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Wireless also possible in Ex zones

Wireless switches simplify the installation and operation of machines and plant

When switching devices no longer require power cables and can radio their signals out of their environment, the advantages can be considerable depending on the application in question. Wireless switches are beneficial wherever access in the plant following installation is restricted. The benefits of wireless switchgear technology are now increasingly appreciated in Ex zones as well. steute has a wide range of certified Wireless Ex switches for such applications.

The new generation of Wireless Ex switchgear communicates bidirectionally and is battery-powered. Photo: The new Ex RF 96 position switches.

Wireless communication opens up many new possibilities, for example when designing man-machine interfaces. steute recognised the benefits very early on, meaning that the company can already look back on nearly ten years of experience in the development of wireless switchgear. Technology platforms and wireless standards adapted to suit specific application fields have emerged. They can be used for both process technology and mechanical and plant engineering.

Explosion protection and radiowaves – compatible?

Wireless networks in explosive zones are generally viewed critically because they introduce energy to the environment. But signal transmission from switch or sensor to evaluation device involves radio signals

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with extremely low energy levels, excluding any risks. At the same time, use of wireless switchgear addresses the wish of machine builders and users for solutions which are as simple as possible, whereby "simple" refers both to installation and to maintenance. In explosive zones the demands made on device interfaces and cables are high: cable ducts and connectors must be Ex-compatible. For movable machine elements, special safety precautions have to be taken in addition, for example to prevent components from becoming electrostatically charged.
The established solutions – Ex-compatible connectors, switchgear with terminal compartments, Ex-compatible conductor lines and rotary feedthroughs – mean considerable effort in construction and usually also higher costs. This is why wireless technology is increasingly arousing interest, especially as it has long since become established in other areas of industry.

New development on a tried-and-tested technological platform

As a manufacturer of high-quality switchgear, steute has taken an intensive look at this topic and developed a Wireless Ex technology which is now already available in the second generation. The first generation used the EnOcean wireless standard, the basic version of which is to be found throughout building and industrial automation. One of its characteristics is high transmission reliability with low energy levels (around 10 mW) and unidirectional communication. An individual 32-Bit identification number creates the prerequisite for several switching devices being able to work within one transmission field. Robustness of the signal transmission regarding signals from other wireless networks such as DECT, Wi-Fi, etc. is also guaranteed. The maximum ranges are 30 m indoors and 300 m outdoors. Power supply is self-sufficient via an electrodynamic energy generator. This wireless technology was certified according to ATEX requirements and launched in the market. Application fields include process technology, as well as the production and processing of all materials which lead to dust-filled environments, for example the timber industry.

Wireless Ex switching devices radio out of their Ex zone and transmit their signals to repeaters or receiver units which can be installed inside a control cabinet; new to the Wireless Ex range are inductive sensors with a universal transmitter which also guarantees voltage supply.

Further development as requirements grow

Further development was then based on the steute sWave wireless technology using the 868-MHz and 915-MHz wavebands. This industry-compatible wireless protocol permits bidirectional communication, meaning that it can transmit presence signals, for example. That makes particular sense for applications in which switches

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are used to monitor plant components and actuate infrequently. In addition, the bidirectional protocol permits battery voltage to be monitored. Overall, even higher availability is attained without any great increase in cost. The switching devices work on batteries and the batteries can be changed within an Ex zone without any problems. Since the wireless receivers are usually mounted inside a control cabinet, signals are sent to outside the Ex zone, meaning that receiver units do not have to comply with explosion protection standards.

Wireless switchgear for gas and dust Ex zones

All steute switching devices using the Wireless Ex technology are categorised in the ignition protection class "intrinsically safe" and designed according to EN 60097-11 for protection level "i". This means that they can be used in gas Ex zones 1 and 2, as well as dust Ex zones 21 and 22, while conforming to standards. The EC-type examination certificate was issued by a nominated body. Switches incorporating the sWave technology include the Ex RF 96 series of position switches, as well as the Ex RF IS series of inductive sensors with a cylindrical design and available in different diameters. They are operated in combination with a universal radio transmitter which also guarantees intrinisically safe voltage supply.
In this way, machine builders and users can not only profit from the benefits of Wireless Ex technology in general automation and process technology, but also in explosive environments. The manufacturer is continually expanding its switchgear range in order to provide suitable solutions for the growing number of potential applications.

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