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INTERVIEW: PHILIP SCHMERSAL AND EDGAR STADLER 'DIGITISATION IS ABOUT NETWORK CAPABILITY, CONNECTIVITY AND DATA'

Safety technology is of growing importance in automation. The objective is to achieve reliably operating machines and systems where, alongside productivity, the safety of employees is paramount. Philip Schmersal, Managing Partner, and Edgar Stadler, Head of the Technology Division, at K.A. Schmersal GmbH & Co. KG in Wuppertal, discuss the impact of digitisation and the current situation in materials acquisition on the development of the company.

KEM construction: Mr Schmersal, you are the Managing Director of the eponymous corporate group, can you talk us through some of the key company data?

Philip Schmersal: The Schmersal Group develops and produces around 18,000 different safety switchgear devices and with the range that we have, we are one of the largest suppliers in the world. We have more than 1900 employees across 20 countries who work together with customers to accomplish forward-looking safety solutions. We focus on three areas – lift technology, automation technology and safety technology. New safety concepts require system solutions and there is a need to integrate functional principles and to explore new options for data communication. Finally, the growing collection of standards and guidelines for machine safety presents new challenges for manufacturers and users of machinery.

KEM construction: Digitisation is changing workflows in industry. What specific challenges do these pose to manufacturers of safety technology for mechanical and systems engineering?

Edgar Stadler: Digitisation is chiefly about network capability, connectivity, data generation and data evaluation. These are functionalities that we integrate into our products and are constantly expanding. The digital transformation requires our components to have end-to-end communication capability, even in devices with lesser complexity. Virtually every switchgear device now has a microprocessor, which is usually the basis for its communication capability. A second aspect is the growing proportion of software functionalities in devices. Many functions that used to involve electromechanics or electrical system are now accomplished with software. Additionally, data and document exchange with devices in digital form is becoming

increasingly extensive, and we too must give our customers more and more information. Modern devices supply a vast amount of different data, whose digital communication we need to support with appropriate processes. One of the main areas of focus for customers is predictive maintenance. It is our aim to make the data required for predictive maintenance available to customers in the best form possible. In addition to their actual safety function (safe shutdown), most safety technology devices can also provide extensive additional information. We are already bringing together safety and measurement technology, as safety sensors are measuring devices as well. This is of benefit to customers – we are not just selling a safety device, but a measuring sensor as well.

KEM construction: Safety technology lives through the Machinery Directive. The Machinery Directive is transposed through the Machinery Ordinance. What have the recent changes been, what is likely to change in the coming months as a result? What will the consequences be?

Stadler: The pending Machinery Ordinance will ensure operator safety in the new generation of machinery, and will help to promote innovation. It will also ensure safe integration of an AI (artificial intelligence) system into the overall machine. Additionally, the legal clarity of relevant stipulations will also be enhanced and the administrative burden, and costs, for companies will be reduced thanks to the allowing of digital formats for documentation in the future. At the same time, uniform interaction with other CE regulations will also be ensured. The former Machinery Directive 2006/42/EC will continue to apply until 2025. In terms of machine safety, the most important standards for Schmersal are IEC 61508 as the base standard, and EN 62061, which is derived from that, as well as the harmonised standards in the sense of the Machinery Directive EN

ISO 13849, we which we take into account when we're developing our components. In the future, the standards (e.g. IEC62443) will define security levels (SL) analogously to safety levels (SIL). To this end, manufacturers of communication-capable products must be able to state the SL to which the product is being designed and, most importantly, must implement the correct industrial security capabilities that it requires for the planned usage environment. The topic of security is likely to need constant attention in the future.





KEM construction: Machine safety today goes well beyond the supply of components – what is the scope of the project business and service at Schmersal and what activities are you currently committed to in this area?

Schmersal: The service business is our fastest growing business area, including internationally. We have merged all of these activities under the tec.nicum brand and invested a great deal in competent and skilled employees. This will mean that we have everything we need to serve our customers worldwide to the best of our ability. In addition to the development, production and distribution of safety-related devices and systems, this business area also provides manufacturer-independent consulting. In addition to consulting, tec.nicum also provides engineering, software development and integration, as well as a wide range of services for the training of specialists. Our range of services from A to Z – as an example, we also construct fences and install the safety technology, plus certify and document the projects. Our goal is to use our comprehensive range and our service to become a one-stop shop for machine safety.

KEM construction: What is the state of development of safety technology for human-robot collaboration?

Schmersal: The need for intelligent safety solutions in robotics is growing strongly and the number of robots in use is constantly increasing. Applications in which humans cooperate or work in coexistence with robots are certainly the majority right now. If the speed of work of these solutions can be increased, collaboration will lend itself to an ever increasing number of applications. But there are a number of safety concerns that need to be addressed. The working area containing the dangerous movements of the robot needs to be secured and there is the challenge of monitoring the tool in the tool centre point in order to rule out danger to humans. There are both tactile and non-tactile solutions, which we are looking at as part of the continued development of our safety range. Tactile means that the robot arm is equipped with sensors that slow down or stop its movements if the robot is touched. The non-tactile solution is a much more elegant solution as it monitors the danger area by means of optical sensors, and safely controls the robot's movements without the need for direct contact. We're still in the early stages of development, but working with technology partners, we're in a very interesting area of application that we are keen to be a part of.

KEM construction: There are intensive discussions about machine learning at the moment. How do you rate the importance of this technology for machine safety?

Stadler: It's usually just a matter of time before technologies from non-safe automation technology find their way into safety technology as well. The new Machinery Ordinance will also address the integration of AI systems into machinery. The fact that as manufacturers, we will also integrate AI methods into safe sensors in the future, is already an issue in the development of safety switchgear devices. In the first stage, these will be algorithms in the field of machine learning. A subsequent step would then be to use deep-learning approaches, perhaps with multi-layer neural networks. If the security technology can be mapped in a secure cloud, the prerequisite for comprehensive machine-learning principles will also be there in safety technology. These approaches could therefore be used to create useful functions to increase robustness and enhance safety.



KEM construction: IO-Link Safety, AS-i-Safety at Work, Profisafe as an example of safe Ethernet protocols, OPC UA, how do you rate the development of communication technologies?

Stadler: If you operate internationally, you have to support technologies that are widespread internationally. That's why we're continuously expanding the Safety Fieldbox from our Gateway product range, so that we can support all relevant safety protocols, like Profinet/Profisafe, Ethernet IP with CIP Safety or Ethercat/FSOE. This means that we need to implement scalable and modular architectures. In the future, safety will be increasingly cross-machine in its use. Proof of this is the integration of safety into the Industry 4.0 communication standard OPC UA. The Profibus user organisation, for example, has defined a standard for safety over OPC UA. This standard is currently in the standardisation and definition phase at the PNO. This will help to simplify communication between machines and controllers from different manufacturers, their communication and the programming of the safety application, which were originally designed to be proprietary. The bidirectional interface IO-Link Safety for functional safety will almost certainly gain further in importance. IO-Link with safety enhancement is suitable for components in which the Ethernet interface would mean excessive hardware costs. For us, ASi-Safety is a valuable part of the product range, and wireless solutions are also conceivable in the future. With these, robustness is a key area of focus that must be taken into account alongside the safety function. Safety products are only useful and safe if they can function robustly and with absolute reliability.

KEM construction: Schmersal also offers switchgear devices for explosion protection in accordance with ATEX. Would Ethernet APL from process technology based on SPE also be a conceivable approach for the networking of safety switchgear devices?

Stadler: Ethernet APL is of lesser interest to us because our products are sold primarily in the factory automation industries and sectors. Ethernet APL is a special standard for process technology which is derived from single-pair Ethernet activities. But, we do consider SPE an interesting development. SPE gives us a two-wire line available that could be developed as an alternative to IO-Link or to IO-Link-Safety. At the moment we are concentrating on IO-Link-Safety. IO Link is a solid solution for transferring data from less complex products. A technical drawback, however, is the parallel wiring based on the star-shaped network topology. In the medium term, we can see single-pair Ethernet becoming an alternative to IO-Link.

KEM construction: Alongside digitalisation, sustainability is gaining in importance. Within the EU, the aim is a significant reduction in CO2 emissions over the coming years. How important is sustainability for you? When will Schmersal's production become climate-neutral?

Schmersal: We're not yet able to say when our production will become climate-neutral, but we have implemented a whole host of measures towards that end. We are currently working on a sustainability report according to the standards of the Global Reporting Initiative (GRI). We have established three solar farms that supply our plants with electricity, and we have built a completely climate-neutral administration building. Our vehicle fleet is now largely electric, and we are part of a circular economy project here in Wuppertal, aimed at maximising the reuse of plastics. In a nutshell, we are working on a number of projects that will help us to move forward in this area.

KEM construction: Factors such as the lack of skilled workers and the supply of semi-finished products and raw materials are currently having an impact on economic development. What is the situation at Schmersal?

Schmersal: There is an extreme lack of skilled workers, particularly in software engineering and IT. The supply of electronic components and materials such as plastic granulate or punched parts is a major challenge right now, and is occupying resources, such as those used to qualify alternatives. We've seen major price increases for processors in particular. When you have up to four processors in a single product, it puts major upward pressure on manufacturing costs. This in turn affects the purchasing behaviour of the entire competitive environment, and clouds the earnings situation as well.

Stadler: Volatility in procurement also plays a role here. We're even seeing promised deliveries be postponed at short notice. We then have to respond very quickly in order to prevent critical delivery bottlenecks from occurring. We often have an entire development team looking for alternative components. By the time they've been qualified, they might be out of stock again. This occupies employee capacity and delays important development projects. We expect that this situation to continue throughout 2022.

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