

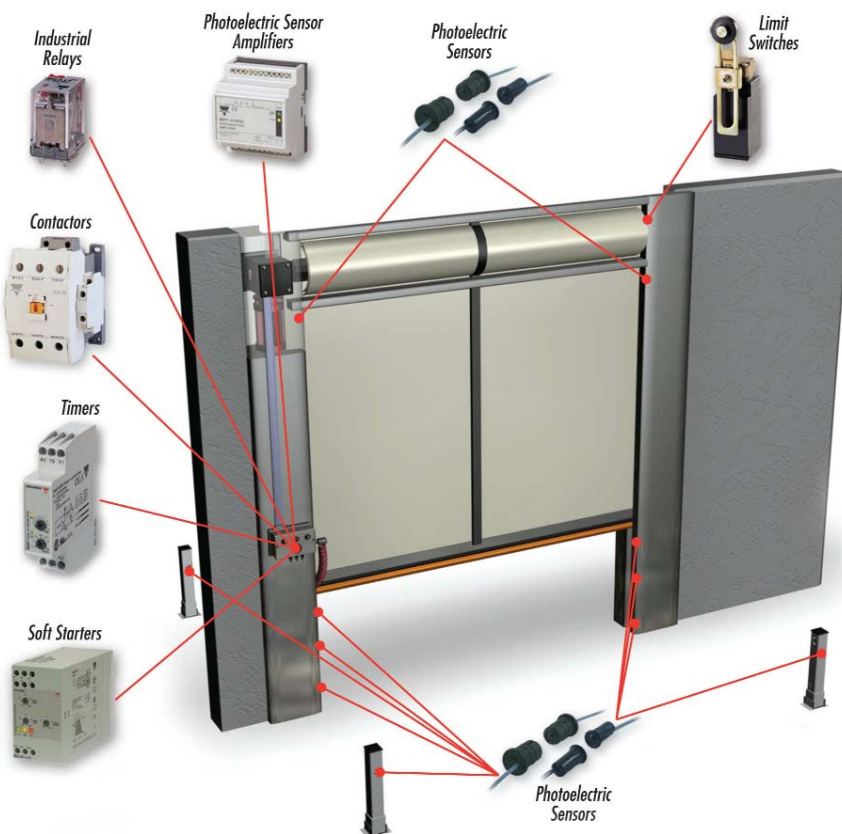
By Torben Rochat

Reducing Risk

Safety in industrial automatic doors and gates

Safety issues have become a very important aspect for industrial, commercial and garage automatic door and gate manufacturers and subcontractors. Accidents in North America and Europe have led to changes in national standards. In March 2000, revisions of UL 325 went into affect in North America and, in April 2005, the product standard EN13241-1 set of regulations was implemented throughout Europe. Both regulations have led to improved safety, reducing the risk of people being trapped by a moving door or gate.

The choice of door type and its specification needs to be made after taking into account where the door is to be installed and the operating requirements expected. The choice of door type is linked by safety in use,



Both the North American and European regulations suggest the use of safety category 2 sensors.

ease of use, the amount and frequency of maintenance, its mode of operation, frequency of operation, degree of automation, provision to pass doors and the position of the door within the building.

All door types must be constructed in such a manner that no cutting hazard may occur. Regarding power-operated doors or gates crushing, shearing and drawing-in points generated by the door leaf during normal use should be eliminated. Safety devices, such as pressure-sensitive or electro-sensitive protective devices, should be designed and tested according to the national regulations—for North America UL325 and, for Europe EN13241-1, EN12445, EN12453 and EN12978.

Opening or closing forces exerted by the door leaf of power-operated doors, including power-operated pass doors, where crushing, shearing or impact hazards are safeguarded by limiting the force, shall be kept safe for all users. If a power-operated door, which opens upward, can lift an adult or a child, this can lead to a foreseeable misuse, which may create a dangerous situation especially when the door is located in a public area.

Therefore, each time a door can give a person a lift, a danger point is considered to exist between leaves and fixed parts in the vicinity or in the neighborhood of shafts or rising spindles of rolling doors, irrespective of its height above the floor.

Both the North American and European regulations suggest the use of safety category 2 sensors (i.e. sensors without self-checking and forced relay contacts like category 3 or 4 sensors). A category 2 sensor

interacts with the door controller itself in such a manner that, before each opening or closing cycle, the door controller checks the sensing function so both the sensor itself and all wires connected to and from the sensor are monitored.

After this test routine, the door leaf movement can be completed. For sensors used as pressure-sensitive protection, the device must be active in the total door-leaf width preventing forces of exceeding a specific force or preventing the door leaf from even touching the person. The maximum force may be exceeded for the extreme of 2 inches (in North America) and 30 mm (in Europe) of each end, but the sensor must remain active.

Giving these considerations, there are a handful of manufacturers that provide a range of photoelectric sensors designed specifically for use in power-operated automatic doors for both pressure-sensitive protecting equipment and electro-sensitive protective equipment. These sensors are all category 2.


The sensing principle used in the photoelectric sensors consists of:

- Through beam sensors to be controlled by an external amplifier with sensing ranges up to 165 feet and up to three multiplexed sensor heads.
- Self-contained through beam sensors with transistor outputs with sensing distances up to 66 feet and up to three code-separated sensors.
- Through beam sensors with AC/DC supply and relay outputs. Polarized retro-reflective sensors with AC/DC supply and relay outputs.

All sensors are made in accordance with UL325, EN12445, EN12453 and EN12978, and have incorporated a mute input for interaction with the door controller.

In the illustration on page 44, you can see the various locations photoelectric sensors (and other automation control products) can be used to automate and/or provide added safety to a high-speed rolling door.

In applications where an additional sensor is required to detect the presence of a person or obstacle standing on the floor at one side of the door, a sensor is mounted close to the floor at a maximum distance of 6 inches (in North America) and 30 cm (in Europe).

To avoid a manual inspection every six months, a safety sensor of category 2 can be used. This sensor prevents safety-related problems. For example: If a vehicle is to be detected in the doorway, the safety sensor will, in most cases, look underneath the bed of the car and an additional sensor must be added at an appropriate height of approximately 2 feet or 60 cm. 

Torben Rochat is the international product manager for Carlo Gavazzi. Based in Buffalo Grove, Ill., the company provides an extensive range of high-quality, reliable components to the industrial automation market. For more information, call 847.465.6100; visit www.GavazziOnline.com or email info@carlogavazzi.com