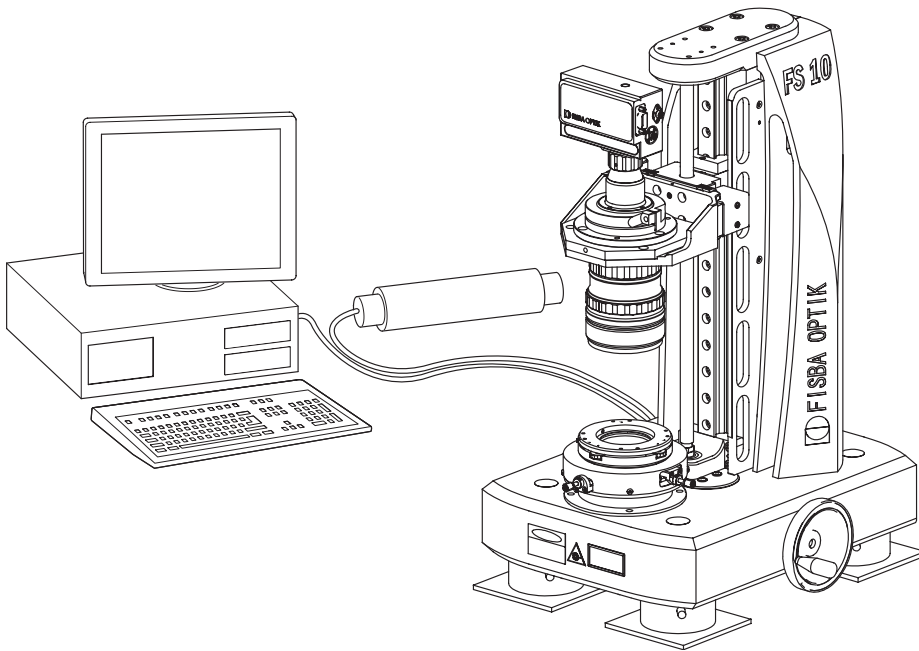


μPhase® FS10 Specifications



Digital phase-shifting interferometer for versatile use in optical production and laboratory. The modular concept of this system enables surface measurements on flat and spherical components, single transmission measurements on optical systems, absolute and relative radius of curvature measurements as well as focal length. The integrated radius measurement readout ensures a quick and accurate transmission of data.

The μPhase® FS 10 complements modern quality management processes by providing the latest hardware and software technology.

SYSTEM

Measurement Technique	Twyman-Green phase-shifting interferometer
Measurement Capability	Measurement of surface topography of reflective surfaces and optics, and wavefronts of optical systems in transmission
Interferometer Sensor	μPhase® 2 HR / μPhase® 2 SR
Operative Laser Wavelength	632.8nm, option: 355-1064nm upon request
Test Beam Diameter Options	Flat objectives: 2, 5, 10 or 50/∞ Spherical objectives: NA range see selection, p. 2
Mounting Options	Vertical
Length Measurement	Series: Renishaw RGH 24Y
<i>Integrated Optical Linear Encoder</i>	Displayable units: mm, inch Measurement range: 230 mm
<i>Length measurement uncertainty (optical axis)¹</i>	Range 0..20mm: max. 10μm ² Range 20..230mm: 10μm + 0.1‰ of measurement length (e.g. length = 130mm, max. error = 10μm + 13μm = 23μm)
Alignment System	Interferometer integrated electronic system
Alignment Field of View	± 2.5° (flat objective 10/∞)
Pupil Focus Range	±9mm for 10/∞, ±230mm for 50/∞
Computer	Pre-configured state-of-the-art Hewlett Packard PC with hard drive, CD-R/W, floppy drive
Software	μShape™ Professional measuring and analysis software under Microsoft® Windows® 2000 (XP upon request)

OPTIONAL: MOTORIZED μPHASE® FS10

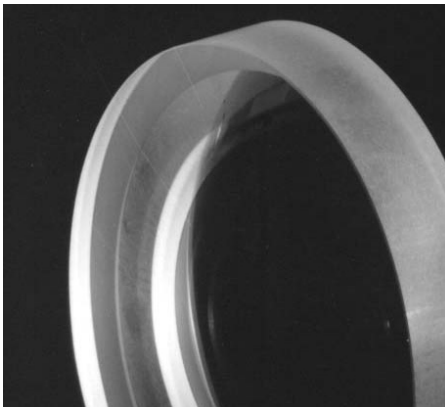
Motorized Axis	Z-Axis (X- and Y-Axis upon request)
Speed (Z-Axis) [§]	Max. 50 mm/s
Control	Manual control via joystick (Automated positioning functionality upon request)
Hardware Requirements	Computer (no stand-alone function)

DIMENSIONS

Size (L x D x H)	System: approx. 300 x 400 x 600 mm Laser: approx. 410 x 65 x 60 mm (radius) PC footprint: 400 x 350 x 110 mm
------------------	--

¹ Specifications are valid for temperature range of 21°C ± 3°C

² Achievable length measurement uncertainties within the range of 0..20mm: 3μm



TEST PART CHARACTERISTICS

Material

All polished surfaces, glass, ceramics, plastics and crystals

Processes

Polishing processes, plastic moulding, and diamond machined

Size (H x W x D)

Sample diameter 0.1-10 mm OD, depending on selected illumination lens

Sample Reflectivity

μPhase® 2 SR: 4 - 100 %
μPhase® 2 HR: 0.3 - 100 %

Coated / uncoated

Integrated and selected attenuation filters - no external filters required.

System Quality

Plano testing up to $\lambda/20$
Spherical testing up to $\lambda/20$

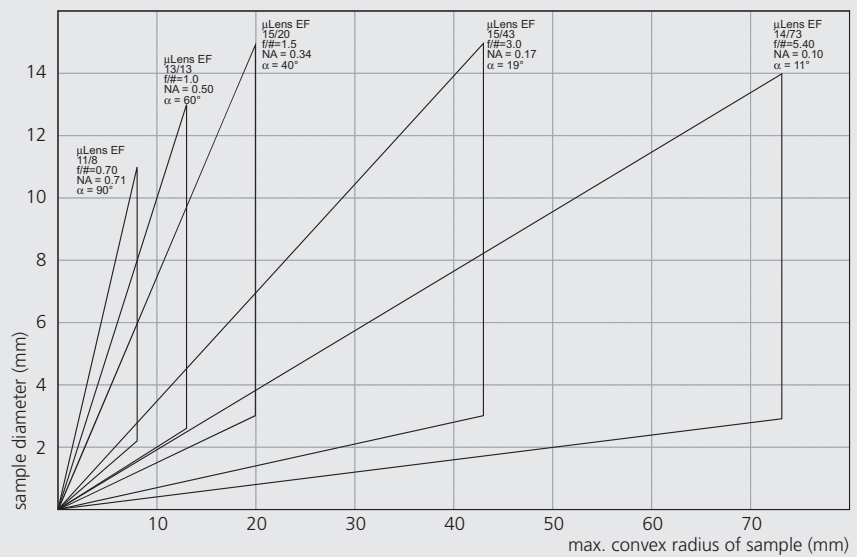
SYSTEM PERFORMANCE

PV Repeatability ⁽¹⁾	$\lambda / 400$ ($\lambda = 632.8\text{nm}$)
RMS Repeatability ⁽²⁾	$\lambda / 6500$ ($\lambda = 632.8\text{nm}$)
Measurement Uncertainty ⁽³⁾	$\lambda / 35$ ($\lambda = 632.8\text{nm}$)
Camera Resolution	μPhase® 2 HR: 1000 x 1000 pixel μPhase® 2 SR: 500 x 500 pixel
Digitization	8 bit

LASER SPECIFICATIONS

Type	Frequency-stabilized HeNe laser
Laser Protection Class	3A
Laser Stability	Minimum 8-hour frequency stability $\leq \pm 6 \cdot 10^{-9}$
Wavelength	Standard: 632.8 nm
Output Power at Aperture	≥ 1 mW
Beam Polarization	Linear; option: circular
Coherence Length	< 100 m (328 ft)

SPHERICAL LENS SELECTION DIAGRAM

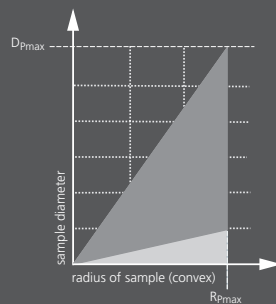


Guide to sawtooth diagrams

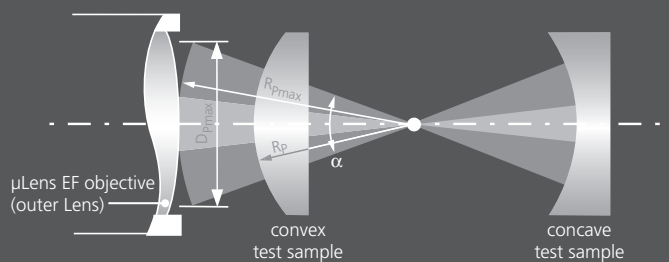
Legend

D_{Pmax} : Max. measurable convex sample \varnothing
 R_{Pmax} : Max. measurable convex radius
 R_p : Sample radius
 α : Aperture angle of the spherical objective μLens EF

■ Recommended working area D_p/R_p
■ Possible working area D_p/R_p



Measuring area of a μLens EF spherical objective



OPERATING REQUIREMENTS

Power Consumption: 100 to 240 V~, 50/60Hz

Temperature: 15° to 30°

Reference Temperature: 21°

Humidity: 5-95%, relative, non-condensing of system

SAFETY COMPLIANCE

CE Compliant

Standard: EN60825-1:2001

Laser: Class 2/II

NOTATIONS:

(1) Measured PV-Repeatability of the quoted statistic is for 100 consecutive measurements of the same cavity, measured over 96% clear aperture with 16 phase averages per data set. The specification represents the 2σ value of each statistic.

(2) Measured RMS-Repeatability of the quoted statistic is for 100 consecutive measurements of the same cavity, measured over 96% clear aperture with 16 phase averages per data set. The specification represents the 2σ value of each statistic.

(3) The measurement uncertainty equals the surface accuracy of the calibration surface used for the interferometer calibration up to the specified value.

All measurements were performed on a isolated optical table.

051108MT39e