

POWERED BY OPTEST® SOFTWARE

LensCheck™ VIS Lens Measurement System



I GE Exhibit 1022

LensCheck™ VIS Lens Testing System

Portable and Precise for Visible Infrared Lens Measurements

A cost-effective solution to your production and prototype lens qualification needs. Optikos, the leader in image quality test equipment, is pleased to offer this compact, efficient, easy-to-use quality control tool. LensCheck, with patented VideoMTF® image analysis software, features real-time MTF testing and analysis that allow manufacturers to qualify incoming products quickly and reliably, thereby minimizing the risks of sub-standard complete assemblies.

Applicable Lenses for Testing:

The suitability of the LensCheck VIS for testing a visible wavelength lens depends primarily on:

- Entrance pupil diameter → up to 50 mm
- Focal length, → 3-200 3-200mm (with appropriate image analyzer objective lens)
- f-number of the lens, and → f/20 – f/1 (with appropriate image analyzer objective) The suitability of fast, non-telecentric lenses at off-axis field angles is determined by whether the image cone falls within the acceptance cone of the image analyzer objective.
- Image format size → up to 25 mm image diagonal

Other characteristics that factor into the determination are:

- spatial frequency of interest
- chromatic performance of the lens
- departure from telecentricity at off-axis angles

These parameters are seldom independent, making it difficult to place rigid bounds on the space of lenses that may be tested on the LensCheck VIS. Nonetheless, it is generally true to say that lenses that fall within the bounds given below are usually good candidates for testing with this instrument. There may be some special case in which lenses within these bounds may not be suitable for testing, and there are certainly cases in which lenses outside of these bounds may be tested. When in doubt, consult an Optikos engineer for advice.

Applicable Measurements:

- MTF – on/off axis
- EFL and f-number
- Back focal length
- Astigmatism
- Field Curvature
- Distortion
- Transmission (optional)
- Relative illumination (optional)
- Line of Sight (optional)
- Veiling glare (with optional instrument)

Features:

- Patented VideoMTF® technology enables real time MTF measurements
- Flexible platform allows a wide range of measurements (e.g. MTF, EFL, distortion)
- Industry leading measurement accuracy and repeatability
- Configurable automated measurement routines
- Installed in production and R&D facilities around the world

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Specifications:

Physical Size:	15" (355mm) H 30" (762mm) W 48" (1219mm) L
Power Requirements:	24VDC Power Supply (Supplied): Input 100-240VAC(3A) Fiber Light Source (Supplied): Input 100-120VAC(2A) / 200-240VAC(1A)
Environmental:	Ambient light - For best performance, do not use in direct light
Refractive Collimator	355 mm EFL achromat, 50mm clear aperture
Source Module	Fiber-optic light source: 400-700nm (400-1000nm also available) Integrated 8-position manual target and filter wheels Target set: 4 pinholes, USAF target, alignment crosshair Filter set: 546nm bandpass, RGB set, and infrared cutoff
Visible Image Analyzer	GigE Camera: Sony ICX694 CCD (6MP) using a 1" sensor, 4.54um pixels, 2736x2192 Sony EXview HAD CCD II technology. Offers improved sensitivity, dynamic range, and noise characteristics Spectral sensitivity 400-1000nm 12-bit video output Calibrated 40X 0.65NA achromatic DIN objective
Motorized Z-axis	25 mm travel 0.1 µm resolution
Motorized X-axis	25 mm travel with 0.05 µm resolution glass scale encoder
Manual Y-axis	12.5 mm travel
Motorized Lens Platform	+/- 100 degree off-axis rotation 0.0001° resolution glass scale encoder 0.5m optical rail Integrated self-centering lens mount

Options:

- Rotary Lens Mount
- Audit Lens
- Transmission Kit
- Veiling Glare Instrument
- Finite Conjugate Instrument – available as a LensCheck option or standalone unit
- Achromatic Objectives
- Reflective Collimator*
- Apochromatic Objective*
- Lens Mounts: The LensCheck is supplied with a standard three-jaw caliper lens holder for lenses with diameters in the 5-25 mm range. For best results, we suggest using one of the available lens mounts for specific mounting interfaces. A partial list of available adapters includes the following: M7 through M12, C-Mount, T-Mount, Nikon F-Mount, etc.
- Spectral Filters
- Optical Rail – custom configurations are available upon request

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Rotary Lens Mount



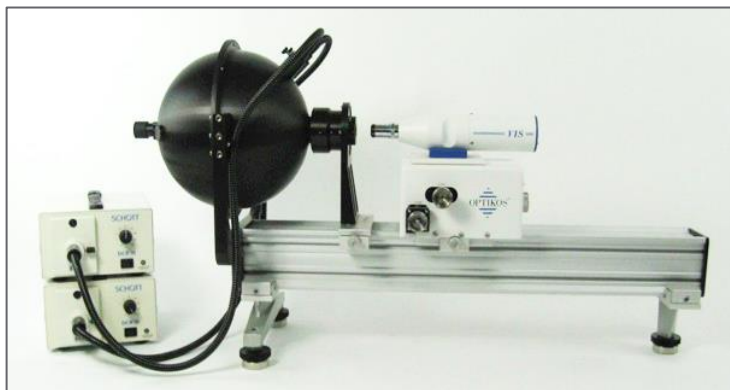
Transmission Kit



Transmission measurements:

- Measure sphere irradiance with or without UUT
- Accuracy of 0.1% validated using Reference Lens with uncoated window

Veiling Glare Instrument



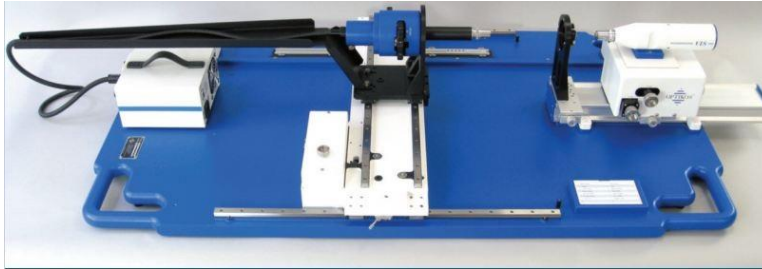
- Stray Light measurements per ISO 9358
- Black dot surrounded by uniform bright field
- Validated with Reference Lens down to 0.1%

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Finite Conjugate Lens Measurement Instrument

The Finite Conjugate Measurement Instrument is available as a standalone unit, or as an option for the LensCheck VIS.

When used as a LensCheck add-on option for measuring finite distances, the LensCheck™ Image Analyzer (IA), IA Mount, Rail and Lens Mount are removed from the LensCheck unit and mounted to the instrument base below. The image may then be moved to a precise location on the rail, and may be moved off axis.



- Manual Z-axis: 500mm travel with 0.01mm resolution encoder
- Motorized X-axis: 500mm travel with 0.1mm resolution
- Footprint: 53" x 30" (134.6 x 76.2cm) Approximately 80 lbs (36.4 kg)

Get Started with Optikos

Optikos offers metrology products and services for measuring lenses and camera systems, as well as engineering design and manufacturing for optically-based product development.

Our full-line of standard products for testing optical, imager and camera systems are appropriate for any industry and we will design a custom product for your specific application. Visit our website at www.optikos.com and contact us or your international sales representative to help you choose the right solution for your testing needs.

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