

Boost Safety & Productivity

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(Two partners collaborate to leverage safety exhaust valves to design a uniform machine that isolates hazardous energy sources.)

Manufacturers are more in tune with machine safety requirements than ever before. They want to provide safe machinery for employees while maintaining productivity, and many are using methods such as safety controls integration to improve productivity while protecting workers.

For example, at Schneider Packaging Equipment Co., Inc., we've collaborated with safety valve maker Ross Controls to design an integrated safety system for Schneider Packaging's machines to provide safe operator access for routine, repetitive tasks. Repetitive tasks performed by operators fall under the "alternative measures" category for lockout/tagout (LOTO) that calls for a safe machine-guarding system to provide equivalent protection as required by the Occupational Safety and Health Administration (OSHA).

In addition, various American National Standards Institute (ANSI) standards, such as the Z244 Lockout standard and B11 General Safety Requirements, and the Packaging Machinery Manufacturers Institute (PMMI) B155.1 standard, also provide details on what is required for repetitive tasks.

Migration Toward Integrated Safety Systems At Schneider Packaging, a machine builder for end-of line packaging solutions and a Rockwell Automation Machine Builder Partner, we've seen more customers specifying integrated safety systems to improve machine safety and productivity. This trend is growing as manufacturers are becoming more aware of available components and today's safety standards. This migration toward integrated safety systems is important because it means more OEMs and manufacturers are working together to clarify customer expectations up front and to design and build well thought-out equipment — machines that maintain the manufacturer's productivity requirements while protecting customer employees.

Partner Collaboration Benefits Customers

This is one of the factors that led to the collaboration between Schneider Packaging and Ross Controls, a Rockwell Automation Encompass™ Product Partner. Representatives from both companies met numerous times through local distributors and at conferences and other industry events, and we became familiar with each other's personnel and capabilities. We're sharing our knowledge of Rockwell Automation solutions to design an enhanced safety solution for Schneider Packaging's machines.

To increase safe worker access for routine and repetitive tasks, Schneider Packaging now designs its machines with Allen-Bradley® GuardLogix® programmable automation controllers (PAC) from Rockwell Automation (www.rockwellautomation.com/go/tjguardlogix) for the electrical safety control circuit, and Ross DM²® safety valves to isolate the pneumatic energy.

The Schneider Packaging team considered several safety relays and smaller stand-alone programmable logic controllers (PLC) for the machine safety solution. However, we selected the GuardLogix® because it provides the most flexibility to set up different machine reactions based on input from the safety devices, and it's integrated into the entire control system.

This integrated safety approach provides users with a uniform machine that isolates all energy sources prior to any personnel accessing a potentially hazardous area. The uniformity comes from the Rockwell Automation Integrated Architecture™ that's core to the GuardLogix® safety controller. The architecture makes it easier for the machine builder to troubleshoot in the event of a problem because we don't have to deal with two different systems. The solution helps ensure that no single point of failure leads to an unsafe condition, and does so without adversely affecting the machine's productivity.



Safety Controller and Valves Work Together

The DM²® category 4 safety exhaust valves isolate hazardous pneumatic energy sources before personnel access a potentially hazardous area. This helps improve safety as well as productivity by eliminating lockout.

Integrating the valve requires simultaneous dualchannel outputs from the GuardLogix® safety controller to power the two main solenoids that shift the valve and provide downstream pressure for normal machine operation.

When a safety event occurs, the GuardLogix® safety controller removes power from the main solenoid coils.

This removes pneumatic energy that's creating motion during operation. The safety events can be pre planned, such as putting the machine in a safe condition to clear a jam, or unplanned, such as when a person trips a light curtain or scanner that's controlling access to the potentially hazardous area.

The valve also provides feedback to the control system about the valve's condition via a pressure switch. The switch isn't part of the safety system inherent in the valve; it's used for diagnostics. An abnormal valve operation, or fault, occurs when the two internal elements don't synchronously shift within 100ms of each other. This helps monitor for a sticky or sluggish valve, meeting "diminished performance" requirements of the ANSI/PMMA B155.1 standard.

Should the valve operate abnormally, the status indicator switch provides a signal that the valve isn't ready to run. The valve then can be reset through a dedicated reset solenoid. This dedicated reset requires that a system fault is acknowledged and cleared. Like an electrical safety module, when the valve faults, internal monitoring causes the valve to go into its safety mode, which exhausts downstream pneumatic energy and inhibits further operation.

The status indicator drives a message on the operator control station, alerting the operator of a problem within the pneumatic safety circuit. The message also provides the operator with the next steps needed to clear the fault.



DM²® Series E
Control Reliable Valve

One Swift Action

The machine's integrated safety design also includes the modular, flexible Allen-Bradley Bulletin 2030™ ElectroGuard® Safety Isolation System (www.rockwellautomation.com/go/tjelectroguard). The DM²® in the Pneumatic Isolation Module essentially acts as a "pneumatic safety relay" that blocks the incoming supply of pneumatic energy, and rapidly exhausts downstream pneumatic energy.

The valve's redundant internals with cross-flow paths and cross-monitored internals meet ISO 13849-1 Category 4 PL e requirements.

This helps allow the Electroguard Safety Isolation System to isolate both electrical and pneumatic energy in one swift action. As a result, operators can more easily access equipment with greater assurance of safety standards compliance, with the added value of improved productivity.

They Go Hand-In-Hand

Integrating the DM²® valve with Rockwell Automation safety controls provides an alternative method to lockout. This helps improve safety and productivity because the task of locking out has been eliminated from the process, except for non-production related maintenance tasks for which traditional lockout is still required.

The use of integrated safety systems on machines illustrates that manufacturers can enhance safety while increasing efficiency. The improved uptime and productivity provide payback to the user that justifies the cost to implement this safety system.

(Schneider Packaging Equipment Co., Brewerton, N.Y., supplies end-of-line packaging solutions that include case packing, robotic palletizing and systems integration.)

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Additional resources

For extended information related to safety products,
please contact your local ROSS distributor.

Also, please visit the safety page at www.rosscontrols.com.

