

Industrial Ethernet for Proline flowmeters

The system integration of the future

Flexible and powerful from start to finish

- Versatile range of applications: industrial Ethernet technology for Coriolis and electromagnetic flowmeters
- Flawless engineering: reduced wiring effort without additional components
- Reliable maintenance: automatic parametrization via the system after a device replacement
- Quick installation: use of industrial Ethernet cables and connection components
- Seamless system integration: continuous communication system from control to the field device level
- Optimum process monitoring: access to all process and diagnostic parameters
- Reliable production processes: highest possible real-time data transmission rates of up to 100 Mbit/s

EtherNet/IP™

PROFI[®]
NET





Industrial Ethernet

Continuous networks from office to sensor

No matter which sector of the process industry you operate in, Endress+Hauser is the right place to come to if you want to combine the advantages of state-of-the-art flow measuring technology with those of data transmission via industrial Ethernet. Now you can also use Endress+Hauser's Proline flowmeters, which have been tried-and-tested for decades, for digital communication via EtherNet/IP or PROFINET.

Flexible production systems, transparent processes, efficient plant maintenance, environmentally friendly utilization of resources and smooth operations are just some of the important aspects that users need to consider in order to remain competitive in the long term. In addition, users face increasingly stricter regulations, necessitating even more rigorous process monitoring which in turn calls for an increased use of field devices. Traditional fieldbus technology has its limits, particularly in large-scale plants with their massive diagnostic and process data. This applies especially to modern, multivariable field devices which record several

process variables at the same time to ensure maximum operational transparency.

In this case particularly, new and promising opportunities are created by the significantly higher data transmission rates of modern Ethernet protocols such as EtherNet/IP and PROFINET. This is not least due to the fact that modern digitalization is becoming more important in the field level of process automation. Moreover, process data can now be integrated seamlessly in cross-sectoral data acquisition systems, such as for logistics or quality assurance departments.

Industrial Ethernet technology has firmly established itself in the automation technology sector and is used more and more frequently. This holds particularly true for sectors where performance capabilities of process control, IT functions (e.g. diagnostics) or very large data volumes are top priorities. Industrial Ethernet also gives plant engineering companies even greater flexibility when it comes to plant planning, components and system architecture.



Advantages of Industrial Ethernet

- Uniform and continuous communication system from control to the field device level
- Simultaneous transmission of real-time measuring data and IT data via a single network
- Highest possible data transmission rates of up to 100 Mbit/s
- Significantly reduced wiring costs thanks to standard Ethernet cables and connection components (RJ45 or M12)
- Increased product quality in less time and at lower costs
- High level of investment protection since existing field-bus systems can be integrated at any point via couplers

Advantages of Proline flowmeters with Industrial Ethernet

- Cost-efficient system integration without additional components (e.g. gateways or couplers)
- Fast device parametrization via the integrated webserver without a device driver
- HistoROM data storage concept: easy device replacement with automatic device recognition and configuration
- Direct access to all measuring values and diagnostic parameters via PC, control room or Internet (remote diagnostics)
- High level of plant availability and process reliability
- Heartbeat Technology for reliable self-diagnostics and device verification

Making use of IT functions thanks to an integrated webserver

Industrial Ethernet technology makes it possible to use the highly versatile IT functions of automation devices optimally. For this reason, the Proline 100 and Proline 400 flowmeters have been equipped with a webserver as a standard. Status or diagnostic messages can now be viewed or retrieved in their entirety using a conventional web browser – via Ethernet (PC, laptop) or via a WLAN access point (tablet, smartphone).



EtherNet/IP

EtherNet/IP™

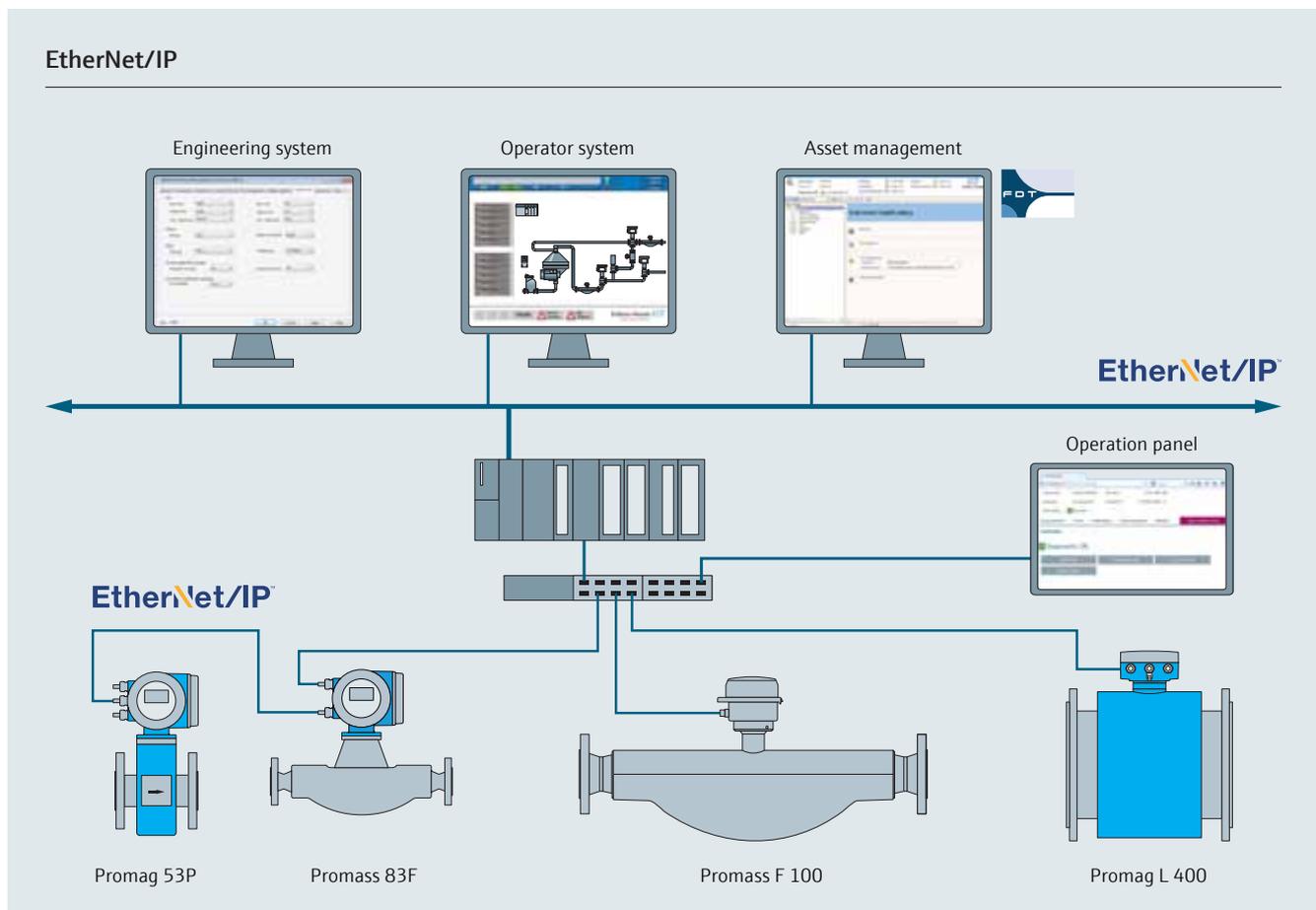
Tried-and-tested, flexible and powerful

EtherNet/IP was originally developed by Allen-Bradley (Rockwell Automation). Today it represents one of the most reliable and sophisticated industrial Ethernet network solutions for manufacturing automation with a market share of 30%. Among others, ODVA (of which Endress+Hauser is a member) has played a decisive role in the release of this industry standard.

As technology leaders Endress+Hauser introduced – in addition to devices for registration and analysis – the very first flowmeters featuring EtherNet/IP to the market: Promass 83 in 2010, and Promag 53 in 2011. Recent new arrivals are the compact Proline 100 line for the foodstuff and life sciences industries, as well as Proline 400 for the water industry. What does this mean for our customers? It means excellent integration in all important automation systems such as RSLogix 5000 from Rockwell Automation or Unity from Schneider Electric as well as in plant asset management operating tools such as Endress+Hauser's FieldCare.

Advantages at a glance

- Open standard
- Integrated webserver for easy configuration and troubleshooting
- Immediate device identification as network nodes
- Preventive maintenance thanks to the provision of reliable diagnostic data (e.g. with Heartbeat Technology)
- Direct upload of the system integration file (EDS) from the device.
- FDT/DTM technology for advanced system configuration, asset information and calibration management
- All EtherNet/IP devices from Endress+Hauser are ODVA-certified
- Add-on profiles (AOP Level 3) for seamless integration in Rockwell automation systems as well as a time-saving parametrization of the network nodes
- One or two Ethernet ports for flexible star or line topology



Proline with EtherNet/IP

Endress+Hauser has been offering a wide range of tried-and-tested Coriolis, as well as electromagnetic flowmeter systems with EtherNet/IP technologies since 2010, such as for process monitoring, quality assurance and plant protection.

- Tried-and-tested sensors with long-term stability
- Installation could not be easier ("fit and forget")
- Resistant against pipe vibrations and external pipe forces
- Greatest possible measuring accuracy
- Low-maintenance; no moving parts



Promass 83



Promass 100



Promag 53



Promag 400

Coriolis flowmeters:

- Promass 83 (A, E, F, H, I, P, S, O, X)
- Promass 100 (P, S, I, E, F, H, A, O, X, G, Cubemass C)

Electromagnetic flowmeters:

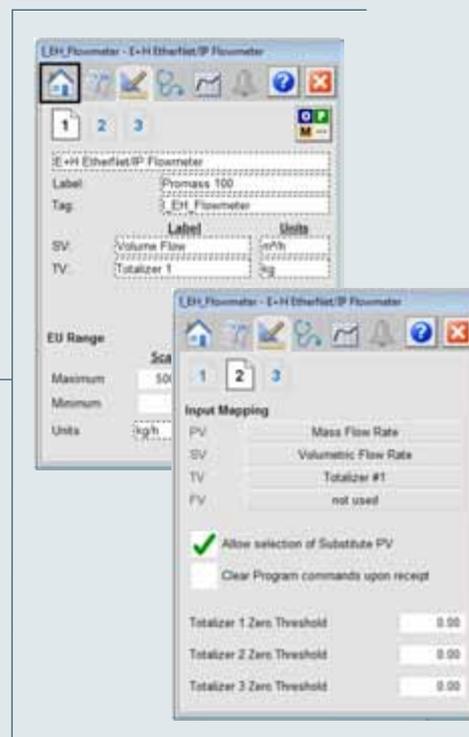
- Promag 53 (H, P, W, E)
- Promag 100 (H, P)
- Promag 400 (W, L, D)

Add-on profiles for seamless integration in Rockwell automation systems

We provide add-on profiles (AOP Level 3) containing the corresponding data structures and device information for all Proline 100 flowmeters with EtherNet/IP. This interface also features a graphical environment (faceplates) and ensures seamless integration of our devices in control systems from Rockwell Automation:

- Efficient planning thanks to a uniform user interface for all measuring devices
- Simplified engineering thanks to a well-structured and clear parameter display
- Error-free configuration thanks to automatic validation of device parameters

Add-on profiles and user interfaces



**Rockwell
Automation**

PROFINET

A true innovation in flow measurement



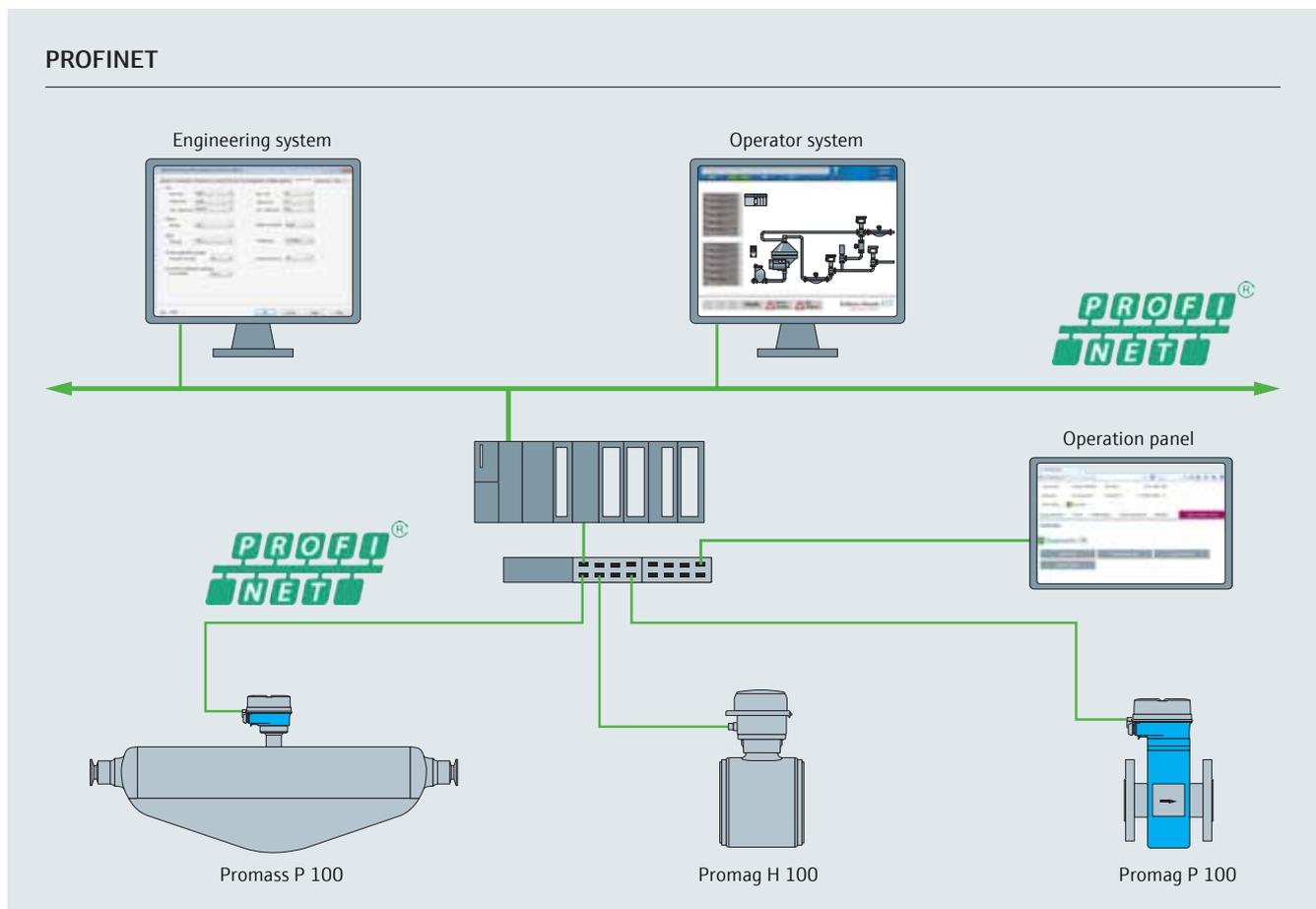
PROFINET represents the technological advancement of the PROFIBUS fieldbus on the basis of industrial Ethernet. This protocol was originally developed by Siemens as well as Profibus & Profinet International (PI). As a successor of PROFIBUS DP, PROFINET has proven its worth for years in manufacturing automation and mechanical engineering. It currently holds a market share of 30%.

PROFINET, similar to EtherNet/IP, ensures complete interoperability, which means a uniform and continuous communication system from control to the field device level. It is also possible to operate multiple protocols simultaneously or to integrate existing fieldbus systems with the help of proxy technology. PROFINET thus has the same advantages of an industrial Ethernet protocol, including real-time transmission of extensive diagnostic and process data volumes from multivariable field devices.

To do justice to the continually growing importance of PROFINET, Endress+Hauser is now offering the groundbreaking industrial Ethernet protocol for its Proline 100 compact flowmeter line and as such, is the first manufacturer worldwide to do so.

Advantages at a glance

- Integrated web server for easy configuration and troubleshooting
- Preventive maintenance thanks to the provision of reliable diagnostic data (e.g. with Heartbeat Technology)
- Quick and reliable device integration directly from the device with the device description file (GSD)
- Increased plant safety and easy maintenance thanks to easy replacement of field devices without the need for tools (automatic parameter configuration)
- Flexible network design (e.g. star typology)
- Simple offline parameter configuration without using additional tools. And the ability to upload files to the field device automatically.
- An Ethernet port for flexible star topology



Proline with PROFINET

Proline 100 is the first flowmeter line worldwide which offers digital communication via PROFINET. With its highly compact design, Proline 100 offers full functionality in a small package. It has been specifically designed for modular process facilities with skids in the life sciences and foodstuff industry:

- Space-saving, multivariable measuring technology in a compact and ultra-compact design
- Highest degree of protection (IP69K) guarantees an absolutely tight seal, even during cleaning processes
- Tried-and-tested sensors with long-term stability

- Resistant against pipe vibrations and external pipe forces
- Greatest measuring accuracy
- Low-maintenance, no moving parts

Coriolis flowmeters:

- Promass 100 (P, S, I, E, F, H, A, O, X, G, Cubemass C)

Electromagnetic flowmeters:

- Promag 100 (H, P)



Promass 100



Promag 100

Maximum transparency in the process

Proline flowmeters can be integrated seamlessly into the PROFINET engineering environment. Therefore, it is possible to retrieve all diagnostic and process data at any time during operation, allowing for optimum monitoring

and evaluation of data. Malfunctions or disturbances can be easily recognized and taken care of immediately, leading to long-term increase in plant availability.

Network typology and process data

The screenshot displays a software interface for PROFINET engineering. On the left, a 'Topology view' shows a network diagram with a central controller and several slave devices. The middle section, 'Device overview', contains a table with the following data:

| Module | Rank | Slot | Address | ID addr. | Type |
|------------------------------|------|------|---------|----------|-------|
| ehpromag100 | 0 | 0 | | | Slave |
| x_H100 | 0 | 0 | | | Slave |
| Mass flow_1 | 0 | 1 | 256.260 | | Meas |
| Volume flow_1 | 0 | 2 | 261.260 | | Value |
| Corrected volume flow_1 | 0 | 3 | 266.270 | | Comp |
| Density_1 | 0 | 4 | 271.270 | | Scale |
| Reference density_1 | 0 | 5 | 276.280 | | Scale |
| Temperature_1 | 0 | 6 | 281.285 | | Temp |
| Oscillation damping 1_1 | 0 | 7 | 68.72 | | Oscil |
| Oscillation frequency 1_1 | 0 | 8 | 73.77 | | Oscil |
| Oscillation amplitude 1_1 | 0 | 9 | 78.82 | | Oscil |
| Oscillation amplitude 1_2 | 0 | 10 | 83.87 | | Oscil |
| Frequency fluctuation 1_1 | 0 | 11 | 88.92 | | Freq |
| Encoder current 1_1 | 0 | 12 | 93.97 | | Scal |
| Tube damping fluctuation 1_1 | 0 | 13 | 102.130 | | Tube |
| Actual diagnostic_1 | 0 | 14 | 98.101 | | Actu |
| Totaller_1 | 0 | 15 | | | Total |
| TotallerValue | 0 | 15.1 | 286.290 | | Total |
| TotallerControl | 0 | 15.2 | | 64.85 | Total |

On the right, a 'Catalog' window lists various process data points such as 'External temperature', 'Density', 'Concentration', 'Velocity', and 'Headbeat'. The bottom of the interface shows tabs for 'General', 'Properties', 'Info', and 'Diagnostics'.

Endress+Hauser

Your Partner

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 you with automation engineering, logistics and IT services and solutions. With dedicated sales centers and

a strong network of partners, Endress+Hauser guarantees competent support worldwide. Our production centers in twelve countries are able to meet your needs and requirements quickly and effectively. The Group is managed and coordinated by a holding company in Reinach, Switzerland.



Market leader in fieldbus technology

Endress+Hauser is one of the pioneers of fieldbus technology and plays a leading role in the implementation of HART, PROFIBUS DP/PA and FOUNDATION fieldbus technology.

As a market leader, Endress+Hauser continues to implement the groundbreaking industrial Ethernet trend and is the first manufacturer worldwide to offer flowmeters with PROFINET in addition to EtherNet/IP.

Endress+Hauser operates its own fieldbus laboratory in Reinach (Switzerland):

- Accredited PROFIBUS and PROFINET Competence Center
- Engineering of fieldbus networks
- System integration testing
- Training courses, seminars
- Customer service

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Endress+Hauser 

People for Process Automation