APPLICATION NOTES

AB 03 EN

Pressure Gauges with Pressure Compensation Element

Application

A pressure gauge is an instrument used to measure and indicate the pressure of a medium.

As pneumatic accessories in valve engineering, they are used to measure and indicate the pressure applied to devices, such as positioners or supply pressure regulators.

Special features

- Integrated pressure compensation element to prevent condensation
- Valve size 40
- Various indicating ranges
- Version according to
  - **EN 837-1** · Bourdon tube pressure gauges; dimensions, metrology, requirements and testing
  - **EN 837-2** · Selection and installation recommendations for pressure gauges
  - **EN 837-3** · Diaphragm and capsule pressure gauges; dimensions, metrology, requirements and testing

Fig. 1: *Pressure gauge with outer scale 0 to 6 bar and inner scale 0 to 90 psi*

Measuring accuracy

The pressure gauges have the accuracy class 2.5 [1] according to EN 837-1. The permissible reading error over the entire span must not exceed 2.5 % according to this standard.

Example:
The permissible deviation for a pressure gauge scale from 0 to 6 bar: 2.5 % x 6 bar = 0.15 bar

As a result, the deviation is ±0.15 bar:

➔ The actual pressure at a reading of 6 bar on the scale:
6 bar ±0.15 bar: 5.85 to 6.15 bar

➔ The actual pressure at a reading of 0.4 bar on the scale:
0.4 bar ±0.15 bar: 0.25 to 0.55 bar

[1] The pressure gauges are mere pressure sensing and indicating equipment. As a result, they are not categorized as measuring equipment. Metrological certification, such as PAC (Pattern Approval Certificate) are, therefore, not available.

General details on pressure gauges

NOTICE

Risk of damage to plants, pressure gauges and other components due to improper use of the pressure gauges.

Only use pressure gauges that are suitable for the operating conditions and that have been mounted properly.

Note

The pressure limit identifying mark on the dial applies as the upper pressure limit while testing the pressure of pipelines or tanks.

Operating conditions

➔ Observe the selection and installation recommendations specified in EN 837-2 (formerly DIN 16005, Parts 1 and 2) on selecting a pressure gauge suitable for a particular application.

Selection criteria

➔ Select the pressure gauge according to the following criteria:
- Material compatibility with the process medium, atmosphere and temperature
- Overloading
- Indicating range

➔ Make sure that the operating pressure to be expected is within the middle third of the indicating range.

➔ The type and location of the connecting thread (process fluid connection) must be considered.

➔ Observe the regulations that apply for a particular application and the specifications of EN 837-2.

Installation

NOTICE

Risk of malfunction and damage of the pressure gauge due to incorrect mounting position.

– Mount the pressure gauge with the pressure compensation element pointing down.

– Protect against direct sunlight.

Additional points that apply concerning the installation of pressure gauges:

➔ Pressure gauges must only be installed by properly trained staff.

➔ On installing or removing the pressure gauge, do not apply any force to the housing. Therefore, always use a suitable wrench at the wrench face of the connection.

➔ By mounting a lock nut at the threaded connection, the pressure gauge dial can be moved to the right position to allow the pressure to be read properly.

➔ Make sure that the joints are leak tight.

➔ Observe the maximum plant pressure as well as the medium and ambient temperature on selecting suitable seals.

➔ The specified steady pressure limit must not be exceeded.

Removal

➔ Take sufficient precautions before removing the pressure gauge.

➔ Before removing the pressure gauge from the pipeline, depressurize the relevant plant section. On doing so, be aware that residual medium in the pressure gauge can pose a risk to staff, equipment and the environment.

Start-up and operation

➔ Avoid fast changes in temperature as well as pressure surges.

➔ Carefully open the upstream shut-off equipment.

Maintenance and repair

Pressure gauges are maintenance-free.

Repairs by the manufacturer are only permitted.

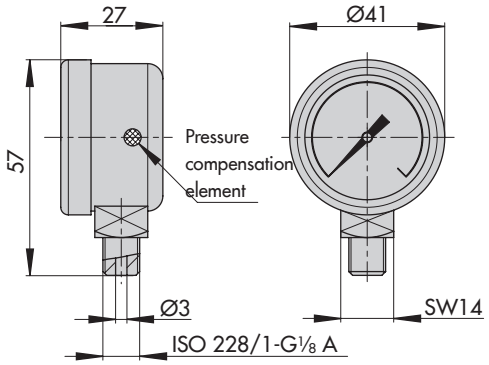
Table 1: *Technical data*

Pressure gauges according to	**EN 837-1, EN 837-2, EN 837-3**	
Application	For gases according to ISO 8573-1: Maximum particle size and density: Class 4, oil content: Class 3 Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected.	
Accuracy class	2.5	
Permissible ambient temperature	–40 to +80 °C/–60 to +80 °C [1]	
Valve size [mm]	40	
Degree of protection	IP65	
Indicating range (see order numbers)	0 to 6 bar · 0 to 90 psi [3]	
	0 to 1.2 bar · 0 to 18 psi [3]	
	0 to 1.6 bar · 0 to 24 psi [3]	
	0 to 10 bar · 0 to 150 psi [3]	
	0 to 6 kg/cm² · 0 to 0.6 MPa	
Inscription	Without inscription	
Process connection	ISO 228/1-G ⅛	
Additional electrical equipment	Pressure compensation element	
Materials	**Standard**	**Stainless steel**
Housing and external parts	1.4404/316L	1.4404/316L
Measuring element	Copper alloy	1.4404/316L
Connecting thread	Nickel-plated brass	1.4404/316L
Connection between housing and measuring unit	Glued [2]	Welded
Window and ring	Polycarbonate with EPDM seal	
Pointer	Black plastic	
Dial	Aluminum (white)	

1) Avoid frequent fluctuations in pressure when used down to –60 °C. The accuracy class may change as a result.
2) Not free of substances that impair paint adhesion
3) Conversion in kPa possible.

Dimensions in mm

Bottom radial threaded connection



Center radial threaded connection

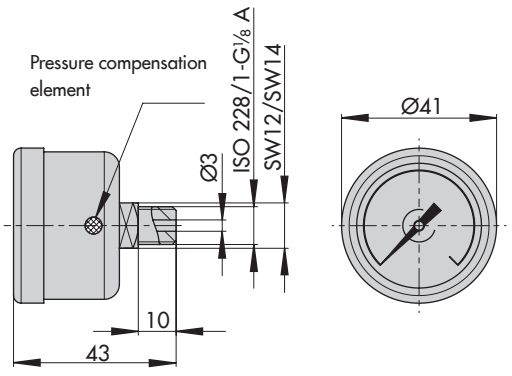


Table 2: *Order numbers, center radial threaded connection*

Indicating range	Version	Ordering number
0 to 6 bar 0 to 90 psi	Standard	100071415
	Stainless steel	100071411
0 to 1.2 bar 0 to 18 psi	Standard	100071373
	Stainless steel	100071377
0 to 1.6 bar 0 to 24 psi	Standard	100071428
	Stainless steel	100071420
0 to 10 bar 0 to 150 psi	Standard	100071409
	Stainless steel	100071410
0 to 6 kg/cm² 0 to 0.6 MPa	Standard	100071378
	Stainless steel	100195218

Table 3: *Order numbers, bottom radial threaded connection*

Version	Indicating range	Ordering number	Suitable for Type		
			6116	6126	6134
Standard	0 to 1.2 bar 0 to 18 psi	100071367	•	•	•
Standard	0 to 6 bar 0 to 90 psi	100071369	•	•	•
Standard	0 to 6 kg/cm² 0 to 0.6 MPa	100071368	•	•	•

Table 4: *Order numbers, sets of accessories for SAMSON positioners, reversing amplifiers and limit switches*

Version	Indicating range	Set of accessories consisting of:		Ordering number	Suitable for Type …							
		Pressure gauges	Accessories		3710	3725	3730/TROVIS 3730	3731	3793/TROVIS 3793	3766/3767	3768	4763/4765
Standard	0 to 6 bar 0 to 90 psi	2x 100071415	2x Lock nuts	1402-1637		•	•	•	•	•	•	•
	0 to 6 bar 0 to 90 psi	1x 100071415	1x Lock nut	1402-1636	•							
	0 to 10 bar 0 to 150 psi	2x 100071409	2x Lock nuts	1402-1583					•			
	0 to 10 bar 0 to 150 psi	3x 100071409	3x Lock nuts	1402-1528					•			
	0 to 6 kg/cm² 0 to 0.6 MPa	2x 100071378	2x Lock nuts	1402-1613			•	•				
Stainless steel	0 to 6 bar 0 to 90 psi	2x 100071411	2x Lock nuts	1402-1638		•	•	•	•	•	•	•
	0 to 6 bar 0 to 90 psi	1x 100071411	1x Lock nut	1402-1337	•							
	0 to 10 bar 0 to 150 psi	2x 100071410	2x Lock nuts	1402-1584					•			
	0 to 10 bar 0 to 150 psi	3x 100071410	3x Lock nuts	1402-1577					•			

Table 5: *Accessories*

Accessories	Material	Ordering number
Lock nut	1.4404	0250-1949
Seal	NBR	0430-1102

Table 6: *Order numbers, sets of accessories for discontinued models and associated successor models*

Order number for old sets of accessories (with white pressure compensation element)	Order number for new sets of accessories (with black pressure compensation element)
1402-1295	1402-1636
1402-1338	1402-1636
1402-0938	1402-1637
1402-0939	1402-1638
1402-1231	1402-1613
1402-1627	1402-1639