

Power

Broad range of solutions for
gas-fired power plants



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. With our broad range of solutions Endress+Hauser has proven applicability in the entire power generation process, from gas flow to combustion efficiency to emissions monitoring.



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. Measuring devices and complete metering solutions 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. Endress+Hauser measures a number of parameters which are used for combustion control: O₂, CO and air flow, to provide the quickest possible signal for control.

Denitrification (DeNO_x)



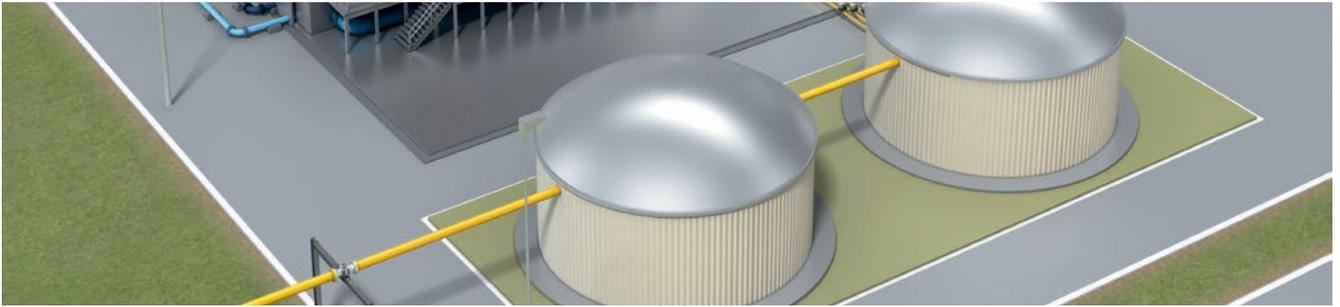
DeNO_x systems are used in many gas fired plants, in order to meet stringent emission limits for this pollutant. We provide analyzer equipment to monitor the performance of the DeNO_x systems.

Emission monitoring

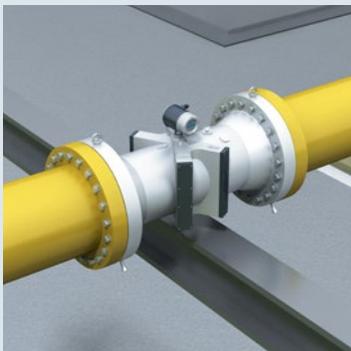


The regulatory requirements for emissions are becoming more stringent all over the world. Our analyzers and system solutions monitor and verify emissions of pollutants, calculate the total mass emissions to insure that the limits are always met.

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. FLOWSIC600-XT is an ultrasonic gas flowmeter for high precision measurement. The FLOWSIC600-XT 2plex combines a fiscal gas meter (4 measuring paths) and a check flowmeter (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 flowmeter



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

FLOWSIC500 flowmeter



www.endress.com/flowsic500

Metering systems



In addition to providing flowmeters, our capability also includes complete integrated flow metering solutions. From basic metering lines with piping, gas flowmeters 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 FAT¹, SAT² and documentation.

FLOWSKID600 flow metering systems

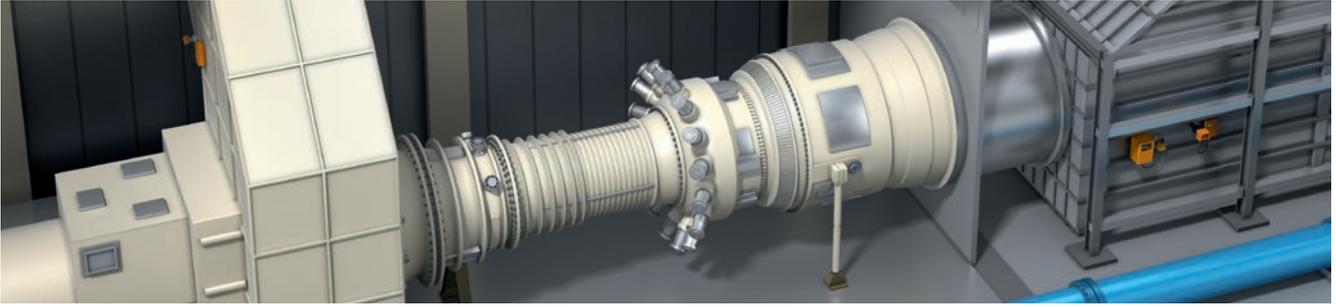


www.endress.com/flowskid600

¹ Factory Acceptance Test

² Site Acceptance Test

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 O₂ and CO at the boiler outlet are key elements to control the excess air in the combustion process. The ZIRKOR200 O₂ analyzer provides a reliable and rapid measurement of oxygen even at higher temperatures up to +600 °C (+1,110 °F); with accessories up to +1,600 °C (+2,900 °F).

ZIRKOR200 in-situ gas analyzer



www.endress.com/zirkor200

Monitoring exhaust gas



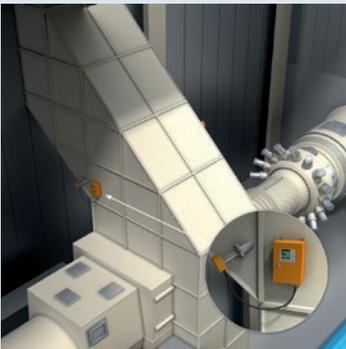
Power plant efficiency requires continuous monitoring and optimizing of the combustion process. Monitoring the exhaust gas air for CO is important because it provides the necessary signal needed to maintain the correct stoichiometric ratio and optimize the efficiency of the combustion process. The in-situ technology provides the fast response necessary for control. The GM901 in-situ gas analyzer for CO is available as a cross-duct device version. As a result, it is suited to a broad range of applications – even for difficult measuring tasks.

GM901 in-situ gas analyzer



www.endress.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 measuring principle 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

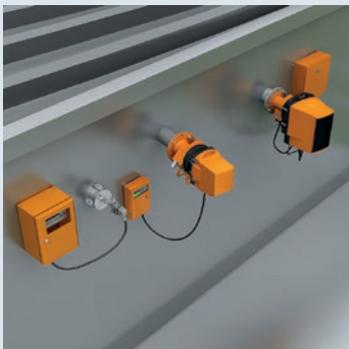


www.endress.com/flowsic100

Steam cycle monitoring



Measuring DeNO_x 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 DeNO_x systems.

- GM32 in-situ gas analyzer
- GM700 in-situ gas analyzer
- ZIRKOR200 in-situ gas analyzer

GM32, GM700, ZIRKOR200 in-situ gas analyzer



www.endress.com/gm32
www.endress.com/gm700
www.endress.com/zirkor200

NO and NO₂ measurement at the heat recovery steam generators (HRSG)¹



The GM32 in-situ gas analyzer measures continuously 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.endress.com/gm32

Steam flow



Steam flow measurement often requires compromise, but it doesn't have to. Ultrasonic flowmeters 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.

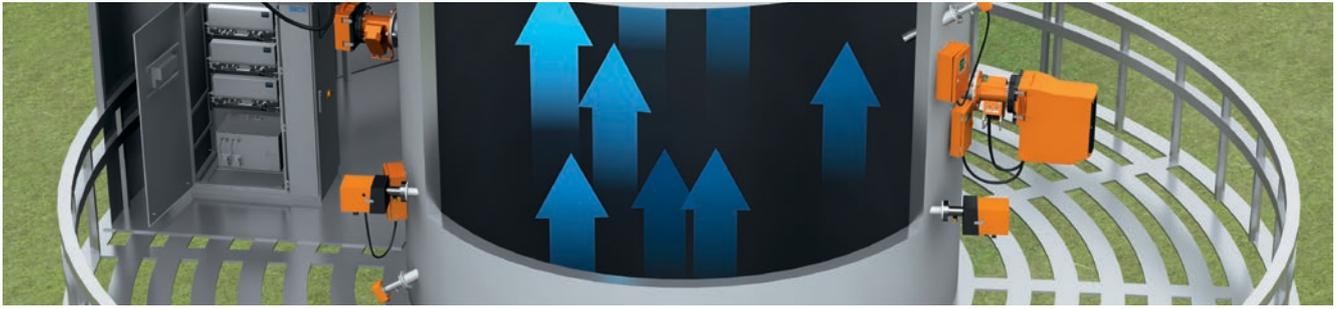
FLOWSIC100 process gas flow measuring device



www.endress.com/flowsic100

¹ Heat Recovery Steam Generators

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 device version measuring dust at medium to high concentrations. An automatic check of zero and reference point as well as contamination check are included. The measuring principle is optical transmission. When the correct purge air blowers are used, the DUSTHUNTER T100 is suitable for measurements at high temperatures up to +600 °C (+1,110 °F)

DUSTHUNTER T100 dust measurement device



www.endress.com/dusthunter-t100

Monitoring stack gas flow



Stack gas flowmeters 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. It includes internal air cooling of the sensor heads in order to allow the accurate ultrasonic instruments to be used in high temperatures up to +450 °C (+840 °F).

FLOWSIC100 volume flow measuring device



www.endress.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. Our product portfolio for emission monitoring provides complete solutions from one source. An especially for this application tailor-made CEMS package the PowerCEMS100 measures simultaneously CO, NO_x, O₂ and optionally SO₂ and/or CO₂.

PowerCEMS100 customized analyzer system



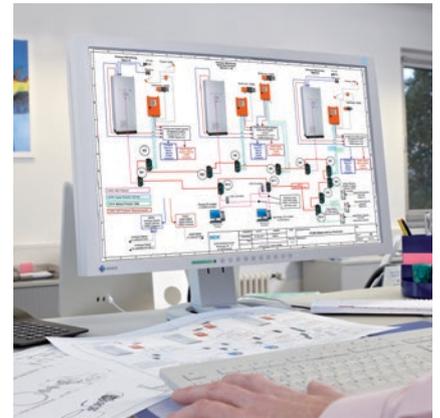
www.endress.com/powercems100

From a single device to a complete analyzer system

Our 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. The system engineers plan and design

tailored solutions from Endress+Hauser 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 systems guarantee safe

processes, constant product quality and protect people and the environment. From the outset and over many years, our 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.

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