

Pressure gauge

For normal pressure Operating instructions

E 15.01.01

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Standard

EN 837-1 Standard for pressure gauge with bourdon tubes
EN 837-2 Recommended selection and installation of pressure gauge

Pressure Equipment Directive 97/23 / EC

Pressure gauge is included in the group "Pressure accessories" according to Article 1, paragraph 2.1.4. The pressure-sensitive volume of the measuring housing is <math><0,1\text{ L}</math>. Pressure gauge with a pressure range up to a maximum of 200 bars is part of Article 3, paragraph 3, and is not CE-marked. This means that there are no special requirements more than the usual approved manufacturing process. Pressure gauge with pressure range > 200 bar belongs to group 1G according to Appendix 2, Table 1 and is CE marked.

Storage

Always keep the pressure gauge in the original package. If the instrument is picked up for control, it must always be returned in its original packaging. The storage temperature should be between $-20/+60\text{ }^{\circ}\text{C}$. Other storage temperatures are possible for some pressure gauge. The permitted temperature range is shown in the current type sheet. Protect the instrument from moisture and dust.

Selection of measurement location

The pressure gauge must be mounted vibration-free and placed easily accessible and in such a way that good reading can be done. Unless the tube to the instrument is stable enough for vibration-free mounting, either a gauge holder or an additional bracket must be mounted on the housing over a fastening edge. If vibration can not be avoided by suitable installation, measurements with liquid damped gauges should be used.

Pressure outlet

The pressure relief plug must be installed with a sufficiently large inner diameter ($\varnothing 6\text{ mm}$), if possible via a shut-off valve, so that the pressure outlet is not disturbed by flowing the measuring medium.

Measuring tube

The measuring pipe between the pressure outlet and the pressure gauge shall have a sufficiently large inside diameter to avoid stop and delay during pressure transfer. It must not have any sharp curves. It should be pulled with a smooth slope of about 1:15. The measuring pipe must be designed and mounted to accommodate current loads due to strain, vibration and heat effect. When using gases as a measuring medium, a condensate drainage must be provided at the lowest location and when using liquids, a venting must be provided at the highest point.

Cleaning of pipelines

In case of expulsion or blow-out of pipelines or containers, the pressure gauge must not be loaded higher than the boundary mark indicates on the display board. Otherwise, the pressure gauge must either be locked off or disassembled.

Working pressure

The operating pressure of the measuring medium must never exceed the endpoint of the pressure gauge. Normal working pressure should correspond to approximately 75% of the scale's final value. Some gauges tolerate temporary overload. See information about working pressure on each individual datasheet.

Measurement medium

Pressure gauges should always be selected according to the medium to be measured. Instruments with parts of copper alloy are attacked by aggressive media and are therefore completely inappropriate. If the medium is viscous, gauge with pressure transmitter should be selected. Each data sheet describes which material is used for the pressure-sensitive media parts of the pressure gauge and in which environment and context each pressure gauge is suitable for use.

Operating temperature

The operating temperature is the medium temperature when it reaches the pressure gauge. If the system temperature is higher than $60\text{ }^{\circ}\text{C}$, the medium must be cool down before it reaches the pressure gauge. Pressure gauge with stainless steel measuring system can handle $+100\text{ }^{\circ}\text{C}$ and also $+200\text{ }^{\circ}\text{C}$ in special design. However, careful consideration must be given to the influence of the temperature on the measurement accuracy. A pressure gauge accuracy class is specified at a operating temperature at $+20\text{ }^{\circ}\text{C}$. Higher or lower temperatures cause deterioration.

Temperature Deviation

The pressure gauge must be positioned so that the permitted operating temperature is neither undermined nor exceeded, even if the instrument is exposed to convection or heat radiation. In addition, pressure gauge and shut-off valve must be protected by sufficiently long measurement lines or gauge syphons. Take into account the influence of the temperature on the measurement accuracy.

Oxygen or acetylene

Should the pressure gauge be used to measure oxygen or acetylene, it must be manufactured according to the standards applicable to these media. For oxygen measurement, the pressure gauge must be free from grease and equipped with the specified safety features. When measuring acetylene, the media-affected parts may not have a copper content greater than 70%. Therefore, a standard pressure gauge should never be fitted in these contexts.

Mounting

In order to set the instrument to the lowest position, the connection should be provided with a sleeve or an union nut. The pressure gauge can only be screwed in and out with the pressure gauge square-key (do not tighten the housing). If the pressure gauge is located lower than the pressure gauge, the measuring line must be flushed thoroughly before it is connected to remove foreign particles.

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Pressure units

The pressure gauge is delivered in unit bar, kPa, MPa, mbar and psi. Also dual-scales with bar and psi, bar and kPa, bar and MPa are available



Scale deviations

The number of divisions depends on the interval of the scale, the accuracy class and the basic designation.

Case dimension

The case dimensions of the pressure gauges comply with current EN standards and can be obtained, depending on the design, with dim Ø 40, 50, 63, 80, 100, 160 or up to dim Ø 250 mm

Case material

The pressure gauges cases are made of plastic, black painted steel or stainless steel.

Media-affected parts

Pressure element and wetted parts are made of copper alloy or stainless steel.

Shut-off valve

Between the pressure outlet and pressure gauge, a shut-off valve should be fitted to enable the instrument to be switched during operation and for zero point adjustment. For special applications (steam boiler), the shut-off valve must be fitted with test connection for the pressure gauge to be checked without first disassembling.



Sealing

To seal the pressure gauge connections, sealing washers in flat design or WIKAI-design should be used.



In-line filter

For gases or liquids with solid particles an In-line filter should be fitted between pressure exits and shut-off valves. The filter prevents solid particles from flowing into the pressure gauge and by means of the shut-off valve, the filter can be emptied during operation.

Diaphragm Seals

For aggressive, high viscosity, contaminated or crystallizing measuring media that may not penetrate the instrument, diaphragm seals should be used as separators. For pressure transfer to the instrument, a neutral fluid used for the measurement medium is used.

Protective Accessories

If the measuring medium is subjected to rapid pressure changes or if pressure shocks can be expected, these should not be transferred to the instrument, but must be attenuated by suitable restrictors, such as integrated restrictor screw or damping devices



Overpressure protectors

Adjustable overpressure protectors are intended to protect pressure gauges against the effect of pressures exceeding their maximum pressure rating. When the system pressure exceeds the set pressure, the force exerted by the spring is overcome and the valve closes. The valve will remain closed until the system pressure drops approx. 25 % below the closing pressure, where-upon the force of the spring will open the valve.

Pressure gauge adaptor

Pressure gauge adaptor for reducing or enlarging the thread of a pressure gauge or pressure transmitter. Material brass or stainless steel 1.4571. The adaptor has to be completed with a gasket.



Rubber cover

Should the pressure gauge be used for portable use and there is a risk of damage to the gauge, a rubber cover can be fitted. The rubber cover is threaded on the instrument as a shield and protects from scratches, stroke or other improper treatment.

High operating temperature

In case of pressure measurement on steam or hot liquids, the instrument must be protected against high temperatures. The temperature in the instrument must not exceed the prescribed temperature ranges. A pressure gauge kit with gauge syphons, shut-off valves and welding pipes can then be a suitable solution.









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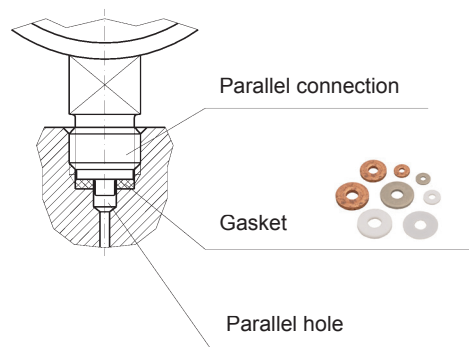
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Type of mounting

| | | | | | |
|---|---|---|--|---|---|
|  |  |  |  |  |  |
| Direct mounting | | Surface mounting | Panel mounting | | |
| Lower mount | Back mount | Lower mount with back flange | Back mount with front flange | Back mount with clamp | Lower mount with front flange |

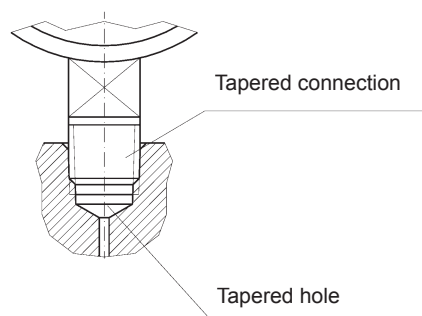
Standard connection EN 837

Parallel connection with floating pin



Special connection EN or ASME

Tapered connection without floating pin



Pressure connection

Pressure gauges have a pressure connection for installation in the process. By default, cylindrical pipe threads are used in accordance with EU standards. The pipe thread ends with a brazed part and a flight leg. During assembly, a gasket must be mounted against the frustrated part and around the seal pad.

The size of the pressure thread is related to the size of the pressure gauge housing. At case size 40 mm, G1/8" is used, at case dimensions 50 and 63 mm G1/4" is used and at case dimensions 100 and 160 mm, G3/8" or G1/2" is used.

For special purposes, there are also tapered threads 1/4"NPT and 1/2"NPT. These threads have no floating pin and require no gasket. The thread is self-sealing when assembled.

Case dimension 40 mm = Pressure connection G1/8"

Case dimension 50 mm = Pressure connection G1/4"

Case dimension 63 mm = Pressure connection G1/4"

Case dimension 80 mm = Pressure connection G3/8"

Case dimension 100 mm = Pressure connection G3/8", G1/2" eller 1/2"NPT

Case dimension 160 mm = Pressure connection G3/8", G1/2" eller 1/2"NPT

DN 8 = G1/4"

DN 10 = G3/8"

DN 15 = G1/2"