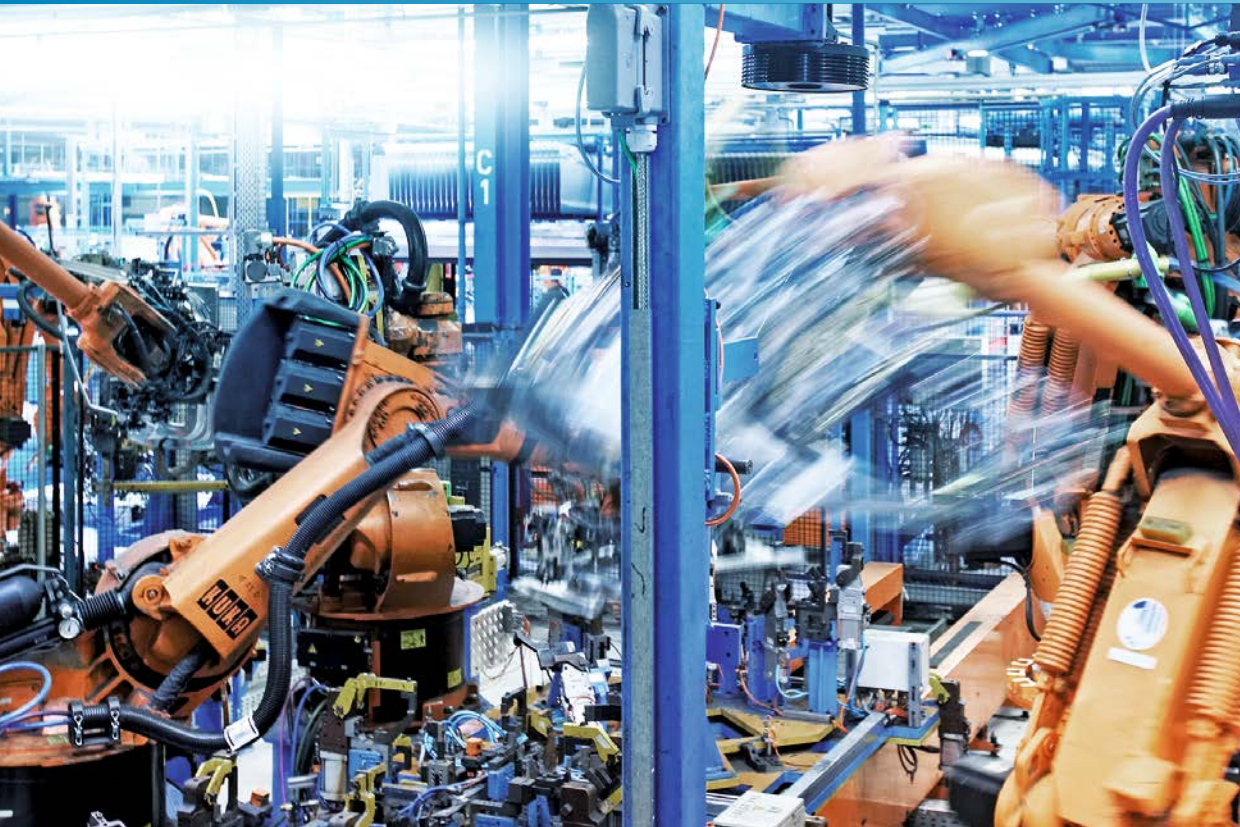# ScanningRuler

RELIABLE AND PRECISE SNAPSHOT 3D FOR A LARGE FIELD OF VIEW

High-end cameras

SICK
Sensor Intelligence.

3D VISION FOR ROBOTIC APPLICATIONS

The ScanningRuler is a high-end 3D camera that boosts the performance and cost-effectiveness of robotics applications. A single device is able to scan the entire pallet (U.S. and European) without moving.

Imaging of stationary scenes

The ScanningRuler provides accurate and reliable 3D data from stationary objects, which allows robot systems to locate parts in advanced picking applications and find the optimum gripping position. Packed with state-of-the art technology and innovative features, the ScanningRuler is the ideal choice for high-throughput solutions in harsh industrial environments.

Easy to integrate

The ScanningRuler delivers 3D images of stationary scenes with the use of an integrated, sweeping laser. In addition, the laser scan generates a 2D intensity overlay that can be used for part identification. No external light sources, encoders or additional imaging equipment are required since all components are contained in the rugged IP 65 aluminum housing. Together with the features of the imaging technology, this facilitates the design and development of highly competitive solutions.

APPLICATIONS

Random bin picking in material processing and assembly lines
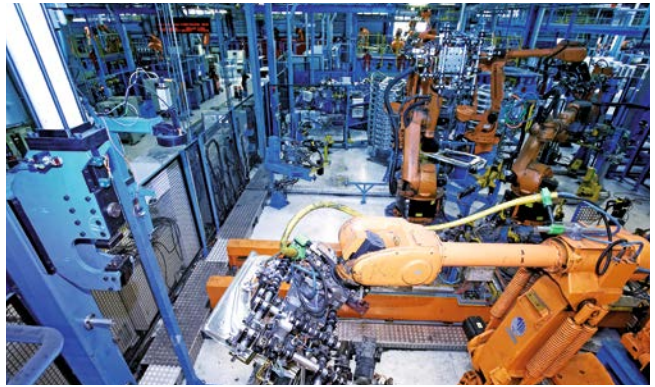
Picking position of large parts in robotics applications

Robot picking from large pallets or trays

Completeness check and empty space reduction in boxes at distribution centers

De-palletizing of pallets or trays at logistics centers
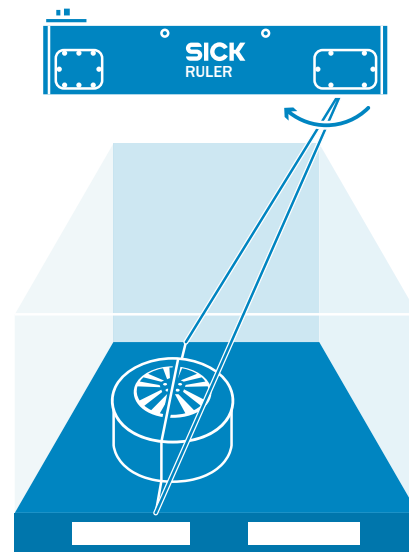
ADVANCED 3D CAMERA TECHNOLOGY AT YOUR SERVICE

① **Snapshot 3D imaging of stationary scene and parts**
No need for external light sources, encoders or mechanics to create motion

② **Large field of view (volume)**
A single camera at a fixed position scans the entire pallet (both U.S. and European)

③ **Accurate and factory-calibrated 3D data**
Measurements in millimeters are readily available in advanced robot picking applications

④ **High immunity to ambient light and contrast variation**
Measurements can be obtained on a wide range of materials and colors

⑤ **Out-of-the-box 3D and 2D image acquisition**
Easy to configure, integrate, and commission

⑥ **Rugged IP 65 aluminum housing**
Industry proven, reliable operation in harsh industrial environments

⑦ **Built-in 2M laser light source**
Eye-safe lighting with a long lifetime

⑧ **Gigabit Ethernet interface**
Easy connection to PC for streaming 3D data

⑨ **Rugged connectors**
Metal casing and protection for Power-I/O and Gigabit Ethernet connections
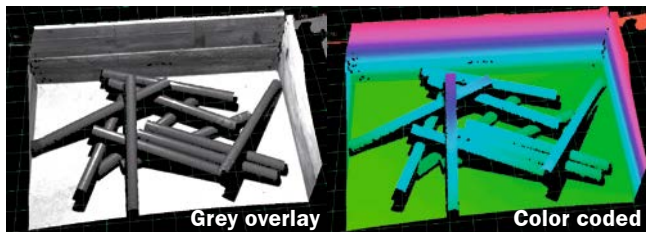
MEASURING WITH
THE SCANNINGRULER

The ScanningRuler measures the 3D shape and 2D intensity of stationary parts using the laser triangulation principle. When a trigger signal is received, the internal rotating mirror sweeps the laser line over the stationary parts.

The result of each sweep is a calibrated 3D point cloud, representing the surfaces of the parts in the field of view. Each measurement in the point cloud contains the position (x, y, z) in millimeters, and the reflected intensity. The 3D data can also be retrieved as a rectified height map.
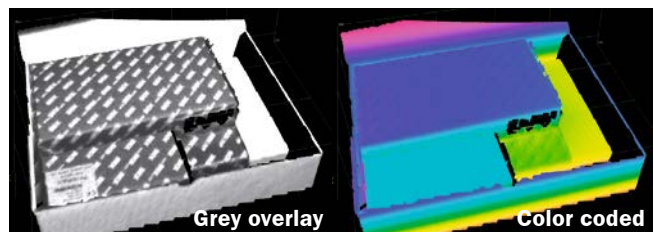
In a vision system, the ScanningRuler acts as a data streamer and sends the 3D and intensity data to a hosting PC where it is further processed. A typical application for the ScanningRuler is a robot picking system, where the 3D images are used to locate parts and calculate the best gripping position.
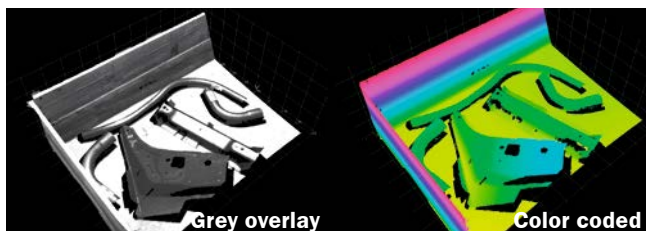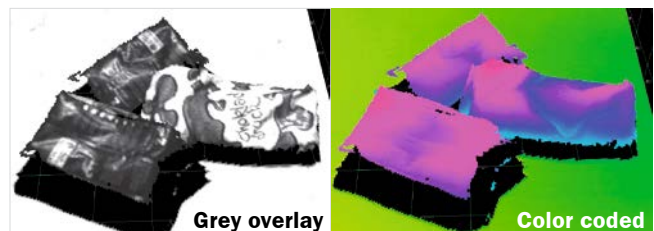
3D MEASUREMENT RESULTS

Grey overlay **Color coded**

Metal rods

Grey overlay **Color coded**

Packed boxes

Grey overlay **Color coded**

Automotive parts

Grey overlay **Color coded**
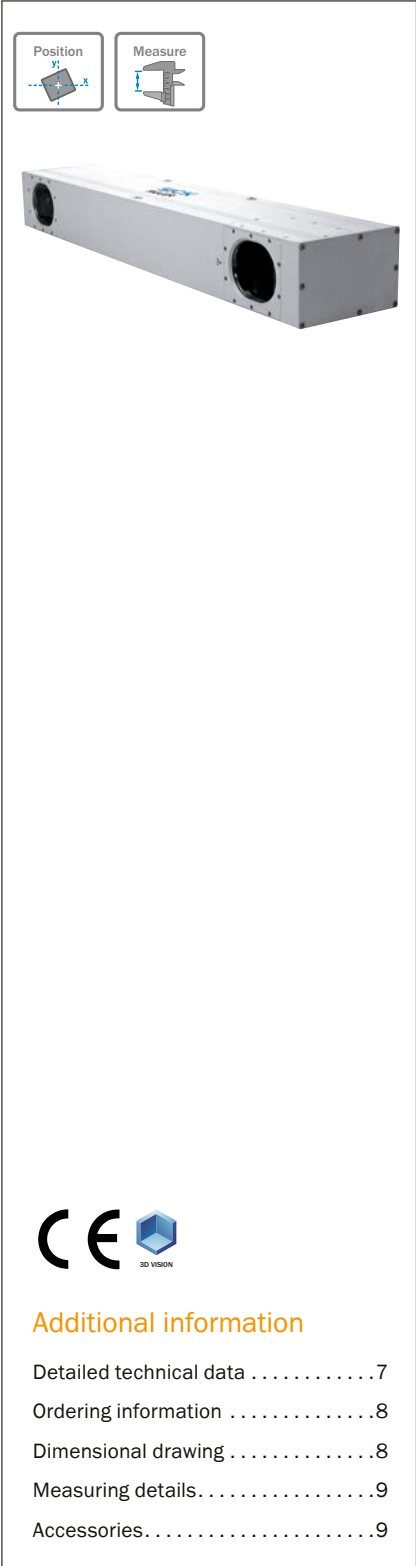
Bags

RELIABLE AND PRECISE SNAPSHOT 3D FOR LARGE FIELD OF VIEW

Product description

The ScanningRuler is the perfect tool for 3D imaging in robot picking applications. It provides accurate and reliable 3D measurements of stationary objects. The data that is acquired can be used to locate parts in random bin picking applications and to calculate the best robot gripping position. The camera has a built-in laser light source and provides 3D point cloud measurements in millimeters of the entire scene. These features, in combination with the camera's immunity to ambient light and its simple configuration, make the ScanningRuler very easy to integrate and use. In addition to 3D images, the ScanningRuler also provides a 2D image of the scene to simplify part identification. The ScanningRuler is connected to a PC with Gigabit Ethernet and has a rugged design that provides reliable operation in harsh industrial environments.

At a glance

- 3D imaging of stationary objects
- Large field of view for scanning U.S. and Euro pallets
- Accurate and reliable acquisition of factory-calibrated 3D data in millimeters
- High immunity to ambient light and contrast variation
- Rugged housing with built-in laser light source
- Point cloud 3D data with grayscale information

Your benefits

- 3D imaging of stationary objects reduces the effort and the costs required to develop robot picking applications
- Large field of view within a single device allows for cost-efficient solutions
- Reliable factory-calibrated 3D measurements provide easy integration, use and replacement
- High immunity to ambient light ensures accurate measurements and increased throughput in factory conditions
- Industrial design with a built-in laser light source ensures problem-free operation

Additional information

➜ **www.mysick.com/en/ScanningRuler**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

Detailed technical data

Features

Task	Positioning, measuring
Technology	3D snapshot
Working distance	1,000 mm … 2,000 mm
Example volume of view (L x W x H)	1,000 mm x 1,200 mm x 750 mm (max. image area), 800 mm x 1,200 mm x 1,000 mm (max. height range)
Light source	Visible red light (laser, 660 nm, ± 15 nm)
Data synchronization	Free running, external trigger
Grayscale measurements	✔
Spectral range	Approx. 630 nm … 690 nm
Factory calibrated	✔

Performance

Image sensor	CMOS
Typical resolution (X, Y, Z)	1 mm … 4 mm, depending on distance to camera

Interfaces

Configuration software	Ranger Studio
Communication interfaces	Gigabit Ethernet
Operating system	Windows 7, Windows XP Pro
Development environment	C++ / .Net
Programming interface	iCon API
Digital inputs	2 x HIGH = 10 V … 28.8 V
Digital outputs	1 x B-type, < 100 mA in total

Mechanics/electronics

| Connectors	Harting Push Pull (Ethernet), M12, 8-pin male connector (power I/O)
Connector material	M12: nickel-plated brass, Ethernet: thermoplast/anodized aluminum
Supply voltage	24 V DC, ± 20 %
Ripple	< 5 V_{pp}
Power consumption	10 W
Current consumption	< 1 A
Enclosure rating	IP 65
Housing material	Aluminum
Housing color	Gray, varnished
Window material	Float glass, AR-coated
Weight	13.5 kg
Dimensions (L x W x H)	820 mm x 107 mm x 145 mm

Ambient data

Shock load	15 g, 3 x 6 directions
Vibration load	5 g, 58 Hz … 150 Hz
Ambient operating temperature	0 °C … +40 °C [1]
Ambient storage temperature	–30 °C … +70 °C [1]

[1] Non-condensing.

Ordering information

Sub product family	Maximum performance	Sensor resolution	Laser class	Product name	Model name	Part no.
ScanningRuler S1200	2.5 s per 3D image	756 px x 512 px	2M	ScanningRuler S1200	Ruler-S2114	1051660

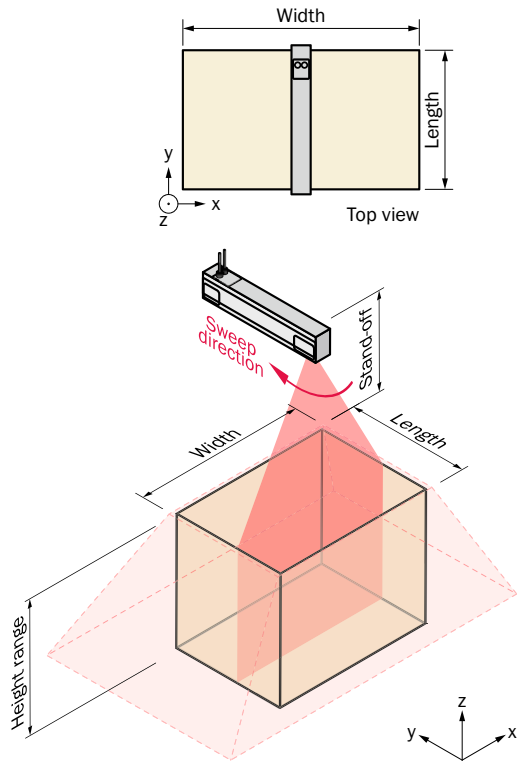## Dimensional drawing (Dimensions in mm (inch))
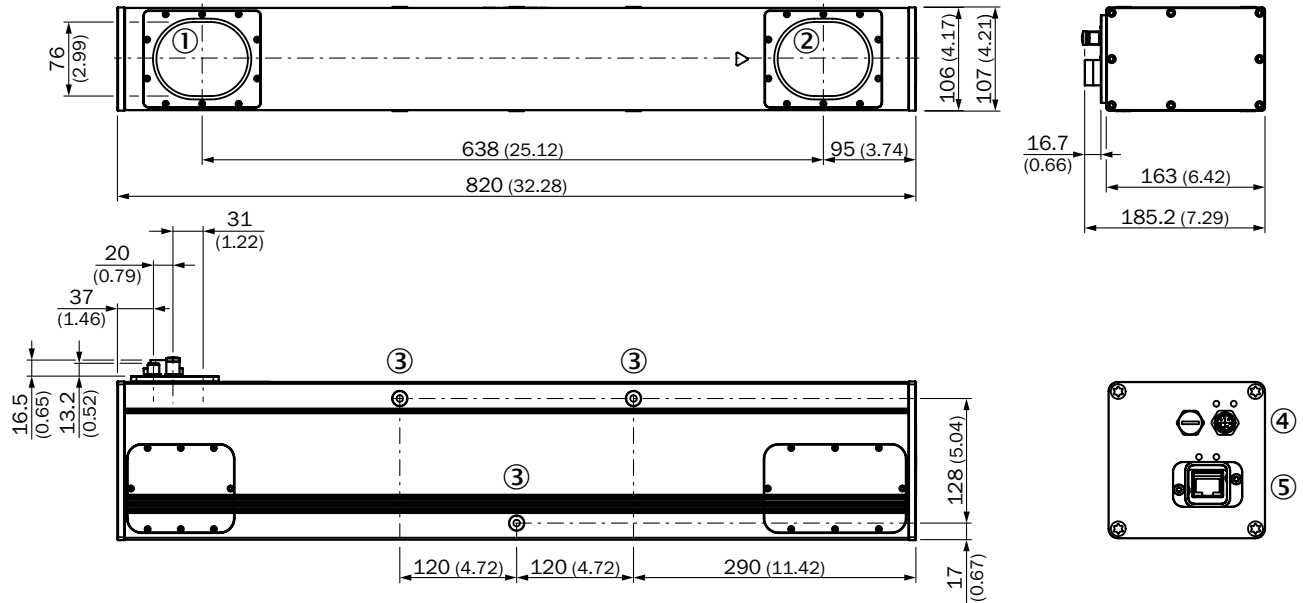
① Image sensor
② Laser unit and rotating mirror
③ Fastening threads (M8 x 15 mm)
④ Power I/O: M12, 8-pin
⑤ Gigabit Ethernet

Measuring details

Top view

Sweep direction

Stand-off

Width

Length

Height range

Accessories

Connection systems

Adapters/distributors

	Connection type head A	Connection type head B	Cable	Model name	Part no.
	Male connector, M12, 8-pin	Female connector, M12, 8-pin Female connector, M12, 8-pin	T-junction, parallel connected	SBO-02F12-SF	6026503

Modules/gateways

	Brief description	Model name	Part no.
	Single port PCI board for connection to Gigabit Ethernet high-end camera	Gigabit Ethernet board single	6032329
	Gigabit Ethernet Switch with 5 ports. Allows connection of up to four Ranger E/D or Ruler E/S to one PC.	Gigabit Network Switch x5	6032330
	Opto media converter with power supply (EU), RJ45 port to opto fibre (SC-type)	Opto adapter Gigabit to fibre	6032331

Plug connectors and cables

	Signal type/ application	Connection type head A	Connection type head B	Cable	Cable length	Model name	Part no.
	Gigabit Ethernet	Male connector, PushPull	Male connector, RJ45	CAT6	5 m	SSL-0J08-G05ME	6032321
					10 m	SSL-0J08-G10ME	6032322
					20 m	SSL-080J-G20ME	6032323
					70 m	SSL-0J08-G70ME	6033028

	Signal type/ application	Connection type head A	Connection type head B	Cable	Cable length	Model name	Part no.
	Power, digital I/Os	Female connector, M12, 8-pin, straight	Cable	8-pole, UL	2 m	DOL-1208-G02MA	6020633
					5 m	DOL-1208-G05MA	6020993
					10 m	DOL-1208-G10MA	6022152
					15 m	DOL-1208-G15MA	6022153
			Male connector, M12, 8-pin, straight	8-pole, UL	2 m	DSL-1208-G02MAC	6030121
					5 m	DSL-1208-G05MAC	6032325
					10 m	DSL-1208-G10MAC	6034901
	Digital I/Os	Male connector, M12, 8-pin, straight	Cable	8-pole, UL	2 m	STL-1208-G02MA	6029330
					5 m	STL-1208-G05MA	6029331
					10 m	STL-1208-G10MA	6032324
	Gigabit Ethernet	Male connector, SC-type, straight	–	Fiber optics cable on roll	30 m	OPTO FIBRE, 30 m	1014337
					50 m	OPTO FIBRE, 50 m	1014279
					100 m	OPTO FIBRE, 100 m	1014338

Power supply units/power cord connectors

	Brief description	Model name	Part no.
	24 V DC power supply with 8-pin M 12 connector, 90 ... 264 V AC, 14 A / 24 W, including two line cords (European and US)	Power supply (Ruler E/S)	1014242

Reflectors/optics

Illuminations

	Brief description	Model name	Part no.
	Terminal box for with a key switch to turn on and off the power to the internal laser. The ICT-R is intended for devices with class IIIb/3B lasers to comply with laser safety regulations. It has a removable key, switch-on delay (< 5 s), M12 connectors and LED indicators for power status.	ICT-R	1029242

Other accessories

CDs/DVDs

	Brief description	Model name	Part no.
	Development software high-end cameras on CD	CD-ROM software high-end cameras	2047925

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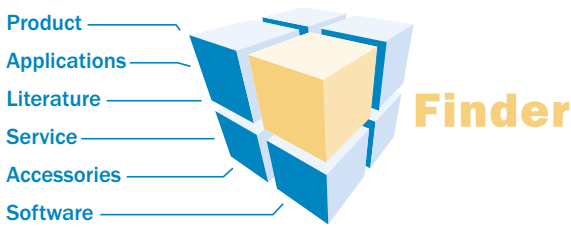

Product ——————
Applications ——————
Literature ——————
Service ——————
Accessories ——————
Software ——————

Finder

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SICK AT A GLANCE

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