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Precision Is Always A Question Of Technology.

Proven and Innovative Solutions for Modern Process Analytics.

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Process Analytics. Trust in Siemens!

Siemens process gas analytic devices are highly regarded worldwide for their quality, reliability, and precision, and have been used in the process industries for more than 40 years. Siemens offers the full range of modern process analysis for all sectors, processes, and applications – from single analyzer to customized system solutions.

Discover the world of continuous process gas analytics with us and see the benefits for yourself:

- Use our continuous process gas analyzers to monitor and optimize processes, improve product quality or ensure safe operations.
- Optimum solutions are available for all applications; place your trust in our long-time experience – we're familiar with the challenges and contexts of production processes.
- Focus on flawless processes: Siemens offers gas analytic products, solutions, and services under a single umbrella.
- In addition to reliable equipment, you'll also benefit from outstanding services in every phase of operation: from planning to support, we, as a global player, can competently assist with your processes.

Serving People and the Environment

International and national environmental protection laws regulate the emission of pollutants into the air. The monitoring of emissions is thus necessary at many industrial combustion plants. They have to be controlled exactly and reliably around the clock to comply with the respective legislation to receive the permission for continued operation. Emission measurement systems by Siemens comply with the latest statutory regulations and positively contribute to environmental protection.
Apart from emission controls demanded by the authorities, measurements also deliver valuable information for the optimization of combustion plants or for process control in thermal production processes. Be it in large combustion plants, industrial combustion engines, gas turbines, or industrial furnaces – analyzers for emission-monitoring and systems by Siemens for the measurement of NO_X, SO_2, CO, and O_2 support you in the successful management and control of your industrial and power plants. Profit from our precise emissions technology to comply with ever-stricter environmental regulations and to optimize your efficiency.

Siemens Gas Analyzers – at Home in Many Sectors

By tradition, Siemens focuses strongly on a number of industrial sectors. It is only by knowing and fully understanding the specific requirements of each unique user that we can develop and offer customized products.

The applications of continuous gas analytics are varied. Reliable and efficient gas analyzers by Siemens offer you exact measurements and consistently high reliability at comparably low operational costs. Our analyzers enable you to control and optimize processes, confirm purity and detect dangerous substances, and reduce emissions or increase energy efficiency.

Oil and gas industry

When it comes to analytic solutions in the oil and gas sector, Siemens has the right answers for all midstream and downstream processes. Typical practical examples for Siemens process analytics in midstream processes are quality and fiscal measurements at transmission stations for natural-gas pipelines, LNG refueling facilities (gasification/re-gasification) and gas entry points into natural-gas grids (e.g. biogas).

Power generation

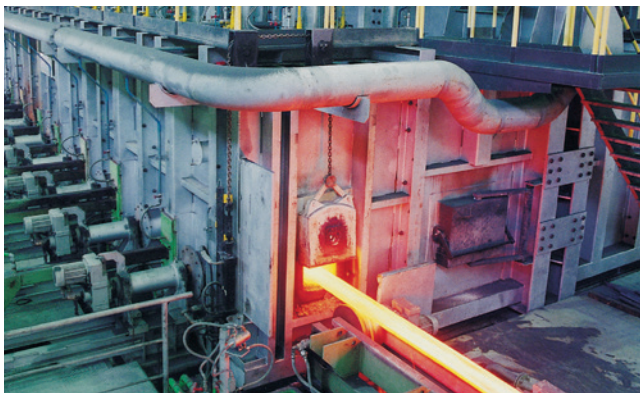
In the energy sector, new technologies improve the efficiency of power plants and reduce emissions and thus the negative impact on the environment. Process analytics deliver precise and reliable data from processes and thereby make their optimization possible. Powerful and robust measurement technologies are crucial to achieve this.

Steel industry

Siemens gas analyzers are not only deployed to achieve climate protection goals, but also to optimize the operational performance in the steel industry. Thanks to the monitoring of the oxygen concentration, the electric energy or coal consumption can be reduced in the melting processes. By controlling the gas atmosphere in heat treatment processes, high-quality products can be manufactured.

Chemical industry

Process analytics has had a high significance for the chemical and petrochemical industry for many years. The use of gas analysis systems is a central means to make processes even more economical and efficient at many process stages. Siemens gas analyzers enable the increase of output and yields and help to ensure a consistently high product quality. At the same time, they support the secure operation of your facilities at critical measurement points.



The Siemens Process Gas Analyzers in Practical Applications

Emission monitoring in power plants

One of the key topics in stationary large combustion plants, gas turbines, incinerators, and cement plants is the need for statutory continuous emission monitoring. It can be realized with the help of the in situ gas analyzer LDS 6 and extractive gas analytics via ULTRAMAT 23, ULTRAMAT, OXYMAT, FIDAMAT or SIPROCESS UV600. Which of these analytic devices to choose depends on the following factors:

- Measuring range
- Components you wish to measure
- Location of measurement: type of fuel and capacity of the power plant and local regulatory requirements

The ULTRAMAT 23 is an analyzer for the measurement of components such as CO, NO, SO_2, and O_2 in the emissions of gas-, oil-, or coal-fired power plants. Analyzers in our Series 6 range – ULTRAMAT, OXYMAT, FIDAMAT, and LDS 6 – as well as SIPROCESS UV600 – can also be deployed in incinerators and cement plants which demand analysis of more components, generally coupled with lower emission limits. These analyzers can measure the components CO, NO, NO_2, SO_2, O_2, NH_3, HCl, H_2O, as well as total organic carbon.

Individual analyzers are also offered in combination with our complete SET-CEM (Continuous Emission Monitoring) systems, which reliably cover the requirements from the sampling point through sample preparation to gas analysis according to EN 14181 and EN 15267.

Emissions monitoring on ships

Tougher emissions regulations and the quest for more efficiency in operating large cargo and merchant ships have resulted in an increasing demand for facilities to monitor emissions on ships. Such CEM systems have been used in the monitoring of stationary emission sources for over 30 years. The continuous gas analyzer ULTRAMAT 6 is the core component of a CEM system. High availability and independently certified high measurement accuracy are the decisive performance characteristics of CEM systems. With their performance characteristics, our analyzers have proven themselves in countless systems. System builders appreciate the easy integration into complete measurement facilities in the shipping industry for instance.

Monitoring of hydrogen-cooled turbo generators

To increase their efficiency, turbo generators in power plants are typically cooled with hydrogen gas. In comparison to air, it offers a clearly better cooling performance and lower friction losses for rotating parts because of the low gas density and higher dielectric strength. Safety issues may arise when using hydrogen. In addition, it has to be considered that impurities of the cooling hydrogen can influence the above-mentioned positive characteristics in a negative way. They increase the risk of explosions and reduce efficiency. For the quantitative determination of hydrogen, the Series 6 analyzer CALOMAT, also as a module of SIPROCESS GA700[1], is the perfect choice. It is characterized by a high measurement dynamic range (e.g. 0–1% and 0–100% H_2, parameterizable) and a low T_{90} time. Its use to continuously monitor the cooling gas for impurities is recommended not only for safety-related reasons, but also for economical ones.

[1] Planned for future product versions.

Process gas analyzers in ethylene oxide production facilities

Ethylene oxide is a highly flammable gas. Thus, the monitoring of the process gas for its oxygen concentration in production is important for safety reasons. However, production yields increase proportionally with the oxygen concentration in process gas. This is why the oxygen concentration is kept at the lower explosion threshold to optimize yields. The efficiency of ethylene oxide plants can be increased through the monitoring of the oxygen concentration with the OXYMAT due to its extremely fast and exact measurements. Oxygen concentrations – without sample preparation – can be measured directly within the process vessels by using the in situ gas analyzers LDS 6 and SITRANS SL.

Measurement of NH_3, HCl, and H_2O in the flue gas of plants subject to authorization

Facilities causing emissions such as incinerators, power plants, or cement plants are subject to ever-stricter regulations on air pollution control. These and similar facilities have to be authorized, and in turn, there is a demand to continuously monitor the emission of pollutants in the flue gas. The laser gas analyzer LDS 6 is a suitability-tested measurement system for the continuous monitoring of flue gases for residual air pollutants. The device offers ideal characteristics for this task: LDS 6 offers an in situ measurement and delivers exact and reliable results in real time for the continuous monitoring of NH_3 and HCl as well as the reference value H_2O.

NH_3 slip monitoring in fluidized bed crackers

Flue gas denitrification is characterized by primary and secondary measures. Primary measures are conducted directly in the burner to suppress the generation of NO_X. Secondary measures are based on chemical reactions between the flue gas and an added reagent to convert NO_X to harmless substances. An ammonia compound which is added reacts with the nitrogen oxides to produce molecular nitrogen and water. By monitoring the ammonia slip, the amount of added ammonia compound can be controlled to optimize the denitrification in two ways: firstly, by only using sufficient ammonia required for the destruction of NO_X, costs are significantly reduced and secondly, emissions of unreacted ammonia and NO_X are minimized. The concentration of ammonia is measured in real time with the diode laser gas analyzer, LDS 6, which is installed directly inside the exhaust gas stream. The measurements serve to comply with limit values and at the same time control and optimize the $DeNO_X$ facility. Consequently, in situ gas measurements contribute to environmental protection in the petrochemical industry.

Fast oxygen safety measurements

Nearly all processes in steel plants produce high concentrations of CO and CO_2. After the appropriate treatment, the accumulated carbon monoxide is used as a fuel. Since it is flammable in high concentrations when mixing with even low concentrations of oxygen, the continuous monitoring of the O_2 concentration is crucial for safety reasons. Due to its design, the SITRANS SL is the ideal analytic device for the control of such safety processes. Even in very rough industrial environments, the analyzer makes a drift-free, quick, and exact measurement of the oxygen concentration possible. It is explosion-proof according to Ex d. At the same time, it delivers the highest reliability at very low operational costs. SITRANS SL has no wear parts and field calibration checks are only required annually.

Heat treatment of steel

Methods to treat steel with heat, such as carbonization, decarbonization, or carbonitriding, determine the properties of the future product. To achieve ideal results in heat treatment, the atmosphere in which the processes are executed is controlled continuously by determining its chemical composition. Additionally, industrial gases like ammonia or methane are indispensable to optimize the properties of the material and its surface quality. An exactly balanced atmosphere by continuous monitoring is key to all thermal treatment processes. The multicomponent gas analyzer ULTRAMAT 23 enables the analysis of CO, CO_2, and CH_4 values in one device. The analyzer utilizes a non-dispersive infrared (NDIR) sensor providing high selectivity, stability, and measurement accuracy. Relay control, automatic maintenance, and remote diagnosis functions facilitate the integration of the ULTRAMAT 23 into different automation concepts.

Use of process analytic devices in cracking processes at refineries

Gas chromatographs and continuous gas analyzers deliver important data for processes in crude-oil cracking facilities. The essential goals of continuous monitoring of the process streams regarding their composition are to control and optimize the facility's efficiency and product quality, secure the safety of people and plants, and ensure that residual emissions into the atmosphere remain below the statutory limits subsequent to any appropriate treatment. This is where our gas analyzers ULTRAMAT 6 and ULTRAMAT 23 are brought into the equation.

Analysis of hydrogen in process and exhaust gases at crude-oil refineries

Hydrogen management is an important issue in refineries. High-purity hydrogen is needed in any facility to remove sulfur and nitrogen compounds. The same applies to cracking facilities for heavy hydrocarbons and for the saturation of aromatic compounds. Efficient and economical hydrogen management calls for the exact and reliable measurement of the hydrogen concentration in gas flows of production and exhaust treatment facilities. With the continuous analysis provided by our thermal conductivity gas analyzer CALOMAT 62, concentration measurements for H_2, N_2, Cl_2, HCl, or NH_3 can be reliably determined in binary or quasi-binary mixtures. The CALOMAT 62 delivers low long-term drift along with a very high measurement accuracy using a reference gas chamber that can be filled with an optimized gas for the respective measurement task.

Process analytics in power-to-gas facilities

Process analytic devices are essential tools to ensure the efficient conversion of electric energy into the component gases hydrogen and methane as energy carriers in power-to-gas facilities. They effectively monitor process workflows for optimal yield and control. Depending on the process, various measurement components need to be controlled. Siemens offers suitable analyzers for many tasks: continuous gas analyzers for quality monitoring and process control as well as analyzers (typically gas chromatographs) for the measurement of gas quality for custody transfer and certification issues.

Trace oxygen analysis in air separation plants

The most important operational goals in air separation plants are to lower production costs by reducing energy consumption and to secure product quality. Efficient process analyzers confirm the necessary concentration values from different parts of the facility. Oxygen purity is by far the most important component in this process. The gas analyzer OXYMAT 64 has been developed especially for the oxygen trace analysis at a minimal measuring range of 0 to 10 vpm with a 100 ppb O_2 detection limit. It belongs to the classical Series 6 and has been designed for high-precision measurements and wide-range linearity. The OXYMAT 64 is suitable for process monitoring (low-pressure version) as well as for the filling of high-pressure bottles (high-pressure version).

In the Center of Attention: In Situ Process Gas Analytics

Directly and without sampling: in situ analytical techniques are part of the actual process gas line and thus ensure immediate and accurate results without disruption of the process.

Being part of the process, in situ analytic devices have to be tough. The gas analyzers LDS 6 and SITRANS SL are extremely robust. The wide range of sensors and probes delivers answers to all common measurement tasks directly in the process vessel. Our analytic devices also adapt to changing process conditions, by taking into account dynamic temperature and pressure compensations and automatically process them within the calibration model.

The fast and non-contact measurement of gas concentrations directly in the process is the domain of in situ diode laser gas analyzers (TDLS – Tunable Diode Laser Spectroscopy). Siemens TDL analyzers feature exceptional selectivity and flexibility. Neither wide ranges of process temperatures nor high and varying concentrations of particulates in the gas stream impact the quality of measurement.

High long-term stability coupled with minimal maintenance requirements, low installation efforts, and easy operation: both LDS 6 and SITRANS SL offer precise real-time measurements at low operational costs. The integrated maintenance-free reference gas cell guarantees extremely stable operation and long maintenance intervals. Versions of LDS 6 measure O_2, NH_3, HCl, HF, H_2O, CO, or CO_2 in flue gas before and after the gas purification. SITRANS SL is often used for process monitoring in chemical industries and explosive environments because of its Ex d housing design. For such applications, SITRANS SL meets the need for a SIL rated device.

Extractive Measurement Methods: Top Analytical Performance under Defined Circumstances

In extractive measurement methods, the sample to be analyzed is extracted from the process vessel and fed into the analytic device via a sample line, usually with some degree of sample preparation.

Sample preparation determines the exact setting of environmental parameters such as pressure, temperature, flow rate. Additionally, the sample gas can be freed from dust and humidity if necessary. This ensures that the measurement is carried out under predefined and optimal conditions for both the measurement quality and preservation of the analyzer. Depending on the components to be measured and the measurement point, various measurement methods are used. They are based on different physical and electrochemical principles. Siemens provides two device families for extractive gas analysis, Series 6/ULTRAMAT 23 and SIPROCESS GA700. The device family SIPROCESS GA700 is the latest generation of Siemens gas analyzers and is characterized by easy operation and a modular design that makes a very flexible combination of analysis modules possible.
With the SIPROCESS UV600, we also offer an extractive UV gas analyzer that can measure up to three UV-active gases in very low concentrations at the same time. NO and NO_2 can be measured at the same time – without the use of an NO_2 converter.

The products and solutions we offer in cooperation are being deployed in power generation facilities, the steel industry, and the process industries – from fossil-fired power plants to incinerators and refineries as well as chemical facilities and cement plants.

Strong Partnership for Emission Control: NO, NO_2, SO_2 and More

Emission protection is more than measuring the concentration of harmful gases in the exhaust of combustion plants. It also includes measuring the concentration of dust and mercury that leaves the stack per unit of time and volume. Durag Group and Siemens now collaborate and offer solutions for customers under a single umbrella.

Durag Group's portfolio in the fields of dust, opacity, volume flow, and mercury concentration measurement, as well as in evaluation systems for emissions data, perfectly complements Siemens' industrial gas analytic devices and system solutions: together, we can fulfill the various requirements of emission monitoring worldwide.

Easier Than Ever.

SIPROCESS GA700 – The New Generation of Continuous Gas Analytics.

SIPROCESS GA700 – the benchmark of flexibility in precision measurement.

Simply more options.

Three analysis modules, two housing types, one console display: there is a system behind the new Siemens series. A unique modular system that gives you more flexibility for the wide range of requirements in the market – and hence makes process analytics easier than ever for you. For the first time, two analysis modules now fit into the rack and wall housing. Pairing any two of the OXYMAT 7, CALOMAT 7, and ULTRAMAT 7 modules, provides you with any combination option[1] that you need in continuous gas analysis. That gives you the benefit of carrying out both combined measurements and cross-gas corrections in a single appliance. Furthermore, the equally fast and easy process of exchanging modules makes conversion and retrofitting very cost-effective and thus operation eventually effortless. No matter which analyzers you use, operation of all the modules is easy to control via just one display.

Simply more benefits.

- Individual analytics solutions due to flexible combination possibilities
- Easy and fast exchange of separate modules on-site
- Easy retrofitting and conversion when analytical requirements change
- Uniform operating concept for all housings and analyzers
- High availability of the analyzer thanks to on-site module exchange and Plug & Measure principle
- Fast and cost efficiency operational readiness due to auto-calibration
- High cost efficiency owing to minimum downtime
- Space gain by integraton of two modules in one housing
- Open interface architecture for easy integration in system communication networks
- Fast data transmission thanks to PROFIBUS, Ethernet, Modbus and PROFINET[2]

[1] Currently, there are still limitations on certain combinations.
[2] Planned for future product versions.

The Siemens Product Family – Great Teamwork!

The answer to special requirements in different sectors: Siemens products for continuous process gas analytics. With our analyzers, you profit from the advantages of a consistent product family.

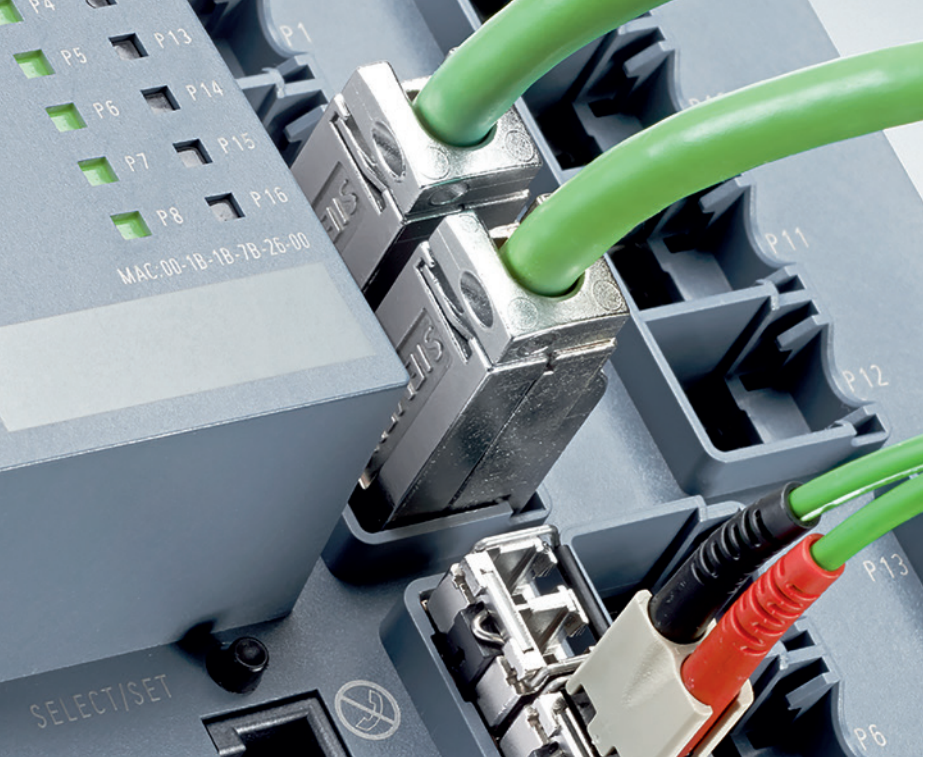
The new generation of continuous gas analytics has a uniform basic menu navigation. This is why their handling is intuitive, particularly for users who are familiar with a device from our product family. The uniform operational mode is embedded in the user functions. After choosing the gas for which the settings are to be adjusted, you will get to the main menu with uniform and intuitive functions.

The analyzers can be parameterized due to the customer's specifications on the ground. Parameterization and configuration correspond to NAMUR recommendations and can be protected from unauthorized modification by graded code levels. Working with Siemens gas analyzers, you can be sure that you have control over your production at all times and can flexibly and quickly react to new requirements.

Our Sets – Application-Specific Complete Systems

The market demands complete systems for specific applications. With our Set CEM (Continuous Emission Monitoring), Siemens delivers standardized and certified systems that cover the requirements from the sample point through to sample preparation and gas analysis.

Set CEM can measure the concentration of the gas components CO, CO_2, NO, NO_x, SO_2, O_2, HCl, HF, NH_3, and H_2O. The set is available in different designs to flexibly cover the application requirements. Its modularity offers additional freedom: a set consisting of a mounting frame with analyzers and sample preparation can be extended easily and quickly with other application-specific options as a certified solution.



Constant automatic exchange of information between the control system and analyzer is an important part of process control and monitoring today.

Communication – Keeping in Touch

The devices' communication possibilities have become a decisive performance feature for analyzers.
Examples for important communication features are:

- Gathering and transmission of measurement values, if needed with correction of interference components
- Reading and, if required, adjustment of certain parameters
- Functions control
- Automatic trigger of adjustment procedures (AutoCal)
- Inquiry of status signals, e.g. preventive maintenance

To make the data transmission as easy and reliable as possible, we employ standardized interfaces.

Continuous gas analytics – extractive

The Series 6 and SIPROCESS GA700 families as well as the ULTRAMAT 23 offer data transmission via 4–20 mA analog and binary outputs and the following communication possibilities:

- RS485 interface (in Series 6 and ULTRAMAT 23 devices)
- PROFIBUS DP/PA (in Series 6 devices, planned for the SIPROCESS GA700 device family)
- Ethernet (in Series 6 devices via external interface converters)
- PROFINET (planned for the SIPROCESS GA700 device family)
- Modbus via TCP (SIPROCESS GA700 device family)

The SIPROM GA software (for Series 6 devices) or the SIMATIC PDM software (for the SIPROCESS GA700 device family) can be used as a service and configuration tool.

Continuous gas analytics – in situ

LDS 6 and SITRANS SL comprise 4–20 mA analog and digital I/O interfaces. The SITRANS SL also comes with optional PROFIBUS DP or Modbus interfaces. With the help of the LDScomm software, you can send and receive data as well as change system settings. This installation and service tool can remotely control and adapt important device statuses and calibration parameters. If necessary, a complete system diagnosis can be carried out via a remote data connection. If service is required, necessary information (e.g. characteristic curves of laser measurement, measurement and operating data of the laser) is sent to a Siemens staff member per modem. They then take the necessary measures or carry them out from our service center via a data connection.
The possibility of remote maintenance and diagnosis is realized via a standard LAN modem. The remote access is protected and is administered in the customer's central unit.

Service and Support: At Your Side and Always within Your Reach

The range of our services comprises the planning of competent expert advice through the connection to the control system to comprehensive customer service:

- Facility planning and scheduling
- Complete design planning and engineering of analytic systems
- Specialists consulting on the choice of analytics and process devices
- Facility documentation
- Installation, testing and commissioning
- Comprehensive after-sales service

Training: Perfectly prepared

To optimize the system availability, Siemens process analytics offers you a comprehensive training program for your planning, control, and maintenance personnel. Product training as well as system and specific application training can be carried out either at one of our Siemens training centers (Karlsruhe, Houston, Singapore, Dalian) or at the customer's site. After the training, your own service personnel can carry out the necessary services and take over certain maintenance work.

Repairs: Quick and reliable

Very rarely, the unexpected occurs: a device has to be sent to the workshop. But there is no need to worry: we will repair your devices in no time at one of our certified service centers worldwide.

Service: At home around the globe

Facilities have to work efficiently around the clock – reliable process analytics and instrumentation are indispensable prerequisites for this. You have to be able to rely on the fast and competent service of your provider. Whether you need consulting, fast deliveries, or the installation of new devices – we offer a network of experts that is at your service worldwide and around the clock. From product support to service information: Siemens' industry online support is always the first address whenever you have any questions, 24-7, 365 days a year!

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Learn more at:

siemens.com/cga

With your investment in gas analyzers, you can benefit from our more than 40 years of experience:

- Innovative products and proven technology in an ideal combination
- Highest quality and reliability
- Optimum solutions for your measurement tasks

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