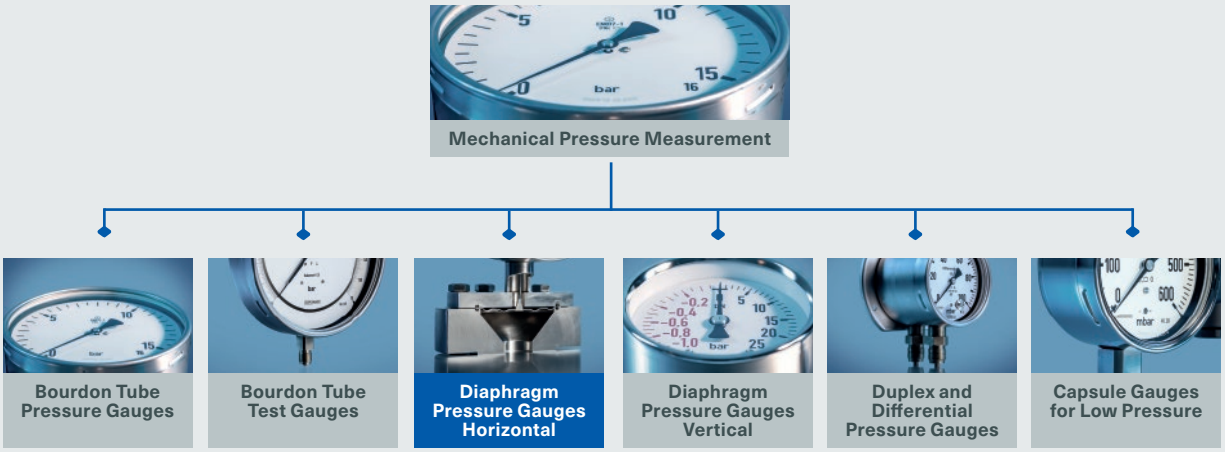
Heading 3

ARMANO

Mechanical Pressure Measurement

Diaphragm pressure gauges (horizontal diaphragm)

ARMANO Messtechnik GmbH



Quality Made in Germany

Mechanical Pressure Measurement

The ARMANO Messtechnik GmbH represents tradition and innovation in the production and distribution of precision pressure and temperature measuring instruments, which have an excellent reputation worldwide – for more than 120 years.

We are continually developing customer-specific solutions for a variety of applications requiring pressure and temperature measuring technology. Their use is manifold and there are always new applications.

Mechanical pressure gauges are indicating pressure measuring instruments for gauge, absolute and differential pressure.

For the optimal solution of various applications, we distinguish between the following product categories: Bourdon tube pressure gauges, Bourdon tube test gauges, diaphragm pressure gauges (horizontal / vertical diaphragm), duplex and differential pressure gauges and capsule gauges for low pressure.

In this brochure, you will find our range of mechanical pressure measuring instruments from our product range pressure gauges with horizontal diaphragm, including additional electrical accessories, as well as a brief description of the metrological features of those instruments.

You will also find solutions for special applications such as sterile applications.
Your instrument is not listed here?
Jointly, we will find a suitable solution for your application.
Do not hesitate to contact us!

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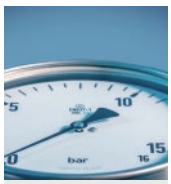
Our Products at a Glance



Mechanical Pressure Measurement

Electronic Pressure Measurement

Chemical Seal Mounting

Calibration Technology

Mechanical Temperature Measurement

Electrical Temperature Measurement

Thermowells & Accessories

Applications

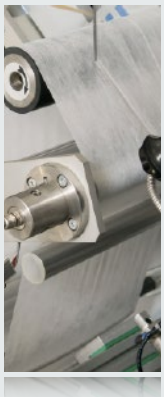
Diaphragm pressure gauges with horizontal diaphragm are suitable for the measurement of pressure and vacuum between 0 – 10 mbar and 0 – 40 bar. The measuring flanges are available in two different sizes, depending on the pressure range. They are suitable for highly fluid media, versions with open connection flange, as well as for contaminated or pulpy media.

Fields of Application

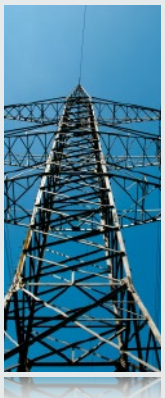
Chemistry & Petrochemistry

Engineering & Plant Construction

Pulp & Paper Industry

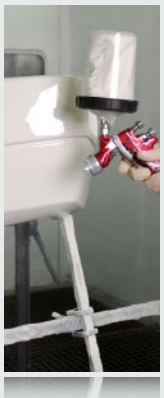


Energy



Building Materials Industry

Coatings & Paints



Sewage Plants & Waste Water Engineering

Media

for gaseous and liquid media,
also with solids content

Pressure Ranges

from 0 – 10 mbar to 0 – 40 bar
from 60 mbar also available with limit switch contact assembly

Characteristics

- Thread connection and flange connection
- Special materials: coating PTFE, foils made of various special materials etc.
- High overpressure resistance: as standard 5-times overrange protected
  special versions: 10-times overrange protected, highly overrange protected up to PN 600
- High medium temperatures: up to +200 °C with limitation
  (here recommended as an alternative: diaphragm seals with significantly higher indication accuracy)

General Features

Selection Criteria

The information given in DIN EN 837-2 have to be considered for the selection of the suitable measuring instrument (cf. the selection criteria for pressure gauges in our mounting and operating instruction, which can be found as pdf file on our website). In particular, the user has to ensure that the medium does not corrode any of the wetted parts.

Standard Material Combinations (for the Wetted Parts)

» Materials

Depending on the process, a wide range of materials (e.g. steel, tantalum) are applied to meet the demands on temperature resistance, mechanical strength and chemical resistance. Additionally, we provide particularly economic, material-saving construction types for special materials. There, only the wetted parts are made of the special material.

» Coatings / Foils

A coating / foil is a method to achieve an increased corrosion resistance. In special processes, the wetted part is coated.
Diaphragm: PTFE, fine silver, tantalum and others
Lower flange: PTFE lining

Ordering code	Pressure ranges	Lower flange	Sealing	Diaphragm	Foil
– 2	10 – 250 mbar 0.4 – 40 bar	galvanised steel	NBR	the measuring elements (diaphragms) are made of • stainless steel 316L (1.4404) • Duratherm • Inconel if a NACE conformity of the measuring element is required, we supply Inconel or stainless steel	
– 3	10 – 250 mbar 0.4 – 40 bar	stainless steel 316L	FKM		
– 5	40 – 250 mbar 0.4 – 40 bar	stainless steel 316L, PTFE lining	PTFE		PTFE

Measuring Flanges

Pressure gauges with horizontal diaphragm are available with the following sizes:

Pressure range	Measuring flange Ø
0 – 10 to 0 – 250 mbar	160 mm (6")
0 – 0.4[1] to 0 – 40 bar	100 mm (4")

Case Fillings

Case fillings are applied for difficult operating conditions, such as vibrations, high pressure variations or to avoid condensation (outdoor installations). The standard filling liquid is glycerin or a special oil for pressure gauges with mounted additional electrical accessory (model: ..Oe). For temperatures below –20 °C (–4 °F), special fillings are available upon request. For the measuring flange Ø 160 mm (6"), the instruments are available with case filling from 0 – 40 mbar onwards.

Process Connections

Our diaphragm pressure gauges are available with the following process connections as standard:
- G ½ B (½" BSP) according to DIN EN 837-1

Almost all models are available with the following connections without any extra charges:
- ½" NPT
- M 20x1.5

Further versions are available as customised product.

Pressure Ranges

Bar is the preferred pressure unit according to DIN EN 837-3. In this model overview, the available pressure ranges are indicated in bar. Beyond that, there are several further pressure units available, e.g. psi, mmWS, kg/cm², kPa, MPa. Dual or triple scales are available as well.
Special scales for almost all instruments can be manufactured upon request.

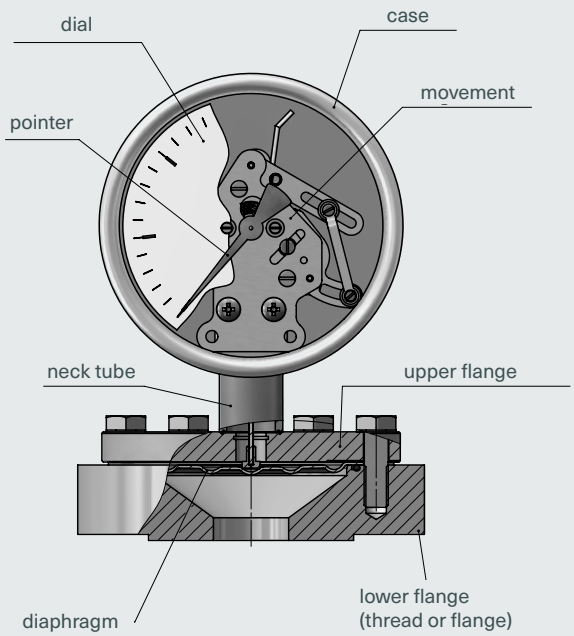
[1] For diaphragm pressure gauges with limit switch contact assemblies, the pressure range 0 – 0.4 bar is only available with measuring flange Ø 160 mm (6").

Metrological Features

Construction

The design of the measuring system is the same for all models. Lower flange (with thread or flange connection), diaphragm, upper flange, body, movement, dial and pointer form a self-contained component ready for measurement.
The case and the ring with glass window basically serve as protection against external influences.

Construction Example



Accuracy According to DIN EN 837-3

- Class 1.6
  indication accuracy better than ±1.6 % of the span at +20 °C (+68 °F)

- Class 2.5 (with foil, special material)
  indication accuracy better than ±2.5 % of the span at +20 °C (+68 °F)

Pressure Limitations

To guarantee a long service life, the pressure range should be selected according to DIN EN 837-2 in a way to ensure that the pressure load does not exceed 75 % of the full scale value for steady loads or 65 % of the full scale value for dynamic loads.

The following maximum load limits are to be regarded:

- at steady load: full scale value
- at dynamic load: 90 % of the full scale value
- overpressure: 5-times full scale value, max. 40 bar

Metrological Features

Temperature Limitations

- Storage temperature: up to +100 °C (+212 °F)
  for glycerin filling up to +70 °C (+158 °F)

Please regard possible limitations in the data sheets. Special versions and other temperature ranges are available upon request.

- Ambient temperature: –20 / +60 °C (–4 °F / +140 °F)
- Medium temperature: +100 °C (+212 °F)

Please regard that the additional error, caused by medium or ambient temperatures deviating from +20 °C (+68 °F), can be considerable.

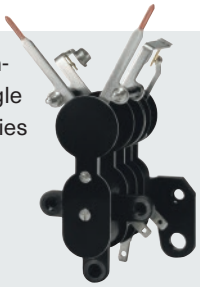
- Reference temperature: +20 °C ±5 °C (+68 °F ±9 °F)
  (DIN EN 837-3)

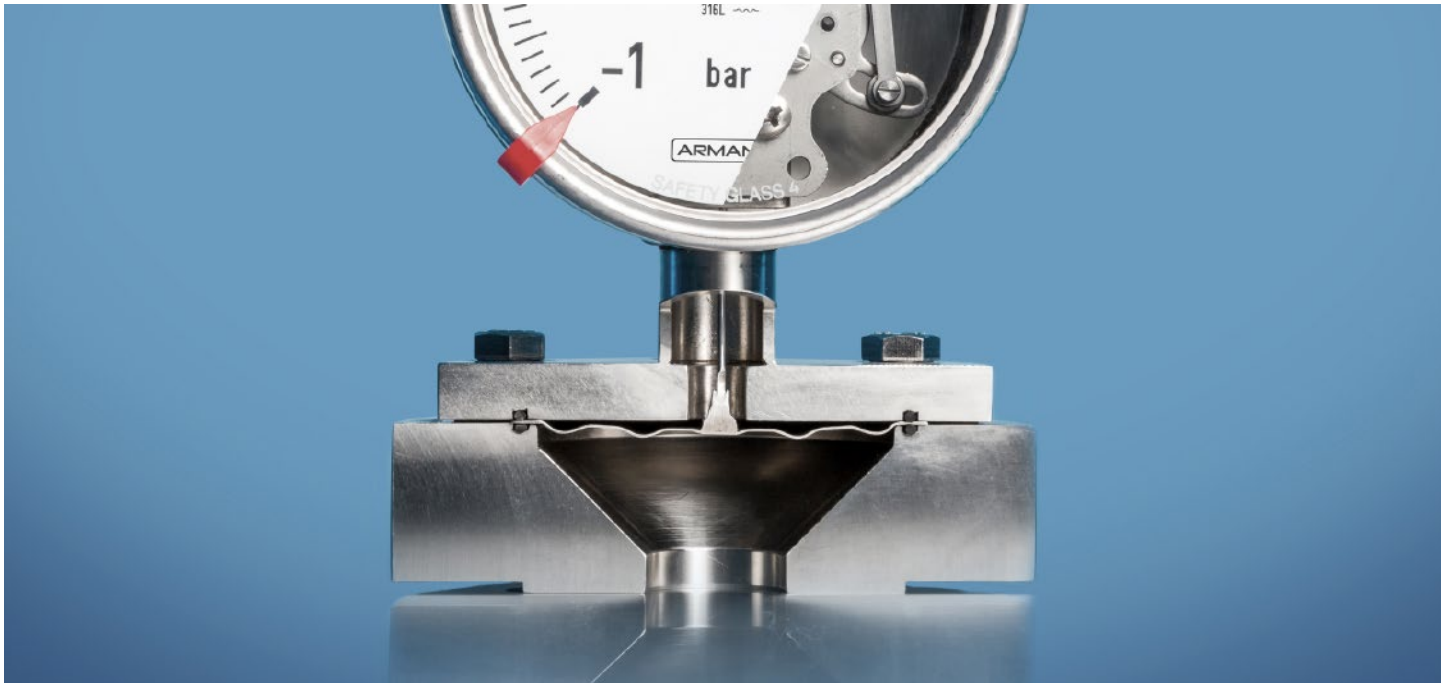
If the operating temperatures of the measuring system deviate from the reference temperature, additional deviations of the pressure indication do occur. According to DIN EN 837-3, these can be up to ±0.8 % of the span per 10 K.

If pressure gauges with case filling are applied at temperatures below +10 °C (+50 °F), please state the operating temperature in your order, since the instruments then have to be filled with a glycerin / water mixture or with silicone.

Additional Electrical Accessories

The installation of additional electrical accessories such as electromechanical (low-action or magnetic contact), inductive, electronic or pneumatic limit switch contact assemblies, potentiometric and rotation angle transducers and others is possible, see data sheets for pressure gauges with additional electrical accessories (last digits ..90 or ..91) and the data sheets of catalogue heading 9.





Dial / Standard Scales / Scale Division

Dial inscriptions, pressure range, scale divisions and figures on the scale are designed according to DIN EN 837-3. All pressure gauges are stamped with a serial instrument number on the dial. The standard dial is white with a black inscription. All diaphragm pressure gauges are supplied without stop pin on the dial. Standard pressure ranges and scale divisions can be found in the table below.

Pressure Ranges According to DIN EN 837-3 (Class 1.6)

Pressure	Compound range	Vacuum	Smallest subdivision of the scale
mbar			mbar
10	−4 / +6	−10 / 0	0.2
	−6 / +4		
16	−6 / +10	−16 / 0	0.5
	−10 / +6		
25	−10 / +15	−25 / 0	0.5
	−15 / +10		
40	−15 / +25	−40 / 0	1
	−25 / +15		
60	−20 / +40	−60 / 0	1
	−40 / +20		
100	−40 / +60	−100 / 0	2
	−60 / +40		
160	−60 / +100	−160 / 0	5
	−100 / +60		
250	−100 / +150	−250 / 0	5
	−150 / +100		
400	−150 / +250	−400 / 0	10
	−250 / +150		

Pressure	Compound range	Vacuum	Smallest subdivision of the scale
bar			bar
0.6		−0.6 / 0	0.01
1.0		−1 / 0	0.02
		−1200 / 0 mbar	20 mbar
1.6	−1 / +0.6		0.05
2.5	−1 / +1.5		0.05
4	−1 / +3		0.1
6	−1 / +5		0.1
10	−1 / +9		0.2
16	−1 / +15		0.5
25			0.5
40			0.5

Standard Range

For Aggressive, Contaminated or Viscous Liquids

PCh / PChG

Specifics	up to 5-times overrange protected as standard, max. 40 bar
Nominal size	100, 160 mm (4, 6")
Pressure ranges	0 – 10 mbar to 0 – 40 bar
Accuracy	class 1.6 class 2.5 (with protection foil)
Data sheet	3201

For the Sterile Process Technology DG (Dry Genic)

PCh 100 – 3 DG

Specifics	dry (unfilled) measuring system made of 316L welded, with membrane flush welded
Nominal size	100 mm (4")
Pressure ranges	−1 / +3 bar to −1 / +9 bar
Accuracy	class 1.6
Data sheet	3202

Safety Version

PSCh / PSChG

Specifics	up to 5-times overrange protected as standard, max. 40 bar
Nominal size	100, 160 mm (4, 6")
Pressure ranges	0 – 10 mbar to 0 – 40 bar
Accuracy	class 1.6 class 2.5 (with protection foil)
Data sheet	3600

Absolute Pressure Gauges

APCh / APChG

Specifics	overrange protected as standard
Nominal size	100, 160 mm (4, 6")
Pressure ranges	0 – 60 mbar abs. to 0 – 2500 mbar abs.
Accuracy	class 1.6
Data sheet	3901

With Additional Electrical Accessories

PCh / PChOe

Specifics	PChOe with special oil filling, up to 5-times overrange protected as standard, max. 40 bar
Nominal size	100, 160 mm (4, 6")
Pressure ranges	0 – 10 mbar to 0 – 40 bar
Accuracy	class 1.6 class 2.5 (with protection foil)
Data sheet	3201.90

With Additional Electrical Accessories

PSCh / PSChOe

Specifics	safety pressure gauge PSChOe with special oil filling, up to 5-times overrange protected as standard, max. 40 bar
Nominal size	100, 160 mm (4, 6")
Pressure ranges	0 – 10 mbar to 0 – 40 bar
Accuracy	class 1.6 class 2.5 (with protection foil)
Data sheet	3600.90

Customer Solutions

Numerous customer solutions are available for almost all models. Thus, only a few examples are specified below. Further versions can be found in the data sheets or other technical documents of the respective models. Further individual special configurations are available upon request.
No matter what requirements and needs your application has, together with our technicians we will find an ideal solution for you – please contact us!

High Overpressure Protected

PCh 100 – 3 HOP	
Features	"HOP" (high overpressure protected) – highly overload resistant, overrange protection up to 100, 250 or 600 bar
Nominal size	100, 160 mm (4, 6")
Pressure ranges	from 0 – 250 mbar to 0 – 40 bar
Accuracy	class 1.6
Product leaflet	PB_3_044

Absolute Pressure Gauge With Small Pressure Range

APCh 100 – 3	
Features	small pressure ranges wetted parts made of 316L, others upon request, e.g. Hastelloy and Monel, helium leak detection up to 10^{-9} mbar l/s all connections welded
Nominal size	100, 160 mm (4, 6")
Pressure ranges	from 0 – 25 mbar abs. to 0 – 25 bar abs.
Accuracy	class 1.6

Certificates and Approvals

Standards

Our company is certified according to the highest quality standards and our product portfolio meets the highest quality demands. We do not only manufacture according to product-specific instrument standards, we also offer versions with special approvals for application areas with specific requirements. The ARMANO Messtechnik GmbH is certified according to DIN EN ISO 9001.

SIL 2
SIL 3

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