

## PRESSURE TRANSDUCERS AND TRANSMITTERS



# 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 branches in 14 countries and a network of over 80 worldwide distributors.

## QUALITY AND TECHNOLOGY

A **pressure transducer** is an electronic device that converts a **physical variable** (pressure) **into an electrical signal** (current or voltage) that can be read or acquired by various **control, measurement, and adjustment** devices. Gefran, with its own Technological Pole, is one of the few international companies with the know-how to create sensitive elements based on the following technologies: **Thick film on stainless steel, Bonded strain gauge, Piezoresistive silicon**.

Gefran sensors can measure the pressure of fluids and gases in all industrial applications, with a complete line for ranges from 0...50 mbar to 0...5000bar for both relative and absolute pressures.

## ONE STOP SHOP

Gefran offers **complete display solutions for industry**, providing its own sensors and ensuring **maximum component compatibility and integration**.

## SERVICES

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



## APPLICATIONS



PLASTIC AND RUBBER INJECTION  
PRESSES



PRESSES AND METAL WORKING  
MACHINERY



AGRICULTURAL AND EARTH-MOVING  
MACHINERY



ATEX



TEST BENCHES AND TEST EQUIPMENT



TEST BENCHES AND TEST EQUIPMENT



BLOWING MACHINES



FLUID POWER AND HYDRAULIC  
POWER PACKS



AUTOMOTIVE TEST EQUIPMENTS,  
ENGINE TEST BEDS



FOOD INDUSTRY



MATERIAL TEST MACHINES



STEAM TREATMENT PLANTS

# OUR PASSION FOR TECHNOLOGY

Gefran owns the technology for its transducers.:

## THICK FILM ON STAINLESS STEEL

The *Wheatstone* bridge is made with the screen printing process, which deposits the insulating layer (dielectric), the conducting layer (Cermet) and the resistive layer on the steel diaphragm.

The thickness of the diaphragm determines the measurement range, and the increase from 200°C to 900°C makes the sensor extremely sturdy and reliable.

To further ensure quality, the diaphragm is connected to the electronics by means of *Wire Bonding*.



## PIEZORESISTIVE SILICON

Piezoresistive silicon technology is characterised by complex and delicate installation of the chip (solid state *Wheatstone* bridge) on the metal support and by a separating metal diaphragm with interposition (under vacuum) of insulating silicone oil (filling).

Thanks to this technology, the measurement range of Gefran sensors can be very low (0-50 mbar), with high precision and overpressure capacity.

## BONDED STRAIN GAUGE

Bonded *strain-gauge* technology is very often used to produce pressure sensors thanks to its applicative versatility, reliability, and accuracy.

The measurement element (resistance) consists of an extremely thin foil of metal alloy, chemically etched using a specific process.

The resistance and diaphragm are bonded with sophisticated techniques after precise positioning of the strain-gauge (extensometer) to ensure perfect adhesion to the surface and to guarantee linearity and repeatability.



## MEASUREMENT RANGES

### WIDE RANGE OF PRODUCTS FOR EVERY APPLICATION

Gefran offers an extremely wide range of transducers to **measure pressure in all industrial applications**.

The range includes models for **special applications and for high precision**, as well as for use in **very harsh and demanding environments** as typical on mobile machines.

The **TPF/TPFADA** series is an advanced technical solution with a very sturdy steel flush measurement diaphragm.

This makes it unique and **especially suitable for measuring the pressure of very dense and harsh fluids and pastes**.

Add to this the new series **TPFAS** that introduces the **miniaturized diaphragms down to Ø 8.6 mm**, which are the smallest of this kind on the market.

The **TPH/TPHADA**, series, with monolithic measurement diaphragm, is the **ideal product for measuring very high pressures (up to 5000 bar)**, including with highly dynamic pressure pulsation.

### FUNCTIONAL SAFETY

The new **KS**, series is the **best solution for all hydraulic and pneumatic applications** that demand a pressure transducer with competitive price as well as **high performance and reliability**. KS series is supplied with SIL2 certification according to IEC/EN 62061 in compliance with Machinery Directive 2006/42/EC2006/42/CE.

With SIL2 approval is also available the new KH series for mobile hydraulics applications.



TPFAS



TPH/TPHADA



KS

## WHY GEFRAN?

### ATEX: INTRINSIC SAFETY

Gefran's range of pressure sensors includes **ATEX** pressure transmitters, **ideal for applications in potentially explosive atmospheres**.

ATEX Directive 2014/34/EU refers to electrical and mechanical devices and to protection systems that can be used in potentially explosive atmospheres (gases, vapours, and flammable powders), including under extreme conditions.

The KX series is certified II1G Ex ia IIC T4, T5 and T6 and covers measurement ranges from  $\pm 1$  bar to 0...1000barg in temperatures from -40°C to +80°C.

To ensure maximum safety and reliability, the KX series, as well as ATEX, is also certified SIL2 (Functional Safety), then applicable in safety equipment that can be installed in potentially explosive atmospheres.

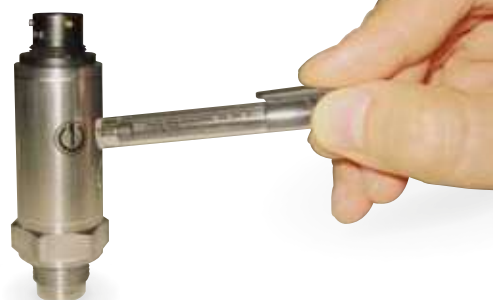


### AUTOZERO & SPAN

The **Autozero & Span** function provides simple and effective zero and full-scale setting of the pressure transducer by means of a magnetic pen.

Simply place the pen on the contact point (identified by the symbol  for a few seconds and the operation is done, without having to open or disassemble the transducer.

The digital **Autozero & Span** function is available on models TKDA, TPSADA, TPFADA, TPFAS and TPHADA.



## GUIDE TO SELECTION



Relative

| PRESSURE TYPE                                                                                                    | ACCURACY                   | FULL SCALE               | PROCESS TEMPERATURE | DIAPHRAGM             | AREA | OUTPUT TYPE                                                                              | MODEL                                                                                   |                     |
|------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|---------------------|-----------------------|------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------|
| <div></div> <div>Relative</div> | ≤ 0.15% FS                 | ≥ ± 1 bar<br>≤ 1000 bar  | -40 ... 80°C        | Standard              | Atex | Current                                                                                  | KX   |                     |
|                                                                                                                  | ≤ 0.1% FS                  | ≥ 50 bar<br>≤ 1000 bar   | -40 ... 105°C       | Standard              | Safe | Voltage                                                                                  | TPSA/TPSADA                                                                             |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | TPSA/TPSADA                                                                             |                     |
|                                                                                                                  |                            | ≥ 1000 bar<br>≤ 5000 bar | -30 ... 120°C       | Standard              | Safe | Voltage                                                                                  | TPHADA                                                                                  |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | TPHADA                                                                                  |                     |
|                                                                                                                  |                            |                          |                     |                       |      | mV/V                                                                                     | TPH                                                                                     |                     |
|                                                                                                                  | ≥ 0.15% FS<br>÷ ≤ 0.25% FS | ≥ 25 bar<br>≤ 600 bar    | -40 ... 120°C       | Flush<br>miniaturized | Safe | Voltage                                                                                  | TPFAS                                                                                   |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | TPFAS                                                                                   |                     |
|                                                                                                                  |                            | ≥ 10 bar<br>≤ 1000 bar   |                     | Standard              |      | mV/V                                                                                     | TPS                                                                                     |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Voltage                                                                                  | TPFADA                                                                                  |                     |
|                                                                                                                  |                            |                          |                     | Flush                 |      | Current                                                                                  | TPFADA                                                                                  |                     |
|                                                                                                                  |                            |                          |                     |                       |      | ≥ 0.05 bar<br>≤ 50 bar                                                                   | -20 ... 80°C                                                                            | Standard            |
|                                                                                                                  |                            | Voltage                  |                     | TSA                   |      |                                                                                          |                                                                                         |                     |
|                                                                                                                  |                            | Current                  |                     | TSA                   |      |                                                                                          |                                                                                         |                     |
|                                                                                                                  | ≥ 0.25% FS ÷<br>≤ 0.5% FS  | ≥ ± 1 bar<br>≤ 500 bar   | -40 ... 105°C       | Standard              | Safe | Voltage                                                                                  | TK/TKDA                                                                                 |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | TK/TKDA                                                                                 |                     |
|                                                                                                                  |                            | ≥ 1 bar<br>≤ 1000 bar    | -40 ... 125°C       |                       |      | Voltage                                                                                  | KS   |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | KS   |                     |
|                                                                                                                  |                            | ≥ 4 bar<br>≤ 1000 bar    |                     |                       |      | Voltage                                                                                  | KH   |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Current                                                                                  | KH  |                     |
|                                                                                                                  |                            | Ratiometric              |                     |                       |      | KH  |                                                                                         |                     |
|                                                                                                                  |                            |                          |                     |                       |      | Absolute                                                                                 | ≤ 0.15% FS                                                                              | ≥ 1 bar<br>≤ 40 bar |
|                                                                                                                  | Current                    | TSA                      |                     |                       |      |                                                                                          |                                                                                         |                     |

| MODEL          | MIN. RANGE            | MAX. RANGE            |
|----------------|-----------------------|-----------------------|
| PRESSURE       | BAR<br>PSI            | BAR<br>PSI            |
| KS             | 0...1<br>0...15       | 0...1000<br>0...15000 |
| TK<br>TKDA     | ± 1<br>± 15           | 0...500<br>0...7500   |
| TSA            | 0...0,05<br>0...5     | 0...60<br>0...1000    |
| TPS            | 0...10<br>0...150     | 0...1000<br>0...15000 |
| TPSA<br>TPSADA | 0...50<br>0...750     | 0...1000<br>0...15000 |
| TPF            | 0...10<br>0...150     | 0...1000<br>0...15000 |
| TPFADA         | 0...10<br>0...150     | 0...1000<br>0...15000 |
| TPFAS          | 0...25<br>0...350     | 0...600<br>0...9000   |
| TPH            | 0...1000<br>0...15000 | 0...5000<br>0...70000 |
| TPHADA         | 0...1000<br>0...15000 | 0...5000<br>0...70000 |
| KX             | ± 1<br>± 15           | 0...1000<br>0...15000 |
| KH             | 0...4<br>0...60       | 0...1000<br>0...15000 |

## ACCESSORIES

### DISPLAY

The **TDP-1001** plug-in display is a universal local device that can be used with all Gefran pressure transmitters with 4-20 mA output and EN 175301-803 A solenoid connector.

It needs no power supply: it inserts directly into the connector and supplies a 4-figure local digital display in programmable engineering units.

It also has a user-settable PNP open collector alarm limit for independent management of security systems.

An ATEX-certified intrinsic safety version, **TDP-2000**, is available for use in potentially explosive atmospheres.



### ADAPTERS AND SEALS

Gefran pressure transducers offer a very wide selection of built-in pressure connections: metric, gas, NPT and UNF, as well as a wide range of stainless steel adapters (both male/male and male/female) with seals, called **PKITxxx**, to satisfy all possible process connection requirements.



### CONNECTORS AND EXTENSION CABLES

Gefran pressure transducers are available with various types of electrical connectors (EN 175301-803, M12x1, etc.), and for each of these Gefran supplies the female connector for the cable to be soldered (called **CON xxx**) or an extension cable pre-attached to the female connector (called **CAVxxx**) with length up to 30 metres.



## RELATED PRODUCTS

### CONTROLLERS

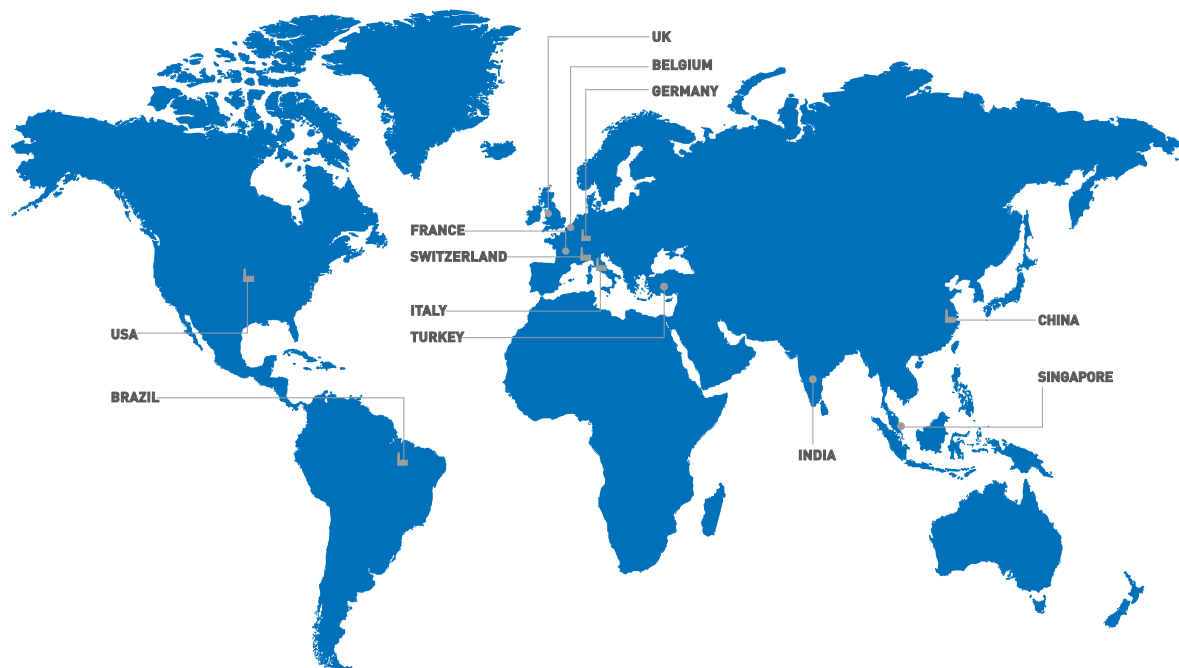
- universal inputs for amplified and non-amplified sensors
- very high acquisition speed
- high accuracy
- math calculations, pressure delta
- 4 configurable outputs
- Modbus and Profibus communication



### PRESSURE INDICATORS

- universal inputs for amplified sensors
- very high acquisition speed
- high accuracy
- math calculations, pressure delta
- 4 configurable outputs
- Modbus and Profibus communications
- input for non-amplified pressure sensors
- 4 configurable outputs
- Modbus communications
- input for amplified pressure sensors
- 4 configurable outputs
- Modbus communication





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# GEFRAN

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