



## ImageMaster<sup>®</sup> HR 2

Image quality testing with  
highest precision and reliability





# Passion for optics

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TRIOPTICS develops and produces the world's largest range of optical measurement and manufacturing technology for the development, quality control and production of lenses, lens systems and camera modules.



# ImageMaster® HR 2

## The worldwide benchmark in image quality measurement

The ImageMaster® HR 2 is our newly developed MTF test station which takes our ImageMaster® R&D product line to the next level. It is the worldwide standard solution for image quality testing of lenses e. g. for smartphone, surveillance cameras as well as automotive camera modules. The convenient availability of a wide range of measurement parameters leads to high efficiency in R&D as well as in prototype testing and production.

The new ImageMaster® HR 2 stands for highest measuring accuracy and reproducibility. The flexible system is suitable for different industries and customer applications. Many "off-the-shelf" upgrade solutions are available, for example Finite/finite conjugates, Encircled Energy, Veiling Glare and Edge Spread function as well as various wavelengths, target reticles and filters.

ImageMaster® HR 2 precisely measures the imaging properties of optical systems. The accuracy of the measurement is traceable to international standards.



# ImageMaster® HR 2

## Key features and benefits

ImageMaster® HR 2 is the completely redesigned new version of the long-time successful ImageMaster® HR.

The improvements achieved result in an extended usability for customers, high repeatability, ease of operation, modern design and a clean look-and-feel.

Many years of experience with a wide range of customer requirements have been incorporated into the development of the new ImageMaster® HR 2.

By using the ImageMaster® HR 2, our customers in R&D benefit from precise and repeatable measurement results. The correlation to production testers and other devices enables worldwide consistent measurements independent of location as well as consistent measurement results in the product lifecycle from R&D to production.

Customers benefit from our many years of experience, know-how and consulting quality, e.g. in selecting the appropriate system configuration and ensuring objective, valid and reliable measurement results.

- **High repeatability for all measurement parameters**

Measurement values taken by ImageMaster® HR 2 are highly stable and reliable, ensuring correlation worldwide. Optional encoders improve position accuracy, i.e. improvement of the accuracy and reproducibility of the focus position. Highest repeatability for all measurement parameters is the result.

- **New Software “MTF Studio” with modern user interface and ease of use**

Flexible software support in combination with mechanical features contribute to better correlation testing. Easy handling minimizes the operator’s influence on the measurement results. Recurring measurement tasks can be carried out semi-automatically by using self-created scripts.

- **Extended range of measurable samples**

ImageMaster® HR 2 offers an extended range of measurable samples. Larger samples (in length) can be measured due to motorized height adjustment of the entrance pupil (up to 350 mm). Heavier samples (up to 5 kg) can be measured, due to improved mechanical stiffness. Moreover, absolute FFL/BFL measurement can be carried out and the sample FFL is increased due to a longer focus axis compared to ImageMaster® HR.

# ImageMaster® HR 2

## Measurement parameters and MTF Studio Software

- MTF on-axis and off-axis
- Effective Focal Length (EFL)
- Distortion
- Field curvature
- Lateral and longitudinal chromatic aberrations
- Astigmatism
- Chief Ray Angle
- Point Spread Function (PSF)
- Encircled Energy (EE)
- Edge Spread function (ESF)
- Veiling Glare
- Depth of focus
- Field of view
- Flange Focal Length (FFL)\*
- Back Focal Length (BFL)\*
- Relative illumination

\* Absolute FFL/BFL measurement

The powerful ImageMaster® MTF Studio software package provides an easy-to-use graphical user interface and a complete functionality for fast and reliable image quality measurements.

It is the new standard software for the ImageMaster® HR 2.



# ImageMaster® HR 2

## Technical data

	Technical data - ImageMaster® HR 2
Optical set up	Infinite conjugates, (finite conjugates optional)
Max. off-axis angle	± 105°
Spectral range	NUV, VIS, NIR, SWIR, LWIR
Azimuth range	360°
Max. image height	± 40 mm
Clear aperture	Up to 45 mm
Collimator focal length	50 mm, 300 mm, 500 mm
EFL range of the sample	0.5 mm - 150 mm
Spatial frequency range	0 - 500 lp/mm
All following specification valid for VIS range	
MTF on-axis and off-axis Accuracy Repeatability	± 0.02 MTF ± 0.005 MTF
Effective Focal Length Accuracy	From 0.5 mm - 3 mm: ± 5 µm From 3 mm - 150 mm: ± 0.2%
Distortion Repeatability Distortion with improved positioning accuracy Repeatability	± 0.3% ± 0.1%
Lateral chromatic aberration Repeatability	± 0.3 µm
Longitudinal chromatic aberration Repeatability	± 0.2µm
Chief Ray Angle Repeatability	± 0.4°
Relative illumination Repeatability	± 2%



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