



PowerMeasuringCassette



On the Heels of the Defect in a Neck and Neck Race

Clever minds: When cycle times grow ever shorter and error tolerances ever lower, it is important to be sure of your beam power every day and at all times. That's why you should put your trust in the mobile laser power sensor PowerMeasuringCassette, which measures right at the processing head and is designed for the processing heads from Trumpf, Precitec, and Scansonic.

The laser power in the interaction zone is a key parameter to the process result in laser material processing. Before a drop in power causes serious quality issues on a component being processed, it makes sense to measure the laser power directly in or near the process zone. As a mobile laser power sensor, the PowerMeasuringCassette (PMC) makes it possible to determine the laser power right at the processing head. The PMC is available for processing heads from Trumpf, Precitec, and Scansonic and replaces the protective window when directly integrated. This special power meter is used to measure the power of solid-state lasers.

Measuring: Daily, Mobile, via App

This measuring system is suitable for monitoring beam power during daily operation. Thanks to its compact design, power measurements can be taken even when there isn't enough space below the processing head for a measuring device.

A protective casing shields the PowerMeasuringCassette from shocks and moisture. It has an integrated LCD display. The Cube gets its energy to operate from a lithium cell that can be conveniently charged through a micro-USB connection.

The temperature of the PMC should not exceed the critical temperature limit. An interlock signal is available for monitoring of this important system parameter and we recommend that you use it. The PowerMeasuringCassette is now also available in an especially compact model with bluetooth (PMC-C) instead of the display. It can then be controlled via a mobile phone or tablet (Android) using the PRIMES Cube app.



Variety of Models

In addition to the special model for Trumpf-BEO processing heads, we have expanded the selection to include two more models. The slot in the geometry of the protective window cartridge of Precitec-YW52 processing heads has been adjusted for the PMC-YW. With the PMC-ALO, the slot is designed precisely for Scansonic-ALO3 processing heads.

Special Properties

The absorber of the calorimetric measuring system is irradiated with the laser beam for a short time. The absorber temperature is then measured. Based on the rise in temperature, the microprocessor-based electronics are capable of producing a high-precision calculation of the laser power.

Mechanical integration is achieved by making use of the concept for a removable cartridge in the focusing head. For the duration of the power measurement, the protective window cartridge of the processing head is replaced by the PowerMeasuringCassette.

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 laser power)



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



Technical Data

	PMC-BEO	PMC-YW	PMC-ALO	PMC-C
MEASUREMENT PARAMETERS				
Power range	400 – 12 000 W	400 – 6 000 W	400 – 6 000 W	400 – 12 000 W
Wavelength range	900 – 1 090 nm	900 – 1 090 nm	900 – 1 090 nm	900 – 1 090 nm
Max. beam diameter on the absorber	30 mm	10 – 30 mm	10 – 30 mm	10 – 30 mm
Max. power density on the absorber (approx. 2 mm underneath the protective window) at beam diameters				
> 10 mm	4 kW/cm ²	1.5 kW/cm ²	1.5 kW/cm ²	4 kW/cm ²
10 – 3 mm	5 kW/cm ²	2.5 kW/cm ²	2.5 kW/cm ²	5 kW/cm ²
3 – 1.5 mm	10 kW/cm ²	5 kW/cm ²	5 kW/cm ²	10 kW/cm ²
< 1.5 mm	12 kW/cm ²	6 kW/cm ²	6 kW/cm ²	12 kW/cm ²
Irradiation time	0.1 – 1 s (depending on the laser power) ¹⁾	0.1 – 1 s (depending on the laser power) ¹⁾	0.1 – 1 s (depending on the laser power) ¹⁾	0.1 – 1 s (depending on the laser power) ¹⁾
Min. on/off times (duty cycle) for pulsed lasers	50 µs (e.g. max. 10 kHz at 50% duty cycle)	50 µs (e.g. max. 10 kHz at 50% duty cycle)	50 µs (e.g. max. 10 kHz at 50% duty cycle)	50 µs (e.g. max. 10 kHz at 50% duty cycle)
Max. laser rise time	100 µs	100 µs	100 µs	100 µs
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	300 – 500 J	300 – 500 J	300 – 500 J
Total duration until measurement value output	< 15 s	< 15 s	< 15 s	< 15 s
Nominal measuring frequency	300 J: 1 cycle/min, 3 000 J: 1 cycle/15 min	300 J: 1 cycle/min, 3 000 J: 1 cycle/15 min	300 J: 1 cycle/min, 3 000 J: 1 cycle/15 min	300 J: 1 cycle/min, 3 000 J: 1 cycle/15 min
DEVICE PARAMETERS				
Max. absorber temperature	120 °C	120 °C	120 °C	120 °C
Max. angle of incidence	± 5°	± 5°	± 5°	± 5°
Max. centered tolerance	± 2.0 mm	± 2.0 mm	± 2.0 mm	± 2.0 mm
Measuring accuracy at angles of incidence up to 5 °	± 3 %	± 3 %	± 3 %	± 3 %
Reproducibility	± 1 %	± 1 %	± 1 %	± 1 %
SUPPLY DATA				
Power supply	Integrated lithium-ion battery, which can be recharged via a micro-USB port			
Temperature range for charging the lithium-ion battery	0 – 45 °C	0 – 45 °C	0 – 45 °C	0 – 45 °C
COMMUNICATION				
Interfaces	USB	USB	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	15 – 40 °C	15 – 40 °C	15 – 40 °C	15 – 40 °C
Storage temperature range	5 – 50 °C	5 – 50 °C	5 – 50 °C	5 – 50 °C
Reference temperature	22 °C	22 °C	22 °C	22 °C
Permissible relative humidity (non-condensing)	10 – 80 %	10 – 80 %	10 – 80 %	10 – 80 %

¹⁾ The stated limit values are to be understood in correlation with the permitted maximum energy ($E = P \cdot t$).