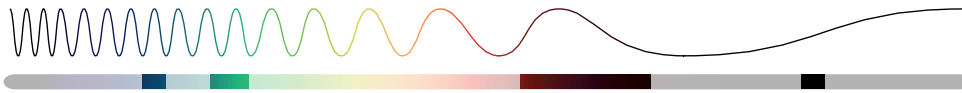
PowerMonitor PM+

PRIMES

- Fiber and disc laser
- Diode laser
- Ultrashort pulse laser
- CO_2 laser



450 nm | 515 – 532 nm | 800 – 1 100 nm | 10 600 nm

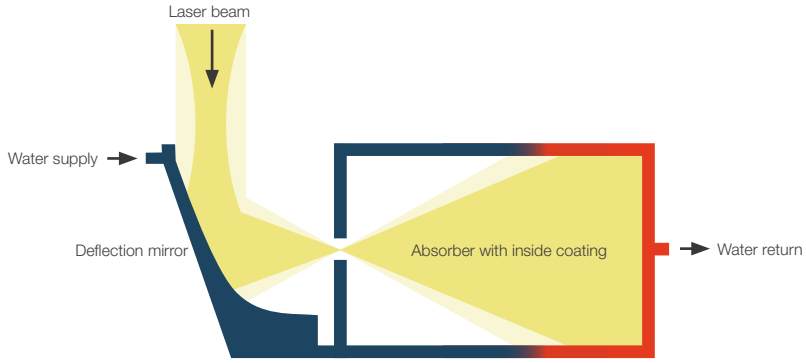
Unique and robust power meter for measuring high powers as well as high intensities, delivering most exact and trustable results.

- Caustic
- Raw beam
- Power
- Beam profile
- Pointing stability
- Vector
- Focus shift

POWER RANGE	0.8 – 15 kW
BEAM QUALITY M^2	Single mode – Multi mode
BEAM DIAMETER	up to max. 24 mm
HIGHLIGHT	Absorption of high-intensity continuous radiation
INTERFACES	EtherNet (PoE) / USB-C

Tech Corner

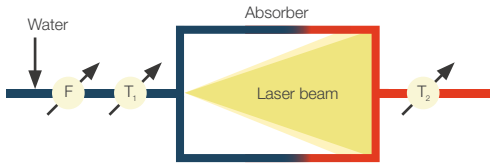
Unlike standard power meters whose design is typically based on a flat absorber, the PowerMonitor PM+ provides a water cooled cylindrical absorber. The Integrating-Spheres-like setup, combined with its entrance mirror, maximizes the wavelength independent absorption to over 99 %. Thanks to the innovative design, the absorber can allow very high degrees of absorption with very little back-reflection.



Schematic beam path in the PowerMonitor with cylindrical absorber and deflection mirror

The laser power is measured calorimetrically. Two seperate temperature sensors determine the temperature rise between in- and outlet. Furthermore, the mass flow is measured using a highly accurate flow meter.

The unique design and sophisticated calibration with production-proven laser sources, guarantees unrivaled accuracy and quality.



Calorimeter equation: $P = m \bullet c_p \bullet \Delta T$

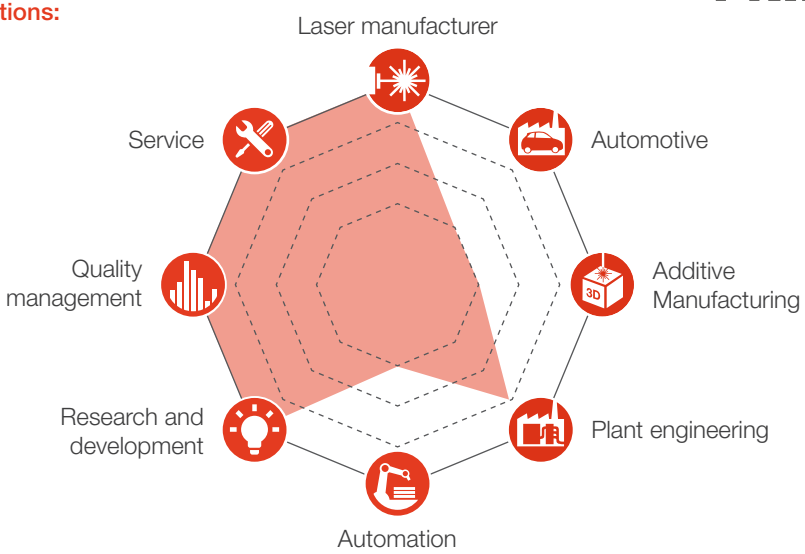
P: Power
m: Mass flow (water)
c_p: Heat capacity (water)
ΔT: Temperature difference in/out
F: Flow meter
T_1/T_2: Temperature sensor

The PowerMonitor PM+ can be used as a stand-alone power meter, providing the most relevant information on its integrated display. It can also be used along with our new Laser-DiagnosticsSoftware LDS for a more detailed data analysis or parallel operation of a focus analyzing device like the FocusMonitor.

Laser safety has always the top priority when working with high-power lasers. The integrated interlock prevents the device from getting damaged in case of a critical water flow status or a closed shutter.

MEASUREMENT PARAMETERS	PM+
Power range	0.8 – 15 kW
Wavelength range	450 nm, 515 – 532 nm, 800 – 1 100 nm and 10 600 nm
Irradiation time	continuous (cw) For pulsed lasers please contact support@primes.de
Max. power density at 15 kW at 450 nm, 515 – 532 nm at 800 – 1 100 nm, 10 600 nm	 10 kW/cm² 15 kW/cm²
DEVICE PARAMETERS	
Entrance aperture	48 mm
Accuracy at 450 nm, 515 – 532 nm at 800 – 1 100 nm, 10 600 nm	 ± 2.5 % ± 2.0 %
Reproducibility	± 1 %
Time constant	20 s up to 99 % of final value
SUPPLY DATA	
Power Supply	24 V ± 5 %, max. 0.5 A, Power over Ethernet (PoE), max. 24 V, USB-C, max. 20 V
Cooling water pressure (min./max.) Min. cooling water flow Min. cooling water flow (interlock) Max. cooling water flow	2 bar / 6 bar 0.7 l/min/kW 6 l/min 25 l/min
Cooling water temperature T_{in} Stability of cooling water temperature	Dew point temper. $< T_{in} < 30$ °C < 1 k/min or < 0.08 k/5 sec
Compressed air for automatic operation of the shutter Pressure (min./max.) Purity class	 2 bar / 4 bar ISO 8573-1:2010 [7:4:4]
COMMUNICATION	
Interfaces	EtherNet (PoE)/USB-C/Interlock
DIMENSIONS AND WEIGHT	
Dimensions (L x W x H) (with connectors and shutter knob without device feet)	375 x 180 x 190 mm
Weight (approx.)	12 kg

Applications:



System description: The PowerMonitor PM+ is a calorimetric laser power meter that is, due to its special absorption design, unique on the market! A highest degree of wavelength-independent absorption at greatest measuring accuracies makes it optimally suited for the most challenging demands. Depending on the used calibration, the system can be operated from VIS to NIR over to CO_2 at power levels up to 15 kW.

Your benefit: The PM+ is a powerful and reliable tool for precise power measurements of high power and high intensity laser beams. With wavelength independence and the versatile setup possibilities, it can be flexibly applied to a variety of scenarios in many fields – either as a stand-alone power meter, or in combination with a beam profiler. Besides the high absorption degree (> 99 %) and measurement accuracy (± 2 %), its long-term stability, robustness and laser safety have also been proven even in the toughest industrial environment.

CONCLUSION

The output power level of lasers has continuously climbed in recent years, and the relevant applications are booming. All these trends make the accurate measurement of high-power lasers more important than ever, not only for laser manufacturers, but also for machine builders and all laser users. The PowerMonitor is the perfect tool to meet such challenges and always delivers most exact and trustable measuring results.

For further information please visit www.primes.de/pm

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