

Water is a matter of trust

Flow measurement in the
water industry



Proline

simply clever

Process monitoring is becoming more demanding and the need for maximum product quality is steadily increasing. This is why Endress+Hauser continues to provide industry-specific flow measurement solutions optimized for future technology requirements.

The new generation of our Proline flowmeters is based on a uniform device concept. This means time and cost savings, as well as maximum safety over the entire plant life cycle.

Consistent and uniform

Proline increases the safety and efficiency of operation

Optimal application solutions

Proline optimizes your plant up-time

Innovative and proven in use

Proline guarantees state-of-the-art technology

Ingeniously simple

Proline is user-friendly through and through

Perfect integration

Proline optimizes production and business processes

Added value in every respect



HistoROM

- Automatic data storage ensures maximum plant safety
- Simple data restoration enables quick exchange of components
- Event logbook and data logger for quick failure analysis



Heartbeat Technology™

- Permanent self-monitoring for all Proline measuring technologies
- Diagnostics for reduced maintenance and quick remedy
- Verification of measuring point, e.g. printing documents for quality reporting (e.g. ISO 9001)



Seamless system integration

- Direct and transparent due to a wide range of fieldbuses
- Risk-free through extended host testing and certification
- Compatibility over the entire product life cycle enables device replacement without expert know-how



W@M Life Cycle Management

- Open information system for device documentation and management
- Device-specific information for everyday work
- Quality of information unparalleled in scope and depth



Web server

- Time-saving local operation without additional software
- Comprehensive access to device, diagnostics and process information
- Fast data upload/download for maintenance and service



Simple operation

- Time-saving Endress+Hauser operating concept
- Optimal usability through guided parameterization
- User-specific menu structures and device access



Solutions from one source

Whether drinking water, industrial water, irrigation water or wastewater – easy operation and a high degree of reliability are characteristics of all flowmeters from Endress+Hauser. Our extensive product portfolio ensures that you can find the right device for every application.

Clean drinking water is a scarce resource around the world that needs to be made available to people on a consistent basis. For this reason it is decisive that modern, urban society uses effective techniques to purify the waste water it produces and discharges it back into natural water systems. The long-term objective in the water industry is therefore clearly defined: to extract, purify and distribute water in sufficient measure.

To record the quantity of relevant water flows correctly, operators of supply and treatment plants rely on robust and high quality flow measurement technology. Equally important are expert service providers who maintain the meters and who can test for legal compliance as an independent calibration center – whether for custody transfer compliant

applications or for accurate balancing and process control in water mains systems and treatment plants.

Either way, Endress+Hauser is a reliable and highly competent partner in all these areas. You can rely on us being thoroughly familiar with your needs for anything to do with the subject of water. With us you get everything from one source:

- Expert consulting and service worldwide
- First-class meters with high accuracy and repeatability
- Tailor-made solutions for your applications
- Highly developed concept for the calibration and verification of flowmeters



Your benefits throughout the life cycle

- Accurate measurement and billing of water
- Assured compliance with guidelines and regulations
- Reduced operating costs through optimal process automation



Calibration and verification

Proven and consistently high accuracy of flowmeters is essential in the water industry. Endress+Hauser provides everything for their verification and calibration from a single source.

The smallest measurement inaccuracies can cause shortfalls in the end-of-year accounting for providers or consumers. In the water industry's 24-hour operation, demounting flowmeters for test measurements or recalibration is simply not realistic – especially for custody transfer metering points or in large pipelines. The questions asked by a plant operator are therefore always the same:

- How can I prove that my flowmeter measures within the specified accuracy?
- How can flow measuring points be inspected and verified in accordance with the law?
- Is it possible to extend the calibration cycles specified by law?
- Is the periodic recalibration of flowmeters actually required from a technical point of view?
- Can flowmeters also be calibrated directly onsite?

The answers to these questions vary according to the country and application. Either way, you can always count on Endress+Hauser for verification and calibration:

- Many years of experience working in calibration and the water business
- Individual consultation by experienced specialists
- Planning new measuring points subject to billing
- Comprehensive calibration instrumentation for factory and onsite verification or calibration respectively
- All test equipment fully traceable to national standards according to ISO/IEC 17025 (e.g. METAS, PTB, NPL, LNE, NIST or CN)
- Worldwide unique – each calibration rig is accredited by national inspection authorities
- Uncertainty factory calibration: ± 0.05 to 0.08% o.r.
Uncertainty onsite-calibration: ± 0.11 to 0.25% o.r.
- Calibration service in over 45 countries



Verification with Heartbeat Technology™

Reliable operation is a must for plant operators. Heartbeat Technology ensures that things keep up this way. This function, integrated into the measuring electronics, allows you to monitor your Proline flowmeter constantly and verify its performance at any time – guaranteeing high measurement quality:

- Verification possible using any device interface – no presence in the field required
- Without process interruption
- Metrologically traceable
- Seamless documentation in accordance with ISO 9001
- Automated, time-saving method – prevents operator errors
- Continuous diagnostics for quick remedy in case of failure

Test measurements with Prosonic Flow 93T

The portable Prosonic Flow 93T ultrasonic measurement system allows temporary flow metering for comparative purposes without interrupting the process. Prosonic Flow 93T can be verified periodically on accredited calibration rigs and thus fulfills the requirements for test equipment in accordance with ISO 9001:

- Portable, battery-operated device – versatile in use
- Monitoring the measuring accuracy of flowmeters without uninstalling
- Safe recording of flow data and measured values (device under test) in the data logger
- Measured values can be transferred via USB memory stick, e.g. for further evaluations
- Max. measured error: $\pm 2\%$ of reading
- Repeatability: $\pm 0.3\%$ of reading

European Measuring Instruments Directive (MID)

The flowmeters approved by Endress+Hauser as meeting legal requirements for custody transfer applications, such as the Promag W 400, fulfill the requirements for measuring devices in accordance with the 2004/22/EC European directive. This is confirmed by a Declaration of Conformity based on an EC type-examination certificate from a recognized metrology institute (e.g. PTB, NMi Certin B.V., etc.).

Endress+Hauser has obtained all of the necessary certifications for the production and calibration of flowmeters for custody transfer applications. Our approved devices reduce the effort required for commissioning and qualification and thus also cut costs.











Experience – over 1.7 million times

Since 1977, Endress+Hauser has supplied its customers with over 1.7 million magmeters and implemented them successfully into a vast range of applications – including over 750 000 units in the water industry alone. This figure stands for:

- Global trust in Endress+Hauser as a business partner
- Extensive expertise in a wide range of industries and applications
- High dependability and robustness of our instruments
- Innovative products and solutions
- Worldwide sales network with highly skilled technicians and service engineers





Electromagnetic measuring principle				
Transmitters	Promag 400 Broad functionality <ul style="list-style-type: none">■ Corrosion-resistant housing■ Automatic data storage (HistoROM)■ Integrated web server for time-saving operation■ Heartbeat Technology for measuring point verification and permanent self-monitoring		Promag 800 Battery-powered <ul style="list-style-type: none">■ Maintenance-free long-term operation up to 15 years■ Corrosion-resistant housing■ Secure storage of measured values in the data logger (SD card)■ Data transmission and retrieval via mobile communication network (GSM)	
	Promag L For standard applications <ul style="list-style-type: none">■ Up to 30% less weight than traditional devices■ Simple installation thanks to lap-joint flanges (up to DN 300)■ Short, optimized face-to-face length (fulfills ISO and DVGW)■ DN 50 to 2400		Promag S For demanding fluids <ul style="list-style-type: none">■ For fluids with up to 80% solids■ For measuring drained or thickened sewage sludge■ For fluids with low electrical conductivity■ DN 15 to 600	
Sensors	Promag W For special applications <ul style="list-style-type: none">■ For hazardous areas (Ex)■ Safe long-term operation underwater or buried underground (optional: IP68/Type 6P enclosure)■ Approved for custody transfer applications in accordance with MI-001■ Certified corrosion protection (EN ISO 12944)■ DN 25 to 2000		Promag H For low flows <ul style="list-style-type: none">■ For dosing chemicals■ Chemically resistant PFA lining■ Numerous process connections made from metal and plastic■ Corrosion-resistant electrodes made from tantalum or platinum■ DN 2 to 150	
	Promag D For basic applications <ul style="list-style-type: none">■ Wafer device with minimal face-to-face length and minimum weight■ Precise centering thanks to innovative housing design■ DN 25 to 100		<div><div></div><div>Promag L, W and D are available with internationally recognized drinking water approvals: KTW/W270, ACS, NSF 61, WRAS BS 6920</div></div>	



Raw water extraction



Sand filtering system

Flowmeters for every application

		Promag				
		L	W	D	S	H
Drinking water						
	Water extraction (seawater, river water, groundwater and spring water)	✓✓	✓			
Treatment	Raw water treatment	✓✓	✓	✓		
	Seawater desalination	✓	✓✓			
	Flocculating agents (dosing station)					✓✓
	Conditioning (dosing of chemicals)	✓				✓✓
Membrane filtration	Ultrafiltration and microfiltration	✓	✓✓			
	Reverse osmosis	✓	✓✓			
Storage (inlet/outlet)		✓✓	✓			
Distribution, transport	Drinking and industrial water	✓✓	✓			
	Irrigation water	✓✓		✓		
	Leak detection (between pump stations)	✓✓	✓			
	Custody transfer		✓✓			
Waste water						
Transport (canalization, collectors)	Inlet canalization/inlet sewage plant	✓	✓✓			
	Stormwater reservoir (inlet/outlet)	✓✓	✓			
	Leak detection (between pump stations)	✓✓	✓			
Waste water treatment	Biological treatment	✓✓	✓			
	Clarifier tank/flocculation tank	✓✓	✓			
	Effluents (into rivers)	✓✓	✓			
	Flocculating agents (dosing station)					✓✓
	Aeration (activated sludge tank)					
Sludge treatment	Concentrated sludge	✓✓			✓	
	Digester (inlet/outlet)	✓			✓✓	
	Dewatered sludge				✓✓	
	Biogas					



Desalination plant for seawater



Water distribution

Promass		Prosonic Flow				t-mass				
I	Cubemass C	91W	93W	93T	B 200	65I	65F	B 150	A 150	T 150
		✓✓	✓	✓						✓
		✓✓	✓	✓		✓✓	✓	✓✓	✓	✓
		✓✓	✓	✓						✓
	✓									
	✓									
		✓✓	✓	✓						
		✓✓	✓	✓						✓
		✓✓	✓	✓						✓
		✓✓	✓	✓						✓✓
										✓✓
		✓✓	✓	✓						✓
		✓	✓✓	✓						
		✓✓	✓	✓						
		✓✓	✓	✓						
		✓	✓✓	✓		✓✓	✓	✓✓	✓	
		✓	✓✓	✓						
	✓✓	✓✓	✓	✓						
						✓✓	✓	✓✓	✓	
✓										
✓										
✓										
					✓✓	✓	✓			



Irrigation



Wastewater treatment (clarifier)

Coriolis measuring principle

Cubemass C

For low flows

- For high-precision measurement of minimal flows, e.g. when dosing flocculating agents, etc.
- Corrosion-resistant materials
- DN 1 to 6

**Promass I**

The specialist for sludge

- Ideal for fluids with a high solids content, e.g. sewage sludge
- For determining the dry mass, based on density functions
- Straight single-tube system without pressure loss
- DN 8 to 80



Ultrasonic measuring principle

Prosonic Flow 91W

For standard applications

- Clamp-on flowmeter for external measurement
- Can be retrofitted without process interruption
- DN 15 to 2000

**Prosonic Flow B 200**

For biogas/digester gas

- For wet or dirty gases at low pressure and fluctuating process conditions
- Traceable factory calibration ($\pm 1.5\%$ o.r.)
- Real-time measurement of methane content and temperature
- Calculation of standard volume, calorific value and Wobbe index
- DN 50 to 200

**Prosonic Flow 93W**

For demanding applications

- Expanded functionality including multi-channel measurement
- Clamp-on flowmeter for external measurement
- Can be retrofitted without process interruption
- Also available as a welded version
- DN 15 to 4000

**Prosonic Flow 93T**

For temporary measurement

- Portable, battery-operated clamp-on flowmeter
- For verification of other flowmeters
- With data logger and current input (4–20 mA)
- Measured values can be transferred into Microsoft® Office via USB memory stick
- DN 15 to 4000



Thermal measuring principle

t-mass 65 F/I

For accurate gas metering

- Flanged versions (t-mass F): DN 15 to 100
- Insertion version (t-mass I): DN 80 to 1500 for circular pipes and rectangular ducts
- For air, oxygen, biogas, etc.
- Measurement even at minimal gas pressures and flow velocities
- Accuracy: $\pm 1.5\%$ o.r. (10 to 100% o.f.s.)
 $\pm 0.15\%$ o.f.s. (1 to 10% o.f.s.)

**t-mass A/B 150**

For cost-effective gas metering

- Flanged versions (t-mass A): DN 15 to 50
- Insertion version (t-mass B): DN 80 to 1500 for circular pipes and rectangular ducts
- For air, oxygen, biogas, etc.
- Measurement even at minimal gas pressures and flow velocities
- Accuracy: $\pm 3\%$ o.r. (15 to 100% o.f.s.)
 $\pm 0.45\%$ o.f.s. (1 to 15% o.f.s.)



The new t-mass T 150 measures all water-like fluids, regardless of their electrical conductivity.

W@M Life Cycle Management

Complete and instantly available device information is a key to any successful production plant operation. Endress+Hauser's W@M Life Cycle Management is an intelligent information platform designed to support you end-to-end throughout your facility's life cycle.

Data for actuators and sensors is continuously generated when designing and procuring components, during installation and commissioning and finally during operation and maintenance. These kinds of information can be retrieved worldwide with W@M Life Cycle Management – wherever and whenever you want. Your benefits: Increased process reliability and product quality around the clock; and service technicians receive quick and targeted assistance in the event of disruptions or during maintenance.

W@M Life Cycle Management ...

- is an open information system based on intranet and internet technology
- brings together software, products and services from Endress+Hauser
- ensures the worldwide availability of equipment and plant data
- puts an end to time-consuming searches for device information in archive



Plant Asset Management (W@M Portal)

- Managing the installed base
- Worldwide requesting/ordering of spare parts, software versions, device data, documentation, etc.

Configuring/parameterizing devices

- With FieldCare (software for Plant Asset Management)
- With Field Xpert (handheld terminal)
- Quick local operation thanks to the integrated **web server** and uniform **operating concept**
- Quick restoration of device data in case of service (**HistoROM**)

Calibration management

- CompuCal: Software for the administration of maintenance and calibration tasks
- Device on-site verification with FieldCheck (test instrument) or **Heartbeat Verification** (device function)



Proline ▶ Page 2

Finding documentation quickly

Downloadable online in multiple languages via "Device viewer" or the "Operations App":

- Technical information brochures
- Operating manuals
- Approvals
- Calibration certificates, etc.

Defining products

- Selecting, sizing and documenting measuring instruments using "Applicator"
- Project documentation

Configuring products

- Generating product codes with the "Product Configurator"
- Customer-specific pre-configuration

Finding spare parts

- With the Spare Part Finder (SPF)

Ordering online

- Ordering standard products, services and spare parts
- Pricing information
- Delivery times
- Order status and shipping status





Selecting the right device

Applicator is a proven selection and sizing program from Endress+Hauser. Applicator has been built around 30 years of industry experience and expert knowledge:

- Targeted product search by measuring task, measured variable, approvals, process data, communication, etc.
- Dependable sizing without specialized knowledge
- Display and depiction of important parameters such as optimal nominal diameter, pressure loss, etc.
- Direct link to Product Configurator and online shop
- Cost-saving administration and documentation of plant projects (project module)
- Language versions: English, German, French, Spanish, Russian, Chinese and Japanese



Applicator online version / Newsletter:
<http://www.endress.com/applicator>

Calibration management

In certain industries, measuring devices have to be serviced regularly due to regulations or internal directives. This also includes recalibrating quality-critical measuring points within the installed base. CompuCal is a program that provides optimal assistance in this process:

- Planning, monitoring and documenting calibration, inspection and maintenance cycles
- Complete traceability in conjunction with the test equipment used by Endress+Hauser
- Comprehensive, global data access thanks to web-based software
- Conforms completely to FDA 21 CFR Part 11 – Electronic Records; Electronic Signatures Validation

Operations App

The Operations App from Endress+Hauser offers fast access to the latest product information bulletins and device details, including order codes, availability, spare parts, successor products and general product information – wherever you are, whenever you need the data. Just key in the serial number or scan the 2D code on the device to download the information.



Easy commissioning and maintenance

The modular FieldCare software from Endress+Hauser provides users with an extensive toolset for field support of their measuring points (Plant Asset Management).

Basic functions

- Configuring and commissioning via fieldbuses or service interface
- Detecting and rectifying errors
- Documenting measuring points (data printout/export)
- Comparing measuring point parameters (set/actual value)
- Backing up/archiving data (upload/download)

Expansion functions

- Presenting the measured values graphically
- Calling up service functions
- Monitoring diagnostic data
- Evaluating verification results



Always at your service

It is our aim that all devices manufactured by Endress+Hauser guarantee high measuring accuracy and operational safety – around the clock, seven days a week, throughout the entire life cycle of your plant.

Our sales and customer service centers in over 45 countries ensure that everything runs smoothly for you. Whether you are based in Europe, America, Asia, Africa or Australia – we are always by your side!

This is how Endress+Hauser supports you in the water business:

- First-class field measurement technology for all process variables (flow, analysis, level, etc.)
- Planning and delivery of all common control, visualization and process control systems
- Consulting, design, engineering
- Planning and advice from consultants, engineers and expert technicians onsite
- Professional management of national and international projects
- Installation, commissioning and configuration
- Inspection and maintenance (maintenance contracts)
- Factory and onsite calibrations, control measurements
- Repair service, spare parts, conversion kits
- Individual maintenance concepts (Installed Base Audit)
- Training courses and qualifications
- World-wide service



Endress+Hauser – Your partner

Endress+Hauser is a global leader in measurement instrumentation, services and solutions for industrial process engineering.

With dedicated sales centers and a strong network of partners, Endress+Hauser guarantees competent worldwide support. Our production centers in twelve countries meet customers' needs and requirements quickly and effectively. The group is managed and coordinated by a holding company in Reinach, Switzerland. As a successful family-owned business, Endress+Hauser is set to remain independent and self-reliant.

Endress+Hauser provides sensors, instruments, systems and services for level, flow, pressure and temperature measurement as well as analytics and data acquisition. The company supports customers with automation engineering, logistics and IT services and solutions. Our products set standards in quality and technology.

We work closely with the chemical, petrochemical, food and beverage, oil and gas, water and wastewater, power and energy, life science, primary and metal, renewable energy, pulp and paper and shipbuilding industries. Endress+Hauser supports customers to optimize their processes in terms of reliability, safety, economic efficiency and environmental impact.

Flow measurement as competence

The Endress+Hauser group is a global player. Within the group, Endress+Hauser Flowtec AG ranks internationally as one of the leading producers of industrial flowmeters for liquids, gases and steam. As a competence center, we have achieved a top position in global market for over 35 years. Endress+Hauser Flowtec AG currently employs a workforce of more than 1400 at six production facilities in Reinach (Switzerland), Cernay (France), Greenwood (USA), Aurangabad (India), Suzhou (China) and Itatiba (Brazil).



Reinach, Switzerland



Cernay, France



Greenwood, USA



Aurangabad, India



Suzhou, China



Itatiba, Brasil



To learn more about Endress+Hauser, visit:
www.endress.com

www.addresses.endress.com

CP00013D/06/EN/13.14