

User Guide

TEST AND LABORATORY PRESSURE GAUGES 01.15 & 17.1 – 01.16 – 01.17 – 01.25 – 01.27





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1. General information

The instrument described in this manual has been designed and produced in conformity to the following standards EN 837-1-2 and ASME B40.1. All components are submitted to severe quality and traceability controls. The quality management system is certified according to the ISO 9001 standard. This manual contains important information about the use and the installation of the gauge in safe conditions. Therefore it is highly recommended to read carefully the following instructions before using the instrument.

The instrument works in safe conditions when correctly selected and installed in the system and when the rules concerning the product as well as the maintenance procedures established by the manufacturer are respected. The staff charged with the selection, installation and maintenance of the instrument must be able to recognize the conditions that may negatively affect the instrument's ability to work and which may lead to premature breakage. The staff must therefore be technically qualified and properly trained, and must carry out the procedures called for in the plant regulations.

Standards

Directive P.E.D. 97/23/CE

This instruments are designed and manufactured according to the safety rules included in the safety international standards in force. According to the 97/23/CE standard this pressure gauges are classified in 2 categories

PS ≤200 bar: these instruments should not satisfy the essential safety standards but they have only to be designed and manufactured according to a SEP-Sound Engineering Practice and they do not have to bring any CE marking.

PS >200 bar: these instruments should satisfy the essential safety standards established by the PED, they are classified as category I and they are certified according to Form A. They should bring the CE marking as reproduced here below



1.1 Intended use

These instruments are designed to be used as test instruments to check or recalibrate other instruments where the accuracy and repeatability are important matters.

They can be used with gaseous or liquid media which do not corrode copper alloy and which do not have high viscosity or do not crystalize.

2. Packing

All test and laboratory pressure gauges from DRUCK & TEMPERATUR Leitenberger GmbH, Germany, are supplied with dedicated packing to protect the instruments from shock due to transport handling which can modify the original accuracy. Before to proceed with installation all the packing protection shall be removed.

For a safe transport, on the model **01.27**, the pointer is locked with a tape which shall be removed before the use. To remove the tape proceed first to unlock the front protection ring by removing the four screws on the back of the ring. Once unlocked the protection ring, gently remove the tape by keeping the pointer locked between the fingers and avoiding any sharp action which could jeopardize the original accuracy.

3. Installation



- The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.
- Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.
- Disconnect the instruments only after depressurization of the system..
- The process fluids residuals in the disassembled gauges could affect people, the environment and the system. It is highly recommended to take proper precautions.



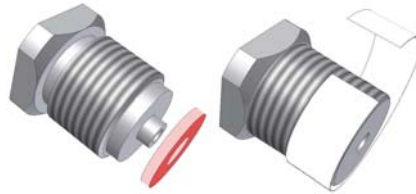
- Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid
- This manual does not concern the instruments conforming to standard 94/9/CE (ATEX).
- The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.
- The user is totally responsible for the instrument installation and maintenance.
- Handle and store carefully the instruments used for the measurement of toxic or flammable..

In order to verify the working and manufacturing features of the instruments read the catalogue sheets in the most updated edition available online on www.druck-temperatur.de

The instrument installation should be carried out according to standard EN 837-2 (Recommendation for pressure gauges installation and selection)

- The gauge should be connected to the process system forcing through a special wrench on the process connection point without forcing on the case by the hands. As for the process connections with cylindrical threading, a head gasket compatible with the fluid to be measured should be used. In case the connection threading is conic additional sealing materials are applied on the thread (PTFE tape).

This procedure is not suitable for cylindrical threading.



- Installation must be done according to EN 837-1, Chapter 8. The user is solely responsible for any combinations that differ from the ones shown in the mentioned rule.
- The requested torque to guarantee an adequate tightness depends in the measuring range, on the threading type and on the gasket type.
- As for gauges with security device installation should guarantee a free space on the back side of 20mm at least.
- As for gauges with surface mounting and back connection be sure that the pipe conducting the fluid in pressure is connected to the instrument connection without tensions.
- In order to guarantee the accuracy in measuring it is necessary to respect the working limits described in the data sheets.
- Instruments should be installed in vibrations proof positions. If the mounting point is not stable because of vibrations a support for the instrument fixing should be used such as a clamp or a flange , possibly use a flexible capillary.
- If vibrations cannot be prevented during installation, use liquid filled instruments.
- The instrument mounting according to standard EN 837-1 /9.6.7 established the vertical position as standard mounting. Calibration and therefore mounting positions different from standard (when requested) are shown on the dial.

- Instruments must be protected from wide ambient temperature variations.
- Instruments must be protected from sun radiations during working in order to prevent overheating.
- During installation be sure that no deviation above or below the fluid allowed and the ambient temperatures takes place considering the heating radiations. It is necessary to consider the temperature influence on the accuracy value.
- During the first operating procedure all pressure peak or fast changes should be prevented. Slowly open the interception valves.
- It is not recommended to reinstall the instruments on plants working with different process fluids in order to prevent any chemical reaction which could cause explosions owing to contamination of the wetted parts.
- If the pressure indication stays fixed for a long time be sure that this is not due to a closing up of the pipe bringing the pressure to the sensing element. Before disassembling especially in case of pressure with zero value be sure that there is no pressure inside the gauge isolating it through the interception valve.

4. Accuracy

The accuracy of the test and laboratory pressure gauges is granted at the ambient temperature written on the dial of each and every instruments and within $\pm 3^{\circ}\text{C}$ of variation of it. For larger temperature variation the thermal drift shown on the relevant data sheet shall be considered .

4.1 Calibration report

Each and every test and laboratory pressure gauges is supplied with its calibration report which attest the original accuracy and correct working. On demand we can supply a calibration report issued by the accredited laboratory (DAkkS / ACCREEDIA).

5. Zeroing

The test and laboratory pressure gauges are equipped with the following devices which permit to correct the zero deviation :

- **01.27:** external adjusting knob placed on the front protection ring.
- **01.15 & 17.1, 01.16, 01.17, 01.25:** micrometric adjustable pointer .

The zero deviations can be corrected if they are not larger than 5% of the full scale value, while if they are larger it is recommended to proceed with the full recalibration procedure.

6. Limits of use

6.1 Ambient and process temperature

The instruments are designed to be safe if used within following limits :

Model	Ambient temperature	Process temperature
01.15 & 17.1	-25...+65°C	-40...150°C
01.16	-25...+65°C	-40...150°C
01.17	+15...+65°C	max 65°C
01.25	-20...+65°C	max 65°C
01.27	+10...+60°C	max 20°C

6.2 Working pressure

The instrument shall be chosen considering the working pressure between 25% and 75% of the full scale range. The full scale range should be approximately double than the working pressure value.

6.3 Overpressure

These instruments are not designed to withstand over pressure. They can however withstand a short overpressure, as per the below table, for a period of time not longer than 10 seconds.

Model	Overpressure
01.15 & 17.1	30% of the Full Scale Value (F.S.V)
01.16	30% (F.S.V)
01.17	25% (F.S.V) for ranges $\leq 60\text{bar}$ 15% (F.S.V) for ranges $\geq 100\text{bar}$
01.25	25% (F.S.V) for ranges $\leq 60\text{bar}$ 15% (F.S.V) for ranges $\geq 100\text{bar}$
01.27	Not available

6.4 Safety devices

In systems working with compressed gas it is recommended to choose an instrument with a proper safety device in accordance to standard EN 837-2. In case of unexpected breaking of the sensing element the compressed gas expands outside the case through the safety device

7. Wrong applications

7.1 Fatigue rupture

A continuous pressure variation highlighted by oscillations of indication can reduce the elastic element's life. These damages, which could be more dangerous if occur in measuring compressed gas instead of liquids, cause a pressure increase inside the case and therefore the safety device opening. In case of operation with high pressure the breakage could degenerate in an explosion.

7.2 Overpressure rupture

The effects of this kind of breakage are unexpected. Most commonly they are more serious during compressed gas measuring procedure and they can cause the explosion of the instrument whose debris could be deflected everywhere. The safety device opening does not always hold the fragments. In case of breakage risk for overpressure we recommend to use a solid front blow out back. instrument. In case of breakage this model prevents that the operator is hit by the instruments fragments. The glass alone does not guarantee a proper protection and in this case it represents the most dangerous component. Short overpressure pulsations could occur in pneumatic or hydraulic systems especially after valves opening or closing. The amplitude of these pulsations can often be higher than the working pressure and their high velocity does not allow to read the instrument so they are invisible for the operator. These pulsations can bring to the final breakage of the instrument or to a permanent zero error. Also in this case the application of a choking element can reduce the overpressure peak amplitude transmitted to the sensing element. The use of a limiting pressure valve protects the instrument from pressures which could be higher than those on which the valve itself is calibrated protecting in this way the instrument from overpressures.

The bourdon tube pressure gauges as well can be designed in order to resist to overcharges.

A clamp is mounted inside the gauge preventing any further extension of the tube.

7.3 Corrosion rupture

The compatibility with the process medium is fundamental in preventing breakage for corrosion. The sensing element is generally less thick so it works in conditions of stress corrosion. None of the most common materials is immune from a chemical attack whose entity is influenced by concentration, temperature and the type of a mix of different chemical substances.

7.4 Explosion rupture

It occurs after a violent release of thermal energy due to some chemical reactions such as the adiabatic compression of oxygen in presence of hydrocarbons. The use of a solid front gauge does not even prevent the deflection of the debris away from the front of the gauge.

Pressure gauges suitable for use with oxygen are marked



“Oxygen - No lubrication” and/or they are marked with a crossed out oil can symbol on the dial

Instruments are supplied properly cleaned and degreased with special products and packed in polyethylene bags. The user must take the necessary precautions to ensure that the connection and the elastic element are kept clean after the pressure gauge has been unpacked.

7.5 Vibration and shocks rupture

Vibrations most commonly cause an abnormal deterioration of the parts in movement bringing to a gradual loss of accuracy and then to a total block of the pointer. Vibrations could also cause stress cracks in the sensing element structure causing a liquid leakage and even an explosion

8. Maintenance

The instrument's characteristics should be maintained during time through a special maintenance program which should be carried out and managed by qualified technicians.

The maintenance program includes: the cleaning of the external parts of the instrument by a humid cloth, the pressure indication check, the gaskets tightness check, condensate presence inside the case, the glass, case and safety device soundness.

As for heavy work instruments operating in severe conditions (plants (vibrations, pulsating pressures, corrosive or sedimentous fluids, fuel or inflammable fluids) we recommend to schedule their replacement according to the maintenance program schedule. In case the instrument does not work properly it is necessary to proceed to an unscheduled checking procedure.

Instruments should be kept in their original packaging and placed indoor and protected from humidity. The stocking area temperature should be between $-25\dots$ and $+65^{\circ}\text{C}$ except different instructions.

A careless moving of the instrument could affect the metrological features although it is properly packed. Instruments should be checked before use. In particular in the zero free instruments it could occur that the null-pressure pointer position is inside the zero span.

8.1 Routine check

In order to verify the sensing element condition install the instrument on the pressure generator introducing an interception valve between them. Apply the maximum pressure value to the gauge and exclude it from the pressure source through the valve. Any possible leakage of the sensing element can be noticed from the slow return of the pointer to zero.

8.2 Recalibration

If after recalibration results are different from the nominal values declared on the catalogue sheet the recalibration procedure should be repeated. It is recommended to return the instrument to **DRUCK & TEMPERATUR Leitenberger GmbH** for this procedure.

DRUCK & TEMPERATUR Leitenberger GmbH will not be responsible for any non-authorized intervention on the instrument. Moreover the contract warranty and the CE Conformity Declaration will be no longer valid.



8.3 Product return service

In case of failure or maintenance of these products DRUCK & TEMPERATUR Leitenberger GmbH provides its customer with the Product Return service. This service can supply the necessary assistance, proper communications and fast response time to facilitate the repairing or replacement procedure of the defective products. This service is available by contacting DRUCK & TEMPERATUR Leitenberger GmbH by e-mail to DT-Export@Leitenberger.de

9. Disposal

An inappropriate disposal can be dangerous for the environment. The instrument components and packing materials disposal must follow an eco-compatible procedure and must be in accordance to the national standards. The fluid remaining inside the instrument could be dangerous or toxic for the environment, for people and for equipments.