



POWER

SENSOR SOLUTIONS FOR GAS-FIRED POWER PLANTS

SICK
Sensor Intelligence.

CHALLENGES IN GAS-FIRED POWER PLANTS

The power industry faces many challenges when generating electricity. In every plant, the efficient use of fuel is of utmost importance to insure optimum profitability. SICK is an ideal partner for the power industry. With our broad range of intelligent sensors and solutions we have proven applicability in all areas of the power generation process, from gas flow to combustion efficiency to emissions monitoring.



→ www.sick.com/power



Gas supply and metering

Fuel supply is carefully controlled to insure efficiency in power production. A highly accurate, real-time metering solution is critical to optimizing fuel efficiency. Sensors and complete metering solutions from SICK are ideal for reliable and extremely robust gas flow measurements.



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: O₂, CO and air flow, to provide the quickest possible signal for control.



DeNOx

DeNOx systems are used in many gas fired plants, in order to meet stringent emission limits for this pollutant. SICK provides analysis equipment to monitor the performance of the DeNOx systems.



Emission monitoring

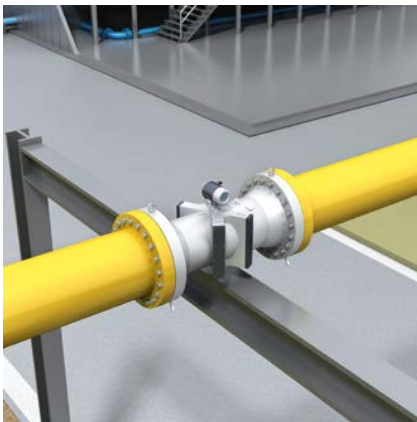
The regulatory requirements for emissions are becoming more stringent all over the world. SICK analyzers and system solutions monitor and verify emissions of pollutants, calculate the total mass emissions to insure that the limits are always met.



Safety and protection

The safety and protection of industrial sites and their assets, as well as, personnel is always the highest priority. SICK makes sensors for fence line monitoring to detect unwanted intruders for safe plant operation.

GAS SUPPLY AND METERING



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-XT is an ultrasonic gas flow meter for high precision measurement. The FLOWSIC600-XT 2plex combines a fiscal gas meter (4 measuring paths) and a check flow meter (1 measuring path) in one meter body. Due to the direct path layout, the meter is not influenced by contamination. This results in long-term stability and accuracy of the system.

- FLOWSIC600-XT gas flow meter



→ www.sick.com/FLOWSIC600-XT



Gas flow metering

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 FLOWSIC500 ultrasonic compact gas meter from SICK enables highly accurate metering in natural gas distribution: With no moving parts, the gas flow meter is a low-maintenance device resulting in a significant reduction in operating costs. FLOWSIC500 can be easily integrated into existing measuring stations.

- FLOWSIC500 gas flow meter



→ www.sick.com/FLOWSIC500



Metering systems

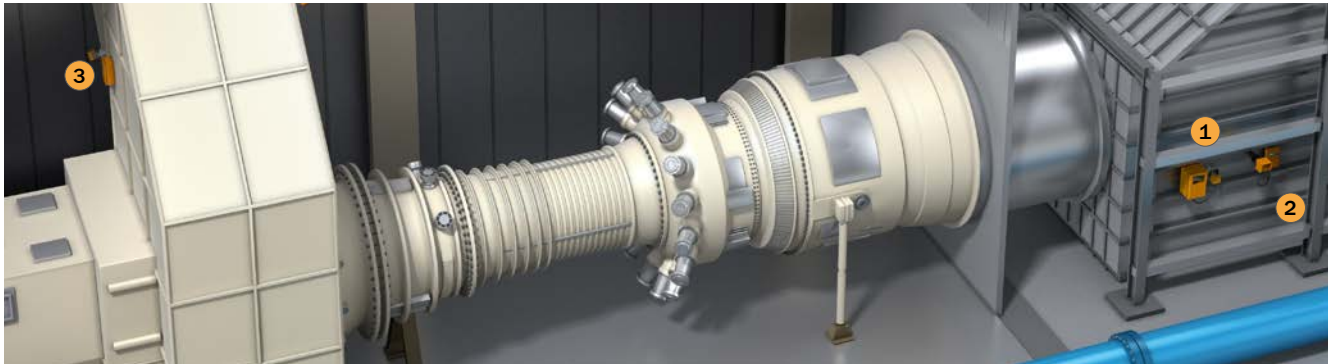
In addition to providing flow meters, SICK's capability also includes complete integrated flow metering solutions. From basic metering lines with piping, gas flow meters and transmitters to complete metering systems including filtration, analyzer systems, pressure and flow control systems, electrical control cabinets with supervisory systems and PLCs. This includes all related services like engineering, training, commissioning FAT, SAT and documentation.

- FLOWSKID600 flow metering systems



→ www.sick.com/FLOWSKID600

COMBUSTION EFFICIENCY



Monitoring gas at the turbine 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 as a secondary component for combustion control. Reliable and accurate monitoring of O_2 and CO at the boiler outlet are key elements to control the excess air in the combustion process. The ZIRKOR200 in-situ analyzer provides a reliable and rapid measurement of oxygen even at higher temperatures.

- ZIRKOR200 in-situ gas analyzer



→ www.sick.com/ZIRKOR200



Monitoring exhaust gas

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

- GM901 in-situ gas analyzer



→ www.sick.com/GM901



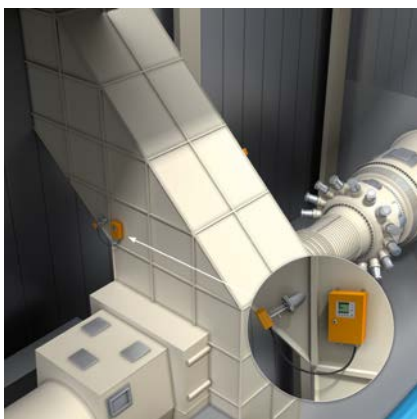
Monitoring air flow

The correct supply of air to the turbine is a primary task for combustion efficiency. The correct amount of air insures that the oxygen is present in the correct stoichiometric ratio. The FLOWSIC100 ultrasonic flowmeter is used for accurate measurements of combustion air flow. With the ultrasonic technology there is no loss of pressure and the FLOWSIC100 delivers accurate flow measurements even at low velocities, perfect especially for peaking plants.

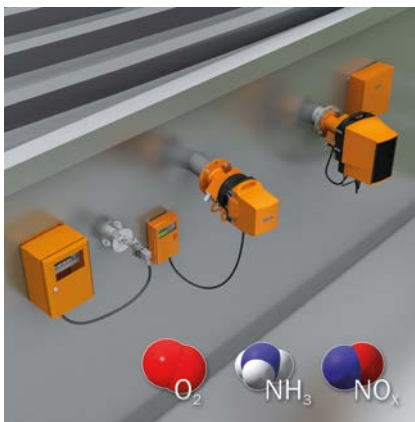
- FLOWSIC100 volume flow measuring device



→ www.sick.com/FLOWSIC100



STEAM CYCLE MONITORING



Measuring DeNOx efficiency

In some countries or states, the limits for NO_x emissions are so low that power plants burning relatively clean natural gas require additional pollution reduction systems, like selective catalytic reduction to further reduce the NO_x emissions and meet permit requirements. When that happens, monitoring is also necessary to insure correct performance of the DeNOx systems.

- GM32 in-situ gas analyzer,
- GM700 in-situ gas analyzer,
- ZIRKOR 200 in-situ gas analyzer



→ www.sick.com/GM700

→ www.sick.com/ZIRKOR200

→ www.sick.com/GM32



NO and NO₂ measurement at the HRSG

The GM32 in-situ gas analyzer measures low levels of NO_x 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.

- GM32 in-situ gas analyzer



→ www.sick.com/GM32



Steam flow

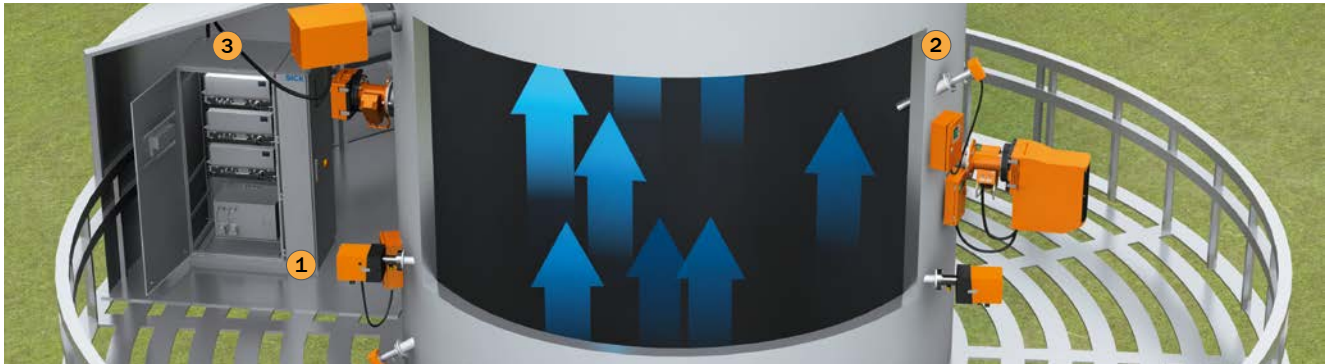
Steam flow measurement often requires compromise, but it doesn't have to. Ultrasonic flowmeters from SICK operate around the world on challenging high-value steam flow installations. These include custody transfer of steam where accuracy is important for billing, loss of pressure can be avoided or bi-directional flow needs to be measured.

- FLOWSIC100 process ultrasonic gas flow measuring device



→ www.sick.com/FLOWSIC100

CONTINUOUS EMISSION MONITORING



Monitoring dust emissions

Dust concentration or opacity is measured in the stack emission from a gas turbine plant when multiple fuels are used for combustion. The DUSTHUNTER T100 is a cross duct version measuring dust at medium to high concentrations. An automatic check of zero and reference point as well as contamination check are included. The principle of operation is optical transmission. When the correct purge air blowers are used, the DUSTHUNTER T100 is suitable for measurements at high temperatures.

- DUSTHUNTER T100 dust measurement device



→ www.sick.com/DUSTHUNTER



Monitoring stack gas flow

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.

- FLOWSIC100 volume flow measuring device



→ www.sick.com/FLOWSIC100



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 systems 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 product portfolio for emission monitoring provides complete solutions from one source. A specially developed CEMS package the PowerCEMS100 measures CO, NO_x, O₂ and optionally SO₂ and/or CO₂.

- PowerCEMS customized analyzer system



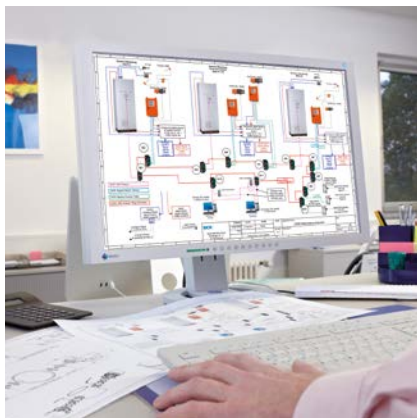
→ www.sick.com/PowerCEMS100

FROM A SINGLE DEVICE TO A COMPLETE ANALYSIS SYSTEM

SICK's capabilities do not end with the sale of a single product. We employ an extensive team of custom system planning and project engineers as well as detail engineers with expertise in electrical and mechanical engineering. SICK's

system engineers plan and design tailor-made solutions including the complete range of peripheral equipment such as walk-in shelters, PLC connections, calibration gas distribution and data handling and evaluation. All solutions are de-

signed and built in accordance with recognized international standards. An experienced project manager follows the project from initial order through to site acceptance test and hand over to local field service specialists.



Analyzers and measurement systems supply monitoring and control-relevant information and protect people and systems. When optimally integrated and maintained, these components and sys-

tems guarantee safe processes, constant product quality and protect people and the environment. From the outset and over many years, SICK LifeTime Services provide suitable services for all

aspects of your measurement systems and plants: from planning and conception to commissioning and ongoing operations, all the way to conversions and upgrades.

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

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

For us, that is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, 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