

# Diaphragm monitoring system with HART® protocol

## For sanitary applications

### Model DMSU21SA

WIKA data sheet DS 95.11



for further approvals  
see page 9



#### Applications

- Hygienic pressure measurement for the pharmaceutical industry and for aseptic food processing
- Pressure/vacuum measurement on pipelines, fermenters, bioreactors and vessels as well as with processing and transport of high-quality media
- Suitable for the production of active pharmaceutical ingredients (API)
- For the monitoring of processes with sterile steam
- For gases, vapour; liquid, pasty, powdery and crystallising media

#### Special features

- Double-diaphragm system prevents contamination of process and environment
- Hygienic process connections in different designs
- Signal transmission and configuration with only one cable per measuring location
- Minimal installation costs, even with retrofitting

#### Description

The model DMSU21SA diaphragm monitoring system fulfils the constantly growing requirements for process monitoring on plants for sanitary applications. With the HART® protocol, not only the measuring signal, but also the status of the integrated diaphragm monitoring can be transmitted, as required, to the process control. The system architecture with integrated diaphragm monitoring bridges the gap between digitalisation and process reliability.

With the patented diaphragm monitoring, a monitoring element is mainly used for electrical/digital signal transmission of the diaphragm condition. In addition, the diaphragm condition is displayed on a dial with red/green areas.



Diaphragm monitoring system, model DMSU21SA

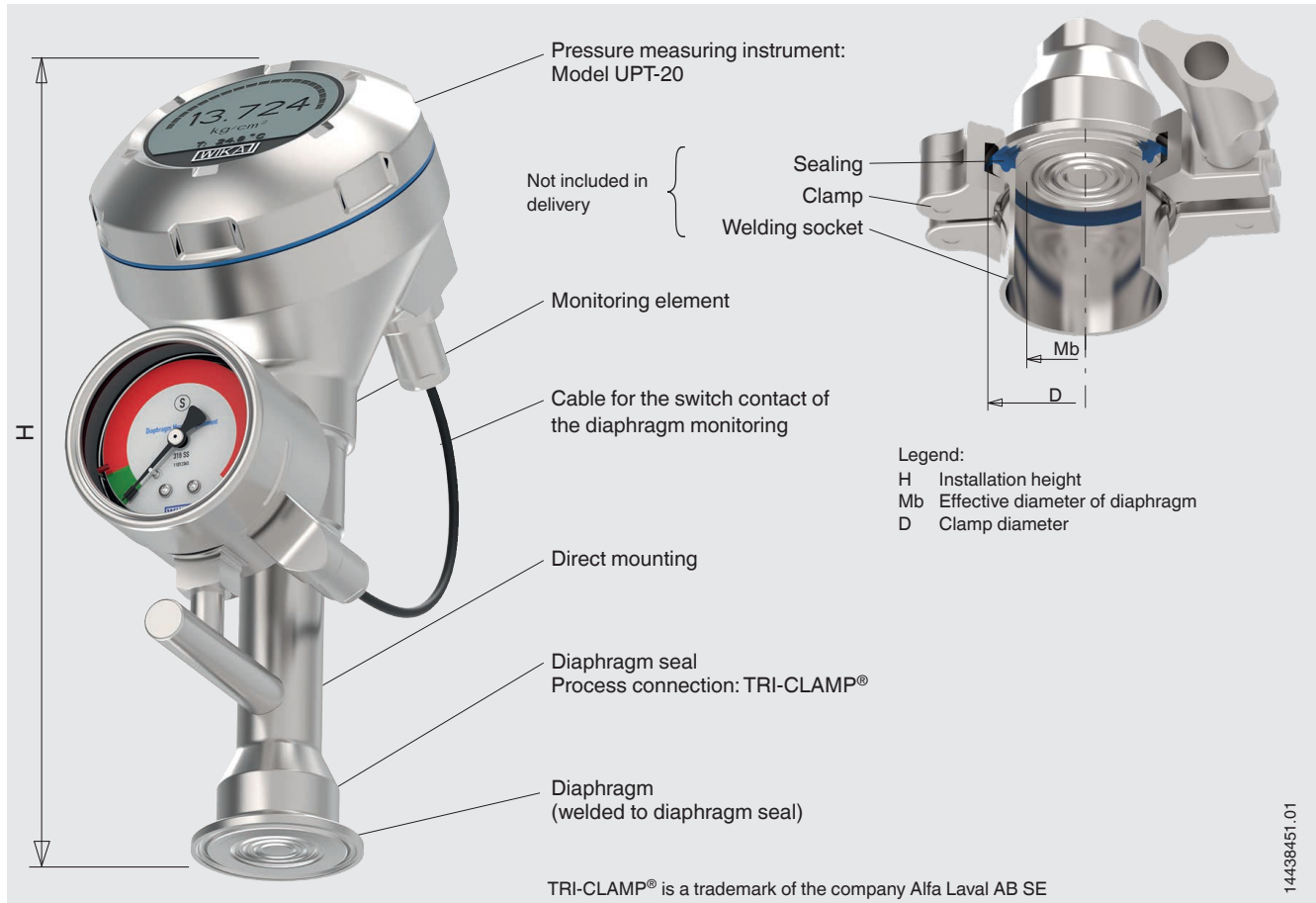
In the event of a diaphragm rupture, a second, internal diaphragm ensures the reliable separation of the environment and the process. A fluid inside the system, which is explicitly chosen to suit the particular measuring requirement, hydraulically transmits the pressure to the pressure measuring instrument. Depending on the application, the system fill fluid is FDA- and also USP-compliant.

The diaphragm monitoring system can be supplied with all common process connections for sanitary applications and fulfils the applicable standards for them, e.g. EHEDG, 3-A and ASME BPE.

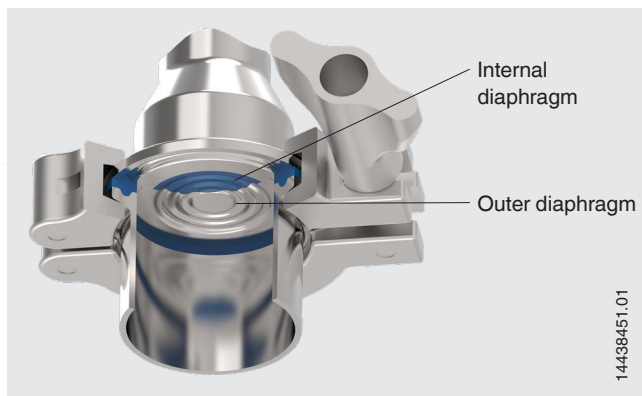
This product, WIKA model DMSU21SA, is a patented WIKA development (US 10794787, NL 2019251).

## Illustrative example of a diaphragm monitoring system

The diaphragm monitoring system is a combination of pressure measuring instrument and diaphragm seal with an additional monitoring element for the diaphragm condition.



## Functional principle of diaphragm monitoring



WIKA's double-diaphragm design is the solution for critical processes where neither the medium should find its way into the environment, nor should the system fill fluid find its way into the product.

### Normal operation

In normal operation, the pressure measurement and the diaphragm monitoring operate without limitations within the performance limits of the overall system.

The space between the two diaphragms is evacuated. With the monitoring element, this vacuum is measured and the condition signalled in the green area; no electrical/digital alarm signal will be output.

### Diaphragm rupture

In the event of a diaphragm rupture, the pressure monitored in the intermediate space increases. As soon as the display of the monitoring element exceeds the predefined set point, the alarm signal for a diaphragm rupture is transmitted. The alarm signal is output either via the HART® protocol or as an error signal on the current loop. The simple cabling enables a quick instrument replacement at the measuring location.

### Safety

The measuring technology of the monitoring element withstands the process pressure despite the diaphragm rupture. The measuring function of the overall system is maintained without limitations. The process safety is guaranteed because the materials used for the two diaphragms are the same as those of the wetted parts of the diaphragm seal. The overall system is, nevertheless, damaged and must be replaced immediately.

## Specifications

Diaphragm seal system	
<b>Design</b>	Model UPT-20 process transmitter mounted to a diaphragm seal with clamp connection, welded
<b>Material <sup>1)</sup></b>	
Wetted	Diaphragm and diaphragm seal: Stainless steel 1.4435 (316L); UNS S31603
<b>Surface roughness</b>	
Wetted	<ul style="list-style-type: none"> <li>■ <math>Ra \leq 0.38 \mu\text{m}</math> [15 <math>\mu\text{in}</math>] per ASME BPE SF4, electropolished (except for weld seam)</li> <li>■ <math>Ra \leq 0.76 \mu\text{m}</math> [30 <math>\mu\text{in}</math>] (except for weld seam)</li> </ul>
Non-wetted	$Ra \leq 0.76 \mu\text{m}$ [30 $\mu\text{in}$ ] (except for weld seam)
<b>Case head</b>	<ul style="list-style-type: none"> <li>■ Plastic (PBT) with conductive surface per EN 60079-0:2012, colour: Night blue RAL5022</li> <li>■ Stainless steel case 1.4308 (CF-8), precision-cast (suitable for chemical and petrochemical industries)</li> <li>■ Stainless steel case 1.4308 (CF-8) with electropolished surface (suitable for pharmaceutical, food and hygienic industries)</li> </ul>
<b>System fill fluid</b>	<ul style="list-style-type: none"> <li>■ Medicinal white mineral oil, FDA 21 CFR 172.878</li> <li>■ Medicinal white mineral oil, FDA 21 CFR 178.362 (a)</li> </ul> <p>USP-, EP- and JP-certified</p> <p>USP = United States Pharmacopeia EP = European Pharmacopoeia JP = Japanese Pharmacopoeia</p>
<b>Mounting type</b>	Direct mounting
<b>Level of cleanliness of wetted parts</b>	Oil- and grease-free per ASTM G93-03 level F WIKA standard ( $< 1,000 \text{ mg/m}^2$ )

1) Other materials on request

Diaphragm monitoring <sup>1)</sup> via switch contact and dial with red/green areas	
<b>Output signal</b>	The status of the switch contact (alarm signal) is monitored in the process transmitter and output via the HART® protocol or as an error signal on the current loop. → see "Output signals"
<b>Alarm signal condition</b>	For the monitoring element to change the status of the switch contact, the specified set point must be reached for at least 1.5 seconds. This prevents shocks or vibrations from triggering the alarm signal unintentionally.
<b>Dial display</b>	<p>Pointer in green range → Outer diaphragm intact</p> <p>Pointer in red range → Outer diaphragm defective</p>
<b>Material</b>	
Case	Stainless steel, with solid baffle wall (Solidfront) and blow-out back
Pressure element	Stainless steel 316L
Movement	Stainless steel
Bayonet ring	Stainless steel
Pointer/dial	Aluminium
Window	Laminated safety glass

1) In the event of a diaphragm rupture, the diaphragm monitoring is specified for process pressures  $\geq 0$  bar gauge

## Measuring range

Gauge pressure						
<b>bar</b>	0 ... 2.5	0 ... 4	0 ... 6	0 ... 10	0 ... 16	0 ... 25
<b>psi</b>	0 ... 30	0 ... 60	0 ... 100	0 ... 160	0 ... 250	0 ... 360

Vacuum and +/- measuring ranges <sup>1)</sup>						
<b>bar</b>	-1 ... +1.5	-1 ... +3	-1 ... +5	-1 ... +9	-1 ... +15	-1 ... +24
<b>psi</b>	-14.5 ... 20	-14.5 ... +40	-14.5 ... +80	-14.5 ... +130	-14.5 ... +200	-14.5 ... +350

1) Under vacuum, diaphragm monitoring is only possible to a limited extent

Other units settable (→ see page 7).

Other measuring ranges can be set via turndown.

For example, a 0 ... 6 bar [0 ... 100 psi] instrument can also be used from -1 ... +6 bar [-14.5 ... +100 psi].

Vacuum/overload safety	
<b>Vacuum safety</b>	Yes
<b>Overload safety</b>	1-fold

## Output signal

Output signal	
<b>Signal types</b>	<ul style="list-style-type: none"> <li>■ 4 ... 20 mA with HART® signal (HART® rev. 7)</li> <li>■ 4 ... 20 mA</li> </ul>
<b>Load in Ω</b>	$\leq U_+ - 14 \text{ V} / 0.023 \text{ A}$ U <sub>+</sub> = Applied supply voltage (→ see "Supply voltage")
<b>Dampening</b>	0 ... 99.9 s, adjustable After the set dampening time the instrument outputs 63 % of the applied pressure as output signal.
<b>Settling time t<sub>90</sub></b>	80 ms
<b>Refresh rate</b>	50 ms

## Process connection

Standard	
<b>Clamp connection per DIN 32676</b>	→ See from page 11
<b>Clamp connection per ISO 2852</b>	→ See page 13
<b>Aseptic threaded pipe connection per DIN 11864-1</b>	→ See from page 14
<b>Aseptic flange connection per DIN 11864-2</b>	→ See from page 17
<b>Aseptic clamp connection per DIN 11864-3</b>	→ See from page 20
<b>Ingold connection with union nut</b>	→ See page 23

## Accuracy specifications

Accuracy specifications	
<b>Accuracy at reference conditions</b> 1)	<ul style="list-style-type: none"> <li>■ 0.1 % of span</li> <li>■ 0.5 % of span</li> </ul>
<b>Adjustability</b>	
Zero point	-20 ... +95 % (downwards, the adjustability is always limited by the minimum pressure of 0 bar abs. [0 psia])
Span	-120 ... +120 % with a difference between zero point and span of max. 120 % of the nominal measuring range
Turndown	Unlimited; maximum recommended turndown 20:1
	Measuring range ≤ 25 bar [360 psi]
<b>Mounting correction</b>	-20 ... +20 %
<b>Non-repeatability</b>	≤ 0.1 % of span
<b>Behaviour with turndown</b> 2)	
TD ≤ 5:1	No influence on the accuracy
TD > 5:1 ... ≤ 100:1	GES = GG x TD / 5
<b>Long-term stability</b>	≤ 0.1 % of span

1) Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).

2) **Legend**

GES: Overall accuracy via turndown

GG: Accuracy (e.g. 0.15 %)

TD: Turndown factor (e.g. 4:1 corresponds to TD factor 4)

## Reference conditions per IEC 61298-1

Reference conditions per IEC 61298-1	
<b>Temperature</b>	23 °C ±2 °C [73 °F ±7 °F]
<b>Supply voltage</b>	DC 23 ... 25 V
<b>Air pressure</b>	860 ... 1,060 mbar [86 ... 106 kPa, 12.5 ... 15.4 psi]
<b>Air humidity</b>	45 ... 75 % r. h.
<b>Characteristic curve determination</b>	Terminal method per IEC 61298-2
<b>Curve characteristics</b>	Linear
<b>Reference mounting position</b>	Vertical, diaphragm points downward

## Voltage supply

Voltage supply	
<b>Supply voltage U+</b>	DC 14 ... 30 V
<b>Maximum voltage U<sub>i</sub></b>	DC 30 V
<b>Maximum current I<sub>i</sub></b>	100 mA
<b>Maximum power P<sub>i</sub> (gas)</b>	1,000 mW
<b>Effective internal capacitance</b>	11 nF
<b>Effective internal inductance</b>	100 μH

→ For more information, see "Approvals"

# Case design of process transmitter

Case	
Material	<ul style="list-style-type: none"> <li>■ Plastic (PBT) with conductive surface per EN 60079-0:2012. Colour: Night blue RAL5022</li> <li>■ Stainless steel case 1.4308 (CF-8) with electropolished surface (suitable for pharmaceutical, food and hygienic industries)</li> </ul>

## Electrical connection

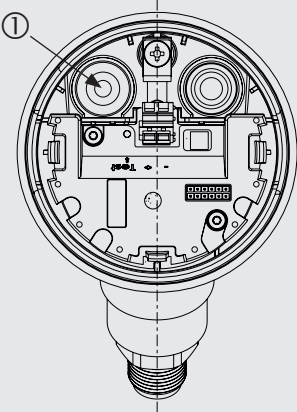
Electrical connection		
<b>Cable glands M20 x 1.5</b>		
Stainless steel cable gland in hygienic design	Sealing	FDA-compliant
	Cable diameter	6 ... 12 mm [0.24 ... 0.47 in]
	Ingress protection per IEC/EN 60529	IP66/67
<b>Angular connector DIN 175301-803A with mating connector</b>	Wire cross-section	Max. 1.5 mm <sup>2</sup> (AWG 16)
	Ingress protection per IEC/EN 60529	IP65 <sup>1)</sup>
<b>Circular connector M12 x 1 (4-pin) without mating connector</b>	Ingress protection per IEC/EN 60529	IP65 <sup>1)</sup>
<b>Electrical safety</b>	Reverse polarity protection	

1) The stated ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

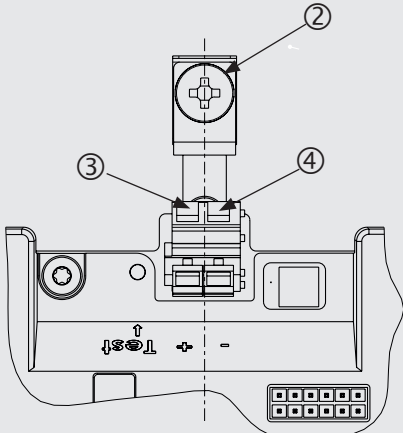
## Pin assignment

**Cable gland M20 x 1.5 and spring-loaded terminals**

Outlet for connection cable



Pin assignment



① Cable gland  
 ② Shield  
 ③ Positive power supply terminal U+  
 ④ Negative power supply terminal U-

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## Display and operating unit, model DI-PT-U

Display and operating unit, model DI-PT-U	
<b>Display type</b>	LC display <sup>1)</sup>
<b>Refresh rate</b>	200 ms
<b>Main display</b>	4 ½-digit
<b>Segment display</b>	Character size 14 mm [0.55 in]
<b>Additional display</b>	Selectable via menu, three-line scale range
<b>Bar graph display</b>	20 segments, radial, pressure gauge simulation
<b>Adjustable units</b>	
Pressure units	<ul style="list-style-type: none"> <li>■ bar</li> <li>■ psi</li> <li>■ mbar</li> <li>■ MPa</li> <li>■ kPa</li> <li>■ hPa</li> <li>■ Pa</li> <li>■ mH<sub>2</sub>O</li> <li>■ mmH<sub>2</sub>O</li> </ul> <ul style="list-style-type: none"> <li>■ ftH<sub>2</sub>O</li> <li>■ inH<sub>2</sub>O</li> <li>■ mHg</li> <li>■ mmHg</li> <li>■ inHg</li> <li>■ kg/cm<sup>2</sup></li> <li>■ g/cm<sup>2</sup></li> <li>■ Torr</li> </ul>
Level units	<ul style="list-style-type: none"> <li>■ m</li> <li>■ cm</li> <li>■ mm</li> <li>■ ft</li> <li>■ in</li> </ul>
Volume units	<ul style="list-style-type: none"> <li>■ l</li> <li>■ m<sup>3</sup></li> <li>■ gal</li> <li>■ inch<sup>3</sup></li> <li>■ ft<sup>3</sup></li> <li>■ %</li> </ul>
Free unit	A free character string (6 characters) can be defined as a unit
<b>Operating state</b>	Display via symbols
<b>Operating temperature</b>	By using the display and operating unit, the operating temperature is limited to -20 ... +60 °C [-4 ... +140 °F]
<b>Storage temperature</b>	-40 ... +80 °C [-40 ... +176 °F]
<b>Operation</b>	4 buttons for the recall and operation of the settings
<b>Colours</b>	
Background	Light grey
Digits	Black
<b>Display size</b>	Separated into main and segment displays
<b>Ingress protection per IEC/EN 60529</b>	<ul style="list-style-type: none"> <li>■ IP20 (loose)</li> <li>■ IP40 (built-in without cover)</li> </ul>
<b>Material</b>	Case from ABS, window from polyester film

1) For the process transmitter only this display may be used. → For order number see "Accessories and spare parts".

## Operating conditions

Operating conditions	
Range of applications	Suitable for internal and external operation, exposure to direct sunlight is permitted
Permissible air humidity	≤ 93 % r. h.
<b>Permissible temperature ranges</b>	
Ambient	10 ... 40 °C [50 ... 104 °F]
Medium	<ul style="list-style-type: none"> <li>■ -10 ... +130 °C [14 ... 266 °F]</li> <li>■ -10 ... +150 °C [14 ... 302 °F]</li> </ul>
Storage	10 ... 60 °C [50 ... 140 °F]
Ingress protection per IEC/EN 60529	IP65 The ingress protection only applies with closed case head and closed cable glands.
Explosion protection	→ See "Approvals"



### Temperature ranges for Ex protection

Temperature class	Ambient temperature
T6 ... T3	$-40 \leq T_a \leq +40$ °C [ $-40 \leq T_a \leq +104$ °F]



## Approvals





### Approvals included in the scope of delivery

Logo	Description	Country
	<b>EU declaration of conformity</b>	European Union
	EMC directive, interference emission (group 1, class B) and immunity per EN 61326-1:2013 (industrial application), EN 61326-2-3:2013 <sup>1)</sup>	
	Pressure equipment directive	
	RoHS directive	
	<b>EHEDG <sup>2)</sup></b> Hygienic Equipment Design	European Community

1) With electrostatic discharge, a short-term, increased error of up to 1 % of the nominal measuring range can occur.

2) EHEDG conformity only in connection with the marked process connections

### Optional approvals

Logo	Description	Country
 	<b>EU declaration of conformity</b>	European Union
	ATEX directive Hazardous areas Gas II 2G Ex ia IIC T6 ... T3 Gb	
 	<b>IECEx</b> Hazardous areas Gas Ex ia IIC T6 ... T3 Gb	International

## Certificates (option)

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)
- 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy)
- FDA conformity of the system fill fluid
- 3-A conformity of the diaphragm seal, based on a third party verification
- EHEDG conformity
- Others on request

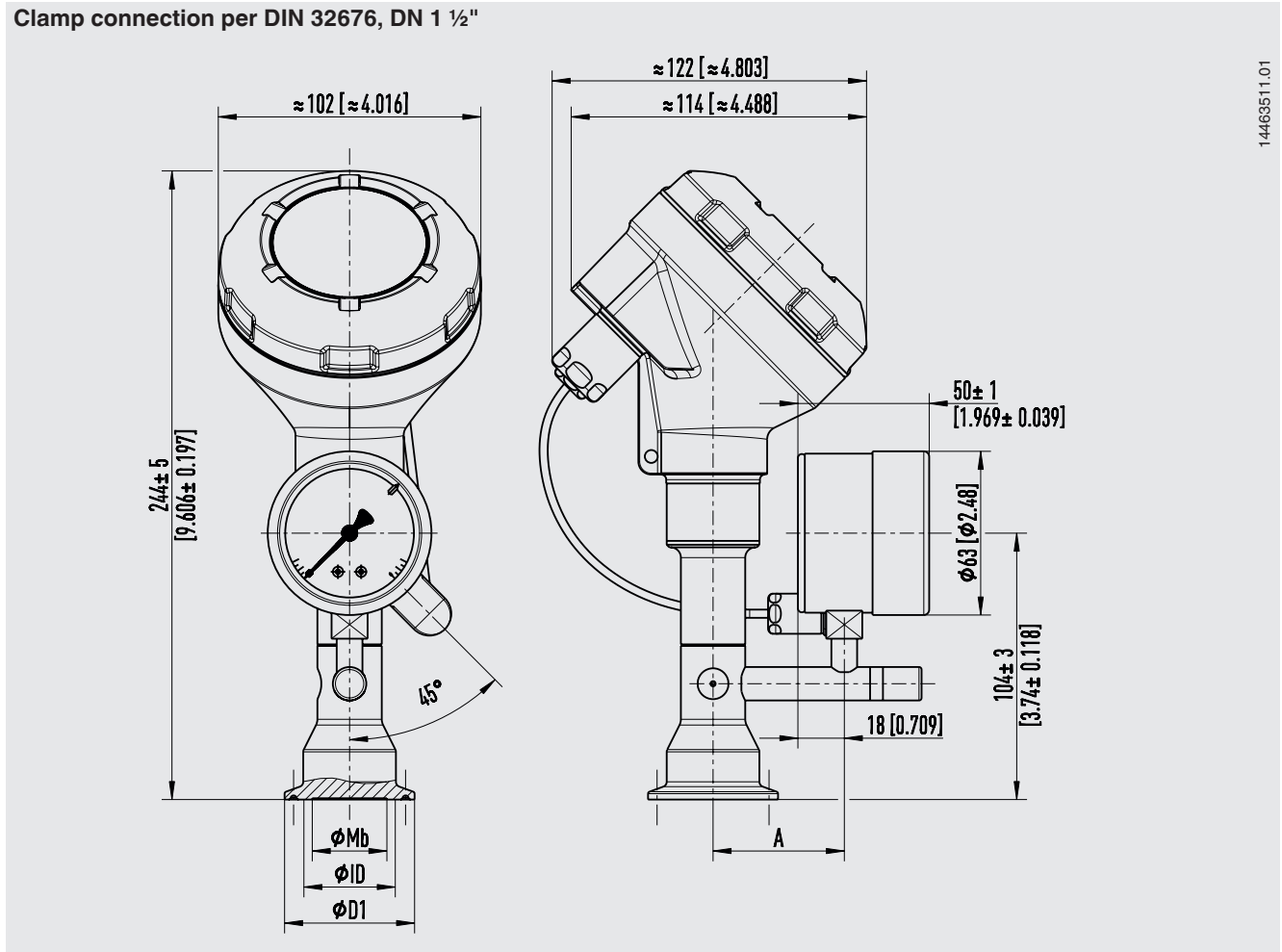
## Patents, property rights

- Diaphragm monitoring for diaphragm seals (US 10794787, NL 2019251)

Approvals and certificates, see website

# Dimensions in mm [in]

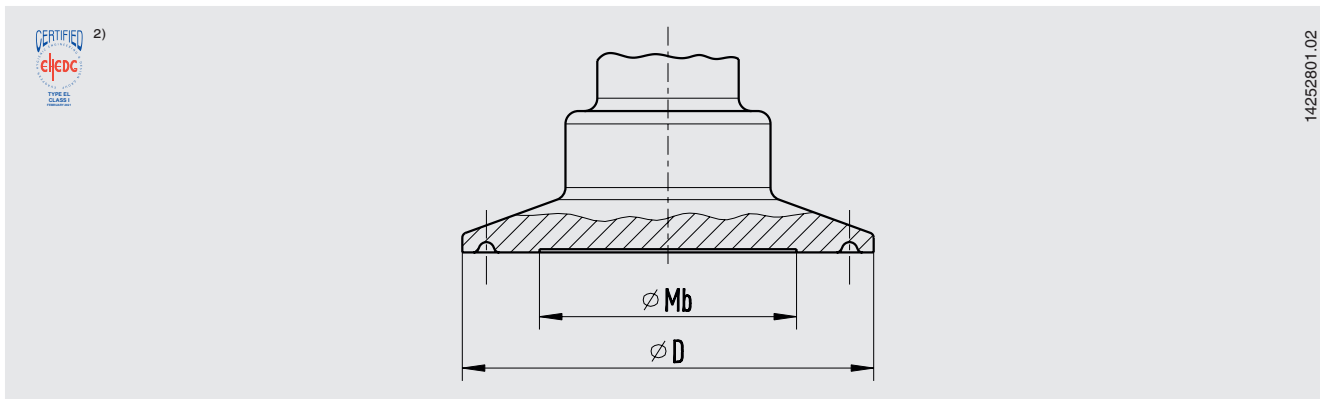
Clamp connection per DIN 32676, DN 1 1/2"



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For further information on model UPT-20 see data sheet PE 86.05

## Clamp connection per DIN 32676



### Process connection: Clamp connection per DIN 32676 Pipe standard per DIN 11866 row B and ISO 1127 row 1

DN	PN <sup>1)</sup>	Dimensions in mm [in]			
		For pipe outer $\varnothing$ x wall thickness	Pipe inner $\varnothing$	D	Mb
26.9	40	26.9 x 1.6 [1.059 x 0.063]	23.7 [0.933]	50.5 [1.988]	22 [0.866]
33.7	40	33.7 x 2 [1.327 x 0.079]	29.7 [1.169]	50.5 [1.988]	25 [0.984]
42.4	40	42.4 x 2 [1.669 x 0.079]	38.4 [1.512]	64 [2.52]	32 [1.26]
48.3	40	48.3 x 2 [1.902 x 0.079]	44.3 [1.744]	64 [2.52]	40 [1.575]
60.3	40	60.3 x 2 [2.374 x 0.079]	56.3 [2.217]	77.5 [3.051]	52 [2.047]
76.1	25	76.1 x 2 [2.996 x 0.079]	72.1 [2.839]	91 [3.583]	60 [2.362]

### Process connection: Clamp connection per DIN 32676 Pipe standard per DIN 11866 row C or ASME BPE

DN	PN <sup>1)</sup>	Dimensions in mm [in]			
		For pipe outer $\varnothing$ x wall thickness	Pipe inner $\varnothing$	D	Mb
1"	40	25.4 x 1.65 [1 x 0.065]	22.1 [0.87]	50.5 [1.988]	22 [0.866]
1 1/2"	40	38.1 x 1.65 [1.5 x 0.065]	34.8 [1.37]	50.5 [1.988]	32 [1.26]
2"	40	50.8 x 1.65 [2 x 0.065]	47.5 [1.87]	64 [2.52]	40 [1.575]
2 1/2"	40	63.5 x 1.65 [2.5 x 0.065]	60.2 [2.37]	77.5 [3.051]	52 [2.047]
3"	25	76.2 x 1.65 [3 x 0.065]	72.9 [2.87]	91 [3.583]	60 [2.362]

### Process connection: Clamp connection per DIN 32676 Pipe standard per BS 4825 part 3 and O.D. tube

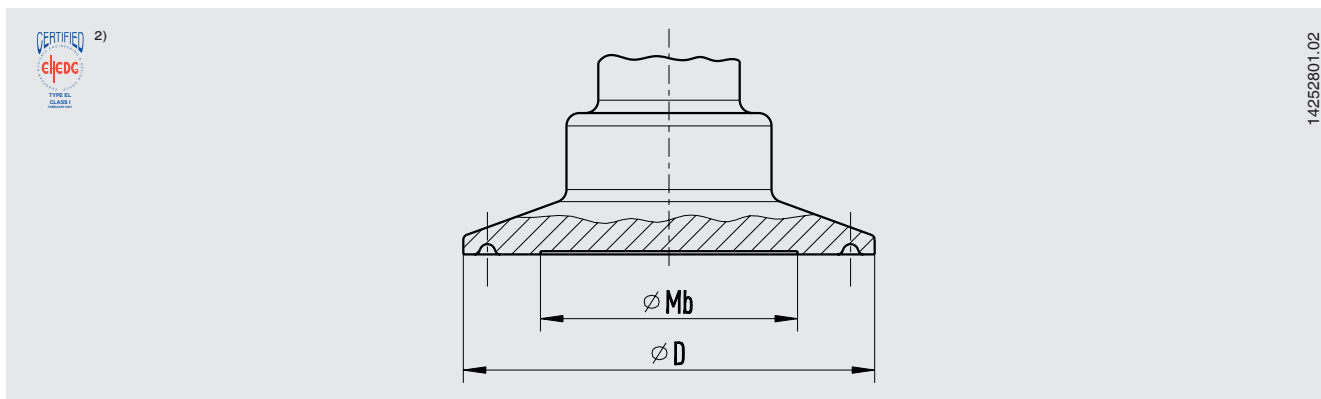
DN	PN <sup>1)</sup>	Dimensions in mm [in]			
		For pipe outer $\varnothing$ x wall thickness	Pipe inner $\varnothing$	D	Mb
25.4	40	25.4 x 1.6 [1 x 0.063]	22.2 [0.874]	50.5 [1.988]	22 [0.866]
38.1	40	38.1 x 1.6 [1.5 x 0.063]	34.9 [1.374]	50.5 [1.988]	32 [1.26]
50.8	40	50.8 x 1.6 [2 x 0.063]	47.6 [1.874]	64 [2.52]	40 [1.575]
63.5	40	63.5 x 1.6 [2.5 x 0.063]	60.3 [2.374]	77.5 [3.051]	52 [2.047]
76.2	25	76.2 x 1.6 [3 x 0.063]	73 [2.874]	91 [3.583]	60 [2.362]

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

2) EHEDG conformity only in combination with TRI-CLAMP® seals Combifit International B.V., The Netherlands.

Further dimensions and higher nominal pressures on request

## Clamp connection per DIN 32676



Process connection: Clamp connection per DIN 32676  
 Pipe standard per DIN 11866 row A and DIN 11850 row 2

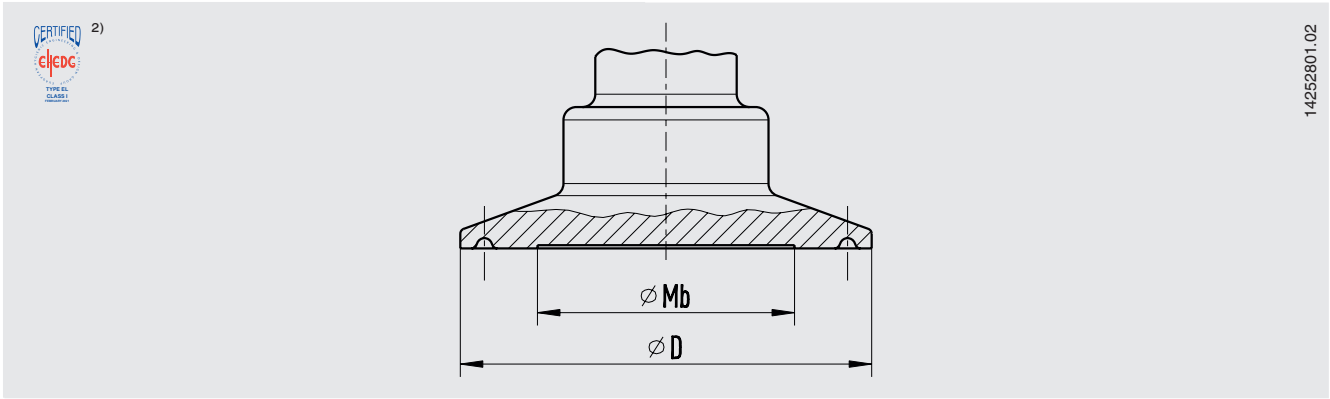
DN	PN <sup>1)</sup>	Dimensions in mm [in]			
		For pipe outer $\varnothing$ x wall thickness	Pipe inner $\varnothing$	D	Mb
25	40	29 x 1.5 [x 0.059]	26 [1.024]	50.5 [1.988]	25 [0.984]
32	40	35 x 1.5 [x 0.059]	32 [1.26]	50.5 [1.988]	29 [1.142]
40	40	41 x 1.5 [x 0.059]	38 [1.496]	50.5 [1.988]	32 [1.26]
50	40	53 x 1.5 [x 0.059]	50 [1.969]	64 [2.52]	40 [1.575]
65	25	70 x 2 [x 0.079]	66 [2.598]	91 [3.583]	59 [2.323]
80	25	85 x 2 [x 0.079]	81 [3.189]	106 [4.173]	72 [2.835]
100	25	104 x 2 [x 0.079]	100 [3.937]	119 [4.685]	90 [3.543]

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

2) EHEG conformity only in combination with TRI-CLAMP® seals Combifit International B.V., The Netherlands.

Further dimensions and higher nominal pressures on request

## Clamp connection per ISO 2852



### Process connection: Clamp connection per ISO 2852 Pipe standard per ISO 2037 and BS 4825 part 1

DN	PN <sup>1)</sup>	Dimensions in mm [in]			
		For pipe outer $\varnothing$ x wall thickness	Pipe inner $\varnothing$	D	Mb
25	40	25 x 1.2 [0.984 x 0.047]	22.6 [0.89]	50.5 [1.988]	22 [0.866]
33.7	40	33.7 x 1.2 [1.327 x 0.047]	31.3 [1.232]	50.5 [1.988]	25 [0.984]
38	40	38 x 1.2 [1.496 x 0.047]	35.6 [1.402]	50.5 [1.988]	32 [1.26]
40	40	40 x 1.2 [1.575 x 0.047]	37.6 [1.48]	64 [2.52]	32 [1.26]
51	40	51 x 1.2 [2.008 x 0.047]	48.6 [1.913]	64 [2.52]	40 [1.575]
63.5	40	63.5 x 1.6 [2.5 x 0.063]	60.3 [2.374]	77.5 [3.051]	52 [2.047]
70	25	70 x 1.6 [2.756 x 0.063]	66.8 [2.63]	91 [3.583]	60 [2.362]
76.1	25	76.1 x 1.6 [2.996 x 0.063]	72.9 [2.87]	91 [3.583]	60 [2.362]
88.9	25	88.9 x 2 [3.5 x 0.079]	84.9 [3.343]	106 [4.173]	72 [2.835]
101.6	25	101.6 x 2 [4 x 0.079]	97.6 [3.843]	119 [4.685]	90 [3.543]

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

2) EHEDG conformity only in combination with TRI-CLAMP® seals Combit International B.V., The Netherlands.

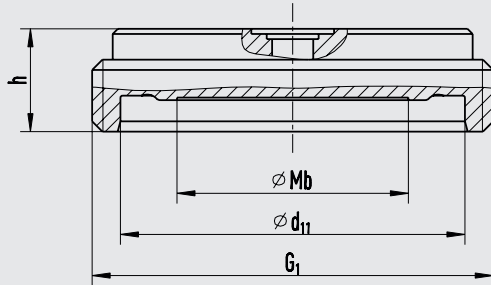
Further dimensions and higher nominal pressures on request



# Aseptic threaded pipe connection per DIN 11864-1

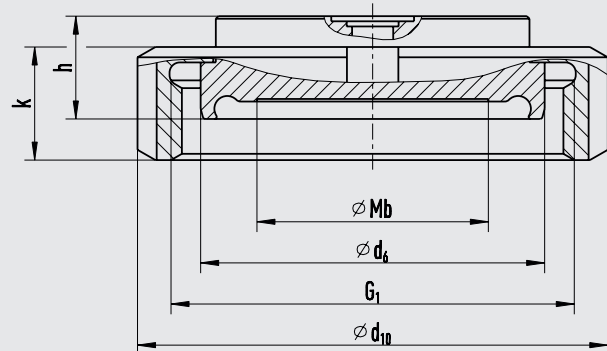


With threaded coupling



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With liner and union nut



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Type of process connection: Aseptic threaded pipe connection per DIN 11864-1 form A  
Pipe standard per DIN 11866 row B or DIN ISO 1127 row 1

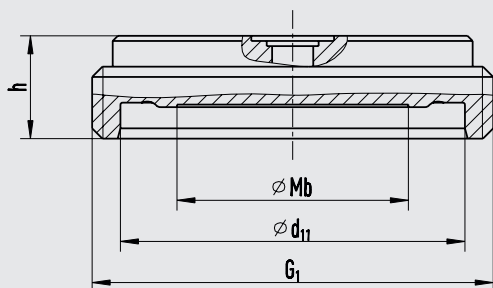
DN	For pipe Outer Ø x wall thick ness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]							
			Mb	d <sub>6</sub>	d <sub>11</sub>	G <sub>1</sub>	h	d <sub>10</sub>	k	Aseptic O-ring
26.9	26.9 x 1.6 [1.059 x 0.063]	40	22 [0.866]	42.9 [1.689]	43 [1.693]	RD 52 x 1/6 [2.047 x 1/6]	20 [0.787]	63 [2.48]	21 [0.827]	26 x 3.5 [1.024 x 0.1378]
33.7	33.7 x 2 [1.327 x 0.078]	40	25 [0.984]	48.9 [1.925]	49 [1.929]	RD 58 x 1/6 [2.283 x 1/6]	20 [0.787]	70 [2.756]	21 [0.827]	32 x 5 [1.26 x 0.197]
42.4	42.4 x 2 [1.669 x 0.078]	25	35 [1.378]	54.9 [2.161]	55 [2.165]	RD 65 x 1/6 [2.559 x 1/6]	20 [0.787]	78 [3.071]	21 [0.827]	40.5 x 5 [1.594 x 0.197]
48.3	48.3 x 2 [1.902 x 0.078]	25	45 [1.772]	66.9 [2.634]	67 [2.638]	RD 78 x 1/6 [3.071 x 1/6]	20 [0.787]	92 [3.622]	22 [0.866]	46.5 x 5 [1.831 x 0.197]
60.3	60.3 x 2 [2.374 x 0.078]	25	60 [2.362]	84.9 [3.343]	85 [3.346]	RD 95 x 1/6 [3.74 x 1/6]	20 [0.787]	112 [4.409]	25 [0.984]	58.5 x 5 [1.831 x 0.197]
76.1	76.1 x 2 [2.996 x 0.078]	25	72 [2.835]	98.9 [3.894]	99 [3.898]	RD 110 x 1/4 [4.331 x 1/4]	20 [0.787]	127 [5]	29 [1.142]	73.5 x 5 [2.894 x 0.197]
88.9	88.9 x 2.3 [3.5 x 0.091]	25	90 [3.543]	118.9 [4.681]	119 [4.685]	RD 130 x 1/4 [5.118 x 1/4]	20 [0.787]	148 [5.827]	31 [1.22]	86.5 x 5 [3.406 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic threaded pipe connection per DIN 11864-1

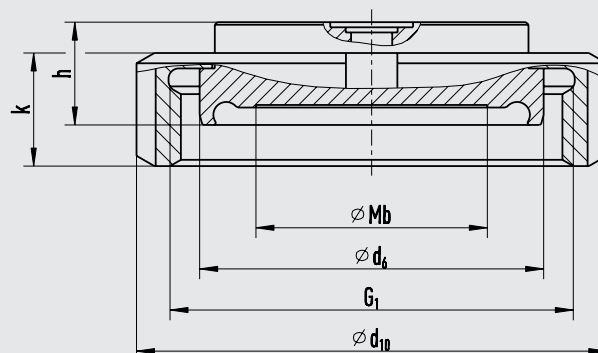


With threaded coupling



11077655.01

With liner and union nut



11077647.01

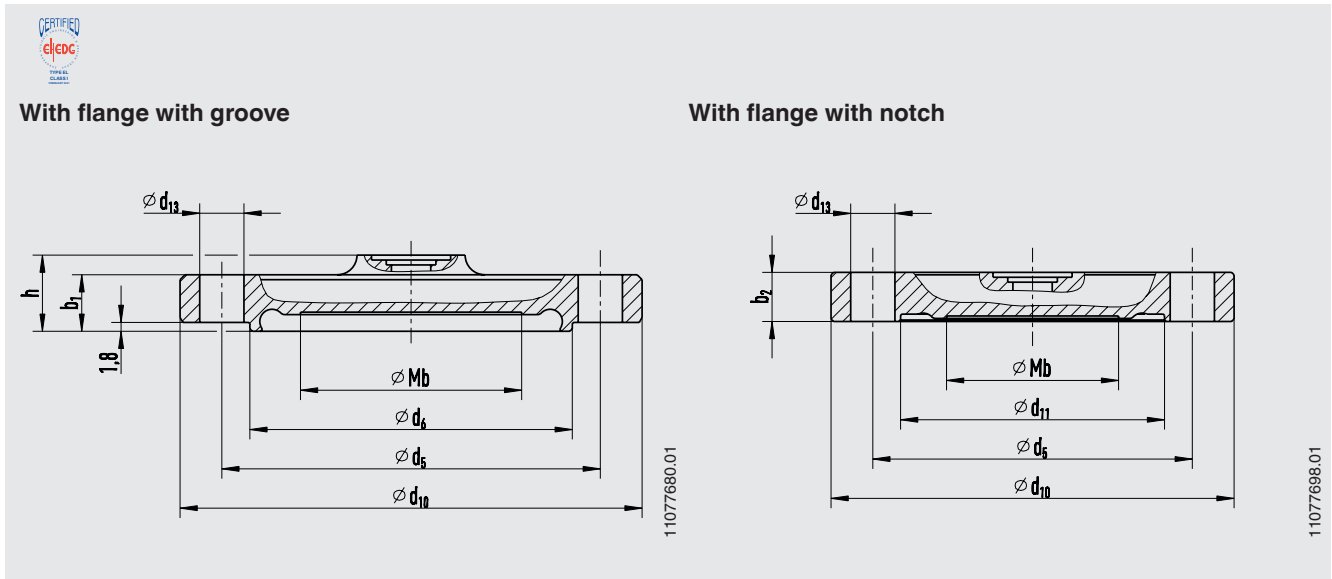
Type of process connection: Aseptic threaded pipe connection per DIN 11864-1 form A  
 Pipe standard per DIN 11866 row C or ASME BPE 1997

DN	For pipe Outer Ø x wall thick ness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]							
			Mb	d <sub>6</sub>	d <sub>11</sub>	G <sub>1</sub>	h	d <sub>10</sub>	k	Aseptic O-ring
1"	25.4 x 1.65 [1.831 x 0.065]	40	22 [0.866]	42.9 [1.689]	43 [1.693]	RD 52 x 1/6 [2.047 x 1/6]	20 [0.787]	63 [2.48]	21 [0.827]	24 x 3,5 [0.945 x 0.1378]
1 1/2"	42.4 x 1.65 [1.669 x 0.065]	40	32 [1.26]	54.9 [2.161]	55 [2.165]	RD 65 x 1/6 [2.559 x 1/6]	20 [0.787]	78 [3.071]	21 [0.827]	37 x 5 [1.457 x 0.197]
2"	48.3 x 1.65 [1.902 x 0.065]	25	45 [1.772]	66.9 [2.634]	67 [2.638]	RD 78 x 1/6 [3.071 x 1/6]	20 [0.787]	92 [3.622]	22 [0.866]	50 x 5 [1.969 x 0.197]
2 1/2"	60.3 x 1.65 [2.374 x 0.065]	25	52 [2.047]	84.9 [3.343]	85 [3.346]	RD 95 x 1/6 [3.74 x 1/6]	20 [0.787]	112 [4.409]	25 [0.984]	62 x 5 [2.441 x 0.197]
3"	76.1 x 1.65 [2.996 x 0.065]	25	60 [2.362]	98.9 [3.894]	99 [3.898]	RD 110 x 1/4 [4.331 x 1/4]	20 [0.787]	127 [5]	29 [1.142]	75 x 5 [2.953 x 0.197]
4"	88.9 x 2.11 [3.5 x 0.083]	25	90 [3.543]	118.9 [4.681]	119 [4.685]	RD 130 x 1/4 [5.118 x 1/4]	20 [0.787]	148 [5.827]	31 [1.22]	100 x 5 [3.937 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.



# Aseptic flange connection per DIN 11864-2

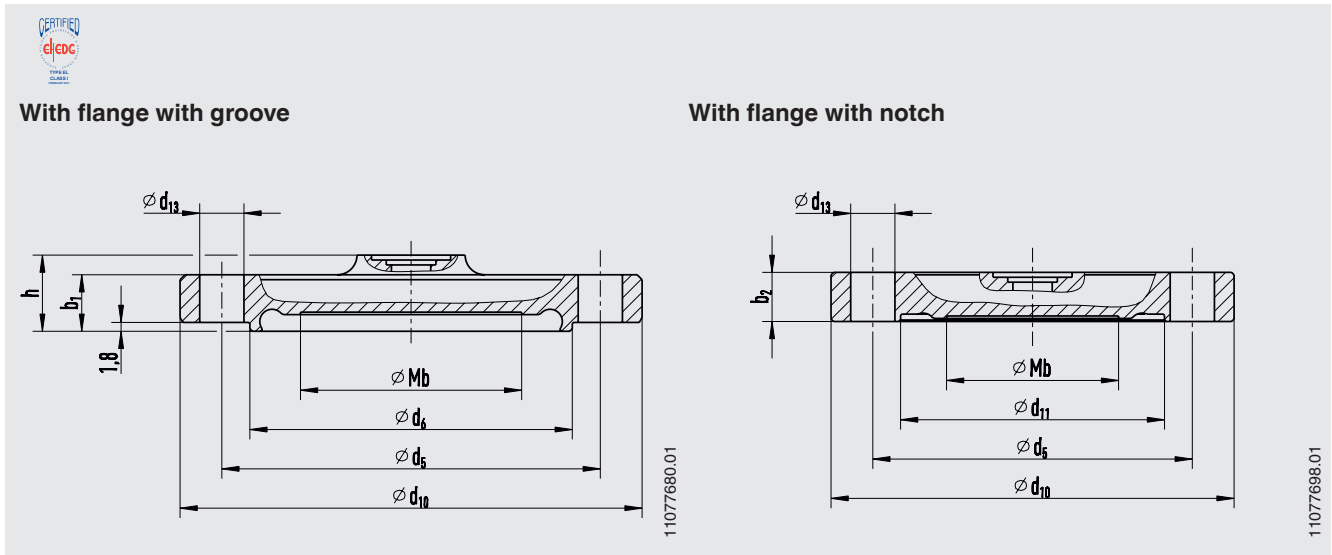


Type of process connection: Aseptic flange connection per DIN 11864-2 form A  
 Pipe standard per DIN 11866 row A or DIN 11850 row 2

DN	For pipe Outer Ø x wall thickness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]									
			Mb	d <sub>6</sub>	d <sub>11</sub>	d <sub>5</sub>	d <sub>10</sub>	h	b <sub>1</sub>	b <sub>2</sub>	d <sub>13</sub>	Aseptic O-ring
25	29 x 1.5 [1.142 x 0.071]	25	22 [0.866]	38.3 [1.508]	38.4 [1.512]	53 [2.087]	70 [2.756]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	28 x 3.5 [1.102 x 0.1378]
32	35 x 1.5 [1.378 x 0.071]	25	25 [0.984]	47.6 [1.878]	47.7 [1.878]	59 [2.323]	76 [2.992]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	34 x 5 [1.339 x 0.197]
40	41 x 1.5 [1.614 x 0.071]	25	35 [1.378]	53.6 [2.11]	53.7 [2.114]	65 [2.559]	82 [3.228]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	40 x 5 [1.575 x 0.197]
50	53 x 1.5 [2.087 x 0.071]	16	45 [1.772]	65.6 [2.583]	65.7 [2.587]	77 [3.032]	94 [3.7]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	52 x 5 [2.047 x 0.197]
65	70 x 2 [2.756 x 0.078]	16	60 [2.362]	81.6 [3.213]	81.7 [3.217]	95 [3.74]	113 [4.449]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	8 x Ø 9 [0.354]	68 x 5 [2.677 x 0.197]
80	85 x 2 [3.346 x 0.078]	16	72 [2.835]	97.6 [3.843]	97.7 [3.846]	112 [4.409]	133 [5.236]	17.5 [0.689]	13.5 [0.531]	12 [0.472]	8 x Ø 11 [0.433]	83 x 5 [3.268 x 0.197]
100	104 x 2 [4.094 x 0.078]	16	90 [3.543]	116.6 [4.591]	116.7 [4.594]	137 [5.394]	159 [6.2598]	19.5 [0.768]	15.5 [0.61]	14 [0.551]	8 x Ø 11 [0.433]	102 x 5 [4.016 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic flange connection per DIN 11864-2

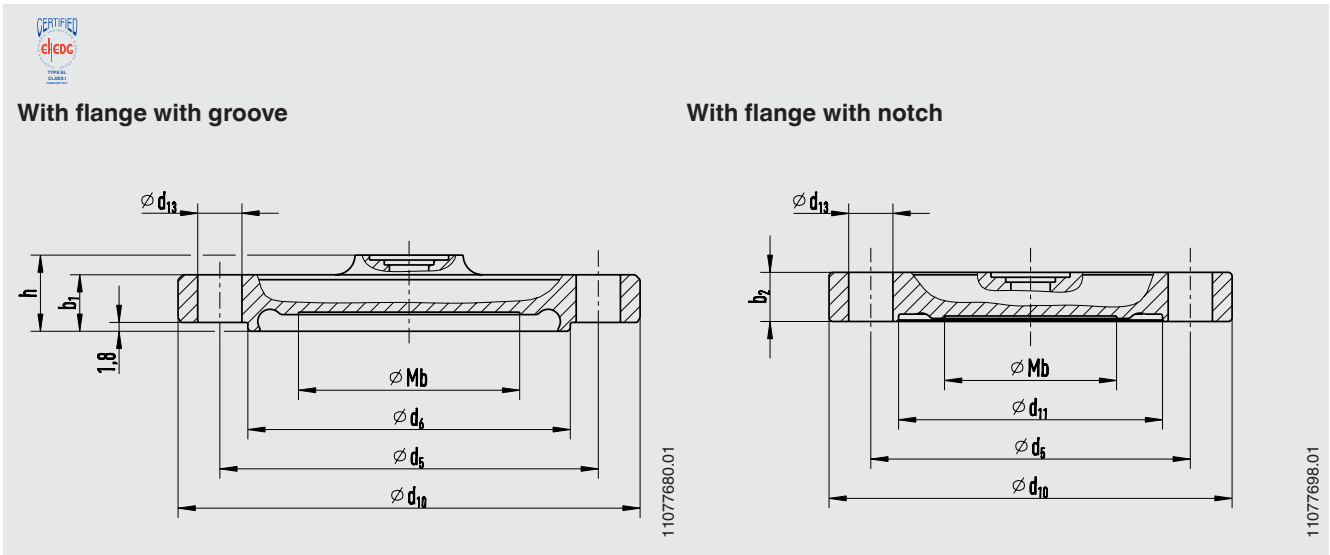


Type of process connection: Aseptic flange connection per DIN 11864-2 form A  
 Pipe standard per DIN 11866 row B or DIN ISO 1127 row 1

DN	For pipe Outer Ø x wall thick- ness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]									
			Mb	d <sub>6</sub>	d <sub>11</sub>	d <sub>5</sub>	d <sub>10</sub>	h	b <sub>1</sub>	b <sub>2</sub>	d <sub>13</sub>	Aseptic O-ring
26.9	26.9 x 1.6 [1.059 x 0.063]	25	22 [0.866]	36 [1.417]	36.1 [1.421]	52 [2.047]	69 [2.717]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	26 x 3.5 [1.024 x 0.1378]
33.7	33.7 x 2 [1.327 x 0.078]	25	25 [0.984]	45.3 [1.783]	45.4 [1.787]	57 [2.244]	74 [2.913]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	32 x 5 [1.2598 x 0.197]
42.4	42.4 x 2 [1.669 x 0.078]	16	35 [1.378]	54 [2.126]	54.1 [2.1299]	65 [2.559]	82 [3.228]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	40.5 x 5 [1.594 x 0.197]
48.3	48.3 x 2 [1.902 x 0.078]	16	40 [1.575]	59.9 [2.358]	60 [2.362]	71 [2.795]	88 [3.465]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	46.5 x 5 [1.831 x 0.197]
60.3	60.3 x 2 [2.374 x 0.078]	16	52 [2.047]	71.9 [2.831]	72 [2.835]	85 [3.346]	103 [4.055]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	8 x Ø 9 [0.354]	58.5 x 5 [1.831 x 0.197]
76.1	76.1 x 2 [2.996 x 0.078]	16	60 [2.362]	88.1 [3.469]	88.1 [3.469]	104 [4.094]	125 [4.921]	17.5 [0.689]	13.5 [0.531]	12 [0.472]	8 x Ø 11 [0.433]	73.5 x 5 [2.894 x 0.197]
88.9	88.9 x 2.3 [3.5 x 0.091]	16	72 [2.835]	100.9 [3.972]	101 [3.976]	116 [4.567]	137 [5.394]	17.5 [0.689]	13.5 [0.531]	12 [0.472]	8 x Ø 11 [0.433]	86.5 x 5 [3.406 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic flange connection per DIN 11864-2



Type of process connection: Aseptic flange connection per DIN 11864-2 form A  
 Pipe standard per DIN 11866 row C or ASME BPE 1997

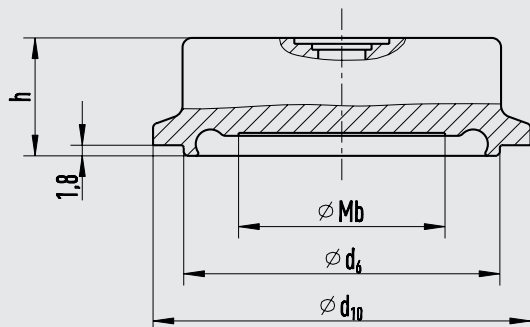
DN	For pipe Outer Ø x wall thickness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]									Aseptic O-ring
			Mb	d <sub>6</sub>	d <sub>11</sub>	G <sub>1</sub>	d <sub>10</sub>	h	b <sub>1</sub>	b <sub>2</sub>	d <sub>13</sub>	
1"	25.4 x 1.65 [1.831 x 0.065]	25	22 [0.866]	34.3 [1.354]	34.4 [1.354]	49 [1.929]	66 [2.598]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	24 x 3.5 [0.945 x 0.1378]
1 ½"	42.4 x 1.65 [1.669 x 0.065]	25	32 [1.26]	50.4 [1.984]	50.4 [1.984]	62 [2.44]	79 [3.11]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	37 x 5 [1.457 x 0.197]
2"	48.3 x 1.65 [1.902 x 0.065]	16	45 [1.772]	63 [2.48]	63 [2.48]	75 [2.953]	92 [3.622]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	50 x 5 [1.969 x 0.197]
2 ½"	60.3 x 1.65 [2.374 x 0.065]	16	52 [2.047]	75.8 [2.984]	75.9 [2.988]	89 [3.504]	107 [4.213]	15.5 [0.61]	11.5 [0.071]	10 [0.394]	4 x Ø 9 [0.354]	62 x 5 [2.441 x 0.197]
3"	76.1 x 1.65 [2.996 x 0.065]	16	60 [2.362]	89.5 [3.524]	89.6 [3.528]	104 [4.094]	125 [4.921]	17.5 [0.689]	13.5 [0.531]	12 [0.472]	8 x Ø 11 [0.433]	75 x 5 [2.953 x 0.197]
4"	88.9 x 2.11 [3.5 x 0.083]	16	90 [3.543]	114.2 [4.496]	114.3 [4.5]	135 [5.315]	157 [6.181]	19.5 [0.768]	15.5 [0.61]	14 [0.551]	8 x Ø 11 [0.433]	100 x 5 [3.937 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic clamp connection per DIN 11864-3

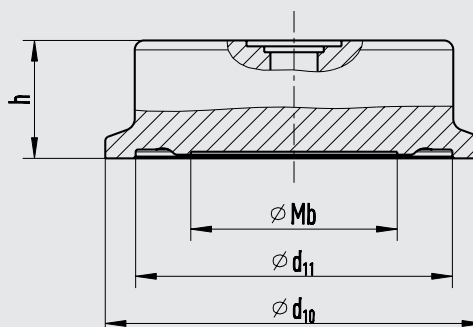


With clamp with groove



11077701.01

With clamp with notch



11077710.01

Type of process connection: Aseptic clamp connection DIN 11864-3 form A  
 Pipe standard per DIN 11866 row A or DIN 11850 row 2

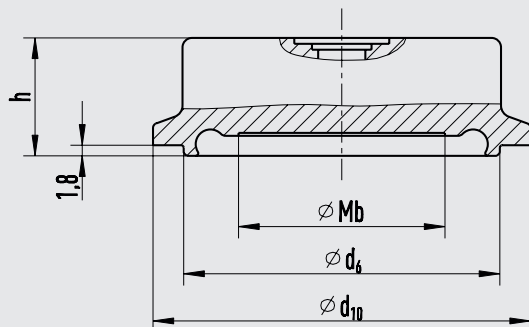
DN	For pipe Outer Ø x wall thick ness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]					Aseptic O-ring
			Mb	d <sub>6</sub>	d <sub>11</sub>	h	d <sub>10</sub>	
25	29 x 1.5 [1.142 x 0.071]	40	22 [0.866]	38.3 [1.508]	38.4 [1.512]	20 [0.787]	50.5 [1.988]	28 x 3.5 [1.102 x 0.1378]
32	35 x 1.5 [1.378 x 0.071]	40	25 [0.984]	47.6 [1.878]	47.7 [1.878]	20 [0.787]	50.5 [1.988]	34 x 5 [1.339 x 0.197]
40	41 x 1.5 [1.614 x 0.071]	40	35 [1.378]	53.6 [2.11]	53.7 [2.114]	20 [0.787]	64 [2.5197]	40 x 5 [1.575 x 0.197]
50	53 x 1.5 [2.087 x 0.071]	25	45 [1.772]	65.6 [2.583]	65.7 [2.587]	20 [0.787]	77.5 [3.051]	52 x 5 [2.047 x 0.197]
65	70 x 2 [2.756 x 0.078]	25	60 [2.362]	81.6 [3.213]	81.7 [3.217]	20 [0.787]	91 [3.583]	68 x 5 [2.677 x 0.197]
80	85 x 2 [3.346 x 0.078]	16	72 [2.835]	97.6 [3.843]	97.7 [3.846]	20 [0.787]	106 [4.173]	83 x 5 [3.268 x 0.197]
100	104 x 2 [4.094 x 0.078]	16	90 [3.543]	116.6 [4.591]	116.7 [4.594]	20 [0.787]	130 [5.118]	102 x 5 [4.016 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic clamp connection per DIN 11864-3

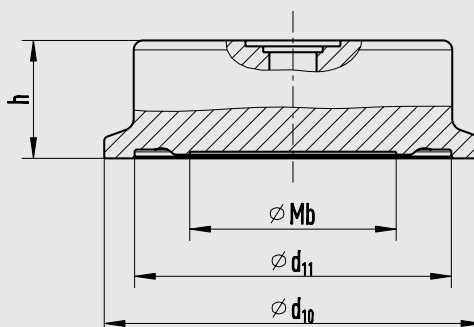


With clamp with groove



11077701.01

With clamp with notch



11077710.01

Type of process connection: Aseptic clamp connection DIN 11864-3 form A  
 Pipe standard per DIN 11866 row B or DIN ISO 1127 row 1

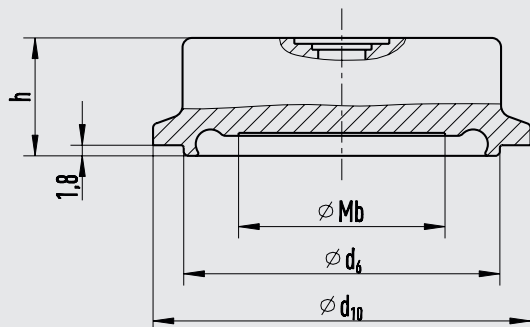
DN	For pipe Outer Ø x wall thick ness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]					Aseptic O-ring
			Mb	d <sub>6</sub>	d <sub>11</sub>	h	d <sub>10</sub>	
26.9	26.9 x 1.6 [1.059 x 0.063]	40	22 [0.866]	36.0 [1.417]	36.1 [1.421]	20 [0.787]	50.5 [1.988]	26 x 3.5 [1.024 x 0.1378]
33.7	33.7 x 2 [1.327 x 0.078]	40	25 [0.984]	45.3 [1.783]	45.3 [1.783]	20 [0.787]	50.5 [1.988]	32 x 5 [1.2598 x 0.197]
42.4	42.4 x 2 [1.669 x 0.078]	25	35 [1.378]	54.0 [2.126]	54.1 [2.1299]	20 [0.787]	64 [2.5197]	40.5 x 5 [1.594 x 0.197]
48.3	48.3 x 2 [1.902 x 0.078]	25	40 [1.575]	59.9 [2.358]	60 [2.362]	20 [0.787]	64 [2.5197]	46.5 x 5 [1.831 x 0.197]
60.3	60.3 x 2 [2.374 x 0.078]	25	52 [2.047]	71.9 [2.831]	72.0 [2.835]	20 [0.787]	91 [3.583]	58.5 x 5 [2.303 x 0.197]
76.1	76.1 x 2 [2.996 x 0.078]	16	60 [2.362]	88.1 [3.469]	88.2 [3.472]	20 [0.787]	106 [4.173]	73.5 x 5 [2.894 x 0.197]
88.9	88.9 x 2 [3.5 x 0.078]	16	72 [2.835]	100.9 [3.972]	101 [3.976]	25 [0.984]	119 [4.685]	86.5 x 5 [3.406 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.

# Aseptic clamp connection per DIN 11864-3

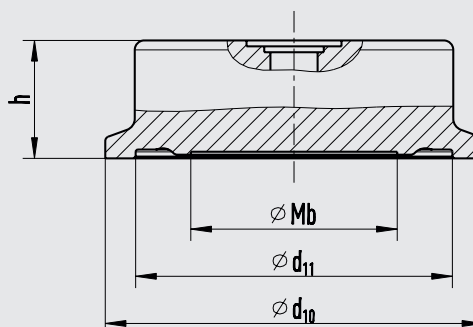


With clamp with groove



11077701.01

With clamp with notch



11077710.01

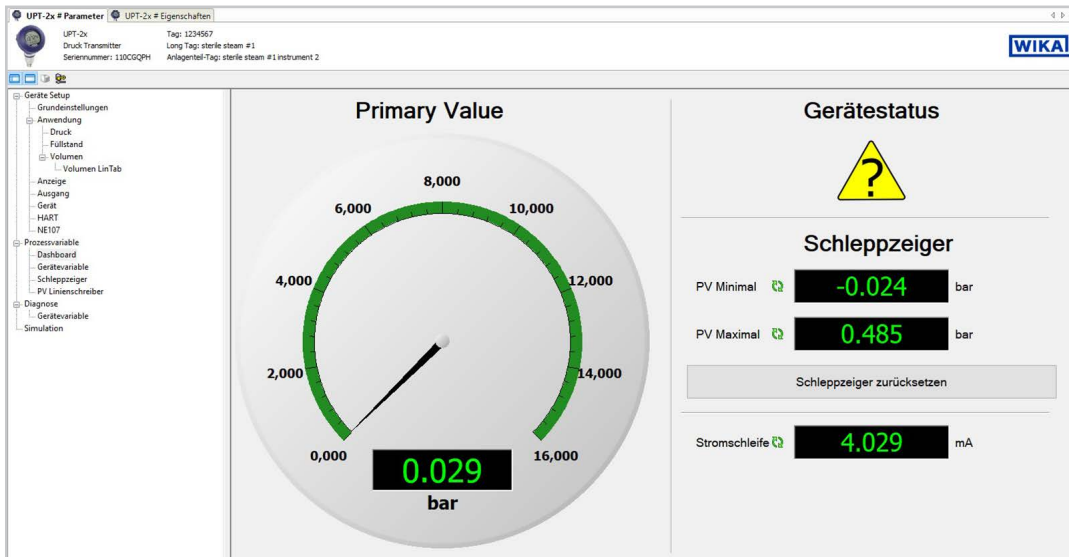
Type of process connection: Aseptic clamp connection DIN 11864-3 form A  
 Pipe standard per DIN 11866 row C or ASME BPE 1997

DN	For pipe Outer Ø x wall thickness in mm [in]	PN <sup>1)</sup>	Dimensions in mm [in]					Aseptic O-ring
			Mb	d <sub>6</sub>	d <sub>11</sub>	h	d <sub>10</sub>	
1"	25.4 x 1.65 [1.831 x 0.065]	40	22 [0.866]	34.3 [1.35]	34.4 [1.354]	20 [0.787]	50.5 [1.988]	24 x 3.5 [0.945 x 0.1378]
1 ½"	42.4 x 1.65 [1.669 x 0.065]	40	32 [1.26]	50.4 [1.984]	50.5 [1.988]	20 [0.787]	64 [2.5197]	37 x 5 [1.457 x 0.197]
2"	48.3 x 1.65 [1.902 x 0.065]	25	45 [1.772]	63 [2.48]	63 [2.48]	20 [0.787]	77.5 [3.051]	50 x 5 [1.969 x 0.197]
2 ½"	60.3 x 1.65 [2.374 x 0.065]	25	52 [2.047]	75.8 [2.984]	75.9 [2.988]	20 [0.787]	91 [3.583]	62 x 5 [2.441 x 0.197]
3"	76.1 x 1.65 [2.996 x 0.065]	16	60 [2.362]	89.5 [3.524]	89.6 [3.528]	20 [0.787]	106 [4.173]	75 x 5 [2.953 x 0.197]
4"	88.9 x 2.11 [3.5 x 0.083]	16	90 [3.543]	114.2 [4.496]	114.3 [4.5]	25 [0.984]	130 [5.118]	100 x 5 [3.937 x 0.197]

1) Permissible pressure in bar; these pressures may only be applied when using suitable sealing materials up to a temperature of -10 ... +140 °C.



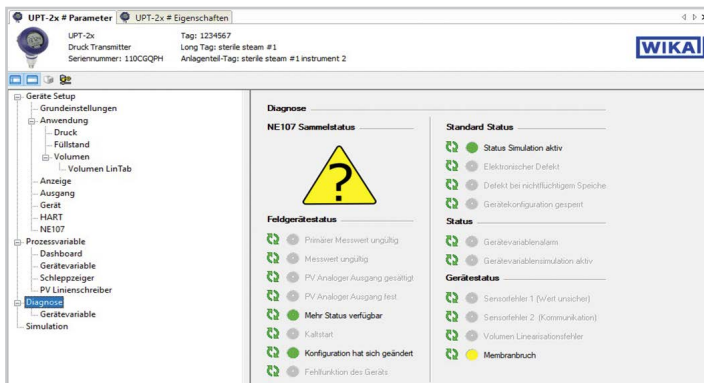
# Diaphragm monitoring via DTM



For HART® output signals, a DTM is available in accordance with the FDT standard. The DTM provides a self-explanatory and clear user interface for all setup and control processes of the transmitter. For testing purposes, it is also possible to simulate process values and archive the parameter data. Recording of the measured values is available for diagnostic purposes.

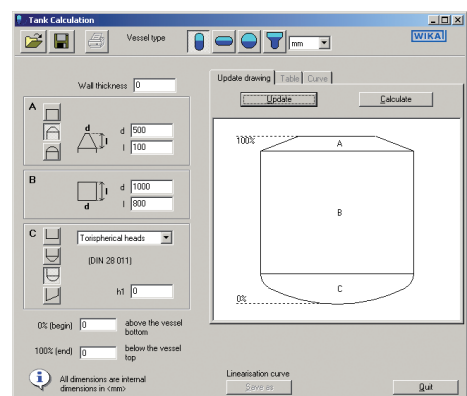
## Diagnostics: Diaphragm rupture

In the event of a diaphragm rupture in the first diaphragm, the instrument status will be set to “Diaphragm rupture”. This allows the user to analyse faults to the second, while the instrument continues to monitor the process pressure without restriction. The user thus has the advantage of reducing to a minimum any production errors that may occur. No contamination of the process medium or the environment has occurred at this time.




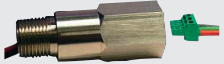


## Tank volume calculation

The additional tank volume calculation of the DTM function can be used to reproduce any optional tank geometry. The corresponding linearisation table is generated automatically. The linearisation table can be transferred directly to the transmitter.








## Accessories and spare parts

Description	Order number	
	HART® modem for USB interface, specifically designed for use with notebooks (model 010031)	11025166
	HART® modem for RS-232 interface (model 010001)	7957522
	HART® modem for Bluetooth® interface Ex ia IIC (model 010041)	11364254
	PowerXpress HART® modem, with optional power supply (model 010031P)	14133234
	Overvoltage protection for transmitters, 4 ... 20 mA, M20 x 1.5, series connection	14002489
	Display and operating unit, model DI-PT-U The display and operating unit can be attached in 90° steps. The display and operating unit features a main display and an additional display. The main display shows the output signal. The additional display shows different values, at the same time as the main display - these values can be selected by the user. The process pressure transmitter can be configured through the display and operating unit. Only this display may be used for installation into the process transmitter.	14090181
	Hygienic cable gland M20 x 1.5 Cable diameter: 6 ... 12 mm [0.24 ... 0.47 in]	11348691

## Instruments for on-site calibration

Model	Description
	<b>CPG-KITP</b> Pneumatic service kit, accuracy 0.1 % FS (0.05 % FS or 0.025 % FS also available) <ul style="list-style-type: none"> <li>■ Model CPG1500 precision digital pressure gauge</li> <li>■ Model CPP30 pneumatic hand test pump, pressure generation -0.95 ... +35 bar</li> <li>■ Adapter set</li> <li>■ Service case</li> </ul> → see data sheet CT 93.01
	<b>CPH7000</b> Portable process calibrator, accuracy 0.025 % FS <ul style="list-style-type: none"> <li>■ Model CPH7000 process calibrator, integrated manual pressure generation -0.85 ... +25 bar</li> <li>■ Power supply unit</li> <li>■ Service case</li> </ul> → see data sheet CT 15.51
	<b>CPH7650</b> Portable pressure calibrator, accuracy 0.025 % FS <ul style="list-style-type: none"> <li>■ Model CPH7650 pressure calibrator, integrated electrical pressure generation -0.85 ... +20 bar</li> <li>■ Test cables</li> <li>■ Battery charger</li> </ul> → see data sheet CT 17.02

FS = Full span = end of measuring range - start of measuring range

## Calibration adapter

Description	Order number
Calibration adapter TRI-CLAMP®, 1 ½"	11563206
Calibration adapter TRI-CLAMP®, 2"	14332415

Other calibration adapters on request



**Ordering information**

Model / Case head / Surface roughness / System fill fluid / Measuring range / Accuracy / Output signal / Electrical connection / Process connection / Certificates

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