

RADAR IS THE BETTER ULTRASONIC!

VEGA adds to its portfolio of level sensors a new, complete radar instrument series for standard measuring tasks and price-sensitive applications.

Radar sensors with 80-GHz technology have been opening up new applications in level measurement every day for five years already. Now another innovation is headed our way: VEGA has developed a new instrument series based on 80 GHz specifically for simple applications. It represents a real alternative to ultrasonic technology.

Radar technology has undergone tremendous development in recent decades. While radar sensors were used mainly by the military in the past, today they are used in everyday applications, even in homes. Typical examples are motion detectors for door openers and complex distance sensors in vehicles. At the same time, radar technology has taken a giant leap forward in industrial applications, for level measurement in particular – notwithstanding that this requires significantly higher signal sensitivity.

The Schiltach-based company VEGA, that has been developing sensors for radar level measurement for 30 years, has played a key role in this. When, just a few years ago, it introduced VEGAPULS sensors with 80-GHz operating frequency, another new era began. Thanks to the more precise focusing of the transmitted signal, the received measurement and interference signals can be better separated – this makes the measuring process much more reliable and easier. Many measuring tasks that had once been considered impossible became commonplace thanks to this technology. Radar sensors from VEGA are now in use in more than 750,000 applications worldwide.

The series of 80-GHz radar sensors started with VEGAPULS 69. It is designed for continuous measurement of bulk solids under widely different process conditions. And is ideal for level measurement in extremely high silos, large bunkers and segmented vessels. In contrast, VEGAPULS 64, with its dynamic range of 120 dB, measures practically any liquid. Its application spectrum ranges from aqueous media to hydrocarbons and liquid gases – regardless of the dielectric constant. Thanks to precise signal focusing, the level sensor achieves very good results even in complex processing systems with agitators or other internal components. And due to its very small process fittings, it is also suitable for compact containers as well as for retrofitting.

The 80-GHz VEGAPULS 80 series offers a number of additional advantages. One of the most important is undoubtedly its independence from external conditions – the radar sensor is just as unaffected by temperature fluctuations, vacuum or high pressures as it is by dirt and contamination. As a result, the level sensors are virtually wear and maintenance free and remain in service for many, many years.



The new VEGAPULS compact version (left), the standard version (middle) and the VEGAMET controller (right).

The heart of the new instrument series – a new microchip

VEGA is once again breaking new ground by adding a new compact instrument series to its portfolio of radar sensors. It is suitable especially for price-sensitive applications, such as found in the water/wastewater industry or in auxiliary process loops in process automation. VEGA developed a new radar microchip especially for this purpose, one that is characterized by its extremely small size and low energy consumption. This makes it possible for the company to offer a very compact radar sensor. These microchips are also much cheaper, which allows the sensors to keep up with ultrasonic measurement technology in terms of price.

Robust and weatherproof

The new VEGAPULS instruments are ideal for level measurement of liquids and bulk solids. They are available both as compact version with cable connection compartment and as standard version with fixed cable connection (IP68). Like the previous sensors of the

VEGAPULS series, they deliver reliable measured values without effect from external conditions such as temperature fluctuations or soiling. What is more, they output standardized signals directly.

The VEGAPULS instrument series is complemented by the optional VEGAMET controllers. These have a large graphic display that can be used to visualize all measured values. Initially designed to meet the special requirements of the water/wastewater industry, the controller series is ideal for simple implementation of pump controls, flow measurement in open channels or overflow protection according to WHG (national water resources legislation). To protect them from the elements, the controllers are equipped with a weather-resistant field housing.

Independent of ambient conditions

The new instruments' non-susceptibility to ambient conditions is a feature that pays off especially in the water/wastewater sector. In this particular area there are still many ultrasonic sensors in use. Due to their physical measuring principle, however, these sensors have to contend with the adversities of nature from time to time. The reason is that the transit time of sound changes when the

temperature changes, e.g. due to solar radiation. Strong wind or rain, or even fog, can also damp the emitted sound waves and further restrict the measuring range. In contrast to this, the new VEGAPULS instrument series is completely immune to such external influences.

A typical application for the radar sensors can be found in the channels that transport wastewater to the sewage treatment plant. Whether it rains or shines, the flow is continuously measured at different points along the channel network. Reliable data are important, because measurement of the water quantity at the inlet of the sewage treatment plant is the basis for calculating wastewater levies. The high accuracy of the radar sensors, completely unaffected by solar radiation and temperature fluctuations, enables exact measurement here.



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Stable readings despite dirt and contamination

In other applications, level sensors often struggle with buildup and soiling. This applies especially to ultrasonic sensors: buildup affects the reliability of the measurement signal and enlarges the dead zone. Radar sensors, however, can simply suppress any interference caused by buildup on the antenna system. Their optimized signal processing allows them to do this. What is more, radar sensors are not affected by soiling and therefore do not need to be cleaned.

This advantage manifests itself especially in the wastewater industry, for example in silos holding lime, which is used to stabilize the pH value. Radar sensors deliver reliable readings without effect from ambient conditions such as dust generation. At the same time, their strong signal focusing allows them to measure reliably when buildup collects on the vessel walls or even on the sensor itself.

Submerged? No problem for radar sensors

Due to process conditions, sensors are regularly flooded in some applications. For that reason ultrasonic sensors often equipped with mechanical flood protection sleeves. However, such components can easily become soiled or damaged. Radar sensors do not need such protective equipment that often has to be cleaned or repaired.

Secure supply

Another big advantage is that radar sensors allow reliable measurement right up to the sensor antenna. This is particularly important for storage and buffer tanks that ensure the supply of raw materials for ongoing processes. Compact radar sensors can exploit their strengths here, as they can be installed even in very confined spaces and small process fittings. Since they have no dead zone, the sensors can measure dependably right up to the top of the container. Even when there is strong outgassing from the medium, the sensors deliver reliable measuring results – regardless of the type of medium and process conditions. Since most of the new sensors have Ex approval, they can also be used for flammable media.

Precision measurement

Thanks to the strong focusing of 80-GHz technology, the radar beam can be aimed at the measured medium with pinpoint accuracy. As a result, narrow shafts or deposits on vessel walls or internals such as pipes or pumps cannot generate interfering signals. A typical application can be found in water pumping stations, where height differences in the terrain are effectively evened out. Level measurement in the pump shaft allows cost-effective control of the pumps. The measured values from the radar sensors provide the basis



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for this, regardless of dirt, foam or condensate. Even spider webs do not impair the function of the radar sensor, which always delivers reliable readings.

On top of all that, there are also very practical reasons why radar measurement technology is

increasingly replacing ultrasonic. Radar technology from VEGA is really simple to install and commission, and easy to handle in day-to-day work processes.

One thing that contributed to this is the broad experience gained with the 80-GHz VEGAPULS standard instrument series in many different industries and applications. VEGA engineers were able to incorporate this know-how in the development of the new compact series. So there is now an extremely large treasure trove of experience available, and that will certainly pay off in future applications. Another thing is that the instruments can be used universally, which allows a reduced inventory, with far fewer instruments and spare parts kept in stock. That's good for the user, who can rest assured that any components needed will be delivered quickly!

Simple setup and commissioning thanks to wireless operation

The instruments of the new series can be installed quickly and easily. Setting their internal parameters and putting them into operation is also a breeze. And thanks to the proven VEGA Tools app, any user can set up and adjust the instruments quickly and wirelessly via Bluetooth – from a safe distance, if necessary. It only takes a few steps for the user to get his first reliable and accurate level values. Bluetooth makes everything much easier – parameterization, display and diagnostics – especially when working in harsh environments or Ex hazardous areas. Besides higher accuracy and dependability, these are important arguments for choosing radar measurement technology for standard measuring tasks.



VEGAMET controller

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