Industrial Automation

Solutions for

Plastics Machinery
ABOUT CARLO GAVAZZI

Carlo Gavazzi Automation is a multinational electronics group active in designing, manufacturing 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: Sensors, Switches, Controls and Fieldbuses.

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

Among the major types of plastics machinery, extrusion equipment has seen an interesting growth, thanks to the construction sector, with an increase in the demand for extruded goods such as pipes, fitting and coatings. Injection moulding equipment remains a large segment of the plastics machinery market. Injection moulding machines are used in a wide range of applications, ranging from automotive components to consumer goods.

The production efficiency of the machines for plastics has continuously increased over the last few decades. Appropriate temperature control is essential to ensure good quality of the final outcome. The thermal stability necessary in such machinery can only be achieved through the use of solid state relays (SSRs) which are capable of meeting the demands for fast heater switching. The lifetime of the SSRs versus their mechanical counterparts ensures low production downtime and maximizes plant efficiency. Carlo Gavazzi offers a comprehensive range of SSRs which feature back to back thyristors in combination with direct copper bonding technology for increased lifetime and reliable operation of the SSR.

Carlo Gavazzi’s patented Tripleshield™ capacitive sensors have become the standard all other manufacturers are measured against. Capacitive sensors will detect most materials, conductive and nonconductive. This makes them ideal for level detection in raw plastic delivery systems. Carlo Gavazzi’s ultrasonic, photoelectric and inductive sensors are also used extensively in plastics machinery. Ultrasonic sensors are ideally suited to detecting transparent objects.

In order to protect the working area, ensuring the safety of operators and the safe operation of the machines, Carlo Gavazzi provides a new range of safety light curtains, in conjunction with configurable and standard safety modules and safety magnetic sensors. The 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, safety light curtains, photocells, emergency stops, two-hand controls, mechanical switches, laser scanners and safety mats.
Process stability is critical to ensure high product quality. Stable temperatures are achieved by constant switching. Carlo Gavazzi solid state switches provide extremely reliable solutions that permit the fast switching needed in these processes. The RGS1 series and RM1 series are 1-phase solid state solutions which can be mounted on a chassis or an external heatsink, whilst the RGC1 series is provided with an integrated heatsink, hence ready for use. The integrated over voltage protection and high surge current capability of Carlo Gazazzi SSRs ensure trouble free operation, preventing unnecessary machine stoppages which result in scrap material and high down time costs.

Carlo Gavazzi’s standard safety modules are used with safety light curtains, safety photo sensors, emergency stop buttons or safety magnetic switches. In plastics machines, the gates must often be opened under safety conditions: the standard NES02 and NES13 modules enable the opening of the press motor mains when the gates are open.

For applications that require flexible logic or the multiple coordination of 3 or more safety devices, the CERTUS configurable safety module delivers a superior product vs its competitors, in terms of features and competitive price. CERTUS is certified to the highest safety levels: SIL+, SILCL 3, PLe and Cat.4; it offers intuitive and quick logical configuration software, easy to set-up tamper proof safety systems, and a reduction in components and wiring.
Consistency and repeatability of extruded parts can only be ensured if the temperature control process is stable with minimum deviations from set points. Deviations from temperature set points are limited with fast switching of heaters which can only be done through solid state relays. Carlo Gavazzi offers a wide range of solid state solutions for temperature control of the barrel zones. The RGC1, RGS1 and RM1 series are 1-phase solutions, whilst the RGC3 series provides 3-phase switching solutions. The RM and RG series meet the industry EMC immunity requirements without the need for additional external components. Additionally, the RG series utilises wire bonding technology that reduces the thermal stress of the solid state switch, guaranteeing extended lifetime over other SSRs. The RGC1S and RGC3..M versions integrate detection for malfunction of the load or the SSR, where an alarm output is readily available for immediate intervention. Capacitive, photoelectric and ultrasonic sensors are used to detect any interruption in the extruded pipe. They ensure prompt intervention in the case of interruption and round-the-clock monitoring of the extrusion process.

In both injection machines and extrusion machines, Carlo Gavazzi’s switches and sensors ensure smooth and efficient production processes, capacitive sensors in particular are widely used in silos.
Reliable thermal process control is key in determining the quality of the final outcome in blow moulding. An accurate thermal process can only be guaranteed by continuous monitoring of the load and system parameters. The RGC1S series offers the ideal solid state switching solution. The RGC1S is equipped with integrated current measurement and so is able to detect variations in load current, which will ultimately affect temperature. The integration of current measurement within the solid state switch eliminates the need for additional external monitoring and so gives panel space benefit as well as less installation time. The load current is continuously monitored and if a deviation is observed a partial load failure alarm is issued. The RGC1S is also able to detect load and solid state switch malfunction.

Photoelectric sensors and inductive sensors are installed along the machinery for part counting, detection and verification and for mould position detection. The VMU-C EM is a comprehensive web-based monitoring solution to keep track of energy consumption in industrial facilities and to improve the energy efficiency of the installation.

<table>
<thead>
<tr>
<th>Solid state switches</th>
<th>Inductive sensors</th>
<th>Photoelectric sensors</th>
<th>Monitoring relays</th>
<th>Web server</th>
<th>Safety light curtains</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGC1S</td>
<td>ICB12</td>
<td>PA18</td>
<td>DIA53</td>
<td>VMU-C EM</td>
<td>SC2</td>
</tr>
<tr>
<td>RGS1S</td>
<td>ICB18</td>
<td></td>
<td>DPA51</td>
<td></td>
<td>SC4</td>
</tr>
<tr>
<td>RGC1A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is essential that plastics processing machines operate without breakdown. When the machine restarts after a breakdown, the material might also have to be scrapped: this is typical of blown film extrusion. By using an ultrasonic sensor to check film loop tension, film breakage is prevented and interruptions in the production cycle are minimized. Three ultrasonic sensors placed round the cylinder of blown plastic film, measuring the actual diameter of the cylinder, are used for controlling the air pressure and maintaining a controlled diameter and thickness of the plastic film.

If the distance of the bubble surface from the machinery is not controlled, dangerous contacts can occur. Several analogue ultrasonic sensors can be positioned to constantly check the size and the shape of the bubble. To monitor the ON/OFF switching of groups of the heating elements, a DIA53 monitoring relay can be used. This does not need any auxiliary power supply. It is supplied by the measured current, with a built-in current transformer up to 100 A. Furthermore, a CPT power transducer checks the electrical parameters vital for the motor, as a motor running in overload condition can suffer irreparable damage.
In thermoforming processes, heating is a critical phase. The plastic sheet needs to be evenly heated at the right temperature before entering the forming phase; failure to control the heat evenly and precisely results in a poor quality product.

The temperature is controlled via a temperature sensor and the signal is then sent to a PID controller. The PID control needs to be extremely efficient and so fast switching of the heaters is mandatory. This can only be done with the use of solid state relays. A number of heating zones are used to ensure even heating. This requires a number of solid state relays to control all the heaters and panel space is often a challenge. Carlo Gavazzi’s new series of solid state contactors, the RGC1F, offer a compact solution which also integrates fuse protection. This solution is provided in the same footprint as a standard solid state relay, whilst freeing up space normally utilised for protection components. An integrated solution provides saving on installation time and costs. Inductive sensors placed in the mould, at the end of the pins, can detect whether the mould is properly sealed, enabling the system to start with a new injection process, thus preventing damage to the machinery, as well as improving safety conditions.

The new eco-friendly potting material of ICB sensors, allow higher resistance to shocks and vibrations.
Carlo Gavazzi components also integrate well also in auxiliary equipment that is used in combination with plastics machinery such as plastic dryers and dosing units, as well as stand-alone temperature control units for zone control.

Wherever plastic granules are conveyed and processed, capacitive sensors monitor the levels in pipes and in silos or through sight glasses in loaders on injection machines, extruders and blow moulding machinery. Thanks to Tripleshield™ technology, Carlo Gavazzi capacitive sensors are protected against disturbances caused by high ESD up to 40 kV. Featuring EMC and ESD immunity, Carlo Gavazzi sensors – EC and CA series - detect the level of plastic pellets in the hopper whilst withstanding environmental interference. The sensing face (flush mounted) withstands temperatures up to 120°C. Additionally, heaters for the drying of the plastic granules can be switched with RM1A or RGC1A for 1-phase heaters or RGC2A, RGC3A for 3-phase heaters. The RJ1P, RGC2P and RGC3P series offers the possibility of controlling the switching of the heater with an analog input (0-10V or 4-20mA) which can be fed directly to the SSR.

PDI temperature controllers are the ideal devices for controlling and monitoring the temperature with absolute precision. Furthermore, Carlo Gavazzi Dupline® fieldbus system can be used to monitor several production lines. Pulse outputs from energy meters are connected to Dupline® counter modules, alarm outputs of temperature controllers are fed into digital input modules and pressure transducers are connected to analog 4-20 mA input modules. All values and alarms are transmitted to a central monitoring PC with a SCADA system.

<table>
<thead>
<tr>
<th>Solid state switches</th>
<th>Proportional controllers</th>
<th>Capacitive sensors</th>
<th>Dupline® controllers</th>
<th>Photoelectric sensors</th>
<th>Temperature controllers</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM1A, RGC1A</td>
<td>RGC3P</td>
<td>CA18</td>
<td>G3800</td>
<td>PA18</td>
<td>PDI 409</td>
</tr>
<tr>
<td>RGC2A, RGC3A</td>
<td>RGC2P</td>
<td>CA30</td>
<td></td>
<td></td>
<td>PDI 720</td>
</tr>
</tbody>
</table>

Plastic dryers & Dosing systems

Carlo Gavazzi Automation Components. Specifications are subject to change without notice. Illustrations are for example only.
# Our Product Range

## 1-phase Solid State Relays

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input ranges</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM1A/RM1A</td>
<td>58.2 x 44.8 x 28.8mm, panel mount</td>
<td>up to 660 VAC</td>
<td>17.5 AAC, 30 AAC, 50 AAC</td>
<td>4-32 VDC, 20-280 VAC</td>
<td>CE - cULus - CSA - CCC - VDE (RAM)</td>
</tr>
</tbody>
</table>

## 1-phase Solid State Switches

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input ranges</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGS1A/RGC1A</td>
<td>17.5 mm up to 70 mm, DIN or panel mount</td>
<td>up to 660 VAC, 90 AAC, 18000 A 2 s</td>
<td>4-32 VDC, 20-275 VAC</td>
<td>4-32 VDC</td>
<td>CE - cULus (RGC1A) - cURus (RGS1A) - CSA (RGS1A) - VDE - GL (RGC up to 30 AAC)</td>
</tr>
</tbody>
</table>

## 1-phase Solid State Contactors

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input ranges</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGC2A/RGC3A</td>
<td>54 mm up to 70 mm, DIN-rail mount</td>
<td>up to 660 VAC</td>
<td>65 AAC/pole (RGC3A) @ 40°C</td>
<td>5-32 VDC, 20-275 VAC</td>
<td>CE - cULus</td>
</tr>
</tbody>
</table>

## 3-phase Solid State Contactors

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input ranges</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGC1F</td>
<td>106 x 35.6 x 165 mm, DIN mount</td>
<td>up to 660 VAC</td>
<td>40 kA</td>
<td>5-32 VDC</td>
<td>CE - cULus (up to 30 A)</td>
</tr>
</tbody>
</table>

## 1 and 3-phase Proportional Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ1P/RGC2P/RGC3P</td>
<td>45 mm up to 70 mm, DIN-rail mount</td>
<td>up to 660 VAC</td>
<td>40 AAC/RGC2P, 65 AAC/pole RGC3P @ 40°C</td>
<td>0-20 mA, 4-20 mA, 12-20 mA, 0-10 VDC, 0-5 VDC, 1-5 VDC</td>
<td>CE - cULus</td>
</tr>
</tbody>
</table>

## Capacitive Sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input range</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC30</td>
<td>M30 mm</td>
<td>Plastic, metal housing</td>
<td>400 VDC</td>
<td>CE - UL-CSA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input range</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA18/CA30</td>
<td>M18/M30</td>
<td>Plastic housings</td>
<td>up to 30 mm</td>
<td>CE - cULus</td>
<td></td>
</tr>
</tbody>
</table>

## Capacitive Sensors

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Rated operational voltage</th>
<th>Rated current</th>
<th>Control input range</th>
<th>Approvals/Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA18/CA30</td>
<td>4th generation Tripleshield™ technology</td>
<td>Plastic</td>
<td>up to 30 mm</td>
<td>CE - cULus</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Inductive sensors</th>
<th>Photoelectric sensors</th>
<th>Ultrasonic sensors</th>
<th>Safety magnetic sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICB12 / ICB18 / ICB30</strong></td>
<td><strong>PA18</strong></td>
<td><strong>UA18 / UA30</strong></td>
<td><strong>SMS / CLS</strong></td>
</tr>
<tr>
<td>• M12, M18 and M30 Nickel-brass housing in short or long barrel lengths</td>
<td>• Dimensions: M18 x 39 mm</td>
<td>• Dimensions: M18, M30</td>
<td>• Dimensions: 88 x 25 x 13 mm</td>
</tr>
<tr>
<td>• Standard and double distance sensing ranges</td>
<td>• Diffuse reflective sensors, 1 m detecting distance</td>
<td>• Ultrasonic sensors with integrated amplifier providing a digital and/or analog output and integrated amplifier</td>
<td>• Normally open or closed output</td>
</tr>
<tr>
<td>• Output functions: NO or NC, NPN or PNP</td>
<td>• Cable or M12 plug versions</td>
<td>• Housing material: plastic</td>
<td>• Up to 100 VAC switching</td>
</tr>
<tr>
<td>• Two meter oil resistant PVC cable or M12 plug version</td>
<td>• Power supply from 10 to 30 VDC</td>
<td>• Approv/Marks: CE - cULus - CSA</td>
<td>• 250 mA maximum output</td>
</tr>
<tr>
<td>• Protection: reverse polarity, short circuit, transients</td>
<td>• Approv/Marks: CE - cULus</td>
<td></td>
<td>• Up to 5 VA switching power</td>
</tr>
</tbody>
</table>

### MAIN FEATURES
- High precision and programmable outputs thanks to the microprocessor technology
- Eco-friendly potting material made from recycled corn by-product
- Improved design for highest reliability and resistance to vibration and impacts

### MAIN FEATURES
- Sensors used to detect the finish plastic items
- Fast mounting, smooth finish
- Sensitivity adjustment

### 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

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

### 3-phase monitoring relays
<table>
<thead>
<tr>
<th><strong>DPA51</strong></th>
<th><strong>DPB51</strong></th>
<th><strong>DIA 53</strong></th>
<th><strong>E83-2050</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing</td>
<td>• Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing</td>
<td>• Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing with 12 mm hole for current measurement</td>
<td>• DIN-rail or surface mounting 22.5 mm Euronorm housing with 12 mm hole for current measurement</td>
</tr>
<tr>
<td>• Phase sequence and loss relay</td>
<td>• TRMS 3-phase over/under voltage, phase sequence and loss relay</td>
<td>• Current monitoring relay with built-in current transformer</td>
<td>• AC current transformer with 4-20 mA DC secondary</td>
</tr>
<tr>
<td>• 3 phase AC (own power supply); regenerated voltage</td>
<td>• 3 phase AC (own power supply); regenerated voltage</td>
<td>• 20, 50 or 100 A full scale</td>
<td>• 1 phase AC current measurement</td>
</tr>
<tr>
<td>• Power supply from 208 to 480 VAC</td>
<td>• Power supply 208 to 480 VAC</td>
<td>• Self powered</td>
<td>• Power supply from 10 to 40 VDC</td>
</tr>
<tr>
<td>• Approv/Marks: CE - UL - CSA - CCC</td>
<td>• Approv/Marks: UL - CSA</td>
<td>• Approv/Marks: UL</td>
<td>• Approv/Marks: UL</td>
</tr>
</tbody>
</table>

### MAIN FEATURES
- Compressor protection from reverse running and phase loss
- 17.5 mm width: the smallest in the market
- Plug and play: no settings needed

### MAIN FEATURES
- Detects the phase-phase or phase neutral voltage
- 17.5 mm width
- Independent voltage setpoints and built-in delays

### MAIN FEATURES
- 2 wire connection
- Knob adjustable setpoint
- Integrated solid state NPN PNP output

### MAIN FEATURES
- 7 knob selectable ranges from 5 to 50 AAC
- Easy interface to PLC or monitoring relays
## Our product range

<table>
<thead>
<tr>
<th>Energy analysers</th>
<th>Energy analysers</th>
<th>Energy analysers</th>
<th>Web server</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EM210 / EM21 72D</strong></td>
<td><strong>EM24 DIN</strong></td>
<td><strong>EM26 96</strong></td>
<td><strong>VMU-C EM</strong></td>
</tr>
<tr>
<td>- 3-phase energy meters with CT connection</td>
<td>- 3-phase energy meters with direct connection</td>
<td>- 3-phase energy meters with CT/VT connection</td>
<td>- Micro PC with Web-server, FTP and Web-service capabilities</td>
</tr>
<tr>
<td>- Solid or split-core 5A CT</td>
<td>- Current input up to 65 A</td>
<td>- Primary current input: 5 A</td>
<td>- Data and event logging capability</td>
</tr>
<tr>
<td>- Dimensions: 4 DIN modules or 72x72 housing</td>
<td>- Dimensions: 4 DIN modules</td>
<td>- Dimensions: 96 x 96 mm housing, only 45 mm behind the panel</td>
<td>- Internal 4GB memory and 16GB SDHC card back-up memory</td>
</tr>
<tr>
<td>- Class 1 (kWh) acc. to EN62053-1</td>
<td>- Pulse open collector output</td>
<td>- Pulse 1 (kWh) acc. to EN62053-1</td>
<td>- Variables shown as graphs and tables</td>
</tr>
<tr>
<td>- Modbus communication port</td>
<td>- Pulse open collector output</td>
<td>- Modbus communication port</td>
<td>- All data exports on Excel compatible files</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
</tr>
<tr>
<td>- Very compact and space saving meter</td>
<td>- Direct measurement in a very compact housing to save space</td>
<td>- Energy analyser in a very compact housing to save space</td>
<td>- Energy analysis of each single load</td>
</tr>
<tr>
<td>- Can be installed both on DIN-rail or on the panel</td>
<td>- Suitable for measuring generated and consumed energy</td>
<td>- Suitable for measuring generated and consumed energy</td>
<td>- Energy bill evaluation</td>
</tr>
<tr>
<td>- MID Annex D certification available (EM21 only)</td>
<td>- MID Annex D certification available</td>
<td>- MID Annex D certification available</td>
<td>- Virtual main meter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Alarms control with automatic e-mailing and SMS management</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Universal mobile 3G modem available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power transducers</th>
<th>Timers</th>
<th>Timers</th>
<th>Timers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPT</strong></td>
<td><strong>DBB01 / PBB01</strong></td>
<td><strong>DCB01 / PCB01</strong></td>
<td><strong>DAA51 / DMB51</strong></td>
</tr>
<tr>
<td>- Dimensions: 83.5 x 45 x 98.5 mm DIN-rail housing</td>
<td>- Dimensions: 22.5 mm EuroNorm for DIN-rail or 36 mm plug-in version</td>
<td>- Dimensions: 22.5 mm EuroNorm for DIN-rail or 36 mm plug-in version</td>
<td>- Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing</td>
</tr>
<tr>
<td>- Accuracy 0.5 % (voltage, current)</td>
<td>- Multi voltage true delay on release timer</td>
<td>- Asymmetrical Recycler timer with 4 functions</td>
<td>- Delay on operate function (DAA), multifunction (DMB)</td>
</tr>
<tr>
<td>- Measurement by CT and VT</td>
<td>- Combined AC and DC power supply</td>
<td>- Combined AC and DC power supply</td>
<td>- Combined AC and DC power supply</td>
</tr>
<tr>
<td>- Front protection degree IP20</td>
<td>- Repeatability: &lt; 0.2%</td>
<td>- Repeatability: &lt; 0.2%</td>
<td>- Repeatability: &lt; 0.2%</td>
</tr>
<tr>
<td>- Analogue, digital, pulse or serial outputs available</td>
<td>- Approv/Marks: UL - CSA</td>
<td>- Approv/Marks: UL - CSA</td>
<td>- Approv/Marks: UL - CSA - RINA</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
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<td><strong>MAIN FEATURES</strong></td>
</tr>
<tr>
<td>- Very compact size power transducer</td>
<td>- Time range 0.1 to 600s - capacitor powered</td>
<td>- Time range 0.1 to 100h</td>
<td>- Delay on operate/release; interval (manual/automatic start);</td>
</tr>
<tr>
<td>- Provides electrical variables set to a PLC to manage compressors and other loads</td>
<td>- 4 time ranges selectable by DIP-switches, knob time setting</td>
<td>- 4 time ranges selectable by DIP-switches, knob time setting</td>
<td>- Double interval; symmetrical recycler (ON or OFF first)</td>
</tr>
<tr>
<td>- Suitable for on-board panel installation</td>
<td>- Output: 8 A SPDT or 8 A DPDT relay</td>
<td>- Output: 1 or 2 x SPDT relay</td>
<td>- Timing range from 0.1s to 100h</td>
</tr>
</tbody>
</table>

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

**CMM**
- 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
- CNC config memory card slot
- LOG file with last 5 conf. modifications
- 24 connectors in 22.5 mm
- Connection with 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

**CERTUS**
**I/O expansion units**

**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: 8I, 2O; 12I, 8 test O; 8I, 16I; 2 OSSD, 4 OSSD; 2 relay O, 4 relay O

**CERTUS**
**I/O expansion units**

**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
- 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 100 m for each connection. Maximum 5 CBT expansions

**CERTUS**
**data/diag mod. + CERTUS bus transfer**

**NA1/3 / NL1/3 Series**
- Safety modules for gate and emergency stop (NA1/3) and light-curtain (NL1/3)
- 3 normally open safety outputs
- < 30ms response time
- IP40 protection for housing and IP20 protection for terminals
- Approv/Marks: CE - UL - CSA

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

**PDI 409**
- Dimensions: 48 x 48 x 98 mm, panel mount
- Power supply: 24 VAC/DC, 100-240 VAC
- Up to 3 configurable outputs: relay, 8 mA / 8 VDC for SSR
- Input signal: TC (K, S, J, R), PTC, NTC, mV, PT100, 0/4-20 mA, 0/1-5 V, 0/2-10 V
- Approv/Marks: CE - cULus

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

**PDI 720**
- Dimensions: 72 x 72 x 97 mm, panel mount
- Power supply: 24 VAC/DC, 100-240 VAC
- Up to 3 configurable outputs: relay, 8 mA / 8 VDC for SSR
- Input signal: TC (J, K, S, IR), PTC, NTC, mV, PT100, 0/4-20 mA, 0/1-5 V, 0/2-10 V
- Approv/Marks: CE - cULus

**MAIN FEATURES**
- Single display digital controller, up to 4 configurable setpoint
- ON/OFF, neutral zone or single/double action PID control with autotuning
- RS485 communication

**G3800**
- Dupline® Master Channel Generator
- Provides: power supply and communication for one Dupline® network
- Dimensions: 8 DIN modules
- Ports: 2 x RS485, 1 x RS232
- 4 digital inputs / 4 digital outputs onboard

**MAIN FEATURES**
- Intelligent programmable functions for lighting, blinds etc.
- Trend logging of energy values, temperatures etc.
- Option to link several units to central SQL database via LAN/Internet
- Alarm notification and scheduling
- Modbus-RTU interface to external devices via RS485 / RS232
### Our product range

<table>
<thead>
<tr>
<th>1-phase DIN-rail power supplies</th>
<th>Metal enclosed power supplies</th>
<th>Low profile DIN-rail power supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Output power from 5 W to 240 W</td>
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<tr>
<td>• Input 110/240 VAC single phase and DC</td>
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<tr>
<td>• Short circuit, overload and overvoltage protection</td>
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<tr>
<td>• PFC &gt;100 W</td>
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<tr>
<td>• UL 1310 Class 2 output up to 90 W</td>
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<td></td>
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<tr>
<td>• ULus, TUV and CCC approved</td>
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<tr>
<td><strong>MAIN FEATURES</strong></td>
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<tr>
<td>• Power supply OK output</td>
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<tr>
<td>• Parallel connection feature</td>
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<tr>
<td>• Spring, screw terminals or detachable connectors</td>
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<tr>
<td><strong>SPPC</strong></td>
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<tr>
<td>• Output power from 25 W to 800 W</td>
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<tr>
<td>• Input 110/240 VAC single phase</td>
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<tr>
<td>• Short circuit, overload and overvoltage protection</td>
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<td></td>
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<tr>
<td>• PFC function available &gt;75 W</td>
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<td>• UL and CE approved</td>
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<tr>
<td><strong>MAIN FEATURES</strong></td>
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<td></td>
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<tr>
<td>• Adjustable output +/- 10%</td>
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<tr>
<td>• Compact dimensions</td>
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<tr>
<td>• Wide operating temperature range up to 70°C</td>
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<tr>
<td><strong>SPM</strong></td>
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<tr>
<td>• Output power from 7.5 W to 100 W</td>
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<tr>
<td>• Input 110 / 240 V single phase and DC 120 to 370 V</td>
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<tr>
<td>• Short circuit, overload protection</td>
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<td></td>
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<tr>
<td>• From -25 to +60°C operation w/out derating</td>
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<tr>
<td>• ULus, TUV and CCC approved</td>
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<tr>
<td><strong>MAIN FEATURES</strong></td>
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<td></td>
</tr>
<tr>
<td>• UL 1310 Class 2 output &lt; 9 W</td>
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<tr>
<td>• Adjustable output +/- 10%</td>
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<tr>
<td>• Low voltage LED indication</td>
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</tr>
</tbody>
</table>
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