



NCG-R
LINE

NON-CONTACT SENSORS REFLECTOMETRIC CONTROLLERS



Interferometric Point Controllers

NCG-R™ is a family of controllers designed to work with optical sensor heads for measuring thickness at nanometer level. It combines two technologies: interferometric and reflectometry. Paired with a dedicated software package for data processing, it provides the ideal solution for high-accuracy measurements in scenarios where contact with the part is not possible and the thickness layer is really thin.

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ChromaPoint Controllers



ChromaPoint Sensor Heads



Interferometric Point Controllers



ChromaLine Controllers



ChromaLine Sensor Heads



ChromaVision Camera



Accessory



NCG-R Controllers – High-Precision Non-Contact Thickness Measurement

NCG-R controllers enable high-precision, non-contact measurements with no risk of damaging the parts.

Among their main advantages is the ability to measure thickness with extremely high resolution on all types of surfaces and materials, including highly reflective ones.

Equipped with dedicated optical sensors, NCG-R systems can operate in a wide range of conditions — from post-process inspection to in-process applications — thanks to specific solutions with high levels of protection (e.g. IP-rated housings).

The measurement of thin films, coatings, and nanolayers represents the core strength of the system, offering premium performance with no rival on the market.

NCG-R controllers (visible range) are compatible with the full family of sensor heads, with performance optimized for each measurement range and application condition — including different working distances and spot sizes.



NCG-R

High-Resolution Reflectometric Controller for OEM Integration.

NCG-R offers one of the best price/performance ratios for OEM integration.

Available in a 1-channel (1CH) version, it is the ideal solution for applications in the semiconductor industry, medical devices, electronic components, and all sectors requiring non-contact measurements with extremely high accuracy — capable of detecting ultra-thin layers at nanometer scale.

NCG-R is a complementary solution to the Marposs Horizon family (specifically designed for post-process and laboratory applications) and to the P3IF family (dedicated to in-process control in semiconductor machining environments).

Benefits

- Interferometric and reflectometric technologies allow measurement on almost any type of material.
- Device integration is managed via protocol commands, enabling control of multiple controllers simultaneously.
- SDK libraries are available (in addition to protocol commands) to simplify integration into any system.
- Ethernet interface for seamless communication with the machine or automation system.

Application fields

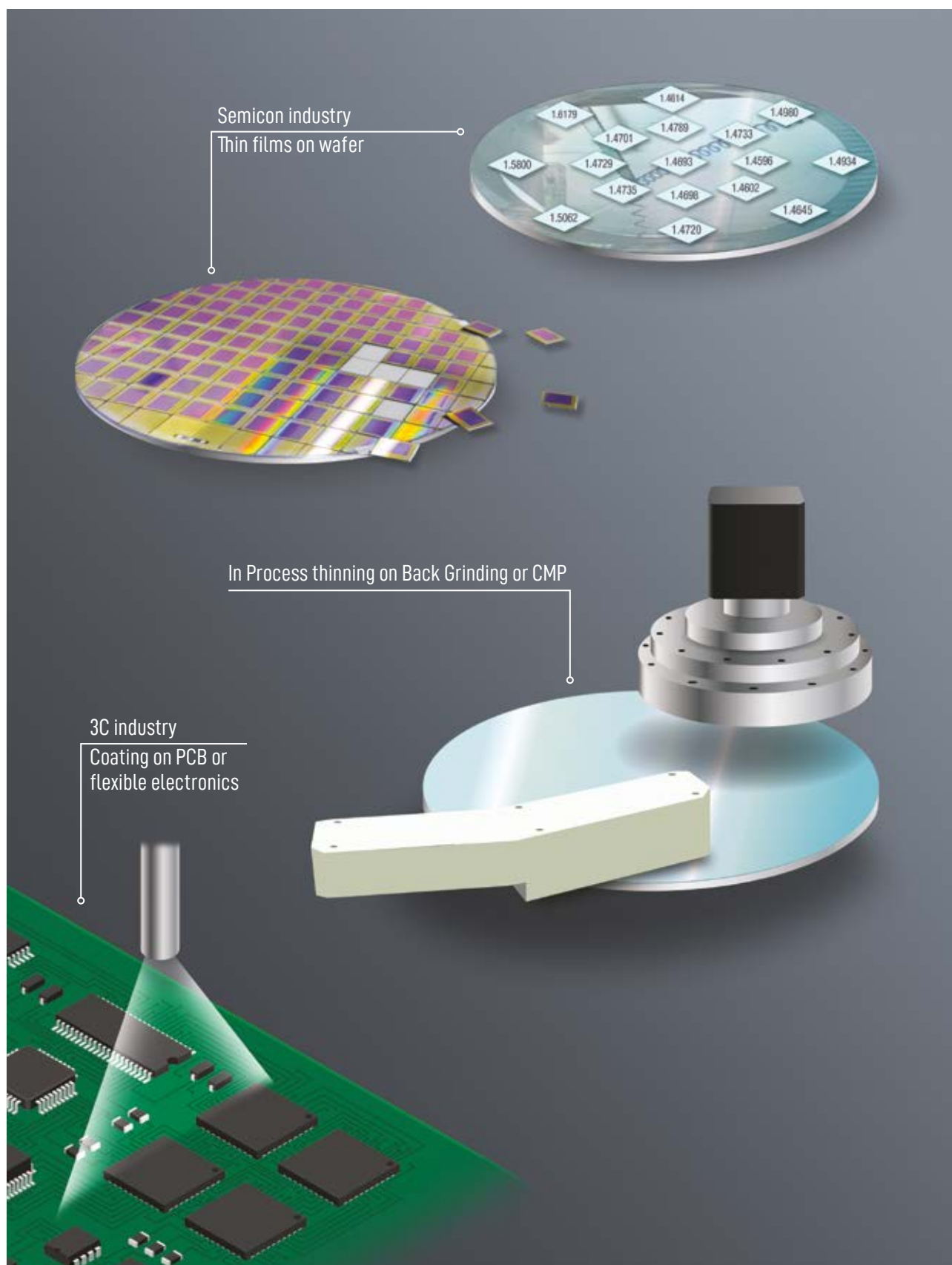
NCG-R Precise, Affordable Thin Film Measurement Systems.

- In the electronics industry, interferometry is used to measure the thickness of thin layers in integrated circuits or displays, ensuring uniformity and flatness in high-density production processes.
- In the semiconductor, electronics, and aerospace industries, reflectometric technology is used to measure the thickness of thin layers deposited on integrated circuits or within OLED displays, ensuring uniformity and flatness in high-density production processes.
- The medical sector benefits from this technology in the manufacturing of precision devices such as optical lenses, surgical instruments, stents, and miniaturized sensors. NCG-R guarantees compliance with the stringent quality standards required for these applications.
- Reflectometric technology is also essential in scientific research and academia, for studying advanced materials, as well as in semiconductor manufacturing, where it is used for the characterization of wafers and thin films.

Thanks to its ability to adapt to a wide range of surfaces and materials — including highly reflective and transparent ones — reflectometry has become an indispensable tool in industries where precision and reliability are critical.

The use of reflectometric principles will become increasingly widespread across all high-tech industries, driven by the growing demand for non-contact, high-resolution measurement solutions.

Application examples



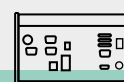
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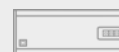
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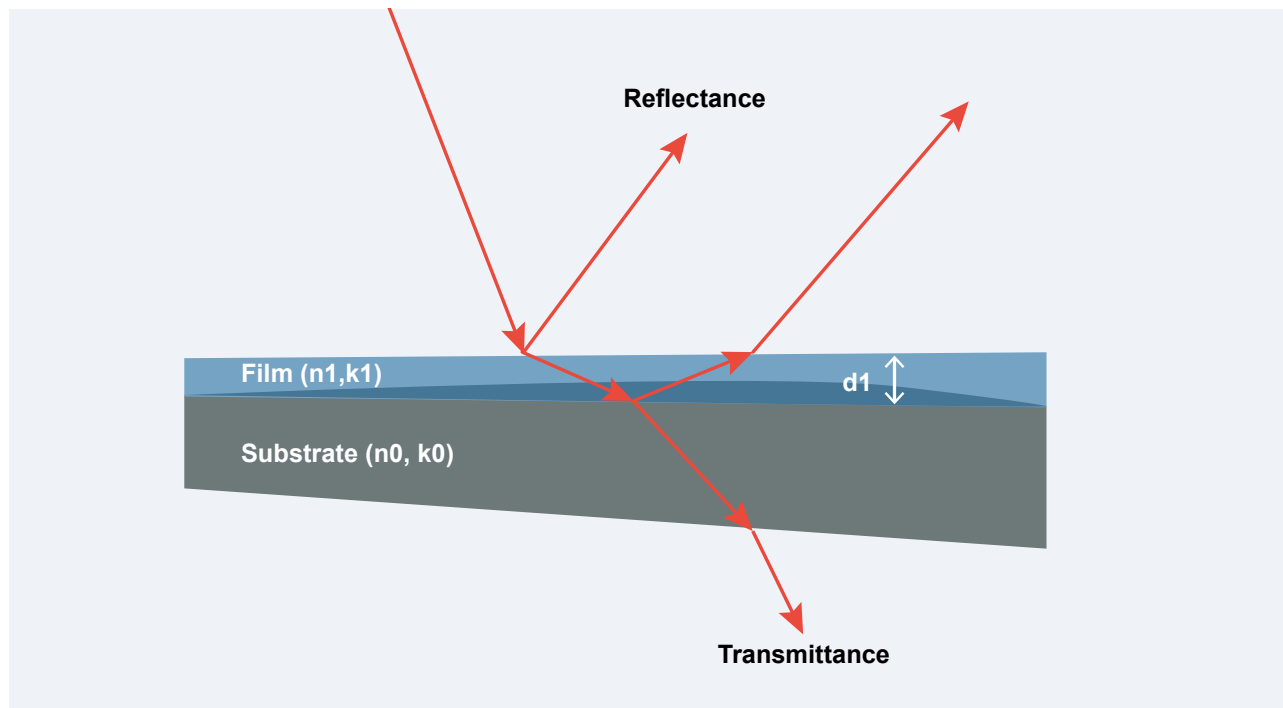
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Working Principle

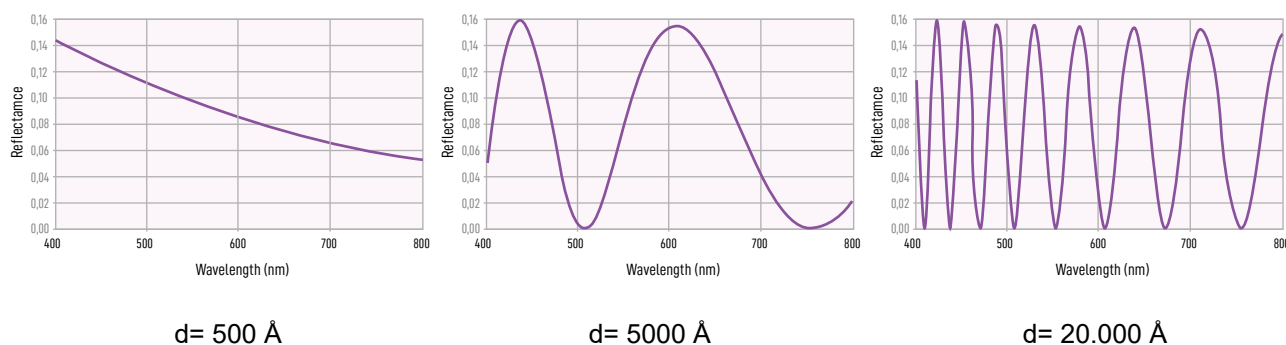
When light encounters an interface between two materials with different refractive indices, part of the light is reflected while the rest is transmitted.

Due to the wave nature of light, multiple reflections within the sample structure can interfere with each other.



This interference results in constructive and destructive patterns, which appear as oscillations in the wavelength-dependent reflectance spectrum.

These oscillations are characteristic of the optical thickness of the film.



Two primary data analysis methods are employed to extract the layer thickness.

In curve-fitting method, the system accurately determines the film thickness by fitting the measured spectral reflectance to a theoretical model that incorporates the material's optical coefficients.

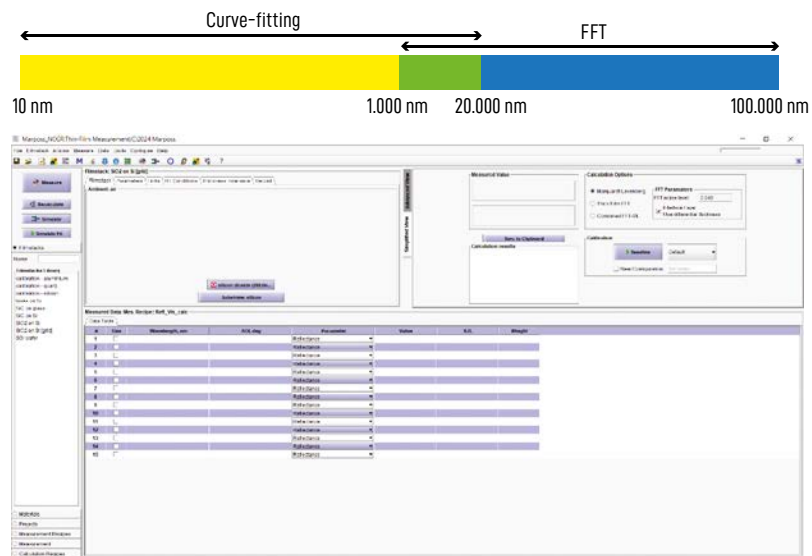
In the FFT method, the system extracts the thickness using a Fourier Transform algorithm.

Software tool

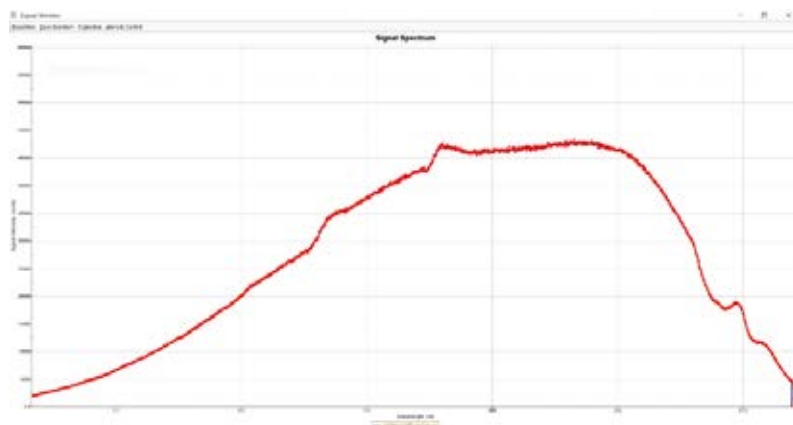
NCG-R family includes a user-friendly HMI, Marposs NCGR, that is used to manage all setting parameters dedicated to the application.

NCG-R automatically works with both methods:

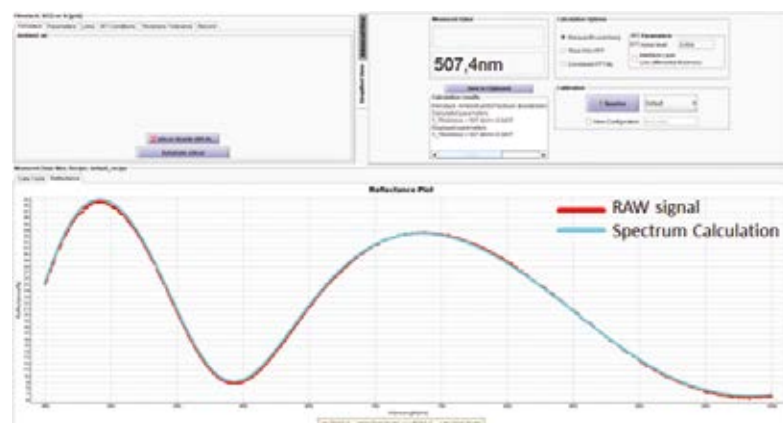
- Curve fitting (10nm÷20.000nm)
- FFT (1.000 nm ÷ 100.000nm)



RAW signal, elaborated by NCG-R



Best Fitting calculation to identify curve and thickness.



The measuring results can then be integrated by TCP/UDP protocol commands or SDK Libraries. Other requirements can always be evaluated upon request.

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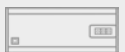
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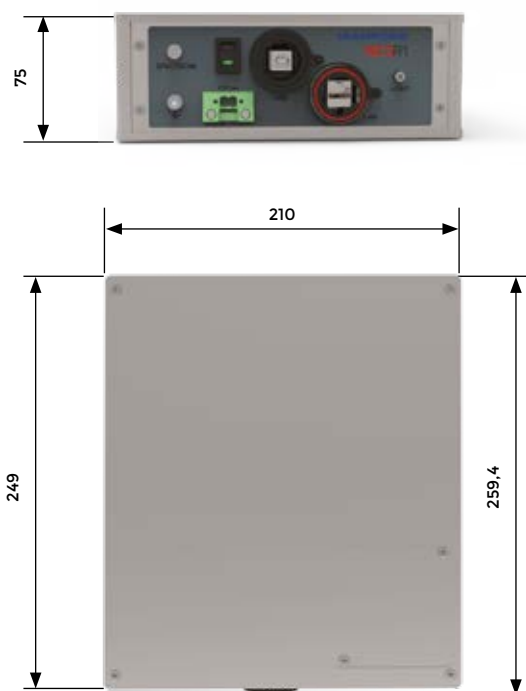
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NCG-R Line

Technical Specifications

| Controller type | NCGR1 | NCCR2 |
|--------------------------------------|------------------------------|----------------|
| Order code | B830I010S00 | B830I011S00 |
| Measuring principle | reflectometric | reflectometric |
| Channels | 1 | 1 |
| Measure type [μ] | Thickness | Thickness |
| Sampling rate [Hz] | 1500 | 1500 |
| Measuring rate [Hz] | 12.5 | 12.5 |
| Light source | Halogen Lamp | Halogen Lamp |
| Wave length [nm] | 400÷1000 | 450÷1050 |
| Measuring range* [μ] | 0.025 ÷ 110 | 0.035÷220 |
| Accuracy [%] | 0,2 (min 1nm) | 0,2 (min 1nm) |
| Axial resolution [nm] | 0,1 | 0,1 |
| Measuring mode | Thickness | Thickness |
| Digital port | USB / ETH | |
| Interfaces | Ethernet (10/100 Mbit) | |
| Network connection | YES | |
| Power supply | 12÷24 Vdc (+20%/-15%) | |
| Power consumption | 30 W | |
| Protection degree Standard IEC 60529 | IP40 | |
| Weight | 2,8 Kg | |
| Dimension [mm] | 210 (w) x 75 (h) x 259,4 (d) | |

DIMENSIONS (mm)



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| Probe code | | B3PITR10A02 | B3PITR10A04 | B3PITR21W00 |
|-----------------------|-------|-----------------------|-------------------|---|
| Description | | PROBE RF RX SOA4 CL02 | PROBE RF RX SOA15 | PROBE RF RX 90 SOA3 WP CL04 |
| Thickness measurement | | • | • | • |
| Axial | | • | • | - |
| Radial | | - | - | • |
| Cable | | Integrated | Separated | Integrated |
| Stand off (SO) | [mm] | 4 | 15 | 3 if the measurement is carried out in water, 2 mm if it is carried out in air |
| Max. Slope Angle | [°] | 2 | 2 | 2 |
| Spot size | µm | 600 | 600 | 600 |
| Dimensions - [mm] | Ø | 6,3 | 18 | - |
| | L | 50 | 67,7 | 105 |
| | H | - | - | 50 |
| | W | - | - | 30 |
| Controller | NCGR1 | • | • | • |
| | NCGR2 | • | • | • |

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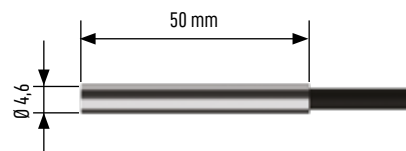


OPTICAL SENSORS DIMENSIONS (mm)

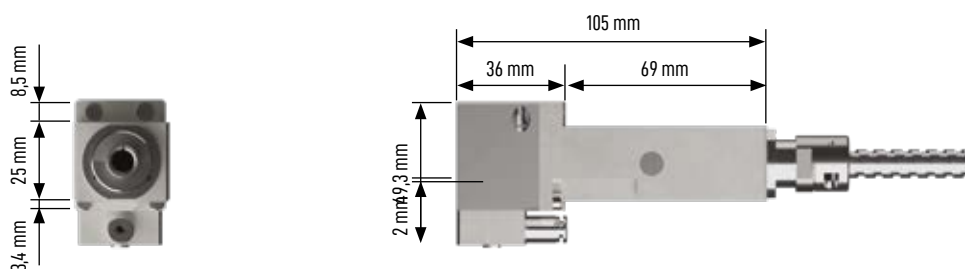
PROBE RF RX SOA4 CL02



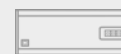
PROBE RF RX SOA15



PROBE RF RX 90 SOA3 WP CL04



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OPTICAL FIBER

| Code | B4132344103 |
|-------------|-----------------------------------|
| Description | MM400/420_2,0M_2XSMA905-SMA905_PP |
| Lenght [m] | 2 |

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Connections

NCG-R is not only a standard desktop system but a controller designed for easy HW integration with third party systems. The device is complete and fully equipped with the following:

- **in line 1 ETH connection**
for device configuration and machine interface.
- **1 x USB**
FW Update & Serviced



Sw TOOL

Device Configuration.

NCG-R™ is equipped with Marposs NCGR, its configurator software to perform dedicated settings in relation to part to be measured and application requirements.

To simplify integration, each NCG-R™ controller comes equipped with libraries (*.dll) and protocol commands

Device Integration.

NCG-R™ can be integrated through 2 main tools:

- TCP/UDP protocol commands
- SDK Libraries

SDK Libraries have been designed using the most robust and efficient software environments C++, C, and C# leveraging state-of-the-art development technologies to ensure high performance and reliability. Integration examples are included, and you will benefit from Marposs's dedicated support to streamline your integration process.

Libraries will make easy and simple the NCG-R™ integration in third-party SW.



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