

Water is our life

A partner you can depend on to optimize your water processes





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Water is our life

A partner you can depend on to optimize your water processes –
the People for Process Automation

Water is a vital resource, and one that we need to manage carefully. Rely on a partner that offers the best measuring devices and solutions, assists you with technical support on site and has an accurate knowledge of the requirements in the water and wastewater industry. With Endress+Hauser, you get high-quality solutions capable of increasing your plant efficiency and optimizing costs.

Put your trust in a global partner that has decades of experience in the field of measurement and control engineering

We are committed to our responsibility in the environment and within our society. The special 'Spirit of Endress+Hauser' shapes the way we do business and how we work together.

→ [Read more on page 6](#)

Take advantage of the reliable Endress+Hauser portfolio optimally tailored to your sector

With our unique and comprehensive line of measuring devices, services and solutions, we help you to minimize the costs of water and wastewater treatment and optimize the availability of your plant.

→ [Read more on page 8](#)

Use our Plant Asset Management solution to manage your documents

W@M® Life Cycle Management supports your risk and quality management system with up-to-date information on your installed device base. This enhances the efficiency of your business processes from planning and purchasing to operation and maintenance.

→ [Read more on page 29](#)

Optimize the costs of your plant and increase plant safety

Endress+Hauser offers you the best service package for operation and maintenance in the process automation field. With us, you can reduce the time spent on maintenance and costs so that you can concentrate on your core competencies.

→ [Read more on page 30](#)



 www.us.endress.com/water-wastewater

We are well-established in all areas of water and wastewater treatment



Water body monitoring



Drinking water treatment



Salt water desalination and water reuse



Drinking water distribution



Municipal wastewater treatment



Industrial water treatment and wastewater treatment

The brand and the people

Endress+Hauser has a global presence



The production center in Maulburg, Germany, back in 1968



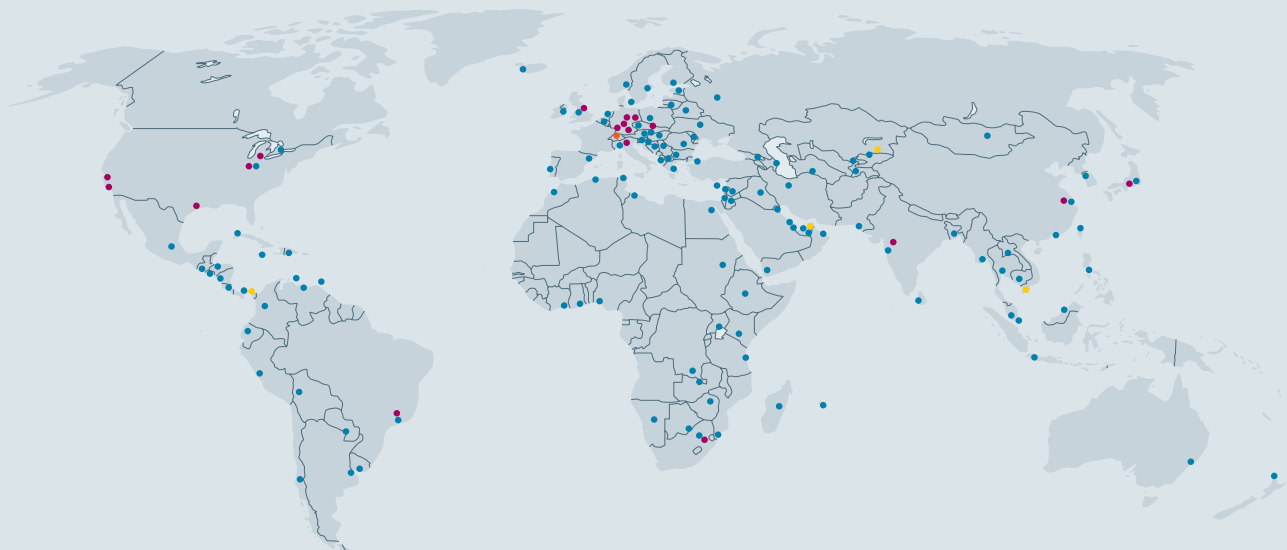
... and today

As a solid, financially strong and independent family firm with 60 years' experience, we stand for fairness, reliability, top quality and strength in innovation. We are committed to our responsibility to the environment and within our society.

Today, more than 11,900 Endress+Hauser employees around the world are working together with our customers'

with the aim of improving the safety and reliability of their plants. The basis for this is our portfolio of field devices. We also offer solutions for improving energy efficiency, material consumption and maintenance costs. Water and wastewater, both municipal and industrial, has been one of our core areas since the very beginning. Our technology leadership and strength in innovation makes our customers successful.

Endress+Hauser worldwide



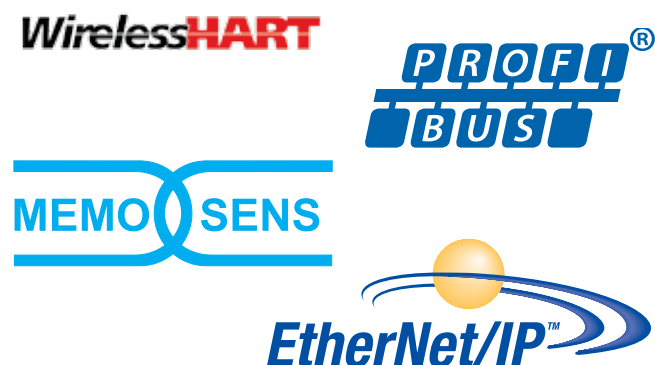
● Holding

● Production center

● Sales center

● Regional support center

Looking to the future It is likely that new requirements in terms of parameters and technologies will be driven by trends emerging specifically in the water and wastewater sector. Rising demands for standalone measuring points in networks, unmanned system parts, or even new technologies such as deammonification, trace substance elimination and phosphorus recovery, are just some examples. To be able to recognize and assess these trends in good time, Endress+Hauser collaborates closely with customers, universities and research institutes worldwide.

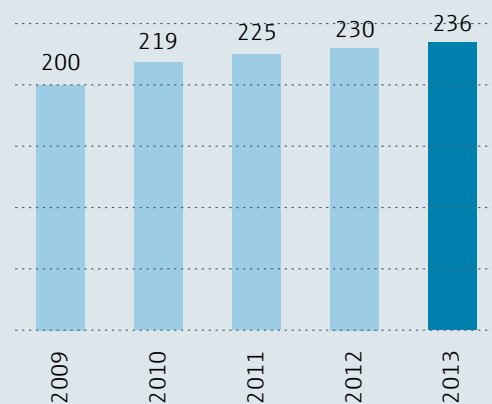


Technology leadership For us, technology leadership means being able to present our customers with an essentially complete portfolio, adapted to the special requirements of the water and wastewater industry. This offers us and our customers the flexibility to find the best measurement solution from a technical point of view in virtually any application. Our strength in innovation is clear from the many examples where Endress+Hauser, with its developments, has become the benchmark for measurement solutions: Limit level measurement by tuning fork (1968) followed a year later by the introduction of ultrasound technology for continuous non-contact level measurement. That's not to mention even more recent examples, such as Memosens technology (2005), which revolutionized online analytical sensors, and, our ultrasonic flow measurement for wet biogas, which not only reliably measures throughflow but also records methane content. Additionally, Endress+Hauser is actively involved in the development of digital communication standards, i.e. PROFIBUS® and Ethernet.

Innovation milestones

1953	Capacitance probe for level measurement
1968	Limit level signaling device with vibrating fork
1969	Ultrasonic sensor for continuous level monitoring
1980	Microprocessor-controlled level measuring instrument with diagnostic function
1982	pH sensors developed in-house
1986	First mass flow measuring device with straight pipes
1992	Market launch of Promass F product family
1996	Launch of first field device with PROFIBUS PA
2005	pH sensors with Memosens® technology introduced to market
2010	First field device with Ethernet connection
2012	Enhancement with optical spectroscopy for gas analysis
2012	Ultrasonic flow and methane measuring device with CH ₄ parameter
2014	Heartbeat Technology® for all Proline measurement technologies for permanent self-monitoring and verification

Patent registrations of the Endress+Hauser Group



Our patent portfolio amounts to over 5691* protected rights. In 2013, we were able to record 236 inventions as new patents worldwide.

* Last update December 31, 2013

Our portfolio for the water and wastewater sector

Take advantage of our reliable products and services optimally tailored to your industry

Robust, reliable and user-friendly measurement technology is essential to the reliable operation of water works and sewage treatment plants. Our modern portfolio of measuring devices makes it possible to find the best solutions for your applications.

Overarching instrumentation concepts Platform technologies such as Proline (flow), Liquiline® (analysis) and Cerabar® (pressure) offer a host of benefits for planners, system integrators, owner operators and service personnel:

- Reduced complexity thanks to standardization of comparable measuring points
- Easy multiplication of device settings for comparable measuring points saves time and reduces potential for error during commissioning
- Optimized stocking of replacement parts thanks to modularity of device platforms

Measuring point availability begins at the design stage

A high degree of flexibility given by the extensive device portfolio is the basis for the consulting services we offer during the measuring point design stage:

- Availability of various metrological principles for a particular measurement task
- Portfolio segmentation with regard for customer-specific requirements, such as advanced self-diagnostics functions or designs
- Various components and data loggers complete the measuring device portfolio and allow smart solutions in respect of local data storage, individual preferences for relay or I/O quantities, lightning protection or even wireless data transfers
- Wide selection of communication protocols, from analog, HART®, WirelessHART® to MODBUS, PROFIBUS®, FOUNDATION™ FIELDBUS and Ethernet



Accurate pressure measurement in a membrane system



Flow measurement of water, wastewater or sludge: The electromagnetic induction method of flow measurement is the standard



Reliable level monitoring of basins



Always on: Data loggers and indicators for cabinet and control center

Measuring devices for every application

Measuring devices for drinking water treatment

Device designation	Measuring principle	Water												Sludge		
		Raw water withdrawal	Aeration / oxidation	Flocculation / coagulation	Sand filter	Pressure filter	Activated charcoal filtration	Membrane filtration	Softening	Neutralization	Disinfection	End treatment / effluent	Storage	Distribution	Sludge concentrator and dewatering	Sludge conditioning
Flow																
Prosonic S FMU90/FDU91	Open channel	✓✓														
Promag L/W 400/800	Magnetic Flowmeter	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	
Promag H	Magnetic Flowmeter															✓✓
Prosonic Flow 9XW	Ultrasonic	✓✓	✓	✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓	✓✓			
Prosonic Flow 93T	Ultrasonic, mobile system	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓			
Gas flow																
t-mass 65	Thermal mass flow		✓✓		✓✓	✓✓				✓✓						
t-mass A/B 150	Thermal mass flow		✓✓		✓✓	✓✓				✓✓						
Liquid analysis																
CM44x	Transmitter	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	
CPS11D	pH potentiometric	✓✓	✓✓	✓✓					✓✓	✓✓	✓✓	✓✓	✓✓	✓✓		
CPS12D	ORP potentiometric	✓✓	✓✓						✓✓			✓				
CLS50D	Conductivity - inductive	✓✓							✓✓	✓✓	✓✓		✓✓			
COS61D	Oxygen - optical	✓✓	✓✓									✓				
CUS52D	Turbidity - optical	✓✓		✓✓	✓✓	✓✓	✓✓	✓✓		✓✓	✓✓	✓✓	✓✓			
CUS51D	TSS - optical															✓✓
CUS71D	Sludge level, ultrasonic			✓												✓✓
CA71FE/CA71MN	Fe/Mn colorimetric		✓✓													
CSF48/CSP44	Sampler	✓✓			✓	✓	✓	✓	✓		✓✓					

Device designation	Measuring principle	Water											Sludge			
		Raw water withdrawal	Aeration / oxidation	Flocculation / coagulation	Sand filter	Pressure filter	Activated charcoal filtration	Membrane filtration	Softening	Neutralization	Disinfection	End treatment / effluent	Storage	Distribution	Sludge concentrator and dewatering	Sludge conditioning
Liquid analysis																
CCS142D	Chlorine, amperometric						✓✓			✓✓		✓✓	✓✓			
CAS40D	NO ₃ /NH ₄ ion-selective	✓									✓					
CAS551D	SAC/NO ₃ photometric	✓✓			✓✓	✓✓	✓✓				✓✓					
Level																
Prosonic S FMU90/FDU91	Cont. level - ultrasonic		✓✓	✓✓	✓✓		✓✓	✓	✓✓				✓✓			
Prosonic T FMU30/RMA452	Cont. level - ultrasonic		✓✓	✓✓	✓✓		✓✓	✓	✓✓				✓✓			
Micropilot® FMR50	Cont. level - radar		✓✓	✓✓					✓✓				✓✓			
Waterpilot FMX21	Cont. level - hydrostatic	✓✓											✓✓		✓✓	
FTW360	Pump protection - conductive	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
FTL5X/FTL20	Limit switch - vibronic			✓✓											✓✓	
Pressure																
Cerabar PMC71/51	Absolute and relative pressure	✓✓			✓✓	✓✓		✓✓								
Cerabar PMC131	Absolute and relative pressure				✓✓	✓✓		✓✓								
Deltabar® FMD71/72/78	Differential pressure					✓✓		✓✓								
Temperature																
Omnigrad M TR10	RTD temperature	✓✓						✓✓	✓✓			✓✓	✓✓	✓✓		

Measuring devices for wastewater treatment

Device designation	Measuring principle	Wastewater										Sludge treatment				
		Sewer / storm water basin	Pumping station / lift station	Bar screen	Influent	Sand / grease trap	Preclearification / secondary clarification	Sludge activation	PO4 coagulant dosing	Blower system	Return sludge	Disinfection and effluent	Sludge concentrator / dewatering	Sludge digestion	Biogas treatment	Sludge conditioning
Flow																
Prosonic S FMU90/FDU91	Open channel	✓✓	✓	✓✓	✓✓		✓					✓✓				
Promag L/W 400	Magnetic Flowmeter	✓✓	✓		✓✓		✓✓	✓✓			✓✓	✓✓	✓✓			
Promag H	Magnetic Flowmeter								✓✓							✓✓
Promag 55S	Magnetic Flowmeter													✓✓		
Promass® I	Coriolis mass flow							✓								✓
Gas flow																
t-mass 65	Thermal mass flow									✓✓						✓
t-mass A/B 150	Thermal mass flow									✓✓						✓
Prosonic Flow B 200	Ultrasonic														✓✓	
Liquid analysis																
CM44x	Transmitter				✓✓		✓✓	✓✓			✓✓	✓✓	✓✓	✓✓		
CPS11D	pH potentiometric				✓✓			✓✓			✓✓			✓		
CPS12D	ORP potentiometric							✓✓								
CLS50D	Conductivity - inductive	✓			✓✓							✓✓				
COS61D	Oxygen - optical							✓✓								
CUS51D	TSS - turbidity				✓		✓	✓✓		✓✓	✓✓	✓✓	✓✓			
CUS71D	Sludge level, ultrasonic						✓✓						✓✓			
CCS142D	Chlorine - amperometric											✓✓				
CAS40D	NO3/NH4 - ion-selective								✓✓							
CAS551D	SAC/NO3 - photometric	✓			✓			✓✓				✓✓				

Device designation	Measuring principle	Wastewater										Sludge treatment			
		Sewer / storm water basin	Pumping station / lift station	Bar screen	Influent	Sand / grease trap	Precipitation / secondary clarification	Sludge activation	PO4 coagulant dosing	Blower system	Return sludge	Disinfection and effluent	Sludge concentrator / dewatering	Sludge digestion	Biogas treatment
Liquid analysis															
CA71PH	o-PO4 - colorimetric				✓		✓				✓				
CA72TP	P total - colorimetric				✓						✓				
CA80AM	NH4 - colorimetric				✓		✓				✓				
CSF48/CSP44	Sampler	✓	✓		✓	✓					✓				
Level															
Prosonic S FMU90/FDU91	Cont. level - ultrasonic	✓	✓	✓		✓						✓			
Prosonic T FMU30/RMA452	Cont. level - ultrasonic	✓	✓	✓		✓		✓				✓			
Micropilot FMR50	Cont. level - radar	✓	✓	✓		✓									
Micropilot FMR54	Cont. level - radar													✓	
Waterpilot FMX21	Cont. level - hydrostatic	✓	✓	✓								✓			
Deltapilot® FMB50	Cont. level - hydrostatic											✓		✓	
FTW360	Pump protection, conductive		✓				✓	✓	✓		✓	✓	✓	✓	
FTL5x / FTL20	Limit switch - vibronic					✓		✓				✓			
Pressure															
Cerabar PMC71/51	Absolute and relative pressure - ceramic cell		✓			✓				✓	✓			✓	✓
Cerabar PMC131	Absolute and relative pressure - ceramic cell									✓				✓	
Temperature															
Omnigrad M TR10	RTD temperature				✓					✓				✓	✓

Water body protection begins with monitoring

Endress+Hauser offers a comprehensive range of products and services for water body monitoring worldwide

Sustaining good ecological water systems is the vision of many regions around the world, and it demands intensive studies so that measures for sustainable development in this area can be taken strategically.

Customer-specific container solutions for water body monitoring The measurement container solutions of Endress+Hauser are based on many years of experience in engineering, container construction and project management. On request, we even incorporate third-party devices and components to create a total turnkey solution.

Why should you choose Endress+Hauser as your partner?

- Experience in the engineering and design of customer-specific panel and container solutions, including standalone measuring points with independent power supply, remote data querying and integration of third-party suppliers
- Our innovative sensors and transmitters with self-diagnostics function support the effective maintenance planning of standalone measuring points
- Minimized complexity thanks to modular platform technology in our portfolio
- Expert support of our local on-site service, i.e. with personalized training, servicing and commissioning



www.us.endress.com/CSP44



Quick and easy: Direct sampling on the banks of a stream with the mobile Liquiport CSP44



Compact water body monitoring station with container solution



Reliable monitoring of flow rates with Promag electromagnetic flowmeter





Clean drinking water is one of life's essentials

Reliable access to clean drinking water is still one of the world's greatest challenges

Risk management in the production and distribution of drinking water has become a matter of strategic importance around the globe for operators of drinking water plants.

New stipulations in quality management As the WHO outlines with the Water Safety Plan, quality management requires more than simply defining “critical measuring points”: Document management, measuring point verification and maintenance strategies also have a role to play.

Growing importance of measurement technology The increasing complexity of water plants today cannot be overcome without automation solutions. As it is inconceivable to run a plant without any form of online measurement technology, employing the “right” measurement technology is the key to today's plant optimization requirements.



www.us.endress.com/industries/potable-water-treatment



Our offer – your benefit

- Minimal complexity thanks to coherent instrumentation concepts for your entire plant
- Customer-specific solutions, such as analytical panels and containers, local data storage and remote transfer, process automation and visualization
- Personalized solutions in the field of asset and document management
- Maintenance optimization and improved measuring point verification
- Comprehensive support worldwide provided by service technicians on site, e.g. with training, commissioning and servicing
- Unrivaled expertise from many years' experience in calibration and verification of measuring points
- Manufacturer-independent measuring point audit for evaluating critical measuring points

Membrane filtration is the key to unlocking water resources

Salt water desalination, water reuse and even other modern methods owe much to the development of membrane filtration. Membrane filtration has proven itself to be a safe and reliable method.

Finding the right balance The goal is to find the right balance between throughput, filter cleaning cycles and avoiding irreversible filter damage or even breakthroughs. Without measurement technology-based monitoring, this process would be inconceivable.

✓ Our offer – your benefit

- Support in the engineering phase for the reliable and optimum design of all relevant measuring points in the membrane system
- Customer-specific panel solutions for monitoring water quality in the filter inlets and outlets
- Local support of our sales and service organizations worldwide



For safe operation, membrane systems need to be monitored continuously using measurement technology

The solution for critical measuring points



Benefits of the new Memosens technology

- Service life of sensors extended by up to 40%
- Fewer calibration cycles thanks to longer service life of sensors
- Improved reliability of measured values thanks to possibility of in-lab calibration by trained laboratory personnel
- Predictive maintenance is an integral feature of Memosens technology and assists maintenance planning and asset management



Memosens innovation Take advantage of the new Memosens technology and monitor your critical measuring points reliably in the plant and in the distribution network. Both the fulfillment of the necessary water quality and the success of an individual process step in the treatment chain are documented at many points by means of analysis parameters. In addition, the quality monitoring of drinking water on the water distribution side is becoming increasingly important because this is where even more critical measuring points are being defined.

Intelligent sensors Maintaining a high degree of measurement accuracy entails the need for servicing and, often, regular calibration. The idea of developing online analytical systems that would combine ease of use with minimal potential for user error was the driving force behind the development of Memosens technology. Memosens is based on digital, intelligent sensors with integrated data chip. The digitalization of raw data in the

sensor head itself has made it possible to achieve a stable measurement regardless of external influencing factors (i.e. moisture and dirt) and an absolutely reliable transfer of data. The data chip in the sensor head stores all relevant, sensor-specific information such as calibration data and history. The task of calibrating the sensor is therefore no longer geographically tied to the measuring point and can be carried out under optimum conditions in the laboratory.

Memosens is a new standard Memosens means a significant gain in measurement quality and reliability. With over 250,000 Memosens sensors installed and with the technology opened up for other providers, Endress+Hauser has established de facto a new standard.

Optimum choice for water works and distribution networks: Analytical panels and Memobase lab software



Easy maintenance and user operation of measuring points with our panel solutions

Multiple parameters in one go The interaction between the Liquiline multichannel transmitter and digital Memosens sensor on the same panel is the optimum solution for measuring points with multiple analysis parameters. We support you in the design, installation and commissioning of customer-specific panel solutions. These also include local data storage and remote transfer as well as the implementation of hydraulic parameters, such as flow or pressure.

Calibration of Memosens sensors – easy and reliable

The beneficial calibration concept of Memosens sensor technology offers advantages not least for measuring points dispersed throughout the far-reaching network:

- The sensors precalibrated in the lab are put to use easily on site
- Automatic sensor detection helps to ensure immediate readiness with no need for further configuration
- The swapped-out sensors are regenerated and recalibrated in the lab and are then ready for their next deployment
- The in-lab regeneration of sensors significantly increases sensor service life; sensor throughput is reduced and costs are reduced



Quality management in the lab easily solved with Memobase software

Easy document management The document management of the analytical sensors used, which includes the calibration results, the quality and the aging process of an individual sensor, can be monitored easily and at a glance with the Memobase® laboratory software. In this way, the laboratory personnel have an overview of the quality and history of every single measuring point at all times.



www.us.endress.com/memosens

Cost-efficient and reliable measurement and verification of flow rates

Exact flow measurement When it comes to flow measurements, customers expect long-term stable and dependable performance with a high degree of accuracy. Where additional requirements in respect of corrosion resistance are imposed, the certified anti-corrosion protection of Endress+Hauser for salt water desalination applications, or in-ground installation conditions offer the best protection and optimum longevity. Furthermore, legal requirements, or even economic factors, demand an accurate overseeing of flow measuring points in the drinking water distribution network.

In-situ testing Where water treatment equipment runs 24 hours a day, removing flowmeters for comparison measurements and recalibrations is practically impossible. The answer is to put the measuring device installed through its paces and verify the measuring point, leaving the device in place and therefore without any downtime. The new generation Proline Promag 400, with its innovative self-diagnostics concept, is a plus for safety. Our service technicians will be there for you on site and also assist you with your measuring point verification, no matter the manufacturer.



www.us.endress.com/flow



Our offer – your benefit

- Complete product portfolio of electromagnetic flowmeters, models Promag 400/800, specifically for the water industry
- Corrosion resistance certified to EN ISO 12944 for a maintenance-free, dependable measurement even in buried and other corrosion-prone installation conditions
- Increased measurement reliability thanks to advanced self-diagnostics concept
- Installation costs reduced by flexible installation with unique "lap-joint flange concept"



Promag L 400: The flowmeter with integrated web server and weight-optimized sensor



Verification of a flow measurement during live operation by an experienced service technician

Our experts are here to help you

- Many years of experience in calibration and verification of flow measuring points in the water and wastewater sector
- Personalized advice by experienced specialists
- Comprehensive product portfolio for factory calibrations and verification and calibration measurements on site
- Calibration service in over 45 countries

Pressure and differential pressure are basic parameters and indispensable to safe operation

Ensuring there is enough pressure in the system From water withdrawal to the consumer – pressure is measured everywhere along the way. With so many pressure measuring points in different measuring ranges, it is easy to lose sight of the overall picture. That's why, in the area of pressure and differential pressure measurements, Endress+Hauser offers the perfect solution for reducing complexity and simplifying replacement part stocks, even in the face of different measurement requirements. Thanks to modular platform technology, it is therefore possible to realize cost-saving potential and sustain a high level of plant safety.



www.us.endress.com/pressure



Reliable pressure measurement in a membrane system



Our offer – your benefit

The Deltabar (differential pressure) and Cerabar (pressure) family offers:

- Excellent long-term stability (better than $\pm 0.1\%$ p.a.)
- Robust ceramic measuring cells resistant to pressure peaks
- Support for predictive maintenance concepts thanks to self-diagnostics function
- Coverage of a diverse range of applications with a clever electronics concept and a base unit for all pressure measuring points in the plant and network

Wastewater treatment safely mastered

Modern methods improve efficiency – if they are accurately controlled and managed



Modern sewage treatment plant that also meets strict requirements

Modern sewage treatment plants Without automation, today's modern sewage treatment plants can no longer be run at its optimum potential. Online measurement parameters are the basis for process management and optimization. Consequently, measurement technology is having to meet increasingly stringent requirements for reliability, accuracy and ease of use.

We support our wastewater technology customers

- With specialists who offer expertise and close customer relationships worldwide
- With the possibility of coherent instrumentation concepts for sewage treatment plants
- With a wide range of services and solutions purposefully geared to tapping plant and cost optimization potential in the areas of maintenance, energy and material consumption

✓ Our offer – your benefit

- Coherent instrumentation throughout the entire plant
- Analytics containers for outlet monitoring and monitoring of industrial intakes
- Energy monitoring solution for identifying specific energy efficiency and optimization potential
- Control loops for aeration optimization and phosphate precipitation
- Remote monitoring of plant peripherals
- Maintenance optimization and plant audits around the installed base
- Plant asset management solutions
- Fieldbus engineering



Plant operation begins before the point of entry

Channeling wastewater safely out of the sewer, avoiding runoffs into the drainage canal where possible, is the task of the sewerage company. Optimum use must be made of available storage chambers to accommodate possible heavy downpours.

Fill level as a versatile variable from the sewer The fill level is used in many places as a basis for calculating the used or remaining storage chamber capacity and for determining flow in open channels. The installation conditions are not always easy and the sensors must continue to provide reliable measurements even in narrow shafts, in the event of flooding, ice formation and moisture in general.

Endress+Hauser is your level expert We have been dealing with level applications for over half a century. Whether we are dealing with continuous level or limit detection, potentially explosive atmospheres, mist, ice formation, foam or outgassing atmospheres – we find the best solution for your level gaging problem.



Inspection of a wastewater sewer for the safe channeling of water



Our offer – your benefit

Added flexibility and always the best measurement technology-based solution in the sewer, lift station or sewage treatment plant:

- Ultrasonic sensors of the Prosonic product family, a diverse line of sensors for the sewer and sewage treatment plant
- Free-space Micropilot FMR50 radar measuring system with RIA452 process display unit
- Hydrostatic level measurement with Waterpilot FMX21 and RIA15 process display unit



Dependable level measurement in the extensive sewerage system

Elegant and efficient solution to influent and effluent monitoring

From sampler to small analyzer unit thanks to Liquiline CM44x The inlet and outlet points of a sewage treatment plant enjoy the special attention not only of the authorities, but also of owner operators. Keeping an eye on the wastewater matrix on the influent side is particularly important on account of possible disturbance to biological life. Monitoring the discharge not only provides proof of the efficacy of wastewater treatment, it is also crucial to the monitoring of pipelines delivering effluent into bodies of water. Online measurements and sampling for laboratory measurements are carried out here simultaneously.

All parameters in view Endress+Hauser offers an elegant way to combine online analytics and sampling in a single system. The basis for this innovation is the Liquiline CM44x multichannel transmitter, which not only supplies the analytical sensors, is also the core electronic component of the CSF48 sampler series. A single Liquiline transmitter can control sampling programs as well as up to four additional online parameters simultaneously.

✓ Our offer – your benefit

The Liquistation CSF48 sampler can be easily converted into a smart, reliable measuring station by linking up to four freely selectable analysis parameters:

- One integrated transducer (Liquiline CM44x) for online sensors and samplers
- Fully automated operation and documentation in accordance with legal requirements
- Flexible installation of sampler on open channel, in a basin or on pressure pipes
- Sample cooling avoids sample changes
- Easy to use and large selection of sampler programs

 www.us.endress.com/CSF48



Simple to use and easy to extend: The CSF48 stationary sampler

Biological wastewater treatment – easy, safe and efficient

Today, biological wastewater treatment is a core process in any modern sewage processing plant. It involves the decomposition of organic loads and eutrophying nutrients. Aeration, however, is still a major cost factor. Around 50% of electrical energy is consumed here alone. It has already been proven by many operators that a significant improvement in both discharge values and energy efficiency can be achieved with a strategically implemented aeration control system.

Phosphate precipitation is necessary in many places, but this too represents a considerable cost factor. Load-sensitive phosphate precipitation is an effective solution for two aspects in plant operation: Safeguarding discharge values with maximum cost efficiency.

Liquicontrol CDC80 – the smart control solution for aeration and phosphate precipitation The load-sensitive growth controller Liquicontrol CDC80 is the result of many years of process and instrumentation experience. It optimizes the process engineering of the growth stage, reduces your energy consumption and lowers your operating costs – while delivering reliable effluent values. In addition, our solution is incredibly flexible and can be fully adapted to your requirements in terms of time, personnel and materials.

Liquicontrol CDC80 undergoes continuous development. Indeed, a module designed to support load-sensitive phosphate precipitation has already been realized.

Energy monitoring in sewage treatment plants

Transparent presentation of energy consumption in individual processes is a prerequisite for benchmarking and energy optimization. Endress+Hauser has developed a smart energy monitoring solution for sewage treatment plants based on the highly successful Memograph RSG40. As an energy manager, the RSG40 collects, calculates and visualizes the defined key performance indicators of the plant. In conjunction with the intuitive Field Data Manager software (FDM), remote access and further processing become very easy to implement. Energy monitoring offers:

- Optimized plant performance
- Increased pump efficiency
- Electricity generation (where biogas is used)
- Better aeration performance
- Customized KPIs



Online analytics with the Liquiline CM44x transmitter is the basis for further optimization in biological treatment

Efficient sludge treatment and biogas use

Treatment and disposal of sewage sludge is one of the greatest challenges, but it also offers new opportunities

Efficient recycling of sewage sludge Sludge treatment is currently one of the major challenges faced in the wastewater industry worldwide. The goal is to reduce the amounts of sewage sludge destined for disposal because sewage sludge has long been a significant cost factor for sewage treatment plant operators.

Biogas recovery through sludge digestion and improvements in sludge dewatering are generally the answer. Recently, sludge has been discovered as a source of phosphorus. Endress+Hauser steps in when pilot plants are developed and these are ready to be scaled up.

Foam detection in the digestion tank – A plus for operational safety In digestion tanks, unexpected foaming could happen at any time. To avoid unwelcome downtimes, there is a measurement technology-based solution for detecting foam height which involves two different level measurement principles. The Deltabar FMB50 hydrostatic level measurement unit on the floor of the digestion tank measures the water column. A radar measurement unit (Micropilot FMR50) measures the surface. In the event of foam generation, a difference arises between the two level signals because the compact foam has virtually no effect on the hydrostatic measurement, but the radar device measurement still reliably detects the foam height. Anti-foam measures can then be implemented as and when necessary. This reduces costs and increases operational safety.

✓ Our offer – your benefit

For operation of digestion tanks, it is important to have information on dwell period, foam height, loading and biogas production.

- Supplier for complete instrumentation in sludge digestion and dewatering, including measuring devices for flow measurement in highly concentrated sewage sludge
- Support for maintenance
- Experience in fieldbus engineering and continuous support for analog technologies and bus technologies
- On-site support by experienced sales and service personnel



✓ Benefits

- Increased operational safety thanks to active foam detection
- Cost efficiency, as anti-foam measures are not required unless necessary

Operational safety and cost optimization thanks to reduced foam formation in the digestion tank

Reliable measurement of flow and biogas methane content

content Biogas production and the methane content are the first indicators of the state of the anaerobic process. Nevertheless, the measurement conditions in the wet biogas directly upstream of the digester tank always used to present a major challenge. That was until the Prosonic Flow B 200 ultrasonic flowmeter entered the market in 2012. This measurement problem has now been safely and reliably solved.

Sludge dewatering Sludge conditioning with lime milk or polymers before dewatering is the key to a good dewatering result and prolonging filter life as much as possible.

The standard solution is to measure the volume flow of sludge and conditioning agents and, in many instances, to implement an optical measurement of solids content. While the optical measurement is a state-of-the-art technique for the most part, it does tend to reach its limitations with very black sludge. Endress+Hauser offers an alternative to the optical solids measurement with the Coriolis measurement. In addition to mass flow, the Coriolis measurement also supports density measurements. Pieced together, these items of information enable load-sensitive dosing of conditioning agents – even in black sludge.

Always a good solution By varying the dosage of conditioning agents in line with the solids content, it is possible to optimize not only the dewatering result, but also the consumption of chemicals.

- Promass Coriolis measuring device (bypass installation) – sludge color no longer an issue
- Promag L400 in conjunction with optical solids measurement technology (with Liquiline CM44 transducer and CUS51D solids sensor)

✓ Benefits

Advantages of the Prosonic Flow B 200 biogas professional include:

- Reliable measurement of flow, temperature and methane content in wet biogas
- No negative effects caused by biogas changes or moisture content
- Low pressure loss and short inlet and outlet runs
- Low maintenance
- Bidirectional flow measurement



Ultrasonic measurement of biogas methane content and flow with the Prosonic Flow B 200



Coriolis-based density measurement in the sludge conditioning process with a Promass device



www.us.endress.com/B200



Belt filter in a sewage facility for sludge dewatering

Sustainable water management in industry

Overarching measurement technology-based concepts for your plant's water and wastewater treatment processes

A growing population, industrialization and climate change are intensifying competition for resources such as water and rare earth elements. Process water, industrial wastes and even sewage sludge are being recognized as sources of raw products and attempts are being made to reclaim useful materials. Known as urban mining, this trend sees brand new opportunities for industry to safeguard ever scarcer raw products and recyclables. Endress+Hauser is supporting the emergence of urban mining by providing the necessary process measuring technologies, some of which are still under development.

We know your production processes inside out – and we're also fully versed in water management We know the industry-specific requirements that need to be fulfilled and, what's more, we are familiar with all the relevant water and wastewater applications. That means:

- Interdisciplinary competencies in applications, services and solutions in production and auxiliary circuits
- A comprehensive portfolio of parameters and technologies including the relevant approvals and certificates

Increased plant availability Our objective is to assist our customers constructively and in the long-term to optimize operating costs. In addition to our portfolio for measurement technology, we also offer the following services and solutions:

- Commissioning and advice on maintenance optimization
- Turnkey, customer-specific container or panel solutions, including sampling
- Aeration optimization of biological wastewater treatment with optimum energy use
- Packaged solutions for various dosing tasks, i.e. wastewater neutralization or phosphate precipitation



Benefits

- One partner for all your plants' measurement technology requirements
- Synergies from overarching maintenance concept for the entirety of the installed base



www.us.endress.com/analytical-monitoring-stations



Container solution of Endress+Hauser for efficient water management in production and auxiliary circuits

Good document management for your plant's life cycle

All the information you want at the press of a button

In the water and wastewater industries, demand is rising for technical quality management and the installation of risk management systems. Faultless operation of critical measuring points must be ensured. Solutions for maintenance optimization and for document and information management for the installed device base have gained importance.

Support by web-based tools W@M Portal and W@M Enterprise give you the support you need from plant planning to maintaining your equipment – anytime, anywhere.

Quickly available and up-to-date information and documentation enable:

- Effective monitoring of your installed equipment and technologies
- Increased plant productivity and reliability
- Minimal plant downtimes

Only if you have a perfect grasp of the status of your plant can you implement a proactive maintenance strategy and save time and money.

Working better and more effectively With the W@M Life Cycle Management tools of Endress+Hauser, you can reduce your internal workload and improve process quality at the same time. To achieve this, you get access to the following:

- Selection and arrangement of the appropriate measuring technologies for your process conditions
- Fast access to critical information, such as replacement parts lists and maintenance events

Thanks to the online connection to the Endress+Hauser product database, you automatically benefit from up-to-date information about your measuring devices, i.e. product availability, replacement parts list, device history, documentation, calibration reports, operating instructions, etc.



✓ Benefits

Efficient management of installed equipment and technologies for the entire life cycle of your plant:

- Web-based tool for fast access to the most important information about your installed devices
- Automatic storing of device documentation, i.e. calibration reports, operating instructions, certificates
- Quick overview of process criticality and repair risk of installed equipment and technologies
- Planning, documentation and reminder function for calibration, repair and maintenance events
- Open interfaces for easy integration of information into maintenance systems, i.e. SAP PM or IBM Maximo



Services are an integral part of what we offer

Helping you optimize your process plants and maintain safe, reliable operation

For safe, reliable operation and optimized process plants For over 60 years, we have been supporting our customers, from the planning stage, through to fitting the equipment and, finally, maintaining process-engineering plants. In so doing, our focus remains on outstanding quality, safety and reliability throughout our product portfolio. This is also true for our service range: Industry-specific, expert technical support, on-site service wherever you are, unparalleled calibration expertise, helpful commissioning tools and new, attractive services and features to optimize your process plants. Our processes and tools are certified in accordance with OHSAS 18001 and ISO 9001.



www.us.endress.com/services



Benefits

- Increased plant efficiency thanks to improved availability of measured values
- Optimized maintenance measures and inventory management, resulting in enhanced plant safety and cost transparency
- Compliance with internal or required quality standards
- Documented traceability in line with the requirements to produce supporting documentation

Technical support – for quick assistance With our technical support for all measuring device technology, software and automation solutions, we ensure that interruptions to your plant processes are kept to a minimum in the event of a fault. Our support services are tailored to your individual requirements:

- 24-hour, worldwide availability by telephone
- Fast reaction time and direct access to technical experts
- Remote access to your plant components
- Workshop service for repair, diagnostics and calibration with short processing times



Our technical support is there for you 24 hours a day – worldwide.

On-site service for smooth plant operation Do you want to have your measuring devices up and running quickly, maintain your plants' value throughout their life cycle, ensure that your water treatment is of consistently good quality, and reduce the workload of your maintenance team? To make sure you get all this, we offer an on-site service that is available wherever you are and will support you throughout all the phases of your plants' life cycles. From commissioning through to regular calibration and maintenance:

- Worldwide service network
- Approvals for industry-specific maintenance work
- On-site presence, project and installation site management
- Flow verification for billing-relevant measuring points
- Support in commissioning
- Maintenance of your installed measurement technology
- Helpful maintenance tools for diagnostics and testing
- Online tools for searching for serial numbers and spare parts and for plant management
- Seminars and training sessions to train your employees



Our experts provide on-site support for smooth plant operation

Optimization services – to continually improve your processes We offer effective methods and services to optimize your business processes – from consultation to managing the maintenance work on your installed measurement and control systems. The focus here is on continual process improvements, increased efficiency and support for strategic business decisions:

- Maintenance management for the coordination and organization of maintenance measures
- Device management irrespective of manufacturer, i.e. data capture, analysis and optimization of the installed measurement and control systems
- Advice on standardization and inventory reduction
- Data management and integration of data into your systems
- Measurement technology consultation



Improve your processes with our optimization concepts

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