



Process Industry

Diaphragm Seal Solutions



Smart in sensing

Diaphragm Seal Systems Provide Protection to Ensure Safety & Reliability

Diaphragm seal systems protect gauges from hot, viscous, contaminated or corrosive media. This added layer of protection ensures that the media doesn't reach the gauge, helping to prevent gauge failure that can cause safety issues for operations and personnel.

Diaphragm Seals

- Prevent clogging, corrosion or contamination of your pressure gauges
- Reduce fugitive emissions
- Extend the service life of the pressure instrument, which reduces process downtimes
- Reduce or eliminate maintenance costs



WIKA Combines Expertise and Technology to Provide Custom, Quality Systems

WIKA's dedicated lean manufacturing focus factory produces custom solutions for diaphragm seal systems. We fabricate seal components from raw materials using state-of-the-art CNC machining equipment, and we use innovative technologies such as metal bonding and laser welding to produce durable finished systems.

WIKA's toolbox of modular solutions and proprietary software help determine results of newly configured systems prior to manufacturing. This process minimizes the design cycle, improves lead times, optimizes safety and assures performance of your diaphragm seal solutions.

Diaphragm Seals to Exceed Your Expectations

Operating Principle

A diaphragm seal is connected to the measuring instrument via a direct connection or capillary. The instrument side of the seal is separated from the process media by a flexible diaphragm.

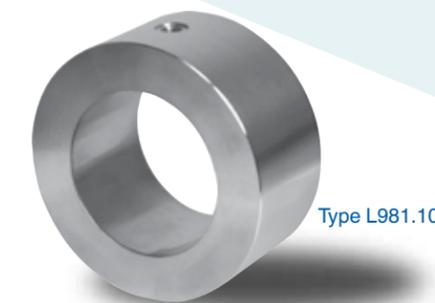
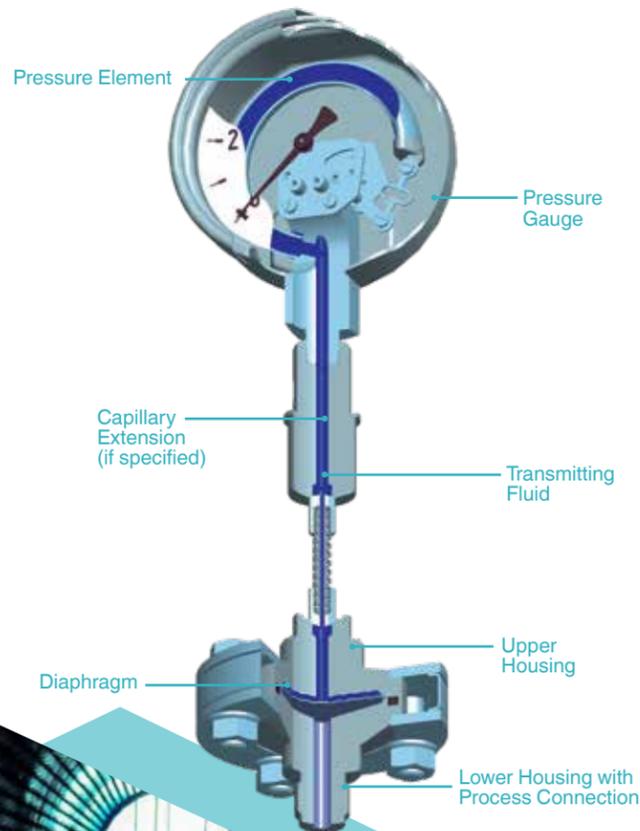
The chamber between the diaphragm and the instrument contains system fill fluid which transfers the pressure of the process media. When fluctuations in pressure of the process media occur, the change is transmitted across the flexible diaphragm through the system fill fluid, which is hydraulically connected to the measuring instrument.

Diaphragm Seals

Diaphragm seals are mounted to the process via threaded, open flange, sanitary or other connections. The diaphragm is either encased within the seal body or flush with the process connection. Numerous process sizes and materials are available.

InLine SEAL

The WIKA InLine SEAL is integrally mounted into the pipeline for use with flowing process media. This seal contains a unique cylindrical diaphragm that avoids any interruptions to the process flow. The InLine SEAL is available with various process connections to meet specific industry requirements.



InLine SEAL

Model Numbers: L981.10, L981.18, L981.22 and L981.2

Application

The WIKA InLine SEAL is used for gauge or differential pressure measurements in applications with restrictions toward cavities. The InLine SEAL mounts directly into process lines with size 1/2" to 8" pipe. This seal design eliminates all "dead space," making it ideal for sanitary applications.

Solutions

- Eliminates all "dead space" to prevent bacteria growth and settlement
- Avoids turbulence and provides continuous process flow, resulting in true pressure measurement
- Creates a self-cleaning instrument connection through continuous flow design
- Reduces line taps by providing a single instrument for pressure and temperature measurement (optional feature)

All-Welded System

Model Number: M93X.D1

Application

WIKA's All-Welded System is a drop-in retrofit for existing gauges. The all-welded, tamper-resistant construction is suitable for applications where emissions to the environment are tightly monitored.



Diaphragm Seal Solutions

| Specifications | |
|--------------------------------|---|
| Process connection | Wafer, integral flanged, male threads and sanitary |
| Process wetted materials | 316L SS, Hastelloy® C276, Titanium, Monel®, Tantalum, PFA-coated and others |
| Pressure: | |
| Mechanical gauge, ranges | Vacuum to 6,000 psi |
| Transmitter gauge, span | 50" H ₂ O (minimum) |
| Transmitter differential, span | 10" H ₂ O (minimum) (measuring span dependent on process line size) (restrictions may apply) |
| Options | Integral RTD for remote temperature reading Direct or remote mount to instrument Electro-polished process wetted surfaces |
| Datasheets | L981.10, L981.18, L981.22, L981.27 |

Solutions

- Extends gauge life
- Eliminates potential leak paths
- Creates a tamper-resistant assembly by removing all threaded connections
- Complies with the EPA's "dual containment" requirements
- Ideal for pump monitoring

| Specifications | |
|--------------------------|---|
| Gauge | Robust 23X.34 with 4.5" case |
| Assembly | Gauge is direct mount and back-welded to diaphragm seal |
| Process connection | 1/4" NPT and 1/2" NPT, male or female |
| Process wetted materials | 316L stainless steel, Hastelloy® C276, and Monel® |
| Pressure: | |
| Mechanical gauge, ranges | Vacuum to 5,000 psi |
| Options | Gauge restrictor can be internally mounted to minimize assembly height (results are similar to adding a snubber) A majority of standard gauge options are available with this assembly; contact factory for more information |
| Datasheet | M93X.D1 |

Diaphragm Seal Solutions



Type L990.FB

All-Welded Flanged Seal System

Model Number: L990.FB

Application

The flange's all-welded, tamper-resistant design is ideal for applications where emissions to the environment are tightly controlled (e.g. gas manufacturing). This solid metallic all-welded seal assembly provides a flange connection to the process, eliminating all gaskets and O-rings.

Solutions

- Eliminates potential leak paths
- Creates a tamper-resistant assembly by removing all threaded connections
- Excellent for Phosgene gas applications

| Specifications | |
|--------------------------|--|
| Assembly | Gauge is directly mounted and back-welded to diaphragm seal |
| Process connection | 1/2" NPT to 2" flange size |
| Process wetted materials | 316L SS, Hastelloy® C276 |
| Pressure: | |
| Mechanical gauge, ranges | Vacuum to flange rating |
| Options | Gauge restrictor can be internally mounted to minimize assembly height (similar to adding a snubber) |
| Datasheet | L990.FB |

High Pressure Seal

Model Numbers: L990.34 and L990.36

Application

Both the L990.34 and L990.36 mini-seals are ideal for pressures up to 9,000 psi. The flush mounted diaphragm on the L990.36 is especially well-suited for highly viscous or solidifying process media that might plug an internal seal cavity.



Type L990.36

Type L990.34

Solutions

- Reduces the number of threaded or gasket connections within the process
- Provides a built-in anti-clogging feature by eliminating internal cavities
- Serves as a high pressure gauge protector

| Specifications | |
|--------------------------|--|
| Process connection | |
| L990.34 | 1/8" NPT to 1" NPT, male or female |
| L990.36 | 1/2" NPT male to 2" NPT male |
| Process wetted materials | 316L SS, Hastelloy® C276 and Monel® |
| Pressure: | |
| Mechanical gauge, ranges | Vacuum to 9,000 psi |
| Transmitter gauge, span | 10 psi to 9,000 psi (measuring span is dependent on connection size) |
| Options | Diaphragm seal can be directly mounted to measuring instrument or remote mounted with capillary Unique process connection sizes and threads available Additional material also available; please consult factory |
| Datasheets | L990.34, L990.36 |

HF Alkylane

Model Number:

Application

The Alkylation process in a refinery is often part of the same operating area as the FCC unit. Alkylation produces a very high quality gasoline blending component because it has a high octane rating, contains no benzene or other aromatics, no olefins and little or no sulfur.

The process occurs in presence of a strong acting acid as catalyst. The acid can be either sulfuric acid(SA) or hydrofluoric acid (HFA).

Solutions

- WIKA has developed a special design of it's all-welded system especially for HF applications
- The all-welded system features a diaphragm seal back-welded to a WIKA XSEL process gauge to eliminate a potential lead path.
- No threaded fill port, so it's a tamper-resistant design
- WIKA expanded on this technology for HF applications by constructing the bourdon tube made of Monel 400, which is a NACE listed material. This feature provides added protection from corrosion should the diaphragm ever be compromised.
- Monel 400 is used for all wetted parts and non-wetted diaphragm seal parts.
- With all of these built-in safety and reliability features, this is a suggested solution for HF applications where you need an instrument that can withstand the highly corrosive HF conditions for the upmost protection against leaks and vapor release.
- A red case housing is used for better identification along with acid detection paint to detect any potential leak points.

Diaphragm Seal Solutions



Multi-Purpose Seals

Model Numbers: L990.10, L990.12 and L990.FC

Application

WIKA types L990.10 (threaded) and L990.12 (flanged) seal configurations are constructed of an upper and lower housing with a welded design. The design of these multi-purpose seals enables them to be used on a variety of applications.



Type L990.10

Type L990.12

Solutions

- Reduces process temperature influence, improving instrument performance
- Locates and diffuses high stress areas, resulting in extended instrument life cycle
- Improves performance while maintaining corrosion protection

| Specifications | |
|--------------------------|---|
| Process connection | threaded (L990.10), flanged (L990.12) |
| Process wetted materials | 316L SS, Hastelloy® C276, Monel® and Tantalum |
| Pressure: | |
| Mechanical gauge, ranges | vacuum to 3,625 psi or flange rating |
| Transmitter gauge, span | ≥ 15 psi |
| Options | available in variety of material and sizes |
| Datasheets | L990.10, L990.12 |

Type 910.24



Cooling element installed



Cooling Element

Available on most seal models; contact factory for details.

Application

WIKA's cooling element acts as a heat exchanger to protect the pressure instrument from extreme process temperatures. The cooling element allows the instrument to be rigidly mounted to the seal instead of using a capillary to remotely mount the instrument.

Solutions

- Provides effective temperature reductions of 200°F depending on ambient conditions
- Mounts the instrument directly to the diaphragm seal, eliminating the use of a capillary
- Fits all types of pressure instrumentation

(Note: Use a cooling element with a diaphragm seal to improve overall temperature reduction)

Specifications

Dissipates media temperatures up to 360°F maximum in favorable application environments (typical temperature drops of 200°F or more are common).

Solid one-piece 316L stainless steel construction.

Welded to seal and instrument (standard).

Can be installed on most types of gauge pressure measuring instruments including mechanical gauges, switches and transmitters.

Datasheet ACS 99.MO

Fully "Rotatable" Flange

Application

If installation makes it mandatory to have the face of the gauge showing in a specified direction, WIKA offers a few helpful solutions.

Model: L990.FR, Flush Flange

L990.FE, Recessed Diaphragm

L990.ER, Extended Diaphragm

Installation friendly from an orientation point of view. Due to its design, rotation in any direction is possible. All three designs have mounting and wetted parts separated; Allowing the gauge face to be turned in a more favorable position.



Solutions

- Flush, extended or recessed diaphragm flanged seals are available for this service.
- Diaphragm and rotating flang with 360 degree turn ability with the following details:
 - Large wetted parts material selection
 - Several non wetted parts
 - Different diaphragm sizes per design less critical to installation

Specifications

For switch, transmitters and gauge ranges, low ranges (≥ 60 psi) consult factory for volumetric info.

Sealing Face: Serrated finish per ASME B16.5

Special Requirements: NACE: per MR0175/ISO 15156-2:2009

MTR: Material Certification per EN10204 3.1

Oxygen & Chlorine Service: Cleaned per ASME B40.100 Level IV more available

System Fill Fluids

WIKA sets the industry standard in its variety of seal system fill fluid. A diverse selection of system fill fluids is available to meet most applications, including:

- process & petrochemical
- high purity
- pharmaceutical
- food & beverage
- sanitary
- paint & automotive
- power generation
- wastewater

WIKA's system fill fluids meet most temperature requirements from -220°F to +750°F (process at ambient temperatures). They are also ideal for vacuum pressures up to 400°F down to 1mBarA (absolute).

Damage and Error Reduction

To reduce damage, WIKA machines a matching diaphragm pattern (continuous duty) into the seal upper housing. Isolated points of pressure can then be applied to the seal diaphragm without causing permanent deformation, avoiding non-linear or non-repeatable pressure measurements. System fill fluid under the diaphragm is decreased, reducing temperature effects.

WIKA's Engineering Advantage

WIKA's engineering and procurement resources can design and supply a complete package for specific applications. WIKA offers several solutions to reduce measurement and installation efforts, including:

- Engineering seal assemblies to reduce line taps
- Complete packages for installation and value-added work
- Performance calculations

Talk to us and find out how we can engineer a solution for your individual requirements.



Mounting Options

Cooling Element

The 4" and 8" cooling element is intended to protect the pressure instrument from high or low process temperature. Air flow across heat exchanging fins reduces or increases the temperature of the system fill fluid to protect the pressure measuring instrument.

Capillary Line

Stainless steel capillary with or without stainless steel armor provides a connection between the pressure instrument and the diaphragm seal. It protects the pressure instrument from high or low process temperatures and provides distant or remote reading.

The capillary should be selected as short as possible, since changes in ambient temperature conditions may considerably affect the accuracy and response time of the pressure instrument. Standard length is five feet; other lengths are available upon request.

Installation on mechanical gauges normally requires a **gauge support** and **gauge adaptor** or other **surface mounting provisions**.

Any level difference between pressure instrument and diaphragm seal will cause a pressure indication error. The level difference can be compensated for during calibration of the diaphragm seal assembly if the level difference is known.

Minor corrections can be made on site by means of an adjustable pointer or zero adjustment of the pressure instrument.

Gauge Support and Adaptor

The gauge support and adaptor provides wall mounting of the pressure instrument by clamping it to the gauge adaptor. Material: gauge support - aluminum or stainless steel, gauge adaptor - stainless steel.



ISO 9001
Certified

For 70 years, WIKA has continuously advanced instrumentation for pressure, temperature, level, flow and force measurement. Our broad selection of standard and custom solutions, as well as services, work to support operational safety, productivity and profitability. A global leader in lean manufacturing, WIKA can be your reliable partner anywhere in the world.



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