

Operating Instruction Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

Contents

	Page		Page
1. Important Note, Scope	1	8. Maintenance and Repair	8
2. Measuring Units, Construction of Pressure Gauges and Chemical Seals	1	9. Electrical Accessories	8
3. Selection Criteria	3	10. Storage	8
4. Accessories	5	11. Installation in Potentially Explosive Areas	9
5. Set-up Options	6	11.1 General Information	9
6. Installation	7	11.2 Marking for Explosive Area	9
7. Operation	7	12. CE-Marking	9

1. Important Note, Scope

1.1 Important Note

Please inspect the transport packaging and the delivered goods immediately upon their receipt to determine their integrity and completeness. In case of returns, please use the original packaging.

1.2 Scope

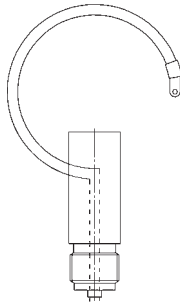
The information provided in this operating instruction, relating to the selection, application, set-up options, installation and operation, applies to pressure gauges with elastic element.

2. Elastic Elements, Construction of Pressure Gauges and Chemical Seals

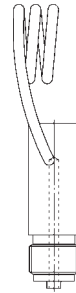
2.1 Elastic Elements

Bourdon Tube Types:

C-Type Bourdon Tube

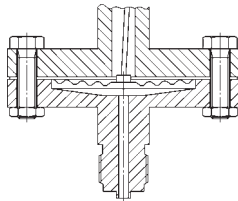


Helical Bourdon Tube

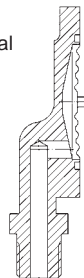


Diaphragm Type:

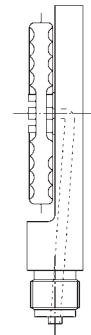
horizontal



vertical



Capsule Type:



Sales and Export South, West, North

ARMATURENBAU GmbH
Manometerstraße 5 • D-46487 Wesel-Ginderich
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MANOTHERMBeierfeld GmbH
Am Gewerbestraße 9 • D-08344 Grünhain-Beierfeld
Tel.: +49 3774 58 – 0 • Fax: +49 3774 58 – 545
www.manotherm.com • mail@manotherm.com

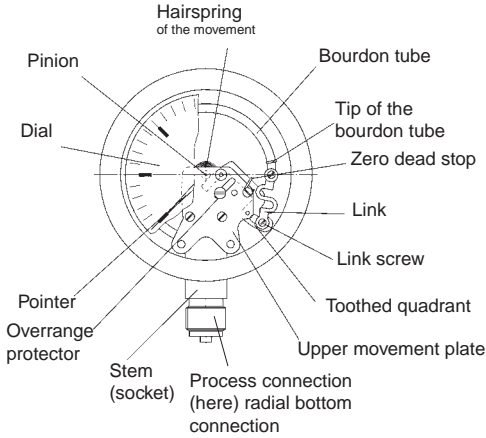
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Operating Instruction Pressure Gauges

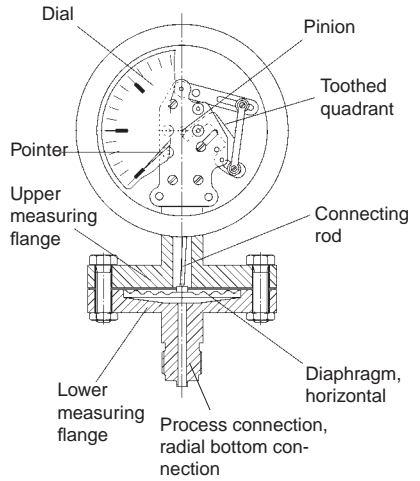
Selection Criteria, Set-up Options, Installation and Operating Instructions

2.2 Construction of Pressure Gauges

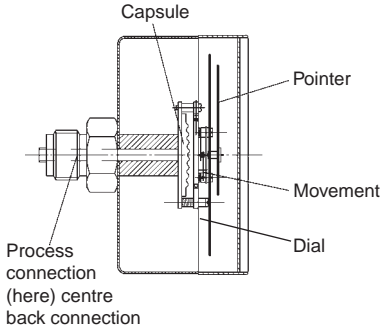
Pressure Gauge with C-type Bourdon Tube



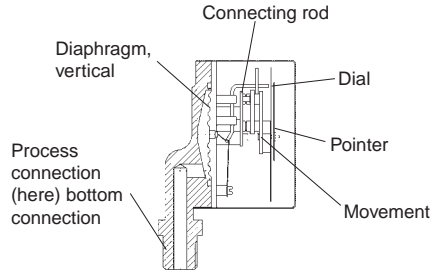
Pressure Gauge with Horizontal Diaphragm



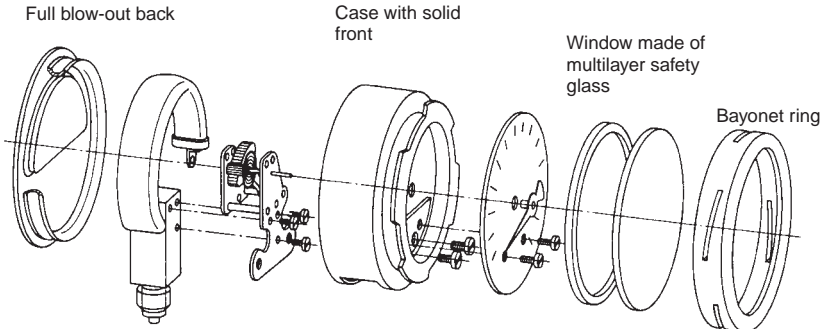
Pressure Gauge with Diaphragm Capsule



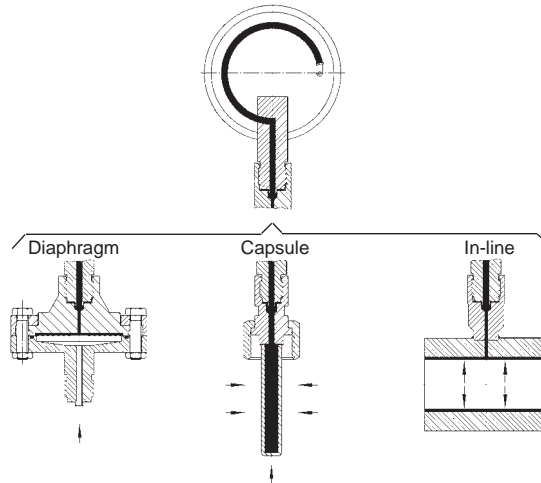
Pressure Gauge with Vertical Diaphragm



Pressure Gauge in line with Safety Requirements according to EN 837-1, S3 (formerly DIN 16 006 Part 1 and Part 2)



2.3 Types of Chemical Seals



3. Selection Criteria

The user has to ensure that the proper pressure gauge is selected regarding indication range and type (e.g. resistance of the materials against medium, atmosphere and temperature, overrange protection etc.). The regulations applying to the particular application as well as EN 837-2 have to be regarded.

3.1 Principles of Measurement

The pressure gauges described in this operating instruction contain measuring elements that deform elastically when subjected to pressure. This motion is transferred to a movement. Due to their robustness and easy handling, these instruments (pressure gauges) are widely used in pressure measurement.

The measuring elements are generally made of copper alloys or alloyed steel.

Pressure Gauges with Bourdon Tube

Bourdon tubes are circular bent tubes with an oval cross-section. The pressure that is to be measured acts on the interior of the tube so that the tube's oval cross section approaches a circular form. The hoop stress produced by this deformation causes the arced Bourdon tube to open. The end of the bourdon tube that is not fixed performs a motion, which is a measure for the pressure. For pressure ranges up to 40 bar, circular bent bourdon tubes with a torsion angle of 270° are generally used. For higher pressure ranges, helical bourdon tubes with several torsions are applied.

Bourdon tubes have a relatively low restoring force.

Therefore, when using additional accessories such as indicating pointers, limit switch contact assemblies or potentiometric transducers, their influence on the indication has to be taken into account.

Pressure gauges with a bourdon tube can only be protected against overload to a limited extent, by supporting the elastic element at a specific pressure limit.

Bourdon tube pressure gauges are applied for pressure ranges from 0.6 bar to 4,000 bar, generally in the accuracy classes 0.6 to 2.5.

The influence of temperature changes on the indication mainly depends on the temperature coefficient (TEC= change in stiffness caused by change in temperature) of the modulus of elasticity of the bourdon tube.

Depending on the material, the accuracy error caused by differing temperatures lies between 0.3 % and 0.4 % per 10 K.

Diaphragm Pressure Gauges

The diaphragms are corrugated and circular shaped. The pressure acts on one side of the diaphragm. The deflection of the diaphragm is a measure for the pressure. Diaphragms have a relatively high restoring force. Therefore, the influence of additional accessories is lower compared to bourdon tube gauges. Due to the annular fixing arrangement of the diaphragm it is less sensitive to vibrations. Diaphragms can be protected against high overload, by supporting the measuring unit. They can be protected against corrosive media by applying coatings or foils. Diaphragm gauges can be applied to an advantage with highly viscous and crystallising media, as extended connection bores, open connection flanges or purge holes allow for cleaning options.

There are gauges with horizontal diaphragm and with vertical diaphragm, i.e. where the diaphragm is placed in parallel to the dial. For pressure ranges < 0.6 bar, diaphragms with a diameter of 160 mm are generally used, whereas for higher pressure ranges diaphragms with a diameter of 100 mm are used. Due to the annular fixing arrangement of the diaphragm, the deviation in indication caused by temperature changes is significantly greater compared to bourdon tube gauges. Diaphragm pressure gauges are applied for pressure ranges from 10 mbar to 25 bar in the accuracy classes of 1.6 and 2.5, exceptionally also in 4.0.

Operating Instructions Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

Capsule Pressure Gauges

A diaphragm capsule consists of two corrugated, circular shaped diaphragms or a diaphragm and a base plate that are assembled pressure tight at the edge. The pressure is introduced at the centre of one of the diaphragms and acts on the inside of the capsule. The hereby produced lifting movement is a measure for the pressure.

Capsule pressure gauges are not suited for liquid media. They can be applied for pressure ranges from 2.5 mbar to 600 mbar in accuracy classes from 0.6 to 1.6.

The deviation in indication caused by changes in temperature can lie between 0.3 % and 0.4 % per 10 K, depending on the material.

3.2 Pressure Ranges

The operating pressure should lie in the middle third of the pressure range of the gauge. The maximum pressure load should not exceed 75 % of the full scale value at steady load or 65 % of the full scale value at dynamic load, cf. EN 837-2.

3.3 Accuracy Limits

The error limits for pressure gauges are defined in EN 837-1 (bourdon tube gauges) and EN 837-3 (capsule and diaphragm gauges – formerly DIN 16 005).

Pressure gauges of the classes 0.1 to 0.6 and higher are preferably used in laboratories and workshops for accurate measurements.

Pressure gauges of the classes 1.0 and 1.6 are mainly used for measurements on machines and production facilities.

Pressure gauges of the classes 2.5 and 4.0 are used for monitoring tasks without special accuracy requirements.

3.4 Conditions of Usage

When selecting pressure gauges the selection criteria and installation recommendations in accordance with EN 837-2 (formerly DIN 16 005 Part 1 and Part 2) as well as the instructions provided here, especially in sections 3.4.1, 3.4.2 and 5, must be considered.

The use of pressure gauges which do not meet the actual operating conditions, can cause great consequential damages.

3.4.1 Pressure Media Properties

Pressure History

Rapid pressure changes or pressure strokes should not act abruptly on the measuring element.

Pressure strokes must not exceed the pressure limits specified for the pressure gauges. If necessary, overload protection (see section 4) must be connected upstream. Pressure changes of >10% of the full scale value per second impair the readings of the measured values. Moreover, this will severely reduce the service life of the pressure gauges. In such cases, attenuators must be provided.

With snubbers (restrictor screw or adjustable snubber) the inlet cross section can be significantly reduced, thus delaying the change in pressure in the measuring element. The installation of an integrated restrictor screw (reduction of the cross section of the measuring element) is also possible.

In both cases, the susceptibility to contamination is disadvantageous. Attenuators at the movement only decelerate the pointer fluctuation. Fluid filled cases dampen the fluctuation of the measuring element and reduce the wear of the moving parts.

Temperature

If the temperature of the medium at the measuring point deviates from the operating temperature specified for the pressure gauge (see section 7, as well as EN 837-1, -2, -3), a measuring line with sufficient length, a siphon or a chemical seal with capillary line must be connected upstream to the pressure gauge.

The influence on the indication owing to deviating instrument temperatures from +20 °C must be considered.

Highly Viscous, Crystallising and Solid-Containing Media

For measurements of highly viscous, crystallising or solid-containing media, the use of diaphragm or bourdon tube pressure gauges with attached chemical seal (see section 4.4) is recommended.

Corrosive Media

If corrosive media can be kept away from the measuring element by separating agents, then standard pressure gauges may be used. Otherwise, the selection of suitable material is mandatory, whereby the user must provide the manufacturer with every information on the materials that are compatible with the medium under the specific measuring conditions, cf. EN 837-2, 4.3.

Due to the restricted choice of materials for the elastic elements, diaphragm pressure gauges with a protective lining possibly have to be used, or chemical seals made of media resistant materials need to be connected upstream to a bourdon tube pressure gauge.

Safety

A higher risk exists, for example, with gases and fluids under high pressure. In case of leakage or bursting of pressure-retaining components, employees standing in front of the window of the instrument, should not be endangered by medium emerging to the front. Safety pressure gauges with a blow-out device at the rear, for example a blow-out back, provide for protection (see fig. on page 2, at the bottom).

With hazardous media, for example

- oxygen
- acetylene
- combustible substances
- toxic substances

as well as refrigerating units, compressors etc., the applicable regulations must be considered.

In accordance with EN 837-1, 9.7 fluid filled pressure gauges must be equipped with blow-out devices (version S1, or S2 or S3 according to EN 837-1).

3.4.2 Ambient Conditions

Vibrations

If an exposure of the pressure gauge to vibrations can not be avoided by way of suitable installations, gauges equipped with dampened movement or with fluid filling must be used.

Ambient Temperature

The error limit given on the dial applies to a reference temperature of +20 °C. Deviating temperatures have an influence on the indication. The extent of the influence depends on the measuring principle (see section 3.1).

At outdoor installations, the ambient conditions must be taken into account through selection or protection, in order to prevent, for example, the pressure gauge from freezing over at temperatures below 0 °C. In fluid filled instruments the viscosity of the fluid increases as the temperature drops causing a considerable delay of indication. The ambient temperature must also be taken into account regarding the maximum allowed operating temperature for the pressure gauge.

Corrosive Atmosphere

In corrosive atmospheres, correspondingly suitable casings and components made of corrosion resistant materials must be provided.

Special surface finishings help protect the pressure gauge cases on the outside.

4. Accessories

Shut-off Fittings for Pressure Gauges

It is recommended to install a shut-off device between the measuring point and the pressure gauge, which allows for an exchange of the pressure gauge and check of zero point during continued operation of the system. Depending on the application, either cocks or valves are used. Cocks have three positions:

- Venting: The supply line is shut-off and the gauge is connected to the atmosphere. The zero point can be checked.
- Operation: The supply line is open, the gauge is pressurised.
- Blow-out: The supply line is open, the medium escapes into the atmosphere. The gauge is not working.

With valves (e.g. according to DIN 16 270 and DIN 16 271), a venting screw is usually provided between valve seat and pressure gauge.

Venting to the atmosphere should be thus arranged that employees are not endangered by escaping medium. Environmental pollution should be avoided.

With certain applications (e.g. steam boilers), the shut-off fittings must have a test port, to allow for checking of the pressure gauge without having to remove it from the system.

Pressure Gauge Holder

If the measuring line is not sufficiently stable to support the pressure gauge free from vibrations, a suitable holder is to be provided.

Siphons

To protect the shut-off fittings and pressure gauges against heating through hot media (e.g. steam), sufficiently long measuring lines or siphons should be installed.

Chemical Seals

With aggressive, hot, highly viscous or crystallising media, chemical seals can be mounted to bourdon tube gauges as separating element in order to prevent the ingress of such media into the measuring element. The pressure is transmitted to the measuring element by a neutral fluid that is selected depending on measuring range, temperature, viscosity and other influences, whereby the compatibility of this fluid with the medium has to be considered.

Chemical seals are available in different configurations, see figure in section 2.3, whereas the diaphragm seal is the most commonly used model.

With in-line and flange type diaphragm seals the pressure gauge must be mounted at works to the chemical seal, in accordance to the given installation position.

Pressure gauge and chemical seal should not be disconnected.

Possible errors, occurring due to mounting of a chemical seal to a pressure gauge have to be considered.

Overrange Protection Devices

If, for operational reasons the indication pressure range has to lie below the maximum operating pressure, the pressure gauge can be protected against damages by connecting overrange protection devices.

At a pressure stroke the overrange protector shuts down immediately, at slow rising pressure gradually. The closing pressure that needs to be set, therefore depends on the progress in time.

Highly viscous and contaminated media, however, can impair the function of the overrange protector or render it ineffective.

Capsule and diaphragm pressure gauges can also be produced overrange protected (3-fold, 5-fold or 10-fold overrange protected).

Operating Instructions Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

Table 1

State of the filling in the measuring line	fluid			gaseous		
	fluid	partly degassing	fully degassing	gaseous	partly condensed (humid)	fully condensed
Examples	condensate	boiling fluids	"liquid gases"	dry air	moist air flue gas	water vapour
a) Pressure gauge above the measurement port						
b) Pressure gauge below the measurement port						

The arrangements 3, 4, 5, 7, 8 and 11 are to be preferred.

5. Set-up Options

General Remarks

Proven measuring arrangements and proposals for components are detailed in VDE/VDI 3512 sheet 3. Table 1 shows an overview of possible arrangements.

Pressure Measuring Port

The pressure measuring port should be installed where the flow is unimpaired and permanent measuring conditions exist. It is recommended to provide for a sufficiently large bore for the pressure measurement and to lock the measuring port with a shut-off device.

Measuring Line

The measuring line is the connection between pressure measuring port and pressure gauge. The inside diameter of the measuring line should be sufficiently large in order to avoid blockage. The measuring line should have a steady slope (recommended is a slope of 1:15). With gaseous media, a drain should be provided at the lowest point, with high-viscosity fluids a vent should be provided at the highest point. With gases or fluids containing solids, separators should be provided that can be demounted from the system and emptied during operation, due to shut-off valves. The measuring line should be implemented and installed in such a way that it withstands loads caused by expansion, vibration or thermal effects.

Shut-off Valves at the Pressure Gauge

Shut-off valves at the pressure gauge serve the purpose of checking the zero setting or exchanging the pressure gauge during operation (cf. section 4).

Pressure Gauge

The pressure gauge has to be mounted free of vibrations and so that the dial is easily readable. When reading the dial, parallax errors should be avoided. It has to be ensured that any blow-out devices in the pressure gauge are not blocked (cf. EN 837-1, 9.7).

The pressure gauge should be installed in such a way that the temperature does not drop below or exceed the permissible operating temperature (see also sections 3.4.1 and 7). In the process, the influence of convection and thermal radiation should be considered. When the measuring element of a pressure gauge is filled with water or a water mixture, the instrument must be protected against frost.

Generally, the pressure gauge is mounted with a vertical dial. In all other cases, the symbol on the dial indicating the position according to EN 837 (formerly DIN 16 257) applies.

A difference in height between the pressure measuring port and the pressure gauge causes a shift at the start of measurement, when the medium in the measuring line does not have the same density as the ambient air. This shift at the start of measurement Δp results from the difference in density ($\rho_M - \rho_L$) and the difference in height Δh : $10^{-5} \cdot (\rho_M - \rho_L) \cdot g \cdot \Delta h$

$$\begin{aligned} \Delta p &= \text{Shift at start of measurement} && \text{(bar)} \\ \rho_M &= \text{Density of the medium} && \text{kg/m}^3 \\ \rho_L &= \text{Density of the air (1.205 at 20 °C)} && \text{kg/m}^3 \\ \Delta h &= \text{Difference in height} && \text{m} \\ g &= \text{Gravitational acceleration} && \text{m/s}^2 \\ &(\text{approx. gravitational acceleration} = 9.81 \text{ m/s}^2) \end{aligned}$$

The indication is decreased by Δp when the pressure gauge is positioned higher than the pressure measuring port, and increased by Δp when it is positioned lower.

Operating Instructions Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

6. Installation

Pressure gauges should only be installed by trained engineering personnel.

For measurement arrangement see section 5.

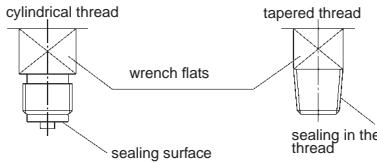
During installation or removal, pressure gauges should never be held at the case but at the wrench flat of the socket. It must be ensured that the matching process connection is selected (nominal width, if required suitable sealing face, etc.).

For instruments with thread connection, an installation with clamping sleeve or union nut is recommended, in order to allow for proper readability.

Instruments with flange connections are fitted to the counter flange and secured with suitable screws. Ensure that the screws are firmly tightened.

The connections must be tight. Therefore, sealings made of suitable medium-resistant material should be used for the connection.

For the sealing of pressure measurement connections with cylindrical thread spigots, flat sealing rings according to EN 837-1 or profile packings, or lense-type sealing rings for corresponding high pressure connections have to be applied at the sealing surface. Tapered threads (e.g. NPT-threads) are sealed additionally with sealants such as for example PTFE-tape (cf. EN 837-2).



For pressure gauges with pressure ranges of ≤ 6 bar and with a pressure relief vent \varnothing of 13 mm at the top of the case, it is recommended to cut off the fitting at the filling plug in order to allow for internal pressure compensation through venting of the gauge.

If the pressure gauge is positioned below the pressure relief vent, the measuring line should be rinsed thoroughly before putting into operation.

During pressure tests on pipes or vessels, the pressure gauge must not be exposed to higher loads than indicated by the pressure limit indication mark ▼ on the dial; or the pressure limit at steady load, specified for the pressure gauge, should not be exceeded (see section 7).

With diaphragm gauges the clamping bolts for the upper and lower flange must not be unloosened.

The connections between pressure gauge and chemical seal and possibly between chemical seal and capillary line are not to be released.

Before **removing** the pressure gauge, the measuring unit must be depressurised. Possibly the pressure must be relieved on the measuring line. Residues of the medium in demounted pressure gauges can endanger personnel, facilities and the environment. Therefore, precautionary measures must be taken.

(Electrical accessories: see section 9).

7. Operation

Shut-off devices should be opened slowly in order to avoid sudden pressure peaks when putting into operation.

Application Range

The application range for steady loads is indicated on the dial of many pressure gauges by a pressure limit indication mark ▼ (see EN 837-1, EN 837-3).

At steady load bourdon tube pressure gauges of nominal case sizes 100, 160 or 250 are loadable to the full scale value. At dynamic load only the 0.9-fold as peak load of that pressure is permissible, for pressure ranges of 0/2500 bar and 0/4000 bar only 2/3 max. of the full scale pressure value. Bourdon tube pressure gauges are overrange protected up to 1.3 of the full scale value (instruments with the ranges 0/2500 bar and 0/4000 bar can only be loaded to their full scale value!).

At steady load bourdon tube pressure gauges of nominal case sizes 40, 50, 60, 63, 80 and 72x72 are loadable up to 3/4 of the full scale value, at dynamic load up to 2/3 maximum of the full scale value and only temporarily to the full scale value.

Diaphragm pressure gauges with vertical diaphragm are loadable to the full scale value at steady load, at dynamic load to the 0.9-fold of the full scale value.

Diaphragm pressure gauges with horizontal diaphragm are overrange protected to the 5-fold of the full scale value (custom-made instruments also higher), but never higher than 40 bar.

Capsule pressure gauges are loadable to the full scale value at steady load, at dynamic load maximum to the 0.9-fold of the full scale value. Just as bourdon tube pressure gauges they are 1.3-fold overrange protected (custom-made instruments also higher).

Zero Point Check

In order to check the zero point of the pressure gauge during operation, the required shut-off device has to be closed (see section 4) and pressure is relieved. The pointer must rest within the zero range indicated by 1.

If the pointer comes to rest outside this range, a permanent deformation of the measuring unit can be assumed, which has to be checked thoroughly in order to avoid accidents caused by measuring errors. Therefore, the pressure gauge should be replaced and, if necessary, returned to the manufacturer for checking and repair.

Operating Instructions Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

Pressure Range Check

If the pressure range indication has to be checked during operation, the pressure gauge is separated from the process via the required shut-off device with test port (see section 4), and a test pressure is applied to the gauge. The error limits according to EN 837-1 or EN 837-3 apply.

Temperature-Resistance

The permissible operating temperatures of the pressure gauge must not be exceeded.

The temperature resistance or the permissible operating temperature generally lies between -40 °C to $+60\text{ °C}$ maximum (cf. EN 837-1 and EN 837-3), whereas unfilled gauges with brazed bourdon tubes withstand measuring temperatures of up to $+100\text{ °C}$ or with shielded arc welded bourdon tubes in stainless steel cases up to $+200\text{ °C}$.

Special versions that are labelled accordingly (tA / tR) can be suitable for higher temperatures.

Note: These are only pieces of information on temperature resistance of the materials or the soldered joints or welded seams. The information on indication errors due to deviation from the reference temperature has to be considered!

Further details can be found in our model overview 1000 for bourdon tube pressure gauges.

Cleaning Temperature

When rinsing the measuring line, the permissible operating temperature of the pressure gauge (see above) must not be exceeded. If necessary, the gauge has to be shut-off or removed.

The maximum cleaning temperature tR of pressure gauges with chemical seals must not be exceeded.

8. Maintenance and Repair

In general, pressure gauges are maintenance-free.

They should only be repaired by the manufacturer. Before returning an instrument for repair, all wetted parts must be cleaned thoroughly, especially regarding hazardous media (see also section 6). The repair order should include a description of the medium or a declaration of contamination.

9. Electrical Accessories

Installation and electrical connections should only be performed by trained engineering personnel.

Instruments with electric accessories are marked with a nameplate that indicates the electrical connection of the instrument.

Consideration of load limits is obligatory. Exceeding of load limits can cause damage.

The national and international safety regulations (e.g. VDE 0100) must be considered during installation, starting up and operation of the instruments.

It must be ensured that the cable diameters match the nominal widths of the sealing inserts. Screw fittings must be tightened firmly. Only then compliance with certified protection standards can be ensured. In versions with angular plugs, plug connectors or terminal boxes, the centrally arranged fixing screws must be tightened hand-tight.

For the connection of pressure transmitters DMU, only shielded cables are to be used in order to conserve the electromagnetic compatibility (EMC). The shield of the cable must be connected with the case or with the ground terminal of the angular plug.

The CE mark according to EMC-guidelines on instruments with magnetic contact only applies, when the frequency of operation does not exceed 5 switching cycles per minute.

If specified, suitable switch amplifiers or multifunctional relay must be used (e.g. for instruments with inductive contacts). The valid operating instructions must be considered.

10. Storage

During storage, the pressure gauges should remain in their original packaging and be stored protected against damages caused through external influences.

After possible temporary removal of a pressure gauge (e.g. for a test), it should be replaced in the original packaging for further storage.

In general, during storage the minimum temperature should not fall below -40 °C and the maximum temperature should not exceed $+60\text{ °C}$ (cf. EN 837-1 and EN 837-3).


Operating Instructions Pressure Gauges

Selection Criteria, Set-up Options, Installation and Operating Instructions

11. Installation in Potentially Explosive Areas

11.1 General Information

Pressure Gauges are mechanical pressure measuring instruments and when operated as intended, do not show sources of ignition. Versions made of stainless steel and with laminated safety glass are suitable for application in areas of category 2 and 3 according to the ATEX-Directive 94/9/EC. For applications in category 1 (e.g. installation to Zone 0), only pressure gauges with integrated, type-approved flame arresters, our model Adapt-FS, are suitable. This protection system prevents a flame penetration at deflagration of explosive vapour-air or gas-air mixtures of explosion groups IIA, IIB and IIC in an upstreamed volume of max. 0.2 l. The flame arrester "Adapt-FS" is certified with

 IIG IIC PTB 12 ATEX 4001 X





on condition that the operating pressure does not exceed 1.1 bar abs. and the operating temperature does not exceed 60 °C.

To avoid heating of the measuring elements of bourdon tube pressure gauges, dynamic load is not allowed with gaseous media!

11.2 Marking for Explosive Area

Pressure gauges **without** limit switch contacts for application in potentially explosive areas, are marked as follows:

Example: Bourdon Tube Pressure Gauge
Type RCh 100 – 3
Manufacturer ARMATURENBAU

	Manometerstraße 5 • D-46487 Wesel
	Bourdon Tube Pressure Gauge Type RCh 100 – 3
	II 2Gc II 2Dc
	Temperature range -25...+75 °C

(content binding, partition free)

Please contact the manufacturer in case of uncertainties.

12. CE-Marking

Pressure Equipment Directive 2014/68/EU
Pressure measuring instruments by ARMATURENBAU GmbH and MANOTHERM Beierfeld GmbH with a pressure of > 0.5 bar are covered by the Pressure Equipment Directive 2014/68/EU as "pressure accessories". Our pressure measuring instruments according to DIN EN 837-1 "Bourdon tube pressure gauges" have a CE mark according to the conformity assessment procedure for pressure ranges from 200 bar onwards. Pressure gauges with connection flange > DN 25 or 1", or with thread connection > 1" have a CE mark already for pressure ranges from 0...0.5 bar onwards. The labelling is realised via nameplate externally on the case:



Measuring instruments with pressure ranges > 0.5 bar and < 200 bar, which are covered by article 4 (3) of the pressure equipment directive, do not receive a CE mark.

EU-Konformitätserklärung

EC Declaration of Conformity

nach DIN EN ISO / IEC 17 050-1
according to DIN EN ISO / IEC 17 050-1



Für die nachfolgend bezeichneten Erzeugnisse

We hereby declare for the following named goods

Rohrfedermanometer
Typ R...
Plattenfedermanometer
Typ (A)P...
Differenzdruck- oder Doppelmanometer
Typ D(i)R..., DiP..., DiK...
Kapselfedermanometer
Typ K...

Bourdon Tube Pressure Gauges
Model R...
Diaphragm Pressure Gauges
Model (A)P...
Differential- or Duplex Pressure Gauges
Model D(i)R..., DiP..., DiK...
Capsule Pressure Gauges
Model K...

wird hiermit bestätigt, dass sie den folgenden Normen entsprechen:

that they agree with the following standard:

DIN EN 837-1:1997-02
DIN EN 837-3:1997-02

DIN EN 837-1:1997-02
DIN EN 837-3:1997-02

Sie werden gemäß den Bestimmungen folgender Richtlinie gefertigt:

They are produced according to the requirements of the following directive:

RICHTLINIE 2014/68/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES VOM 15. Mai 2014 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Druckgeräte – kurz: **Druckgeräterichtlinie**

DIRECTIVE 2014/68/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from 15. May 2014 on the approximation of the laws of the Member States concerning pressure equipment – short: **Pressure Equipment Directive**

Mit Messbereichen ab 200 bar oder Flanschanschlüssen ab DN 25 und Messbereichen ab 0,5 bar fallen sie ihrer Art nach unter „Druckhaltende Ausrüstungsteile“ und werden folgendem Konformitätsbewertungsverfahren unterzogen:

Pressure Gauges with ranges from 200 bar or flange connection from DN 25 and ranges from 0,5 bar are part of “Pressure Accessories” and will subjected to the following conformity assessment process:

Modul A2 “Interne Fertigungskontrolle mit Überwachung der Abnahme”

Module A2 “Internal Production Control with Surveillance of Final Assessment”

Benannte Stelle:
TÜV NORD Systems GmbH & Co. KG
Meidericher Straße 16
D-47058 Duisburg
Nummer der benannten Stelle: **0045**

Notified Body:
TÜV NORD Systems GmbH & Co. KG
Meidericher Straße 16
D-47058 Duisburg
Number of Notified Body: **0045**

Die CE-Kennzeichnung erfolgt mittels Aufkleber auf dem Gehäuse.

The CE-marking is made by a label on the case.

Diese Erklärung wird verantwortlich für die Hersteller:

This declaration will responsibly for the manufacturers:

ARMATURENBAU GmbH
MANOTHERM Beierfeld GmbH

abgegeben durch / by

Bernd Vetter
Geschäftsführer / Managing Director

WESEL 2017-02-03
(Ort / Location) (Datum / Date)

(rechtsgültige Unterschrift / Legal signature)

EU-Konformitätserklärung

EC Declaration of Conformity

nach DIN EN ISO / IEC 17 050-1

according to DIN EN ISO / IEC 17 050-1



Für die nachfolgend bezeichneten Erzeugnisse

We hereby declare for the following named goods

Manometer

Typen RCh..., RSCh..., RChg..., RQ..., RF...,
Pm..., PCh..., PSCh..., PsP..., D(i)RCh..., DiRZCh...,
DiKPCh..., KPB..., KPCh...

Pressure Gauges

Models RCh..., RSCh..., RChg..., RQ..., RF...,
Pm..., PCh..., PSCh..., PsP..., D(i)RCh..., DiRZCh...,
DiKPCh..., KPB..., KPCh...

Thermometer

Typen TBi..., TSChg..., TGeChg..., TFChg..., TA...,
TSCh..., TGeCh..., TF..., TRCh...

Thermometers

Models TBi..., TSChg..., TGeChg..., TFChg..., TA...,
TSCh..., TGeCh..., TF..., TRCh...

ohne Grenzsinalgeber

without Limit Switch Contact

wird hiermit erklärt, dass sie den wesentlichen Schutzanforderungen entsprechen, die in der nachfolgend bezeichneten Richtlinie festgelegt sind:

that they meet the essential protective requirements which are fixed in the following directive:

RICHTLINIE 2014/34/EU DES EUROPÄISCHEN PARLAMENTES UND DES RATES vom 26. Februar 2014 für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen – kurz:

DIRECTIVE 2014/34/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL from 26. February 2014 on equipment and protective systems intended for use in potentially explosive atmospheres – short:

ATEX-Richtlinie

ATEX-Directive

Zur Beurteilung der Erzeugnisse hinsichtlich der Richtlinie wurden folgende Normen herangezogen:

The following standards have been used to assess the goods regarding the directive:

DIN EN 13463-1:2009-07

DIN EN 1127:2011-10

DIN EN 13463-5:2011-10

Kennzeichnung:



Temperaturbereich: -25 °C* ... +75 °C

* optional bis -60 °C,
je nach Gerätetyp und Anforderung

Marking:



Range of temperature: -25 °C* ... +75 °C

* optionally up to -60 °C,
depending on models and requirements

Diese Erklärung wird verantwortlich für die Hersteller:

This declaration is responsibly for the manufacturers:

ARMATURENBAU GmbH
MANOTHERM Beierfeld GmbH

abgegeben durch / by

Bernd Vetter

Geschäftsführer / Managing Director

WESEL

(Ort / Location)

2017-02-03

(Datum / Date)

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