SAFETY BEYOND LIMITS

SAFETY LASER SCANNERS FOR EFFICIENT PROCESSES

Safety laser scanners

SICK

Sensor Intelligence.

FOUR DIMENSIONS OF IMPRESSIVE SENSORS

Reliable technology

Dust, dirt, ambient light – the safety laser scanners from SICK are at home in harsh industrial settings: The safeHDDM® scanning technology makes them extremely rugged. The patented safeHDDM® methodology also makes it possible to combine a compact design, large scanning range, and high-precision measurement data.

⊕ **Avoid downtimes thanks to the high availability
of the safety laser scanner**

Intelligent functions

The sensor settings can be adjusted for different requirements with the help of intelligent functions, for example simultaneous protective fields or contour detection fields. All 128 available fields can be individually configured when doing so.

⊕ **This configurability gives you
a high level of flexibility**

POWERFUL INNOVATION MEETS SAFETY EXPERTISE

Safety laser scanners enable humans and machines to work safely alongside one another in everyday industrial settings: They protect hazardous areas, hazardous points and access points both indoors and outdoors. With its microScan3, nanoScan3 and outdoorScan3 product families, SICK is pushing the boundaries of the possible. Ambient light, dirt, dust, rain, fog and snow are reliably filtered out thanks to the safeHDDM® technology. This opens up new fields of application for you, enables you to increase your productivity, and really raises the bar for safety laser scanners.

Smart integration

Quick to mount, exchange and easy to wire: Configuration and diagnostics can be managed directly from the safety laser scanners or centrally within the industrial network. Depending on the variant, the devices can be integrated into industrial networks via I/Os or EtherNet/IP™ CIP Safety™, PROFINET PROFIsafe, EtherCAT® FSoE, EFI-pro and other interfaces.

⊕ **Save time and money during mounting and commissioning**

→ see page 10

Intuitive operation

Complex technology, easy to use: The safety laser scanners can be quickly and easily configured using the license-free Safety Designer software. Important diagnostic data can be accessed directly on the device via pushbuttons or the display. Detailed diagnostic information on the safety laser scanners is also available in Safety Designer.

⊕ **Benefit from the high usability achieved through sophisticated technology**

→ see page 11

FIND OUT MORE ABOUT OUR INNOVATIVE SAFETY LASER SCANNERS

Indoor safety laser scanners

The microScan3 and nanoScan3 variants master challenges such as ambient light, dust and dirt as well as large scanning ranges with ease thanks to the safeHDDM® scanning technology. With smart connectivity options, intuitive operation, rugged design, and customizable settings, they are very well equipped for your applications. The TiM-S safety laser scanner with performance level PL b rounds off the comprehensive sensor portfolio.

→ To find out more see pages 6 – 17

Outdoor safety laser scanners

The outdoorScan3 builds on the product advantages of the microScan3 and has been adapted to handle challenging environmental influences. To achieve this, the outdoor safeHDDM® scanning technology was specially enhanced for outdoor applications. As a result, the outdoorScan3 is the first safety laser scanner to be certified for outdoor applications.

→ To find out more see pages 18 – 21

HIGH RELIABILITY THANKS TO INNOVATIVE SCANNING TECHNOLOGY

The patented safeHDDM® (HDDM = High Definition Distance Measurement) scanning technology from SICK allows, for example, scanning ranges of up to 9 m and a scanning angle of 275°.

275°

3.0 m

194 m²

9.0 m

Navigation range up to 64 m

0.1° angular resolution
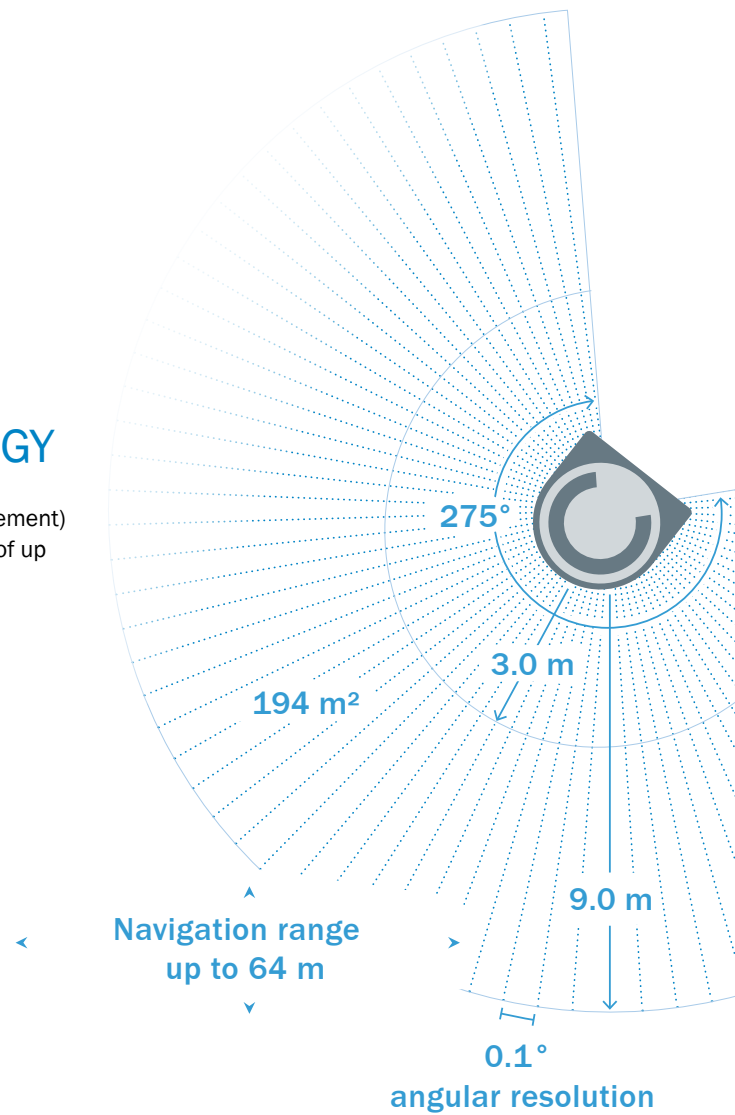
safeHDDM® scanning technology

The technology detects the distance of objects based on the time-of-flight measurement. With 88,000 individual pulses, it emits significantly more laser pulses than a conventional scanner (approx. 500 pulses per scan cycle). Through filtering and evaluation of this data with intelligent algorithms, the safeHDDM® scanning technology generates highly precise measured values.

Up to 2,750 values are produced per revolution. The safety laser scanner maintains its availability regardless of sources of interference such as ambient light, dirt, dust or sparks, thereby avoiding switching errors.

safe HDDM
safe high definition distance measurement

Δt

①

②

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Highlights

- Increased productivity thanks to protective field range of 9 m
- High availability: resistant to dust, dirt and ambient light
- Highly precise measurement data for exact localization
- Space-saving due to compact design

The advantages of safeHDDM® at a glance

- Safe leg detection even at a distance of 9 m due to the high angular resolution of 0.1°
- No safety gaps even if the device is mounted in a corner thanks to the 275° scanning angle
- The large protective field range enables automated guided vehicle systems to operate at high speeds and reduces the number of devices needed to protect larger areas

More information about safeHDDM®:
➜ https://youtu.be/mEQoy0ptyy4

Compact and rugged design

- The scanning technology allows large scanning ranges with a compact design. This enables the nanoScan3 to even fit under a Euro pallet
- Reduced maintenance costs: High mechanical resistance thanks to rugged aluminum die-cast housing
- High productivity thanks to trouble-free operation: The mounting systems used are vibration- and shock-tested
- High availability: Machine downtimes are reduced thanks to the high electromagnetic compatibility (EMC) of the device

More information on ruggedness:
➜ https://youtu.be/ui2nwQS2coU

INTELLIGENT FUNCTIONS FOR NUMEROUS POSSIBILITIES

The demands on the economic efficiency of laser scanners, and therefore on efficient, uninterruptible processes, are high. With the intelligent functions of the microScan3 and nanoScan3 product families from SICK, safety and productivity go hand-in-hand. You can tailor the safety laser scanners to various tasks and machine environments, thereby ensuring processes run smoothly. All functions can be easily configured in the Safety Designer software.
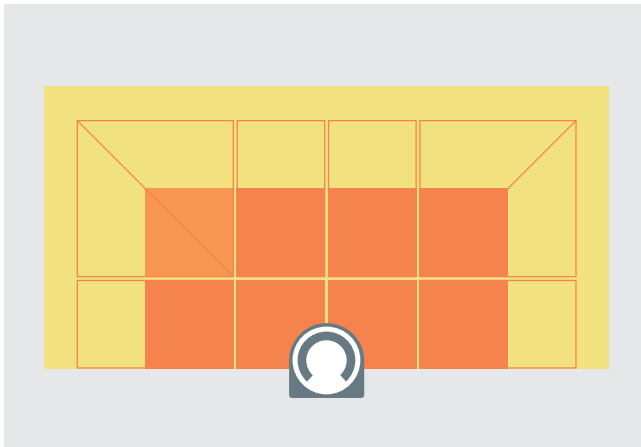
128 freely-configurable fields, 8 simultaneous protective fields

- With up to 128 fields and monitoring cases, you can flexibly adjust the sensor settings to the current requirements. In the case of mobile applications, for example, to specific speeds, loads or curves
- Cost-efficient protection of hazardous areas: Simultaneous protective field evaluation enables a single scanner to monitor up to 8 protective fields
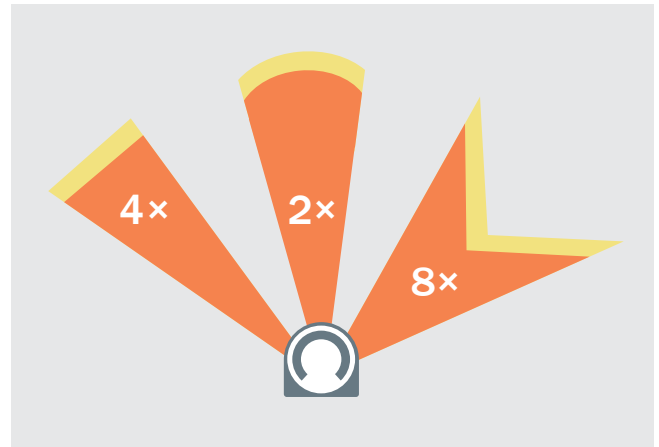
Individual field settings

- Multiple sampling and object resolution can be individually defined for each field, including simultaneous protective fields, thereby enabling you to tailor the settings to the ambient conditions
- Numerous additional background functions such as reliable case switching ensure a high level of productivity. The number of scans required immediately after field switching can be individually defined, which reduces switching errors

Highlights

- Central commissioning and diagnostics thanks to network technology
- Flexibility through 128 freely-configurable fields
- Simultaneous monitoring of up to 8 protective fields reduces the number of devices required
- Protection and measurement data for navigation support using just one device
- Fewer switching errors thanks to individually configurable multiple sampling and additional functions such as reliable case switching
- Increased safety through monitoring of the machine environment using a contour detection field
- Host/guest functionality for easy connection of up to 4 devices
- Dynamic control inputs allow speed-dependent case switching
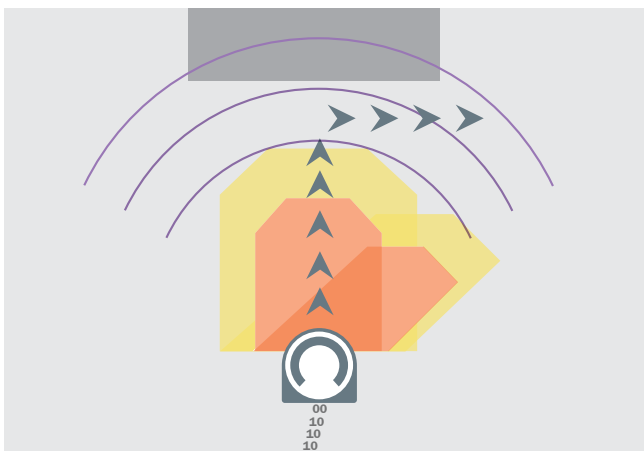
Measurement data for navigation support

- The microScan3 precisely records its environment within a scanning range of 64 m. It makes the acquired measurement data accessible via Ethernet for navigation support
- Thanks to its 0.1° angular resolution, the microScan3 delivers a variety of navigational data for a remarkably clear environmental image and exceptional contour recognition as well as reflector localization
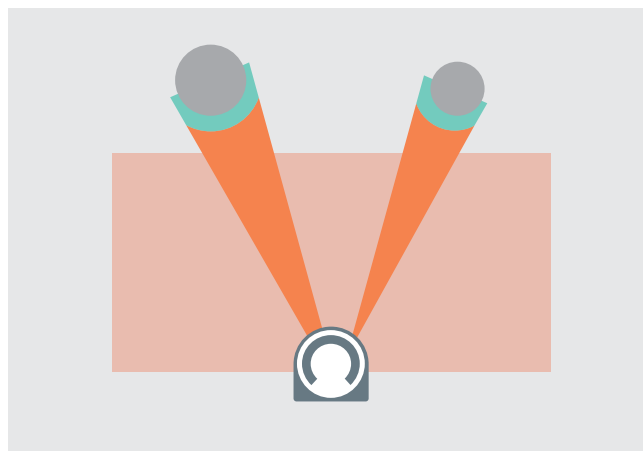
Contour detection field

- When the safety laser scanner detects a previously defined contour, an automated guided vehicle system, for example, can tailor its response accordingly. It can detect the loading position, an aisle entrance, or a change in warehouse reliably and without the need for additional sensors, e.g., to safely adjust the vehicle speed

SMART INTEGRATION
CAN BE THIS SIMPLE

Safety laser scanners are remarkably uncomplicated to incorporate into your application: quick to mount, easy to wire, and able to be safely integrated into industrial networks.


Quick mounting, standardized cabling

The standardized M12 connectivity enables you to mount the laser scanner quickly and inexpensively. Optical fiber variants are available for particularly demanding EMC environments.

Safe network integration

The safety laser scanners from SICK can be easily and safely integrated into industrial networks such as EtherNet/IP™ CIP Safety™, PROFINET PROFIsafe or EtherCAT® FSoE.
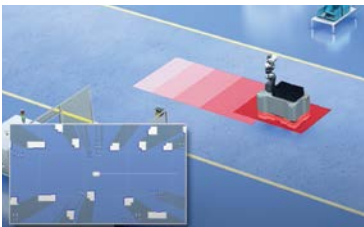
Easy integration of measurement data

SICK offers drivers for easy integration of measurement data into common robotics programming environments (C++, ROS, NVIDIA Isaac SDK™).

Quick device exchange

The configuration is saved in the system plug. This means that if the safety laser scanner gets damaged, you only need to exchange it and the cabling remains the same.

INTUITIVE OPERATION
INTELLIGENT SENSOR TECHNOLOGY

Using the Safety Designer software, you can quickly and easily configure the safety laser scanner as well as access detailed diagnostics information. Important diagnostic data are also available directly on the device on the display.

Diagnostics directly available on the device

You can obtain important diagnostic data quickly via the display and the well visible LEDs. You can also access detailed information conveniently over the network.
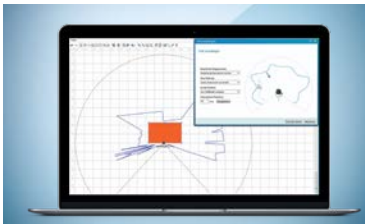
Easy operation of the Safety Designer software

Configuration and diagnostics are performed via the easy-to-use Safety Designer software and using a convenient step-by-step configuration assistant.
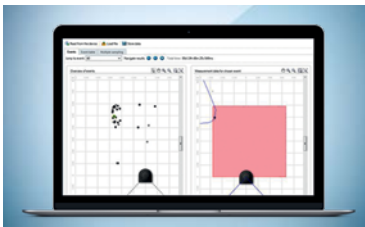
Process and configuration optimization by analyzing object detections

Measurement data can be stored, analyzed and used to assist optimization. This avoids unscheduled machine downtimes.

Easy fault analysis:
The EventCam shows what happened

The freely-positionable camera records the period of time before and after a protective field interruption and visualizes the cause of false trips.

INDUSTRY 4.0 IS PICKING UP SPEED: SAFETY LASER SCANNERS FOR AUTOMATED GUIDED VEHICLES

Automated guided vehicles (AGVs) will be essential for the intelligent, fully-networked factory of the future – they make production processes more flexible and efficient. The special requirements of these mobile applications are continuously fed into the development processes for SICK safety laser scanners. With a range of clever features and functions, SICK is preparing the industrial vehicle for Industry 4.0.
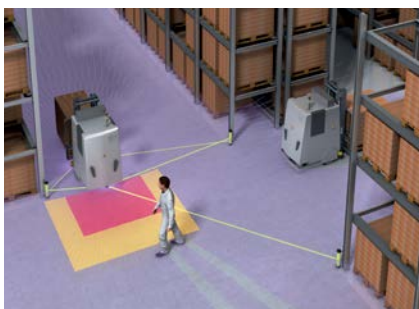
Navigation and localization

When using independent localization via reflectors or surrounding contours, the vehicle determines its absolute position. Thanks to the high quality of the values measured with an angular resolution of up to 0.1°, the measurement data of the safety laser scanner are very well suited for AGV navigation. The data can be exchanged between the vehicles via Ethernet - vehicles can communicate with each other and processes can be adapted to one another.
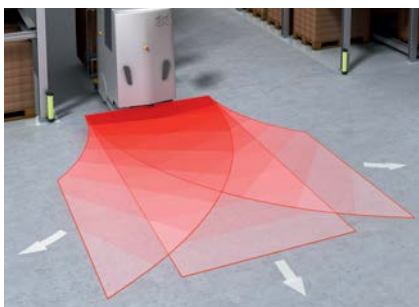
Suitable for cornering and high speeds

The protective fields of the safety laser scanner are ideally suited for cornering and parking: The 128 freely-configurable fields and 8 simultaneous protective fields enable the system to be flexibly adapted to the local environment. Thanks to the simultaneous protective fields, it is possible for the AGVs to reduce their speed incrementally. The protective field range of 9 m allows the AGVs to move at high speeds, thereby increasing throughput and boosting productivity.

Highlights

- Localization and navigation using precise measurement data
- Adjustment to ambient conditions thanks to 128 freely-configurable fields and 8 simultaneous protective fields
- Fast speeds and high productivity thanks to a large protective field range of up to 9 m
- High availability of AGVs and increased productivity thanks to safe motion control
- Compact nanoScan3 for easy integration

Safe speed monitoring for AGVs: Safe Motion

With its systems for safe motion control, such as the Safe EFI-pro System, SICK offers you convenient, complete solutions for the safe detection and control of the speed and driving direction of automated guided vehicle systems. The Safe EFI-pro system comprises the safety laser scanners microScan3 and/or nanoScan3 and the Flexi Soft safety controller. The system can be very well integrated into AGV controllers. With information on speed and driving direction, the Safe EFI-pro system switches the fields, ensuring that the AGV always drives at the right speed, in the right direction.

Additional information:
➜ www.sick.com/safe-motion

Space-saving laser scanner for small AGVs: nanoScan3

The miniaturization of high-precision and extremely rugged safety laser scanners continues: The nanoScan3 from SICK with its small installation size is opening up new possibilities in the design of small automated guided vehicles. The sensor is so compact that it even fits under a pallet.

Additional information:
➜ www.sick.com/nanoScan3
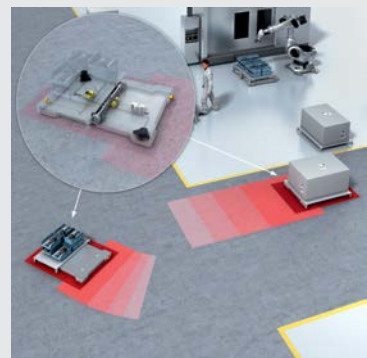
WORKING TOGETHER AS EQUALS: SAFETY LASER SCANNERS FOR ROBOTICS

The close and, at the same time, safe collaboration between humans and robots on an equal footing is the prerequisite for high productivity, increasing efficiency, and improved ergonomics.
Safety technology thereby plays a key role. The safe safety systems from SICK reliably protect against the hazards of this close teamwork, making it possible for humans and machines to work together both safely and efficiently.

Safety systems specifically for robotics applications

Collaboration between humans and machines can be implemented efficiently and conveniently with the help of safety systems such as Safe Robotics Area Protection or the Safe EFI-pro system. They combine a safety laser scanner with a safety controller and, thanks to the comprehensive documentation and control logic, can be easily integrated into robot controllers. These safety systems are also available in manufacturer-specific variants, e.g., for robots from Universal Robots (UR), Yaskawa or FANUC.

Safe Robotics

Safe and productive: SICK sensor solutions for robotics

The prerequisite for safe, productive human-robot collaborations is intelligent sensors and sensor systems – they enable humans to intervene in the robot system unimpeded. As a leading manufacturer of safety technology, SICK makes companies fit for Industry 4.0 and is also a competent partner in Safe Robotics. From initial consultation to global onsite support from our safety experts, SICK offers a wide portfolio of sensor solutions and services for efficient human-robot collaboration.

Additional information:
➜ www.sick.com/safe-robotics
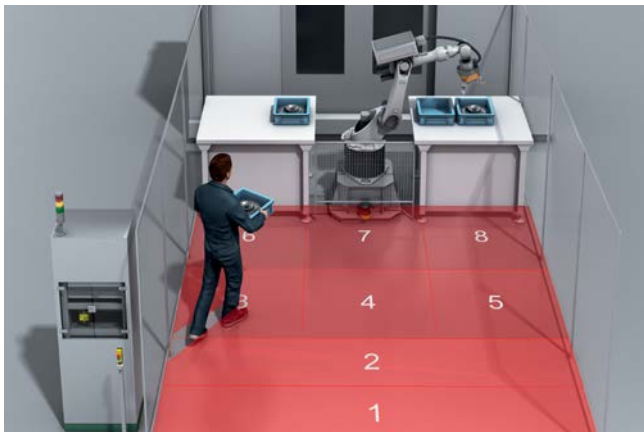
Human machine cooperation

A robot works in one area, a worker walks in another: In human-robot collaboration, the safety laser scanner's simultaneous fields enable various robot motions to be protected with just one device. Sequence monitoring can be used to detect which direction a person is walking. If a person approaches the robot, the robot first reduces its work speed instead of coming to an immediate stop.
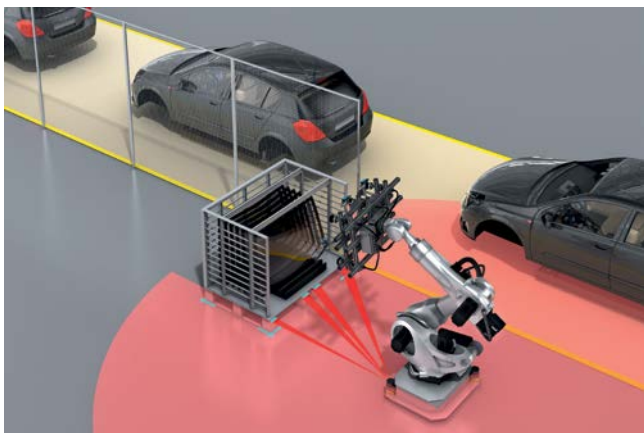
Reliable and automated object detection

The contour detection field is used to safely determine the position of objects in a previously defined environment. The safety laser scanner detects, e.g, by means of a previously programmed surrounding contour, whether a robot is in its prescribed docking position. The protective fields can then be adjusted as required. No additional sensors for position detection are therefore required, which saves you costs for position switches.

Portal protection

FLEXIBLE AND RELIABLE PROTECTION OF ACCESS PASSAGES

Humans and machines work together in close spaces in production lines: Automated guided vehicle systems supply automated material transition stations, robots and workers do mounting work in the same production cells. Safe Portal Solutions from SICK differentiates between human and material: While all movements are stopped when the worker enters the hazardous area, the automated guided vehicle system can pass through the access passage without problems. The result: Flexible processes and easily-adaptable production.

Highlights

- Seamless production processes by storing predefined vehicle contours in the safety solution
- Flexible processes through rapid, safe switching between fields
- Easy, adaptable production processes because the sender and receiver are integrated into a single device
- Cost savings as fewer laser scanners are needed
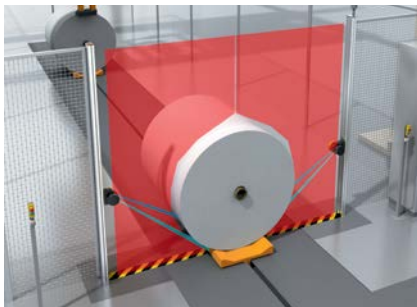
Reliable object detection using the measurement data

Based on precise measurement data, the safety solution detects objects using predefined contours stored in the device. For further processing, the safety solution transmits the data to the machine controller. This makes it possible to differentiate between human and material.

Flexibility and safety due to simultaneous protective fields with individual fields settings

The customized adjustments and simultaneous fields on the safety solution enable quick, safe switching between the individual fields. The individual field settings on the safety solution are available without restrictions even if simultaneous fields are used.
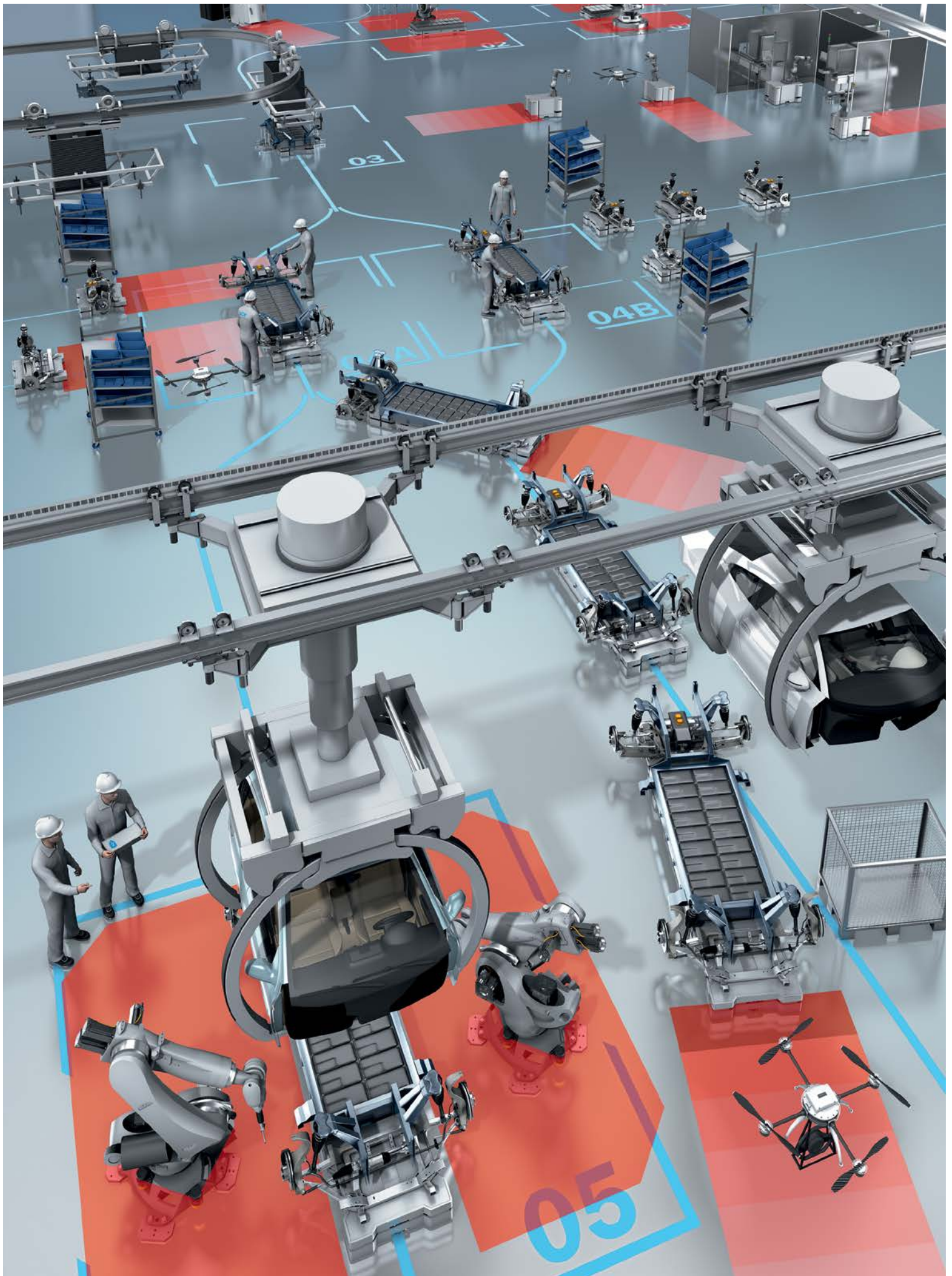
| Sunlight | Rain | Snow | Fog |

Facing challenging weather conditions

The outdoorScan3 works safely and reliably, even under challenging weather conditions. No matter if there's sun, rain, fog, or snow, outdoorScan3 takes personal safety and productivity to a new level – regardless of potentially disruptive factors. Accessories specially developed for outdoor applications provide additional protection against the effects of weather and increase the performance of the safety laser scanner.

➕ **You are well-prepared even for changing weather conditions with reliable safety technology from SICK**

MOVING BEYOND LIMITS

The world's first IEC 62998-certified safety laser scanner for indoor and outdoor use opens up a whole new world of easy and safe outdoor automation.

With the outdoorScan3, people and machines can now work outside together safely. This leads to higher AGV (Automated Guided Vehicles) speeds and a continuous material flow between several production halls. Quite simply, the outdoorScan3 enables you to increase your productivity both indoors and outdoors.

Additional information:
➜ www.sick.com/outdoorScan3

Outdoor certified

The outdoorScan3 is designed to allow man and machine to work safely side by side and is certified for use in industrial production and logistics areas both inside and outside of buildings. This certification is based on the ISO 13849-1 and IEC 62998 standards, among others.

⊕ **Increase your productivity outdoors with safe human-machine cooperation**

Outdoor safeHDDM® scanning technology

The outdoorScan3 is exceptionally suitable for protecting both stationary and mobile outdoor applications. The patented safeHDDM® technology from SICK used in the safety laser scanner has been specifically enhanced for outdoor applications through the addition of special algorithms. It reliably detects people without the need for additional protective devices.

⊕ **You will be impressed with its high availability, even in unfavorable weather conditions**

outdoorScan3 –
FOR DIVERSE FIELDS OF APPLICATION

**Productivity increase with
AGV Dynamic Weather Assist**

82 % fewer rain-related
switch-offs*

97 % fewer snow-related
switch-offs*

Greater availability of AGVs due to weather-dependent speed adjustment

The safety requirements for mobile applications in outdoor areas are demanding: Personal safety must be ensured in unfavorable weather conditions, even if the laser scanner gets dirty. At the same time, unplanned machine stops should be reduced.

The AGV Dynamic Weather Assist function block of the Flexi Soft safety controller makes it possible to adapt protective fields to changing weather conditions. This enables the outdoorScan3 to dynamically adjust the speed of the AGV, thereby smoothly linking production sequences and logistics processes both indoors and outdoors.

*The efficiency of the AGV Dynamic Weather Assist was examined in a long-term stationary test over a period of 12 months at the Outdoor Technology Center. The evaluation showed a significant increase in availability of the outdoorScan3 when used with the AGV Dynamic Weather Assist.

For more information on the AGV Dynamic Weather Assist, visit
➜ www.sick.com/AGV_Dynamic_Weather_Assist

Hazardous area protection for stationary applications

From basic safety mat replacement and presence detection through to protecting multiple hazardous areas at the same time, the outdoorScan3 is the right choice. Suitable horizontal protective fields can be set up and monitored to protect against the dangers posed by hazardous machines, plants or open spaces. As we move towards the Smart Factory, we find humans, machines and autonomous systems working ever closer together. Safety for humans is always a primary focus, without ever losing sight of productivity.

Constant condition monitoring

The Monitoring Box from SICK is a browser application that lets you administer the sensor and machine data and visualize it in a dashboard. Status changes can be easily monitored and quickly diagnosed.

If necessary, an alert can be sent in the event of any significant change in the device status. This enables operators to intervene in a timely manner. This ensures the availability and productivity of your systems.

Additional information on the Monitoring Box
➜ www.sick.com/Monitoring_Box

YOUR PARTNER FOR PRODUCTIVE OUTDOOR SAFETY SOLUTIONS

Once the foundations have been laid and the legal framework has been defined, you then have various options available when it comes to safely automating processes in the outdoor area. SICK can help you protect your individual applications.

Normative requirements

Machine safety is a crucial consideration for the outdoorScan3. In this context, the ISO 13849-1 safety standard defines the range of application for the laser scanner.
The systematic approach via IEC 62998 allows for the intended use of the outdoorScan3 in outdoor areas.

Application requirements

For outdoor areas, a holistic view of the interplay between sensor performance, accessory components, machine integration and organizational measures is the key to success.

Applications

- Industrial production and logistics areas
- Non-public areas: Access for authorized personnel only
- Moderate ambient conditions (similar to the temperate climates defined in IEC 60721-2-1, for example)
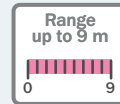
CREATING
SAFE
PRODUCTIVITY

Protective field range
The protective field range describes the maximum range of the monitored field.

Scanning angle
The scanning angle describes the maximum viewing angle of the safety laser scanner.
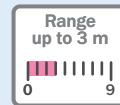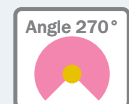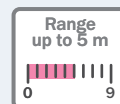
Indoor

microScan3
➜ www.sick.com/microScan3

Range up to 9 m
0 — 9

Angle 275°

nanoScan3
➜ www.sick.com/nanoScan3

Range up to 3 m
0 — 9

Angle 275°

TiM-S
➜ www.sick.com/TiM-S

Range up to 5 m
0 — 9

Angle 270°

Outdoor

outdoorScan3
➜ www.sick.com/outdoorScan3

Range up to 4 m
0 — 9

Angle 275°
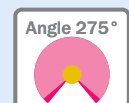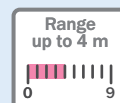
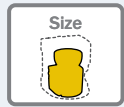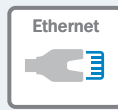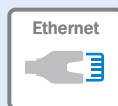| Fields	Dimensions	Measurement data output	Integration	Performance level
The number of fields indicates how flexibly the laser scanner can be adapted to different process phases.	(width × height × depth) The more compact the device, the simpler it is to integrate into the machine design.	The surrounding contour recorded is available for different interfaces for uses such as vehicle navigation.	Safe integration into the machine controller can take place via various interfaces.	
128 fields	Size 110 mm × 135 mm × 110 mm	Ethernet	I/Os, EFI-pro, PROFINET PROFIsafe, EtherNet/IP™ CIP Safety™, EtherCAT® FSoE	**PL d**
128 fields	Size 101 mm × 80 mm × 101 mm	Ethernet	I/Os EFI-pro, EtherNet/IP™ CIP Safety™	**PL d**
48 fields	Size 60 mm × 86 mm × 60 mm	Ethernet	I/Os	**PL b**
128 fields	Size 110 mm × 135 mm × 110 mm	Ethernet	I/Os, PROFINET PROFIsafe, EtherNet/IP™ CIP Safety™	**PL d**
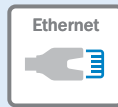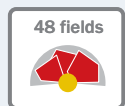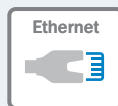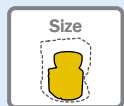
SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 11,900 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

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SICK
Sensor Intelligence.