Solutions

Plastics Machinery
Solutions for Plastics Machinery

ABOUT CARLO GAVAZZI

Carlo Gavazzi Automation is a multinational electronics group active in designing, manufacturing and marketing 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 three product lines: Sensors, Switches and Controls.

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.

Our wide array of products includes sensors, monitoring relays, timers, energy management systems, solid state relays, safety devices and fieldbus systems.
DESIGNED TO MEET MARKET REQUIREMENTS

The rising demand for processed food and beverages, followed by increasing requirements for packaging, is driving overall growth in plastics machinery applications. Accuracy, reliability and energy efficiency are becoming more and more important. Extrusion equipment has seen an interesting growth, with an increase in the demand for extruded goods. Injection moulding machines are used in a wide range of applications, ranging from automotive components to consumer goods. The production efficiency of 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. 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 non conductive. 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.

In order to protect the working area, ensuring the safety of operators and the safe operation of the machines, Carlo Gavazzi provides 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 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 frequent 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 Gavazzi SSRs ensure trouble free operation, preventing unnecessary machine stoppages which result in frequent scrap material and high downtime costs.

Real time data from each solid state relay is accessible with the NRG series. This allows machine builders to make informed decisions, solve urgent problems on short notice and develop machines that are more autonomous. The capacitive sensors with IO-Link can be used in hoppers, dryers and dosers to detect the dielectric constant of the plastics and when a wrong material is used, the sensors give an alarm. The filling mode can be performed, without involving a PLC, just connecting two IO-Link sensors together and setting the logic functions.

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 NES provides a safety-related interruption of a safety circuit. 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+, SILc, 3, PL e 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 by 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 of 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.

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 of malfunction of the load or the SSR, where an alarm output is readily available for immediate intervention.
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 more panel space as well as less needing 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 UWP 3.0 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.
It is essential that plastics processing machines operate without breakdown. When the machine restarts after a breakdown, the material might 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 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.

The IO-link ICB inductive sensors allow easy exchange of process data, remote configurations and events with simple and inexpensive 3-wire cabling, without needing to change the existing architecture. The ICB series, available from M12 to M30, can be completely configured to enable new functionalities such as the divider and speed control functions. 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. Fast switching is necessary to maintain stable processes. This can only be done by solid state relays. A number of solid state relays is typically required to ensure even heating and panel space is often a challenge.

The RGC1F, offers 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 savings on installation time and costs. Quality and scrap rates can be further improved through timely decisions based on real time data. This is possible with the NRG series that through its communication interface enables the read out of parameters. 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 ICS series offer the ideal solution for industrial automation equipment in applications where space is limited. The extended sensing range together with the compact and robust stainless steel housing makes this sensor extremely reliable. The ICS05 with its very high switching frequency up to 6 kHz can be used where fast detection is a must. The variants with on-board IO-Link communication allow advanced sensing performance such as rotational speed monitoring and RPM counter.
Carlo Gavazzi components integrate into 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 a viewing window in loaders of injection machines, extruders and blow moulding machinery. Thanks to Tripleshield™ technology, Carlo Gavazzi capacitive sensors are protected against disturbance 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. The new PD30ET photoelectric sensors are ideal for industrial environments and work perfectly even in the harshest conditions. The high-quality stainless steel housing guarantees maximum mechanical resistance. Retroreflective and polarized retroreflective versions are used to check the level of plastic granules in loaders. Additionally, heaters for the drying of the plastic granules can be switched with the RM1A or RGC1A for 1-phase heaters or the RGC2A, RGC3A for 3-phase heaters. The RGC1P, RGC2P and RGC3P series offer the possibility of controlling the switching of the heater with an analog input (0-10 V or 4-20 mA) which can be fed directly to the SSR. The touch screen BTM series reads the electrical measurement from Carlo Gavazzi energy meters or any other energy meter. It shows the data as instantaneous values and/or depicts it in diagrams.
### Our Product Range

#### 1-phase Solid State Relays

**RGS1A / RGC1A**
- **Product width:** 17.5 mm up to 70 mm, DIN-rail or panel mount
- **Ratings:** up to 660 VAC, 90 AAC, 18000 A 2 s
- **Integrated output overvoltage protection**
- **Control input range:** 4-32 VDC, 20-275 VAC (24-190 VDC)
- **Approvals/Marks:** CE - cULus [RGC] - cURus [RGS] - CSA - VDE - EAC - GL [RGC up to 30 AAC]

**MAIN FEATURES**
- Integrated heatsink [RGC1A], without heatsink [RGS1A]
- 100 kA short circuit current rating
- Optional overtemperature protection

#### 1-phase Solid State Switches

**RGS1S / RGC1S**
- **Product width:** 17.5 mm up to 70 mm, DIN-rail or panel mount
- **Ratings:** up to 660 VAC, 85 AAC, 18000 A 2 s
- **Integrated output overvoltage protection**
- **Control input range:** 4-32 VDC
- **Approvals/Marks:** CE - cURus [RGS1S] - CSA [RGS1S] - EAC - cULus [RGC1S]

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

#### 1-phase Solid State Contactors

**RAM1A / RM1A**
- **Dimensions:** 58.2x44.8x28.8 mm, panel mount
- **Rated operational voltage:** up to 660 VAC
- **Rated current:** 25 AAC, 50 AAC, 75 AAC, 100 AAC, 125 AAC
- **Control input range:** 4-32 VDC, 20-280 VAC
- **Approvals/Marks:** CE - cURus - CSA - CCC - EAC - VDE (RAM)

**MAIN FEATURES**
- Zero cross or Random switching
- Suitable for resistive, inductive or capacitive loads
- Integrated output overvoltage protection (RM)

#### 3-phase Solid State Relays

**RGC2A / RGC3A**
- **Product width:** 54 mm up to 70 mm, DIN-rail mount
- **Ratings:** up to 660 VAC, 75 AAC/pole [RGC2A], 65 AAC/pole [RGC3A] @ 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 - EAC - CCC

**MAIN FEATURES**
- 3-phase; 2-pole [RGC2A] or 3-pole switching [RGC3A]
- Monitoring for SSR and load circuit malfunction [RGC..M]
- 100 kA short circuit current rating
Our product range

<table>
<thead>
<tr>
<th>1 and 3-phase proportional controllers</th>
<th>Solid state switches with fieldbus interface</th>
<th>3-phase pumps and ventilators soft starters</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGC1P / RGC2P / RGC3P</td>
<td>NRG</td>
<td>RSWT</td>
</tr>
<tr>
<td><strong>Product width</strong>: 35 mm up to 70 mm, DIN-rail or panel mount</td>
<td><strong>Ratings</strong>: up to 660 VAC, 90 AAC</td>
<td><strong>Motor rating</strong>: Up to 45 kW (90 A)</td>
</tr>
<tr>
<td>1-ph with heatsink (RGC1P) or for panel mount (RGS1P), 3-phase with heatsink (RGC2P, RGC3P)</td>
<td><strong>DC control voltage</strong>: 4 - 32 VDC</td>
<td><strong>3-phase controlled &amp; internally bypassed</strong></td>
</tr>
<tr>
<td><strong>Ratings</strong>: up to 660 VAC, 90 A (1-phase), 75 A/pole (2-phase), 65 A/pole (3-phase)</td>
<td><strong>Modbus RTU over RS485</strong></td>
<td><strong>Operational voltage</strong>: RSWT40: 220-400 VAC, RSWT60: 220-600 VAC</td>
</tr>
<tr>
<td><strong>Control input</strong>: 0-20 mA, 4-20 mA, 12-20 mA, 0-10 VDC, 0-5 VDC, 1-5 VDC</td>
<td><strong>Up to 48 RG..N solid state relays with 1 NRG controller</strong></td>
<td><strong>PIC input, Alarm - Top of ramp - Run relay indication</strong></td>
</tr>
<tr>
<td><strong>Approvals/Marks</strong>: CE - cULus - cURus (RGS1P) - CSA (RGS1P) - EAC - CCC (RGC2P, RGC3P)</td>
<td><strong>24 VDC supply for the NRG controller</strong></td>
<td><strong>Approvals/Marks</strong>: cULus - CCC - EAC</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
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<td><strong>MAIN FEATURES</strong></td>
</tr>
<tr>
<td>• Selectable switching modes</td>
<td>• Read-out of variables: current, voltage, frequency, power, energy consumption, running hours</td>
<td>• Easy to use and set up</td>
</tr>
<tr>
<td>• Integrated overvoltage protection</td>
<td>• Diagnostics information to identify failure mode for fast troubleshooting</td>
<td>• Self-learning algorithm to improve pump starts/stops</td>
</tr>
<tr>
<td>• Monitoring for SSR and load circuit malfunctions (RGC2P, RGC3P)</td>
<td>• Autoconfiguration for easy and quick set-up</td>
<td>• Integrated overload protection (Class 1D)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3-phase general purpose soft starters</th>
<th>Capacitive sensors</th>
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</tr>
</thead>
<tbody>
<tr>
<td>RSGD</td>
<td>EC30</td>
<td>CA18 / CA30</td>
</tr>
<tr>
<td><strong>Operational voltage range</strong>: 187-440 VAC, 187-660 VAC</td>
<td><strong>Tripleshield™ sensor protection</strong></td>
<td><strong>4th generation Tripleshield™ technology</strong></td>
</tr>
<tr>
<td><strong>Operational current range</strong>: 12 AAC up 100 AAC</td>
<td><strong>Dimensions</strong>: M30 mm</td>
<td><strong>Dimensions</strong>: M18 / M30</td>
</tr>
<tr>
<td><strong>Control voltage</strong>: 24 VAC, DC, 110-400 VAC</td>
<td><strong>Plastic or metal housing, DC and AC versions</strong></td>
<td><strong>Plastic housings DC versions</strong></td>
</tr>
<tr>
<td><strong>Auxiliary relays for top of ramp and alarms</strong></td>
<td><strong>Sensing distance up to 30 mm</strong></td>
<td><strong>Sensing distance up to 30 mm</strong></td>
</tr>
<tr>
<td><strong>Approvals/Marks</strong>: cULus - CCC - EAC</td>
<td><strong>Approvals/Marks</strong>: CE - UL - CSA</td>
<td><strong>Approvals/Marks</strong>: CE - cULus</td>
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<tr>
<td><strong>MAIN FEATURES</strong></td>
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</tr>
<tr>
<td>• Serial communication (Modbus 2-wire) [RSGD 75mm models]</td>
<td>• High EMC immunity</td>
<td>• Highest EMC immunity</td>
</tr>
<tr>
<td>• Easy to use and set-up</td>
<td>• Protection: short circuit, transient and reverse polarity</td>
<td>• ESD ratings up to 40 KV</td>
</tr>
<tr>
<td>• Self-learning algorithm to adapt to different loads</td>
<td></td>
<td>• Sensing face temperature up to 120°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Best immunity towards inverters</td>
</tr>
</tbody>
</table>

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

### Capacitive sensors with IO-Link

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
</table>
| CA18..IO / CA30..IO | - Dimensions: M18/M30 (Plastic)  
- 4th generation TRIPLESHIELD™ Technology  
- IO-Link communication with timer, diagnostics and logic functions  
- Sensing distance up to 30 mm  
- Approvals/Marks: CE, cULus approved |

### Photoelectric sensors

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
</table>
| PA18 | - Dimensions: M18 x 39 mm  
- Diffuse reflective sensors, 1 m detecting distance  
- Cable or M12 plug versions  
- Power supply from 10 to 30 VDC  
- Approvals/Marks: CE - cULus |

### Inductive sensors with IO-Link

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
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</table>
| ICS05 / ICS08 | - M5 and M8 stainless steel housings  
- Sensing distance from 0.8 mm up to 4 mm  
- Flush or non-flush (ICS08 only) versions  
- M8-plug or cable versions  
- Advanced diagnostic functions with indication of short-circuit and overload  
- IO-Link communication V 1.1 |

### Smart configurator for IO-Link sensors

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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</thead>
</table>
| SCTL55 | - Handheld device for IO-Link sensors  
- 5.5” HD touch screen display  
- Automatic IODD file download via Wi-Fi  
- High capacity rechargeable battery  
- M8 3-wire, M8 4-wire and M12 connectors  
- Approvals/Marks: CE, FCC  
- IO-Link v1.1 |

### Inductive sensors with IO-Link

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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| ICB12 / ICB18 / ICB30 | - M12, M18 and M30 long or short barrel nickel-plated brass housings  
- Sensing distance from 4 mm up to 22 mm  
- Flush or non-flush  
- M12-plug or 2 metre cable  
- Dual LED user interface for advanced diagnostics  
- IO-Link communication V 1.1 |

### Capacitive sensors with IO-Link

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</table>
| PD30ET | - World standard housing style 11x31.5x21 mm  
- Supply voltage: DC 4-wire  
- Sensing distance: < 15 m  
- Output: NPN/PNP NO+NC  
- Sensor types: D, B, R, P and T  
- Connectivity: Cable or M8 connectors  
- Approvals/Marks: CE - cULus - ECO4AB |

### Photocapacitive sensors

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- IO-Link communication with timer, diagnostics and logic functions  
- Sensing distance up to 30 mm  
- Approvals/Marks: CE, cULus approved |

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- Approvals/Marks: CE, FCC  
- IO-Link v1.1 |
Our product range

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<tr>
<th>Ultrasonic sensors</th>
<th>Safety magnetic sensors</th>
<th>3-phase Monitoring Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UA18 / UA30</strong></td>
<td><strong>CLS / SMS</strong></td>
<td><strong>DPA51 / DPA52</strong></td>
</tr>
<tr>
<td>• Dimensions: M18, M30</td>
<td>• Rectangular housing</td>
<td>• Dimensions: 81x17.5x6.7 mm DIN-rail housing</td>
</tr>
<tr>
<td>• Ultrasonic sensors with integrated amplifier providing a digital and/or analog output and integrated amplifier</td>
<td>• Connection: PVC cable or pigtail solution</td>
<td>• Phase sequence and loss relay</td>
</tr>
<tr>
<td>• Housing material: plastic</td>
<td>• Housing material: Plastic</td>
<td>• 3 phase AC (own power supply); repowered voltage</td>
</tr>
<tr>
<td>• Approvals/Marks: CE - cULus - CSA</td>
<td>• Approvals/Marks: CE - cULus</td>
<td>• Power supply from 208 to 480 VAC</td>
</tr>
<tr>
<td>MAIN FEATURES:</td>
<td>MAIN FEATURES:</td>
<td>MAIN FEATURES:</td>
</tr>
<tr>
<td>• Excellent EMC performance and precision</td>
<td>• Multiple flux coding</td>
<td>• Motor protection from reverse running and phase loss</td>
</tr>
<tr>
<td>• Detects clear, transparent and shiny targets, solid objects, liquid or granules.</td>
<td>• Several combinations of safety and auxiliary outputs available</td>
<td>• 17.5 mm width. Suitable for NORM panels.</td>
</tr>
<tr>
<td>• Protection: short circuit, transient and reverse polarity</td>
<td>• Operating temperature -25°C to +70°C</td>
<td>• Plug and play: no settings needed</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>3-phase Monitoring Relay</strong></th>
<th>Monitoring relays</th>
<th><strong>Energy analyzers</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>DPB52</strong></td>
<td><strong>DIA 53</strong></td>
<td><strong>EM210</strong></td>
</tr>
<tr>
<td>• Dimensions: 81x17.5x6.7mm DIN-rail housing</td>
<td>• Dimensions: 81x17.5x6.7mm DIN-rail housing with 12 mm hole for current measurement</td>
<td>• 3-phase energy meters</td>
</tr>
<tr>
<td>• Phase sequence and loss relay</td>
<td>• Current monitoring relay with built-in current transformer</td>
<td>• Solid or split-core 5 A CT, 333mV CT, Rogowski coils</td>
</tr>
<tr>
<td>• Over/under voltage monitoring with adjustable time delay</td>
<td>• 20, 50 or 100 A full scale</td>
<td>• Dimensions: 4 DIN modules or 72x72 housing</td>
</tr>
<tr>
<td>• Power supply from 208 to 480 VAC</td>
<td>• Solid powered</td>
<td>• Class 1 (kWh) acc. with EN62053-1</td>
</tr>
<tr>
<td>• Approvals/Marks: cULus - CCC approved</td>
<td>• Approvals/Marks: UL - CSA - CCC</td>
<td>• Class B (kWh) acc. with EN50470-3</td>
</tr>
<tr>
<td>MAIN FEATURES:</td>
<td>MAIN FEATURES:</td>
<td>MAIN FEATURES:</td>
</tr>
<tr>
<td>• Motor protection from reverse running and phase loss</td>
<td>• 2 wire connection</td>
<td>• Pulse or serial RS485 output</td>
</tr>
<tr>
<td>• 17.5 mm width. Suitable for NORM panels.</td>
<td>• Knob adjustable setpoint</td>
<td>• cULus approved</td>
</tr>
<tr>
<td>• Plug and play: easy setup via front dials</td>
<td>• Integrated solid state NPN PNP output</td>
<td></td>
</tr>
<tr>
<td>CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Our product range

### 3-phase energy analysers

**WM20**
- 96x96 mm panel mounting housing
- Accuracy 0.2 % (voltage, current)
- Class 0.5S (kWh)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved

**MAIN FEATURES**
- Provides installation data to a SCADA to manage the whole system
- Modular housing to build the instrument according to the real application needs
- Modbus, Ethernet, Profibus, BACnet (IP and MS/TP) communication ports

### 3-phase power analyzers

**EM24**
- 3-phase energy analyser with direct connection
- Direct connection up to 65 A or by CT
- Dimensions: 4-DIN-rail module housings
- Class B (EN50470)
- Pulse open collector output
- Modbus RTU or Ethernet or M-bus communication port

**MAIN FEATURES**
- Direct measurement in a very compact housing to save space
- Suitable for measuring generated and consumed energy
- On request, MID annex D certification available
- M-bus port integrated in the meter without external gateways

### Monitoring gateway and controller

**UWP 3.0**
- Micro PC with embedded Web-Server
- Data and event logging from Modbus, Modbus/TCP and Dupline® devices
- Local gateway functions (to BACNet and Modbus/TCP)
- Remote gateway functions (FTP, SFTP, FTPS, Rest-API)
- Microsoft Azure Certified for IoT
- Huge ecosystem of compatible meters, sensors, actuators

**MAIN FEATURES**
- Flexible control functions
- Energy efficiency monitoring
- Building automation control
- Car parking guidance

### Monitoring gateway

**WM20**
- 96x96 mm panel mounting housing
- Accuracy 0.2 % (voltage, current)
- Class 0.5S (kWh)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved

**MAIN FEATURES**
- Provides installation data to a SCADA to manage the whole system
- Modular housing to build the instrument according to the real application needs
- Modbus, Ethernet, Profibus, BACnet (IP and MS/TP) communication ports

### Touch screen/ Datalogger

**BTM-T4-24 / BTM-T7-24**
- 4” / 7” colour display
- Easy setup of graphic pages and functions with the powerful Wizard software
- Activation of internet links through touch buttons
- Support viewing from IP cameras

**MAIN FEATURES**
- Ethernet connection
- Wide screen display, 64 K colours
- USB port, SD memory, Modbus RTU serial port

### True delay on release timers

**DBB01 / PB001**
- Dimensions: 22.5 mm Euronorm for DIN-rail or 36 mm plug-in version
- Multi voltage true delay on release timer
- Combined AC and DC power supply
- Repeatability: < 0.2%
- Approvals/Marks: UL - CSA

**MAIN FEATURES**
- Time range 0.1 to 600s - capacitor powered
- 4 time ranges selectable by DIP-switches, knob time setting
- Output: 8 A SPDT or 8 A DPDT relay
## Our product range

<table>
<thead>
<tr>
<th>Asymmetrical recycler timers</th>
<th>ON delay and multifunction timers</th>
<th>1-phase DIN-rail power supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DCB01 / PCB01</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Dimensions: 22.5 mm Euronorm for DIN-rail or 36 mm plug-in version</td>
<td>- Dimensions: 81x17.5x67.2 mm DIN-rail housing</td>
<td>- Output power from 5 W to 480 W</td>
</tr>
<tr>
<td>- Asymmetrical Recycler timer with 4 functions</td>
<td>- Delay on operate function (DAA), multifunction (DMB)</td>
<td>- Input 110/240 VAC 1-phase and DC</td>
</tr>
<tr>
<td>- Combined AC and DC power supply</td>
<td>- Combined AC and DC power supply</td>
<td>- Short circuit, overload and overvoltage protection</td>
</tr>
<tr>
<td>- Repeatability: &lt; 0.2%</td>
<td>- Repeatability: &lt; 0.2%</td>
<td>- PFC &gt;100 W</td>
</tr>
<tr>
<td>- Approvals/Marks: UL - CSA</td>
<td>- Approvals/Marks: UL - CSA - RINA</td>
<td>- Approvals/Marks: CE - cULus - cURus - UL1310 Class 2 (up to 90W) - ISA 12.12.1 Class I Div2 - TÜV - CCC</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
</tr>
<tr>
<td>- Time range 0.1s to 100h</td>
<td>- Delay on operate/release; interval (manual/automatic start);</td>
<td>- Power supply OK output</td>
</tr>
<tr>
<td>- 4 time ranges selectable by DIP-switches, knob time setting</td>
<td>- Double interval; symmetrical recycler (ON or OFF first)</td>
<td>- Parallel connection feature</td>
</tr>
<tr>
<td>- Output: 1 or 2 x SPDT relay</td>
<td>- Time range from 0.1s to 100h</td>
<td>- Spring, screw terminals or detachable connectors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metal enclosed power supplies</th>
<th>Low profile DIN-rail power supplies</th>
<th>Compact DIN-rail power supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPPC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Output power from 15 W to 800 W</td>
<td>- Output power from 7.5 W to 100 W</td>
<td>- Output power from 30 W to 240 W</td>
</tr>
<tr>
<td>- Input 110/240 VAC 1-phase</td>
<td>- Input 110 / 240 V 1-phase and DC 120 V to 370 V</td>
<td>- Universal input range of 110-240 VAC or up to 370 VDC</td>
</tr>
<tr>
<td>- Short circuit, overload and overvoltage protection</td>
<td>- Short circuit, overload protection</td>
<td>- Short circuit, overload, overvoltage and over temperature protection</td>
</tr>
<tr>
<td>- PFC function available &gt;75 W</td>
<td>- From -25°C to +60°C operation w/out derating</td>
<td>- Compact dimension</td>
</tr>
<tr>
<td>- Approvals/Marks: CE - cURus</td>
<td>- Approvals/Marks: CE - cULus - cURus - UL1310 Class 2 (up to 91.2 W) - ISA 12.12.1 Class I Div2 - TÜV</td>
<td>- Approvals/Marks: CE - cULus (all except 240 W) - cURus (all except 240 W) - UL1310 Class 2 (up to 72 W, for 72 W only for 24 VDC models)</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
</tr>
<tr>
<td>- Adjustable output ±10%</td>
<td>- Operating temperature w/o derating from -25°C to +60°C</td>
<td>- Save up to 20% panel space</td>
</tr>
<tr>
<td>- Compact dimensions</td>
<td>- Short circuit and Overload protection</td>
<td>- High efficiency and wide operating temperature</td>
</tr>
<tr>
<td>- Wide operating temperature range up to 70°C</td>
<td>- High efficiency (up to 89%)</td>
<td>- Screw or spring terminal connectors</td>
</tr>
</tbody>
</table>
**Our product range**

<table>
<thead>
<tr>
<th>Compact DIN-rail power supplies</th>
<th>Battery chargers &amp; UPS</th>
<th>CERTUS configurable safety module</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPDC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output power: 120 W / 240 W / 480 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universal input: 90 VAC / 264 VAC / 127 VDC - 370 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output voltage: 120 W - 12/24 VDC, 240 W - 24 VDC, 480 W - 24/48 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High efficiency &gt; 90%</td>
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<td></td>
</tr>
<tr>
<td>Approvals/Mark: CE - cULus - cULus</td>
<td></td>
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</tr>
<tr>
<td><strong>SPUC / SPUBC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply, UPS and battery charger “All-in-one” [SPUC], UPS controller [SPUC]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 or 24 VDC 5 A output (up to 30 A SPUC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power boost up to 2 times rated output, permanent (SPUC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built in battery status, complete diagnosis [SPUC]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approvals/Mark: CE - cULus - cULus [SPUC] - TÜV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CMM</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 non-safety test outputs for sensor monitoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 non-safety programmable digital signals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 non-safety inputs for Start / Restart interlock and EDM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log file with 5 configuration modifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection with other expansion units via rear bus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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
- Models offer a variety of non-safety Inputs/Outputs such as: inputs for Start/Restart interlock and EDM, test outputs

**MAIN FEATURES**

- The models offer 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

**CES**

- Expansion units to monitor speed (Pl e):
  - Zero speed, Max speed, Speed range
  - Motion direction: Rotation / Translation
- RIA5 for encoder connections and terminal blocks for connection of proximity (up to 2 proximity switches per module)
- Inputs frequency: Encoder up to 500 KHz (300 KHz for HTL), Proximity up to 5 KHz.

**MAIN FEATURES**

- The modules allow the configuration of up to 4 speed thresholds for each logic output (axis)
- Each module integrates two logic outputs configurable via the MSD and is capable of controlling up to two independent axes

**NES / NLG Series**

- Safety modules for gate and emergency stop (NES) and light curtain (NLG)
- 3 normally open safety outputs
- < 30 ms response time
- IP40 protection for housing and IP20 protection for terminals
- Approvals/Mark: CE - UL - TÜV - cULus

**MAIN FEATURES**

- Safety category 4
- < 30 m/s response time
- Performance level PL e in accordance with ISO 13849-1
- SIL CL 3 in accordance with IEC 62061

---

**CERTUS configurable I/O expansion modules**

**CERTUS speed monitoring modules**

**Safety modules**

**SPDC**

- Output power: 120 W / 240 W / 480 W
- Universal input: 90 VAC - 264 VAC / 127 VDC - 370 VDC
- Output voltage: 120 W - 12/24 VDC, 240 W - 24 VDC, 480 W - 24/48 VDC
- High efficiency > 90%
- Approvals/Mark: CE - cULus - cULus

**SPUC / SPUBC**

- Power supply, UPS and battery charger “All-in-one” [SPUC], UPS controller [SPUC]
- 12 or 24 VDC 5 A output (up to 30 A SPUC)
- Power boost up to 2 times rated output, permanent (SPUC)
- Built in battery status, complete diagnosis [SPUC]
- Approvals/Mark: CE - cULus - cULus [SPUC] - TÜV (SPUC)

**CMM**

- 4 non-safety test outputs for sensor monitoring
- 2 non-safety programmable digital signals
- 2 non-safety inputs for Start / Restart interlock and EDM
- Log file with 5 configuration modifications
- Connection with other expansion units via rear bus

**C I/O**

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**MAIN FEATURES**

- The models offer eight combinations:
  - 8 Inputs 2 Outputs, 12 Inputs 8 test Outputs
  - 8 Inputs, 16 Inputs
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  - 2 relay Outputs, 4 relay Outputs

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- 3 normally open safety outputs
- < 30 ms response time
- IP40 protection for housing and IP20 protection for terminals
- Approvals/Mark: CE - UL - TÜV - cULus

**MAIN FEATURES**

- Safety category 4
- < 30 m/s response time
- Performance level PL e in accordance with ISO 13849-1
- SIL CL 3 in accordance with IEC 62061
Our product range

<table>
<thead>
<tr>
<th>CERTUS multifunction safety module</th>
<th>CERTUS multifunction safety module</th>
<th>Electromagnetic safety interlocks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CM22D0A</strong></td>
<td><strong>CM40D0A / CM30D1A</strong></td>
<td><strong>ESI</strong></td>
</tr>
<tr>
<td>• Up to 4 OSSD safety outputs</td>
<td>• 4 OSSD safety outputs (CM40D0A)</td>
<td>• Improving safety for applications requiring access to remain closed and locked until potential hazards have stopped or come to a predetermined safe state</td>
</tr>
<tr>
<td>• 2 OSSD auxiliary outputs</td>
<td>• 3 OSSD safety outputs + 1 auxiliary output (CM30D1A)</td>
<td>• Standards compliance. SIL 3 in accordance with EN 62061, PL e in accordance with EN ISO 13849-1, interlock type 2 in accordance with EN ISO 14119</td>
</tr>
<tr>
<td>• Safety solution for enhanced safety and high protection in inertia machinery</td>
<td>• Safety solution for basic machines, equipment and production lines</td>
<td>• Approvals/Marks: CE - cULus - IMQ</td>
</tr>
<tr>
<td>• Compact dimensions, 1 DIN, W x H x D: 18 x 90 x 63 mm</td>
<td>• Compact dimensions, 1 DIN, W x H x D: 18 x 90 x 63 mm</td>
<td>• Ensures protection in inertia machinery</td>
</tr>
<tr>
<td><strong>MAIN FEATURES</strong></td>
<td><strong>MAIN FEATURES</strong></td>
<td>• Protects machines from interruptions</td>
</tr>
<tr>
<td>• Configurable pre-set delayed safety outputs, set via the hex-switch</td>
<td>• Can be used in applications with: e-stop, e-gate, limit switch, non-contact switch, safety light curtains, safety light beam, safety mat</td>
<td>• Prevents entry into a dangerous area until the unlock signal</td>
</tr>
<tr>
<td>• Can be used in applications with: e-stop, e-gate, limit switch, non-contact switch, safety light curtains, safety light beam, safety mat</td>
<td>• Cat.4 PL e (ISO 13849-1), SIL 3 (IEC 62061), SIL CL 3 (IEC 61508)</td>
<td>• Manual unlock device for emergency</td>
</tr>
<tr>
<td>• Cat.4 PL e (ISO 13849-1), SIL 3 (IEC 62061), SIL CL 3 (IEC 61508)</td>
<td>• Approval by TUV</td>
<td>• Block controlled by solenoid</td>
</tr>
<tr>
<td>• Approval by TUV</td>
<td>• Manual or automatic start selectable</td>
<td></td>
</tr>
<tr>
<td>• Manual or automatic start selectable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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