Multiplelabs
Turnkey Laboratories Solutions

Analytical®
Technologies Limited

MMR-3942

Multimode Microplate Reader

EPCC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

An ISO 9001 Certified Company

www.analyticalgroup.net

The "More-Value-For-Money" Reader –with monochromator technology

With ATL S the successful multi-technology microplate reader platform has been extended in its modu- larity, performance and user-friendliness by adding additional reading technologies and a double monochromator for wavelength selection.

- Monochromator Technology
- UV/VIS FRET
- High-sensitivity Luminescence
- Time resolved Fluorescence (TRF)
- BRET
- Time Resolved FRET (TR-FRET / HTRF®)
- UV/VIS Absorbance
- Fluorescence Polarization
- UV/VIS Fluorescence

The ATL (S) series is a perfect fit for life sciences research. It has been developed to support a fully modular approach. Any combination of reading technologies and options can be composed maintaining all possibili ties of later upgrades.

Versatility and User-Friendliness

Choice of reagent injectors:

The ATL (S) can be equipped with up to 3 JET injectors with variable volumes. Up to two injectors can be installed in measurement position, e.g. for flash luminescence measurements with highest sensitivity. Additionally, two injectors positions are available in pre-position, making the ATL (S) ready to meet the requirements for multiple assays formats.

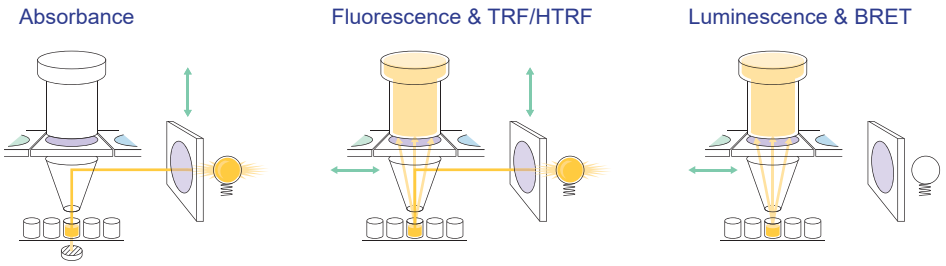
Ergonomic design and front access:

All operations such as plate loading, filter change and reagent connections are accessible from the front. Reagent vials can be stored in the front of the instrument, providing easy access and visibility. A removable trough can be filled with water or ice to keep reagents cooled.Different reagent tube holders are available to ensure secure handling of valuable reagents.

ONE-4-ALL optics

The registered optical system ONE-4-ALL combines the stability and user-friendliness of a multimodal optical system with the sensitivity and versatility of dedicated optical devices.The system proves its superior performance for all applications where highest sensitivity, reliability and cross-talk reduction is of key importance.The ONE-4-ALL optical design offers the highest intrinsic security – as the correct device is always inserted and selected – and the highest lifetime – as there are no moving parts.

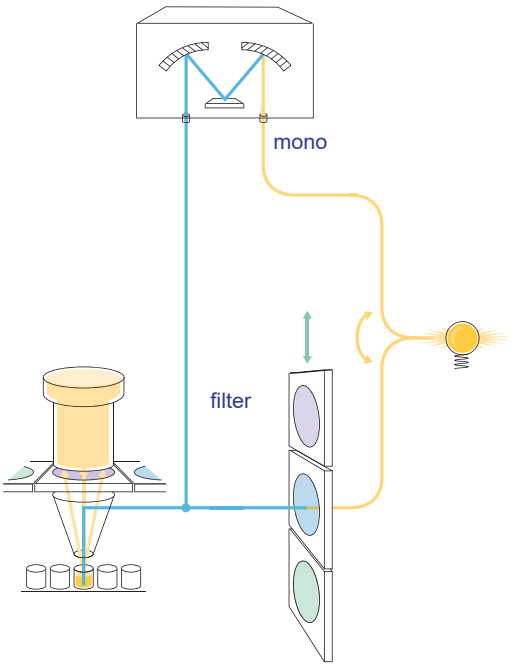
The established system has been optimized in the new ATL S, now featuring a high performance Xenon flash lamp as a central light source and additional pathways for monochromator and filter options.



Monochromator Technology

Flexibility in wavelength selection for any current and future assay requirements is best met by the ATL S double-monochromator with high transmission and best blocking properties for absorbance and fluorescence excitation. Use the benefits of complete absorbance and excitation spectral scans to measure wavelength shifts due to e.g. changes in pH or polarity on the chromophore's properties.

The monochromator is equipped with software controlled continuous bandwidth variation to optimize the instrument for the specific demands of different assay requirements.

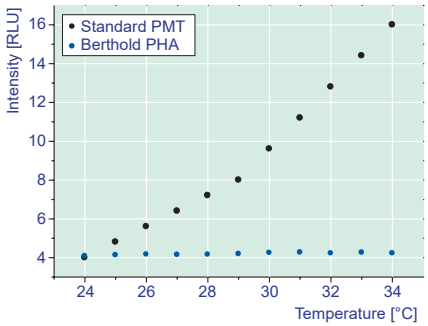


Filter Technology

Due to their high transmission characteristics – which can be up to 25-fold that of monochromators – technologies like Time-Resolved Fluorescence (TRF) can be measured more efficiently with filters. In addition filters are available with wide bandwidths making them the ideal choice for fluorophores with wide spectra and for all luminescence based assays requiring the use of filters, e.g. ChromaGlo™, BRET and BRET².

Due to the quick change of filters, tolerant to any wavelength diffe- rence, this technology is the ideal device for fast ratiometric measure- ments common in Fura 2 Calcium monitoring. Up to 40 different excitation and emission filters can be easily mounted on exchangeable filter carriers.

Detectors



The ATL S-series is equipped with a high-sensitivity UV-extended photodiode for absorbance measurements and a low noise photomultiplier (PMT) for luminescence and fluorescence applications.

Dual Mode PMT Detector Optimized Detection for Any Assay:

The variety of measurement techniques requires different operation modes of the photomultiplier for optimal performance.The ATL S features a novel dual mode detector technology that automatically chooses between single photon counting and analogue operation.

Noise Free Fluorescence Read-out with Pulse Height Analysis (PHA):

The patent pending pulse-height-analysis detection mode operates almost background-free (dark count rate reduced by factor of 100).Temperature effects are significantly reduced and even at elevated temperatures, often required for cell-based assays, the dark count rate increases only marginally.

When Every Photon Counts:
The single photon counting mode is automatically selected for best sensitivity in luminescence, BRET, TRF and TR-FRET/HTRF studies. A dynamic range spanning 7 orders of magnitude is achieved without the need of any adjustments for maximum convenience and security.

All PMTs are subject to a stringent pre-selection process to guarantee low noise, high detection efficiencies and unmatched stabilities. Optionally available PMTs with an extended wavelength range up to 850nm cover the demands of near-infrared dyes.

Sensitivity

Low Level Detection.The revolutionary dual-mode detector guarantees the best sensitivity combined with a low and stable background for every measuring mode. In combination with the optimized ONE-4-All optical design this is the major parameter for best performance in a measurement device enabling detection of extremely low amounts of analyte.

- Less than 5 amol Europium (TRF)
- Less than 200 amol Fluorescein (Fluorescence)
- Less than 6 amol ATP (Luminescence)

Save Money and Time.The high sensitivity provides additional benefits, even when detecting the lowest signal levels is not the key to an assay. In these cases the consumption of expensive reagents or valuable cells can be greatly reduced. Similarly, you can significantly reduce the reading time per sample and save valuable total operation time.

ICE-Softwaret

Wizard Guidance:Instrument Control and Evaluation software has been designed with the requirements of today's researchers in mind: Wizard Guidance guarantees ease of use during protocol, creation, measurement and data export has been achieved with the wizard-guided and clearly structured ICE software package.

Intuitive Dialogues and Displays:starting a measurement, displaying results and exporting data is straight-forward due to clearly structured screen and intuitive dialogs.During routine operation you simply select the required protocol, load the microplate and start the measurement – as easy as this!

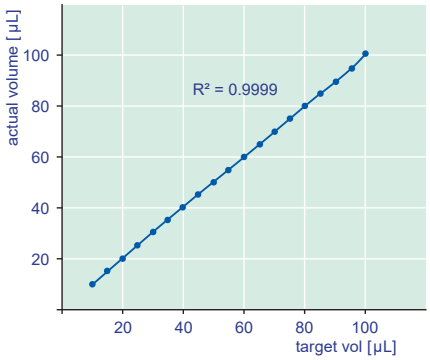
Measurement and Operation Modes:Due to the manifold of settings and freely configurable combinations of operation sequences the ICE software package is as flexible as your research is. A protocol file can be well adjusted to the respective needs of an assay:

- Single Endpoint
- Multiple Endpoint
- Repeated (long term kinetics)
- Spectral Scanning
- Shaking
- Ratio Endpoint
- Delay
- Kinetics
- Scanning

Report and Export: For documentation and sharing of results data can be exported in CSV- or XLS-file format with multiple selection options, as well as the choice of an individual file- directory per measurement-protocol.

JET Injectorst

Berthold Technologies JET injectors use Teflon bellows for accurate and fast injections even for smallest injections volumes, and guarantee most efficient mixing as well as extreme longevity.



- Accuracy and precision of better than 98%over the entire volume range
- Frinctionless operation for extended lifetime
- Cell-friendly materials and negli gible shear forces enable injection of cell suspensions, e.g. in Aequorin-based calcium assays
- Sophisticated Prime mode reduces reagentconsumption while ensuring homogeneous, gas-free fillin

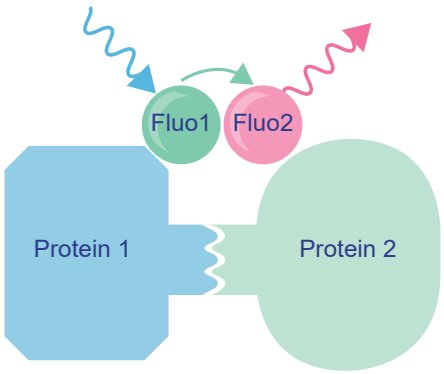
Interaction Assayst

The ATL S is the ideal instrument for molecular interaction studies in variuous assays formats.

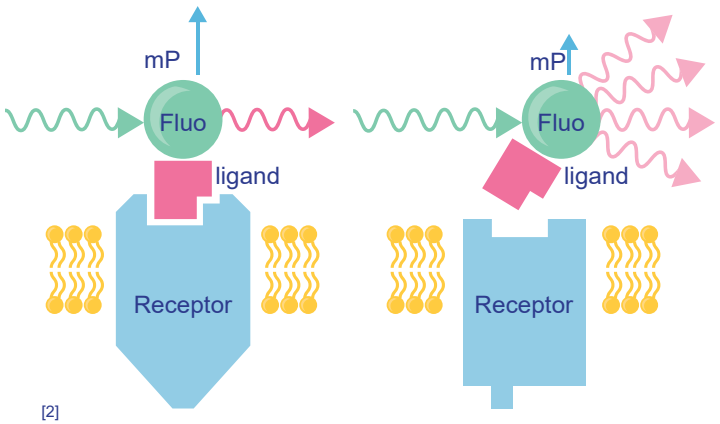
TR-FRET/HTRF®:[1]

The TR-FRET/HTRF® assay format facilitates the identification of molecular interactions with highest sensitivity.The technology uses the non-radiative fluorescence resonance energy transfer (FRET) between a donor and an acceptor dye, which occurs, when the two chromophores come in close proximity to monitor molecular interactions of respectively labeled interaction partners. While the ATL S offers this standard FRET-approach the TR-FRET/HTRF® option even enhances the sensitivity of these studies, by combining the FRET-technology with time-resolved fluorescence read-out of FRET-acceptors with long fluorescence lifetimes in the range of hundreds of microseconds.

After excitation of the donor with a short light-pulse, the acceptor emission is recorded after a tuneable time-delay of 50-300µs. This way, exclusively the acceptor emission is recorded and potential background emission with decay time constants in the nanosecond time regime is effectively suppressed and the pure interaction FRET-signal is detected without any external disturbances.



[1]



[2]

Fluorescence Polarization (FP): [2]

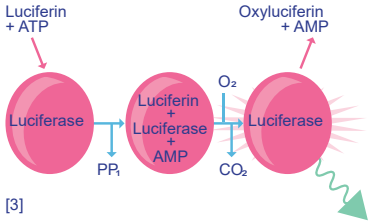
The FP approach is the method of choice for molecular interaction analysis when only one interaction partner can be fluorescently labelled. FP uses the size dependence of molecular rotational diffusion to analyse binding events. Due to rotational diffusion, linear polarized excitation light undergoes depolarization due to the rotation of the labelled molecule during the excited state lifetime of the chromophore.

Once a molecular interaction takes place, the overall size of the labelled molecule increases, causing the rotational diffusion to decelerate. This effect can be detected as a higher degree of polarization of the flu-orescence light. FP-based assays require labelling of only one interaction partner and are therefore highly versatile and suited for many types of interaction analyses.

Applications

Reporter Gene Assay[3]

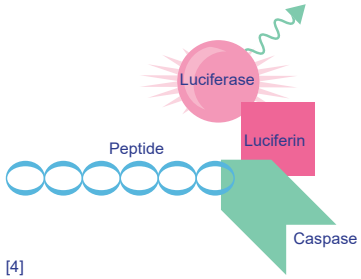
In basic research of gene regulation as well as in drug discovery the use of luciferases, s-glucuronidases, s-galactosidases and secreted alkaline phosphatases as well as GFP has become a standard tool. Due to the high sensitivity and the possibility to use filters in the ONE-4-ALL optics even colour luciferase reporter genes assay can be measured sensitively.



[3]

Caspase Assays[4]

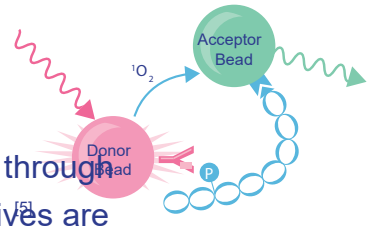
Monitoring the activity of caspases – a group of cysteine-aspartic acid peptidases – is a key method in apoptosis research. The assays are designed around specific peptide substrates for Caspase 3, 7, 8, and 9 respectively which will be cleaved when caspases are present.



[4]

Kinase Assays[5]

The luciferase reaction can be used as well for monitoring kinases through a coupled reaction correlated by the amount of ATP. Other alternatives are being offered for HTRF® , Fluorescence Polarization and Alpha technology.



[5]

Detection Mode / Assay	ATP Measurement	Binding Assays	Ca^{++}Monitoring	Caspase	Cell Proliferation	Cell Viability	Cyclic AMP	Cytokine Quantification	Cytotoxicity	DNA/RNA Quantification	Dual Reporter Gene	Enzyme Activities	GPCRs with ß-arrestin	Immunoassay / ELISA	IP1	Kinase	Protease	Protein – Protein Interactions	Protein Quantification	Reactive Oxygen Species (ROS)	Receptor – Ligand Binding	Receptor Dimerisation	Reporter Gene	SNPs	Spectral Scanning
Absorbance / Colorimetric				•	•	•	•	•	•	•		•		•		•	•		•	•			•		•
BRET / BRET²				•									•			•	•	•			•	•			
Luminescence	•			•	•	•	•	•	•	•	•	•		•		•	•		•	•			•		•
Luminescence Flash with Injection	•		•		•	•			•		•	•		•						•			•		
Fluorescence			•	•		•	•	•		•		•		•		•	•		•	•	•		•	•	•
Fluorescence Flash with Injection			•									•								•					
FRET		•		•			•						•				•	•			•	•			
TRF		•					•	•	•					•		•					•				
HTRF®		•					•							•	•	•	•	•			•	•			
Fluorescence Polarisation		•					•							•		•					•			•	
Fluorescence Polarisation Flash with Injection		•										•									•				

GPCR Monitoring[6]

Especially in the field of G-protein coupled receptor research the BRET technology offers the opportunity to establish a homogeneous and universal functional assay.

Calcium Assays

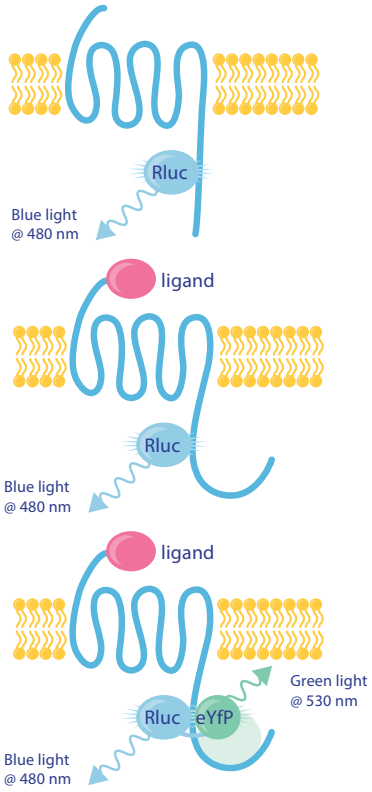
Intracellular Ca++ levels are important indicators for the functioning of ion channels and G-protein coupled receptors as well as for the phases of apoptosis and cell injury. Aequorin and Fura 2 have become established detection agents.

DNA Quantification

The use of specific fluorescent labels provides lowest detection limits and widest dynamic range whereas the UV method offers label-free detection by direct excitation of DNA-emission.

Protein Quantification

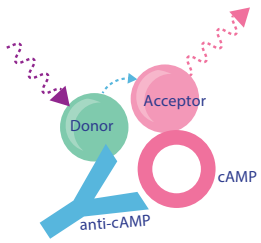
Traditional absorbance-based Lowry and Bradford methods are as well suited as fluorescent labels and the label-free UV measurement.



[6]

Second Messengers: IP1 and cAMP[7]

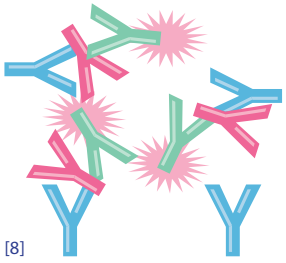
Typically, after agonist binding GPCRs trigger downstream responses via the cAMP or the Phosphoinositol pathways.Both can be monitored with HTRF® or Alpha® technologies or, using Epac, a FRET-based approach may be taken.



[7]

Cytotoxicity and Cell Viability

Resazurin-based assays can be read in absorbance or in fluorescence mode whereas assays can also be established for the sensitive luminescence readout using Firefly reaction to determine cell viability via the ATP content.


[8]

ELISAs and Immunoassays[8]

Horse radish peroxidases and phosphatases can be used with colorigenic,luminogenic or fluorogenic substrates.Using a luminescent substrate the sensitivity can be increased up to a 100-fold.

… and many other biochemical and cellular applications.

Quality Control

Berthold Technologies offers easy-to-use test devices and standardized operational procedures to monitor the proof of functionality and performance of the ATL S.

Luminescence Test Plate

The solid state test plate for luminescence is the easiest, quickest and most reliable way to periodically check the performance of an instrument. The test plate can be applied to monitor the instrument's

- efficiency
- accuracy
- reproducibility
- mechanical positioning
- crosstalk

An annual check-up and calibration of the test plate ensures its consistency.

Absorbance Test Plate

The absorbance test plate can be used over a wide range of wavelengths from UV to VIS. It can be applied to check the instrument's

- accuracy
- reproducibility
- mechanical positioning

The test plate can be submitted to periodical checks.

Luminescence Performance Kit

With the QC luminescence performance kit (consisting of two controls and two different detection reagents) the ATL S luminescence performance can be checked. It is an alternative to the test plate and an ideal quality control method as both injection and detection system can be monitored. The flash type luminescence reaction provides results within seconds.

IQ and PQ Services

The test plates as well as the kit are part of the IQ and PQ services available through Berthold Technologies engineers. All reading technologies will be checked during these services with the reagents or means appropriate.

Order Information

ATL

- ATL base unit incl. ICE software : 57947
- ATL Absorbance module (VIS) : 57950
- ATL Fluorescence module (VIS) : 57949
- ATL Luminescence module : 57948
- Temperature Control : 57613
- Cooled PMT detector : 50835
- Gas connection : 55408

JET Reagent Injectors

- Injector #1, pre-position : 54116-11
- Injector #2, reading position : 54116-12A
- Injector #2, pre-position (T^2S only) : 54116-12B
- Injector #3, reading position : 54116-13
- Mount for reagent vials : 58267
- Cleanit Daily, injector cleaning solution : 45218

Quality Control

- Luminescence QC test plate : 40105-10
- Luminescence QC performance test kit : 55101
- Absorbance QC test plate : 50895-10

Adapters

- Adapter for 15 mm microplates with lid : 59815
- Cuvette adapter : 62930
- Petri dish adapter Falcon 35 & 60mm : 42047
- Petri dish adapter Nunc 35 & 60mm : 39362
- Adapter for Terasaki plates : 39363

Microplates

- Microplates 96 well, white : 23300
- Microplates 96 well, black : 23302
- Microplates 96 well, white, cell culture : 51838
- Microplates 96 well, black, cell culture : 51839
- Microplates 96 well, white, clear bottom, cell culture : 24910
- Microplates, 96 well, black, clear bottom, cell culture : 38840

ATL S

- ATL S base unit incl. ICE software : 61457
- ATL S Absorbance module (UV/VIS) : 62770
- ATL S Fluorescence module (UV/VIS) : 62769
- ATL S Luminescence module : 62768
- ATL S TRF module : 62771
- ATL S TR-FRET/HTRF® module : 62772
- ATL S FP (FITC) : 63546
- Temperature Control : 62762
- Cooled PMT detector : 61434
- Monochromator (excitation) : 62027
- µPlate G0.5 (2 – 4 µL volume) : 62751

Filter Packages

- BRET/BRET² package : 39350
- BRET "High Efficiency" package : 53431
- BRET² "High Efficiency" package : 53432
- nanoBRET package : 63140
- Chroma-Glo package : 62751

Performance Qualification Services

- PQ Luminescence : 55319
- PQ Absorbance VIS : 55321
- PQ Absorbance UV : 55376
- PQ Fluorescence : 55325
- PQ Time-Resolved Fluorescence : 55374

Software

- ICE upgrade to Advanced version : 53615-02
- Mikrowin 2010 Lite : 37854-204
- Mikrowin 2010 Advanced II : 37854-206

Microplates

- Microplates 96 well, black w/ white wells : 55008
- Microplates 96 well, white, clear bottom : 60705
- Microplates, 96 well, black, clear bottom : 60706
- Microplates 24 well, white, clear bottom, cell culture : 41081
- Microplates, 24 well, black, clear bottom, cell culture : 41082
- Microplates 384, white : 32505

	ATL	ATL S
Detection Unit	Low-noise photomultiplier tube in single photon counting mode, usable spectral range 380 – 650 nm Photo diode, spectral range 200 – 1000 nm	Low-noise photomultiplier tube in dual mode, spectral range 280 – 650 nm Photo diode, spectral range 200 – 1000 nm
Excitation Source	Halogen lamp, spectral range 340 – 1000 nm	Xenon flash lamp, spectral range 200 – 1000 nm
Wavelength Selection	High quality interference filters	Double monochromator 3D design F number 2.7 (high transmission) Variable bandwidth 4 – 22 nm Increment 1 nm Blocking 10-6 Stray light 10 High quality interference filters
Measurement Technologies	Luminescence BRET, BRET² Fluorescence (top) FRET Absorbance Vis	Luminescence BRET, BRET² Fluorescence (top) FRET Absorbance UV & Vis Time-Resolved Fluorescence TR-FRET/HTRF® FP (Fluorescence Polarization)
Performance: Luminescence Fluorescence Absorbance TRF	 < 6 amol ATP < 0.3 fmol Fluorescein Accuracy better 2 %, precision better 0.6 % n.a.	 < 6 amol ATP < 0.3 fmol Fluorescein Accuracy better 2 %, precision better 0.6 % < 10 amol Eu
Dynamic Range	> 6 order of magnitude 0 – 3.5 OD	> 6 order of magnitude 0 – 3.5 OD
Crosstalk	Low crosstalk due to crosstalk reduction design: 5 x 10^{-6}	

	ATL	ATL S
Injection Unit	Up to 3 injectors Volume: 10 – 100 µL JET injection technology Accuracy better 2 % (over entire range of volume) Precision better 2 % (over entire range of volume)	
Temperature Control	+5 °C above RT to 42 °C (option), includes cooled photomultiplier	
Microplate Formats	6 to 384 well Plate heights 15 ±1 mm and 20 ±1 mm	6 to 1536 well
Measurement Technologies	Luminescence BRET, BRET² Fluorescence (top) FRET Absorbance Vis	Luminescence BRET, BRET² Fluorescence (top) FRET Absorbance UV & Vis Time-Resolved Fluorescence TR-FRET/HTRF® FP (Fluorescence Polarization)
Interface	USB	
PC Operating System	Win XP, Win Vista, Win 7	
PC Requirements	Pentium Processor, 500 MHz (or better), CD ROM drive, display 1024 x 768 (or better), USB	
Regulations	CE, UL	
Power Supply	Pentium Processor, 500 MHz (or better), CD ROM drive, display 1024 x 768 (or better), USB	
Temperature Range	Storage : 0 – 40 °C Operation : 15 – 35 °C	
Humidity	10 – 85 % non-condensing	
Dimensions (W x D x H)	391 x 470 x 345 mm	400 x 470 x 345 mm
Weight	21 kg	22 kg

ICE Software

- Wizard guided operation
- Single and multiple endpoint
- Kinetics and Repeated
- Scanning
- Ratio calculation
- Display of kinetic curves incl. zoomed view