

Dynamica



The HALO Range

UV-VISIBLE AND VISIBLE SPECTROPHOTOMETERS

REDEVOLUTION

RED VOLUTION

The Dynamica Halo range sets another benchmark in laboratory instrumentation. Dynamica's extensive manufacturing experience, commitment to innovation and continuous refinement, has resulted in an extensive range of precision laboratory instrumentation that fulfils the challenges of the contemporary and multifaceted laboratory environment. Versatility, flexibility, performance, efficiency, design are hallmarks of Dynamica's dedication to excellence.

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Halo XB-10 / VIS-20

UV / Visible and Visible Touch Screen Spectrophotometer

The Halo XB-10 and VIS-20 are based on the remarkable DNAmaster design and offer the same high quality, touch screen operation in a compact measurement systems for daily analysis in education, quality control and basic research.

Compact Optics with Full Range Scanning

The single beam optics are compact resulting in significant bench space saving. The long life Xenon lamp optics system in Halo XB-10 ensures quick and reliable performance. The Halo VIS-20 is equipped with a Tungsten Halogen lamp for stable measurement.

Color Touch Screen Operation

The intuitive color touch screen provides simple access to an extensive range of function. The touch screen is sensitive to stylus or fingers (with and without gloves). Icon driven on board software improves accessibility and the graphical display allows spectrum or standard curve show on screen. The forward and backward quick action keys are another convenience feature. An enlarged data display for photometry measurement enhances the legibility of numerical and graphical data.

Various Measurement Modes

Operation modes include photometric, multiple wavelength analysis, spectrum scanning, time scan, kinetics and direct concentration results.

Optional Accessories

A various selection of accessories include: test tube holder, flow cell with sipper, temperature control holder, long pathlength cuvette holder, and an automatic multiple cell changer is available to enhance different application needs.

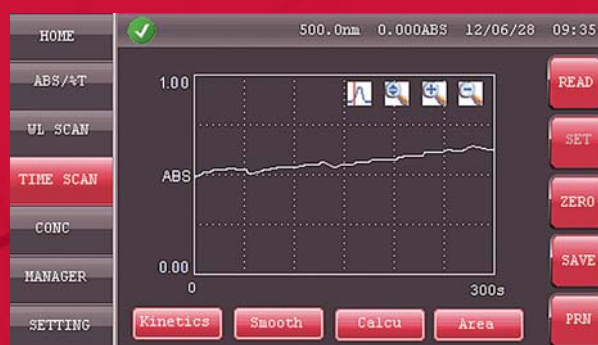
Storage and Data Output

External storage with SD card allows data export to PC compatible text or spreadsheet format. Master Report software is available to convert the raw data to an organized data table.

Method and result storage is almost unlimited by exchanging the SD card when needed. A printer option is available for direct printing of data and graphics. Advanced control, analyses and reporting can be performed with the optional UV Detective software installed in computer.

Validation Function

To ensure optimum instrument performance, self diagnosis functions are executed with the GLP/GMP wizard for performance validation and auditing.



HALO XB-10 / VIS-20 SPECIFICATIONS	XB-10	VIS-20
Wavelength Range	190 to 1000nm	320 to 1100nm
Resolution	1nm	
Spectral Bandwidth	5nm	6nm±1.2
Transmittance Accuracy	±1% T	±0.50% T
Transmittance Repeatability	0.50% T	0.20% T
Noise	0.004A at 0A at 250nm	≤0.0008Abs (500nm)
Stray Light	<0.5% T at 220nm, 340nm, 360nm	≤0.3% T
Wavelength Accuracy	±2nm	±1nm
Wavelength Repeatability	≤1nm	≤0.5nm
Absorbance	-0.3 to 1.999	
Transmittance	0 to 199.9%	
Spectrum Scanning	Yes	
Concentration	-300 to 1999	
Memory	SD card storage	
Quantitation	-300 to 1999	
Time Scan Display	Graphical and calculated concentration value	
Wavelength Scan Analysis	Absorbance and wavelength of peaks and valleys	
GLP	Time and date display Self diagnosis	

Halo XB-10 / VIS-20 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo XB-10 UV-Visible Single Beam Spectrophotometer 100-230V, 50/60Hz	XB-10
Halo VIS-20 Visible Single Beam Spectrophotometer 100-230V, 50/60Hz	VIS-20
Test Tube Holder (Tube Diameter : 9-22mm; Height 70-150mm)	XB-10-TTH
Microcell Holder	XB-10-MCH
Sample Sipper (with 150µl flow cell)	XB-10-SS
Temperature Control Holder (20- 40°C)	XB-10-TCH
Rectangular Long Pathlength Cell Holder (for 10, 20,30, 40, 50, 100mm)	XB-10-RLPH
Automatic 5 Cell Changer	XB-10-A5C
Flow Cell Holder (with 150µl flow cell)	XB-10-FCH
UV Detective for XB-10 / VIS-20	UVDS-08-05
Compact Thermal Printer	XB-10-PRINT



Long Pathlength Cell Holder



Temperature Controlled Holder



Microcell Holder



Sample Sipper



Auto 5 Cell Changer



Flow Cell Holder



Test Tube Holder



Compact Thermal Printer



Halo RB-10

UV / Visible Ratio Beam Spectrophotometer

The Halo RB-10 is a ratio beam spectrophotometer with an extensive array of built-in functions for versatility and suitability to many analytical and biological applications. The ratio beam optics impart greater accuracy and reproducibility than the conventional, single beam optics.

Ratio Beam Optics

The absorbance signal in conventional single beam instruments can destabilize and result in data inaccuracy. By contrast, ratio beam optics compensate and stabilize signal fluctuations to increase accuracy and reliability even over prolonged usage such as in time course and kinetic measurements. The ratio beam principle involves splitting the beam generated by the light source by a half mirror. One of the split beams passes through the sample and is quantified by a detector whereas the other split beam, which is representative of the absorbance signal, is measured by an independent detector to obtain a signal reference. The ratio of the values from both detectors is then calculated to detect and compensate for any aberration in the energy of the light source or a temporal change of the optical elements and produce highly stable photometric values.

Spectral Features

Boasting a 2 nm spectral bandpass the Halo RB-10 offers superior spectra and peak resolution.

Other specifications include an impressive wavelength accuracy of $\pm 0.5\text{nm}$, noise level 0.0005Abs (500nm) and stray light $\leq 0.05\%$ (220nm NaI, 340nm NaNO_2).

Diverse Range of Measurement Modes

Photometry Mode: Perform quantitative analyses in either absorbance or transmittance modes. Select from single wavelength, up to 6 multiple individual wavelengths, nucleic acid/protein A260/A280 ratios and set up calibration curves with up to 20 standards for concentration measurements.

Time Scan: Perform kinetic measurements for time periods ranging from 1 minute to >27 hours. Measurement intervals are factory preset and automatically selected when the scan time is set.

Wavelength Scan: Perform a full spectral scan from 190 to 1,100nm at any of 8 incremental and preset selectable scan speeds starting from a high resolution 10nm/minute up to a

swift 3,600nm /minute. Data is displayed as either numerical values or a graphical spectrum. Furthermore, perform downstream processing of data, such as peak / valley search or smoothing, directly on board or with the optional Halo UV Detective software.

Dual Lamp Advantage

By virtue of the halogen tungsten and deuterium lamps typically found in higher end analytical spectrophotometers the Halo RB-10 wavelength range is an impressive 190nm – 1,100nm. Lamp switching is automatic (by default at 340nm) and both lamps are long life.

User Friendly Operation and Information Rich LCD Display

The 94mm x 70mm, backlit LCD screen with adjustable brightness control is sufficiently large to display a large array of data even in a graphical format. Furthermore, single wavelength absorbance or transmittance data can be enhanced and enlarged using the unique zoom function. The seamless and chemical resistant keypad is designed for easy and quick selection of navigation and function features whilst protecting against any laboratory spills.

Validation Functions

To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo RB-10 is switched on. Furthermore, the Halo RB-10 is equipped with a GLP/GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

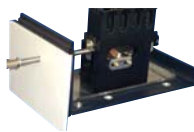
Stand Alone or PC Operation

The Halo RB-10 is fully equipped and capable of executing all functions in stand alone mode. Simply connect a standard laser printer for direct printouts of data and graphs. For more advanced analyses and reporting, the simple slide of a switch places the Halo RB-10 under the direct control of the optional UV Detective software installed in computer with Windows® XP or Windows® 7 operating system.

Accessories

4-Sample Cuvette Holder

A cuvette holder / changer with a 4-cuvette capacity is supplied as standard. Therefore measurement can be expedited by inserting the 4 cuvettes in tandem and manually sliding the holder / changer forwards or backwards to select the appropriate cuvette for measurement. The cuvette holder /changer is easily removed for cleaning purposes.



Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples

- > Accommodates 4 x long-path cuvettes
- > Accepts cuvettes with 6 optical path lengths of: 10, 20, 30, 40, 50 & 100 mm



Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature

- > Water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: $\pm 0.3^{\circ}\text{C}$
- > Complete with tubing for quick connection to water source (such as circulating water bath)



Test Tube Holder

Designed for the direct measurement of samples in a test tube with no need to transfer to a cuvette

- > Spring mechanism automatically adjusts and accepts test tubes with diameters from 12 - 18 mm
- > High ceiling cover accommodates even the tallest test tubes



Micro-cuvette Holder

Designed for measuring micro-volumes with 50 μl micro-cuvette

- > Wavelength range: 220 to 950nm
- > Noise level: $\pm 0.004\text{Abs}$ (with 50 μl volumes)



Micro-cuvettes

Suitable for use in the micro-cuvette holder

- > Made from quartz
- > Available size: 50 μl



Sample Sipper

Designed for the rapid measurement of multiple samples. Sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement.

- > Minimum sample volume: 0.6ml
- > Carryover: $\leq 1\%$
- > Sipper cuvette capacity: ~50 μl
- > Optical path length: 10mm



HALO RB-10 SPECIFICATIONS	
Optics	Concave diffraction grating / Ratio beam principle
Wavelength Range	190nm -1,100 nm
Spectral Bandwidth	2nm
Stray Light	≤0.05% (220nm NaI, 340nm NaNO ₂)
Wavelength Accuracy	±0.5nm
Photometric Range	Absorbance: -3 to +3 %T: 0% to 300% Concentration: 0,000 to 9,999
Photometry Accuracy (measured with NIST 930D)	±0.002Abs (0~0.5Abs) ±0.004Abs (0.5~1.0Abs) ±0.008Abs (1.0~2.0Abs) ±0.3%T
Photometry Repeatability (measured with NIST 930D)	±0.001Abs (0~0.5Abs) ±0.002Abs (0.5~1.0Abs) ±0.004Abs (1.0~2.0Abs) ±0.15%T
Wavelength Scan Speed	10, 100, 200, 400, 800, 1,200, 2,400, 3,600 nm/minute
Baseline Stability	0.001 Abs/hr (500nm, after 2 hours)
Noise Level	0.0005 Abs (500nm)
Light Source	Tungsten-Halogen and Deuterium Lamps
Light Source Switching	Automatic switching at 340nm
Detector	Silicon Photodiode
Display	Back-lit LCD 94(W) x 70(H) mm
Dimensions	370(W) x 550(D) x 265(H) mm
Net Weight	20Kg
Gross Weight	25Kg
Power Requirements	110 - 220 V selectable, 50/60Hz

Halo RB-10 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo RB-10 UV-Visible Ratio Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	RB-10-220
Thermostatic Cuvette Holder with Tubing	RB-10-TCH
Test Tube Holder (includes High Ceiling Cover)	RB-10-TTH
Micro-cuvette Holder	RB-10-MCH
Micro-cuvettes - quartz 50µl / 10mm Optical Pathlength	RB-10-MC-50
Sample Sipper	RB-10-SS
UV Detective Software	UVDS-08-01



Halo DB-20/DB-20S/DB-20R

UV / Visible Double Beam Spectrophotometer

The Halo DB-20 is a high performance double beam spectrophotometer suitable for many analytical applications that a higher level of accuracy is required.

Genuine Double Beam Optics

True double beam optics ensure concurrent measurement of the sample and reference for improved stability, accuracy and reproducibility. The light beam is split in two using a half mirror so that one beam passes through the sample side whilst the other passes through the reference side. Both beams are then measured on individual detectors. The reference side beam also acts to stabilize photometric values in a similar manner to the ratio beam principle.

Spectral Features

Coma aberration elimination from the concave diffraction grating achieves a high resolution 1.5 nm (DB-20S : 1nm) spectral bandpass and certifies compliance of the Halo DB-20 to the stringent European Pharmacopoeia standards.

Other specifications include an impressive wavelength accuracy of $\pm 0.3\text{nm}$, noise level 0.0003Abs (500nm) and stray light $\leq 0.05\%$ (220nm NaI, 340nm NaNO₂).

Built-in and Diverse Range of Measurement Modes

Photometry Mode: Perform quantitative analyses in either absorbance or transmittance modes. Select from single wavelength, up to 6 different individual wavelengths, nucleic acid/protein A260/A280 ratios and set up calibration curves with up to 20 standards for concentration measurements.

Time Scan: Perform kinetic measurements for time periods ranging from 1 minute to >27 hours. Measurement intervals are factory preset and automatically selected when the scan time is set.

Wavelength scan: Perform a full spectral scan from 190 to 1,100nm at any of 8 incremental and preset selectable scan speeds starting from a high resolution 10nm/minute up to a swift 3,600nm /minute. Data is displayed as either numerical values or a graphical spectrum. Furthermore, perform downstream processing of data, such as peak / valley search or smoothing, directly on board or with the optional Halo UV Detective software.

Dual Lamp Advantage

By virtue of the long life, halogen tungsten and deuterium lamps, the Halo DB-20s wavelength range is an extensive 190nm – 1,100nm. Lamp switching is automatic

and selectable from a wavelength range of 325nm to 370nm.

User Friendly Operation and Information Rich LCD Display

The extra large 165mm x 122mm, backlit LCD screen with adjustable brightness control displays a large array of data also in graphical format. The seamless and chemical resistant keypad is designed for easy and quick selection of navigation and function features whilst protecting against any laboratory spills. Other unique features include the 'GO TO WL' short cut key to allow direct input of a new wavelength into an existing measurement.

Validation Functions

To ensure optimum instrument performance, self-diagnosis incorporating a number of parameters and wavelength calibration are automatically initiated upon start-up. Furthermore, the Halo DB-20 is equipped with a GLP/ GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

Stand Alone or PC Operation

The Halo DB-20 is fully equipped and capable of executing all functions in stand alone mode. For more advanced control, analyses and reporting, the simple slide of a switch places the Halo DB-20 under the direct control of the optional UV Detective software installed in computer with Windows® XP or Windows®7 operating system.

On-Board Data Storage

Up to 20 operating programs and up to 10 sets of measurement data can be stored in the flash memory of the Halo DB-20.

Programs can easily be recalled, edited and deleted. Furthermore, when in stand alone mode, data (in text format) can be downloaded directly to an external memory stick via the USB port and transferred for further processing to any computer loaded with commercial spreadsheets (such as Microsoft® Excel)

PC Control Operation DB-20R

The Halo DB-20R shares the same specification of DB-20S with impressive 1nm bandwidth. DB-20R is PC control only, which the display and USB storage port are replaced by the UV Detective software come as standard.

Halo DB-20/DB-20S/DB-20R Accessories

Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples

- > Accommodates 2 x long-path cuvettes (sample and reference sides)
- > Accepts cuvettes with 6 optical path lengths of: 10, 20, 30, 40, 50 & 100 mm
- > Outer width: 12.5mm



Cylindrical Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples using a cylindrical cuvette

- > Accommodates 2 x long-path cylindrical cuvettes (sample and reference sides)



Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature

- > External water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: $\pm 0.3^\circ\text{C}$
- > Complete with tubing for quick connection to water source (such as circulating water bath)



5-Cuvette Holder / Changer

Designed for mounting up to 5 standard 10mm cuvettes on the sample beam side.

- > Total capacity: 5 cuvettes on sample beam side + 1 cuvette on reference beam side)
- > Turret design cuvette holder for efficient changeover
- > Manual change of cuvettes by turning front mounted knob
- > No temperature control



6-Cuvette Holder / Changer (with Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes with temperature control and stirring

- > Total capacity: 6 cuvettes on sample beam side + 1 cuvette on reference side)
- > Electronic change over – change cuvettes automatically at defined time intervals
- > Electronic thermostat – set temperature between +20°C to +40°C
- > Includes magnetic stirrer (and fleas)
- > Requires water circulated cooling (tubing included)



Micro-cuvette Holder

Designed for measuring micro-volumes with 50 μl micro-cuvette

- > Wavelength range: 220 to 950nm
- > Noise level: $\sim 0.005\text{Abs}$ (with 50 μl volumes)



Micro-cuvettes

Suitable for use in the micro-cuvette holder

- > Made from quartz
- > Available size: 50 μl



Auto Sample Sipper (without Temperature Control)

Designed for the rapid measurement of multiple or large amounts of sample without the requirement for manual washing or changing of cuvettes. The sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement. Two models are available with and without electronic temperature control, the former maintains the flow cuvette section at a constant temperature.



- > Minimum sample volume: 0.7ml
- > Wavelength range: 190nm – 900nm
- > Carryover: $\leq 1\%$
- > Sipper cuvette capacity: $\sim 50\mu\text{l}$
- > Optical path length: 10mm.

Auto Sample Sipper (with Temperature Control)

The same features as the Auto sipper with the added convenience of electronic temperature control to maintain the flow cuvette section at a constant temperature.

- > Temperature control range: +20°C to +40°C
- > Requires water circulated cooling (tubing included)



Micro Flow Cuvette Holder

Designed for the continuous measurement of trace samples. The sample can be injected directly into the flow cuvette with a syringe or other injection device.

- > Flow cuvette capacity: 70 μl
- > Pressure tolerance: Max. 0.1Mpa
- > Optical path length: 10mm
- > Teflon tubing provided



Glass Sample Holder

Designed for measuring the transmittance / absorbance of glass samples or filters.

- > Glass sample thickness: 0.5mm to 5mm
- > Glass sample dimensions: Min. 12x25mm to Max. 55x100mm



Film Sample Holder

Designed for measuring the transmittance to absorbance of thin film-like samples.

- > Film sample dimensions: 25m (W), 30 to 50mm (H)
- > Beam aperture: 10mm(W) x 20mm (H)



HALO DB-20 / DB-20S / DB-20R SPECIFICATIONS	DB-20	DB-20S	DB-20R
Optics	Concave diffraction grating / Double beam principle		
Wavelength Range	190nm -1,100 nm		
Spectral Bandwidth	1.5 nm	1.0 nm	
Stray Light	≤0.05% (220nm NaI, 340nm NaNO ₂)	≤0.10% (220nm NaI, 340nm NaNO ₂)	
Wavelength Accuracy	±0.3nm		
Photometric Range	Absorbance: -3 to +3 %T: 0% to 300%T Concentration: 0,000 to 9,999		
Photometry Accuracy (Measured with NIST 930D Filter)	±0.002Abs (0~0.5Abs) ±0.004Abs (0.5~1.0Abs) ±0.008Abs (1.0~2.0Abs) ±0.3%T		
Photometry Reproducibility (Measured with NIST 930D Filter)	±0.001Abs (0~0.5Abs) ±0.002Abs (0.5~1.0Abs) ±0.004Abs (1.0~2.0Abs) ±0.15%T		
Wavelength Scan Speed	10, 100, 200, 400, 800, 1,200, 2,400, 3,600 nm/minute		
Baseline Stability	0.0003 Abs/hr (500nm, after 2 hours)		
Noise Level	0.0003 Abs (500nm)		
Light Source	Tungsten-Halogen and Deuterium Lamps		
Light Source Switching	Automatic switching selectable from 325nm to 370nm		
Detector	Silicon Photodiode		
Display	Back-lit LCD 165(W) x 122(H) mm		N/A
Dimensions	505(W) x 590(D) x 265(H) mm		
Net Weight	29Kg		
Gross Weight	35Kg		
Power Requirements	110 - 220 V selectable, 50/60Hz		

Halo DB-20/DB-20S/DB-20R Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DB-20 UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20-220
Halo DB-20S UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20S-220
Halo DB-20R UV-Visible Double Beam Spectrophotometer 110 - 220 V selectable, 50/60Hz	DB-20R-220
Rectangular Long-Path Cuvette Holder	DB-20-RLPH
Cylindrical Long-Path Cuvette Holder	DB-20-CLPH
Thermostatic Cuvette Holder (includes Tubing)	DB-20-TCH
Manual 5-Cuvette Holder/Changer	DB-20-FCC
Auto 6-Cuvette Holder/Changer with Temperature Control and Stirrer	DB-20-SCCT
Auto 6-Cuvette Holder/Changer without Temperature Control and Stirrer	DB-20-SCC
Micro-cuvette Holder*	DB-20-MCH
Micro-cuvette - Quartz: 50µl / 10mm Optical Pathlength*	MC-50
Auto Sample Sipper with Temperature Control*	DB-20-SST
Auto Sample Sipper without Temperature Control*	DB-20-SS
Micro Flow Cuvette Holder*	DB-20-MFH
Glass Sample Holder	DB-20-GSH
Film Sample Holder	DB-20-FSH
UV Detective Software	UVDS-08-01

Note : * Not Applicable for Halo DB-20S & DB-20R



Halo DB-30

UV / Visible Double Beam Spectrophotometer

The next generation Halo DB-30 double beam spectrophotometer boasts superlative performance characteristics for applications demanding the utmost sensitivity by combining higher signal to noise ratios with minimal stray light. This warrants the Halo DB-30 suitable to many diverse fields and industries such as pharmaceutical, food, sanitation, environment, biology, agriculture, geology, mineral, petrochemical, optical, life science, education, manufacturing and many others applications.

Exceptionally Low Stray Light

The intricate but elegant and innovative optical pathway is engineered to deliver outstanding double beam performance characteristics, in particular stray light which achieves an impressive low 0.010%. The outcome is an increase in the linearity of absorbance characteristics for most samples thus increasing the scope of analytical applications particularly at higher concentrations.

Spectral Features

The asymmetric monochromator with long focal length results in improved sensitivity. Furthermore, up to 6 slit widths are selectable and switchable (with the highest achievable resolution of 0.1 nm) thus allowing for the optimization of different applications.

Other specifications include an impressive wavelength accuracy of $\pm 0.3\text{nm}$, noise level 0.0003Abs (500nm), wavelength repeatability of $\pm 0.1\text{nm}$ for the accuracy and reproducibility of analytical data and an absorbance range of -4 to $+5$ Abs for the analysis of high absorbance samples without the need for further dilution.

High Scan Speeds and Resolution

Select from 8 scan speeds starting at a high resolving 1nm/min. Coupled with the precise fine tuning of the photomultiplier tubes, a wavelength resolution of 0.1nm is maintained even at the fastest scan speed of 2,000 nm/min.

Powerful UV Detectable PC Control

The Halo DB-30 is PC controlled using the UV Detectable software (included with the instrument). Refer to page 3 for further details on the UV Detectable software. UV Detectable can also operate optional accessories such as the sample sipper and 6-cuvette holder.

The UV Detectable software is powerful but user friendly using Windows® XP or Windows® 7, as depicted in the process flow below

- > Select Function (e.g. Photometry)
- > Set Method Parameters
- > Auto-zero or Baseline
- > Sample test
- > Data processing
- > Report Generation

Dual Lamp Advantage

By virtue of the long life, halogen tungsten and deuterium lamps, the Halo DB-30s wavelength range extends from 190nm – 900nm. Furthermore, the dual lamp system results in higher accuracy than corresponding xenon lamps. Lamp switching is automatic and selectable from a wavelength range of 325nm to 370nm.

Validation Functions

To ensure optimum instrument performance, self-diagnosis incorporating a number of parameters and wavelength calibration are automatically initiated upon start-up. Furthermore the Halo DB-30 and the UV Detectable software is equipped with a GLP/GMP feature for analyses requiring validation and auditing. Parameters such as wavelength accuracy, wavelength reproducibility, bandpass, baseline flatness, baseline stability and noise level can be all validated and the audit report printed.

DB-30 Accessories

Rectangular Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples

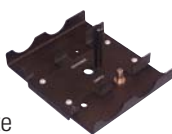
- > Accommodates 2 x long-path cuvettes (sample and reference sides)
- > Accepts cuvettes with 6 optical path lengths of: 10, 20, 30, 40, 50 & 100 mm



Cylindrical Long-Path Cuvette Holder

Designed for low concentration or low absorbance samples using a cylindrical cuvette

- > Accommodates 2 x long-path cylindrical cuvettes (sample and reference sides)



Thermostatic Cuvette Holder

Designed for applications requiring incubation and/or maintenance of a sample at a constant temperature

- > External water circulation maintains temperature stability
- > Operating temperature range: Room Temperature to +40°C
- > Temperature stability: $\pm 0.3^\circ\text{C}$
- > Requires water circulated cooling (tubing included)



5-Cuvette Holder / Changer

Designed for mounting up to 5 standard 10mm cuvettes on the sample beam side.

- > Total capacity: 5 cuvettes on sample beam side + 1 cuvette on reference beam side
- > Turret design cuvette holder



6-Cuvette Holder / Changer (with Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes with temperature control and stirring

- > 6 cuvettes on sample beam side + 1 cuvette on reference side
- > Automatic cuvettes change over at defined time intervals
- > Electronic thermostat – set temperature between +20°C to +40°C
- > Includes magnetic stirrer (and fleas)
- > Requires water circulated cooling (tubing included)



6-Cuvette Holder / Changer (without Electronic Temperature Control)

Designed for mounting up to 6 standard 10mm cuvettes without temperature control and stirring

- > 6 cuvettes on sample beam side + 1 cuvette on reference side
- > Automatic cuvettes change over at defined time intervals



Micro-cuvette Holder

Designed for measuring micro-volumes with 50 μl micro-cuvette

- > Wavelength range: 220 to 880nm
- > Noise level: $\sim 0.001\text{Abs}$ (with 50 μl volumes)



Micro-cuvettes (50 μl)

Suitable for use in the micro-cuvette holder

- > Made from quartz



Auto Sample Sipper (without Temperature Control)

Designed for rapid measurement of multiple or large amounts of sample without manual washing or changing of cuvettes. The sample is sipped from an external tube directly into the sipper's integrated cuvette and automatically measured. The sample can also be recovered post-measurement.

- > Minimum sample volume: 0.7ml
- > Wavelength range: 190nm – 900nm
- > Carryover: $\leq 1\%$
- > Sipper cuvette capacity: $\sim 50\mu\text{l}$
- > Optical path length: 10mm



Auto Sample Sipper (with Temperature Control)

The same features as the Auto sipper with electronic temperature control to maintain the flow cuvette section at a constant temperature.

- > Temperature control range: +20°C to +40°C
- > Requires water circulated cooling (tubing included)



Micro Flow Cuvette Holder

Designed for the continuous measurement of trace samples. The sample can be injected directly into the flow cuvette with a syringe or other injection device.

- > Flow cuvette capacity: 70 μl
- > Pressure tolerance: Max. 0.1Mpa
- > Optical path length: 10mm
- > Teflon tubing provided



Glass Sample Holder

Designed for measuring the transmittance / absorbance of glass samples or filters.

- > Glass sample thickness: 0.5mm to 5mm
- > Glass sample dimensions: Min. 12x25mm to Max. 55x100mm



Film Sample Holder

Designed for measuring the transmittance / absorbance of thin film-like samples.

- > Film sample dimensions: 25mm (W). 30 to 50mm (H)
- > Beam aperture: 10mm(W) x 20mm (H)



Low And High Temperature Thermostat Cell Holder

The dual temperature-controlled cuvette holders mounted on posts, one is used for the sample and the other for the reference. Designed for mounting up to 2 standard 10mm cuvettes with temperature control and stirring. Each has a thermoelectric (Peltier) device mounted to one side of the tower for temperature control.

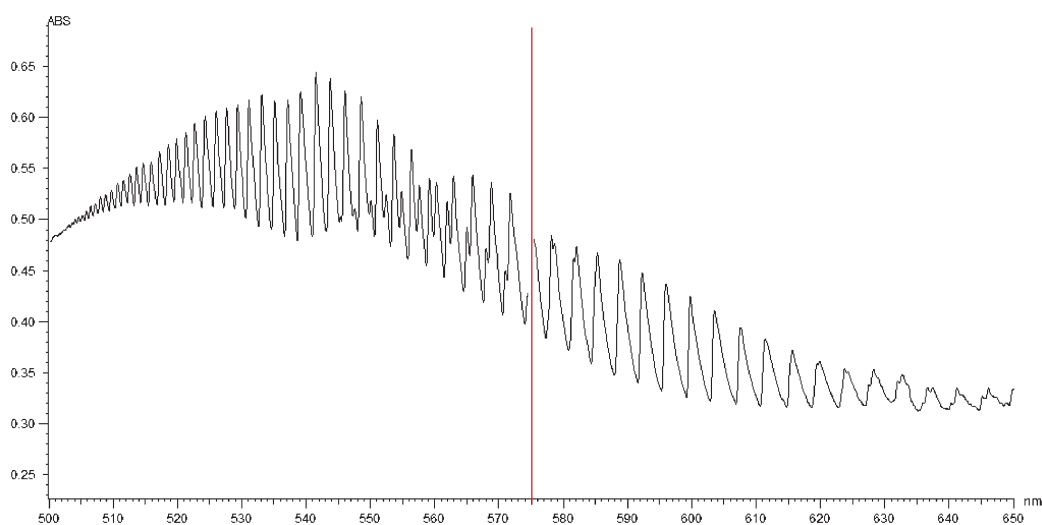


- > Each holder holds standard 10 x 10 mm cuvette with outside dimensions of 12.5 x 12.5mm
- > Electronic thermostat—set temperature between -20°C to +110 °C
- > Includes magnetic stirrer and the speed is 400 to 2000 rpm
- > Requires water circulated cooling

High Spectral Resolution

High spectral resolution measurement can be achieved with Halo DB-30 Spectrophotometer.

- > Bandwidth: 0.1nm
- > Sample: Iodine vapor



Fiber Optic Adaptor

With the fiber optic adaptor, remote sample or online measurement can be measured easily. The adaptor can fit into the standard cell holder and just connect the fiber optic probe to the adaptor, without the hassle on the fibre optic connection.



Integrating Sphere

Designed for measuring high absorbance or solid samples

- > Sphere diameter: 60mm
- > Wavelength range: 220 to 850nm
- > Incidence angle: 0 deg (sample); 8 deg(reference)
- > Sample size: 25 x 25mm(Reflectance); 25mm (Transmittance)
- > Noise level : 0.002 Abs

HALO DB-30 SPECIFICATIONS	
Optics	Diffraction grating / Double beam
Wavelength Range	190nm - 900nm
Spectral Bandwidth	Selectable: 0.1nm, 0.2nm, 0.5nm, 1.0nm, 2.0nm, 5.0nm
Stray Light	≤0.010%T (220nm NaI, 340nm NaNO ₂)
Wavelength Accuracy	±0.3nm
Wavelength Repeatability	±0.1nm
Setting Wavelength	0.01nm increments
Photometric Accuracy (NIST 930D filter)	±0.002Abs (0~0.5Abs)
	±0.004Abs (0.5~1Abs)
	±0.008Abs (1~2Abs)
	±0.3% T
Photometric Repeatability (NIST 930D filter)	±0.001Abs (0~0.5Abs)
	±0.002Abs (0.5~1Abs)
	±0.004Abs (1~2Abs)
	±0.15% T
Measurement Modes	Abs, %T, Conc. E(S), E(R)
Photometric Range	Absorbance: -4 to +5
	%T: 0% to 600%T
	Conc: -9,999 ~ +9,999
	E(S), E(R): 0 ~ 600
Wavelength Scan Speed	Selectable: 1; 5; 20; 120; 300; 1,000; 1,600; 2,000 nm/minute
Wavelength Slew Speed	3,000nm/min.
Baseline Flatness	±0.001Abs (200~850 nm)
Baseline Stability	0.0004 Abs/hr (500nm, after 2 hours)
Noise Level	±0.0003 Abs (500nm)
Light Source	Tungsten-Halogen and Deuterium Lamps
Light Source Switching	Automatic switching, selectable from 325nm to 370nm
Detector	Photomultiplier
Instrument Control	PC with Windows® XP or Windows® 7 operating system
Dimensions	710(W) x 630(D) x 268(H) mm
Net Weight / Gross Weight	50kg / 56kg
Power Requirements	110-220V AC (50/60Hz), 300VA

Halo DB-30 Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DB-30 UV-Visible Double Beam Spectrophotometer 220V AC, 50/60Hz with UV Detective Software	DB-20-220
Rectangular Long-Path Cuvette Holder	DB-20-RLPH
Cylindrical Long-Path Cuvette Holder	DB-20-CLPH
Thermostatic Cuvette Holder (includes Tubing)	DB-20-TCH
Manual 5-Cuvette Holder/Changer	DB-20-FCC
Auto 6-Cuvette Holder/Changer with Temperature Control and Stirrer	DB-20-SCCT
Auto 6-Cuvette Holder/Changer without Temperature Control and Stirrer	DB-20-SCC
Micro-cuvette Holder	DB-20-MCH
Micro-cuvette - quartz: 50µl / 10mm Optical Pathlength	MC-50
Auto Sample Sipper with Temperature Control	DB-20-SST
Auto Sample Sipper without Temperature Control	DB-20-SS
Micro Flow Cuvette Holder	DB-20-MFH
Glass Sample Holder	DB-20-GSH
Film Sample Holder	DB-20-FSH

Basics of UV-VIS Spectroscopy

UV-VIS Spectroscopy is one of the most common and useful technique in qualitative and quantitative analysis of certain chemical, physical-chemical, material and biological properties in laboratory.

The basics of the UV-VIS spectroscopy is to choose one particular wavelength from a board band light source to pass through the sample. Part of the light irradiate onto the sample is absorbed by the sample. The transmitted light is than received by a detector. The amount of light absorbed is the difference of the intensity of the incident light and the transmitted light. It is usually expressed in transmittance or absorbance. In most biological study, the terms optical density (OD) is used instead of absorbance.

Below are the definition of the Transmittance, Absorbance and Optical Density.

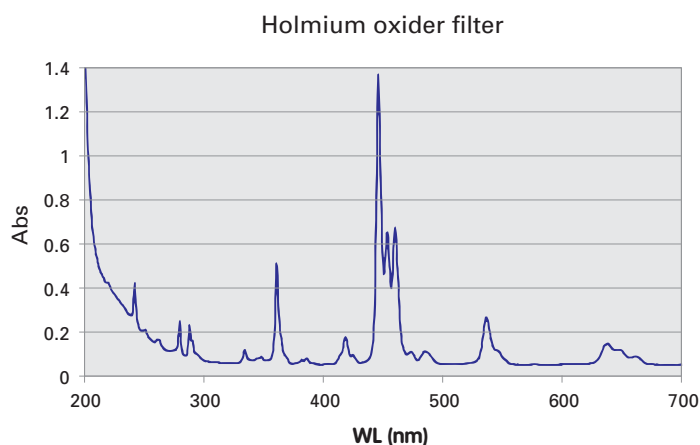
Transmittance, $\%T = (\frac{I}{I_0}) \times 100\%$

Absorbance or Abs, $A = -\log T$

Optical Density, $OD = -\log T$

An UV-VIS spectrum is usually obtained by changing the wavelength from UV to Visible region and obtain the transmittance or absorbance at each wavelength. Depends on the applications, the spectrum usually can tell the identity of a material, the transparence of a glass material, the color of a material or the efficiency of a material blocking the UV from the Sun.

A typical UV-VIS spectrum is shown below.



The amount of certain analytes present in solution can also be determined by relating the absorbance to the concentration. This is the famous Beer's Law described as below.

$$A = \epsilon / c$$

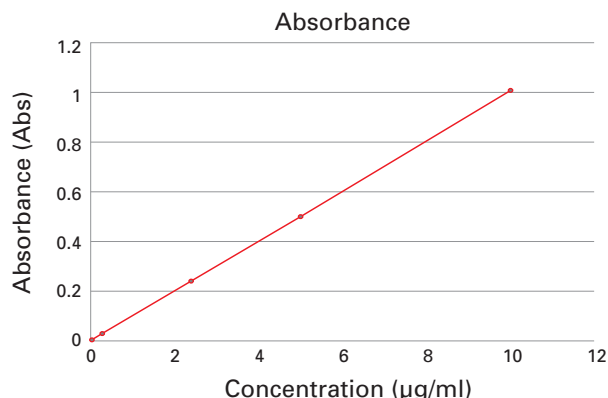
Where

ϵ = Absorptivity, or sometimes called extinction coefficient

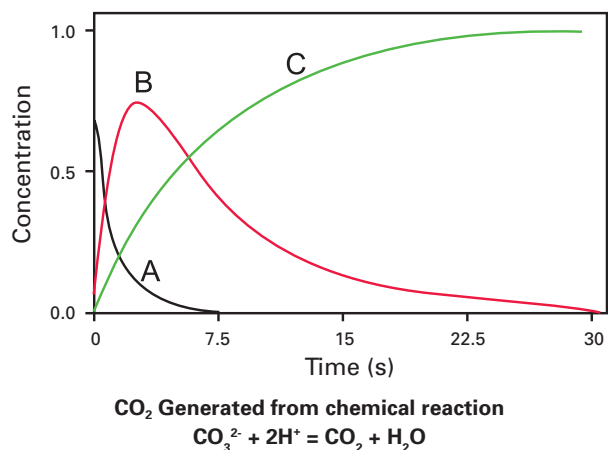
l = Pathlength, usually in mm

c = concentration of the analyte

Below is a graph showing the linear relation of Absorbance and Concentration as specified in Beer's Law



The change of absorbance or optical density against time is measured to study the rate of chemical reaction or the kinetics of an enzyme. Below shows the change of concentration, hence the absorbance of reactant, intermediate and product over time.



The UV-VIS Spectrophotometer instrument is usually constructed with the below components

1. A board band light source, such as D2 lamp, Tungsten lamp or Xenon lamp
2. A monochromator to select the wavelength
3. A sample holder to hold the sample
4. A detector to collect the light transmitted
5. A signal processor
6. A Screen with Keypad or Personal computer to control the instrument and analyze the data
7. Output device such as printer or external data storage device

Depends on the application requirements, different types of optical configuration are commercially available. Common UV-Vis spectrophotometers are classified as single beam, ratio beam, double beam, variable slit width and CCD based instrument.

Dynamica is offering almost all of the above instruments which will fit different challenging applications.



Halo DNAmaster

Microvolume Nucleic Acids And Proteins Measurement

The Halo DNAmaster complements the existing range of Halo spectrophotometers and plate readers. It is designed for the measurement and analysis of precious samples by requiring only microvolume quantities. Naturally, DNAmaster features the same ruggedness, reliability, precision and reproducibility synonymous with the Halo family. The Halo DNAmaster is equipped with a comprehensive selection of on-board functions for versatility and suitability to many life science applications involving nucleic acid, proteins and bacterial cultures.

Spectral Features

The Halo DNAmaster boasts a wavelength range from 200 to 900nm, an absorbance range between 0 - 4 O.D. and a wavelength accuracy of 1nm. Low noise (~ 0.005 O.D.)

combined with a photometric accuracy of ± 0.01 O.D. and 4nm bandwidth ensure excellent sensitivity, accuracy and reproducibility.

Minimal Volume for Precious Samples

By virtue of the innovative 'Ultramicro' cell as little as 0.5 μ l of sample is required (optional cap is needed). Simply pipette the sample on the appropriate section of the Ultramicro cell, perform the measurement and then wipe off or aspirate the sample for further downstream applications.

If microvolume measurement is not a must, the Halo DNAmaster is also available configured with 50 μ l cells. However, both configurations can be used as a conventional spectrophotometer with standard 10mm optical path length cuvettes.



User Friendly Operation and Information Rich LCD Display

The 90mm x 120 mm, colour LCD screen is touch sensitive with intuitively designed software for quick selection by sample type. Effortless step by step navigation and a virtual QWERTY keyboard provide fast and efficient input and analysis. Data is displayed numerically and also in a graphical format (where applicable) with the further option of direct printing or storage in a SD card. Master Report PC software can convert the settings and results in a report format (Microsoft® Excel is required). UV detective PC software is available for controlling the DNAmaster via PC

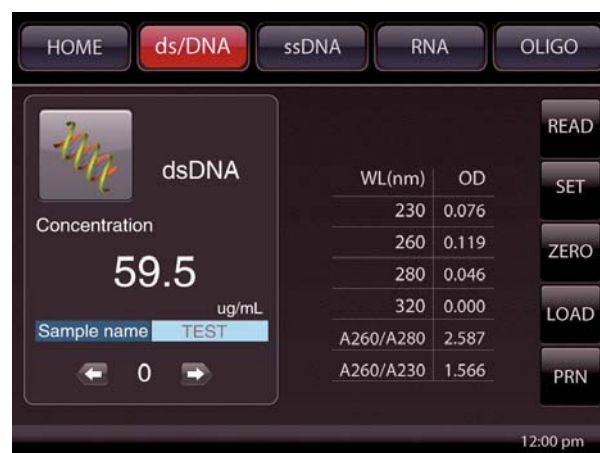


Nucleic Acid Analysis

The Halo DNAmaster is configured with onboard functions for the quantification of nucleic acids. Select the nucleic acid of choice such as double stranded DNA, single stranded DNA, RNA or oligonucleotides and absorbance measurements at the prescribed wavelength are directly converted into concentration units. The detection limit of the Halo DNAmaster is 6ng/μl (double stranded DNA), with optional 2mm cap of ultramicro cell.

The purity of nucleic acids can also be determined from ratio calculations such as A260 / A280 nm for protein contamination of DNA preparations.

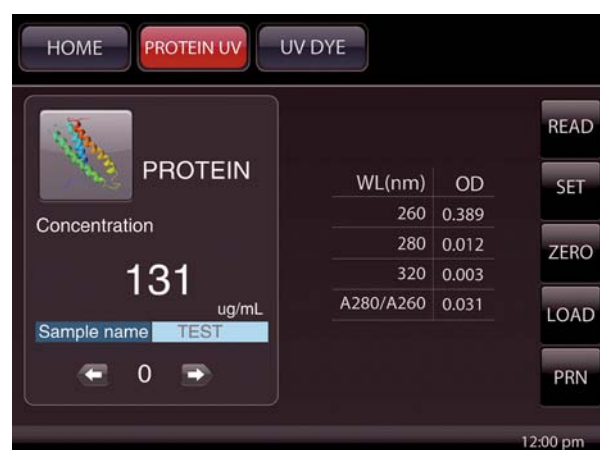
Furthermore, The Halo DNAmaster can measure concentrations DNA, RNA and oligonucleotide – dye complexes.



Protein Analysis

The Halo DNAmaster measures protein concentrations from a range of colourimetric assays such as Bradford, Lowry, Biuret and BCA. In addition to numerical data the standard calibration curve can be displayed.

Furthermore, measure protein alone at 280nm or protein-dye complexes that absorb at different wavelength.



Cell Culture Optical Density

The Halo DNAmaster also measures bacterial cell density at 600nm. Absorbance readings of approximately 0.4 units define a bacterial culture in exponential growth phase and at the most appropriate for harvest or induction.



Conventional Spectrophotometry

At the touch of the screen the Halo DNAmaster converts into a conventional spectrophotometer for use with either the Ultramicro cell or a standard 10mm optical path length quartz or glass cuvette. It can perform single wavelength photometry in either absorbance or % transmittance mode including multiple wavelength photometry for up to 6 user defined wavelengths in absorbance mode.

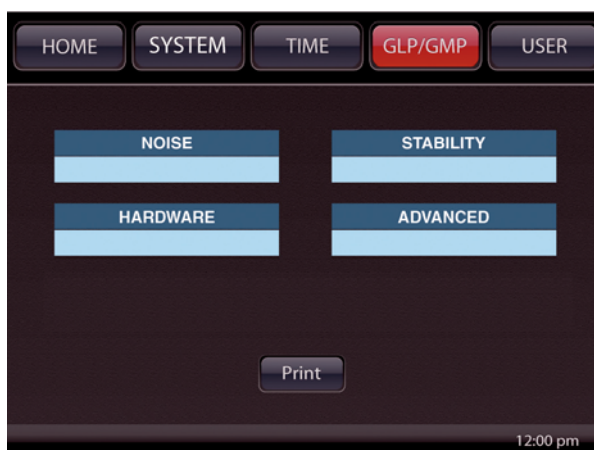
Other functions include wavelength scans, time scans for kinetic studies and concentration calculations from standard curves.



Validation Functions

To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo DNAmaster is switched on including a selectable GLP/GMP function.

(Validation kit is required in some parameter.)



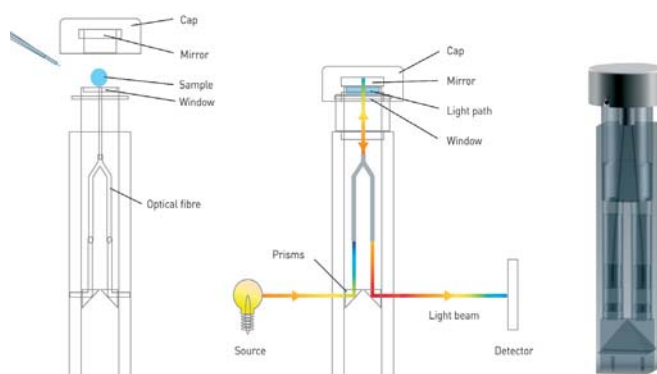
Thoughtful Design

Dynamica considered every detail in the design of Halo DNAmaster, for example, the cuvette holder can be removed for washing and it is autoclavable for decontamination. Furthermore, a cover protects both the cuvette holder and the detector from dust and dirt when the unit is not in use. The side mounted cuvette rack is detachable for easy cleaning and a smaller footprint if bench space is at a premium.



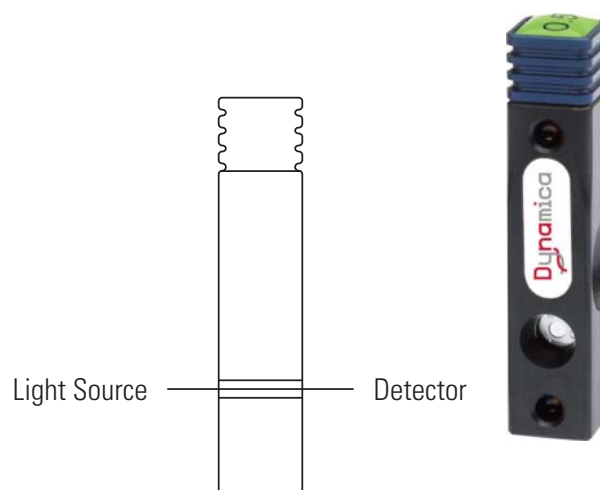
Ultramicro Cell

The Ultramicro cell utilises fibre-optic technology and is designed for measurement of extremely small volumes of DNA/RNA samples with high accuracy and reproducibility. In applications involving very high or very low DNA concentrations, a single light path is often insufficient, however the interchangeable cap of the Ultramicro cell imparts light paths of 1 mm and 0.2 mm respectively and effectively creates virtual dilutions to overcome such situations. Other pathlengths are available for different volume and concentration limit. The cap can also prevent the sample from drying up and ensure that measurements remain reproducible since sample characteristics can be affected by solvent evaporation.



Ultramicro Cell II

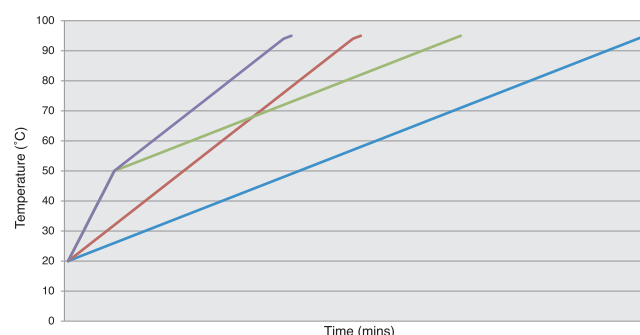
The Ultramicro cell II (UMII) uses advanced precision micro-machining techniques and materials to produce a high energy optical system which ensures that sufficient energy is available to measure low volume samples accurately and reproducibly across a wide absorbance range. The UMII is available in 3 pathlengths for direct analysis of sample volumes of less than 2.5µl (down to 0.6µl) for life science applications. The UMII design utilizes a magnetic closure mechanism to facilitate rapid filling/emptying plus easy cleaning of the cell and to prevent carryover. It has a simple optical transmission path for high energy throughput enabling minimal reduction in baseline



Programmable Temperature Control Model

The DNAmaster temperature control model utilizes a Peltier regulated cell holder to control the sample temperature from a range of 20°C to 95°C (with $\pm 0.5^\circ\text{C}$ precision). Predominantly designed for the determination of nucleic acid T_m (at 260nm) up to 4 heating profiles can be selected, including 1°C/min, 2°C/min or a quick heat mode for heating up to a plateau temperature of 50°C at 5°C/min before ramping commences at 1°C/min or 2°C/min.

The heated cell holder can also be used in other applications requiring incubation and/or keeping a sample at a constant temperature for example during kinetic analyses.



DNAMASTER SPECIFICATIONS	
Lamp Source	Long Life Xenon Flash Lamp
Detector Device	2048 pixel CCD
Wavelength Range	200-900nm
Measuring Range	0-4.0 OD
Wavelength Accuracy	+/-1nm
Bandwidth	4nm
Noise	~0.005 OD (RMS)
Drift	~0.005 OD
Photometric Accuracy	+/-0.01 OD
Photometric Repeatability	+/-0.005 OD
Stray Light	0.5%T
Ultramicro Cell dsDNA Detection Limit (Depends on the Cap Used)	13ng/μl (Standard cap) 6ng/μl (Optional cap)
Ultramicro Cell Minimum Sample Volume (Depends on the Cap Used)	0.7μl (Standard cap) 0.5μl (Optional cap)
Start Up Melodies	Selectable from 7 types and mute
Energy Saving Mode	Yes
Memory Storage	Internal or SD card
Result Storage	40,000 (internal) Unlimited (SD Card)
User Defined Program Storage	10 for each function
Dimension W x D x H (mm)	300 x 300 x 115 300 x 300 x 155 (TC model)
Weight (kg)	3.5kg 4.5kg (TC model)
Power Requirement	110 - 220 V, 50/60Hz

Quantification of dsDNA with Different Ultramicro Cell Cap

	Factor	2 mm cap	1 mm cap	0.2 mm cap	0.1 mm cap	Total Detection Range
dsDNA [ng/μl]	50	6 - 425	13 - 850	63 - 4250	125 - 8500	6 - 8500
Required Sample Volume		6 - 10 μl	3 - 5 μl	0.7 to 4 μl	0.5 to 3 μl	

Quantification of dsDNA of different UMII

	UMII125	UMII200	UMII500
Pathlength	0.125mm	0.2mm	0.5mm
Minimum sample volume	0.6μl	1.0μl	2.5μl
dsDNA (ng / μl)	7.1 - 12,000	3.0 - 9,000	1.2 - 3,500

Halo DNAmaster Ordering Information

PRODUCT	CATALOG NUMBER#
Halo DNAmaster 200nm-900nm with 50μl microvolume cell 100-230V, 50 / 60Hz	DNAM
Halo DNAmaster 200nm-900nm with ultramicro cell (0.2mm & 1mm cap included)	DNAM-UM
Halo DNAmaster 200nm-900nm temperature control model	DNAM-TC
Compact thermal printer for DNAmaster	DNAM-PRINT
Ultramicrocell with 1mm and 0.2mm cap	ULTRACELL
2mm cap for DNAmaster ultramicro cell	2MM CAP
1mm cap for DNAmaster ultramicro cell	1MM CAP
0.2mm cap for DNAmaster ultramicro cell	0.2MM CAP
0.1mm cap for DNAmaster ultramicro cell	0.1MM CAP
Ultramicro cell II 0.125mm pathlength include bubble viewer	UMII125
Ultramicro cell II 0.2mm pathlength include bubble viewer	UMII200
Ultramicro cell II 0.5mm pathlength include bubble viewer	UMII500
UV Detective for DNAmaster	UVDS-08-05



Halo BIOmaster

Spectrophotometer for Life

Halo BIOmaster allows measurement of nucleic acid concentrations and purity (using ratio function) including protein concentrations. As a high quality spectrophotometer, the Biomaster features touch screen operation packaged as a lightweight system with a compact footprint for life science and education related applications.

Life Science Programs

Halo BIOmaster contains onboard functions for the quantification of nucleic acid, including dsDNA, ssDNA, RNA and Oligonucleotides. The purity of the nucleic acid can also be determined with the ratio A260/A280 calculation. Protein concentrations can be measured from a range of colourimetric assays such as Bradford, Lowry, Biuret and BCA. Standard calibration data and curves can also be displayed. Furthermore, proteins can be quantified at 280nm.

Bacterial cell density at 600nm can also be measured under the OD600 cell culture optical density function. It can define a bacterial culture in exponential growth phase and at the most appropriate time for harvest or induction.

Compact Optics with Full Range Scanning

The single beam optics are compact resulting in significant bench space saving. The long life Xenon lamp optics system in the Biomaster ensures quick and reliable performance.

Color Touch Screen Operation

The intuitive color touch screen provides simple access to an extensive range of function. The touch screen is sensitive to stylus or hands (with and without gloves). Icon driven on board software improves accessibility and the quick action keys are another convenience feature.

Various Measurement Modes

In addition to the Lifescience program, BIOmaster also features conventional spectrophotometer functions such as single/ multiple wavelength analysis, spectrum scanning, kinetics and concentration measurement.

Optional Accessories

A various selection of accessories include: microcell holder, flow cell with sipper, temperature control holder, long path-length cuvette holder and an automatic multiple cell changer is available to enhance different application needs.

Storage and Data Output

External storage with SD card allows data export to PC in compatible text or spreadsheet format. MasterReport software is available to convert the raw data to an organized data table. Method and result storage is almost unlimited by exchanging the SD card when needed. A printer option is available for direct printing of data and / or graphics. Advanced control, analyses and reporting can be performed with the optional UV Detective software installed on a computer.

Validation Function

To ensure optimum instrument performance, self diagnosis functions are executed with the GLP/GMP wizard for performance validation and auditing.



BIOmaster SPECIFICATIONS	
Wavelength Range	190 to 1000nm
Resolution	1nm
Spectral Bandwidth	5nm±1nm
Transmittance Accuracy	±1% T
Transmittance Repeatability	0.50% T
Detection Limit Concentration	dsDNA 1.5 - 100µg/ml (for 100µg cell)
Noise	0.004A at 0A at 250nm
Stray Light	<0.5% T at 220nm, 340nm, 360nm
Wavelength Accuracy	±2nm
Wavelength Repeatability	1nm
Absorbance	-0.3 to 1.999
Transmittance	0 to 199.9%
Spectrum Scanning	Yes
Concentration	-300 to 1999
Memory	SD card storage
Quantitation	-300 to 1999
Time Scan Display	Graphical and calculated concentration value
Wavelength Scan Analysis	Absorbance and wavelength of peaks and valleys
GLP	Time and date display Self diagnosis
Standard Accessories	Microcell holder and 100µl micro cell

Halo BIOmaster Ordering Information

PRODUCT	CATALOG NUMBER#
Halo BIOmaster Life Science Spectrophotometer with 100µg micro cell	BIOM
Test Tube Holder (Tube Diameter : 9-22mm; Height 70-150mm)	XB-10-TTH
Conventional 10mm Cell Holder	XB-10-CCH
Sample Sipper (with 150µl flow cell)	XB-10-SS
Temperature Control Holder (20- 40°C)	XB-10-TCH
Rectangular Long Pathlength Cell Holder (for 10, 20,30, 40, 50, 100mm)	XB-10-RLPH
Automatic 5 Cell Changer	XB-10-A5C
Flow Cell Holder (with 150µl flow cell)	XB-10-FCH
UV detective for XB-10 / VIS-20	UVDS-08-05
Compact Thermal Printer	XB-10-PRINT



100µl Micro Cell



Long Pathlength
Cell Holder



Temperature Controlled
Holder



Conventional 10mm
Cell Holder



Sample Sipper



Auto 5 Cell
Changer



Flow Cell
Holder



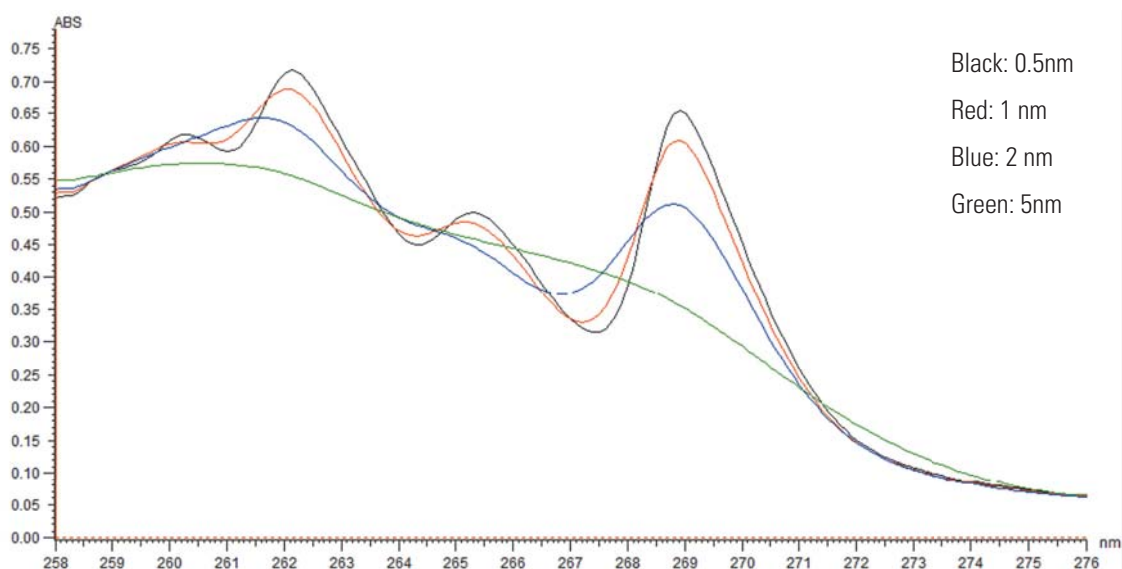
Test Tube
Holder



Compact Thermal
Printer

The Power of Spectral Resolution

Spectral resolution is defined as the ability of an instrument to differentiate between two adjacent wavelengths. It is different from the "wavelength resolution" in the specification of most spectrophotometer which is a display or selection resolution of the wavelength. Instrument with better instrument spectral bandwidth usually gives better spectral resolution and thus better wavelength and absorbance accuracy.



The figure shows that at slit width 5nm, all the peaks cannot be resolved. As the slit width getting smaller from 2nm, then 1nm and down to 0.5nm, more peaks appear as the resolution getting better.

Due to smaller the slit width, higher resolution reduces light throughput entering the detector and cause lower sensitivity. Depending the application, careful choice of the instrument spectral bandwidth is required to obtain optimized resolution and sensitivity.

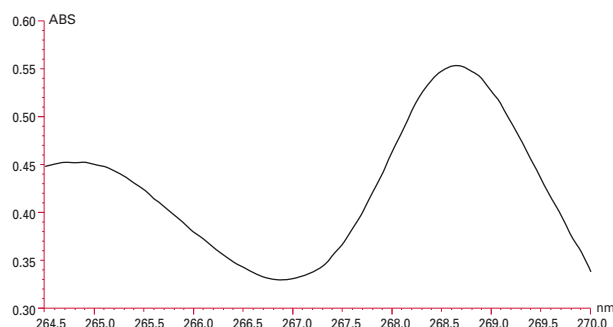
Dynamica is offering full range of the instruments with slit width ranges from 8nm to 0.1nm.

Slit width	8	5	4	2	1.5	1.0	0.5	0.2	0.1
Applicable model		DB-30		DB-30		DB-30	DB-30	DB-30	DB-30
	VIS-20	XB-10	DNAmaster	RB-10	DB-20	DB-20S			
				SB-10		DB-20R			

Application

Application in pharmaceuticals

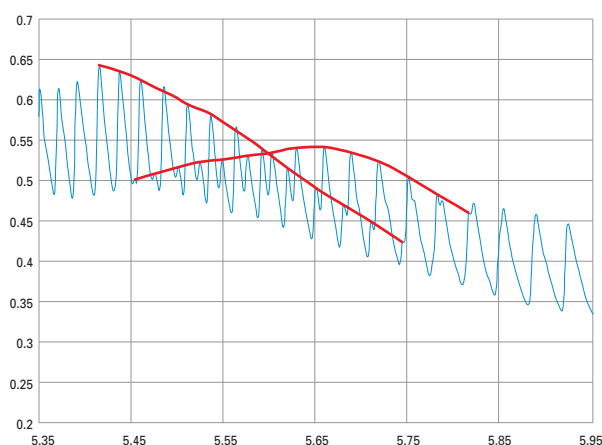
For pharmaceutical applications, it is required to have instrument spectral resolution better than 1.5nm. Halo DB-20 is thus the most suitable instrument for such application.



The European Pharmacopeia requires that the maximum/minimum ratio obtained by measuring 0.02% (v/v) solution of toluene in hexane shall be 1.5 or larger. Above shows the result is 1.6 obtained by DB-20 which is better than requirement.

Study of iodine vapor absorption

In a study of the absorption of certain vapor, such as iodine, the electronic and vibrational spectral can be shown with detail with spectrophotometer having spectral bandwidth better than 0.2nm.



Above is a spectrum of the iodine vapor measured by Halo DB-30 with slit width 0.1nm. High sensitivity PMT detector is used in Halo DB-30 to cope with the lower signal level at such high resolution measurement.

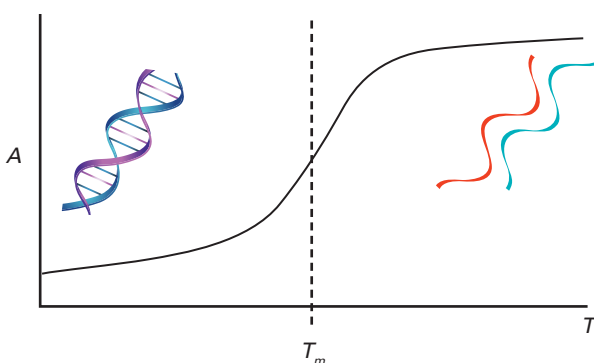
Study of DNA molecule

Study of the DNA and other nucleic acids are very common nowadays. DNA Sequencing is one of the most powerful technique in the life science research. DNA quantification is one of the key step to ensure adequate amount of DNA to be used for various sequencing technique after extraction and amplification.

DNA molecule is comprised of two deoxyribonucleic acid chains and twist together by hydrogen bonding in double helix configuration.

Each deoxyribonucleic acid chain is composed of a combination of 4 kinds of the bases name Adenine (A), Thymine (T), Cytosine (C) and Guanine (G). The helix strand is formed via hydrogen bonding of the corresponding base pair (A-T) and (C-G). The bases absorb UV light at 260nm and this is the basis of DNA quantification.

In practice, the measured absorbance of DNA is usually less than the theoretical value due to the hydrogen bonding changing the electronic environment. If heated is applied to the DNA double strand, the hydrogen bonding will break and usually the absorbance increases as the double strands start to break as temperature increases and the term melting is used to referring to this process. The melting temperature (T_m) is referring to the midpoint of the temperature range that the DNA melting occurs. As G-C pair consists of 3 hydrogen bonds, the melting point usually higher if DNA having higher percentage of G-C pairs. The measured T_m can be a basis to estimate the percentage of A-T and G-C percentage of a DNA molecule.



Due to the limited amount of DNA available in biological sample and the vast number of sample throughput, the spectrophotometer required for DNA quantification need to be able to handle ultratrace sample amount with high sensitivity and very fast measurement. Most conventional spectrophotometers do not meet all above requirements in single instruments. A new approach is deployed by Dynamica Halo DNAmaster which is constructed with a high energy xenon lamp, an ultratrace cell to handle sub-microliter level of sample and a high performance CCD to achieve simultaneous measurement and high sensitivity.

In addition to conventional constant temperature application such as enzymatic activity, Halo DNAmaster with temperature control is also able to measure DNA melting temperature (T_m).

Halo BIOmaster is the sister instrument of DNAmaster for less sample throughput and larger (100 μ l) sample amount.

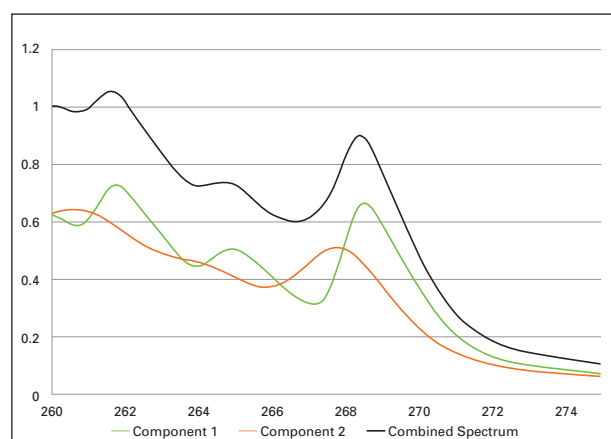
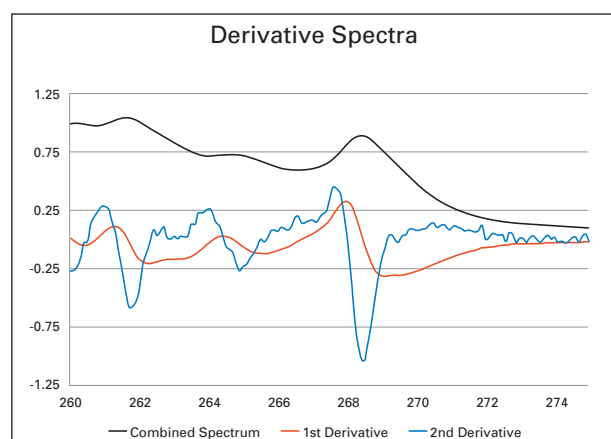
Derivative Spectroscopy

Derivative spectroscopy is a very powerful technique for post processing and analysis in spectroscopic study. It can be used to differentiate two overlapping peaks and to reduce certain interference due to scattering, matrix effect or other unwanted absorbance material.

If happen two peaks too closed and appears as a single peak, the derivatives may tell us it is composed of two individual peaks instead.

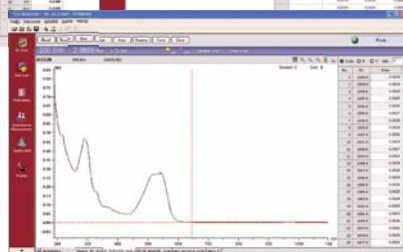
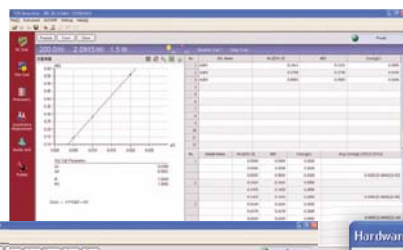
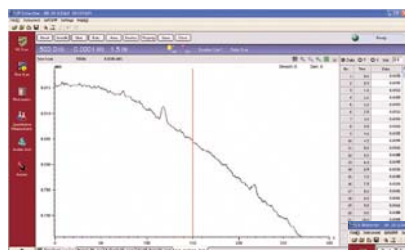
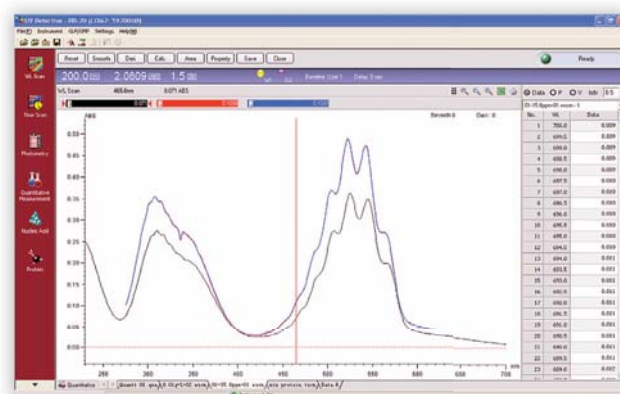
Interference from scattering is sometimes annoying and is difficult to get rid of by sample pre-treatment. The scattering interference can be reduced by taking the derivative approach.

2 components cannot be resolved in normal spectrum analysis but it can be resolved by derivative spectrum. 2 peaks are clearly seen in the above 2nd derivative spectrum.

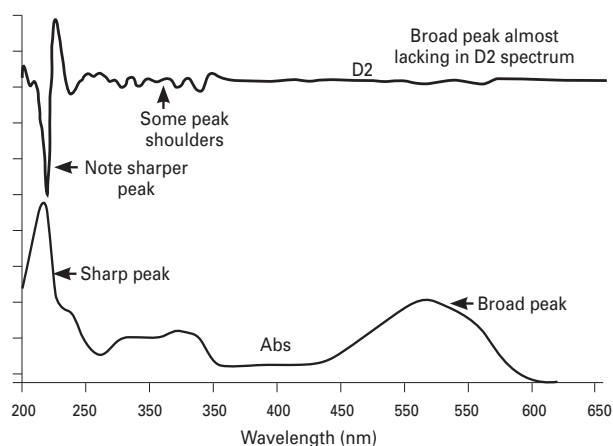


Halo UV Detective Software

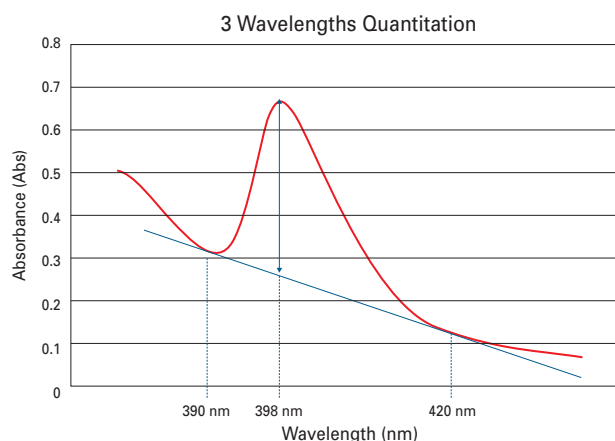
UV Detective is powerful, user friendly software specifically designed for the control (and data processing) of selected Halo spectrophotometers from computers installed with the Windows® XP or Windows® 7 operating system. The versatile UV Detective can control all spectrophotometer operations such as photometry, wavelength scans, time scans and more. Further functions include storage of methods programs, saving of numerical and graphical data, downstream data processing, data transfer to commercial spreadsheets such as Microsoft® Excel and report generation.



Advanced Function of UV Detective Software



UV Detective has built-in function to perform derivation on spectrum. This is a powerful tools to analyze complex spectrum, such as biological samples.



For absorption peak with slope baseline, UV Detective can perform accurate calculation using the 3 wavelengths

Compatible Spectrophotometers	Halo XB-10, VIS-20, RB-10, DB-20, DB-20S, DNAmaster, BIOmaster (optional) Halo DB-20R, DB-30 (standard)
Control Functions	Wavelength setting, auto-zero, auto calibration, optical path calibration, accessories such as 6-cuvette positioner and sipper
Measurement Conditions	Start-up, setting, output and storage of measurement parameters
Measurement Function	Wavelength scan, time scan, quantitative analysis, multi-spectrum measurement, kinetic analysis, concentration measurement, nucleic acid / protein measurements
Data Output	Display of spectra, data and scans (time and spectrum)
Quantitative Methods	Multi-wavelength, input of constant, standard curve calibration (linear, quadratic, cubic and segment)
Data Processing	Integral, derivative, flatness, calculation (spectrum and constant), kinetic

Halo UV Detective Software Ordering Information

PRODUCT	CATALOG NUMBER#
UV Detective Software for RB-10 / DB-20 Series / XB-10 / VIS-20 / DNAmaster / BIOmaster	UVDS-08-01

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Halo LED 96

Microplate Reader



HALO LED 96 is a computer controlled microplate reader for 96 well plates. Easy and safe operation removes the hassle from your daily microplate reading jobs. It is based on the most modern LED technology, no need to worry about lamp replacements anymore.

LED Technology

Instead of lamps and filters, HALO LED 96 is supplied with up to 6 intelligent, wavelength specific LED-plugins (patent pending). Each plugin contains its own digital ID, LED-light source, filter and lenses in one easily exchangeable component.

Low Power Consumption

In times like these, low power consumption must be a key issue with any electrical devices. With a maximum consumption of 12W during reading and a standby consumption of not more than 2W, HALO LED 96 again is setting new standards.

Unrivalled Optical Performance

Using LED's as light source moves all those known problems with halogen lamps used in other readers to history. Modern LED's are known for their high and extremely stable light energy paired with very low energy consumption and no heat development.

Intelligent LED Plugins

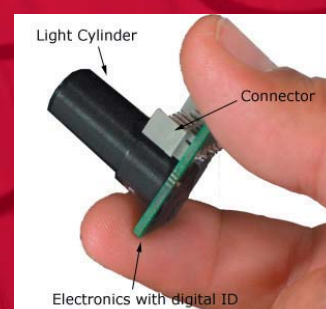
Adding new wavelengths (e.g. 340nm) or exchanging existing ones is as easy and safe as 1-2-3. Auto-recognition of the individual plugins takes away the worry about filter positions in the reader.

Computer Controlled

HALO LED 96 is fully computer control-led. 96 (included) allows plate reading and collecting the raw OD data from the reader. With its clipboard function, it allows raw data to be pasted into any spreadsheet program for further calculations.

MikroWin2010 Compliant

In combination with MikroWin2010 data reduction software (optional), HALO LED 96 adapts itself to any of your requirements for microplate based assays. Depending on your package selection, MikroWin2010 is the best choice for routine applications as well as extended screening, curvefit and kinetic studies.



HALO LED 96 SPECIFICATIONS	
Plate Types	96 well
Optical System	8 channel transmission photometer
Light Source	Digital controlled LED lamps, wavelength specific
Photodetector	8 silicon photodiodes
Wavelength Range	340 - 750nm (special wavelengths up to 900nm)
Resolution	0.1 mOD (0.0001 OD)
Indication Range	0.000 - 4.000 OD (Abs)
Accuracy	better than $\pm 1\%$ and ± 0.005 OD up to 2.5 OD (any wavelength)
Linearity	$\leq \pm 0.5\%$ and ± 0.005 OD from 0.1 to 1.5 OD (any wavelength) $\leq \pm 0.75\%$ from 1.5 to 2.5 OD (400nm – 750nm) $\leq \pm 0.75\%$ and ± 0.005 OD from 0.1 to 2 OD (340 - 400 nm)
Reproducibility	better than $\leq \pm 0.3\%$ at 1OD (any wavelength) better than $\leq \pm 0.5\%$ at 2OD (400-750nm)
Measurement Mode	Single and dual wavelength Linear scan (30 points/well) for agglutination etc.
Reading Speed	5 seconds (kinetic interval, single wavelength) 10 seconds (96 well, dual wavelength)
Wavelengths	4 wavelengths onboard (405, 450, 492, 620nm) up to 6 possible (340 - 750)
Shaking	4 speeds
PC-Interface	USB 2.0 (USB 1.1 compatible)
PC Software	Capture96 included MikroWin2010 demo version included
Dimensions	23cm x 12cm x 36cm (W x H x L)
Weight	6.7 kg net
Housing	Anodized Aluminium
Power Supply	external power adapter 100-240V, 50 or 60 Hz (autosensing), 24VDC, 2.5A (approved to EN 60601-1-2, EN 61000-6-3, EN 61000-6-1, EN 60601-1, EN 60950)
Scope of Supply	Power adapter, USB Cable, 4 Standard Filters, User manual (CD), Capture96 Control Software, MikroWin2010 Connect (demo version)

Halo LED 96 Ordering Information

PRODUCT	CATALOG NUMBER#
HALO LED 96 Microplate Reader	WR-302-02
LED plugin (xxx = wavelength in nm)	WR-302-xxx
MikroWin2010 Lite	MikroLite
MikroWin2010 Full Version (Screening & Curve Fit & Kinetic)	MikroFullV1

For more information on MikroWin2010 and its features, please visit www.mikrotek.de



CORONA MTP-601F

Automatic Fluorescence Microplate Reader

The MTP-601F is a reliable and high sensitive PMT based automatic fluorometer. It's ideal for a wide range of fluorescence-based ELISA and measurements including cytokines, growth factors, cytosolic Ca^{2+} , proteases and DNase.

Self-Diagnosis Function

Reminder for Lamp Replacement: The usage and life-span of the halogen lamp is automatically monitored. The user will be prompted to replace the lamp when the usage exceeds the standard life-span of the lamp.

Low Maintenance Cost: The price of halogen lamp is less than 10% of a Xenon lamp without compromising the sensitivity.

Auto-Alignment Function

Enable the use of microplates from different manufacturers without compromising the result accuracy.

A versatile instrument that is capable of making minor adjustment according the microplate parameters provided by the manufacturer for precise measurement. The instrument is preset to use with the Greiner's F-bottom microplate. Additional 5 microplate formats can be added upon user preference.

High Sensitivity

MTP-601F is equipped with a high sensitive photomultiplier tube (R928), which enables the detection of fluorescein as low as 2×10^{-11} mol/l.

Shaking

- > 2 shaking modes : orbital or linear
- > 3 different shaking speeds
- > 3 different durations : 5, 10 or 20 seconds

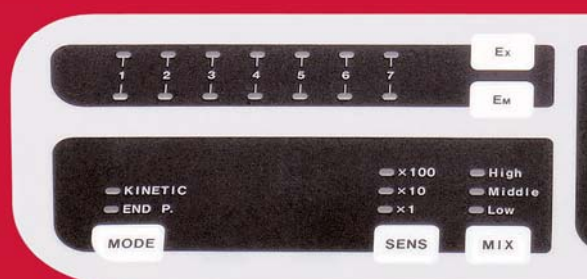
User-Friendly On- Board Control Panel

The keypads on the main unit enables the scrolling and direct display of operating conditions on the LED.

MODE: Endpoint/Kinetic

SENS: Sensitivity range

MIX: Shaking duration



CORONA MTP-601F SPECIFICATIONS	
Plate formats	96 well plate (flat bottom, black) (Greiner#781076 recommended)
Measurement direction	Vertical and Horizontal
Measurement	Digital controlled LED lamps, wavelength specific
Detection mode	Fluorescence
Measurement principle	End point / Kinetic measurement
Sensitivity	2×10^{-11} mol / Fluorescein
Interference Filter	Excitation:490nm
	Emission:530nm
Wavelength range	Excitation:340nm-710nm
	Emission:400-750nm
Shaking mode	Rotational / linear, 3 step speeds
	Time: 5s, 10s and 20s
Detection interval and number of measurement	Maximum 999 seconds; 99 times
Detection time	Min 60 seconds/96-well plate
Light source	Halogen lamp
Detector	Photomultiplier Tube -R928

Japan Medical cert no.08BZ0089

For proper operation, follow the instruction manual when using the instrument.

STANDARD ACCESSORY	
Main unit-MTP 601F	1
Fuse(3A)	1
Screwdriver(M3)	1
Data processing software(PC compatible)	1
KF2000PCC(window 98/2000/Me/xP compatible) CD-ROM	1
Vinyl cover	1
Power cord	1
Instruction manual	1

The standard interference filter (Ex 490 nm, Em 530 nm) in the package can be replaced by any other filter if it is not required by the user.





The HALO Range

UV-VISIBLE AND VISIBLE SPECTROPHOTOMETERS

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