MTF Tester K8

Compact Instrument to measure MTF of photographic lenses or similar systems

The modulation transfer function (MTF) is since many years an established concept to describe the image quality of lenses. It's fast and simple measurement is an indispensable tool in industrial and application oriented laboratories.

The MTF-Tester K8 of Carl Zeiss is a versatile and compact instrument for the measurement of the modulation transfer function of photographic lenses or similar systems at infinite object distance. The measurement is performed in real-time at three different spatial frequencies. The measurement is based on a line image analysis by means of a scanning slit system.

The K8 is founded on more than 40 years of experience in using the MTF in the lab and in industrial production control at Carl Zeiss.

Carl Zeiss AG - Camera Lens Division
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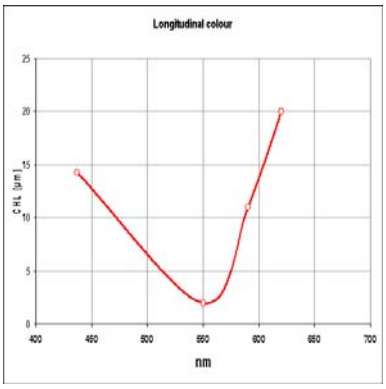
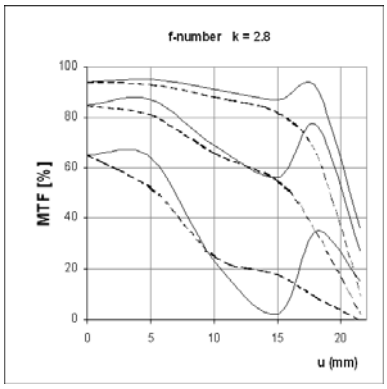
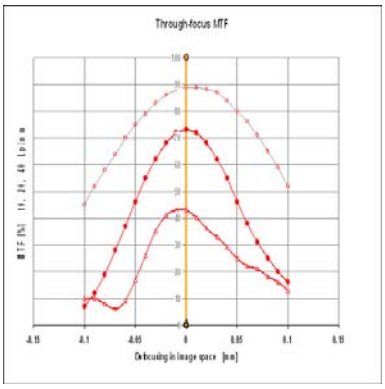
Features and Measuring Facilities







- Visual presentation of point-spread and line-spread functions on the PC monitor
- Simultaneous MTF-measurement at three spatial frequencies
- MTF as a function of image height and as a function of backfocal distance
- Simple switching between tangential and sagittal slit orientation
- Measurement in real-time supports fine tuning of lenses during assembly
- Easy change between different spectral weighting functions
- Measurement of field curvature and longitudinal chromatic aberration
- Measurement of flange-back distances
- Rapid change between measurement on axis and in the field
- Sample rotation 360°, with automatic recording of minimum and maximum MTF
- Low space requirement

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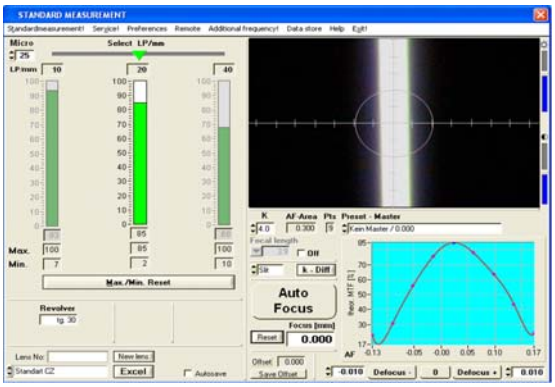
Software and Operation



- Operation and control of main hardware components by mouse, footswitch and function keys of the PC-keyboard
- Graphical and digital presentation of MTF values
- Display of an additional fourth spatial frequency
- True MTF display by automatic compensation the of slit width influence
- Graphical presentation of the through-focus MTF-curve
- Software controlled manual focusing
- Automatic focusing at user-selected spatial frequency
- Image height indicator
- Sample azimuth indicator
- Focus position indicator
- Simple measurement of aperture depending focus shift
- Storage of pinhole and slit images
- Measurement data recording directly into MS EXCEL
- Operating system: Windows-XP
- Remote control of the K8 software via RS232 or TCPIP

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Technical Data and Modules

Illumination system	
Standard light source	Halogenlamp 12V, 100W, 3200K
Standardfilter	Schott BG38
Additional filterholder	5, for customer-specified filters
Slit width	0.03mm and 0.3mm, motorised revolver
Collimators	
Standard	Lens type, Achromat 80/1200mm
Collimator Option 1	Lens type, Achromat 150/1200mm
Collimator Option 2	Lens type, Achromat 150/2200mm
Light path	
Standard	sliding mirror for on-axis measurement tilting and sliding mirror for field measurement
Collimator Option 2	single mirror for axis and field measurement sliding and tilting
Sample stage	
Baseplate	Thread mount M 82x1 for customer-specified adapters
Ball bearing turntable	Rotation 360° (optional with encoder) centring facility of base-plate
Lateral shift	Precision bearing for up to 50mm shift from axial position
Focus drive	motorised, step resolution 0.001mm
Maximum sample length	ca. 500mm
Maximum sample weight	ca. 10kg
Analyser	
Line image analysis	- scanning slit system with motor 1500r/min - digital filtering of the Fourier spectrum at 3 frequencies (with ratio 1:2:4) - scaling of spatial frequency by microscope objective
Calibration	with synthetic line image (rectangular slit)
Microscope objective	- used to form a magnified image of the sample image at the scanning slit system - the magnification determines the set of spatial frequencies and the window size of integration - the numerical aperture determines the maximum possible chief ray angle during measurement in the field of the sample

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Standard-Objectives	20x resp. 25x / 0.55 for spatial frequencies 10, 20 and 40Lp/mm window size ca. 0.4mm
Optional objectives	for spatial frequencies 5- 160 p/mm
Lightsensor	1 1/8" side-on PMT , Hamamatsu R446
Spectral weighting	centre weighted white light
Image orientation	motorised Schmidt-prism
Line image-display	½ " -colour-CCD camera, PC-monitor
Repeatability	better than 5% at 20 Lp/mm and image height 30mm
Controller	
Computer	Industrial PC, Windows-XP® equipped with 4 channel motor amplifier, A/D converter board, frame grabber 17" TFT-monitor
Electronic box	19" rack, DC and AC power supply
Options	electronic image height encoder electronic azimuth encoder Collimator Option 1: Achromat 150/1200mm Collimator Option 2: Achromat 150/2200mm
Dimensions and weight	
W x H x D	1700 x 1300 x 800mm
Weight	ca. 200 kg
Environment conditions	
Temperature	18 to 23°C
Humidity	20 to 76% dust free minimum air flow
Power supply	240V AC / 50 Hz, 800VA

Subject to change

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