CHROMATIC CONFOCAL

REFERENCE GUIDE

MARPOSS

STIL

ABOUT US

Marposs was founded in 1952. It provides shop-floor solutions for measurement, inspection and testing in the production environment, and offers standard or customized solutions for each stage of the production process.

Marposs' solutions include:

- gauging equipments for mechanical components, before, during and after the production process;
- monitoring solutions on machine tools;
- assembly and testing for many industry sectors;
- automatic machines and inspection stations for production lines

Marposs is one of the main suppliers to the automotive industry providing solutions for both traditional and electric mobility, and additionally operates in the aerospace, biomedical, hi-tech, white appliance, and glass containers industries.

Marposs Group employs 3500 people around the world and is present in 34 countries with more than 80 sales offices.

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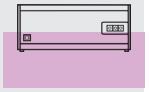
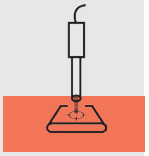
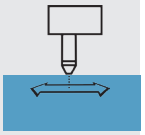


ChromaLine Sensor Heads

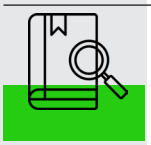


ChromaVision Camera



Accessories

Glossary

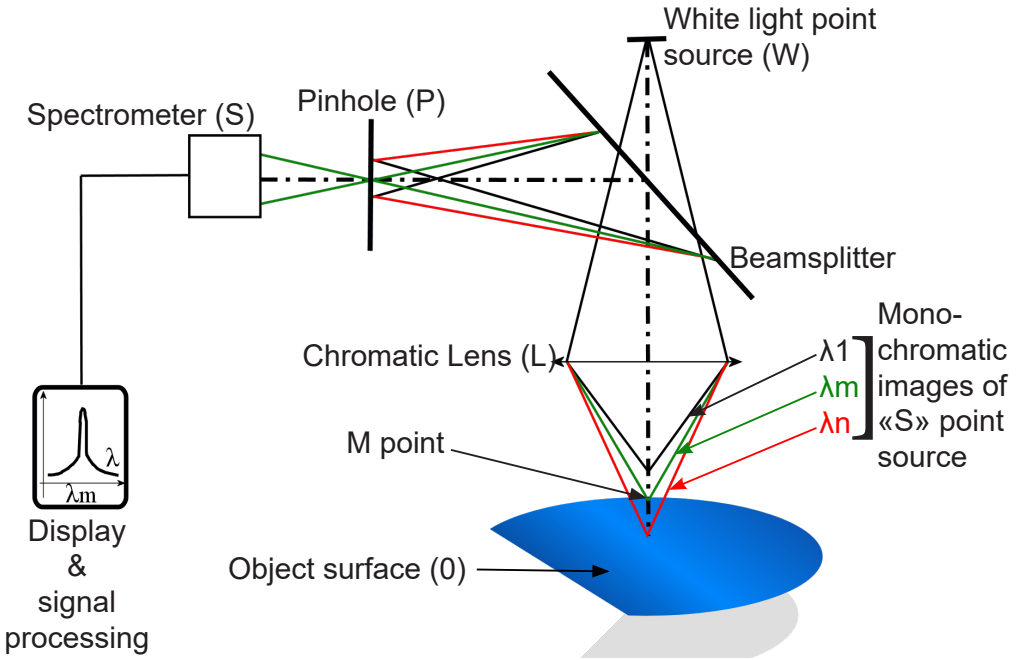


MARPOSS

CHROMATIC CONFOCAL PRINCIPLE

STIL is the Marposs non-contact product line based on chromatic confocal technology, meeting the market and industries requirements in the development of their applications.
STIL products are the perfect balance between technology and precision.

CHROMATIC CONFOCAL PRINCIPLE



A pinhole of incident white light is transformed, through a chromatic lens, into a continuum of monochromatic images along the Z-axis, thus providing a «color coding» along the optical axis. When an object is present in this «colored» field, a single wavelength is perfectly focused on its surface and then reflected in the optical system.

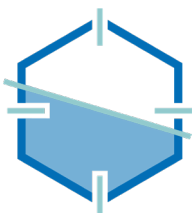
This reflected beam passes through a filtering pinhole in a spectrograph, which determines the wavelength that was perfectly focused on the object and then accurately determines its position in the measurement field.

Confocal chromatic imaging provides reliable, accurate and repeatable dimensional measurements with extremely high resolution.

Works on every material, any reflectivity simultaneously

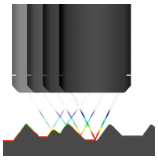
Coaxial optical beam

Easy industrial integration / Plug&Play sensor

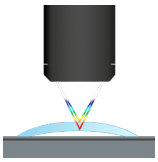


High slope detection & measurement

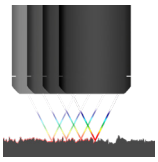
MEASUREMENTS



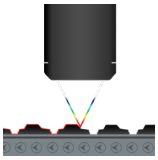
DISTANCE **0.15 µm --> 100 mm**



THICKNESS **5 µm --> +100**



ROUGHNESS **Ra = 0.05 µm -->700 µm**



INSPECTION **Defect size > 1 µm**

BENEFITS

ALL MATERIALS

HIGH RESOLUTION UP TO 3 nm

FAST RESULT
100 kHZ (MC2)
20 kHz (ZENITH)

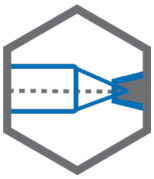
SLOPE ANGLE
± 88°

Vision with a 2.6 mm depth of field.
No need for autofocus

ADVANTAGES

- Reliable and accurate dimensional measurements
- Extremely high resolution (submicronic)
- High speed solution for in-process control
- Compatible with any kind of material and environment
- Ability to measure high slopes
- Passive optomechanical sensor

TECHNOLOGY

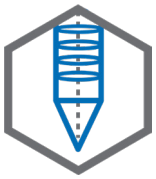


COAXIAL WITHOUT SHADOW EFFECT

High slope angle measurement until +/-45° on mirror and +/-88° on diffusing surfaces with no shadow effect

LARGE NUMERICAL APERTURE

High slope angle measurement thanks to high numerical aperture and micrometric spot size within the Measuring Range (MR)



PASSIVE COMPONENTS

Safe optical pens & probes are composed of passive components only. No heat. Emission for stable measurement. Light emission under Max. Permissible Exposure (MPE)

FOR ALL TYPES OF ENVIRONMENT

STIL sensors work within any kind of environment (hot and cold temperature, industry and laboratory) independently of ambient light

EASY AND FLEXIBLE INTEGRATION

Plug & Play integration for 3D OEM machine and industrial protocol of communication

COMPATIBILITY IN VACUUM CHAMBER

Compatible within vacuum chamber, radioactive area or transparent liquid immersion - on request

CHROMATIC CONFOCAL CONTROLLERS FOR POINT SENSORS

ChromaPoint Controllers

ZENITH™ controllers in association with a wide range of STIL Chromatic Confocal sensors heads, are designed for Metrology, Mechanics, Semiconductors, 3C, Glass, Automotive, Aerospace, Medical and Academics and Research laboratories.
They are highly precise and allow accurate measurements of distance, shape, roughness, and thickness.

ZENITH20C1
ZENITH20C2

ZENITH20C1™ is the new high performance single channel controller from STIL for non contact measurements using chromatic confocal technology.
ZENITH20C2™ offers 2 simultaneous synchronized measurement channels at 20 kHz.

ChromaPoint controllers allow high precision measurements without contact and without risk of damaging the parts.
Among the various advantages of these controllers is the measurement of distance and thickness at very high resolution on all types of surfaces and materials, including reflective surfaces.
Thickness measurement on glass or transparent films is achieved with a single controller, a single high-precision sensor head, a maximum measurement frequency of 20 kHz and sub-micron accuracy.
ChromaPoint controllers are compatible with all STIL sensor heads (CL-MG™, OP™, ENDO™, EVEREST™...) with a performance adapted to each measurement range.
The new ZENITH20C2™ offers two simultaneous 10 kHz channels for high performance on R2R applications.

Benefits

- Chromatic confocal technology measures any material reflecting enough white light (e.g. metal, glass, plastic, carbon, paint films, liquids …)
- High measurement accuracy
- Interchangeable STIL optical heads: CL-MG™ / OP™ / ENDO™ / EVEREST™ series
- ChromaPoint controllers can store up to 20 calibrations to allow the most appropriate probe to be used
- Availability of Software Development Kit (SDK) and protocol commands for easy integration into any system
- Synchronized measurements with encoder for dynamic acquisitions
- Several communication interfaces : Ethernet, RS422, synchronization interface, encodeur

Application fields

Non-contact measurement is suitable wherever it is necessary or preferable to measure without touching the part.

Technical Specifications

Model	ZENITH 5C1	ZENITH 5C2	Zenith 10C1	Zenith 10C2	Zenith 20C1	Zenith 20C2
Ordre Code EXPORT FREE (E)	O8ST17E1004	O8ST17E1102	O8ST17E1201	O8ST17E1301	O8ST17E1401	O8ST17E1501
Ordre Code DUAL USE (D) *	O8ST17D1004	O8ST17D1102	O8ST17D1201	O8ST17D1301	O8ST17D1401	O8ST17D1501
Technology	Chromatic Confocal					
Source	White LED					
Number of channel	1	2 (simultaneous)	1	2 (simultaneous)	1	2 (simultaneous)
Acquisition Frequencies	Up to 5 kHz		Up to 10 kHz		Up to 20 kHz	
Measuring range	From 100 micrometers to 100 millimeters **					
Axial resolution	Version (E) > 0.25 µm / Version (D) > 0.001 µm					
Calibration table memory	Up to 20					
Distance Measurement	1 peak among 8: First/Second/.../Seventh/Eighth/Last/Strongest					
Thickness Measurement	2 peaks among 8					
Multipeak Measurement	First 5 peaks					
Advanced features	Web configurator/ Multipeak / Network Discovery App/ AutoExposureTime/Computed data/ EncoderTrigger/ Master&Slave mode...					
Digital Output	Ethernet (GigE) and RS422					
Synchronization	Trigger in (5V TTL or -24Vdc or encoder) & Trigger out (5V TTL)					
Other Input/Output	Up to 5 encoder inputs (differential TTL)					
Fiber connection	E2000/APC					
Temperature in use	+5 to + 50°C					
Storage temperature	-20 to +70°C					
Relative humidity	5 to 80% RH without condensation					
Protection type	IP 40					
Compliance	-Electromagnetic compatibility (EN 61326-1) -Cold operation at +5°C (CEI EN 60068-2-1 A) -Stationary hot humid operation at +45°C and 93% RH (CEI EN 60068-2-78) -Cold storage at -20°C (CEI EN 60068-2-1 A) -Dry hot storage at +65°C (CEI EN 60068-2-2 B) -5G Sinusoidal vibrations (CEI EN 60068-2-6 FC) -Degree of tightness IP40 (CEI EN 60529)					
Power Supplier	24 VDC					
Maximum/Usual Consumption	25W/10W	25W/15W	25W/10W	25W/15W	25W/10W	25W/15W
Dimensions (mm)	169 x 110 x 88					
Weight	1 kg	1.2 kg	1 kg	1.2 kg	1 kg	1.2 kg

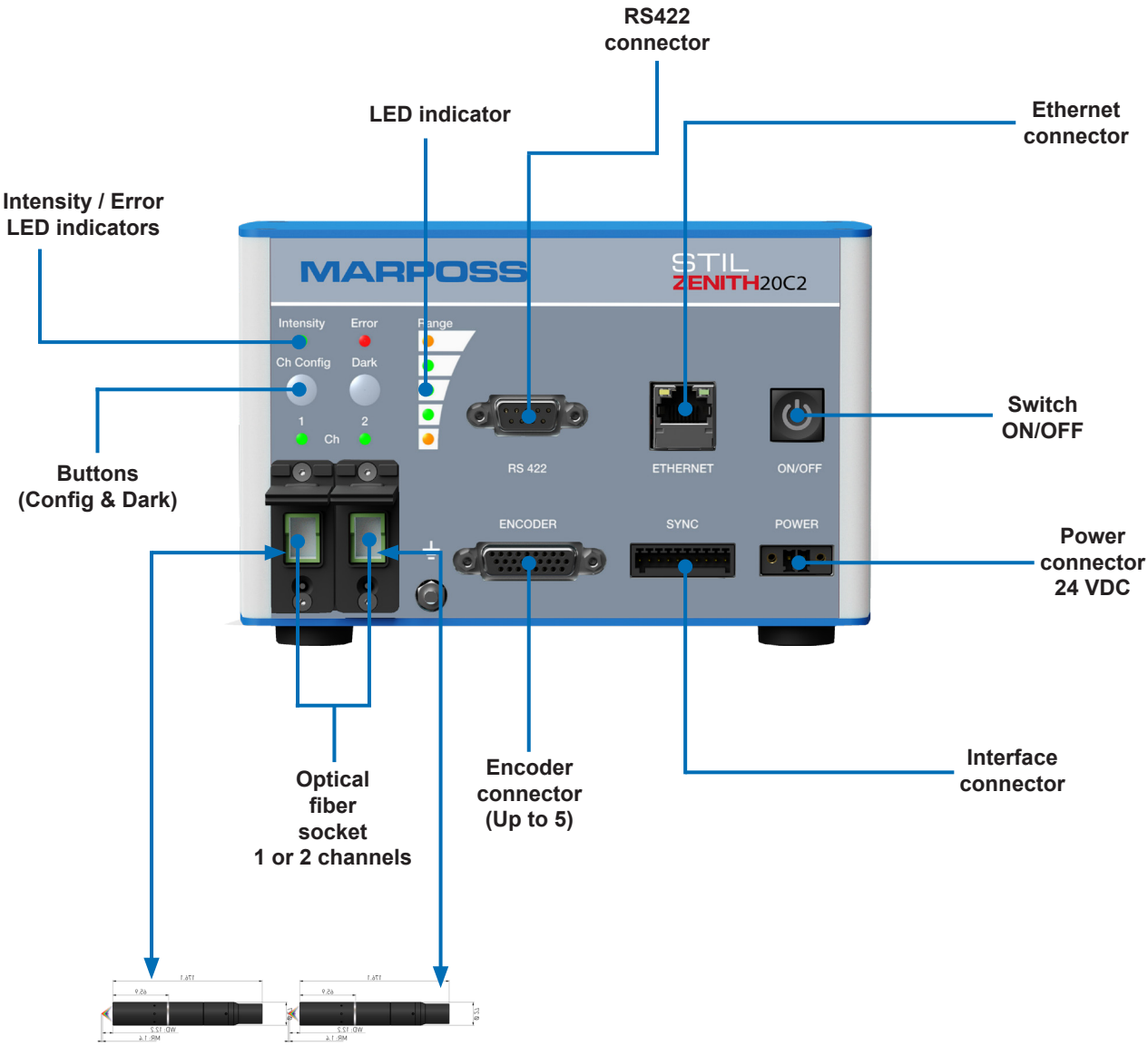
* Full resolution on request, please contact your local sales representative
** Depending on the associated sensor head

Product features

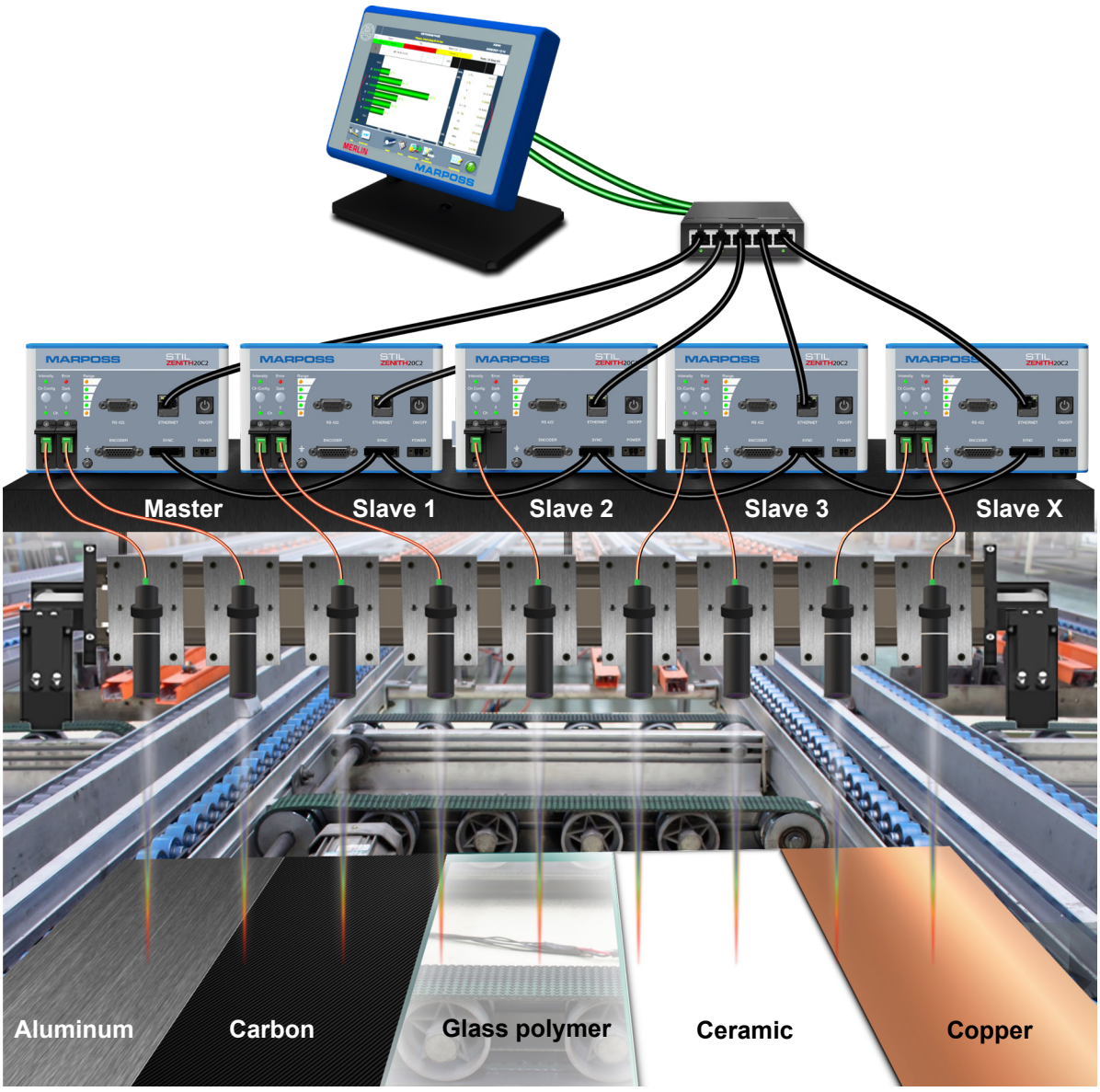
ZENITH™ controller manages acquisition signals, computes the distance data, and provides data transmission functions via the RS422 or Gigabit Ethernet link.

The front panel of the controller features:

- On/Off Switch with power LED indicator
- 1 or 2 Optical fiber socket(s) for connecting sensor heads,
- RS422 connector
- RJ-45 Gigabit Ethernet connector
- Interface connector for synchronization signals
- Encoder connector
- 7 LED indicators (Measure: 5 ; Intensity: 1 ; Error: 1)
- A “Dark” button to set the noise level before measurement acquisitions



Synchronisation

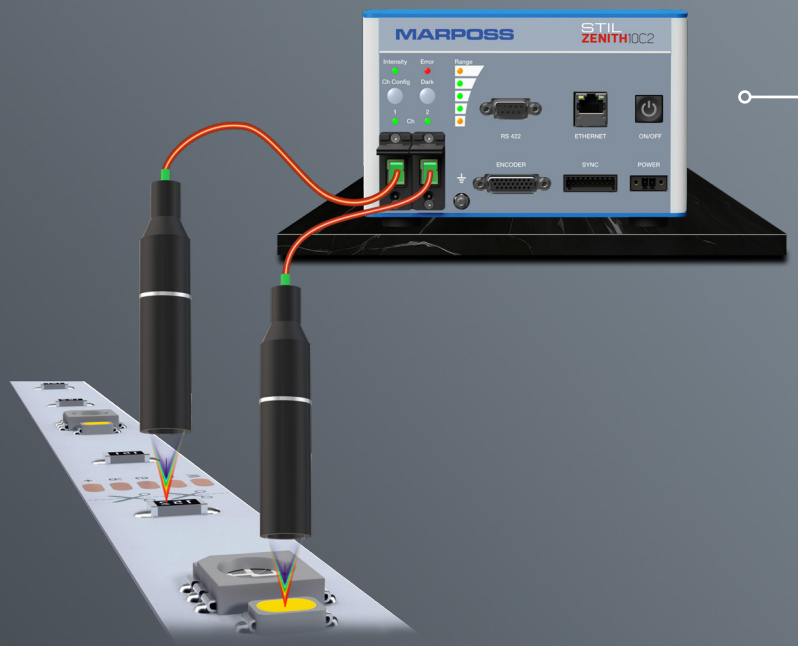


ZENITH™ controllers with 1 or 2 measurement channels, can be synchronised at up to their maximum frequency (in occurrence 20 kHz) within a Master-Slave configuration. Measurement synchronisation of all controllers is then done via the “Trigger In” & “Trigger out” pinned on Interface connector.The controller working at the slowest frequency defines the tempo.
Adjusting Exposure Time of other controllers allow all sensors to perform measurements within perfect/nominal conditions. This allows each sensor of the set to face different surface conditions and still provide reliable measurements.
Measurement data are then transmitted via Ethernet network and can then be collected on a computer Marposs Merlin™ for example.

Main Data collected on your applicatons:

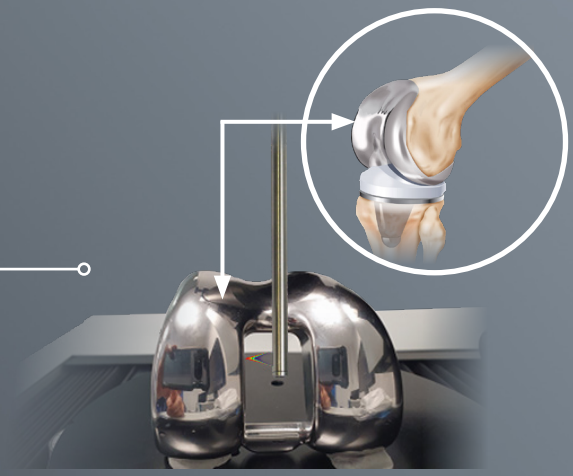
- Distances (Sensor 1 & Sensor 2)
- Thickness (Sensor 1, Sensor 2)
- Computed Data for the following measurement configurations :
  - Face-to-Face (Drawing)
  - Differential (Drawing)
  - Inner &/ Outer diameter (Drawing) Master Slave
- Light Intensity (Sensor 1 & Sensor 2)
- Exposure times
- Coder of motors
- Time stamps
- Barycenters
- Counters

Applications examples



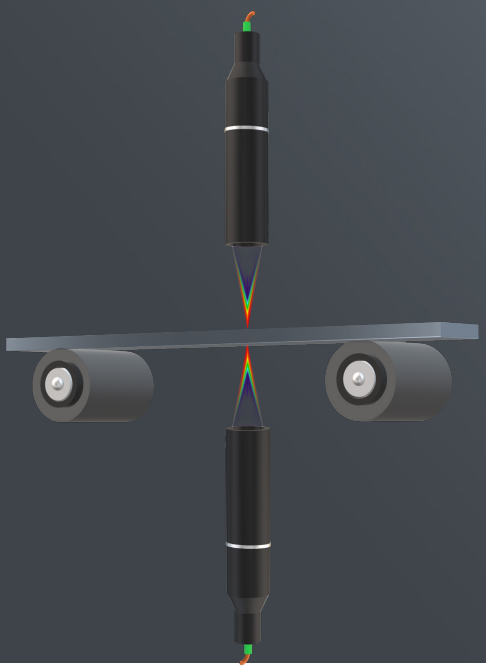
Electronics Components on Board

- Components heigh on board
- Component shapes & tilt
- Whatever component material (Silicon, Metal, Ceramic, Plastic, Carbon ...)
- Board shape
- Board thickness



Knee Prothesis Roughness

- Shape measurement
- Roughness
- Compatible with ISO Norm 25178-602
- Sensors work on any Surface Finishion & Reflectivity



Roll-to-Roll (R2R) – Thickness :

R2R applications include thickness measurement of carbon or ceramic lithium-ion battery electrodes, metallic laminated films, transparent (rubbery) or reflective materials; and more.
R2R configuration allows continuous in-process non-contact measurement of material thicknesses of long rolls. Thanks to high speed synchronisation, submicron accuracy is achievable in dynamic mode.

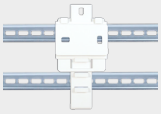
Associated sensor heads

Model	Description
	CL-MG™ Sensor Head - Diam.: 27 mm - MR: 0.15 mm to 24 mm - WD: 3.3 mm to 21.5 mm - Spot Size: 1.8 µm to 43 µm - Axial or Radial
	CL-MG VACUUM ™ Sensor Heads - Diam.: 27 mm - MR: 0.15 mm to 24 mm - WD: 3.3 mm to 21.5 mm - Spot Size: 1.8 µm to 43 µm - Axial or Radial
	ENDO™ Sensor Head - Diam.: 4 mm to 8 mm - MR: 1 mm to 10 mm- WD: 1 mm to 11.3 mm - Axial or Radial
	ENDO VACUUM ™Sensor Heads - Diam.: 4 mm to 8 mm - MR: 1 mm to 10 mm- WD: 1 mm to 11.3 mm - Axial or Radial
	OP™ Sensor Head - Diam.: 15 mm to 120 mm - MR: 0.22 mm to 100 mm - WD: 5 mm to 650 mm - Axial or Radial
	EVEREST™ Sensor Head - Diam.: 82 mm to 47 mm- MR: 1 mm to 6 mm- WD: 13.7 mm to 19.2 mm - Axial

Compatible fiber optics

Model	Description	Order code
	E50-3 Optical fiber - standard cladding - Length : 3 m or 5 m or 10 m; External Diam.: 2.8 mm Minimum bending radius in : Static Mode: 25 mm - Dynamic Mode: 40 mm	3 m - 067SE503001 5 m - 067SE505001 10 m - 067SE510001
	E50-3-MA Optical fiber - armored fiber - Length: 3 m or 5 m or 10 m; External Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm	3 m - 067SE503M02 5 m - 067SE505M02 10 m - 067SE510M02
	E50-3-M Optical fiber - stainless steel cladding - Length: 3 m or 5 m or 10 m or 15 m or 20 m ; External Diam.: 6.2 mm Minimum bending radius in : Static Mode: 40 mm - Dynamic Mode: 40 mm	3 m - 067SE503M01 5 m - 067SE505M01 10 m - 067SE510M01 15 m - 067SE515M01 20 m - 067SE520M01
	F50-1.5 and F50-3 optical fiber, standard cladding FC/APC connector at both ends Length: 1,5 or 3 meters External diam.: 2.8mm Vacuum type	1,50 m - 067SF5015V1 3 m - 067SF5030V1

Accessories

Model	Description	Order code
	Optical connector cleaner for Chromapoint sensors	O15ST000028
	DIN support for CCS and ZENITH controllers	O15ST000031
	2xFC/APC bulkhead connection for Vacuum Chamber Compatibility	O67STC2FCV1

Product mix

Software development kit

In order to ease integration, each ZENITH™ controller is delivered with a software development kit (SDK).

ZENITH™ SDK tool set had been developed with most valuable and efficient software environments C++, C, and C#, with state of the art software development technologies. Integration examples are available and you'll benefit STIL support in your integration work if needed.

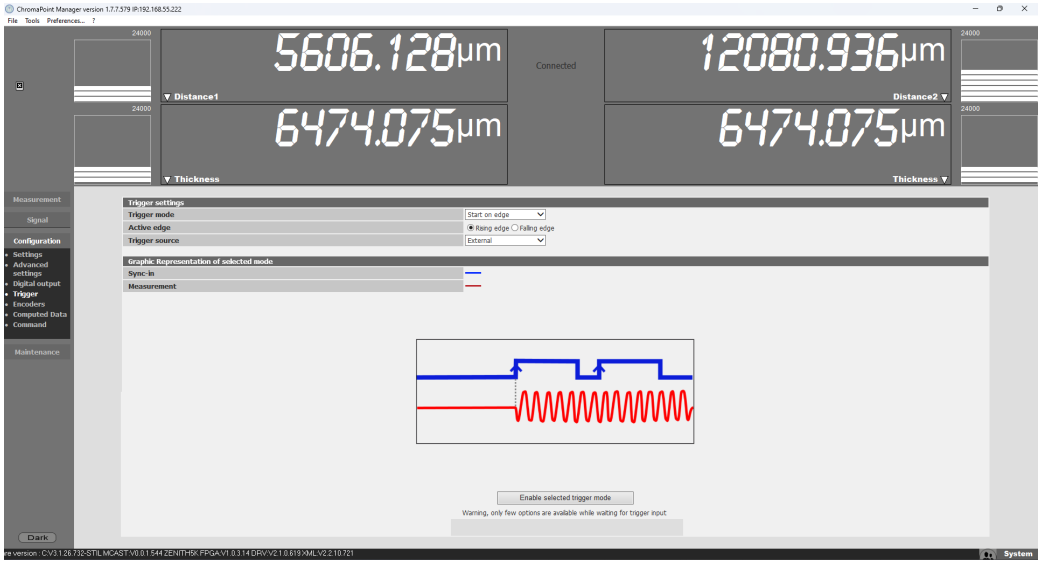
QUICKSPC™

Software Chromapoint Manager

Each ZENITH™ controller is delivered with a dedicated software « Chromapoint Manager® » to easily :

- Adjust sensor measurement parameters
- Visualise signal
- Set communication & synchronisation parameters
- Define Computed Data equation
- Test commands

Thanks to its secured web based platform, any ZENITH™ controller can be accessed from any PC on your network.

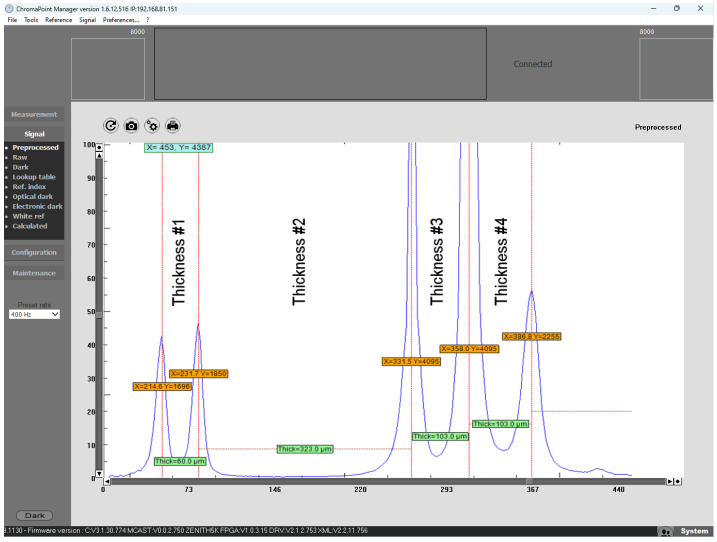


MINIMUM REQUIREMENTS

Integration requires any Windows® compatible PC with: Windows10™ (32 bits or 64 bits) or Windows7™ (32 bits or 64bis) operating system, Core i5-2500 CPU @3.30 GHz with 4GB RAM or more.

RUNNING MULTIPEAK FEATURE

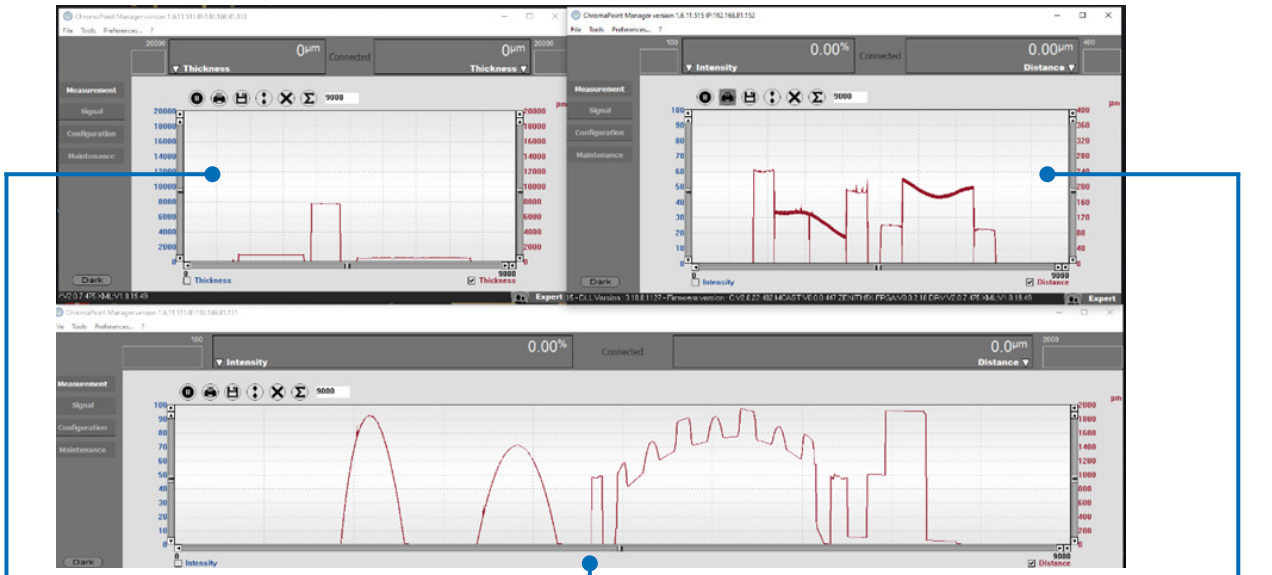
ZENITH™ with MultiPeak feature is able to detect simultaneously up to 5 peaks and to measure up to 4 layers



MULTIPEAK STATISTIC MEASUREMENT EXAMPLE

Name	Thickness							
Layer 1	Min:	59.6 µm	Max:	59.7 µm	Avr:	59.7 µm	Std Dev:	0.01 µm
Layer 2	Min:	323.2 µm	Max:	323.2 µm	Avr:	323.2 µm	Std Dev:	0.00 µm
Layer 3	Min:	102.9 µm	Max:	102.9 µm	Avr:	102.9 µm	Std Dev:	0.00 µm
Layer 4	Min:	102.8 µm	Max:	102.9 µm	Avr:	102.9 µm	Std Dev:	0.01 µm
Total	Min:	588.5 µm	Max:	588.7 µm	Avr:	588.7 µm	Std Dev:	0.02 µm

Typical measuring tasks

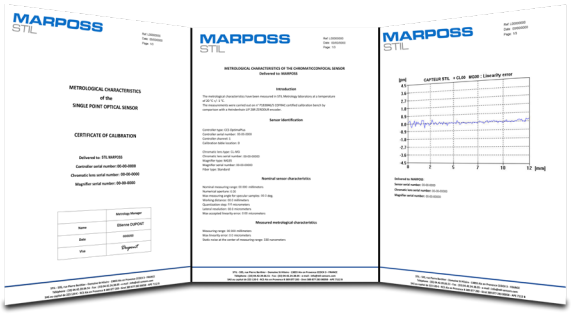


Data safety

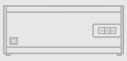
Our security protocols are worthy of the largest world-renowned banks. Our AES algorithmic encryption & RSA-4096 make it impossible for hackers to take control of the controller from the Ethernet port or any other communication port.

Calibration

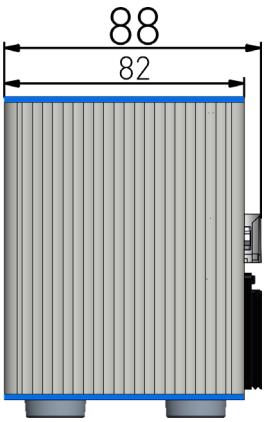
One calibration report is delivered per optical pen

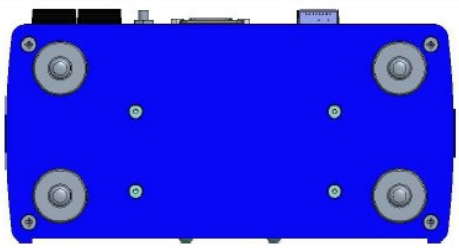


TRUST METROLOGY



Dimensions (mm)





CHROMATIC CONFOCAL MULTICHANNEL CONTROLLERS FOR POINT SENSORS

ChromaPoint Controllers

LIGHTMASTER™ & LIGHTMASTER16™ are multichannel controllers designed to work with a wide range of sensors designed for Metrology, Mechanics, Semiconductors, 3C, Glass, Automotive, Aerospace, Medical.
They are highly precise and parallel. They allow to accurately measure distance, shape, roughness, and thickness of different materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes.

LIGHTMASTER / LIGHTMASTER16

The LIGHTMASTER™ is a modular, multi-channel controller for STIL chromatic confocal sensor heads. It is capable of 48 simultaneous measurements. It features 12 LighSlot modules with 4 measurement channels each, all contained within a 19" 3U rack. It offers/proposes a universal Ethernet GiGE interface, Ethernet interface for easy integration of a trigger input, and can be easily mounted on a production line.
For those needing a more compact solution, the LIGHTMASTER16™ offers16 simultaneous measurements within 4 LightSlots modules with 4 channels each, a smaller size, and the same advanced capabilities as the LIGHTMASTER™.

Available versions are with:
• up to 48 channels with 12 LightSlots
• up to 16 channels with 4 LightSlots
Both can be supplied in Standard (S) or Fast (F) version.

Benefits

- Chromatic confocal technology can measure any material capable of reflecting white light (e.g. metal, glass, plastic, paint films, liquids)
- Non-contact measurement is suitable in all cases where it is necessary to measure without touching the part
- Input/output: Ethernet
- Universal: interchangeable STIL optical heads like CL-MG™ / OP™ / ENDO™ / EVEREST™ series
- Up to 48 simultaneous and so parallel, synchronized measurements
- Availability of SDK and protocol commands for easy integration into any system
- Synchronized measurement with encoder for dynamic acquisitions
- Works in any environment
- LightSlot board is made for 4 point sensor inputs

Application **fields**

Any application requiring simultaneous measurements on the largest set of surface reflectivity, transparent or opaque, shiny or diffusive.

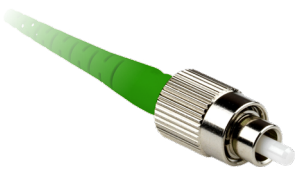
Versions

- LIGHTMASTER™ is available in 2 versions :
  - Standard with 48 channels max
  - Compact LIGHTMASTER 16™ with 16 channels max
- LIGHTMASTER™ is availaible in 2 configurations :
  - S (STANDARD) 750 Hz speed
  - F (FAST) 2 kHz speed
- Each LIGHTMASTER™ is modular, thanks to the 4 measurement channels LIGHTSLOT which can be adapted to the applications

Technical Specifications

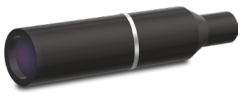
Model	Lightmaster S	Lightmaster F	Lightmaster16 S	Lightmaster16 F
Order Code	**08ST08M0001**	**08ST08M0002**	**08ST08M003**	**08ST08M004**
Technology	Chromatic Confocal			
Source	White LED			
Number of channel	Up to 48 (simultaneous)		Up to 16 (simultaneous)	
Acquisition Frequency	Up to 1300 Hz	Up to 2000 Hz	Up to 1300 Hz	Up to 2000 Hz
Distance Measurement	First/Second/Third/Fourth/Last/Strongest peak			
Thickness Measurement	2 Peaks among 5			
Advanced features	Exposure time /Encoder trigger...			
Digital Output	Ethernet (GigE)			
Synchronization	Trigger in&out			
Other Input/Output	Encoder input (1)			
Fiber connection	E2000/APC			
Temperature in use	+5 to +50°C			
Storage temperature	-30 to +70°C			
Relative humidity	5 to 80% RH without condensation			
Protection type	IP20			
Compliance	EN 61010-1; EN 61326-1			
Power	100-240 VDC		24 VDC	
Maximum/Usual Consumption	120W / 70W			
Dimensions	502 x 440 x 184 mm		436 x 236 x 183 mm	
Weight	11 kg		6.2 kg	

OPTICAL FIBER



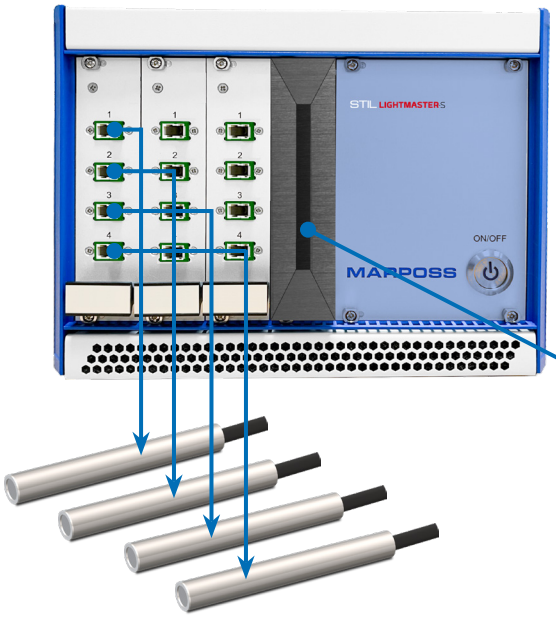
- Standard cladding
- Stainless steel cladding
- Armored fiber

SENSOR HEAD

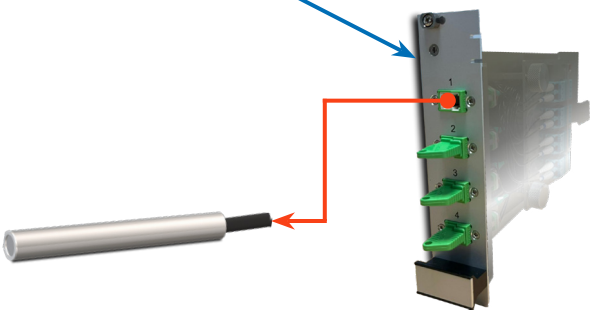


- EVEREST™ Series
- CL-MG™ Series
- OP™ Series
- ENDO™ Series

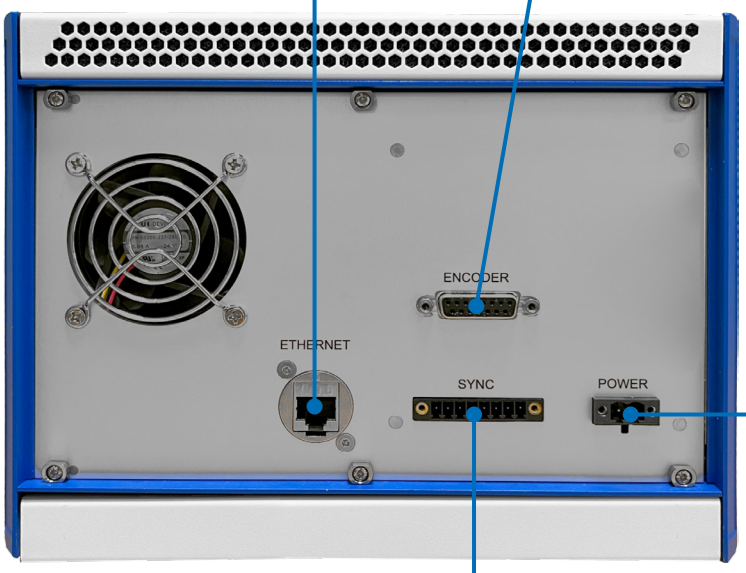
Product features



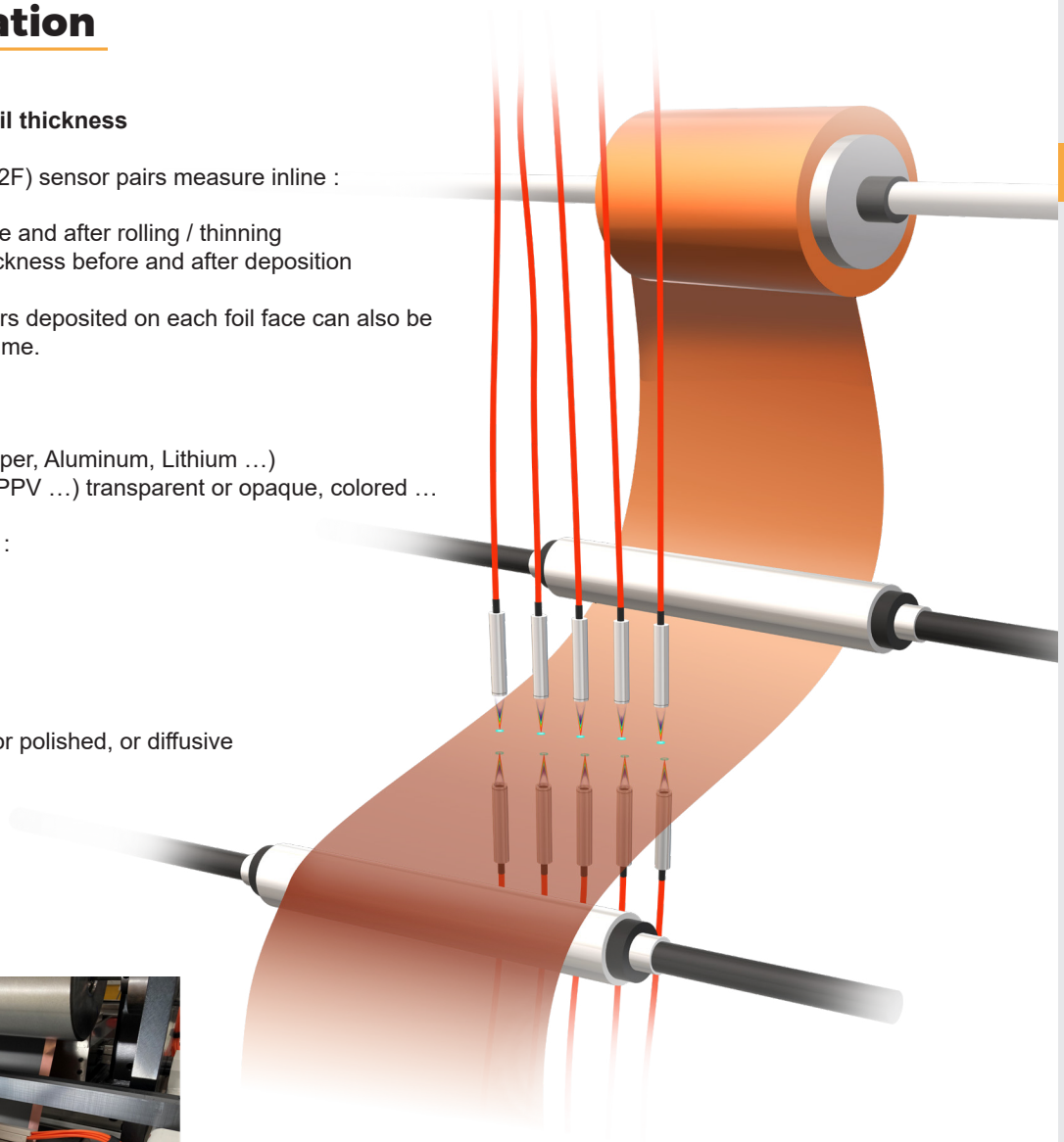
LIGHTMASTER™ and LIGHTMASTER16™ controllers manage acquisition signals, compute the distance data, and provide data transmission functions via Gigabit Ethernet link.
The front panel of the controller features:
• up to 48 (16 - respectively) parallel and simultaneous acquisitions through 12 (4 – respectively) LightSlots of 4 optical lines each
• On/Off Switch with power LED indicator
The back panel of the controller features:
• Power supply
• RJ-45 Gigabit Ethernet connector
• Interface connector for synchronization signals
• Encoder connector



Detachable for easy maintenance



Synchronisation



Roll-to-Roll (R2R) – Foil thickness

Up to 24 face-to-face (F2F) sensor pairs measure inline :

- Foil thickness before and after rolling / thinning
- Or foil + coating thickness before and after deposition

Up to 4 transparent layers deposited on each foil face can also be measured at the same time.

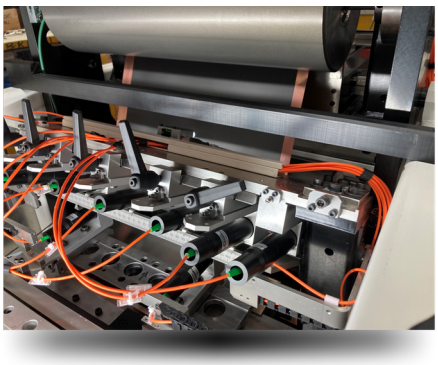
Foil material can be :

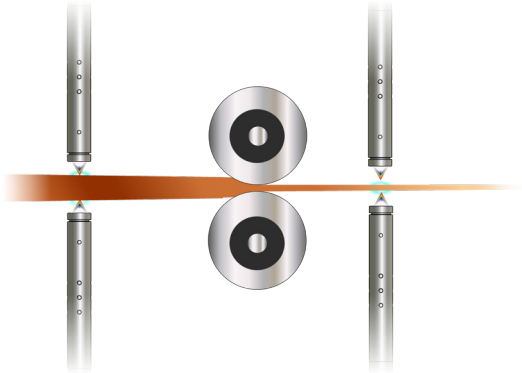
- Metallic (Steel, Copper, Aluminum, Lithium …)
- Organic (PE, PLA, PPV …) transparent or opaque, colored …

Coating material can be :

- Ceramic
- Carbon
- Metallic
- Organic …

Surfaces can be rough or polished, or diffusive



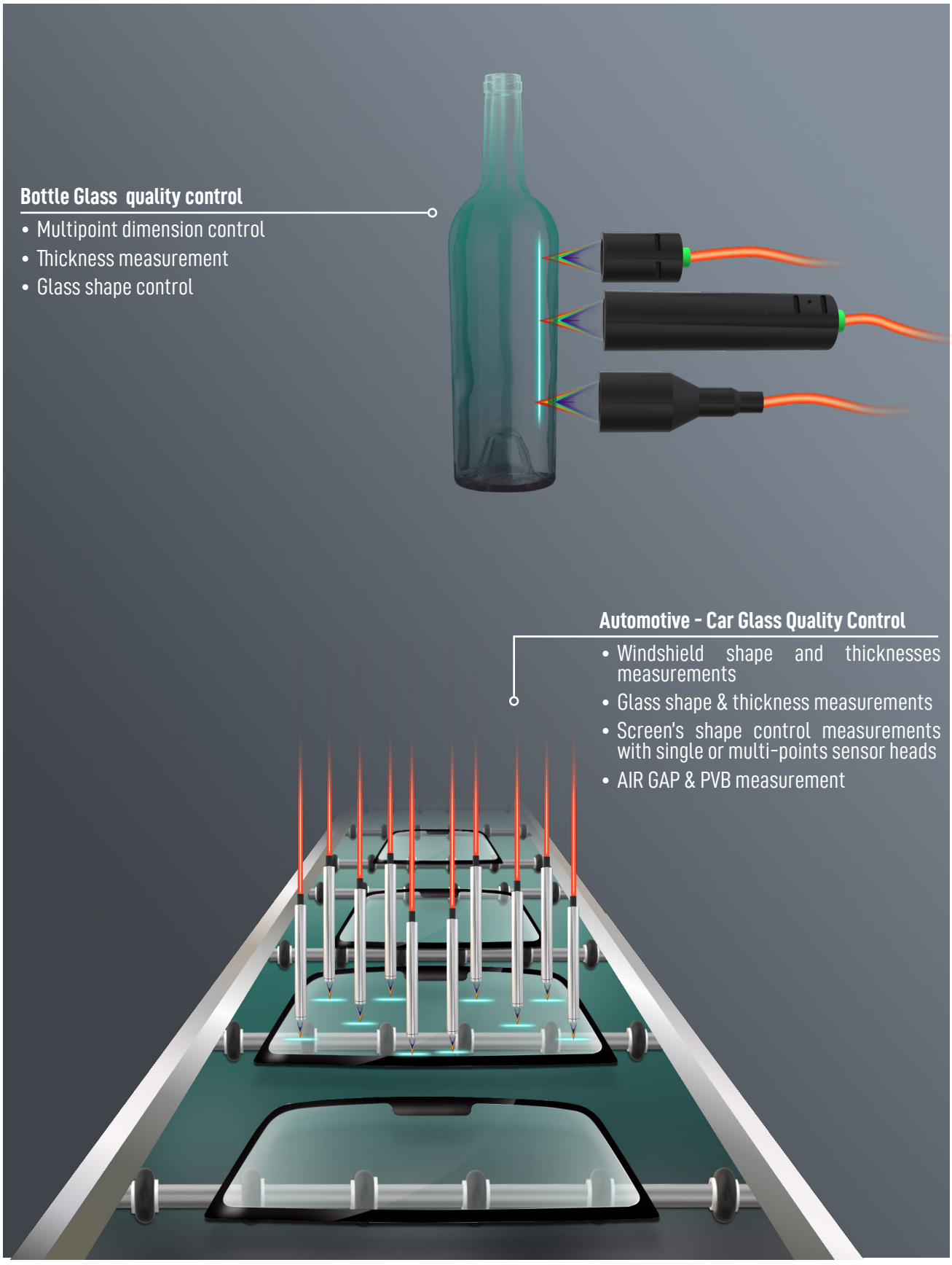


R2R – Roll adjustments

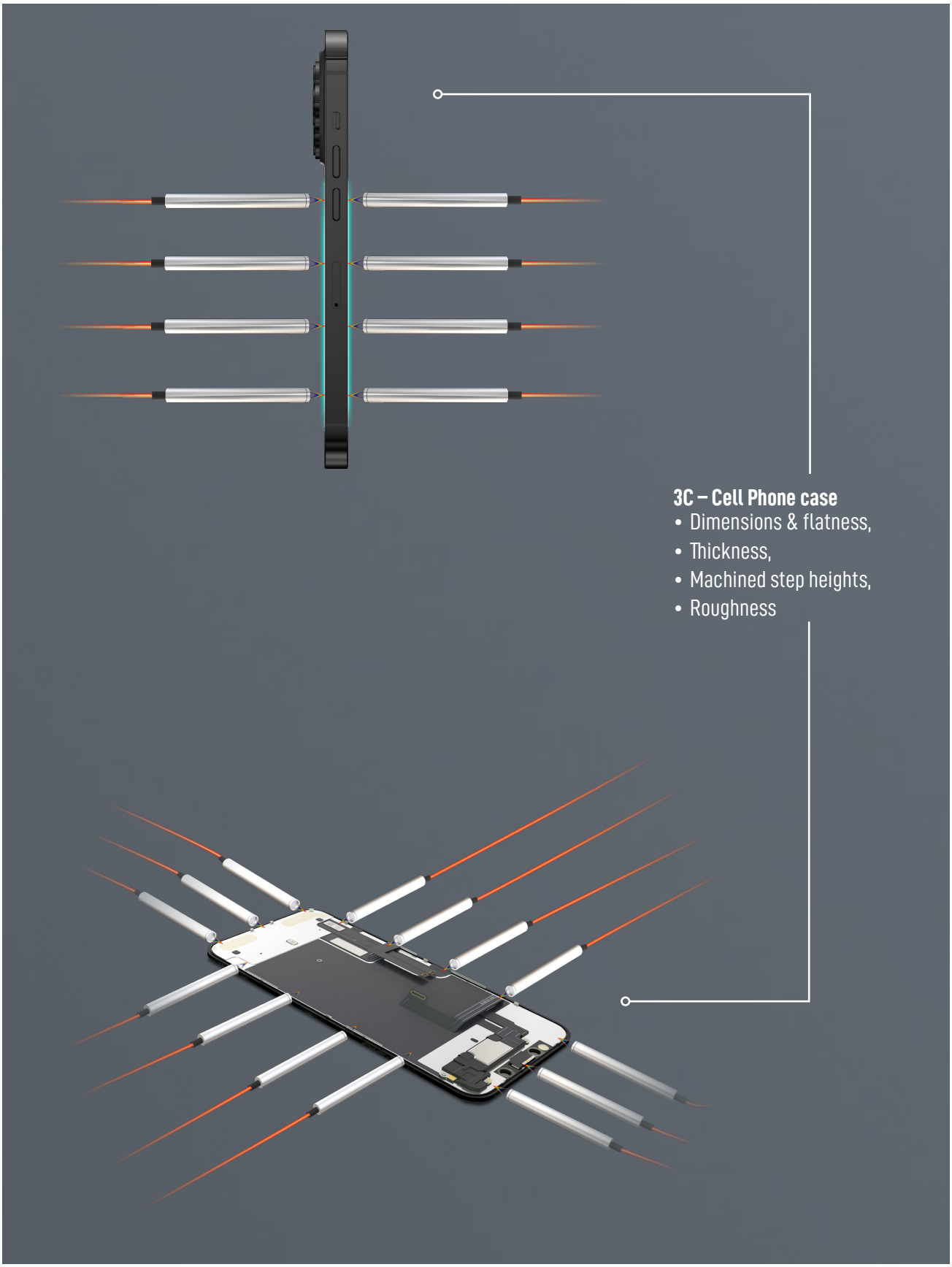
In cold calendering process, measuring thickness of foil after the rolls offers the ability to adjust in real time roll spacing & tilt in order to deliver better characteristics uniformity on final foil. Measuring before the rolls allows to anticipate foil thickness variations to better adjust roll pressure.

Similarly, in lamination processes, measuring films before & after the rolls allows a fine control of final product characteristics.

Application examples



Application examples



Compatible sensor heads

Model	Description
	CL-MG™ Sensor Head - Diam.: 27 mm - MR: 0.15 mm to 24 mm - WD: 3.3 mm to 21.5 mm - Spot Size: 1.8 µm to 43 µm - Axial or Radial
	CL-MG VACUUM ™ Sensor Heads - Diam.: 27 mm - MR: 0.15 mm to 24 mm - WD: 3.3 mm to 21.5 mm - Spot Size: 1.8 µm to 43 µm - Axial or Radial
	ENDO™ Sensor Head - Diam.: 4 mm to 8 mm - MR: 1 mm to 10 mm- WD: 1 mm to 11.3 mm - Axial or Radial
	ENDO VACUUM ™Sensor Heads - Diam.: 4 mm to 8 mm - MR: 1 mm to 10 mm- WD: 1 mm to 11.3 mm - Axial or Radial
	OP™ Sensor Head - Diam.: 15 mm to 120 mm - MR: 0.22 mm to 100 mm - WD: 5 mm to 650 mm - Axial or Radial
	EVEREST™ Sensor Head - Diam.: 82 mm to 47 mm- MR: 1 mm to 6 mm- WD: 13.7 mm to 19.2 mm - Axial

Compatible fiber optics

Model	Description	Order code
	E50-3 Optical fiber - standard cladding - Length: 3 m or 5 m or 10m; External Diam.: 2.8 mm Minimum bending radius in : Static Mode: 25 mm - Dynamic Mode: 40 mm	3 m - O67SE503001 5 m - O67SE505001 10 m - O67SE510001
	E50-3-MA Optical fiber - armored fiber - Length: 3 m or 5 m or 10 m; External Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm	3 m - O67SE503M02 5 m - O67SE505M02 10 m - O67SE510M02
	E50-3-M Optical fiber - stainless steel cladding - Length: 3 m or 5 m or 10 m or 15 m or 20 m ; External Diam.: 6.2 mm Minimum bending radius in : Static Mode: 40 mm - Dynamic Mode: 40 mm	3 m - O67SE503M01 5 m - O67SE505M01 10 m - O67SE510M01 15 m - O67SE515M01 20 m - O67SE520M01

Accessories

Model	Description	Order code
	Optical connector cleaner for Chromapoint sensors	O15ST000028

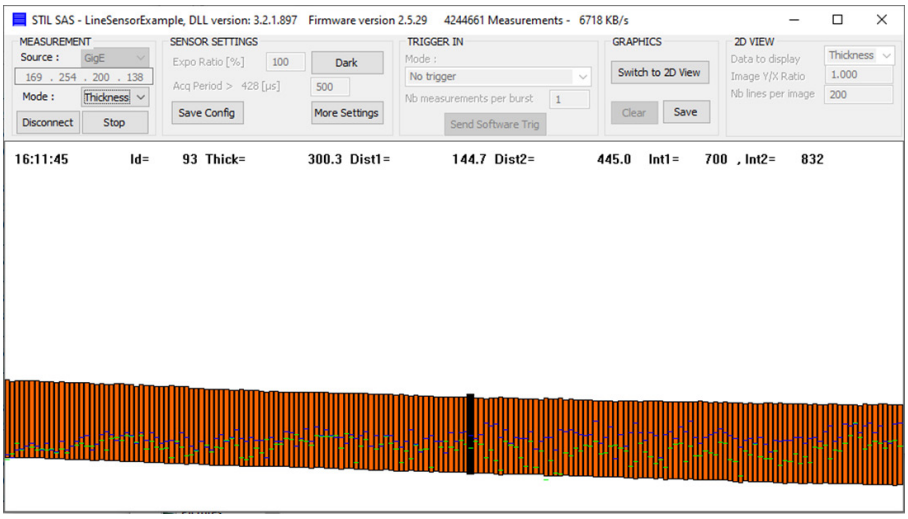
Software development kit

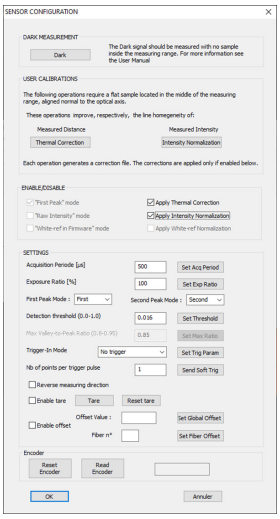
In order to ease integration, each LighMaster™ controller is delivered with a software development kit (SDK). LightMaster™ SDK tool set was developed with most valuable and efficient software environments C, C++, and C#, with state-of-the-art software development technologies. Integration examples are available and you'll benefit STIL support in your integration work if needed.

Software MultiPoint Manager

Each LightMaster™ controller is delivered with a dedicated software « Multi-ChromaPoint Manager® » to easily :

- Adjust sensor measurement parameters
- Visualise signals
- Set communication & synchronisation parameters
- Test commands



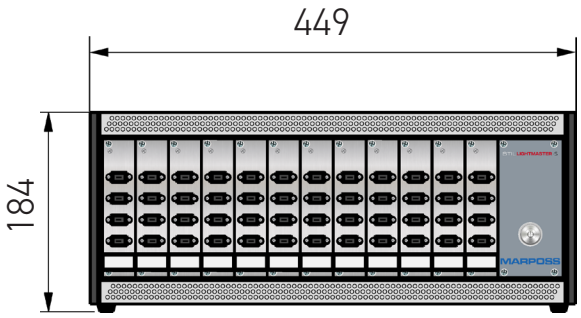


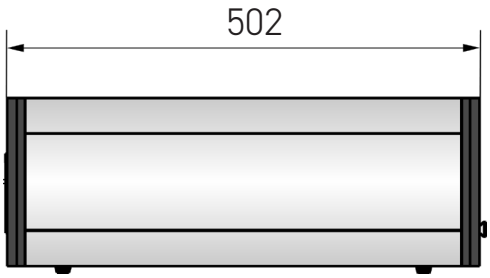
MINIMUM REQUIREMENTS

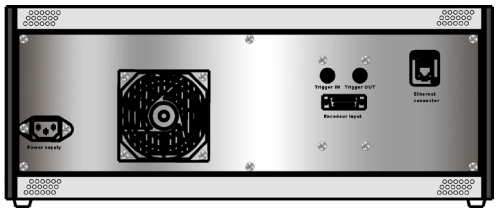
Integration requires any Windows® compatible PC with: Windows10™ (32 bits or 64 bits) or Windows7™ (32 bits or 64bis) operating system, Core i5-2500 CPU @3.30 GHz with 4GB RAM or more.

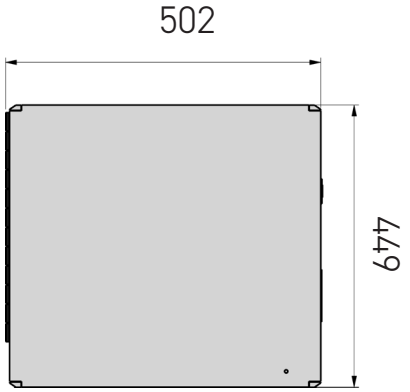
Dimensions (mm)

LIGHTMASTER™

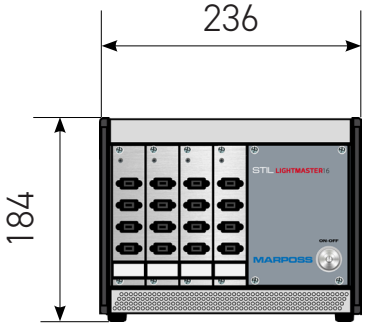


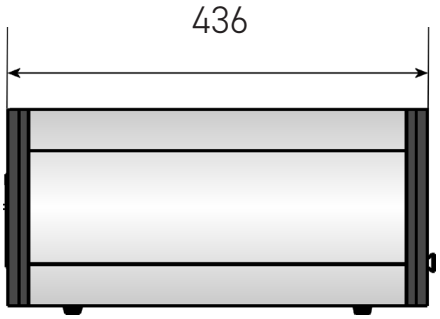






LIGHTMASTER16™



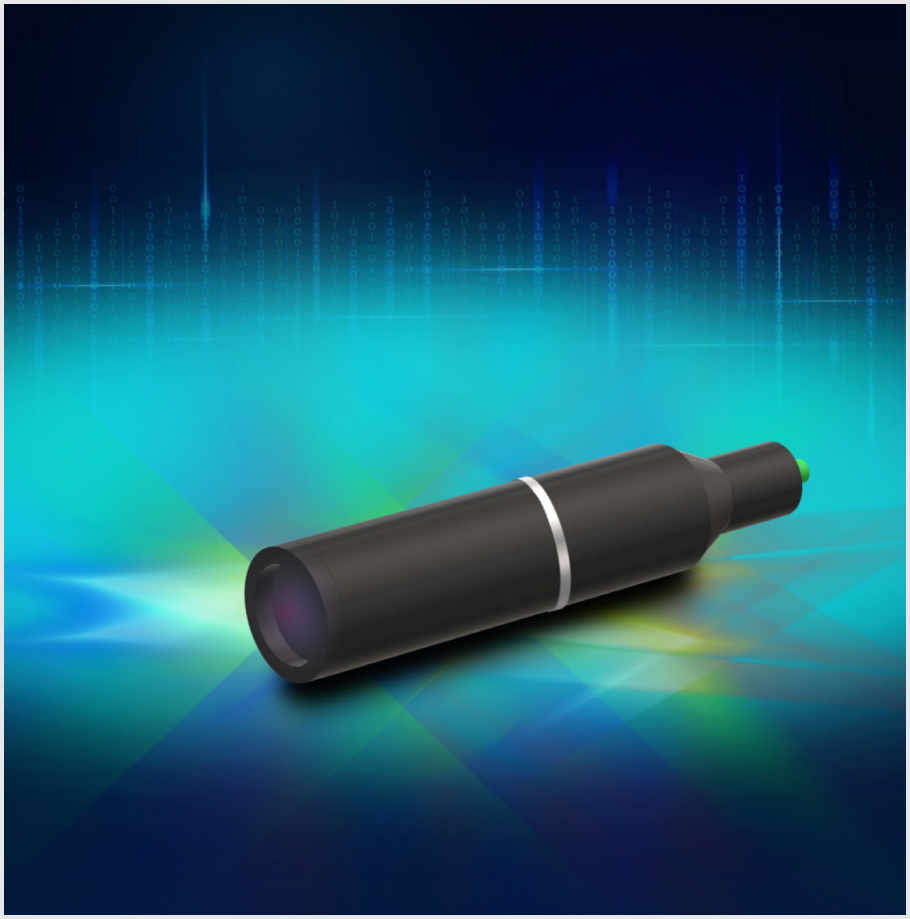


MARPOSS

STIL

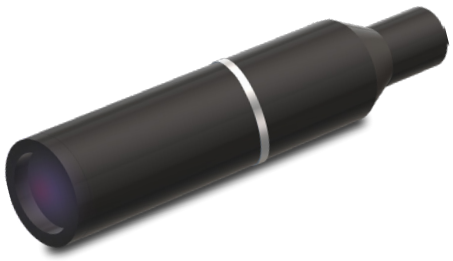
CL-MG

CHROMATIC CONFOCAL POINT SENSOR HEADS



ChromaPoint Sensor Heads

A wide range of sensors designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C.
They are highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes...



CL-MG

UNIVERSAL AND MODULAR

STIL CL-MG™ series of optical heads is composed of different chromatic lens models (CL1™ to CL6™) which, in combination with a variety of six dedicated magnifiers (MG420™ to MG20™), offer excellent metrological performances (down to the nanometer resolution) for a wide range of applications.

Built to the highest quality standards since 1995, CL-MG™ series is composed of robust and reliable passive components, suitable for use in industrial and laboratory environments as well as vacuum chambers, explosive, radioactive, hot environments.

All CL-MG™ optical heads are available with options such as FOLD to measure at 90°, and are connected to STIL ChromaPoint controllers Zenith™ or Lightmaster™ to measure solutions in multiple application contexts and on any type of surface: transparent or opaque, rough or polished, shiny or diffusing.

Benefits

- Dedicated to industrial environment, independent from ambient light
- High axial resolution: From nanometer scale (nm)
- High lateral resolution: From micrometer scale (µm)
- High signal to noise ratio
- Works on the largest set of materials, including black carbon, glass, colored or white ceramic, metal, plastics, rough or polished surface, liquid
- Wide choice of measuring ranges
- Steep slope compatibility thanks to Large Numerical Aperture (NA)
- Coaxial (no shadow effect)
- « Speckle » free

Application **fields**

Designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C

It is highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes.

Versions

- CL-MG™ series is available in 6 versions of Chromatic Lens with measuring ranges from 150 µm to 24 mm
- They are also composed of 6 different magnifiers
- For specific applications such as vacuum chambers or hot/explosive environments, each CL-MG™ probe can be customized
- CL-MG™ optical heads are compatible with all STIL ChromaPoint controllers such as Optima+™, Zenith™ or Lightmaster™, via a fiber optic connection.

Versatile

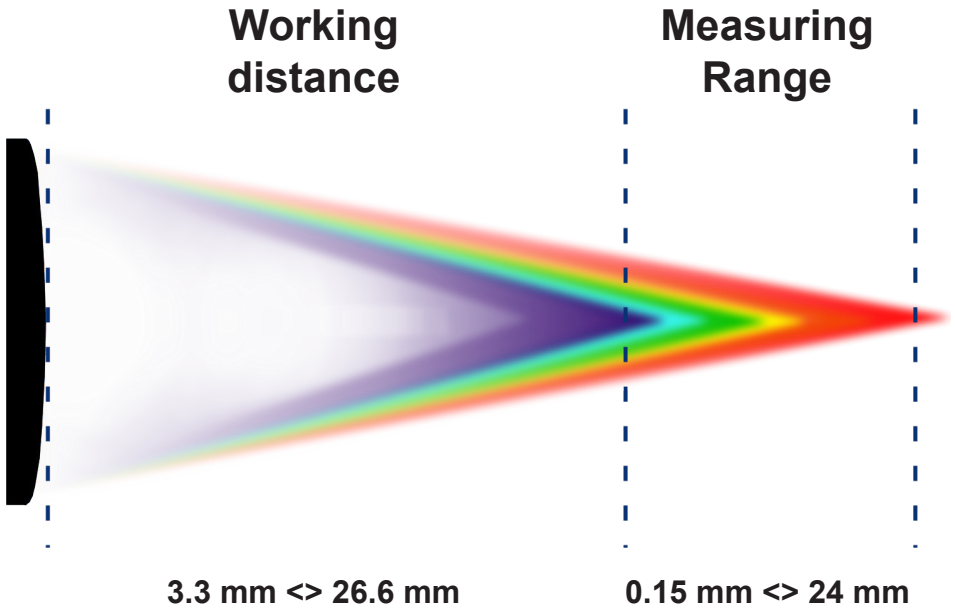
Suitable to any type of surface

Industrial

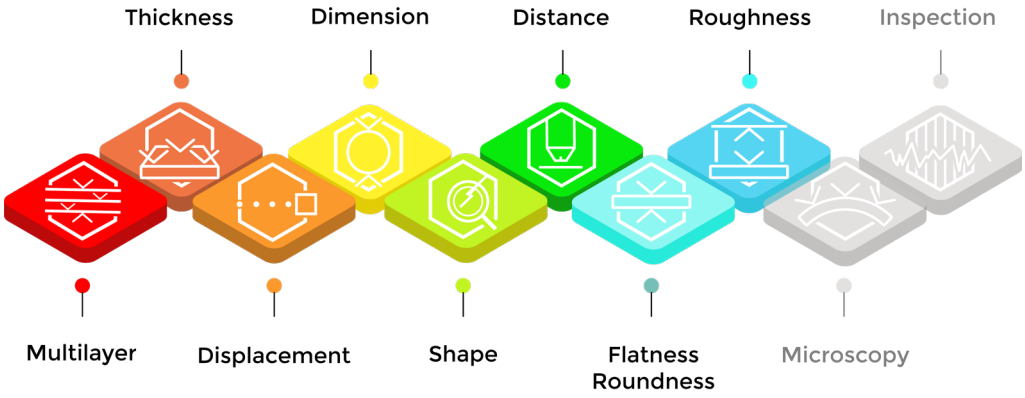
Works in any environment

Approved

+15K sensor heads used worldwide



Perfect for



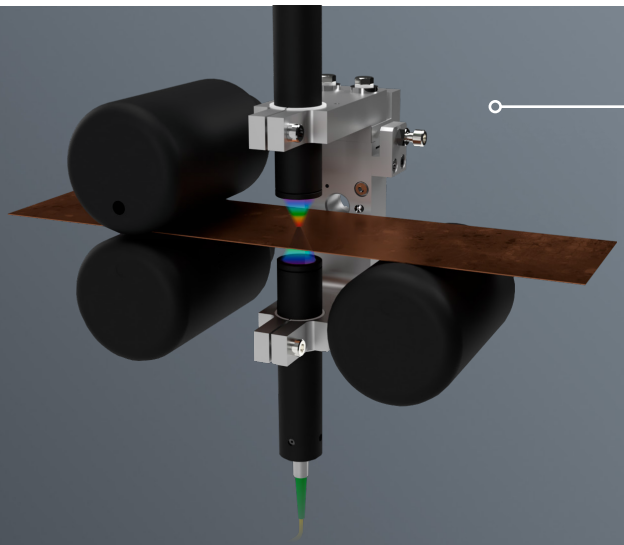
Technical specifications

Model	Unit	CL1-MG420	CL1-MG210	CL1-MG140	CL2-MG210	CL2-MG140	CL2-MG70	CL3-MG140
Order code		03PS0114202	03PS0112102	03PS0111402	03PS0122102	03PS0121402	03PS0127002	03PS0131401
Measuring Range	mm	0.15	0.15	0.15	0.4	0.4	0.4	1.4*
Working Distance	mm	3.3	3.3	3.3	10.8	10.8	10.8	12.2
Numerical Aperture		0.71	0.71	0.71	0.46	0.46	0.46	0.41
Max. Slope Angle	°	±42	±42	±42	±28	±28	±28	±25
Axial		Standard						
90° Folded Model		Option						
Max. Linearity Error*	µm	±0.025	±0.025	±0.02	±0.045	±0.04	±0.035	±0.11
Static Noise*	nm	3.5	4	4.5	9	11	13	27
Axial resolution (Averaging 10)*	nm	1.17	1.33	1.5	3	3.67	4.33	9
Lateral Resolution	µm	0.8	1.1	1.3	1.7	1.8	3.7	2.6
Spot Size	µm	1.8	2.7	3.5	4	5.2	8.8	6.8
Photometric Efficiency		0.8	5	13	3	8	42	12
Min. Measurable Thickness	µm	5	7.5	9	14	14	22	38
Length	mm	270	243.8	209.4	243.3	208.9	176.1	208.9
Diameter	mm	27	27	27	27	27	27	27
Weight	g	310	268	195	248	190	189	215

Model	Unit	CL3-MG70	CL4-MG35	CL4-MG20	CL5-MG35	CL5-MG20	CL6-MG35	CL6-MG20
Order code		03PS0137001	03PS0143501	03PS0142001	03PS0153501	03PS0152001	03PS0163501	03PS0162001
Measuring Range	mm	1.4*	4	4	12	12	24	24
Working Distance	mm	12.2	16.5	16.5	26.6	26.6	20	20
Numerical Aperture		0.41	0.32	0.32	0.2	0.2	0.12	0.12
Max. Slope Angle	°	±25	±21	±21	±14	±14	±8.5	±8.5
Axial		Standard						
90° Folded Model		Option						
Max. Linearity Error*	µm	±0.08	±0.225	±0.205	±0.5	±0.4	±1.2	±1
Static Noise*	nm	30	65	80	210	270	370	400
Axial resolution (Averaging 10)*	nm	10	21.67	26.67	70	90	123.33	133.33
Lateral Resolution	µm	4.5	4.6	7	11	14	11	18
Spot Size	µm	11.9	12.3	19.9	24.3	40	26.8	43
Photometric Efficiency		63	31	96	42	108	14	60
Min. Measurable Thickness	µm	40	110	120	350	550	590	725
Length	mm	176.1	145.4	130	145.4	130	171	155.6
Diameter	mm	27	27	27	27	27	27	27
Weight	g	214	155	140	175	160	195	180

* With ZENITH Controller (D version)

Examples of applications



Roll-to-Roll (R2R) Thickness

R2R applications include thickness measurement of carbon or ceramic lithium-ion battery electrodes, metallic laminated films, transparent (rubbery) or reflective materials and more.

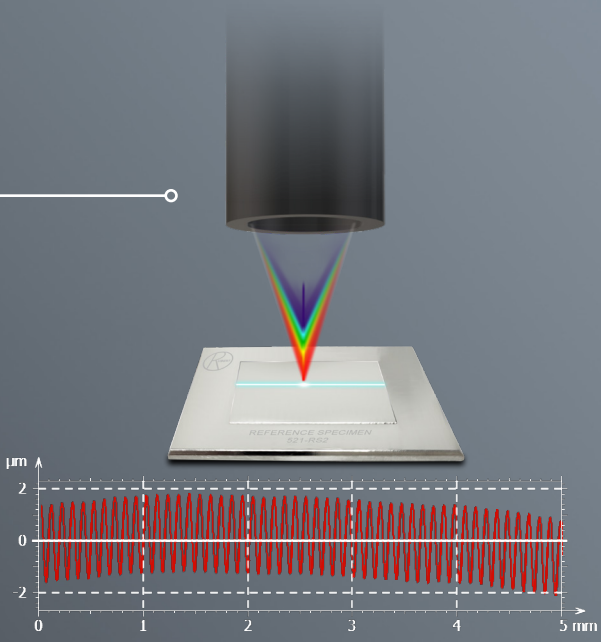
Surface Topography / Roughness certified measurements

Chromatic Confocal technology is one of the non-contact contactless technologies that ISO 25178-602 norm recommends to measure "Surface Topography" including roughness (Ra, Rq, Rz, ... Sa, Sq ...).

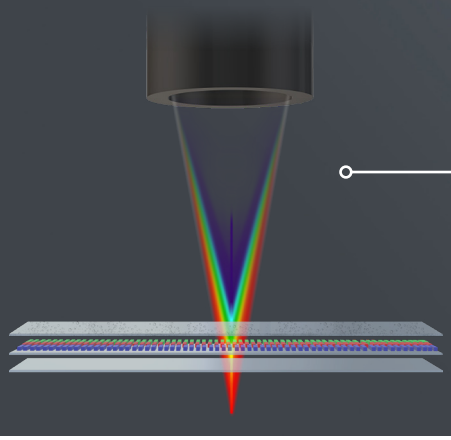
CL1™ CL2™ and CL3™ are the most suitable sensors for such Surface Topography contactless measurements, allowing, Roughness Ra ≥ 70 nm (mirror polished surface) to be measured. Certified gauge measurements had been proved (against tactile measurements).

The main advantages of using non-contact Confocal Chromatic technology for Roughness measurements are :

- Surface is not scratched or contaminate, allowing the part to continue its way in production
- Measurement is faster than tactile profilers



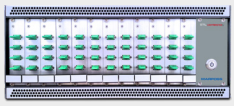
ISO 4287 - Roughness (S-L)		
F: None		
S-filter (λs): Gaussian, 2.5 µm		
L- filter (λc): Gaussian, 0.8 mm		
Evaluation length: All λc (6)		
Amplitude parameters		
Ra	0.967	µm
Rq	1.072	µm



Transparent multi-layer measurements

CL-MG sensors in association with Zenith or LightMaster controller can measure up to 5 transparent layers at once. This is of interest for multilayer car-glass windows, isolating windows, coated / varnished surfaces, multi-layers polymers.

Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

Compatible fiber optics

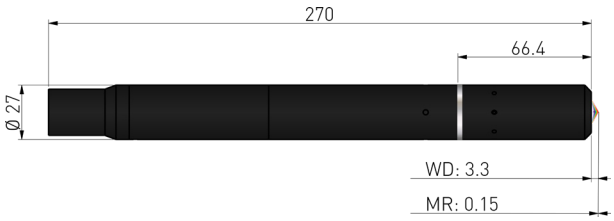
Model	Description	Order code
	E50-3 Optical fiber - standard cladding - Length: 3 m or 5 m or 10m; External Diam.: 2.8 mm Minimum bending radius in : Static Mode: 25 mm - Dynamic Mode: 40 mm	3 m - O67SE503001 5 m - O67SE505001 10 m - O67SE510001
	E50-3-MA Optical fiber - armored fiber - Length: 3 m or 5 m or 10 m; External Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm	3 m - O67SE503M02 5 m - O67SE505M02 10 m - O67SE510M02
	E50-3-M Optical fiber - stainless steel cladding - Length: 3 m or 5 m or 10 m or 15 m or 20 m ; External Diam.: 6.2 mm Minimum bending radius in : Static Mode: 40 mm - Dynamic Mode: 40 mm	3 m - O67SE503M01 5 m - O67SE505M01 10 m - O67SE510M01 15 m - O67SE515M01 20 m - O67SE520M01

Accessories

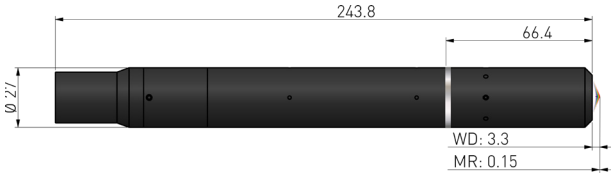
Model	Description	Order code
	Holder D27 for 27 mm Diameter probes (CL-MG)	O15ST000004
	Optical connector cleaner for Chromapoint sensors	O15ST000028

Dimensions (mm)

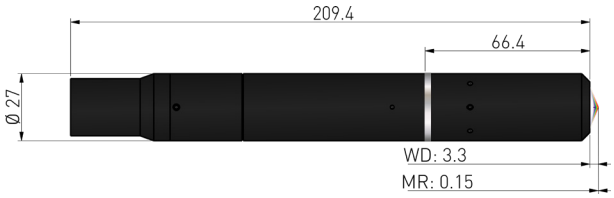
CL1-MG420™



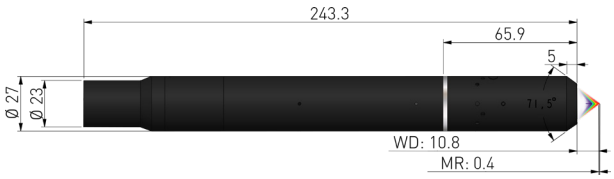
CL1-MG210™



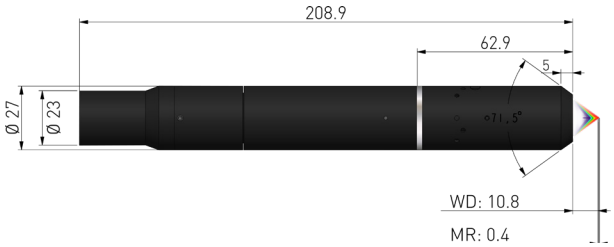
CL1-MG140™



CL2-MG210™

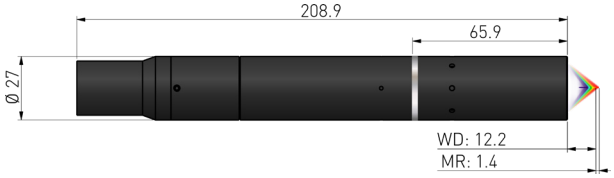


CL2-MG140™

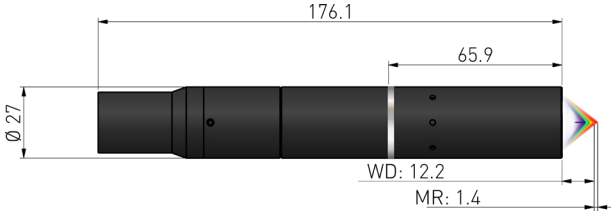


CL2-MG70™

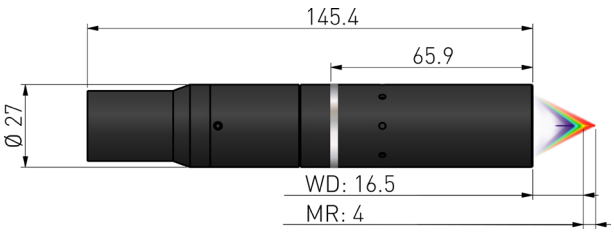
CL3-MG140™



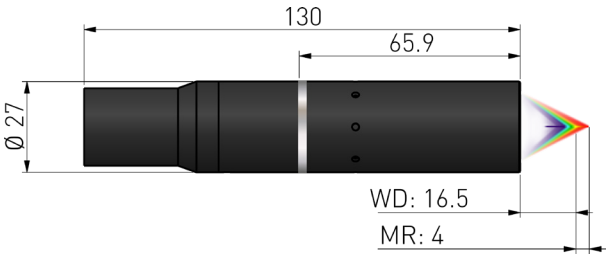
CL3-MG70™



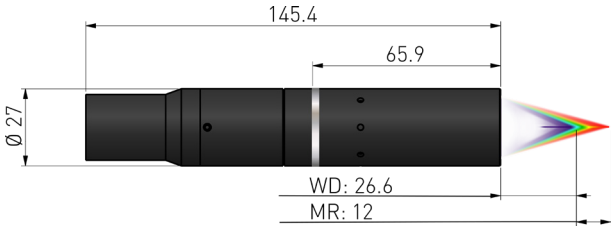
CL4-MG35™



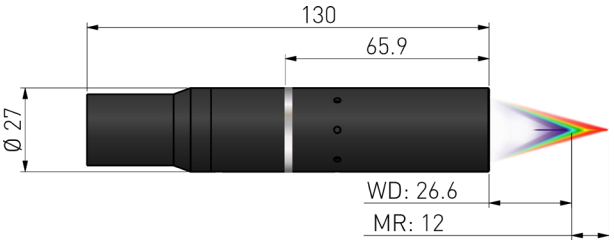
CL4-MG20™



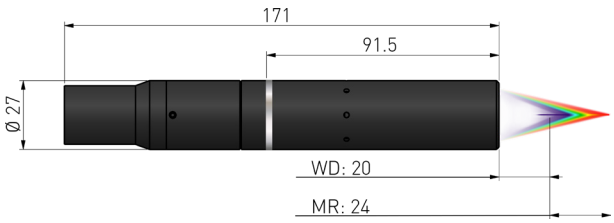
CL5-MG35™



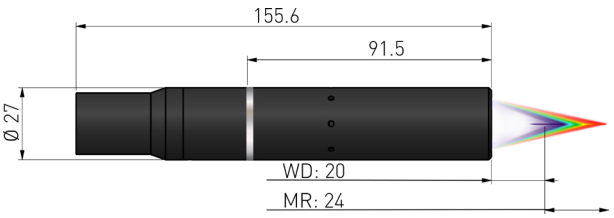
CL5-MG20™



CL6-MG35™



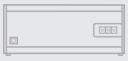
CL6-MG20™



CHROMATIC CONFOCAL POINT SENSOR HEADS FOR VACUUM APPLICATIONS

Chromapoint Sensor Heads

Discover a wide range of sensors heads to fit with your specific vacuum applications. As vacuum environments demand precise measurement methods tailored to varying pressure values, our solutions ensure exceptional accuracy and efficiency. Designed with passive components, our sensors generate no heat. Explore our innovative products based on chromatic confocal technology and elevate your vacuum measurement capabilities today with a high level of performance (Resolution & Accuracy).

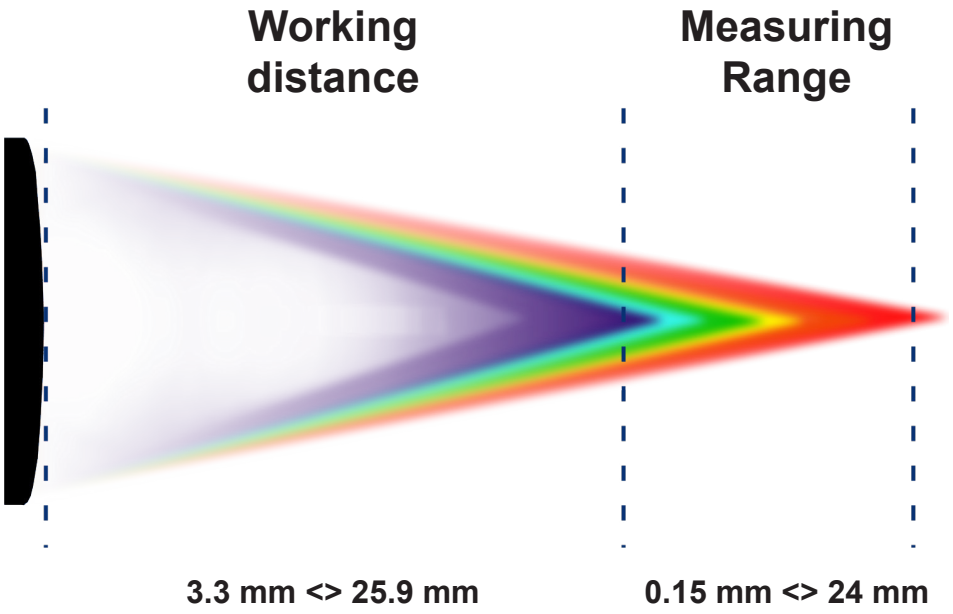


Benefits

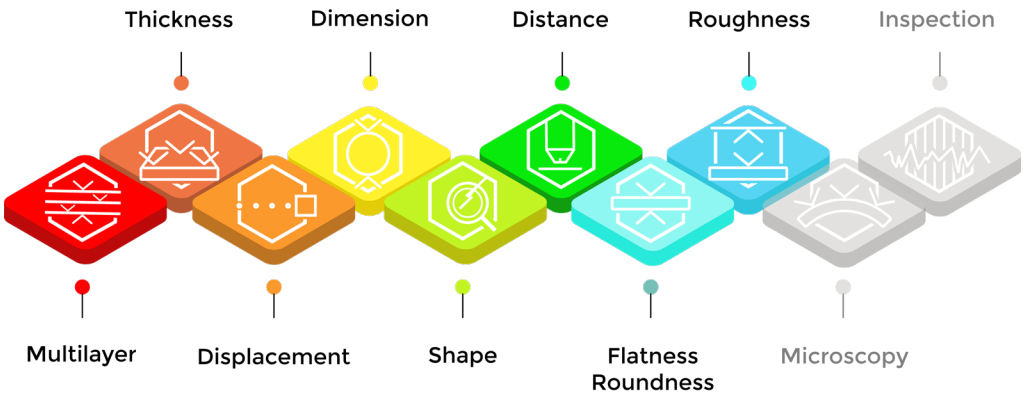
- Non contact chromatic confocal sensors
- Vacuum & High vacuum compatible
- A wide range of configurations
- High performance with sub-micron accuracy

Application fields

- Metrology
- Semiconductors
- Aerospace
- Academic & Research



Perfect for



Technical specifications

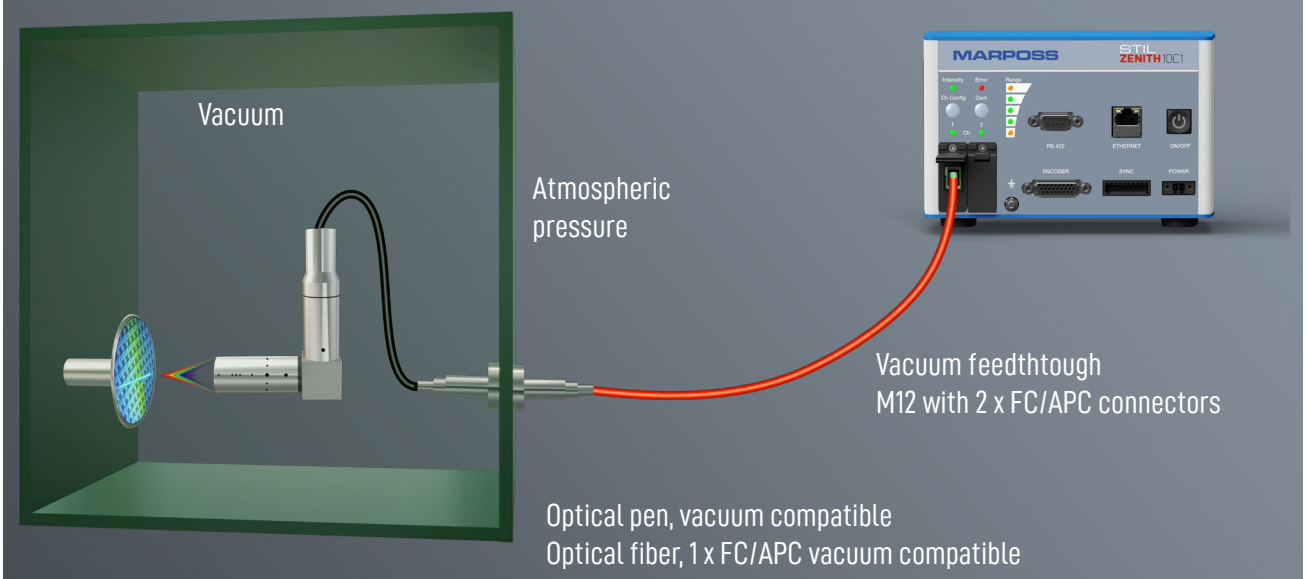
Model	Unit	CL1-MG210	CL1-MG140	CL2-MG210	CL2-MG140	CL2-MG70	CL3-MG140	CL3-MG70
Order code		O3PS01121V1	O3PS01114V1	O3PS01221V2	O3PS01214V2	O3PS01270V2	O3PS013140V1	O3PS01370V2
Measuring Range	mm	0.15	0.15	0.4	0.4	0.4	1.4*	1.4*
Working Distance	mm	3.3	3.3	10.8	10.8	10.8	12.2	12.2
Numerical Aperture		0.71	0.71	0.46	0.46	0.46	0.41	0.41
Max. Slope Angle	°	±42	±42	±28	±28	±28	±25	±25
Axial		Standard						
90° Folded Model		Option						
Max. Linearity Error*	µm	±0.025	±0.02	±0.045	±0.04	±0.035	±0.11	±0.08
Static Noise*	nm	4	4.5	9	11	13	27	30
Axial resolution (Averaging 10)*	nm	1.33	1.5	3	3.67	4.33	9	10
Lateral Resolution	µm	1.1	1.3	1.7	1.8	3.7	2.6	4.5
Spot Size	µm	2.7	3.5	4	5.2	8.8	6.8	11.9
Photometric Efficiency		5	13	3	8	42	12	63
Min. Measurable Thickness	µm	7.5	9	14	14	22	38	40
Length	mm	243.8	209.4	243.3	208.9	176.1	208.9	176.1
Diameter	mm	27	27	27	27	27	27	27
Weight	g	268	195	248	190	189	215	214

Model	Unit	CL4-MG35	CL4-MG20	CL5-MG35	CL5-MG20	CL6-MG35	CL6-MG20
Order code		O3PS01435V1	O3PS01420V1	O3PS01535V1	O3PS01520V1	O3PS01635V1	O3PS01620V1
Measuring Range	mm	4	4	12	12	24	24
Working Distance	mm	16.5	16.5	26.6	25.9	20	20
Numerical Aperture		0.32	0.32	0.2	0.2	0.12	0.12
Max. Slope Angle	°	±21	±21	±14	±14	±8.5	±8.5
Axial		Standard					
90° Folded Model		Option					
Max. Linearity Error*	µm	±0.225	±0.205	±0.5	±0.4	±1.2	±1
Static Noise*	nm	65	80	210	270	370	400
Axial resolution (Averaging 10)*	nm	21.67	26.67	70	90	123.33	133.33
Lateral Resolution	µm	4.6	7	11	14	11	18
Spot Size	µm	12.3	19.9	24.3	40	26.8	43
Photometric Efficiency		31	96	42	108	14	60
Min. Measurable Thickness	µm	110	120	350	550	590	725
Length	mm	145.4	130	145.4	130	171	155.6
Diameter	mm	27	27	27	27	27	27
Weight	g	155	140	175	160	195	180

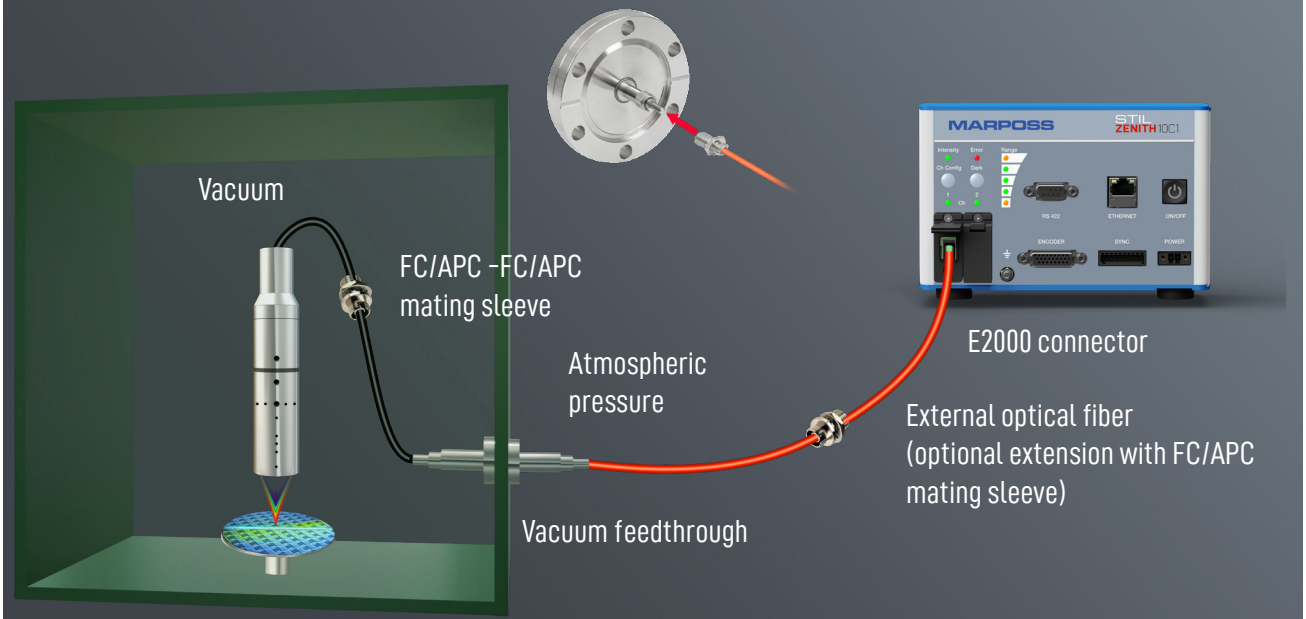
* With ZENITH Controller (D version)

Application examples

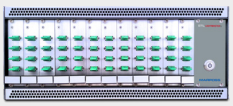
Standard setup



Specific setup



Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

Compatible fiber optics

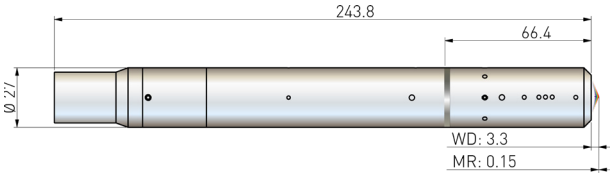
Model	Description	Order code
	F50-1.5 Vacuum optical fiber, standard cladding FC/APC connector at both ends Length: 1.5 meters - External diam; 2.8 mm - type	O67SF5015V1
	F50-1.5 Vacuum optical fiber, standard cladding FC/APC connector at both ends Length: 3 meters - External diam; 2.8 mm - type	O67SF5030V1

Accessories

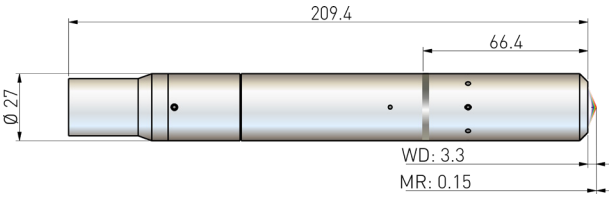
Model	Description	Order code
	Holder D27 for 27 mm Diameter probe (CL-MG)	O15ST000004
	Optical connector cleaner for Chromatline sensors	O15ST000028
	Fold Vacuum 90° folding mirror for modular Chromatic Confocal optical head, adaptable on CL-MG optical heads - Vacuum type - to be ordered with CL-MG vacuum compatible	O15ST0000V1
	TC 2XFC/APC Vacuum 2xFC/APC bulkhead connection - Vacuum type	O67STC2FCV1

Dimensions (mm)

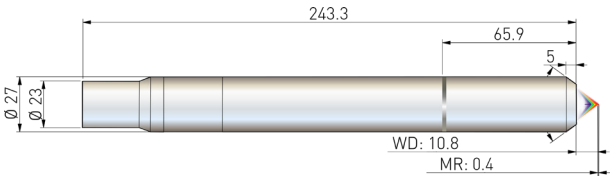
CL1-MG210-Vacuum™



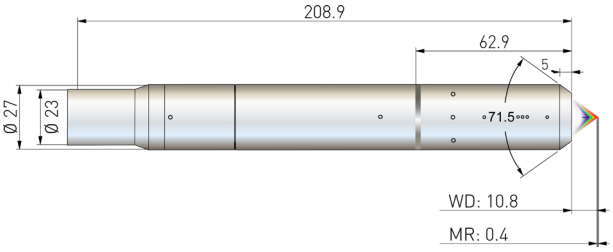
CL1-MG140-Vacuum™



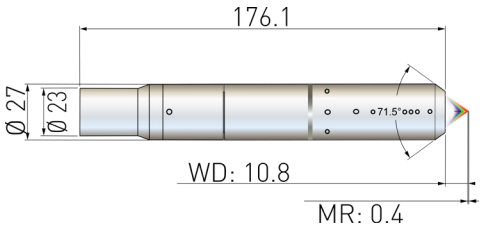
CL2-MG210-Vacuum™



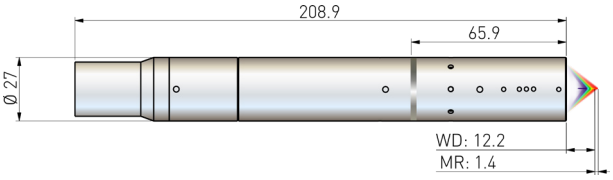
CL2-MG140-Vacuum™



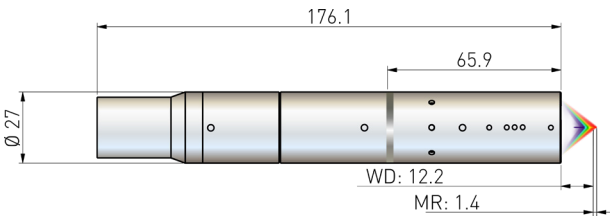
CL2-MG70-Vacuum™



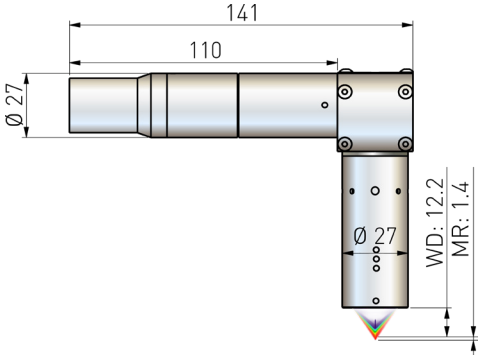
CL3-MG140-Vacuum™



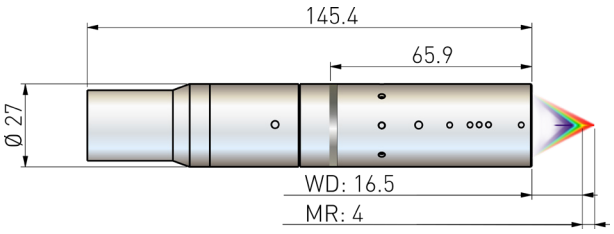
CL3-MG70-Vacuum™



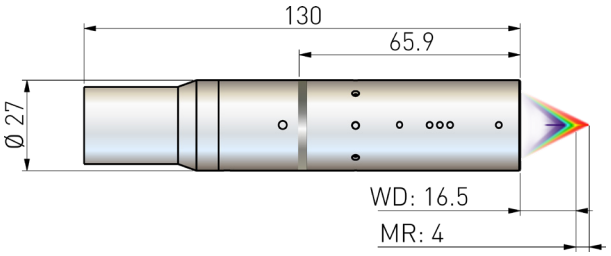
CL3-MG70-90-Vacuum™



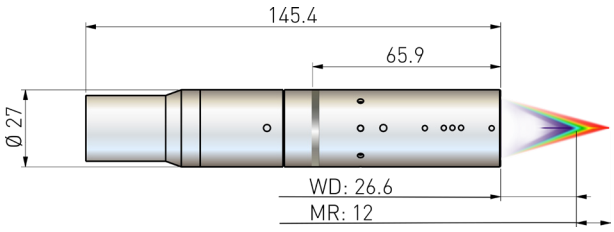
CL4-MG35-Vacuum™



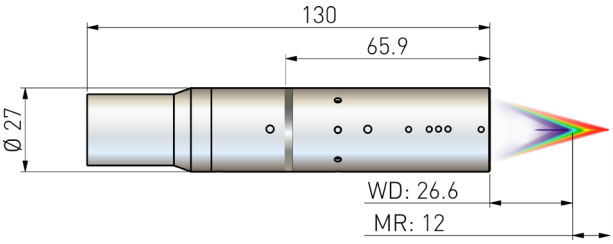
CL4-MG20-Vacuum™



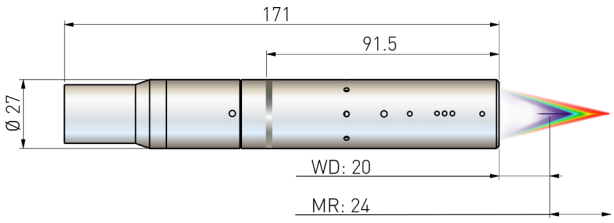
CL5-MG35-Vacuum™



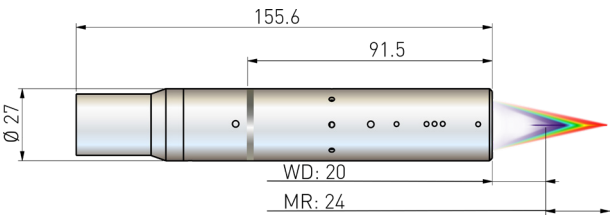
CL5-MG20-Vacuum™



CL6-MG35-Vacuum™



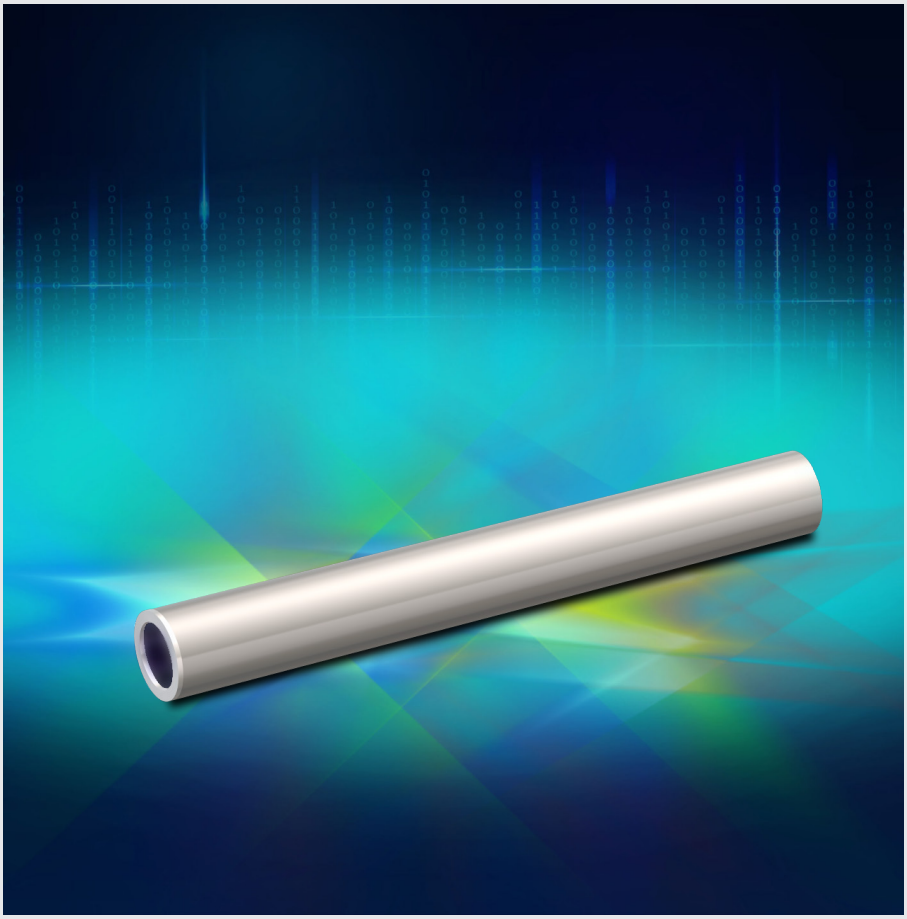
CL6-MG20-Vacuum™



MARPOSS

ENDO

CHROMATIC CONFOCAL POINT SENSOR HEADS



ChromaPoint Sensor Heads

A wide range of sensors designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C.
They are highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes...

ENDO

SMALL DIAMETERS FOR NARROW ENVIRONMENTS

STIL introduces ENDO™ series, a new range of chromatic confocal sensor heads with an exceptionally small size.

With a mechanical diameter from 4 to 8 millimeters and a straight or radial (90° from axis) beam, ENDO™ series is ideal for non-contact measurement applications in reduced / limited space environments.

These miniature ENDO™ optical heads are very useful for measuring small diameter holes or cavities.

Their small size makes them easy to integrate into production line inspection machines.

Working with any STIL optoelectronic controller, ENDO™ series allows to perform a precise measurement with a sub-micron resolution.

Benefits

- Suitable for small space/volume applications
- Axial or radial beam
- Light weight: from 3.5 g to 25 g .
- Ideal for integration in / on the robot arm, in vacuum chambers, in glove boxes / sealed boxes
- High signal to noise ratio
- Works on a large set of materials, including black carbon, glass, colored or white ceramic, metal, plastics, rough or polished surfaces, liquid.
- Coaxial (no shadow effect)
- Speckle free
- Metal

Application fields

ENDO™ optical heads are typically used in large quantities for simultaneous measurement of Thickness (R2R), roundness (Glass tubes, Bottles …), flatness (Wafers, Flat Glass …) and shape (Wafer Bow & Warp, TTV, Automotive Glass - Wind shields …)

Versions

- ENDO™ series is available in three standard diameter versions: 4 mm, 6 mm and 8 mm
- Among the features of the series are the axial and radial beam
- The measurement range and optical specifications are adapted to the different applications
- All ENDO™ optical heads are compatible with STIL's ChromaPoint controllers like Zenith™ or Lightmaster™

Versatile

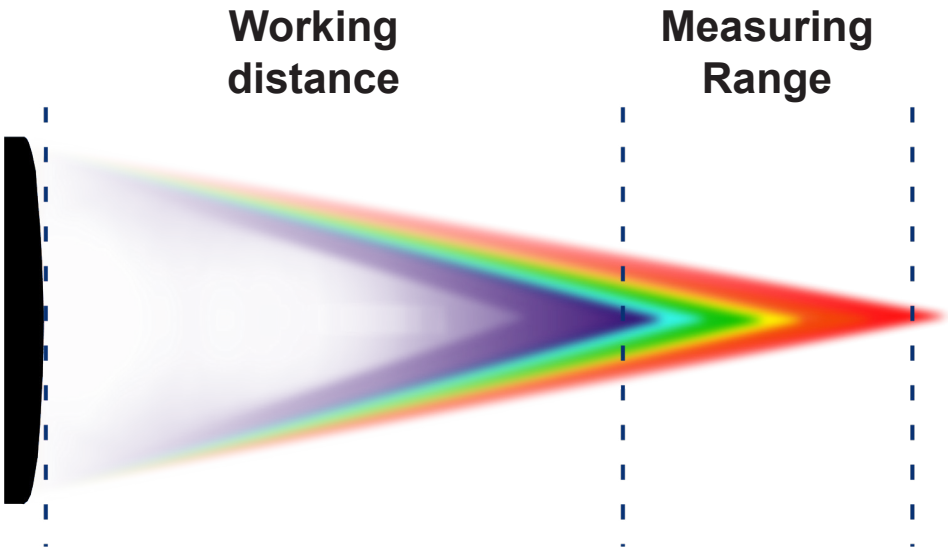
Adapted to any type of surface

Industrial

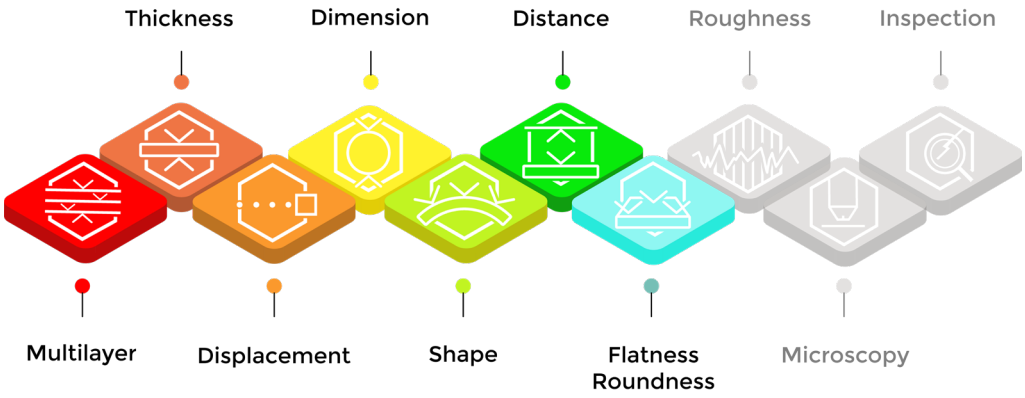
Works in any environment

Accuracy

± 0.03 µm



Perfect for



Technical specifications

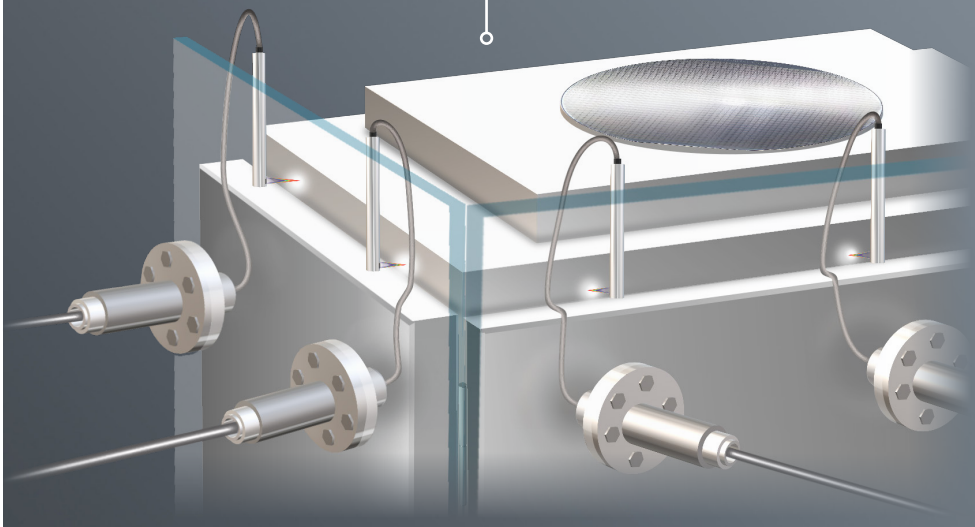
Model	Unit	ENDO 0.2/D8	ENDO 1/D4-R	ENDO 1.5/D6-R	ENDO 2/D6	ENDO 1/D8-R	ENDO 1.2/D8	ENDO 10/D8	ENDO 10/D8-R
Order Code		03PS0382002	03PS0341002	03PS0362502	03PS0362702	03PS0386501	03PS0386001	03PS0388001	03PS0388501
Measuring Range	mm	0.22	1	1.5	2	1	1.2	10	10
Working Distance	mm	4.8	1	0.9	5.2	0.6	3.5	11.3	8.4
Numerical Aperture		0.39	0.16	0.19	0.18	0.37	0.36	0.1	0.1
Max. Slope Angle	°	±21.5	±7.5	10	10	20	±19.5	±4.5	±4.5
Axial or Radial model		Axial	Radial		Axial	Radial	Axial		Radial
Max. Linearity Error*	µm	±0.04	±0.15	±0.15	±0.16	±0.06	±0.06	±0.45	±0.45
Static Noise*	nm	15	60	95	100	35	35	300	300
Axial resolution (Averaginng 10)*	nm	5	20	570	600	210	11.67	100	100
Lateral Resolution	µm	2.5	6.5	10	8.5	3.4	3.4	17	17
Spot Size	µm	4.6	13.2	19.5	16.5	6.7	6.8	31	31
Photometric Efficiency		16	10	29	24	13	19	36	24
Min. Measurable Thickness	µm	25	300	200	180	60	60	500	500
Length	mm	102	64	95.1	82.2	77.6	74	102	108.7
Diameter	mm	8	4	6	6	8	8	8	8
Weight	g	20	3.5	13	12	16	16	23	23

* With Zenith™ Controller (D version)

Application examples

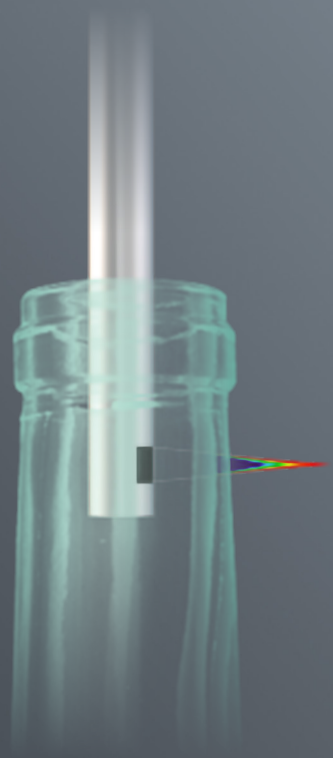
Vacuum Application : Part positionning

Endo™ sensors are suitable to vacuum environment where space is limited, like CVD, PVD, EUV photolithography & E-beam ... chambers

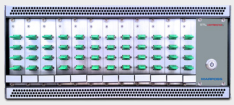


Small volume measurements : Bottle neck

Endo™ sensors perfectly suit measurements in small rooms like small diameter holes, bottle necks... They have been designed to measure inner diameters, thicknesses, roughness (Ra >= 150 nm), liquid height (volume) ... with nanometric resolution.



Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

Compatible fiber optics

Model	Description	Order code
	E50-3-MA Optical fiber - armored fiber Length: 3 m; Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm*	O67SE503001

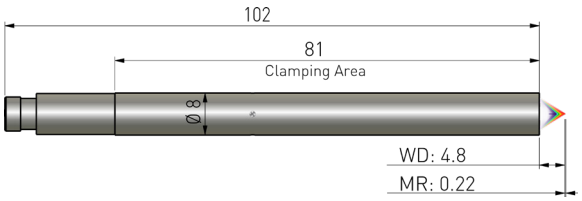
* ENDO series has only welded & non-disconnectable fiber

Accessories

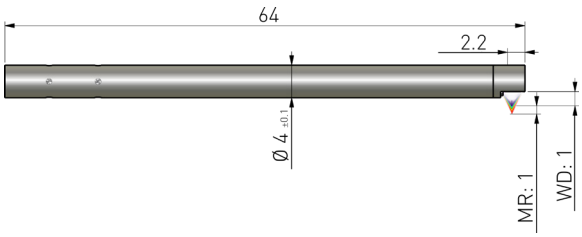
Model	Description	Order code
	Holder D6 for 6 mm Diameter probes (Endo0.3/D6, Endo1.2/D6...) Holder D8 for 8 mm Diameter probes (Endo0.2/D8, Endo10/D8...)	O15ST000027 O15ST000002
	Optical connector cleaner for Chromapoint sensors	O15ST000028

Dimensions (mm)

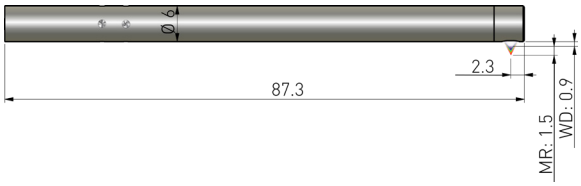
ENDO 0.2/D8™



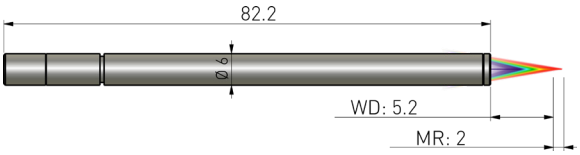
ENDO 1/D4-R™



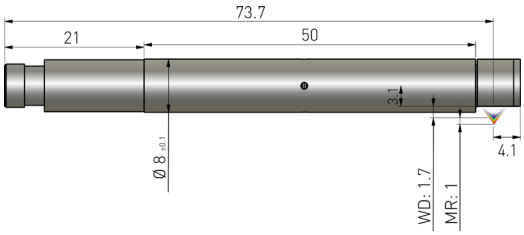
ENDO 1.5/D6-R™



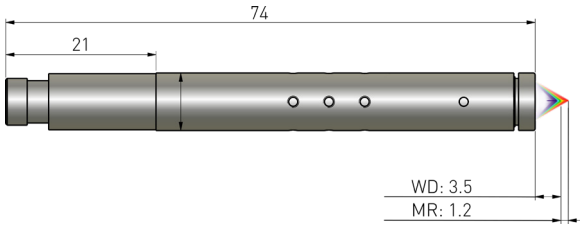
ENDO 2/D6™



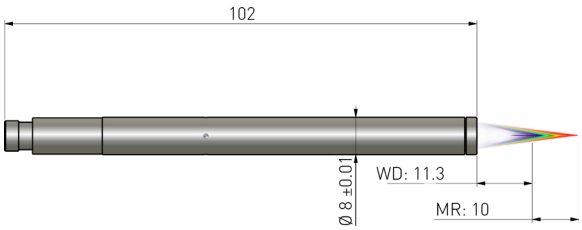
ENDO 1/D8-R™



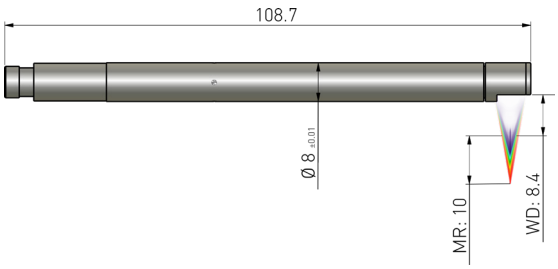
ENDO 1.2/D8™



ENDO 10/D8™



ENDO 10/D8-R™



CHROMATIC CONFOCAL POINT SENSOR HEADS FOR VACUUM APPLICATIONS

Chromapoint Sensor Heads

Discover a wide range of sensors heads to fit with your specific vacuum applications. As vacuum environments demand precise measurement methods tailored to varying pressure values, our solutions ensure exceptional accuracy and efficiency. Designed with passive components, our sensors generate no heat. Explore our innovative products based on chromatic confocal technology and elevate your vacuum measurement capabilities today with a high level of performance (Resolution & Accuracy).

ENDOVacuum

SMALL DIAMETERS FOR NARROW ENVIRONMENTS

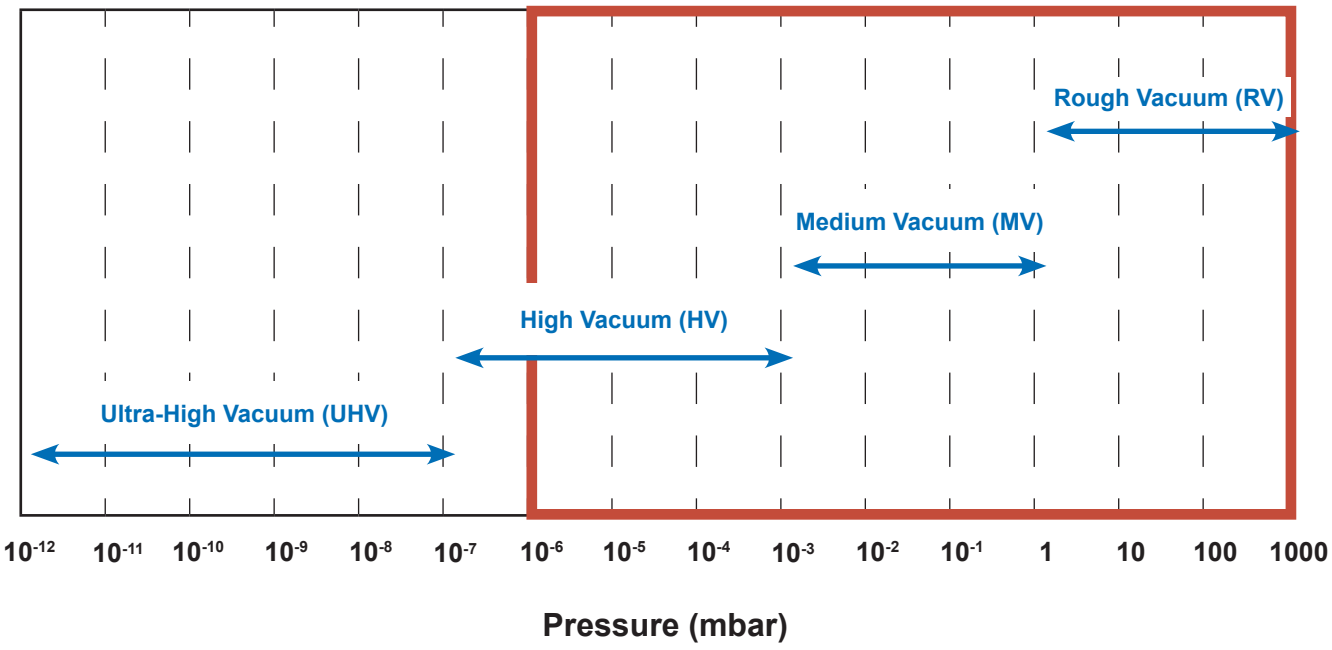
STIL introduces ENDO™ series, a new range of chromatic confocal sensor heads with an exceptionally small size.

With a mechanical diameter from 4 to 8 millimeters and a straight or radial (90° from axis) beam, ENDO™ series is ideal for non-contact measurement applications in reduced / limited space environments.

These miniature ENDO™ optical heads are very useful for measuring small diameter holes or cavities.

Their small size makes them easy to integrate into production line inspection machines.

Working with any STIL optoelectronic controller, ENDO™ series allows to perform a precise measurement with a sub-micron resolution.



Benefits

- Non contact chromatic confocal sensors
- Vacuum & High vacuum compatible
- A wide range of configurations
- High performance with sub-micron accuracy

Application fields

ENDO™ optical heads are typically used in large quantities for simultaneous measurement of Thickness (R2R), roundness (Glass tubes, Bottles …), flatness (Wafers, Flat Glass …) and shape (Wafer Bow & Warp, TTV, Automotive Glass - Wind shields …)

Versatile

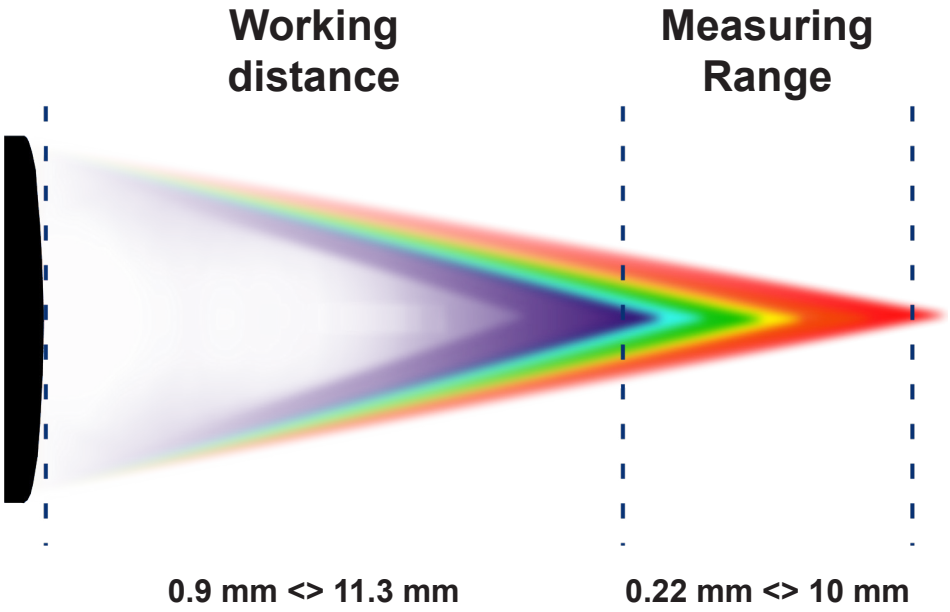
Adapted to any type of surface

Industrial

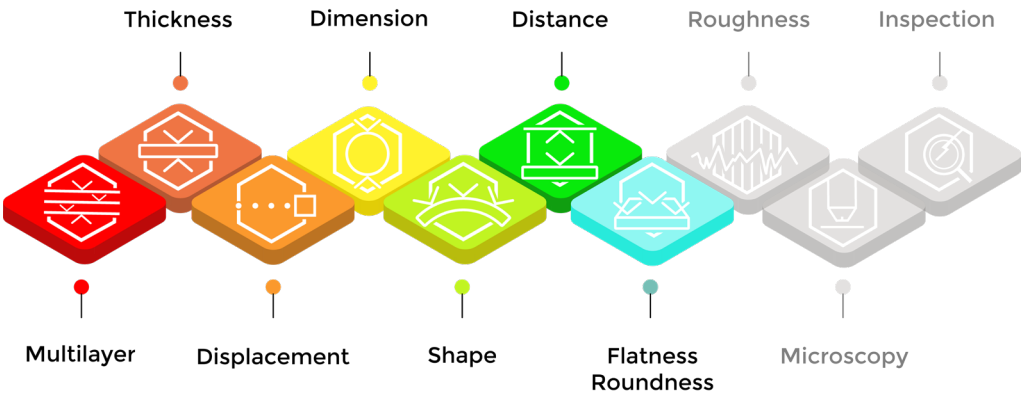
Works in any environment

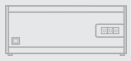
Accuracy

± 0.03 µm



Perfect for



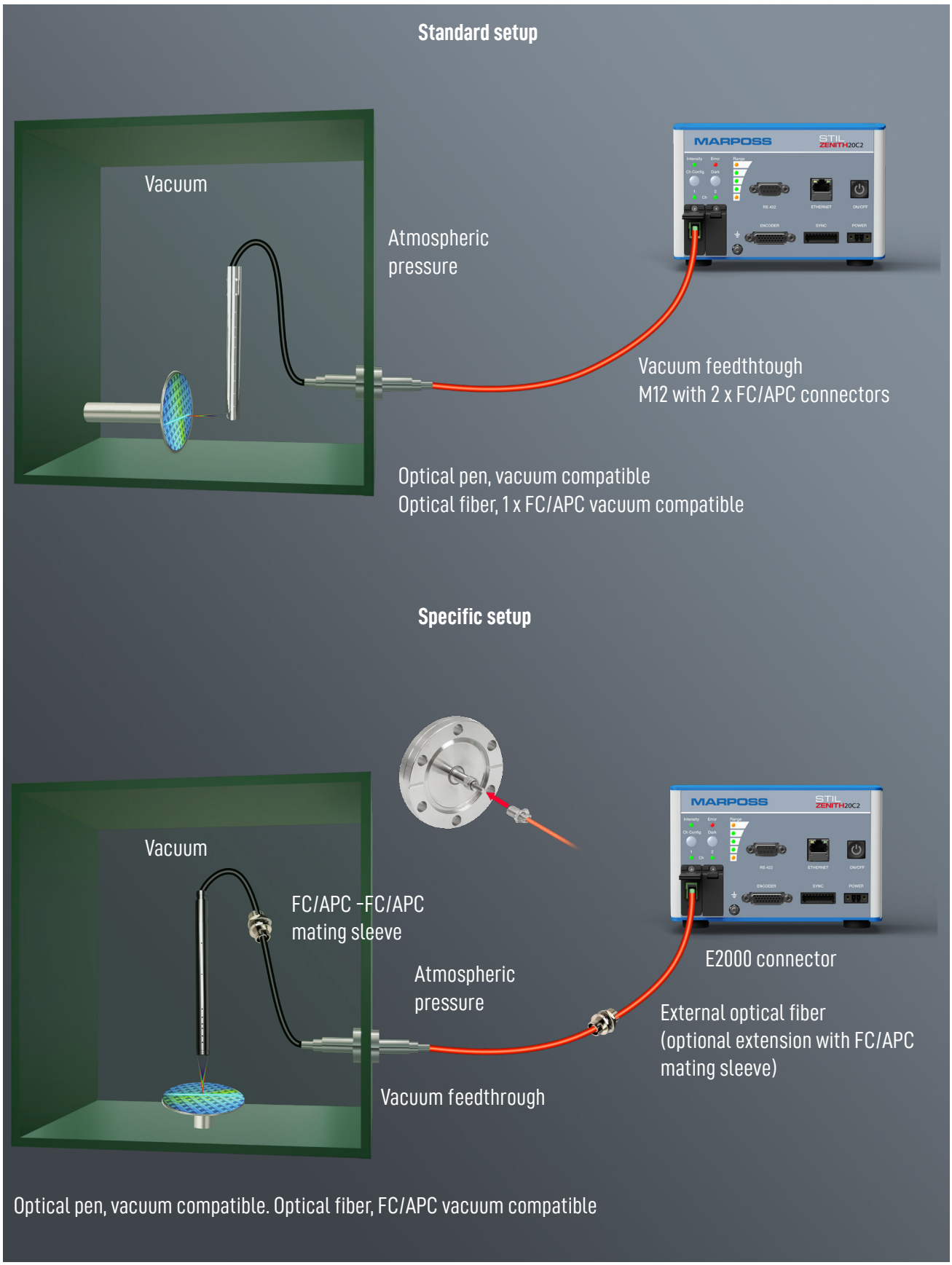


Technical specifications

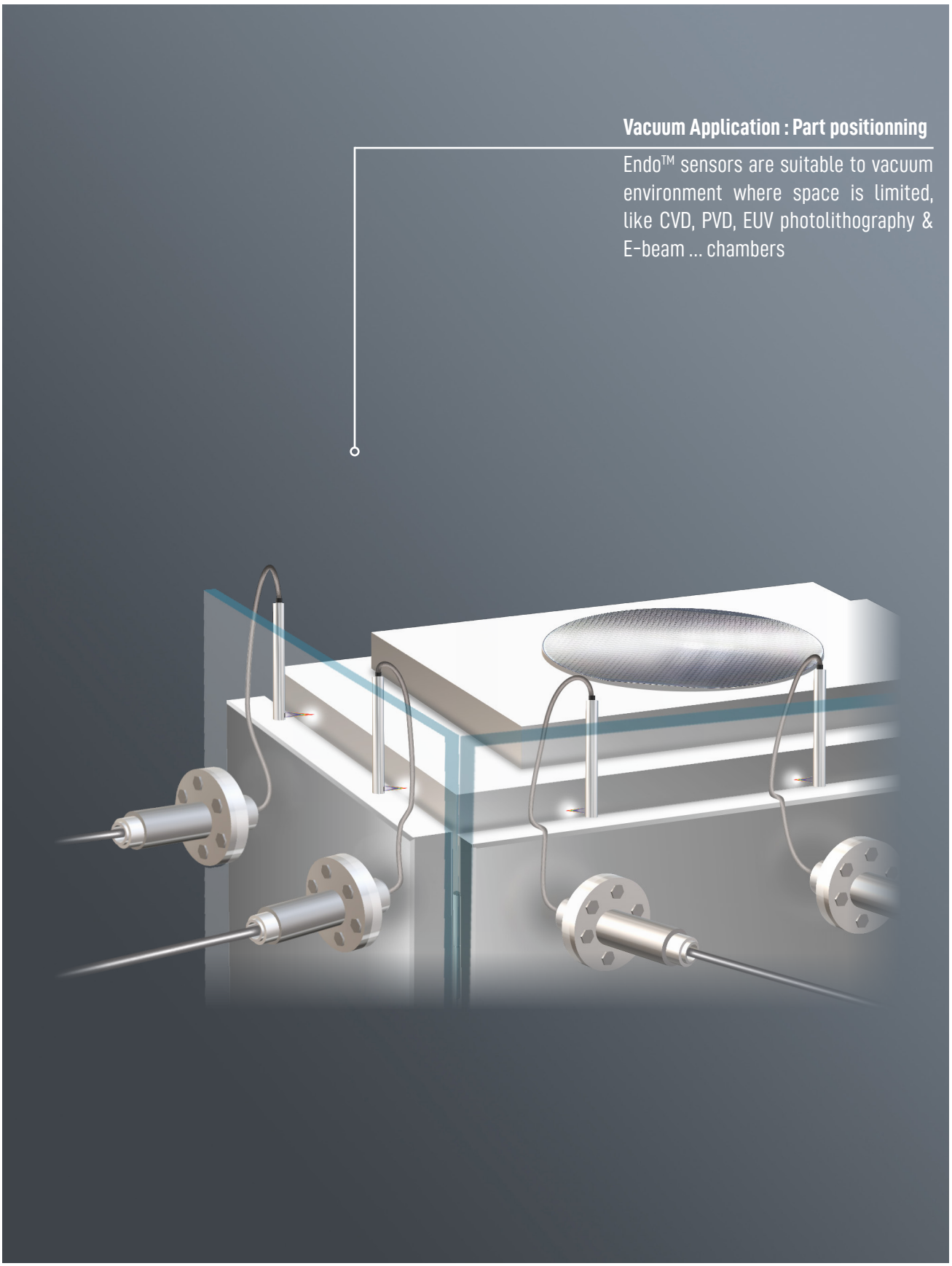
Model	Unit	ENDO 0.2/D8	ENDO 1/D4-R	ENDO 1.5/D6-R	ENDO 2/D6	ENDO 1/D8-R	ENDO 1.2/D8	ENDO 10/D8	ENDO 10/D8-R
Order Code		**On demand**	**03PS0341003**	**On demand**	**On demand**	**On demand**	**On demand**	**03PS0388002**	**03PS0388502**
Measuring Range	mm	0.22	1	1.5	2	1	1.2	10	10
Working Distance	mm	4.8	1	0.9	5.2	0.6	3.5	11.3	8.4
Numerical Aperture		0.39	0.16	0.19	0.18	0.37	0.36	0.1	0.1
Max. Slope Angle	°	±21.5	±7.5	10	10	20	±19.5	±4.5	±4.5
Axial or Radial model		Axial	Radial		Axial	Radial	Axial		Radial
Max. Linearity Error*	µm	±0.04	±0.15	±0.15	±0.16	±0.06	±0.06	±0.45	±0.45
Static Noise*	nm	15	60	95	100	35	35	300	300
Axial resolution (Averaginng 10)*	nm	5	20	570	600	210	11.67	100	100
Lateral Resolution	µm	2.5	6.5	10	8.5	3.4	3.4	17	17
Spot Size	µm	4.6	13.2	19.5	16.5	6.7	6.8	31	31
Photometric Efficiency		16	10	29	24	13	19	36	24
Min. Measurable Thickness	µm	25	300	200	180	60	60	500	500
Length	mm	102	64	95.1	82.2	77.6	74	102	108.7
Diameter	mm	8	4	6	6	8	8	8	8
Weight	g	20	3.5	13	12	16	16	23	23

* With Zenith™ Controller (D version)

Application examples



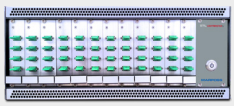
Application examples



Vacuum Application : Part positionning

Endo™ sensors are suitable to vacuum environment where space is limited, like CVD, PVD, EUV photolithography & E-beam ... chambers

Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

Compatible fiber optics

Model	Description	Order code
	E50-3-MA Optical fiber - armored fiber Length: 3 m; Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm*	O67SE503001

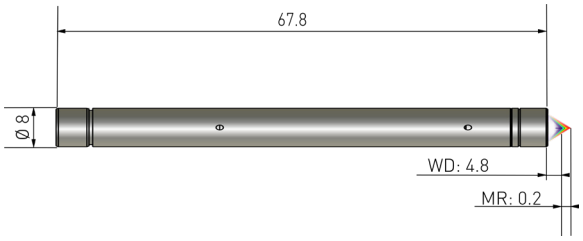
* ENDO series has only welded & non-disconnectable fiber

Accessories

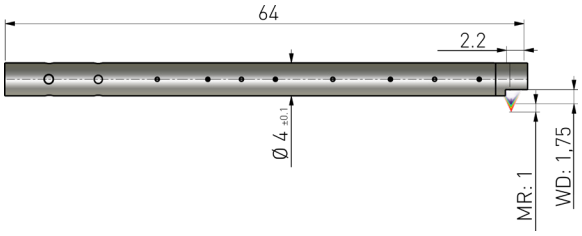
Model	Description	Order code
	Holder D6 for 6 mm Diameter probes (Endo0.3/D6, Endo1.2/D6...) Holder D8 for 8 mm Diameter probes (Endo0.2/D8, Endo10/D8...)	O15ST000027 O15ST000002
	Optical connector cleaner for Chromapoint sensors	O15ST000028
	TC 2XFC/APC bulkhead connection - Vacuum type	O67STC2FCV1

Dimensions (mm)

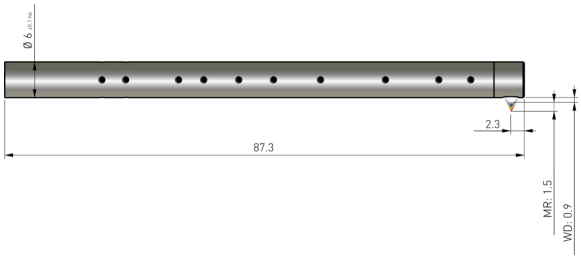
ENDO 0.2/D8-Vacuum™



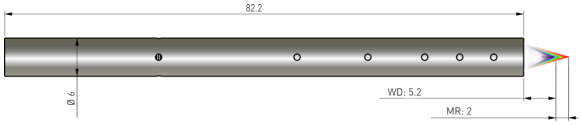
ENDO 1/D4-R-Vacuum™



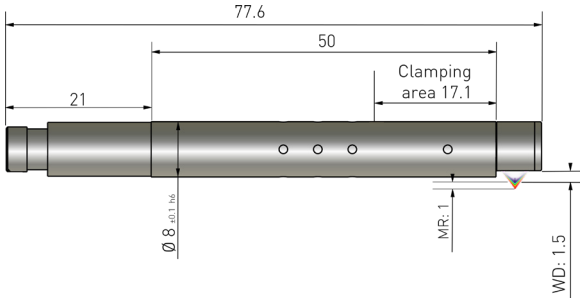
ENDO 1.5/D6-R-Vacuum™



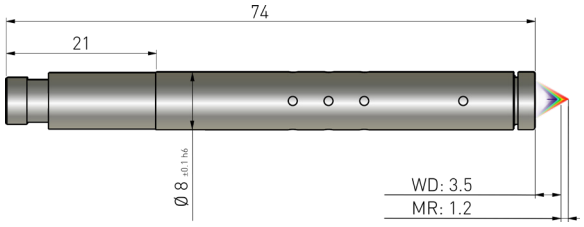
ENDO 2/D6-Vacuum™



ENDO 1/D8-R-Vacuum™



ENDO 1.2/D8-Vacuum™



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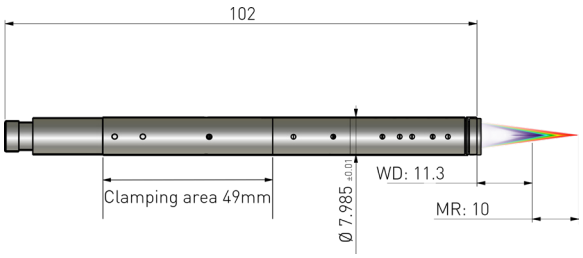
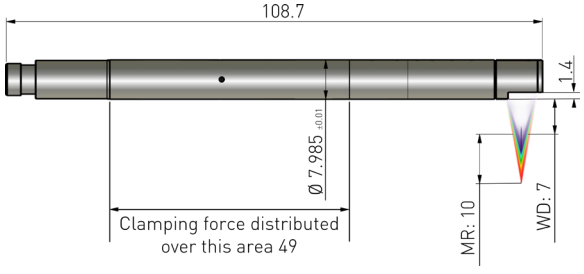


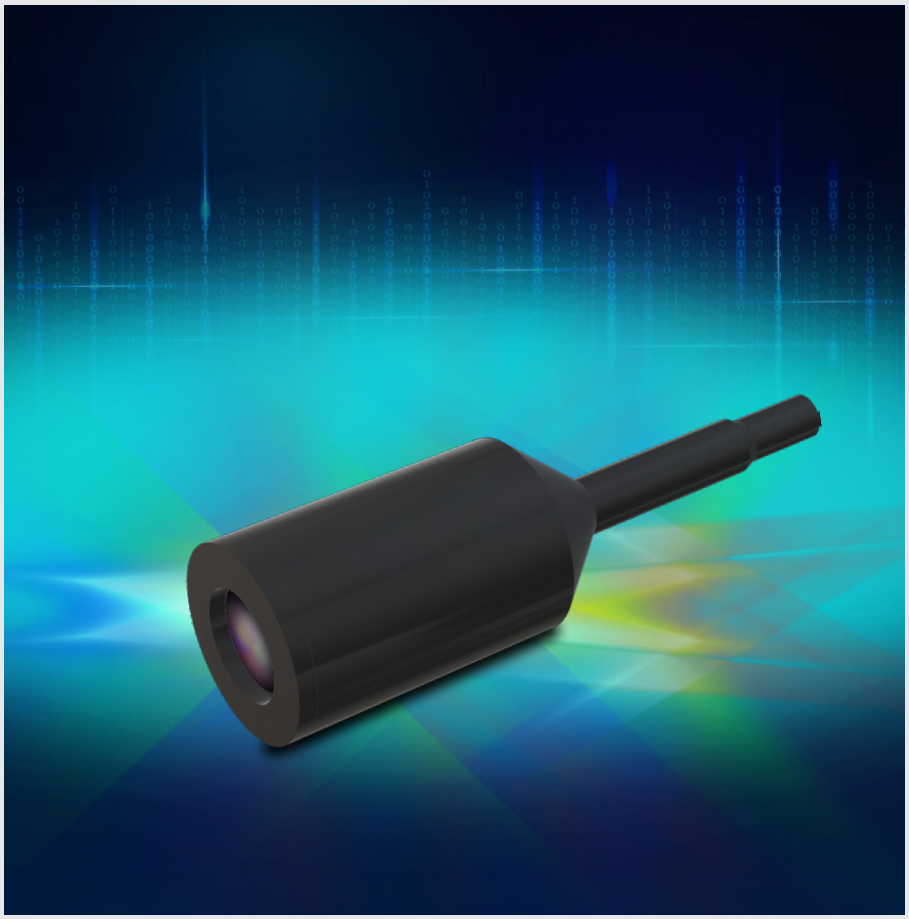
ENDO 10/D8-R-Vacuum™



MARPOSS

EVEREST

CHROMATIC CONFOCAL POINT SENSOR HEADS



ChromaPoint Sensor Heads

A wide range of sensors designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C.
They are highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes...

EVEREST

HIGHEST NUMERICAL APERTURE

Born from the lastest STIL innovation, EVEREST™ chromatic confocal sensor heads contains / synthetize the best of research and development in terms of sensors.

EVEREST™ series offers an extended measurement range with the highest performances.

EVEREST™ series is composed of three different models with a measuring range of 1 mm, 2 mm, 6 mm offering excellent metrological performance (down to the nanometer) for a wide variety of applications.

Its Large Numerical Aperture, up to 0.7, allows signal acquisition on a steep slopes with angle of +/-44° on specular surfaces up to +/-88° on diffusing surfaces.

Built with the highest quality standards, EVEREST™ series is specifically composed of passive, robust and reliable components.

Benefits

- Dedicated to the industrial environment, independent of ambient light
- Steepest slopes angle +/- 44° (mirror) +/- 88° (rough surfaces)
- Suitable for use in a wide range of applications
- High axial resolution: from nanometer scale (nm)
- High lateral resolution: from micrometer scale (µm)
- High signal to noise ratio
- Works on the largest set of materials, including black carbon, glass, colored or white ceramic & plastics, rough or polished metal

Application **fields**

Suitable for use in an industrial environment as well as in laboratories to measure roughness according to ISO 25178-602 as well as microtopography, flatness and wedge angles.

Versions

- EVEREST™ optical heads are available in three versions : from 1 mm to 6 mm measuring range
- EVEREST™ optical heads are compatible with all STIL ChromaPoint controllers such as Zenith™ or Lightmaster™ via a fiber optic connection.

Slope angle

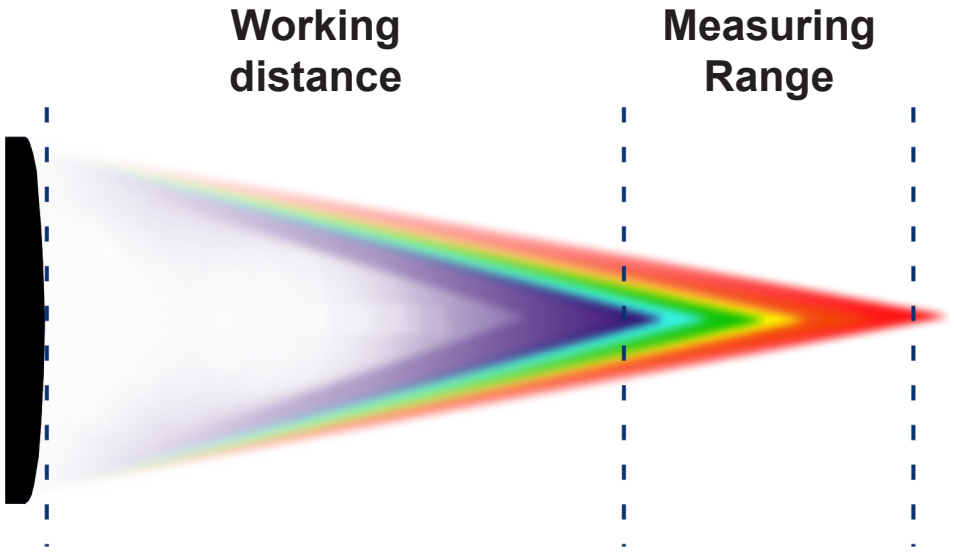
± 44°

Industrial

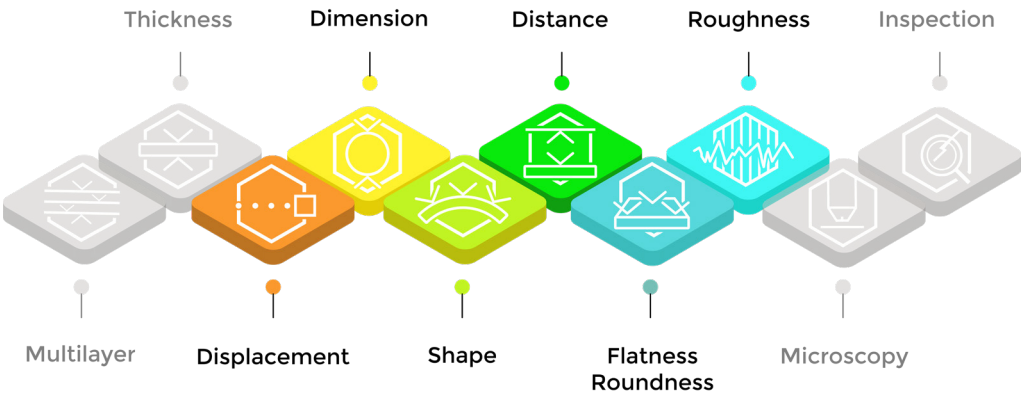
Works in any environment

Accuracy

± 0.06 µm



Perfect for

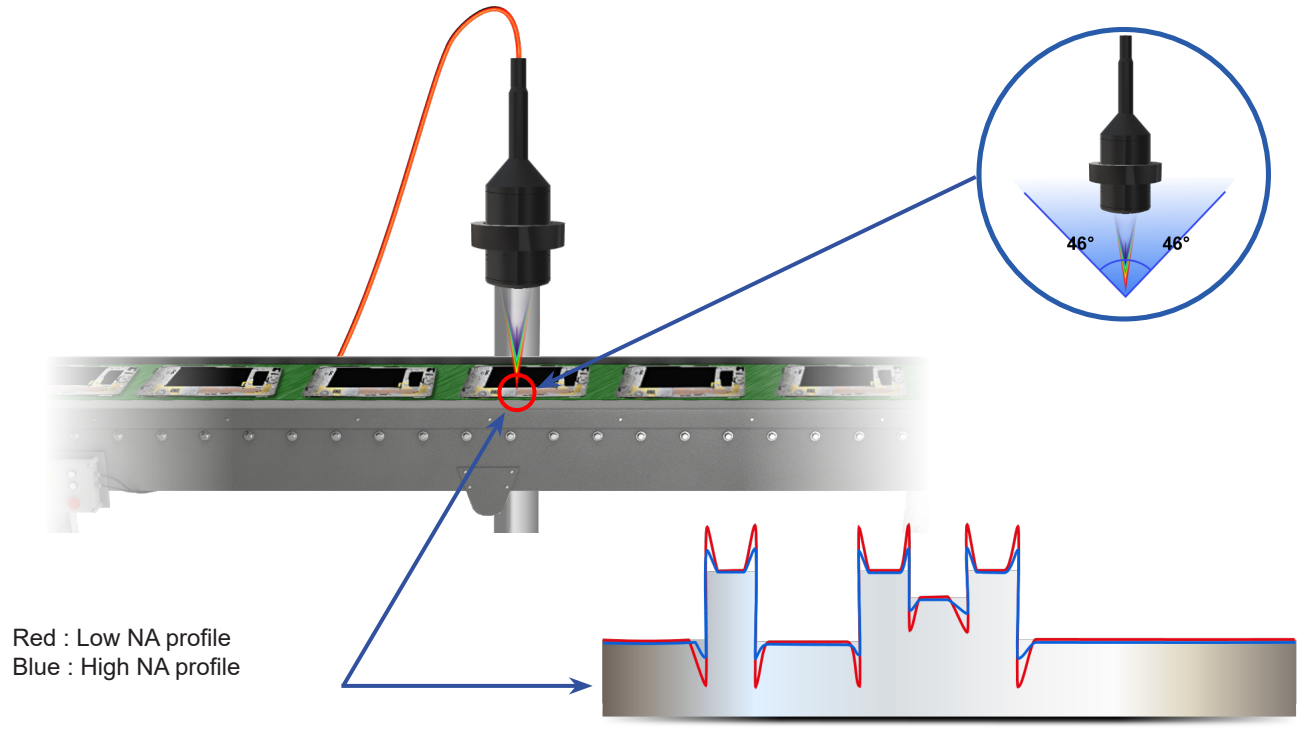


Technical specifications

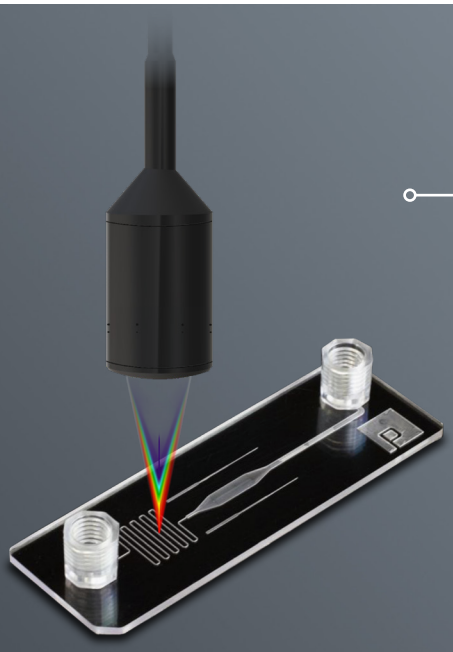
Model	Unit	Everest K1	Everest K2	Everest K6
Order Code		**03PS0470001**	**03PS0472001**	**03PS0461001**
Measuring Range	mm	1	2	6
Working Distance	mm	18.5	19.2	13.7
Numerical Aperture		0.7	0.67	0.55
Max. Slope Angle	°	±44	±42	±32
Axial or Radial model		Axial		
Max. Linearity Error*	µm	±0.06	±0.12	±0.25
Static Noise*	nm	19	38	100
Axial resolution (Averaginng 10)*	nm	6.33	12.67	33.33
Lateral Resolution	µm	2.5	3.8	5.2
Spot Size	µm	5	7	10.4
Photometric Efficiency		34	52	26
Min. Measurable Thickness	µm	50	100	150
Length	mm	260.5	243.4	136.3
Diameter	mm	82	82	47
Weight	g	1400	1250	360

* With Zenith™ Controller (D version)

HIGH NUMERICAL APERTURE



Application examples

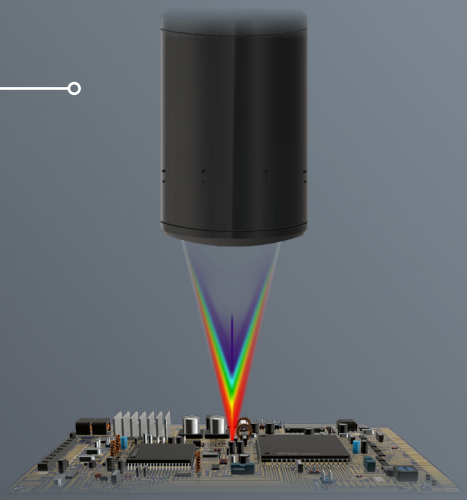


MEMSensors & Medical - MicroFluidic channels

EVEREST™ sensors, thanks to their large Numerical Aperture (NA), the large Measuring Range (MR) & their lateral resolution in µm, can measure all dimensions of micro-fluidic channels, Lab-on-Chip, MEMS, Displays & Solid lighting (LED, OLED, TFT, Electronic ink ...), Integrated Optics, RF chips ...

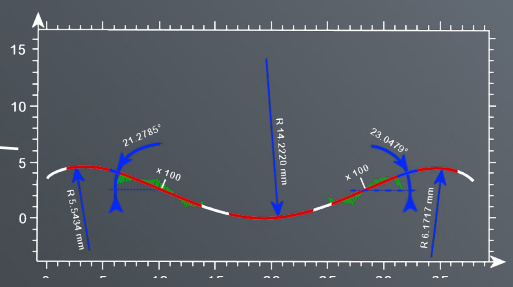
3C - Electronic components

EVEREST™ sensors have been designed to measure components on boards, where their large Measuring Range, high accuracy & their ability to measure the largest set of materials without shadowing effect is key.

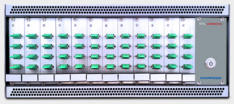


Medical - knee implants

EVEREST™ sensors, thanks to their ability to measure steep slopes even if mirror polished, can measure medical implant shape even with simple set-up.
Everest can also measure roughness Ra ≥ 0.4 µm.



Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

Compatible fiber optics

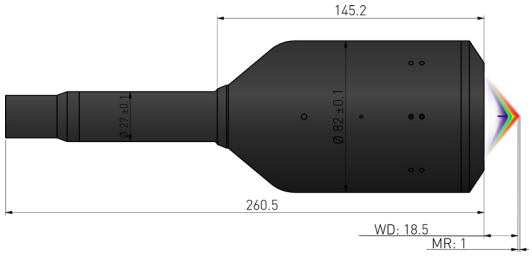
Model	Description	Order code
	E50-3 Optical fiber - standard cladding - Length: 3 m or 5 m or 10m; External Diam.: 2.8 mm Minimum bending radius in : Static Mode: 25 mm - Dynamic Mode: 40 mm	3 m - O67SE503001 5 m - O67SE505001 10 m - O67SE510001
	E50-3-MA Optical fiber - armored fiber - Length: 3 m or 5 m or 10 m; External Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm	3 m - O67SE503M02 5 m - O67SE505M02 10 m - O67SE510M02
	E50-3-M Optical fiber - stainless steel cladding - Length: 3 m or 5 m or 10 m or 15 m or 20 m ; External Diam.: 6.2 mm Minimum bending radius in : Static Mode: 40 mm - Dynamic Mode: 40 mm	3 m - O67SE503M01 5 m - O67SE505M01 10 m - O67SE510M01 15 m - O67SE515M01 20 m - O67SE520M01

Accessories

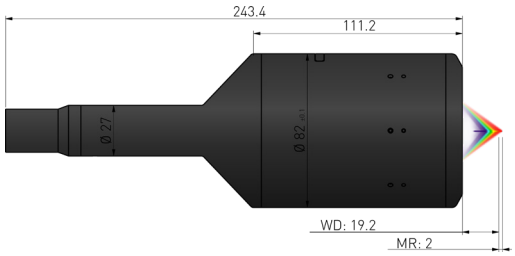
Model	Description	Order code
	Holder D47 for 47mm Diameter probes (Everest-K6) Holder D82 for 82 mm Diameter probes (Everest-K1 & K2)	O15ST000021 O15ST000007
	Optical connector cleaner for Chromapoint sensors	O15ST000028

Dimensions (mm)

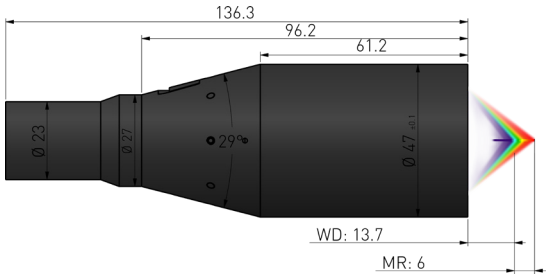
EVEREST K1™



EVEREST K2™



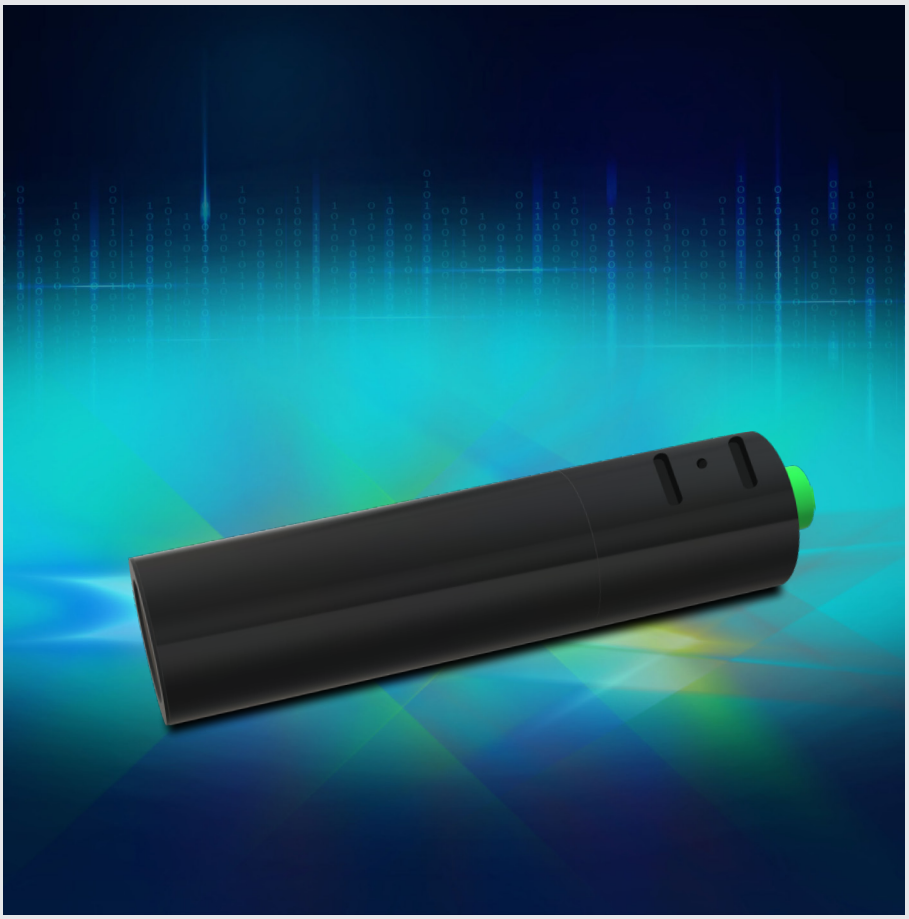
EVEREST K6™



MARPOSS

OP

CHROMATIC CONFOCAL POINT SENSOR HEADS



ChromaPoint Sensor Heads

A wide range of sensors designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C.
They are highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes...

OP

LONG WORKING DISTANCE

OP™ series consists of a one-piece optical sensor head for dedicated applications (e.g. long distance measurements).

The performance and specifications of each OP™ sensors are dedicated to some applications in the industry.

More than 10 references are optimized in terms of photometric efficiency, working distance and slope angle acceptance to measure non-contact roughness, multi-layer thicknesses, in-line dark bottles wall thickness, hot glass …

OP™ series can be enlarged on demand according to your specifications.

Benefits

- Exceptional working distance up to more than 0.5 m
- Ideal for implementing a specific optical path while respecting mechanical constraints
- Dedicated to industrial environment, independent from ambient light
- High axial resolution: from nanometer scale (nm)
- High photometric efficiency
- High signal to noise ratio (S/N)
- Works on the largest set of materials, including black carbon, glass, colored or white ceramic & plastics, rough or polished metal
- Steep slope compatibility thanks to Large Numerical Aperture (NA)
- Coaxial (no shadow effect)
- « Speckle » free

Application fields

Typically integrated for measuring 3D shapes, glass thickness, perform autofocus, OP™ series fits a wide range of applications. OP™ series is the ideal compromise between flexibility, mechanical and optical constraints, with high performances.

Versions

- OP™ series is available in more than ten standard versions. Customization and OEM design are available in circular diameter and square mechanical design
- Each OP™ optical head is compatible with all STIL ChromaPoint controllers such as Zenith™ or Lightmaster™

Slope angle

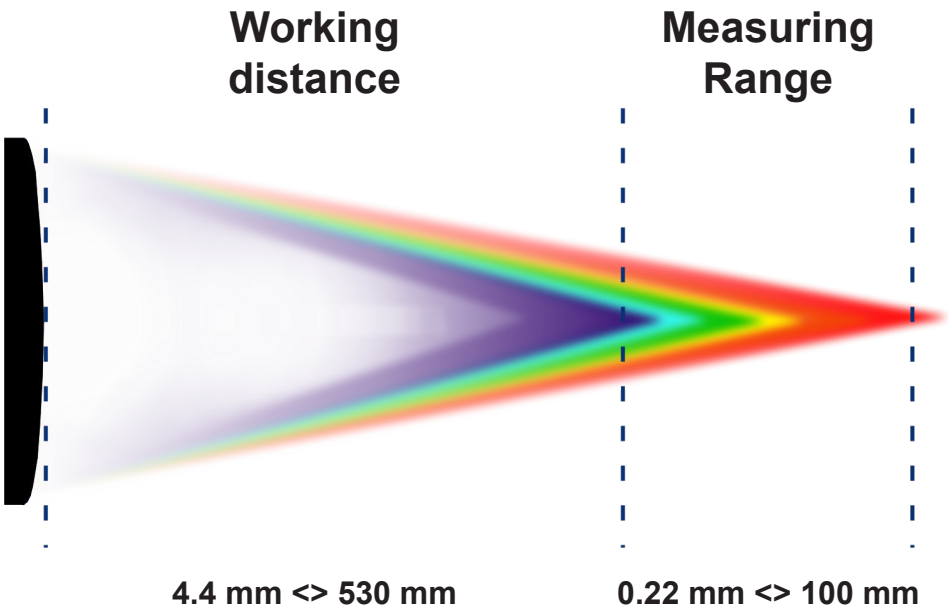
± 25°

Accuracy

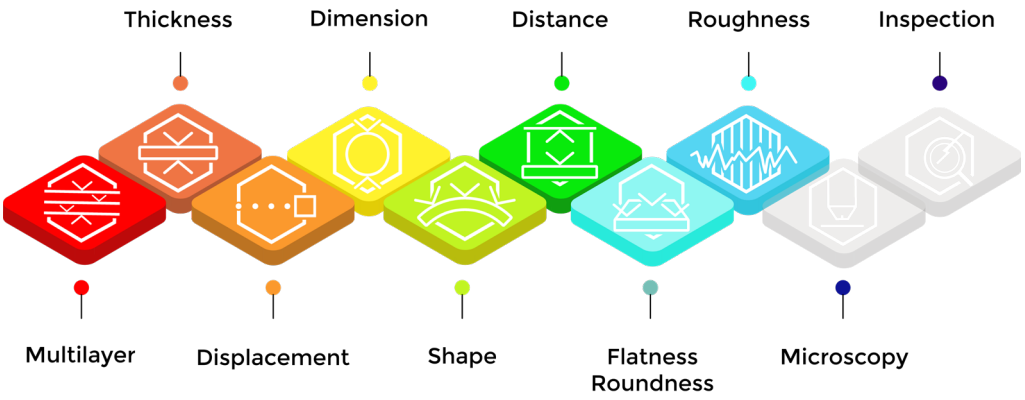
± 0.04 µm

Resolution

0.004 µm



Perfect for



Technical specifications

Model	Unit	OP 300VM	OP300-VM-R	OP 850-I	OP 850-T**	OP 1 000	OP 2 400-I
Order Code		**03PS1400021**	**03PS1400022**	**03PS1400813**	**03PS1400814**	**03PS1400003**	**03PS1402401**
Measuring Range	mm	0.22	0.22	0.85	0.85	1	2.4
Working Distance	mm	5	4.4	12.3	12.3	23.9	11.3
Numerical Aperture		0.5	0.5	0.48	0.48	0.45	0.45
Max. Slope Angle	°	±25	±25	± 28	±28	±24	27
Axial or Radial model		Axial	Radial	Axial			
Max. Linearity Error*	µm	±0.04	±0.04	± 0.07	±0.06	±0.15	±70
Static Noise*	nm	12	12	45	20	30	35
Axial resolution (Averaging 10)*	nm	4	4	0.27	0.12	10	12
Lateral Resolution	µm	3.2	3.2	4.2	2.2	2.2	5.6
Spot Size	µm	6.4	6.4	7.5	3.8	4.4	10.1
Photometric Efficiency		34	24	54	14	15	70
Min. Measurable Thickness	µm	25	25	50	30	25	50
Length	mm	127	128	149	159	254.1	109
Diameter	mm	15	15	35	35	50	27
Weight	g	27	39	180	200	753	110

Model	Unit	OP 2 400-T	CL4-LWD	OP 6 000	OP 8 000	OP 10 000	OP 10 000-R
Order Code		**03PS1402402**	**03PS014LWD0**	**03PS1400004**	**03PS1400005**	**03PS1400006**	**03PS1400007**
Measuring Range	mm	2.4	4	6	8	10	10
Working Distance	mm	11.3	40	28	39	66.9	66.9
Numerical Aperture		0.45	0.36	0.39	0.295	0.2	0.2
Max. Slope Angle	°	27	±21	±22	±16	±11	± 11
Axial or Radial model				Axial			90° folded
Max. Linearity Error*	µm	±70	±0.3	±0.3	±0.35	±0.51	± 0.51
Static Noise*	nm	25	110	100	160	280	280
Axial resolution (Averaging 10)*	nm	8	660	33.333	53.333	93.333	93.333
Lateral Resolution	µm	2.8	4.3	6.25	16.5	25	25
Spot Size	µm	5.1	8.6	12.5	33	50	50
Photometric Efficiency		14	25	43	145	156	138
Min. Measurable Thickness	µm	40	110	200	300	425	425
Length	mm	123	167.4	205.5	139	189	152
Diameter	mm	27	50	60	40	50	50
Weight	g	120	470	760	365	525	674

*With Zenith™ Controller (D version)

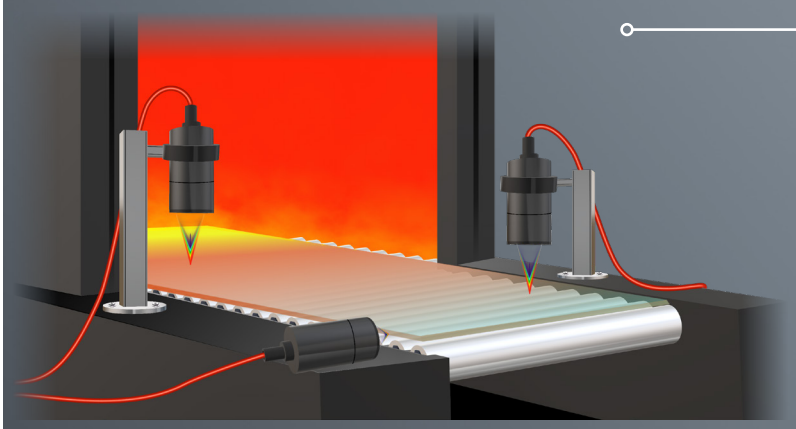
Product	Unit	OP 12 000	OP 30 000	OP 35 000	OP 42 000	OP 100 000	NCTP***
Order Code		**03PS1400010**	**03PS1400008**	**03PS1400011**	**03PS1400012**	**03PS1400014**	**03PS1400009**
Measuring Range	mm	12	30	35	42	100	2
Working Distance	mm	46	220	62	530	451	54.5
Numerical Aperture		0.25	0.095	0.33	0.052	0.08	0,35/0,17
Max. Slope Angle	°	± 14	± 5	±17	±2.5	±5	±18/9
Axial or Folded Model		Axial					
Max. Linearity Error*	µm	± 0.4	± 1.5	±1.65	±30	±16	±2
Static Noise*	nm	225	750	600	6000	5000	1000
Axial resolution (Averaginng 10)*	nm	75	250	200	2000	1666.667	6000
Lateral Resolution	µm	14	48	13	53	55	15
Spot Size	µm	32.5	96	26	106	110	30
Photometric Efficiency		100	117	30	90	>150	73
Min. Measurable Thickness	µm	550	2000	1200	2500	2500	500
Length	mm	58.3	168	300.3	327	348.9	210
Diameter	mm	36	59	80	85	120	80/35
Weight	g	130	405	2200	1700	4200	1025

*With Zenith™ Controller (D version)
** OP 850-T preliminary specifications

*** NCTP

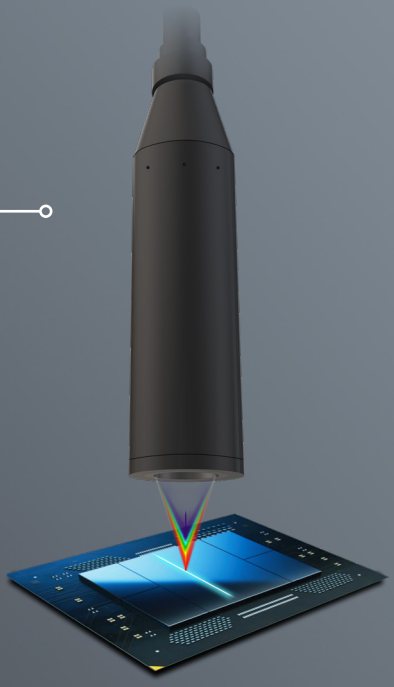
NCTP : STIL mastering Chromatic Confocal technology, we can provide sensors with different shapes (than cylindric), like the rectangular shape NCTP pen.

Application examples



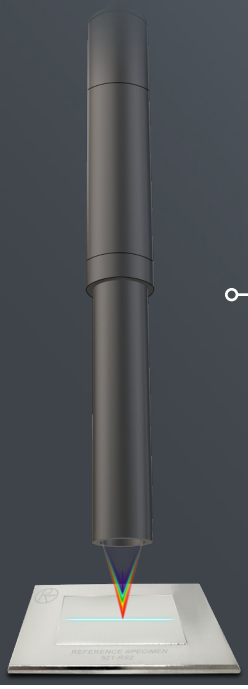
Hot glass thickness & shape measurement

OP 100 000TM, for example, has been designed with exceptional working distance (WD) and a 100 mm Measuring Range (MR) so that it can measure glass as close as possible to glass furnace exit, where the glass is not shining any more but still hot (Glass Temperature ≤600 °C).



PCB and Electronic Components

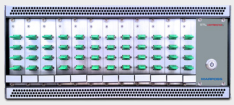
OP 1000™, for example, has been designed to measure in-line electronic components height, tilt and shape once the board is soldered.
STIL Chromatic Confocal technology can measure surfaces of the largest set of materials, rough or polished, without "shadow" effects nor "speckle".



Roughness / Surface Topography

OP300VM™ & OP300VM-90™, for example, has been designed to measure roughness (Ra ≥ 0.12 µm) in narrow places like the inner surface of tubes.
ISO 25178 norm certifies Confocal Chromatic technology for Surface Topography / Roughness measurements. Certified gauge measurements was been proved (against tactile measurements).

Associated controllers

Model	Description	Order code
	ZENITH™ 20C1 / 20C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 20 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1401 2 ch. O8ST17E1501 1 ch. O8ST17D1401 2 ch. O8ST17D1501
	ZENITH™ 10C1 / 10C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 10 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1201 2 ch. O8ST17E1301 1 ch. O8ST17D1201 2 ch. O8ST17D1301
	ZENITH™ 5C1 / 5C2 Series Chromatic Confocal Controller - 1 or 2 channels- Max acq. rate: 5 kHz. Input/output: Ethernet, RS422, trigger in/out, encoder input (up to 5)	1 ch. O8ST17E1004 2 ch. O8ST17E1102 1 ch. O8ST17D1004 2 ch. O8ST17D1102
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 16 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M003 F-O8ST08M004
	LIGHTMASTER-S or F™ Chromatic Confocal Multipoint Controller - Up to 48 simultaneous channels with 12 LIGHTSLOT modules - Max. acq. Rate: 750Hz - MR: Full - Input/output: Ethernet - Trigger in - Lightmaster controller must be associated with lightslot (1 to 12)	S-O8ST08M0001 F-O8ST08M0002

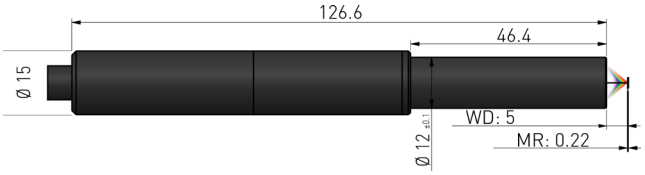
Model	Description	Order code
	E50-3 Optical fiber - standard cladding - Length: 3 m or 5 m or 10m; External Diam.: 2.8 mm Minimum bending radius in : Static Mode: 25 mm - Dynamic Mode: 40 mm	3 m - O67SE503001 5 m - O67SE505001 10 m - O67SE510001
	E50-3-MA Optical fiber - armored fiber - Length: 3 m or 5 m or 10 m; External Diam.: 3 mm Minimum bending radius in : Static Mode: 30 mm - Dynamic Mode: 60 mm	3 m - O67SE503M02 5 m - O67SE505M02 10 m - O67SE510M02
	E50-3-M Optical fiber - stainless steel cladding - Length: 3 m or 5 m or 10 m or 15 m or 20 m ; External Diam.: 6.2 mm Minimum bending radius in : Static Mode: 40 mm - Dynamic Mode: 40 mm	3 m - O67SE503M01 5 m - O67SE505M01 10 m - O67SE510M01 15 m - O67SE515M01 20 m - O67SE520M01

Accessories

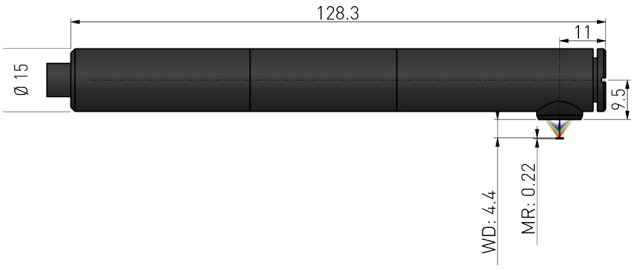
Model	Description	Order code
	Holder D15 for 15 mm Diameter probes (OP300VM) Holder D36 for 36mm Diameter probes (OP12000) Holder D59 for 59mm Diameter probes (OP30000) Holder D60 for 60 mm Diameter probes (OP6000)	O15ST000003 O15ST000020 O15ST000022 O15ST000006
	Optical connector cleaner for Chromapoint sensors	O15ST000028

Dimensions (mm)

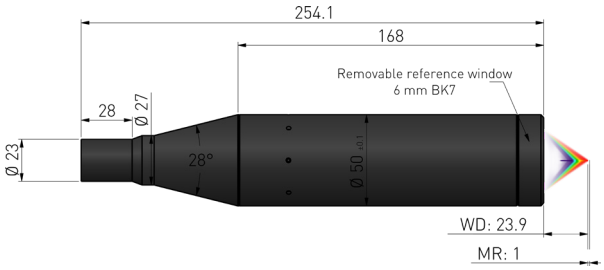
OP 300-VM™



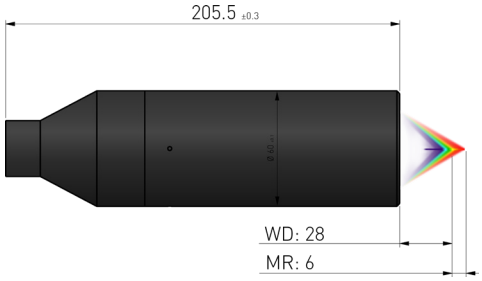
OP 300-VM-R™



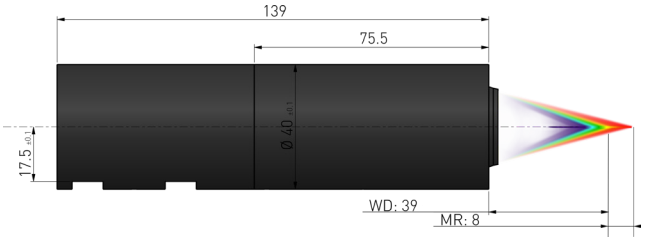
OP 1000™



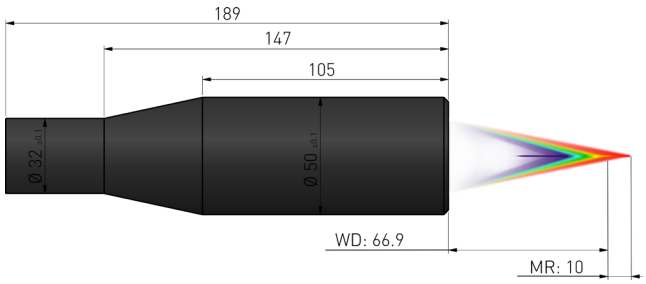
OP 6000™



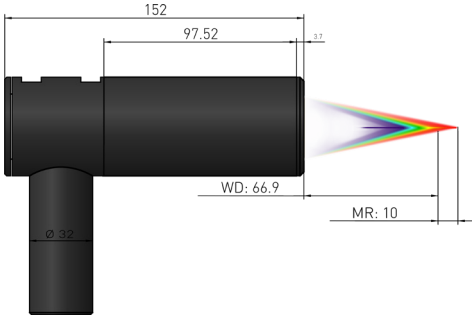
OP 8000™



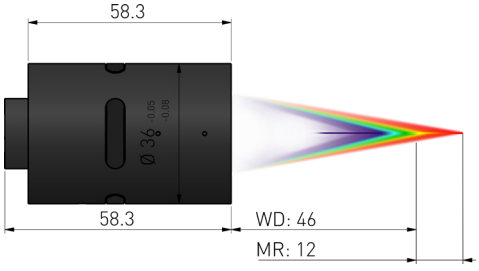
OP 10 000™



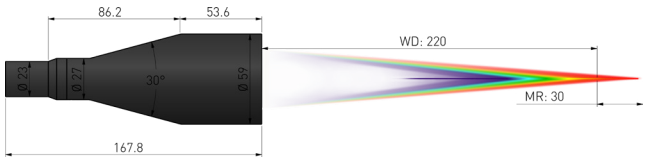
OP 10 000-R™



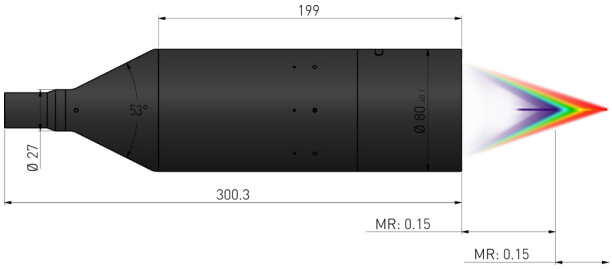
OP 12 000™



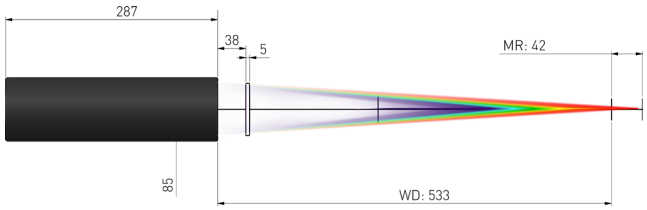
OP 30 000™



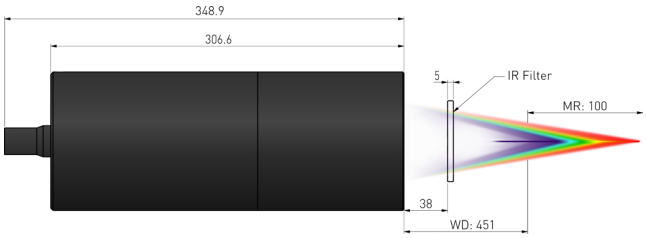
OP 35 000™



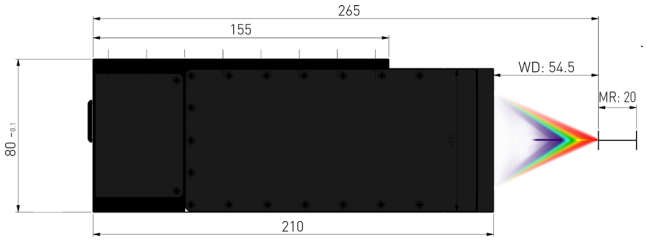
OP 42 000™



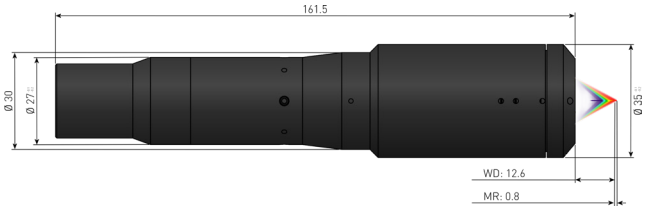
OP 100 000™



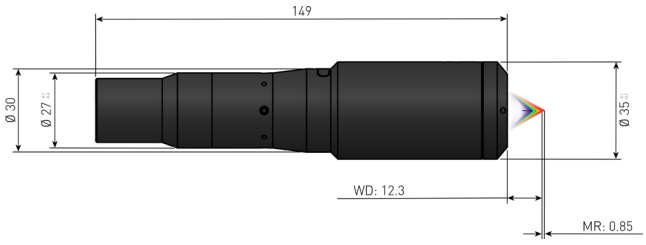
NCTP™



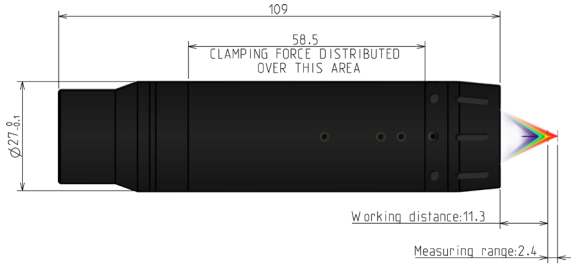
OP 850-T™



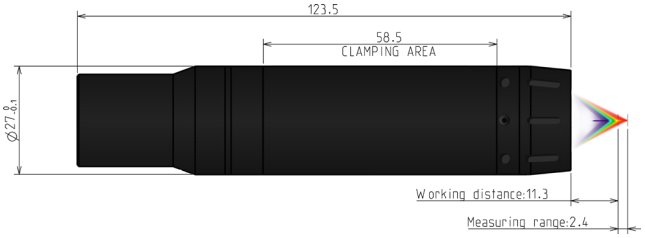
OP 850-I™



OP 2 400-I™



OP 2 400-T™



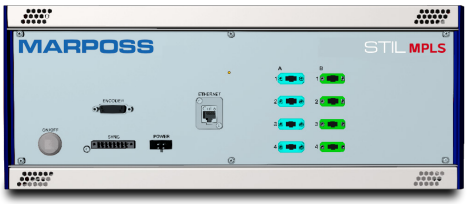
MARPOSS

MPLS

CHROMATIC CONFOCAL CONTROLLERS FOR LINE SENSOR HEADS

ChromaLine Controllers

A wide range of sensors designed for Metrology, Mechanics, Automotive, Aerospace, Glass, Medical, Semiconductor, 3C.
They are highly precise and can accurately measure distance, shape, roughness, and thickness on the largest set of materials, such as varnish, coatings, rolled sheets, and lithium-ion battery electrodes...



MPLS

MPLS™ controller in association with STIL Chromatic Confocal Line Sensor Heads are designed for Metrology, Mechanics, Semiconductors, 3C, Glass, Automotive, Aerospace, Medical laboratories to in-line needs.

Highly precise, MPLS allows 180 accurate point measurements of distance, shape, roughness, and thickness along a line ranging from 1 to 12 mm.

Benefits

- Dedicated to industrial environment, independent from ambient light sub-micrometric accurency & nanometric resolution along Z optical axis
- High signal to noise ratio
- Works on a large set of materials, including black carbon, glass, colored or white ceramic & plastics, metal, rough or polished surface
- Wide choice of sensors
- Steep slope compatibility large Numerical Aperture (NA) up to 46° on specular surface as mirror, up to 88° on rough surfaces
- Coaxial (no shadow effect)
- « Speckle » interference free

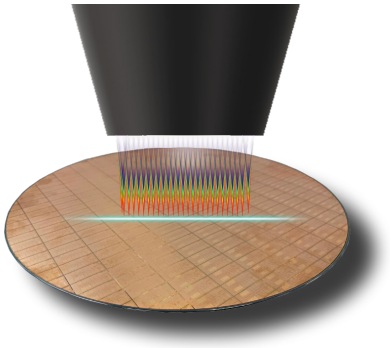
Application **fields**

Any large area application requiring simultaneous measurements on the largest set of material, transparent or opaque, and surface reflectivity, shiny or diffusive.
MPLS™ can advantageously replace triangulated laser lines as it doesn't have shadowing effect.

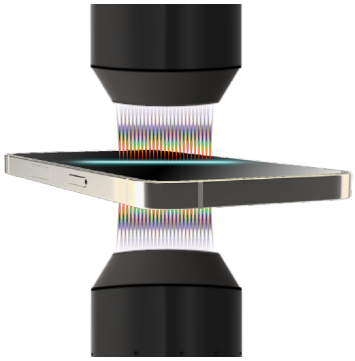
Versions

- MPLS-DM™ connect one sensor head via a single fiber bundle with 180 points of measurement simultaneously
- MPLS™ allows multiple combinations on the same controller: 1 sensor with 180 points 2 sensors of 90 points each, 4 sensors of 45 points each (illustration below).

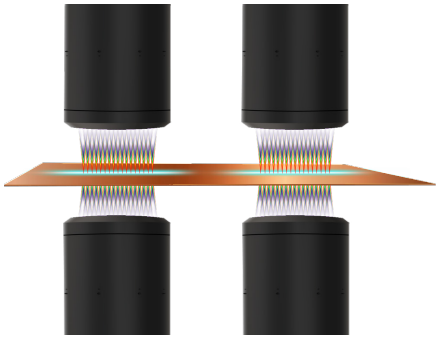
1 X 180 points



2 X 90 points



4 X 45 points



Technical Specifications

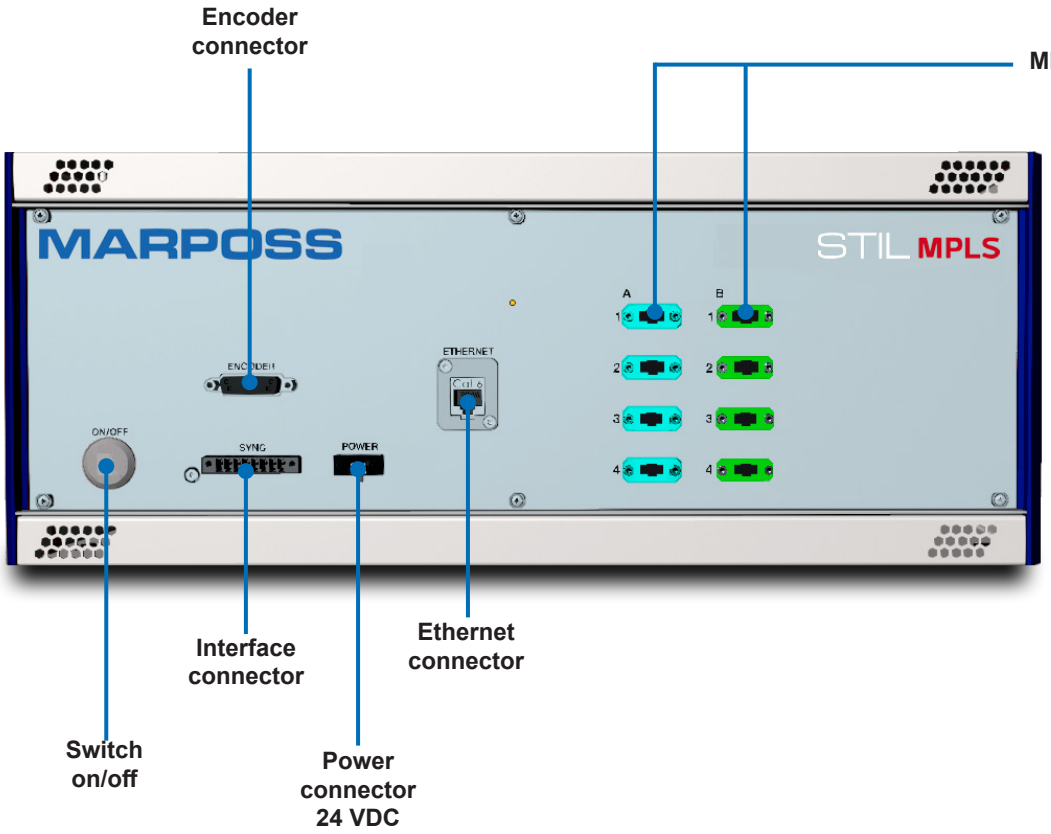
Controller	MPLS-DM	MPLS
Order Code	**08ST05M0003**	**08ST05M0004**
Technology	Chromatic Confocal	
Source	White LED	
Number of Points	180	(1) x 180 / (2) x 90 / (4) x 45
Measuring Frequency	200 Hz to 2000 Hz (up to 6000 Hz decreasing MR)	
Distance Measurement	Highest/First/Second/Third/Fourth/Last Peak	
Thickness Measurement	2 of 5 peaks	
Digital Output	GigaEthernet	
Synchronization	Trigger in&out	
Other Input/Output	Encoder Input (1)	
Sensor head connection	via fiber bundle 5 m long	Via optical connectors
Temperature In Use	+5 to + 50°C	
Storage Temperature	-30 to + 70°C	
Relative Humidity	5 to 80% RH without condensation	
Protection Type	IP20	
Compliance	EN 61010-1; EN 61326-1	
Power Supply	100-240 VAC	
Maximum/Usual Consumption	120W/70W	
Dimensions (mm)	497 x 448.9 x 184	
Weight	14.5 kg	

Product features

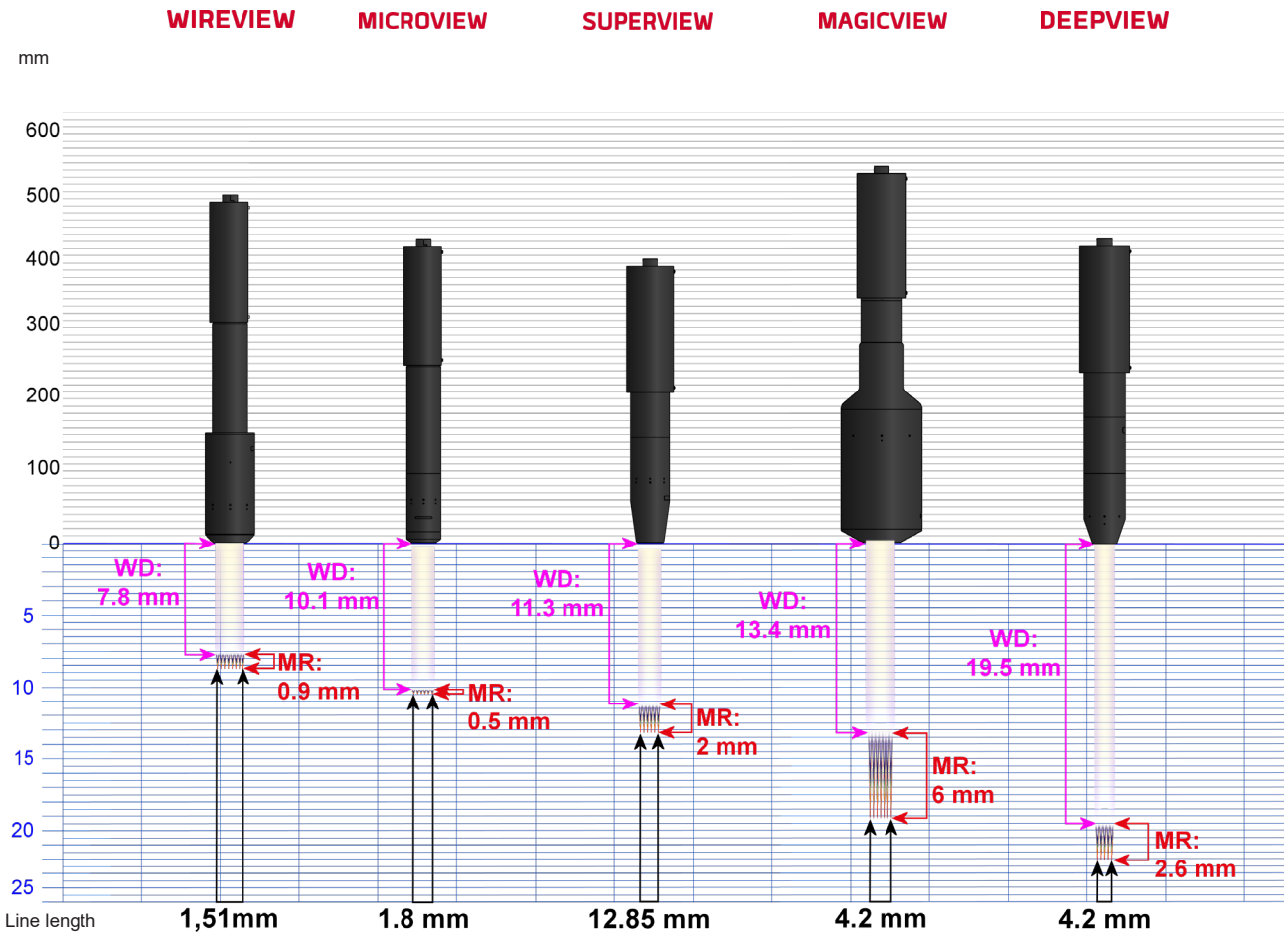
MPLS™ and MPLS-DM™ controllers manage the signal acquisitions, compute the distance and thickness data, and provides data transmission functions via Gigabit Ethernet link.

The front panel of the controller features:
- up to 180 parallel and simultaneous acquisitions through 8 MPO of 45 optical lines each
- On/Off Switch with power LED indicator

The back panel of the controller features:
- Power supply
- RJ-45 Gigabit Ethernet connector
- Interface connector for synchronization signals
- Encoder connector



Working Distance Length

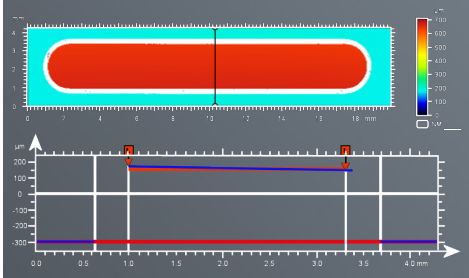


OUR COMPETITIVE ADVANTAGES

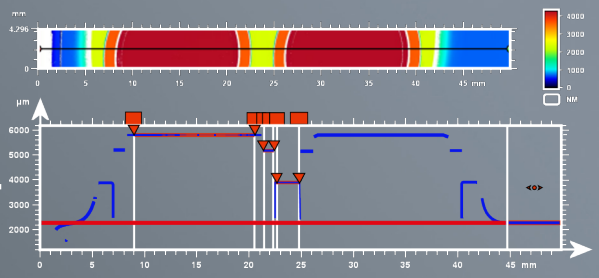
	Triangulated Laser	Triangulated Confocal	All in one Confocal	Chromaline Confocal STIL MARPOSS
Passive sensor	X	X	X	✓
No heat source	X	X	X	✓
ATEX conpatible	✓	X	X	✓
Clean room	✓	X	X	✓
Biologic environment	X	X	X	✓
Vibration free	✓	X	X	✓
High aspect ratio	X	X	✓	✓
Z resolution	X	✓	✓	✓

Application examples

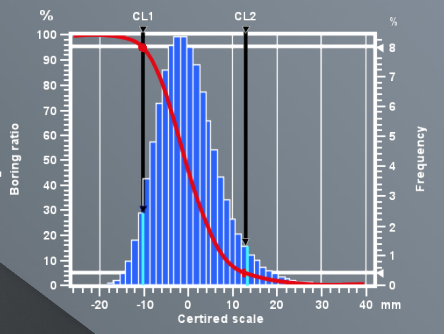
DeepView

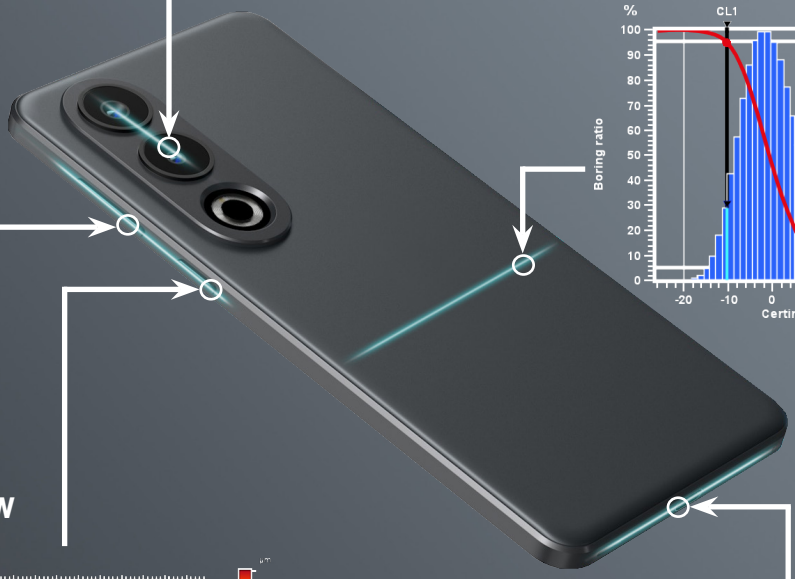


WireView

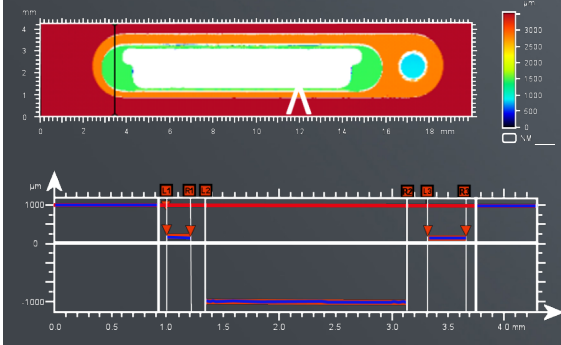


SuperView

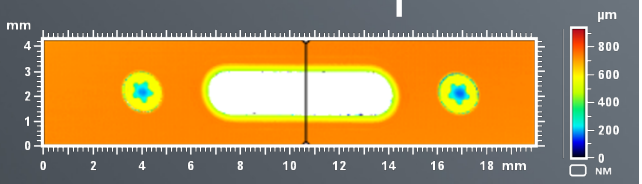


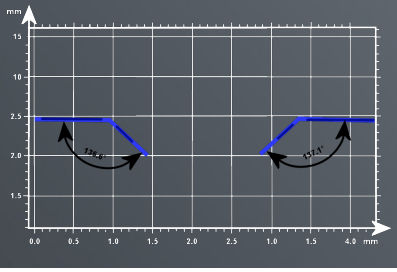


MagicView



MicroView

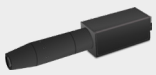




Smartphone control with line sensor heads™

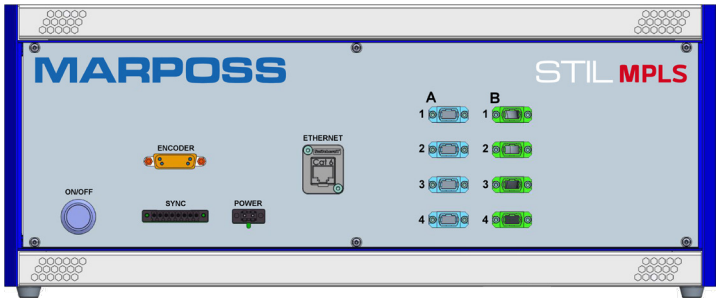
- surface control measurement
- thickness control measurement with multi-points sensor heads
- shape measurement

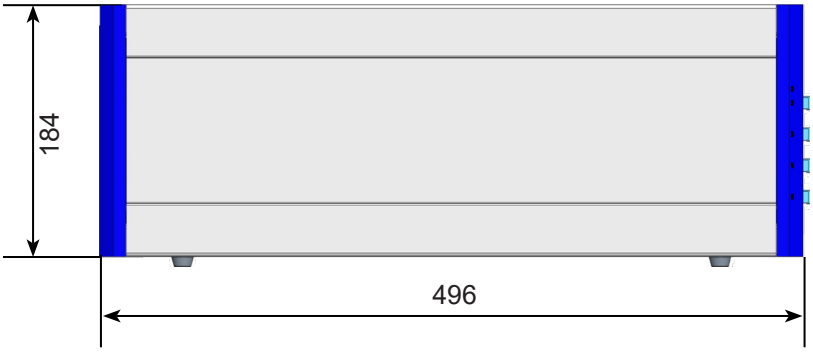
Associated sensor heads

Model	Description
	SuperView Sensor Head - Diam.: 60mm - MR: 2mm - WD: 11.3mm - 12.85mm line length with 180 points - 5m fibre bundle
	MicroView Sensor Head - Diam.: 50mmm - MR: 0.5mm - WD: 10.1mm - 1.8mm line length with 180 points - 5m fibre bundle
	DeepView Sensor Head - Diam.: 60mm - MR: 2.6mm - WD: 19.5mm - 4.2mm line length with 180 points - 5m fibre bundle
	WireView Sensor Head - Diam.: 70mm - MR: 0.9mm - WD: 7.8mm - 1.51mm line length with 180 points - 5m fibre bundle
	MagicView Sensor Head - Diam.: 118mmm - MR: 6mm - WD: 13.4mm - 4,2mm line length with 180 points - 5m fibre bundle - To be connected with the MPLS-DMRD Chromatic Confocal Line Sensor

Dimensions (mm)

MPLS™





CHROMATIC CONFOCAL LINE SENSOR HEADS

ChromaLine Sensor Heads

A wide range of sensors designed for Metrology, Mechanics, Semiconductors, 3C, Glass, Automotive, Aerospace, Medical.
They are highly precise and can accurately measure distance, shape, roughness, and thickness of different materials, such as varnish, coatings, rolled sheets, and lithiumion battery electrodes.

SUPERVIEW/MAGICVIEW DEEPVIEW/MICROVIEW/WIREVIEW

HIGH PERFORMANCE MULTIPOINT SENSOR HEADS

ChromaLine sensors provide exceptional precision and robustness, making them ideal for on-line control applications on MPLS™ controller.

With a maximum linear error of 0.04 µm, steep slope angle of +/- 88° and a 0.75 NA, these sensors offer high axial resolution. ChromaLine sensors are compatible with all MPLS™ versions. These advanced sensors provide reliable and durable control solutions for various industrial settings.

Benefits

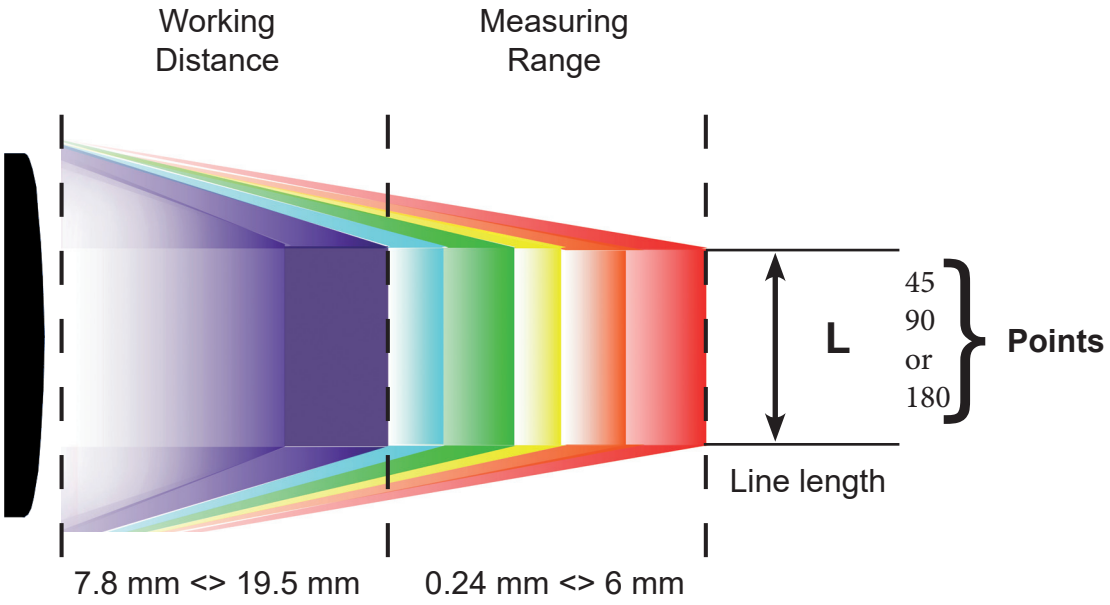
- Dedicated to industrial environment, independent from ambient light sub-micrometric accurency & nanometric resolution along Z optical axis
- High signal to noise ratio
- Works on a large set of materials, including black carbon, glass, colored or white ceramic & plastics, metal, rough or polished surface
- Wide choice of sensors
- Steep slope compatibility large Numerical Aperture (NA) up to 46° on specular surface as mirror, up to 88° on rough surfaces
- Coaxial (no shadow effect)
- « Speckle » interference free

Application **fields**

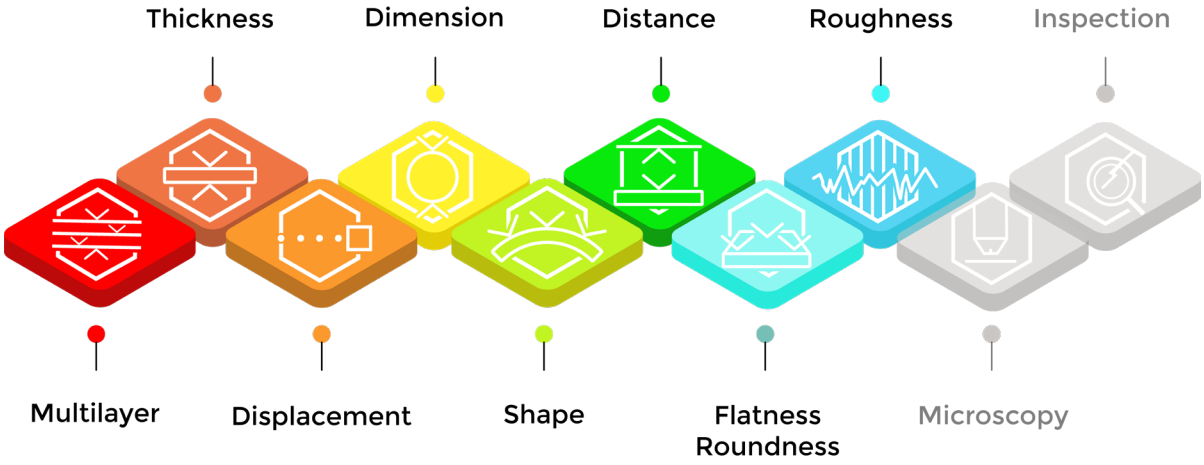
Designed for Metrology, Mechanics, Semiconductors, 3C, Glass, Automotive, Aerospace, Medical

Versions

- ChromaLine sensors™ are available in five versions: MicroView™, WireView™, DeepView™, SuperView™ and MagicView™
- All ChromaLine sensor heads™ are available with 45, 90 or 180 points of measure


Working Distance
Measuring Range
L
45
90
or
180
Points
Line length
7.8 mm <> 19.5 mm
0.24 mm <> 6 mm

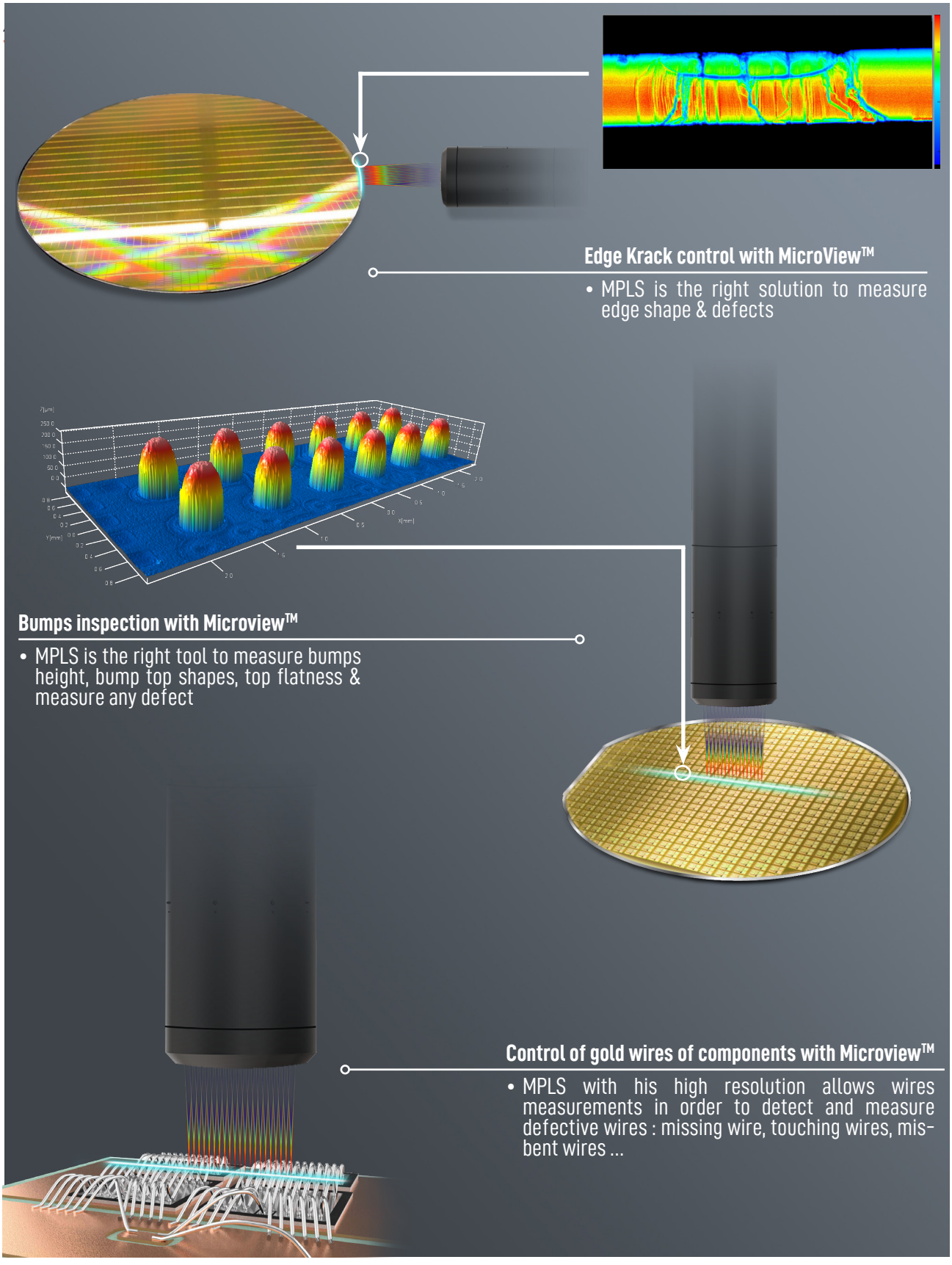
Perfect for


Thickness
Dimension
Distance
Roughness
Inspection
Multilayer
Displacement
Shape
Flatness
Roundness
Microscopy

Technical specifications

Product	Unit	WireView	MicroView	DeepView	SuperView	MagicView
Order Code MPLS-DM		**OPSTM710002**	**OPSTM706002**	**OPSTM707002**	**OPSTM711002**	**OPSTM712001**
Order Code 45 points		**O3PS1800451**	**O3PS1200451**	**O3PS0200451**	**O3PS1700451**	**O3PS2000451**
Order Code 90 points		**O3PS1800901**	**O3PS1200901**	**O3PS0200901**	**O3PS1700901**	**O3PS2000901**
Order Code 180 points		**O3PS1801801**	**O3PS1201801**	**O3PS0201801**	**O3PS1701801**	**O3PS2001801**
Line Length	mm	1.51	1.8	4.2	12.85	4.2
Measuring Range 2 kHz	mm	0.9	0.5	2.6	2	6
Measuring Range 4 kHz	mm	0.45	0.23	1.15	0.9	/
Measuring Range 6 kHz	mm	0.24	0.12	0.65	0.5	/
Working Distance	mm	7.8	10.1	19.5	11.3	13.4
Numerical Aperture		0.75	0.5	0.37	0.33	0.65
Max. Sample Slope	°	± 46	± 30	± 20	± 17	38
Pitch 45 pts	µm	34	40.4	94	287.2	96
Pitch 90 pts	µm	17	20.2	47	143.6	48
Pitch 180 pts	µm	8.5	10.1	23.5	71.8	24
Max. Linearity Error	µm	± 0.1	± 0.08	± 0.12	± 0.12	0.35
Static Noise	nm	150	100	300	300	400
Axial Resolution	µm	0.9	0.6	1.8	1.8	2.4
Spot Size	µm	3.2	3.8	8.8	27.2	9.2
Homogeneity	nm	200	125	400	400	0.7
Min. Measurable Thickness	µm	110	50	250	300	300
Length	mm	480.7	425.6	428.3	397.8	537.3
Diameter	mm	70	50	60	60	118
Weight	kg	2.2	1.6	2.8	2.55	7.2

Application examples



Edge Krack control with MicroView™

- MPLS is the right solution to measure edge shape & defects

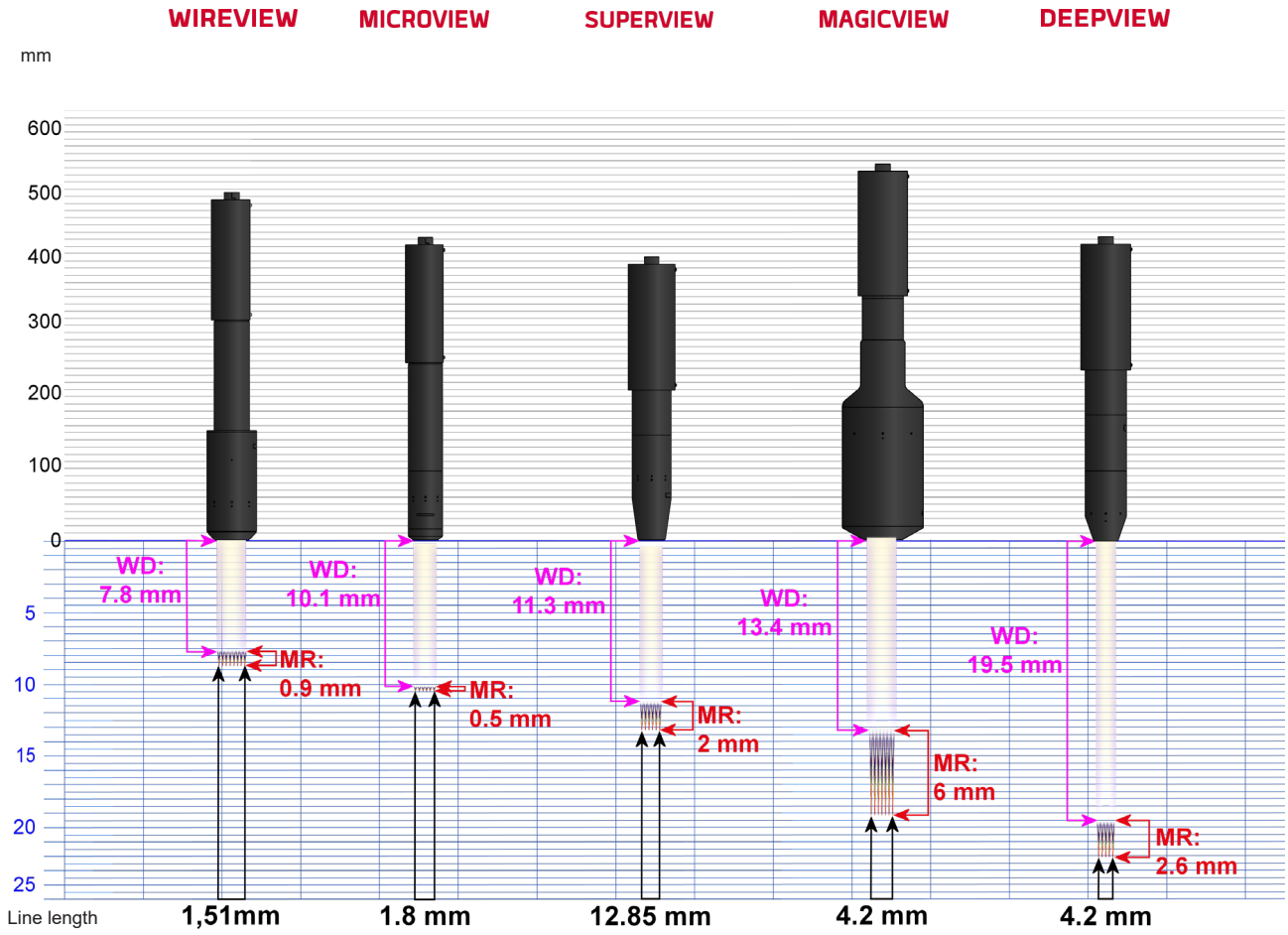
Bumps inspection with Microview™

- MPLS is the right tool to measure bumps height, bump top shapes, top flatness & measure any defect

Control of gold wires of components with Microview™

- MPLS with his high resolution allows wires measurements in order to detect and measure defective wires : missing wire, touching wires, mis-bent wires ...

Working Distance Length



Associated controllers

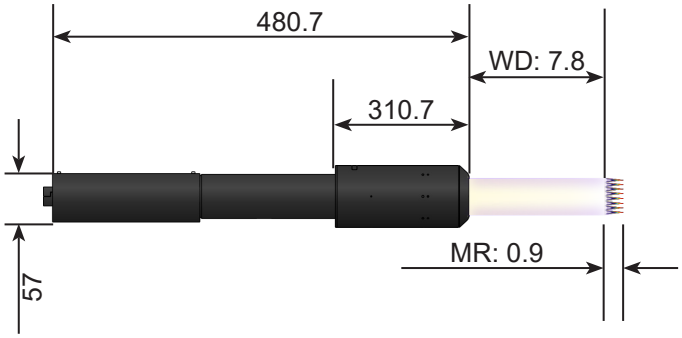
Model	Description	Order code
	MPLS-DM™ Chromatic confocal sensor - with 45 - 90 - 180 point sensor head - Ethernet & Trigger in/out Software Toolkit, 5 m Fibre Bundle	085T05M0004

Accessories

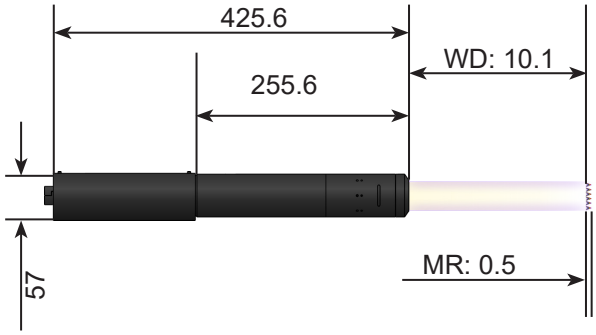
Model	Description	Order code
	Holder D50 for 50 mm Diameter probes (MicroView) Holder D60 for 60 mm Diameter probes (DeepView, Superview) Holder D70 for 70 mm Diameter probes (WireView) Holder D118 for 118 mm Diameter probes (MagicView)	015ST000005 015ST000006 015ST000010 015ST000037

Dimensions (mm)

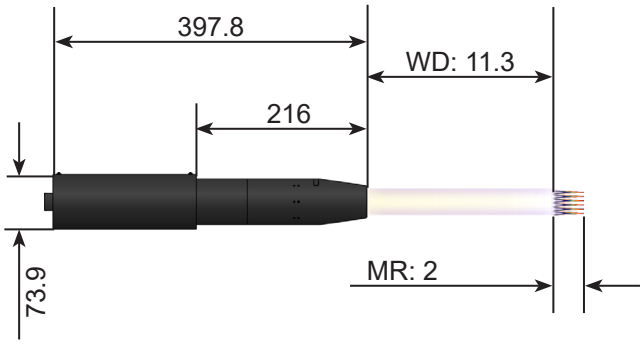
WIREVIEW™



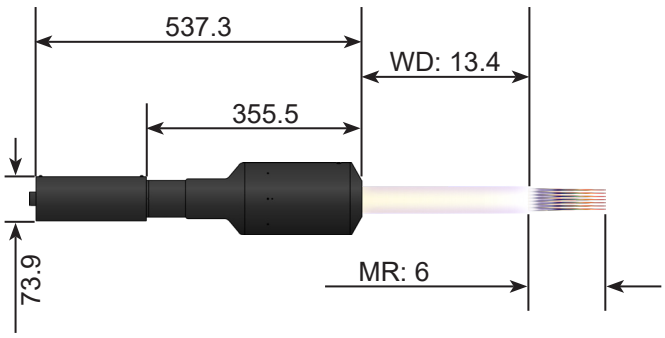
MICROVIEW™



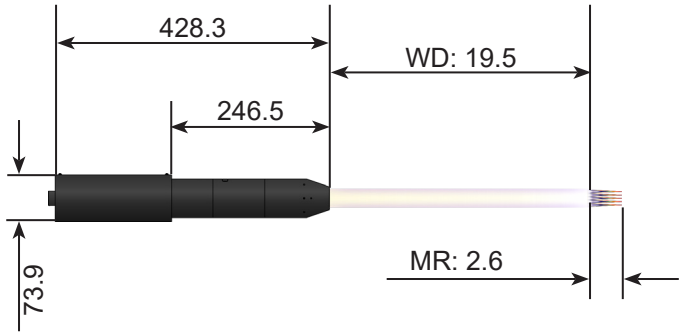
SUPERVIEW™



MAGICVIEW™



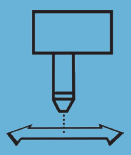
DEEPVIEW™



MARPOSS

MC2

CHROMATIC CONFOCAL CAMERA



ChromaVision Camera

MC2 Chromaline Camera is a line camera based on Chromatic Confocal technology. It delivers high resolution microscopic images with tremendous Field of View (FoV) lengths and 100x the Depth of Focus (DoF - also called Depth of Field) than same magnification microscopes. Such images can then be used to measure 2D features, to detect and measure defects.

MC2

The MC2 ChromaVision Camera is a game-changer for microscopy, quality inspection & 2D measurements in various industries. Based on Chromatic Confocal technology & optics, it offers 100x the Depth of Focus (DoF - also called Depth of Field) of similar microscopic magnifications, extended Field of View (FoV) with still high level lateral resolutions. Then, imaging with MC2 camera will require lower motion specifications and avoid auto-focus, saving valuable time.

MC2 line varies from 1.34 mm up to 12.5 mm and lateral resolution from 0.43 µm up to 4.1 µm.

This high speed 4K camera connectable with standard or private image treatment software is the ideal device for inline or near line quality controls for semiconductor wafers, consumer electronics and micromechanics components …

Benefits

- Industrial microscopy :
- Thanks to MC2 large Depth of Focus (DoF - also called Depth of Field), imaging will accept lower flatness specification of motion tables and limit the number focusing / auto-focus
- its large Field of View (FoV) will avoid stitching and stitching correction within a band, thus saving valuable acquisition time
- Up to ≈ 200 Klines /sec (199,000 lines/second exactly) with this high speed 4K line camera
- 2D pattern measurements : Microscopic 2D pattern measurements can be performed using any 3rd party available
- Software Microscopic Defect Detection can be performed in association to any 3rd party software available

Application fields

Modular Inspections for patterned and unpatterned wafers Broken pattern front and back ; Scratch, cracks, chipping or burrs on edges

Designed for multi applications as:

- Wafer dimensions 2D control
- Wafer warpage & Edge 2D inspection
- Bumps and micro-bumps inspection
- Micro-Channels for cooling fluid
- Solar wafer control & inspection
- Wire bonding inspection
- & many others (LED, CD, TSV, MEMS…)

Line lenght

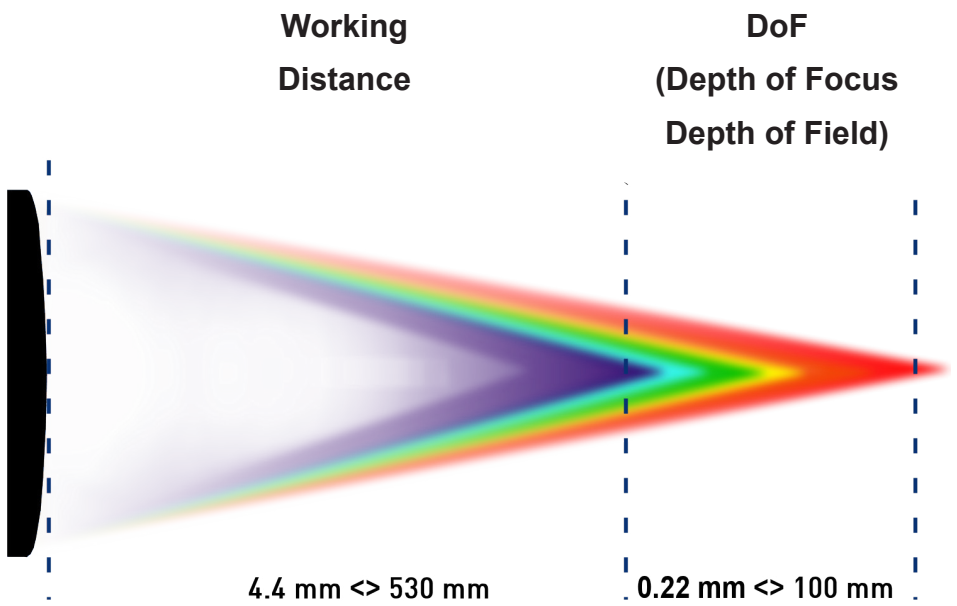
1.51 to 12.5 mm

DOF

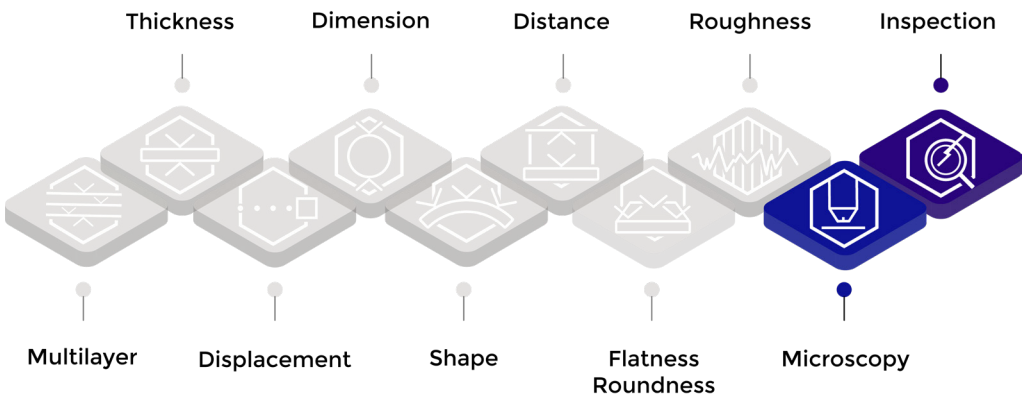
120 to 2600 µm

Resolution

0.49 to 4.1 µm



Perfect for



Technical specifications

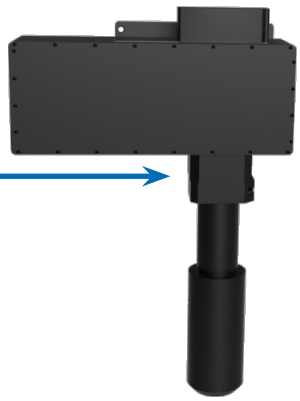
Controller		MC2
Technology		Chromatic Confocal line camera
Source		White LED in external box
Fiber bundle length		5 m
Temperature in use		0 to +65°C
Storage temperature		-30 to +70°C
Relative humidity		5 to 80% RH without condensation
Protection type		IP 20 (ChromaLight) IP50 (Body)
Line Detector	Camera	SW-4000M-PMCL
	Number of pixels	4096
	Number of used pixels	≈ 3100
	Pixel size	7.5 µm
	Line rate	Up to 199.5 kHz
	Control and data	Camera Link (x2)
	Power supply	5-24 VDC
	Power dissipation	5W
Chromalight (LED source)	Power Supply	100-240 VAC
	Maximum/Usual Consumption	100W / 60W
	Dimensions (mm)	235.5 x 184.2 x 255.5
	Weight	4 kg

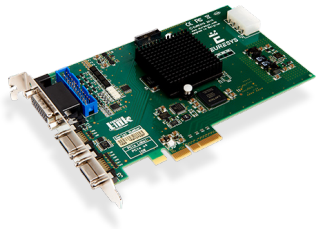
Product		WireView	MicroView	DeepView	SuperView
Order Code		**OPSTM708001**	**OPSTM704001**	**OPSTM706002**	**OPSTM709001**
Line Length	mm	1.51	1.8	4.2	12.85
Depth of Field	mm	0.9	0.5	2.6	2.0
Working Distance	mm	7.8	10.1	19.5	11.3
Magnification		15.6	12.9	5.6	1.8
Numerical Aperture		0.75	0.5	0.37	0.33
Max. Sample Slope	°	± 46	± 30	± 20	± 17
Pixel Size on the Sample	µm	0.49	0.58	1.35	4.1
Lenght	mm	468	412.8	408.5	378
Diameter	mm	70	50	60	60
Weight	kg	5.8	5.2	5.85	5.6

MC2 architecture

Combined camera and optical sensors adaptated to the frame grabber of choice

Camera JAI SW-4000 high performance





Frame grabber

Will suit the Image processing Softwares of your choice

Select a frame grabber
Coaxlink Quad CXP-12
Coaxlink Duo CPX-12
Coaxlink Octo
Coaxlink Quad G3 DF
Coaxlink Quad G3 LH
Coaxlink Quad 3D - LLE
Coaxlink Quad
Coaxlink Quad CXP - 3
Coaxlink Duo
Grablink Full
Grablink DualBase
Grablink Base
Grablink Value
Grablink Avenue
Grablink Express
Domino Melody
Domino Harmony

Compatible powerful Image processing Softwares

HALCON a product of MVTec

LabVIEW™

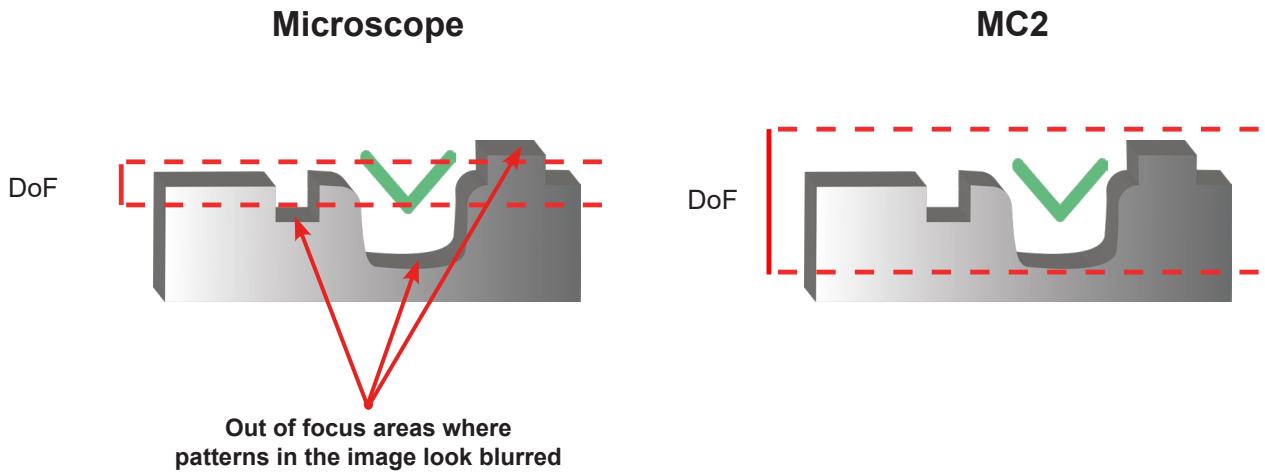
COGNEX VisionPro pc-based vision

AI STUDIO KONICA MINOLTA

Component selection

Brand	Model	Download	Supported frame grabber
Coaxlink Quad CXP-12	SW-4000M-PMCL	JAI_SW-4000-PMCL.ZIP	Grablink Duo, Grablink Full, Grablink Full XR

Permanent focus



Depth of Focus, also called Depth of Field or DoF, is defined as the distance (on Z-axis) where all points are well resolved so that image elements are distinguished, understandable & usable.
Anypoint within the surface and out of the the Dof appears blurred and out of the DoF appears blurred the DoF appears blurred.
MC2 offers 100x the DoF of a microscope for the same magnification maintaining same lateral (X-Y) resolution preventing any focus adjustement

Example turning insert cutter

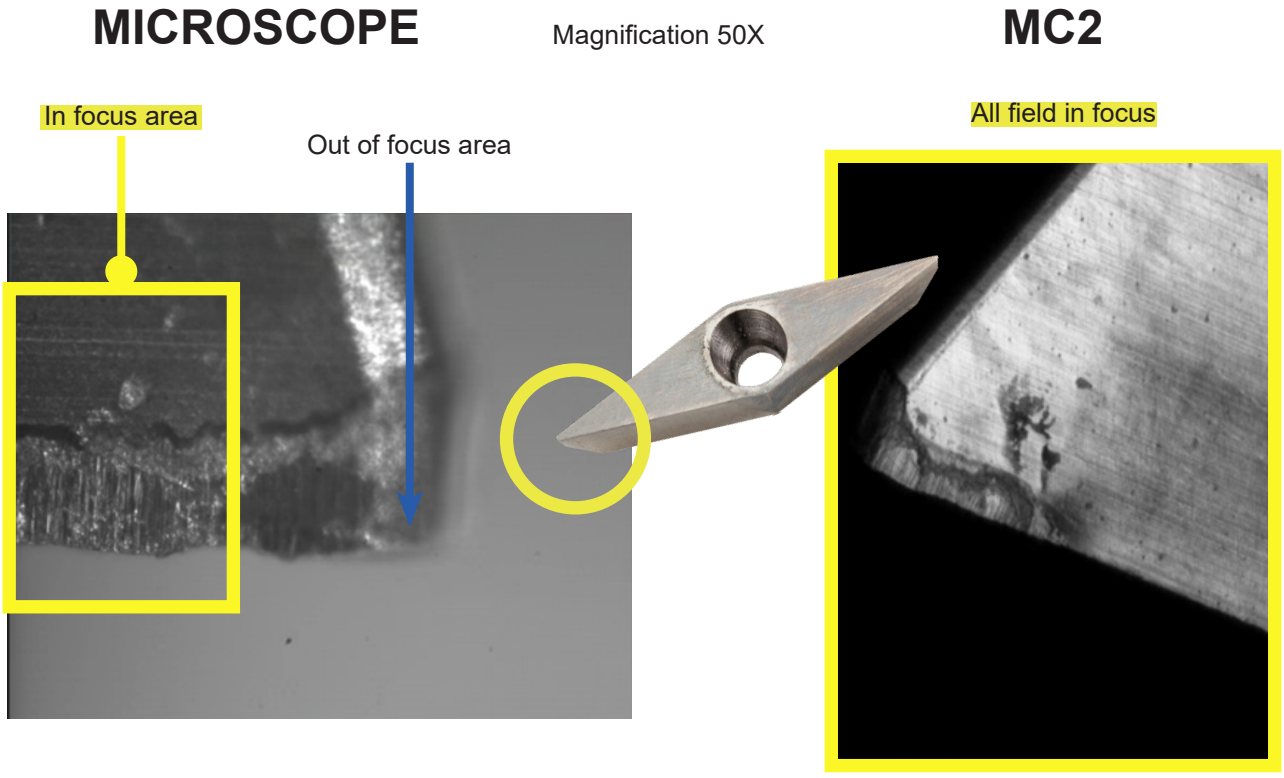


Image X-Y size (µm/mm) Resolution X-Y

Image X-Y size (µm/mm) Resolution X-Y

Application examples

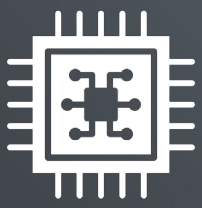
Micro-mechanics and medical

- Screws inspection
- Pipe, tubes ... defect detection
- Implants defect detection
- Lab-on-chip : pattern measurements & defect detection

Electrical Vehicles

Whatever the material : Si, SiC, III-V & II-VI, plastics, glass, ceramic, metallic ...

- Defect detections on patterned & Unpatterned wafers, front side, back side and wafer edges : scratches, cracks, chippings, burrs, layer mis-covering ...
- 2D Pattern dimension measurements for :
- Power & RF chips, MEMS, Microfluidics, integrated optics, solar cells ...
- Wafer level connections (Bumps, Pillars, TSV ...) & wire bonding ...



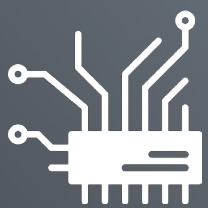
Semiconductor

Whatever the material : Si, SiC, III-V & II-VI, plastics, glass, ceramic, metallic ...

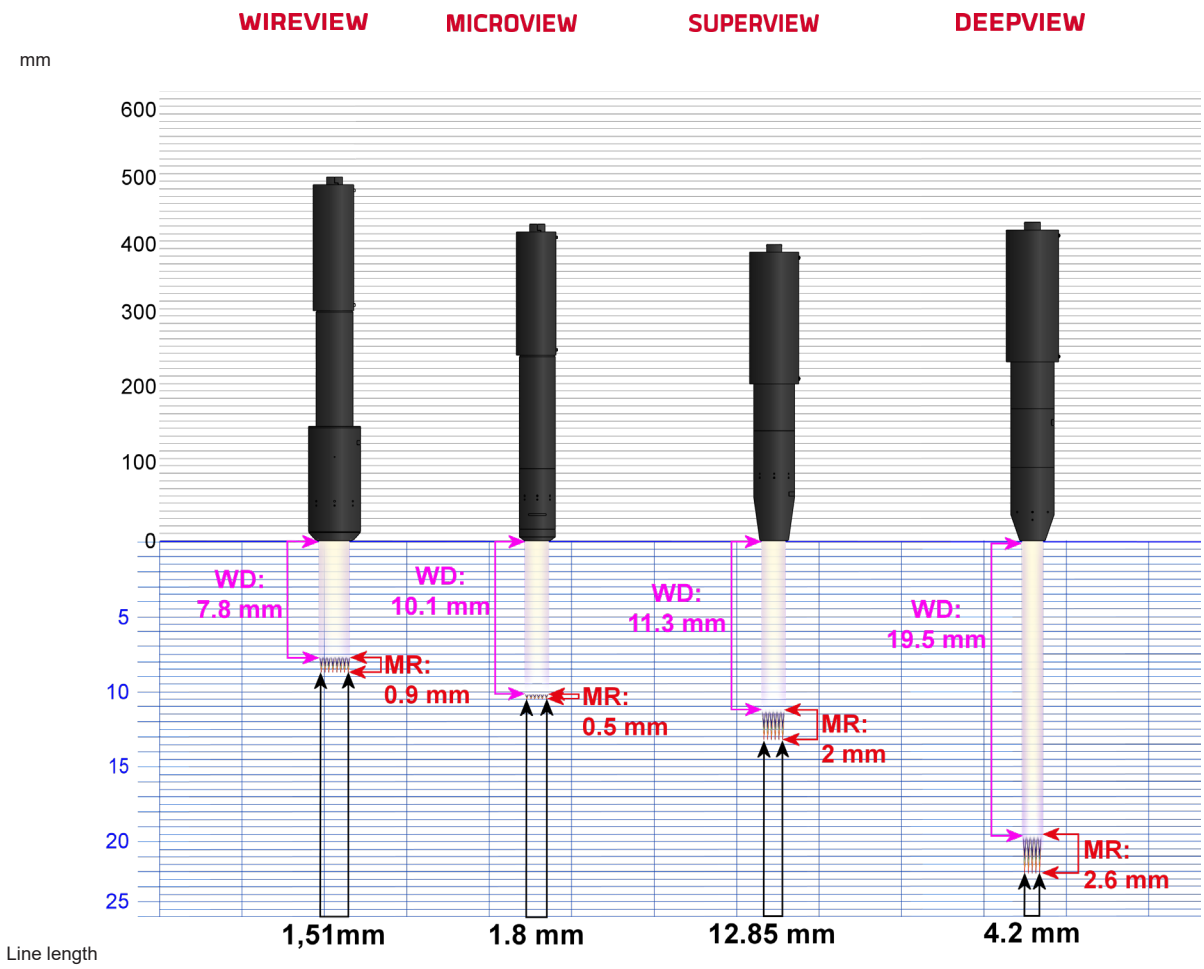
- Defect detections on patterned & Unpatterned wafers, front side, back side and wafer edges : scratches, cracks, chippings, burrs, layer mis-covering ...
- 2D Pattern dimension measurements for :
  - Power & RF chips, MEMS, Microfluidics, integrated optics, solar cells ...
  - Wafer level connections (Bumps, Pillars, TSV ...) & wire bonding ...

Consumer electronics

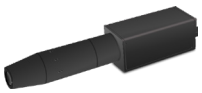
- Wire bonding : missing wire, cut wires, touching wires, welding points size ...
- Misplaced, or missing components on boards or in package
- Lines & vias : dimensions & defects
- Native corrosion
- Phone, tablets ... glass & glass edges inspection for defects & inclusions



DOF and line lenght

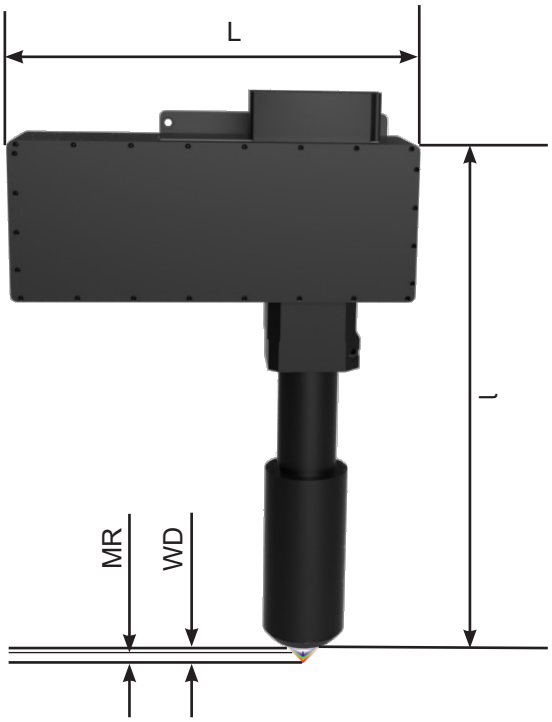


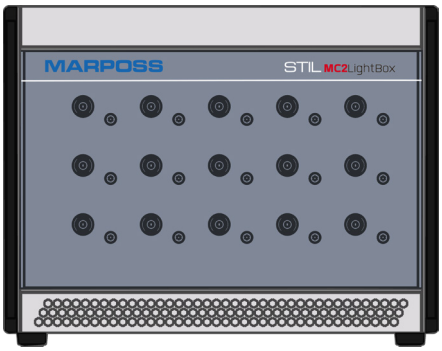
Associated sensor heads

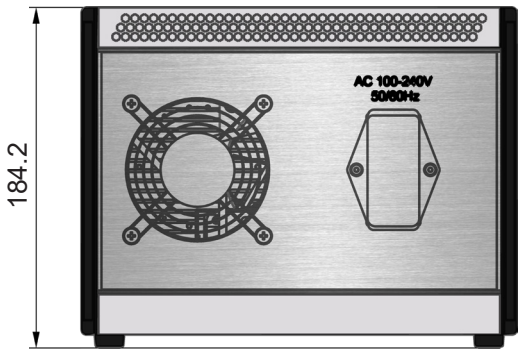
Model	Description
	MICROVIEW™ Chromatic Confocal Line Chromapoint - 1.79 mm Line Length with 3000 points - Sensor Head: DoF 0.5 mm - WD 10.1 mm - Camera-link Interface - lightbox not included, to be ordered separately
	DEEPVIEW™ Chromatic Confocal Chromapoint- 4.2 mm Line Length with 3000 points - Sensor Head: DoF 2.6 mm - WD 19.5 mm - Cameralink Interface - lightbox not included, to be ordered separately
	WIREVIEW™ Chromatic Confocal Line Chromapoint - 1.51 mm Line Length with 3000 points - Sensor Head: DoF 0.9 mm - WD 7.8 mm - Cameralink Interface - lightbox not included, to be ordered separately
	SUPERVIEW™ Sensor Head - Diam.: 60mm - MR: 2mm - WD: 11.3mm - 12.85mm line length with 180 points - Cameralink Interface - lightbox not included, to be ordered separately

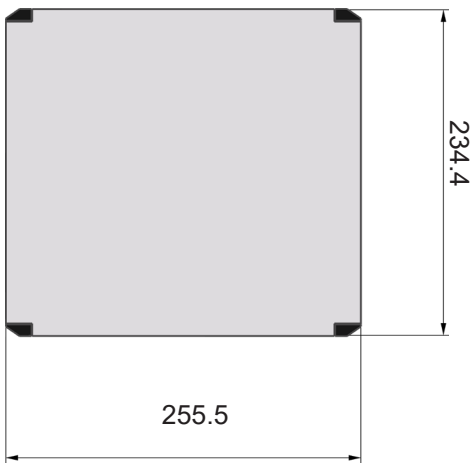
Dimensions (mm)

MC2™





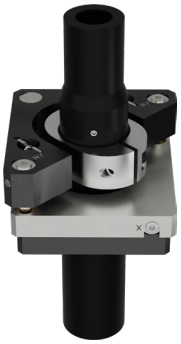




ALIGNMENT TOOL FOR R2R

Accessories

AMT stands for Alignment Tool. This is latest STIL ultra-stable coaxiality alignment tool for STIL confocal sensors dedicated to dark materials thickness measurements like Roll-to-Roll (R2R) applications. This innovative system ensure high-precision alignment and then measurements, making it ideal for the most demanding R2R applications.



AMT27

Our alignment tool employs a cutting-edge optical system that reduces installation and alignment errors of optical axes. This minimizes measurement inaccuracies caused by vibrations or tilts, providing ultra-precise and stable results. The AMT-27 tool is adaptable to the CL-MG series and the OP2400, making it versatile for a wide range of industrial applications and ensuring compatibility with existing systems.

The adjustable mounting adapter allows for perfect coaxiality adjustment of sensors for bilateral thickness measurements. The pre-mounted adapter plates enable quick and easy integration into your production setups, ensuring optimal performance and seamless compatibility with various configurations.

Benefits

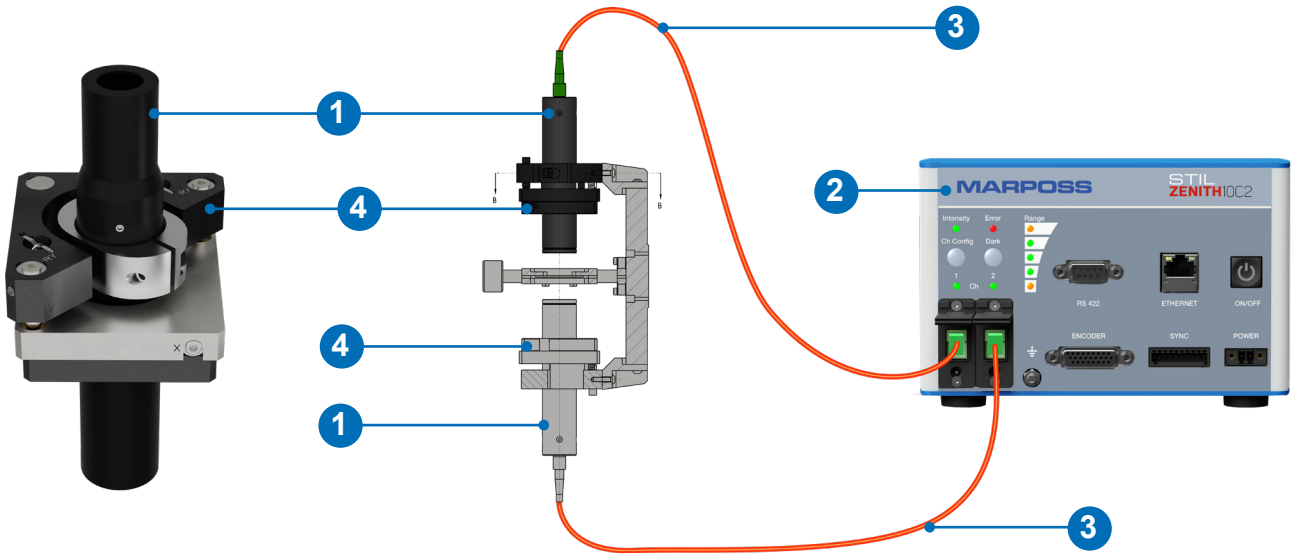
- Enhanced Precision: Innovative alignment technology eliminates installation errors, delivering more reliable results.
- Seamless Integration: Designed for easy integration into existing machines and processes, ensuring smooth operations.
- Environmental Resilience: Built to perform in sensitive environments, including cleanrooms and low-humidity areas.
- Optical Stability: Minimizes aberrations for consistent and reliable long-term performance.

Application fields

- STIL AMT sensor are specifically designed for Roll-to-Roll (R2R) applications where precise thickness measurements are crucial. Perfect for industries involving film or foil manufacturing, flexible printed circuits, laminated materials it optimizes continuous production processes, enhancing both efficiency and accuracy in your operations.

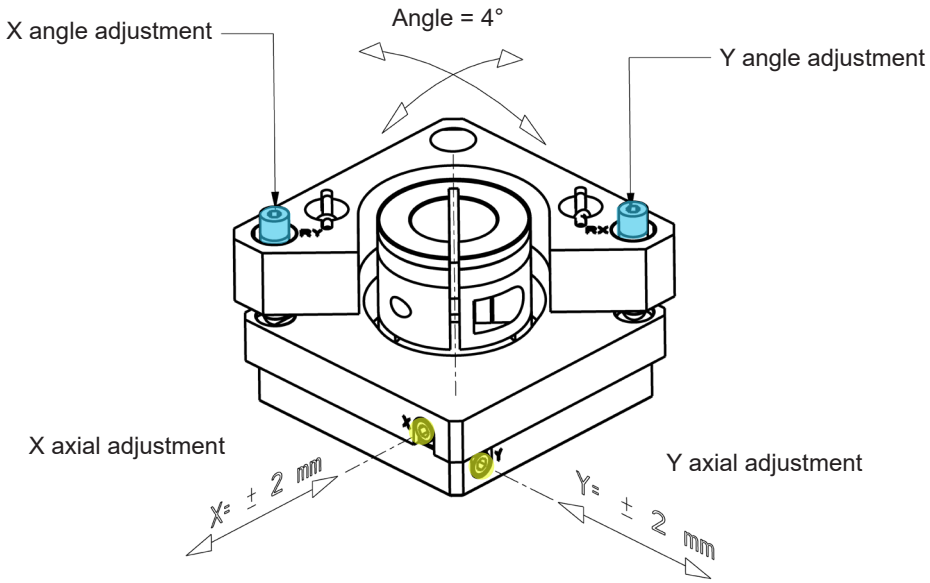
Technical specifications

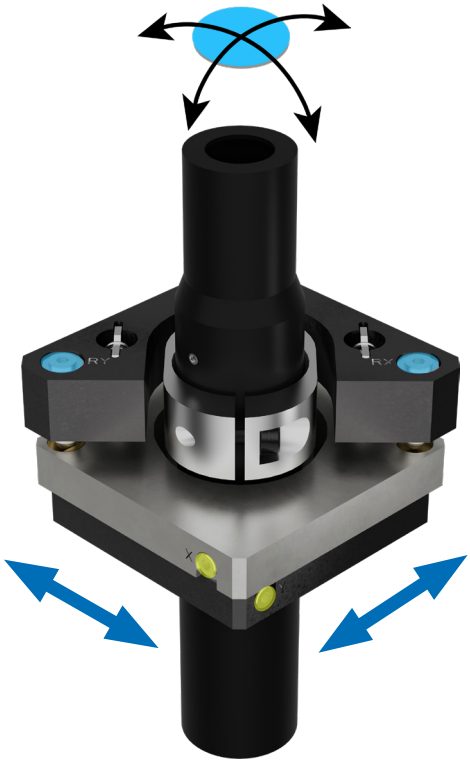
Model		AMT-27
Order code		**B3042442400**
Tilting Range	X	±4 ° (continuously adjustable)
	Y	±4 ° (continuously adjustable)
Shifting Range	X	±2 mm (continuously adjustable)
	Y	±2 mm (continuously adjustable)
Adjustment mode		Hexagonal wrench M2.5
Sensor model		Compatible with all Ø 27 mm diameter body sensors like CL-MG family & OP 2400

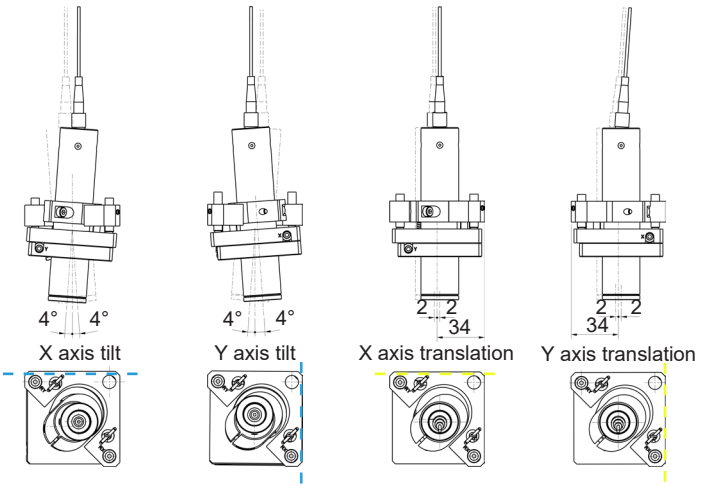


1. Sensor heads
2. Zenith controller
3. Optical fiber
4. Alignment tool AMT-27

Setup & adjustement



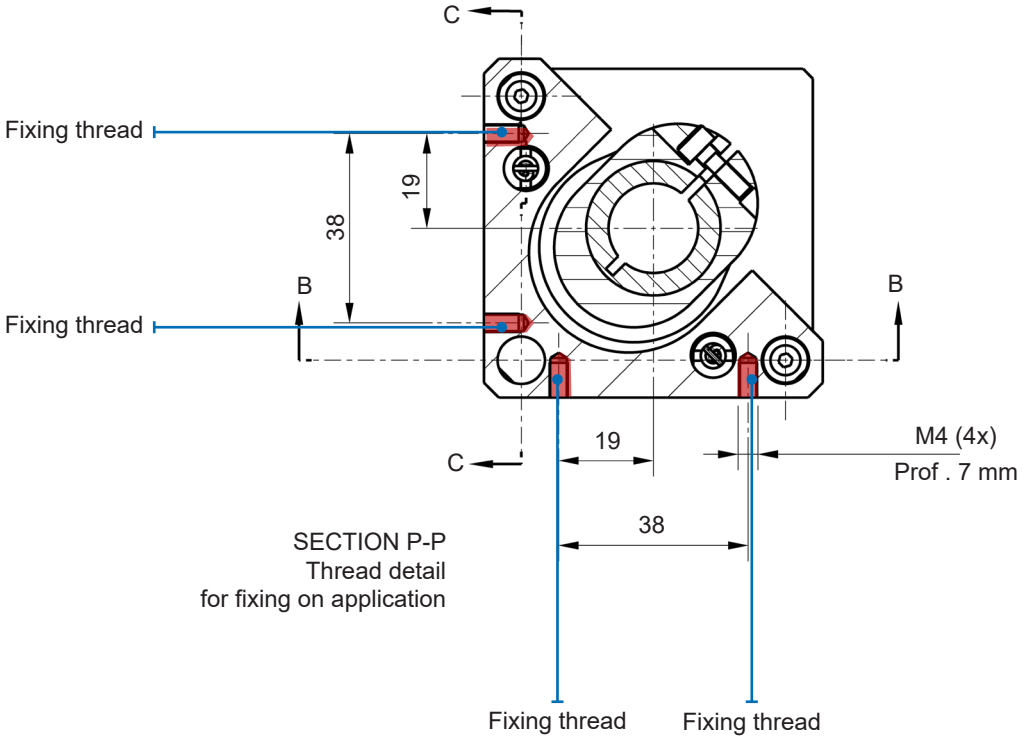


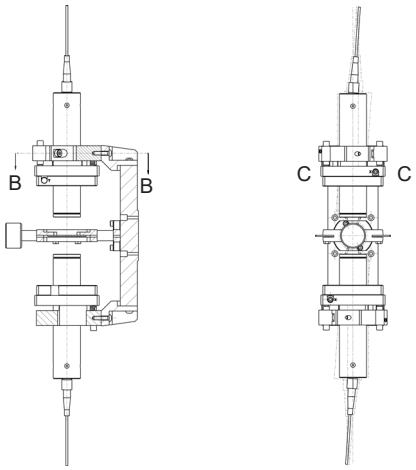


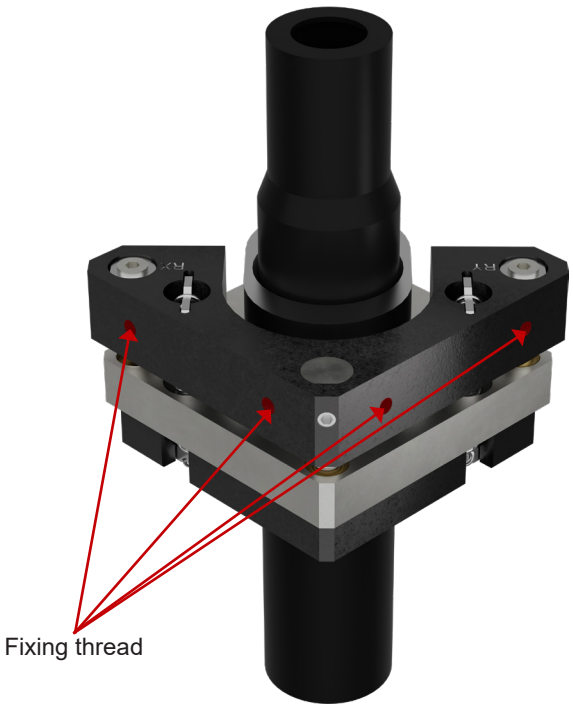
RX / RY tilting

X / Y translation

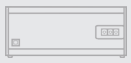
Application examples



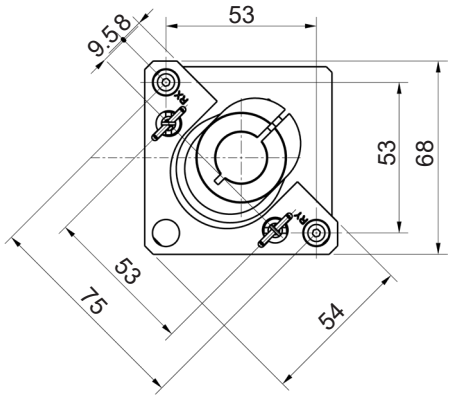


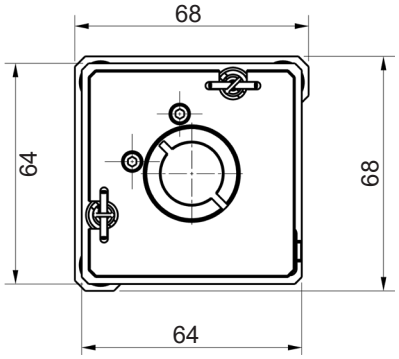


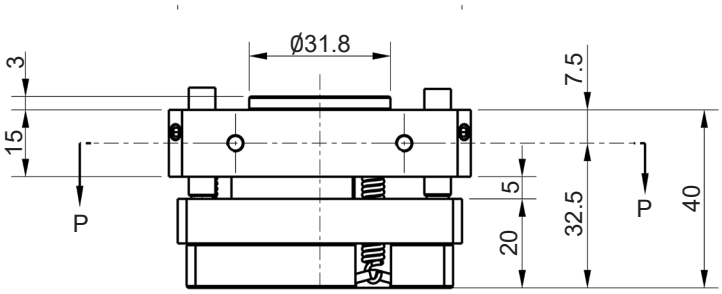
Fixing thread

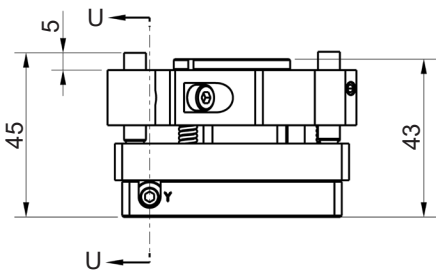


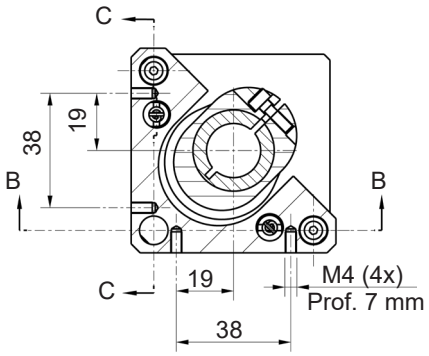
Dimensions (mm)











Thread detail
for fixing on application

Glossary

Specification	Explanation
Axial Resolution	The axial resolution is defined as the static noise obtained when using data averaging. Unless stated otherwise, the reported axial resolution values are based on an averaging of 10. Measurements are performed at optimal settings on a sample located at the center of the measuring range. mus
DoF Depth of Focus Depth of Field	DoF stands for Depth of Focus, also called Depth of Field. DoF defined as the distance along the optical axis within which all points in the Field of View are well defined or «in focus», so the points that are not blurred. MC2 DoF is 100 times (100x) larger than microscope ones for same magnification still offering larger Field of View.
Full Range	The Full Range is the maximum measuring range that is possible to consider, regardless of the performance
Field of View	Definition : «Field of view is the area of the sample visible in the whole picture. In microscopy, it's usually expressed in mm (inches) or µm (µinches).
Homogeneity	Homogeneity is the variation (RMS) of values measured by the 180 channels of a MPLS-DM sensor on a perfectly aligned plane. This feature is measured immediately after factory calibration and with optimal conditions & settings.
Lateral Resolution	Lateral Resolution is the 10%-90% transition distance observed when measuring an abrupt photometric change. The values are measured at the center of the measuring range. Lateral Resolution is the smallest distance between patterns in the picture that still allow distinction between patterns. It's limited by optical performances & diffraction limit. On MC2, Lateral Resolution is measured as the 10%-90%
Line Length	Length of the measurement line of a Chromaline sensor or of the inspection line of a Chromaline Camera. Length of the imaging line projected on the sample.
Magnification	Optical magnification is the ratio between the apparent size of an object in the depth of field of the sensor and its true size.
Max. Linearity Error	The Maximum Linearity Error is the max absolute error observed in the entire measuring range when comparing the distance measured by the sensor with sample position determined by a 1-nm accurate encoder. This parameter is measured with optimal settings immediately after calibration and is specified on the calibration certificate which is delivered with each sensor.
Max. Sample Slope	The maximum sample slope value is the maximum angle of measurement when focusing on specular surfaces (mirror-like). For scattering surfaces, the maximal slope angle is higher; however the intensity of the collected signal decreases with increasing slope angle for all types of samples.
Measuring Range	The measuring range is the distance between the first measurable point and the last one in the Depth of field. It depends on the controller model and on the calibration. The numerical values in the specification table are nominal values. In certain cases, it is possible to calibrate on a larger range with reduced performances (for details contact your vendor).
Min. Measurable Thickness	The minimal measurable thickness is the thinnest thickness which can be measured using the sensor. These are typical values considering a layer of glass, i.e. considering a refractive index n=1.51.
Numerical Aperture	The Numerical Aperture (NA) is a parameter of the range of angles over which the optical head can accept or emit light. The NA has no unit, no dimension.
Photometric Efficiency	The photometric efficiency is the amount of energy collected by different optical pens when measuring the same sample, in relative units. The numerical values in this table are typical. They are given as a guide for selecting the optical head.
Pitch (dist. between 2 points)	The pitch of a line sensor is the distance between the center of 2 consecutive points along the line.
Pixel Size on the Sample	Pixel size on the sample is determined from the pixel size on the camera and the magnification of the optical head.
Protective Window	The protective window is a glass plate that can be either located inside the optical pen, or fixed in the working distance. It protects the optical pen and can be easily replaced in case of damages.
Pixel size on sample	Definition : Pixel size is the projecton of camer pixel on the sample through the optical system. For high magnifications, it is different than Resolution that is then limited by diffraction limits.
Static Noise	The Static Noise is defined as the RMS noise level measured on a static sample. Measurement is performed at optimal settings on a sample located at the center of the measuring range. This parameter is measured immediately after calibration and is specified on the calibration certificate which is delivered with each sensor. This is possible to improve it using a data averaging.
Working Distance	The working distance is the distance between the optical pen and the beginning of the measuring range. The numerical values in the specification tables are nominal values. The working distance depends on the calibration, the real value can differ by a few percent from the nominal value.

Taking notes