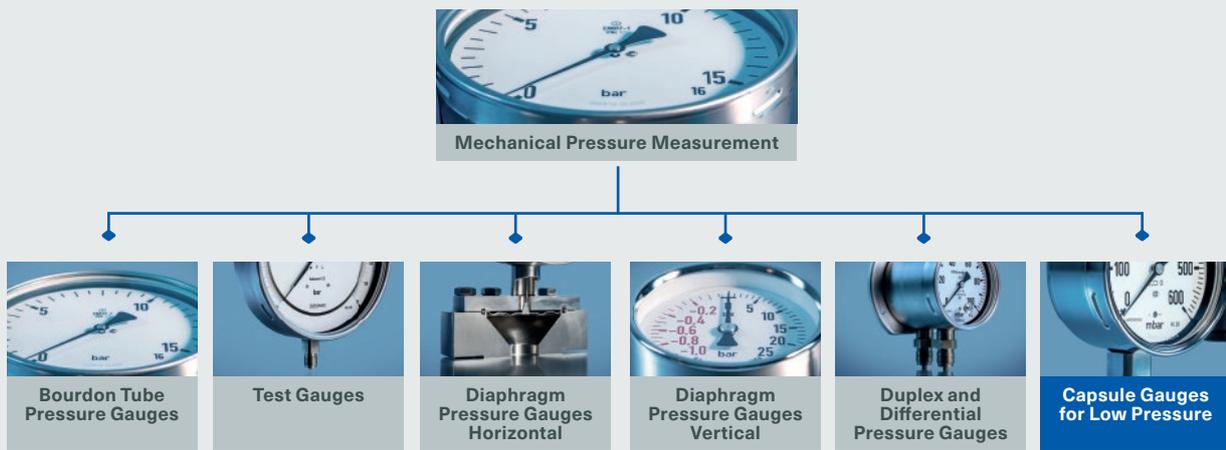


ARMANO



# Mechanical Pressure Measurement

**Capsule gauges for low pressure**



## 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 100 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 diaphragm capsule, 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!

Applications	4
General Features	5
Metrological Features	6
Dial / Standard Scales / Scale Division	7
Model Overview	8
Customer Solutions	10
Certificates and Approvals	11

## 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

Capsule gauges for low pressure are suitable for the measurement of positive and negative overpressures between 0 – 2.5 and 0 – 600 mbar for gaseous media.

Diaphragm capsules consist of corrugated membranes, which are assembled pressure-tight at the edge. The pressure is passed into the centre of one of the membranes and acts onto the inside of the diaphragm capsule. The lifting movement generated hereby is a measure for the pressure.

## Pressure Ranges of Our Capsule Gauges for Low Pressure

Pressure range in mbar		2.5	4	6	10	16	25	40	60	100	160	250	400	600
NCS 50	KPChg													
NCS 63	KPChE													
	KPCh/KPChg													
NCS 80	KPChg													
	KPChgG													
NCS 100	KPCh/KPChg													
	KPChG/KPChgG													
NCS 160	KPCh/KPChg													
	KPChG/KPChgG													
NCS 250	KPCh													
NCS 4½"	KPPG													
NCS 96 <sup>2</sup>	KPQS													
NCS 144 <sup>2</sup>	KPQS													

scale angle 180°

### Media

for gaseous media

### Pressure Ranges

from 0 – 2.5 mbar to 0 – 600 mbar

## General Features

### Selection Criteria

The information given in DIN EN 837-2 have to be considered for the selection of the suitable measuring instrument. In particular, the user has to ensure that the medium does not corrode any of the wetted parts.

A detailed description of the selection criteria can be found in the commentary of the DIN e. V. "Überdruckmessgeräte nach DIN EN 837" ("Overpressure measuring instruments according to DIN EN 837", available in German only), published by the Beuth Verlag. Please compare the selection criteria for pressure gauges described in our operating instruction, which can be found as pdf file on our website.

#### Standard Material Combinations

##### (for the wetted parts)

Depending on the process, a wide range of materials are applied to meet the demands on temperature resistance, mechanical strength and chemical resistance.

Ordering code	Connection	Sealing	Diaphragm capsule
- 1	brass	NBR	CuBe alloy
- 3	stainless steel 316L	FKM	stainless steel 316L

#### Process Connections

With only a few exceptions, our capsule gauges for low pressure are available with the following process connections according to DIN EN 837-3:

- ◆ G ¼ B (¼" BSP) up to NCS 63
- ◆ G ½ B (½" BSP) from NCS 80

Almost all models are available with the following connections without any extra charges:

- ◆ ¼" NPT or M 12x1.5 up to NCS 63
- ◆ ½" NPT or M 20x1.5 from NCS 80

Further versions are available as customised product.

#### Pressure Ranges

Mbar is the preferred pressure unit according to DIN EN 837-3. In this model overview, the available pressure ranges are indicated in mbar. Beyond that, there are further pressure units available, e.g. kPa. Multiple scales are available as well. Capsule gauges for low pressure are equipped with an adjusting screw for zero adjustment on the front side, with an adjustment range of  $\pm 5\%$ .

#### Case Fillings

Liquid fillings are used to achieve a higher damping of the measuring system against pulsation of the medium and to avoid condensation at the window.

The standard filling liquid for the filled versions (models ...G) is glycerin.

### Construction

The design of the measuring system is basically the same for all models. Diaphragm capsule, socket with thread connection, movement, scale and pointer form a self-contained unit ready for measurement. The case and the ring with glass window basically serve as protection against external influences.



## Metrological Information

### Accuracy According to DIN EN 837-3

#### Class 1.6

The accuracy class indicates the error limits as a percentage of the measuring span. The accuracy class also defines the limit value for the hysteresis of the instruments. Please regard possible limitations in the data sheets.

### Load Limits According to DIN EN 837-3

The following maximum load limits are to be regarded:

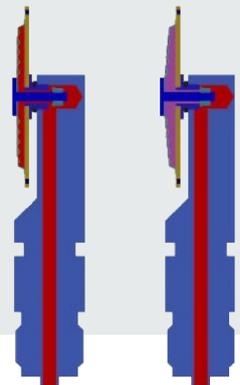
- ◆ at steady load: full scale value
- ◆ at dynamic load: 90 % of the full scale value
- ◆ overpressure: 1.3-times full scale value

#### Recommendation

According to DIN EN 837-2, for the normal use of all devices it is recommended that the maximum pressure load does not exceed 75 % of the full scale value for steady loads or 65 % of the full scale value for dynamic loads in order to maintain the metrological properties during a long service life. It is also recommended not to use the initial range (up to approx. 20 %) for measurements, because there the measurement deviation is relatively large in relation to the measured value.

#### Overpressure or vacuum protection

- ◆ For all capsule gauges for low pressure, up to 3 times overrange or vacuum protection is available.
- ◆ For many capsule gauges for low pressure, also up to 10 times overrange or vacuum (max. down to -1000 mbar) protection is available.
- ◆ In addition, we offer 10 times overrange protection with max. 10 times vacuum protection combined.
- ◆ Details can be found in the data sheets of the respective instrument models.



### Temperature Limitations

- ◆ Medium temperature:
 

unfilled	max. +100 °C (+212 °F)
filled	max. +70 °C (+158 °F)
- ◆ Storage temperature:
 

unfilled	-40 / +70 °C (-40 / +158 °F)
filled	-20 / +70 °C (-4 / +158 °F)
- ◆ Ambient temperature:
 

unfilled	-40 / +60 °C (-40 / +140 °F)
filled	-20 / +60 °C (-4 / +140 °F)

Please regard possible limitations in the data sheets. Please contact us if you require instruments with higher or lower temperature limitation.

- ◆ Reference temperature: +20 °C ±5 °C (+68 °F ±9 °F)

If the operating temperatures of the measuring system (resilient element and movement) deviate from the reference temperature, additional deviations of the pressure indication do occur. These can be up to ±0.6 % of the span per 10 K.

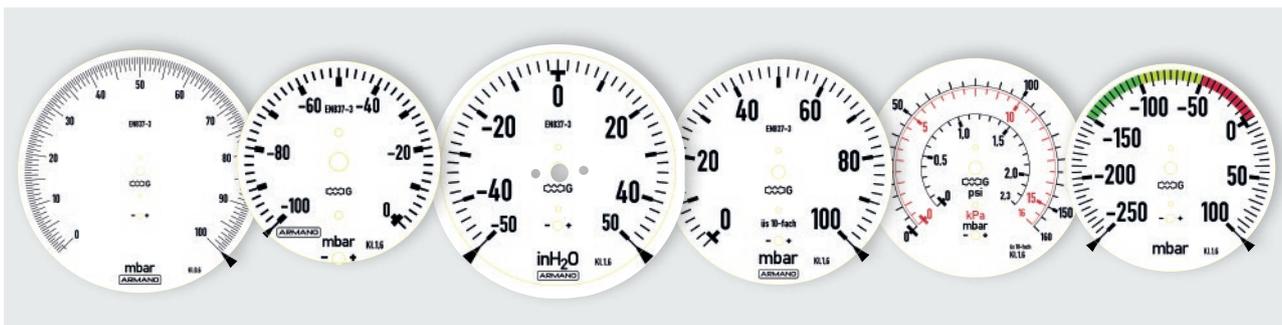
# Dial / Standard Scales / Scale Division

Dial inscriptions, pressure range, scale divisions and figures on the scale are designed according to DIN EN 837-3. The standard dial is white with black inscription.

## Standard Pressure Ranges and Scale Division

mbar			Nominal case sizes		inH <sub>2</sub> O			Nominal case sizes	
Vacuum	Compound range	Pressure	50, 63	80, 100, 160, 250, 4½", 96x96, 144x144	Vacuum	Compound range	Pressure	50, 63	80, 100, 160, 250, 4½", 96x96, 144x144
			Smallest subdivision of the scale					Smallest subdivision of the scale	
-2.5 / 0	-1 / +1.5	0 - 2.5	-	0.05	-1 / 0	-0.4 / +0.6	0 - 1	-	0.02
	-1.5 / +1					-0.6 / +0.4			
-4 / 0	-1.5 / +2.5	0 - 4	-	0.1	-1.6 / 0	-0.6 / +1	0 - 1.6	-	0.05
	-2.5 / +1.5					-1 / +0.6			
-6 / 0	-2 / +4	0 - 6	-	0.1	-2.5 / 0	-1 / +1.5	0 - 2.5	-	0.05
	-4 / +2					-1.5 / +1			
-10 / 0	-4 / +6	0 - 10	-	0.2	-4 / 0	-1.5 / +2.5	0 - 4	-	0.1
	-6 / +4					-2.5 / +1.5			
-16 / 0	-6 / +10	0 - 16	-	0.5	-6 / 0	-2 / +4	0 - 6	-	0.1
	-10 / +6					-4 / +2			
-25 / 0	-10 / +15	0 - 25	1	0.5	-10 / 0	-4 / +6	0 - 10	0.2	0.2
	-15 / +10					-6 / +4			
-40 / 0	-15 / +25	0 - 40	1	1	-16 / 0	-6 / +10	0 - 16	0.5	0.5
	-25 / +15					-10 / +6			
-60 / 0	-20 / +40	0 - 60	2	1	-25 / 0	-10 / +15	0 - 25	1	0.5
	-40 / +20					-15 / +10			
-100 / 0	-40 / +60	0 - 100	2	2	-40 / 0	-15 / +25	0 - 40	1	1
	-60 / +40					-25 / +15			
-160 / 0	-60 / +100	0 - 160	5	5	-60 / 0	-20 / +40	0 - 60	2	1
	-100 / +60					-40 / +20			
-250 / 0	-100 / +150	0 - 250	10	5	-100 / 0	-40 / +60	0 - 100	2	2
	-150 / +100					-60 / +40			
-400 / 0	-150 / +250	0 - 400	10	10	-160 / 0	-60 / +100	0 - 160	5	5
	-250 / +150					-100 / +60			
-600 / 0	-200 / +400	0 - 600	20	10	-250 / 0	-100 / +150	0 - 250	10	5
	-400 / +200					-150 / +100			

## Special Scales



## Standard Range



**KPCh / KPChG**

Case / ring	bayonet ring case stainless steel
Case filling	without / with
Accuracy	class 1.6
Nominal size	100, 160, 250 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 2.5 mbar to 0 – 600 mbar
Data sheet	6201



**KPCh / KPChG 63**

Case / ring	bayonet ring case stainless steel
Case filling	without / with
Accuracy	class 1.6
Nominal size	63 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 25 mbar to 0 – 600 mbar
Data sheet	6211



**KPChE**

Case / ring	snap-in window stainless steel
Case filling	without
Accuracy	class 1.6
Nominal size	63 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 25 mbar to 0 – 600 mbar
Data sheet	6211.1

## Standard Range



**KPChg / KPChgG**

Case / ring	crimped-on ring case stainless steel
Case filling	without / with
Accuracy	class 1.6
Nominal size	100, 160 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 2.5 mbar to 0 – 600 mbar
Data sheet	6202



**KPChg / KPChgG 80**

Case / ring	crimped-on ring case stainless steel
Case filling	without / with
Accuracy	class 1.6
Nominal size	80 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 2.5 mbar to 0 – 600 mbar
Data sheet	6203



**KPChg / KPChgG 63**

Case / ring	crimped-on ring case stainless steel
Case filling	without / with
Accuracy	class 1.6
Nominal size	63 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 25 mbar to 0 – 600 mbar
Data sheet	6212



**KPChg 50 - 1**

Case / ring	crimped-on ring case stainless steel
Case filling	without
Accuracy	class 1.6
Nominal size	50 mm
Wetted parts	- 1 brass
Pressure ranges	0 – 100 mbar to 0 – 600 mbar
Data sheet	6232

## Special Gauges



**Process Gauge  
Case According to US Standard**

**KPPG 4 1/2" – 3**

Case / ring	with screw ring, PBTP (thermoplastic) black
Case filling	without
Accuracy	class 1.6
Nominal size	4 1/2"
Wetted parts	- 3 stainless steel 316L
Pressure ranges	0 – 25 mbar to 0 – 600 mbar
Data sheet	6401



**Square Gauge**

**KPQS**

Case / ring	square case, galvanised steel
Case filling	without
Accuracy	class 1.6
Nominal size	96x96, 144x144 mm
Wetted parts	- 1 brass - 3 stainless steel 316L
Pressure ranges	0 – 2.5 mbar to 0 – 600 mbar
Data sheet	6500



**With Integrated Pressure  
Transmitter DMU, Model DIGPTM**

**KPCh 100 – 3**

Case / ring	bayonet ring case stainless steel
Case filling	without
Accuracy	$\leq \pm 1.0\%$ / $\pm 0.25\%$
Nominal size	100 mm
Wetted parts	- 3 stainless steel 316L
Pressure ranges	0 – 2.5 mbar to 0 – 600 mbar
Data sheet	9632

## 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!



# 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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