

ImageMaster[®] PRO 10

High Speed MTF Tester
for Production



ImageMaster® PRO 10: MTF Testing with Outstanding Speed and Performance

Moving imaging applications into high volume markets such as mobile phones has posed a new challenge to the quality control and characterization of imaging optics. The basic requirements for high volume MTF testing, including ultra-fast measurement time, multiple field measurement points, fast and accurate autofocus and extremely stable software, have already been fulfilled successfully by the first generation of ImageMaster® PRO instruments.

TRIOPTICS has been involved in the first R&D projects related to visual applications in the field of mobile communications. We are proud that the very first mobile phone lenses ever manufactured, have been measured and qualified by using the ImageMaster® PRO 1 originally developed by TRIOPTICS. In the years that followed the ImageMaster® PRO Series became the uncontested international standard for MTF testing and is recognized as the industry standard providing the highest accuracy and reliability. The PRO Series is the most successful range of production MTF testers (modulation transfer function testers) for single lenses and wafer level samples (WL lenses). The calibration of the instruments is directly traceable to international standards.



As a result of various improvements the ImageMaster® PRO 10 enables customers to significantly increase their yield. It is the fastest and most accurate MTF measurement system on the market for qualifying image sensors, mobile phone and automotive lenses as well as other miniature lenses. Besides the new software architecture and functions, the more precise mechanical components lead to best performance in accuracy, reliability and measurement speed. Faster MTF algorithms reduce the test cycle time so that an outstanding throughput is achieved.

The new ImageMaster® PRO 10 also provides additional measurement functions. For example, measurements at different frequencies and RGB measurements can be performed to determine chromatic aberration. An upgrade of four additional cameras allows the measurement of relative illumination for testing the homogeneous illumination of lenses in the field. The exceptional innovations make this MTF production tester ready for future needs and upcoming high resolution megapixel lenses.



Measurement chamber with up to 27 cameras

Advantages of the new ImageMaster® PRO 10 at a glance

- Highest measuring accuracy worldwide:
1.5% MTF
- Fastest measurement time per sample
1.3 sec. (2700 UPH)
- Up to 49 measurement points in 27 field positions (cameras)
- Measurement time independent from amount of cameras and measurement parameters
- Max Field of View 215° (optional)
- Tele Application for Small Field of View
- Finite – Finite plane and sphere from 300 mm to infinity
- Stable chamber temperature (+/- 2°C) realized by fans and checked by temperature sensors
- Measurement traceable to international standards
- Vibration insulated measurement chamber
- Cleanroom compatible

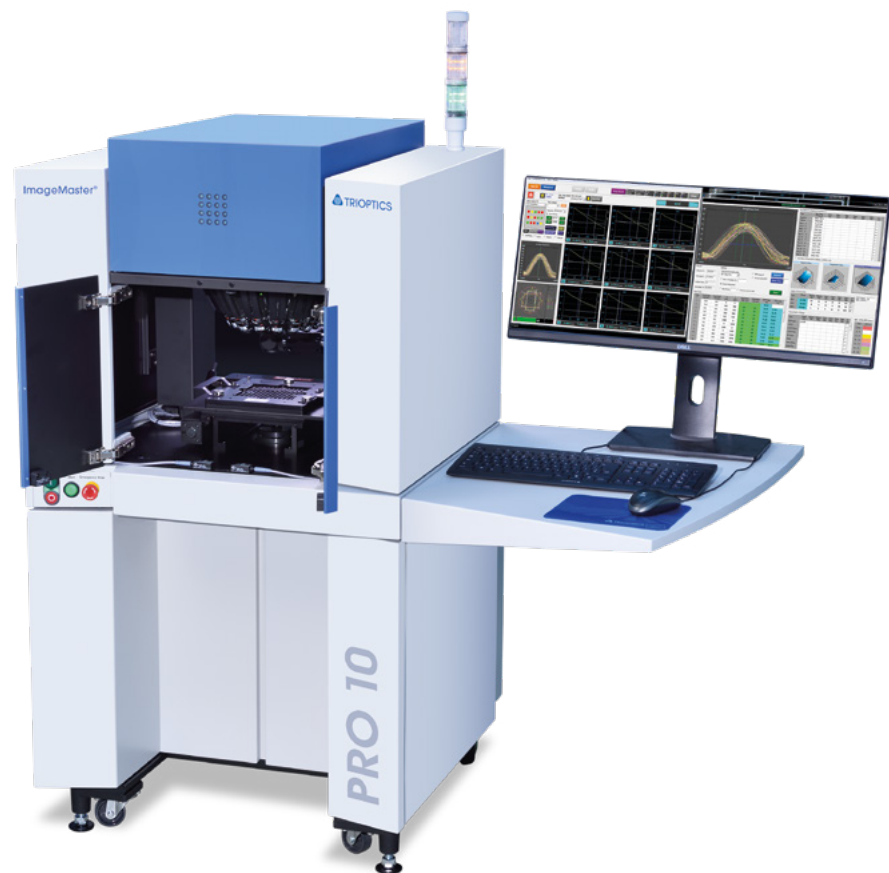
Measurement Parameters

ImageMaster® PRO 10 for ultra-fast MTF testing, measures the following parameters:

- MTF on and off axis
- MTF at best lens performance (tilt correction)
- Multi frequency MTF measurement
- Effective Focal Length (EFL)
- Flange Focal Length (FFL)
- Field curvature
- Multi Frequency Focus Shift
- Tilt of image plane
- Depth of Focus DOF
- Best focus position
- Astigmatism

New for ImageMaster® PRO 10:

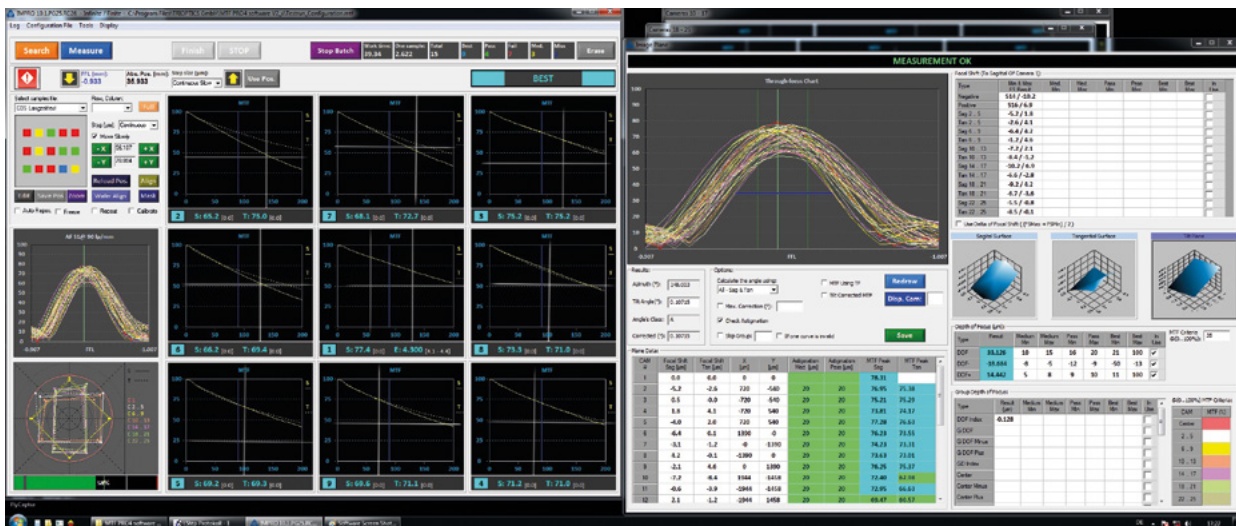
- Relative illumination
- Chromatic aberrations
- Relative distortion
- Field of View Measurement (on request)
- Veiling Glare index (on request)



Software

The recognized ImageMaster® PRO software, called MTF Pro, has been further improved. It features increased speed, advanced performance and clearly displayed test results.

The optimized MTF algorithms are the result of the continuous improvement and TRIOPTICS years of experience in the field of MTF measurement



- Automatic pass or fail results based on a multitude of freely selectable criteria
- Intuitive graphical representation of the measurement data in order to detect lenses out of specification at an early stage
- Software enabling real-time images of all cameras.
- Individual setting of spatial frequencies for each camera
- Settings to enable focusing curve for on-axis and / or off-axis cameras
- Storage of lens and batch data, data analysis via Excel
- Polar diagram for displaying MTF symmetry in image field

Technical Specification

	ImageMaster® PRO 10
Optical set up	Infinite-finite conjugates
Max. spatial frequency	600 lp/mm
Accuracy MTF on-axis	0.8 % MTF (up to 350 lp/mm)
Accuracy MTF off-axis	1.5 % MTF
Accuracy EFL (Effective Focal Length)	4 µm
Accuracy FFL (Flange Focal Length)	3 µm
Measurement time display on axis	1.3 sec/sample
Measurement time display all off axis curves	1.3 sec/sample
Throughput of samples (Units per hour)*	2700 UPH
Measurement points	53 field positions/27 cameras
Dimensions (height x width x depth)	1550 mm x 1330 mm x 805 mm
Weight	210 kg
Sample holder / trays	3 point kinematic mount tray with certified reference flatness
Sample quality classes	4 quality classes
Cleanroom class FS 209 / ISO14644-1	Prepared for 100 / ISO 5

*10 seconds for changing trays, 1 tray includes 148 samples

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