

OPTICAL SENSORS

The sensors of the CHRcodile family feature very fast measuring rates, precise measurements and compact design.

They can be used as stand alone devices and are easily integrated. Every product group has their own advantages:

CHR 150 E, CHRcodile E, Chrocodile X

The sensors are perfectly designed for topography and thickness measurements. The Xenon-technology of CHRcodile X allows the measurement on dark surfaces with at a very high measuring rate.

CHRcodile M4

Modular design specifically for inline applications and will accommodate up to 4 channels and 4 optical probes for simultaneous output.

CHRcodile IT

This design is optimized for thickness measurements of silicon wafers and multilayers of thin films.

CHRcodile LR

Very high lateral resolution to measure intricate structures. Optimized for inline measurement of thick foils.

Sensor	CHR 150 E	CHRcodile E	CHRcodile X	CHRcodile M4	CHRcodile IT	CHRcodile LR
Measurements/second	1000	4000	14000 ¹⁾	4000	–	4000
chromatic [Hz]:	333	4000	4000	4000 ²⁾	4000	4000
interferometric [Hz]:						
Linearity	less than ± 0.1 %					
Reproducibility [%] of measuring range	< 0.009	< 0.009	< 0.009	< 0.012	< 0.02	< 0.02
Resolution	0.003 % of measuring range, 15 bit (23 bit possible)					
Number of measuring channels	1	1	1	1 - 4	1	1
Number of calibration tables	6	16	10	16 ³⁾	16	16
Interfaces ⁴⁾	RS 232 2 x analog (12 bit)	USB RS 232 2 x analog (15 bit)	Ethernet USB RS 232 2 x analog (15 bit)	RS 422 USB RS 232 2 x analog (15 bit)	USB RS 232 2 x analog (15 bit)	USB RS 232 2 x analog (15 bit)
Synchronization with external devices	Trigger input					
Number encoder inputs	0	3	3	3 ³⁾	3	3
Length optical fiber	2 - 50 m – also with steel sheath					
Light source	Halogen lamp	Halogen lamp	Xenon-short arc lamp	Halogen lamp	SLD 1300 nm	SLD 830 nm
Data processing	DSP Microcontroller	DSP Microcontroller	DSP Embedded PC	DSP Microcontroller	DSP Microcontroller	DSP Microcontroller
Rated power	110 W	125 W	130 W	175 W	25 W	25 W
System voltage	90 - 264 V AC 47 - 63 Hz	85 - 264 V AC 47 - 63 Hz	85 - 264 V AC 47 - 63 Hz	85 - 264 V AC 47 - 63 Hz	85 - 264 V AC 47 - 63 Hz	85 - 264 V AC 47 - 63 Hz
Operating temperature	+ 5°C to + 50°C					
Dimensions	W:	260 mm	260 mm	360 mm	19"	260 mm
	H:	115 mm	115 mm	160 mm	3 HE	115 mm
	D:	310 mm	310 mm	400 mm	306 mm	310 mm
Weight	4.5 kg	4.5 kg	11 kg	10 kg	5 kg	5 kg

Legend

¹⁾ also on dark surfaces

²⁾ for high resolution module

³⁾ each channel

⁴⁾ LVDT output option

OPTICAL PROBES AND SENSORS



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CHRcodile

If time matters...

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OPTICAL PROBES

The optical probes for non-contact distance and thickness measurements have a wide measuring range between some few microns and several millimeters. This allows a perfect optical probe for every application.

- precise measurement independent of the surface type; i.e. polished, rough, bright or dark
- high lateral and z-resolution for the measurement of intricate structures
- ability to measure on high tilted, mirroring surfaces
- robust and compact housing

All optical probes are available in a vacuum version. Our probes have the following advantages:

Measuring range	300 µm	300 µm 90° angled	350 µm	600 µm	600 µm 90° angled	2 mm ¹⁾	2 mm ¹⁾ 90° angled	3 mm ¹⁾	6 mm ¹⁾	10 mm ¹⁾	25 mm ¹⁾	2-250 µm ²⁾	2-250 µm ²⁾	2-250 µm ²⁾	40 - 3500 µm ²⁾	40 - 3500 µm ^{2),3)}	100 µm	30 - 1200 µm ²⁾	30 - 1200 µm ^{2),3)}		
Optical probes																					
Sensor	CHR 150 E, CHRocodile E, CHRocodile X, CHRocodile M4											CHR 150 E, CHRocodile E, CHRocodile X			CHRocodile IT		CHRocodile LR				
Application	Distance + Thickness											Thickness			Distance + Thickness		Thickness				
Measuring principle	Chromatic Confocal											Interferometric			with Reference		Chrom. Conf.		with Reference		
Working distance [mm]	4.5	4.5	8	6.5	6.5	61	2 - 19	22.5	36	70	80	27	9.5	101	23	23	5.8 (7.5 without cover)	27	26.5		
Resolution in z [nm] ⁴⁾	10	10	14	20	20	70	70	100	200	300	800	10	10	10	200	200	10	100	100		
Accuracy [µm]	0.1	0.1	0.14	0.2	0.2	0.7	0.7	1	2	3	8	0.1	0.1	0.1	1	1	0.1	1	1		
Spot diameter [µm]	5	5	5	4	4	12.5	12.5	12	16	24	25	40	10	50	13	13	1.4	9	9		
Lateral resolution [µm]	2.5	2.5	2.5	2	2	6	6	6	8	12	12.5	20	5	25	6.5	6.5	0.7	4.5	4.5		
Numerical aperture	0.5	0.5	0.33	0.5	0.5	0.26	0.26	0.5	0.43	0.33	0.26	0.09	0.17	0.1	0.12	0.12	0.66	0.12	0.12		
Measurement angle to surface ⁵⁾ 90°	±30°	±30°	± 20°	±30°	± 30°	± 15°	± 15°	± 30°	± 25°	± 20°	± 15°	± 5°	± 10°	± 5°	± 5°	± 5°	± 40°	± 5°	± 5°		
Maximum thickness measurement range ⁶⁾ [mm]	0.45	0.45	0.525	0.9	0.9	3	3	4.5	9	15	37.5	0.16	0.16	0.16	2.33	2.33	0.15	0.8	0.8		
Dimensions [mm]	L: 107 Dia: 15	L: 113 □ = 15 x 16	L: 98 Dia: 16	L: 121 Dia: 19	L: 104 □ = 19 x 36	L: 105 Dia: 45	L: 139 □ = 50 x 50 ⁷⁾	L: 102 Dia: 49	L: 194 Dia: 52	L: 146 Dia: 65	L: 240 Dia: 76	L: 50 Dia: 15	L: 50 Dia: 15	L: 126 Dia: 28	L: 46 Dia: 20	L: 53 Dia: 20	L: 154 Dia: 30	L: 49 Dia: 20	L: 49 Dia: 20		
Weight [g]	38	89	90	71	78	473	734	505	1245	724	1638	21	21	278	75	90	267	75	75		

Legend

¹⁾ increase sensitivity at high scanning speed

²⁾ optical length

³⁾ especially suited for multilayer systems

⁴⁾ for 15 bit resolution, 23 bit maximum resolution

⁵⁾ reduced accuracy at high slopes

⁶⁾ refractive index n = 1.5

⁷⁾ for 19 mm working distance