Everything continues to flow; safely
Interlocks and sensors from Schmersal ensure that Krones systems are safe and productive

Krones AG ensures that the international beverage industry remains keeps flowing: Worldwide, every third bottle opened has been filled, labelled and packaged on a Krones plant. As a world market leader in its sector, the company is known throughout the beverage world for its efficient and safe systems for beverage filling and packaging. Following an extensive market investigation, the company now equips the machines that it manufactures for the global market with the safety sensors RSS36 and the safety interlock AZM300 from Schmersal. Protection against tampering, very good diagnostics possibilities and AS-i-Safety at Work connectivity were decisive factors for the choice of these components.

Every day millions of bottles, cans and shaped containers are "processed" on plants manufactured by Krones, particularly in breweries, the soft drinks industry, wine, sparkling wine and spirits producers, but also in the food and luxury goods industries, as well as the chemical, pharmaceutical and cosmetic sectors. Krones employs over 14,000 people worldwide. The company develops and produces around 3,000 machines and plants for the filling and packaging technology sector every year. And about 90 percent of Krones products are sold abroad.

Krones' customers include well-known brand manufacturers from around the world. This is why high quality standards and production using state-of-the-art technology are an essential part of the company's success strategy.

The ISO standard 14119 requires new safety interlocks

To keep abreast of the state-of-the-art, Krones regularly conducts extensive market surveys. Krones undertook such a thorough market analysis about three years ago as part of a project to introduce a new safety interlock as a standard. One of the reasons for this conversion was the introduction of the EN ISO 14119 standard, which places greater demands on the protection against tampering with the protective equipment used on machinery.

"Our customers, especially the international corporations, place great emphasis on ensuring that their machines work smoothly, but also demand that safety is at the highest level and meets the requirements of the currently applicable legal regulations," says Robert Giehrl, Head of Control Technology, Corporate Research and Development at Krones. As part of the tender for the new safety interlock, Krones' products used by more than 15 suppliers were subjected to a thorough internal assessment and complex tests.

The choice finally came to the safety components manufactured by Schmersal; safety sensor RSS36, which was already in use at Krones, and the AZM300 safety interlock. "The integrated RFID technology enables both components to achieve the coding level "high" according to EN ISO 14119, ensuring a high degree of tamper protection", explains Christian Heller, Head of Product Management at the Schmersal Group.

Comprehensive safety portfolio with AS-i interface

Both the sensor and the interlock are also equipped with an integrated AS-i Safety at Work interface. "We have an exceptionally comprehensive program of safety components with AS-i interface. All of our main series are available with AS-i Safety nodes," emphasises Christian Heller. For Robert Giehrl, this is also an important advantage with regard to tamper protection: "What use is it if the individual sensor has a high tamper protection, but the safety devices can be electronically manipulated? With the AS-i link I have complete protection against tampering, as the safety circuit can only be manipulated as a whole and this requires considerable effort".

Fig. 1: The energy-efficient AZM300: This solenoid interlock is versatile in use thanks to a new type of interlock system that takes the shape of a rotating Maltese cross.

The extra tamper protection is just another add-on advantage with AS-i. Further AS-i advantages, which are even more important, are savings on wiring, high flexibility and good diagnostics. These prompted Krones to rely on AS-i many years ago. "Since automation technology became part of mechanical engineering the number of sensors and cables increased dramatically. As cables are very difficult to clean, the food industry is pushing for solutions with fewer cables, which can be well achieved with AS-i", says Robert Giehrl.

The wide-ranging diagnostic possibilities extend to the level of the individual safety switch or sensor enabling early fault detection – a key aspect with regard to preventive maintenance and industry 4.0. For example, faults such a protective door that is sagging are detected when the machine is still running and can be repaired immediately. As a result, the availability of machines and systems is increased. "For us the diagnostic possibilities are very important. It is part of the Krones philosophy to pass all information precisely to the machine visualisation to enable rapid fault rectification" explains Robert Giehrl

Fig. 2: Safety sensor RSS 36 also complies to the principles of hygienic design and offers enhanced protection against manipulation with RFID technology.

Flexible solutions – energy-efficient safety interlocking

Once installed, an AS-i based safety solution can be changed or extended at any time. This is an important factor, as Krones' customers are increasingly demanding machines and systems that are extremely flexible and suitable for the rapidly growing variety of bottled products and product packaging – a trend that is particularly promising in the global beverage market and promises healthy growth opportunities.

Up to 15 safety switches are integrated in a Krones machine. The fact that Schmersal succeeded in significantly reducing the power consumption of the AZM300 can be seen as positive in the energy balance. In addition, the RSS36 safety sensor and the AZM300 safety interlock feature a hygienic design - an indispensable prerequisite for the use of these components in machines for the food industry. With the AZM 300, a new type of patented mechanism with a rotary, cross-shaped interlock in combination with protection class IP69K, enables easy cleaning and reduces the deposition or penetration of impurities. The sensor RSS 36 also has an IP69K protection rating and is resistant to a wide range of cleaning fluids.

Worldwide service

"In our opinion, the quality and the price-performance ratio of the two products are well matched", says Robert Giehrl. But it wasn't only the technical characteristics of Schmersal's safety products that prompted Krones to choose these solutions. "Schmersal is a globally recognised supplier and specialist in machine safety. For our globally operating customer it is important that the components are always available worldwide and the manufacturers can also be contacted locally if necessary. Because our machines have a long service life, spare parts must also be available from suppliers over the long term" says Giehrl. Schmersal has also further expanded its customer-oriented services around the world – at the beginning of 2016 the company established its services division international tec. nicum consisting of a worldwide network of qualified Functional Safety Engineers. "Teamwork as a partner is important to us. The devices are becoming more complex, the demands higher – therefore we want to work together in direct contact with our partners at an early stage and, if possible, in advance of new developments" said Robert Giehrl. "We have had good experiences with the Schmersal Group in this regard for many years. We are in regular contact to improve products on both sides. And we appreciate Schmersal reacting to our requirements and responding quickly and reliably to problems".

Fig. 3: In the Krones filling systems, solenoid interlock AZM 300 and safety sensor RSS 36 are now being used: Both components achieve coding level "high" in accordance with EN ISO 14119.