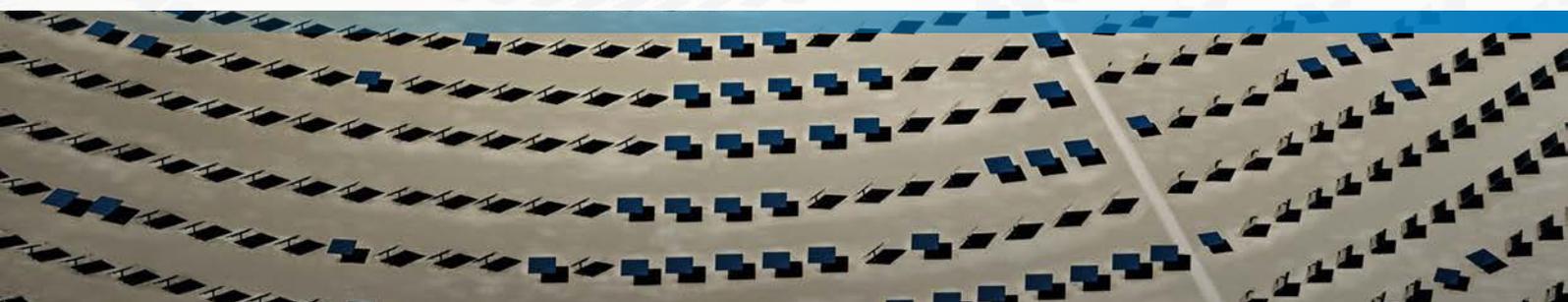




POWER

SENSOR SOLUTIONS FOR SOLAR POWER PLANTS

SICK
Sensor Intelligence.



CHALLENGES IN SOLAR POWER PLANTS

The power industry faces a number of challenges when generating electricity. In every plant, the efficient use of heat source and protection of assets are of utmost importance to insure optimum profitability. 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. Solar plants are often located in remote areas with limited staff. Intelligent sensors, which provide their own health data to remote networks and even cloud based data handling provide early warning of problems. These can be fixed either with replacement or planned service visits, saving time and money.



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



Safety control

By monitoring gas leaks in heat exchanger media, SICK can help detect problems with the thermal storage systems before they become big issues. Gas analyzers measure low concentrations of hydrocarbons or water continuously and quickly. SICK's gas analyzers provide real-time measurement data, allowing operators to act quickly to detect and remedy problems.

Increasing efficiency

Monitoring of the position of the mirrors or reflectors in a concentrated solar power plant is of utmost importance to improving the efficiency of energy conversion. With its extensive line of encoders and inclination sensors, SICK helps to achieve this target.

Emission monitoring

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

Asset protection

Ensuring that unwanted persons do not enter the plant area is of high importance for critical infrastructure. The remote CSP plants have few full-time staff members, so fenceline monitoring for intrusions can be a welcome addition to protect the asset.

Service and maintenance support

Solar plants are often located in remote areas with limited staff. Intelligent sensors, which provide their own health data to remote networks and even cloud based data handling provide early warning of problems. These can be fixed either with exchange or planned service visits, saving time and money.

FROM A SINGLE DEVICE TO A COMPLETE 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

designed 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.

POSITIONING AND MOTION CONTROL



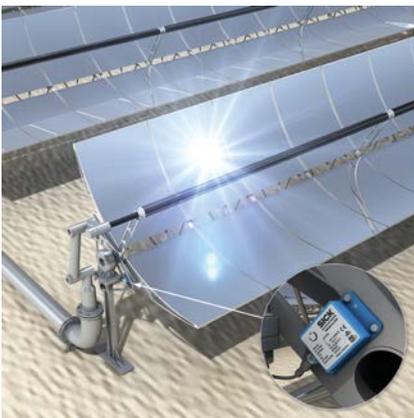
Heliostat – tracking in concentrated solar power plants

In order to align and adjust the mirrors to best track the sunlight, the heliostat is guided by encoder systems that adjust and identify the exact x and y position of the mirror. SICK manufactures a range of absolute and incremental encoders, for example the AFS absolute singleturn encoder that provides very high accuracy, even at extreme ambient temperatures.

- AFS60 absolute singleturn encoder



→ www.sick.com/AFS_AFM60_SSI

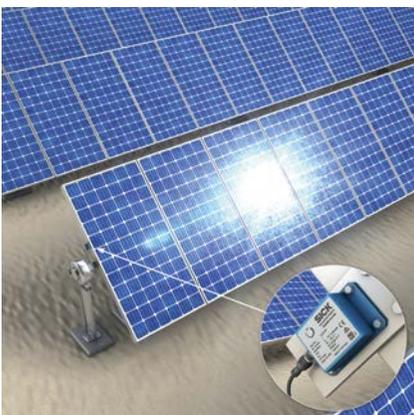


Parabolic trough – tracking in CSPs

In this system, the sunlight is concentrated by using parabolic mirrors. The sunlight, which enters the mirror parallel to its plane of symmetry is focused along the focal line and is warming up a heat transfer media like oil. The position of the mirror needs to be guided to follow the sun's daily path in order to achieve the optimal energy efficiency. Inclination sensors report the actual position of the parabolic mirror to the controller. An inclination sensor which provides very high accuracy even in rough environments can be used to align and adjust the positioning of the parabolic trough.

- TMS/TMM inclination sensors

→ www.sick.com/inclination_sensors



Solar panel – tracking photo voltaics

The inclination sensor of a solar panel system is communicating the actual tilt position to the controller. The TMS/TMM range of inclination sensors provides non-contact inclination measurement with precision, even under tough ambient conditions. The sensors are available for one or two-dimensional measurements and offer high availability with fully encapsulated electronics.

- TMS/TMM inclination sensors



→ www.sick.com/inclination_sensors

THERMAL STORAGE



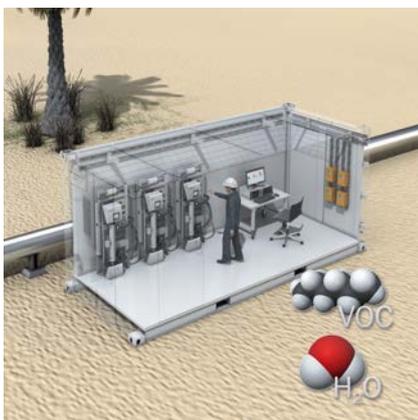
Process monitoring of VOCs

The thermal storage/conversion systems use heat exchangers to produce steam for the turbines. Organic carbon can be monitored at low concentrations using an FID analyzer to protect against leaks in the N₂ blanketing system. The FIDOR uses the Flame Ionization principle (FID) which measures with high sensitivity at low concentrations to quickly detect leaks so that safety measures can be implemented and/or process lines can be closed to prevent damage.

- GMS800 FIDOR extractive gas analyzer



→ www.sick.com/GMS800-FIDOR



Monitoring for heat exchanger leaks

The MCS300P process monitor can be used to check if there is any steam/water leakage into the thermal oil. The MCS300P is a multi-component analyzer with a heated long-path cell ideally suited to measure H₂O in oil or other liquid hydrocarbon steams.

- MCS300P extractive gas analyzer



→ www.sick.com/MCS300P



Steam flow measurements

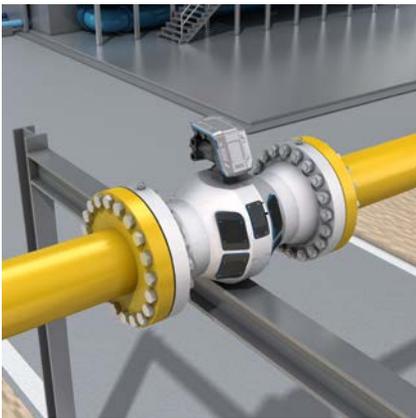
Steam flow measurement often requires compromise, but it doesn't have to. Ultrasonic flowmeters from SICK operate around the world on challenging high-value steam flow installations. These ultrasonic systems feature no loss of pressure, which means greater plant efficiency.

- FLOWSIC100 Flare mass flow measuring device



→ www.sick.com/FLOWSIC100-Flare

GAS FIRED BACK-UP POWER GENERATION



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. 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 volumetric flow of natural gas at the turbine inlet provides the necessary information for the computation of total mass emissions of the plant. 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 gas flow meter



→ www.sick.com/FLOWSIC500



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

REMOTE SERVICES AND DATA TRANSMISSION



High- and low-pressure calibration

SICK is a reliable and experienced manufacturer of ultrasonic gas meters. In addition, SICK sets high standards with the long term durability, accuracy and stability of its products. Calibration plays a key role when it comes to ensuring accuracy. It is for this reason that the ultrasonic gas meter is tested against a measurement standard and then adjusted to it. This guarantees that the customer obtains maximum accuracy and is also the basis for use in custody transfer. The calibration can be performed subject to the application conditions as a high-pressure or low-pressure calibration.



SICK remote service

Providing expert assistance and quick service to customers is a priority during commissioning and operation. Fast, system-specific support provided by specialists is more important than ever. Complex systems and growing pressure on costs are giving rise to a demand for optimized maintenance and proactive service. SICK remote services meet these requirements, combined with high safety standards for a secure connection. With this solution, experts are only one click away which leads to high efficiency as well as it is reducing the need of planning, travelling and setup time.



→ www.sick.com/remote-service

- Meeting Point Router



TDC gateway systems - ideal for remote installations

The TDC (Telematic Data Collector) gateway system collects and saves data from sensors using various interfaces. The mobile communication present in the system transmits the data to a customer server or cloud. The incoming and outgoing data can be used for downstream process optimization and increased transparency, therefore increasing productivity. SICK offers optional customer-specific cloud solutions for this purpose.



→ www.sick.com/gateway-systems

- TDC gateway systems

SICK AT A GLANCE

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

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

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

That is “Sensor Intelligence.”

Worldwide presence:

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

Detailed addresses and further locations → www.sick.com