



# BeamMonitor BM+

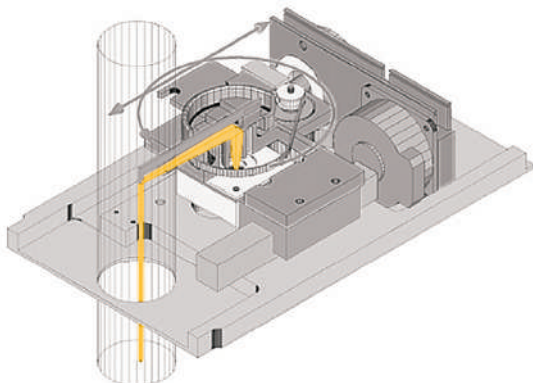


## Brilliant Minds rely on Beam Analysis

Are you using an industrial laser for cutting and joining or finishing surfaces? Then surely you are no stranger to the radiant power of precision and its significance for efficiency and productivity in your company. Even the smallest deviation, a gradual increase in degradation, is an absolute economic no-go that you can now proactively combat with a reliable solution for analyzing unfocused beams: the BeamMonitor BM+.

Regular monitoring helps: The BeamMonitor BM+ is a measuring device possessing the latest electronics for performing

beam diagnostics on the unfocused, continuous wave laser beams of CO<sub>2</sub> and solid state lasers with high power output. Analyzing and documenting the laser parameters can allow you to further optimize working processes and/or identify undesirable deviations such as soiling, incorrect beam positioning, or faulty optics adjustment. The BeamMonitor BM+ reliably measures beam position, beam dimensions, beam symmetry, and power density distribution. Especially developed for use in harsh industrial production environments, the device can be adapted to all kinds of spacial conditions and can even be installed upside down without additional components.



Sketch to the mechanical setup of the BM+

## Detecting Wear and Deviations

In practice, laser beams are often “customized” for the respective area of application using telescopes and adaptive lenses. As a result of this, the beam waist diameter and divergence of the laser beam often change dynamically, which then might change the focus dimensions or focus location in modern systems for laser cutting or welding.

The focus is therefore on penetration through the material surface, but it is “pushed” into the material for the actual cutting



process. For laser welding, one setting may be used to tack a piece, while the another is used to weld. In addition to variation, a number of other variable parameters can also be analyzed and documented. With its ability to detect wear on laser lenses, which could have a negative impact on processing results, the BeamMonitor BM+ has also earned a place in quality assurance and laser approval. Diode lasers and other solid-state lasers are checked in the collimated range and can thus be assessed with relatively little effort.

### The Principle

A rotating measuring tip gathers measurements of the laser beam at points. The mirror holder is also moved linearly in order to scan the entire beam profile. One partial beam is directed to the detector at a time and measured in this way. The fast 16-bit AD converter and a high resolution of up to 1 024 x 1 024 pixels facilitate exact analysis of even the smallest disturbances in the raw beam.

The raw data generated by BM+ can be analyzed using the new LaserDiagnosticsSoftware developed by PRIMES. Here is what LDS offers standard:

- Beam measurement
- Beam position
- Measurements: single measurements, series measurements (monitor operation), and measurement of development over time (linescan)
- Displays: isometry, false colors, contour, line presentation and display of numeric results
- Data storage in PRIMES format .lpf as well as CSV and export graphic

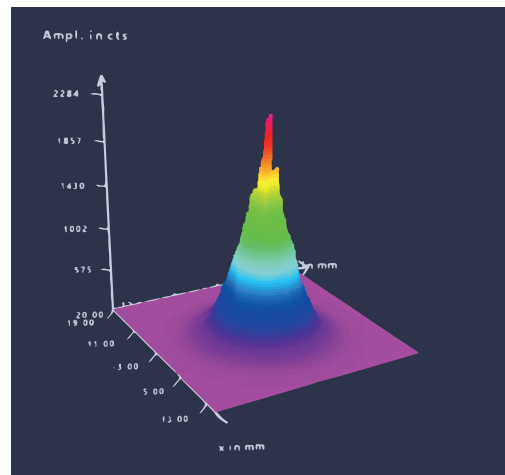
**Note:** During the measurement, the entire beam exits the BeamMonitor and must be absorbed as fully and securely as possible, with the PowerMonitor for example.

### Easy Operation

You will love operating the BeamMonitor BM+: Our diagnostics tool LaserDiagnosticsSoftware contains extensive tools for analyzing, presenting, and preparing measurement data, including a report feature. Data communication via Ethernet connection.

### New: Measurements in the green and blue wavelength range

The BeamMonitor BM+ is now additionally qualified for the measurement of lasers in the green and blue spectral range. For the first time it is possible to efficiently measure your laser-based machining processes and manufacturing tasks from the far infrared to the blue spectral range. Depending on the beam dimensions, the BeamMonitor BM+ can be used with apertures of 60 mm (round aperture) or 100 mm (rectangular aperture). Both models are now available for CO<sub>2</sub>, NIR and VIS lasers. The aperture must correspond to at least 1.4 times the laser beam diameter, so that any intensity along the edge does not hit the BM+ housing, preventing a limited measuring range or distorted measuring results.



The power density distribution with the BM+



## Technical Data

	BM+ 60	BM+ 100S
<b>MEASUREMENT PARAMETERS</b>		
Power range	50 – 25 000 W	50 – 25 000 W
Wavelength range	450 – 1 090 oder 10 600 nm	450 – 1 090 or 10 600 nm
Beam diameter	5 – 42 mm (450 – 1 090 nm) 10 – 42 mm (CO <sub>2</sub> )	10 – 70 mm
Max. power density	10 kW/cm <sup>2</sup> <sup>1)</sup>	10 kW/cm <sup>2</sup> <sup>1)</sup>
Max. beam divergence	100 mrad	100 mrad
Irradiation time	2 s – infinity	2 s – infinity
A/D conversion	16 bit	16 bit
Nominal measuring frequency	Linescan 25 Hz	Linescan 30 Hz
<b>DETERMINED PARAMETERS</b>		
Beam position x, y	yes	yes
Beam dimensions x, y	yes	yes
Power density distribution	2D, 3D	2D, 3D
Linescan	yes	yes
Measuring time per plane depending on measuring parameters (like resolution, rotation speed, measuring window position)	5 – 40 s	5 – 40 s
<b>DEVICE PARAMETERS</b>		
Working range x-y	60 x 60 mm	100 x 100 mm
Measurement window sizes	0.1 x 0.1 mm – 60 x 60 mm	0.1 x 0.1 mm – 100 x 100 mm
Resolution	32 x 32 – 1 024 x 1 024 px	32 x 32 – 1 024 x 1 024 px
Rotation speed of the measuring tip	1 562 min <sup>-1</sup>	1 562 min <sup>-1</sup>
Accuracy (beam diameter)	± 5 %	± 5 %
Reproducibility (beam diameter)	± 3 %	± 3 %
<b>SUPPLY DATA</b>		
Power supply	24 V DC ± 5 %, max. 1.8 A	24 V DC ± 5 %, max. 1.8 A
<b>COMMUNICATION</b>		
Interfaces	Ethernet, RS485	Ethernet, RS485
<b>DIMENSIONS AND WEIGHT</b>		
Dimensions (L x W x H)	316 x 212 x 83 mm	436 x 292 x 83 mm
Weight (approx.)	9 kg	10 kg
<b>ENVIRONMENTAL CONDITIONS</b>		
Operating temperature range	10 – 40 °C	10 – 40 °C
Storage temperature range	5 – 50 °C	5 – 50 °C
Reference temperature	22 °C	22 °C
Permissible relative humidity (non-condensing)	10 – 80 %	10 – 80 %

<sup>1)</sup> Higher power densities on request.