C101-E170

SHIMADZU
Excellence in Science

UV-VIS Spectrophotometer

UV-i Selection

A Reliable Partner

Can we achieve customer working practice reforms for spectrophotometer measurement operations?

That was the question that inspired the UV-i Selection and LabSolutions™ UV-Vis products.

Three Kinds of
Value Provided by
Analytical Intelligence

intelligence

Improved Quality Control Productivity and Operators Freed from Repetitive Tasks ▸ P.6

informatics

Improved Productivity of Data Analysis Operations and Stronger Data Management ▸ P.8

innovation

Improved Administrative Productivity for High-Throughput Measurements ▸ P.12

UV-i Selection

UV-1900i

UV-2600i/2700i

UV-3600i Plus

SolidSpec™-3700i

ANALYTICAL INTELLIGENCE

Analytical Intelligence is a new concept for analytical instruments proposed by Shimadzu corporation.
Systems and software operate in the same way as experienced technicians, automatically determining a condition or result, and providing feedback to users and resolving problems. It also supplements differences in knowledge and experience of analytical instruments and ensures data reliability.


Add to Table

UV-i Selection with LabSolutions UV-Vis

Enables higher productivity and provides for a more convenient analytical environment.

ANALYTICAL INTELLIGENCE

Setting Parameters

Smooth Operability

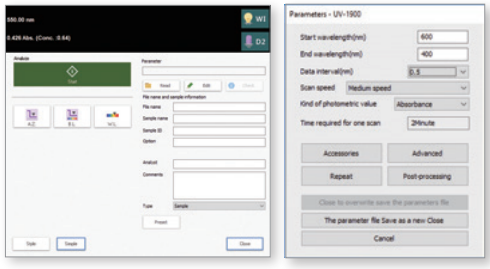
Four Measurement Modes

Four separate measurement modes: spectral, quantitative, photometric, time-course, automatic measurement (optional) enable measurements to be performed using intuitive operations.

Four Measurement Mode Windows

Instrument Control Panel

Instrument parameter settings can be specified via panels that are separate from the measurement window. The control panels include various functionality that is laid out for superior visibility. Each measurement window connects seamlessly to the corresponding parameter settings window.

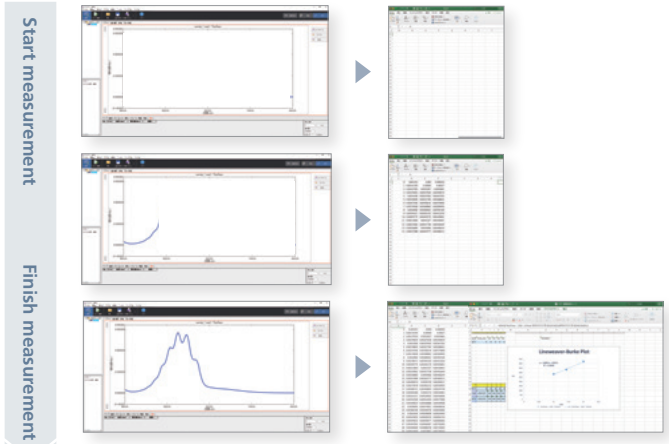


From Measurement to Data Output

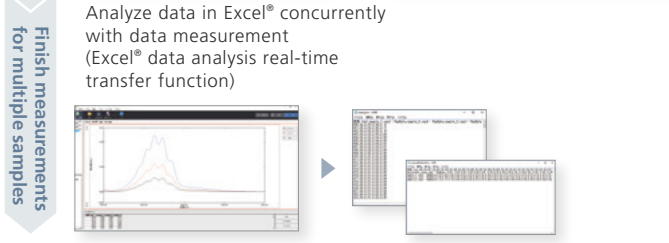
Improved Productivity of Data Analysis Operations

▶ P8.

Data analysis and data output operations can be performed at the same time (simultaneously) as data measurement. Time spent outputting or analyzing data can also be reduced by simultaneously sending data to an Excel® spreadsheet in real time or saving data as text. The software can also automatically perform post-processing of measured data, such as processing/correcting spectra, and perform pass/fail judgments of measurement results (automatic spectral evaluation).



Analyze data in Excel® concurrently with data measurement (Excel® data analysis real-time transfer function)

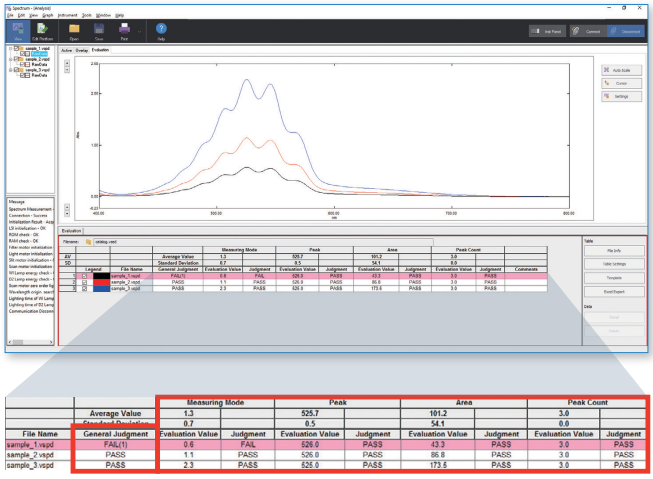


Also easily transfer data to external data analysis software (simultaneous text saving and matrix output functions)

Data Management

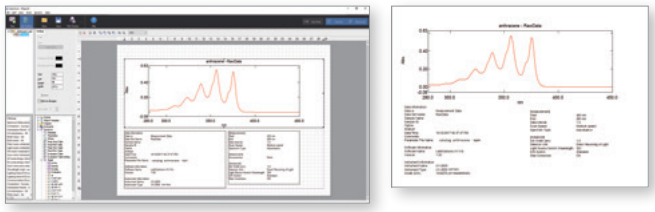
Automatic Spectral Evaluation (Spectral Evaluation Function) ▶ P6.

By specifying various evaluation criteria for measurement results, spectra judgments can be made automatically.



		Measuring Mode		Peak		Area		Peak Count	
	Average Value	1.3		525.7		101.2		3.0	
	Standard Deviation	0.7		0.5		54.1		0.0	
File Name	General Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment
sample_1.vspd	FAIL(1)	0.6	FAIL	526.0	PASS	43.3	PASS	3.0	PASS
sample_2.vspd	PASS	1.1	PASS	526.0	PASS	86.8	PASS	3.0	PASS
sample_3.vspd	PASS	2.3	PASS	525.0	PASS	173.5	PASS	3.0	PASS

In the report creation window, reports can either be prepared based on a previously specified report format or freely laid out based on various parameters, data, or other elements.



Stronger Data Management ▶ P10.

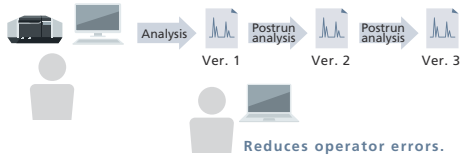
In addition to regular file management in folders on a PC, ideal solutions for saving data in a database with sophisticated security functionality and compliance with ER/ES-related regulations are also available.

Optional Software

LabSolutions DB UV-Vis
LabSolutions CS UV-Vis

Database Management

Managing data in a database can prevent the overwriting or deletion of analysis data. Furthermore, during postrun analysis, the data can be managed using version numbers, so there are no concerns about overwriting the data.



intelligence

Pass/Fail Results Visible at a Glance Improved Quality Control Productivity

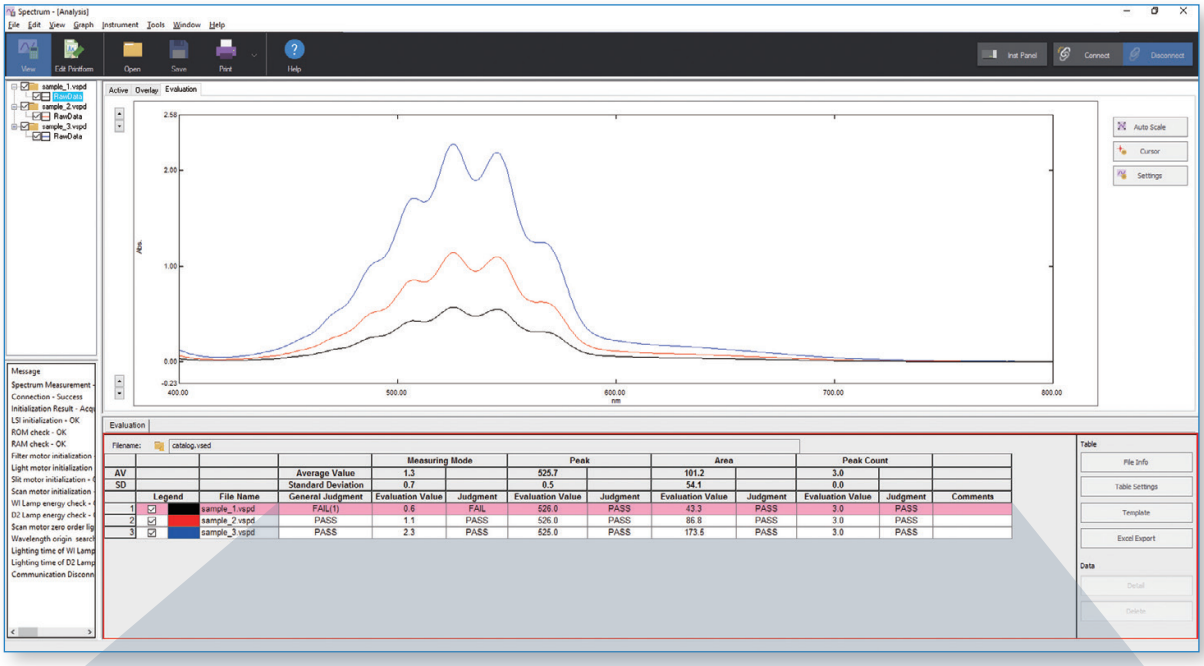
The real need was not for measurement or data analysis results, but rather pass/fail results.
The system provides support for all users involved in maintaining product quality.

Spectral Evaluation Functions

If spectra satisfy all evaluation criteria in accordance with the customized evaluation method, then an overall pass/fail result of "Pass" is output. Multiple evaluation criteria can be configured.

Previous
Checked/decided by looking at peak values or spectra.

LabSolutions UV-Vis
Decided by software based on data.

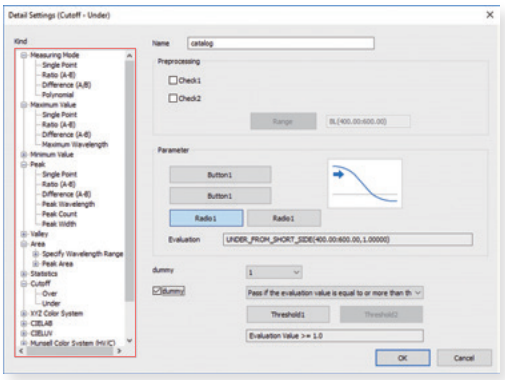


		Measuring Mode		Peak		Area		Peak Count	
	Average Value	1.3		525.7		101.2		3.0	
	Standard Deviation	0.7		0.5		54.1		0.0	
File Name	General Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment	Evaluation Value	Judgment
sample_1.vspd	FAIL(1)	0.6	FAIL	526.0	PASS	43.3	PASS	3.0	PASS
sample_2.vspd	PASS	1.1	PASS	526.0	PASS	86.8	PASS	3.0	PASS
sample_3.vspd	PASS	2.3	PASS	525.0	PASS	173.5	PASS	3.0	PASS

Customizable or Selectable from a Wide Variety of Evaluation Methods

The method used to calculate evaluation values can be selected from a variety of 33 standard evaluation methods (arithmetic calculations, peak/valley, area, or statistical calculations) or customized. The system also supports evaluation based on other criteria as well, such as color, film thickness, solar reflectance, or UPF.

Pass/fail criteria can also be selected from eight types (such as pass if greater than or equal to, less than or equal to, greater than, or less than a specified value), with results color-coded red to visually indicate evaluation values that exceed criteria.



Parameter Setting Window

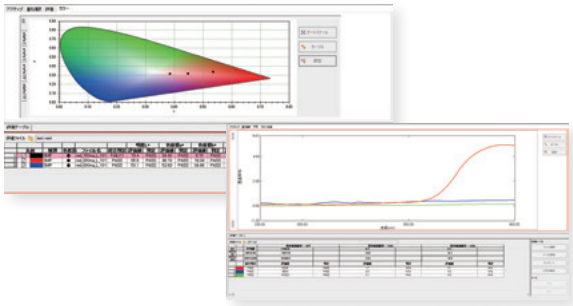
Color Analysis Optional

- Color calculations can be added to evaluation functions.
- In addition to JIS, calculations compliant with international ISO standards can also be selected.

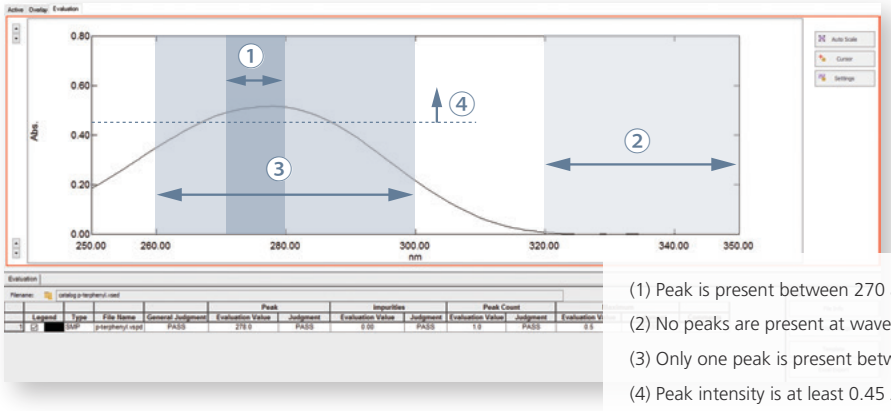
UPF Analysis Optional

- UPF criteria can be added to evaluation functions.
- UVA, UVB, and other criteria can also be evaluated in addition to UPF.

The automatic pass/fail judgment function is especially useful for the wide variety of evaluation functions and for evaluating various applications and samples.

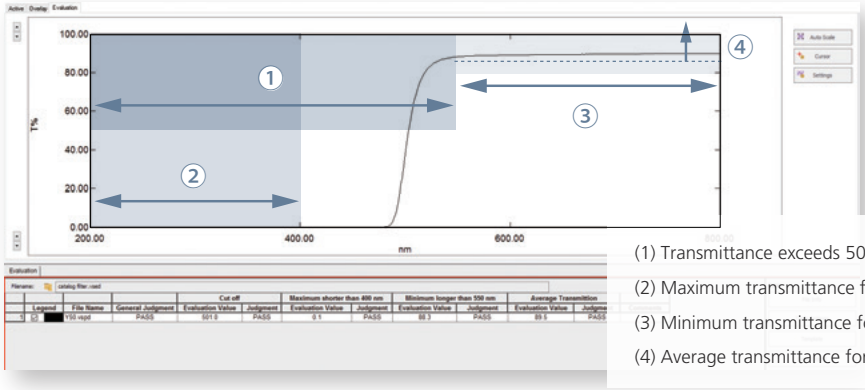


Example 1 Confirmation Testing for Drug Development



(1) Peak is present between 270 and 280 nm.
(2) No peaks are present at wavelengths longer than 320 nm.
(3) Only one peak is present between 260 and 300 nm.
(4) Peak intensity is at least 0.45 Abs.

Example 2 Quality Inspection of UV Filter



(1) Transmittance exceeds 50 % for the first time at a wavelength shorter than 550 nm.
(2) Maximum transmittance for 400 nm or shorter wavelengths is 1.0 % or less.
(3) Minimum transmittance for 550 nm or longer wavelengths is 80.0 % or more.
(4) Average transmittance for 550 nm or longer wavelengths is 85.0 % or more.

Real-Time Measurement and Data Analysis Improved Productivity of Data Analysis Operations

Data can be smoothly transferred to Excel® or other software for data analysis.

Excel® Real-Time Transfer Functions

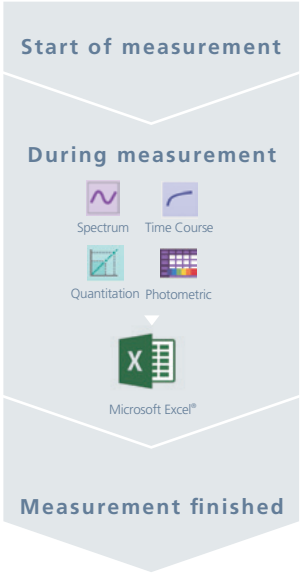
During measurements, this function transfers spectral and time-course data to Excel® software in real time (requires separate Microsoft Excel® software). That enables data analysis without the trouble of having to first save the data as a text file.

Previous

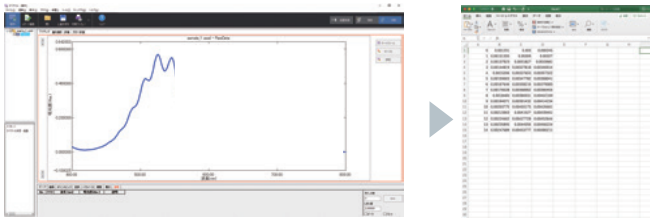
Involved significant trouble of saving as text, etc.

LabSolutions UV-Vis

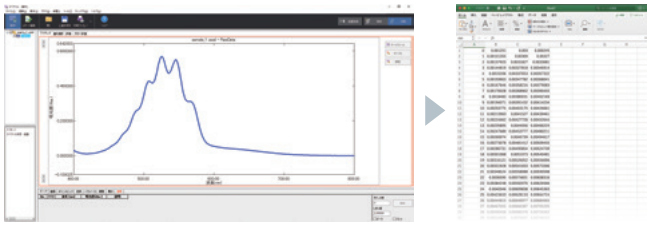
Data can be analyzed with Excel® or saved as text at the same time as measurements.



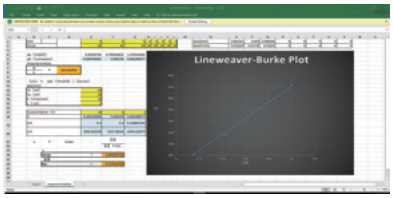
During measurement, data is transferred to Excel® in real time.



Data transfer and measurement processes finish at the same time.

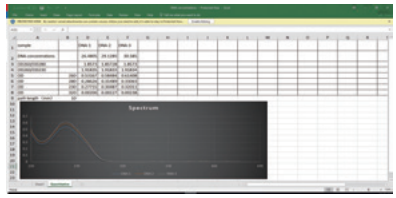


Customized data analysis and measurement processes finish at the same time.



Enzymatic Reaction Speed

It is possible to obtain the maximum reaction rate and Michaelis-Menten constant from the equation of Michaelis-Menten on Excel® simultaneously with LabSolutions UV-Vis measurement in the time course mode.
These are based on the formula for calculating the reaction rate and the Lineweaver-Burk plot graph (The vertical axis is the inverse of the reaction rate, and the horizontal axis is the inverse of the substrate concentration.) set in Excel® beforehand.
Note: Excel® image is an image.



Nucleic Acid Concentration / Purity Calculation

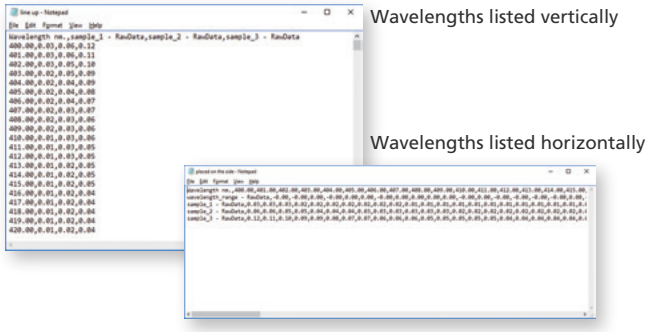
It is possible to determine nucleic acid concentration and purity at the same time as spectrum measurement with LabSolutions UV-Vis by setting the calculation formula for nucleic acid concentration and purity in Excel®. It is also possible to measure RNA and protein by changing the calculation formula in Excel®.
Note: Excel® image is an image.

Productivity Improved for Data Analysis by External Software

In addition to saving unique LabSolutions UV-Vis data files, LabSolutions UV-Vis can also simultaneously save data as a text file or Excel® file. That means the software can be used for data operations or data analysis based on given administrative or research circumstances, such as by simultaneously analyzing data in LabSolutions UV-Vis, Excel®, and as text in external numerical data analysis software such as MATLAB.

Text Output and Matrix Output

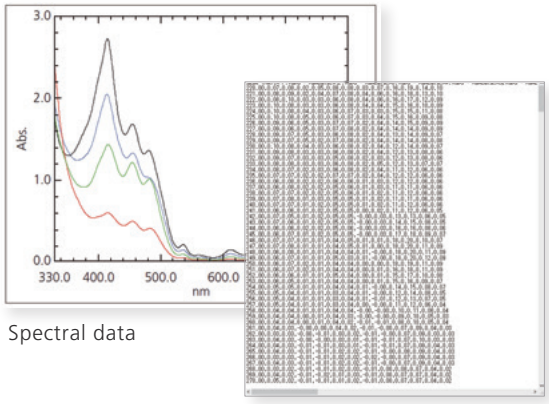
LabSolutions UV-Vis includes functionality for outputting data in text format, so that data can also be analyzed with Excel® or other software. Whenever data (spectral, photometric, time-course, or quantitative data) is saved, LabSolutions UV-Vis automatically generates a text file as well. Multiple sets of data can be output consolidated in a single text file, which is convenient for transferring data to software for multivariate analysis.



Data listing orientation is selectable.

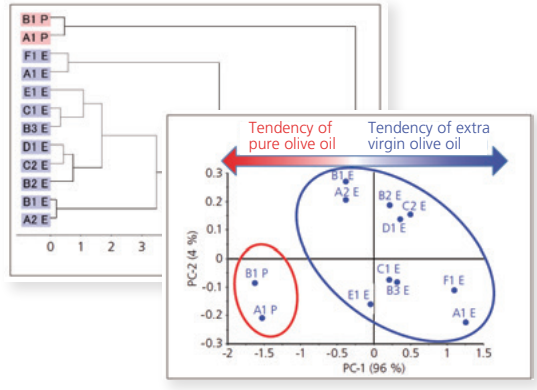
Example Multivariate Analysis

LabSolutions UV-Vis can acquire data and save it as text. Specific data of interest can also be extracted later for collective output as text. It is easy to transfer data to commercial numerical data analysis software or multivariate analysis software.



Spectral data

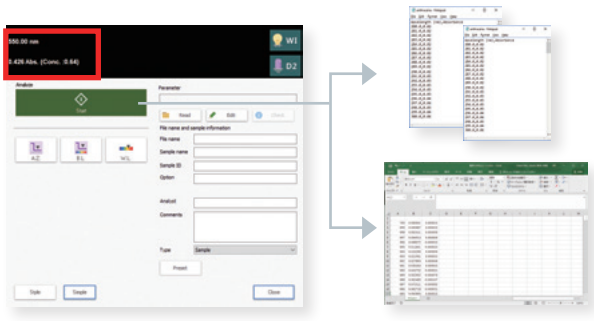
Text data



VisEase™ Simple Control Application Optional

VisEase is a simplified control application offered in response to users that prefer to measure data within the control software by the simplest way possible, without data analysis, report creation, or printing. All the necessary functionality, from measurement mode selection to starting analysis and setting wavelengths, is integrated in one simplified main window for easy one-click operation. It is ideal for users that only want to view measurement values, save data as text, or process data in Excel®. After simple measurement, the optimal output method can be selected based on how the data will be used.

Compatible models: UV-1280 and UV-1900 series



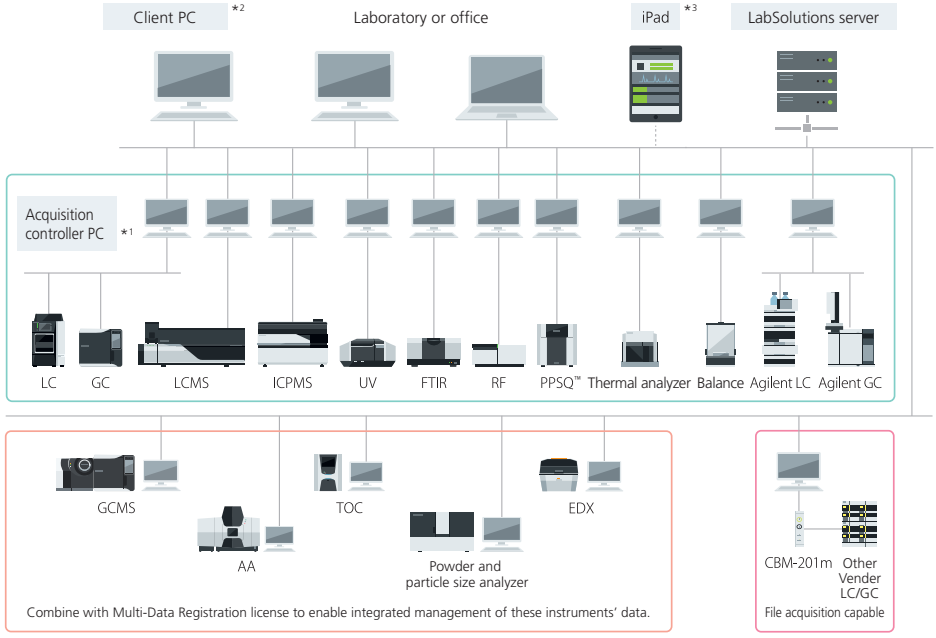
Main window

informatics

Stronger Data Management Comprehensive Data Integrity Compliance

The system enables full compliance with data integrity requirements, not only for chromatography equipment, but also UV-VIS spectrophotometers and other spectral analysis instruments.

LabSolutions CS/DB UV-Vis provides compliance for regulations concerning electronic record keeping and electronic signatures required by FDA 21 CFR Part 11 and other regulations stipulated by Japan's Ministry of Health, Labour and Welfare (ER/ES regulations). Additionally, since the software supports laboratory networking, analytical results from a broad variety of analytical instruments used in the laboratory, including LC, LCMS, GC, GCMS, ICPMS, FTIR, RF, EDX, TOC, PPSQ and so on, can be managed centrally from a server.



Network System: LabSolutions CS

LabSolutions CS can freely access all instruments on the analytical network, so that all analytical data is managed on the network server and the data can be loaded to any computer connected to the network. This is especially recommended for customers that have many users and want to manage data on a server together with LC, GC, FTIR, UV, RF, EDX, TOC, PPSQ, and other data for ER/ES compliance.

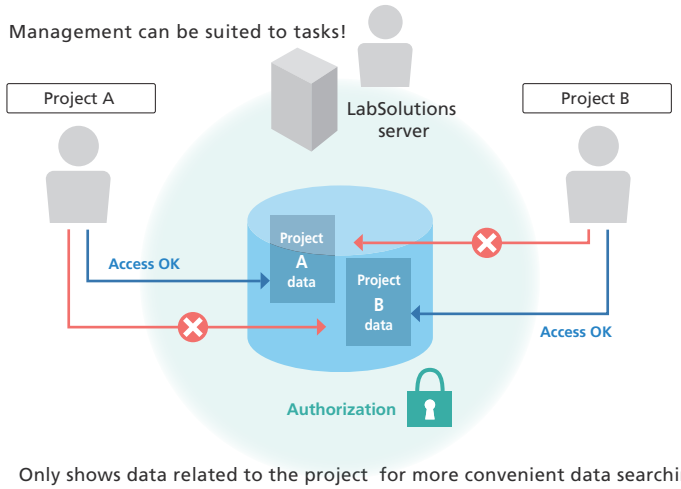
Standalone Database System: LabSolutions DB

This configuration does not require a network connection and is ideal for customers that want to manage all data on one computer for ER/ES compliance only.

*1 The acquisition control PC controls analytical instruments. It can also be used to send analytical instructions and perform postrun analysis, just like a client PC.
*2 If a terminal service is used, then LabSolutions software does not need to be installed on client PCs.
*3 If an iPad is used, then XenApp from Citrix must be installed.

Pertinent Information is Managed for Every Project

LabSolutions DB UV-Vis and CS UV-Vis provide a project management function enabling management suited to tasks and system operations. This function enables equipment and user management, security policy, and data processing to be set on a project by project basis, thereby improving the efficiency of data searches and management tasks.

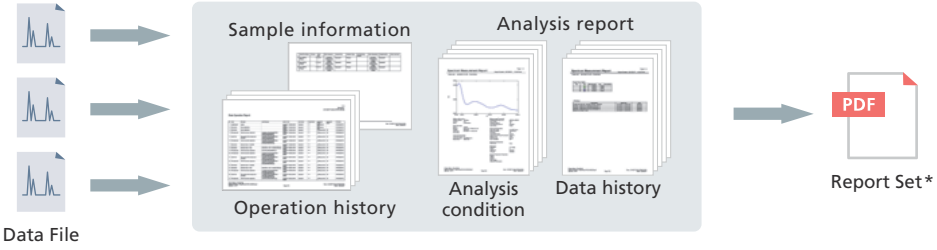


Only shows data related to the project for more convenient data searching.

Visualization of a Series of Analysis Operations

Creating a report set* provides visibility of the individual analytical operations involved in the overall analytical process. When analytical operations are visible, it is easier to check for operating errors, which helps improve the efficiency and reliability of checking processes.

* Report sets include test methods and test results for a series of samples analyzed, and also a corresponding operation log (a record of all operating events from login to logout), which is automatically extracted from the data and summarized in a single report.

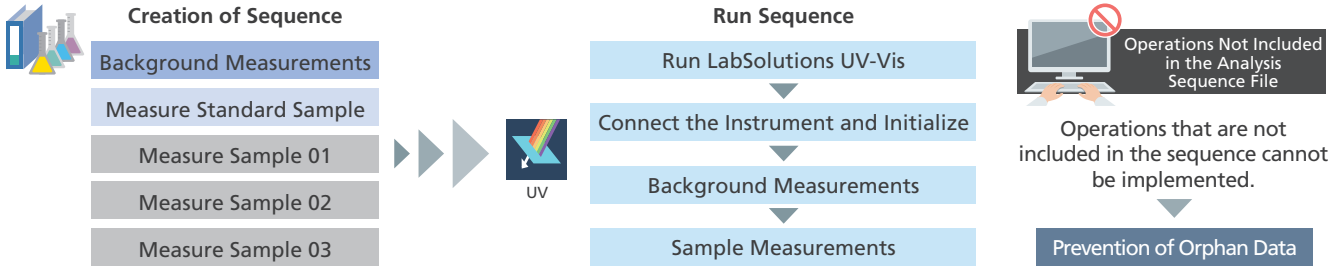


Analysis Sequence Optional

Ensuring data integrity requires a system that shows no data manipulation has occurred. Shimadzu has achieved this through the introduction of its Analysis Sequence for spectrometers. Using the Analysis Sequence, it is possible to verify that the full chain of analysis has been carried out according to experimental protocol (or SOP).
The LabSolutions Analysis Sequence (optional) provides a three-step workflow:

1. **A sequence is put together according to a given experimental protocol (or SOP). See the flow below for reference.**
2. **The operator conducts analysis in the order shown by the sequence file.**
3. **After analysis, a report set is created from the sequence file used in the analysis. The experiment leader uses the report set to review the data chain generated by the sequence.**

Until now, a problematic issue with data integrity in spectrometers has been the existence of orphan data (data which is isolated and not reviewed, despite being used in the analysis). However, the LabSolutions Analysis Sequence option not only meets the requirements for data integrity by preventing the creation of orphan data, but also allows for highly efficient spectrometer operation.



innovation

High-Throughput Measurement Automatic Measurement Capabilities Improve Productivity for Multianalyte Analysis

An autosampler can be used to automate analysis in order to avoid the trouble of having to replace cells and enable simultaneous analysis of many samples.

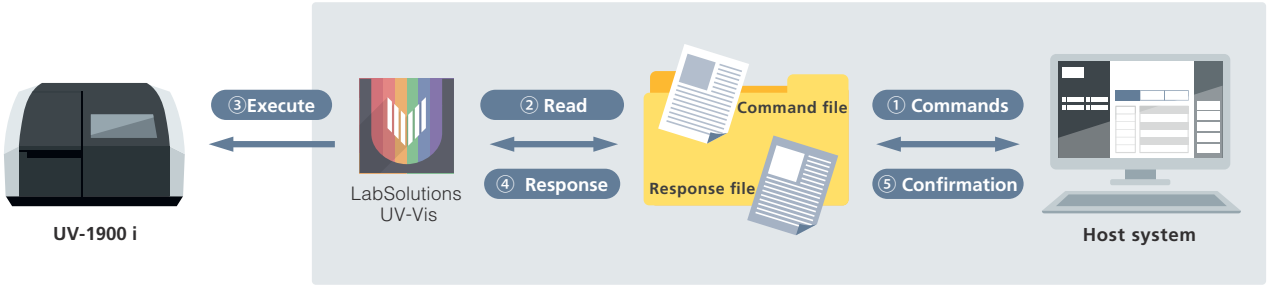
Measurements Automated with Automatic Control

Automatic control satisfies needs of customers that want to link the spectrophotometer to non-Shimadzu instruments or operate the spectrophotometer from the LabSolutions UV-Vis software, rather than by using the control panel.

Automatic Control of Shimadzu UV Instruments

Automatic control functionality is used by LabSolutions UV-Vis to successively perform operations automatically in order of the assigned commands, without an operator having to click buttons or enter characters in software windows with a mouse or keyboard.

Using this functionality enables automated system analysis, permits execution of specific operations, such as start/stop operations that do not require an operator performing the operations in a window, and can achieve a system that prevents human errors.



Commands are text files that can be used to configure specialized systems. By placing simple text files that contain a list of commands in a folder, LabSolutions UV-Vis automatically reads the commands contained in the file, loads the parameter settings file, performs baseline corrections, measures the spectrum, or performs other processes automatically.

Optional

Autosampler Used for Continuous Analysis of Up to 360 Samples

If used in combination with an ASX series autosampler for automatic analysis, up to 360 samples can be automatically analyzed continuously. Furthermore, the spectral evaluation function can be used to navigate the entire process from measurement to data analysis.

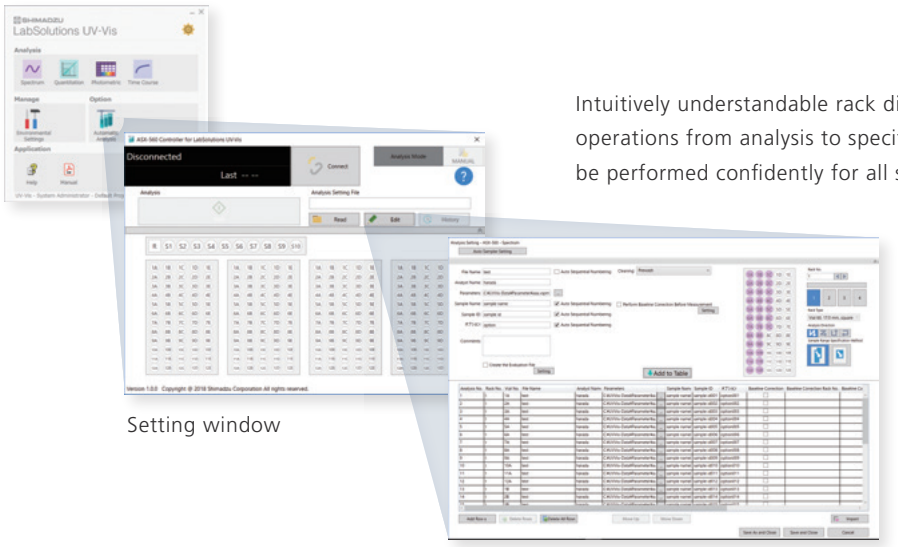
Previous
100 samples/day

UV-Vis [Automatic Analysis**]**
360 samples before noon

Select automatic analysis

Set parameter setting

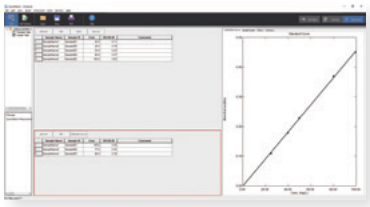
Measure, quantify, analyze data



Setting window

Intuitively understandable rack display ensures operations from analysis to specifying settings can be performed confidently for all specified analyses.

Automatic analysis application screen



Either the quantitation mode, spectrum mode, or photometric mode can be selected for continuous analysis. In combination with the spectral evaluation function, it is also possible to quickly determine pass/fail results visually after measuring multiple samples.

UV Automatic Analysis System
ASX-560+UV-1900i+Sipper Unit

For automatic multianalyte analysis of 240 analytes

ASX-560 Autosampler

(P/N 211-94230-01)

Sample containers and number of samples:
10, 50-mL containers (standard samples)
or 240, 14-mL containers
360, 7-mL containers (rack sold separately)
160, 20-mL containers (rack sold separately)
84, 50-mL containers (rack sold separately)
Size: W580 × D550 × H620 mm (main unit)
(including sample probe)

For automatic multianalyte analysis of 120 analytes

ASX-280 Autosampler

(P/N 211-94412)

Sample containers and number of samples:
10, 50-mL containers (standard samples)
or 120, 14-mL containers
180, 7-mL containers (rack sold separately)
80, 20-mL containers (rack sold separately)
42, 50-mL containers (rack sold separately)
Size: W355 × D550 × H620 mm (main unit)
(including sample probe)
Note: Up to 360 (4 x 90 Rack) can be analyzed using the optional rack.

Shimadzu Spectrophotometers

UV-i Selection Compatible with LabSolutions UV-Vis

Hardware represents all of Shimadzu's extensive spectrophotometer technologies.

Model	Control	Measurement Wavelength Range/ Detector	Sample Types
 UV-1900i	Computer-controlled or color touch pane	190 to 1100 nm Silicon photodiode	Liquids
 UV-2600i UV-2700i	Computer-controlled	185 to 900 nm Photomultiplier tube 220 to 1400 nm (UV-2600i + ISR-2600Plus) electron multiplier + InGaAs photodiode)	Liquids or solids
 UV-3600i Plus	Computer-controlled	185 to 3300 nm Photomultiplier tube InGaAs photodiode Cooled PbS photoconductive element	Liquids or solids
 SolidSpec-3700i SolidSpec-3700i DUV	Computer-controlled	3700i: 240 to 2600 nm (Direct detection unit: 190 to 3300 nm) 3700i DUV: 175 to 2600 nm (Direct detection unit: 165 to 3300 nm) Photomultiplier tube InGaAs photodiode Cooled PbS photoconductive element	Liquids or large solids samples

Resolution/ Wavelength Accuracy	Monochromator	Characteristics
1 nm/ ±0.1 nm(656.1 nmD_2) ±0.3 nm(for all regions)	Aberration correction single monochromator with Czerny-Turner mounted low stray light diffraction grating	**Immediately understandable user-friendly interface** Color touch panel ergonomically designed for easy operability **High performance that satisfies a wide variety of needs** Lowest stray light and noise in its class, with ultra-high-speed scanning capability **Even more advanced regulatory compliance** Enables easily performing tests compliant with pharmacopeia in respective countries (JP, USP, and EP).
0.1 to 5 nm/ ±0.1 nm(656.1 nmD_2) ±0.3 nm(for all regions)	UV-2600i Single monochromator with Czerny-Turner mounted low stray light diffraction grating UV-2700i Double monochromator with Littrow and Czerny-Turner mounted low stray light diffraction grating	**Expandable UV-2600i for reflectance measurements to near-infrared** Bright optics support measuring a wide variety of samples, from liquids to solids. Optional ISR-2600Plus integrating sphere enables even near-infrared measurements from 220 to 1400 nm. **High-accuracy UV-2700i captures even 0.000001 % (8 Abs) levels.** UV-2700i double-monochromator design with ultra-low stray light diffraction grating enables measurements to high 8 Abs absorbance levels. Measures samples ranging from highly concentrated samples to thin films, even capturing extremely slight light levels from samples with low transmittance characteristics.
0.1 to 8 nm(UV-VIS region) 0.2 to 32 nm(Near-infrared region) ±0.2 nm(UV-VIS region) ±0.8 nm(near-infrared region)	2 × 2 grating type double-monochromator	**Highest sensitivity in class with three detectors** In addition to PMT and PbS detectors, also includes an InGaAs detector for the near-infrared region to achieve high sensitivity in all wavelength regions. Large sample compartment and integrating sphere unit with three-detector capability enable high-sensitivity measurements of even solid samples. **High resolution, ultra-low stray light, and wide measurement wavelength range** Achieves high resolution (max. 0.1 nm) and ultra-low stray light (max. 0.00005 % at 340 nm)
0.1 to 8 nm(UV-VIS region) 0.2 to 32 nm(Near-infrared region) ±0.2 nm(UV-VIS region) ±0.8 nm(near-infrared region)	2 × 2 grating type double-monochromator	**High sensitivity and wide measurement wavelength range** Achieves high-sensitivity measurements in deep UV region below 190 nm or in near-infrared region. Enables measurements over a wide range, as wide as 165 to 3300 nm (using optional product). **Large sample compartment accommodates a wide variety of samples** Large samples up to 700 × 560 mm can be placed horizontally for each measurement. An absolute reflection measuring device and a variable angle measuring device are installed in the sample chamber for various measurements. In solid state measurement, a unique confocal optical system allows the selection of collimated and focused light.

Guide to Selecting Accessories

Liquid Samples

Samples	Measurement Method and Conditions			Accessories
Transparent Samples	Sample volume: 2.5 mL min.			Standard Sample Compartment + 10 mm Cell
	Micro-volume measurement		1 mL min.	Semi-Micro Cell + Micro Cell Holder with Mask
			500 µL min.	Micro Cell + Micro Cell Holder with Mask
			50 µL min.	Super-micro Cell + Super-micro Cell Holder
			For automatically measuring samples in multiple cells	MMC-1600 8/16 Series Micro Multi-Cell Holders and Cells
	Samples with high absorbance, but that are difficult to dilute (short optical path measurement)			Short-Path Cell (1, 2, 5 mm) + Spacer for Short-Path Cell
	Samples with low absorbance, but that are difficult to concentrate (long optical path measurement)			Long-Path Cell (20, 30, 50, 100 mm) + Long-Path Rectangular Cell Holder
	For automatically measuring samples in multiple cells	Normal measurement		Multi-Cell Sample Compartment (sample volume: 2.5 mL min.)
		Small sample volumes (50 µL min.)		MMC-1600 8/16 Series Micro Multi-Cell Holders and Cells
		Requires temperature control		CPS-100 Six-Cell Thermoelectrically Temperature-Controlled Cell Positioner (sample volume: 2.5 mL min.)
	For temperature-controlled measurements (constant-temperature measurement)	Temperature-controlled with water circulation		Constant-Temperature Cell Holder + NTT-2200P Constant-Temperature Water Circulator
		Thermoelectrically temperature controlled	Normal measurement	TCC-100 Thermoelectrically Temperature-Controlled Cell Holder
			For automatically measuring samples in multiple cells	CPS-100 Six-Cell Thermoelectrically Temperature-Controlled Cell Positioner
			Tm analysis or variable temperature measurement	S-1700 Thermoelectric Single Cell Holder
	Automatically supplies sample to flow cells (automatic analysis)	Requires temperature control (constant-temperature water circulation)		160C Sipper Unit + NTT-2200P
		Temperature control not necessary		160L/160T/160U Sipper Unit (Select type based on liquid volume.)
		Requires accurate control of aspiration volume.	Requires temperature control (constant-temperature water circulation)	Syringe Sipper CN + NTT-2200P (Select flow cell based on liquid volume.)
			Temperature control not necessary	Syringe Sipper N (Select flow cell based on liquid volume)
	For automating measurement of multiple samples			Sipper Unit or Syringe Sipper + Autosampler ASX-560/280 or ASC-5 Auto Sample Changer
Suspension Samples	Absorption measurement of suspension samples		Wavelength range: 240 nm min.	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)
			For measuring UV region above 190 nm	SolidSpec-3700iDUV
	Turbidity measurement		Light transmitted light turbidity measurement (commonly used measurement method)	10/50 mm Cell + Long-Path Rectangular Cell Holder (Optical path length of cell depends on test method.)
			Integrating sphere turbidity measurement	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)

Solid Samples

Samples	Measurement Method and Conditions			Accessories
Smooth Surface Samples*	Transmittance measurement		Less than 3 mm thick	Standard Sample Compartment + Film Holder, Cell Type Sample Holder, Glass/Film Holder for Standard Sample Compartment
			More than 3 mm thick	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)
			Requires a large integrating sphere (due to ISO compliance and other reasons).	Integrating Sphere Attachment, 150 mm Dia. (ISR-1503, ISR-1503F)
			Large sample size (over 100 mm square)	Large-Sample Compartment (MPC-2600A/603A or SolidSpec-3700i) Glass Sample Holder for MPC series/SolidSpec
	Reflectance measurement	Relative specular reflectance measurement	Normal measurement	Specular Reflectance Measurement Attachment (5° incident angle)
			Large sample size (over 100 mm square)	SolidSpec-3700i + Large Specular Reflectance Measurement Attachment (5° incident angle)
		Absolute specular reflectance measurement	5° incident angle measurement	Absolute Specular Reflectance Attachment (ASR-3105) (Requires a Large-Sample Compartment and BIS-3100/3700/603 Sample Base Plate Integrating Sphere Set separately).
			12°/30°/45° incident angle measurement	Absolute Specular Reflectance Attachment (ASR-3112, ASR-3130, ASR-3145) (Requires a Large-Sample Compartment, BIS-3100/3700/603 Sample Base Plate Integrating Sphere Set, and polarizer assembly separately.)
			Variable incident angle measurement	Variable Angle Measurement Unit (Requires large-sample compartment and polarizer assembly separately.)
		Relative diffuse reflectance measurement	Normal measurement	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)
			Requires a large integrating sphere (due to ISO compliance and other reasons).	Integrating Sphere Attachment, 150 mm Dia. (ISR-1503, ISR-1503F)
			Large sample size (over 100 mm square)	Large-Sample Compartment (MPC-2600A/603A, or SolidSpec-3700i)
Rough Surface Sample**	Transmittance measurement		Normal measurement	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)
			Requires a large integrating sphere (due to ISO compliance and other reasons).	Integrating Sphere Attachment, 150 mm Dia. (ISR-1503, ISR-1503F)
			Large sample size (over 100 mm square)	Large-Sample Compartment (MPC-2600A/603A, or SolidSpec-3700i)
	Reflectance measurement	Relative diffuse reflectance measurement	Normal measurement	Integrating Sphere Attachment (ISR-2600, ISR-2600Plus, ISR-603)
			Requires a large integrating sphere (due to ISO compliance and other reasons).	Integrating Sphere Attachment, 150 mm Dia. (ISR-1503, ISR-1503F)
			Large sample size (over 100 mm square)	Large-Sample Compartment (MPC-2600A/603A, or SolidSpec-3700i)
		Absolute diffuse reflectance measurement		Consult your Shimadzu representative. (Depends on the sample. A method using conversion from the mirror reflectance, for instance, is available.)
Large sample size (over 100 mm square)				Large-Sample Compartment (MPC-2600A/603A, or SolidSpec-3700i)
Small sample size (below 5 mm square)				Micro Sample Holder + Micro Beam Lens Unit

* Metals with a mirror-finished surface, mirrors, transparent acrylic and films, etc.
** Paper, cloth, plastics, semi-transparent films, etc.
For color measurement, the Color Analysis Software or LabSolutions UV-Vis Color Measurement Software is required separately. For film thickness measurement, the Film Thickness Measurement Software is required separately.

	Model		P/N	Remarks	UV-1900i	UV-2600i UV-2700i	UV-3600i Plus	SolidSpec-3700i/ 3700i DUV
Basic Measurement	Film Holder		204-58909	This holder is used to hold films, filters, and other items. It is compatible with sample sizes between a minimum W16 × H32 mm and maximum W80 × H40 mm.	○	○	○	○
	Glass/Film Sample Holder		207-21573-41	This holder is designed so that a polarizer can be placed in the film holder. 15 mm square samples that are less than 1 mm thick.	○	○	○	○
	Rotating Film Holder		206-28500-41	This film holder enables in-plane rotation of samples centered on the optical axis. It is compatible with sample sizes up to 33 × 30 mm.	○	○	○	
	Cell Type Film Sample Holder		207-21637-41	This holder is for holding film samples in the 10 mm square cell holder included standard. It is compatible with sample sizes from 9 to 10 mm square and up to 0.1 mm thick.	○	○	○	○
	Four-Cell Sample Compartment Unit		206-23670-91	This holds up to four cells on the sample side. It is controlled manually.	○	○	○	
	Multi-Cell Sample Compartment (Six Cells)		206-69160-41	This holds up to six cells on the sample side. It is controlled automatically.	○	○	○	
Short Optical Path Measurement	Spacers for Short-Path Cells	1 mm	204-21473-03	This standard cell holder is required for short optical path cells.	○	○	○	○
		2 mm	204-21473-01		○	○	○	○
		5 mm	204-21473-02		○	○	○	○
Long Optical Path Measurement	Long-Path Rectangular Cell Holder		204-23118-01	This holds rectangular cells with an optical path length of 10, 20, 30, 50, 70, or 100 mm.	○	○	○	○
	Four-Cell Universal Rectangular Cell Holder		204-27208	This holds up to four rectangular cells with an optical path length of 10, 20, 30, 50, 70, or 100 mm on the sample side. The four-cell sample compartment unit is required.	○	○	○	
	Reference-Side Rectangular Long-Path Absorption Cell Holder		204-28720	If a four-cell universal rectangular cell holder is used, then this holder is required to also hold rectangular long-path absorption cells on the reference side.	○	○	○	
	Cylindrical Cell Holder		204-06216-02	This holds cylindrical cells with an optical path length of 10, 20, 50, or 100 mm.	○	○	○	○
Micro-Volume Measurement	Supermicro Cell Holder		206-14334	This cell holder is for supermicro cells. Volumes between 50 and 200 µL can be measured, depending on the type of black cell used.	○	○	○	○
	Micro Cell Holder with Mask		204-06896	This holder is required when using cells with an optical path width of 4 mm or less. The mask width can be continuously adjusted.	○	○	○	○
	3 µL Capillary Cell Kit for Ultramicro Volume Measurement		206-69746	This kit is for use with ultra-trace samples, such as a biological sample. Suck the sample into the capillary and set it to the capillary adapter cell for measurement.	○	○	○	○
	8/16-Series Micro Multi-Cell Holder (MMC-1600)		206-23680-58	This holder enables the use of 8 or 16-series multi-cells for micro-volume samples. They are available for either 50 µL or 100 µL cell types.	○	○	○	
	8/16-Series Constant-Temperature Micro Multi-Cell Holder (MMC-1600C)		206-23690-58	A constant-temperature model	○	○	○	
	Mesh filter		206-82299-91	Accessories on the reference side for measuring samples with high absorbance.		○	○	
Constant-Temperature Measurement	Constant-Temperature Cell Holder		202-30858-44	This cell holder controls the cell temperature by circulating constant-temperature water. The operating temperature range is 5 to 90 °C (requires a separate constant-temperature water circulator).	○	○	○	
	Constant-Temperature Four-Cell Holder		204-27206-02	Maintain four sample cells and a reference cell at a desired, uniform temperature by circulating constant-temperature water.	○	○	○	
	Six-Cell Thermoelectrically Temperature-Controlled Cell Positioner (CPS-100)		206-29500	This can control the temperature of six cells on the sample side. The temperature-control range is 16 to 60 °C. A USB adapter CPS (206-25234-91) is required.	○	○	○	
	Thermoelectrically Temperature-Controlled Cell Holder (TCC-100)		206-29510	This device can control the temperature of cells on both the sample and reference side. The temperature-control range is 7 to 60 °C.	○	○	○	
	Thermoelectric Single-Cell Holder (S-1700)		206-23900	This holder (including a stirrer) can be programmed to increase/decrease the temperature on the sample side. The temperature-control range is 0 to 110 °C. Cooling water must be circulated to cool the Peltier element. Tm analysis software 206-57476-91 is required to program the temperature.	○	○	○	
	Tm Analysis System (TMSPC-8)		206-24350	This system is used to analyze the melting temperature (Tm) of nucleic acids-DNA and RNA. The temperature-control range is 0 to 110 °C. Cooling water must be circulated to cool the Peltier element.	○	○	○	
Automatic Analysis	Sipper Unit	160L	206-23790-51	This device aspirates liquid samples using a peristaltic pump. The standard model includes an L-shaped flow cell, but a triple-pass model (160T), constant-temperature model (160C), and ultra-micro volume model (160U) are also available.	○	○	○	
		160T	206-23790-52		○	○	○	
		160C	206-23790-53		○	○	○	
		160U	206-23790-94		○	○	○	
	Solenoid Valve(Fluoropolymer)		204-06599-01	The sipper unit is required for using strong acids, strong alkalis, or ester solutions.	○	○	○	
	Syringe Sipper	Model N	206-23890-51	This device aspirates liquid samples using a syringe pump. The connection areas are ensure excellent chemical resistance. Requires flow cells separately.	○	○	○	
		Model CN	206-23890-52	A constant-temperature water circulator model.	○	○	○	
	Front Panel with Holes		204-27588-03	This is required for cells that use tubes, such as flow cells.	○	○	○	
	Auto Sample Changer (ASC-5)		206-23810-91	If the ASC-5 is combined with a sipper unit or syringe sipper, it is possible to configure an automated multisample measurement system for liquid samples. A USB adapter ASC (206-25235-91) is required.	○	○	○	
	Auto Sampler	ASX-560	240 analytes	If the Auto Sampler is combined with a sipper unit or syringe sipper, it is possible to configure an automated multisample measurement system for liquid samples. CETAC Connect Kit for UV (207-26525-41) and Automatic Analysis (207-25807-91) are required.	○	○	○	
		ASX-280	120 analytes		○	○	○	
	Micro Flow Cells	10 mm	204-06222	Cell and cell holder that enable continuous analysis of effluents from column chromatography, for example.	○	○	○	
		5 mm	204-06222-01		○	○	○	
	Flow Cell for HPLC		206-12852-41	This can be used as a UV-VIS detector for variable wavelength high-performance liquid chromatography.	○	○	○	
	Sample Pretreatment Automation Connection Kit		206-80880-01	This kit is required for connecting to a Gilson GX-271 liquid handler.	○	○	○	
Onsite Measurement	Optical Fiber Coupler		206-54175-41	This device is used for external measurements via optical fiber. It includes two 0.5 mm optical fibers.	○	○	○	
	Crossflow Cell for Process Monitor System		206-53570-13	This cell enables solution monitoring measurements in combination with an optical fiber coupler.	○	○	○	

	Model		P/N	Remarks	UV-1900i	UV-2600i UV-2700i	UV-3600i Plus	SolidSpec-3700i/ 3700i DUV
Suspensions Sample	Integrating Sphere Attachment (ISR-2600)		206-28400-58	These are integrating sphere units. They can be used for relative diffuse or specular reflectance measurements. The angle of incidence to the sample can be set by setting it to zero or eight degrees in combination with functionality for switching between sample and reference sides of the spectrophotometer. The measurement wavelength range is 220 to 850 nm for the ISR-2600 or 220 to 1400 nm for the ISR-2600Plus. It is compatible with reflectance samples that are W95 × H135 × T20 (for 0-deg. angle of incidence) or W70 × H70 × T12 (for 8-deg. angle of incidence).		○		
	Integrating Sphere Attachment (ISR-2600Plus)		206-28410-58			2600i		
	Integrating Sphere Attachment (ISR-603)		207-20100-58	They can be used for relative diffuse or specular reflectance measurements. The angle of incidence to the sample can be set by setting it to zero or eight degrees in combination with functionality for switching between sample and reference sides of the spectrophotometer. The measurement wavelength range is 220 to 2600mm. It is compatible with reflectance samples that are Ø100 ×T15mm.			○	
Opaque Sample Measurement	Multipurpose Large-Sample Compartment (MPC-2600A)		207-23520-41	This multipurpose sample compartment can be used freely to measure the transmittance or reflectance of variously shaped samples. Measurement wavelength range is 220 to 1400 nm. It is compatible with transmittance sample sizes up to 305 mm in diameter and 50 mm thick or up to 204 mm in diameter and 300 mm thick, or reflectance sample sizes up to 305 mm in diameter and 50 mm thick.		○		
	Multipurpose Large-Sample Compartment (MPC-603A)		207-23550-41	This multipurpose sample compartment can be used freely to measure the transmittance or reflectance of variously shaped samples. Measurement wavelength range is 220 to 2600 nm. It is compatible with transmittance sample sizes up to 305 mm in diameter and 50 mm thick or up to 204 mm in diameter and 300 mm thick, or reflectance sample sizes up to 305 mm in diameter and 50 mm thick.			○	
Sample Holder Accessories	Powdered Sample Holder (for Integrating Sphere)		206-89065-41	This powdered sample holder is for installation in an integrating sphere.		○	○	○
	Micro Sample Holder		206-28055-41	This holds small samples against the integrating sphere. It is compatible with sample sizes from 5 to 10 mm square and between 0.5 and 2 mm thick. Recommended for use in combination with a small beam aperture unit (206-22051-41). (A large sample compartment is required.)		○	○	○
	Cylindrical Sample Holders	D25	207-23559-41	This holds lenses or other cylindrical samples inside a multipurpose large-sample compartment. Compatible sample diameters are from 5 to 25 mm for model D25, from 30 to 50 mm for D50, or from 40 to 110 mm for D110. (A large sample room is required.)		○	○	○
		D50	207-23559-42			○	○	○
		D110	207-23559-43			○	○	○
Reflectance Measurement	Specular Reflectance Measurement Attachment (5° Incident Angle)		206-14046-58	This device enables specular reflectance measurements. The angle of incidence to the sample is 5 degrees. It is compatible with sample sizes from 7 mm in diameter up to 160 × 100 mm and up to 15 mm thick.	○	○	○	○
	Large specular reflectance attachment (5° Incident Angle)		206-20570-58	This device enables specular reflectance measurements of large sample. It is compatible with sample sizes from up to 470W × 560H mm and 40 mm thick.				○
	Absolute Reflectance Attachments	ASR-3105	206-16817-58	These attachments are installed in a multipurpose large-sample compartment to enable absolute specular reflectance measurements of solid samples.Models with a 5, 12, 30, or 45-degree angle of incidence to the sample are available. The measurement wavelength range is 300 to 2400 nm and compatible sample size range is 20 to 150 mm square and up to 30 mm thick. (A large sample room is required.)(A large sample room is required.)		○	○	○
		ASR-3112	206-16100-58			○	○	○
		ASR-3130	206-15001-58			○	○	○
		ASR-3145	206-15002-58			○	○	○
	Variable Angle Measurement Unit for MPC-2600A		207-23490-41	This device enables absolute reflectance measurements of solid samples, with the incident and reflection angles set to any angle. Measurement wavelength range is 250 to 1400 nm. It is compatible with sample sizes from 20 to 70 mm square and between 2 and 15 mm thick. The incident angle can be set between 5 and 70 degrees. (A large sample room is required.)		○		
	Variable Angle Measurement Unit for MPC-603A		207-23490-42	This device enables absolute reflectance measurements of solid samples, with the incident and reflection angles set to any angle. Measurement wavelength range is 250 to 1650 nm. It is compatible with sample sizes from 20 to 70 mm square and between 2 and 15 mm thick. The incident angle can be set between 5 and 70 degrees.(A large sample room is required.)			○	
	Variable Angle Measurement Unit for SolidSpec-3700i		207-23470-42	This device enables absolute reflectance measurements of solid samples, with the incident and reflection angles set to any angle. Measurement wavelength range is 250 to 2500 nm. It is compatible with sample sizes from 20 to 70 mm square and between 2 and 15 mm thick. The incident angle can be set between 5 and 70 degrees.				○
Light Beam Control	Micro Beam Lens Unit		206-22051-41	This device focuses the light beam shone on the sample. The light beam diameter can be set to 1.3 mm or 2.2 mm. (A large sample room is required.)	○	○	○	○
	Large Polarizer Set		206-15694-40	These enable control of polarization characteristics of incident light on samples. The wavelength range is from 250 to 2300 nm for the large polarizer, from 400 to 800 nm for polarizer type I, from 260 to 700 nm for type II, or from 260 to 2300 nm for type III. Polarizer Adapter Set is required.	○	○	○	○
	Polarizers	Type I	206-13236-41		○	○	○	○
		Type II	206-13236-42		○	○	○	○
		Type III	206-13163-40		○	○	○	○
	Polarizer Adapter Set		206-15693	Required for using a polarizer.	○	○	○	○
Large Sample Compartment Accessory for SolidSpec	Sample stage and integrating sphere set (BIS-3100)		206-17059	Required when using absolute reflectance attachment or small beam aperture unit.		○		
	Sample stage and integrating sphere set (BIS-603)		207-21100-58	Required when using absolute reflectance attachment or small beam aperture unit.			○	
	Sample stage and integrating sphere set	For SolidSpec-3700i	206-20880-51	Required when using absolute reflectance attachment or small beam aperture unit.				3700i
		For SolidSpec -3700i DUV	206-20880-52					3700i DUV

	Model		P/N	Remarks	UV-1900i	UV-2600i UV-2700i	UV-3600i Plus	SolidSpec-3700i/ 3700i DUV
Large Integrating Sphere	ISR-1503 integrating sphere		207-20900-58	Integrating sphere with 150 mm I.D. and max. 4.0 % aperture ratio, for compliance with a variety of regulations. Measurement wavelength range is from 220 to 2500 nm.			○	
	ISR-1503F integrating sphere		207-21300-58	Integrating spheres made of PTFE are available.			○	
	Small sample holder for transmittance		207-21742-41	This small sample holder is attached in the 0° transmittance measurement position. Beam diameter of 4 mm is compatible with sample sizes up to 20 mm. For ISR-1503F (207-21742-42)			○	
	Standard cell holder for direct detection		207-21741-41	Enables 10 mm standard cell measurements by replacing the included optical system.			○	
	Rear cover with window		207-21858-41	Enables easy sample replacement in combination with standard cell holder for direct detection.			○	
	Powdered sample holder		207-21815-41	This holder is for measuring the reflectance of compressed powdered samples. For ISR-1503F (207-21815-42)			○	
	Film holder		207-21743-41	This film holder is attached in the 0° transmittance measurement position. It can hold sample sizes up to 50 mm square. For ISR-1503F (207-21743-42)			○	
	Hanging sample holder		207-21750-41	Used to measure the absorbance of samples hung inside the integrating sphere. For ISR-1503F (207-21750-42).			○	
	Standard white plate		207-21744-41	Used to measure reflectance. For ISR-1503F (207-21744-42)			○	
	Sample stage		207-21868-41	Used for 8° reflectance measurement samples that cannot be secured properly if made smaller. For ISR-1503F (207-21868-42)			○	
Automatic Measurement	Automatic X-Y stage		206-20810-58	Automatically estimates multiple points. Compatible with sample sizes up to 310 mm in diameter, 310 mm square, or 40 mm thick. Automatic XY stage attachment is controlled by the included UVProbe software.				○
	Standard cell holder for SolidSpec integrating sphere		206-22339-92	10 mm standard cell holder for integrating sphere				○
SolidSpec Solution Measurement	Direct detection unit	For SolidSpec-3700i	206-20264-51	Enables SolidSpec measurements without the integrating sphere normally used as the detector for SolidSpec. The measurement wavelength range is 190 to 3300 nm for the Solidspec-3700i and 1650 to 3300 nm for the Solidspec-3700i DUV.				3700i
		For SolidSpec-3700i DUV	206-20264-52					3700i DUV
Deep UV Measurement	Purged measurement controller	MC-3BS constant-flowrate thermal attachment	206-28212-91	Used to control nitrogen flowrate during nitrogen purging.				○
	Purged measurement	Purge box	206-21788-58	Unit required for purging the direct detection unit with nitrogen. It includes a film holder and six-cell holder.				○

Software	Color Calculation Software	207-24528-91	This software is used to calculate the color value of a measurement from the measured spectrum. It can display a graph of the chromaticity coordinate xy of the XYZ color system and a graph of the lightness index / color coordinate of CIELAB.	○	○	○	○
	Film Thickness Calculation Software	207-25804-91	This software is used to calculate the film thickness from the measured spectrum using the interference interval method or Fourier transform method.	○	○	○	○
	UPF Calculation Software	207-25806-91	This software is used to calculate UPF (ultraviolet shielding factor) from measured spectrum.	○	○	○	○
	Solar Radiation Calculation Software	207-25805-91	This software is used to calculate solar transmittance / reflectance from measured spectrum.	○	○	○	○
	Tm Analysis Software	206-57476-91	This software for the S-1700 that takes temperature vs. absorbance curve data on PC and analyzes Tm (melting temperature) such as nucleic acid (DNA, RNA).	○	○	○	○
	Secondary License for LabSolutions UV-Vis	207-24525-93	This is required for use with maltiple LabSolutions UV-VIS.	○	○	○	○
	LabSolutions DB UV-Vis	207-24526-91	This is an ideal configuration for customers who want to manage data together on a single PC. Also, it is recommended for those who want to do ER/ES only for standalone.	○	○	○	○
	LabSolutions CS UV-Vis	207-24527-91	It can build a LabSolutions CS network system. It is recommended for those who want to perform ER/ES by managing data other than UV.	○	○	○	○
	VisEase	207-26411-91	This is a very simple application that specializes in controlling UV devices and outputting data in text format with a minimal interface. Compatible models are UV-1280 and UV-1900/1900i.	○			

ANALYTICAL
INTELLIGENCE

-Automated support functions utilizing digital technology, such as M2M, IoT , and Artificial Intelligence (AI), that enable higher productivity and maximum reliability.
-Allows a system to monitor and diagnose itself, handle any issues during data acquisition without user input, and automatically behave as if it were operated by an expert.
-Supports the acquisition of high quality, reproducible data regardless of an operator's skill level for both routine and demanding applications.

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