

# CompactPowerMonitor CPM+



Fiber and disc laser



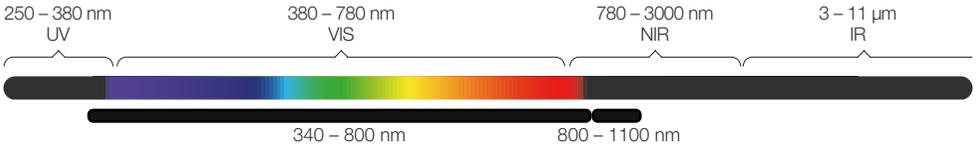
Diode laser



High frequency pulse laser



CO<sub>2</sub> laser



**Built for precision. Ready for industry – the CPM+ delivers reliable power measurement from the lab to the production floor.**



Caustic



Raw beam



Power



Beam profile



Pointing stability



Vector



Focus shift

POWER RANGE	max. 30 kW
ACCURACY	± 3 %
BEAM DIAMETER	max. 180 mm
HIGHLIGHT	Position, incidence and beam size independent

# Engineered for Precision

At PRIMES, all laser power measurements are based on the calorimetric principle — the most stable and linear method available. However, to achieve true accuracy, independence of external factors such as beam position, diameter, or wavelength is essential. The CPM+ was developed with exactly this goal in mind — and it delivers: by design, it ensures highly accurate and repeatable results regardless of varying beam conditions.



CPM+ F-10

The key to the CPM+'s superior performance lies in its specially engineered absorber, featuring a structured surface and an industry-grade, wear-resistant coating. This unique combination enables extremely high absorption across the entire industrial wavelength spectrum — from blue to green to NIR — with minimal back-reflection. Even off-centered or inclined laser beams are absorbed efficiently, ensuring consistently accurate power measurements regardless of beam position or incidence angle.

The CPM+ (F-10 and F-30) is also equipped with a novel ultrasonic flow meter, replacing mechanical components and eliminating wear-prone parts. The result: greater long-term reliability, minimal maintenance, and precise thermal readings even during extended operation.

Despite its small size, the CPM+ product family handles a wide power range from 0.1 kW up to 30 kW of laser power. It can be used as a permanent absorber, making it ideal for service tasks, lab use, long-duration testing, and even direct power measurement from fiber-coupled lasers. And when paired with our LaserDiagnosticsSoftware (LDS) or other PRIMES tools like the FocusMonitor FM+ or BeamMonitor BM+, it becomes a powerful component in any laser diagnostics setup. This combination ensures that you capture all relevant information about your laser beam — from power to focus position and beam shape — giving you the insights needed to validate process functionality and implement targeted optimizations.



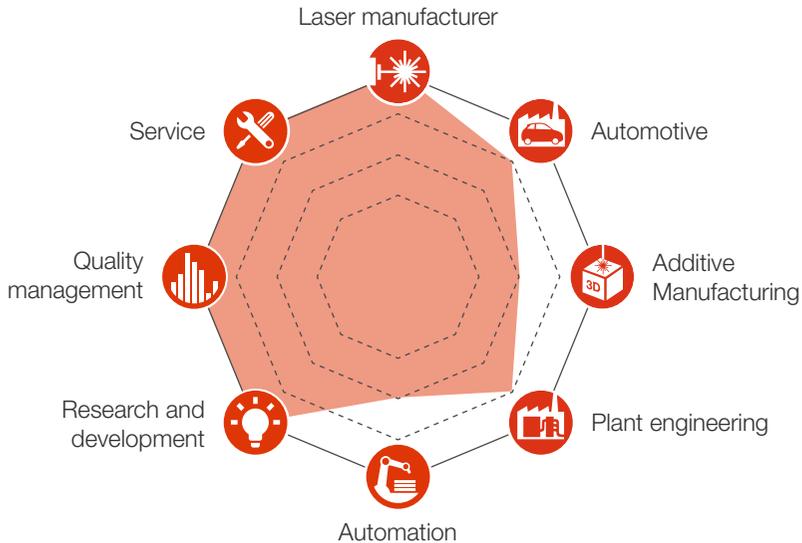
EC-PM

## Establish your own factory standard

Imagine getting identical results from every power meter in your facility — every time. With the PRIMES EC-PM, you can set a new company-wide standard for power measurement. Used as a reference device together with our exclusive on-site calibration software, it enables unified readings across your entire PRIMES line-up — from CPM/CPM+ to PM/PM+. Get in touch and discover how the EC-PM can become your gold standard.

MEASUREMENT PARAMETERS	CPM+ F-1	CPM+ F-10	CPM+ F-30
Power range	0.1 – 1.4 kW	0.5 – 10 kW	2 – 30 kW
Wavelength range	340 – 800 nm <sup>1)</sup> 800 – 1100 nm		
Irradiation time	continuous		
Max. power density	1 kW/cm <sup>2</sup>		
Average power density	0.5 kW/cm <sup>2</sup>		
DEVICE PARAMETERS			
Entrance aperture	45 mm	90 mm	180 mm
Max. beam diameter	23 mm	50 mm	90 mm
Max. centered tolerance	± 3 mm	± 5 mm	
Max. angle of incidence perpendicular to inlet aperture	± 10°		
Accuracy (NIR)	± 3 %		
Reproducibility	± 1.5 %		
Time constant	< 10 s		< 15 s
Flow meter	turbine	ultrasonic	
SUPPLY DATA			
Power supply	PoE Standard IEEE 802.3af-2003; Power class 3, USBc		
Recommended cooling water flow rate	1 – 2 l/min	7 – 10 l/min	20 – 30 l/min
Min. cooling water flow (interlock)	0.5 l/min	4 l/min	9 l/min
Cooling water temperature T <sub>in</sub>	Dew point temperature < T <sub>in</sub> < 30 °C		
Cooling water pressure	2 – 4 bar		
COMMUNICATION			
Interfaces	Ethernet/PoE/USB-C/Interlock		
DIMENSIONS AND WEIGHT			
Dimensions (L x W x H) (including connectors and device feet)	180 x 143 x 71 mm	180 x 182 x 71 mm	260 x 220 x 113 mm
Weight (approx.)	2.2 kg	3.2 kg	5.2 kg

<sup>1)</sup> Due to technical limitations and the lack of national high performance standards, calibrations for this wavelength range are currently not available. However, we have provided evidence that measurements can be made in this range. For this demonstration, we used low power absorption spectra and a wavelength transfer process. The latter requires the use of a PRIMES EC-PM with a wavelength independent absorber. For practical purposes, add 2 % to the instrument accuracy value above (+/-5 % instead of +/-3 %). We are also able to offer an additional verification using our 1 kW green Laser (515 nm).



## Your benefit

The CPM+ delivers highly accurate laser power measurements — regardless of beam size, position, or wavelength — thanks to its calorimetric design and advanced absorber. Its robust construction and maintenance-free ultrasonic flow meter ensure long-term reliability, even in demanding environments. Combined with PRIMES diagnostic tools, it provides all critical data to ensure process stability and enable targeted optimization.

- Highly accurate, repeatable measurements
- Compact, robust design for up to 30 kW
- Accuracy of 3%
- Independent of beam size, position, and wavelength
- Extremely high absorption, minimal back-reflection
- Extreme short time constants of under 15 s
- Full integration with FM+, BM+ and LDS for complete beam diagnostics

## CONCLUSION

As laser power levels continue to rise and applications expand, precise and reliable laser power measurement becomes more critical than ever. The CPM+ meets these challenges with outstanding robustness and unmatched flexibility — delivering accurate results regardless of beam position, angle, or wavelength — making it the perfect tool for researchers, manufacturers and machine builders alike.



For further information please visit [www.primes.de/cpm+](http://www.primes.de/cpm+)