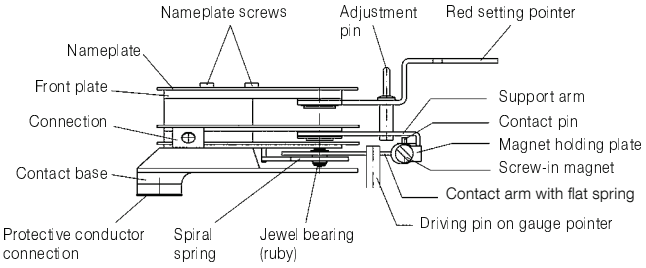
Electrical contacts electromechanical

Precision contact system

Sectional view



Magnetic spring contact

Electrical contacts (electromechanical magnetic spring contacts) in measuring devices with pointers are auxiliary electrical switches which open or close electrical circuits at set limit values by means of a contact arm which is moved in accordance with the indicated value. They consist of:

- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which holds the contact pin
- A contact arm which is moved by the gauge pointer and which carries the second contact pin

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).

Two types of electromechanical contacts are available: magnetic spring contacts and sliding contacts (which are not described in detail here).

Principle of operation

Magnetic spring contacts have a permanent magnet screwed to the setting pointer at the contact support arm. To close the circuit, the contact pin of the moving contact arm is attracted by the magnet so that the contact snaps closed. When the circuit opens, the magnet attracts the contact arm until the resetting force of the measuring element overcomes the effective force of the magnet so that the contact snaps open.

The snap action reduces arcing between the contacts, thus allowing for greater switch ratings. Due to the increased contact force, this type of contact is also less sensitive to vibrations. Furthermore, the contact stability is increased by greater contacting pressure.

Application

Magnetic spring contacts can be used under almost any type of operating condition. They can also be integrated into devices with filling. In order to prevent switching errors (particularly in the case of greater inductive switch ratings or considerable system vibration or in gauges with filling) we recommend installing our pulse-controlled series MSR contact protection relays.

Technical specifications

Supply voltage
Max. 250 V

Making current and breaking current
Max. 1.0 A

Continuous current
Max. 0.6 A

Switch rating
Max. 30 W 50 VA (no filling)
Max. 15 W 20 VA (with filling)

Contact material
Ag80 Ni20 Au 10 µ
(extra charge for special materials)

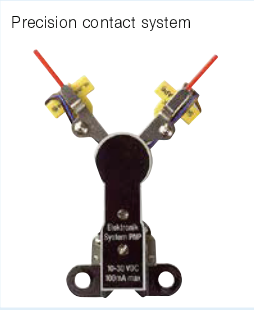
Switching accuracy
Approx. 2–5 % of full scale value

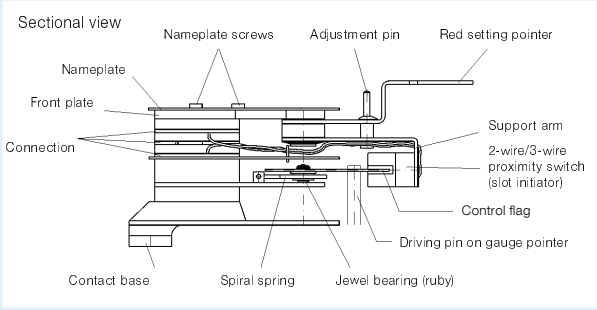
Operating temperature range
-20/+70 °C or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Electrical contacts electronic

1





Electronic contact

Electronic contacts have non-contact electrical displacement pick-ups (proximity sensors).
They consist of:
- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which carries the control head (initiator) with the completely encapsulated electronics
- A control flag which is moved by the gauge pointer

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).

Principle of operation

The proximity switches used in the electronic contacts are simple 2-wire or 3-wire DC voltage switches. Due to the slot design, the proximity switches are also referred to as slot initiators. The electromagnetic field is concentrated between 2 opposing coils. The switch is activated when the aluminium control flag moved by the gauge pointer reaches the gap between the two coils (slot). The signal is generated without a delay, according to the motion of the gauge pointer.

The switching behaviour of the PNP switches used in these contacts is usually defined as a normally open contact, i.e.: Control flag in the slot initiator
- Contact closed
- Output active

Control flag not in the slot initiator
- Contact open
- Output not active

Application

Due to non-contact switching, the high switching accuracy and the long service life, electronic contacts with PNP output are ideal for any type of industrial application.
The use of these contacts is particularly advantageous in applications with liquid-filled measuring instruments, at low voltages (DC 10-30 V) and low DC loads ≤ 100 mA), e.g.
- For PLC signal input
- To control opto-isolators
- For other electronic evaluation units

Version

Standard electronic contacts are shipped with a 3-wire initiator type Si2-K08-AP6.
The contacts are also available with the 2-wire initiator Si2-K08-AG6.

Technical specifications

Supply voltage
DC 10–30 V

Switching current
≤ 100 mA

Switching accuracy
Approx. 0.5 % of full scale value

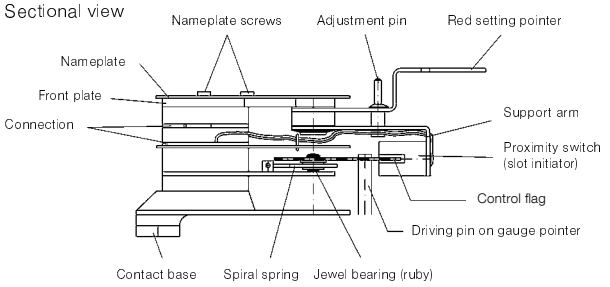
Operating temperature range
-25/+70 °C or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Electrical contacts inductive

Precision contact system

Sectional view



Inductive contact

Inductive contacts have non-contact proximity sensors as per EN 60947-5-6 / NAMUR worksheet NA 001. They consist of:

- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which carries the control head (initiator) with the completely encapsulated electronics
- A control flag which is moved by the gauge pointer

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).

Principle of operation

Inductive contacts are used together with an isolating switching amplifier. The switching amplifier supplies the control head with direct voltage. As soon as the control flag reaches the control head, the internal resistance in the control head increases (high-resistance initiator). This causes the current to change which is used to control the switching amplifier. The amplifier converts the input signal into a binary output signal. Therefore, the switching function of inductive contacts is not only determined by the slot initiator, but also by the switching amplifier.

Application

Due to non-contact switching, the high switching accuracy and the long service life, inductive contacts are ideal for industrial applications and should be used in liquid filled pressure gauge. Inductive contacts are particularly recommended when the switching function must be extremely reliable or when the switching frequency is high. The electronics are fully encapsulated so that this type of contact is also suitable for corrosive environments.

If suitable isolating switching amplifiers (such as KFA6-SR2-Ex) are used, the system will have the type of protection "intrinsic safety i". It is marked Ex II 1G Ex ia IIC T6 and is approved for use in hazardous areas, zones 1 and 2 together with an isolating switching amplifier. The isolation switching amplifier must always be installed outside of the hazardous area.
For standard industrial applications that do not require EX protection or that require only low EX protection (zone 2), we recommend our cost-efficient multifunctional series MSR-I relays.

Version

Inductive contacts are shipped with a 2-wire initiator type Si2-K08-Y1.

Technical specifications

Nominal voltage
≈ DC 8 V = (Ri 1 kOhm)

Supply voltage
5–25 V

Current input
≥ 2.1 mA (active area free)
≤ 1.2 mA (active area covered)

Switching accuracy
Approx. 0.5 % of full scale value

Operating temperature range
-20/+70 °C
or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Option
Contact systems with
safety integrity level
SIL 2

SIL
Protect your process!

Switching functions and definitions

1

Figure 1

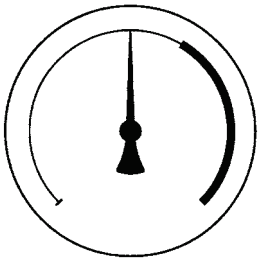


Figure 2

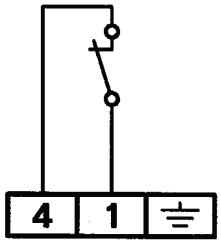
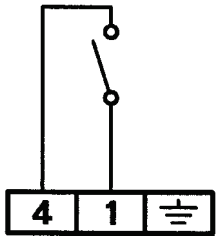


Figure 3



Definition of switching function

1 = Contact closes clockwise when the setpoint is reached
2 = Contact opens clockwise when the setpoint is reached
W = 1 contact opens and 1 contact closes at the same time (changeover contact)

The switching function of a contact is always specified in terms of a clockwise movement of the pointer. If the gauge pointer moves counterclockwise, the switching function is inverted!
If several contacts are fitted to a gauge, the contact closest to the left start value or end value of the scale is defined as the first contact. This also applies to vacuum ranges!

Optimisation of the switching performance

Application-related specifications, such as the operating behaviour of the contact (e.g. contact switches with increasing or decreasing pressure), the switching point or the speed of pressure changes, help to optimise contact adjustment to achieve a more accurate switching performance.

Selection table switching functions

The selection tables on the following pages show the switching functions of single, double and the most common triple contacts (with switching scheme and wiring diagram).
This allows you to quickly and easily find the correct contact designation for the required switching function.

Description of switching scheme

Figure 1:
- Thin line means: contact open, circuit open
- Thick line means: contact closed, circuit closed

Description wiring diagram

Figure 2:
- Contact closed
- Circuit closed

Figure 3:
- Contact open
- Circuit open

Definition of the contact type

MK = magnetic spring contact
SK = sliding contact
EK = electronic contact
IK = inductive contact

Depending on the type of the pressure gauge, up to 4 contacts can be installed per gauge. The number of contacts is indicated by means of a figure (1-4) after the contact type designation.

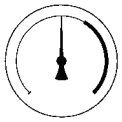
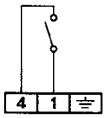
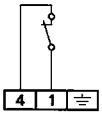
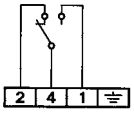
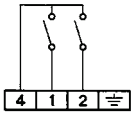
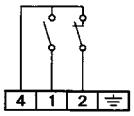
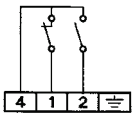
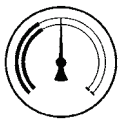
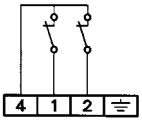
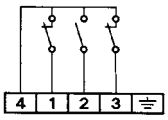
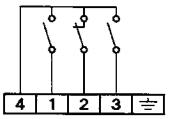
Example: MK 2.12
- Magnetic spring contact
- 2 contacts
- Contact 1 closes
- Contact 2 opens

Definition of complete gauge

The code for the contact is appended to the type designation of the measuring instrument.

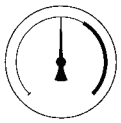
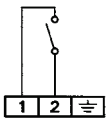
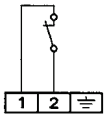
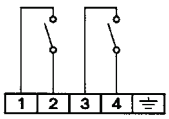
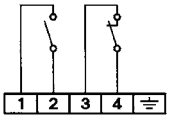
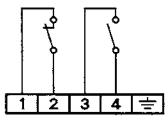
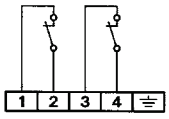
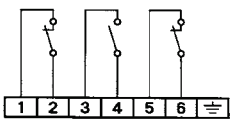
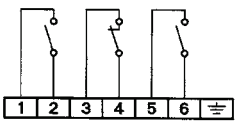
Example:
RF100Ch IK1.2
- Bourdon tube pressure gauge,
- NG 100,
- Gauge for chemical applications,
- Inductive contact,
- 1 contact,
- Contact opens

Switching functions of electrical contacts (electromechanical)

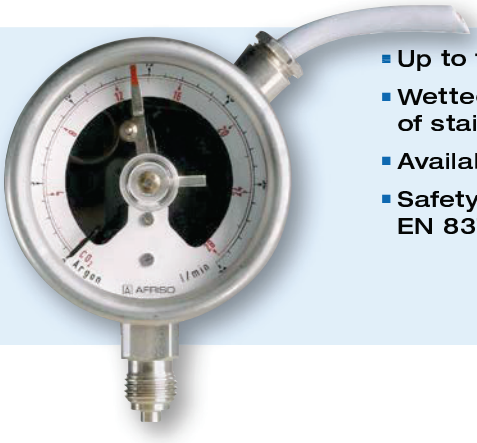
Switching scheme	Wiring diagram	Switching function (pointer moves clockwise)	Contact type	
			Magnetic spring contact	Sliding contact
Single contact				
		Contact closes	MK1.1	SK1.1
		Contact opens	MK1.2	SK1.2
		Contact switches over, i.e. 1 contact opens 1 contact closes	MK1.W	SK1.W
Double contact				
		Contact 1 closes Contact 2 closes	MK2.11	SK2.11
		Contact 1 closes Contact 2 opens	MK2.12	SK2.12
		Contact 1 opens Contact 2 closes	MK2.21	SK2.21
		Contact 1 opens Contact 2 opens	MK2.22	SK2.22
Triple contact				
		Contact 1 opens Contact 2 closes Contact 3 opens	MK3.212	SK3.212
		Contact 1 closes Contact 2 opens Contact 3 closes	MK3.121	SK3.121

Switching functions of inductive electrical contacts

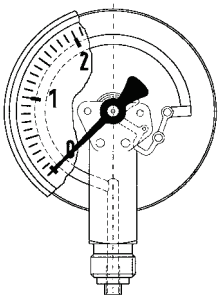
1

Switching scheme	Wiring diagram	Switching function	When the setpoint is exceeded, the gauge pointer moves the control flag ...	Contact type
		Pointer moves clockwise		**Inductive contact**
Single contact				
		Contact closes	out of the control head	IK1.1
		Contact opens	into the control head	IK1.2
Double contact				
		Contact 1 closes Contact 2 closes	of the 1st and 2nd contact out of the control head	IK2.11
		Contact 1 closes Contact 2 opens	of contact 1 out of the control head of contact 2 into the control head	IK2.12
		Contact 1 opens Contact 2 closes	of contact 1 into the control head of contact 2 out of the control head	IK2.21
		Contact 1 opens Contact 2 opens	of the 1st and the 2nd contact into the control head	IK2.22
Triple contact				
		Contact 1 opens Contact 2 closes Contact 3 opens	of the 1st and the 3rd contact into the control head of contact 2 out of the control head	IK3.212
		Contact 1 closes Contact 2 opens Contact 3 closes	of the 1st and the 3rd contact out of the control head of contact 2 into the control head	IK3.121

Bourdon tube pressure gauges with electrical contacts nominal size 63



- Up to two contacts possible
- Wetted parts and movement made of stainless steel
- Available with MK, EK, IK
- Safety housing S2 as per EN 837-1 (blow-out)

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Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise. For measuring in areas with limited space. Especially suitable for monitoring minimum pressure in gas cylinders together with AFRISO alarm unit for low gas level.

Technical specifications

Type
D 3

Nominal size
63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/+0.6 to -1/+15 bar
0/1.6 to 0/600 bar

Application area
Static load: ¾ x full scale value
Dynamic load: $^{2}/_{3}$ x full scale value
Short-term: full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 103 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1,6 bar
EK/IK double 1.6 bar

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
rising temperature approx. ±0.4 %/10 K
falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 42 (EN 60529)

Standard version

Connection
Stainless steel 316 L, bottom or bottom back G¼B – spanner size SW 14
(EN 837-1/7.3)

Electrical connection
Cable gland M12 x 1.5
1 metre cable

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304, safety housing S2 as per EN 837-1, with rear blow-out

Push on bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

- Wetted parts oil-free and grease-free (≤ 0/400 bar)
- Ultra-pure gas version
- Back flange
- Damping screw
- Special scales
- Other process connections

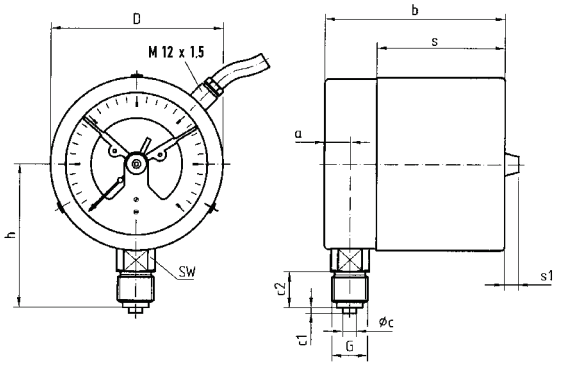
i See page 115 for prices.

Bourdon tube pressure gauges with electrical contacts nominal size 63

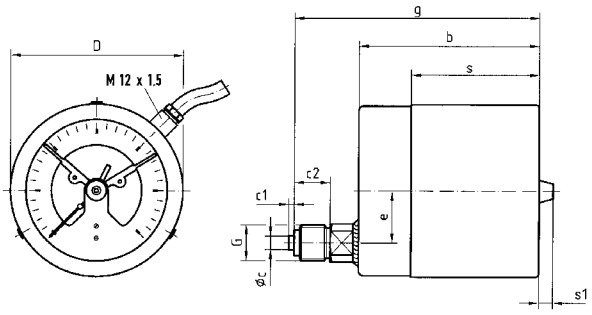
Type D3

1 Housing types and dimensions

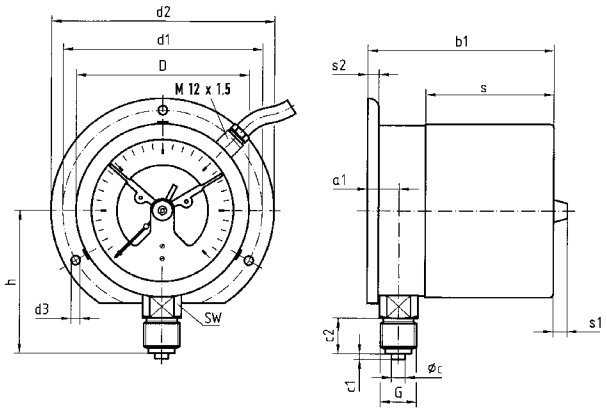
Bottom connection



Centre back connection



Bottom connection, back flange



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	D*	d1*	d2*	d3*	g	G	h	s	s1	s2	SW
63	9.5	13	66	69.5	5	2	13	64	75	85	3.6	89	G¼B	46	47.5	8	5.5	14

* Dimensions as per DIN 16063

Pressure gauges for industrial applications with electrical contacts

- Robust stainless steel housing
- Excellent readability
- Up to three contacts
- Available with MK, EK, IK

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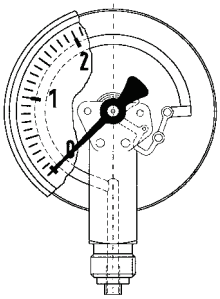


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/1,000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value

Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 103 for technical specifications.

Minimum ranges

Contact	
MK	single 1.6 bar
MK	double 1.6 bar
EK/IK	single 1 bar
EK/IK	double 1 bar

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
rising temperature approx. ±0.4 %/10 K
falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, bottom or bottom back
G½B – spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Cable gland M12 x 1.5
1 metre cable

Measuring element
Bourdon tube, ≤ 60 bar "C" type tube, copper alloy,
> 60 bar helical tube, 316 Ti/316 L

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet type bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Connector
- Special scales
- Other process connections

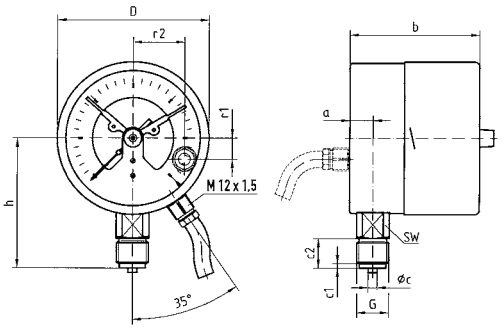
i
See page 116 for prices.

Pressure gauges for industrial applications with electrical contacts

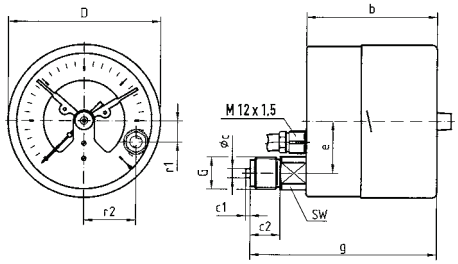
Type D 4 – NG 100

1 Housing types and dimensions

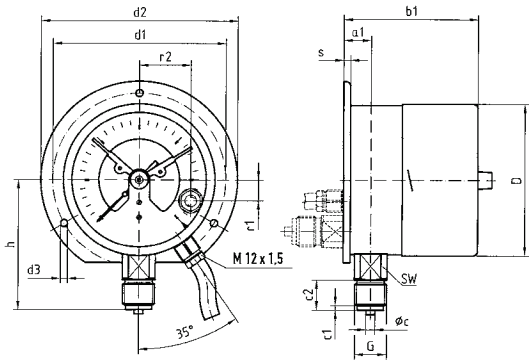
Bottom connection



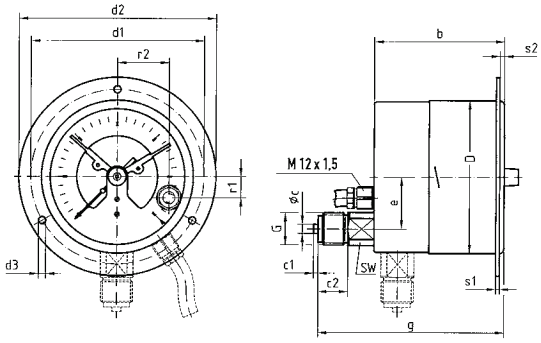
Centre back connection



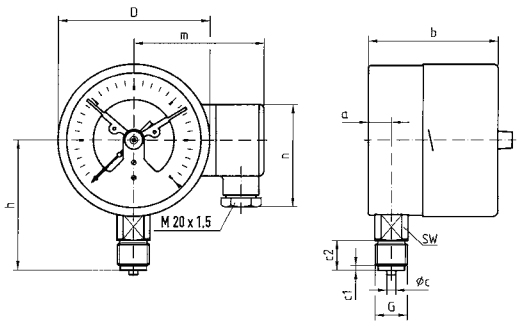
Bottom connection (centre back connection), back flange



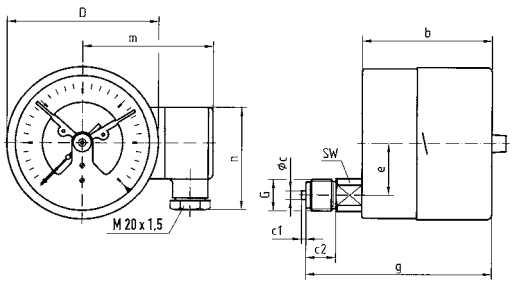
Centre back connection (bottom connection), 3-hole fixing, panel mounting bezel



Bottom connection, with junction box (option)



Centre back connection, with junction box (option)



Dimensions (mm)

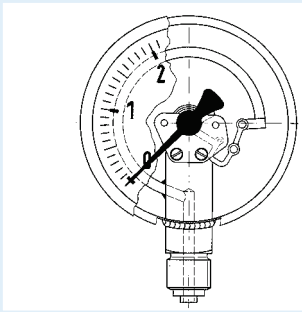
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	26.5	119	G½B	86	92	72	14	34.5	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	26.5	129	G½B	116	122	72	14	34.5	6	2

Nominal size (NG)	s2	SW
100	4	22
160	4	22

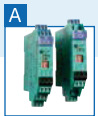
* Dimensions as per DIN 16064.

Bourdon tube pressure gauges for chemical applications with electrical contact

- Measuring system fully welded to housing
- Robust mechatronical pressure gauge
- Up to three contacts
- Tightness-tested with helium
- GOSSTANDART-certified



A 
Page 119

A 
Page 119

A 
Page 118

Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/1,000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value

Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = $^{2}/_{3}$ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 103 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1 bar
EK/IK double 1 bar

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
rising temperature approx. ±0.4 %/10 K
falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 L, bottom or bottom back, G½B- spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Junction box

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet type bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

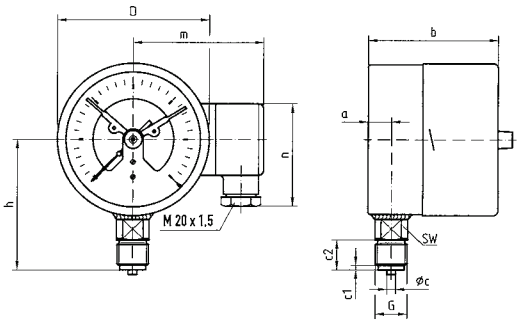
- Liquid filling (silicone oil)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Connector
- Special scales
- Other process connections

i See page 116 for prices.

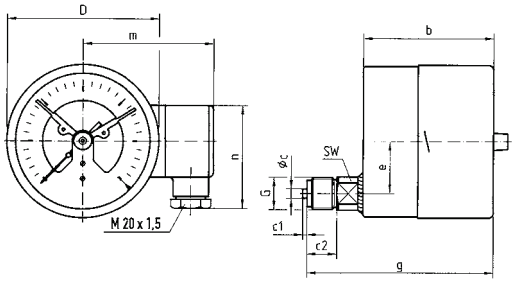
Bourdon tube pressure gauges with electrical contacts for chemical applications type D 4 – NG 100/160

1 Housing types and dimensions

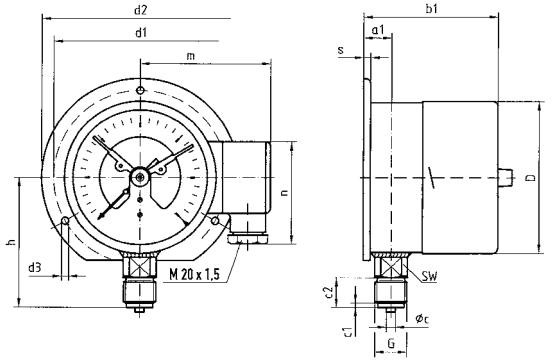
Bottom connection



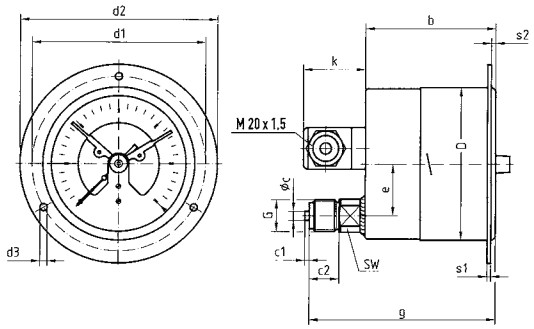
Centre back connection



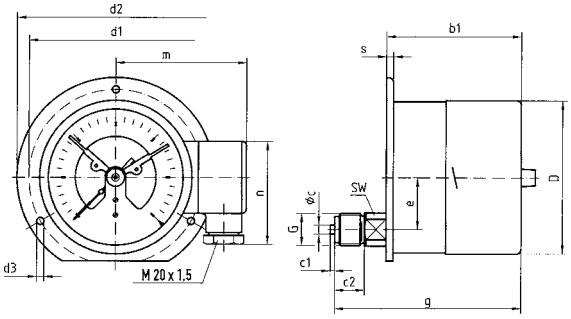
Bottom connection, back flange



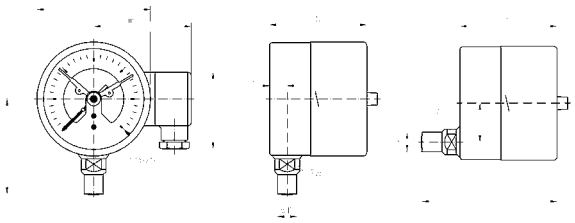
Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, back flange



Bottom connection, back for diaphragm seal mounting



Dimensions (mm)

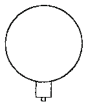
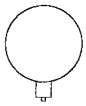
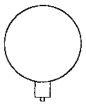
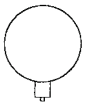
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	h1	k	m	n	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	34.5	121	G½B	86	83.5	40	92	72	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	34.5	131	G½B	116	116	40	122	72	6	2

Nominal size (NG)	S2	SW
100	4	22
160	4	22

* Dimensions as per DIN 16064.

Bourdon tube pressure gauges with electrical contacts

DG: M

Type	RF63MK1, D302	RF63MK2, D302	RF63IK1, D302	RF63IK2, D302
Version				
Housing Ø	63	63	63	63
Housing	Stainless steel 304 with push on bezel			
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L			
Accuracy class	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B
Contact type	Magnetic spring single	Magnetic spring double	Inductive, single	Inductive, double
PG	3	3	3	3
Range (bar)	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0	---	---	---	---
-1/+0.6	87402302	87502302	87452302	87552302
-1/+1.5	87403302	87503302	87453302	87553302
-1/+3	87404302	87504302	87454302	87554302
-1/+5	87405302	87505302	87455302	87555302
-1/+9	87406302	87506302	87456302	87556302
-1/+15	87407302	87507302	87457302	87557302
Price €				
0/0.6	---	---	---	---
0/1	---	---	---	---
0/1.6	87411302	87511302	87461302	87561302
0/2.5	87412302	87512302	87462302	87562302
0/4	87413302	87513302	87463302	87563302
0/6	87414302	87514302	87464302	87564302
0/10	87415302	87515302	87465302	87565302
0/16	87416302	87516302	87466302	87566302
0/25	87417302	87517302	87467302	87567302
0/40	87418302	87518302	87468302	87568302
Price €				
0/60	87419302	87519302	87469302	87569302
0/100	87420302	87520302	87470302	87570302
0/160	87421302	87521302	87471302	87571302
0/250	87422302	87522302	87472302	87572302
0/400	87423302	87523302	87473302	87573302
Price €				
0/600	87424302	87524302	87474302	87574302
0/1,000	---	---	---	---

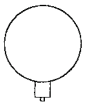
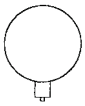
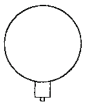
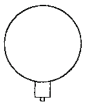
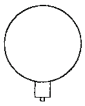
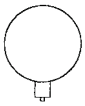
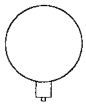
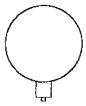
Blue part no. = in-stock items

Please specify required switching function (normally closed/normally open).
See page 117 for other versions.

Bourdon tube pressure gauges with electrical contacts

1

DG: M

Type	RF100l MK1, D401	RF100l MK2, D401	RF100l IK1, D401	RF100l IK2, D401	RF100Ch MK1, D402	RF100Ch MK2, D402	RF100Ch IK1, D402	RF100Ch IK2, D402
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Stainless steel 304 with bayonet bezel							
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)				Bourdon tube, stainless steel 316 Ti/316 L			
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
Contact type	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double
PG	2	2	2	2	3	3	3	3
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	---	---	87701401	87751401	---	---	87701402	87751402
-1/+0.6	87602401	87652401	87702401	87752401	87602402	87652402	87702402	87752402
-1/+1.5	87603401	87653401	87703401	87753401	87603402	87653402	87703402	87753402
-1/+3	87604401	87654401	87704401	87754401	87604402	87654402	87704402	87754402
-1/+5	87605401	87655401	87705401	87755401	87605402	87655402	87705402	87755402
-1/+9	87606401	87656401	87706401	87756401	87606402	87656402	87706402	87756402
-1/+15	87607401	87657401	87707401	87757401	87607402	87657402	87707402	87757402
Price €								
0/0.6	---	---	87709401	87759401	---	---	87709402	87759402
0/1	---	---	87710401	87760401	---	---	87710402	87760402
0/1.6	87611401	87661401	87711401	87761401	87611402	87661402	87711402	87761402
0/2.5	87612401	87662401	87712401	87762401	87612402	87662402	87712402	87762402
0/4	87613401	87663401	87713401	87763401	87613402	87663402	87713402	87763402
0/6	87614401	87664401	87714401	87764401	87614402	87664402	87714402	87764402
0/10	87615401	87665401	87715401	87765401	87615402	87665402	87715402	87765402
0/16	87616401	87666401	87716401	87766401	87616402	87666402	87716402	87766402
0/25	87617401	87667401	87717401	87767401	87617402	87667402	87717402	87767402
0/40	87618401	87668401	87718401	87768401	87618402	87668402	87718402	87768402
Price €								
0/60	87619401	87669401	87719401	87769401	87619402	87669402	87719402	87769402
0/100	87620401	87670401	87720401	87770401	87620402	87670402	87720402	87770402
0/160	87621401	87671401	87721401	87771401	87621402	87671402	87721402	87771402
0/250	87622401	87672401	87722401	87772401	87622402	87672402	87722402	87772402
0/400	87623401	87673401	87723401	87773401	87623402	87673402	87723402	87773402
Price €								
0/600	87624401	87674401	87724401	87774401	87624402	87674402	87724402	87774402
0/1,000	87625401	87675401	87725401	87775401	87625402	87675402	87725402	87775402

Blue part no. = in-stock items

i

Please specify required switching function (normally closed/ normally open). See page 117 for other versions.

Extra charges for electrical contacts

DG: M, PG: 3

Design			Magnetic spring contact			Inductive contact		
Code			MK 1	MK 2	MK 3	IK 1	IK 2	IK 3
Number of contacts			1	2	3	1	2	3
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)			1 2	11 , 12 21 , 22	As specified	1 2	11 , 12 21 , 22	As specified
The extra charges indicated include mounting; gauge not included								
Version	Nominal size	Housing	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Bourdon tube pressure gauges for industrial applications type D4 (only without filling)	100	No filling						
Pressure gauges for chemical applications type D4/D8	160	No filling						
Safety pressure gauges type D4/D8	100	With filling						
Stainless steel diaphragm pressure gauges type D4/D8 Diaphragm pressure gauges for differential pressure type MFW	160	With filling						
Standard diaphragm pressure gauges type D4/D8	100	No filling						
	160	No filling						
	100	With filling						
	160	With filling						
Diaphragm pressure gauges for chemical applications type D4/D8	100	No filling						
	160	No filling						
	100	With filling						
	160	With filling						

Blue part no. = in-stock items

DG: M, PG: 4

Extra charges for special versions		**NG 100**	**NG 160**
Electronic contact with 3-wire slot initiator (extra over and above magnetic spring contact)	1 contact (EK 1)		
	2 contacts (EK 2)		
	3 contacts (EK 3)		
Separate circuits for double magnetic spring contacts			
Separate circuits for triple magnetic spring contacts			
Cable NYLHY (more than 1 metre) per metre	Up to 4 wires		
	5 wires / 7 wires		
Junction box	for gauges without filling		
Additional cable for junction box, 1 m long			
Single changeover contact (extra charge over and above single magnetic spring contact) *			
Double changeover contact (extra charge over and above double magnetic spring contact) *			
Contact pins made of special material (per contact)	Gold-silver		
	Platinum-iridium		
Inductive contact, safety version (per contact) (can only be used in conjunction with isolating switching amplifier KHA6-SH-Ex!)	Type IK SN		
	Type IK S1N (NG 100 only 1 contact possible)		

* Also available for nominal size 63, enquire for price.

Blue part no. = in-stock items

i

Versions with 4 electrical contacts on request.