METAL AND STEEL INDUSTRY METAL FORMING AND FINISHING PROCESS

GIVING THE FINAL SHAPE AND TOUCH – PRECISION HOLDS ALL THE ACES.

SICK
Sensor Intelligence.
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Applications in focus

The application graphics shown are not binding, they are no substitute for the need to seek expert technical advice.

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At the end, the quality has to be right. To achieve this, some things needs to be observed. This includes the correct position and alignment of semi-finished and finished products on roller tables and the optimal distance between finished products in order to avoid damage. Flexible processes and interactions between humans and machines require safety technology. Protective facilities are necessary and not only secure danger zones but also optimize production. Time is money – this also applies here. Monitoring the flow and dosing of bulk materials optimizes the throughput and reduces maintenance times. The regulations for emissions monitoring and data transmission to the authorities are becoming increasingly more; this includes the steel industry. SICK delivers sensor solutions for almost every application so that reliable products are delivered to customers in the end.

**Security and protection**
It’s not just the protection of people that is important. Equally important are the protection of the plant and its machines from damage and loss. SICK offers solutions for collision protection, access control in risk zones and accident prevention within and outside of the production building.

**Quality control**
The product quality has to be consistently ensured in the production chain. Solutions from SICK ensure that the required quality level of finished products is achieved – from measuring the sheet thickness to galvanization, from profiling and adjustment to warpage detection.

**Positioning**
The encoder, laser scanner, distance and presence sensors from SICK make the highly precise alignment and positioning of semi-finished and finished products easier – even for ladle cars, transfer cars, industrial cranes, torpedo ladles. The sensors are available in different designs and with different interfaces.
Monitoring and checking
Sensors from SICK not only assist in complying with the emission limit values, but also provide reliable data as verification for the monitoring authority. In addition, remote maintenance systems from SICK provide measuring convenience in daily operation and reduce maintenance costs.

Material flow optimization
Laser scanners measure the volume flow on conveyor belts. Encoder and presence sensors control the dosing process. Level sensors monitor silo contents and material discharge hoppers. Even the materials management benefits from sensor technology from SICK: the production efficiency increases.

Emission monitoring
Measurement systems either check to see if emissions standards are reached and complied with or only report limit violations. Operators in steel mills always trust the expertise of SICK when choosing appropriate solutions for dust, gas flow and exhaust measurement.
Continuous casting

Focus 1
Cooling Water

Focus 2
Oxygen Torches/Cutters

Focus 3
Rolling beds, walking beam beds, process machines

Focus 4
Slab and billet storage

Focus 5
Conveyor system and rolling bed
Focus 1: Cooling Water
CONTINUOUS CASTING

Monitoring level and pressure of cooling water during continuous casting

Continuous casting machines and equipment require constant monitoring of cooling water, hydraulic fluids and coolants’ levels and pressures. Robust sensors are ideal for these level and pressure monitoring tasks. A pressure switch offers various programmable switching functionalities and up to 3 outputs in a single device. A level sensor measures independently of installation conditions. It accurately measures, even when liquid properties change. Additionally, there are no mechanical or moving parts to wear, offering continuous reliability for the plant’s staff.
Focus 2: Oxygen Torches/Cutters
CONTINUOUS CASTING

1. Positioning of the oxygen cutting torch during continuous casting
Positioning the cutting torch during the continuous casting process is an important step in guaranteeing that each object is precisely cut to length. An encoder and presence detection sensor enable accurate positioning of the cutter as the hot steel is being extruded. While the photoelectric switch detects the object’s presence, the encoder can be programmed to accommodate any value to 65,536 pulses per revolution - something no other encoder can do. It includes a revolutionary design and a metal code disc that provides a high temperature tolerance – an undeniable requirement for this task.

2. Measuring length and speed of slabs during casting
Knowing the speed and length of steel slabs is important information for the correct alignment of oxygen torches and mechanical cutters after the casting process. A contactless OLV linear measurement sensor measures both length and speed of the moving object in order to optimize subsequent processes. This linear sensor accurately measures at fast speeds (80 m per second) and has been successfully tested on hot material surfaces. This permanently calibrated, maintenance-free measuring device helps optimize the steel casting process.

This graphic is not presented in the overview.
Focus 2: Oxygen Torches/Cutters

CONTINUOUS CASTING
Presence and leading edge detection in the furnace during continuous casting

Identifying the leading edge of an object and properly positioning oxygen cutter torches is an important task for subsequent downstream process planning. A distance sensor detects the leading edge of a steel slab traveling along a rolling table up to 10 m away and is immune to all types of ambient light, which allows for its use in this challenging environment. Properly protected, a DT50-2 Pro uses time-of-flight measurement technology to detect the slab, thereby allowing the correct positioning of the cutter and optimizing the casting process.

Positioning and measurement of slabs, billets and beam blanks on rolling beds

Steel slabs are positioned and measured on rolling beds during the continuous casting process to aid in the classification process, time subsequent process steps and ensure that the operation is running constantly and without incident. To achieve these tasks, a laser measurement system can be used wherever long range object detection is required. Two-dimensional contour data of the steel slab can be processed in combination with other known information, such as the conveyor’s speed, to provide precise data on the object’s location and size.
Steel rod diameter measurement on rolling beds during continuous casting process

During the casting process, determining the diameter of a steel rod allows for object classification and end product quality assurance. Measuring the rod’s diameter is achieved via a combination of a laser measurement sensor and a presence detection sensor. A photo-electric retro-reflective sensor, together with a reflector, recognizes the object’s presence as it passes along a roller table. The laser measurement sensor, mounted above the moving conveyor table, measures the width of the traveling object. The rod’s dimensions are calculated and the finished good can be accurately recorded.
Focus 3: Rolling beds, walking beam beds, process machines

CONTINUOUS CASTING

4 Measurement of length, width and speed of steel slabs, billets, beam blanks

During the continuous casting process, the length and width of steel slabs can be easily measured while they move along a rolling table for sorting and classification purposes or data recording. A laser measurement system’s range is dependent on the surface of the object; the greater its reflectivity, the longer the measurement system’s range. However, the over-dimensioned range reserve ensures even dull objects are reliably detected. Additionally, the LMS’s housing is weatherproof; dirt, dust, and steam have no effect on the reliability of the measuring system.

5 Safeguarding during monitoring and positioning at cooling bed

During the continuous casting process, safeguarding employees from moving equipment is imperative. To prevent humans from coming in contact with automated machinery or encroaching on a robot’s work sphere, a fenced area, locked with a safety switch should be implemented. A non-contact, transponder safety switch is an intelligent solution for monitoring the gate’s position. If the gate is opened, the safety switch relays that information to the automated equipment so that it ceases production. Safety switches combine a small housing with direct evaluation thereby safeguarding the hazardous area.
6 Safeguarding physical barriers during continuous casting

Restricting employees from entering access-controlled areas is critical during the casting process. Mounted on doors and gates, non-contact safety sensors are a simple and cost-effective series connection, achieving PLe, Cat 4 integrity. They are effortlessly installed, allowing simple series connection on multiple entryways, which saves time and money. Furthermore, the safety sensors are easy to clean, making them suitable for the dirty areas of the casting line.
Product detection on processing machines during post production logistics

Optimum process efficiency requires detecting products on processing machines and beam beds during the casting process to enhance the production output and correctly plan ensuing process tasks. Reliable product detection using long sensing range and high robustness in the very harsh casting environment are two key success factors for detecting steel slabs. A W45 photoelectric retro-reflective sensor detects steel, up to 800 degrees Celsius. Alternatively, a W24-2 through-beam photoelectric sensor detects objects with a temperature of less than 50 degrees Celsius.
Focus 3: Rolling beds, walking beam beds, process machines

CONTINUOUS CASTING
Handling of slabs and billets in storage during post production logistics

Once produced, finished steel products are moved around the storage area. Knowing precise stock levels, managing their movement and ensuring damage-free inventory achieves ideal post-production management. A compact, reliable detection and trustworthy laser measurement sensor efficiently completes this task. Such a laser measurement sensor ensures anti-collision of overhead gantry cranes and position evaluation of finished goods in the storage facilities regardless of whether they are inside or out.
Focus 5: Conveyor system and rolling bed
CONTINUOUS CASTING

1. Outdoor slab monitoring on conveyor systems during post production logistics

Monitoring finished steel goods as they travel along conveyors in outdoor storage areas can be a tricky application, especially in inclement weather. However, the slabs can be easily monitored with a laser measurement system with its midrange scanning range and a 10% reflectivity range at 35 m. The sensor offers a high level of reliability, even in poor environmental conditions. Reliable detection of objects at long distances is crucial for this outdoor task. The high-performance time-of-flight technology monitors and prevents product collision thereby ensuring damage-free goods management.

2. Slab length and width measurement on beds during post production logistics

In order to properly classify and manage finished goods, their dimensions must be determined. Calculating the length and width of steel slabs requires a non-contact distance measurement sensor, using time-of-flight technology to measure the distance to naturally reflecting objects up to 155 m away. The DMT10 variant even functions at distances up to 1200 m. The large measuring range makes these distance sensors ideal for measuring steel objects’ dimensions, positioning outdoor cranes and measuring surfaces of hot or aggressive liquids.
Proper orientation of goods on conveyor systems during post production logistics

Proper orientation of finished goods on a conveyor system allows for damage-free transport and ensures easy logistic management. A photoelectric retro-reflective sensor can help tweak the good’s position and align the object on a roller bed during the logistic process by detecting an improper orientation. A photoelectric sensor or through-beam photoelectric sensor can scan large distances and ranges, which is necessary in a large logistics hall. Additionally, its robust housing is resistant to the harsh warehouse environment, and it has a high degree of insensitivity to ambient light.
Goods positioning on a conveyor system during post production logistics

Properly positioning steel goods on a conveyor system or roller bed is critical for perfect post-production management. Accurate goods placement is a task easily and reliably accomplished with a distance measurement sensor. Using time-of-flight technology, a long distance sensor continuously measures the position of the finished goods as they move along a rolling bed, thereby ensuring proper object placement for future transport and subsequent process step timing.
Hot rolling process

Focus 1
Ovens, rolling beds and tables

Focus 2
Rolling stands

Focus 3
Shear and cutter

Focus 4
Hot roller table

Focus 5
Cold roller table
Focus 1: Ovens, rolling beds and tables

HOT ROLLING PROCESS

1. Positioning hot slabs on conveyor belt before rolling

During the rolling process, steel slabs travel down the roller tables en route from the continuous casting process and to the walking beam oven. Knowing when these slabs arrive at the end of the table is helpful for scheduling subsequent oven loading processes. The detection of these traveling objects is achieved using a reflector and photoelectric retro-reflective sensor, properly protected with a water cooled insulation solution and dust tube, mounted perpendicular to the object’s path. This positioning information is then relayed to successive stations for oven charging optimization.

2. Presence detection and positioning before the pusher into a reheating furnace

Ensuring proper positioning of steel slabs as they are loaded into a furnace optimizes the rolling process and enhances productivity in the mill. Proper alignment in the furnace is imperative to reduce the chance of jamming from a wedged slab. A laser measurement sensor assures proper positioning thanks to its multi-echo, high-speed sampling technology which provides reliability. Additionally, its 80 m measuring range and millimeter accuracy allow perfect alignment. The laser’s intelligent self-monitoring features result in reduced maintenance which leads to lower total cost of ownership.
Presence detection and positioning during the rolling process

Often during the rolling process, it is necessary to know when and where an object is inside a furnace in order to optimize the timing of subsequent tasks. To detect the presence of an object in a furnace, a long distance measuring sensor is mounted and aligned at an opening cut into the roof of the furnace. The sensor then identifies the slab as it travels through the oven and relays that information to later process machinery. Properly protected with water cooling and a dust tube, the DMT distance sensor can reliably operate in object temperatures up to 1400 degrees C.

This graphic is not presented in the overview.
**Presence detection and positioning for the pusher out of a reheating furnace**

Giving notice to the unloading mechanism is necessary to detect when a hot slab approaches the exit of a walking beam furnace. To detect the presence of the exiting slab in the furnace, a mid-range distance measuring sensor is mounted and aligned at an opening cut into the side of the furnace wall. The sensor identifies when the slab passes and trips the lifting mechanism which then loads the hot steel onto a rolling stand. Properly protected from the heat and dirty atmosphere, the DT50 optimizes the beginning of the rolling process.
Focus 1: Ovens, rolling beds and tables

HOT ROLLING PROCESS
Focus 2: Rolling stands
HOT ROLLING PROCESS

① Hydraulic pressure detection in the rolling process
The mechanics on rolling tables require hydraulic pressure monitoring in order to avoid equipment failure and production downtime. A universal electronic pressure transmitter measures hydraulic fluid’s pressure and can be adapted optimally thanks to its versatile configuration possibilities. With its enhanced measurement accuracy or flush-mounted membrane, the PFT can measure in gauge, absolute and compound measurement ranges. The transmitter can operate in process temperatures up to 150 °C and withstand high shock and vibration often prevalent on roller tables during the rolling process.

② Hydraulic oil level detection during the rolling process
The mechanics on steel conveyors and rolling tables require sufficient and uninterrupted hydraulic oil supply in order to avoid equipment failure and production downtime. A level sensor measures the hydraulic fluid level inside storage and feed tanks via low-energy, electromagnetic pulses. The LFP Cubic level probe’s robust design increases service life and since calibration is not necessary, it saves time and money. The transmitter can operate in process temperatures up to 100 °C and withstand high shock and vibration which are often prevalent in rolling mill equipment.
Incremental encoders can control the motor of the hot roller table and therefore also the speed at which steel bars move within the rolling mill train. Controlling the train’s speed helps to ensure product quality and to optimize the rolling process. The advantages and success factors of an incremental encoder include robustness, compactness and programmability. The high enclosure rating, wide temperature range and large ball bearing distance make the DFS60 the ideal encoder for the rolling mill’s harsh environment.
Focus 2: Rolling stands
HOT ROLLING PROCESS

Synchronization of drive motors during the rolling process

Synchronization of rollers and their stands during the rolling process is an important goal to ensure consistent product quality. Production optimization is also attained via proper rolling equipment control. Absolute and incremental encoders regulate the rolling stands motor drives during the rolling process thereby controlling the speed at which the objects pass through the rollers and stands. Benefits of these encoders include permanent and safe operation of the equipment due to a high enclosure rating, extreme temperature resistance and a long bearing lifetime.
Focus 2: Rolling stands

HOT ROLLING PROCESS
1 Determining the position of actuator on shear during the rolling process

In the rolling process, a shear cuts the steel sheeting or wire which passes through the machine while the actuator indicates the position of the shear. An inductive sensor easily determines the position of an actuator on a shear by detecting the indicating lever’s position. The success factors for this task include the proximity sensor’s immunity to dust, vibration and dirt and its robustness in very harsh environments.
Focus 3: Shear and cutter

HOT ROLLING PROCESS
Focus 4: Hot roller table
HOT ROLLING PROCESS

1 Monitoring of (hot) slabs, billets and beam blanks during the rolling process

Monitoring hot objects during the rolling process is important for steel production optimization and planning purposes. Overseeing the objects as they travel along the roller bed requires a laser measurement sensor, which not only monitors but also measures the bars to ensure proper positioning for the next task in the hot rolling process. The scanner’s efficient performance operates well in adverse environmental conditions due to its multi-echo technology. Additionally, its ability to synchronize multiple sensors allows for the integration of complex solutions in the rolling process.

2 Presence detection and positioning for the pusher into a reheating furnace

Ensuring proper positioning of steel slabs as they are loaded into a furnace optimizes the rolling process and enhances productivity in the mill. Proper alignment in the furnace is imperative to reduce the chance of jamming from a wedged slab. A laser measurement sensor assures proper positioning thanks to its multi-echo, high-speed sampling technology which provides reliability. Additionally, its 80 m measuring range and millimeter accuracy allow perfect alignment. The laser’s intelligent self-monitoring features result in reduced maintenance which leads to lower total cost of ownership.

This graphic is not presented in the overview.
Focus 5: Cold roller table
HOT ROLLING PROCESS

① Slab material tracking and monitoring during the rolling process
For ideal production monitoring, steel bars moving along a roller table can be easily tracked - both indoor and out. Laser measurement sensors, mounted along the side of the table, detect and track the passing steel. Rods that aren’t positioned correctly can be easily identified and corrected before reaching their destination. For outdoor applications, weather and other adverse conditions won’t disrupt the tracking because the scanners are housed in a protective casing, which ensures their continuous availability to identify and track the moving product.

② Slab, bloom, billet and beam blank detection during the rolling process
Detecting rods and bars traveling along roller tables allows proper management of production and optimization of the rolling process. Distance measurement sensors can detect the bars from 70 m away with precise reliability (+/- 3 mm) without a reflector. Mounted along the moving roller bed, distance sensors quickly and accurately measure the passing bars. Depending on the need for precision and speed, and the object’s temperature, there’s a distance measurement sensor to fulfill each requirement.
Controlling the speed of objects and conveyor belt during the rolling process

Controlling the speed at which bars travel along the cold rolling table is an asset in the rolling production process since product quality assurance can be achieved through process optimization. An incremental encoder can control the motion of the cold roller table and therefore also the speed at which the rods move along the roller table. The unique features of a DFS60 incremental encoder include easy programmability of the output signal, zero pulse and resolution of up to 65,356 pulses, in addition to sturdiness and small size, which result in high-quality product and rolling precision.
Strip processing

Focus 1 42
Coiling and decoiling machine

Focus 2 48
Protection of straightening bench and metal forming machines

Focus 3 50
Galvanizing plant
Focus 1: Coiling and decoiling machine

STRIP PROCESSING

1. Protecting personnel in close proximity to dangerous movements during processing

Safeguarding personnel in close proximity to dangerous movements of coiling and decoiling machines is an important requirement in a mill. A safety laser scanner mounted on the coiling machine safeguards hazardous points of operation in compliance with Type 3 of IEC/EN 61496-3. The S3000’s durable, modular design is ideally suited to the steel mill’s harsh environments. Plus, the safety laser scanner can be easily interconnected in a network or integrated into existing control solutions. Alternatively, safety light curtains can be used to safeguard the entry and exit of the decoiling area.

2. Width and diameter control of coils during winding

During the finishing process, steel is wound into coils, which are monitored and measured to ensure proper length and width before leaving the coiling area. A combination of SICK solutions allows this task to be easily achieved. A laser measurement sensor monitors the coil’s width on the winding machine while an incremental encoder controls the speed and motion of the coiling machine. A distance measurement sensor determines the wound coil’s diameter while a pressure transmitter monitors the coiling machine’s coolant pressure and fluid level.
Positioning of coils before and after the coiling machine

Detecting steel coils as they pass through a finishing machine so that they can be subsequently queued for successive finishing processes, is a simple task solved with a photoelectric retro-reflective sensor. The through-beam photoelectric sensor operates reliably in steel mill environments with temperature fluctuations, such as the finishing department.
**Focus 1: Coiling and decoiling machine**

**STRIP PROCESSING**

**4 Detection of a moving object to determine a broken steel sheet during processing**

Detecting broken or torn metal sheeting while the strip is moving requires the expertise of a photoelectric sensor. Mounted sidewise above the moving material, the proximity switch detects a possible tear in the sheet. The WT24-2 owes its success to its immunity to ambient light and crosstalk from other sensors, while providing reliable operation and little downtime. Additionally, the sensor’s cover protects configuration components against environmental hazards often found in strip processing areas.

**5 Continuous control of thickness of steel plate and steel sheeting**

Uniform thickness of metal sheeting during strip processing and coil rolling is monitored via a displacement sensor. With its wide measuring range and high repeatability, a short-range displacement sensor measures the steel’s thickness with high precision. The OD Precision offers the highest measurement accuracy and automated calculation within the amplifier unit. Alternatively, the OD Max displacement sensor’s resolution is even more precise. The controller unit allows for on-the-spot calculations, thereby ensuring the steel’s accurate thickness.
Coil handling and management in coiling and decoiling machine

Precise and accurate grapple positioning during coil handling is imperative as finished coils are safely moved around the warehouse. Thanks to an optical displacement short-range distance sensor’s precise measuring range (<500 mm) and repeatability (down to 15 µm), damage-free coil handling is assured. The OD Value’s success factors offer a high degree of precision especially suited for efficiency and quality improvement while reducing material and downtime costs in steel mill logistic management.
Coil diameter classification after coiling process
Measuring steel coils’ diameters for correct classification of finished product is an important task in any steel logistic warehouse. Either the DT50-2 Pro distance measurement sensor with its robust metal housing, wide temperature range guarantee and high repeatability over longer distances, or, when the coil’s temperature is constant, the UM30 universal ultrasonic sensor, can solve this coil classification application. Alternatively, the precise long distance DT500 sensor measures coils’ diameters reliably and accurately without a reflector.
Focus 1: Coiling and decoiling machine

STRIP PROCESSING
Focus 2: Protection of straightening bench and metal forming machines

STRIP PROCESSING

① Safeguarding bench during product profile straightening during processing

Safety light curtains safeguard those who work with profile straightening, bending, or finishing benches. A C4000 Standard or C4000 Advanced safety light curtain protects personnel and machines in these automated production areas while at the same time help to optimize work processes. Safety light curtains can be mounted vertically, horizontally or diagonally in order to safeguard workers or equipment from movement potential hazards. With a flexible design to fit all applications, opto-electronic protective devices are simple to commission and maintain and very easy to use.

② Access, hand and finger protection where sheet metal is milled or formed

In sheet metal workshops, profile forming machines and straightening benches are commonly used during the finishing process. With these profiling machines come hazards. Restricting access with physical barriers, such as fences or gated areas, and safeguarded with a safety interlock such as an i110 Lock helps to ensure that staff stays out of areas occupied by forming machines. Safeguarding dangerous work areas and protecting employees are of upmost importance in steel mills.
Focus 2: Protection of straightening bench and metal forming machines
Bath level measurement during galvanizing process

Under filling the ladle in a galvanizing plant is not optimal while overfilling can create a hazard in the plant. Using time-of-flight measurement principles, a DMT10-2 displacement sensor can measure up to 155 m on natural targets and accurately measuring the level of the filled ladle. The sensor’s robust metal housing is designed for trouble-free operation in the rough environmental conditions of a galvanizing plant. Coupled with a Thermo Protection Cooling Case, this sensor solution is ideally suited to improve the process while protecting the plant and its staff from potential dangers.
### Material handling processes

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Focus 1: Automated handling machines
MATERIAL HANDLING PROCESSES

Detection of cold metal plates during automated handling
Damage-free, automated handling of metal plates, sheets and strips is a common, yet important task in metal producing and handling plants. The reliability of this operation affects both production and safety aspects. Regardless of the objects’ surface color, reliable detection of the goods is the success factor. Robust, contactless ultrasonic sensors ideally offer a simple solution in harsh environments for reliable object detection during automated handling.

Protecting of personnel from movement during automated handling process
Protection of factory personnel from automated transport vehicles is an important safety issue for all types of production and handling processes in a steel mill. A coil handling machine, equipped with S3000 safety laser scanners, detects obstacles in its path enabling the automated machine to quickly come to a controlled stop before a collision occurs. The path can be cleared and the machine can automatically continue on its way thanks to the automatic restart function. This safety precaution protects physical assets as well as personnel crossing paths with the machine.
Focus 1: Automated handling machines

MATERIAL HANDLING PROCESSES

Distance measurement for multiple slab handling during post production logistics

During automated handling of finished slabs, overhead machines require accurate distance-to-goods information in order to achieve proper gripper positioning. Reliable measurements ensure damage-free material handling process. The DT50-2 Pro distance sensor identifies the presence of objects and guarantees proper placement of finished products in the logistics area. Additionally, automated grippers, cranes and other overhead equipment also rely on mid-range distance sensors to prevent collisions between gantry cranes in the goods warehouse.

DT50 Hi → p. 87
DT50-2 Pro → p. 88
Focus 2: Automated transfer cars
MATERIAL HANDLING PROCESSES

1. Tracking and tracing products on automated vehicles within a plant
Tracking and tracing products loaded on automated transfer cars is an important task in industrial production processes. Radio Frequency Devices (RFD) offer a modular concept for flexible and cost-effective solutions when tracking material on vehicles in automated areas. The RFU620 is an industry-oriented compact device with an integrated antenna making the sensor ideal for solving tasks in logistic automation areas. Whether in the steel mill or the warehouse, the RFU620 is an ideal solution for tracking goods outfitted with transponders.

2. Safeguarding entry and exit of automated sheet metal transport during logistics
Safeguarding the warehouse entry and exit points for automated transporters is essential in order to ensure a plant’s perfect safety record. Humans should not enter areas where automated vehicles operate without devices to secure a safe, controlled stop of a loaded vehicle. A horizontally mounted safety light curtain such as the C4000 Fusion, ensures the automated vehicle will safely brake when an obstacle presents itself.
Protection of factory personnel from an automated vehicle transporting and positioning finished coils is crucial. Even if the route is fenced, assurance of accident- and injury-free work areas is still necessary. Therefore, a safety laser scanner, such as the S3000 with its 190 degree scanning angle and 7 m protective field range mounted on the vehicle and positioned to monitor the path, is an ideal solution to protect workers and the goods alike.
Focus 2: Automated transfer cars

MATERIAL HANDLING PROCESSES

Vehicle positioning during post production logistics

Correctly positioning automated vehicles during post production logistics can be difficult without the aid of a distance measurement sensor. Properly protected from the elements such as dust, heat, and accidental jostling, a DL-100Pro long range sensor can provide assistance to a vehicle when determining the position to allow loading and unloading of finished goods. To achieve precise positioning, the sensor uses time-of-flight technology to determine the vehicle’s exact position and passes this information on to the automated vehicle’s control system.

Protecting of factory personnel during post production logistics

Humans and automated machinery work side by side in steel mills. Safeguarding the path of an automated transfer vehicle can be accomplished by outfitting the vehicle with two S3000 safety laser scanners - mounted front and back. These safety rated sensors detect upcoming obstacles or persons, allowing the automated machinery to avoid an accident. Additionally, safeguarding physical barriers, such as a fence or gated area, with a guard locking device i110 Lock can help ensure that humans stay out of areas occupied by automated transfer cars and other moving machinery.
Focus 2: Automated transfer cars

MATERIAL HANDLING PROCESSES
Focus 3: Cranes
MATERIAL HANDLING PROCESSES

1. **Outdoor crane positioning**

   Precise crane positioning can be achieved by using the rugged KH53 linear encoder. To properly determine the crane’s x-axis, this non-contact, virtually maintenance-free linear measuring system mounted on the crane’s column. This encoder determines the crane’s absolute position by sensing the integrated magnets buried parallel to the rails on which the crane runs. This accurate linear encoder can measure up to 1,700 m at speeds up to 6.6 m/s. The KH53 is an ideal solution in harsh environments with superior background suppression and immunity to cross talk from other sensors.

2. **Positioning of multiple indoor cranes**

   Positioning of multiple indoor cranes during material handling is an important task for ensuring proper positioning and avoiding overhead collisions. To best manage this process, an OLM200 linear measurement sensor determines the crane’s current position using bar code tape mounted along the length of the crane’s track. The bar code tape can be placed along a curve, free roaming path, incline, decline or straight line. The OLM200 accurately determines the crane’s correct position with an excellent repeatability of up to 0.15 mm – even if multiple cranes are on the same runway.
3. Vertical positioning of cranes in stock yards

Vertical cranes are used in post-production warehouse for small items. These cranes retrieve parts by traveling vertically along shelving. To ensure proper retrieval, a mid range distance sensor, such as the compact DL50 Hi, helps properly position the crane. The sensor delivers exceptional performance up to 50 m and its High-definition Distance Measurement technology provides excellent repeatability. A red laser light ensures precise alignment and its tough metal housing is ideal for the environment.
Focus 3: Cranes
MATERIAL HANDLING PROCESSES

4. Overhead crane trolley positioning
Proper overhead crane positioning in a warehouse or outdoor area is easily solved using a combination of encoders. While precise positioning of the crane’s x- and y-axes can be managed with linear encoders, the z-axis positioning is solved using an absolute multiturn encoder. The KH53 non-contact linear encoder is a rugged solution that determines the absolute position of an overhead crane. It can measure lengths of up to 1.7 kilometers and be used in the harshest environmental conditions, often present in steel warehouses. Additionally, KH53 linear encoders tolerate speeds up to 6.6 m/s.

5. Overhead crane gear positioning
Positioning overhead cranes can be accomplished using a combination of encoders. While precise positioning of the crane’s x- and y-axes can be managed with linear encoders, the z-axis positioning is solved using an absolute multiturn encoder. The AFS/AFM60 encoder is a rugged solution that determines the absolute position of the overhead crane’s gears. The absolute encoder measures infinite lengths by counting rotations and is used in the harshest environmental conditions, which are often present in outdoor areas of steel plants.
Detection of material on automated cranes in outdoor applications

Outdoor material storage facilities are common in steel plants. To help manage the outdoor storage facilities, 2D laser scanners provide a compact solution for reliable detection and distance measurement. Mounted on a moving crane, these scanners collect 2D contour and volume data of raw materials or finished goods and enable the gathered information to be processed remotely. The scanners are ideal for material detection in outdoor warehouses and damage-free product management, while ensuring anti-collision of cranes and their loads.
Focus 3: Cranes
MATERIAL HANDLING PROCESSES

7 Anti-collision of cranes during material handling
During the material handling process, multiple cranes are used. Without proper protection and warning systems, cranes on the same runway can collide with one another. Using time-of-flight technology, a mid range distance measurement sensor mounted on each side of each crane is able to reliably detect approaching cranes and stationary walls up to 50 m away. Reflective tape is affixed to each crane. Able to operate in temperatures up to +65 °C and with a tough die-cast metal housing, this sensor is ideal in logistics areas. Alternatively, long range distance or ultrasonic sensors can also solve this task.

8 Positioning of rail-mounted shuttles during the material handling process
Proper positioning of outdoor rail-mounted transfer cars and product shuttles during the material handling process is simple with the help of a linear encoder. The encoder’s several magnetic heads are buried in concrete between the shuttles’ rails while the encoder is mounted underneath the moving shuttle. The non-contact, accurate measuring system identifies each shuttle’s position on the track. Since the vehicles’ track isn’t necessarily straight, the linear encoder is able to reliably manage the track’s curves. Outdoor vehicle positioning could not be easier.
Hydraulic pressure measurement during material handling

Steel plants' outdoor warehouse facilities often use mobile cranes to efficiently manage finished product. Outdoor mobile cranes' gears require hydraulic fluid to ensure that the moving hinges are properly protected, lubricated and functioning. However, this necessary hydraulic fluid requires constant pressure monitoring. This task is best done with a PBS pressure switch, which monitors pressures up to 600 bar.
Focus 3: Cranes
MATERIAL HANDLING PROCESSES

Coil handling, positioning and management
Once steel coils are wound, they are ready to be relocated to storage areas or loaded on trains for transport to their final destination. This process requires proper, damage-free handling via an overhead crane. A 2D laser scanner is mounted on the crane above the coils where it uses laser pulses to continuously measure the height profiles of the stacked coils below. Using time-of-flight technology, the laser scanner reliably detects the coils’ even when interfering factors such as smoke or dust are present.

Proper positioning of overhead cranes inside storage area
Correctly positioning overhead cranes to manage, move and retrieve finished steel product is accomplished with mid or long range distance sensors with sensing ranges from 150 mm up to 300 m. Due to their highly reliable measurement capabilities, distance sensors accurately position overhead cranes. Best of all, distance sensors have easy-to-understand setup and programming, ensuring they can be commissioned quickly. They offer the perfect combination of range, reliability, precision and price for this indoor material handling task.
Focus 4: Discharge and dosing bulk materials

MATERIAL HANDLING PROCESSES

1. Rotary valve operation during material handling

Although rotary valves are small parts in big steel plants, they play an important role in the material flow process which is vital for uninterrupted steel making. Discharging lump raw materials, dust or ash from silos, bunkers and hoppers or takeover points in conveying systems are typical locations for rotary valves. For proper functioning of all system parts, it is important to monitor the operation of the valve via axle movement control using inductive sensors or encoders.

2. Conveyor belt operation during material handling

Conveyor belts convey materials throughout a steel plant. From the unloading supply deliveries to filling intermediate bunkers. From transporting slag to the eventual shipping of finished goods. A conveyor belt malfunction can cause significant delays in production and involve major costs. It is therefore necessary to control the operation of conveyors, as well as proper loading, unloading and positioning of goods. Such tasks require the reliability of a flow meter system Bulkscan® LMS511 complete with a rotary encoder. Zero contact, zero wear: a smart solution for conveyors.
Volume and mass flow measurement during material handling

Many bulk or lump materials used in the steel producing process are transported to various parts of the mill via belts. Before being used in the production process, most of those bulk materials are weighed. However, it is often important to know both the volume and the mass flow of the material before loading it into trucks, ships or other vessels to prevent overfilling and to determine the actual amount used for accurate billing purposes. If the density (specific and/or bulk) is required, then 2D laser scanners, in addition to a weighing system, can deliver exact volume flow and the material density.
Focus 5: Storage silos and conveyor belts

MATERIAL HANDLING PROCESSES

1. Fire detection in carbon storages during material handling

Different forms of carbon are often used in metal and steel production processes. The carbon is stored in silos or bunkers that have limited space depending on the filling grade. In case an inert silo or bunker is not used, an O₂ measurement technology can detect a potential fire risk and alleviate that risk by decreasing the O₂ content in the silo. Alternatively, a CO monitor can detect a fire by sensing an increase in the CO content. A combination of both technologies in one installation is possible and increases the overall safety level of the process.

TRANSIC100LP p. 81
GM901 p. 82

2. Level measurement during material handling

Level control in storage facilities is vital to ensure trouble-free operation. Overfilling leads to spilling and waste. Spillage requires removal, which costs time and money and can be performed only when the process is stopped. Conversely, material shortage also causes problems. Therefore, silos’ material levels must be monitored. A vibrating level switch, such as a single rod or tuning fork, accurately measures the level. Alternatively, a non-contact ultrasonic level sensor can be installed to provide exact levels.

UM30 p. 91
LBV300 p. 94
LBV301 p. 94
UP56 p. 95
Inertization of carbon silo during material handling

Different forms of carbon are often used in metal and steel production processes. The carbon is stored in silos or bunkers that have limited space depending on the filling grade. In case an inert silo or bunker is not used, the TRANSIC100LP’s O₂ measurement technology can detect a potential fire risk and alleviate that risk by decreasing the O₂ content in the silo. This technology increases the overall safety level of the material handling process and safeguards plant personnel.
Bulk material detection during material handling

Different bulk materials are used in the steel making process. Fill level information allows precise material management by avoiding conveyor belt blockages and hopper overflows, thereby avoiding waste, delays and additional costs. Sometimes, simple material level information is sufficient and can be achieved using optical distance sensors or ultrasonic sensors. If more information is requested, and the bulk material density is known, a complete 2D laser scanner solution can offer accurate volume and mass flow data.
Focus 5: Storage silos and conveyor belts

MATERIAL HANDLING PROCESSES
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W24-2 – At a glance

- IP 69K-tested die-cast zinc housing
- Terminal chamber protected by the housing
- Immune to ambient light and cross-talk
- Selectable PNP/NPN, light/dark output
- Variants with DC voltage and universal AC/DC voltage with UL approval
- Optional test input, time delays, alarm output and front screen heating also available in high-power version.
- M12 or terminal chamber connection: both 90° rotatable

Your benefits

- Rugged metal housing that has passed IP 69K testing offers reliability and a long service life
- Immune to ambient light and crosstalk, which improves detection security
- Long-range retro-reflective and through-beam versions have a very high operating reserve, which ensures reliable operation even when the sensor is contaminated
- Ensuring reliable operation in environments with temperatures fluctuation due to standard or high-power front lens heating (prevention and reduction of condensation water on the front lens)
- Variants with DC voltage and universal AC/DC voltage provide installation flexibility

W34 – At a glance

- Durable plastic housing or zinc die-cast (W24-2)
- Protection cover for the configuration components
- Immune to ambient light and crosstalk from another sensor
- Switch selectable PNP or NPN output
- Switch selectable Light or Dark operating mode
- Versions with DC voltage (10...30V) or universal AC/DC voltage (12 ... 240 V DC / 24 ... 240 V AC)
- Optional test input, adjustable ON and OFF time delays, alarm output
- M12 or terminal chamber connection: 90° rotatable
- UL approval

Your benefits

- Excellent resistance to chemicals, which increases sensor life and reduces replacement costs
- The sensor cover protects configuration components against environmental hazards and reduces the variety of devices needed for stocking
- Immune to ambient light and crosstalk from another sensor, providing reliable operation and less downtime
- High operating reserve at a long sensing range of retro-reflective and through-beam sensors ensures reliable operation
- Variants with DC voltage and universal AC/DC voltage provide installation flexibility


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.

www.mysick.com/en/W34

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.
W45 – At a glance
- Long sensing range with a high operating reserve
- Rugged metal housing
- Optional: Powerful front lens heating
- Optional test input, time delays and alarm output

Your benefits
- Reliable continuous operation due to high operating reserves
- Very large sensing distance
- Rugged metal housing ensures a long service life in harsh industrial environments
- Front lens heating prevents condensation and frost for reliable operation in outdoor applications

Variants for 10 - 60 V DC or 24 - 240 V DC / 24 - 240 V AC voltage supply

IMB – At a glance
- Types M08 to M30
- Extended sensing ranges: 2 to 20 mm
- Electrical wiring: DC 2/3/4-wire
- Enclosure rating: IP 68, IP 69K
- Temperature range: -40 °C to 100 °C

Your benefits
- Straightforward product selection as fewer sensor variants are required – one sensor suits a whole range of applications
- Stable processes thanks to extended, highly precise sensing ranges enabled through the use of the latest SICK ASIC technology
- Reduced machine downtimes thanks to longer sensor service life, even in harsh working conditions

Rugged stainless steel housing, sensing face made of plastic (LCP)
- Visual installation aid, IO-Link-compatible
- Resistant to oils and cooling lubricants; suitable for use outdoors

Quick and easy installation thanks to visual installation aid and self-locking nuts
- High degree of flexibility and communication options thanks to IO-Link
- Easy to implement customer-specific variants within the standard product portfolio

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.

www.mysick.com/en/W45

www.mysick.com/en/IMB
S3000 Standard – At a glance
• 4 m, 5.5 m or 7 m protective field range
• 1 field set
• Configuration memory integrated in the system plug
• Interface (EFI) for reliable SICK device communication
• Selectable resolution for hand, leg or body detection
• Simultaneous monitoring of up to 4 protective fields
• Contour as reference for vertical applications
• Integrated external device monitoring (EDM)

Your benefits
• Large protective field range of 7 m enables a large variety of applications
• Safety technology – with no loss of productivity
• Quick recommissioning via configuration memory
• Modular expansions, low wiring effort and additional functions such as the simultaneous monitoring of up to four protective fields using a SICK safety controller via EFI

Your benefits
• Easy installation, commissioning and maintenance for stationary and mobile applications
• Decades of proven safety technology guarantee maximum reliability and availability – even under difficult conditions
• Simple alignment and reliable operation in vertical mode

C4000 Standard – At a glance
• Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
• 7-segment display
• PSDI mode with the UE402 switching amplifier
• External device monitoring (EDM) and restart interlock (RES)
• Configuration and diagnostics via PC
• Cascade up to three systems
• ADO (Application Diagnostic Output) signaling output for contamination indicator
• Accessory Clone Plug – for configuration memory

Your benefits
• 7-segment display saves time during alignment and diagnostics
• Beam coding protects the systems against optical interference by ensuring a high level of availability
• Ability to cascade up to three systems optimizes the safety application and reduces wiring costs

Your benefits
• Preconfigured light curtains and the clone plug enables easy and rapid commissioning
• Precise, convenient configuration and diagnostics reduces downtime

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.

www.mysick.com/en/C4000_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.
C4000 Advanced – At a glance

- Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
- Various options for blanking objects: fixed, floating, or teach-in
- 7-segment display
- PSDI mode with the UE402 switching amplifier
- External device monitoring (EDM) and restart interlock (RES)
- Beam coding for correct system allocation
- Configuration and diagnostics via PC
- Cascade up to three systems

Your benefits

- Blanking functions enable reliable and safe object detection and increase the productivity in the process
- 7-segment display saves time during alignment and diagnostics
- Beam coding protects the systems against optical interference by ensuring a high level of availability
- Clone plug enables easy and rapid commissioning, saving time and costs
- Ability to cascade up to three systems optimizes the safety application and reduces wiring costs
- Precise, convenient configuration and diagnostics reduce downtime

C4000 Fusion – At a glance

- Type 4 (IEC 61496), SIL 3 (EN 62061), PL e (EN ISO 13849)
- Self-teaching, dynamic blanking for application-specific access protection
- Hand and area protection in dirty environments
- Multiple sampling
- Reduced resolution
- Fixed blanking
- Two virtual photoelectric sensors
- Integrated laser alignment

Your benefits

- Plant productivity is increased, since falling debris does not cause the safety light curtain to switch off
- Available: skids are detected, interference objects such as cables are blanked
- Cost-effective: No additional muting sensors or protective measures are required.
- Maximum access protection in automated material transport applications ensures the system reliably differentiates between people and material
- Easy integration and quick commissioning save time and costs since secondary sensors are not required
- Safe: also provides protection in areas where there is no object, unlike conventional muting solutions
- The integrated laser alignment aid enables time saving alignment of the sender and receiver
M4000 Advanced A/P – At a glance

- Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
- Sender/receiver in a single housing, scanning range up to 7.5 m
- External device monitoring (EDM), restart interlock, application diagnostic output, SDL interface
- Muting in combination with the UE403 muting switching amplifier
- 7-segment display
- Configuration and diagnostics via PC
- Optional integrated: LED

Your benefits

- The wide scanning range allows the device to be customized according to the application
- Robust design with a high level of resistance to environmental changes ensures high machine availability, even under special ambient conditions
- Mounting grooves on three housing sides ensure more mounting flexibility and simplify machine integration
- Customer-friendly interfaces and status display simplify commissioning and maintenance
- For 2- and 4-sensor muting, the on-site connection of the muting signals significantly minimizes wiring costs and simplifies commissioning and maintenance
- Reduced downtime due to 360° visible LED, diagnostics displays and configuration memory in the UE403 muting switching amplifier

TR4 Direct – At a glance

- Response range of up to 25 mm
- Multicoded and unique coded sensors up to enclosure rating IP 69K
- Up to performance level PL e (EN ISO 13849)
- Two OSSD safety outputs
- Safe series connection of up to 30 sensors possible (depending on variant)
- LED status indicator
- Boundary area indication and magnetic retaining force (optional)
- Flexi Loop-compatible M12 plug connector (depending on variant)

Your benefits

- High level of prevention against tampering due to individually coded actuator (depending on type)
- High level of machine availability due to high tolerances for door misalignment and boundary area indication
- High level of machine reliability due to resistance to shocks and vibrations
- Cascadability of up to 30 sensors saves costs
- Long service life due to durable and low-maintenance design
- Fast diagnostics via LED status indicator
- The devices are easy to clean, making them suitable for contaminated areas or environments with strict hygiene standards
- Flexi Loop now enables a safe series connection with enhanced diagnostics capabilities and minimal wiring effort.
SAFETY LOCKING DEVICES

i110 Lock – At a glance
• Narrow plastic housing
• Metal actuator head
• Rigid or mobile actuators
• Available with M20 X 1.5 cable entry glands or Flexi Loop-compatible M12 plug connector (depending on variant)

• Locked by spring force and magnetic force
• Lock and door monitoring

Your benefits
• Small design simplifies installation and makes it easy to mount directly on the guard door frame
• Flexible electrical connectivity due to three cable entry glands
• Improved diagnostics due to additional contacts for door monitoring
• Simple adjustment due to various actuators that are suitable for any door
• Different switching elements offer the appropriate solution for electrical installation

www.mysick.com/en/i110_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.

TRANSIC100LP – At a glance
• O₂ transmitter based on high-performance laser spectroscopy (TDLS)
• For use in potentially explosive atmospheres (FM, ATEX and IECEx approvals)
• Measurement directly in-situ or extractive using a sample gas cell (option)

• Low operating costs: no consumables and no purging gas consumption
• Rugged: reliable measurement even in contaminated gases

Your benefits
• Measures in real-time directly in the process
• Easy installation and operation
• Self-diagnostics with maintenance display
• Low requirements for gas conditioning

www.mysick.com/en/TRANSIC100LP
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.
GM901 – At a glance

- Representative measurement across the duct
- Operation via evaluation unit
- Short response times
- Verifiable with gas-filled cuvette; gas testable probe with test gas

Your benefits

- Measurement results in real time due to in-situ measurement
- Fast and simple installation and commissioning
- Easy, user-friendly operation
- Economical due to low maintenance

DFS60 – At a glance

- Compact installation depth
- High resolution up to 16 bits
- Optionally programmable: Output voltage, zero pulse position, zero pulse width and number of pulses
- Connection: Radial or axial cable outlet, M23 or M12 connector, axial or radial
- Electrical interfaces: 5V & 24V TTL/RS-422, 24 V HTL/push pull
- Mechanical interfaces: face mount or servo flange, blind or through hollow shaft
- Remote zero set possible

Your benefits

- Reduced storage costs and downtime due to customer-specific programming
- Variety of different mechanical and electrical interfaces enable the encoder to be optimally adjusted to fit the installation situation
- Excellent concentricity even at high speeds
- High resolution of up to 16 bits ensures precise measurements
- Permanent and safe operation due to a high enclosure rating, temperature resistance and a long bearing lifetime
- Programmability via the PGT-08 programming software and the PGT-10-S display programming tool allow the encoder to be adapted flexibly and quickly according to customer needs
- Programmable zero pulse position simplifies installation

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.
DBS60 Core – At a glance

- Face mount flange, servo flange, blind and through hollow shaft
- Housing unit: Ø58 mm; compact mounting depth, large bearing distance
- Flange and stator couplings enable diverse mounting options
- Resolution: up to 5,000 pulses

Your benefits

- Diverse installation options due to different flange and shaft versions
- The universal cable outlet and radial connector allow use in tight spaces and makes flexible cable routing possible
- Compact housing dimensions save valuable space. The optional hollow shaft clamp on the back facilitates mounting.
- Protection of the encoder against high shaft temperatures and currents through optional isolated shafts

- Cable outlet, radial M23 or M12 connector
- TTL/RS-422 and HTL/push-pull, universal TTL/HTL interface with 4.5 V DC to 30 V DC
- Hollow shafts: metal up to Ø5/8”, insulated up to Ø15 mm; front and rear clamping

Flanges and stator couplings with different mounting holes allow diverse mounting options with one encoder version
- Rugged design with large bearing distance allows high shaft loads and a longer service life
- The TTL/HTL combination interface enables less product variety and reduces storage costs

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.

AFS/AFM60 PROFINET – At a glance

- High-resolution 30-bit absolute encoder (18-bit singleturn and 12-bit multiturn)
- Face mount flange, servo flange and blind hollow shaft
- Connection type: 3 x M12 axial plug
- PROFINET-IO-RT interface

Your benefits

- Increased productivity as a result of intelligent diagnostics functions and rapid data transfer
- Increase in network reliability due to early error detection
- Simple installation with various configuration options
- Flexible, easy setup and high resolutions for various applications with binary, integer and “decimal point” values based on round axis functionality

- Less than 5 ms data update time
- Round axis functionality
- Alarms, warnings and diagnostics functions for speed, position, temperature, operating time, etc.
- Status display via 5 LEDs

- Maximum system availability through embedded switch technology
- Compact and cost-efficient design

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.
**A3M60 PROFIBUS – At a glance**

- Robust absolute multiturn encoder with up to 31 bits (14 bits singleturn and 17 bits multiturn)
- Face mount flange, servo flange or blind hollow shaft
- Compact design (<70 mm)
- Integrated PROFIBUS interface with DP V0, V1 and V2 functionality (dependent on type)
- Connection system: 3x M12 connectors
- Protection class up to IP67
- Operating temperature: –30 °C to +80 °C (dependent on type)

**Your benefits**

- High level of system reliability even in extreme environmental conditions
- Lower maintenance costs due to non-contact single and multiturn magnetic scanning
- Space-saving, cost-efficient design ensures easy integration into applications with limited space
- High level of productivity due to quick communication and position calculation
- Immune to contamination and condensation, making it ideal for harsh environmental conditions
- Very good price-performance ratio

**ATM60 SSI – At a glance**

- Extremely rugged, tried-and-tested absolute multiturn encoder with a resolution of up to 26 bits
- Mechanical interface: face mount flange, servo flange, blind hollow shaft and extensive adapter accessories
- Zero-set and preset functions via hardware or software
- No battery required
- Electrical interface: SSI with gray or binary code type
- Electronically adjustable, configurable resolution
- Rotary axis function (optional) also for non-binary resolutions (per revolution) and decimal numbers (number of revolutions)
- Magnetic scanning

**Your benefits**

- Fewer variants are required since one freely programmable encoder offers all singleturn and multiturn resolutions
- Easy setup due to various connectivity options (cable, M23)
- Less maintenance and a long service life reduce overall costs
- Application flexibility due to easily interchangeable collets for the blind hollow shaft
- Quick commissioning using the zero set/preset function either at the press of the button on the device or via software
- Increased productivity due to highly reliable shock and vibration resistance
- Worldwide availability and service ensure quick and reliable customer service

www.mysick.com/en/A3M60_PROFIBUS

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.

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www.mysick.com/en/ATM60_SSI

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.
**KH53 – At a glance**

- Non-contact length measurement – maintenance-free, rugged, long lifetime
- High reproducibility (0.3 mm / 1 mm), high system resolution (0.1 mm)
- SSI and PROFIBUS interfaces
- Determination of absolute position
- Measuring lengths of up to 1,700 m possible
- Can be used in harsh environments
- High travel speeds of 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 determination of position under harshest environmental conditions such as influences of dirt, dust, fog, shocks and vibrations
- High efficiency and productivity
- Savings on time – no reference run necessary on initial operation due to absolute position measurement
- Accurate positioning even with high mounting tolerances

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.

**RFU62x – At a glance**

- Compact UHF RFID read/write device with integrated antenna for scanning ranges of less than 1 m
- Standard-compatible transponder interface (ISO/IEC 18000-6C / EPC C1G2)
- Supports industry-standard data interfaces and fieldbuses, as well as PoE
- MicroSD memory card for parameter cloning
- Extensive diagnostic and service functions
- Firmware upgrades and industry-standard compliance ensure long-term reliability
- Minimum changeover times in case of failure thanks to cloning
- RFU62x can be mounted to metal directly – no loss of range
- Easy operation and installation with SOPAS ET user interface

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.
**OD Value – At a glance**

- Several measurement ranges from 26 mm ... 34 mm to 100 mm ... 500 mm
- CMOS receiving element for measurement independent of surface
- Easy, LED-based user and teach-in concept

**Your benefits**

- Reliable measurement independent of surface, minimizes machine downtime
- Extremely simple sensor teach-in makes setup faster and more cost-effective
- Minimal space requirements and less wiring due to its compact, standalone design
- Many measurement ranges and output interfaces make it ideal for cost-effective integration into any production environment

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.

**OD Max – At a glance**

- Several measurement ranges from 24 ... 26 mm up to 250 mm ... 450 mm
- CMOS receiving element for measurement independent of surface
- High measurement frequency and high linearity

**Your benefits**

- Minimum machine downtime due to its reliability on any surface, regardless of brightness or color
- Highly accurate measurement, even during the production process, ensures high product quality
- High measuring frequency of 10 kHz increases processing speeds and reduces cycle times
- Reduce the cost to change your process by making a reference measurement using two sensors

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.
OD Precision – At a glance

- Many measurement ranges from 24 mm ... 26 mm up to 300 mm ... 700 mm
- CMOS receiving element for measurement independent of surface
- High measuring accuracy and frequency
- Glass thickness measurement with just one sensor head
- Different light spot sizes
- Integrated calculations for up to three sensors
- Stand alone use via RS-422

Your benefits

- Non-contact measurement improves quality inspection during production
- Surface-independent measurement algorithms ensure minimum machine downtime, regardless of surface gloss or color
- Reduced processing times as a result of the high measuring frequency of up to 10 kHz
- Simple, cost-effective solution for challenging measuring tasks due to a variety of sensor models
- Optional stand-alone operation via RS-422 means the OD Precision offers maximum performance at lower investment costs
- High visibility LC display enables simple, cost-effective setup
- Many interfaces for simple integration into an existing production environment

Dx50 – At a glance

- HDDM™ technology offers best reliability, immunity to ambient light and price/performance ratio
- Measurement ranges of 10 m or 20 m directly onto the object or even 50 m on reflector
- Different performance levels depending on product and laser class chosen
- Different interfaces: switching, analog or serial interface
- Display with intuitive and consistent operating concept
- Robust die-cast zinc metal housing
- Operating temperature from –30 °C to +65 °C
- Intuitive setup via display or remote teach reduces installation time and costs
- Temperature range from –30 °C to +65 °C allows for outdoor use without additional cooling or heating
- Up to 40 klx ambient light immunity – allows for use in optically challenging environments

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.
**Dx50-2 – At a glance**

- Measuring range up to 10 m on black targets and up to 30 m on white targets within a compact housing
- Output rate up to 3,000/s
- Repeatability: 0.5 mm to 5 mm
- Reliable, patented HDDM™ time-of-flight technology
- Withstands extreme temperatures from –40 °C to +65 °C thanks to rugged metal housing

**Your benefits**

- A wide measuring range and a compact housing increase the number of application possibilities
- Very high throughput thanks to a high measuring frequency
- Precise and reliable measurement regardless of object color improves uptime and process quality
- Withstands harsh ambient conditions thanks to ruggedness, a wide operating temperature, and ambient light immunity


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.

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**Dx100 – At a glance**

- Measuring range up to 300 m (dependent on type)
- Numerous fieldbus interfaces
- Pre-failure notification and diagnostic data available
- Display with intuitive menu and easy to see status LEDs

**Your benefits**

- Enhanced closed-loop behavior offers highest performance and productivity
- Operating temperature down to –40 °C ensures the highest reliability in cold storage warehouses and freezers (dependent on type)
- Numerous fieldbus and Ethernet-based interfaces offer the highest flexibility and fast communication for maximum efficiency
- Pre-failure and extensive diagnostic data allow for preventive maintenance, ensuring the highest machine uptime

← www.mysick.com/en/Dx100

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.
Dx500 – At a glance

- Measurement range of up to 70 m on white targets and 30 m on black targets
- Very high accuracy and repeatability
- Red laser, Class 2
- Heated versions for cold store applications

Your benefits

- Highest measurement precision, of the long range proximity sensors, ensures process stability
- Red laser light as well as adjustable mounting brackets (optional accessory) enable fast and easy alignment, ensuring on-time and cost-effective installation
- A tough, metal housing as well as heating and cooling accessories ensure reliability in rough ambient conditions

www.mysick.com/en/Dx500

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.

DMT – At a glance

- Measurement range from 0.5 m up to 155 m on natural targets
- Excellent accuracy thanks to time-of-flight measurement
- Easy alignment thanks to pilot laser
- Freely programmable parameters

Your benefits

- Extremely wide measurement range of up to 155 m on natural targets offers high flexibility in applications where range is key
- Supplementary visible alignment laser allows fast and easy alignment – even over long distances, offering fast and cost-effective installation
- Tough metal housing design for trouble-free operation in the roughest environmental conditions

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.
OLM200 – At a glance

- Highly accurate non-contact bar code positioning system
- Movement speed of up to 10 m/s can be achieved
- Wear and maintenance-free thanks to camera technology
- Adjustable resolution as low as 0.1 mm
- Compatible with standard and SPEEDCON™ M12 plug connectors
- Output of position and speed data, as well as pre-failure notifications via fieldbus interfaces
- Large temperature range from –30°C to +60°C

Your benefits

- High travel speed linked to precise positioning increases system efficiency and improves throughput
- Camera-based system with no moving parts increases the sensor’s service life, thus reducing lifecycle costs considerably
- Fieldbus interfaces (PROFIBUS, PROFINET, and EtherNet/IP) offer highest flexibility and easiest system integration, hence saving costs for interface converters and protocol adaption
- Status bit for pre-failure notification and preventive maintenance eliminates unpredicted machine downtimes
- The large temperature range from –30°C to +60°C offers reliable use in many applications

OLV – At a glance

- Non-contact, material-independent length and speed measurement
- Permanently calibrated, maintenance-free measuring system
- Measurement accuracy of up to ±0.05 % (depends on total measuring length)
- Sensing range: 120 mm (optional 240 mm)
- Compact dimensions: 167 mm x 94 mm x 39 mm (l x w x h)
- Rugged aluminum housing
- Weight: approx. 1 kg
- Quick configuration and plug and play commissioning
- User-friendly process integration using configurable multifunctional interface
- Easy replacement of existing mechanical systems
- The maintenance-free, non-contact measuring system significantly reduces maintenance costs

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.
UM30 – At a glance

- Integrated time-of-flight technology detects objects such as glass, liquids and transparent foils, independent of color
- Range up to 8,000 mm
- Display enables fast and flexible sensor adjustment
- Immune to dust, dirt and fog
- Available with combined analog and digital outputs
- Synchronization and multiplexing
- Adjustable sensitivity
- Three operation modes: Distance to Object (DtO), Window (Wnd) or Object between sensor and background (ObSB)

Your benefits

- Easy machine integration due to compact size
- Various setup options ensure flexible adaptation to applications
- Multiplex mode eliminates cross-talk interference for consistent and reliable detection and high measurement reliability
- Synchronization mode allows multiple sensors to work as one large sensor, providing a low-cost solution for area detection
- Display enables setup prior to installation, reducing on-site installation time
- Integrated temperature compensation and time-of-flight technology ensure high measurement accuracy
- ObSB-mode enables detection of any object between the sensor and a taught background

LMS5xx – At a glance

- Powerful and efficient laser measurement sensor for ranges of up to 80 m
- Outstanding performance in adverse environmental conditions due to multi-echo technology
- Up to IP 67 enclosure rating, built-in heater for outdoor versions, highly 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 sensor with highest accuracy in its class
- Comprehensive range of lines and models to suit all performance and price requirements
- Fast, reliable object detection in nearly any weather conditions
- Low power consumption reduces total cost of ownership
- Best price/performance ratio in this sensor class on the market
- Fast, easy commissioning due to SOPAS software
- Self-monitoring functions increase system availability

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.
LD-OEM – At a glance

- Long scanning range even when detecting dark surfaces
- Eye-safe, class 1 laser technology
- High angular resolution of up to 0.125 degrees
- High level of immunity to solar radiation and other infrared light sources
- Synchronous monitoring of up to four freely definable fields
- Real-time output of measurement data via Ethernet interface
- Gap-free scanning with uniform laser spot over the full 360-degree angle

Your benefits

- Reliable operation even in harsh ambient conditions
- Reduce ownership costs by using one device type for several different applications
- Reliable detection of small objects at long distances
- Easy adaptation to existing customer-specific systems


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.

LD-LRS – At a glance

- Long scanning range, even when detecting dark surfaces
- High angular resolution of up to 0.0625 degrees
- High immunity to solar radiation
- Synchronous monitoring of up to four different fields
- Small laser spot diameter even at long distances

Your benefits

- Reliable operation even in harsh ambient conditions
- Low installation costs due to large monitoring areas
- Reliable detection of small objects at long distances
- Easy installation options for excavators and crane systems


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.
LEVEL SENSORS LFP Inox

LFP Inox – At a glance

- Level monitoring in hygienic applications
- Manually cutable monoprobe up to 4,000 mm long with Ra ≤ 0.8 µm
- Process temperature up to 180 °C, process pressure up to 16 bar
- CIP/SIP resistant
- High enclosure rating IP 67 and IP 69K, autoclavable
- Interchangeable hygienic process connections
- 3 in 1: combined display, analog output and binary output
- Remote amplifier version with compact process connection

Your benefits

- Robust design increases service life
- High flexibility due to cutable probe and interchangeable connection concept
- Cost savings due to multiple output signals: one system for both level detection and continuous level monitoring
- Time and cost savings due to low maintenance without any calibration and quick commissioning Remote display of the measured value and space savings

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.

www.mysick.com/en/LFP_Inox

LEVEL SENSORS LFP Cubic

LFP Cubic – At a glance

- Level sensor for fluids
- No mechanical moving parts
- Manually cutable and exchangeable probe with lengths from 200 mm up to 2,000 mm or rope probe up to 4,000 mm
- Resistant to deposit formation
- Process temperature up to 100 °C; process pressure up to 10 bar
- 3 in 1: combined display, analog output (acc. NAMUR NE 43) and binary output
- High enclosure rating of IP 67, rotatable housing and remote amplifier version
- Titanium process connection brings high chemical resistance
- Compact and rotatable housing or remote amplifier ensures flexible installation
- No crosstalk when several sensors are mounted next to each other
- Advanced technology enables adjustment-free measurement

Your benefits

- Rugged design increases service life
- High flexibility due to cutable and exchangeable monoprobe or rope probe
- Cost savings due to multiple output signals: one system for both level detection and continuous level monitoring
- Time and cost savings due to low maintenance and quick commissioning without calibration
- Advanced technology enables adjustment-free measurement

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.

www.mysick.com/en/LFP_Cubic
LBV300 – At a glance

- Tough device design
- Several housing materials and electrical outputs available
- Immune to deposit formation
- Commissioning without filling
- Process temperature up to 250 °C
- Very high repeatability

Your benefits

- Easy installation and commissioning, no calibration necessary
- Easy operation and integration, saves time
- Maintenance-free sensor, reduces downtime
- Testing in place possible – no mounting required, which reduces installation time

- ATEx versions (1D/2D/1G/2G) available
- Tube-extended version (LBV330) up to 6 m and rope extensions version (LBV320) up to 80 m available for vertical mounting

www.mysick.com/en/LBV300

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.

LBV301 – At a glance

- Compact sensor from 1 in threaded
- Monoprobe design prevents bulk materials from sticking and jamming
- Polished monoprobe for food applications
- Commissioning without filling
- Process temperature up to 250 °C

Your benefits

- Easy commissioning and no calibration reduce setup time
- Maintenance-free sensor, reduces downtime
- On-site testing – no mounting required, which reduces setup time

- ATEx versions (1D/2D/1G/2G) available
- Tube-extended version (LBV331) up to 6 m and rope-extended version (LBV321) up to 80 m available for vertical mounting

www.mysick.com/en/LBV301

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.
UP56 – At a glance

- Non-contact level measurement up to 3.4 m operating distance / 8.0 m limit scanning distance
- Pressure resistant up to 6 bar (87 psi)
- Transducer protected by PVDF cover for increased resistance
- 3 in 1: continuous level measurement, level switch and display

Your benefits

- Non-contact measurement in pressurized containers – no wear over time
- Easy to set parameters, saving time
- Flexible measurement system for different container sizes – standardization and stock reduction

PBT – At a glance

- Pressure measurement ranges from 0 bar ... 1 bar up to 0 bar ... 600 bar
- Gauge, absolute, and compound measurement ranges
- A large variety of available process connections
- No moving parts: No mechanical wear, fatigue-proof, maintenance-free

Your benefits

- Compact size takes up less space
- Simple and cost-saving installation
- Available in a wide selection of configurations, enabling a perfect match to individual customer requirements

www.mysick.com/en/UP56

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.

www.mysick.com/en/PBT

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.
PFT – At a glance

- Measurement ranges from 0 mbar ... 100 mbar up to 0 bar ... 600 bar
- Gauge, absolute, and compound measurement ranges
- Variant with flush-mounted membrane available
- Process temperature up to 150 °C (optional)
- Large variety of commonly used process connections

Your benefits

- Reliable and highly accurate measurement technology
- Wide application range
- No mechanical wear, fatigue-proof, maintenance-free as no moving parts
- High shock and vibration resistance
- Accuracy 0.5 % or 0.25 %
- Output signal 4 mA ... 20 mA, 0 V ... 5 V, or 0 V ... 10 V
- Zero and span adjustable
- Electrical connection M12 x 1, L-connector according to DIN 175301-803 A or flying leads

Bulkscan® LMS511 – At a glance

- Non-contact measurement of volume and mass flow of bulk material
- Laser pulses with high angular resolution ensure outstanding image resolution
- 5-echo pulse evaluation produces highly reliable measurements
- Offers non-contact belt monitoring

Your benefits

- Maximizes conveyor throughput
- Reduces maintenance costs by preventing belt slippage
- Increases the conveyor belt’s service life
- Reduces loading time
- Integrated center-of-gravity calculator
- Robust structure for harsh ambient conditions
- Can also measure at low temperatures thanks to integrated heater
- Compact housing with IP67 enclosure rating
- Increases efficiency by optimizing belt capacity
- Simple installation
- Low maintenance costs
- Offers savings through minimized energy consumption

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.
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.
SICK LIFETIME SERVICES

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

→ www.sick.com/service
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.

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

→ www.sick.com/products
**PRODUCT OVERVIEW**

**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

Subject to change without notice
PRODUCT OVERVIEW

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 rotary 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
EASY 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

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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

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
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.

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- 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.
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