BMG LABTECH



POLARstar OPTIMA

The multifunctional microplate reader with an exceptional combination of flexibility and performance

POLARstar OPTIMA - The optimal combination of performance and flexibility for all of your R&D applications

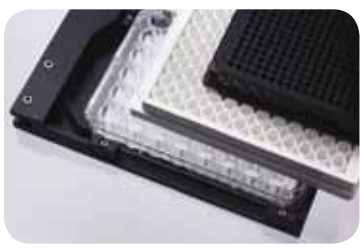
Whether you need sensitivity, flexibility or extensive kinetic capabilities, the POLARstar OPTIMA from BMG LABTECH is the optimal solution for academic and pharmaceutical research.

Flexibility

The POLARstar OPTIMA is a versatile microplate reader offering five separate reading modes with integrated resonance energy transfer detection capabilities (FRET, BRET).

- Fluorescence Polarization (simultaneous vector detection)
- Fluorescence Intensity (simultaneous dual emission)
- Time-Resolved Fluorescence
- Luminescence (flash & glow, simultaneous dual emission)
- Absorbance (low UV to Vis)

The POLARstar OPTIMA reads up to 384-well plates in all detection modes and provides 1536-well plate capability for fluorescence intensity measurements.
On-board reagent injectors can be used to initiate kinetic events. Due to the individually adjustable delivery volumes for each well, the injectors can be used to produce dilution schemes and concentration ranges throughout the plate. Top and bottom plate reading, precise temperature control up to 45°C (60°C is an option), well scanning, multi-mode shaking capabilities and gas vent connection enhance the assay flexibility of the POLARstar OPTIMA.



...any plate format

Optimized for Kinetic Reactions

Kinetic assays, such as Ca^{2+} fluorescence measurements or flash luciferase luminescence, can be easily measured with a high degree of precision and reproducibility. Two precision syringe injectors have direct access to the plate measurement position allowing reagent injection and microplate well reading simultaneously, thereby ensuring that you do not miss any experimental data.
The control software puts you in command over injection timing and pump settings such as injection speed, delivery volumes and the number of reagent injections per well. Kinetic data can be collected at a rapid 50 reading points per second, or as slow as one point every 2½ hours. Furthermore, data can be collected at different rates within the same experiment, allowing you to monitor the signal when and where needed.

...reagent injection and fast filter switching

High-Performance Luminescence

The POLARstar OPTIMA has been designed with a dedicated luminescence measurement system so you do not have to make a choice between a microplate fluorometer and luminometer. The POLARstar OPTIMA offers exceptional luminescence performance in a single instrument package that easily fulfilled Promega's stringent DLReady™ (Dual Luciferase validation) criteria in 96- and 384-well plate formats.

Multichromatic Detection Modes

With sixteen filter positions and features like sequential dual excitation, simultaneous dual emission including ratiometric calculations, the POLARstar OPTIMA is an ideal instrument for multichromatic or ratiometric applications such as

FRET, BRET, 260/280 DNA quantification, cellular indicators, calcium dyes, etc. In dual excitation applications such as FURA-2, fast filter switching enables rapid measurement at both excitation wavelengths. With the simultaneous dual emission reading mode each well of a FRET or BRET assay is read only once, making the POLARstar OPTIMA twice as fast and more accurate than conventional readers.

Stacker and Robot Compatibility

For medium level throughput, BMG LABTECH offers the Stacker with an integrated barcode reader. For higher throughput, the POLARstar OPTIMA can be integrated into many types of robotic systems from a variety of different manufacturers.

...automated plate handling with Stacker

Control and Evaluation Software

The Windows™ based PC software provides an extensive range of options for assay design and data evaluation while being fully compliant with FDA regulation 21 CFR Part 11. The control software offers many features including: real-time data display, unique labeling of well contents, optimization of kinetic assays, user-definable microplates, precise control of multiple injection, shaking and reading events and flexible data output options for bioinformatic programs.

The data evaluation part of the software is based on powerful Excel™ macros and allows you to utilize any of Excel's extensive data manipulation features. Worksheets are provided to display raw data, signal plots and standard curves. Powerful evaluation sheets are pre-programmed to perform calculations such as %CVs, ratios, curve fitting, EC_{50}, FP, dilution factors, etc. In addition, you can create your own workbooks for specific assays and evaluation methods.

Applications

The POLARstar OPTIMA offers a unique combination of features to support all major assay types in many application areas including:

Biomolecular Interaction Assays

A major field in basic research and drug discovery is the monitoring of biomolecular interactions using highly sophisticated assays based on fluorescence polarization, FRET or BRET technologies and time-resolved fluorescence. The POLARstar OPTIMA offers all of these detection modes combined with on-board reagent injection and simultaneous dual emission detection for studying receptor-ligand, protein-protein, DNA-protein and DNA-DNA interactions.

Cell-Based Assays

Cell-based measurements include a large variety of assays that measure cell proliferation, viability, cytotoxicity, apoptosis, the analysis of second messengers like detection of cAMP and Ca^{2+} and the use of reporter gene expression systems. For quantifying cell-based assays, the POLARstar OPTIMA provides all the important features like top and bottom reading (for optimal detection of cell suspensions and adherent cells), gas venting and on-board injectors.

Enzyme Activity Assays

Kinase, caspase and protease gene families are targets that play an important role in the regulation of numerous biological processes, and have been implicated as contributors to several diseases. The POLARstar OPTIMA offers the highest level of flexibility in developing enzyme activity assays and analyzing kinetic data. Five separate measurement modes, precise temperature control, on-board injection, shaking, high sensitivity combined with wide dynamic range and versatile kinetic software features allow you to accommodate a variety of enzyme assays.

Quantification Assays

The concentration of DNA, RNA and protein samples can be quantified quickly and conveniently with the POLARstar OPTIMA. Both fluorescence-based assays and direct UV-absorbance-based detection are possible with the unique optical system that covers a spectral range from 240 nm to 740 nm (to 900 nm with extended wavelength PMT).

Reporter Gene Assays

Reporter genes like luciferase and GFP are extensively used to study gene expression and associated cellular events. With the POLARstar OPTIMA, it is also possible to use advanced co-reporter assays such as dual luciferase and FRET-based GFP. Featuring bottom reading, well scanning, kinetics, precise temperature control, gas venting and on-board-injection, the instrument is the perfect tool to perform reporter gene assays.

POLARstar OPTIMA - Technical Specifications

Due to the modularity of BMG LABTECH's instruments, all or combinations of the features below can be installed at purchase or upgraded at any time. Please contact your local representative for more details or a quote.

Detection Modes	Fluorescence Intensity - including FRET Fluorescence Polarization Luminescence (flash and glow) - including BRET Time-Resolved Fluorescence - including DELFIA® UV/Vis absorbance	
Measurement Modes	Top and bottom reading Endpoint and Kinetic measurements Sequential Multi Excitation measurements Sequential Multi Emission measurements Simultaneous Dual Emission measurements Ratiometric measurements Well Scanning	
Microplate Formats	6 to 384-well plates, user-definable	
Light Source	High energy xenon flashlamp	
Detectors	Two side window photomultiplier tubes	
Optical Filters	Excitation and emission filter wheels for 8 filters each	
Spectral Range	240 to 740 nm or 240 to 900 nm	
Sensitivity	FI	‹ 1 fmol / well Fluorescein
	FP	‹ 5 mP standard deviation at 1 nM Fluorescein
	TRF	‹ 70 amol/well Europium
	LUM	‹ 30 amol/well ATP DLReady certified
	ABS	Dynamic range: ±0.000 - 4.000 OD Reproducibility: ±0.010 OD for 0 - 2 OD range
Read Times	Flying mode: 15 s (96), 30 s (384)	
Reagent Injection	Up to 2 built-in reagent injectors Injection at measurement position (6 to 384-well) Individual injection volumes for each well (3 to 350 µL) Variable injection speed up to 420 µL / s Up to four injection events per well Reagent back flushing"	
Shaking	Linear, orbital, and double-orbital with user-definable time and speed	
Gas Vent	System to inject an atmosphere or to pull a vacuum into the reader	
Incubation	+5°C above ambient up to 45°C or 60°C	
Software	License-free software package including Reader Control and MARS Data Analysis Software	
Dimensions	Width: 44 cm, depth: 48 cm, height: 26 cm; weight: 26 kg	
Accessories		
Stacker	Magazines for up to 50 plates - continuous loading feature	
THERMOstar	Microplate Incubator and Shaker	
Filters	Optimized for dyes, fluorophores and specific assays Filters for all applications from UV to NIR Customized filters available upon request	
Upgrades	Upgrades to include options such as additional detection modes, reagent injectors, extended temperature control, etc. are available. Please contact your local representative for more information.	

Sensitivity is calculated according to the IUPAC standard: $3(SD_{blank})/slope$
Specifications are subject to change without notice

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