



EFFICIENT SOLUTIONS FOR TRAFFIC SYSTEMS

DESIGNING TRANSPORTATION ROUTES TO BE MORE EFFICIENT,
SAFER AND MORE ENVIRONMENTALLY FRIENDLY

SICK
Sensor Intelligence.





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Rugged, innovative and precise solutions in harsh environments

Modern traffic management on road, rail and sea routes is geared towards safety, efficiency and a good environmental balance. Rugged sensor solutions provide reliable control and monitoring systems for transportation applications.

With solutions from SICK, you rely on many years of experience indoors and outdoors. Laser measurement systems classify vehicles as part of the road toll system, automation light grids reliably detect people at train door systems, and dust measuring devices and gas analyzers measure pollutant concentrations in tunnel areas. The wide range of rugged and innovative products combined with a worldwide service and sales structure has made SICK a market and technology leader in many fields of data acquisition in traffic engineering.



Detection

Reliable detection of vehicles in flowing, slowed or stationary traffic is required for progressive traffic planning and efficient traffic management. SICK provides appropriate solutions with high reliability and flexibility for all requirements.



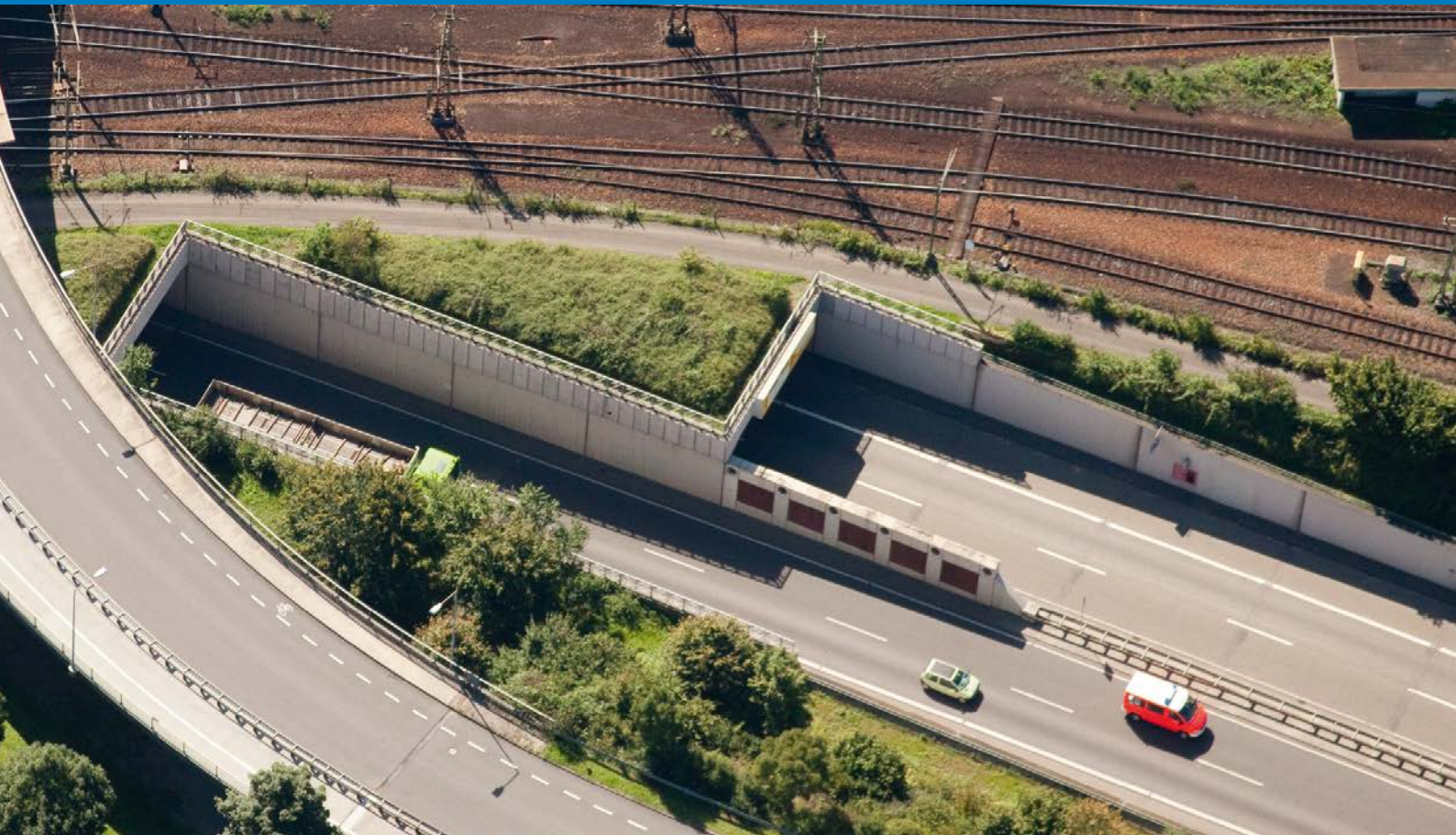
Classification

During traffic data acquisition, vehicles must be classified at traffic counting stations according to regulations such as TLS 8+1 (Germany) or SWISS10 (Switzerland). Solutions from SICK are highly accurate, even in free-flowing traffic across multiple lanes with lane-changing.



Measurement

SICK is the market and technology leader for dimension measurement of trucks, 3D measurement of road surfaces and clearance profiles. Solutions from SICK provide accurate measurements and can be certified depending on the application. In addition, these solutions can also be used to determine vehicle speed.



Monitoring & controlling

Continuous monitoring of air quality and visibility in tunnels is absolutely required for traffic safety. Hazardous weather conditions, such as fog, must be detected on open roads. Solutions from SICK are able to detect the smallest particle and gas concentrations to reliably measure visibility in foggy conditions.



Safety

Significant damage to the infrastructure can occur when vehicles are too wide or too tall, or when objects protrude. Displaced cargo can lead to damages and accidents. SICK provides reliable and flexible solutions for increasing safety outdoors – even when type approval for single vehicles by the inspection authority responsible is required.



Services

Thanks to its extensive knowledge of sensor technology for transportation routes, SICK provides sound application consulting and customized service concepts from simple device instruction to detailed training to long-term maintenance contracts. The global presence of SICK ensures quick, efficient support on site.

Industry experience of SICK: Overview of reference projects

With decades of experience in more than a thousand projects worldwide, SICK provides innovative solutions for all transportation routes in the following areas:

- Traffic management and planning
- Safety
- Environmental protection

Toll Collect: Electronic data acquisition of vehicles subject to tolls



3D data acquisition for multi-lane free-flow systems

Toll Collect stands for nationwide electronic collection of truck tolls on German motorways. In this major project, LMS511 2D laser scanner from SICK are used to classify vehicles. The sensors, which monitor toll bridges, require no installation in the road. Vehicles subject to tolls can be identified in free-flow traffic over multiple lanes. In Germany, more than 12,000 kilometers of motorway on more than 300 toll bridges are reliably monitored. This comprehensive monitoring ensures that the percentage of toll dodgers is less than two percent.

Thermoscanner from ASFINAG: Hot spot detection before entering the Karawanks Tunnel



Detection of trucks and buses at risk of fire

The VHD Vehicle Hot Spot Detector developed by SICK is installed at the north portal of the single-tube, heavily traveled Karawanks Tunnel between Austria and Slovenia. Just a few weeks after the start of operations, a semitrailer with an overheated tire at more than 200 °C was detected and diverted before entering the tunnel. The VHD Vehicle Hot Spot Detector provided a reliable solution within a very short period of time to prevent the vehicle from burning within the tunnel.

Simplon Inter-Modal (SIM) trains: Profile measurement and antenna detection at the BLS



Collision avoidance

Due to increased traffic on the "rolling road" from Freiburg im Breisgau, Germany through Switzerland to Novara, Italy, there was a high risk that parts of loaded freight cars could protrude beyond the permitted clearance and cause damage. Since 2009, the Railway Profiling System RPS from SICK in Bad Heustrich (north of the Lötschberg Tunnel) has been measuring the profile of trains passing at normal speeds. The permitted clearance is adjusted along a wagon based on the distance to the bogies of the wagon to account for cornering. As a result, damage from collisions or short circuits is reliably avoided.

Guadarrama Tunnel: Smoke detection along the high-speed route



Smoke detection for early fire detection

The 28 km Guadarrama Tunnel in Spain is a very demanding high-speed route designed for trains traveling at 350 km/h. Reliable early detection of a fire must be ensured even with extreme pressure waves and vibrations. As a proven solution, 122 VICOTEC411 tunnel sensors with no moving parts were installed in both tunnel tubes. The special requirements of the high-speed route were met by slightly adjusting the mounting design of the dust shield.

Airport Link Tunnel: Measurements to control tunnel ventilation



Measurement of NO₂, NO and CO concentrations

At a length of 6.7 km, the Airport Link Tunnel is the longest road tunnel in Australia and connects downtown Brisbane to the airport. To control tunnel ventilation, NO₂, CO and NO concentrations must be determined. Since Australia has the world's strictest requirements in regards to measurement accuracy and stability, these requirements are regularly checked by on-site test measurements. By installing VICOTEC320 and VICOTEC412 tunnel sensors at 34 locations, gas concentrations can be measured with a very high degree of accuracy. At the same time, FLOWSIC200 sensors at 69 locations measure air speed.





Road

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- 1 Monitoring electronic toll collection

Focus 2 12

- 2 Red light and speed monitoring

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- 4 Traffic management and planning

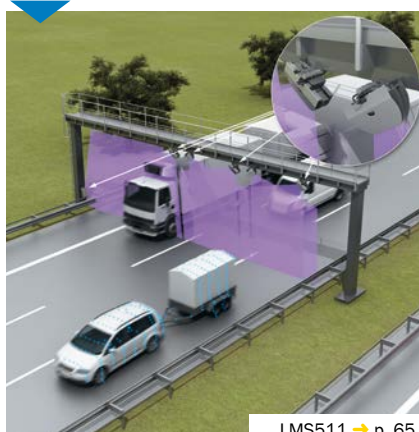
Focus 5 20

- 5 Maintenance and inspection



2 3D data acquisition for multi-lane free-flow systems

The LMS511 2D laser scanner is ideally suited for collecting the 3D contour data of vehicles. The transmitted data can be analyzed based on the customer's requirements, making definition and acquisition of vehicle classes very flexible. The LMS511 is easily and inexpensively mounted above the road and has been a reliable solution thousands of times in road traffic even under the most difficult weather conditions.



LMS511 → p. 65

3 2D laser scanners at toll stations

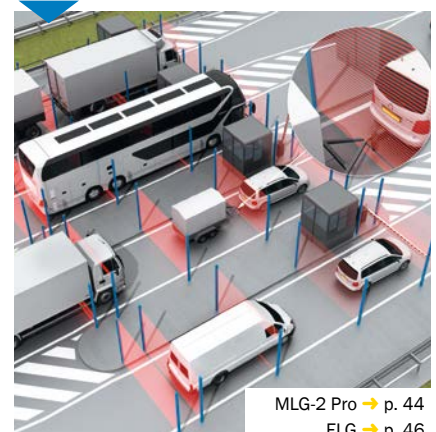
To separate and classify vehicles, LMS111 2D laser scanners are easily and inexpensively mounted above the road. Any effort to clean the sensor is therefore minimal. Even the smallest details such as the towing bar of a car trailer can be reliably detected. The LMS111 is ideally suited for use under the most difficult weather conditions including snowfall.



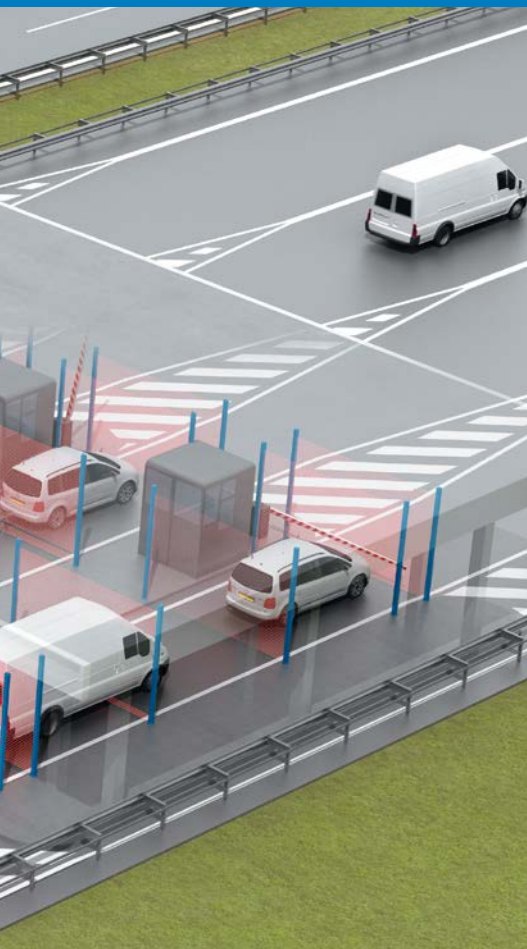
LMS111 → p. 63

4 Automation light grids at toll stations

MLG-2 Pro automation light grids are used for vehicle classification. The transmitted data makes it possible to count vehicle axles and to easily determine the height of the vehicle above the first axis. The ELG automation light grid can be used to easily separate vehicles. Simple length division of the vehicles is determined by arranging multiple light grids per lane.

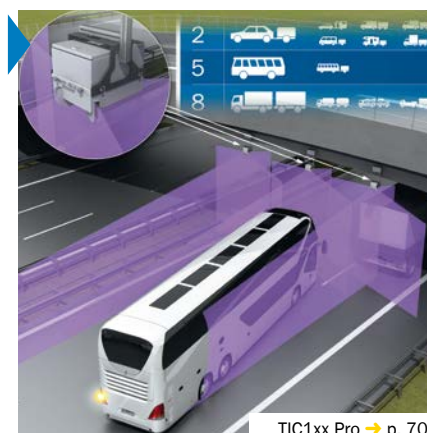


MLG-2 Pro → p. 44
ELG → p. 46



1 Classification and camera triggering on multi-lane free-flow systems

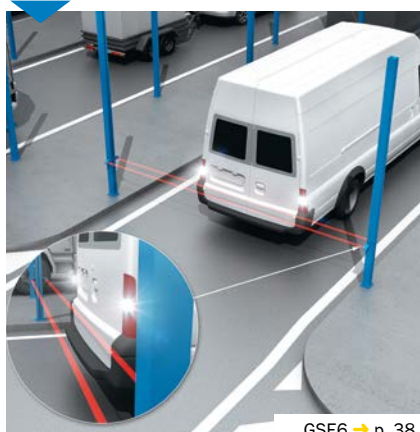
To correctly determine tolls, vehicles must be registered and classified. The integrated TIC1xx Pro Traffic Information Collector identifies up to 30 predefined vehicle classes, which can be grouped together according to customer's requirements or standards like TLS 8+1. The system is easily and inexpensively mounted above the road, allowing even high-value road surfaces to remain functional. Automatic calibration makes it possible to configure the sensor within just a few minutes to correctly classify vehicles, even in cases when drivers change lanes. With the TIC1xx Pro, adjusting the trigger for the camera for license plate detection is simple and flexible so that – incorrectly registered vehicles can be reliably identified.



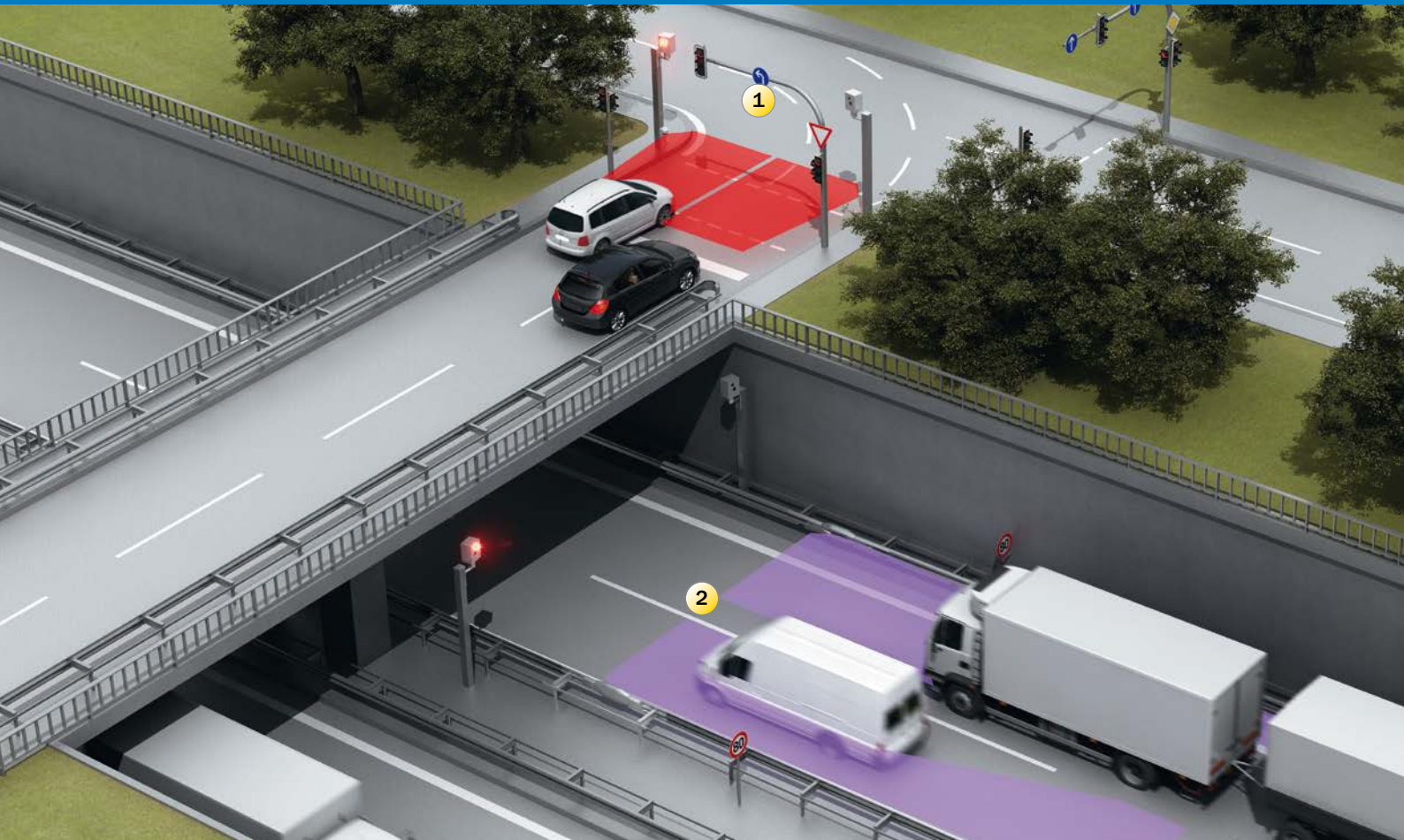
TIC1xx Pro → p. 70

5 Detection of the direction of travel

Toll stations must be able to reliably detect when a vehicle reverses out of the single lane. Acquiring this data ensures the proper toll amount has been paid. Two series-mounted GSE6 photoelectric sensors with a switching frequency of 1 kHz and an infrared light identify the contours of the vehicle very quickly. Even the travel direction of vehicles moving at high speeds is reliably measured.



GSE6 → p. 38



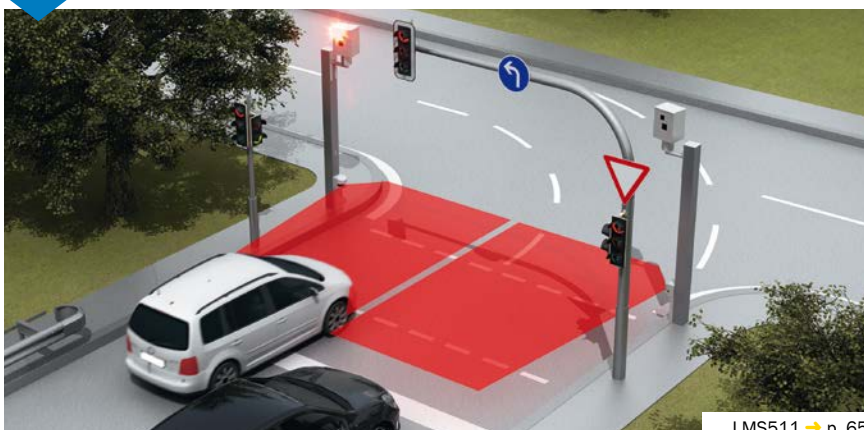
1 Red light monitoring

When a vehicle travels over the stop line of a traffic light on a red, a picture is taken immediately to document the violation. The LMS511 2D laser scanner detects vehicles behind the stop line quickly and reliably even across multiple lanes. The sensor then sends a signal to trigger the camera.

Since the LMS511 is not sensitive to environmental influences such as rain, snow or sleet, false alarms are virtually eliminated. Using the time-of-flight

principle, the LMS511 cannot be manipulated by external radiation sources, mirrors, etc.

The 2D laser scanner is easily and inexpensively mounted above the road. Compared to using induction loops, this solution has the advantage that no new loops have to be laid when resurfacing the road.



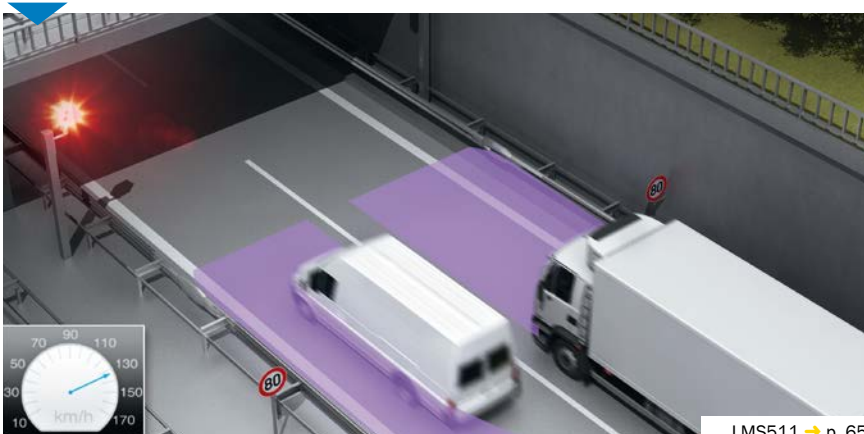
LMS511 → p. 65

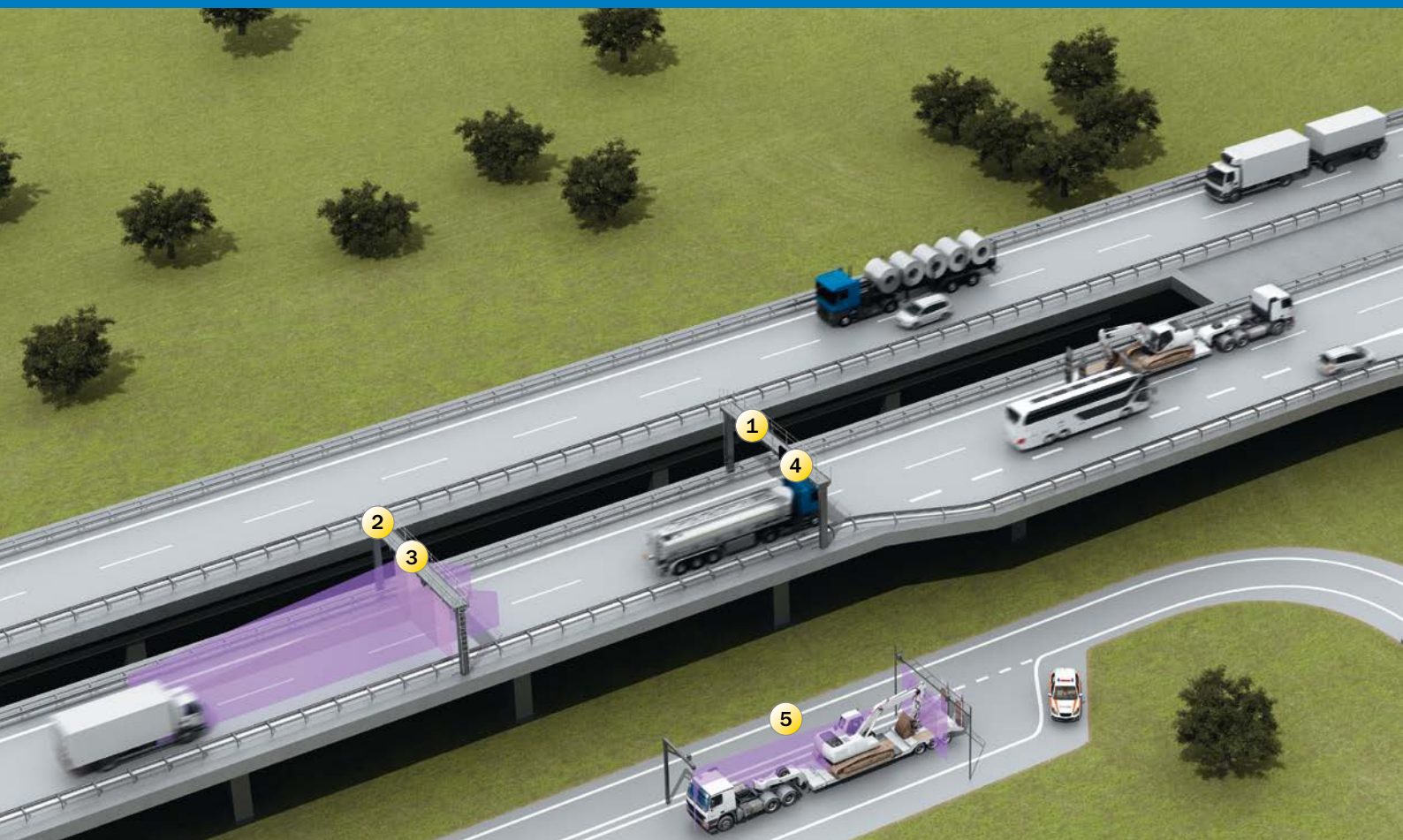


2 Speed monitoring

Speed monitoring can be used as an effective way to increase traffic safety. The LMS511 2D laser scanner is integrated in the crash barrier and is nearly imperceptible to road users. The raw data collected by the sensor is used to calculate speed. If a road user exceeds the posted speed, a camera is actuated.

The LMS511 has a maximum scan frequency of 100 Hz and generates a high number of measuring points to accurately calculate the vehicle speed. It is not sensitive to environmental influences such as rain, snow or sleet. Based on the time-of-flight measurement principle, the LMS511 cannot be manipulated by external radiation sources, mirrors, etc.





2 Detection of high vehicles, including lane detection

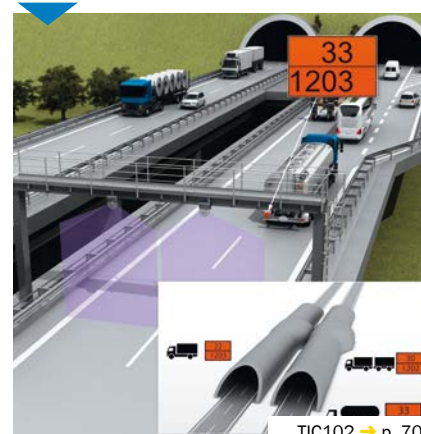
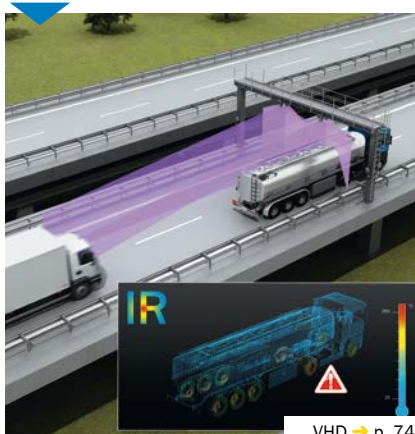
The HISIC450 detects overheight vehicles. The LMS511 2D laser scanner together with the HISIC450 can be used to identify the lane in which the overheight vehicle is traveling, ensuring only the lane concerned needs to be shut down. Compared to other technologies, this solution allows a much more accurate adjustment of the monitored area to the width of the lane.

3 Detection of trucks at risk of fire

Vehicles at risk of fire must be detected and diverted before entering a tunnel. The VHD Vehicle Hot Spot Detector combines 3D data from the LMS511 2D laser scanners and temperature data from infrared cameras to identify and check for individual temperature limits of vehicle components, without affecting traffic.

4 Detection of vehicles transporting hazardous materials

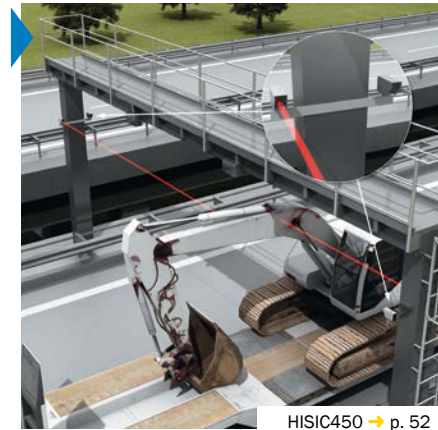
Knowing the number and type of vehicles transporting hazardous materials in a tunnel is important for traffic safety. An infrared camera recognizes the hazardous materials placard based on its shape and reads its content. The integrated TIC102 Traffic Information Collector also records the 3D profile for analysis of possible positions of the hazardous material placard. This ensures the read rate is increased considerably and misinterpretations are avoided.





1 Detection of high vehicles

To protect bridges and tunnel portals, overheight vehicles must be reliably detected. However, exceptions for antennas and other small objects must be made. The HISIC450 overheight detector features a corrosion-proof housing that can be used in and around tunnel systems in harsh atmospheres. A large light spot and high light reserve via the transmitter / receiver principle allow use even in poor weather conditions. Plus, its immunity to ambient light ensures false alarms are avoided.

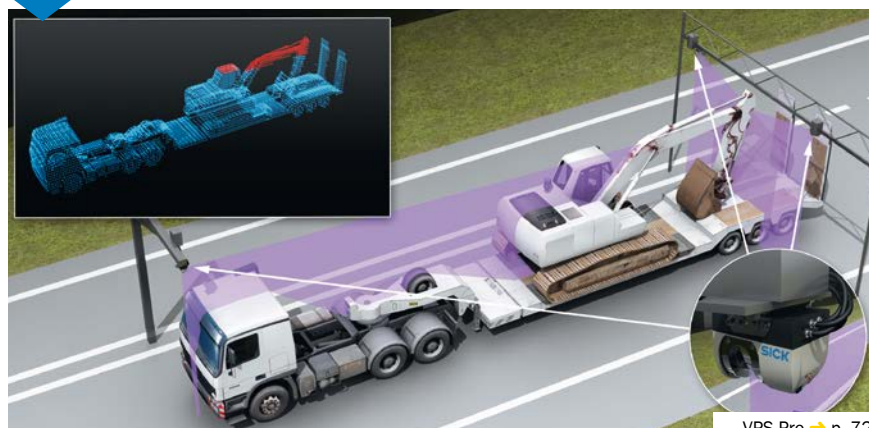


HISIC450 → p. 52

5 Measurement of the truck profile

Trucks that are too wide or too tall can cause significant damage to the infrastructure. The profiling system VPS Pro that automatically measures vehicle dimensions uses LMS511 2D laser scanners to automatically measure vehicles, even in areas that are difficult to reach.

3D visualization that highlights protruding objects allows quick localization of the potential hazard. The system is suitable for tough industrial environments.



VPS Pro → p. 72

6 Measurement of visual range

Fog on the road presents a significant danger to drivers and is often underestimated. The VISIC620 visual range measuring device is used to prevent pile-ups in fog. Depending on the measured visual range, the maximum allowed speed is specified on variable message signs.



VISIC620 → p. 54



2 Extractive measurement of visibility

The VICOTEC450 visibility measurement system can be mounted outside the tunnel, which makes access possible during operation. The VICOTEC450 is extremely rugged and is immune to external influences such as fog, contamination and small animals. The measured values are used for accurate, reliable control of the tunnel ventilation.



VICOTEC450 → p. 54

3 Measuring the CO (NO) concentration

It is important to ensure that the gas concentrations in the tunnel do not exceed the defined limits. In order to provide continuous measurement of the CO (NO) concentration in the tunnel air, the VISIC100SF tunnel sensor is also equipped with electrochemical sensors. These electrochemical sensors meet the requirements of EN 50545. When it comes to measurement quality and maintenance complexity, they are on a par with infrared measuring systems.



VISIC100SF → p. 53

4 Measurement of NO₂ concentration

Nitrogen dioxide (NO₂) is used as an important benchmark for controlling the tunnel ventilation. The VICOTEC321 tunnel sensor continuously measures the exact NO₂ concentration. The VICOTEC321 uses the DOAS process, allowing it to detect the smallest concentrations of NO₂, e.g. in measuring ranges from 0 to 1 ppm. The VISIC100SF tunnel sensor also measures NO₂. This sensor uses an electrochemical process. The lowest measuring range of the VISIC100SF is 0 to 5 ppm.



VICOTEC320 → p. 53



1 In situ measurement of visibility

Particles such as dust and soot, as well as tire and brake wear limit visibility in tunnels. Tunnel sensors from SICK, including the VISIC100SF and VICOTEC320, continuously and directly monitor the tunnel atmosphere and visibility. The measured values are used for accurate, reliable control of the tunnel ventilation. In addition, the VISIC100SF tunnel sensor from SICK for in situ measurement of visibility has no moving or wear parts and is nearly maintenance-free.



VISIC100SF → p. 53

5 Smoke detection for early fire detection

Because the concentration of soot particles increases faster than the temperature, optical sensors can detect a fire very early. The VISIC50SF tunnel sensor uses the scattered light principle with protected measurement volume. It is able to achieve such high reliability that its alarms are processed automatically.

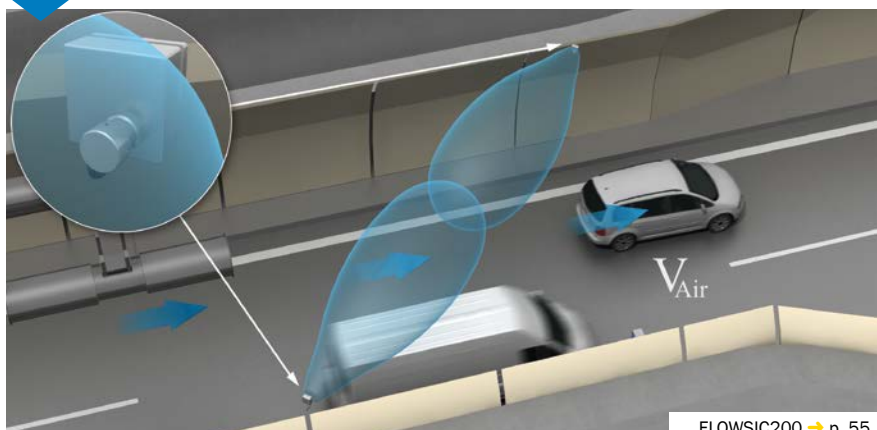


VISIC50SF → p. 52

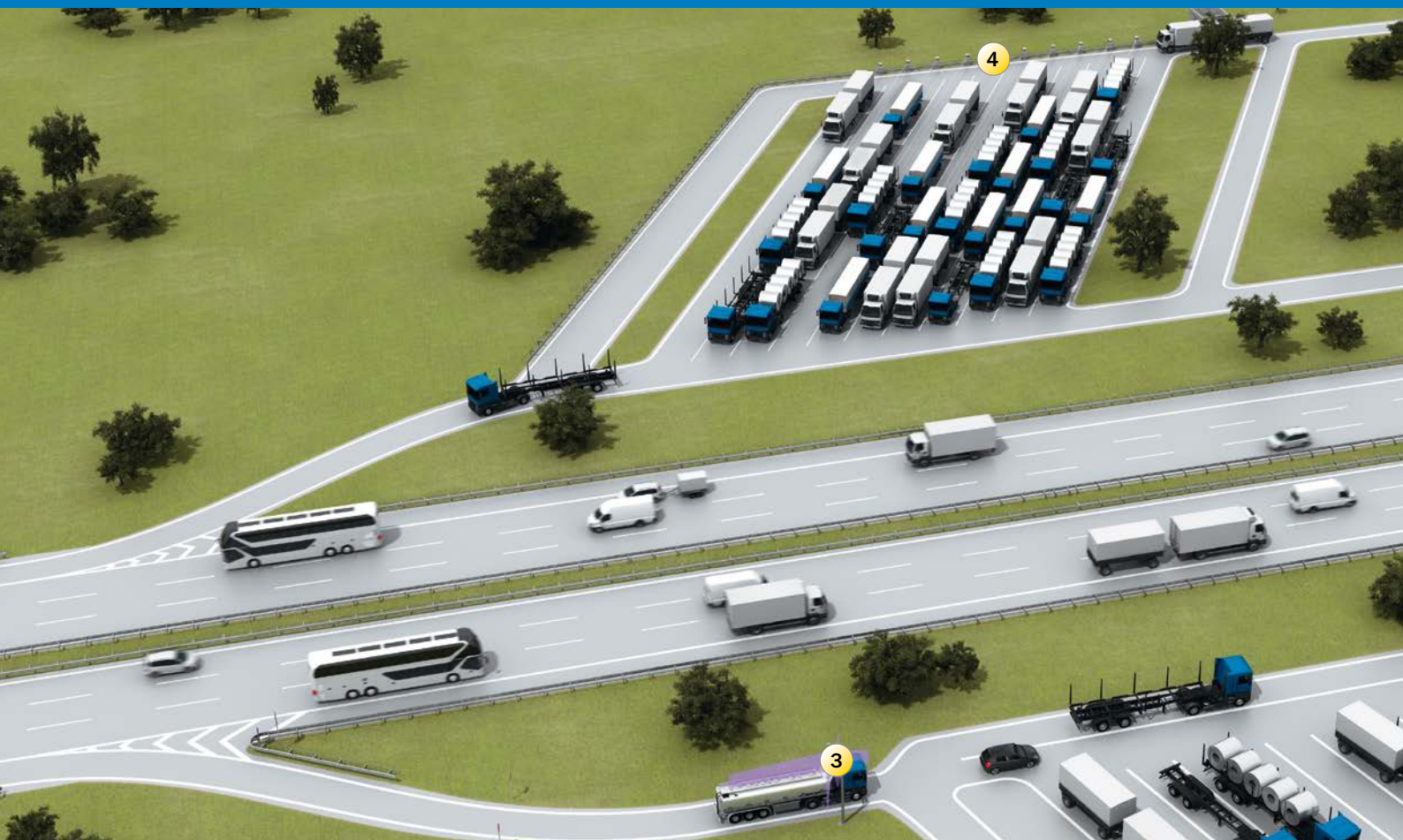
6 Measurement of air speed

To regulate tunnel ventilation, the speed and direction of airflow in the tunnel must be measured: during normal operation and especially in the case of a fire. The FLOWSIC200 tunnel sensor measures flow velocity without contact over the entire length of the tunnel. This ensures detection of airflow through the entire tunnel cross section is much more reliable than for selective measurement systems.

The membrane of the ultrasonic transducer and the housing of the FLOWSIC200 are made of metal. Compared to tunnel sensors made of plastic, metal allows use at higher temperatures. Versions from SICK with a stainless steel housing and a titanium transducer are maintenance-free for at least five years.

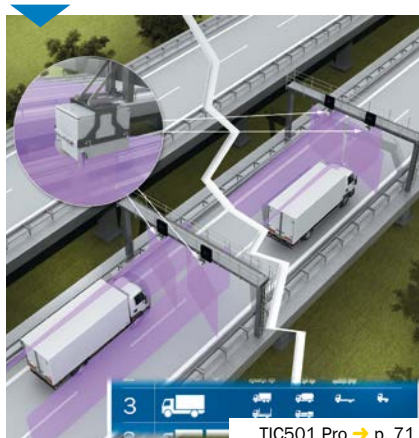


FLOWSIC200 → p. 55



2 Traffic data collection in traffic control systems

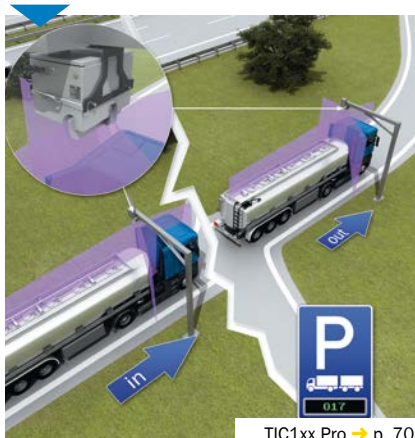
Traffic control systems are intended to improve the flow of traffic on one or more sections of road, at intersections or throughout the entire network. To do so, traffic data such as the number and speed of vehicles, as well as the class of vehicle must be collected. The integrated TIC501 Pro profiling system can also be used in areas where no sensors may be installed in the roadway.



TIC501 Pro → p. 71

3 Determining parking occupancy for trucks

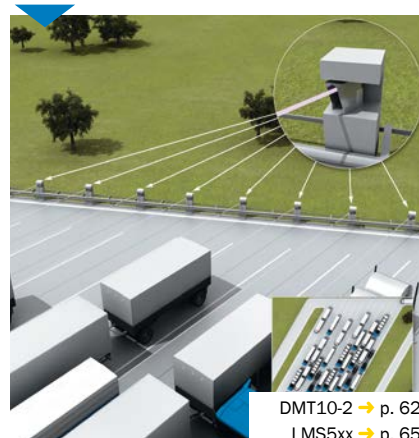
The steady increase in freight on highways leads to an overflow at rest stops. With the integrated TIC1xx Pro profiling system, trucks are counted upon entry and exit and accurately classified. Based on this data, an accurate determination about open capacity at the stop can be made. At full occupancy, trucks can be diverted to the next rest stop with available parking spaces.



TIC1xx Pro → p. 70

4 Determining free capacity in truck parking rows

To determine available spaces in a parking row, the trailing edge of the last truck to enter the row must be reliably measured. The DMT10-2 long-range distance sensor with a sensing range of 65 m is an appropriate solution for long parking rows. For shorter distances, the LMS511 2D laser scanner is the ideal solution.

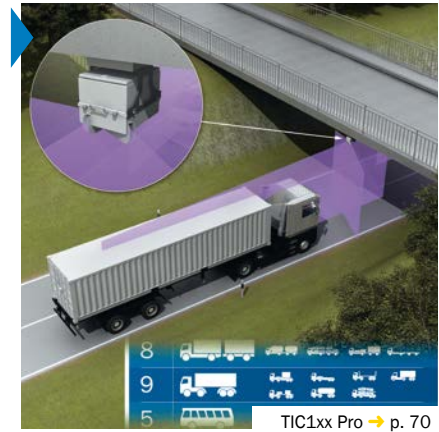


DMT10-2 → p. 62
LMS5xx → p. 65



1 Traffic data collection at traffic counting stations

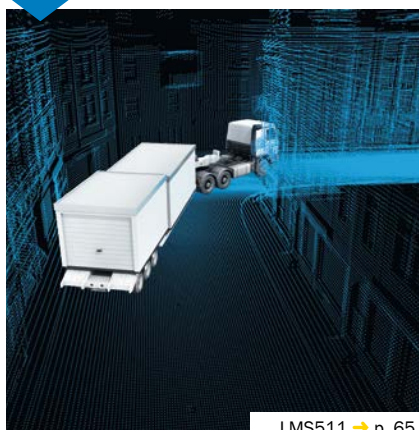
Traffic planning and road construction decisions and actions are based on traffic data collection at traffic counting stations. The integrated TIC1xx Pro profiling system identifies up to 30 predefined vehicle classes, which can be grouped together according to customer's requirements or standards like TLS 8+1. The system is easily and inexpensively mounted above the road, allowing even high-value road surfaces to remain functional. Drivers who change lanes are classified at the same high accuracy as those that remain in the same lane. The TIC1xx Pro is the first overhead mounted system used as reference for testing other technologies for traffic data collection.





3 Measurement of the free space for heavy loads

When route planning for heavy loads, it must be known for certain whether restrictions, bridges or curves block transport. The rugged LMS511 2D laser scanner is mounted on an inspection vehicle and provides accurate measurement data that can be merged to form a 3D image of the roadway and the surrounding area. Based on these calculations, it can be determined whether a long vehicle can easily drive around a tight corner.



LMS511 → p. 65

4 Measurement of the cross-section profile in tunnels

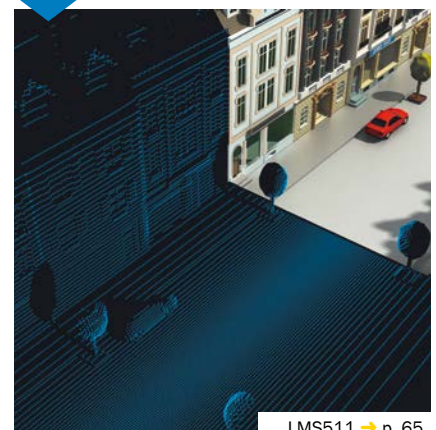
Cross-section profiles of tunnels are regularly measured. The rugged LMS511 2D laser scanner is mounted on an inspection vehicle and provides accurate measurement data that can be merged to form a 3D image of the tunnel. Multiple LMS511 sensors mounted to a vehicle can be synchronized and the speed of the inspection vehicle can be multiplied.



LMS511 → p. 65

5 3D measurement of road surroundings

Multiple LMS511 2D laser scanners are mounted on a surveying vehicle. At a maximum scan frequency of 100 Hz, they measure the distance to objects surrounding the roadway to a distance of up to 80 m. A 3D scatter diagram can be generated from these precise measurements.

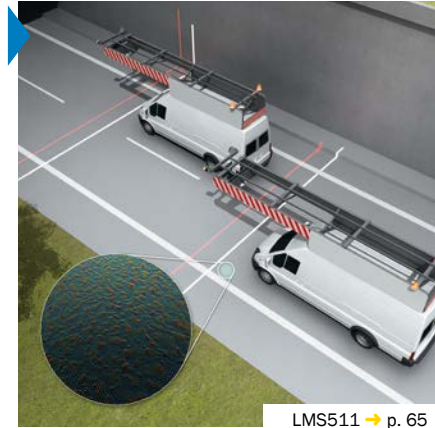


LMS511 → p. 65



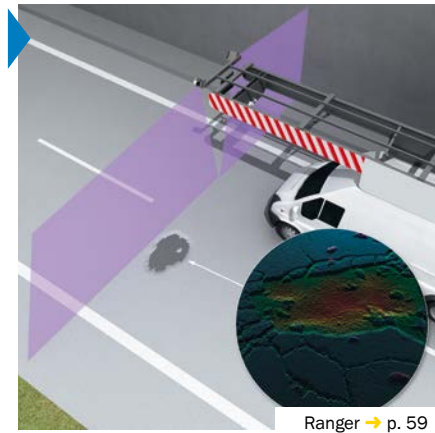
1 Inspection of road conditions: Macrostructure

To assess the condition of the roadway, serious damage such as potholes, ruts and road wear must be reliably detected. The rugged LMS511 2D laser scanner is mounted on an inspection vehicle. Even at high speeds, the sensor provides accurate measurement data that can be merged to form a 3D image of the entire inspected road.

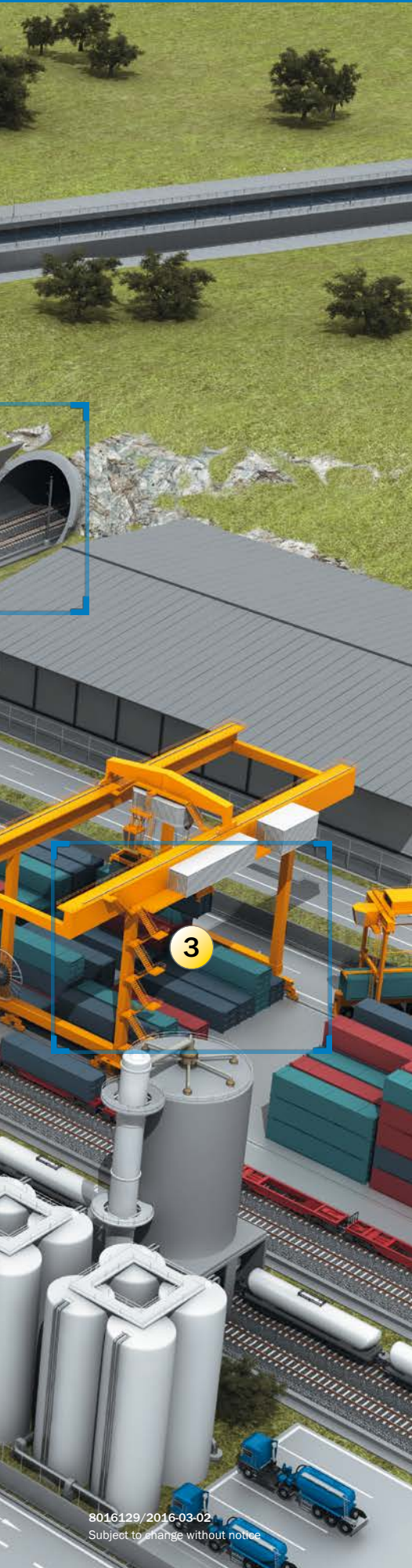


2 Inspection of road conditions: Microstructure

When detecting damage to the microstructure of the roadway, e.g., cracks and minor roughness, the high-end Ranger camera is the ideal solution. Since 3D data can be read at high speeds, submillimeter resolutions are possible. Grayscale and scattered light images can be captured simultaneously. This simplifies data analysis and the design of the measurement system.







Rail and sea routes

Focus 1 24

- 1 Rail – Solutions for traffic safety

Focus 2 28

- 2 Rail – Traffic management

Focus 3 30

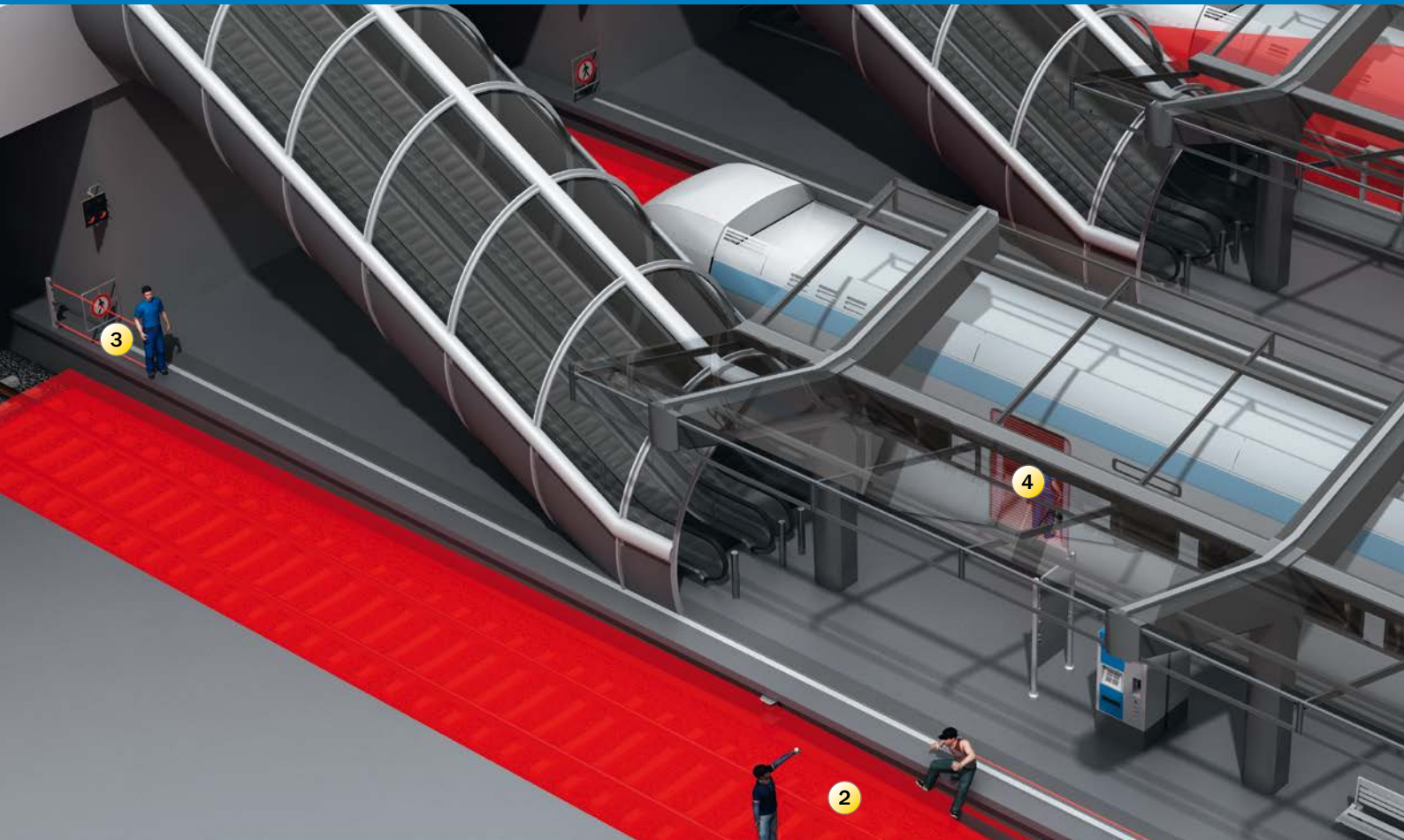
- 3 Rail – Traffic management for intermodal terminals

Focus 4 32

- 4 Rail – Maintenance and inspection

Focus 5 34

- 5 Sea routes – Solutions for traffic safety



2 Monitoring the track area

At stations without platform screen doors, the LMS511 2D laser scanner can be used to monitor the track area for protection of the track system or for the safety of passengers. The control station is notified when anyone is in this area. The combination of the intelligent field functions of the LMS511 and the Flexi Soft safety controller allows the system to distinguish between people and incoming / outgoing trains.

The monitoring areas are activated or deactivated depending on the position of the train via the Flexi Soft safety controller.

3 Monitoring the platform edge

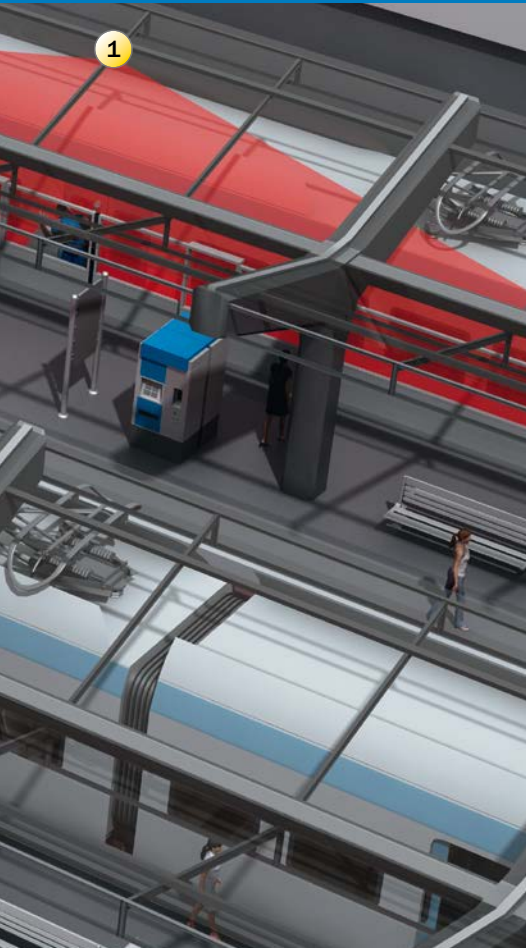
In many stations, the area in front of the platform edge is marked only visually. The WS/WE45 compact photoelectric sensor can also be used to monitor the platform edge at a length of up to 100 m (up to 300 m in buildings). People who get too close to the platform edge can be alerted by an audible or visual signal.



LMS511 → p. 65
Flexi Soft → p. 51

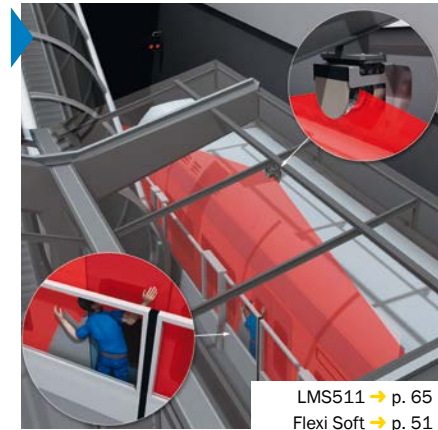


WS/WE45 → p 41



1 Monitoring the area between the platform screen door and the train door

Platform screen doors increase passenger safety. Falling onto the track or moving into the track area is reliably prevented. Half-height platform screen doors (APGs) are used outdoors for safeguarding purposes, and can also be used for partially-covered platforms. In the worst case scenario, persons can be caught between the train door and the platform screen door. Before the train departs, this must be reliably signaled to the driver to prevent the train from starting. The LMS5xx 2D laser scanner is installed over the platform edge, which also protects from vandalism at the same time. Thanks to the large range, a single sensor can monitor up to three platform screen doors at one time. Combined with the Flexi Soft safety controller as well as specific, integrated and external diagnostic measures, a defined safety level can be achieved. This supports individual operating licenses from a government agency or notified body.



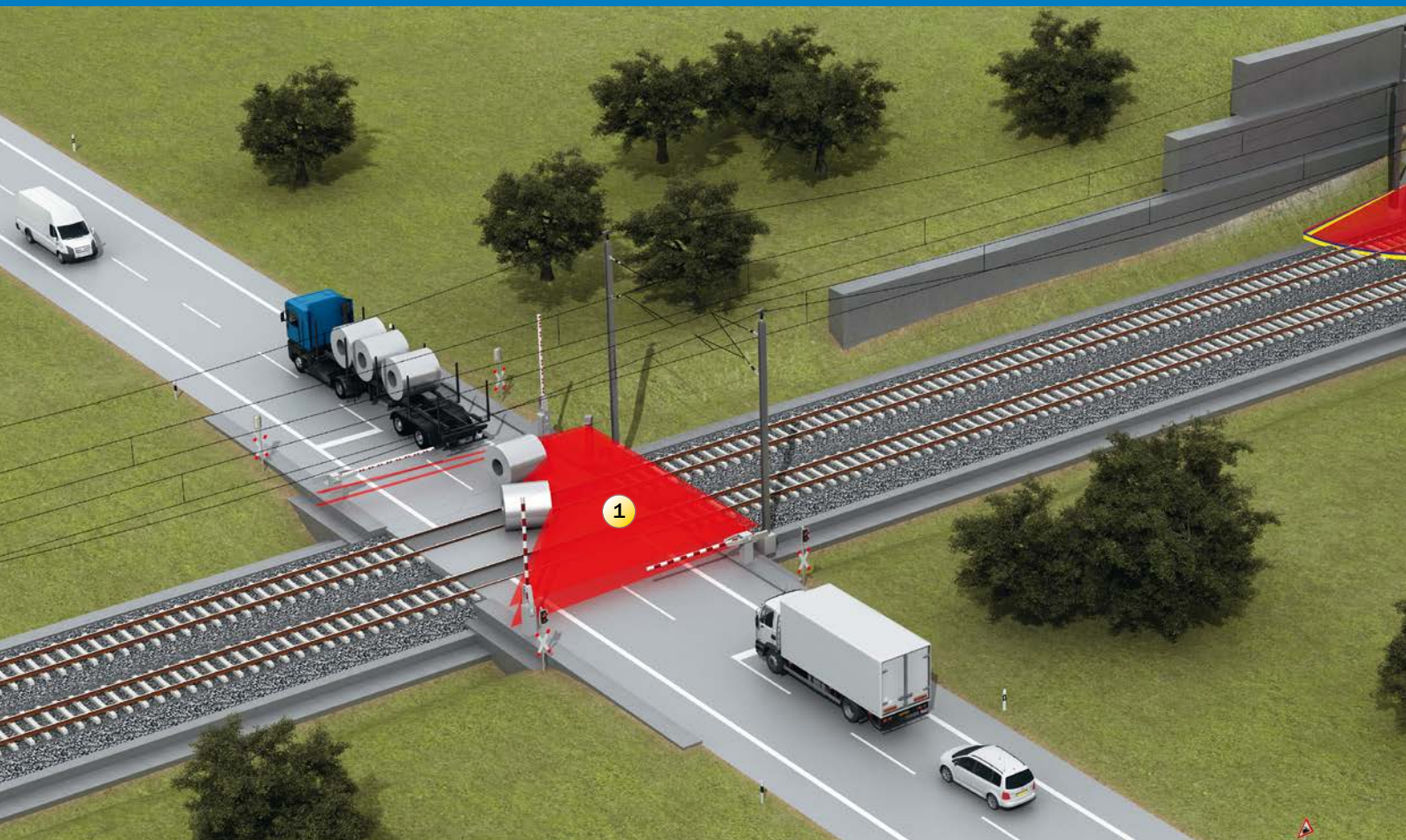
LMS511 → p. 65
Flexi Soft → p. 51

4 Monitoring train doors

The SGS smart light grids prevent train doors from closing when an object or person is between the door panels. The slim design of the SGS and the two options for optical light emission (slim or flat) mean that inconspicuous, barrier-free mounting on the train door is possible. The flexible plastic housing of the SGS allows use even with curved train doors.



SGS → p 48

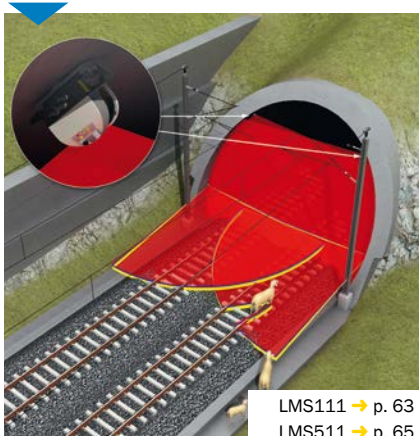


2 Monitoring tunnel portals

To prevent unauthorized entrance in the tunnel, people and animals must be reliably detected in the tunnel portal. LMS111 or LMS511 2D laser scanners are to ensure that the area around the tunnel portal is monitored horizontally and vertically. Combined with the Flexi Soft safety controller, a distinction is made between an incoming train and people or animals. This ensures false alarms are avoided.

3 Smoke detection for early fire detection

Fire in a railway tunnel can have catastrophic consequences. The VISIC50SF tunnel sensor detects fire very quickly and reliably based on the particle concentration in the tunnel air. Compared to temperature measurements, the advantage of this method is a fast response time and almost complete prevention of false alarms.



LMS111 → p. 63
LMS511 → p. 65

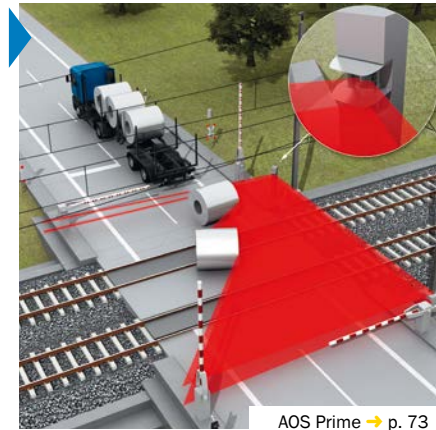


VISIC50SF → p. 52



1 All-clear signal at railroad crossings

With fully-gated railroad crossings, the train only receives a free signal if it is ensured that no large object is located in the danger area between the closed barriers. The AOS Prime object detection system consisting of the LMS511 2D laser scanner combined with the intelligent Flexi Soft safety controller is a reliable and cost-effective solution. The dispatcher is relieved of purely visual monitoring tasks, as the free signal is generated automatically. Due to the clear user interface of the LMS511, the monitoring field can be easily and precisely adapted to the geometry of the danger area. Thanks to the two-channel structure and the automatic system tests of the AOS, a high level of reliability and diagnostic cover is achieved.

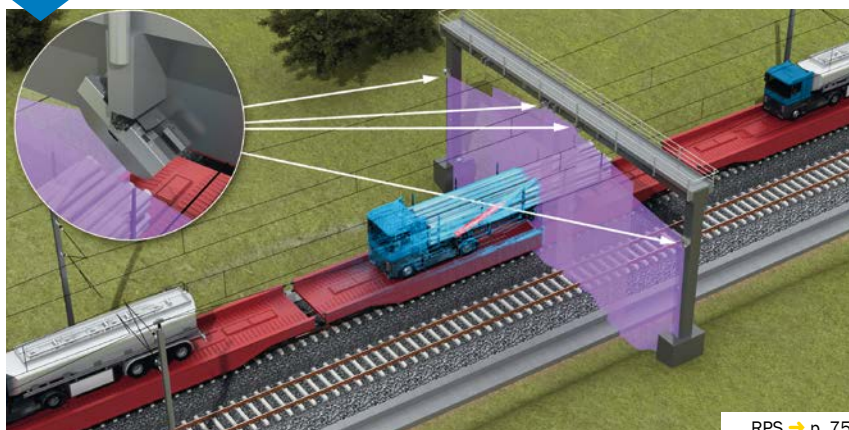


AOS Prime → p. 73

4 Measurement of the train profile

Objects protruding from trains can cause significant damage to the infrastructure. The RPS Railway Profiling System automatically detects clearance violations, which may be caused by a loose tarp, for example.

Clearance violations are detected in high resolution at normal speeds regardless of weather conditions. The permitted clearance is adjusted along a wagon based on the distance to the bogies of the wagon to account for cornering. Even very tight turns can be safely navigated.



RPS → p. 75



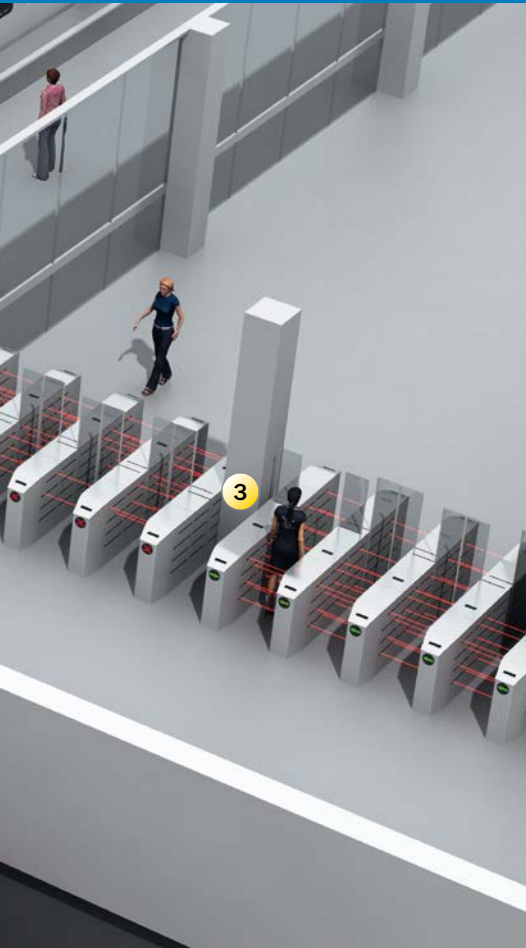
3 Separation in security gates

At public transportation stations, automatic access systems ensure that only people with valid tickets are transported. Multiple WL15 cylindrical photoelectric sensors are mounted on an access system. Combined with a downstream controller, the system ensures that only one person passes the turnstile per opening process.

The WL15 uses the reflection principle and therefore, only has to be wired on one side of the turnstile, which saves time and money.



WL15 → p. 42



1 Determining position trains at stops

At stations with platform screen doors, the train must stop exactly at the predetermined position. The DMT10-2 long-range distance sensor continuously measures the position of the front of the train so that braking can be controlled and the correct stop position can be checked. This reliable solution is particularly suitable for controlling the arrival of driverless trains.



DMT10-2 → p. 62

2 Determining position freight trains while loading and unloading

To ensure loading and unloading is performed correctly, especially in automated systems, freight trains must be accurately positioned. With a maximum measuring length of 1,700 m, the KH53 linear encoder is particularly suitable for use on railway tracks. Non-contact technology ensures that the system is accurate and wear-free regardless of train vibrations, contamination and precipitation.

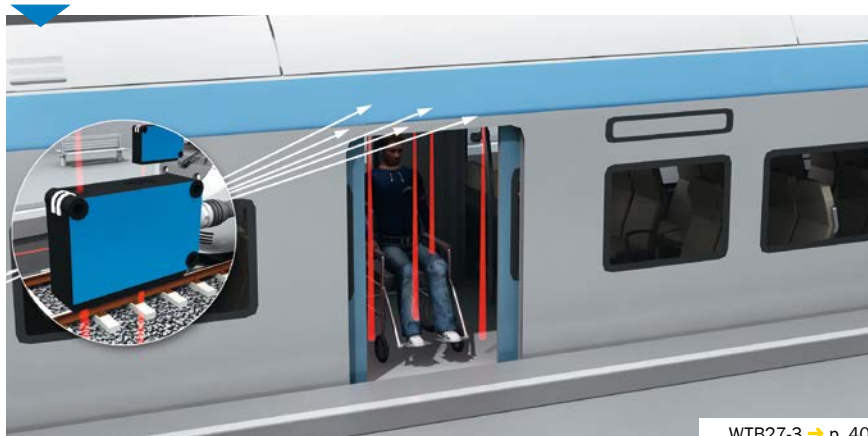


KH53 → p. 56

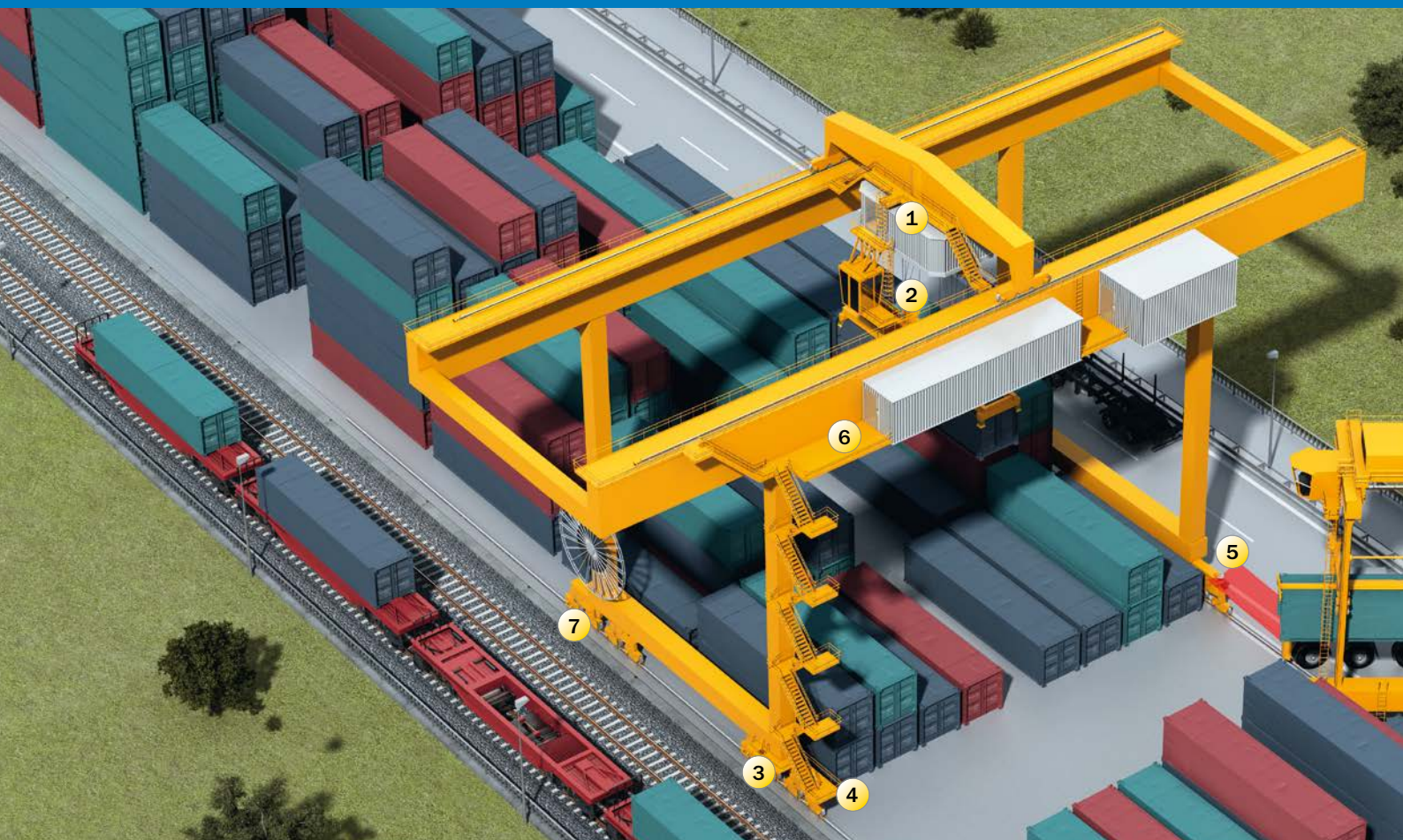
4 Detection of persons for automatic door opening

The position of pushbuttons for doors in public transportation vehicles are often not designed for the needs of wheelchair users. To accommodate individuals in wheelchairs, the WTB27-3 compact photoelectric sensor is mounted above the door to accurately detect when a wheelchair user approaches the door.

The sensing range can be adjusted to reliably detect objects close to the ground (e.g., footrest). The door then opens on time and the wheelchair user can pass unhindered.



WTB27-3 → p. 40



3 Determining position of a traveling crane

The KH53 linear encoder, which uses magnets for non-contact position determination, is ideal for use in harsh environments and over large distances. By obtaining position data of the traveling crane, containers can be accurately stacked with minimal offset.

4 Determining position of a crane

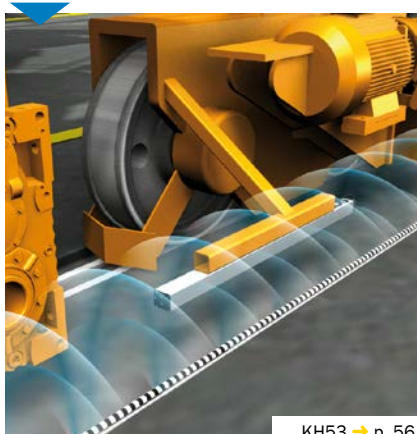
The position of the crane must be detected automatically. Outdoor use and long distances present substantial challenges to the measuring system, often characterized by uneven measuring distances such as railways. The KH53 linear encoder operates over a distance of up to 1,700 m even in harsh environments.

5 Collision avoidance

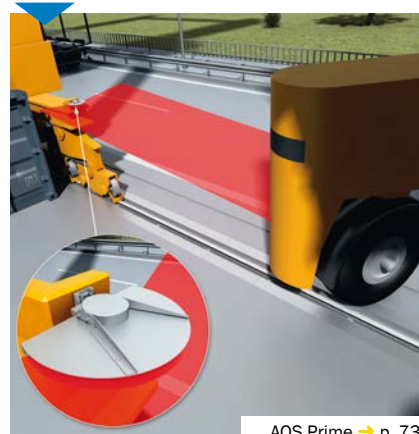
To help the crane operator avoid collisions with objects on the route, the object detection system AOS Prime is a reliable solution.



KH53 → p. 56



KH53 → p. 56



AOS Prime → p. 73



1 Position and presence detection of suspension cables

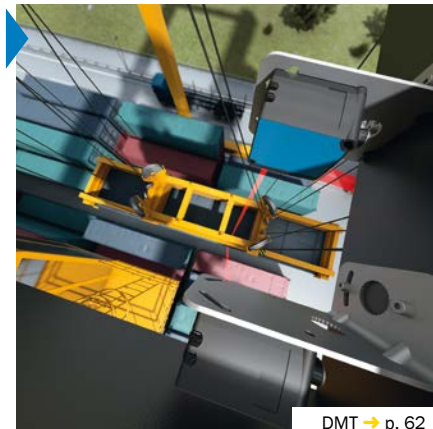
The suspension cables in the crane cabin must be rolled up correctly on the winch to prevent damage. In the event of a tear, the system must reliably detect that the suspension cable is no longer present and the system must be stopped immediately. The DT50 mid-range distance sensor has a specific measuring range and reliably checks the presence and position of the suspension cable over the entire width of the cable guide.



DT50 → p. 61

2 Determining the height position of the spreader

To prevent collisions, the crane operator always needs accurate information about the height position of the spreader relative to the container stack. The DMT long-range distance sensor is ideally suited for outdoor use. It is a non-contact, highly accurate and non-slip solution.



DMT → p. 62

6 Access protection

It is important to prevent access to a dangerous area until all dangerous movements are completed. The i10 Lock electro-mechanical safety locking device protects access points against unauthorized entry.



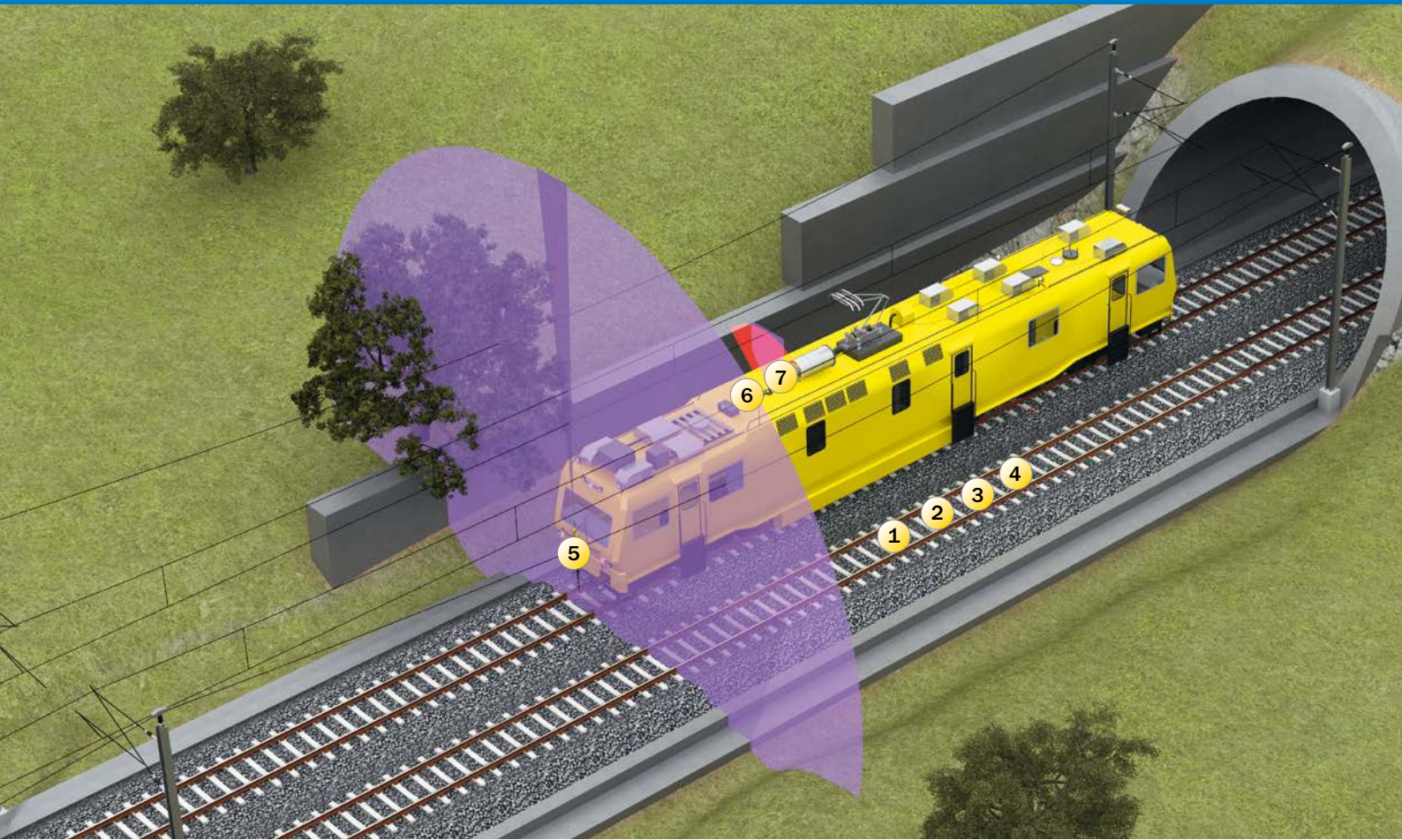
i10 Lock → p. 50

7 End position monitoring

If the traveling crane moves beyond a defined area, it is detected by two redundant IQ40 inductive proximity sensors free of wear and the traveling crane is immediately shut down.



IQ40 → p. 43



5 Measurement of clearance

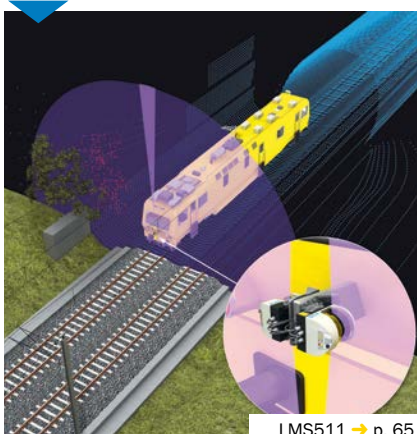
During routine maintenance, it must be determined if objects such as branches are too close to or even extend into the clearance outline of trains. Multiple LMS511 2D laser scanners that can be synchronized are mounted on an inspection vehicle. The individual measuring points are uniquely assigned in space for an accurate measurement even at high speeds or at a very high angular resolution.

6 Determining the position of the contact wire

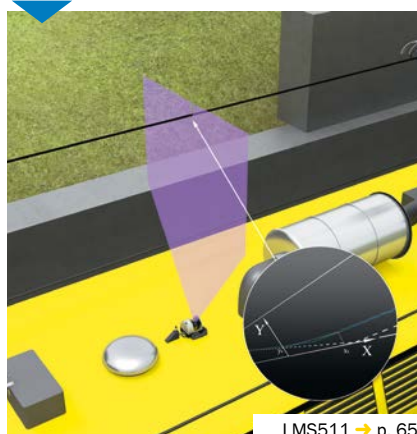
The LMS511 2D laser scanner is mounted on the roof of the inspection vehicle. The position of the contact wire is determined from the data. The sensor detects whether the position of the contact wire deviates from the target position horizontally or vertically.

7 Inspection of the contact wire

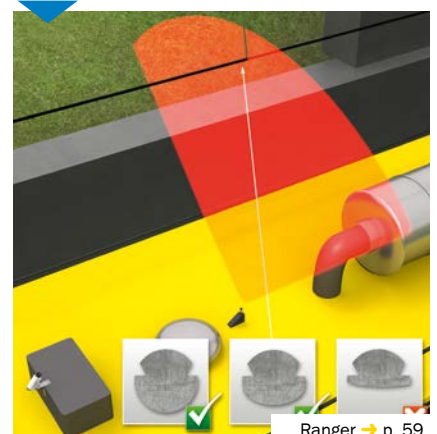
The Ranger high-end camera is mounted on the roof of the inspection vehicle and provides an accurate cross-section profile of the contact wire. Damage and wear are safely and reliably detected even at high speeds.



LMS511 → p. 65



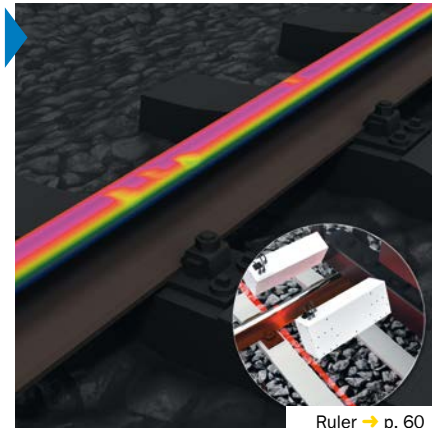
LMS511 → p. 65



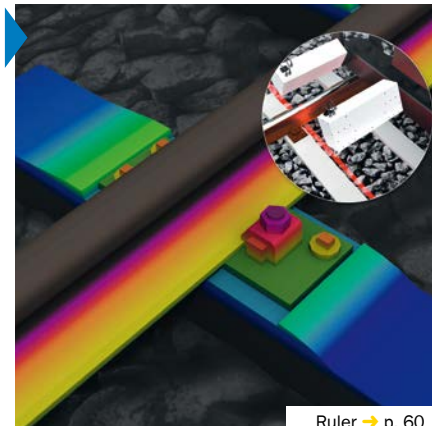
Ranger → p. 59

1 2 3 4 Inspection of the railway tracks

Operators of railway systems must regularly inspect railway tracks as part of maintaining their systems to ensure operational safety and traffic capacity. The maintenance work includes inspection of rails, ties, ballast bed and mounting system. Multiple high-end or Ranger 3D cameras are mounted on an inspection vehicle. These cameras provide accurate cross-section profiles from which the complete geometry of the track is calculated. Up to 30,000 profiles per second provide quick inspection to allow regular railway traffic to run at full operational speed and to keep maintenance costs down. The Ruler high-end camera is pre-calibrated and outputs 3D coordinates. With the Ranger high-end camera, the working distance and field of view can be easily adjusted.



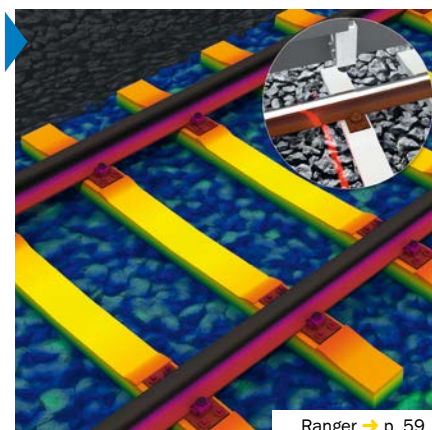
Ruler → p. 60



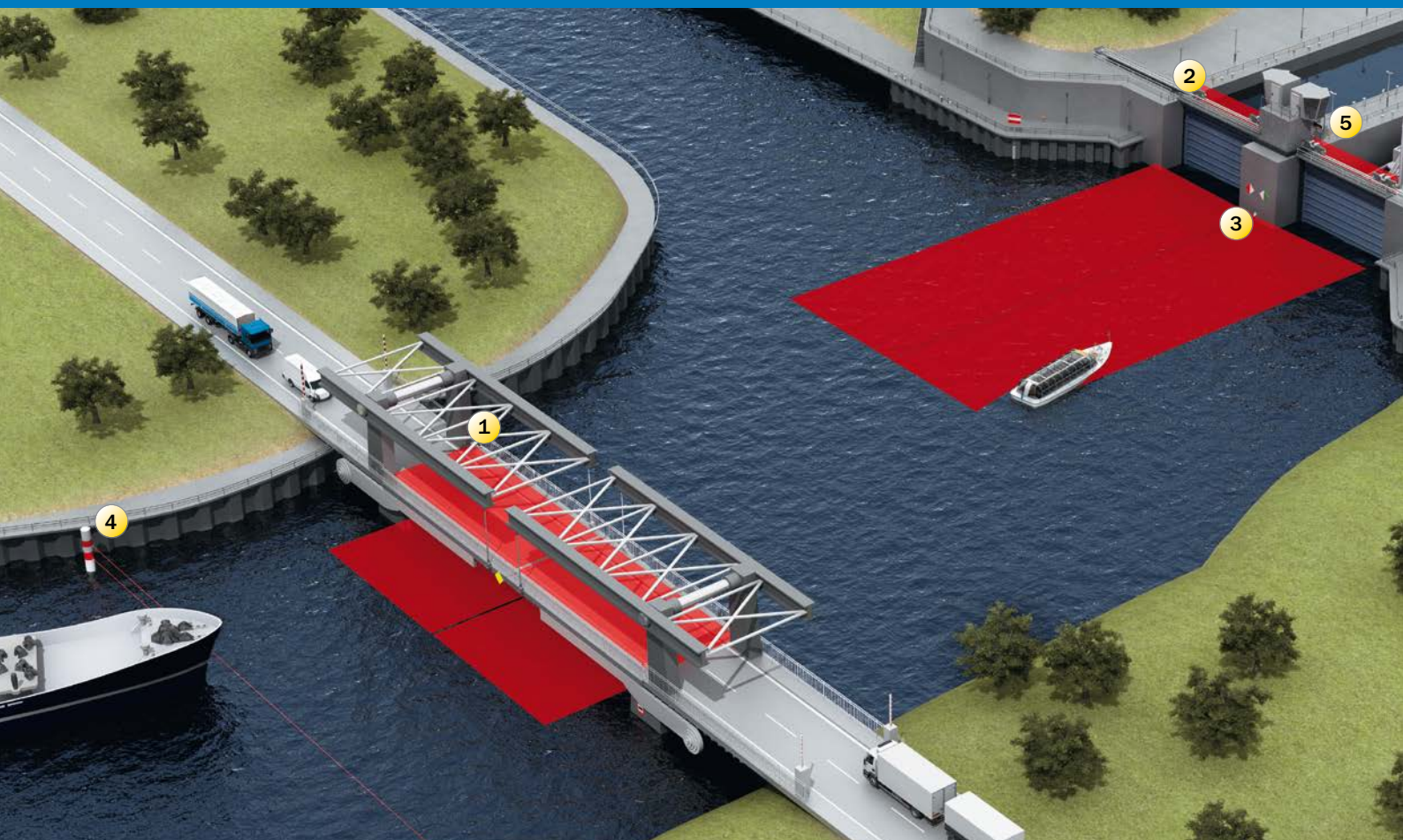
Ruler → p. 60



Ranger → p. 59



Ranger → p. 59



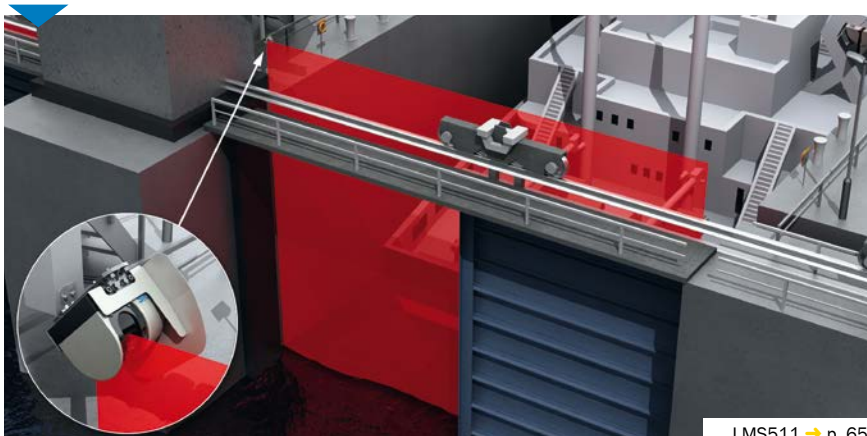
2 Area monitoring at lock gates

Incorrectly positioned vessels in the lock chamber can collide with the gates. The gates can also seize vessels and endanger people or cause expensive damage and downtime. The LMS511 2D laser scanner is mounted above the lock chamber. In combination with the intel-

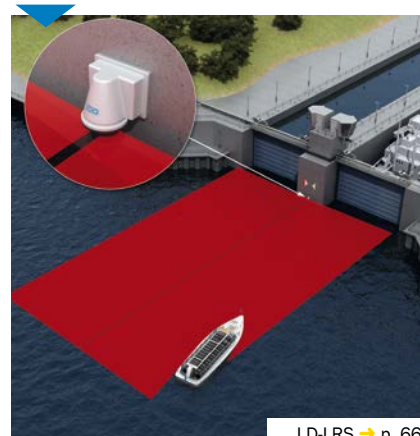
ligent Flexi Soft safety controller and self-tests on a defined test objective, whether a vessel gets too close to the area of the lock gates can be reliably monitored. An input signal can be used to adjust the monitoring area to the water level on the LMS511.

3 Ship arrival in open water

For optimal coordination of locks or control of automatic draw bridges, approaching vessels should be detected in a timely manner. The LD-LRS 2D laser scanner has a maximum sensing range of 250 m, making it ideal for use on wide waterways.



LMS511 → p. 65



LD-LRS → p. 66



1 Area monitoring on and under draw bridges

Before a draw bridge can open, it is important to ensure that there are no objects still on the bridge. When the draw bridge is closing, there must be no vessels underneath it. The 2D laser scanners in the AOS Prime object detection system reliably detect objects on and underneath the bridge. The monitoring field can be adapted to the exact size of the monitored area. Breaching the field causes the laser scanners to send a signal to the Flexi Soft safety controller.



AOS Prime → p. 73

4 Ship arrival on rivers and canals

For optimal coordination of locks or control of automatic draw bridges, approaching vessels should be detected in a timely manner. The HISIC450 consists of two outdoor light barriers. It can be installed either on rivers or canals long before the draw bridge and it reliably detects vessels even in poor weather.

5 Determining position at lock gates

The KH53 linear encoder records the position of the lock gate when closing for optimal control. Non-contact, wear-free technology ensures accurate system measurements, even in harsh environments.



HISIC450 → p. 52



KH53 → p. 56



Product overview

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At a glance

- Rugged metal inserts with inner thread
- SICK ASIC technology - the result of decades of experience with photoelectric sensors
- Large, user-friendly setting screws
- Bright, large-sized indicator LEDs
- IP 67 enclosure rating

Your benefits

- Quick and easy mounting and high durability due to threaded metal inserts
- SICK's ASIC technology provides high performance and excellent reliability
- Easy to adjust due to large, user-friendly setting screws
- Easy to monitor due to extra bright, large-sized indicator LEDs
- Easy installation with SICK accessories

→ www.mysick.com/en/G6

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.



Ordering information

Other device versions can be found at www.mysick.com/en/G6

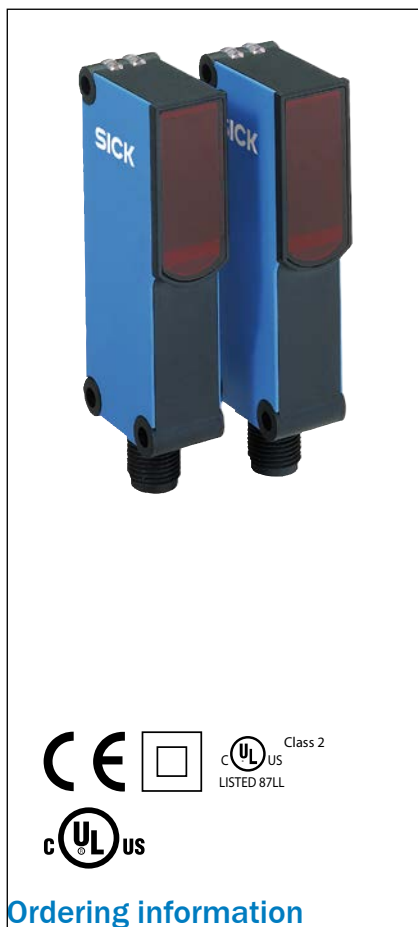
Through-beam photoelectric sensor

Sensing range, max.	Type of light	Switching type version	Switching type	Connection	Model name	Part No.
0 m to 14.5 m	Infrared light	PNP	Light/dark-switching	Cable, 3-wire	GSE6-P1121S14	1059111

Accessories

Mounting brackets/plates

Accessory type	Material	Model name	Part No.
Mounting bracket	Stainless steel	BEF-W100-A	5311520



At a glance

- Red light
- Test input for system diagnostics
- Devices with complementary output and 4-pin M12 plug or 3/4 wire 2 m cable
- Rugged plastic housing

Your benefits

- Through-beam principle ensures very high operating reserves
- Reliable object detection in dusty or dirty environments, even at long distances
- Reliable device monitoring via integrated test input

→ www.mysick.com/en/W14-2

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.



Ordering information

Other device versions can be found at www.mysick.com/en/W14-2

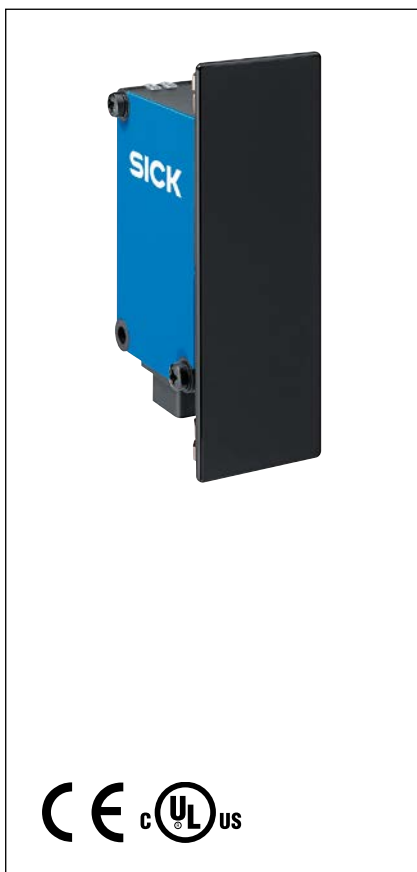
Through-beam photoelectric sensor

Type of light	Sensing range, max.	Switching output	Switching type	Adjustment	Connection	Model name	Part No.
Infrared light	0 m to 20 m	PNP	Light/dark switching	Adjustable, potentiometer 1 revolution	Plug M12, 4-pin	WS/WE14-2P410S01	1044850

Accessories

Plug connectors and cables

Enclosure rating	Sheath material	Model name	Part No.
IP 68	PUR halogen-free	DOL-1204-G02MC	6025900
IP 69K	PVC	DOL-1204-G02MN	6028128



At a glance

- Precise background suppression with no sensing range drift
- PinPoint technology: Intense red-emitting LED with consistent light spot
- Reliable operation in industrial environments – with ambient light, optical reflections and when devices are mounted opposite one another
- Sensing distance adjustment with potentiometer or easy teach-in push-button
- Ambient temperature: –40 °C ... +60 °C
- UL approval

Your benefits

- PinPoint technology can replace laser proximity sensors in some applications, eliminating the need for laser safety measures, and the service life of the PinPoint LED is double that of laser diodes
- Less downtime due to ASIC chip technology by SICK
- Operational safety in ambient light, with optical reflections and when devices are mounted opposite one another
- Reduces setup costs, e.g., in case of format adjustment using an IO-Link sensor communication interface
- Durable housing with reinforced fixing holes withstands harsh conditions
- Reliable operation at temperatures down to –40 °C

→ www.mysick.com/en/W27-3

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.



Ordering information

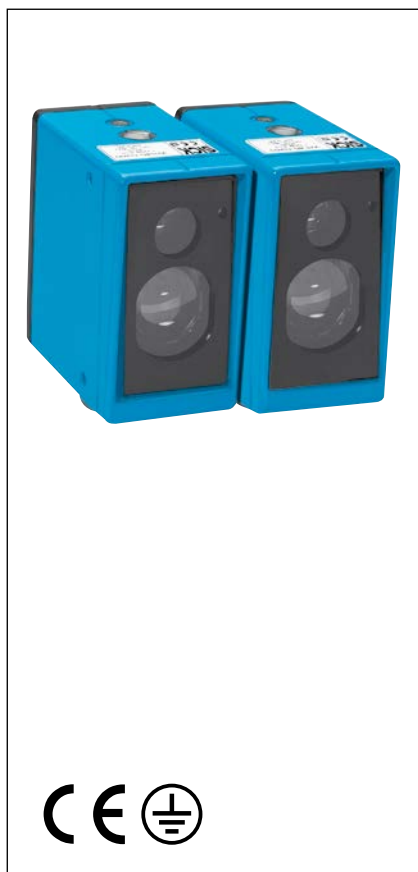
Other device versions can be found at www.mysick.com/en/W27-3

Photoelectric proximity sensor

- Scope of delivery: Front screen preassembled

Detection principle	Type of light	Sensing range, max.	Switching output	Switching type	Connection	Model name	Part No.
Background suppression	Infrared light	30 mm to 2000 mm ¹⁾	Relays	Light switching	Cable, 5-wire	WTB27-3S1511P04	1042970

¹⁾ Object with 90% remission (based on standard white DIN 5033)



At a glance

- Very large sensing range and extremely high operating reserve
- Rugged metal housing
- Optional: Powerful front screen heating
- Optional: Test input, time delays and alarm output
- Variants for 10 - 60 V DC or 24 - 240 V DC / 24 - 240 V AC voltage supply

Your benefits

- Very long sensing range with a high operating reserve at 100 m provides reliable and continuous operation
- Metal housing withstands tough environments and provides a long service life
- Prevention and reduction of condensation on the front screen due to powerful front screen heating
- Optical alignment aid ensures easier alignment for long sensing ranges
- Multiple functions for simpler integration of individual systems
- Assembly compatibility - DC devices and DC/AC devices are available in the same design

→ www.mysick.com/de/W45

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.



Ordering information

Other device versions can be found at www.mysick.com/en/W45

Through-beam photoelectric sensor

- **Type of light:** Infrared light
- **Sensing range, max.:** 0 m to 350 m
- **Switching type:** Light/dark switching
- **Connection:** Terminal connection with PG13.5, 6-pin

Switching output	Model name	Part No.
NPN	WS/WE45-N250	1010982
PNP	WS/WE45-P250	1010983
Relays	WS/WE45-R250	1010994

Accessories

Device protection (mechanical)

Accessory type	Material	Model name	Part No.
Protective housing/tubes	Aluminum, painted	OBW-W45	2011431
Protective housing/tubes	Stainless steel (1.4571)	Protective hood	2041556

Terminal and alignment brackets

Accessory type	Material	Model name	Part No.
Terminal brackets	Steel, zinc-coated	BEF-KK-W45	2011436
Terminal brackets	Stainless steel (1.4581)	Ball-and-socket bracket	2041561



At a glance

- Retro-reflective photoelectric sensor in hybrid design with 5 m sensing range
- Mounting flexibility: M18 front mount using plastic nut or snap ring; side mounting with 24.1 mm hole distance
- Flush mounting using the snap ring
- Transparent back cover
- Well-defined, highly visible light spot
- Adjustable switch-off delay 0 - 2s

Your benefits

- Fully compatible with many competitor models, making it easy to install and integrate into existing systems
- Flush mounting with a snap ring reduces installation time and prevents interruptions to the material flow on conveyor systems
- Clearly visible status LED reduces mounting time and simplifies troubleshooting
- Quick and easy alignment due to highly visible light spot

→ www.mysick.com/en/W15

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.



Ordering information

Other device versions can be found at www.mysick.com/en/W15

Photoelectric retro-reflective sensor

Detection principle	Housing material	Sensing range max.	Switching output	Switching type	Connection	Model name	Part No.
Dual lens	Plastic	0.4 m to 9 m ¹⁾	NPN	Light switching	Cable, 4-wire	WL15-N1000S04	1057336

¹⁾ PL80A.



At a glance

- Increased sensing range up to 40 mm
- Corner LEDs
- Active sensing face that is rotatable in five directions
- Rugged, compact design
- Integrated mounting clamp
- DC and AC/DC versions available

Your benefits

- Flexible mounting options due to rotatable sensor head
- Simple monitoring of the output and operational status
- Cost reduction due to reduced mechanical damage with increased sensing range
- Shorter installation times due to integrated mounting fixture
- Reduced maintenance costs

→ www.mysick.com/en/IQ_Standard

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.



Ordering information

Other device versions can be found at www.mysick.com/en/IQ_Standard

DC 4-wire

Sensing range S_n	Installation type	Output function	Switching output	Electrical wiring	Connection	Model name	Part No.
40 mm	Non-flush	Complementary	PNP	DC 4-wire	Plug M12, 4-pin	IQ40-40NPPKC0K	6037073

Accessories

Plug connectors and cables

Connection type	Plug type	Enclosure rating	Cable outlet	Material, sheath	Length of cable	Model name	Part No.
Plug M12, 4-pin	Cable socket	IP 68	Straight	PUR halogen-free	2 m	DOL-1204-G02MC	6025900



At a glance

- High-resolution light grid: With beam separation of 2.5 mm, 5 mm, 10 mm, 25 mm, and 50 mm
- “High-speed scan” function with triple scanning speed
- “Transparent mode” function for detecting transparent materials
- Can be switched to high-resolution evaluation with accuracy levels of up to 2 mm
- Data compression: Run length coding

Your benefits

- “High-speed scan” function offers short response times for safely detecting objects traveling at high speeds
- Modular concept offers the perfect solution every time from a single source
- “High measurement accuracy” function for detecting small objects reliably
- “Transparent mode” function for reliably detecting and measuring transparent objects
- Integrated bus interfaces and accompanying functional modules reduce the time and effort involved in the commissioning process
- SOPAS configuration software with menu-driven wizard saves time during the configuration process
- Simple maintenance without the need for specialist staff thanks to the cloning function with IO-Link
- High reliability due to ambient light immunity

→ www.mysick.com/en/MLG-2_Pro

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.



Ordering information

Other device versions can be found at www.mysick.com/en/MLG-2_Pro

MLGxxA-xxxxlx

- **Data interface:** RS-485 + 2 x I/O (IO-Link)

Beam separation	Working range	Detection height	Type	Part no.
25 mm	8.5 m	1,925 mm	MLG25A-1925I10801	1214385
50 mm	8.5 m	1,450 mm	MLG50A-1450I10801	1216527

MLGxxA-xxxxRx

- **Data interface:** 4 x Q (IO-Link)

Beam separation	Working range	Detection height	Type	Part no.
25 mm	8.5 m	1,475 mm	MLG25A-1475R10801	1215397
50 mm	8.5 m	1,900 mm	MLG50A-1900R10801	1214018

Accessories

Connection systems


Adapters and distributors

T-junctions



	Brief description	Model name	Part no.
	Male connector M12, 8-pin, to 1 x female connector M12, 8-pin, to 1 x female connector M12, 5-pin, for connecting of a PLC	SBO-02F12-SM1	6053172

Plug connectors and cables


Connecting cables with female connector

	Brief description	Model name	Part no.
 Illustration may differ	Head A: female connector, M12, 8-pin, straight Head B: Cable Cable: special color code, PVC, shielded, 5 m	DOL-1208-G05MF	6020664

Connection cables with female connector and male connector

	Brief description	Model name	Part no.
	Head A: female connector, M12, 5-pin, straight Head B: male connector, M12, 5-pin, straight Cable: drag chain use, PUR, halogen-free, unshielded, 2 m	DSL-1205-G02MC	6025931
	Head A: female connector, M12, 8-pin, straight Head B: male connector, M12, 8-pin, straight Cable: drag chain use, PUR, halogen-free, shielded, 2 m	DSL-1208-G02MAC	6030121

Connection cables with male connector and male connector

	Brief description	Model name	Part no.
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: male connector, RJ45, 8-pin, straight Cable: Ethernet, PUR, shielded, 2 m	SSL-2J04-G02ME	6034414



At a glance

- Up to 128 beams
- Different beam resolutions of 10 mm / 30 mm and 60 mm
- High operating reserve for sensing ranges up to 12 m
- Potentiometer for sensitivity setting
- Ambient light up to 200,000 lx
- Rugged aluminum housing
- PNP/NPN, relay output and a test input
- Optical synchronization

Your benefits

- High immunity to ambient light when exposed to sunlight and reflective objects, eliminating false trips
- A high operating reserve increases application reliability and reduces maintenance costs
- Efficient and effective way to evaluate multiple beams in one housing with one connection cable
- Simple commissioning thanks to a larger optical opening angle and manual fine adjustment option
- Optical synchronization enables quick installation and cost-effective connection
- The sensitivity setting enables trouble-free operation without reflection problems for the customer

→ www.mysick.com/en/ELG

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.



Ordering information

Other device versions can be found at www.mysick.com/en/ELG

ELG3

- **Beam separation:** 30 mm
- **Operating range:** 12 m

Evaluation beams	Monitoring height	Switching output	Model name	Part No.
Parallel beam	690 mm	2 x PNP (Q and /Q)	ELG3-0690P521	1025568
		2 x NPN (Q and /Q)	ELG3-0690N521	1025615
	810 mm	2 x PNP (Q and /Q)	ELG3-0810P521	1025577
	930 mm	2 x PNP (Q and /Q)	ELG3-0930P521	1025511
		2 x NPN (Q and /Q)	ELG3-0930N521	1025616
	1050 mm	2 x PNP (Q and /Q)	ELG3-1050P521	1025570
	1170 mm	2 x PNP (Q and /Q)	ELG3-1170P521	1025579
		2 x NPN (Q and /Q)	ELG3-1170N521	1025617
	1410 mm	2 x PNP (Q and /Q)	ELG3-1410P521	1025502
		2 x NPN (Q and /Q)	ELG3-1410N521	1025618
	1650 mm	2 x PNP (Q and /Q)	ELG3-1650P521	1025503
		2 x NPN (Q and /Q)	ELG3-1650N521	1025620
Cross beam	1170 mm	2 x NPN (Q and /Q) ¹⁾	ELG3-1170N520S08	1029480
Parallel beam	1890 mm	2 x NPN (Q and /Q)	ELG3-1890N521	1025621

¹⁾ Q1: Muting function if more than (n * vehicles) pass the light grid and a beam is still interrupted. This beam is deactivated and not taken into account for controlling output Q1. Activation when the beam again receives a light signal.

ELG6

- **Beam separation:** 60 mm

Operating range	Evaluation beams	Monitoring height	Switching output	Model name	Part No.
9 m	Parallel beam	900 mm	2 x NPN (Q and /Q)	ELG6-0900N541	1041568

Accessories

Mounting brackets/plates

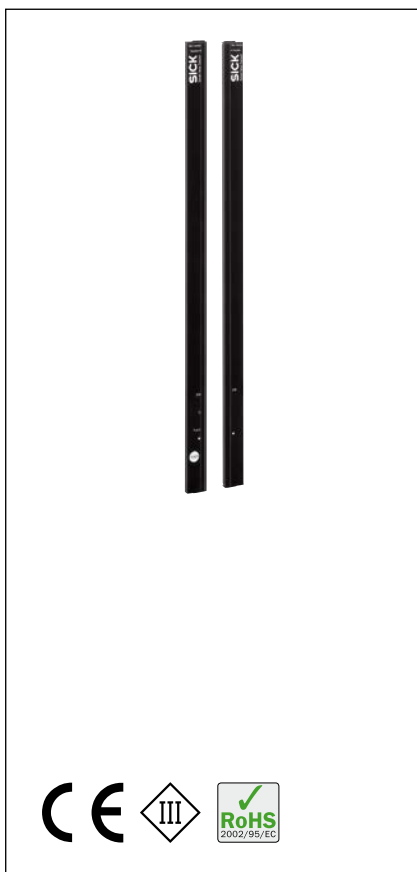
Material	Model name	Part No.
-	BEF-NUT-MLG	2023696
Steel, galvanized	BEF-WK-XLG	2029100

Terminal and alignment brackets

Accessory type	Material	Model name	Part No.
Alignment brackets	Plastic	BEF-2SMKEAKU4	2019649

Plug connectors and cables

Enclosure rating	Sheath material	Model name	Part No.
IP 67	PVC	DOL-1204-G05M	6009866
IP 68	PUR halogen-free	DOL-1204-G05MC	6025901



At a glance

- Variable monitoring lengths from 600 mm to 1400 mm (in 160 mm increments)
- Simple teach-in setup via cable
- Optional: Configuration with teach-in pushbutton, no PC required
- Maximum sensing range of 10 m
- Response time of 18 ms
- 25 mm or 45 mm MDO possible
- Highly immune to sunlight up to 150,000 lx
- Small blind zone < 11 mm

Your benefits

- Small, slim and sleek design enables easy integration into applications
- Slim and flat models offer flexible mounting options and optimize space while reducing damage
- Customized preset configurations or flexible configuration via teach-in pushbutton, no PC required
- Optical synchronization eliminates the need to lay cables, thus saving time
- Optional: Capacitive teach-in pushbutton and LEDs make commissioning easier for complex solutions
- Teach-in pushbutton and auto-muting enable Plug & Play. The alignment aid and the "Click & Go" principle also enable faster installation

→ www.mysick.com/en/SGS

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.



Ordering information

Other device versions can be found at www.mysick.com/en/SGS

- Enclosure rating: IP 65

Dimensions (L x W x H)	Model name	Part No.
8 mm x 25 mm x 1152.4 mm	SGS4-F108P3PS2T01	1207780
8 mm x 25 mm x 1312.4 mm	SGS4-F124P3PS2T00	1048038
8 mm x 25 mm x 1472.4 mm	SGS4-F140P3PS2T00	1208809
8 mm x 25 mm x 1152.4 mm	SGS4-S108P3PS2T07	1207519
8 mm x 25 mm x 1312.4 mm	SGS4-S124P3PS2W00	1047815
8 mm x 25 mm x 1472.4 mm	SGS4-S140P7PS2T00	1208241

Accessories

Mounting brackets/plates

Accessory type	Model name	Part No.
Mounting bracket	BEF-SLG-SET1	2055427

Plug connectors and cables

Connection type	Plug type	Enclosure rating	Cable outlet	Material, sheath	Length of cable	Model name	Part No.
Plug M8, 4-pin	Cable socket	IP 67	Straight	PVC	5 m	D0L-0804-G05M	6009872



At a glance

- Compact plastic housing
- Fixed and mobile actuators
- Three M20 x 1.5 cable entries
- Slow action switching elements with two contacts
- High retaining force
- IP 67 enclosure rating

Your benefits

- High reliability and greater safety due to a conical insertion aid
- High retaining force ensures machine reliability even when exposed to shock and vibration.
- Three cable entry glands provide flexible electrical connection options

→ www.mysick.com/en/i16S

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.



Ordering information

Other device versions can be found at www.mysick.com/en/i16S

Number of positive opening normally closed contacts	Number of normally open contacts	Model name	Part No.
2	0	i16-SA203	6025063

Accessories

Actuator

Design	Actuation option	Door radius	Model name	Part No.
Radial	Partially flexible	≥ 60 mm	iE16-F2	5311278



At a glance

- Narrow plastic housing
- Rigid and mobile actuators
- Three M20 x 1.5 cable entries
- Spring- and solenoid-locked
- Locking and door monitoring
- IP 67 enclosure rating

Your benefits

- Simple mounting without additional mounting plate – directly on the aluminum profile of the guard door frame
- Three cable entry glands for flexible electrical connection options
- Improved diagnostics due to additional signaling contacts
- Practical adjustment: large selection of actuators to match any door
- Various switching elements provide the right solution for the electrical installation

→ www.mysick.com/en/i10_Lock

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.



Ordering information

Other device versions can be found at www.mysick.com/en/i10_Lock

Locking type	Number of positive opening normally closed lock monitoring contacts	Number of N/O lock monitoring contacts	Number of positive action N/C door monitoring contacts	Number of N/O door monitoring contacts	Number of N/C door monitoring contacts	Connection type	Model name	Part No.
Mechanical	2	1	0	0	1	Cable entry	i10-M0233 Lock	6022580

Accessories

Actuator

Brief description	Remarks	Design	Actuation option	Door radius	Model name	Part No.
Door hinged on left/right	Includes two safety screws	Radial	Partially flexible	≥ 100 mm	iE10-R2	5306529



At a glance

- Modularly expandable (12 ... 144 inputs/outputs)
- Intuitive configuration software: easy operation, simulation mode, wiring diagrams, downloadable free of charge
- Configuration memory in the system plug
- Safely link up to four Flexi Soft safety controllers via EFI
- Integration into all common fieldbus systems
- Enhanced sensor functionalities via EFI interface
- 48 TÜV-certified function blocks

Your Benefits

- Prevention of redundant inputs and outputs saves money
- Quick commissioning via a system plug that stores configurations
- Minimized downtimes through the use of gateways such as PROFINET I/O, PROFIBUS-DP, EtherCAT, CANopen, Modbus TCP, Ethernet (TCP/IP)
- Secure communication without additional hardware saves time, space and money
- Fast electronic installation via complete wiring diagram
- Simulation mode allows the user to verify the safety functions before installation
- Fast hardware selection by drag and drop from a list of intuitive element icons

→ www.mysick.com/en/Flexi_Soft

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.



Ordering information

Other device versions can be found at www.mysick.com/en/Flexi_Soft

Flexi Soft main modules

Safety functions	Model name	Part No.
Emergency stop function, machine controller (e.g., clock), differentiation between man and material (muting), control modes and operating mode selection	FX3-CPU000000 ¹⁾	1043783

¹⁾ The system plug has to be ordered separately.

Flexi Soft expansion modules

Safety functions	Connectivity	Number of inputs	Number of outputs	Model name	Part No.
Emergency stop function, machine controller (e.g., clock), differentiation between man and material (muting), control modes and operating mode selection	Plug-in spring terminals	8 single-channel	4	FX3-XTI084002	1044125

Accessories

System plug

Connection type	Model name	Part No.
Screw terminals	FX3-MPL000001	1043700

Configuration connection cable

Description	Connection type	Length of cable	Model name	Part No.
For connecting the configuration connection to the USB interface of the PC	M8 x 4, USB-A	2 m	DSL-8U04G02M-025KM1	6034574



HISIC450 – At a glance

- Aluminum housing with anti-corrosion coating and high enclosure rating
- Built-in lens heaters to prevent condensation or freezing (optional)
- Weather protection against snow, rain and dust
- Accessories (weather hood and mounting bracket) made of stainless steel
- Sensitivity adjustment
- Immune to ambient light

Your benefits

- Reliable stop and alarm signals – even in harsh weather conditions

→ www.mysick.com/en/HISIC450

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.



VISIC50SF – At a glance

- Visibility (K value) measured according to the scattered light measurement principle
- Highly reliable – no moving parts
- Quick and safe smoke detection
- Minimal error rate
- IP 6K9K enclosure rating thanks to a rugged stainless steel housing
- Fog evaporation via integrated heating element (optional)

Your benefits

- Perfect addition to temperature cables due to increased detection speeds
- High levels of reliability and operational safety
- No protective measures required for tunnel washing
- Delivers reliable performance even with portal fog
- Flexible connection options, easy to extend and integrate into existing networks
- Quick K value check with a testing tool
- Low level of effort due to simple mounting and quick commissioning
- Alarm signal with adjustable limit value

→ www.mysick.com/en/VISIC50SF

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.





VICOTEC320 – At a glance

- Very low detection limits for NO and NO₂
- Automatic function monitoring and self-adjustment
- Very rugged stainless steel design
- Automatic beam alignment between sender/receiver unit and reflector

Your Benefits

- Energy and cost savings for ventilation control due to very low zero offset and accurate measurement
- Low operational costs because no air aspiration smoke detection system, no test gases and no ambient air are required
- Low maintenance requirements due to long maintenance interval (1 year)

→ www.mysick.com/en/VICOTEC320

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.



VISIC100SF – At a glance

- Visibility (K value) measured according to the scattered light measurement principle
- CO and NO measurement using electrochemical sensors in accordance with EN 50545
- Software developed in accordance with EN 61508 (SIL1)
- Highly reliable (no moving parts)
- Combines visibility measurement with two different gas measurements
- IP6K9K enclosure rating thanks to rugged stainless steel housing
- Fog compensation thanks to integrated heating (option)

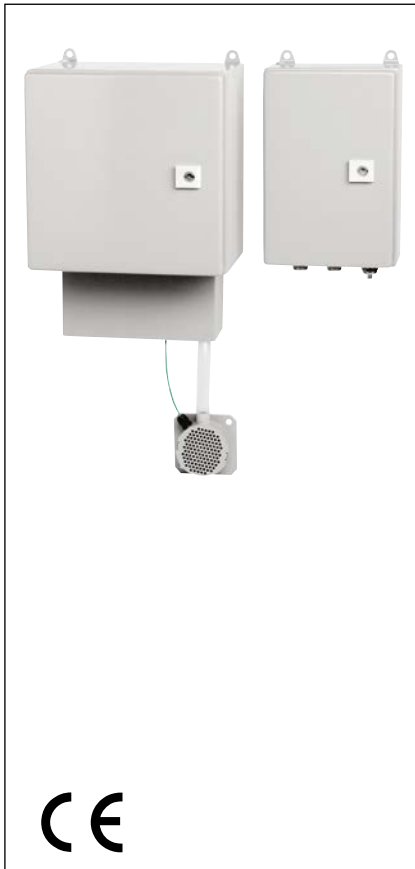
Your Benefits

- One sensor for three measuring components
- High levels of availability and operational safety
- No protective measures required for tunnel washing
- No impairment of ventilator control when tunnel portal is shrouded in fog
- Flexible connection options and easy to extend, can be easily integrated into existing networks
- Visibility measurement can be easily verified with checking tool
- Low level of effort required thanks to easy mounting and quick commissioning

→ www.mysick.com/en/VISIC100SF

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.





VICOTEC450 – At a glance

- Regular functional tests with contamination measurement
- Manual linearity test with filter set possible
- Internal purge air for increased intervals between cleaning
- Maintenance signal (filter and cleaning)
- Logbook function
- Compatible with various interfaces or I/O modules (e.g., PROFIBUS, Ethernet, analog module, etc.)

Your Benefits

- Very reliable operation due to complete self-test
- Cost saving and fast commissioning (no on-site optical alignment required)
- Flexible electrical integration due to optional interfaces and I/O modules

→ www.mysick.com/en/VICOTEC450

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.



VISIC620 – At a glance

- Large measuring range for visibility
- Optional precipitation detector
- Contamination check
- Minimum space requirements and low weight
- Self-sufficient design possible with a solar panel and battery
- Rugged housing that withstands the effects of saltwater

Your Benefits

- Reliable measured values
- Low operational costs
- Reduced downtime due to long maintenance intervals

→ www.mysick.com/en/VISIC620

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.





At a glance

- Very large measuring distances possible
- Contact-free measurement
- Extremely rugged components made of titanium, stainless steel or die cast
- Versions for very corrosive tunnel atmospheres
- Determination of flow direction
- No mechanical moving parts

Your Benefits

- Representative measurement across entire tunnel length
- Very reliable measurement compared with single point measurement methods
- Accurate measurement of low flow velocities
- Long maintenance intervals up to 5 years reduce downtime
- Low operational costs due to reliable operation and low maintenance
- High reliability of devices and measurement data

→ www.mysick.com/en/FLWSIC200

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.



Ordering information

Other device versions can be found at www.mysick.com/en/FLWSIC200

Our regional sales organization will help you to select the best fitting device configuration.



At a glance

- Non-contact length measurement – maintenance-free, rugged, long service life
- High repeatability (0.3 mm / 1 mm), high system resolution (0.1 mm)
- SSI and PROFIBUS interfaces
- Determination of absolute position
- Measuring lengths of up to 1700 m
- Can be used in harsh environments
- High travel speeds up to 6.6 m/s
- Distance tolerance between read head and measuring element: up to 55 mm ± 20 mm possible

Your benefits

- After installation, the system is immediately available and completely maintenance-free, which leads to time and cost savings
- Reliable position determination under harsh environmental conditions such as dirt, dust, fog, shocks and vibrations
- Greater efficiency and productivity
- Saves time – no reference run necessary on initial commissioning due to absolute position measurement
- Accurate positioning even with high mounting tolerances

→ www.mysick.com/en/KH53

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.



Ordering information

Other device versions can be found at www.mysick.com/en/KH53

Measuring range	Electrical interface	System part	Model name	Part No.
0 m to 38 m	SSI	Read head 38 ¹⁾	KHK53-AXB00038	1030052
–	–	Measuring element up to 38 m	KHT53-XXX00038	1030055
		Mounting gauge 38	KHU53-XXX00038 ²⁾	1030056
0 m to 548 m	PROFIBUS DP	Read head 548	KHK53-PXF00548	1036168
–	–	Measuring element up to 548 m	KHT53-XXX00548	1035451
		Mounting gauge 548	KHU53-XXX00548 ²⁾	1035452
0 m to 1700 m	PROFIBUS DP	Read head 1700	KHK53-PXF01700	1036166
–	–	Measuring element up to 1700 m	KHT53-XXX01700	1030085
		Mounting gauge 1700	KHU53-XXX01700 ²⁾	1030086
			KHM53-XXX01700	1030087

¹⁾ With device plug M23, 12-pin

²⁾ Universally codable, for temporary replacement of defective, coded measuring elements

Accessories

Mounting brackets/plates

Accessory type	Model name	Part No.
Mounting bracket	BEF-WK-KHT53	2029159

Terminal and alignment brackets

Accessory type	Model name	Part No.
Terminal brackets	BEF-KHA-KHT53	2042468

Plug connectors and cables

- **Cable outlet:** Straight

Connection type	Plug type	Enclosure rating	Sheath material	Length of cable	Model name	Part No.
Plug M12, 4-pin, PROFIBUS	Cable socket	IP 67	PVC	5 m	DOL-1204-G05M	6009866
Cable socket M12, 5-pin, PROFIBUS	Cable socket	-	-	5 m	DOL-1205-G05MQ	6026006
Cable socket M23, 12-pin, SSI and programming				10 m	DOL-2312-G10MMA1	2029203
-	Cable plug, terminator	-	-	-	PR-STE-END	6021156
Cable plug, 5-pin, PROFIBUS	Cable plug	-	-	5 m	STL-1205-G05MQ	6026005



At a glance

- Modular measuring system with a wide selection of interfaces/measuring lengths
- Measuring lengths: 2 m ... 50 m
- Very durable system (dirt scraper, integrated brushes)
- High-quality winding mechanism and wire input
- Interfaces: - TTL/HTL - ANALOG, SSI, PROFIBUS, CANopen, DeviceNet, HIPERFACE®, EtherNET/IP, EtherCAT, PROFINET
- High enclosure rating
- High resistance to shock and vibrations
- High resolution possible

Your benefits

- Reliable solution for use in harsh environmental conditions
- Long service life due to rugged industrial housing
- Quick and easy installation without the need for precise linear guidance
- Low integration and maintenance costs
- Customization option reduces storage costs
- Teach-in function enables fast commissioning

→ www.mysick.com/en/HighLine

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.



Ordering information

Other device versions can be found at www.mysick.com/en/HighLine

Measurement range	Electrical interface	Connection type	Model name	Part No.
0 m to 5 m	4 mA to 20 mA	Plug M12, 5-pin, radial outlet	BTF13-K1EM05PP	1060982
	PROFIBUS DP	Plug 3 x M12, 5-pin, axial outlet	BTF13-P1BM0525	1060985
0 m to 10 m	SSI	Plug M23, 12-pin, radial outlet	BTF13-A1AM1020	1034301
	EtherNet/IP	Plug 3 x M12, 4-pin, axial outlet	BTF13-I1BM10PP	1060993
0 m to 20 m	PROFINET	Plug 3 x M12, 4-pin, axial outlet	BTF13-N1BM20PP	1060998
	EtherCAT	Plug 3 x M12, 4-pin, axial outlet	BTF13-E1BM20PP	1061000

Accessories

Terminal and alignment brackets

Accessory type	Model name	Part No.
Alignment brackets	MRA-F130-R	6028631

Wire draw mechanism

Model name	Part No.
MRA-F130-B	6038562



At a glance

- Fast 3D measurement with unmatched speed and quality
- In-machine 3D calibration
- Contrast- and color-independent 3D measurements
- MultiScan function for measuring the 3D shape, contrast and scatter, all at the same time
- Full flexibility in configuration, operating distance and field of view
- Sensor resolutions of up to 1536 pixels in 3D and 3072 pixels in grayscale
- Gigabit Ethernet and CameraLink interfaces

Your benefits

- High-speed and high-resolution measurements allow you to increase production throughput and still see the finest details, thus ensuring production quality
- Accurate size and position measurements in 3D regardless of an object's height or color, ensuring reliable solutions
- Full flexibility in the field of view combined with the in-machine 3D calibration concept provides true millimeter dimensions, wherever they are required
- Unique MultiScan technology enables one camera to do the work of many, reducing costs for integration, maintenance, and accessories and creating cost-efficient solutions
- The high level of flexibility and versatility of the Ranger makes it the ideal choice for the most challenging tasks

→ www.mysick.com/en/Ranger

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.



Ordering information

Other device versions can be found at www.mysick.com/en/Ranger

- **Sub-product family:** Ranger E
- **Sensor resolution:** 1536 px x 512 px
- **Scatter measurement:** ✓
- **Lenses:** C-Mount, 1"

Hi-Res grayscale resolution	Product name	Model name	Part No.
–	Ranger E50	Ranger-E50414	1040379
3072 px	Ranger E55	Ranger-E55414	1040380
–	Ranger E50 IR	Ranger-E50424	1040381
3072 px	Ranger E55 IR	Ranger-E55424	1040382

Accessories

Hardware

Brief description	Model name	Part No.
Single Port PCI Board for connection to the Gigabit Ethernet 3D camera	Gigabit Ethernet board single	6032329

Sets

Brief description	Model name	Part No.
Ranger E/D accessory set with 24-V voltage supply, Power I/O terminal, Y cable (2 m), Gigabit Ethernet cable (5 m), lens, operating instructions and camera mounting brackets	Ranger E/D accessory set	2040857



At a glance

- Factory-calibrated 3D millimeter measurements at full production speed
- Contrast- and color-independent 3D measurements
- High accuracy 3D measurements for widths from 100 mm to 1.5 m
- Captures 3D, grayscale and scatter measurements at the same time
- Easy to integrate without the need for external lighting
- Rugged IP 65 enclosure rating and operation in temperatures down to -30 °C for harsh environments
- Remote connection of the camera over long cable distances with Gigabit Ethernet

Your benefits

- High-speed measurements allow you to increase production throughput and still ensure product quality
- Accurate size and position measurements in 3D regardless of an object's height or color, ensuring reliable solutions
- Improved reliability due to simultaneous 3D, scatter and grayscale measurements
- Factory-calibrated 3D measurements with integrated lighting instantly provide results in millimeters, which makes integration easy
- Designed for harsh industrial environments to ensure a long and problem-free service life
- With the freedom to select analysis tools, PC performance and the ability to combine data from several cameras, you can adapt the solution cost and performance to your exact needs

→ www.mysick.com/en/Ruler

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.



Ordering information

Other device versions can be found at www.mysick.com/en/Ruler

- **Sensor resolution:** 1536 px x 512 px

Sub-product family	Heating element	Laser class	Product name	Model name	Part No.
Ruler E600	✓	Class III / 3B	Ruler E600 B	Ruler-E2121	1028042
			Ruler E600 HB	Ruler-E2221	1050303
Ruler E150	–	2M	Ruler E150	Ruler-E4111	1044434

Accessories

Hardware

Brief description	Model name	Part No.
Single Port PCI Board for connection to the Gigabit Ethernet 3D camera	Gigabit Ethernet board single	6032329

Sets

Brief description	Model name	Part No.
Ruler E accessory set with 24-V voltage supply, 10 m Gigabit Ethernet cable, T-plug and three M12 cables (2 m) for voltage I/O and encoder	Ruler E accessory set	1014241



At a glance

- Highest reliability, insensitivity to ambient light and price/performance ratio due to HDDM technology
- Measuring ranges of 10 or 20 m directly to the object or 50 m to the reflector
- Different performance levels depending on the product and laser class
- Various interfaces: Switching, analog or serial
- Display with intuitive and consistent operating concept
- Rugged zinc die-cast housing
- Wide operating temperature range from -30 °C to +65 °C

Your benefits

- Measuring ranges of up to 10, 20 or 50 m in combination with different interfaces enable easy and quick integration in any production environment
- High measurement precision and reliability improve process quality and stability
- High measurement or switching frequencies enable quick material flow
- The versatile Dx50 product portfolio enables easy adaptation to changing application requirements
- Minimal commissioning costs due to simple and fast operation via the display
- The temperature range of -30 °C to +65 °C enables easy use in outdoor and low-temperature areas
- Increased machine reliability thanks to insensitivity to ambient light of up to 40 klx

→ www.mysick.com/en/Dx50

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.



Ordering information

Other device versions can be found at www.mysick.com/en/Dx50

- **Measuring range:** 200 mm ... 10,000 mm, 90% remission; 200 mm ... 6500 mm, 18% remission; 200 mm ... 4000 mm, 6% remission
- **Laser protection class:** 2 (EN 60825-1), wavelength: 658 nm; max. output: 180 mW; pulse duration: 5 ns; pulse rate: 1/200.
- **Analog output:** 1 x 4 mA ... 20 mA ($\leq 300 \Omega$)

Switching output ¹⁾	Multifunction input ³⁾	Model name	Part No.
1 x PNP (100 mA) ²⁾	1 x PNP ⁴⁾	DT50-P1113	1044369
1 x NPN (100 mA) ⁵⁾	1 x NPN ⁵⁾	DT50-N1113	1047396

¹⁾ Output Q short-circuit protected

²⁾ PNP: HIGH = $U_V - (< 2.5 \text{ V})$ / LOW = 0 V.

³⁾ Response time $\leq 15 \text{ ms}$.

⁴⁾ PNP: HIGH = U_V / LOW = $\leq 2.5 \text{ V}$.

⁵⁾ NPN: HIGH = $< 2.5 \text{ V}$ / LOW = U_V .



At a glance

- Measuring range up to 155 m to objects
- Excellent accuracy thanks to time-of-flight measurement
- Easy alignment thanks to pilot laser
- Easy handling thanks to programmable parameters
- Serial RS-422 or RS-232 interface, PROFIBUS, analog output and two switching outputs
- Foreground suppression for operation in a protective housing with view through front protective screen
- Special versions for measurement on hot surfaces up to 1400 °C available

Your benefits

- Extremely wide measuring range of up to 155 m on natural targets offers high flexibility in applications where sensing range is key
- Special visible alignment laser allows fast and easy alignment – even over long distances, offering fast and cost-effective installation
- Rugged metal housing for trouble-free operation in rough environmental conditions
- Laser class 1 provides maximum safety for eye protection
- User-friendly configuration software with an easy-to-follow interface ensures fast and cost-optimized commissioning
- Serial interfaces and two digital switching outputs provide high flexibility for application integration
- Integrated filter option allows for direct measurement of hot objects up to temperatures of 1400 °C

→ www.mysick.com/en/DMT

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.



Ordering information

Other device versions can be found at www.mysick.com/en/DMT

Special characteristic	Measuring range	Response time	Aperture delay time	Interface	Model name	Part No.
Mechanical aperture	0.5 m ... 155 m, 90% remission 0.5 m ... 65 m, 18% remission 0.5 m ... 40 m, 6% remission	1 ms ... 4000 ms ¹⁾	≥ 1 s ²⁾	RS-422, RS-232 ³⁾	DMT10-2-1111	1027603

¹⁾ Dependant on average setting, average depth, timeout, baud rate, data output, output format and effective dead time of aperture

²⁾ Dependant on average setting, average depth, timeout, baud rate, data output and output format

³⁾ Switchable

Accessories

Terminal and alignment brackets

Brief description	Model name	Part No.
Alignment unit for DMT/DML, steel, galvanized, incl. mounting hardware	BEF-GH-DMT	5309130

Plug connectors and cables

Brief description	Model name	Part No.
Serial RS-232 connecting cable, 3 m, 9-pin, D-Sub, socket/open cable end	Connecting cable (socket-open)	2020319



At a glance

- Economical measurement sensor
- Real-time output of measurement data via Ethernet interface
- Field evaluation using intelligent algorithms and programmable applications
- Number of switching outputs can be expanded via external CAN modules
- Configuration interface accessible from the front when the device is mounted
- Rugged housing

Your benefits

- Lightweight housing makes it easy to mount
- No wiring between sender and receiver
- Advanced filtering technology rigorously reduces false trips caused by outdoor environmental factors like fog, rain and snow
- Optional external CAN I/O module increases number of switching outputs for greater application flexibility
- Fast, easy settings due to SOPAS engineering tool

→ www.mysick.com/en/LMS1xx

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.



Ordering information

Other device versions can be found at www.mysick.com/en/LMS1xx

- **Version:** Short Range
- **Application:** Outdoor
- **Heating:** Yes
- **Electrical connection:** M12 round connector
- **Switching outputs:** 3
- **Object remission:** 2% ... > 1000%, reflectors
- **Housing color:** gray (RAL 7032)

Sub-product family	Model name	Part No.
LMS111	LMS111-10100	1041114
LMS151	LMS151-10100	1047607

Accessories

Mounting brackets/plates

Brief description	Model name	Part No.
Mounting bracket for rear mounting on the wall or the machine	Mounting kit 1a	2034324
Mounting bracket for rear mounting on the wall or the machine with protection of optics cover	Mounting kit 1b	2034325
Mounting kit for weather hood 190°/270°	Mounting brackets	2046025

Device protection (mechanical)

Brief description	Model name	Part No.
Weather hood 190°	Weather hood 190°	2046459

Terminal and alignment brackets

Brief description	Model name	Part No.
Quick-action lock system for weather hood 190°/270°	Quick clamp	2046989

Modules

Brief description	Model name	Part No.
External CAN extension module for up to 8 additional switching outputs	Fieldbus module	6038825

Test and monitoring tools

Brief description	Model name	Part No.
Scan finder, receiver to localize infrared scans	LS70b	6020756

Plug connectors and cables

Brief description	Model name	Part No.
Power supply cable, 4 x 0.50 mm ² , screened, M12 socket, 5-pin (A-coded) / open conductor head, 5 m	Connecting cable (socket-open) 5 m	6036159
RS-232/422 data and synchronization input cable, 8-wire, screened, M12 socket, 8-pin (A-coded) / open conductor head, 5 m	Connection cable (socket-open) RS-232/422, 5 m	6036153
I/O connecting cable, 8-wire, screened, M12 plug, 8-pin (A-coded) / open conductor head, 5 m	Connecting cable (plug-open) 5 m	6036155
Ethernet cable, 4-core, screened, M12 plug, 4-pin (D-coded) / RJ-45 plug, 8-pin, 5 m	Connection cable (plug-plug)	6034415



At a glance

- Powerful and efficient laser measurement sensor for ranges of up to 80 m
- Outstanding performance even in adverse environmental conditions due to multi-echo technology
- IP 67 enclosure rating, built-in heater, compact design
- Low power consumption
- Fast signal processing
- Multiple I/Os
- Synchronization of multiple sensors possible

Your benefits

- Superior performance in a vast range of applications
- Smallest laser measurement sensor with highest accuracy in its class
- Fast, reliable detection of objects in nearly all environmental conditions
- Comprehensive product family with various product series and types for all requirements in regards to performance and costs
- Low power consumption reduces total cost of ownership
- Best price/performance ratio in this sensor class
- Fast, easy settings with SOPAS engineering tool
- Self-monitoring functions increase system reliability

→ www.mysick.com/en/LMS5xx

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.



Ordering information

Other device versions can be found at www.mysick.com/en/LMS5xx

Sub-product family	Version	Application	Variant	Resolution power	Object remission	Model name	Part No.
LMS511	Mid range	Outdoor	PRO	Standard resolution	2% ... > 1000%, reflectors	LMS511-10100 PRO	1046135

Accessories

Device protection (mechanical)

Brief description	Model name	Part No.
Protective hood	Protective hood	2056850

Plug connectors and cables

Brief description	Model name	Part No.
Power supply cable, 4 x 0.50 mm ² , screened, M12 socket, 5-pin (A-coded) / open conductor head, 5 mm	Connecting cable (socket-open) 5 m	6036159
RS-232/-422 data and I/O connecting cable, 12-wire, screened, M12 socket, 12-pin (A-coded) / open conductor head, 5 m	Connecting cable (socket-open) RS-232/-422, 12-wire, 5 m	6042735
RS-232/422 data and synchronization input cable, 8-wire, screened, M12 socket, 8-pin (A-coded) / open conductor head, 5 m	Connection cable (socket-open) RS-232/422, 5 m	6036153
I/O connecting cable, 12-wire, screened, M12 plug, 12-pin (A-coded) / open conductor head, 5 m	Connecting cable (plug-open) 5 m	6042732
I/O connecting cable, 8-wire, screened, M12 plug, 8-pin (A-coded) / open conductor head, 5 m	Connecting cable (plug-open) 5 m	6036155
Ethernet cable, 4-core, screened, M12 plug, 4-pin (D-coded) / RJ-45 plug, 8-pin, 5 m	Connection cable (plug-plug)	6034415



At a glance

- Long sensing range, even when detecting dark objects
 - High angular resolution
- High immunity to ambient light
 - Small light spot diameter
 - Up to 4 fields can be programmed

Your benefits

- Optimum installation position on diggers and cranes due to a long sensing range
 - High level of reliability even in harsh environmental conditions
- Low installation costs due to large monitoring areas
 - Small objects can be reliably detected at long ranges

→ www.mysick.com/en/LD-LRS

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.

Ordering information

Other device versions can be found at www.mysick.com/en/LD-LRS

- **Version:** Long Range
- **Application:** Outdoor
- **Heating:** Yes
- **Electrical connection:** 1 20-pin Harting plug
- **Switching outputs:** 4 (digital)
- **Housing color:** gray (RAL 7032)

	Model name	Part No.
	LD-LRS3100	1029042
	LD-LRS2100	1029041

Accessories

Mounting brackets/plates

Brief description	Model name	Part No.
Mounting kit for wall mounting (adjustable bracket)	Mounting kit	2018303

Terminal and alignment brackets

Brief description	Model name	Part No.
Assembly support	Assembly support	5311055

Test and monitoring tools

Brief description	Model name	Part No.
Scan finder, receiver to localize infrared scans	LS70b	6020756

Plug connectors and cables

Brief description	Model name	Part No.
CAN cable, 3 m	Connection cable (plug-plug)	6032845
Configuration cable (connection LD-OEMx100 or LD-LRSx1x0 – PC/power supply, RS-232/RS-422/CAN/Ethernet), 3 m	Connection cable (plug-plug)	6032770



At a glance

- Simultaneous measurement on 4 layers
- Excellent outdoor capabilities with multi-pulse technology
- Compact and lightweight design
Volume is less than 1 liter, weight is approximately 1 kg
- Wide temperature range with low power consumption: $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ at 8 W
- Operation possible even with supply voltages from 9 V DC

Your benefits

- Compensation of vehicle pitch movements via simultaneous measurement on 4 levels
- Easy sensor integration due to compact design
- Low power consumption reduces costs
- Real-time data output provides fast troubleshooting
- IP 69K-rated housing provides accurate measurements in all weather conditions

→ www.mysick.com/en/LD-MRS

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.



Ordering information

Other device versions can be found at www.mysick.com/en/LD-MRS

- **Version:** Long Range
- **Application:** Outdoor
- **Electrical connection:** Round connectors
- **Housing color:** gray (RAL 7032), black (RAL 9005)

Model name	Part No.
LD-MRS400001	1045046
LD-MRS400001S01	1052960

Accessories

Device protection (mechanical)

Brief description	Model name	Part No.
Weather hood	Weather hood	2058033

Terminal and alignment brackets

Brief description	Model name	Part No.
Bracket for LD-MRS, alignment adjustable in 2 axes	Alignment bracket	1047429

Test and monitoring tools

Brief description	Model name	Part No.
Scan finder, receiver to localize infrared scans	LS70b	6020756

Plug connectors and cables

Brief description	Model name	Part No.
Supply cable, 4-pin, round socket / open end, length 2 m	Connecting cable (socket-open)	2049823
Connecting cable for CAN, 12-pin round plug / 9-pin D-Sub socket, length 2 m without termination	Connecting cable (plug-open)	2054647
Ethernet data cable (crossover), 4-pin round plug / RJ45 plug for connecting the Ethernet interface of the LD-MRS to the Ethernet interface of the PC, 2 m	Connection cable (plug-plug)	2049826



At a glance

- Highly precise vehicle classification and axle counting in all traffic conditions
- Reliable in multi-lane, free-flowing traffic and stop-and-go traffic
- Detection of lane changers
- Detection of up to 30 different vehicle classes
- Information about vehicle speed and dimensions
- Time synchronization with external systems

Your benefits

- Automatic calibration allows commissioning in just a few minutes
- Intuitive graphical user interface allows quick and easy operation
- Full detection of vehicles and axles increases classification accuracy
- Simple and economical installation on the side and above the roadway. No work is required on the road surface.
- The software trigger improves the detection and reading rate of license plate detection cameras or the DSRC antenna system
- Long maintenance intervals and fast installation reduce operating costs to a minimum
- Reliable operation even at night and in inclement weather

→ www.mysick.com/en/TIC1xx_Pro

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.



Ordering information

Other device versions can be found at www.mysick.com/en/TIC1xx_Pro

System part	Internal computer	Integrated application	Type	Part no.
Sensor head	-	Vehicle classification, vehicle counting, Axle counting ¹⁾	TIC102-02000	1055104
Processing head	Traffic Controller TIC	Vehicle classification, vehicle counting, Axle counting ¹⁾	TIC102-20000	1055102
-	-	-	LMS511 Traffic	1064730

¹⁾ For the axle counting extension the LMS511 Traffic is needed.

Accessories

Suitable accessories can be found at www.mysick.com/en/TIC1xx_Pro



At a glance

- Ultra-precise vehicle counting and classification in free-flowing traffic
- Maximum mounting flexibility: mounting above and at the side of the road possible
- Detects multiple lanes at the same time
- Highly precise counting, even for vehicles changing the lanes
- Classification of up to 30 different vehicle categories
- Easy to install and commission

Your benefits

- Installation next to the road removes costs associated with gantries and lane closures
- One TIC501 Pro can monitor several lanes at once, reducing overall costs
- Quick, easy and cost-effective mounting since no work is required on the road surface
- Temporary lane changes, for example in construction areas, do not require the TIC501 Pro to be repositioned, allowing continuous operation
- Long maintenance intervals and short installation times reduce operating costs
- Intuitive graphical user interface allows quick and easy operation
- Fast implementation thanks to TCP/IP interface

→ www.mysick.com/en/TIC501_Pro

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.



Ordering information

Other device versions can be found at www.mysick.com/en/TIC501_Pro

Items supplied	Integrated application	Type	Part no.
Laser scanner LMS511 Traffic Traffic Controller with TIC-Software incl. USB Stick with TEMS Manager, TEMS Info Sample-Client, source code for TEMS Info Sample-Client and manuals	Vehicle counting, vehicle classification	TIC501 Pro	1069322

Accessories

Suitable accessories can be found at www.mysick.com/en/TIC501_Pro



At a glance

- Automatic and precise measurement of vehicle dimensions
- Information about the measured vehicle via TCP/IP interface
- Step-by-step configuration wizard for commissioning
- 3D model of vehicle with colored oversize indication
- Additional engineering support; e.g., integration into a higher-level system

Your benefits

- High measurement accuracy thanks to state-of-the-art laser measurement technology
- Automated measurement process reduces manual labor
- No work is required on the road surface
- High efficiency thanks to short measurement time
- Certifications attainable thanks to precise measurement technology
- Low maintenance requirements save time
- Oversized dimensions are detected, even in hard to reach places
- Modular design enables customization based on your application

→ www.mysick.com/en/VPS_Pro

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.



Ordering information

Other device versions can be found at www.mysick.com/en/VPS_Pro

- **Integrated application:** measurement of dimensions for one vehicle at a time
- **Items supplied:** laser scanner LMS511 Traffic, laser scanner LMS111-10100S05 (2 x), Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager, TEMS Info Sample-Client, source code for TEMS Info Sample-Client and manuals

Length measurement accuracy	Width measurement accuracy	Height measurement accuracy	Type	Part no.
± 100 mm with vehicle speed < 7 km/h ^{1) 2)}	± 60 mm with vehicle speed < 7 km/h ^{1) 2)}	± 60 mm with vehicle speed < 7 km/h ^{1) 2)}	VPS153	1067558

¹⁾ Typical value; actual value depends on environmental conditions.

²⁾ Information refers to twice the standard deviation (2 sigma).

- **Integrated application:** measurement of dimensions for one vehicle at a time
- **Items supplied:** laser scanner LMS511 Traffic (3 x), Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager, TEMS Info Sample-Client, source code for TEMS Info Sample-Client and manuals

Length measurement accuracy	Width measurement accuracy	Height measurement accuracy	Type	Part no.
± 50 mm with vehicle speed < 7 km/h ^{1) 2)}	± 30 mm with vehicle speed < 7 km/h ^{1) 2)}	± 30 mm with vehicle speed < 7 km/h ^{1) 2)}	VPS553	1067557

¹⁾ Typical value; actual value depends on environmental conditions.

²⁾ Information refers to twice the standard deviation (2 sigma).

Accessories

Suitable accessories can be found at www.mysick.com/en/VPS_Pro



At a glance

- High diagnostic coverage
- Automated self-test cycles for the entire system
- Safe monitoring of the correct switching behavior and connecting cable of the laser scanner
- Easy implementation of additional login functions
- Easily expandable due to modular concept

Your benefits

- The independent self-testing system ensures secure operation due to excellent diagnostic capabilities
- Reliable, industry-proven laser scanner with enhanced diagnostics for outdoor applications
- Variable monitoring fields make the AOS ideal for a wide range of applications
- Modular concept makes expanding the system simple
- Optional gateways ensure connection to bus systems or remote diagnostics
- Built-in control functions for peripheral devices, even for safety-related signals like emergency stop
- Supports and simplifies individual operating licenses for machinery

→ www.mysick.com/en/AOS_Prime

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.



Ordering information

Other device versions can be found at www.mysick.com/en/AOS_Prime

- **Field of application:** basic systems for different applications

Items supplied	Type	Part no.
LMS111-10100S01 (4 x) Flexi Soft main module FX3-CPU000000, Flexi Soft system plug FX3-MPL000001 Flexi Soft I/O module FX3-XTI084002 (2 x) USB configuration cable DSL-8U04G02M025KM1 USB stick with configuration files I/O connecting cable (4 x), Power supply connecting cable (4 x), RS-232 input connecting cable (4 x) Mounting kit 1b (4 x), Mounting kit 2 (4 x) Ethernet connection cable SSL-2J04-G10ME	AOS104	1066129
LMS511-10100S02 Flexi Soft main module FX3-CPU000000 Flexi Soft system plug FX3-MPL000001 Flexi Soft I/O module FX3-XTI084002 USB configuration cable DSL-8U04G02M025KM1 USB stick with configuration files Ethernet connection cable SSL-2J04-G10ME LMS511 accessory set 1	AOS501	1064409
LMS511-10100S02 (2 x) Flexi Soft main module FX3-CPU000000 Flexi Soft system plug FX3-MPL000001 Flexi Soft I/O module FX3-XTI084002 USB configuration cable DSL-8U04G02M025KM1 USB stick with configuration files Ethernet connection cable SSL-2J04-G10ME LMS511 accessory set 1 (2 x)	AOS502	1066130

Accessories

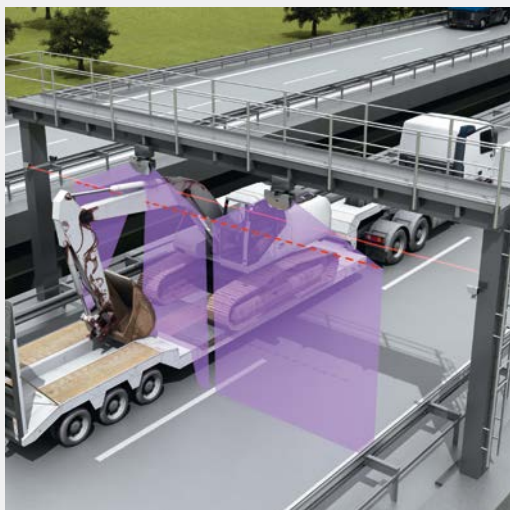
Suitable accessories can be found at www.mysick.com/en/AOS_Prime

Systems for traffic engineering

Systems from SICK for traffic engineering solve the most complex tasks such as accurate classification of vehicles in 30 classes or detection of overheated wheels in moving traffic. These systems are based on the rugged, proven sensors from SICK.

Tasks such as vehicle classification or projection control occur in a similar way in many roadway projects. SICK provides subsystems that take over the essential core tasks and that are easy to configure and integrate. No cumbersome software development by the operator for data analysis is required. These system solutions have been developed with the accumulated expertise from numerous roadway projects and are therefore very safe and reliable.

Smart Modular Solution



Modular software – Multiple solution

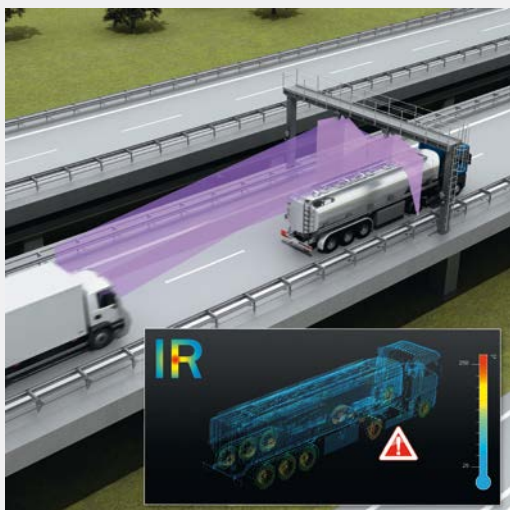
An essential component of the application specific SICK traffic systems is the “Smart Modular Solution”, a software program based on a modular design. Existing software modules are in use in many projects all over the world and can be combined accordingly to meet the requirements of each customer’s application.

The flexible design of the software allows new modules to be created to meet new requirements and linked to existing modules.

The standard modules include the:

- DimensionMEASURER
- OversizeDETECTOR
- VehicleCLASSIFIER
- AxleDETECTOR
- HotSpotDETECTOR
- as well as the essential standardized interfaces

Vehicle Hot Spot Detector VHD



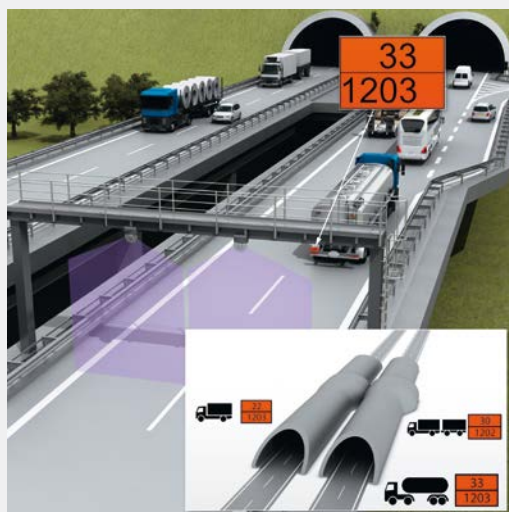
Detection of vehicles at risk of fire

The Vehicle Hot Spot Detector VHD uses thermal imaging and 2D laser scanner to detect overheated vehicles. It protects against fire in critical areas such as tunnels, roads, rail or ferry terminals. A 3D model is generated for every vehicle and the vehicle class automatically determined. In addition, the 3D models are automatically segmented in individual components such as wheels, cabins or exhaust. Infrared cameras create a temperature profile and the individual components are checked for individual temperature limits. The high frame rate allows measurement of vehicles at full speed.

Your benefits:

- Prevention of dangerous, costly vehicle fires
- Prevention of accidents from overheated vehicle parts
- Prevention of traffic congestion due to breakdowns of overheated vehicles
- Increase in safety in tunnels
- Reduced maintenance and operational costs as no road work is required

Vehicle Dangerous Goods Detection System VDG



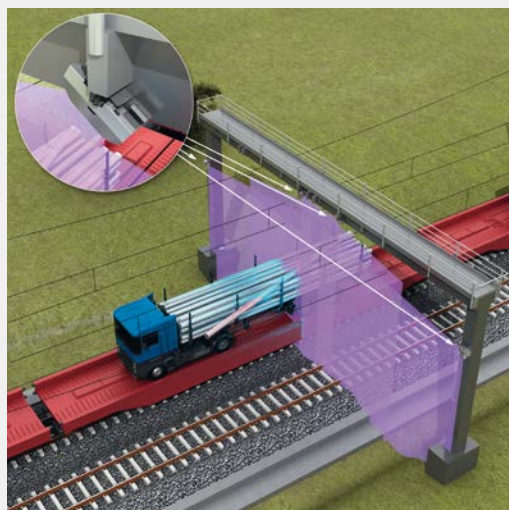
Detection of vehicles transporting hazardous materials

The Vehicle Dangerous Goods Detection System VDG uses two 2D laser scanners and one infrared camera to identify European hazardous materials placards on vehicles. A 3D model is generated from the collected profile information to optimize the camera triggers and to determine the position of the hazardous materials placards. The system reliably identifies even blank hazardous materials placards on vehicles transporting hazardous materials with different loading, radioactive or explosive materials – for maximum traffic safety in tunnels. Detection of dangerous goods is also an ideal addition to the Vehicle Hot Spot Detector VHD. Because both systems use common components, expansion is simple and cost-effective.

Your benefits:

- In the event of an accident or fire, the road operator knows the number of vehicles transporting hazardous materials
- Quick installation and commissioning without interfering with the roadway
- Low operational costs due to simple maintenance work
- The combination of 3D data and vehicle classes increases the read and detection rate of the hazardous materials placards.

Railway Profiling System RPS



Measurement of the train profile

The Railway Profiling System RPS scans the external surface of the train. 2D laser scanners with a very high scanning frequency allow detection of small objects at normal speeds. The permitted clearance is adjusted depending on the distances to the trucks of a wagon. Even very tight turns can be safely navigated.

Your benefits:

- Collision avoidance between the train (and its load) and the railway infrastructure
- Minimized maintenance costs
- Quickest possible reaction to service disruptions

We deliver “Sensor Intelligence.”

SICK sensor solutions for industrial automation are the result of exceptional dedication and experience. From development all the way to service: The people at SICK are committed to investing all their expertise in providing with the very best sensors and system solutions possible.

A company with a culture of success

Almost 7,000 people are on staff, with products and services available to help SICK sensor technology users increase their productivity and reduce their costs. Founded in 1946 and headquartered in Waldkirch, Germany, SICK is a global sensor specialist with more than 50 subsidiaries and representations worldwide. The people work with pleasure at SICK.

This is demonstrated by the accolades that the company is regularly awarded in the “Great Place to Work” competition. This lively corporate culture holds strong appeal for qualified and skilled persons. In SICK, they are part of a company that ensures an excellent balance between career progression and quality of life.



Innovation for the leading edge

SICK sensor systems simplify and optimize processes and allow for sustainable production. SICK operates at many research and development centers all over the world. Co-designed with customers and universities, our innovative sensor products and solutions are made to give a decisive edge. With an impressive track record of innovation, we take the key parameters of modern production to new levels: reliable process control, safety of people and environmental protection.



A corporate culture for sustainable excellence

SICK is backed by a holistic, homogeneous corporate culture. We are an independent company. And our sensor technology is open to all system environments. The power of innovation has made SICK one of the technology and market leaders – sensor technology that is successful in the long term.



“Sensor Intelligence.” for all requirements

SICK is a renowned expert in many industries, and is entirely familiar with the critical challenges they face. While speed, accuracy and availability take center stage in all industries, technical implementations vary greatly. SICK puts its vast experience to use to provide with precisely the solution you need.

For applications worldwide

Hundreds of thousands of installations and applications go to prove that SICK knows the different industries and their processes inside out. This tradition of uncompromising expertise is ongoing: As we move into the future, we will continue to design,

implement and optimize customized solutions in our application centers in Europe, Asia and North America. You can count on SICK as a reliable supplier and development partner.



For your specific industry

With a track record of proven expertise in a great variety of industries, SICK has taken quality and productivity to new heights. The automotive, pharmaceutical, electronics and solar industries are just a few examples of sectors that benefit from our know-how. In addition to increasing speed and improving traceability in warehouses and distribution centers, SICK solutions provide accident protection for automated guided vehicles. SICK system solutions for analysis and flow measurement of gases and liquids enable environmental protection and sustainability in, for example, energy production, cement production or waste incineration plants.

For performance across the board

SICK provides the right technology to respond to the tasks involved in industrial automation: measuring, detecting, monitoring and controlling, protecting, networking and integrating, identifying, positioning. Our development and industry experts continually create groundbreaking innovations to solve these tasks.

www.sick.com/industries



Services for machines and systems: SICK LifeTime Services

SICK LifeTime Services is a comprehensive set of high-quality services provided to support the entire life cycle of products and applications from plant walk-through to upgrades. These services increase the safety of people, boost the productivity of machines and serve as the basis for our customers' sustainable business success. LifeTime Services range from product-independent consulting to traditional product services and are characterized by extensive industry expertise and more than 60 years of experience.





www.sick.com/service



Consulting and design

- Plant walk-through
- Risk assessment
- Safety concept
- Safety software and hardware design
- Validation of functional safety
- CE-conformance check



Product and system support

- Installation
- Commissioning
- Start-up support
- Calibrations
- Telephone support
- 24-hour helpline
- SICK Remote Service
- Troubleshooting on site
- Repairs
- Exchange units
- Extended warranty



Verification and optimization

- Inspection
- Stop time measurement
- Machine safety inspection
- Electrical equipment check
- Accident investigation
- Initial verification
- Performance check
- Maintenance



Upgrade and retrofits

- Upgrade services



Training and education

- Training
- Seminars
- Web training



Versatile product range for industrial automation

From the simple acquisition task to the key sensor technology in a complex production process: With every product from its broad portfolio, SICK offers a sensor solution that best combines cost effectiveness and safety.

www.sick.com/products

Photoelectric sensors

- Miniature photoelectric sensors
- Small photoelectric sensors
- Compact photoelectric sensors
- Cylindrical photoelectric sensors
- Fiber-optic sensors and fibers
- MultiTask photoelectric sensors



Proximity sensors

- Inductive proximity sensors
- Capacitive proximity sensors
- Magnetic proximity sensors



Magnetic cylinder sensors

- Analog positioning sensors
- Sensors for T-slot cylinders
- Sensors for C-slot cylinders
- Sensor adapters for other cylinder types



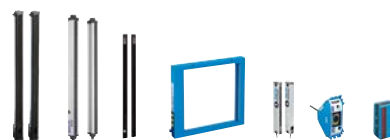
Registration sensors

- Contrast sensors
- Markless sensors
- Color sensors
- Luminescence sensors
- Fork sensors
- Array sensors
- Register sensors
- Glare sensors



Automation light grids

- Measuring automation light grids
- Switching automation light grids



Opto-electronic protective devices

- Safety laser scanners
- Safety light curtains
- Safety camera systems
- Multiple light beam safety devices
- Single-beam photoelectric safety switches
- Mirror columns and device columns



Safety switches

- Electro-mechanical safety switches
- Non-contact safety switches
- Safety command devices



sens:Control – safe control solutions

- Safe sensor cascade
- Safety controllers
- Safety relays



Gas analyzers

- Gas transmitters
- In-situ gas analyzers
- Extractive gas analyzers



Dust measuring devices

- Scattered light dust measuring devices
- Transmittance dust measuring devices
- Gravimetric dust measuring devices



Analyzer solutions

- CEMS solutions
- Process solutions



Traffic sensors

- Tunnel sensors
- Overheight detectors
- Visual range measuring devices



Ultrasonic gas flow measuring devices

- Volume flow measuring devices
- Mass flow measuring devices
- Flow velocity measuring devices
- Gas flow meters



Identification solutions

- Image-based code readers
- Bar code scanners
- RFID
- Hand-held scanners
- Connectivity



Vision

- 2D vision
- 3D vision



Distance sensors

- Short range distance sensors (Displacement)
- Mid range distance sensors
- Long range distance sensors
- Linear measurement sensors
- Ultrasonic sensors
- Optical data transmission
- Position finders



Detection and ranging solutions

- 2D laser scanners
- 3D laser scanners
- Radar sensors



Motor feedback systems

- Motor feedback system rotary HIPERFACE®
- Motor feedback system rotary HIPERFACE DSL®
- Motor feedback system rotary incremental
- Motor feedback system rotativ incremental with commutation
- Motor feedback system linear HIPERFACE®



Encoders

- Absolute encoders
- Incremental encoders
- Linear encoders
- Wire draw encoders
- Safety encoders



Fluid sensors

- Level sensors
- Pressure sensors
- Flow sensors
- Temperature sensors



System solutions

- Customized analyzer systems
- Collision awareness systems
- Robot guidance systems
- Object detection systems
- Profiling systems
- Quality control systems
- Security systems
- Track and trace systems
- Functional safety systems



Simple integration into your automation world

Sensor integration with SICK is easy and fast for you: Our intelligent sensor solutions and safety controllers provide different integration technologies which allow easy access – from HMI, PLC, and engineering tools – to data from our sensors. In this way, we support you towards solving your application rapidly and easily and increase machine reliability with a continuous diagnostic concept.

PLC and engineering tool integration

Function Blocks	
IO-Link devices Level sensors Pressure sensors Presence detection sensors Distance sensors	Bar code scanners, Image-based code readers 1D und 2D
Vision sensors Inspector	RFID RFH6xx RFU62x, RFU63x
Absolute encoders AFS60/AFM60	Laser volume flowmeter Bulkscan® LMS511

Function blocks

The SICK function blocks quickly allow you to establish acyclic communication to our sensors within your PLC program. Additionally, complex and variable process data can be parsed into their individual information contents without programmer effort.

DTM (Device Type Manager)

FDT/DTM is a cross-manufacturer concept, with which configuration and diagnosis of devices from different manufacturers can be done with just one engineering tool.

TCI (Tool Calling Interface)

The Tool Calling Interface (TCI) makes it possible to call up a tool used to carry out parameterization and diagnosis of a field device via the existing communication infrastructure.

HMI integration

OPC server

OPC technology is used to exchange data between field devices and Windows-based applications. The SOPAS OPC server from SICK follows the OPC DA specification and thus can be used on Windows operating systems.



Web server

The SOPAS web server from SICK can be used everywhere, where a web browser is available. The web server is distinguished by its ability to both carry out pure data exchange and also to provide visualizations for the devices, which is a big advantage, particularly for vision sensors.

Fieldbus Communication Interface



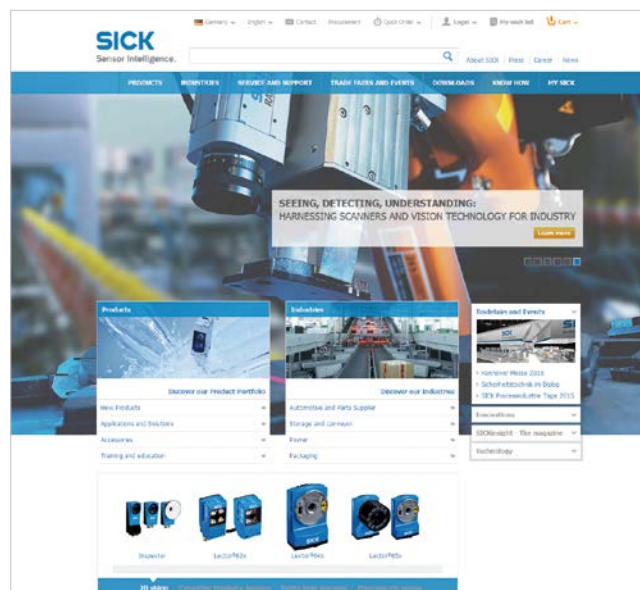
Modbus®TCP

Our fieldbus and network solutions allow SICK sensors and safety controllers to be connected to all conventional automation systems. This guarantees an easy and fast access to the available data.

www.sick.com/industrial-communication

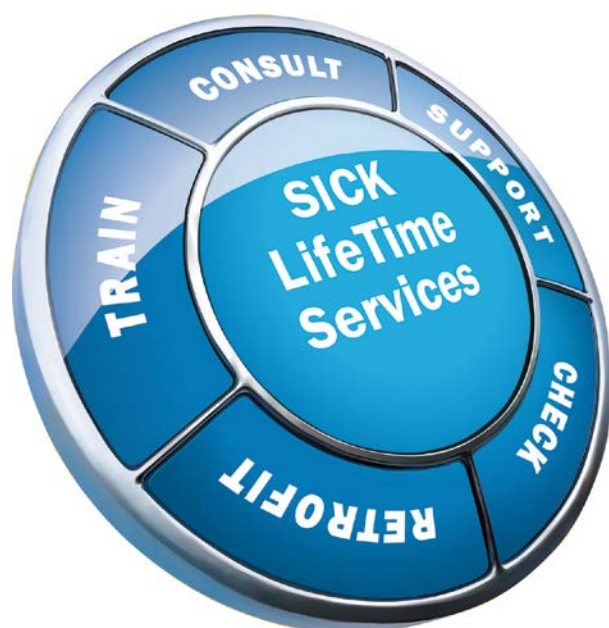
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- ✓ Requests for quotation, ordering and delivery tracking made easy.
- ✓ Overview of all quotations and orders.
- ✓ Direct ordering: submit even very complex orders in moments.
- ✓ View the status of quotations and orders at any time. Receive e-mail notifications of status changes.
- ✓ Easily repeat previous orders.
- ✓ Conveniently export quotations and orders to work with your systems.



Services for machines and systems: 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 almost 7,000 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our 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.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our 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 us a reliable supplier and development partner.

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

For us, that is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, 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 additional representatives → www.sick.com