

Differential pressure gauge

For very low differential pressures, from 2.5 mbar

Model 736.51, with capsule element

WIKA data sheet PM 07.08



for further approvals, see
page 4

switchGAUGE

Applications

- Differential pressure measurement at measuring locations with very low differential pressures, for transparent, gaseous, dry, clean, oil- and grease-free media, also in aggressive environments
- ⊕ media chamber also suitable for corrosive media
- Process industry: Chemical industry, petrochemical industry, on/offshore
- Filter monitoring in ventilation and heating systems or in overpressure and clean rooms
- Differential pressure controlled monitoring of ventilator and blast pressures

Special features

- Differential pressure measuring ranges from 0 ... 2.5 mbar
- Ingress protection IP66
- Case and wetted parts from stainless steel
- Version with switch contact for PLC applications



Fig. left: Model 736.51, NS 100

Fig. right: Model 736.51, NS 160 with switch contacts

Description

The model 736.51 capsule pressure gauge is based upon the proven capsule measuring system and is suitable for very low pressures. On pressurisation, the expansion of the capsule element, proportional to the incident pressure, is transmitted to the movement and indicated.

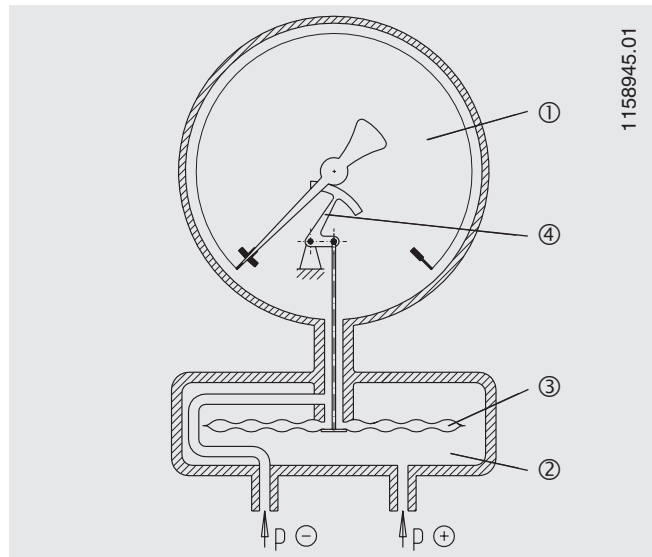
For the version with switch contact, magnetic snap-action contacts, reed switches, and electronic contacts are available. For triggering programmable logic controllers (PLC), electronic contacts and reed switches can be used.

Functionality

- Pressure-sealed case (1) with capsule element in pressure-sealed measuring chamber (2). On the \oplus side, a higher pressure acts than on the \ominus side
- The capsule element (3) is pressurised inside and outside. \oplus pressure enters measuring chamber (2), \ominus pressure enters capsule element (3) and case (1).
- Pressure difference between \oplus and \ominus side causes stroke movement of the capsule element and deflects the capsule element.
- The deflection is transmitted to the movement (4) and indicated.

Note:

The version with switch contact contains plastic components and copper alloy parts. They are incorporated in the pressure-sealed case (1), i.e. they are wetted! Therefore, an application test is recommended.



Overview of versions

Pressure gauge	Switch contact			
	Without	Magnetic snap-action contact (model 821)	Electronic contact (model 830 E)	Reed contact (model 851)
Model 736.51, with capsule element	x			
		x		
			x	
				x

Specifications

Basic information	
Nominal size	<ul style="list-style-type: none"> ■ \varnothing 100 mm ■ \varnothing 160 mm
Window	Laminated safety glass
Case	
Design	Safety level "S1" per EN 837-1: With blow-out device
Material	Stainless steel 1.4571 (316 Ti)
Ring	Bayonet ring, stainless steel
Mounting	<ul style="list-style-type: none"> ■ Without ■ Panel mounting flange, stainless steel ■ Panel mounting flange, polished stainless steel ■ Triangular profile ring with mounting bracket, polished stainless steel ■ Surface mounting flange, stainless steel
Case filling	<ul style="list-style-type: none"> ■ Without ■ Silicone oil
Movement	Stainless steel

Measuring element	
Type of measuring element	Capsule element
Material	Stainless steel 1.4571
Leak tightness	Helium tested, leakage rate: $< 5 \cdot 10^{-3}$ mbar l/s

Accuracy specifications	
Accuracy class	<ul style="list-style-type: none"> ■ 1.6 ■ 1.0
Temperature error	On deviation from the reference conditions at the measuring system: max. $\pm 0.6\%/10$ K of full scale value
Zero point setting	Via adjustment appliance at case circumference at 12 o'clock, stainless steel (wetted)
Reference conditions	
Ambient temperature	+20 °C

Scale ranges for differential pressure

Scale range				
mbar				
0 ... 2.5	0 ... 4	0 ... 6	0 ... 10	0 ... 16
0 ... 25	0 ... 40	0 ... 60	0 ... 100	
kPa				
0 ... 0.5	0 ... 1	0 ... 1.6	0 ... 2.5	0 ... 4
0 ... 6	0 ... 10			
mm H₂O				
0 ... 25	0 ... 40	0 ... 60	0 ... 100	0 ... 160
0 ... 250	0 ... 400	0 ... 600	0 ... 1,000	
in H₂O				
0 ... 5	0 ... 10	0 ... 15	0 ... 20	0 ... 25
0 ... 25	0 ... 30	0 ... 40		

Further details on: Scale ranges	
Special scale ranges	Other scale ranges on request
Unit	<ul style="list-style-type: none"> ■ mbar ■ kPa ■ mm H₂O ■ in H₂O
Overpressure safety and max. operating pressure (static pressure)	<ul style="list-style-type: none"> ■ 200 mbar on ⊕ side ■ 200 mbar on both sides <p>The possibility of selection depends on scale range and nominal size</p>
Vacuum resistance	<ul style="list-style-type: none"> ■ Without ■ Vacuum-resistant to -1 bar
Dial	
Scale graduation	<ul style="list-style-type: none"> ■ Single scale ■ Dual scale
Scale colour	Single scale Black
	Dual scale Black/red
Material	Aluminium
Special scale	Other scales or customer-specific dials, e.g. with red mark, circular arcs or circular sectors, on request
Pointer	
Instrument pointer	Aluminium, black
Set pointer ¹⁾	Aluminium, red

1) Only for version with switch contact

Process connection	
Standard	<ul style="list-style-type: none"> ■ EN 837-1 ■ ANSI/B1.20.1
Size	
EN 837-1	■ 2 x G ½ B
ANSI/B1.20.1	■ 2 x ½ NPT
Restrictor	<ul style="list-style-type: none"> ■ Without ■ Ø 0.6 mm [0.024"], stainless steel ■ Ø 0.3 mm [0.012"], stainless steel
Wetted parts	
Process connection, capsule element, measuring chamber, case	Stainless steel 1.4571
Plug of blow-out device	PUR
Movement	Stainless steel
Dial	Aluminium
Instrument pointer	Aluminium
Set pointer ¹⁾	Aluminium, red
Window	Laminated safety glass
Sealings	PTFE and NBR

1) Only for version with switch contact

Other process connections on request

Output signal: Contact model 821, magnetic snap-action contact	
Connection method	Magnetic snap-action contact
Switching technology	<ul style="list-style-type: none"> ■ No control unit and no supply voltage required ■ Direct switching up to 250 V, 1 A
Number of switch contacts	
Span ≥ 25 mbar ... < 40 mbar ¹⁾	Max. 2 switch contacts
Span ≥ 40 mbar	Max. 3 switch contacts ²⁾
Switching function	<ul style="list-style-type: none"> ■ Separate circuits with ≥ 2 switches ■ Cable break monitoring with parallel resistance (47 kΩ or 100 kΩ) The switching function of each switch is indicated by index 1, 2 or 3
Model 821.1	Normally open (clockwise pointer motion)
Model 821.2	Normally closed (clockwise pointer motion)
Model 821.3	Change-over; one contact breaks and one contact makes simultaneously when pointer reaches set point
Switch point setting	Set pointers of the contact pressure gauges are freely adjustable over the full scale range
Setting range (recommended)	25 ... 75 % of span (0 ... 100 % on request)
Distance between switch points	Recommended minimum distance between 2 contacts: 20 % of span
Switch hysteresis	2 ... 5 % (typical)
Switching current	0.02 ... 0.3 A (resistive load) Permissible switch-on and switch-off current: ≤ 0.5 A
Switching voltage	AC/DC 24 ... 250 V
Switching power	
Unfilled instruments	≤ 30 W, ≤ 50 VA
Filled instruments	≤ 20 W, ≤ 20 VA
Contact material	<ul style="list-style-type: none"> ■ Silver-nickel, gold-plated

1) For scale range 0 ... 25 mbar and scale range 0 ... 40 mbar with 3 or 4 contacts, accuracy class 2.5 applies

2) 4 switch contacts on request

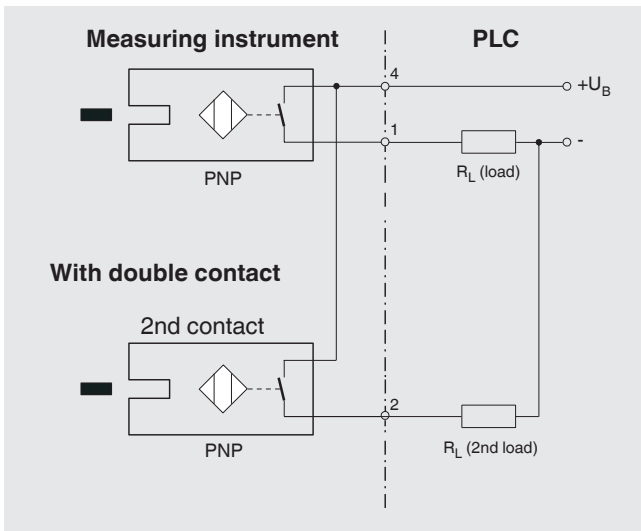
Recommended contact load for contact model 821

Switching voltage	Unfilled instruments			Filled instruments		
	Resistive load		Inductive load	Resistive load		Inductive load
	Direct current	Alternating current	$\cos \phi > 0.7$	Direct current	Alternating current	$\cos \phi > 0.7$
DC 220 V / AC 230 V	100 mA	120 mA	65 mA	65 mA	90 mA	40 mA
DC 110 V / AC 110 V	200 mA	240 mA	130 mA	130 mA	180 mA	85 mA
DC 48 V / AC 48 V	300 mA	450 mA	200 mA	190 mA	330 mA	130 mA
DC 24 V / AC 24 V	400 mA	600 mA	250 mA	250 mA	450 mA	150 mA

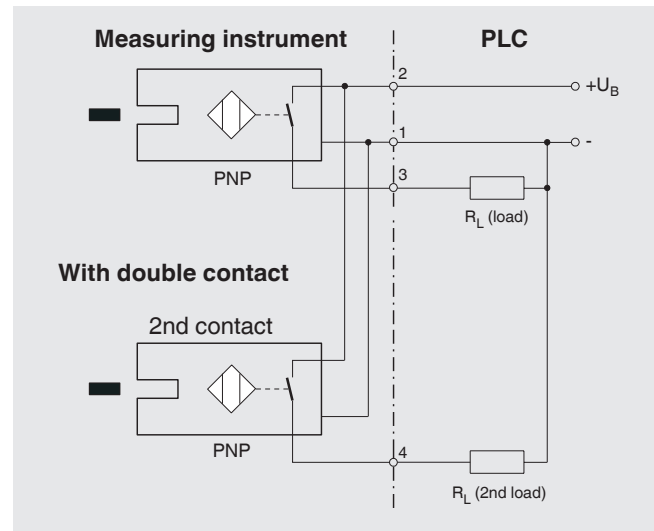
→ For further information on switch contacts, see Technical information IN 00.48

Output signal: Contact model 830 E, electronic contact	
Connection method	Electronic contact (PNP transistor)
Switching technology	<ul style="list-style-type: none"> ■ For direct triggering of a programmable logic controller (PLC) ■ Long service life due to non-contact sensor ■ Low influence on the indication accuracy ■ Fail-safe switching at high switching frequency ■ Insensitive to corrosion
Number of switch contacts	
Span \geq 25 mbar	Max. 3 switch contacts
Switching function	Contact versions: <ul style="list-style-type: none"> ■ 2-wire system ■ 3-wire system The switching function of each switch is indicated by index 1 or 2
Model 830 E.1	Normally open (clockwise pointer motion)
Model 830 E.2	Normally closed (clockwise pointer motion)
Setting range (recommended)	10 ... 90 % of span (0 ... 100 % on request)
Distance between switch points	Up to 2 contacts can be set to an identical set point. For a version with 3 contacts this is not possible. The left (1st) or right (3rd) contact may not be set to the same set point as the other 2 contacts. The required displacement is approx. 30°, optionally to the right or to the left.
Switching current	\leq 100 mA
Switching voltage	DC 10 ... 30 V

2-wire system



3-wire system



→ For further information on switch contacts, see Technical information IN 00.48

Output signal: Contact model 851, reed switch	
Connection method	Bistable reed switch
Switching technology	<ul style="list-style-type: none"> ■ No control unit and no supply voltage required ■ Direct switching up to 250 V, 1 A ■ For direct triggering of a programmable logic controller (PLC) ■ Free from wear as without contact
Number of switch contacts	
NS 100	Max. 2 switch contacts
NS 160	1 switch contact
Switching function	<ul style="list-style-type: none"> ■ Separate circuits with ≥ 2 switches ■ Cable break monitoring with parallel resistance (47 kΩ or 100 kΩ) The switching function of each switch is indicated by index 1, 2 or 3
Model 851.3	Change-over; one contact breaks and one contact makes simultaneously when pointer reaches set point
Switch point setting	Set pointers of the contact pressure gauges are freely adjustable over the full scale range
Setting range (recommended)	10 ... 90 % of span
Distance between switch points	When using two contacts, these cannot be set to the same point. Depending on the switching function, a minimum clearance of 15 ... 30° is required.
Switch hysteresis	3 ... 5 %
Switching current	AC/DC 1 A
Switching voltage ¹⁾	AC/DC 250 V
Switching power	60 W, 60 VA
Contact material	Rhodium
Transport current	AC/DC 2 A
Inductive load $\cos \varphi$	1
Contact resistance (static)	100 m Ω
Insulation resistance	109 Ω
Breakdown voltage	DC 1,000 V
Switching time incl. contact chatter	4.5 ms

1) For switching voltages AC < 50 V and DC < 75 V, switch contact not adjustable from outside

→ For further information on switch contacts, see Technical information IN 00.48


Electrical connections ¹⁾	
Connection type	<ul style="list-style-type: none"> ■ Cable socket, black Per VDE 0110 insulation group C/250 V Cable gland M20 x 1.5 ■ Connector (instead of cable socket)
Wire cross-section	6 screw terminals + PE for 2.5 mm ²
Cable diameter	→ See dimensions
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and ground terminals are appropriately marked.
Material	PA 6 (polyamide)

1) Only for version with switch contact







Operating conditions	
Medium temperature	+60 °C [+140 °F] maximum
Ambient temperature	-20 ... +60 °C [-4 ... 140 °F]
Storage temperature	-20 ... +60 °C [-4 ... 140 °F]
Pressure limitation	
Steady	Full scale value
Fluctuating	0.9 x full scale value
Ingress protection of the complete instrument	IP66 per IEC/EN 60529

Approvals

Approvals included in the scope of delivery

Logo	Description	Region
	EU declaration of conformity	European Union
	EMC directive	
	Low voltage directive	
	RoHS directive	
-	CRN Safety (e.g. electr. safety, overpressure, ...)	Canada

Optional approvals

Logo	Description	Region
	EAC (option) Pressure equipment directive	Eurasian Economic Community
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	MTSCHS Permission for commissioning	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	UkrSEPRO Metrology, measurement technology	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan

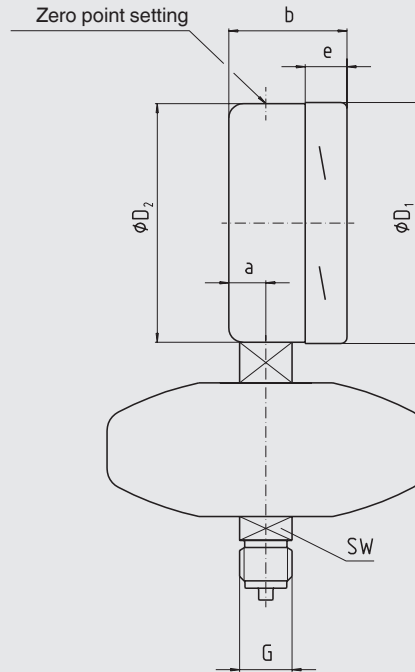
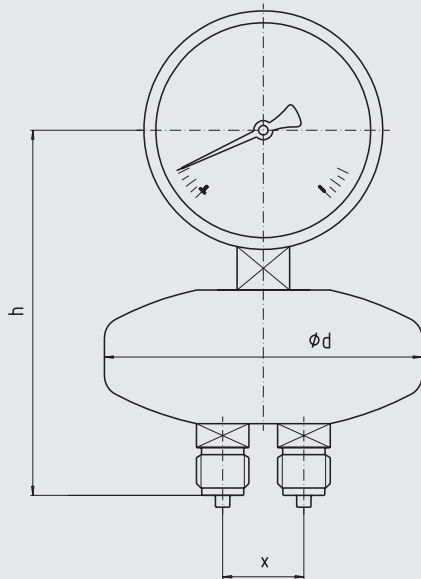
Certificates (option)

Certificates	
Certificates	<ul style="list-style-type: none"> ■ 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. indication accuracy)
Recommended calibration interval	1 year (dependent on conditions of use)

→ Approvals and certificates, see website

Dimensions in mm [in]

Lower mount (radial)



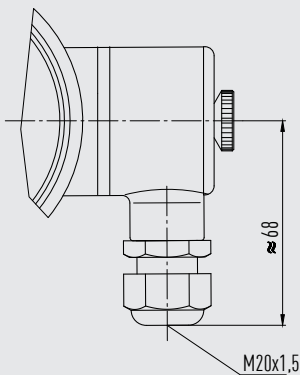
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NS	Dimensions in mm [in]										Weight in kg [lb]
	a	b	D ₁	D ₂	d	e	G	h ±1	X	SW	
100	15.5 [0.61]	49.5 [1.95]	101 [3.98]	99 [3.90]	133 [5.24]	17.5 [0.69]	G ½ B	170 [6.69]	37 [1.46]	22 [0.87]	1.70 [3.75]
160	15.5 [0.61]	49.5 [1.95]	161 [6.34]	159 [6.26]	133 [5.24]	17.5 [0.69]	G ½ B	200 [7.87]	37 [1.46]	22 [0.87]	2.20 [4.85]

Process connection per DIN 16003

Standard cable socket

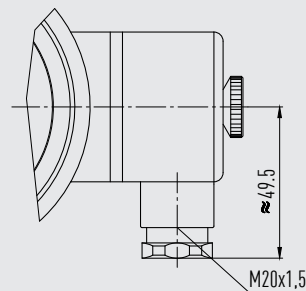
Contact models: 821 and 851



Only use cable with a diameter of 5 ... 10 mm

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Contact model: 830 E



Only use cable with a diameter of 7 ... 13 mm

14336089.01

Accessories and spare parts

Model	Description	Order number
 910.17	Sealings → See data sheet AC 09.08	-
 IV3x, IV5x	Valve manifold for differential pressure measuring instruments → See data sheet AC 09.23	-
-	Diaphragm seal	On request

Ordering information

Model / Switch contact / Nominal size / Scale range / Process connection / Options

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