Differential pressure gauge
For the process industry, all-metal media chamber
Models 732.14, 733.14, 762.14 and 763.14

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 -1 … +30 bar [-14.5 ... 435 psi] to 0 ... 40 bar [0 ... 580 psi]
- High working pressure (static pressure) and high overload safety, selectable 40 bar [580 psi], 100 bar [1,450 psi], 250 bar [3,625 psi], 400 bar [5,800 psi] and 650 bar [9,425 psi]
- The transmission fluid in the measuring chamber dampens the indicator in case of high changes of the rate of pressure
- Model 73x.14: Stainless steel version
  Model 76x.14: Version with special materials

Differential pressure gauge model 732.14

Description

These differential pressure gauges are made of highly corrosion-resistant stainless steel. A high overload safety is achieved by the all-metal construction and the close-fitting design of the diaphragm measuring element.

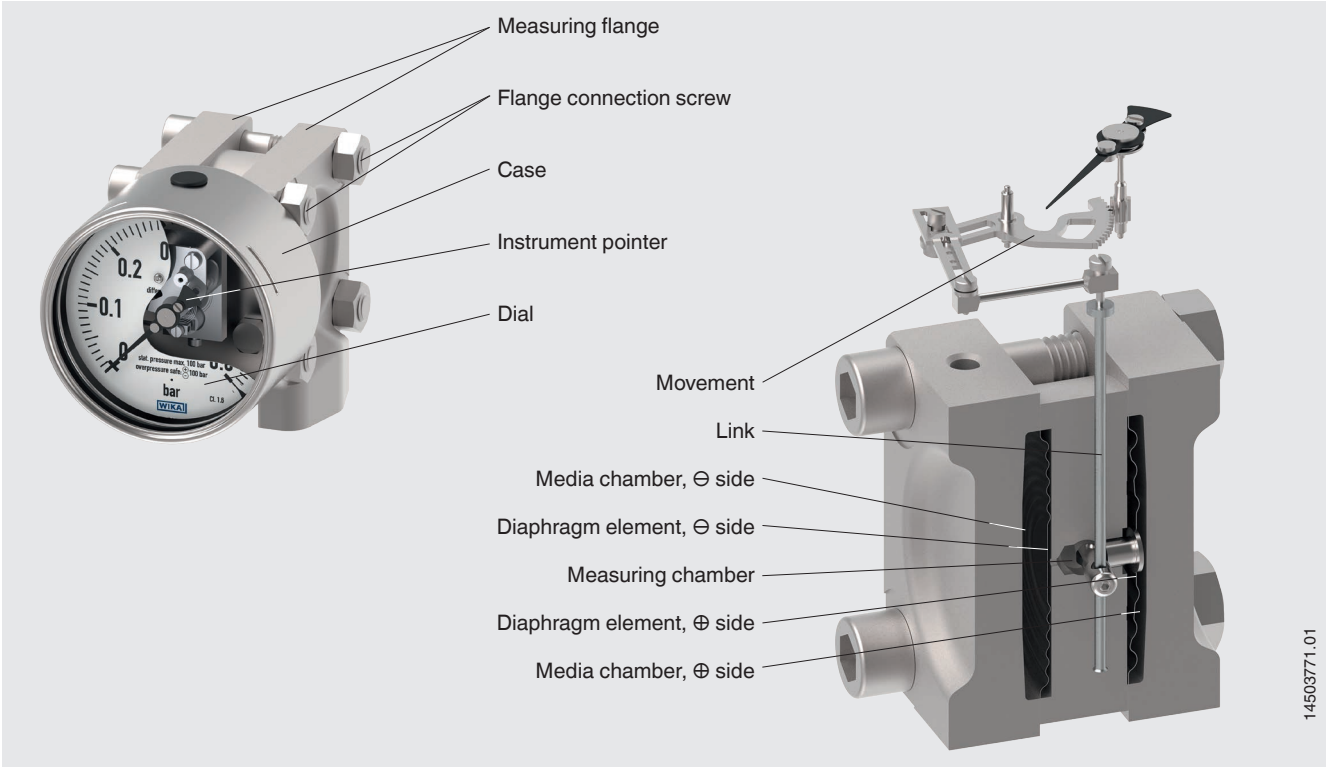
The use of high-quality stainless steel materials and the robust design are geared to applications in the chemical and process engineering industries. Thus the instrument is suitable for liquid and gaseous media, also in aggressive environments.

The wetted parts for these instruments are also available in special materials such as Monel or Hastelloy.

Scale ranges of 0 ... 60 mbar to 0 ... 40 bar [0 ... 0.87 to 0 ... 580 psi] ensure the measuring ranges required for a wide variety of applications.

Data sheets showing similar products:
Differential pressure gauge, high overload safety up to 40, 100 or 400 bar; model 732.14; see data sheet PM 07.13

Functionality



Design and operating principle

- Pressures p1 and p2 act on the ⊕ and ⊖ sides of the measuring chamber.
- The media chambers are separated from the transmission fluid-filled measuring chamber by one diaphragm element each.
- The pressure difference between ⊕ and ⊖ sides deflects the diaphragm of the ⊕ side and displaces the transmission fluid.
- The deflection is transmitted to the movement via the link.
- The movement converts the deflection into a pointer rotation.

Overload safety

Through load take-up points with metallic seating for the diaphragm elements, the instrument can withstand extremely high working pressures with pressure ratings of PN 40 ... PN 650 (40 ... 650 bar [580 ... 9,425 psi]).

Overview of versions

Model	Material of wetted parts		With case filling
	Stainless steel 1.4571 (316 Ti)	Monel 2.4360 / Monel 2.4360 + Hastelloy C276	
732.14	x		
733.14	x		x
762.14		x	
763.14		x	x

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

→ For approvals and certificates, see page 7

Specifications

Basic information		
Standard		
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.		
Nominal size (NS)	■ Ø 100 mm [4"] ■ Ø 160 mm [6"]	
Window	Laminated safety glass	
Connection location	Lower mount (radial)	
	Other connection locations on request	
Case		
Design	Safety level “S1” per EN 837-1: With blow-out device	
Material	Stainless steel 1.4571 (316 Ti)	
Case filling	■ Without ■ Glycerine-water mixture ■ Silicone oil	
	Instruments with case filling with compensating valve to vent case.	
Venting of the media chambers		
Span ≤ 0.25 bar [3.63 psi]	With venting	
Span > 0.25 bar [3.63 psi]	■ Without ■ With venting	
Movement	Stainless steel	

1) Ingress protection IP65 for instruments with case filling

Measuring element		
Type of measuring element	2 diaphragm elements with transmission fluid	
Material		
Diaphragm element, model 732.14 and 733.14	Span ≤ 0.25 bar [3.63 psi]	Stainless steel 316L
	Span > 0.25 bar [3.63 psi]	Stainless steel 316L / NiCr alloy (Inconel)
Diaphragm element, model 762.14 and 763.14	■ Monel 2.4360 ■ Hastelloy C276 [1]	

1) Requirement for design per NACE MR0175 / ISO 15156

Accuracy specifications	
Accuracy class	■ 1.6 ■ 2.5
Zero point setting	
Instruments with case filling	■ Without ■ External setting
Instruments without case filling	■ Without ■ Setting by means of adjustable pointer
Influence of static pressure	Depending on scale range and pressure rating → See separate table
Temperature error	On deviation from the reference conditions at the measuring system: ≤ ±0.5 % per 10 °C [≤ ±0.5 % per 18 °F] of full scale value
Reference conditions	
Ambient temperature	+20 °C [+68 °F]

Static pressure influence

Span	Measuring deviation based on the static pressure in % per 10 bar [1]				
	PN 40	PN 100	PN 250	PN 400	PN 650
0.06 ... 0.16 bar [0.9 ... 2.3 psi]	≤ ±0.125	≤ ±0.1	≤ ±0.12	-	-
0.25 bar [3.6 psi]	≤ ±0.125	≤ ±0.15	-	-	-
0.4 bar [5.8 psi]	≤ ±0.125	≤ ±0.1	≤ ±0.1	-	-
0.6 ... 40 bar [8.7 ... 580 psi]	≤ ±0.125	≤ ±0.1	≤ ±0.06	≤ ±0.063	≤ ±0.038

1) Definition static pressure influence per DIN 16003

Scale ranges

mbar	
0 ... 60	0 ... 1,000
0 ... 100	0 ... 1,100
0 ... 160	0 ... 1,200
0 ... 250	0 ... 1,600
0 ... 400	0 ... 2,500
0 ... 600	

psi	
0 ... 10	0 ... 200
0 ... 15	0 ... 250
0 ... 30	0 ... 300
0 ... 60	0 ... 400
0 ... 100	0 ... 500
0 ... 150	0 ... 600
0 ... 160	

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

kPa	
0 ... 6	0 ... 300
0 ... 10	0 ... 400
0 ... 16	0 ... 600
0 ... 25	0 ... 700
0 ... 40	0 ... 800
0 ... 60	0 ... 1,000
0 ... 70	0 ... 1,400
0 ... 100	0 ... 1,600
0 ... 160	0 ... 2,500
0 ... 200	0 ... 3,000
0 ... 250	0 ... 4,000

Vacuum and +/- scale ranges

mbar	
-60 ... 0	-10 ... +50
-100 ... 0	-20 ... +80
-160 ... 0	-40 ... +120
-250 ... 0	-50 ... +50
-400 ... 0	-50 ... +200
-600 ... 0	-80 ... +80
-1,000 ... 0	-100 ... +150
-1,100 ... 0	-200 ... +600
-1,200 ... 0	-500 ... +500

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

bar	
-0.6 ... 0	-1 ... +5
-1 ... 0	-1 ... +7
-1 ... +1	-1 ... +9
-1 ... +1.5	-1 ... +10
-1 ... +2	-1 ... +15
-1 ... +3	-1 ... +24
-1 ... +4	-1 ... +30

Other scale ranges on request

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

Further details on: Scale ranges		
Unit	■ mbar ■ bar ■ psi ■ kPa ■ MPa ■ mmH_2O ■ inH_2O ■ kg/cm^2 ■ oz/cm^2	
	Other units on request	
Overload safety and max. working pressure (static pressure)		
Pressure ratings PN 40 ... PN 400	Max. 40, 100, 250 or 400 bar [580, 1,450, 3,625 or 5,800 psi] On one, both and alternatingly on the ⊕ and ⊖ sides	
Pressure rating PN 650	Max. 400 bar [5,800 psi] on one side and alternatingly on the ⊕ und ⊖ sides Max. 650 bar [9,425 psi] on both sides on the ⊕ and ⊖ sides	
Dial		
Scale layout	■ Single scale ■ Dual scale	
Scale colour	Single scale	Black
	Dual scale	Black/red
Material	Aluminium	
Customer-specific version	■ Without ■ With special scale, e.g. linear pressure or square root incrementation	
	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	
Pointer		
Instrument pointer	With case filling	Standard pointer, aluminium, black
	Without case filling	Adjustable pointer, aluminium, black
Mark pointer/drag pointer	■ Without ■ Mark pointer on bayonet ring, adjustable	
Pointer stop pin	■ Without ■ At 6 o'clock	

Process connection		
Standard	■ EN 837-1 ■ ANSI/B1.20.1 ■ EN 61518	
	→ For valve manifolds for an instrument hook-up, see “Accessories and spare parts”.	
Size		
EN 837-1	■ 2 x G ½, female thread ■ 2 x G ½ B, male thread	
ANSI/B1.20.1	2 x ½ NPT, male thread	
EN 61518	Flange with differential pressure connection	
Restrictor	■ Without ■ Ø 0.6 mm [0.024"], stainless steel ■ Ø 0.3 mm [0.012"], stainless steel	
Material (wetted)		
Measuring flanges with process connection	Model 732.14 and 733.14	Stainless steel 316L
	Model 762.14 and 763.14	Monel 2.4360
Sealing	FPM/FKM	
Venting of the media chambers	Model 732.14 and 733.14	Stainless steel 316L
	Model 762.14 and 763.14	Monel 2.4360
Diaphragm element, model 732.14 and 733.14	Span ≤ 0.25 bar [3.63 psi]	Stainless steel 316L
	Span > 0.25 bar [3.63 psi]	Stainless steel 316L / NiCr alloy (Inconel)
Diaphragm element, model 762.14 and 763.14	■ Monel 2.4360 ■ Hastelloy C276 [1]	
Material (in contact with the environment)		
Flange connecting screws	PN 40 ... PN 100	Stainless steel
	PN 250 ... PN 650	Steel, corrosion-protected
Measuring chamber	Chrome steel	
Case	Stainless steel, safety level “S1” per EN 837: With blow-out device	
Movement, bayonet ring	Stainless steel	
Dial	Aluminium, white, black lettering	
Window	Laminated safety glass	

1) Ingress protection IP65 for instruments with case filling

Other process connections on request

Operating conditions	
Medium temperature range	■ -20 ... 100 °C [-4 ... +212 °F] ■ +200 °C [+392 °F] maximum
Ambient temperature range	■ -20 ... +60 °C [-4 ... +140 °F] ■ -40 ... +60 °C [-40 ... +140 °F] [1]
Storage temperature range	-20 ... +60 °C [-4 ... 140 °F]
Pressure limitation	
Steady	Full scale value
Fluctuating	0.9 x full scale value
Ingress protection per IEC/EN 60529	■ IP54 ■ IP65 [2]

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

Other versions

- Oil- and grease-free
- For oxygen, oil- and grease-free
- Silicone-free
- Per NACE [1] MR 0175 / ISO 15156, use in H_2S-containing environments in oil and gas production
- Per NACE [1] MR 0103 / ISO 17945, metals resistant to sulfide stress cracking
- With pre-volume deflagration flame arrester [2] for connection to zone 0 (EPL Ga); model 910.21; see data sheet AC 91.02

1) General information about NACE standards, see data sheet IN 00.21
2) Only for instruments with Ex approval

Approvals

Logo	Description	Region
CE	**EU declaration of conformity** Pressure equipment directive PS > 200 bar, module A, pressure accessory	European Union
-	**CRN** Safety (e.g. electr. safety, overpressure, ...)	Canada

Optional approvals

Logo	Description	Region
CE Ex	**EU declaration of conformity** 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	European Union
EAC Ex	**EAC** Hazardous areas	Eurasian Economic Community
	Ex Ukraine Hazardous areas	Ukraine
	PAC Russia Metrology, measurement technology	Russia
	PAC Kazakhstan Metrology, measurement technology	Kazakhstan
-	**MChS** Permission for commissioning	Kazakhstan
	PAC Belarus Metrology, measurement technology	Belarus
	PAC Ukraine Metrology, measurement technology	Ukraine
-	**PAC China** Metrology, measurement technology	China

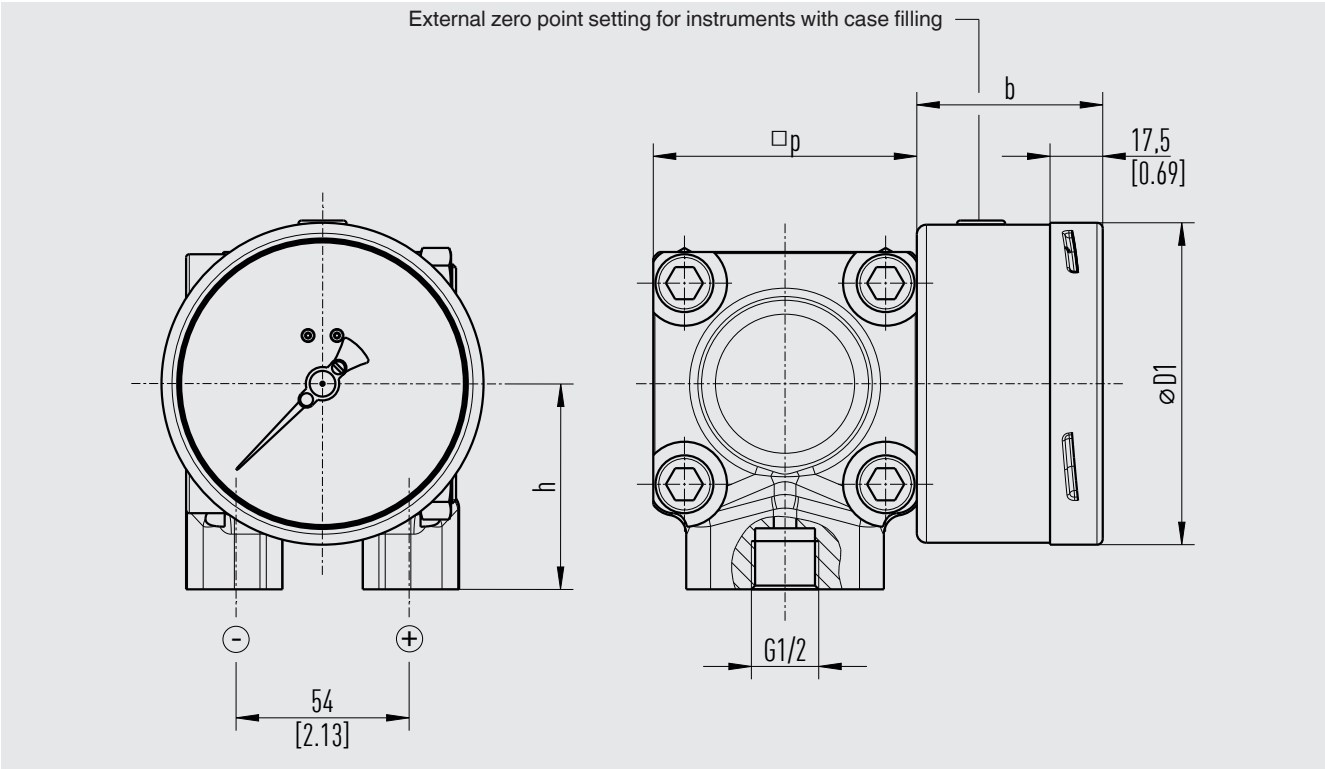
Certificates (option)

Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy)
Recommended recalibration interval	1 year (dependent on conditions of use)

→ For approvals and certificates, see website

Dimensions in mm [in]

Process connection: 2 x G ½, female thread



Pressure ratings PN 40 ... PN 100

NS	Scale range	Dimensions in mm [in]				Weight in kg [lb]	
		b	D_1	h ±1	p □	PN 40	PN 100
100 [4"]	≤ 0.16 bar [2.3 psi]	58.5 [2.3]	101 [4.0]	86 [3.4]	140 [5.5]	12.1 [26.7]	12.1 [26.7]
	≥ 0.25 bar [3.6 psi]	58.5 [2.3]	101 [4.0]	64 [2.5]	82 [3.2]	3.6 [7.9]	3.6 [7.9]
160 [6"]	≤ 0.16 bar [2.3 psi]	65.5 [2.6]	161 [6.3]	86 [3.4]	140 [5.5]	12.5 [27.6]	12.5 [27.6]
	≥ 0.25 bar [3.6 psi]	65.5 [2.6]	161 [6.3]	64 [2.5]	82 [3.2]	4 [8.8]	4 [8.8]

Pressure rating PN 250

NS	Scale range	Dimensions in mm [in]				Weight in kg [lb]
		b	D_1	h ±1	p □	PN 250
100 [4"]	≤ 0.25 bar [3.6 psi]	58.5 [2.3]	101 [4.0]	86 [3.4]	140 [5.5]	13.1 [28.9]
	≥ 0.4 bar [0.8 psi]	58.5 [2.3]	101 [4.0]	64 [2.5]	82 [3.2]	3.9 [8.6]
160 [6"]	≤ 0.25 bar [3.6 psi]	65.5 [2.6]	161 [6.3]	86 [3.4]	140 [5.5]	13.5 [29.8]
	≥ 0.4 bar [0.8 psi]	65.5 [2.6]	161 [6.3]	64 [2.5]	82 [3.2]	4.3 [9.5]

Pressure ratings PN 400 ... PN 650

NS	Dimensions in mm [in]				Weight in kg [lb]	
	b	D_1	h ±1	p □	PN 400	PN 650
100 [4"]	58.5 [2.3]	101 [4.0]	64 [2.5]	86 [3.4]	4.5 [9.9]	4.5 [9.9]
160 [6"]	65.5 [2.6]	161 [6.3]	64 [2.5]	86 [3.4]	4.9 [10.8]	4.9 [10.8]

Process connection per DIN 16003

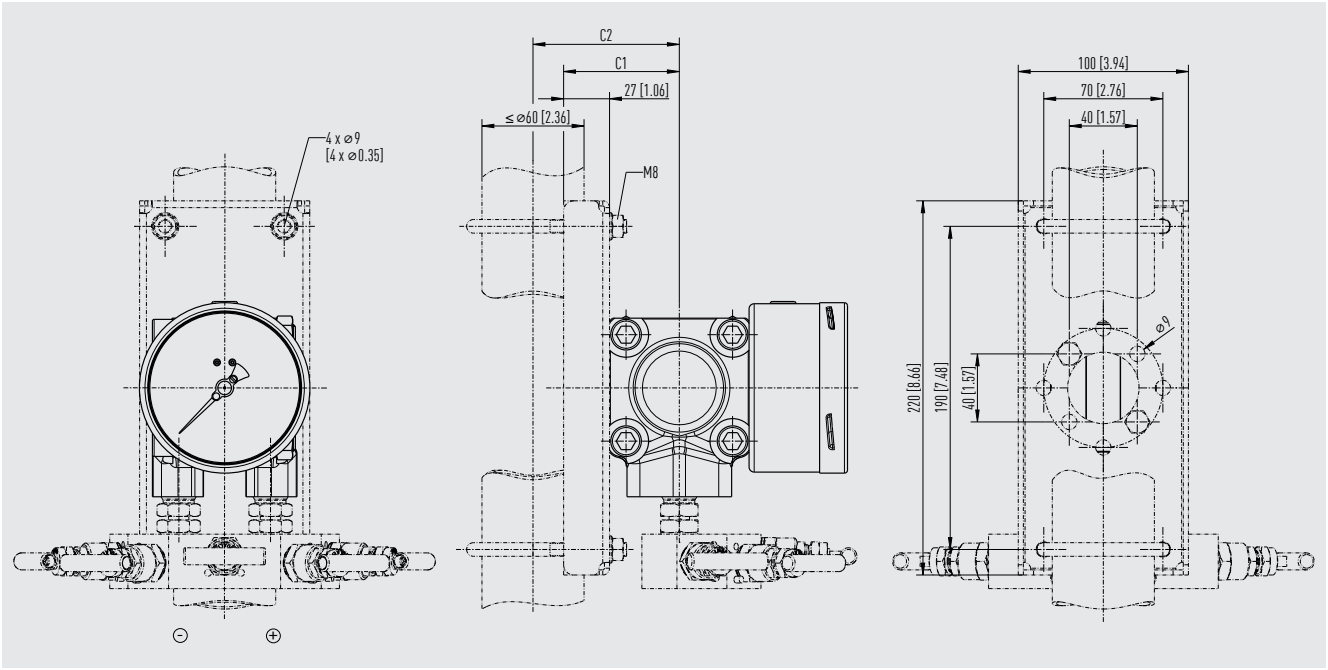
Accessories and spare parts

Model		Description	Order number
	910.33	Adhesive label set for red and green circular arcs → See data sheet AC 08.03	-
		NS 100 [4"]	14238945
		NS 160 [6"]	14228352
	910.17	Sealings → See data sheet AC 09.08	On request
	910.13	Overpressure protector → See data sheet AC 09.04	On request
	IV315	3-valve manifold Process connection / instrument connection: 2 x G ½, male thread / 2 x G ½, pressure screw	81640945
		3-valve manifold Process connection / instrument connection: 2 x ½ NPT, male thread / 2 x G ½, pressure screw	36709683
	IV515	5-valve manifold Process connection / instrument connection: 2 x G ½, male thread / 2 x G ½, pressure screw	83141757
		5-valve manifold Process connection / instrument connection: 2 x ½ NPT, male thread / 2 x G ½, pressure screw	84050640
		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	**2393340**
		Instrument mounting bracket for wall or pipe mounting Stainless steel	**2094941**

Accessories

Dimensions in mm [in]

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



Pressure ratings PN 40 ... PN 100

NS	Scale range	Dimensions in mm [in]	
		C1	C2
100 [4"]	≤ 0.16 bar [2.3 psi]	97 [3.82]	115 [4.53]
	≥ 0.25 bar [3.6 psi]	68 [2.68]	86 [3.39]
160 [6"]	≤ 0.16 bar [2.3 psi]	97 [3.82]	115 [4.53]
	≥ 0.25 bar [3.6 psi]	68 [2.68]	86 [3.39]

Pressure rating PN 250

NS	Scale range	Dimensions in mm [in]	
		C1	C2
100 [4"]	≤ 0.25 bar [3.6 psi]	97 [3.82]	115 [4.53]
	≥ 0.4 bar [0.8 psi]	68 [2.68]	86 [3.39]
160 [6"]	≤ 0.25 bar [3.6 psi]	97 [3.82]	115 [4.53]
	≥ 0.4 bar [0.8 psi]	68 [2.68]	86 [3.39]

Pressure ratings PN 400 ... PN 650

NS	Dimensions in mm [in]	
	C1	C2
100 [4"]	70 [2.76]	88 [3.46]
160 [6"]	70 [2.76]	88 [3.46]

Ordering information

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

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