

# IF-SensorR25

Robust 3D measurement in production

IF-SensorR25 is a solid optical 3D measurement instrument for automated form and roughness measurement in production. The sensor is integrated into a production line and delivers high resolution, repeatable and traceable results when measuring surface characteristics in the  $\mu\text{m}$  or sub- $\mu\text{m}$  range. Therefore, the IF-SensorR25 is a platform that enables the use of the same measurement process both in-line and in a measurement laboratory. Standardized interfaces (e.g. QDAS) support an easy and quick integration into production allowing comparable measurements. In combination with a collaborative 6-axis robot, IF-SensorR25 is used as a collaborative system – “Cobot” – for flexible quality assurance and the measurement of microstructures on large components.



## GENERAL SPECIFICATIONS

Positioning volume (Z)	25 mm (mot.)
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## OBJECTIVE SPECIFIC FEATURES

Objective magnification (*)		10x	20x	50x	2xSX	5xAX	10xAX	20xAX	50xSX
Working distance	mm	17.5	16	10.1	34	34	33.5	20	13
Lateral measurement area (X,Y) (X x Y)	mm mm <sup>2</sup>	2 4	1 1	0.4 0.16	10 100	3.6 13.03	2 4	1 1	0.4 0.16
Measurement point distance	$\mu\text{m}$	1	0.5	0.2	5	2	1	0.5	0.2
Finest lateral topographic resolution	$\mu\text{m}$	2	1	0.64	10	4	2	1	0.64
Measurement noise	nm	40	20	10	1240	165	45	25	15
Vertical resolution	nm	100	50	20	3500	460	130	70	45
Vertical measurement range	mm	16	15	9	25	25	25	19	12
Measurement speed		≤ 1.7 million measurement points/sec.							
Accessibility	°	31	29	19	40	51	51	39	26

(\*) Objectives with longer working distance available upon request

## RESOLUTION AND APPLICATION SPECIFICATIONS

Objective magnification		10x	20x	50x	2xSX	5xAX	10xAX	20xAX	50xSX
Min. measurable height	nm	100	50	20	3500	460	130	70	45
Max. measurable height	mm	16	15	9	25	25	25	19	12
Height step accuracy (1 mm)	%	0.1							
Min. measurable roughness (Ra)	$\mu\text{m}$	0.3	0.15	0.08	n.a.	n.a.	0.45	0.25	0.15
Min. measurable roughness (Sa)	$\mu\text{m}$	0.15	0.075	0.05	n.a.	n.a.	0.25	0.1	0.08
Min. measurable radius	$\mu\text{m}$	5	3	2	20	10	5	3	2
Min. measurable wedge angle	°	20							
Max. measurable slope angle	°	87							

## ACCURACY

Flatness deviation	2 mm x 2 mm with 10x objective	U = 0.1 $\mu\text{m}$
Max. deviation of a height step measurement	height step 1000 $\mu\text{m}$ height step 100 $\mu\text{m}$ height step 10 $\mu\text{m}$ height step 1 $\mu\text{m}$	$E_{\text{Uni: St: ODS, MPE}} = 1 \mu\text{m}, \sigma = 0.1 \mu\text{m}$ $E_{\text{Uni: St: ODS, MPE}} = 0.4 \mu\text{m}, \sigma = 0.05 \mu\text{m}$ $E_{\text{Uni: St: ODS, MPE}} = 0.3 \mu\text{m}, \sigma = 0.025 \mu\text{m}$ $E_{\text{Uni: St: ODS, MPE}} = 0.15 \mu\text{m}, \sigma = 0.01 \mu\text{m}$
Profile roughness	Ra = 0.5 $\mu\text{m}$	U = 0.04 $\mu\text{m}, \sigma = 0.002 \mu\text{m}$
Area roughness	Sa = 0.5 $\mu\text{m}$	U = 0.03 $\mu\text{m}, \sigma = 0.002 \mu\text{m}$
Distance measurement	XY up to 2 mm	$E_{\text{Bi: Tr: ODS, MPE}} = 0.8 \mu\text{m}$
Wedge angle	$\beta = 70^\circ - 110^\circ$	U = 0.15 $^\circ, \sigma = 0.02^\circ$
Edge radius	R = 5 $\mu\text{m} - 20 \mu\text{m}$ R > 20 $\mu\text{m}$	U = 1.5 $\mu\text{m}, \sigma = 0.15 \mu\text{m}$ U = 2 $\mu\text{m}, \sigma = 0.3 \mu\text{m}$

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

## SOFTWARE

Interface	integrated scripting language; LabVIEW framework; .NET remoting interface; Alicona Inspect Professional (enables GD&T measurement)
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