



#### Application area

- General process technology
- Chemical and petrochemical industry
- Machinery construction
- Shipping

#### Features

- Bourdon tube pressure gauge with switch function
- Nominal ranges -1...0 bar to -1...24 bar, 0...1 bar to 0...1600 bar
- High quality case with bayonet 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 functions (electrical contact devices) per DIN 16085:
  - slow acting contact
  - magnetic snap contact
  - inductive contact
  - inductive contact with integrated switching amplifier
- EAC declaration (upon request)

#### Options

- Approvals/Certificates
  - Explosion protection
  - Classification per SIL2
  - Certificate of measuring equipment for Russian Federation
  - Material certificate per EN 10204
  - Calibration certificate per EN 10204
- 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

#### Application

The bourdon tube pressure gauge with switch function (electrical contact device) 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.-Nr. 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 (Macrolon)
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: Macrolon
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 pressure connection material stainless steel mat.-no. 1.4571 (316Ti)
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#### Nominal range

See order details, further ranges upon request

Overload-protection:	Standard: loading up to full scale Higher overload protection see order code.
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#### 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
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#### Temperature ranges

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

Extended temperature range (optional):<sup>2</sup>

	without filling	with filling
Ambient:	-40...100 °C	-40...80 °C (60 °C) <sup>3</sup>
Media: <sup>1</sup>	-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) <sup>3</sup>
Media:	-20...70 °C	-20...70 °C (-20...40 °C) <sup>3</sup>

<sup>1</sup> Nominal range ≤ 1 bar up to 100 °C

<sup>2</sup> Inductive safety initiator necessary

<sup>3</sup> Safety case S3 (IP66)

## Tests and certificates

Ex-protection: Magnetic snap contact:  
Simple electrical apparatus per IEC/DIN EN 60079-11 suitable for intrinsically safe circuits Ex IIC TX.

Inductive contact:

Contact device suitable for intrinsically safe circuits

⊕ II 2G Ex ia IIC T4/T5/T6 Gb

- Reg.-no.: ■ PTB 99 ATEX 2219X  
■ PTB 00 ATEX 2049X

Ex-protection (ATEX) for mechanical devices:

⊕ II 2G c Tx

⊕ II 2D c Tx

Further details see operation instruction BA\_037 and Ex Safety Instructions XA\_005, XA\_013, XA\_014 and XA\_021.

SIL 2: Functional safety:  
per EN 61508, classification per SIL 2, TÜV-Reg.-Nr. 44 799 13190203.  
For devices with inductive contact only (Typ N1, N2 and N4).

- EAC declaration (upon request)
- Certificate of measuring equipment for Russian Federation

## Switch functions

Slow acting contact: Type L2

- 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: Type L4

- 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) Type N4

- max. 3 contacts, contactless
- Control unit required, see product group M7

Inductive contact: (SN) Type N1

- Safety initiator
- max. 3 contacts, contactless
- Control unit required, see product group M7

Inductive contact inverse: (S1N) Type N2

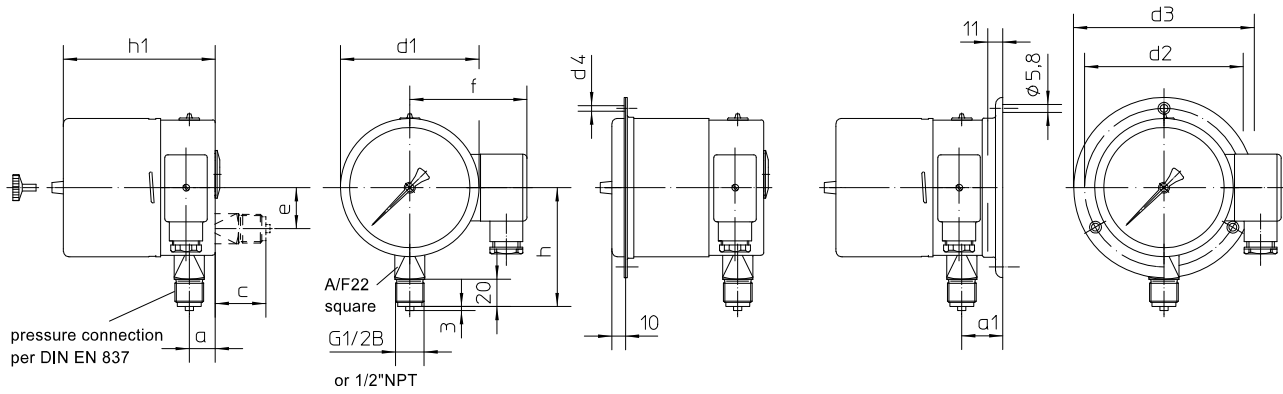
- Safety initiator, inverse switching
- max. 2 contacts, contactless
- Control unit required, see product group M7

Inductive contact with integrated amplifier: Type N6

- 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 function NS 100/160, Type series BE4...

Order details BE4..					
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 pattern gauge per EN 837-1 S3	NS 100	IP 65 process connection bottom without liquid filling		
BE454 .			IP 66 process connection bottom with liquid filling		
BE460 .		NS 160	IP 65 process connection bottom without liquid filling		
BE464 .			IP 66 process connection bottom 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			
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 <sup>1</sup>			
071		0...1600 <sup>1</sup>			
		switch functions	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 <sup>2</sup>	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 <sup>2</sup> separated circuits	double contact	
M2...				triple contact	

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

...	<b>switch function - per contact, replace point with number</b>		
<b>1</b>	switch	increasing pressure makes contact	
<b>2</b>		increasing pressure breaks contact	
<b>4</b>		decreasing pressure makes contact	
<b>5</b>		decreasing pressure breaks contact	
<b>3</b>	change-over element	increasing pressure makes or breaks contact	
<b>6</b>		decreasing pressure makes or breaks contact	

Additional features (to be indicated if required)		
<b>H1</b>	overload protection	1.3 times (meas. range 250...600 bar)
<b>H2</b>		2 times (meas. range 1.0...4.0 bar)
<b>H4</b>		1.5 times (meas. range 6.0...160 bar)
<b>R11</b>	window	Macrolon <sup>2</sup>
<b>T2</b>	marking	on scale (please specify)
<b>U2</b>	restrictor screw	restrictor screw 0.3 mm
<b>U3</b>		restrictor screw 0.6 mm
<b>U4</b>		restrictor screw 1.0 mm
<b>V2</b>	mounting	rear flange for surface mounting
<b>V3</b>		front flange for flush mounting
<b>PL1100-....</b>	output signal	4...20mA (20...4 mA) with electr. angle-of-rotation sensor ( see D6-020)
<b>W1020</b>	material certificate	per EN 10204-3.1, wetted parts
<b>W1032</b>	for use with acid gas	inspection certificate per EN 10204-3.1
<b>W2603</b>	functional safety per EN 61508, classification per SIL2 <sup>4</sup>	
<b>W2673</b>	certificate of measuring equipment for Russian Federation <sup>2</sup>	
<b>W4001</b>	oxygen free of oil and grease	
<b>W4090</b>	extended temperature ranges	
<b>W4102</b>	damping of movement <sup>2,5</sup>	with integrated damping system
<b>Z1</b>	connection to Zone 0 <sup>3</sup>	with Zone 0 adapter (coupler element KF6)

**Order code (example): BE4211 – B2089 – N1100 - ...**

<sup>1</sup> accuracy class 1.6 per EN 837-1

<sup>2</sup> not for devices with Ex-protection

<sup>3</sup> for devices with Ex-protection only, not with magnet snap contact

<sup>4</sup> for devices with inductive contact only

<sup>5</sup> for devices with nominal size 100 only