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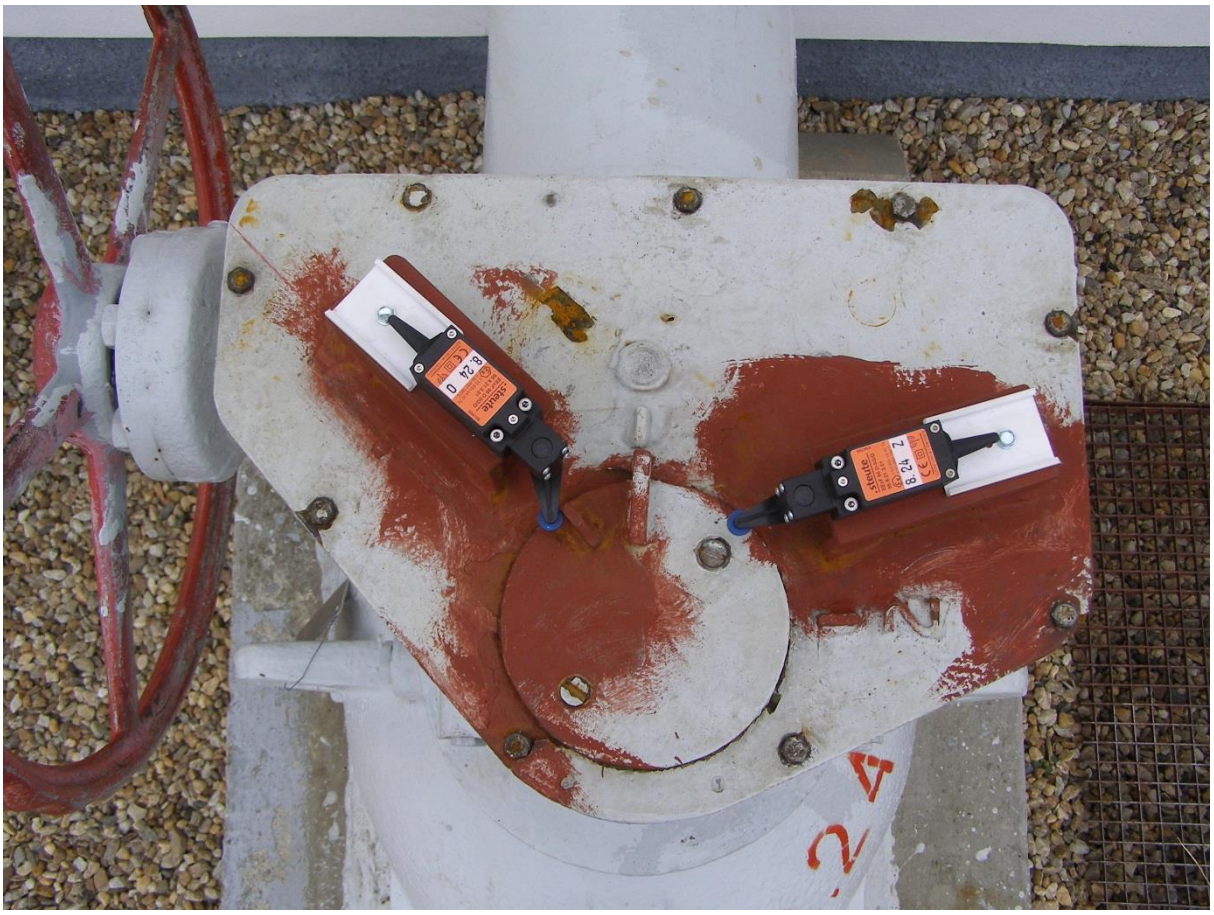
New freedoms

Wireless solutions are replacing cables in process plants



A short overview of wireless switchgear applications in the process industry shows: the reasons for using wireless switchgear vary tremendously. Users can choose between different wireless switch types and different wireless technologies.

Adverse environments, large plants, rotating machine components: in the construction of process plants there are many different arguments for choosing wireless solutions over cables. The application options in process engineering using steute wireless switchgear are correspondingly diverse, some of which will be presented here. But first a brief history and description of the sWave technology developed by steute. At the beginning, self-sufficient switching devices

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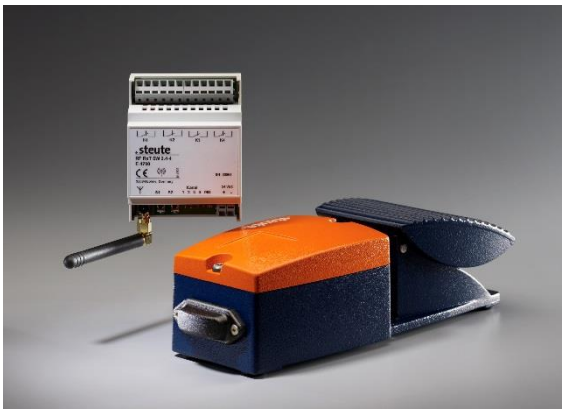
developed on the basis of EnOcean technology were used in industry and then later adapted to the harsh requirements of rougher industrial applications. This further steute development for the 868/915 MHz waveband is available in a self-sufficient version (with an electrodynamic energy generator), as well as battery-powered. The range is considerable, the power consumption low and the susceptibility to interference low. Redundancy is limited, however, due to its use of a single channel, as is availability of the transmission path. An alternative is the sWave 2.4 GHz wireless technology. It uses 32 transmission channels and a higher data rate, meaning that it can be used for more complex applications – albeit with shorter ranges since this technology is based on the Bluetooth platform.

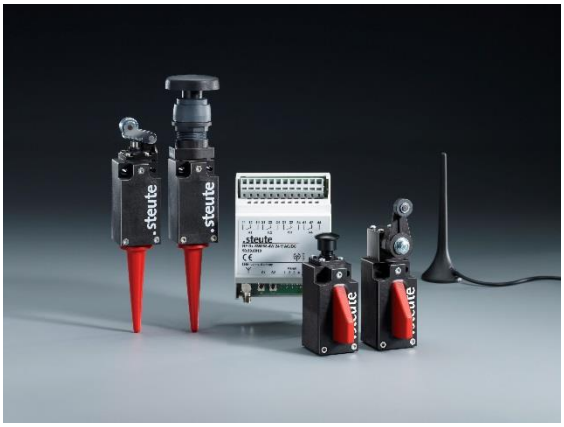


Wireless foot switches mean that cables can be eliminated from the floor, improving ergonomic comfort and increasing occupational safety

Also in Ex zones

There are thus several basic technologies available for the communication between wireless switching devices and their corresponding evaluation units, all of which have differing features (frequency, range, uni-/bidirectional, with/without confirmation, self-sufficient or battery-powered).

The choice for users or process plant engineers is even wider due to the fact that steute has also developed its own wireless technology for explosive zones (Wireless Ex). One of its advantages is that the switching devices "radio out" of the Ex zone and the evaluation unit can therefore be installed outside of this area. For safety-related applications, sWave 2,4 GHz safe also provides a dedicated safe wireless technology. In addition – and in particular for intralogistics applications – there is the sWave.net wireless network, enabling several hundred wireless switching devices to communicate and be integrated in company-wide IT infrastructures. These wireless technologies can be integrated – following the principles of a modular system – in various switchgear designs. The steute product range includes electromechanical wireless switching devices (position, pull wire and foot switches), as well as non-contact switchgear (inductive and magnetic sensors, optical sensors) and remote control command devices and interfaces.



Position switches are among the most frequently used switches using wireless technology

Valve monitoring

In the field of process engineering, wireless

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switching devices are used in all manner of applications – e.g. the position monitoring of valves. One of the very first applications was for manually adjustable valves in pumping stations without a power supply. The obvious solution was to use self-sufficient position switches. When explosive gases need to be transported through pipework systems, it makes sense to use switches from the Wireless Ex range – e.g. Ex RF 96 wireless position switches in a slim rectangular design, as well as Ex RF IS wireless inductive sensors in a cylindrical design. They are suitable for radio transmission in combination with the Ex RF ST universal transmitter and are also powered via the transmitter unit. Both series are certified for use in gas Ex zones 1/2 and dust Ex zones 21/22. In central suction units, the individual "sockets" for the suction tube can be monitored by wireless switches. If the operator opens or closes the cover of a socket, the central suction unit is switched on or off correspondingly, without every socket requiring a cable. Here an obvious choice might be RF RC wireless sensors in combination with a wireless receiver. In paintshops, wireless switches facilitate the elimination of cabling between the on/off switch on the handle, and the pump or the material loading. This improves ergonomic comfort from the point of view of the operator, and also increases the availability of the plant because frequently moved cables are always subject to a high degree of wear and tear.

Special environments

A Scandinavian manufacturer of ore conveyor plants would like to avoid electrical cables wherever possible due to the adverse ambient conditions present, and therefore uses steute wireless switchgear to monitor the position of plant flaps and doors. An RF antenna with a long range is used. Wireless interfaces are also used in conjunction with medical equipment, but for precisely the reverse reason: here the environment is so clean and hygienic that no cables should lie around on the floor attracting dirt. The cables should also be eliminated for safety reasons, otherwise posing a tripping hazard. Wireless switching devices are also frequently used to monitor rotating machine parts. For example, a manufacturer of brewery plants queries the positions of rotating mechanisms in lauter tuns using steute wireless sensors. Thanks to their stainless steel housings, special sealing material and high protection class, these sensors are well suited to direct contact with foodstuffs. Another example from the foodstuffs industry is a wireless foot switch: it operates machines used to ventilate dairy products. Benefits include improved occupational safety, a more flexible positioning of the foot switch and higher availability.

Remote control

For a manufacturer of conveyor systems for plastic sheeting, wireless switches were the solution for monitoring pressure rollers because the rollers then required no separate power supply. And last, but not least, an example from wind energy/ offshore technology: in a North Sea wind park, maintenance staff can switch on the illumination of landing jetties and vertical ladders on individual wind turbines by remote control. Here a wireless system is used with 10 hand-held transmitters and 50 wireless receivers. All these examples

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show: there are many different applications for wireless switchgear and sensors in process engineering and energy technologies, and the reasons why wireless solutions are replacing conventional cables vary considerably. It is definitely true to say that wireless switches, sensors and command systems have now become established as a practical alternative to cabled switchgear.

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