PowerMonitor PM

The PowerMonitor (PM) uses the same calorimetric principle as the CompactPowerMonitor. In contrast to the flat absorber of the CompactPowerMonitor, the laser beam entering the PowerMonitor is guided into a cylindrical absorber via a focussing mirror. A highly absorbing coating is applied on the inside of the water-cooled absorber. The cylindrical absorber enables very high absorption levels at very low back reflection.

This procedure is suitable for highest power levels. All parts that come into contact with the cooling water are made of copper or brass. This effectively prevents stress corrosion in the coolingcircuit. A pneumatic shutter protects the PowerMonitor from contamination.

The development of the PowerMonitor was centred around the following requirements:

- Absorption of radiation with high power density
- High absorption level
- Long term stability
- Accuracy
- Reproducibility
- Short measuring times
- Reliable operation in rough environments

In Practice

The PowerMonitor is intended for both laser source manufacturers and plant manufacturers for the measurement of high laser beam powers. The relatively high mobility of the device enables an application at different systems within a company. However, the PowerMonitor is also suitable for process control when it comes to system integration.

Measured Beam Parameters

Beam power of continuous wave laser sources in the wavelength range of solid-state lasers (YAG) or CO_2 lasers, depending on the calibration. The different models cover power ranges from 300 W up to 25 kW. A system for even 50 kW will soon be available.

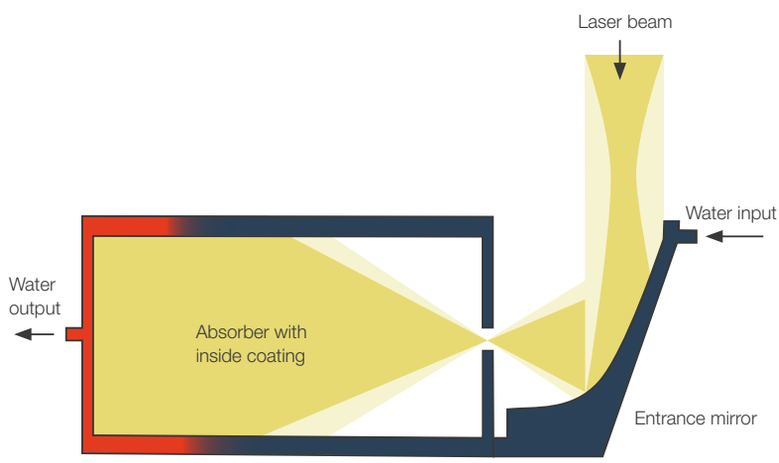
Data Transfer and Display

The PowerMonitor displays the measurement values on an integrated LCD-screen. Furthermore, it can be operated via a PC using the graphical user interface of the PowerMonitorSoftware. It enables the analog display of the current laser power as well as the recording of data over time.

An output signal that is proportional to the power (0 – 10 V) is available as well.

In addition to the incident laser power, the current flow rate, the water temperature as well as the temperature increase of the cooling water can be displayed.

PowerMonitor PM



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

Technical Data

	PM48	PM100
Measurement Parameters		
Power range	300 W – 8 kW	1 kW – 25 kW
Irradiation time	continuous	continuous
Wavelength range	800 – 1100 nm, 10600 nm	800 – 1100 nm, 10600 nm
Entrance aperture	48 mm	100 mm
Max. power density	15 kW/cm²	5 kW/cm²
Accuracy	± 2 %	± 2 %
Reproducibility	± 1 %	± 1 %
Time constant	15 s up to 99 % of final value	60 s up to 99 % of final value
Supply Data		
Power supply	24 V DC ± 5 %, max. 0.5 A	24 V DC ± 5 %, max. 0.5 A
Compressed air	for shutter mechanism	for shutter mechanism
Min. air pressure	2 bar	2 bar
Max. air pressure	3 bar	3 bar
Cooling water flow rate	> 5 l/min	> 12 l/min
Cooling water stability	< 1 K/min	< 1 K/min
Maximum water inlet pressure	6.5 bar	6.5 bar
Communication		
Interfaces	serial/USB	
Dimensions and Weight		
Dimensions (L × W × H) (excl. connectors)	354 x 243 x 125 mm	540 x 330 x 210 mm
Weight	10 kg	50 kg
Mounts for connection of a FocusMonitor	optional	optional
Environmental Conditions		
Operating temperature range	+10 °C up to +40 °C	
Permissible relative humidity (non-condensing)	10 – 80 %	