CARLO GAVAZZI
Automation Components

CARLO GAVAZZI

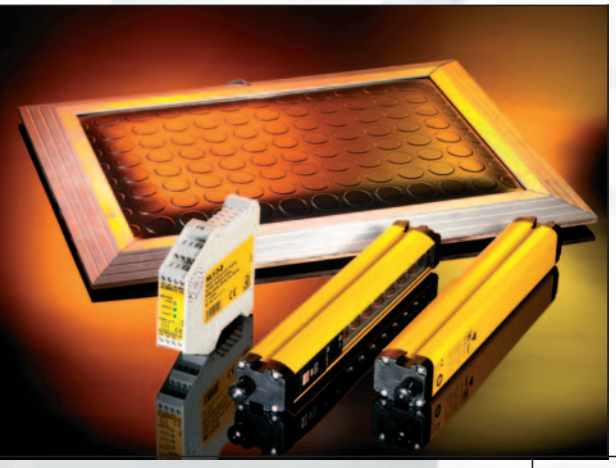
Safety Solutions for Machine Safeguarding

Safety solutions to protect people in industrial environments

The new Safety range from Carlo Gavazzi accurately conceived and designed to satisfy a multitude of applications

- Safety Light Curtains
- Safety Control Modules
- Safety Interlock Switches
- Safety Mat Systems
- Safety Magnetic Sensors

Safety



New Safety Solutions

Industrial Machine Safeguarding from Carlo Gavazzi

- MACHINE TOOLS
- PACKAGING
- AUTOMATIC ROBOTS
- PRESSES
- PLASTIC AND RUBBER
- TEXTILE
- FOOD AND BEVERAGE
- WOOD WORKING MACHINERY
- CERAMIC AND GLASS
- LIFT AND ESCALATORS

EUROPEAN COUNCIL DIRECTIVE

"…preserving and protecting the quality of the environment, and protecting human health, through preventive action"

Annex I
ESSENTIAL HEALTH AND SAFETY REQUIREMENTS
European Machinery Directive 98/37/EC

"…eliminate or reduce risks, take the necessary protection measures in relation to risks that can not be eliminated, inform users of the residual risks. Machinery must be so constructed that it is fitted for its function, and can be adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen by the manufacturer.
The aim of measures taken must be to eliminate any risk of accident throughout the foreseeable lifetime of the machinery, including the phases of assembly and dismantling, even where risks of accident arise from foreseeable abnormal situations…"

The Directive established the technical requirements to be respected during the different phases of a machine or device life.
When dealing with Safety, reliability is a must. Once again, Carlo Gavazzi is fully committed to providing customers with the solutions they have been asking for. Transforming our customers' needs into our commitments, we have invested in research and manufacturing cutting edge Safety products. The new Safety range offered by Carlo Gavazzi has been conceived and designed to satisfy the most severe applications.

Safety Standard conformity covers a wide range of products: Safety Modules, Safety Light Curtains, Encoded Safety Magnetic Sensors, Safety Mat Systems, Safety Interlock Switches. Visit our Safety Website to learn more…

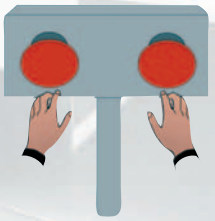
www.GavazziOnline.com/Safety

Emergency Stop

When a dangerous situation is imminent, activating the appropriate push button stops machinery. The 98/37/CE Directive states that an Emergency Stop is required for any machinery with moving parts.

Two Hand Device Control Module

Used for the control of presses or machines with dangerous closing devices. This allows the operator to start the machinery only by pressing two correctly spaced push buttons simultaneously, in order to keep the hands away from the hazardous area.

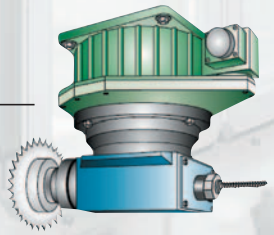


Safety Gates

Machines that require human intervention for normal operation are designed and built with safety devices that force a shut down. If any gate preventing access to the dangerous zone gets opened during normal operation the machine is stopped. Encoded safety magnetic sensors interfaced with safety relays are used to monitor the gates.

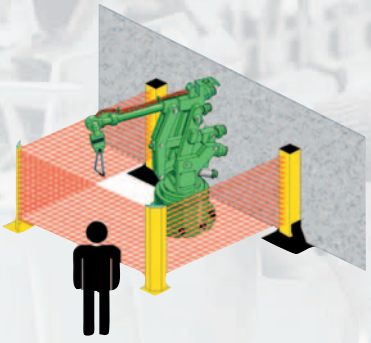
Standstill Monitor

Developed for applications where the rotational speed of mechanical parts in the machinery can be dangerous to the operator, or to the correct operation of the machine.
By measuring the residual voltage in the stator windings of the electric motor, the module allows the execution of certain operations. For example, automatic spindle change in machine tools, or operators opening protective barriers. When the residual voltage is below a set level (the response value) it is assumed that the shaft speed is zero, or within a safe range.



Safety Light Curtains

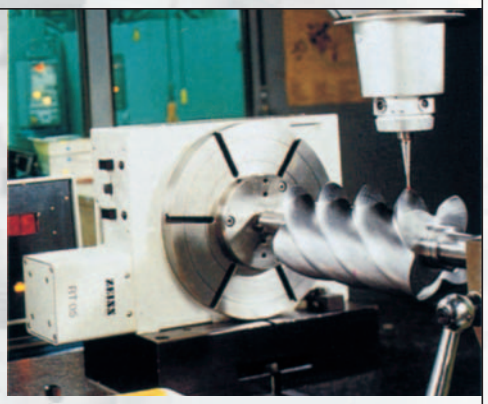
Used to control a side or a perimeter delimiting a dangerous point or zone, safety light curtains are used to stop the machinery every time the operator goes beyond the allowed area. Light curtains detect the presence of the operator through the interruption of the infrared beams between a transmitter and receiver unit.



Safety Mat System

Placed around a hazardous machine or zone, safety mats keep control of the whole area. The machinery will be stopped at any time the operator steps on the mat.

Safety Modules



An extensive range of safety modules for applications in industrial environments in accordance to the European Machinery Directive 98/37/EC and relevant Standards.

E-Stop safety modules and safety gate modules MA, NA, MS, NS

- In conformity with EN 954-1, EN 60204-1, EN 292-1 /-2, EN 418, EN 1088
- E-Stop Category 0 or 1
- 1 to 3 N.O. safety outputs
- Delayed safety output versions

Two hand device safety modules MD, ND

- In conformity with EN 954-1, EN 60204-1, EN 292-1 /-2, EN 574
- Safety category IIIC according to EN 574
- Simultaneous input control
- Self-monitoring
- Failure signalling by LEDs

Standstill monitor safety module MF1-C

- In conformity with EN 954-1, EN 60904, EN 292-1 /-2
- Safety Category 3
- 2 N.O. safety outputs
- Residual voltage measurement
- Single-phase and three-phase inputs connection
- Threshold value adjustable for each channel
- Simultaneous input control
- Suitable for electric motors powered by inverters

Safety modules for safety light curtain monitoring NL

- Safety category 4 in conformity with EN 954-1
- 3 N.O. safety outputs
- Automatic or manual restart
- Failure signalling by LEDs

Safety modules for safety mat monitoring NT

- In conformity with EN 292-1/-2, EN 60204, EN 1760-1
- Safety category 3 according to EN 954-1 (safety module + safety mat)
- Mat integrity monitoring
- Feedback circuit for external contactor monitoring
- Automatic or manual restart
- Failure signalling by LEDs

Lift levelling control module NA1/2-D LIFT, MA1-D LIFT

- In conformity with Lift Directive 95/16/EC, EN 81-1 /-2, EN 12015, EN 12016
- Double-channel input
- 2 N.O. safety outputs
- Failure signalling by LEDs

Extension safety modules NE

- For applications up to safety category 4 in conformity with EN 954-1
- 4 NO safety outputs
- Feedback circuit monitoring output

Elevators/Lifts and Safety: NA1/2-D LIFT Levelling Control Module

EN 81-1 and -2 standards list several requirements in terms of safety. With respect to electrical control, in particular, levelling and re-levelling of the elevator/lift car must fulfill specific needs according to techniques adopted for machinery safety as well.
Load variation on the car can cause misalignment between car and floor due to the elasticity within the system. This is especially noticeable with hydraulic systems involving high loads.
When this misalignment becomes too great, it is necessary to correct the car positioning, which brings about a specific safety issue as the operation is carried out with doors open. The safety level required by such control requires a logic control system to feature redundancy and self-monitoring, similar to machinery safety.
The new levelling control module **NA1/2-D LIFT** by Carlo Gavazzi, which conforms to the Lift Directive 95/16/EC and EN 81-1, 81-2 standards, makes sure that the levelling zone allowed is not exceeded by the car by using 2 magnetic or mechanical switches. As long as the car is within the levelling zone the module bypasses the safety chain with one safety output, while with the other output signals the safety control system that re-levelling can be carried out.

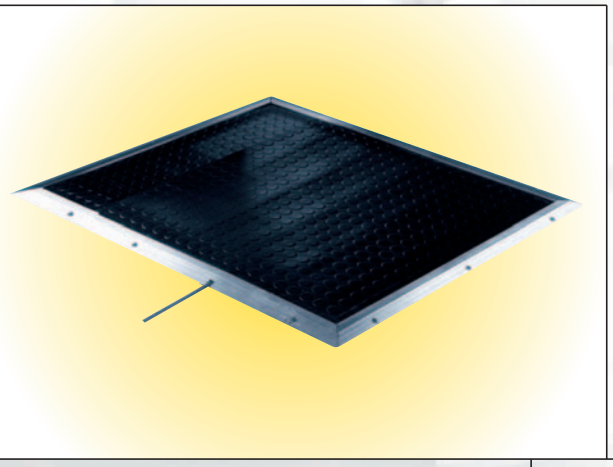
Technical features:

- Power supply: 24 VAC / VDC
- Safety outputs: 2 Normally Open
- Housing: modular, 22.5 mm wide
- Self-monitoring
- Approval TÜV NORD

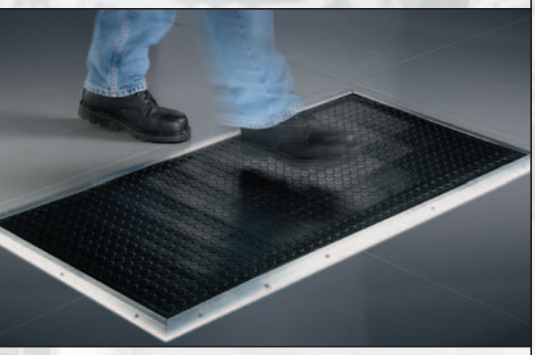
Safety Light Curtains

- Safety Category: 4 in conformance with EN 61496-1 and /-2
- Resolution: 14, 30, 415, 515 mm
- Protected height: 161 to 1650 mm
- Scanning distance: 6 to 25 m
- Power supply: 24 VDC
- 2 PNP self-monitored safety outputs
- Fixed/floating blanking, cascade operation, EDM
- Alignment LEDs
- Compact profiles
- Wide range of accessories available

- Approval TÜV UL



Pressure Sensing Safety Mat System for Area Monitoring



The **SM** safety mat is the sensing element of the system and is used for guarding access to potentially hazardous areas, typically around industrial machinery. The **SM** safety mat is connected to the new **NT1/2-D** safety module, that stops machine operation any time the operator steps into the protected area.

This safety system represents an effective way to protect operators working around hazardous machines, offering flexibility without restricting the operator's movement. Thanks to its simple construction, a special soldering process and total sealing of the external layers, these mats can be used for heavy-duty applications in damp and dusty environments, where no other safety devices could be utilized.
Another advantage of this type of solution is that with a safety mat a whole zone is monitored instead of only a perimeter, as is typical when using other safety devices. Usual applications include machine tools, industrial robots and presses.

How does it work?

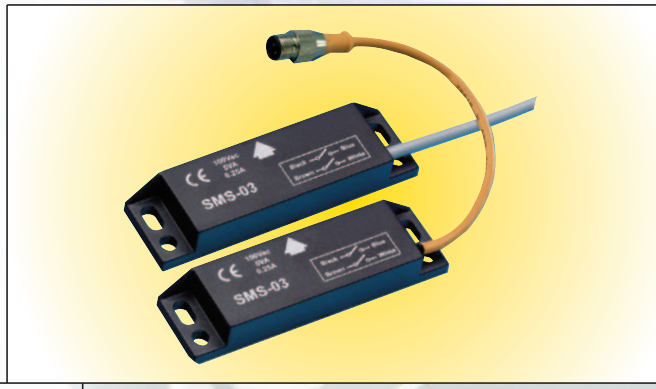
The Safety Mat System operates like a normally open switch, with the **NT1/2-D** Safety Module continuously checking the **SM** Safety Mat status and integrity. If an operator steps into the dangerous area the pressure on the mat closes the circuit and the safety relay stops the machine. If there is an anomaly within the system the safety relay is also triggered.
The new Safety Pressure Sensing Mat **SM** along with the safety control relay **NT1/2-D** constitutes a heavy-duty safety package of Safety Category 3 that conforms to the European Machinery Directive and standards EN 954-1 and EN 1760-1.

Technical Features

- Response time 75 ms max
- Minimum operating pressure 300 g/cm^2 according to EN 1760-1
- Maximum permissible load 100 Kg/ cm^2
- Expected mechanical life > 10^6 working cycles
- Mat integrity monitoring *
- Manual or automatic reset *
- Good chemical resistance
- Approval:

* Together with NT1/2-D safety module

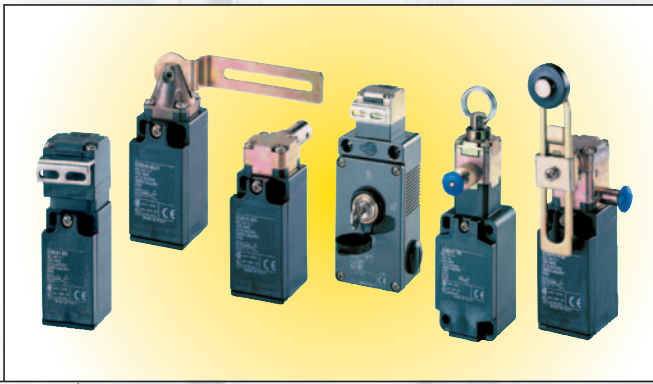
Encoded Safety Magnetic Sensors



- Encoded safety magnetic sensors for gate safe-guarding in applications up to safety category 4 according to EN 954-1
- Multiple flux coding
- Rectangular and cylindrical versions
- Cable or pig tail output connections
- LED signalling versions
- 1NO, 2 NO, 1NO+1NC, 2NO+1NC output functions
- IP 67 protection

Together with the safety modules series, CARLO GAVAZZI provides the complete solution for your application.

Safety Interlock Switches



- Safety switches with reset knob: in compliance with EN 81-1, positive opening—available in thermoplastic or metal housing
- Pull wire safety switches: Emergency stop device in conformity with EN 418, based on a ring-actuated system allowing connec tion to a pull-wire
- Five-way-key actuated safety switches: according to EN 292, EN 294 and EN 60204; designed to allow machinery to start only when key is inserted
- Key actuated interlocks: in compliance with EN 1088, do not allow the release of the key in unsafe conditions — available in thermoplastic or metal housing
- Safety switches for hinges: for protection of gates and windows through the direct application of the metal shaft to the hinge — thermoplastic or metal versions