CHROMATIC CONFOCAL REFERENCE GUIDE

MARPOSS

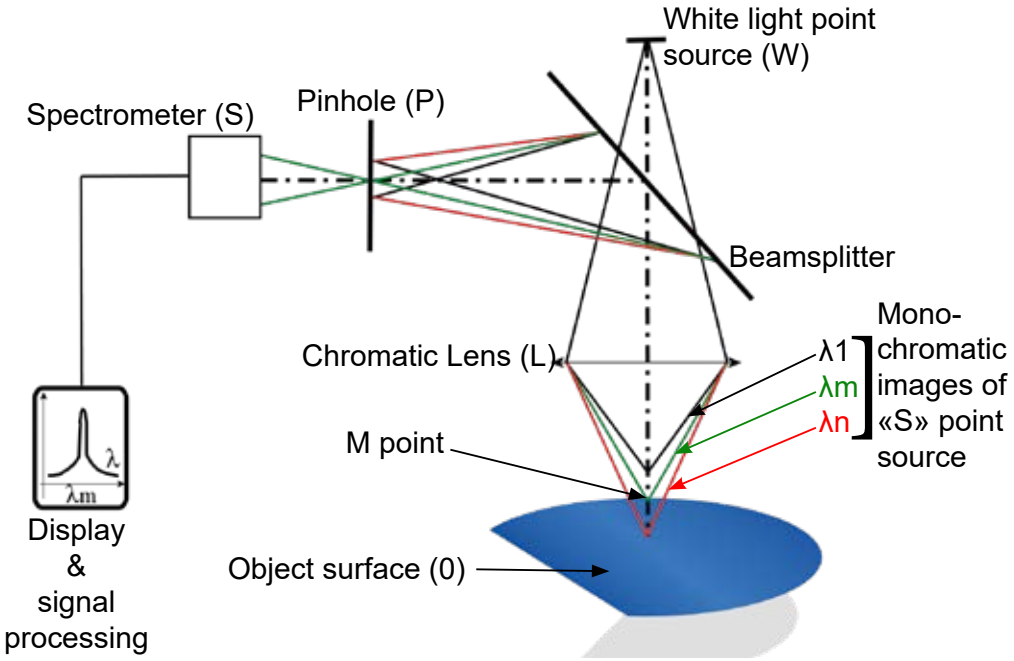
STIL

INDEX

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.



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 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 backscattered beam passes through a filtering pinhole in a spectrograph, which determines the wavelength that was perfectly focused on the object.

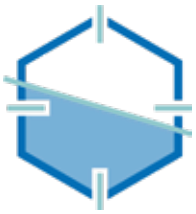
perfectly focused on the object, and then accurately determines its position in the measurement field.

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

Works on every material, any reflectivity simultaneously

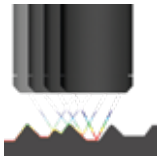
Coaxial optical beam

Easy industrial integration / Plug&Play sensor

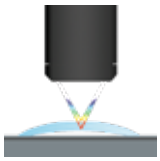


High slope detection & measurement

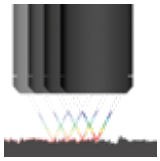
MEASUREMENTS



DISTANCE



THICKNESS



ROUGHNESS

IN PROCESS INSPECTION

BENEFITS

ALL MATERIALS

HIGH RESOLUTION UP TO 3 nm

FAST RESULT 100 kHZ (MC2) 10 Khz (OPTI-MA+)

SLOPE AN-GLE ± 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

FOR ALL TYPES OF ENVIRONMENT

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

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)

LARGE NUMERICAL APERTURE

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

EASY AND FLEXIBLE INTEGRATION

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

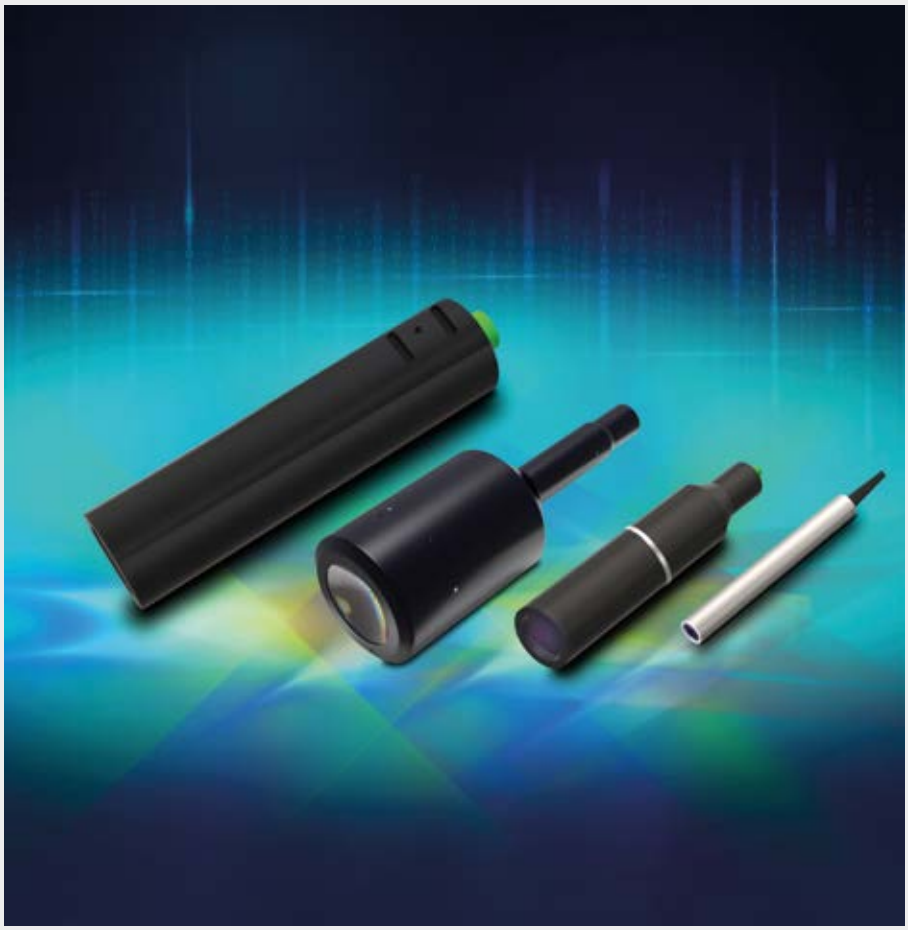
COAXIAL WITHOUT SHADOW EFFECT

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

COMPATIBILITY IN VACUUM CHAMBER

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

CHROMATIC CONFOCAL POINT SENSORS



ChromaPoint 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.

CL-MG

UNIVERSAL AND MODULAR

STIL's 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) 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 and even in specific environments such as vacuum chambers, radioactive environments or hot environments.

All CL-MG optical heads are available with options such as FOLD to measure at 90° radial beam, and are connected to STIL ChromaPoint controllers Prima™, Optima+™, Zenith™, Lightmaster™, or Irix™ to measure solutions in multiple application contexts and on any type of surface reflectivity: transparent or opaque, 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 a large set of materials, including black carbon, glass, colored or white ceramic & plastics, rough or
- polished metal
- Wide choice of measuring ranges
- Steep slope compatibility thanks to Large Numerical Aperture (NA)
- Coaxial (no shadow effect)
- « Speckle » free

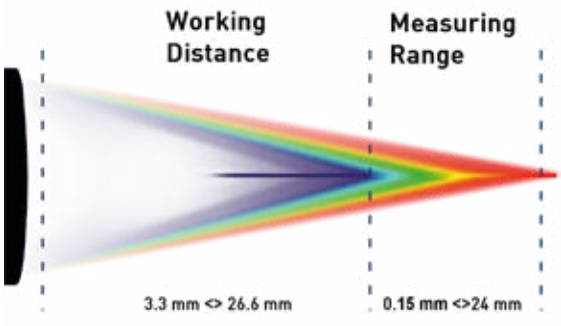
Application **fields**

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

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

Versions

- CL-MG series is available in six versions with a measuring range from 150 µm to 24 mm
- They are composed of six different types of magnifying glasses
- For specific applications such as compatibility with vacuum chambers or hot environments, each CL-MG probe is customized
- CL-MG optical heads are compatible with all STIL ChromaPoint controllers such as Prima™, Optima+™, Zenith™, Lightmaster™, or Irix™ via a fiber optic connection



Versatile

Adapted to any type of surface

Industrial

Works in any environment

Approved

+15K sensor heads sold worldwide

Model	Unit	CL1-MG420	CL1-MG210	CL1-MG140	CL2-MG210	CL2-MG140	CL2-MG70	CL3-MG140
Order Code		**03PS0114201**	**03PS0112101**	**03PS0111401**	**03PS0122102**	**03PS0121402**	**03PS0127002**	**03PS01314011**
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		**03PS0137002**	**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

ENDO

MINIATURE

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 beam of 90°, ENDO series is ideal for non-contact measurement applications in reduced 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

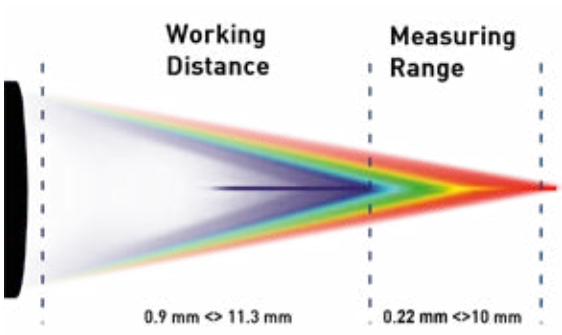
- Suitable for small space/volume applications
- Light weight: from 3.5 g
- Ideal to be integrated in the robot arm
- Axial or radial beam
- High signal to noise ratio
- Adaptable to surface conditions
- Works on a large set of materials, including black carbon, glass, colored or white ceramic & plastics, rough or polished metal
- Coaxial (no shadow effect)

Application **fields**

ENDO optical heads are typically used in large quantities for simultaneous measurement of roundness, flatness and defect inspection

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 Prima™, Optima+™, Zenith™, Lightmaster™, or Irix™



Versatile

Adapted to any type of surface

Industrial

Works in any environment

Approved

+15K sensor heads sold worldwide

Model	Unit	ENDO 0.2/D8	ENDO 0.3/D6	ENDO 0.3/D6 R	ENDO 1/D4-R	ENDO 1.2/D6	ENDO 1.5/D6-R	ENDO 1.2/D8	ENDO 10/D8	ENDO 10/D8-R
Order Code		03PS0382002	03PS0361001	03PS0362001	03PS0341002	03PS0361002	03PS0362501	03PS0386001	03PS0388001	03PS0388501
Measuring Range	mm	0.22	0.3	0.3	1	1.2	1.5	1.2	10	10
Working Distance	mm	4.8	1.3	0.9	1	2.3	0.9	3.5	11.3	8.4
Numerical Aperture		0.39	0.42	0.3	0.16	0.22	0.19	0.36	0.1	0.1
Max. Slope Angle	°	±21.5	±21	±15	±7.5	±13	±10	±19.5	±4.5	±4.5
Axial or Radial model		Axial		Radial		Axial	Radial	Axial		Radial
Max. Linearity Error*	µm	±0.04	±0.038	±0.06	±0.15	±0.14	±0.15	±0.06	±0.45	±0.45
Static Noise*	nm	15	15	24	60	90	95	35	300	300
Axial resolution (Averaginng 10)*	nm	5	5	8	20	30	31.67	11.67	100	100
Lateral Resolution	µm	2.5	3.8	2.5	6.5	7.5	10	3.4	17	17
Spot Size	µm	4.6	6.4	5	13.2	15	19.5	6.8	31	31
Photometric Efficiency		16	19	5	10	46	29	19	36	24
Min. Measurable Thickness	µm	25	20	50	300	140	200	60	500	500
Length	mm	102	70	87.3	64	75.2	87.3	74	102	108.7
Diameter	mm	8	6	6	4	6	6	8	8	8
Weight	g	20	12	13	3.5	10	13	16	23	23

* With zenith Controller

OP

LONG WORKING DISTANCE

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

The performance and specifications are dedicated to various applications in the industry.

OP series is designed according to specifications dedicated to identified applications.

Its robot arm is compatible with a long working distance and an extended measuring range.

More than 10 references are optimized in terms of photometric efficiency, working distance and slope angle acceptance to measure non-contact roughness, multi-layer thickness or curved surfaces.

It is also ideal for specific applications dedicated to in-line signal acquisition such as thickness measurement of dark bottles.

Benefits

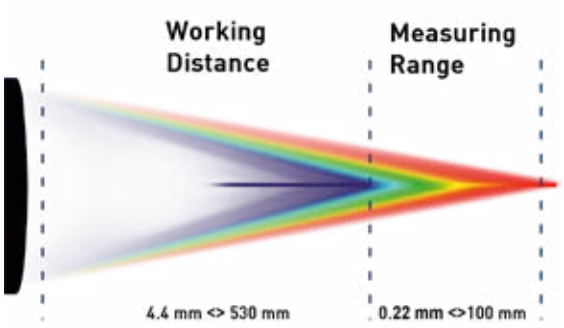
- Exceptional working distance up to more than half a meter
- Ideal for implementing a specific optical path while respecting mechanical constraints
- Dedicated to industrial environment, independent from ambient light
- High axial resolution: from nanometer scale (nm)
- High photometric efficiency
- High signal to noise ratio
- Works on a large 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, autofocus, OP series fits a wide range of applications.
OP series is the ideal compromise between flexibility, mechanical and optical constraints, with performance.

Versions

- OP series is available in more than ten versions as standard. 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 Prima™, Optima+™, Zenith™, Lightmaster™, or Irix™



Versatile

Adapted to any type of surface

Industrial

Works in any environment

Accuracy

Accuracy and repeatability of measurement

Model	Unit	OP 300VM	OP300-VM-R	OP 1 000	OP 6 000	OP 8 000	OP 10 000
Order Code		**03PS1400001**	**03PS1400002**	**03PS1400003**	**03PS1400004**	**03PS1400005**	**03PS1400006**
Measuring Range	mm	0.22	0.22	1	6	8	10
Working Distance	mm	5	4.4	23.9	28	39	66.9
Numerical Aperture		0.5	0.5	0.45	0.39	0.295	0.2
Max. Slope Angle	°	±25	±25	±24	±22	±16	±11
Axial or Radial model		Axial	Radial	Axial			
Max. Linearity Error*	µm	±0.04	±0.04	±0.15	±0.3	±0.35	±0.51
Static Noise*	nm	12	12	30	100	160	280
Axial resolution (Averaging 10)*	nm	4	4	10	33.333	53.333	93.333
Lateral Resolution	µm	3.2	3.2	2.2	6.25	16.5	25
Spot Size	µm	6.4	6.4	4.4	12.5	33	50
Photometric Efficiency		34	24	15	43	145	156
Min. Measurable Thickness	µm	25	25	25	200	300	425
Length	mm	127	128	254.1	205.5	139	189
Diameter	mm	15	15	50	60	40	50
Weight	g	27	39	753	760	365	525

Product	Unit	OP 10 000-R	OP 12 000	OP 30 000	OP 35 000	OP 42 000	OP 100 000
Order Code		**03PS1400007**	**03PS1400010**	**03PS1400008**	**03PS1400011**	**03PS1400012**	**03PS1400014**
Measuring Range	mm	10	12	30	35	42	100
Working Distance	mm	66.9	46	220	62	530	451
Numerical Aperture		0.2	0.25	0.095	0.33	0.052	0.08
Max. Slope Angle	°	± 11	± 14	± 5	±17	±2.5	±5
Axial or Folded Model		90° folded	Axial				
Max. Linearity Error*	µm	± 0.51	± 0.4	± 1.5	±1.65	±30	±16
Static Noise*	nm	280	225	750	600	6000	5000
Axial resolution (Averaginng 10)*	nm	93.333	75	250	200	2000	1666.667
Lateral Resolution	µm	25	14	48	13	53	55
Spot Size	µm	50	32.5	96	26	106	110
Photometric Efficiency		138	100	117	30	90	>150
Min. Measurable Thickness	µm	425	550	2000	1200	2500	2500
Length	mm	152	58.3	168	300.3	327	348.9
Diameter	mm	50	36	59	80	85	120
Weight	g	674	130	405	2200	1700	4200

*With zenith Controller

EVEREST

HIGH PERFORMANCE

Born from the last STIL innovation, EVEREST™ chromatic confocal sensor head contains 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 slope angle of +/-44° on specular sample up to +/-88° on diffusing surfaces.

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

Benefits

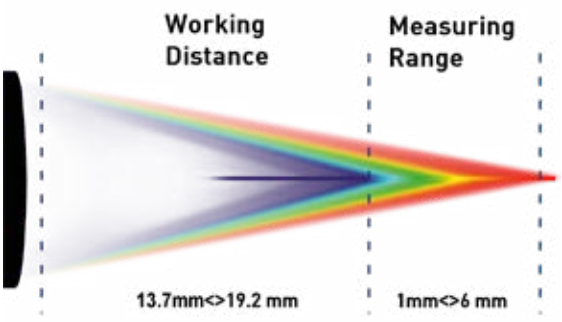
- Dedicated to the industrial environment, independent of ambient light
- Maximum slope angle +/- 44° (mirror) +/- 88° (rought surfaces)
- Suitable for use in a wide range of applications
- High axial resolution: from nanometer scale (nm)
- High lateral resolution: from micrometer scale (µm)
- High signal to noise ratio
- Works on a large 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 angle

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 Prima™, Optima+™, Zenith™, Lightmaster™, or Irix™ via a fiber optic connection



Slope Angle	Accuracy	Measures
Up to ± 88°	Up to ± 0.075 µm	High performance

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

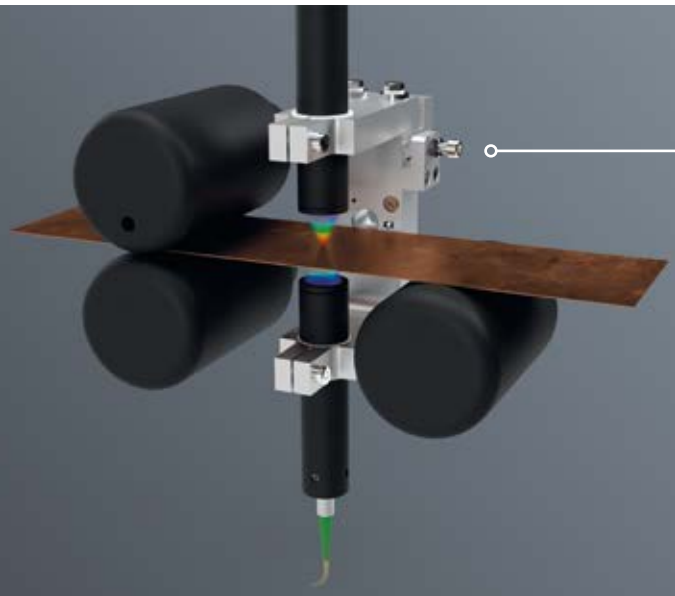
Accessories

Coupled with CHROMAPOINT set-up, some mechanical options are available in standard or in custom such as :

Fold*	Holder	Feedthrough	Din support
			
90° folding mirror for modular Chromatic (CL-MG only)	Holder dedicated to each reference of Optical pen, from 8 to 82 mm	2xFC/APC bulkhead connection for Vacuum Chamber Compatibility	DIN support for Prima, Optima+ and Zenith controllers

*Must be ordered with associated CL-MG

Application examples

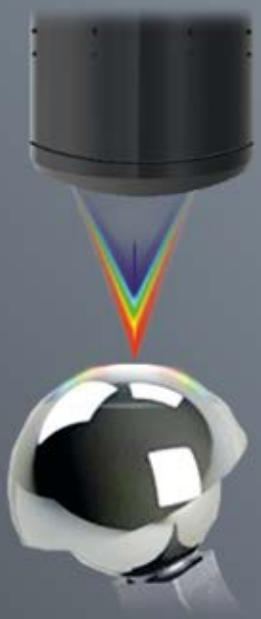


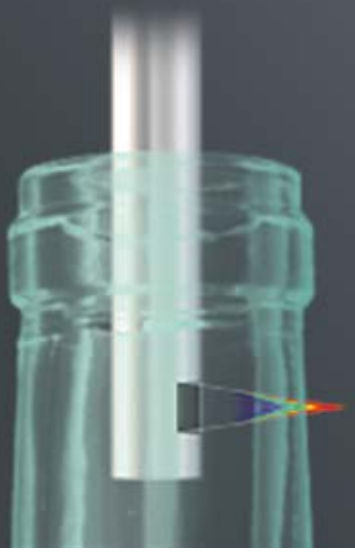
Thickness with R2R technology

R2R applications allow continuous measurement of material thickness on long rolls. Key characteristics include precise and non-contact measurement of layer thickness, with a measurement capability starting at 5 µm. Examples of R2R applications include thickness measurement of lithium-ion battery electrodes, metallic laminated films, rubbery or reflective materials, and more.

Hip prosthesis roughness measurement with EVEREST

The EVEREST K1 and K2 sensors are the perfect tool for roughness measurement and inspection in the bio-medical tech industry. With its sub-nanometric resolution, the EVEREST K2 is capable of measuring the surface roughness of medical implants, prosthetics, and other medical devices with extreme accuracy compatible with ISO Norm 25178-602.. Its non-contact design makes it ideal for delicate surfaces, and its compatibility with various materials makes it a versatile tool for the industry.





Glass thickness measurement with Endo

Endoscopic optical head from 4 mm diameter accuracy in micrometric scale.

CHROMATIC CONFOCAL CONTROLLERS FOR POINT SENSORS

ChromaPoint Controllers

Controllers are used in association with STIL sensor heads to measure distances. Several versions are available among digital outputs from single and up to 48 Channels.

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 5 to 10 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 ZENITH 2 offers two simultaneous 5 kHz channels for high performance on R2R applications.

PRIMA

offer best price/performance rates. For OEM integration, PRIMA is available in boxless version

OPTIMA+

OPTIMA + is high speed controller (10 kHz)

ZENITH
ZENITH2

ZENITH is the new high performance non contact measurement

ZENITH 2 offers two simultaneous synchronized channels at 5 kHz

IRIX

IRIX is the universal and versatile controller with an integrated 7” display unit

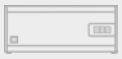
Benefits

- Chromatic confocal technology can measure any material capable of reflecting white light (e.g. metal, glass, plastic, 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 SDK and protocol commands for easy integration into any system
- Synchronized measurement with encoder for dynamic acquisitions
- Several interfaces for communication: Ethernet, USB, RS232/422, analog

Application **fields**

Non-contact measurement is suitable in all cases where it is necessary to measure without touching the target

Model	Prima	Optima+	Zenith	Zenith2	Irix
Order Code	**O8ST10M1001**	**O8ST09M2001**	**O8ST17M1003**	**O8ST17M1101**	**830K100050**
Technology	Chromatic Confocal				
Source	White LED				
Number of channel	1			2	1 or 2
Acquisition Frequency	Up to 2 kHz	Up to 10 kHz	Up to 5 kHz		Up to 2 kHz
Calibration table memory	Up to 20				Up to 32
Distance Measurement	First/Strongest peak		First/Second/Third/Fourth Last Strongest peak		First/Second/Third/ Fourth/Fifth/Sixth Peak
Thickness Measurement	2 Peaks				up to 6 Peaks
Advanced features	AutoLed/AutoDarkDoubleFrequency HoldLastValue...				AutoLed/SetExposureTime/ Encoder Trigger...
Digital Output	RS232, RS422 and USB		Ethernet (GigE) and RS422		Ethernet
Synchronization	1 TTL input and 1 TTL output		Trigger in (5V TTL or 5-24Vdc or encoder) & Trigger out (5V TTL)		
Other Input/Output	2 Analog output/encoder input (up to 3)		Up to 5 encoder inputs (differential TTL)		2 Analog outputs/ 3 encoder inputs
Fiber connection	E2000/APC				FC/APC
Temperature in use	+5 to + 50°C				+5 to +40°C
Storage temperature	+30 to +70°C				-20 to +70°C
Relative humidity	5 to 80% RH without condensation				
Protection type	IP 20		IP 40		
Compliance	EN 61326-1		-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)		EN 61326-1 ; EN 61010-1
Power Supplier	24 VDC				
Maximum/Usual Consumption	25W/8W	25W/9W	25W/10W		28W
Dimensions (mm)	162 x 138.1 x 111.5		169 x 110 x 88		236 x 155 x 132
Weight	1.2 kg		1 kg	1.2 kg	3.2 kg



LIGHTMASTER
LIGHTMASTER16

The LightMaster is a modular, multi-channel controller for chromatic confocal sensor heads, capable of 48 simultaneous measurements with 12 Lighslot modules featuring four channels each, all contained within a 19” 3U rack with a universal Ethernet GiGE interface. The LightMaster has a trigger input, Ethernet interface for easy integration, and can be easily mounted on a production line.
For those needing a more compact solution, the LightMaster16 offers one channel with 16 simultaneous measurements, four LightSlots modules with four channels each, a smaller size, and the same advanced capabilities as the LightMaster.
Overall, LightMaster series are powerful and flexible solutions for applications requiring accurate and efficient measurement tools.

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 target
- Input/output: Ethernet
- Universal: interchangeable STIL optical heads like CL-MG / OP / ENDO / EVEREST series
- Simultaneous up to 48 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**

Provide solutions in multiple application contexts and on any type of surface reflectivity, transparent or opaque, shiny or diffusive

Versions

- LIGHTMASTER are available in 2 versions : Standard with 48 channels max or Compact LIGHTMASTER 16 with 16 channels max
- Each LIGHTMASTER is modular, thanks to the 4 channels LIGHTSLOT in order to adapt the number of channel to the application
- LIGHTMASTER are available in 2 configurations : S - STANDARD speed 750 Hz or F - FAST speed 2 Khz

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 750 Hz	Up to 2000 Hz	Up to 750 Hz	Up to 2000 Hz
Calibration table memory	Up to 20	Half Nominal Measuring Range Up to 48 different optical sensor heads	Up to 20	Half Nominal Measuring Range Up to 48 different optical sensor heads
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 Supplier	100-240 VAC		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	

ADDITIONAL COMPONENTS TO BUILD AN APPLICATION

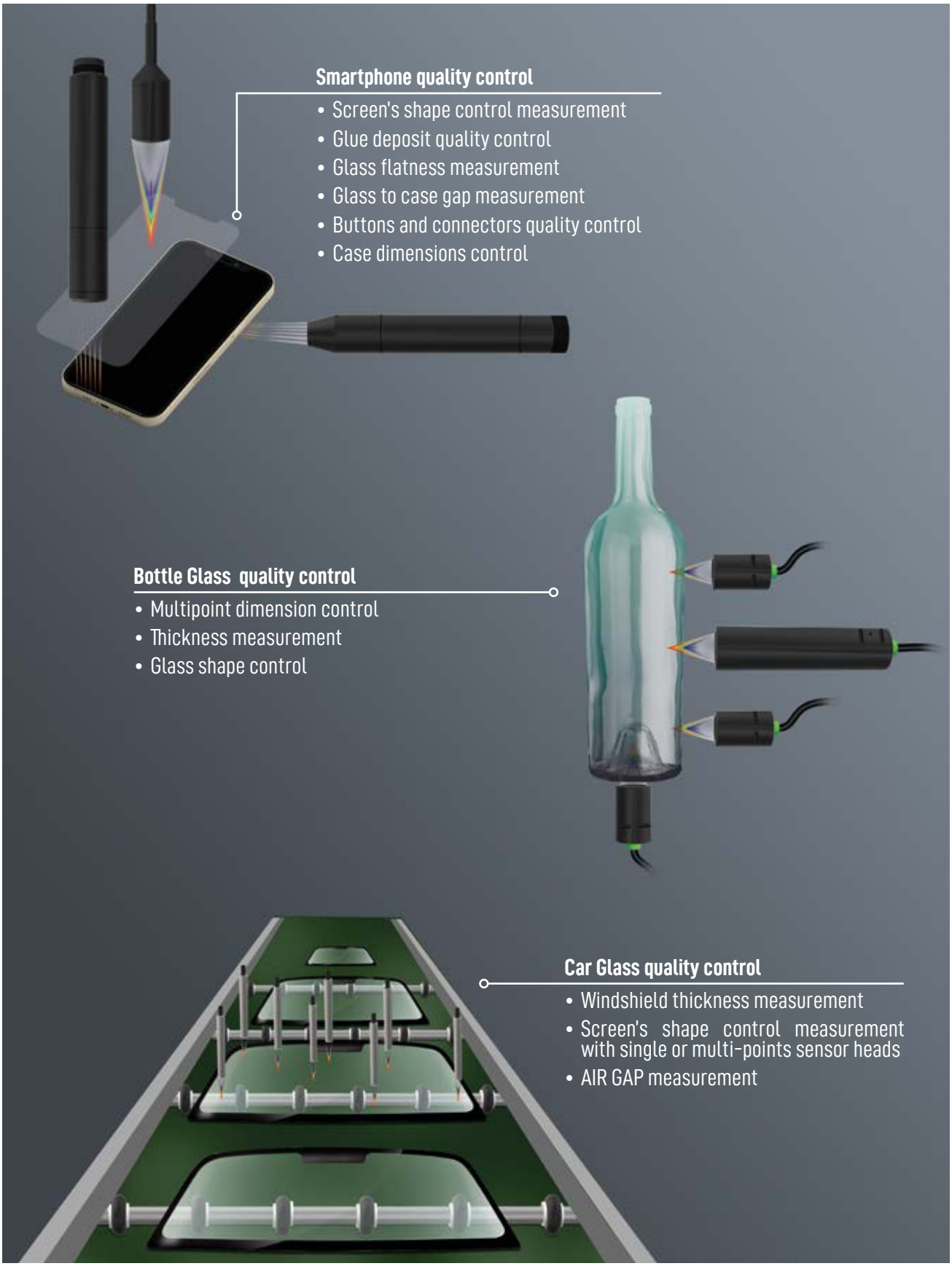
OPTICAL FIBER

- Standard cladding
- Stainless steel cladding
- Armored fiber

SENSOR HEAD

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

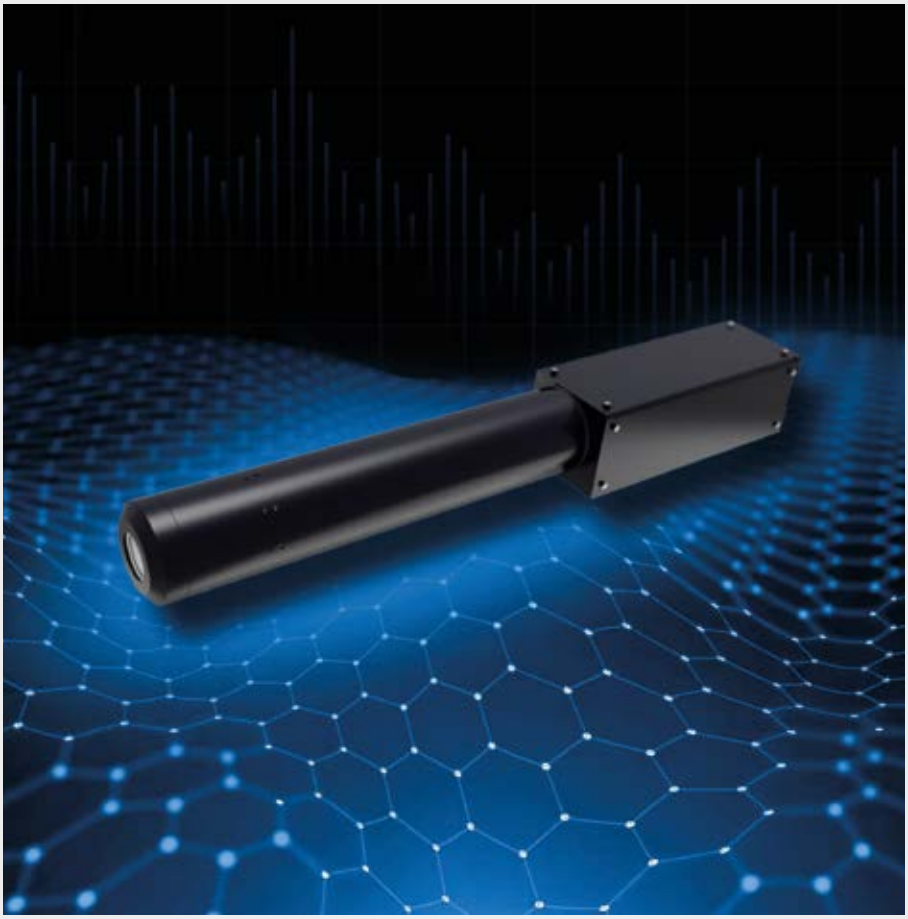
Application examples



MARPOSS

NANOVIEW / WIREVIEW / MICROVIEW / DEEPVIEW / SUPERVIEW / MAGICVIEW

CHROMATIC CONFOCAL LINE SENSORS



ChromaLine Sensor Heads

A wide range of sensors available in 6 line lenght versions with a choice of measurement points from 45 up to 180. These sensor heads are passive components compatible with industrial applications. It is possible to create a combination of several sensor heads associated with one single MPLS controller.

NANOVIEW / WIREVIEW MICROVIEW / DEEPVIEW SUPERVIEW / MAGICVIEW

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

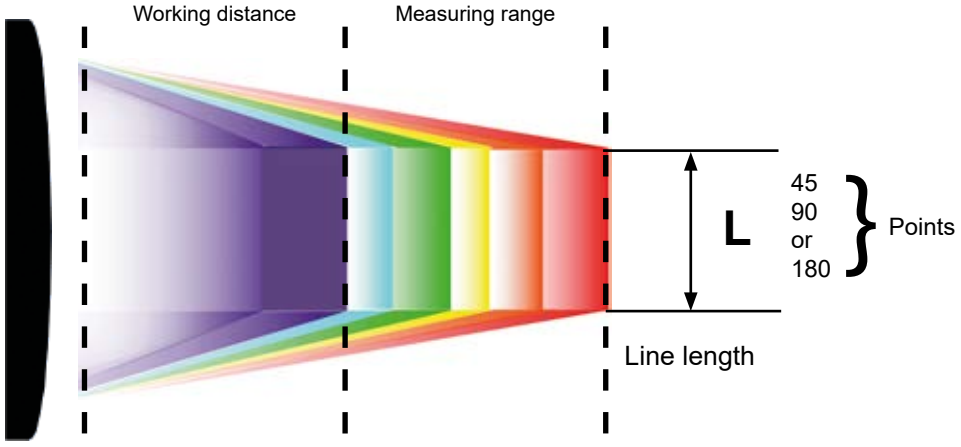
- Dedicated to industrial environment, independent from ambient light Sub-micrometric accurency & nanometric resolution along Z optical axis
- High signal to noise ratio
- Works on a large set of materials, including black carbon, glass, colored or white ceramic & plastics, rough or polished metal
- 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 six versions: NanoView, MicroView, WireView, DeepView, SuperView and MagicView
- All Chomaline sensor heads are available with 45, 90 or 180 points of measure



Product	Unit	NanoView	WireView	MicroView	DeepView	SuperView	MagicView
Order Code MPLS-DM		**OPSTM702001**	**OPSTM710002**	**OPSTM706002**	**OPSTM707002**	**OPSTM711002**	**OPSTM712001**
Order Code 45 points		**O3PS1300451**	**O3PS1800451**	**O3PS1200451**	**O3PS0200451**	**O3PS1700451**	**O3PS2000451**
Order Code 90 points		**O3PS1300901**	**O3PS1800901**	**O3PS1200901**	**O3PS0200901**	**O3PS1700901**	**O3PS2000901**
Order Code 180 points		**O3PS1301801**	**O3PS1801801**	**O3PS1201801**	**O3PS0201801**	**O3PS1701801**	**O3PS2001801**
Line Length	mm	1.34	1.51	1.8	4.2	12.85	4.2
Measuring Range 2 kHz	mm	0.1	0.9	0.5	2.6	2	6
Working Distance	mm	7.5	7.8	10.1	19.5	11.3	13.4
Numerical Aperture		0.75	0.75	0.5	0.37	0.33	0.65
Max. Sample Slope	°	± 40	± 46	± 30	± 20	± 17	38
Pitch 45 pts	µm	30	34	40.4	94	287.2	96
Pitch 90 pts	µm	15	17	20.2	47	143.6	48
Pitch 180 pts	µm	7.5	8.5	10.1	23.5	71.8	24
Max. Linearity Error	µm	± 0.05	± 0.1	± 0.08	± 0.12	± 0.12	0.35
Static Noise	nm	25	150	100	300	300	400
Axial Resolution	µm	0.15	0.9	0.6	1.8	1.8	2.4
Spot Size	µm	2.9	3.2	3.8	8.8	27.2	9.2
Homogeneity	nm	30	200	125	400	400	0.7
Min. Measurable Thickness	µm	18	110	50	250	300	300
Length	mm	434.4	480.7	425.6	428.3	397.8	537.3
Diameter	mm	50	70	50	60	60	118
Weight	kg	1.6	2.2	1.6	2.8	2.55	7.2

ACCESSORIES

Product	Order code	Characteristic
Holder D50	**015ST000005**	Holder D50 for 50 mm Diameter probes (MicroView, NanoView, MicroView)
Holder D60	**015ST000006**	Holder D60 for 60 mm Diameter probes (DeepView,Superview)
Holder D70	**015ST000010**	Holder D70 for 70 mm Diameter probes (WireView)

OPTICAL FIBER

Standard Fiber.
Plastic protection.
External Diameter 2.8 mm.
Minimum bending radius in :
Static Mode: 25 mm.
Dynamic Mode: 40 mm.

Armored Fiber.
High resistance to tension and pressure.
External Diameter 3 mm.
Minimum bending radius in :
Static Mode: 30 mm.
Dynamic Mode: 60 mm.

Metal Clad Cable.
Metal protection for difficult environments.
External Diameter 5mm 6 mm & 2 mm.
Minimum bending radius in :
Static Mode: 40 mm.
Dynamic Mode: 40 mm.

CALIBRATION

One Calibration Report is delivered per optical pen

TRUST METROLOGY

TAILOR-MADE

Thanks to our research & development department and our STIL application team, we are able to answer to each of your needs by offering you a tailor-made solution.
Our product offer is thus enriched with customized sensor head designs:

- Custom dimensions and specifications
- Compatibility and adaptability with any type of environment, including the most hostile (nuclear, explosive, vacuum
- atmosphere, high temperature, high pressure and more)
- Waterproof products

We ensure a complete follow-up by accompanying you from the first contact to the start-up and maintenance of your equipment.
We are committed to providing custom OEM solutions to best meet the requirements of our customers and their markets.

MARPOSS

MPLS

CHROMATIC CONFOCAL CONTROLLERS FOR LINE SENSORS

ChromaLine Controllers

Based on STIL's chromatic confocal technology, ChromaLine controller represents the next step in industrial integration with its multipoints technology with longer measuring lines. The MPLS controller masters application In-process measurement.

MPLS

Thanks to its accuracy, its robustness and a life span of several years without any maintenance, MPLS sensors are adapted to the requirements of on-line control.

With 180 measuring points aligned along a line ranging from 1 to 12 millimeters, the new MPLS version enables high-quality measurement with new capabilities, working with frequencies up to 2 kHz in standard mode, and even 6 kHz with a reduced sensor measuring range.

Benefits

- Versatile: measures any material capable of reflecting white light (e.g. metal, glass, plastic, paint films, liquids)
- Industrial thanks to its optical head made exclusively of passive components
- Up to 360 000 measured points/second allows to work in all industries in standard 2 klines/second
- More than 1 million points/second are acquired on dedicated applications at 6 klines / second
- Distance and thickness measurements
- High measurement accuracy
- Availability of SDK and protocol commands for easy integration into any system
- Synchronized measurement with encoder for dynamic acquisitions
- Ethernet communication

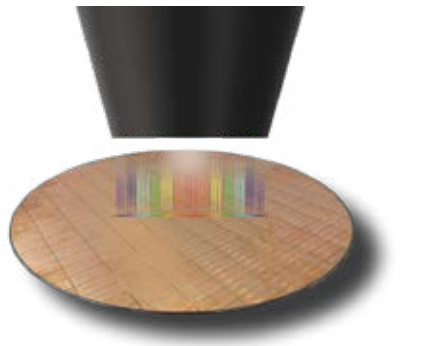
Application **fields**

ChromaLine technology allows immediate measurement. MPLS is able to measure the most subtle variations in shape with high resolution with a linear error of 0.1 µm, positioning us as the undisputed leader regarding resolution Indeed, MPLS solution provides much more precise results than the laser usually used in industry

Versions

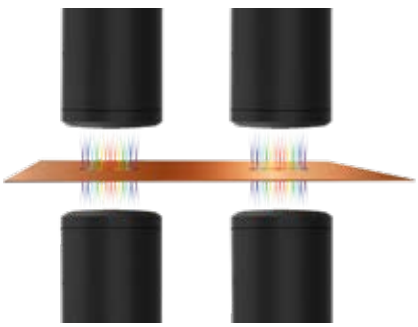
- MPLS-DM connect one sensor head via a single fiber bundle with 180 points of measurement simultaneously
- MPLS allows multiple combinations on the same controller: four sensors of 45 points each , two sensors of 90 points and one sensor with 180 points

1 X 180 points

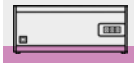


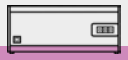
2 X 90 points

4 X 45 points

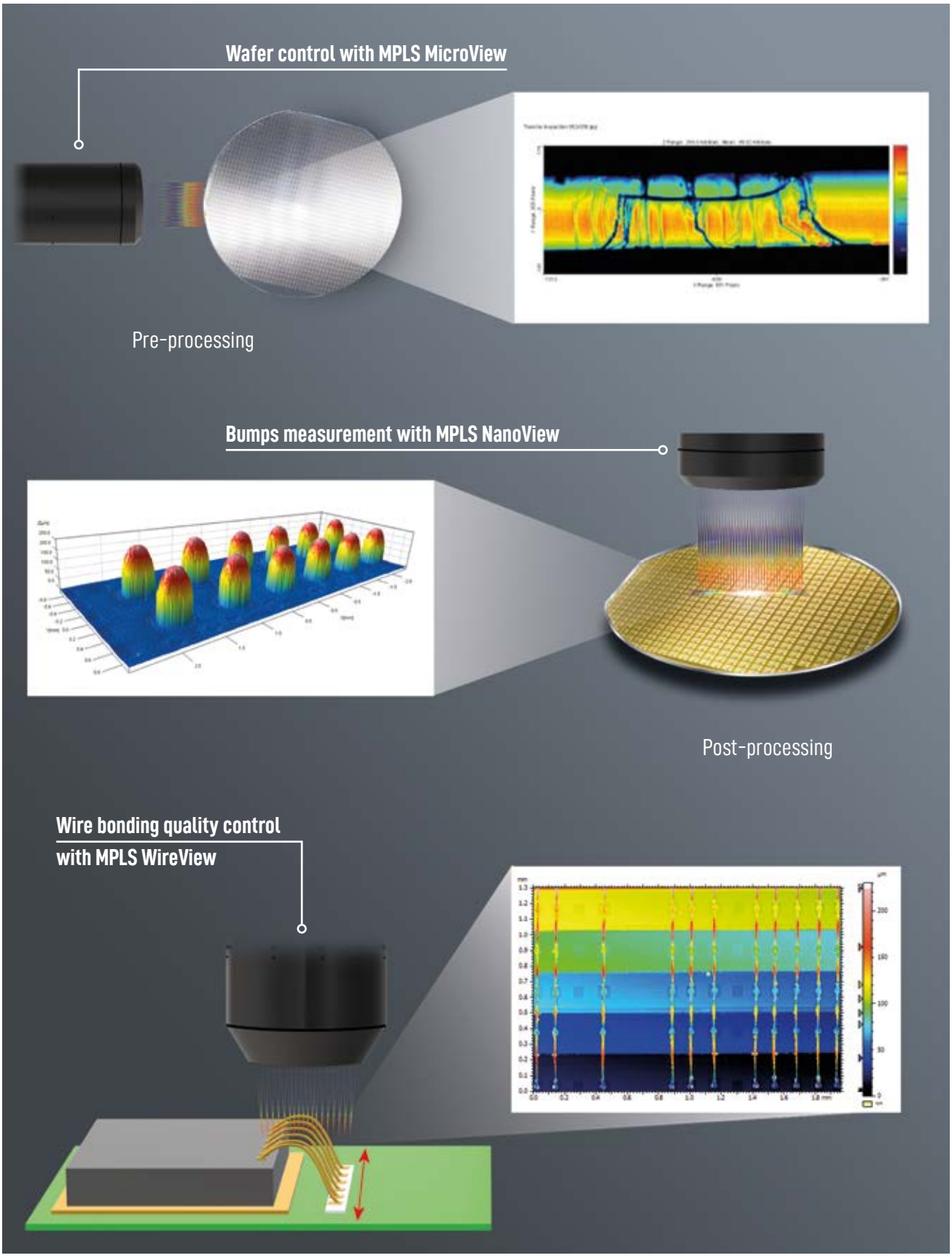


Controller	MPLS-DM	MPLS
Order Code	**O8ST05M0003**	**O8ST05M0004**
Technology	Chromatic Confocal	
Source	White LED	
Number of Points	180	(1) x 180 / (2) x 90 / (4) x 45
Measuring Frequency	200 Hz to 2000 Hz (up to 6000 Hz decreasing MR)	
Distance Measurement	Highest/First/Second/Third/Fourth/Last Peak	
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	





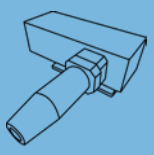
Application examples



MARPOSS

MC2

CHROMATIC CONFOCAL VISION CAMERA



ChromaVision

This camera system has a dual role being: provide a good quality 2D image of the sample surface at the desired magnification without autofocus while processing an image to detect and analyze certain predefined features or textures.

MC2

The MC2 chromatic line vision camera is a game-changer for quality inspection in various industries. By utilizing chromatic objectives for 2D imaging, it offers a greater depth of field while maintaining high lateral resolution. Unlike traditional microscopes, the MC2 camera works without autofocus, which saves valuable time during quality inspection. With a lateral resolution of up to 0.6 µm and a depth of field of up to 2.6 mm, it can detect small defects and measure their dimensions with high accuracy.

The integrated coaxial illumination and chromatic confocal technique provides high contrast on all types of materials, including mirror-like or non-planar objects.

And with a high-speed 4 kline camera, the MC2 camera is the ideal device for inline quality control in areas such as consumer electronics, semiconductors, and micromechanics.

Benefits

- Inspection on any material capable of reflecting white light (e.g. metal, glass, plastic, paint films, liquids)
- Industrial thanks to its optical head made exclusively of passive components
- Up to 199,000 lines/second with the new high speed 4 kline scan camera
- Detection from a micrometric lateral scale
- AOI: Automatic Optical Inspection for OEM

Application **fields**

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

Design for multi applications as:

- Wafer dimensions 2D & 3D control
- Wafer warpage & Edge 2D & 3D inspection
- Bumps and micro-bumps inspection & profile
- Step height & profile on new glass wafer
- Micro-Channels for cooling fluid
- Solar wafer control & inspection
- Wire bonding inspection
- & many others (LED, CD, TSV, MEMS…)

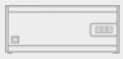
Versions

The standard cameras are available in five versions: Nano, Micro, Wire, Deep and SuperView

From the high numerical aperture NA 0.7 to the extended line width up to 12.5 mm, the minimum resolution is 0.43 µm² on the sample

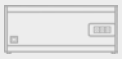
The maximum acquisition rate is 199,500 lines/second

For OEM specifications, camera versions are specifically customized

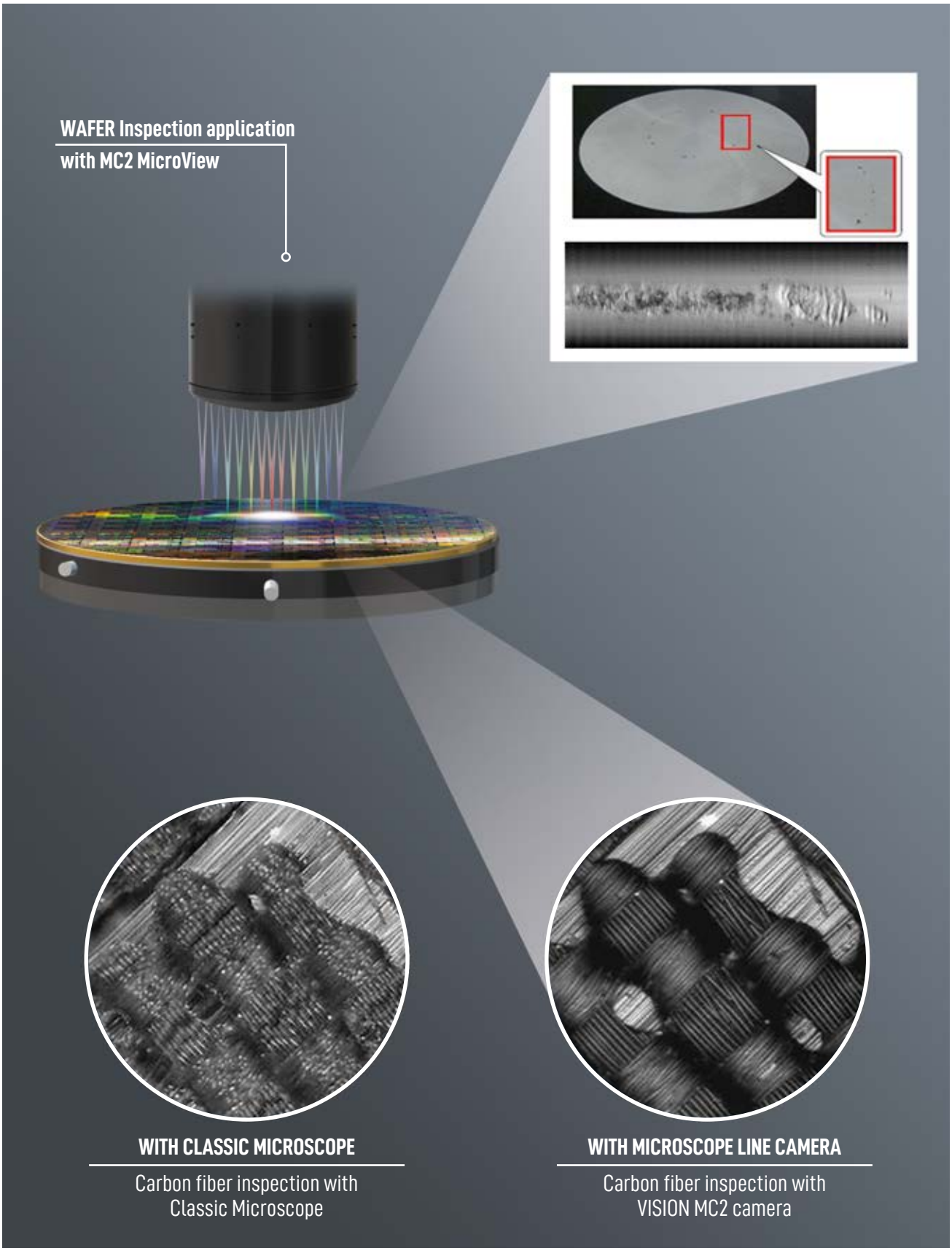


Controller		MC2
Technology		Chromatic Confocal line camera
Source		White LED in external box
Fiber bundle length		5 m
Temperature in use		0 to +65°C
Storage temperature		-30 to +70°C
Relative humidity		5 to 80% RH without condensation
Protection type		IP 20 (ChromaLight) IP50 (Body)
Line Detector	Camera	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	Unit	NanoView	WireView	MicroView	DeepView	SuperView
Order Code		**OPSTM702001**	**OPSTM708001**	**OPSTM704001**	**OPSTM706002**	**OPSTM709001**
Line Length	mm	1.34	1.51	1.8	4.2	12.85
Depth of Field	mm	0.1	0.9	0.5	2.6	2.0
Working Distance	mm	7.5	7.8	10.1	19.5	11.3
Magnification		17.3	15.6	12.9	5.6	1.8
Numerical Aperture		0.75	0.75	0.5	0.37	0.33
Max. Sample Slope	°	± 40	± 46	± 30	± 20	± 17
Pixel Size on the Sample	µm	0.43	0.49	0.58	1.35	4.1
Lenght	mm	421.6	468	412.8	408.5	378
Diameter	mm	50	70	50	60	60
Weight	kg	5.2	5.8	5.2	5.85	5.6



Application examples



GLOSSARY

Specification	Explanation
Axial Resolution	The Axial Resolution is defined as the peak to peak value of noise level, measured on a static sample. Measurement is performed at optimal settings on a sample located at the center of the measuring range. Assuming a statistical gaussian distribution, the axial resolution corresponds to the value of the static noise multiplied by a factor 6.
Depth of Field	The Depth of Field is the distance between the first and the last visible wavelength focused along the optical axis which are used to create the image.
Full Range	The Full Range is the maximum measuring range that is possible to consider, without regarding the performances.
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. Theoretically, the lateral resolution is defined as half the spot diameter.
Line Length	Length of the measurement line of a Chromaline sensor or of the inspection line of a Chromaline Camera.
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.
Spot Size	Theoretical diameter of the light spot, computed for the focalized wavelength at the middle of the measuring range.
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.

NOTES

For a full list of address locations, please consult the Marposs official website

Marposs has an integrated system to manage the Company quality, the environment and safety, attested by ISO 9001, ISO 14001 and OHSAS 18001 certifications.
Some models of the product line, or parts of them, may be subject to export restrictions if exported outside the European Union or may be subject to restrictive measures adopted by the competent national, supranational or international authorities.