

## Overview

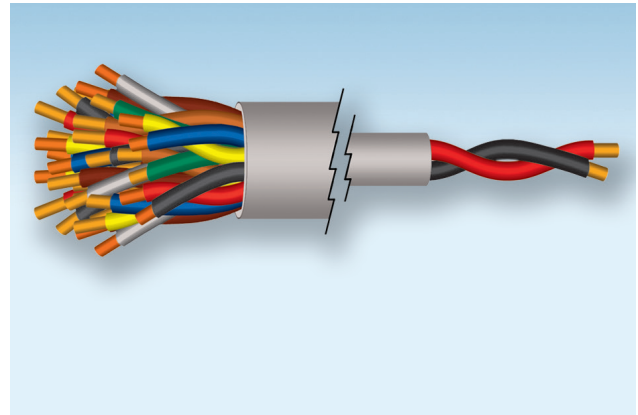
# Fieldbuses

# Overview

## The system

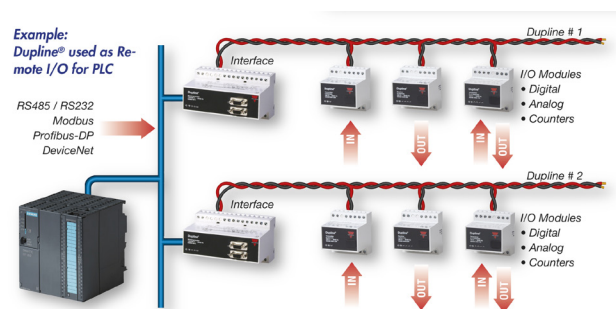
### Introduction

Carlo Gavazzi's Dupline® is a fieldbus that offers unique solutions for a wide range of applications such as mining, irrigation, elevators and energy management. The system transmits multiple digital and analog signals over several km, via an ordinary 2-wire cable. The modular design and simple operation enable it to be used easily in new or existing applications. Solutions are engineered by combining products from the wide range of Dupline® modules, including digital and analog I/O modules, PLC and PC interfaces, HMI and modems. All modules are connect to the same 2-wire cable, which is used to exchange data between modules and between a central controller and modules.



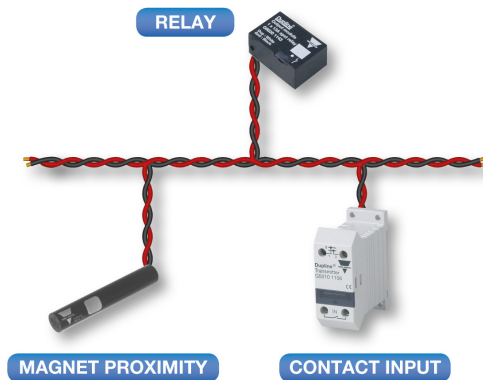
### Flexible and modular remote I/O-system

Dupline® is typically used as a remote I/O system, creating a link between field devices, such as sensors, contactors, valves, push buttons etc. and a central Monitoring Controller, which may be a PLC, PC or the Dupline® Controller. Dupline® can also be used as a simple wire replacement system where signals are transmitted peer-to-peer without involving a controller or other intelligent unit. The Dupline® signals can be transmitted not only on copper wire, but also on fibre optic cable, via radio modem, on leased telephone lines or via GSM Modem. Dupline® has proven its performance in more than 150,000 installations worldwide since 1986. And even though the latest ASIC technology is used today, the new Dupline® modules are still compatible with those installed 20 years ago.



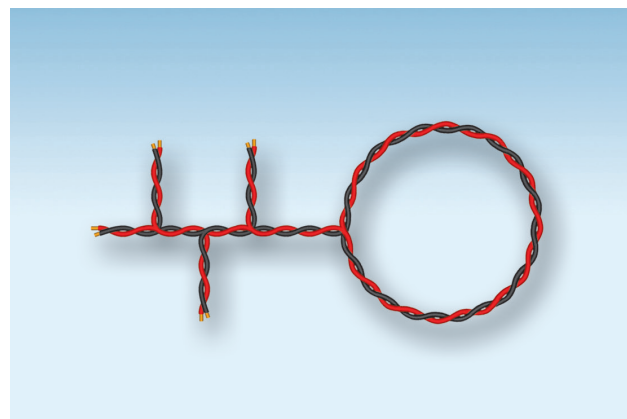
### Unique set of features

Many criteria have to be considered when selecting a fieldbus system. These include transmission distance capabilities, easy operation, noise immunity, topology, response-time and of course cost-effectiveness. Therefore, it is important to define the key application requirements in order to optimize the bus system for the specific task. The strength of the Dupline® system lies in a unique set of features that enable smart, flexible and cost-effective solutions for a wide range of applications. The efficiency of the protocol allows a low carrier frequency of 1 kHz, providing a long transmission distance and superior noise immunity. Hence, Dupline® is capable of transmitting multiple digital and analog signals over distances up to 10 km, via a non-shielded, non-twisted 2-wire cable, without using repeaters.



### Flexible cabling and easy handling

These unique Dupline® features provide considerable cost savings, especially where existing cables are available for use. Another important Dupline® characteristic is its easy in use in all project phases. No PC is required, since the coding of addresses and testing is carried out by means of simple handheld devices. There is no need for special cables and terminations, and there are no cable routing restrictions. Many customers do their own installation, trouble-shooting and maintenance, thus eliminating the need for costly installation and service contracts. Dupline® is an independent and open system for interfacing with basically any kind of controller. Serial interfaces with Modbus and dedicated PLC protocols, together with gateways for Profibus-DP and Devicenet, enable easy and flexible interfacing to PLCs, PCs and dedicated controllers.





# Applications and benefits



## Water distribution

Control and monitoring of pumps, valves, levels and flow over long distances, with or without wires.

- Up to 10 km transmission distance without Repeaters
- No special cable requirements: existing cable can be used
- Easy handling
- All signals can be controlled and monitored from any point in the system
- Transmission via GSM Modem, Radio Modem or Fibre Optics possible
- Flexible interfacing to PLCs, PCs and RTUs
- Cost-effective



## Elevators

3-wire bus solution for power and transmission of signals from push-buttons, lamps and floor indicators.

- Provides significant reduction in installation and commissioning time
- Simple to handle and easy to apply
- Industrial grade and noise immune
- Cost-effective



## Irrigation

Control and powering of multiple valves, monitoring of flow, valve position and water consumption.

- Reduced installation time
- Reduced cable cost
- Easy to expand or change an installation
- Extremely user-friendly
- Free topology
- Robust, reliable and proven technology
- Flexible interfacing to irrigation controllers
- Cost-effective



## Long conveyors

Safe monitoring of pull-wire emergency stop switches with DuplineSafe precise diagnostic information.

- Immediate and precise diagnostics
- Safer than traditional emergency stop systems
- Approved by TÜV according to EN/IEC61508-SIL3 and EN954-1 Cat.4
- Up to 5 km transmission distance without repeater
- High noise immunity – false trips avoided
- Easy to design, install and commission a system
- Several safety relays can read the same input modules

# Overview

## Fieldbuses - Industrial

Controllers	Channel generator	Gateways	Repeaters	Converters
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**G38000016230**

- Programmable channel generator
- Supports various protocols for PLC such as Modbus RTU, Allan Bradley, Mitsubishi, Omron, Schneider and Matsushita
- Automatic data exchange between multiple networked Master Generators, allowing systems with up to 4096 I/O points
- Real-time, timer and logic functions
- Alarm monitoring
- RS232 and 485 ports
- Possibility of 3<sup>rd</sup> wire operation with DC-power on the 3<sup>rd</sup> wire



**G34900000230**

- Generates 8, 16, 24, 32, 40, 48, 56, 64, 96 or 128 channels
- Number of channels selectable by rotary switch
- Number of sequences (1 or 2) selectable
- cULus approved
- Quartz-controlled oscillator
- Cable compensation
- LED-indication for supply and Dupline® carrier
- AC or DC power supply



**G38910020230**

- Built-in Dupline® channel generator
- Gateways for Profibus-DP, Devicenet, Modbus RTU, Modbus/TCP
- Split-I/O mode selectable
- AC and DC power supply
- DIN-rail mounting



**D38920000230**

- Repeaters make any transmission-distance possible (cascading of repeaters)
- Power-booster for applications with several Dupline®-supplied units
- Minimized delay (max. 1 Dupline® scan)
- Number of channels adjusted automatically
- H8-housing
- LED-indication for power supply, primary Dupline® OK and secondary Dupline® (follows Dupline® carrier)
- Built-in channel generator function for secondary Dupline®



**G34920000230**

- Converts Dupline® for transmission on optical fibre
- Runs on optical multimode fibre pairs (50/125, 62.5/125)
- ST type connector
- Up to 5 km optical transmission distance with 62.5/125 fibre
- DIN-rail mounting
- LED-indications for supply and fibre connection

Private line modem	Analogue input modules DIN-rail	Analogue output modules DIN-rail	Analogue input modules de-central	Digital input modules DIN-rail
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**G34910040230**

- Long distance connection of two Dupline® networks
- Approved according to EU standard TBR 15
- Watchdog output
- LED-indications for Supply, Dupline® and Fail



**G34296470230**

- 4 isolated analog inputs
- Inputs individually configurable for 0-20 mA, 4-20 mA or 0-10 VDC
- Selectable resolution: 1/1999 or 1/255 of full scale
- Selectable data format: 8-bit, Analink or 3 1/2 digit BCD
- Address-selection through rotary-switches
- LED-indication for supply and Dupline® carrier
- LED-indication for invalid switch setting and 4-20 mA underflow



**G34396470230**

- 4 analog outputs
- Outputs individually configurable for 0-20 mA, 4-20 mA or 0-10 VDC
- Selectable resolution: 1/1999 or 1/255 of full scale
- Selectable data format: 8-bit, Analink or 3 1/2 digit BCD
- Address-selection through rotary switches
- LED-indication for supply and Dupline® carrier
- LED-indication for invalid switch setting and faulty received data
- Watchdog output for faulty received data



**G8810 6265**

- 0-10 VDC analog inputs
- Analink protocol (8-bit resolution)
- Uses one Dupline® address per used input
- DC-powered (15-30 VDC)
- Small dimension housing for decentralized installation inside wall-box or environmental sensor housings
- Address programming via GAP1605



**G34105501**

- Monostable transmitter
- Optoisolated contact or NPN or PNP transistor inputs
- Dupline® powered
- LED-indications for supply, input activated and Dupline® carrier
- Channel coding by GAP 1605

# Fieldbuses - Industrial

Digital output modules DIN-rail	Digital input modules de-central	Digital output modules de-central	Digital sensors	Analogue sensors
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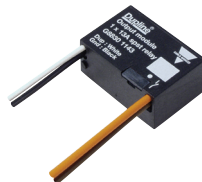
**G34304443230**

- 1-, 2- or 4-channel receiver
- Galvanically separated SPDT or SPST relay outputs
- Load:
  - 1 x 10 A/250 VAC
  - 2 x 10 A/250 VAC
  - 4 x 5 A/250 VAC
- LED-indications for supply, outputs and Dupline® carrier
- Channel coding by GAP 1605



**G8810 2201**

- Compact monostable transmitter
- Contact inputs for pushbuttons
- Input pulse prolongation
- Compact housing
- Dupline® supplied
- Address coding by GAP 1605
- cULus approved



**G8830 1143**

- Small sized single relay output
- Load: 13 A/250 VAC
- Withstands 130A inrush current
- Powered via Dupline®
- Address coding by GAP 1605



**G8910 1101**

- Inductive or Magnetic Proximity Switch
- ABS housing cylindrical
- Ø11, M14 or M18 housing
- Supplied by Dupline®
- IP67
- 1.5 m cable
- Channel coding by GAP 1605 with ADAPT 1605



**G8911 1010**

- AnaLink temperature transmitter with built-in Pt 1000 sensor
- Temperature range: -30°C to +60°C (-22° to +140°F)
- Uses only 1 channel
- Channel coding by GAP 1605
- M12 connection
- Easily mountable
- Supplied by Dupline®

Display modules	Coding unit	Test unit	Termination unit
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**G54606606230**

- 16 channel status LED indicator
- Label slide for LED descriptions
- Individual address coding of LED's
- Normal or inverted LED operation per 8 channel group
- AC/DC power supply
- NPN transistor output for loss of Dupline carrier
- Horizontal panel mounting, 96 x 96 mm
- Channel coding by GAP 1605



**GAP1605**

- Portable programming unit
- Individual coding of every input or output
- Group coding of an entire module
- Reading of codes
- Editing of channel codes
- On/off-line coding of Dupline® modules type G ....
- LED display 4 x 8 LEDs
- Battery powered
- Easy-to-handle plug-type connection



**GTU8**

- Portable test unit
- Monitoring of Dupline® channel status
- LCD-display
- 12-key tactile keyboard
- Supplied by Dupline®
- Transmission latch
- Dual-group reading
- Analog BCD reading
- Split I/O channel reading


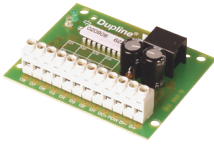
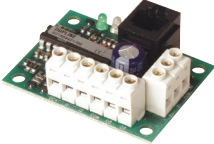
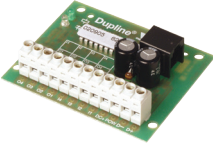



**DT01**

- Removes distortion caused by reflections on the Dupline® or High-Dupline® bus
- H1-housing
- For mounting on DIN-rail (EN 50022)
- No power supply needed



# Fieldbuses - Elevator and Irrigation

Input module	Output module	Input /output module	Input /output module	Master module
 <p><b>G2120</b></p> <ul style="list-style-type: none"> <li>• Open PCB 72.3 x 59 mm</li> <li>• Snap locks or DIN-rail (vertical or horizontal)</li> <li>• 3-wire operation with DC-power on wire 3</li> <li>• Power supply 10-30 VDC</li> <li>• Operating temperature: -20°C to +50°C</li> <li>• Channels : 8</li> <li>• 8 contact inputs for push buttons or transistors</li> <li>• LED indications for supply and carrier</li> </ul>	 <p><b>G2130</b></p> <ul style="list-style-type: none"> <li>• Open PCB 74 x 59 mm</li> <li>• Snap locks or DIN-rail (vertical or horizontal)</li> <li>• 3-wire operation with DC-power on wire 3</li> <li>• Power supply 10-30 VDC</li> <li>• Operating temperature: -20°C to +50°C</li> <li>• Channels: 8</li> <li>• 8 outputs for control of floor indicators and lamps</li> <li>• LED indications for supply and carrier</li> </ul>	 <p><b>G21404421</b></p> <ul style="list-style-type: none"> <li>• Open PCB 54 x 40 mm</li> <li>• Snap locks or DIN-rail (vertical or horizontal)</li> <li>• 3-wire operation with DC-power on wire 3</li> <li>• Power supply 10-30 VDC</li> <li>• Operating temperature: -20°C to +50°C</li> <li>• Channels: 4</li> <li>• 2 push button inputs</li> <li>• 2 PNP-transistor outputs</li> <li>• LED indications for supply and carrier</li> </ul>	 <p><b>G214055.0</b></p> <ul style="list-style-type: none"> <li>• Open PCB 74 x 59 mm</li> <li>• Snap locks or DIN-rail (vertical or horizontal)</li> <li>• 3-wire operation with DC-power on wire 3</li> <li>• Power supply 10-30 VDC</li> <li>• Operating temperature: -20°C to +50°C</li> <li>• Channels: 8</li> <li>• 4 push-button inputs</li> <li>• 4 transistor outputs</li> <li>• LED indications for supply and carrier</li> </ul>	 <p><b>G2196</b></p> <ul style="list-style-type: none"> <li>• Open PCB 86 x 54 mm</li> <li>• Snap locks or DIN-rail (vertical or horizontal)</li> <li>• 3-wire operation with DC-power on wire 3</li> <li>• Power supply 20-30 VDC</li> <li>• Operating temperature: -20°C to +60°C</li> <li>• Channels: 128 inputs and 128 outputs</li> <li>• 128 signals</li> <li>• RS 485/RS 232 interface to control system</li> <li>• LED indications for supply, carrier and RS485Tx</li> </ul>
Master module	Digital I/O module	Digital I/O module	Converter module	Test unit

 <p><b>G3496</b></p> <ul style="list-style-type: none"> <li>• Dimensions: 77 x 72 x 70 mm</li> <li>• DIN-Rail, H4</li> <li>• Possibility for 3-wire operation with DC-power on 3 wires</li> <li>• Power supply 20-30 VDC</li> <li>• Operating temperature: 0°C to +50°C</li> <li>• Storage temperature: -50°C to +85°C</li> <li>• Channels: selectable</li> <li>• Plug &amp; Play RS232/RS485</li> <li>• Interface with built-in protocols for specific PLC brands and Modbus</li> <li>• Protection degree IP20</li> <li>• Built-in protocol for specific PLC brands for easy interfacing</li> </ul>	 <p><b>GH3440 4412</b></p> <ul style="list-style-type: none"> <li>• Dimensions: 77 x 72 x 70 mm</li> <li>• DIN-Rail, H4</li> <li>• I/O module for irrigation valve control</li> <li>• Powered through Hi-Line signal (see GH34850000)</li> <li>• Operating temperature: 0°C to +50°C</li> <li>• Storage temperature: -50°C to +85°C</li> <li>• Channels: 4</li> <li>• 2 outputs for control of 3-wire 12 VDC latching valve</li> <li>• 2 contact inputs</li> <li>• Protection degree IP20</li> </ul>	 <p><b>GH6440 4412</b></p> <ul style="list-style-type: none"> <li>• Dimensions: 80 x 77 x 50 mm</li> <li>• Fully molded housing for under ground installation</li> <li>• I/O module for irrigation valve control</li> <li>• Powered through Hi-Line signal (see GH34850000)</li> <li>• Operating temperature: 0°C to +50°C</li> <li>• Storage temperature: -50°C to +85°C</li> <li>• Channels: 4</li> <li>• 2 outputs for control of 3-wire 12 VDC latching valve</li> <li>• 2 contact inputs</li> <li>• Protection degree IP67</li> </ul>	 <p><b>GH3485 0000</b></p> <ul style="list-style-type: none"> <li>• Dimensions: 77 x 72 x 70 mm</li> <li>• DIN-Rail, H4</li> <li>• Dupline® to Hi-Line converter</li> <li>• Power supply 20-30 VDC</li> <li>• Operating temperature: 0°C to +50°C</li> <li>• Storage temperature: -50°C to +85°C</li> <li>• Channels: Automatic adjustment</li> <li>• Converts the Dupline® signal to Hi-Line 28 VDC level for control of irrigation valves (see GH3440 4412 and GH6440 4412)</li> <li>• Protection degree IP20</li> </ul>	 <p><b>GHTU8</b></p> <ul style="list-style-type: none"> <li>• Dimensions: 145 x 90 x 28 mm</li> <li>• Handheld</li> <li>• Monitoring and control of Dupline® channels. Used for Hi-line modules</li> <li>• Powered through the Dupline® network</li> <li>• Operating temperature: 0°C to +50°C</li> <li>• Storage temperature: -20°C to +85°C</li> <li>• Channels: Automatic adjustment</li> <li>• Digital, multiplexed BCD and 8-bit analogue signals</li> <li>• Options for latching digital signals and for reading multiplexed BCD values</li> <li>• Protection degree IP40</li> </ul>
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# DuplineSafe

<b>Safety relay output module</b>	<b>Profibus DP gateway</b>	<b>Input modules</b>	<b>Handheld programming and test tool</b>
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## GS3830

- Dimensions: 77 x 144 x 70 mm
- Monitors up to 63 safety input modules
- For mounting on DIN-rail (EN50022)
- 230 VAC power supply
- Approvals/Marks: cULus approved
- Approved by TÜV Rheinland Group according to IEC/EN 61508-SIL3, IEC/EN 62061-SIL3 and ISO/EN 13849-1 PL e
- Automatic or manual restart
- Status output for external equipment
- Easy configuration and testing with handheld programming tool



## GS3891

- Dimensions: 77 x 144 x 70 mm
- Profibus-DP slave according to EN50170
- For mounting on DIN-rail (EN50022)
- 230 VAC power supply
- Approvals/Marks: cULus approved
- Makes DuplineSafe diagnostics available on Profibus-DP
- Several gateways can be connected to the same bus
- Useful for interfacing to PLCs and PCs



## GS7510

- Dimensions: 36 x 57.5 x 16.4 mm
- Powered by the bus
- IP67 rating
- Approvals/Marks: cULus approved
- Approved by TÜV Rheinland Group according to EC/EN 61508-SIL3, IEC/EN 62061-SIL3 and ISO/EN 13849-1 PL e
- Easy coding and testing with handheld programming tool
- Small dimensions (57.5 x 36.0 x 16.4 mm) for decentralized installation at the actual location of the safety switch



## GS7380

- Dimensions: 145 x 90 x 28 mm
- Used for address coding of GS75102101 and configuration of GS38300143230
- Battery-powered
- Can be connected at any point on the bus to read out status of all safety signals
- Easy-to-use

<b>Optical converters</b>	<b>Modbus RS485 gateway</b>	<b>Dupline® profinet gateway</b>	<b>Dupline® master channel generator</b>
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## GS3492 / eGS3493

- Dimensions: 77 x 72 x 70 mm
- Runs on optical multimode fibre pairs (50/125, 62.5/125)
- ST type connector
- For mounting on DIN-rail (EN50022)
- AC power supply
- Up to 5 km / 3.1 miles optical transmission distance with 62.5/125 fibre
- Converts DuplineSafe for transmission on optical fibre



## GST150

- Dimensions: 55 x 70 x 15 mm
- Enables monitoring of safety signals from text displays, touchscreens, PLCs and PCs
- Power supply from bus and text display
- Approvals/Marks: cULus approved
- Small dimension housing for mounting directly at text display
- Several GST150s can be connected to the same bus



## GS3391

- Dimensions: 90 x 35 x 58.5 mm
- 24 VDC power supply
- For mounting on DIN-Rail
- Profinet-DP slave
- Makes DuplineSafe diagnostics available on Profinet-DP
- Up to 7 master generators can be connected via the HS RS485 bus (side connector)
- Built-in mini-webserver
- Interfacing with PLCs and PCs



## GS3390

- Dimensions: 90 x 35 x 58.5 mm
- 24 VDC power supply
- For mounting on DIN-Rail
- Module that generates 128 Dupline® channels and power to the bus modules
- Extended digital output mode for Profinet
- Generates Dupline® carrier signal
- Supports digital I/O, Analink I/O, Mux BCD I/O, 8-digit I/O

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### ITALY

Carlo Gavazzi Controls SpA  
Belluno

### LITHUANIA

Uab Carlo Gavazzi Industri Kaunas  
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### CHINA

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