CARLO GAVAZZI
Automation Components

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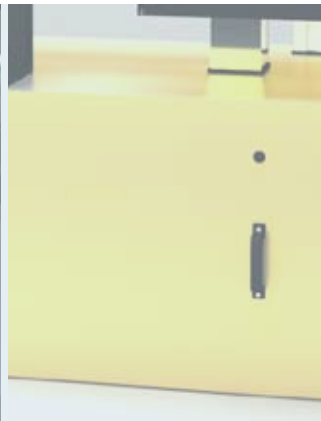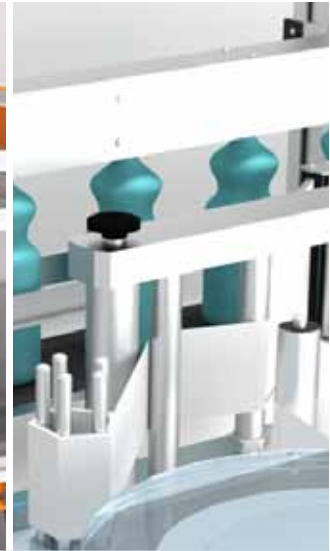1931–2011

CARLO GAVAZZI

Industrial Automation

Solutions for
Packaging Machinery

Solutions for Packaging Machinery

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 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 21 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 five product lines : Sense, Switch, Control, Fieldbus and EcoEnergy equipment.

Our wide array of products includes sensors, monitoring relays, timers, solid-state relays, electronic motor controllers, energy management equipment, fieldbus systems and components for renewable energy.

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 materials 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 machine industry is noted for its advanced technology, due to the high level of automation of the packaging lines and the intensive use of advanced electronic components

In all types of packaging machinery - food and beverage as well as pharmaceutical and cosmetics - each component has to meet the strict requirements of the individual equipment.

This is to guarantee the continuity of production and the conformity of the packed 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 inspection.

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.

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

Carlo Gavazzi light curtains, magnetic switches and key switches detect intrusion into a non safe zone and shut down the machinery via a safety module.

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

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Filling

Photoelectric sensors	Photoelectric sensors	Inductive sensor	Ulrasonic sensor	Capacitive sensors	Conductive sensors
PD30 MOFT	PA18 PH18	ICB	UA	EC CD	CLH CLD

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 continuous 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 has a smooth design. Axial, radial and square versions are available.

Important benefits are that objects do not hit the sensors so often and the conveyor can be cleaned much more easily.
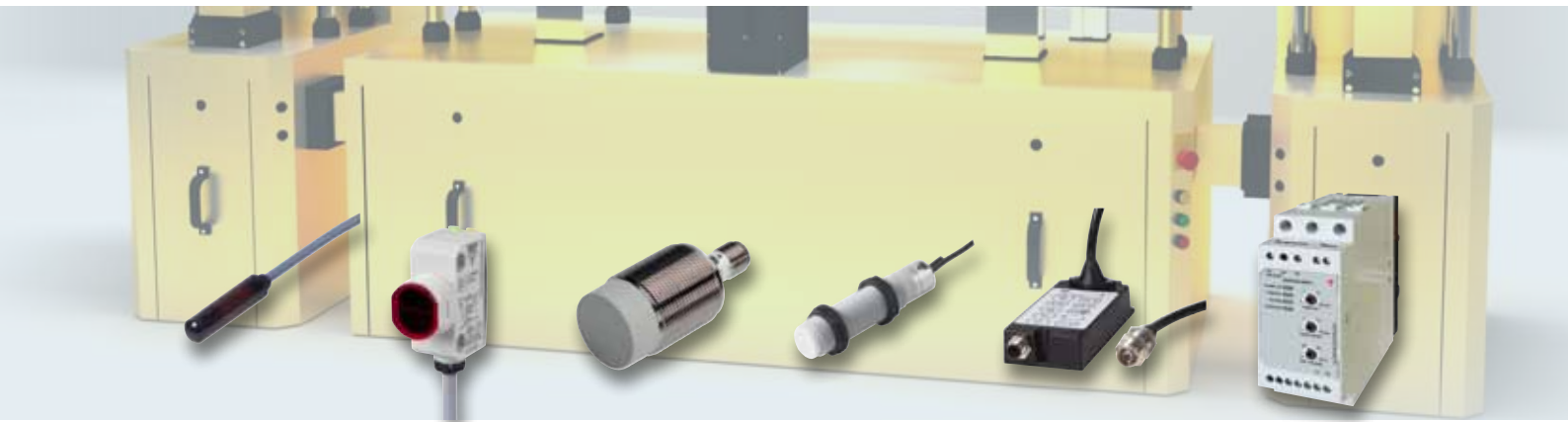
For accurate control of the filling process a PD30 sensor can also provide an output signal when the product is at the appropriate fill level.

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	Photoelectric sensors	Inductive sensor	Ulrasonic sensor	Photoelectric sensor	Soft starter
PD30 MOFT	PA18 PH18	ICB	UA	PD12	RSHR MIDI

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: you just connect the sensor and you are up and running.
Furthermore, the specialised optics of the PD60CNG - 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.
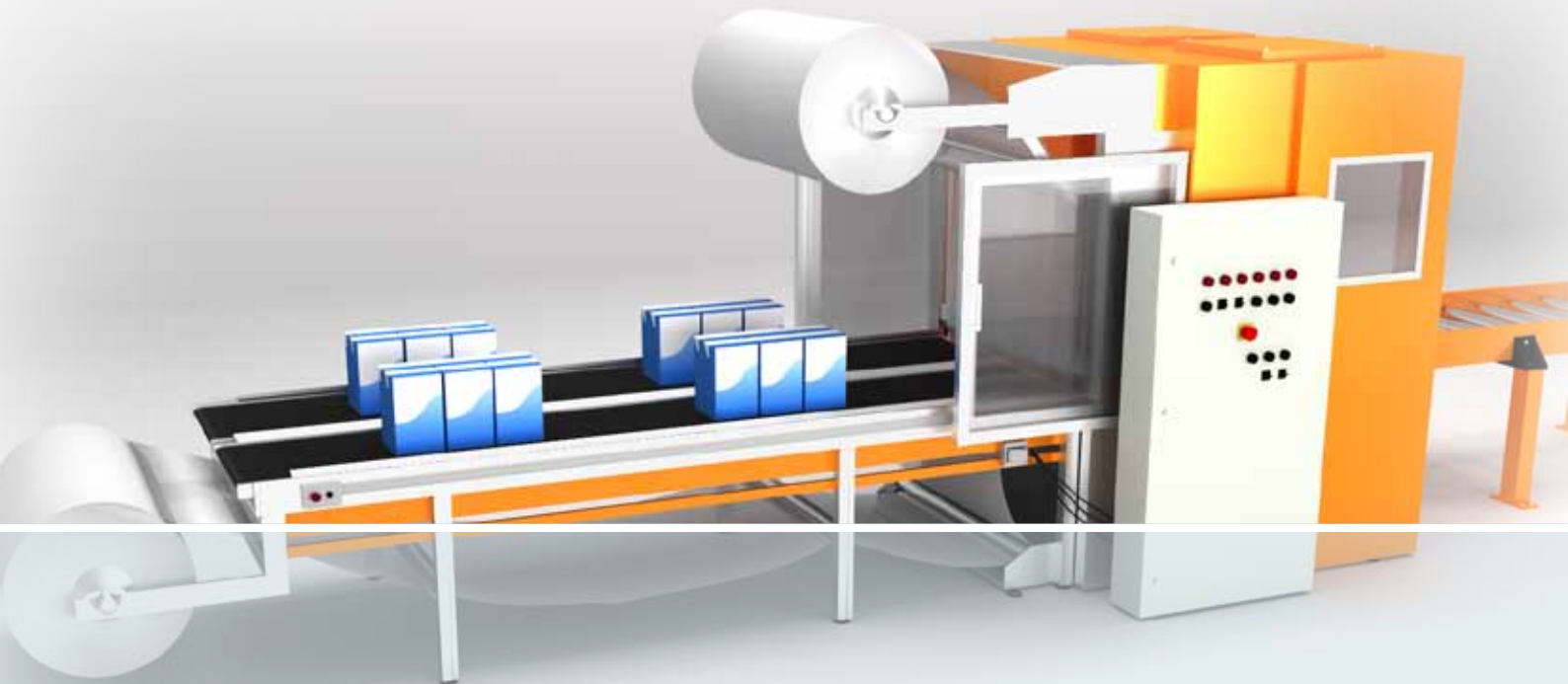In some confectionery applications, it is necessary to detect if a cake decoration is present or properly positioned.
The PD30 diffuse sensor can recognise the coloured decoration on top of the cake.

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Wrapping and sealing

Photoelectric sensor	Photoelectric sensor	Solid state relay	Solid state relay	3-phase switching device
PC50	**PD60**	**RM**	**RGS DIN**	**RZ3A**

Multiple bottles are bundled together and shrink-wrapped. Carlo Gavazzi solid state relays (RM, RJ orRZ3A series) are used to switch the heaters on and off to control the temperature, thus maintaining an even shrink of the plastic wrap.

In order to verify that the shrink-wrap has been added, a PD60CNG 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.

If the shrink-wrap has not been applied, the sensor will detect only the bottles. Other common applications include automatic continuous processes of thermoforming, filling and sealing.

For these applications our SSR RGC series (with integrated load monitoring) assures high accuracy in temperature control.

With a resulting maximum temperature variation of +/- 1°C we are able to support constantly high quality production and sealing of plastic trays.

Labelling

Inductive sensor	Photoelectric sensor	Photoelectric sensor	Photoelectric sensor
ICB	PF80	PD60	PD12

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.

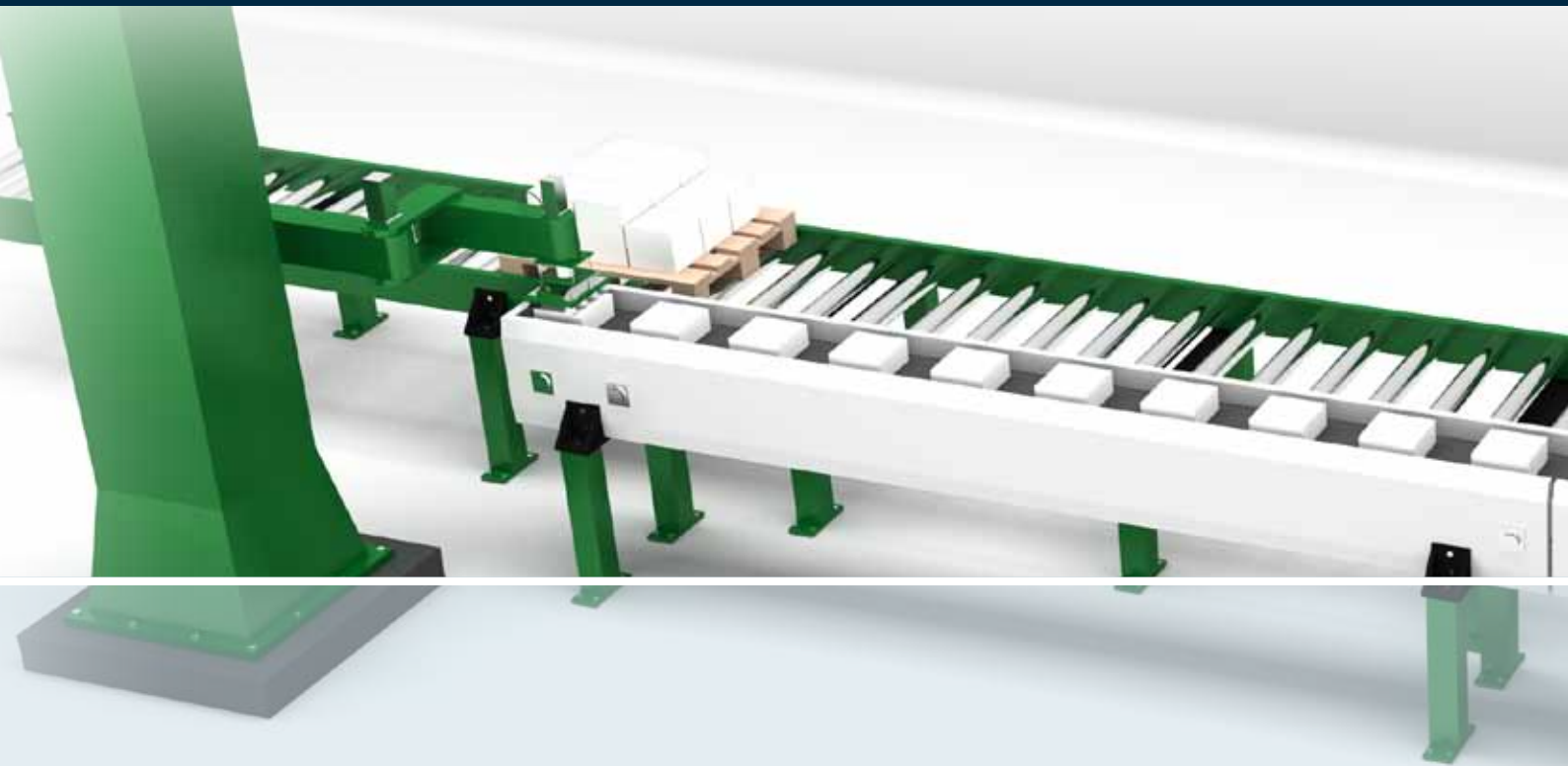The photoelectric proximity sensors provide the necessary sensitivity for maximum reliability.

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 to 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.

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.

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Safety magnetic switches	Limit switches	Safety module	Safety light curtains
SMS **CLS**	**PS**	**NA13D**	**SB4**

Carlo Gavazzi's safety devices are especially popular for packaging machinery. They must be able to prevent access to dangerous areas, until the machines are completely stopped.

For instance, the emergency stop and safety gates module NDSB is used to stop a cellophaning machine every time workers enter its dangerous area. When workers have to remove the pallet - after the machine has filled it - a system able to protect them is needed. A simple and reliable way to deal with this issue is to use safety light curtains (SB series) with NLG safety modules.

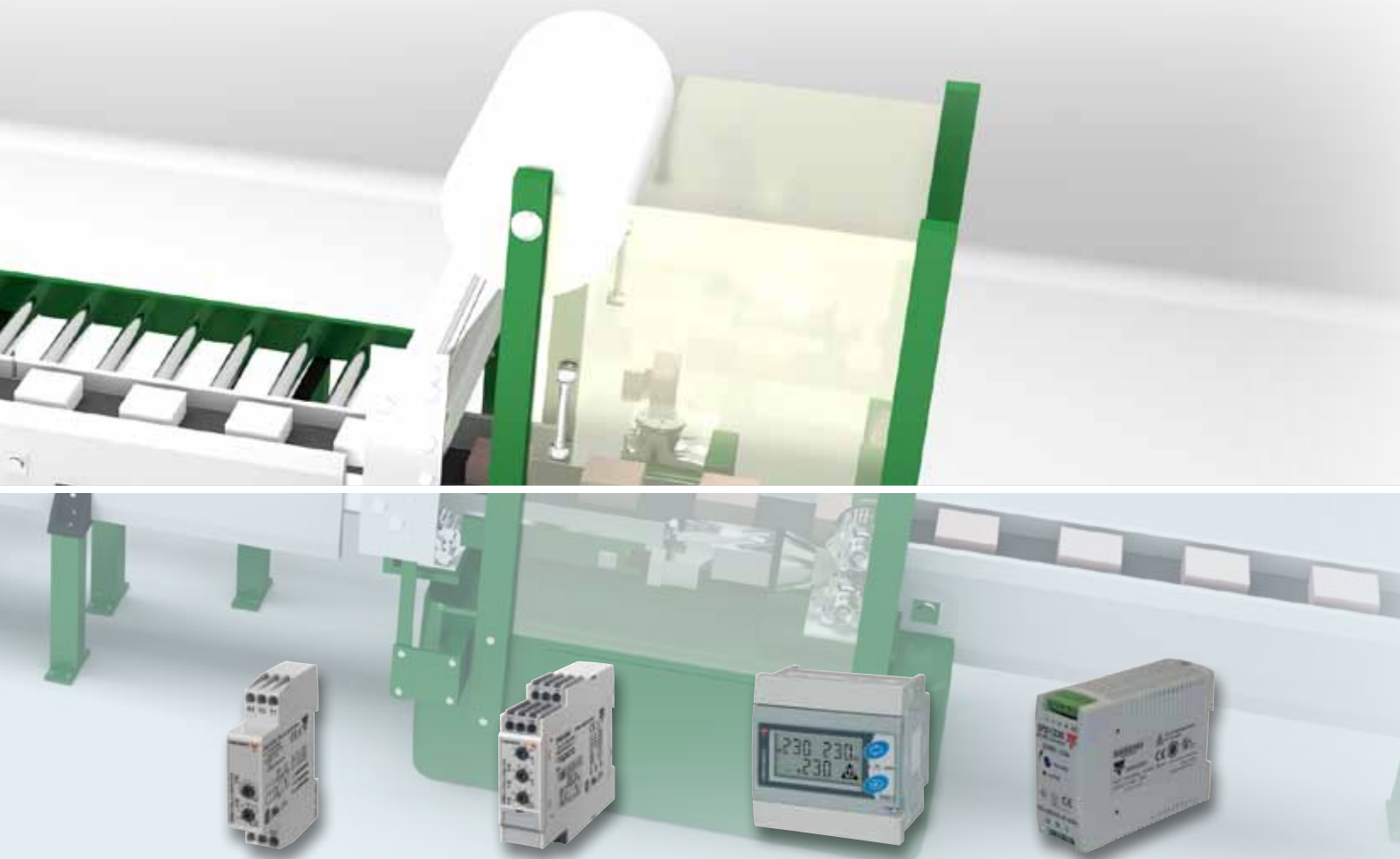Carlo Gavazzi light curtains for type 2 and type 4, also with a line provided with a muting function, give easy access to load and unload without reducing productivity. The type 4 light curtians have the EDM function - on all versions - to control the reliability of all external switching devices. The safety modules (used with light curtains, emergency stop buttons or safety magnetic switches) close the safety chain to switch off when needed in cases of emergency.

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 machinery.

Safety devices and energy efficiency

Timers	Monitoring relay	Energy meter	Switching power supply
DAA **DCB**	**DPB01**	**EM21**	**SPD**

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 so operators can identify consumption trends and take corrective action. EM21 72 DIN 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, 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.

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.

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Packaging Machinery

Our product range

Photoelectric sensors	Photoelectric sensor	Photoelectric sensor

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

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 programming
- Approvals/Marks: CE - UL 508

MAIN FEATURES
- Distance and output setting by means of teach-button
- Long detecting distances
- Protection: reverse polarity, short circuit and transients

PC50

- Product Width: 17.5mm [RGC..15] upto 70mm for [RGC..90], DIN-rail mount
- Operational voltage range: 24-660 VAC
- Rated current @ 40°C: 20AAC, 23AAC, 30AAC, 40AAC, 60AAC, 85AAC
- Control input ranges: 4-32 VDC, 24-275 VAC (24-190 VDC)
- Approvals/Marks: CE- cULus Listing - VDE - GL [RGC..15, 20, 30]

MAIN FEATURES
- Optional overtemperature protection
- Blocking voltage 1600Vp [RGH1A]
- SCCR 100kArms

Photoelectric sensor	Photoelectric sensor	Photoelectric sensor

PD60

- Dimensions: 60 x 13 x 30 mm
- Fibre optic contrast sensor, retroreflective, polarized for transparent objects
- Operational voltage 10 - 30 VDC
- Teach-In (keyboard or remote setup)
- Approvals/Marks: CE-cUL

MAIN FEATURES
- Light or dark switching selectable
- Microprocessor controlled and EEPROM parameter storage
- High immunity to shiny surfaces

PD12

- Fibre optic colour sensor
- Range: from 2 to 60 mm
- Operational voltage 24 VDC
- Timer one shot function 0.05 to 5 s
- Teach-In (keyboard or remote setup)
- Approvals/Marks: CE-cUL

MAIN FEATURES
- Detection of 1 or up to four recorded colours
- Microprocessor controlled and EEPROM parameter storage
- Keyboard lock

PF80

- Dimensions: 12 x 37.5 x 80 mm
- Slot width of 3 mm
- Detection of transparent material
- Teach-In (push button or by wire), teach in lock
- Operating frequency: 10 kHz

MAIN FEATURES
- Settings: standard and fine mode
- High speed of detection

Our product range

Photoelectric sensors	Ultrasonic sensors	Inductive sensors

MOFT, MOFR

- Ø 10mm polycarbonate housing or M12, M14 stainless steel
- Range: 5, 20 or 50m
- Built in lens: 2°, 5° or 8°
- Degree of protection IP66/IP67

MAIN FEATURES
- High immunity to ambient light
- High penetration power
- Modulated infrared light

UA12...30

- Ultrasonic sensors with integrated amplifier providing a transistor and/or analog output and integrated amplifier
- Dimensions: M30 x 125
- Housing material: plastic
- Approvals/Marks: CE - UL -CSA

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

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

Capacitive sensors	Capacitive sensor	Conductive level controllers / probes

CA12 / 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

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

CLD / CLH

- Multiple filling and emptying applications
- Rated operational voltage: 24 VAC/DC, 115 VAC or
- 230 VAC
- Output 2x8A/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

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Packaging Machinery

Our product range

PCB mount solid state relay	1 phase solid state relays	1 phase solid state relay

RP1

- Dimensions 25.4x43x10.5mm
- Operational voltage range: 24-480 VAC
- Rated operational current: 3, 5, 5.5, 10AAC
- 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
- 4kV isolation between input & output
- Accessories for DIN mount option available

RM1.., RAM1..

- Dimensions 58.2x44.8x28.8mm, panel mount
- Operational voltage range: 24-660 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 [RM1A..L]
- Integrated over-voltage protection [RM1A]

RGS / RGS DIN

- Dimensions 90x17.5x50.6mm
- Operational voltage range: 24-660 VAC
- Rated operational current: 25, 50, 75, 90 AAC
- Control input ranges: 4-32 VDC, 20-275 VAC (24-190 VDC)
- Approvals/Marks: CE- cURus - CSA - VDE

MAIN FEATURES
- Zero cross or random switching
- Optional pluggable spring input terminal
- Integrated over-voltage protection

1 phase solid state contactor	1 phase analog input solid state contactor	3 phase solid state relay

RGC

- Product Width: 17.5mm [RGC..15] upto 70mm for [RGC..90], DIN-rail mount
- Operational voltage range: 24-660 VAC
- Rated current @ 40°C: 20AAC, 23AAC, 30AAC, 40AAC, 60AAC, 85AAC
- Control input ranges: 4-32 VDC, 24-275 VAC (24-190 VDC)
- Approvals/Marks: CE- cULus Listing - VDE - GL [RGC..15, 20, 30]

MAIN FEATURES
- Optional overtemperature protection
- Blocking voltage up to 1600Vp [RGH1A]
- SCCR 100kArms

RJ1P

- Dimensions 103x45x102mm, DIN-rail mount
- Operational voltage range: 90-660 VAC
- Rated current @ 25°C: 30, 50 AAC
- Control input ranges: 0-10VDC, 4-20mADC
- Approvals/Marks: CE- cURus

MAIN FEATURES
- Phase Angle, Distributed Full Cycle or Burst Control
- Integrated over-voltage protection
- Optional overtemperature protection

RZ3A

- Dimensions 74x103x41mm, panel mount
- Operational voltage range: 24-660 VAC
- Rated operational current: 3x 25, 55, 75AAC
- Control input range: 4-32 VDC, 24-275VAC
- Approvals/Marks: CE- cURus - CSA

MAIN FEATURES
- 3-phase zero cross switching SSR
- Integrated over-voltage protection
- Optional overtemperature protection

Our product range

Soft starter	Energy meter	Temperature controller

RSHR MIDI

- Dimensions 114 x45 x126 mm DIN or panel mount
- 2-Phase controlled, Internally supplied
- Operational current: up to 18AAC
- Operational voltage up to 600VAC, 50/60Hz
- Approvals/Marks: UL, cUL approved

MAIN FEATURES
- Wide operational control voltage range
- Up to 60 starts per hour @ 40C
- Compact dimensions

EM21

- 3-phase energy meters with CT/VT connection
- Primary current input: 5 A
- 96 x 96 mm housing dimensions, only 45 mm behind the panel
- Class 1 (kWh) acc. to EN62053-1
- Modbus communication port

MAIN FEATURES
- Energy analyser in a very compact housing to save space
- Suitable for measuring generated and consumed energy
- MID Annex D certification available

PDI 409

- Dimensions 48x48x98 mm, panel mount
- Power supply: 24 VAC/DC; 100-240 VAC
- Up to 3 configurable outputs: relay, 8mA/8VDC for SSR
- Input signal: TC (J,K,S,I R), PTC, NTC,mV, PT100, 0/4-20mA, 0-1V, 0/1-5V, 0/2-10V
- Approvals/Marks: CE- cURus

MAIN FEATURES
- Dual display digital controller, up to 4 configurable setpoint
- ON/OFF, single/double action PID or neutral zone control
- Fast autotuning and selftuning PID

Safety light curtains	Safety modules	Safety magnetic sensors and units

SB4

- 35 x 40mm in lengths from 256 - 1,726mm (10 - 68")
- 24VDC supply with two PNP transistor outputs
- Approvals/Marks: CE - UL -CSA
- IEC-61496-2 environment light rejection

MAIN FEATURES
- Light curtains to protect both employees and machinery
- Total or partial muting, override and automatic or manual reset

NA1/3 and NL1/3 Series

- Safety modules for gate and emergency stop (NA) and light curtain (NL)
- 3 normally open safety outputs
- < 30ms response time
- IP40 protection for housing and IP20 protection for terminals
- Approvals/Marks: CE - UL -CSA

MAIN FEATURES
- Safety category 4
- < 30ms response time

SMS / CLS

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

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

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Packaging Machinery

Our product range

Monitoring relays	Timers	Power supplies

DPB51

- Dimensions 81 x 17.5 x 67.2 mm DIN-rail housing
- TRMS 3-phase over/under voltage, phase sequence and loss relay
- 3 phase AC (own power supply); regenerated voltage
- Power supply 208 to 480 VAC
- Approvals/Marks: UL and CSA approved

MAIN FEATURES
- Detects the phase-phase or phaseneutral voltage
- 17.5 mm width: the smallest on the market
- Independent voltage setpoints and built-in delays

DAA51, DMB51

- Dimensions 81x17,5x67,2mm 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

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

Limit switches

PS

- Head type: plunger rounded, plunger with roller, side rotary lever
- Housing material: thermoplastic or metal
- Offered for horizontal or vertical actuation
- Approval/marks: UL, CSA, CE

MAIN FEATURES
- Mechanical life: >10 million cycles
- Minimum actuation force/torque
- Immune to electromagnetic disturbance

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OUR COMPETENCE CENTRES AND PRODUCTION SITES

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