

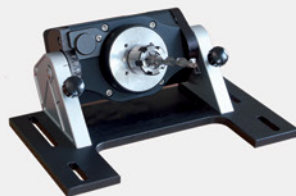
InfiniteFocus G5plus

Verification of dimensional accuracy and surface finish measurements in one system

InfiniteFocus is a highly accurate, fast and flexible optical 3D measurement system. With only one sensor, users verify dimensional accuracy and measure surface roughness of their components. Based on the technology of Focus-Variation the range of measurable surfaces is almost unlimited. By means of Vertical Focus Probing, which is an extension of Focus-Variation vertical surfaces are probed laterally as well. Components are traceably measured in high accuracy, with a high vertical resolution and in high repeatability. The robust measurement principle of Focus-Variation in combination with a vibration-isolating hardware enables the form and roughness measurement of also large and heavy components. All axes of InfiniteFocus are equipped with highly accurate encoders ensuring precise stage movement. With an automation interface, InfiniteFocus is also applied for fully automatic measurements also in production.



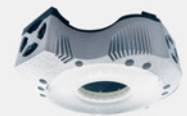
AdvancedReal3D RotationUnit G2



Real3D Rotation Unit G2



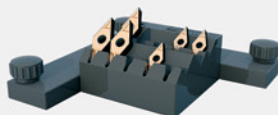
RotationGrip



RinglightHP



AdvancedInsertGrip



InsertGrip G2



ToolGrip



GENERAL SPECIFICATIONS

Measurement principle	non-contact, optical, three-dimensional, based on Focus-Variation incl. Vertical Focus Probing technology
Positioning volume (X x Y x Z)	200 mm x 200 mm x 100 mm = 4000000 mm ³
Max. specimen weight	30 kg; more on request

OBJECTIVE SPECIFIC FEATURES

Objective magnification (*)		2.5x	4x	10x HX (**)	10x	20x HX (**)	20x	50x	100x
Numerical aperture		0.075	0.135	0.2	0.3	0.3	0.4	0.6	0.8
Working distance	mm	8.8	30	37	17.5	30	19.0	11	4.5
Lateral measurement range (X,Y) (X x Y)	mm	5.63	3.97	1.62	1.62	0.7	0.81	0.32	0.16
	mm ²	31.7	15.76	2.62	2.62	0.49	0.66	0.10	0.03
Extended lateral measurement range (X x Y) (***)	mm ²	6195.26	2304	387.30	387.30	96.83	96.83	15.49	3.87
Measurement point distance	µm	3.52	2.16	0.88	0.88	0.44	0.44	0.18	0.09
Calculated lateral optical limiting resolution	µm	4.35	2.42	1.64	1.09	1.09	0.82	0.54	0.41
Finest lateral topographic resolution	µm	7.04	4.32	1.76	1.76	1.17	0.88	0.64	0.44
Measurement noise	nm	800	160	75	30	20	10	3	1
Vertical resolution	nm	2300	450	250	100	80	50	20	10
Vertical measurement range	mm	8	28.5	36	16.5	29	18	10	4
Vertical scanning speed	µm/s	3000	3000	1000 - 3000	1000 - 3000	500 - 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.

(***) Larger measurement areas possible with data reduction (primarily limited by positioning volume).

RESOLUTION AND APPLICATION SPECIFICATIONS

Objective magnification		2.5x	4x	10x HX	10x	20x HX	20x	50x	100x
Min. measurable height	µm	2.3	0.45	0.25	0.1	0.08	0.05	0.02	0.01
Max. measurable height	mm	8	28.5	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	mm ²	40000	40000	40000	40000	24780	24780	3965	990
Max. measurable profile length	mm	200							
Min. measurable roughness (Ra)	µm	7	1.35	0.75	0.3	0.24	0.15	0.06	0.03
Min. measurable roughness (Sa)	µm	3.5	0.675	0.375	0.15	0.12	0.075	0.03	0.015
Min. measurable radius	µm	20	12	5	5	3	3	2	1
Min. measurable wedge angle	°	20							
Max. measurable slope angle	°	Focus-Variation: 87 / Vertical Focus Probing: >90							

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 10000µm height step 1000µm height step 100µm height step 10µm height step 1µm	E _{Uniz} : St: ODS, MPE = 0.8 µm, σ = 0.4 µm E _{Uniz} : St: ODS, MPE = 0.5 µm, σ = 0.1 µm E _{Uniz} : St: ODS, MPE = 0.4 µm, σ = 0.05 µm E _{Uniz} : St: ODS, MPE = 0.3 µm, σ = 0.025 µm E _{Uniz} : St: ODS, MPE = 0.15 µm, σ = 0.01 µm
Profile roughness	Ra = 0.1 µm Ra = 0.5 µm	U = 0.025 µm, σ = 0.002 µm U = 0.04 µm, σ = 0.002 µm
Area roughness	Sa = 0.1 µm Sa = 0.5 µm	U = 0.02 µm, σ = 0.002 µm U = 0.03 µm, σ = 0.002 µm
Distance measurement (*)	ImageField XY up to 1 mm ImageField XY up to 10 mm ImageField XY up to 20 mm MultiMeasurement XY	E _{UnixY} : Tr: ODS, MPE = 0.7 µm E _{UnixY} : Tr: ODS, MPE = 1.0 µm E _{UnixY} : Tr: ODS, MPE = 2.0 µm E _{UnixY} : Tr: ODS, MPE = 3.2+L/100 (**)
Wedge angle	β = 70 ° - 110 °	U = 0.15 °, σ = 0.02 °
Edge radius	R = 5 µm - 20 µm R > 20 µm	U = 1.5 µm, σ = 0.15 µm U = 2 µm, σ = 0.3 µm

(*) E_{Uniz} and E_{UnixY} based on ISO 10360-8. (**) Measurement at reference temperature of 22°C +/- 0.5K and with reference weight of 15kg +/- 5kg.

