

Sensor- und Lasertechnik

Power and Energy Measurement for Lasers



Sensor- und Lasertechnik



- Pyroelectric Detectors
- Thermopile Detectors
- Powermeter
- OEM-Detectors
- THz-Detectors

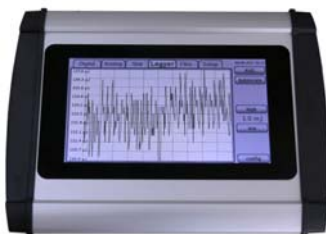
Power and Energy Meter PEM 710

A large 7" capacitive touch panel and clearly arranged menus make this device very comfortable and easy to handle.

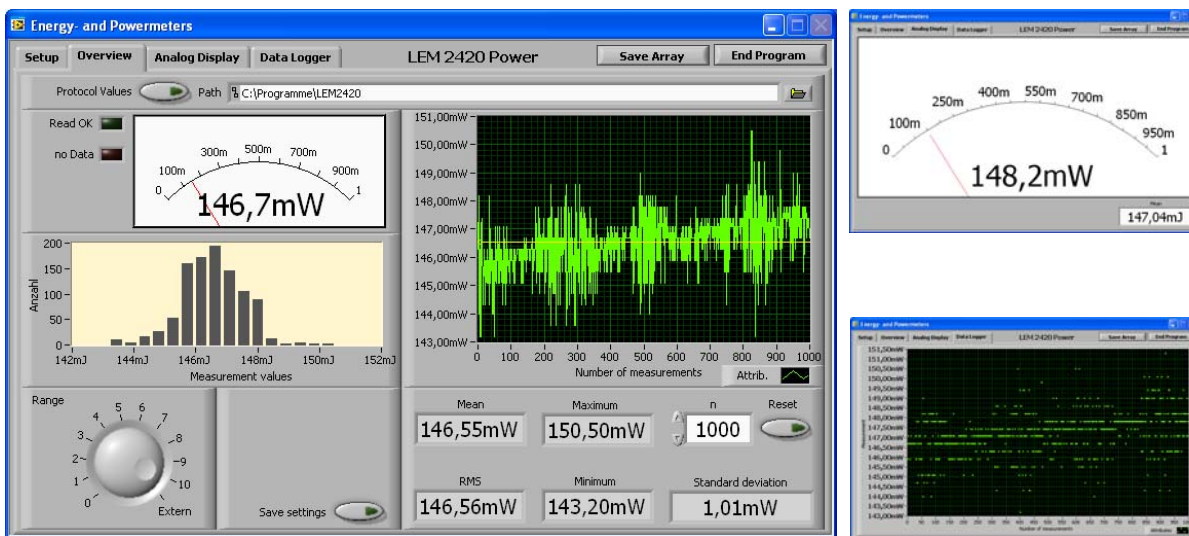
Very low noise amplifiers and for every signal path optimised AD converters, allow to use a wide range of sensor heads. After connecting a detector, the display read all relevant parameters from detector-EEPROM and setting up the device automatically. Manually setup possibilities for wavelength and correction are possible.

The large graphic display offers space for a variety of display and analysis choices. The digital display can be used for determining the energy, frequency and average power. The analogue part with its bar graph display is useful for e.g. laser adjustments. Laser stability can be monitored using the data logger and statistics window. Also a data logging window and a statistic window with histogram in selectable

The PEM 710 is equipped with USB interfaces. These ports allow remote control and transferring of all data to a PC or USB memory stick. An analogue output give a lot of possibility fo integration the display into own measurement arrangements.



- For pyroelectric energy sensor heads and thermopile power sensor heads
- Digital display, analogue display, graphic data logger, statistics and histogram
- HiRes 7" Graphic display with background illumination
- Wide dynamic range
- Input of correction factors e.g. for mirrors or beam splitters
- Wavelength correction
- Adjustable trigger level
- Analogue output
- Capacitive touch panel
- USB 2.0 interface for remote operation
- compatible to all heads of PEM, HP, LP and BB series
- In energy mode rep rates 1000 pps
- Data storage on USB memory stick
- Compatible with E-connector with integrated EEPROM with all detector parameters
- Dimension 220 mm x 190 mm x 57 mm



A Labview based software for displaying all via USB transferred data is also available. An overview window shows a small analog instrument, Histogram, data logger and also some statistical results. Additionally it is possible to save the showed data into a file.

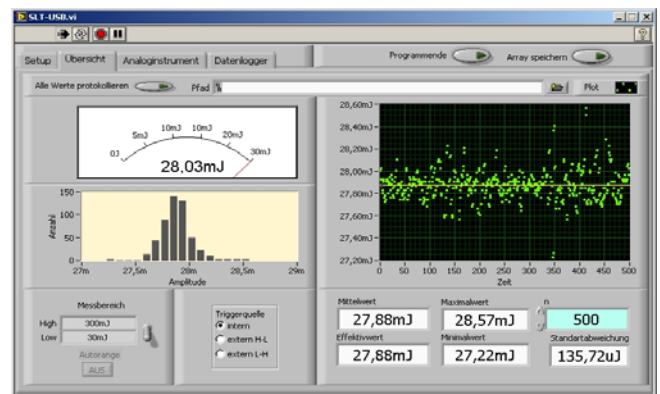
For adjustment work it is possible to switch to the analog instrument or the data logger.

Some basic Labview VIs for own projects are available. Because of the simple data structure and the simulated COM-port it is very easy to implement the device in other programming languages or other operating systems.

Pyrobox and Powerbox

Use this interfaces to connect your pyroelectric or thermopile detector directly to your PC. It's simple to program and drivers for the most operating systems are available.

- USB 2.0 connection
- Power supply from USB
- Labview based software for different applications available (Analogue and digital display, data logger, statistics)
- Data transfer as ASCII code



Powerbox:

- For all thermopile detectors
- Compatible with E-connector
- Four ranges
- On request with RS232 output
- For BNC-Input choose Powerbox –OEM
- Dimensions 110 mm x 62 mm x 30 mm

Pyrobox:

- For all PEM detectors
- Two ranges
- Max. rep. rate 100 pps
- Additional external trigger input
- Dimensions 90 mm x 62 mm x 30 mm

LM100-3

This read out unit is designed to measure the output power of different lasers in combination with a thermopile detector. The maximum power is limited by the used power head. By using this read out unit it is possible to reduce the time constant of the whole measurement system to 1 second. Normally, the time constant of a power head is in the region of 15 to 25 seconds.

The LM100 is equipped with a rechargeable battery and charging unit. It is possible to operate the LM100 either from the power supply or rechargeable built-in batteries so that it remains versatile and can be adapted to most applications. The batteries are automatically charged when the instrument is plugged into the power supply. The batteries can also be charged when the LM100 is turned off. The charging circuit prevents the batteries from being overcharged. The state of the batteries and the charging circuit is displayed by two LEDs.

- large analogue display
- 8 ranges : 1 mW .. 3 W
- power supply and battery operation
- integrated charging unit
- time between charges: 300 hrs.
- time constant 1 sec.
- solid metal case
- outer dimensions: 160x180x70 mm³
- analogue output



Thermopile Detectors

The listed power heads are based on thermoelectric principles, which means that the heat generated from the incident radiation is transformed directly into a voltage.

The heads of BB – series have a black, broadband absorbing coating, whereas the HP – series is equipped with a ceramic layer allowing higher energy and power densities.

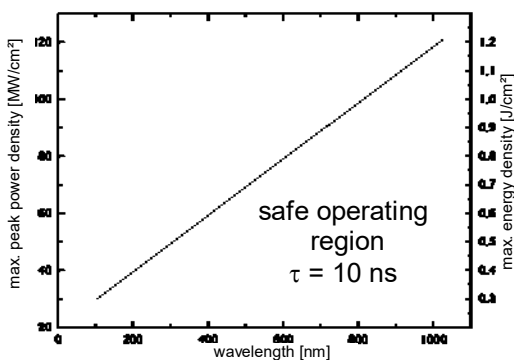
The head HP 25 S is specially made for service application. The compact dimensions enable easier transport. Due to the smaller heat sink, high powers are only possible for a short time.

The heads need several seconds to reach a thermal equilibrium. To avoid this delay time, we recommend the use of one of our read out units, such as LM 100 or PEM710. These devices determine the voltage and their increase and evaluate the laser power from this data. The time constant of the whole system is reduced to 1 second.

The main characteristic of the LP sensor is the very high sensitivity. This enables the sensor to measure small laser power with high precision and resolution over the high dynamic range of 6 orders of magnitude. For stabilisation of the sensor one can use a thermal isolation of the sensor housing. Additionally, the housing has a removable tube to protect the surface against stray light and air moving. Additionally, you can replace the tube by special adapters for using optical fibres.

	BB 10*	LP 20	BB 25 S	HP 25 S	HP 25 / 50
active diameter	10 mm	20 mm	25 mm	25 mm	25 mm
Power range	100 µW - 3 W	10 µW - 3 W	1 mW - 10 W	1 mW - 10 W	1 mW - 50 W
max. power density	40 W/cm ²	2.5 W/cm ²	40 W/cm ²	40 W/cm ²	40 W/cm ²
sensitivity	250 mV/W	5 V/W	70 mV/W .. 150 mV/W		
Cooling	convection				
connector	E-connector with EEPROM				

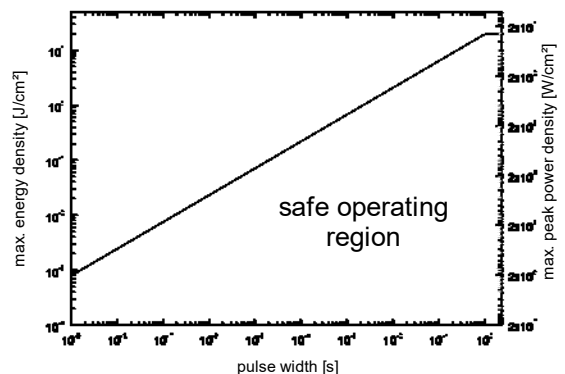
permissible power and energy densities vs. wavelength for sensors of HP-series

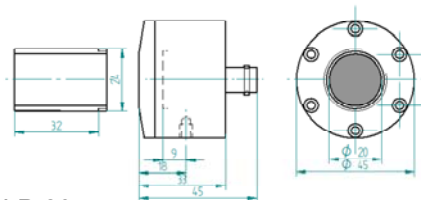
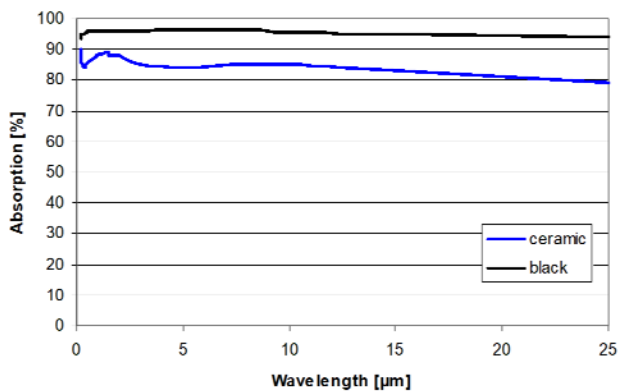


for pulses with width t [ns] apply :

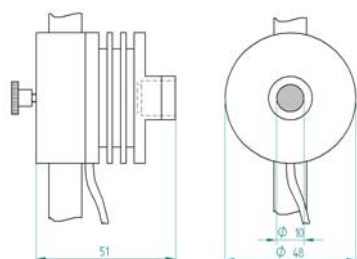
$$E_{max} [J/cm^2] = 10^{-2} \cdot (5 + 0.03 \cdot \lambda [nm]) \cdot \sqrt{t [ns]}$$

permissible power and energy densities vs. pulse width for sensors of BB-series

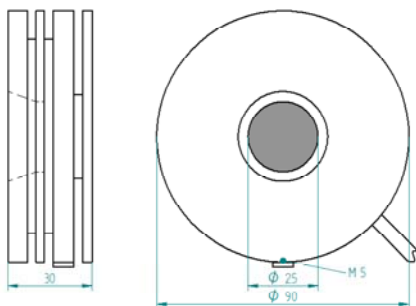




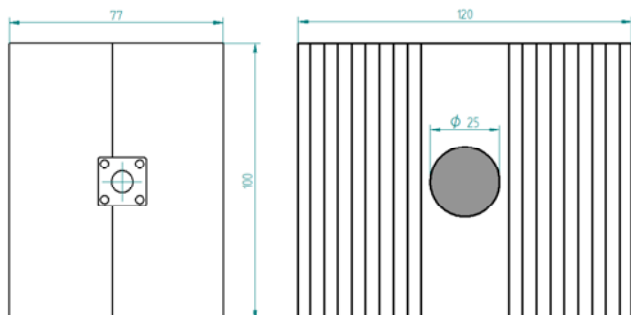
LP 20



BB 10



BB 25 S



HP 25/50



Basics

Calibration

Displays

Energy Detectors

Power Detectors

THz Detectors

OEM

Amplifiers

OEM Powermeter

These family of high sensitive thermopile sensors and electronics are ideally for online power monitoring.

The sensor elements are available in different sizes for different power ranges. The housings have a lot of holes for mounting and combination with additional optical components like

beam splitters, diffuser discs or optical fibre adaptors, please ask for a solution.

Additionally a preamplifier module with analogue output is available to read the power directly into own applications. For digital interface the OEM Powerbox are available.

PM404010

	PM404010-3	PM404010-5	PM404010-3-A	PM404010-5-A
active diameter	10 mm	10 mm	10 mm	10 mm
Power range	0.5 mW - 3 W	0.5 mW - 5 W	0.5 mW - 3 W	0.5 mW - 5 W
max. power density	40 W/cm ²	40 W/cm ²	40 W/cm ²	40 W/cm ²
sensitivity	250 mV/W .. 450 mV/W		1 V/W	
Cooling	convection			
connector	SMA	SMA	Molex Microblade	

PM404010-5

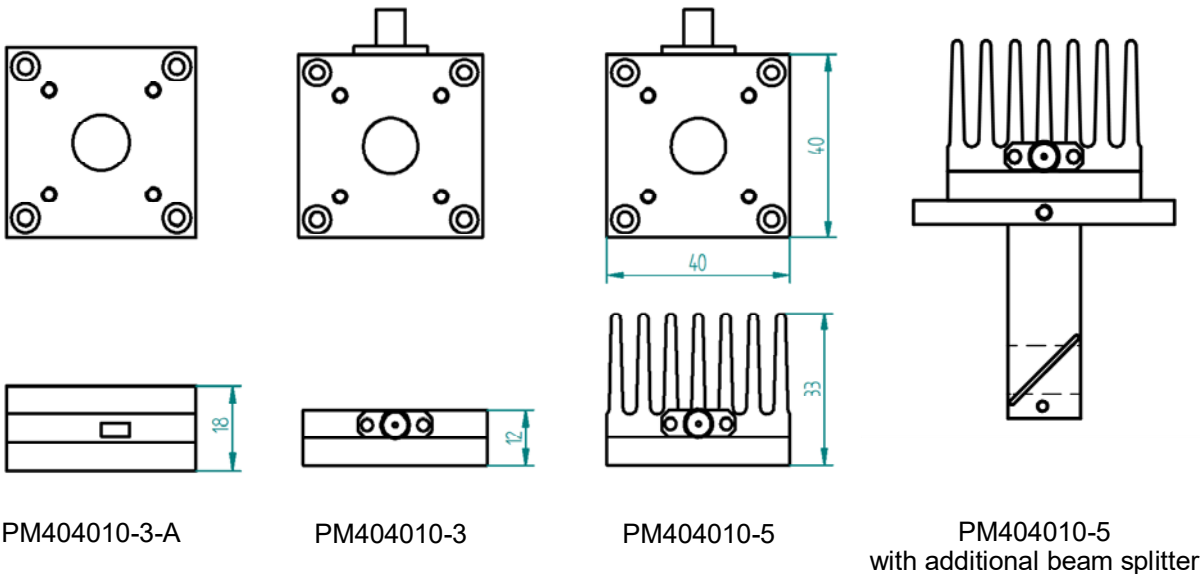


PM404010-5-A



PM404010-3





PM404010-3-A

PM404010-3

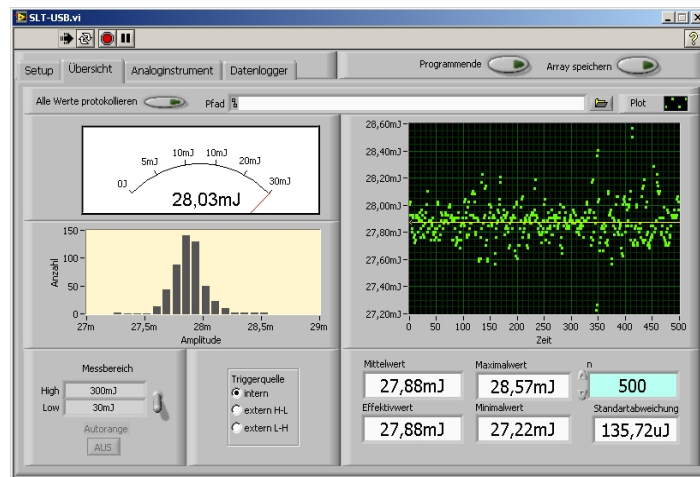
PM404010-5

PM404010-5 with additional beam splitter

OEM Powerbox

This „Powerbox“ processes the signals of all thermopile power detectors. The output signal will be transferred to a connected PC via USB. The device is powered from the USB-port. The Powerbox communicates with the computer using ASCII code and is very easy to integrate into your own existing software program or systems.

- USB 2.0 connection
- Power supply from USB
- Labview based software for different applications available (Analogue and digital display, data logger, statistics)
- Data transfer as ASCII code
- For all thermopile detectors
- Four ranges
- On request with RS232 output
- Dimensions 100 mm x 41 mm x 24 mm



SLT Sensor- und Lasertechnik GmbH

Freiheitstr. 124-126
15745 Wildau
Germany

Tel.: +49 3375 5257201
Fax: +49 3375 5257203

www.pyrosensor.de
service@pyrosensor.de