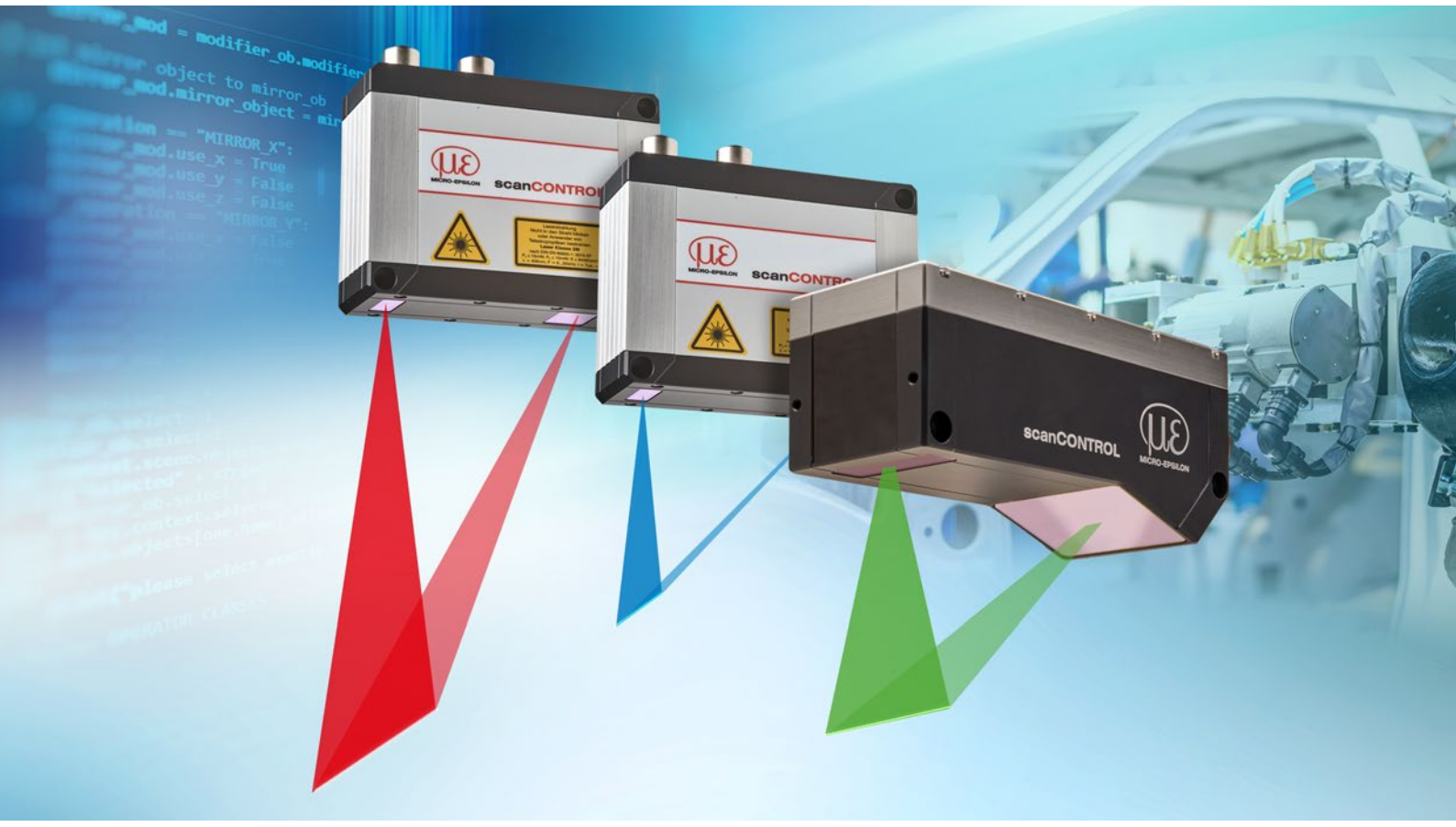
MICRO-EPSILON

More Precision.

scanCONTROL // 2D/3D Laser profile scanners



High-performance laser scanners with 4K resolution
scanCONTROL 8200 / 8500

- The smallest SMART 3D scanner with 4K resolution
- Innovative Green Laser Technology
- Highest measuring rate for maximum speed: 25 million points/sec
- Direct output of measurement values via Industrial Ethernet
- Highest detail detection with 4,224 points per profile



The new scanCONTROL 8500 laser scanners set new standards in industrial 3D measurement technology. For the first time, complete 3D data processing is performed directly in the sensor head in addition to 2D evaluation. The calculated measurement values are transmitted directly to a controller via Industrial Ethernet. Alternatively, calibrated 3D point clouds can be exported for further processing.

The series offers 4,224 measurement points per profile and can process up to 25 million points per second – ideal for high measuring rates. With a point cloud resolution of 8,448 × 4,224 pixels, even the smallest details are detected with the highest precision, which significantly improves process stability.

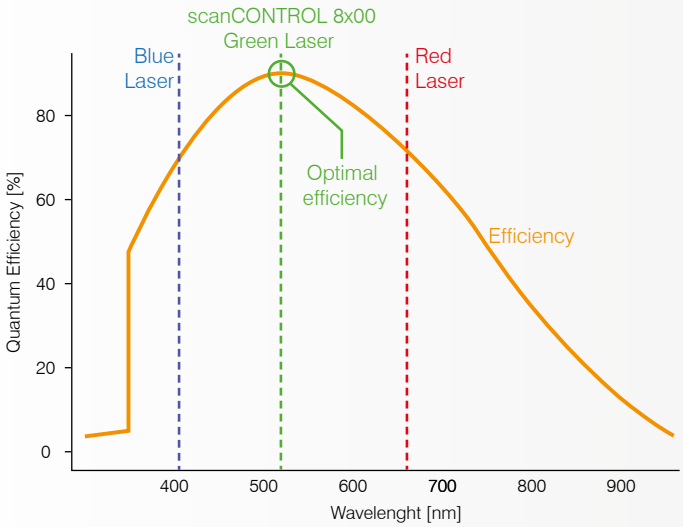
Article designation

LLT	8x00	-25

Measuring range
25 mm
50 mm
100 mm

Model series
LLT8500: 4,224 points per profile
LLT8200: 2,112 points per profile

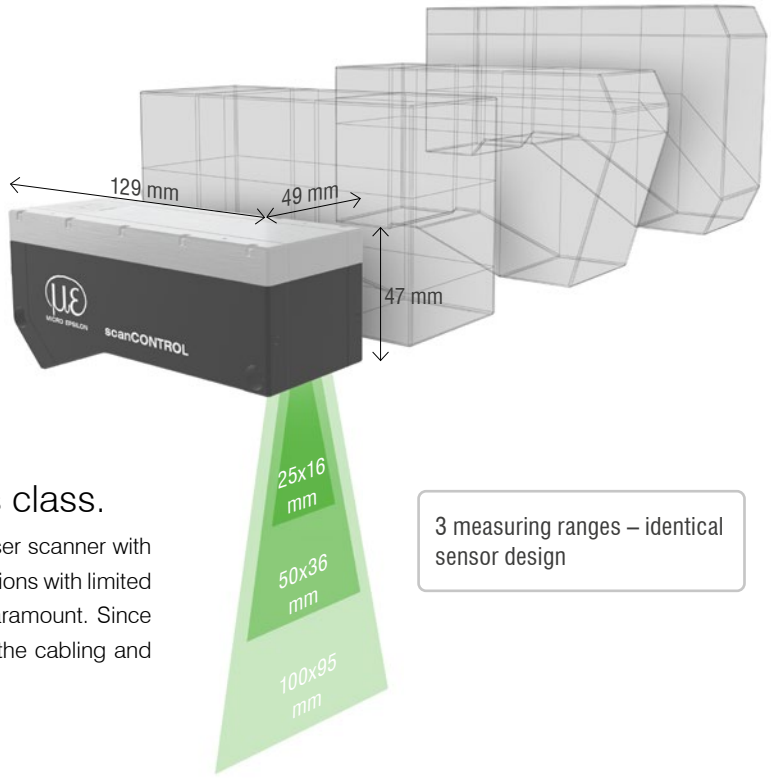
Accessories starting on page 50



The Green Laser Technology: Stable signal, maximum precision

The scanCONTROL 8x00 sensors use innovative Green Laser Technology (520 nm), which is close to the range of the sensor's maximum quantum efficiency. This produces extremely stable measuring signals with minimal noise – even on shiny metals, printed circuit boards, or organic surfaces.

The green laser enables shorter exposure times and higher repeatability, and significantly expands the application range – a decisive advantage over conventional scanners with red or blue lasers.



The most compact scanner in its class.

The scanCONTROL 8500 is the most compact 4K laser scanner with integrated SMART 3D evaluation. It is ideal for applications with limited installation space where precision and speed are paramount. Since no external computer unit is required, this simplifies the cabling and mechanical integration.

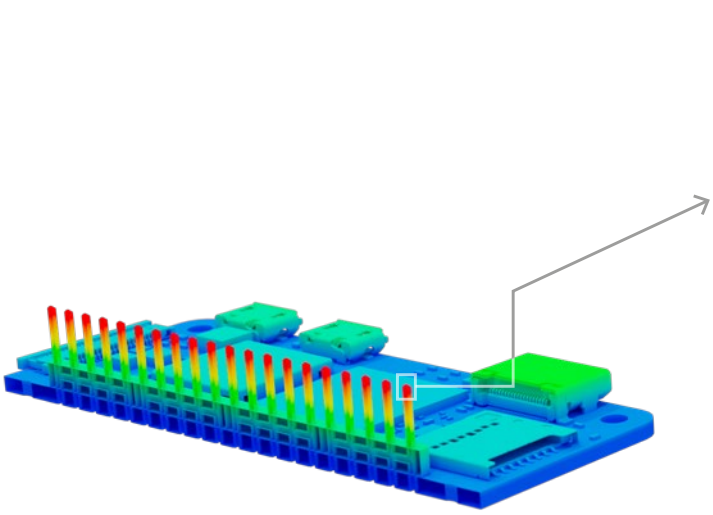
3 measuring ranges – identical sensor design

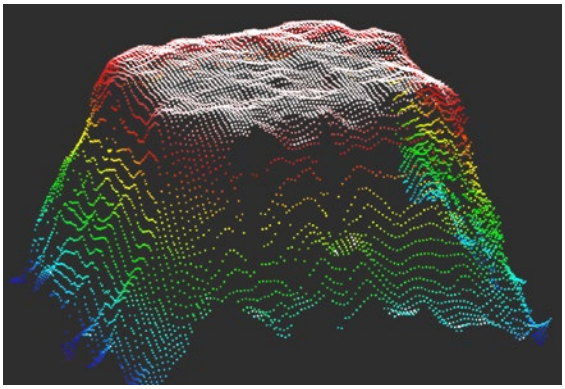
4K sensor matrix for maximum resolution and dynamic range

The new high-performance 4K matrix with extended dynamic range redefines precision. It captures even the finest details at the highest resolution while delivering impressive speed – even on strongly varying surfaces or under changing lighting conditions. This sensor matrix enables ultra-fast, high-resolution measurement processes and sets new standards for modern industrial applications.

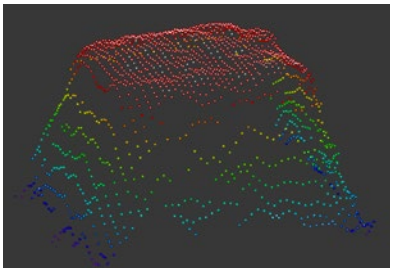
New lens system for maximum light output

The newly developed high-performance lens system sets new standards in laser scanner technology. Through maximum light output and perfectly matched optical components, the scanners deliver their full potential even on challenging surfaces. The result is consistently reliable measurements and optimal performance in every application.





scanCONTROL 8500 enables ultra-sharp scans



Conventional scanners

Innovative laser scanner with 4K resolution
scanCONTROL 8500

Model		LLT8500-25	LLT8500-50	LLT8500-100
Measuring range (z-axis)	Start of measuring range	74.5 mm	83 mm	110 mm
	Mid of measuring range	82.5 mm	101 mm	157.5 mm
	End of measuring range	90.5 mm	119 mm	205 mm
	Height of measuring range	16 mm	35 mm	95 mm
Linearity (z-axis) [1] [2]		±0.005 %	±0.005 %	±0.005 %
Measuring range (x-axis)	Start of measuring range	24.2 mm	46.2 mm	84 mm
	Mid of measuring range	25 mm	50 mm	100 mm
	End of measuring range	25.8 mm	53 mm	115 mm
Resolution (x-axis)		6 µm	12 µm	24 µm
		4,224 points/profile		
Profile frequency		up to 10,000 Hz		
Interfaces	Ethernet GigE Vision	Output of measurement values Sensor control		
	Digital inputs	Trigger Encoder Mode switching		
	Differential inputs/outputs (I/O; Sync)	Trigger Encoder Switch output Synchronization		
Output of measurement values		Ethernet (UDP / Modbus TCP); switch signal; PROFINET; EtherCAT; EtherNet/IP		
Control and indicator elements		3x color LEDs for laser, data and error		
Light source	Green laser	≤ 20 mW	≤ 20 mW	≤ 20 mW
		Standard: Laser class 2M, semiconductor laser 520 nm		
Laser switch-off		via software and hardware switch-off		
Aperture angle of laser line		24 °	29 °	42°
Permissible extraneous light [3]		150,000 lx	120,000 lx	90,000 lx
Protection class (DIN EN 60529)		IP67 [4]		
Vibration (DIN EN 60068-2-27)		2g / 20 ... 500 Hz		
Shock (DIN EN 60068-2-6)		15g / 6 ms		
Temperature range	Storage	-20 °C ... +70 °C		
	Operation	0 °C … +45 °C [5]		
Weight		approx. 560 g / 720 g (with passive cooling unit)		
Supply voltage		11 … 30 VDC, nominal value 24 V, 15 W Power over Ethernet (PoE) available		

[1] Based on the measuring range; measuring object: Micro-Epsilon standard object
[2] According to a one-time averaging across the measuring field (4,224 points)
[3] Measured under illumination with an incandescent lamp
[4] When an optional active cooling unit is installed, the IP rating is reduced to IP40.
[5] Applies with sufficient heat dissipation through suitable mechanical connection or the optionally available passive cooling unit

Innovative laser scanner
scanCONTROL 8200

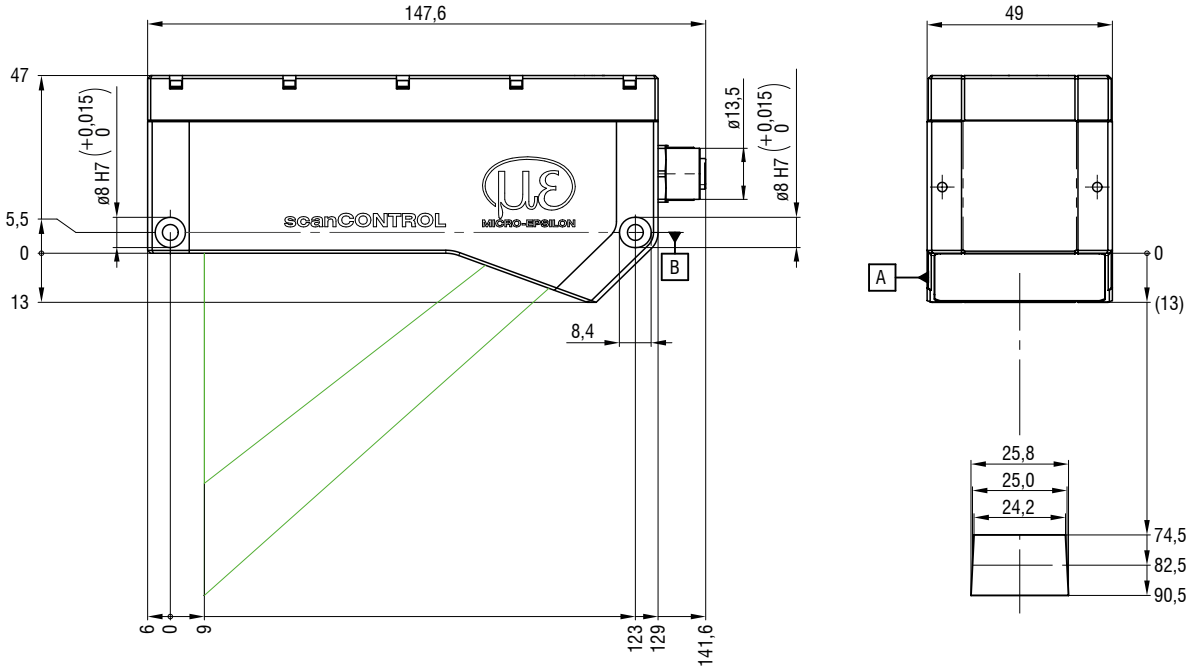
Model		LLT8200-25	LLT8200-50	LLT8200-100
Measuring range (z-axis)	Start of measuring range	74.5 mm	80 mm	110 mm
	Mid of measuring range	82.5 mm	97 mm	157 mm
	End of measuring range	90.5 mm	115 mm	205 mm
	Height of measuring range	16 mm	35 mm	95 mm
Linearity (z-axis) [1] [2]		±0.005 %	±0.005 %	±0.005 %
Measuring range (x-axis)	Start of measuring range	24.2 mm	46.2 mm	84 mm
	Mid of measuring range	25 mm	50 mm	100 mm
	End of measuring range	25.8 mm	53 mm	115 mm
Resolution (x-axis)		12 µm	24 µm	48 µm
		2,112 points/profile		
Profile frequency		up to 10,000 Hz		
Interfaces	Ethernet GigE Vision	Output of measurement values Sensor control		
	Digital inputs	Trigger Encoder Mode switching		
	Differential inputs/outputs (I/O; Sync)	Trigger Encoder Switch output Synchronization		
Output of measurement values		Ethernet (UDP / Modbus TCP); switch signal; PROFINET; EtherCAT; EtherNet/IP		
Control and indicator elements		3x color LEDs for laser, data and error		
Light source	Green laser	≤ 20 mW	≤ 20 mW	≤ 20 mW
		Standard: Laser class 2M, semiconductor laser 520 nm		
Laser switch-off		via software and hardware switch-off		
Aperture angle of laser line		24 °	29 °	42°
Permissible extraneous light [3]		150,000 lx	120,000 lx	90,000 lx
Protection class (DIN EN 60529)		IP67 [4]		
Vibration (DIN EN 60068-2-27)		2g / 20 ... 500 Hz		
Shock (DIN EN 60068-2-6)		15g / 6 ms		
Temperature range	Storage	-20 °C ... +70 °C		
	Operation	0 °C … +45 °C [5]		
Weight		approx. 560 g / 720 g (with passive cooling unit)		
Supply voltage		11 … 30 VDC, nominal value 24 V, 15 W Power over Ethernet (PoE) available		

[1] Based on the measuring range; measuring object: Micro-Epsilon standard object
[2] According to a one-time averaging across the measuring field (2,112 points)
[3] Measured under illumination with an incandescent lamp
[4] When an optional active cooling unit is installed, the IP rating is reduced to IP40.
[5] Applies with sufficient heat dissipation through suitable mechanical connection or the optionally available passive cooling unit

Dimensions and measuring ranges
scanCONTROL 8200 / 8500

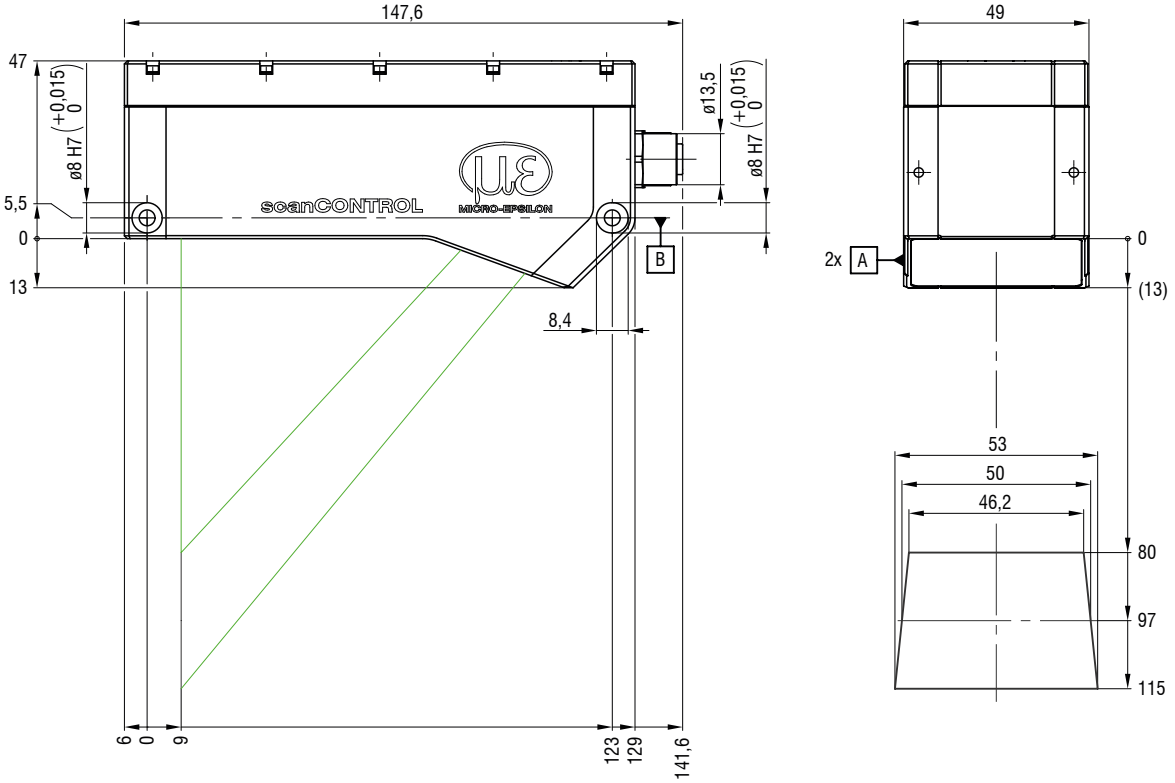
LLT8x00-25

Green-Laser



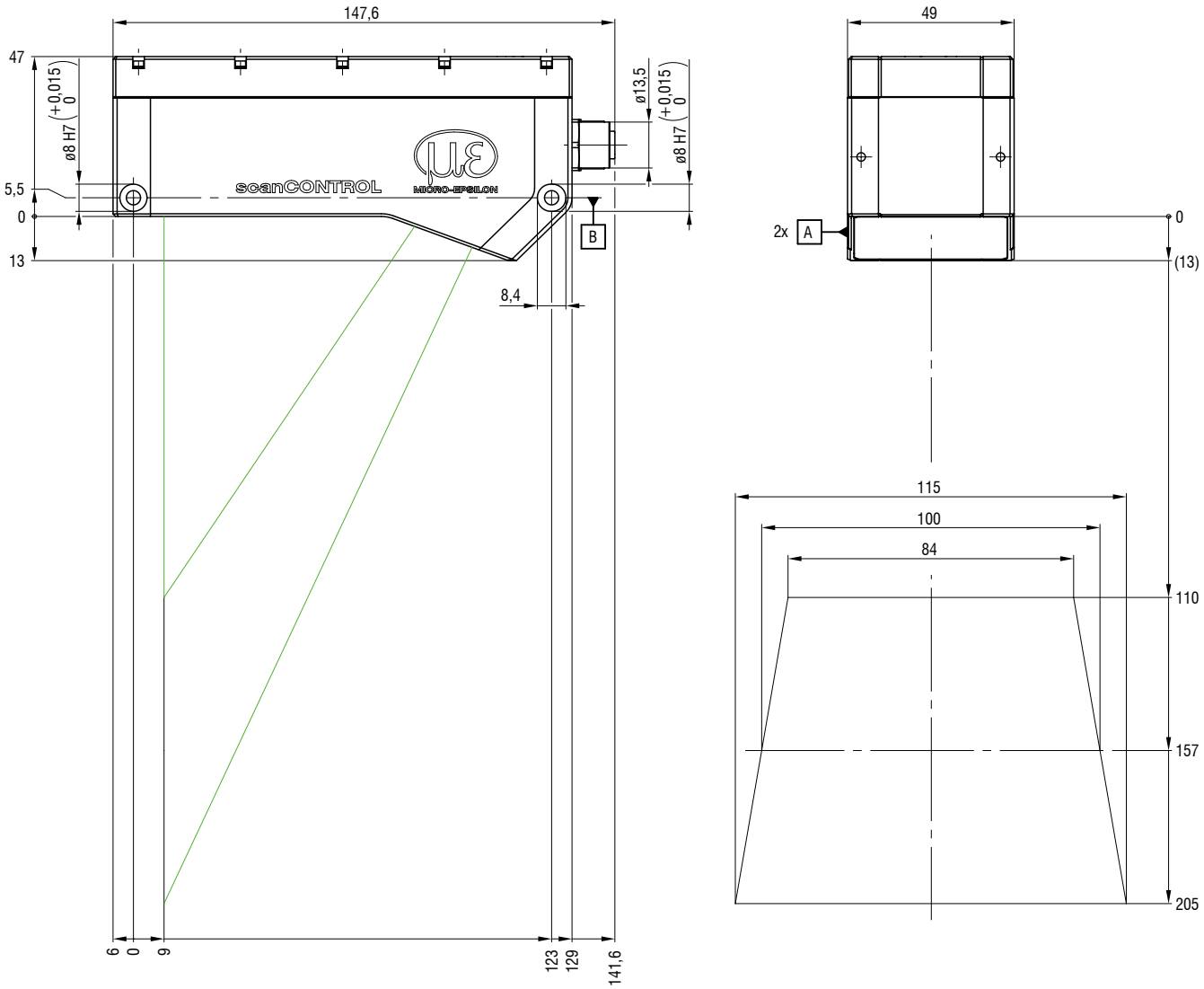
LLT8x00-50

Green-Laser



LLT8x00-100

Green-Laser



Software for surface inspection and 3D measurement
3DInspect

More information



3DInspect: powerful software for 3D measurement and inspection tasks

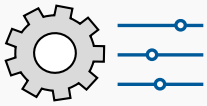
3DInspect is powerful software for industrial measurement and inspection tasks. The 3D measurement data generated by the sensor are processed, evaluated, and automatically assessed in the software based on defined criteria. Measurement results can be visualized, logged and, if required, output directly to a machine or line PLC. In addition, both the measurement results and the complete 3D data can be saved for documentation and later analysis.

Fast & intuitive path to a high-precision 3D solution

The 3D sensors are parameterized directly in 3DInspect. This enables quick configuration of the optimal sensor settings for the specific measurement task. The captured 3D data are preprocessed and optimized. For example, the part position is aligned automatically to enable repeatable evaluation of the point cloud independent of the workpiece orientation. In addition, functions are available for filtering, smoothing, cropping, creating cross-sections, and highlighting relevant features.

3DInspect offers over 80 powerful measurement programs for data evaluation. This enables reliable localization and measurement of features such as edges, spheres, or bores. In addition to evaluating the complete 3D data, cross-sections can also be evaluated. All 2D and 3D objects can be related to one another to determine, for example, distances between a sphere and a plane or the angle between two edges. All determined values and performed evaluations can be output as measurement results.

End-to-end workflow from parameterization to output



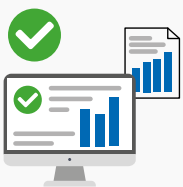
Parameterization
- Optimal sensor parameters for the application
- Save and reuse parameter sets
- Select measuring ranges



Data preprocessing
- Align and position the point cloud
- Set filters and cross-sections
- Highlight features, remove interference



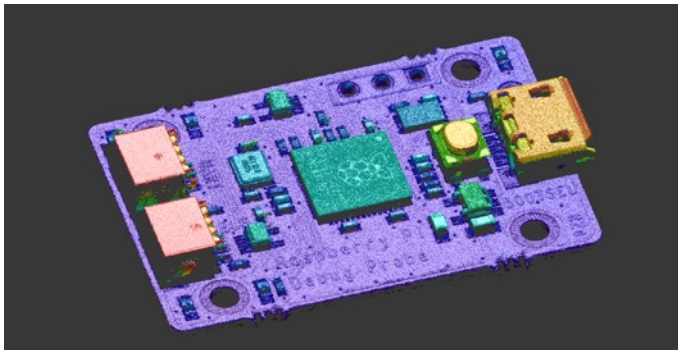
Data evaluation
- Over 80 measurement programs
- Combination of multiple programs
- Evaluation of cross-sections or 3D areas



Evaluation & output
- Evaluation of results (OK/NOK)
- Output via digital outputs, fieldbus or Ethernet
- Logging and export of measurement values and 3D data

3DInspect with scanCONTROL

The 3DInspect software supports the scanCONTROL 30xx and scanCONTROL 8x00 models. The scanCONTROL 8x00 series can execute 3DInspect evaluation programs directly on the sensor. The scanCONTROL sensors of the 30xx series require an external computing unit for this.



All benefits at a glance

- User-friendly interface – easy creation of measurement programs
- Inline operation – stand-alone operation of the measurement programs directly on the SMART sensors
- Wide range of predefined programs for 2D & 3D geometry measurements and surface inspection
- Logging and storage of 3D data directly in the software
- Valid3D – Real 3D instead of only 2.5D enables a true representation of the measuring object without data loss
- Parameterization of fieldbus integration via the automation interface

Functional extensions

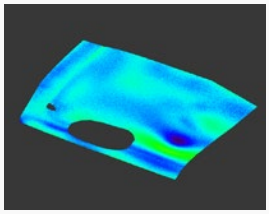
Optional functional extensions allow the functionality to be tailored specifically to the application. The following functional extensions are available for scanCONTROL:

Functional extension: Automation

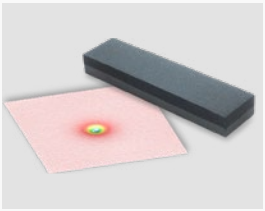
The *Automation* extension enables the base software to be controlled via the PLC. Data and measurement results can be exchanged bidirectionally between the software and the control system. For the scanCONTROL 8x00 models, the SMART Automation license already includes the Automation functional extension.

Functional extension: Surface inspection

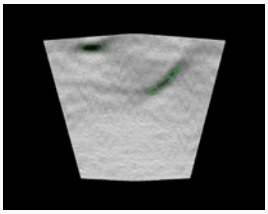
The *Surface inspection* extension enables reliable detection of deviations from a homogeneous surface. Tools such as Digital Stone, Digital Master, and defect detection with sorting and counting options are available from 3DInspect 3.1 onwards.



Digital Master:
Objective target/actual comparison with good parts (including variance taken into account)



Digital Stone:
Simulates a physical whetstone. High precision with high repeatability



Defect detection with sorting and counting function:
Automatic defect detection and height evaluation

Connectivity options
scanCONTROL 8x00



More information

The right solution for integrated evaluation or 3D data

Depending on the variant, the 8x00 sensor family offers a particularly straightforward way to directly output measurement values or further process 3D data.

SMART

Fast, intuitive path to a high-precision 3D solution

3D DATA

Highest precision with maximum integration flexibility

Direct output of measurement values

For PLCs and automation

- Transfer measurement values directly to the PLC
- Sensor control via standard protocols
- OK/NOK result evaluation and output via digital outputs or fieldbus

Recommended tools

3DInspect, ME Modbus Tool

EtherCAT, EtherNet/IP, PROFINET, Modbus, UDP

Integration into image processing

For vision systems and software

- Standardized interfaces: GenICam / GigE Vision
- Direct connection to compatible vision software
- Output of 3D data

Compatible interfaces & software

COGNEX VisionPro, HALCON a product of MVTec, GENICAM, GIGE VISION

Integration into customer software

For developers and OEMs

- SDKs and LLT.DLL for C/C++ or C#/.NET
- LabVIEW drivers and example programs
- Developer Tool with sample code
- Documentation and support

Supported environments

3D sensor SDK

C/C++, C#/.NET, Linux, LabVIEW, python

For custom workflows, advanced integrations or special requirements, we will be happy to help you select the right solution.

Connection options
scanCONTROL



LLT8x00

Supply and output cable (see accessories)

SMART

3D DATA

3D DATA



LLT30xx

Supply and output cable (see accessories)

SMART



2D/3D Gateway

SMART

PROFILE



Industrial Performance Unit (IPU)

SMART

PROFILE

PROFILE



LLT2xx0

Supply and output cable (see accessories)

SMART



2D/3D Gateway

SMART

PROFILE

PROFINET, EtherCAT, EtherNet/IP, Modbus TCP, UDP

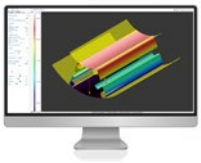


PLC

GigE Vision

3DInspect

GigE Vision



Third-party software

PROFINET, EtherCAT, EtherNet/IP

Modbus TCP, UDP

PROFINET, EtherNet/IP, EtherCAT, Modbus TCP

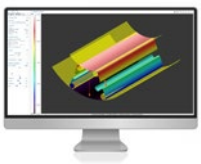


PLC

GigE Vision

3DInspect

GigE Vision



Third-party software

PROFINET, EtherCAT, EtherNet/IP

Modbus TCP, UDP



PLC

GigE Vision



Third-party software

Industrial PC for GigE Vision sensors
Industrial Performance Unit

More information

- The powerful solution for 3D measurement tasks
- Full compatibility and inline capability for customer applications
- Intuitive 3DInspect software with Valid3D technology from Micro-Epsilon
- Efficient commissioning of Micro-Epsilon sensors
- Integrated interfaces: Modbus/TCP, EtherCAT, PROFINET, EtherNet/IP
- Industrial-grade hardware with passive cooling



SMART PROFILE 3D DATA

PROFINET EtherCAT EtherNet/IP Modbus

The powerful solution for 3D measurement tasks

The Industrial Performance Unit (IPU) is a powerful computing platform for the efficient commissioning of Micro-Epsilon sensors and systems and offers full compatibility for inline processes in customer applications. The IPU is compatible with scanCONTROL 30xx laser scanners and is required for using 3DInspect with these scanner models. For scanCONTROL 8x00 models, processing power can be increased by using an IPU. Micro-Epsilon 3D sensors can be connected to the Industrial Performance Unit via the GigE Vision standard. The intuitive 3DInspect software with Micro-Epsilon Valid3D technology makes sensor parameterization easy, allowing measurements to start immediately. The Industrial Performance Unit directly processes the 3D data, which are subsequently evaluated and assessed using 3DInspect. The integrated Modbus/TCP, EtherCAT, PROFINET and EtherNet/IP interfaces are available for outputting the results. The flexible, industrial-grade hardware with passive cooling allows easy and space-saving installation. This makes integration into a control cabinet or direct mounting in the machine very easy. Accessories such as a monitor, mouse or keyboard can be easily connected to the computer.

Model		Industrial Performance Unit
RAM		16 GB
Memory		128 GB SSD
Supply voltage		9 ... 36 V DC
Power consumption	typ.	50 W
	max.	112 W
Digital interfaces		Gigabit Ethernet (GigE Vision / GenICam) / PROFINET / EtherCAT / EtherNet/IP
Connection		4-pin supply terminal strip; 2x RJ45 for Gigabit Ethernet; 2x RJ45 for Industrial Ethernet (PROFINET, EtherCAT or EtherNet/IP); 1x HDMI, 1x VGA, 4x USB3.2 (Gen1); 4x USB2.0
Mounting		Mounting holes; accessories for table or wall mounting and DIN rail mounting
Temperature range	Storage	-40 ... +85 °C
	Operation [1]	0 ... +50 °C
Shock (DIN EN 60068-2-27)		20g / 11 ms half-sine
Vibration (DIN EN 60068-2-6)		3g / 5 ... 500 Hz
Protection class (DIN EN 60529)		IP40
Material		Metal housing
Weight		2.8 kg
Control and indicator elements		2 LEDs for storage and power; 4 LEDs for Ethernet status display / 1 power on/off switch
Special features		Windows 10 IoT Enterprise

[1] Maximum permissible operating temperature at 0.7 m/s airflow

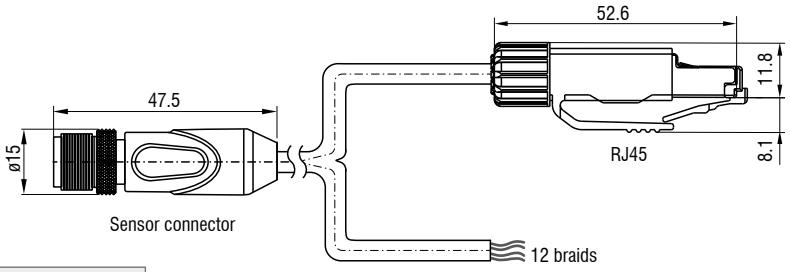
Connection cables

For LLT8x00

Multifunction cable PCR8500-x/OE-RJ45

Power supply cable suitable for drag chains and robots, digital I/Os, sync, and Industrial Ethernet

Cable length in meters: 2 / 5 / 10 / 15 / 25 / 35



Article no.	Model
29011601	PCR8500-2/OE-RJ45
29011602	PCR8500-5/OE-RJ45
29011603	PCR8500-10/OE-RJ45

Article no.	Model
29011604	PCR8500-15/OE-RJ45
29011606	PCR8500-25/OE-RJ45
29011607	PCR8500-35/OE-RJ45

Multifunction cable with right-angle connector PCR8500/90-x/OE-RJ45

Power supply cable suitable for drag chains and robots, digital I/Os, sync, and Industrial Ethernet

Cable length in meters: 2 / 5 / 10 / 15 / 25 / 35

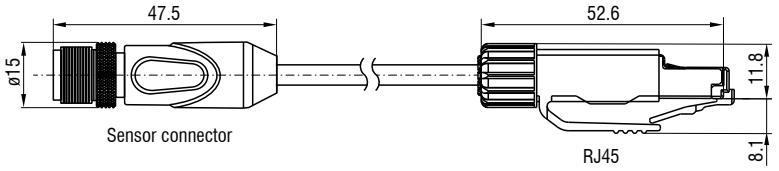
Article no.	Model
29011758	PCR8500/90-2/OE-RJ45
29011759	PCR8500/90-5/OE-RJ45
29011760	PCR8500/90-10/OE-RJ45

Article no.	Model
29011761	PCR8500/90-15/OE-RJ45
29011762	PCR8500/90-25/OE-RJ45
29011763	PCR8500/90-35/OE-RJ45

Ethernet connection cable SCR8500X-x

Cable for parameter setting, measurement value and profile data transmission; suitable for drag chains and robots

Cable length in meters: 2 / 5 / 10 / 15 / 25 / 35



Article no.	Model
29011647	SCR8500X-2
29011648	SCR8500X-5
29011649	SCR8500X-10

Article no.	Model
29011650	SCR8500X-15
29011652	SCR8500X-25
29011653	SCR8500X-35

Gigabit Ethernet cable with right-angle connector SCR8500X/90-x

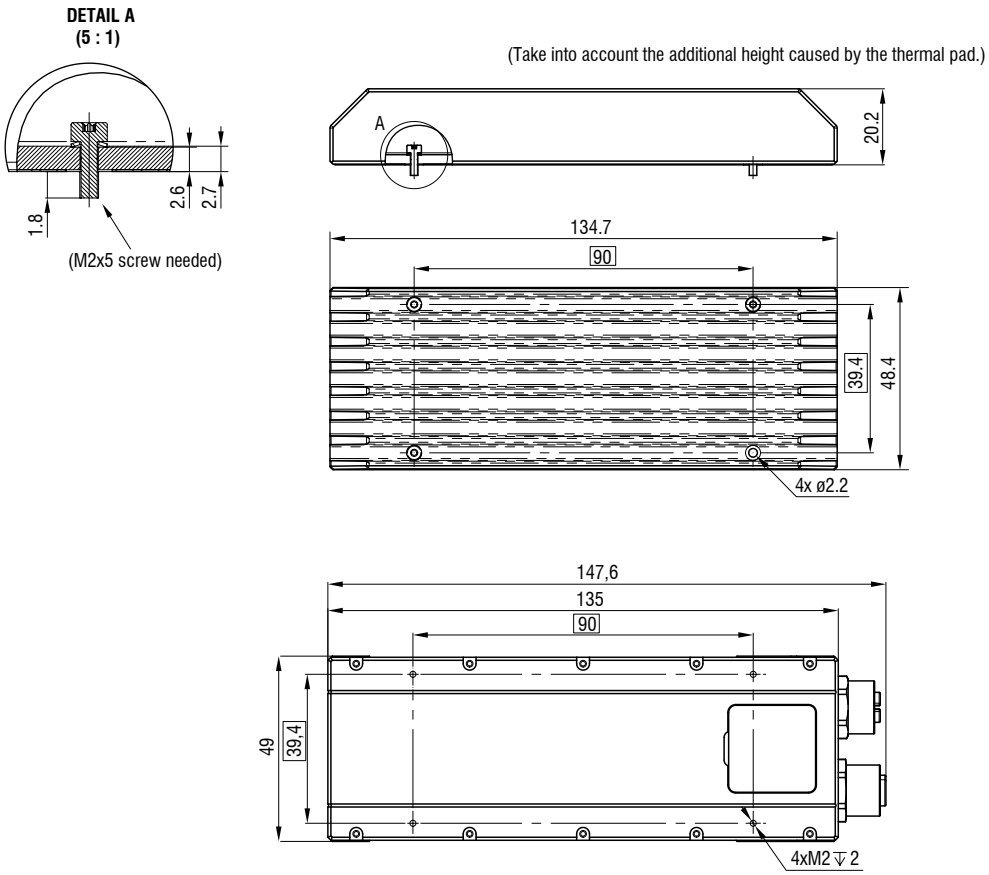
Cable for parameter setting, measurement value and profile data transmission; suitable for drag chains and robots

Cable length in meters: 2 / 5 / 10 / 15 / 25 / 35

Article no.	Model
29011772	SCR8500X/90-2
29011773	SCR8500X/90-5
29011774	SCR8500X/90-10

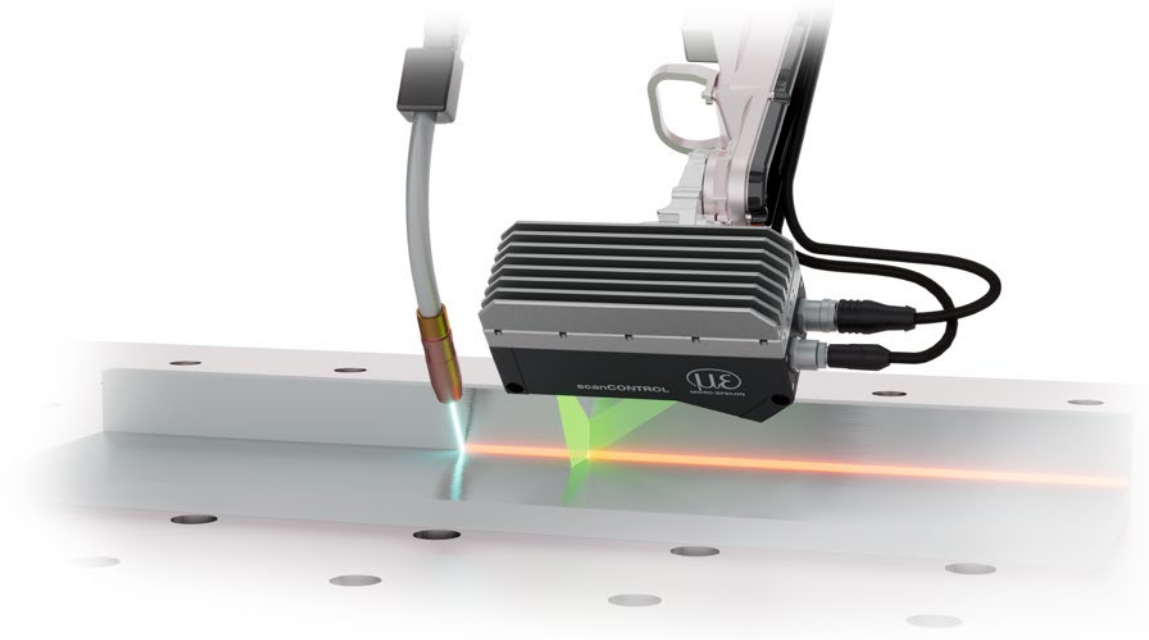
Article no.	Model
29011775	SCR8500X/90-15
29011776	SCR8500X/90-25
29011777	SCR8500X/90-35

Passive heat sink for LLT8x00



Article no.	Model
2820205	Passive heat sink for scanCONTROL 8x00

Active heat sinks with fans and integration of customer-specific cooling solutions are also possible. Contact us.



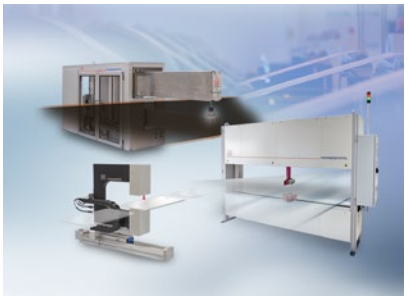
Sensors and Systems from Micro-Epsilon



Sensors and systems for displacement, distance and position



Sensors and measurement devices for non-contact temperature measurement



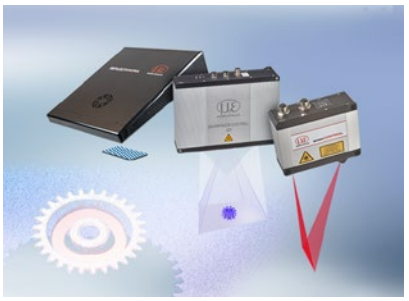
Measuring and inspection systems for metal strips, plastics and rubber



Optical micrometers and fiber optics, measuring and test amplifiers



Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection

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