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LOOKING AHEAD FROM THE CLOUD

A Smart Safety Solution for safety switchgear diagnostics

Comprehensive information about the status of a machine or plant: This brief formula turns one of the key demands of operators into a reality, a demand that also applies to safety-related components. With the Smart Safety Solution, this demand also becomes a reality. The solution gathers diagnostics data and transfers it via gateway for display and evaluation in the cloud.



The modular Protect PSC 1 safety controller can be equipped with a gateway module for the Safety to Cloud solution.

Whether large or interlinked machines and plants, the 'availability factor' is of central importance — an unplanned shutdown or failure brings with it an immediate impact on productivity, especially in the case of plants involved in food production or packaging machines operating with a continuously high throughput rate. Concepts such as predictive maintenance play an increasingly important role in this regard, with the aim of identifying and responding to irregularities promptly, before they lead to a machine shutdown. In addition, component wear must also be monitored carefully so that components can be replaced before they fail.

From the safety door to the cloud

These concepts are by no means new, but it is only now, as part of the digitisation of

production, that they are being realised on a wider scale as a core element of industry 4.0, and experts anticipate high growth rates in the near future. The Schmersal Group decided to tackle this topic early on and developed a Safety to Cloud solution with Smart Safety Solution which the company introduced on PLC IPC drives at the end of 2017. The solution is based on the existing SD (serial diagnostics) interface with which a number of the manufacturer's safety switch, interlock and sensor series are equipped. Certain optoelectronic safety device series can also be connected to this interface in series. The SD interface collects operational (i.e. not safety-related) and diagnostics data and transmits it cyclically to an SD gateway, an edge gateway or to the modular PSC1 safety controller. And here is the innovative part of the Smart Safety Solution — from

there, the data collected at 'shop floor level' is then transmitted to a cloud service. The edge gateway currently forwards the data in MQTT format, which is an open M2M communication protocol, or alternatively in OPC/UA format, giving the user the option of collecting and evaluating data for each individual safety switchgear device. A typical example: Some series of electronic safety switch and interlock (AZM 200, AZM 300, RSS 260, MZM 100, etc.) record the tolerance range, whereby the switch and actuator communicate via a secure RFID signal and emit a signal when they detect a safety door offset. This allows the user to respond before the machine's safety shutdown is triggered due to an excessive offset between the safety switch and the actuator. The number of switching cycles is also recorded, i.e. how often a safety door is opened, as well as distance warnings and other parameters. When SD-capable optoelectronic safety equipment is installed, e.g. the SLC 420 safety light barrier, the signal strength is also used to detect and display the degree of soiling of transmission and receiving units.

Continuous data basis

The diagnostics information can be displayed on screens (e.g. in the production control room) or retrieved on mobile terminal devices such as tablets and smartphones for remote monitoring of production processes. For data visualisation using dashboards, the user can use the popular Microsoft Azure cloud platform, which offers users a range of helpful functions for data display, e.g. in the form of tables, diagrams and graphs.



Data can also be transmitted to the cloud via the SD gateway (left) or the edge gateway.

ke NEXT digs deeper

Oscar Arias, Chief Sales Officer at the Schmersal Group, explains the reasoning behind the development of a cloud solution for safety switchgear diagnostics information.

Mr Arias, cloud-based maintenance represents a significant step towards industry 4.0. Are customers following along this path?

Not only are they following, they're actively seeking these solutions. Especially machine builders who manufacture powerful machines

and plants for the manufacture of consumer goods. They can bring huge benefits to their customers through early detection and rapid rectification of irregularities. Any break in production can prove very expensive. The Smart Safety Solution helps to ensure that there are no dips in productivity levels.

The topic of security is prominent in industry, especially when it comes to safety applications. Do your customers have any reservations?

No. We have deliberately created a solution for diagnostics data and not for safety-related data. Cloud-based solutions are already well established in predictive maintenance, we're just linking into them.

What has been the reaction from the market, and are there any ideas for further development of the system?

We involved many of our key customers in the development stage — customers who were looking to use a system like this. So the need is there, and the interest, such as in construction of packaging machines. Further development is currently in two directions. We're equipping other switchgear series with the SD interface, for example the control panels in the BDF 200 series, with emergency-stop functions, and we're expanding the range for Safety to Cloud communication. In addition to MQTT, users

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will also be able to use OPC/UA and other industry protocols, providing the option of incorporating safety-related signals as well.

The questions were asked by Gerald Scheffels, a freelance writer for Schmersal.

Video tip

The Safety to Cloud solution

A video in which Oscar Arias, Chief Sales Officer at the Schmersal Group, explains the industry 4.0-capable Safety to Cloud solution can be watched on the Schmersal Deutschland YouTube channel or accessed directly via <https://youtu.be/A630CuvIZ3E>.