



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Water is life

Modern water management

Optimising processes and reducing costs



Modern water management

Optimising processes and reducing costs

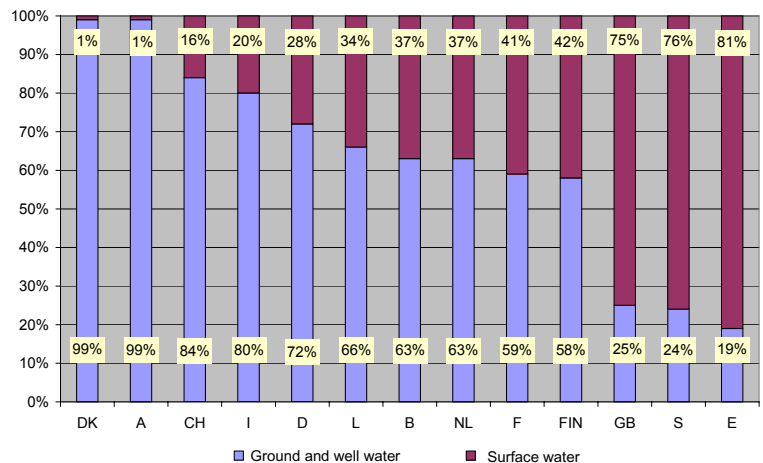
A well-functioning, public fresh water supply is a vital component in the modern industrial world. Availability of water in the necessary quality and quantity is the basis for human well-being and economic development. European Directive 98/83 defines new requirements in fresh water treatment. These have already been, or are currently being, adapted by the European member states. The origin and quality of raw water used in drinking water treatment differ in diverse parts of the world. The drinking water treatment plants therefore vary in their complexity. Independent of this, all utility companies are required to maintain a first-rate performance and increasingly cost-effective operations.

For the supplier of fresh water, this means:

- Optimising processes
- Use of accredited analysis according to the requirements of the latest fresh water regulations
- Cost reduction with savings in operating costs, i.e. maintenance strategies for preventive maintenance and increased process safety

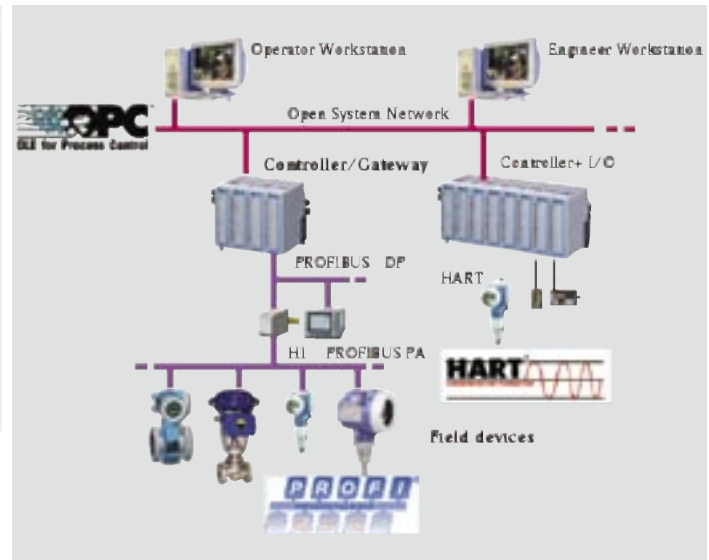
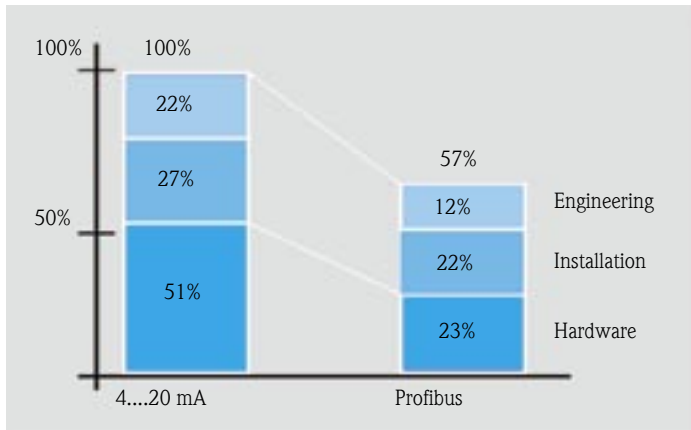
Essentially, it is the measurement technology which provides important functions as far as process availability, process safety and cost development are concerned. Endress+Hauser takes up the challenge as a leading producer of measuring technology. We are your partners in the areas of maintenance strategies and calibration services. We are involved in innovative communication technologies such as Fieldbus or e-commerce, right up to overriding topics such as consulting and engineering services. We are also your partners when the topics require competent people at your side for all matters concerning measurement and control technology.

Source fresh water in Europe



From integration to automation

More information, cost saving.....



With the introduction of communication technologies like HART®, PROFIBUS and Foundation Fieldbus a little more than ten years ago, the barriers between field instrumentation and the system level began to disappear. The instruments became more intelligent and an integral part of the automation architecture. Because we recognised this development at an early stage Endress+Hauser has been actively involved in different standardising bodies and user organisations since the beginnings of fieldbus technology. In this way, we want to ensure that our customers stay in touch with new trends.

A fieldbus connection offers much more than a data interface to a field instrument. It is the carrier of additional information from the field. Instrument status, maintenance and diagnosis information from the process to the control room may be used to increase the availability of the plant and to optimise processes. Endress+Hauser ensures the integration of this information into the system environment. To this end, we support both technologies established in the market and the new FDT integration technology for Plant Asset Management. We offer comprehensive engineering services for the integration of field instruments into all relevant control and asset management systems in process industry.

Field instrumentation is the source of the information to be measured in order to perform waste water treatment. The process itself could be complicated to keep running due to inlet water flow and pollutant variation, while effluent standard have to be fulfilled anytime. Plant supervision and control are useful tools not only to perform the treatment process, to improve it, saving energy, reagents, and other direct costs. While instrumentation represent the source of the informations for plant control, installation conditions, filtration and sampling systems, especially for analysers, are key to obtain a representative measurement, closer to process conditions. Our solution concept, embrace these aspects and this knowledge can be used during purchasing, engineering, start-up and commissioning of such measurement points. Complete automatic measurement station could be supplied on specific design.



A range of services to suit your needs

Optimised processes with an analysis of the installed base

Operators of industrial plants find themselves increasingly under pressure to reduce costs. Decreasing costs involves optimising processes and focusing on core processes. Water treatment is also subject to this trend. Safety, time and quality are becoming increasingly important. The main task in water processing is the treatment and availability of drinking water. The measuring technology itself is a side event, however, it is the main feature as far as plant availability and product safety is concerned.

Maintenance

E+H also offers support in the form of additional services such as:

- Calibration service on site or at the factory, in one of our 5 accredited laboratories
- Maintenance contracts for the installed measuring technology
- Start-up with protocolling
- Training – customer-specific content, content on demand (service, basics in measurement technology and/or industries)
- Repairs on site or at the factory with 48-hour emergency service
- Spare parts service and consultation in the selection of components
- Instrument rentals as a means for making decisions prior to purchase or for mobile temporary measurement requirements

Instrument Management Solutions

Instrument Management Solutions (IMS) is an efficient, cost-effective process that optimises the installed base. The advantages are:

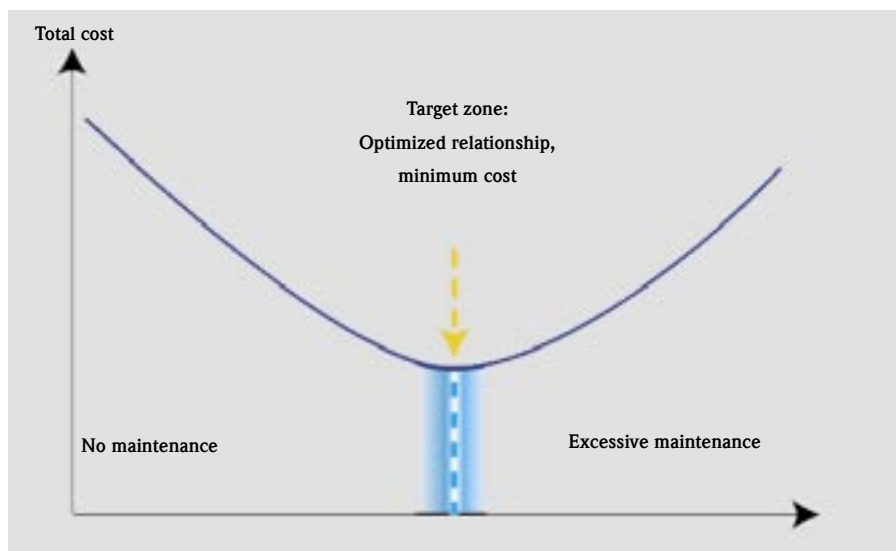
- Increased plant availability
- Fast problem solving
- Reduced follower costs already in the planning stage
- Quick availability of spare parts
- Reduction of maintenance costs
- Documentation including data CD

The basis for IMS is the analysis of the installed base. Endress+Hauser measures, evaluates and protocols the measurement system and its condition resulting in the definition of the critical parts of the plant, the discovery of optimisation possibilities in spare parts inventories, type reduction, phase-out planning and recommendations in regards to future maintenance strategies.

Summary

Endress+Hauser is the complete range supplier for measuring technology in your process, whether it be flow, level, pressure, analysis, recording or system components right up to services in the area of calibration, maintenance, repair, commissioning and more.

Challenge us!



Endress+Hauser – a single source

With its head office in Basel, Switzerland, Endress+Hauser is an international group of companies with 50 years' experience in the field of measurement and automation technology. The global E+H network is ISO 9001 certified, ensuring all-encompassing quality in production, products and management. Efficient, innovative and practical solutions for process automation and control in all industries have powered Endress+Hauser to a leading position in this area.

Our industry-specific focus ensures that measuring technology is developed according to the requirements of the specific industries. As complete solutions provider, we offer you concepts in engineering, control systems, measuring technology, maintenance and service – everything from one single source!

Liquid analysis

Liquisys M – an instrument for all parameters. Modular construction permits the measurement of pH/redox, conductivity, oxygen, turbidity and chlorine – the system is adaptable and can be easily retrofitted.



Stamosens CNS70 / CSS70

In-situ nitrate and SAC measurement – wet chemical, inline measurement for direct determination of nitrate/nitrite and organic loads in fresh water, process and wastewater. Low maintenance due to automatic cleaning function.

Stamolys CA71

Automatic analysis of ammonium, iron, manganese, aluminium by colourimetric methodology.



Level measurement

Waterpilot FMX 167 for hydrostatic level measurement 22mm. measuring cell diameter enables level measurement even in the smallest boreholes. The KTW, ACS and NSF certification, make it ideal for use in drinking water.



Prosonic M performs a non-contact ultrasonic level measurement. Simple commissioning, complete diagnosis and easy operation are the benefit of this well established level meter from Endress+Hauser.



Pressure measurement

Whether high precision, modular systems or straightforward transducers, all instruments offer sturdy ceramic or metal sensors for high pressure ranges up to 400 bar, in a detailed segmentation of technology to best suit any application.



Flow measurement

PROline Promag 50W is an electromagnetic flowmeter for applications wherever water flows! Our FieldTool software checks quality and documents the measuring point – it can be integrated into internal quality standards.



PROline Prosonic Flow 90W is an innovative ultrasonic flow measurement with proven clamp-on system. Flexible with diameters from 50 to 4000mm, the units can be installed quickly and without interrupting the process. The alternative to electromagnetic systems.



Recording

Memo-Graph visual data manager. Paperless and easy to use with adjustable parameter grouping – tamper-proof and TÜV tested.



Water is not the same everywhere

The pollutants in raw water vary with the extraction sites. As a rule, however, the ground water is high quality, as natural sedimentary filtration retains undesired materials. Nevertheless, even here and in particular during artificial enrichment of the groundwater, further requirements must be maintained. The use of surface waters necessitates a multi-stage treatment plant. For all extraction wells, adherence to suitable safety measures is necessary to ensure the timely shutdown of individual extraction points in order to protect the treatment plant.



Ground water

The operation of wells requires the measurement of level, pressure and flow. In order to measure the level in wells, rope probes are fitted in stilling wells with very small diameters. Endress+Hauser's hydrostatic level probe Waterpilot FMX 167 has been specially developed with an external diameter of 22mm. It is perfect for this application and can be directly installed in the stilling well. Reliable measurement is thereby ensured to control water extraction from the well network.

Hydrostatic level measurement, combined with flow and pressure measurement, is used to determine the mechanical pump performance. By employing the electrical pump performance as a measuring parameter, the degree of efficiency can be calculated. Endress+Hauser's

Memo-Graph multi-channel paperless recorder with datalogger is the ideal solution to register the required parameters and perform calculations. It is certified tamper-proof and features mathematical functions.

Quality control is essential where there is a danger of pollutants entering the source water. Turbidity measurement provides the ideal solution. In the event of rainfall, it is recommended that the well be closed as soon as 0.3 turbidity units is reached. This is done in order to avoid excessive treatment costs due to polluted raw water.

Nitrate can also be an important monitoring parameter in the well if agricultural activity is found in the vicinity of the well.

Diffusion of nutrients makes inline nitrate measurement an additional safety factor for the well operator.

Surface water – catchment basins

Depending on the climate, yearly seasons and other environmental factors such as agricultural usage or industrial settlements, surface raw water quality varies substantially. This makes it necessary for the operator of an extraction point to check several analysis parameters for quality control as well as for volume. Turbidity, pH and temperature measurements are standard, since these parameters are subject to wide fluctuations. These measuring parameters are further used to test the suitability of the extraction points as catchment basins, thereby protecting the system from highly polluted raw water whilst minimising costs. Conductivity and oxygen are also frequently found parameters. Conductivity is used in the early recognition of problematic water intakes, whilst oxygen is an early indicator in view of the wide spectrum of micro-organisms it contains.

Endress+Hauser offers a complete range of analytical equipment. The nitrate and the organic load (SAC) probe was developed especially for fresh water applications and uses UV absorption to reliably measure their concentration in water.



Measurement system for Nitrate and organic load (SAC)

Fresh water treatment for every type of water

Hardly any water is just like another – that is the reason why the treatment process must be tailor-made i.e. designed specifically for every case. Two goals must be kept in mind – treatment of the water, so that it is suitable for human consumption and the removal of anthropogenic materials. This includes the separation or removal of bacteria, viruses and parasites, also the removal of nitrates, pesticides and herbicides used in insect eradication. A number of proven fresh water treatment processes are available. By using examples of a number of specific and partial processes, we would like to demonstrate technical measurement solutions for fresh water treatment with Endress+Hauser technology.

Gas exchange

Gas exchange is a method to remove unwanted gases from water and the oxygen supply. The focus is normally on the removal of aggressive carbon dioxide (deacidification) or other odour or taste adding materials such as hydrogen sulphide. Volume measurement of the incoming water and air is required for control as the relationship of water to air has to be kept constant. To measure the volume of water, electromagnetic flowmeters are customarily employed. Promag 50W is a measuring instrument developed especially for the water industry. Next to its high accuracy, typical with EMF measurement, the instruments in the PROline Promag family are characterised by their safety functions – EPD electrode, tooling concept for measuring point documentation and instrument testing.

External flow measurement using ultrasonic technology is being applied in drinking water treatment. Endress+Hauser is innovative here too. The new Prosonic Flow 90W with improved signal recognition and evaluation allows this measuring method to be used in synthetic, fibreglass reinforced pipes. Advantages of ultrasonic measurement are found in the flexibility of the system as well as the simple installation procedure which does not interrupt the process.

In this way, the Prosonic Flow 90W line is also a favourite when used as a measuring instrument which is applied flexibly, e.g. for special inspection and accounting purposes.

The potential for reducing operating costs with optimised parts, inventory control and standardisation of models is a feature of this analysis technology.

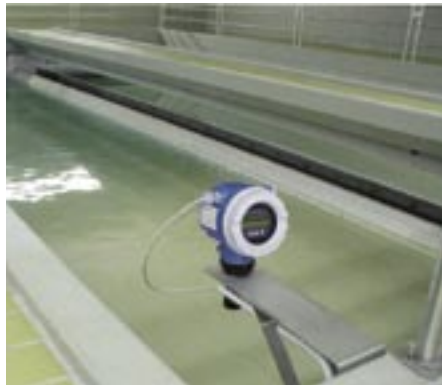
A uniform transmitter concept for all relevant quality parameters such as conductivity, oxygen, pH, turbidity and chlorine is not often available. For the user, this represents increased expenditures in operating, training and inventory control. A uniform transmitter concept covering all relevant parameters reduces these costs.

Endress+Hauser's Liquisys M offers a uniform transmitter concept. Uniform, menu-guided operation, modular system, parameter-specific check functions and the ability to cover all relevant parameters with one transmitter family in working efficiently and cost-effectively.





Non-contact ultrasonic level measurement with Prosonic M FMU 40/41



Ultrasonic level measurement above the sand filter



Liquisys M transmitter

Flocculation, sedimentation and filtration

Flocculation is used to form separable particles with the addition of flocculation agents. These flocculation compounds are batched according to volume and turbidity and controlled by using discharge control (turbidity) measures. Our proven turbidity sensor CUS 31, in combination with our Liquisys M transmitter, ensures reliable measurement, avoiding interfering influences of adhering gas bubbles. If solids are separated by way of flocculation filtration, the filter must be rinsed regularly by using level and differential pressure measurements. For open filters, Endress+Hauser supplies diverse measuring processes to measure the level – as a rule this is done using non-contact ultrasonic measurement

Prosonic M FMU 40 is a favourite instrument here as the unit is compact, cost-effective and measures reliably due to its leading edge signal evaluation and envelope curve function. The free ToF Tool package also offers to the user optimised software support in layout, adjustment and documentation of the measuring points. Additionally, Endress+Hauser offers the pressure and differential pressure transmitter family for level and pressure measurement to monitor the filter. User-friendly Prosonic M FMU 40/41 can be adjusted on site at the instrument while facilitating cost-effective integration in every control system (HART, PA, FF).

The back rinsing process is an important step as far as availability and safety of the solids separation process is concerned. Of decisive importance is not only the flushing time, but more importantly the speed with which air and water are pressed through the filters. Next to the Promag 50W for water volume measurement, which has already been mentioned, Endress+Hauser supplies a range of devices to measure air volumes. In addition to traditional and proven orifice plate measurement, vortex counters and thermal mass meters are also available.



Final adjustment and storage



Following final adjustment, water volumes have to be stored after every water treatment stage. The storage capacity is used to equalise fluctuations in usage, to maintain pressure ranges, bridge downtimes and maintain levels for fire fighting etc. These tasks are usually carried out from elevated reservoir basins situated in a decentralised position in the supply network. Next to regulating water levels, flow measurement also facilitates the operation of large basins. In the distribution network, it is flow (leakage detection) and pressure measurement that is of critical importance to the process.

Final adjustment at the decalcification stage

Higher concentrations of hardening calcium and magnesium ions do not represent a source of danger to health. Nevertheless, central water softening plants are gaining in importance. The significance becomes apparent in the growing number of warm water plants and water installation instruments in the household where boiler-damaging mineral deposits as well as the increasing water hardness is a problem. There are many different decalcification processes whose use depends on the specific characteristics of the water to be treated. Floating bed reactors, filled with quartz sand, are used in the rapid decarbonisation process. The water is supplied to the reactor, together with lime milk. With the addition of lime milk, the hydrocarbon ions in the water and the carbon dioxide are neutralised and calcium carbonate precipitates. Precipitation of this calcium carbonate is registered by the rise of the floating bed caused by the increasing solids load in the reactor. Therefore, regular removal of the solids particles is required. The particles are removed with the help of ultrasonic sludge mirror measurement. This procedure reliably detects the increase in solids load and initiates partial removal if required.

Storage

Water containers must meet diverse requirements in order to ensure reliable protection of the drinking water and avoid changes in the water characteristics as far as bacteria, chemical, physical and biological composition are concerned. Using a suitable remote system, an excellent monitoring function is activated when the central control panel detects pronounced changes in water level, pressure, flowrate and quality characteristics.

Electromagnetic flowmeters and conventional water counters are used for the measurement of flowrate in custody transfer applications.

Endress+Hauser offers two solutions: the custody transfer certified

Promag 50W which is prepared for this task at works. Custody transfer verification can be adapted at a later date. As an alternative, E+H offers to organise the certification with the calibration centre for you. You then receive the custody transfer certified and sealed instrument.

Optimising network distribution

In water distribution involving networks, it is primarily pressure and flow measurement which is required. These measurements are necessary for accounting purposes, leakage detection and monitoring the pressure loss in the pipes. In large distributor networks, further intermediate containers may be required in which depot chlorination is carried out. In this event, end control of the chlorination is initiated before the water is returned to the network.

The quality control cycle can be repeated with Liquisys M CLM 253 and chlorine sensor CCS 140. A common transmitter concept ensures minimum replacement part storage for all quality relevant online parameters.

In order to monitor the network for pressure fluctuations, Endress+Hauser offers a pressure transmitter family with optimised segmentation to meet even the most demanding requirements. The Cerabar pressure transmitter range contains 3 types - the straightforward transducer (Cerabar T) with fixed measuring ranges, Cerabar M with complete communication capabilities and communication options (from 4...20mA to HART or PROFIBUS) and the highly accurate Cerabar S with its modular design, which enables process connections, cell modules and electronics to be exchanged without requiring new calibration.

Low, long-term drift ($<0.1\%/year$ or $0.25\%/5$ years) as well as function monitoring from the measurement cell right up to the electronics are further advantages of the Cerabar S in view of safety in the distributor network.

Cerabar M PMP 41



Chlorine sensor CCS 140



Endress+Hauser: for the life cycle of your plants!



Since the beginning of 2003, Endress+Hauser offers its customers the new and unique asset management system - W@M.

Easy to use, W@M can be accessed at any time, any place, offering support from the planning stage through to the implementation of solutions and service support.

For any further information: www.endress.com

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