

# In-line diaphragm seal with sterile connection

## For sanitary applications

### Models 981.22, 981.52 and 981.53, clamp connection

WIKA data sheet DS 98.52



#### Applications

- For direct, quickly removable installation in pipelines
- For flowing, pure media
- Pharmaceutical industry, biotechnology industry, production of active ingredients
- Aseptic plants

#### Special features

- Completely round diaphragm (Europ. Pat. No. 0609846) to avoid dead spaces
- Self-draining in all mounting positions
- Quick cleaning of measuring point, without residue
- Suitable for SIP and CIP
- 3-A compliant

#### Description

Diaphragm seals are used to protect the pressure measuring instrument from aggressive, adhesive, crystallising, corrosive, highly viscous, environmentally hazardous or toxic media. A diaphragm made of the appropriate material provides for the separation from the medium to be measured. Thus even the most difficult measuring requirements can be met by combining measuring instruments with diaphragm seals.

A fluid inside the system, which can be chosen to suit the particular application, hydraulically transmits the pressure to the measuring instrument.

Almost limitless application possibilities exist due to the large number of available variants, such as diaphragm seal designs or materials. The type of process connection (flange, threaded and sterile connection) and the basic method of manufacture are important design differentiation criteria.

For further technical information on diaphragm seals and diaphragm seal systems see IN 00.06 "Application, operating principle, designs".

The model 981.22, 981.52 and 981.53 in-line diaphragm seals with clamp connections, due to their circular design,



**In-line diaphragm seal with sterile connection, model 981.22**

can be mounted directly into the pipeline, meaning no special measuring point connection is required. Through the integration into the process line, turbulences, dead spaces, corners and other obstructions can be avoided. For this diaphragm seal WIKA uses a completely round diaphragm, which, due to the unobstructed flow of the media, produces an automatic cleaning of the chamber.

The diaphragm seal systems can withstand the cleaning vapour temperatures occurring in the SIP processes and thus ensure a sterile connection between the medium to be measured and the diaphragm seal.

Assembly of the diaphragm seal and measuring instrument is made via a direct assembly as standard or optionally via a cooling element or a flexible capillary.

For the material selection WIKA offers a variety of solutions, in which the upper body and the diaphragm are made of identical materials. Stainless steel 316L (1.4435) is used as standard material, other special materials are available on request.

Measuring systems with model 981.22, 981.52 and 981.53 WIKA diaphragm seals are successfully used in the life science industry, in food production, pharmaceutical and biotechnology applications.

## Standard version

### Type of process connection

Model 981.22: Clamp connection

Model 981.52: Clamp connection per DIN 32676

Model 981.53: Clamp connection per ISO 2852

For exact designs and nominal widths see tables on page 4

### Nominal pressure

See tables on page 4

### Measuring ranges

min. 0 ... 0.6 bar, max. 0 ... 40 bar

(also vacuum and +/- measuring ranges)

### Material of main body

Stainless steel 1.4435 (316 L)

### Material of wetted parts

Diaphragm: Stainless steel 1.4435 (316L)

### Surface roughness of wetted parts

$Ra \leq 0.76 \mu\text{m}$  per ASME BPE SF3 (except for weld seam)

### Level of cleanliness of wetted parts

Oil and grease free per ASTM G93-03 level E (WIKA standard) and ISO 15001 ( $< 550 \text{ mg/m}^2$ )

### Connection to the measuring instrument

Weld-in connection

## Options

- Higher nominal pressures on request (for maximum pressure range consider pressure rating of clamp)
- Surface roughness of wetted parts  
 $Ra \leq 0.38 \mu\text{m}$  per ASME BPE SF4, only with electropolished surface (except for weld seam)
- Sealing from NBR or PTFE
- Zero point stabilisation (ZPS, required for SIP processes, EHEDG tested)
- Connection to the measuring instrument  
G 1/2, G 1/4, 1/2 NPT or 1/4 NPT (female)
- Origin of wetted parts (EU, CH, USA)
- Marking of the diaphragm seal with 3-A standard 74-05

## Materials

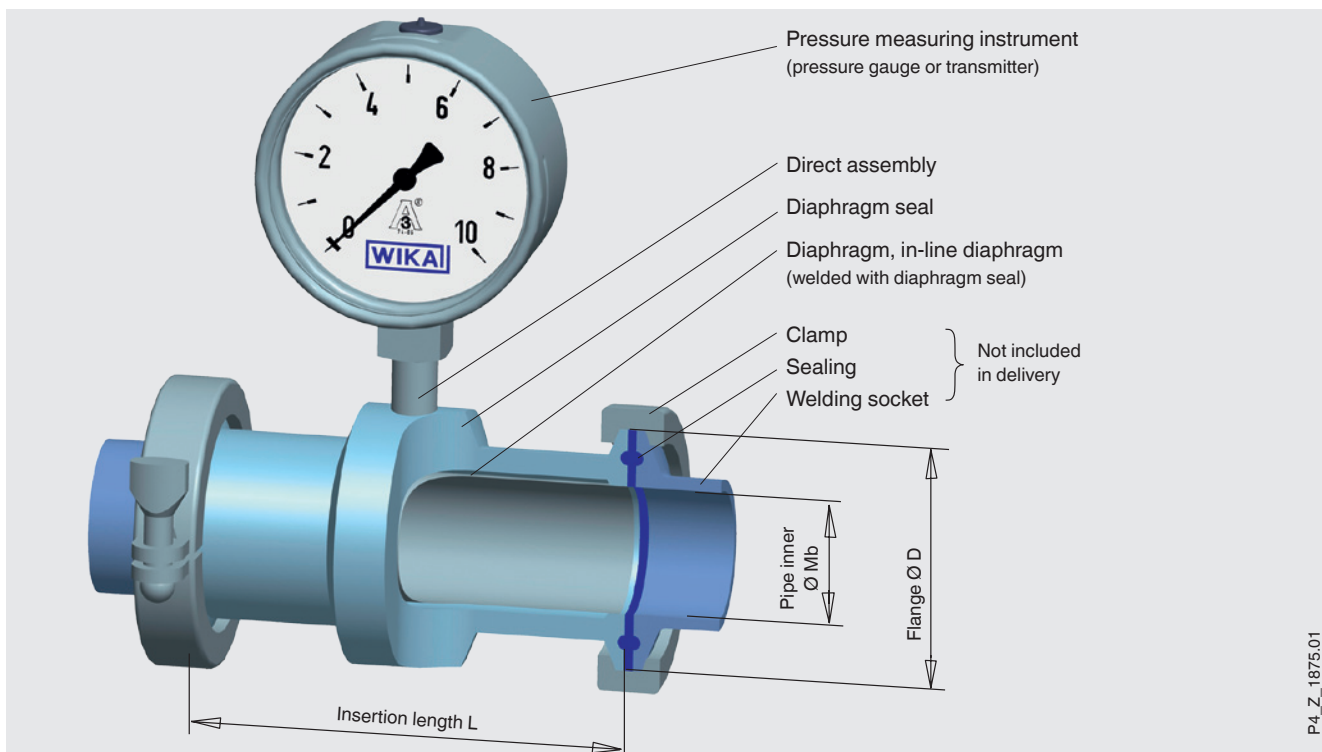
Main body	Wetted part Diaphragm
<b>Standard</b>	
Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L)
<b>Option</b>	
Stainless steel 1.4435 (316L), electropolished <sup>1)</sup>	Stainless steel 1.4435 (316L), electropolished <sup>1)</sup>
Stainless steel 1.4539 (904L)	Stainless steel 1.4539 (904L)
Hastelloy C276 (2.4819)	Hastelloy C276 (2.4819)

1) Only in connection with a surface roughness of  $Ra \leq 0.38 \mu\text{m}$  for the wetted parts

Further material combinations on request

## Installation example

In-line diaphragm seal, sterile connection, model 981.22  
with directly assembled pressure gauge in a pipeline



P4\_Z\_1875.01

## Additional information for diaphragm seal systems

### See Technical information IN 00.06 "Diaphragm seals - Diaphragm seal systems, application, operating principle, designs"

- Pressure measuring instrument model
- Connection to the measuring instrument: Direct assembly (for types of instrument connection see below, calibrated in the mounting position selected for the in-line diaphragm seal)
- Process temperature
- Ambient temperature
- System fill fluid
  - Recommendation for the food and beverage production: Neobee® KN 59 (FDA 21 CFR 172.856, 21 CFR 174.5)
  - Recommendation for pharmaceutical and cosmetics applications: Medicinal white mineral oil KN 92 (FDA 21 CFR 172.878, 21 CFR 178.3620(a); USP, EP, JP)

## Options for diaphragm seal systems

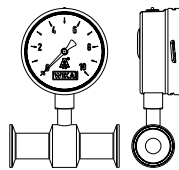
- Connection to the measuring instrument via cooling element or capillary
- Further pressure measuring instruments possible
- Vacuum service (suitable for vacuum operation)
- Higher level of cleanliness of wetted parts
  - Oil and grease free per ASTM G93-03 level D and ISO 15001 (< 220 mg/m<sup>2</sup>)
  - Oil and grease free per ASTM G93-03 level C and ISO 15001 (< 66 mg/m<sup>2</sup>)
- Height difference between measuring point and pressure measuring instrument with capillary in metre increments (max. 7 m with silicone oils/edible oils)
- Mounting bracket (required for connection to the measuring instrument via capillary, model 910.16, data sheet AC 09.07)
  - Form H per DIN 16281, 100 mm, aluminium, black
  - Form H per DIN 16281, 100 mm, stainless steel
  - Bracket for pipe mounting, for pipe Ø 20 ... 80 mm, steel
- Special version
  - Complete measuring assembly autoclavable, on request

## Assembly of the pressure measuring instrument

### ■ For horizontal pipelines

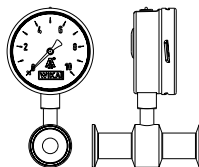
#### Variant 1

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



#### Variant 2

- Pressure measuring instrument: Lower mount (LM)
- Pointer shaft: Parallel to flow direction
- Assembly: Direct assembly, horizontal pipeline



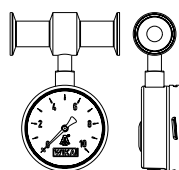
#### Variant 3

- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Parallel to flow direction
- Assembly: Direct assembly, horizontal pipeline



#### Variant 4

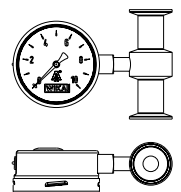
- Pressure measuring instrument: Connection location at 12 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, horizontal pipeline



### ■ For vertical pipelines

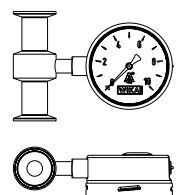
#### Variant 1

- Pressure measuring instrument: Connection location at 3 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



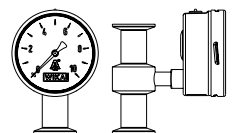
#### Variant 2

- Pressure measuring instrument: Connection location at 9 o'clock
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



#### Variant 3

- Pressure measuring instrument: Lower back mount (LBM)
- Pointer shaft: Crosswise to flow direction
- Assembly: Direct assembly, vertical pipeline



## Dimensions in mm

### Model 981.22

Type of process connection: Clamp connection per  
DIN 32676

Pipe standard: Pipes per DIN 11866 row B or ISO 1127  
row 1

DN	For pipe Outer Ø x wall thickness	PN <sup>1)</sup>	Dimensions in mm		
			L	D	Mb
13.5	13.5 x 1.6	40	114	25	10.3
17.2	17.2 x 1.6	40	114	25	14.0
21.3	21.3 x 1.6	40	114	50.5	18.1
26.9	26.9 x 1.6	40	114	50.5	23.7
33.7	33.7 x 2	40	114	50.5	29.7
42.4	42.4 x 2	40	146	64	38.4
48.3	48.3 x 2	40	146	64	44.3
60.3	60.3 x 2	40	156	77.5	56.3
76.1	76.1 x 2	25	156	91	72.1

1) For maximum pressure range consider pressure rating of clamp.

Type of process connection: Clamp connection

Pipe standard: Pipes per BS4825 part 3 and O.D.-tube

DN	For pipe Outer Ø x wall thickness	PN <sup>1)</sup>	Dimensions in mm		
			L	D	Mb
½"	12.7 x 1.6	40	114	25	9.55
¾"	19.05 x 1.6	40	114	25	15.7
1"	25.4 x 1.6	40	114	50.5	22.2
1 ½"	38.1 x 1.6	40	146	50.5	34.9
2"	50.8 x 1.6	40	156	64	47.6
2 ½"	63.5 x 1.6	40	156	77.5	60.3
3"	76.2 x 1.6	25	156	91	73.0

1) For maximum pressure range consider pressure rating of clamp.

### Model 981.52

Type of process connection: Clamp connection per  
DIN 32676

Pipe standard: Pipes per DIN 11866 row C or DIN 11850  
row 2

DN	For pipe Outer Ø x wall thickness	PN <sup>1)</sup>	Dimensions in mm		
			L	D	Mb
25	29 x 1.5	40	114	50.5	26
32	35 x 1.5	40	146	50.5	32
40	41 x 1.5	40	146	50.5	38
50	53 x 1.5	40	156	64	50
65	70 x 2	25	156	91	66
80	85 x 2	25	156	106	81
100	104 x 2	25	156	119	100

1) For maximum pressure range consider pressure rating of clamp.

Type of process connection: Clamp connection per  
DIN 32676

Pipe standard: Pipes per DIN 11866 row C or ASME BPE

DN	For pipe Outer Ø x wall thickness	PN <sup>1)</sup>	Dimensions in mm		
			L	D	Mb
1"	25.4 x 1.65	40	114	50.5	22.1
1 ½"	38.1 x 1.65	40	146	50.5	34.8
2"	50.8 x 1.65	40	156	64	47.5
2 ½"	63.5 x 1.65	40	156	77.5	60.2
3"	76.2 x 1.65	25	156	91	72.9

1) For maximum pressure range consider pressure rating of clamp.

### Model 981.53

Type of process connection: Clamp  
connection per ISO 2852

Pipe standard: Pipes per ISO 2037 and  
BS 4825 part 1



DN	For pipe Outer Ø x wall thickness	PN <sup>1)</sup>	Dimensions in mm		
			L	D	Mb
25	25 x 1.2	40	114	50.5	22.6
28	28 x 1.2	40	114	50.5	25.6
33.7	33.7 x 1.2	40	146	50.5	31.3
38	38 x 1.2	40	146	50.5	35.6
40	40 x 1.2	40	146	64	37.6
51	51 x 1.2	40	156	64	48.6
63.5	63.5 x 1.6	40	156	77.5	60.3
70	70 x 1.6	25	156	91	66.8
76.1	76.1 x 1.6	25	156	91	72.9
88.9	88.9 x 2	25	156	106	84.9
101.6	101.6 x 2	25	156	119	97.6

1) For maximum pressure range consider pressure rating of clamp.

2) Observe the note on Ehedg conformity on page 5 under "Certificates".

## Approvals

- GOST-R, import certificate, Russia

## Certificates <sup>1)</sup>

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy for diaphragm seal systems)
- 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metallic parts, indication accuracy for diaphragm seal systems)
- FDA conformity of the system fill fluid
- 3-A conformity of the diaphragm seal, based on a third party verification, in accordance with 3-A standard 74-05
- EHEDG conformity of the model 981.53 diaphragm seal (only in combination with a Kalrez® stainless steel gasket from Dupont de Nemours or with a T-ring seal from Combifit International B.V.)
- Manufacturer's declaration regarding EU regulation 1935/2004 EC
- Others on request

1) Option

Approvals and certificates, see website

## Ordering information

Diaphragm seal:

Diaphragm seal model / Process connection (type of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / Zero point stabilisation (ZPS) / Connection to the measuring instrument / Level of cleanliness of wetted parts / Origin of wetted parts / Certificates

Diaphragm seal system:

Diaphragm seal model / Process connection (type and specification of process connection, pipe standard, pipe dimension) / Material (main body, diaphragm) / Surface roughness of wetted parts / Sealing / Zero point stabilisation (ZPS) / Pressure measuring instrument model (per data sheet) / Assembly (direct assembly horizontal/vertical, cooling element horizontal / vertical, capillary) / min. and max. process temperature / min. and max. ambient temperature / Vacuum service / System fill fluid / Certificates / Height difference / Level of cleanliness of wetted parts / Origin of wetted parts / Mounting bracket

© 2002 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.  
The specifications given in this document represent the state of engineering at the time of publishing.  
We reserve the right to make modifications to the specifications and materials.

