

# HASO4

## 126 BROADBAND

**HIGH ACCURACY**  
WAVEFRONT SENSOR

**HIGH RESOLUTION**  
21420 MICROLENSES

**CALIBRATED FOR**  
350-1100 nm

**EASY TO USE**  
AND INTEGRATE



Wavefront measurement tool  
for optical systems alignment and characterization

## A UNIQUE SET OF ADVANTAGES

- Wavefront sensor on the latest CMOS camera for the 350-1100 nm range
- 170 x 126 sampling points over a 13.77 mm x 10.22 mm sensing area
- 6 nm RMS or  $\lambda/100$  rms absolute measurement accuracy
- 30 Hz acquisition frequency<sup>(1)</sup>
- External trigger capability
- Spot Tracker eliminates alignment requirements
- Patented technology for simultaneous and independent measurements of phase and intensity
- USB 3.0 connectivity
- Compatible with WaveKit (SDK) in C/C++, LabVIEW and Python
- Compatible with R-Flex2 for optics alignment and characterization

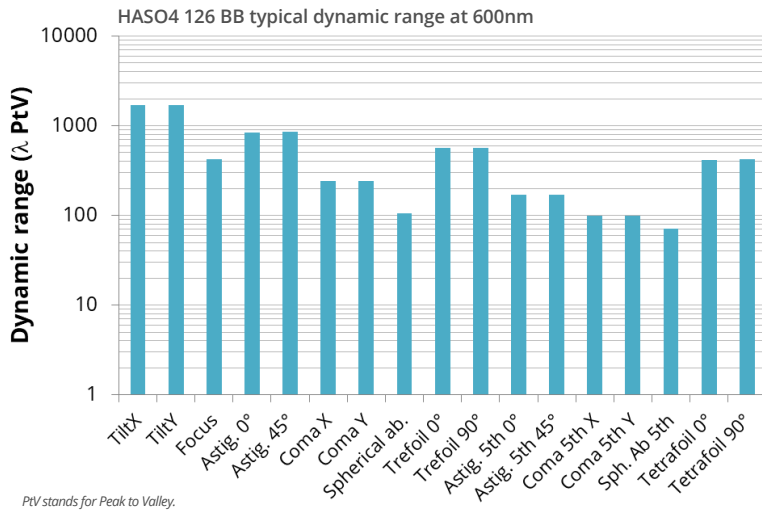
<sup>(1)</sup> 30Hz in sequence mode, 10Hz for wavefront display

# HASO4 LARGE APERTURE, BROADBAND WAVEFRONT SENSOR

## 126 BROADBAND

Providing outstanding performance, the HASO wavefront sensor family is used worldwide in the most demanding applications in optical metrology, industrial control, microscopy and laser diagnostics. We offer a unique combination of expertise in high-quality microlens production, software development and accurate factory calibrations. This allows the HASO4 126 BB to provide high performance for applications requiring a high spatial frequency and very large dynamic range.

- Acceptable tilts up to +/-3°, and NA up to 0.1
- Large dynamic range (see the graph below)
- Independent phase (wavefront) and intensity (amplitude) measurements
- Easy hardware and software integration



## EXAMPLES OF APPLICATIONS

- Optical metrology such as for freeform optics, parabolic mirrors, etc.
- Product quality control
- High spatial-frequency aberration detection

## SOFTWARE

- **WaveView** is the most advanced wavefront measurement and analysis software. It offers more than 150 features and tools optimized for a wide range of highly demanding applications. WaveView development philosophy is based on tens of years of customer feedback, improving the user experience with each version. WaveView provides a function to analyze segmented wavefronts and allows autosave for sequence measurements. Modules dedicated to PSF and MTF are available.
- **WaveKit** is the SDK in C/C++, LabVIEW and Python, providing the basic blocks on which one can build a fully customized software for specific HASO-based applications or WaveView data processing routines. WaveKit is available on request.

## SPECIFICATIONS

Aperture dimension	13.78 x 10.21 mm <sup>2</sup>
Number of microlenses	170 x 126
Tilt dynamic range	± 3 °
Focus dynamic range	± 0.010 m to ± ∞
Absolute accuracy	6 nm or λ/100 RMS
Repeatability	<λ/200 rms
Spatial sampling	~ 81 μm
Maximum acquisition frequency	30 Hz <sup>1)</sup>
External trigger	TTL signal
Calibrated spectral range	350 - 1100 nm
Dimensions / weight	47 x 60 x 62 mm <sup>3</sup> / 200g
Working temperature	15 - 30 °C
Interface / Power consumption	USB 3.0 / 3.6W
Operating system	Windows 10
Minimum power	3 nW <sup>2)</sup>

1) 30 Hz in sequence mode, 10 Hz for WF display

2) At 30 Hz, the maximum exposure duration is 33ms.