

# Differential pressure gauge

## For the process industry, all-metal media chamber

### Models 732.31, 733.31, 732.51 and 733.51

WIKA data sheet PM 07.05



for further approvals,  
see page 7

#### Applications

- For gaseous and liquid aggressive media that are not highly viscous or crystallising, also in aggressive environments
- Pump monitoring and control
- Filter monitoring
- Level measurement on closed vessels

#### Special features

- Differential pressure measuring ranges from 0 ... 16 mbar to 0 ... 40 bar or 0 ... 10 inH<sub>2</sub>O to 0 ... 600 psi
- High operating pressure (static pressure) up to 40 bar [600 psi]
- High overload safety up to 40 bar [600 psi]
- Models 732.31 and 733.31: Case with safety level "S3" per EN 837
- All-welded media chamber

#### Description

These differential pressure gauges are made of highly corrosion-resistant stainless steel and feature an all-metal media chamber to ensure long-term leak tightness (no elastomer sealing elements).

A high overload safety is achieved by the all-metal construction and the close-fitting design of the diaphragm measuring element.

The use of high-quality stainless steel materials and the robust design are geared to applications in the chemical and process engineering industries. Thus the instrument is suitable for liquid and gaseous media, also in aggressive environments.



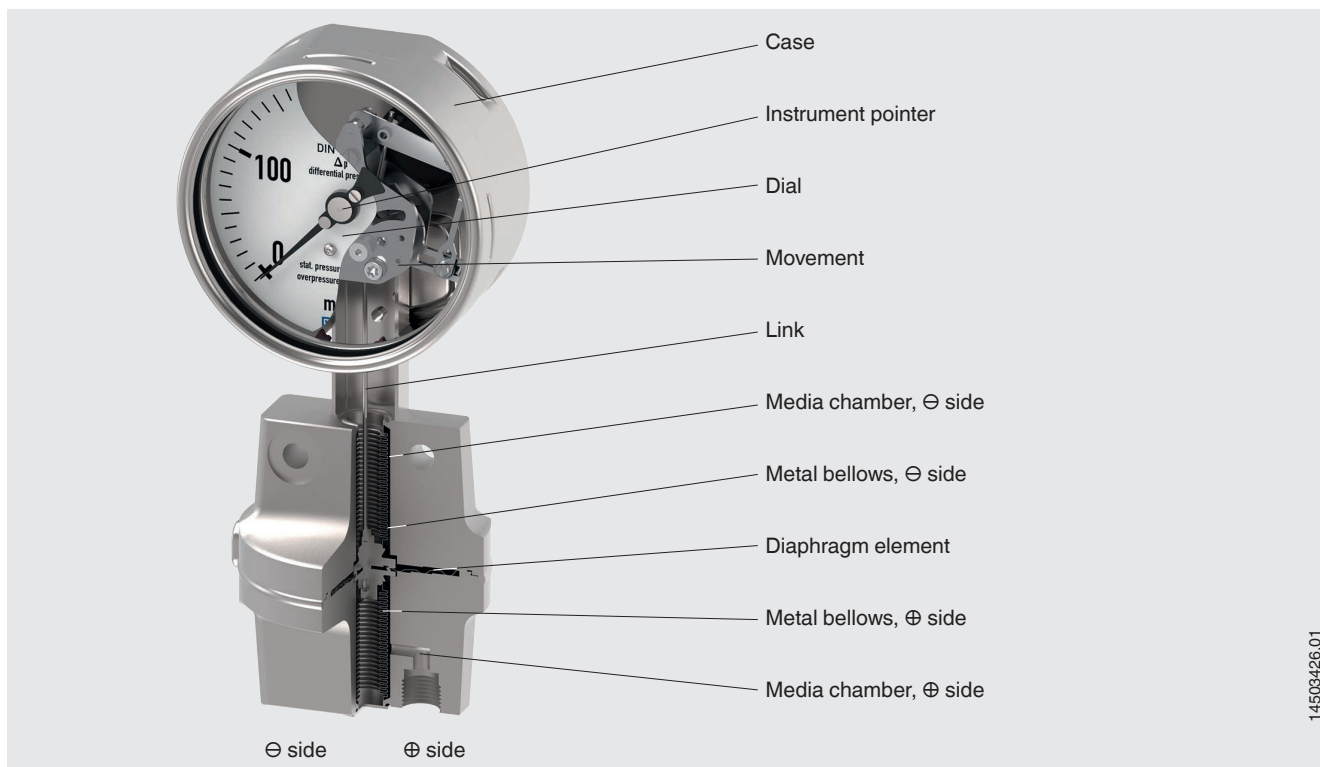
Differential pressure gauge model 732.51

The low-temperature version POLARgauge® allows operation with ambient temperatures down to -70 °C [-94 °F].

Cases with safety level "S3" are fitted with a non-splintering window, a solid baffle wall between measuring system and dial and a blow-out back. In the event of a failure, the operator is protected at the front side, as media or components can only be ejected via the back of the case.

Scale ranges of 0 ... 16 mbar to 0 ... 40 bar or 0 ... 10 inH<sub>2</sub>O to 0 ... 600 psi ensure the measuring ranges required for a wide variety of applications.

## Functionality



### Design and operating principle

- Media chambers of the  $\oplus$  and  $\ominus$  side are separated by the diaphragm element
- Metal bellows isolate the media chambers from the atmosphere
- The pressure difference between  $\oplus$  and  $\ominus$  side leads to an axial pressure element deflection
- The deflection is transmitted to the movement via the link
- The movement converts the deflection into a pointer rotation

### Overload safety

Diaphragm elements have a relatively large actuating force and, due to the annular clamping of the element, they are less sensitive to vibration in comparison with Bourdon tubes. Diaphragm elements can be subject to a higher overload of up to 10 times the full scale value, up to a max. of 40 bar, through load take-up points with metallic seating.

### Overview of versions

Model	Case design		With case filling	Low-temperature version POLARgauge®
	Safety level "S3"	Safety level "S1"		
732.31	x			Not selectable
733.31	x		x	Selectable
732.51		x		Not Selectable
733.51		x	x	Selectable

The above-mentioned versions can, optionally, be ordered with Ex approval.

→ For approvals and certificates, see page 7

# Specifications

Basic information	
<b>Standard</b>	
Pressure measuring instruments for differential pressure	DIN 16003
→ For information on the “Selection, installation, handling and operation of pressure gauges”, see Technical information IN 00.05.	
<b>Further version</b>	<ul style="list-style-type: none"> <li>■ Oil- and grease-free</li> <li>■ For oxygen, oil- and grease-free</li> <li>■ Silicone-free</li> <li>■ With pre-volume deflagration flame arrester <sup>1)</sup> for mounting to zone 0 (EPL Ga); model 910.21; see data sheet AC 91.02</li> </ul>
<b>Nominal size (NS)</b>	<ul style="list-style-type: none"> <li>■ Ø 100 mm [4"]</li> <li>■ Ø 160 mm [6"]</li> </ul>
<b>Window</b>	Laminated safety glass
<b>Connection location</b>	Lower mount (radial) Other connection locations on request
<b>Case</b>	
Design	<ul style="list-style-type: none"> <li>■ Safety level “S1” per EN 837-1: With blow-out device</li> <li>■ Safety level “S3” per EN 837-1: With solid baffle wall and blow-out back</li> </ul>
Material	<ul style="list-style-type: none"> <li>■ Stainless steel 1.4301 (304 SS)</li> <li>■ Stainless steel 1.4571 (316 Ti)</li> </ul>
<b>Case filling <sup>2)</sup></b>	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ Glycerine-water mixture</li> <li>■ Silicone oil</li> </ul>
Instruments with case filling with compensating valve to vent and reseal case.	
<b>Venting of the media chambers</b>	
Span ≤ 0.25 bar [100 inH <sub>2</sub> O]	With venting
Span > 0.25 bar [100 inH <sub>2</sub> O]	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ With venting</li> </ul>
<b>Movement</b>	Stainless steel

1) Only for instruments with Ex approval

2) Ingress protection IP65 for instruments with case filling

Measuring element	
<b>Type of measuring element</b>	Diaphragm element
<b>Material</b>	
Span ≤ 0.25 bar [100 inH <sub>2</sub> O]	Stainless steel 1.4571 (316 Ti)
Span > 0.25 bar [100 inH <sub>2</sub> O]	NiCr alloy (Inconel)

Accuracy specifications	
<b>Accuracy class</b>	<ul style="list-style-type: none"> <li>■ 1.6</li> <li>■ 1.0</li> <li>■ 2.5</li> </ul>

Accuracy specifications	
<b>Zero point setting</b>	
Instruments with case filling <sup>1)</sup>	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ External setting</li> </ul>
Instruments without case filling	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ Setting by means of adjustable pointer</li> </ul>
<b>Influence of static pressure</b>	
Span ≤ 0.25 bar [100 inH <sub>2</sub> O]	±0.3 %/1 bar [14.5 psi]
Span > 0.25 bar [100 inH <sub>2</sub> O]	±0.04 %/1 bar [14.5 psi]
<b>Temperature error</b>	On deviation from the reference conditions at the measuring system: ≤ ±0.5 % per 10 °C [≤ ±0.5 % per 18 °F] of full scale value
<b>Reference conditions</b>	
Ambient temperature	+20 °C [+68 °F]

1) Except for model 733.31, setting possible by means of adjustable pointer

## Scale ranges

mbar		
0 ... 16 <sup>1)</sup>	0 ... 160	0 ... 1,000
0 ... 25	0 ... 250	0 ... 1,100
0 ... 40	0 ... 300	0 ... 1,200
0 ... 60	0 ... 400	0 ... 1,600
0 ... 100	0 ... 600	0 ... 2,500

bar		
0 ... 0.25	0 ... 4	0 ... 20
0 ... 0.4	0 ... 6	0 ... 25
0 ... 0.6	0 ... 7	0 ... 30
0 ... 1	0 ... 10	0 ... 40
0 ... 1.6	0 ... 14	
0 ... 2.5	0 ... 16	

kPa		
0 ... 1.6 <sup>1)</sup>	0 ... 40	0 ... 700
0 ... 2.5	0 ... 60	0 ... 800
0 ... 4	0 ... 100	0 ... 1,000
0 ... 6	0 ... 160	0 ... 1,400
0 ... 10	0 ... 250	0 ... 1,600
0 ... 16	0 ... 300	0 ... 2,500
0 ... 25	0 ... 400	
0 ... 30	0 ... 600	

inH <sub>2</sub> O		
0 ... 10 <sup>1)</sup>	0 ... 30	0 ... 150
0 ... 15	0 ... 40	0 ... 200
0 ... 20	0 ... 60	0 ... 250
0 ... 25	0 ... 100	

psi		
0 ... 6	0 ... 60	0 ... 250
0 ... 8	0 ... 100	0 ... 300
0 ... 10	0 ... 150	0 ... 400
0 ... 15	0 ... 160	0 ... 600
0 ... 30	0 ... 200	

## Vacuum and +/- scale ranges

mbar		
-16 ... 0 <sup>1)</sup>	-600 ... 0	-50 ... +50
-25 ... 0	-1,000 ... 0	-80 ... +80
-40 ... 0	-1,100 ... 0	-125 ... +125
-60 ... 0	-1,200 ... 0	-200 ... +200
-100 ... 0	-8 ... +8	-300 ... +300
-160 ... 0	-10 ... +15	-500 ... +500
-250 ... 0	-20 ... +20	-600 ... +400
-400 ... 0	-30 ... +30	-1,000 ... +600

psi	
-15 ... 0 inHg	-30 inHg ... +300
-30 ... 0 inHg	-5 ... +5
-30 inHg ... +15	-15 ... +15
-30 inHg ... +30	-30 ... +30
-30 inHg ... +60	-50 ... +50
-30 inHg ... +100	-100 ... +100
-30 inHg ... +160	-150 ... +150
-30 inHg ... +200	

bar		
-0.6 ... 0	-1 ... +1.5	-1 ... +9
-1 ... 0	-1 ... +3	-1 ... +15
-1 ... +0.6	-1 ... +5	-1 ... +24

kPa		
-60 ... 0	-15 ... +15	-100 ... +500
-100 ... 0	-20 ... +40	-100 ... +700
-2 ... +4	-100 ... +60	-100 ... +900
-4 ... +6	-100 ... +100	-100 ... +1,000
-6 ... +4	-100 ... +150	-100 ... +1,500
-6 ... +10	-100 ... +200	-100 ... +2,400
-10 ... +6	-100 ... +300	
-10 ... +15	-100 ... +400	

1) Scale angle approx. 180°, with all other scale ranges the scale angle is 270°.

Other scale ranges on request

### Further details on: Scale ranges

<b>Unit</b>	<ul style="list-style-type: none"> <li>■ mbar</li> <li>■ bar</li> <li>■ psi</li> <li>■ kPa</li> <li>■ MPa</li> <li>■ mmH<sub>2</sub>O</li> <li>■ inH<sub>2</sub>O</li> <li>■ kg/cm<sup>2</sup></li> </ul> Other units on request	
<b>Overload safety and max. operating pressure (static pressure)</b>	The possibility of selection depends on the scale range. → See separate table	
<b>Dial</b>		
Scale layout	<ul style="list-style-type: none"> <li>■ Single scale</li> <li>■ Dual scale</li> </ul>	
Scale colour	Single scale	Black
	Dual scale	Black/red
Material	Aluminium	
Customer-specific version	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ With special scale, e.g. linear pressure or square root incrementation</li> </ul> Other scales, e.g. with red mark, circular arcs or circular sectors, on request → Alternatively, adhesive label set for red and green circular arcs; see data sheet AC 08.03	
<b>Pointer</b>		
Instrument pointer	With case filling	Standard pointer, aluminium, black
	Without case filling	Adjustable pointer, aluminium, black
Mark pointer/drag pointer	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ Mark pointer on bayonet ring, adjustable</li> </ul>	
<b>Pointer stop pin</b>	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ At 6 o'clock</li> </ul>	

Overload safety and max. operating pressure (static pressure)	
Scale range	Overload safety / max. operating pressure (static) Either side max.
0 ... 16 to 0 ... 40 mbar [0 ... 10 to 0 ... 16 inH <sub>2</sub> O]	<ul style="list-style-type: none"> <li>■ 2.5 bar [36 psi] / 2.5 bar [36 psi]</li> <li>■ 2.5 bar [36 psi] / 6 bar [87 psi]</li> </ul>
0 ... 60 to 0 ... 250 mbar [0 ... 25 to 0 ... 100 inH <sub>2</sub> O]	<ul style="list-style-type: none"> <li>■ 2.5 bar [36 psi] / 6 bar [87 psi]</li> <li>■ 6 bar [87 psi] / 10 bar [145 psi]</li> </ul>
0 ... 400 mbar [0 ... 6 psi]	<ul style="list-style-type: none"> <li>■ 4 bar [58 psi] / 25 bar [363 psi]</li> <li>■ 40 bar [600 psi] / 40 bar [600 psi]</li> </ul>
0 ... 0.6 bar [0 ... 10 psi]	<ul style="list-style-type: none"> <li>■ 6 bar [87 psi] / 25 bar [363 psi]</li> <li>■ 40 bar [600 psi] / 40 bar [600 psi]</li> </ul>
0 ... 1 bar [0 ... 15 psi]	<ul style="list-style-type: none"> <li>■ 10 bar [145 psi] / 25 bar [363 psi]</li> <li>■ 40 bar [600 psi] / 40 bar [600 psi]</li> </ul>
0 ... 1.6 bar [0 ... 30 psi]	<ul style="list-style-type: none"> <li>■ 16 bar [232 psi] / 25 bar [363 psi]</li> <li>■ 40 bar [600 psi] / 40 bar [600 psi]</li> </ul>
0 ... 2.5 to 0 ... 40 bar [0 ... 60 to 0 ... 600 psi]	<ul style="list-style-type: none"> <li>■ 25 bar [363 psi] / 25 bar [363 psi]</li> <li>■ 40 bar [600 psi] / 40 bar [600 psi]</li> </ul>


Process connection		
<b>Standard</b>	<ul style="list-style-type: none"> <li>■ EN 837-1</li> <li>■ ANSI/B1.20.1</li> </ul> <p>→ For valve manifolds for an instrument hook-up, see "Accessories and spare parts".</p>	
<b>Size</b>		
EN 837-1	<ul style="list-style-type: none"> <li>■ 2 x G ¼, female thread</li> <li>■ 2 x G ½ B, male thread</li> </ul>	
ANSI/B1.20.1	<ul style="list-style-type: none"> <li>■ 2 x ¼ NPT, female thread</li> <li>■ 2 x ½ NPT, male thread</li> </ul>	
<b>Restrictor</b>	<ul style="list-style-type: none"> <li>■ Without</li> <li>■ Ø 0.6 mm [0.024"], stainless steel</li> <li>■ Ø 0.3 mm [0.012"], stainless steel</li> </ul>	
<b>Material (wetted)</b>		
Media chambers with process connection	Stainless steel 1.4571 (316 Ti)	
Venting of the media chambers	Stainless steel 1.4571 (316 Ti)	
Diaphragm element	Span ≤ 0.25 bar [100 inH <sub>2</sub> O]	Stainless steel 1.4571 (316 Ti)
	Span > 0.25 bar [100 inH <sub>2</sub> O]	NiCr alloy (Inconel)
Bellows	Stainless steel 1.4571 (316 Ti)	

Other process connections on request










Operating conditions	
<b>Medium temperature range</b>	<ul style="list-style-type: none"> <li>■ -20 ... +100 °C [-4 ... +212 °F]</li> <li>■ -20 ... +120 °C [-4 ... +248 °F]</li> <li>■ -20 ... +150 °C [-4 ... +284 °F]</li> </ul>
<b>Ambient temperature range</b>	<ul style="list-style-type: none"> <li>■ -20 ... +60 °C [-4 ... +140 °F]</li> <li>■ -40 ... +60 °C [-40 ... +140 °F] <sup>1)</sup></li> <li>■ -70 ... +60 °C [-94 ... +140 °F] for low-temperature version POLARgauge®</li> </ul>
<b>Storage temperature range</b>	-20 ... +60 °C [-4 ... 140 °F]
<b>Pressure limitation</b>	
Steady	Full scale value
Fluctuating	0.9 x full scale value
<b>Ingress protection per IEC/EN 60529</b>	<ul style="list-style-type: none"> <li>■ IP54</li> <li>■ IP65 <sup>2)</sup></li> <li>■ IP66</li> </ul>

1) Only selectable in combination with silicone oil case filling  
2) Ingress protection IP65 for instruments with case filling

## Approvals

Logo	Description	Region
	<b>EU declaration of conformity</b> RoHS directive	European Union
-	<b>CRN</b> Safety (e.g. electr. safety, overpressure, ...)	Canada

### Optional approvals

Logo	Description	Region
	<b>EU declaration of conformity</b>	European Union
	ATEX directive Hazardous areas Gas II 2G Ex h IIC T6 ... T1 Gb X Dust II 2D Ex h IIIC T85 °C T450 °C Db X	
	<b>EAC</b> Hazardous areas	Eurasian Economic Community
	<b>Ex Ukraine</b> Hazardous areas	Ukraine
	<b>KCs</b> Hazardous areas	Korea
	<b>PAC Russia</b> Metrology, measurement technology	Russia
	<b>PAC Kazakhstan</b> Metrology, measurement technology	Kazakhstan
-	<b>MChS</b> Permission for commissioning	Kazakhstan
	<b>PAC Belarus</b> Metrology, measurement technology	Belarus
	<b>PAC Ukraine</b> Metrology, measurement technology	Ukraine
-	<b>PAC China</b> Metrology, measurement technology	China

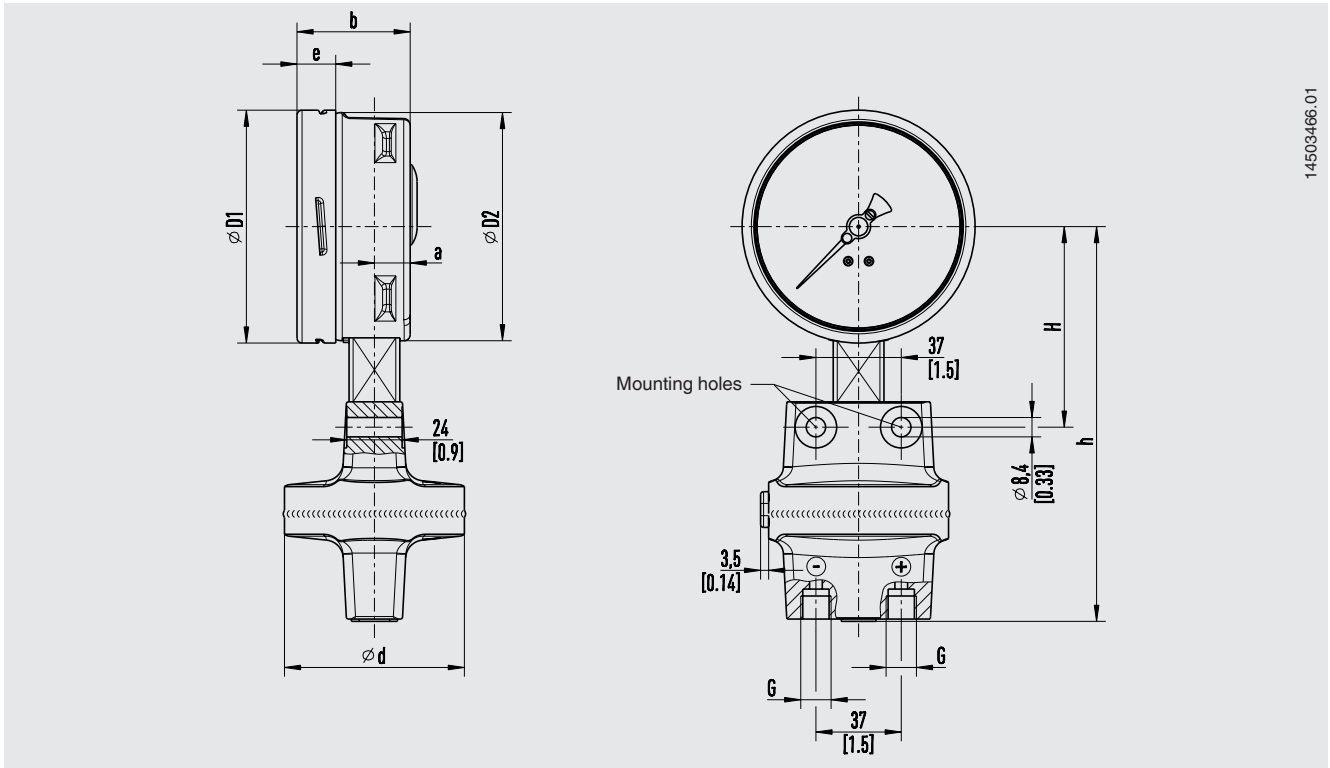
## Certificates (option)

Certificates	
<b>Certificates</b>	<ul style="list-style-type: none"> <li>■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy)</li> <li>■ 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy)</li> </ul>
<b>Recommended calibration interval</b>	1 year (dependent on conditions of use)

→ For approvals and certificates, see website

## Dimensions in mm [in]

Process connection: 2 x G ¼, female thread



14503466.01

### Models 732.31 and 733.31




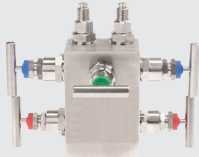
NS	Span	G	Dimensions in mm [in]								Weight in kg [lb]
			a	b	D <sub>1</sub>	D <sub>2</sub>	d	e	h ±1	H	
100 [4"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	G ¼	23.5 [0.96]	59 [2.32]	101 [3.98]	99 [3.90]	140 [5.51]	17.5 [0.69]	160 [6.30]	90 [3.54]	2.70 [5.95]
	> 0.25 bar [100 inH <sub>2</sub> O]	G ¼	23.5 [0.96]	59 [2.32]	101 [3.98]	99 [3.90]	78 [3.07]	17.5 [0.69]	170 [6.69]	87 [3.43]	1.90 [4.12]
160 [6"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	G ¼	23.5 [0.96]	59 [2.32]	161 [6.34]	159 [6.26]	140 [5.51]	17.5 [0.69]	190 [7.48]	120 [4.72]	3.40 [7.5]
	> 0.25 bar [100 inH <sub>2</sub> O]	G ¼	23.5 [0.96]	59 [2.32]	161 [6.34]	159 [6.26]	78 [3.07]	17.5 [0.69]	200 [7.87]	117 [4.61]	2.40 [5.29]

### Models 732.51 and 733.51

NS	Span	G	Dimensions in mm [in]								Weight in kg [lb]
			a	b	D <sub>1</sub>	D <sub>2</sub>	d	e	h ±1	H	
100 [4"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	G ¼	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	140 [5.51]	17.5 [0.69]	160 [6.30]	90 [3.54]	2.70 [5.95]
	> 0.25 bar [100 inH <sub>2</sub> O]	G ¼	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	78 [3.07]	17.5 [0.69]	170 [6.69]	87 [3.43]	1.90 [4.12]
160 [6"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	G ¼	15.5 [0.61]	49.5 [1.95]	161 [6.34]	159 [6.26]	140 [5.51]	17.5 [0.69]	190 [7.48]	120 [4.72]	3.40 [7.5]
	> 0.25 bar [100 inH <sub>2</sub> O]	G ¼	15.5 [0.61]	49.5 [1.95]	161 [6.34]	159 [6.26]	78 [3.07]	17.5 [0.69]	200 [7.87]	117 [4.61]	2.40 [5.29]



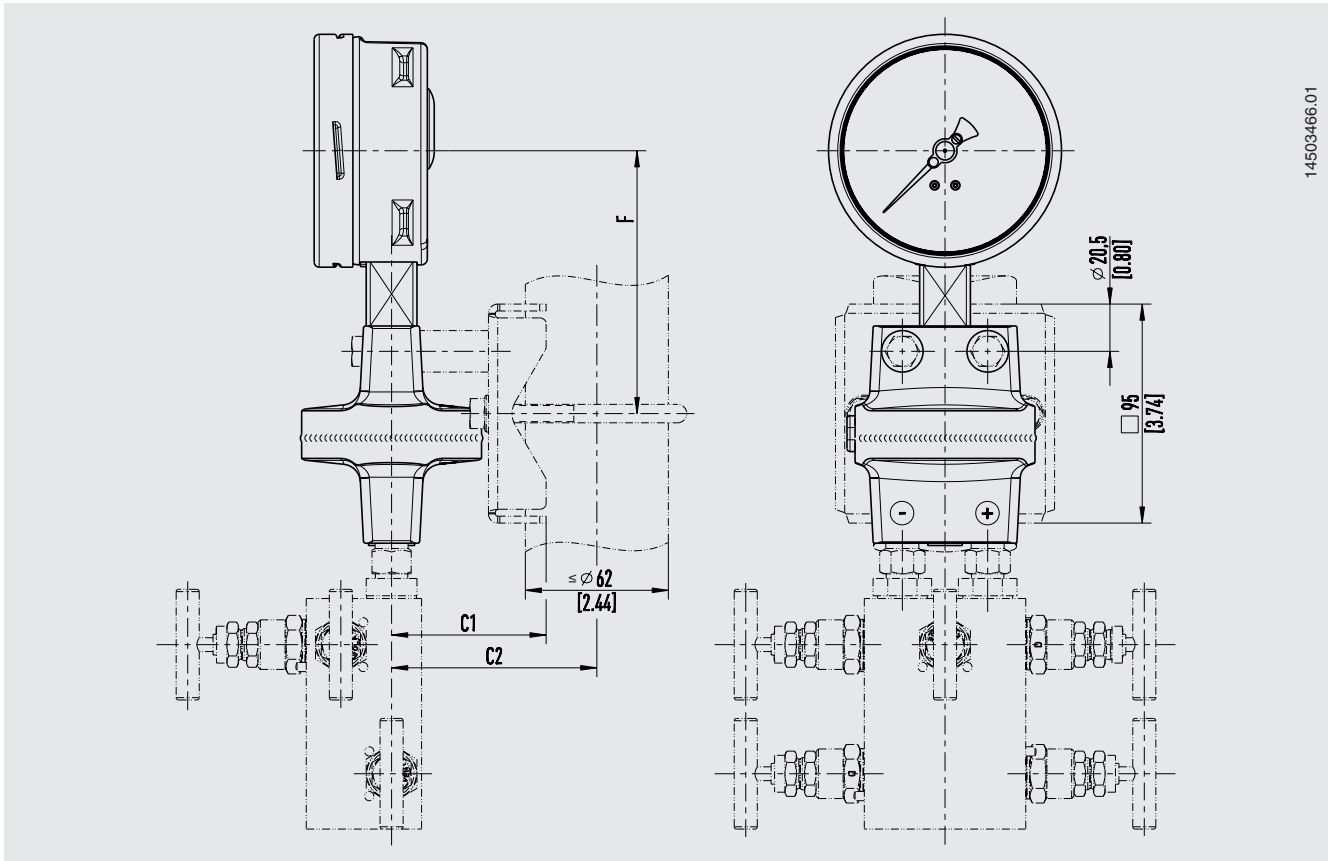
## Accessories and spare parts

Model	Description	Order number
	<b>910.33</b> Adhesive label set for red and green circular arcs → See data sheet AC 08.03	-
	NS 100 [4"]	14238945
	NS 160 [6"]	14228352
	<b>910.17</b> Sealings → See data sheet AC 09.08	On request
	<b>IV304</b> 3-valve manifold Process connection / instrument connection: 2 x G ½, male thread / 2 x G ¼, male nut	37105018
	3-valve manifold Process connection / instrument connection: 2 x ½ NPT, male thread / 2 x G ¼, male nut	48752900
	<b>IV504</b> 5-valve manifold Process connection / instrument connection: 2 x G ½, male thread / 2 x G ¼, male nut	2020389
	5-valve manifold Process connection / instrument connection: 2 x ½ NPT, male thread / 2 x G ¼, male nut	81640336
	<b>IV3x, IV5x</b> Valve manifolds for differential pressure measuring instruments → See data sheet AC 09.23	On request
-	Instrument mounting bracket for wall or pipe mounting Steel, silver painted	1282999
-	Instrument mounting bracket for wall or pipe mounting Stainless steel	1473700

## Accessories

### Dimensions in mm [in]

Representation with mounting bracket for wall or pipe mounting and fitted 5-valve manifold



NS	Scale range	Dimensions in mm [in]		
		F	C1	C2
100 [4"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	114 [4.49]	96 [3.78]	118 [4.65]
	> 0.25 bar [100 inH <sub>2</sub> O]	114 [4.49]	66 [2.60]	88 [3.46]
160 [6"]	≤ 0.25 bar [100 inH <sub>2</sub> O]	144 [5.67]	96 [3.78]	118 [4.65]
	> 0.25 bar [100 inH <sub>2</sub> O]	144 [5.67]	66 [2.60]	88 [3.46]

### Ordering information

Model / Nominal size / Scale range / Scale layout (linear pressure or square root incrementation) / Max. operating pressure (static pressure) ... bar / Process connection / Connection location / Options

© 10/2008 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.

