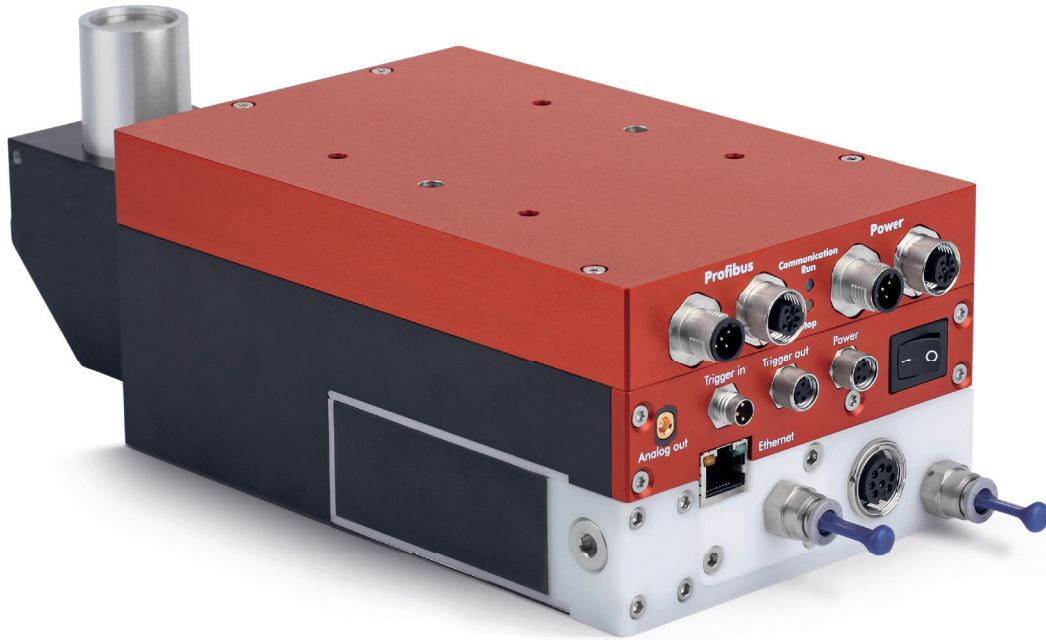




MicroSpotMonitor-Compact



Your Eye on the Ground in Micromachining

Camera on: Are you in the business of milling and cutting for micromachining? Then there's no way you can afford to let flaws in quality slip by when you're machining a workpiece. The camera-based focus analysis system MicroSpotMonitor-Compact is specially designed for use in tight spaces in micromachining systems and can be modularly expanded to meet your requirements. Focus in on your beam parameters and benefit from a consistently high level of quality during production.

Top precision is the name of the game for applications such as spot welding in medical technology, laser sintering in SLM systems, or drilling cooling ducts into turbine blades. Beam analysis can be especially hard to perform in tight spaces. It is for precisely these specialized needs that we designed the solid MicroSpotMonitor-Compact, which is perfectly suited to mea-

asuring beam waist diameters of NIR beams of 20 – 600 μm and is sure to impress with its many different user prompts.

We have designed the MicroSpotMonitorCompact to take up so little space that it can accommodate a minimal beam entrance height of 150 millimeters resting on the surface of a DIN A5 sheet of paper. It measures the power density distribution (for a single intersecting plane), the beam measurements, and the orientation of the beam in the measuring plane. Depending on the chosen spatial resolution, repeated measurements can be taken with a repetition rate of up to one Hertz.

Although this monitoring device does not have its own axes of movement, caustic measurements conforming to standards can be easily performed in conjunction with an external z-axis: Focus dimensions, focus location in space, beam quality factor M^2 , Rayleigh length, and far field divergence are then standard.



The Principle

The laser beam is then magnified using a measuring objective, diffused through two beam splitters, and mapped on a CCD sensor via a reflecting mirror. An additional filter can also be installed in front of the sensor to further attenuate the beam.

The measured data is transmitted to a PC via Ethernet and analyzed using the PRIMES LaserDiagnosticsSoftware. Data can also be optionally determined internally to the device and transmitted to the system controller via a PROFIBUS® interface.

Operating Modes: From Manual to Fully Automatic

- 1 The PC-based LaserDiagnosticsSoftware enables you to measure beam density distribution manually and determine the beam position and beam dimensions.
- 2 Scripts provide semi-automatic control of the MicroSpotMonitor-Compact, for instance for repetitive measuring operations in service, quality assurance, and final inspection. They are individually adapted to the current measuring task. This programmed set of user prompts facilitates highly convenient operation of the MSM-C.
- 3 The PROFIBUS® option facilitates fully automatic measuring operation. Measuring processes can be controlled completely by machine programs when the machine controller is connected. There is no need for an additional PC when taking advantage of this option.

The Key Benefits

- 1 Can be fully integrated into the system controller, enabling you to directly control and adjust the beam parameters in your system. Using the optional PROFIBUS® option with or without PC connection, the MicroSpotMonitor-Compact can be controlled directly from your laser machine.
- 2 Modularly expandable and including accessories such as overhead mounting and 90° beam deflection.
- 3 From manual to fully automatic, a variety of operating modes are available.
- 4 Space-saving dimensions of just 230 x 120 x 60 mm for a camera casing with electronics, attenuation, and power absorbers.



MSM-C redirection with attached cyclone



Technical Data

MEASUREMENT PARAMETERS	
Power range	10 mW – 1 kW average power multi mode and up to 100 W average power single mode
Wavelength range	1 030 – 1 090 nm
Beam dimensions	20 – 600 µm (depending on optics)
CAMERA MODULE	
Modules	3.3x (NA = 0.1) Triggered measurement of pulsed lasers
SUPPLY DATA	
Power supply	24 V DC ± 5 %, max. 1.8 A
Max. power input	500 mA
Cooling water flow rate	0.7 – 1.2 l/min
Max. water inlet pressure	2 bar
Recommended pre-filter with filter fineness	50 µm
Cooling water temperature $T_{in}^{1)}$	Dew point temperatur < T_{in} < 30 °C
Compressed air (clean, dry)	3 – 5 l/min
COMMUNICATION	
Interfaces	Ethernet, PROFIBUS® (optional)
DIMENSIONS AND WEIGHT	
Dimensions (L x W x H) (without connectors)	231 x 120 x 60 mm (standard) 275 x 120 x 127 mm (with beam benders) 231 x 120 x 85 mm (PROFIBUS®)
Weight (approx.)	2.6 kg (standard), 3.1 kg (with beam benders), 3.1 kg (PROFIBUS®), 7.4 kg (PROFIBUS® Overhead Mounting 170)
ENVIRONMENTAL CONDITIONS	
Operating temperature range	15 – 40 °C
Storage temperature range	5 – 50 °C
Reference temperature	22 °C
Permissible relative humidity (non-condensing)	10 – 80 %
PROTECTION	
Protection category	IP 40
Protection class	III