

Pressure Transducers and Transmitters

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GEFRAN

Our Know how,
Your Solution.

Why you should choose Gefran

The Gefran Group has a specific facility that designs and produces a wide range of sensors that measure pressure, shift, force, humidity and temperature.

Thanks to years of know-how in the sensor field, Gefran guarantees:

- total control of the production process, from design of the sensitive element to production of precision mechanical parts, ensuring the high quality, reliability and precision of the finished product.
- constant updating of technologies and solutions to satisfy the specific needs of its customers and automated production lines, to keep at the forefront of technology.
Sophisticated pressure controllers allow work with gas up to 40 bar and with oil up to 5000 bar.
- effective research and development activities.

Technology

The pressure transducer is an electronic device used to convert a physical variable (pressure) into an electrical signal (current or voltage) that can be acquired by electronic equipments and control and regulation systems.

Gefran is using one of the most popular and reliable principles, the "Wheatstone Bridge".

Various technologies can be used to produce the sensor element.



Gefran is one of the few international companies to develop its own Technology, with know-how to produce sensor elements with the following technologies:

- **Thick film on steel**

The screen printing (serigraph) process is used to deposit dielectric layers, the conductor (cermet) and the resistor on the steel diaphragm to create the Wheatstone bridge.

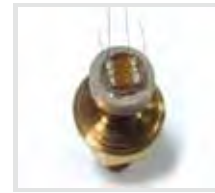
Diaphragm thickness determines the measurement range, and the various steps in the process (heat treatments from 200°C to 900°C) make the sensor extremely sturdy and reliable.



• **Bonded strain gauge**

Bonded strain gauge technology, developed by Gefran from the very start, is one of the most widely used methods for building pressure sensors due to its versatility, reliability and precision.

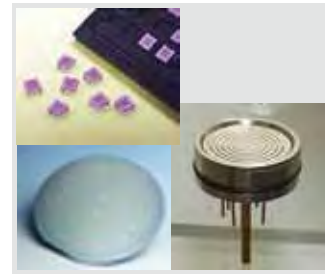
The measuring element (resistance) consists of an extremely thin sheet of metal alloy, chemically engraved by means of a printed circuit process. It is bonded to the steel diaphragm after precise positioning of the strain gauge, guaranteeing perfect bonding on the surface and absolute linearity.



• **Silicon piezoresistive technology**

Attraverso questa tecnologia, il campo di misura dei sensori Gefran può essere anche molto basso (0-50 mbar), con elevata precisione e capacità di sovrappressione.

La tecnologia "Piezoresistiva al silicio", sviluppata da Gefran negli anni, trova la sua particolarità nella complessa e delicata fase di installazione del chip (ponte di Wheatstone allo stato solido) nel supporto metallico e di installazione della membrana metallica di separazione con l'interposizione sotto vuoto dell'olio siliconico di isolamento (riempimento). Per ulteriori informazioni su queste tecnologie consultare il nostro sito web www.gefran.com alla voce "TECNOLOGIE".



Intrinsic safety (ATEX) -40°C



Gefran offers ATEX-certified pressure transmitters for applications in potentially explosive atmospheres. ATEX directive 94/9/CE refers to electrical and mechanical devices and to protection systems that can be adopted in potentially explosive atmospheres (inflammable gases, vapours and dusts), also in harsh environments. Series XSA and XPSA are certified II 1G Ex ia IIC T4, T5 and T6, and cover measurement ranges from 0...250 mbarg to 0...1000 barg, with working range from -40°C up to +80°C.

Pressure ranges

Gefran sensors can measure the pressure of fluids and gases in all industrial applications.

Gefran offers a complete line for measurement ranges from 0...50 mbar to 0...5000 mbar for relative and absolute pressure.

Model	Pressure	KS	TK TKDA	TSA	TPS	TPSA TPSDA	TPF	TPFADA	TPH	TPHA	XSA	XPSA
Range	BAR	0...1	± 1	0..0,05	0...10	0...50	0...10	0...10	0...1000	0...1000	0...0,25	0...50
min.	PSI	0...15	± 15	0...5	0...150	0...750	0...150	0...150	0...15000	0...15000	0...5	0...750
Range	BAR	0...1000	0...500	0...60	0...1000	0...1000	0...1000	0...1000	0...5000	0...5000	0...60	0...1000
max.	PSI	0...15000	0...7500	0...1000	0...15000	0...15000	0...15000	0...15000	0...70000	0...70000	0...1000	0...15000



MODEL	KS	TK	TKDA
MEASUREMENT RANGE	0...1 to 0...1000bar 0...15 to 0...15000psi	± 1bar to 0...500bar ± 15psi to 0...7500psi	± 1bar to 0...500bar ± 15psi to 0...7500psi
ACCURACY	<± 0,5% FSO	H ± 0,25% FSO M ± 0,5% FSO BFSL typical	H ± 0,25% FSO M ± 0,5% FSO BFSL typical
OVERPRESSURE	6x...1,5x	2x	2x
PRESSURE CONTAINMENT	9x...2x	4x	4x
PRESSURE MEDIA	Stainless steel	Stainless steel 17-4PH, AISI 430F	Stainless steel 17-4PH AISI 430F
OUTPUT SIGNAL	4-20mA; 0-10V	4-20mA; 0-10V; 0-5V; 0,1-10,1V; 0,1-5,1V; 1-5V; 1-10V; 1-6V; Custom	4-20mA; 0-10V; 0-5V; 0,1-10,1V; 0,1-5,1V; 1-5V; 1-10V; 1-6V; Custom
OPERATING TEMPERATURE RANGE	-40...+125°C (-40...+257°F)	-40...+120°C (-40...+248°F)	-40...+120°C (-40...+248°F)
COMPENSATED TEMPERATURE RANGE	-20...+85°C (-4...+185°F)	-10...+85°C (+14...+185°F)	-10...+85°C (+14...+185°F)
TEMPERATURE EFFECTS OVER COMPENSATED RANGE	± 0,015% FSO/°C typical	± 0,012% FSO/°C typical	± 0,012% FSO/°C typical
INGRESS PROTECTION (IEC 529) (With female connector correctly installed)	IP65/IP67	IP65/IP67	IP65/IP67
TYPICAL APPLICATIONS	<p>Compact size Wide choice of pressure ranges from 0...1 to 0...1000 bar wide operating temperature range</p> <ul style="list-style-type: none"> - Industrial automation - Compressors - Oil gear boxes - Mobile hydraulics - Hydraulic presses - Chiller systems - Pumps 	<p>Low cost and high accuracy & reliability sensor with thick film Gefran technology. Wide range of current and voltage signal outputs, pressure connections and electrical connectors. Fast response, compact size, ranges from ± 1 bar to 0...500 bar; vibration insensitivity.</p> <ul style="list-style-type: none"> - Industrial automation - Compressors - Oil gear boxes - Mobile hydraulics - Earth moving machines - Pumps - Test benches / test stands - Chiller systems - Injection moulding machines - Blowing machines 	<p>Low-cost sensor offering high precision and reliability. Wide range of current and voltage signal outputs, pressure and electrical connectors. Fast response, compact size, ranges from ± 1 bar to 0...500 bar; vibration insensitivity. Autozero and digital Span function with autostart via magnetic pen.</p> <ul style="list-style-type: none"> - Industrial automation - Compressors - Oil gear boxes - Mobile hydraulics - Earth moving machines - Pumps - Test benches / test stands - Chiller systems - Injection moulding machines - Blowing machines



TSA

TPS

TPSA

TPSADA

0...0,05 to 0...60bar rel. ass.
0...1 to 0...1000psi rel. ass.

0...10 to 0...1000bar
0...150 to 0...15000psi

0...50 to 0...1000bar
0...750 to 0...15000psi

0...50 to 0...1000bar
0...750 to 0...15000psi

± 0,15% FSO
BFSL typical

± 0,15% FSO > 200bar
BFSL typical
± 0,25% FSO ≤ 200bar

± 0,1% FSO
BFSL typical

± 0,1% FSO
BFSL typical

8x...1,5x

2x (p. max 2000bar)

3x

3x

10x...2x

4x (p. max 2500bar)

5x

5x

Stainless steel
AISI 304 and AISI 316+NBR

Stainless steel
17-4PH

Stainless steel
17-4PH

Stainless steel
17-4PH

4-20mA; 0-10V; 0-5V;
0,1-10,1V; 0,1-5,1V;
1-5V; 1-10V; 1-6V; Custom

3mV/V
2mV/V
1,5mV/V

4-20mA; 0-10V; 0-5V;
0,1-10,1V; 0,1-5,1V;
1-5V; 1-10V; 1-6V; Custom

4-20mA; 0-10V; 0-5V;
0,1-10,1V; 0,1-5,1V;
1-5V; 1-10V; 1-6V; Custom

-20...+85°C
(-4...+185°F)

-40...+120°C
(-40...+248°F)

-40...+120°C
(-40...+248°F)

-40...+120°C
(-40...+248°F)

-10...+85°C
(+14...+185°F)

-20...+85°C
(-4...+185°F)

-10...+85°C
(+14...+185°F)

-10...+85°C
(+14...+185°F)

± 0,01% FSO/°C > 1bar
± 0,04% FSO/°C ≤ 1bar
typical

± 0,01% FSO/°C
typical

± 0,008% FSO/°C
typical

± 0,008% FSO/°C
typical

IP65/IP67

IP65/IP67

IP65/IP67

IP65/IP67

Precision (<0.15%FS) silicon piezoresistive sensor.
Wide range of current and voltage outputs, pressure connections and electrical connectors.
Fast response (<1msec), compact size, low pressure up to 0...50 mbar; vibration insensitivity, high overpressure capability.

High precision (<0.15%FSO) non amplified strain gauge sensor.
Wide range of pressure connections and electrical connectors, compact size, ranges up to 0...1000 bar; vibration insensitivity and high overpressure capability (3x FS).

High accuracy (<0.1%FS) and reliability sensor.
Wide range of current and voltage signal outputs, pressure connections and electrical connectors.
Fast response (<1msec), compact size, ranges up to 0...1000 bar; vibration insensitivity and high overpressure capability (3x FS).

Sensor with high precision (< 0.1% FSO) and reliability.
Wide range of current and voltage signal outputs, pressure and electrical connectors.
Fast response (< 1 msec), compact size, ranges up to 0...1000 bar; vibration insensitivity, high overpressure capacity (3x FS).
Autozero and digital Span function with autostart via magnetic pen.

- Industrial automation
- Test benches / test stands
- Blowing machines
- Pneumatic automation
- Engine test beds
- Weather stations
- Absolute measurements

- Industrial automation
- Test benches / test stands
- Materials testing machines
- Injection moulding machines
- Oil gear box

- Industrial automation
- Hydraulic / oil presses
- Oil Gear boxes
- Test benches / test stands
- Injection moulding machines
- Mobile hydraulics
- Material testing machines

- Industrial automation
- Hydraulic / oil presses
- Oil Gear boxes
- Test benches / test stands
- Injection moulding machines
- Mobile hydraulics
- Material testing machines



NEW

MODEL	TPF	TPFADA	TPH
MEASUREMENT RANGE	0...10 to 0...1000bar 0...150 to 0...15000psi	0...10 to 0...1000bar 0...150 to 0...15000psi	0...1000 to 0...5000bar 0...15000 to 0...70000psi
ACCURACY	± 0,2% FSO BFSL > 50bar ± 0,5% FSO BFSL ≤ 50 bar	± 0,2% FSO BFSL > 50bar ± 0,5% FSO BFSL ≤ 50bar	± 0,1% FSO BFSL typical
OVERPRESSURE PRESSURE CONTAINMENT	2x (p. max 2000bar)	3x (p. max 2000bar)	2x (p. max 6000bar)
PRESSURE MEDIA	3x (p. max 2000bar)	4x (p. max 2000bar)	3x (p. max 6000bar)
OUTPUT SIGNAL	Stainless steel 17-4PH	Stainless steel 17-4PH	Stainless steel 15-5PH
OPERATING TEMPERATURE RANGE	3mV/V 2mV/V 1,5mV/V	4-20mA; 0-10V; 0-5V; 0,1-10,1V; 0,1-5,1V; 1-5V; 1-10V; 1-6V; 1-11V	1mv/V
COMPENSATED TEMPERATURE RANGE	-40...+120°C (-40...+248°F)	-40...+120°C (-40...+248°F)	-30...+120°C (-22...+248°F)
TEMPERATURE EFFECTS OVER COMPENSATED RANGE	-20...+85°C (-4...+185°F)	-10...+85°C (+14...+185°F)	-10...+85°C (+14...+185°F)
INGRESS PROTECTION (IEC 529) (With female connector correctly installed)	± 0,01% FSO/°C > 50bar ± 0,02% FSO/°C ≤ 50bar	± 0,01% FSO/°C	± 0,01% FSO/°C typical
TYPICAL APPLICATIONS	IP65/IP67	IP65/IP67	IP65/IP67
	Flush fitting non amplified strain gauge sensor. Wide range of electrical connectors, compact size, ranges up to 0...1000 bar; vibration insensitivity.	Flush fitting amplified strain gauge sensor. Wide range of electrical connectors and current and voltage signal outputs, compact size, ranges up to 0...1000bar, vibration insensitivity. High thickness steel diaphragm. Autozero and digital Span function with magnetic pen.	Very high pressure non amplified strain gauge sensor. Wide range of electrical connectors, compact size, ranges up to 0...5000 bar, vibration insensitivity. Suitable for static pressure measurement and dynamic pressure measurement
	- Chemical industry - Food & beverage industry - High viscosity - fluid pressure	- Chemical industry - Food & beverage industry - High viscosity - fluid pressure - Resins dosing machines	- Autoclaves - Waterjet cutting machines - Test benches - Oil components - Very high pressure systems



TPHADA

XPSA

XSA

0...1000 to 0...5000bar
0...15000 to 0...70000psi

0...50 to 0...1000bar
0...750 to 0...15000psi

0...0,25 to 0...60bar
0...5 to 0...1000psi

± 0,1% FSO
BFSL typical

± 0,1% FSO
BFSL typical

± 0,15% FSO
BFSL typical

2x (p. max 6000bar)

3x

8x...1,5x

3x (p. max 6000bar)

5x

10x...2x

Stainless steel
15-5PH

Stainless steel
17-4PH

Stainless steel
AISI 304 and AISI 316 +NBR

4-20mA; 0-10V; 0-5V;
0,1-10,1V; 0,1-5,1V;
1-5V; 1-10V; 1-6V;
1-11V

4-20mA

4-20mA

-30...+120°C
(-22...+248°F)

-40...+80°C
(-40...+176°F)

-40...+80°C
(-40...+176°F)

-10...+85°C
(+14...+185°F)

-10...+70°C
(+14...+158°F)

-10...+70°C
(+14...+158°F)

± 0,01% FSO/°C
typical

± 0,01% FSO/°C
typical

± 0,01% FSO/°C > 1 bar
± 0,04% FSO/°C ≤ 1 bar
typical

IP65/IP67

IP65/IP67

IP65/IP67

Very high pressure amplified strain gauge sensor. Wide range of electrical connectors and current and voltage signal outputs, compact size, ranges up to 0...5000bar; vibration insensitivity. Suitable for static pressure measurement and dynamic pressure measurement. Digital autozero and span function with magnetic pen

ATEX certified unit to be used in Hazardous Area (Intrinsically Safe) applications. High accuracy, fast response, compact size, ranges up to 0...1000 bar; vibration insensitivity. Certified down to -40°C.

ATEX certified unit to be used in Hazardous Area (Intrinsically Safe) applications. High accuracy, fast response, compact size, low ranges up to 0...250 mbar; vibration insensitivity. Certified down to -40°C.

- Autoclaves
- Waterjet cutting machines
- Test benches
- Oil components
- Very high pressure systems

- Natural Gas distribution plants
- Pressure reduction Gas stations
- Gas compressors
- Chemical plants

- Natural Gas distribution plants
- Pressure reduction Gas stations
- Gas compressors
- Chemical plants



TDP

MODEL	
DISPLAY	4-digit red LED display Programmable decimal point setting
INDICATION RANGE	-1999...9999
ACCURACY	0,2% of span \pm 1 digit
CONVERSION RATE	Three measurements/second until 25.5/second adjustable
DATA BACK-UP	Non-volatile EEPROM
ERROR MESSAGE	HI: over range LO: under flow
PROGRAMMING	With two keys, menu-assisted, scaling of indication, decimal point, gate time, error message switch point
PROTECTION	IP65
TEMPERATURE INFLUENCE ON DISPLAY	0,01%/°C
STORAGE TEMPERATURE	-30...+80°C
MOUNTING	Universal on transducers with 4-20 mA output DIN43650 connector

TYPICAL APPLICATIONS

The TDP plug-in display is a universal local display suitable for use with various transmitters.

The plug-in display is simply plugged in between connector and socket; it is then ready for operation.

The plug-in display is supplied by the current loop of the 4-20 mA signal transmitter.

No additional auxiliary power is required. The programmed parameters are stored in an EEPROM, they are therefore not lost after power failure.

Over or under range are displayed as a message on the LED display.

All device functions are continuously monitored by an integral diagnostic system.






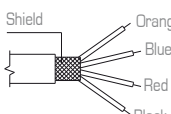
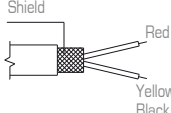
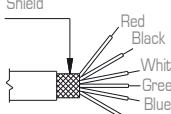
The indicating unit can be rotated in 90° steps, it can thus be adapted to different installation positions.

The integral open-collector output, allows a transmitters to be used easily with a limit contact.

Also available for use in hazardous areas: ATEX certified version II 2G EEx ib IIC T4 (TDP2000).

- TDP-1001 (standard)
- TDP-2000 (ATEX)

Electrical connections

Connector	KS	TK	TKDA	TSA	TPS	TPSA	TPSADA	TPF	TPFADA	TPH	TPHADA	XPSA	XSA
 <p>4 pole Male connector Prot. IP65 G4A1M4</p>	-	-	-	-	-	-	-	-	-	-	-	•	•
 <p>6 pole Male connector Prot. IP66 VPT02A10-6PT2</p>	-	•	•	•	•	•	•	•	•	•	•	•	•
 <p>7 pole Male connector Prot. IP67 09-127-09-07</p>	-	•	•	•	•	•	•	•	•	•	•	•	•
 <p>4 pole Male connector Prot. IP67 M12x1 serie 713</p>	•	•	•	•	•	•	•	•	•	•	•	•	•
 <p>4 pole connector Prot. IP65</p> <p>E EN175301-803 Type A M EN175301-803 Type C</p>	•	•	•	•	•	•	•	•	•	•	•	•	•
 <p>Cable Prot. IP65 2x0,25</p> <p>Shield Orange Blue Red Black</p>	-	•	•	•	-	•	•	-	•	-	•	-	-
 <p>Cable Prot. IP65 2x0,25</p> <p>Shield Red Yellow or Black</p>	-	•	•	•	-	•	•	-	-	-	-	•	•
 <p>Cable Prot. IP65 6x0,25</p> <p>Shield Red Black White Green Blue Orange</p>	-	-	-	-	•	-	-	•	•	•	•	-	-

Process connections

Cod	Description	KS	TK	TKDA	TSA	TPS	TPSA	TPSADA	TPF	TPFADA	TPH	TPHADA	XPSA	XSA
1	G 1/4 gas male (DIN 3852-A)		•	•	•	•	•	•					•	•
2	7/16-20 UNF-2A male (SAE 4 per AS4395-E)		•	•	•	•	•	•					•	•
3	G 1/2A (DIN 16288) (DIN 3852-E) x KS	•	•	•	•	•	•	•					•	•
4	G 1/4 gas female		•	•	•	•	•	•					•	•
5	1/8-27 NPT female		•	•	•	•	•	•						
6	1/4-18 NPT female		•	•	•	•	•	•						
7	1/4-18 NPT male		•	•	•	•	•	•					•	•
8	M14 x 1,5 male		•	•	•	•	•	•						
9	1/8-27 NPT male		•	•	•	•	•	•						
E	G 1/4 gas male (DIN 3852-E)	•	•	•	•	•	•	•						
R	M12 x 1,5 male		•	•	•	•	•	•						
K	7/16-20 UNF-2A male (SAE 4 for J1926-2)		•	•	•	•	•	•						
F	7/16-20 UNF-2A female (SAE 4)		•	•	•	•	•	•						
G	M18 x 1,5 flush fitting								•	•				
L	3/4-16 UNF flush fitting								•	•				
M	G 1/2 flush fitting								•	•				
D	F250-C (9/16-18 UNF female)										•	•		
E	M16 x 1,5 female										•	•		

Applications

PLASTIC AND RUBBER
INJECTION PRESSES



BLOWING MACHINES



MATERIAL PROCESSING



HYDRAULICS AND
OIL-PRESSURE
SYSTEMS
OIL-PRESSURE
CONTROL UNITS



AGRICULTURAL AND
EARTH-MOVING
MACHINERY



TEST MACHINES
AUTOMOTIVE SECTOR
MOTOR TEST LABS



ATEX:
INTRINSIC SAFETY
METHANE DISTRIBUTION
PLANTS
METHANE GAS
COMPRESSORS



FOOD INDUSTRY



TEST BENCHES
TEST EQUIPMENTS



MATERIAL TEST MACHINES



HEAT EXCHANGE PLANTS



STEAM TREATMENT
PLANTS



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Peru
Poland
Portugal
Rumania
Russia

Saudi Arabia
Singapore
Slovakia Republic
Slovenia
South Africa
Sweden
Taiwan
Thailand
Tunisia
Turkey
Ukraine
United Arab Emirates
Venezuela