

INFINITEFOCUS

Optical micro coordinate measurement and surface finish measurement in one system

alicono

THE SYSTEM

Fastest optical form- and roughness measurement system in its class

InfiniteFocus is a highly accurate, extremely fast and highly flexible optical 3D measurement system. Users benefit from a 3D micro coordinate measurement machine and surface roughness measurement device in only one system. The range of measurable surfaces is almost unlimited, enabled by the use of coaxial lighting and an optimized LED ring light. In addition, all axes of InfiniteFocus are equipped with highly accurate encoders ensuring highly precise stage movement. Users achieve traceable measurements that combine high resolution, high repeatability and high accuracy.

THE BENEFITS

Easy to use, flexible and efficiently automated

All relevant surface features are measured using only one multi-functional measurement sensor. Generally, the optimal setting of measurement parameters is provided automatically. This allows multiple users in different groups or departments with different materials to use the system with ease and confidence. InfiniteFocus is almost maintenance free, easy to install and does not require controlled environments to operate.

THE APPLICATIONS

Micro- and precision components as well as microstructured surfaces

In tool- and mold making, quality assurance with InfiniteFocus is a worldwide standard. Quality assurance and in-production measurement include cutting edge measurement as well as full form and roughness measurement of drills, mills, inserts etc. With InfiniteFocus in both material and process optimization manufacturer maximize turnover also in micro manufacturing, automotive industry, medical device development, pharmaceutical industry, injection molding, aerospace industry, electronics and forensics.



TECHNICAL SPECIFICATIONS

INFINITEFOCUS

GENERAL SPECIFICATIONS

Measurement principle	non-contact, optical, three-dimensional, based on Focus-Variation
Max. number of measurement points in a single measurement	X: 1840, Y: 1840, X x Y: 3.3 million
Max. number of measurement points	X: 540000, Y: 540000; X x Y: 500 million
Positioning volume (X x Y x Z)	100 mm x 100 mm x 100 mm = 1000000 mm ³ (optional: 200 mm x 200 mm x 100 mm = 4000000 mm ³)
Maintenance	maintenance free
Coaxial illumination	white LED coaxial illumination, high-power, electronically controllable
Ring light illumination (optional)	white LED high-power ring light, 24 segments, wireless, snap-on system
System monitoring	automatic self-diagnosis due to 10 temperature and 3 vibration sensors, internal current and voltage monitoring
ControlServerHP	12 Core, 32 GB, 27" Full HD LED Monitor

DIMENSIONS AND ENVIRONMENTAL CONDITIONS

Dimensions (W x D x H)	measurement instrument: 810 mm x 640 mm x 700 mm (up to 948 mm); ControlServerHP: 200 mm x 485 mm x 440 mm
Mass	measurement instrument: 105 kg - 120 kg; ControlServerHP: 19 kg
Ambient temperature range	measurement instrument: possible: 18° C - 28° C; calibrated for: 18° C - 22° C, (can be calibrated for other temperature ranges); ControlServerHP: possible: 5° C - 30° C
Permissible temperature gradient	less than 1° C/h
Permissible relative humidity	recommended: 45 % (+/-5 %); possible: 45 % (+/-15 %)
Supply voltage and current electric power	1000 W; 100 - 240 VAC; 50 - 60 Hz

MEASUREMENT OBJECT

Surface texture	surface topography Ra above 0.009 µm with λ _c 2 µm; depending on surface structure
Max. height	100 mm - 345 mm
Max. weight	30 kg; more on request
Preparation	none

OBJECTIVE SPECIFIC FEATURES

Objective magnification (*)		2.5x	5x	10x HX (**)	10x	20x HX (**)	20x	50x	100x
Numerical aperture		0.075	0.15	0.2	0.3	0.3	0.4	0.6	0.8
Working distance	mm	8.8	23.5	37	17.5	30	19.0	11	4.5
Lateral measurement range (X, Y) (X x Y)	mm	5.63	2.82	1.62	1.62	0.7	0.81	0.32	0.16
	mm ²	31.7	7.95	2.62	2.62	0.49	0.66	0.10	0.03
Measurement point distance	µm	3.52	1.76	0.88	0.88	0.44	0.44	0.18	0.09
Calculated lateral optical limiting resolution	µm	4.35	2.18	1.64	1.09	1.09	0.82	0.54	0.41
Finest lateral topographic resolution	µm	7.04	3.51	1.76	1.76	1.76	0.88	0.64	0.44
Measurement noise	nm	800	120	75	30	30	10	3	1
Vertical resolution	nm	2300	410	250	100	100	50	20	10
Vertical measurement range	mm	8	22.5	36	16.5	16.5	18	10	4
Vertical scanning speed	µm/s	3000	3000	1000 - 3000	1000 - 3000	1000 - 3000	500 - 3000	200 - 2000	100 - 1000
Measurement speed		≤ 1.7 million measurement points/sec.							

(*) Objectives with longer working distance available upon request (**) Objective available in special objective configuration

EXTENDED MEASUREMENT RANGE

Objective magnification		2.5x	5x	10x HX	10x	20x HX	20x	50x	100x
Extended lateral measurement range (X, Y) (*)	mm	100	100	100	100	100	100	47.83	23.91
	Optional (X x Y) (**)	mm ²	200	200	200	200	119.56	119.56	47.83
Extended lateral measurement range with data reduction (X, Y) (*)	mm								
		Optional					100	100	200
(X x Y) (**)	mm ²								
		Optional	10000	10000	10000	10000	10000	10000	3965
		40000	40000	40000	40000	24780	24780	3965	990

(*) Maximum unidirectional measurement area along the X- and Y-axis (**) Maximum X/Y-measurement area

RESOLUTION AND APPLICATION LIMITS

Objective magnification		2.5x	5x	10x HX	10x	20x HX	20x	50x	100x
Min. measurable height	µm	2.3	0.41	0.25	0.1	0.08	0.05	0.02	0.01
Max. measurable height	mm	8	22.5	36	16.5	29	18	10	4
Height step accuracy (1 mm)	%	n.a.	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Max. measurable area Optional	mm ²	10000	10000	10000	10000	10000	10000	3965	990
		40000	40000	40000	40000	40000	24780	24780	3965
Max. measurable profile length Optional	mm	100							
		200							
Min. measurable roughness (Ra)	µm	7	1.2	0.75	0.3	0.24	0.15	0.06	0.03
Min. measurable roughness (Sa)	µm	3.5	0.6	0.375	0.15	0.12	0.075	0.03	0.015
Min. measurable radius	µm	20	10	5	5	3	3	2	1
Min. measurable wedge angle	°	20							
Max. measurable slope angle	°	87							

ACCURACY

Flatness deviation	1.6 mm x 1.6 mm with 10x objective	U = 0.1 µm
Max. deviation of a height step measurement	height step 10000 µm	E _{Uni: St: ODS, MPE} = 0.8 µm, σ = 0.4 µm
	height step 1000 µm	E _{Uni: St: ODS, MPE} = 0.5 µm, σ = 0.1 µm
	height step 100 µm	E _{Uni: St: ODS, MPE} = 0.4 µm, σ = 0.05 µm
	height step 10 µm	E _{Uni: St: ODS, MPE} = 0.3 µm, σ = 0.025 µm
	height step 1 µm	E _{Uni: St: ODS, MPE} = 0.15 µm, σ = 0.01 µm
Profile roughness	Ra = 0.1 µm	U = 0.025 µm, σ = 0.002 µm
	Ra = 0.5 µm	U = 0.04 µm, σ = 0.002 µm
Area roughness	Sa = 0.1 µm	U = 0.02 µm, σ = 0.002 µm
	Sa = 0.5 µm	U = 0.03 µm, σ = 0.002 µm
Distance measurement	XY up to 1 mm	E _{Bi: Tr: ODS, MPE} = 0.7 µm
	XY up to 10 mm	E _{Bi: Tr: ODS, MPE} = 1.0 µm
	XY up to 20 mm	E _{Bi: Tr: ODS, MPE} = 2.0 µm
Wedge angle	β = 70° - 110°	U = 0.15°, σ = 0.02°
Edge radius	R = 5 µm - 20 µm	U = 1.5 µm, σ = 0.15 µm
	R > 20 µm	U = 2 µm, σ = 0.3 µm

E_{Uni: St: ODS, MPE} & E_{Bi: Tr: ODS, MPE} conform to ISO 10360-8

SOFTWARE

Measurement modules	Standard: 3D data capturing, profile form, profile roughness (Ra, Rq, Rz,...), surface texture (Sa, Sq, Sz,...), volume, 2D; Alicona Inspect (3D inspection incl. GD&T) Optional: automatic multi measurement; fusion; form/contour/difference; various application specific measurement modules; Edge Measurement Package (edge radius/form/contour, edge break, chipping/roughness, difference measurement, multi edge measurement); Alicona Inspect Professional; flash measurement
Automation	integrated scripting language; LabVIEW framework; .NET remoting interface; Alicona Inspect Professional (enables GD&T measurement)
Database	intuitive, graphical database
Languages	German, English, French, Korean, Japanese, Chinese
Export formats	3D data sets (e.g.: AL3D, STL, G3D, Open GPS, CVS, QDAS); image formats (e.g.: BMP, JPG, PNG)
Import formats	Standard: 3D data sets (e.g.: AL3D, STL, G3D, IGES, STEP); image formats (e.g.: BMP, JPG, PNG) Optional: Alicona Inspect Professional (SolidWorks; CATIA V4, V5, V6; Pro/E)

