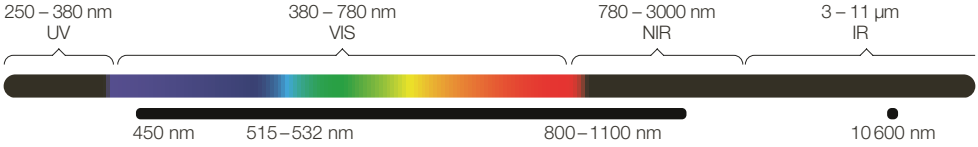
PowerMonitor PM

PRIMES

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



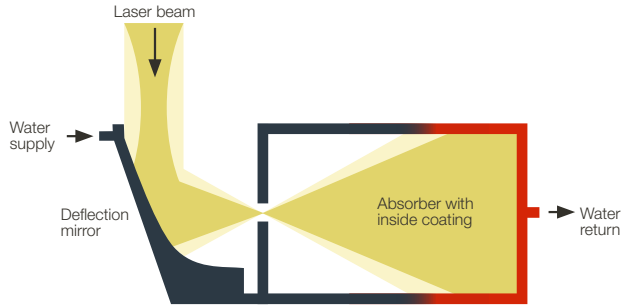
Powerful. Precise. Proven.
The ultimate solution for high-power and high-intensity laser measurement.

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

POWER RANGE	PM 48 PM 100 PM HP	0,3 – 8 kW 1 – 25 kW 3 – 150 kW
ACCURACY	PM 48 PM 100 PM HP	± 2 – ± 2.5 % ± 3 – ± 3.5 % ± 3 %
BEAM DIAMETER	PM 48 PM 100 PM HP	up to 24 mm up to 50 mm up to 45 mm
HIGHLIGHT	Absorption of high-intensity continuous radiation	
INTERFACES	RS485 / USB / Analog out	

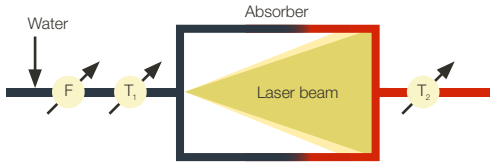
Engineered for Precision

The PowerMonitor redefines laser power measurement with cutting-edge engineering and a focus on uncompromising precision. Unlike conventional power meters that rely on flat absorbers, the PowerMonitor features a water-cooled cylindrical absorber designed for maximum efficiency. Paired with an integrated entrance mirror, this absorber mimics the effect of an integrating sphere, achieving wavelength-independent absorption rates exceeding 99% — with minimal back-reflection.



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

The absorber and the power measurement system are fully integrated into a single compact unit, streamlining installation and operation. Thanks to the device's low pressure drop in the cooling circuit, less inlet pressure is required — making integration into existing water supply systems easier and more cost-efficient.



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

Power is measured calorimetrically, using two independent temperature sensors to detect the rise in water temperature from inlet to outlet. An integrated high-precision flow meter ensures accurate mass flow measurements, resulting in highly reliable power data.

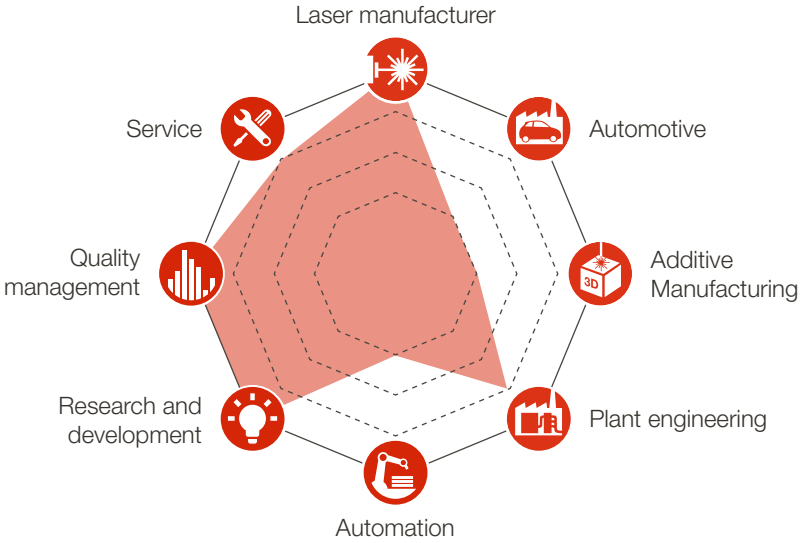
Calibration with production-grade laser sources ensures the highest level of measurement accuracy. Use the PowerMonitor as a stand-alone device with its intuitive display, or connect it to our LaserDiagnosticsSoftware (LDS) for extended data analysis and integration with beam profilers like the FocusMonitor.

Engineered with safety in mind, the PowerMonitor includes an interlock mechanism to prevent damage in the event of insufficient water flow or a closed shutter, making it ideal for safe operation with high-power lasers.

For extreme laser powers, the PM HP addresses the growing demand for accurate measurement at ever-higher power levels. Designed to handle up to 150 kW of laser power at power densities up to 20 kW/cm², the PM HP offers a unique solution on the market — ensuring you're equipped for the challenges of today and the breakthroughs of tomorrow.

MEASUREMENT PARAMETERS	PM 48	PM 100	PM HP
Power range	0.3 – 8 kW	1 – 25 kW	3 – 150 kW
Wavelength range	450 nm, 515-530 nm, 800-1100 nm, 2000 nm and 10600 nm		1 000 nm – 1 100 nm
Irradiation time	continuous	continuous	continuous
Max. power density at 450 nm, 515 – 532 nm at 800 – 1100 nm, 2000 nm, 10600 nm at 1000 – 1100 nm	 10 kW/cm² 15 kW/cm² –	 5 kW/cm² 5 kW/cm² –	 – – 20 kW/cm²
Min. divergence full angle (convergent) Max. divergence full angle (divergent)	- 50 mrad +160 mrad	- 50 mrad +180 mrad	- 50 mrad +180 mrad
DEVICE PARAMETERS			
Entrance aperture	48 mm	100 mm	90 mm
Accuracy at 450 nm, 515 – 532 nm at 800 – 1100 nm, 2000 nm, 10600 nm at 1000 – 1100 nm	 ± 2.5 % ± 2.0 % ± 2.0 %	 ± 3.5 % ± 3.0 % ± 3.0 %	 – – ± 3.0 %
Reproducibility	± 1 %	± 1 %	± 1 %
Time constant	15 s up to 99 % of final value		
SUPPLY DATA			
Power supply	24 V ± 5 %, max. 0.5 A		
Cooling water pressure (min./max.) Min. cooling water flow Min. cooling water flow (interlock) Max. cooling water flow Water pressure drop	2 bar / 6 bar 0.5 l/min/kW 4 l/min 12 l/min –	1 bar / 4 bar 0.5 l/min/kW 8 l/min 30 l/min –	1 bar / 3 bar 0.5 l/min/kW 25 l/min 150 l/min 2.1 bar at 75 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 s		
Compressed air Pressure (min./max.) Purity class	 2 bar / 4 bar ISO 8573-1:2010 [7:4:4]		
COMMUNICATION			
Interfaces	RS485 / USB / Interlock / Analog out		
DIMENSIONS AND WEIGHT			
Dimensions (L x W x H) (with connectors and device feet)	394 × 242 × 125 mm	580 x 330 x 215 mm	600 x 330 x 215 mm
Weight (approx.)	10 kg	44 kg	52 kg

Applications



Your benefit

Designed for industrial performance, the PowerMonitor is your go-to tool for precise, stable, and safe measurement of high-power laser beams — even under the toughest conditions. Whether you're working in manufacturing, R&D, or integration, it adapts to your setup and delivers trusted results.

- 99% wavelength-independent absorption for universal application
- Calorimetric measurement with ±3% accuracy
- Compact and robust design with proven long-term stability
- Seamless integration with LDS software and focus analysis tools
- Built-in laser safety features for high-power operation
- Laser powers up to 150 kW and extreme power densities up to 20 kW/cm²
- Direct measurement from the fiber with LLK-D, QBH or HLC-16 connectors
- Time constant <15 s till 99% of final value

CONCLUSION

Laser output powers have been steadily rising — and with them, the need for precise, reliable measurement solutions. From advanced manufacturing to next-generation research, accurate monitoring is now more critical than ever. The PowerMonitor, and especially the PM HP, are built to meet these demands — now and into the future.

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

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