



## Industrial Automation

# Solutions for Agriculture

# Agriculture

## Solutions for



**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 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 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 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.

# Agriculture

## Tractors and agricultural machinery



### Inductive sensors

ICB

### Pick up sensors

PA2PK

### Ultrasonic sensors

UA

### Limit switches

PS21

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. The pick-up sensors detect and measure the speed 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 sensors ATEX version	Capacitive sensors	Conductive level controllers / probes	Solid state switches	Energy meters	Timers
VC CB32	EC30	CLD CLH VS2	RGC RGS	EM23 EM24 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 capacitive sensors EC30 are sensors developed for industrial applications. The sensors have a long sensing distance that allows easy detection of dry feed or grains. The sensing distance is adjusted via a multiturn potentiometer making the distance settings quite accurate. With both DC and AC versions available the sensors can be used in most applications. The VC11/12 sensors are available in multivoltage power supply with relay output and used in many applications

for the agriculture business. The conductive level program by Carlo Gavazzi comprises a complete range of intelligent conductive level controllers for liquids like slurry tanks (CL-series), CLH electrode probes (3 or 5 electrodes) and VS2 level probes (2 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.

# Agriculture

## Feed distribution systems



**Magnetic sensors**

**SA2  
CL2**

**Capacitive sensors**

**CA18**

**Capacitive sensors**

**VC  
CB**

**Inductive sensors**

**ICB**

**Photoelectric sensors**

**PA18 / PH18  
PC50  
PD112**

**Soft starters**

**RSGD**

**Energy meters**

**EM23  
EM24  
EM33**

**Switching power supplies**

**SPD**

Feeding distribution systems are critical to the quality and safety of farms with pig, poultry and dairy sectors. Each part and component therefore plays an important role in maximising processes, saving time and reducing labour costs. In feeding systems it is important to feed all chickens at the same time and manual handling is eliminated. The distribution is controlled by sensors (capacitive, photoelectric, colour and contrast sensors), normally 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 feed, fluids etc.). Moreover the new VC11/12 sensors are able to directly

drive a contactor or a small motor. 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 - PD112) have a high accuracy, background suppression in a reinforced housing and provide a long sensing range together with sensitivity adjustment detecting e.g., pigs or cattle directly. Ultrasonic sensors control the levels in the tanks and monitor emptying to ensure the efficiency of the process. Furthermore, Carlo Gavazzi soft starters (RSGD, RSDR) soft start and soft stop pumps, screw feeders, ventilators as well as chillers (RSBT).





# Irrigation



**Dupline®**  
digital I/O modules

**GH3440 4412**  
**GH6440 4412**

**Dupline®**  
converters

**GH3485 0000**

**Conductive level**  
controllers / probes

**CLD**  
**CLH**

**Timers**

**DAA51**  
**DMB51**

**Monitoring**  
relays

**DPA51**



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.

# Agriculture

## Our product range

### Pick up sensors



#### PA2PK

- Dimensions: diameter M20 x 1.5  
length 60, 70, 107 mm
- Pulse output function
- Cylindrical nylon with 30% glass fibre
- Protection degree IP65
- Approvals/Marks: CE

#### MAIN FEATURES

- AMP connector Superseal
- Suitable for applications where the measurement of gear speed is required.
- Operating frequency > 100 Hz

### Capacitive sensors



#### EC30

- Dimensions: M30
- TRIPLESIELD™ sensor protection
- Plastic housing, DC and AC versions
- Sensing distance up to 25 mm
- Approvals/Marks: CE - UL - CSA

#### MAIN FEATURES

- Detection of e.g., corn or feed
- Sensing face can withstand temperatures up to 120°C
- Protection: short circuit, transient and reverse polarity

### Capacitive sensors



#### CA18CLF

- Sensing distance: 0.5 - 12 mm (M18)
- Automatic detection of NPN or PNP load
- Selectable "make or break" switching by means of Teach function
- Approvals/Marks: CE - UL - CSA

#### MAIN FEATURES

- Teach-in of sensing distance via push-button or COM-input
- Humidity compensation
- Protection: short-circuit, transients and reverse polarity

### Capacitive sensors



#### VC11/12

- Capacitive level sensors for solid, fluid or granulated substances
- Dimensions: Ø32
- Adjustable sensing distance: 4 - 12 mm
- Multivoltage supply: 20.4 to 255 VAC/DC
- Approvals/Marks: CE - cULus

#### MAIN FEATURES

- New back-part with integrated trimmer shafts
- SPDT relay output
- Time delay on operate or release

### Capacitive sensors



#### CB32

- Capacitive level sensors for solid, fluid or granulated substances
- Dimensions: Ø32
- Adjustable sensing distance: 4 - 20 mm
- Protection transients and reverse polarity
- Featuring TRIPLESIELD™ sensor protection
- Approvals/Marks: CE

#### MAIN FEATURES

- Approved acc. to ATEX directive operation in potential explosive dusty
- Relay output
- With or without adjustable time delay

### Inductive sensors



#### ICB12 / ICB18 / ICB30

- M12, M18 and M30 Nickel-brass housing in short or long barrel lengths
- Standard and double distance sensing ranges
- Output functions: NO or NC, NPN or PNP
- Two metres 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



# Our product range

## Ultrasonic sensors



### UA18 / UA30

- Ultrasonic sensors with integrated amplifier providing a transistor and/or analog output and integrated amplifier
- Dimensions: M18 or M30
- Housing material: PBT
- Approvals/Marks: CE - cULus

#### MAIN FEATURES

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

## Conductive level controllers / probes



### CLD / CLH / VS2

- Multiple filling and emptying applications
- Rated operational voltage: 24 VAC/DC, 115 VAC or 230 VAC
- Output 2 x 8 A / 250 VAC SPDT relay
- Flexible conductive level probe CLH (up to 5 electrodes), SV2 with 2 electrodes

#### MAIN FEATURES

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

## Photoelectric sensors



### PC50

- Dimensions: 17 x 50 x 50 mm
- Power supply: 112 - 240 VDC / 24 - 240 VAC
- Output SPDT 3 A relay output
- Diffuse reflective, retro-reflective and through beam versions

#### MAIN FEATURES

- Visible polarized light or Infrared versions and long range diffuse reflection

## Photoelectric sensors



### PA18

- 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

- IP69K / ECOLAB approved / CE marking / cULus approved acc. to UL508
- Diagnostic LED indication (Green and Yellow LED)
- Short-circuit, reverse polarity and overload protection

## Photoelectric sensors



### PH18

- Square sensor with M18 front
- Power supply: 10 to 30 VDC
- Separate models available for NPN or PNP outputs
- Sensing types: Diffuse reflective, BGS, Pol. Retro-reflective, Through beam
- Sensitivity adjusted by potentiometer
- Approvals/Marks: CE - cULus

#### MAIN FEATURES

- IP69K / ECOLAB approved / CE-marking / cULus approved acc. to UL508
- Diagnostic LED indication (Green and yellow LED)
- Short circuit, reverse polarity and overload protected

## Photoelectric sensors



### 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 function
- 2.5 m sensing distance
- Long range background suppression

#### MAIN FEATURES

- UL508
- Long detection range on black objects

# Agriculture

## Our product range

### Magnetic sensors



#### S series

- Type: rectangular plastic housing
- Dimensions: 79 x 21.2 x 11.5 mm
- Side operated
- Operating temperature -25°C to 75°C
- Protection degree IP67

#### MAIN FEATURES

- Several operating distances thanks to wide range of magnetic units (CL series)
- Easy and fast mounting

### 1-phase Solid state switches



#### RGS1 / RGC1

- Product width: 17.5 mm up to 70 mm, DIN-rail or panel mount
- Ratings: up to 660 AV, 90 AAC, 18000 A<sup>2</sup>s
- Integrated overvoltage protection
- Control input ranges: 4-32 VDC, 20-275 VAC (24-190 VDC)
- Approvals/Marks: CE - cULus (RGC), cURus (RGS), CSA (RGS), VDE - GL (RGC up to 30 AAC)

#### MAIN FEATURES

- Integrated heatsink (RGC), without heatsink (RGS)
- 100 kA short circuit current rating
- Optional over temperature protection

### Switching power supplies



#### SPD

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

#### MAIN FEATURES

- Overload protection
- Parallel versions available
- High efficiency

### 3-phase 22 kW General purpose soft starters



#### RSGD

- Motor rating: up to 22 kW in 45 mm
- Ramp up time: 1 - 20s
- Internally bypassed
- Multi-voltage operation:  
RSGD40: 220 - 400 VAC  
RSGD60: 220 - 600 VAC
- Wide control voltage range :  
RSGD40: Option E: 110 - 400 VAC, Option F: 24 VAC/DC  
RSGD60: Option G: 100 - 240 VAC

#### MAIN FEATURES

- Easy to use and setup
- Current balancing algorithm
- Auxiliary relays for top of ramp and alarms
- Optional fan for additional starts per hour (for 37/45 Amp models only)

### 3-phase Scroll compressor soft starters



#### RSBD / RSBT

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

#### MAIN FEATURES

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

### 3-phase General purpose soft starters



#### RSDR

- Motor rating: Up to 500 kW @400 V
- Ramp up time: 0.5 - 30s
- Internally bypassed
- Simple user interface
- Approvals/Marks: UL

#### MAIN FEATURES

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



# Our product range

## Current transformer



### E83-2050

- DIN-rail or surface mounting 22.5 mm Euronorm housing with 12 mm hole for current measurement
- AC current transformer with 4-20 mA secondary
- 1-phase AC current measurement
- Power supply from 10 to 40 VDC
- Approvals/Marks: UL approved

#### MAIN FEATURES

- 7 knob selectable ranges from 5 to 50 AAC
- Easy interface to PLC or monitoring relays

## Monitoring relays



### DPA51

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

#### MAIN FEATURES

- Protection from reverse running and phase loss
- 17.5 mm width: the smallest in the market
- Plug and play: no settings needed

## Monitoring relays



### DIA53

- Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing with 12 mm hole for current measurement
- Current monitoring relay with built-in current transformer
- 20, 50 or 100 A full scale
- Self powered
- Approvals/Marks: UL - CSA - CCC approved

#### MAIN FEATURES

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

## Monitoring relays



### 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 - CSA approved

#### MAIN FEATURES

- Detects the phase-phase or phase-neutral voltage
- 17.5 mm width: the smallest in the market
- Independent voltage setpoints and built-in delays

## Monitoring relays



### DIB02 / PIB02

- Dimensions: 22.5 mm for DIN-rail (DIB) or 35.5 mm for plug in (PIB)
- Overcurrent or undercurrent detection
- DC current measurement by means of external Shunt
- Power supply 115/230 VAC, 24/48 VAC, 24 VDC, 48 VDC
- Adjustable time delay

#### MAIN FEATURES

- Motors protection from Overload
- DC or AC current measurement
- 3-phase overcurrent measurement with MP3 CT

## Power transducers



### CPT

- Dimensions: 83.5 x 45 x 98.5 mm DIN-rail 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

# Agriculture

## Our product range

### Energy meters



#### EM23 / EM33

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

### Energy analysers



#### EM24 DIN

- 3-phase energy meter with direct connection
- Direct connection up to 65 A or by CT
- Dimensions: 4-DIN-rail module housings
- Class 1 (kWh) acc. to EN62053-1
- Pulse open collector output
- Modbus 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

### Current transformers



#### CTD / TADK

- CTD: currents from 40 to 4000 A
- TADK2: 1 - 250 A
- Removable panel fixing clips
- DIN-rail and panel mounting facility
- Double screw terminals (CTD)
- Sealable covers
- Case: ABS, self-extinguishing level UL 94 V-0
- Accuracy class: 0.5

#### MAIN FEATURES

- Wound primary / solid core or split-core
- Compliance with IEC 60185, VDE 0414-1 regulations
- Removable DIN-rail mounting holder

### Timers



#### DAA51 / DMB51

- Dimensions: 81 x 17.5 x 67.2 mm DIN-rail housing
- Delay on operate function (DAA), multifunction (DMB)
- Combined AC and DC power supply
- Repeatability: < 0.2%
- Approvals/Marks: UL - CSA - RINA

#### 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

### Timers



#### FAA / FMB01

- Dimensions: 48 x 48 mm housing for 11 pin socket or panel mounting
- Multifunction timer with 7 functions
- DPDT output
- Universal power supply
- Approvals/Marks: cUR - CSA

#### 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

### Limit Switches



#### PS21

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

#### MAIN FEATURES

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



## Our product range

### Dupline® digital I/O modules



#### GH3440 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

### Dupline® valve control



#### GH6440 4412

- Module for controlling 3-wire latching valves
- 2 outputs for open and close valve
- 2 inputs for e.g., pulse counting, tamper switch or status feedback
- Built in charge capacitor, gas arrestor and microcontroller

#### MAIN FEATURES

- Can be buried in the ground at the actual valve position
- Supplied by bus – no external power needed

### Dupline® converters



#### GH34850000

- 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

### Dupline® test unit



#### GHTU8

- Portable test unit
- 12 key tactile keyboard
- Dual group reading
- Analog BCD reading

#### MAIN FEATURES

- Monitoring of Hi-line channel status with LCD display
- Designed as part of the Dupline irrigation concept





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## OUR COMPETENCE CENTRES AND PRODUCTION SITES

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Carlo Gavazzi Ltd  
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