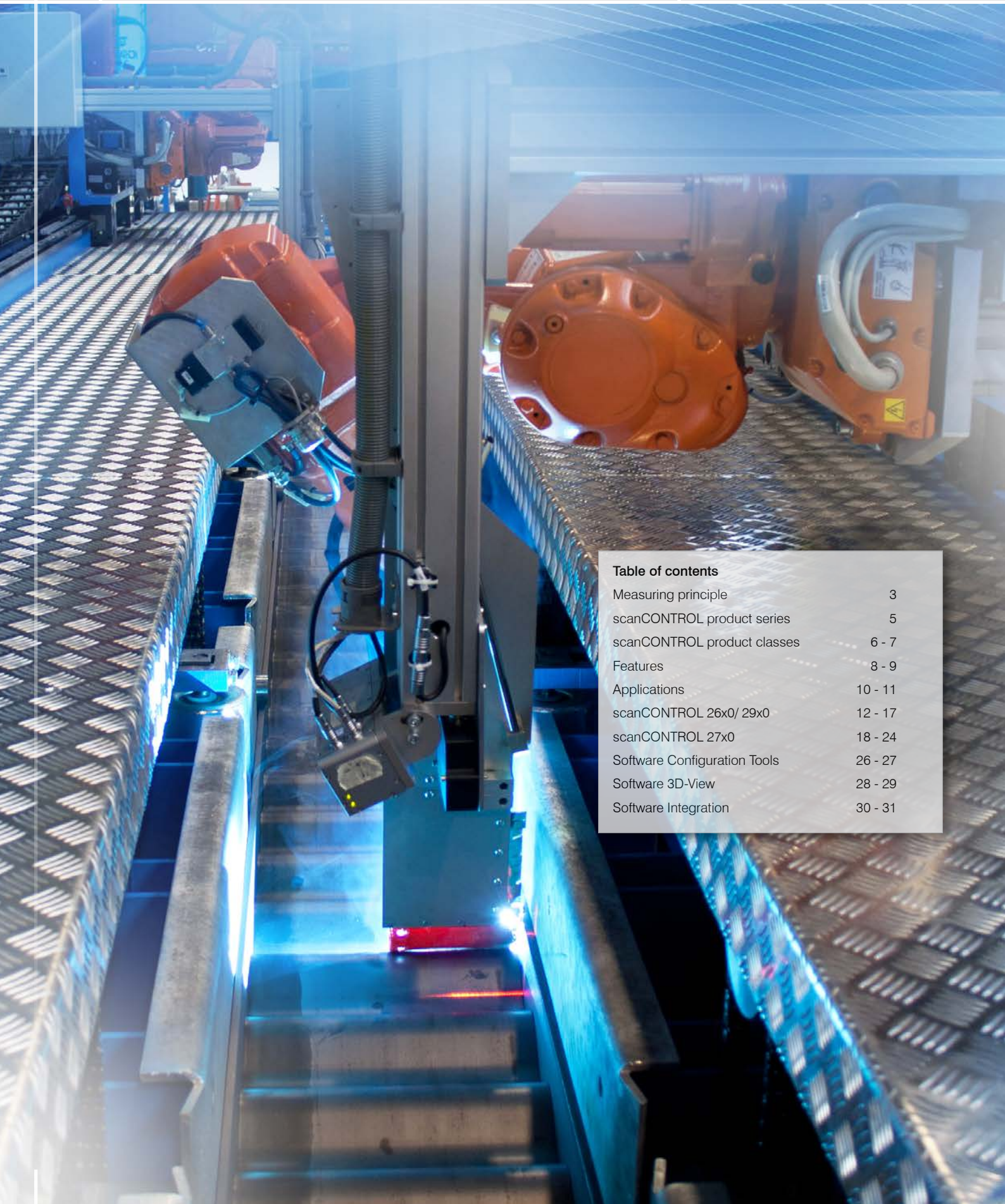




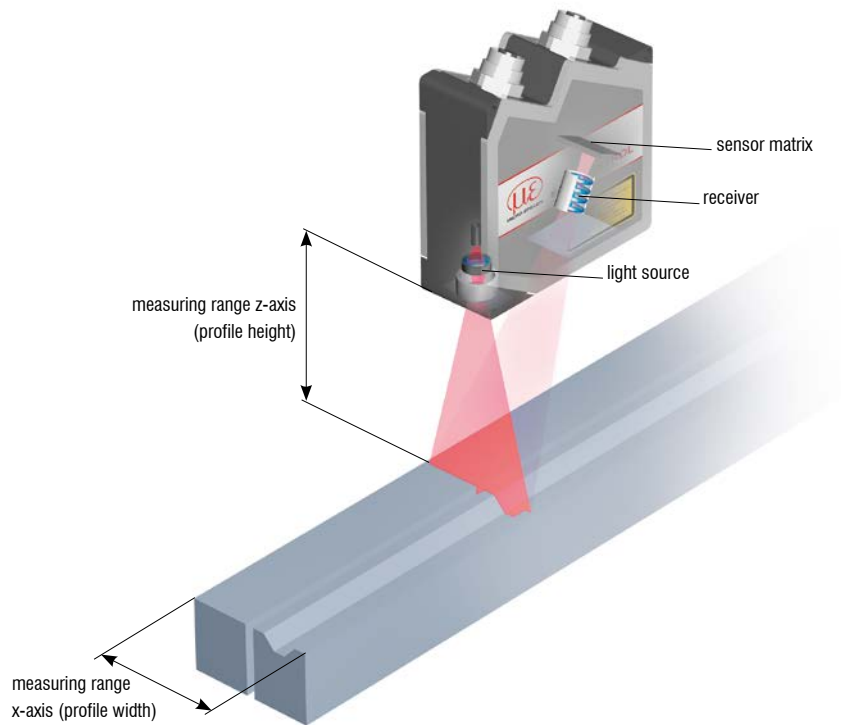
More Precision

scanCONTROL // 2D/3D laser scanner (laser profile sensors)



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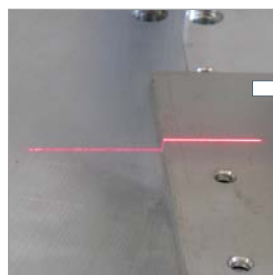
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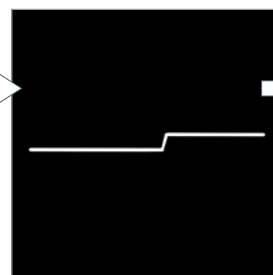
Laser scanner from the scanCONTROL series record, measure and evaluate profiles on a variety of different target surfaces. With its scanCONTROL series, Micro-Epsilon offers everything from preconfigured sensors to complex measuring systems from a single source.

The measuring principle

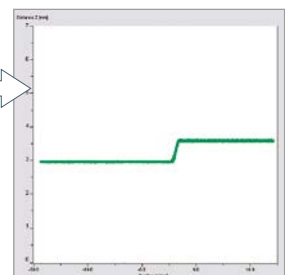
Laser scanner from Micro-Epsilon - often referred to as profile sensors - use the laser triangulation principle for two-dimensional profile detection on different target surfaces. By using special lenses, a laser beam is enlarged to form a static laser line and is projected onto the target surface. A high quality optical system projects the diffusely reflected light of this laser line onto a highly sensitive sensor matrix. In addition to distance information (z-axis), the controller also uses this camera image to calculate the position along the laser line (x-axis). These measured values are then output in a two-dimensional coordinate system that is fixed with respect to the sensor. In the case of moving objects or a traversing sensor, it is therefore possible to obtain 3D measurement values.



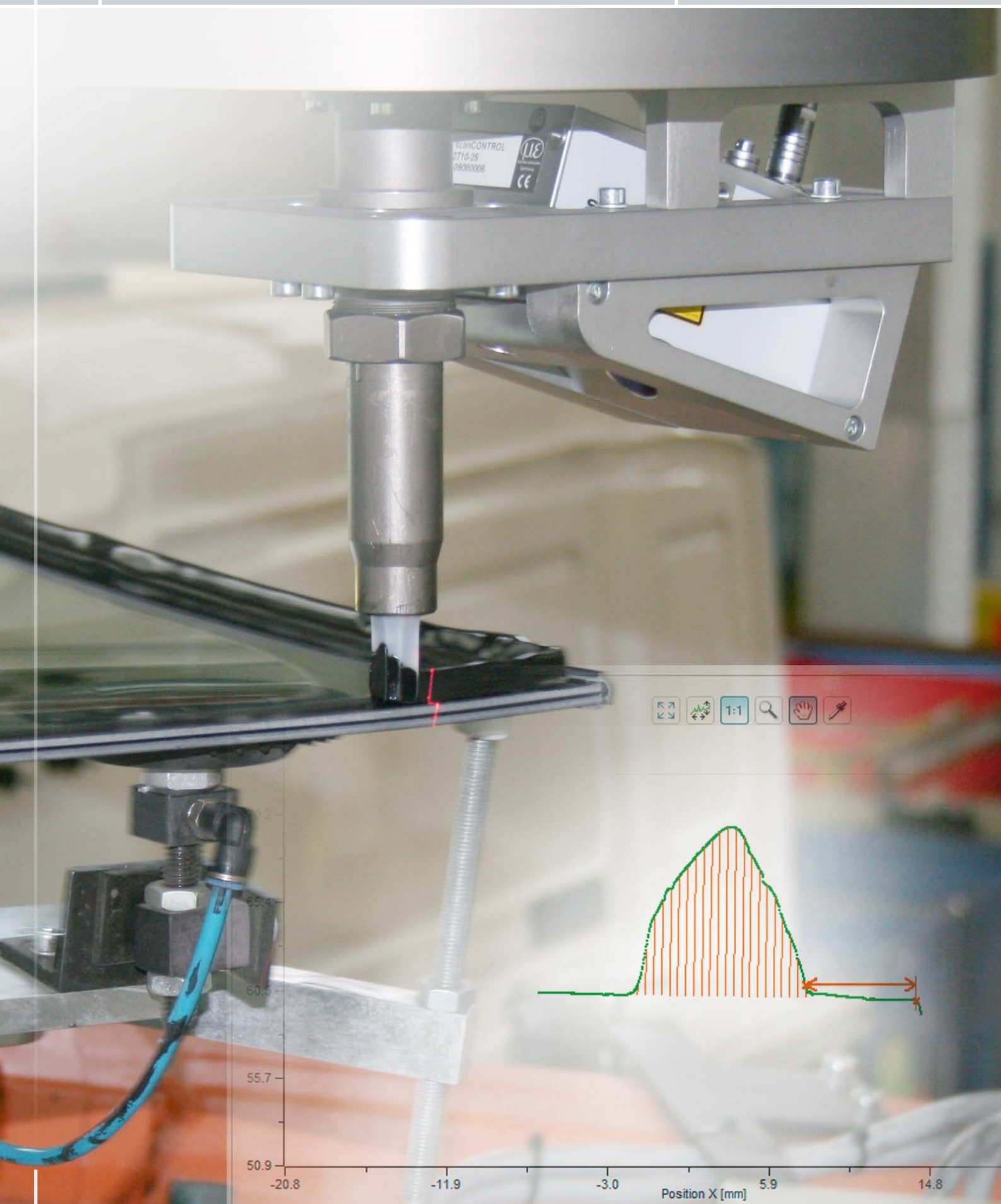
Laser line
Projecting a laser line onto the target surface



Sensor matrix (pixels)
The diffusely reflected light from the laser line is shown on the high quality sensor matrix



Calibrated x/z measuring points
Calculation of the distance coordinate z and the actual position x along the laser line for each measuring point





Perfect for automation

scanCONTROL 26x0

z-axis measuring range up to 265mm
 x-axis measuring range up to 143.5mm
 Profile frequency up to 4,000Hz
 Measuring rate up to 2,560,000 points/sec
 z-axis reference resolution from $2\mu\text{m}$
 Resolution x-axis up to 640 points



High-end automation scanner

scanCONTROL 29x0

z-axis measuring range up to 265mm
 x-axis measuring range up to 143.5mm
 Profile frequency up to 2,000Hz
 Measuring rate up to 2,560,000 points/sec
 z-axis reference resolution from $2\mu\text{m}$
 Resolution x-axis up to 1,280 points



For long offset distances

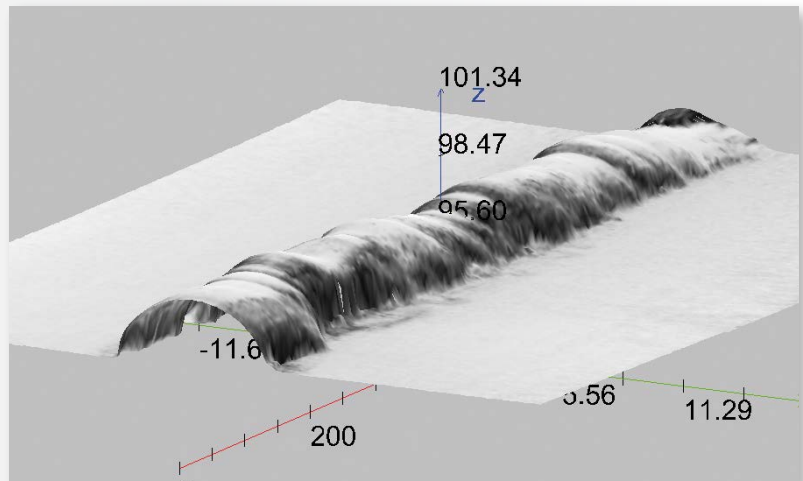
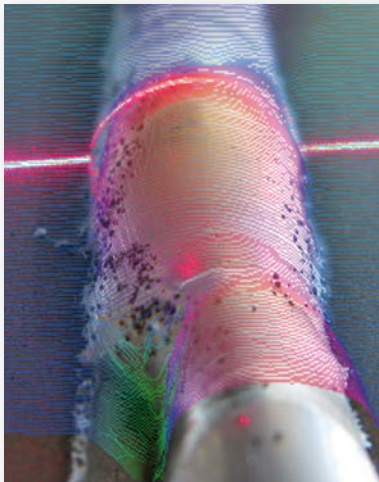
scanCONTROL 27x0

Maximum offset distance up to 600mm
 z-axis measuring range up to 300mm
 x-axis measuring range up to 148mm
 Profile frequency up to 4,000Hz
 Measuring rate up to 1,280,000 points/sec
 z-axis reference resolution from $4\mu\text{m}$
 Resolution x-axis up to 640 points

scanCONTROL series are available in three classes:

COMPACT

HIGHSPEED



COMPACT and HIGHSPEED:

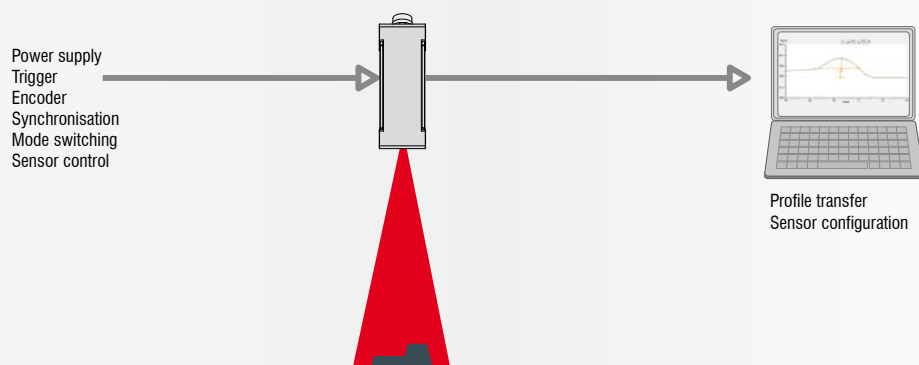
Profile transmission

The scanCONTROL COMPACT series sensors (2600, 2900, 2700) and the HIGHSPEED models (2650, 2950, 2750) provide calibrated profile data for external profile analysis, for example on a PC.

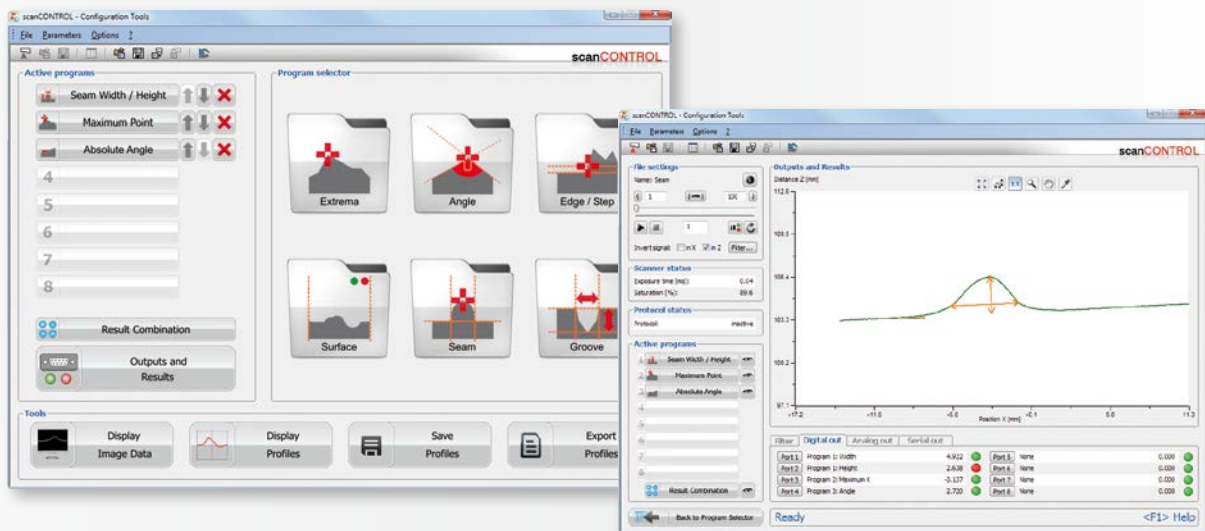
An Ethernet interface allows the user to configure the sensor via a PC application, as well as to transmit profile data.

More details about the software interface can be found in the "Integrating scanCONTROL in application software" chapter.

The multi-function port can be used for power supply, as a trigger input, for synchronising several scanCONTROL sensors, for switching parameters, as well as for sensor control or encoder input.



SMART



SMART: Measurement data output

The scanCONTROL SMART series (2610, 2910, 2710) offers plug & play solutions for simple-to-complex measurement tasks, eliminating the need for any external controller or PC.

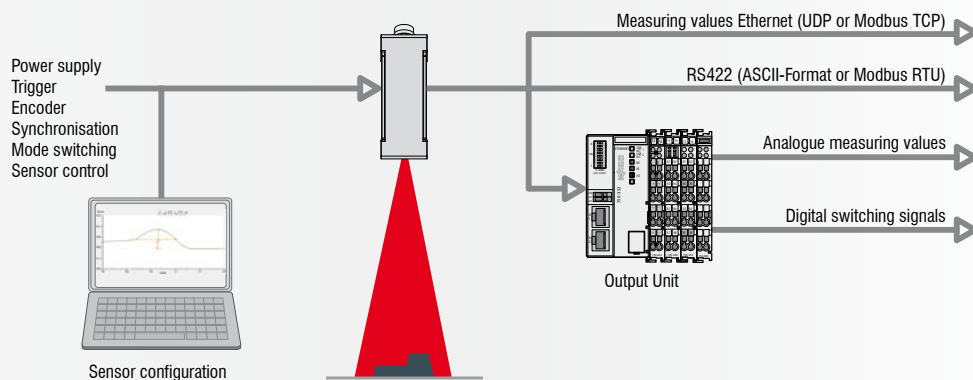
Set up and configuration of the sensor is carried out via the scanCONTROL Configuration Tools software using a PC, which enables the measurement of e.g. steps,

angles, seams and grooves. The parameters can be saved in the integrated controller. The sensor executes the measurements in standalone mode without requiring a PC.

As well as output of measurement values via Ethernet (UDP or Modbus TCP protocol) and RS422 (Modbus RTU protocol or ASCII format), additional digital switch signals and analogue measuring values

can also be output. This is performed by using an Output Unit that converts measurement signals into digital and analogue signals.

The multi-function port can be used for power supply, as trigger input, for synchronising several scanCONTROL sensors, for switching parameters, for sensor control or for measurement value output via RS422.





Designed for industrial applications

The sensors of the scanCONTROL product range are designed for industrial applications. Due to their design and technical features, the sensors offer precision measurement even in harsh environments. Each series is available in a number of different measurement ranges which cover almost all common measuring distances.

Robot integration

In many measuring applications, e.g. positioning, tracking and 3D measurement, the sensor needs to be integrated with a robot. For this reason, durable, flexible, robot-compatible cables are available.

Variable measuring field

In many cases it may be useful to reduce the measuring field, i.e. the range of the sensor matrix being considered by the sensor for recording profiles. Reducing the height and the width of the rectangular measuring field helps to filter out, for example, any interfering reflections. A total of 128 pre-defined measuring fields are available.

Laser class 2M or 3B

The standard scanCONTROL sensors operate using a visible, red semiconductor laser at a wavelength of 658nm in laser class 2M. No additional safety requirements are necessary.

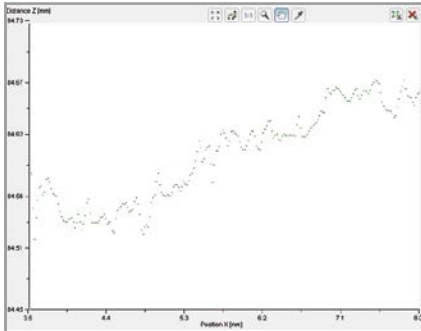
scanCONTROL sensors are also available in laser class 3B, which offers a higher laser power. This is useful for measurements against poorly reflecting surfaces such as black rubber. Please notice that special precautions are required for this laser class.

Blue laser line

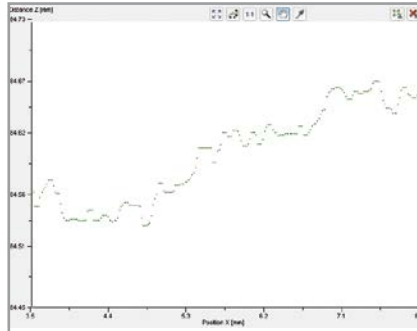
The 29xx scanCONTROL series and the 27xx-100 scanCONTROL series are optionally available with a blue laser line (wavelength 405nm) in laser class 2M. This offers advantages when measuring on red-hot glowing, (semi-) transparent and organic materials.

Adjustable profile filter functions

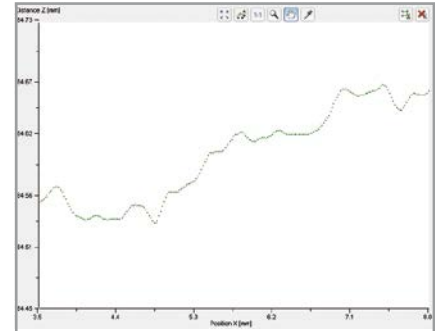
Median filter and average filter features are available in order to achieve optimal results for every application. These filters are applied directly to each profile inside the controller. Additionally, the profile can equidistantly be sampled along the surface, optimising the profile data optimally for later use. Up to 8 measurement values can be filtered and output simultaneously.



Unfiltered profile



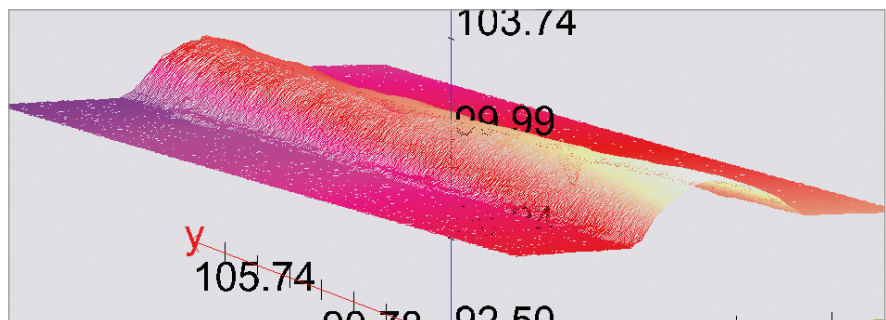
Profile with median filter



Profile with average filter

Calibrated measured values

Unlike systems that combine only one camera and one laser line, scanCONTROL sensors deliver not just pixel values, but rather true measurement data with calibrated coordinates. Each sensor is supplied with an individual calibration protocol. This document is included in the scope of delivery and verifies the precision of each individual sensor.



Trigger for precise synchronised measurements

scanCONTROL has been designed with a high speed external profile trigger input. In this way, the data rate can be optimised and measurements can be triggered at a specific event in time. This is particularly beneficial when several systems are operating synchronously. With its combination of a compact design and simple wiring, scanCONTROL is ideally suited for multi scanner applications.

Counter for easy 3D measurement

The sensors used for profile data transmission can also operate with an encoder input, enabling the assignment of the profile data using a counter in the next processing step. Furthermore, it is possible to trigger the scanner using the encoder input in order to scan, for example, a 3D surface at a constant profile distance.

Simple integration thanks to standard interfaces

For profile transfer, the scanCONTROL COMPACT and HIGH SPEED sensors use the universal GigE Visions Ethernet interface on which many other camera systems are also based.

Adapting dynamically to rapidly changing surfaces

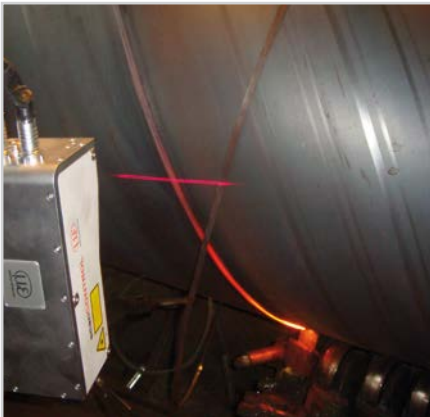
One challenge when using optical measurement systems is the dependence of the measurement data on the surface characteristics. Laser profile scanners operate using diffuse reflections of which the intensity is highly dependent on the colour and how shiny and reflective the respective component is. Different modes enable the scanCONTROL sensors to dynamically adapt to constantly changing surfaces, providing more reliable measurements. The scanner can therefore autonomously adapt values such as exposure time or the threshold for recognising a reflection.



Auto exposure is important for measurements with changing surfaces

scanCONTROL**Sensors, solutions and systems from Micro-Epsilon**

Micro-Epsilon has many years' experience in integrating highly efficient laser line sensors to customer applications and in supplying complete systems from a single source. scanCONTROL sensors are adapted to a variety of applications in quality control, production processes and automation.



Tracking weld seams



Edge tracking on a robot



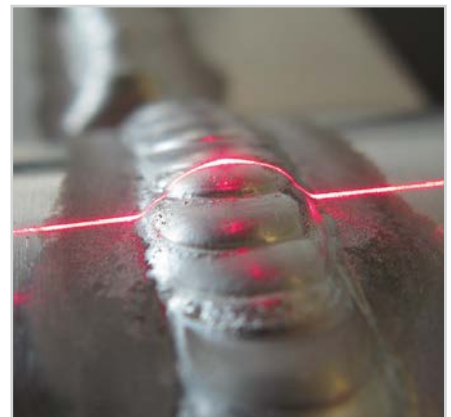
V-gap measurement on pipes



Gap measurement on a car body



Profile measurements on brake disks



Measuring weld seam profiles



Tyre inspection



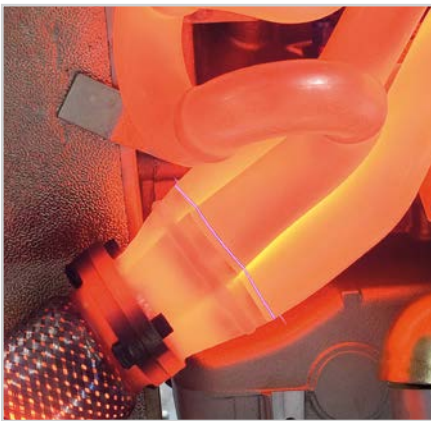
Distance measurement at the centre console



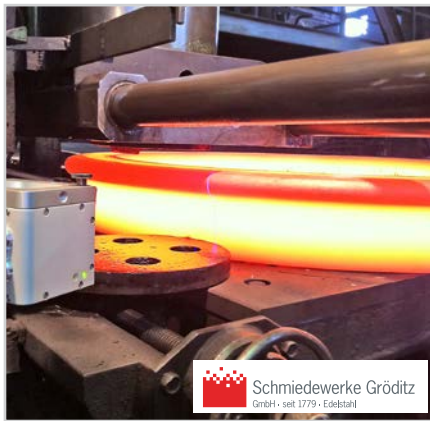
Inspection of the adhesive beading

scanCONTROL BL

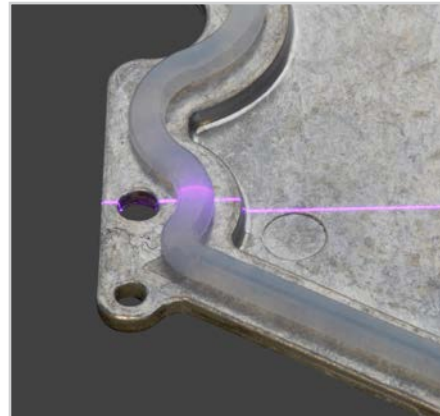
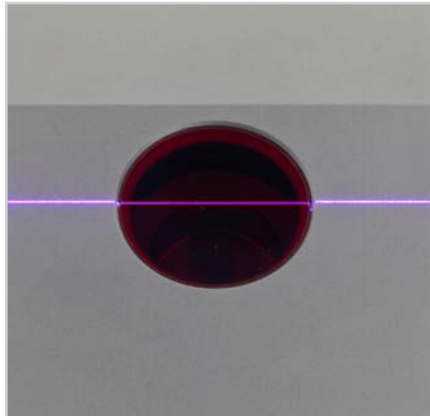
The scanCONTROL BL is used for multi-dimensional measurement on red-hot glowing metals as well as on transparent and organic materials. While allowing higher stability, the blue laser light does not penetrate the measurement object due to the shorter wavelength of the blue-violet laser and offers more stability. Red-hot glowing and even organic objects are measured more reliably compared to the red laser.



Application on red hot glowing metals



Application on (semi-) transparent materials



Application on organic materials





- z-axis measuring range up to 265mm
- x-axis measuring range up to 143.5mm
- Profile frequency up to 4,000 Hz
- Measuring rate up to 2,560,000 points/sec
- z-axis reference resolution from 2µm
- Resolution x-axis up to 1,280 points
- Also available with blue laser

Extremely compact design

The design of the scanCONTROL 26 and 29 series is focussed on minimal size and low weight. All electronics is integrated in the housing, simplifying cabling arrangements, mechanical integration and automated robot tasks.

Power over Ethernet

The scanners can be supplied via Ethernet. If Industrial Ethernet is used as data connection to the sensor only one cable will remain that connects the sensor to the periphery.

Multi-function port

The multi-function port can be used for power supply, as data output, for switching parameters, as trigger input or for synchronizing several scanCONTROL sensors. This port makes the scanner very flexible.

Flexible measurement value output

There are different options for output of measurement values: Ethernet (UDP, Modbus TCP), serial (ASCII, Modbus RTU) with output unit as analogue signals or digital switch signal.

Multi-scanner applications

Due to their multi-function port, scanCONTROL 26x0 and 29x0 sensors enable several systems to operate synchronously. If two laser lines overlap, a special mode can be used to operate them alternately. One scanner is measuring whilst the other laser line is switched off.

scanCONTROL is available in three classes:

COMPACT

The **scanCONTROL 2600** and **2900** sensors are the perfect choice for both static and dynamic measurement tasks. The compact sensors offer a profile frequency of up to 200Hz and are used to transmit raw profile data.

HIGHSPEED

The **scanCONTROL 2650** and **2950** sensors offer everything for advanced highspeed and 3D applications. A profile frequency of up to 4,000Hz can be acquired using these sensors. They are also used to transmit raw profile data.

SMART

The SMART series **scanCONTROL 2610** and **2910** offer a Plug & Play solution with integrated controller for simple-to-complex measurement tasks. The sensor structure is identical to the COMPACT and HIGH-SPEED classes. The scanner evaluates recorded profiles and outputs the measurement values.

Also available with blue laser

The Blue Laser technology uses a laser diode with a shorter wavelength of 405nm. The outstanding characteristics of this wavelength range enable reliable measurements to be made that to date have been difficult to achieve using red laser scanners. Its advantages can be seen particularly well on red-hot glowing metals, (semi-) transparent and organic materials.

Model		scanCONTROL	26x0/29x0-25	26x0/29x0-50	26x0/29x0-100
z-axis (height)	Standard measuring range	Start of measuring range	53.5mm	70mm	190mm
		Midrange	66mm	95mm	240mm
		End of measuring range	78.5mm	120mm	290mm
	Extended measuring range	Start of measuring range	53mm	65mm	125mm
		End of measuring range	79mm	125mm	390mm
	Linearity ¹⁾ (3sigma)		±0.16% FSO	±0.16% FSO	26x0: ±0.20 % FSO 29x0: ±0.16 % FSO
	Reference resolution ^{2) 3)}		2µm	4µm	12µm
x-axis (width)	Standard measuring range	Start of measuring range	23.4mm	42mm	83.1mm
		Midrange	25mm	50mm	100mm
		End of measuring range	29.1mm	58mm	120.8mm
	Extended measuring range	Start of measuring range	23.2mm	40mm	58.5mm
		End of measuring range	29.3mm	60mm	143.5mm
	Resolution x-axis		26x0: 640 points/profile 29x0: 1,280 points/profile		
	Profile frequency		standard	up to 200Hz	
			Highspeed 2650	up to 4,000Hz	
			Highspeed 2950	up to 2,000Hz	
	Interfaces	Multi function port	Ethernet GigE-Vision	Output of measurement values Sensor control Profile data transmission	
Digital inputs			Mode switching Encoder Trigger		
RS422 (half-duplex)			Output of measurement values Sensor control Trigger Synchronisation		
Output of measurement values			Ethernet (UDP / Modbus TCP) RS422 (ASCII / Modbus RTU) ⁴⁾ Analogue ⁵⁾ Switching signal ⁵⁾		
Display (LED)			1x laser ON/OFF, 1x power/error/status		
Light source	standard		Semiconductor laser 658nm (red)		
	optional (only 29x0)		Semiconductor laser 405nm (blue)		
Aperture angle laser line			20°	25°	25°
Laser power	standard		8mW (class 2M)		
	optional		20mw (class 3B)		
Laser off			optional		via external contact
Permissible ambient light (fluorescent light) ²⁾			10,000lx		
Protection class (Sensor)			IP 65		
EMC			acc. EN 61326-1: 2006-10 DIN EN 55011: 2007-11 (group 1, class B) EN 61000-6-2: 2006-03		
Vibration			2g / 20 ... 500Hz		
Shock			15g / 6ms		
Operating temperature			0°C to 45°C		
Storage temperature			-20°C to 70°C		
Dimensions			96 x 85 x 33mm		
Weight sensor (without cable)			380g		
Supply			11-30VDC, 24V, 500mA, IEEE 802.3af class 2, Power over Ethernet		

¹⁾ Standard measuring range

²⁾ Measuring object: Micro-Epsilon standard object (metallic, diffusely reflecting material)

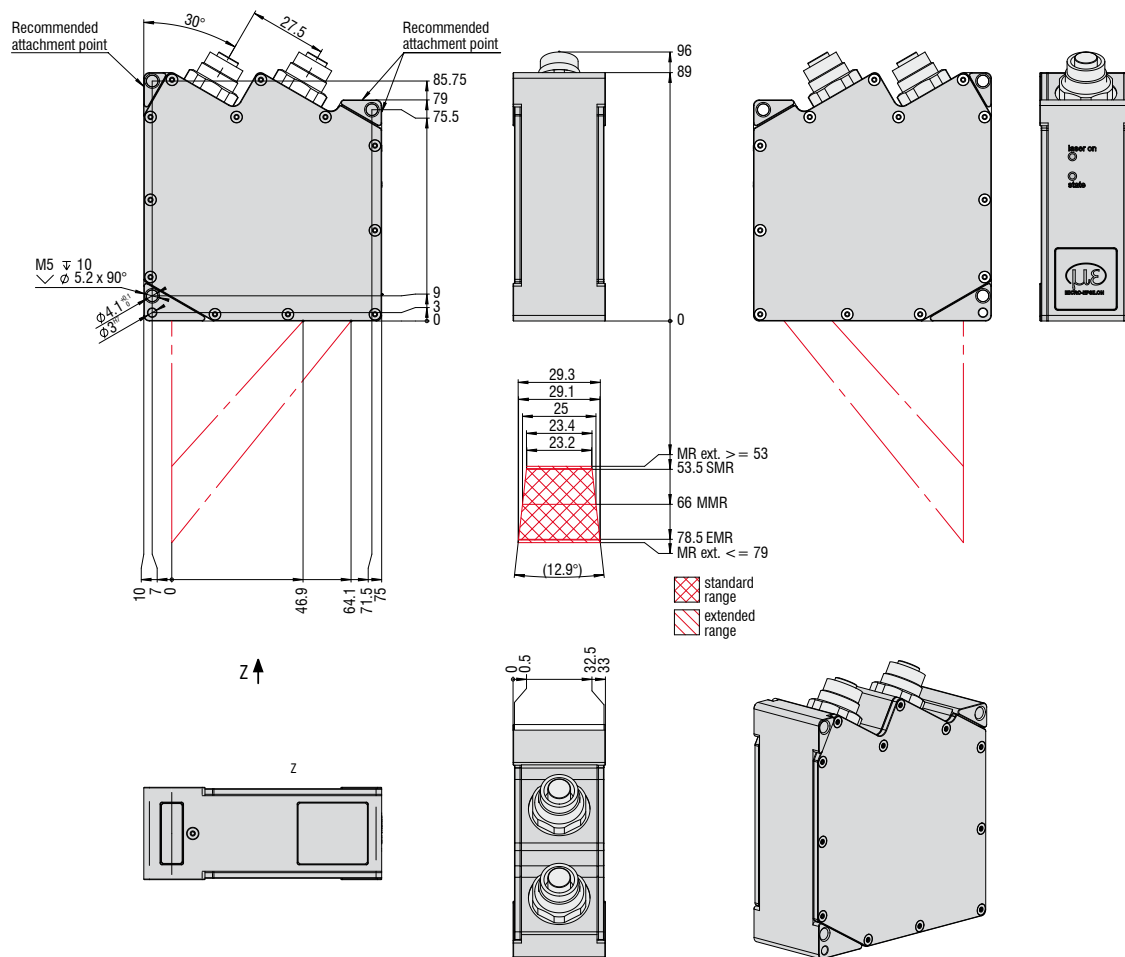
³⁾ According to a one-time averaging across the measuring field (640 points)

⁴⁾ RS422 interface, programmable as serial interface or input for triggering / synchronisation

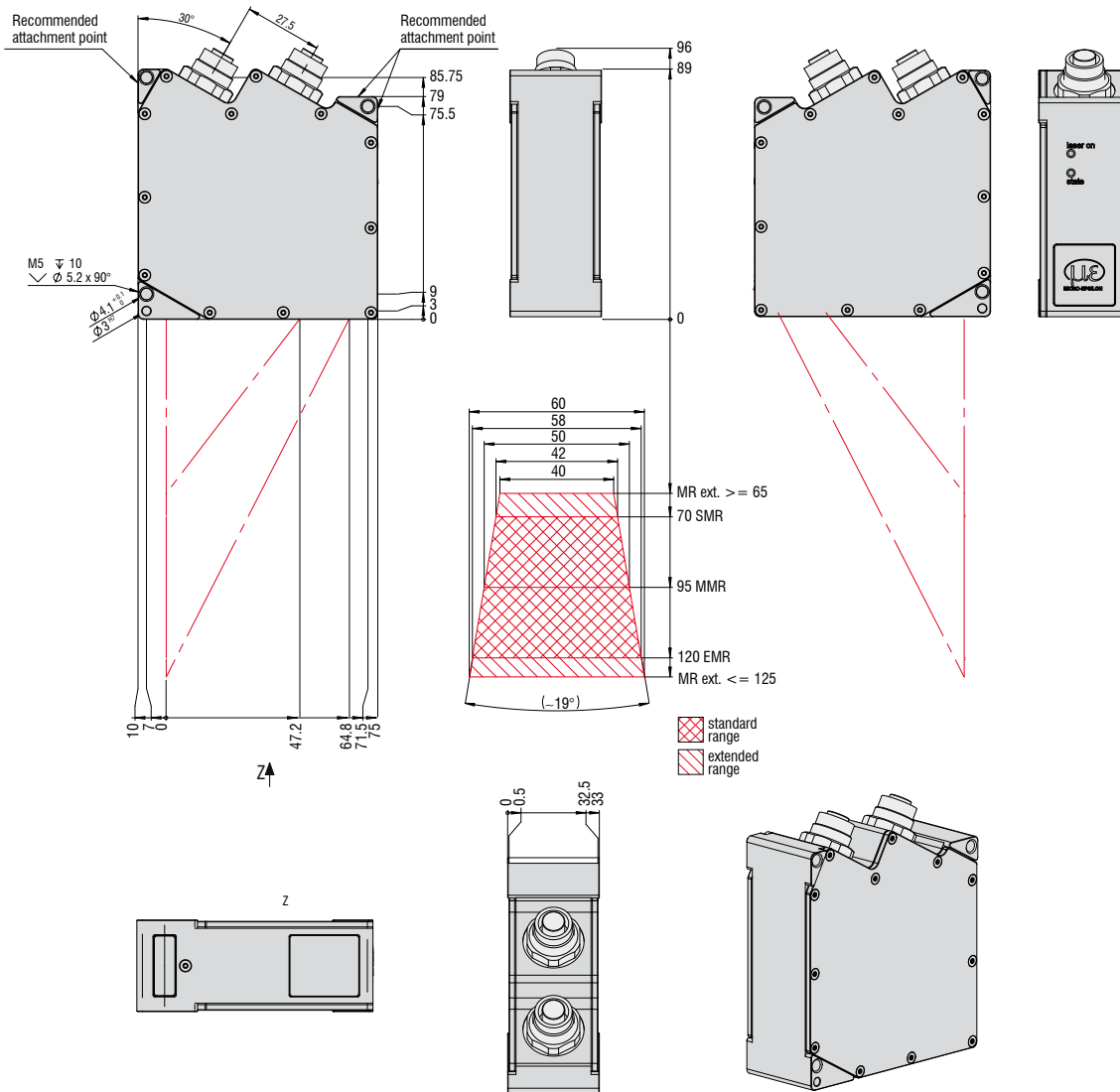
⁵⁾ Only with Output Unit

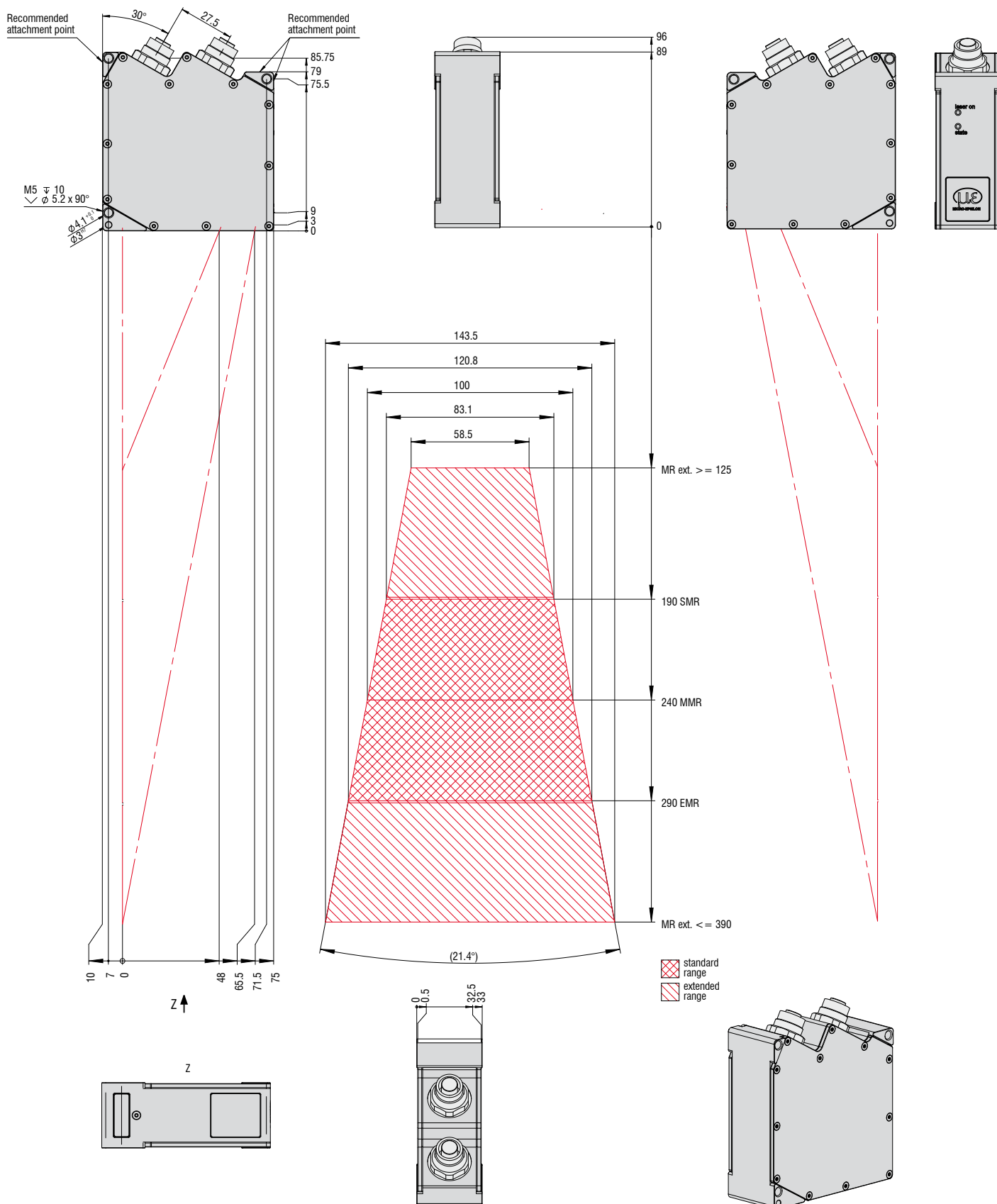
FSO = Full scale output

scanCONTROL 26x0/29x0-25



scanCONTROL 26x0/29x0-50

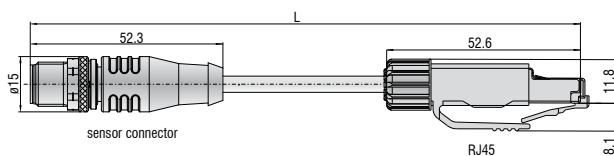




Options*:

/SI	Integrated sensor switch-off	/PT	Pigtail cable
	Hardware switch-off of the laser line		0.25m long cable directly out of the sensor
/3B	Class 3B	/BL	Blue laser line
	Improved laser power (20mW) for e.g. dark surfaces		Blue laser line (405nm) for (semi-) transparent, red-hot glowing and organic materials

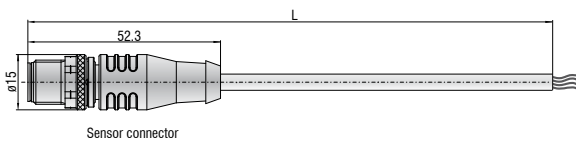
*Options can be combined



Ethernet connecting cable, qualified for drag chain use*

Part. No.	Model	Description
2901856	SC2600/2900-0.5	Ethernet interface cable, 0.5m
2901857	SC2600/2900-2	Ethernet Interface cable, 2m
2901858	SC2600/2900-5	Ethernet Interface cable, 5m
2901769	SC2600/2900-10	Ethernet Interface cable, 10m
2901859	SC2600/2900-15	Ethernet Interface cable, 15m
2901783	SC2600/2900-20	Ethernet Interface cable, 20m
2901860	SC2600/2900-35	Ethernet Interface cable, 35m

*Version suitable for use with robots is available



Multi-function cable, qualified for drag chain use*

Part. No.	Model	Description
2901988	PC2600/2900-2	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 2 m
2901868	PC2600/2900-5	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 5 m
2901767	PC2600/2900-10	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 10 m
2901989	PC2600/2900-15	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 15 m
2901869	PC2600/2900-20	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 20 m
2901966	PC2600/2900-25	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 25 m
2901990	PC2600/2900-35	multi-function cable, power supply, digital inputs (TTL or HTL), RS422 (half-duplex), 35 m

*Version suitable for use with robots is available

Accessories

Part. No.	Model	Description
0323478	Connector/12-pol/LLT2600-2900/PS/RS422/DigIN	Connector multifunction port for series scanCONTROL 2600/2900
0323479	Connector/8-pol/LLT2600-2900/Ethernet	Connector for Ethernet port for series scanCONTROL 2600/2900
2420067	PS2600/2900	Wall power supply for scanCONTROL 2600/2900
0254058	Suitcase scanCONTROL	Transport suitcase for scanCONTROL sensors, incl. measuring stand



- z-axis measuring range up to 300mm
- x-axis measuring range up to 148mm
- Profile frequency up to 4,000Hz
- Measuring rate up to 1,280,000 points/sec
- z-axis reference resolution from 4µm
- Resolution x-axis up to 640 points

Compact design and large offset distance

scanCONTROL 27x0 is ideal if a compact design and large distance between the sensor and the measurement object are required. This is particularly beneficial in dynamic, high speed processes, or where high target temperatures exist.

Extended measuring ranges for large targets

Extended measuring ranges are available for larger objects. Using software, the user can switch over from the standard range to the extended range. To document the measuring ranges, each sensor is equipped with a traceable calibration certificate.

Protective cover plate for harsh environments

A protective cover plate is available for harsh industrial environments. This plate can be equipped with an air purge. The cover plate is attached to the base of the sensor and has a protective window, through which the laser beam passes through. Therefore, applications such as measurements close to the welding process are possible.

scanCONTROL is available in three classes:

COMPACT

The **scanCONTROL 2700** sensors are the most economic sensors for static and dynamic applications. The sensor provides a profile frequency of 100Hz and up to 64,000 measuring points per second.

HIGHSPEED

The **scanCONTROL 2750** sensors offer everything you need for advanced high speed 3D applications. Up to 1,280,000 points per second with a profile frequency of up to 4,000Hz are possible using these sensors.

SMART

The SMART series **scanCONTROL 2710** offers a Plug & Play solution with integrated controller for simple measurement tasks. The sensor design is identical to the 2700 and 2750 series.

scanCONTROL 27x0-100 also with blue laser line

The large offset distance of the scanCONTROL 27x0-100 makes the sensor suitable for applications on hot and red-hot glowing materials. As a result, this sensor model is also available with a blue laser diode operating at a wavelength of 405nm. The special optics filters out the red reflections, allowing the sensor to precisely scan the exact contour of the blue laser line.

	Model	scanCONTROL	27x0-25	27x0-50	27x0-100
z-axis (height)	Standard measuring range	Start of measuring range	90mm	175mm	350mm
		Midrange	102.5mm	200mm	400mm
		End of measuring range	115mm	225mm	450mm
	Extended measuring range	Start of measuring range	85mm	160mm	300mm
		End of measuring range	125mm	260mm	600mm
	Linearity ¹⁾	(3sigma)	±0,2% FSO		
	Reference resolution ^{2) 3)}		4µm	10µm	15µm
x-axis (width)	Standard measuring range	Start of measuring range	23mm	44mm	88mm
		Midrange	25mm	50mm	100mm
		End of measuring range	27mm	56mm	112mm
	Extended measuring range	Start of measuring range	22mm	41mm	76mm
		End of measuring range	29mm	64mm	148mm
	Resolution x-axis		640 points/profile		
Profile frequency		standard	up to 100Hz		
		Highspeed 2750	up to 4,000Hz		
Interfaces		Ethernet GigE-Vision ⁶⁾	Output of measurement values Sensor control Profile data transmission		
		RS422 (half-duplex)	Output of measurement values Sensor control Trigger Encoder Synchronisation		
Output of measurement values		Ethernet (UDP / Modbus TCP) RS422 (ASCII / Modbus RTU) ⁴⁾ Analogue ⁵⁾ Switching signal ⁵⁾			
Display (LED)		1x laser, 1x power/error/status			
Light source		standard	Semiconductor laser 658nm (red)		
		optional	-	-	Semiconductor laser 405nm (blue)
Aperture angle laser line		20°			
Laser power		standard	10mW (class 2M)		
		optional	20mW (class 3B)		
Laser off		optional	via external contact		
Permissible ambient light (fluorescent light) ²⁾		10.000lx			
Protection class		IP 64			
EMC		acc. EN 61326-1: 2006-10 DIN EN 55011: 2007-11 (group 1, class B) EN 61000-6-2: 2006-03			
Vibration		2g / 20 ... 500Hz			
Shock		15g / 6ms			
Operating temperature		0°C to 50°C			
Storage temperature		-20°C to 70°C			
Dimensions		127 x 69 x 73mm	142 x 69 x 73mm	170 x 69 x 73mm	
Weight		approx. 700g	approx. 800g	approx. 850g	
Supply		8-30VDC, 500mA			

¹⁾ Standard measuring range

²⁾ Measuring object: Micro-Epsilon standard object (metallic, diffusely reflecting material)

³⁾ According to a one-time averaging across the measuring field (640 points)

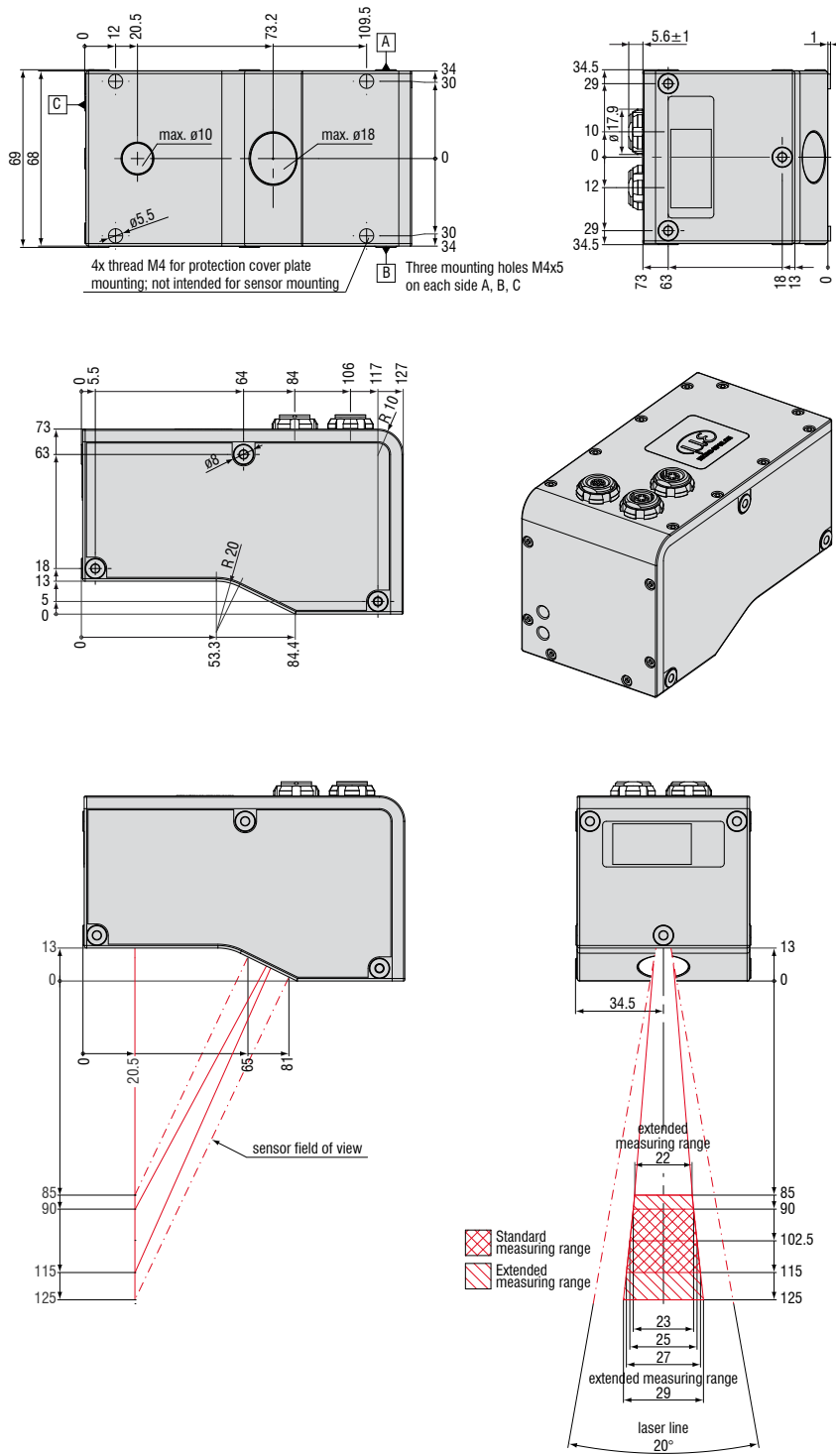
⁴⁾ RS422 interface, programmable as serial interface or input for triggering / synchronisation

⁵⁾ Only with Output Unit

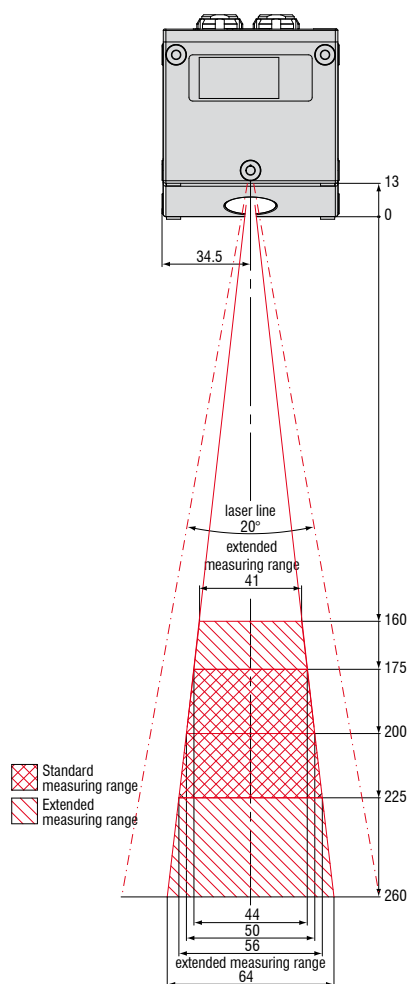
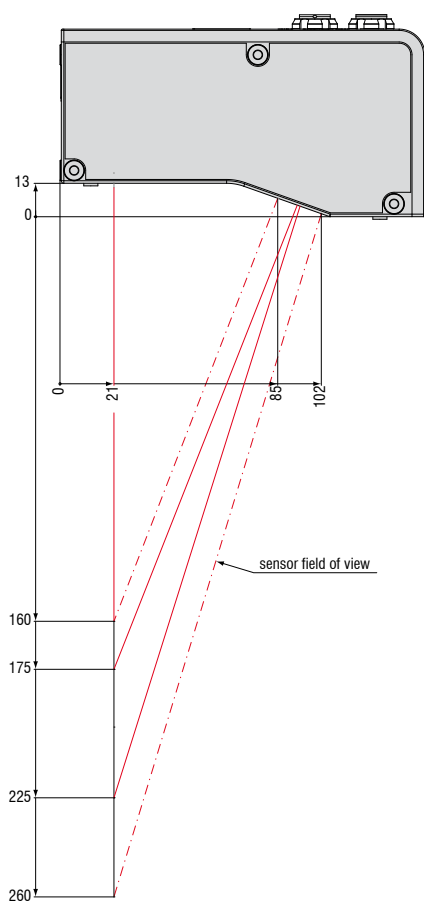
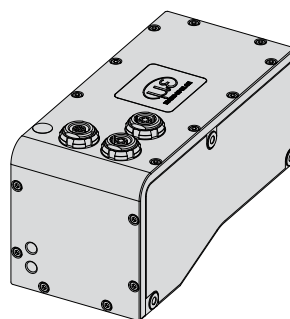
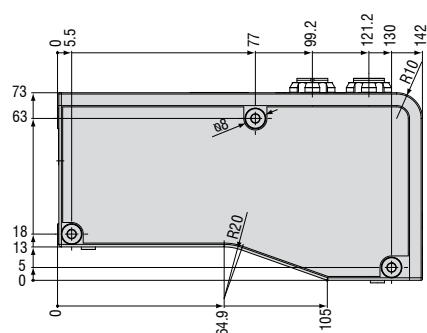
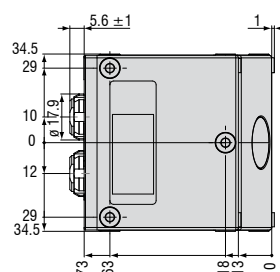
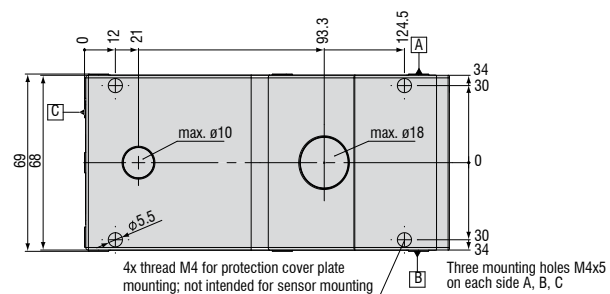
⁶⁾ Optionally available as Firewire interface

FSO = Full scale output

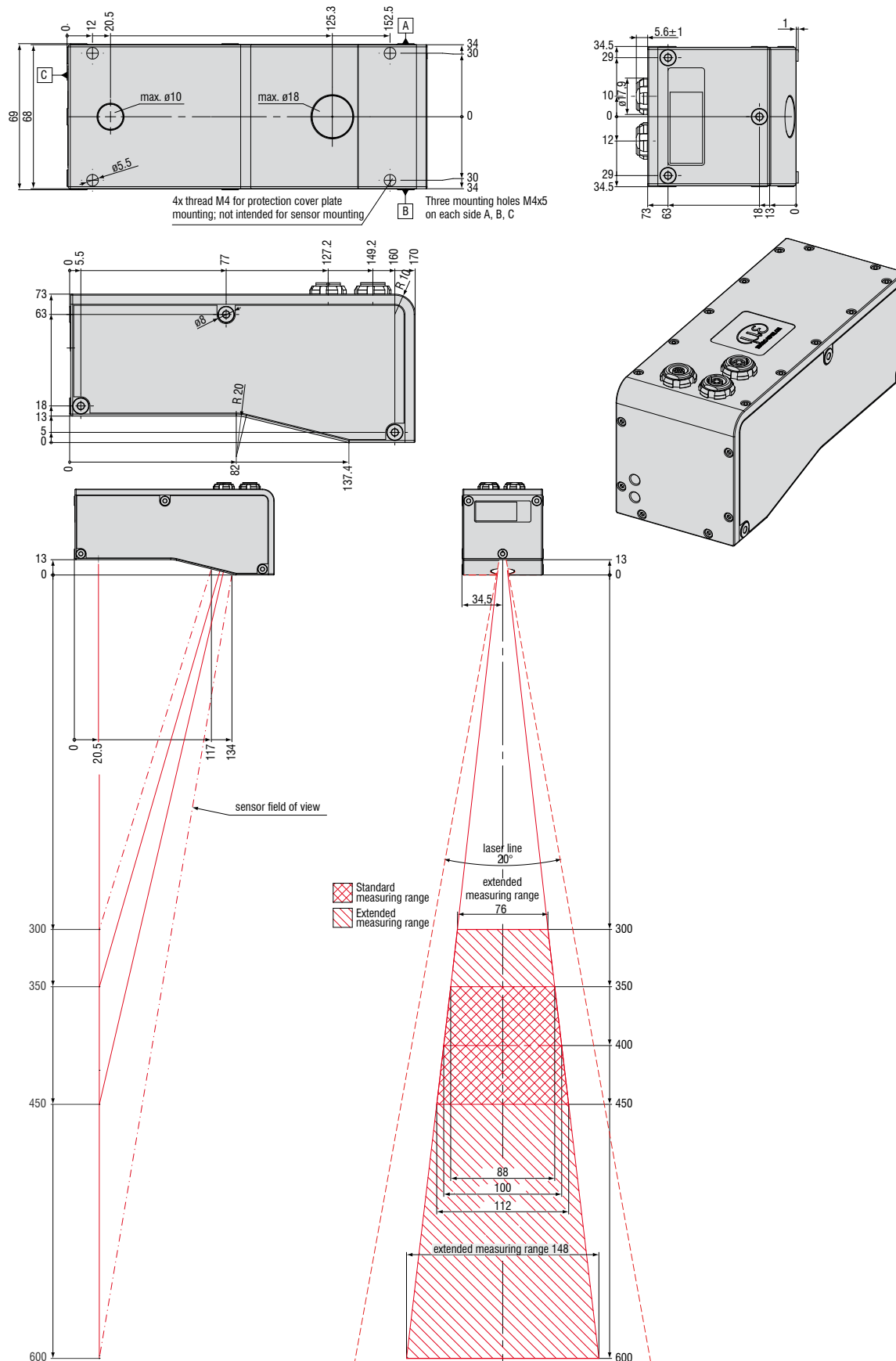
scanCONTROL 27x0-25



scanCONTROL 27x0-50



scanCONTROL 27x0-100

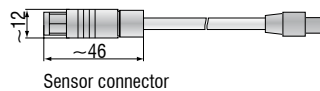


Connecting cables for power supply and interfaces

Ethernet connecting cables, qualified for drag chain use

Part. No.	Model	Description
2901512	SC2700-2/ET	Ethernet connecting cable 2m
2901513	SC2700-5/ET	Ethernet connecting cable 5m
2901514	SC2700-10/ET	Ethernet connecting cable 10m
2901515	SC2700-15/ET	Ethernet connecting cable 15m
2901516	SC2700-20/ET	Ethernet connecting cable 20m
2901640	SC2700-35/ET	Ethernet connecting cable 35m

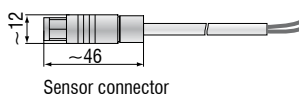
Ethernet connecting cable RJ45



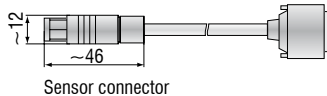
Ethernet connecting cables, qualified for robotic use

Part. No.	Model	Description
2901542	SCR2700-2/ET	Ethernet connecting cable 2m
2901543	SCR2700-5/ET	Ethernet connecting cable 5m
2901544	SCR2700-10/ET	Ethernet connecting cable 10m
2901545	SCR2700-15/ET	Ethernet connecting cable 15m
2901546	SCR2700-20/ET	Ethernet connecting cable 20m
2901702	SCR2700-35/ET	Ethernet connecting cable 35m

External power supply cable



RS422 interface cable



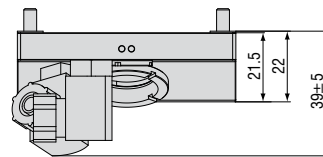
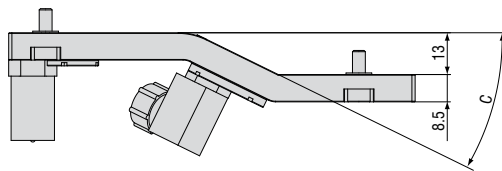
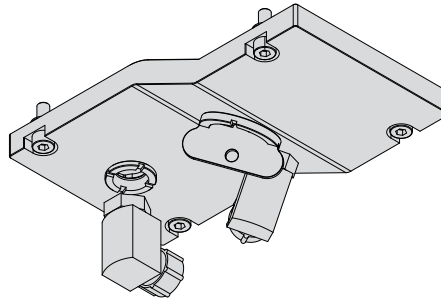
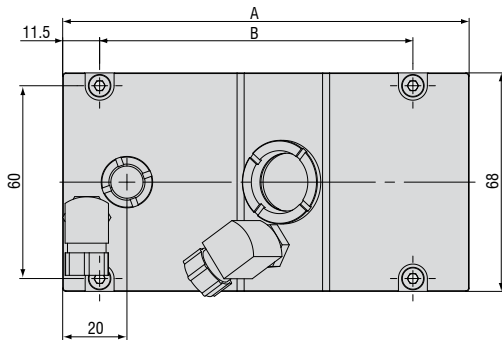
Other cables

Part. No.	Model	Description
2901407	PC2700-4,5	Power supply cable, 4.5m
2901406	SC2700-4,5/RS422	RS422 interface cable, 4.5m
2901581	SC2700-0,5/SYNC	Synchronisation cable for two scanCONTROL 2700 sensors

Accessories

Part. No.	Model	Description
0323399	Plug/8-pol/LLT2700/Ethernet	Connector for Ethernet port for series scanCONTROL 27xx
0323320	Connector/6-pin/LLT2700/power supply	Connector for power port for series scanCONTROL 27xx
0323351	Connector/6-pin/LLT2700/RS422	Connector for RS422 port for series scanCONTROL 27xx
2420059	PS2700	Power supply für suitcase scanCONTROL 2700
0254058	Suitcase scanCONTROL	Transport suitcase for scanCONTROL sensors, incl. measuring stand

Protective shield, fixed on the sensor (with or without air supply)

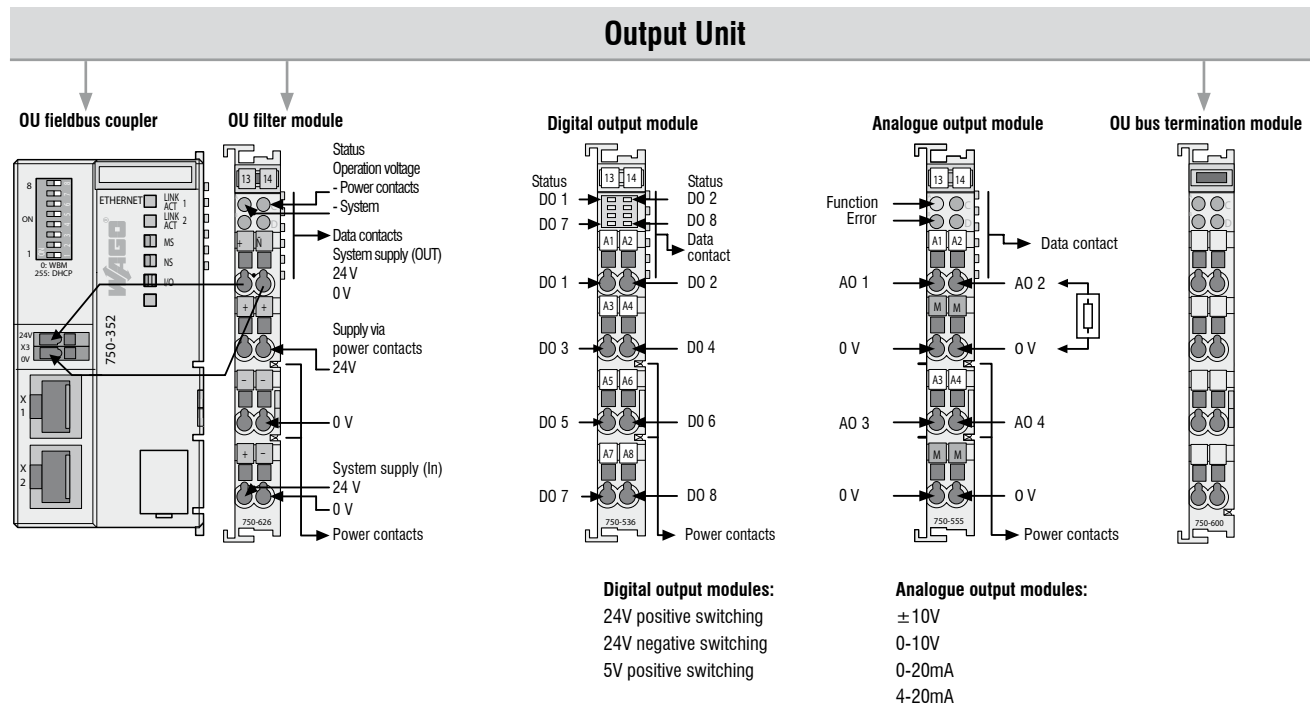


	A	B	C
PS-LLT2700-25	126.5	97.5	26.14°
PS-LLT2700-50	141.5	112.5	19.5°
PS-LLT2700-100	169.5	140.5	13.78°

Part. No.	Model	Description
2105029	PS-LLT2700-25	protective shield, mounted
2105028	PS-LLT2700-25/AIR	protective shield with air supply, mounted
2105027	PS-LLT2700-50	protective shield, mounted
2105026	PS-LLT2700-50/AIR	protective shield with air supply, mounted
2105025	PS-LLT2700-100	protective shield, mounted
2105024	PS-LLT2700-100/AIR	protective shield with air supply, mounted

Output Unit for scanCONTROL 26x0, 29x0 and 27x0 series

The scanCONTROL Output Unit is addressed via Ethernet and outputs analogue and digital signals. Different output terminals can be connected to the fieldbus coupler.



Part. No.	Model
6414073	Output Unit Basic/ET: Fieldbus coupler with filter module and bus termination
0325126	OU-AnalogueOut 2-Channel/0-10V
0325127	OU-AnalogueOut 2-Channel/0-20mA
0325128	OU-AnalogueOut 2-Channel/4-20mA
0325129	OU-AnalogueOut 2-Channel/ $\pm 10V$
0325132	OU-AnalogueOut 4-Channel/0-20mA
0325133	OU-AnalogueOut 4-Channel/4-20mA
0325135	OU-AnalogueOut 4-Channel/0-10V
0325116	OU-AnalogueOut 4-Channel/ $\pm 10V$
0325122	OU-DigitalOut 4-Channel/DC24V/0.5A/positive switching
0325123	OU-DigitalOut 4-Channel/DC24V/0.5A/negative switching
0325124	OU-DigitalOut 4-Channel/DC5V/20mA/positive switching
0325125	OU-DigitalOut 4-Channel/DC24V/0.5A/positive switching
0325131	OU-DigitalOut 8-Channel/DC24V/0.5A/negative switching
0325115	OU-DigitalOut 8-Channel/DC24V/0.5A/positive switching

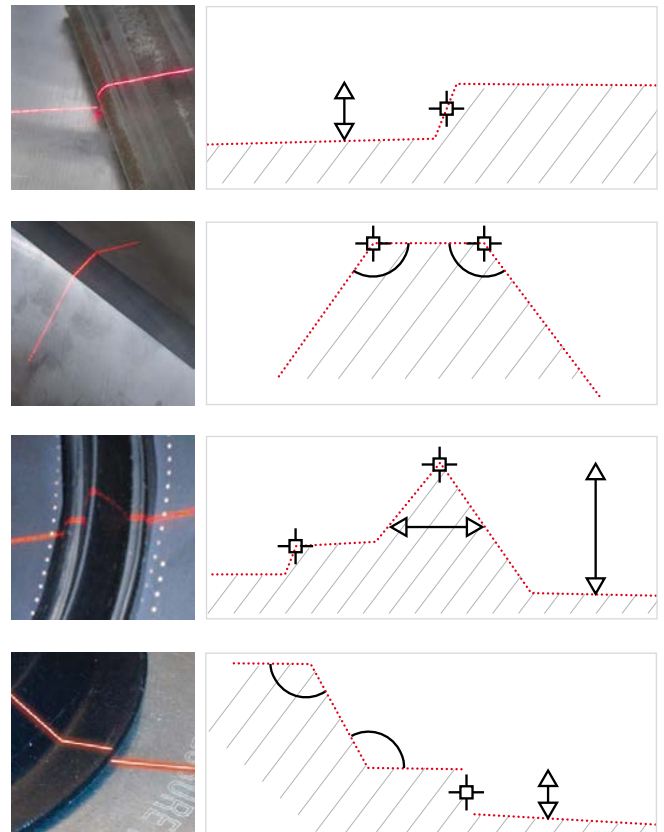


- Plug & Play solution for complex measurement tasks
- Real time profile analysis inside the controller
- Real-time saving of profile data
- Load and save parameters
- Protocol feature for measured values
- Easy online and offline analysis

The sensors of the SMART series have an intelligent controller which allows simple profile analysis without an additional PC.

The scanCONTROL Configuration Tools software is used for parameter setup of the profile analysis. As well as configuration of the sensor, this also enables the parameters of the measurement task to be set up and of the outputs, resulting in a compact, industrial, inline measurement solution.

For offline testing of high speed processes, the functions of the software also operate using pre-recorded profiles, without requiring a sensor to be connected. A complete profile analysis task can be programmed in four simple steps. The pre-configured measuring system operates in standalone mode and transmits the measured values to a PLC.

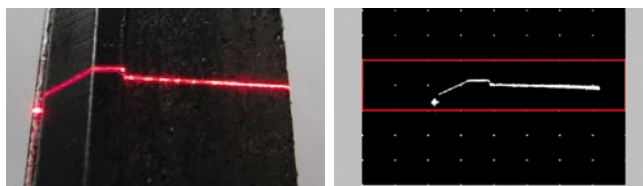


The system is freely configurable and can be quickly and easily adjusted for a variety of tasks

Step 1

Alignment of the sensor

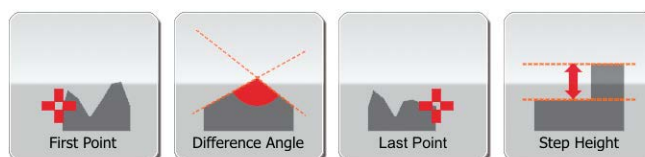
The 'Display Image Data' module will help you to mount the sensor. This shows a live image of the sensor matrix and the optimum measuring range, as well as the reflection characteristics of the target.



Step 2

Selection of measurement programmes

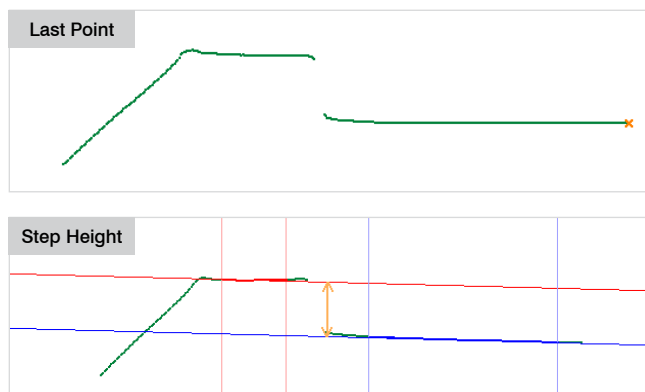
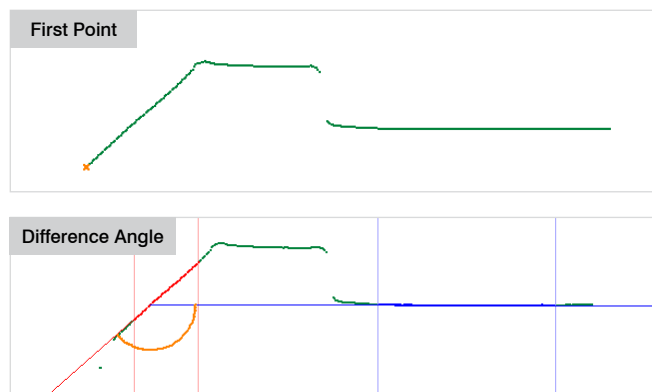
Depending on the measurement task, one or more measurement programmes can be selected with a simple mouse click. More than 25 modules are available. There are different module groups for the respective, common profile measurement tasks. The measurement programs to the right are suitable for the exemplary profiles above.



Step 3

Configuration of measurement programmes

Each of these measurement programmes can be individually configured. On a simple interface, different methods of interacting with the live measurement signal are available. Therefore, the relevant areas of the signal, for example, can be cut out and reference points set. The results of the individual measurement packages are displayed directly in the profile.



Step 4

Data processing

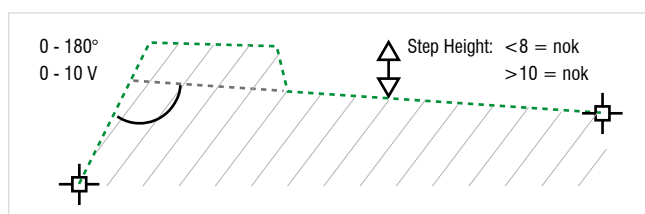
Once the individual measurement task parameters have been set up, the respective results are calculated together. This provides a simple method of calculating, for example, several angles or distances between points or lines against each other, or to project points onto lines. There are no limits to the flexibility of calculating measurement values.



Step 5

Defining the outputs and displaying measured values

In the final step, all measurement values are displayed as a profile, filtered temporally if required, and assigned to the different outputs. Limit values and interfaces can therefore be easily configured.





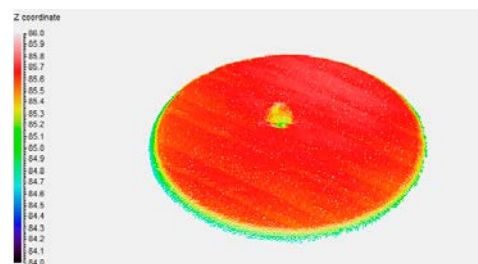
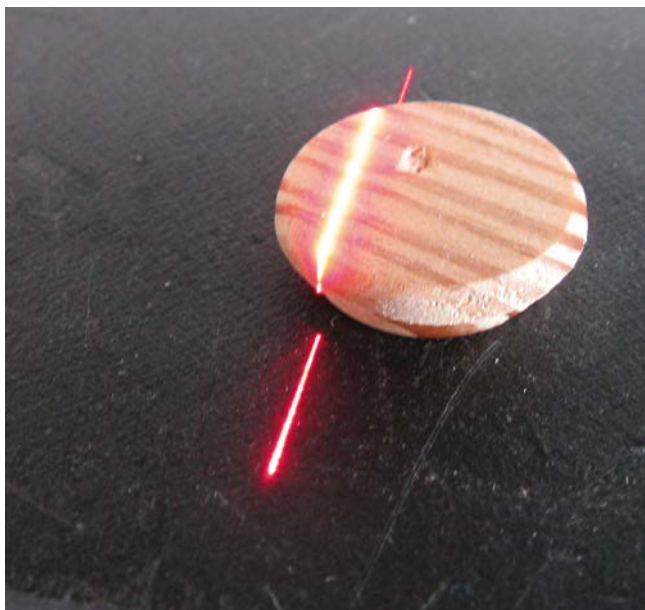
- Display of profile sequences
- Offline or real-time display of 3D profiles
- Synchronisation of the direction of travel (e.g. by encoder)
- 2D Export of the profile sequences (PNG)
- 3D Export (ASC, STL, CSV) for CAD programmes
- Intensity per point can be displayed and exported

Interactive 3D visualisation for all scanCONTROL models

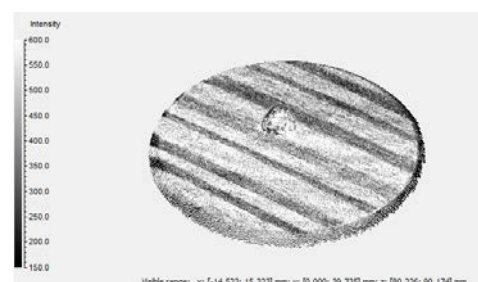
By means of the relative movement between sensor and target, the third dimension for the measurement data is obtained. The y-coordinates are assigned via a trigger or CMM counter.

The scanCONTROL 3D-View software is designed for viewing and exporting this 3D data. In addition, 3D-View also supports the configuration of the scanCONTROL sensor.

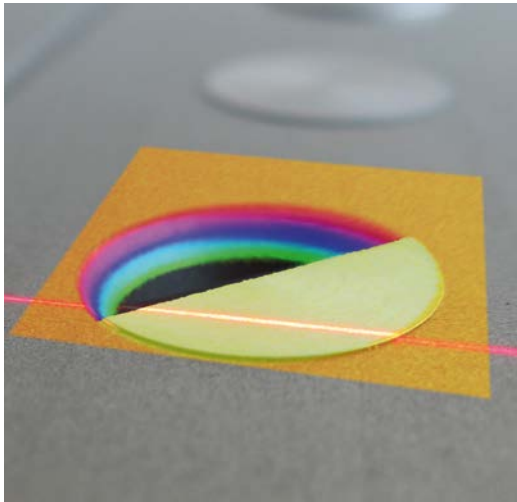
The software enables the interactive viewing of 3D data and the export of this measurement data to common data formats (ASCII, STL or PNG). Various display modes, views and colour palettes help in setting up the sensors and analysing the profiles. The software supports the online visualisation of the profiles as well as offline analysis of stored profile sequences.



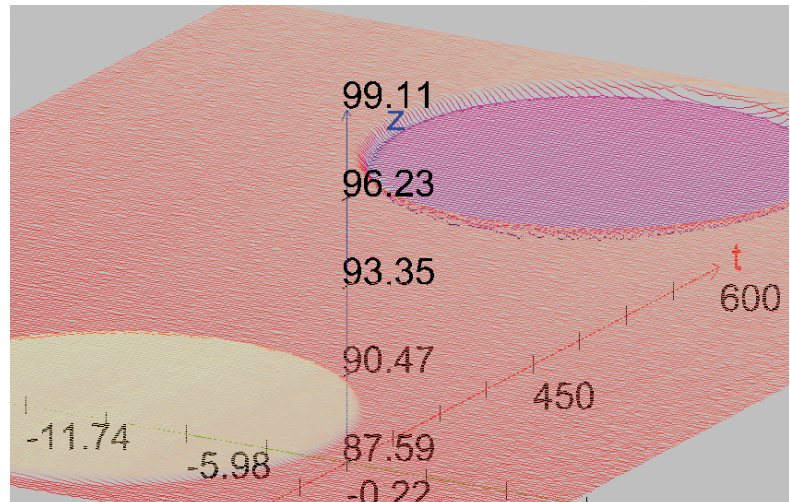
Distance profile



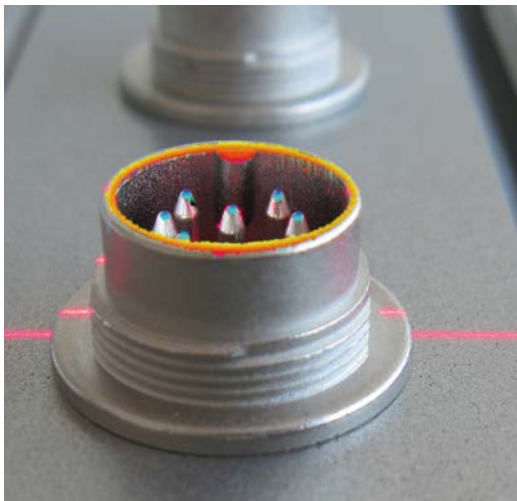
Intensity



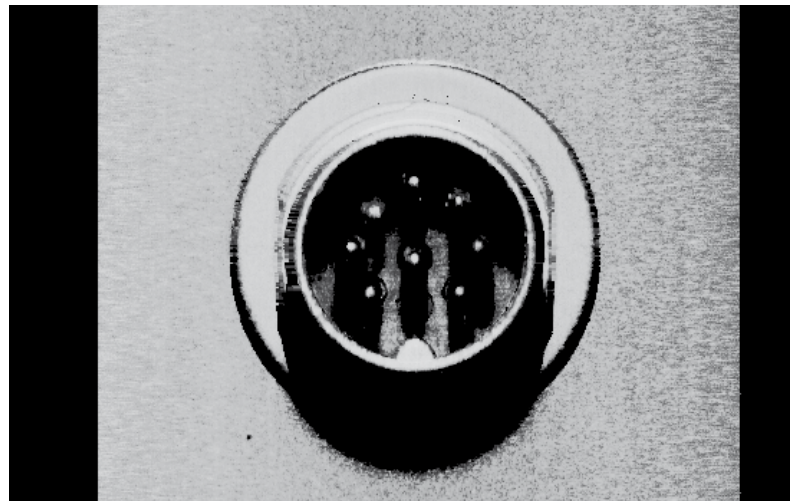
Rivet



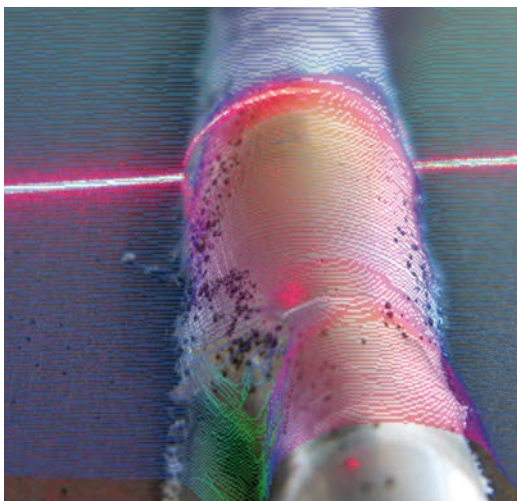
Display mode: „3D view lines“; Colour palette „z-coordinates“



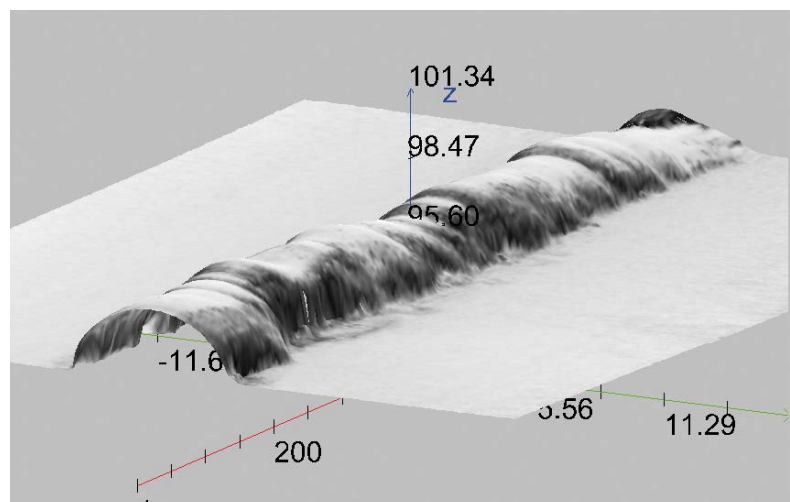
Pin



Display mode: „2D view“; Colour palette „intensity“



Weld seam



Display mode: „3D view triangles“; Colour palette coding „intensity“



The scanCONTROL COMPACT and HIGHSPEED sensors record a profile from individual calibrated points for each measurement. These profiles can be used individually or combined in a container set, and transferred to your own applications as an array or matrix. In addition to the data transfer of individual measuring points and their additional information (e.g. intensity, counter reading) the entire configuration of the sensor can also be controlled from its own application software.

Micro-Epsilon provides a number of interfaces to access the parameter and data transfer functions.

The transmission interface primarily used by scanCONTROL sensors for communications and profile transfer is Ethernet.

Ethernet and GigE Vision

The scanCONTROL with Ethernet interface complies with the GigE Vision (Gigabit Ethernet for machine vision) standard of the AIA (Automated Imaging Association).

GigE Vision ensures optimum data security, perfect performance and short design-in times during implementation. GigE Vision is based on Gigabit Ethernet and offers a maximum transfer rate. Ethernet technology offers advantages such as long cable lengths without using repeaters/ hubs, and it permits the use of inexpensive network components. The GigE Vision standard provides an open framework for data transmission (e.g. profiles, data sets) and control signals between scanCONTROL and a PC. The infrastructure topology provides numerous opportunities for single and multiple scanner applications.

C/C++/C#	LabView	Geomagic
LLT.DLL		IMAQdx
GigE Vision		
scanCONTROL with Ethernet		

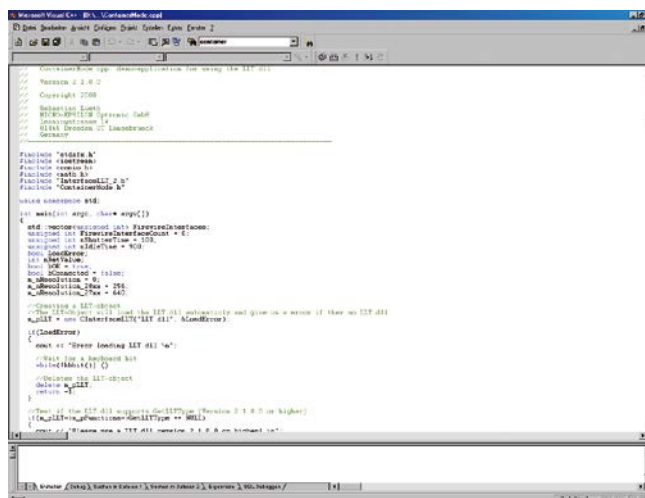
GigE
VISION

Integration with the C/C++ library

The C/C++ library for scanCONTROL supports both static and dynamic loading. Both stdcall and cdecl are supported as calling conventions. The individual functions of the library are clearly documented in the interface description and explained using examples.

The scanCONTROL SDK integration package includes:

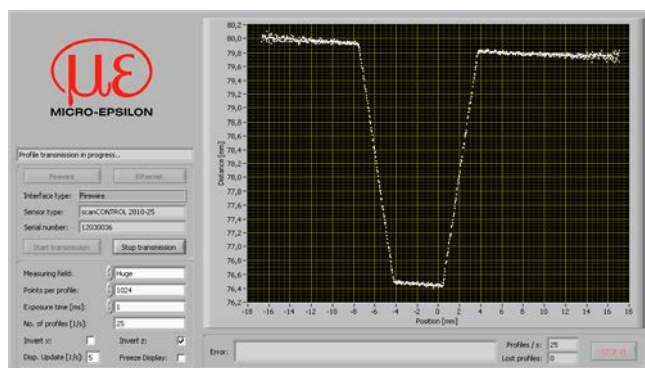
- The LLT.DLL library file
- Interfaces and scanCONTROL documentation
- Numerous programming examples for C++, e.g. for trigger and container mode
- Programming example for C#
- DeveloperDemo.exe demo for quick testing of the sensor configuration



Integration with LabVIEW

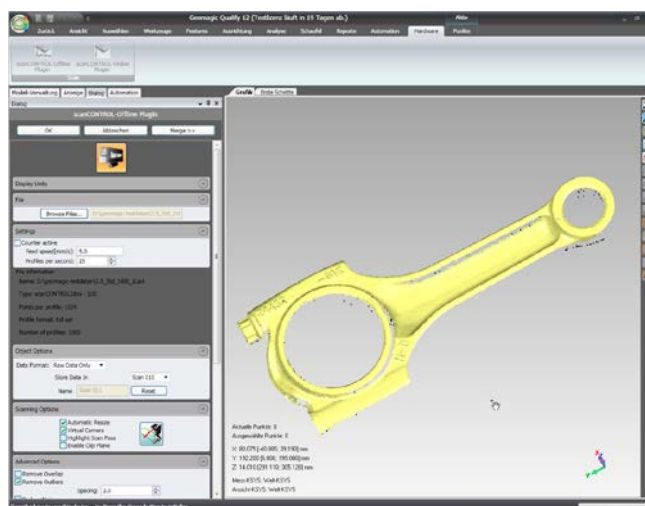
The LabVIEW scanCONTROL instrument driver supports fast integration of scanCONTROL sensors into the LabVIEW application environment. For accessing a scanCONTROL sensor and its basic settings, users can drag-and-drop modules directly from the function palette into their VI. Example VIs that illustrate scanCONTROL integration are also included in this package.

The integration of scanCONTROL sensors into the LabVIEW environment is based on the C/C++ library (LLT.DLL) of Micro-Epsilon. Detailed documentation also shows how to set up additional special sensor parameters.



Integration with Geomagic

Geomagic Wrap / Geomagic Quality and Geomagic Studio offer fast and accurate comparisons between digital reference models and scanned 3D data. These programs are used for testing pre-production products, production checks and managing supplier quality. The plug-in developed by Micro-Epsilon supports both online operations with all scanCONTROL sensors and importing offline data. So the plug-in can be used quickly and easily even without a sensor.



High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Optical micrometers, fibre optic sensors and fibre optics



Colour recognition sensors, LED analyzers and colour online spectrometer



Measurement and inspection systems



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