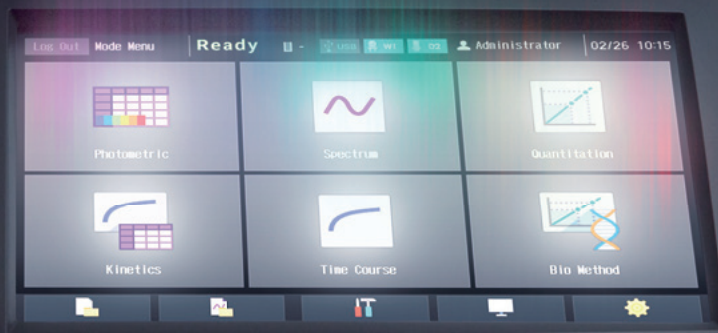


UV-VIS Spectrophotometer

UV-1900



SHIMADZU



Navigate Your Way

Easy to Operate, Obtain Answers Easily and Rapidly

Easy-to-use user interface design

Ergonomic touch-screen display

Advanced Regulatory Compliance

Validation functions enable checks in accordance with Pharmacopeia (JP, USP, and EP) to be performed easily

In combination with LabSolutions™ DB/CS, comply with FDA 21 CFR Part 11 and PIC/S GMP guidelines

High Performance to Meet Diverse Needs

Performance at the highest level in its class, provides advanced function than UV-1800

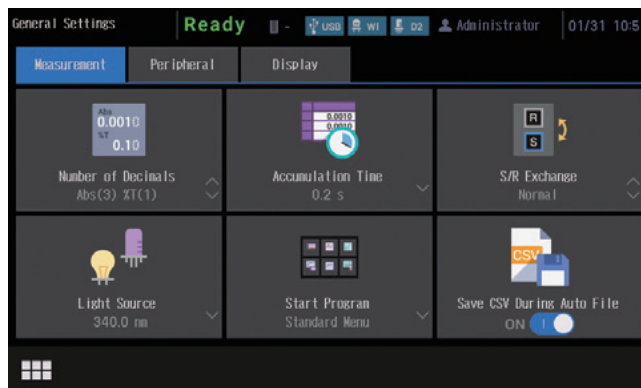
Ultra-fast scan performance, capable of obtaining high-accuracy spectra in just a few seconds

Easy to Operate, Obtain Answers Easily and Rapidly



Easy-to-Use Interface Grasp the Current Status and Operating Procedures at a Glance

The UV-1900 on-screen user interface includes large, easy-to-see icons deployed on a black background, so the instrument settings are evident at a glance. In addition, the large, easy-to-see icons improve intuitive understanding, which enables users to quickly become familiar with the operations. Furthermore, the user interface is designed to minimize transitions between windows, so users do not get confused during the operations.



Hardware Design Based on Ergonomics

The control panel design is based on ergonomics and positioned at the very best viewing angle for the user. Users can operate easily with any posture. In addition, a stylus pen is equipped next to the panel, so users can switch easily between operations using their fingers or the stylus pen.



Navigation Tabs Improve Usability

In quantitation mode on the UV-1900, the stages of the entire measurement process and the current status are always shown on the display. As a result, users know immediately what to do in the next step.

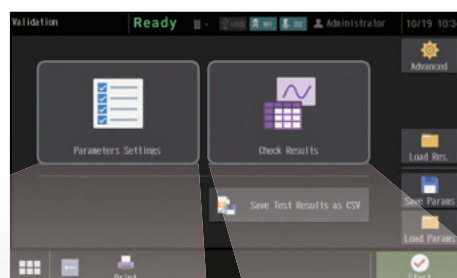


Advanced Regulatory Compliance

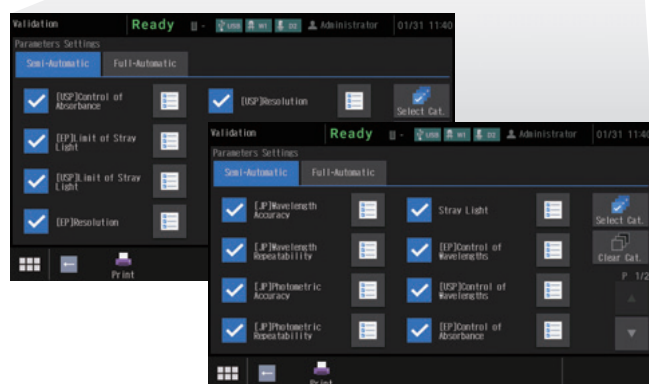
Full Support for Pharmacopeia, GLP/GMP, FDA 21 CFR Part 11 and Other Regulations

Instrument Validation Functions Compliant with JP, USP, and EP

This instrument can not only run checks for nine JIS items, but also those stipulated in the Japanese Pharmacopoeia (JP), United States Pharmacopeia (USP), and the European Pharmacopoeia (EP). Naturally, the hardware is also compliant with the specifications required by each Pharmacopeia. In addition, the check conditions can be saved. As a result, once the conditions are saved, checks can be performed easily just by calling them up as needed. Check results can also be saved.



Main Screen



Parameters Setting Screen



During Testing Screen

The Check Results Screen shows a table of test results for '[EP]Control of Wavelengths'. The table has columns for Test W. (nm), Meas. W. (nm), Diff. (nm), Criteria (nm), Result, and 1/4. The results are as follows:

Test W. (nm)	Meas. W. (nm)	Diff. (nm)	Criteria (nm)	Result	1/4
241.21	241.80	0.59	1.00	Pass	▲
287.30	287.80	0.50	1.00	Pass	▲
361.31	361.55	0.24	1.00	Pass	▲
536.63	536.95	0.32	3.00	Pass	▼

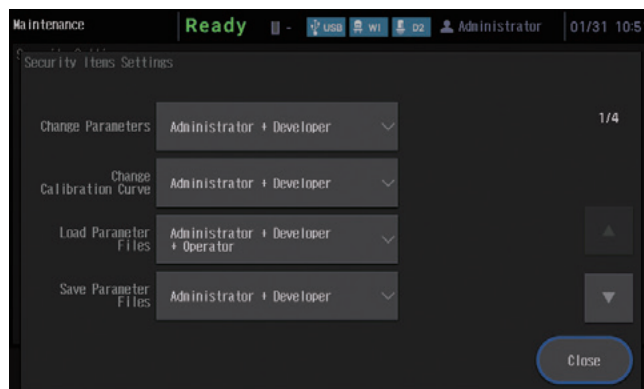
Check Results Screen

Resolution of 1 nm, the Highest in its Class

In addition to achieving a resolution of 1 nm, the highest in its class, by using a monochromator with a Czerny-Turner mounting, the UV-1900 also features a compact, bright optical system. The instrument is more than capable of meeting the wavelength resolution required in the European Pharmacopoeia.

Improved Security Functions

An external control security function has been added to provide more support for compliance with regulations. Three user authority levels, "Administrator", "Developer", and "Operator", can be set for instrument users.



Support for FDA 21 CFR Part 11, PIC/S GMP Guidelines and Other Regulations and Guidelines

Ensuring the integrity of data (database management), including the user management, user authority management, and data audit trails required for compliance with FDA 21 CFR Part 11, PIC/S GMP guidelines, and other ER/ES regulations, is possible.

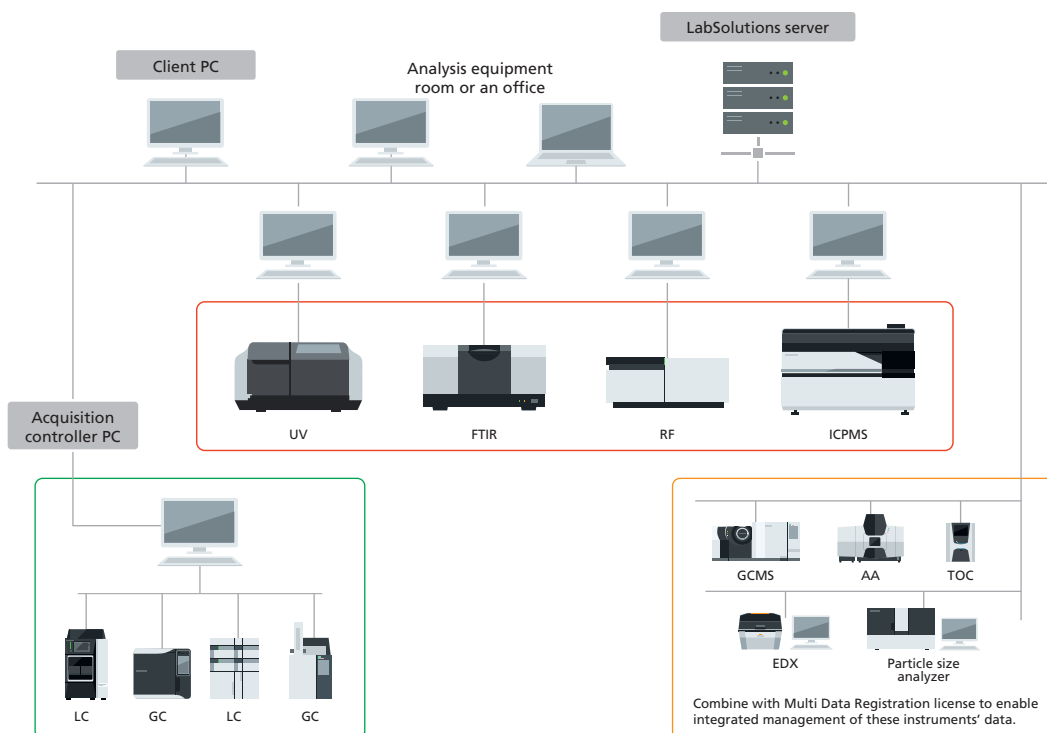
LabSolutions DB UV-Vis or UVProbe / LabSolutions DB System

The system allows for data management and user management with a database. Compliant with ER/ES regulations, the system is optimally configured for customers using a PC.



LabSolutions CS UV-Vis* or UVProbe / LabSolutions CS System (Network System)

The system is optimally configured for customers who want to manage data on a server together with LC and GC data for ER/ES compliance.



*: coming soon

High Performance to Meet Diverse Needs

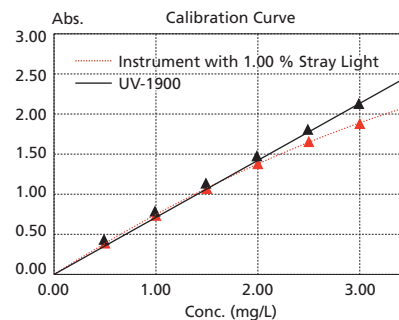


Low Stray Light

Stray light is at 0.5 % max. (198 nm), twice as low as the performance level of the UV-1800. With this stray light reduction, accurate measurements are possible up to the vicinity of 2 Abs even in the ultraviolet region. In addition, high-concentration samples can be quantified accurately.

The figure on the right is a calibration curve for acetic acid, created with absorbance at 200 nm.

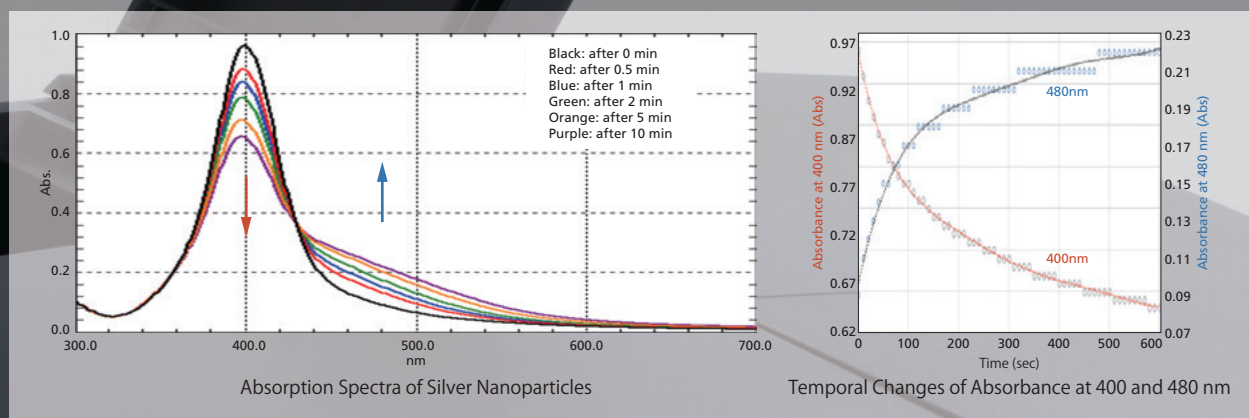
The correlation coefficient is 0.9997, and correct measured values are obtained even in the vicinity of 2 Abs. Linearity will be lost in the high absorbance region due to the stray light.



Ultra-Fast Scan

Spectra can be acquired as fast as 29,000 nm/min. Ultra-fast scan is effective in tracking chemical reactions in a short time. In addition to the absorbance change at specified wavelengths, spectra can also be acquired in a short time with the UV-1900. Therefore, more detailed behavior can be investigated by observing spectra with the UV-1900.

The figures below show the analysis of particle agglomeration process when salts are added to silver nanoparticles. Measurements of the 300 to 700 nm region were performed in ultra-fast scan mode. In addition to the decrease of absorbance at 400 nm and the increase of absorbance at 480 nm, the temporal changes of spectra can also be observed.



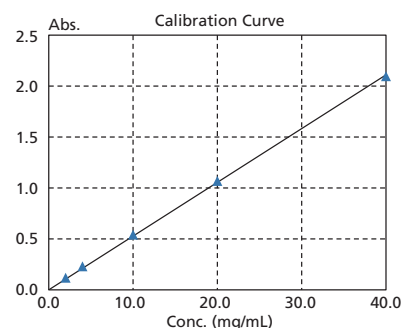
High Reproducibility and Repeatability Accuracy

The photometric repeatability accuracy is 0.0002 Abs max. (0.5 Abs and 1.0 Abs), an improvement of five times over the performance level of the UV-1800. With this high photometric repeatability accuracy, variance in the measurement results is suppressed, enabling more accurate quantitation and the detection of low-concentration samples.

The figure on the right is a calibration curve for caffeine, created with absorbance at 273 nm. The calibration curve has an Abs = 0.0528 Conc., the lower limit of quantitation determined from the standard deviation is 0.0051 mg/L at a point where it would be 0.051 mg/L^{Note} for the UV-1900.

Note: One method of determining the lower limit of quantitation is to use ten times the standard deviation. This is an actual measured value and is not guaranteed.

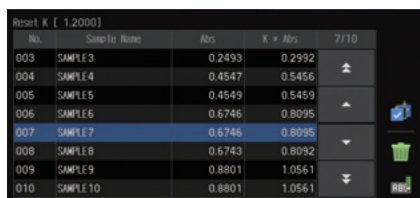
No.	Absorbance of Blank Solution (273 nm)
1	-0.00001
2	0.00001
3	-0.00002
4	0.00002
5	0.00001
6	-0.00003
7	0.00001
8	-0.00004
9	0.00001
10	0.00005
Standard Deviation σ	0.000025



A Diversity of Measurement Modes

Photometric

Measures the photometric value at a single wavelength or multiple (up to eight) wavelengths.

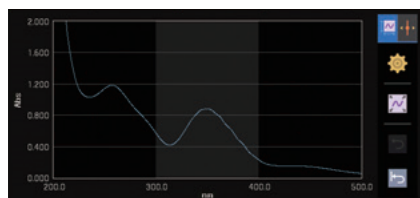


Reset K [1.2000]

No.	Sample Name	Abs	K * Abs	7/10
003	SAMPLE3	0.2493	0.2992	
004	SAMPLE4	0.4547	0.5456	
005	SAMPLE5	0.4549	0.5459	
006	SAMPLE6	0.6746	0.8095	
007	SAMPLE7	0.6746	0.8095	
008	SAMPLE8	0.6743	0.8092	
009	SAMPLE9	0.8801	1.0561	
010	SAMPLE10	0.8801	1.0561	

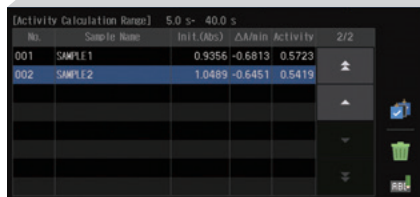
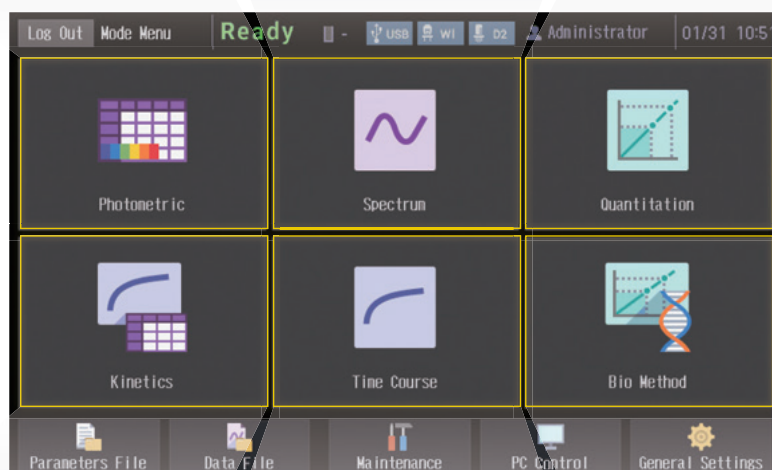
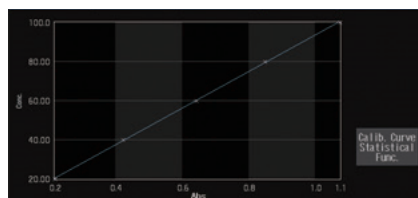
Spectrum

Measures a sample spectrum using wavelength scanning.



Quantitation

Generates a calibration curve from the measurement of standards, and then calculates the concentrations of unknowns.

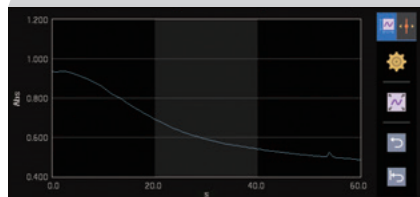


Activity Calculation Range: 5.0 s - 40.0 s

No.	Sample Name	Init.(Obs)	ΔAbs Activity	2/2
001	SAMPLE1	0.9356	-0.6813	0.5723
002	SAMPLE2	1.0489	-0.6451	0.5419

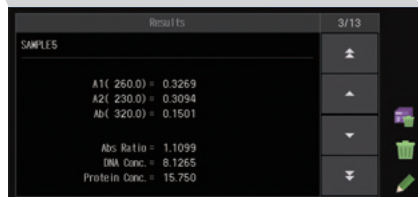
Kinetics

Measures absorbance changes as a function of time, and obtains the enzymatic activity values. The kinetics measurement method or the rate measurement method can be selected.



Time Course

Measures changes over time in photometric values at a specified wavelength.



Results 3/13

SAMPLES
A1(260.0) = 0.3269
A2(230.0) = 0.3094
Ab(320.0) = 0.1501
Abs Ratio = 1.1099
DNA Conc. = 6.1265
Protein Conc. = 15.750

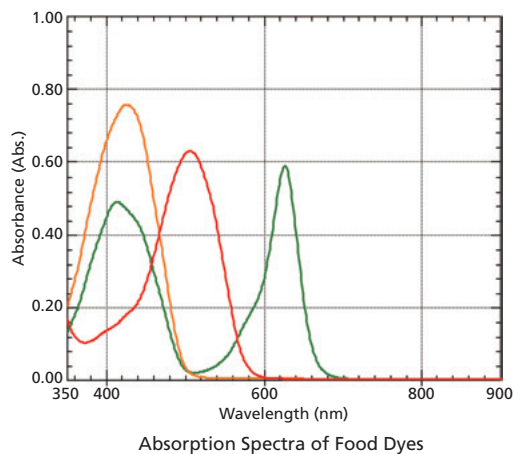
Biomethod

Quantifies DNA or protein concentrations.

Applications

Foods

This is an example of the analysis of food dyes. By using ultra-fast scan mode, the time needed for routine spectral checks can be shortened. The 350 nm to 900 nm region can be measured at 1 nm intervals in approx. 4 seconds.



Pharmaceuticals and Life Sciences

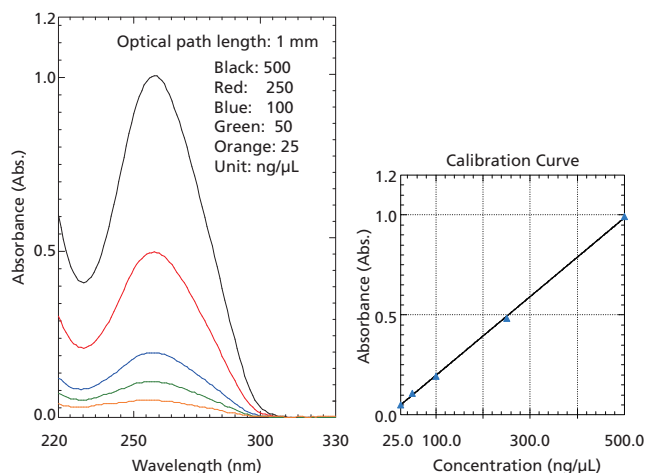
This is an example of the analysis of λ DNA. Trace quantities (on the order of a few μ L) can be measured by combining the instrument with NanoStick and TrayCell™. Using TrayCell, a calibration curve for 4 μ L of λ DNA was obtained correctly in the range between 25 μ L and 500 μ L.



TrayCell

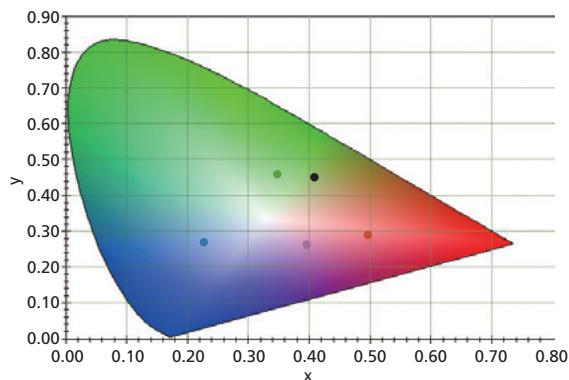
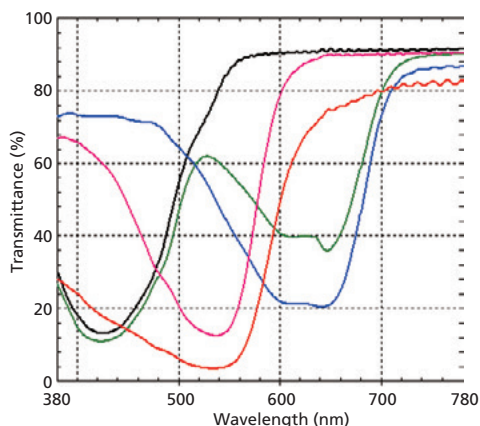


NanoStick



Chemistry

This is an example of the analysis of colored cellophane tape. Materials can be confirmed quantitatively by using LabSolutions UV-Vis and color measurement software.



Optional Software

Control with LabSolutions UV-Vis Software



The UV-1900 can be controlled using LabSolutions UV-Vis software. LabSolutions UV-Vis is a next-generation Shimadzu UV control software pursuing efficiency of analysis. The simple design layout enables even first-time users to perform operations easily. A new spectrum evaluation function automates the measurement, analysis, and printing of reports to significantly enhance the efficiency of routine analysis. In addition, it achieves the easy transfer of measurement data. Users can export the measurement data in text format and import it into other software for analysis with Excel®.

(A separate USB cable is required to connect with a computer.)

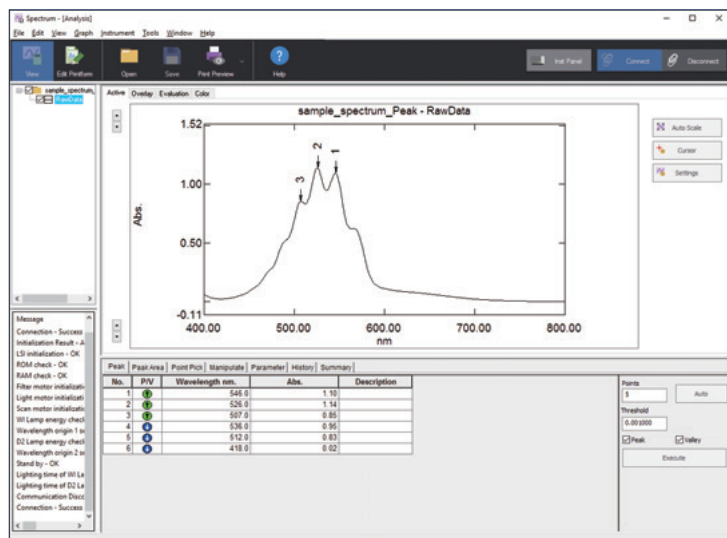
For more details, refer to LabSolutions UV-Vis brochure (C101-E147).

Note: LabSolutions UV-Vis is the latest optional software. UV-1900 is equipped with UVProbe software as standard.

Simple Design

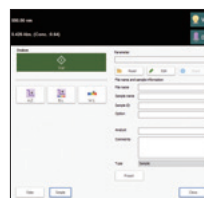
From the start, the software's user-friendliness allows users to perform operations with ease.

With extensive features, LabSolutions UV-Vis meets a wide range of users' expectations.



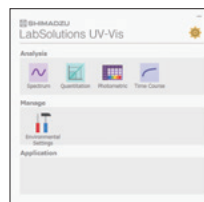
Simple Main Window

Clear and simple layout of the graphs and measurement results makes it easy to read.



Instrument Control Panel

The instrument control panel that brings together the measurement functions enables automatic measurement, analysis and reporting.



Easy-to-follow Configuration Window

Large icons make it easy for users to understand and operate.

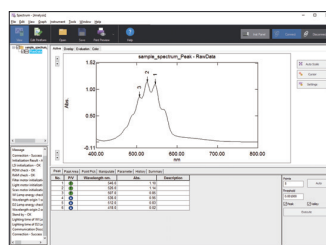
Four Measurement Modes

It permits four measurement modes: spectrum, quantitative, photometric, and time course.

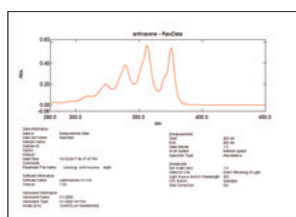
Users can open multiple measurement modes at the same time, so that data analysis can be performed in one mode while collecting data in another mode.

Report

Easily create report layouts.



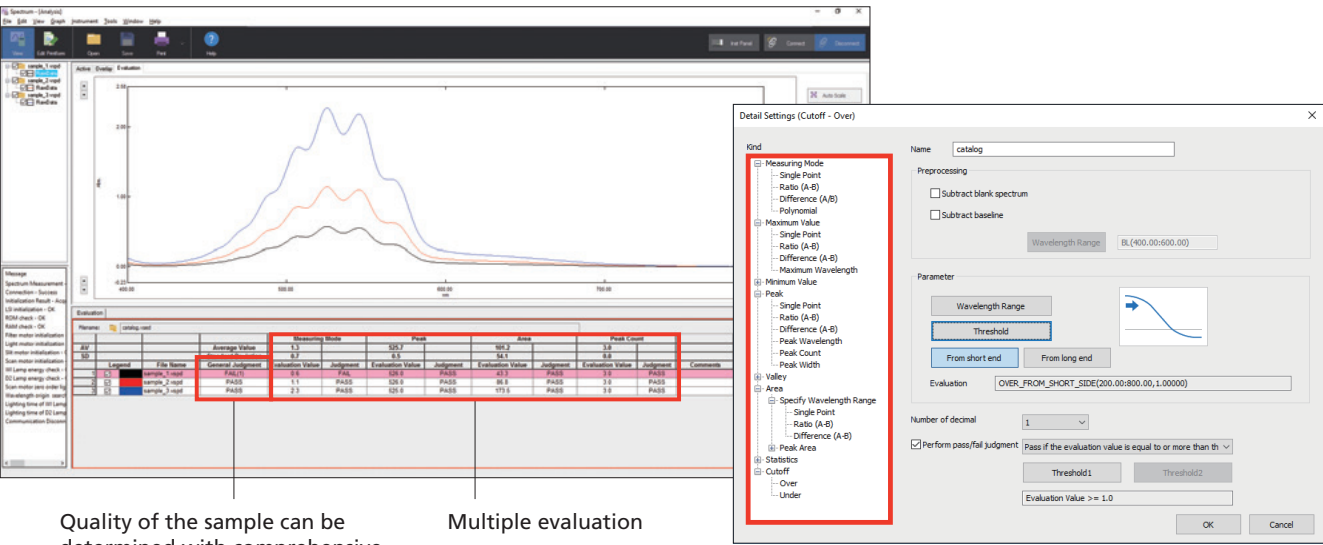
Print from the measurement window with one click.



Report is printed.

Spectra Evaluation Function

In addition to providing measurement and analysis results, judgment results are also provided.
With this feature, LabSolutions UV-Vis enables users to maintain a product's quality.



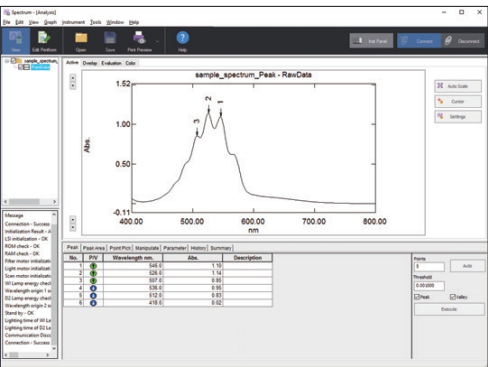
Quality of the sample can be determined with comprehensive judgment at a glance.

Multiple evaluation criteria can be set.

Detail Settings Window
Evaluation method can be selected from a wealth of choices.

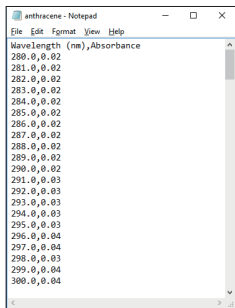
Easy Transfer of Measurement Data

Users want to export measurement data immediately in text format, and import for analysis in other software, such as Excel.



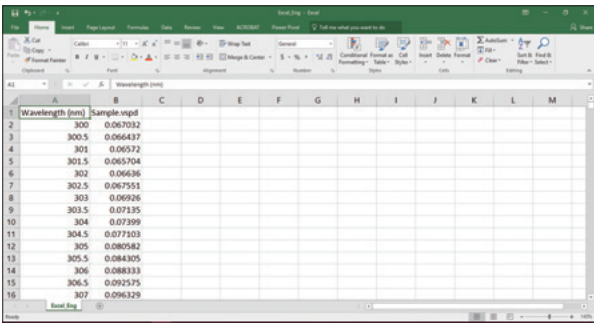
To Analysis Software

Automatically generates a text file when the spectra data are saved. It can be immediately imported into other software.



To Excel

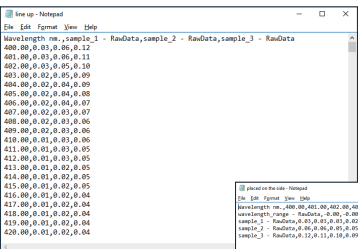
Real-time transfer of the spectrum waveform to Excel during measurement.
No need to create a CSV file each time.



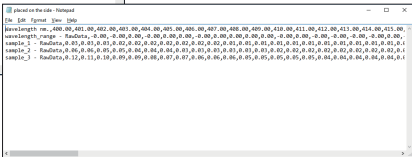
Matrix Output

Outputs multiple spectra to one text file.
Easy to import data into multivariate analysis software.

Line up wavelengths vertically.



Line up wavelengths horizontally.



Select how the data is ordered

Control with UVProbe Software

Spectrum Module

Photometric Module (Quantitation)

Kinetics Module (Time Course Measurement)

Report Generator

In addition to peak detection, area calculation and other data processing functions, UVProbe is equipped with various functions including: security functions that limit each user limited to specific functions, a data history log function, and an instrument audit trail function.

[illegible]

Sample Table - (Active)

Sample ID	Type	Ex	Conc	VL558	VL559	Result
1	Dye A	Standard	1.000	0.136	0.121	0.013
2	Dye B	Standard	2.250	0.149	0.134	0.016
3	Dye C	Standard	3.000	0.283	0.262	0.032
4	Dye D	Standard	4.750	0.440	0.388	0.061

Standard Curve

Abs vs Conc (mg/L)

Sample Graph

Conc (mg/L) vs Sequence No.

Description

Water filter installation - Passed
 Wavelength origin 1 search - Passed

Date/Time
 07/15/00 PM 4:45:00
 07/15/00 PM 4:45:02

User
 Administrator
 Administrator

500.000 nm 0.000 Abs.

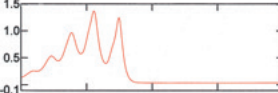
Auto Zero Baseline **Go To WL** **Print Data** **Document**

File name: Data.xls

The screenshot shows the 'Spectrum' application window. The title bar reads 'Spectrum - report'. The menu bar includes 'File', 'Edit', 'View', 'Insert', 'Window', and 'Help'. The toolbar contains various icons for file operations, editing, and viewing. The main window displays a 'Spectrum Peak Pick Report' for 'Data Set: Storage 1 - RawData-020 - D:\Program Files\SHIMADZU\MSProber\Data\CermetMetWtl SalsynData.spc'. The report includes a plot area with a gray background and axes ranging from 0.00 to 1.00. Below the plot, there are two empty rectangular boxes labeled 'Notes/Parameters' and 'Data'. The status bar at the bottom indicates 'Scan 1 / 1', 'Run: 655.050 in', and 'MIM'.

Spectrum Peak Pick Report 01/26/01 06:06:01

Data Set: Storage 055829 PM - RawData - D:\Program Files\SHIMADZU\Analysis\DATA\RAW\055829 PM.SPC

Abs.  nm.

Measurement Properties
Wavelength Range (nm): 300.0 to 500.0
Scan Speed: Fast
Sampling Interval: 0.2

Instrument Properties
Measuring Mode: Abs.
Slit Width: 2.0

No.	FW	Wavelength	Abs.	Description
1	0.1	304.1	0.21	
2	0.1	312.1	0.45	
3	0.1	320.1	0.80	
4	0.1	338.1	0.75	
5	0.1	354.1	1.35	
6	0.1	365.1	1.40	
7	0.1	376.1	0.25	
8	0.1	388.1	0.05	
9	0.1	400.1	0.02	
10	0.1	412.1	0.01	

Page 1/1

Accessories

Film Holder

(P/N 204-58909)

Used in transmittance measurement of thin samples such as films and filters. Holds thin samples, such as films and filters, for analysis.



Long-Path Rectangular Cell Holder

(P/N 204-23118-01)

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



Sipper Unit

Model	P/N	Standard Sample Volume
Sipper Unit 160L (Standard Sipper)	206-23790-51	2.0 mL
Sipper Unit 160T (Triple-Pass Sipper)	206-23790-52	1.5 mL
Sipper Unit 160C (Constant-Temperature Sipper)	206-23790-53	2.5 mL
Sipper Unit 160U (Supermicro Sipper)	206-23790-54	0.5 mL

Four types of sipper units with different flow cells are available. The stepping motor-driven peristaltic pump ensures reliable and smooth aspiration of sample solution.

(Direct driving is possible from the UV-1900 so no interface is required.)

CPS-100 Cell Positioner, Thermoelectrically Temperature Controlled

(P/N 206-29500-**)

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°C to 60°C
- Temperature display accuracy (difference from the true value): $\pm 0.5^{\circ}\text{C}$
- Temperature control precision (variation of temperature): $\pm 0.1^{\circ}\text{C}$
- Ambient temperature: 15°C to 35°C

Note: Square cells (P/N 200-34442) are not included, please purchase separately.

A USB adapter CPS

(P/N 206-25234-91) is required.

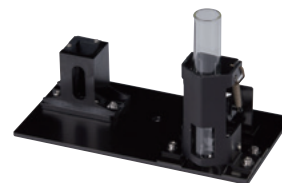


Test Tube Holder

(P/N 207-23510-41)

Holds test tube instead of sample compartment.

- Specifications:
Outside diameter: $\phi 15$ to 18 mm
Height: 84 to 115 mm
Note: Test tube is not included.



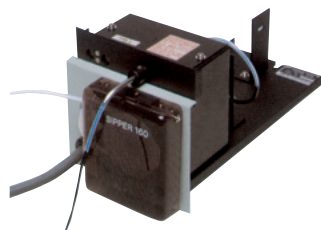
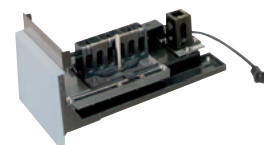
Multi-Cell Sample Compartment

(P/N 206-69160-41)

Holds up to six 10-mm square cells on the sample side. No temperature control capability.

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

Note: Square cells are not included, please purchase separately.



Note: The use of a Solenoid Valve (Fluoropolymer) (P/N 204-06599-01) and the SWA-2 Sample Waste Unit (206-23820-58) are recommended when strong acids, strong alkalis, or organic solvents are to be measured.

TCC-100 Thermoelectrically Temperature Controlled Cell Holder

(P/N 206-29510-**)

Uses Peltier effect for controlling the sample and reference temperature, so no thermostated bath or cooling water is required.

- Number of cells: One each on the sample and reference sides (temperature-controlled)
- Temperature control range: 7°C to 60°C
- Temperature display accuracy (difference from the true value): $\pm 0.5^{\circ}\text{C}$
- Temperature control precision (variation of temperature): $\pm 0.1^{\circ}\text{C}$

Note: Square cells (P/N 200-34442) are not included, please purchase separately.





UV-1900 Website

https://www.shimadzu.com/an/molecular_spectro/uv/uv-1900/index.html

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TrayCell is a trademark of Hellma GmbH.

Excel is either registered trademarks or trademarks of Microsoft Corp. in the United States and/or other countries.



Shimadzu Corporation

www.shimadzu.com/an/

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First Edition: April 2018, Printed in Japan 3655-02804-30AIT