

PhaseCam®

Model 4020

4D Technology

High Performance Dynamic Twyman Green Interferometer

Instantaneous Acquisition

The PhaseCam® 4020 is a compact, lightweight dynamic laser interferometer with simple, manual controls for measurement of optics and optical systems. The industry standard for measuring large, focal optical systems such as concave telescope mirrors and lens systems, the PhaseCam is equally well suited for testing small aperture afocal components such as flat mirrors and collimators.

The PhaseCam 4020 incorporates patented technology using a single camera, high-speed optical phase sensor that makes a wavefront measurement in less than 30 microseconds—over 5000 times faster than a temporal phase shifting interferometer. Because acquisition time is so short, the PhaseCam can be used under almost any conditions, even for measuring moving parts, without vibration isolation or turbulence control. This insensitivity to environmental factors makes the PhaseCam ideally suited for use on the production floor, in clean rooms and in environmental test chambers. It can even measure moving parts such as deformable or scanning mirrors, spinning disks, or vibrating membranes.

Complete Measurement System

The PhaseCam 4020 is a turnkey instrument that includes the interferometer, 4Sight™ advanced wavefront analysis software, and complete, high-speed computer system. Samples with any reflectivity from 1% to 100% can be performed with a simple adjustment. Its stabilized HeNe laser (632.8 nm) provides excellent coherence stability.



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Industry Leading Analysis, Standard

4Sight wavefront analysis software features a user-friendly interface with unmatched simplicity, analysis features and graphical displays. The Measurement Console display aids alignment and execution of single, averaged, burst or continuous data acquisition. The Measurement Flow interface lets you visualize the entire measurement data flow, from raw acquisition through masking, reference subtraction, terms removal, etc. The unique Measurement Stack enables complex data manipulation and comparison. Zernike, Seidel, geometric and diffraction analyses are easy to perform. Comprehensive data sharing capabilities let you read, write, save and print from most file types, including MetroPro IDL®, MatLab®, Opticode®, Vision®, HDF5® and CodeV®. Generating phase movies to characterize deforming surfaces and moving parts is simple and straightforward.

Accessory Optics

Numerous accessories and options are available including diverger lenses, beam expanders and wavelength options.

FEATURES

- Vibration Insensitive Dynamic Operation
- 30 μ sec Data Acquisition Time
- 1000 x1000 Pixel Camera
- Outstanding Data Analysis and Visualization Software

APPLICATIONS

- Meter-Class Telescope Optics
- Quality Verification of Optical Components
- Vacuum and Environmental Chamber Testing
- Production Floor Quality Control
- Optical Testing of Moving Parts

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Specifications

Configuration	Model 4020
Description	Turnkey vibration insensitive dynamic Twyman-Green interferometer
Acquisition Mode	Single camera, high-speed optical phase sensor
Laser Source	Stabilized HeNe @ 632.8 nm
Maximum Cavity Length	> 100 m
Beam Diameter	7.0 mm collimated (nominal)
Polarization	Circular
Pupil Focus Range	±12.5 mm
Pupil Magnification	Fixed, 4x digital zoom
Fringe Contrast	User adjustable attenuator not required for high reflectance optics
Camera	1K X 1K pixels, 10-bit standard
Data Array	User Selectable full, half, quarter data arrays
Computer System	Minimum Dual Core 2.4 GHz processor, 4 GB RAM, 320 GB hard drive CDRW, DVDRW, 22 in LCD monitor, keyboard, mouse
Operating System	Windows XP [®]
System Software	4Sight™ Analysis Software, with User Manual Instantaneous Phase Shifting data acquisition Reference generation, subtraction, data averaging, masking 2D and 3D surface maps Zernike / Seidel / Slope / Geometric / Fourier Analysis Fiducial aided data set mapping HDF4 / HDF5 data format standard, others supported Absolute sphere, prism & corner cube analysis Multiple sub-aperture analysis Upgrades – free during warranty period
Physical Envelope	< 75 x 25 x 18.3 cm (30 x 10 x 7.2 in)
Weight	< 15 kg (33.1lbs)
Power consumption	< 750 Watts
Temperature Range	Operational: 60–80° F, non-condensing Storage: 30–100° F, non-condensing

Warranty One Year, limited, on-site system installation and operator training

Options

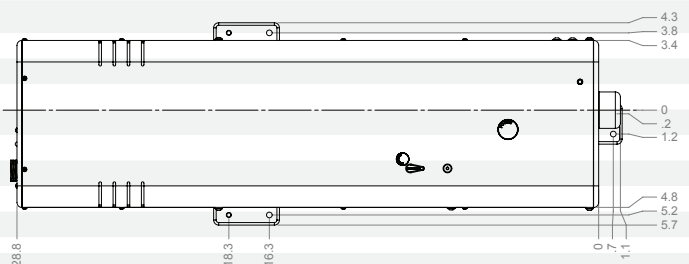
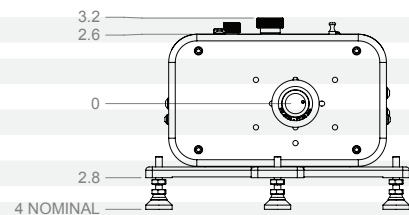
4 MegaPixel Camera	2048 x 2048 pixels, 12-bit
Beam Expanders	Optional 25 mm, 45 mm (others on request)
Divergers	Range of lenses from f/1 to f/32
High Speed	1 µsec exposure
Aperture Options	25 mm, 50 mm (others on request)
Special Analysis	Modal (Vibration) Analysis
Wavelengths	IR options available
High Power	High power output for low return testing

System Performance

Acquisition Rate	> 10 frames/sec display; 4 interferograms/frame > 25 frames/sec max data acquisition with post processing
Minimum Exposure	30 µsec
Sample Reflectivity	1 to 100%
RMS Repeatability	< 0.001 wave*
RMS Precision	< 0.002 wave**

*One sigma for RMS of 10 data sets of calibration mirror, each data set being an average of 16 measurements.

**Average RMS of the difference of 10 data sets between measured surface and the calibrated surface. Each data set being an average of 16 measurements. Calibrated surface is the pixel by pixel average of 10 measurements of calibration mirror.



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All specifications subject to change without notice.

