

SIEMENS



Process Instrumentation and Analytics

First-class process quality thanks to perfect integration of all components

Chemical industry



Answers for industry.

Industry knowledge and technology expertise

As a partner for the process industry and a leader in automation technology, Siemens has a unique portfolio for process instrumentation and analytics. Our products and systems set the standards in their disciplines, meet all industry requirements, and range from customized individual solutions to comprehensive systems.

Your partner for all process application areas

Increasing competitive pressure, investment security, high system availability, quality conformity, environmental standards and regulations, safe and cost-effective operation, harsh ambient conditions – the requirements in the chemical industry are complex and varied. You need a partner who not only offers a broad product range for process automation, but also possesses expert knowledge of the processes and specific requirements of your category, be it basic, special, or fine chemistry.

Siemens is that partner. Decades of experience in the measurement, analysis, regulation and control of industrial processes form the basis for unmatched expertise in all fields of process engineering. We are the technology leader in many fields and have set new standards with our products.

As a manufacturer of process control technology, Siemens has for many years maintained a close relationship with NAMUR, the process control technology association of the chemical and pharmaceutical industry. The association consists entirely of process control users and currently has 126 member companies. With our expertise in process automation and instrumentation, we support NAMUR and co-operate closely with its working groups.

Totally Integrated Automation

Process instruments and analytics also form an integral part of Siemens' Totally Integrated Automation (TIA) strategy. Its open system architecture creates the basis for sustained success in the chemical industry. TIA is ideal for meeting the increasing demands of international markets, and is marked by a unique degree of consistency.

This assures the perfect interplay of all components, from the field level to the production control level to the management level. TIA makes an essential contribution to production process optimization and complexity reduction. This results in increased efficiency, flexibility, and productivity, with a high degree of investment security.



In Siemens, you have a partner with many years of expertise in process automation. Cooperation and the exchange of knowledge with our customers create the basis for ongoing innovations. We pursue a single goal – providing you with dependable and profitable solutions for any process automation task.

Everything from a single source

■ Process instrumentation

- Measurement transducers for pressure, temperature, flow and level
- Positioners for pneumatic linear and rotary actuators
- Process controllers and recorders

■ Process analytics

- Process gas chromatography
- Process gas analysis
- In-situ laser spectrometry
- Solutions, standard sets, and systems

■ Weighing technology

- Components for weighing systems, belt scales, weigh feeders and solids flowmeters
- Components for process monitoring

■ Other highlights:

- SIMATIC PDM Process Device Manager (PDM), a universal tool for the planning, scaling, commissioning, diagnostics and maintenance of intelligent field devices and automation components
- Consistent engineering and standardization for field instrumentation
- SIPLAN C/E engineering tool for efficient project management
- Simple, open integration of existing and future components via PROFIBUS, Foundation Fieldbus or HART communication standards



Precise solutions for industry-specific requirements

Our extensive product portfolio for the chemical industry meets all user measurement technology requirements. In all product groups, we offer instruments with the approvals required worldwide. In new developments we observe the relevant NAMUR requirements, based on our many years of close cooperation with test labs and shops.

The right solution for every measuring task

The spectrum of process measurement applications can range from simple to very difficult. Because the specific requirements of the measurement application are not always known, finding the most suitable measuring method for each application can present a major challenge. In such cases, it is all the more important to have a partner who offers a suitable product range, and also possesses the required process experience and knowledge to find the optimum solution.

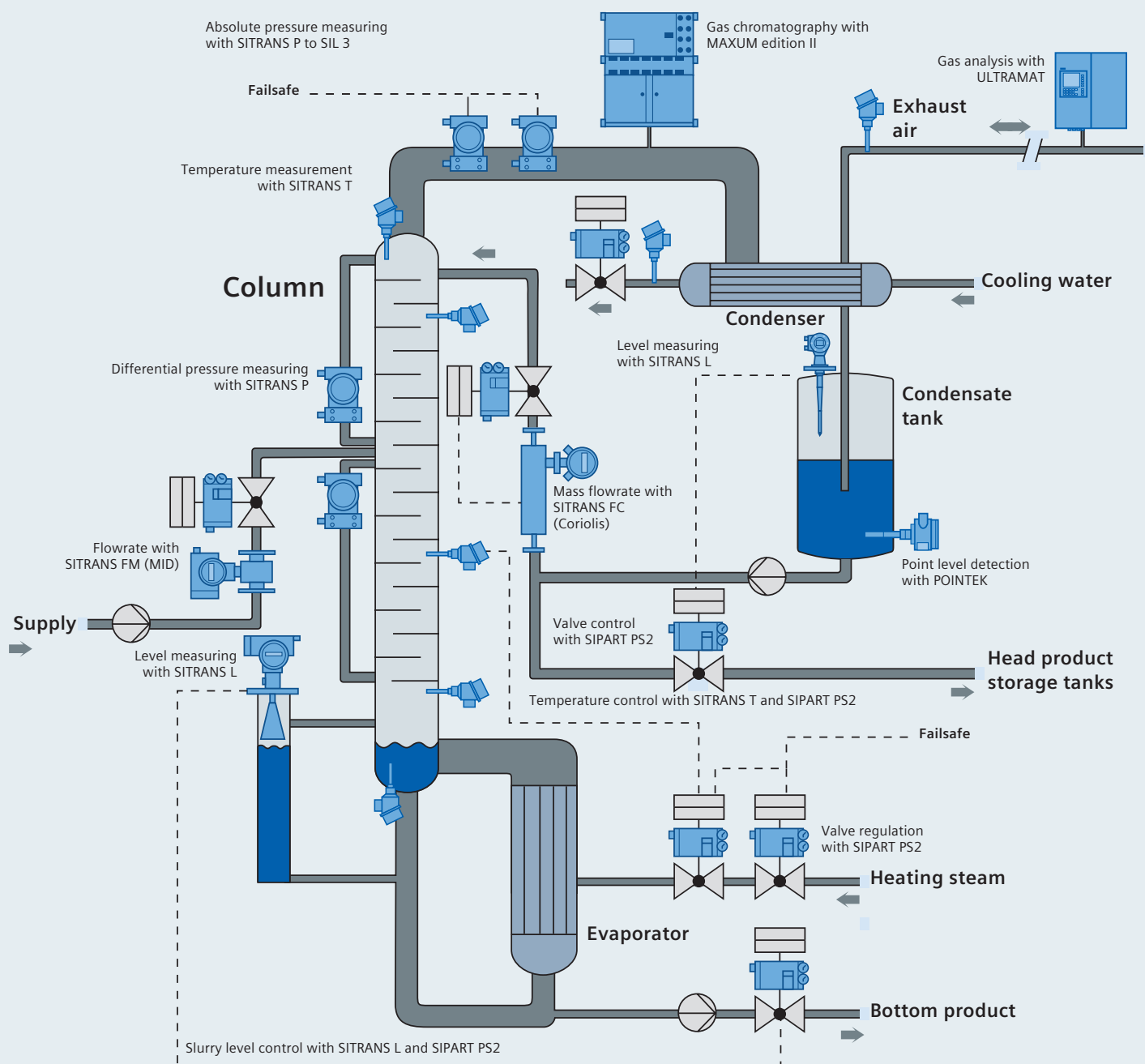
In extreme cases: individual solutions

Our specialists welcome the challenge of highly complex or entirely new applications. In cooperation with you, they will find the suitable solution on site, and, if required, adapt the measuring devices to meet your specific application.

Communication is everything

Within a process automation system, reliable, effective communication between field device and control system or between field and control level is critical for optimum process control. For this reason, all necessary interfaces, including communication protocols, are pre-installed on our field level instruments. Our process instruments are available with HART, PROFIBUS PA and Foundation fieldbus, consistent with the Ex-zone.





Scheme of a multi-level distillation process

Process instruments from standard tasks to individual solutions

In few industries the requirements are as extreme as in the chemical industry. Many different materials must be measured with extreme precision. Each material has its own very specific properties and must be considered individually. In addition, measurements are frequently carried out in extremely harsh ambient conditions, so specialized process instruments with many different designs (e.g. pressurized enclosures) are often required for the safety-relevant approvals.

Level measurement

The requirements placed on level measurement in the chemical industry are manifold. They range from protection against overfilling, to measurements in potentially explosive dust zones, to procedures whose processes make them inherently difficult, whether in simple storage tanks or in complex process tanks. The media to be measured may have extremely variable characteristics. For example, steam, dust, foam, and high temperatures and pressures often occur in conjunction with turbulence, caking, condensate formation and extreme product characteristics. We offer a broad range of level sensors for all these requirements. With our SITRANS L level transmitters

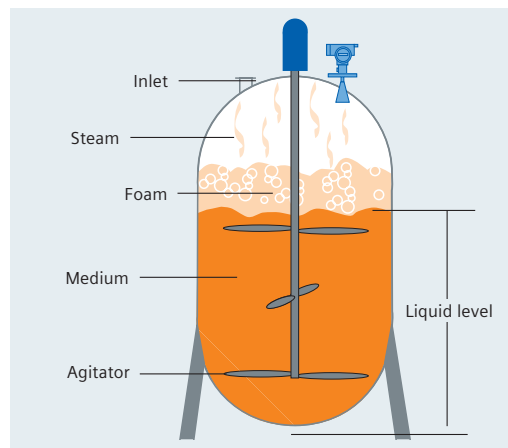
and the Pointek sensors we redefine level measurement, from limit value capture to continuous measurement. We have many years of experience with a very wide spectrum of applications, and can help you choose the right measurement method and device configuration. We understand the difficulties of level measurement – tank geometries, and tank installations such as heating systems, stirring machines, scrapers, aggressive media, inlets and outlets. With our various level technologies (radar, ultrasound, capacitance, pressure or weighing), we can provide you with the optimum solution.



Storage tank level measurement with SITRANS LR



Reliable radar level measurement during titanium dioxide production – despite extreme deposits on the horn antenna



Level measuring in process tanks with foam formation



Compact SITRANS FC430 Coriolis flowmeter with SIL 3 certification

Flow measurement

Liquids, steam, gases, pulps, slurries, or pastes – the wide range and varying conditions of media to be measured require comprehensive knowledge and experience to determine the correct measuring point location. Large and small tube diameters, varying pressures, high temperatures, high viscosities – we're experts at determining the best measurement method for a given task. We offer a wide range of innovative flow measurement instruments, backed by years of experience.

Our broad range of measuring technologies provides optimum solutions, centering on our low-maintenance electronic flowmeters, which require no protrusions within the measuring tube, including ultrasonic flowmeters, electromagnetic flowmeters, and mass flowmeters using the Coriolis principle that give 0.1 % measuring accuracy,

allowing measurement with almost no disruption to the process parameters. "Classical" mechanical methods are also available, with rotary piston meters, variable-area flowmeters, and measuring orifices making up an integral part of our product family. We offer many of our instruments in different function versions.

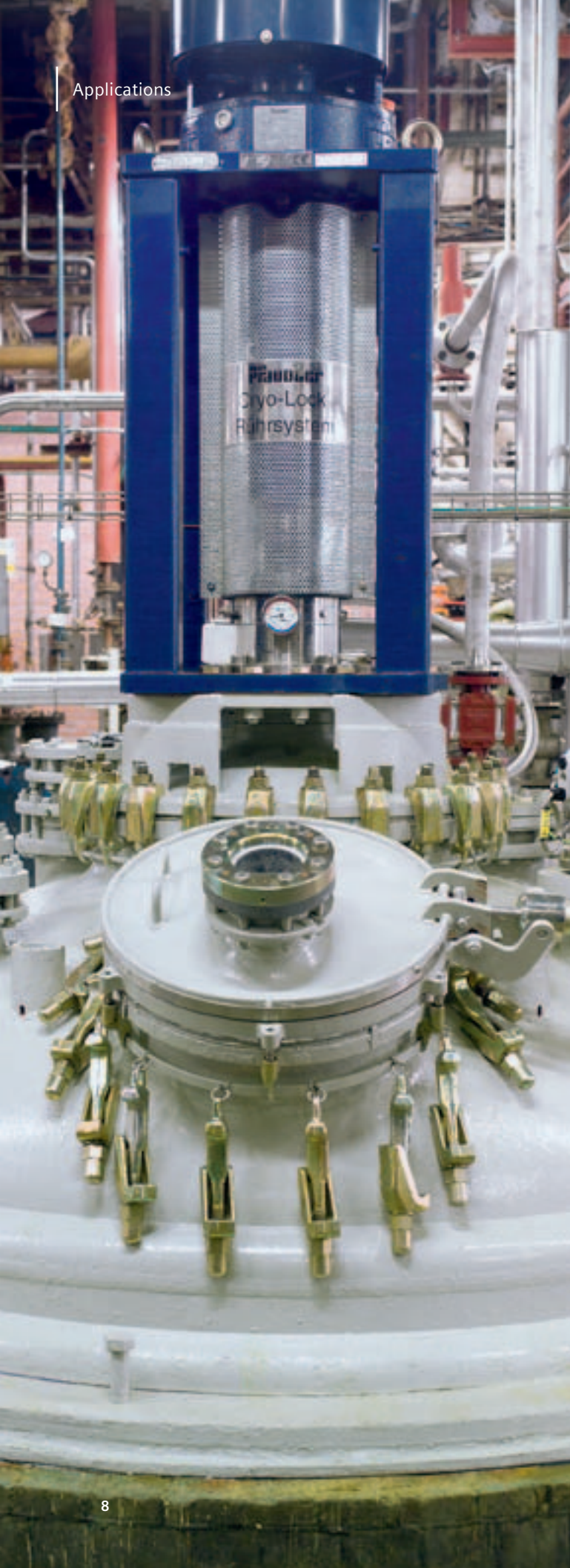
For example, our MIDs can also precisely measure media with magnetic components (such as iron). The measuring principle of the pulsed-alternated field system required for such tasks has been patented and is exclusively produced by Siemens. For aggressive or abrasive materials, we offer our patented NOVOLAK flow tube lining, a material with extraordinary resistance. Its smooth, nonporous surface is suited for full vacuum, offers excellent pressure resistance, and is resistant to chemicals, abrasion, and wear.



Flow measurement at a measuring orifice with SITRANS P



Electromagnetic flowmetering in an explosion hazard area with the SITRANS FM



Pressure measurement

Whether relative, differential or absolute pressure, the SITRANS P pressure transmitters provide precise pressure measurements, even with very aggressive media that place special demands on the separating diaphragm material. We offer stainless steel, Hastelloy, Monel, tantalum and gold diaphragms, while for harsh ambient conditions stainless steel and aluminum die cast enclosures are available.

The design of the SITRANS P DS III transmitter provides device-integrated zone separation. As a result, the device's process connection can be operated in zone 0 and simultaneously supplied with EEX Ib auxiliary energy. With the SITRANS P DS III transmitter, your inventory costs are reduced to a minimum because our standard device fulfills the criteria for inventory applications in accordance with SIL 2. The device can also be used for safety-related measurements. Due to the modular design, the electronics can be replaced singly, while the sensor-specific data remains reliably stored in the measuring cell and cannot be lost. This means that a HART device can quickly and individually be converted into a PROFIBUS device, while on-site repairs – a rare occurrence with a device MTBF of over 300 years – are much faster and simpler.

In large process plants, faster commissioning and maintenance times are important advantages. The SITRANS P DS III pays dividends here as well, as its simple 3-key operation allows all necessary parameters to be modified quickly. Additional functions like loop check and pressure simulation save time, effort, and many long tours through the plant. Another feature that speaks for SITRANS P is the fact that functions such as self-test, drag indication, diagnostics, and multiple adjustable limit values are accessible during operation.

Weighing and dosing

With the high-precision SIWAREX weighing system, Siemens has been setting standards in weighing technology for many years. Since it is based on standard SIMATIC components, it can easily be integrated into process automation structures and the SIMATIC PCS 7 process control system. In addition to electronic weighing systems and cells, you can select from an extensive range of Milltronics belt scales, weigh feeders, and solids flowmeters to meet your individual requirements.

Temperature measurement

SITRANS T is the first choice for temperature measurement, and delivers dependable and precise results even under extreme process conditions. Whether sensor, converter, panel, field or head transmitter, or the complete measuring device, we cover all chemical industry requirements.

High temperatures, high pressures, aggressive media – temperature measurement is often challenging, but no problem for the materials we use for sensors, protective and long-collar pipes, or for our tough die cast aluminum or stainless steel housings. SITRANS T transmitters are available in a range of styles, from simple designs to inherently safe models with diagnostics and simulation options.

In the chemical processing industry, the monitoring, control, and recording of processes is often subject to special requirements. Our process controllers and recorders have been in use for these applications for decades. The product range extends from SIPART DR compact controllers to SIREC process recorders, available as traditional paper recorders or the latest generation digital display recorders.

Valve control and regulation

Valves are the crucial links in a plant, and must be operated precisely yet economically – exactly the job for the SIPART PS2. This electropneumatic positioner is available for linear and rotary actuator mounting or for remote operation with an external travel sensor. Application-specific designs are also possible. The SIPART PS2 valve positioner requires very little system energy and provides return on investment rapidly. With a typical air consumption of just 20 liters per hour, convenient local operation, and additional diagnostics functions, it is the absolute high end. Automated commissioning saves an enormous amount of time, since end position alignment and control parameter optimization are automatic. All this has made the SIPART PS2 the defined standard in many areas.



Dependable safety. SITRANS P DS III – applicable for SIL 2, redundant also for SIL 3



Monitoring temperatures with SITRANS T to boost efficiency in the Kalina process



SIPART PS2 – the most frequently used intelligent positioner for linear and rotary actuators

Siemens process analytics

There is great interest in process-relevant, substance-specific online information for the optimization and control of chemical production processes. Accordingly, one of the main functions of modern process analytics is the quantitative analysis of one or more components of complex mixtures with the highest selectivity. Continuous innovations in online analytics provide system operators with increasingly current process information, facilitating early intervention in important process parameters. Innovative analytics by Siemens offer all possibilities, from in-situ measuring close to the process, to system integration of components with sampling and processing, to complete analysis house.



MAXUM and MicroSAM process gas chromatographs

Process gas chromatography

Process gas chromatographs accompany production processes, from raw material analysis all the way to quality monitoring.

- Thanks to its modular design, MAXUM Edition II can be optimally adjusted to the respective chromatographic analysis task. Maximum accuracy of the analysis results, reduced maintenance expenditures, and a multitude of the most varying applications in the chemical industry are convincing arguments – whether for the detection of sulfur compounds, aromatic hydrocarbons or raw material contaminants, even at trace levels.
- The most modern micro-mechanics form the basis of our smallest explosion-protected online process gas chromatograph, MicroSAM. It is so compact and sturdy that it can be mounted directly at the sampling point, even in the harshest ambient conditions. It analyzes both aliphatic and chlorinated hydrocarbons or O₂ and N₂ in the most complex product matrices.



Process gas analysis – extractive

Process gas analysis optimizes a chemical process from reaction gas input monitoring, to product flow control, to emission monitoring at the flue for compliance with legal standards. The safety-relevant measurement of explosive or toxic substances enhances personal and plant safety.

- Paramagnetic oxygen measuring with maximum accuracy, even in the smallest measuring ranges, whether in O₂ purity monitoring in air separation plants or O₂ trace analysis in potentially explosive processes, presents no problems with the OXYMAT 6 and OXYMAT 61. Since they have no moving parts, they combine minimum maintenance requirements with maximum service life for the highest cost-effectiveness.
- NDIR gas analyzers like the ULTRAMAT 6 and ULTRAMAT 23 are highly selective concentration measurements for IR-active gases and gas mixtures. With ULTRAMAT you can measure multiple components in one device at low cost. This is indispensable for many anorganic and organic chemistry production processes.
- Total hydrocarbon analysis with an FID (flame ionization detector): The FIDAMAT 6 can handle almost any application, from hydrocarbon trace analysis in pure gases to hydrocarbon sum measurement in corrosive gases.
- The CALOMAT offers very high measuring range dynamics and short response times for the measurement of hydrogen or inert gas concentrations in binary mixtures by means of specific thermal conductivity, even in explosive areas.



Process gas analysis – in-situ

The fast, contactless measurement of gas concentrations directly in the process is the domain of in-situ diode laser gas analytics. Our LDS 6 and SITRANS SL in-situ gas analyzers have an integrated reference cell that allows “laser locking” regardless of the process gas concentration. This ensures extremely stable operation, negligible drift, and long maintenance intervals. These tough, dependable units can measure gas under extreme conditions, and are suitable for use in explosive hazard areas.

■ LDS 6

The design of the LDS 6 opens up new perspectives in process and emissions monitoring. It reliably delivers precise readings, even in combustion processes and extreme dust concentrations. It also permits low-cost multichannel measurement. The LDS 6 is used to measure in-situ concentrations of gases such as O_2 , NH_3 , HCl , HF , H_2O , CO , and CO_2 in exhaust before and after scrubbing, in many applications in the chemical and petrochemical industries, as well as emissions monitoring. It can even be used in Ex-zone 0.

■ SITRANS SL

The SITRANS SL features a uniquely compact shape. It can be operated using the built-in Local User Interface (LUI) or a flexible remote connection (PROFIBUS/Modbus). It is recommended for individual measurements in challenging environments, and is often used for process monitoring.



Continuous gas analyzer with cutting-edge in-situ diode laser technology for process monitoring under extreme conditions



SIMATIC PDM (Process Device Manager) enables central access to all communication-capable process devices within a system. It facilitates the manufacturer-independent operation, adjustment, maintenance and diagnostics of intelligent process devices. This ensures that all devices and procedures integrated in your process automation system are safely under control. Regardless of the automation system, SIMATIC PDM can be applied via PC or programming devices, or integrated into the SIMATIC PCS 7 automation system. Communication connection can be accomplished via HART, PROFIBUS DP, PROFIBUS PA, or other protocols.

SIMATIC PDM complies with NAMUR specification NA64 on the status signaling of field devices, and supports the NAMUR recommendation NE91 on plant-oriented asset management. The diagnostics options of the process devices, in conjunction with PROFIBUS communication and the Electronic Device Description EDD used in SIMATIC PDM, create added value in chemical plants in the form of faster and more focused maintenance personnel support.

Services and support

Siemens offers proven solution concepts for process instrumentation and overall systems all from a single source, from consulting, to engineering, to connection to the control system. This is complemented by professional installation and commissioning, and comprehensive after-sales services.



Our services at a glance

- System and schedule planning by an experienced project management team
- Complete planning/engineering of the field level, manufacturer-independent device requirements
- Specialist advice on the selection and dimensioning of the process instruments and analytics
- Effective, efficient system planning with SIPLAN C/E engineering tool
- System documentation:
 - Basic documentation
 - Superordinated system and process design documentation
 - Mechanical documentation
 - Electrical documentation
- Selection and supply of all required process instruments
- Full installation preparation
- Supply of all mounting brackets and installation material
- Installation and commissioning
- Comprehensive after-sales services

A consistent engineering tool

Often, plant commissioning puts all involved parties under enormous time pressures. Any change in the planning specifications just adds to this pressure. That's why we developed SIPLAN C/E. It contains a library with implemented applications as well as our field devices and best practice measurement solutions. This enables us to prepare a complete plant engineering structure, including the documentation for process instruments and analytics, considerably faster than with conventional planning tools. Using E-Plan, you get the complete project, including device documentation, construction plans, circuit diagrams, mounting and commissioning documentation, cable lists, and measuring point lists.



Our service – available around the world

Plants must function reliably around the clock. Efficient and effective process instruments and analytics are indispensable for this – as is fast and expert service from your device manufacturer.

Whether for expert advice or the fast delivery and installation of new devices, as your partner we're there for you, around the world and around the clock. Our specialists can assist you with their automation and process technology knowledge on site or online.

See [siemens.com/chemicals](https://www.siemens.com/chemicals) to find out what else Siemens offers.

Online support: rapid assistance by mouseclick

Our online support, with its interactive information system and extensive portfolio, is available to you at all times. It offers fast, expert, comprehensive help when you need it. From product support to service information to interactive services, our online support is always the first choice, around the clock and 365 days a year.

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Subject to change without prior notice 06/12
Order No.: E20001-A170-P780-X-7600
DISPO 27900
WÜ/42508 MI.SC.IM.XXXX.52.2.07
WS 06121.0
Printed in Germany
© Siemens AG 2012

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