

Fit for extreme applications

The first 2-wire loop-powered compact transmitter enters the market

With 70,000 solved applications and almost 60 years of experience, radiometry is an important pillar in Endress+Hauser's portfolio. Gamma detectors are mainly used in applications where other measurement principles reach their limits. The new generation surpasses previous radiometric instruments in terms of safety, compactness and user-friendliness and offers outstanding customer benefits.

In the 60s, Georg H. Endress asked his developers to create an all-metal sensor that reliably measures everywhere. Increased customer enquiries for high-temperature and high-pressure applications made clear that capacitive probes could not cover all tasks in the field of level measurement. This was the birth of radiometry. Within a very short time, this alternative measuring principle developed into a perfect addition to the existing product range. A lot has happened in the meantime: since the launch of the Geiger-Müller counter and the first rod scintillator more than 50 years have passed. An important milestone in the field of radiometry was without doubt the development of the Gammapilot FMG60. With this device, Endress+Hauser introduced the first multifunctional compact transmitter onto the market. Together with the requirements in the field, our products are constantly evolving. So it was time to prepare the proven detector for tomorrow's tasks.

Fields of application

The Gammapilot is used in process vessels such as reactors, autoclaves, separators and cyclones and measures in both liquids and solids. In addition to the detection of the level and point level, it is also suitable for density and interface measurements. It works where other measuring principles cannot be applied due to corrosion, abrasion, viscosity or toxicity. The new Gammapilot FMG50 is particularly suitable for primaries and metal applications as well as in the oil and gas industry but can also be found in the field of chemicals. Due to its installation from the outside, there are no restrictions even when high temperature and high pressure occur.

Innovative 2-wire technology

In many industries, 2-wire technology has been the preferred type of instrumentation for quite a few years. In the field of radiometry, technological hurdles in high-voltage generation prevented the development of a 2-wire compact transmitter so far. Until now, the components of the detectors required more energy so that the direct connection to a control system (PLC) was not possible. Even conventional 2-wire devices could only be used with an external power supply due to the separate transmitter system. The Gammapilot FMG50 uses a unique, patented high-voltage generation and requires only a fraction of the energy of its predecessor to reach the same measurement performance. This revolutionizes radiometric measurement and offers valuable advantages over conventional 4-wire and 2-wire devices. As additional installations and wiring for a supply voltage are no longer needed, considerable cost savings are achieved over the entire life cycle of the measuring point.

This eliminates purchase and installation costs for additional cables and reduces the planning effort to design the power supply. In addition to monetary advantages, the 2-wire concept offers benefits for safe and simple maintenance. Especially in hazardous areas maintenance is now simpler and safer than with conventional devices. Before, the power supply had to be interrupted and secured against being switched on again. Normally, this is done in connection rooms, which are often located at great distance from the measuring point. Only after switching-off the device, the necessary work can be carried out on the detector, which is now currentless and therefore inoperable. In the case of 2-wire compact transmitters, the intrinsically safe ex-concept allows safe maintenance work even during ongoing measuring operation. Replacement is quick and easy and thanks to an exchangeable data module, there is no need for reparameterization or recalibration anymore. In addition, diagnostic functions and direct feedback on the device are available in the field, i.e. the user can see whether the maintenance work was successful even before the power supply is switched on again.

Digital potential

Everyone working to modernize their company for the digital future must continually optimize both their information technology and the field level. This requires sensors that provide relevant data for initiating process optimizations and efficiency boosts. In the technology road map to "Process sensors 4.0", NAMUR requests to open up a second, mobile way for communication with the sensor, which provides information for preventive maintenance and process optimization. The NAMUR also requires that product information such as manuals or certificates are always available on site in a mobile form.

With the latest generation of Gammapiilot, operators communicate with the sensor using Bluetooth Technology[®] and the SmartBlue app from Endress+Hauser. The app makes all product and diagnostic data available that could previously only be determined with greater effort. Another benefit of the Bluetooth functionality is the remote commissioning of the device. This is particularly relevant for measuring points that are difficult to access.

The diagnostic function of Heartbeat Technology indicates the status of the Gammapiilot. The performance of the instrument is determined by more than 50 parameters. The permanent self-diagnostics guarantees safe system operation with extended proof test cycles. In addition to the current device diagnostics, the verification via Heartbeat Technology enables complete documentation without process interruption. The automatically generated test protocol serves as proof of compliance with regulations and laws. The intuitive Heartbeat Verification Wizard guides the operator step-by-step through the test process. The Heartbeat Technology Monitoring function supports predictive maintenance. The user receives valuable information about the operating time of the radiation source for the corresponding application as well as about the lifetime of the sensor. The instrument data enable trend detection. This means that maintenance measures can be planned and implemented in a targeted manner and plant downtimes can be avoided.

Functional device safety

Manufacturers who develop their measuring devices according to the international norm IEC 61508 for functional safety follow the "safety by design" principle. They set up their electronic devices in a way to be used directly in SIL applications. That requires a comprehensive quality management of the manufacturer with a focus on safety aspects, a so-called functional safety management.

Hardware and software are designed in a way to avoid systematic errors. In addition, the hardware needs a control of random errors and a quantitative calculation of failure probabilities. Certainly the devices must fulfill prerequisites for the planned conditions regarding for example temperature and they need a simple and clear user documentation with a product safety handbook. Who buys devices designed according to functional safety saves much time in qualification. The qualification effort is handed over to the manufacturer. The formula is simple: What means more effort for the manufacturer to design a device has the effect of higher savings for the customer in the field.

The Gammapilot FMG50 has also been developed according to IEC 61508 for use in SIL2 and SIL3 applications and is currently the safest radiometric device on the market. It offers the SIL functionality for all measuring tasks (level, point level, density and interface). The newly implemented, user-friendly SIL Wizards reduce systematic and human errors. Safety-relevant parameter settings can already be confirmed during commissioning, and continuous device diagnostics of safety-relevant functions take place during operation. The SIL proof test Wizard guides step-by-step through the test procedure and automatically generates a report. This simplifies the work for the user and creates freedom for the optimization of further processes.

Sensor technology for use without additional water cooling

In applications with high temperatures, conventional instruments require additional water cooling to ensure a trouble-free measurement. The Gammapilot FMG50 solves this challenge with a high-quality sensor material. In addition, the innovative sensor design ensures the minimal self-heating of the device electronics and thereby contributes to the use without cooling. By eliminating the need for water cooling, planning, installation and operation costs can be saved.

The advantages of the new Gammapilot FMG50 at a glance

- Universal measuring principle for use in extreme applications
- Savings in engineering and installation thanks to innovative 2-wire technology
- Safety by Design: developed according to IEC 61508 for use in SIL2 and SIL3 application in homogenous redundancy for all measuring tasks
- Heartbeat Technology reduces verification efforts without interrupting the process and guarantees a safe plant operation
- Innovative sensor technology for usage without additional cooling ensures savings in installation and operation
- Bluetooth® wireless technology for easy operation even at hard-to-reach locations
- Intuitive user interface with guided Wizards