

New SRB safety modules – More safety, less components

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Safety relay modules are frequently used in simple safety circuits for the evaluation of the safety-related signals. The new series of these safety modules feature additional functions, offering specific advantages for certain fields of application. The latest innovations in the field of control technology and safety switching appliances even allow the connection of multiple switchgears to one safety monitoring module – this saves costs and space in the control cabinet.

The usual “safety equipment” of small machine consists of an emergency stop button and a safety switch, monitoring the position of the safety guard. Until now, the mechanical engineer had to install an individual safety relay module for both functions and if the safety functions needed logic connections, both safety modules required additional wiring. These extra expenses came on top of the charges and costs for two such safety modules and the space taken in the control cabinet, notwithstanding their “slim fit”.

The perfect solution for small machines

These additional expenses come as an unpleasant surprise to the mechanical engineer, especially on small machines, which belong to cost-sensitive market sectors. Elan Schaltelemente GmbH & Co. KG, a company associated to the Schmersal Group, now offers a more cost-efficient solution for the evaluation of safety-related signals: the SRB 202 and SRB 400 safety relay modules of the PROTECT SRB series (image 1).

These modules come with a double functionality: two safety guards can be connected in parallel and the safety releases can be switched off dependent on the safety guard triggering the safety function.

Differentiated switch-off behaviour

The advantages of this differentiated switch-off behaviour to the mechanical engineer can be explained by means of an example. If an emergency stop command device and an interlocking device (safety switch) are connected, the emergency stop command device will produce effect on all safety releases, the interlocking equipment exclusively on the preset part of the releases. A safety release therefore has priority over the other.

Improved machine availability

This means that the user can abandon one safety monitoring module. This saves costs and space in the control cabinet, especially as the SRB 202 is only 22.5 mm wide. This differentiation simultaneously increases the availability of the machine: as both safety circuits no longer have to be wired in series, only the required actuators will



Image 1: The perfect solution for small machines: safety relay module for two safety guards with differentiated switch-off behaviour.

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be deactivated instead of the entire system. It is possible to make a distinction between an ordinary process intervention and an emergency intervention and to authorise the corresponding application-specific machine functions. The interconnection for the logical AND, OR and NOR links can be abandoned.

The SRB 202 module has two potential-free safety release as well as two signalling contacts to realise this differentiated switch-off behaviour, the SRB 400 module four potential-free safety releases. This enables a differentiated switch-off of one or two safety releases, depending on the module used. This structure meets the requirements for control category 4 to EN 954-1.

Perfect for adjustable-frequency drives

All commercially available emergency stop command devices and safety switching appliances for guard door monitoring can be connected to these both modules, whose design was awarded an iF-Design Award. The main fields of application of the new modules are adjustable-frequency drives, which require a different reaction after the intervention of the operator. For instance, when the guard door is opened, the position of a handling unit or feeder will be maintained, whereas the drive loses its position upon the actuation of an emergency stop button because of the complete shutdown of the machine (image 2). This feature enables an optimisation of the machine productivity.

The SRB 202 and SRB 400 safety relay modules feature different options, enabling a perfect adjustment to the specific application. They are available with, amongst other things, a reset function with edge detection, an automatic reset function and a crosswire short detection. All modules from the PROTECT SRB series have plug-in terminals and LED's to indicate the internal switching conditions of the individual monitoring circuits and the operating voltage.

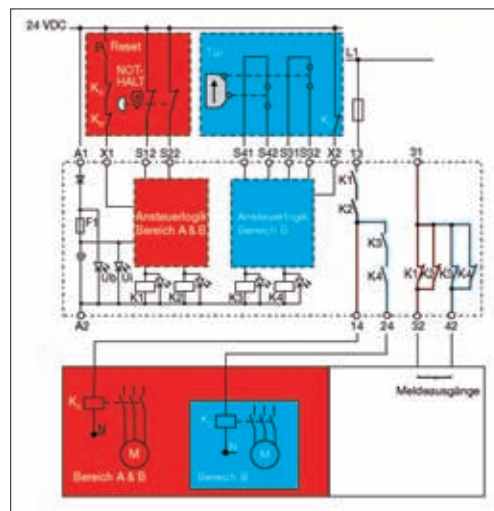


Image 2: The differentiated switch-off behaviour offers operational advantages: the productivity of the machine as well as the protection against manipulation is increased.



Image 3: The safety switches of the new generation can be series-wired for the evaluation. This saves costs, wiring expenses and space in the control cabinet.

Multiple safety switching appliances – one safety monitoring module

The number of safety monitoring modules in the control cabinet can be reduced by using the new SRB models, but also by choosing appropriate safety switching appliances. To this end, Schmersal offers new generations of safety switches (AZ 200, image 3), solenoid interlocks (AZM 200 and MZM 100) as well as a variety of safety sensors (CSS 180 and CSS 34) for series wiring. In this way, a maximum of 31 safety switchgears can be connected to one safety monitoring module, without losing the high safety level. The available Profibus based Gateway for the evaluation of non safety-related diagnostic signals also enables a series wiring of the safety switchgears.

Double reset:

additional safety in accessible machine areas

The new SRB 100 DR (image 4) safety monitoring module was especially developed to increase the safety of the repair or maintenance staff required to perform work in accessible machine areas with switched-off machine control.

The module ensures that the restart of the machine control is only possible after the operator has actuated a reset or restart switch inside the station, cleared the hazardous area and then actuated a second reset/restart button located outside of the accessible area.

Adjustable time window

To realise this "double reset", an adjustable time window can be set by DIP switch from 3 to 30 seconds. The both buttons must be actuated exclusively in the defined order and within the time window. If the operator does not actuate the first button at all or does not actuate the second button within the time window, e.g. because the restart process of the machine could not be performed quickly enough, the double reset must be repeated.

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A correct reset generates an enabling signal in the SRB 100 DR module, which is then processed as start signal by a commercially available safety relay module, for instance from the PROTECT series. The signals from the buttons are processed with the additional safety related feature of edge detection, i.e. the trailing edge is analysed after the reset of the command device in order to ensure that failures, e.g. a welded contact, cannot lead to a hazardous state.

Safety gaps closed

This safety relay module from the Schmersal Group closes a „safety gap“. In actual practice, service or maintenance staff often is unintentionally entrapped in accessible machine areas. This people then are exposed to danger, as the machine can be started as soon as the safety guard is locked. This risk also can be eliminated by means of a mechanical solution: a “panic handle”, installed inside the hazardous area (image 5), enables accidentally entrapped people opening the guard from inside and evacuating the area. This panic handle is suitable for the solenoid interlocks of the AZM and STS series.

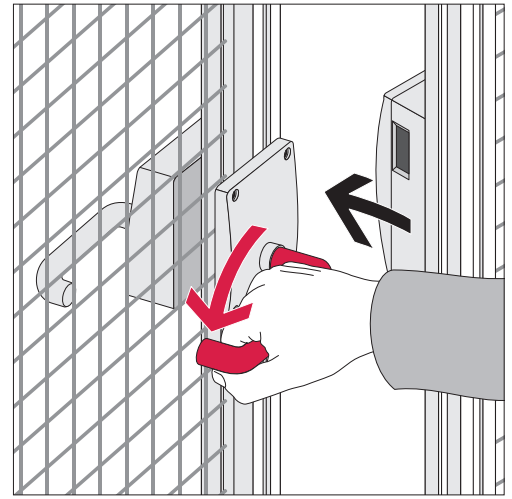


Image 5: With the red “panic handle”, entrapped persons can open the safety guard from inside the machine plant to quickly evacuate the hazardous area.



Image 4: A new safety relay module with double reset provides for additional safety in accessible hazardous areas.

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