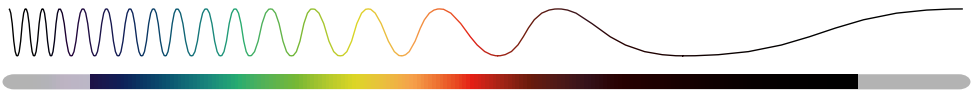
# CompactPowerMonitor CPM+

PRIMES

- Fiber and disc laser
- Diode laser
- High frequency pulse laser
- $CO_2$ laser

340 – 800 nm

800 – 1100 nm

**Reliable, precise and now even more robust due to its novel ultrasonic flow meter.**

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

| | |
|---|---|
| POWER RANGE | max. 30 kW |
| BEAM QUALITY $M^2$ | Up to single mode |
| APERTURE | max. 180 mm |
| HIGHLIGHT | Calorimeter: position and beam-size independent, ultrasonic flow meter |
| INTERFACES | Ethernet/PoE, USB-C, Interlock |

# Tech Corner

We believe that a highly accurate power meter also needs to be independent from external influences such as laser position and diameter. This is why PRMES relies on the calorimetric principle for all power meters. Despite being the most accurate and linear measuring principle by far, there is still room for improvement.


CPM+ F-10

Reliable, precise and now even more robust due to its novel ultrasonic flow meter.
By replacing the conventional flow meter with a new ultrasonic version, any potential interference from a wearing part is eliminated, making it even more reliable and easier to maintain in the long term.
This is why the CompactPowerMonitor CPM+ is the ideal choice for all laser power measurements, not only under ideal laboratory conditions, but also in harsh industrial environments.

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 long term tests running for hours or even days. Combined with a fiber receiver it can even measure the power output of fiber guided lasers directly out of the fiber.

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.


EC-PM

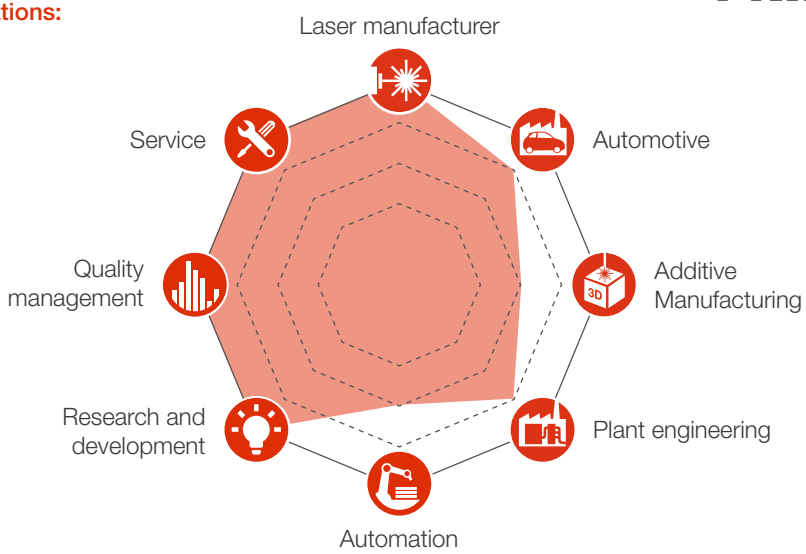
## Establish your own factory standard

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.

| 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 in nm | 340 – 800[1)]<br>800 – 1100 | 340 – 800[1)]<br>800 – 1100 | 340 – 800[1)]<br>800 – 1100 |
| Irradiation time<br>(depending on laser power) | continuous | continuous | continuous |
| Max. power density | 1 kW/cm² | 1 kW/cm² | 1 kW/cm² |
| Average power density | 0.5 kW/cm² | 0.5 kW/cm² | 0.5 kW/cm² |
| DEVICE PARAMETERS | | | |
| Entrance aperture | 45 mm | 90 mm | 180 mm |
| Max. beam diameter | 23 mm | 45 mm | 90 mm |
| Max. centered tolerance | ± 3 mm | ± 5 mm | ± 5 mm |
| Max. angle of incidence perpendicular to inlet aperture | ± 10° | ± 10° | ± 10° |
| Accuracy (NIR) | ± 3 % | ± 3 % | ± 3 % |
| Reproducibility (NIR) | ± 1.5 % | ± 1.5 % | ± 1.5 % |
| Time constant | < 10 s | < 10 s | < 15 s |
| SUPPLY DATA | | | |
| Power supply | PoE Standard IEEE 802.3af-2003; Power class 3, USBc | | |
| Recommended cooling water flow rate<br>Min. cooling water flow rate<br>Cooling water temperature $T_{in}$ | 1 – 2 l/min<br>0.5 l/min<br>Dew point temperature < $T_{in}$ < 30 °C | 8 – 11 l/min<br>4 l/min | 25 – 30 l/min<br>15 l/min |
| Cooling water pressure | 2 – 4 bar | 2 – 4 bar | 2 – 4 bar |
| COMMUNICATION | | | |
| Interfaces | Ethernet/PoE, USB-C, Interlock | | |
| DIMENSIONS AND WEIGHT | | | |
| Dimensions (L x W x H)<br>(including connectors and device feet) | 180 x 143 x 71 mm | 260 x 182 x 113 mm | 260 × 220 x 113 mm |
| Weight (approx.) | 2.2 kg | 4.7 kg | 5.8 kg |

[1)] 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 %). We are also able to offer an additional verification using our 1kW green Laser (515nm).

## Applications:




**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 ± 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 FM+ or BeamMonitor BM+ works seamlessly, combining your power readings with your laser profile data.

**Your benefit:** Lasers in the 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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