

Cost-effective automation of soldering systems with multifunctional safety relays



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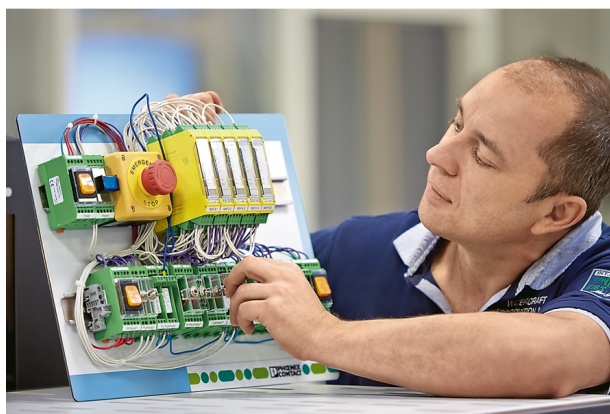
Overview

- Since safety technology is so important at Ersa GmbH, the company has modularized the safety concepts of its selective soldering systems.
- In order to improve its customers' manufacturing processes, the soldering specialist must be able to respond flexibly to their requirements.
- The PSR-MXF multifunctional safety relays can be used in simple machines as well as in modular safety concepts.

Customer profile

Ersa GmbH, based in Wertheim, Germany, is Europe's largest manufacturer in the field of soldering technology.

The international supplier of selective and wave soldering systems provides services and solution packages for optimizing its customers' production processes.



Electrical designer Edgar Diener tested the circuit on a demo board

Application

The selective soldering process is often the only conceivable concept when components that are wired on both sides need to be soldered and a wave soldering process with the classic wave on the second side of the module is no longer possible.

In comparison to the classic wave soldering system, the selective soldering system usually requires considerably less space. Its minimal configuration consists of a programmable high-precision fluxer for applying the flux, a preheater module, and the actual soldering module.

Depending on customer requirements, the function of the selective soldering system can be extended to include further units, each comprising a preheater and soldering module. Such a concept requires compact devices that are easy to handle and can be flexibly adapted to the respective conditions.



The PSR-MXF multifunctional safety relays are used in the Versa-Flow selective soldering system

Solution

Based on the requirements described above, Erska uses PSR-MXF multifunctional safety relays from Phoenix Contact in its Versa-Flow series. This is because the narrow safety component, which measures just 22.5 millimeters, can process two local and one higher-level sensor circuit up to Performance Level PL e or Safety Integrity Level SIL CL 3. The small size is possible, among other things, thanks to the use of the three-level MEmax housing from the Phoenix Contact product range with a total of 24 contact points.

The tool-free Push-in connection technology was also another important criterion that convinced Edgar Diener, who is responsible for the electrical design of selective soldering systems, to opt for PSR-MXF safety relays. "I only really want to use components that use direct connection technology, which permits quick and easy wiring," explains Diener.

As the example of a selective soldering system demonstrates, the patented concept that combines two independent switch-off levels with two local and one higher-level safety function even allows modular machine concepts to be implemented with ease. Thanks to the functionality integrated into the safety relay, the effort involved in verifying and validating the safety solution is reduced considerably in comparison to alternative concepts.

Edgar Diener reports, "In future we'll be using the basic version, which accounts for a considerable proportion of the total series volume, with one instead of three safety relays". Every additional module of the soldering system that contains its own control cabinet fits seamlessly into the existing concept whereby the higher-level emergency stop signal from the fluxer module is processed by all downstream parts of the circuit. During the safety assessment, the participants also specified that the door locking mechanisms of the individual function units must always affect the upstream and downstream modules.



Erska uses further components from Phoenix Contact in addition to the safety relays to automate the soldering system.

Summary

The automation specialists at Erska opted for the PSR-MXF safety relay as the concept surrounding the Versa-Flow selective soldering system is specifically designed with easy handling and maximum flexibility in mind. When using a configurable safety relay module, every module extension would have required individual adjustment to the software. This is an important consideration, as the assembly concept for the soldering systems is based on maximum effectiveness. On the production line, Erska employees manufacture a new soldering system in nine four-hour cycles.

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