CARLO GAVAZZI
Automation Components

CARLO GAVAZZI

Industrial Automation

Solutions for
Agriculture

Solutions for Agriculture

| Tractors and agricultural machinery | Silos | Feed distribution systems | Irrigation |

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

Agriculture has experienced a rapid and decisive evolution which has involved a significant growth of agricultural mechanization in production processes.

Reliable and efficient mechanization has a great potential to affect the quantity and quality of agricultural production.

To summarize, we can subdivide the machines and equipment for agriculture into two main categories: farm tractors and feed processing systems. Tractors and other agricultural machinery are responsible for most of the basic work in agricultural production.

Advances in technology and the optimum performance of our components are two major factors which make agricultural machinery more versatile and suitable for a wide range of farming tasks. Carlo Gavazzi offers, among others things, a wide range of inductive proximity and hall effect sensors to measure speed and rotational direction of wheels in farm tractors, harvesting machines etc.

Carlo Gavazzi's capacitive sensors are widely used for level measurements of seed, fodder and liquids in silos and in animal feeding machinery. Ultrasonic sensors are used mainly for level measurements of liquids (e.g. milking machinery).

Reliable irrigation systems are highly important for agricultural production. The well proven Dupline® fieldbus. With its up-to-the-minute technology, has become known as an extremely user-friendly and flexible fieldbus able to transmit signals over long distances - features that make Dupline® ideal as a fieldbus for irrigation systems.

Finally – thanks to Carlo Gavazzi's wide product range – most agricultural application challenges can be met by one supplier.

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Tractors and agricultural machinery

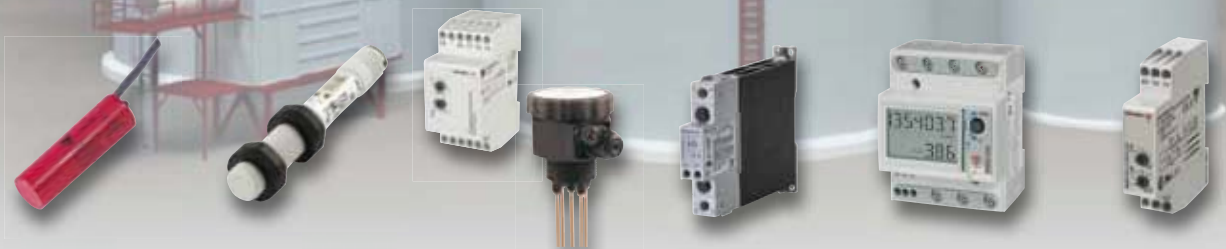| Inductive sensor	Pick up sensor	Ultrasonic sensor	Limit switch
ICB	**PA2PK**	**UA**	**PS21L**

Agricultural machinery needs reliable and durable parts and components able to work long hours in difficult outdoor conditions, exposed to every kind of stress. Carlo Gavazzi offers a comprehensive range of components for most applications in agricultural and earth-moving vehicles, from passive magnetic "Pick-up" sensors (PA2PK) to inductive proximity sensors. This detect and measure the speed and the direction of rotation of phonic or toothed wheels and generally of any rotating device built in a ferromagnetic material and provided with slots and cogs, for example in engines and in tractors'.
Inductive sensors are used for non-

contact measurements - for example to count revolutions of the axle in machinery or to monitor the bucket position in a backhoe loader. Safety and positional mechanical switches in different versions and configurations are also available.
Ultrasonic sensors (UA series) are also used to monitor sprayer heights in self-propelled row-crop sprayers. A particular application of ultrasonic sensors with analog output is the control of the driving direction of the wagons or a motorized chassis - equipped with one or more fixed or mobile platforms - for example - for harvesting fruit.

Silos

Capacitive sensor	Capacitive sensor	Conductive level controller / probe	Solid state relays	Energy meters	Timers
VC	CA	CLD CLH	RGC RGH	EM23 EM33	DAA51 DMB51

Carlo Gavazzi offers very efficient means for liquid and solid level measurement, both in large silos and in small storage containers. The new generation of capacitive sensors (CA12, CA18, CA30) with the newest microprocessor-based technology, includes self-teaching functions and humidity compensation for quick, reliable and precise measurement. With the simple push of a button, the user can program the sensors to detect virtually any material: the user can also program the sensors to ignore certain materials. The humidity compensation technology, in the form of a self-compensating mechanism, will ignore condensing water on the front of the

"non-flush mounted" sensor. By using the new generation sensors, you do not have to worry about the polarity of the load, NPN or PNP. The polarity will be detected and selected automatically.

The conductive level program by Carlo Gavazzi comprises a complete range of intelligent conductive level controllers (CL-series) and CLH electrode probes (3 or 5 electrodes). The controllers include all common level control functions. Various adjustment possibilities enable the controller to perform filling operations, emptying operations or a combination of the two.

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Feed distribution systems

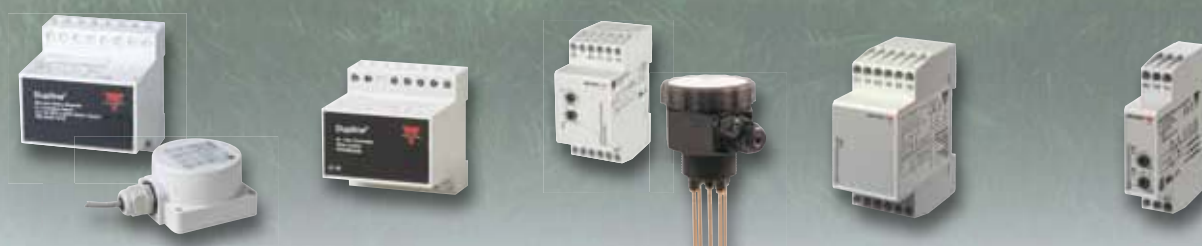| Capacitive sensors	Inductive sensors	Photoelectric sensors	Softstarters	Monitoring relay	Energy meter
VC CB	ICB	PC50 PD112	RSHR RSBT	DLA71	EM23

Feeding distribution systems are critical to the quality and safety of farms with pig, poultry and diary sectors.

Each part and component therefore plays an important role in maximising processes, saving time and reducing labour costs. Manual handling is eliminated and the environment remains dust free, protecting feed from moisture and contamination. The distribution is controlled by sensors (capacitive, photoelectric, colour and contrast sensors), combined with solid state relays and soft starters.

Carlo Gavazzi capacitive level sensors (VC series) are excellent for use in the agricultural sector (detection of grain, fluids etc.). They are available with adjustable sensing distances and with/without a built-in time delay. The relay output ensures that the load can be driven directly.

The photoelectric sensors (PC50CNB), high accuracy, background suppression sensors in a reinforced housing, provide a long sensing range together with sensitivity adjustment.

Ultrasonic sensors control the levels in the tanks and bins and monitor emptying to ensure the efficiency of the process. Furthermore, Carlo Gavazzi soft starters (RSE, RSHR, RSBT) control the start and stop of pumps, ventilators and chillers.

Irrigation

Dupline® digital I/O modules	Dupline® converter	Conductive level controller / probe	Monitoring relay	Timers
GH3440 4412 GH6440 4412	GH3485 0000	CLD CLH	DLA71	DAA51 DMB51

Traditional irrigation systems are characterized by complex and expensive wiring. Expansion is also a problem due to extra wires for valves that need to be added to the system. The Carlo Gavazzi Dupline® irrigation bus reduces installation costs and increases flexibility in agricultural irrigation systems, where the valves are usually distributed over a large area. By running the power, valve control signals and pulses from flow meters onto a single two-wire cable, Dupline® significantly reduces the wiring and cable costs and makes expansion easy. Any type of irrigation controller, whether it is a PLC, PC or dedicated controller, can use Dupline® as a remote I/O system. The wiring topology is completely free, with no limitation to the number and length of branches. Finally, the Dupline® Fieldbus, with its free topology configuration, is the ideal system to control levels, monitor pumps and activate valves over a large area and from a distance.

Furthermore, the Carlo Gavazzi product range includes a variety of automation components suitable for use in irrigation control, in landscaping and green-houses: we offer 3-phase monitoring relays, inductive, capacitive and ultrasonic sensors, digital panel meters and energy meters.

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Agriculture

Our product range

Capacitive sensors	Capacitive sensors	Pick up sensor	Inductive sensors
CA12 / EC	**VC / CB**	**PA2PK**	**ICB12 / ICB18 / ICB30**

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

VC / CB

- Capacitive level sensors for solid, fluid or granulated substances
- Dimensions: M32, M18
- Adjustable sensing distance: 3 12 mm
- Protection degree IP65
- Approval: CE

MAIN FEATURES
- Suitable for applications where gear speed-taking is requested
- Operation frequency > 100 Hz

PA2PK

- Dimensions: M20x1.5
- Pulse output function
- Cylindrical nylon with 30% glass fibre
- Protection degree IP65
- Approval: CE

MAIN FEATURES
- Suitable for applications where the measurement of gear speed is required.
- Operation frequency > 100 Hz

ICB12 / ICB18 / ICB30

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

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

Conductive level controller / probe	Ultrasonic sensors	Photoelectric sensor	Photoelectric sensor
CLD / CLH	**UA12...30**	**PD112**	**PC50**

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

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, shiny and solid objects, liquid or granules.
- Protection: short circuit, transient and reverse polarity

PD112

- Dimensions 25 x 45 x 112 mm
- Power supplies receiver: 10 to 30 VDC
- NPN and PNP NO or NC output
- Emitter with mute input for testing sensor fucntion
- 2.5 m sensing distance

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

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

Our product range

Monitoring relay	Monitoring relays	1 phase Solid state contactors	3ph 7.5kW Motor Softstarters
DLA71	**DIA / DIB / DIC**	**RGC / RGH**	**RSHR, RSHR Midi**

DLA71

- Pump alternating relay for 2 or 3 pumps
- 35.5 mm DIN-rail housing
- LED indication for relay and power supply ON
- Output: 2 x 5 A SPST relay or 3 x 5 A SPST
- Approvals: CE, UL, CSA

MAIN FEATURES
- Galvanically separated power supply
- Built-in delay for the second or third pump in case simultaneous activation is required
- Built-in function for automatic rotation of the pumps

DIA / DIB / DIC

- 1-Phase AC/DC Over Current (DIA), 1-Phase True RMS AC/DC Over or Under Current (DIB, DIC)
- Adjustable current and voltage on relative scale
- LED indication for relay, alarm and power supply ON
- Approvals: CE, UL, CSA

MAIN FEATURES
- Galvanically separated power supply
- For mounting on DIN-rail in accordance with DIN/EN 50 022

RGC / RGH

- 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)
- CE- cULus Listing - VDE - GL [RGC..15, 20, 30]

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

RSHR, RSHR Midi

- Operational voltage up to 600 VAC
- Motor rating: 3-phase up to 7-5 kW (RSHR Midi), 22 kW (RSHR)
- LED status indicators
- Approvals: CE, UL, CSA

MAIN FEATURES
- Up to 250 starts per hour (RSHR Midi), 50 starts per hour (RSHR)
- Wide range of operating temperature: -20°C to 60°C

3-phase 7.5kW soft starters	3ph Scroll Compressor Softstarters	3ph General Purpose Soft starter	3ph Advanced General Purpose Soft Starter
RSHR	**RSBD & RSBT**	**RSDR**	**RSXK**

RSHR

- Operational Voltage: Up to 600 VAC 50/60 Hz
- Motor Rating: 3-phase up to 22 kW @ 400 V
- Ramp up time: 1 - 10 sec
- Ramp down time: 1 - 30 sec
- UL, cUL, CSA approvals

MAIN FEATURES
- Up to 50 starts per hour
- Wide operating temperature: -20C o +60°C
- Internally bypassed: less heat dissipation

RSBD & RSBT

- Enhanced current reduction capability with patented auto-adpative algorithm
- Motor Rating: 3-phase up to 45kW @ 400V
- Integarted diagnostic functions
- 2- and 3-phase controlled solutions
- Approvals/Marks: cUL listed

MAIN FEATURES
- Plug and play: no user settings required
- Typicallly >50% scroll compressor inrush current reduction
- Internally bypassed and Internally supplied

RSDR

- Motor Rating: Up to 500kW @400V
- Ramp up time: 0.5 - 30sec
- Internally bypassed
- Simple User Interface
- Approvals/Marks: UL

MAIN FEATURES
- Multi voltage operation: 230-460VAC, 50/60Hz
- Auxiliary relays for top of ramp and alarms

RSXK

- Motor Rating: 3 phase up to 1000kW @ 440V
- 3 phase controlled
- Automatic application setup
- Inside delta capability
- Trip Class 30 starting duty

MAIN FEATURES
- Integrated keypad with LCD display
- Alpha numeric display of parameters and alarms
- Energy optimising capability

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Agriculture
Our product range

Timers	Timers	Power transducer	Energy meters

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

FAA, FMB01

- 48 x 48 mm housing for 11-pin socket or panel mounting
- Multifunction timer with 7 functions
- DPDT output
- Universal power supply
- cUR and CSA approved

MAIN FEATURES
- Front knob adjustable time setting
- Selectable time ranges from 0.05s to 300h
- Delay on operate/release, ON/OFF first symmetrical recycle, single/double interval on trigger open/close

CPT

- Dimensions 83.5x45x98.5mm DINrail housing
- Accuracy 0.5 % (voltage, current)
- Measurement by CT and VT
- Front protection degree IP20
- Analogue, digital, pulse or serial outputs available

MAIN FEATURES
- Very compact size power transducer
- Provides electrical variables set to a PLC to manage compressors and other loads
- Suitable for on-board panel installation

EM23 / EM33

- 3-phase energy meter with direct connection
- Direct connection up to 32A (EM33) or 65A (EM23)
- Dimensions 4-DIN rail module housings
- Class 1 (kWh) acc. to EN62053-1
- Serial RS485 (EM33) or open collector (EM23) output

MAIN FEATURES
- Direct measurement in a very compact housing to save space
- Allows local energy allocation for cost allocation purposes
- On request, MID annex D certification available

Dupline® Digital I/O Modules	Dupline® Converter	Power supply	Limit Switch

GH3440 4412
GH6440 4412

- Module for controlling 3-wire latching valves
- 2 outputs to open and close valve
- 2 inputs for e.g. pulse counting, tamper switch or status feedback
- Supplied by bus - no external power needed
- Valve closes in case of bus fault

MAIN FEATURES
- Built-in microcontroller for correct coil-pulsing and charge monitoring
- Valve closes in case of bus fault

GH344850000

- Generates 28 V Hi-Line signal
- Supplies and controls up to 64 valve I/O modules over two wires
- LED-indications for Dupline® carrier, Hi-Line carrier and supply

MAIN FEATURES
- Built-in Gas-arrestor for lightning protection
- Up to 7 km transmission distance

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

PS21L

- Material: plastic, metal
- Horizontal / vertical control available
- Minimum actuation force / torque
- Approvals: CE, UL, CSA

MAIN FEATURES
- Mechanical life > 15,000,000 cycles
- Precise operating point

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![Carlo Gavazzi logo]

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