

Next Level Instrumentation

The new standard in radar
instrumentation –
the Micropilot family

NEXT LEVEL



Safe ■ Precise ■ Efficient

Time-of-Flight – the new standard

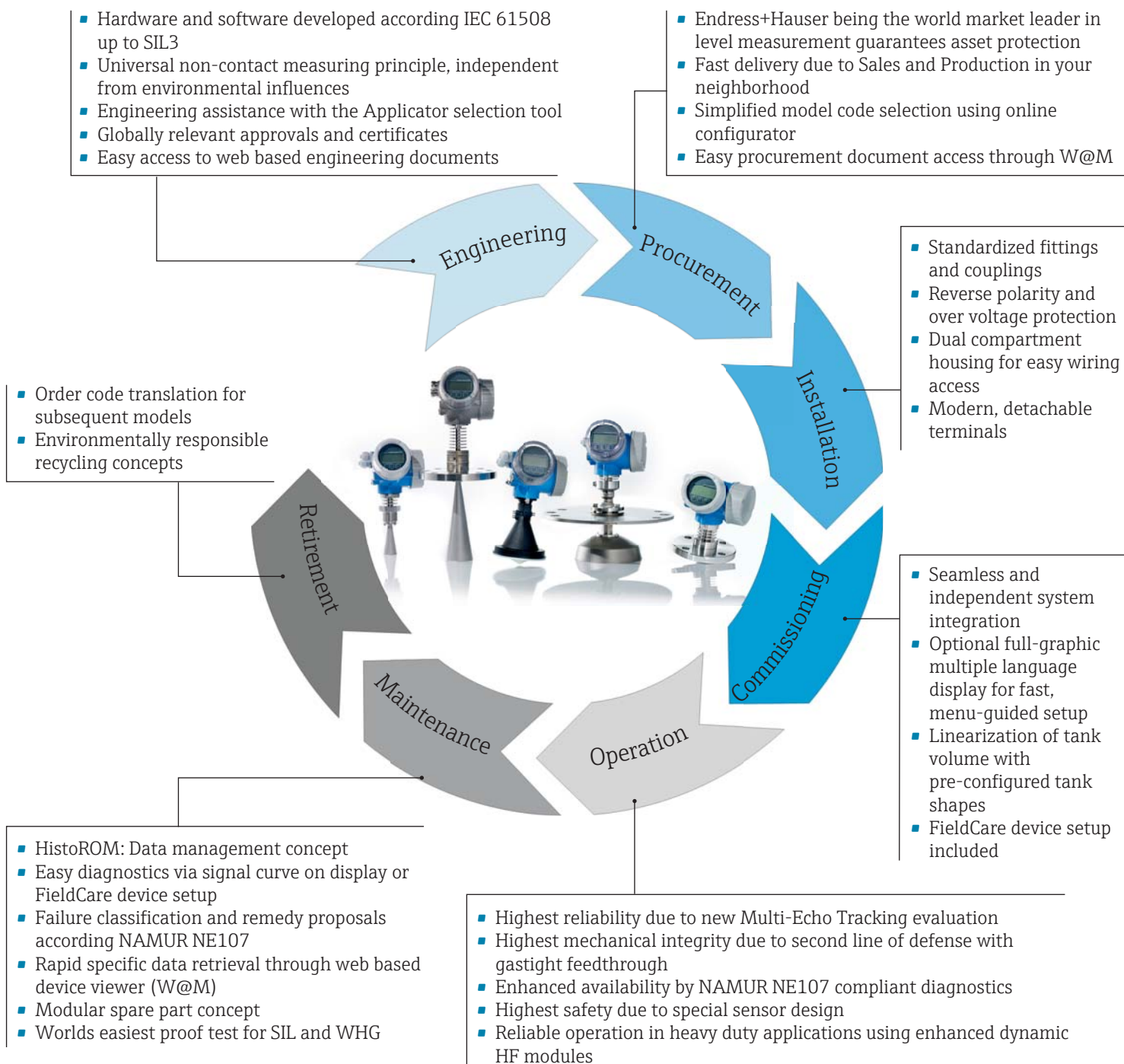
The world of instrumentation is constantly evolving as process needs change and new tasks develop. Endress+Hauser as full-range supplier is meeting this challenge and can support you with innovative field instrument solutions. This will seamlessly optimize your production and safety processes during the full life cycle of your plant. With more than one million installed instruments of the Time-of-Flight method, we offer you the know-how as world market leader.

Our instruments create new standards so that you can concentrate completely on your processes and requirements. Developed on basis of a common technology concept – processes were harmonized and simplified, from selection and commissioning through to operation and maintenance. The new instrument generation of Endress+Hauser provides safety, precision and efficiency across the entire life cycle for you.





Supporting you over the whole life cycle



The experts for the process industry in liquid level measurement

For aggressive or hygiene requirements – Micropilot FMR52

For applications in aggressive liquids, Micropilot FMR52 offers extraordinary advantages.

FMR52 is a specialist for applications involving aggressive media. The flange-flush antenna is completely filled with chemically resistant PTFE plastics and enables the use of the sensors also in highly aggressive liquids. The material resistance increases the availability of the instrument in the process and thus saves money.



- SIL2 according to IEC 61508, SIL3 in homogeneous redundancy
- Worlds easiest proof test for SIL and WHG
- Completely PTFE filled and flush-mounted horn antenna
- PTFE-insulation including flange plating

Optionally: Gastight feedthrough, overvoltage protection
Tests and certificates: International explosion protection certificates, 5-point linearity protocol, WHG, ship building approval

Micropilot FMR52 is also the sensor for hygiene-sensitive applications in the food and life sciences industry.

Particularly in the life sciences industry, an instrument must fulfill to the highest hygiene requirements and these are exactly met by Micropilot FMR52 – ASME BPE and USP Class VI.

FMR52 offers a non-contact measurement independent of the medium properties and this with verifiably no effect on cell and bacteria cultures.



- Confirmed conformity according to ASME BPE
- Approval according to 3-A and EHEDG
- Front-flush design for the highest hygiene requirements
- Parts in contact with the medium (PTFE) are FDA-listed and tested according the USP Class VI
- Process connections for hygiene applications (Triclam, 11851)

Tests and certificates: International explosion protection certificates, 5-point linearity protocol

- Temperature -40...+200°C / -40...+392°F
- Pressure -1...+16bar / -14.5...+232psi
- Maximum measuring range: 40m / 131ft (60m / 197ft for increased dynamic variant)
- Accuracy: ± 2mm / ± 0.08"
- K-band: 26GHz



Note: Survey proves that the microwaves of the Micropilot don't have a verifiable effect on cell and bacteria cultures.



The all-rounder – Micropilot FMR51

Micropilot FMR51 - the standard sensor for the highest demands in liquid level measurement.

FMR51 is predestined for level measurements in liquids, also under extreme conditions, and offers safety as well as reliability under the highest process requirements. The instruments were developed in accordance with IEC 61508 according to SIL specifications and achieve SIL2 safety level, with homogeneous redundancy even SIL3 safety level. Such a high degree of safety is unique in the market!

Micropilot FMR51 solve sophisticated measuring tasks also in the oil & gas and chemical industry. The devices are especially designed for high temperatures and pressures. The new high-temperature version master process temperatures of up to 450°C. The new and innovative sensor design guarantees the highest degree of safety in high-temperature and high-pressure applications. This is achieved by double ceramic coupling and an additional gastight feedthrough as a third safety level.

Even with strong condensate formation, FMR51 offers maximum reliability due to an innovative and patented design of the sensor surface.

- SIL2 according to IEC 61508, SIL3 in homogeneous redundancy
- Highest safety due to double ceramic coupling and gastight feedthrough
- Worlds easiest proof test for SIL and WHG
- Horn antenna
- Process connections 1½" thread, Tri-Clamp or flange
- Temperature -196...+450°C / -321...+842°F
- Pressure -1...+160bar / -14.5...+2,320psi
- Maximum measuring range: 40m / 131ft (70m / 230ft for increased dynamic variant)
- Accuracy: ± 2mm / ± 0.08"
- K-band: 26GHz

Optionally: Gastight feedthrough, horn protection, antenna extension

Tests and certificates: International explosion protection certificates, 5-point linearity protocol, WHG, ship building approval



Up to
150°C / 302°F



Up to
250°C / 482°F



Up to
450°C / 842°F



For all basic level applications

For simple applications in liquids – Micropilot FMR50

Micropilot FMR50 is the economic basic model for liquid applications without high demands on process temperature, pressure or chemical resistance.

Particularly in simple reservoir and storage applications as well as utility processes, Micropilot FMR50 is the best choice.



- Optimum price-performance ratio
- Worlds easiest proof test for SIL and WHG
- Encapsulated PVDF or PP-plated horn antenna
- Process connection 1½" thread, mounting bracket or slip-on flange
- Temperature -40...+130°C / -40...+266°F
- Pressure -1...+3bar / -14.5...+43.5psi
- Maximum measuring range: 30m / 98ft (40m / 131ft for increased dynamic variant)
- Accuracy: ± 2mm / ± 0.08"
- K-band: 26GHz

Tests and certificates: International explosion protection certificates, 5-point linearity protocol, WHG



The pioneers of radar instrumentation

For simple applications in liquids – Micropilot FMR53

With its slim rod antenna, FMR53 is particularly suited for small process connections. The PTFE coating of the rod antenna and flange plating guarantee resistance also in aggressive media.



- SIL2 according to IEC 61508, SIL3 in homogeneous redundancy
- Worlds easiest proof test for SIL and WHG
- Basic variant with two antenna lengths
- Rod antenna
- Process connection 1½" thread or flange
- Temperature -40...+150°C / -40...+302°F
- Pressure -1...+40bar / -14.5...+580psi
- Maximum measuring range: 20m / 66ft
- Accuracy: ± 6mm / ± 0.24"
- C-band: 6GHz

Tests and certificates: International explosion protection certificates, 5-point linearity protocol, WHG

For special applications in liquids – Micropilot FMR54

Traditionally, FMR54 is mainly used for applications where strong steam or ammonia can occur. The specially designed planar antenna is particularly suited for stilling well applications. FMR54 is also prepared for use in high-pressure and high-temperature applications up to 160bar and 400°C thus representing an alternative also in demanding applications.



- SIL2 according to IEC 61508, SIL3 in homogeneous redundancy
- Worlds easiest proof test for SIL and WHG
- Horn antenna or planar antenna
- Process connection flange
- Temperature -60...+400°C / -76...+752°F
- Pressure -1...+160bar / -14.5...+2,320psi
- Maximum measuring range: 20m / 66ft
- Accuracy: ± 6mm / ± 0.24"
- C-band: 6GHz

Tests and certificates: International explosion protection certificates, 5-point linearity protocol, WHG



The experts for the bulk solid industry

For simple applications in bulk solids – Micropilot FMR56

FMR56 is the economically efficient basic model and particularly designed for light-duty process conditions as they occur in silos and storage tanks for solids. The sensor is easily and flexibly aligned to the surface of the solids by the mounting bracket or a turnable seal.



- Optimum price-performance ratio
- World's easiest proof test for SIL and WHG
- PP plated horn antenna
- Process connection mounting bracket or slip-on flange
- Temperature -40...+80°C / -40...+176°F
- Pressure -1...+3bar / -14.5...+43.5psi
- Max. measuring range: 30m / 98ft
- K-band: 26GHz

Tests and certificates: International explosion protection certificates, 5-point linearity protocol

The standard in bulk solids level measurement – Micropilot FMR57

Micropilot FMR57 is the sensor for the highest demands in bulk solids and best suited for measurements in high silos, bunkers or stockpiles. The parabolic antenna, in particular, facilitates very small emitting angles and thus the measurement in slim silos with lateral baffles. FMR57 may be easily used in applications up to 400°C thus also solving demanding measuring tasks.

The innovative Polyimide sensor material leads to the highest degree of measured value reliability in the near distance of the sensor, also under extreme conditions. Thanks to the additional air purge connection, even strongly dusting and buildup-forming media do not present any problem to FMR57.



- Optimum adaptation to the surface of bulk solids using an alignment device
- Horn antenna or parabolic antenna
- Process connection 1½" thread or flange
- Temperature -40...+400°C / -40...+752°F
- Pressure -1...+16bar / -14.5...+232psi
- Max. measuring range: 70m / 230ft
- K-band: 26GHz

Optionally: Horn protection

Tests and certificates: International explosion protection certificates, 5-point linearity protocol



HistoROM data management concept

The innovative and intelligent HistoROM data management concept generates significant benefits in different areas of the life cycle.

Duplication



HistoROM stores the parameters of an instrument during commissioning. If similar measuring points are commissioned, the display serves as a data carrier like a USB stick.

Backup/restore



After commissioning of the instrument, the final parameter settings can be transferred from HistoROM to the display memory. In this way, the display serves as a HistoROM backup.

If parameters are accidentally or intentionally set at the display during operation, this data is automatically changed in HistoROM. If, subsequently, the original status is to be recovered, the settings stored in the display may be transferred to HistoROM via the "Restore" function.

Exchange of electronics



If electronics are defective, they are replaced by new electronics. HistoROM has stored all parameter settings and transfers the data automatically to the electronics and the instrument restarts operation.



Your benefit:

- Increased data safety
- High plant availability
- Easy measuring point multiplication
- Safe and easy exchange of electronics
- Data storage of up to 20 diagnostic events



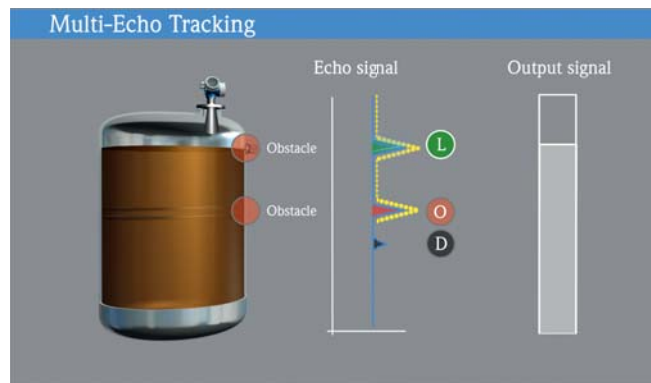
Multi-Echo Tracking

Apart from instrument properties, the analysis of echo signals provides safety and reliability in Time-of-Flight level measurement.

In its new instrument generation, Endress+Hauser has developed an even more intelligent and reliable echo signal evaluation by the echo signal curve – Multi-Echo Tracking. If obstacles, e.g. heating coils, protrude into the signal path in a measurement, they generate a corresponding signal. These interfering signals are suppressed, so that they are not analyzed. The problem of the traditional evaluation is that level signals below the suppression cannot be analyzed thus causing signal losses.

Innovative Multi-Echo Tracking offers the solution. All of the echo signals are marked and traced, not only the level signal. Thanks to the new evaluation, the level signal is also

acquired if it is below the suppression – this guarantees safe and precise measurement at any time, e.g. also if the tank contains sources of interference.



Functional safety

To obtain the highest degree of safety in the process industry Endress+Hauser offers the most extensive portfolio. The hardware and software of the new generation of Time-of-Flight instrumentation is developed according to IEC61508 and can be used up to SIL3 in homogeneous redundancy. In addition to the products the processes and associates of the Endress+Hauser's marketing, research & development as well as production departments are certified in Functional Safety Management by TÜV Rheinland.

Using continuous self-monitoring, Micropilot always checks its correct functionality within the measuring instrument. If a failure occurs, the instrument changes to its safety status. The proof test can easily be started by an optional operating tool or directly from the control room. Communication is

permanently monitored. This saves time and increases the safety of the operating staff.





Safe ■ Precise ■ Efficient



Safe

- Hardware and software developed according to IEC 61508 up to SIL3
- Consistent implementation of industrial standards
- Big variety of Ex approvals
- Variants for high temperatures and pressures
- Gastight feedthrough

Precise

- Highest reliability due to new Multi-Echo Tracking evaluation
- Dynamic algorithms for highest measuring safety and precise measurements
- Accuracy $\pm 2\text{mm}$ / $\pm 0.08''$
- FieldCare software for easy and comfortable operation

Efficient

- HistoROM: Data management concept for fast and easy commissioning, maintenance and diagnostics
- Intuitive, menu-guided operating concept (on-site or via the control system) in national languages reduces costs for training, maintenance and operation
- Seamless integration into control or asset management systems
- Exact instrument and process diagnosis for fast decisions with clear details suggesting remedies
- Worlds easiest proof test for SIL and WHG saves time and costs

Endress+Hauser, being the world market leader in level instrumentation, has long-standing experience at its disposal – from planning and commissioning through to maintenance and plant management, we are the right partner for you.

After the successful launch more than 20 years ago, we continued developing Micropilot together with our customers and users. More than 300,000 installed radar measuring points underline our competence.

The new Micropilot family comprises a total of seven products – from the standard product for basic applications through to high-performance versions for sophisticated high-pressure or high-temperature applications.

Dynamic, continually self-learning evaluation algorithms safeguard precise measuring results. An intuitive and user-friendly designed menu guidance, a unique integrated HistoROM data management concept and a comprehensive concept for instrument and process diagnosis complete the profile.

This increases safety and reduces costs across the entire life cycle of the instruments.

Level measurement of Endress+Hauser – more than a mere measured value.

Next Level Instrumentation – Micropilot family



www.addresses.endress.com

CP 00067F/00/EN/01.12