

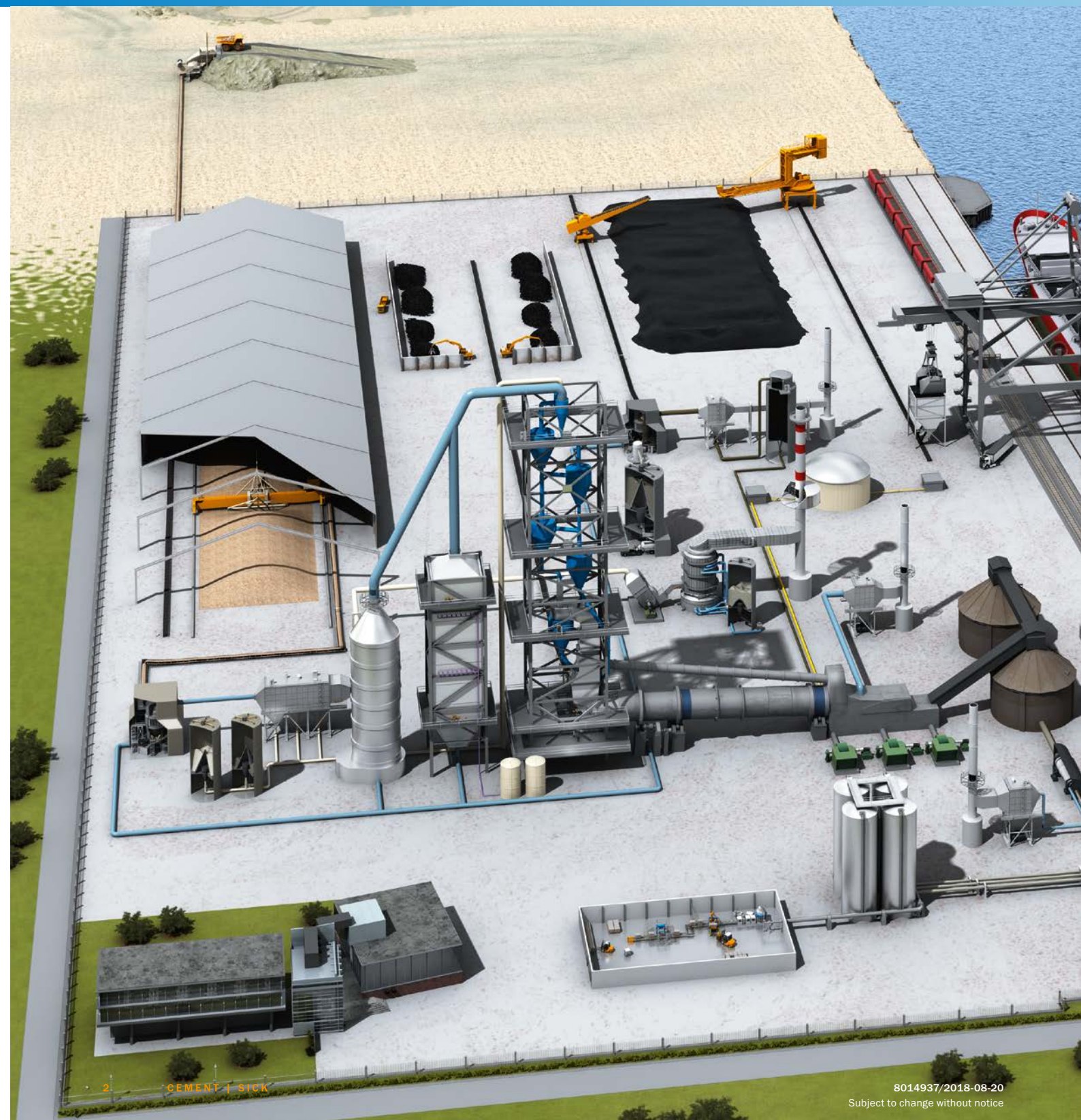


CEMENT INDUSTRY

FUTURE THINKING FROM THE START.

SICK
Sensor Intelligence.

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More information on the
cement industry
→ www.sick.com/cement

Challenges

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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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TASKS IN THE CEMENT INDUSTRY

Productivity and product quality play a key role within the international environment of the cement industry. What's more, with its high level of energy and raw materials use, the cement industry is also concerned with conserving natural resources and protecting the global environment. Cement plants therefore rely on the very latest sensors and analyzer systems in order to fulfill all requirements and also to meet their own set targets. SICK is the only manufacturer that can provide the full range of sensors for measuring gas and dust concentration, volume flow, and for performing data analysis. Sensors from SICK are also used for controlling the processes related to cement production – including mass flow measurement when transporting raw material or bulk fuels, level measurement in silos, and object recognition in packaging machines. By providing intelligent solutions, SICK has proven itself in all areas of cement production.



Emission measurement

The cement industry continuously monitors emission levels in order to ensure environmentally friendly production. SICK's analysis and measurement technology provides the information with all required values from the measured components. These values can then be further processed in a data acquisition system if required.



Quality control

With measurements at the rotary kiln, calciner, and cyclone preheater, SICK offers intelligent, rugged solutions for monitoring the clinker production. As when measuring emissions, it is also important here to reconcile high measurement availability with low maintenance efforts.



Service

SICK is a one-stop shop for a complete range of services – expert advice, skilled planning services, detailed project planning and engineering, installation, and commissioning. We also provide reliable post-sales maintenance and repair support.



Optimum material flow

To ensure an optimum production process, the precise amount of stored or transported fuels, raw materials, and products is indispensable. Level and volume flow measurement sensors from SICK make it possible to manage storage and transport efficiently and in order to match requirements.



Machine safety

Whether on the packaging machine or when palletizing cement bags, safety solutions from SICK maximize operator safety, optimize production, reduce the machine footprint, and minimize downtimes.



Plant monitoring

Monitoring the electrostatic precipitator to prevent explosion due to the sudden buildup of an excessive concentration of CO is just as much a part of the proven complete solution as monitoring the coal handling systems for smoldering fire or preventing collisions in the quarry and in ports.





Raw material extraction and preparation

Focus 1

8

① Limestone quarry

Focus 2

10

② Crushing

Focus 3

12

③ Homogenization and storage

① Protecting shovel and bucket excavators

It can be challenging for vehicle operators to give their full attention during loading operations when surrounded by other moving haul trucks or graders, especially when driving space is limited due to embankments. The MINESIC100 EPS is a high-precision driver assistance system that monitors the area around the vehicle. It guides the haul truck operator safely to the correct loading position. The operating display indicates all obstacles within the relevant warning field. If a collision is imminent, the operator will be warned by an audible alarm so that the current maneuver can be safely stopped in a timely manner.



MINESIC100 EPS → p. 84



② Protecting wheel loaders and bulldozers

When using wheel loaders and bulldozers, there is a risk of collision with other moving vehicles when backing up. Infrastructure obstacles such as embankments, stockpiles, or silos pose a considerable collision risk. When loading and unloading, wheel loaders are constantly moving forward and backward, while the main attention of

the operator is focused on the bucket. The MINESIC100 WPS is a highly precise driver assistance system that monitors the critical zones within the rear section of the vehicle. The system sends a warning signal when there is a risk of collision and provides assistance to the operator during difficult maneuvers.



MINESIC100 WPS → p. 84



③ Protecting haul trucks

Due to the size, height and speed of the haul truck, as well as the constantly changing operating conditions, the haul truck driver often has poor visibility. Therefore, in a stone quarry, for example, front-end and rear-end collisions, as well as unintended road departures are all common. The MINESIC100 TPS is a highly precise driver assistance system

that monitors critical zones around the vehicle and also takes the current driving conditions into consideration. A road departure warning provides guidance to the truck operator along the haul road and alerts the operator if the truck is about to leave the safe driving path.



MINESIC100 TPS → p. 85

① Overfill protection at the crusher

During unloading, monitoring the crusher and continually measuring the raw material flow are important in order to fill the crusher correctly. The Bulkscan® LMS511 laser volume flowmeter monitors and measures whether the crusher is being efficiently loaded. If this is not the case, the sensor optimizes the process with absolute accuracy, without causing interruptions. Using the principle of time-of-flight measurement, the Bulkscan® LMS511 laser volume flowmeter monitors the operation without contact. If the crusher is over-filled, or if over-sized stones are detected, an immediate warning is sent out so that the material transportation can be stopped.



Bulkscan® LMS511 → p. 87



② Monitoring conveyor belt operation during material handling

Conveyor belts transport raw materials and additives to interim storage facilities and afterwards final products to storage areas and to the dispatch points. A conveyor belt malfunction can cause significant delays in production and involve major costs. It is therefore necessary to monitor the operation of

all conveyor belts, as well as the proper loading, unloading, and positioning of products. The Bulkscan® LMS511 laser volume flowmeter performs these tasks in combination with a DFS60 incremental encoder, which provides the speed information.



Bulkscan® LMS511 → p. 87
DFS60 → p. 97



③ Monitoring the hydraulic pressure during the crushing process

In order to further process raw materials, large pieces of stones are crushed first. The crushers used for this processing step require hydraulic fluid for seamless transfer of high forces, as well as for lubrication to ensure that

moving parts function correctly. The hydraulic fluid pressure must always be monitored. For this purpose, a PBS pressure sensor is used, which can monitor pressures of up to 600 bar.



PBS → p. 89

① Measuring piles of raw material

The LD-LRS LiDAR sensor simplifies the work on outdoor and indoor piles of raw material through reliable detection and distance measurement. Mounted on a movable stacker, the 2D LiDAR sensor collects data about the contour and volume of raw materials and sends this data for decentralized processing. The raw material usage and storage capacities can be efficiently optimized. Based on the distance measurement between the stacker and the pile of raw material, the LD-LRS calculates the minimum dumping height and helps to prevent dust formation. This saves water and energy for dust binding. The scanner can simultaneously ensure collision protection, so that wear and tear as well as repairs on vehicles can be reduced.



① This graphic is not presented in the overview.



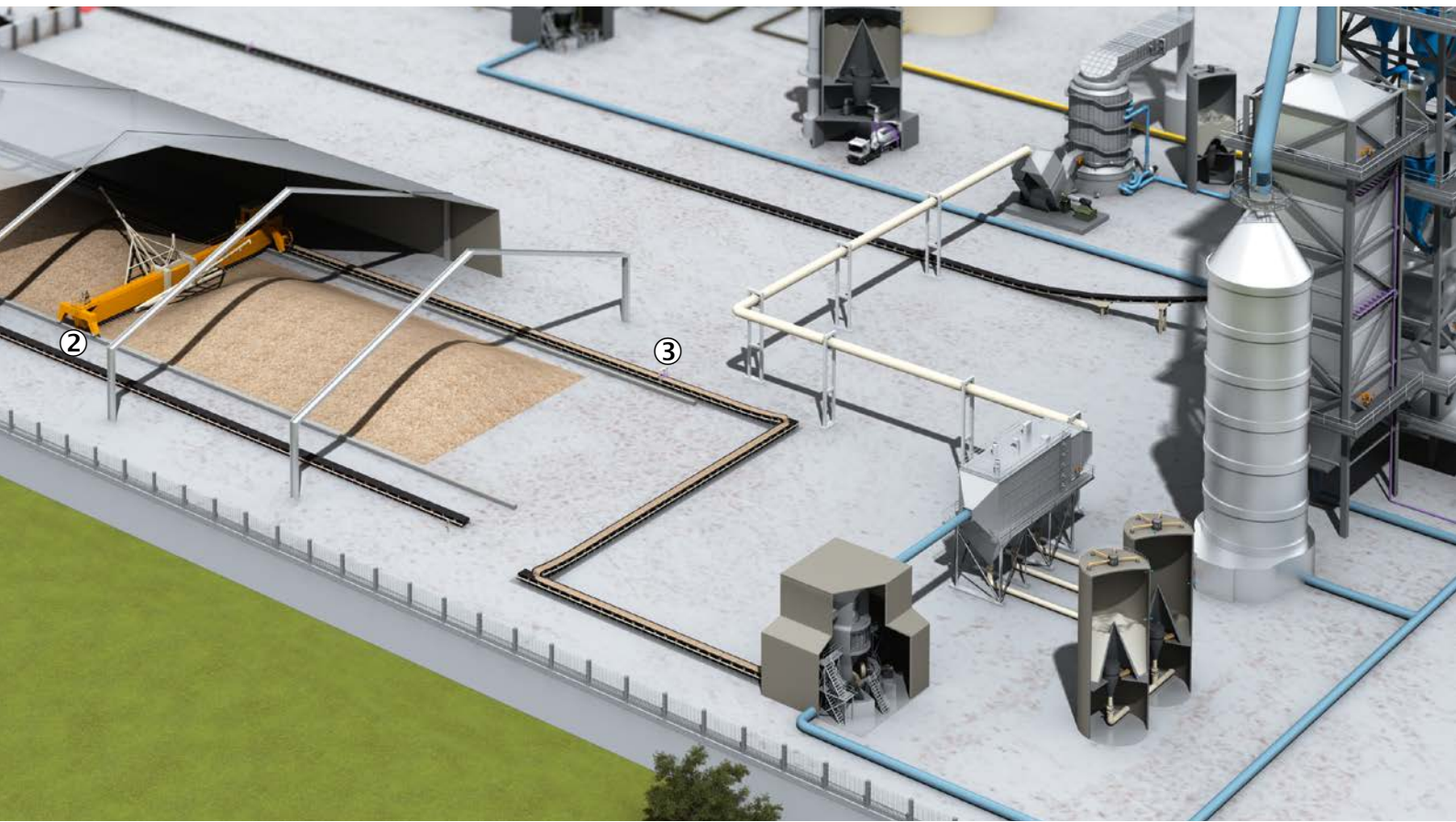
② Monitoring the hydraulic pressure at stackers and reclaimers

In storage areas of cement plants, stackers and reclaimers are often used to transport raw materials. Those machines require hydraulic fluid for seamless movement during high pressure applications, as well as for lubrication

to ensure that moving parts function correctly. The hydraulic fluid pressure must always be monitored. The PBS pressure sensor can monitor pressure of up to 600 bar.



PBS → p. 89



③ Monitoring conveyor belt operation during material handling

Conveyor belts transport raw material and additives to interim storage facilities and then final products to storage areas and to the shipping points. A conveyor belt malfunction can cause significant delays in production and involve major costs. It is therefore necessary to monitor the operation of all conveyor belts,

as well as the proper loading, unloading, and positioning of products. The Bulkscan® LMS511 laser volume flow-meter performs these tasks in combination with a DFS60 incremental encoder, which provides speed information.



Bulkscan® LMS511 → p. 87
DFS60 → p. 97

④ Position determination of stackers and reclaimers

Dx1000 non-contact distance sensors are able to determine the position of stackers and reclaimers at extremely long distances of up to 1,500 m, both in- and outdoors. The excellent performance of the Dx1000 long range distance sensor is impressive. The DT1000 sensor variant is ideal for distance measurement on natural targets, and the DL1000 is for use with reflectors. These sensors cover a wide spectrum of applications and offer high flexibility when determining distance and speed values, whether for gap measurement or collision prevention. Combined with easy installation, the Dx1000 makes a great contribution to increased plant availability.



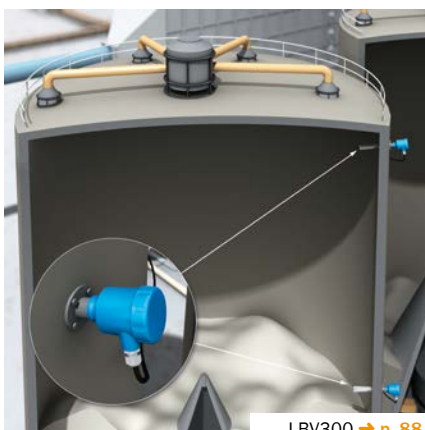
Dx1000 → p. 93



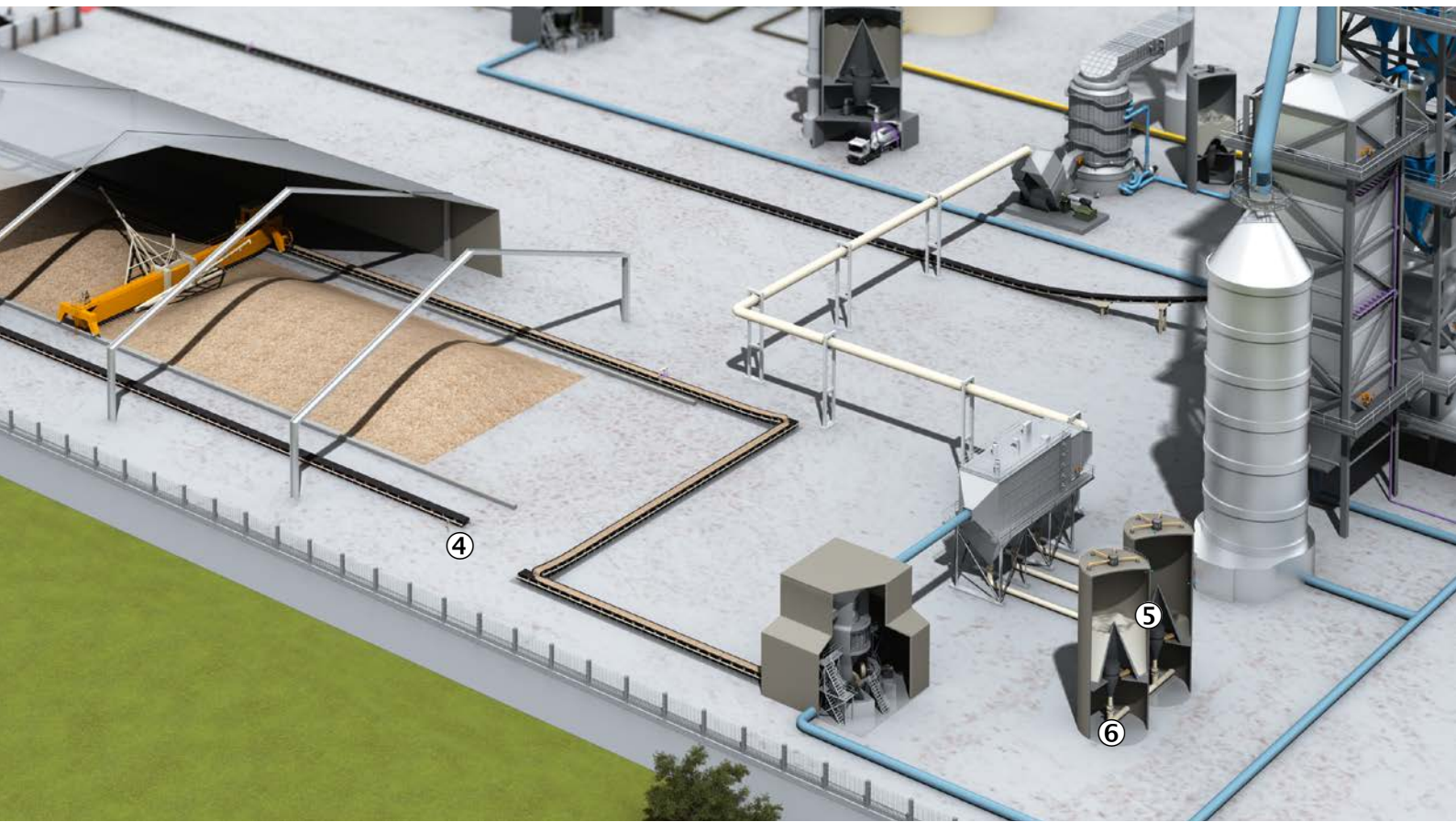
⑤ Overfill protection for aggregates and raw meal silos

Before burning, raw meal and aggregates are pulverized in a mill. Reliable fill level monitoring is indispensable for ensuring continuous production. The vibration level switches of the LBV300 product family are reliable and fulfill the measuring tasks with high precision. For example, it can operate as a full, empty or demand detection device. The

sensors operate with no mechanical moving parts, and are immune to deposit formation. They are easy to install and can be commissioned without filling the silo. These product features make the LBV300 suitable not only for bulk materials such as raw meal, but also for monitoring the fill level of cement silos.



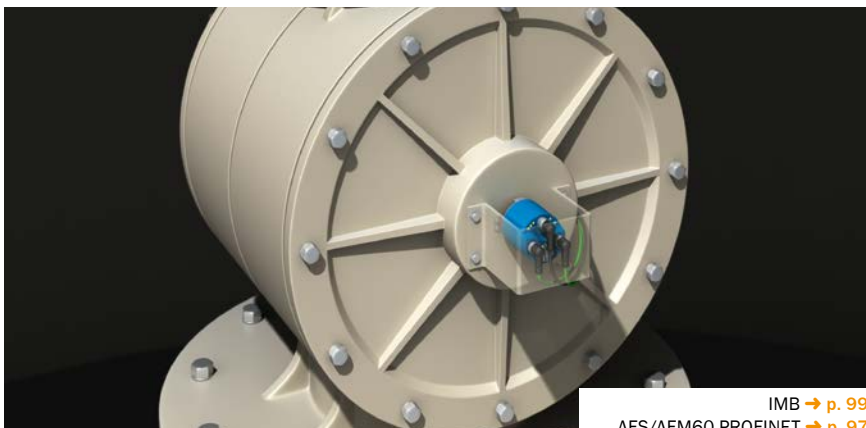
LBV300 → p. 88



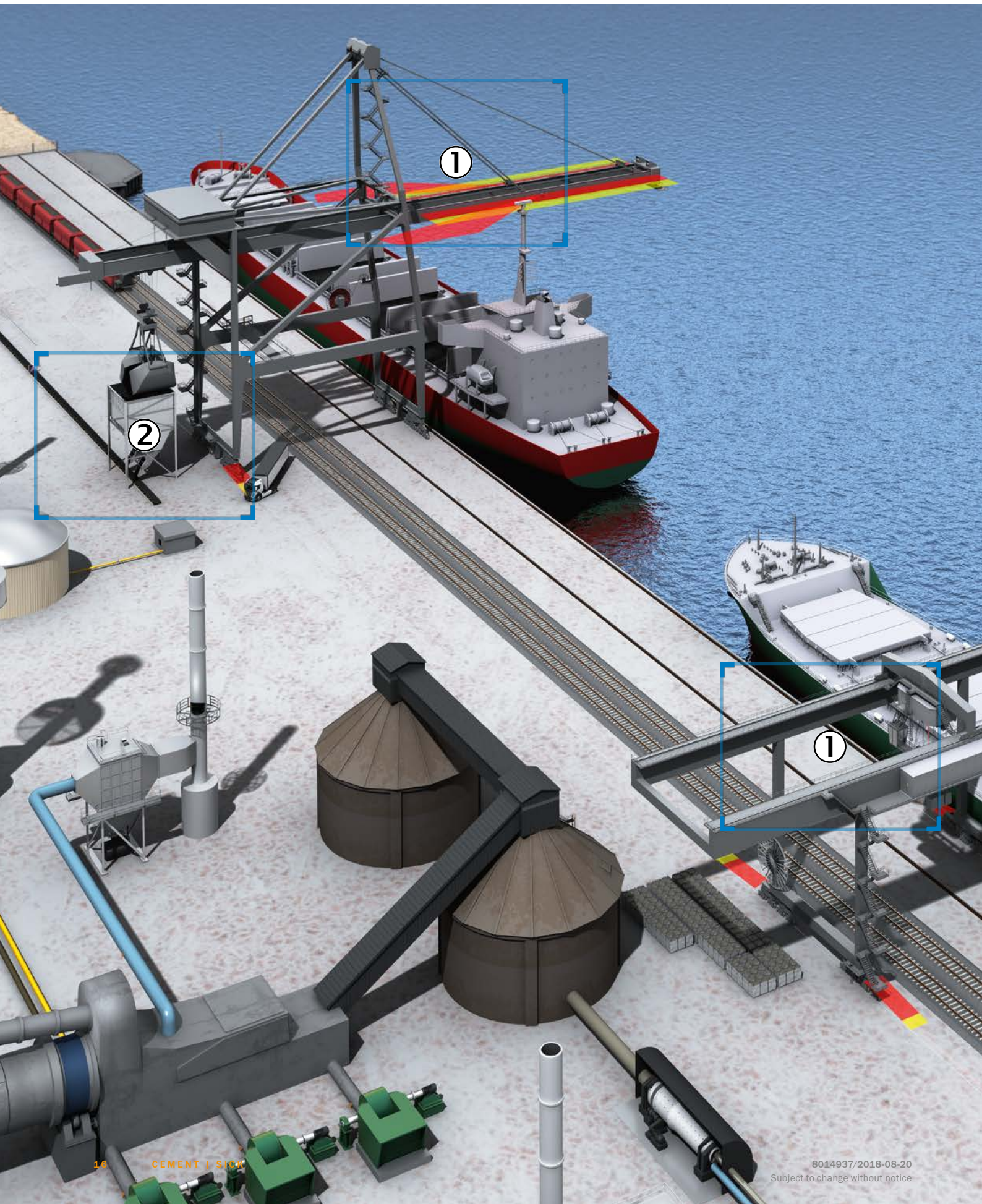
⑥ Monitoring rotary valve operation during material discharge

Rotary valves are small parts in cement plants, nevertheless they play an important role in the material flow process, which is vital for uninterrupted cement production. Typical locations for rotary valves include discharging systems for raw meal, additives, dust or ash from silos, bunkers and hoppers as well as

transfer points in conveying systems. So that all system parts function without error, the rotation axis of rotary valves are monitored using absolute encoders, such as the AFS60 PROFINET. An alternative solution to determine the valve position is the use of inductive proximity sensors such as the IMB.



IMB → p. 99
AFS/AFM60 PROFINET → p. 97





Material transport

Focus 1

18

① Cranes

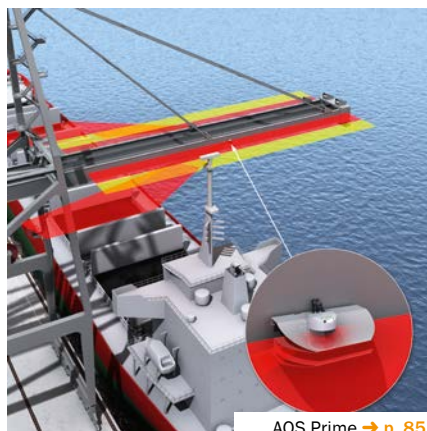
Focus 2

24

② Conveyor belts

① Collision avoidance on crane booms and between adjacent cranes

The AOS502 STS mounted on a gantry crane provides a safe and reliable method of detecting ship superstructures, such as radar systems. By analyzing the various 2D LiDAR sensor (2D laser scanner) warning and stopping fields, the AOS502 STS provides collision avoidance from crane to crane as well as from boom to object. The safety controller and integrated control software monitor the system functions and ensure reliable operation.



AOS Prime → p. 85



② Collision avoidance on the path of a quay crane using LiDAR

The LMS15x LiDAR sensor can be relied upon to help avoid collisions between the crane and other objects. Crane operators have to keep track of large, visible obstacles in their path as well as objects that may be hidden or concealed – even when driving backwards. With a range of up to 50 m, the LMS15x can precisely monitor areas in terms of length and width.



LMS1xx → p. 90

③ Collision avoidance on the path of a quay crane using radar

An economical solution, the RAS4xx radar sensor has detection ranges up to 20 m. It assists the crane operator in monitoring the travel path and helps to prevent collisions between the crane and other objects.



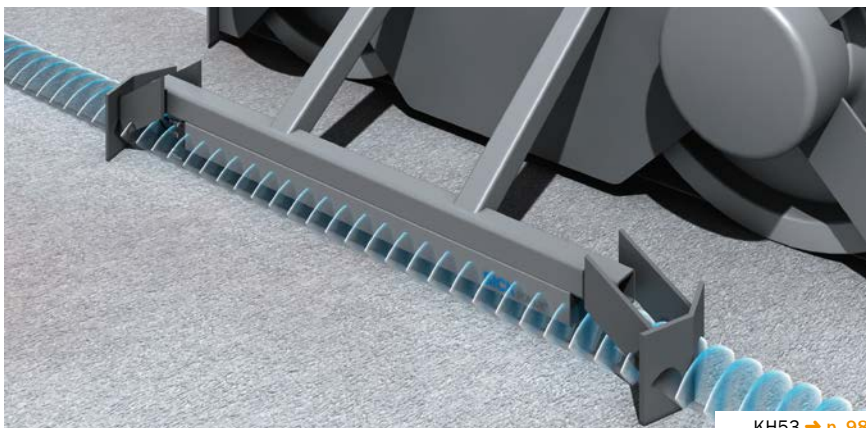
RAS4xx → p. 96



④ Positioning outdoor overhead traveling cranes

The crane's position must be determined automatically. Measuring distances outdoors across large distances and sometimes under difficult or uneven measurement conditions, such as railways, pose a great challenge to the measuring system. The KH53 linear encoder measures distances of up to 1,700 m, even under poor environmental conditions. With a resolution of

0.1 mm and a reproducibility of up to 0.3 mm, the KH53 is suitable for exact positioning tasks on overhead traveling cranes. Due to its absolute positioning functionality, the sensor provides the correct position immediately after being switched on, so a reference run of the crane is not necessary. The crane is ready for use instantly.



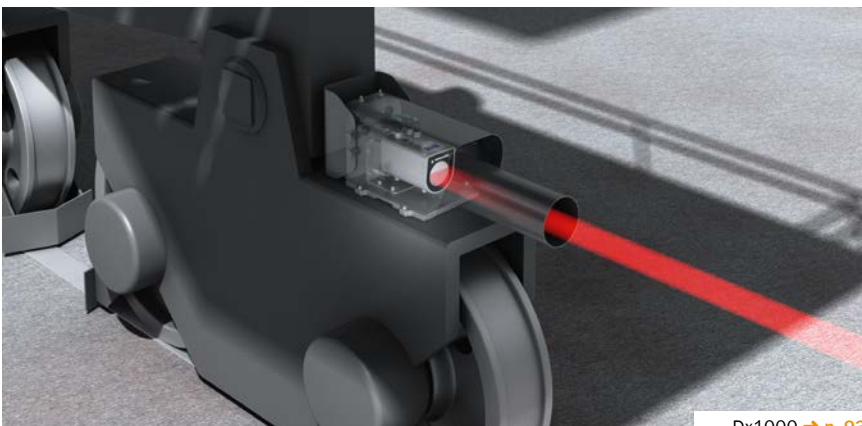
KH53 → p. 98



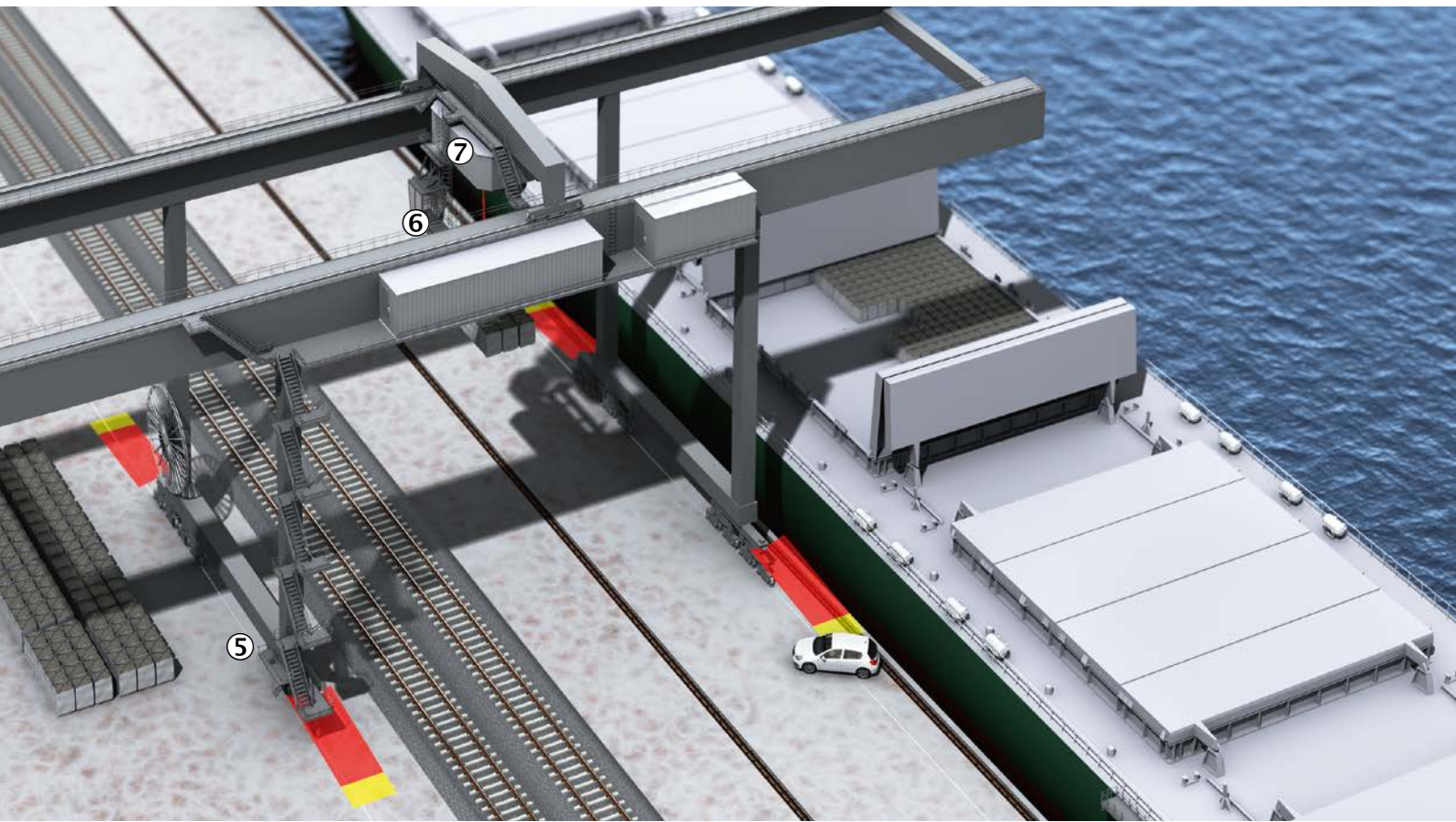
⑤ Collision avoidance for rail-mounted gantry cranes

The long range DT1000 distance sensors enable reliable non-contact distance measurement between rail-mounted gantry cranes for crane-to-crane collision avoidance, with low installation effort. If the adjustable distance limits are reached or if the cranes are traveling too fast, the data will be transmitted via a switching signal

to the higher-level control. Using the configurable RS-422/SSI interface, the DT1000 can also provide data relating to distance and speed. Additionally, there is a scalable analog output signal available. The DT1000 therefore contributes significantly towards increasing system availability in the port.



Dx1000 → p. 93



⑥ Determining the height position of the lifting equipment

To prevent collisions between the lifting equipment and other objects, the DT1000 long range distance sensor continuously transmits accurate information about the current position of the lifting equipment in the working area. The DT1000 performs highly accurate non-contact distance and speed measurements. The sensor has a configurable RS-422-/SSI interface and is well suited for outdoor environments.

⑦ Access protection

Access to a hazardous area on the crane must be restricted when there are dangerous movements. The i110 Lock electro-mechanical safety locking devices monitor access points and prevent unauthorized entry. Thanks to a wide selection of actuators, the safety switch is also suitable for use with almost any type of door. Additional contacts are provided for door monitoring purposes.



Dx1000 → p. 93



i110 Lock → p. 104

⑧ Positioning the trolley

The KH53 is perfectly suited for positioning the traveling trolley on a crane. It provides good repeatability of up to 0.3 mm, and long reading distances of up to 55 mm. It is extremely rugged in the event of shocks and vibrations, and stands up to the affects of severe weather. With the position data of the traveling crane, it is possible to very precisely load BigBags (flexible intermediate bulk containers) with little deviation. Due to its wear-free measurement design, the positioning systems can be reliably used for many years and enable high productivity of the crane with low maintenance costs.



KH53 → p. 98

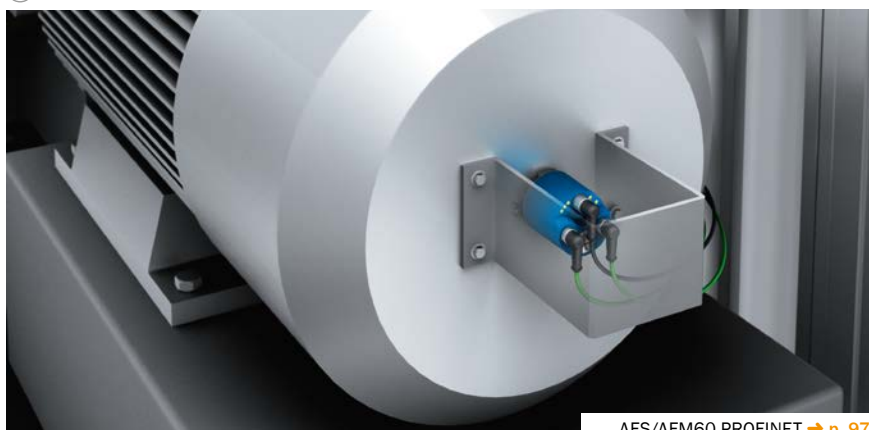


⑨ Detecting the position of overhead traveling crane gears

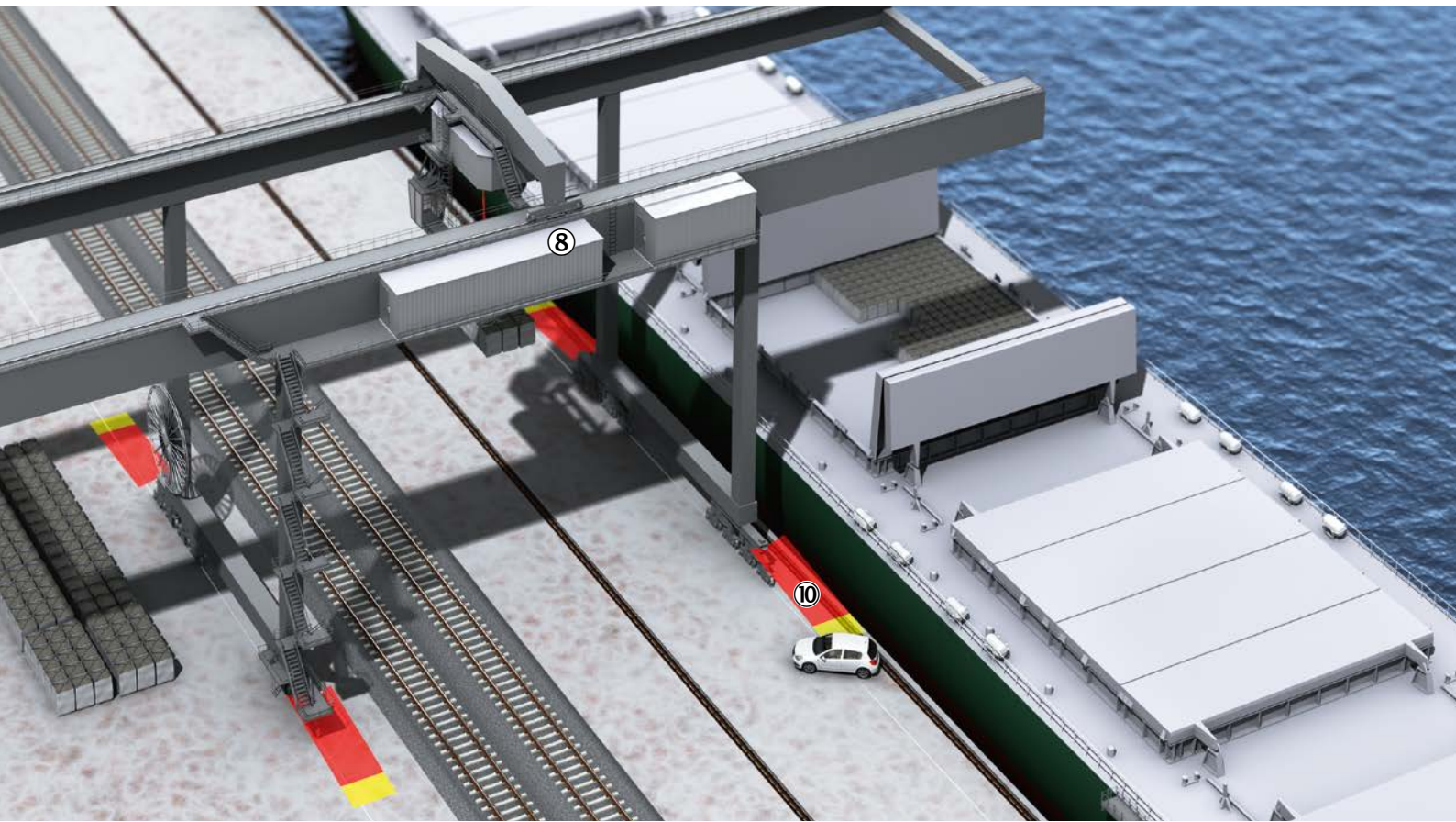
Combining multiple encoders makes it particularly easy to ensure the correct positioning of cranes. Linear encoders or long-range distance sensors can be used for the precise detection of the X-axis and Y-axis on the crane, while a multiturn absolute encoder can be used for the Z-axis. The AFM60 PROFINET ab-

solute encoder is a robust, durable solution for detecting the absolute position of traveling crane gears and the position of the crane harness. Absolute encoders measure unlimited path lengths by counting revolutions. They can be used in the harsh ambient conditions found in outdoor areas of cement plants.

! This graphic is not presented in the overview.



AFS/AFM60 PROFINET → p. 97



⑩ Collision avoidance

The AOS Prime is a reliable solution for preventing gantry crane collisions. This object detection system consists of a 2D LiDAR sensor and a safety controller. The 2D LiDAR sensor helps to avoid collisions between the crane and other objects along the crane's path, as

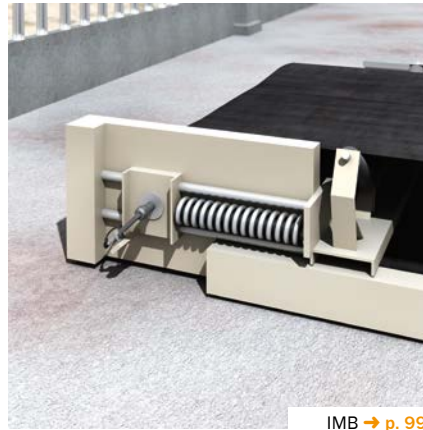
well as assisting the crane operator in monitoring the route to be traveled. With wide ranges and variable monitoring fields that allow the operator to adjust the length and width, the AOS Prime is a reliable and versatile solution.



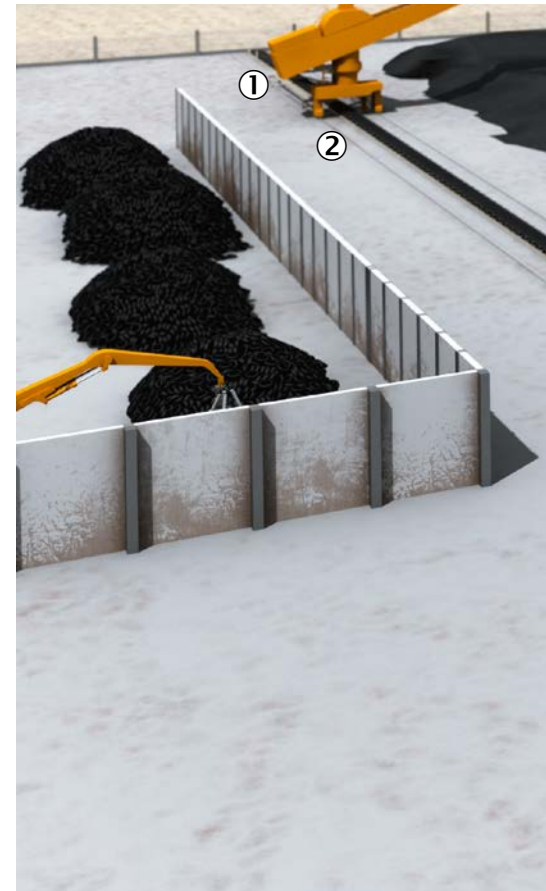
AOS Prime → p. 85

① Monitoring belt tension on the conveyor belt

To prevent spilling, down time and material waste, the tension of the conveyor belt cannot be too high or too low. The IMB18 inductive proximity sensor is perfectly suited for this task, and prevents extensive wear and overstretching of the belt. It also reliably performs its task in the roughest environments, and ensures a safe operation of the conveyor belt. Thanks to the visual adjustment aid and self-locking nuts, installation on-site is quick and easy.



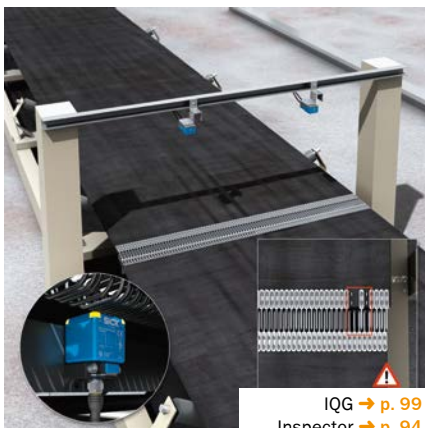
IMB → p. 99



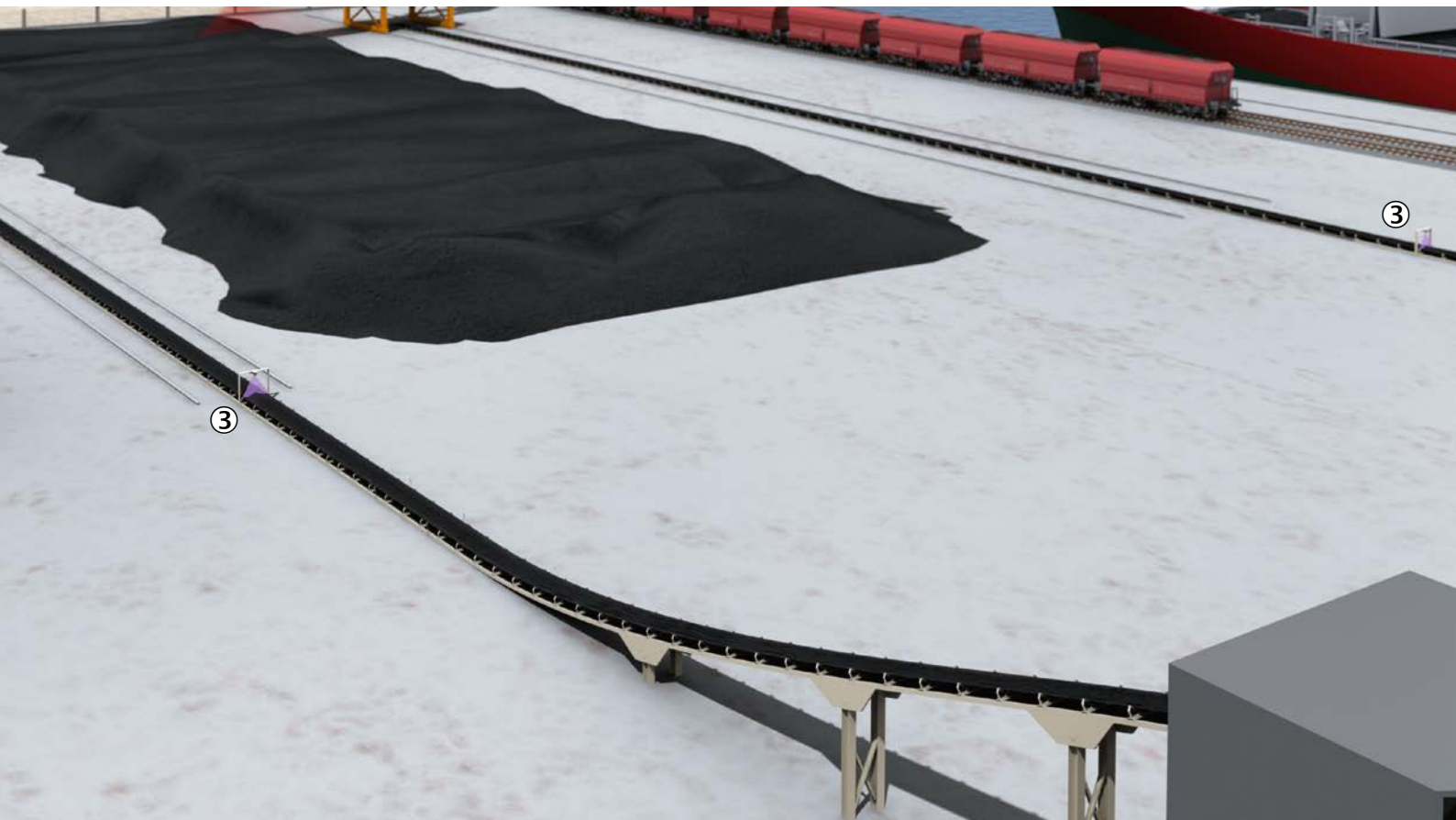
② Wear detection on conveyor belt clamps

Conveyor belt clamps can be used to connect two belt ends together quickly and securely. With the high demands placed on long conveyor belts with high tension levels, signs of wear around the clamps can cause the conveyor belt to fail, resulting in production losses due to downtime. Manually checking for wear around the clamps is laborious and time-consuming, and requires the belt to be stopped. This is a costly process

with the risk of human error. Using the rugged IQ40 inductive proximity sensor to trigger a PIM60 2D vision sensor, the check can be performed automatically while the belt is moving at speeds of over 6 m/s. The PIM60 triggers an alarm as soon as signs of wear appear. Additionally, this system can upload inspection images to an FTP server for data archiving purposes.



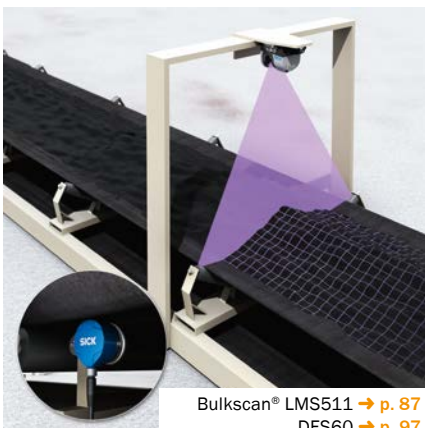
IQG → p. 99
Inspector → p. 94



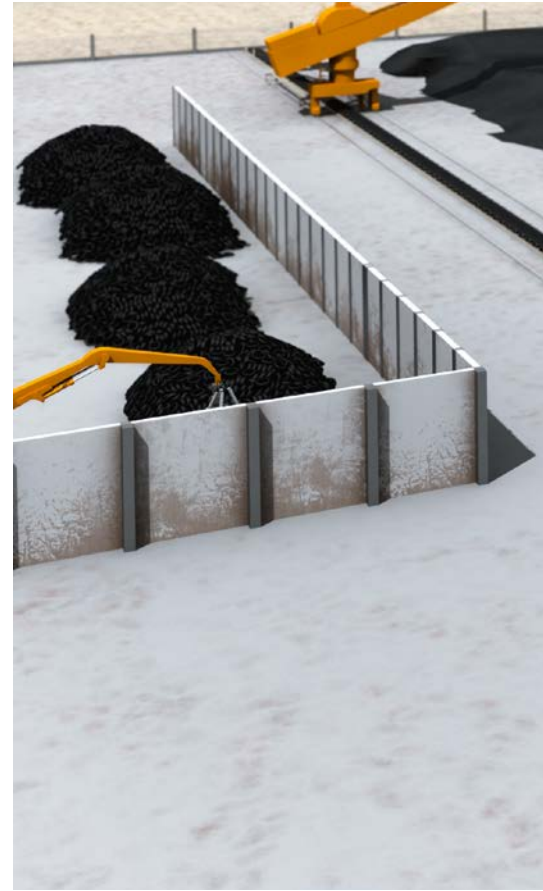
③ Monitoring conveyor belt operation

Conveyor belts transport raw materials and additives to interim storage facilities and then to storage areas and dispatch points. A conveyor belt malfunction can cause significant delays in production and involve major costs. Therefore it is necessary to monitor the operation of all conveyor belts, as well as the proper loading, unloading, and positioning of

fuels. The Bulkscan® LMS511 laser volume flowmeter performs these tasks in combination with a DFS60 incremental encoder. The encoder provides the information on conveyor speed, while the Bulkscan® LMS511 laser volume flowmeter determines the volume flow, center of gravity of the load and load height with no contact and no wear.



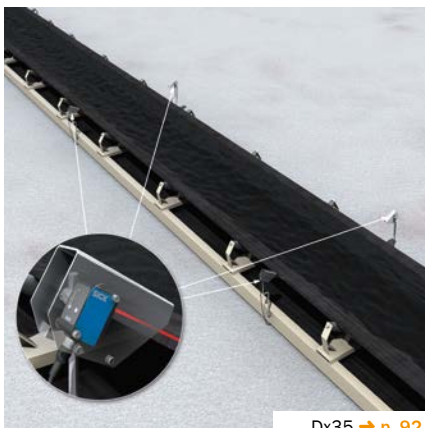
Bulkscan® LMS511 → p. 87
DFS60 → p. 97



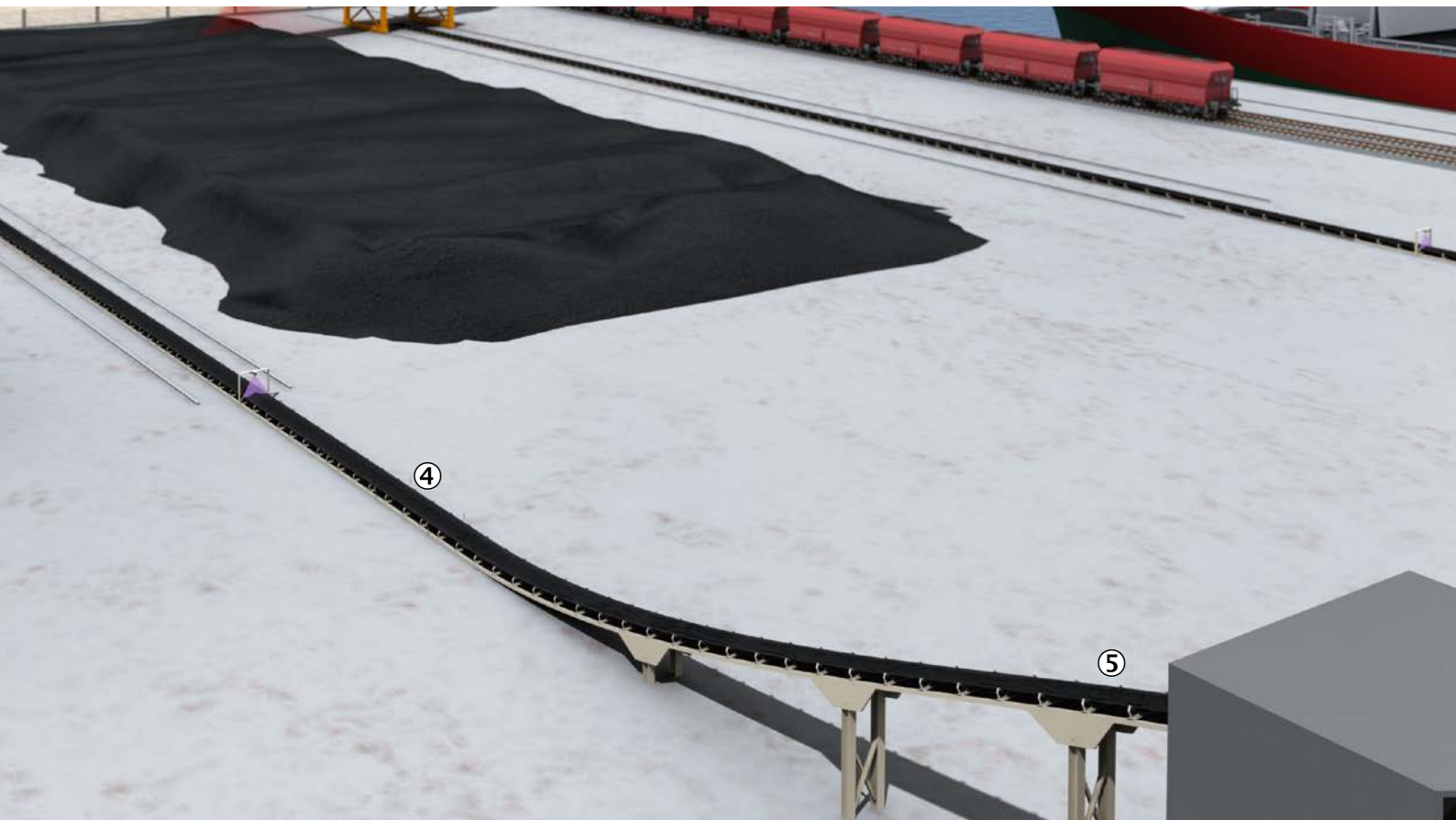
④ Belt drift detection on the conveyor belt

When bulk materials are unevenly loaded, the conveyor belt tensioners and runners can deviate from the optimal alignment and cause conveyor belt drift. When this occurs, the edge of the conveyor belt overshoots the support rollers. Material can be lost or, in extreme cases, the belt is derailed. Compact Dx35 distance sensors on both sides of the conveyor belt monitor

the lateral movements of the belt and send a warning before belt drift occurs. The Dx35 uses HDDM™ time-of-flight technology, either based on red or infrared emitted light, and is immune to ambient light and dust. It needs almost no maintenance after installation and setup. With its flexible interfaces and easy installation, the Dx35 is an economical measurement solution.



Dx35 → p. 92



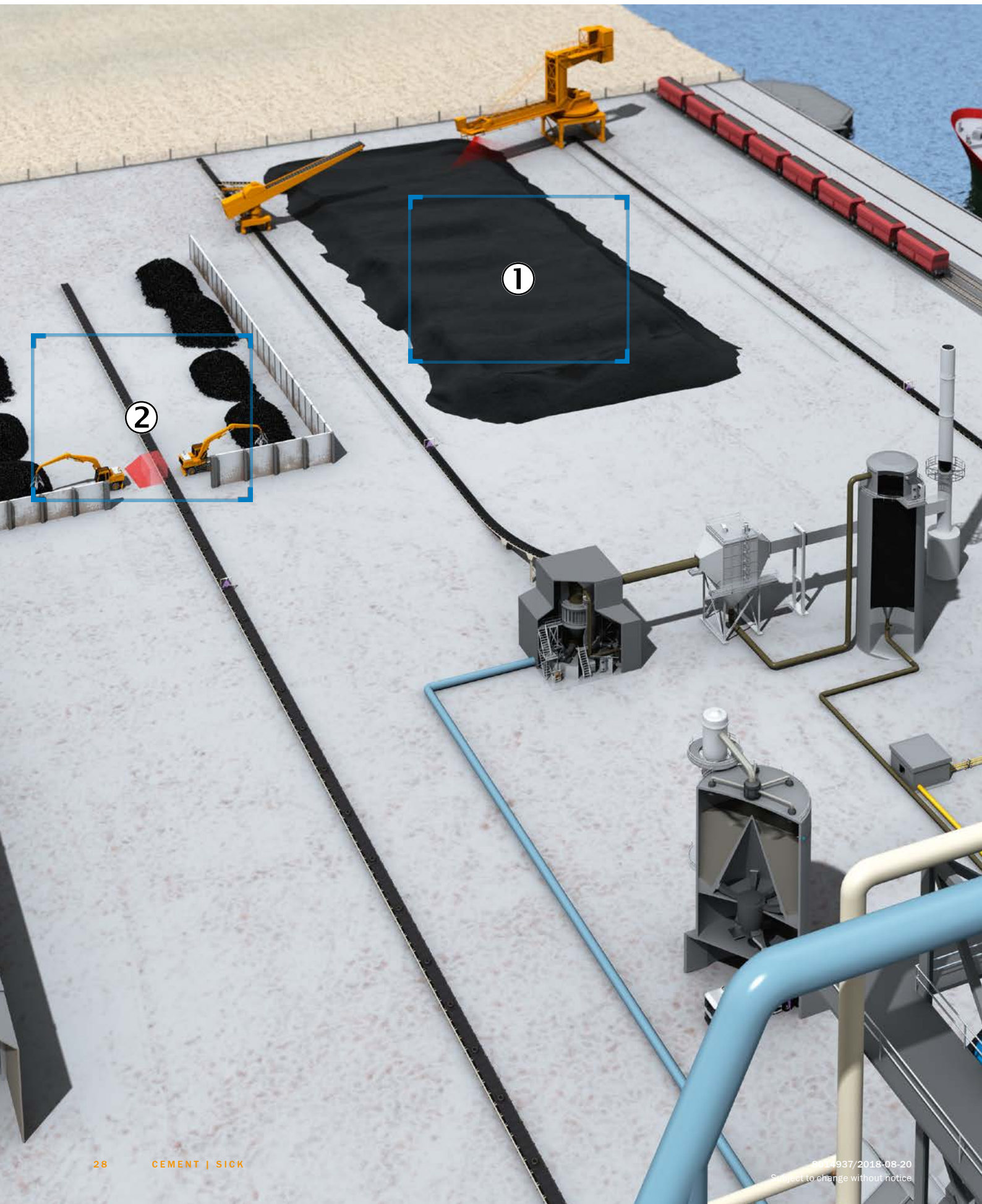
⑤ Determining the belt speed

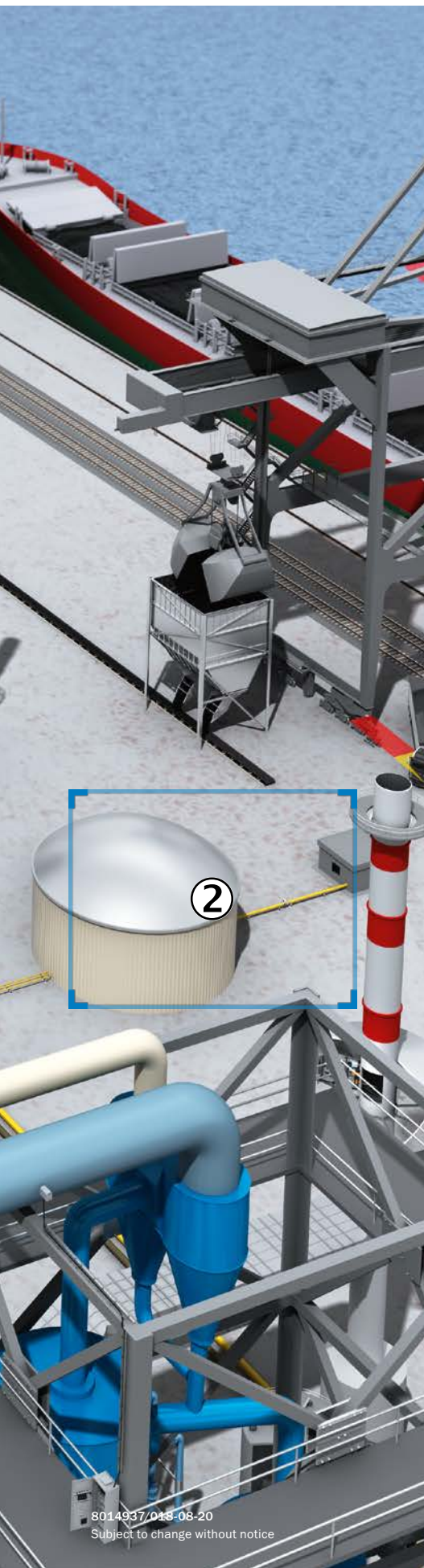
When fuel and raw materials are transported on conveyors to storage locations for further processing, the conveyor belt's speed is very important when it comes to controlling material flow. The DFS60 incremental encoder precisely calculates the speed and running direction of a belt, regardless of whether it is installed on a drive or deflection

roller. When monitoring the ends without a drive, reliable feedback can be given to see whether the conveyor system is working correctly. The encoder can either be configured via a PC or a separate programming tool. The DFS60 therefore provides comprehensive programming flexibility for all industrial requirements.



DFS60 → p. 97





Handling primary and secondary fuels

Focus 1 30

① Coal

Focus 2 36

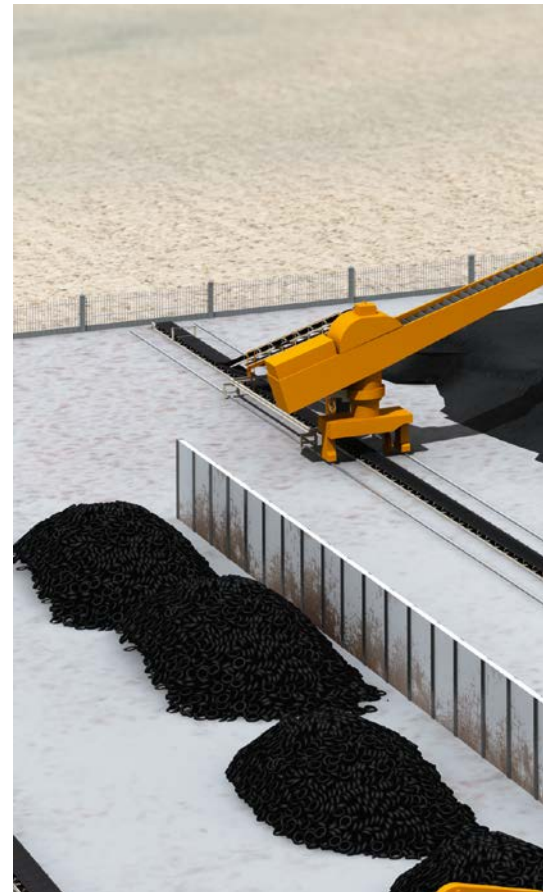
② Gas and alternative fuels

① Measuring the coal pile

The LD-LRS LiDAR sensor simplifies the work on outdoor and indoor piles of coal through reliable material detection and distance measurement. Mounted on a moveable stacker, the LiDAR sensor collects data about the contour and volume of the coal pile and sends this data for decentralized processing. The removal of bulk fuels is optimized and capacities can be efficiently optimized. Based on the distance measurements between the stacker and the pile, the LD-LRS calculates the minimum dump height and helps to prevent dust formation. The scanner can simultaneously ensure collision avoidance, so that wear and tear as well as repairs on machines can be reduced.



LD-LRS → p. 90



② Positioning the stacker

The position of the stacker must be determined automatically. Outdoor use across long distances and under sometimes difficult measurement conditions, such as uneven measuring distances like railways, poses a great challenge to the measuring system. The KH53 linear encoder measures a distance of up to 1,700 m, even under poor environmen-

tal conditions. Thanks to the magnetic measurement principle, dirt and dust do not affect the performance. Even salt water or extreme weather conditions, such as mist, do not limit the functionality of the encoder. This avoids downtime, and ensures high productivity in these applications.



KH53 → p. 98



③ Monitoring the coal conveyor belt operation

Conveyor belts transport materials in all areas of cement plants: they transport raw materials and bulk fuels to interim storage facilities and then take end products to storage areas or dispatch points. A conveyor belt malfunction can cause significant delays in production and involve major costs. It is therefore

necessary to monitor the operation of all conveyor belts, as well as the proper loading, unloading, and positioning of products. The Bulkscan® LMS511 laser volume flowmeter performs these tasks in combination with a DFS60 incremental encoder, which provides speed information.

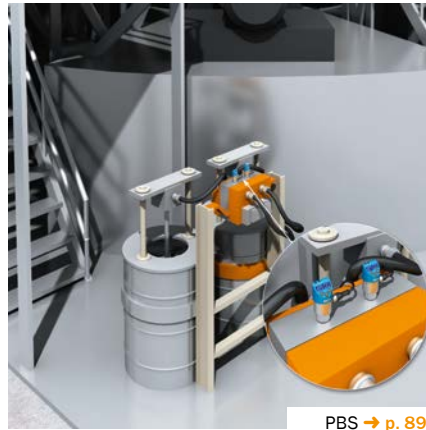


Bulkscan® LMS511 → p. 87
DFS60 → p. 97

① This graphic is not presented in the overview.

④ Monitoring the hydraulic pressure at the coal mill

Coal is ground into fine dust in coal mills. This fine grinding enables reliable ignition of the coal in the pyro process. Hydraulic fluid is needed to ensure perfect functionality of the coal mill. The hydraulic fluid must always be pressure-monitored. For this purpose, a PBS pressure switch is used, which can monitor pressures of up to 600 bar.



PBS → p. 89



⑤ Protecting the coal mill by monitoring CO and O₂

Coal dust is commonly used as a primary fuel for cement kilns. Inert gas is introduced into the coal mill to prevent fires. A rise in the O₂ concentration indicates a leak and the ingress of ambient air. By performing continuous O₂ measurement, leaks can be detected early and dealt with in a timely manner. If required, CO measurement can be

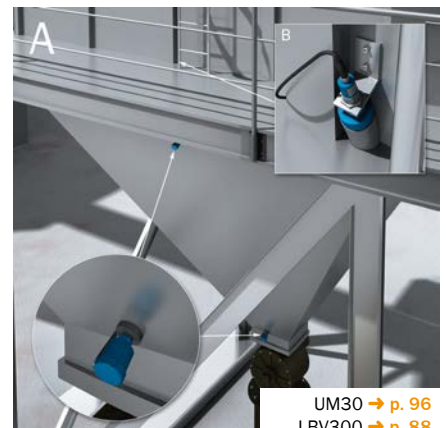
added to detect smoldering fires. The MKAS Compact analyzer system with an Ex-protected sampling probe is the ideal solution. The integrated SIDOR gas analyzer allows simultaneous measurement of CO and O₂ and can be adjusted using ambient air. This system provides the reliability needed for safety-related measurements.



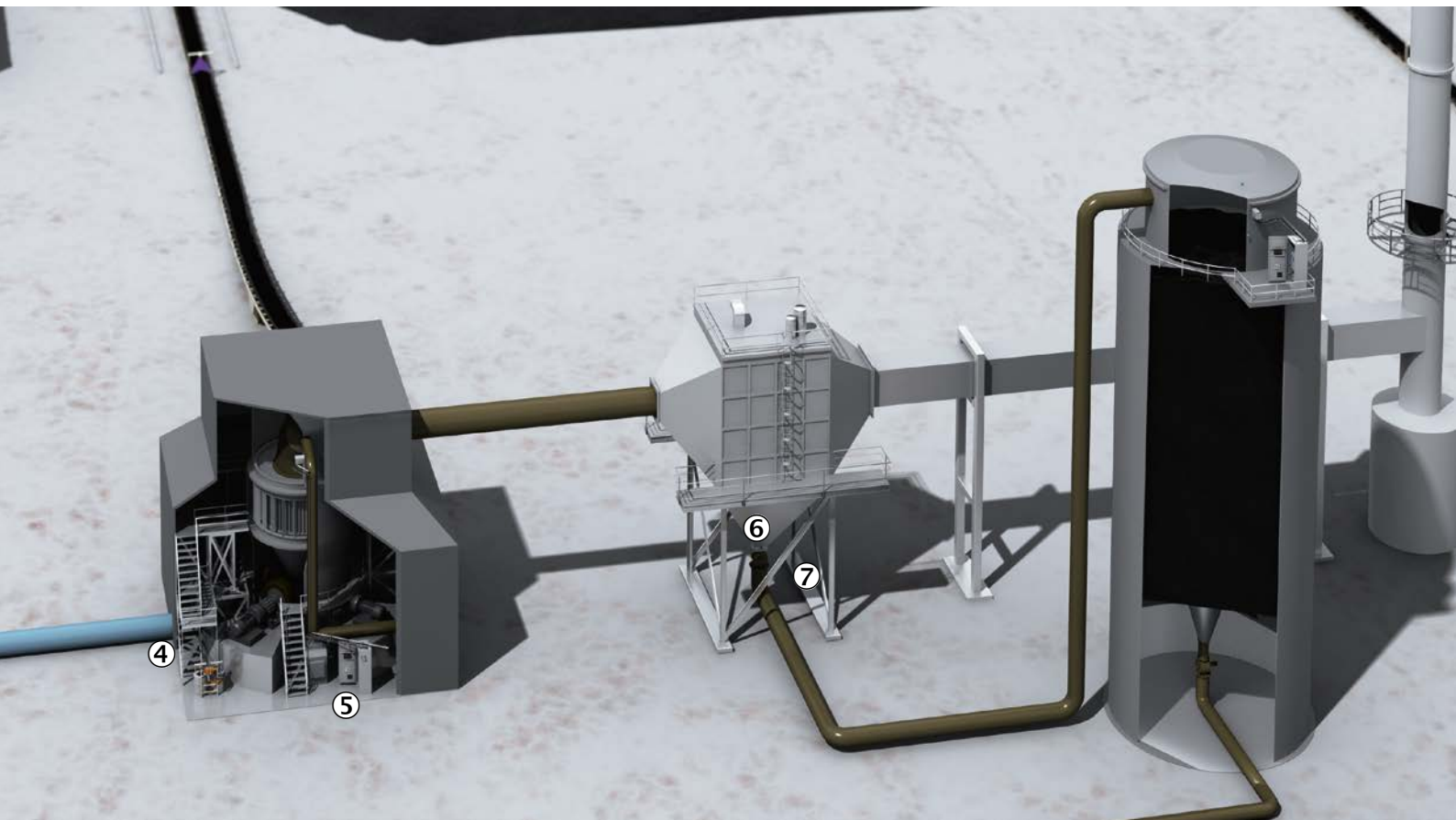
SIDOR → p. 78
MKAS Compact → p. 82

⑥ Level monitoring in the coal hopper

Level monitoring in coal hoppers is indispensable in order to ensure continuous operation of the bag filter. If the hopper is over-filled, the filter bags may be damaged, and may have to be removed. The replacement of the filter bag can delay the process or even interrupt production. These interruptions cost time and money.



UM30 → p. 96
LBV300 → p. 88



⑦ Monitoring rotary valve operation at the coal hopper

Additional time is required for cleaning. Any possible blockage in the hoppers must therefore be reliably detected. Ultrasonic sensors such as the UM30, or vibration level switches such as the LBV300 effortlessly fulfill the requirements of this monitoring process.

Coal dust collected in the coal hoppers is dosed using rotary valves and then is transported for further processing. This process must be monitored using an absolute encoder, such as the AFS60 PROFINET. This ensures that all parts of the system function without error and

that a reliable and low-maintenance dosing is ensured. An alternative solution to determine the valve position is the use of inductive proximity sensors such as the IMB.



AFS/AFM60 PROFINET → p. 97

⑧ Monitoring rotary valve operation at the coal silo

Rotary valves are small parts used for material flow in cement plants, and they play an important role in the material flow process, which is vital for an uninterrupted cement production. Typical locations for rotary valves include coal discharging systems from silos, or transfer points in conveying systems. To ensure that all system parts function without error, the rotation axis of rotary valves are monitored using absolute encoders, such as the AFS60 PROFINET. An alternative solution to determine the valve position is the use of inductive proximity sensors such as the IMB.



AFS/AFM60 PROFINET → p. 97



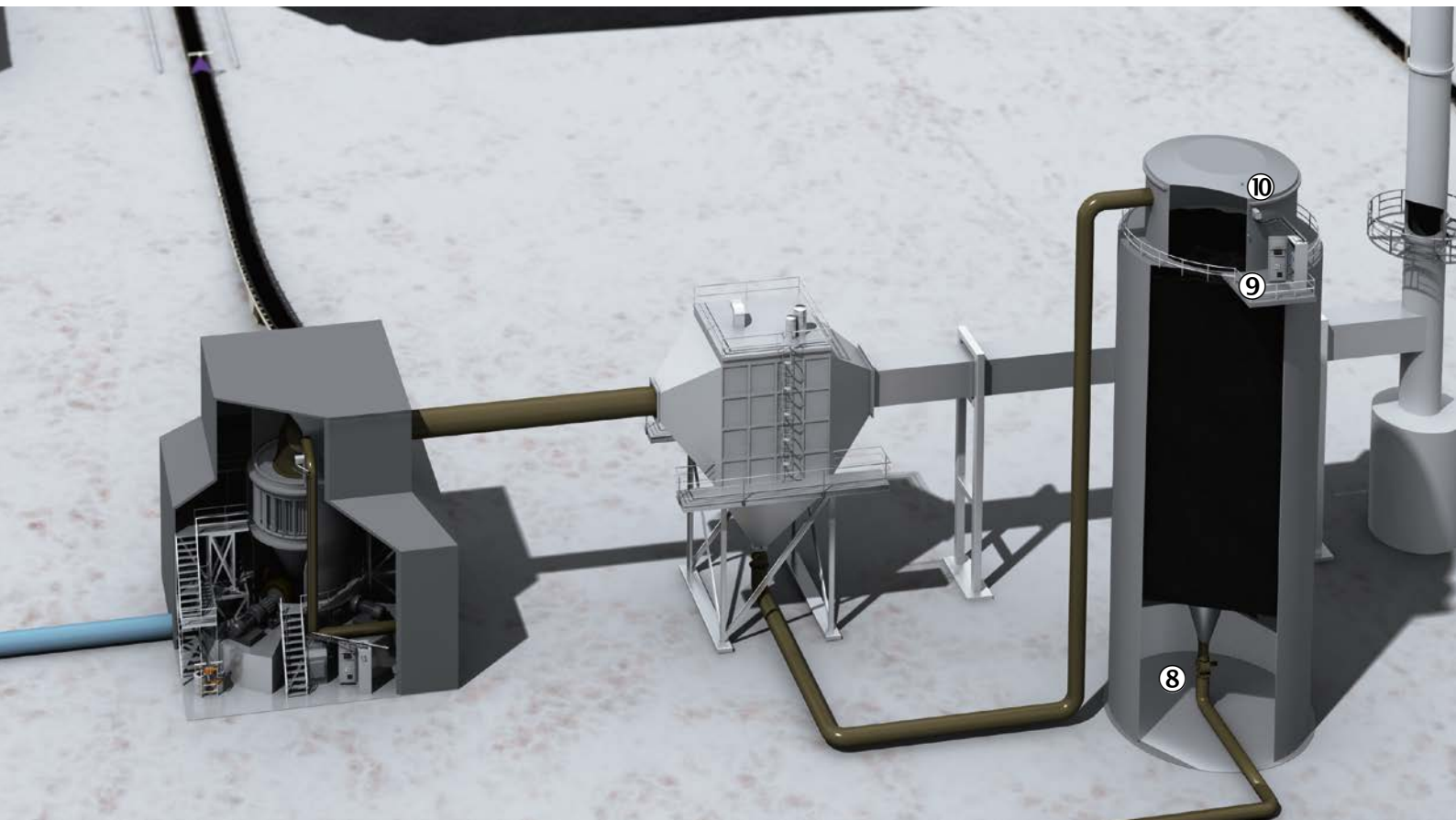
⑨ Protecting the coal silo by monitoring CO and O₂

Coal dust used as fuel is stored in silos. Coal silos present the risk of smoldering fires in which CO can accumulate to form explosive mixtures with air. By performing continuous measurement of the CO concentration, smoldering fires can be identified at an early stage and dealt with in a timely manner. In addition, O₂ measurement can be inte-

grated in order to monitor inert gas. The MKAS Compact analyzer system with an Ex-protected sampling probe is the ideal solution. The integrated SIDOR gas analyzer allows for simultaneous measurement of CO and O₂ and can be adjusted using ambient air. The long maintenance intervals reduce operating costs.



SIDOR → p. 78
MKAS Compact → p. 82

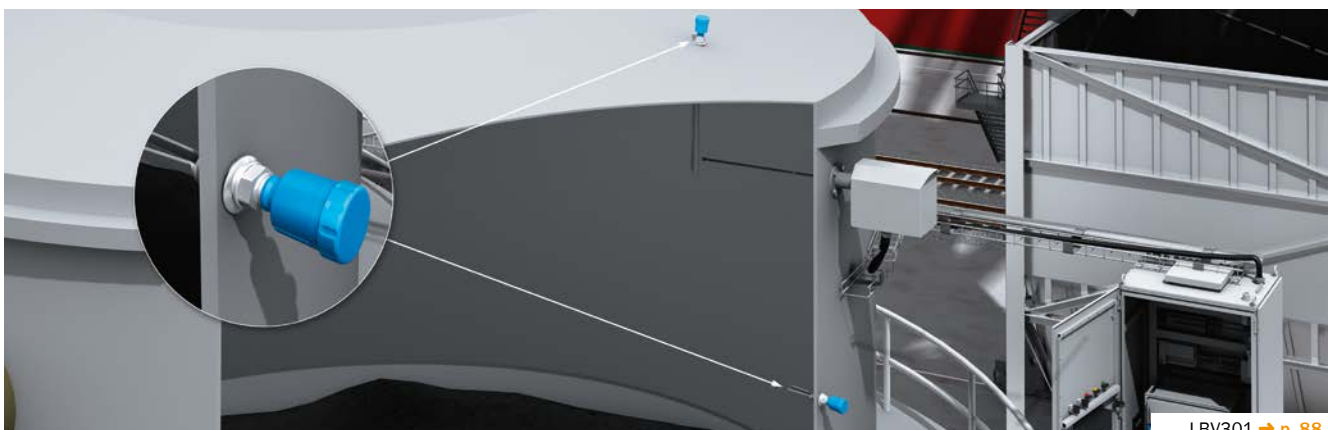


⑩ Level monitoring in the coal silo

Injection of coal dust into the rotary kiln is an important step in the production of cement. Disruptions to the continuous feed of coal has consequences on production and clinker quality. There must always be sufficient quantities of

coal available to ensure production. For this, the actual amount of coal in the silo must be known, so that if the fill level is low, it can be refilled. The LBV301 product family of vibrating level switches perform challenging tasks reliably and

with high precision, for example as a full, empty, or demand detection device. They operate with no mechanical moving parts, and are immune to deposit formation. They are easy to install and can be commissioned without filling the silo.



LBV301 → p. 88

① Collision avoidance for grab excavators

Used tires are often utilized as secondary fuels in cement plants for thermal recycling. The Visionary-B streaming camera is used as an intelligent driver assistance system to reduce the risk of collision during turning maneuvers and when traveling in reverse. The camera provides a live image, and optical as well as acoustic warning signals, so that objects and other vehicles are detected in and around the blind spot. The vehicle operator also receives appropriate support even in poor outdoor conditions such as bright sunlight, rain or dust. The Visionary-B lets the operator focus on the key tasks, while still maintaining awareness of critical situations whenever they occur.



Visionary-B → p. 94



② Monitoring the conveyor belt for secondary fuels

Secondary fuels such as used tires are often transported on conveyor belts to the rotary kiln. A conveyor belt malfunction can cause significant delays in production and involve major costs. Therefore it is necessary to monitor the operation of all conveyor belts, as

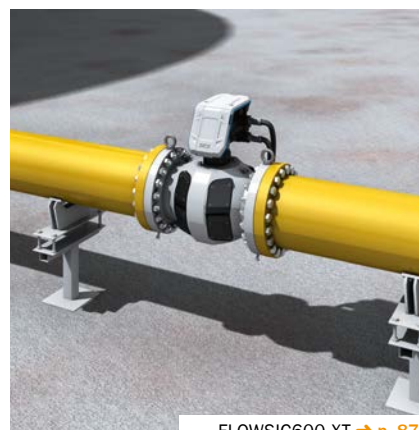
well as the proper loading, unloading, and positioning of fuels. The Bulkscan® LMS511 laser volume flowmeter performs these tasks in combination with a DFS60 incremental encoder, which provides the speed information.



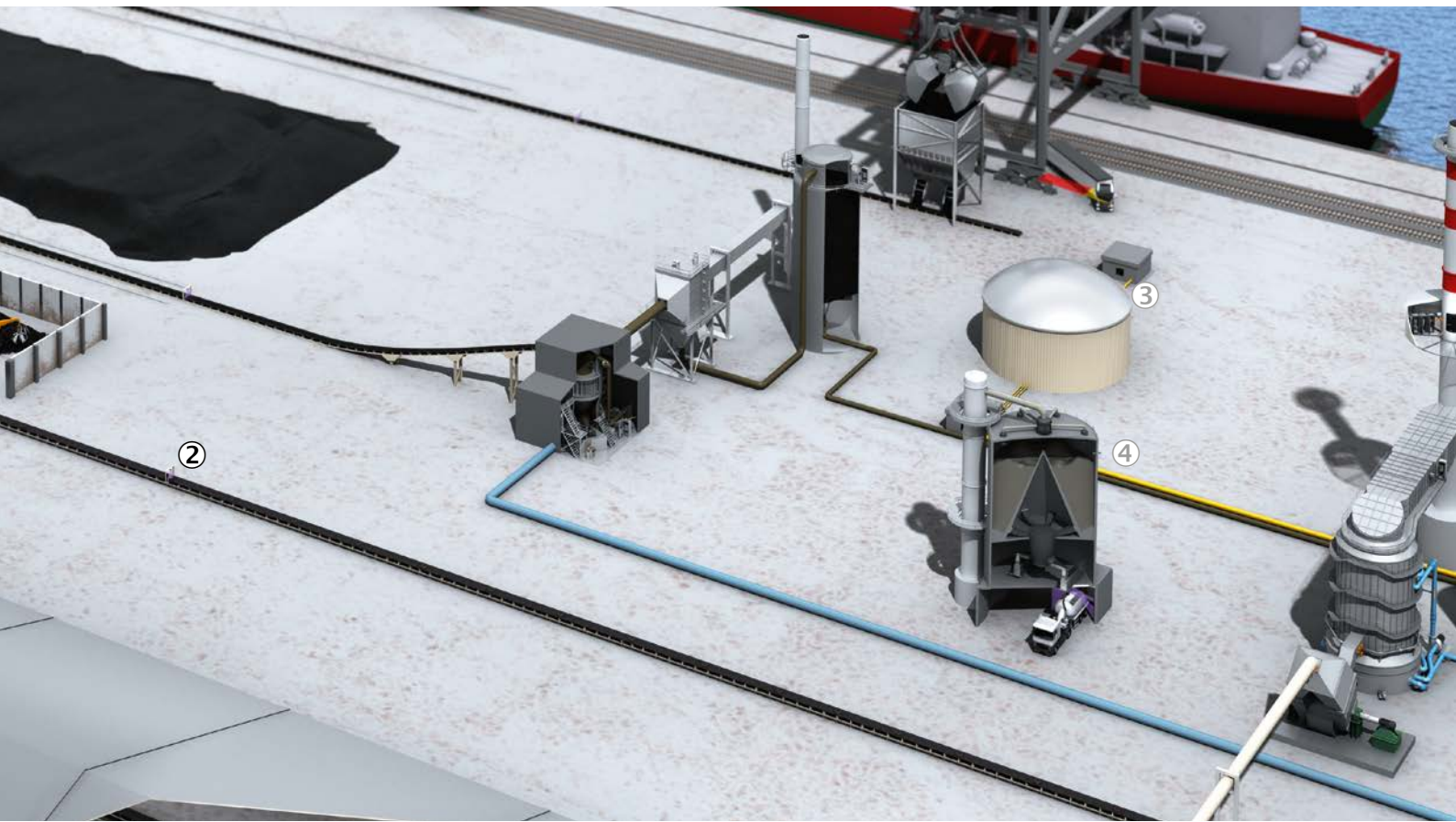
Bulkscan® LMS511 → p. 87
DFS60 → p. 97

③ Custody transfer gas measurement

Measuring the consumption of natural gas is important for the computation of total gas consumption for accounting with gas suppliers. The accuracy of measurements and reliability of the system are extremely important. The FLOWSIC600-XT gas flow meter fulfills all of the international standards and directives for custody transfer of natural gas. With four device versions available, the FLOWSIC600-XT can take on any challenge – whether it is being used as a stand-alone or system solution – and



FLOWSIC600-XT → p. 87



delivers best measurement performance. Measurement and diagnostics data as well as status changes can be recorded permanently in six accessible data archives. The FLOWSIC600-XT further ensures that measurements continue to be taken and data is stored even in the event of a power failure, thanks to PowerIn Technology™. The robust design provides a fault-, and maintenance-free system. The direct path layout has a long-term resistance to contamination and moisture in the gas.

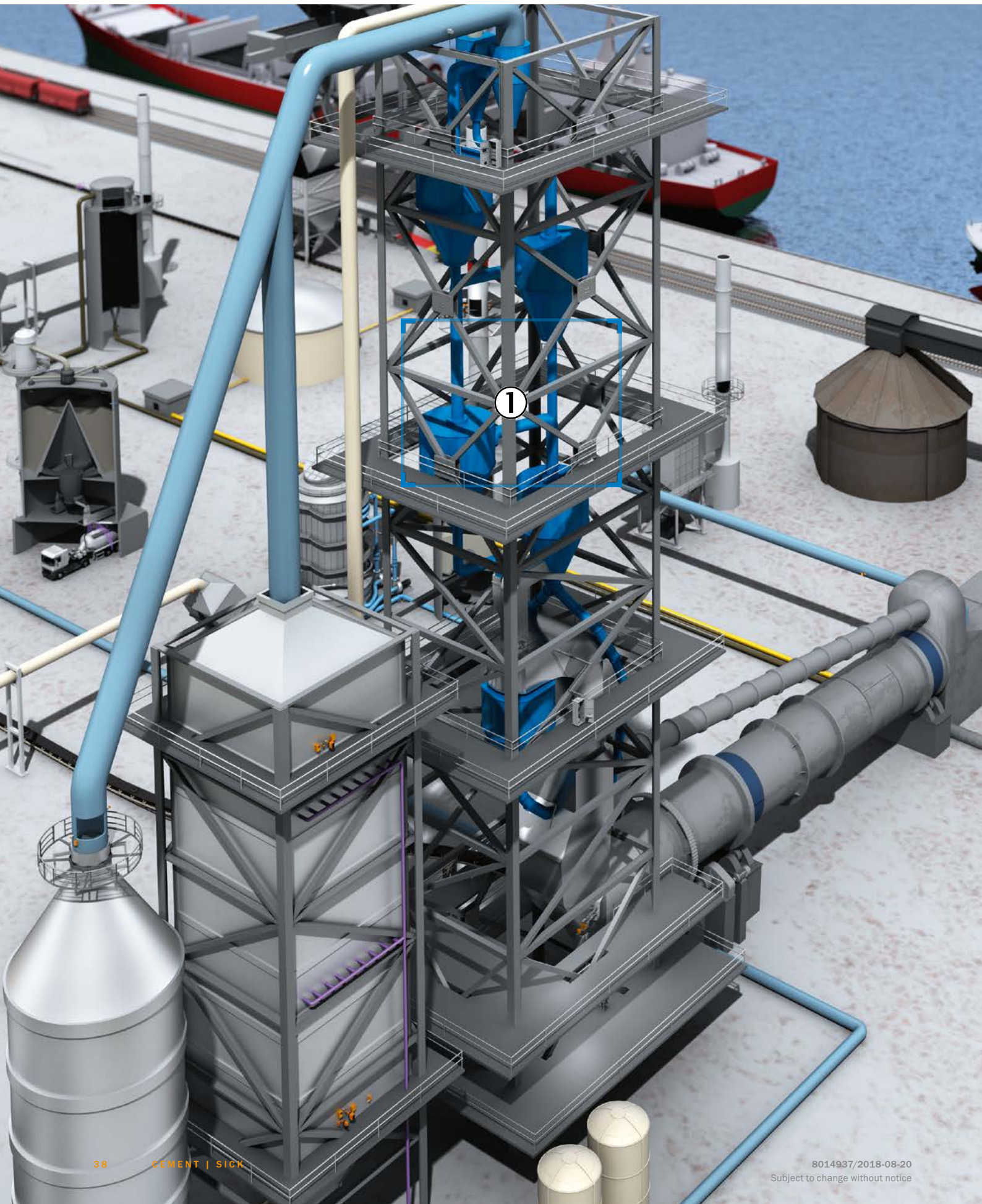
④ Monitoring natural gas consumption

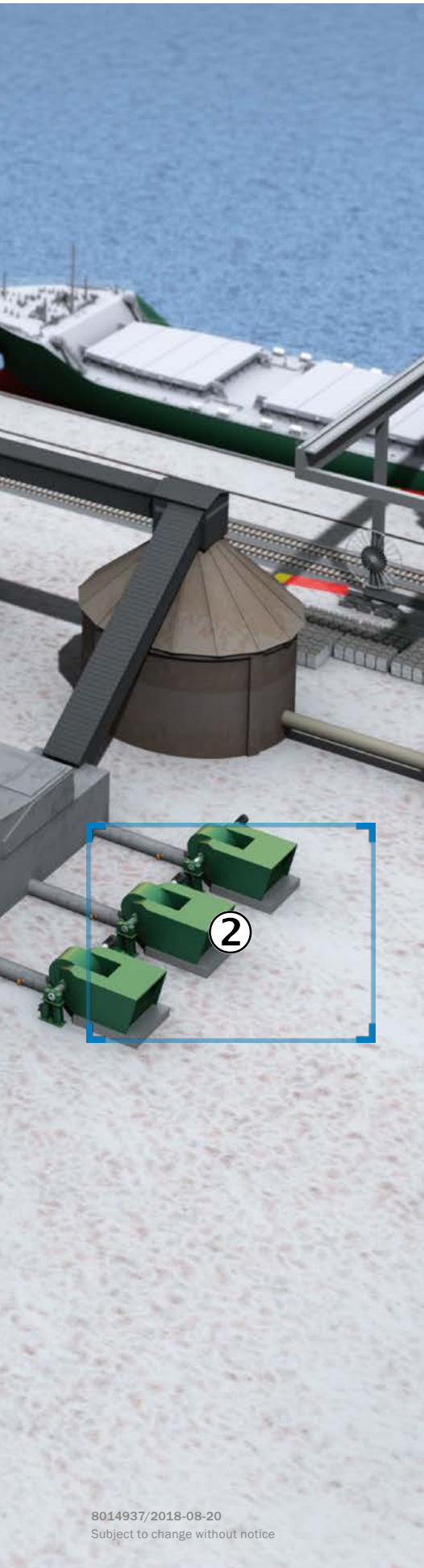
Measuring the consumption of natural gas provides the information required to calculate the total mass emissions of the cement plant. The FLOWSIC500 ultrasonic gas flow meter enables highly precise measurement of natural gas distribution and exact accounting of gas quantity. FLOWSIC500 does not feature any mechanically operated parts, and

is therefore extremely robust, reliable and requires little maintenance. This reduces operating costs significantly. It can easily be integrated into existing measuring stations with no inlet or outlet requirements. The FLOWSIC500 operates either by an intrinsically safe power supply or with battery back-up.



FLOWSIC500 → p. 86





Pyro process

Focus 1

40

- ① Rotary kiln, calciner and preheater

Focus 2

42

- ② Clinker cooler

① Process monitoring at the rotary kiln

Cement clinker quality is highly dependent on the process conditions inside the rotary kiln. Performing gas analysis at the kiln inlet allows plant operators to optimize the combustion efficiency and clinker burning process simultaneously and to prevent blockages in the kiln or preheater system. Using analyzer systems of SICK's SCPS-series such as the SCP3000 high temperature gas extraction probe, in combination with the MCS300P HW process gas analyzer, cement plant operators have a complete measurement solution. Furthermore, it performs reliably even under harsh operating conditions with high temperatures and high dust concentrations. The solution enables the measurement of up to 6 components plus O_2 simultaneously. It even performs under harsh conditions and is characterized by its high availability.

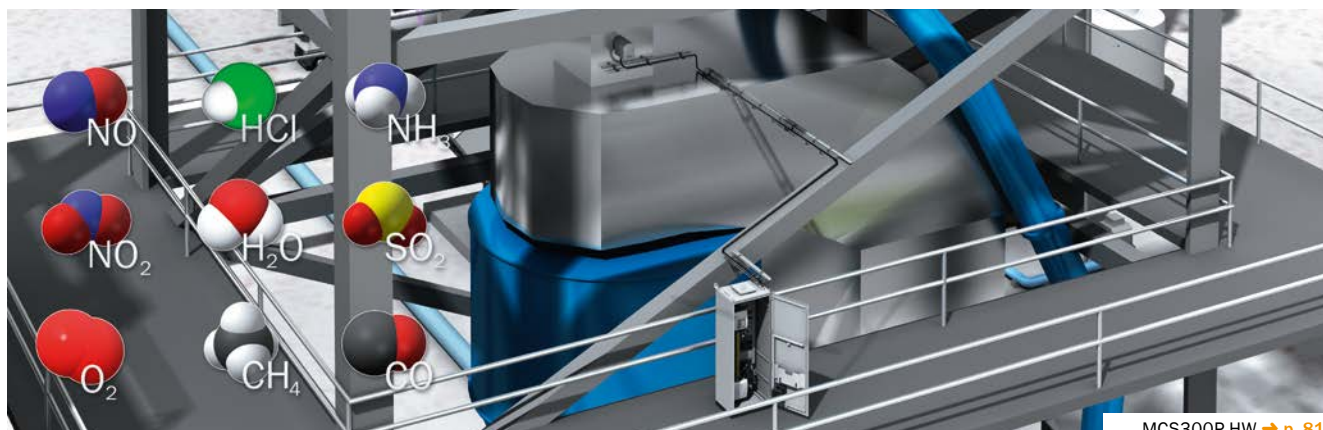


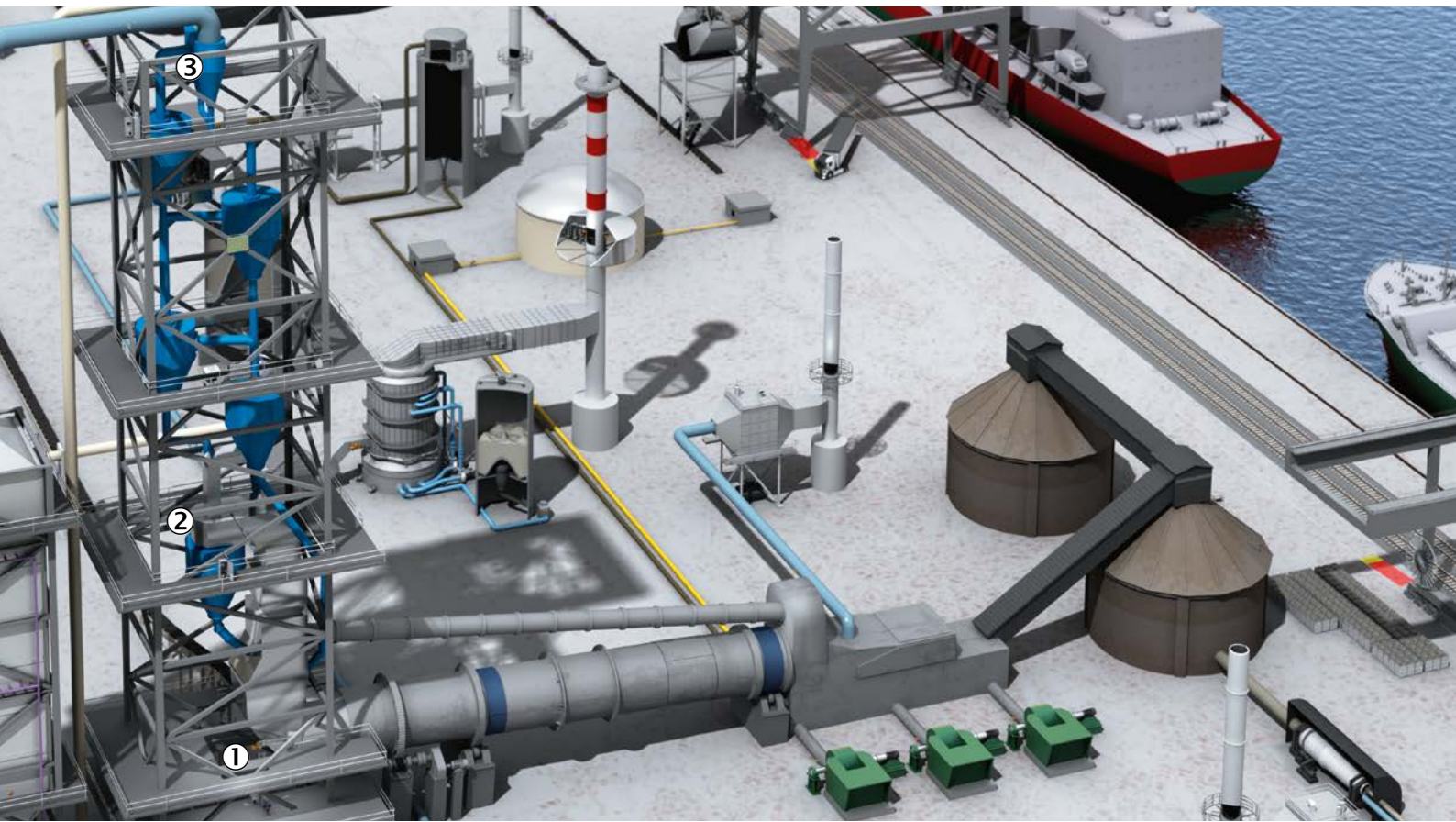
② Process gas monitoring at the calciner

In many cement plants, there is a calciner with a secondary firing that takes place between the preheater and the rotary kiln. The process gas components in the kiln exhaust gas are continuously monitored in order to optimize the operation of the calciner. An MCS300P HW

hot wet measuring process gas analyzer system with a back-purging gas sampling probe is used to handle this task. The system enables simultaneous measurement of up to 6 components plus O_2 . If a SNCR process is used in the calciner to denitrify the flue gas, the

ammonia slip and the NO_x concentration can be checked with this system, too. Depending on the site, the measurement point is located at a suitable location between the calciner outlet and the pre-heater outlet.

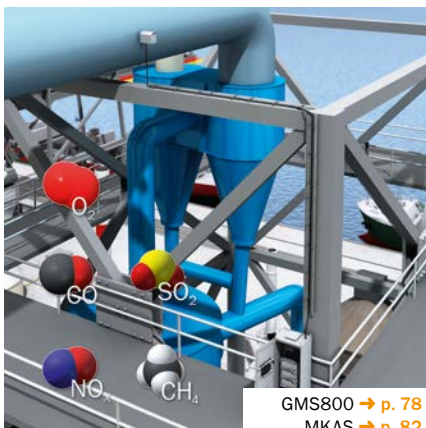




③ Process gas monitoring at the preheater

The composition of flue gases at the outlet of the preheater provides information about the pyro process and indicates an imminent risk of explosion for the downstream electrostatic precipitator. To acquire this information, changes in the concentration of the gas components CO, NO, O₂, and, if applicable, SO₂, and CH₄ are measured at the preheater. The

MKAS multi-component analyzer system with the GMS800 gas analyzer is suited for this measuring task, involving high dust loading, high gas temperatures and space limitations. This system enables reliable process gas monitoring, providing an economical solution for increasing plant efficiency and safety.



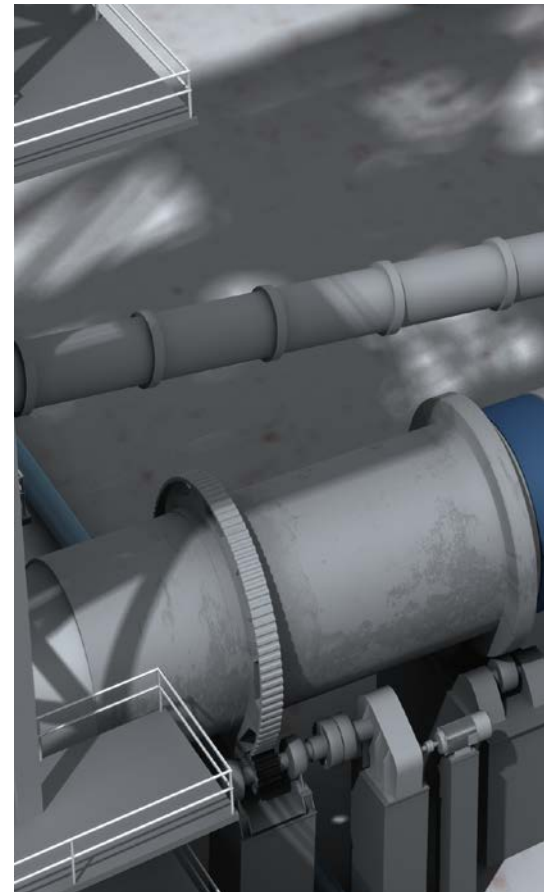
GMS800 → p. 78
MKAS → p. 82

① Monitoring the cooling air flow

In order to further process hot clinker, it must first be cooled down. This normally occurs using a grate cooler, which is fed with cooling air coming from multiple blowers. For optimal cooler operation, the airflow in the various temperature zones in the cooler must be adjusted. The FLOWSIC100 volume flow measuring device enables regulation of the cooler through an exact measurement of air flow, which prevents losses resulting from waste exhaust streams.



FLOWSIC100 → p. 86



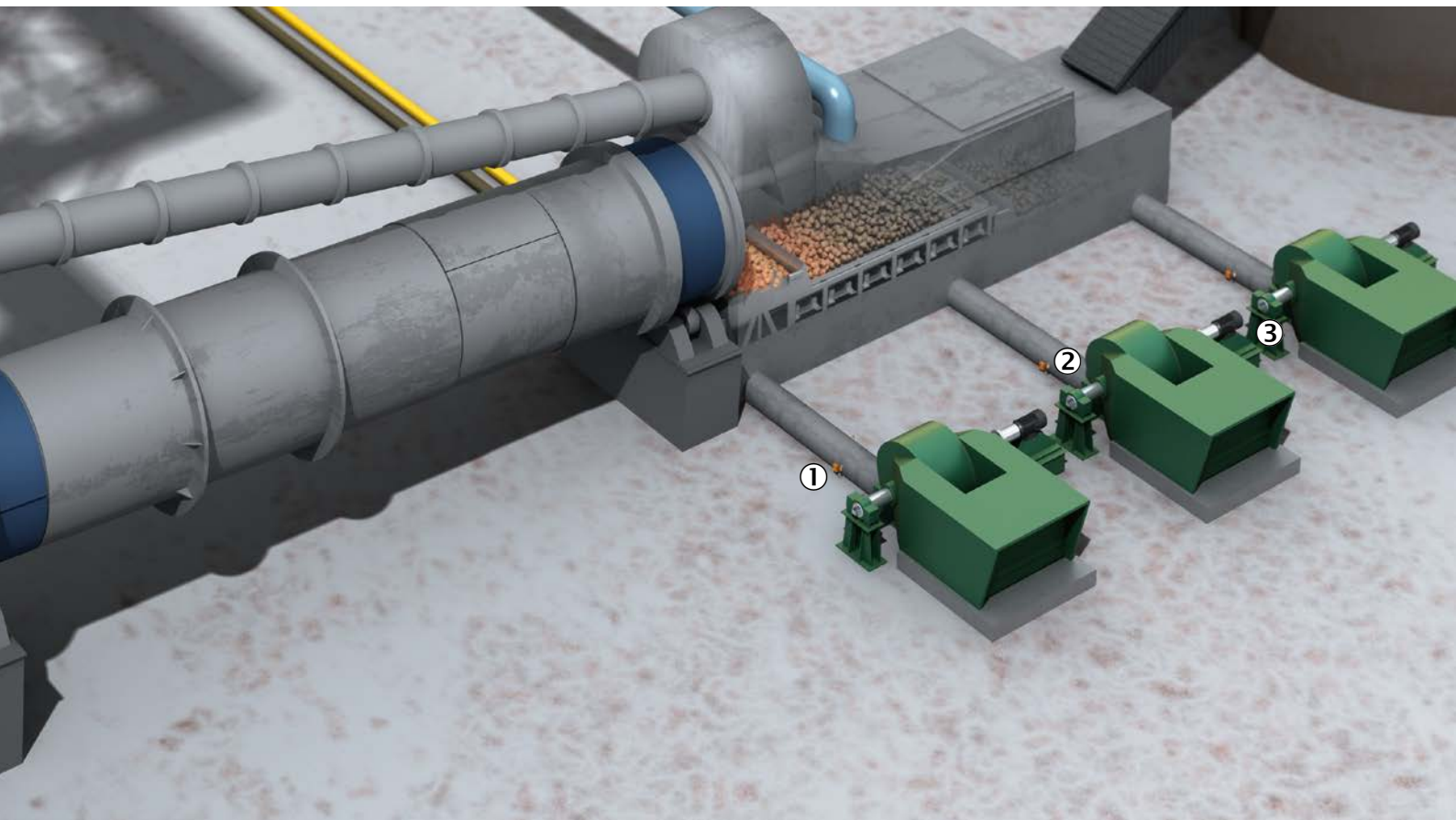
② Temperature monitoring at bearings

To guarantee interruption-free and high quality clinker production, the clinker cooler must have a continual supply of cooling air. The compact TCT temperature sensor detects a rise in temperature at the ventilators' bearings, which is normally an indication of wear or dam-

age. Consequences include increased lubrication consumption, bearing play and total failure. The continual monitoring of the bearing temperature enables early intervention and preventive maintenance to be conducted, reducing downtime and production failures.



TCT → p. 89



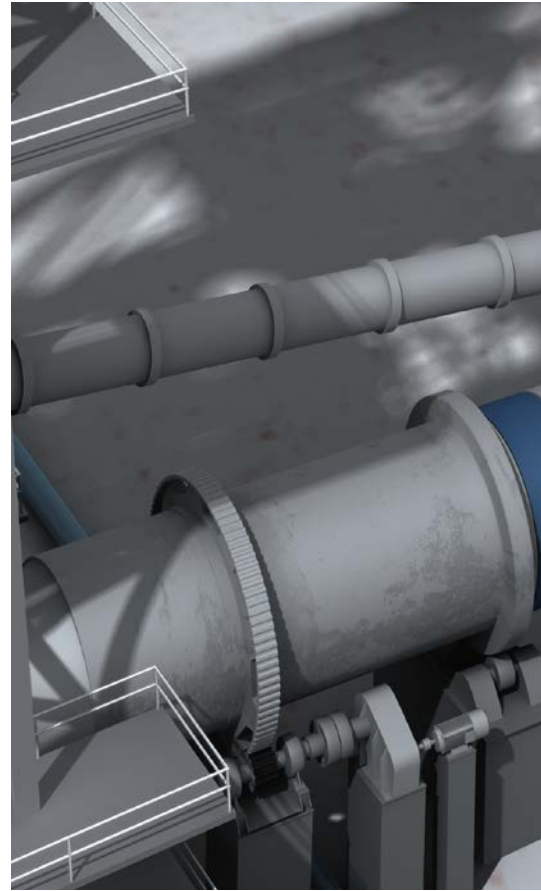
③ Monitoring the fan speed

The hot clinker falls out of the rotary kiln onto an air-permeable moving grate and is cooled with air. Speed-regulated fans are used in order to adjust the amount of cool air according to the requirements. The DFS60 incremental encoder measures the speed of the fans with high precision and thus helps to ensure

efficient heat exchange between the hot clinker and the cooling air. This guarantees uninterrupted and high quality clinker production. The encoder can either be configured via a PC or a separate programming tool. The DFS60 therefore provides comprehensive programming flexibility for all industrial requirements.



DFS60 → p. 97



④ Monitoring the exhaust gas flow

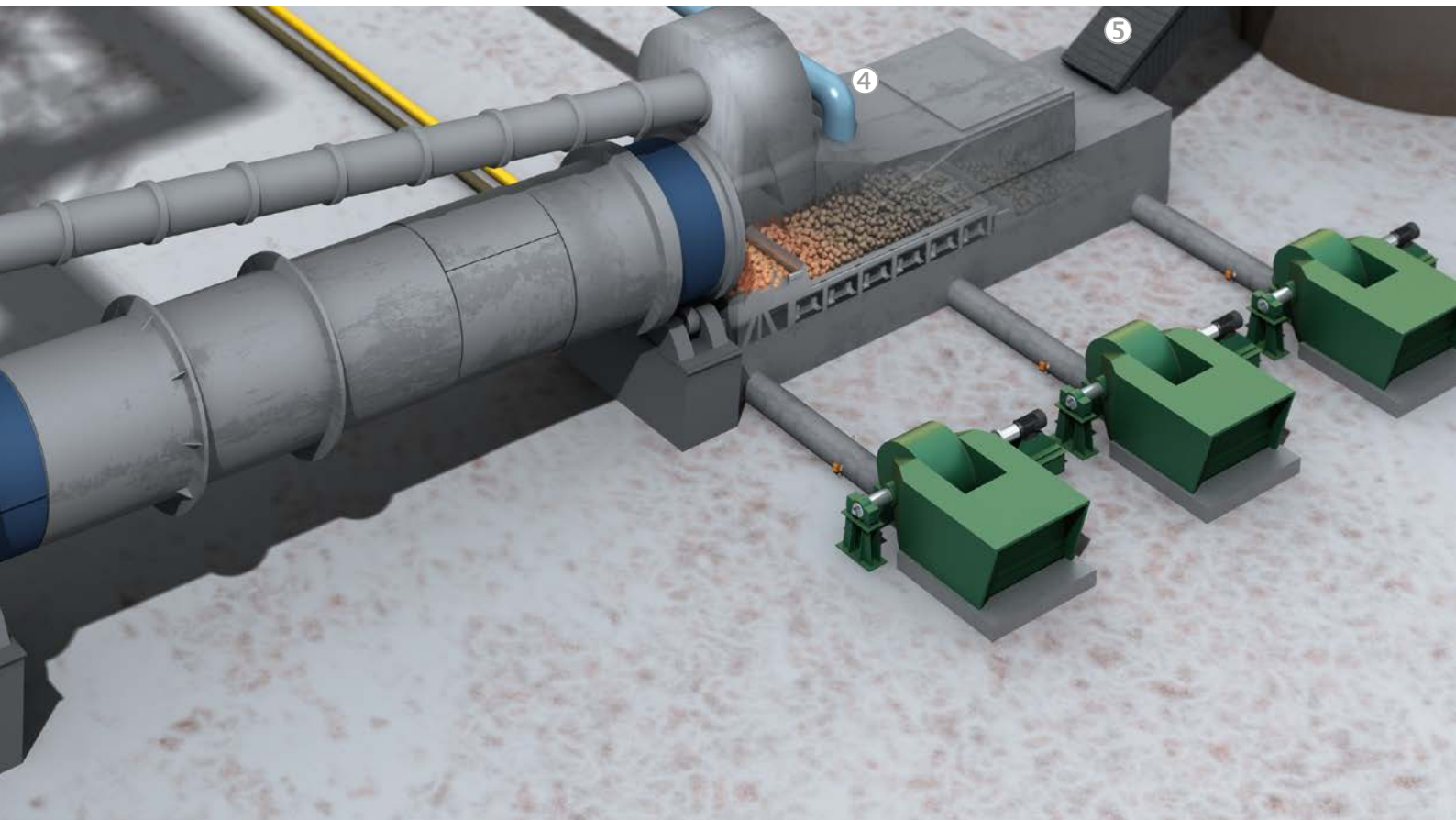
The heat recuperated in the clinker cooler can be re-added to the combustion process as secondary air in the rotary kiln or as tertiary air in the calciner. The internally cooled ultrasonic gas flow measuring devices FLOWSIC100 M-AC and H-AC can be used to determine the quantity of unused, hot exhaust air from the clinker cooler.

The required cooling is achieved using a cooling air supply integrated into the device, which means that cooling is performed within the sender/receiver unit and cooling air cannot penetrate into the measuring medium. Continual flow monitoring ensures efficient operation of the clinker cooler.



FLOWSIC100 → p. 86

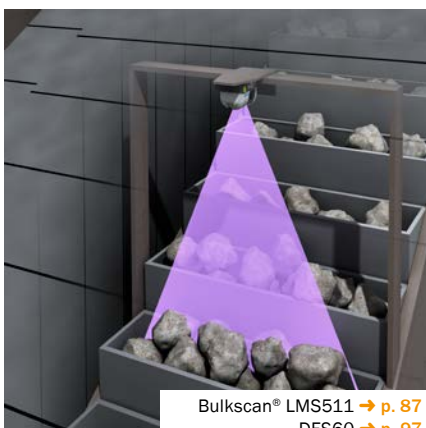
ⓘ This graphic is not presented in the overview.



⑤ Monitoring the bucket conveyor at the clinker cooler outlet

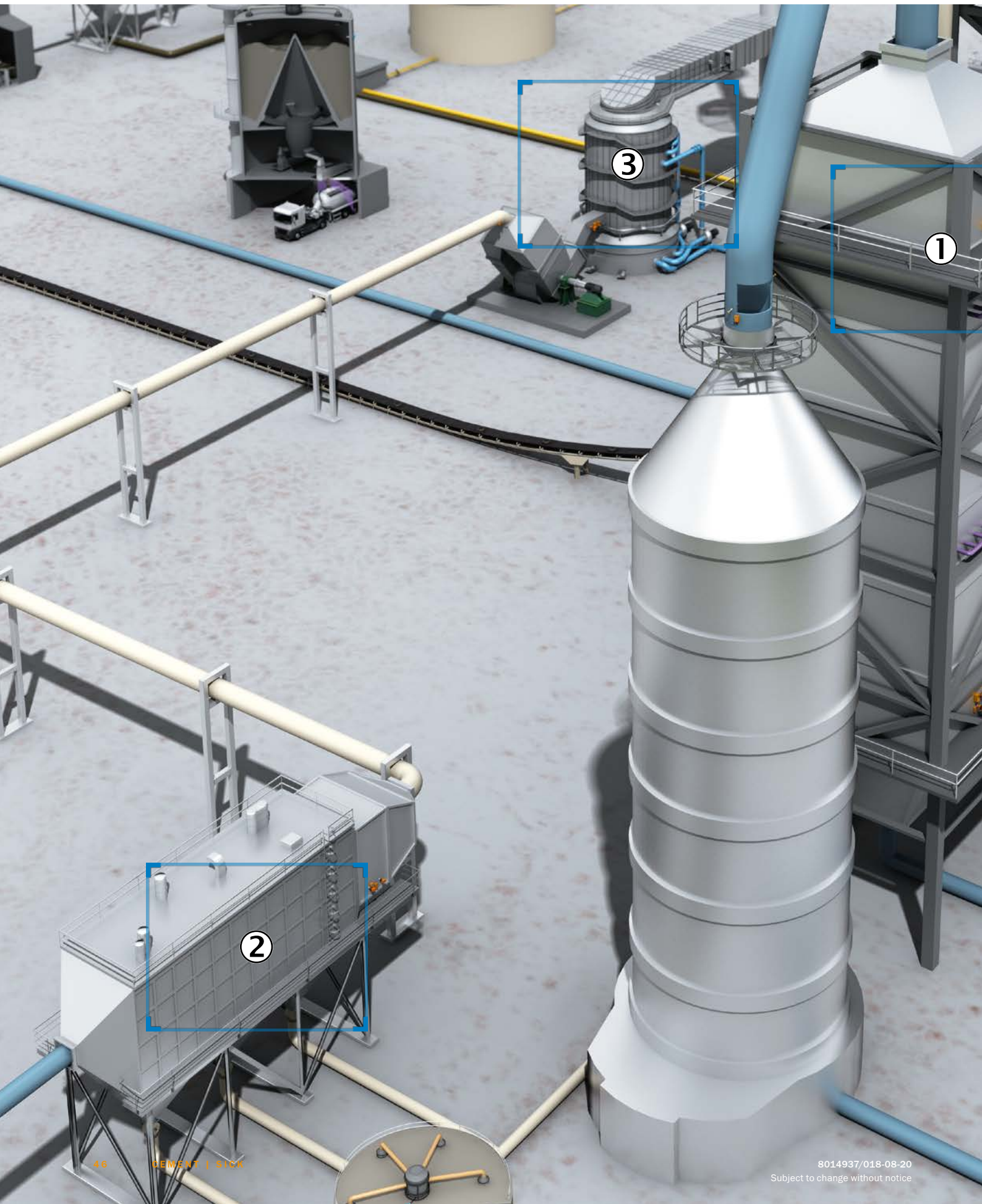
After the pyro process, a bucket conveyor transports the hot clinker to the interim storage area. Belt malfunctions can cause significant delays in production and involve major costs. It is therefore necessary to monitor the operation of all conveyor belts, as well as the proper

loading, unloading, and positioning of products. The Bulkscan® LMS511 laser volume flowmeter performs these tasks in combination with a DFS60 incremental encoder, which provides the speed information.



Bulkscan® LMS511 → p. 87
DFS60 → p. 97

① This graphic is not presented in the overview.





Flue gas cleaning

Focus 1	48
① Flue gas denitrification	
Focus 2	50
② Dust filter	
Focus 3	52
③ Flue gas desulfurization	
Focus 4	54
④ Continuous emission monitoring (CEMS)	

① Volume flow measurement at the cooling tower

In the cooling tower, the hot exhaust gases from the preheater tower are cooled by injecting water if needed. This protects filter systems from excessively high gas temperatures and increases filtering efficiency when using electrostatic precipitators. The FLOWSIC100 product family continuously and accurately performs non-contact gas velocity measurements, making it especially suited for system optimization.. The FLOWSIC100 H-AC model is especially suited for taking measurements under harsh conditions with high gas temperatures and high dust concentrations. The low-maintenance FLOWSIC100 devices allow efficient process regulation even if there are highly fluctuating flows.



FLOWSIC100 → p. 86



② Measurement of NO, NO₂, and O₂ at the SCR inlet

The gas conditions include high dust and high temperature, so analyzer/probe installation location is important. Abrasion and clogging can occur due to particulate load and temperature in both process and ambient environments. The GM32 in-situ gas analyzer measures NO and NO₂ if required, as well as pres-

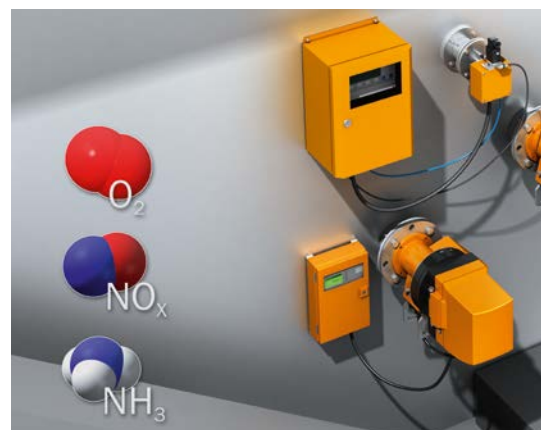
sure and temperature in the gas duct: directly, fast and without gas sampling and transport – true values in “real time.” The ZIRKOR200 in-situ analyzer, provides a reliable and rapid measurement of oxygen for reporting normalized values.

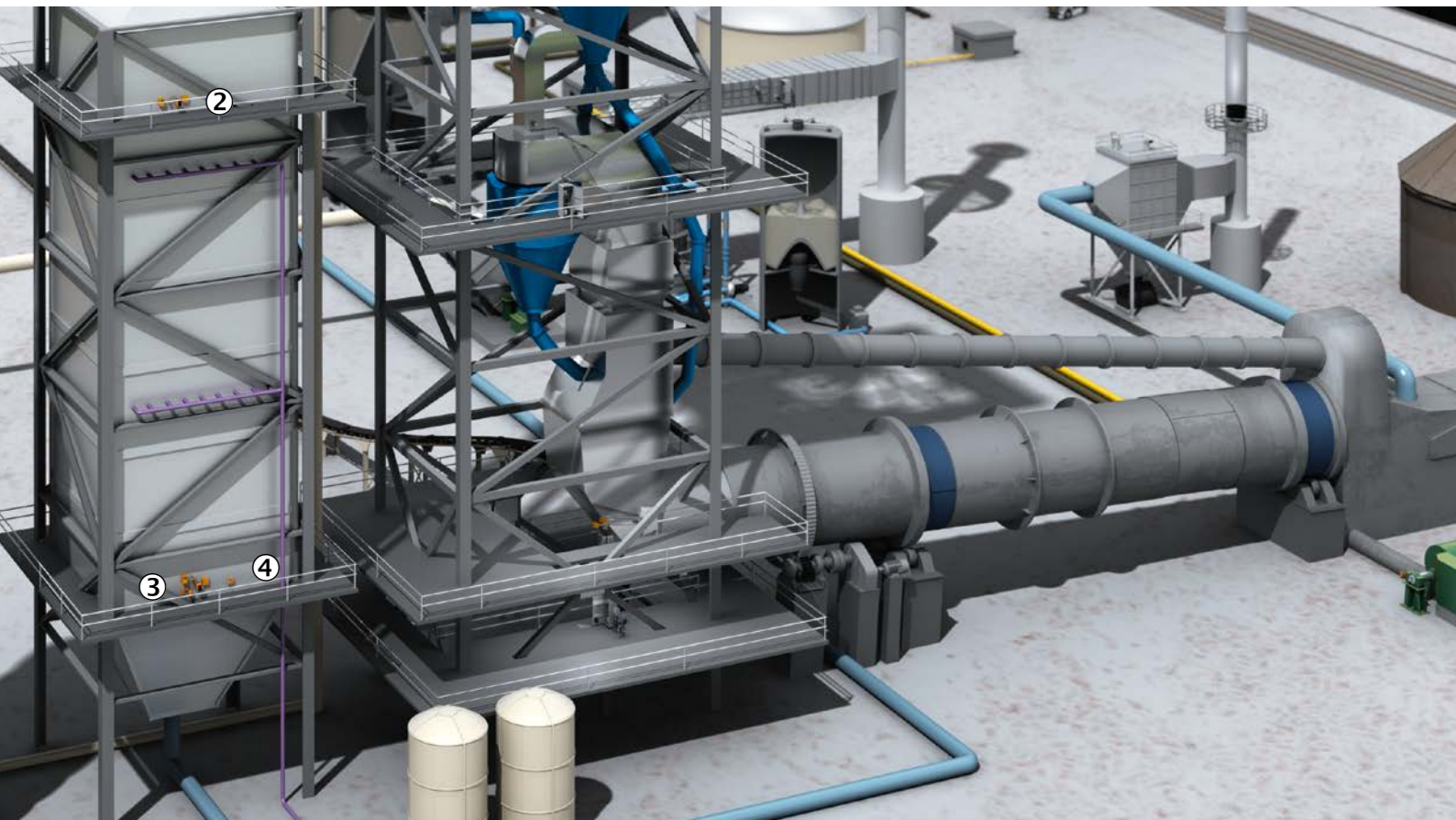


GM32 → p. 76
ZIRKOR200 → p. 77

③ Measurement of NO, NO₂, NH₃, and O₂ at the SCR outlet

The NO_x concentration is typically measured at the outlet of the SCR to calculate the denitrification efficiency. Ammonia is measured to ensure that NH₃ slip is low. The GM32 in-situ gas analyzer measures NO and NO₂ (NO_x) concentrations in the exhaust duct – directly, quickly, and without gas sampling and transport. The GM700 TDLS in-situ gas analyzer continuously





monitors low NH_3 concentrations. The key advantages of this device include reliability, precision, and short response times. The ZIRKOR200 in-situ gas analyzer provides a reliable and rapid measurement of oxygen for standardized reporting. The combination of GM32, GM700 and ZIRKOR200 can also be used to control an upstream installed SNCR unit with ammonia injection.

④ Volume flow measurement for selective catalytic reduction (SCR)

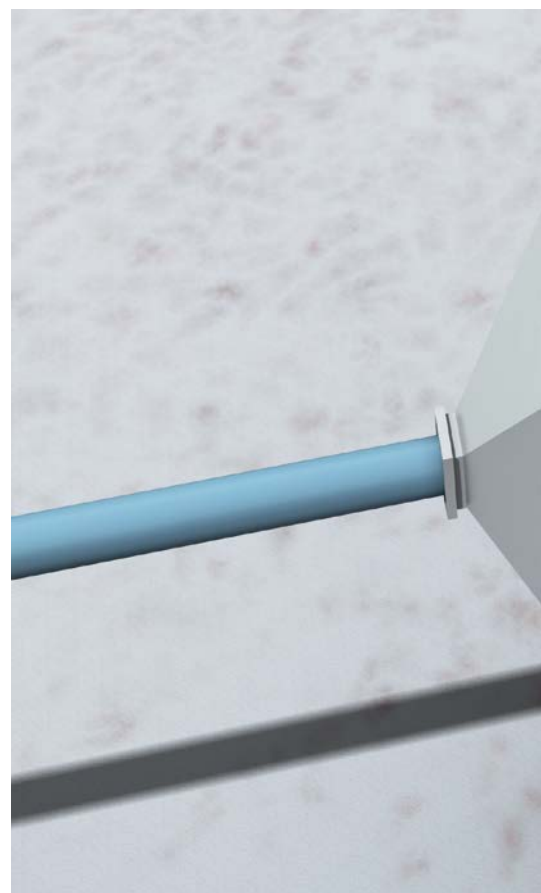
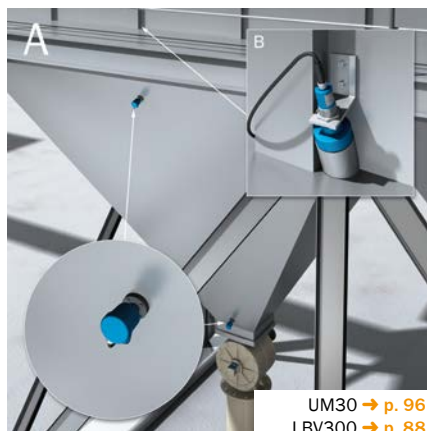
To determine mass emissions, volume flow in the duct after the SCR can be measured. The high-power FLOWSIC100 ultrasonic flowmeter is suitable for measurements in large diameter ducts as well as for applications with high dust content. Rugged titanium transducers are standard. For very hot gas tempera-

tures $> 260^\circ\text{C} \dots 450^\circ\text{C}$, the measuring system operates with built-in cooling air to protect the sensor heads against high temperatures. The MCU controller is used for input and output of signals, for calculation of volume flow to reference conditions (standardization) as well as for a user interface.



① Level monitoring in the dust hopper

Level monitoring in dust hoppers is indispensable in order to ensure continuous operation of the filter. If the hopper is over-filled, the filter elements may be damaged, and may have to be removed. Replacement of the filter bags can delay the process or even interrupt production. These interruptions cost time and money. Additional time is required for cleaning. Any possible blockage in the hoppers must therefore be reliably detected. Ultrasonic sensors such as the UM30, or vibration level switches such as the LBV300 effortlessly fulfill the requirements of this monitoring process.



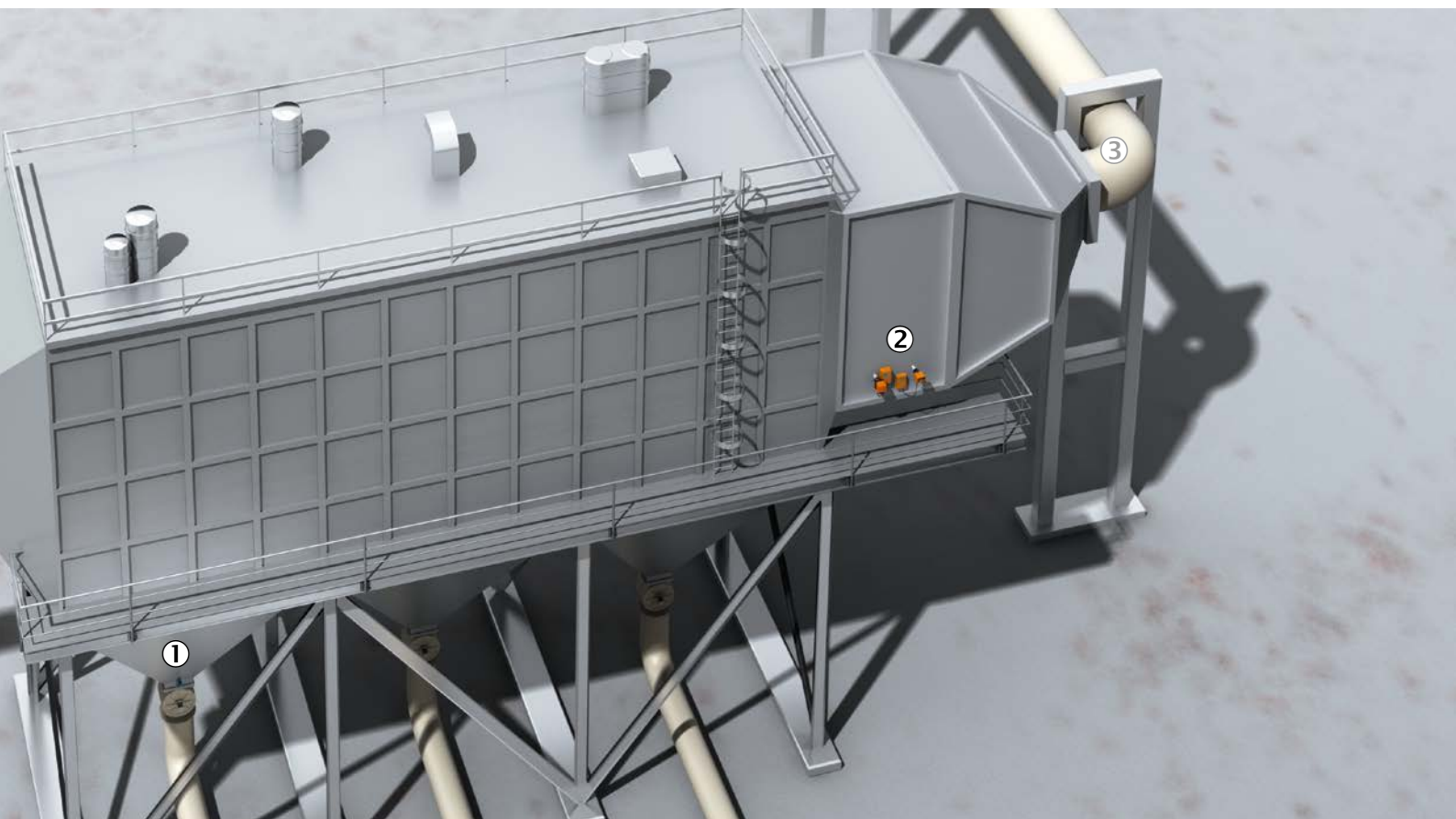
② Monitoring the electrostatic precipitator

Exhaust gases from cement production are loaded with dust particles. Environmental protection legislation requires that the dust is removed before the gas is released into the atmosphere. The DUSTHUNTER SP100 measures even low dust concentrations and thus de-

tests any filter errors. An automatic zero and reference point check is integrated to reduce the need for maintenance. Installation from one side of the electrostatic precipitator is simple. CO concentration is also monitored on the electrical filter outlet. High CO concentrations

combined with oxygen and electrostatic discharge could cause an explosion in the electrostatic precipitator. The Cross Duct version of the GM901 gas analyzer can even handle difficult measurement conditions and greatly contributes to operational safety.





③ Volume flow measurement at the induced draft fan

There are a number of fans in a cement plant that are used to maintain the flow of process gases and to emit them through emission stacks. This ensures that no health-damaging gases can be released uncontrolled through cracks in the duct work, especially if the natural

draft is not strong enough. Continual measurement of the flue gas volume flow is necessary to ensure economical operation and a high degree of energy efficiency. This ensures that the fans are always operated at an optimal operating speed.



FLOWSIC100 → p. 86

① This graphic is not presented in the overview.

① Measurement of SO_2 and O_2 at the inlet of the flue gas desulfurization system

SO_2 is measured at the inlet on the flue gas desulfurization system to control lime dosification in addition to make the removal efficiency calculation to check FGD performance. O_2 is measured for normalization. The GM32 in-situ gas analyzer is recommended for the measurement of SO_2 because it is fast and measures under the process conditions without gas sampling and transport. The automatic check cycle, which use internal components as a zero-point reflector, gas filled cuvette and grid filters, provide periodic checks of zero and span ensuring high availability without using expensive test gases. The ZIRKOR200 in-situ analyzer provides reliable and rapid measurement of oxygen, even at higher temperatures.



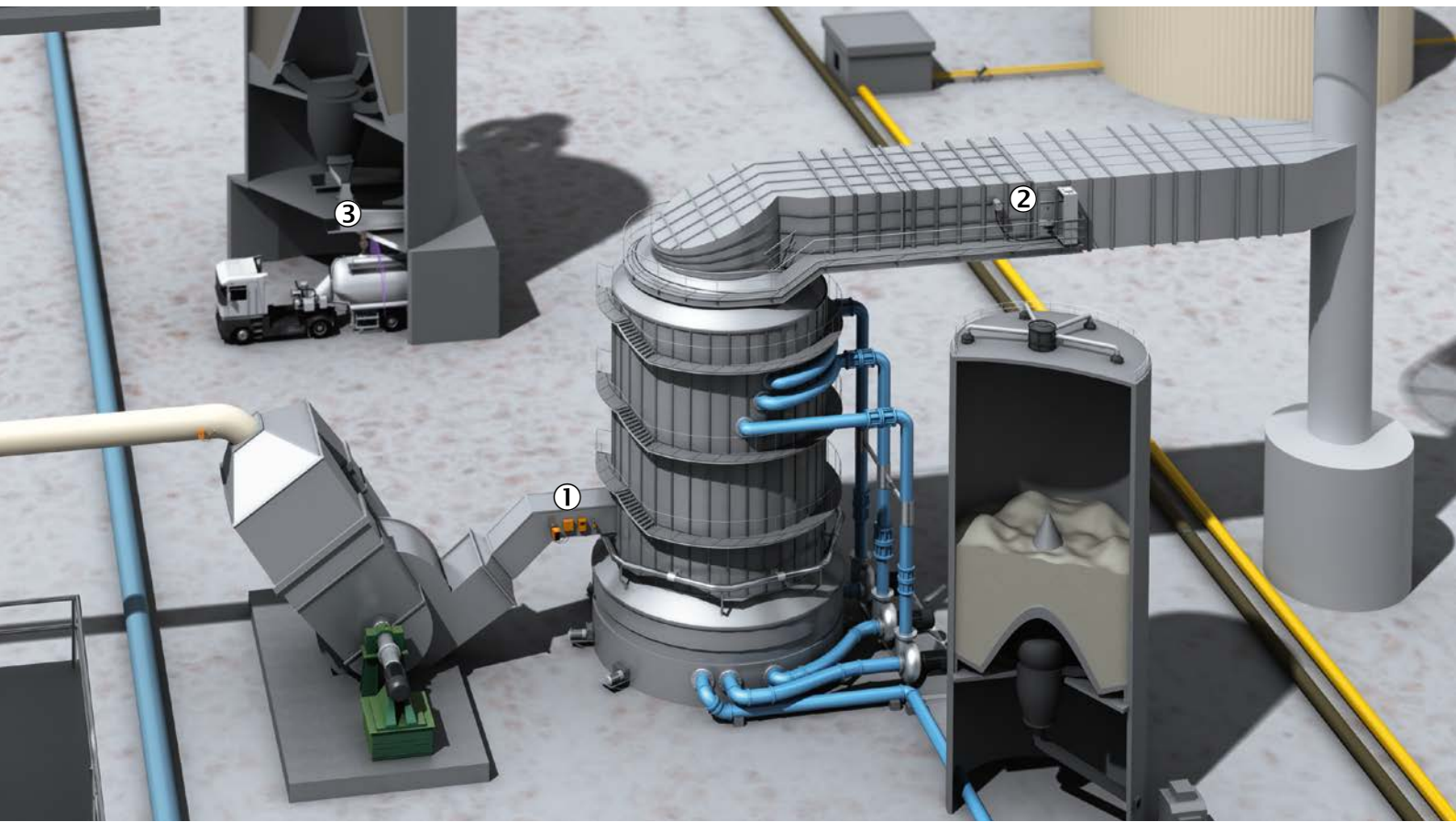
② Measurement of SO_3 and H_2SO_4 at the outlet of the flue gas desulfurization system

Measuring acid gases such as SO_3 and H_2SO_4 after the desulfurization system can provide feedback control for dry sorbent injection. Sorbents are used to reduce acid gases as well as for the removal of elemental mercury. These acid gases also cause corrosion in the

duct work and their presence is indicated by a blue plume. The MCS100E HW extractive analyzer measures SO_2 , SO_3 , H_2SO_4 as well as HCl , H_2O and a variety of other gases. A built-in calibration filter gives the operator the ability to run internal checks of the system to maintain

stability without the need for expensive and dangerous test gases or liquids. The high sample gas flow rate of the system ensures quick response so control can be performed based on the analysis results.

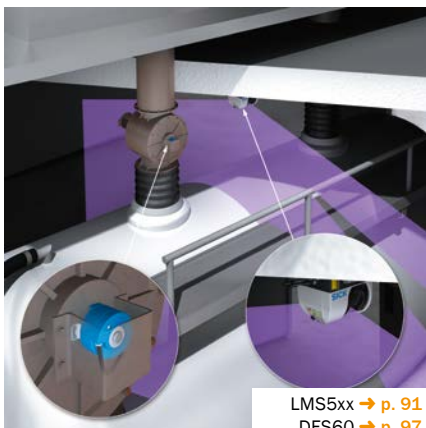




③ Filling of gypsum transport tanks

Gypsum (CaSO_4) is a by-product created by the oxidation of the CaSO_3 solution that arises during the desulfurization process. It is sold to the construction industry or re-used directly in cement plants. Sensors are used to assist with product fill in the gypsum tankers. Sen-

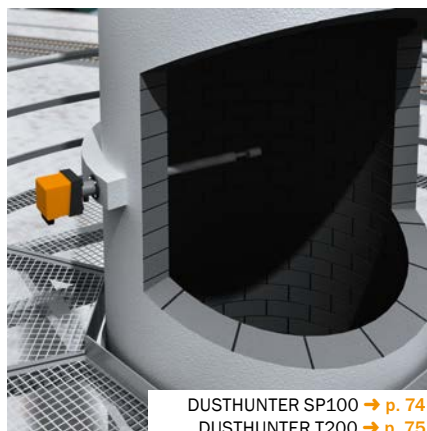
sors are used to fill the gypsum tankers with the product. The LMS511 is used to position the loading spouts correctly for filling the gypsum into the tanker or truck. The DFS60 incremental encoder accurately controls the speed of the metering unit and enables dust-free filling.



LMS5xx → p. 91
DFS60 → p. 97

① Measurement of dust emissions

Dedusting equipment is used in cement plants for maintaining compliance with regulatory dust limit values in exhaust gas, in accordance with local regulations. Electrostatic precipitators or fabric filters are used for dedusting. The measurement results ensure that the limit values are kept and also provide an indicator of possible leaks or other malfunctions in the filtering equipment. The DUSTHUNTER SP100 scattered light measuring device with a single-side mountable measuring probe is especially suited for fabric filters, while the DUSTHUNTER T200 transmissiometer is suited for electrostatic precipitators. Both devices have integrated device monitoring, and thus require very little maintenance.



DUSTHUNTER SP100 → p. 74
DUSTHUNTER T200 → p. 75

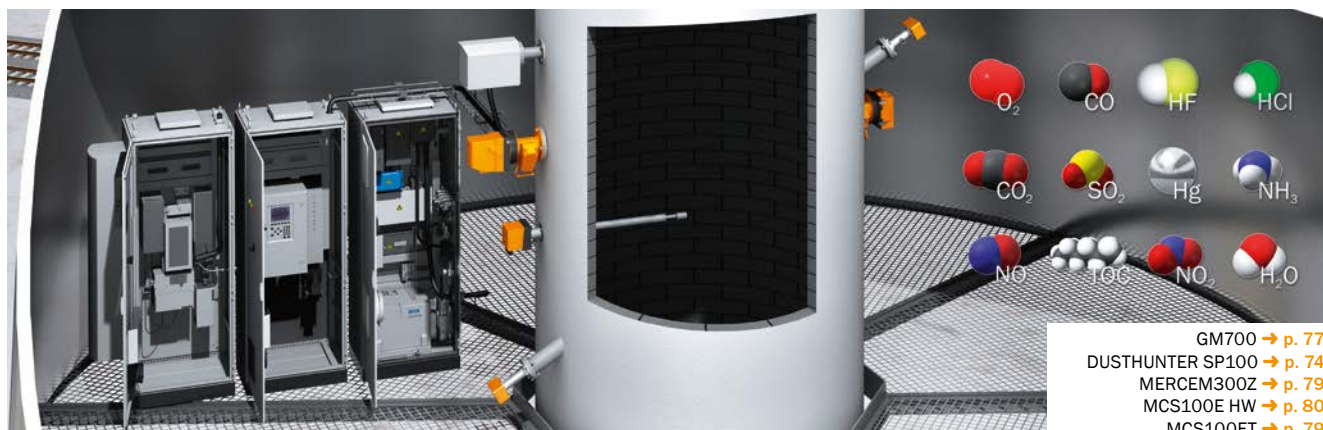


② Measurement of flue gas emissions

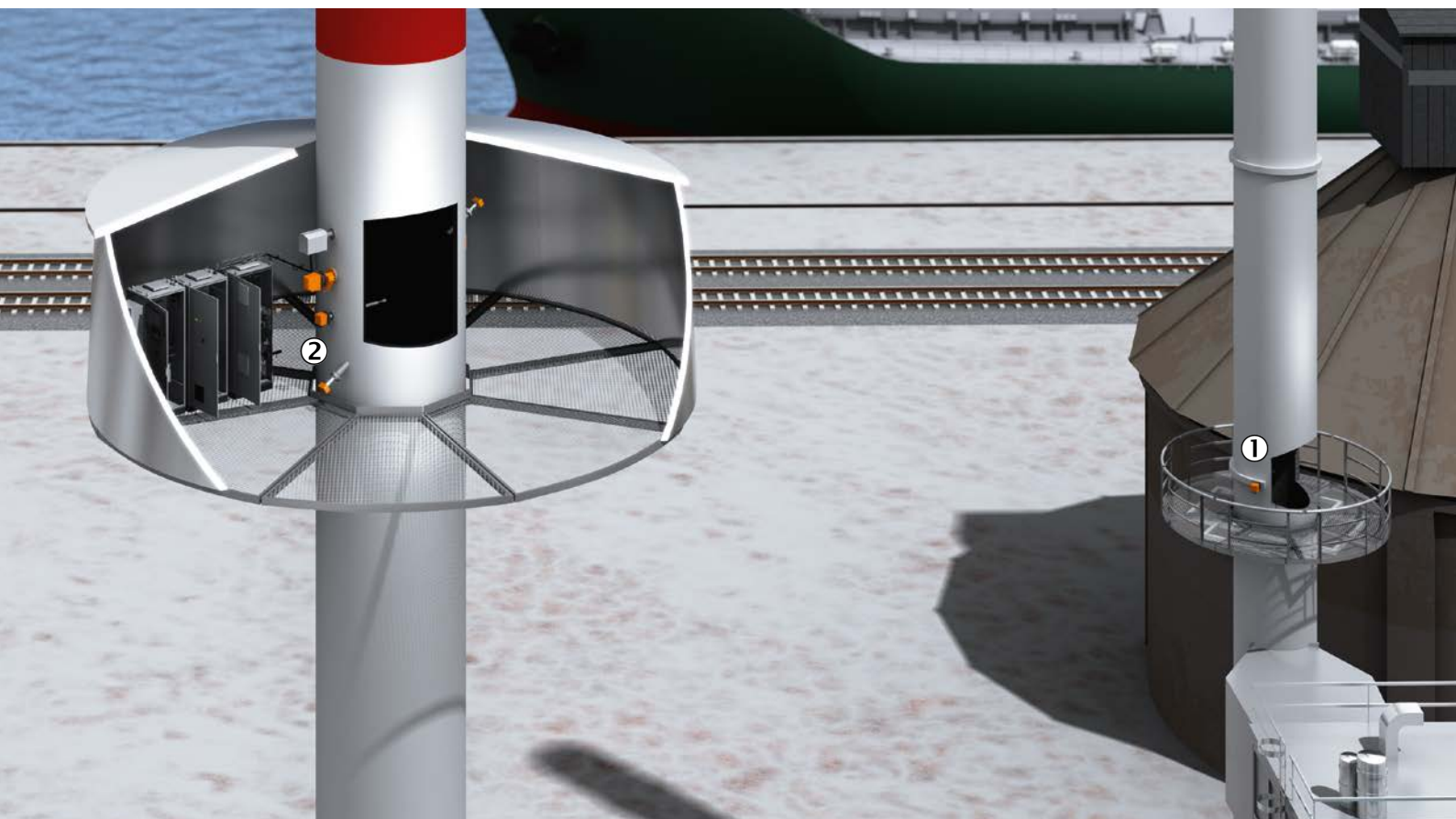
Environmental regulations stipulate that certain pollutants in the flue gas emitted by cement plants, as well as the reference values, must be continuously monitored. In many countries, emission measuring technology must be tested for suitability, e.g., in Europe in accordance with EN15267-3, or in the US in compliance with EPA stan-

dards. SICK's wide product portfolio for emission monitoring provides complete solutions all from one source. These include dust measuring devices from the DUSTHUNTER product family, in-situ gas analyzers such as the GM700, and extractive gas analyzer systems such as the MCS100E HW and MCS100FT. Gas analyzers for special components, such

as the MERCEM300Z for mercury (Hg), complete the solution portfolio. The FLOWSIC100 product family provides volume flow measurement. The use of extractive or in-situ technology provides an ideal way to meet local measurement requirements.



GM700 → p. 77
DUSTHUNTER SP100 → p. 74
MERCER300Z → p. 79
MCS100E HW → p. 80
MCS100FT → p. 79



③ Emission data management

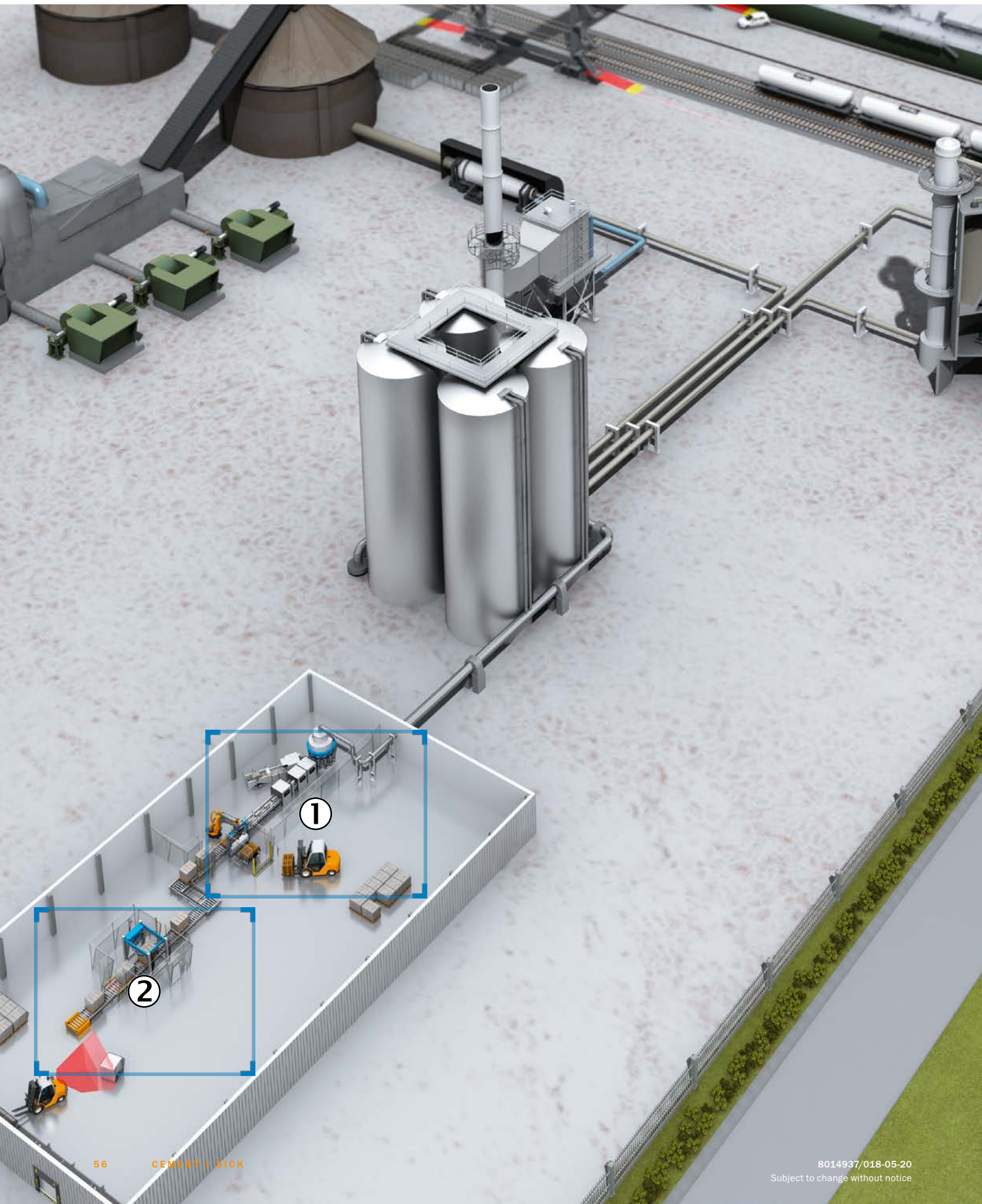
The MEAC300 data acquisition system is ideal for determining, saving, normalizing, analyzing, displaying, and forwarding a continuous flow of data. It is available in several different variants, which perform reporting procedures in accordance with the applicable local legislation. The MEAC300 is TÜV-tested and certified, and provides data analysis

that takes into account QAL3 data on drift control, among other elements. The MEAC300 is also the solution for redundant operation. For digital data transfer to the control system, all standard data transmission protocols are available. Wired, analog signal transmission is also possible.

ⓘ This graphic is not presented in the overview.



MEAC300 → p. 80





Packaging and logistics

Focus 1	58
① Bagging and palletizing	
Focus 2	62
② Stretch film wrapper	
Focus 3	64
③ Road transport	

① Determining the roll diameter

The mid-range Dx50 distance sensor reliably monitors roll diameter and measures the use of the cement bags. Due to its precise detection, the roll change process can be initiated before the end of the roll is reached and bagging can continue without interruption.



Dx50 → p. 92



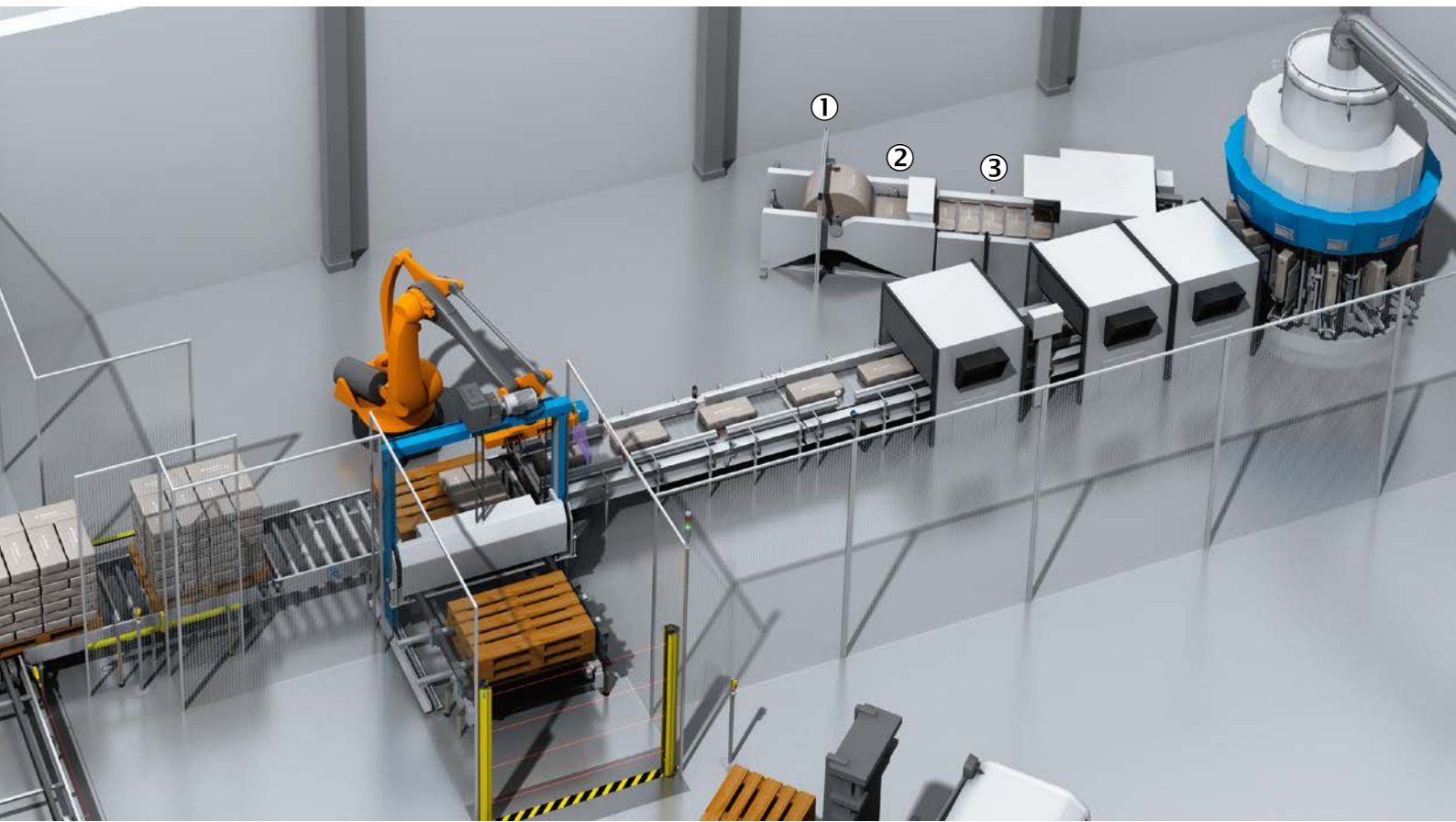
② Reliable print mark detection

Print marks help to detect packaging materials in automated production processes and to position them correctly. The KTM Core contrast sensor detects these marks even at low contrasts and high speeds. It detects minute grayscale variations between the mark and the background on matte, shiny, or trans-

parent surfaces, to ensure machine functions such as sack cutting. The resulting positioning accuracy improves the package quality in the process. The compact design and the rapid teach-in enables the KTM Core to be quickly and easily integrated into the machine.



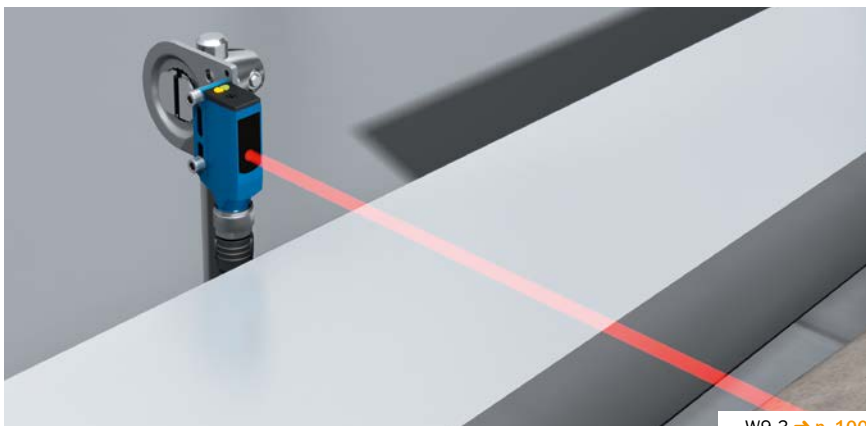
KTM Core → p. 100



③ Presence detection during bagging

The small WL9-3 photoelectric sensor monitors the correct flow of empty bags. The photoelectric sensors pass this information to the filling system control device by sending a control signal. Non-contact and wear-free sack counting takes place at the same time. The high degree of reliability of the photo-

electric sensor enables exact detection even in a dusty atmosphere. The light spot enables fast speed and thus a high throughput of bags. The robust VISTAL housing of the WL9-3 protects the photoelectric sensor from vibrations. Thus downtime is reduced.



W9-3 → p. 100

④ Tracking shipments

Identifying and tracking bags with various types of cement throughout the entire production process is quite challenging. The Lector63x image-based code reader directly identifies marked components with an extremely high scanning performance. Thanks to 4Dpro technology from SICK, a large number of network integrations, such as PROFINET and EtherNet/IP™ are available. Intelligent identification algorithms ensure that various 1D, 2D, and stacked codes, even plain text can be read on all kinds of materials. Intuitive setup with aiming laser, focus adjustment, and auto-setup reduces training and installation time as well as costs to a minimum.



Lector63x → p. 93



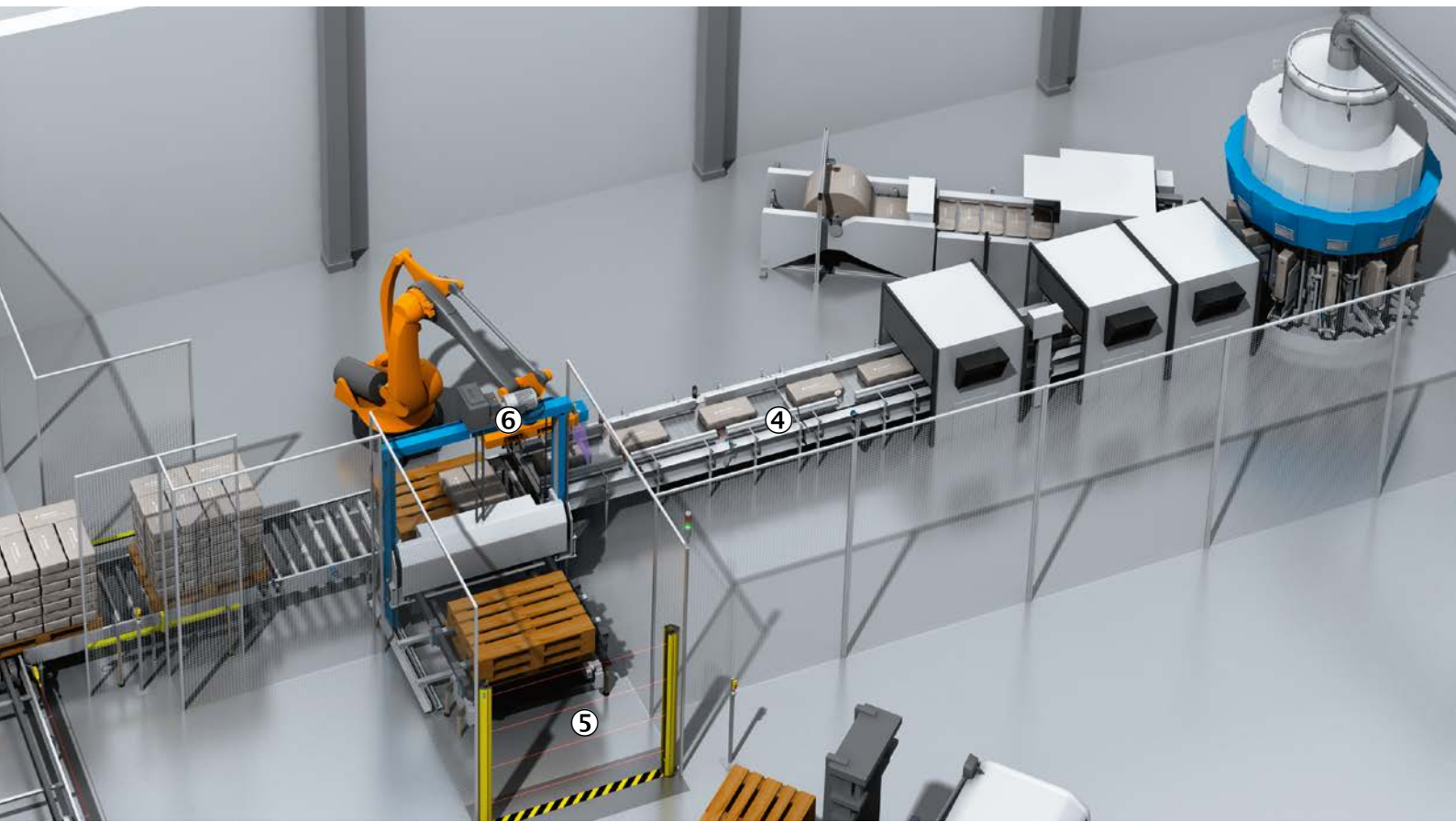
⑤ Access protection for pallet feeding

Automatic pallet handling machines stack filled cement bags onto pallets. In order to avoid accidents, access protection in those working areas is required. During the loading process, deTem4 Core multiple light beam safety devices monitor the automatic infeed and

switch the machine off safely if a person enters this area. When the loading process is complete, the pallets can be removed easily. All safety signals can be processed and logically gated with the compact Flexi Soft safety controller.



deTem4 Core → p. 102
Flexi Soft → p. 106



⑥ Controlling the palletizer

Robots contribute to a significant improvement in process efficiency. They take care of palletizing and depalletizing mass shipments outside of peak periods for an optimal use of resources. The LMS4xx LiDAR sensor enables the

position calculation of cement bags on a conveying line. The 2D LiDAR sensor detects the contour of any type of object at a distance of up to 3 m. The encoder provides a third dimension for the path information, allowing the scanner to

create a 3D image of each individual sack, including its position and center of gravity. All data are transferred to the robot controller, which positions its arm to grab the sacks at the optimal position and to stack them on a pallet.



LMS4xx → p. 91

① Controlling the wrapping process

After the pallet has reached its position, the stretch film is secured to the pallet and wrapped using upward and downward movements of the film. SICK's measurement technology products handle both the measurement of pallet dimensions and detection tasks for controlling the wrapping process. For this task, the IQ40 compact inductive proximity sensor is used as the end position switch. While two WL280-2 compact photoelectric sensors determine the position of the pallet, the AFM60 EtherNet/IP absolute encoder monitors the wrapping process.



IQG → p. 99
W280-2 → p. 101
AFS/AFM60 EtherNet/IP → p. 98



② Access protection without muting on the stretch film wrapper

The C4000 Palletizer safety light curtain ensures intelligent human-material differentiation at the output of the stretch film wrapper. For access protection, the safety light curtain is installed horizontally at pallet height in front of the out-feed of the stretch film wrapper. This is an innovative and cost-effective solution since additional components, such as muting sensors, signal lamps, or fence elements, are not needed.

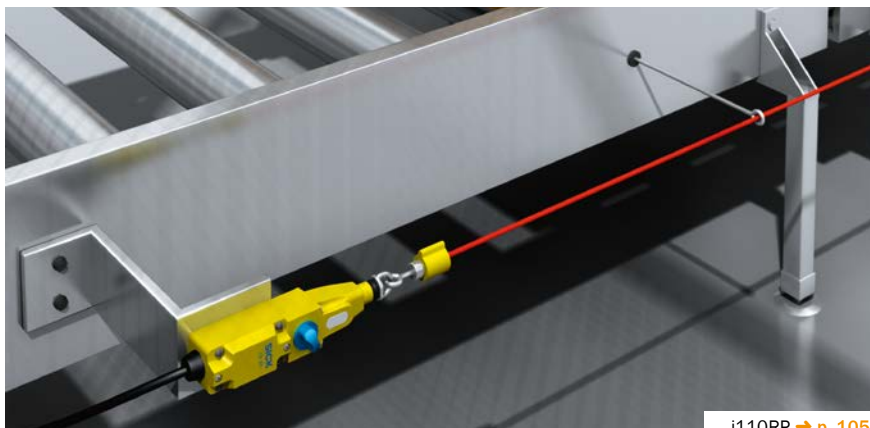


C4000 Palletizer → p. 102

③ Protecting roller conveyors

If a dangerous situation arises, the operating personnel can put a conveyor system into a safe status using rope pull switches. The i110RP rope pull switch allows users to implement solutions that comply with all statutory specifications. It is the ideal safety solution for longer

conveyor systems, since the switching function can be triggered from any point along the conveyor system. Additional signal contacts (N/O contacts) are used for visualizing the output state and, therefore, allow the operators to locate the source of an error quickly.



i110RP → p. 105



④ Protection of the door for the stretch film wrapper

Access to the hazardous areas near the wrapping machine must be restricted when there are dangerous movements. The TR10 Lock electro-mechanical safety locking devices monitor access points and prevent unauthorized entry. An ES11 emergency stop pushbutton with a reset function is attached to switch off the system in case of danger. An E100 enabling switch is used for safe setup operation.

⑤ Access protection with muting on stretch film wrappers

The M4000 Advanced multiple light beam safety device secures the material transportation area of the stretch wrapper so that unintended entrance of persons is detected and the machine is switched off. This is achieved using four WL27-3 compact photoelectric sensors which are linked to the M4000 Advanced via the UE403 muting switch device. Safe differentiation between people and materials is ensured.

⑥ Rear collision awareness

Mounted on a forklift truck, the Visionary-T FL 3D vision sensor protects the forklift from the risk of collision when backing up. Usually the operators need to handle many different tasks. Forklift trucks often travel backwards for many hours. Most accidents happen while operating backwards, and primarily when starting. The Visionary-T actively sends out a warning as soon as a person or object is located in the configurable 3D zone around the forklift truck.



ES11 → p. 104
E100 → p. 105
TR10 Lock → p. 103
Flexi Soft → p. 106



M4000 Advanced → p. 103
W27-3 → p. 101



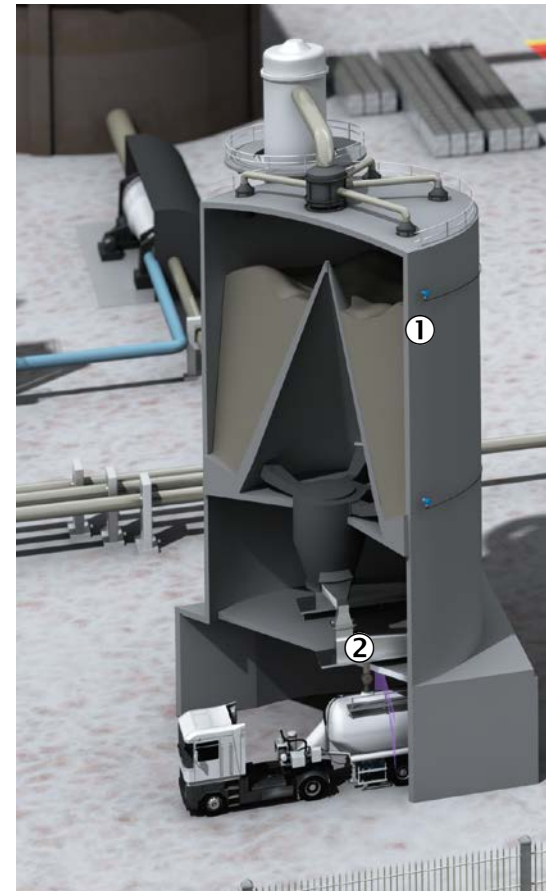
Visionary-T → p. 95

① Level monitoring in the cement silo

There must always be sufficient quantities of cement available to ensure deliverability. For this purpose, the actual amount of cement in the silos must be known, so that if the fill level is low, it can be refilled. The vibrating level switches of the LBV300 product family perform challenging tasks reliably and with high precision, for example as full, empty, or demand detection device. They operate with no mechanical moving parts, and are immune to deposit formation. They are easy to install and can be commissioned without filling the silo.

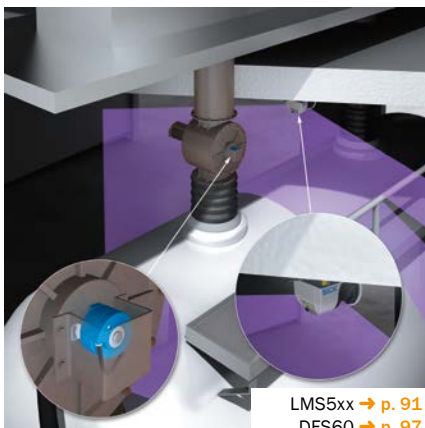


LBV300 → p. 88

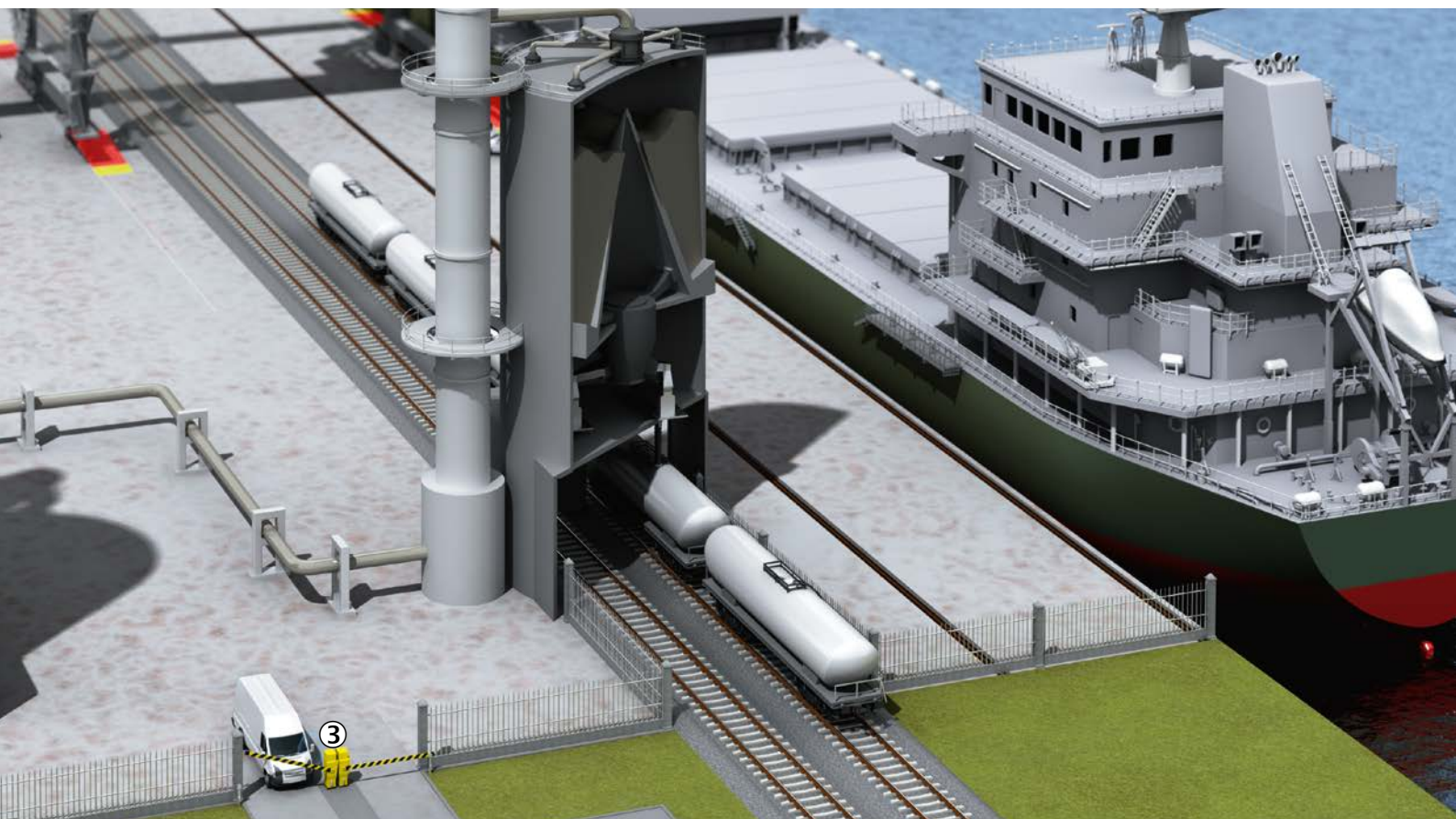


② Filling of cement trucks

Sensors are used to automatically fill cement trucks with the product. The LMS511 2D LiDAR sensor is used to position the loading spouts into the correct position for the cement to be filled into the tanker or truck. The DFS60 incremental encoder accurately controls the speed of the metering unit and enables dust-free filling.



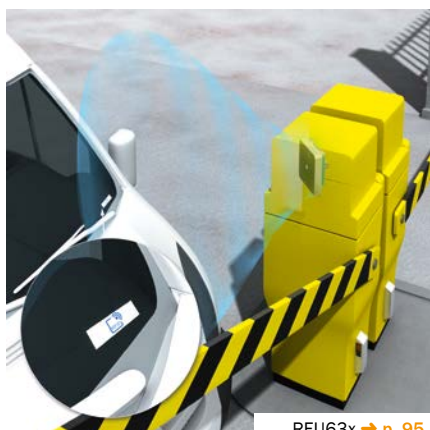
LMS5xx → p. 91
DFS60 → p. 97



③ Non-contact access protection with RFID

Because of its large sensor field, the RFU63x RFID reader enables non-contact reading of UHF transponders and manages access control for barriers without delay. The device can reliably read transponders without direct contact, even at greater distances of up to 5

meters. The optional RAM security system also enables simple management of access rights for up to 1,000 transponders using up to 20 readers. The access rights are saved in the relevant devices and updated online using the administration software.



RFU63x → p. 95

TAILORED FOR MEASURING EMISSIONS

SICK analyzers and analysis solutions monitor and check emission limit values, contaminant emissions and the release of other substances into the environment. Typical applications are power stations, waste incineration plants, pulp factories, cement plants, and the chemical industry.

Real-time gas analysis directly within the process

Innovative measurement technology that allows the devices to be mounted directly at the measurement site: In-situ gas analyzers take measurements directly within the process under system conditions. These analyzers are primarily characterized by their minimal maintenance requirements and extremely short response times. SICK's in-situ gas analyzers are available in two different versions:

- The cross-duct version for representative measurement results across the entire duct diameter
- The measuring probe version, optimized for single-sided gas duct installation



Reliable gas analysis – even under harsh process conditions

SICK's extractive gas analyzers can be used in a large number of applications. The extractive measurement technology extracts a partial gas flow from the gas duct, conditions the extracted gas and feeds it to an analyzer module under constant conditions. All the measurement technology that SICK offers – from gas sampling and conditioning right through to the numerous analyzer modules – is perfectly tailored to the measurement task concerned.



Systematic extractive gas analysis

Extractive analyzer systems based on high-quality standard modules and components. Thanks to the configurable design, the analyzer systems can be provided with the optimum specifications to meet the requirements of particular customers. If desired, retrofitting can be carried out easily and cost-effectively by installing analyzers and gas conditioning components. Long-term system support is assured.



Tailored for measuring emissions

SICK's CEMS solutions are analyzer solutions that have been specifically designed for measuring emissions at power plants, industrial facilities, or on ships. CEMS solutions can be used to measure pollutants and reference quantities and to perform data processing on the results in accordance with the relevant national or international legislation.



The reliable way to detect low dust concentrations

Light scattering by dust particles is a measurement principle that allows even very low concentrations of dust to be detected. Depending on the system-specific requirements, either forward scattering or backward scattering can be used in this context. Both measurement principles return stable and reproducible measurement results, regardless of the gas velocity, humidity, or dust particle charges.



Maintaining a clear sightline even when dust concentrations are high

Transmittance dust measuring devices transmit light through the entire duct. With this type of measurement, light attenuation indicates the concentration of dust inside the duct. These measuring devices are specially designed for medium to high dust concentrations and large duct diameters. Consequently, they are equally suited to emission and process monitoring as they are to hall monitoring applications.



Continuous volume flow measurement from SICK is setting standards

The FLOWSIC100 is used for continuous volume flow measurement in industrial systems. It is approved under established European standards and complies with EPA standards. The measuring device only rarely requires maintenance thanks to a drift-free measurement principle and high-quality components. It is also ideal for humid, aggressive gases, high temperatures, and high levels of dust.



EVERYTHING FROM STAND-ALONE DEVICES TO COMPLETE ANALYZER SYSTEMS

SICK provides application-related system solutions based on an extensive range of products. In addition to standard solutions, SICK also provides customized system solutions for the cement industry.

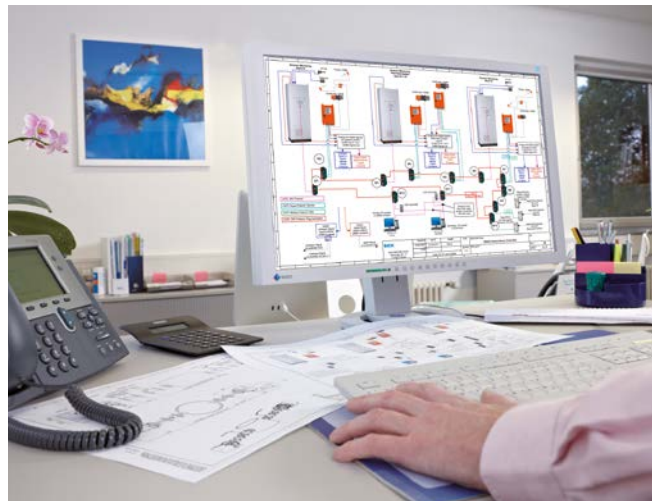
Ready-to-use analyzer containers

Whether used for emissions or process measurements, the analyzers should be installed in the immediate vicinity of the measurement points. Analysis containers serve an important function here by protecting the highly precise measuring systems and signal processing devices from the harsh ambient conditions at the installation site in the cement plant.



Custom planning and engineering

Planning and engineering at SICK is combined with decades of experience in emissions and process monitoring. SICK's engineers use the latest CAD systems to plan and design solutions to handle the cement plant requirements. In doing so, the latest technology in analyzers and sample conditioning is deployed, and the current communications interfaces are used to ensure rapid data transfer. Systems are designed in accordance with the applicable international standards, as well as many national standards. Implemented solutions are extensively and clearly documented. The system documentation thus forms the basis for creating comprehensive project documentation and for supplying replacement parts rapidly. Customers have an experienced project team and a worldwide service organization at their disposal through commissioning and afterwards to ensure reliable and sustained system operation.



Project management according to internationally recognized methods

SICK ensures globally consistent and effective project management. No matter in what country our customers award a project contract to SICK, our international project teams provide consistent project results based on the same high standards of quality. Experienced project teams support the projects starting with the contract award and continuing through to acceptance at the construction site. These teams work to adhere to the scheduled project delivery deadlines, organize the system acceptance in the plant or on-site, and update the project documentation in consultation with the customer. The project team remains available even after the conclusion of the project. The responsible project team begins supporting complex projects as early as the bidding phase. This ensures that all project requirements are correctly understood and included in the bid.



The Meeting Point Router from SICK (MPR)

SICK's Meeting Point Router works like a modem. It acts as a connection switching point between your sensors and systems and ensures safe, feedback-free separation of the networks. You can activate and quit the remote maintenance with the touchscreen.

Your benefits

- Remote session activation with a click
- No mechanical devices like fans or hard disks
- Also ideal for small systems
- Physical network separation for highest level of security
- Can also be retrofitted into existing systems



CLOSE SAFETY GAPS BEFORE THEY ARISE!

When it comes to protecting public buildings, industrial property, or private houses, structural measures or protection using security guards often have their limitations. SICK electronic protective devices for stationary, portable, or mobile applications are therefore a useful addition. Among others, reliable people-counting and access systems are indispensable for optimizing business processes and complying with security rules. Person detection is also relevant in the framework of building control and automation and for securing logistical processes. For these applications, SICK offers professional consultation and the necessary planning support in addition to the appropriate sensor solutions.

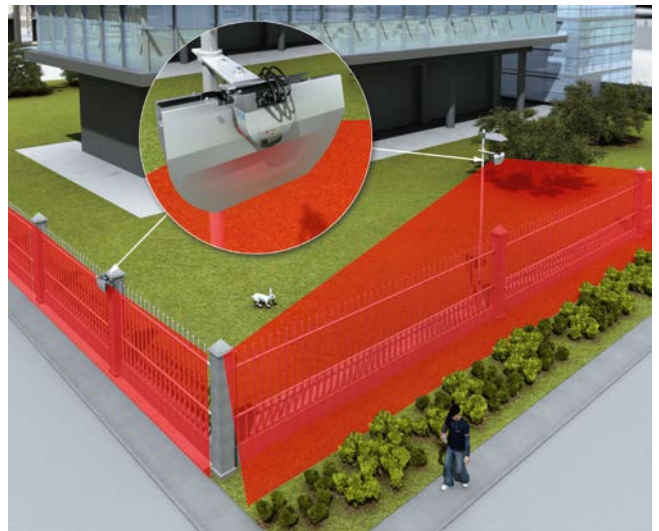
Horizontal monitoring of open spaces in front of buildings

2D-LiDAR sensors monitor open spaces connected to a property horizontally. Multiple monitoring fields and selective field evaluation can be freely defined. This makes it possible to block out certain access routes and paths and to monitor anyone entering.



Vertical protection of a fence

A LiDAR sensor generates a vertical field on a single fence. In doing so, the sensor quickly detects whether a person has violated this field by crawling beneath or climbing over, regardless of the weather conditions, and puts out an alarm.





Perimeter protection - vertical or diagonal monitoring of a fence. The electronic LiDAR sensor detects risks even before the mechanical protection is attacked.

Tasks and uses: 2D-LiDAR sensors

- make undetected intrusion into an area difficult
- detect events at the perimeter of an area
- protect fences and forecourts
- secure and monitor access points
- protect from undercutting with horizontal and diagonal setup
- monitor large areas
- protect from manipulation using surrounding contours as a reference
- are not influenced by illumination or unfavorable weather conditions
- can blank fixed obstacles or small objects

Benefits

Perimeter protection via sensors starts at the barrier encircling the premises and ends at the building envelope. In order to keep the entire area secure, software inside the sensor evaluates all pre-defined monitoring fields. If one of these monitoring fields is violated, an alarm goes off. The position data of persons in this field can be easily determined using the measurement data from the sensor.

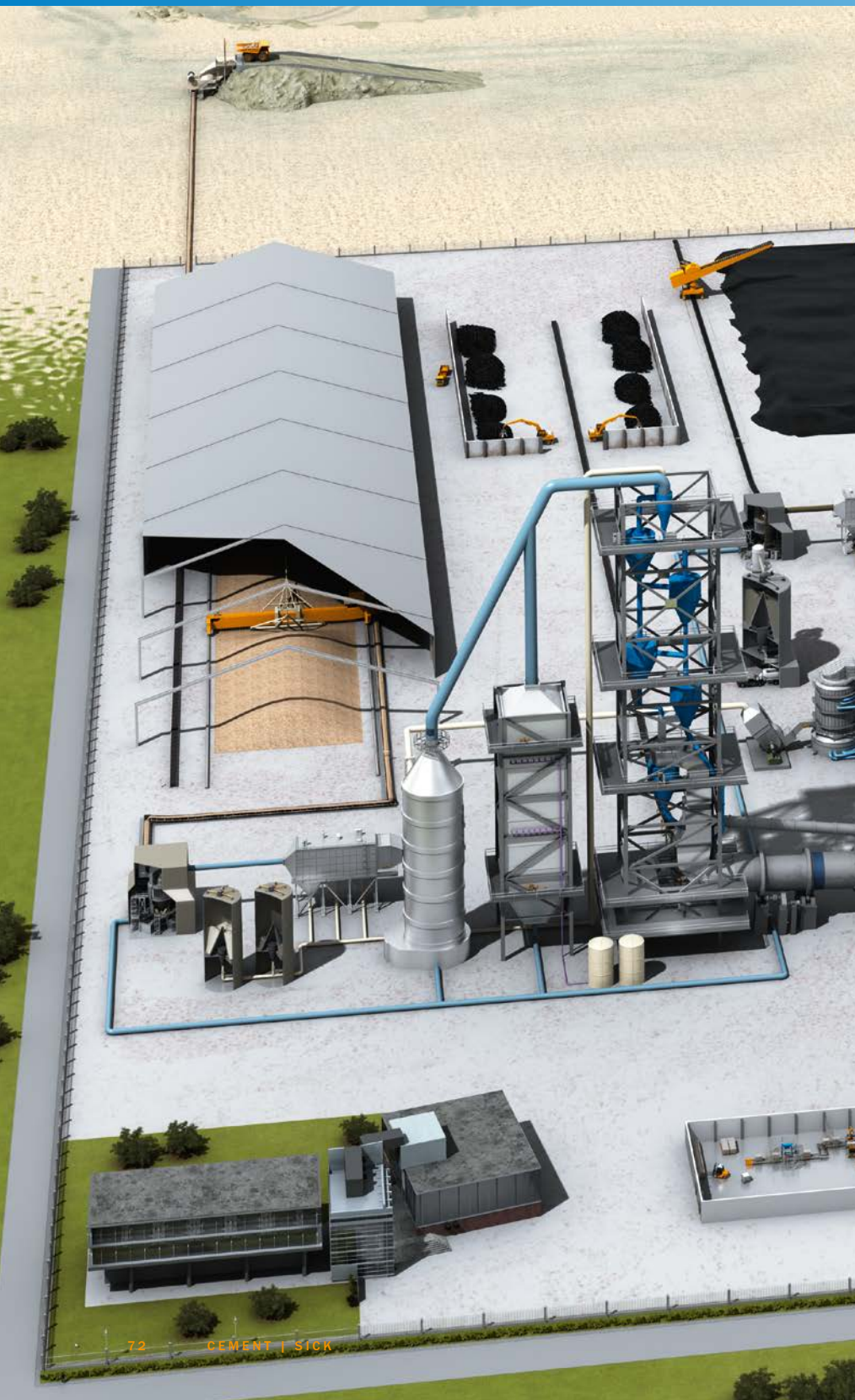
At the same time, the multi-echo technology and the possibility of blanking defined objects such as small animals decrease the number of false alarms. This results in reliable object detection regardless of the ambient conditions. This protects personal rights, as the sensor only detects the field violation and does not take personal photos.

Recommended products:

LiDAR sensors
LMS13x, LMS14x, LMS531, LD-LRS

PRODUCT OVERVIEW

CEMENT



Product overview

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DUSTHUNTER SP100 – At a glance

- One-side installation
- For very low to medium dust concentrations
- Automatic check of zero and reference point
- Contamination check
- Hastelloy probe available for corrosive gas environments
- For small to medium duct diameters

Your benefits

- Ideal for thick- or double-walled ducts
- Approved according to EN 15267
- Low maintenance due to self-monitoring and contamination check
- Quick installation – no alignment required

→ www.sick.com/DUSTHUNTER_SP100

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



DUSTHUNTER SB100 – At a glance

- For very low to medium dust concentrations
- One-sided installation
- Contamination check
- Automated thorough check of zero and reference point
- Automated compensation of background radiation, therefore no light absorber required
- For medium to large duct diameters

Your benefits

- Easy installation, commissioning, and operation
- Measurement independent of gas velocity, humidity and particle charge
- Approved according to EN 15267
- Low maintenance due to self-monitoring

→ www.sick.com/DUSTHUNTER_SB100

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





DUSTHUNTER T100 – At a glance

- For medium to high dust concentrations
- On-board contamination check
- Automated thorough check of zero and reference point
- For small to large measuring distances

Your benefits

- Easy installation, commissioning and operation
- Measurement independent of gas velocity, humidity and particle charge
- Low maintenance due to self-monitoring
- Approved according to EN 15267

→ www.sick.com/DUSTHUNTER_T100

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



DUSTHUNTER T200 – At a glance

- Integrated contamination check for sender/receiver and reflector unit
- Automatic self-alignment of the optical assembly
- Automatic check of zero and reference point
- For medium to high dust concentrations
- For small to large measuring distances

Your benefits

- Easy installation, commissioning and operation
- Measurement independent of gas velocity, humidity and particle charge
- Low maintenance due to self-monitoring and contamination check
- Approved according to EN 15267

→ www.sick.com/DUSTHUNTER_T200

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





GM901 – At a glance

- Representative measurement along the duct diameter
- Operation via evaluation unit
- Short response times
- Verifiable with gas-filled cell; 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

→ www.sick.com/GM901

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



GM32 – At a glance

- Direct, fast in-situ measurement
- No gas sampling, no gas transport, no gas conditioning
- Up to eight measuring components at the same time, plus process temperature and pressure
- DOAS and CDE evaluation process
- Numerous independent measuring ranges with consistent accuracy
- Automatic self-test function (QAL3) without test gases
- Overpressure encapsulated design for ATEX Zones 1 and 2

Your benefits

- Measured values in real time without altering the gas composition
- Short-term process deviations are detected
- Representative measurement by selection of cross-duct or measuring probe versions
- Fast on-site service due to modular design
- Long maintenance-free intervals
- Cost-effective in-situ gas analyzer – also in ATEX design
- Low cost of installation and operation, no test gases required
- Complete emissions measurement in Kraft pulp process by way of simultaneous measurement of TRS components plus SO₂, NO, NH₃

→ www.sick.com/GM32

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





GM700 – At a glance

- High selectivity due to high spectral resolution
- Short response times
- No calibration required
- No moving parts: minimal wear and tear
- No gas sampling or conditioning required

Your benefits

- In-situ measurement directly in the process for accurate measured values
- Probe and cross-duct models to match the requirements of your measuring task perfectly
- High reliability during operation
- Can also be used in harsh ambient conditions
- Detects quick and short-term process fluctuations

→ www.sick.com/GM700

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



ZIRKOR200 – At a glance

- Measurement cell with extremely long service life due to innovative protection mechanism
- Measurement cell self-monitoring
- Fully automated adjustment mechanism integrated into the control unit
- Version for high temperatures available
- ZIRKOR remote app for remote access to analyzer
- Very short response time
- Suitability-tested according to EN 15267
- Easy connection of process control systems

Your benefits

- Very high availability due to measurement cell with extremely long service life
- High reliability due to innovative measurement cell protection – even in corrosive or reducing conditions
- Reduction of analyzer failures due to internal self-monitoring
- No manual adjustment required
- Quick measurement close to the combustion process for timely control
- Approved for emission monitoring
- Easy analyzer operation – even remotely

→ www.sick.com/ZIRKOR200

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





SIDOR – At a glance

- Detector with high long-term stability
- Paramagnetic or electrochemical O₂ measurement
- Automated adjustment with component-free ambient air
- Immune to contamination

Your benefits

- Automated readjustment, self-monitoring, and fault diagnosis
- Test gas only needs to be checked every 6 months
- Long maintenance intervals
- TÜV suitability testing and MCERTS certification according to EN 15267
- Can be repaired on-site in many cases
- Replacement of components without complicated factory temperature calibration

→ www.sick.com/SIDOR

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



GMS800 – At a glance

- 6 different analyzer modules: DEFOR (NDUV, UVRAS), MULTOR (NDIR), OXOR-E (electrochemical O₂), OXOR-P (paramagnetic O₂), THERMOR (TC), and UNOR (NDIR)
- 4 different types of enclosures
- Gas module with sample gas pump and/or control sensors
- New enclosure type for easy and quick integration in analyzer systems
- Remote diagnosis via Ethernet with SOPAS ET software

Your benefits

- Approved according to EN 15267 and EN 14181
- Installations in Non-Ex-areas and Ex-areas (Zone 1 and 2 according to ATEX) possible
- Minimum service and maintenance work as well as easy reconditioning of existing installations due to modular design
- Adjustment without test gases via optional adjustment unit
- Minimal influence of ambient temperature through thermostatic controlled modules
- Reliable measuring results by proven measurement technology
- Easy maintenance and repair due to replacement of complete assemblies or modules

→ www.sick.com/GMS800

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





MERCEM300Z – At a glance

- Accurate measurement of “total mercury” directly in a thermal converter (patented)
- Measuring operation without using consumables
- Practically maintenance-free gas sampling using an ejector pump – no moving parts
- Integrated adjustment cell for automated drift checking
- Automated adjustment of the entire measuring system with a built-in test gas generator (optional)
- Completely modular system design

Your benefits

- Reliable results for the actual measured values of elemental and chemically bound Hg in gases
- Extremely low operating cost
- Automated adjustment with test gas for high measurement certainty (optional)
- Minimum maintenance required
- Self-adjusting gas analyzer provides high long-term stability without the need for maintenance
- Convenient, quick access for easy service and user-friendly remote diagnostics



→ www.sick.com/MERCEM300Z

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



MCS100FT – At a glance

- Lowest approved HF measuring range: 0 ... 3 mg/m³
- Automatic spectrum adjustment via AutoVAL for reliable measuring values
- Operation via touchscreen
- Sample gas transport by an ejector without moving parts
- Approved according to EN 15267
- Remote control and diagnosis via software SOPAS ET
- Automatic adjustment of analyzer
- Automatic backflushing and filter cleaning of sampling unit

Your benefits

- Genuine HF threshold value monitoring
- Only one analyzer for more than 12 measuring components
- Easy integration into the customer network environment
- Long maintenance interval of 6 months for many components
- Type approved measurement of greenhouse gases such as N₂O, CH₄, and CO₂
- Low maintenance requirements save time



→ www.sick.com/MCS100FT

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





MCS100E HW – At a glance

- Extractive measurement of up to 8 IR-active gas components
- Additional oxygen and total hydrocarbon analyzer as option
- Gas lines heated throughout
- Sample gas infeed on gas sampling probe or analyzer
- Back-purging of gas sampling probe for filter cleaning
- Rapid measured gas exchange to minimize adsorption and desorption processes
- Automated sample point switching

Your benefits

- Measurement of several gas components with one analyzer
- Heated gas paths enables measurement of difficult gases like HCl and NH₃
- Long maintenance intervals (typically 6 months) due to self monitoring of the analyzer
- Selective measurement of NO and NO₂ – no converter required
- QAL3 drift test with internal calibration filter wheel – no test gas required

→ www.sick.com/MCS100E_HW

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



MEAC300 – At a glance

- Bus-capable data acquisition from measuring devices and plants
- Evaluation conforming to the Industrial Emissions Directive, EN 14181 QAL2, and optionally QAL3 (CUSUM)
- Secure storage with automated backup
- Ergonomic display for constant monitoring of evaluation rules and device statuses
- Fast data transmission to the plant control in a 5 s cycle

Your benefits

- Easy installation of the MEAC300 software on any commercially available PC running Windows 7 or 10
- Easy commissioning without wiring for all Modbus-capable measuring devices
- Continued use of existing data and configurations from earlier MEAC versions
- Savings on service costs thanks to a flexible configuration interface for users
- Time savings through simulation mode for installation and function checks
- High availability through automated redundancy for data acquisition and output (optional)
- Free design of protocols in MS Excel format by the user (optional)
- Parallel GHG or QAL3 evaluation in the same system (optional)

→ www.sick.com/MEAC300

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





MCS300P HW – At a glance

- Simultaneous measurement of up to 6 components plus O₂
- Sample flow control and sample gas pressure measurement
- Temperature of heated system components up to 220 °C
- Automatic sample point switching for up to 8 sample points (option)
- Automatic adjustment of zero and span point
- Integrated adjustment unit without span gas (option)
- Extended operation via PC and software
- Flexible I/O modules

Your benefits

- Economic, automatic adjustment without expensive test gases
- Easy remote control by integration in existing networks
- Automatic control of the complete measuring system and probe
- Low maintenance and reliable due to hot measurement
- In combination with probe SCP3000 also for measurements at high dust loads and high temperatures
- Short response time due to high sample gas flow

→ www.sick.com/MCS300P_HW

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



SCP3000 – At a glance

- For gas temperatures up to 1,400 °C
- For very high dust loads up to 2,000 g/m³
- Effective shock blower prevents blockage on probe inlet
- Rotating unit prevents build-up of deposits on probe surface
- Self-test functions to protect components against power, coolant or compressed air malfunction
- Pneumatic or electric retraction of the probe in the event of power, coolant or compressed air malfunction

Your benefits

- Modular design for easy installation
- Reduced maintenance costs: Up to 100 hours per year due to automated purging and cleaning of probe and filter
- Automated monitoring and remote access to the entire system via PLC
- Comfortable touch screen with intuitive menus for easy operation
- High operational availability and functional reliability due to anti-stick and back-purging system
- Reliable operation due to self-test functions and emergency retraction of the probe
- System field-tested under harsh process conditions

→ www.sick.com/SCP3000

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





MKAS – At a glance

- Up to 3 S710 or SIDOR analyzers or NO_x-converter
- Includes the major system components
- Can be upgraded with optional components
- Wired and tested – ready for use

Your benefits

- Modular design to match the measuring task
- Use of highly proven system components ensures high reliability
- Meets the requirements for automated measuring devices in accordance with EU standards
- Sample gas bypass for reduced response time

→ www.sick.com/MKAS

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



MKAS Compact – At a glance

- Compact analyzer cabinet
- For maximum 2 S710 or SIDOR analyzers or NO_x converter
- Includes the major system components
- Wired and tested – ready for use

Your benefits

- Space-saving complete system
- Adaptable to the measuring task due to modular concept
- Proven system components offer a reliable solution
- Fulfills the requirements for an automatic measuring system according to EU standards, especially EN 15267

→ www.sick.com/MKAS_Compact

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





PowerCEMS50 – At a glance

- Basic system measures NO_x, CO and O₂
- Configured system with sampling, gas cooler and integrated gas pump
- The system with its free-standing cabinet is suitable for ambient temperatures +5 ... +35 °C
- Measuring value outputs: analog (4 ... 20 mA) or digital (Modbus)
- The system is tested according to EN 61000-6 EMI and electrical safety, and is CE-certified

Your benefits

- High system availability through long maintenance intervals
- Dependable through superior performance
- Easy start-up and trouble-free installation
- Compact system design requires minimal installation space
- Competitively priced

→ www.sick.com/PowerCEMS50

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



PowerCEMS100 – At a glance

- Cold-extractive analyzer system certified according to EN 15267 and EN 14181
- Plug-and-play analyzer module with 24 V power supply
- Control unit for displaying all measured values and status information on a monitor
- External sensors can be connected via interfaces

Your benefits

- Your investment is secure, as the system can be adapted easily to meet future needs
- Easy commissioning and trouble-free on-site approval of the measuring system by the relevant authorities
- Easy service due to clear separation of the electrical system and the analyzer component
- Easy and quick replacement of modules with CAN bus technology for high availability

→ www.sick.com/PowerCEMS100

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





MINESIC100 EPS – At a glance

- Active collision awareness for shovel operator when there are other mining vehicles in the vicinity
- Vehicle positioning and loading assistance
- Highwall collision warning
- Visual feedback (touch screen operator display) and audible alarm
- Open interface to fleet management via event logging

Your benefits

- Reduction of incidents, downtime and repair costs
- Detection and tracking of moving and stationary obstacles without the need for RFID tags
- Active situation-dependent warning with low false alarm rates
- Easy to install and operate
- Easy to maintain, integrated test function and reporting
- Can be configured to meet on-site operational requirements at the mine
- Full service package provided by SICK LifeTime Services
- Sound system knowledge thanks to comprehensive user training

→ www.sick.com/MINESIC100_EPS

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



MINESIC100 WPS – At a glance

- Full coverage rear-end collision warning
- Visual feedback (touch screen operator display) and audible alarm
- Open interface to fleet management / dispatch systems & event logging
- Full functional operation across speed range (0...v_{max})
- Active reverse assist for maneuvering in confined spaces
- Displays accurately all obstacles behind the vehicle (windrows, vehicles, personnel) in real time

Your benefits

- Reduction of incidents, downtime and repair costs
- Detection and identification of mobile and stationary obstacles without the need for RFID tags
- Active situation-dependent warning with low false alarm rates
- Easy to install and operate
- Easy to maintain, integrated test function and reporting
- Can be configured to meet on-site operational requirements at the mine
- Full service package provided by SICK LifeTime Services
- Sound system knowledge thanks to comprehensive user training

→ www.sick.com/MINESIC100_WPS

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MINESIC100 TPS – At a glance

- Intelligent front-end collision warning
- Road departure warning
- Reverse assist (collision awareness protects tires and suspension)
- Black-spot warning (geo fencing of hazardous areas)
- Visual feedback (touch screen operator display) and audible alarm
- Open interface to fleet management via event logging
- Full functional operation across speed range (0 ... 60 km/h)
- Adaptive warning zone dimensions

Your benefits

- Reduction of incidents, downtime and repair costs
- Detection and tracking of moving and stationary obstacles without the need for RFID tags
- Active situation dependent warning with low false alarm rates
- Simple installation, easy to operate
- Easy to maintain – Integrated test function and reporting
- Configurable to mine site operational requirements
- Full service package provided by SICK LifeTime Services
- Sound system knowledge thanks to comprehensive user training

→ www.sick.com/MINESIC100_TPS

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



AOS Prime – At a glance

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

Your benefits

- Via self-testing cycles the system ensures excellent diagnostic coverage
- Robust laser scanner with enhanced reliability for outdoor applications
- Variable monitoring fields are ideal for a wide range of applications
- Modular concept allows simple adapting of the system
- Optional gateways provide connection to bus systems or for remote diagnostics
- Built-in control functions for peripheral devices, even for safety-related signals like emergency stop
- Supports and simplifies individual machine approvals

→ www.sick.com/AOS_Prime

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





FLOWSIC100 – At a glance

- Rugged titanium converters for long service life
- Corrosion-resistant material for use with aggressive gases (option)
- Integrated measurement via duct diameter for types H, M, and S
- Probe version PR for cost-saving, single-sided installation in duct
- Automated operational check with zero and reference point test

Your benefits

- Reliable flow measurement for ducts with small up to very large diameters
- High durability of the device
- Minimum operating and maintenance costs
- Accurate measuring results under difficult measuring conditions
- Measurement without pressure loss, therefore no influences on the process
- User-friendly operation via SOPAS ET software
- Reliable function monitoring due to enhanced diagnosis
- No purge air required for applications with gas temperatures up to 260 °C

→ www.sick.com/FLOWSIC100

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



FLOWSIC500 – At a glance

- Cutting-edge technology: ultrasound
- Diagnostics and permanent operational check
- Rugged and reliable due to lack of moving parts
- Exchangeable cartridge
- Straight inlet/outlet zone not required
- Overload-proof
- Optional integrated flow conversion / date registration
- Battery or intrinsically safe power supply

Your benefits

- Ultimate measurement certainty and safety of continuous gas supply
- Reduction of installation costs due to integrated volume correction
- Simple installation, compatible with conventional technologies (turbine and rotary displacement meters)
- Minimal operating costs due to being nearly maintenance-free
- Easy recalibration due to straightforward cartridge replacement
- Reliable under dynamic load changes
- Self-sufficient operation

→ www.sick.com/FLOWSIC500

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





FLOWSIC600-XT – At a glance

- User-friendly product family
- Automatic correction of pressure and temperature effects
- Available for all operating conditions
- PowerIn Technology™ for reliable backup operation
- Intelligent application diagnostics with i-diagnostics™
- Extendable with flow computers per connect-and-go

Your benefits

- Low measurement uncertainty in every application
- Excellent measurement data reliability and availability
- The right ultrasonic gas flow measuring device for every application – without compromise
- Simple device integration – even in compact systems
- Quick and easy commissioning and checks

→ www.sick.com/FLOWSIC600-XT

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



Bulkscan® LMS511 – At a glance

- Non-contact measurement of volume and mass flow of bulk materials
- Laser pulses with high angular resolution ensure outstanding image resolution
- 5-echo pulse evaluation produces highly reliable measurements
- Non-contact belt monitoring
- Integrated center-of-gravity calculator
- Rugged design for harsh ambient conditions
- Integrated heater allows measurement even at low temperatures
- Compact housing with IP 67 enclosure rating

Your benefits

- Maximizes conveyor throughput
- Reduces maintenance costs by preventing belt slippage
- Increases the conveyor belt's service life
- Reduces loading time
- Increases efficiency by optimizing belt capacity
- Simple installation
- Low maintenance costs
- Offers savings through minimized energy consumption

→ www.sick.com/Bulkscan_LMS511

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





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
- 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

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
- Flexible and tough system for a multitude of applications
- Solutions for vertically mounted switches in difficult installation conditions and surroundings

→ www.sick.com/LBV300

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



LBV301 – At a glance

- Compact sensor from 1" thread
- Monoprobe design prevents bulk materials from sticking or jamming
- Polished monoprobe for food applications
- Commissioning without filling and medium calibration
- Process temperature up to 250 °C
- ATEX certifications (1D/2D/1G/2G) available
- Tube extension variant (LBV331) up to 6 m and cable extension model (LBV321) up to 80 m available for vertical mounting

Your benefits

- Easy commissioning, no upstream calibration necessary
- Maintenance-free system
- Sensors can be tested while installed
- Flexible, reliable system suitable for many types of applications
- Vertical mounting, even in difficult installation and ambient conditions

→ www.sick.com/LBV301

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





TCT – At a glance

- Pt100 element, accuracy class A according to IEC 60751
- Measuring ranges $-50\text{ °C} \dots +150\text{ °C}$ and $-50\text{ °C} \dots +250\text{ °C}$
- Wetted parts made from corrosion resistant stainless steel 1.4571
- Various mechanical adaptations and insertion lengths, also available with thermowell
- Pt100 (4-wire) or 4 mA ... 20 mA (2-wire)
- Circular connector M12 x 1 (IP 67) or L-connector according to DIN EN 175301-803 A (IP 65)

Your benefits

- Reliable operation through rugged design and high-quality materials
- Very good long-term stability, accuracy and linearity
- Quick and safe installation
- Convenient system integration through compact dimensions and industry-standard output signals
- Optimal solutions for individual requirements due to versatile configurability

→ www.sick.com/TCT

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



PBS – At a glance

- Electronic pressure switch with display for monitoring pressure in liquids and gases
- Precise sensor technology with stainless steel membrane
- Integrated process connections manufactured from high-quality stainless steel
- Pressure values indicated on display. Output states are indicated separately via wide-angle LEDs.
- Unit of pressure value in display can be switched
- Min/max memory
- Password protection
- IO-Link

Your benefits

- Quick and easy setup and operation due to three large pushbuttons and clear display
- Perfect display readability and optimal cable routing due to rotatable housing
- No compromises: Individual solutions through a variety of configurations
- Universal application due to fully welded, highly durable stainless steel membrane
- Saves space and costs: no adapters required due to broad range of standard process connections
- Highly reliable due to application of proven technologies and high-quality materials, water resistance according to IP 65 and IP 67 as well as excellent overpressure safety
- Ultimate system availability: IO-Link enables fast, reliable parameter setting when changing over products

→ www.sick.com/PBS

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





LD-LRS – At a glance

- Long sensing 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 six 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

→ www.sick.com/LD-LRS

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



LMS1xx – At a glance

- Efficient and cost-effective 2D LiDAR sensors for measuring ranges of up to 50 m
- Outstanding performance whatever the weather, thanks to multi-echo technology and intelligent algorithms
- Rugged, compact housing with enclosure rating up to IP 67, integrated heating and a temperature range from -40°C and +60°C
- Variants for security applications with relay outputs and VdS certification available
- Measurement data output via Ethernet interface in real time
- Number of switching outputs can be expanded via external CAN modules

Your benefits

- Straightforward integration and mounting due to compact design
- Low purchase and operating costs: One device can monitor areas of over 5,500 m² in size
- Product family with many variants, which also provide solutions for demanding and specialized applications
- Extended filter options significantly reduce measurement errors caused by conditions such as fog, rain or snow
- Optional CAN I/O module increases number of switching outputs for greater application flexibility
- Ethernet interface enables straightforward implementation and remote maintenance

→ www.sick.com/LMS1xx

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





LMS5xx – At a glance

- Powerful and efficient LiDAR sensor for measuring ranges of up to 80 m
- Outstanding performance in adverse weather conditions due to multi-echo technology
- Compact housing up to IP67 enclosure rating and built-in heater for outdoor devices
- 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 LiDAR sensor with highest accuracy in this sensor class
- Rapid and reliable detection of objects under practically any ambient conditions
- Extensive product family with various product lines and types for all performance and cost requirements
- Low power consumption reduces total cost of ownership
- Best price/performance ratio in this sensor class
- Fast and easy commissioning with SOPAS engineering tool
- Self-monitoring functions increase system availability

→ www.sick.com/LMS5xx

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



LMS4xx – At a glance

- The “Level Control” application integrated in the sensor is, with its gapless scanning surface, able to perform “shadowless” detection of objects in containers. Even small objects, regardless of color, are detected anywhere in the container.
- Large dynamic measurement range of 0.7 m to 3 m
- Rugged design
- High angular resolution and scanning frequency
- Ideal for depalletizing tasks, contour verification and vision applications on pallets

Your benefits

- The integrated Level Control feature replaces a number of sensors and drastically reduces the effort required for wiring and programming
- Reliable detection at high conveyor speeds
- Neither shading nor artificial lighting is necessary
- Mounting is possible in positions beyond the robot collision area
- Fast data acquisition thanks to highly precise detection and positioning measurements in real time

→ www.sick.com/LMS4xx

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





Dx35 – At a glance

- Maximum reliability, immunity to ambient light, and best price/performance ratio thanks to HDDM™ technology
- Measuring range of 0.05 m to 12 m for natural objects or 0.2 m to 35 m on reflective tape
- Devices with analog and switching output, or just switching
- Infrared or red laser in class 1 or class 2
- Repeatability: 0.5 mm to 5 mm
- Small housing size
- IO-Link

Your benefits

- Precise and reliable measurement regardless of object color extends run time and process quality
- A small size and blind zone make flexible mounting possible when space is limited
- Optimum solution thanks to flexible settings for speed, range and repeatability
- Flexible interface use: 4 mA to 20 mA, 0 V to 10 V, PNP output, NPN output, or IO-Link – making machine integration simple
- Offering easy alignment, optimal performance or inconspicuous measurement, versatile light senders make it an ideal solution for all scenarios
- Low investment costs and high performance levels guarantee a quick return on investment
- IO-Link offers full process control, from commissioning to service
- A wide variety of control options ensures rapid commissioning and fast batch changes

→ www.sick.com/Dx35

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



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

Your benefits

- Wide measurement ranges up to 10, 20 or 50 m in combination with different interfaces allow an easy and fast integration in any production environment
- Highly reliable and precise measurement helps to increase process quality and stability
- High measurement or switching frequencies enable a fast material flow
- Dx50 product family is based on a common platform, offering multiple performance levels, making it easy to accommodate future changes
- 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

→ www.sick.com/Dx50

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





Dx1000 – At a glance

- Long range distance sensor with infrared laser featuring HDDM+ technology
- Measures natural objects (DT1000) or reflectors (DL1000)
- Dust-proof and waterproof housing (IP 65 and IP 67) made of highly corrosion-resistant aluminum alloy
- Configurable digital inputs and outputs, analog output, RS-422/SSI
- Measures hot surfaces (DT1000)

Your benefits

- Reliable distance measurement indoors and outdoors enables high system throughput
- Multi-echo technology can suppress undesirable reflections – enabling use in a wider range of applications
- Comprehensive options for adjustments enable perfect adaptation to the individual measuring task
- Fast, safe commissioning using a graphical touch display, convenient SOPAS ET user interface and red alignment laser
- A small number of device variants (standardization) accommodating a wide range of requirements keeps costs down
- Laser class 1 and therefore eye-safe

→ www.sick.com/Dx1000

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



Lector63x – At a glance

- Code reader with 2-megapixel sensor
- Flexible optics and filter design
- Integrated, replaceable high-power illumination
- Intuitive user interface, with flexible result string with code analysis options
- Function buttons, aiming laser, acoustic feedback signal, and green feedback LED
- microSD memory card

Your benefits

- High-resolution sensor and intelligent processing ensure outstanding reading performance, even under difficult reading conditions
- Flexible optical design and high-power illumination enable small codes to be read at high speeds or in applications with a large reading distance
- Fast, straightforward commissioning thanks to the intuitive user interface; function button for rapid device setup; integrated illumination and aiming laser
- Direct results monitoring thanks to acoustic signal and colored feedback spot on the object
- Few machine downtimes in the event of faults on the production line, thanks to straightforward cloning function using microSD memory card

→ www.sick.com/Lector63x

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





Inspector – At a glance

- High-speed positioning, inspection and measuring
- Powerful “object locator” tool, independent of position, rotation and scale
- Unique, interchangeable housing design supporting dome and various optical accessories
- Simple step-by-step configuration in PC including emulator
- Easy-to-use operator interfaces
- Flexible machine and HMI design interfaces

Your benefits

- The multi-functional vision toolbox offers smart camera-level performance but with sensor ease-of-use
- Unique, interchangeable housing design provides the easiest way to improve image quality
- The simple configuration in SOPAS, including emulator for offline configuration and testing, will reduce down-times in production to a minimum
- The easy-to-use operator interfaces are optimized to make it easier for the operator to oversee daily work more efficiently
- Ethernet communication and web API gives excellent connectivity and freedom to customize user’s HMI

→ www.sick.com/Inspector

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



Visionary-B – At a glance

- Intelligent 3D assistant systems improve collision awareness in harsh outdoor environments
- High temperature range from –40 °C to +75 °C
- Rugged housing: IP 69K for the sensor head
- Sensing range up to 6 m
- 2-in-1 solution: Active 3D sensor with integrated 2D live camera
- Installation height between 1 m and 2.4 m
- Standalone system with monitor enables simple configuration
- Records activities from the last hours

Your benefits

- This 3D solution provides a real image with a visual and audible warning enhances collision awareness
- Perfectly designed to work in challenging outdoor environments – even in strong sunlight or rain.
- You get everything in one package, suitable for retrofit business
- Assists operator to concentrate more on his duties, e.g. during maneuvering
- 3D vision helps to detect relevant objects in blind zones around the vehicle
- Recording feature helps for event analysis
- Simple and intuitive configuration

→ www.sick.com/Visionary-B

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





Visionary-T – At a glance

- Record up to 30 3D images per second
- Distance values: 144 x 176 pixels per snapshot
- Output 3D data via a Gigabit Ethernet interface
- Depth reproducibility of 3 mm and 30 mm at 1 m and 7 m distances respectively
- Temperature range: 0 °C to 50 °C or up to 45 °C (depending on the housing), Enclosure rating: IP 67; light sensitivity: 0 klx ... 50 klx

Your benefits

- More than 25,000 distance and intensity values in a single recording. As a result, no actuator is required and 3D information is also available for stationary applications.
- Easy mounting and rapid sensor replacement
- Solutions which provide the exact information required for the application
- Programming interface for using 3D data for further analysis on an external host
- The Visionary-T AG product version supports intelligent data reduction

→ www.sick.com/Visionary-T

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



RFU63x – At a glance

- UHF RFID read/write unit for industrial applications
- With or without integrated antenna, depending on the type (up to four external antennas can be connected)
- Standard-compliant transponder interface (ISO/IEC 18000-6C/EPC G2C1)
- Supports common industrial data interfaces and fieldbuses
- MicroSD memory card for device parameter cloning
- Several diagnostic and service options available

Your benefits

- Intelligent technology allows stand-alone usage
- Highest reading/writing performance
- Flexible integration in common industrial fieldbuses via 4Dpro compatibility
- Less maintenance time due to an integrated cloning back-up system using microSD memory card
- Easily adapts to application requirements via SOPAS parameter setting tool
- Free usable feedback LED quickly provides read results and diagnostic information directly to the user

→ www.sick.com/RFU63x

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





RAS4xx – At a glance

- Optional and simple sensing range adjustment of up to 20 m
- High level of availability even with contamination and in poor weather conditions
- Simple mounting and adjustment
- Additional sender / receiver modules

Your benefits

- The resistant collision avoidance system and driver assistance made to work in a diverse range of applications under any weather conditions
- A configurable sensor even makes it possible to detect awkward objects in extreme situations
- Large sensing ranges and detection beams are ideal for detecting objects early to provide reliable collision avoidance even under high workloads
- Quick and cost-effective adaptation to local conditions
- Long maintenance cycles to provide high levels of availability
- No additional wiring is required thanks to high level of independence from interference signals

→ www.sick.com/RAS4xx

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



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

→ www.sick.com/UM30

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





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-Pro display programming tool allow the encoder to be adapted flexibly and quickly according to customer needs
- Programmable zero pulse position simplifies installation

→ www.sick.com/DFS60

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



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 male connector
- PROFINET-IO-RT interface
- 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

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

→ www.sick.com/AFS_AFM60_PROFINET

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





AFS/AFM60 EtherNet/IP – At a glance

- High-resolution, 30-bit absolute encoder
- Integrated web server and FTP server
- DLR (Device Level Ring)
- Function module
- Comprehensive diagnostic functions
- IP addressing via software or hardware
- Round axis functionality (transmission calculation)

Your benefits

- Integrated web server for easy configuration without the need for specialized interface knowledge
- FTP server for firmware updates directly on site and in existing systems
- DLR (Device Level Ring) for enhanced system throughput thanks to redundant network communication
- Status display via five duo LEDs on the sensor for a quick initial indication of the operational status
- Comprehensive diagnosis via the 32-bit fault header
- Round axis functionality for full scalability for binary and non-binary resolutions as well as not complete multiturn revolutions (transmission calculation)
- Individual IP address via DHCP or pre-defined IP address via DEC switches

→ www.sick.com/AFS_AFM60_EtherNet_IP

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



KH53 – At a glance

- Non-contact length measurement – maintenance-free, rugged, long service life
- 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 harshest ambient conditions
- High traversing 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 ambient conditions such as the effects of dirt, dust, fog, shock, and vibration
- High efficiency and productivity
- Time savings – no reference run necessary on initial commissioning due to absolute position measurement
- Accurate positioning even with high mounting tolerances

→ www.sick.com/KH53

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





IMB – At a glance

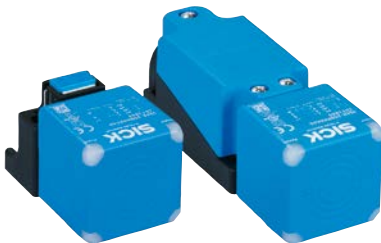
- Types: M8 to M30
- Extended sensing ranges: 2 mm to 20 mm
- Electrical configuration: DC 3-/4-wire, DC 2-wire
- Enclosure rating: IP 68, IP 69K
- Temperature range: –40 °C to +100 °C
- Rugged stainless-steel housing; plastic sensing face
- Optical adjustment indicator, IO-Link-ready
- Resistant to oils and cooling lubricants; suitable for use outdoors

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
- Quick and easy installation thanks to optical adjustment indicator 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

→ www.sick.com/IMB

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



IQG – At a glance

- Type: 40 mm x 40 mm
- Extended sensing ranges: 20 mm to 40 mm
- Electrical configuration: DC 3-/4-wire
- Enclosure rating: IP 68, IP 69K
- Temperature range: –25 °C to +85 °C
- Plastic housing
- Push-lock mounting system
- Sensor head can be rotated in five directions

Your benefits

- Easy to mount in only two seconds without the need for additional tools
- Reliable, cost-effective detection
- The four corner LEDs ensure that the sensor status can be identified from any viewing direction, whatever the mounting position
- Can be easily adapted to numerous applications
- Long sensor service life, even in harsh environments that are subjected to severe weather conditions
- Stable processes thanks to extensive sensing ranges

→ www.sick.com/IQG

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





W9-3 – At a glance

- High-performance sensor in ultra-rugged VISTAL™ housing
- PinPoint LED for highly visible and precise light spot
- Two emitter LEDs for best-in-class background suppression
- Variable mounting with M3 or M4 hole pattern
- Wide range of connection options

Your benefits

- Robustness with the VISTAL™ housing
- Best in class performance
- Wide variance in connection, mounting and optic

→ www.sick.com/W9-3

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



KTM Core – At a glance

- Small, tried-and tested housing
- High grayscale resolution
- Very large dynamic range means reliable detection of contrasts on glossy materials
- Switching frequency: 10 kHz
- White light

Your benefits

- Small housing allows installation even where space is limited
- Powerful, fast contrast sensor ensures high machine throughput
- Good contrast resolution and a very large dynamic range ensure good detection performance on glossy materials, thus increasing the range of application possibilities
- Quick and easy configuration

→ www.sick.com/KTM_Core

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





W280-2 – At a glance

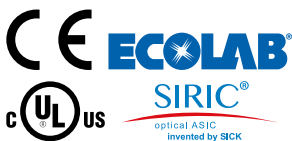
- Easily visible red light thanks to BrightLight LED
- Potentiometer for adjusting the sensing range/sensitivity
- Light/dark switching (DC devices only)
- Rotatable male connector, cable connection or terminal connection
- Variants for 10 – 30 V DC or 24 – 240 V DC/AC voltage supply
- AC/DC devices (-2Hxxxx) are compliant with EN-61000-6-3 (electromagnetic interference for “residential, commercial and light industrial environments”)
- BEF-W280 mounting bracket made of stainless steel (1.4301) included with delivery

Your benefits

- Simple and fast commissioning with the highly visible light spot of the BrightLight LED
- Simple operation via potentiometer
- Light/dark switching provides application flexibility
- All necessary mounting and operating accessories are included in delivery, enabling quick and easy setup: since mounting bracket (stainless steel 1.4301) is included in delivery scope
- DC devices and AC/DC devices available in the same housing, allowing electrical flexibility
- Less contamination due to high operating reserves, reducing downtime

→ www.sick.com/W280-2

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



W27-3 – At a glance

- Intense visible red emitter LED with consistent light spot for PinPoint versions
- Long sensing ranges with IR LED achieve up to 2500 mm
- Precise background suppression for detection of multi-colored objects
- Universal DC or DC/AC supply voltage
- Operating temperature: –40 °C – +60 °C
- Flexible sensor settings, monitoring, advanced diagnostics, and visualization

Your benefits

- Quick and easy commissioning due to a highly visible red PinPoint LED
- PinPoint technology can replace laser photoelectric proximity sensors in some applications. No laser safety regulations and a longer operating life due to PinPoint technology
- Resistant to ambient light, optical reflections, and crosstalk from other photoelectric devices
- Less contamination due to high operating reserves, reducing downtime
- Resistant to vibrations, reducing downtime
- Operation in harsh environments with temperatures as low as –40 °C
- IO-Link provides easy data access from the PLC
- Quick and easy configuration

→ www.sick.com/W27-3

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





C4000 Palletizer – At a glance

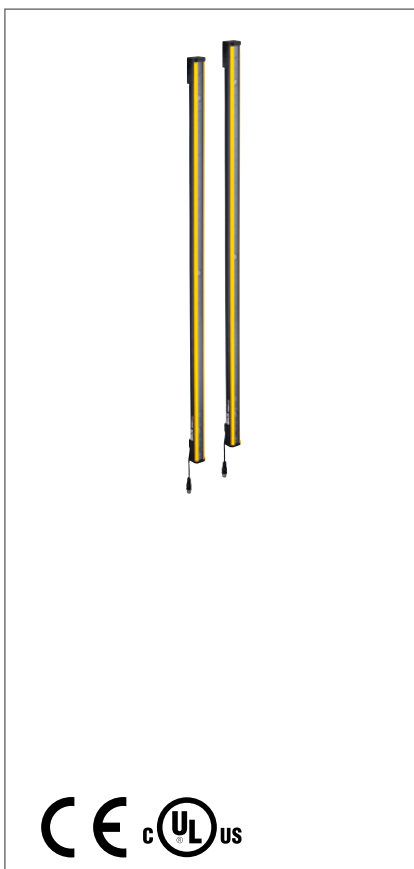
- Type 4 (IEC 61496), SIL3 (EN 62061), PL e (EN ISO 13849)
- Self-teaching, dynamic blanking for detection of goods and pallets
- Direction detection
- Multiple sampling
- Reduced resolution
- Muting alternative
- Beam coding
- Object gap suppression

Your benefits

- Cost-effective due to the savings made on additional muting sensors or other protective measures
- A compact sensor pair significantly reduces mounting effort – additional muting sensors are not required
- With the dynamic and self-teaching blanking function, the system can reliably differentiate between man and material – this provides maximum safety
- Mixed pallet operation allows mesh boxes, Euro pallets, and half pallets to pass, significantly increasing system throughput
- Saves storage space: pallets can be parked permanently in the protective field
- One system monitors multiple conveyor belts, reducing sensor costs
- Quick commissioning: Detects Euro pallets, mesh boxes etc. without any programming

→ www.sick.com/C4000_Palletizer

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



deTem4 Core – At a glance

- Typical scanning range of up to 90 m
- 2 versions: small and wide scanning range
- Compact design
- The same housing as deTec
- Versions with 2, 3, and 4 light beams
- Ambient operating temperature of -30 °C to +55 °C
- Enclosure ratings IP65 and IP67

Your benefits

- Protection of large access areas with multiple beam deflections as well
- Little space required
- The same quick and easy mounting and commissioning as the deTec: the same accessories and connectivity
- Reduced variant diversity
- Reliable in challenging environments

→ www.sick.com/deTem4_Core

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





M4000 Advanced – At a glance

- Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
- Robust housing with three mounting grooves
- Wide scanning range, up to 70 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 integration features: laser alignment aid, 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

→ www.sick.com/M4000_Advanced

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



TR10 Lock – At a glance

- PL e for door and locking monitoring (EN ISO 13849)
- 1,690 N locking force
- RFID actuator with low or high coding level (EN ISO 14119)
- Enclosure rating IP 67, IP 69K
- Power to lock or power to release variants
- Reliable series connection of safety outputs (OSSDs)
- Four actuation directions
- Flexi-Loop-ready

Your benefits

- The high coding level of the actuator meets all the EN ISO 14119 requirements relating to manipulation-proofing without additional measures
- Self-monitoring semiconductor outputs (OSSDs) afford a high level of safety
- Reliable series connection reduces installation work
- Rugged IP 69K housing ideally suited to use in heavily contaminated environments
- Slim housing design with flexible actuator installation options enables simple machine integration
- Bistable solenoid coil consumes only a small amount of power and produces no heat when the system is either locked or unlocked
- Fast diagnosis via LED status indicator

→ www.sick.com/TR10_Lock

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





i110 Lock – At a glance

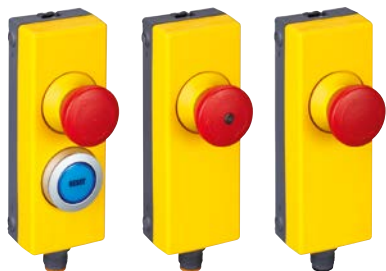
- Narrow plastic housing
- Metal actuator head
- Rigid or mobile actuators
- Available with M20 X 1.5 cable entry glands or Flexi Loop-compatible M12 plug connector (depending on variant)
- Locked by spring force and magnetic force
- Lock and door monitoring

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
- Rugged metal housing provides increased machine reliability, even when the guard has a mechanical offset
- Flexi Loop now enables a safe series connection with enhanced diagnostics capabilities and minimal wiring effort.

→ www.sick.com/i110_Lock

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



ES11 – At a glance

- Slim plastic housing with quick disconnect mounting clip
- Available as an emergency stop pushbutton or as a combined emergency stop/reset unit
- Emergency stop pushbutton with optional LED illumination
- Illuminated reset pushbutton
- Flexi Loop-compatible M12 plug connector

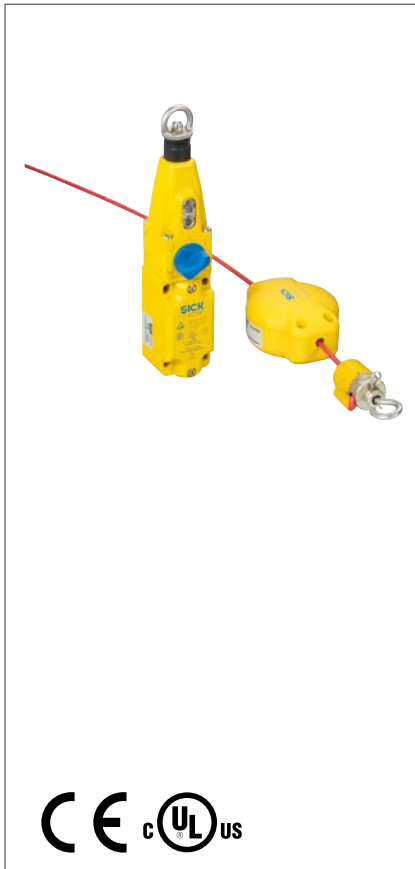
Your benefits

- Easy mounting with snap-in connection
- Quick commissioning and rapid replacement thanks to M12 plug connector
- User-friendly status display
- With Flexi Loop: safe series connection including diagnostics with easier wiring

→ www.sick.com/ES11

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





i110RP – At a glance

- Rope lengths up to 30 m, with rope break and rope pull function
- Metal housing with integrated rotary unlocking lever and tension display
- Available with M20 X 1.5 cable entry gland or Flexi Loop-compatible M12 plug connector (depending on variant)
- Slow-action switching elements with four contacts
- Complies to the standards EN ISO 13850 and IEC/EN 60947-5-5

Your benefits

- The emergency stop function can be triggered at any point along the rope
- Simple adjustment of the rope tension
- Rugged metal housing offers a high level of protection for the rope pull switch
- User-friendly systems available with many rope lengths
- Additional contacts provide quick and easy diagnostics
- Flexi Loop now enables a safe series connection with enhanced diagnostics capabilities and minimal wiring effort.

→ www.sick.com/i110RP

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



E100 – At a glance

- Plastic housing with connected cable
- 3-stage functional structure (off-on-off)
- Slow-action switching elements with four contacts
- Variant with additional plus/minus buttons
- Complies to the standard IEC/EN 60947-5-8

Your benefits

- Personal protection with enabling switches: increased safety in setup mode when protective devices are deactivated
- Plus/minus buttons for additional control of direction of movement
- Different cable lengths available to meet customer application requirements

→ www.sick.com/E100

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





Flexi Soft – At a glance

- Expansion modules, Motion Control modules, and gateways for all common fieldbuses
- Configuration data stored in the system plug
- Safe networking of up to 32 Flexi Soft stations
- Integration of sensor cascade
- Multi-language, license-free configuration software: exceptionally simple operation, plausibility check, simulation mode, wiring diagram, parts list, documentation, and data recorder

Your benefits

- Scalable for an efficient and cost-optimized safety application solution
- Cost savings: Flexi Soft offers a modular structure that is in line with your requirements, and thus offers an ideal level of granularity
- Intuitive configuration software featuring comprehensive functions enables continuous monitoring of the configuration
- Rapid verification of the safety application: The configuration software provides documentation and a wiring diagram
- Safety logic is easy to create thanks to ready-made, TÜV-certified function blocks
- The main module's diagnostics interfaces and the configuration storage facility in the system plug enable rapid commissioning, component replacement, and troubleshooting, resulting in minimum downtimes

→ www.sick.com/Flexi_Soft

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



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

More than 8,000 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 agencies 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 70 years of experience.





→ www.sick.com/service



Consulting and design

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



Product and system support

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



Verification and optimization

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



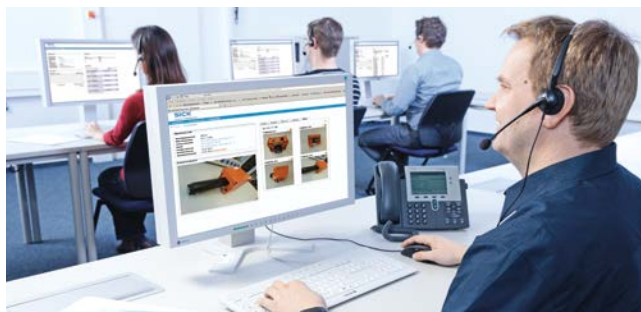
Upgrade and retrofits

- Upgrade services



Training and education

- Training
- Seminars
- Web training



VERSATILE PRODUCT RANGE FOR INDUSTRIAL AUTOMATION

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

→ www.sick.com/products

Photoelectric sensors

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



Proximity sensors

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



Magnetic cylinder sensors

- Position 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
- Pattern sensors



Automation light grids

- Measuring automation light grids
- Switching automation light grids



Opto-electronic protective devices

- Safety laser scanners
- Safety light curtains
- Safety camera systems
- Multiple light beam safety devices
- Single-beam photoelectric safety switches
- Mirror columns and device columns
- Upgrade kits for opto-electronic protective devices



Safety switches

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



sens:Control – safe control solutions

- Safe sensor cascade
- Safety controllers
- Motion Control 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
- Control units



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
- Flow computers



Identification solutions

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



Vision

- 2D vision
- 3D vision



Distance sensors

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



Detection and ranging solutions

- 2D LiDAR sensors
- 3D LiDAR sensors
- 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 and inclination sensors

- Absolute encoders
- Incremental encoders
- Linear encoders
- Wire draw encoders
- Safety encoders
- Inclination sensors
- Measuring wheel encoders



Fluid sensors

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



Integration products

- Sensor Integration Machine
- 4Dpro connectivity



System solutions

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



Software products

- SICK AppSpace
- Analytics Solutions
- Integrated Managing Solutions



EASY INTEGRATION INTO YOUR AUTOMATION WORLD

In the age of information easy, fast, and manageable access to information is becoming a strategic asset. Our intelligent sensor solutions and safety controllers provide different integration technologies that 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 availability with a continuous diagnostic concept.

PLC and engineering tool integration

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

Function blocks

The SICK function blocks allow you to quickly 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 programming 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 for carrying 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 wherever there is a web browser 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 and network solutions



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

→ www.sick.com/industrial-communication

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- ✓ Create, save, and share as many wish lists as you want.
- ✓ Use the direct order to quickly order a big amount of products.
- ✓ Check the status of your orders and quotes and get information on status changes by e-mail.
- ✓ Save time by using past orders.
- ✓ Easily export orders and quotes, suited to your systems.



SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

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



Consulting and design
Safe and professional



Product and system support
Reliable, fast, and on-site



Verification and optimization
Safe and regularly inspected



Upgrade and retrofits
Easy, safe, and economical



Training and education
Practical, focused, and professional

SICK AT A GLANCE

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

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

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

That is “Sensor Intelligence.”

Worldwide presence:

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

Detailed addresses and further locations → www.sick.com