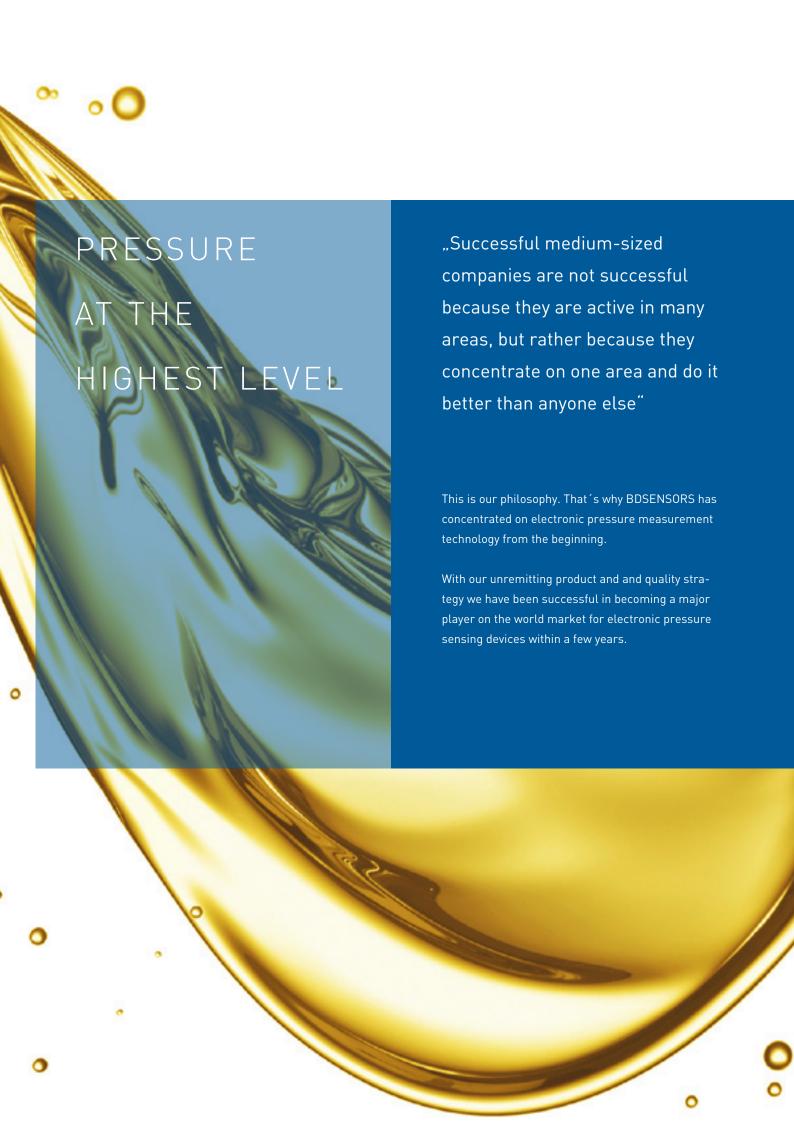
# PRODUCT CATALOGUE PRESSURE SWITCH









With 260 employees at 4 locations in Germany, the Czech Republic, Russia and China BD|SENSORS has solutions from 0.1 mbar to 6000 bar:

$\rightarrow$	pressure	sensors,	pressure	transducers
	pressure	transmitt	ters	

- → electronic pressure switches
- pressure measuring devices with display and switching outputs
- → hydrostatic level probes

Two pressure transmitters and a submersible probe, based on a stainless steel silicon sensor were the beginning. Today the range extends to more than 70 standard products, from economical OEM devices to high-end products with HART® communication or field bus interface.

In addition we have developed hundreds of customerspecific applications, underlining the competence and flexibility of BD|SENSORS. The excellent price/performance ratio of our products is proof of the fact that we are able to meet the toughest demand: Being a problem-solver for our customers.

INDEX	
PRESSURE SWITCH WITH DISPLAY	5-59
INDUSTRY	5-53
OEM	54-59
PRESSURE SWITCH WITHOUT DISPLAY	60-65

66

**4 ARGUMENTS** 

For large production batches as well as for small production numbers, no matter for what medium or external factors, with almost any mechanical or electrical connection - we solve your problem

flexibly, quickly and cost-efficiently.

	disp hou			cont	acts			pressu	re port			
	stainless steel ball housing	plastic	accuracy [FSO] <sup>1</sup>	1/2	1/2/4	nominal pressure [bar]	inch and NPT thraed	inch thread flush	dairy pipe	clamp	certificates	ebed
with display												
DS 400	•		0.35 %	•		0 100 up to 0 600	•				EX	5-9
DS 401	•		0.5 %	•		0 0.4 up to 0 600	•				EX	10-14
DS 200		•	0.35 %		•	0 0.1 up to 0 600	•				EX	15-19
DS 201		•	0.5 %		•	0 0.4 up to 0 600	•				EX	20-24
DS 202		•	0.5 %		•	0 6 up to 0 600	•				EX	25-29
DS 210		•	0.35 %		•	0 0.01 up to 0 1	•				EX	30-34
DS 214		•	0.5 %		•	0 600 up to 0 2200	•				EX	35-38
DS 400P	•		0.35 %	•		0 0.1 up to 0 40		•	•	•	EX, 3A	39-43
DS 200P		•	0.35 %		•	0 60 up to 0 400		•	•	•	EX, 3A	44-48
DS 201P		•	0.5 %		•	0 0.1 up to 0 40		•			EX	49-53
DS 217		•	0.5 %	•		0 6 up to 0 600	•					54-56
DS 230		•	1.5 %	•		0 2 up to 0 400	•					57-59
without display												
DS 4			2 %	•		0 1 up to 0 10	•					60-62
DS 6			1 %	•		0 2 up to 0 400	•					63-65

<sup>&</sup>lt;sup>1</sup> according to IEC 60770



# Intelligent Electronic Pressure Switch Stainless Steel

Stainless Steel Sensor

accuracy according to IEC 60770: standard: 0.35 % FSO option: 0.25 % FSO

## **Nominal pressure**

from 0 ... 100 mbar up to 0 ... 600 bar

#### **Contacts**

1 or 2 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

## **Optional versions**

- ► IS-versionEx ia = intrinsically safe for gases
- pressure sensor welded
- customer specific versions

The electronic pressure switch DS 400 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the DS 400 offers a PNP contact and a display module, which is mounted rotable in the ball housing. Additional optional versions like e.g. an intrinsically safe version, a second contact and an analogue output complete the profile.

## Preferred areas of use are



Plant and Machine Engineering



Heating and Air Conditioning



Environmental Engineering (water – sewage – recycling)

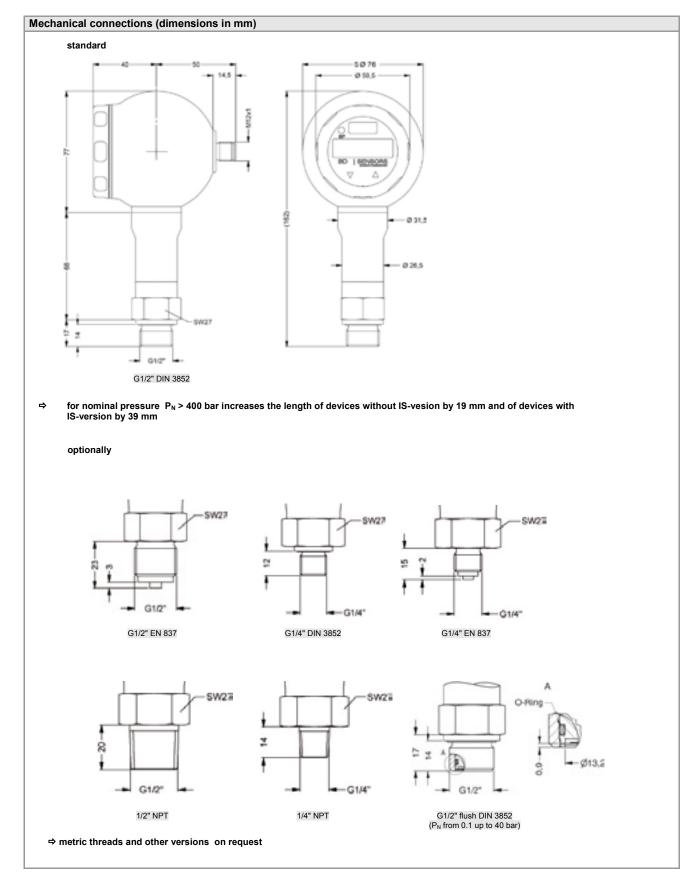




Input pressure range												
Nominal pressure	[bar]	-1 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
gauge / abs.		-1 0	0.10	0.10				'	1.0	2.5	4	
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50
Nominal pressure						l						
gauge / abs.	[bar]	10	16	25	40	60	100	160	250	400	600	
Overpressure	[bar]	40	80	80	105	210	210	600	1000	1000	1000	
Burst pressure	[bar]	50	120	120	210	420	420	1000	1250	1250	1250	
Vacuum resistance	[bui]			ted vacuu			120			n request		
		IN = ID	ar. uriiirii	ica vacat	1111 1031310	arioc		ı N	· i bai. o	Trequest	•	
Contact <sup>1</sup>												
Number, type		standard	d: 1 PNF	ontact			optio	on: 2 in	depende	nt PNP co	ontacts	
Max. switching current		4 20 r	nA / 2- a	nd 3-wire:	conta	ct rating 1	25 mA, s	hort-circu	it resistar	nt; V <sub>switch</sub> =	= V <sub>S</sub> – 2V	
_		0 10 \	/ / 3-wire	:		ct rating 5						
Accuracy of contacts 2		≤ ± 0.25	% FSO									
Repeatability		≤ ± 0.1 %	% FSO									
Switching frequency			nax. 10 l		/ 3-w	rire: 50 Hz	<u>.</u>					
Switching cycles		> 100 x	10 <sup>6</sup>									
Delay time		0 100										
with IS-protection max. 1 co.	ntact nossi											
Analogue output (option	· · ·											
	ialiy) / Su		/ . /	40 00								
2-wire current signal				= 13 36		) / 0 00 4	10				10	
0 1				$R_{\text{max}} = [()$		n) / U.U2 A	il 75		respons	se time: <	10 msec	
2-wire current signal with				= 13 28		\	•				. 40	
IS-protection				$R_{\text{max}} = [()$						se time: <	10 msec	
3-wire current signal				= 24 V <sub>DC</sub> =		djustable	(turn-dow	n of span				
				$R_{\text{max}} = 50$						se time: <	30 msec	
3-wire voltage signal		0 10 '	V / V <sub>S</sub> =	24 V <sub>DC</sub> ±	10 % adj	ustable (ti	ırn-down	of span 1	:5) <sup>3</sup>			
		permissi	ible load:	$R_{min} = 10$	kΩ				respons	se time: <	30 msec	
Without analogue output		V <sub>S</sub> = 15	36 V <sub>D</sub>									
Accuracy 2		standard	l: nomir	nal pressu	re < 0,4 l	bar: ≤ ± 0.	5 % FSO					
			nomir	nal pressu	re ≥ 0,4 l	oar: ≤ ± 0,	35 % FS	С				
$^3$ with turn-down of span the a	analogue sig	gnal is adju	stment (n	on-linearity	, hysteresi	oar: ≤±( s, repeatab neasuring r	oility)	80				
<sup>2</sup> accuracy according to IEC 6 <sup>3</sup> with turn-down of span the a <b>Thermal effects (Offset a</b> Nominal pressure P <sub>N</sub>	analogue sig	t point adju gnal is adju	stment (n	on-linearity matically to	, hysteresi	s, repeatab	oility)	80		2	0.40	
<sup>3</sup> with turn-down of span the a <b>Thermal effects (Offset a</b> Nominal pressure P <sub>N</sub>	analogue sig and Span	t point adju gnal is adju	stment (ne sted autor	on-linearity matically to	, hysteresi	s, repeatab	oility) ange	80			0.40 ± 0.75	
<sup>3</sup> with turn-down of span the a <b>Thermal effects (Offset a</b> Nominal pressure P <sub>N</sub>	analogue sig and Span [bar]	t point adju gnal is adju	stment (ne sted autor	on-linearity, matically to . 0 .75	, hysteresi	s, repeatab	ange	80		≤ :		
<sup>3</sup> with turn-down of span the a <b>Thermal effects (Offset a</b> Nominal pressure P <sub>N</sub> Tolerance band in compensated range	analogue sig and Span [bar] [% FSO] [°C]	t point adju gnal is adju	stment (no sted autor -1 ≤ ± 0	on-linearity, matically to . 0 .75	, hysteresi	s, repeatab	ange < 0.40 ≤ ± 1	60		≤ :	± 0.75	
with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperature	analogue sig and Span [bar] [% FSO] [°C]	t point adju gnal is adju )	stment (no sted autor -1 ≤ ± 0 -20	on-linearity matically to . 0 .75	hysteresi the new n	s, repeatab neasuring r	oility) ange < 0.40 ≤ ± 1 0 70		35 °C s	≤ : -20	± 0.75 ) 85	C.
<sup>3</sup> with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures	analogue sig and Span [bar] [% FSO] [°C]	t point adju gnal is adju	stment (no sted autor -1 ≤ ± 0 -20	on-linearity matically to . 0 .75	hysteresi the new n	s, repeatab	oility) ange < 0.40 ≤ ± 1 0 70		35 °C s	≤ : -20	± 0.75	C
<sup>3</sup> with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Electrical protection	analogue sig and Span [bar] [% FSO] [°C]	point adju gnal is adju ) medium:	stment (no sted autor -1 ≤ ± 0 -20	on-linearity matically to . 0 .75	hysteresi the new n	s, repeatab neasuring r	oility) ange < 0.40 ≤ ± 1 0 70		35°C s	≤ : -20	± 0.75 ) 85	С
Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Electrical protection	analogue sig and Span [bar] [% FSO] [°C]	medium:	stment (no sted autor -1 ≤ ± 0 -20 : -40 1	on-linearity, matically to . 0 .75 .85	hysteresi the new n	s, repeatab neasuring r	oility) ange < 0.40 ≤ ± 1 0 70		35°C s	≤ : -20	± 0.75 ) 85	C
Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Electrical protection Reverse polarity protection	analogue sig and Span [bar] [% FSO] [°C] es	medium:	-1 ≤ ± 0 -20 -40 1	on-linearity, matically to . 0 .75 .85 .25 °C	hysteresi the new n	s, repeatab neasuring r nics / env	illity) ange  < 0.40 ≤ ± 1 0 70  ironment		35°C s	≤ : -20	± 0.75 ) 85	C
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<sup>3</sup> with turn-down of span the a <b>Thermal effects (Offset a</b> Nominal pressure P <sub>N</sub> Tolerance band	analogue sigand Span [bar] [bar] [% FSO] [°C] es	medium: permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate standard option: stainless pressure according to	stment (no sted autor  -1  ≤ ± 0  -20  -40 1  ent age, but a an and imm  IS (25  steel 1  d safety  IS steel 1  port, se steel 1  port, se o EN 837;  / 2-wire)  6 ATEX	on-linearity, matically to 0.75.85.85.25 °C. also no furmunity acc 2000 Hz) 4404 (316.	electron electron according to	s, repeatable reasuring ressure ressure re	idity) ange  < $0.40$ $\leq \pm 1$ $0 \dots 70$ ironment  ironment  welded v	068-2-6 068-2-27 ersion <sup>4</sup> c	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
3 with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatib Mechanical stability Vibration Shock Materials Pressure port Housing Viewing glass Seals (media wetted) Diaphragm Media wetted parts 4 welded version only for pres Explosion protection (or Approval AX14-DS 400	analogue sigand Span [bar] [bar] [% FSO] [°C] es	medium: permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate standard option: stainless pressure according to Zone 0:	stment (no sted autor  -1  ≤ ± 0  -20  -40 1  ent age, but an and imm  as steel 1  sted 1  d safety  ls FKM  NBR;  steel 1  port, see	on-linearity, matically to 0.0.75.85.25 °C. also no fur munity acc 2000 Hz) 4404 (316.4404 (316.4404 (316.4405 (316.	electron electron according to	s, repeatable reasuring resure resource rector) / II	idity) ange  < 0.40 $\leq \pm 1$ 0 70 ironment  if 6  N EN 600 N EN 600  welded v  anges $P_N \leq$	-40 8	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatib Mechanical stability Vibration Shock Materials Pressure port Housing Viewing glass Seals (media wetted)  Diaphragm Media wetted parts welded version only for press Explosion protection (or Approval AX14-DS 400)	analogue sigand Span [bar] [bar] [% FSO] [°C] es	medium: permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate standard option: stainless pressure according to Zone 0: U <sub>i</sub> = 28 \	stment (no sted autor  -1  ≤ ± 0  -20  -40 1  ent age, but an and imm  as steel 1  sted 1  d safety  ls FKM  NBR;  steel 1  port, see	on-linearity, matically to 0.75.85.85.25 °C. also no furmunity acc 2000 Hz) 4404 (316.	electron electron according to	s, repeatable reasuring resure resource rector) / II	idity) ange  < 0.40 $\leq \pm 1$ 0 70 ironment  66  N EN 600 N EN 600  welded v	-40 8	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
³ with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatib Mechanical stability Vibration Shock Materials Pressure port Housing Viewing glass Seals (media wetted) Diaphragm Media wetted parts ⁴ welded version only for pres Explosion protection (or Approval AX14-DS 400 Safety techn. maximum va Max. switching current ⁵  Tolerance P <sub>N</sub>	analogue sigand Span [bar] [bar] [% FSO] [°C] es  in bility  assure ports anly for 4.	medium:  permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate stainless pressure according to Zone 0: U <sub>i</sub> = 28 \ 70 mA	stment (no sted autor -1 ≤ ± 0 -20  -40 1  ent age, but a and imr  sted alimn  sted autor  -1  -20  -20  -40 1  ent age, but a and imr  sted alimn  sted 1	on-linearity, matically to 0.0.75.85.25 °C.  also no fununity acc 2000 Hz)  4404 (316 glass.4435 (316 als, diaph possible for 1050 X ia IIC T4 mA, P <sub>i</sub> = 6	electron electron according to	s, repeatable specified in the second of th	idity) ange  < 0.40 $\leq \pm 1$ 0 70  ironment  ironment  ironment  iron  iro	-40 8	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
3 with turn-down of span the a Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatib Mechanical stability Vibration Shock Materials Pressure port Housing Viewing glass Seals (media wetted) Diaphragm Media wetted parts 4 welded version only for pres Explosion protection (or Approval AX14-DS 400 Safety techn. maximum va Max. switching current 5 Permissible temperatures	analogue sigand Span [bar] [bar] [% FSO] [°C] es  in bility  assure ports anly for 4.	medium:  permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate stainless pressure according to Zone 0: U <sub>i</sub> = 28 \ 70 mA in zone 0	stment (no sted autor -1 ≤ ± 0 -20  1 -40 1  ent age, but a and imm and i	on-linearity, matically to 0.0.75.85.25 °C.  also no fununity acc 2000 Hz)  4404 (316.	electron electron according to	s, repeatable specified in the second of th	idity) ange  < 0.40 $\leq \pm 1$ 0 70  ironment  ironment  ironment  iron  iro	-40 8	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Persure polarity protection Shock Materials Pressure port Housing Viewing glass Seals (media wetted) Diaphragm Media wetted parts Welded version only for pres Explosion protection (or Approval AX14-DS 400 Safety techn. maximum va Max. switching current 5 Permissible temperatures Permissible temperatures Permissible temperatures	analogue sigand Span [bar] [bar] [% FSO] [°C] es  In Span Span Span Span Span Span Span Spa	medium:  permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate standard option: stainless pressure according te 20 mA IBExU 0 Zone 0: U <sub>i</sub> = 28 \ 70 mA in zone 0 in zone 0	stment (no sted autor -1 ≤ ± 0 -20  -40 1  ent age, but a and imm	on-linearity, matically to 0.0.75.85.25 °C.  also no furnunity acc. 2000 Hz)  4404 (316.4404 (31	electron ele	s, repeatable specified in the pressure received by the pressure recei	idity) ange  < 0.40 $\leq \pm 1$ 0 70  ironment  ironmen	ersion <sup>4</sup> c	on reques	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	
Thermal effects (Offset a Nominal pressure P <sub>N</sub> Tolerance band in compensated range Permissible temperatures Permissible temperatures Permissible temperatures Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatib Mechanical stability Vibration Shock Materials Pressure port Housing Viewing glass Seals (media wetted) Diaphragm Media wetted parts  *welded version only for pres Explosion protection (or Approval AX14-DS 400  Safety techn. maximum va Max. switching current 5	analogue sigand Span [bar] [bar] [% FSO] [°C] es  anilogue signed	medium: permane no dama emissior  10 g RM 500 g / 1  stainless stainless laminate standard option: stainless pressure according te. Zone 0: U <sub>i</sub> = 28 \ 70 mA in zone 0: in zone 0: cable ca cable inc	stment (no sted autori -1 ≤ ± 0 -20  -40 1  ent age, but an and imr  IS (25 msec  steel 1 d safety I: FKM NBR; s steel 1 e port, se o EN 837; / 2-wire) 6 ATEX II 1G Ex /, I, = 93  D: -20 pacitance ductance	on-linearity, matically to  0  75  85  25 °C  also no fundamentity according	electro electro accor accor sL) sL) sL) sL) sL) sL) sL) sLi line/shiel	s, repeatable specified in the second of th	idity) ange  < 0.40 $\leq \pm 1$ 0 70  ironment  ironmen	ersion <sup>4</sup> c  40 bar  IIB T4 Ga	on reques a (cable)	≤ : -20 torage: -4	± 0.75 ) 85 0 100 °	

Miscellaneous	
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Current consumption	2-wire signal output current: max. 25 mA
(without contacts)	3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA
Ingress protection	IP 67
Installation position	any <sup>6</sup>
Weight	approx. 400 g
Operational life	> 100 x 10 <sup>6</sup> cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) 7
deviation in the zero point for pressure	ertical position with the pressure connection down. If this position is changed on installation there can be slight ranges $P_N \pm 1$ bar. with maximum permissible overpressure > 200 bar
Wiring diagrams	
2-wire-system (current)  p supply + supply - contact 1 contact 2	3-wire-system (current / voltage)  p
Pin configuration	
Electrical connection	M12x1 metal (5-pin)
Supply + Supply – Signal + (only 3-wire) Contact 1 Contact 2	1 3 2 4 5
Shield	plug housing / pressure port
<b>Electrical connection (dimension</b>	s in mm)
M12x1 (5-pin)	
Designs <sup>8</sup>	
side display	45° display (on request)

<sup>8</sup> all designs in horizontal rotatable housing as standard



This price list contains product specifications; properties are not guaranteed. Subject to change without notice.

DS 400	<u> </u>	]-∐-	□-□-	· 🗆 - 🗆	<u> </u>	- 🔲	]-[]	- 🔲	]
Pressure gauge 1	7 A 0								
absolute	7 A 0 7 A 1				ш				
Input [bar] 0.10		0							
0.16 0.25	1 6 0 2 5 0	0							
0.40	4 0 0	0							
0.60 1.0	6 0 0 1 0 0	0 1							
1.6 2.5	1 6 0 2 5 0	1							
4.0	4 0 0	1							
6.0 10	6 0 0 1 0 0	1 2							
16 25	1 6 0 2 5 0	2 2							
40	4 0 0	2							
60 100	6 0 0 1 0 0	2 3							
160 250	1 6 0	3							
400	4 0 0	3							
600 -1 0	6 0 0 X 1 0	3							
customer	X 1 0 9 9 9	2 9			ш				consult
Design Stainless steel globe housing		кн							
(side display) Stainless steel globe housing									
(45° display)		K 4							consult
Analogue output without			0						
4 20 mA / 2-wire 0 10 V / 3-wire, adjustable			1 3						
4 20 mA / 3-wire, adjustable Intrinsic safety 4 20 mA / 2-wire <sup>2</sup>			3 7 E						
customer			9						consult
Contact 1 contact		_	1						
2 contacts <sup>2</sup> Accuracy			2		ш				
standard for P <sub>N</sub> ≥ 0.4 bar 0.35 %				3					
standard for $P_N < 0.4$ bar 0.5 % option 1 for $P_N \ge 0.4$ bar 0.25 %				5					
customer Electrical connection				9					consult
Male plug M12x1 (5-pin) /				N	1 1				
metal version customer					9 9				consult
Mechanical connection G1/2" DIN 3852						1 0 0			
G1/2" EN 837						2 0 0			
G1/4" DIN 3852 G1/4" EN 837						2 0 0			
G1/2" DIN 3852 with flush sensor <sup>3</sup>						F 0 0			
1/2" NPT						N 0 (			
1/4" NPT customer						N 0 0 N 4 0 9 9 9	9		consult
Seals FKM							1		
without (welded version) 4							2		consult
NBR customer							5 9		consult
Special version standard								0 0 0	
customer								0 0 0	consult

<sup>&</sup>lt;sup>1</sup> from 60 bar: measurement starts with ambient pressure

This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

<sup>&</sup>lt;sup>2</sup> with Ex version max. 1 contact is possible

with LA Version max. For that is possible 3 only possible for nominal pressure ranges  $P_N \le 40$  bar 4 welded version only with pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \le 40$  bar 4 welded version only with pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \le 40$  bar 4 bar 4 bar 4 bar 5 only with pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \le 40$  bar 4 bar 4 bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 5 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 6 only with pressure ranges  $P_N \le 40$  bar 7 only with pressure ranges  $P_N \le 40$  bar 7 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 8 only with pressure ranges  $P_N \le 40$  bar 9 only with pressure ranges  $P_N \le 40$  bar 9 only with pressure ranges  $P_N \le 40$  bar 9 only with pressure r



# Intelligent Electronic Pressure Switch Stainless Steel

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

## **Nominal pressure**

from 0 ... 400 mbar up to 600 bar

#### **Contacts**

1 or 2 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4  $\dots$  20 mA  $\,/\,$  0  $\dots$  10 V

others on request

#### Special characteristics

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

## **Optional versions**

- ► IS-versionEx ia = intrinsically safe for gases
- pressure port PVDF
- customer specific versions

The electronic pressure switch DS 401 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for universal usage in industry applications; with flush diaphragm the DS 401 is suitable for the usage in viscous, pasty or highly contaminated media. The rotatable stainless steel housing is predestined for rough conditions and difficult installing conditions, caused by the high functionality and robustness. As standard the DS 401 offers a PNP contact and is optionally available with a second, independent contact. Additionally the DS 401 could be equipped with an analogue output

## Preferred areas of use are



Plant and Machine Engineering



Environmental Engineering (water – sewage – recycling)



Water



Hydraulic Oil



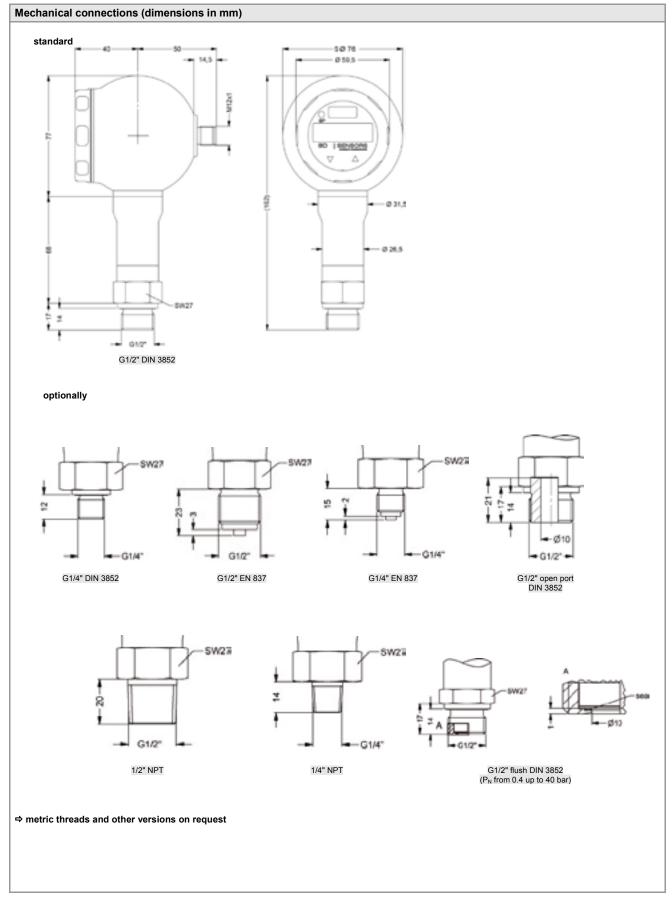


Input pressure ranges																			
Nominal pressure gau	ıge [bar]	-10	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs	s. [bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Level gauge	[mH <sub>2</sub> O]	-	4	6	10	16	25	40	60	100	160	250	400	600	-	-	-	-	-
Overpressure	[bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥	[bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880
Vacuum resistance		P <sub>N</sub> ≥ 1	bar: ι	nlimit	ed va	cuum	resis	tance	)										
		$P_N < 1$	bar: o	on req	uest														

Contact <sup>1</sup>	
Number, type	standard: 1 PNP contact
	option: 2 independent PNP contacts
Max. switching current	4 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V <sub>Switch</sub> = V <sub>S</sub> - 2V contact rating 500 mA, short-circuit resistant
Accuracy of contacts 2	≤ ± 0.5 % FSO
Repeatability	≤±0.2 % FSO
Switching frequency	2-wire: max. 10 Hz / 3-wire: 50 Hz
Switching cycles	> 100 x 10 <sup>6</sup>
Delay time	0 100 sec
with Ex-protection max. 1 contact page 2 accuracy according to IEC 60770 -	possible - limit point adjustment (non-linearity, hysteresis, repeatability)
Analogue output (optionally)	
2-wire current signal	4 20 mA / V <sub>S</sub> = 13 36 V <sub>DC</sub>
2 Wild Gallotte digital	permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
2-wire current signal,	$4 20 \text{ mA} / V_s = 13 28 V_{DC}$
Ex-protection	permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
3-wire current signal	$4 \dots 20 \text{ mA} / V_S = 24 \text{ V}_{DC} \pm 10 \%$ adjustable (turn-down of span 1:5) $^3$
	permissible load: $R_{max}$ = 500 $\Omega$ response time: < 30 msec
3-wire voltage signal	$0 \dots 10 \text{ V} / \text{V}_{\text{S}} = 24 \text{ V}_{\text{DC}} \pm 10 \%$ adjustable (turn-down of span 1:5) $^3$
	permissible load: $R_{min}$ = 10 k $\Omega$ response time: < 30 msec
Without analogue output	V <sub>S</sub> = 15 36 V <sub>DC</sub>
Accuracy <sup>2</sup>	≤ ± 0.5 % FSO
<sup>3</sup> with turn-down of span the analogu	ue signal is adjusted automatically to the new measuring range
Thermal effects (Offset and S	pan) / Permissible temperatures
Thermal error	≤±0.2 % FSO / 10 K
in compensated range	-25 85 °C
Permissible temperatures	medium: -40 125 °C
	electronics / environment: -40 85 °C
4-	storage: -40 100 °C
<u> </u>	mum permissible temperature is -30 °C
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Materials	
Pressure port / housing	1.4404 (316L)
· · ·	PVDF (for P <sub>N</sub> ≤ 60 bar, G1/2" open port )
Housing	1.4404 (316L)
Display housing	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals	standard: FKM option: EPDM ( $P_N \le 160$ bar), NBR others on request
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %
Media wetted parts	pressure port, seals, diaphragm

Explosion protection (only for 4.	20 mA / 2-wire)							
Approval AX14-DS 401	IBExU06ATEX1050 X   zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)							
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C \approx 0 \text{ nF}, L_i \approx 0  \mu\text{H}$							
Max. switching current <sup>5</sup>	70 mA							
Permissible temperatures for	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar							
environment	in zone 1: -25 70 °C							
Connecting cables	cable capacitance: signal line/shield also signal line: 100 pF/m							
(by factory)	cable inductance: signal line/shield also signal line/signal line: 1 µH/m							
<sup>5</sup> the real switching current in the applica	ation depends on the power supply unit							
Miscellaneous								
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)							
Option oxygen application <sup>6</sup>	for $P_N \le 15$ bar: O-ring in 70 EPDM 281 (with BAM-approval); permissible maximum values are 15 bar / 60° C and 10 bar / 90° C for $P_N \le 25$ bar: O-ring in FKM Vi 567 (with BAM-approval); permissible maximum values are 25 bar / 150° C							
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA							
Ingress protection	IP 67							
Installation position	any							
Weight	approx. 400 g							
Operational life	> 100 x 10 <sup>6</sup> pressure cycles							
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) <sup>7</sup>							
<sup>6</sup> not possible with flush pressure ports	vith maximum permissible overpressure > 200 bar							
Wiring diagrams	101 Hamilan politica de 101 proceso 200 au							
2-wire-system (current)	3-wire-system (current / voltage)							
p supply +  supply -  contact 1  contact 2	$V_S = \begin{array}{ c c c c } \hline p & & & & & & & & & \\ & & & & & & & & &$							
Pin configuration								
Electrical connections	M12x1 metal (5-pin)							
Supply +	1							
Supply – Signal + (only 3-wire) Contact 1 Contact 2	3 2 4 5							
Shield	plug housing / pressure port							
Electrical connections (dimension	ns in mm)							
M12x1 (5-pin)								
Design <sup>8</sup>								
side display	45° display (on request)							

<sup>8</sup> all designs in horizontal rotatable housing as standard



DS 401		-[	П		-[	Ц	-[	- <u> </u>	]-[	]-[	Ц		-[	П	]-	-[	- <u> </u>	<b> </b> -[	]-[		Ц	
Pressure gauge	7 A 2																					
gauge in mH₂O absolute	7 A 2 7 A E 7 A 3																					
Input [mH <sub>2</sub> O] [bar] 4 0.4		4	0 0	0																		
6 0.6 10 1.0		6 1	0 0	0																		
16 1.6 25 2.5		1	6 C																			
40 4.0 60 6.0		4 6	0 0	1																		
100 10 160 16		1 1	0 0	2																		
250 25 400 40		2	5 0			Н																
600 60 100		6	0 0	2																		
160 250		1 2	6 0			П															П	
400 600		4	0 0	3																		
-1 0		X 9	1 0	2																		consult
Design		9	9   8	ופו																		Consuit
Stainless steel globe housing (side display)					K	Н																
Stainless steel globe housing (45° display)					K	4									_						Ш	consult
Analogue output without							0								Т					Т	П	
4 20 mA / 2-wire 0 10 V / 3-wire, adjustable							1															
4 20 mA / 3-wire, adjustable Intrinsic safety 4 20 mA / 2-wire <sup>1</sup>							7 E															
Contact							9															consult
1 contact 2 contacts 1								1 2														
Accuracy 0.5 %		•	•	•	•	۰	•	-	5				•	Н	т		_			۳	Н	
customer Electrical connection									9						÷					H		consult
Male plug M12x1 (5-pin) / metal version										N												
customer  Mechanical connection										9	9	9										consult
G1/2" DIN 3852 G1/2" EN 837													1	0	0							
G1/4" DIN 3852 G1/4" EN 837													3	0	0							
G1/2" DIN 3852 with flush sensor <sup>2</sup>													F		0							
G1/2" DIN 3852 open pressure port 1/2" NPT													H	0	0							
1/4" NPT customer													N	0 1 0 1 4 9	0						П	consult
Seals FKM														101		1						Coriodit
EPDM <sup>3</sup> NBR																3						
customer								_	_	_						5 9					П	consult
Pressure port Stainless steel 1.4404 (316L) PVDF <sup>4</sup>																	1				П	
customer																	9 9				Ш	consult
Diaphragm  Ceramics Al <sub>2</sub> O <sub>3</sub> 96%																		2				
Special version																		9				consult
standard oxygen application <sup>5</sup>																			(	0 0 0	0 7	
customer																			(	9	9	consult

<sup>&</sup>lt;sup>1</sup> with Ex version max. 1 contact is possible

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<sup>\*</sup> with EX Version max. I contact is possible

2 G1/2" flush up to 25 bar and nominal pressure abs. on request

3 possible for nominal pressure ranges P<sub>N</sub> ≤ 160 bar

4 PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar); Ex-protection not possible, (min. permissible temperature -30°C)

5 oxygen application with FKM-seal up to 25 bar or with EPDM-seal up to 15 bar possible



## **Electronic Pressure Switch**

Stainless Steel Sensor

accuracy according to IEC 60770: standard: 0.35 % FSO option: 0.25 % FSO

## **Nominal pressure**

from 0 ... 100 mbar up to 0 ... 600 bar

## **Contacts**

1, 2 or 4 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

#### **Optional versions**

- IS-versionEx ia = intrinsically safe for gases
- pressure sensor welded
- customer specific versions

The electronic pressure switch DS 200 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the DS 200 offers a PNP contact and a rotatable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

#### Preferred areas of use are



Plant and Machine Engineering



Heating and Air Conditioning



Environmental Engineering (water – sewage – recycling)





Input pressure range

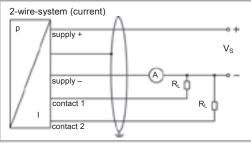
Input pressure range											
Nominal pressure [ba	ar] -10	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
gauge <sup>1</sup> / abs. Level gauge <sup>1</sup> [mH <sub>2</sub> :	01 -	1	1.6	2.5	4	6	10	16	25	40	60
Overpressure [hings		0.5	1.0	1	2	5	5	10	10	20	40
Burst pressure ≥ [ba		1.5	1.5	1.5	3	7.5	7.5	15	15	25	50
Durot pressure = [be	r.o	1.0	1.0	1.0		1.0	1.0	10	10	20	
Nominal pressure gauge <sup>1</sup> / abs. [b	ar] 10	16	25	40	60	100	160	250	400	600	
Level gauge <sup>1</sup> [mH <sub>2</sub> 0	D] 100	160	250	400	600	-	-	-	-	-	
Overpressure [ba	ar] 40	80	80	105	210	210	600	1000	1000	1000	
Burst pressure ≥ [ba	ar] 50	120	120	210	420	420	1000	1250	1250	1250	
Vacuum resistance			ted vacuu	m resista	nce; P <sub>N</sub> <	1 bar: on	request				
<sup>1</sup> from 60 bar: measurement starts w	ith ambient pr	essure									
Contact <sup>2</sup>											
Standard	1 PNP o	contact									
Options			NP contac	ts							
•			NP contac	ts (pos:	sible with 10 V/3-wir	e on requ	est)		•		
Max. switching current	0 10	V / 3-wire		cont	act rating	500 mA, s	short-circu	uit resista		= V <sub>S</sub> − 2V	
Accuracy of contacts <sup>3</sup>	standar option:	P <sub>N</sub>	< 0.4 bar: ≥ 0.4 bar:			P <sub>N</sub> ≥	0.4 bar: :	≤ ± 0.35 %	% FSO		
Repeatability	≤ ± 0.1										
Switching frequency	max. 10										
Switching cycles	> 100 x										
Delay time	0 100										
<sup>2</sup> max. 1 contact for 2-wire current signo contact possible with 3-wire in co	gnal with plug ombination wi	ISO 4400 a th plug ISC	as well as 2 0 4400	?-wire curre	ent signal w	rith IS-prote	ction				
Analogue output (optionally) /											
2-wire current signal			= 13 36 R <sub>max</sub> = [(V		) / 0 02 A1	0			response	time: < 10	0 msec
2-wire current signal with			= 13 28		, , o.o <u>-</u> , ,				. соросс		
IS-protection			$R_{max} = [(V_{max} + V_{max} + V_$		) / 0.02 A]	Ω			response	time: < 10	0 msec
3-wire current signal	4 20	$mA / V_S =$	= 19 30 R <sub>max</sub> = 50	V <sub>DC</sub> adjus	stable (tur	n-down of	span 1:5	) 4	response	time: < 3	sec
3-wire voltage signal	0 10	V / V <sub>S</sub> =	15 36 V		permissibl	e load: R	<sub>nin</sub> = 10 kΩ	2	response	time: < 3	msec
without analogue output		36 V <sub>DC</sub>									
Accuracy <sup>3</sup>	option:	$P_N \ge 0$	0.4 bar: ≤ 0.4 bar: ≤	± 0.25 %	FSO		0.4 bar: ≤	± 0.35 %	6FSO		
<ul> <li>accuracy according to IEC 60770 -</li> <li>with turn-down of span the analogu</li> </ul>	- limit point ad ie signal is ad	justment (n justed auto	non-linearity matically to	r, hysteresi the new n	is, repeatab neasuring r	oility) ange					
Thermal effects (Offset and Sp											
Nominal pressure P <sub>N</sub> [ba		-1				< 0.40				0.40	
Tolerance band [% FS0		≤ ± 0				≤ ± 1				£ 0.75	
in compensated range [°C	C]	-20	. 85			0 70			-20	85	
Permissible temperatures											
Permissible temperatures	medium	1: -40 1:	25 °C	electron	ics / envir	onment: -	40 85	°C	storage	e: -40 1	00 °C
Electrical protection											
Short-circuit protection	perman										
Reverse polarity protection			lso no fur								
Electromagnetic compatibility	emissio	n and imn	nunity acc	ording to	EN 61326	6					
Mechanical stability											
Vibration	10 g RN	/IS (25	2000 Hz)	accord	ding to DII	N EN 600	68-2-6				
Shock	500 g /	1 msec		accord	ding to DII	N EN 600	68-2-27				
Materials											
Pressure port	stainles	s steel 1.4	1404 (316	L)							
Housing			1404 (316								
Display housing	_	polycarbo		,							
				option:	NRR: W	elded ver	sion <sup>5</sup>	othe	ers on requ	ıest	
	standar	d. EKM					J. J. I	Otile			
Seals (media wetted)	standar		1435 (316		INDIX, W	0.000					
Seals (media wetted) Diaphragm Media wetted parts	stainles	s steel 1.4	1435 (316 als, diaphi	L)	TABIT, W						

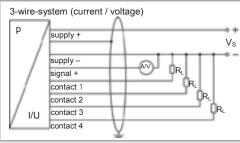
Explosion protection (only for	4 20 mA / 2-wire)
Approval AX14-DS 200	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i$ = 28 V, $I_i$ = 93 mA, $P_i$ = 660 mW, $C \approx 0$ nF, $L_i \approx 0$ $\mu H$
Max. switching current <sup>6</sup>	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 70 °C
Connecting cables	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m
(by factory)	cable inductance: signal line/shield also signal line: 1 μH/m
the real switching current in the app	plication depends on the power supply unit
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Current consumption	2-wire signal output current: max. 25 mA
(without contacts)	3-wire signal output current: approx. 45 mA + signal current
	3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any <sup>7</sup>
Weight	min. 160 g (depending on mechanical connection)
Operational life	> 100 x 10 <sup>6</sup> cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) <sup>8</sup>
7	

<sup>&</sup>lt;sup>7</sup> Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be deviation in the zero point for pressure ranges  $P_N \le 1$  bar.

§ This directive is only valid for devices with maximum permissible overpressure > 200 bar

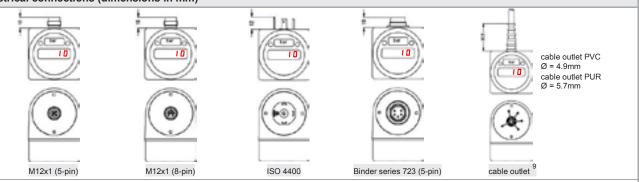
## Wiring diagrams



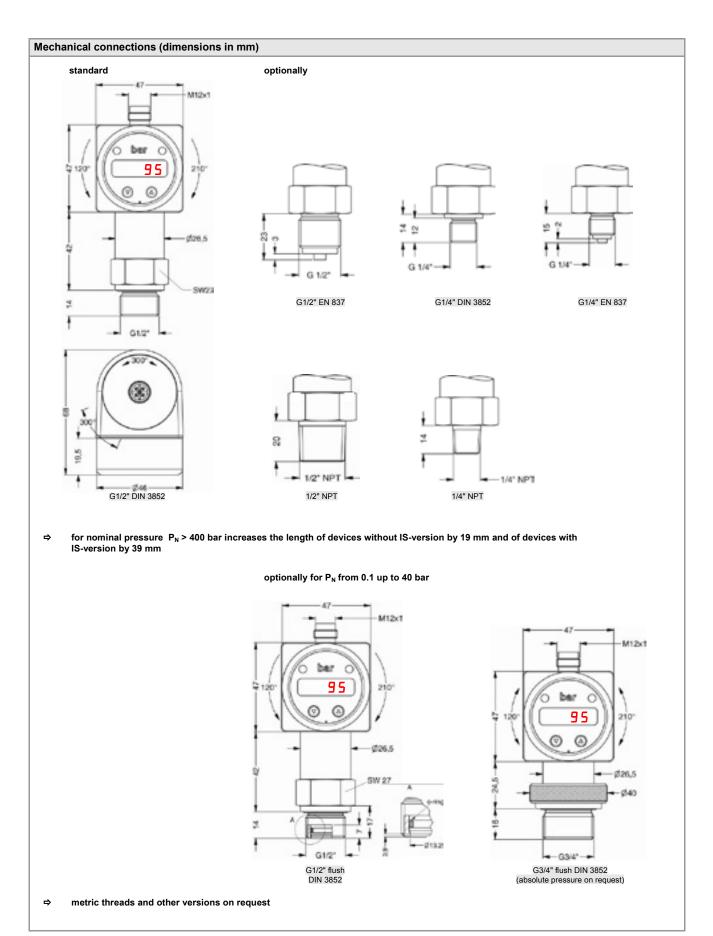


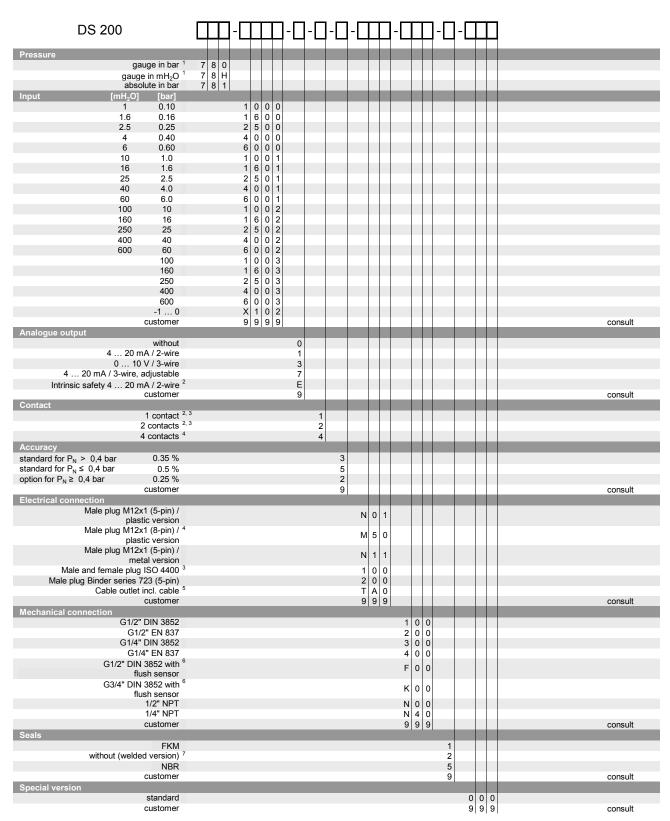
Pin configuration						
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gy (grey)
Contact 2	5	5	5	-	1	pk (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	ye/gn (yellow/green)

## Electrical connections (dimensions in mm)



<sup>&</sup>lt;sup>9</sup> different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)





<sup>&</sup>lt;sup>1</sup> from 60 bar: measurement starts with ambient pressure

This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

with Ex version max. 1 contact is possible

<sup>&</sup>lt;sup>3</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

<sup>&</sup>lt;sup>4</sup> 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

standard: 2 m PVC cable without ventilation tube, others on request

 $<sup>^{6}</sup>$  not possible for nominal pressure  $P_{N} > 40$  bar; also not possible for vacuum ranges; for G3/4" flush nominal pressure abs. on request

 $<sup>^{7}</sup>$  welded version only with pressure ports according to EN 837; possible for nominal pressure ranges  $P_N \le 40$  bar



## **Electronic Pressure Switch**

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

## **Nominal pressure**

from 0 ... 400 mbar up to 0 ... 600 bar

## Contacts

1, 2 or 4 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

## **Optional versions**

- ► IS-version
  Ex ia = intrinsically safe for gases
- pressure port PVDF
- customer specific versions

The electronic pressure switch DS 201 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for universal usage in industry applications. The DS 201 is available with flush pressure ports for viscous, pasty and highly contaminated media.

As standard the DS 201 offers a PNP contact and a rotable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

## Preferred areas of use are



Plant and Machine Engineering



Environmental Engineering (water – sewage – recycling)

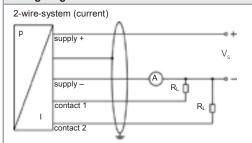


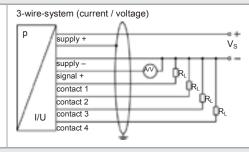


Input pressure range 1	Input pressure range <sup>1</sup>																		
Nominal pressure gauge	e [bar]	-10	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs.	[bar]	-	-	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Level gauge	[mH <sub>2</sub> O]	-	- 4 6 10 16 25 40 60 100 160 250 400 600									-							
Overpressure	[bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥	[bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880
Vacuum resistance		P <sub>N</sub> ≥ 1	bar: u	nlimit	ed va	cuum	resis	tance											
P <sub>N</sub> < 1 bar: on request																			
<sup>1</sup> PVDF pressure port poss	ible for no	minal pre	essure	ranges	s up to	60 ba	r												

Contact <sup>2</sup>			
Standard	1 PNP contact		
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1 0 10 V/3-wire on request)	, 8-pin for 4 20 mA/3-wire	;
Max. switching current		mA, short-circuit resistant; V mA, short-circuit resistant	V <sub>Switch</sub> = V <sub>S</sub> - 2V
Accuracy of contacts 3	≤ ± 0.5 % FSO		
Repeatability	≤±0.2 % FSO		
Switching frequency	max. 10 Hz		
Switching cycles	> 100 x 10 <sup>6</sup>		
Delay time	0 100 sec		
<sup>2</sup> max. 1 contact for 2-wire current s no contact possible with 3-wire in c	ignal with plug ISO 4400 as well as 2-wire current signal with combination with plug ISO 4400	h IS-protection	
Analogue output (optionally)	/ Supply		
2-wire current signal	4 20 mA / V <sub>S</sub> = 13 36 V <sub>DC</sub>		
	permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$	respons	se time: < 10 msec
2-wire current signal with	4 20 mA / V <sub>S</sub> = 13 28 V <sub>DC</sub>		
IS-protection	permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$		e time: < 10 msec
3-wire current signal	4 20 mA / $V_S$ = 19 30 $V_{DC}$ adjustable (turn-dc	own of span 1:5) <sup>4</sup>	
	permissible load: $R_{max} = 500 \Omega$		e time: < 0,5 sec
3-wire voltage signal	$0 \dots 10 \text{ V} / \text{V}_{\text{S}} = 15 \dots 36 \text{ V}_{\text{DC}}$ permissible load:	$R_{min} = 10 \text{ k}\Omega$ respons	e time: < 10 msec
Without analogue output	V <sub>S</sub> = 15 36 V <sub>DC</sub>		
Accuracy 3	≤ ± 0.5 % FSO		
<ul> <li>accuracy according to IEC 60770</li> <li>with turn-down of span the analog</li> </ul>	<ul> <li>limit point adjustment (non-linearity, hysteresis, repeatabili ue signal is adjusted automatically to the new measuring rar</li> </ul>	ity) nge	
Thermal effects (Offset and S	pan) / Permissible temperatures		
Thermal error	≤ ± 0.2 % FSO / 10 K		
in compensated range	-25 85 °C		
Permissible temperatures <sup>5</sup>	medium: -40 125 °C electronics / environment: -40 85 °C storage: -40 100 °C		
<sup>5</sup> for pressure port of PVDF the mini	mum permissible temperature is -30 °C		
Electrical protection			
Short-circuit protection	permanent		
Reverse polarity protection	no damage, but also no function		
Electromagnetic compatibility	emission and immunity according to EN 61326		
Mechanical stability			
Vibration	10 g RMS (25 2000 Hz) according to DIN	EN 60068-2-6	
Shock	500 g / 1 msec according to DIN	EN 60068-2-27	
Materials			
Pressure port / housing		pressure port	housing
, J	Standard: Option for G1/2" open port (up to 60 bar): Options for G3/4" flush (0.6 bar $\leq$ P <sub>N</sub> $\leq$ 25 bar):	stainless steel 1.4404 PVDF PVDF	stainless steel 1.4404 stainless steel 1.4404 PVDF
Display housing	PA 6.6, polycarbonate		
Seals (media wetted)	standard: FKM option: EPDM ( $P_N \le 160$ bar), NBR others on request		
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %		
Media wetted parts	pressure port, seals, diaphragm		

Explosion protection (only for	4 20 MA / 2-wire)
Approval AX14-DS 201	IBExU 06 ATEX 1050 X
	zone 1: Il 2G Ex ia IIC T4 Gb (connector) / Il 2G Ex ia IIB T4 Gb (cable)
Safety tech. maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C \approx 0 \text{ nF}, L_i \approx 0  \mu\text{H}$
Max. switching current <sup>6</sup>	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-20 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
the real switching current in the app	lication depends on the power supply unit
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Option oxygen application <sup>7</sup>	for P <sub>N</sub> ≤ 15 bar: O-ring in 70 EPDM 281 (with BAM-approval); permissible maximum values are 15 bar / 60° C and 10 bar / 90° C for P <sub>N</sub> ≤ 25 bar: O-ring in FKM Vi 567 (with BAM-approval); permissible maximum values are 25 bar / 150° C
Current consumption	2-wire signal output current: max. 25 mA
(without contacts)	3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	approx. 200 g
Operational life	> 100 x 10 <sup>6</sup> cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) 8
<sup>7</sup> not possible with flush pressure por <sup>8</sup> This directive is only valid for device	ts es with maximum permissible overpressure > 200 bar
Wiring diagrams	

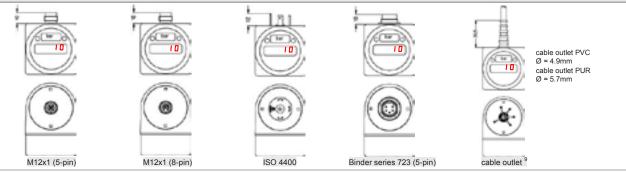




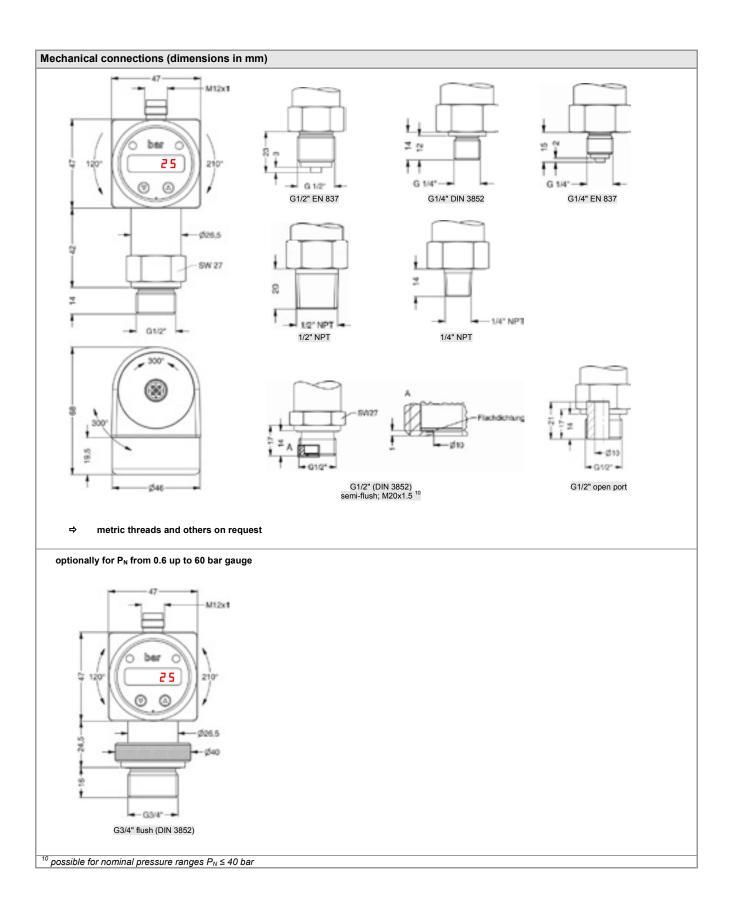
Pin	configuration
	comingulation

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gy (grey)
Contact 2	5	5	5	-	1	pk (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure	plug housing/	via pressure	ground con-	plug housing/	ye/gn
Silield	port	pressure port	port	tact	pressure port	(yellow/green)

## Electrical connections (dimensions in mm)



<sup>&</sup>lt;sup>9</sup> different cable types and lengths available, permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)



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## Ordering Code

DS 201			-П-Г	1-	-	П-		٦.	-□-	П-	П-Г		]
Pressure													
gauge in bar gauge in mH₂O	7 8 2 7 8 E												
absolute in bar	7 8 3												
Input [mH <sub>2</sub> O] [bar] 4 0.4		4 0 0 0			_	_		т					
6 0.6		6 0 0 0				П							
10 1.0 16 1.6		1 0 0 1											
25 2.5 40 4.0		1 6 0 1 2 5 0 1 4 0 0 1											
60 6.0		6 0 0 1											
100 10 160 16		1 0 0 2 1 6 0 2											
250 25		2 5 0 2				П							
400 40 600 60		4 0 0 2 6 0 0 2											
100		1 0 0 3 1 6 0 3											
160 250		1 0 0 3 1 6 0 3 2 5 0 3 4 0 0 3											
400 600		4 0 0 3				Ш							
-1 0		6 0 0 3 X 1 0 2 9 9 9 9											
Analogue output customer		9 9 9 9			_	ш	_	4			_		consult
without			0					T					
4 20 mA / 2-wire 0 10 V / 3-wire			1 3										
4 20 mA / 3-wire, adjustable			7			П						ш	
Intrinsic safety 4 20 mA / 2-wire 1 customer			9										consult
Contact 1 contact 1,	2												
2 contacts 1,	2		1 2 4										
4 contacts <sup>3</sup> Accuracy			4			_							
O.5 %				5 9	_			т					
customer Electrical connection				9	_								consult
Male plug M12x1 (5-pin) /				_	N 0	1	-	Т					
plastic version Male plug M12x1 (8-pin) / 3					M 5								
plastic version Male plug M12x1 (5-pin) /													
metal version					N 1								
Male and female plug ISO 4400 <sup>2</sup> Male plug Binder series 723 (5-pin)					1 0	0							
Cable outlet incl. cable <sup>4</sup>					T A	0		I					
Mechanical connection		_	-	-	9 9	9		÷					consult
G1/2" DIN 3852 G1/2" EN 837							1 0 2 0	0					
G1/2 EN 837 G1/4" DIN 3852							3 0	0					
G1/4" EN 837 G1/2" DIN 3852 with <sup>5</sup>							4 0						
flush sensor							F 0	0					
G3/4" DIN 3852 with <sup>6</sup> flush sensor							K 0	0					
G1/2" DIN 3852 open pressure port							H 0	0					
1/2" NPT 1/4" NPT							H 0 N 0 N 4 9 9	0					
customer							9 9	9					consult
Seals FKM _									1				
EPDM <sup>7</sup> NBR									3				
customer									5 9				consult
Pressure port Stainless steel 1.4404 (316L)										1			
PVDF <sup>8</sup>										B 9			
Diaphragm customer										9			consult
Ceramics Al <sub>2</sub> O <sub>3</sub> 96%											2 9		
Special version customer											9		consult
standard											0	0 0 0 7	
oxygen application <sup>9</sup>											0	0   7	

<sup>1</sup> with Ex version max.1 contact possible

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with Laversion max. 1 contact possible 2 with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible 3 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request 4 standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request

standard: 2 in PVC cable without ventilation tube (permissible temperature:  $5 \dots 70^{\circ}$  C), others on request

5 possible for nominal pressure ranges  $P_N \ge 0.6$  bar up to  $P_N \le 50$  bar gauge, absolute on request

6 possible for nominal pressure ranges  $P_N \ge 0.6$  bar up to  $P_N \le 60$  bar gauge

7 possible for nominal pressure ranges  $P_N \ge 160$  bar

8 PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar) and G3/4" DIN 3852 with flush sensor (0.6 bar  $\le P_N \le 25$  bar), (min. permissible temperature -30°C)

9 oxygen application with FKM-seal up to 25 bar or with EPDM-seal up to 15 bar possible, flush version on request



## **Electronic Pressure Switch**

welded, dry Stainless Steel Sensor

accuracy according to IEC 60770: 0.5 % FSO

## **Nominal pressure**

from 0 ... 6 bar up to 0 ... 600 bar

#### **Contacts**

1, 2 or 4 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

## **Optional versions**

- IS-versionEx ia = intrinsically safe for gases
- oxygen application
- customer specific versions

The electronic pressure switch DS 202 is the successful combination of

- robust pressure transmitter
- digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the DS 202 offers a PNP contact and a rotable display module with 4-digit LED display. The transmitters are suitable for an unrestricted use in oxygen applications up to 600 bar and an intrinsically safe IS-Version.

## Preferred areas of use are



Medical Technology



Plant and Machine Engineering



Refrigeration



Oxygen application





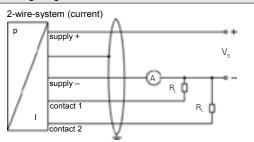
Input pressure range												
Nominal pressure gauge	[bar]	6	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	14	35	35	70	140	140	350	350	700	1200	1200
Burst pressure ≥	[bar]	35	85	85	175	350	350	850	850	1750	2800	2800
Vacuum resistance		unlimited										

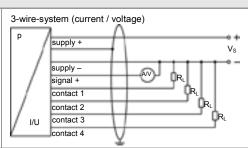
option: 2 independent PNP contacts 4 independent PNP contacts 4 independent PNP contacts 4 independent PNP contacts 4 independent PNP contacts (possible with M12x1 8-pin for 4 20 mA / 3-wire)  Max. switching current 4 20 mA / 2 - and 3-wire: contact rating 125 mA, short-circuit resistant; V <sub>worn</sub> = V <sub>S</sub> − 2V 0 10V / 3-wire: contact rating 500 mA, short-circuit resistant; V <sub>worn</sub> = V <sub>S</sub> − 2V 0 10V / 3-wire: contact rating 500 mA, short-circuit resistant; V <sub>worn</sub> = V <sub>S</sub> − 2V 0 100 sec 1 100	Contact <sup>1</sup>	
Q 10 V / 3-wire   contact rating 500 mA, short-circuit resistant	Number, type	option: 2 independent PNP contacts 4 independent PNP contacts
Repeatability	Max. switching current	
Switching frequency	Accuracy of contacts 2	≤±0.5 % FSO
Switching cycles	Repeatability	≤ ± 0.1 % FSO
Delay time		
"with 15-protection max. 1 contact possible           Analogue output (optionally) / Supply           2-wrier current signal         4 20 mA / $V_S = 13$ 36 $V_{DC}$ permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] Ω$ response time: < 10 msec		
Analogue output (optionally) / Supply  2-wire current signal  420 mA / $V_S = 13$ 36 $V_{CD}$ permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec  2-wire current signal with  420 mA / $V_S = 13$ 28 $V_{CD}$ permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec  3-wire current signal  420 mA / $V_S = 19$ 30 $V_{CD}$ permissible load: $R_{max} = 500 \text{ k}\Omega$ 3-wire voltage signal  010 V / $V_S = 15$ 36 $V_{CD}$ permissible load: $R_{max} = 500 \text{ k}\Omega$ without analogue output $V_S = 15$ 36 $V_{CD}$ permissible load: $R_{min} = 10 \text{ k}\Omega$ without analogue output $V_S = 15$ 36 $V_{CD}$ permissible load: $R_{min} = 10 \text{ k}\Omega$ without analogue signal a signal line/signal line : 160 pF/m  A connecting to Ethica in the signal line/signal line : 160 pF/m  A connecting to Ethica in the signal line signal line/signal line : 160 pF/m		1 1111
	with IS-protection max. 1 contact po	ssible
permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω	Analogue output (optionally) /	· · ·
IS-protection   permissible load: $R_{max} =   (N_{2} - V_{S min}) / 0.02 A] \Omega$ response time: < 10 msect 3-wire current signal   4 20 mA $V_{S} = 19 30 V_{DC}$ permissible load: $R_{max} = 500 \text{ k}\Omega$ adjustable (turn-down of span up to 1:5) \(^{3}\) 3-wire voltage signal   0 $10 V / V_{S} = 15 36 V_{DC}$ permissible load: $R_{min} = 10 \text{ k}\Omega$ without analogue output   $V_{S} = 15 36 V_{DC}$ permissible load: $R_{min} = 10 \text{ k}\Omega$   $V_{S} = 15 36 V_{DC}$   $V_{S} = 15 36 V_{$	2-wire current signal	permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal  4 20 mA / V <sub>s</sub> = 19 30 V <sub>DC</sub> adjustable (turn-down of span up to 1:5) 3 3-wire voltage signal  0 10 V / V <sub>s</sub> = 15 36 V <sub>DC</sub> permissible load: R <sub>min</sub> = 10 kΩ without analogue output  V <sub>s</sub> = 15 36 V <sub>DC</sub> secureacy 2  ≤ ± 0.5 % FSO  3-excuracy 3 3-wint voltage signal  1		
adjustable (turn-down of span up to 1:5) $^3$		
without analogue output  Accuracy 2 ≤ ± 0.5 % FSO  *accuracy according to IEC 60770 - Immt point adjustment (non-linearity, hysteresis, repeatability) *with turn-down of span the analogue signal is adjusted automatically to the new measuring range  Thermal effects (Offset and Span)  Thermal error	3-wire current signal	adjustable (turn-down of span up to 1:5) <sup>3</sup>
Accuracy scording to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability) suith turn-down of span the analogue signal is adjusted automatically to the new measuring range  Thermal effects (Offset and Span)  Thermal error ± 0.3 % FSO / 10 K in compensated range 0 70 °C  Permissible temperatures  Permissible temperatures    medium:		
* accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) **with turn-down of span the analogue signal is adjusted automatically to the new measuring range  Thermal effects (Offset and Span)  Thermal error	without analogue output	
*with turn-down of span the analogue signal is adjusted automatically to the new measuring range  Thermal effects (Offset and Span)  Thermal error	Accuracy <sup>2</sup>	
Thermal error	with turn-down of span the analogue	signal is adjusted automatically to the new measuring range
in compensated range 0 70 °C  Permissible temperatures  Permissible temperatures  medium: electronics / environment: -40 125 °C electronics / environment: -40 85 °C storage: -40 100 °C  Electrical protection  Short-circuit protection permanent Reverse polarity protection no damage, but also no function  Electromagnetic compatibility emission and immunity according to EN 61326  Mechanical stability  Vibration 10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6  Shock 500 g / 1 msec according to DIN EN 60068-2-7  Materials  Pressure port stainless steel 1.4571 (316 Ti)  Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBEXU 66 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment cable inchesing all line/shield also signal line/signal line: 160 pF/m	Thermal effects (Offset and Sp	an)
Permissible temperatures  Permissible temperatures  medium: -40 125 °C electronics / environment: -40 85 °C storage: -40 100 °C  Electrical protection  Short-circuit protection permanent Reverse polarity protection no damage, but also no function Electromagnetic compatibility emission and immunity according to EN 61326  Mechanical stability  Vibration 10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6 Shock 500 g / 1 msec according to DIN EN 60068-2-7  Materials  Pressure port stainless steel 1.4571 (316 Ti) Housing stainless steel 1.4404 (316 L) Display housing PA 6.6, polycarbonate Seals (media wetted) none (welded) Diaphragm stainless steel 1.4542 (17-4PH) Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBEXU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current 4 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment conduction of the connection of the production of the productivity: 4.7 mH)  Permissible temperatures for environment conduction of the production of th		
Permissible temperatures       medium: 40 125 °C electronics / environment: 40 85 °C storage: 40 100 °C         Electrical protection       permanent         Short-circuit protection       permanent         Reverse polarity protection       no damage, but also no function         Electromagnetic compatibility       emission and immunity according to EN 61326         Mechanical stability       with a coording to DIN EN 60068-2-6         Shock       500 g / 1 msec       according to DIN EN 60068-2-6         Shock       500 g / 1 msec       according to DIN EN 60068-2-27         Materials       Pressure port       stainless steel 1.4571 (316 Ti)         Housing       stainless steel 1.4404 (316 L)         Display housing       PA 6.6, polycarbonate         Seals (media wetted)       none (welded)         Diaphragm       stainless steel 1.4542 (17-4PH)         Media wetted parts       pressure port, diaphragm         Explosion protection (only for 4 20 mA / 2-wire)         Approval AX14-DS 202       IBEXU 06 ATEX 1050 X Zone 1: Il 2G Ex ia IlC T4 Gb (connector) / Il 2G Ex ia IlB T4 Gb (cable)         Safety technical maximum values       U <sub>1</sub> = 28 V <sub>1</sub> I <sub>1</sub> = 93 mA, P <sub>1</sub> = 660 mW, C <sub>1</sub> ≈ 0 nF, L <sub>1</sub> ≈ 0 μH         Max. switching current <sup>4</sup> 70 mA (max. permissible inductivity: 4.7 mH)         Permissible temperatures for enviro	in compensated range	0 70 °C
electronics / environment: _40 85 °C _ storage:40 100 °C  Electrical protection  Short-circuit protection	Permissible temperatures	
Short-circuit protectionpermanentReverse polarity protectionno damage, but also no functionElectromagnetic compatibilityemission and immunity according to EN 61326Mechanical stabilityVibration10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6Shock500 g / 1 msec according to DIN EN 60068-2-27MaterialsPressure portstainless steel 1.4571 (316 Ti)Housingstainless steel 1.4404 (316 L)Display housingPA 6.6, polycarbonateSeals (media wetted)none (welded)Diaphragmstainless steel 1.4542 (17-4PH)Media wetted partspressure port, diaphragmExplosion protection (only for 4 20 mA / 2-wire)Approval AX14-DS 202IBEXU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)Safety technical maximum valuesU₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μHMax. switching current 470 mA (max. permissible inductivity: 4.7 mH)Permissible temperatures for environment-20 70 °CConnecting cables (by factory)cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	Permissible temperatures	electronics / environment: -40 85 °C
Reverse polarity protection no damage, but also no function  Electromagnetic compatibility emission and immunity according to EN 61326  Mechanical stability  Vibration 10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6  Shock 500 g / 1 msec according to DIN EN 60068-2-27  Materials  Pressure port stainless steel 1.4571 (316 Ti)  Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBEXU 06 ATEX 1050 X  Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current 4 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment  Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	Electrical protection	
Reverse polarity protection no damage, but also no function  Electromagnetic compatibility emission and immunity according to EN 61326  Mechanical stability  Vibration 10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6  Shock 500 g / 1 msec according to DIN EN 60068-2-27  Materials  Pressure port stainless steel 1.4571 (316 Ti)  Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBEXU 06 ATEX 1050 X  Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current 4 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment  Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	Short-circuit protection	permanent
Electromagnetic compatibility emission and immunity according to EN 61326  Mechanical stability  Vibration 10 g RMS (25 2000 Hz) according to DIN EN 60068-2-6 Shock 500 g / 1 msec according to DIN EN 60068-2-7  Materials  Pressure port stainless steel 1.4571 (316 Ti) Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBExU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current 4 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment  Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	•	
Mechanical stabilityVibration10 g RMS (25 2000 Hz)according to DIN EN 60068-2-6Shock500 g / 1 msecaccording to DIN EN 60068-2-27MaterialsPressure portstainless steel 1.4571 (316 Ti)Housingstainless steel 1.4404 (316 L)Display housingPA 6.6, polycarbonateSeals (media wetted)none (welded)Diaphragmstainless steel 1.4542 (17-4PH)Media wetted partspressure port, diaphragmExplosion protection (only for 4 20 mA / 2-wire)Approval AX14-DS 202IBEXU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)Safety technical maximum valuesU <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 0 μHMax. switching current 470 mA (max. permissible inductivity: 4.7 mH)Permissible temperatures for environment-20 70 °CConnecting cables (by factory)cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	<u> </u>	
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Shock 500 g / 1 msec according to DIN EN 60068-2-27  Materials  Pressure port stainless steel 1.4571 (316 Ti)  Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBEXU 06 ATEX 1050 X  Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 0 $\mu$ H  Max. switching current 4 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment -20 70 °C  Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	<u> </u>	10 a PMS (25 2000 Hz) according to DIN EN 60068-2-6
Materials         Pressure port       stainless steel 1.4571 (316 Ti)         Housing       stainless steel 1.4404 (316 L)         Display housing       PA 6.6, polycarbonate         Seals (media wetted)       none (welded)         Diaphragm       stainless steel 1.4542 (17-4PH)         Media wetted parts       pressure port, diaphragm         Explosion protection (only for 4 20 mA / 2-wire)         Approval AX14-DS 202       IBEXU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)         Safety technical maximum values       U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH         Max. switching current 4       70 mA (max. permissible inductivity: 4.7 mH)         Permissible temperatures for environment       -20 70 °C         Connecting cables (by factory)       cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		
Pressure port stainless steel 1.4571 (316 Ti) Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBExU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H}$ Max. switching current $V_i = 0.0000000000000000000000000000000000$		300 g / Thisec according to bit Liv 00000-2-27
Housing stainless steel 1.4404 (316 L)  Display housing PA 6.6, polycarbonate  Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBExU 06 ATEX 1050 X  Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values  Max. switching current $^4$ 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment  Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		atainless atacl 1.4571 (216 Ti)
Display housing       PA 6.6, polycarbonate         Seals (media wetted)       none (welded)         Diaphragm       stainless steel 1.4542 (17-4PH)         Media wetted parts       pressure port, diaphragm         Explosion protection (only for 4 20 mA / 2-wire)         Approval AX14-DS 202       IBExU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)         Safety technical maximum values       U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH         Max. switching current 4       70 mA (max. permissible inductivity: 4.7 mH)         Permissible temperatures for environment       -20 70 °C         Connecting cables (by factory)       cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		
Seals (media wetted) none (welded)  Diaphragm stainless steel 1.4542 (17-4PH)  Media wetted parts pressure port, diaphragm  Explosion protection (only for 4 20 mA / 2-wire)  Approval AX14-DS 202 IBExU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H}$ Max. switching current $V_i = 28 \text{ V}, V_i = 93 \text{ mA}, V_i = 93 $		
Diaphragmstainless steel 1.4542 (17-4PH)Media wetted partspressure port, diaphragmExplosion protection (only for 4 20 mA / 2-wire)Approval AX14-DS 202IBEXU 06 ATEX 1050 X Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H}$ Max. switching current 470 mA (max. permissible inductivity: 4.7 mH)Permissible temperatures for environment-20 70 °CConnecting cables (by factory)cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		
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Approval AX14-DS 202   IBExU 06 ATEX 1050 X   Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)   Safety technical maximum values   U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> $\approx$ 0 nF, L <sub>i</sub> $\approx$ 0 $\mu$ H   Max. switching current $^4$   70 mA (max. permissible inductivity: 4.7 mH)   Permissible temperatures for environment   -20 70 °C   Connecting cables (by factory)   cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	<u> </u>	· · · · · · · · · · · · · · · · · · ·
Zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H}$ Max. switching current <sup>4</sup> 70 mA (max. permissible inductivity: 4.7 mH)  Permissible temperatures for environment  -20 70 °C  Connecting cables (by factory)  cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		
values  Value	Approval AX14-DS 202	
Permissible temperatures for environment  -20 70 °C  connecting cables (by factory)  cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	values	$U_i$ = 28 V, $I_i$ = 93 mA, $P_i$ = 660 mW, $C_i \approx 0$ nF, $L_i \approx 0$ $\mu H$
Permissible temperatures for environment  -20 70 °C  connecting cables (by factory)  cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	Max. switching current 4	70 mA (max. permissible inductivity: 4.7 mH)
Connecting cables (by factory) cable capacitance: signal line/shield also signal line/signal line: 160 pF/m	Permissible temperatures for	-20 70 °C
odolo inductario. Olginal informicia dico dignal informicia inform		cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m

Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, digit width 4.85 mm (angle 10°); range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	min. 160 g (depending on mechanical connection)
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) <sup>5</sup>

<sup>&</sup>lt;sup>5</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

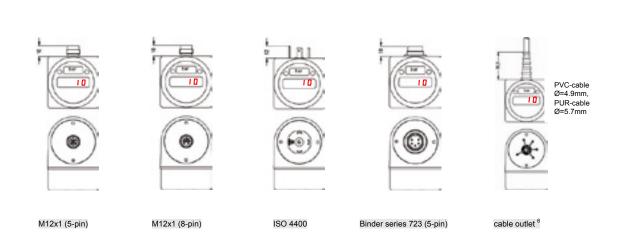
## Wiring diagrams



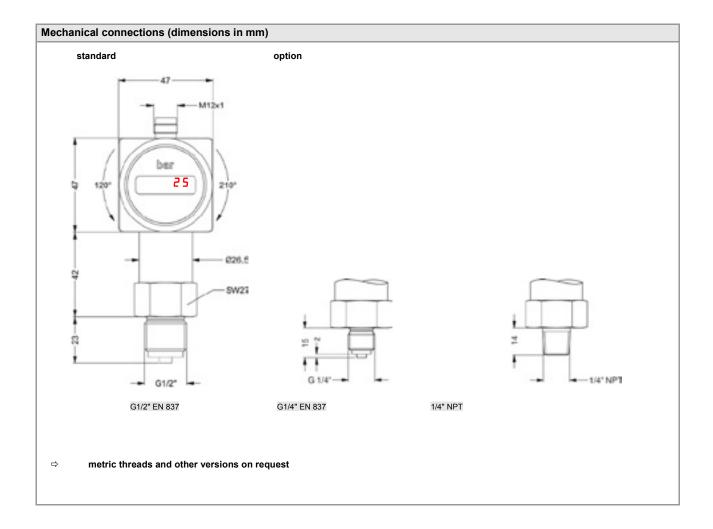


Pin configuration					
Electrical connection	M12x1 plastic	M12x1 metal	M12x1 plastic	ISO 4400	cable colours
Electrical connection	(5-pin)	(5-pin)	(8-pin)	130 4400	(DIN 47100)
Supply +	1	1	1	1	wh (white)
Supply –	3	3	3	2	bn (brown)
Signal + (only 3-wire)	2	2	2	3	gn (green)
Contact 1	4	4	4	3	gy (grey)
Contact 2	5	5	5	-	pk (pink)
Contact 3	-	-	6	-	-
Contact 4	-	-	7	-	-
Shield	via pressure	plug housing /	via pressure	ground contact	ye/gn
Silleiu	port	pressure port	port	ground contact	(vellow/green)

## Electrical connections (dimensions in mm)



<sup>&</sup>lt;sup>6</sup> different cable types and lengths available, permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)



DS 202	Ш-[	-		- 🗆 - l		□-[	П	-	-[		]
Pressure											
gauge in bar <sup>1</sup> Input [bar]	7 8 4				_	_	-		-		
6.0	6	0 0 1									
10	1	0 0 2 6 0 2 5 0 2									
16	1	0 0 2 6 0 2 5 0 2 0 0 2 0 0 2 0 0 3									
25	2	5 0 2									
40	4	0 0 2									
60 100	6	0 0 2 0 3									
160	1	6 0 3									
250	2	6 0 3 5 0 3 0 0 3									
400	4	0 0 3									
600	6	0 0 3 9 9									
customer	9	9 9 9									consult
Analogue output											
without			0								
4 20 mA / 2-wire			1								
0 10 V / 3-wire 4 20 mA / 3-wire			7								
Intrinsic safety 4 20 mA / 2-wire <sup>2</sup>			E								
customer			9								consult
Contact											
1 contact <sup>2</sup>			1								
2 contacts			2								
4 contacts			4								
Accuracy											
standard 0.5 % customer				5 9							consult
Electrical connection				9							Consuit
Male plug M12x1 (5-pin) /				_		4			_		
plastic version					N 0	1					
Male plug M12x1 (8-pin) / 3					M 5	0					
plastic version						•					
Male plug M12x1 (5-pin) / metal version					N 1	1					
Male and female plug ISO 4400 <sup>4</sup>					1 0	0					
Male plug Binder series 723 (5-pin)					2 0	0					
Cable outlet incl. cable 5					T A 9 9	0					
customer					9 9	9					consult
Mechanical connection											
G1/2" EN 837							2 0 0				
G1/4" EN 837 1/4" NPT							4 0 0 N 4 0				
customer							N 4 0 9 9 9				consult
Seals							01019				Consult
without (welded version)								2			
customer								9			consult
Special version											
standard									0	0 0	
oxygen application									0	0	7
customer									9	9 9	consult

<sup>&</sup>lt;sup>1</sup> from 60 bar: measurement starts with ambient pressure

<sup>&</sup>lt;sup>2</sup> with Ex version max. 1 contact is possible

<sup>&</sup>lt;sup>3</sup> 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

<sup>4</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible 5 different cable types and lengths deliverable, standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube



## **Electronic Pressure Switch**

Without Media Isolation

accuracy according to IEC 60770: 0.35 % FSO

## **Nominal pressure**

from 0 ... 10 mbar up to 0 ... 1000 mbar

#### **Contacts**

1, 2 or 4 independent contacts freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4digit LED display
- rotatable and configurable display module

## **Optional versions**

- ► IS-version Ex ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch DS 210 is the successful combination of

- intelligent pressure switch
- digital display

and has been specially designed for measuring of very small overpressure and for vacuum applications. Permissible media are gases, pressurized air and thin non aggressive media.

As standard the DS 210 offers a PNP-contact and a rotable display module. Additional features like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

## Preferred areas of use are



Plant and Machine Engineereing



Heating and Air Conditioning



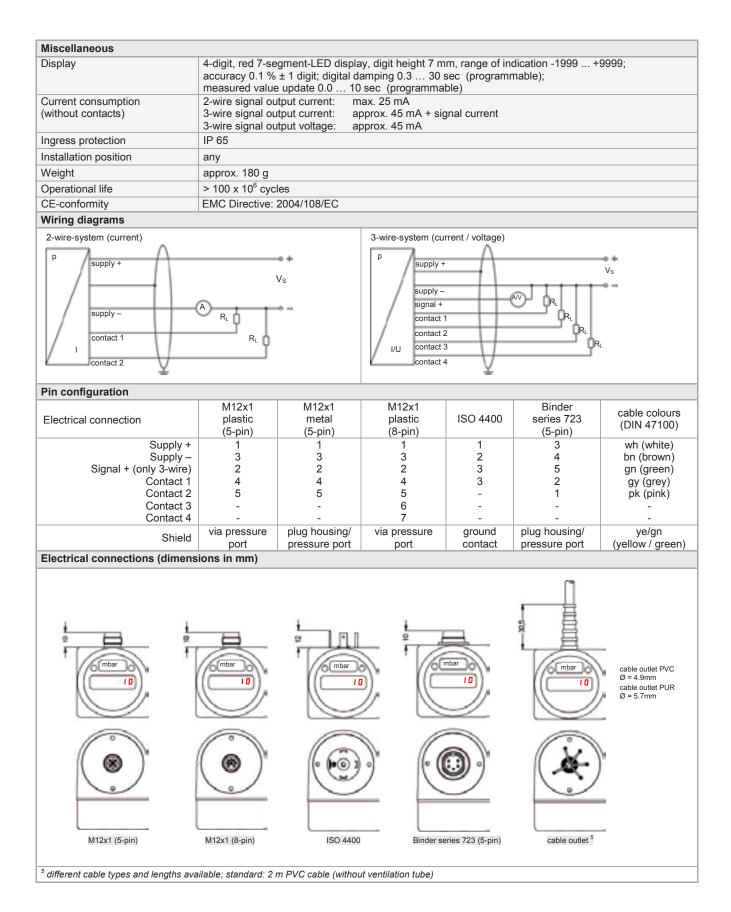
**Laboratory Techniques** 

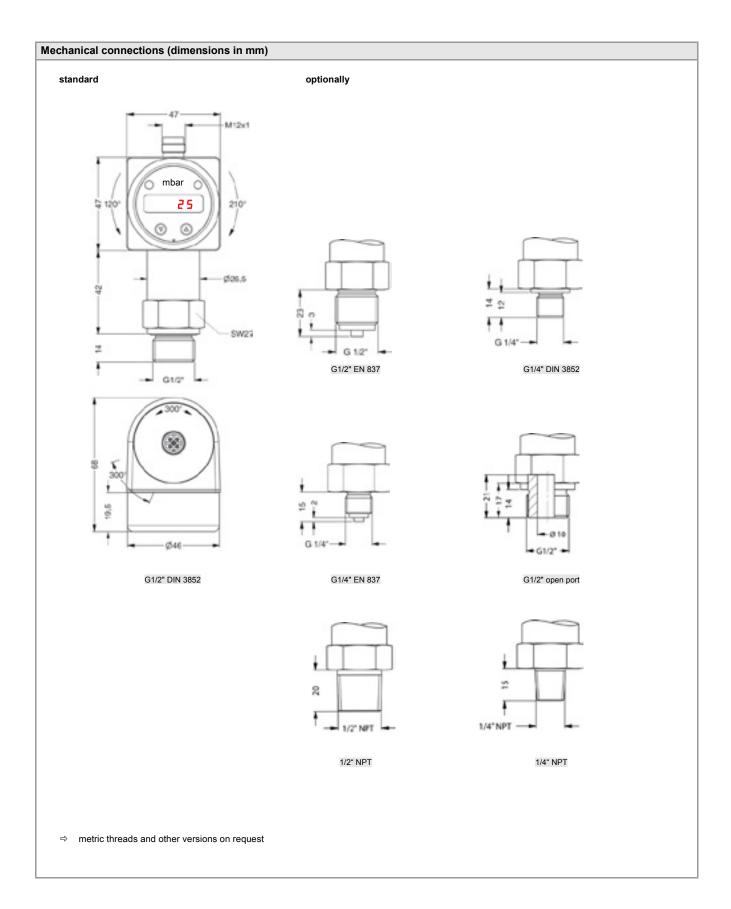




Input pressure range													
Nominal pressure gauge	[mbar]	-1000 0	10	16	25	40	60	100	160	250	400	600	1000
Overpressure	[bar]	3	0.2	0.2	0.5	0.5	0.5	1	2	3	3	3	3
Burst pressure	[bar]	5	0.3	0.3	0.75	0.75	0.75	1.5	3	5	5	5	5

Contact <sup>1</sup>											
Standard	1 PNP contact										
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 20 mA/3-wire; 0 10 V/3-wire on request)										
Max. switching current		, , , , , , , , , , , , , , , , , , ,									
Accuracy of contacts <sup>3</sup>	standard: nominal pressure ≤ 100 l	nominal pressure ≤ 100 mbar: ≤ ± 0.5 % FSO									
Repeatability	≤ ± 0.1 % FSO										
Switching frequency	max. 10 Hz										
Switching cycles	> 100 x 10 <sup>6</sup>										
Delay time 0 100 sec											
<sup>1</sup> max. 1 contact for 2-wire current signal no contact possible with 3-wire in comb		2-wire current signal with Ex-	protection								
Analogue output (optionally) / Su	pply										
2-wire current signal	permissible load: R <sub>max</sub> =	4 20 mA / $V_S$ = 18 41 $V_{DC}$ permissible load: $R_{max}$ = [( $V_S - V_{Smin}$ ) / 0,02 A] $\Omega$ response									
Ex-protection											
3-wire current signal	$4 \dots 20$ mA $/$ V <sub>S</sub> = 19 30 V <sub>DC</sub> adjustable (turn-down of span max. 1:5) $^2$ permissible load: R <sub>max</sub> = 500 Ω response time: < 3 sec										
3-wire voltage signal	0 10 V / V <sub>S</sub> = 15 36	S V <sub>DC</sub> permissible load:	$R_{min} = 10 \text{ k } \Omega$ res	sponse time: < 3 msec							
without analogue output	V <sub>S</sub> = 15 36 V <sub>DC</sub>										
Accuracy	standard: nominal pressure ≤ 100 r	$\leq \pm 0.35 \% FSO$ mbar: $\leq \pm 0.5 \% FSO$									
with turn-down of span the analogue si accuracy according to IEC 60770 – lim	gnal is adjusted automatically it point adjustment (non-linean	to the new measuring range ity, hysteresis, repeatability)									
Thermal effects (Offset and Span											
Nominal pressure P <sub>N</sub> [mbar]	-1000 0	≤ 100	≤ 400	> 400							
Tolerance band [% FSO]	≤ ± 0.75	≤±1.5	<u> </u>	≤ ± 0.75							
in compensated range [°C]	-20 85	0 50	0 70	-20 85							
Permissible temperatures											
Permissible temperatures	medium: -40 125 °C	electronics / environr	nent: -40 85 °C	storage: -40 100 °C							
Electrical protection	,										
Short-circuit protection	permanent										
Reverse polarity protection											
Electromagnetic compatibility	emission and immunity according to EN 61326										
Mechanical stability											
Vibration	10 g RMS (25 2000 H	z) according to DIN EN	I 60068-2-6								
Shock	500 g / 1 msec	according to DIN EN	l 60068-2-27								
Materials											
Pressure port	stainless steel 1.4404 (3	16L)									
Housing	stainless steel 1.4404 (3	16L)									
Display housing	PA 6.6, Polycarbonate	,									
Seal (media wetted)	FKM										
Sensor	stainless steel 1.4404 (3	16L), silicon, Epoxy or RT	V, glass								
Media wetted parts pressure port, seal, sensor											
Explosion protection (for 2-wire of											
Approval AX14-DS 210  IBEXU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)											
Safety technical maximum values	Safety technical maximum  II = 28 V I = 93 mA P = 660 mW C≈ 0 nF I ≈ 0 µH										
Max. switching current <sup>4</sup>	70 mA (max. permissible	e inductivity: 4 7 mH)									
Permissible temperatures for environment	-20 70 °C										
Connecting cables (by factory)											
<sup>4</sup> the real switching current in the applica			O - P - W								





This document contains product specifications; properties are not guaranteed. Subject to change without notice.

## Ordering Code

DS 210	П	□-		Ц	]-		-[	-[	- [			-[			-[	-[			
Pressure																			
gauge	7 8	Α																	
Input [mbar]			0 4		_														
10 16			0 1	6															
25			0 2	5	0														
40			0 4	0	0														
60			0 6	0	0														
100			1 0	0	0														
160 250			1 6 2 5	0															
400			4 0	0	0														
600			6 0	0	0														
1000			1 0	n	1														
-1000 0			X 1 9 9	0	2														
customer			9 9	9	9						_	_	_				ш		consult
Analogue output without						0													
4 20 mA / 2-wire						1													
0 10 V / 3-wire						3													
4 20 mA / 3-wire, adjustable						7													
Intrinsic safety 4 20 mA / 2-wire 1						Е													
customer				_	_	9											ш		consult
Contact 1 contact 1	. 2						_												
2 contacts <sup>1</sup>	, 2						1												
4 contacts <sup>3</sup>							4												
Accuracy																			
standard for P <sub>N</sub> > 0.1 bar 0.35 %								3						П					
standard for $P_N \le 0.1$ bar $0.5 \%$								5											
customer		_	_			_	_	9			_	_	_		_				consult
Electrical connection  Male plug M12x1 (5-pin) /					-				-										
plastic version									N	0	1								
Male plug M12x1 (8-pin) / 3									M	5	0								
plastic version									IVI	J	U								
Male plug M12x1 (5-pin) / metal version									N	1	1								
Male and female plug ISO 4400 <sup>2</sup>									1	0	0								
Male plug Binder series 723 (5-pin)									2	0	0								
Cable outlet incl. cable <sup>4</sup>									Т	A 9	0								
customer				_	_	_			9	9	9	_	_				ш		consult
Mechanical connection G1/2" DIN 3852						•	-	-	-	-	-	1	0	0					
G1/2" EN 837												2	0	0					
G1/4" DIN 3852												3	0	0					
G1/4" EN 837												4	0	0					
G1/2" DIN 3852 open pressure port												Н		0					
1/2" NPT 1/4" NPT												N	0	0					
customer												N 9		9					consult
Seals													3	9					Consuit
FKM															1				
customer															9				consult
Special version																			
standard customer																0		0	
customer																9	9	9	consult

<sup>&</sup>lt;sup>1</sup> with Ex version max. 1 contact is possible

 $<sup>^{2}</sup>$  with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

 $<sup>^3</sup>$  4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

 $<sup>^4</sup>$  standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request



# **Electronic Pressure Switch for very high pressure**

Thinfilm Sensor

accuracy according to IEC 60770: standard: 0.35 % FSO

## **Nominal pressure**

from 0 ... 600 bar up to 0 ... 2200 bar

#### **Contacts**

1, 2 or 4 independent PNP contacts, freely configurable

## **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

## **Special characteristics**

- indication of measured values on a 4-digit LED display
- pressure sensor welded
- extremely robust and excellent longterm stability

## **Optional versions**

- adjustability of span and offset (4 ... 20 mA / 3-wire)
- customer specific versions

The electronic pressure switch DS 214 for very high pressure up to 2200 bar has been designed especially for use in plant and machine engineering as well as in mobile hydraulics.

The DS 214 has one 1 contact with standard version, this can optionally be upgraded up to four independent contacts.

Via the rotatable modul with an integrated 4-digit display the DS 214 can be programmed easily and comfortably.

## Preferred areas of use are



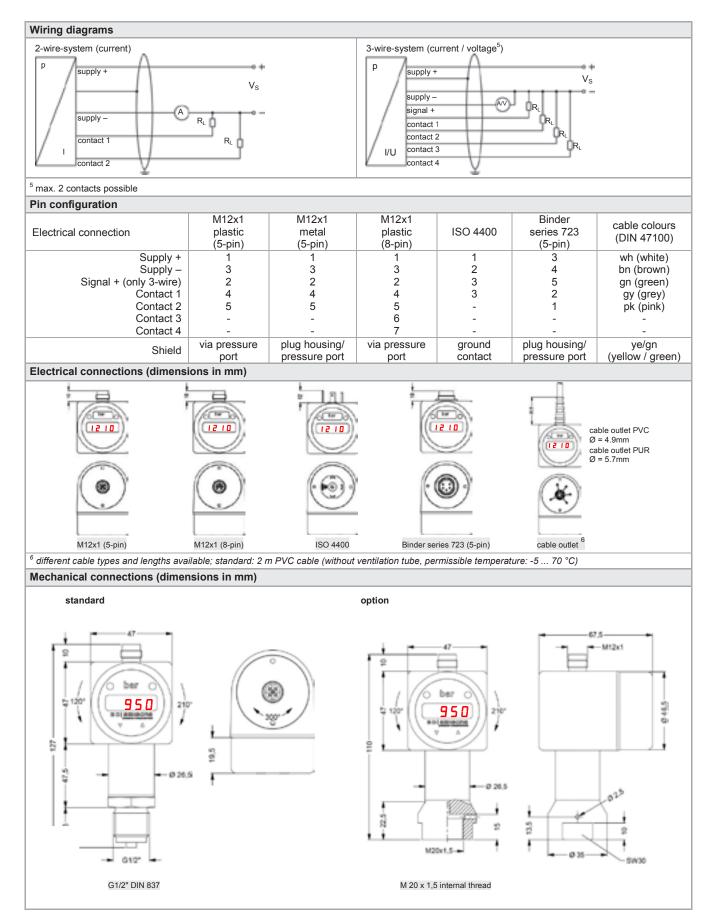
Plant and Machine Engineering



Commercial Vehicles and Mobile Hydraulics



Input pressure range											
Nominal pressure gauge [ba	1 600 <sup>1</sup>	1000	1600	2000	2200						
Overpressure [ba	800	1400	2200	2800	2800						
only available with pressure port G1	2" EN 837										
Contact <sup>2</sup>											
Standard	1 PNP contact										
Options	2 independent PNP of	contacts									
·	4 independent PNP of		with M12x1, 8-pin for	r 4 20 mA/3-wire)							
Max. switching current	4 20 mA / 2- and 3 0 10 V / 3-wire:	3-wire: contact ra		ircuit resistant; V <sub>switc</sub>	n = V <sub>S</sub> – 2V						
Accuracy of contacts 3	standard: ≤ ± 0.3	5 % FSO									
Repeatability	≤ ± 0.1 % FSO										
Switching frequency	max. 10 Hz										
Switching cycles	> 100 x 10 <sup>6</sup>										
Delay time	0 100 sec										
<sup>2</sup> max. 1 contact for 2-wire current sign no contact possible with 3-wire in co		00									
Analogue output (optionally) /	Supply										
2-wire current signal	4 20 mA / V <sub>S</sub> = 13	36 Vnc									
0 00 0 0.gridi	permissible load: R <sub>ma</sub>		2 A] Ω	respons	se time: < 10 msec						
3-wire current signal	4 20 mA / V <sub>S</sub> = 19 permissible load: R <sub>ma</sub>	30 V <sub>DC</sub> adjustable		1:5)4	se time: < 3 sec						
3-wire voltage signal	0 10 V / V <sub>S</sub> = 15		ssible load: R <sub>min</sub> = 10		se time: < 3 msec						
without analogue output	V <sub>S</sub> = 15 36 V <sub>DC</sub>	oo v <sub>DC</sub> perim	Solbie load. Timin	7 NS2 TOOPOTE	oc time. To moco						
Accuracy <sup>3</sup>	standard: ≤ ± 0.35 °	%FSO IFC 60770									
<sup>3</sup> accuracy according to IEC 60770 – <sup>4</sup> with turn-down of span the analogue	limit noint adjustment (non-	linearity hysteresis rei	peatability) uring range								
Thermal effects (Offset and Sp		•									
<u> </u>	] ≤ ± 0.25 / 10 K										
•	1 -20 85										
Permissible temperatures	]  20 00										
· · · · · · · · · · · · · · · · · · ·		C -la -ti / -		05 °C -t	40 400 °C						
Permissible temperatures  Electrical protection	medium: -40 140 °	C electronics / e	environment: -25	85 C Stora	ge: -40 100 °C						
Short-circuit protection	Permanent										
Reverse polarity protection	no damage, but also	no function									
Electromagnetic compatibility	emission and immuni		1226								
	emission and immuni	ity according to Live	1320								
Mechanical stability											
Vibration	10 g RMS (25 200	0 Hz)									
Shock	100 g / 11 msec	100 g / 11 msec									
Materials											
Pressure port	stainless steel 1.4542	2 (17-4 PH)									
Housing	stainless steel 1.4404										
Display housing	PA 6.6, polycarbonat										
Seals (media wetted)	none (welded version										
	` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` ` `	<u>,                                      </u>									
Diaphragm Madia water dia anta	stainless steel 1.4542										
Media wetted parts	pressure port, diaphr	agm									
Miscellaneous											
Display	4-digit, red 7-segmen accuracy 0.1 % ± 1 d measured value upda	igit; digital damping	0.3 30 sec (progr		+9999;						
Current consumption (without contacts)	2-wire signal output of 3-wire signal output output of 3-wire signal output output output of 3-wire signal output ou	current: max. 25 n	nA	t							
Ingress protection	IP 65										
Installation position	any										
Weight	min. 200 g (dependin	a on mechanical cor	nection)								
	0 ( )	g on mechanical col									
Operational life	> 100 x 10 <sup>6</sup> cycles										
CE-conformity	EMC Directive: 2004	/108/EC	Pressure Equipm	ent Directive: 97/23/	EC (module A)						



## Ordering Code

DS 214	Ш-Ш	]-[]-[	]-[	Ш-□	-	
Pressure						
gauge	7 8 B					
Input [bar]						
600 <sup>1</sup>	6 0 0 3 1 0 0 4 1 6 0 4 2 0 0 4 2 2 0 4 9 9 9 9	3				
1000	1 0 0 4	1				
1600	1 6 0 4	1				
2000	2 0 0 4 2 2 0 4 9 9 9 9	1				
2200	2 2 0 4	1				
customer	9 9 9 9	9				consult
Analogue output						
without		0				
4 20 mA / 2-wire		1				
0 10 V / 3-wire		3 7				
4 20 mA / 3-wire, adjustable		7				
customer		9				consult
Contact						
1 contact <sup>2</sup>		1				
2 contacts <sup>2</sup>		2				
4 contacts <sup>3</sup>		4				
Accuracy						
0.35 %			3			
customer			9			consult
Electrical connection						
Male plug M12x1 (5-pin) /			N 0 1			
plastic version						
Male plug M12x1 (8-pin) / <sup>3</sup> plastic version			M 5 0			
Male plug M12x1 (5-pin) /						
metal version			N 1 1			
Male and female plug ISO 4400 <sup>2</sup>			1 0 0			
Male plug Binder series 723 (5-pin)			2 0 0			
Cable outlet incl. cable <sup>4</sup>			T A 0			
customer			1 0 0 2 0 0 T A 0 9 9 9			consult
Mechanical connection			0 0 0 0			
G1/2" DIN 837 <sup>5</sup>				2 0 0		
M20x1.5 internal thread				2 0 0 D 2 8 9 9 9		
customer				9 9 9		consult
Seals						
without (welded version)				2		
customer				2 9		consult
Special version						
standard					0 0 0	
customer					0 0 0 9 9 9	consult
					1 1 -	1

<sup>&</sup>lt;sup>1</sup> only available with pressure port G1/2" EN 837

<sup>&</sup>lt;sup>2</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

<sup>&</sup>lt;sup>3</sup> 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

 $<sup>^{\</sup>rm 4}$  standard: 2 m PVC cable without ventilation tube, others on request

<sup>&</sup>lt;sup>5</sup> According to EN 837, the pressure port and the complement, at pressure over 1000 bar must be preferably made of stainless steel with a tensile strength of R<sub>P</sub> > 260 N/mm² in accordance with DIN 17440. The maximum allowed pressure is 1600 bar!



# **DS 400P**

# Intelligent Electronic Pressure Switch Stainless Steel

Process Connections
With Flush Welded
Stainless Steel Diaphragm

accuracy according to IEC 60770: standard: 0.35 % FSO option: 0.25 % FSO

### **Nominal pressure**

from 0 ... 100 mbar up to 0 ... 40 bar

#### **Contacts**

1 or 2 independent PNP contacts, freely configurable

### **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

### Special characteristics

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module
- configurable contacts
   (switch on / switch off points, hysteresis
   / window mode, switch on / switch off
   delay)
- hygienic version

### **Optional versions**

- IS-versionEx ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch DS 400P is the successful combination of

- intelligent pressure switch
- digital display

and has been developed for process industry; especially for food / beverage and pharmaceutical industry.

As standard the DS 400P offers a PNP contact and a rotatable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. 2 contacts and an analogue output complete the profile.

### Preferred areas of use are



Food and Berverage



Pharmaceutical Industry

### Material and test certificates

- inspection certificate 3.1 according to EN 10204
- test report 2.2 according to EN 10204

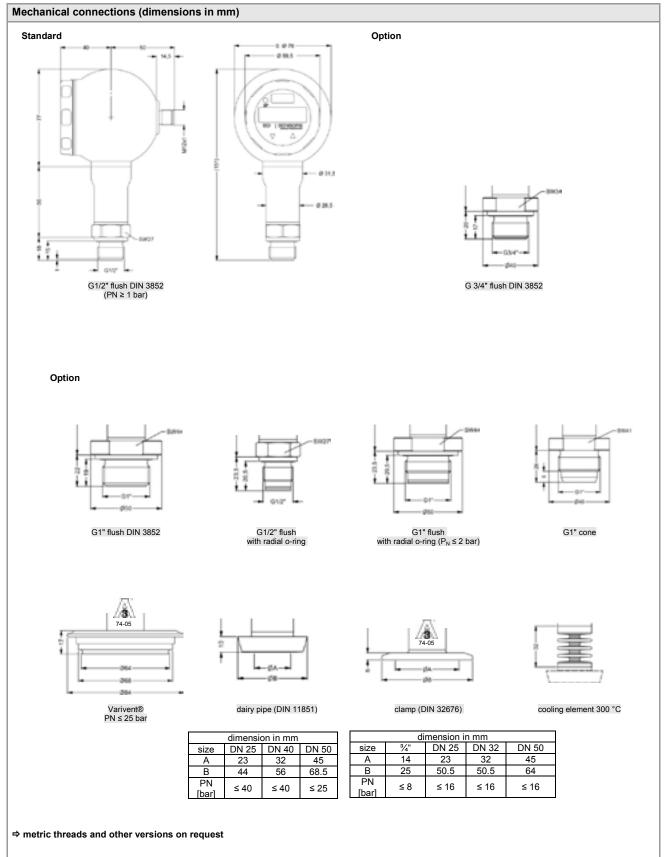






Input pressure range 1																
Nominal pressure	[bar]	-1 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40
gauge / abs.			0.5	1	1	2	5		10		20	40		90		105
Overpressure Burst pressure ≥	[bar] [bar]	5 7.5	1.5	1.5	1.5	3	7.5	5 7.5	15	10 15	25	40 50	40 50	80 120	80 120	105 210
Vacuum resistance	[Dai]	$P_N \ge 1 \text{ ba}$						7.5	13	-		par: on			120	210
<sup>1</sup> consider the pressure resistant	ce of fitti			intoa i	acaan	110010				<u> </u>	N ·	Jul. 011	Toquo			
Contact <sup>2</sup>		3	<i>p</i> -													
Number, type		standard	l: 1 PN	P cont	act				optio	n: 2 in	depen	dent P	NP co	ntacts		
Max. switching current		4 20 n 0 10 \			-wire:				mA, s	hort-ci	cuit re	esistant esistant	; V <sub>switc</sub>		- 2V	
Accuracy of contacts <sup>3</sup>		standard:	nor	ninal p	ressur	e ≥ 0.4	4 bar: 4 bar: 4 bar:	≤ ± 0.3	5 % FS	80						
Repeatability		≤ ± 0.1 %	6 FSO													
Switching frequency			2-wire: max. 10 Hz / 3-wire: 50 Hz													
Switching cycles		> 100 x														
Delay time		0 100	sec													
with IS-protection max. 1 contains																
Analogue output (optional	lly) / Su															
2-wire current signal		4 20 n permissi	ble loa	d: R <sub>max</sub>	= [(V <sub>S</sub>	-V <sub>s</sub>	<sub>nin</sub> ) / 0.0	02 A] Ω	2		re	espons	e time	: < 10 ı	msec	
2-wire current signal with		4 20 n					\ / 0 /	20 41 6			_		_ 4:	10.		
IS-protection		permissi 4 20 n	bie loa	a: K <sub>max</sub>	, = [(V <sub>S</sub>	- V <sub>S n</sub>	nin) / U.I	JZ A] (.	n dave	o of or		espons	e time	: < 101	nsec	
3-wire current signal		9 20 m permissi 0 10 \	ble loa	d: R <sub>max</sub>	= 500	Ω					re	espons	e time	: < 30 ı	msec	
3-wire voltage signal		permissi					ijustabi	e (turn	-down	oi spai		espons	e time	: < 30 ı	msec	
Without analogue output		V <sub>S</sub> = 15 .	V <sub>S</sub> = 15 36 V <sub>DC</sub>													
Accuracy <sup>3</sup>		standard option 1:	noi	minal p	ressur	e ≥ 0.	4 bar: 4 bar: 4 bar:	≤ ± 0.3	35 % F	SO						
Thermal errors (offset and Nominal pressure P <sub>N</sub>	d span) [bar]	⁵/ Permis		emper 0	atures				0.40					≥ 0.40		
	% FSO]			0.75					± 1.5					± 0.70		
in compensated range	[°C]			85					50					20 8		
Permissible temperatures <sup>6</sup>		medium:	-10	125	°C for	filling	fluid si fluid fo 85°C			e oil		stor	age: -	40 1	00 °C	
Permissible temperature me	edium	filling flui						ressur	e: -40 .	300	°C				50 °C 7	
for cooling element 300°C		filling flui	d food	compa	atible o	il	overp	ressur	e: -10 .	250	°C	vacı	Jum: -	10 1	50 °C	
<sup>5</sup> an optional cooling element ca <sup>6</sup> max. temperature of the mediu <sup>7</sup> also for P <sub>abs</sub> ≤ 1 bar	an influen um for no	ce thermal minal press	effects i	for offse	t and s	nan de										
		<u> </u>	ure gau	ige > 0	bar: 150	0 °C foi	r 60 min	on inst utes wit	allation th a max	position c. enviro	and fill	ling con al tempe	ditions erature	of 50 °C	·	
<u> </u>				ige > 0	bar: 150	0 °C for	r 60 min	on inst utes wit	allation th a max	position c. enviro	and fill	ling con al tempe	ditions erature	of 50 °C	;	
Short-circuit protection		permane	nt		bar: 150	O°C for	r 60 min	on inst utes wit	allation th a max	position c. envirc	and fill	ling con al tempe	ditions erature	of 50 °C	;	
Short-circuit protection Reverse polarity protection	tv	permane no dama	nt ge, bu	t also r	bar: 150	o °C for	r 60 min	utes wit	allation th a max	position k. enviro	and fill	ling con al tempe	ditions erature	of 50 °C		
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit	ty	permane	nt ge, bu	t also r	bar: 150	o °C for	r 60 min	utes wit	allation th a max	position k. envirc	and fill	ling con al tempe	ditions erature	of 50 °C	;	
Reverse polarity protection Electromagnetic compatibilit Mechanical stability		permane no dama emission	ent ge, but and in	t also r nmunit	no func	o °C for	to EN 6	utes wit	th a max	k. enviro	nment	al tempe	erature			
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2-	-6)	permane no dama	ent ge, but and in	t also r nmunit MS (25	no func	etion rding t	to EN 6	utes wit	except	position c. enviro G 1/2": G 1/2":	nment	10 ç	erature	(25	2000 I	Hz)
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2-Shock (DIN EN 60068-2-27	-6)	permane no dama emission	ent ge, but and in	t also r nmunit MS (25	no func y acco	etion rding t	to EN 6	utes wit	except	G 1/2":	nment	10 ç	g RMS	(25		Hz)
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2-Shock (DIN EN 60068-2-27	-6)	permane no dama emission	ent ge, bui and in 20 g RI	t also r nmunit MS (25	no func y acco	etion rding t	to EN 6	utes wit	except	G 1/2":	nment	10 ç	g RMS	(25		Hz)
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard	-6)	permane no dama emission G 1/2": 2 G 1/2":	ent ge, but and in 20 g RI	t also r nmunit MS (25 50	no func y acco 5 200 00 g / 1	etion rding to msec	to EN (	61326 others e	except	G 1/2":	nment	10 g	g RMS g / 1 i	(25 msec		
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard Optional	-6)	permane no dama emission G 1/2": 2 G 1/2": silicon oi food com	ent ge, but and in 20 g RI	t also r nmunit MS (25 50	no func y acco 5 200 00 g / 1	etion rding to msec	to EN (	61326 others e	except	G 1/2":	nment	10 g	g RMS g / 1 i	(25 msec	2000 I	
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard Optional Materials	-6)	permane no dama emission G 1/2": 2 G 1/2": silicon oi food com (Mobil D	ent ge, bui and in 20 g RI I npatible TE FM	t also r nmunit MS (25 50 e oil (w 32; Ca	no func y acco i 200 0 g / 1 ith FD/ ategory	etion rding to the second seco	to EN (	61326 others e	except	G 1/2":	nment	10 g	g RMS g / 1 r	(25 msec others	2000 I	uest
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard Optional Materials Pressure port / Housing	-6)	permane no dama emission G 1/2": 2 G 1/2": silicon oi food com	ent ge, but and in 20 g RI I patible TE FM	t also r nmunit MS (25 50 e oil (w 32; Ca	no func y acco i 200 0 g / 1 ith FD/ ategory	etion rding to the second seco	to EN (	61326 others e	except	G 1/2":	nment	10 g	g RMS g / 1 r	(25 msec others	2000 I	uest
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard Optional  Materials Pressure port / Housing Viewing glass	-6)	permane no dama emission  G 1/2": 2 G 1/2": silicon oi food com (Mobil D'	ent ge, but and in 20 g RI I patible TE FM	t also r nmunit MS (25 50 e oil (w 32; Ca	no func y acco i 200 0 g / 1 ith FD/ ategory	etion rding to the second seco	to EN (	61326 others e	except	G 1/2":	nment	10 g	g RMS g / 1 r	(25 msec others	2000 I	uest
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2-Shock (DIN EN 60068-2-27 Filling fluids Standard Optional  Materials Pressure port / Housing Viewing glass Seals Standard	-6)	permane no dama emission  G 1/2": 2 G 1/2": silicon oi food com (Mobil D'	ent ge, but and in 20 g RI Inpatible TE FM steel d safet	t also r nmunit MS (25 50 e oil (w 32; Ca 1.4404 ry glass	no func y acco 5 200 0 g / 1 ith FD/ ategory (316 L s	etion  of the street of the st	to EN (	51326 others controls of the second states at the s	except except escept egistrat	G 1/2": G 1/2":	nment	10 g	g RMS g / 1 r	(25 nsec others	2000 I	uest
Short-circuit protection Reverse polarity protection Electromagnetic compatibilit Mechanical stability Vibration (DIN EN 60068-2- Shock (DIN EN 60068-2-27 Filling fluids Standard Optional  Materials Pressure port / Housing Viewing glass Seals	-6)	permane no dama emission G 1/2": 2 G 1/2": silicon oi food com (Mobil D' stainless laminate	ent ge, but and in 20 g RI Inpatible TE FM steel d safet comme	t also r nmunit MS (25 50 e oil (w 32; Ca 1.4404 ry glass ended the	no func y acco 5 200 00 g / 1 iith FD/ ategory (316 L s	etion rding to the control of the co	to EN (	51326 others controls of the second states at the s	except except escept egistrat	G 1/2": G 1/2":	nment	10 g	g RMS g / 1 r	(25 nsec others	2000 I on requ	uest

Explosion protection (only for 4.	20 mA / 2-wire)							
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X Zone 0: II 1G Ex ia IIC T4							
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C \approx 0 \text{ nF}, L_i \approx 0  \mu\text{H}$							
Max. switching current <sup>8</sup>	70 mA							
Permissible temperatures for environment	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1: -25 70 °C							
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m							
<sup>8</sup> the real switching current in the applica	tion depends on the power supply unit							
Miscellaneous								
Display	4-digit, 7-segment-LED display, visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 +9999; accuracy 0.1% ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)							
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA							
Ingress protection	IP 67							
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for $P_N \le 4$ bar have to be specified in the order)							
Weight	min. 500 g (depending on mechanical connection)							
Operational life	> 100 x 10 <sup>8</sup> cycles							
CE-conformity	EMC Directive: 2004/108/EC							
Wiring diagrams								
p supply + Vs supply - R RL contact 1 contact 2	p supply + Vs supply - Signal + A/V R RL Contact 1 contact 2							
Pin configuration								
Electrical connection	M12x1 metal (5-pin)							
Supply + Supply – Signal + (only 3-wire) Contact 1 Contact 2	1 3 2 4 5							
Shield	plug housing / pressure port							
Designs 9	Electrical connections (dimensions in mm)							
side display	45° display (others on request)  M12x1 (5-pin)							
<sup>9</sup> all designs in horizontal rotatable housi	ng as standard							



DS 400P		<b></b>
Pressure gauge	7 A 5	
absolute <sup>1</sup> Input [bar]	7 A 6	
0.10 0.16	1 0 0 0 0 1 6 0 0	
0.25 0.40	2 5 0 0 4 0 0 0	
0.60 1.0	6 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
1.6 2.5	1 6 0 1 2 5 0 1 4 0 0 1	
4.0 6.0	4 0 0 1 6 0 0 1	
10 16	1 0 0 2 1 6 0 2 2 5 0 2	
25	2 5 0 2	
40 -1 0	4 0 0 2 X 1 0 2 9 9 9 9	
Design	9 9 9	consult
Stainless steel globe housing (side display)	к н	
Stainless steel globe housing (45° display)	K 4	consult
Analogue output without	0	
4 20 mA / 2-wire 0 10 V / 3-wire, adjustable	1 3	
4 20 mA / 3-wire, adjustable Intrinsic safety 4 20 mA / 2-wire 2	7	
customer	9	consult
1 contact 2 contacts <sup>2</sup>	1	
Accuracy		
standard for $P_N \ge 0.4$ bar 0.35 % standard for $P_N < 0.4$ bar 0.5 %	3 5	
option for $P_N \ge 0.4$ bar 0.25 % customer	2 9	consult
Electrical connection Male plug M12x1 (5-pin) /	NAA	
metal version customer	N 1 1 9 9 9	consult
Mechanical connection G1/2" with flush		
welded diaphragm (DIN 3852) <sup>3</sup> G3/4" with flush		
welded diaphragm (DIN 3852) G1" with flush	Z 3 0	
welded diaphragm (DIN 3852) G1" DIN 3852 with rad. o-ring	Z 3 1	
and flush diaphragm 4	z 5 7	
G1/2" DIN 3852 with rad. o-ring and flush diaphragm	Z 6 1	
G 1" cone Clamp DN 25 (DIN 32676) / 3A	K 3 1 C 6 1	
Clamp DN 32 (DIN 32676) / 3A Clamp DN 50 (DIN 32676) / 3A	C 6 1 C G 2 C G 3 C G 9	
Clamp 3/4" (DIN 32676) / 3A Dairy pipe DN 25 (DIN 11851) <sup>5</sup> Dairy pipe DN 40 (DIN 11851) <sup>5</sup>	M 7 3	
Dairy pipe DN 50 (DIN 11851) <sup>5</sup>	M 7 6	
Varivent® DN 40/50 / 3A customer	P 4 1 9 9 9	consult
Diaphragm Stainless steel 1.4435 (316L)	1	"
customer Seals	9	consult
for clamp, dairy pipe, Varivent <sup>®</sup> : none for inch thread: FKM	0 1	
FFKM customer	7 9	consult
Filling Fluids Silicon oil		1
food compatible oil (FDA) customer		2 consult
Special version standard		0 0 0
with cooling element up to 300°C customer		2 0 0 9 9 9 consult
customer		3 3 3 Consult

<sup>&</sup>lt;sup>1</sup> absolute pressure possible from 1 bar

This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

ansolute pressure possible from 1 par

2 with Ex version max. 1 contact is possible

3 only possible for nominal pressure ranges P<sub>N</sub> ≥ 1 bar

4 only possible for nominal pressure ranges P<sub>N</sub> ≤ 2 bar

5 The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut has to be ordered as separate position.



# **DS 200P**

### **Electronic Pressure Switch**

Process Connections
With Flush Welded
Stainless Steel Diaphragm

accuracy according to IEC 60770: standard: 0.35 % FSO option: 0.25 % FSO

### **Nominal pressure**

from 0 ... 100 mbar up to 0 ... 40 bar

#### **Contacts**

1, 2 or 4 independent PNP contacts, freely configurable

### **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

### **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module
- configurable contacts
   (switch on/switch off points, hysteresis/window mode, switch on/switch off

### **Optional versions**

- ► IS-version Ex ia = intrinsically safe for gases
- customer specific versions

The electronic pressure switch DS 200P is the successful combination of

- intelligent pressure switch
- digital display

and is suitable for the usage with viscous and pasty media.

As standard the DS 200P offers a PNP contact and a rotatable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

### Preferred areas of use are



Food and Beverage



Pharmaceutical Industry

### Material and test certificates

- inspection certificate 3.1 according to EN 10204
- ▶ test report 2.2 according to EN 10204

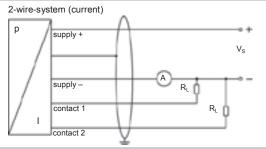


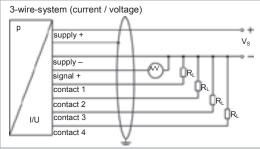




Input pressure range <sup>1</sup>																
Nominal pressure (P <sub>N</sub> )		1 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
gauge / abs.	[bar]	-1 0	0.10	0.16	0.25	0.40	0.00	'	1.0	2.5	4	0	10	10	25	40
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance		P <sub>N</sub> ≥ 1 b	ar: unl	imited	vacuun	n resist	ance			P <sub>N</sub> ·	< 1 bar	: on red	quest			
consider the pressure resistance	of fittii	ng and cl	amps													
Contact <sup>2</sup>																
Standard		1 PNP c	ontact													
Options	1	2 indepe	endent	PNP c	ontacts											
	4	4 indepe	endent	PNP c	ontacts	(pos	sible w	ith M12	2x1, 8-p	oin for 4	· 20 ı	mA/3-w	/ire;			
							10 V/3-									
Max. switching current		4 20 r			wire:	conta	ct rating	125 m	nA, sho	rt-circui	t resist	ant; V <sub>s</sub>	witch = \	√ <sub>S</sub> - 2V		
3		0 10 \						500 m		rt-circui						
Accuracy of contacts 3		standard							$P_N \ge 0$	.4 bar:	$\leq \pm 0.3$	35 % FS	50			
Den e etabilit.	_	option:			ar. ≤±	0.25 %	% FSO									
Repeatability		≤ ± 0.1 °														
Switching frequency			ıx. 10 Hz													
Switching cycles		> 100 x														
Delay time		0 100														
<sup>2</sup> max. 1 contact for 2-wire current						wire cu	rrent sigi	nal with	IS-prote	ection						
no contact possible with 3-wire in						bustava	aia	atabilit.	٠)							
<sup>3</sup> accuracy according to IEC 60770			justiner	ıı (mon-li	nearity,	nystere	ыь, гере	alability	)							
Analogue output (optionally		<u> </u>	nΛ /\/	- 40	20.1	,										
2-wire current signal		4 20 r					) / 0 00	Δ1Ω				recess	eo tim	0. < 10	meaa	
2-wire current signal with		permissi 4 20 r					n) / U.U2	. √] 22				respon	oc IIII	e: < 10	msec	
IS-protection							\ / 0 02	Λ1.0				rocpon	co tim	0. – 10	meac	
3-wire current signal			rmissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$ response time: < 10 msec 20 mA / $V_S = 19$ 30 $V_{DC}$ adjustable (turn-down of span 1:5) <sup>4</sup>													
3-wire current signal			$\sim$ 20 mA / $v_{\rm S}$ = 19 50 $v_{\rm DC}$ adjustable (turn-down of spair 1.5) response time: < 0.5 sec													
3-wire voltage signal		0 10 '					rmiooib	lo lood	ı. D -	= 10 kΩ		•				
					. 30 VD	c pe	:111115511	ile ioau	I. Kmin -	- 10 K22		respon	se ume	e: < 10	msec	
Without analogue output			' <sub>S</sub> = 15 36 V <sub>DC</sub>													
Accuracy <sup>3</sup>		standard: $P_N < 0.4 \text{ bar: } \le \pm 0.5 \% \text{ FSO}$ $P_N \ge 0.4 \text{ bar: } \le \pm 0.35 \% \text{ FSO}$ option: $P_N \ge 0.4 \text{ bar: } \le \pm 0.25 \% \text{ FSO}$														
4		option:														
with turn-down of span the analo							illeasui	ing rang	je							
	bar]	7 1 611	. 1-		Jeratui	-		< 0.40	١				≥ 0.	40		
Tolerance band [% FS				0.75									≤±(			
	[°C]			85				0 50					-20			
Permissible temperatures <sup>6</sup>		medium		00		-40				silicon	oil		-20	00		
T cimissible temperatures	'	incalain	•			-10	125 °C	for fillir	ng fluid na fluid	food co	ompatih	ole oil				
		electroni	ics / en	vironm			85 °C		.5				: -40	. 100 °C	2	
Permissible temperature medi	ium f	filling flu	id silico	n oil				ssure:	-40	300 °C				150 °		
for cooling element 300°C	_	filling flu			atible o					250 °C				150 °		
<sup>5</sup> an optional cooling element can	influen	nce therm	al effect	s for off	set and	span de	epending	on inst	allation	position a	and fillin	g condit	tions.			
<sup>6</sup> max. temperature of the medium	n for no	ominal pre	essure g	auge >	0 bar: 1	50 °C fo	r 60 min	utes wit	h a max	. enviror	nmental	tempera	ature of	50 °C		
<sup>7</sup> also for P <sub>abs</sub> ≤ 1 bar																
Electrical protection			1													
Short-circuit protection		permane		4 -1		·:										
Reverse polarity protection		no dama					- FNI C4	220								
Electromagnetic compatibility  Mechanical stability	(	emissior	ı and ir	iiiiunit	y acco	ruing to	רט עו⊐ כ	320								
Vibration		5 a DM	2 (25	2000	<b>⊔</b> →\		accord	ina to l	DINI EN	1 60060	2.6					
Shock		5 g RMS 100 g / 1			1 14)					l 60068 l 60068						
		100 g / 1	i i mse	C			accord	ing to	DIN EN	80000	-2-21					
Filling fluids Standard		silicon o	il													
Options		food con		a oil (v	ith ED/	annra	wal)									
Ориона		(Mobil D						SF Rea	istratio	n No · 1	30662	)	others	on requ	ıest	
Materials		,J		J_, J(		2000.	,	9			3300L	,	1010	J 1540		
Pressure port / Housing		stainless	steel	1 4404	(316	)							othere	on requ	ıest	
Display housing		PA 6.6,				.,							0111013	on requ	,,,,,,	
Seals (media wetted)		. , , 0.0,	. Grycai	Jonatt												
Standard		FKM (re	comme	ended f	or med	lium ter	mperati	ires < 2	200 °C	١						
Option		FFKM (r											others	on requ	uest	
		Clamp, d								,				- 4		
Diaphragm																
Standard		stainless				.)										
Option	I	Hastello	y <sup>®</sup> C-27	76 (2.48	819)								Tantalı	um on r	equest	
Media wetted parts	1	pressure	port, s	seal, di	aphrag	m										

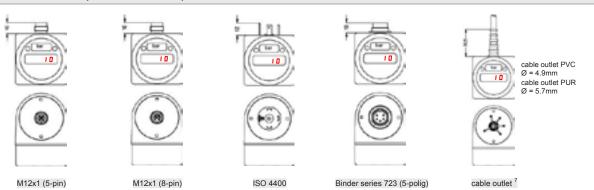
Explosion protection (only for 4	1 20 mA / 2-wire)
Approval AX14-DS 200P	IBExU06ATEX1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i$ = 28 V, $I_i$ = 93 mA, $P_i$ = 660 mW, $C \approx 0$ nF, $L_i \approx 0$ $\mu H$
Max. switching current 8	70 mA (max. permissible inductivity: 4.7 mH)
Permissible temperatures for environment	-25 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
<sup>8</sup> the real switching current in the appl	ication depends on the power supply unit
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any (standard calibration in a vertical position with the pressure port connection down; different installation position for $P_N \le 2$ bar have to be specified in the order)
Weight	approx. 160 250 g
Operational life	> 100 x 10 <sup>6</sup> cycles
CE-conformity	EMC Directive: 2004/108/EC
Wiring diagrams	



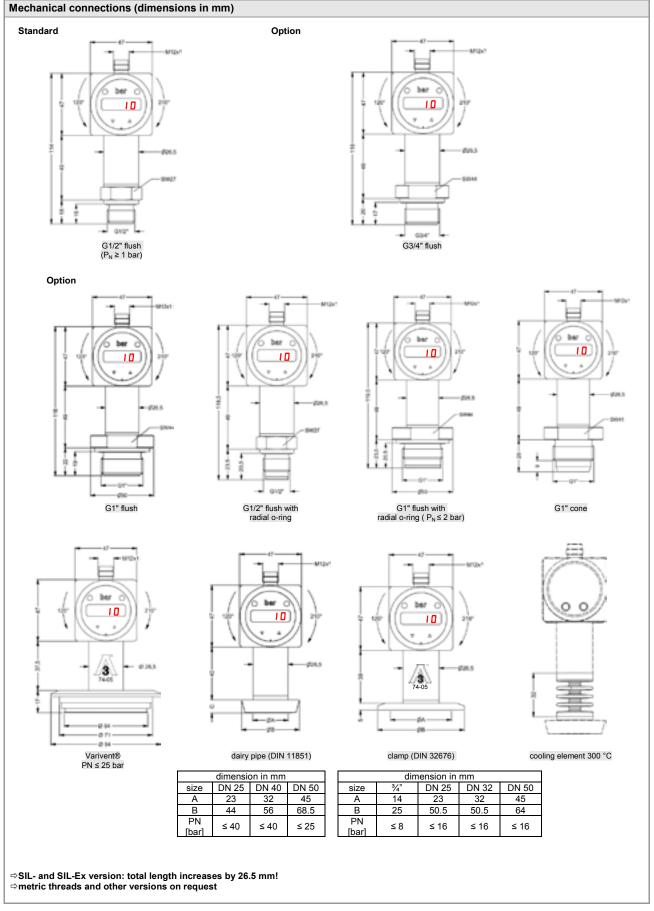


Pin configuration						
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gy (grey)
Contact 2	5	5	5	-	1	pk (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure	plug housing/	via pressure	ground	plug housing/	ye/gn
Silielu	port	pressure port	port	contact	pressure port	(yellow / green)

### Electrical connections (dimensions in mm)



<sup>7</sup> different cable types and lengths available, permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70°C)



# DS 200P

## Ordering Code

DS 200P		]-[]-[]-				-	
gaug absolut Input [bar]					_		
0.10 0.16	1 0 0 0 1 6 0 0						
0.25 0.40	2 5 0 0 4 0 0 0 6 0 0 0						
0.60 1.0 1.6	1 0 0 1					ш	
2.5 4.0	2 5 0 1 4 0 0 1						
6.0	6 0 0 1						
16 25 40	1 0 0 2 1 6 0 2 2 5 0 2 4 0 0 2						
-1 custome	X 1 0 2						consult
Analogue output withou		0					
4 20 mA / 2-wir 0 10 V / 3-wir 4 20 mA / 3-wire, adjustabl	е	1 3 7					
Intrinsic safety 4 20 mA / 2-wir custome	e <sup>1</sup>	E 9					consult
Contact 1 contact		1					
2 contact 4 contact		2 4					
Accuracy standard for $P_N > 0.4$ bar 0.35 % standard for $P_N \leq 0.4$ bar 0.5 %		3 5					
option for $P_N \ge 0.4$ bar $0.25\%$	0	2					consult
Electrical connection  Male plug M12x1 (5-pin)			N 0 1				
plastic versio Male plug M12x1 (8-pin)	/ 3		M 5 0				
plastic versio Male plug M12x1 (5-pin) metal versio	1		N 1 1				
Male and female plug ISO 4400 Male plug Binder series 723 (5-pir	)		1 0 0 2 0 0				
Cable outlet incl. cabl custome	e <sup>4</sup> r		T A 0 9 9 9				consult
Mechanical connection G1/2" with flush		_	_	Z 0 0			
welded diaphragm (DIN 3852 G3/4" with flush welded diaphragm (DIN 3852				Z 3 0			
G1" with flush welded diaphragm (DIN 3852				Z 3 1			
G1" DIN 3852 with rad. o-rin and flush diaphragr	n <sup>6</sup>			Z 5 7			
G1/2" DIN 3852 with rad. o-rin and flush diaphragr G 1" con	า			Z 6 1 K 3 1			
Clamp DN 25 (DIN 32676) / 3, Clamp DN 32 (DIN 32676) / 3,	4			C 6 1 C 6 2			
Clamp DN 50 (DIN 32676) / 3, Clamp 3/4" (DIN 32676) / 3,	A A			C 6 1 C 6 2 C 6 3 C 6 9 M 7 3 M 7 5 M 7 6 P 4 1			
Dairy pipe DN 25 (DIN 11851 Dairy pipe DN 40 (DIN 11851	) 7			M 7 3 M 7 5			
Dairy pipe DN 50 (DIN 11851 Varivent <sup>®</sup> DN 40/50 / 3, custome	4			M 7 6 P 4 1 9 9 9			consult
Diaphragm Stainless steel 1.4435 (316L				9 9 9		_	Consuit
Tantalur Hastelloy <sup>®</sup> C-276 (2.4819	n )			T H			consult
Seals	r			9			consult
for clamp, dairy pipe, Varivent <sup>®</sup> : without for inch thread: FKN	1				0 1 7		
custome Filling Fluids					9		consult
Silicon of food compatible oil (FDA	)				1 2		
Special version custome	r				9		consult
standar with cooling element up to 300°(						0 0 0 2 0 0 9 9 9	
custome						9 9 9	consult

<sup>with Ex version max. 1 contact is possible
with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible
3 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request
4 standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request
5 possible only for P<sub>N</sub> ≥ 1 bar
7 The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut has to be ordered as separate position.</sup> 



# **DS 201P**

### **Electronic Pressure Switch**

Pressure Port With Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770: 0.5 % FSO

### **Nominal pressure**

from 0 ... 60 bar up to 400 bar

### **Contacts**

1, 2 or 4 independent PNP contacts, freely configurable

### **Analogue output**

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

### **Special characteristics**

- indication of measured values on a 4-digit LED display
- rotatable and configurable display module

### **Optional versions**

- ► IS-version
  Ex ia = intrinsically safe for gases
- cooling element up to 300 °C
- customer specific versions

The electronic pressure switch DS 201P is the successful combination of

- intelligent pressure switch
- ▶ digital display

and is designed for universal applications in the mechanical engineering and other industries where a flush stainless steel diaphragm is necessary. This can be the case, for example, with higher viscous or slightly contaminated fluids. For usage with higher media temperature optionally a cooling element up to 300 °C is available.

### Preferred areas of use are



Plant and Machine Engineering



Food Industry

### Preferred used for



Viscous and pasty media



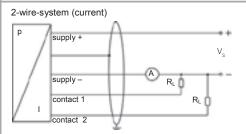


Input pressure ranges									
Nominal pressure gauge/abs.	[bar]	60	100	160	250	400			
Overpressure	[bar]	100	200	400	400	600			
Burst pressure ≥	[bar]	120	250	500	500	650			

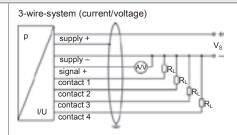
Contact <sup>1</sup>		
Standard	1 PNP contact	
Options	2 independent PNP contacts	
Орион	4 independent PNP contacts (	possible with M12x1, 8-pin for 4 20 mA/3-wire; ) 10 V/3-wire on request)
Max. switching current		contact rating 125 mA, short-circuit resistant; $V_{\text{switch}}$ = $V_{\text{S}}-2V$ contact rating 500 mA, short-circuit resistant
Accuracy of contacts <sup>2</sup>	≤ ± 0.5 % FSO	
Repeatability	≤ ± 0.2 % FSO	
Switching frequency	max. 10 Hz	
Switching cycles	> 100 x 10 <sup>6</sup>	
Delay time	0 100 sec	
<ul> <li>max. 1 contact for 2-wire current signal with plug ISO 4400</li> <li>accuracy according to IEC 60770 – limi</li> </ul>		rent signal with Ex-protection no contact possible with 3-wire in combination sis, repeatability)
Analogue output (optionally) / Su	pply	
2-wire current signal	4 20 mA / V <sub>S</sub> = 13 36 V <sub>DC</sub>	
		<sub>S min</sub> ) / 0.02 A] Ωresponse time: < 10 msec
2-wire current signal with	4 20 mA / V <sub>S</sub> = 13 28 V <sub>DC</sub>	
Ex-protection	permissible load: $R_{max} = [(V_S - V_S)]$	
3-wire current signal		djustable (turn-down of span max. 1:5) 3
	permissible load: $R_{max} = 500 \Omega$	response time: < 0.5 sec
3-wire voltage signal	0 10 V / V <sub>s</sub> = 15 36 V <sub>DC</sub>	
	permissible load: $R_{min} = 10 \text{ k}\Omega$	response time: < 10 msec
without analogue output	V <sub>S</sub> = 15 36 V <sub>DC</sub>	
accuracy <sup>2</sup>	≤ ± 0.5 % FSO	
<sup>3</sup> with turn-down of span the analogue sig		measuring range
Thermal error (offset and span) 4		
Thermal error	≤ ± 0.2 % FSO / 10 K	
in compensated range	-20 85°C	
Permissible temperatures <sup>5</sup>	electronics / environment: -40	0 125 °C for filling fluid silicon oil 0 125 °C for filling fluid food compatible oil 0 85 °C 0 100 °C
Permissible temperature	filling fluid silicon oil	overpressure: -40 300 °C vacuum: -40 150 °C
medium for cooling element 300°C	filling fluid food compatible oil	overpressure: -10 250 °C vacuum: -10 150 °C
<sup>5</sup> max. temperature of the medium for over	ce thermal effects for offset and span de	pending on installation position and filling conditions s with a max. environmental temperature of 50 °
Electrical protection		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according	g to EN 61326
Mechanical stability		
Vibration	5 g RMS (25 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
Filling fluids		
Standard	silicon oil	
Optional	food compatible oil with FDA app	oroval de: H1; NSF Registration No.: 130662)
Materials		
Pressure port	stainless steel 1.4404 (316 L)	
Housing	stainless steel 1.4404 (316 L)	
Display housing	PA 6.6, Polycarbonate	
Seals		(for media temperature ≤ 200 °C)
Ocaio	option: FFKN others on request	(for media temperature > 200 °C)
Diaphragm	stainless steel 1 4435	
Diaphragm Media wetted parts	stainless steel 1.4435 pressure port, seals, diaphragm	

Explosion protection (only for	4 20 mA / 2-wire)
Approval AX14-DS 201P	IBExU06ATEX1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i$ = 28 V, $I_i$ = 93 mA, $P_i$ = 660 mW, $C \approx 0$ nF, $L_i \approx 0$ $\mu H$
Max. switching current <sup>7</sup>	70 mA (max. permissible inductivity: 4.7 mH)
Max. temperatures for environment	-25 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m
<sup>7</sup> the real switching current in the app	lication depends on the power supply unit
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 +9999; accuracy 0.1 % ± 1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any (standard calibration in a vertical position with the pressure port connection down)
Weight	min. 200 g (depending on mechanical connection)
Operational life	> 100 x 10 <sup>6</sup> cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) 8
ATEX Directive	94/9/EC

### Wiring diagrams

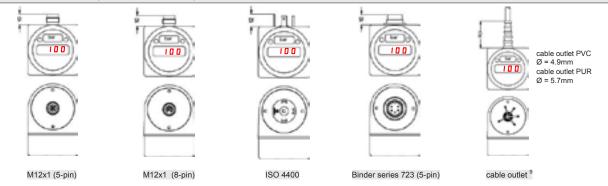


<sup>8</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.

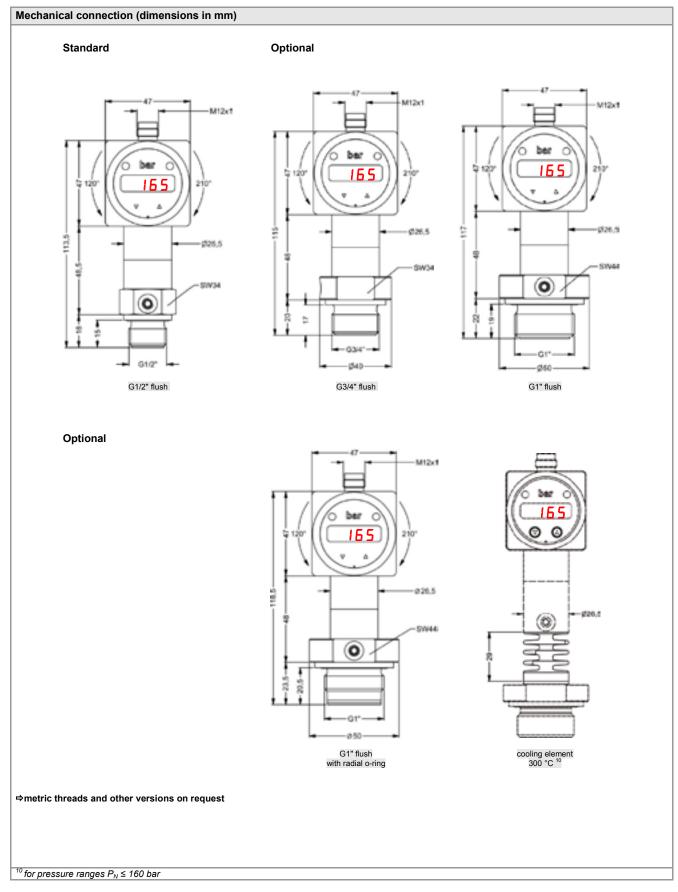


Pin configuration						
Electrical connection	M12x plastic (5-pin)	M12x metal (5-pin)	M12x plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	3	wh (white)
Supply –	3	3	3	2	4	bn (brown)
Signal + (only for 3-wire)	2	2	2	3	5	gn (green)
Contact 1	4	4	4	3	2	gy (grey)
Contact 2	5	5	5	-	1	pk (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure	plug housing/	via pressure	ground	plug housing/	ye/gn
Siliela	port	pressure port	port	contact	pressure port	(yellow/green)

### Electrical connections (dimensions in mm)



<sup>&</sup>lt;sup>9</sup> different cable types and lengths available, permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70°C)



# DS 201P

## Ordering Code

DS 201P		-Щ		<b>□</b> ·	-[	-[	]-[	]-[		Ц	-[			-[	-[	]-[	]- <u></u>				
Pressure																					
gauge	7 8 7																				
absolute Input [bar]	7 8 8																				
input [bar]		6 0	0	2						П								_			
100		1 0	0	2 3 3 3																	
160		1 6	0	3																	
250		2 5 4 0	0	3																	
400 customer		4 0	0	3																a a may elle	
Analogue output	_	9 9	1 9	9							-			-	-			-		consult	
without		_			0					П	_			_	_						
4 20 mA / 2-wire					1																
0 10 V / 3-wire					3																
4 20 mA / 3-wire, adjustable					7																
Intrinsic safety 4 20 mA / 2-wire 1					Ε																
Contact					9				L			L								consult	
1 contact 1,1	2					1															
2 contacts 1,	2					2															
4 contacts						4															
Accuracy																					
0.5 %							5														
customer							9													consult	_
Electrical connection Male plug M12x1 (5-pin) /										Н											
plastic version								N	0	1											
Male plug M12x1 (8-pin) / <sup>3</sup>									_												
plastic version								IVI	5	0											
Male plug M12x1 (5-pin) /								N	1	1											
metal version																					
Male and female plug ISO 4400 <sup>2</sup> Male plug Binder series 723 (5-pin)								1 2	0												
Cable outlet incl. cable <sup>4</sup>									A	0											
customer								9	A 9	9										consult	
Mechanical connection																					
G1/2" DIN 3852 with											Z	0	0								
flush diaphragm											_										
G3/4" DIN 3852 with flush diaphragm											Z	3	0								
G1" DIN 3852 with											_	_						L			
flush diaphragm											Z	3	1								
G 1/2" DIN 3852 with rad. o-ring											Z	6	1								
and flush diaphragm																					
Diaphragm											9	9	9							consult	
Stainless steel 1.4435 (316L)														1							
customer														9							
Seals																					
FKM FFKM <sup>5</sup>															1						
FFKM <sup>5</sup>															7						
customer															9					consult	
Filling Fluids Silicon oil																1					
food compatible oil																2					
customer																2 9				consult	
Special version																					
standard																	0	0	0		
with cooling element up to 300°C <sup>6</sup>																	2	0 0 9	0		
customer																	9	19	9	consult	

<sup>&</sup>lt;sup>1</sup> with Ex version max. 1 contact is possible

This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

<sup>&</sup>lt;sup>2</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

with conflector 160 4400 and output 2\*wire Version only max. For index possible in a fine that Conflector 10 V/3-wire on request

4 standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request

5 possible for nominal pressure ranges P<sub>N</sub> ≤ 100 bar

6 cooling element up to 300°C not possible for pressure range P<sub>N</sub> > 160 bar



# Pressure Switch with welded Stainless Steel Sensor

### Characteristics:

- accuracy according to IEC 60770: 0.5 % FSO
- ► nominal pressure ranges from 0 ... 6 bar up to 0 ... 600 bar
- ► 1 analogue output and up to 2 contacts
- ▶ display and housing rotatable
- suitable for oxygen applications

**Technical Data** 

CE

1												
Input pressure range	-									1		
1 0 0	bar]	6	10	16	25	40	60	100	160	250	400	600
	bar]	14	35	35	70	140	140	350	350	700	1 200	1 200
· · ·	bar]	28	70	70	140	280	280	700	700	1 400	1 500	1 500
Vacuum resistance		unlimite	d									
Contact												
standard		1 PNP d	ontact									
option		max. 2 i	ndepende	ent PNP o	ontact; 1	analogue	output					
Switching current		standar	d: contact	rating ma	ax. 500 m	A, short-	circuit res	istant				
Accuracy of switching points	1	≤ ± 1.5 °	% FSO									
Repeatability		≤ ± 0.5 °	% FSO									
Switching frequency		max. 10										
Switching cycles		> 100 x	10 <sup>6</sup>									
Delay time		0 100	0 100 sec									
Analogue output (optionally) / Supply												
3-wire current signal		4 20 ı	nA / V <sub>s</sub> =	24 V <sub>DC</sub> ±	10 %							
Accuracy 1		≤ ± 0.5 °	% FSO									
Permissible load		3-wire:	$R_{\text{max}} = 50$	$\Omega$ 00								
Influence effects		supply:	0.05 % F	SO / 10 \	/			loa	d: 0.	05 % FS0	) / kΩ	
Measuring rate		10 Hz										
<sup>1</sup> accuracy according to IEC 6077	'0 – lin	nit point ac	ljustment (	non-linearit	y, hystere	sis, repeata	ability)					
Thermal effects (Offset and	Spa	n) / Perm	issible te	emperatu	ires							
Thermal error		≤ ± 0.5 °	% FSO / <sup>*</sup>	10 K	in com	pensated	range -2	5 85 °C	)			
Permissible temperatures		medium	: -25 1:	25 °C	electro	nics / env	rironment	: -25 85	5 °C	stora	age: -40	. 85 °C
Electrical protection												
Short-circuit protection		perman	ent									
Reverse polarity protection		no dama	age, but a	lso no fui	ncition							
Electromagnetic compatibility	,	emissio	n and imr	nunity acc	cording to	EN 6132	26					

Mechanical stability			
Vibration	10 g (25 2000 Hz)	according to DIN EN 600	068-2-6
Shock	500 g / 1 msec	according to DIN EN 600	068-2-27
Materials			
Pressure port / Housing	stainless steel 1.4571 (316	Ti) / stainless steel 1.4301 (30	04)
Display housing	PA 6.6, polycarbonate		
Seal sensor	none (welded)		
Diaphragm	stainless steel 1.4542 (17-4	IPH)	
Media wetted parts	pressure port, seal pressure	e port, diaphragm	
Miscellaneous			
Weight	approx. 160 g		
Display	+9999; accuracy 0.1% ± measured value update 0.0	1 digit; digital damping 0.3 10 sec (programmable)	5 mm (angle 10°); range of indication -1999 30 sec (programmable);
Long term stability	≤ ± 0.3 % FSO / year at refe		
CE-conformity	EMC Directive: 2004/108/E		pment Directive: 97/23/EC (module A) 2
<sup>2</sup> This directive is only valid for device	es with maximum permissible ov	rerpressure > 200 bar.	
Wiring diagrams			
Supply – Signal + Contact 1 Contact 2	A RL RL	_	
Pin configuration Electrical connections		M12x1 (5-pin) pl	astic
supply +		1	
supply –		3	
signal + (only for 3-wire)		2	
contact 1 contact 2		4 5	
shield		via pressure p	ort
Connections (dimensions in	mm)	Tid procedio p	
	·	Il connections - optional	Electronical connections
			1
(6 ber	= ;		Dur
(6 ber	2 % 1 1 0 1	G1/4" EN 837	
See	27	G1/4" EN 837	M12x1 (5-pin)

# Ordering Code

Pressure    Gauge   7   8   P	DS 217	Ш-Ш	□ - □ -	]-□-	-Ш		Ш	]-□	-[		
Input   Inpu									_		
Input [bar] 6 6 0 0 1 10 1 0 0 2 16 1 6 0 2 25 2 5 0 2 40 4 0 0 2 60 6 0 0 2		7 8 P									
6 6 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		7   0   1							-		
10		6 0	0 1							П	
25 2 5 0 2 40 4 0 0 2 60 6 0 0 2	10										
60 6 0 0 2		1 6	0 2								
60 6 0 0 2		2 5	0 2								
60 6 0 0 2 100 1 0 0 3 160 1 6 0 3 250 2 5 0 3 400 4 0 0 3		4 0	0 2								
100 1 0 0 3 160 1 6 0 3 250 2 5 0 3 400 4 0 0 3		6 0	0 2								
160 1 6 0 3 250 2 5 0 3 400 4 0 0 3		1 0	0 3								
400 4 0 0 3		1 6	0 3								
600 6 0 0 2		2 5	0 3								
	600	6 0	0 3								
customer 9 9 9 9 9 9 Consult		9 9	9 9								consult
Analogue output		3 3									Consuit
without analogue output 0 0			0							_	
4 20 mA / 3-wire 7											
customer 9         consult	customer		9								consult
Contact	Contact										
1 contact 1				1							
2 contacts 2				2							
Accuracy [IEC 60770]											
standard 0.5 % 5				5							
customer 9 Consult				9						Ш	consult
Electrical connection											
Male plug M12x1 (5-pin) / N 0 1					N 0	1					
plastic version						0					aanault
Mechanical connection Syly Syly Sylvanian Consult				_	9 9	9			-		Consuit
						,	2 0 0	2			
G 1/2" EN837 2 0 0 2 G1/4" EN 837 4 0 0 2						- 4	1 0 0	2			
1/4" NPT N   4   0   2						1	1 4 0	2			
1/4" NPT							9 9	9			consult
Special version	Special version										
	standard								0	0	0
standard         0         0         0           oxygen application         0         0         7									0	0	7
customer 9 9 9 consult	cuetomer										



# **Electronic OEM Pressure Switch**

### Applications:

- pneumatics
- pumps and hydraulic machines

### Characteristics:

- ▶ nominal pressure ranges from 0 ... 2 bar up to 0 ... 400 bar
- ▶ display and housing rotatable
- ▶ up to 2 contacts
- ► configurable via display
- ▶ optional: analogue output

### **Technical Data**



Input pressure range											
Nominal pressure gauge	[bar]	2	5	10	20	50	100	250	400		
Overpressure	[bar]	4	10	20	40	100	200	400	600		
Burst pressure	[bar]	7	15	35	70	150	250	450	650		
Supply											
Supply voltage V <sub>S</sub>		24 V <sub>DC</sub> ±10	%								
Current consumption		< 40 mA (w	ithout analog	gue output ai	nd without co	ontacts)					
Output signal											
Number, type		standard:	1 PNP cont								
		optional:	max. 2 inde	pendent PN	P contacts; 1	analogue ou	ıtput				
Contact (Standard)											
Switching current				max. 500 m	A, short-circu	uit resistant					
Accuracy of contacts 1		≤ ± 1.5 % F	SO BFSL								
Repeatability 1		≤ ± 0.5 % F	SO BFSL								
Switching frequency		max. 100 H	max. 100 Hz								
Switching cycles		> 100 x 10 <sup>6</sup>									
Functions		Hysteresis-	/ Compare r	node							
		n/o / n/c									
Delay time		0 99.99 s	ec								
Analogue output (optional	ly)										
Signal output		4 20 mA	(3-wire)								
Linearity, hysteresis, repeatability		≤ ± 0.5 % F	SO BFSL								
Calibration accuracy		≤ ± 1 % FS	O BFSL								
Permissible load		R <sub>max</sub> = 500	Ω								
Response time		< 10 msec									
<sup>1</sup> depending on nominal pressu	ıre range										
Thermal effects (Offset and	d Span)	/ Permissible	temperature	es							
Thermal error for offset		≤ ± 0.5 % F	SO / 10 K	in com	pensated rar	nge -25	. 85 °C				
Permissible temperatures		medium: -2	5 125 °C	electro	nics / enviro	nment: -25	85 °C	storage: -	40 85 °C		

## Technical Data

Electrical protection	
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Materials	
Pressure port	stainless steel 1.4301
Housing	stainless steel 1.4301
Display housing	PA 6.6, Polycarbonate
Seals (media wetted)	FKM others on request
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %
Touchpad	polyester
Media wetted parts	pressure port, seals, diaphragm
Miscellaneous	
Display	4-digit, red LED display, digit size 7 mm, digit width 4.85 mm (angle 10 $^{\circ}$ ); range of indication -1999 9999; accuracy 0.3 $\%$ ±1 digit; digital damping 0.3 30 sec (programmable); measured value update 0.0 10 sec (programmable)
Weight	approx. 180 g
Installation position	any
Ingress protection	IP 65
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) <sup>2</sup>
	vith maximum permissible overpressure > 200 bar
Wiring diagram	
Supply – Signal + Contact 1 Contact 2	A R <sub>L</sub>
Pin configuration	
Electrical connection	M12x1 (5-pin), plastic
Supply + Supply - Signal + Contact 1 Contact 2 Shield	1 3 2 4 5 via pressure port
Dimensions (in mm)	
2 120 10 10 10 10 10 10 10 10 10 10 10 10 10	2 10° 120° 10° 210° 210° 210° 210° 210°
G1/4" DIN 3852	1/4" NPT
2 3 3 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Pat b

## Ordering Code

DS 230	<u> </u>		<b>-</b> [		]-	П		]-[	]- <u></u>			
Pressure												
gauge	7 8 R											
Input [bar]												
2	2 0 0 1 5 0 0 1 1 0 0 2 2 0 0 2 5 0 0 2											
5	5 0 0 1 1 0 0 2 2 0 0 2 5 0 0 2 1 0 0 3 2 5 0 3 4 0 0 3											
10	1 0 0 2											
20	2 0 0 2											
50	5 0 0 2											
100 250	1 0 0 3											
250 400	1 0 0 3 2 5 0 3 4 0 0 3											
400 customer	9 9 9 9											
Analogue output	9 9 9 9		_	_	_	_	-	_			_	consult
without analogue output												
4 20 mA / 3-wire		7										
customer		9										consult
Contact		9										Consuit
1 contact		1					_					
2 contacts		2										
Calibration accuracy												
2 %			G			_	_					
customer			9									consult
Electrical connection												Concur
Male plug M12x1 (5-pin) /												
plastic versión			ľ	1 0	1							
customer			ç	9	9							consult
Mechanical connection												
G1/4" DIN 3852						3	0 0					
1/4" NPT						N	4 0					
customer						9	4 0 9 9					consult
Seals												
FKM								1				
customer								9				consult
Special version												
standard									0	0	0 9	
customer									9	9	9	consult

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## **Electronic OEM Pressure Switch Pneumatics**

### Applications:

- **Pneumatics**
- Vacuum technology

### Characteristics:

- nominal pressure ranges from 0 ... 1 bar up to 0 ... 10 bar also -1 ... 0 bar
- 1 or 2 contacts
- compact design
- configurable via PC or programming device P6

### **Technical Data**

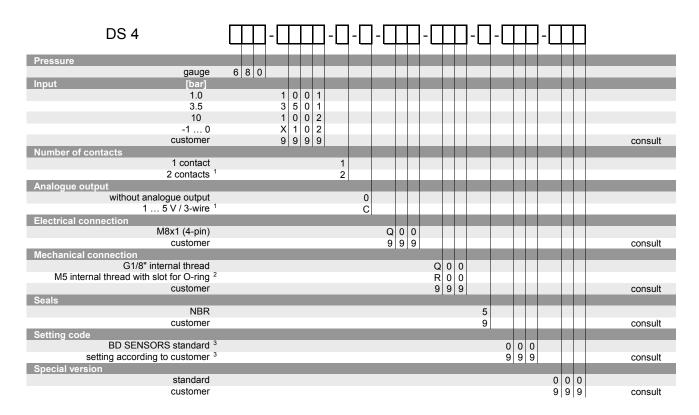
CE

Input pressure range						
Nominal pressure gauge	[bar]	-1 0	1	3.5	5	10
Overpressure	[bar]	2	2	7		13
Supply						
Supply voltage V <sub>S</sub>		12 30 V <sub>DC</sub>				
Current consumption		max. 14 mA (without co	ontacts)			
Output signal						
Contact 1						
Number		standard: 1		optional: 2	2	
Туре		PNP				
Switching performance		max. 300 mA, short-circ	uit proof			
Accuracy of contacts 2		≤ ± 1 % FSO				
Repeatability		≤ ± 0.2 % FSO				
Status indication		SP 1: green		SP 2: yello	ow	
Switching function <sup>3</sup>		standard: n/o		optional:	n/c	
Switching mode <sup>3</sup>		standard: hysteresis me		optional:	window mo	ode
Switch on point 3		standard: factory settin	g 80 % FSO			
2			der; adjustable range 0 .	100 % FSO		
Switch off point 3		standard: factory settin		4000/ 500		
	3		der; adjustable range 0 .	100 % FSO		
Switch on / switch off delay	/ <sup>°</sup>	standard: off	dan adriatable sees to be	10	1- 00 (-	. ( 40 )
0 11 1			der, adjustable range fro	m 10 msec up	to 90 sec (s	step 10 msec)
Switching frequency		200 Hz (without switchin	ng delay)			
Switching cycles		> 100 x 10 <sup>6</sup>				
Analogue output 1 (option	nally)					
Analogue output		1 5 V / 3-wire				
Accuracy		IEC 60770 <sup>3</sup> : ≤ ± 2 % FS	80			
Permissible load		$R_{min} = 10 \text{ k}\Omega$				
with optional analogue output	t max 1 c	contact possible				

with optional analogue output max. 1 contact possible
 accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
 Parameters can be programmed by customer either with the programming kit CIS 680 / CIS 681 or with the programming device P6 (available as accessories).

n) / Permissible temperatures		
	compensated range 0	
medium / electronics / environm	ent: -25 85 °C	storage: -40 85 °C
permanent		
emission and immunity according	g to EN 61326	
10 g RMS (20 2000 Hz)		
100 g / 11 msec		
aluminium		
PA 6.6 black		
NBR		
silicon, RTV		
pressure port, seal, sensor		
	gases	
approx. 25 bis 35 g		
any		
IP 54		
EMC Directive: 2004/108/EC		
supply +	^	contact (with analogue output) supply +
Supply –  contact 1  contact 2	V <sub>s</sub>	supply – signal + contact
M8x1 (4-pin)	M8x1 (4-pin)	M8x1 (4-pin)
1 contact	2 contacts	1 contact, 1 analogue output
I .		1
3	3	3
	- 4	2 4
	I .	
813.9	Mechanical	connections (view X)
呂	1	G1/8-6.5 deep
	st 0.4 % FSO / 10 K in medium / electronics / environmedium / electronics / environmedium / electronics / environmedium / electronics / environmedium / environmedium emission and immunity according a luminium emission and immunity according in the part of the pressure port of the part of the pressure port of the part	set 0.4 % FSO / 10 K in compensated range 0  medium / electronics / environment: -25 85 °C  permanent no damage, but also no function emission and immunity according to EN 61326  10 g RMS (20 2000 Hz) 100 g / 11 msec  aluminium PA 6.6 black NBR silicon, RTV pressure port, seal, sensor  compressed air, non-aggressive gases approx. 25 bis 35 g any IP 54 EMC Directive: 2004/108/EC  2 contacts (without analogue output)  Vs supply - contact 1 contact 2  M8x1 (4-pin) 1 contact 2  1 1 3 3 - 4 4 - 2 2  Mechanical

## Ordering Code



<sup>&</sup>lt;sup>1</sup> with optional analogue output max. 1 contact possible

<sup>&</sup>lt;sup>2</sup> suitable for flange installation

<sup>&</sup>lt;sup>3</sup> Parameters can be programmed by customer either with the programming kit CIS 680 / CIS 681 or with the programming device P6 (available as accessories).



# **Electronic OEM Pressure Switch**

### Applications:

- mechanical enginering / hydraulics
- measuring, control and process technology

### Characteristics:

- ► nominal pressure ranges from 0 ... 2 bar up to 0 ... 400 bar
- ▶ 1 or 2 contacts
- configurable via PC or programming device P6
- ▶ optional:
  - oil- and fat free version
  - oxygen application

**Technical Data** 

CE

Input pressure range									
Nominal pressure gauge	[bar]	2	5	10	20	50	100	200	400
Nominal pressure abs.	[bar]	2	5	10	20	50	100	200	400
Overpressure	[bar]	7	12	25	50	120	250	400	600
Supply									
Supply voltage V <sub>S</sub>		12 30 V <sub>D</sub>	C						
Current consumption		max. 14 m/	A (without co	ntacts)					
Contacts									
Number		standard:	1			optional:	2		
Туре		PNP							
Switching performance		max. 300 n	nA, short-circ	uit proof					
Accuracy of contacts		IEC 60770:	≤ ±1 % FSC	)					
Repeatability		≤ ± 0.2 % F	SO						
Minimum hysteresis of con	tacts	≤ ± 0.5 % F	SO						
Status indication		SP 1: gree	n			SP 2: ye	llow		
Switching function <sup>1</sup>		standard:	n/o			optional:			
Switching mode <sup>1</sup>		standard:	hysteresis m	node		optional:	window mod	de	
Switch on point 1				ng 80 % FSC					
		others:			ble range 5 .	100 % FS	0		
Switch off point 1				ng 75 % FSC					
	1	others:		rder; adjusta	ble range 5.	100 % FS	0		
Switch on / switch off delay	<i>'</i> '	standard:				4.0			
<u> </u>		others:			ble range fro	m 10 msec	up to 90 sec	(step 10 msed	C)
Switching frequency			hout switching	ng delay)					
Switching cycles		> 100 x 10 <sup>6</sup>							
Parameters can be programn (available as accessories).	ned by cu	istomer either	with the progra	amming kit CIS	685 / CIS 686	or with the p	rogramming de	vice P6	
Thermal effects (Offset a	nd Spar	n) / Permiss	ble tempera	atures					
Thermal error		≤ ± 0.3 % F	SO / 10 K		in co	mpensated	range -25	85 °C	
Permissible temperatures		medium / e	lectronics / e	nvironment:	-25 85 °	°C s	torage: -40	85 °C	

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	,
Vibration	10 g RMS (20 2000 Hz)
Shock	100 g / 11 msec
	100 g / 11 msec
Materials	\(\text{\cong}\)
Pressure port	stainless steel 1.4305
Housing	stainless steel 1.4305, POM black
Seals (media wetted)	Standard: FKM optional: EPDM, NBR
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %
Media wetted parts	pressure port, seals, diaphragm
Miscellaneous	
Option oxygen application	for $P_N \le 15$ bar: O-ring in 70 EPDM 281 (with BAM-approval); permissible maximum values are 15 bar / 60° C and 10 bar / 90° C for $P_N \le 25$ bar: O-ring in FKM Vi 567 (with BAM-approval); permissible maximum values are 25 bar / 150° C
Weight	approx. 90 g
Installation position	any
Ingress protection	IP 67
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) <sup>2</sup>
<sup>2</sup> This directive is only valid for devices	with maximum permissible overpressure > 200 bar
Wiring diagrams	
1 contact	2 contacts
supply –  V contact	$V_s$ $\begin{array}{cccccccccccccccccccccccccccccccccccc$
Pin configuration	
Electrical connection	M12x1 (5-pin)
	1
Supply + Supply –	3
Contact 1	4
Contact 2	5
Shield	plug housing
Dimensions (in mm)	Page 11- and 2
LED SP1  0 26  SW24	-M12x1
G1/4" DIN 38	52

## Ordering Code

DS 6	- — - — ·	. 🗆 - 🗆 - 🖂		<b>-</b>		
Pressure						
gauge	6 8 5 6 8 6					
absolute	6 8 6					
Input [bar]						
2	2 0 0 1					
5	5 0 0 1					
10	1 0 0 2 2 0 0 2					
20	2 0 0 2					
50	5 0 0 2					
100	1 0 0 3					
200	2 0 0 3					
400	4 0 0 3 9 9 9 9					
customer	9 9 9 9					consult
Number of contacts						
1 contact		1				
2 contacts		2				
Analogue output						
without analogue output		0				
Electrical connection						
M12x1 (5-pin)		N 1 1				
customer		9 9 9				consult
Mechanical connection						
G1/4" DIN 3852			3 0 0			
customer			3 0 0 9 9 9			consult
Seals						
FKM			1			
EPDM			3	3		
NBR			5	5		
customer			9			consult
Setting code						
BD SENSORS standard <sup>1</sup>				0 0 0		
setting according to customer 1				0 0 0 9 9		consult
Special version						
standard				0		
oxygen application <sup>2</sup>				0	0 7	
oil and grease free				0	0 8	
customer					9 9	

<sup>1</sup> Parameters can be programmed by customer either with the programming kit CIS 685 / CIS 686 or with the programming device P6 (available as accessories).

 $<sup>^{2}</sup>$  oxygen application with FKM-seal up to 25 bar or with EPDM-seal up to 15 bar possible, flush version on request

### **COMPETENCE**

# PRICE / PERFORMANCE

Industrial pressure measurement technology from 0.1 mbar up to 6000 bar

pressure measurement at the highest level

- → pressure transmitters, electronic pressure switches or hydrostatic level probes
- → OEM or high-end products
- → standard products or customized solutions

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HVAC



hydraulics



refrigeration



calibration techniques



laboratory techniques



medical technology



food and beverage



vehicles and mobile hydraulics



oil and gas industry



pharmaceutical industry



marine / shipbuilding / offshore



heavy industry



environmental industry



packaging and paper industry

### **MEDIA**



sewage



aggressive media



colours



gases



fuels and oils



pasty and viscous media



oxygen



water



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