with known values.

Multi Wavelength Measurement

Measure the absorbance and transmittance at up to eight designated wavelengths. For absorbance measurements, calculation of data for up to four wavelengths, including the difference or ratio between two wavelengths, is possible.

Quantitation

Generates a calibration curve from measurement of standards, and then calculates the concentrations of unknowns. Allows various combinations of wavelength number (1 to 3 wavelengths, peak area values) and calibration curves (K factor, 1st to 3rd order).

Time Course Scan

Measures the changes in absorbance, transmittance or energy as a function of time. Using the MMC-1600/1600C (8/16 cells) or the CPS-240A Cell Positioner (6 cells), multiple samples can be measured at the same time.

Optional Application Programs

In seconds, the easy-to-insert program packs reconfigure the UV-1601 for specific laboratory protocols.

Instrument Conditions

The basic instrument conditions can be set to accommodate the method of use for even greater convenience. And, built-in self-performance check functions ensure the continued reliability of measurement data.

Wavelength repeatability and other automatic test functions are built-in, providing easy compliance with GLP and ISO-9000 requirements.

Photometrics

Measures absorbance or transmittance at a wavelength of your choice. By connecting an optional multicell sample compartment, up to 16 samples can be measured continuously (when using MMC-1600/1600C and 16-cell micro multicell). And, data may be conveniently stored on IC cards.

PC Control

The built-in RS-232C allows connection between the UV-1700 and your PC, permitting full control from the PC, automatic system configuration, data exchange, and an expanded array of data processing functions.



Parameter Recall

The measurement mode and its parameters can be stored in memory or on IC cards, available for recall and setting at any time. Operation is easy and there is less possibility of making setting errors.

Maintenance

The maintenance functions include an indication of the date and time of the previous baseline correction, confirmation of lamp usage time, and unit validation.

IC Cards

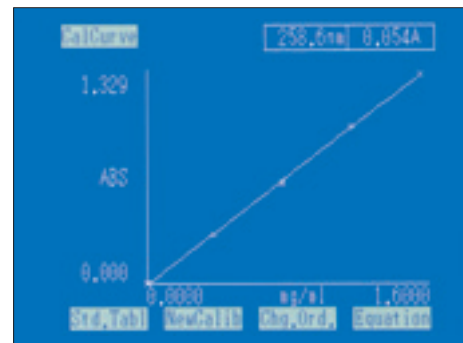
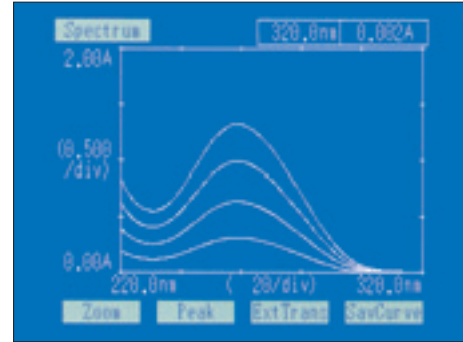
Special IC cards greatly extend the functionality of the UV-1700 system. IC card utilities allow data pack copying, IC card initialization, and other functions.



From transparent samples to samples with suspended and components, they can all be measured and quantitated. Even volume and enzyme activity measurements are possible.

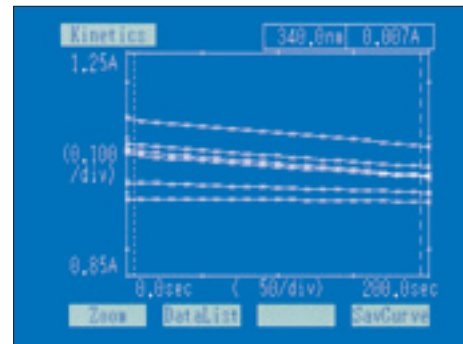
1. Micro Volume Sample Measurement

3 μ L capillary cells and 50 μ L ultramicro cells are available for measurement of minute volumes of sample. The spectra in the first figure were obtained from measurement of DNA in herring sperm in phosphate buffer solution. (A 3 μ L capillary cell was used.) Even though measurement was conducted in the ultraviolet region, the light beam was condensed sufficiently to provide a spectrum with a high signal-to-noise ratio. The second figure shows the linearity of the calibration curve.



2. Multicell Kinetic Measurement

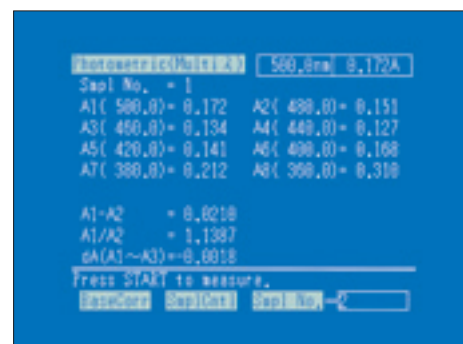
Multicell kinetics measurement can be performed using a temperature controlled cell positioner. At right, the enzyme activity of cholinesterase in blood serum was measured. Enzyme reactions can be measured in up to 16 cells at one time.



3. Multi Wavelength Measurement

Measures the absorbance or transmittance for a sample at up to eight selected wavelengths. When absorbance is measured, results can be displayed or output by calculating data using up to four wavelengths.

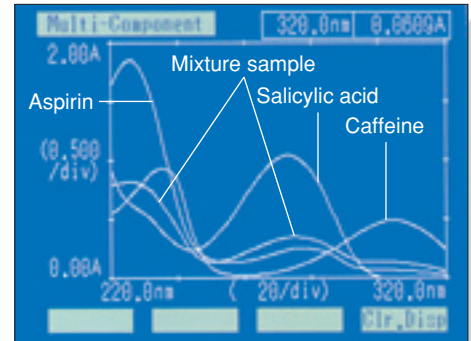
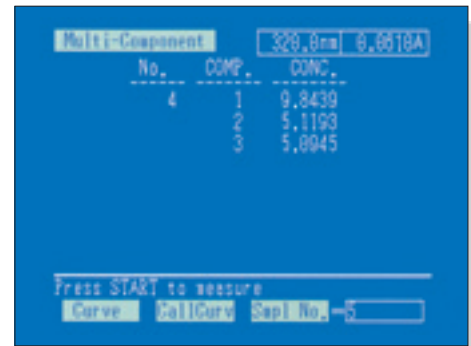
Note : If a printer is connected, results are printed after each measurement.
(The data cannot be saved for individual measurements.)



interfering micro

4. Multi-component Analysis

Quantitative analysis can be performed for up to 8 components mixed in a single sample. At right, aspirin, caffeine and salicylic acid were present in a sample in ratios of 2 : 1 : 1, as confirmed in the separated quantitation result. The second figure shows the spectral characteristics of the three ingredients and the mixture. Note the distinctly different spectral characteristics, allowing the various compounds to be distinguished.

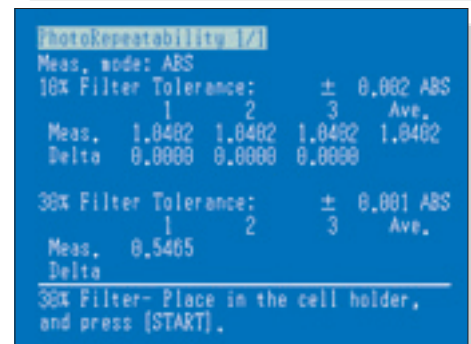


5. Instrument Validation Functions

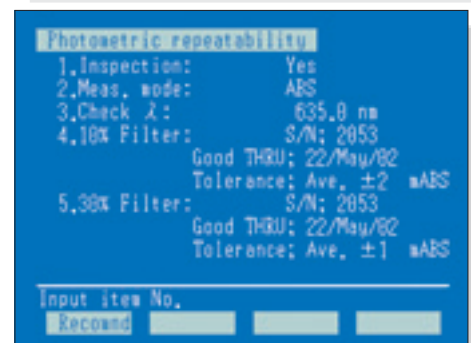
These functions can conduct performance checks (measurement, pass/fail evaluation and printing) for nine items, including wavelength accuracy. Validation is divided into fully automatic checks, where all procedures from measurement to evaluation are automatically completed, and semi-automatic checks, where the insertion and removal of inspection jigs are required.



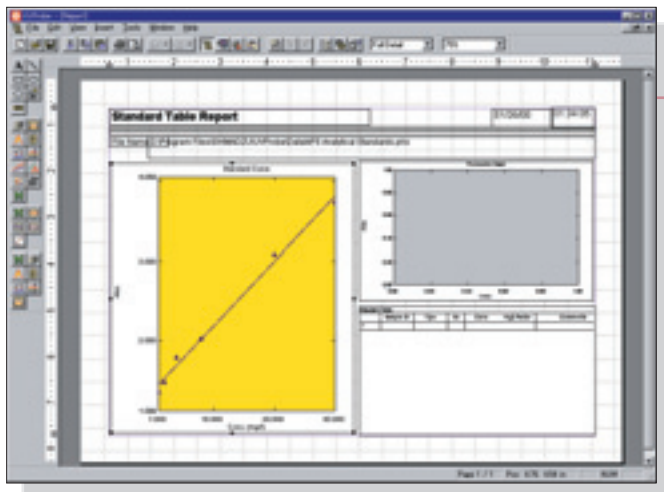
The semi-automatic checks are performed interactively. The user can conduct the validation by inserting or removing inspection jigs as instructed by messages on the screen.



The control numbers and expiration date of the inspection jigs can be entered in the inspection conditions. The expiration date is automatically checked at the start of the test and the validation is discontinued if a jig is past its expiration date.



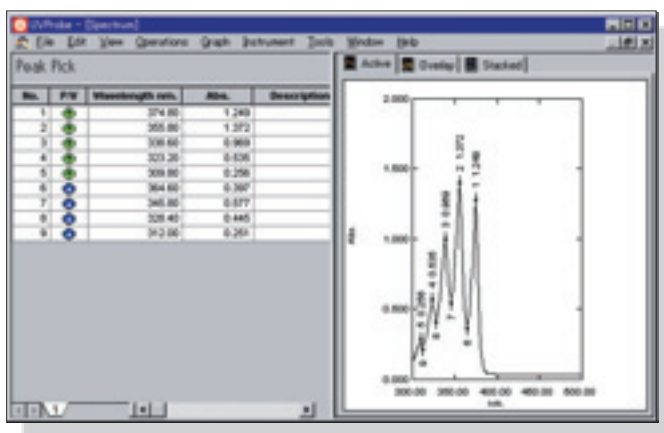
GLP/GMP Compliant UVProbe—The most advanced software available



Totally Customized Reports

Arrange graphs and data just as you wish to create informative, easy-to-read reports. Freely specify line thickness and font color and size, and place labels wherever you like on graphs.

Because the setup is all in WYSIWYG format, layouts can be stored as templates to enable fast and simple generation of future reports.



Loaded with Data Processing/Calculation Functions

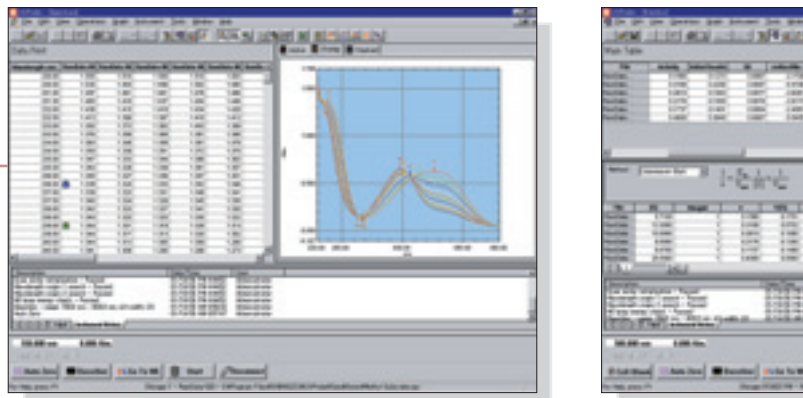
Peak detection, Point Pick, area calculation, and many more—UVProbe includes all the data processing functions you'll need for spectrum and time course data. A variety of calculations are also yours for the choosing, like integration and interpolation conversions, and arithmetic operations between data.

All-in-One Software

Spectrum, kinetics (time course), photometric (quantitation) measurement functions, and superb report generation functions are all included as standard. This software is ideal for all of your lab's spectroscopy tasks.

UV-1650PC Your Personal Spectroscopy System

With UVProbe software running under Microsoft Windows NT, your PC can control the optical bench.



Powerful Quantitation Functions

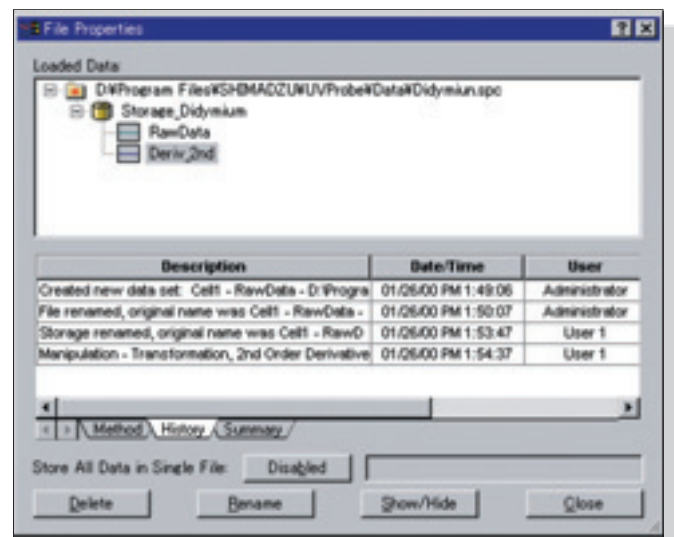
The Photometrics module permits multi wavelength and single wavelength quantitation, and quantitation based on peaks as well as area values.

Calibration curves can be generated using K factor, single or multi point methods.

Further, customized functions can be created to determine pass/fail of measurement results.

Sample Table - (Active)

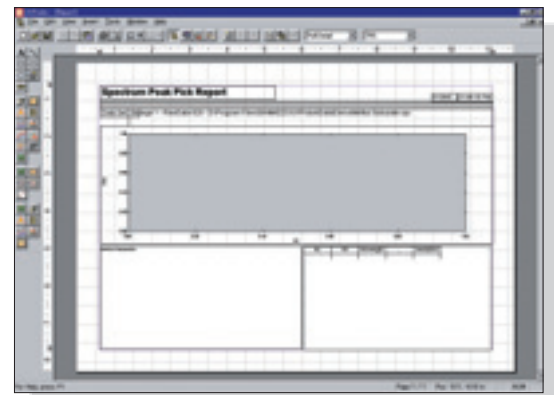
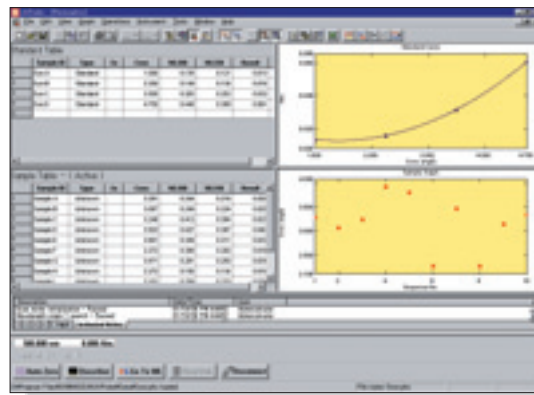
Sample ID	Type	Ex	WL_MIN	WL_MAX	Result_000	Result_001	Result_002	Comments
1	Filter_1	Unknown	50.000	50.200	Pass	Pass	Pass	
1	Filter_2	Unknown	50.000	50.200	Pass	Pass	Pass	
1	Filter_3	Unknown	40.000	50.000	Pass	Pass	Pass	
4	Filter_4	Unknown	40.000	50.100	Fail	Fail	Fail	
1	Filter_5	Unknown	50.000	50.200	Pass	Pass	Pass	
1	Filter_6	Unknown	50.000	50.200	Pass	Pass	Pass	
1	Filter_7	Unknown	50.000	50.000	Pass	Pass	Pass	
1	Filter_8	Unknown	50.000	40.000	Fail	Pass	Fail	
1	Filter_9	Unknown	50.000	50.200	Pass	Pass	Pass	
1	Filter_10	Unknown	50.000	50.200	Fail	Pass	Fail	Performs logical operation to determine if a sample is within a specified range or above or below a specified value. Formula: (WL_MIN <= WL) & (WL <= WL_MAX)



GLP/GMP Compliant

For example, when data processing is performed, the resultant data is stored together in the same file with the original data, which remains intact.

The audit trail function tracks the instrument history, and security functions, such as the limiting of individual users to specific types of software operations, ensuring full GLP/GMP compliance.





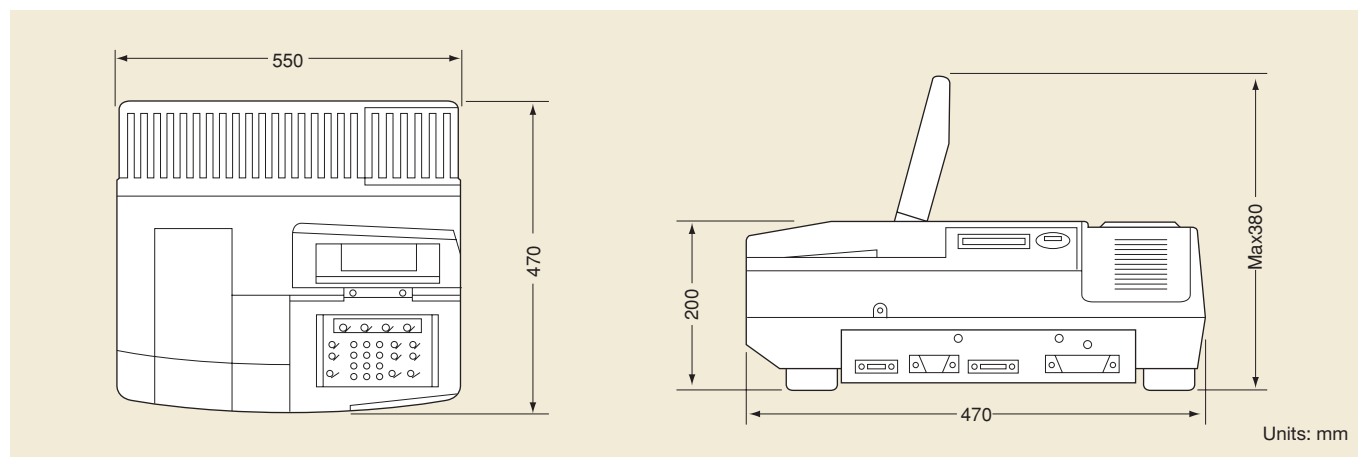
Spectrophotometer Specifications (UV-1700 and UV-1650PC)

Item	Specifications
Spectral bandwidth	1nm (190 to 900nm) (UV-1700) < 2nm (UV-1650PC)
Dimensions	550W × 470D × 200H (mm) (Max height 380mm)
Weight	17kg (UV-1700), 18kg (UV-1650PC)
Wavelength range	190 ~ 1100nm
Wavelength display	0.1nm increments
Wavelength setting	0.1nm increments (1nm increments when setting scan range)
Wavelength accuracy	±0.3nm (at D2 peak 656.1nm, 486.0nm)
Wavelength repeatability	±0.1nm
Wavelength slew rate	About 6000nm/min
Wavelength scanning speed	About 3000nm/min ~ 10nm/min (UV-1700) About 3200nm/min ~ 160nm/min (UV-1650PC)
Lamp interchange wavelength	295.0 ~ 364.0nm (340.8nm)
Stray light	Less than 0.05% (220.0nm, 340.0nm)
Photometric system	Double beam optics
Photometric range	Absorbance : -0.5 ~ 3.999Abs Transmittance : 0.0 ~ 300%
Recording range	Absorbance : -3.99 ~ 3.99Abs Transmittance : -399 ~ 399%
Photometric accuracy	±0.004 Abs (at 1.0 Abs) Using NIST 930D ±0.002 Abs (at 0.5 Abs) standard filter

Item	Specifications
Photometric repeatability	±0.002 Abs (at 1.0 Abs) ±0.001 Abs (0.5 Abs)
Baseline stability	±0.001 Abs/h (700nm, After 1 hour from power on)
Baseline flatness	±0.001 Abs (1100nm to 200nm) After 1 hour from power on (UV-1700) ±0.002 Abs (UV-1650PC)
Noise level	0.002 Abs
Baseline correction	Automatic with computer memory, in two stages of coarse and fine
Light source	20W halogen lamp (UV-1700), 50w halogen lamp (UV-1650PC) deuterium lamp Built-in light source auto position adjustment
Monochromator	Aberration corrected concave blazed holographic grating
Detector	Silicone photodiode
Sample compartment	Internal dimensions : 110W×230D×105H (mm) (155mmH at one part) Distance between light beams : 100.0mm Installation : Fixed with 2 screws Beam size : 10 × 1mm
Power requirements	AC100, 120, 220, 240 V 50/60Hz; 130VA (UV-1700), 160VA (UV-1650PC)
Ambient requirements	Temperature : 15 ~ 35°C, Humidity : 45 ~ 80%

Overall Dimensions (Common to UV-1700 and UV-1650PC)

Note : Since the UV-1650PC has no LCD unit, its height is the same as that of the UV-1700 with its LCD unit folded down. Additional space is also required for adjacent placement of a PC.



UV-1700 Software Specifications

Measurement mode	Specifications
Photometric Mode	<ol style="list-style-type: none"> Measurement at user-selected fixed wavelength Quantitation using K-factor method Photometric modes: Choice of T% and Abs Data table storage and recall functions Automatic data printout
Spectrum Mode	<ol style="list-style-type: none"> Measurement modes: Abs, T%, E Scanning range: 190.0 to 1100.0 nm Ordinate range: Abs : -3.99 to +3.99 Abs T%, E : -399 to +399% Scanning speed: Very Fast, Fast, Medium, Slow, and Very Slow Number of repeat scans: 1 to 99 Recording system: Selection between single spectrum and data overlay Data processing Peak/valley detection (up to 20 of each) Area calculation Arithmetic operations between data Arithmetic operations between data and constants 1st to 4th derivative/smoothing Point pick Data storage and recall (up to 6 in main memory, 27 in data pack) Data output Graph axis range change Data readout at cursor-specified point Data export via RS-232C port
Quantitation Mode	<ol style="list-style-type: none"> Measurement methods Choice of 1-wavelength, 2-wavelength, 3-wavelength, 1st to 4th derivative methods Quantitation methods Automatic concentration calculation by K-factor Automatic concentration calculation using single-point calibration curve or multi-point calibration curve method (1st to 3rd order regression curves) Measurement parameters Number of repeat measurements: 1 to 9, to obtain a mean value for quantitation Order of derivatives: 1st to 4th Number of standards for multi-point calibration curve: 2 to 10 Order of calibration curve: 1st to 3rd Choice of zero or non-zero intercept Data table storage and recall Automatic data printout
Kinetics Mode	<ol style="list-style-type: none"> Measures absorbance changes as a function of time and calculates the enzymatic activity values. Measurement time: 1 to 6500 sec/min Measurement method: 1-wavelength, 2-wavelength, multicell and rate measurements Supports Cell Positioner CPS-240A, Multicell Holder and Sipper 160 Data processing Recalculation Graph axis range change Data table display Data storage and recall Data export via RS-232C port

Measurement mode	Specifications
Time Scan	<ol style="list-style-type: none"> Measurement mode: Abs, T%, E Measurement time: 1 to 6500 sec/min Supports Cell Positioner CPS-240A, 6-cell Multicell Sample Compartment, MMC-1600/1600C and Sippers Measures changes in Abs, T%, or energy over time Data processing: Identical to Spectrum Mode Data export via RS-232C port
Multi-Component Quantitation	<ol style="list-style-type: none"> Up to eight components quantified at once. A mixture, as well as pure components, can be used as a standard. Data on standards can be stored, in addition to measurement wavelengths. Quantitation of recalled spectrum data.
Multi Wavelength Measurement	<ol style="list-style-type: none"> Measurements at up to eight designated wavelengths (set in 0.1 nm increments) Data calculation at up to four wavelengths (difference or ratio between two wavelengths, calculation between three wavelength, etc.) possible. Photometric mode: Abs, T% Results can be printed after each measurement. (The data cannot be saved for Individual measurements.)
Maintenance	<ol style="list-style-type: none"> Baseline correction Lamp usage time display and reset Instrument validation functions <ol style="list-style-type: none"> Compatible with 9 JIS items Wavelength accuracy, wavelength repeatability, resolution, stray light, photometric accuracy, photometric repeatability, baseline flatness, baseline stability, noise level, initialization result recording Semi-automatic validation Validation inspections conducted interactively while inserting and removing inspection jigs. Fully automatic validation Automatic validation inspections from measurement to evaluation and printout. Setting inspection parameters and pass/fail criteria Authority to make changes can be protected by password access. Bulk printout of results Results of the previous validation inspection are printed in list form. (The results of the previous inspection are cleared when another inspection is started.)
Shared Functions	<ol style="list-style-type: none"> Automatic setting of measurement mode after instrument initialization Designation of a parameter file is possible. Backup of previous measurement parameters Selection of displayed number of decimal places Absorbance: 3 or 4 decimal places Transmittance: 3 or 4 decimal places ON/OFF of the beep function Number of files that can be saved: Measurement parameters: 16 files max. Data: 6 files max. Screen hard copy printout (when a printer is connected) Date stamping can be selected between ON and OFF. PC control Spectrophotometer can be controlled by an external PC (via RS-232C). The optional UVProbe software controls this instrument.



UV-1650PC Software Specifications

Operating System	Windows NT 4.0 / 2000 / XP
Instruments	UV-1601 Series, UV-2401/2501 Series
Data Acquisition Modes	Spectrum, Kinetics (time course measurement) and Photometric (quantitation)
General	<ul style="list-style-type: none"> • Multitasking (simultaneous measurement and data processing and other types of processing) • Customizable measurement screen layout (wavelengths, data display font and font size, colors, displayed number of rows) • GLP/GMP compliant (security, history) • Real time concentration display
Spectrum Mode	<ul style="list-style-type: none"> • Comparison of multiple spectra/relative processing*2 • Save all processed data with original data set including a history of all manipulations • Spectrum enlargement/shrinking, auto scale and Undo/Redo of these operations • Annotation on spectrum screen
Data Processing in Spectrum Mode	<ul style="list-style-type: none"> • Normalization, Point Pick, peak/valley detection, area calculation • Transformations : 1st - 4th derivatives, smoothing, reciprocal, square root, natural log, log, Abs. to %T conversion, exponential, Kubelka-Munk conversion • Ensemble averaging, interpolation, data set and constants arithmetic (between spectra, between spectra and constants)
Photometric (Quantitation) Mode	<ul style="list-style-type: none"> • Single wavelength, multi wavelength (includes 1, 2 or 3 wavelengths), spectrum quantitation (peak, maximum, minimum, area, etc. for specified wavelength ranges) • Multi-point, single point, K-factor calibration curves (1st, 2nd, 3rd order function fits, pass-through-zero specification) • Photometric processing with user-defined functions (+, -, ×, ÷, Log, Exp, etc. functions, including factors) • Weight correction, dilution factor correction, and other corrections using factors • Averaging of repeat measurement data • Simultaneous display of standard table, unknown table and calibration curves • Display of Pass/Fail indications
Kinetics (Time Course) Mode	<ul style="list-style-type: none"> • Comparison/relative processing of multiple time course data*2 • Single or double wavelength measurement (difference or ratio) • Simultaneous display of time course data, enzyme table and graphs • Enzyme kinetics calculation (for single or multicell) • Michaelis-Menten calculations and graph creation (Michaelis-Menten, Lineweaver-Burk, Hanes, Woolf, Eadie-Hofstee), Dixon plot, Hill plot • Unitary management of sample information including original data, sample weight and dilution factors, etc. • Event recording such as addition of reagents during measurement • Time course spectrum data processing (same as in spectrum data processing)
Report Generator	<ul style="list-style-type: none"> • Preview and print functions for customized formats • Layout and editing of templates • Quick printing using report templates • Multi-page printout support • Insert date, time, text, and drawing objects including lines, circles and rectangles • Insert spectrum and quantitation data, method and history • Headers and footers easily inserted • Specify graph line thickness (as in all modules), font style and size

Standard Contents

No.	Description	Quantity
1	Spectrophotometer main unit	1
2	Standard accessories <ul style="list-style-type: none"> • Power cable • Fuse • Installation adapter 	1
3	Software <ul style="list-style-type: none"> • CD-ROM • Transmission cable (IBM PC) 	1
4	Instruction manual (Installation, Maintenance)	1
	Instruction manual (Operation)	1

Notes:

- 1) PC, monitor and printer are not included.
- 2) Depends on PC environment (memory, etc.). As a guideline, from 20 ~ 30 spectrum data sets.

Required and recommended PC configuration for running UVProbe is as follows:

- PC with Pentium (200MHz) or better processor, or 100% compatible. (Pentium II (300MHz) recommended)
- 64MB RAM, 128MB recommended
- 50MB available hard disk capacity
- SVGA video monitor, 800 × 600 dot screen resolution (1024 × 768 recommended)
- Parallel and serial ports
- Graphic printer, or plotter (recommended for printing data)
- Mouse or similar pointing device
- CD-ROM drive

Even with the above configuration, UVProbe operating performance cannot be guaranteed, depending on Windows settings, hardware state, etc.

Use Shimadzu recommended equipment, if possible.

ACCESSORIES

Time Course (Multi λ) Program Pack

(Cat. No. 206-80704-02)

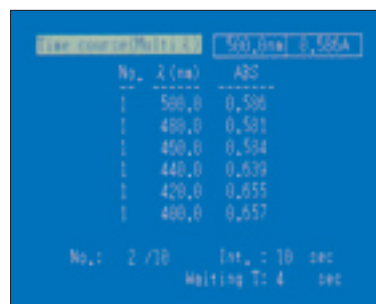
Measures changes in absorbance or transmittance for up to 6 wavelengths, with respect to time. The changes are presented as time course curves for the selected wavelengths.

- Number of wavelengths : 6 max. (wavelength adjustment in 0.1 nm steps)
- Photometric mode : Abs. or T%
- Repeated measurement : Up to 99 repetitions and up to 9999 seconds measuring time
- Graphic \leftrightarrow tabulated display changeover
- Automatic data printout

Note : Not applicable to UV-1650PC



Parameter Selection



Display during Measurement

Data Pack

(Cat. No. 206-80700)

Stores operational parameters as well as data.

- Stores up to 79 sets of operational parameters per pack.
 - Stores up to 27 data sets per pack.
- * Not interchangeable with the Data Pack for the UV-1200 Series.
(Cat. No. 206-62029)

The Data Pack must be initialized for use with the UV-1700.

Note : Not applicable to UV-1650PC





ACCESSORIES

Protein Quantitation Program Pack

(Cat. No. 206-82850-02)

Determines protein concentration in any of the four coloring methods or directly from the absorbance at 280nm. The instrument parameters for quantitation are incorporated.

- The following five quantitation methods are included.
 - Lowry Method
 - BCA Method (method using Bicinchoninic Acid)
 - CBB Method (method using Coomassie Brilliant Blue G-250)
 - Biuret method
 - UV Absorption (direct measurement at 280nm)
- Features of methods other than UV Absorption,
 - K-factor method-Values for K and B may be input for calculation using : $C = K \times ABS + B$
 - In the single point calibration curve method, a single standard is measured to generate a calibration curve, which passes through the origin.
 - In the multi-point calibration curve method, up to 10 standards are measured to generate either a linear calibration curve or a second order calibration curve.
 - Up to 9 repeat measurements can be conducted to obtain a mean value for use in quantitation.
 - Selection from any of four concentrations is possible: mg/ml, µg/ml, etc.
 - The equation used for generating the calibration curve as well as any determination coefficients may be displayed.

Note : Not applicable to UV-1650PC

DNA/Protein Quantitation Program Pack

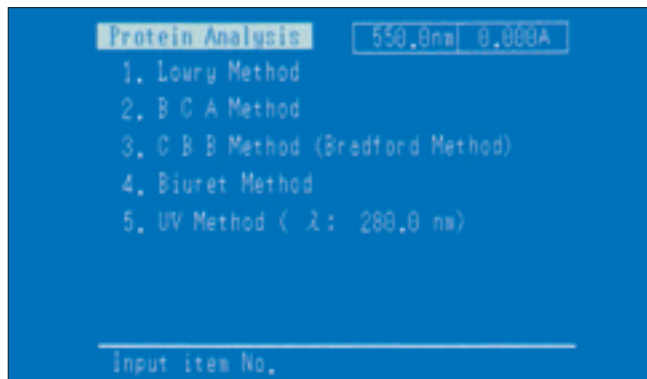
(Cat. No. 206-82851-02)

Determines DNA or protein concentrations directly from the UV absorption bands at 230nm, 280nm and 260nm. No coloring procedure is required.

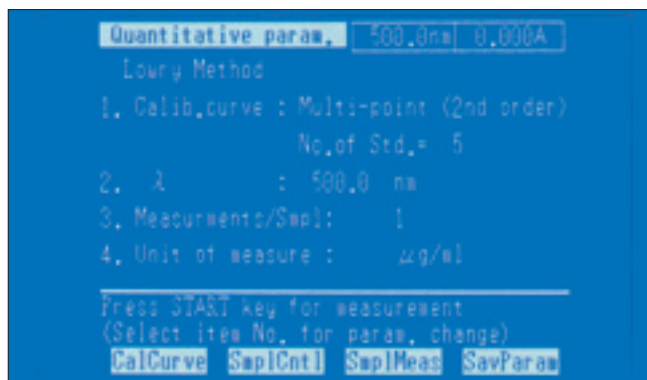
Quantitative data are obtained through simple keyboard operation, using the resident formula. The wavelengths and factors used in the computation are arbitrarily changeable.

- The following two formulas are user selectable:
 - 1) Formula using absorbances at 260.0nm (A1) and 230.0nm (A2)
 - Absorbance ratio = $A1/A2$
 - DNA concentration = $49.1 \times A1 - 3.48 \times A2$
 - Protein concentration = $183.0 \times A2 - 75.8 \times A1$
 - 2) Formula using absorbances at 260.0nm (A1) and 280.0nm (A2)
 - Absorbance ratio = $A1/A2$
 - DNA concentration = $62.9 \times A1 - 36.0 \times A2$
 - Protein concentration = $1552 \times A2 - 757.3 \times A1$
- The absorbance at 320nm can be used for background correction.

Note : Not applicable to UV-1650PC



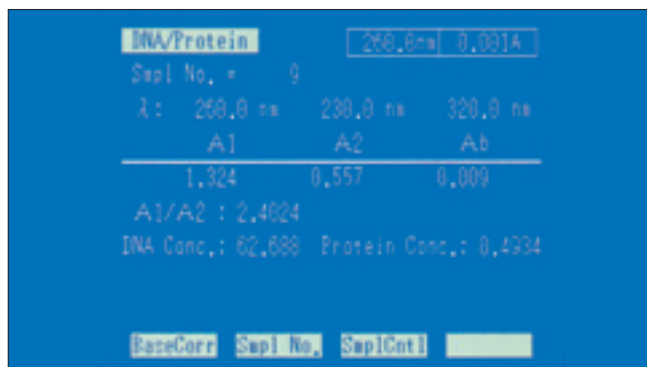
Quantitation Selection



Parameter Selection (Lowry method)



Parameter Selection



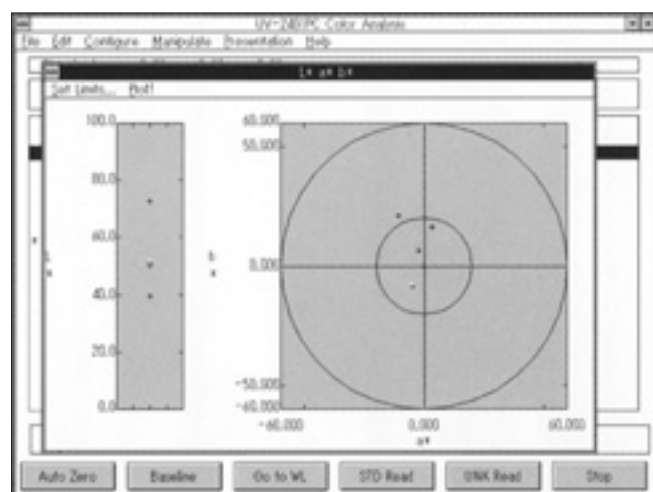
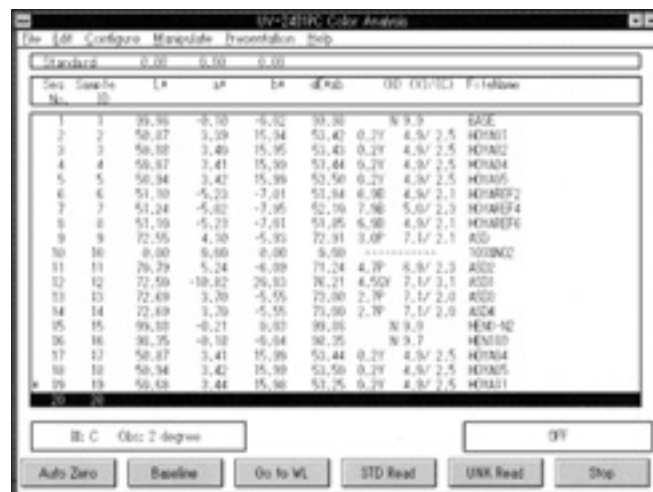
Measurement Display

Color Measurement Software

(Cat. No. 206-67449)

This software calculates color indices from the spectra given by the spectrophotometer.

- Presents indices of XYZ, Lab (Hunter), $L^*a^*b^*$, $L^*u^*v^*$, Munsell, whiteness, yellowness, metamerism, and many others.
- Recalculates any results with different parameters and conditions.
- Chromaticity diagram and magnified color difference diagram may be graphically displayed.
- Permits computation using user-defined illuminants, besides the standard ones. The user-defined illuminants may be stored as files to be recalled at any time.
- Correction using the standard white plate ensures high accuracy in color computation. The set standard values may be stored as files to be recalled at any time.
- Calculates color differences using the arbitrarily selected standard samples.
- Available convenient functions include thickness correction, smoothing, averaging, and standard deviation calculation.
- Up to 100 data may be displayed together.



Performance Validation Software

(Cat. No. 206-84836-91)

Routine checking, calibration, and quality recording of your instrument performance are quite important for maintaining the reliability of data given by the instrument.

The Shimadzu Performance Validation Software carries out all these jobs with minimized labor and with minimal operator errors.

Features

- Test results are printed out automatically together with the time and date.
- Automate the number and sequence of up to 11 test validation methods. This batch of methods becomes your Standard Operating Procedure.
- The results, conditions, and history of checking may be automatically filed.

Specifications

Checking is made on the following 11 items, and the results are printed out in a semi-automated sequence. (The installation and removal of standard samples and/or tools for checking are made manually.)

- Instrument status after initialization
- Wavelength accuracy
- Wavelength repeatability
- Wavelength resolution
- Stray light
- Photometric accuracy
- Photometric (measurement) repeatability
- Baseline stability (amount of drift)
- Baseline flatness (peak to noise)
- Noise level
- 0% T line flatness



ACCESSORIES

DPU-414 Screen Copy Printer

(Cat. No. 206-55215-**)

Prints hard copies of screens, including numeric data. A printout is made after each measurement.

Spectra, kinetics reaction data, and quantitation calibration curves displayed on the screen are output in the screen print. A hard copy can be printed at any time, making it simple to record measurement parameters.

Thermal paper (10 rolls): 088-58907-04

The printer cable is included with DPU-414.

Dimensions: 160 x 170 x 66.5 mm

Note : Not applicable to UV-1650PC



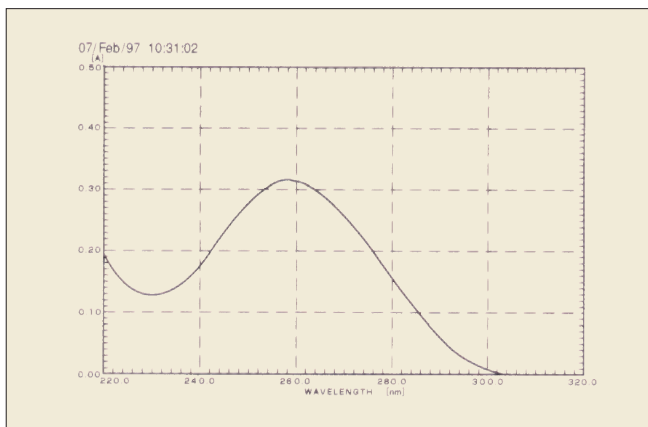
Interface Cable (Centronics standard)

(Cat. No. 088-50904-20)

This cable connects the UV-1601 to any general commercial printer (limited to ESC / P specifications) to allow printout. Color and monochrome printers are both supported.

Note : Not applicable to the UV-1650.

For information regarding specific printer types, please contact your Shimadzu representative.



Analog Output Interface

(Cat. No. 204-04757)

- Allows analog output for monitoring a liquid chromatograph, etc., and can connect to an integrator (C-R3A, etc.).
- Analog output full scale
100mV / 2Abs or 100mV / 100%T

Note : Not applicable to UV-1650PC

RS-232C Cable (Type 2)

(Cat. No. 200-86408)

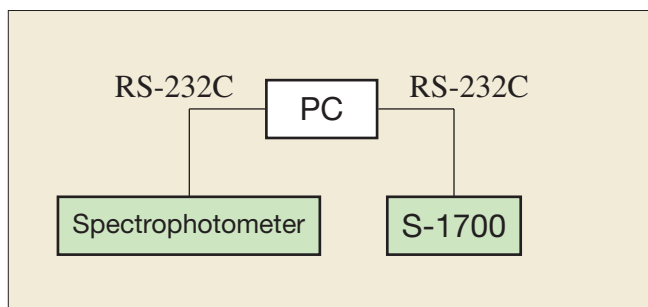
This cable is required for connection of the UV-1700 to an IBM-PC compatible personal computer.

- The cable is equipped with a 9-pin female PC connector and 9-pin male connector for connection to the UV-1700.
- Three wires in the cable are used, 2 wires for output and 1 wire for ground.
- At the connector that connects to the PC, the pins for the control wires allow constant input and output from the PC.

Tm Analysis Software

(Cat. No. 206-57476-91)

- This software works with the S-1700 and accumulates temperature-versus-absorbance curve data at the PC to analyze the Tm (melting temperature) of nucleic acids such as DNA and RNA. The right figure is a typical setup for this software.
- RS-232C cables (Cat. No. 200-86408) are needed to connect the PC to the S-1700 and the spectrophotometer.



CPS-240A Cell Positioner, Thermoelectrically

Temperature Controlled (Cat. No. 204-05837-**)

This attachment permits measurement of up to six sample cells under constant temperature conditions. Combination of this attachment and the Kinetics mode provides measurement of temperature sensitive enzyme kinetics of one to six samples.

- Number of cells : 6 on the sample side (temperature controlled)
1 on the reference side (temperature not controlled)
- Temperature control range : 16 to 60°C
- Temperature display accuracy (difference from the true value) : ±0.5°C
- Temperature control precision (variation of temperature) : ±0.1°C
- Ambient temperature : 15 to 35°C

Note : Sample cells (Cat. No. 200-34442) are not included in the standard contents.



TCC-240A Thermoelectrically Temperature

Controlled Cell Holder (Cat. No. 204-05557-**)

Uses Peltier effect for controlling the temperatures of the sample and reference sample. No thermostatic bath or cooling water is required, so the operation is quite simple and easy.

- Number of cells : One each on the sample and reference sides
- Temperature control range : 7 to 60°C
- Temperature display accuracy (difference from the true value) : ±0.5°C
- Temperature control precision (variation of temperature) : ±0.1°C

Note : Sample cells (Cat. No. 200-34442) are not included in the standard contents.



S-1700 Thermoelectric Single Cell Holder

(Cat. No. 206-56000-**)

This cell holder permits setting of a temperature program to increase and decrease the sample cell temperature.

- The thermoelectric system allows prompt control of sample temperature between 0°C and 110°C.
- Temperature increase/decrease speed can be changed using 12 settings, which means the holder can be used in analysis of melting curves for nucleic acids, etc., that occur during quick as well as slow heating (or cooling).
- A stirrer also is provided to ensure uniform temperature distribution throughout the cell.
- A cooling water circulation is required for Peltier element cooling. And though tap water can be used, it is recommended that a commercially available constant-temperature water circulator be used, as the following conditions must be fulfilled to exact maximum performance from the S-1700.
 - Cooling water specification: 20 ±2°C
 - Water flow: 4.8L / min or more
- Temperature is not controlled at the reference side.
- Cells are not supplied. Please use 10mm square tight-sealing cells (a Hellma product).

Type	Optical Path	Minimum Sample Volume Required
110-QS-10	10mm	3.5mL
115B-QS-10	10mm	400µL

- Temperature accuracy in cell (when room temperature is 25°C)
 - Within ±0.25°C (0 to 25°C)
 - Within ±1%°C of set value (25 to 75°C)
 - Within ±2%°C of set value (75 to 110°C)





ACCESSORIES

Sipper Unit 160L (Standard Sipper)

(Cat. No. 204-08270-01)

Sipper Unit 160T (Triple Pass Sipper)

(Cat. No. 204-08270-02)

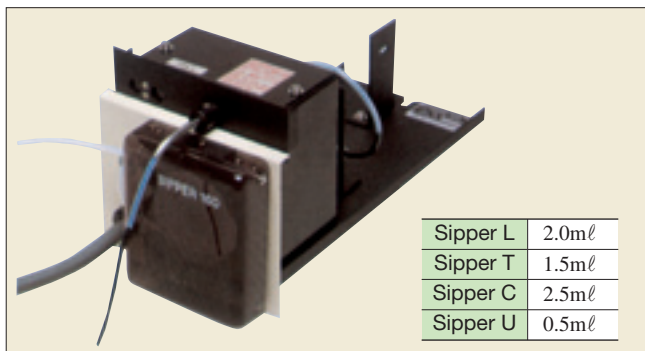
Sipper Unit 160C (Constant Temperature Sipper)

(Cat. No. 204-08270-03)

Sipper Unit 160U (Supermicro Sipper)

(Cat. No. 204-08270-04)

The four sippers listed above are available, depending on the flow cell shape. A peristaltic pump driven by a stepping motor ensures reliable and smooth aspiration of sample solution. (Direct drive is possible from the UV-1700, so no interface is required.)



Note : The use of a Teflon Valve Unit (Cat.No. 204-06599-01) and the SWA-2 Sample Waste Unit (Cat.No. 204-29230) are recommended when strong acids, strong alkalis, or organic solvents are to be measured.

ASC-5 Auto Sample Changer

(Cat. No. 204-09100-**)

Combine with a Sipper 160 to build an automated multisample spectrophotometry system.

- The aspirating nozzle is programmed to move in the X, Y, and Z (vertical) directions.
- Up to 8 sets of operational parameters, including the size of racks and the number of test tubes, may be memorized in the battery back-up protected files.
- Up to 100 test tubes may be set together on the rack.

Note : A commercially available test tube stand, with a footprint smaller than 220 × 220 mm, is applicable



NTT-2200P Constant-Temperature Water Circulator

(Cat. No. 208-97263)

Circulates temperature controlled water to a constant-temperature cell holder.

- Temperature range: Ambient +5°C to +80°C
- Temperature control precision: ±0.05°C~
- Max. pumping rate: 27/31 L/min, 9.5/13 m (50/60 Hz)
- External circulation nozzle: 10.5 mm OD (both outlet and return)
- Tank capacity: About 10 L (9 L during use)
- Safety feature: Detection of over-temperature of Upper or Lower limits, Detection of heater wire malfunction, Protection of heating too few circulating water, Detection of sensor malfunction, Independent over heat protection, Over current circuit protector
- Standard accessories: Lid with handles, Rubber hose (4m), Hose clamps (4pc.), instruction manual
- Dimensions: 270W x 560H x 400D (mm)
- Power requirements: 100 VAC, 1250 VA, with 1.7 m power cord and grounded plug



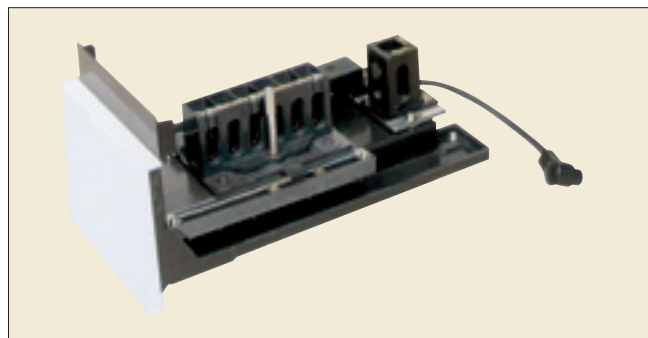
Multicell Sample Compartment

(Cat. No. 206-69160)

Holds up to six 10 mm square cells. No temperature control capability.

- Number of cells : 6 on the sample side
1 on the reference side.

Note : Cells are not included in the standard contents.



3 μ L Capillary Cell Set for Ultramicro Volume Measurement

(Cat. No. 206-69746)

- Recommended for small and precious samples, such as in biological application. The minimum sample volume required is 3 μ l, when the tube closure is used. (theoretical value)
- Solution sample is aspirated into the capillary cell and the cell is directly subjected to measurement.
- The holder is the same size as a 10 mm square cell and can be mounted to the standard cell holder.
- Supplied with 100 capillaries (made of quartz) and a tube closure.



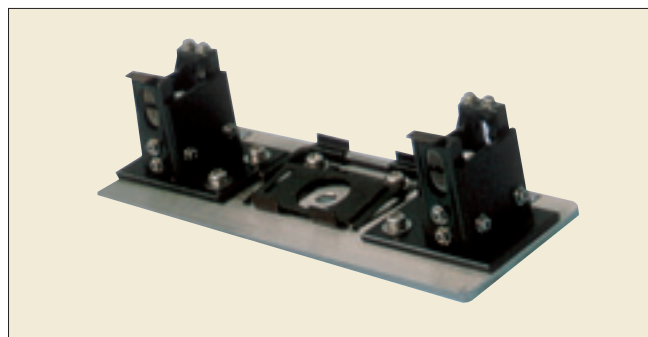
Supermicro Cell Holder (for UV-1650PC)

(Cat. No. 206-14334)

Holds supermicro cells for measurement of extremely small samples. The cell height is adjustable and the sample volume required is variable from 50 μ l to 200 μ l, depending on the type of black cell used.

- Application cell : ⑦ and ⑧ in the list of cells on the back cover.
(Cells are not included in the standard contents.)
- Mask : Choice of 1.5^w×1^hmm and 1.5^w×3^hmm

Note : Not applicable to UV-1700



Supermicro Cell Holder (for UV-1700)

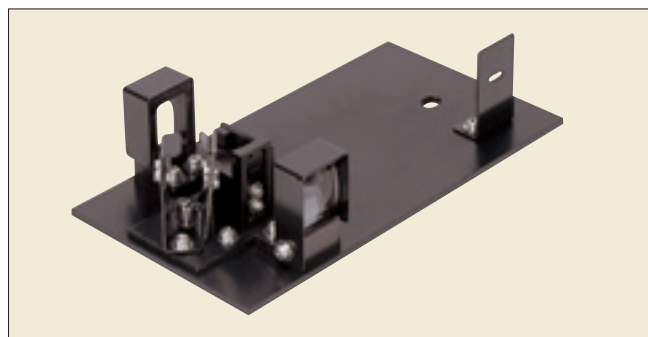
(Cat. No. 206-55050-91)

Holds supermicro cells for measurement of extremely small samples.

Samples of 25 to 200 μ L can be measured, depending on the type of black cell used.

- Applicable cells: ⑦, ⑦', and ⑧ in the cell list on the back cover

Note : Not applicable to UV-1650PC



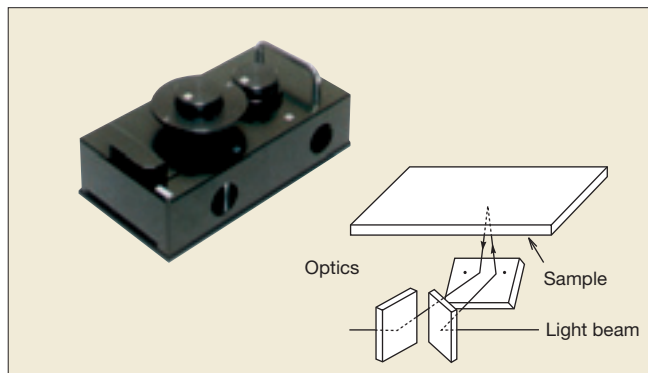


ACCESSORIES

Specular Reflectance Measurement Attachment (5° incident angle) (Cat. No. 206-14046)

The technique of specular reflectance measurement is often utilized for evaluation of semiconductors and optical materials relative to a reference reflecting surface. The 5° incident angle minimizes the influence of polarized light. Thus, no polarizer is required in measurement ••• the operation is quite simple.

- Sample as large as 100^W×160^P×15^Tmm can be readily measured, the minimum size is 7 mm in diameter.
- Sample placement is quite easy ••• just set it on the holder with the measuring face down.



GSC-3A Gel Scanner (Cat. No. 204-51774-01)

Used to record stained bands on disk gels. The record is given as a time-course curve, under Kinetics mode.

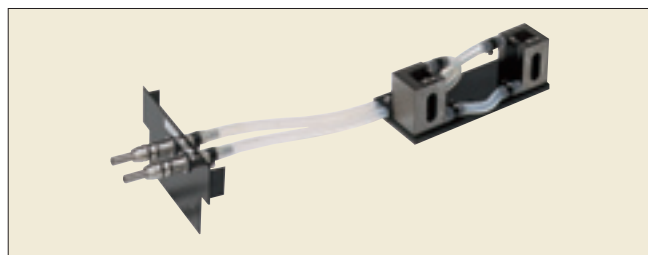
- Cell : Made of quartz, 6^W×77.5^L×11^Hmm in inner dimensions. One piece is included in the standard contents.
- Scanning range : 60 mm
- Standard contents : A main controller, a cell holder, a cell.



Constant-Temperature Cell Holder (Cat. No. 202-30858-04)

Maintains sample and reference cells at a desired, uniform temperature by circulating constant-temperature water.

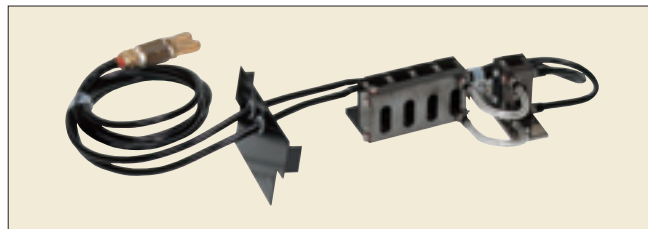
- Temperature range : 5 to 90°C (depends on the performance of the constant-temperature water circulator)
- Cell holder : Accepts a pair of 10 mm square cells



Constant-Temperature Four Cell Holder (Cat. No. 204-27206-02)

Maintains four sample cells and a reference cell at a desired, uniform temperature by circulating constant-temperature water.

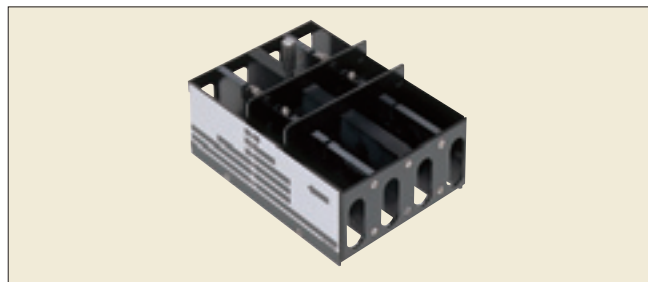
- Temperature range : 5 to 90°C
- * The Four-Cell Sample Compartment Unit (Cat. No. 204-00850-01) is required.



Universal Rectangular Cell Holder, Four-Cell Type (Cat. No. 204-27208)

Permits manual change of four rectangular cells having an optical path of 10, 20, 30, 50, 70, or 100mm.

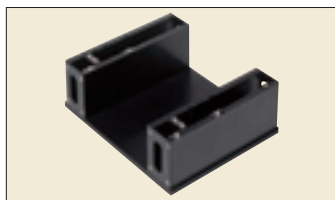
- * The Four-Cell Sample Compartment Unit (Cat. No. 204-00850-01) is required.
- * When a rectangular, long-path cell is used on the reference side, its holder (Cat. No. 204-28720) is additionally required.



Long-Path Rectangular Cell Holder

(Cat. No. 204-23118-01)

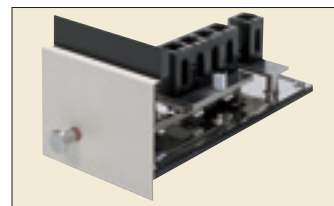
Holds rectangular cells having an optical path of 10, 20, 30, 50, 70, or 100mm.



Four-Cell Sample Compartment Unit

(Cat. No. 204-00850-01)

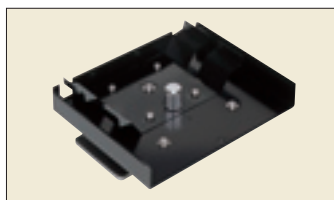
Accommodates a four cell holder of cylindrical, rectangular, and other types of cells. Incorporates a four cell holder for 10 mm square cells.



Cylindrical Cell Holder

(Cat. No. 204-06216-02)

Holds cylindrical cell having an optical path of 10, 20, 50, or 100 mm.



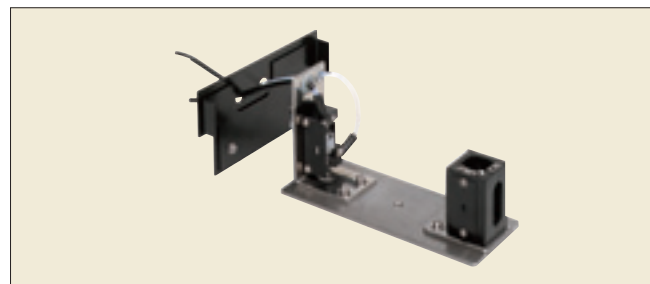
10 mm Micro Flow-thru Cell with Holder

(Cat. No. 204-06222)

5 mm Micro Flow-thru Cell with Holder

(Cat. No. 204-06222-01)

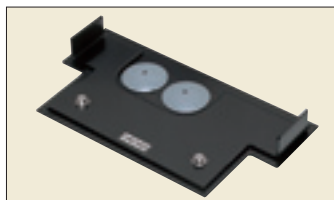
Cat. No.	optical path	volume
204-06222	10mm	0.3mℓ
204-06222-01	5mm	0.15mℓ



Front Panel with holes

(Cat. No. 204-27588-03)

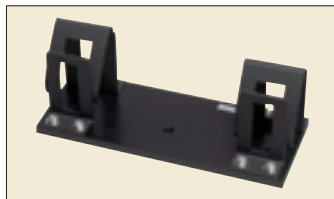
Allows the tubes of a flow-thru cell, for example, to be connected through the front panel of the instrument.



Film Holder

(Cat. No. 204-58909)

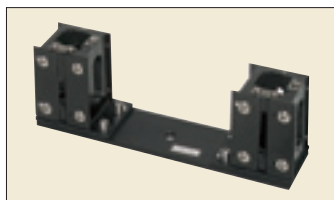
Used in transmittance measurement of thin samples such as films and filters.



Micro Cell Holder with Mask

(Cat. No. 204-06896)

Holds a micro cell, less than 3 mm wide. (The mask width is continuously adjustable.)

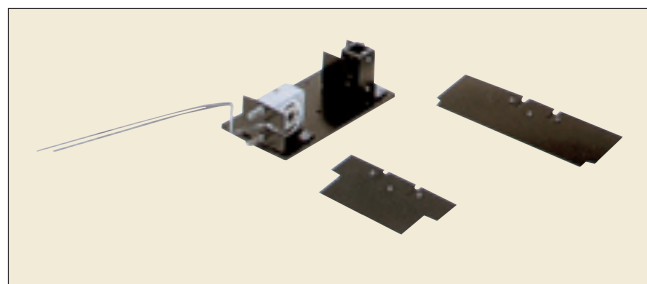


Flow-Thru Cell for HPLC

(Cat. No. 206-12852)

With this flow-thru cell attached, the spectrophotometer can be used as a variable-wavelength UV-VIS detector for an HPLC system.

- 1mm I. D., 10mm path length, 8μℓ inner volume
- Flow-thru cell on the sample side and cell holder with a mask on the reference side
- The analog signal output interface (Cat. No. 204-04757) is necessary for connecting the UV-1700 to a Shimadzu Chromatopac data processor. The UV-1650PC cannot send analog signals.





ACCESSORIES

8/16 Series Micro Multi-Cell

Cell Holder

Model	Cat. No.
8/16 Series Micro Multi-cell Holder MMC-1600	206-53945-91
8/16 Series Constant Temperature Micro Multi-cell Holder MMC-1600C	206-53900-91

This cell holder holds one micro multi-cell, either 8 or 16 cell, for micro volume measurement.

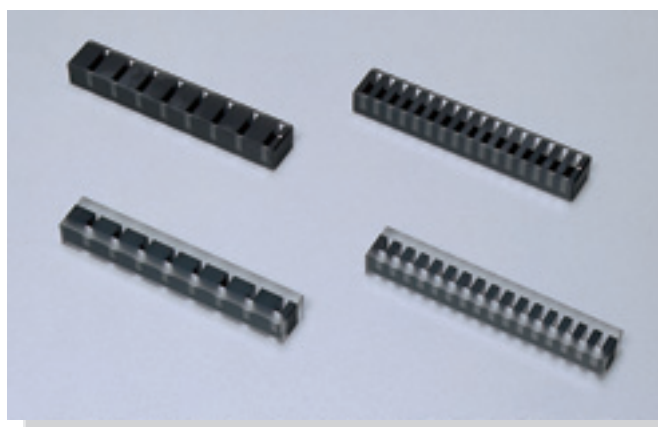
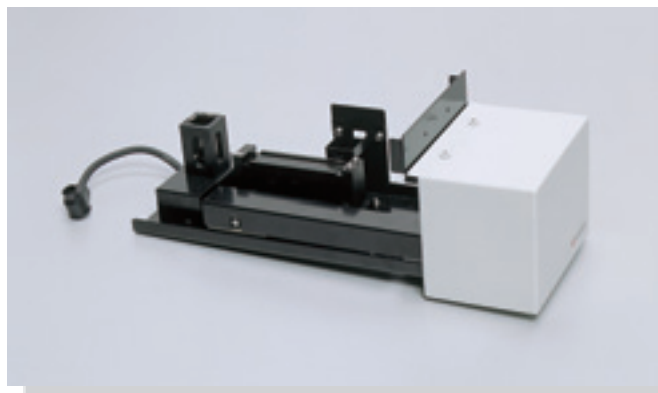
Two types of micro multi-cell holders are available, the standard type (MMC-1600) and the constant temperature water circulation type (MMC-1600C).

Micro Multi-cells

Model	Cat. No.
8 Series Micro Multi-cell; optical path length 10mm, cell volume 100 μ l	208-92089
16 Series Micro Multi-cell; optical path length 10mm, cell volume 100 μ l	208-92088
8 Series Micro Multi-cell; optical path length 5mm, cell volume 50 μ l	208-92086
16 Series Micro Multi-cell; optical path length 5mm, cell volume 50 μ l	208-92085

There are two types of micro multi-cells available in both the 8 Series and the 16 Series models, a 50 μ l type and a 100 μ l type. The cell intervals of the 8 Series Micro Multi-cell are applicable for use with 8 \times 12 well microplates and 8 channel pipettes. Microplate samples aspirated into multi channel pipettes can be injected directly into the cells for measurement.

- Micro volume samples can be measured (minimum sample volume: 50 μ l or 100 μ l, respectively)
- Support for commercial microplates and micro pipettes. (with 8 Series micro cells)
- Up to 16 samples can be measured at a time (with 16 Series micro cell)



Syringe Sipper

Model	Cat. No.	Remarks
Syringe Sipper N	206-53800-93	Normal temperature type (Flow cell available separately. Choose from the recommended flow cells listed below.)
Syringe Sipper CN	206-53800-94	Constant temperature, water circulating type (Flow cell available separately. Choose from the recommended flow cells listed below.)

Recommended Flow Cells				
Cell Type	Cat. No.	Optical Path Length	Dimensions of Aperture	Standard Required Sample Volume
Square (Ultra-micro)	208-92114	10mm	ϕ 2mm	0.9ml
Square (Micro)	208-92113	10mm	ϕ 3mm	1.0ml
Square (Semi-micro)	208-92005	10mm	H11 \times W3.5mm	5.0ml

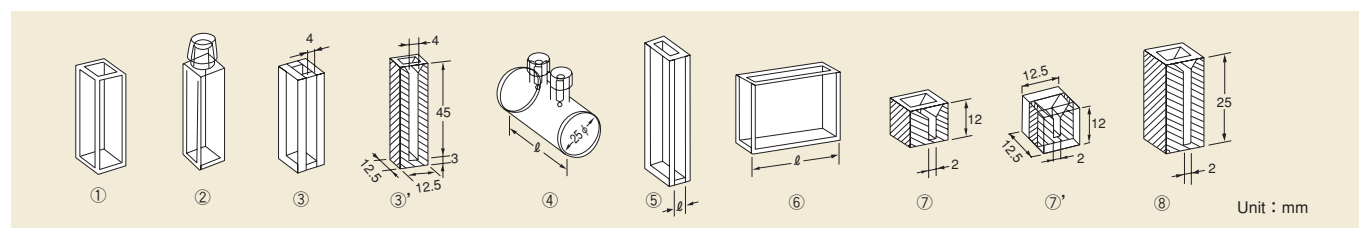
The sipper unit employs a syringe pump system. The liquid contact surfaces are composed of Teflon, glass, or quartz, imparting excellent chemical resistance and ease of maintenance, and allowing measurement of almost any sample type. Further, the extremely high repeatability of sipping volume (repeat precision: \pm 0.03ml) makes it ideal when performance validation is required.

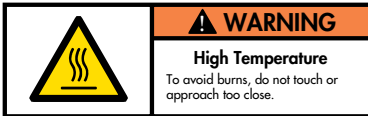
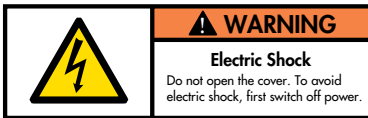
- The flow cell can be changed independently for excellent ease of maintenance.
- Excellent chemical resistance allows measurement of almost any sample.
- Excellent repeat sipping of fixed volumes.



CELLS

Description	Optical path (ℓ)	Type	Fused silica (S) Cell	Glass (G) Cell
Square cell	10mm	①	200-34442	200-34565
	20mm	⑥	200-34446	200-34446-01
	50mm	⑥	200-34944	200-34944-01
	100mm	⑥	200-34676	200-34676-01
Square cell with stopper	10mm	②	200-34444	200-34444-01
Semi-micro cell	10mm	③	200-66501	200-66501-01
Semi-micro black cell	10mm	③*	200-66551	—————
Super micro black cell	10mm	⑦	200-66578-11	—————
	5mm	⑦*	208-92116	—————
Micro black cell	10mm	⑧	200-66578-12	—————
Cylindrical cell	10mm	④	200-34448 (silica window)	200-34448-01 (glass window)
	20mm		200-34472 (silica window)	200-34472-01 (glass window)
	50mm		200-34473-01 (silica window)	200-34473-03 (glass window)
	100mm		200-34473-02 (silica window)	200-34473-04 (glass window)
Short path cell	1mm	⑤	200-34660-01	200-34662-01
	2mm		200-34655	200-34662-11
	5mm		200-34449	200-34449-01





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