



The KAMtec machine delivers one hundred percent tested and therefore high quality cable lugs. Source: Siemens AG

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Safety Integrated – with integrated safety for the perfect cable lug

Eberhard Renner

For a current customer order, the special machine manufacturer KAMtec not only relies on fail-safe controls with integrated safety functions to implement machine safety, but goes one step further: In a particularly space-saving and efficient solution, there are also compact motor starters with a second, safe switch-off path including electricity – and voltage measurement are used.

When it comes to machine and operating safety, Ingo Malchus, owner and managing director of the special-purpose machine manufacturer KAMtec, accepts no compromises. „If there are different options when selecting certain system components, we always choose the safest solution. Safety first. After all, people, machines, and the environment must not be harmed under any circumstances,“ says the mechanical engineer. At the same time, the safety aspect should not have a negative impact on the cost-effectiveness of the application, which is why Siemens integrates safety almost invisibly and seamlessly into the standard automation system. KAMtec's customer Weitkowitz from Peine/Lower Saxony – a traditional company and quasi inventor of the cable lug – also benefits from this. KAMtec delivered a system for the advanced automation and digitalization of the production process for the meanwhile 100-percent subsidiary of the Intercable Group. As a result, Weitkowitz was able to combine a previously partly automated and partly manual production step so that the employee responsible for this could take on new, demanding tasks in quality assurance.

A high degree of optimization with Safety Integrated components from Siemens

KAMtec has been using fail-safe control systems from Siemens for some time now, thus taking advantage of the benefits of integrated safety and secure transmission via Profinet/Profisafe. For the Weitkowitz job, KAMtec went even one step further in terms of optimization. Since the project required the integration of PC-related functions such as quality control and KPI evaluations, this time a fail-safe software controller was used instead of a hardware controller. The Panel PC, which does not require any space in the control cabinet due to its high degree of protection, contains all essential functions in addition to the control system, safety technology, visualization, and quality control.

The special aspect: If Windows has to be restarted due to security updates, the software controller continues to operate nonetheless. The compact and safe motor starters, consisting of contactor, reversing



Figure 1 The compact, fail-safe ET 200SP motor starters permit more space in the control cabinet due to their small module width of only 30 mm and can be configured quickly and easily in the TIA Portal. Source: Siemens AG



Figure 2 (optional) The non-contacting RFID safety switches with maximum protection against manipulation (3SE63) ensure that the doors of the plant are reliably monitored. Source: Siemens AG

contactor, motor protection, short-circuit protection and a second safe shutdown path including current and voltage measurement, were also used. The solution is particularly space-saving and efficient for KAMtec as a special-purpose machine manufacturer, as the starters of the modular system can be easily plugged together in combination with the standard and fail-safe inputs and outputs on a mounting rail.

Weitekowitz as end user also benefits in many ways, for example from the space gained in the control cabinet, the diagnostic function, and the additional data such as power consumption, volta-

ge and switching cycles, from which predictive maintenance measures can be derived.

Continuing to press ahead with digitalization and automation

„The special feature of the KAMtec machine is its ability to deliver fully tested and therefore qualitatively perfect parts, because the quality inspection function is already integrated in the machine without manual control,“ explains Miguel Mulero, registered manager and managing director of the Weitkowitz company. „This not



Figure 3 The scalable and highly flexible Simatic ET 200AL distributed I/O system is used to connect the process signals to a higher-level control system via a fieldbus.

Source: Siemens AG



Figure 4 Two hand control equipped with pushbuttons and indicator lights Sirius Act guarantees a safe operation of the machine. Source: Siemens AG

only saves us the separate inspection of all parts, but without additional expense this also fulfils the high requirements and standard criteria of the automotive industry, for which Weitkowitz is a direct and indirect supplier.“ Apart from this, the KAMtec machine helps Weitkowitz to achieve an even higher degree of digitalization in the process. The data generated during machine operation is analyzed and thus serves as a basis for continuous process improvement (CIP). The basis of the machine application is an IP67 Panel PC

directly on the machine, on which the fail-safe Simatic S7-1500 software controller is installed together with the 3D camera software. As a result, considerable space could be saved in the machine by integrating the safety technology.“ Safety technology is an integral part of the Siemens solution. Fail-safe signals are read in directly via the integrated Profinet interface of the IPC: Commanding and signaling devices as add-on elements in so-called Extension Units, the integration of fail-safe motor starters in the ET200SP

I/O system without additional wiring, visually appealing pushbuttons and indicator lights from the Sirius Act range, and switches for monitoring doors based on RFID (Radio Frequency Identification). The overall concept is rounded off by the connection of SINAMICS G120 and S210 converters – naturally via Profinet and using Safety Integrated. The ET 200SP motor starters in particular impress with their very compact design. Comprehensive diagnostics is carried out in a user-friendly manner via channel-granular LEDs and web servers; this ensures high plant availability. Via the galvanic isolation, as soon as the starter is pulled out of the parking position, it is possible to work on the motor without danger as required.

Fully integrated, modularly expandable system

Rüdiger Röhrs, Siemens Sales Specialist for Safety Integrated, explains what makes integrated safety technology stand out from other concepts: „Prior to the integrated solution, external safety devices, controllers and various PCs were used, which required additional space. Today, an IP67 Panel PC, which itself does not require space in the control cabinet, replaces the components. With Safety Integrated, Profinet and the PROFIsafe protocol, the overall system is not only more compact, but the wiring and mounting effort is also significantly reduced. The ET 200SP hybrid motor starters for fixed-speed drives, for example, are simply lined up and offer many diagnostic options as well as integrated motor and short-circuit protection. The devices are switched flexibly via Profinet. In addition to the reduction of interfaces, wiring and numerous individual components, the control cabinet space could be reduced by approximately 35% to 40%.“ Configuring takes place in the TIA (Totally Integrated Automation) Portal engineering framework.

For Miguel Mulero, the Siemens safety solution has another, very pragmatic advantage. „I have to make sure the employees don't get hurt. The Siemens systems cover everything that needs to be covered in this respect, making my work easier. I also believe that an integrated system that monitors everything is better and more reliable than many different systems that have to work together. In addition, troubleshooting and fault correction become much easier, which benefits plant availability.“

INFOBOX FOR KAMTEC

The company KAMtec was founded in 2002 and has been working closely with Siemens ever since. The special-purpose machine manufacturer supplies fully automatic production plants all over the world, with its core business being in Germany and Europe. In addition to the reliability of the Siemens components, KAMtec benefits from another important factor of Siemens technology: All components are certified and meet the strict EU standards. Since these standards are considered to be particularly high worldwide, KAMtec does not need any additional, new and expensive certifications for its solutions in China or the USA.

INFOBOX FOR WEITKOWITZ

Founded in 1918, the company with a long-standing tradition produces cable lugs for conductor cross-sections from 0.5 to 1,000 square millimeters for solderless connection at its production site in Peine. The cables are crimped with crimping tools that are also manufactured by Weitkowitz so that the customer benefits from an absolutely reliable and functionally safe system. In addition to around 7,000 standard articles, Weitkowitz also produces about the same number of special articles, which are made according to customer specifications – if necessary in batch size 1 and overnight. For this purpose, the Intercable subsidiary in Peine employs 200 people in three shifts. Production is largely automated, although manual work is still indispensable, especially for custom-made products.

Highly future-proof and simple ordering process

The decision at KAMtec to rely on Siemens products since the company was founded in 2002 has many reasons. In addition to the high availability and reliability of the components, the good personal contact and the simple ordering process are decisive factors for Ingo



Figure 5 The KAMtec machine produces 100% tested and therefore qualitatively perfect cable lugs.
Source: Siemens AG



Figure 6 Ingo Malchus, owner and managing director of KAMtec GmbH, Miguel Mulero, managing director of Weitkowitz GmbH, and Rüdiger Röhrs, Sales Specialist of Siemens AG in the Northern Germany region (from left to right).
Source: Siemens AG

Malchus. „The order is placed via the e-commerce platform in the Siemens Industry Mall. With the configuration tool (TIA Selection Tool), all automation components including Safety can be configured and checked. Then the configuration is imported into E-CAD, the Siemens Industry Mall, and TIA Portal. Multiple configurations are thus avoided. A very customer-friendly and smart solution, I think.“ But Weitkowitz as an end user also benefits from using Siemens technology – for several reasons, as Miguel Mulero explains: „On the one hand, Siemens products are very good and reliable. On the other hand, with Siemens as a component supplier, we also have the guarantee that spare parts will be available quickly and for a long time, which is very important for reliable plant operation. We don't have to stock large quantities of spare parts in our warehouse, which significantly reduces inventory and costs. In addition, using one system from one supplier also makes it much easier for us to conduct training. I don't need umpteen specialists for diffe-

rent systems, but basically there is one for everything. We can also rely on Siemens with regard to future orientation and parts certification.“

There is more – the next steps

Speaking of the future. Both KAMtec and Weitkowitz have clear ideas for further cooperation in this regard. „We attach great importance to long-term partnerships,“ says Miguel Mulero. „A solid basis of trust is essential, and with KAMtec this is definitely a given. Therefore, we are currently already planning the second plant. By the way, this basis of trust also exists directly between Siemens and Weitkowitz. After all, Siemens is also one of our customers. So we have come full circle.“ Ingo Malchus would like to be able to work even more with simulations for the development of future tailor-made machines. „This applies above all to the simulation of PLC programs (programmable logic controllers, editor's note). But our goal is not only to simulate the software, we want a real digital twin of our machine.“ With the Mechatronics Concept Designer, Siemens offers the ideal tool for this and once again proves to be a powerful partner. ■ TS835



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