

## Pressure gauge Installation Guide

This safety and installation guide contains important safety and handling information for Badotherm pressure gauges.



Read all information below before using the application to avoid injury, improper functioning, or damage. Additional information can be found at: [www.badotherm.com](http://www.badotherm.com)

**CAUTION:** Read this installation guide carefully before unpacking the pressure gauge. Improper handling can cause damage to the pressure gauge. All pressure gauges are tested and calibrated in a Badotherm factory under monitored & controlled conditions.

**Unpacking the pressure gauge** - Make sure the environment is free of dirt and fluids that may damage the case, thread, and window.

**Using spanners** - When installing the pressure gauge a suitable spanner with the correct size must be used to prevent damage to the connection. NEVER twist the case in order to tighten the gauge.

**Capillary use** - For distance pressure measurement applications, capillary is used. When handling such a device the capillary must never be bent. Surplus capillary can be wound and bundled with a tie wrap.

**Thread sealing** - BSP threads are sealed on the sealing face with a washer which must be compatible with the medium. NPT threads are sealed on the thread with a metal to metal sealing. In some cases a never seize paste or PTFE tape can be used.

**Gauge pressure** – Pressure gauges are designed to operate in a specific pressure range. Before installing, the specifications of the process must be compared to the design pressure of the pressure gauge.

**Gauge inspection** – Pressure gauges should be checked thoroughly once a year to check accuracy and damage to the gauge. If the gauge is exposed to extreme conditions such as fire, extreme temperatures, or wrong process

fluids the gauge must be replaced or send back to Badotherm for inspection.

**Mounting type** – Pressure gauges can be mounted in several ways (Type A to F). The connection position is dependant on this mounting variable. For panel or surface mounting options several accessories are available.

**Safety level** - Badotherm pressure gauges are manufactured according to highest safety levels.

**S1:** Blow out device on back, no mark on dial;

**S2:** Blow out back, no baffle wall, dials marked with S and the EN standard;

**S3:** Blow out back, baffle wall, dials marked with encircled S and EN standard. (Ensure that the gap between wall and gauge is >20mm)

**Fill fluid** - Filling fluids reduces the vibration inside the case of the gauge which reduces the wear of the internals. When the case temperature rises, the filling fluid will expand. To prevent overpressure in the case the filling plug on top of the case must be cut or pierced, depending on the execution of the plug. This makes the gauge suitable to compensates with the atmospheric pressure.

**Mounting advice** – For correct functioning of the gauges Badotherm advices:

- The use of an isolation valve
- Process fluid compatible washers
- Correct mounting type and accessories
- Installation by an experienced mechanic

### Use in an oxygen circuit

Check that the pressure gauge is designed for such an application. The dial must have the word OXYGEN printed and the international symbol “oil-free” . The pressure gauge must not have been in contact with oil or grease that is incompatible with oxygen RISK OF EXPLOSION.

## Pressure gauge Safety Guide

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**WARNING:** Failure to follow these safety instructions could result in injury or other damage. Badotherm refutes all responsibility for any direct or indirect damage to property or persons resulting from failure to follow the instruction in this guide.

**Pressurised installations** - Do not use the gauge in an environment where the pressure exceeds the maximum pressure without overpressure protector.

**Hazardous installations** - Do not use the gauge in an environment where hazardous liquid or fumes can cause corrosion or other physical damage to the measuring system. The use of an isolation valve reduces the chance on injuries. Make sure to follow the regulations of the installations or plant to prevent injury or spill of hazardous fluids.

**Pressure gauge design** - Make sure the design of the gauge is suitable for the purpose of use. Before installing the OPERATING PRESSURE, FLUID COMPATIBILITY and ENVIRONMENTAL CONDITIONS must be checked. More details on these topics can be found below.

**Operating pressure** - The operating pressure may never exceed its full scale value. The maximum measuring range is marked with a triangular symbol on the scale. This pressure limits should not be exceeded. More details on working pressure and overpressure is presented in the pressure gauge datasheets.

**Fluid compatibility** – Before installing the pressure gauge, the material/process fluid compatibility must be checked. The latest information on material compatibility can be

found in the tables at [www.badotherm.com](http://www.badotherm.com). or page 24 of the catalogue

**Environmental conditions** - The condition of the local environment of the pressure gauge must be analysed carefully when installing the gauge. The frequency of the vibration and the surrounding atmosphere must not exceed limits of the EN837 without the use of capillary. The surrounding atmosphere must be free of heavily corrosive gasses to prevent corrosion of the materials used in the pressure gauge.

**Mechanical shock & vibrations** - If there is a risk of mechanical shock or vibrations the pressure gauge should have a capillary and a seal. The limits of the vibration frequency can be found in the EN837.

**Pressure pulses** – If there is a risk of pressure pulses Badotherm advises to use a snubber (BDT45). **WARNING:** pressure pulses cause considerable shortening of operating life of a pressure gauge.

**Case temperature** - Avoid excessive case temperatures. The maximum case temperature with dry cases should be <95°C and liquid filled cases <65°C.

**Installation advice** – The use of an overpressure protector BDT49 is required when the operating pressure can exceed the design pressure of the pressure gauge. A siphon is advised when using a pressure gauge in steam applications or mount a diaphragm seal to reduce the temperature within the gauge.

## Pressure gauge Maintenance and Service Guide

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**WARNING:** Use safety clothes, protective goggles and protective (chemical resistant) gloves before starting the disassembly.

The general safety of a facility often depends on the reliability of indications of the pressure gauges installed in the facility. Any pressure gauge that seems to be giving false readings must be removed immediately, and then tested with a testing device. If the tests prove the reading is unreliable, it must be replaced by a new pressure gauge. Also when the pressure gauge shows damages caused by mechanical influences it must be replaced with a new gauge.

**Periodic verifications** - Once a year a thorough check should be carried out in order to check the accuracy of the gauge. Any pressure gauge considered to have been subjected to abnormal conditions of use (e.g. fire, wrong fluid, excessive temperatures, etc.) must not be re-used.

**Cleaning** - The pressure gauge and accessory should be cleaned regularly with a damp cloth and a soap solution.

**Filling level** - When filled pressure gauges are used the fluid level in the case must be checked on a regular base and must not drop below 75% of the gauge diameter.

### Disassembly instruction

For safe disassembly the following steps must be carried out sequential:

1. Study the statutory regulations before any installation will be started.

2. Check if the gauge casing is at an acceptable temperature and pressure to prevent burning.
3. Un-tighten the gauge with a correct sized spanner.
4. Check if the gauge is clear from process residues which may cause damage to persons and the environment.
5. When sending the gauge to a Badotherm office, clean the gauge, pack it safely, and attach a proof of cleanliness.
6. When disposing of the pressure gauge please observe the local waste treatment and disposal regulation.
7. When sending the pressure gauge to a Badotherm office, clean the complete pressure gauge and accessories according statutory regulations, pack it thoroughly to prevent damage, and attach a proof of cleanliness and the necessary Material Safety Data Sheet.
8. When disposing of the pressure gauge always observe the statutory waste treatment and disposal regulations.

**WARNING:** Mishandling products exposed to a hazardous substance can cause serious injury or death. If the product is exposed to a hazardous substance a copy of the Material Safety Data Sheet (MSDS) must attached to the returned goods.