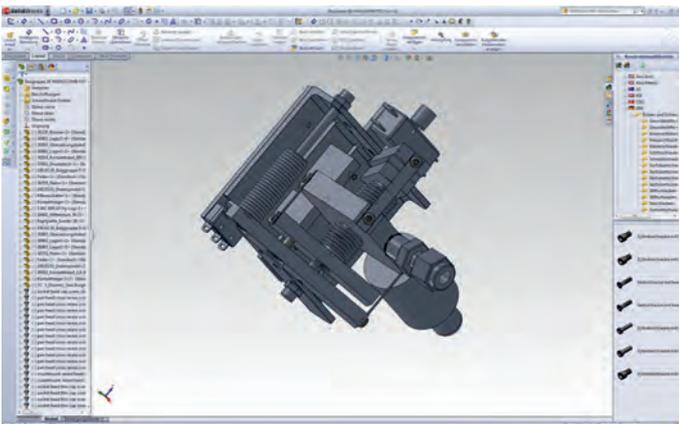


Company Profile

Product Range



About *PINTER*



Design and Development / Starting with an idea, the realization demands for a lot of aspects to be taken into consideration, such as safety related design in regard to the desired use of the product.

While designing and developing new products PINTER uses most modern resources such as FMEA, risk analysis and 3D-CAD.



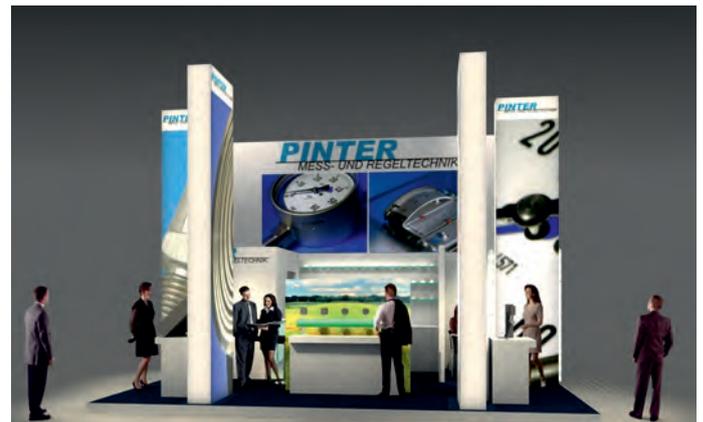
Production / As a full-operation company PINTER does not follow outsourcing strategies but tries to manufacture all necessary parts in-house, thus PINTER has an in-house manufacturing rate of approx. 90%. Most modern CNC machines, assembly and testing workplaces, internal toolroom and welding shop assure top quality and intime delivery.

PINTER / PINTER is a medium-sized family-run business with its headquarters in Obrigheim/ Germany, about 30 driving minutes from famous Heidelberg. Already started in 1950 (former Metz Mannheim GmbH) one is engaged in industrial pressure measurement. In further progress of the company's history the product portfolio is permanently broadened and the business units Engineering and Service have been created.



Quality Assurance / Permanent process monitoring ensures constant high quality. PINTER's quality management is certified according to DIN EN ISO 9001:2008.

Additionally many products have test type approvals according to e.g. VdTÜV Druck 100, Pressure Equipment Directive, Gas Appliances Directive, ATEX-Directive.



Sales and After Sales Support / Products for safety relevant processes need to be well-considered. PINTER's sales representatives and agencies support you choosing the right products regardless if you are reseller, distributor or end-user.

Also after your purchase PINTER is there to support you in any matter.

Industrial Instrumentation



Pressure Switches | Signal elements which are used for pressure measuring in pressure lines for gases, vapours, liquids or suspensions. The switch points are transformed into a binary electric or pneumatic output signal which is necessary for the control and regulation of processes, e.g. safety and alarm devices.



Pressure Gauges | Mechanical pressure indicators. The actual process pressure acts on a measuring element and deforms it. The deformation is converted into a 270° rotating motion by the attached movement. Due to the electricity-free function, pressure gauges even remain fully functional in most total damage occurrence.

INSTRUMENTS / PINTER develops and manufactures technically sophisticated pressure instruments renowned for their safe function. Used worldwide these pressure instruments perform in applications such as general engineering, plant engineering, chemical and petro-chemical industry, power plant engineering, medical engineering, food industry, defence technology and many more.

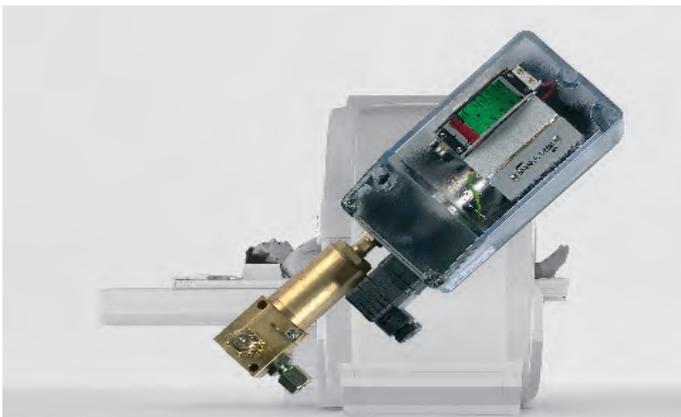


Pressure Transmitters | Electronic pressure instruments that transform process pressure into an electrical signal. The signal is proportional to the applied pressure and changes according to the pressure change. Output signals could be either voltage or current and are used for controlling processes or for archiving process data.



Diaphragm Seals | Mechanical process separating elements which are mounted on measuring instruments directly or via capillary; with diaphragm seals the measuring instrument is separated from the actual process to protect the instrument from hot, polluted, aggressive or chrysalizing media.

Engineering Excellence



Special Design Pressure Switch (TÜV) | This specially designed unit used on MRTs is able to switch 13 mbar on failing helium supply plus it withstands overpressure shocks up to 4 bar without any malfunctions. The integr. pressure transducer is used for signalling to a PLC and the integr. pressure gauge tells the service personell if the system is pressurized even when there is no power supply.

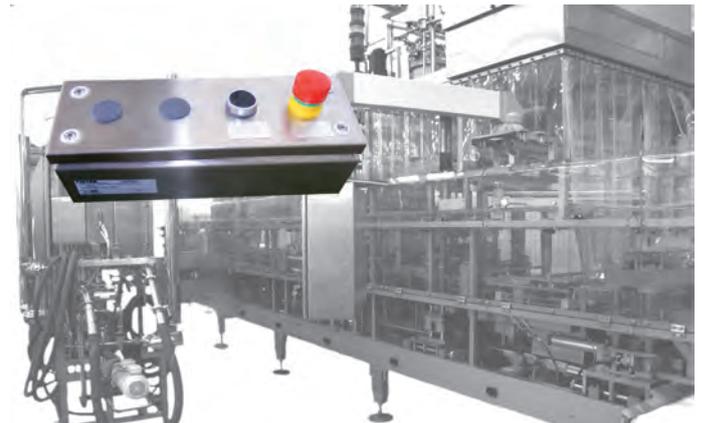


Safety Equipment for Natural Gas Extraction (ATEX, SIL) | To replace an expensive setup with several instruments and components PINTER was asked to developed a unique system to control gas extraction with regard to MAX and MIN pressure monitoring, supply air control, battery-powered GSM-alarm and many other functional and safety-related features .

ENGINEERING / PINTER develops and manufactures standardized or tailor-made systems and solutions. Amongst others electronic, hydraulic or pneumatic controllers, e.g. for controlling safety valves or emergency-stop systems for general engineering.



Pneumatic Controller for Safety Valves (TÜV, ATEX, SIL) | For more than 10 years PINTER manufactures pneumatic / electro-pneumatic controllers for a renown German manufacturer of safety valves. These types of safety valves are used in all kinds of power plants and process industries. With an installation base of several thousand controllers this truly is a success story.



Emergency Stop Module for General Engineering (ATEX, PL) | The ESM was developed and is being manufactured for a customer making high-pressure compressors. It provides an out-the-box solution for stopping the compressor from working in an emergency situation. Kept simple, the machine operator just has to hit one STOP-button for a controlled shutdown.

DEFINITION OF PRESSURE

A force applied uniformly over a certain area is called **pressure**:

$$p = F / A$$

(pressure = force / area)

Pressure (P) besides temperature is one of the most frequently measured physical units. The unit „Pascal“ (Pa) is the SI unit of pressure within the metric unit system. In Europe „bar“ is the most commonly used (SI) unit. It roughly equals with the magnitude of the atmospheric pressure.

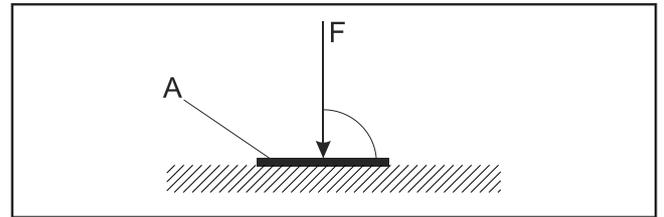
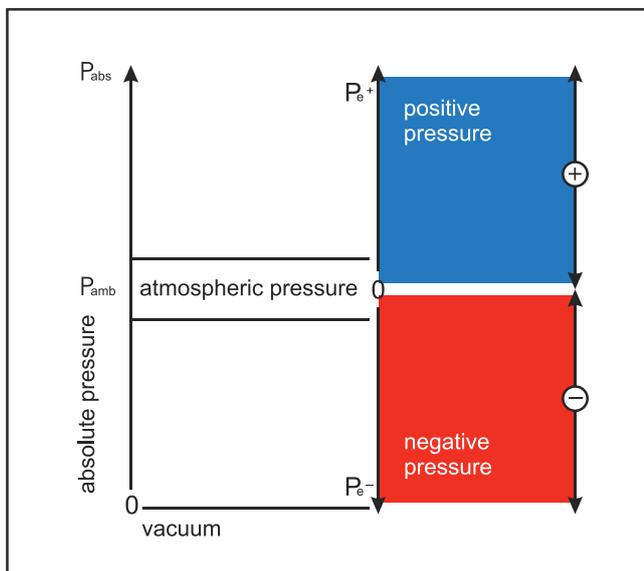
$$1 \text{ bar} = 0,1 \text{ MPa} = 0,1 \text{ N/m}^2 = 10^5 \text{ Pa}$$

Particularly in the anglo-american influenced region „psi“ (pounds per square inch) is the most common unit.

The general term „pressure“ is not always very clear:

In technical usage several types of pressure are differentiated, mainly differences between two pressure points, which in general linguistic usage all are called pressure.

To avoid confusion, the various types of pressure are distinguished according to their point of reference:



Absolute Pressure (Pabs)

Absolute pressure always refers to the absolute vacuum, i.e. the zero-point is the absolute vacuum.

A pressure gauge with measuring range 0 - 10 bar absolute shows the current ambient pressure (Pamb) when in nonoperating state/not installed.

Ambient Pressure (Pamb)

The atmospheric pressure is the ambient pressure.

Atmospheric Pressure Difference (Pe)

The atmospheric pressure difference, also called positive pressure (Pe+) respectively negative pressure (Pe-) is the most commonly measured type of pressure in the technical field.

It refers to atmospheric pressure (Pamb) and is the difference between the atmospheric pressure (Pamb) and absolute pressure (Pabs).

$$P_e = P_{abs} - P_{amb}$$

Pe becomes positive when the absolute pressure is higher than the atmospheric pressure; Pe becomes negative when the absolute pressure is lower than the atmospheric pressure.

A pressure gauge with measuring range 0 - 10 bar relative shows 0 bar when in nonoperating state/not installed.

Differential Pressure (DP)

Differential pressure is the pressure difference (ΔP) between two measured pressures (P1, P2).

$$\Delta P = P_1 - P_2$$

Differential pressure instruments are universal, as they can be used to as a relative pressure instrument or for **hydrostatic level measurement**.

CONVERSION TABLE FOR PRESSURE UNITS

		Standard International Units						Technical Units					
		mbar	bar	Pa	kPa	MPa	mm WC	m WC	kp/cm ²	atm	Torr	psi	
Standard International Units	mbar	•	0,001	100	0,1	0,0001	10,197	10,197 x 10 ⁻³	1,0197 x 10 ⁻³	0,98692 x 10 ⁻³	0,75006	14,504 x 10 ⁻³	
	bar	1.000	•	100.000	100	0,1	10,197 x 10 ³	10,197	1,0197	0,9869	750,06	14,504	
	Pa	0,01	0,00001	•	0,001	0,000001	0,10197	0,10197 x 10 ⁻³	0,10197 x 10 ⁻⁶	9,8692 x 10 ⁻⁶	7,5006 x 10 ⁻³	0,14504 x 10 ⁻³	
	kPa	10	0,01	1.000	•	0,001	0,10197 x 10 ³	0,10197	10,197 x 10 ⁻³	9,8692 x 10 ⁻³	7,5006	0,14504	
	MPa	10.000	10	1.000.000	1.000	•	0,10197 x 10 ⁶	0,10197 x 10 ³	10,197	9,8692	7,5006 x 10 ³	0,14504 x 10 ³	
Technical Units	mm WS	98,067 x 10 ⁻³	98,067 x 10 ⁻⁶	9,8067	9,8067 x 10 ⁻³	9,8067 x 10 ⁻⁶	•	10 ⁻³	10 ⁻⁴	96,784 x 10 ⁻⁶	73,556 x 10 ⁻³	1,4223 x 10 ⁻³	
	m WS	98,067	98,067 x 10 ³	9,8067 x 10 ³	9,8067	9,8067 x 10 ⁻³	10 ³	•	10 ⁻¹	96,784 x 10 ⁻³	73,556	1,4223	
	kp/cm ²	0,98067 x 10 ³	0,98067	98,067 x 10 ³	98,067	98,067 x 10 ⁻³	10 ⁴	10	•	0,96784	735,56	14,223	
	atm	1,0133 x 10 ³	1,0133	0,10133 x 10 ⁶	0,10133 x 10 ³	0,10133	10,332 x 10 ³	10,332	1,0332	•	760	14,693	
	Torr	1,3332	1,3332 x 10 ³	0,10133 x 10 ³	0,10133	0,13332 x 10 ⁻³	13,595	13,595 x 10 ⁻³	1,3595 x 10 ⁻³	1,3158 x 10 ⁻³	•	19,34 x 10 ⁻³	
	psi	68,948	68,948 x 10 ⁻³	6,8948 x 10 ³	6,8948	6,8948 x 10 ⁻³	0,70307 x 10 ³	0,70307	0,70307 x 10 ⁻³	0,70307 x 10 ⁻⁶	51,715	•	

MINICOMB® Pressure Switches



Pressure Switches are Signal elements which are used for pressure measuring in pressure lines for gases, vapours, liquids or suspensions.

The switch points are transformed into a binary electric or pneumatic output signal which is necessary for the control and regulation of processes, e.g. safety and alarm devices.

The MINICOMB® Series is a very compact-sized pressure switch for measuring compressed air, low-viscous media and non-aggressive gases.

Choose from various standard models:

Measuring Principle	
	<p>Mechanical force-balance measuring system with bellows sensor actuating one micro-switch, featuring:</p> <ul style="list-style-type: none"> • friction-free operation • low hysteresis • high repeatability • very good longterm stability • maintenance free • high lifecycle

Enclosure
anodized aluminium, IP65 (NEMA 4, 4x)

Pressure Ranges
0,2 - 16 bar / 3 - 230 psig
-0,9...0 bar / -13...0 psig
-0,9...+1 bar / -13...+14,5 psig

Wetted Parts
aluminium, brass, NBR

Switching Contact
standard multi-purpose micro switch

Process Connections
1/4" BSP female
1/4" NPT female
sub-base mounting
sub-base mounting CNOMO

Electrical Connections
4-pin plug according to ISO 4400
M12x1 connector

Approvals
PLc approval (ISO 13849)
ATEX approval (Zone 2 / 22)

INDUSWITCH® Pressure Switches



Pressure Switches are Signal elements which are used for pressure measuring in pressure lines for gases, vapours, liquids or suspensions.

The switch points are transformed into a binary electric or pneumatic output signal which is necessary for the control and regulation of processes, e.g. safety and alarm devices.

The INDUSWITCH® Series is a compact-sized multipurpose pressure switch.

Choose from a limited set of options:

Measuring Principle	
	<p>Mechanical force-balance measuring system with bellows sensor actuating one micro-switch, featuring:</p> <ul style="list-style-type: none"> • friction-free operation • low hysteresis • high repeatability • very good longterm stability • maintenance free • high lifecycle
Enclosure	
anodized aluminium, IP65 (NEMA 4, 4x)	
Pressure Ranges	
„bar“-ranges: 0 - 4 bar, 0 - 6 bar, 0 - 10 bar, 0 - 16 bar, 0 - 25 bar, 0 - 40 bar	
„psi“-ranges: 0 - 60 psig, 0 - 100 psig, 0 - 150 psig, 0 - 250 psig, 0 - 400 psig, 0 - 600 psig	
bar, mbar, kPa, MPa, psi, etc. ranges also available	
Wetted Parts	
brass or stainless steel	
Switching Contacts	
standard or gold-plated contacts	
contacts for high or low hysteresis	
contacts for high or low switch loads	

Process Connections
BSP threads (e.g. 1/2" BSP male)
NPT threads (e.g. 1/2" NPT male)
Flanges (EN or ASME standards available)
Chemical Seals
Electrical Connections
4-pin plug according to ISO 4400
M12x1 connector
cable
Optional Features
cleaned for oxygen service
customer specific design

MANOCOMB® Pressure Switches



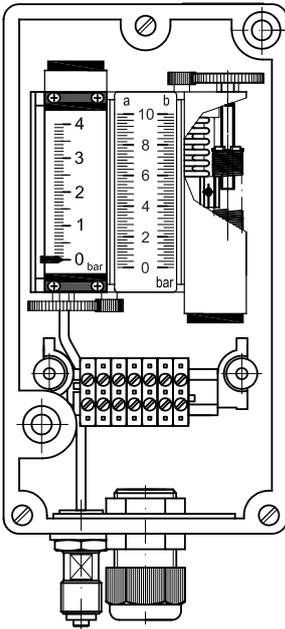
Pressure Switches are Signal elements which are used for pressure measuring in pressure lines for gases, vapours, liquids or suspensions.

The switch points are transformed into a binary electric or pneumatic output signal which is necessary for the control and regulation of processes, e.g. safety and alarm devices.

The MANOCOMB® Series is sophisticated, fully customizable process instrument for safety-critical, also heavy-duty applications with pressure, vacuum and differential pressure and optionally integrated pressure gauge and/or pressure transducer.

Choose from a full-blown set of products and options in order to have the best solution for your application:

Measuring Principle



Mechanical force-balance measuring system with bellows sensor actuating one or two switching contacts, featuring:

- friction-free operation
- very high repeatability
- extraordinary long-term stability
- pressure/dp ranges from 0 - 60 mbar up to 0 - 400 bar / 0 - 1 psig up to 0 - 5,800 psig (scales also available in all common measuring units)
- vacuum ranges from -1...0 bar up to -60...0 mbar / -15... 0 psig up to -1...0 psig (scales also available in all common measuring units)
- comfortable setpoint adjustment on calibrated scale
- maintenance free
- high lifecycle
- **optionally integrated pressure gauge and/or optionally integrated pressure transducer**

Switching Function	Description
1K	1x change-over contact
1KA	1x change-over contact, 1x integrated gauge
2K	2x change-over contact
2KA	2x change-over contact, 1x integrated gauge
2KP	2x change-over contact, separate measuring systems
2K2AP	2x change-over contact, separate measuring systems with 1x integrated gauge each
1KPDi	1x change-over contact, differential pressure
1K2APDi	1x change-over contact, differential pressure, 2x integrated gauge - 1x for + und - inlet

Enclosures
offshore suitable enhanced plastics with transparent cover, IP65 (NEMA 4, 4x)
aluminium enclosure, IP65 (NEMA 4, 4x)
EExd aluminium enclosure, IP66 (NEMA 4, 4x)

Pressure Ranges
„bar“ - Low Pressure Ranges 0 - 60 mbar; 0 - 100 mbar; 0 - 160 mbar; 0 - 250 mbar; 0 - 400 mbar; 0 - 600 mbar
„bar“ - Pressure Ranges 0 - 1 bar; 0 - 1,6 bar; 0 - 2,5 bar; 0 - 4 bar; 0 - 6 bar; 0 - 10 bar; 0 - 16 bar; 0 - 25 bar; 0 - 40 bar; 0 - 60 bar
„bar“ - High Pressure Ranges 0 - 100 bar; 0 - 160 bar; 0 - 250 bar; 0 - 400 bar
„bar“ - Vacuum Ranges -1...0 bar; -600...0 mbar; -400...0 mbar; -250...0 mbar; -160...0 mbar; -100...0 mbar; -60...0 mbar
„psi“ - Low Pressure Ranges 0 - 1 psig, 0 - 1.5 psig, 0 - 2.5 psig, 0 - 4 psig, 0 - 6 psig, 0 - 10 psig
„psi“ - Pressure Ranges 0 - 15 psig, 3 - 15 psig, 0 - 25 psig, 0 - 40 psig, 0 - 60 psig, 0 - 100 psig, 0 - 150 psig, 0 - 250 psig, 0 - 400 psig, 0 - 600 psig 0 - 1,000 psig
„psi“ - High Pressure Ranges 0 - 1,500 psig, 0 - 2,500 psig, 0 - 4,000 psig, 0 - 5,800 psig
„psi“ - Vacuum Ranges -15...0 psig; -10...0 psig, -6...0 psig, -4...0 psig, -2.5...0 psig, -1.5...0 psig, -1...0 psig
Differential Pressure Ranges (all above mentioned ranges)
bar, mbar, kPa, MPa, psi ranges also available
two contact versions can be equipped with two different pressure ranges (e.g. 0 - 40 psig for MIN- contact and 0 - 400 bar for MAX-contact)

Wetted Parts
brass or stainless steel

Switching Contact
standard or gold-plated micro switches
micro switches for high or low hysteresis
micro switches high or low switch loads
micro switches with internal interlock/manual reset
inductive contacts
pneumatic contacts
two contact versions can be equipped with two dif- ferent switching contacts (e.g. one micro switch and one pneumatic contact)

Process Connections
BSP threads (e.g. 1/2" BSP male)
NPT threads (e.g. 1/2" NPT male)
Flanges (EN or ASME standards available)
Chemical Seals

Electrical Connections
cable gland / terminal blocks inside enclosure
4-pin plug according to ISO 4400 (2x for 2K-versions)
M12x1 connector (2x for 2K-versions)
HARTING HAN7D / 8U connector
cable
MIL-type connections

Optional Features
integrated pressure gauge
integrated pressure transducer
silicone free version
cleaned for oxygen service
high / low temperature version
fully customized designs

Approvals
SIL 2 and SIL 3 approval (IEC 61508 / 61511)
PLd approval (ISO 13849)
TÜV approval (VdTÜV Leaflet Pressure 100)
Pressure Equipment Directive 97/23/EC
Gas Appliances Directive 90/396/EEC
GOST-R (Proof of Conformity with Russian Quality Standards and Regulations)
ATEX approval (Zone 1 and 2 / Zone 21 and 22)

ATEX versions
EExd (flameproof encapsulation)
EExi (intrinsically safe)
EExc (constructional safety) - pneumatic only

Accessories (excerpt)
valves, cock valves
(EExi-) isolation amplifiers

P-SERIES Pressure Gauges

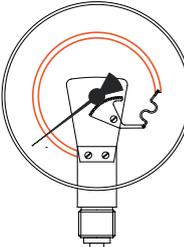
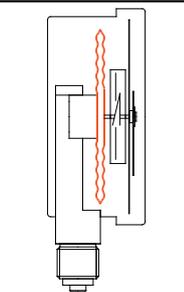
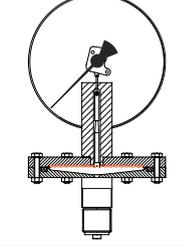


Pressure Gauges are mechanical pressure indicators. The measuring element is made of metal (stainless steels, copper alloy).

Once the measuring element is pressurized, it deforms proportionally to the increase of pressure („expand“ during increase in pressure and/or, „pull together“ with negative pressure).

With the controlled deformation of the measuring element, it „travels“ its way, which then is transmitted to an axle. A pointer is attached on this axle, which makes this movement readable on the dial.

Choose from a comprehensive set of products and options in order to have the best solution for your application:

Measuring Principles	
	<p>Bourdon tube pressure gauge Type P1 for aggressive, gaseous and liquid, not highly viscous media</p> <p>Applications e.g. Steam- und power technology, chemical and petrochemical industry, pharmaceutical and food industry, general mechanical engineering, pneumatics, hydraulics</p>
	<p>Capsule pressure gauge Type P2 for aggressive gaseous and dry media</p> <p>Applications e.g.: gas production lines, medical applications, analytical applications, filter technology, pneumatic fuel gauges, instrument calibration</p>
	<p>Diaphragm pressure gauge Type P3 for gaseous and liquid media, with open flange also suitable for highly viscous and polluted media</p> <p>Applications e.g.: chemical and petrochemical industry, water and sewage industry</p>
Enclosures	
100mm (2,5“) or 160mm (4“) diameter	
steel or stainless steel enclosure, NEMA 3	
standard, rack mount or wall mount	
safety version available	
Pressure Ranges	
all common bar, mbar, psi, kPa, MPa pressure/vacuum ranges	
combined pressure and vacuum ranges	
special ranges	
Wetted Parts	
brass or stainless steel	
Damping for Measuring System	
no filling	
filled enclosure (e.g. glycerine filled)	
no filling, damped axis	
Process Connections	
back or bottom entry	
BSP threads (e.g. 1/2“ BSP male)	
NPT threads (e.g. 1/2“ NPT male)	
VCR connectors (for pure gas applications)	
Flanges (EN or ASME standards available)	
Chemical Seals	
Optional Features	
adjustable pointer, MIN/MAX pointer	
silicone free version	
cleaned for oxygen service	
with switching contact(s)	
with integrated pressure transducer	

INDUSENS® Pressure Transmitters



Pressure transmitters transform the applied process pressure into a proportional electrical signal. This signal can e.g. be a defined current of 4 - 20mA.

Each pressure value corresponds clearly to a value of the electric current.

Due to the continuous change of process pressure, the continuous output signal changes accordingly.

These output signals (0 - 10 V, 0 - 20 mA, 4 - 20 mA) are transmitted as standardized analogue signals to e.g. a PLC.

Choose from a comprehensive set of products and options in order to have the best solution for your application:

Measuring Principles
ceramics sensor
silicium sensor
stainless steel sensor

Enclosures
standard enclosure, stainless steel, NEMA 4, 4x,
field type enclosure, stainless steel, NEMA 6

Pressure Ranges
all common bar, mbar, psi, kPa, MPa pressure/vacuum ranges
absolute or relative pressure
combined pressure and vacuum ranges
special ranges

Wetted Parts
ceramics, stainless steel, FKM
stainless steel, FKM
stainless steel (fully welded)

Output Signals
4 - 20 mA (2-Wire)
0 - 10 V (3-wire)
0 - 20 mA (3-wire)

Accuracy
0,5% FS
0,25% FS
0,1% FS

Process Connections
BSP threads (e.g. 1/2" BSP male)
NPT threads (e.g. 1/2" NPT male)
Flanges (EN or ASME standards available)
Chemical Seals

Electrical Connections
4-pin plug according to ISO 4400
M12x1 connector
cable
Binder series 723
MIL-type connections

Optional Features
silicone free version
cleaned for oxygen service

Approvals
SIL 2 approval (IEC 61508 / 61511)*
ATEX approval (Zone 1 and 2 / Zone 21 and 22)*

ATEX versions
EExi (intrinsically safe)*

Accessories (excerpt)
universal plug-on indicators
power supply
(supply) isolation amplifiers

* available from Fall 2012

CHEMSEAL® Diaphragm Seals



Diaphragm seals are mechanical process separation elements, that separate the measuring instrument from the actual process with a diaphragm.

They are mounted to the measuring instrument and filled with a special transmission fluid. The fill fluid hydraulically transmits the actual process pressure that acts on the membrane, to the instrument's measuring systems.

Diaphragm seals are recommended, when the measured media could damage the measuring instrument due to its chemical or thermal condition, when the measuring instrument shall be installed further away from the measuring point using capillaries, or bacterial contamination might occur to the measured media.

Choose from a variety of products in order to have the best solution for your application:

Built Type

thread types
flange types
food, bio, pharmaceutical types
industry specific types

Body Materials

different types of stainless steels (e.g. AISI 316L or 316Ti)

Diaphragm Materials

different types of stainless steels (e.g. AISI 316L or 316Ti)

Diaphragm Coatings

PFA, PTFE or ECTFE
Gold or Silver coatings

Instrument Connections

1/2" or 1/4" BSP female
1/2" or 1/4" NPT female
welding connection (if instrument supports fully welded connection - all PINTER instruments support fully welded connections)

Mounting Options

directly mounted to instrument
mounted via capillary
mounted via cooling element

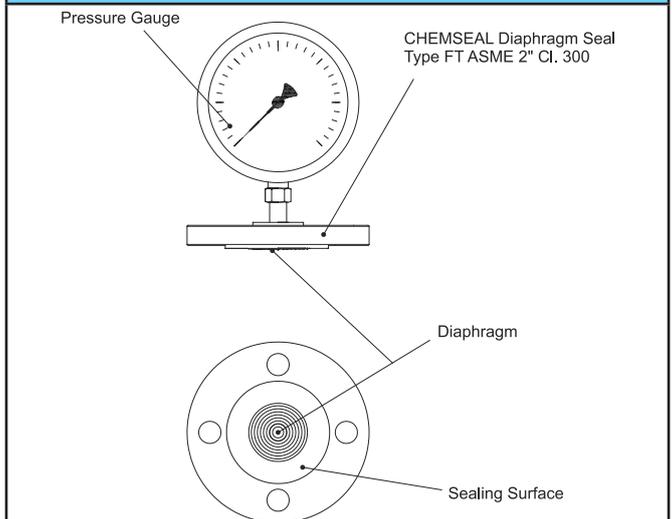
Process Connections

BSP threads (e.g. 1/2" BSP male front facing dia.)
NPT threads (e.g. 1/2" NPT male front facing dia.)
Front facing flanges (EN or ASME standards available)
Front facing clamp connections (e.g. ISO 2852)
Front facing food-stuff connections (e.g. ISO 2853)
Front facing VARIVENT® connections

Filling Fluid

general purpose oil
FDA approved oil
oil for either low or high temperature
oil suitable for oxygen service
oil suitable for use in radioactive contaminated area

Sample Configuration



DIMIO Digital Indicators DI01



Universal plug-on indicators for transmitters with output signal 4 - 20mA or 0 - 10 V. Indicating of one signal in freely definable scale and unit.

- optionally up to two relay outputs
- loop powered - no additional power supply necessary

DIMIO Digital Indicators DI10 / DI11 / DI12



Digital Indicators DI10/11/12 for indicating/converting/logging of up to 8 independent analogue input signals in freely definable scale and unit.

- Optionally up to two relay outputs
- all parameters can be adjusted/stored with PC.
- wide range power supply permits large supply range (20 - 253VDC and 50 - 253VAC).

PI-control Isolation Amplifier TV200/300



Isolation amplifiers for the galvanic separation and reinforcement of current or voltage signals (0/4...20 mA or 0...10 V).

Input, output and supply are galvanically separated with a high level of isolation. The integrated electronic power supply with high efficiency avoids strong warming and thus permits high output loads.

PI-control Supply Isolation Amplifier STV200/300



Supply isolation amplifiers for the galvanic separation and reinforcement of current signals (0/4...20 mA).

The transmitter is supplied directly by a galvanically isolated and limited supply voltage.

Input, output and supply are galvanically separated with an high level of isolation. The integrated electronic power supply with high efficiency avoids strong warming up and thus permits high output loads.

PI-control Supply Isolation Amplifier STV-Ex



Supply isolation amplifiers for the galvanic separation and reinforcement of current signals (0/4...20 mA).

The transmitter is supplied directly by a galvanically isolated and limited supply voltage.

Input, output and supply are galvanically separated with an high level of isolation.

The STV-Ex was especially developed for utilisation in explosion-proof environment

IMPRINT

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