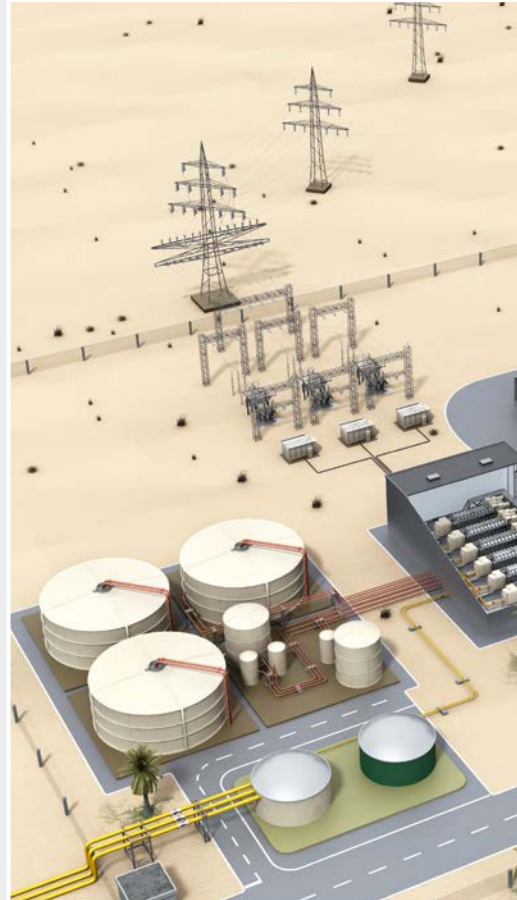
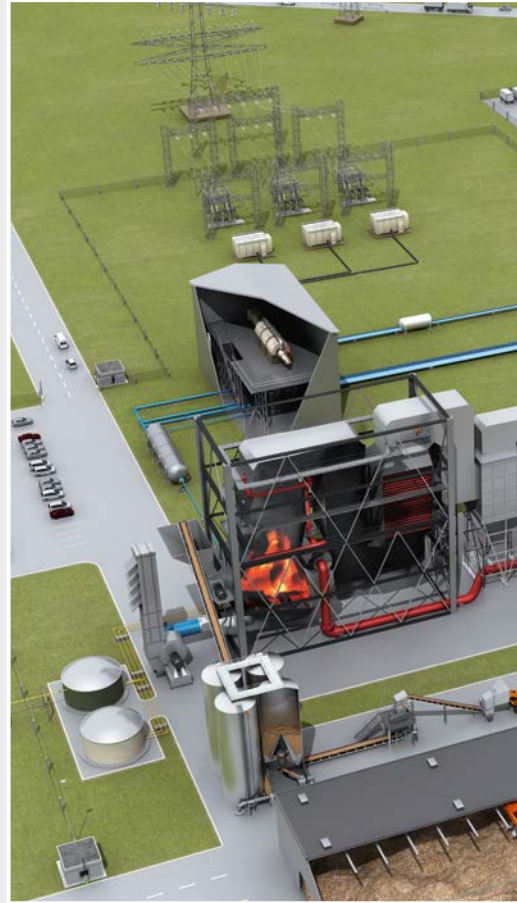
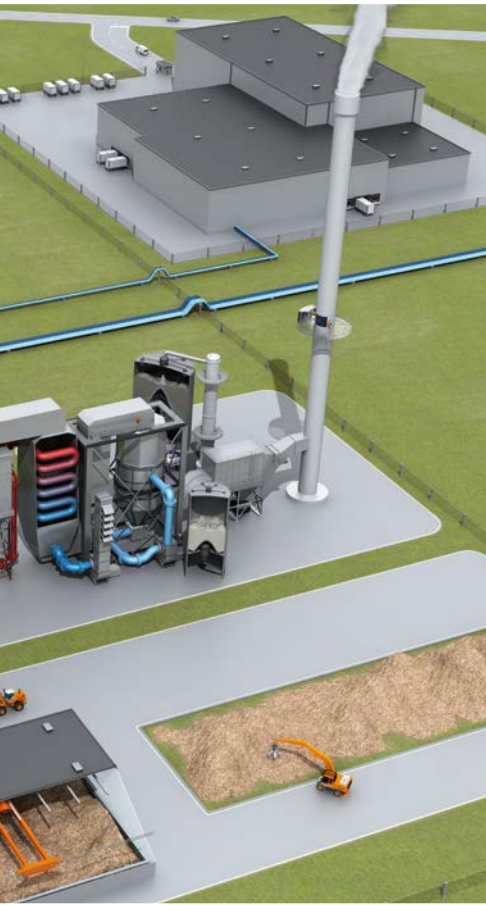


Efficient Solutions for the Power Industry

Intelligent sensors in electricity generating plants

SICK
Sensor Intelligence.





Challenges

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| Efficient, environmentally friendly and cost effective – a difficult balance for electricity producers | 4 |
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Building security

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| Monitoring of perimeters / fences / walls | 6 |
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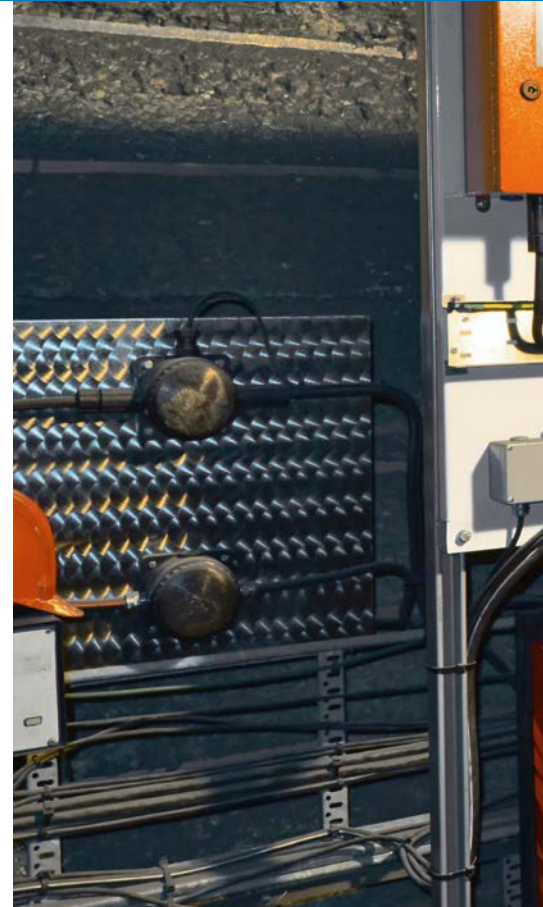
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Challenges in the power industry

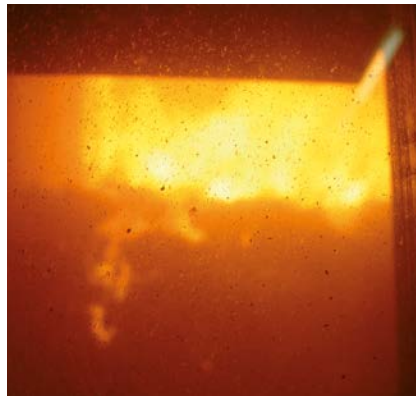
The power industry faces a number of challenges when generating electricity. In every plant, the efficient use of fuel and protection of assets are of utmost importance to insure optimum profitability. Emission monitoring and pollution control is a requirement in nearly every country.

SICK is an ideal partner for the power industry. With its broad range of intelligent sensors and solutions they have proven their applicability in all areas of the power generation process, from material flow to pollution control to emissions monitoring – all from a single source.



Emissions monitoring

The regulatory requirements for emission monitoring and reporting are becoming more stringent in nearly every country in the world. In order to insure compliance, many customers turn to SICK to meet their needs for dust, volumetric flow and continuous gas emissions monitoring solutions.



Efficiency

Combustion efficiency means getting the maximum energy out of the fuel, without damage or danger to plant staff and equipment. SICK measures a number of parameters which are used for combustion control: O_2 , CO and primary air flow, all in-situ, to provide the quickest possible signal for control.



Service

Competent consulting, qualified planning support, detailed project planning and engineering, installation and start-up – SICK provides all of these services with our own personnel. SICK is also available for service support of the equipment during scheduled outages and in emergency situations.



Pollution control systems

Scrubbers, catalytic reactors and particulate filters all remove gaseous pollutants from the flue gas to meet stringent environmental limits. SICK's range of in-situ gas analyzers provides real-time measurement data to calculate removal efficiency and control system performance.



Optimum material flow

Monitoring fuel flow into the plant optimizes throughput, reduces loading time and saves maintenance time. SICK has a wide variety of scanners used to measure bulk volumes on conveyors as well as level measurements in bins and silos. Sensor data to help increase production efficiency.



Corrosion protection

Boiler corrosion can be a nightmare for plant owners. It means shortened boiler lifetime, increased maintenance and repair cost, unwanted outages: in short – lower plant efficiency. SICK provides a system to monitor CO and O₂ directly at the boiler wall to limit the potential for corrosion.

Stop any security gaps before they appear

When it comes to protecting public buildings, industrial property or construction projects, using security guards often have their limitations. Making additional use of electric or electronic protective devices is therefore a sensible idea.

Reliable people counting systems are just one example of a device that is essential in order to optimize business processes and comply with safety regulations. Counting of persons can be used for building management and automation or for marketing and logistics purposes.

In addition to offering you an appropriate sensor solution, SICK can also provide you with an expert consultation and the necessary planning assistance.



Perimeter monitoring

Vertical or diagonal monitoring of fences. Electronic laser sensors will detect danger before the mechanical protection devices are even tampered with.

Description and benefits

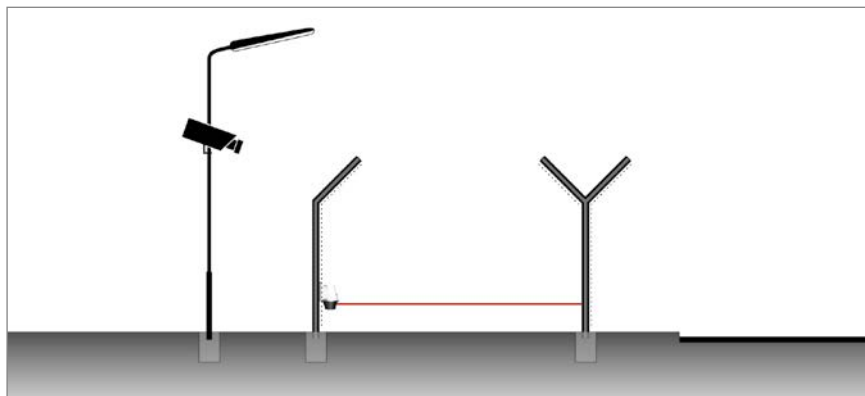
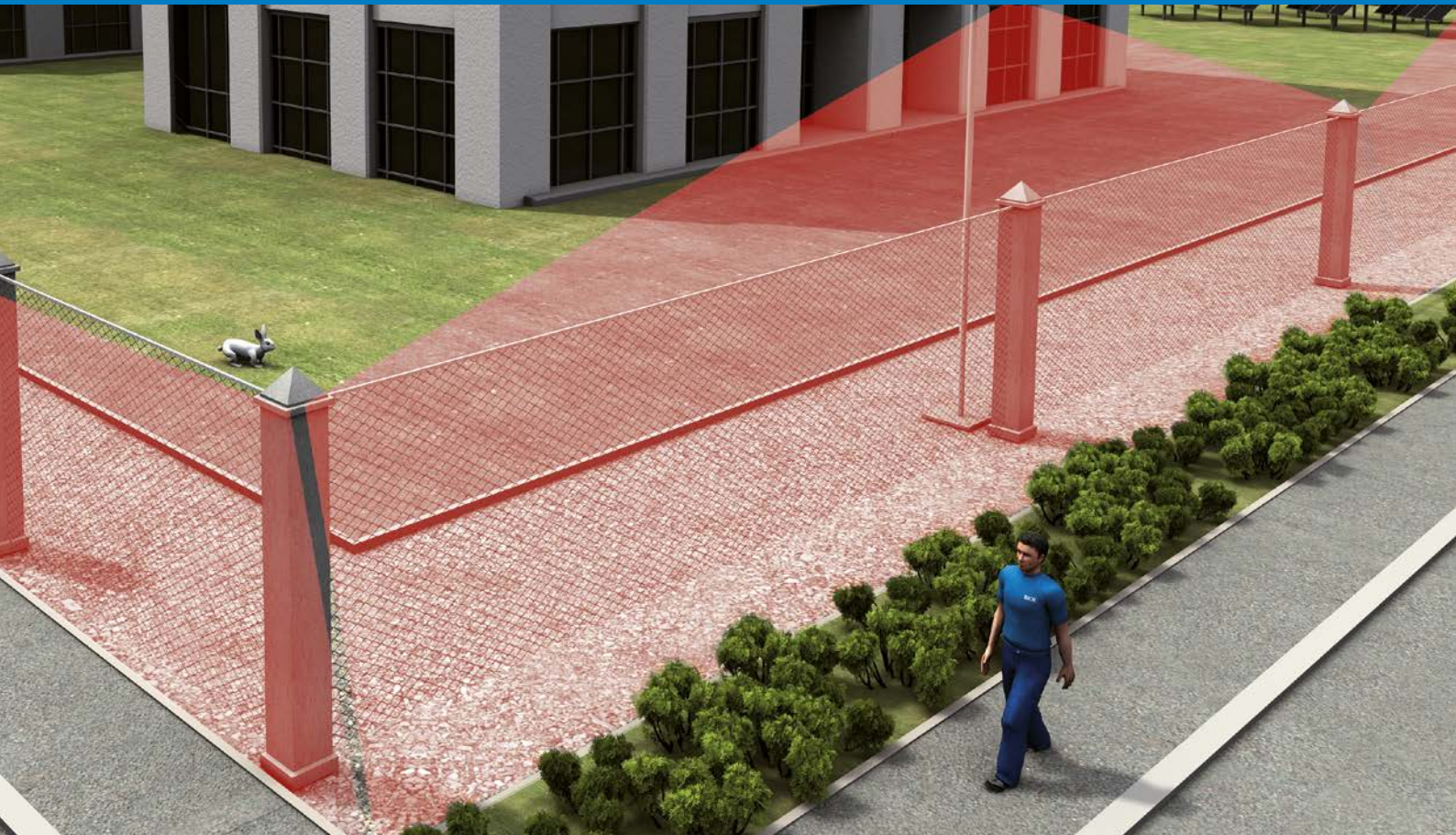
For building automation of a perimeter, fence or wall, we distinguish two application areas area monitoring and location indicator systems.

With area monitoring, software in the sensor will manage all monitoring areas. The system signals if intruders are present by releasing the switching output and triggering an alarm whenever an area is violated. This may, for instance, also be triggered by objects or items regardless of whether they are mobile or not.

The sensor uses the measuring data with which it has been provided to determine the location.

When this is done, the devices are set so that small animals, adverse weather conditions or mere passers-by do not trigger any false alarms.

Another important feature is that the devices take privacy into account. Unlike other protective devices, SICK sensors only record contours for personal identification and not real images. This means that the system will be able to tell that somebody is present within the monitored area but not who it is.



Perimeter protection/double fence

Unlike single fence, which uses vertical or diagonal area monitoring, with a double fence horizontal monitoring can also be used. The area between the fences then provides constant, predefined conditions. SICK laser scanners will monitor the area reliably and constantly and have a low rate of false alarms.

Tasks and benefits

Laser scanners

- Make undetected intrusion into an area extremely difficult
- Detect events at the perimeter of an area
- Fence protection, protection of approach areas
- Protection and/or monitoring of entrances
- Excavation protection (with horizontal/diagonal setup)
- Monitoring large areas
- Store of all types of surrounding contours as references
- Not impaired by surrounding lighting
- Fixed-position obstacles can be blanked (e.g. walls)

Recommended products

Laser scanners

**LMS13x (LMS111), LMS2xx/
LMS5xx (outdoor), LD-MRS,
LD-LRS**





Coal fired power plant

Focus 1 10

- ① Coal handling

Focus 2 12

- ② Combustion process

Focus 3 14

- ③ DeNOx

Focus 4 16

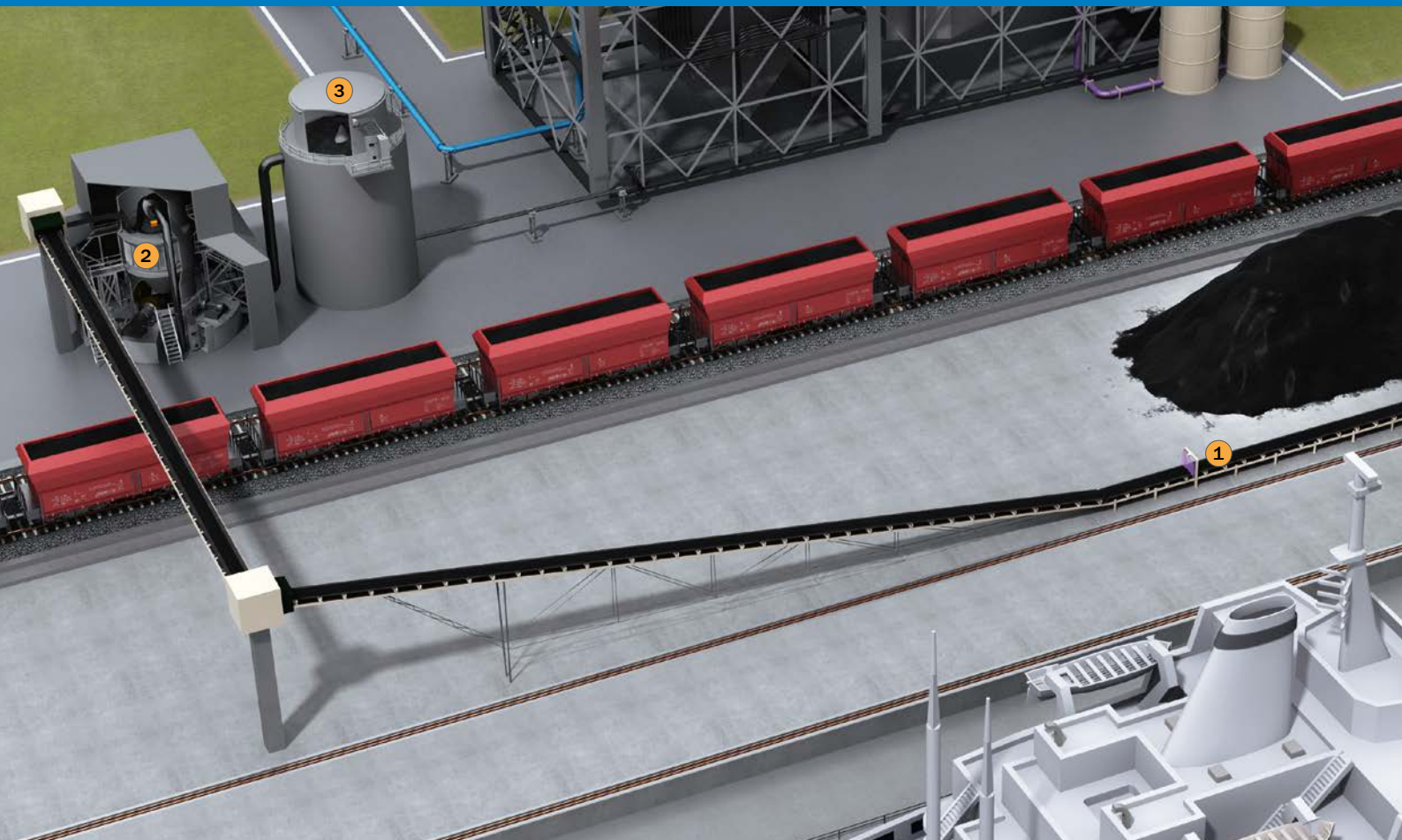
- ④ Dust removal

Focus 5 18

- ⑤ Wet flue gas desulfurization (FGD)

Focus 6 20

- ⑥ Continuous emission monitoring



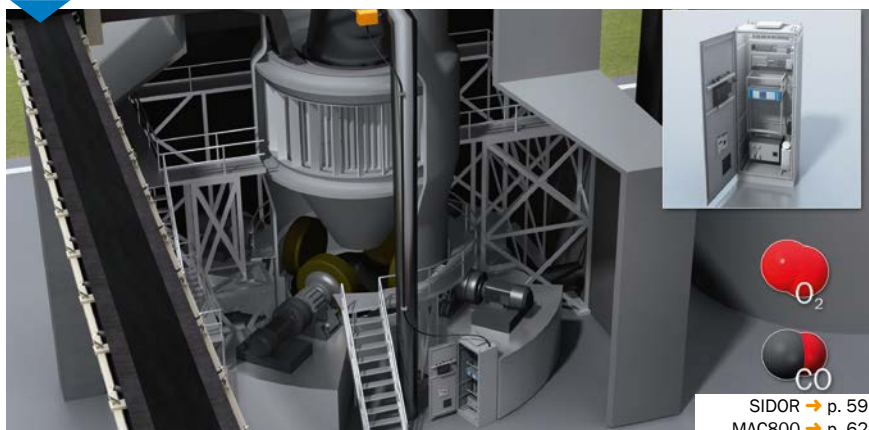
2 Protecting the coal mill by monitoring CO and O₂

CO and O₂ measurement in the coal mill is important for early warning of a smoldering fire and/or a leak in the inerting system. The MAC800 analyzer system equipped with an explosion-protected sampling probe is the ideal solution for this monitoring. The system can be configured to sequentially monitor a number of mills. The SIDOR gas analyzer provides simultaneous measurements of O₂ and CO.

An important feature is the stability of the measuring benches allowing routine adjustments to be made using only ambient air or inert gas. It is the ideal device for safety-relevant measurements.

3 Overfill protection for coal bunkers/silos

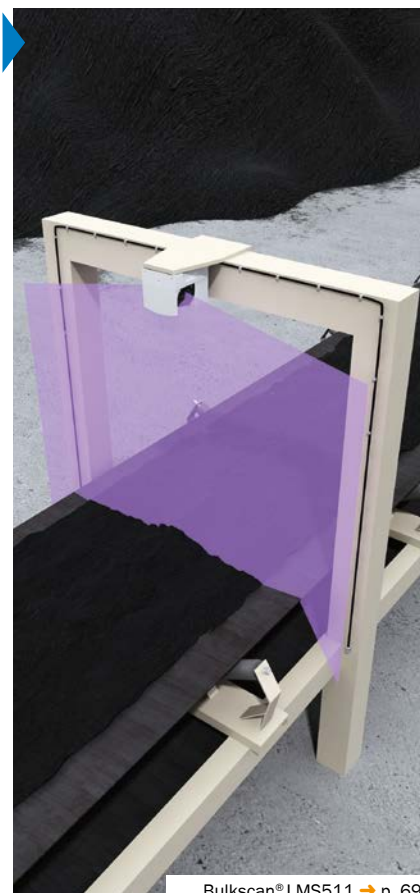
Coal is typically stored in silos after it has been pulverized. In order to prevent overfilling of the silo, a point measurement of the level is needed. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is also resistant to deposit formation, making it an ideal choice for use in bin level monitoring of coal.



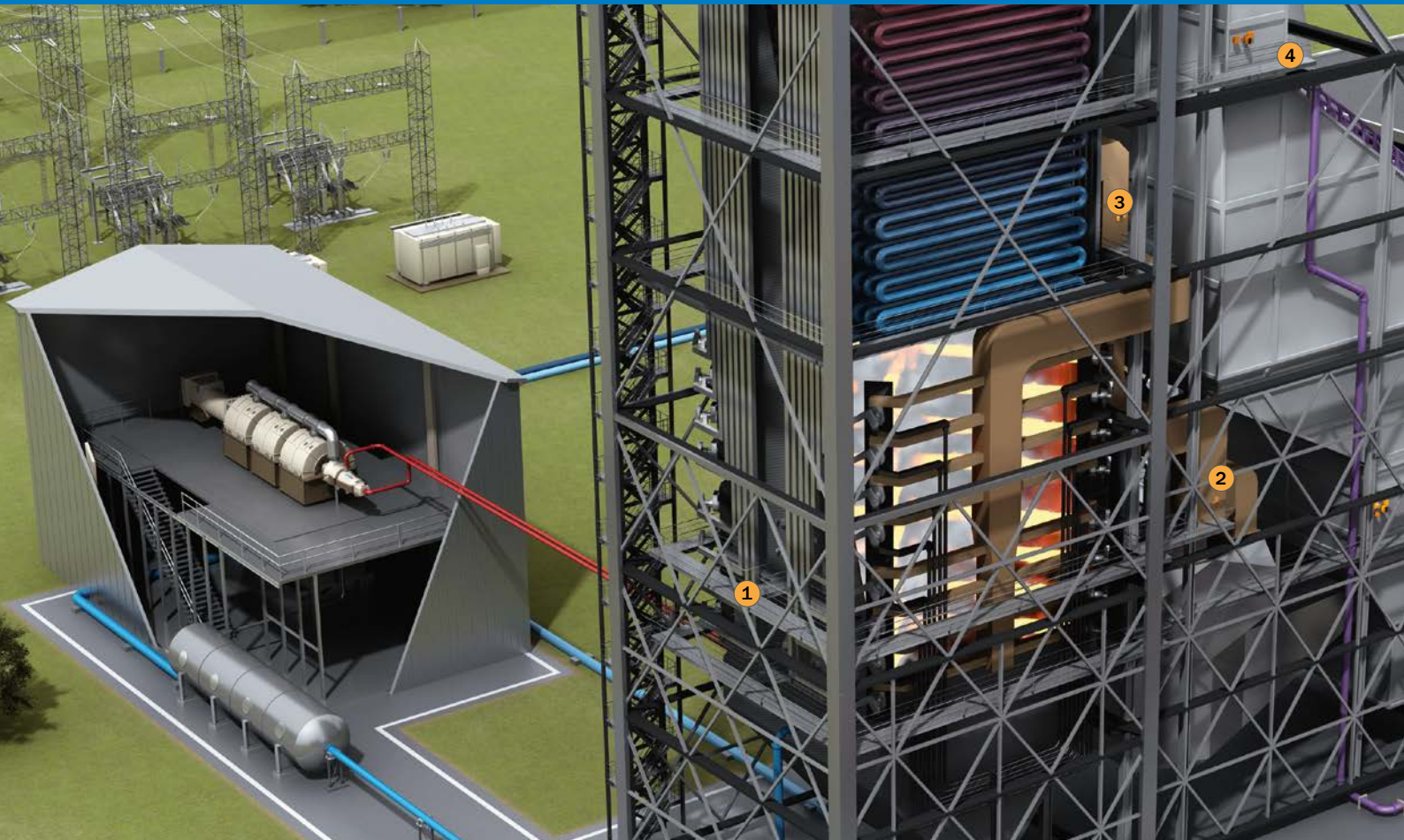


1 Conveyor control and crusher monitoring

The coal is transported on conveyor belts, moving from the coal pile to the crushers or transfer points. Volume measurement is necessary here to control coal delivery to the mill and optimize throughput. Loading time can also be reduced by making a volumetric measurement at this point. The Bulkscan® LMS511 sensor records volume flow on conveyors without contact, based on the principle of laser flight time measurement. The integrated centre-of-gravity calculator maximizes transport performance and detects one-sided loading or uneven belt loads. The belt running control serves to detect belt unevenness which causes higher belt wear costs.



Bulkscan® LMS511 → p. 69



2 Monitoring primary air flow

Power plant efficiency requires continuous monitoring and optimization of the combustion process. The supply of combustion air is a primary task because it delivers the required amount of oxygen which must be optimized and controlled carefully to ensure safe and efficient combustion, to minimize fuel consumption as well as emission of pollutants like CO, CO₂ and NO_x.

Reliable and accurate monitoring of primary combustion air volume flow at the boiler inlet is very important. The FLOWSIC100 ultrasonic flow meter is ideal for measuring flow in this hot and dusty ambient environment. The system features accuracy even at low flow rates, no loss of pressure and low cost of installation due to short inlet and outlet runs.

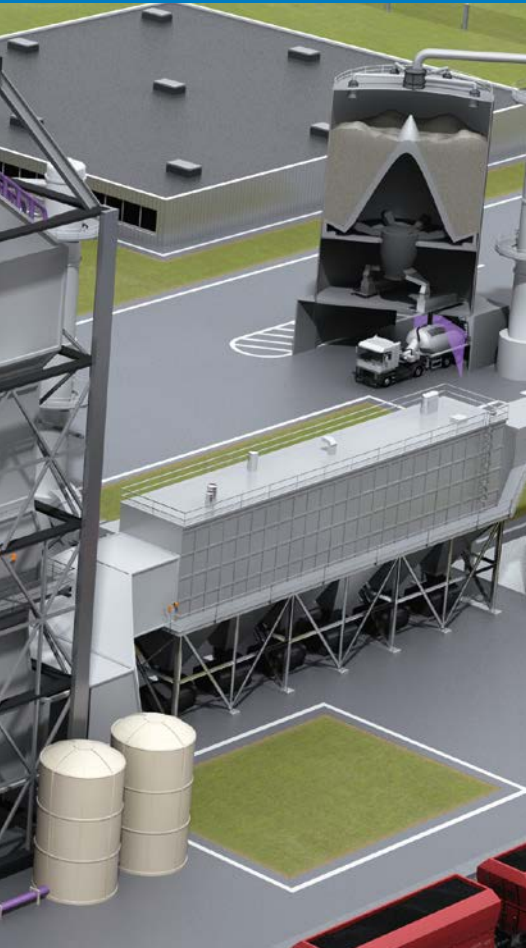
3 Monitoring re-circulation air

Power plant efficiency requires continuous monitoring and optimizing of the combustion process. Monitoring the recirculation air for CO is important because it provides the necessary signal needed to control the addition of fresh air, to maintain the correct stoichiometric ratio and optimize the efficiency of the combustion process. In-situ analysis provides the fast response necessary for control.



FLOWSIC100 M-AC → p. 67





1 Monitoring at the boiler wall

The reducing atmosphere inside the boiler is the primary cause of corrosion and the formation of deposits. By maintaining CO at low levels and O₂ at minimum of 0.5%, corrosion or deterioration of the boiler wall can be minimized. The GM960 boiler wall monitor is a measuring system for the analysis of CO and O₂ at the inner boiler wall. The CO Corrosion Level and CO Corrosion Load are determined at each of up to 40 measuring points. CO and O₂ values and CO Corrosion Levels detect potential danger of corrosion so that immediate action can be taken such as better control of feeders or combustion air. CO Corrosion Load represents the long term CO corrosion exposure to the boiler wall.



GM960 → p. 63

The GM901 in-situ CO gas analyzer is available as a cross-duct type. As a result, it is suited to a broad range of applications - even for difficult measuring tasks such as overpressure, critical flow profiles or high gas concentrations.

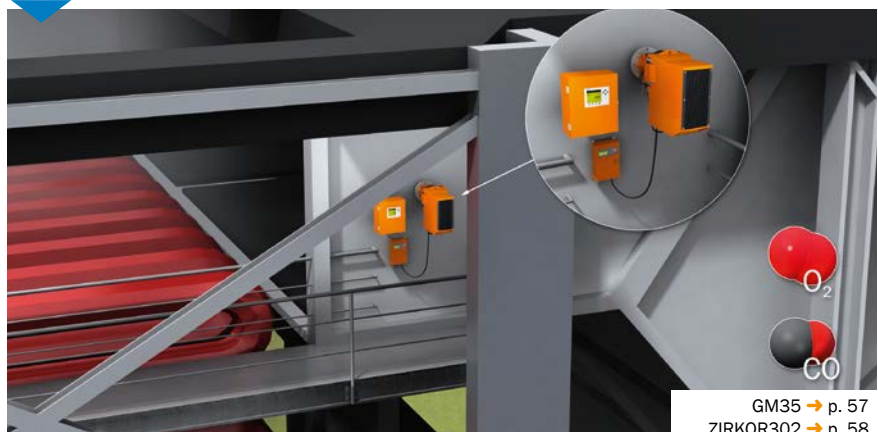
4 Gas monitoring at the boiler outlet

Combustion efficiency is an important control parameter when fuel is burned to generate heat. Zirconium oxide oxygen analyzers are the most widely used combustion control instruments. CO is measured at the economizer as a secondary component for burner control. Reliable and accurate monitoring of O₂ and CO at the boiler outlet are key elements to control the excess air in the combustion process.

The ZIRKOR302 in-situ analyzer provides a reliable and rapid measurement of oxygen even at higher temperatures. The GM35 gas analyzer measures CO, CO₂ and H₂O concentrations as well as temperature and pressure quickly, easily and economically.



GM901 → p. 58

GM35 → p. 57
ZIRKOR302 → p. 58



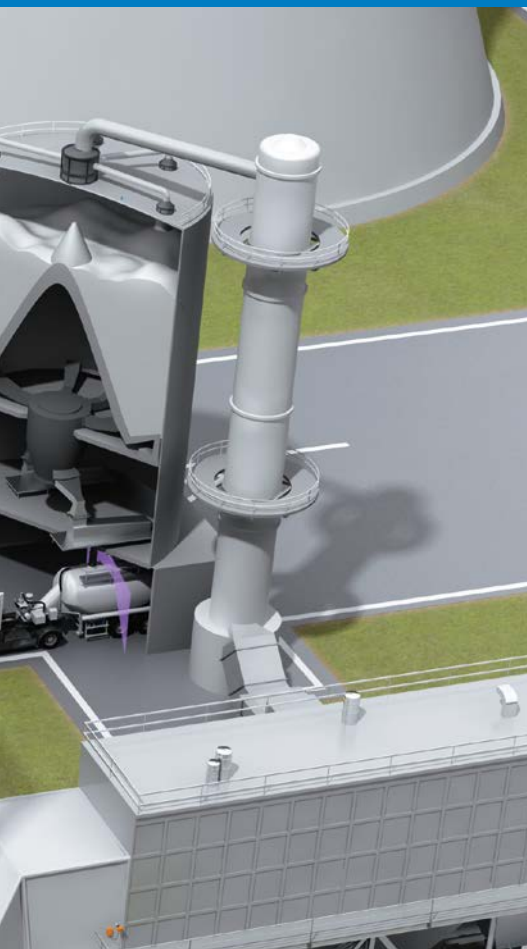
2 Volume flow measurement

To determine mass emissions, flow in the duct after the SCR can be measured. The “High Power” FLOWVIC100 H ultrasonic meter 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 temperatures $>260^{\circ}\text{C}$... 450°C the measuring system operates with built-in cooling air to protect the sensor heads against high temperature.

The MCU controller is used for input and output of signals, for calculation of volume flow to reference conditions (standardization) as well as for user interface.



FLOWVIC100 H → p. 66



1 Economizer outlet, selective catalytic reactor (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 pressure and temperature in the gas duct - directly, fast and without gas sampling and transport - true values in "real time". The ZIRKOR302 in-situ analyzer, provides a reliable and rapid measurement of oxygen for reporting normalized values.



GM32 → p. 56
ZIRKOR302 → p. 58

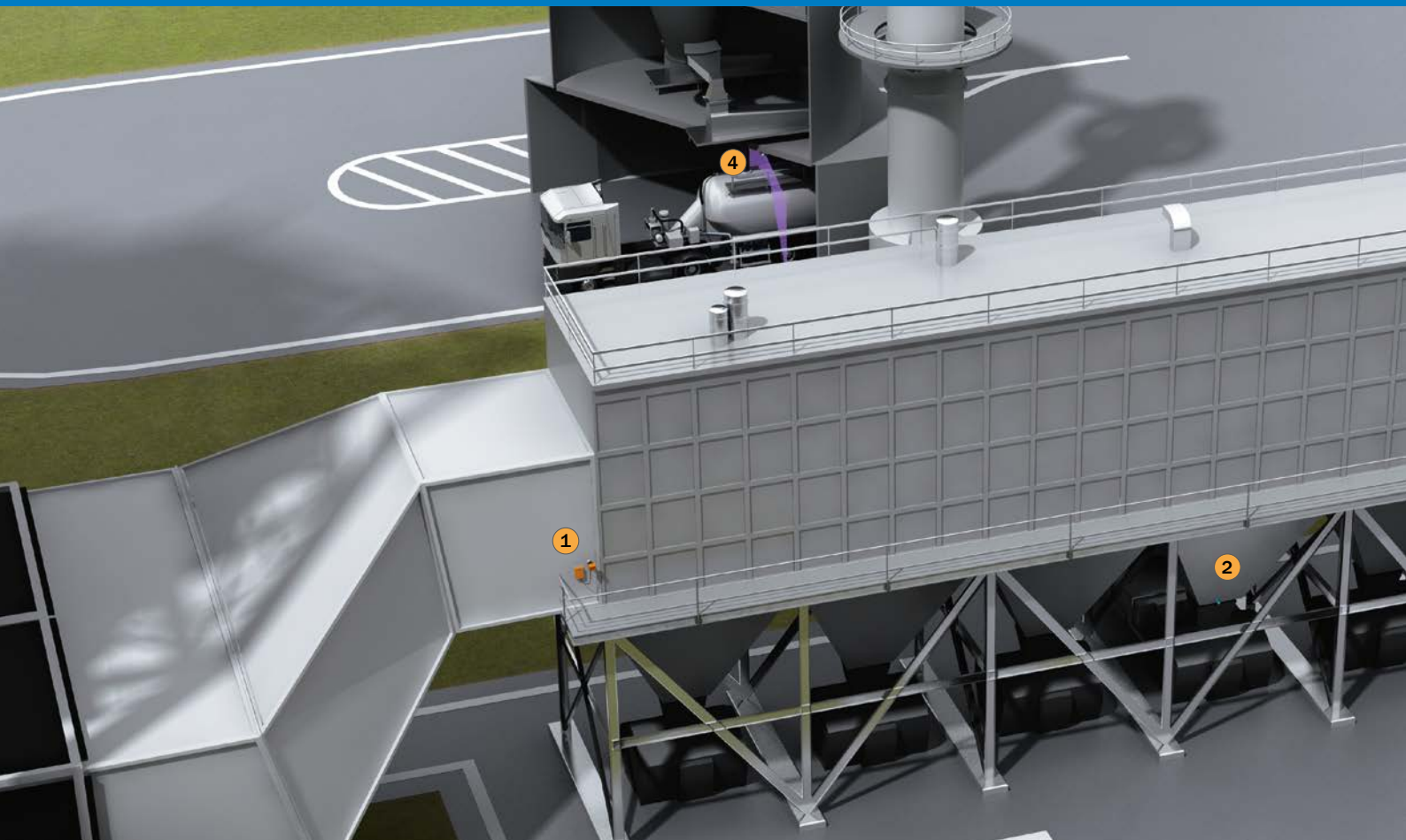
3 Selective catalytic reactor (SCR) outlet prior to air heater

NOx is typically measured at the outlet of the SCR for removal efficiency calculation or feedback to NH₃ injection controller. Ammonia is often measured here to insure that NH₃ slip is low for several reasons including clogging of the air heater and NH₃ bonding to the fly ash making disposal a problem. The GM32 in-situ gas analyzer measures NO and NO₂ (NOx) in the gas duct - directly, fast and without gas sampling and transport.

Reliability, precision and fast response times are the distinguishing features of the GM700 laser gas analyzer which continuously monitors low levels of NH₃.

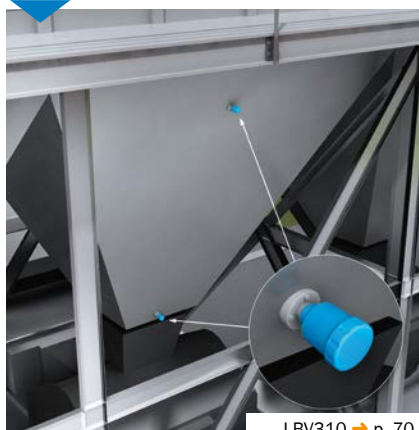


GM32 → p. 56 GM700 → p. 57 ZIRKOR302 → p. 58



2 Ash collection hoppers

The particulate that passes into the electrostatic precipitator is collected on the plate surfaces. Once “rapping” is done, the collected particulate falls off into collecting hoppers. In order to detect if the hopper is full, point level measurements are made. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is insensitive to deposit formation. Apart from that, it is characterized by easy installation as well as start-up without filling.

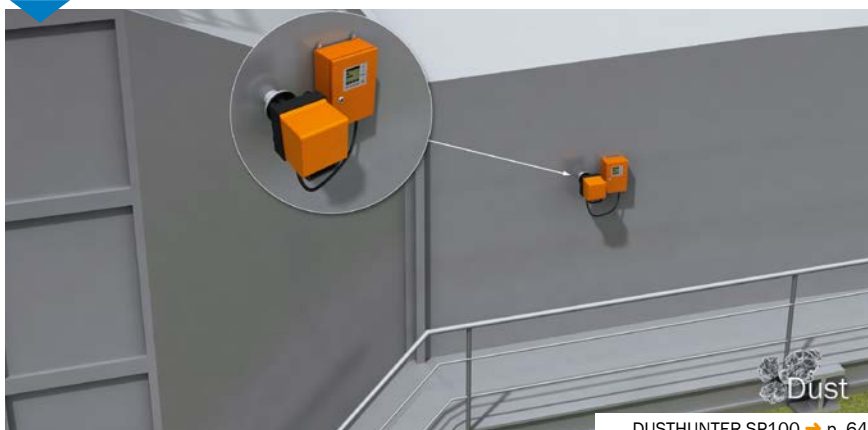


LBV310 → p. 70

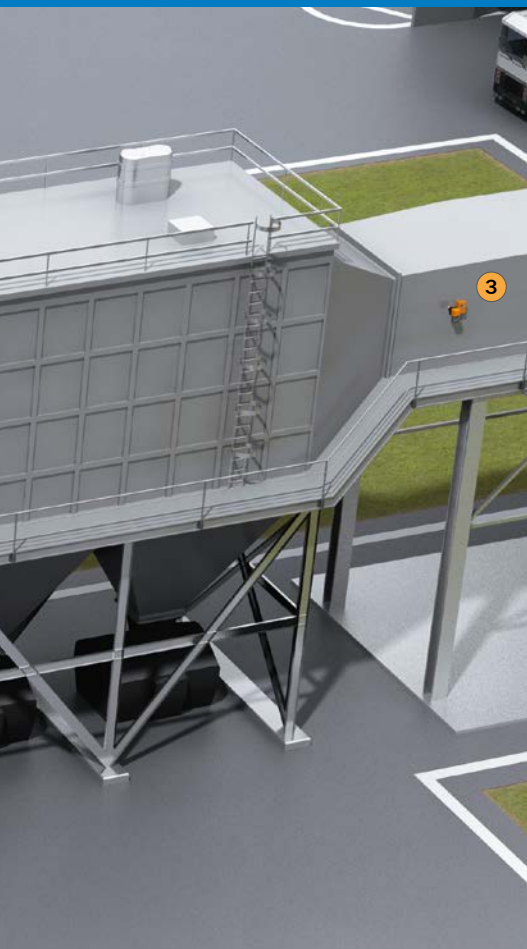
3 Monitoring dust removal efficiency

Flue gases from coal fired combustion processes are loaded with particulate matter (PM) and, due to environmental regulations, must be cleaned before release into the atmosphere. This is done by passing a dedusting device, such as an electrostatic precipitator. The correct operation of the electrostatic precipitator is ensured by continuously monitoring the dust concentration after the filter.

The DUSTHUNTER SP100 is a good choice for very low to medium dust concentrations. The measurement is based on the forward scattering of light. An automatic check of zero and reference point as well as contamination check are integrated in the device.



DUSTHUNTER SP100 → p. 64



1 Electrostatic precipitator protection

Flue gases from coal-fired combustion are loaded with particulate matter. The particulate has to be removed before the gas is released to the atmosphere. In order to do that, coal fired plants often use electrostatic precipitators to remove dust. CO is monitored in the ductwork at the inlet of the precipitator in order to provide an indication if a high level of CO is present. This could cause an explosion inside the precipitator which is dangerous and costly. The GM901 gas analyzer is available as a cross-duct type. As a result, it is suitable even for difficult measuring tasks such as high pressure, critical flow profiles or high measuring gas concentrations.

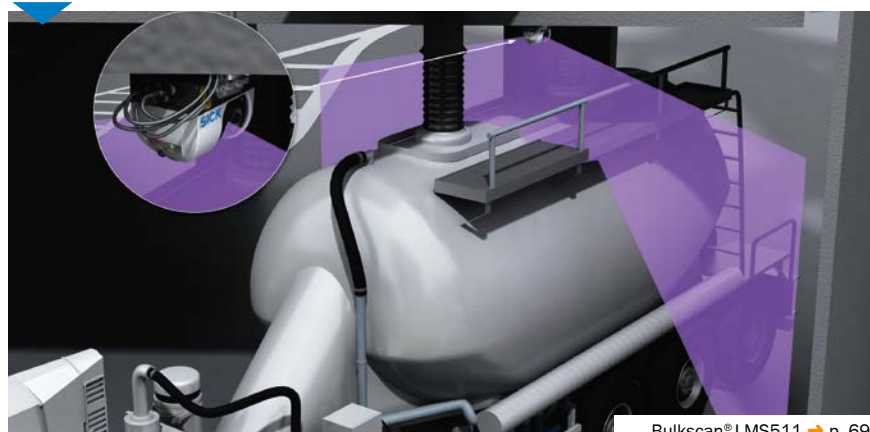


GM901 → p. 58

4 Filling fly ash tanks for transport to disposal site

Fly ash is removed from the collection hoppers and then transported by trucks to disposal sites. Position sensors are used to insure that the loading spouts are correctly positioned and no fly ash escapes into the atmosphere during loading. The LMS511 is used to position the trucks underneath the collection hoppers. This powerful and efficient laser scanner can measure to ranges of up to 80 m.

Housed in a rugged IP 67 enclosure, it is immune to harsh weather conditions and high dust environments associated with ash loading.



Bulkscan® LMS511 → p. 69



2 Outlet DeSOx acid gas control

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.



MCS100E HW → p. 60

3 Overfill protection of the lime silo

Lime is typically stored in silos for use as an absorber/neutralizer in the flue gas desulfurization system. In order to prevent overfilling of the silo, a point measurement of the level is necessary. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is also resistant to deposit formation, making it an ideal choice for monitoring bin levels.



LBV310 → p. 70



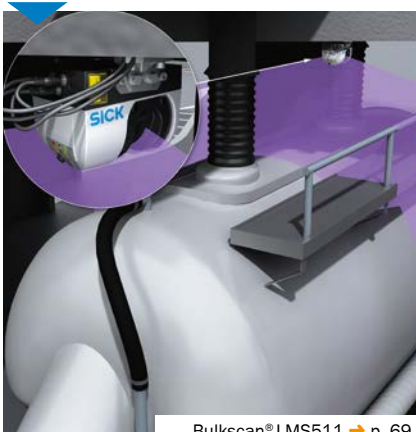
1 Flue gas desulfurization (FGD) inlet control

SO_2 is measured at the inlet to the flue gas desulfurization system to control the lime dosification and 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 using internal components as 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 ZIRKOR302 in-situ analyzer provides a reliable and rapid measurement of oxygen, even at higher temperatures.



4 Filling gypsum tanks for transport to customer.

Gypsum by-product is created by forced oxidation of the CaSO_3 solution created during the desulfurization process. CaSO_4 also known as gypsum is sold to the building industry (e.g. for the production of dry wall). Sensors are used to assist with product fill in the gypsum tankers. The LMS511 is used to position the loading spouts correctly for filling the gypsum into the tanker or truck.



Bulkscan® LMS511 → p. 69



2 Monitoring dust emissions

The FWE200 dust measuring system is designed to measure dust concentration in wet gas. Measurement can be difficult downstream of a wet flue gas desulfurization system (FGD), because the water vapor interferes with the dust measurement. Using the FWE200 the gas is extracted via a sampling probe and heated above dew point. Any droplets in the gas are vaporized to ensure accurate measurement results.

The scattered light principle allows even very low dust concentrations to be measured. The FWE200 features an automatic zero and span check and internal contamination check system resulting in minimum maintenance requirements.

3 4 Emission monitoring in exhaust gas

Environmental regulations require the continuous monitoring of certain pollutants and reference values. These regulations for emission monitoring are specific for each country. 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 standards. SICK's wide product portfolio for emission monitoring provides complete solutions all from one source.



FWE200 → p. 63



MERCEM300Z → p. 60



1 Stack gas flow monitoring

Stack gas flow meters can be used to determine the mass emissions from combustion sources. The "High Power" FLOWSIC100 H ultrasonic flow meter is suitable for measurements in stacks with large diameters as well as for applications with high dust content. The FLOWSIC100 M version is used for stack diameters up to 3 1/2 meters. Rugged titanium transducers are standard and suitable under difficult conditions. The measuring system needs no purge air and consists of 2 sender/receiver units and an MCU control unit. The MCU is used for input and output of signals, for calculation of volume flow to reference conditions as well as user-friendly operator interface.



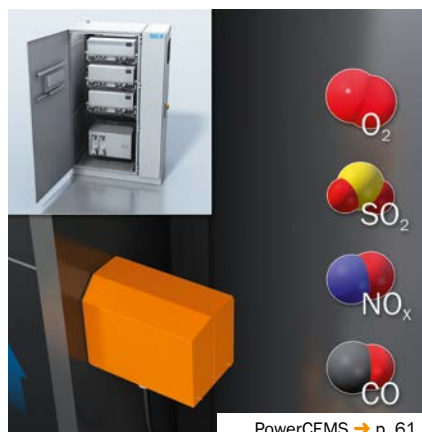
FLOWSIC100 H → p. 66

A specially developed CEMS package, the PowerCEMS100, measures CO, NO_x, SO₂ and O₂. The MERCCEM300Z mercury measuring system monitors Hg emissions in flue gases with high availability even at very low concentration ranges and meets required legislative regulations. Data acquisition systems from SICK complete the CEMS package.

5 Greenhouse gas control

The European directive 2003/87/EC for trading greenhouse gas emission allowances requires proof of the CO₂ emissions in many plants. Usually the CO₂ amount is rather difficult to calculate, therefore measurement in the exhaust duct is a desirable alternative provided the total uncertainty limits are met. SICK has a package for monitoring the CO₂ emissions directly and providing the uncertainty certifications for reporting and trading of allowances on

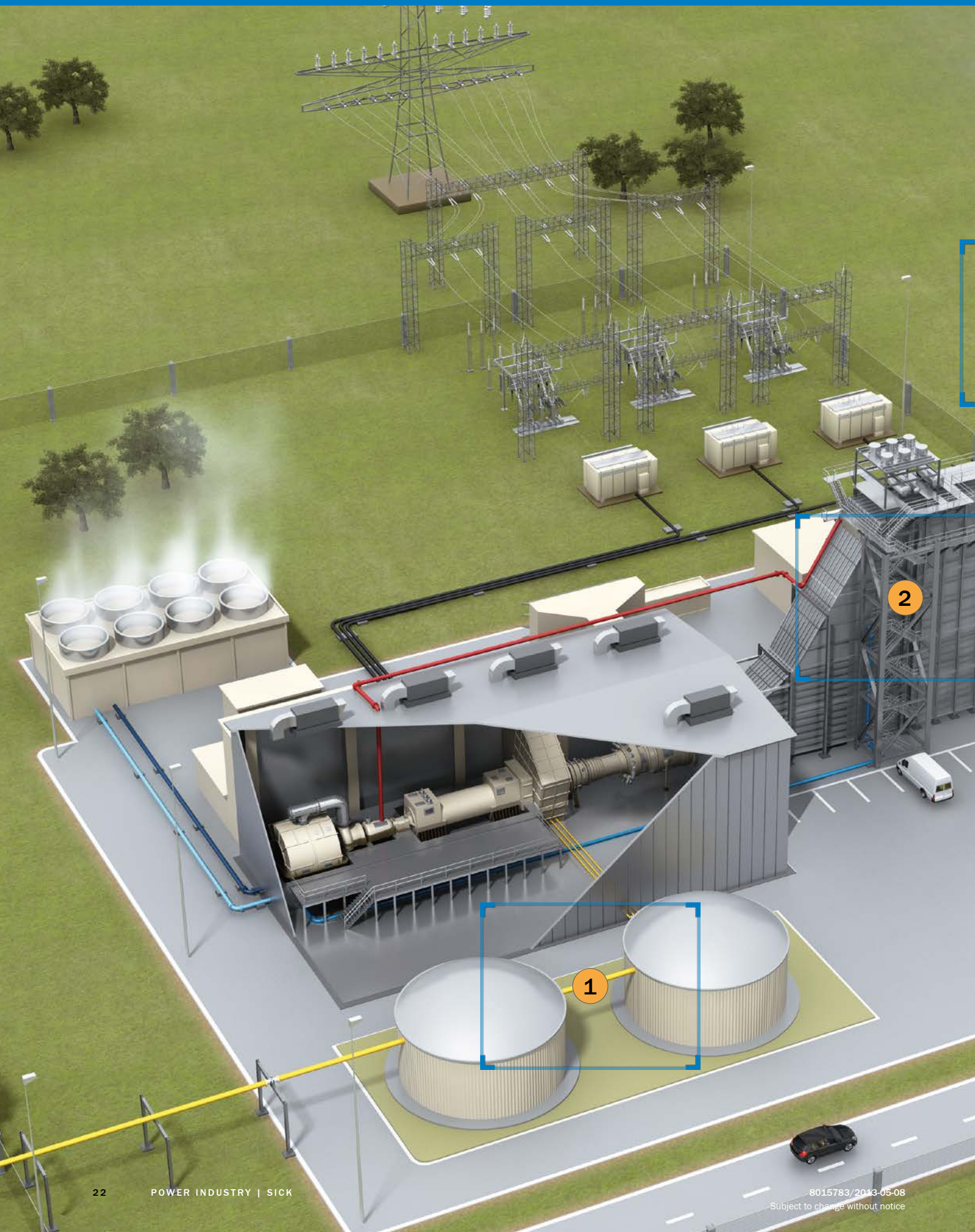
the basis of the EU regulations. GHG Control uses the GM35 NDIR cross duct monitoring system and the FLOWSIC100 ultrasonic flow meter as the basis for the measurement. Laborious sampling and fuel analysis necessary for the calculation method can be either reduced or eliminated entirely.



PowerCEMS → p. 61



GM35 → p. 57
FLOWSIC100 → p. 66





Gas fired power plant

Focus 1 24

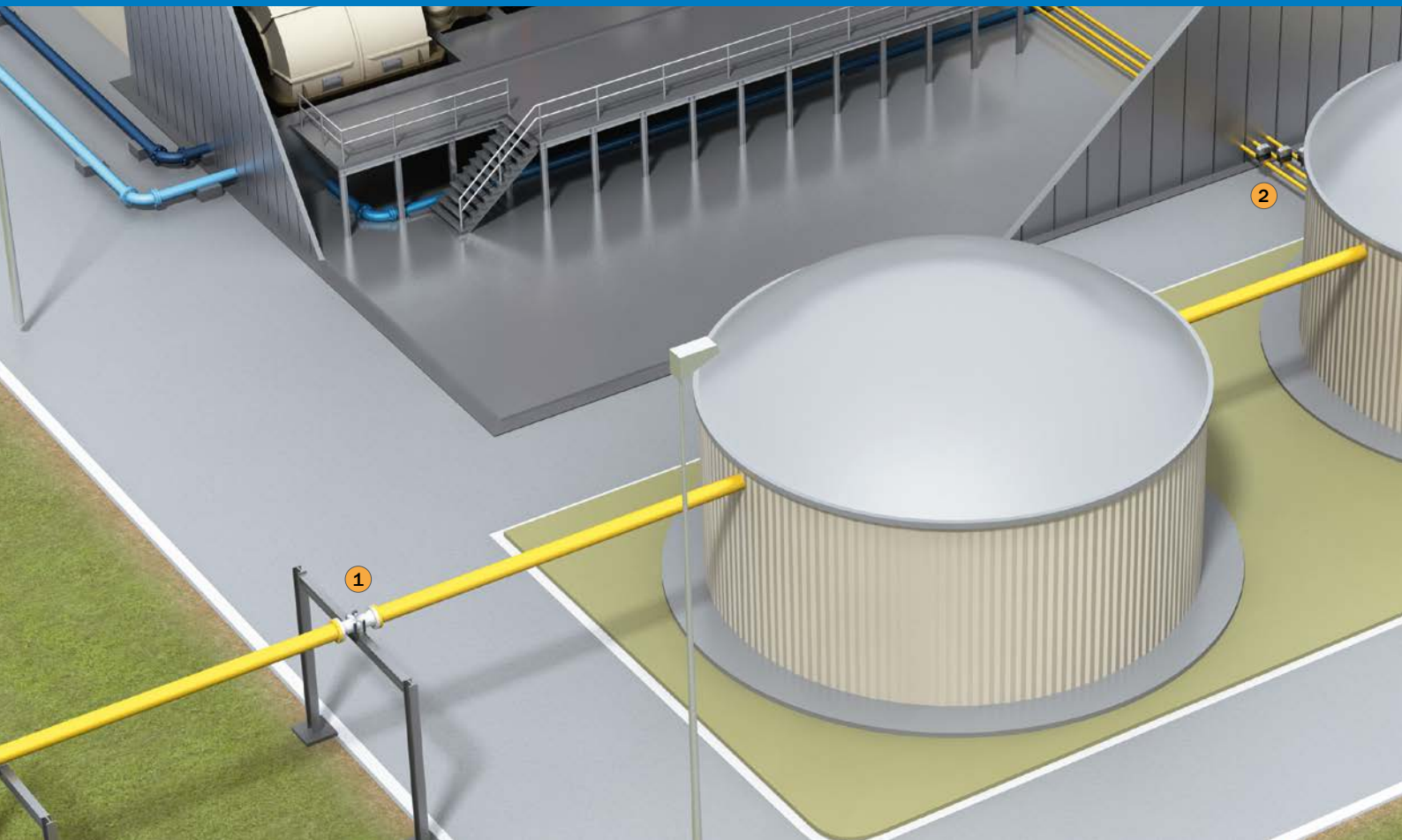
- ① Gas supply

Focus 2 26

- ② DeNOx

Focus 3 28

- ③ Continuous emission monitoring



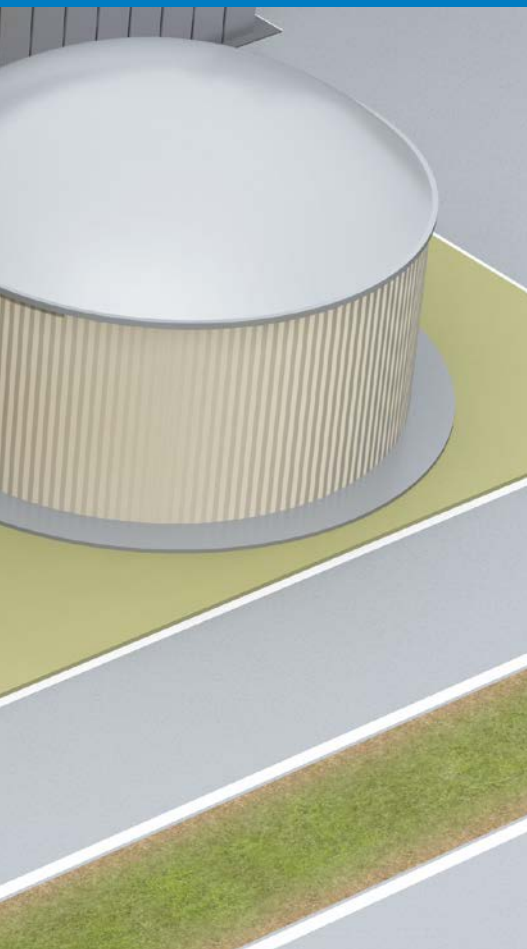
2 Gas flow

Measuring the consumption of natural gas at the turbine inlet provides the necessary information for the computation of total mass emissions of the plant. Here accuracy of measurement and system reliability is of utmost importance. The new FLOWSIC500 ultrasonic compact gas meter from SICK enables highly accurate metering in natural gas distribution.

No moving parts means the FLOWSIC500 is a robust, fail-safe and low-maintenance device resulting in a significant reduction in operating costs. FLOWSIC500 can easily be integrated into existing measuring stations. The FLOWSIC500 operates either in an energy self-sufficient configuration or failsafe in network operation with battery back-up.



FLOWSIC500 → p. 67



1 Gas custody transfer

Whether for custody transfer metering or internal company metering and billing, monitoring the flow of natural gas into the power plant is very important. The FLOWSIC600 is an ultrasonic gas flow meter for high precision measurement. The FLOWSIC600 2plex combines a fiscal gas meter (4 measuring paths) and a check flow meter (1 measuring path) in one meter body. This provides advanced diagnostic capabilities. The compact design with concealed cabling provides a robust, trouble-free and low-maintenance system. Due to the direct path layout, the meter is not influenced by contamination. This results in long-term stability and accuracy of the system. Adjustable impulse outputs or Modbus connections allow the use of installed flow computers.



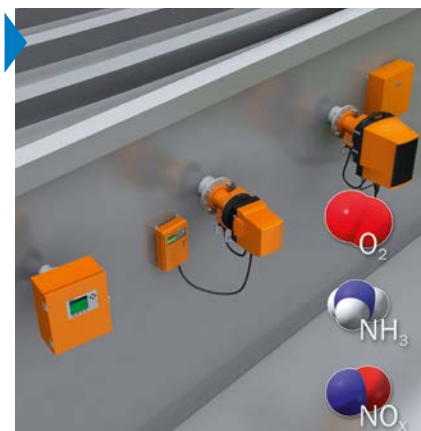
FLOWSIC600 → p. 68





1 DeNOx heat recovery steam generation (HRSG) outlet

In some countries or states, the limits for NOx emissions are so low that even low NOx fuels such as gas require additional pollution control devices in order to meet the stringent emission limits. In such cases selective catalytic reduction systems are installed to further reduce the NOx emissions and meet permit requirements. The GM32 in-situ gas analyzer measures low levels of NOx - directly, fast and without gas sampling and transport. Using the cross duct version, the entire HRSG duct can be used as the active measuring path enabling measurement of very low concentrations of pollutants. The GM700 laser analyzer measures NH₃ slip with high precision and speed. The ZIRKOR302 in-situ O₂ analyzer provides a reliable and rapid measurement of even at higher temperatures.



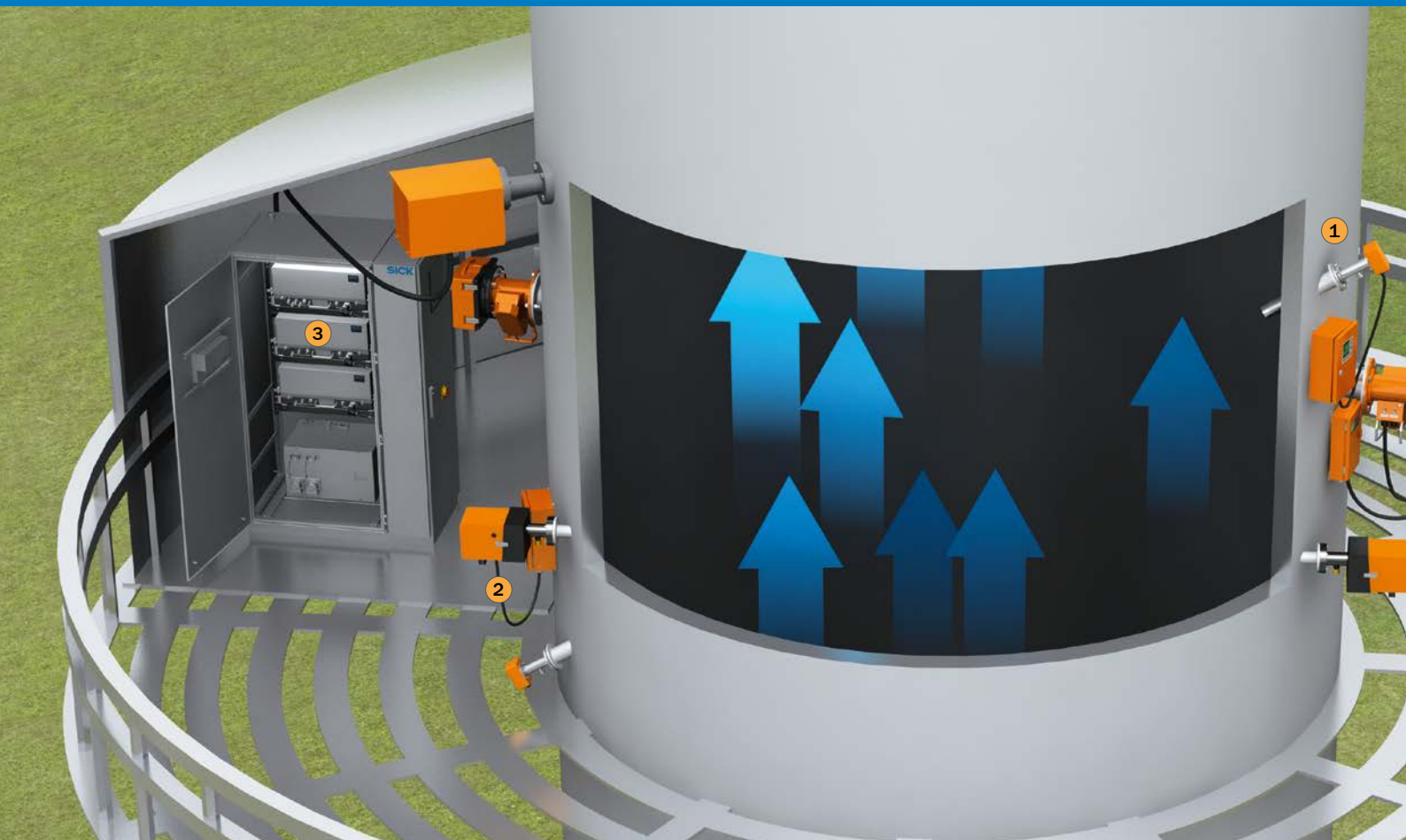
GM32 → p. 56



ZIRKOR302 → p. 58



GM700 → p. 57



2 Monitoring dust emissions

Dust concentration or opacity is typically measured in the stack emission in a fossil fuel fired power plant. The exact ranges of measurement and the number of components are dependent on local or national regulatory requirements and are indicated in the plant operating permit. The DUSTHUNTER SP100 is a probe version for very low to medium dust concentrations. The measurement is based on the forward scattering of light.

An automatic check of zero and reference point as well as contamination check are included. The DUSTHUNTER T100 is a cross duct version measuring dust at medium to high concentrations. The principle of operation is optical transmittance. When the correct purge air blowers are used, the T100 is suitable for measurements at high temperatures.

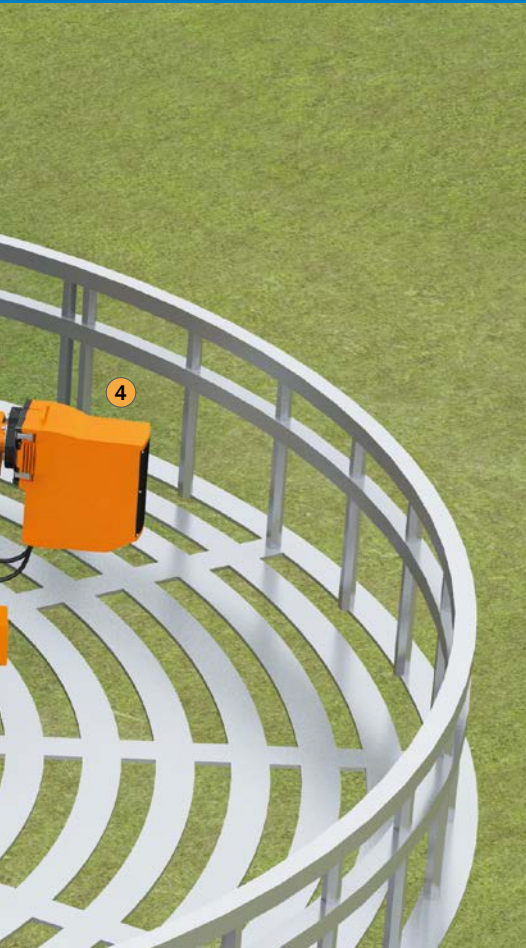
3 Emission monitoring in exhaust gas

Legal environment regulations require the continuous monitoring of certain pollutants and reference values. These regulations for emission monitoring are specific for each country. 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 standards. SICK's wide product portfolio for emission monitoring provides complete solutions from one source.



DUSTHUNTER T100 → p. 65





A specially developed CEMS package the PowerCEMS100 measures CO, NO_x, O₂ and optionally SO₂. Data acquisition system from SICK complete the CEMS package.



PowerCEMS → p. 61

1 Stack gas flow monitoring

Stack gas flow meters are often used to determine the mass emissions from combustion sources. The FLOWSIC100 M-AC ultrasonic flow monitor is especially suited for stacks with medium diameter and offers superior accuracy of measurement to meet rigorous environmental standards. The FLOWSIC100 M-AC includes internal air cooling of the sensor heads in order to allow the accurate ultrasonic systems to be used in high temperatures up to 450°C. The system consists of 2 sender/receiver units and an MCU control unit. The MCU offers input and output of signals, calculation of volume flow to reference conditions via a user-friendly operator interface.



FLOWSIC100 M-AC → p. 67

4 Greenhouse gas control

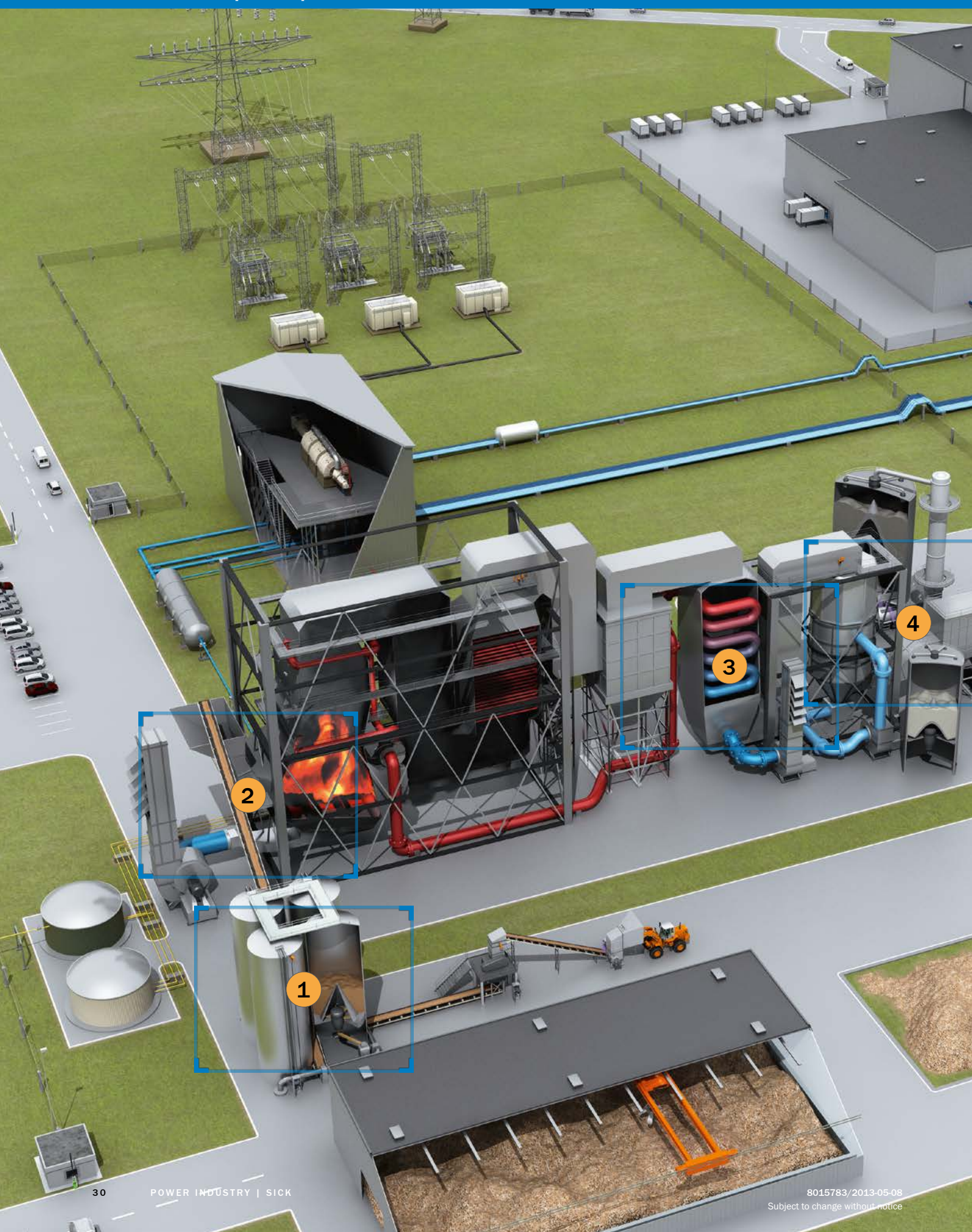
The European directive 2003/87/EC for trading greenhouse gas emission allowances requires the proof of the CO₂ emissions in many plants. Usually the exact amount of CO₂ is rather difficult to calculate, therefore measurement in the exhaust duct is a desirable alternative provided the total uncertainty limits are met. SICK has developed a solution for monitoring the CO₂ emissions directly and providing the uncertainty certifications for reporting and

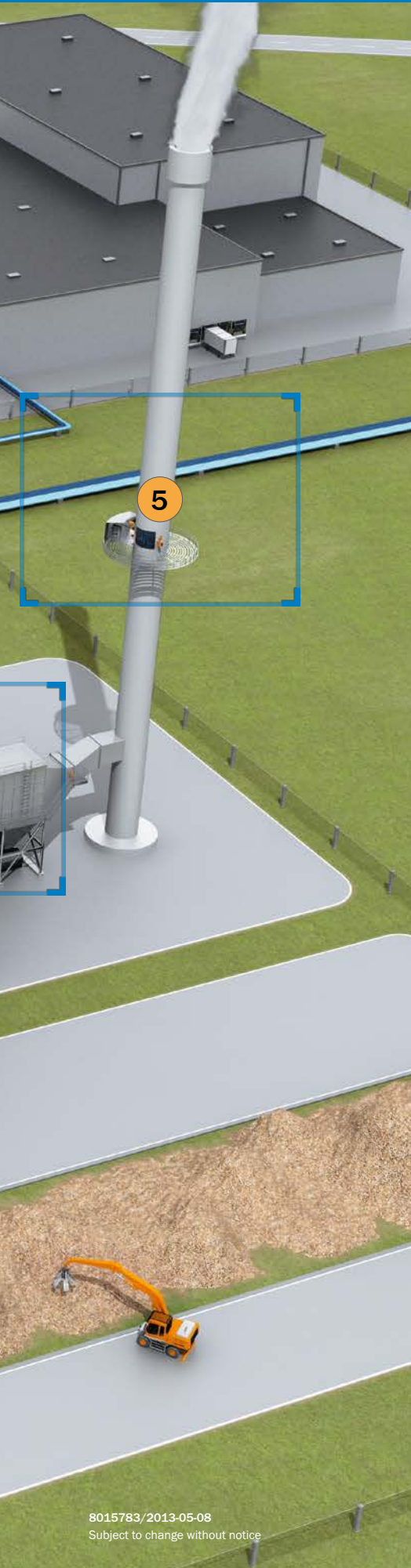
trading of allowances on the basis of the EU regulations. GHG Control solution includes the GM35 NDIR gas analyzer, the FLOWSIC100 ultrasonic flow meter, MEAC GHG software package plus engineering services to provide a complete measurement system eliminating the need for laborious calculation methods to save time and money.



GM35 → p. 57
FLOWSIC100 → p. 66

Applications in focus
Biomass fired power plant





Biomass fired power plant

Focus 1 32

- ① Fuel delivery / Storage

Focus 2 36

- ② Combustion process

Focus 3 38

- ③ Dry flue gas desulfurization (FGD)

Focus 4 40

- ④ Dust removal

Focus 5 42

- ⑤ Continuous emission monitoring



2 Natural gas flow

Measuring the flow of natural gas to feed the burners is done to control consumption, maintain fuel supply and system reliability. The new FLOWSIC500 ultrasonic compact gas meter provides accurate metering in natural gas distribution. Operating costs are reduced by no moving parts, fail safe operation and low maintenance. The FLOWSIC500 can easily be integrated into existing measuring stations.

It's available in either an energy self-sufficient or fail safe configuration with battery back-up.

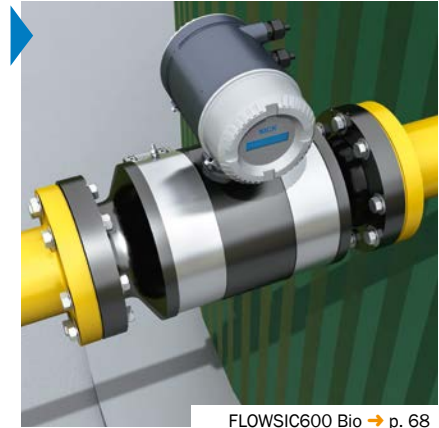


FLOWSIC500 → p. 67



1 Biogas flow

Measuring the flow of biogas used to feed the burners is often done to control consumption and maintain fuel supply. Biogas is used as an alternative to biomass depending on the availability and price of the different fuel types. The FLOWSIC600 Bio is a two path ultrasonic gas flow meter specifically designed for accurate measurement of biogas. The low-maintenance meter is housed in a corrosion-resistant body, with no moving parts, no pressure drop and concealed cabling. Sealed ultrasonic transducers make the FLOWSIC600 Bio suitable for use in dry, wet or corrosive gases.

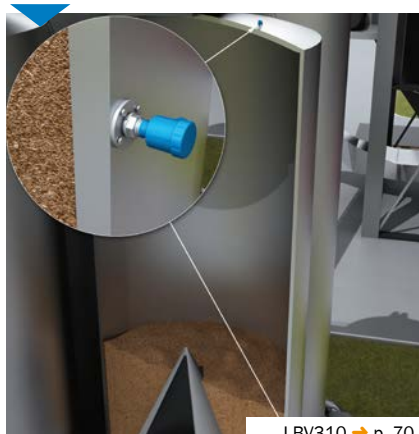


FLOWSIC600 Bio → p. 68



2 Overfill protection for biomass bunkers/silos

Biomass is typically stored in silos before being used in the burners as a primary fuel source. In order to prevent overfilling of the silo, a level point measurement is recommended. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is also resistant to deposit formation, making it an ideal choice for use in bin level monitoring of biomass.



LBV310 → p. 70

4 Conveyor control and shredder monitoring

Biomass is transported on conveyor belts, moving from the heap to the shredders or transfer points. Volume measurement is necessary to control fuel delivery to the shredder and optimize throughput. Loading time can also be reduced by making volumetric measurements at these points. The laser flow sensor LMS511 records volume flow on conveyors without contact.

This is based on the principle of laser time of flight measurement. The Bulkscan® LMS511 stands out particularly through sturdy design, reliability as well as wear-free operation. The integrated centre-of-gravity calculator maximizes transport performance and detects one-sided loading or uneven belt loads saving on wear and tear of the belts and maintenance cost.

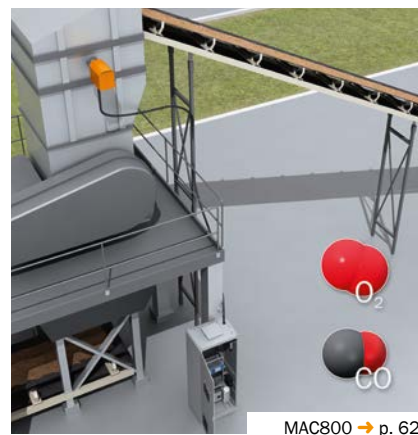


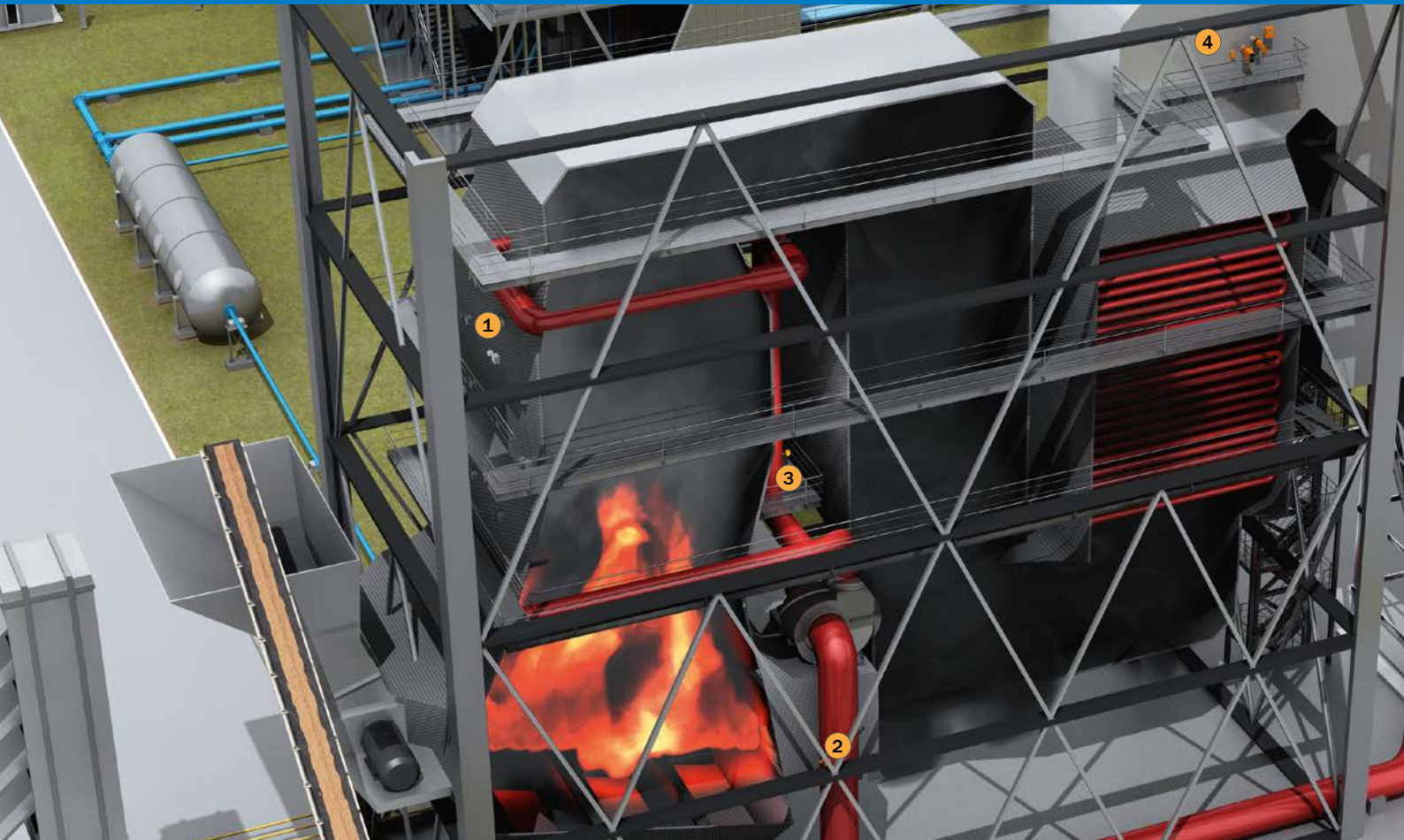
Bulkscan® LMS511 → p. 69



1 3 Protection of the biomass bunker and the wood shredder

Measuring CO and O₂ in the biomass bunker and in the shredder is an important measure to provide early warning of a smoldering fire and/or a leak in the inerting system. The MAC800 analyzer system equipped with an explosion-protected sampling probe is the ideal solution for this monitoring point. The system can be configured to sequentially monitor a number of bunkers and or shredders. The gas analyzer SIDOR provides simultaneous measurements of O₂ and CO. An important feature is the stability of the measuring system allowing routine adjustments to be made using only ambient air or inert gas. It is the ideal device for safety-relevant measurements.





2 Monitoring primary air flow

Power plant efficiency requires continuous monitoring and optimizing of the combustion process. Combustion air supply delivers oxygen which must be optimized and controlled for safe and efficient combustion to minimize fuel consumption and emission of CO, CO₂ and NOx pollutants. Reliable and accurate monitoring of primary combustion air volume flow at the boiler inlet is very important.

The FLOWSIC100 ultrasonic flow meter is ideal for measuring flow in this hot and dusty ambient environment. The meter features a high measuring dynamic, accuracy even at low flow rates, no pressure loss and low installation cost due to short inlet and outlet runs.

3 Monitoring re-circulation air

Power plant efficiency requires continuous monitoring and optimizing of the combustion process. Monitoring recirculation air for CO is important to control the addition of fresh air, maintain the correct stoichiometric ratio and optimize the efficiency of the combustion process. In-situ analysis provides the fast response necessary for control.



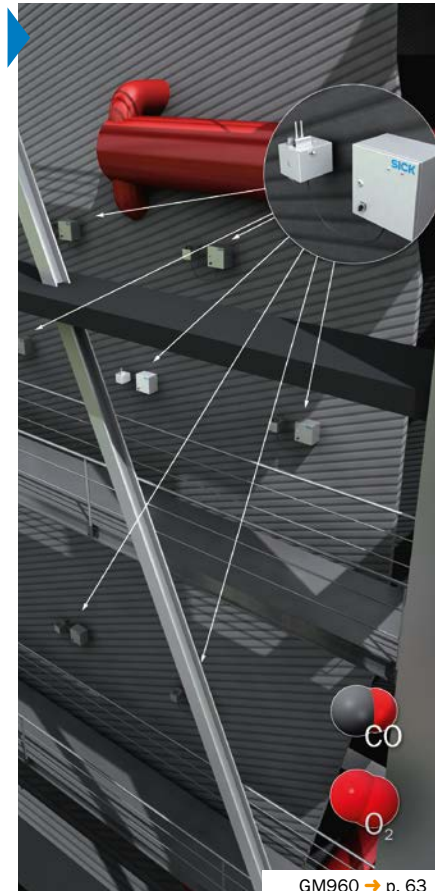
FLOWSIC100 M-AC → p. 67





1 Monitoring at the boiler wall

Reducing atmosphere inside of the boiler is the primary cause of corrosion and formation of deposits. Corrosion or deterioration of the boiler wall can be avoided by maintaining CO at low levels and O₂ at minimum of 0.5%. The GM960 boiler wall monitor is a trend measuring system for the analysis of CO and O₂ at the inner boiler wall. The CO Corrosion Level and CO Corrosion Load are determined at each of up to 40 measuring points. The CO and O₂ values and the CO Corrosion Levels are aimed at detecting potential danger of corrosion so that immediate action can be taken such as better control of feeders or combustion air. The value of the CO Corrosion Load represents the long term CO corrosion exposure to the boiler wall.



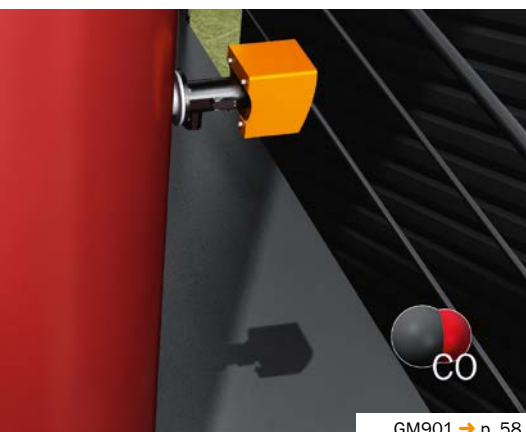
GM960 → p. 63

The GM901 in-situ CO gas analyzer is available as a cross-duct or probe type suitable to a broad range of applications such as high dust loads, overpressure, critical flow profiles or high gas concentrations.

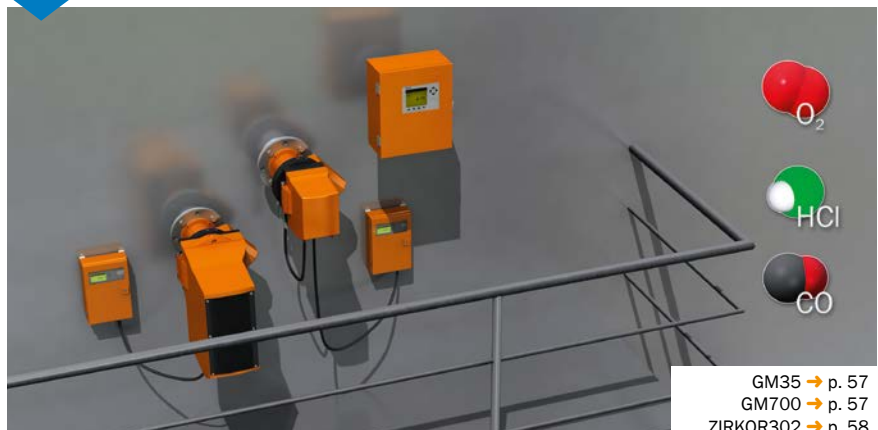
4 Gas monitoring at the boiler outlet

Whenever fuel is burned to generate heat, combustion efficiency is important to control. Zirconium oxide oxygen analyzers are widely used for combustion control, CO is measured as a secondary component. Reliable and accurate monitoring of O₂ and CO at the boiler outlet is necessary to control excess air in the combustion process. The ZIRKOR302 in-situ analyzer provides reliable and rapid measurement of oxygen even at higher temperatures.

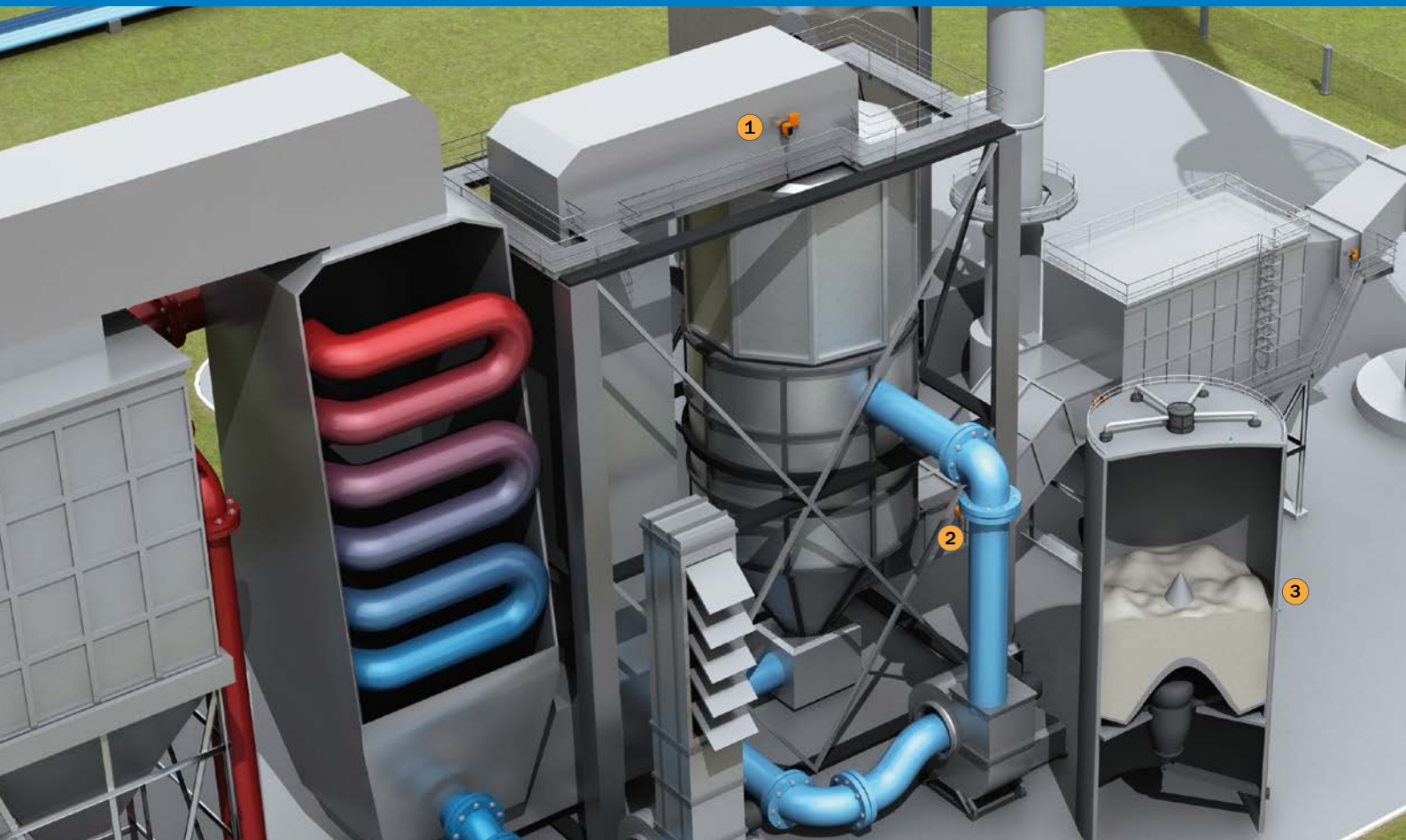
The GM35 gas analyzer quickly, easily and economically measures CO, CO₂, humidity concentrations, temperature and pressure. HCl measurement using the TDLS (tunable diode laser spectroscopy) system GM700 can be used as part of acid gas sorbent injection control.



GM901 → p. 58



GM35 → p. 57
GM700 → p. 57
ZIRKOR302 → p. 58

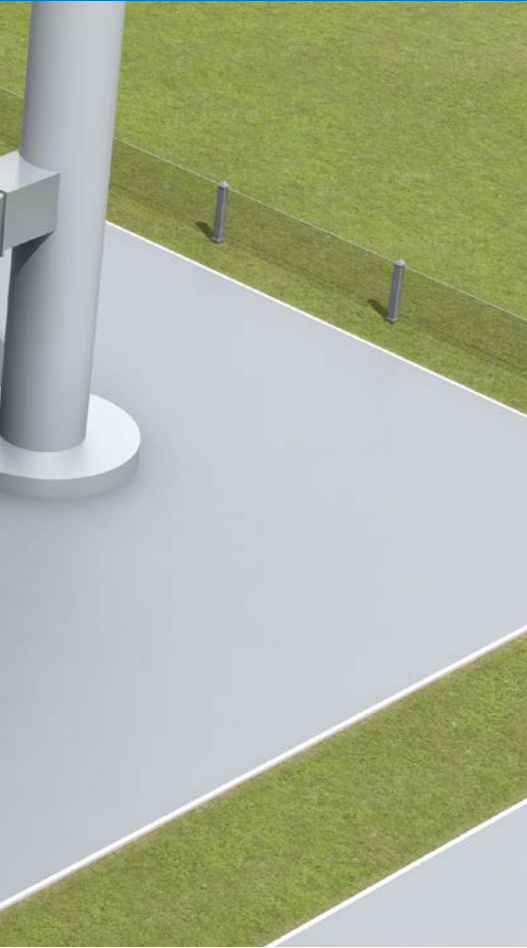


2 Flue gas desulfurization (FGD) outlet monitoring

New tighter limits on gas emissions require plants to install absorbers to remove acid gases such as SO_2 and HCl . Water is injected upstream of the flue gas desulfurization unit and temperature is lowered to aid in efficient SO_2 removal. It is critical to monitor the H_2O injection because an overdose would transform the dry sorbent into a sticky mass leading to malfunction of the bag filters. HCl is measured as part of the acid gas sorbent injection control.

The MCS300HW system is designed to measure up to 6 components in the hot wet gas phase including O_2 . The built-in automatic adjustment filter allows for routine calibration eliminating the need for expensive test gases.





1 Flue gas desulfurization (FGD) inlet monitoring

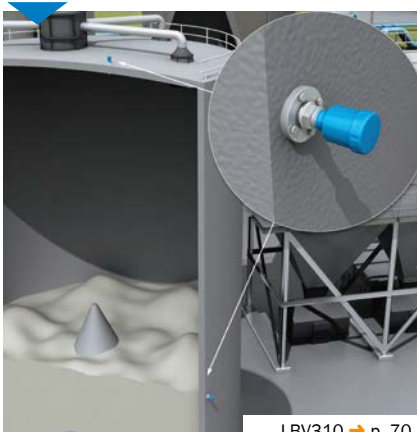
SO₂ is measured at the flue gas desulfurization system inlet to make the removal efficiency calculation and can be useful as feed forward signal for lime dosification. O₂ is measured for normalization. The GM32 in-situ gas analyzer for SO₂ measures under the process conditions without gas sampling and transport with reliable measurement results. In case of a malfunction an early warning will be shown. The ZIRKOR302 in-situ analyzer provides a reliable and rapid measurement of oxygen, also at higher temperatures.



GM32 → p. 56

3 Overfill protection of the lime silo

Lime is typically stored in silos for use as a absorber/neutralizer in the flue gas desulfurization system. In order to prevent overfilling of the silo, a point measurement of the level is recommended. The vibration limit switch LBV300 is particularly outstanding for it's ruggedness. The LBV300 has no mechanically moving parts and is also insensitive to deposit formation, making it an ideal choice for monitoring bin levels.

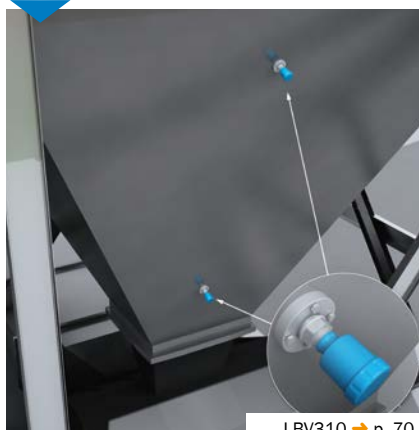


LBV310 → p. 70



2 Ash collection hoppers

The particulate that passes into the baghouse is collected on the filter bag surfaces. When the fly ash is shaken off it falls into collecting hoppers. In order to detect if the hopper is full, point level measurements are made. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is also insensitive to deposit formation. Apart from that, it is characterized by easy installation as well as start-up without filling.



LBV310 → p. 70

3 Dust removal efficiency

Flue gas from biomass combustion contains a high level of particulate matter (PM) environmental regulations stipulate this must be removed before releasing the gas into the atmosphere. New tighter limits on dust emissions require plants to install bag houses with fabric filters. Bag house filters collect the particulate by passing through a tightly woven fabric.

The DUSTHUNTER SB50 measures low dust concentrations based on the back scattering of light. An automatic zero check and reference point is integrated reducing maintenance. One-sided installation makes it easy to install in the ductwork downstream of the bag filter.



DUSTHUNTER SB50 → p. 64



1 Filter protection

Flue gases from biomass combustion include a significant amount of dust which has to be removed before the gas is released into the atmosphere. In order to remove dust, biomass plants often use bag filters. CO is monitored in the ash sieve to indicate if a high level is present. CO could cause a dangerous and costly explosion inside the filter system. The GM901 CO gas analyzer is available as a cross-duct or probe type and is suitable for difficult measuring tasks such as high dust loads, overpressure, critical flow profiles or high measuring gas concentrations.



GM901 → p. 58

4 Filling fly ash tanks for transport to disposal site.

Fly ash is removed from the collection hoppers and then transported by trucks to disposal sites. Sensors are used to insure that the loading spouts are correctly positioned and no fly ash escapes into the atmosphere at this transfer point. The LMS511 is used to position the trucks underneath the collection hoppers.

This powerful and efficient laser scanner can measure up to ranges of 80 m. Housed in a rugged IP 67 enclosure, it is resistant to harsh weather conditions and high dust environments associated with ash loading.



Bulkscan® LMS511 → p. 69



2 Monitoring dust emissions

Dust concentration or opacity is measured in the stack emissions of a biomass co-fired plant. The exact ranges of measurement and the number of components are dependent on local or national regulations indicated in the plant operating permit. The DUSTHUNTER SP100 is an approved measuring device with probe for very low to medium dust concentrations based on the forward scattering of light.

Automatic zero check, contamination check and reference point is included. The DUSTHUNTER T200 is a measuring device for dust at medium to high concentrations based on the optical transmittance principal. It includes a two-sided contamination check and automatic self-alignment of the optical assembly.

3 Emission monitoring in exhaust gas

Local environment regulations require the continuous monitoring of certain pollutants and reference values specific to each country. In many countries, emission measuring technology must be tested for suitability, in Europe in accordance with EN15267-3 or in the US in compliance with EPA standards. SICK's wide product portfolio for emission monitoring provides complete solutions from one source.



DUSTHUNTER SP100 → p. 64





A specially developed CEMS package the PowerCEMS100 measures CO, NO_x, SO₂, and O₂. Data acquisition systems from SICK complete the CEMS package.



PowerCEMS → p. 61

1 Stack gas flow monitoring

Stack gas flow meters can be used to determine the mass emissions from combustion sources. The FLOWSIC100 M is especially suited for stacks with medium diameter. Rugged titanium transducers are standard and suitable under difficult conditions. The measuring system needs no purge air, consists of 2 sender/receiver units and an MCU control unit. The MCU is used for input and output of signals, for calculation of volume flow to reference conditions as well as user-friendly operator interface.



FLOWSIC100 M → p. 66

4 Greenhouse gas control

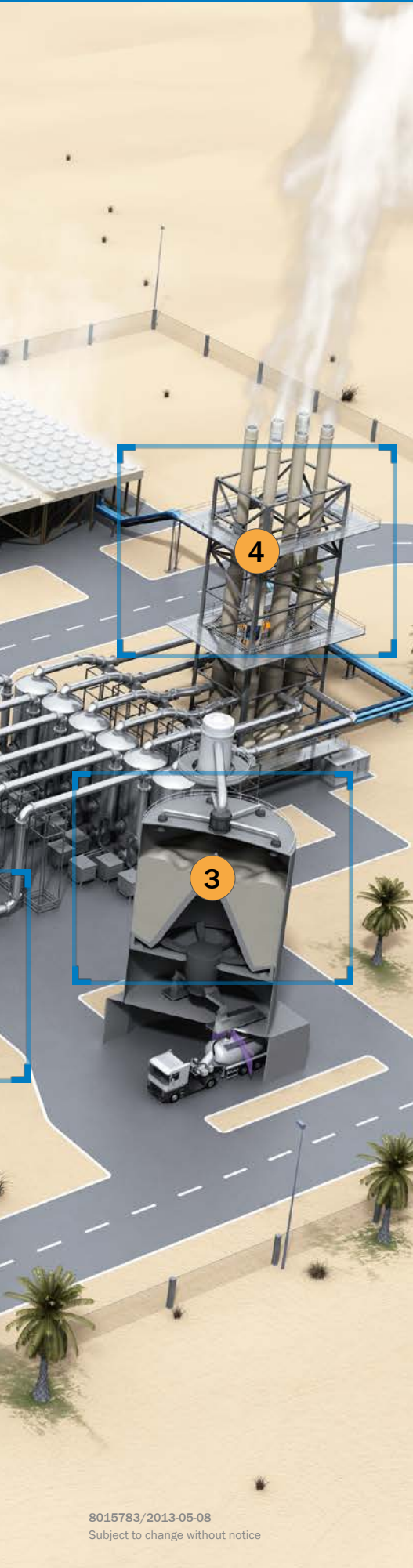
European directive 2003/87/EC for trading greenhouse gas emission allowances requires proof of the emitted amount of carbon dioxide in many plants. Calculating CO₂ can be rather difficult, therefore measurement in the exhaust duct is a desirable alternative as long as the total uncertainty limits are met. SICK has developed a unique system for monitoring the CO₂ emissions directly and providing the uncertainty certifications for reporting and trading of allowances

on the basis of the EU regulations. GHG Control uses the GM35 NDIR cross duct monitoring system and the FLOWSIC100 ultrasonic flow meter for the measurement; reducing or entirely eliminating laborious sampling and fuel analysis necessary for the calculation method.



GM35 → p. 57
FLOWSIC100 → p. 66





Diesel fired power plant

Focus 1 46

- ① Fuel delivery / Storage

Focus 2 48

- ② DeNOx

Focus 3 50

- ③ Dry flue gas desulfurization (FGD)

Focus 4 52

- ④ Continuous emission monitoring



② Measurement of raw biogas under low pressure before and after purification

Measuring the flow of biogas feed to the engines is often done in order to control consumption and to insure the fuel supply is not exhausted. Biogas is used as an alternative to natural gas depending on the availability and price of the different fuel types. The FLOWSIC600 Bio is an ultrasonic gas flow meter made for demanding environments.

The FLOWSIC600 Bio 2-path is the basic model with two measuring paths in one meter body. The meter features no pressure drop and no moving parts. The ultrasonic transducers and the lightweight meter body made from polyethylene (PE100) are suitable for H_2S concentration in the wet biogas with the potential for corrosion. The FLOWSIC600 Bio provides reliable readings with low maintenance.

③ Metering of the gas consumption of each engine

Measuring the consumption of natural gas at the engine inlet provides the necessary information for the computation of the individual engine efficiency and optimization of the gas consumption. Accuracy of measurement and system reliability is of utmost importance. The new FLOWSIC500 ultrasonic compact gas meter from SICK enables highly accurate metering in natural gas distribution.



FLOWSIC600 Bio → p. 68





1 Gas flow at custody transfer

Measuring the consumption of natural gas at the gas connection point of the plant gate provides the necessary information for the computation of total gas consumption for accounting with the gas supplier. Accuracy of measurement and system reliability is of utmost importance. The FLOWSIC600 Quatro model combines two 4-path fiscal meters with equal accuracy within one meter body. The FLOWSIC600 Quatro detects perturbations before they affect the measuring results of the fiscal metering. The compact design with concealed cabling provides a robust, trouble-free and low-maintenance system. Due to the direct path layout, the signals are not reflected inside the device and thus not influenced by contamination. This results in long-term stability and accuracy of the system.



FLOWSIC600 → p. 68

In absence of mechanical moving parts, the FLOWSIC500 is a robust, fail-safe and low-maintenance device resulting in a significant reduction in operating costs. FLOWSIC500 can easily be integrated into existing measuring stations or pipes. The FLOWSIC500 operates either in an energy self-sufficient configuration or failsafe in network operation with battery back-up.

4 Tank inertization

Surveillance of inert gas blanketing to determine the oxygen content during flow through inerting. Inert gas is fed into the system from a gas inlet and simultaneously vented at another point when loading or unloading liquid gas/other flammable liquids. The TRANSIC100LP is a laser oxygen transmitter suitable for measuring O_2 concentrations in inert blanketing gas applications.

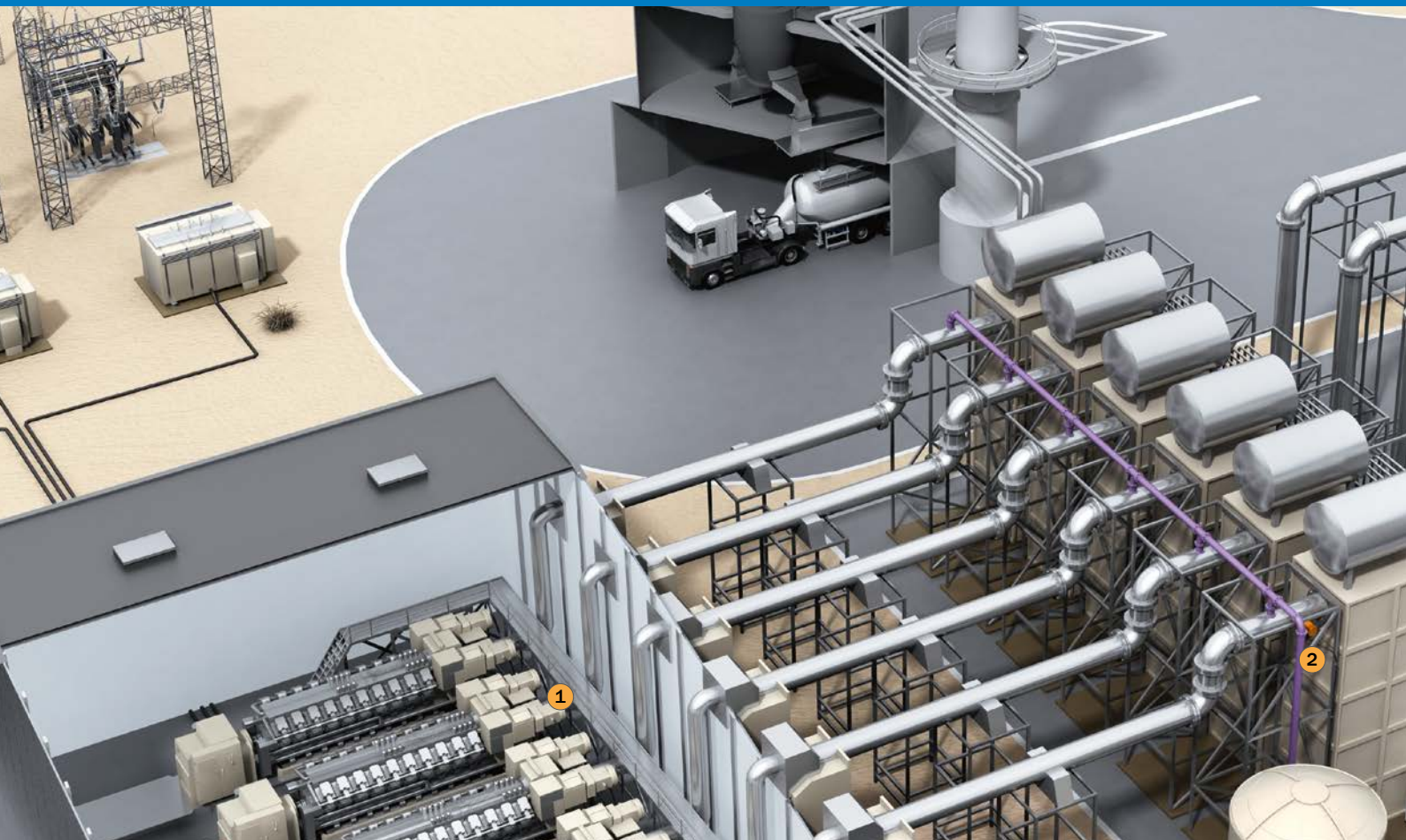
The TRANSIC100LP can operate at wide temperatures both process and ambient, suitable for installation in harsh industrial environments.



FLOWSIC500 → p. 67



TRANSIC100LP → p. 56



2 Selective catalytic reactor (SCR) inlet prior to optimizing the SCR process

The selective catalytic reduction (SCR) process is typically applied for NO_x reduction by adding a reagent such as ammonia (NH₃) which converts nitrogen oxide into water and nitrogen over a catalyst at approx. 400 °C. NO concentration is measured at the inlet as part of the removal efficiency calculation. H₂O and O₂ are measured for normalization and to obtain a value of the water content before the SCR to calculate the right balance with the value of the SCR outlet.

The MCS100E HW is often used for this. The sample is kept hot during the entire analysis using this multi-component Infrared system. It can be set up to multiplex several sample points and measures up to 8 gas components including H₂O and O₂.



MCS100E HW → p. 60



1 Recirculation air from turbo charger to motor intake air

In order to reduce the NO_x forming in the motor itself, the oxygen content in the cleaned recirculation stream has to be measured and controlled. The TRANSIC100LP provides real time measurements for direct feedback and control. The analyzer is easy to install and to operate. Operational costs can be kept to a minimum there are no consumables and purging with nitrogen is not necessary. Optics are heated to prevent condensation and the measuring values of this TDLS (tunable diode laser spectroscopy) system are stable using an internal drift monitoring system.



TRANSIC100LP → p. 56

3 Selective catalytic reactor (SCR) outlet prior to air heater

Environmental regulations demand efficient reduction of the NO_x content of the flue gas before it is released into the atmosphere. At the outlet of the SCR, NO_x and NH₃ are measured: The NH₃ concentration (ammonia slip) is important to limit the excess NH₃ which can foul and plug process components downstream of the SCR, the NO_x is used to determine the efficiency of the SCR.

The MCS100E HW is a good candidate for this measurement especially for diesel engine exhaust. The sample is kept hot during the entire analysis using this multi-component Infrared system. In addition, it can be used for measuring several sample points in sequence (both inlet and outlet) and can measure up to 8 gas components including H₂O and O₂ used for normalization of the measuring values.



MCS100E HW → p. 60



2 Filling dry sorbent from tanks for transport to disposal site.

Sorbent used from the dry FGD is removed from the collection hoppers and then transported by trucks to disposal sites. LMS511 position sensors are used to insure that the loading spouts are correctly positioned and no sorbent escapes into the atmosphere at this transfer point. This powerful and efficient laser scanner can measure up to ranges of 80 m. Housed in a rugged IP 67 housing, it is immune to harsh weather conditions and high dust environs associated with dry sorbent loading.



Bulkscan® LMS511 → p. 69

**1 Sorbent material storage silo**

Whether from the absorber or dust, the collected particulate falls off into collecting hoppers. In order to detect if the hopper is full, point level measurements are made. The vibration limit switch LBV300 is particularly outstanding for its ruggedness. The LBV300 has no mechanically moving parts and is insensitive to deposit formation. Apart from that, it is characterized by easy installation as well as start-up without filling.



LBV310 → p. 70



2 Monitoring dust emissions

Dust concentration or opacity is typically measured in the stack emission in a fossil fuel fired power plant. The exact ranges of measurement and the number of components are dependent on local regulatory requirements and are indicated in the plant operating permit. The DUSTHUNTER SP100 probe version is an approved measuring device for very low to medium dust concentrations.

An automatic check of zero and reference point and contamination check is included. The DUSTHUNTER T200 cross duct version is a measuring device for dust at medium to high concentrations. The principle of operation is optical transmittance. The T200 includes a two-sided contamination check as well as an automatic self-alignment of the optical assembly.

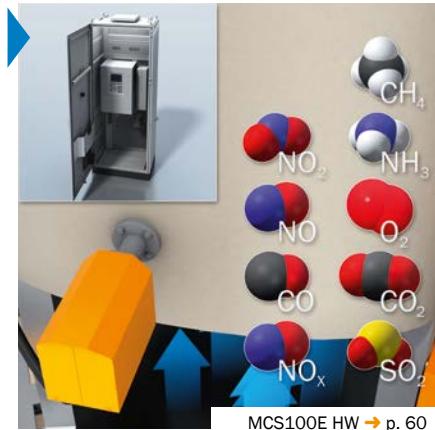


DUSTHUNTER T200 → p. 66



1 Emission monitoring in exhaust gas

Bi- and trifuel fired diesel power plants are often located in remote areas with harsh environmental conditions where maintenance and associated support is difficult to get. Therefore, robustness and long-term stability in CEMS measuring systems with calibration cells are favored. SICK's wide product portfolio for emission monitoring provides flexible complete solutions here from one source. Dust measuring devices from the DUSTHUNTER product family are used, in-situ gas analyzer and hot extractive gas analyzers like MCS100E HW. The FLOWSIC100 product family is available for measuring volume flow rates and the MEAC computer system for data acquisition and computation. Using extractive or in-situ technology supports optimum compliance with local measuring requirements.



MCS100E HW → p. 60



FLOWSIC100 → p. 66

3 Greenhouse gas control

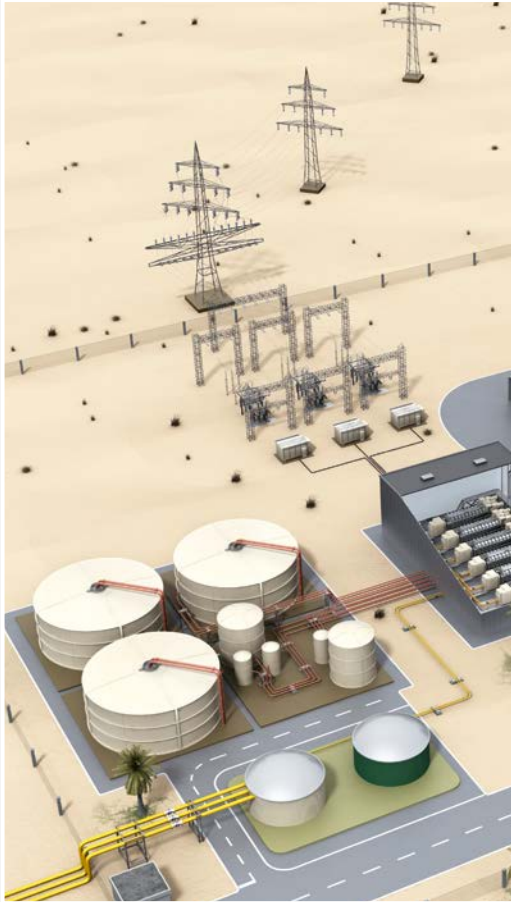
The European directive 2003/87/EC for trading greenhouse gas emission allowances requires proof of the CO₂ emissions in many plants. Usually the CO₂ amount is rather difficult to calculate, therefore measurement in the exhaust duct is a desirable alternative provided the total uncertainty limits are met. SICK has developed a solution for monitoring the CO₂ emissions directly and providing the uncertainty certifications for reporting and trading of allowances on the

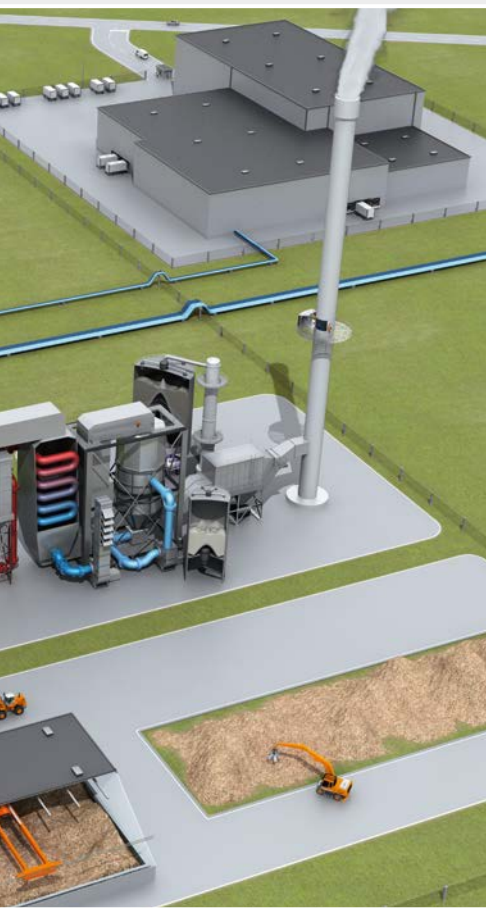
basis of the EU regulations. GHG Control solution includes the GM35 NDIR gas analyzer, the FLOWSIC100 ultrasonic flow meter, MEAC GHG software package plus engineering services to provide a complete measurement system eliminating the need for laborious calculation methods to save time and money.



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TRANSIC100LP – At a glance

- O₂ transmitter using effective laser spectroscopy (TDLS)
- For use in potentially explosive atmospheres (FM, ATEX and IECEx certificate)
- In-situ-measurement directly in the process or extractive using a sample cell (option)
- Optimized for use in harsh industrial environments
- Transmitter concept – compact design and simple to operate
- Long term stability
- No moving part

Your benefits

- Fast real-time measurements, right in the process
- Easy to install, easy to operate
- Diagnostic output for preventive maintenance
- Minimizes the need for sample conditioning equipment
- Low operational costs: no consumables and no purge gas consumption
- Robust - measures reliably in unpurified gases

→ www.mysick.com/en/TRANSIC100LP

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



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.mysick.com/en/GM32

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





GM35 – At a glance

- Dynamic humidity correction
- Fast in-situ measurement directly in the process
- Simultaneous determination of up to three gas components, temperature and pressure
- No gas sampling and conditioning
- Gas testable version of measuring probe available
- Integrated self test and control functions

Your benefits

- Dynamic humidity measurement directly in the process
- Provision of real humidity reference values
- Unbiased measuring values due to in-situ measurement
- Fast or short-term fluctuations in the process are being detected
- Representative measurement by selection of an appropriate probe or cross-duct type

→ www.mysick.com/en/GM35

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



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 and conditioning required

Your benefits

- Unbiased measuring values due to in-situ measurement directly in the process
- Best application solution using probe or cross-duct type
- High reliability during operation
- Also applicable for harsh environment conditions
- Detection of fast and short-term process fluctuations

→ www.mysick.com/en/GM700

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





GM901 – At a glance

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

Your benefits

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

→ www.mysick.com/en/GM901

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



ZIRKOR302 – At a glance

- All parts in contact with gas are heated
- Automatic testing and adjustment with ambient air
- Fixed physical zero point
- Short response time
- Operation of up to 3 sensors via one evaluation unit

Your benefits

- For high process temperatures up to 1400 °C
- No reference gas required
- No re-ignition into sample gas possible
- Ideal for process control due to rapid measurement
- Economic due to low maintenance effort

→ www.mysick.com/en/ZIRKOR302

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





SIDOR – At a glance

- Detector with high long-term stability
- Paramagnetic or electrochemical O₂ measurement
- Automatic adjustment with component-free ambient air
- Insensitive to contaminations

Your benefits

- Automatic adjustment, self-monitoring and fault diagnosis
- Test gas adjustment only every 6 months
- Long maintenance intervals
- TÜV approval and ATEX type approval for measurement of CH₄, CO₂ and O₂
- Repairable on site
- Exchange of components without complicated temperature adjustment in the factory

→ www.mysick.com/en/SIDOR

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



MCS300P – At a glance

- Simultaneous measurement of up to 6 components
- Process cuvettes up to 60 bar and 200 °C
- Automatic sample point switching
- Integrated adjustment unit
- Safety devices for measurement of toxic or flammable mixtures
- Extended operation via PC and software SOPAS ET
- Flexible I/O module system

Your benefits

- Automatic adjustment without expensive test gases
- Integration in existing networks
- Integration of external parameters like temperature or pressure
- Suitable for potentially explosive atmospheres

→ www.mysick.com/en/MCS300P

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





MERCEM300Z – At a glance

- Accurate measurement of “total mercury” directly in a thermal converter (patented)
- Measuring operation without using consumables
- Very low maintenance gas sampling using an ejector pump – no moving parts
- Integrated adjustment cell for automatic drift correction
- Automatic adjustment of the entire measuring system with a built-in test gas generator (optional)
- Modular design with the entire system

Your benefits

- Reliable results of the actual measuring values of elemental Hg and Hg compounds in gases
- Very low operating expenses
- Minimum maintenance expenditure
- Long-term stability minimizes technician time requirements due to self-adjusting measuring system
- Measuring certainty using the fully automated adjustment with test gas
- Convenient and fast access for easy service and user-friendly remote diagnosis

→ www.mysick.com/en/MERCEM300Z

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



MCS100E HW – At a glance

- Extractive measurement of up to 8 IR-active gas compounds
- Additional oxygen and total hydrocarbon analyzers as an option
- Gas paths completely heated
- Test gas supply at the gas sampling probe or at the analyzer
- Back-purging of gas sampling probe for cleaning of filters
- Fast sample gas exchange for minimizing adsorption and desorption effects
- 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 3 months) due to self monitoring of the analyzer
- QAL3 drift test according to EN 14181 with internal calibration filter wheel – no test gas required

→ www.mysick.com/en/MCS100E_HW

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





PowerCEMS – At a glance

- Completely configured system with sampling, gas cooler, and integrated sample gas pump
- Modular design makes assemblies easily accessible
- Control unit for measured value and status indication
- Analyzer module with 24 V power supply for quick on-site exchange
- Certified as a fully configurable emission monitoring system in compliance with EN15267

Your benefits

- Simple integration of external sensors such as pressure, temperature, volume flow, and dust
- High availability
- Easy and quick exchange of modules and sensors
- Simple installation and quick commissioning
- Cost-effective solution for simultaneous NO/NO₂ measurement, since no NO_x converter is required
- Remote access via Ethernet or Modbus connection
- Compact system design requires minimal space

→ www.mysick.com/en/PowerCEMS

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



MEAC – At a glance

- Evaluation according to EU directives 2000/76/EC and 2001/80/EC
- Evaluation according to 13., 17., 27. and 30. FICA and TA -Luft (Technical Instructions on Air Quality Control)
- Inclusion of operational parameters and plant conditions
- Visualization of emission and operational data
- Remote data transfer, remote diagnosis and remote control
- Alarm signals when exceeding the limit values

Your benefits

- Software monitors all communications with connected field devices and control systems
- All values are stored on hard disk, thus it is possible to look at data history even after many years
- A routine back-up is made regularly on a second hard disk
- Screen displays and output of actual and historical data are freely configurable

→ www.mysick.com/en/MEAC

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





MKAS Compact – At a glance

- Compact analyzer cabinet
- For maximum 2 S710 or SIDOR analyzers or NOx 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 15267-3

→ www.mysick.com/en/MKAS_Compact

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



MAC800 – At a glance

- Cold-extractive analyzer system certified according to EN 15267-3
- Plug-and-play analyzer modules with 24 V power supply
- Operating unit for displaying all measured values and status information on a touch screen
- External sensors via interfaces connectable
- Display and control of external sensors is possible
- Remote control of the complete system via Ethernet, Modbus or additional GPRS modem

Your benefits

- Cost-effective investment because of easy modifications for future needs
- Easy commissioning and trouble-free on-site approval of the automatic measuring system (AMS) by the relevant authorities
- Full overview via touchscreen and integration of remote sensors (p, T, volume flow, dust)
- Easy service due to clear separation of the electrical and the analytical sections
- High availability through easy and fast change of modules
- Ethernet or Modbus connection to networks

→ www.mysick.com/en/MAC800

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





GM960 – At a glance

- Up to 40 boiler wall probes, each with one CO and O₂ sensor for installation directly in the boiler wall
- Up to 40 connection units for pressurized air, power supply and data bus
- One master unit with standard network connection for operating the peripheral system components
- Software MEPA-GM960 for graphical visualization of readings, for process control, storage of data and communication

Your benefits

- Online monitoring of values relevant to corrosion for the optimization of combustion control
- Effects of adjustment of the burners and combustion air can be followed online
- Lowering of operational costs and potentially improved safety through early warning of potential dangers caused by corrosive erosion of the boiler wall
- Efficient location of possible problem areas of the boiler wall
- Use of data for creation of effective maintenance and revision plans
- Installation and commissioning possible while boiler running

→ www.mysick.com/en/GM960

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



FWE200 – At a glance

- For very low to medium dust concentrations
- Gas sampling and return combined in one probe
- Contamination check
- Automatic check of zero and reference point

Your benefits

- Reliable dust measurement in wet gas
- No movable parts with contact to aggressive gas, therefore low maintenance efforts
- Installation directly at the duct due to compact design

→ www.mysick.com/en/FWE200

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





DUSTHUNTER SB50 – At a glance

- For low to medium dust concentrations
- One-side installation
- Automatic check of zero and reference point
- Automatic compensation of background radiation, therefore no light absorber necessary
- For medium to large duct diameters

Your benefits

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

→ www.mysick.com/en/DUSTHUNTER_SB50

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



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 15267-3
- Low maintenance due to self-monitoring and contamination check

→ www.mysick.com/en/DUSTHUNTER_SP100

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





DUSTHUNTER T50 – At a glance

- For medium to high dust concentrations
- Automatic check of zero and reference point
- For small to medium measuring distances

Your benefits

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

→ www.mysick.com/en/DUSTHUNTER_T50

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



DUSTHUNTER T100 – At a glance

- For medium to high dust concentrations
- Integrated contamination check
- Automatic 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 15267-3

→ www.mysick.com/en/DUSTHUNTER_T100

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





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 15267-3

→ www.mysick.com/en/DUSTHUNTER_T200

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



FLOWSIC100 M/H/PR/S – At a glance

- Rugged titanium transducers for high durability
- Measuring system without purge air
- Corrosion-resistant material for application in aggressive gases (option)
- Integral measurement over the duct diameter with types H, M and S
- Probe type PR for economic installation from one side of the duct
- Automatic function control with zero and span point check

Your benefits

- Reliable flow measurement for ducts with small up to very large diameters
- High durability of the device
- Very low operating and maintenance costs due to operation without purge air
- 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

→ www.mysick.com/en/FLOWSIC100_M_H_PR_S

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





FLWSIC100 M-AC/H-AC – At a glance

- Rugged titanium transducers for high durability
- Innovative internal cooling for applications with gas temperatures up to 450 °C
- No input of cooling air into measuring medium
- Corrosion-resistant material for application in aggressive gases (option)
- Integral measurement over the duct diameter
- Automatic function control with zero and span point check

Your benefits

- Reliable flow measurement for ducts with small up to large diameters
- High durability of the device
- Minimum operating and maintenance costs
- No influence on measuring medium due to closed cooling circuit
- 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

→ www.mysick.com/en/FLWSIC100_M-AC_H-AC

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



FLWSIC500 – At a glance

- Cutting-edge technology: ultrasound
- Diagnostics and permanent operational check
- Robust and reliable without moving parts
- Replacable cartridge
- Straight inlet/outlet piping not required
- Overload-proof
- Optional integrated volume correction/data 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 as nearly maintenance-free
- Simplified recalibration due to straightforward cartridge replacement
- Reliable under dynamic load changes
- Self-sufficient operation

→ www.mysick.com/en/FLWSIC500

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





FLWSIC600 – At a glance

- High efficient transducers
- Direct path layout
- Intelligent self-diagnosis
- Compact and robust design
- Integrated logbook and data logs
- Wide measuring range up to 1:120
- Bidirectional measurement
- Low power consumption (<1 W)

Your benefits

- Low maintenance effort due to intelligent self-diagnosis
- No pressure loss
- Nearly insensitive to pressure regulator noise
- Calibration with air at atmospheric pressure possible
- Transducer can be dismantled under line pressure
- Power supply via solar panel possible

→ www.mysick.com/en/FLWSIC600

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



FLWSIC600 Bio – At a glance

- Flow measurement for biogas plants
- Durable, reliable, low maintenance
- Lightweight meter body made from polyethylen (PE100)
- Non-corrosive materials, anti-stick surface
- Measurement in wet and corrosive gases
- Process measurement with an uncertainty of $\pm 1.5\%$
- Version for ATEX-zone 1 and -zone 2 available
- Installation in PE and stainless steel piping possible

Your benefits

- The advantages of ultrasonic gas flow measurement adapted to the special application conditions of biogas plants
- Measuring devices based on ultrasound technology can be applied in all process stages between fermentation and injection into natural gas grids
- Low maintenance costs
- No pressure drop

→ www.mysick.com/en/FLWSIC600_Bio

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





LMS5xx – At a glance

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

Your benefits

- Superior performance in a vast range of applications
- Smallest sensor with highest accuracy in its class
- Comprehensive range of lines and models to suit all performance and price requirements
- Fast, reliable object detection in nearly any weather conditions
- Low power consumption reduces total cost of ownership
- Best price/performance ratio in this sensor class on the market
- Fast, easy commissioning due to SOPAS software
- Self-monitoring functions increase system availability

→ www.mysick.com/en/LMS5xx

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



Bulkscan® LMS511 – At a glance

- Non-contact measurement of volume and mass flow of bulk material
- Laser pulses with high angular resolution ensure outstanding image resolution
- 5-echo pulse evaluation produces highly reliable measurements
- Offers non-contact belt monitoring
- Integrated center-of-gravity calculator
- Robust structure for harsh ambient conditions
- Can also measure at low temperatures thanks to integrated heater
- Compact housing with enclosure rating IP67

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.mysick.com/en/Bulkscan_LMS511

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





LBV310 – At a glance

- Rugged 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 extensions (LBV330) and rope extensions (LBV320) available for vertical mounting up to 80 m distance

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

→ www.mysick.com/en/LBV310

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



LBV330 – At a glance

- Rugged device design with tube extension up to 6 m
- 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
- Short versions (LBV310) and rope-extended devices (LBV330) available

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 robust system for a multitude of applications
- Solutions for vertically mounted sensors in difficult installation conditions

→ www.mysick.com/en/LBV330

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



Sensor Intelligence is a promise

At SICK, sensor solutions are developed for industrial automation with commitment and experience. From development to service provision: Every employee is completely committed to ensuring that sensors and application solutions from SICK optimally fulfill their versatile functions.

Company with a culture of success

With a variety of products and services, approximately 5,800 employees help SICK sensor technology users to increase their productivity and reduce their costs. Founded in 1946, the company has its headquarters in Waldkirch, Germany, and with nearly 50 subsidiaries and interests, in addition to numerous representatives, it is globally active.

People like working at SICK. This is evident from the fact that SICK has regularly been named "Employer of the Year". This lively workplace culture has a strong appeal for qualified and skilled persons. At SICK, they are part of a company that offers a balance between career progression and quality of life.



Innovation creates competitive advantage

SICK sensors simplify procedures and optimize processes to achieve sustainable production. To do this, SICK has researched and developed facilities in many locations across the globe. In discussion with its customers and in cooperation with higher education institutions, innovative sensor products and solutions are developed. These form the basis for reliable process control, personal protection and environmentally friendly production.



Model with a far-reaching effect

SICK builds upon an established corporate culture, pursuing financial independence and technological transparency. Innovation has made SICK into a technological and market leader. Because it is only with targeted modernization and improvement that universally applicable sensors can be successful in the long term.



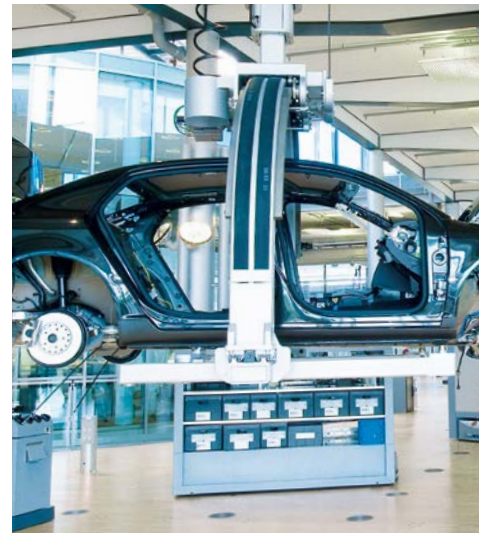
Sensor Intelligence for all requirements

SICK has representation in numerous fields and is therefore familiar with the processes used in a wide range of industries. Fundamental requirements such as precision, speed and availability apply globally, but must be implemented differently according to the industry in question.

For applications all over the world

Hundreds of thousands of installations and implemented applications prove it: SICK is familiar with the industries and their processes. And that is not going to change – in the application centers in Europe, Asia and North America, sensors and system

solutions are designed, tested and optimized in accordance with customer specifications. This contributes to the company's position as a reliable supplier and development partner.



For industries with specific dynamics

Where the demands for quality and productivity rise in parallel, industries profit from SICK's profound knowledge and expertise in the relevant sectors. In addition to the automotive and pharmaceutical industries, this also applies to the electronics and solar sectors. SICK provides productive solutions for accident prevention in automated guided vehicles and increases the throughput speed and traceability in warehouses and distribution centers. For protection of the environment and process optimization in cement production, waste incineration or in power stations, SICK provides system solutions for gas analysis and flow measurement. Natural gas distribution networks use the high-precision gas meters manufactured by SICK.

For better results in all fields

Every field has special procedures. And yet the tasks of the sensors is identical in principle: To measure, detect, control and monitor, protect, connect and integrate, identify, position. This puts the SICK specialists in the position to provide successful solutions industry-wide for other industrial automation applications.

www.sick.com/industries



For safety and productivity: SICK LifeTime Services

From system planning to upgrade services, SICK LifeTime Services provide a high quality of service all over the world. These services enhance personal safety and increase machine productivity to produce a solid foundation for sustainable operation.



Benefit from SICK services

Personal safety and machine and system productivity are largely dependent on the availability of the services required in each phase of a product's life cycle, i.e. the services that enable and sustain the functional integrity and reliability of a sensor, system

or safety device. At SICK, this is possible thanks to comprehensive industry know-how and more than 60 years of practical experience!





Consulting & Design

- Plant walk-through
- Risk assessment
- Safety concept
- Feasibility studies
- Software and hardware design



Verification & Optimization

- Inspections
- Maintenance
- Barcode testing
- Accident investigation
- Stoptime measurement
- Machine safety inspection



Training & Education

- User training
- Seminars
- WebTraining



Product & System Support

- Commissioning
- Exchange units and spare parts
- Remote support
- Hotline



Upgrade & Retrofits

- Machine retrofitting
- Sensor upgrades
- Technology retrofitting

www.sick.com/service



Versatile product range for industrial automation

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

www.sick.com/products

Photoelectric sensors



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

Proximity sensors



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

Magnetic cylinder sensors



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

Identification solutions



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

Detection and ranging solutions



- Laser measurement technology

System solutions



- Volume measurement systems
- Code reading systems
- Dimension weighing scanning systems
- Vision systems

Fluid sensors



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

Registration sensors



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

Distance sensors



- Short range distance sensors (displacement)
- Mid range distance sensors
- Long range distance sensors
- Linear measurement sensors
- Ultrasonic sensors
- Double sheet detector
- Optical data transmission
- Position finders

Automation light grids



- Advanced automation light grids
- Smart light grids
- Standard automation light grids

Vision



- Vision sensors
- Smart cameras
- 3D cameras

Opto-electronic protective devices



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

Safety switches



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

sens:Control – safe control solutions



- Safety relays
- Safety controllers
- Network solutions

Motor feedback systems



- Interfaces: incremental, HIPERFACE® and HIPERFACE DSL®
- Safety motor feedback systems
- Rotary and linear motor feedback systems for asynchronous, synchronous motors and linear motors

Encoders



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

Analyzers and systems



- Gas analyzers
- Dust measuring devices
- Analyzer systems
- Liquid analyzers
- Data acquisition systems
- Tunnel sensors

Gas flow measuring devices



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

Software



- Safexpert® safety software

Simple integration into your automation world

Our intelligent sensor solutions and safety controllers make available 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.

Industrial communication



SICK's fieldbus and network solutions allow sensors and safety controllers from SICK to be connected to all common automation systems. This guarantees simple and fast access to all available data and information.



PLC and engineering tool integration



Whether the issue is generic integration using device description files, standardized interfaces (e.g. TCI, FDT/DTM) for diagnosis or integration into the PLC program via function blocks – the user-friendly tools from SICK support you in implementation.

HMI integration



SICK offers a wide range of means to integrate process, status, and diagnostic data from SICK sensors into a visualization system. Tools such as OPC servers, web servers, or SCL allow simple and fast integration into your individual HMI solution – independent of the technology used.

Software and tools

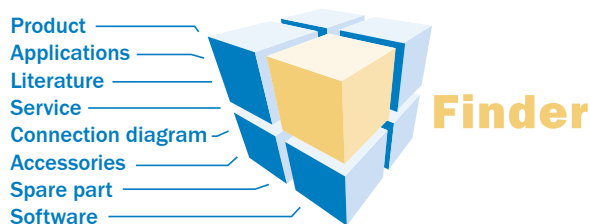


Our software tools support you in establishing connections, parameterizing and diagnosing sensors and safety controllers from SICK. The intuitive user interface permits simple and fast designing and realization of the application required.

www.sick.com/industrial-communication

www.mysick.com – search online and order

Search online quickly and safely – with the SICK “Finders”

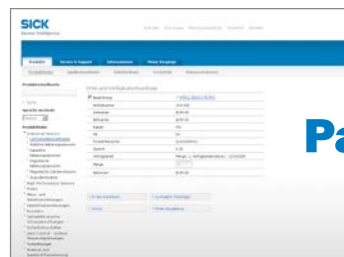


Product Finder: We can help you to quickly target the product that best matches your application.

Applications Finder: Select the application description on the basis of the challenge posed, industrial sector, or product group.

Literature Finder: Go directly to the operating instructions, technical information, and other literature on all aspects of SICK products.

Efficiency – with the e-commerce tools from SICK



Partner Portal
www.mysick.com

Find out prices and availability: Determine the price and possible delivery date of your desired product simply and quickly at any time.

Request or view a quote: You can have a quote generated online here. Every quote is confirmed to you via e-mail.

Order online: You can go through the ordering process in just a few steps.

For safety and productivity: 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 system design all the way 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.



Consulting & Design

Globally available experts for cost-effective solutions



Product & System Support

Fast and reliable, by telephone or on location



Verification & Optimization

Checks and recommendations for increased availability



Upgrade & Retrofits

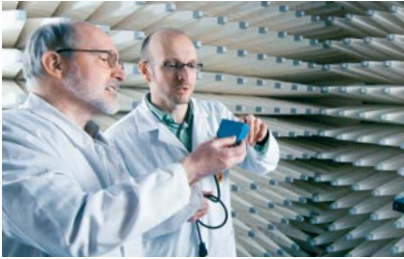
Uncovers new potential for machines and systems



Training & Education

Employee qualification for increased competitiveness

SICK at a glance



Leading technologies

With a staff of more than 5,800 and nearly 50 subsidiaries and representations worldwide, SICK is one of the leading and most successful manufacturers of sensor technology. The power of innovation and solution competency have made SICK the global market leader. No matter what the project and industry may be, talking with an expert from SICK will provide you with an ideal basis for your plans – there is no need to settle for anything less than the best.



Unique product range

- Non-contact detecting, counting, classifying, positioning and measuring of any type of object or media
- Accident and operator protection with sensors, safety software and services
- Automatic identification with bar code and RFID readers
- Laser measurement technology for detecting the volume, position and contour of people and objects
- Complete system solutions for analysis and flow measurement of gases and liquids



Comprehensive services

- SICK LifeTime Services – for safety and productivity
- Application centers in Europe, Asia and North America for the development of system solutions under real-world conditions
- E-Business Partner Portal www.mysick.com – price and availability of products, requests for quotation and online orders

Worldwide presence with subsidiaries in the following countries:

Australia
Belgium/Luxembourg
Brasil
Česká Republika
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España
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Israel
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