



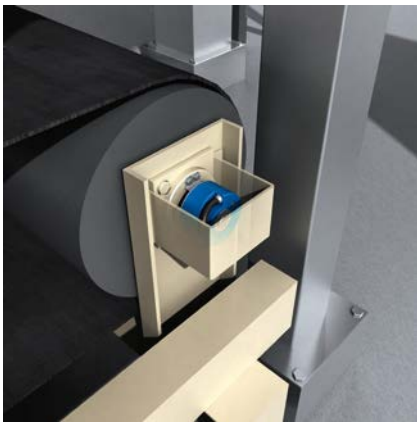
BIO ENERGY

SENSOR SOLUTIONS FOR BIOMASS POWER PLANTS

SICK
Sensor Intelligence.



DELIVERY AND STORAGE OF BIOMASS



Conveyor belt speed of the biomass belt

The conveyor belt speed at which the biomass is transported to the shredder and then to the storage location is very important when it comes to managing the material flow. The DFS60 incremental encoder calculates the speed and running direction of the belt. It can be configured either via a PC or a separate programming tool, thus offering comprehensive programming flexibility for all industrial requirements.

- DFS60 incremental encoder



→ www.sick.com/DFS60



Conveyor control and volume flow measurement

The conveyor belts transport biomass from the waste heap to shredders or transfer stations. During this process, volume measurement systems control the rate at which biomass is fed to the shredders. These measuring systems also optimize throughput, and reduce loading time. The Bulkscan® LMS511 records the volume flow on conveyor belts with no contact. The built-in center of gravity calculator maximizes transportation performance and detects one-sided or unequal loading of the conveyor belt. The advantages: reduced belt wear and lower maintenance costs.

- Bulkscan® LMS511 flow sensor



→ www.sick.com/LMS5xx



Protection of the biomass bunker and the wood shredder

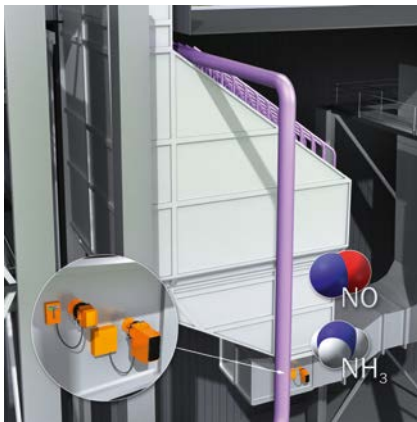
Measuring CO and O₂ in the biomass bunker and in the shredder is an important measure for early warning of a smoldering fire or leaks in the inerting system. The MKAS system solution is ideal because it is equipped with an explosion-protected sampling probe. The system can be configured to sequentially monitor a number of bunkers and shredders. An important feature is the stability of the measuring system, allowing routine adjustments to be made using only ambient air. It is excellent for safety-relevant measurements.

- MKAS continuous emission monitoring system



→ www.sick.com/MKAS

FLUE GAS DENITRIFICATION (DENOX)



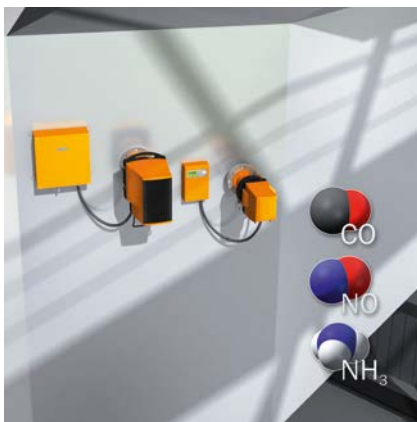
Operation of an SCR denitrification system

Selective catalytic reduction removes nitrogen oxides (NO) from flue gases with the aid of a catalyst and injection of aqueous ammonia. NO is converted into water and nitrogen at 200 to 400 °C. At the SCR inlet, the NO concentration can be measured and thus the amount of ammonia added can be regulated. Both NO and NH₃ are measured at the SCR outlet. This NO value in conjunction with the NO concentration at the SCR inlet determines the efficiency of the denitrification process. The GM32 in-situ gas analyzer continuously measures NO and the GM700 measures the so-called "NH₃ slip".

- GM32 in-situ gas analyzer
- GM700 in-situ gas analyzer



→ www.sick.com/GM32



Operation of an SNCR denitrification system

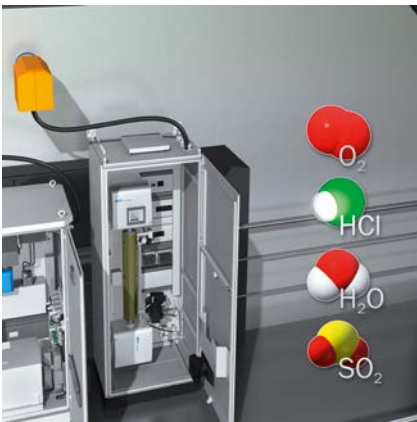
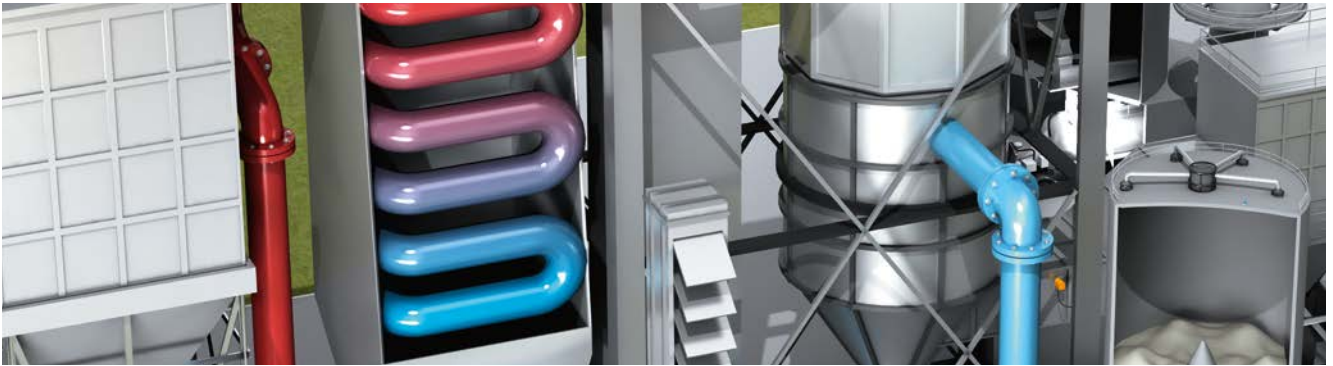
For the process of cleaning gas through selective non-catalytic reduction, ammonia or an aqueous urea solution is directly injected behind the combustion chamber at a temperature of 900 to 1100 °C. This causes the nitrogen oxides to react with the ammonium compounds and turn into nitrogen and water. This reduces NO_x emissions. At the combustion chamber outlet, the GM700 measures the ammonia slip.

- GM700 in-situ gas analyzer



→ www.sick.com/GM700

FLUE GAS SCRUBBER



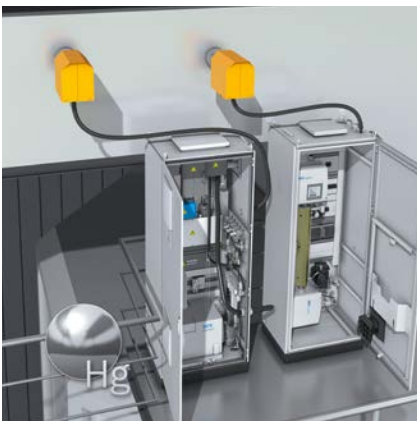
Process measurement at flue gas scrubber inlets

Flue gas scrubbers reduce HCl and SO₂. In wet scrubbers, a cleaning solution is injected into the washing tower against the flow of the gas. In order to remove any heavy metals and organic pollutants, activated carbon is added during dry absorption. At the inlet of the flue gas scrubber, the MCS300P HW analyzer system simultaneously measures the components SO₂, HCl, H₂O and optionally O₂. This measurement can help to significantly reduce the consumption of reagents, thereby lowering operating costs. Peaks in concentration can also be recorded quickly and reliably.



→ www.sick.com/MCS300P HW

- MCS300P HW process solution



Monitoring mercury separation in the scrubber

The mercury process measurement is used for monitoring high Hg concentrations (Hg and HgCl₂) which occur in particular during the combustion of biomass of unknown composition. If the gas scrubber is overloaded with very high Hg concentrations of more than >3,000 µg/m³, the plant operator must take countermeasures immediately. The MERCEM300Z is ideal for this application. Thanks to its Zeeman measuring technology, it measures Hg concentrations reliably and without cross-sensitivity, even at high SO₂ concentrations.



→ www.sick.com/MERCEM300Z

- MERCEM300Z extractive gas analyzer



Overflow protection of the lime silo and biomass storage

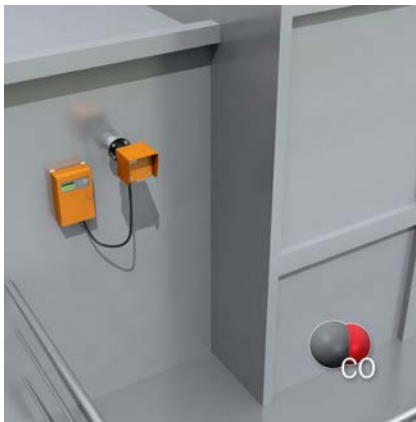
Lime is typically stored in silos for use as an absorber or neutralizer in the flue gas desulfurization system. Point measurement of the level is recommended to prevent the silo from overflowing. The LBR SicWave radar-based level switch is highly resistant to external interference, dust and deposits. Thanks to its non-contact 80 GHz radar technology, it is easy to install and maintain.



→ www.sick.com/LBR SicWave

- LBR SicWave level sensor

DUST REMOVAL



CO monitoring for the filter system

Flue gases from biomass combustion include a significant amount of dust which has to be removed before the gas is released into the atmosphere. Bag filters are often used to remove dust in biomass power plants. In this application, the GM901 gas analyzer monitors the CO content in the ash sieve, as too high carbon monoxide concentrations can cause explosions in the filter system. The GM901 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.



→ www.sick.com/GM901

- GM901 in-situ gas analyzer



Point level measurement in ash collection hoppers

The dust particles that pass through the bag filter also accumulate on the filter surfaces. The movement of the bag filter causes the dust particles to fall off and collect in ash hoppers underneath the bag filter. Point level measurements are used to determine whether the hoppers are full. The LBR SicWave radar-based level sensor is very well suited for this application. It is highly resistant to external disturbances, dust and deposits. Thanks to its non-contact 80 GHz radar technology, it is easy to install and maintain.



→ www.sick.com/LBR SicWave

- LBR SicWave level sensor



Efficient dust measurement in the bag filter

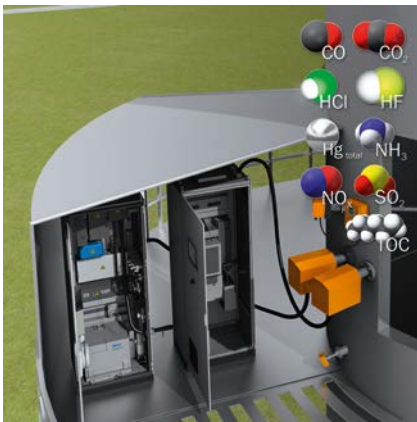
The flue gas produced during the combustion of biomass contains a high proportion of particulate matter (PM). And the new, stricter limit values for dust emissions recommend that power plants install fabric bag filters. The DUSTHUNTER SB50 is used for dust measurement and measures even low dust concentrations with light back-scattering. Its automatic zero and reference point check enables a reduction in maintenance effort. In addition, installation from one side facilitates installation behind the bag filter.



→ www.sick.com/DUSTHUNTER SB50

- DUSTHUNTER SB50 scattered light dust measuring device

CONTINUOUS EMISSION MONITORING



Monitoring gas emissions

With only one gas sampling probe, the MCS100FT CEMS solution continuously and simultaneously measures 12 gas components: SO₂, NH₃, O₂, H₂O, CO₂, TOC, HF and NO_x as the sum of NO and NO₂. The MERCEM300Z continuously monitors critical gaseous mercury emissions when contaminated biomass is combusted. The MERCEM300Z gas analyzer surpasses other gas analyzers when it comes to accuracy, availability and measurement down to small measuring ranges.

- MCS100FT CEMS solution
- MERCEM300Z extractive gas analyzer



→ www.sick.com/MCS100FT



Monitoring dust emissions

In wet exhaust gases, dust can be measured extractively, whereas in dry exhaust gases, continuous in-situ dust measurement is useful. SICK has the right solution for both applications. A DUSTHUNTER S100 is best suited for the standard application with dry flue gas (above the acid dew point). The FWE200DH is used for wet flue gas (under the acid dew point).

- DUSTHUNTER S100 scattered light dust measuring device
- FWE200DH scattered light dust measuring device



→ www.sick.com/FWE200DH



Emission reporting

The MEAC Data Acquisition System is ideal for recording, saving, normalizing, displaying, and forwarding a continuous flow of emissions data. SICK offers different variants of the MEAC, which perform reporting in accordance with the applicable national legislation. The MEAC is TÜV-tested and certified, and provides data analysis that takes into account QAL3 data on drift control, amongst other elements. SICK also provides solutions involving the MEAC for redundant emission data handling. All common data transfer protocols are available for digital data transfer to the process control system.

- MEAC CEMS solution



→ www.sick.com/MEAC

Biomass combustion is similar to any solid fuel combustion in many ways. Depending on the biomass fuel used, the regulatory parameters may fall under waste incineration directives or conventional power plant directives. SICK measuring devices are used in a number of areas and applications in biomass combustion plants, from fuel handling and pollution removal efficiency to emissions. SICK offers suitable sensor and system solutions for all requirements in biomass power plants.



Read more about sensor solutions for the power and waste industry:
 → www.sick.com/power
 → www.sick.com/waste



Emission monitoring

The regulatory requirements for emission monitoring and reporting are becoming more stringent in nearly every country in the world. SICK analyzers and system solutions monitor and check emission limit values, contaminant emissions and the release of other substances into the environment.



Flue gas treatment

Scrubbers, catalytic reactors and particulate filters all remove gaseous pollutants from the flue gas. Process gas analyzers provide real-time measurement to optimize removal efficiency. This leads to significant savings on material and to less maintenance for plant operators.



Plant safety

Gas analyzers, dust monitors and level sensors ensure plant operation and safety. For example, they monitor biomass bunkers. SICK sensors monitor electrostatic precipitators, bag filters and control the stock of necessary reagents.



Service

Competent consulting, qualified planning support, detailed project planning and engineering, installation and start-up – SICK provides all of these services with its own personnel. SICK also provides equipment service support .

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 10,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

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

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

That is “Sensor Intelligence.”

Worldwide presence:

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

Detailed addresses and further locations → www.sick.com