

Diaphragm Seal Solutions



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.

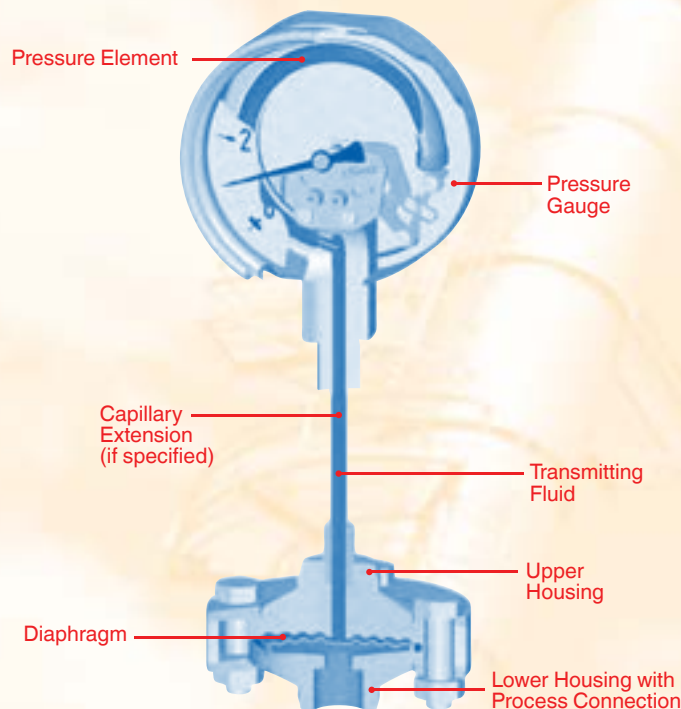
Diaphragm Seals

- 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

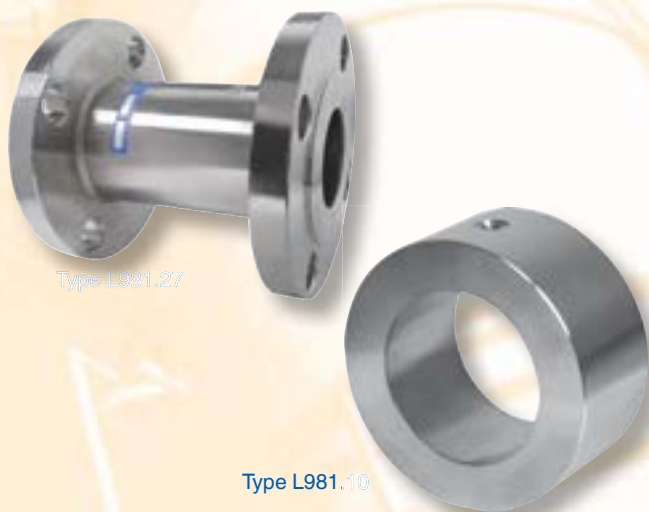
The WIKA InLine SEAL is integrally mounted into the pipeline for use with flowing process media. This seal contains a unique cylindrical diaphragm that avoids any interruptions to the process flow. The InLine SEAL is available with various process connections to meet specific industry requirements.

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 ½" 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)

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

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.



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

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.



Type L990.FB

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 L990.34



Type L990.36

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

Metal Bonded Diaphragm

Available on Model Numbers: L990.27 and L990.28

Application

WIKA's patent pending L990.27 and L990.28 metal bonded diaphragms are standard offerings for processes requiring Hastelloy®, Monel® and Tantalum flush diaphragms. A continuous sheet of diaphragm material covers the complete process wetted surface and all diaphragm welds are non-existent. To protect the measuring instrument and increase life expectancy in corrosive environments, an exotic diaphragm material is required.



WIKA's proprietary solution includes metallic bonding of the diaphragm directly to the seal body. This metallic bonding process is adhesive free and reduces temperature restrictions.

Solutions

- Removes potential leak paths through WIKA's one-piece design
- Eliminates adhesives, thus temperature limits are defined only by the system fill fluid and ambient conditions
- Reduces media compatibility issues
- Provides increased product reliability by eliminating wetted welds for exotic diaphragm materials

Specifications

Process connection	1.5" to 4" flange size
Process wetted materials	Hastelloy® C276, Monel® and Tantalum
Pressure:	
Mechanical gauge, ranges	Vacuum to flange rating
Transmitter gauge, span	50" H ₂ O to flange rating
Transmitter differential, span	10" H ₂ O to flange rating (measuring span is dependent on process line size)
Options	Radial mounting of L990.27 instrument connection
Datasheets	L990.27, L990.28

Multi-Purpose Seals

Model Numbers: L990.10 and L990.12

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

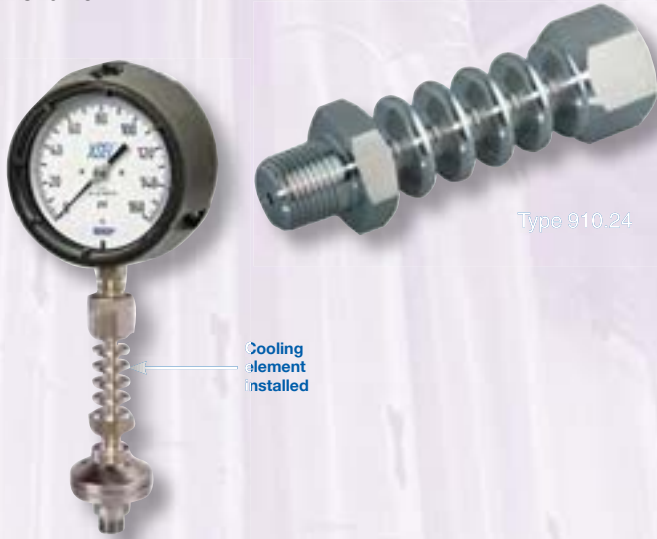
Process connection	threaded (L990.10), flanged (L990.12)
Process wetted materials	316L SS, Hastelloy® C276, Monel® and Tantalum
Pressure:	
Mechanical gauge, ranges	vacuum to 3,625 psi or flange rating
Transmitter gauge, span	≥ 15 psi
Options	available in variety of material and sizes
Datasheets	L990.10,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

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

Corrosion Resilient Teflon®

Available on Model Numbers: L990.10, L990.12, L990.27, L990.28, L990.40, L990.41, L990TC, L990.FA, L990.FC, L990.FD and L910.ZA

Application

Teflon®-lined diaphragms and solid or Teflon®-lined lower housings are ideal for applications requiring extreme protection against corrosion. Bonded to a metallic diaphragm, they are comprised of solid sheet Teflon® that is 50% thicker than required to prevent porosity issues. Teflon® is more economical and may provide equal or better protection compared to other exotic materials.



Solutions

- Minimizes cold flowing and eliminates output drift through use of a metallic backup
- Provides additional strength for higher pressure ratings over solid Teflon® diaphragms, leading to higher pressure limits
- Eliminates one O-ring connection and removes a potential leak path (when Teflon®-lined diaphragms are welded to the seal upper housing)

Specifications

Process connection flanged and threaded

Pressure:

Mechanical gauge, ranges -30" Hg to flange rating

Transmitter gauge, span 50" H₂O to flange rating

Transmitter

differential, span 10" H₂O to flange rating (measuring span is dependent on process line size)

Options

Teflon® linings can be supplied with carbon pigmented or virgin Teflon®

Teflon®-lined metallic diaphragms can be welded to the upper housing, removing a potential leak path

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).

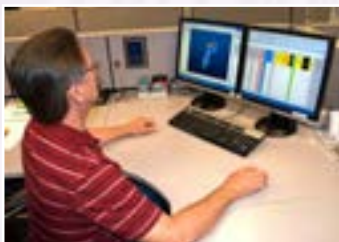


WIKA's Engineering Advantage

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.



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.

Mounting Options

Cooling Element

The 4" 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.

The cooling element is recommended for process temperatures above 212°F. It is "direct mounted" between the pressure instrument and the diaphragm seal. Silicone fill is recommended. Effective for temperature reductions of 200°F, depending upon ambient conditions. The all stainless steel construction is back welded to the stainless steel upper housing or flange.

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.



With almost 70 years of experience, WIKI Instrument, LP is the leading global manufacturer of pressure and temperature measurement instrumentation, producing more than 43 million pressure gauges, diaphragm seals, pressure transmitters, thermometers and other instruments annually. WIKI's extensive product line, including mechanical and electronic instruments, provides measurement solutions for any application in a large variety of industries. A global leader in lean manufacturing and instrumentation experience, WIKI also offers a broad selection of stock and custom instrumentation as well as dedicated services to provide customers with the right solutions, at the right time, wherever they need us.



All-Welded System
M93X.D1



All-Welded Flanged Seal
L990.FB

WIKI provides distinctive service and support to our channel partners and customers:

- Award winning U.S.-based manufacturing, sales and ordering customer service and technical support
- Certified technical specialists who conduct Best Practice Instrument Reviews with performance improvement reports
- An in-house engineering team for product customization and innovation
- Proven capabilities to connect with customer business processes for ordering and inventory management
- Web-based customer service features, including RFQs, literature request and competitor product cross reference

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