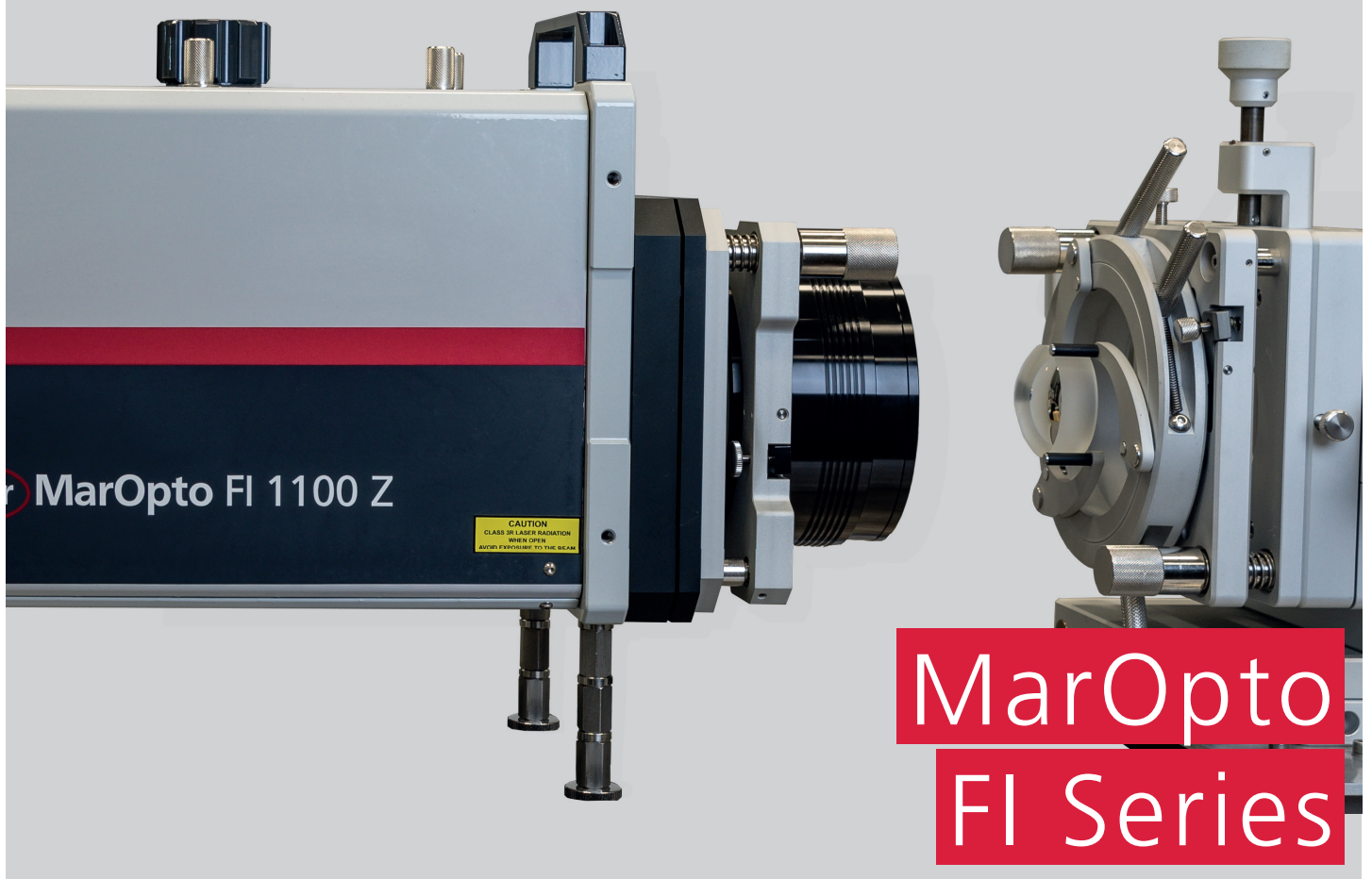


MarOpto



MarOpto
FI Series

POWERFUL FIZEAU INTERFEROMETER

- High-accuracy measurement capability with unsurpassed flexibility and versatility
- Non-contact form and wavefront measurement

This is what we mean by **EXACTLY.**

- 0 +



EXACTLY

NON-CONTACT FORM AND WAVEFRONT MEASUREMENT



➔ MEASURING TASKS

- Measurement of flat, concave or convex surfaces
- Wedge angle and homogeneity measurements
- Transmission and surface testing of optics
- Measurement of the radius of curvature
- Wavefront analysis of optical systems and components

MarOpto FI 1040 Z with optional vertical measuring stand



More information

www.mahr.com, WebCode: 21874 + 21875

+49 (0) 551 7073 800

info@mahr.com

OPTICAL MEASURING INSTRUMENT

MAROPTO FI 1040 Z, 1100 Z, 1150 Z

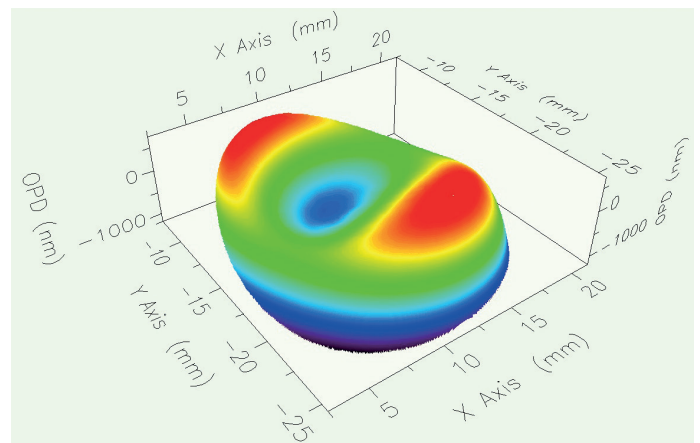
The **MarOpto FI 1040 Z**, **FI 1100 Z** and **FI 1150 Z** are powerful interferometers that enable the non-contact measurement of flat or spherical surfaces and transmitted wavefront of optical components and assemblies.

Measurements can be performed using simple basic visual fringe inspection, IntelliPhase static spatial carrier analysis, or phase-modulated interferogram analysis.

MarOpto FI 1040 Z, **FI 1100 Z** and **FI 1150 Z** offer flexibility and excellent performance for handling today's industrial applications.

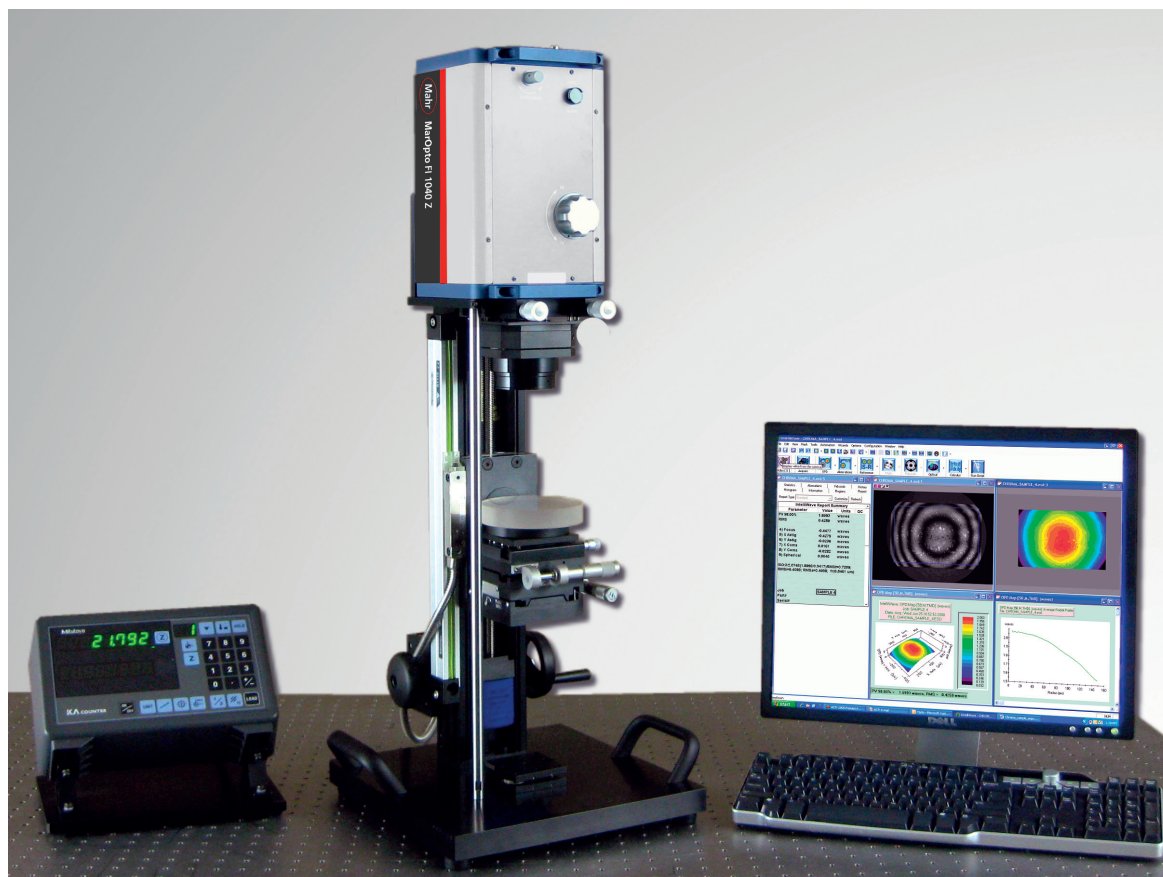
FEATURES

- 3x zoom / 6x zoom
- Total USB connectivity option with 1k x 1k true spatial resolution
- 3 modes of interferogram analysis: Phase shifting, IntelliPhase – static spatial carrier analysis, or fringe tracing
- Vibration-insensitivity can be achieved using Mahr's IntelliPhase static spatial carrier recording and evaluation software
- Compatible with all industry standard 4" (100 mm) and 150 mm (6") reference optics and accessories (MarOpto FI 1100 Z and MarOpto FI 1150 Z)
- Small size allows easy integration into OEM systems
- Compact, rugged design
- High-accuracy measurements at an affordable price
- Configurations include horizontal, vertical look up and vertical look down. Optional workstations for flats and for radius of curvature measurements.



MAROPTO FI 1040 Z

FIZEAU INTERFEROMETER FOR FLAT OR SPHERICAL SURFACES



REFERENCE OPTICS

F/# the TS	Radius TS [mm]
	$\lambda/10$
0.7	17
1	25
2	64
3	123
4	131
6	206
TF: \varnothing 40 mm	

MEASURING TASKS

- Transmission and surface testing of small optics
- Measurements of the radii of curvature



More information

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MAROPTO FI 1100 Z - HIGH ACCURACY MEASUREMENT CAPABILITY WITH UNSURPASSED FLEXIBILITY AND VERSATILITY



REFERENCE OPTICS

F/# the TS	Radius TS [mm]	
	$\lambda/10$	$\lambda/20$
0.55	19	---
0.65	39	
0.74	47.6	
1	90	
1.5	120.4	
2.2	175.9	
2.4	264.5	
3.3	300	
4	370	---
4.9	540	
5	450	---
7.0	665	---
7.1	800	
10.7	1200	
11	1050	---
23	2329.8	---
TF: \varnothing 100 mm		



MEASURING TASKS

- Measurement of flat, concave or convex surfaces
- Wedge angle and homogeneity measurements
- Transmission and surface testing of optics components
- Measurement of optics components, ceramic, and wafer surfaces
- Wavefront analysis of optical systems and components
- Measurements of the radii of curvature



More information

www.mahr.com WebCode 21874

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MAROPTO FI 1150 Z

EASY AND FAST INTERFEROMETRIC CHARACTERIZATION



REFERENCE OPTICS

F/# theTS	Radius TS [mm]	
	$\lambda/10$	$\lambda/20$
0.75	72.09	
1.1	130.68	
1.6	220.35	
2.4	346.7	
3.5	518.3	
5	739.8	
7.4	1128	
TF: \varnothing 150 mm		

➔ MEASURING TASKS

- Measurement of flat, concave or convex surfaces
- Wedge angle and homogeneity measurements
- Transmission and surface testing of optics components
- Measurement of optics components, ceramic, and wafer surfaces
- Wavefront analysis of optical systems and components
- Measurements of the radii of curvature



More information

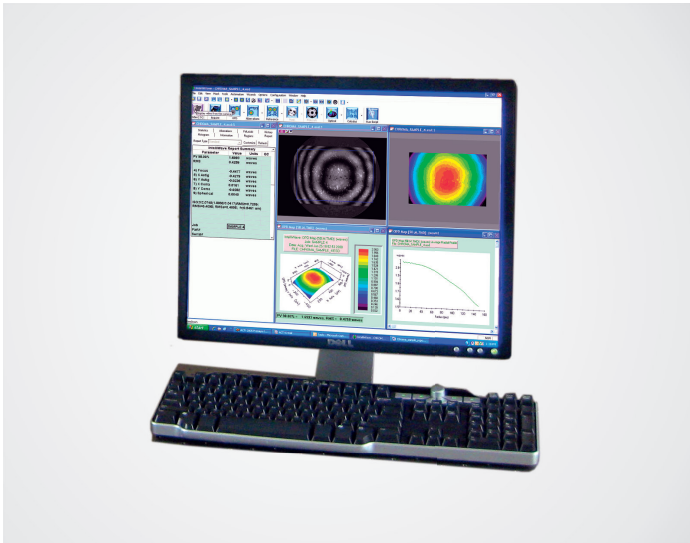
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MAROPTO INTELLIWAVE SOFTWARE

HIGH PERFORMANCE INTERFEROMETRIC ANALYSIS SOFTWARE

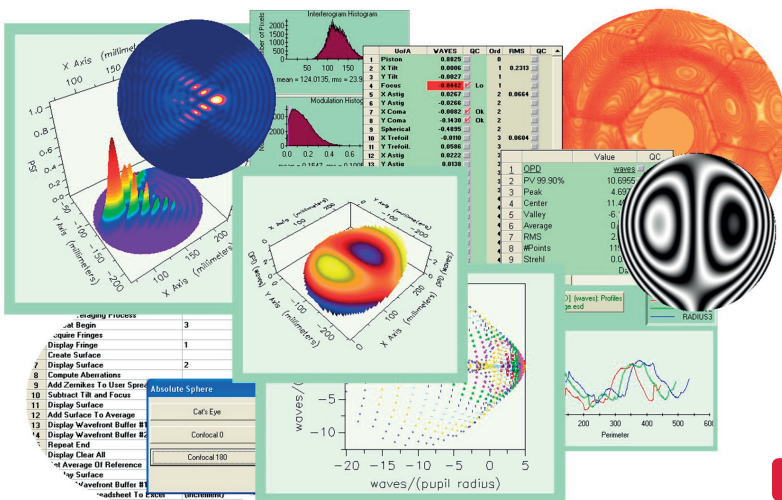
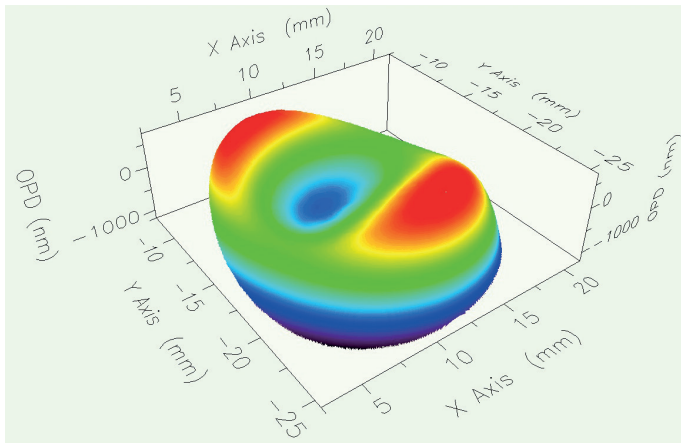


DESCRIPTION

IntelliWave allows for the characterization of spherical optics, aspheric optics, machined parts, ceramics, semiconductor wafers, and analysis of optical wavefronts. Applications include measuring, flatness, irregularity, curvature, stress, and strain.

FEATURES

- Multiple polynomial sets (aberrations) for analysis
- Differentials and integrals
- Complex masking including unrestricted masking groups
- Fiducials and image transformations
- Measurement of wavefront, wedge, angle, prisms, 3-flat-test, homogeneity
- Optional interfaces: IDL™, LabVIEW™, Excel™
- IntelliPhase – static spatial carrier analysis



i More information
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info@mahr.com

MAROPTO FI SYSTEMS

TECHNICAL DATA

MarOpto FI - System	FI 1040 Z	FI 1100 Z	FI 1150 Z
Beam diameter	38 mm	102 mm	150 mm
Zoom	6x / 3x	6x	6x
Focus	±1.5 m	± 2.0 m	± 2.0 m
Intensity	adjustable		
Alignment	easy two-point alignment		
View to the alignment	±1.5°		
Display	live video on the computer screen		
Performance Parameters ¹			
RMS repeatability ²	1 nm		
Calibrated accuracy	$\lambda / 100$		
Height resolution	$\lambda / 8000$		
Lateral resolution	640 x 480 / 1k x 1k		
Digitalization	8 bit / 10 bit		
Recording time	300 ms		
Averaging methods	intensity and phase		
Laser			
Wavelength	632.8 nm HeNe-Laser / stabilized HeNe laser		
Polarization	linear / circular		
Coherence	≥ 100 m		
Laser class	2		
Power supply, dimensions, weight			
Power supply	110 / 240 V; 50 / 60 Hz / < 155 Watt	110 / 240 V; 50 / 60 Hz / < 130 Watt	110 / 240 V; 50 / 60 Hz / < 130 Watt
Dimension [mm]	335 x 195 x 160	421 x 190 x 256	604 x 304 x 316
Weight	7.25 kg	14 kg	42 kg
Environmental conditions ³			
Temperature	+15°C up to + 30°C		
Allowed temperature change	< 1.0°C pro 15 min		
Relative humidity	5% to 95%, non-condensing		
Vibration damping	required at frequencies 1Hz to 120 Hz		

1. Vibration-free environment with temperature change < 1°C / 15 min between 20°C and 23°C, no thermals
2. 1 σ repeatability accuracy of the RMS for 32 data sets, each as an average of 16 measurements
3. The system can be operated under these conditions; the conditions, however, are not the environmental conditions that are required for the best performance.

MAROPTO FI SYSTEMS

CONFIGURATION POSSIBILITY

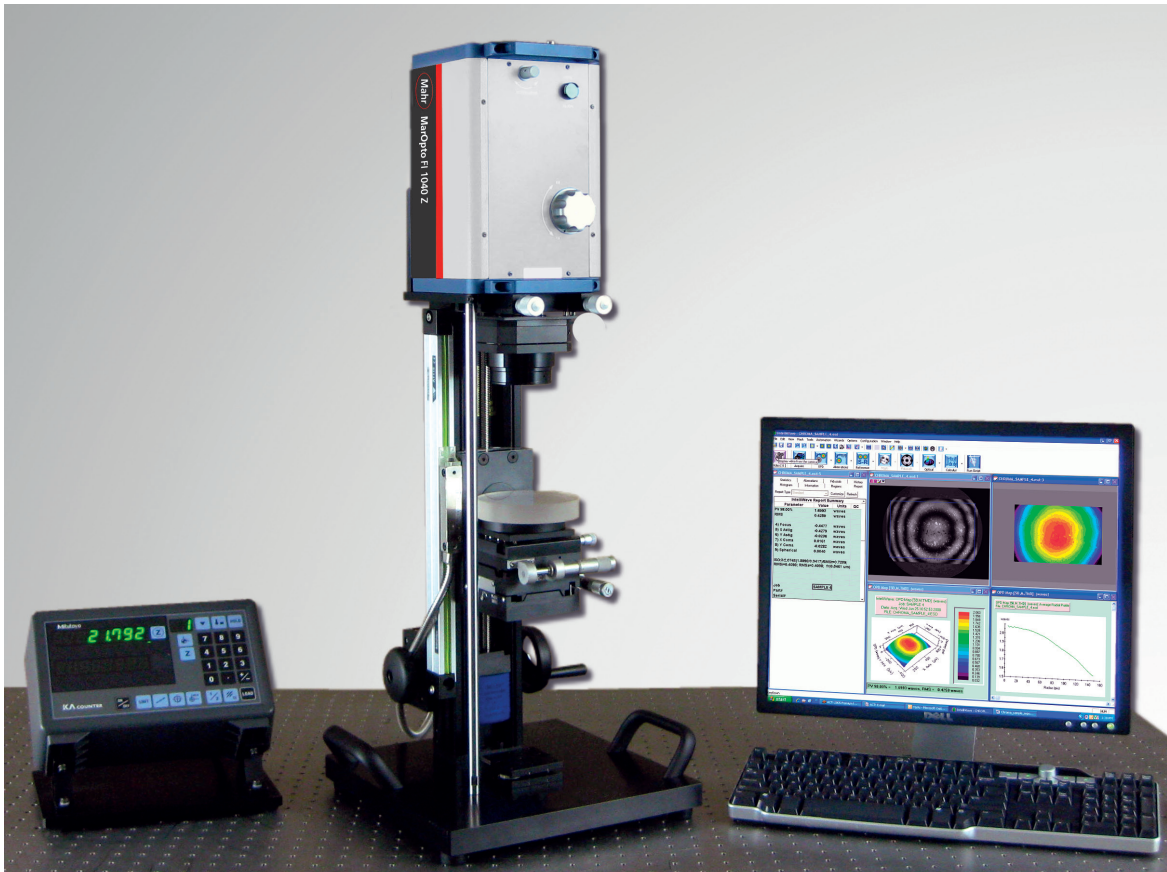
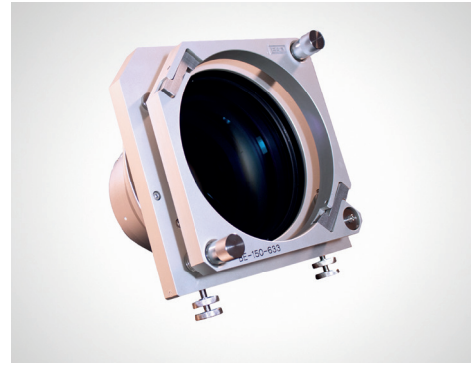
- Position-independent use, e.g. vertical and horizontal
- Static or dynamic phase shift
- Option to measure the radii of curvature

WORKING PLACE STATION

- Powerful computer with software IntelliWave installed
- All hardware interfaces are set up to operate the MarOpto FI interferometer.

ACCESSORIES (DEPENDING ON THE SYSTEM)

- Complete set of reference optics
- Beam: 102 mm to 150 mm, 200 mm and 300 mm
- Isolations table
- Compatible with all standardized 4" reference optics



PRODUCTION METROLOGY

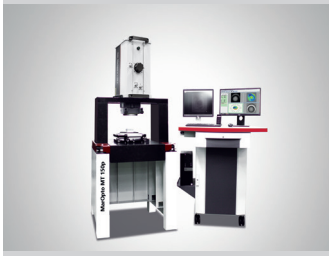


MarOpto MT 100 / 100i
High-precision Fizeau interferometer measuring tower for the testing of spherical glass surface.

WebCode: 22065
www.mahr.com

MarOpto MT 150
Highly precise Fizeau interferometer measuring tower for the testing of flat, spherical and optionally aspherical lenses.

WebCode: 22066
www.mahr.com



MarOpto MT 150p
High-precision Fizeau interferometer measuring tower for the testing of single plane surfaces or multiple carriers in optics production.

WebCode: 22068
www.mahr.com

MarOpto MT 150i
Highly precise Fizeau interferometer measuring tower for the testing of spherical and aspherical lenses with CGH.

WebCode: 22067
www.mahr.com



MarOpto MT 50
A compact Fizeau workshop interferometer for the testing of spherical components in the production environment.

WebCode: 22064
www.mahr.com

Precimar SM 60
Length measuring bench
A user-friendly measuring instrument for fast, precise outside measurements on workpieces.

WebCode: 22735
www.mahr.com



MarSurf UD 130 Aspheric 2D
Precision 2D measuring station for measuring and evaluating optical components.

WebCode: 22044
www.mahr.com

MarForm MFU 200 Aspheric
High-precision contour measurement of spheres and aspheres. 3D determination of form error early in production process.

WebCode: 21881
www.mahr.com



MarSurf LD 130 / 260
Aspheric 2D / 3D
High-precision contour measurement of spheres and aspheres. 3D determination of form error early in production process.

WebCode: 21880
www.mahr.com

MarOpto TWI 60
Tilted wave interferometer for fast and highly accurate measurement of aspheres.

WebCode: 21879
www.mahr.com



PRODUCTION METROLOGY



MarSurf WM 100

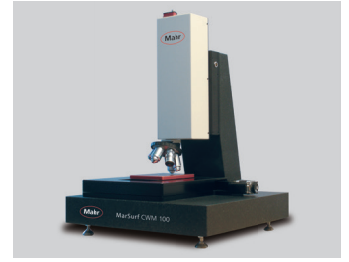
Optical roughness measurement on highly polished optical components in the nanoscale range.

WebCode: 20565
www.mahr.com

MarSurf CWM 100

User-friendly, high-precision contactless topography measurement on optical components.

WebCode: 20566
www.mahr.com



MarVision MM 420

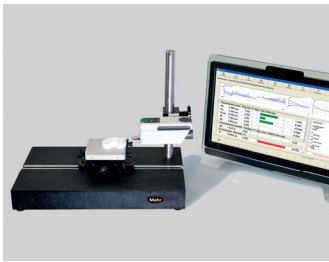
Stereo zoom microscope for detecting defects on large lenses.

WebCode: 20875
www.mahr.com

MarVision SM 150 / 151

Stereo zoom microscope with digital camera for detecting defects.

WebCode: 21050
www.mahr.com



MarSurf XR 1

Mobile roughness measurement with Bluetooth between drive unit and evaluation unit.

WebCode: 20555
www.mahr.com

MarVision MM 320

Video workshop measuring microscope. High precision for your quality control.

WebCode: 20874
www.mahr.com



MarVision QM 300

Video workshop measuring microscope. High precision for your quality control.

WebCode: 20879
www.mahr.com

MarSurf CM expert

Powerful confocal microscope for the three-dimensional measurement and analysis of surfaces.

WebCode: 22662
www.mahr.com



MarCator Digital and Dial Indicators

Its easy handling makes it one of the most diverse tools for everyday testing.

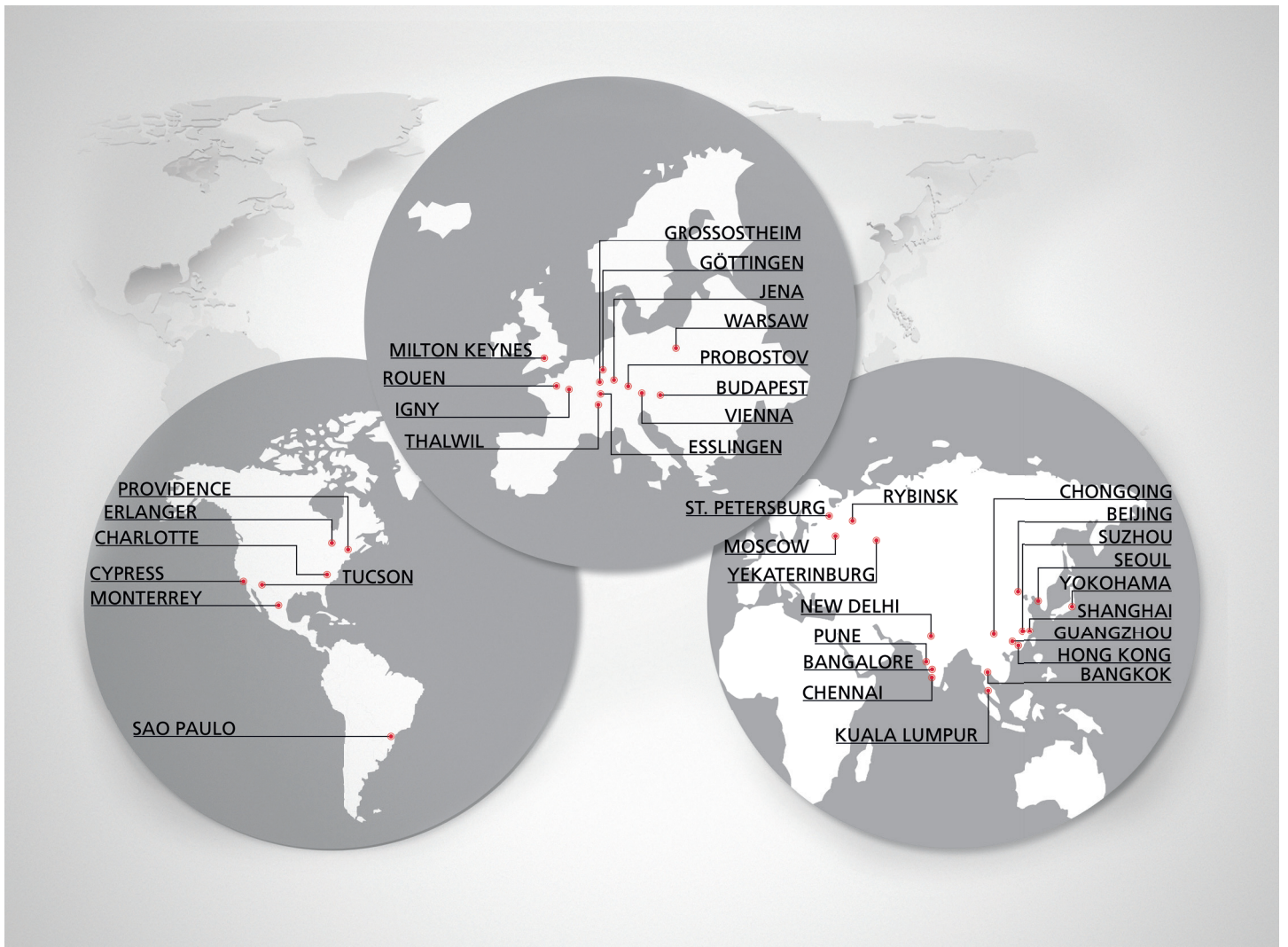
WebCode: 20234
www.mahr.com

MarCal Calipers

Digital and mechanical calipers for inner, outer and step measurements.

WebCode: 20066
www.mahr.com





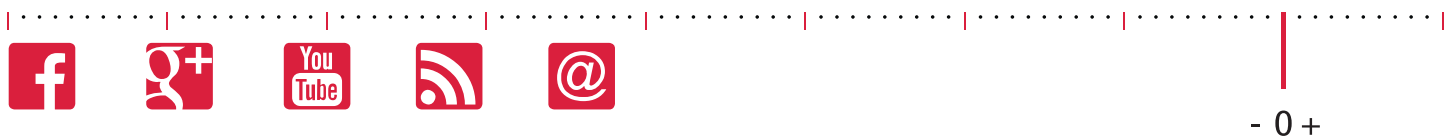
Partner of manufacturing companies worldwide.

Close to our customer.



Got QUESTIONS? Want more INFORMATION?

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