

The intention of these articles is to inspire thought, not provide a solution. All safety design should be conducted by a professional engineer.

GFCI PROTECTION

The Ontario Electrical Safety Code has been amended to require Ground Fault Circuit Interrupter (GFCI) protection for kitchen counter receptacles. Effective January 1, 2003, "Receptacles located in kitchens and installed within 1 m of a kitchen sink along the wall behind counter work surfaces shall be protected by a ground fault circuit interrupter of the Class A type." The 1 meter distance is measured from the edge of the kitchen sink. This doesn't just apply to your kitchen at home - it's for all places with cooking facilities. (Hot plates and microwaves are deemed not to be cooking facilities.)

Also remember that receptacles installed within 3m of wash basins must be GFCI, including those in commercial and industrial installations. (There are some exclusions to this rule, such as doctors' and dentists' offices). ↗



JOKAB VITAL SOLUTION

The Jokab Vital Solution is increasing in popularity. The heart of this system lies in the coded non-contact gate interlock switches and the dynamic signal that is sent through them. The advantage of non-contact interlock switches is that, of course, they never come in contact with each other. This drastically reduces the chance of switches breaking or failing. This also allows for some misalignment of the mating parts. Unlike conventional non-contact switches, the Jokab coded switches send a dynamic signal that is altered by each of the devices in the system. The result is a robust safety circuit that will detect failures that conventional systems don't.

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NEW ROBOT STANDARD

There is a new version of the CSA "Industrial Robots and Robot Systems" standard, CSA Z434-03. The standard is far more comprehensive than previous versions of this standard.

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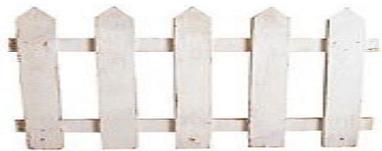
NEW ROBOT STANDARD

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Some of the features:

- Detailed section on robot risk assessments
- Approx. 30 pages of diagrams
- New sections on training and procedures
- Can get a 20 minute VHS video on the standard.

Robots are very productive but can be very dangerous machines. A safe design needs to be coupled with comprehensive training of all staff that come in contact with the robot. Operators, programmers, and maintenance staff need to be aware of all procedures and possible hazards. Only then will the machine be safe to use. ✎



PERIMETER FENCING

When installing perimeter fencing, a 1.8m (6 foot) minimum height is strongly recommended. However, this does not automatically eliminate all hazards -- a tall person could easily reach a hazard with a height of around 6 feet located just behind the fence. In fact, the anthropometric data tables in CSA Z432 (Safeguarding of Machinery) show that 1.8m perimeter fencing must be 600mm (2 feet) away from a hazard located at the same height.

Installing fixed guarding of any kind. It's always a good idea to consult the anthropometric tables before installing fixed guarding of any kind. It's technically only meant as a "guide", but it helps to ensure that all workers will be safe. ✎

JOKAB VITAL

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It doesn't stop there - you can integrate your E-stops, light curtains, and other dual-channel safety devices to the Vital system by means of a TINA interface. This eliminates the need for additional safety relays.

Perhaps the greatest feature of the Vital system is that each device has an LED indicator which provides feedback signals to the operator. If the safety relay won't reset, it doesn't take long before maintenance staff starts tracing circuits with a multimeter. With the LED indicators, the operator knows which device is preventing restart and can attempt to identify the problem on his/her own.

Overall, Jokab has introduced a comprehensive and easy-to-use system that addresses far more safety concerns than most competitors. It is slightly more expensive than conventional system, but will save installation, maintenance and troubleshooting costs. ✎

AIR DUMP - DOES IT WORK?

A large number of machines have pneumatic solenoid valves which directly initiate hazardous motion. A typical machine would have a safety relay, and power to these pneumatic valves would be directly interrupted by that safety relay (or similar circuitry). The electrical circuitry would likely be control reliable, but what about the pneumatics?

This is where the air dump valve enters the picture. In the event of an E-stop or other safety related event, the safety relay will drop out, and all solenoid valves de-energize, including the air dump valve. This provides a secondary means of stopping and preventing all hazardous pneumatic motion.

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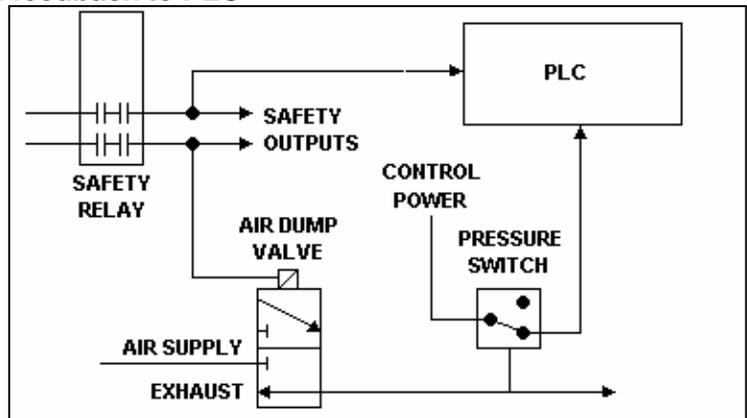
AIR DUMP

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So the machine is safe.... right? Perhaps not. The air dump could fail with no indication to the control system or the operator. Counteracting this issue requires monitoring of the air dump valve and there are a number of different methods of accomplishing this.

Method #1: Pressure Switch feedback to PLC

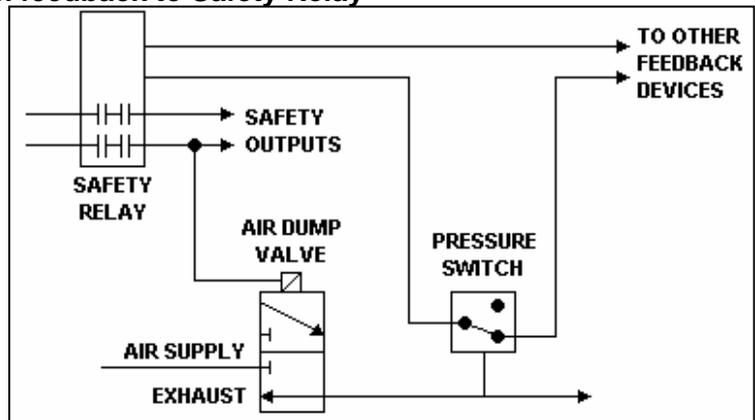
It is good practice to ensure the pneumatic system is at pressure before initiating motion. To accomplish this, a "pneumatics OK" pressure switch is often used. This same switch can be used to monitor the air dump valve - on every cycle of the MCR, the pneumatics pressure should drop to zero, and the "pneumatics OK" switch change state. If the pneumatic pressure remains OK while the MCR cycles, the air dump valve is not functioning properly.



OK while the MCR cycles, the air dump valve is not functioning properly.

Method #2: Pressure Switch feedback to Safety Relay

For applications where a higher level of safety is required, wire a pressure switch directly into the safety relay's feedback loop. This will prevent the safety relay from resetting until the pressure switch acknowledges a loss of air. Again, a good control system will also ensure the pressure returns to normal before allowing hazardous motion to recommence. A variation on this method would be to use an air dump valve with an integrated pressure switch.



Conclusion:

Too many air dump valves are being installed unmonitored. Perform a risk assessment to determine what level of safety your application requires and install your air dump accordingly. ✓

ASK THE EXPERTS

Q. My plant is currently undergoing renovations. Many pieces of equipment are being relocated; including some that have already had PHSR's performed on them. When exactly do I have to get a PHSR done on a machine or process?

A. For items that have already had a PHSR performed, if the apparatus etc. is currently in compliance with the *Regulation for Industrial Establishments* and the modifications to the apparatus, structure, protective element, or process do not require new or modified engineering controls or other measures to maintain compliance, then another PHSR is not required. Basically if you are performing a non-safety related modification, such as a tooling change, you do not need to repeat the PHSR process.

However, if the equipment in question has not yet had a PHSR performed on it, a number of factors come into play. First, all equipment should be in compliance with the *Regulation for Industrial Establishments*. If this is not the case, or if compliance status is unknown, steps should be taken to ensure compliance immediately via the PHSR process.

If the renovations and relocations will require new or modified engineering controls or other new or modified measures to comply with the *Regulation for Industrial Establishments* we must now consider exemptions. There are various exemptions pertaining to guarding, rack and stacking structures, spray booths, and lifting devices. If no exemptions apply or the documentation necessary for the exemption is not available, then a PHSR must be performed. If an exemption applies and the documentation is available, a PHSR is not required. As a general rule, if the entire machine can be relocated at once (without modifying the fixed guarding or interlock devices), then a PHSR is not required. In most cases, this is extremely difficult, if not impossible.

A PHSR is required if the equipment is new and is not exempted, or if the required documentation is not available. If an exemption applies and all documentation is present, a PHSR is not required.

If you have a question you would like to see answered in a future "Ask the Experts" column, email us at wintek@wintek-eng.com. We can't wait to hear from you! ✈

Visit WINTEK at www.phsr.com for more helpful hints and informative articles about PHSR's. You will also find links to various standards and other safety related downloads. We can also answer your specific questions regarding PHSR's in individual situations.

Our main website, www.wintek-eng.com, gives more detailed information regarding WINTEK's services and various accomplishments.

ONE LAST THOUGHT...

To the optimist, the glass is half full. To the pessimist, the glass is half empty. To the engineer, the glass is twice as big as it needs to be.