

HASO³TM

Imagine Optic's HASO family of wavefront sensors offer professionals unsurpassed quality, precision and ease of use. Key features include:

- high-resolution - from 1280-16384 measurement points
- independent and simultaneous measurement of both phase & intensity
- true absolute measurement
- unbeatable accuracy and dynamic range



Imagine OpticTM

HASO3™

Exceptional results come from accurate measurement. We conceive, build and support our products to meet and exceed our customers' needs. For over 10 years, Imagine Optic's wavefront sensors have become an industry standard for reliability and durability. Their independent yet simultaneous measurements of both phase and intensity are key in consistently providing customers with the high-quality wavefront metrology results they can depend on.

HASO3, the most recent evolution of our award-winning HASO product line., is based on our patented Shack-Hartmann technology. Fast, performing and easy to integrate, their insensitivity to vibration and compact design make them the ideal choice for demanding industrial and scientific applications. Even more, our all-new HASO3 76 GE and HASO-128 GE are equipped with Giga Ethernet ports for fast and easy control over local networks.

In laser and optical metrology, your HASO3 wavefront sensor used with HASOv3 software enables you to:

- conduct zonal and modal wavefront reconstruction
- calculate the PSF, MTF and Strehl ratio
- visualize the spot diagram
- obtain the M^2 parameter

For adaptive optics, HASO3 coupled with our CASAO™ software, lets you:

- perform precision metrology to control your active components including deformable mirrors and SLM
- perfect your beam's shape and optimize its focal spot

If you would like more information on our products, please call +33 (0)1 64 86 15 60 or visit imagine-optic.com.



- **Wide dynamic range**
- **Unequaled precision**
- **True absolute measurement**

Dynamic Spot Tracking™ & Auto Spot Finder™	provide HASO3's exceptional dynamic range
Refractive microlenses	their exceptional optical quality ($\lambda/50$) enables HASO3's precision and dynamic range
Absolute measurement	thanks to our proprietary calibration technology, HASO3 provides outstandingly accurate absolute measurements every time, without the need for a reference beam
Independent phase and intensity measurement	patented technology that lets you directly measure both the phase and intensity simultaneously, independently and in real-time
Dynamic range and accuracy	HASO3 offers the best combination of dynamic range and accuracy available

	HASO3-32	HASO3-42	HASO3-76 GE	HASO3-128 GE
Aperture dimension	4.9 x 6.1mm ²	4.8 x 5.9mm ²	8.7 x 11.4 mm ²	15 x 15 mm ²
Sub-apertures dedicated for analysis	32 x 40	42 x 52	76 x 100	128 x 128
Refractive microlens technology	standard square	rotated square	standard square	
Tilt dynamic range	>±3° (520λ)		>±3° (1100λ)	>±3° (1500λ)
Focus dynamic range - minimum local radius of curvature	20 mm	15mm		
Focus dynamic range - maximum n.a.	> 0.1			
Repeatability	< λ/200			
Wavefront measurement accuracy in relative mode (rms) ¹	λ/150			
Wavefront measurement accuracy in absolute mode (rms) ²	λ/100			
Tilt measurement sensitivity (rms)	3 μrad		1 μrad	<1 μrad
Focus measurement sensitivity (rms)	10 ⁻³ m ⁻¹		5.10 ⁻⁴ m ⁻¹	2.5.10 ⁻⁴ m ⁻¹
Spatial resolution	~160 μm		~115 μm	
Maximum acquisition frequency	50 Hz		17 Hz	75 Hz
Processing frequency (CPU 3Ghz, 512 Mb RAM)	20 Hz		10 Hz	5 Hz
Working wavelength range	350 - 1100 nm			
Calibrated wavelength range	400 - 600 nm, 500 - 700 nm, 630 - 900 nm, 800 - 1100 nm			
Extended wavelength range	see HASO3 76-GE / 128-GE	not available	400 - 700 nm, 500 - 900 nm, 650 - 1100 nm	
Working temperature	15 - 30° C			
Dimension / weight	75 x 62 x 68 mm / 510 g		115 x 51 x 60 mm / 400g	
Power supply	12 V / 6 W			
Interface	FireWire		Giga Ethernet	

1) Difference between the real wavefront and a reference wavefront obtained in similar conditions (10 λ of shift maximum). 2) Wavefront as seen by the wavefront sensor. Performance kept on the whole spectral range.

Imagine Optic™

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