

Instructional Manual

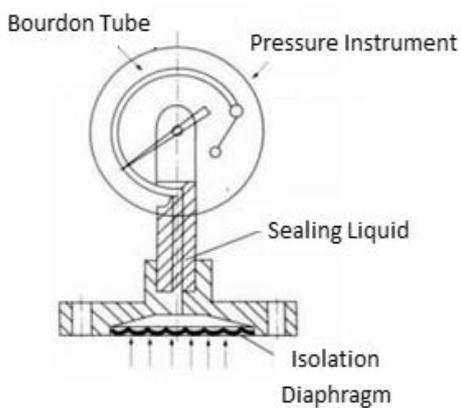
Pressure Gauge with Diaphragm Seal



STRATAA CONTROLS Pressure Gauge with Diaphragm Seal

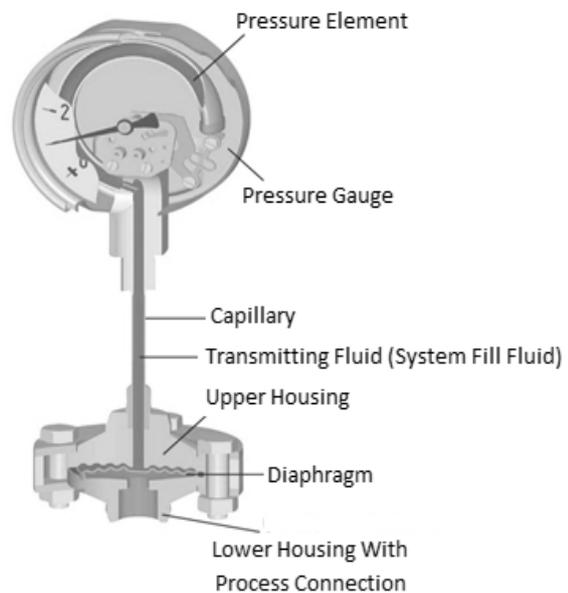


Pressure Gauge



Diaphragm Seal Pressure Gauge Structure

Pressure Gauge with Diaphragm Seal



Pressure Gauge with Remote Diaphragm Seal

Pressure Gauge

Bourdon Tube designed pressure gauge to be used in conjunction with Diaphragm Seal.

Diaphragm seals

A diaphragm seal should be used to protect gauges from corrosive media, or media that will plug the instrument. Diaphragm seals are offered in a wide variety of designs and corrosion resistant materials to accommodate almost any application and most connections.

Selection Criteria (Recommended)

- (A) The instrument must be selected with a working pressure value between 20% and 80% of the full-scale range of pressure gauge.
- (B) Selection of the Range of the gauge below the recommended Range may result in (a) reduced life span of the diaphragm due to exertion of high operating pressure and (b) susceptibility to overpressure due to intermittent pressure that exceed the normal operating pressure.

(C) Selection of the range of the gauge above the recommended range may effect the resolution for the given application.

Temperature handling(Standard Gauge Without Diaphragm Seal)

(A) For a long life and stability in accuracy, pressure gauges should preferably be used at an ambient temperature between -30°C to $+65^{\circ}\text{C}$.

(B) In unlikely event the Gauge operates below -30°C temperature, it may indicate slow pointer response.

(C) In unlikely event if the gauge is operated above 65°C , the accuracy will get affected by approximately 1.5% of full scale range.

Temperature handling for different type of Diaphragm Seals with filled fluid

(We can offer diaphragm seal material like Hastelloy C and other exotic material depending upon the process fluid (Consult factory)).

- ❖ Our standard gauge is **Silicone** filled stainless steel gauge having a broader service range – 40 to 205°C .
- ❖ With glycerin filled diaphragm seal can be used from -6°C to 82°C .
- ❖ PTFE coated diaphragm seal can withstand the process temperature upto maximum of 150°C .
- ❖ PVC diaphragm seal can withstand the process temperature upto maximum of 60°C .
- ❖ Food clamp diaphragm seal can withstand the process temperature upto 130°C for 1 hour during the cleaning and sterilization phases.
- ❖ Food diaphragm seals for homogenizers can withstand the process temperature upto 150°C for 1 hour during cleaning and sterilization.

Mounting Suggestions

Users should predetermine how the gauge will be mounted in service: stem (pipe), wall (surface) or panel (flush). Wall or panel mounting accessories should be ordered with the gauge as per the requirement.

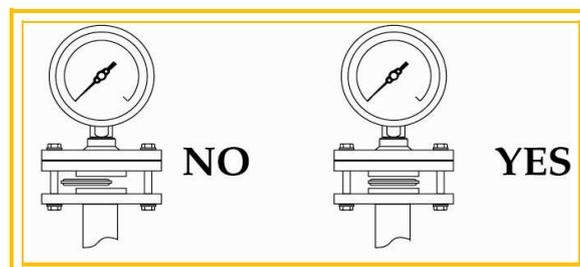
INSTALLATION

Process isolation

A isolation valve should be installed between the gauge and the process in order to be able to isolate the gauge for inspection or replacement without shutting down the process.

Threaded process connection

Cylindrical Pressure Connection thread type, two plane faces are tighten together by a ring seal.

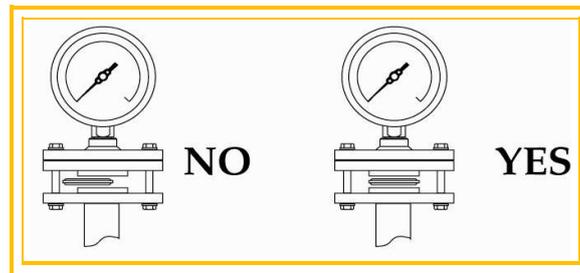


Warning – As gripping hold for the wrench, use the seal side and not the gauge side, in order to prevent leaking of the filling liquid from the seal side In case of threaded connection with exposed

membrane it is necessary to use the gasket which complies with the chemical environment and the temperature at which the instrument is used.

Flanged process connections or wafer

A proper seal should be selected considering its chemical and thermal compatibility as well as the flange tightness surface finishing type and degree. When mounting the seal between the diaphragm and the process connection take care to avoid any partial coverage of the diaphragm in order to prevent any leakage or damage to the diaphragm, in order not to partially hide accidentally the diaphragm.



In line process connection

In the first place install the welded stub, then fix the diaphragm seal inside the housing through the supplied studs.

WARNING: the seal is generally metallic and the seal seat is created by pressure during the first installation. Proceed carefully to the studs clamping.

Commissioning

In case of root valves, they must be opened slowly. Verify that the connection is watertight and that the accessories are installed and fixed correctly.

OPERATION

Frequency of inspection

This is quite subjective and depends upon the severity of the service and how critical the accuracy of the indicated pressure is. For example, a monthly inspection frequency may be in order for critical, severe service applications. Annual inspections, or even less frequent schedules, are often employed in non-critical applications.

In-service inspection

If the accuracy of the gauge cannot be checked in place, the user can at least look for (a) erratic or random pointer motion; (b) readings that are suspect – especially indications of pressure when the user believes the true pressure is 0 psig. Any gauge which is obviously not working or indicating erroneously, should be immediately valved-off or removed from service to avoid a possible pressure boundary failure.

When to check accuracy

Any suspicious behavior of the gauge pointer warrants that a full accuracy check be performed. Even if the gauge is not showing any symptoms of abnormal performance, the user may want to establish a frequency of bench type inspection.

When to recalibrate

This depends on the criticality of the application. If the accuracy of a 3-2-3% commercial type gauge is only 0.5% beyond specification, the user must decide whether it's worth the time and expense to bring the gauge back into specification. Conversely if the accuracy of a 0.25% test gauge is found to be 0.1% out of specification then the gauge should be recalibrated.

Other considerations

These include (a) bent or unattached pointers due to extreme pressure pulsation; (b) broken windows which should be replaced to keep dirt out of the internals; (c) leakage of gauge fill; (d) case damage –dents and/or cracks; (e) any signs of service media leakage through the gauge including its connection; (f) discoloration of gauge fill that impedes readability.

Spare parts

As a general rule it is recommended to keep a set of required spares for any type of instruments.

Failure for corrosion

When the diaphragm material is subject to a chemical attack from the chemical substances contained in the fluid to be measured a failure for corrosion could occur. In this case the material is weakened and a punctiform leak or a crack could take place. The diaphragm is thin so it works under mechanical stress. Therefore the chemical compatibility with the fluid to measure must be considered. None of the common materials can be immune from a chemical attack which depend on several elements such as: concentration, temperature and mix of different chemical substances.

Failure for explosion

The silicon oil must not be used as a filling liquid with highly oxidants agents such as oxygen, chlorine, nitric acid and hydrogen peroxide because chemical inflammability or explosion spontaneous reactions could occur. In these cases the use of fluorrupe is recommended.

Failure for high temperature

The filling liquid expansion due to temperature higher than the allowed one cause a diaphragm seal bulge which damages permanently the diaphragm and/or could cause the production of gas due to the filling liquid decomposition affects the assembling permanently making it unusable.

Mechanical stress and vibrations

Instrument must not be affected by mechanical stress and vibrations. If the installation points are mechanically stressed instruments must be remote mounted and connected through a capillary.

Gauge reuse

ASME B40.100 recommends that gauges not to be moved indiscriminately from one application to another. The cumulative number of pressure cycles on an in-service or previously used gauge is generally unknown, so it is generally safer to install a new gauge whenever and wherever possible. This will also minimize the possibility of a reaction with previous media.

DISMOUNTING

In case of polluted, viscous or crystallizing process media it may be necessary to clean the diaphragm from time to time. Only remove deposits from the diaphragm with a soft brush and a suitable solvent. Do not use aggressive cleaning agents. Do not damage the diaphragm with sharp edged tools. Do not use powerful water jets for the diaphragm cleaning. Some models are



prearranged for cleaning operations because they are flushed diaphragm seals or have an intermediate ring with a cleaning plug. Models with diaphragms welded to the upper body can be dismantled for cleaning. When remounted the gasket between upper and lower body must be replaced. Models with a mechanical tightness cannot be dismantled and must be disposed and returned to Strataa for cleaning or maintenance. For disposal we recommend to separate the diaphragm seal from the instrument, empty the filling circuit, remove the window and the plugs then dispose it as aluminum and stainless steel. The remaining fluid inside the instrument could be toxic and dangerous.

IMPORTANT

STRATAA CONTROLS instruments are designed and manufactured according to the safety rules included in the safety international standards in force. The instrument described in this manual has been designed and produced in conformity to the standards in force. All components are submitted to severe quality controls.

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.

Therefore it is highly recommended to read carefully the following instructions before using the instrument.



Attention



Warning

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 instruments 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.***
- ❖ ***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.***