

Data Sheet

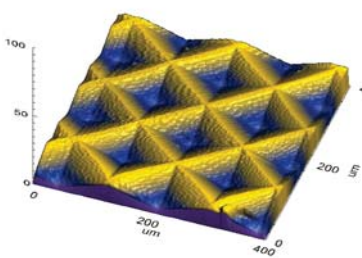
FRT CWL - Chromatic White Light Sensor

Used in many sectors

- Medical Technology
- Semiconductors
- Photovoltaics
- MEMS
- Optics
- Automotive

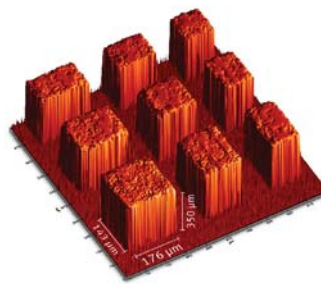


The FRT CWL is a fast, optical distance measurement sensor that can be precisely configured for the given application. For this, there is a choice of standard and special sensor heads with different measuring ranges available. The non-destructive working principle of the FRT CWL performs equally well on surfaces with high and low reflectivity. Due to its bright light source and a measuring rate of up to 14 kHz, the sensor is used for a variety of applications in industrial production control and R&D. Up to 16 different measuring heads can be calibrated on one sensor electronics and be used exclusively as required.



Incisions in a print matrix, measured with FRT CWL 300 μm

3D topography with incisions in a print matrix. The evaluation of roughness, depth and volume allow the optimization of the printing process and the quality control of the products.



Sawn ceramic, measured with CWL 600 μm (Source: DISCO Corporation)

Ceramic bars after wafer processing with a precision saw. The exact sawing pattern and the length, width and height of the bars can be controlled with 2D and 3D surface analysis.

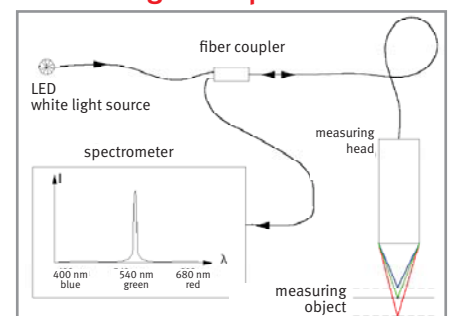
Typical Measuring Tasks

- 2D profile measurement
- 3D topography measurement
- Step height measurement
- Roughness and planarity measurement
- Structure and contour measurement

Measuring Features

- Optical, non-contact, non-destructive measurement
- High measuring rate up to 14 kHz
- Bright, small measuring spot
- High lateral and vertical resolution
- Excellent signal/noise ratio
- Small, robust, wear-free measuring head

Measuring Principle



The CWL is based on the principle of chromatic distance measurement. White light is focused on the surface by a measuring head with a strongly wavelength-dependent focal length. The spectrum of the light reflected on the surface generates a peak in the spectrometer. The wavelength of this peak is used to determine the distance to the sample surface.

Visit frt-gmbh.com/whitepapers for detailed application examples!

Technical Data

FRT CWL - Chromatic White Light Sensor


Measuring range z ¹⁾	300 µm	600 µm	1 mm	3 mm	6 mm	10 mm
Working distance	4.5 mm	6.5 mm	20 mm	22 mm	35 mm	70 mm
Resolution z ²⁾	3 nm	6 nm	10 nm	30 nm	60 nm	100 nm
Resolution x,y	2.5 µm	2 µm	1.8 µm	6 µm	8 µm	12 µm
Numerical Aperture	0.5	0.5	0.7	0.5	0.43	0.33
Measuring angle ³⁾	90° ± 30°	90° ± 30°	90° ± 45°	90° ± 30°	90° ± 25°	90° ± 20°

- 1) Further measuring ranges available
 2) Maximum resolution based on reduced measuring range
 3) Diffusive surfaces allow for wider measuring angles


Sensor electronics	CWL	CWL F	CWL X
Measuring rate	2,000 measurements / sec. (2 kHz)	4,000 measurements / sec. (4 kHz)	14,000 measurements / sec. (14 kHz)
Light source	LED	Halogen lamp	Xenon high-pressure lamp
Repeatability	< 0.00009 x measuring range		
Measuring accuracy	< 0.00033 x measuring range + 0.001 x measuring height		
Calibration tables	16		
Operating temperature	+ 5° C to + 50° C		
Dimensions (W x H x D)	200 mm x 100 mm x 93 mm	260 mm x 115 mm x 310 mm	360 mm x 160 mm x 400 mm

Scope of Delivery


Measuring head, optical fiber, sensor electronics, operating manual




Use this sensor in a FRT multisensor metrology tool!




MicroProf® 200 Multisensor
 Tabletop metrology tool with multisensor capability for sample sizes of up to 200 mm².



MicroProf® 300 TTV Multisensor
 Housed multisensor metrology tool for surface and part thickness measurement of sample sizes up to 300 mm².



FRT MFE® Metrology for Frontend
 Fully automated multisensor metrology tool with wafer handling for MEMS and semiconductor fabs.



GERMANY

FRT, Fries Research & Technology GmbH
 Phone +49 (0)2204 - 84 2430
 Fax +49 (0)2204 - 84 2431
 E-mail: info@frt-gmbh.com

SWITZERLAND

FRT Suisse AG
 Phone +41 (0)41 - 8322 252
 Fax +49 (0)1212 - 50 42 19 649
 E-mail: info@frt-suisse.ch

ASIA/PACIFIC

FRT Shanghai Co., Ltd.
 Phone +86 21 - 3876 0907
 Fax +86 21 - 3876 0917
 E-mail: info@frt-china.cn

AMERICA

FRT of America, LLC
 Phone +1 408 - 261 2632
 Fax +1 408 - 261 1173
 E-mail: info@frtofamerica.com

