

# Analytical and Measuring Instruments

- Molecular Spectrophotometry  
UV-VIS Spectrophotometer  
Water Analyzer
- Life Science  
Microvolume Spectrophotometer(DNA/RNA, Protein, IgG, etc.)  
Microplate Reader(ELISA, Endotoxin, etc.)
- Process Analysis  
UV Analyzer  
PAT(Process Analytical Technology)



K LAB Co., Ltd. offers a 25 months warranty on all our products.  
We confidently guarantee the highest quality and durability.  
Experience products you can trust with peace of mind!



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## K LAB products

UV-Vis & Microvolume Spectrophotometer



POP Series

### POP (190 to 1100 nm)

- Single-beam Type
- Spectral Bandwidth : < 1.8 nm
- Measurable Range : -3 A to 3 A
- 7" Display
- 8 Cell holder (Initially installed)
- Voice support



Alpha

### Alpha (190 to 1100 nm)

- Double-beam Type
- Spectral Bandwidth : 1.0 nm
- Measurable Range : -4 A to 4 A
- 8 Cell holder (Initially installed)
- Voice support



MRX Series

### MRX A2000

- Microplate Reader
- Plates: 6-, 96-, 384-well plates
- Spectral Bandwidth: 2.9 nm
- Read-out range: 0 to 4.0 OD
- Reading speed: < 8 seconds (96 wells)
- Temperature control: up to 65 °C



NanoQ Series

### NanoQ Plus (190 to 850 nm)

- Xenon flash lamp
- Absorbance Accuracy  
3% (at 0.97A at 302 nm)
- Maximum Concentration  
27,500 ng/μL (dsDNA), 825 mg/mL (BSA)



Cuve Lite

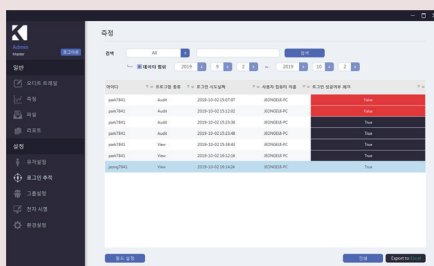
### Cuve Lite

- LEDs
- Spectral Resolution :  $\leq 8.0$  nm
- Wavelength Range:  
450, 540, 600, one selected  
wavelength (customizable)

COMING  
SOON

### \*Upcoming Products

- Microplate Reader (Multi-mode)
- Variable bandwidth spectrophotometer
- UV-Vis-NIR spectrophotometer
- Raman spectroscopy



### Secure

Secure is Windows® PC software can manage, check and trace user activities(Login, measurement, print) at View. You need View(CFR mode included) to use Secure.

## Alpha

The luxuriously designed Alpha is a spectrophotometer that uses the double-beam method.

Alpha can grasp the quantitative characteristics such as density or purity by measuring transmittance or optical density according to wavelength of sample in the range of ultraviolet rays and visible ray. Series can be utilized from not only a general analysis experiment to but also a specialized research field and guarantee accurate measurement and excellent reproducibility, accordingly offer reliable results in the various fields such as environment, biotechnology, chemistry, etc.



reddot award 2019  
winner



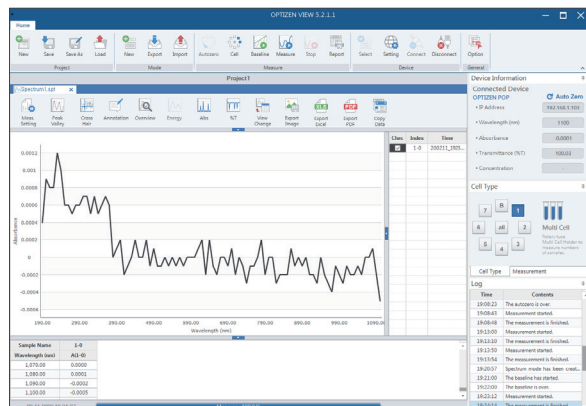
GOOD DESIGN  
신제품 디자인대상

The previous single beam type spectrophotometer has a weak point of error occurrence in measuring a sample, because of the movement of a light source by time lag in measuring the strength of between a reference light and a light from sample. To solve the problem, Alpha was designed as a double-beam type spectrophotometer. The system utilizes an additional reference beam to improve the measurement performance by compensating the intensity fluctuation of its light source.



- 01 Offering self-diagnosis function
- 02 Easily and quickly call up the information that is being measured or analyzed by registering it in you favorites.
- 03 Changing to the remote mode and then can link it with PC by using View.
- 04 The measurement is possible in the optimal condition by checking the equipment's operation time, lamp warm up condition and accumulated using time in real time.
- 05 Alpha's login function can prevent the measured data from leaking to many and undesigned persons.
- 06 Various cell compatibility and fast cell type choice.
- 07 Automatic measurement of lots of samples by equipping multi-cell.
- 08 Convenient voice service and volume control.
- 09 Offers 64GB storage.
- 10 Data can be printed by connecting to the machine without installing a printer driver

## View (\*Optional)



View, PC-Interface software of Series, enables the user to check and control the result of sample measurement in real time in Windows® environment and facilitate the general management related to the device and the measurement.

| Specifications               |                                            |                           |                                                          |
|------------------------------|--------------------------------------------|---------------------------|----------------------------------------------------------|
| Photometrics System          | Double-beam type                           | Baseline Stability        | Less than 0.0003 Abs/hr                                  |
| Light Source(s)              | Tungsten Lamp / Deuterium Lamp             |                           | (700 nm, one hour after light source turned ON)          |
| Detector                     | Silicon Photodiode                         | Baseline Flatness         | $\leq \pm 0.0005 \text{ A}$                              |
| Spectral Bandwidth           | Fixed - 1.0 nm (190 to 1100 nm)            |                           | (190 to 1,100 nm, one hour after light source turned ON) |
|                              | (Optional) Variable - 0.5, 1, 1.5, 2, 4 nm | Photometric Repeatability | Less than $\pm 0.0002 \text{ Abs}$ at 0.5 Abs            |
| Wavelength Range             | 190 to 1,100 nm                            |                           | Less than $\pm 0.0006 \text{ Abs}$ at 1.0 Abs            |
| Wavelength Display (setting) | 0.05 nm                                    |                           | Less than $\pm 0.0010 \text{ Abs}$ at 2.0 Abs            |
| Wavelength Accuracy          | $\pm 0.3 \text{ nm}$ (For entire range)    | Stray Light               | Less than 1.00 % (198 nm KCl)                            |
|                              | $\pm 0.1 \text{ nm}$ (656.1 nm)            |                           | Less than 0.05 % (220 nm NaI)                            |
| Wavelength Repeatability     | $\pm 0.1 \text{ nm}$                       |                           | Less than 0.05 % (340 nm $\text{NaNO}_2$ )               |
| Wavelength Slew Rate         | Approx. 25,000 nm/min                      | RMS noise                 | Less than 0.00005 Abs (700 nm)                           |
| Scanning Speed(Max)          | 6,000 nm/min                               | Monochromator             | Czerny-Turner type with 1,200 lines/nm blazed grating    |
| Lamp interchange Wavelength  | 340 to 410 nm (Default 370 nm)             | Standard Cell Holder      | Automatic Rotary type 8-position Multi-Cell Holder       |
| Photometric Range            | Absorbance: -4 A to 4 A                    | Operating System (OS)     | Windows 10 (Embedded PC)                                 |
|                              | Transmittance: 0% to 400%                  | Display                   | 8 inch color LCD with touch screen                       |
| Photometric Accuracy         | $\pm 0.002 \text{ Abs}$ at 0.5 Abs         | Control Options           | Onboard with built-in touchscreen                        |
|                              | $\pm 0.004 \text{ Abs}$ at 1.0 Abs         |                           | PC Software (View)                                       |
|                              | $\pm 0.006 \text{ Abs}$ at 2.0 Abs         | Dimensions(W*D*H)         | 520 mm * 500 mm * 200 mm                                 |
|                              | (NIST930D/NIST1930 or equivalent)          | Power Requirement         | AC 100-240 V, 50/60 Hz, 140 VA                           |
| Environmental requirements   | Temperature: 15 °C to 35 °C                | Weight                    | 14 kg                                                    |
|                              | Humidity: 30 % to 80 %                     | PC Software               | (Optional) FDA 21 CFR Part 11 compliance S/W (Secure)    |

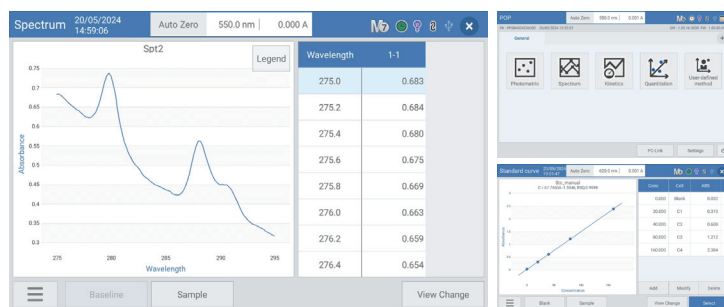
## POP Series

POP chooses our unique high resolving power wavelength measurement mechanism.

POP Series are single-beam type spectrophotometers and offer stable performance and compact-size and reasonable price to the users. The series are categorized into POP, POP-V according to the specification of the products.



POP offers four measurement modes (Photometric Mode, Quantitative Mode, Spectrum Mode, Kinetics Mode). The user can choose a suitable mode depending on the purpose to measure. The embedded S/W, touch screen interface and application facilitate the use of the device.



- 01 Offering a help service with a graphic type.
- 02 Easily and quickly call up the information that is being measured or analyzed by registering it in your favorites.
- 03 Link it with PC by using View.
- 04 The measurement is possible in the optimal condition by checking the equipment's operation time, lamp warm up condition and accumulated using time in real time.



- 05 The measurement monitoring is possible through choosing cell type without entering a mode and easily checking the current cell condition is possible through a change cell type icon according to the cell type condition or position.
- 06 It can measure automatically lots of samples by using Multi Cell.
- 07 Supporting convenient voice service and volume control function.

| 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                                                 | < 1.8 nm                                                 |
| Wavelength Range             | 190 to 1100 nm                                           | 340 to 1100 nm                                           |
| Wavelength Display (setting) | 0.1 nm                                                   |                                                          |
| Wavelength Accuracy          | <± 0.5 nm                                                |                                                          |
| Wavelength Repeatability     | <± 0.1 nm                                                | <± 0.2 nm                                                |
| Slew Rate                    | 7,800 nm/min                                             |                                                          |
| Scanning Speed               | 4,000 nm/min                                             |                                                          |
| Photometric Range            | 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, one hour after light source)        | <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% NaNO2)                     |
|                              | < 0.05 % (at 340 nm with 0.5% NaNO2)                     |                                                          |
| RMS noise                    | < 0.0002 Abs rms (at 700 nm)                             |                                                          |
| Monochromator                | Czerny-Turner Monochromator                              |                                                          |
| Standard Cell Holder         | Multi-cell (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                  | (optional) View for Windows                              |                                                          |

## QX Series

We recommend QX Series possessing an excellent water quality analysis function.

QX is invented to help scientists, facility managers, engineers, environment health experts and water treatment specialists to carry out the water quality analysis quickly and accurately. As the device provides the voice service and more than 150 pre-programmed methods, the users can use it easier than other devices. The device is available for a continuous management, an improved and simplified analysis procedure and a simple, precise analysis for measuring water quality items such as COD, TN, TP, etc.



QX Series are the water quality analysis system to reduce the correction time and improve the general precision degree. The devices use Hach's and Merck's pre-programmed methods (more than 150) and their convenient interface and automation function help you to perform an easy, quick and precise experiment.

### QX Series' main characteristics

- Water quality analysis.
- Standard curve drawing is possible by themselves.
- High speed wavelength scanning.
- Supporting a network printer connection function.
- Supporting all-in-one cell holder .  
(original size : 16, 25mm, quadrangle 10 mm compatibility).
- Convenient voice service.

- 01 Using all-in-one cell holder enables the user to use all the cell conveniently and simply.
- 02 Easily and quickly call up the information that is being measured or analyzed by registering it in your favorites.
- 03 Using Hach and Merck kit's pre-programmed methods (more than 150), one of the best water quality test kits.  
(\*Refer to the table shown in right side.)
- 04 Supporting software online update.

## Hach Method

| Parameter          | Range | Unit       |
|--------------------|-------|------------|
| N., Nitrate HR TNT | 0.0   | 30.0 mg/L  |
| N., Total HR TNT   | 0     | 150 mg/L   |
| N., Total LR TNT   | 0.0   | 25.0 mg/L  |
| P. React. HR TNT   | 0.0   | 100.0 mg/L |
| Molybdenum HR AV   | 0.0   | 40.0 mg/L  |
| P. Total HR TNT    | 0.0   | 100.0 mg/L |
| N., Ammonia Ness.  | 0.00  | 2.50 mg/L  |
| P. React. Mo AV    | 0.0   | 45.0 mg/L  |
| N., Nitrate MR AV  | 0.0   | 10.0 mg/L  |
| N., Nitrate MR PP  | 0.0   | 10.0 mg/L  |
| N., Nitrite HR PP  | 0     | 250 mg/L   |
| Iron, FerroMo      | 0.00  | 1.80 mg/L  |
| Iron, TPTZ         | 0.000 | 1.800 mg/L |
| Iron, TPTZ AV      | 0.000 | 1.800 mg/L |
| Manganese, LR      | 0.005 | 0.700 mg/L |
| Silica, HR         | 0.0   | 100.0 mg/L |
| Chloride           | 0.0   | 25.0 mg/L  |
| Hydrazine          | 0     | 600 ug/L   |
| Hydrazine AV       | 0     | 600 ug/L   |
| N., Nitrate LR     | 0.00  | 0.50 mg/L  |
| N., Nitrite LR AV  | 0.000 | 0.300 mg/L |
| N., Nitrite LR PP  | 0.000 | 0.300 mg/L |
| N., Nitrite LR TNT | 0.000 | 0.500 mg/L |
| Iron, FerroVer     | 0.00  | 3.00 mg/L  |
| Iron, FerroVer AV  | 0.00  | 3.00 mg/L  |
| Perman. Index HR   | 4.50  | 15.00 mg/L |
| Aluminum Alumin.   | 0.000 | 0.800 mg/L |
| Hardness, Ca       | 0.00  | 4.00 mg/L  |
| Hardness, Mg       | 0.00  | 4.00 mg/L  |
| Ozone HR AV        | 0.00  | 1.50 mg/L  |
| Ozone LR AV        | 0.00  | 0.25 mg/L  |
| Ozone MR AV        | 0.00  | 0.75 mg/L  |

## Merck Method

| Parameter                  | Range | Unit             |
|----------------------------|-------|------------------|
| Acid capacity CT to pH 4.3 | 0.40  | 8.00 mmol/L OH   |
| Acid capacity CT to pH 4.3 | 20    | 400 mg/L CaCO3   |
| Aluminium Test             | 0.10  | 1.20 mg/L Al     |
| Aluminium Test             | 0.020 | 0.200 mg/L Al    |
| Aluminium CT               | 0.02  | 0.50 mg/L Al     |
| Aluminium CT               | 0.02  | 0.50 mg/L Al     |
| Ammonium CT                | 0.010 | 2.000 mg/L NH4-N |
| Ammonium CT                | 0.010 | 2.000 mg/L NH4-N |
| Ammonium CT                | 0.01  | 2.58 mg/L NH4+   |
| Ammonium CT                | 0.01  | 2.58 mg/L NH4+   |
| Ammonium CT                | 0.010 | 2.000 mg/L NH3-N |
| Ammonium CT                | 0.010 | 2.000 mg/L NH3-N |
| Ammonium CT                | 0.01  | 2.43 mg/L NH3    |
| Ammonium CT                | 0.01  | 2.43 mg/L NH3    |
| Ammonium Test              | 0.05  | 3.00 mg/L NH4-N  |
| Ammonium Test              | 0.03  | 1.50 mg/L NH4-N  |
| Ammonium Test              | 0.010 | 0.500 mg/L NH4-N |
| Ammonium Test              | 0.06  | 3.86 mg/L NH4+   |
| Ammonium Test              | 0.04  | 1.93 mg/L NH4+   |
| Ammonium Test              | 0.013 | 0.644 mg/L NH4+  |
| Ammonium Test              | 0.05  | 3.00 mg/L NH3-N  |
| Ammonium Test              | 0.03  | 1.50 mg/L NH3-N  |
| Ammonium Test              | 0.010 | 0.500 mg/L NH3-N |
| Ammonium Test              | 0.06  | 3.65 mg/L NH3    |
| Ammonium Test              | 0.04  | 1.82 mg/L NH3    |
| Ammonium Test              | 0.016 | 0.608 mg/L NH3   |
| Ammonium CT                | 0.20  | 8.00 mg/L NH4-N  |
| Ammonium CT                | 0.20  | 8.00 mg/L NH4-N  |
| Ammonium CT                | 0.26  | 10.30 mg/L NH4+  |
| Ammonium CT                | 0.26  | 10.30 mg/L NH4+  |
| Ammonium CT                | 0.20  | 8.00 mg/L NH3-N  |
| Ammonium CT                | 0.20  | 8.00 mg/L NH3-N  |

## Humas Method

| Parameter    | Range | Unit      |
|--------------|-------|-----------|
| HS-COD-IR    | 5     | 40 mg/L   |
| HS-COD-LR    | 15    | 150 mg/L  |
| HS-COD-MR    | 50    | 1500 mg/L |
| HS-COD(Mn)-L | 0.6   | 20 mg/L   |
| HS-COD(Mn)-U | 0.2   | 3 mg/L    |
| HS-TN-U      | 0.2   | 5 mg/L    |
| HS-TN-L      | 2.5   | 20 mg/L   |
| HS-TN-H      | 10    | 100 mg/L  |
| HS-TN-L(CA)  | 1     | 50 mg/L   |
| HS-TN-H(CA)  | 10    | 100 mg/L  |
| HS-TP-L      | 0.01  | 3 mg/L    |
| HS-TP-H      | 1     | 15 mg/L   |
| HS-NO2(N)-L  | 0.1   | 1 mg/L    |
| HS-NO2(N)-H  | 10    | 150 mg/L  |
| HS-NO3(N)-H  | 1     | 15 mg/L   |
| HS-NO3(N)-L  | 0.2   | 10 mg/L   |
| HS-NO3(N)-CA | 0.5   | 30 mg/L   |
| HS-NH3(N)-L  | 0.2   | 6 mg/L    |
| HS-NH3(N)-U  | 0.03  | 1 mg/L    |
| HS-P04(P)-L  | 0.01  | 3 mg/L    |
| HS-P04(P)-H  | 1     | 15 mg/L   |
| HS-COD(Mn)-H | 20    | 100 mg/L  |
| HS-Mn        | 0     | 20 mg/L   |
| HS-NH3(N)-H  | 2     | 60 mg/L   |
| HS-Al        | 0.01  | 0.3 mg/L  |
| HS-Al-DW     | 0.01  | 0.3 mg/L  |
| HS-TOC-L     | 1.5   | 30 mg/L   |

• The listed water quality testing methods are partial contents.

## Specifications

|                              |                                                  |                             |                                               |
|------------------------------|--------------------------------------------------|-----------------------------|-----------------------------------------------|
| Photometrics System          | Single-beam type                                 | Baseline Stability          | <0.001 Abs/h                                  |
| Light Source(s)              | Tungsten Halogen Lamp & Deuterium Lamp           |                             | (700 nm, after one hour warm-up)              |
|                              | (Built-in light source auto interchanging motor) | Baseline Flatness           | <0.001 Abs rms                                |
| Detector                     | Silicon Photodiode                               |                             | (200 to 1,100 nm, after one hour warm-up)     |
| Spectral Bandwidth           | < 1.8 nm                                         | Stray Light                 | < 0.05 % (at 220 nm with 0.1% NaI)            |
| Wavelength Range             | 190 to 1100 nm                                   |                             | < 0.05 % (at 340 nm with 0.5% NaNO2)          |
| Wavelength Display (setting) | 0.1 nm                                           | Monochromator               | Czerny-Turner Monochromator                   |
| Wavelength Accuracy          | <± 0.5 nm                                        | Standard Cell Holder        | All-in-one cell                               |
| Wavelength Repeatability     | <± 0.1 nm                                        | Lamp Interchange Wavelength | 340 to 410 nm (Default 370 nm)                |
| Slew Rate                    | 7,800 nm/min                                     | Operating System (OS)       | Android                                       |
| Scanning Speed               | 4,000 nm/min                                     | Display                     | 7-inch (Resolution: 1280 x 800)               |
| Photometric Display          | Absorbance : -3 A to 3 A                         | Control Options             | Stand-alone, PC                               |
|                              | Transmittance : 0 % to 300 %                     | Dimensions(W*D*H)           | 433 mm * 381 mm * 180 mm                      |
| Photometric Range            | 3 Abs                                            | Power Requirement           | AC100 to 240 V, 50/60 Hz, 140 VA              |
| Photometric Accuracy         | <± 0.005 Abs at 0.0 to 0.5 Abs                   | Weight                      | 10.5kg                                        |
|                              | <± 1% Abs at 0.50 to 2.0 Abs                     | Preprogrammed Method        | > 130 (Hach), > 480 (Merck)                   |
|                              | (NIST SRM 930e)                                  | PC Software                 | (optional) View for Windows                   |
| Photometric Repeatability    | ± 0.003 Abs                                      | Connectivity                | RJ45 ethernet, USB A * 2, RS-232 * 2, USB * 1 |

NanoQ

It supplies extremely fast and easy quantitative analysis of nucleic acid and protein by UV-Vis absorption spectrophotometry.

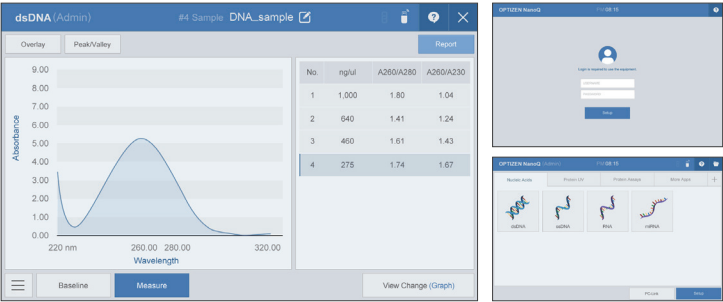
NanoQ is wide wavelength microvolume spectrophotometer with modern design and user convenience UI. It provides microvolume sample measuring mode and cuvette measuring mode so can measure wide range of concentration. You can easily set over 20 measuring modes.

**Note** The NanoQ Plus model provides pedestal and cuvette measuring mode, but the NanoQ does not.



Full Spectrum Analysis

NanoQ can measure the absorption spectrum UV-Vis (190 - 850 nm) in seconds using by array type spectrophotometer technology with Xenon lamp and CMOS-sensor(2048 pixels). It also provides various algorithms like Peak/Valley detection.



Measuring Mode : Nucleic Acid(dsDNA, ssDNA, RNA), Protein(Lysozyme, BSA, IgG), OD600, etc.

| Measurement menu configuration |           |            |
|--------------------------------|-----------|------------|
|                                | Menu      | Factor     |
| Nucleic Acid (ng-cm/μℓ)        | dsDNA     | 50         |
|                                | ssDNA     | 33         |
|                                | RNA       | 40         |
|                                | miRNA     | 33         |
|                                | Custom    | Input      |
| Protein (g-cm/ℓ)               | BSA       | 1.5        |
|                                | SA        | 1.49, 1.72 |
|                                | IgG       | 0.71, 0.74 |
|                                | IgE Human | 0.65       |
|                                | Lysozyme  | 0.38       |
|                                | OD1       | 1          |
| OD600                          | OD600     | 1          |

| Specifications                 |                               |                                                                            |                               |
|--------------------------------|-------------------------------|----------------------------------------------------------------------------|-------------------------------|
| Product Name                   |                               | NanoQ Plus                                                                 | NanoQ                         |
| Photometrics System            |                               | Microvolume & Cuvette Spectrophotometer                                    | Microvolume Spectrophotometer |
| Light Source(s)                |                               | Xenon flash lamp                                                           |                               |
| Lifetime                       |                               | Up to 10 years                                                             |                               |
| Detector                       |                               | 2048-element CMOS linear image sensor                                      |                               |
| Spectral Resolution            |                               | 1.5 nm (FWHM at Hg 253.7 nm)                                               |                               |
| Wavelength Range               |                               | 190 to 850 nm                                                              |                               |
| Wavelength Display (setting)   |                               | 1 nm                                                                       |                               |
| Wavelength Accuracy            |                               | ± 1 nm                                                                     |                               |
| Baseline Correction Wavelength |                               | Selectable (190 to 850 nm)                                                 |                               |
| Absorbance Precision           |                               | 0.002 AU (0.5 mm path) or 1%                                               |                               |
| Absorbance Accuracy            |                               | 3% (at 0.97A at 302 nm)                                                    |                               |
| Measurement Time               |                               | Less than 8 seconds                                                        |                               |
| Microvolume                    | Minimum Sample Volume         | 1 µL                                                                       |                               |
|                                | Pathlength                    | 0.03 to 1.0 mm                                                             |                               |
|                                | Photometric Range             | 0.02 to 550 A (10mm equivalent)                                            |                               |
|                                | Detection Range               | 2 - 27,500 ng/µL (dsDNA) / 0.06 - 825 mg/mL (BSA) / 0.03 - 400 mg/mL (IgG) |                               |
|                                | Pedestal Compartment Material | 303 stainless steel and quartz fiber                                       |                               |
| Cuvette                        | Photometric Range             | 0 to 2 A                                                                   | -                             |
|                                | Display Range                 | 0 to 3 A                                                                   | -                             |
|                                | Detection Limit               | 0.2 - 150 ng/µl (dsDNA)                                                    | -                             |
|                                |                               | 0.006 - 5 mg/mL (BSA)                                                      | -                             |
|                                |                               | 0.003 - 2 mg/ml (IgG)                                                      | -                             |
|                                | Center Height (Z-height)      | 8.5 mm                                                                     | -                             |
|                                | Cell Types                    | 12.5 x 12.5 mm (Outside dimension)                                         | -                             |
| CPU                            |                               | Octa Core ARM® Cortex™-A53 Processor                                       |                               |
| Storage                        |                               | 32 GB                                                                      |                               |
| Glove Compatibility            |                               | Compatible with lab gloves                                                 |                               |
| Connectivity                   |                               | 4 x USB-A ports, Ethernet, RS232                                           |                               |
| Display                        |                               | 7-inch (resolution: 1280 * 800)                                            |                               |
| Operating System (OS)          |                               | Android                                                                    |                               |
| Dimensions(W*D*H)              |                               | 216 mm * 290 mm * 165 mm                                                   |                               |
| Weight                         |                               | 3.0 kg                                                                     |                               |

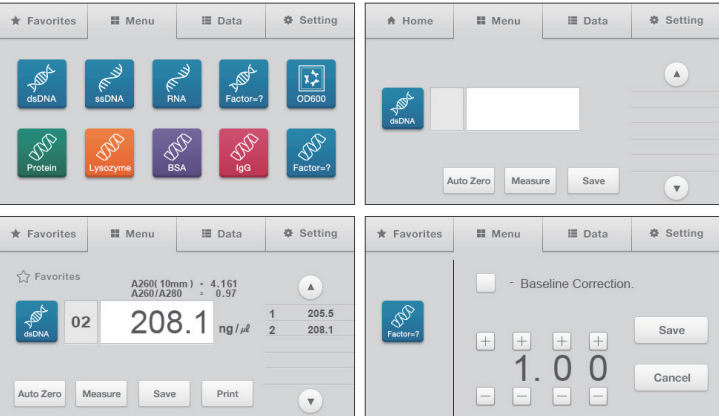
# NanoQ Lite

NanoQ Lite is a small microvolume sample analyzer with a simple yet sophisticated design and easy and convenient user interface(UI).

It applies the Slope Algorithm, which is a light path optimization technique, to enable measurement of a wide range of absorbance. Using three LEDs (260 nm, 280 nm, and 600 nm) and a single silicon photodiode, it lowered the product cost drastically while maintaining the needed functions and performance level. It offers the baseline correction function using an additional LED (360 nm).



The system provides a simple and intuitive user interface with default Factor values for each mode. Additionally, the Input mode allows users to customize Factor values based on their experimental conditions. This flexibility is especially useful for proteins, as users can apply different Factor values for various types.



| Measurement menu configuration |          |        |
|--------------------------------|----------|--------|
|                                | Menu     | Factor |
| Nucleic Acid (ng-cm/μl)        | dsDNA    | 50     |
|                                | ssDNA    | 33     |
|                                | RNA      | 40     |
|                                | Other    | Input  |
| Protein (g-cm/l)               | Protein  | 1      |
|                                | BSA      | 1.5    |
|                                | IgG      | 0.71   |
|                                | Lysozyme | 0.38   |
| OD600                          | Other    | Input  |
|                                | OD600    | 1      |

| Specifications                 |                               |                                          |
|--------------------------------|-------------------------------|------------------------------------------|
| Product Name                   |                               | NanoQ Lite                               |
| Photometrics System            |                               | Microvolume Spectrophotometer            |
| Light Source(s)                |                               | LEDs                                     |
| Lifetime                       |                               | Up to 10 years                           |
| Detector                       |                               | Two Silicon photodiodes                  |
| Spectral Resolution            |                               | $\leq 8.0$ nm                            |
| Wavelength Range               |                               | Pedestal: 260, 280 / Cuvette: 600 nm     |
| Wavelength Accuracy            |                               | $\pm 1$ nm                               |
| Baseline Correction Wavelength |                               | Pedestal: 360 nm                         |
| Absorbance Precision           |                               | 0.004 AU (0.5 mm path)                   |
| Absorbance Accuracy            |                               | < 5% (at 1A at 260nm)                    |
| Measurement Time               |                               | < 10 seconds                             |
| Microvolume                    | Minimum Sample Volume         | 1 $\mu$ L                                |
|                                | Pathlength                    | 0.1 to 0.5 mm                            |
|                                | Photometric Range             | 0.004 to 40 Abs                          |
|                                | Detection Limit               | 4 - 2,000 ng/ $\mu$ L (dsDNA)            |
|                                |                               | 0.12 - 60 mg/mL (BSA)                    |
|                                |                               | 0.06 - 29 mg/mL (IgG)                    |
|                                | Pedestal Compartment Material | 303 stainless steel and quartz fiber     |
| Cuvette                        | Photometric Range             | 0 to 2 A                                 |
|                                | Display Range                 | 0 to 3 A                                 |
|                                | Center Height (Z-height)      | 15 mm                                    |
|                                | Cell Types                    | 12.5 x 12.5 mm (Outside dimension)       |
| CPU                            |                               | ARM® Cortex-M series                     |
| Display                        |                               | 4.3-inch, (resolution: 480 * 272 pixels) |
| Touchscreen                    |                               | Resistive touch                          |
| Glove Compatibility            |                               | Compatible with lab gloves               |
| Storage                        |                               | 4 GB                                     |
| Operating Voltage              |                               | 12 V (DC)                                |
| Dimensions(W*D*H)              |                               | 145mm * 190mm * 120mm                    |
| Weight                         |                               | 1.4 kg                                   |

## Cuve Lite

A compact sample analyzer with excellent portability, allowing for on-the-go processing and analysis.

K LAB's portable analyzer boasts high portability, enabling fast and accurate measurements anywhere. With a built-in battery(\*Optional), it can be used without a power connection, offering convenience wherever you go. Providing excellent performance at an affordable price, it ensures reliable results even in environments where immediate on-site analysis is required. Its user-friendly design makes it easy for anyone to use.



Cuve Lite is optimized for on-site diagnostic testing (POCT) across various fields, including pharmaceuticals, biotechnology, chemistry, food testing, and environmental monitoring, through its combination with a wide range of reagents. It enables fast and accurate real-time analysis in the field.

### Cuve Lite main characteristics

- Compact & Ultra-light (1kg): Offers excellent portability
- Versatile Reagent Combinations: Maximizes effectiveness
- Optimized for POCT: Real-time field measurement, OEM bulk supply available
- Battery & AC Power: Built-in auto-charging function (\*Optional)
- Intuitive UI: Easy and simple measurements
- USB Port Support: Easy data output to PC and printer
- Semi-permanent LED Lamp: Low-power design reduces maintenance costs

### Concentration Measurement

| Standard Curve Manager |     |
|------------------------|-----|
| STC1 (mg/l)            | 0.1 |
| STC2 (mg/l)            | 0.1 |
| No Function (mg/l)     | 0.1 |

Back Edit Select

| STC1                           |          | 540 nm                        |
|--------------------------------|----------|-------------------------------|
| 1.0000 x Abs + 0.0000 * factor |          |                               |
| Factor: 1.0                    |          |                               |
| <b>-0.0 mg/l</b>               |          |                               |
| 1.000                          | 100.07 % | Date: 25.03.19 Time: 22:10:19 |

Back Blank Sample Data

### Absorbance Measurement

| Absorbance Measurement |  | 540 nm |
|------------------------|--|--------|
| Factor: 1.0            |  |        |
| <b>0.000 Abs</b>       |  |        |
| T(%) = 100.00 %        |  |        |
| * Abs = OD x Factor    |  |        |

Back Blank Sample Data

| Date    | Time     | Abs   | Factor |
|---------|----------|-------|--------|
| 5.02.11 | 13:40:01 | 0.741 | 1.000  |
| 5.02.11 | 13:40:02 | 0.729 | 1.000  |
| 5.02.11 | 13:40:03 | 0.732 | 1.000  |
| 5.02.11 | 13:40:04 | 0.731 | 1.000  |
| 5.02.11 | 13:40:07 | 0.731 | 1.000  |

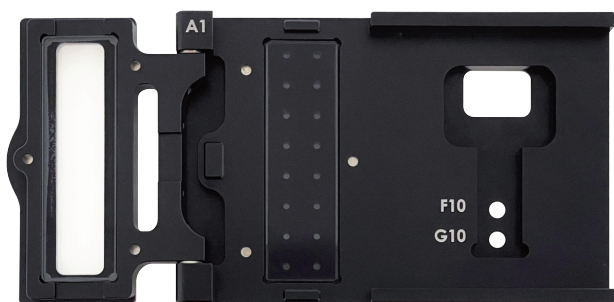
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| Specifications       |                          |                                                       |
|----------------------|--------------------------|-------------------------------------------------------|
| Product Name         |                          | Cuve Lite                                             |
| Photometrics System  |                          | Cuvette Spectrophotometer                             |
| Light Source(s)      |                          | LEDs                                                  |
| Lifetime             |                          | Up to 10 years                                        |
| Detector             |                          | Silicon photodiodes                                   |
| Spectral Resolution  |                          | $\leq 8.0$ nm                                         |
| Wavelength Range     |                          | 450, 540, 600, one selected wavelength (customizable) |
| Wavelength Accuracy  |                          | $\pm 1$ nm                                            |
| Absorbance Precision |                          | 0.004 AU (0.5 mm path)                                |
| Absorbance Accuracy  |                          | < 5% (at 1A at 260nm)                                 |
| Measurement Time     |                          | < 10 seconds                                          |
| Cuvette              | Photometric Range        | 0 to 2 A                                              |
|                      | Display Range            | 0 to 3 A                                              |
|                      | Center Height (Z-height) | 15 mm                                                 |
|                      | Cell Types               | 12.5 x 12.5 mm (Outside dimension)                    |
| Battery (Optional)   | Battery Type             | Lithium-Ion                                           |
|                      | Cell Format              | 18650                                                 |
|                      | Cell Configuration       | 3 S (3 Series)                                        |
|                      | Nominal Voltage          | 10.8 V                                                |
|                      | Capacity                 | 3400 mAh                                              |
| CPU                  |                          | ARM® Cortex-M series                                  |
| Display              |                          | 4.3-inch, (resolution: 480 * 272 pixels)              |
| Touchscreen          |                          | Resistive touch                                       |
| Glove Compatibility  |                          | Compatible with lab gloves                            |
| Storage              |                          | 200 Measurement data                                  |
| Operating Voltage    |                          | 12 V (DC)                                             |
| Dimensions(W*D*H)    |                          | 145mm * 190mm * 120mm                                 |
| Weight               |                          | 1.0 kg                                                |

## MRX A2000

Microplate Reader MRX A2000 can be used with 6 - 384 well plates and cuvettes, and provides excellent measurement performance in the UV-VIS range.

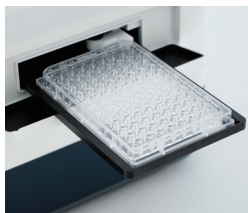
User convenience has been improved by enabling the use of tablet PCs as well as PC software. It provides Endpoint, Kinetic, Spectral scanning, and Well area scanning modes, as well as Incubation and Shaking functions to enable various applications.



### Microvolume Plate (\*Optional)

The MRX A2000-specific microvolume plate is designed for handling small sample volumes (2 $\mu$ L), especially for DNA, RNA, and protein analysis. It typically consists of wells designed to accommodate various experimental samples. This plate allows for precise measurement and analysis of sample quantities, enabling accurate results with minimal sample volume, thereby enhancing research efficiency.

- 01 Quantitative analysis of nucleic acids and proteins, ELISA, microbial growth experiments with selectable wavelengths in the range of 190 – 1100 nm.
- 02 Various workflows applied by providing Endpoint, Kinetic, Spectral scanning, and Well area scanning modes.
- 03 Compatible with 6 – 384 well plates
- 04 Quantitative analysis of nucleic acids without dilution using Micro-Volume Plates accessory.
- 05 Temperature control up to 65°C, condensation control to perform temperature-sensitive assays.
- 06 Linear, orbital and double orbital shaking.
- 07 Measurement through cuvette port. (\*MRC models only)



- Endpoint or Kinetic ELISA
- Nucleic acid, protein direct quantification
- Microbial growth assay
- Cytotoxicity assay
- Cell proliferation assay
- Spectral scanning
- Endotoxin Testing (\*Optional)

#### Configurations

|                 |                                          |
|-----------------|------------------------------------------|
| MRX B2000       | Shaking                                  |
| MRX A2000 (MR)  | Shaking, Incubating                      |
| MRX A2000 (MRC) | Shaking, Incubating, Cuvette measurement |

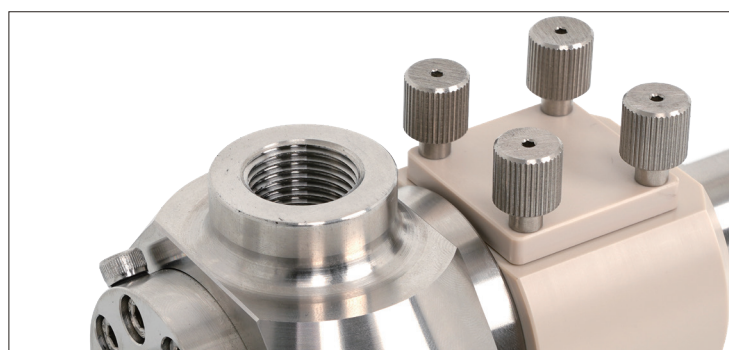
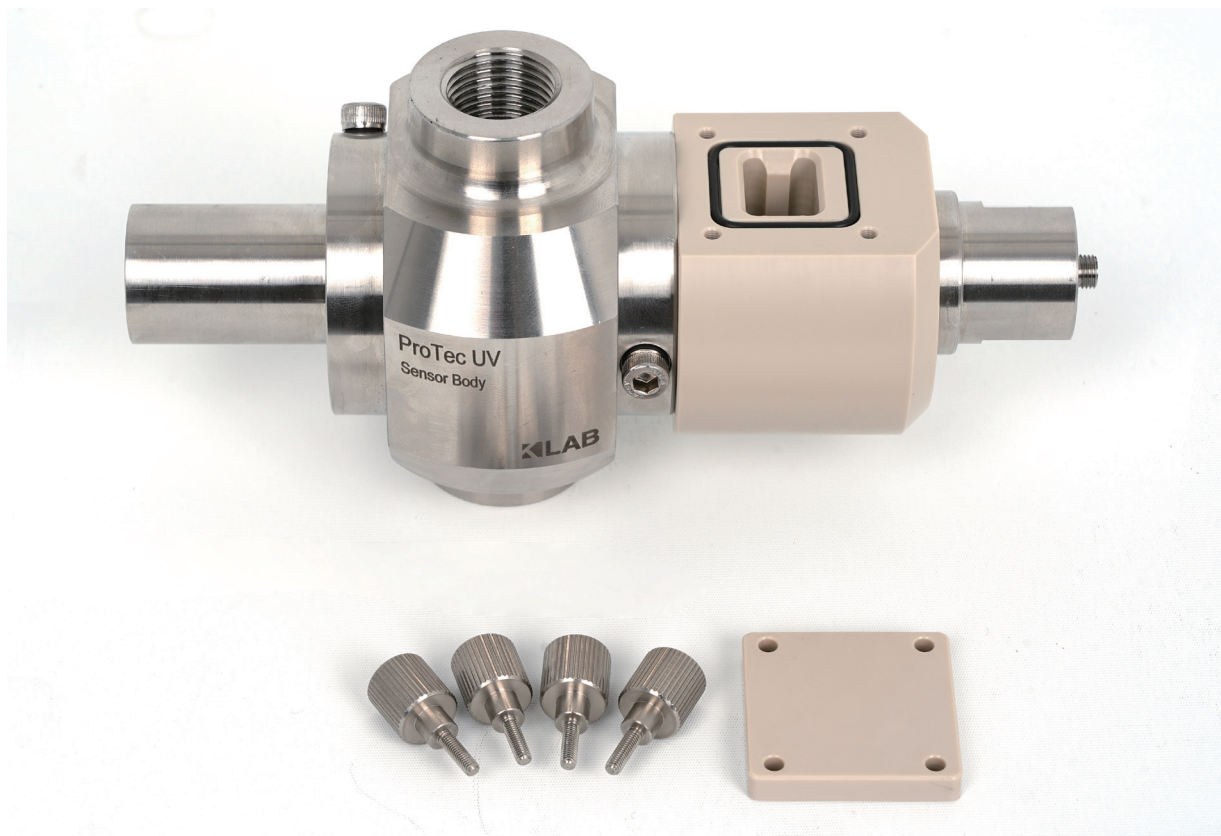
#### Specifications

|                                        |                                                          |
|----------------------------------------|----------------------------------------------------------|
| Detection modes                        | UV-Vis absorbance                                        |
| Light source                           | Xenon flash Lamp                                         |
| Detector                               | Photodiode                                               |
| Wavelength selection                   | Monochromator                                            |
| Wavelength range                       | 190 to 1,100 nm / 1 nm increments                        |
| Bandwidth                              | 2.9 nm                                                   |
| Linearity @ 450 nm                     | < 1% from 0 to 2.5 OD                                    |
| Accuracy @ 450 nm                      | < 3% at 2.5 OD                                           |
| repeatability @ 450 nm                 | at 2 OD: $\pm 0.5$ %                                     |
| OD repeatability                       | < 0.5% at 2.0 OD                                         |
| Read-out range                         | 0 to 4.0 OD                                              |
| Resolution                             | 0.0001 OD                                                |
| Pathlength correction                  | yes                                                      |
| Wavelength accuracy                    | $\pm 1.5$ nm                                             |
| Wavelength repeatability               | $\pm 0.2$ nm                                             |
| Stray light                            | 0.03 % at 230 nm                                         |
| Measurement speed (from A1 back to A1) | 8 seconds with 96-well plate                             |
| Shaking                                | Linear, orbital, double orbital                          |
| Read methods                           | Endpoint, Kinetic, Spectral scanning, Well area scanning |
| Microplate types                       | 6-, 96-, 384-well plates                                 |
| Incubation range                       | From ambient + 2 °C to 65 °C                             |
| User interfaces                        | PC software                                              |
| Connections                            | Ethernet port                                            |
| Power                                  | 110/220 V, 50/60 Hz                                      |
| Weight                                 | 12 kg                                                    |
| Dimensions(W*D*H)                      | 340 mm * 410 mm * 225 mm                                 |

## ProTec UV Sensor

ProTec UV Sensor is a single channel Process UV Absorption sensor with a lamp reference channel applied.

It is designed for inline process monitoring and ensures accurate concentration measurements and reproducibility and linearity. When measuring data, it compensates for fluctuations in the intensity of light by simultaneously measuring the intensity of light from the lamp with the PD of the reference channel.

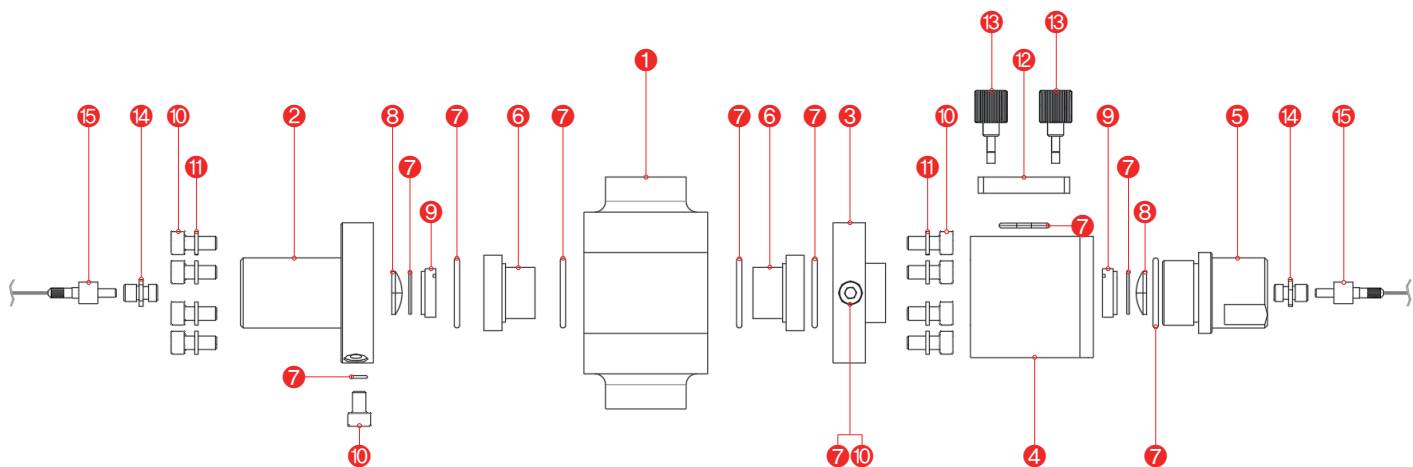


Depending on the needs, users can choose from a variety of wavelengths such as 254, 280, 290, 300, 313 nm, and optical pathlength in the range of 1 – 160 mm. This makes it applicable to Aromatic compound detection, protein concentration, and other demanding applications.

The use of sapphire as optical windows provides high hardness and resistance to chemical corrosion. It also offers a variety of line sizes and process connections and wetted materials to facilitate connection to process equipment.



- Inline real-time process monitoring
- Compensation for fluctuations in light intensity using reference channel
- Provides various line sizes and process connection methods (line size, process connection)
- Wetted materials



| Number | Part Name      | Material   | Q'TY |
|--------|----------------|------------|------|
| 1      | UV SENSOR BODY | STS316L    | 1    |
| 2      | SENSOR COVER 1 | STS316L    | 1    |
| 3      | SENSOR COVER 2 | STS316L    | 1    |
| 4      | FILTER HOUSING | PEEK       | 1    |
| 5      | FIBER TUBE     | STS316L    | 1    |
| 6      | WINDOW         | Sapphire   | 1    |
| 7      | O-RING         | VITON,EPDM | 10   |
| 8      | LENS           | -          | 2    |

| Number | Part Name | Material | Q'TY |
|--------|-----------|----------|------|
| 9      | LENS FIX  | STS316L  | 2    |
| 10     | BOLT      | STS304   | 18   |
| 11     | WASHER    | STS304   | 18   |
| 12     | FH COVER  | PEEK     | 1    |
| 13     | HAND BOLT | STS304   | 4    |
| 14     | CONNECTOR | STS304   | 2    |
| 15     | FIBER     | -        | 2    |

| Specifications              |                                          |
|-----------------------------|------------------------------------------|
| Measurement principle       | 1-Channel Absorption of light            |
| Measurement wavelength [nm] | 260, 280, 360, ... others on request     |
| Light source                | LED                                      |
| Detector                    | Silicon photodiode (hermetically sealed) |
| Reference detector          | Silicon photodiode (hermetically sealed) |
| Optical pathlength          | 0.1 - 200 mm                             |
| Material                    | Stainless steel KS D 2706 STS316L / PEEK |
| Line size                   | 10, 15A, ... others on request           |
| Process connection          | 3/8", 1/2" PT, ... others on request     |
| Process pressure            | 0.01-60 bar (0.15-870 psi)               |
| Window                      | Sapphire                                 |
| Window gaskets              | Viton® (FDA), EPDM                       |

## ProTec UV Converter

ProTec UV Converter is a single channel UV Absorption Sensor Converter with a lamp reference channel applied.

ProTec UV Converter is a microcontroller-based photometric converter that can be applied to ultraviolet and visible light absorption sensors (ProTec UV Sensor). User convenience has been improved by applying a 7-inch color touch display and menu-based UI. Measured values are expressed through text or graphs, and a data log function is provided to check the trend of the measured values.

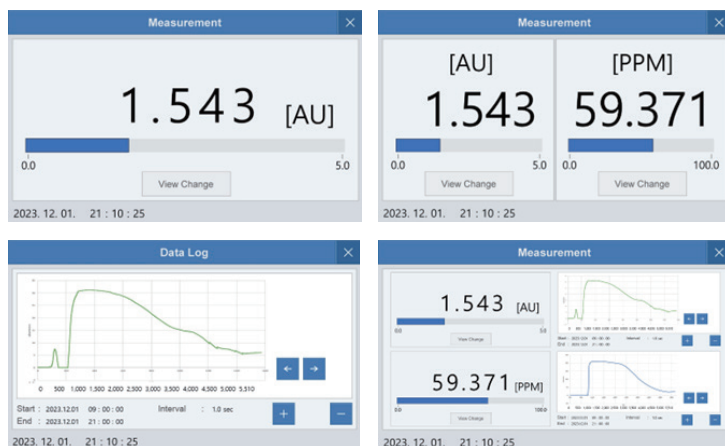


### ProTec UV Package

To present our products in the highest quality, we offer them in elegantly designed sets. This packaging not only highlights the premium nature and professionalism of our products but also leaves a strong, positive impression on consumers. Through excellent design and meticulous packaging, we strive to provide customers with a unique experience and satisfaction.

*Included in the package: ProTec UV Sensor Body, Converter, Validation Sample Set*

- Real-time Photometric Converter
- Data log recording for quality control (up to 20,000 data)
- Easy installation using Optical Fiber
- Up to 4-channel analog input/output for PLC connection (0-20mA or 4-20mA)
- Data transmission via Ethernet and RS232
- Communication with OPC UA Server (Modbus-TCP)
- Supports remote monitoring and control
- Explosion-proof case (Optional)



### Remote Control and Monitoring

- Remote control via OPC UA Server (Modbus-TCP)
- Remote control features: Parameter, Zero, Linearization, etc.
- Real-time data reception and control via Ethernet LAN and RS-232
- Customizable communication protocols and software available
- Remote control for PLC input/output available

### PLC Input/Output

- Up to 4 channels of 0-20mA, 4-20mA input/output selectable (Customization available for input/output conditions and ranges)
- Up to 4 channels of SPDT relay contacts available (Customization available for relay operation conditions)
- Parameter set provided for each channel
- Linearization function available for various physical units
- Span-Offset calibration function available

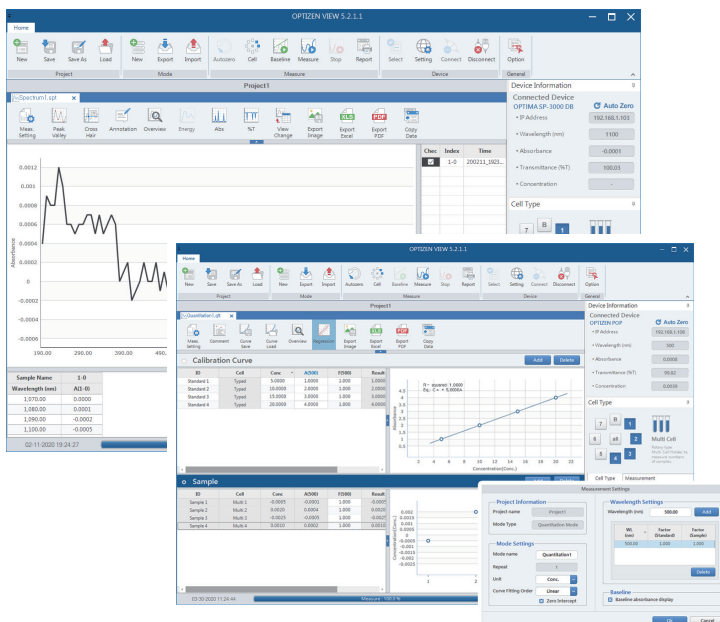
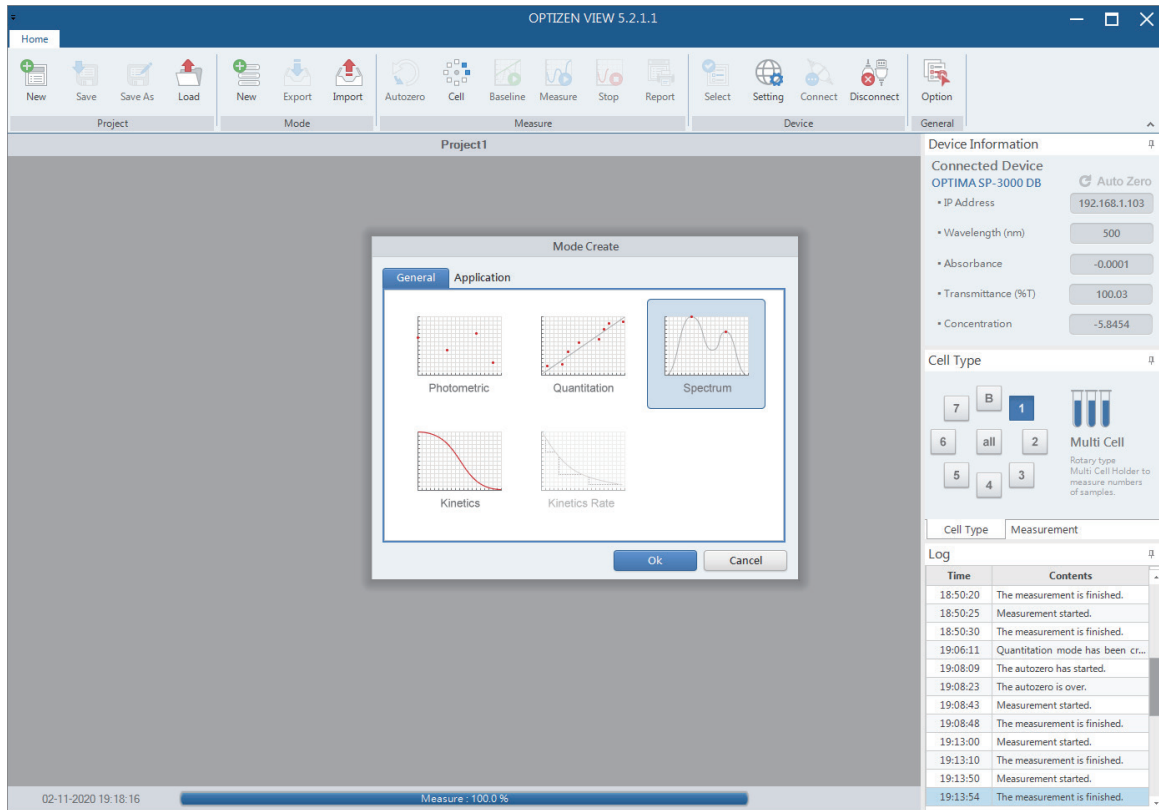
| Number | Port name    | Description               | Value                              |
|--------|--------------|---------------------------|------------------------------------|
| ①      | LIGHT SOURCE | LED Light Source Output   | Radiated Power < 15 mW             |
| ②      | DETECTOR     | Light Detect Sensor Input | Spectral range : 190 nm to 1100 nm |
| ③      | mAIO_CHx     | 0/4 - 20 mA Input/Output  | Load Resistance < 600 Ω            |
| ④      | REL_OUT      | Relay contact (SPST/SPDT) | 2 A at 30 VDC / 0.2 A at 250 VAC   |
| ⑤      | ETHERNET     | Ethernet TCP/IP port      | Cat5e                              |
| ⑥      | RS232        | RS-232 Serial comm. port  | Receiver input : -25 V to 25 V     |
| ⑦      | AC INPUT     | 220 VAC Power input       | 90 VAC to 260 VAC / 47 Hz to 63 Hz |

| Specifications     |                                                         |
|--------------------|---------------------------------------------------------|
| Product name       | ProTec UV Converter                                     |
| Housing material   | Steel (Powder coated)                                   |
| Display            | 7 inches (Resistive touch screen)                       |
| Display resolution | 800 x 480 pixels (Color)                                |
| mA-inputs/outputs  | "4 channels (4-20mA or 0-20mA) Load: 100-600 Ohm"       |
| Relay outputs      | 4 independent software-configurable SPDT relay contacts |
| Interface          | RS232/Ethernet                                          |
| Supply Voltage     | Selectable (115-230V AC 60Hz / 12V DC)                  |
| Power Consumption  | Max. 12W                                                |

## View

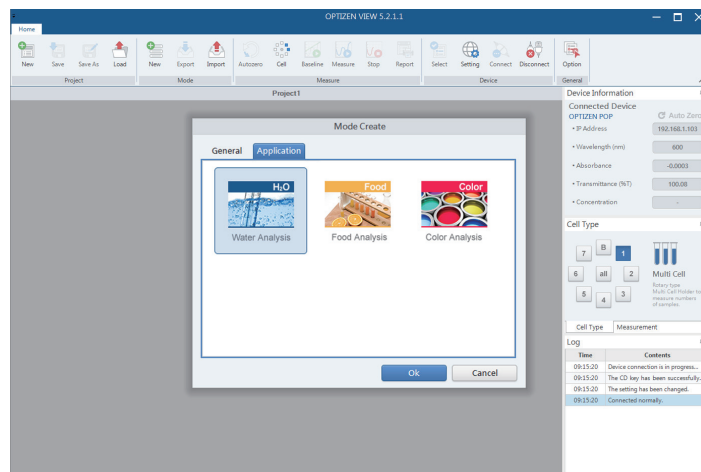
Compatible devices: Alpha, POP, QX

View is a Windows-based PC software that can manage the operation and data of the series spectrophotometer using a general PC. View provides a total of 4 modes; Photometric Mode to measure absorbance(Abs) or transmittance(%T) at specific wavelengths easily, Quantitation Mode to measure and manage calibration curve and measure the concentration of an unknown sample, Spectrum Mode to check the spectrum of a desired wavelength band, and Kinetic Mode that allows you to check the change in absorbance (or transmittance) over time at a specific wavelength.



- 01 You can easily manage various types of modes by saving and loading them in the form of a project.
- 02 Provides a monitoring screen where you can immediately check the currently set wavelength or measured value.
- 03 Provides graph and table functions for easy analysis of complex spectral data like peak/valley, crosshair, tooltip, etc.
- 04 Provides a function to analyze the absorbance change rate and enzyme activity value according to the enzyme reaction by measuring the change in absorbance over time.
- 05 Decimal control possible for absorbance transmittance and concentration.
- 06 Provides easy and convenient report generation and printing functions.
- 07 Multilingual UI support. (English, Chinese, Korean)
- 08 Provides export function in various formats (Excel, PDF, Data Copy, HTML)
- 09 Meets FDA 21 CFR Part 11 Compliance (\*Secure must be purchased separately)

## Application Mode



View provides three application modes: Water analysis, food analysis, and color analysis.

**\*Water analysis mode is available for a fee.**

### Water analysis mode (optional)

- This mode enables water quality analysis using calibration information for water quality analysis.
  - A separate tab is provided for each water quality assay kit manufacturer. (Hach, Merck, Humas)
  - Provides the ability to judge the validity of measurement results.
  - Individual calibration curves can be created with customization.
- \*Measurement kit must be purchased separately.**

### Food Analysis Mode(DOBI, Wine, Olive Oil)

#### DOBI of palm oil

- Provides DOBI (Deterioration of Bleachability Index) value measurement and discrimination function.
- Calculates DOBI value based on absorbance measured at 446 nm and 269 nm.
- The concentration of Carotene in the oil can be displayed when entering the weight of the sample.

#### Wine

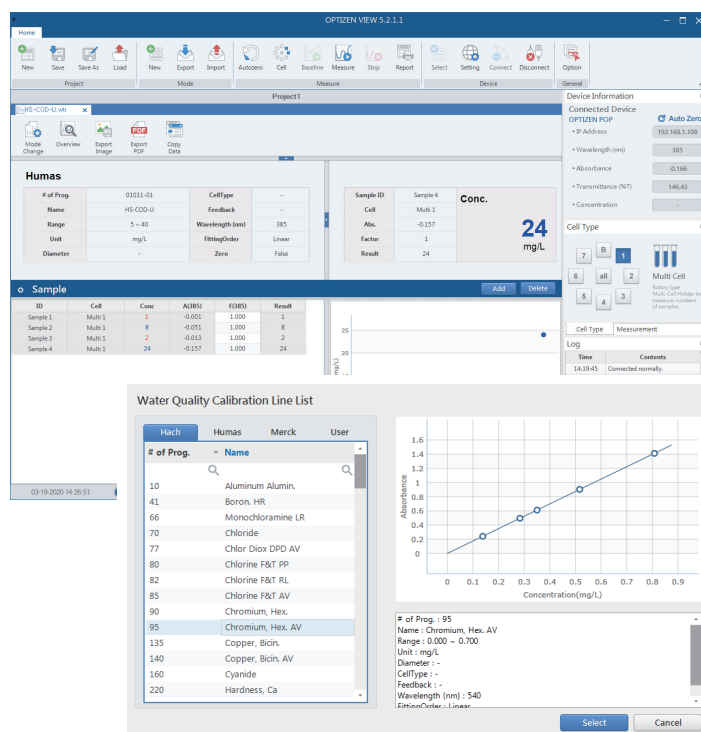
- Provides a mode to measure Wine Color Intensity and Wine Hue.
- Wine Color Intensity – Calculated as the sum of absorbance in Violet, Green, and Red, and checks the darkness of the wine.
- Wine Hue – Calculated as the ratio of absorbance in the Violet and Green areas, and checks the tone of the wine

#### Olive Oil

- Provides a function to determine whether each oil meets the standard of each level. (Extra virgin olive oil / Virgin olive oil / Refined olive oil)
- Meets EEC / 2568/91 (1991) and EEC / 2472/97 (1997) regulations.

### Color Analysis Mode

- Yellowness is an indicator of overall degradation, pollution and combustion from light, chemical exposure and processing.
- Yellowness Index (YI E313) can be measured in Color Analysis mode.



| Minimum Specifications                                                | Recommended Specifications                                                   |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------|
| Windows® 7, 8, 10                                                     | Windows® 8, 10                                                               |
| Intel® Pentium® D or AMD Athlon 64 X2                                 | Intel® Core 2 Duo E6600(2.4 GHz) or AMD Athlon 64 X2 5000+ (2.6 GHz) or more |
| NVIDIA® GeForce; 6800(256 MB) or ATI Radeon X1600 Pro(256 MB) or more | NVIDIA® GeForce; 8800 GT(512 MB) or ATI Radeon HD 4850(512 MB) or more       |
| 2 GB RAM                                                              | 4 GB RAM                                                                     |
| 1 GB or more free hard drive space                                    | 1 GB or more free hard drive space                                           |
| Minimum 1920 * 1080 display resolution                                | Minimum 1920 * 1080 display resolution                                       |

## Secure

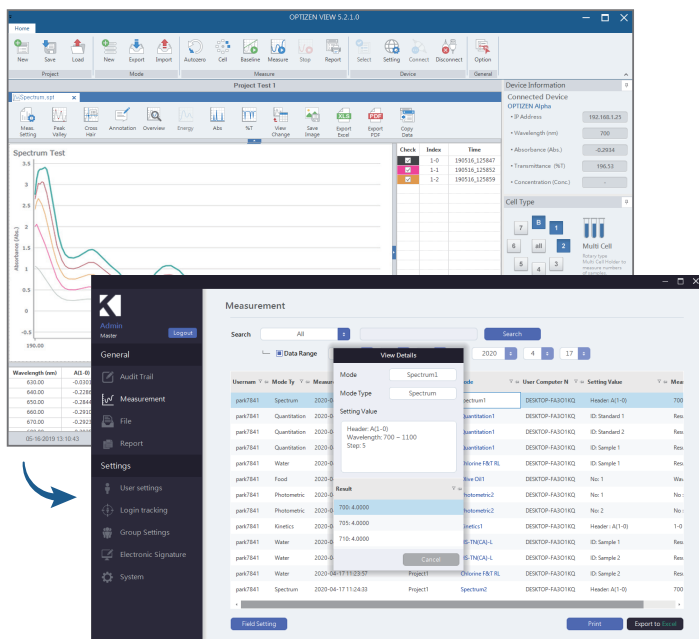
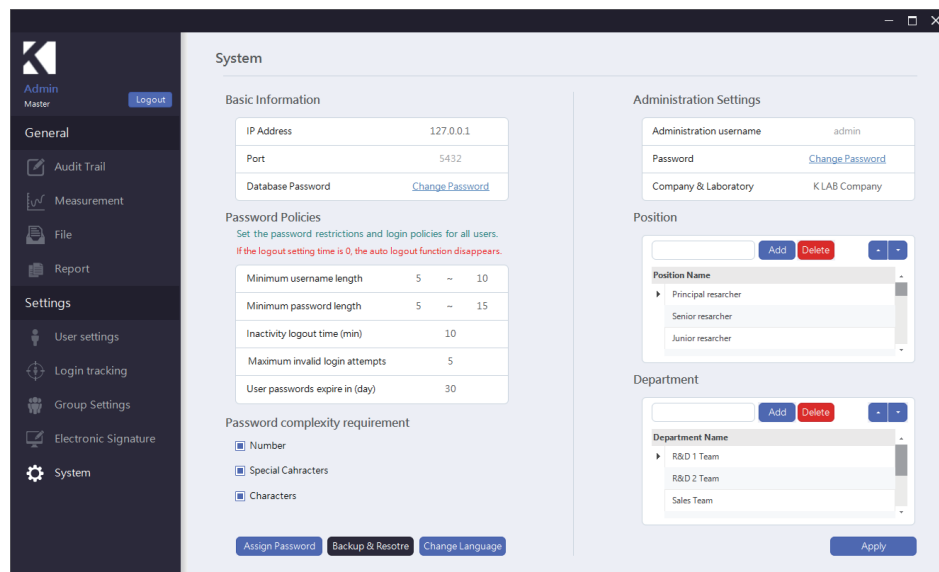
### Meets 21 CFR Part 11 Compliance and Audit Trail Features

Secure provides a convenient and simple feature that automatically records and monitors all activities of users so that the data is saved in View. Secure contains 21 CFR Part 11 guidelines from the U.S. FDA enforcing users to store and protect electronic records and conduct electronic signatures. This is to secure the integrity of records and the reliability of medicines and to prevent inappropriate data manipulation by tracking and keeping important data (analysis information, analysis reports, records related to the operation of analysis equipment, etc.).

#### What is 21 CFR Part 11?

Pharmaceutical companies must comply with GMP\* and GMP places emphasis on electronic records and electronic signatures. To this end, special requirements for electronic records and electronic signatures have been established as Part 11 in 21 CFR by the U.S. FDA.

\*Good Manufacturing Process mandatory for all processes such as manufacturing and shipping products in order to manufacture excellent and safe drugs



- 01 System verification, record creation, record protection, access control, audit trail (registration, change, event occurrence, operator action, login/out, electronic signature), operation check, authority check, document encryption, etc. can be checked.
- 02 Electronic signatures are unique to each individual and verify an individual's identity prior to registration. In addition, to prevent illegal use of IDs and passwords, electronic signatures are made based on IDs and passwords.
- 03 It supports an audit trail on users to log in and log out in Window based PC software for auditing and tracking user activities such as login, measurement, storage, reporting, etc, performed in View.
- 04 Provides Checksum function to detect damage and deformation of measurement data.
- 05 Provides user management, user-specific group, authorization functions.

\*In order to use Secure, it operates normally only on a PC in which View (CFR Mode) software is installed.

## 21 CFR Part 11 Implementation

The table below introduces 21 CFR Part 11 compliance by item through Secure.

| Part 11        | 21 CFR Part 11                                                                                                                                                                                                                                                                                                                         | Yes/No | Secure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.10(a)       | Validation of systems to ensure accuracy, reliability, consistent intended performance, and the ability to discern invalid or altered records.                                                                                                                                                                                         | Yes    | <p>While the customer is responsible for developing a verification protocol suitable for the system, K LAB provides IQ, OQ and PQ services. The device is equipped with a function that can verify its performance. Standard materials or recalibration services are available.</p> <p>We use a system that requires an Username and Password so that only authorized users can access the system.</p> <p>Checksums are included to clarify the origin of the data or to prevent tampering. Unauthorized checksums are denied to access.</p>                                                            |
| 11.10(b)       | The ability to generate accurate and complete copies of records in both human readable and electronic form suitable for inspection, review and copying by the agency. Persons should contact the agency if there are any questions regarding the ability of the agency to perform such a review and copying of the electronic records. | Yes    | <p>Secure enables historical measurement results, reports and audit trails. Print and export utilities are also provided to facilitate this.</p> <p>The system can make accurate and complete copies of all records. In particular, all methods and data files created by View are stored in the database as intact files in their original format.</p> <p>Methods and data files contain electronic records, data, methods, audit trail records, operator IDs and electronic signatures. Secure can load them at any time in the form of copies of the original data for FDA review or inspection.</p> |
| 11.10 (i)      | Determination that persons who develop, maintain or use electronic record/electronic signature systems have the education, training and experience to perform their assigned tasks.                                                                                                                                                    | Yes    | <p>Records of K LAB staff's training and recruitment can be verified during on-site audits after the verification process.</p> <p>In addition, all relevant K LAB staff have been trained on regulatory requirements.</p> <p>It is the responsibility of the user organization to ensure that users of the system have received education, training, and experience consistent with their duties.</p> <p>K LAB provides basic guidance training for system users during product installation process. Training courses are also available for administrators and users.</p>                             |
| 11.50 (a)      | Signed electronic records shall contain information associated with the signing that clearly indicates all of the following:<br>The printed name of the signer;<br>The date and time when the signature was executed; and<br>The meaning (such as review, approval, responsibility, or authorship) associated with the signature.      | Yes    | <p>Secure results provide electronic signature function. Electronic signature displays include:</p> <ul style="list-style-type: none"> <li>· User username, signer's full name</li> <li>· The signer's title or profile</li> <li>· The date and time the signature was applied.</li> <li>· Significance (criticism, approval, responsibility, author) with respect to the signature;</li> </ul> <p>All signatures are saved with the resulting file and cannot be changed.</p>                                                                                                                          |
| 11.50 (b)      | The items identified in paragraphs (a)(1), (a)(2), and (a)(3) of this section shall be subject to the same controls as for electronic records and shall be included as part of any human readable form of the electronic record (such as electronic display or printout).                                                              | Yes    | <p>Electronic signatures appear on View results reports and can be displayed or printed electronically.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11.70          | Electronic signatures and handwritten signatures executed to electronic records shall be linked to their respective electronic records to ensure that the signatures cannot be excised, copied, or otherwise transferred to falsify an electronic record by ordinary means.                                                            | Yes    | <p>You must have a verified user username and password to enter your signature in View. Electronic signatures are always stamped on electronic records and cannot be transferred from one record or file to another.</p>                                                                                                                                                                                                                                                                                                                                                                                |
| 11.100 (a)     | Each electronic signature shall be unique to one individual and shall not be reused by, or reassigned to, anyone else.                                                                                                                                                                                                                 | Yes    | <p>The View Signing and Authorization Tool requires two separate proofs of identity: a unique Username and Password. Each user must have a unique and valid user username and password.</p>                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11.200 (a) (1) | Employ at least two distinct identification components such as an identification code and password.                                                                                                                                                                                                                                    | Yes    | <p>View's signature and authentication tools require two separate proofs of identity: a unique user username and password. Each user must have a unique and valid username and password. No user can share the same user username/password combination.</p>                                                                                                                                                                                                                                                                                                                                             |

This table is a simple reference material excerpted to help users understand. For more information, please contact us.

## ACCESSORIES

Compatibility with various accessories provides the perfect solution for each laboratory and experimental environment.



### Multi Cell Holder

The multi cell holder to be able to measure automatically a great volume of sample.

#### (\*) Compatible Products

#### 8 Cell holder

- Alpha (\*Initially installed)
- POP (\*Initially installed)
- POP-V (\*Initially installed)



### Micro Volume Cell Holder

The single cell holder available, in case that sample's volume is below 500  $\mu\text{L}$ .

Optical Path Length: 10 mm  
Center Height: 15 mm

#### (\*) Compatible Products

- POP
- POP-V
- Alpha



### Round Cell Holder

The single cell holder available, when using circle cell to analyze a sample.

Test Tube Diameter: 16 mm / 25 mm  
Test Tube Height: max. 100 mm

#### (\*) Compatible Products

- POP
- POP-V
- Alpha



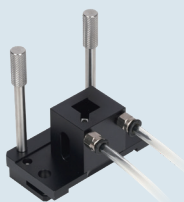
### Long Path Cell Holder

The single cell holder is used, when measuring after lengthening a light path in order to analyze a low density sample.

Optical Path Length: 50 – 100 mm

#### (\*) Compatible Products

- POP
- POP-V
- Alpha



### Temperature Cell Holder (Water/Oil Circulator Type)

This is used to control the temperature of the cell holder by using a temperature circulatory device.

Tubing Size: 6 mm

#### (\*) Compatible Products

- POP
- POP-V
- Alpha



### Film Cell Holder

The single cell holder available for measuring the solid sample for a light to pass through such as an optical film or a slide glass.

Sample Size: max. 100 mm(H) x 70 mm(W)  
Sample Thickness: max. 5 mm

#### (\*) Compatible Products

- POP
- POP-V
- Alpha



### Sipper

It is possible to perform automatic suction and measurement of liquid samples, and it has a built-in function to automatically correct the amount of suction, enabling accurate and stable sample processing.

Flow rate range: 0.035~570  
Speed range: 0.5~150 rpm  
Speed resolution: 0.1 rpm (0~100 rpm), 1 rpm (100~600 rpm)

#### (\*) Compatible Products

- POP
- POP-V
- Alpha

## OPEN LAB

K LAB provides training courses to increase laboratory efficiency and improve equipment operation, and problem-solving skills.



Join product training and transform your lab operations at OPEN LAB. By operating various analysis devices, OPEN LAB supports quality services, analysis methods and analysis solutions that can satisfy customers. Also, OPEN LAB explains the theory of devices so that there is no inconvenience in using our devices.

We are striving to provide various and systematic training programs for customers, such as operation training, maintenance training to react to various trouble shootings, etc. application experts, scientists, and researchers work together to help optimize workflow and results for productivity.

### 1. Education Outline

- 1) Organizer: K LAB
- 2) Target: Users and Distributors
- 3) Place
  - Offline Training: Training is conducted in OPEN LAB, and it comes with various training manuals.
  - Online Training: You can experience face-to-face training through Google Meet in real time.
  - \* What you need for online education:
    - Computer or other device to view the Webex meeting
    - Telephone or ability to call in via your computer
    - Microphone – USB headset/earbuds with microphone
- 4) Certificate provided upon completion of training.



### 2. Customized Training

A customized, onsite or online course allows you to train your entire team together, without having to organize travel.

### 3. How to apply for training

Contact each sales representative

#### Product Training

Product Overview

Installation Qualification(IQ) & Operational Qualification(OQ)

Maintenance and Customer Service

#### Maintenance Training

Basic Level - Disassembly, replacement, re assembly and calibration

Intermediate Level - Diagnosis and solving the problem

Professional Level - Alignment

Master Level - Fixing all parts

\*If you need training outside of the curriculum, please contact us.

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