

FocusParameterMonitor



Fiber and
disc laser



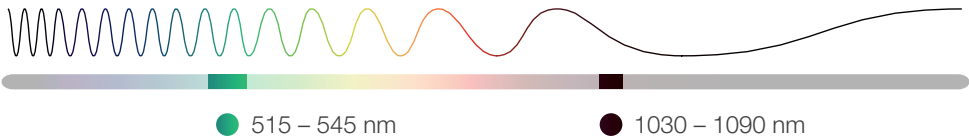
Diode laser



Ultrashort
pulse laser



CO₂ laser



A compact, PLC integrated measurement solution for inline beam characterisation featuring an industrially proven power measurement combined with best-in-class beam analysis.



Caustic



Raw beam



Power



Beam profile



Pointing stability



Vector



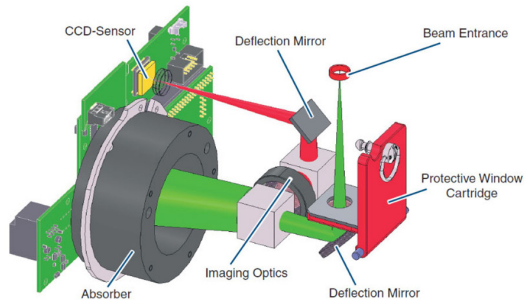
Focus shift

POWER RANGE	400 W – 8 kW
BEAM QUALITY M ²	Single mode and Multi mode
BEAM DIAMETER	75 µm up to 2000 µm
SPECIAL FEATURE	Auton. beam characterisation and process parameters
INTERFACES	PROFINET®, PROFIBUS®, Ethernet (Webserver)

Tech Corner

The FocusParameterMonitor FPM is a unique tool specifically designed to meet the needs of quality assurance and predictive maintenance in a production line. It is a fully integrated sensor providing information on laser power and beam distribution in seconds. The autonomous working principle does not require any external cooling.

The laser beam that enters the aperture is initially split into two beams. Both are then guided to the separated measuring components: The main beam is dumped in an absorber measuring the power, while a small section of the beam is running through an imaging optic and additional attenuators. The integrated camera provides a magnified image of the power density distribution. Information such as the spot location and beam diameter are calculated from this image.



The FPM is designed to measure short laser pulses. Most of the times this is closer to the real laser process than a measurement that is performed in cw operation. The measured focus position will be much closer to the focus position during the laser process.

To achieve the compact design (comparable to a small shoe box), there are no internal moving parts. For measuring a caustic we rely on the external z-axis, e.g. of highly automated production lines, to measure the power density distribution at different z-positions. The FPM features a dust proof housing and only needs a bit of clean air for dust purging.

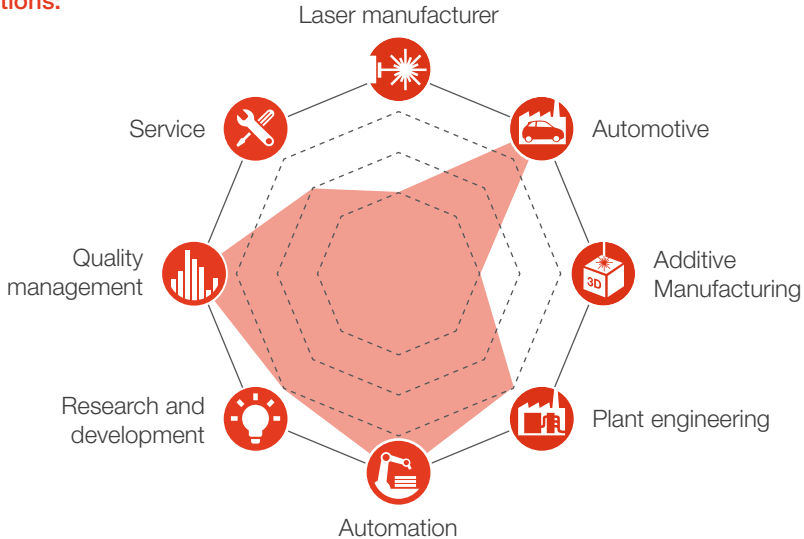


To achieve minimal measurement times and enable measuring during part changes, we decided to sacrifice some conveniences for speed. This means that the FPM needs be setup on time for the measurement task, but takes almost no maintenance or care from that point on.

You can freely decide how often you want to measure and what you want to measure. The FPM will send all measurement results to the SPS, an additional option is the build in web-server, displaying the results in a website. This website can be used as a visual representation of the results and be saved for quality assurance.

MEASUREMENT PARAMETERS		FPM
Power range (300 ms; 3000 J)		400 – 8 000 W
Wavelength range		515 – 545 nm, 1030 – 1090 nm
Beam dimensions		75 – 2000 µm
Max. power density (60 mm below aperture on protective window)		1 MW/cm ²
Max. beam divergence (depending on configuration)		60, 100 or 160 mrad
Irradiation time		0.3 – 1 s
Energy per measuring cycle		100 – 3 000 J
SUPPLY DATA		
Power supply		24 V DC ± 5 %, max. 0.5 A
Compressed air pressure		1 – 2 bar
Flow rate		10 – 15 l/min
Specification of compressed air according		ISO 8573-1:2010 [1:4:2]
COMMUNICATION		
Interfaces (alternatively)		PROFIBUS®, PROFINET®, PROFINET M12, Ethernet (optionally)
DIMENSIONS AND WEIGHT		
Dimensions (L × W × H) (without connectors)		210 × 185 × 153 mm
Weight (approx.)		10 kg
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 (with the closure closed)		IP 64
Protection class		III

Applications:



System description: The FPM is a compact, autonomous sensor that measures laser power, power density distribution and caustic inline. It is designed for the integration in a production line and can perform measurements during part changes or other down times within a fraction of a second. **The FPM is the ideal tool to monitor the overall performance of your laser station.**

Your benefit: The FPM can perform measurements of a caustic conform to ISO 11146, using power density distributions fully autonomously. It is easy to integrate, since there is no cooling needed. The operation principle that requires short laser pulses closely reassembles the welding process of high precision tasks (e.g. battery welding, hairpin welding). **Especially for parts that have high costs and areas at the beginning of a value chain, such as batteries and fuel cells, the documentation and monitoring of the tools used (including the laser) becomes more important. On hand errors in the beam distribution can be identified before it leads to a defective part, and the condition of the laser is documented should a part fail in a later process.**

CONCLUSION

The FPM measures power and beam characteristics online in a production line. The measurement results can be documented for quality assurance. It has a compact design and features field proven PRIMES technology. It is almost maintenance free and will warn you if your process starts to drift out of allowed bounds.



For further information please visit www.primes.de/fpm