

Dynamica

A Brand of
Precisa Gravimetrics AG
Switzerland



The HALO Range

UV-VISIBLE AND VISIBLE SPECTROPHOTOMETERS

Dynamica sets the new benchmark for laboratory instrumentation. Utilizing Dynamica's extensive experience in marketing and manufacturing, the range of precision laboratory instrumentation is built tough to withstand the demands of the modern laboratory environment, day after day, year after year without compromise.

Furthermore, Dynamica instrumentation is designed for versatility and flexibility to maximize performance efficiency in the contemporary and multifaceted laboratory environment.

The Halo range of bench top UV-Visible and Visible spectrophotometers deliver the precision and reproducibility of advanced optics and electronics for essential quantitative analyses covering a broad range of scientific disciplines. They are further enhanced with a comprehensive range of on-board functions and features, user friendliness, rugged reliability and an extensive range of accessories to fulfill even the most demanding applications.

Dynamica supplies the innovation, you supply the inspiration.

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.

| | |
|-------------------------------|---|
| Compatible Spectrophotometers | Halo RB-10 (optional), Halo DB-20/DB-20S (optional), Halo 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 |

Ordering Information

| PRODUCT | CATALOG NUMBER# |
|-----------------------|-----------------|
| UV Detective Software | UVDS-08-01 |

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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 even during simple applications thus resulting in data inaccuracy. By contrast, ratio beam optics compensate and stabilize any 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 the 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 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 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. Furthermore a dual lamp system results in higher accuracy than corresponding xenon lamps. 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. 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, 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 on a computer with Windows® XP or Windows® 7 operating system.

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.

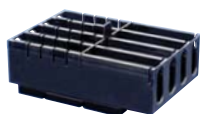


RB-10 Accessories

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: $\sim 50\mu\text{l}$
- > 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 | $\leq 0.05\%$ (220nm NaI, 340nm NaNO ₂) |
| Wavelength Accuracy | $\pm 0.5\text{nm}$ |
| Photometric Range | Absorbance: -3 to +3 |
| | %T: 0% to 300% |
| Wavelength Scan Speed | Concentration: 0,000 to 9,999 |
| | 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 |

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 50 μl / 10mm optical path length | RB-10-MC-50 |
| Sample Sipper | RB-10-SS |
| UV Detective Software | UVDS-08-01 |



Halo DB-20/DB-20S

UV / Visible Double Beam Spectrophotometer

The Halo DB-20 is a high performance double beam spectrophotometer suitable for many analytical applications where 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. 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.

User Friendly Operation and Information Rich LCD Display

The extra large 190mm x 138mm, 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. Simply connect a standard laser printer for direct printouts of data and graphs. 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 on a 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)

DB-20/DB-20S 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 50µl micro-cuvette

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



Micro-cuvettes

Suitable for use in the micro-cuvette holder

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



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: ≤ 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: 70µl
- > 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: 25mm (W), 30 to 50mm (H)
- > Beam aperture: 10mm(W) x 20mm (H)

| HALO DB-20 / DB-20S SPECIFICATIONS | DB-20 | DB-20S |
|--|---|--|
| 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 | ±0.3 nm | |
| Wavelength Repeatability | ±0.1 nm | |
| Photometric Range | Absorbance: -3 to +3 %T: 0% to 300%T Concentration: 0.000 to 9,999 | |
| Photometric Accuracy (NIST 930 filter) | ±0.002 Abs (0-0.5 Abs) ±0.004 Abs (0.5-1 Abs) ±0.008 Abs (1-2 Abs) ±0.3%T | |
| Photometric Repeatability (NIST 930 filter) | ±0.001 Abs (0-0.5 Abs) ±0.002 Abs (0.5-1 Abs) ±0.004 Abs (1-2 Abs) ±0.15%T | |
| Wavelength Scan Speed | 10, 100, 200, 400, 800, 1,200, 2,400, 3,600 nm/minute | |
| Measurement Mode | Abs, %T, Concentration | |
| Baseline Flatness | ±0.002 Abs (200-950 nm) | |
| 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 | |
| Dimensions | 505(W) x 590(D) x 265(H) mm | |
| Net Weight/ Gross Weight | 29Kg/ 35Kg | |
| Power Requirements | 110 - 220 V selectable, 50/60Hz | |

DB-20/DB-20S 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 |
| 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 path length* | 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



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.

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%T. 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 at even 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 2 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

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

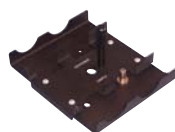
Designed for low concentration or low absorbance samples



- > 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: $\pm 0.3^{\circ}\text{C}$
- > 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)

6-Cuvette Holder / Changer (without electronic temperature control):

Designed for mounting up to 6 standard 10mm cuvettes without 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



Micro-cuvette Holder

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

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



Micro-cuvettes

Suitable for use in the micro-cuvette holder

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

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: 70µl
- > 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)

| HALO DB-30 SPECIFICATIONS | |
|--|---|
| Optics | Diffraction grating / Double Beam |
| Wavelength Range | 190nm - 900nm |
| Spectral Bandwidth | Selectable: 0.1nm, 0.2nm, 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 | 50Kg |
| Gross Weight | 56Kg |
| Power Requirements | 110-220V AC (50/60Hz), 300VA |

DB-30 Ordering Information

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



Halo VIS-10

Visible Spectrophotometer

Designed for reliability and value, the Halo VIS-10 combines full scanning capability with excellent resolution applicable to a wide range of routine and advanced procedures in the visible spectrum.

Optimum Optical Performance

The advanced single beam system utilizes a concave diffraction grating monochromator requiring fewer mirrors thus ensuring a shorter optical path and resulting in fewer aberrations and brighter optics (further enhanced with the high energy, long life halogen tungsten lamp). The outcome is greater compactness complemented with increased efficiency and reliability. The silicon photodiode detector commonly utilized in more advanced models also provides superior sensitivity. Furthermore a convex lens focuses the light beam and is especially useful for smaller volume samples.

Spectral Features

The spectral bandpass of 5nm ensures optimum performance with excellent spectra and peak resolution.

Other specifications include a wavelength accuracy of $\pm 1\text{nm}$, noise level 0.5% T (500nm, 100%T) and stray light $\leq 0.5\%$ (360nm NaNO₂).

Built-in and Diverse Range of Measurement Modes

Photometry Mode. Perform quantitative analyses in either absorbance or transmittance modes. Select from single wavelength and set up calibration curves with up to 8 standards for concentration measurements.

Wavelength scan: Perform a full spectral scan from 330 to 999nm at a selectable scan speed ranging from a high resolving 60nm/minute up to a quick 800nm /minute. Data is displayed as either numerical values or a graphical spectrum in either absorbance or transmittance modes.

User friendly operation and information rich LCD display

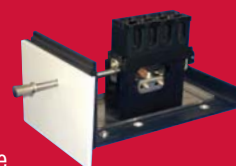
The 89mm, backlit LCD screen with adjustable brightness control is sufficiently large to display a large array of data even in a graphical format. Data and spectra are also displayed in real time. The seamless and chemical resistant, keypad is designed with fewer keys for easier and quicker operation and also protects against liquid spills.

Validation Functions

To ensure continued instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo VIS-10 is switched on. Furthermore the Halo VIS-10 is equipped with a built-in self calibration function which checks and verifies wavelength accuracy with a holmium oxide glass filter. The system memory then stores the wavelength scan baseline as a reference spectrum for blank subtraction.

Cuvette Holder and Large Sample Compartment

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. The spacious sample compartment can accept a variety of accessories for various applications including tall test tubes (with optional test tube holder).

VIS-10 Accessories

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 the 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

| HALO VIS-10 SPECIFICATIONS | |
|----------------------------|---|
| Optics | Concave diffraction grating / Single Beam Principle |
| Wavelength Range | 330nm -999 nm |
| Spectral Bandwidth | 5nm |
| Stray Light | 0.5%T (360nm NaNO ₂) |
| Wavelength Accuracy | $\pm 1\text{nm}$ |
| Photometric Range | Absorbance: -0.17 to +2 %T: 0% to 150% |
| Wavelength Scan Speed | 60 - 800 nm/minute |
| Baseline Flatness | $\pm 0.005\text{ Abs}$ |
| Noise Level | 0.2%T (500nm, 0%T) / 0.5%T (500nm, 0%T) |
| Light Source | Tungsten-Halogen Lamp |
| Detector | Silicon Photodiode |
| Display | Back-lit LCD 89(W) x 89(H) mm |
| Dimensions | 400(W) x 360(D) x 180(H) mm |
| Net Weight | 15Kg |
| Gross Weight | 19Kg |
| Power Requirements | AC 110-220V $\pm 10\%$, 50/60Hz |

Ordering Information

| PRODUCT | CATALOG NUMBER# |
|---|-----------------|
| Halo VIS-10 Visible Spectrophotometer 220V $\pm 10\%$, 50/60Hz | VIS-10-220 |
| Rectangular Long-Path Cuvette Holder (holds 4 x cuvettes) | VIS-10-LPH |
| Thermostatic Cuvette Holder with tubing (excludes long-path cuvettes) | VIS-10-TCH |
| Test Tube Holder (includes High Ceiling Cover) | VIS-10-TTH |



Halo SB-10

UV / Visible Single Beam Spectrophotometer

The Halo SB-10 single beam spectrophotometer combines exceptional value with precision spectrophotometry in an uncomplicated package.

Spectral Features

The Halo SB-10 can achieve a 2 nm spectral band pass for superior spectra and peak resolution with its single beam optics.

Other specifications include a wavelength accuracy of $\pm 0.5\text{nm}$, baseline stability $\pm 0.002\text{Abs/hr}$ (500nm) and stray light $\leq 0.05\%T$ (220nm NaI, 340nm NaNO_2).

Photometry

Perform quantitative analyses in either absorbance or transmittance modes and in single wavelengths within a wavelength range of 190-1100nm.

Dual Lamp Advantage

By virtue of the halogen tungsten and deuterium lamps typically found in higher end, analytical spectrophotometers the Halo SB-10s wavelength range is an impressive 190nm – 1,100nm. Furthermore a dual lamp system results in higher accuracy than corresponding xenon lamps. Lamp switching is automatic (by default at 340nm) and both lamps are long life.

Validation Functions

To ensure optimum instrument performance, a self-diagnostic function incorporating a number of parameters is executed each time the Halo SB-10 is switched on. Furthermore the internal memory can store up to 200 calibration curve data.

Stand alone or PC Operation

The SB-10 is easy to use in stand alone

mode. For advance function including multiple wavelength analysis, spectrum scanning and DNA/protein analysis, the optional UV detective for SB-10 can be installed on a computer to control the SB-10 and extend its function further.

4 Sample Cuvette Holder

A 4 cuvette capacity holder is supplied as standard. Measurement can be expedited by inserting the 4 cuvettes in tandem and manually sliding the holder forwards or backwards to select the appropriate cuvette for measurement.

| HALO SB-10 SPECIFICATIONS | |
|---------------------------|--|
| Optics | Single Beam Principle |
| Wavelength Range | 190nm -1,100 nm |
| Spectral Bandwidth | 2nm |
| Measurement Modes | Abs, %T, E(S) |
| Stray Light | <0.05% (220nm NaI, 340nm NaNO ₂) |
| Wavelength Accuracy | ±0.5nm |
| Photometric Range | Absorbance: -3 to +3 %T: 0% to 300% |
| Baseline Stability | ±0.002 Abs/hr (500nm) |
| Light Source | Tungsten-Halogen and Deuterium Lamps |
| Light Source Switching | Automatic switching at 340nm |
| Display | Back-lit LCD 94(W) x 70(H) mm |
| Dimensions | 470(W) x 370(D) x 180(H) mm |
| Net Weight | 20Kg |
| Gross Weight | 25Kg |
| Power Requirements | 220 V selectable, 50/60Hz |

SB-10 Ordering Information

| PRODUCT | CATALOG NUMBER# |
|--|-----------------|
| Halo SB-10 UV-Visible Single Beam Spectrophotometer 220 V, 50/60Hz | SB-10-220 |
| UV Detective for SB-10 | UVDS-SB-10 |





The HALO Range

UV-VISIBLE AND VISIBLE SPECTROPHOTOMETERS

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