Proline
Prowirl 200
The vortex revolution for steam, gas and liquid

Robust, multifunctional, proven

- Tried-and-tested maintenance-free sensors: installed in over 400 000 applications worldwide
- Best long-term stability thanks to lifetime calibration factor
- Robust sensors for high resistance to vibration, temperature shocks and water hammer
- High repeatability
- Seamless and cost-effective system integration through uniformt two-wire concept for flow and level
- High process reliability: devices developed completely to IEC 61508 for SIL 2/3
- Efficient steam plant operation thanks to the only wet steam detection of its kind in the world
- Accurate calculation of heat and energy flows using a multivariable measuring concept
- Traceable measurement results due to accredited calibration facilities: SAS (Switzerland), A2LA (USA) and CNAS (China)

Endress+Hauser
People for Process Automation

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 is a proven and uniform product concept, designed to do the same things the same way, thereby increasing the safety and efficiency of your operations.

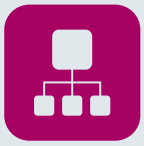
Optimal application solutions Proline incorporates all modern flow measuring technologies, thus optimizing plant up-time – true to our motto: "The industry-optimized flowmeter for your application."

Innovative and proven in use Proline is based on a versatile, continually updated technology concept, guaranteeing that you are always implementing state-of-the-art technology.

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

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

Prowirl 200

The reliable multi-talented device

Whether it is reliable control at high pressures and temperatures, or reliable measured values during continuous operation, the new Prowirl 200 has been designed to meet your needs. The fields of application in the chemical, petrochemical, pharmaceutical, power engineering and foodstuff industries, for example, involve a wide variety of fluids:

- Wet steam, saturated steam, superheated steam
- Compressed air, nitrogen, oxygen, natural gas
- Liquefied gases, cryogenic liquids
- Demineralized water, boiler feedwater, condensates
- Solvents, coolants, heat-transfer oils, etc.

In addition, Prowirl 200 has several functions that are unique worldwide, thus ensuring maximum flexibility for plant design and highest reliability in operation:

- Wet steam alarm for reliable and efficient steam plant operation
- Inlet-run correction function for exact measurements even when installation space is at a minimum
- Heartbeat Technology for continuous self-diagnosis and simple device verification at one's fingertips without process interruption for compliance with ISO 14001 / ISO 50001
- Gas mixtures can be freely defined with up to eight components
- Steam and gas data in accordance with international standards: IAPWS-IF97, AGA8, AGA5, SGERG, ISO 6976, etc.
- Easy energy management due to integrated pressure and temperature measurement


Prowirl
571.94 kg/h
100.80 %
7.04 K
25.00 bar

Prowirl 200
Advantages at a glance

Easy operation
- Uniform Endress+Hauser operating concept
- Fast commissioning via guided configuration of parameters
- 17 display languages for use anywhere in the world
- Optimal on-site process control via simultaneous display of up to four measured variables, e.g. mass flow, volume flow, temperature, pressure or energy

Maximum operational safety
- Heartbeat Technology
  – Continuous self-diagnosis
  – Traceable device verification “at one’s fingertips”. No dismantling or process interruption required.
- Developed for SIL 2/3 applications
- Continuous monitoring of the steam dryness fraction

Seamless system integration
- Simple and seamless integration into existing process control and asset management systems via an optimized, uniform two-wire concept
- Tried-and-tested W@M information system:
  – Global access to all device information
  – Cost-effective support of business processes
- Compatibility between field device and process control system ensured at all times, as firmware/device drivers are available during the entire life cycle

Sensors proven in real-world applications
- Successfully installed in over 400 000 applications worldwide
- High accuracy and reliable measurement results thanks to lifetime calibration factor
- Unmatched long-term stability in operation thanks to capacitive DSC sensor (patented)
- High repeatability (±0.1%)
- Traceable measurement results – each device is tested on accredited calibration rigs (ISO/IEC 17025)

Your benefits throughout the life cycle
- Minimum operating and maintenance costs
- Maximum reliability in operation
- Highest measuring accuracy for internal costing and billing
- Highest plant efficiency for energy management

Two-wire technology at Endress+Hauser

Combining the benefits of the vortex flow measuring principle with efficient two-wire technology no longer requires compromises. Prowirl 200 enables seamless integration into existing plant systems along with tried-and-tested sensors:
- High operational safety in Ex areas due to intrinsically safe design (Ex ia)
- Reduced costs for installation and wiring
- Seamless system integration into existing infrastructures
- Common installation practice

Perfectly standardized
Uniform operation, menu structures, function designations, software, interfaces, data management, system integration, documentation, product structures, etc.

High flexibility
Modular housing components and electronic modules

Increased safety
Consistent implementation of all requirements of common industrial standards and recommendations

Precise diagnostics
Clear categorization of device or process errors according to NE107: Maintenance/Out of specification/Function check/Failure

Simply unforgettable
Customer-friendly data storage concept (HistoROM): backup, copy, compare or restore data

Fulfills industry standards
Interference immunity, data retention, signal level, software, pressure equipment directive, self-monitoring, etc.

Tailor-made flowmeters

Our solutions for your application

Prowirl D 200
Wafer device

- With centering rings for high fitting accuracy
- Worldwide standardized installation length (65 mm) enables one-to-one replacement of orifice plates
- DN 15 to 150 (½ to 6")

Prowirl F 200
Standard device

- Suitable for detecting and measuring wet steam
- Correction function for short inlet runs
- Worldwide standardized installation lengths
- DN 15 to 300 (½ to 12")

Prowirl R 200
For low flows

- With a single and even double line size reduction for:
  - Increasing the flow velocity
  - Extending the lower measuring range
- DN 25 to 200 (1 to 8") single reduction
- DN 40 to 250 (1½ to 10"), double reduction

Prowirl O 200
High-pressure specialist

- Flange or butt-weld version
- DN 15 to 300 (½ to 12")

For more technical data: see last page

Dualsens version

Due to safety reasons, critical applications often require redundant measurements. Therefore all Prowirl sensors are also available in a Dualsens version; in other words, they have two separate DSC sensors and two measuring electronics.

Through development in accordance with IEC 61508, the redundant measuring system can even be used in SIL 3 applications. This means high reliability at low cost!

Robust, multifunctional and intelligent

Three reasons why choosing Prowirl

Patented DSC sensor

Robust sensor – reliable measuring technology

Endress+Hauser's unique DSC (Differential Switched Capacitor) sensor technology ensures high-precision measured values even under the toughest conditions. With an installed base of over 400 000 devices, this sensor concept has been proving its value for decades. The patented DSC sensor is highly resistant to:

- Vibration
- Dirty fluids
- Water hammer
- Temperature shock (>150 K/s)

Even after being used for decades, DSC sensors did not exhibit any drift – proof of their exceptional long-term stability.

Multivariable measurement

Energy management made easy

All industries have utilities with steam, cooling water or hot water. Generating, transporting and distributing these fluids consumes a lot of energy. Efficiently controlling such processes is becoming even more important. Therefore Prowirl 200 offers everything in one device for a comprehensive energy management:

- Integrated flow computer for calculating:
  - Mass, heat and energy flow of steam and liquids
  - Corrected volume flow and energy flows of gases (e.g. air, natural gas)
- Reading in external temperature and pressure values via HART, PROFIBUS PA and FOUNDATION Fieldbus as well as via the optional current input
- Integrated pressure and temperature measurement for the direct mass measurement of saturated and superheated steam and gases (temperature/pressure compensation)

One-of-a-kind wet steam detection

Process reliability and efficiency

Prowirl 200 is the world's first vortex flowmeter with the option of monitoring steam quality and immediately generating an alarm message in case of wet steam. The transfer of heat energy is energetically efficient only for saturated steam. Often, however, wet steam predominates, since fluctuations in pressure and temperature cause water to condense out, or water gets into the steam lines due to disruptions in the boiler system. The consequences are usually serious:

- Low efficiency for the transmission of energy
- Hazardous water hammer
- Heavy corrosion from the salts dissolved in the water carried over

Movie – Steam quality measurement with Prowirl 200

Prowirl measures all types of steam right in the pipe. Look and see!

https://youtu.be/UAV-6y4xA_E

Technical data

Prowirl 200 (transmitter)	
Display	4-line display with push buttons or with touch control (backlit)
Operation	– Via local display (17 operating languages) – Via operating tools, e.g. "FieldCare" from Endress+Hauser
Power supply	DC 12 to 35 V
Ambient temperature	–40 to +80 °C (–40 to +176 °F) Optional: up to –50 °C (–58 °F)
Degree of protection	IP66 and IP67 (Type 4X enclosure)
Design Housing material	– Compact or remote – Aluminum or stainless steel housing
Galvanic isolation	All circuits for outputs and power supply are galvanically isolated from each other
Output/Input	Current output (4–20 mA, HART); 2nd current output (optional); pulse/frequency/switch output; passive current input (optional)
Communication	HART, PROFIBUS PA; FOUNDATION Fieldbus
Ex approvals	ATEX, IECEx, cCSAus, NEPSI, TIIS
Ignition protection type	Intrinsically safe (Ex ia/IS) Flame-proof (Ex d/XP), Ex n

The Prowirl 200 measuring system fulfills the EMC requirements according to IEC/EN 61326 and NAMUR NE21. It also conforms to the requirements of the EU and ACMA directives and thus carries the CE and mark.

Prowirl D, F, R, O (sensors)	
Max. measured error	– Volume flow liquids: ±0.75%; gases/steam: ±1.0% – Mass flow liquids: ±1.0%; gases/steam: ±1.5%
Nominal diameters	– Prowirl D: DN 15 to 150 (½ to 6") – Prowirl F: DN 15 to 300 (½ to 12") – Prowirl R: DN 25 to 250 (1 to 10") – Prowirl O: DN 15 to 300 (½ to 12")
Process connections	– Prowirl D: wafer – Prowirl F/R/O: flange (EN [DIN], ASME, JIS) – Prowirl O: flange (EN [DIN], ASME, JIS), butt-weld version
Process pressure	Prowirl F: PN 10 to 100, Class 150 to 600, 10 to 20K Prowirl D, R: PN 10 to 40, Class 150 to 300, 10 to 20K Prowirl O: PN 160 to 250, Class 900 to 1500
Process temperature	– Standard: –200 to +400 °C (–328 to +752 °F) – Option (Prowirl F, R, O): up to +450 °C (+842 °F)
Degree of protection	IP66 and IP67 (Type 4X enclosure)
Materials	Stainless steel, Alloy C22
Approvals	Marine approvals; PED, CRN, AD 2000; SIL 2/3; degreased according to BS-IEC-60877; 1999 (e.g. for oxygen)
Ex approvals	ATEX, IECEx, FM, cCSAus, NEPSI, TIIS

Subject to modification

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Endress+Hauser

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