CAM SQUARED

M2 meter
The smart one

Compact
Alignment-Free
Ultra short measurement cycle

imagine optic

TOPAG Lasertechnik

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CAM SQUARED +

A great choice for almost any lab or industrial application, the CAM SQUARED is Imagine Optic's innovative answer to the need for laser quality testing and M^2 measurement.

Finally an M2 meter as easy and quick to set up as a beam profiler.

APPLICATIONS

Laser beam quality testing is of utmost importance in many laser-based applications where beam waist and beam divergence matter:
+ Manufacturing, machining, welding for fluence
+ Imaging, for resolution
+ Fiber optics, for coupling
+ Free space optical communications and laser radar systems (LIDAR) for better propagation through turbulent atmosphere.

CAM SQUARED performs multiple measurements : M^2, divergence, focus diameter, waist position, Rayleighlength, thermal effects.

FEATURES

+ ISO 11146 standard compliant. The measurement of intensity combined with phase allows to generate 10 to ∞ of intensity frames from which is calculated the M^2 factor, such as described in the ISO 11146 standard.
+ Self aligned. CAM SQUARED requires no alignment, making setup quick and easy.
+ Short measurement cycle. CAM SQUARED requires no translation, making measurement cycle very short and the solution perfectly adapted to pulsed lasers and dynamic applications.
+ Optics free. As no mirrors nor lenses are necessary, there are no optics introducing aberrations which impair the beam quality. There are also no coatings limiting the range of use of the sensor.
+ SM1 thread on the front of the sensor for easy mounting of optical densities in order to adapt to the power of the laser to be tested.

SPECIFICATIONS*

OPERATING SPECS

	M	L	XL / XXL (on request)	SWIR
Aperture dimensions	4.5 x 3.7 mm²	6.9 x 5.1 mm²	13.8 x 10.2 / 22 x 22 mm²	9.3 x 7.4 mm²
Recommended beam diameter min. @ 1/e² (min. @ 1/e³)	0.7 mm (0.8 mm)	0.7 mm (0.8 mm)	0.7 mm / 1,2 mm (0.8 mm / 1.4 mm)	1.6 mm (1.9 mm)
max. @ 1/e² (max. @ 1/e³)	3 mm (3.6 mm)	4.2 mm (5 mm)	8.2 mm / 17.8 mm (10.1 mm / 21.9 mm)	6 mm (7.3 mm)
Maximum acquisition frequency	125 Hz (USB 3.0) 30 Hz (GigE)	55 Hz (USB 3.0) 30 Hz (GigE)	30 Hz (USB 3.0) / 10 Hz (10GigE)	150 Hz (USB 3.0) 49 Hz (GigE)
Wavelength range	350 - 1100 nm			900 - 1700 nm
Minimum power	0.15 nW		0.15 nW / 0.7 nW	0.3 pW
External trigger	TTL signal			
Operating system	Windows 10 & 11			
Measurement cycle time	~ ms typically, depending on settings			
Travel range	not limited by translation stage			
Typical M² accuracy	5%			
Pulsed sources	full compatibility			
Damage thresholds	50 mW / cm² in CW mode 50 uJ/ cm² in Pulsed mode			

MISC

Dimensions (Height x Width x Length)	50 x 50 x 55 mm³	56 x 56 x 60 mm³ / TBD	70 x 70 x 71 mm³
Weight for USB version	200 g	200 g / 800 g	250 g
Mounting configuration	horizontal or vertical		
Working temperature	15 - 30 °C		
Interface	USB 3.0 or optional GigE converter	USB 3.0 / 10GigE	USB 3.0 or option. GigE converter
Power consumption	3.1 W	3.6 W / 14 W	5 W

OPTION

CAMSQUARED can be upgraded in option for wavefront sensing. In this case, in addition to the M² meter, you get access to a complete wavefront sensor with the following features (see HASO datasheets for more information):

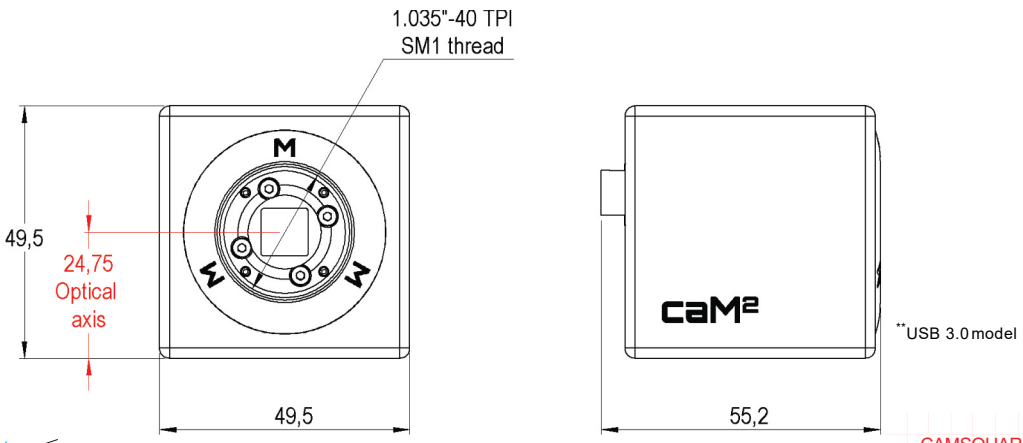
Repeatability: < λ/200 RMS

Absolute wavefront measurement accuracy: ~ λ/100 RMS

Wavefront error measurement provides detailed quantitative knowledge of the cause of aberrations and beam quality.

*Subject to changes without further notice

DIMENSIONS** (mm)

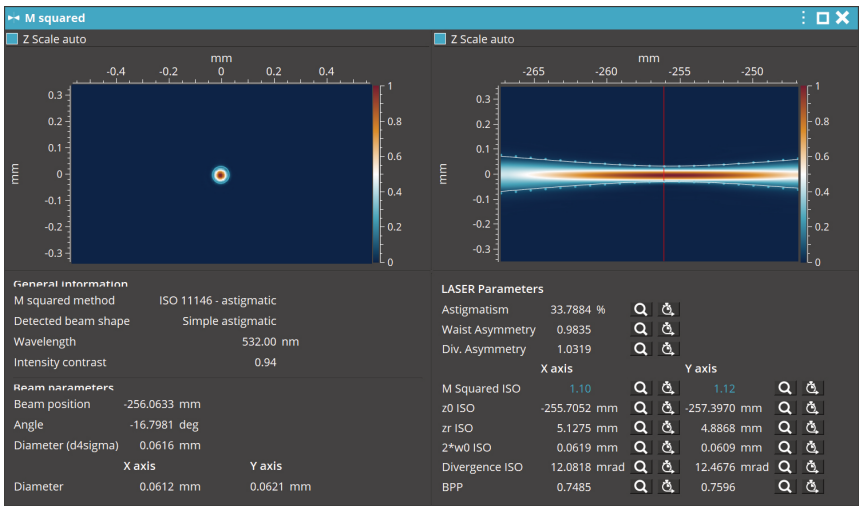


**USB 3.0 model

SOFTWARE

WAVESQUARED

+ Optimized display of laser quality metrics
+ Beam pointing adjustment and stability measurement
+ Optional phase measurement extension for wavefront diagnostic and analysis (alignment, collimation, optical aberrations analysis and more than 150 features)
+ Optional SDK in C/C++, LabVIEW and Python



ACCESSORIES

+ Several mounting options are available, including adapters for the most common mechanical stages and magnetically coupled top and bottom plates, allowing to mount, remove, and replace CAM SQUARED with a high repeatability.

APPLICATION NOTES

+ M2 measurement with CAM SQUARED

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