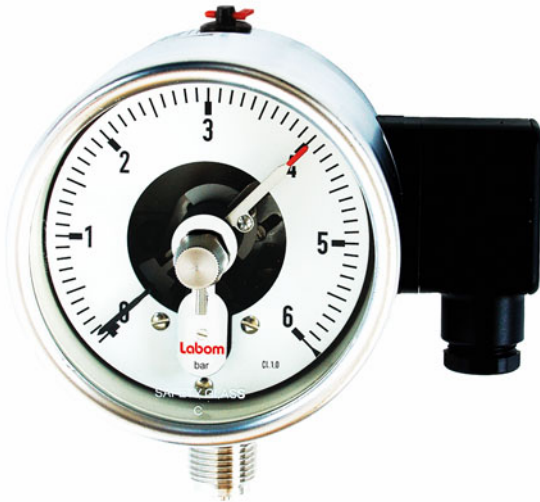


Bourdon tube pressure gauge with switch contact NS 100/160 Type series BE4...



Application area

- General process technology
- Chemical and petrochemical industry
- Plant and mechanical engineering
- Shipping

Features

- Bourdon tube pressure gauge with switch contact
- Nominal ranges -1...0 bar to -1...24 bar, 0...1 bar to 0...1000 bar
- High quality case with bajonet ring NS 100/160 per EN 837-1 S1, alternative safety version per EN 837-1 S3
- Case, measuring element and pressure connection of stainless steel
- Switch contacts (electrical contact devices) per DIN 16085:
 - slow acting contact
 - magnetic snap contact
 - inductive contact
 - inductive contact with integrated switching amplifier

Options

- Approvals / Certificates
 - Ex-protection (ATEX/UKEX)
 - Classification per SIL2
 - Material certificate per EN 10204-3.1
 - Calibration certificate per EN 10204-3.1
- As per UKCA regulations
- Higher overload protection
- Case with liquid filling
- Damping of movement
- Electronical angle-of-rotation sensor, Type series PL1100, see data sheet D6-020
- Extended temperature range
- Oxygen free of oil and grease
- Connection to Zone 0 by using the flame arrester MF21xx, see data sheet DB_D6-025

Application

The bourdon tube pressure gauge with switch contact is suitable for use in measurement and control systems for indicating and monitoring pre-selectable minimum and/or maximum pressure values. Mechanical contacts are used as slow acting contacts or with magnetic snap contacts. The devices can also be supplied with inductive contact.

Technical data

Constructional design / case

Design:	High quality case with bayonet ring per EN 837-1 S1, material: stainless steel mat.-no.-1.4301 (304) ; with blow-out device, material: PUR, ventilation valve, material: PUR	
	Alternative: Safety design with blow-out back and solid baffle wall per EN 837-1 S3, Material: Stainless steel 1.4301 (304)	
Nominal size:	NS 100 or NS 160	
Degree of protection per EN 60529:	■ Without filling: IP 65 ■ With filling S1 case: IP 65 ■ With filling S3 case: IP 66	
Case filling:	Labofin	
Atmosph. pressure compensation:	Via ventilation valve. Safety case, filled: with pressure compensation diaphragm, material: silicone	
Case seal:	Material gasket: NBR	
Window:	Non-splintering laminated glass. Option: Non-splintering plastic (polycarbonate)	
Contact lock:	Stainless steel with NBR gasket	
Measuring element:	Bourdon tube < 60 bar: c-type ≥ 60 bar: spiral	
Movement:	Stainless steel segment Optional: movement with integrated damping system	
Scale:	Pure aluminium, white with black inscription. Option: with red marking, special scale upon request.	
Pointer:	Pure aluminium, black. With micro adjustment for zero point correction.	
Mounting:	Via process connection. Optional with flange for surface mounting or for flush mounting with DIN mounting flange.	
Electronical connection:	Connection plug with cable gland M20 x 1.5 and removable test cover, material: polycarbonate	
Weight:	NS 100 without filling:	approx. 0.9 kg
	NS 160 without filling:	approx. 1.8 kg
	NS 100 with filling:	approx. 1.5 kg
	NS 160 with filling:	approx. 3.6 kg

Process connection

Design:	Per EN 837-1. G1/2 B, 1/2" NPT or M20 x 1.5, bottom or back eccentric connection. Optional with throttle screw for system damping, further process connections upon request
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Material wetted parts

Measuring element:	Bourdon tube and shanks stainless steel mat.-no. 1.4571 / 1.4404 (316Ti / 316L)
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Nominal range

See order details, further information upon request

Overload limit:	Standard: loading up to full scale Higher overload protection see order code.
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For information on definitions of terms regarding the Pressure Equipment Directive, see Technical Instruction TA_068.

Accuracy

Accuracy class:	NS 100			
	nominal range (bar)	no. of contacts		
		1	2	3
	1	cl. 1	cl. 1.6	-
	≥ 1.6	cl. 1	cl. 1	cl. 1.6
	1000	cl. 1.6	cl. 1.6	cl. 1.6
	NS 160			
	nominal range (bar)	no. of contacts		
		1	2	3
	1	cl. 1	cl. 1.6	cl. 2.5
	1.6	cl. 1	cl. 1.6	cl. 2.5
	≥ 2.5	cl. 1	cl. 1	cl. 1.6
	1000	cl. 1.6	cl. 1.6	cl. 1.6
	Plus effect of switch function on indication per DIN 16085.			
Temperature influence:	Max. ± 0.4% / 10K of measuring span per EN 837-1			

Temperature ranges

	without filling	with filling
Ambient:	-20...70 °C	-20...70 °C (60 °C) ³
Medium: ¹	-20...150 °C	-20...100 °C
Storage:	-40...70 °C	-40...70 °C (-20...60 °C) ³

Extended temperature range for nominal ranges
≤ 600 bar (optional): ²

	without filling	with filling
Ambient:	-40...100 °C	-40...80 °C (60 °C) ³
Media: ¹	-40...200 °C	-40...200 °C

Devices with classification per SIL2:

	without filling	with filling
Ambient:	-20...70 °C	-20...70 °C (-20...40 °C) ³
Media:	-20...70 °C	-20...70 °C (-20...40 °C) ³

¹ Nominal range ≤ 1 bar up to 100 °C

² Inductive safety initiator necessary

³ Safety case S3 (IP66)

Tests and certificates

Ex-protection:	<u>Magnetic snap contact:</u> Simple electrical apparatus per EN 60079-11 suitable for intrinsically safe circuits Ex IIC TX. <u>Inductive contact:</u> Contact device suitable for intrinsically safe circuits ⊕ II 2G Ex ia IIC T4/T5/T6 Gb ATEX ■ PTB 99 ATEX 2219X ■ PTB 00 ATEX 2049X UKEX: ■ CML 21UKEX2893X ■ CML 21UKEX2977X <u>Ex-protection (ATEX/UKEX) for mechanical devices:</u> ⊕ II 2G Ex h IIC T1...T6 Gb X ⊕ II 2D Ex h IIIC Txx°C Db X
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Further details see operation instruction BA_037 and Ex Instructions XA_005, XA_013 and XA_021.

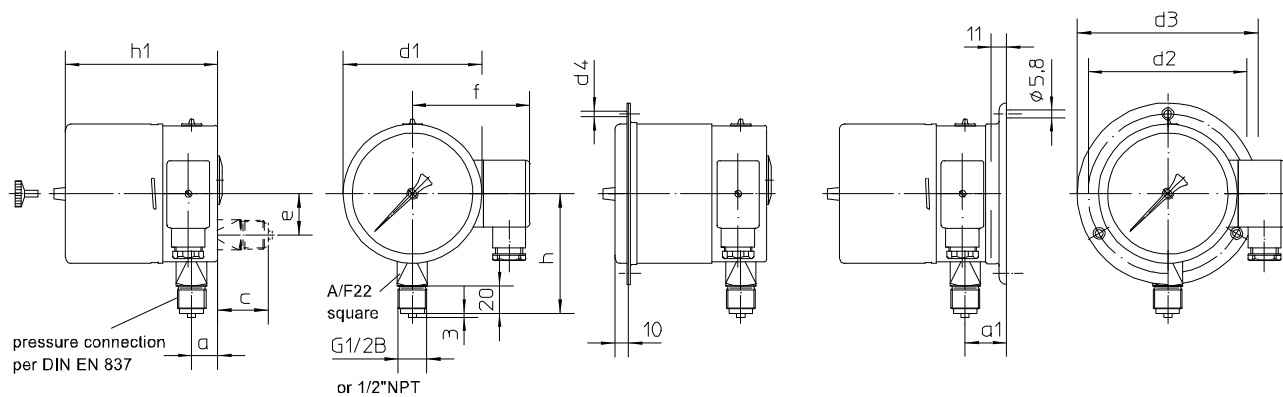
SIL 2:	Functional safety: per EN 61508, classification per SIL 2, TÜV-Reg.-No. 44 799 13190203. For devices with inductive contact only (Type N1, N2 and N4).
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Switch contacts

Slow acting contact:	<u>Type L2</u> ■ max. 3 touch contacts ■ Contact load: 10 W / 18 VA ■ Switching up to 230 V DC ■ Available with separate circuit (Type M2)
Magnetic snap contact:	<u>Type L4</u> ■ max. 3 touch contacts ■ Contact load: 30 W / 50 VA ■ Switching up to 230 V DC ■ Available with separate circuit (Type M4)
Inductive contact: (standard)	<u>Type N4</u> ■ max. 3 contacts, contactless ■ Control unit required
Inductive contact: (SN)	<u>Type N1</u> ■ Safety initiator ■ max. 3 contacts, contactless ■ Control unit required
Inductive contact inverse: (S1N)	<u>Type N2</u> ■ Safety initiator, inverse switching ■ max. 2 contacts, contactless ■ Control unit required
Inductive contact with integrated amplifier:	<u>Type N6</u> ■ max. 2 contacts, contactless ■ 100 mA ■ 3-wire technology, suitable for direct activation at a PLC

Further information see operating instruction BA_037 and Technical Information TA_039.

Dimensions



Standard design

for flush mounting

for surface mounting

Dimensions standard design (mm)											
case	d1	h1	a	c	e	f	h	d2	d3	d4	a1
NS 100	100	111	19	37	30	89	83	116	132	4.8	30
NS 160	160	112	19	37	60	119	113	178	196	5.8	30

Dimensions safety case (mm)											
case	d1	h1	a	c	e	f	h	d2	d3	d4	a1
NS 100	100	123	37	-	-	89	83	116	132	4.8	-
NS 160	160	133	37	-	-	119	113	178	196	5.8	-

Order details

Bourdon tube pressure gauge with switch contact NS 100/160				
BE420 .	case design per EN 837-1 S1	NS 100, IP 65	without liquid filling	process connection bottom
BE421.				process connection at back
BE422 .			with liquid filling	process connection bottom
BE423 .				process connection at back
BE430 .		NS 160, IP 65	without liquid filling	process connection bottom
BE431 .				process connection at back
BE432 .			with liquid filling	process connection bottom
BE433 .				process connection at back
BE450 .	safety case per EN 837-1 S3	NS 100, IP 65	without liquid filling	process connection bottom
BE454 .		NS 100, IP 66	with liquid filling	
BE460 .		NS 160, IP 65	without liquid filling	
BE464 .		NS 160, IP 66	with liquid filling	
0	design	standard		
1		Ex-protection		
A2...	process connection	G 1/2 B		
B2...		1/2" NPT		
C2...		M 20 x 1.5		
086	nominal range [bar]	-1...0		
087		-1...0.6		
088		-1...1.5		
089		-1...3		
090		-1...5		
091		-1...9		
092		-1...15		
093		-1...24		
052		0...0,6		
053		0...1		
054		0...1.6		
055		0...2.5		
056		0...4		
057		0...6		
058		0...10		
059		0...16		
562		0... 20		
060		0...25		
061		0...40		
062		0...60		
063		0...100		
064		0...160		
065		0...250		
066		0...400		
068		0...600		
070		0...1000 ¹		
	switch contacts	type of contact	number	
L4 . 00	touch contact	magnetic snap contact	single contact	
L4 . . 0			double contact	
L4 . . .			triple contact	
L2 . 00		slow acting contact ²	single contact	
L2 . . 0			double contact	
L2 . . .			triple contact	
M4 . . 0		magnetic snap contact, separated circuits	double contact	
M4 . . .			triple contact	
M2 . . 0		slow acting contact ² separated circuits	double contact	
M2...			triple contact	

N4 . 00	inductive contact	initiator (N)	single contact
N4 . . 0			double contact
N4 . . .			triple contact
N1 . 00		safety initiator (SN)	single contact
N1 . . 0			double contact
N1 . . .			triple contact
N2 . 00		safety initiator invers (S1N)	single contact
N2 . . 0			double contact
N6 . 00		inductive contact with integrated switching amplifier, 3-wire technology PNP ²	single contact
N6 . . 0			double contact

...	switch function - per contact, replace point with number		
1	switch	rising measured value closes contact	
2		rising measured value opens contact	
4		falling measured value closes contact	
5		falling measured value opens contact	
3	change-over element ³	rising measured value switches	
6		falling measured value switches	

Example of order code switch contacts N4120:

Double inductive contact with initiator → type of contact = N4

1. Inductive contact closes on rising measured value → code number 1
2. Inductive contact opens on rising measured value → code number 2
3. Inductive contact not be used → code number 0

Additional features (to be indicated if required)		
H1	overload protection	1.3 times (meas. range 250...600 bar)
H2		2 times (meas. range 1.0...4.0 bar)
H4		1.5 times (meas. range 6.0...160 bar)
H8 ⁴		5 times (meas. range 0...20 bar)
R11	window	polycarbonate ²
T2	marking	on scale (please specify)
U2	restrictor screw	restrictor screw 0.3 mm
U3		restrictor screw 0.6 mm
U4		restrictor screw 1.0 mm
V2	mounting	rear flange for surface mounting ⁵
V3		front flange for flush mounting
PL1100-....	output signal	4...20 mA (20...4 mA) with electr. angle-of-rotation sensor (see data sheet D6-020) ⁶
W1020	material certificate	per EN 10204-3.1, wetted parts
W1204	calibration certificate	per EN 10204-3.1, 3 measuring points
W1201		per EN 10204-3.1, 5 measuring points
W2603	functional safety per EN 61508, classification per SIL2 ⁷	
W2660	as per UKCA regulations	
W4001	oxygen free of oil and grease	
W4090	extended temperature ranges	
W4102	damping of movement ⁸	with integrated damping system

Order code (example): BE4211 – B2089 – N4120 - ...

¹ Accuracy class 1.6 per EN 837-1.

² Not for devices with Ex-protection.

³ Possible with touch contacts only (slow acting contact or magnetic snap contact).

⁴ Only in combination with safety case according to EN 837-1 S3 in NS160 and scale with 200 degrees of angle (overload range red).

⁵ Not possible with safety case S3.

⁶ Not possible with damping of movement.

⁷ For devices with inductive contact only.

⁸ For devices with nominal size 100 only.