CompactPowerMonitor CPM+



Calorimeter: position and

beam-size independent

USB-C, PUC,

safety interlock



SPECIAL FEATURE

INTERFACES

Pointing stability

Vector

ocus shift

Tech Corner

We believe that a power meter should be independent of the diameter and the position of the laser beam. This is why PRIMES relies on the calorimeter technology to build power meters. As just the amount of generated heat is counted, this technology is not affected by other laser parameters. No matter what the beam diameter or position is, the CPM+ will always show a correct and stable reading for the laser power.



CPM+ F-10

This is why the CompactPowerMonitor is the ideal choice for all laser power measurements, not only under ideal conditions in a laboratory, but also in a harsh industrial environment where positions and diameters and other parameters might vary.

It is surprisingly compact for a device with such a large power range. It can be used as a permanent absorber, excellent not only for service tasks, but also for burn-in tests running for hours or days. The built-in interlock connector ensures safety when running the device inside a cabin where there is a distance between the operator and the device.

The CPM+ features an advanced absorber that combines a proven surface structure with our optimized coating, resulting in a virtually flat response for all industrial laser wavelengths from blue to green to NIR. You don't even have to fiddle with setting a wavelength, you just go ahead and measure the laser power.



Establish your own factory standard

Have you ever dreamed of getting the same readings from all your power meters? Think about using a PRIMES EC-PM as a company standard! Contact us for further information on how to use it as a gold standard for all your PRIMES power measuring units like the CPM/ CPM+ and PM/PM+, using our unique on-site calibration software. This can be your way to identical power readings – company wide.

EC-PM

MEASUREMENT PARAMETERS	CPM+ F-1	CPM+ F-10	CPM+ F-20	CPM+ F-30	CPM+ C-9 1)
Power range	0.1 – 1.4 kW	0.5 – 10 kW	1 – 20 kW	2 – 30 kW	0.5 – 9 kW
Wavelength range in nm	340 - 1030 ²⁾ 1030 - 1080	340 - 1030 ²⁾ 1030 - 1080	340 - 1030 ²⁾ 1030 - 1080	340 - 1030 ²⁾ 1030 - 1080	340 - 1030 ²⁾ 1030 - 1080 and 10600
Irradiation time (depending on laser power)	continuous	continuous	continuous	continuous	continuous
Max. power density	1 kW/cm²	1 kW/cm²	1 kW/cm²	1 kW/cm²	10 kW/cm ² (Ø < 10 mm) 5 kW/cm ² (Ø 10 – 30 mm) 0.5 kW/cm ² (Ø 30 – 55 mm)
Average power density	0.5 kW/cm ²	0.5 kW/cm ²	0.5 kW/cm ²	0.5 kW/cm ²	5 kW/cm ² (Ø < 10 mm) 5 kW/cm ² (Ø 10 – 30 mm) 0.5 kW/cm ² (Ø 30 – 55 mm)
DEVICE PARAMETERS					
Entrance aperture	45 mm	90 mm	135 mm	180 mm	55 mm
Accuracy (NIR)	±3%	±3%	±3%	±3%	± 3 %
Accuracy (NIR) Reproducibility (NIR)	± 3 % ± 1.5 %	± 3 % ± 1.5 %	± 3 % ± 1.5 %	± 3 % ± 1.5 %	± 3 % ± 1.5 %
Accuracy (NIR) Reproducibility (NIR) Time constant	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 15 s	± 3 % ± 1.5 % < 10 s
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 15 s	± 3 % ± 1.5 % < 10 s
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply	± 3 % ± 1.5 % < 10 s	± 3 % ± 1.5 % < 10 s PoE Standard	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2	± 3 % ± 1.5 % < 15 s 2003; Power cla	± 3 % ± 1.5 % < 10 s ass 3
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water temperature T _{in}	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 l/min 4 l/min Dew po	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 - 30 l/min 15 l/min < T _{in} < 30 °C	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water temperature T _{in} Cooling water pressure	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min 2 - 4 bar	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 l/min 4 l/min Dew po 3 – 4 bar	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature 3 - 4 bar	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 - 30 l/min 15 l/min < T _{in} < 30 °C 3 - 4 bar	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min 2 – 4 bar
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water pressure Cooling water pressure	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min 2 - 4 bar	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 I/min 4 I/min Dew po 3 – 4 bar	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature 3 - 4 bar	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 - 30 l/min 15 l/min < T _{in} < 30 °C 3 - 4 bar	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min 2 – 4 bar
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water pressure Cooling water pressure COMMUNICATION Interfaces	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min 2 - 4 bar Ethernet	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 l/min 4 l/min Dew po 3 – 4 bar	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature 3 - 4 bar	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 - 30 l/min 15 l/min 2 < T _{in} < 30 °C 3 - 4 bar sal Connector),	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min 2 – 4 bar safety interlock
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water pressure Cooling water pressure COMMUNICATION Interfaces DIMENSIONS AND WEIGHT	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min 2 - 4 bar Ethernet	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 I/min 4 I/min Dew po 3 – 4 bar	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature 3 - 4 bar	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 - 30 l/min 15 l/min < T _{in} < 30 °C 3 - 4 bar sal Connector),	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min 2 – 4 bar safety interlock
Accuracy (NIR) Reproducibility (NIR) Time constant SUPPLY DATA Power supply Recommended cooling water flow rate Min. cooling water flow rate Cooling water pressure Cooling water pressure COMMUNICATION Interfaces DIMENSIONS AND WEIGHT Dimensions (L x W x H) (excluding connectors)	± 3 % ± 1.5 % < 10 s 1 - 2 l/min 0.5 l/min 2 - 4 bar Ethernet 180 x 123 x 71 mm	± 3 % ± 1.5 % < 10 s PoE Standard 8 – 11 I/min 4 I/min Dew po 3 – 4 bar /USB-C/PUC (F 180 x 162 x 71 mm	± 3 % ± 1.5 % < 10 s IEEE 802.3af-2 15 - 23 l/min 8 l/min int temperature 3 - 4 bar PRIMES Univers 260 × 162 x 113 mm	± 3 % ± 1.5 % < 15 s 2003; Power cla 25 – 30 l/min 15 l/min < T _{in} < 30 °C 3 – 4 bar sal Connector), 260 × 220 x 113 mm	± 3 % ± 1.5 % < 10 s ass 3 8 – 11 l/min 4 l/min 2 – 4 bar safety interlock 180 × 162 × 136 mm

¹⁾ This model requires a beam incidence central to the aperture.

²¹ 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 accuracyvalue above (+/-5 % instead of +/-3 %).



System description: The CompactPowerMonitors CPM+ are a family of power meters ranging from the 'small' CPM+ F-1 (max. 1.4 kW) to the CPM+ F-30 with a capacity of up to 30 kW. All of them feature the calorimetric measuring principle, making the readings stable and precise, especially making them independent of beam size and position. The good accuracy of \pm 3 % is a 'no footnote' value – there are no additional/hidden contributions as you might find in some data sheets (+ x % of scale, + y % of linearity, + z % for the readout device). The CPM+ can be used as a stand-alone power meter, providing the information you need on its integrated display. When using it with our new LaserDiagnosticsSoftware LDS, data storage, processing and analysis come at the click of your mouse. And of course, the parallel operation of a focus analyzing device like the FocusMonitor or BeamMonitor works seamlessly, combining your power readings with your laser profile data.

Your benefit: Lasers for NIR, green or blue – the CPM+ with its advanced absorber can measure them all. Due to the special surface structure in combination with the industry proven coating, it generates very low back reflection. An additional benefit is the compact size and low weight for a water-cooled instrument that can be used as a permanent absorber for high powers.

CONCLUSION

Improve your power measurements by using the PRIMES calorimetric technology. The CPM+ is the most reliable and precise tool to cover all requirements of a service technician and laser user.

For further information please visit www.primes.de/cpm+

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