



## LUMIstar OPTIMA

LUMIstar OPTIMA – a fully upgradeable  
microplate luminometer for all of your assays



# LUMIstar OPTIMA - a versatile and upgradeable microplate luminometer for glow and flash luminometric assays

Whether you need sensitivity, flexibility, or extensive kinetic capabilities, the LUMIstar OPTIMA from BMG LABTECH raises microplate luminescence analysis to a new level. And, because the LUMIstar OPTIMA is the only microplate luminometer that can be fully up-graded to FLUOstar OPTIMA or POLARstar OPTIMA specifications, it can easily handle fluorescence, absorbance, polarization, and other assays as your needs change.

### Flexible and upgradeable

The LUMIstar OPTIMA is a fully automated microplate reader that is designed for flash and glow type bio- and chemiluminescence measurements. With on-board syringe injectors, the system can simultaneously read and inject in all plate formats up to 384-wells. Individually adjustable delivery volumes for each well allow the researcher to determine optimal reagent volumes for initiating kinetic events or producing dilution schemes and concentration ranges.

Instrument flexibility is further enhanced by top and bottom reading, precise temperature control up to 45°C (with a 60°C option), well scanning, gas vent/purge for environment sensitive assays, multi-mode shaking capabilities, automatic gain adjustment, stacker and robot compatibility.

When you are ready, the LUMIstar OPTIMA can be upgraded to a high performance multifunctional microplate reader with the following reading modes:

- Fluorescence
- UV/Vis absorbance
- Fluorescence polarization
- Time-resolved fluorescence
- Simultaneous dual emission fluorescence

Please see FLUOstar OPTIMA and POLARstar OPTIMA brochures for complete information and specifications.



### Optical detection unit

The combination of BMG LABTECH's Digital Photon Integration (DPI) technology, automatic and programmable gain control, and specially configured photomultiplier tubes (PMTs) gives the LUMIstar OPTIMA impressive sensitivity that is characteristic of the best photon counting instruments. The extended linear dynamic range is more than eight decades, insuring that you will be able to capture the full output range of your assays.

The LUMIstar OPTIMA can read up to eight different luminescence wavelengths per assay using the optical luminescence filters. Therefore, you will have the capability to read luminescence color discrimination assays such as BRET or ChromaGlo™.

Additionally, the LUMIstar OPTIMA can be equipped with two PMTs allowing it to read two reporter wavelengths at the same time, thus doubling the speed of your reads and reducing the variations between them.



*...eight color detection and individual injection volumes for each well*



### Optimized for flash-type luminescence assays

Two precision syringe injectors with a delivery volume of 3 to 350  $\mu\text{L}$ , adjustable in 1  $\mu\text{L}$  increments, have direct access to the measurement position allowing simultaneous reagent injection and reading of the plate. Flash luminescence reactions, such as calcium flux measurements with aequorin expressing cells or luciferase based gene expression analysis, can be started precisely and kinetic data can be taken before, during, and after injection. The control software allows you to set injection of injection timing, pump speeds, delay times, and sampling rate for all kinetic events. Up to 250 data points can be collected per well, ranging in intervals from 20 ms to over 10,000 seconds, enabling runs from a few seconds in length to over several days.



...precise reagent injection in plate formats up to 384-well

### Precise temperature control and flexible shaking

Enzyme and cell-based assays require uniform incubation of the microplate as well as flexible shaking capabilities, including shaking during measurement. The LUMIstar OPTIMA has precise temperature control, to within 0.2°C across the plate, and uses two heating elements positioned above and below the microplate movement area to minimize evaporation and condensation. The microplate temperature is updated in the real-time display and recorded at each data point measured. The LUMIstar OPTIMA also has three plate shaking options (linear, orbital, and figure eight) with adjustable speed and amplitude to ensure you get effective mixing during your runs.

### Intuitive control and evaluation software

The Windows™ based PC software provides an extensive range of options for assay design and data evaluation. The evaluation part of the software is Excel™ based and uses powerful macros to provide you with many analysis options. Worksheets are provided for raw data display, calculations (including dual luciferase reporter assay data evaluation), signal plots, averages, max/min, %CVs, dilution factors,

calculation of unknowns, and standard curves. In addition, you can create your own workbook for specific assays and evaluation methods. During plate measurement the current state feature can be used to observe the progress of kinetic reactions in all wells. Powerful scripting language can even allow you to automatic logic control and make decisions based on results – in real time.

### Applications

The LUMIstar OPTIMA offers a unique combination of features to support all major luminescence assays in many application areas including:

#### □ Reporter gene assays

Bioluminescent reporter systems, especially utilizing luciferase and galactosidase, are frequently used to study gene expression and cellular events. These systems are favored because of their speed, sensitivity, and wide dynamic range. With the LUMIstar OPTIMA and its flexible injection and data evaluation capabilities, it is also possible to use advanced co-reporter assays (e.g. firefly and *Renilla* luciferase based systems) which provide quantitative results based on the normalization of the second reporter.

#### □ ATP detection - viability, toxicology, food monitoring

ATP is a marker for cell viability because it is present in all metabolically active cells and the concentration declines very rapidly when the cells undergo necrosis or apoptosis. When ATP is the limiting factor in the ATP-dependent oxidation of luciferin by luciferase, the amount of light produced is proportional to the ATP concentration of the sample. The LUMIstar OPTIMA is the perfect tool to read this flash-type signal due to its integrated reagent injectors, precise temperature control, and real-time kinetic monitoring.

#### □ Calcium imaging

Aequorin is a calcium-sensitive chemiluminescent molecule originating from the jellyfish *Aequorea victoria*, which is used extensively in calcium imaging assays with cell lines coexpressing a receptor and apoaequorin (the precursor protein). The LUMIstar OPTIMA provides all the important features necessary for quantifying cell-based assays such as on-board injectors, top and bottom reading for optimal detection of cell suspensions and adherent cells, multi-mode shaking, precise temperature control, gas venting, and recording of real-time kinetics.

### Stacker and robot compatibility

If you have medium throughput screening needs for your LUMIstar OPTIMA, BMG LABTECH offers an optional 50 plate stacker that can be equipped with a barcode reader. For higher throughput needs, the entire BMG LABTECH line of microplate readers can be integrated into all existing robotic systems.

# LUMIstar 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.

<b>Detection Modes</b>	Luminescence (flash and glow) - including BRET	
<b>Measurement Modes</b>	Top and bottom reading Endpoint and Kinetic measurements Sequential Multi Emission measurements Simultaneous Dual Emission measurements Ratiometric measurements	
<b>Microplate Formats</b>	6 to 384-well plates, user-definable	
<b>Detectors</b>	Side window photomultiplier tube	
<b>Optical Filters</b>	One filter wheel for 8 filter	
<b>Spectral Range</b>	240 to 740 nm	
	LUM	< 30 amol/well ATP DLReady certified
<b>Read Times</b>	Flying mode: 20 s (96), 55 (384)	
<b>Reagent Injection</b>	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	
<b>Shaking</b>	Linear, orbital, and double-orbital with user-definable time and speed	
<b>Gas Vent</b>	System to inject an atmosphere or to pull a vacuum into the reader	
<b>Incubation</b>	+5°C above ambient up to 45°C or 60°C	
<b>Software</b>	License-free software package including Reader Control and MARS Data Analysis Software	
<b>Dimensions</b>	Width: 44 cm, depth: 48 cm, height: 26 cm; weight: 26 kg	
<b>Accessories</b>		
<b>Stacker</b>	Magazines for up to 50 plates - continuous loading feature	
<b>THERMOstar</b>	Microplate Incubator and Shaker	
<b>Filters</b>	Optimized for dyes, fluorophores and specific assays Filters for all applications from UV to NIR Customized filters available upon request	
<b>Upgrades</b>	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.	



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