

## STRAIN AND FORCE SENSORS WITH SENSORMATE TECHNOLOGY



# GEFRAN



Thanks to forty years of experience, Gefran is the world leader in the design and production of solutions for **measuring, controlling, and driving industrial production processes**.

We have 14 branches in 12 countries and a network of over 80 worldwide distributors.

## QUALITY AND TECHNOLOGY

Gefran components are a **concentration of technology**, the result of constant study and **cooperation with major Research Centres**.

This is why Gefran is synonymous with **quality and expertise in the design and production of force transducers**.

Force transducers are built for machining of solids with a CNC machine.

For this reason, the primary sensing elements are machined from a single block and have no welds, thus guaranteeing maximum accuracy and reliability of measurement as well as maximum strength.

## SERVIZI

A team of Gefran experts works with the customer to select the ideal product for its application and to help install and configure devices ([customercare@gefran.com](mailto:customercare@gefran.com)).

Gefran offers a wide range of courses at different levels for the technical-commercial study of the Gefran product range as well as specific courses *on demand*.

In addition to foreseeing the market's application needs, Gefran forms partnerships with its customers to find **the best way to optimise and boost the performance of various applications**.



# APPLICATIONS



**INJECTION MOLDING**



**TEXTILE**



**AUTOMOTIVE**



**STAMPING PRESSES**



**INDUSTRIAL LIFTING**



**DIECASTING**



**INDUSTRIAL PRINTING**

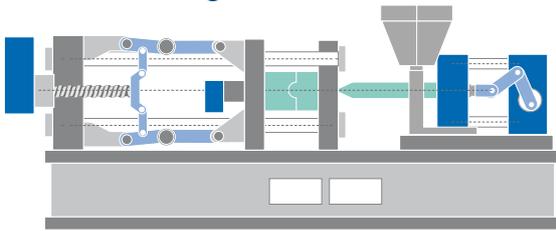


**MATERIAL PROCESSING**



**AGRICULTURAL**

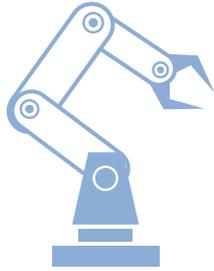
## APPLICATIONS



### INJECTION MOLDING MACHINE

Magnet tie bar sensors, strain links, strain rings and mould protection systems are suitable for use in fully electric machines as well as hybrid injection moulding machines.

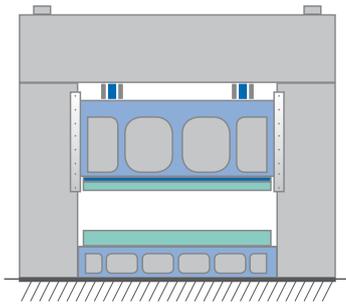
They are used for checking the injection force, closing force and mould cavity pressure profile and also offer effective mould protection for the tool.



### ROBOTIC ARM

In the field of the robots designed to interact with objects, there is a growing need for robots capable of physical interaction, handling precision and dexterity.

To reach this target, it becomes increasingly necessary to provide strain and force sensors which are functionally developed for use with robots.



### STAMPING PRESS

Indirect force sensors are used on each individual step of the forming press.

To calibrate the individual sensor for manufacturing, load cells are necessary.

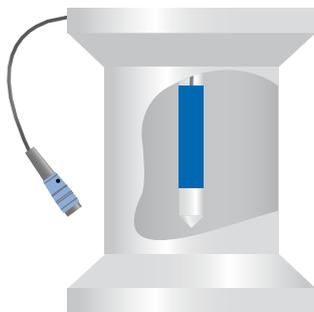
On smaller presses, where the sensors are used on the frame, the strain sensors can also be calibrated with load cells.



### STRAIN STETHOSCOPE

The magnet strain sensor type QE is placed with the stainless steel foil facing towards the surface to be measured.

The strong permanent magnets press the strain gauge so strong onto the surface that friction replaces the bond: the strain is transmitted to the strain gauge as with bonded strain gauges.

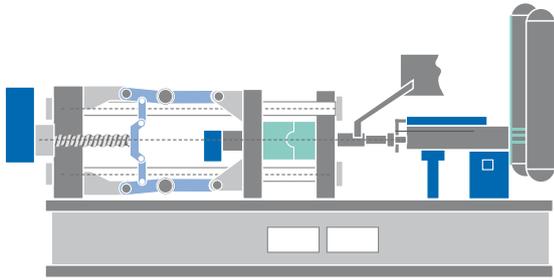


### DO-IT-YOURSELF LOAD CELL

Build your own load for cyclical application simply using a steel cylinder which is sufficiently parallel on both ends.

Apply our strain sensors (e.g. type GE, QE or ML) and the compression load cell is ready.

Knowing the Young's modulus of the steel, the cross section of the cylinder and measuring the strain value with our sensors, we can easily measure the force applied on the cylinder  $F = E \times \epsilon \times A$ .



### DIE CASTING MACHINE

Optimum locking tonnage and evenly distributed load on the tie bars are important parameters for die cast machines.

Only perfect machine alignments ensure the quality of the parts and also extend the lifetime of tool and machine.

Parallelism in particular plays an important role. If the platens are not parallel or the tool is not parallel, different tensile stresses occur in the individual tie bars.

In some cases, the result is an overload of an individual tie bar, resulting in cracks or even broken tie bars.

It is strongly recommended to check the machine with every mould change for parallelism.

This is done most simply and reliably by measuring the strain tie bar strain.

## OUR PASSION FOR TECHNOLOGY

Gefran owns the technology for its transducers.

### BONDED STRAIN GAUGE

Gefran load cells and force transducers, built in various sizes and capacities, are available in stainless or in aluminium, with protection levels from IP65 to IP68 and many precision classes.

The cells measure the deformation generated by compression, traction/compression, cutting, double cutting, and bending, and convert it by means of glued strain-gauge technology.

The strain-gauges are linked to form a Wheatstone bridge that converts the deformation into an easily managed electrical signal.

### PRESS ED-ON STRAIN GAUGE

The **press-on strain sensors** measure the surface-strain directly at the mounting location, similar to bonded strain gauges.

The strain gages are protected: they are positioned under the stainless protective foil and are strongly pressed onto the measuring surface that friction **replaces the bonding** normally used to fix strain gauges.

The sensors can be installed **very easily and just in few seconds**.

The sensors do not need to be recalibrated every time they have been **replaced or remounted**.



## GEFRAN RANGE



### PRECISION, STRENGTH, ACCURACY

All the machines are no longer manufactured without sensors.

The reason is simple: ever increasing demands for improved performance and consistent product quality call for fast and reliable machines with sophisticated controls.

Sensormate products provide this control and help to achieve continuously higher quality levels.

Sensormate prides itself on delivering products which offer maximum ease-of-use, making the job for the user as simple as possible.

#### All the sensors you need from one manufacturer

As sensor specialists with many years of experience in several markets, we can provide you with precise solutions for your sensing problem. And we can create tailor-made sensor systems that deliver total flexibility.

## GUIDE TO SELECTION

		KIND OF SURFACE	TECHNOLOGY	MODEL			
SENSORS FOR CONTINUOUS MEASUREMENT	Flat		Bonded strain gauge	SL		Ideal for tension mode	
				DLC		For injection force measurement	
			Pressed strain gauge	SB		Compression and tension	
	Round		Pressed strain gauge	Bonded strain gauge	Wireless load cell		For injection force measurement
				GE		Independent from the diameters	
				AN		No mounting hole necessary	
				ML		Tie bar in depth measurement	
				MLO		Protected positioning	

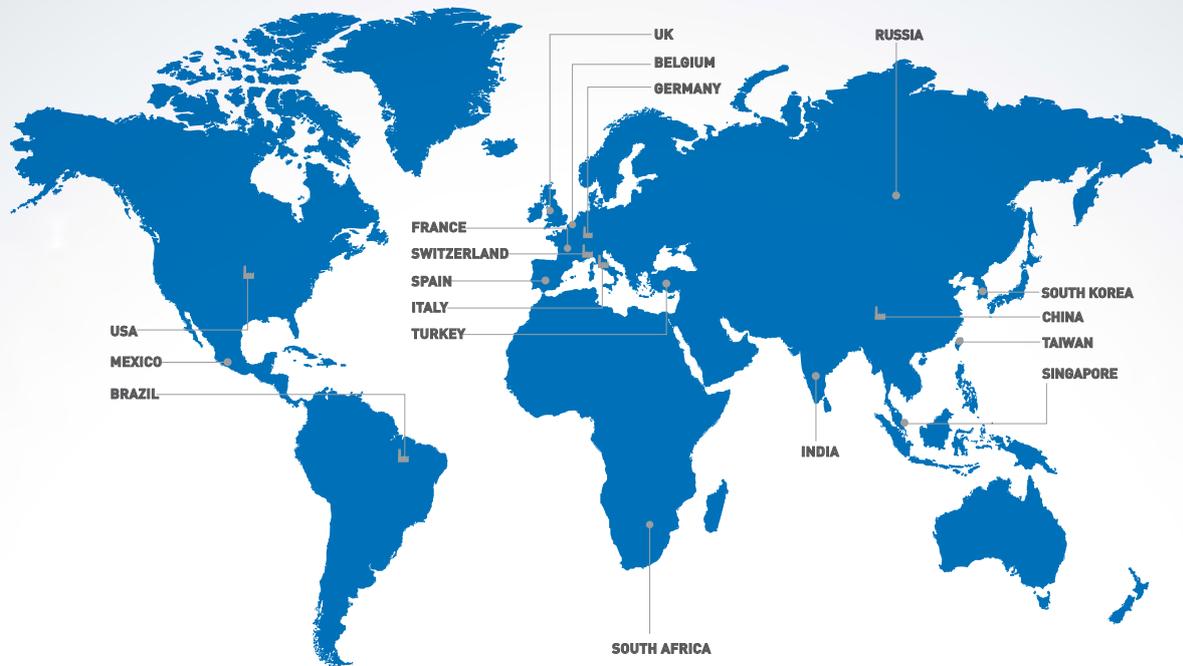
## STRAIN AND FORCE SENSORS

	KIND OF SURFACE	TECHNOLOGY	MODEL		
SYSTEMS FOR TEMPORARY MEASUREMENT	Round & flat	Pressed strain gauge	QE1008		Magnet mounting
			QE1008W		Wireless transmission
	Round	Pressed strain gauge	GE		Bending compensated system
	Flat	Bonded strain gauge	DAKIN		Nozzle touch force and melt pressure
		Pressed strain gauge	QE1010		Strain stethoscope

	FUNCTION	HOUSING	MODEL		
AMPLIFIERS	Triple	ALU	VDA-TRIO		For fully electric injection molding machines
	Double	ALU	VDA-DUO		For fully electric injection molding machines
	Single	ALU	VDA-H		Very rugged housing
		DIN	VDA-DIN		DIN rail installation
		ILA	VDA-ILA		Digital inline amplifier

## ACCESSORIES

	CHANNELS	INTERFACE	MODEL		
MONITORS	One	Display	DU-1D		One channel digital monitor
	Four	USB	DU-4USB		Four channel digital monitor with USB interface
		Display	DU-4D		Four channel digital monitor



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