

PowerMeasuringCassette PMC



The PowerMeasuringCassette (PMC) is intended for power measurements of solid-state lasers. It will be placed into the laser processing head as direct integration instead of the protection glass drawer. The PMC is available for laser processing heads from Trumpf (BEO D70), Precitec (YW52) and Scansonic (AL03).

The laser power in the interaction zone is one of the key parameters for the processing result in the field of laser material processing. A power decrease can result in serious quality problems with regard to the processed component, which is why the laser power has to be measured directly in or near the processing zone. As a mobile laser power sensor, the PowerMeasuringCassette enables the determination of the laser power directly at the processing head.

In Practice

This measuring system is able to monitor the beam power in daily operation.

Due to the compact design, the PMC even enables measurements when there is not enough space for a measuring device below the processing head.

A sealed housing protects the PMC from impacts and humidity. It has an integrated LCD display. Electricity for its operation is supplied by an integrated lithium cell, which can be charged via a micro-USB port.

The temperature of the PMC should not exceed the critical temperature limit. In order to be able to control this vital system parameter, it is strongly recommended to use the available interlock signal.

The PMC is also available as ultracompact Bluetooth device (PMC-C) without LCD display. Control of the PMC-C will be done by an Android mobile device using the PRIMES Cube App.

Beside this device for Trumpf BEO processing heads, two new models for further processing heads are available. For the PMC-YW, the drawer is adapted to the geometry of the protective glass cartridge of Precitec type YW52 processing heads. The PMC-ALO has the drawer geometry of the protective glass cassettes of Scansonic ALO3 processing heads.

Measuring Procedure – the Principle

The absorber of the calorimetric measuring system is irradiated with the laser for a short period of time, before the absorber temperature is measured. On the basis of the temperature increase, the microprocessing-based electronics is then able to measure the laser power with high accuracy.

The idea behind the mechanical integration is to make use of the concept of a removable cassette in the focusing head. The PowerMeasuringCassette simply replaces the protective window cartridge.

Measured Parameters

Power of solid-state lasers at:

- Wavelength: 900 – 1 090 nm
- Power range: 400 – 12 000 W
- Measuring time: 100 – 1 000 ms (depending on the laser power)

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From left to right:
PMC-C, PMC-BEO, PMC-YW,
PMC-ALO

Technical Data

	PMC-BEO	PMC-YW	PMC-ALO	PMC-C
Measurement Parameters				
Beam dimensions	10 – 30 mm			
Power range				
• Standard absorber ¹⁾	400 – 8 000 W ²⁾	400 – 6 000 W ²⁾	400 – 6 000 W ²⁾	400 – 6 000 W ²⁾
• Advanced absorber ¹⁾	400 – 12 000 W ²⁾	–	–	400 – 12 000 W ²⁾
Wavelength range	900 – 1 090 nm			
Irradiation time	0.1 – 1 s (depending on the laser power) ²⁾			
Nominal measuring frequency	300 J: 1 cycle/min, 3 000 J: 1 cycle/15 min			
Measuring accuracy at angles of incidence up to 5 °	± 3 %			
Reproducibility	± 1 %			
Limit Values				
Max. absorber temperature	120 °C	120 °C	120 °C	120 °C
Energy per measurement	50 – 3 000 J	30 – 2 000 J	25 – 1 500 J	50 – 3 000 J
Recommended energy per measurement	300 – 500 J			
Max. power density (peak) on the absorber (approx. 25 mm underneath the protective window) at beam diameters				
• Standard absorber	> 10 mm 10 – 3 mm 3 – 1.5 mm < 1.5 mm	1.5 kW/cm ² 2.5 kW/cm ² 5 kW/cm ² 6 kW/cm ²	1.5 kW/cm ² 2.5 kW/cm ² 5 kW/cm ² 6 kW/cm ²	1.5 kW/cm ² 2.5 kW/cm ² 5 kW/cm ² 6 kW/cm ²
• Advanced absorber	> 10 mm 10 – 3 mm 3 – 1.5 mm < 1.5 mm	4 kW/cm ² 5 kW/cm ² 10 kW/cm ² 12 kW/cm ²	– – – –	4 kW/cm ² 5 kW/cm ² 10 kW/cm ² 12 kW/cm ²
Max. laser rise time	100 µs	100 µs	100 µs	100 µs
Max. angle of incidence	± 5°	± 5°	± 5°	± 5°
Supply Data				
Power supply	Integrated lithium-ion battery, which can be recharged via a micro-USB port			
Communication				
Interfaces	USB			USB/Bluetooth
Dimensions and Weight				
Dimensions (L x W x H)	179 x 84 x 31 mm	171 x 84 x 24 mm	177 x 84 x 24 mm	100 x 76 x 31 mm
Weight (approx.)	460 g	280 g	280 g	350 g
Environmental Conditions				
Operating temperature range	+ 10 up to + 40 °C			
Permissible relative humidity (non-condensing)	10 – 80 %			

¹⁾ Please read the information on the identification plate to determine if your device is equipped with a standard or advanced absorber.

²⁾ The stated limit values are to be understood in correlation with the permitted maximum energy ($E = P \cdot t$).