ScanFieldMonitor SFM 2D

PRIMES

Fiber and disc laser

Diode laser

Ultrashort pulse laser

CO_2 laser

1 000 – 1 100 nm

250 – 380 nm	380 – 780 nm	780 – 3 000 nm	3 – 11 µm
UV	VIS	NIR	IR

The perfect tool for fast and easy laser and scanner characterization at full process power.

Caustic

Raw beam

Power

Beam profile

Pointing stability

Vector

Focus shift

POWER RANGE	10 W – 1.5 kW
BEAM SHAPE	Gaussian, Top Hat, Ring[1)]
BEAM DIAMETER	Focused 50 – 300 µm
HIGHLIGHT	2D array of structures
INTERFACES	WLAN

[1)] Cf. application note on www.primes.de/sfm

Engineered for Precision

Laser scanners are essential in modern manufacturing, especially in metal additive manufacturing and remote welding. Their performance, however, depends on precise calibration — traditionally a slow and error-prone process using anodized aluminum plates. The ScanField-Monitor 2D (SFM 2D) eliminates these drawbacks by enabling fast, precise, and process-relevant calibration within seconds.

Building on the proven SFM measurement principle, the laser beam is scanned across a well-defined structured glass plate (signal plate). In the SFM 2D, this measurement principle is expanded to a two-dimensional array of engravings, allowing near-simultaneous analysis of the entire scan field. An analysis that is done in no time providing not only positional data, but also a heat map of various laser related parameters! Spot variations, misalignments, nonuniformities, and timing errors are detected and corrected instantly – all with one tool: the SFM 2D.

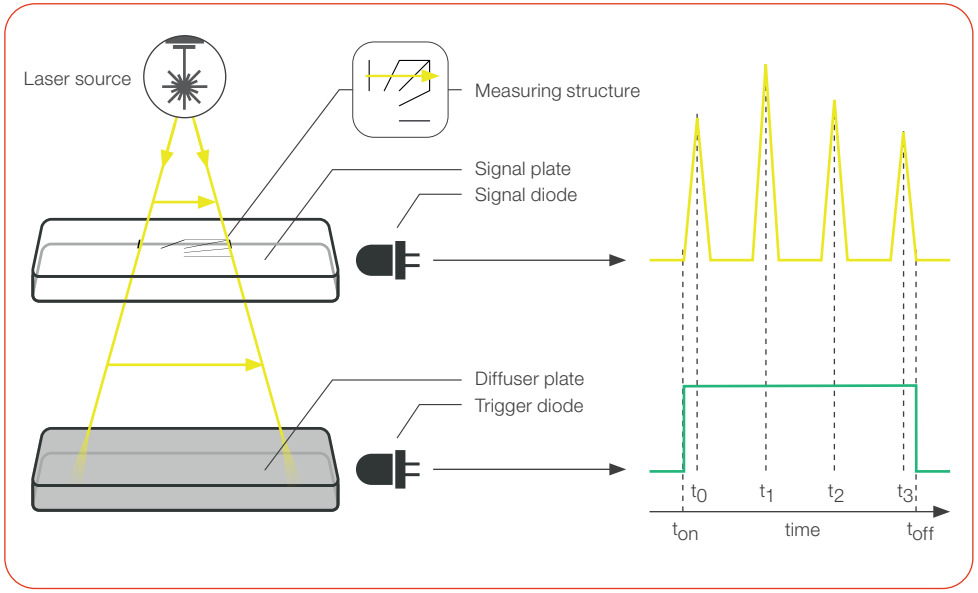


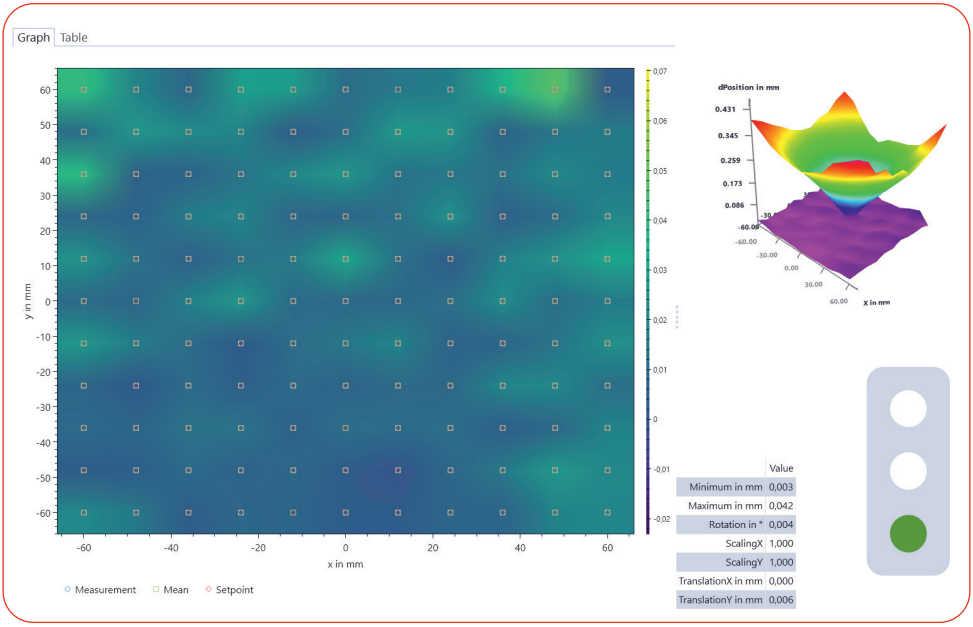
Figure: Measuring principle of the ScanFieldMonitor

The system uses ultrashort-pulse laser-engraved scattering structures on a transparent glass substrate. When the laser passes these microstructures, the scattered light generates a distinct signal captured by photodiodes. Real-time analysis of this signal provides precise data on position, velocity, direction, and beam diameter.

Each measurement automatically includes the vector's start and end points, marking speed, and length. With structure sizes around 7.5 mm and vector lengths of 10 mm at scanning speeds from 0.1 m/s to 10 m/s, every measurement takes only a fraction of a second.
The SFM 2D performs hundreds of measurements in just a few seconds, drastically reducing the time needed to analyze focus shift, delay times, reproducibility, and multi-source stitching.

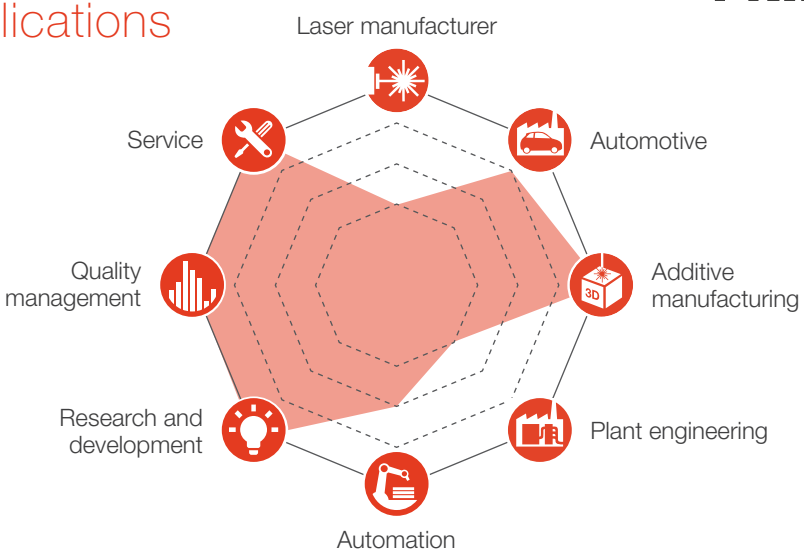
MEASUREMENT PARAMETERS	SFM 2D
Power range	10 – 1 500 W
Wavelength range	1 000 – 1 100 nm
Beam diameter	50 – 300 µm
Max. power density	100 MW/cm²
DEVICE PARAMETERS	
Max. angle of incidence perpendicular to inlet aperture	0 – 20°
Marking speed	0.1 – 10 m/s
Dimension of an individual measuring structure	7.5 mm x 7.5 mm
Array size [2)]	15 x 15
COMMUNICATION	
Interfaces	WLAN
DIMENSIONS AND WEIGHT	
Dimensions (L x W x H)	245 x 245 x 161 mm (adaptable to required dimension)
Weight (approx.)	7.5 kg

[2)] for a measuring area of 235 x 235 mm²



Data visualization within PRIMES LaserDiagnosticsSoftware

Applications



Your Benefit

The ScanFieldMonitor SFM 2D was developed specifically to meet the requirements of laser-scanner-applications in remote welding and additive manufacturing machines (SLM or LPBF). The device operates by detecting the scattered laser light on a structured glass plate and is therefore independent of the laser power. **No need for external wiring or water supply to cool the absorber, even at full process power. Even more importantly, it is capable of process-oriented measurements across the entire build plate.**

Due to its **flexible design, scalability,** and a **novel prooven measurement principle**, the SFM 2D addresses all **laser-scanner-specific** measurement tasks in **just one device** and enables laser beam characterization on the entire scanfield.
The modern, intuitive LaserDiagnosticsSoftware (LDS) ensures an **easy handling** and a **fast measurement** procedure.

Conclusion

The SFM 2D analyses various process parameters of scanner systems under actual operating conditions. Combining separate applications for various measurement tasks into a single device cuts down on investments, complexity and work time. Say Goodbye to engraved metal plates.

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

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