ENG

PRESSURE TRANSDUCERS AND TRANSMITTERS

GEFRAN

BEYOND TECHNOLOGY


K6
IC13
IC2
IGND
TP1
IC32
S5
J10
R252
R251
R242
R241
J14
IC28
IC29
IC31
IC36
G1
S4
J12

GEFRAN

BEYOND TECHNOLOGY

More than fifty years of experience, and being an organisation 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, heating and lift 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.

GEFRAN
BEYOND TECHNOLOGY

PRESSURE TRANSDUCERS

A pressure transducer is an electronic device that transforms a physical variable (pressure) into an electrical signal (current or voltage), acquired by various control, measurement and regulation devices such as controllers or PLCs.

Gefran sensors are capable of measuring fluid and gas pressure in all applications required by the industry.

The Gefran Group relies on a unit dedicated exclusively to the design and production of a full range of sensors capable of measuring pressure, displacement, force, humidity and temperature. Based on know-how gained over years of activity in the field of sensors, Gefran guarantees:

· Total control of the production process, from the design of the sensitive element to the production of precision mechanical parts, ensuring high standards of quality, reliability and precision of the finished product.

· The constant updating of technologies and solutions meets the specific needs of the customer. Automated production lines use sophisticated pressure controllers making it possible to work with gas at an absolute pressure of up to 40 bar and oil up to 5000 bar.

· Effective product research and development. Gefran offers a complete range of measurement from 0...50 mbar to 0...5000bar, for relative and absolute pressures.

Gefran is one of the few companies at an international level that has developed the know-how to produce sensitive elements based on the following technologies in its Technological Pole:

· Thick film on steel;

· Glued strain gauge;

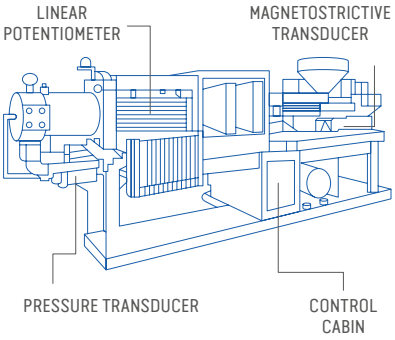
· Silicon piezoresistive.

Gefran pressure transducers are the result of years of experience and close collaboration with the best European universities as well as the company's own customers. Each transducer has been designed and manufactured with characteristics aimed at satisfying the requirements of its particular application.

KS, KH, KHC,KM, KMC, KS-I
PRESSURE TRANSDUCERS

TPFADA, TPFAS FLUSH DIAPHRAGM
PRESSURE TRANSDUCERS

TPHADA HIGH PRESSURE
TRANSDUCERS



PLASTIC INJECTION PRESS

APPLICATION SECTORS

PLASTIC AND RUBBER INJECTION PRESSES

BLOW MOULDING MACHINES

MATERIALS PROCESSING

HYDRAULICS AND HYDRAULIC POWER PACKS

FARMING AND EARTHMOVING MACHINERY

AUTOMOTIVE TEST BENCHES ENGINE TEST ROOMS

STEAM TREATMENT PLANTS

FOOD INDUSTRY

EQUIPMENT TEST BENCHES

MATERIALS TESTING MACHINES

HEAT EXCHANGE SYSTEMS

ATEX: INTRINSIC SAFETY METHANE GAS DISTRIBUTION SYSTEMS METHANE GAS COMPRESSORS

GEFRAN
BEYOND TECHNOLOGY

WIDE RANGE OF PRODUCTS
FOR EVERY APPLICATION

Gefran offers an extensive range of transducers for pressure measurement in all industrial applications.

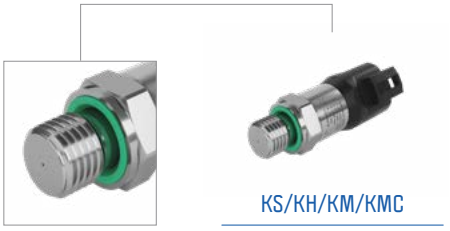
Models are available for special and high-precision applications, also for use in particularly heavy duty and demanding environments, such as mobile vehicles.

The TPF/TPFADA series adopts a state-of-the-art technical solution with a very sturdy flush steel measuring diaphragm.

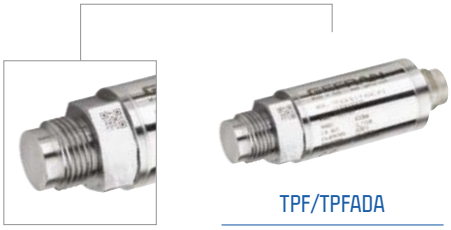
This makes the product unique and particularly suitable for pressure measurement in very dense and aggressive fluids and pastes.

In addition, the new TPFAS series introduces new membranes miniaturised up to Ø 8.6 mm which are the smallest of their kind on the market.

The TPH/TPHADA series, with its monolithic measuring diaphragm structure, is the ideal product for very high pressure measurements, up to 5000 bar, even with high dynamic push- button pressure.



KS/KH/KM/KMC



TPF/TPFADA

TPFAS

TPH/TPHADA

	KS	KS-I	KH	KHC	KM	KMC	KX	TK	TKDA	TSA	TPS	TPSA	TPSADA	TPH	TPHADA	TPF	TPFADA	TPFAS
4-20mA	X		X		X		X	X	X	X		X	X		X		X	X
0-10Vdc	X		X		X			X	X	X		X	X		X		X	X
RATIOMETRIC mV/V											X			X		X		
CAN OPEN - CAN OPEN SAFETY - CAN SAE 1939	X			X		X												
IO-LINK		X																
SIL2	X		X		X	X	X											
PLd						X												
E1						X												
cULus	X																X	
ATEX							X											
EAC EX							X											
PESO							X											
AUTOZERO		X*		X*		X*			X				X		X		X	X

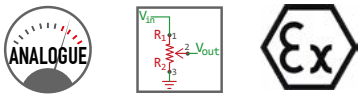
* Autozero via software communication

ANALOGUE OR DIGITAL ELECTRICAL OUTPUT?

GEFRAN manufactures both transmitters and transducers with the following electrical outputs:

ANALOGUE

- Ratiometric
- 4...20mA
- 0.5...4.5Vdc, 0...5Vdc, 0...10Vdc



DIGITAL

- CANopen CiA DP 3.01 rel.4.0 and DS406 with the following special features
  - Selectable baud rate from 10KBaud to 1MBaud
- CAN SAE J1939 multi-PDU approach (CiA 602-2)
  - 14 bit digital resolution
- IO-Link
  - IO-Link digital output version 1.1
  - COM3 high-speed communication (230.4 kBaud)

MEASUREMENT RANGES

Gefran sensors are capable of measuring fluid and gas pressure in all applications required by the industry.

Gefran offers a complete range for measurement from 0...50 mbar to 0...5000bar, for relative and absolute pressures.

MODEL	PRESSURE	KS	KH	KHC	KM	KMC	KX	KS-I	TK TKDA	TSA	TPS	TPSA TPSADA	TPF	TPH	TPHADA	TPF TPFADA	TPFAS
Campo min.	BAR	0...1	0...4	0...4	0...4	0...4	±1	0...4	±1	0..0,05	0...10	0...4	0...10	0...1000	0...1000	0...10	0...25
	PSI	0...15	0...60	0...60	0...60	0...60	±15	0...60	±15	0...5	0...150	0...60	0...150	0...15000	0...15000	0...150	0...350
Campo max.	BAR	0...1000	0...1000	0...1000	0...1000	0...1000	0...1000	0...1000	0...1000	0...60	0...1000	0...1000	0...1000	0...5000	0...5000	0...1000	0...600
	PSI	0...15000	0...15000	0...15000	0...15000	0...15000	0...15000	0...15000	0...1500	0...1000	0...15000	0...15000	0...15000	0...70000	0...70000	0...15000	0...9000

PRESSURES FROM 0...50MBAR TO 0...5000 BAR

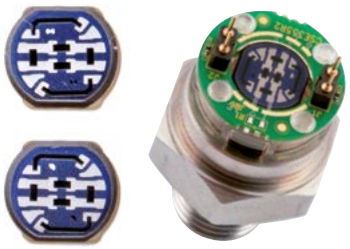
GEFRAN
BEYOND TECHNOLOGY

TECHNOLOGY

Gefran uses one of the most widespread and proven existing measurement principles, the so-called "Wheatstone Bridge". There are a number of different technologies for making the sensitive element on the basis of this principle.

THICK FILM ON STEEL TECHNOLOGY

Using the "screen printing process" technique, the insulating layers (dielectric), the conductive layer (cermet) and the resistive layer are deposited on the steel membrane to create the "Wheatstone bridge". The thickness of the membrane determines the measurement range, and the step-by-step transition from 200°C to 900°C makes the sensor extremely robust and reliable.



EXTENSIMETRIC TECHNOLOGY

"Glued strain gauge" technology, originally developed by Gefran, is one of the most widely used methods in the construction of pressure sensors for its versatility of application, reliability and precision. The measuring element (resistance) consists of an ultra-thin sheet of metal alloy, chemically etched using the process employed in printed circuit boards. It is glued to the steel diaphragm using sophisticated techniques following careful positioning of the strain gauge to ensure perfect adhesion to the surface and the necessary linearity.

SILICON PIEZORESISTIVE TECHNOLOGY

Silicon piezoresistive technology is characterized by the complex and delicate step of installing the chip (solid state Wheatstone bridge) in the metal substrate and the metal separation membrane, interposing silicone insulation oil (filling) in a vacuum. With this technology, the measurement range of Gefran sensors can also be very low (0-50 mbar), with high precision and overpressure capability.

SIL2: FUNCTIONAL SAFETY

The new KS/KH/KM/KMC series represents the best solution for all applications, both hydraulic and pneumatic, requiring a pressure transducer and offering not only competitive price but also high performance and reliability. The KS series is supplied with SIL2 certification according to IEC/EN 62061 in accordance with Machinery Directive 2006/42/EC. The KS/KH/KM series for applications on mobile vehicles and the KX series for potentially explosive areas are also available with the same SIL2 certification.

PFD (PROBABILITY OF FAILURE ON DEMAND)	PFH (PROBABILITY OF FAILURES FOR HOUR)	SIL EN 61508 EN 62061	PL EN 13849-1	RISK REDUCTION FACTOR
10-2 < PFD < 10-1	10-6 < PFH < 10-5	1	B,C	10 TO 100
10-3 < PFD < 10-2	10-7 < PFH < 10-6	2	D	100 TO 1.000
10-4 < PFD < 10-3	10-8 < PFH < 10-7	3	E	1000 TO 10.000

The concepts Safety Integrity Level (SIL) and Performance Level (PL) describe the ability of the control and command system to reduce the risk factor, in terms of safety.

ATEX: INTRINSICALLY SAFE

Gefran's range of pressure sensors includes pressure transmitters in ATEX versions ideal for applications in potentially explosive atmospheres. ATEX Directive 2014/34/EU refers to electrical and mechanical equipment and protective systems that can be used in potentially explosive atmospheres (flammable gases, vapours and dusts), even under extreme conditions. The KX series is II1G Ex ia IIC T4, T5 and T6 certified and covers measurement ranges of ±1 bar at 0...1000bar, with operation from -40°C to +80°C. To guarantee maximum safety and reliability, the KX series is also SIL2 (Functional Safety) certified, and is therefore applicable in safety equipment that can be installed in potentially explosive atmospheres.

AUTOZERO & SPAN

The Autozero & Span function permits simple, and effective adjustment of the pressure transducer zero as well as full scale using a magnetic pen. Simply place the pen on the contact point identified by the symbol for a few seconds and the operation is complete, with no need to open or disassemble the transducer. The Digital Autozero & Span function is optional.

GEFRAN
BEYOND TECHNOLOGY

PRESSURE TRANSDUCERS

MAIN TECHNICAL CHARACTERISTICS





MODEL	KS	KH	KHC	KM	KMC
MEASUREMENT RANGES	0...1 a 0...1000 bar (0...15 a 0...15000 psi)	0...4 to 0...1000 bar (0...60 to 0...15000 psi)	0...4 to 0...1000 bar (0...60 to 0...15000 psi)	0...4 to 0...1000 bar (0...60 to 0...15000 psi)	0...4 to 0...1000 bar (0...60 to 0...15000 psi)
ACCURACY	<± 0,5% FS	< ± 0.5% FS	<± 0.5% FS	<± 0.5% FS	<± 0,5% FS
NON-LINEARITY	+- 0,15% FS (typical)	+- 0,15% FS (typical)	+- 0,15% FS (typical)	+- 0,15% FS (typical)	+- 0,15% FS (typical)
OVERPRESSURE	2x	2x	2x	2x	2x
BURST STRENGTH	4x	4x	4x	4x (>=400bar : 1500bar)	4x (>=400bar : 1500bar)
SAMPLING TIME	< 1 msec.	< 1 msec	< 1 msec	< 1 msec	< 1 msec.
MEASURING PRINCIPLE PROPERTIES	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane
OPERATING TEMPERATURE (PROCESS) RANGE	-40...+125°C (-40...+257°F)	-40...+125°C (-40...+257°F)	-40...+125°C (-40...+257°F)	-40...+125°C (-40...+257°F)	-40...+125°C (-40...+257°F)
COMPENSATED TEMPERATURE RANGE	-20...+85°C (-4...+185°F)	-20...+85°C (-4...+185°F)	-20 ... +85°C (-4...185°F)	-20 ... +85°C (-4...185°F)	-20...+85°C (-4...+185°F)
ZERO DRIFT IN COMPENSATED FIELD	± 0,01% FS/°C typical (± 0,02% FS/°C max.)	± 0.01% FS/°C typical (± 0.02% FS/°C max.)	± 0.01%FS/°C typical (± 0.02% FS/°C max.)	± 0.01%FS/°C typical (± 0.02% FS/°C max.)	± 0.01%FS/°C typical (± 0.02% FS/°C max.)
TRANSDUCER BODY CONSTRUCTION MATERIAL	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
PARTS IN CONTACT WITH THE PROCESS	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel
ELECTRICAL CONNECTIONS	4-pin microDIN connector (P8) (C) 4-pin M12x1 connector (Z) 4-pin DIN connector (P18) (E) 2/3 pole shielded cable (1m) (F)	4-pin M12x1 connector (Z) 3-pin connector - EN 175301-803 (E) 3 pole shielded cable (1m) (F) 4-pin Deutsch DT04 connector (G) 3-pin AMP Superseal 1.5 connector (S) 3-pin Metri-Pack 150 connector (K) 3-pin Deutsch DT04 connector (D)	5-pin M12x1 connector (A)	4-pin M12x1 connector (Z) 4-pin Deutsch DT04 connector (G) 3-pin Deutsch DT04 connector (D)	5-pin M12x1 connector (A)
OUTPUT SIGNAL	Analogue 0.1...5.1 Vdc 0.1...10.1 Vdc 4...20 mA 0...5 Vdc* 0...10 Vdc* 1...5 Vdc 1...6 Vdc * SIL2 certification not available	Analogue 0...10 Vdc* (3 wires) 4...20mA (2 wires) 0.5...4.5 V ratiometric * SIL2 certification not available	Digital CANopen CAN SAE J1939	Analogue 0,5...4,5 Vdc (3 wires) (4) 0...10 Vdc* (3 wires) (N) 4...20mA (2 wires) (E) 1...5 Vdc (P) * SIL2 certification not available	Digital CANopen CAN SAE J1939 CANopen Safety
MEASUREMENT RANGES	bar: B01U B1V6 B02U B2V5 B04U B06U B01D B16U B02D B25U — 1* 1,6* 2* 2,5* 4 6 10 16 20 25 bar: B04D B06D B01C B16D B02C B25D B04C B06C B01M — 40 60 100 160 200 250 400 600 1000 * SIL and UL certification not available	bar: B04U B06U B01D B16U B02D B25U B04D — 4 6 10 16 20 25 40 bar: B06D B01C B16D B02C B25D B04C B06C B01M — 60 100 160 200 250 400 600 1000	bar: B04U B06U B01D B16U B02D B25U B04D B06D — 4 6 10 16 20 25 40 60 bar: B01C B16D B02C B25D B04C B06C B01M — 100 160 200 250 400 600 1000	bar: B04U B06U B01D B16U B02D B25U B04D — 4 6 10 16 20 25 40 bar: B04D B06D B01C B16D B02C B25D B04C B06C B01M — 40 60 100 160 200 250 400 600 1000	bar: B04U B06U B01D B16U B02D B25U — 4 6 10 16 20 25 bar: B04D B06D B01C B16D B02C B25D B04C B06C B01M — 40 60 100 160 200 250 400 600 1000
PROTECTION CLASS (IEC 529) (WITH FEMALE CONNECTOR MOUNTED)	IP65/IP67	IP65/IP67	IP67/IP69K	IP65/IP67	IP65/IP67
PROCESS CONNECTIONS	G 1/4 gas male (DIN 3852-E) (E) G 1/2 gas male (DIN 3852-E) (3)	G 1/4 gas male (DIN 3852-E) (E) 1/4-18 NPT male (7)	G1/4 gas male (DIN 3852-E) (E) 1/4-18 NPT male (7)	G 1/4 ISO 1179-2 (E1) 9/16 UNF SAE J1926-2 (W3) R 1/4 ISO 7/1 (H4)	G 1/4 ISO 1179-2 (E1) 9/16 UNF SAE J1926-2 (W3) R 1/4 ISO 7/1 (H4)
MAIN APPLICATIONS	- Industrial automation - Compressors - Hydraulic power units - Plastic injection presses - Hydraulic presses - Hydraulic systems - Pumps	- Agricultural vehicles - Railways - Municipalities - Mining - Construction - Mobile hydraulics	- Agricultural vehicles - Municipalities - Mining - Construction - Mobile hydraulics	- Industrial automation - Compressors - Hydraulic power units - Plastic injection presses - Hydraulic presses - Boats/Yachts - Hydraulic systems - Pumps	- Industrial automation - Compressors - Hydraulic power units - Plastic injection presses - Hydraulic presses - Boats/Yachts - Hydraulic systems - Pumps




MODEL	KS-I	KX	TK	TKDA
MEASUREMENT RANGES	0...4 to 0...1000 bar (0...60 to 0...15000 psi)	-1...1 a 0...1000 bar (-15...15 a 0...15000 psi)	0....1000bar 0....15000psi	0....1000bar 0....15000psi
ACCURACY	<± 0,5% FS	+- 0,15% FS (typical)	H ± 0,25% FS (typical) M ± 0,5% FS (typical)	H ± 0,25% FS (typical) M ± 0,5% FS (typical)
NON-LINEARITY	+- 0,15% FS (typical)			
OVERPRESSURE	2x	2x	2x	2x
BURST STRENGTH	4x	4x	4x	4x
SAMPLING TIME	< 1 msec.	< 1 msec	< 1 msec	< 1 msec
MEASURING PRINCIPLE PROPERTIES	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane	Thick film of sensitive element deposited on steel membrane
OPERATING TEMPERATURE (PROCESS) RANGE	-40...+125°C (-40...+257°F)	-40...+125°C (-40...+257°F)	-40...+105°C (-40...+221°F)	-40...+105°C (-40...+221°F)
COMPENSATED TEMPERATURE RANGE	-20...+85°C (-4...+185°F)	-20...+85°C (-4...+185°F)	-10...+85°C (+14...+185°F)	-10...+85°C (+14...+185°F)
ZERO DRIFT IN COMPENSATED FIELD	± 0,01% FS/°C typical (± 0,02% FS/°C max.)	± 0,01% FS/°C	± 0,012% FS/°C (typical)	± 0,012% FS/°C (typical)
TRANSDUCER BODY CONSTRUCTION MATERIAL	Stainless steel	Steel	Stainless steel	Stainless steel
PARTS IN CONTACT WITH THE PROCESS	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel	Fluids compatible with AISI 430F and 17-4 PH stainless steel
ELECTRICAL CONNECTIONS	5-pin M12x1 connector (A)	7-pin M16x0.75 connector (P) 6-pin connector (V) 2 pole 2x0.25 shielded cable (1m) (F) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M) 4-pin M12x1 connector (Z	7-pin connector (P) 6-pin connector (V) 2x0.25 shielded cable (2m) (F) 4-pin 4x0.25 shielded cable (2m) (F) 4-pin M12x1 connector (Z) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)	7-pin connector (P) 6-pin connector (V) 2x0.25 shielded cable (2m) (F) 4-pin 4x0.25 shielded cable (2m) (F) 4-pin M12x1 connector (Z) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)
OUTPUT SIGNAL	Digital IO-Link Version 1.1 COM3 (230.4 kbaud)	Analogue 4-20 mA	Analogue 4...20mA (two wires) 0,1...5,1Vdc 0,1...10,1Vdc 0...5Vdc 0...10Vdc 1...5Vdc 1...10Vdc	Analogue 4...20mA (two wires) 0,1...5,1Vdc 0,1...10,1Vdc 0...5Vdc 0...10Vdc 1...5Vdc 1...10Vdc
MEASUREMENT RANGES	bar: B04U B06U B01D B16U B02D B25U: 4 6 10 16 20 25 bar: B04D B06D B01C B16D B02C B25D B04C B06C B01M: 40 60 100 160 200 250 400 600 1000	bar: N01U N1V6 N02U N2V5 N04U N06U N01D B02U B2V5 B04U B06U B01D: -1...+1 -1...+1,6 -1...+2 -1...+2,5 -1...+4 -1...+6 -1...+10 2 2,5 4 6 10 bar: B16U B02D B25U B04D B06D B01C B16D B02C B25D B04C B06C B01M: 16 20 25 40 60 100 160 200 250 400 600 1000	bar: N01U N02U N03U N05U N01D B03U B04U B05U B06U B07U B01D B16U B02D B25U: -1..+1 * -1..+2 * -1..+3 * -1..+5 -1..+10 0..3 0..4 0..5 0..6 0..7 0..10 0..16 0..20 0..25 bar: B03D B04D B05D B06D B01C B16D B02C B25D B35D B04C B05C B06C B07C B01M: 0..30 0..40 0..50 0..60 0..100 0..160 0..200 0..250 0..350 0..400 0..500 600 700 1000 *Class M only	bar: N01U N02U N03U N05U N01D B03U B04U B05U B06U B07U B01D B16U B02D: -1..+1 * -1..+2 * -1..+3 * -1..+5 -1..+10 0..3 0..4 0..5 0..6 0..7 0..10 0..16 0..20 bar: B25U B03D B04D B05D B06D B01C B16D B02C B25D B35D B04C B05C B01M: 0..25 0..30 0..40 0..50 0..60 0..100 0..160 0..200 0..250 0..350 0..400 0..500 0...1000
PROTECTION CLASS (IEC 529) (WITH FEMALE CONNECTOR MOUNTED)	IP65/IP67	IP65/IP67	IP65/IP66/IP67	IP65/IP67
PROCESS CONNECTIONS	G 1/4 gas male (DIN 3852-E) (E) G 1/2 gas male (DIN 3852-E) (3)	G1/4 gas male (DIN 3852-E) (E) 1/4-18 NPT male (7)	G 1/4 gas male (DIN 3852-E) (E) G 1/2 gas male (DIN 3852-E) (3) 1/4"-18 NPT male (7) 1/2"-14 NPT male (J)	G 1/4 gas male (DIN 3852-E) (E) 1/4-18 NPT male (7) 1/2"-14 NPT male (J) G 1/2 gas male (DIN 3852-E) (3)
MAIN APPLICATIONS	- Industrial automation - Compressors - Hydraulic power units - Plastic injection presses - Hydraulic presses - Hydraulic systems - Pumps	- Compressors - Distributors - Methane gas	- Hydraulic power units - Test benches - Plastic injection presses - Die-casting injection presses on request	- Hydraulic power units - Test benches - Plastic injection presses - Die-casting injection presses
	IO-Link	ANALOGUE SIL2 Ex EAC Ex	ANALOGUE	ANALOGUE AUTOZERO

GEFRAN
BEYOND TECHNOLOGY

PRESSURE TRANSDUCERS

MAIN TECHNICAL CHARACTERISTICS



MODEL	TSA	TPS	TPSA
MEASUREMENT RANGES	0…0,05 a 0…60bar (0…1 a 0…1000psi) Absolute ranges >= 1 bar / 15psi	0…10 bar a 0…1000 bar (0…150psi a 0…15000psi)	0…4 bar a 0…1000 bar (0….60psi a 0…15000psi)
ACCURACY	± 0.15% FS (typical) (±0.5% FS for absolute ranges)	± 0,15% FS (typical) >200bar/3000psi ± 0,25% FS (typical) ≤200bar/3000psi	± 0,1% FS (typical) ≥ 100bar/1500psi ± 0,15% FS (typical) < 100bar/1500psi
OVERPRESSURE	4x…2x	2x	3x…2x
BURST STRENGTH	6x…3x	4x…2,5x	5x…2,5x
RESPONSE TIME	< 4 msec	<0,1 msec.	< 1 msec.
MEASURING PRINCIPLE PROPERTIES	Silicon piezoresistive	Extensimeter	Thick film of sensitive element deposited on steel membrane
OPERATING TEMPERATURE (PROCESS) RANGE	-20…+85°C (-4…+185°F)	-40…+120°C (-40…+248°F)	-40…+105°C (-40…+221°F)
COMPENSATED TEMPERATURE RANGE	-10…+85°C (+14…+185°F)	-20…+85°C (-4…+185°F)	-10…+85°C (14…+185°F)
ZERO DRIFT IN COMPENSATED FIELD	± 0.01% FS/°C (typical) (± 0.02% FS/°C max) ranges >1 bar ± 0.04%FS/°C (typical) ranges ≤ 1 bar	± 0.01% FS/°C (typical) (± 0.02% FS/°C max.)	± 0.008% FS/°C (typical) (± 0.015% FS/°C max.)
TRANSDUCER BODY CONSTRUCTION MATERIAL	AISI 304 stainless steel	AISI 304 stainless steel	AISI 304 stainless steel
PARTS IN CONTACT WITH THE PROCESS	AISI 316L stainless steel	17-4PH stainless steel	17-4PH stainless steel
ELECTRICAL CONNECTIONS	4-pin M12x1 connector (Z) EN 175301-801 type A connector (E) EN 175301-801 type C connector (M) 2/3 pole shielded cable (F)	7-pin connector (P) 6-pin connector (V) 6-pin x0.25 shielded cable (1m) (F) 4-pin M12x1 connector (Z) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)	4-pin solenoid valve connector (E) 2/4-pin x0.25 shielded cable (2m) (F) 4-pin M12x1 connector (Z) 4-pin micro solenoid valve connector (M) 7-pin connector (P) 6-pin connector (V)
OUTPUT SIGNAL	Analogue 4 .. 20 mA 0 .. 10 Vdc 0,1 .. 10,1 Vdc 0 .. 5 Vdc	Ratiometric mV/V	Analogue **Standard** 0.1 ... 10.1 Vdc - 4 ... 20 mA 0...10 Vdc **On request** 0.1 ... 5.1 Vdc - 0 ... 5 Vdc 1 ... 5 Vdc - 1 ... 10 Vdc 1 ... 6 Vdc
MEASUREMENT RANGES	bar: BV05* 0...0.05, BV10* 0...0.1, BV25* 0...0.25, BV50* 0...0.5, B01U 0...1, B1V2 0.8...1.2, B02U 0...2, B2V5 0...2.5, B04U 0...4, B05U 0...5; B06U 0...6, B07U 0...7, B01D 0...10, B16U 0...16, B02D 0...20, B25U 0...25, B03D 0...30, B04D 0...40, B05D 0...50, B06D 0...60 *related fields only	bar: B01D 0..10, B16U 0..16, B02D 0..20, B25U 0..25, B03D 0..30, B35U 0..35, B04D 0..40, B05D 0..50, B06D 0..60; B01C 0..100, B16D 0..160, B02C 0..200, B25D 0..250, B35D 0..350, B04C 0..400, B05C 0..500, B06C 0..600, B07C 0..700, B01M 0..1000	bar: B04U 0..4, B05U 0..5, B06U 0..6, B07U 0..7, B01D 0..10, B16U 0..16, B02D 0..20, B25U 0..25, B03D 0..30, B04D 0..40; B05D 0..50, B01C 0..100, B16D 0..160, B02C 0..200, B25D 0..250, B35D 0..350, B04C 0..400, B05C 0..500, B06C 0..600, B07C 0..700, B01M 0..1000
PROTECTION CLASS (IEC 529) (WITH FEMALE CONNECTOR MOUNTED)	IP65/IP67	IP65/IP66/IP67	IP65/IP66/IP67
PROCESS CONNECTIONS	G 1/4 gas male (DIN 3852-E) (E) G 1/2A (DIN 16288) (3)	**Standard** G 1/4 gas male (1) **On request** 7/16-20 UNF-2A male (SAE 4 for AS4395-E) (2) G 1/2A (DIN 16288) (3) G 1/4 gas female (4)	**Standard** G 1/4 gas male (1) **On request** 7/16-20 UNF-2A maschio (SAE 4 per AS4395-E) (2) G 1/2A (DIN 16288) (3) G 1/4 gas female (4)
MAIN APPLICATIONS	- Food industri - Packaging - Air filters	- Test benches - Material testing machines	- Test benches
	ANALOGUE		ANALOGUE

MODEL	TPSADA	TPH	TPHADA
MEASUREMENT RANGES	0...4 bar a 0...1000 bar (0....60psi a 0...15000psi)	0...1000 a 0...5000 bar (0…15000 a 0…75000 psi)	0...1000 a 0...5000 bar (0…15000 a 0…75000 psi)
ACCURACY	± 0,1% FS (typical) ± 0,15% FS (typical)	± 0,1% FS (typical) ± 0,15% FS (typical)	± 0,1% FS (typical)
OVERPRESSURE	3x…2x	2 x Fondo Scala (max 6000 bar)	2 x Fondo Scala (max 6000 bar)
BURST STRENGTH	5x…2,5x	3 x Fondo Scala (max 7500 bar)	3 x Fondo Scala (max 7500 bar)
RESPONSE TIME	< 1 msec.	<0,1 msec.	< 1 msec.
MEASURING PRINCIPLE PROPERTIES	Thick film of sensitive element deposited on steel membrane	Strain gauge extensometer on steel	Strain gauge extensometer on steel
OPERATING TEMPERATURE (PROCESS) RANGE	-40...+105°C (-40...+221°F)	-30...+120°C (-22...+248°F)	-30...+120°C (-22...+248°F)
COMPENSATED TEMPERATURE RANGE	-10...+85°C (14...+185°F)	-10...+85°C (14...+185°F)	-10...+85°C (14...+185°F)
ZERO DRIFT IN COMPENSATED FIELD	± 0,008% FSO/°C typical (± 0,015% FSO/°C max.)	± 0,008% FSO/°C typical (± 0,015% FSO/°C max.)	±0,01% FSO/°C typical (±0,020% FSO/°C max.)
TRANSDUCER BODY CONSTRUCTION MATERIAL	AISI 304 stainless steel	AISI 304 stainless steel	AISI 304 stainless steel
PARTS IN CONTACT WITH THE PROCESS	17-4PH stainless steel	15-5PH stainless steel / 17-4PH stainless steel	15-5PH stainless steel / 17-4PH stainless steel
ELECTRICAL CONNECTIONS	4-pin solenoid valve connector (E) 2/4-pin x0.25 shielded cable (2m) (F) 4-pin M12x1 connector (Z) 4-pin micro solenoid valve connector (M) 7-pin connector (P) 6-pin connector (V)	6-pin connector (V) 7-pin connector (P) 4-pin M12x1 connector (Z) 4/6-pin x0.25 shielded cable (1m) (F) 4-pin Type A DIN connector (E) MicroDin 4-pin Type C-ind D 9.4 mm connector (M)	6-pin connector (V) 7-pin connector (P) 4-pin M12x1 connector (Z) 4/6-pin x0.25 shielded cable (1m) (F) 4-pin Type A DIN connector (E) MicroDin 4-pin Type C-ind D 9.4 mm connector (M)
OUTPUT SIGNAL	Analogue	Ratiometric	Analogue
	Standard 0.1 ... 10.1 Vdc - 4 ... 20 mA 0...10 Vdc **On request** 0.1 ... 5.1 Vdc - 0 ... 5 Vdc 1 ... 5 Vdc - 1 ... 10 Vdc 1 ... 6 Vdc	mV/V	**Standard** 4.20 mA - 0.10 Vdc **On request** 0.1...5.1 Vdc - 0...5 Vdc 1...5 Vdc - 1...10 Vdc 1...6 Vdc 0.1...10.1 Vdc
MEASUREMENT RANGES	bar: B04U 0..4, B05U 0..5, B06U 0..6, B07U 0..7, B01D 0..10, B16U 0..16, B02D 0..20, B25U 0..25, B03D 0..30, B04D 0..40 bar: B05D 0..50, B01C 0..100, B16D 0..160, B02C 0..200, B25D 0..250, B35D 0..350, B04C 0..400, B05C 0..500, B06C 0..600, B07C 0..700, B01M 0..1000	bar: B01M 0..1000, B15C 0..1500, B02M 0..2000, B35C 0..3500, B04M 0..4000, B05M 0..5000	bar: B01M 0..1000, B15C 0..1500, B02M 0..2000, B35C 0..3500, B04M 0..4000, B05M 0..5000
PROTECTION CLASS (IEC 529) (WITH FEMALE CONNECTOR MOUNTED)	IP65/IP66/IP67	IP65/IP66/IP67	IP65/IP66/IP67
PROCESS CONNECTIONS	**Standard** G 1/4 gas male (1) **On request** 7/16-20 UNF-2A male (SAE 4 for AS4395-E) (2) G 1/2A (DIN 16288) (3) G 1/4 gas female (4)	F-250-C (9/16-18UNF female) (D) M16 x 1.5 female (E)	F-250-C (9/16-18UNF female) (D) M16 x 1.5 female (E)
MAIN APPLICATIONS	- Production test benches	- Waterjet - High pressure pumps - High pressure test benches	- Waterjet - High pressure pumps - High pressure test benches
	ANALOGUE AUTOZERO		ANALOGUE AUTOZERO

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PRESSURE TRANSDUCERS

MAIN TECHNICAL CHARACTERISTICS

MODEL	TPF	TPFADA	TPFAS
MEASUREMENT RANGES	0...10 a 0...1000bar (0...150 a 0...15000psi)	0...10 a 0...1000bar (0...150 a 0...15000psi)	0...25 a 0...600 bar (0...375 a 0...9000 psi)
ACCURACY	H ± 0,2% FS (typical) M ± 0,5% FS (typical)	H ± 0,2% FS (typical) M ± 0,5% FS (typical)	±0.5% FS
OVERPRESSURE	3 x Full scale (max 2000 bar)	3 x Full scale (max 2000 bar)	3 x Full scale
BURST STRENGTH	4 x Full scale (max 2000 bar)	4 x Full scale (max 2000 bar)	4 x Full scale (max 2000 bar)
RESPONSE TIME	<0,1 msec.	< 1 msec.	< 1 msec.
MEASURING PRINCIPLE PROPERTIES	Strain gauge extensometer on steel	Strain gauge extensometer on steel	Strain gauge extensometer on steel
OPERATING TEMPERATURE (PROCESS) RANGE	-40...+120°C (-40...+248°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)
ZERO DRIFT IN COMPENSATED FIELD	± 0,01% FS/°C (typical) ± 0,02% FS/°C (typical)	± 0,01% FS/°C (typical)	± 0,01% FS/°C (typical)
TRANSDUCER BODY CONSTRUCTION MATERIAL	AISI 304 stainless steel	AISI 304 stainless steel	AISI 305 stainless steel
PARTS IN CONTACT WITH THE PROCESS	17-4PH stainless steel	17-4PH stainless steel	17-4PH stainless steel
ELECTRICAL CONNECTIONS	6-pin connector (V) 7-pin connector (P) 4-pin M12x1 connector (Z) 6-pin x0.25 shielded cable (1m) (F) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)	6-pin connector (V) 7-pin connector (P) 4-pin M12x1 connector (Z) 4/6-pin x0.25 shielded cable (1m) (F) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)	6-pin connector (V) 7-pin connector (P) 4-pin M12x1 connector (Z) 4/6-pin x0.25 shielded cable (1m) (F) 4-pin solenoid valve connector (E) 4-pin micro-solenoid valve connector (M)
OUTPUT SIGNAL	Ratiometric	Analogue	Analogue
	mV/V	**Standard** 4...20 mA 0...10 Vdc 0.1...5.1 Vdc **On request** 0...5 Vdc - 1...5 Vdc 1...10 Vdc - 1...6 Vdc 0.1...10.1 Vdc	4...20 mA - 0...10 Vdc 0,1...5,1 Vdc - 0...5 Vdc 1...5 Vdc - 1...10 Vdc 1...6 Vdc - 0,1...10,1 Vdc
MEASUREMENT RANGES	bar: B01D B16U B02D B25U B03D B35U B04D B05D B06D B01C — 0...10 0...16 0...20 0...25 0...30 0...35 0...40 0...50 0...60 0...100	bar: B16D B02C B25D B35D B04C B05C B06C B07C B01M — 0...160 0...200 0...250 0...350 0...400 0...500 0...600 0...700 0...1000	bar: B01D B16U B02D B25U B03D B35U B04D B05D B06D — 0...10 0...16 0...20 0...25 0...30 0...35 0...40 0...50 0...60	bar: B01C B16D B02C B25D B35D B04C B05C B06C B07C B01M — 0...100 0...160 0...200 0...250 0...350 0...400 0...500 0...600 0...700 0...1000	bar: B25U B03D B35U B04D B05D B06D B01C — 0...25 0...30 0...35 0...40 0...50 0...60 0...100	bar: B16D B02C B25D B35D B04C B05C B06C — 0...160 0...200 0...250 0...350 0...400 0...500 0...600
PROTECTION CLASS (IEC 529) (WITH FEMALE CONNECTOR MOUNTED)	IP65/IP66/IP67	IP65/IP66/IP67	IP65/IP66/IP67
PROCESS CONNECTIONS	**Standard** M18x1,5 (G) - 1/2" G male (M) **On request** 3/4-16 UNF (L)	**Standard** M18x1,5 (G) - 1/2" G male (M) **On request** 3/4-16 UNF (L)	G ¼ B front seal (Y) G ¼ E (E) M10x1 E (T)
MAIN APPLICATIONS	- Mixing dosing pumps - Food industry	- Rubber processing - Mixing dosing pumps - Concrete pumps	- Mixing dosing pumps - Concrete pumps
	ANALOGUE	ANALOGUE, c UL us LISTED, AUTOZERO	ANALOGUE, AUTOZERO

PROCESS CONNECTIONS

	KS	KS-I	KX	KH	KHC	KM	KMC	TK	TKDA *	TSA	TPS	TPSA	TPSADA *	TPH	TPHADA	TPF	TPFADA	TPFAS
G 1/4 GAS MALE (DIN 3852-E)	(E)	(E)	(E)	(E)	(E)	(E1)	(E)	(E)*	(E)*	(E)	(E)*	(E)*	(E)*					(E)
G 1/4 GAS MALE (DIN 3852-A)								(1)	(1)	(1)	(1)	(1)	(1)					
7/16-20 UNF-2A MALE (SAE 4 PER AS4395-E)								(2)	(2)		(2)*	(2)*	(2)*					
G 1/2A (DIN 16288)	(3)	(3)	(3)					(3)	(3)	(3)	(3)*	(3)*	(3)*					
G 1/4 GAS FEMALE								(4)*	(4)*		(4)*	(4)*	(4)*					
G 1/8 ISO 1179-2						(X1)												
1/8-27 NPT FEMALE								(5)*	(5)*		(5)*	(5)*	(5)*					
1/4 - 18 NPT FEMALE								(6)*	(6)*		(6)*	(6)*	(6)*					
1/4 - 18 NPT MALE			(7)	(7)	(7)	(74)	(7)	(7)*	(7)*		(7)*	(7)*	(7)*					
1/2 -14 NPT MALE			(J)															
M14 X 1,5 ISO 9974-2						(81)												
M14 X 1,5 MALE						(83)		(8)*	(8)*		(8)(*)	(8)(*)	(8)(*)					
1/8 - 27 NPT MALE						(94)		(9)*	(9)*		(9)(*)	(9)(*)	(9)(*)					
M12 X 1,5 ISO9974-2 MALE						(R1)												
M12 X 1,5 ISO 6149-2 MALE						(R3)		(R)	(R)		(R)*	(R)*	(R)*					
7/16-20 UNF-2A MALE (SAE 4 PER J1926-2)						(K3)		(K)* **	(K)* **		(K)* **	(K)* **	(K)* **					
7/16-20 UNF-2A FEMALE (SAE 4)								(F)*	(F)*		(F)*	(F)*	(F)*					
F-250-C (9/16-18UNF FEMALE)														(D)	(D)			
3/8 UNF SAE J1926-2						(03)												
9/16 UNF SAE J1926-2						(W3)												
M16 X 1.5 FEMALE														(E)	(E)			
G ¼ B FRONT SEAL																		(Y)
M18X1,5																(G)	(G)	
1/2" G MALE																(M)	(M)	
3/4-16 UNF																(L)*	(L)*	
R 1/4 ISO 7/1						(H4)												
M10 X 1 ISO 9974-2						(T1)												
M10 X 1 ISO6149-2						(T3)												(T)

* Process connection on request
** Max. working pressure: 630 bar (9137 psi)

In the PROCESS CONNECTIONS table, the letter or number between () is the option that identifies the type of mechanical installation connection of the pressure probe to the process port.

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CONNECTORS

CON069 4 PIN EV
IP67

CON006 4 PIN EV
IP65

CON031 5 PIN M12 (UL)
IP67

CON041 5 PIN M12 90° (UL)
IP67

CON035 8 PIN M12 (UL)
IP67

CON042 8 PIN M12 90°
IP67

CON117 8 PIN M12 90° (UL)
IP67

CON021 6 PIN M16
IP40

CON022 6 PIN M16
IP67

CON118 6 PIN M16 (UL)
IP67

CON023 6 PIN M16 90°
IP67

CON026 7/8 PIN M16
IP40

CON027 7/8 PIN M16
IP67

CON028 7/8 PIN M16 90°
IP67

CAV011 CAVO M12 5 PIN 2M.
IP67

CAV021 CAVO M12 5 PIN 90°
2M. **IP67**

CAV002 CAVO M12 8 PIN 2M.
IP67

CAV005 CAVO M12 8 PIN 90°
2M. **IP67**

CON380 5 PIN M12 M.
PROFIBUS IP67

CON390 5 PIN M12 F.
PROFIBUS IP67

PCAV700 CAVO M8 4 PIN
3M. **IP67**

PCAV702 CAVO M8 F. 5 PIN
3M. **IP67**

PCAV703 CAVO M8 M. 5 PIN
3M. **IP67**

CONNECTORS

			KS	KS-I	KX	KH	KHC	KM	KMC	TK	TKOA	TSA	TPS	TPSA	TPSADA	TPH	TPHADA	TPF	TPFADA	TPFAS
CON006	3 POLE + EARTH FEMALE CONNECTOR (EN 175301-803A); CULUS -40..+65°C	IP65			X					X	X	X	X	X	X	X	X	X	X	X
CON008	FEM. FEMALE 3 POLE + EARTH CONNECTOR (EN 175301- 803C); P9.4	IP65			X					X	X		X	X	X	X	X	X	X	X
CON031	M12 5-POLE FEMALE CONNECTOR;	IP67		X			X		X											
CON041	M12 5-POLE FEMALE CONNECTOR; 90°	IP67		X			X		X											
CON045	FEM. CONN. 3-POLE + EARTH FEMALE CONN. (EN 175301-803A);H=28; CULUS -40..+65°C	IP65	X																X	
CON047	FEMALE 3 POLE + EARTH CONNECTOR (EN 175301- 803C); P8	IP65	X									X								
CON050	4-POLE 90° M12X1 FEMALE CONNECTOR	IP67	X										X			X	X	X	X	X
CON064	3-POLE + EARTH FEMALE CONNECTOR (EN 175301-803A); CULUS -40..+65°C (KH/KS SERIES)	IP65	X			X		X												
CON087	4-POLE M12X1 FEMALE CONNECTOR; CULUS -25...+90°C	IP67	X																X	
CON088	4-POLE, 90°, M12X1 FEMALE CONNECTOR; CULUS -25...+90°C	IP67	X																X	
CON110	7-POLE 90° M16 FEMALE CONNECTOR; CULUS -40...+100°C	IP40																	X	
CON111	7-POLE M16 FEMALE CONNECTOR; CULUS -40...+100°C	IP67																	X	
CON112	7-POLE M16 FEMALE CONNECTOR; CULUS -40...+100°C	IP40																	X	
CON113	3 POLE +EARTH FEMALE CONNECTOR (EN 175301- 803A); CULUS -40..+90°C	IP65	X																X	
CON114	3-POLE + EARTH FEMALE CONNECTOR (EN 175301-803A);H=28; CULUS -40..+90°C	IP65	X																X	
CON115	3-POLE + EARTH FEMALE CONNECTOR (EN 175301- 803C); P9.4 IP65, CULUS -40..+90°C	IP65	X																X	
CON116	3-POLE + EARTH FEMALE CONNECTOR (EN 175301-EN 803C); P8, CULUS -40..+90°C	IP65	X																	
CON293	4-POLE M12X1 FEMALE CONNECTOR	IP67	X		X	X		X		X	X	X	X	X	X	X	X	X	X	X
CON300	6-POLE FEMALE CONNECTOR, BAYONET	IP66			X					X	X		X	X	X	X	X	X	X	X
CON320	7-POLE M16 FEMALE CONNECTOR	IP40			X								X			X	X	X	X	X
CON321	7-POLE M16 FEMALE CONNECTOR	IP67			X					X	X		X	X	X	X	X	X	X	X
CON322	7-POLE 90° M16 FEMALE CONNECTOR	IP40											X			X	X	X	X	X
CO2W	6-PIN FEMALE CONNECTOR (CON300) + 2M CABLE	IP65											X					X		
CO2WLS	6-POLE FEMALE CONNECTOR (CON300) + 2M CABLE (6X0.25)	IP66														X	X		X	X
CAV011	FEMALE CONNECTOR WITH 2 METRES OF CABLE	IP67					X		X											
CAV220	M12X1 FEMALE CONNECTOR WITH 2 METRES OF CABLE, VENTED (CULUS -30+80°C)	IP67	X		X	X	X	X	X			X							X	
CAV501	2 CONNECTORS (M/F) M12 5 PIN CABLE 2M.	IP67		X																
CAV502	2 CONNECTORS (M/F) M12 5 PIN CABLE 5M.	IP67		X																
CAV503	2 CONNECTORS (M/F) M12 5 PIN CABLE 10M.	IP67		X																

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ACCESSORIES

DISPLAY

The TDP-1001 plug-in display is a universal local display device suitable for use with all Gefran pressure transmitters with 4-20 mA output and an EN 175301-803 A solenoid valve type connector.

It requires no doesn't require power supply, plugs directly into the connector and provides a 4-digit digital local indication in a programmable engineering unit. It is also equipped with a PNP type open collector alarm threshold that can be set by the user for independent management of security systems, if present.

An intrinsically safe Atex certified version is also available for use in hazardous areas at risk of explosion, called TDP-2000.

ADAPTERS AND SEALS

A vast selection of native threaded connections is available for Gefran pressure transducers, from metric to gas, from NPT to UNF threads. A wide range of stainless steel adapters is also available, both male/male and male/female, with the corresponding seals, named PKITxxx, in order to meet all possible process connection requirements.

CONNECTORS AND EXTENSION CABLES

Gefran pressure transducers are available with various types of electrical connectors (EN 175301803, M12x1, etc.), and each of these may be supplied with the corresponding female solder cable (named CONxxx) or an extension cable already assembled with the female connector (named CAVxxx), up to 30 metres in length.

MATCHING PRODUCTS

CONTROLLERS

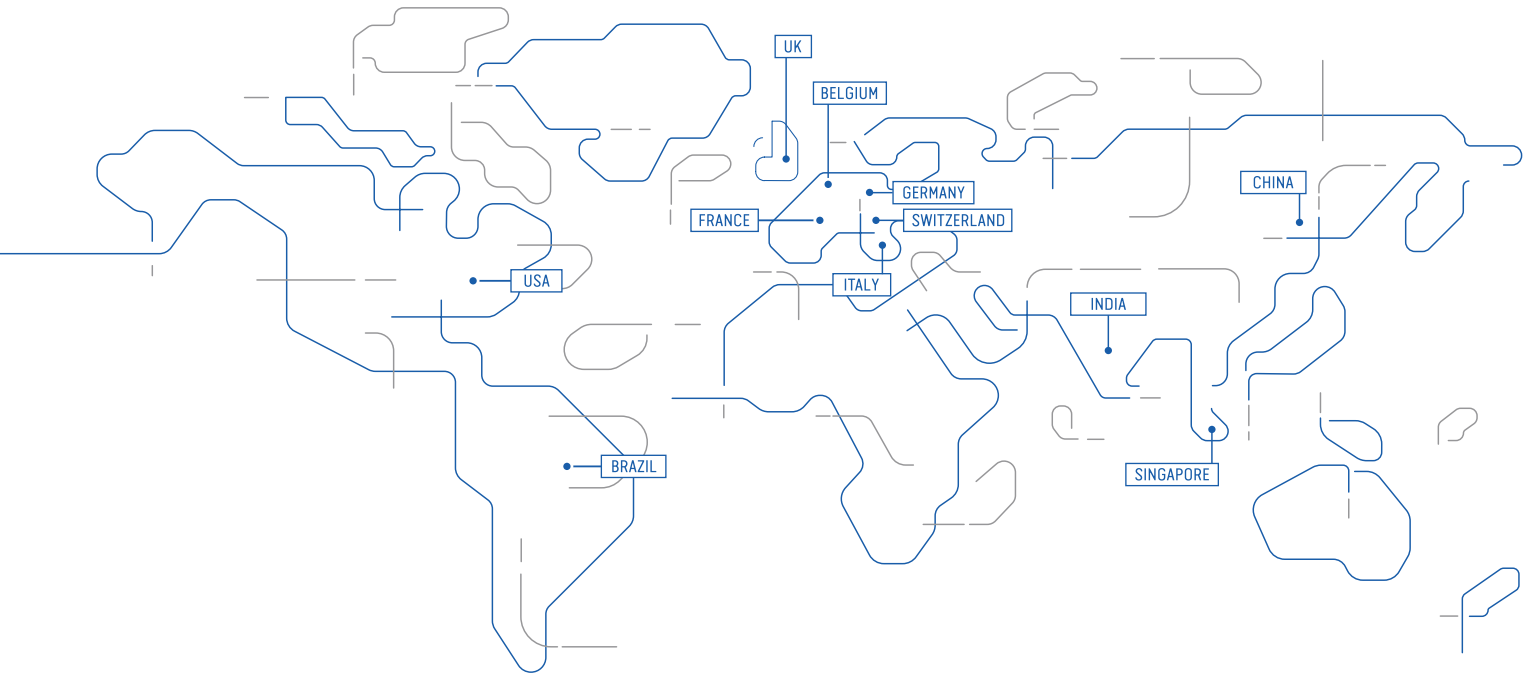
- universal inputs for amplified and non-amplified probes - very high acquisition speed
- high accuracy
- mathematical calculations, pressure delta
- 4 configurable outputs
- Modbus and Profibus communication

PRESSURE GAUGES

- universal inputs for amplified probes
- very high acquisition speed
- high accuracy
- mathematical calculations, pressure delta - 4 configurable outputs
- Modbus and Profibus communication
- input from non-amplified pressure probes - 4 configurable outputs
- Modbus communication
- input from amplified pressure probes
- 4 configurable outputs
- Modbus communication

COD. 81221IN

FM 608910



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