



Industrial Automation

Solutions for
Packaging Machinery

Packaging Machinery

Solutions for



Filling

Inspection

**Wrapping
and sealing**

Labelling

ABOUT CARLO GAVAZZI

Carlo Gavazzi Automation is a multinational electronics group active in the design, manufacture and marketing of electronic equipment targeted at the global markets of industrial and building automation.

Our history is full of firsts and our products are installed in a huge number of applications all over the world. With more than 80 years of successful operation, our experience is unparalleled.

We have our headquarters in Europe and numerous offices around the world.

Our R&D competence centres and production sites are located in Denmark, Italy, Lithuania, Malta and the People's Republic of China.

We operate worldwide through 22 of our own sales companies and also selected representatives in more than 65 countries, from the United States in the West to the Pacific Rim in the East.

Our core competence in automation spans four product lines: Sense, Switch, Control and Fieldbus.

Our wide array of products includes sensors, monitoring relays, timers, energy management system, solid state relays, safety devices and fieldbus systems.

We focus our expertise on offering state-of-the-art product solutions in selected market segments.

Our customers include original equipment manufacturers of packaging machines, plastic-injection moulding machines, food and beverage production machines, conveying and material handling equipment, door and entrance control systems, lifts and escalators, as well as heating, ventilation and air-conditioning devices.



DESIGNED TO MEET MARKET REQUIREMENTS

The packaging machinery industry requires constant changes and innovations to meet the demands of a constantly evolving market.

This means new technology to produce more reliable and flexible machinery with a multitude of possibilities for packaging. To meet these needs, the industry has gradually introduced more automation and more sophisticated electronic controls.

In today's packaging production lines, the different stages are completed in minutes rather than in hours compared to years past.

In all types of packaging machinery – in all sectors of industry - each component must meet the strict requirements of the individual application. This is to guarantee the continuity of production and the conformity of the packaged product to quality standards.

For many years, Carlo Gavazzi photoelectric, inductive and capacitive sensors have proven to be the best solution in applications for filling and checking. In shrink wrapping applications, careful control of heating is essential for good results. Solid state relays are used to switch the heaters on and off in order to maintain the correct temperature.

The packaging industry also needs safety devices to guarantee the safety of the operators engaged in the work area, ensuring safe operation of the machines.

Carlo Gavazzi's comprehensive safety range includes safety light curtains and key switches that detect intrusions within the non-safe zone/s and shut down the machinery in a controlled manner via standard and/or configurable safety modules.

For all its products, Carlo Gavazzi offers easy installation, high precision and long term reliability.

Filling Packaging Machinery



Photoelectric sensors

PD30

Photoelectric sensors

PA18
PH18

Inductive sensors

ICB

Ultrasonic sensors

UA

Capacitive sensors

EC
CD
CA

Conductive level probes

CLH

Carlo Gavazzi offers a complete range of automation components for the packaging industry.

In a bottling line UA ultrasonic sensors are used to verify that the appropriate level of a product is in the container before it is sealed and shipped.

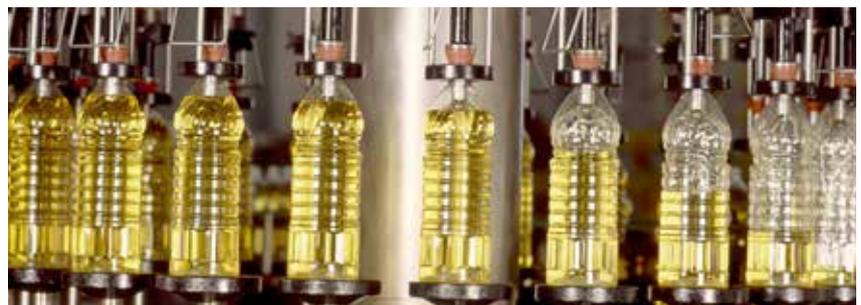
Ultrasonic sensors are also used to measure the level of ingredients – either liquid or solid – in a container. The continual analog output signal allows for better control of the process. The level of solid material, such as ground coffee, coffee beans or flour, can be accurately detected using photoelectric sensors.

The new PA /PH 18 sensors come with a new mounting bracket which

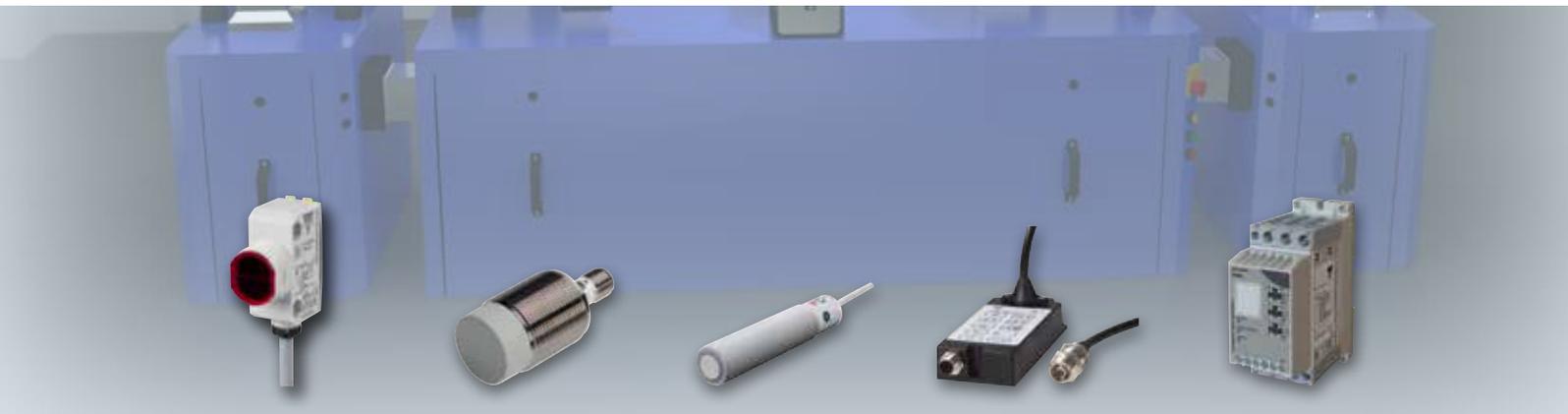
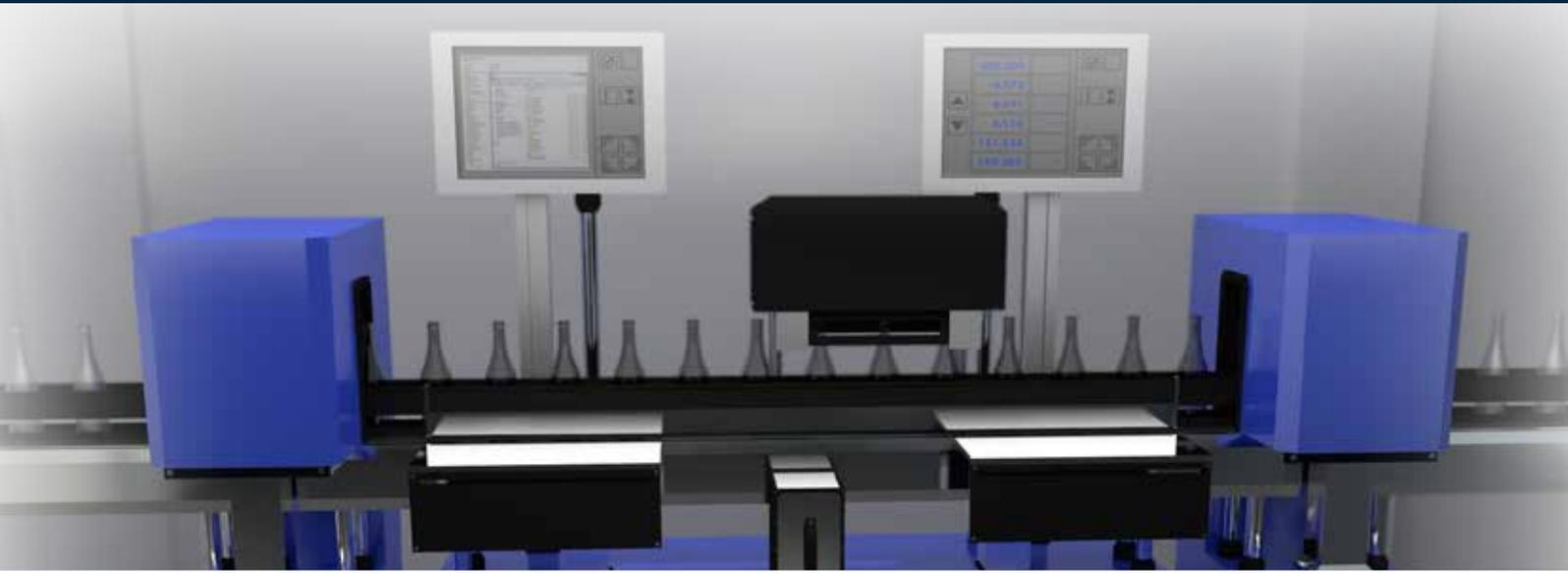
allows fast mounting and space saving, but also have a smooth design. Axial, radial and square versions are available.

Important benefits are that objects do not hit the sensors as often and the conveyor can be cleaned much more easily.

For accurate control of the filling process, a PD30 sensor can also provide an output signal when the product is at the appropriate fill level. A background suppression sensor sets the detecting depth, excluding the shiny bottom of the tin, assuring safe detection irrespective of the colour or material of the contents.



Inspection



Photoelectric sensors

**PH18
PA18
PD30**

Inductive sensors

ICB

Ultrasonic sensors

UA

Photoelectric sensors

PD12

Soft starters

RSGD

Carlo Gavazzi products have many applications in the inspection-detection field. For bottling lines that have darker or less transparent bottles, PA18 through beam sensors can be used to detect the presence of the bottles. The new family of products is from 40 % to 60 % smaller than existing housings.

The sensor has a manual potentiometer and for some versions no adjustment is necessary: simply connect the sensor and you are up and running. Furthermore, the specialised optics of the PD30CNG - combined with a reflector - are perfect for detecting clear bottles on a conveyor.

To verify that a bottle cap is present on the bottle a PD60 fiber optic amplifier with a fiber optic cable and lens are positioned above the bottles and programmed to detect any reflection from the bottle cap.

The PD12 colour sensor recognises up to four separate colours, and gives an output for each. For instance, it can verify that a multi-colour sponge is positioned correctly, so that packaging is consistent and orderly.

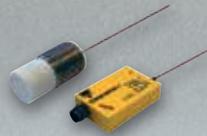
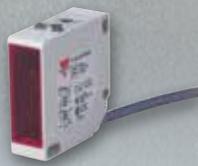
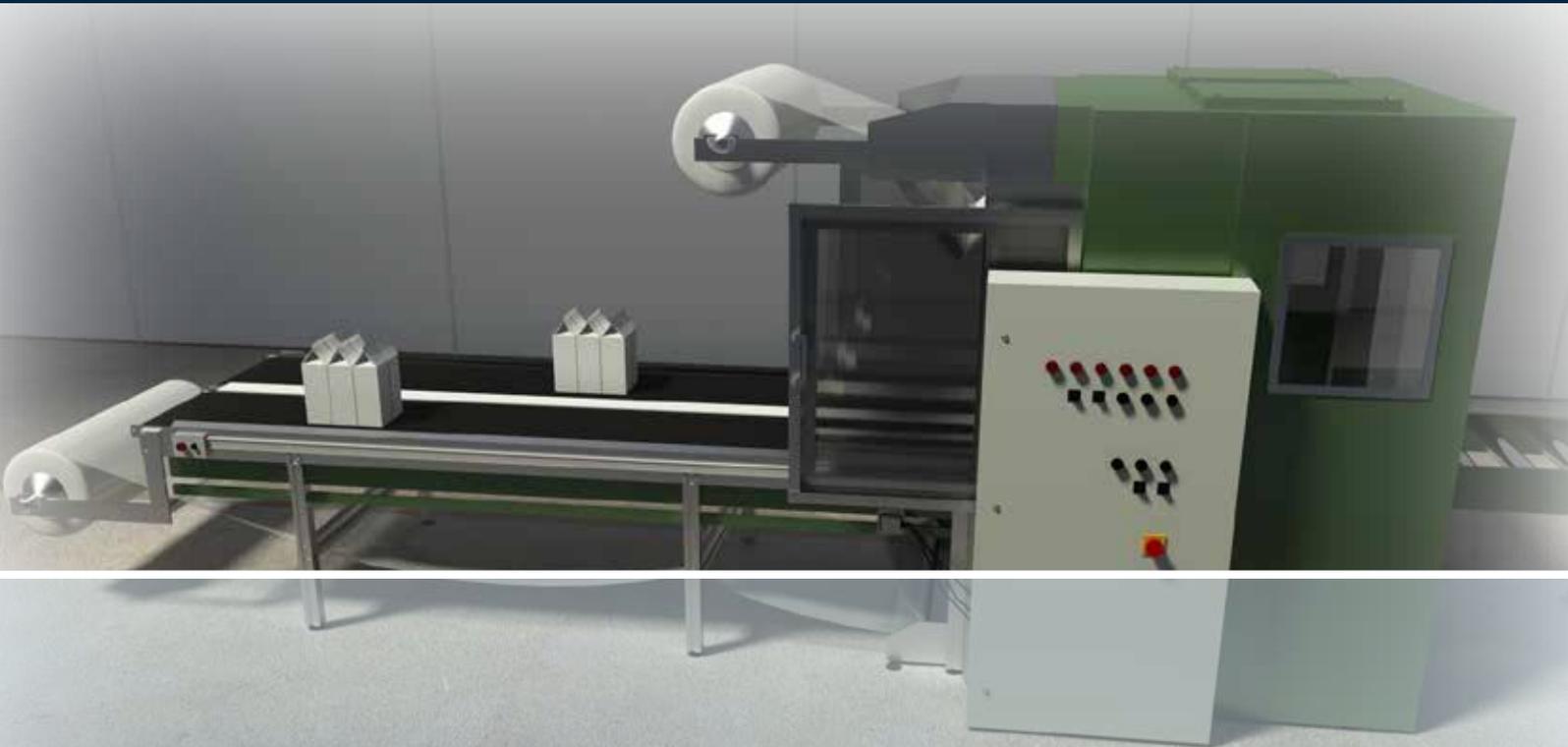
In some confectionery applications, it is necessary to detect if a cake decoration is present or properly positioned.

The PD30 diffuse sensor can recognise the coloured decoration on top of the cake.



Packaging Machinery

Wrapping and sealing



Photoelectric sensors

Photoelectric sensors

Capacitive sensors

Solid state switches

Solid state switches

3-phase solid state contactors

PD112

**PC50
PD30**

ECH

**RGS
RGC
RM**

**RGC15
RGS15**

**RGC3A
RGC2A**

Multiple bottles are bundled together and shrink-wrapped. Carlo Gavazzi solid state relays (RM or RG series) allow fast switching of heaters that enable accurate control of the process temperature thus maintaining an even shrink of the plastic wrap. Solid state solutions allow frequent switching without affecting the lifetime of the switch, unlike mechanical contactors. In order to verify that the shrink-wrap has been added, a PD30CNG clear object sensor is positioned to focus at the level of the bottle necks. If the shrink-wrap is present, the clear object sensor will have a continuous output as the package passes by. Diffuse reflective photoelectric sensors

with long detecting distance (PD112) detect goods on the pallet to ensure that wrapping is stopped at the required height. In hot-melt heating systems the high temperature ECH sensors have proven their capability and reliability. Other applications include automatic continuous processes of thermoforming, filling and sealing. The RG range offers a wide variety of solutions, starting from just solid state switching of heaters to more sophisticated solutions that apart from the switching function integrate monitoring features that are able to detect load and system malfunctions to guarantee a reliable thermal process.



Labelling



Inductive sensors

ICB

Photoelectric sensors

PD60

Photoelectric sensors

PD12

Photoelectric fork sensor

PF80



Once a container is filled, the next step is to apply the appropriate label.

Contrast sensors (PD60CNK) are used to detect the presence of a mark on a bottleneck label, which confirms that the bottle is in correct position for the main label to be applied. Furthermore, these sensors detect the presence of security bands that are required on many bottles and containers. They recognise the difference between the security band and bottle cap. Precise control of labels, even small labels, is an important part of the packaging process. The surfaces of the labels are often reflective.

The photoelectric proximity sensors provide the necessary sensitivity for

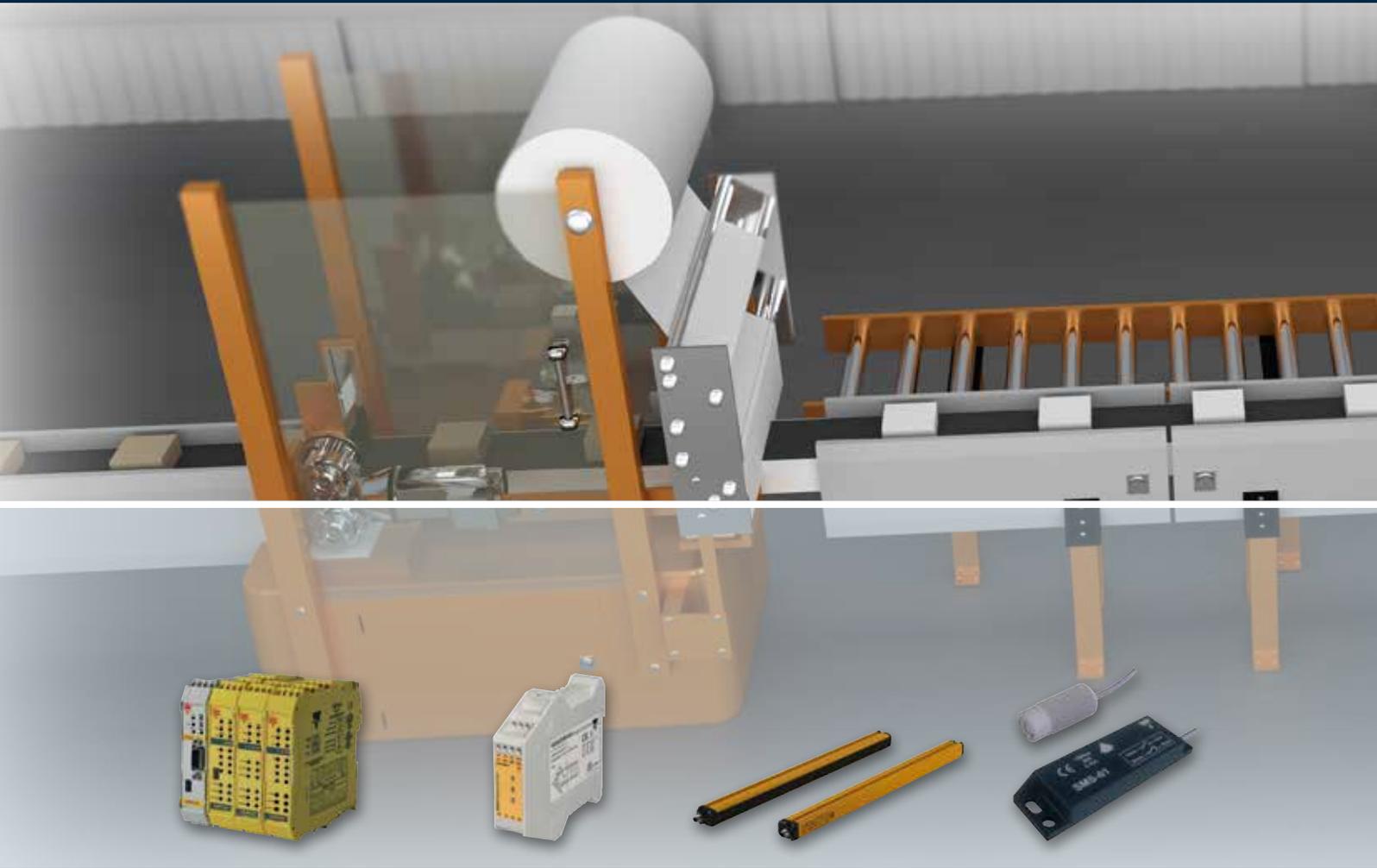
maximum reliability.

Colour sensors are used for detection of coloured labels, marks, tags, wires, liquids, etc. The PD12 is a fibre optic amplifier made specifically for recognition of 1 or 1-4 colours. Teaching of the colours is easily performed by means of the "Teach-in" function. Each colour has a separate output which can be delayed up to 5 secs by means of the built-in timer.

Detection of labels, marks and double sheets, as well as holes and edges, are typical applications for the PF80 fork sensor.

Packaging Machinery

Our expertise



Certus configurable safety modules

CERTUS

Carlo Gavazzi's safety devices are especially popular in the packaging machinery market segment. They must be able to prevent access to dangerous areas, until the machines are completely stopped. For example, the new CERTUS configurable safety module offers up to 128 inputs and 16 pairs of programmable solid state outputs in a compact modular system, managing and monitoring at the same time safety sensors and commands such as: safety light curtains, photocells, emergency stops, two-hand controls, mechanical switches, laser scanners, and safety mats. CERTUS is certified to the highest safety levels: SIL+, SILCL 3, PL e and Cat.4, and its advantages to the packaging industry are endless. Safety light curtains, types 2 and 4, with the

Safety modules

**NES02D
NES13D
NLG**

muting function provide easy access to load and unload optimising productivity output. The type 4 safety light curtains also feature the EDM function to control the reliability of external devices. The safety modules (used with safety light curtains, safety photo sensors, emergency stop buttons or safety magnetic switches) close the safety control loop.

Safety light curtains

**SC4
SC2**

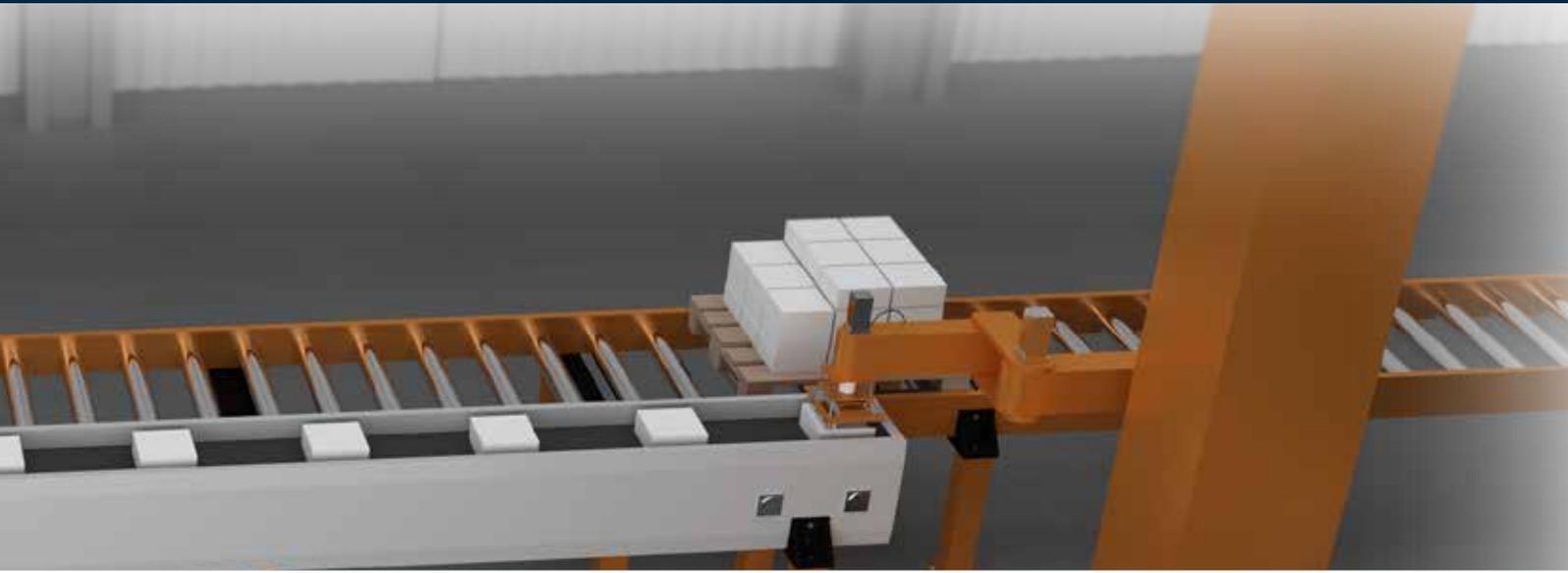
Safety magnetic switches

**SMS
CLS**

Our safety magnetic switches (SMS, CLS) are commonly used in pharmaceutical, and food and beverage plants, thanks to their ability to be easily cleaned of germs, bacteria, etc. All of this makes Carlo Gavazzi the clear choice for safety components in your packaging machinery applications.



Safety devices and energy efficiency



Timers

**DAA
DCB**

Carlo Gavazzi offers a vast array of products to improve energy efficiency and to ensure the monitoring of entire processes - all from one source.

Energy management components, for instance, provide vital information for operators to identify consumption trends and take corrective action. EM21 72 DIN

Monitoring relays

**DPB01
DPA01
DIB01**

energy meters can monitor all the main parameters of an electric line or load. Monitoring relays DPB01/PP01 or DPB71 monitor phase sequence-loss and over-under voltage of the mains to set up a check system.

Carlo Gavazzi timers - available in four different housings (standard DIN-rail,

Energy meters

EM210

Plug-in, 48x48 and MiniD housing) - provide correct, reliable solutions for every application.

Stack lights, beacons and buzzers are used on packaging machinery as visual or audible signalling if any malfunction occurs.

Emergency stop switches allow the complete shutdown of systems or processes to protect operators and avoid damage to the machines.

Switching power supplies

SPD



Packaging Machinery

Our product range

Photoelectric sensors



PA18, PH18

- Standard M18 cylindrical housing
- Power supply: 10 to 30 VDC
- Separate models available for NPN or PNP outputs
- Range: 1 m (Axial), 0.8 m (Radial)
- Sensitivity adjustment by potentiometer
- Approvals/Marks: CE - cULus

MAIN FEATURES

- ECOLAB approved/CE-marking /cULus
- Approved according to UL508
- Diagnostic LED indication (Green and Yellow LED)
- Short-circuit, reverse polarity and overload protection

Photoelectric sensors



PD30

- World standard housing style
- Power supply: 10 to 30 VDC
- NPN or PNP transistor output
- Connection cable or built in M8 connector
- Sensitivity adjustment by Teach-in or by potentiometer
- Approvals/Marks: CE - UL 508

MAIN FEATURES

- Background suppression version, with accurate detection
- Long detecting distances
- Protection: reverse polarity, short circuit and transients

Photoelectric sensors



PC50

- Dimensions: 17 x 50 x 50 mm
- Sensing distance up to 20 m
- Modulated infrared light
- Make and break switching function selectable
- Cable and plug version
- Approvals/Marks: CE - UL CSA

MAIN FEATURES

- Adjustable sensitivity
- High EMC immunity
- Protection: reverse polarity, short circuit and transients

Photoelectric sensors



PD112

- Dimensions: 25 x 45 x 112 mm
- Long range Back Ground Suppression (BGS) sensor
- Power supply receiver: 10 to 30 VDC
- NPN and PNP NO or NC output
- Emitter with Mute Input for testing sensor function
- 2,5 m sensing distance

MAIN FEATURES

- Light beam approved to Safety Category 2
- UL325, UL508, EN12445, EN12453, EN12978
- Long detection range on black objects

Photoelectric sensors



PD60, PD12

- Fibre optic contrast sensor, (PD60 retroreflective polarized for transparent objects)
- Operational voltage 10 - 30 VDC (PD60), 24 VDC (PD12)
- Teach-In (keyboard or remote setup)
- Approvals/Marks: CE - cUL

MAIN FEATURES

- Light or dark switching selectable ((PD60)
- Detection of 1 or up to 4 recorded colours
- Microprocessor controlled and EEPROM parameter storage
- High immunity to shiny surfaces

Photoelectric fork sensor



PF80

- Dimensions: 12 x 37.5 x 80 mm. Slot width 3 mm
- Teach-In: push button or by wire
- Rated operational voltage 10 - 30 VDC
- Aluminium housing
- Approvals/ Marks: CE

MAIN FEATURES

- High speed of detection
- Detection of transparent material
- Detection of labels, marks and double sheets

Our product range

Ultrasonic sensors



UA12 /UA18 /UA30

- Up to 6 m sensing distance
- Analogue output 4-20 mA or 0-10 VDC
- Switching output with two setpoints
- M12, M18 or M30 versions
- Housing material: plastic or AISI316L Stainless Steel
- Approvals/Marks: CE - cULus

MAIN FEATURES

- Excellent EMC performance and precision
- Detects clear, transparent and shiny targets, solid objects, liquid or granules.
- Protection: short circuit, transient and reverse polarity

Inductive sensors



ICB12 / ICB18 / ICB30

- M12, M18 and M30 Nickel-brass housing in short or long barrel lengths
- Standard and double distance sensing ranges
- Output functions: NO or NC, NPN or PNP
- Two metre oil resistant PVC cable or M12 plug version
- Protection: reverse polarity, short circuit, transients

MAIN FEATURES

- High precision and programmable outputs thanks to microprocessor technology
- Eco-friendly potting material made from recycled corn by-product
- Air-core sensing coil for highest reliability and resistance to vibration and impacts

Conductive level controllers / probes



CLD / CLH

- Multiple filling and emptying applications
- Rated operational voltage: 24 VAC/DC, 115 VAC or 230 VAC
- Output 2 x 8 A/250 VAC SPDT relay
- Flexible conductive level probe CLH (up to 5 electrodes)

MAIN FEATURES

- Easy installation on DIN rails or with 11 pin circular plug
- Sensitivity adjustment from 250 Ω to 500 KΩ

Capacitive sensors



CA / EC

- Dimensions: M, M18, M30
- Tripleshield™ sensor protection
- Plastic housing, DC and AC versions
- Sensing distance 0.5-12 mm
- Approvals/Marks: CE - UL - CSA

MAIN FEATURES

- Optimized features for level detection in plastic and rubber applications
- Sensing face can withstand temperatures up to 120°C
- Protection: short circuit, transient and reverse polarity

Capacitive sensors



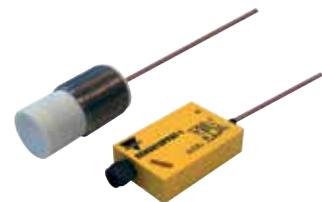
CD

- Dimensions: 28 x 46 x 5.5 mm
- Tripleshield™ sensor protection
- Sensing distance: 1 - 10 mm
- Teach-in via push button or wire input
- Approvals/Marks: CE - UL - CSA

MAIN FEATURES

- Thin profile
- Selectable make-or-break switching by means of Teach-in function
- Protection: short circuit, transient and reverse polarity

Capacitive sensors



ECH

- Sensor diameter: M30, tefflon and stainless steel
- Adjustable sensing distance: 4 to 15 mm, factory set for 10 mm
- Output: transistor NPN or PNP, make & break switching
- Power supply: 10 to 40 VDC

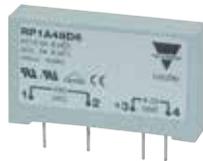
MAIN FEATURES

- Provided with a separate tefflon sensor head in M30 for temperature application within the range of -196°C and +180°C
- Protection: reverse polarity, short-circuit, transients

Packaging Machinery

Our product range

PCB mount solid state relays



RP1

- Dimensions: 25.4 x 43 x 10.5 mm
- Operational voltage range: 24-480 VAC
- Rated operational current: 3, 5, 5.5, 10 AAC
- Control input ranges: 4-32 VDC, 16-32 VAC
- Approvals/Marks: CE - cURus - VDE [RP1...3,5,6]

MAIN FEATURES

- Zero cross or random switching
- 4 kV isolation between input & output
- Accessories for DIN mount option available

1-phase solid state relays



RM1.., RAM1..

- Dimensions: 58.2 x 44.8 x 28.8 mm, panel mount
- Rated operational voltage: up to 660 VAC
- Rated operational current: 25, 50, 75, 100, 125 AAC
- Control input ranges: 4-32 VDC, 20-280 VAC
- Approvals/Marks: CE - cURus - CSA - VDE [RAM1A..]

MAIN FEATURES

- Zero cross or random switching
- Low noise emission - EN55011 class B conformance [RAM1A..]
- Integrated over-voltage protection [RM1]

1-phase solid state switches



RGS1.., RGC1..

- Product width: 17.5 mm up to 70 mm, DIN or panel mount
- Ratings up to 660 VAC, 90 AAC, 18000 A²s
- Integrated output overvoltage protection
- Control input ranges: 4-32 VDC, 20-275 VAC (24-190 VDC)
- Approvals/Marks: CE-cULus (RGC) - cURus (RGS) - CSA (RGS) - VDE - GL (RGC up to 30 AAC)

MAIN FEATURES

- Integrated heatsink (RGC1..), without heatsink (RGS1..)
- 100 kA short circuit current rating
- Optional overtemperature protection

1-phase solid state switches with current monitoring



RGC1S.., RGS1S..

- Product width: 22.5 mm up to 70 mm, DIN or panel mount
- Ratings: up to 660 VAC, 90 AAC, 18000 A²s
- Integrated output overvoltage protection
- Control input range: 4-32 VDC
- Approvals/Marks: CE - cULus [RGC1S] - cURus [RGS1S] - CSA [RGS1S]

MAIN FEATURES

- Partial load failure detection (1/6)
- Monitoring for SSR and load circuit malfunction
- TEACH by local push button or remote signal

3-phase solid state contactors



RGC3A.., RGC2A..

- Product width: up to 70 mm, DIN rail mount
- Ratings: up to 660 VAC 75 AAC/pole [RGC2], 65 AAC/pole [RGC3] @ 40°C
- Motor ratings up to 11 kW @ 400 VAC, 25 HP @ 600 VAC
- Control input range: 5-32 VDC, 20-275 VAC (24-190 VDC)
- Approvals/Marks: CE - cULus

MAIN FEATURES

- 3-phase; 2-pole [RGC2] or 3-pole [RGC3] switching
- Monitoring for SSR and load circuit malfunction [RGC..M]
- 100 kA short circuit current rating

Soft starters



RSGD

- Motor rating: up to 22 kW in 45 mm
- Ramp up time: 1 - 20 sec
- Internally bypassed
- Multi-voltage operation: RSGD40: 220 - 400 VAC, RSGD60: 220 - 600 VAC
- Wide control voltage range : Option E: 110 - 400 VAC, Option F: 24 VAC/DC

MAIN FEATURES

- Easy to use and setup
- Current balancing algorithm
- Auxiliary relays for top of ramp and alarms

Our product range

CERTUS configurable safety module



CMM (CERTUS Master Module)

- 4 non-safety test outputs for sensor monitoring
- 2 non-safety programmable digital signal outputs
- 2 non-safety inputs for Start / Restart interlock and EDM
- CMC config memory card slot
- LOG file containing the last 5 configuration modifications
- 24 connectors in 22.5 mm
- Connection with other exp. units via rear bus

MAIN FEATURES

- Also usable as a stand-alone device, able to control any other expansion unit
- 8 safety digital inputs
- 2 safety OSSD pairs with 400 mA output current
- Certified to the highest safety levels: SIL +, SILCL 3, PLe, Cat.4, CE, TUV, cULus

CERTUS configurable I/O expansion modules



C I/O

- Wide range of Input/Output, Input only or Output only (both OSSD and standard relay) expansion units to serve different application requirements
- In addition to the safety Inputs/Outputs, different models offer a variety of non-safety Inputs/Outputs such as: inputs for Start / Restart interlock and EDM, test outputs for sensor monitoring or programmable digital signalling

MAIN FEATURES

- Subject to the model selected the models offer the following eight combinations
 - 8 Inputs 2 Outputs; 12 Inputs 8 test Outputs
 - 8 Inputs, 16 Inputs,
 - 2 OSSD, 4 OSSD
 - 2 relay Outputs, 4 relay Outputs

CERTUS Data and Diagnostics modules + CERTUS bus transfer



DDC + CBT

- DDC: Expansion unit for Diagnostics and Data Communication:
 - C PFBUS - Profibus DP, - C DNET - DeviceNET
 - C CAN - CANOpen, - C EIP - Ethernet IP
 - C ECAT - EtherCAT, - C PFNET - PROFINET
 - C OMMS - Universal Serial Bus
- Bus Transfer: Interface module allowing Interface module allowing the connection of remote expansions via bus

MAIN FEATURES

- DDC: Allows communication with most common industrial Fieldbus systems
- Bus Transfer: Up to 100m for each connection. Maximum 5 CBT expansions. Ideal solution for the interconnection of the safety functions of several machines in a production line

Safety light curtains



SC4 / SC2

- Dimensions: 36.9 x 32.3 mm in lengths from 300 to 1500 mm for type 2, and from 150 to 1650 mm for type 4
- 24 VDC supply with two PNP transistor outputs
- IEC-61496-2 environment light rejection
- Approv/Marks: CE - cULus

MAIN FEATURES

- Selectable Manual/Automatic Restart, EDM and Anti-interference
- Compact body

Standard safety modules



NES02D / NES13D / NLG

- Safety modules for gate and emergency stop (NE) and light curtain (NL)
- 2NO / 3NO safety outputs
- IP40 protection for housing and IP20 protection for terminals
- Approvals/Marks: CE - cULus

MAIN FEATURES

- Safety category 4
- < 30 ms response time

Safety magnetic sensors and units



SMS / CLS

- Dimensions: 88 x 25 x 13 mm
- Normally open or closed output
- Up to 100 VAC switching
- 250 mA maximum output
- Up to 5 VA switching power

MAIN FEATURES

- Rugged plastic housing
- Operating temperature : -10 to 55°C
- IP65 protection

Packaging Machinery

Our product range

Monitoring relays



DPA01

- Dimensions: 81 x 22.5 x 99.5 mm DIN-rail housing
- 3-phase monitoring relay for phase sequence and phase loss
- Supply range from 208 to 690 VAC covered by two multi-voltage relays
- Approvals/Marks: UL, CCC and CSA approved

MAIN FEATURES

- Detects when all phases are present and have the correct sequence
- LED indication for relay and power supply ON

Monitoring relays



DPB01

- Dimensions: 81 x 22.5 x 99.5 mm DIN-rail housing
- TRMS 3-phase over and under voltage, phase sequence and phase loss monitoring relays
- 3 phase AC (own power supply); regenerated voltage
- Power supply 208 to 480 VAC
- Approvals/Marks: UL and CSA approved

MAIN FEATURES

- Selection of measuring range by DIP-switches
- LED indication for relay, alarm and power supply ON

Monitoring relays Current transformers



DIB01 / A82

- Dimensions: 81 x 22.5 x 99.5 mm DIN-rail housing
- TRMS AC/DC over or under current monitoring relay
- Direct measuring or throughcurrent transformer (A82)
- A82: true RMS AC current metering transformer for 25, 50, 100, 250 or 500 AAC
- Approvals/Marks: UL and CSA approved

MAIN FEATURES

- Programmable latching or inhibit at set level
- LED indication for relay, alarm and power supply ON
- A82: easy interface to PLC or setpoint relays

Energy meters



EM210

- 3-phase energy meters with CT connection
- Solid or split-core 5A CT
- Dimensions: 4-DIN rail module or 72 x 72 housing
- Class 1 (kWh) acc. to EN62053-1
- Pulse open collector or serial RS485 output

MAIN FEATURES

- Very compact and space saving meter
- Can be installed both on DIN-rail or on the panel
- On request, MID annex D certification available

Timers



DAA51, DMB51

- Dimensions: 81 x 17,5 x 67,2 mm DIN-rail housing
- Delay on operate function (DAA), multifunction (DMB)
- Combined AC and DC power supply
- Repeatability: < 0.2%
- Approvals/Marks: UL, CSA, RINA approved

MAIN FEATURES

- Delay on operate/release; interval (manual/automatic start);
- Double interval; symmetrical recycler (ON or OFF first)
- Timing range from 0.1s to 100h

Power supplies



SPD

- DIN-rail housing
- Short circuit protection
- 1-phase AC
- Rated input voltage: 115/230 VAC selectable 100/240 VAC
- Approvals/Marks: UL, cUL listed and TÜV/CE approved

MAIN FEATURES

- Overload protection
- Parallel versions available
- High efficiency



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