

GEFRAN
BEYOND TECHNOLOGY

PLASTICS MACHINERY

INDUSTRY 4.0, SAFETY & GREEN SOLUTIONS

ENG





GEFRAN

BEYOND TECHNOLOGY

More than fifty years of experience, an organization with a strong focus on the customer's needs and constant technological innovation have made Gefran a benchmark in the design and production of sensors, systems and components for industrial process automation and control. Expertise, flexibility and process quality are the factors that distinguish Gefran in the production of integrated tools and systems for specific applications in various fields of industry, with consolidated know-how in the plastics, mobile hydraulics and heating sectors.

Technology, innovation and versatility represent the catalogue's added value, in addition to the ability to create specific application solutions in association with the world's leading machine manufacturers.



SENSORS

A complete range of precision devices for measuring process variables such as pressure, position, force and temperature.

The key components are made in “clean rooms” that are protected against all types of interference to guarantee full measurement precision.

AUTOMATION PLATFORMS

Gefran Soluzioni provides consulting services and engineering and production of automation platforms, electrical panels and software for industrial process control.

We work side by side with clients to improve the performance of their processes and guarantee continuity, attention to the sustainable maximising of value.

CONTROLLERS, INDICATORS AND POWER CONTROLLERS

A series of products dedicated to managing process variables.

Controllers and indicators, static units and power controllers able to improve production process efficiency, even in energy terms.

Gefran interprets the Smart Factory paradigm with a product catalogue that meets connectivity, factory data acquisition, monitoring and diagnostic maintenance needs.

Devices with functions designed to further energy efficiency according to the most recent safety directives.

Focus on the environment and workers' safety are the two cornerstones supporting Gefran's range.

As regards environmental impact, Gefran offers a wide range of Melt pressure sensors with fluid free transmitters or transmitters filled with Green fluids, in line with the RoHS directive.

On the safety side, Gefran sensors are PL'd and SIL2 certified.



INDUSTRY 4.0



GREEN SOLUTIONS

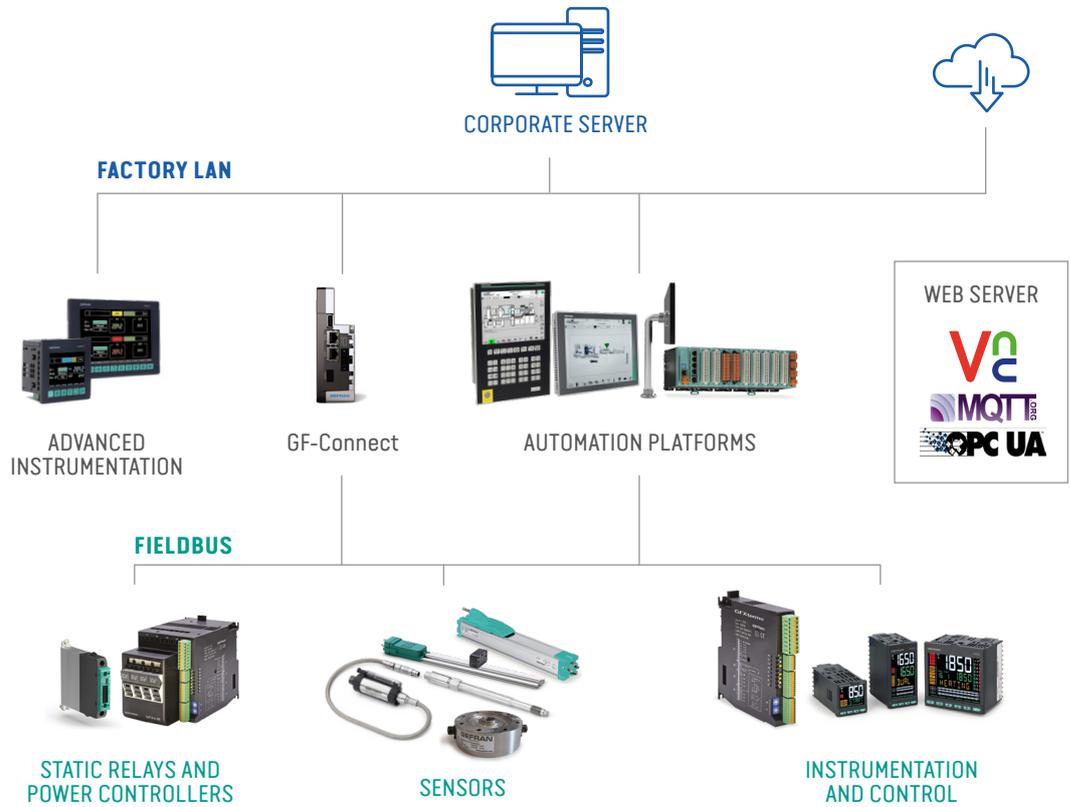


SAFETY

2 MONITORING AND CONTROL

1 DATA ACQUISITION

0 SENSORS AND INSTRUMENTATION



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CONTROLLERS, INDICATORS AND POWER CONTROLLERS

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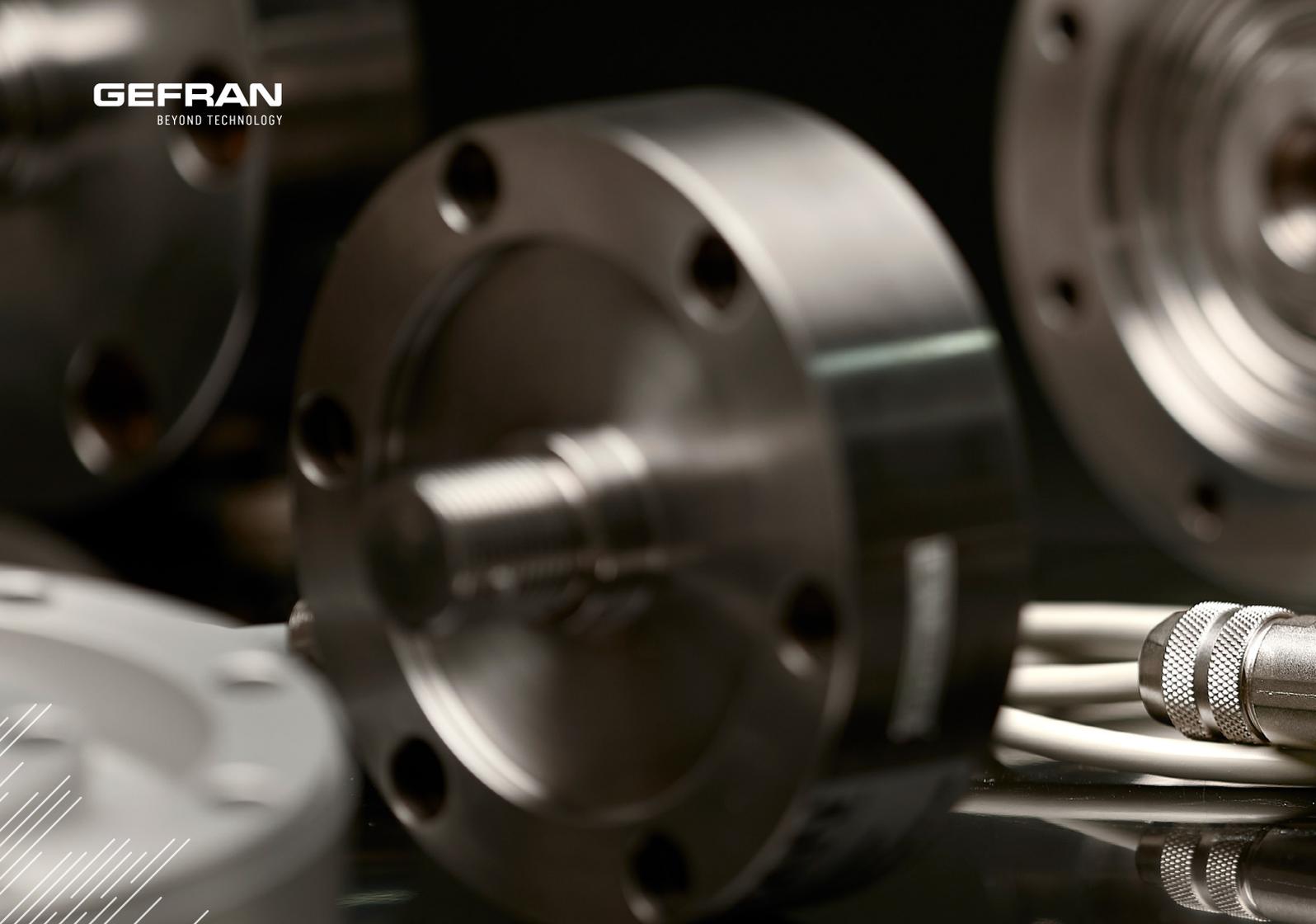
INFRARED LAMP POWER CONTROL (IR)

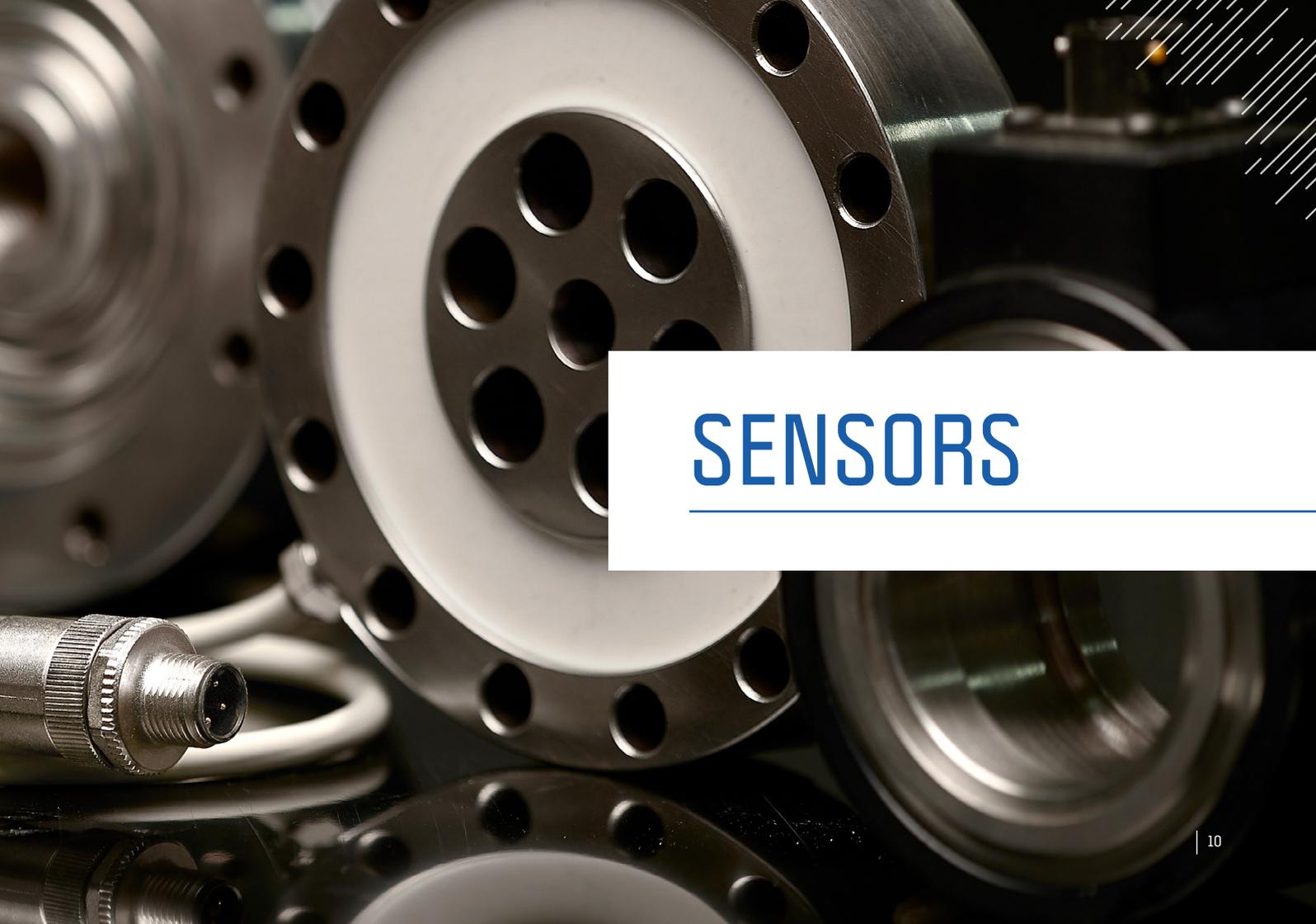
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A close-up photograph of industrial machinery, likely a pump or motor, with a white rectangular overlay containing the word "SENSORS". The machinery is metallic and features several circular openings. A white cable is visible in the lower-left foreground. The background is dark and out of focus, with some diagonal lines in the top right corner.

SENSORS



SAFETY

- Safe overpressure detection PL'd' & SIL2 certified (EN 13849-1 and EN 1114-1)
- Self-diagnosis functions for fault condition monitoring
- ATEX intrinsically safe certification (II IGD)



I71



W70



KE1



HIX



WX1



GREEN SOLUTION

- Patented fluid free technology
- Environmentally friendly filling fluid
- FDA approved filling fluid

FLUID FREE



IE0

GREEN FILLING



KE3



WN2



INDUSTRY 4.0

- Quick and accurate sensor configuration
- Smart sensors for integrated process control
- Flexible sensors for flexible production management



HKE1



ILI1

CANopen



KDO



WD3



HIX THE MELT TRANSDUCER FOR POLIMER PRODUCTION PLANT

The HIX series of Gefran, are pressure transmitters for using in High temperature environment and specifically designed for melt pressure measurement and available mainly to be used large industrial process plants, typically extruders for polymers or equipment for R&D purposes according to the European Directive 2011/65/EU (see informative note RoHS II).

Gefran's HIX series are pressure transmitters with HART communication protocol for use in high temperature environments in potentially explosive areas.



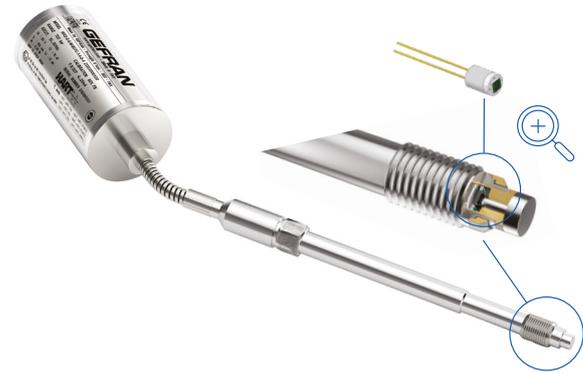
PL'c' PL'd'



The peculiarity of this series is the ability to read the fluid temperature up to 350° C, where the main characteristic of the "IMPACT" sensors is that they do not contain any transmission fluid inside.

The sensitive element, directly positioned behind the contact membrane, is realised in silicon through microprocessing techniques. The micro structure includes the measurement membrane and piezoresistors.

The membrane in contact with the process is very sturdy and can be up to 15 times thicker than the membranes used in traditional melt sensors.



ADVANTAGES

- IMPACT: the most performing fluidfree transducer
- Wide pressure ranges from 0...10 – 0...1000 bar
- HART communication protocol
- ATEX certification for potentially explosive areas
- Active compensation of the variations in average temperature
- Availability of the process temperature (chip) via HART
- Functional safety SIL2 (EN 61508 EN 62061) and PLc' (EN 13849-1)

APPLICATIONS

- HIGH demanding polymers extrusion plants
- Equipment for research and development laboratories

Gefran Melt pressure transducers with adapter flange designed for polymer plant production



IMPACT MELT PRESSURE SENSORS

TRANSMISSION FLUID FREE TECHNOLOGY

IMPACT is Gefran's exclusive series of high-temperature pressure sensors that use the piezoresistive principle. The main characteristic of IMPACT sensors is that they do not contain any transmission fluid. The sensitive element, directly positioned behind the contact diaphragm, is made from silicon by means of microprocessing techniques.

The micro structure includes the measurement membrane and piezoresistors. The minimum deflection required by the sensitive element makes it possible to use very robust mechanics.

The process contact diaphragm can be up to 15 times thicker than that used in traditional melt sensors.

- Patented fluid free technology
- Safe overpressure detection PL'd' & SIL2 certified (EN 13849-1 and EN 1114-1)
- Relay output version available
- ATEX intrinsically safe certification (II 1G)





ADVANTAGES

- Complete RoHS directive compatibility
- Very robust in contact diaphragm → long product life
- Floating stem & modular connection → very easy to install & uninstall
- Ideal for extrusion of abrasive, corrosive materials

APPLICATIONS

- **EXTRUSION**
 - Profile lines
 - Compounders
 - Sheet lines
 - Pipe lines
 - Food
- **BLOW MOULDING**
 - Accumulator head

NAK MELT PRESSURE SENSORS

SODIUM-POTASSIUM FILLED TECHNOLOGY



The Gefran "NaK" series of pressure transmitters are state of the art products suitable for use in very high temperature environments. Thanks to well proven Gefran Sodium-Potassium (NaK) filling technology, the average temperature can go up to 538°C (1000°F) while maintaining excellent stability.

The constructive principle is based on the hydraulic transmission of pressure. Physical measurements are transformed into electrical measurements using thick film strain gauge technology. The autozero function (magnetic or external), provides the product with simple, easy access to output adjustment for best performance.

- **Environmental friendly filling fluid (NaK)**
- **Very high temperature average: up to 538°C**
- **Safe overpressure detection PL'd' & SIL2 certified (EN 13849-1 and EN 1114-1)**
- **HART protocol and CANopen digital versions available**

NaK_{EXGI}

CANopen

IO-Link

HART
COMMUNICATION PROTOCOL



PL'd'





ADVANTAGES

- Complete RoHS directive compatibility
- Quick and accurate sensor configuration
- Smart sensors for integrated process control
- Ideal for extrusion of plastic materials for food and medical purposes.
- Preventive counter, maximum pressure, surge counter, etc. maintenance function (IO-Link)

APPLICATIONS

- **EXTRUSION**
 - Profile lines
 - Compounders
 - Sheet lines
 - Pipe lines
 - Food
- **BLOW MOULDING**
 - Accumulator head

OIL MELT PRESSURE SENSORS

OIL FILLED TECHNOLOGY

The Gefran "W" series of pressure transmitters are products suitable for use in high temperature environments. Thanks to well proven Gefran oil filling technology, the average temperature can go up to 315°C (600°F) while maintaining very good stability. The constructive principle is based on the hydraulic transmission of pressure.

Physical measurements are transformed into electrical measurements by means the strain-gauge technology.

The autozero function (magnetic or external), provides the product with simple, easy access to output adjustment for best performance.

- FDA approved filling fluid
- Safe overpressure detection PL'd' & SIL2 certified (EN 13849-1 and EN 1114-1)
- HART protocol and CANopen digital versions available
- ATEX intrinsically safe certification



PL'c' PL'd'





ADVANTAGES

- Complete RoHS directive compatibility
- Self-diagnosis functions for fault condition monitoring
- Flexible smart sensors for flexible production management
- Preventive counter, maximum pressure, surge counter, etc. maintenance function (IO-Link and CANopen)

APPLICATIONS

- **EXTRUSION**
 - Profile lines
 - Compounders
 - Sheet lines
 - Pipe lines
 - Food
- **BLOW MOULDING**
 - Accumulator head

TWIIST

ABSOLUTE TYPE LINEAR POSITION TRANSDUCER WITH HALL EFFECT WITHOUT CONTACT



Contactless linear position transducer with patented TWIIST technology for longer life. The lack of contact on the sensitive element creates a completely sealed, robust and compact absolute type linear position sensor.

- **Multi-variable Position, Tilt, Acceleration, Temperature**
- **M12 Connector**
- **IP67 protection**
- **Remotely upgradeable firmware (boot loader)**

CANopen

IO-Link



ADVANTAGES

- Technology without parts in contact to extend the life indefinitely
- Excellent compatibility due to voltage or current output
- Precise measurement: repeatability <0.01mm
- Preventive maintenance capabilities

APPLICATIONS

- **AUTOMATIC FILTER REPLACEMENT**
- Extrusion machine with automatic filter changer

WPG / WRG

CONTACTLESS MAGNETOSTRICTIVE LINEAR POSITION TRANSDUCER (ANALOG OUTPUT)



Absolute contactless linear position transducer with HYPERWAVE magnetostrictive technology, with analog output interface. The absence of electrical contacts on the magnetic slider eliminates wear on the moving parts and guarantees a theoretically infinite lifespan. Total protection with ideal use even in difficult environments with high levels of dust and percolating liquid contamination. Excellent linearity, repeatability and resistance to mechanical vibrations and shocks.

- **Slide or Floating Cursor**
- **Standard solenoid valve connector or M12 connector**
- **Protection IP65**

ADVANTAGES

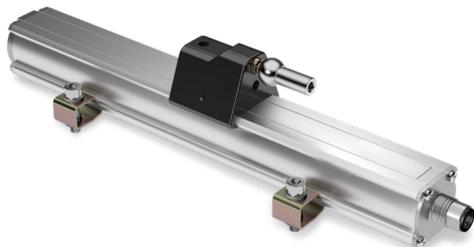
- Contactless technology, with theoretically unlimited life expectancy
- Excellent compatibility thanks to the voltage or current output
- Accurate measurement: repeatability < 0.01 mm

APPLICATIONS

- **AUTOMATIC SCREEN CHANGER**
 - Automatic filter replacement screenchanger device
 - Injection machine: moulded piece ejector position control

WPP-S / WPA-S

CONTACTLESS MAGNETORESTRICTIVE LINEAR POSITION TRANSDUCER (SYNCHRONOUS SERIAL OUTPUT)



 **HYPERWAVE**
HIGH-PERFORMANCE MAGNETOSTRICTIVE TECHNOLOGY



Contactless linear position transducer with HYPERWAVE magnetorestrictive technology, with RS422-SSI digital output interface. The absence of electrical contact on the cursor eliminates all wear and guarantees an almost unlimited lifespan. Compact size for simple installation. Full protection in harsh environments with high levels of contamination and dust. Excellent linearity, repeatability and resistance to mechanical vibration and shocks.

- **Synchronous serial interface (SSI)**
- **Data format: binary or gray code; incremental decremental**
- **Operating temperature: -30...+90°C**

ADVANTAGES

- Contactless technology, with theoretically unlimited life expectancy
- Output data resolution available from 0.5 to 40 μm
- High noise immunity thanks to the digital signal

APPLICATIONS

- **EXTRUSION BLOWING**
 - Carriage movement
 - Mould opening/closing control
 - Blowing nozzle positioning

WPA-F

CONTACTLESS MAGNETOSTRICTIVE LINEAR POSITION TRANSDUCER (PROFINET OUTPUT)



HYPERWAVE
HIGH-PERFORMANCE MAGNETOSTRICTIVE TECHNOLOGY



Contactless absolute linear position transducer with Profinet communication based on the new HYPERWAVE technology. The Profinet interface is integrated into complex systems for long-distance communication and ensures fast and secure data transmission. The absence of contact on the cursor eliminates all wear and ensures an almost infinite transducer lifespan. The many advantages include digital communication, smaller size for easier installation, high protection rating for harsh environments, excellent linearity, repeatability and resistance to vibration and shock for exceptional reliability.

- **Profinet interface: digital communication for smart production**
- **Position and absolute speed measurements**
- **16 independent cursors**

ADVANTAGES

- Contactless technology, with theoretically unlimited life expectancy
- Multiple position readings
- Predictive maintenance functionality
- Resolution: 5 micron
- Sampling time 250 micro seconds
- Operating time (counter)
- Real and maximum temperature reading

APPLICATIONS

- **INJECTION MOULDING MACHINE**
 - Injection trolley positioning
 - Injection cylinder positioning
 - Mould opening/closing control
 - Moulded piece ejector movement control

WPL

CONTACTLESS MAGNETOSTRICTIVE LINEAR POSITION TRANSDUCER (DIGITAL IO-LINK OUTPUT)



Absolute contactless linear position transducer with HYPERWAVE magnetorestrictive technology, with IO Link digital output interface. The WPL series with IO Link V 1.1 digital interface is a “Smart” device specifically designed to meet the demands of the “Industry 4.0” world. The lack of electrical contacts on the magnetic slider eliminates any wear and guarantees a theoretically infinite lifespan. Total protection with ideal use even in difficult environments with high levels of dust and percolating liquid contamination. Excellent linearity, repeatability and resistance to mechanical vibrations and shocks.

- **Position and speed of movement**
- **Response time: 1msec**
- **IO Link COM3 communication (230.4KBaud)**
- **Operating temperature: from -30 to + 85° C**



ADVANTAGES

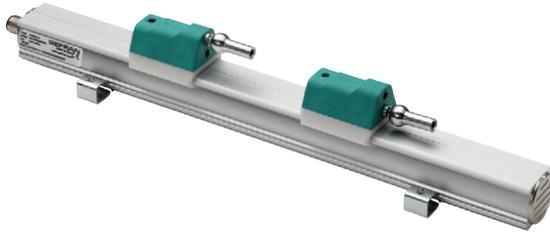
- High noise immunity thanks to the digital signal
- Output data resolution from 5 to 100 µm
- Preventive maintenance function
- Acceleration, speed and maximum temperature
- Recording of working hours, kilometres travelled, etc.

APPLICATIONS

- **EXTRUSION BLOWING**
 - Injection carriage movement
 - Mould opening and closing control
 - Blowing nozzle positioning

MK4-C

CONTACTLESS MAGNETOSTRICTIVE LINEAR POSITION TRANSDUCER
(CANOPEN OUTPUT)



CANopen



Contactless linear position transducer with magnetostrictive technology. The absence of electrical contact on the cursor eliminates all wear and guarantees an almost infinite lifespan. The MK4 CANopen has an integrated microprocessor to process the measurement and diagnose the transducer. The CAN field bus communication system provides fast and safe data transmission. The use of the CANopen DS-301 protocol and Device Profile DS-406 provides quick and easy integration of the transducer in the control and automation system.

- **Position and absolute speed measurements**
- **One or two cursor versions available**
- **CANopen interface: ds-301 v4.01 Device profile ds-406 v2.0**

ADVANTAGES

- Contactless technology for infinite product lifespan
- Predictive maintenance functionality
- Sensor diagnostics capability

APPLICATIONS

- **INJECTION MOULDING MACHINE**
 - Carriage positioning
 - Injection cylinder positioning
 - Mould opening/closing control
 - Moulded piece ejector movement control

LT / LT67

ABSOLUTE TYPE LINEAR POTENTIOMETER



Potentiometers are electromechanical devices that provide a ratiometric voltage output: the output voltage scale range depends on the voltage used to power the transducer.

The transducer has been further optimised in order to ensure greater reliability in all typical application conditions. An even more robust structure makes the LT series increasingly resistant and suitable for applications featuring significant vibrations. The new groove made in the underlying surface provides an advantageous alternative to the usual fixing system using brackets. Ideal for application on injection moulding machines for plastic, plastic blow moulding, as well as on vertical thermoforming presses.

- **Electric stroke from 50mm up to 900mm**
- **Infinite resolution**
- **Output with cable or connector**
- **Environmental protection: IP60, IP65, IP67**

ADVANTAGES

- Precise and accurate measurement
- Space-saving solution
- Installation ease

APPLICATIONS

- **INJECTION MACHINE**
 - Plastic injection movement control
 - Injection unit drive carriage control
 - Mould movement control

PV1

ABSOLUTE TYPE LINEAR POTENTIOMETER



Potentiometers are electromechanical devices that provide a ratiometric voltage output. The output voltage scale range depends on the voltage used to power the transducer. The small size of the transducer makes it suitable for installation in confined spaces and for detecting small movements. The electrical connection positioned laterally allows a through rod structure with double rod support, thus ensuring greater signal repeatability and overall strength of the transducer. Installation is simplified by the absence of variations in the electrical output signal outside the theoretical electrical stroke. Ideal for small mechanical devices, proportional solenoid valves, test instruments and benches.

- **Infinite resolution**
- **Side electrical outlet**
- **Support rod support with double through bush**

ADVANTAGES

- Precise and accurate measurement
- Limited mechanical extra stroke dimensions
- Space-saving solution
- Easy to install

APPLICATIONS

- **BLOW MOULDING**
 - Continuous extrusion blow moulding machine
 - Accumulator extrusion blow moulding machine

KS SIL2

INDUSTRIAL PRESSURE TRANSDUCER



KS transmitters are based on thick film sensitive elements deposited on a stainless steel diaphragm. Thanks to the latest generation SMD electronics and the compact entirely stainless steel structure, these products are extremely robust and reliable with SIL2 certification.

KS transmitters are suitable for all industrial applications, in particular for hydraulics (injection presses, pumps and hydraulic power units, etc.) even in harsh conditions, with high levels of resistance to shocks, vibrations, pressure and temperature peaks.

- High accuracy
- Fluidfree sensing element
- Fast response time

ADVANTAGES

- All stainless steel construction
- SIL2 machine safety certification → high reliability
- Protection from pressure peaks (water hammer)

APPLICATIONS

- **INJECTION**
 - Hydraulic or hydraulic/electric hybrid injection moulding machines
- **BLOW MOULDING**
 - Accumulator extrusion blow moulding machine

KS-I

IO-LINK PRESSURE TRANSDUCER



KS-I transmitters with IO Link digital output are based on thick film sensitive elements deposited on a stainless steel diaphragm. Thanks to the latest generation SMD electronics and the compact entirely stainless steel structure, these products are extremely robust and reliable. The KS transmitters are suitable for all industrial applications, in particular for hydraulics (injection presses, pumps and hydraulic power units, etc.) even in extreme conditions with the presence of high levels of shocks, vibrations, pressure and temperature peaks.

- **High precision**
- **Sampling time 1msec**
- **IO Link COM3 communication (230.4Kbaud)**
- **2 SSC digital outputs and 2 SIO physical outputs**

ADVANTAGES

- 100% stainless steel
- Storage of pressure peaks
- Preventive maintenance features
- Mem. Pressure, maximum temperature, working hours, num. peaks

APPLICATIONS

- **INJECTION**
 - Multi-injection moulding machines
- **FILM EXTRUSION**
 - Line pressure control of the different film layers

TCM MGO

MINERAL OXIDE (MGO) THERMOCOUPLE FOR USE IN THE PLASTIC INDUSTRY

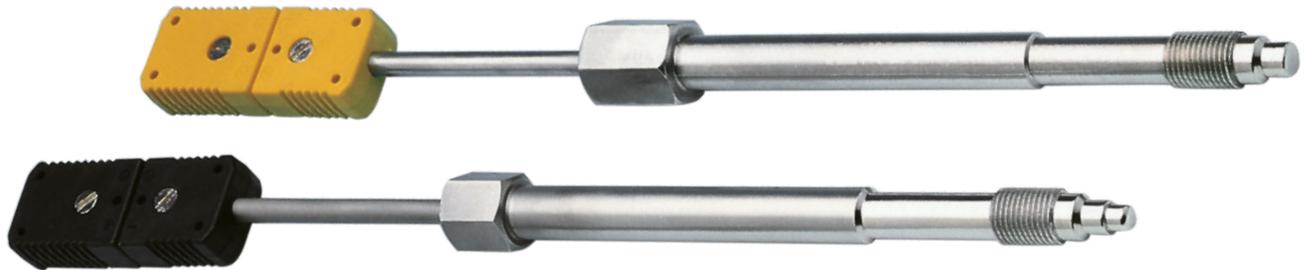
Designed for direct melt contact measurement with flat or blade tip. Sliding tip available for direct flush measurement.

½ -20 UNF or M18x1.5 thread. Stem material available in stainless steel or Hastelloy.

Wired with multiple solutions: cable, compensated connector and steel protected sheath.

- **Thermo-element with compact insulation and continuous metal sheathing (mgo insulation)**
- **Max temperature limit: - 40 ... + 400° C**
- **Thermocouple or pt100 output signal**





ADVANTAGES

- Melt temperature direct measurement
- Accurate process control
- Sliding blade for direct reading of the molten polymer

APPLICATIONS

- **MELT TEMPERATURE DIRECT MEASUREMENTS IN PLASTIC EXTRUSION PROCESSES:**
 - Barrell
 - Head
 - Melt pump
 - Screen changer

DLC(A)

DIAPHRAGM LOAD CELL



Flat type diaphragm load cell, designed for fully electric injection moulding machinery.

The Flat-Body design makes it easy to integrate them into injection units without extending the footprint of the injection unit.

Available with voltage, current, mV/V output or with EEPROM module to increase the mV/V output and improve the signal/noise ratio.

- **Membrane load cell**
- **With or without integrated amplifier**
- **Custom design**

ADVANTAGES

- Reliable customised solution tailored to the injection force
- Flat-body design to minimize machine size
- Eeprom function to amplify the signal sensitivity

APPLICATIONS

- **INJECTION MOULDING MACHINES WITH FULLY ELECTRIC DRIVE :**
 - Injection force measurement

SL76-VDA

STRAIN SENSOR COUPLED WITH DIGITAL VARIABLE AMPLIFIER



The coupled strain sensor captures the surface strain between the two mounting points.

The strain that occurs between the mounting areas is mechanically amplified within the sensor.

The integrated digital amplifier processes the signal instantly. Due to its robustness, this sensor is also used in heavy industry. The sensor requires a cyclic reset before each reading.

- **Mechanical amplification of the stresses between two mounting areas**
- **Ideal for voltage mode**
- **Specially designed for dynamic applications**

ADVANTAGES

- Quick and easy assembly
- On-line torque control
- With integrated signal amplifier

APPLICATIONS

- **FULL ELECTRIC INJECTION MOULDING MACHINES:**
 - Injection force measurement

GE1029-A

COLUMN STRAIN SENSOR WITH INTEGRATED AMPLIFIER



STRAIN AND FORCE SENSORS WITH SENSORMATE TECHNOLOGY

Press-on strain sensors measure surface-strain directly at the mounting location on cylindrical structures, similar to bonded strain gauges. The GE1029-A tie bar strain sensor presses strain gauges under a stainless protective foil onto the cylindrical surface to be measured with such force that friction replaces the bonding normally used to fix strain gauges. The mounting with the stainless steel straps is very stable and the strain gauge is protected. The sensors do not need to be recalibrated once they have been replaced or remounted.

- Direct measurement of surface strain on columns
- Quick and easy assembly with metal clamps
- A single model for installation on steel columns with different diameters

ADVANTAGES

- Space-saving solution with integrated amplifier
- Bending compensated system for very accurate measurements
- Smart solution: no mounting hole necessary

APPLICATIONS

- **INJECTION MOULDING MACHINE:**
 - Tie bar elongation measurement
 - On-line control of clamping force
 - Test and verification of the load on all four moving semi-mould columns

VDA-I

VARIABLE DIGITAL INLINE AMPLIFIER



The variable digital inline amplifier VDA-I converts the signal from strain sensors and load cells into a current or voltage output signal. The VDA-I amplifier can be used in dynamic and static applications.

- **Dynamic and static applications**
- **Solid and compact aluminium case (IP65)**
- **Voltage or current output**

ADVANTAGES

- High sampling frequency
- Improved accuracy
- Reset function

APPLICATIONS

- Mould closing force (i.e. with GE1029)
- Mould protection (i.e. with SB46)
- Injection force (i.e. with DLC)

QE2008-W SET

SYSTEM WITH BLUETOOTH TRANSMISSION FOR STRAIN MEASUREMENT



The magnetically mounted QE2008-W wireless strain sensor measures strain directly where it is mounted, providing a measurement that has the same quality and performance as bonded strain gauges.

Sensormate press-on technology implements a strain gauge placed under a protective film.

When the sensor is mounted on a metal object, the magnets press so tightly that frictional contact occurs and allows for reliable measurement. Sensor mounting is quick, simple and non-destructive, allowing for easy installation and increasing daily productivity. The integrated electronics contain state-of-the-art processing components, which enable high-range measurements and wireless communication via the Bluetooth 5.0 protocol.

The adopted components allow for low energy operation extending the battery life to several working hours. An on-board accelerometer allows the user to check for correct sensor mounting and ensure accurate measurements. Internal RAM memory helps when quick measurement is needed, allowing you to store high resolution data.





- **Wireless system for strain measurements with Bluetooth 5.0**
- **Pressure strain gauge technology (quick and non-destructive assembly)**
- **Easy mounting by magnetic fixing on flat and round surfaces (diameter $\geq 45\text{mm}$)**
- **Measurements displayed via the “Sensormate App” (available for Windows, Android and iOS)**

ADVANTAGES

- High performance amplifier built into each sensor with high resolution and sampling rate
- Integrated LiPo battery with long operating time ($> 12\text{h}$)
- Integrated accelerometer for assembly assistance

APPLICATIONS

- Injection moulding presses
- Mould-holder column parallelism control
- Mould-holder column bending analysis
- Cavity pressure profile inspection
- Mould holder column crack detection

IN-4000 SET

PRESSURE SENSOR FOR INJECTION NOZZLES

Injection moulding machines need regular checks of the nozzle pressure compared to the load cell used behind the screw (for fully electric machines) or, more in general, compared to the reference system used. This sensor is for preventive maintenance and is not an on-line pressure sensor.

Set in carrying case with IN sensor, monitor for pressure display and heater band with controller. The IN type nozzle pressure sensor is mounted on the machine between the mould and the injection nozzle. Installation is very fast and easy thanks to the presence of the magnetic base that allows the nozzle check to be mounted on the mould.

For measuring various pressures (up to 4000 bar), the tip of the IN can be heated (the maximum temperature is 230°C) with the heater bands. In this way, the injected plastic in the dead volume remains liquid.



The pressure when the melt temperature is above 230°C (max 400°C) can also be measured with just one shot. In this way, after solidification the plastic has to be removed with every shot. The IN sensor can be used together with the DAK (nozzle touch force sensor, the force with which the nozzle is pressed against the mould): double measurement at the same time, melt pressure and contact force.

- **Set to measure nozzle melt pressures of up to 4000 bar**
- **Multi-shot and pressure steps possible with heater band up to 230° C**
- **Single-shot pressure possible with melt temperatures of up to 400° C**



ADVANTAGES

- Rational solution to control nozzle pressure
- Multishot (230°C max) or singleshot (400°C) max pressure measurements
- Quick configuration of injection machine data acquisition

APPLICATIONS

- **FULL ELECTRIC INJECTION MOULDING MACHINES:**
 - Check and adjust injection pressure
 - Nozzle pressure compared with load cell measurements (see load cell model DLC)
 - Nozzle force touch measurement too (with DAK sensor)

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Overview

GEFRAN

GEFRAN
PROJECT

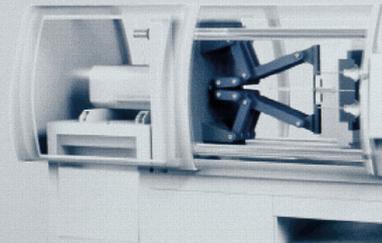
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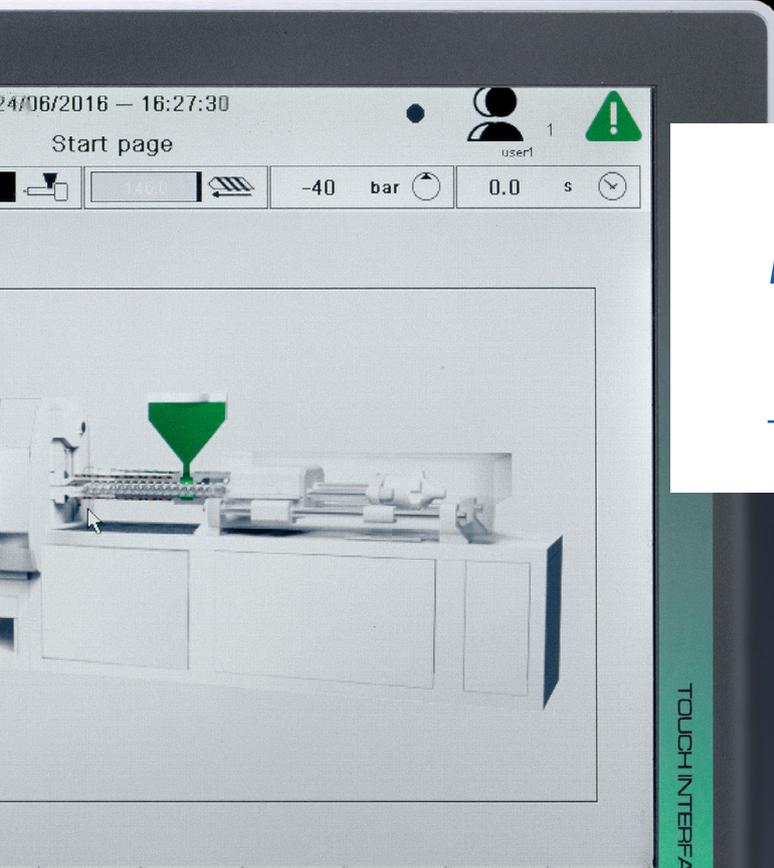
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AUTOMATION PLATFORMS

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BEYOND TECHNOLOGY



GEFRAN SOLUZIONI

Gefran Soluzioni is a company dedicated to providing design and consultancy services for the creation of equipment that is certified to comply with the most common international standards. The industrial environments in which GS has specific expertise and know-how usually involve all the sectors related to the transformation of plastic materials, the heat treatment of glass and metals and the control of autoclaves. The GS Sales and Technical departments can assist a wide range of clients with vastly different needs: OEMs, SIs and End Users are a daily reality for GS.

- **Panel mechanical design**
- **Electrical design, sizing and electrical diagrams**
- **Electrical panel manufacturing**
- **On board machine wiring**
- **Inspection, testing and safety checks**
- **Commissioning at the customer's premises**

SERVICES

Gefran Soluzioni completes its offer with services for builders and end users. Highly qualified engineers provide services in Italy and abroad.

These services provide:

- Guaranteed continuity for hardware and software solutions
- Extremely efficient team of process engineers, at the service of customers to develop specific software applications
- Renewal of electrical and electronic equipment through targeted retrofit and revamping



G- VISION

Powerful widescreen multitouch Panel PCs featuring advanced graphics and integrated PLC. Available in a built-in version or a full IP67 version with tube mounting or a VESA connection.

- **Capacitive multitouch touchscreen**
- **Widescreen led display**
- **Slim, compact design**
- **Full IP67 or recessed**
- **Integrated firewall**
- **Web server**



EVIEW BOX



PLC controller contained in electrical panel for high performance solutions with remote monitoring. The performance of the RT VXWorks and the GDnet and EtherCAT realtime field buses make it the heart of the most demanding applications.

- Intel Atom Bay Trail 1.46 GHz processor
- Fanless PC Controller with solid state drive
- Industry 4.0 and Ethernet Realtime protocols
- RS232-485 and CAN Open serial ports
- Integrated firewall



GF CONNECT



Gateway & edge controller for those who need connectivity and communication services in an Industry 4.0 perspective even without programmable automation products.

GF_Connect can be used to provide advanced connectivity and data processing and representation services for various Gefran product lines: sensors, drives, automation components. GF_Connect offers a secure connection based on an OpenVPN and SSL system. Equipped with an integrated firewall, it allows publication of data in the cloud in compliance with corporate Cyber Security standards.

The data collected can be processed and published on local dashboards using the web server function.

- **Remote access to network or serial connected devices**
- **Secure connection with VPN tunnel**
- **Secure connection: separate machine and company network, integrated firewall**
- **Access from development environment or configuration tool (also for 485 devices)**
- **Sending of e-mails about events**
- **Web server**
- **Gateway between various protocols**

Modbus_{RTU} Modbus_{TCP} EtherNet/IP PROF[®]
NET

MQTT OPC UA





AXM

The AXM platform is a proposal based on a PC panel with a dedicated keyboard for injection moulding applications. Two possible I/O combinations in pre-assembled racks, optimal choice for solutions that require performance and cost containment.

- **Fanless PC Controller with solid state drive**
- **Industry 4.0 and Ethernet Realtime protocols**
- **Integrated firewall**
- **Resistive touchscreen**
- **Integrated PLC RunTime**
- **Ready-to-use injection template SW**





EVIEW LT

Touchscreen HMI with integrated PLC controller, available in different formats: 10", 12" and 15". Industry 4.0 ready.

- Fanless PC Controller with solid state drive
- Industry 4.0 and Ethernet Realtime protocols
- Integrated firewall
- Resistive touchscreen
- Integrated PLC RunTime
- Vertical or horizontal installation



GF VEDO SL

Resistive touchscreen HMI with powerful, economical integrated PLC. Available in formats: 3.5" and 7". Industry 4.0 ready.

- Fanless PC Controller with solid state drive
- Resistive touchscreen
- Integrated PLC RunTime
- Vertical or horizontal installation

GF PROJECT VX **GF PROJECT LX**

GF DESIGNER HD

INTEGRATED DEVELOPMENT ENVIRONMENTS

GF_PROJECT VX AND GF_PROJECT LX:

These are integrated development environments (IDEs) for real-time control applications based on Gefran automation platforms. They contain a complete environment for building HMI pages, configuring the fieldbus, and writing PLC code in all standard IEC61131-3 programming languages. The dedicated functional blocks are supplied in the form of libraries to simplify numerous automation operations.

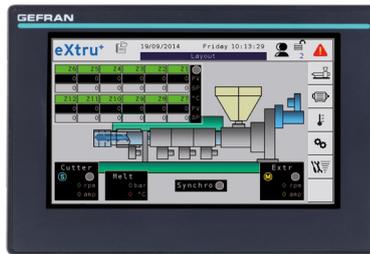
GF DESIGNER HD:

It is the environment for multi-touch HMI and web-server applications, equipped with advanced graphic features.



GEFRAN CLOUD

Gefran Cloud is a connectivity management solution guaranteeing total control in the IIOT sector. Solid, powerful and highly scalable, the system includes advanced VPN capabilities. IIOT-ready, equipped with a clear and simple user interface, Gefran Cloud guarantees secure communication of all devices, networks and remote users.



CANopen



EXTRU⁺

COMPACT AUTOMATION SPECIFICALLY FOR EXTRUSION

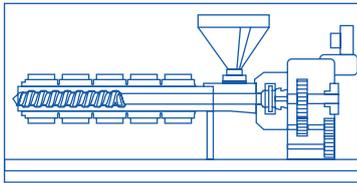
eXtru+ is the compact control system devised by Gefran for laboratory extrusion and compounding. It comes ready-for-use, can be fully programmed and features advanced technological functions. It consists of units for the control (PLC) and management (HMI) of the GF_Vedo 70CT machine and I/O remote modules with CANopen fieldbus communication as well DIN rail installation and has IP20 protection rating.

In addition, the solution offers a response to the growing demand for efficiency in managing heat regulation in automated machines thanks to its functions of saving and energy efficiency management linked to a proper strategy of use in heat regulation zones during start-up and maintenance phases.

The main advantages include:

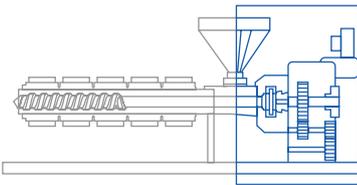
- **Immediate start-up**
- **Zero development costs**
- **Fast and easy personalisation**





MACHINE MANAGEMENT

- Digital inputs
- Digital outputs

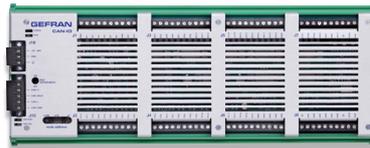


EXTRUDER MOTOR

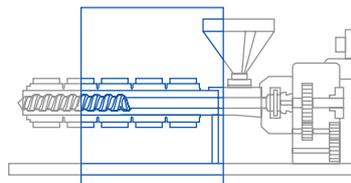
- Speed reference
- Speed and current read



GF_VEDO SL 70CT

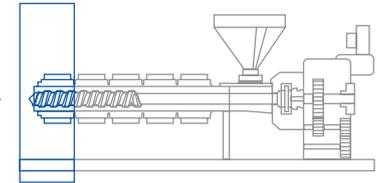


CAN-IO



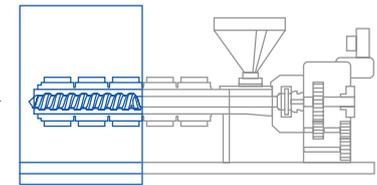
THERMOREGULATION

- Dual-action (hot/cold) zone and Heater Break alarm



PRESSURE SENSOR (MELT)

- Value and alarm read



AUXILIARY MOTOR

- Speed reference
- Speed and current read



PLASTIC TEMPLATE

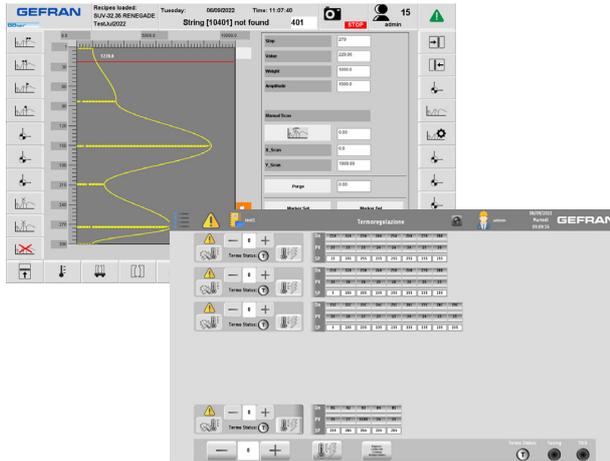
As a result of extensive experience in plastic processing machine control, Gefran has developed Templates specific for the following applications:

- Injection
- Extrusion
- Blowing

Templates are open and fully editable default software applications that provide the scalable control of the various machine settings:

- extrusion plants, with control from one to 9 extruders for a total of 128 heat regulation zones and various line accessories (dosing management, melt pumps, calenders, calibrators, drive, cutters, corrugators, wrapping machines, etc.) with advanced functions for energy savings in temperature control. Euromap 27 and Euromap 84 for integration and Industry 4.0.
- hydraulic, hybrid, two-deck, FEM, double / triple injection machines Euromap 63, Euromap 77 and 82 for integration and Industry 4.0
- continuous and accumulation blowing machines, with Parison control up to 300 master points, hole test control, digital and analogue axes.



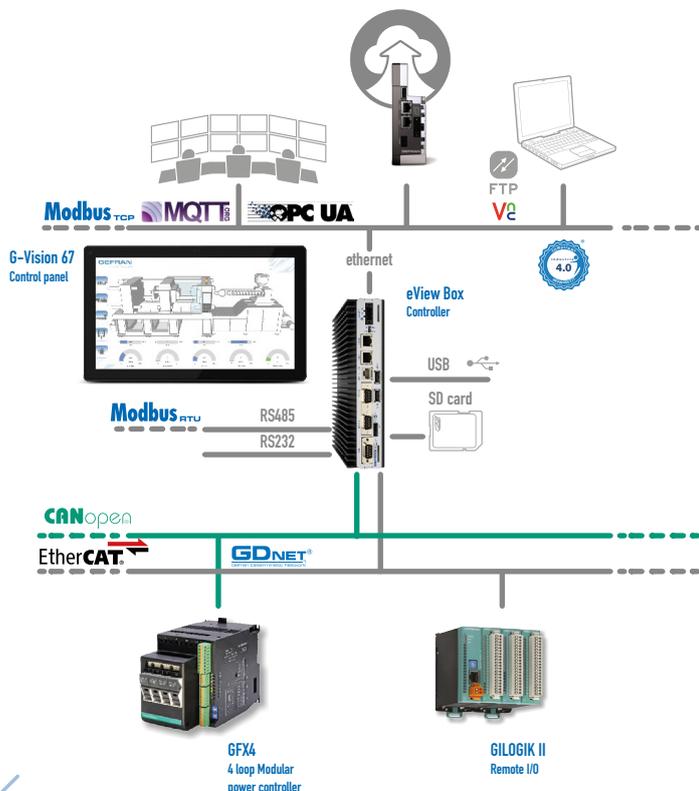


Innovative solutions for efficient power management have been introduced for temperature control. Based on Gefran's extensive experience in temperature control, 2 process phases have been identified where specific energy optimisation controls have been developed. The first Warmup phase, that includes an Energy Saving function, and a second Production phase, where there is a Smart Power Manager function with limitation of power peaks and uniform load distribution thanks to Burst Firing technology. In addition to process control

applications, Templates provide a series of functions typical to automation systems:

- **Management of both real and historical alarms with the possibility of sending e-mails on events**
- **User management**
- **Recipe management (configuration and production)**
- **Multilanguage management**
- **Preventive maintenance management**
- **Graphs for temperature and analog trends**
- **Operator access log also with NFC tag**
- **Weekly clock for temperature control activation**
- **Remote access for remote assistance and WEB pages for monitoring and data collection dashboard**
- **Connection to hmi/scada via Modbus TCP, OPCUA and MQTT**
- **Datalog management**

ARCHITECTURE WITH G-VISION AND EVIEW BOX



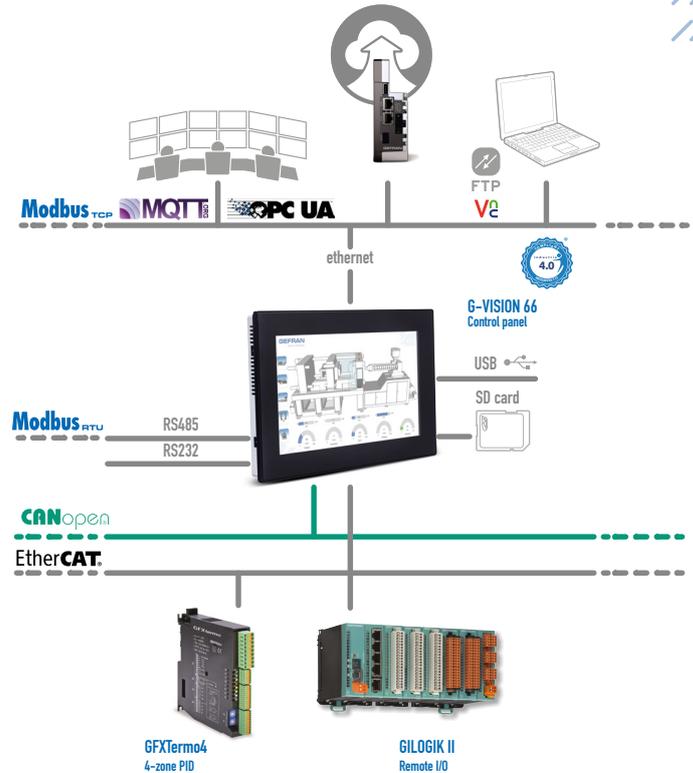
A high-performance solution featuring a capacitive multitouch touchscreen and a boxed PLC inside the panel.

This solution offers all the power of eView architectures with the added versatility of a high-performance multitouch remote monitor widescreen measuring up to 21" and web functionality. Ideal for extended layouts with multiple operator stations.

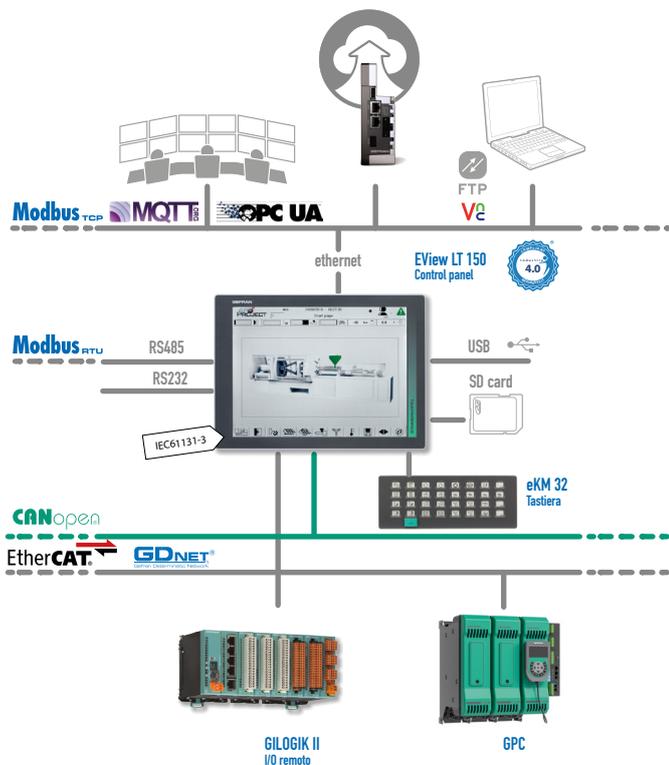
ARCHITECTURE WITH G-VISION

The new Gefran solution featuring a capacitive touchscreen Panel PC offering HMI with an integrated PLC.

Panels with an integrated PLC using the Linux operating system. Screens from 7" to 21" with a capacitive multitouch touchscreen for scalable and compact Industry 4.0 solutions.



ARCHITECTURE WITH EVIEW LT



An optimal high-performance solution for approaching projects featuring compact machines or extended layouts while keeping costs under control.

Panels with an integrated PLC using the VX Works operating system. 10", 12" or 15" resistive touchscreens.

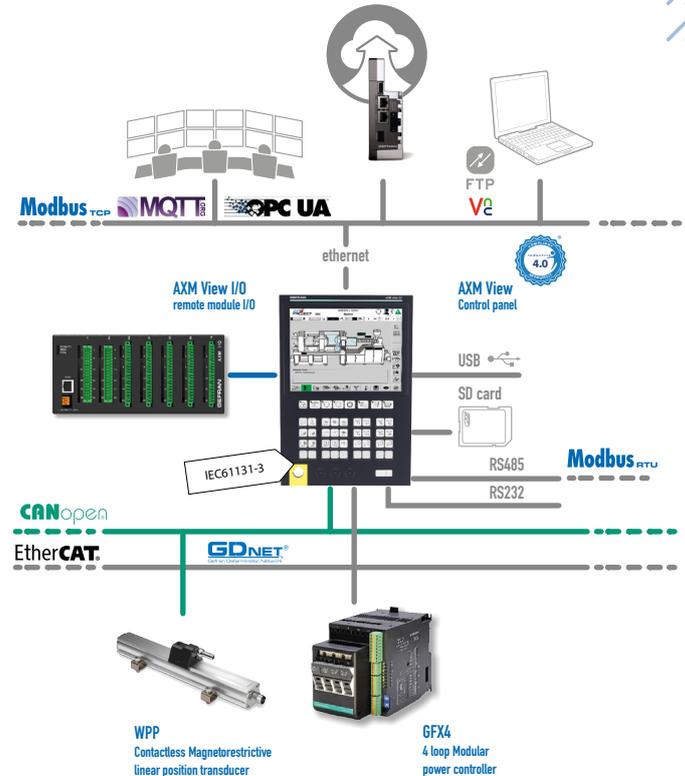
ARCHITECTURE WITH AXM

The AXM platform is a Panel PC based proposal with dedicated keyboard for the injection moulding sector and the choice between two possible combinations of I/O in pre-assembled racks. An optimal choice for solutions requiring high performance while containing costs, AXM View terminals are an evolution of the eView LT family, sharing all its potential and performance.

They are designed to offer a high-performance solution at a competitive price for injection machinery.

The terminals are Panels with an integrated PLC using the VX Works operating system, 10" and 12" resistive touchscreens and dedicated membrane keyboards.

AXM I/O offers a set of inputs and outputs in a pre-assembled rack with a GDNnet fieldbus (Gefran's real-time ethernet) to ensure maximum performance. The SW injection template embraces the HW solution, providing machine configuration with simple on-screen options. Without the need to connect a PC, it is possible to commission hydraulic, hybrid or full-electric machines.



GEFRAN
BEYOND TECHNOLOGY

000
600



850

1650

1650

700





CONTROLLERS, INDICATORS AND TOOLS FOR POWER CONTROL

650/1250/1350

PID 1/16, 1/8 AND 1/4 DIN TEMPERATURE REGULATORS



APPLICATIONS

- Extrusion
- Chillers
- Welding applications for packaging machines

Gefran series 650/1250/1350 PID temperature regulators are devices with an LCD operator interface and universal input. They are available in 1/16, 1/8 and 1/4 DIN versions. Depending on the version, the regulators come with double or triple display 4 and 5 digit white-green-amber colours and 4 and 7 digit white-green-amber triple displays with a bargraph.

The messages can be scrolled and set by the user to meet his or her needs. These regulators can act as kWh meters and count the number of output cycles.

Models are available for valve control and setpoint programmers.

- **Configurable logic functions**
- **TC, RTD, linear mV, V and mA inputs**
- **Front protection: IP65 rating**
- **Regulation: hot/cold pid**
- **Insulated analog out**
- **Modbus serial communications**
- **Load disconnection alarm**
- **Energy meter**

GFXTERM04

4-ZONE PID TEMPERATURE CONTROLLER



Modbus TCP/RTU

CANopen

DeviceNet

PROFINET PROFI BUS

EtherCAT

EtherNet/IP

ODVA CONFORMANT



The GFXTERM04 multi-loop controller is able to independently control 4 temperature control loops. Furthermore, due to the availability of a wide range of communication protocols, GFXTERM04 can be easily included in any industrial automation architecture.

- 4 Settable inputs TC, RTD, mA, V
- 4 Independent hot/cold pid
- 4 Settable outputs: relay/logic/triac/continuous
- 4 Auxiliary analog inputs
- 2 Digital inputs
- 8 Settable alarm thresholds
- Load disconnection alarm
- Din bar fitting

APPLICATIONS

- Injection presses
- Thermoforming
- Extrusion
- Packaging machines
- Hot runners



GPC



IR12/IR24



GFX4-IR



GRM-H



GRP-H



GRS-H



GQ

Gefran offers a complete range of devices for regulating energy from the most simple to the most complex specifically designed for the control of IR heating lamps.

IR heaters are used in many applications thanks to their versatility and capacity to conduct thermal energy accurately and efficiently with the added benefit of saving energy.

With their specific functions, Gefran power regulators provide very rapid and accurate electronic control and ensure perfect control over IR heaters and improved performance.

SPECIFIC SOFT START FOR IR

Current peaks and overloads are kept under control by a specific algorithm which ensures that when a lamp is switched on, it follows a non-linear curve.

SELECTION OF FIRING MODE AND SWITCHING

The half single cycle firing mode and switching regulate IR lamps decrease “flickering” with no EMC noise emission: no filters required. Phase angle control ensures the lamp is emits power in a perfectly stable manner.

FEEDBACK FUNCTIONS

Feedback regarding voltage, current and power allow perfect regulation: variations on voltage and current are automatically corrected so as to always provide the process with the exact quantity of power required whatever the conditions.

BROKEN LAMP DETECTION

Accurate and rapid reading of RMS currents means that broken lamps can be detected regardless of firing or switching mode. An automatic self-learning procedure of the characteristics of the lamps improves the accuracy of fault detection.

CURRENT LIMIT

No risk of exceeding the limit. The peak current and RMS current values are always under control.

ADVANTAGES

- Longer lamp lifespan: up to 20% energy savings thanks to IR soft start.
- Reliable performance: for demanding applications such as photovoltaic.
- Temperature and power auto-tuning: up to 40% cost savings for an all-in-one regulation loop.
- Compact: up to 50% smaller for high density applications.

APPLICATIONS

- Composite and plastic material welding
- Preheating on blow moulding lines
- Thermoforming



IR12 - IR24

MULTI-CHANNEL POWER CONTROLLERS

The IR 12 - IR 24 multi-channel power controllers are ideal for controlling SWIR lamps in industrial heating systems. The powerful and compact IR12 and IR24 multi-channel power controllers are the perfect solution for heating systems that use IR lamps of any type. Compact sturdy metal housings for wall mounting are available as part of the all-in-one philosophy.

These houses all the components needed for full control of sets of IR lamps for power usage of up to 60 kW. Different models are available: IR-24 with 24 adjustable independent outputs and IR-12 with 12 outputs. Both have Modbus RTU communication options or can be fitted with a Profinet fieldbus.

Modbus

PROFINET

PIV
PROFIBUS - PROFINET

- **12 and 24 independent 9A/ch channels**
- **Control in fast zero-crossing, half-singlecycle and phase angle**
- **Integrated extra fast fuses**
- **Current balancing with time-sharing**
- **Compensation for voltage fluctuations**
- **Voltage and current diagnostics (disconnected load, line voltage)**
- **SCR temperature and short-circuit diagnostics, open fuse**

APPLICATIONS

- Composite and plastic material welding
- Preheating on blow moulding lines
- Thermoforming

GFX4-IR

4-ZONE TEMPERATURE CONTROLLER FOR INFRARED LAMPS (IR)



INFRARED LAMP POWER CONTROL (IR)

The GFX4-IR multi-loop controller is able to independently control 4 temperature control loops complete with static units (SSR) for infrared lamp control (IR). Furthermore, due to the availability of a wide range of communication protocols, GFX4-IR can be easily included in any industrial automation architecture.

Fully settable trip functions such as Zero crossing, HSC Half Single Cycle, PH Phase Angle, soft start, current limitation, voltage feedback and power feedback can control loads such as infrared lamps (long waves, medium waves, short waves).

- 4 Independent hot/cold PID
- 30, 60, 80 kW static units
- Voltage overload protection
- CT input load disconnection protection
- Overheat alarm function
- Integrated fuses
- Fieldbus communications
- Current limit
- Voltage, current, power feedback (V,I,P)
- Front protection: IP20 rating

Modbus TCP/RTU

PROFI
NET

PROFI
BUS

CANopen

EtherCAT

EtherNet/IP

DeviceNet

SCCR RMS SYM
100KA / 480V

ODVA
CONFORMANT

PIV
CERTIFIED
PROFIBUS - PROFINET



APPLICATIONS

- Composite and plastic material welding
- Preheating on blow moulding lines
- Thermoforming

GRM-H

COMPACT SINGLE PHASE POWER CONTROLLER UP TO 120A



 IO-Link 

APPLICATIONS

- Welding applications for packaging machines
- Polymerisation plants
- Thermoforming machines
- Rubber vulcanisation plants

The characteristics of GRM-H series Power Controllers guarantee efficient heating management even in the case of complex electrical loads which require special precautions such as in the case of short-wave infrared lamps (SWIR).

The wide range of load currents from 15A to 120A, the size and configuration flexibility guarantee its use in the most diverse types of machines. Furthermore, the availability of an IO-Link communication allows its simple and fast integration within the most modern industrial automation architectures. Simple and safe commissioning, maintenance and rapid diagnostics are now within the reach of devices such as the GRM-H. All this thanks to NFC technology, which allows you to extend the user interface using normal Smartphone or Tablet.

- **Ultra-compact dimensions from 15A to 120A**
- **Load voltage 480V, 600V AC**
- **IO-Link digital communication**
- **Softstart current and ramp limits**
- **V, V2, I, I2, P feedback**
- **Vdc, Analog, PWM or IO-Link logic control**
- **Configurable Zero crossing, Burst Firing, Half Single Cycle and Phase angle control mode**
- **Slave control output (two-phase / three-phase)**
- **Configuration and diagnostics via smartphone app with NFC technology**
- **Advanced partial load breakage diagnostics (1/8)**

GRP-H

SINGLE-PHASE STATIC RELAY WITH ADVANCED DIAGNOSTICS



APPLICATIONS

- Extrusion lines
- Injection presses for plastic
- Packaging and wrapping machines
- Polymerisation plants
- Synthetic fibre production
- Rubber vulcanisation plants

Accurate heating control is the condition for obtaining constant and quality production. It is necessary to manage the different types of industrial heaters, from linear resistors to infrared lamps, to best achieve this goal.

For this purpose, the GRP series provides a wide range of extremely compact SSRs, with a solid basic structure but scalable in current sizes (from 15A to 120A), with partial load breakage diagnostic functions with accuracy up to 1/8 of the total load.

The digital IO-Link communication available with this series of static relays allows their complete integration within the most modern factory automation networks.

Simple and safe commissioning, maintenance and rapid diagnostics are now within the reach of devices such as SSR. All this thanks to the NFC technology available with GRP-H, which allows you to extend the user interface using normal Smartphones or Tablets.

- **Current range from 15A to 120A**
- **Ultra-compact dimensions**
- **IO-Link communication**
- **Digital / analog input command**
- **Switching (ZC//BF/HSC/PA)**
- **Control of linear resistances / infrared heaters (LWIR / MWIR)**
- **Load voltage 480V, 600V AC**
- **HB partial load interrupted alarm option (1/8)**
- **NFC configuration**
- **DIN rail and panel mounting**

GRS-H

COMPACT SINGLE-PHASE STATIC RELAY



SCCR RMS SYM
100KA / 600V

The safe management of electric heaters for industrial heating applications requires robust, compact, fast and diagnostic-capable static relays.

The range of static relays with GRS-H heatsink, with current sizes from 15 to 120 Ampere, voltages up to 600Vac, zero voltage switching (ZC) and in extremely compact dimensions in every single size is the ideal tool for this type of application.

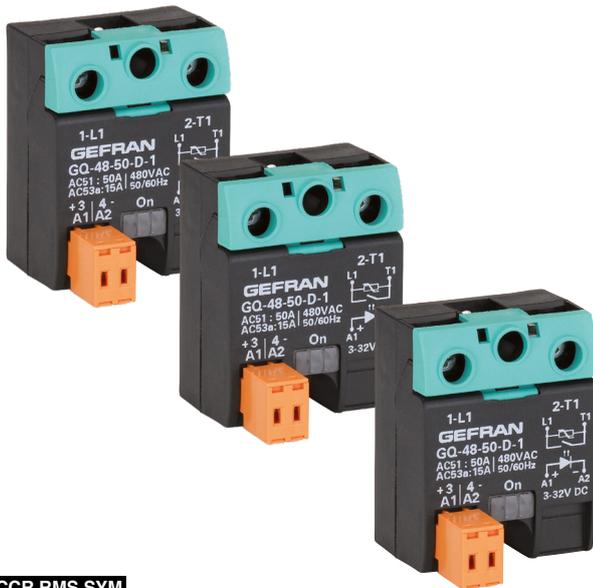
- **Current range from 15A to 120A**
- **Ultra-compact dimensions**
- **DIN rail and panel mounting**
- **Zero voltage switching (ZC)**
- **Input command from DC/AC logic signal with push-in connectors**
- **Cage clamps for power cables**
- **Load voltage 480V, 600V AC**
- **Thermal alarm option with led and alarm output**
- **Interrupted load option with led and alarm output**
- **Voltage overload protection**

APPLICATIONS

- Extrusion lines
- Injection presses for plastic
- Packaging and wrapping machines
- Synthetic fibre production

GQ

SOLID STATE, SINGLE-PHASE RELAY WITH SCR



SCCR RMS SYM
100KA / 600V

The switching relay for zero crossing with double SCR output in antiparallel is the solid state relay most frequently used in industrial applications.

Zero switching. Double SCR output in antiparallel.

Logic command in Vdc (3...32Vdc). LED display.

Integrated IP20 rated shell.

- **3-32 Vdc logic control input**
- **Front protection: IP20 rating**
- **Nominal operating temperature 40°C**
- **Internal mov overload protection**

APPLICATIONS

- Extrusion lines
- Thermoforming
- Packaging machines
- Wrapping machines



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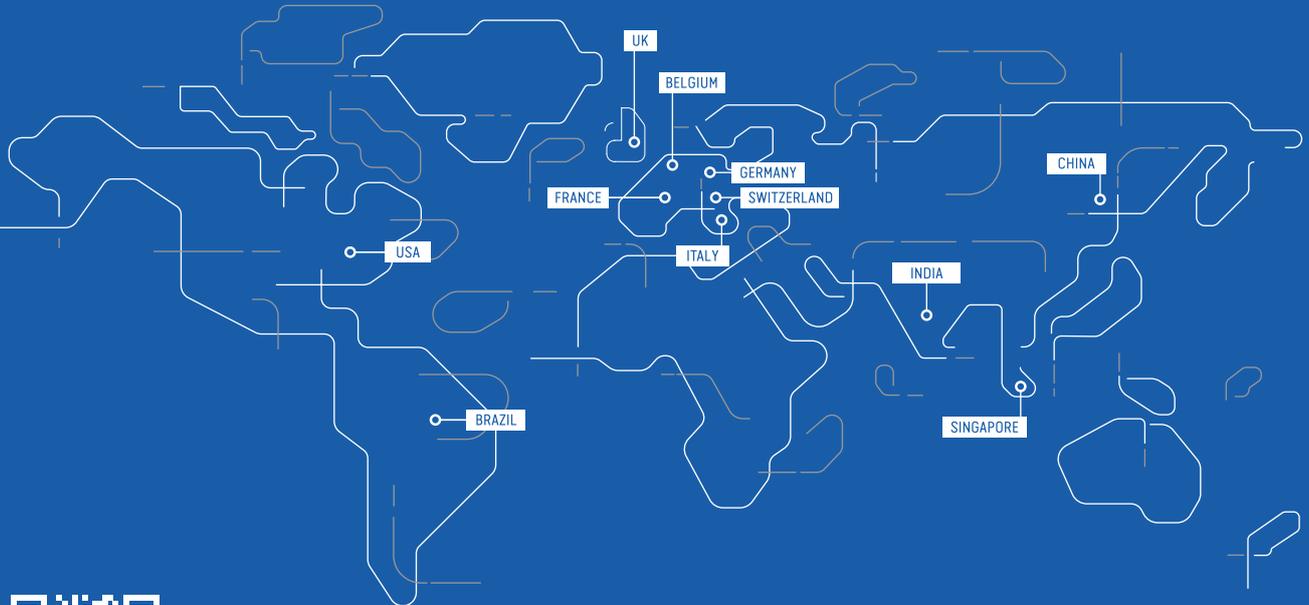
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