

MarOpto



MarOpto FI 3100 VB Dimetior VB

Simultaneous Phase-Shifting for
Vibration Intensive & Turbulent Environments

- 0 +



EXACTLY

MarOpto FI 3100 VB



Mahr's SPARC Technology Insures Measurement Errors of Less than $\lambda/50$ with No Vibration Isolation

Main Features & Benefits

- Absolute vibration insensitivity
- Common path Fizeau geometry
- Measure surfaces with 0.1 % to 100 % reflectivity
- Automated stress measurement
- Remote Fizeau cavity & long optical path applications
- 10 μ s exposure times
- True 1k x 1k resolution, fringe densities equivalent up to 250 fringes of tilt
- Uses Industry Standard 100 mm (4") bayonet reference optics

Reference Optics (partial list)

	TS				TF
F/#	0.75	1.5	3.3	7.0	–
Diameter (mm)	130				126
Height (mm)	93	88	70	92.5	30
Weight (kg)	3	2.9	2.1	2	0.7
Radius of TS	47	120	299	665	–
Accuracy	$\leq \lambda/10$				$\leq \lambda/20$



4" Transmission Flats



Reference Spheres

MarOpto FI 3100 VB

The MarOpto FI 3100 VB Simultaneous Phase-Shifting Fizeau Interferometer is a real-time, high-speed, truly vibration-insensitive metrology instrument with shutter speeds as fast as $10\mu\text{s}$. Ideally suited for shop/production floors and other vibration or turbu-

lent environments, the MarOpto FI 3100 VB offers unsurpassed measurement accuracy, versatility, stability and repeatability for analyzing optical, machined, and semiconductor wafer surfaces.

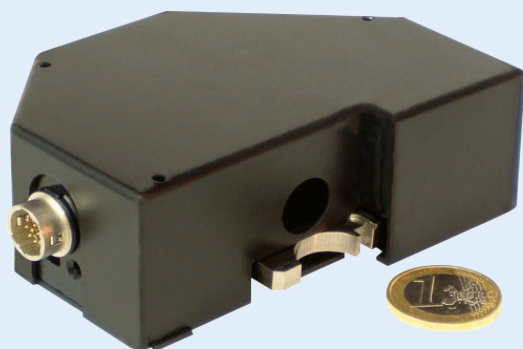
Applications

- Measure flat, concave & convex surfaces, small to astronomical size
- Long optical path length and remote Fizeau cavity measurements
- Vacuum/cryogenic chamber measurements
- In-situ measurements of optical, machined & wafer surfaces
- Dynamic measurements for thermodynamic events, rotating discs, etc.
- Characterization & removal of birefringence effects

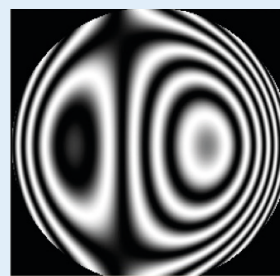
How it Works

Simultaneous phase-shifting inside the MarOpto FI 3100 VB is accomplished by replacing the standard camera with the patented HyperPhase module.

The HyperPhase module produces three ultra precise phase-shifted interferograms, which are simultaneously acquired and processed into a 3D surface map.



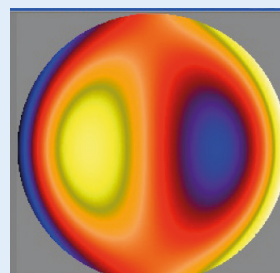
Interferogram #1



Interferogram #2



Interferogram #3



OPD Map

MarOpto FI 3100 VB

Specifications

System

Test Beam	102 mm (4.0")
Zoom	1X to 4X - Remote controlled
Focus	± 4.0 m - Remote controlled
Attenuation	Software controlled
Alignment	Simple two spot alignment
Alignment View	± 1.5 degrees
Part Viewing	Live video with two monitor option

Performance¹

Repeatability 3-Flat ²	$\lambda/300$ PV
RMS Repeatability ³	≤ 1 Å
Accuracy	≤ $\lambda/50$ Instrument Error
Height Resolution	$\lambda/8000$
Spatial Resolution	1k x 1k True Resolution
Fringe Resolution	Fringe densities equivalent to ≤ 250 fringes of tilt
Digitization	10 bits
Recording Speeds	15 Frames/sec. (faster frame rate options)
Exposure Time	10 µs minimum
Averaging Modes	Intensity and Phase
Sample Reflectivity	0.1 to 100 % with no attenuation or special coatings required (1.0 to 100 % with HeNe)

Laser

Wavelength	633 nm (other wavelengths on request)
Polarization	Linear
Coherence	> 100 m
Laser class	3 R

Electrical & Mechanical

Power	110/240 Volts, 50/60 Hz, < 130 Watts
Dimensions	489 x 330 x 325 mm (19.3" x 13" x 12.8")
Weight	27 kg (60 lbs.)

Environmental Requirements⁴

Temperature	15 to 30 °C (59 to 82 °F)
Rate of Temp. Change	< 1.0 °C per 15 min
Humidity	Relative 5 % to 95 %, non-condensing
Vibration Isolation	Not required

- 1) Performance in a lab with temp change < 1 °C/15 min between 20-23 °C.
- 2) 3 sigma repeatability of 3-Flat Test with 32 averages per set.
- 3) 3 sigma of the rms for 128 data sets, each an average of 32 measurements.
- 4) These parameters state conditions which the system can operate; they do not represent the environmental stability required to meet performance.

Configurations

- Operates in ANY orientation
- Long Optical Path and Remote Fizeau Cavity
- OEM Integration

Accessories

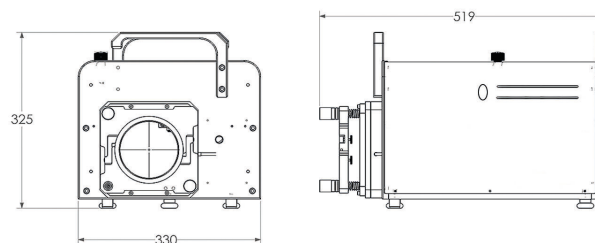
- Full set of reference optics
- 100 mm (4") to 150 mm (6"), 200 mm (8") and 300 mm (12") beam expanders
- Compatible with all industry standard 4" reference optics

Computer Workstations

- High performance computer with IntelliWave software pre-installed
- All hardware interfaces pre-installed for complete MarOpto FI 3100 VB interferometer data acquisition

IntelliWave Software

- Multiple fringe unwrapping algorithms
- Multiple aberration polynomial sets for analysis
- Diffraction and geometric analysis
- Derivatives and Integrals
- Complex masking including unlimited mask groups
- Fiducials and image transformations
- Measurements: Wavefront, Wedge, Angle, Prisms, 3-Flat Test, Two Sphere Test, Homogeneity
- Interface to IDL™, LabVIEW™, Excel™



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