



# CompactPowerMonitor



## Compact, Mobile, Precise

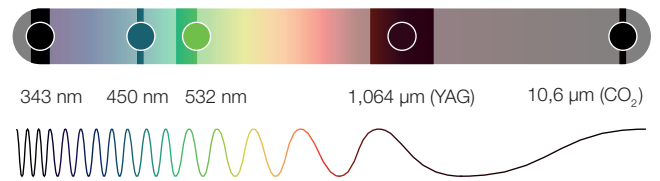
The CompactPowerMonitor family is prepared to attend to your needs with an entire model series. Every one of the five models is sure to win you over with their compact design as well as simple handling and operation. Depending on the model in use, the devices can measure laser power ranging from 100 watts to 30 kW. Absolute power and maximum power density of the irradiation are the decisive factors here.

Knowing what's important: The CompactPowerMonitor (CPM) is designed to meet the demands of laser users and laser manufacturers as well as equipment manufacturers. Its greatest advantage is its outer appearance: An astoundingly compact construction make the device extremely mobile. This allows

you to use it on a wide variety of different machines within the factory or the laboratory. The various designs in the series are differentiated mainly by absorber size and the necessary cooling water flow rate. Connecting, operating, and handling is exactly the same for all five models.

## Beam Parameters

CompactPowerMonitor devices are ideally suited to measuring the beam power of continuous wave laser sources. It can be used at a variant of wavelengths, for example



- 1030 nm – 1080 nm (NIR)  
typ. YAG-, fiber- and disk laser
- 808 nm – 1030 nm  
typ. diode laser
- 515 nm – 532 nm  
frequency doubled solid state laser
- 450 nm  
blue diode laser
- 343 nm – 366 nm  
typ. frequency tripled solid state laser
- 10 600 nm for the CPM C-9  
CO<sub>2</sub> laser



CompactPowerMonitor F-1 with adapter ring



CompactPowerMonitor F-20



## The Principle

The calorimetric measuring principle facilitates high-precision measurements regardless of beam diameter and striking position on the absorber. All models in the CPM family are characterized by an extremely low rate of back reflection. They are water-cooled and meant for long-term use – even with deionized water.

## Diverse Models & Options

### CPM F-10

- Power range 0.5 – 10 kW
- Large, level absorber

### CPM F-1

- Power range 100 W – 1.4 kW
- Derived from CPM F-10; it is considerably smaller and can be used in very tight laser processing cells

### CPM F-20

- Power range 1.0 – 20 kW
- The free aperture of 135 mm facilitates power measurements far behind the focus plane or even of very large raw beam diameters, behind a telescope for example

### CPM F-30

- Power range 2.0 – 30 kW
- For power densities up to 1 kW/cm<sup>2</sup>
- 185 mm aperture

### CPM C-9

- Power range 0.5 – 9 kW
- For power densities up to 10 kW/cm<sup>2</sup> with conical reflector and cylindrical absorber, can also be used at 10 600 nm

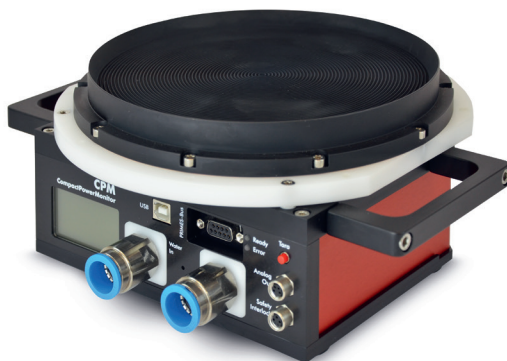
## Your Benefit: Optional Accessories

- ① Adapter for measuring fibers (LLK-D, QBH, QD)
- ② Safety-, transport-, and storage box
- ③ External display unit

## Higher Safety with Fiber Adapter

The fiber adapter makes it possible to directly connect a fiber to a power meter. This allows for laser power measurements of even very high-power lasers under protected conditions.

Adapters for some of the most common fiber couplers such as LLK-D, QBH and QD are available for the CompactPowerMonitors CPM F-1, CPM F-10, and CPM F-20.



CompactPowerMonitor CPM F-30



CompactPowerMonitor C-9



## Technical Data

	CPM F-1	CPM F-10	CPM F-20	CPM F-30	CPM C-9 <sup>1)</sup>
<b>MEASUREMENT PARAMETERS</b>					
Power range	0.1 – 1.4 kW	0.5 – 10 kW	1.0 – 20 kW	2.0 – 30 kW	0.5 – 9 kW
Wavelength range	1 030 – 1 080 340 – 1 030 nm <sup>2)</sup>	1 030 – 1 080 340 – 1 030 nm <sup>2)</sup>	1 030 – 1 080 340 – 1 030 nm <sup>2)</sup>	1 030 – 1 080 340 – 1 030 nm <sup>2)</sup>	1 030 – 1 080 340 – 1 030 nm <sup>2)</sup> and 10 600 nm
Irradiation time	continuous	continuous	continuous	continuous	continuous
Max. power density	1 kW/cm <sup>2</sup>	1 kW/cm <sup>2</sup>	1 kW/cm <sup>2</sup>	1 kW/cm <sup>2</sup>	10 kW/cm <sup>2</sup> (Ø < 10 mm) 5 kW/cm <sup>2</sup> (Ø 10 – 30 mm) 0.5 kW/cm <sup>2</sup> (Ø 30 – 55 mm)
Average power density	0.5 kW/cm <sup>2</sup>	0.5 kW/cm <sup>2</sup>	0.5 kW/cm <sup>2</sup>	0.5 kW/cm <sup>2</sup>	5 kW/cm <sup>2</sup> (Ø < 10 mm) 5 kW/cm <sup>2</sup> (Ø 10 – 30 mm) 0.5 kW/cm <sup>2</sup> (Ø 30 – 55 mm)
<b>DEVICE PARAMETERS</b>					
Entrance aperture	45 mm	90 mm	135 mm	180 mm	55 mm
Accuracy (NIR)	± 3 %	± 3 %	± 3 %	± 3 %	± 3 %
Reproducibility (NIR)	± 1.5 %	± 1.5 %	± 1.5 %	± 1.5 %	± 1.5 %
Time constant	< 10 s	< 10 s	< 10 s	< 15 s	< 10 s
<b>SUPPLY DATA</b>					
Power supply	24 V DC ± 5 %, max. 0.5 A	24 V DC ± 5 %, max. 0.5 A	24 V DC ± 5 %, max. 0.5 A	24 V DC ± 5 %, max. 0.5 A	24 V DC ± 5 %, max. 0.5 A
Min. cooling water flow rate	0.5 l/min	4 l/min	4 l/min	15 l/min	4 l/min
Max. Cooling water flow rate	2 l/min	12 l/min	25 l/min	30 l/min	12 l/min
Cooling water temperature T <sub>in</sub> <sup>1)</sup>	Dew point temperature < T <sub>in</sub> < 30 °C				
Max. cooling water pressure	4 bar	4 bar	4 bar	4 bar	4 bar
Min. cooling water pressure	2 bar	2 bar	2 bar	2 bar	2 bar
<b>COMMUNICATION</b>					
Interfaces	USB and RS485	USB and RS485	USB and RS485	USB and RS485	USB and RS485
<b>DIMENSIONS AND WEIGHT</b>					
Dimensions (L x W x H) (excl. connectors)	180 x 123 x 71 mm	180 x 162 x 71 mm	260 x 162 x 113 mm	260 x 220 x 113 mm	180 x 162 x 136 mm
Weight (approx.)	2.2 kg	3.1 kg	4.7 kg	5.8 kg	5.1 kg
<b>ENVIRONMENTAL CONDITIONS</b>					
Operating temperature range	15 – 40 °C	15 – 40 °C	15 – 40 °C	15 – 40 °C	15 – 40 °C
Permissible relative humidity (non-condensing)	10 – 80 %	10 – 80 %	10 – 80 %	10 – 80 %	10 – 80 %

<sup>1)</sup> This model requires a beam incidence central to the aperture.

<sup>2)</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 (+/-5 % instead of +/-3 %).