

Laboratory

POP Series
UV-Vis Single-beam

Next-Generation UV-Vis Quantitative Analysis Systems Proving Reliability Through Precision

k lab



POP Series is designed with advanced technology and rigorous quality control to provide customers with superior performance, design, and convenience.

K LAB has led the development and distribution of spectrophotometers by pioneering the first high-precision scanning mechanism for monochromators in Korea.

The POP Series utilizes a single-beam structure to minimize system complexity while achieving high measurement accuracy through an automated blank measurement function based on a multi-cell holder. Additionally, it features a Czerny–Turner monochromator. It delivers a scanning speed of 4,000 nm/min with spectral bandwidth < 1.8 nm.

The standard multi-cell holder supports for the automated measurement of up to eight samples. Its rotating structure, powered by precise optical design and micro-stepping control technology, ensures fast and accurate sample analysis.

Quality and Reliability

At K LAB Co., Ltd., rapid service and quality are our core priorities. Every stage of the process, from product design and R&D to production and testing, is strictly monitored at our headquarters in Daejeon, South Korea. K LAB operates under the ISO 9001:2015 Quality Management System and holds CE certification for compliance with EU regulations and safety standards, KC certification for product safety in South Korea, and RoHS certification for environmental compliance. Through these standards, we remain committed to delivering eco-friendly and safe products as our top priority.

Specifications		
Product Name	POP	POP-V
Photometrics System	Single-beam type	
Light Source(s)	Tungsten Halogen Lamp & Deuterium Lamp	Tungsten Halogen Lamp
	(Built-in light source auto interchanging motor)	
Detector	Silicon Photodiode	
Spectral Bandwidth	< 1.8 nm	
Wavelength Range	190 to 1,100 nm	340 to 1,100 nm
Wavelength Display (setting)	0.1 nm	
Wavelength Accuracy	<± 0.5 nm	
Wavelength Repeatability	<± 0.1 nm	<± 0.2 nm
Wavelength Slew Rate	7,800 nm/min	
Scanning Speed(Max)	4,000 nm/min	
Photometric Display	Absorbance : -3 A to 3 A / Transmittance : 0% to 300%	
Photometric Accuracy	<± 0.003 Abs at 0.5 Abs	<± 0.005 Abs at 0.0 to 0.5 Abs
	<± 0.005 Abs at 1.0 Abs	<± 1% Abs at 0.50 to 2.0 Abs
	(NIST SRM 930e)	(NIST SRM 930e)
Photometric Repeatability	± 0.003 Abs	
Baseline Stability	0.001 Abs/h (700 nm, after one hour warm-up)	< 0.002 Abs/h (700 nm, after one hour warm-up)
Baseline Flatness	<0.001 Abs rms (200 to 1,100 nm, after one hour warm-up)	<0.003 Abs rms (340 to 1,050 nm, after one hour warm-up)
Stray Light	< 0.05 % (at 220 nm with 0.1% NaI)	< 0.05 % (at 340 nm with 0.5% $NaNO_2$)
	< 0.05 % (at 340 nm with 0.5% $NaNO_2$)	
Photometric noise	< 0.0002 Abs rms (at 700 nm)	
Monochromator	Czerny-Turner Monochromator	
Standard Cell Holder	Multi Cell Holder(8 cells)	
Lamp Interchange Wavelength	340 to 410 nm (Default 370 nm)	-
Operating System (OS)	Android	
Display	7-inch (Resolution: 1280 x 800)	
Control Options	Stand-alone, PC	
Dimensions(W*D*H)	433 mm * 381 mm * 180 mm	
Power Requirement	AC 100-240V, 50/60Hz, 140VA	
Weight	10.5kg	
PC Software	View for Windows(optional)	
	Secure(21 CFR Part 11) for Windows(optional)	

* The detailed product specifications above are subject to change without prior notice.

POP Series Hardware Overview



Vertical Cell Holder Cover
Features a vertical opening mechanism for easy access

Powerful On-Board Controller
Powered by an ARM Cortex-A55 processor, providing stable, Android-based operation

Versatile Connectivity Ports
Equipped with two USB-A ports, two RS-232 ports, and one Ethernet port to connect easily with various peripheral devices

7-inch Color Touchscreen LCD
Delivers rich visual information through a high-resolution color screen.
The touch interface significantly enhances user convenience

Network Printer Support
Measurements can be easily printed via network connectivity

Generous Storage Space
Offers 32GB of built-in storage with support for data backup via USB memory

Compatibility
Optimized for compatible with a wide range of accessories
(* Refer to page 15.)

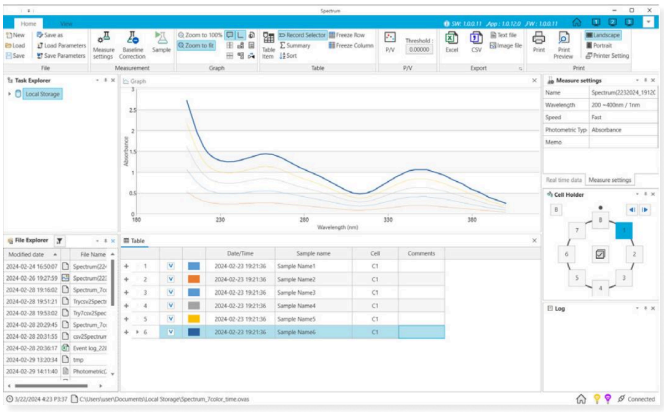
Standard Multi-Cell Holder
The preinstalled mutil-cell holder enables the automated measurement of up to eight samples

Various Application

- Our instruments enable the measurement of transmittance or absorbance of samples across a wide wavelength range, covering both ultraviolet (UV) and visible (Vis) spectrums. The absorption spectrum within this range reveals the molecular structure of the sample and reflect intermolecular interactions as well as environmental conditions. Generally, these absorption bands appear as broad peaks due to the numerous molecular vibrational levels of similar energy.
- UV-Vis spectroscopy is widely utilized in diverse fields, ranging from routine laboratory analysis to environmental science, biotechnology, and chemistry thanks to its ability to provide comprehensive data and its exceptional accessibility,
- **Substance Identification:** By utilizing Spectrum mode, users can measure the absorption spectrum of a sample and qualitatively compare it with reference spectrum to identify the substance.
- **Color Analysis:** Perform advanced color analysis by converting wavelength-specific transmittance data into color coordinates.
- **Quantitative Analysis:** When the optical path length is constant, absorbance is proportional to concentration. By applying Beer's Law, the precise concentration of a sample can be calculated. This method is essential for diverse applications, including DNA/RNA quantification, purity verification, food analysis, and cosmetic formulation.
- **Kinetic Analysis:** Monitor chemical reaction processes in real-time by measuring changes in absorbance over time using Kinetics mode.

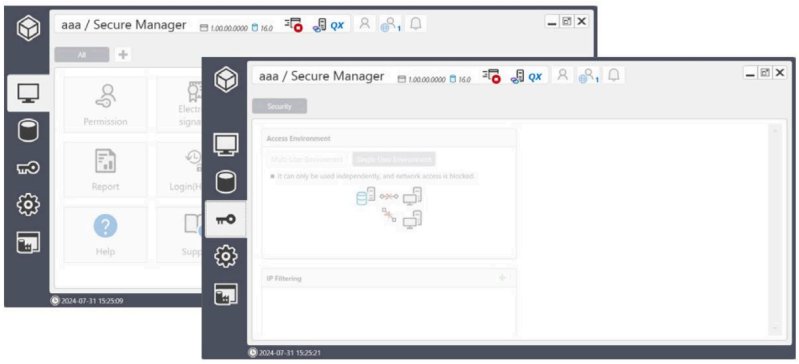
View (* Optional)

A Windows-based PC software application for POP Series, enabling easy data acquisition and analysis.

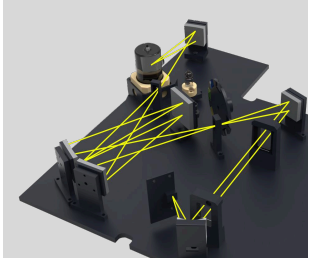


Secure 21 CFR Part11 (* Optional)

- A Windows-dedicated software that enables comprehensive tracking and auditing of all user activities performed within the View software.
- **User Login:** Provides access control based on authentication targets and methods, enabling for group-based permissions and functional restrictions.
- **Electronic Signature:** Provides multi-level authentication to prevent data tampering, and ensure accountability.
- **Audit trail:** Provides comprehensive logs tracking all user activities.

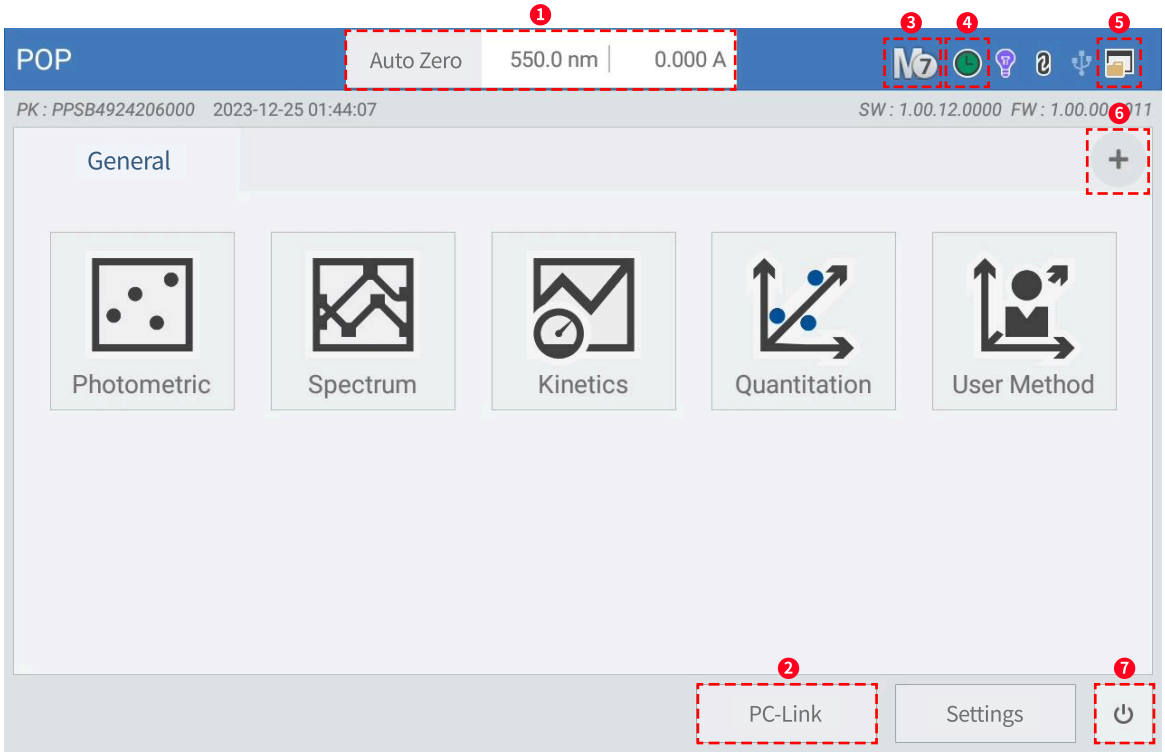


Optical System Schematic



- The UV-Vis spectrophotometer irradiates the sample with light across the ultraviolet (UV) and visible (Vis) spectrums and measure the intensity of the light transmitted through the sample. This process provides wavelength specific absorbance and transmittance, enabling the precise analysis of material properties.
- **Light Source:** mits light across the UV and visible spectrum. It typically consists of a Deuterium lamp for the UV range and a Tungsten lamp for the visible range.
- **Monochromator:** Selects a specific wavelength of light. It is composed of a diffraction grating and mirrors to ensure high spectral purity.
- **Sample Compartment:** Equipped with a cuvette holder designed to securely accommodate samples for measurement.
- **Detector:** Measures the intensity of the transmitted light

The best visual and functional experience
Optimized User Interface



POP Series features an intuitive interface focused on user convenience, enabling accurate data measurement and analysis with just a single touch. It includes a variety of functions optimized for laboratory environments, enabling measurement results to be easily edited and exported.

Interface

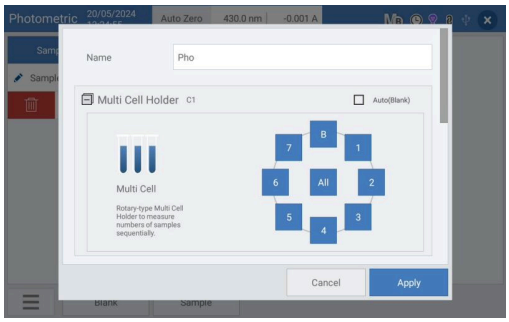
1. **Auto-Zero:** Monitor real-time absorbance at a specified wavelength and instantly set the value to zero (0.000 Abs.) with a single touch of the Auto-Zero button.
2. **PC Connectivity:** By switching the instrument to remote mode, users can use the device with a PC via View software.
3. **Cell Status Monitoring:** Easily check the current cell type and its position.
4. **Lamp Warm-up Status:** Users can monitor the instrument's operating time, lamp warm-up status, and cumulative usage in real-time to ensure optimal measurement conditions.

   - The status icon appears white before the lamp is warmed up
   - It turns green once warming is complete (approx. 1 hour).
   - Measurements and operations can be performed immediately, regardless of the warm-up status.
5. **File Browser:** Manage internal and external storage by creating folders or copying and deleting files directly through the built-in file browser.
6. **Favorites (Custom Mode):** Simplify workflows by combining frequently used measurement modes into a personalized "Favorites" menu.
7. **Setting:** Access general instrument information, modify system settings (such as language, sound, and time), and perform instrument calibration.

Photometric Mode

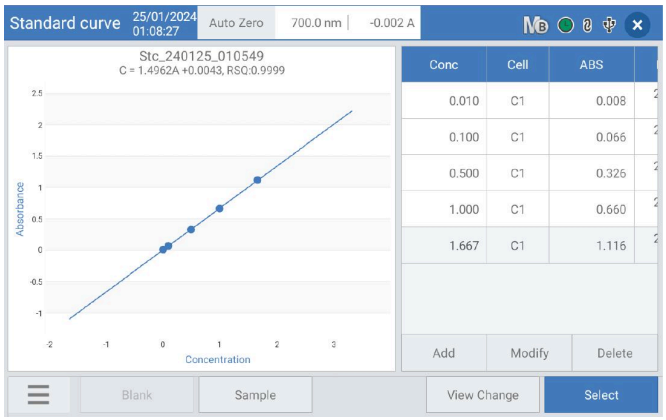
- This mode enables the effortless measurement of absorbance (Abs.) or transmittance (%T) at specific wavelengths.
- By configuring the Factor (K) value, users can perform simple quantitative analysis (C = K x A) for known samples based solely on absorbance measurements.
- The system features settings for up to 20 wavelengths, automatically measuring absorbance data for each selected wavelength.
- Equipped with a multi-cell holder, the instrument enables the automated analysis of up to 8 samples.





Quantitation Mode

- This mode performs quantitative analysis using saved standard curves.
- Users can conduct quantitative analysis of unknown samples by utilizing standard curves generated from standard samples of various concentrations or manually entered values.
- The system leverages repeatable measurement data to ensure higher precision in quantification.

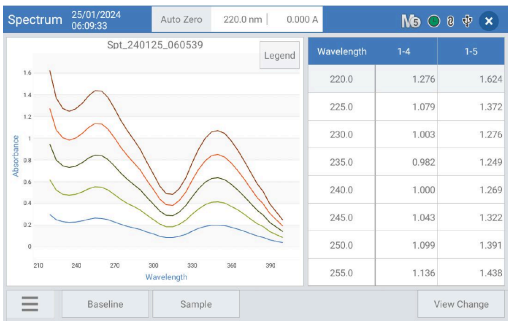


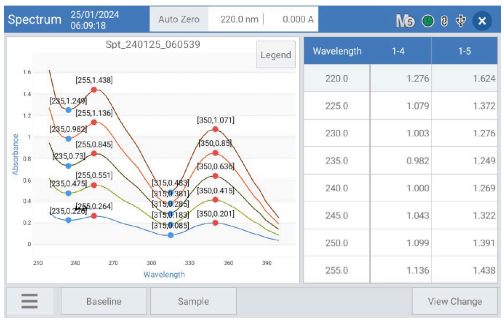
- **Standard Curve Generation Mode:** This system offers four fitting options for standard curve generation, helping users to establish an optimal calibration curve. It supports standard curve by either measuring standard samples of varying concentrations or directly inputting concentration and absorbance data.

  Additionally, the Recall function provides easy editing or deletion of previously stored calibration data, ensuring streamlined data management. These features serve as powerful tools for precise concentration analysis and verification during experimental processes, delivering a high data reliability to the user.

Spectrum Mode

- This mode offers users to monitor the spectrum across their desired wavelength range.
- Through customizable measurement setting, users can easily switch between Absorbance (Abs.) and Transmittance (%T) data.
- This mode features automated spectrum analysis for up to eight samples.





Kinetics Mode

- This mode monitors the change in Absorbance (or Transmittance) over time at a specific wavelength.
- Measurements are taken at fixed time intervals, with a minimum configurable interval of 1 second. (*)Note: The minimum measurement interval may vary depending on the measurement range and conditions.
- A progress bar is displayed during the measurement, which can extend up to a maximum of 99 hours.
- This mode can automatically acquire absorbance data for up to 8 samples.



Report & Print

The system offers review, save (in PDF or HTML formats), and print measured data in a professional report format. This feature supports the systematic reporting and documentation of experimental results, playing a critical role in maximizing data utility and accessibility. Such documentation and storage capabilities enhance the repeatability and transparency of research while ensuring reliable data management.

Convenience Features

- **Remote Control Mode:** POP Series functions as a standalone instrument for direct measurements and also supports remote control via PC connectivity. In a network environment, users can perform measurements remotely and review results directly from their PC.
- **Touch-based Graph Zooming:** Measurement results are automatically auto-scaled and presented in both table and graph formats. The interface offers pinch-to-zoom, helping users intuitively enlarge or reduce specific areas of a graph as needed.
- **Convenient Data Management:** Measurement parameters and results can be stored in the internal memory (32GB included) or on a USB flash drive. Through View software, users can perform various tasks including data conversion, application of conversion formulas, and exporting to Excel.

Built-in test, BIT

When the power is turned on, the system performs a self-diagnostic check to assess the instrument's operational status. During this initial process, it evaluates connectivity, the movement of each motor, lamp conditions, and calibration status to determine any potential malfunctions. By inspecting each component and displaying the results, the system ensures it always maintains optimal performance.
(*)Self-Diagnostic Items: Link, Wavelength Motor, Cell Motor, Filter Motor, Lamp Motor, W-Lamp, D2 Lamp, D2 Lamp(Peak)

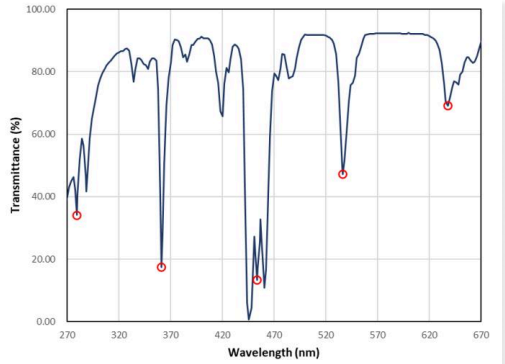


Performance Verified by Measured Data

Proven high accuracy and repeatability through quantitative performance validation

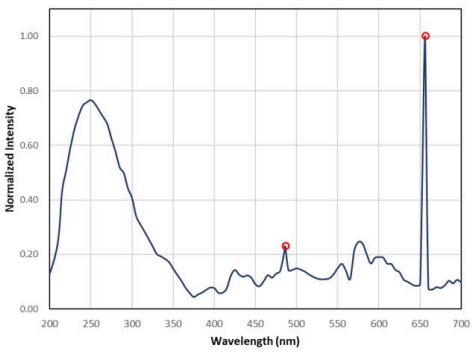
Wavelength accuracy & repeatability

POP Series features our unique high-resolution wavelength measurement mechanism, guaranteeing a wavelength repeatability within 0.1 nm across the entire range. Its performance is validated using a Holmium Oxide filter (MU* = ±0.2nm), achieving a wavelength accuracy of 0.5nm and a repeatability of ±0.1nm or less.



Holmium oxide filter spectrum

Certified Value	279.44 nm	360.89 nm	453.67 nm	536.52 nm	638.00 nm
Measured (Mean)	279.49 nm	361.00 nm	453.80 nm	536.80 nm	638.00 nm
Measured (Std)	± 0.00 nm	± 0.00 nm	± 0.00 nm	± 0.00 nm	± 0.00 nm



D2 lamp spectrum

Certified Value	486.0 nm	656.1 nm
Measured (Mean)	486.0 nm	656.0 nm
Measured (Std)	± 0.00 nm	± 0.00 nm

Spectral Bandwidth	< 1.8 nm
Measured	1.2 nm

Photometric Accuracy & Repeatability

POP Series utilizes a multi-cell holder to automatically update the blank signal for every measurement without additional manual operation, effectively minimizing signal changes over time. Through precision signal processing, the system achieves exceptional noise characteristics, ensuring a Photometric Accuracy of within ±5 mAbs or 1% and a Photometric repeatability of within ±3 mAbs. To maintain the highest standards of quality, every unit is rigorously verified before shipment using SRM 935a (MU ≅ ±5 mAbs) and SRM 930e (MU ≅ ±3 mAbs).

Measurement results of SRM 935a + 0.001 M perchloric acid solution(60 mg/L)

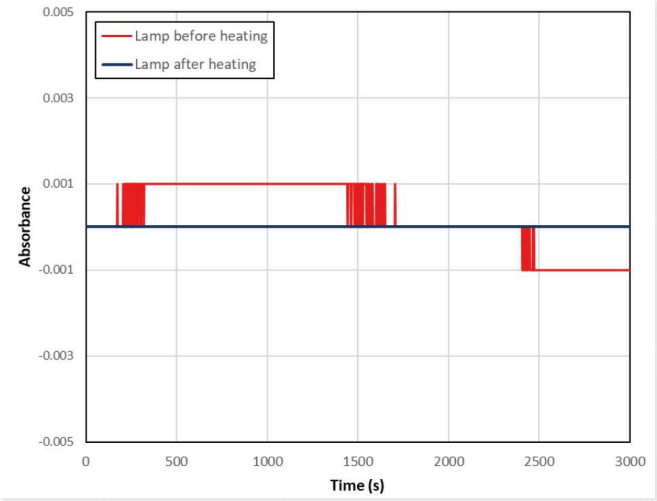
Wavelength	235.0 nm	257.0 nm	313.0 nm	350.0 nm
Certified Value	0.7472	0.8637	0.2935	0.6411
Measured (Mean)	0.740	0.856	0.292	0.641
Measured (Std)	0.000	0.000	0.000	0.000

Measurement results of SRM 930e

Wavelength	440.0 nm	465.0 nm	546.1 nm	590.0 nm	635.0 nm
Certified Value	1.0218	0.9610	0.9983	1.0938	1.0738
Measured (Mean)	1.022	0.961	0.998	1.094	1.074
Measured (Std)	0.000	0.000	0.000	0.000	0.000

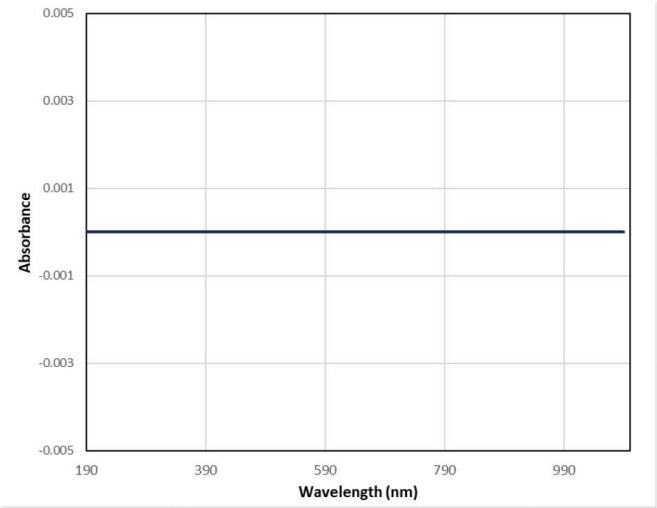
Baseline Stability

Due to the nature of systems utilizing a single-beam monochromator, subtle fluctuations in measurement values may occur immediately after startup caused by light source drift. As this phenomenon gradually stabilizes during the warm-up process, we recommend a warm-up period of at least one hour for high-precision measurements. Under these conditions, the system guarantees stability within 0.001 Abs/h.



Baseline Flatness

POP Series automatically calibrates the baseline for every measurement, delivering consistent baseline flatness without the need for manual baseline correction (< 0.001 Abs rms).



After Sales Support Policy

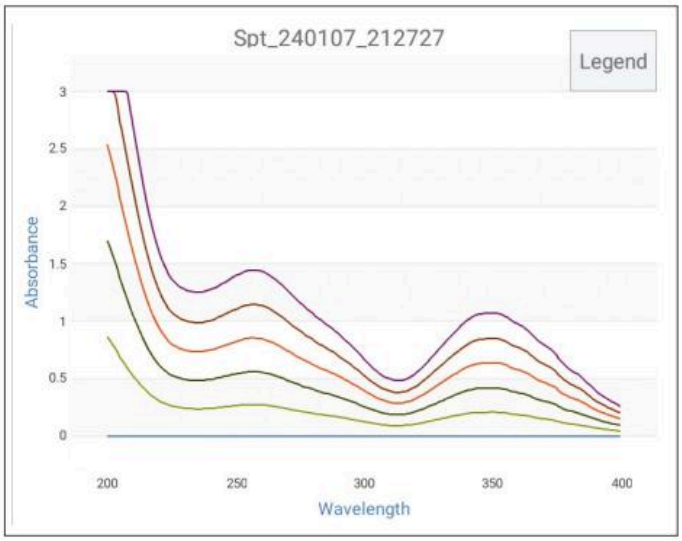
We provide systematic, expert-led technical services to meet the diverse needs of our customers.

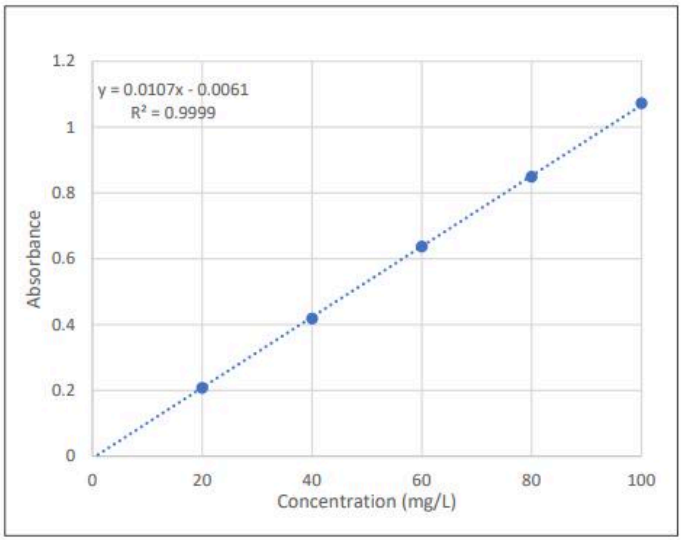
- **Warranty Service**
  - We offer free repair services for products within 25 months from the date of purchase. (Note: Consumables are excluded from the warranty.)
  - For lamps, free replacement is supported only for failures that occur within the guaranteed lifespan.

Through systematic and continuous technical support, we remain committed to ensuring the stable performance and longevity of our instruments.

Application
Linearity & Quantitation

**Pop Series guarantees high linearity within an absorbance range of 0 to 3 Abs.
By utilizing the Quantitation mode, users can measure reference samples to generate a standard curve, which then provides the estimation of concentrations in unknown samples.**



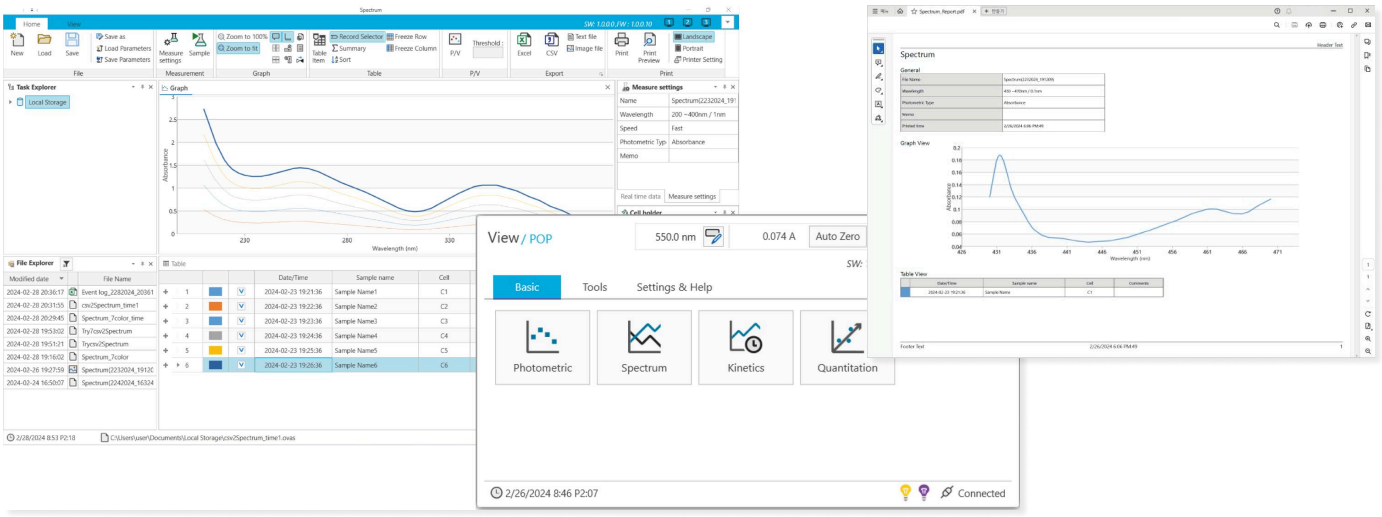


Application

The graph on the left displays the results obtained from measuring reference samples (SRM 930a) at concentrations of 0, 20, 40, 60, 80, and 100mg/L in Spectrum mode. The graph on the right displays the standard curve calculated based on the absorbance at 350nm. By entering the obtained standard curve data into Quantitation mode and measuring an unknown sample, users can easily determine its precise concentration. The R^2 value confirms high linearity, and the standard curve slope of 0.0107 precisely matches the absorbance coefficient (ε_a) of SRM 930a shown in the table.

Nominal mass Fractions, $g \cdot kg^{-1}$	Specific Absorbance, ε_a, $g \cdot kg^{-1} \cdot cm^{-1}$
0.020	10.67
0.040	10.68
0.060	10.69
0.080	10.70
0.100	10.71

PC Software
View (Optional)



PC Software View (Optional)

View is a Windows-based PC software designed to remotely control K LAB spectrophotometers and efficiently manage measurement data. Featuring an intuitive interface, it delivers a consistent and user-friendly experience.

Measurements can be initiated with a single click, and users can monitor experimental progress in real-time through live data displays and cell holder positioning. Furthermore, View supports an optimized environment for data management and analysis by offering folder-based task management and a highly customizable layout, including ribbon menus, docking, and split-pane viewing.

Convenient Data Analysis

Calculated standard curves are easily obtained by converting data measured in Spectrum mode to Quantitation mode. The selection of calibration wavelengths is facilitated through cursor crosshair and Peak/Valley detection functions. With support for repetitive measurement and arithmetic operations based on formulas and functions, users can perform precise and flexible data analysis.

Data Printing Support for Various Formats

Measured data and analysis results can be easily exported in various formats. By saving files in the proprietary View format, users can reload them for further analysis or output them as formal reports. The supported output formats are as follows: Image format(.png), Text format(.txt), Excel format(.csv, .xlsx), Report format(.pdf), Proprietary format(.ova)

Accessories

POP Series provides optimized, customized analytical solutions for laboratory and research environments through its compatibility with various advanced accessories, supporting high accuracy and operational efficiency.

	**Multi Cell Holder** As a standard initially installed accessory, it offers you to mount up to eight 10mm square cuvettes simultaneously, enabling efficient measurement of multiple samples.
	**Single Cell Holder** This dedicated holder for 10mm square cuvettes supports the stable and precise measurement of individual samples.
	**Micro Volume Cell Holder** A single cell holder designed for samples with volumes below 500 µL.
	**Long Path Cell Holder** This cell holder is designed to increase the optical path length for analyzing low-concentration samples. Optical Path Length: 20, 50, 100 mm
	**Film Cell Holder** This film cell holder is designed to measure solid-state samples that allow light transmission, such as optical films or slides glasses.
	**All-in-One Cell Holder** A universal cell holder that compatible with round cell (16mm and 25mm), 10mm square cuvette, and 1inch square cell within a single unit.
	**Round Cell Holder** A round cell holder specifically used for analysis using round cells. Test Tube Diameter: 16 mm / 25 mm Test Tube Height: max. 100 mm
	**Temperature Cell Holder** A cell holder designed to control the temperature of the cell holder using a water or oil circulator. Tubing Size: 6 mm
	**Sipper** A sipper enables the automatic suction and measurement of liquid samples. The device includes an integrated suction volume calibration function, ensuring accurate and stable sample processing.

K LAB Co., Ltd., a leading company in the domestic analytical instrument industry, is the only specialized research and manufacturing enterprise in Korea that manages the entire process—from R&D to production—under one roof.

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