

THE

GATEKEEPER

Man-Machine Safeguarding News

February 2015

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Schedule

Webinar



Safety Webinar

Join us on **March 3** at **2 pm** EST for the safety webinar *ISO14119: The New Machine Safety Standard for Guard Door Interlocks*.

[Register for the Webinar](#)

Safe Switching

ISO 13849 divides a safety function into 3 subsystems; Input, Logic and Output. When designing a safety circuit, the input and logic subsystems are typically more easily identifiable and addressed while the output is often overlooked.

The Input subsystem consists of the safety device which when actuated, will trigger the stopping of a hazardous motion and interlock the machine. This can be in the form, but not limited to, keyed interlock switches, electrical mechanical solenoid locking switches, safety light curtains, emergency stops, etc.

The Logic subsystem is the device which will monitor the input device, typically a safety controller or safety PLC.

The Output is a device used to remove power from the machine actuators, such as motor contactors or master control relays (MCR). Similar to the safety rated input and logic devices there are certain requirements that must be met to use an output device in a safety circuit.

The main requirement for an output device is that it's normally open (NO) and normally closed (NC) contacts must be mechanically linked. In other words, they are not independent from each other, either they all change state or not.

The NO contacts are used to transmit the required voltage to the machine actuators. Once the input and logic subsystems are satisfied, the output device will be energized; the NO contact will close and send the voltage onto the actuators until the input or logic device is interrupted, thus de-energizing the output device and reopening the contact; removing power from the actuator.

The NC contact is used as part of a monitoring circuit called a feedback loop. This contact will complete a closed loop tied back into the logic device. The logic subsystem will monitor the opening and closing of this contact to ensure



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Literature

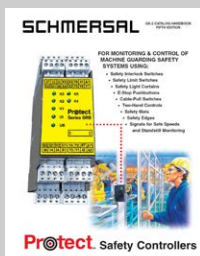


Machine Safety in Europe

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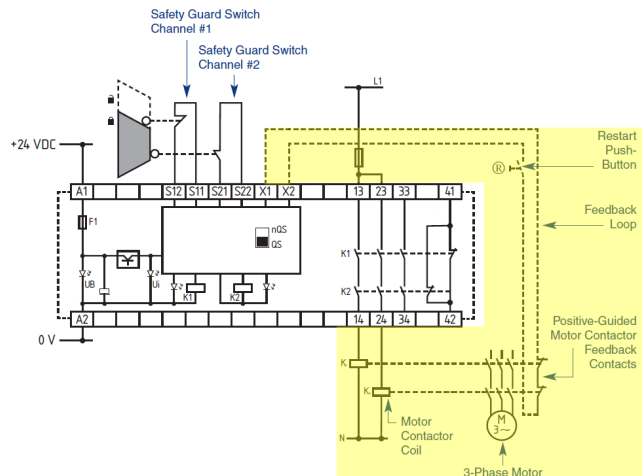
Reference



Safety Controller Guide

the output device is switching appropriately, i.e. there are no welded contacts. Remember, the contacts are mechanically linked so that if there was a welded contact delivering power to the machine actuators, once the logic device de-energizes the contactors it will not be able to reset since the NC contact of the feedback loop will remain open.

Below is a circuit diagram showing a complete safety function with a highlight of the output subsystem and its feedback loop.



Wiring diagram. Yellowed area highlights Output subsystem of circuit. Click image to enlarge

Safety Product Highlights



RSS260 Safety Sensor

The latest addition to our RFID family is the compact RSS260. It has mounting flexibility due to a symmetrical design and actuation from end or side. It is available with several types of actuator targets. [More](#)



PS116 Safety Limit Switches

These compact limit switches are available with a choice of 10 actuator styles and prewired with either a M12 connector or a 2 meter cable lead, on the bottom or side of the housing. Actuators are field adjustable, to be set

in 45° steps. [More](#)

SRB Safety Controllers

Learn more about safety controller uses and how to make proper selections.

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Schmersal USA

660 White Plains Road
Suite 160
Tarrytown, NY 10591
Tel: 888.496.5143

salesusa@schmersal.com

Schmersal Canada

15 Regan Road
Unit #3
Brampton, ON L7A 1E3
Tel: 905.495.7540

salescanada@schmersal.com



SRB Series safety monitoring modules provide secure evaluation of switching component signals and safety circuit faults, increasing the reliability of the machine guarding safety system.

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Ask The Expert

Devin Murray,
TÜV Functional Safety Engineer
ID-No. 4274/11

Q: Are contactors a requirement if I already have designated outputs from a safety controller/safety PLC?

A: Though not required, it's usually necessary. Output cards and contacts from a safety controller are typically not rated to switch the high current and voltage of larger motors as seen on many industrial machines. To reduce stress on these outputs, they can simply deliver lower voltages to energize a coil of a safety rated contactor whose mechanically linked contacts are generally rated higher.