



Ranger3

BIG 3D PERFORMANCE IN A SMALL PACKAGE

3D vision

SICK
Sensor Intelligence.



Configurable sensors



Configurable vision sensors make it quick and easy to set up parameters. Thanks to integrated image processing, the vision sensor works independently and provides results as an output.



Programmable cameras



Programmable cameras facilitate high flexibility, and work independently without a PC. They have integrated image processing, and deliver results as output.



→ www.sick.com/more-than-a-vision

MORE THAN A VISION

Intelligent questions have more than one answer.
The best technology depends on the task at hand.

In industrial environments, providing an effective solution for capturing reality requires more than just a vision. With SICK you have a choice. Multiple dimensions, one philosophy: customer needs come first.

For every application, the same question is asked: Which technology is best? And as always in life, there is never just one answer for every question. The best possible solution is always tailored to the individual technical and economic conditions of the application.

SICK supports you to realize your vision. Our broad 2D and pioneering 3D vision portfolio based on decades of innovation leadership helps customers worldwide. Our vision products range from easy-to-use vision sensors and programmable flexible cameras to high-speed streaming cameras.



Streaming cameras

Streaming cameras provide continuous data acquisition for external analysis on an external image processing device, such as a PC or a Sensor Integration Machine (SIM) from SICK. With a variety of data generation options, including 2D and 3D images, they offer maximum flexibility.



WHEN THE WORLD MOVES FASTER,
DON'T SETTLE FOR JUST KEEPING UP.

The modern industry is a sum of many parts. With ever increasing needs for faster manufacturing processes, more accurate quality control and shorter delivery times, each part must keep up to the speed with the others. The new Ranger3 3D streaming camera not only keeps up, it exceeds the pace – creating new opportunities for vision machine builders and vision system integrators in a wide range of industrial applications.

Setting a new standard for high-speed 3D

Ranger3 is the latest model in the successful Ranger 3D camera line, building on SICK's highly capable, tried and tested technical platform. It is the first product using SICK's new CMOS sensor for superior 3D performance. The performance is a combination of high speed and high image quality. Based on our long experience and customer feedback we have developed a camera for fast throughput environments, which creates new opportunities in 3D vision measurements.

Features

- SICK CMOS sensor with ROCC technology for superior 3D performance
- Up to 15.4 Gigapixels processed per sec
- 3D profiles at 7 kHz in full frame or up to 46 kHz in AOI
- Sensor resolution 2560 x 832 pixels
- GigE Vision and GenICam compliant
- 3D, reflectance and scatter measurements in one device
- Industrial housing with IP65/67 option



SICK's Ranger3 camera and CMOS M30 sensor with ROCC technology (Rapid On Chip Calculation)



PRECISION MEETS PERFORMANCE

Ranger3 is developed around our innovative and unique M30 CMOS sensor with fast 3D measurement speeds for increased throughput. Reliable and accurate measurements on both dark and bright surfaces allows for flexible and smart production which lives up to the Industry 4.0 vision. The Ranger3 works faster than anything comparable on the market, without ever missing a spot.

GigE Vision compliant

Standardized communication interface for industrial cameras

High light sensitivity

Higher speeds with lower laser power

Dynamic 3D algorithm

Reliable and accurate 3D measurements

Rugged connectors

Standard M12 connectors for industrial machinery and factory automation

Compact, metal housing with IP65/67 option

Rugged and secure casing for demanding environments

ROCC Technology

Superior 3D performance with Rapid On-Chip Calculation

High Dynamic Range

Accurate 3D on both very dark and very bright material.

ProFlex-Front

Versatile lens and filter mounting system

GenICam compliant

Standardized software integration

Flexible setup

Wide range of standard accessories for application configuration

High 3D resolution

2560 x 832 sensor with 1/16 subpixel height precision to see the smallest details

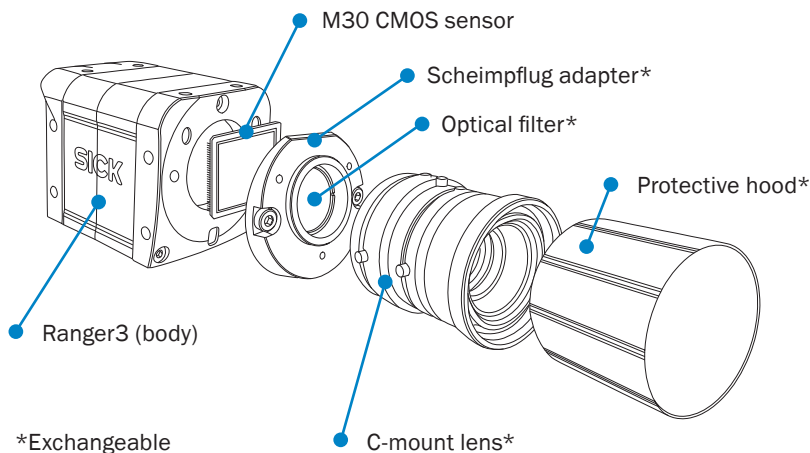
SICK designed CMOS 3D sensor

Innovative and proprietary 3D technology



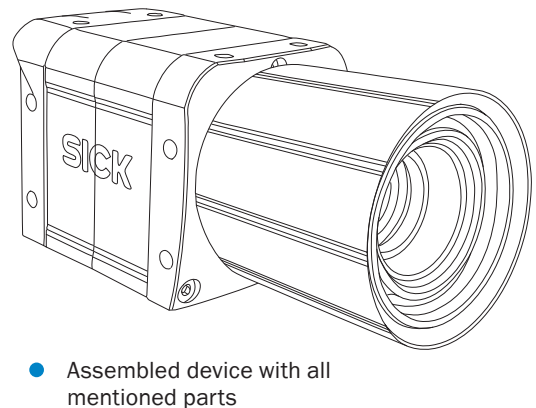
Compact, easy to integrate

Practical integration into existing systems and production lines is crucial for all new technologies. The Ranger3 allows for easy mechanical integration thanks to its compact and sturdy casing, industrial M12 connectors and 4D*pro* compatible accessories. With GigE Vision and GeniCam compliance it can be integrated to all standardized software systems. Ranger3 is available in IP65 and 67 options.



Every detail captured

With 7 times the light sensitivity compared to our previous sensor generation, you can improve your 3D inspection performance without the need for higher laser power. 3D profiles are acquired with 2560 coordinates at 1/16 subpixel resolution. The CMOS sensor has HDR capabilities that enables accurate 3D data on very dark or very reflective materials. This used to be a tough challenge. Not anymore.



ROCC

Up to the task at all speeds – with ROCC technology

Our Rapid On-Chip Calculation technology (ROCC) enables faster and more precise shape, volume and position measurements – improving product quality and decreasing manufacturing times. Even for large depth of fields or height ranges. The 3D calculation is done on the M30 CMOS sensor itself, and the ready-to-use 3D coordinates are sent directly to a standard PC. The sensor's calculation power enables processing of 7000 full sensor images per second. No pixel processing is needed outside the camera, which eliminates the need for expensive post processors or high-speed frame grabbers.

ProFlex

Greater depth-of-field with ProFlex

The new SICK ProFlex camera front puts the camera lens in an optimized angle, creating sharp images using the Scheimpflug principle. This increases the capability to accurately measure objects of various size and shape.

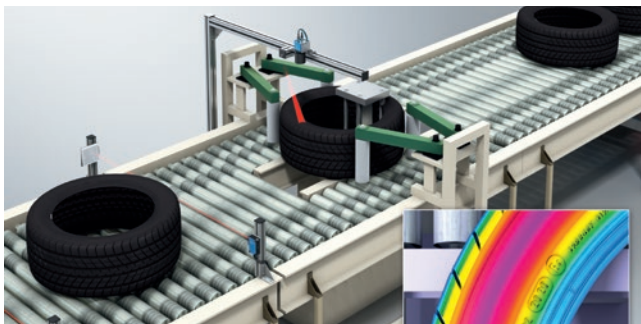
The Ranger3 camera body uses an exchangeable C-mount lens holder. Using a standardized mounting system gives access to an endless choice of lenses and optical filters for ambient light suppression as an example.

The clever ProFlex concept also foresees a IP65/67 class protective hood.

EXPERIENCE A MORE VERSATILE WORLD WITH THE RANGER3

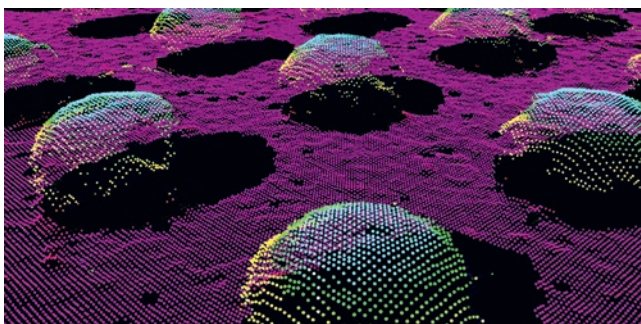
A third dimension in camera vision adds height and shape measurement data, which can be critical in many industrial vision applications. The SICK Ranger line has been used worldwide in electronics, wood, robot vision, plastic, rubber and food industries, among others. With the introduction of the Ranger3, we create even more opportunities for businesses to increase their performance in quality control and production throughput.

CREATING VALUES IN A WIDE RANGE OF INDUSTRIES



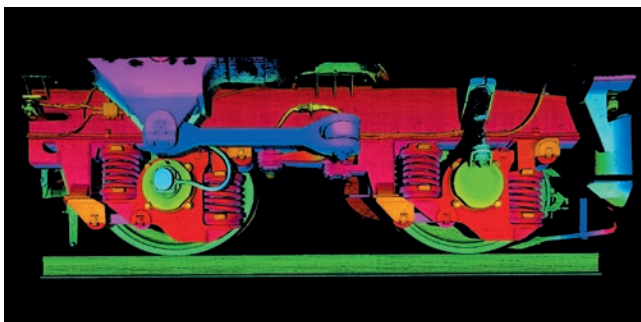
Tire quality inspection

Even small defects in tire rubber can lead to safety hazards. But automatic quality inspection has generally been challenging, due to the dark material and lack of contrast. Up until now. The high light sensitivity of the Ranger3 makes it possible to accurately and rapidly inspect very dark materials, such as rubber. The benefit? Increased versatility and added opportunities to your production and quality control system.



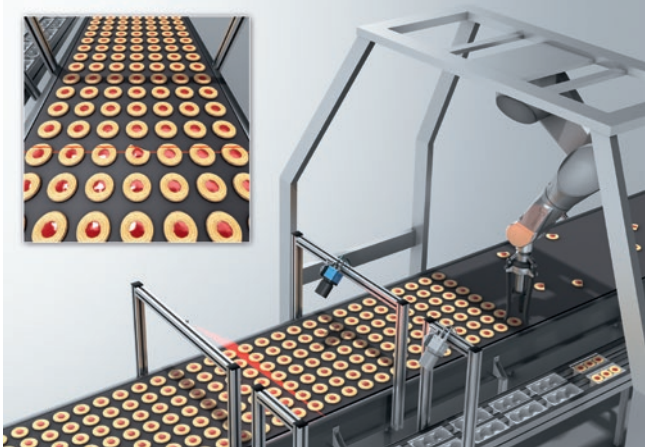
Electronic component and PCB inspection

Today, electronic components and printed circuit boards are everywhere. Literally. Electronics get smaller, and mass production speeds increase rapidly, with tough demands on quality assurance. The Ranger3 from SICK combines high speed with even higher resolution. Integrated into your production, in for instance a solder paste machine or pin inspection system, it allows substantially increased throughput speeds.



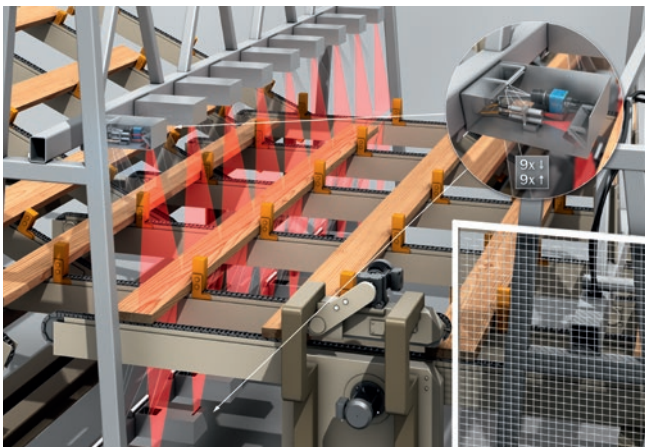
High-speed railway and road surface inspection

3D inspection, faster than a moving train – a reality with the Ranger3. Preventive maintenance on transportation systems such as railways and roads is a challenging task, especially in demanding environments. The high speed and high dynamic range of the Ranger3, in combination with the IP65/67 options, makes it ideal for covering more road or rail in less time, finding smaller defects.



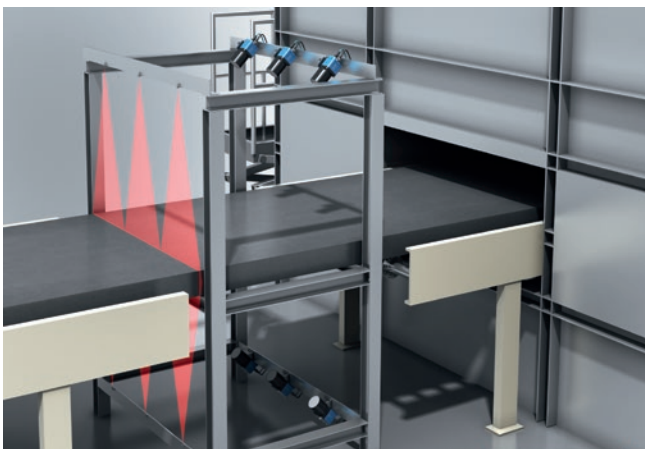
Packaging and food inspection

You eat with your eyes, as they say. Looks and appearances are crucial in the food industry, with its high customer demands. The Ranger3 gives you the possibility to rapidly measure several components of an object, like 3D shape, reflectance information and scatter data. The Ranger3 creates higher throughput speeds, and can use a wide range of attributes for classification of objects.



Wood and board inspection

In a sustainable world, nothing should go to waste. The Ranger3 brings more opportunities for wood inspection systems manufacturers to differentiate their machines through more accurate 3D-, reflectance and scatter measurements – from just one high speed device. This increases woodworking customers' throughput, optimizes quality and minimizes waste of valuable raw material.



Metal and steel industry

When it comes to inspecting steel, you need equipment that's sharp like a sword. With its increased dynamic range, the Ranger3 efficiently handles reflective materials with high speed and resolution. From dimensioning and surface inspection of slabs, tubes and plates, to inspecting the integrity of welding joints. The sturdy Ranger3 can be used for a vast number of applications in the harsh environments of the metal industry, to find even smaller defects or cover larger objects.

BIG 3D PERFORMANCE IN A SMALL PACKAGE



Product description

Highly accurate and with an unmatched measurement speed, the next generation Ranger3 streaming cameras can be configured for a wider range of needs. Powered by our unique 3D sensor tailored for demanding vision applications, Ranger3 will serve as a key component in inspection systems worldwide.

The camera extracts the true 3D shape of an object, regardless of its contrast or color and as a result, improves quality for a multitude of products. Cost-effective integration is guaranteed through GigE Vision and GenICam compliance. Ranger3 offers big 3D performance in a small housing.

At a glance

- SICK CMOS sensor with ROCC technology for superior 3D performance
- Up to 15.4 Gigapixels processed per second
- 3D profiles at 7 kHz full frame
- Sensor resolution 2,560 x 832 pixels
- GigE Vision and GenICam compliant
- 3D, reflectance and scattered light measurement in one device
- Industrial housing with IP65/67 option

Your benefits

- Unique CMOS sensor enables fast 3D measurement speed for increased throughput
- Reliable and accurate measurements on dark and bright surfaces enable flexible production - an enabler for Industry 4.0
- High light sensitivity allows 3D inspection without higher laser power
- Accurate shape, volume and position measurements for a wide range of objects improving product quality
- Standardized software integration with GigE Vision and GenICam
- Easy mechanical integration thanks to a compact housing, the ProFlex-Front, industrial connectors and 4Dpro accessories



Additional information

Detailed technical data 11

Ordering information 12

Dimensional drawings 12

Recommended accessories 13

→ www.sick.com/Ranger3

For more information, simply 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, inspection, measuring
Technology	3D
Shutter technology	Global-Shutter
Example field of view	Free of choice by lens selection
Exposure mode	Linear / HDR
Data synchronization	Free running, encoder triggered, external triggering
3D measurement	✓
Scatter measurement	✓
Reflectance measurement	✓
Spectral range	400 nm ... 950 nm
Lens	Exchangeable (C-mount), to be ordered separately as an accessory
Optical format	1"

Performance

Image sensor	CMOS sensor from SICK with ROCC technology
Sensor resolution	2,560 px x 832 px
Scan/frame rate	46,000 3D profiles/s, in AOI 7,000 3D profiles/s, full frame
Pixel size	6 µm x 6 µm
Maximum 3D height resolution	16 bits, 1/16 subpixel

Interfaces

Ethernet	✓, UDP/IP
Data transmission rate	1,000 Mbit/s
Configuration software	Ranger3 Studio
Operating system	Windows 7, Windows 10
Programming interface	GenAPI
Digital inputs	4 x HIGH = 10 V ... 28.8 V
Digital outputs	2 x TTL
Encoder interface	RS-422

Mechanics/electronics

Connections	Power – I/O: M12, 17-pin, male connector Gigabit Ethernet: M12, female connector
Connector material	M12: Nickel-coated brass
Supply voltage	24 V DC, ± 20 %
Power consumption	12 W
Current consumption	1.5 A
Enclosure rating	IP20 IP65 / IP67 by ProFlex protection hood
Housing material	Aluminum
Housing color	Blue, powder-coated
Weight	330 g
Dimensions (L x W x H)	77 mm x 55 mm x 55 mm

Ambient data

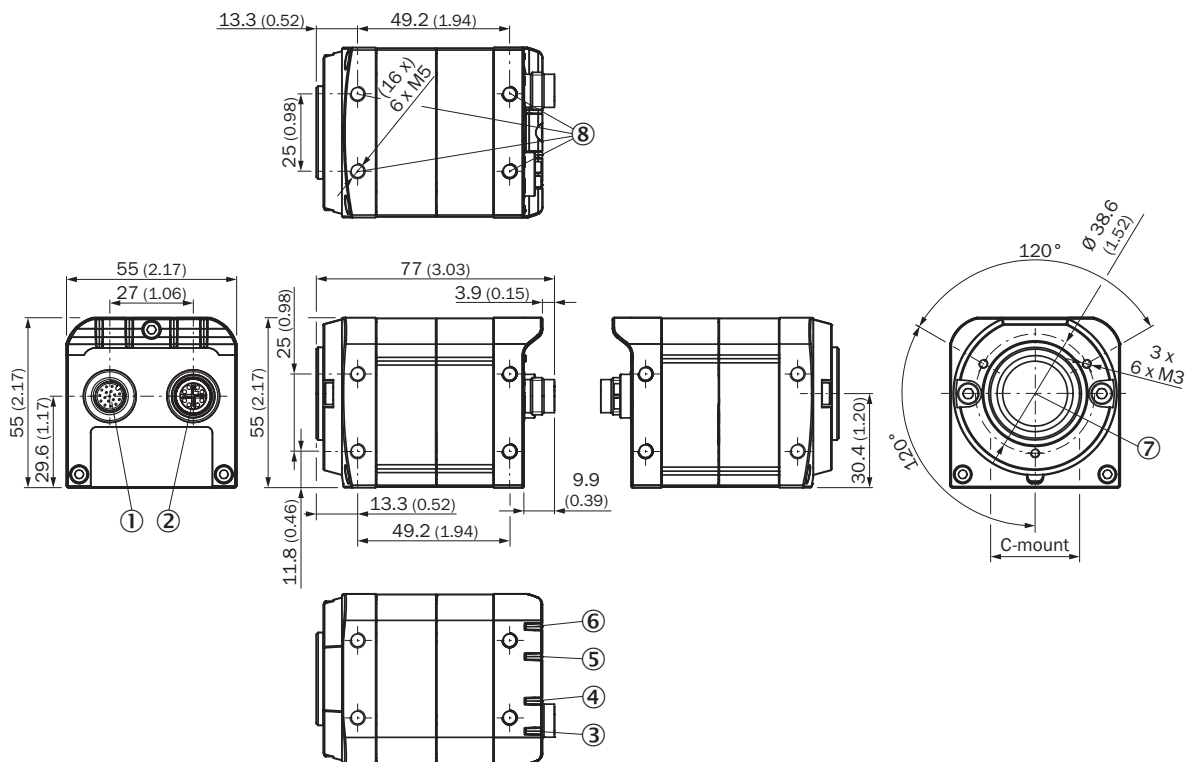
Shock load	15 g, 3 x 6 directions
Vibration load	5 g, 58 Hz ... 150 Hz
Ambient operating temperature	0 °C ... +50 °C ¹⁾
Ambient storage temperature	-20 °C ... +70 °C ¹⁾

¹⁾ Non-condensing.

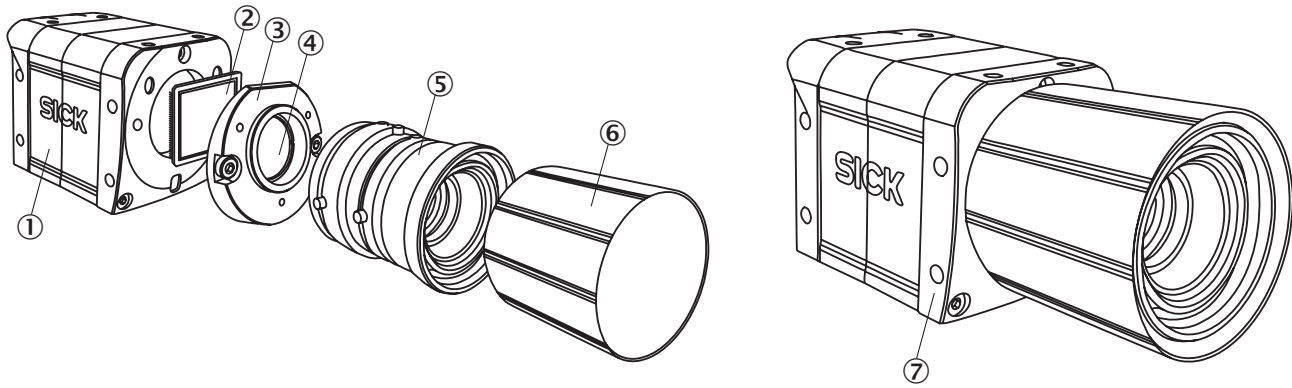
Ordering information

Type	Part no.
V3DR3-60NE31111	1091560

Dimensional drawings (Dimensions in mm (inch))







- ① Power I/O connector
- ② Connector Gigabit Ethernet (Gig E)
- ③ LED; On
- ④ LED; State
- ⑤ LED; Link/Data
- ⑥ LED; Laser
- ⑦ Optical axis, receiver
- ⑧ Mounting holes, 4 x M5



- ① Ranger3 (body)
- ② M30 CMOS sensor
- ③ Scheimpflug adapter, exchangeable
- ④ Optical filter, exchangeable
- ⑤ C-mount lens, exchangeable
- ⑥ Protective hood, exchangeable
- ⑦ Assembled device with all mentioned parts

Recommended accessories

	Brief description	Part no.
Mounting brackets and plates		
	Mounting bracket with camera adapter plate, including screws	2091431
Plug connectors and cables		
 Illustration may differ	Head A: female connector, M12, 17-pin, straight Head B: Flying leads Cable: Power, serial, CANopen, digital I/Os, PUR, halogen-free, unshielded, 3 m	6042772
	Head A: male connector, M12, 8-pin, straight, X-coded Head B: male connector, RJ45, 8-pin, straight Cable: Gigabit Ethernet, twisted pair, PUR, halogen-free, shielded, 2 m	6049728
Lenses and accessories		
 Illustration may differ	C-Mount lens 1", focal length 25 mm, lens aperture 1.4 - 16	5327524

For more accessories, see → www.sick.com/Ranger3

REGISTER AT WWW.SICK.COM TO TAKE ADVANTAGE OF OUR FOLLOWING SERVICES FOR YOU






- ✔ Access information on net prices and individual discounts.
- ✔ Easily order online and track your delivery.
- ✔ Check your history of all your orders and quotes.
- ✔ Create, save, and share as many wish lists as you want.
- ✔ Use the direct order to quickly order a big amount of products.
- ✔ Check the status of your orders and quotes and get information on status changes by e-mail.
- ✔ Save time by using past orders.
- ✔ Easily export orders and quotes, suited to your systems.



SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.



- 
Consulting and design
 Safe and professional
- 
Product and system support
 Reliable, fast, and on-site
- 
Verification and optimization
 Safe and regularly inspected
- 
Upgrade and retrofits
 Easy, safe, and economical
- 
Training and education
 Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,800 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

Comprehensive services round out the offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

That is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com