

# PRESSURE SWITCH

## PRODUCT CATALOGUE



PRESSURE at the highest LEVEL.

**BD|SENSORS**  
pressure measurement

>> [www.bdsensors.de](http://www.bdsensors.de)



# PRESSURE AT THE HIGHEST LEVEL.

“Successful medium-sized companies are not successful because they are active in many areas, but rather because they concentrate on one area and do it better than anyone else.”

This is our philosophy. That’s why BD|SENSORS has concentrated on electronic pressure measurement technology from the beginning.

With our unremitting product and quality strategy we have been successful in becoming a major player on the world market for electronic pressure sensing devices within a few years.

With 260 employees at 4 locations in Germany, the Czech Republic, Russia and China BD|SENSORS has solutions from 0.1 mbar to 8000 bar:

- > pressure sensors, pressure transducers  
pressure transmitters

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- > electronic pressure switches

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- > pressure measuring devices with display and  
switching outputs

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- > hydrostatic level probes

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Two pressure transmitters and a submersible probe, based on a stainless steel silicon sensor were the beginning. Today the range extends to more than 100 standard products, from economical OEM devices to high-end products with HART® communication or field bus interface.

In addition we have developed hundreds of customer-specific 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.

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.**

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	PRODUCT		PREF. APPLIC.		MATERIALS IN CONTACT WITH MEDIA						NOMINAL PRESSURE		ACCURACY	OUTPUTS			DISPLAY		CERTIFICATES			
	page	Industrie „general“	Industrie „flush“	pressure connection		Sensor				bar min	bar max	% FSO (standard)	1 / 2	1 / 2 / 4	analogue signal mA / V	stainless steel	plastic	EX	3A	IO-Link	EHEDG	
				metal	plastic	stainless steel	ceramic	elastomer	without, welded													
<b>with display</b>																						
INDUSTRY	DS 400	5-9	•	•	•	•	•	•	•	0,1	600	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 401	10-14	•	•	•	•	•	•	•	0,4	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 350	15-19	•	•	•	•	•	•	•	0,1	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 351	20-24	•	•	•	•	•	•	•	0,4	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 200	25-29	•	•	•	•	•	•	•	0,1	600	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 201	30-34	•	•	•	•	•	•	•	0,4	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 202	35-39	•	•	•	•	•	•	•	6	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 210	40-44	•	•	•	•	•	•	•	0,01	1	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 214	45-48	•	•	•	•	•	•	•	600	2200	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 233	49-53	•	•	•	•	•	•	•	0,006	1	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 400P	54-59	•	•	•	•	•	•	•	0,1	40	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 350P	60-64	•	•	•	•	•	•	•	0,001	40	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 200P	65-70	•	•	•	•	•	•	•	0,1	40	± 0,35	•	•	•	•	•	•	•	•	•	
	DS 201P	71-75	•	•	•	•	•	•	•	60	400	± 0,50	•	•	•	•	•	•	•	•	•	
OEM	DS 217	76-78	•	•	•	•	•	•	•	6	600	± 0,50	•	•	•	•	•	•	•	•	•	
	DS 230	79-81	•	•	•	•	•	•	•	2	400	± 1,50	•	•	•	•	•	•	•	•	•	
<b>without display</b>																						
OEM	iS 4	82-85	•	•	•	•	•	•	•	1   -1	10   0	± 0,50	•	•	•	•	•	•	•	•		
	DS 4	86-89	•	•	•	•	•	•	•	1   -1	10   0	± 1,00	•	•	•	•	•	•	•	•		
	DS 5	90-92	•	•	•	•	•	•	•	16	600	± 0,50	•	•	•	•	•	•	•	•		
	DS 6	93-95	•	•	•	•	•	•	•	2	400	± 1,00	•	•	•	•	•	•	•	•		



# DS 400

## 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

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 and dust
- ▶ welded pressure sensor
- ▶ 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 rotatable in the globe 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 gauge [bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	
Nominal pressure absolute [bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6	
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 gauge / absolute [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	p <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance						p <sub>N</sub> < 1 bar: on request					

Contact <sup>1</sup>	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	contact rating 125 mA, short-circuit resistant; V <sub>switch</sub> = V <sub>S</sub> – 2V
Accuracy of contacts <sup>2</sup>	≤ ± 0.25 % FSO
Repeatability	≤ ± 0.1 % 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

<sup>1</sup> with IS-protection max. 1 contact possible

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> – V <sub>Smin</sub> ) / 0.02 A] Ω response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> – V <sub>Smin</sub> ) / 0.02 A] Ω response time: < 10 msec
3-wire current signal	4 ... 20 mA / V <sub>S</sub> = 24 V <sub>DC</sub> ± 10 % adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: R <sub>max</sub> = 500 Ω response time: < 30 msec
Without analogue output	V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>
Accuracy <sup>2</sup>	standard: nominal pressure < 0.4 bar: ≤ ± 0.50 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (offset and span)			
Nominal pressure p <sub>N</sub> [bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 70	-20 ... 85

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 60068-2-27

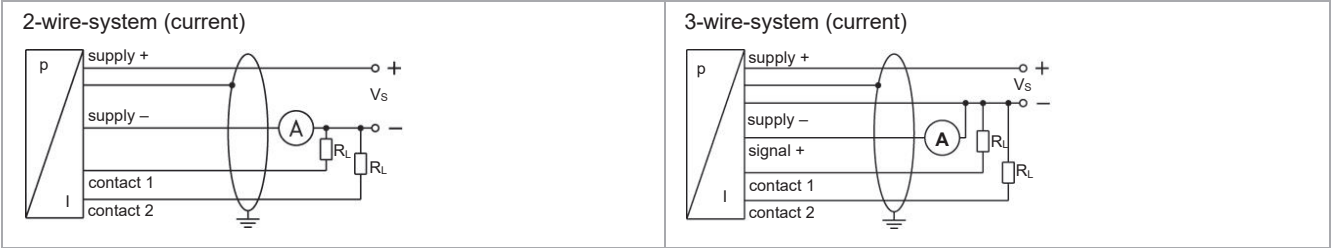
Materials	
Pressure port	stainless steel 1.4404 (316L)
Housing	stainless steel 1.4301 (304)
Housing cap	standard: plastic HDPE for option IS-protection: stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM on request: welded version <sup>4</sup> and others
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

<sup>4</sup> welded version only for pressure ports according to EN 837; possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval AX14-DS 400	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety techn. maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \approx 0 \text{ pF}$ , $L_i \approx 0 \text{ }\mu\text{H}$
Max. switching current <sup>5</sup>	70 mA
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -25 ... 70 °C
<sup>5</sup> the real switching current in the application 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 % $\pm$ 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
Ingress protection	IP 67
Installation position	any <sup>6</sup>
Weight	approx. 400 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>7</sup>
ATEX Directive	2014/34/EU

<sup>6</sup> Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges  $p_N \leq 1 \text{ bar}$ .  
<sup>7</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.

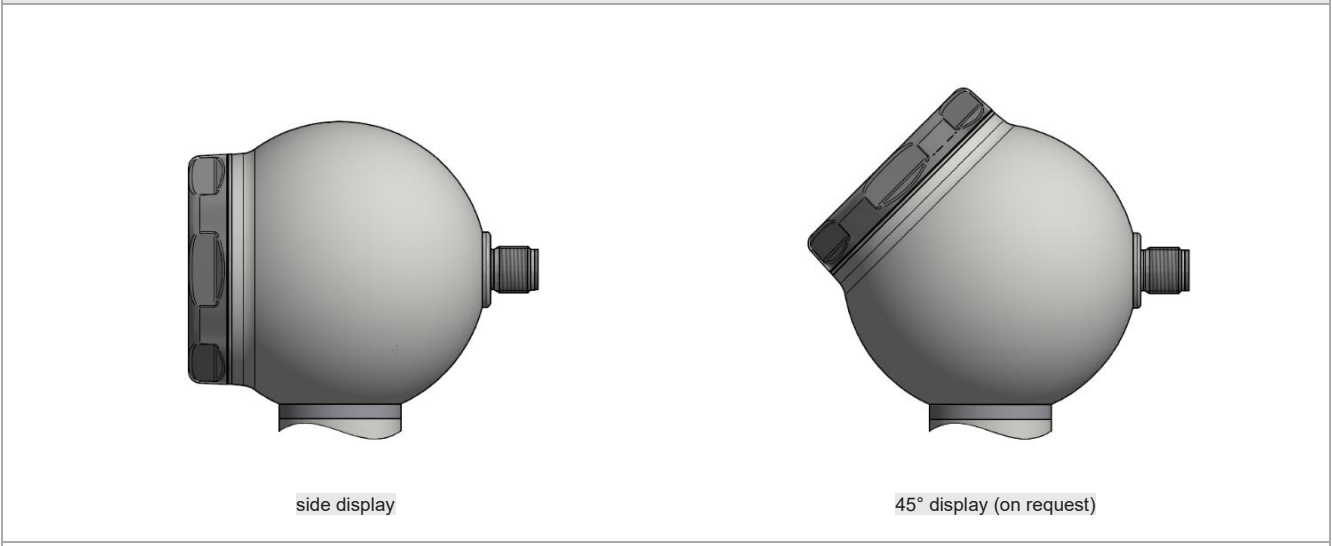
**Wiring diagrams**



**Pin configuration**

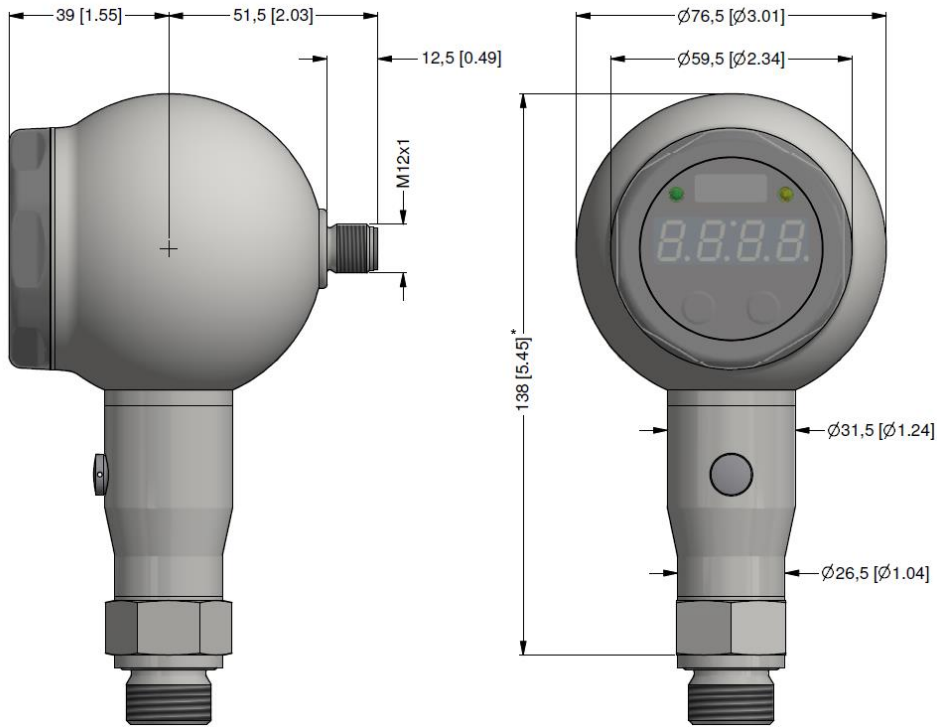
Electrical connection	M12x1 / metal (5-pin)	
Supply +	1	
Supply -	3	
Signal + (only 3-wire)	2	
Contact 1	4	
Contact 2	5	
Shield	plug housing / pressure port	

**Designs <sup>8</sup>**



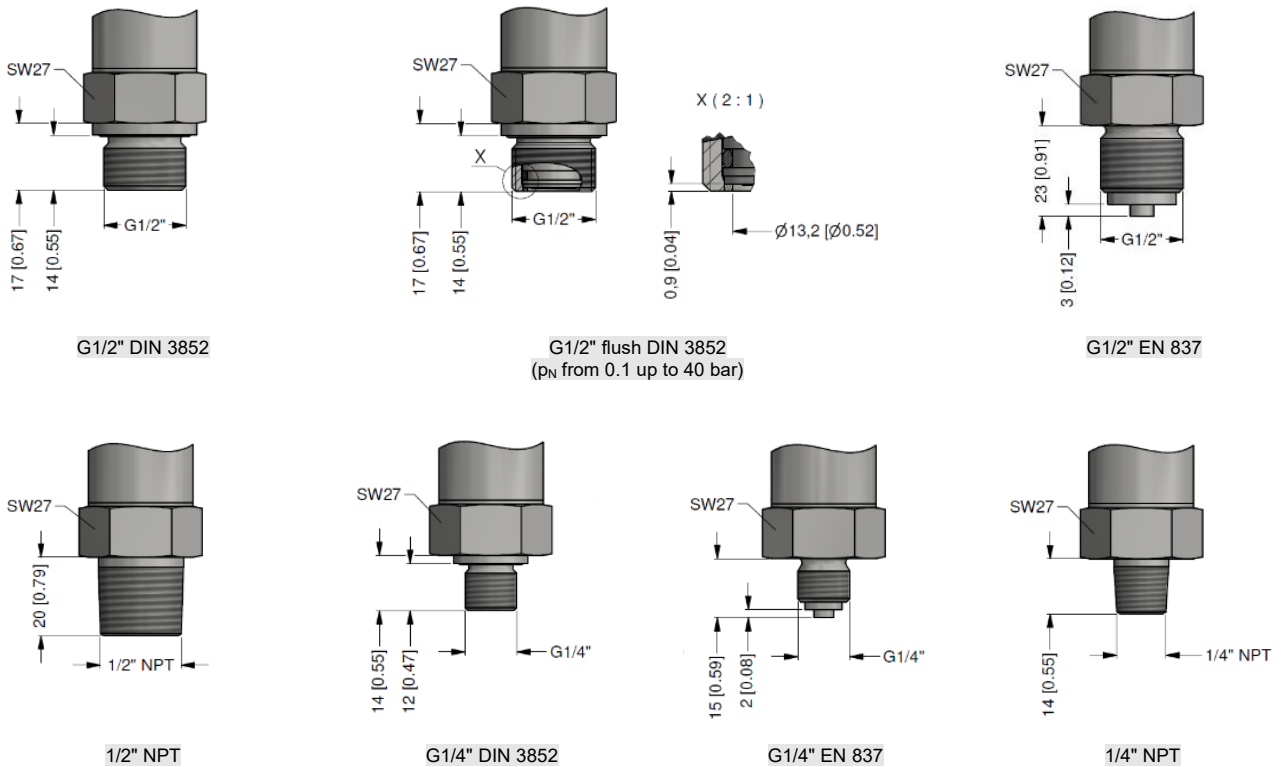
<sup>8</sup> all designs in horizontal rotatable housing as standard

**Dimensions (mm / in)**



\* for nominal pressure  $p_N > 400$  bar increases the length of devices without IS-protection by 19 mm

**Mechanical connections (dimensions mm / in)**



⇒ metric threads and other versions on request



**Ordering code DS 400**

DS 400



<b>Pressure</b>										
	gauge <sup>1</sup>	7	A	0						
	absolute <sup>2</sup>	7	A	1						
<b>Input</b>										
	[bar]									
	0.10 <sup>2</sup>				1	0	0	0		
	0.16 <sup>2</sup>				1	6	0	0		
	0.25 <sup>2</sup>				2	5	0	0		
	0.40				4	0	0	0		
	0.60				6	0	0	0		
	1.0				1	0	0	1		
	1.6				1	6	0	1		
	2.5				2	5	0	1		
	4.0				4	0	0	1		
	6.0				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		
	100				1	0	0	3		
	160				1	6	0	3		
	250				2	5	0	3		
	400				4	0	0	3		
	600				6	0	0	3		
	-1 ... 0				X	1	0	2		
	customer				9	9	9	9		consult
<b>Design</b>										
	stainless steel globe housing (side display)								K H	
	stainless steel globe housing (45° display)								K 4	consult
<b>Analogue output</b>										
	without								0	
	4 ... 20 mA / 2-wire								1	
	4 ... 20 mA / 3-wire, adjustable								7J	
	intrinsic safety 4 ... 20 mA / 2-wire <sup>3</sup>								E	
	customer								9	consult
<b>Contact</b>										
	1 contact								1	
	2 contacts <sup>3</sup>								2	
<b>Accuracy</b>										
	standard for p <sub>N</sub> ≥ 0.4 bar								0.35 %	3
	standard for p <sub>N</sub> < 0.4 bar								0.50 %	5
	option for p <sub>N</sub> ≥ 0.4 bar								0.25 %	2
	customer									9
<b>Electrical connection</b>										
	male plug M12x1 (5-pin) / metal version								N 1 1	
	customer								9 9 9	consult
<b>Mechanical connection</b>										
	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 with flush sensor <sup>4</sup>								F 0 0	
	1/2" NPT								N 0 0	
	1/4" NPT								N 4 0	
	customer								9 9 9	consult
<b>Seals</b>										
	FKM								1	
	without (welded version) <sup>5</sup>								2	consult
	customer								9	consult
<b>Special version</b>										
	standard								0 0 0	
	customer								9 9 9	consult

<sup>1</sup> from 60 bar: measurement starts with ambient pressure  
<sup>2</sup> absolute pressure possible from 0.4 bar  
<sup>3</sup> with IS version max. 1 contact is possible  
<sup>4</sup> only possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar  
<sup>5</sup> welded version only with pressure ports according to EN 837; possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar



# DS 401

## 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 ... 20 mA

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 and dust
- ▶ 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 globe 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



<b>Input pressure ranges</b>																		
Nominal pressure gauge [bar]	-1...0	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: unlimited vacuum resistance p <sub>N</sub> < 1 bar: on request																	

<b>Contact <sup>1</sup></b>	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	contact rating 125 mA, short-circuit resistant; V <sub>Switch</sub> = V <sub>S</sub> - 2V
Accuracy of contacts <sup>2</sup>	≤ ± 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

<sup>1</sup> with Ex-protection max. 1 contact possible

<b>Analogue output (optionally) / Supply</b>	
2-wire current signal	4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
2-wire current signal, IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
3-wire current signal	4 ... 20 mA / V <sub>S</sub> = 24 V <sub>DC</sub> ± 10 % adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: R <sub>max</sub> = 500 Ω 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>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

<b>Thermal effects (offset and span)</b>	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	0 ... 85 °C

<b>Permissible temperatures</b>	
Medium <sup>4</sup>	-40 ... 125 °C
Electronics / environment	-40 ... 85 °C
Storage	-40 ... 100 °C

<sup>4</sup> for pressure port in PVDF the medium temperature is -30 ... 60 °C

<b>Electrical protection</b>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<b>Mechanical stability</b>	
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

<b>Materials</b>	
Pressure port	standard: 1.4404 (316L) option for G1/2" open port (up to 60 bar): PVDF
Housing	stainless steel 1.4301 (304)
Housing cap	standard: plastic HDPE for option IS-protection: stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals	standard: FKM option: EPDM (p <sub>N</sub> ≤ 160 bar) others on request
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %
Media wetted parts	pressure port, seals, diaphragm

<b>Explosion protection (only for 4 ... 20 mA / 2-wire)</b>	
Approval AX14-DS 401	IBExU06ATEX1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C ≈ 0 nF, L <sub>i</sub> ≈ 0 μH
Max. switching current <sup>5</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 or higher: -25 ... 70 °C

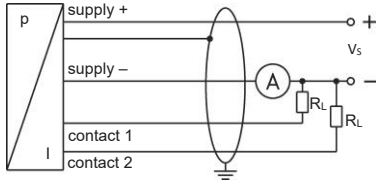
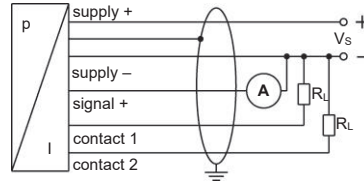
<sup>5</sup> the real switching current in the application depends on the power supply unit

**Miscellaneous**

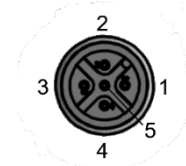
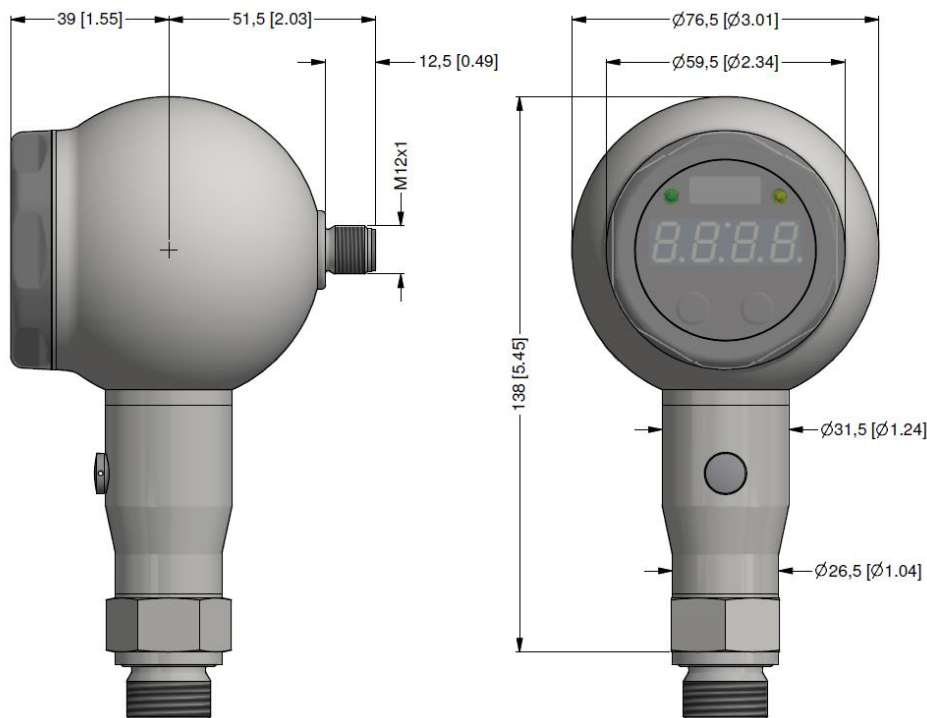
Display	4-digit, 7-segment-LED display; visible range 37.2 x 11 mm; digit height 10 mm, range of indication -1999 ... +9999; accuracy 0.1 % ± 1 digit digital damping 0.3 ... 30 sec (programmable) measured value update 0.0 ... 10 sec (programmable)	
Option oxygen application <sup>6</sup>	for $p_N \leq 25$ 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
Ingress protection	IP 67	
Installation position	any	
Weight	approx. 400 g	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) <sup>7</sup>
ATEX Directive	2014/34/EU	

<sup>6</sup> not possible with flush pressure ports

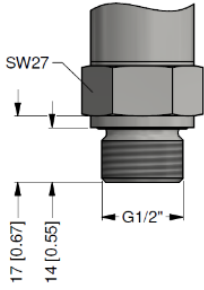
<sup>7</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

**Wiring diagrams****2-wire-system (current)****3-wire-system (current)****Pin configuration**

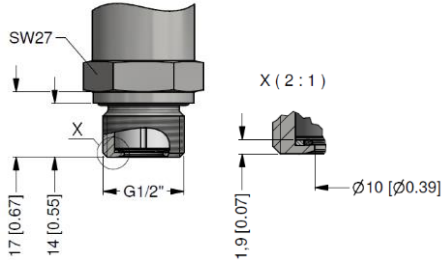
Electrical connection	M12x1 / metal (5-pin)
Supply +	1
Supply -	3
Signal + (only 3-wire)	2
Contact 1	4
Contact 2	5
Shield	plug housing / pressure port

**Dimensions (mm / in)**

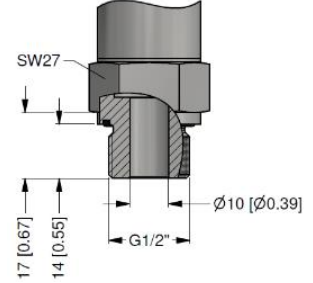
**Mechanical connections (dimensions mm / in)**



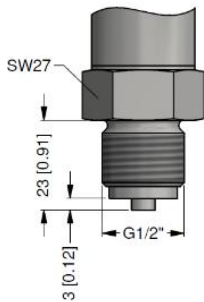
G1/2" DIN 3852



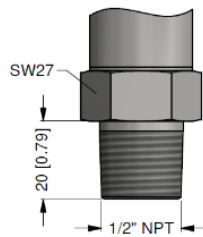
G1/2" flush DIN 3852  
(p<sub>N</sub> from 0.4 up to 40 bar)



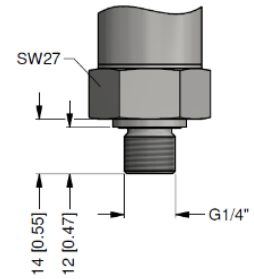
G1/2" open port  
DIN 3852



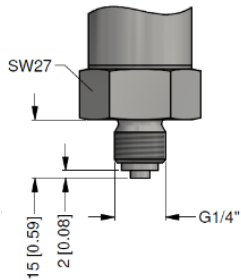
G1/2" EN 837



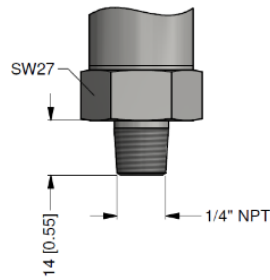
1/2" NPT



G1/4" DIN 3852



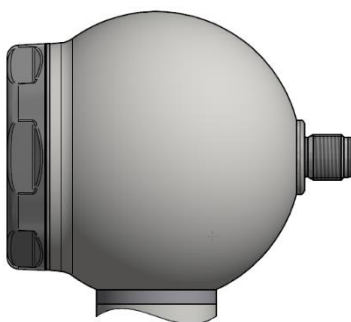
G1/4" EN 837



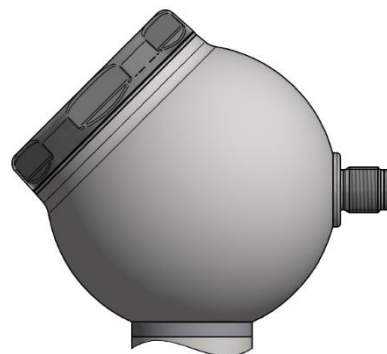
1/4" NPT

⇒ metric threads and other versions on request

**Designs <sup>8</sup>**



side display

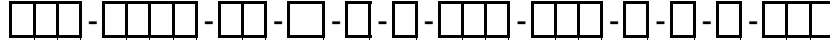


45° display (on request)

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

## Ordering code DS 401

DS 401



Pressure		gauge		7	A	2													
Input		[mH <sub>2</sub> O]	[bar]																
		gauge in mH <sub>2</sub> O		7	A	E													
		absolute		7	A	3													
		4	0.4	4	0	0	0												
		6	0.6	6	0	0	0												
		10	1.0	1	0	0	1												
		16	1.6	1	6	0	1												
		25	2.5	2	5	0	1												
		40	4.0	4	0	0	1												
		60	6.0	6	0	0	1												
		100	10	1	0	0	2												
		160	16	1	6	0	2												
		250	25	2	5	0	2												
		400	40	4	0	0	2												
		600	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												
			600	6	0	0	3												
			-1 ... 0	X	1	0	2												
		customer		9	9	9	9												
<b>Design</b>																			
		stainless steel globe housing (side display)					K	H											
		stainless steel globe housing (45° display)					K	4											
<b>Analogue output</b>																			
		without					0												
		4 ... 20 mA / 2-wire					1												
		4 ... 20 mA / 3-wire, adjustable					7J												
		intrinsic safety 4 ... 20 mA / 2-wire <sup>1</sup>					E												
		customer					9												
<b>Contact</b>																			
		1 contact					1												
		2 contacts <sup>1</sup>					2												
<b>Accuracy</b>																			
		0.5 % FSO					5												
		customer					9												
<b>Electrical connection</b>																			
		male plug M12x1 (5-pin) / metal version					N	1	1										
		customer					9	9	9										
<b>Mechanical connection</b>																			
		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 with flush sensor <sup>2</sup>					F	0	0										
		G1/2" DIN 3852 open pressure port					H	0	0										
		1/2" NPT					N	0	0										
		1/4" NPT					N	4	0										
		customer					9	9	9										
<b>Seals</b>																			
		FKM					1												
		EPDM <sup>3</sup>					3												
		customer					9												
<b>Pressure port</b>																			
		stainless steel 1.4404 (316L)					1												
		PVDF <sup>4</sup>					B												
		customer					9												
<b>Diaphragm</b>																			
		ceramics Al <sub>2</sub> O <sub>3</sub> 96%					2												
		customer					9												
<b>Special version</b>																			
		standard					0	0	0										
		oxygen application <sup>5</sup>					0	0	7										
		customer					9	9	9										

<sup>1</sup> with IS version max. 1 contact is possible<sup>2</sup> G1/2" flush up to 25 bar and nominal pressure abs. on request<sup>3</sup> possible for nominal pressure ranges p<sub>N</sub> ≤ 160 bar<sup>4</sup> PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar); Ex-protection not possible; permissible medium temperature: -30 ... 60 °C<sup>5</sup> oxygen application with FKM-seal up to 25 bar possible



# DS 350

## Electronic Pressure Switch with IO-Link Interface

Stainless Steel Sensor

accuracy according to IEC 60770:  
 standard: 0.5 % FSO / 0.35 % FSO  
 option: 0.25 % FSO

### Nominal pressure

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

### Digital output signal

IO-Link according to specification V 1.1  
 smart sensor profile  
 data transfer 38.4 kbit/sec

### Switchable output signal

PNP / NPN / 4 ... 20 mA / 0 ... 10 V

### Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ parameter settings via IO-Link or menu (VDMA-conform)
- ▶ additional information via IO-Link accessible



### Optional versions

- ▶ different mechanical connections
- ▶ customer specific versions

The electronic pressure switch DS 350 is interesting for all users in plant and machine engineering, due to the integrated IO-Link interface to exchange process data, diagnostic reports and status messages with a superordinate control level, as standard. In addition, further information can be retrieved that allow conclusions to the application process.

Especially in mechanical engineering, great demand for flexible operating conditions have to be satisfied. Therefore the multi-rotatable display module offers best readability for the user by a quick and easy adjustment. Also, the switchability of the output signal as switching signal or analogue signal (mA / V) increases flexibility and integration in different applications.

### Preferred areas of use are

-  Plant and machine engineering
-  Environmental engineering (water – sewage – recycling)



Input pressure range											
Nominal pressure gauge	[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure absolute	[bar]	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Overpressure (static)	[bar]	0.5	1	1	2	5	5	10	10	20	40
Burst pressure $\geq$	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Input pressure range											
Nominal pressure gauge / absolute	[bar]	10	16	25	40	60	100	160	250	400	600
Overpressure (static)	[bar]	40	80	80	105	210	600	600	1000	1000	1000
Burst pressure $\geq$	[bar]	50	120	120	210	420	1000	1000	1250	1250	1800
Vacuum resistance	[bar]	$p_N \geq 1$ bar: unlimited vacuum resistant $p_N < 1$ bar: on request									

Supply	
Voltage supply	$V_S = 18 \dots 30 V_{DC}$
Output signals	
Output signal 1	IO-Link / SIO (PNP / NPN) switchable
Output signal 2	4 ... 20 mA / 3-wire or 0 ... 10 V / 3-wire or PNP / NPN switchable
Signal characteristics switching signal	
Accuracy of switching points <sup>1</sup>	$\leq \pm 0.35$ % FSO
Repeatability	$\leq \pm 0.1$ % FSO
Max switching current	150 mA
Switching frequency	max. 170 Hz
Delay time	0.0 ... 50.0 sec
Response time	< 12 msec
Signal characteristics analogue signal	
Accuracy <sup>1</sup>	standard:    nominal pressure < 0.4 bar: $\leq \pm 0.50$ % FSO nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35$ % FSO option:        nominal pressure $\geq 0.4$ bar $\leq \pm 0.25$ % FSO
Long term stability	$\leq \pm 0.3$ % FSO / year at reference conditions
Load (4 ... 20 mA / 3-wire)	$R_{max} = 330 \Omega$
Load (0 ... 10 V / 3-wire)	$R_{min} = 10 k\Omega$
Influence effects	supply: 0.05% FSO load: $\leq 0.1$ % FSO
Adjustability	offset: $\pm 5$ % span:    -10 %
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span)	
Thermal error	$\leq \pm 0.3$ % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures	
Permissible temperatures	medium:                                    -40 ... 125 °C electronics / environment / storage: -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
IO-Link	
Interface	IO-Link 1.1; slave
Data transfer	38.4 kbit/sec (COM 2)
Mode	SIO / IO-Link
Standard	IEC 61131-2 IEC 61131-9



Mechanical stability		
Vibration	10 g / 25 Hz ... 2 kHz	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27
Materials		
Display housing	PA 6.6	
Pressure port / housing	stainless steel 1.4404 (316L)	
Seal	standard: FKM options: EPDM welded version (only for pressure port according to EN 837 with $p_N \leq 40$ bar) others on request	
Diaphragm	stainless steel 1.4435 (316L)	
Media wetted parts	pressure port, seal, diaphragm	
Miscellaneous		
Display	4-digit, 7-segment-LED display on black base body, white, blue foil digit height 7 mm range of indication -1999 ... +9999 visible range 22.5 x 10.5 mm 4 LEDs for unit switching (bar, mbar, PSI, MPa) LED status display for IO-Link and contacts	
Operation	2 buttons	
Featured	functions according to VDMA 24574-1	
Turn-on time	110 msec	
Weight	approx. 230 g	
Operational life	100 million load cycles	
Current consumption	< 50 mA (without contacts)	
Ingress protection	IP 67	
Installation position	any <sup>2</sup>	
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>3</sup>	

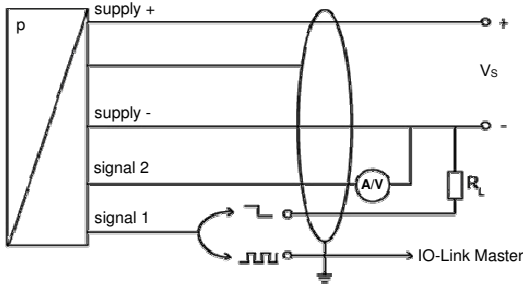
<sup>2</sup> Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges  $p_N \leq 1$  bar.

<sup>3</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.

**Wiring diagrams**

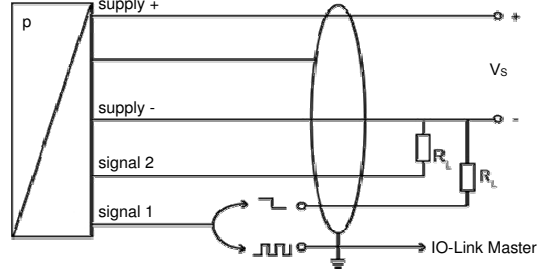
3-wire-system / configuration of analogue output:

signal 1: IO-Link or contact  
signal 2: analogue output



3-wire-system / configuration of contact:

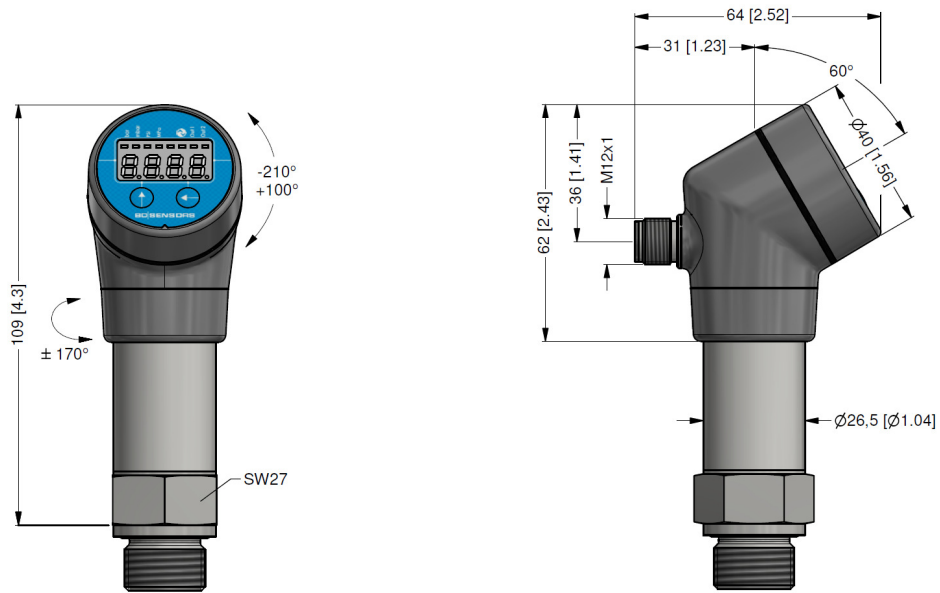
signal 1: IO-Link or contact  
signal 2: contact



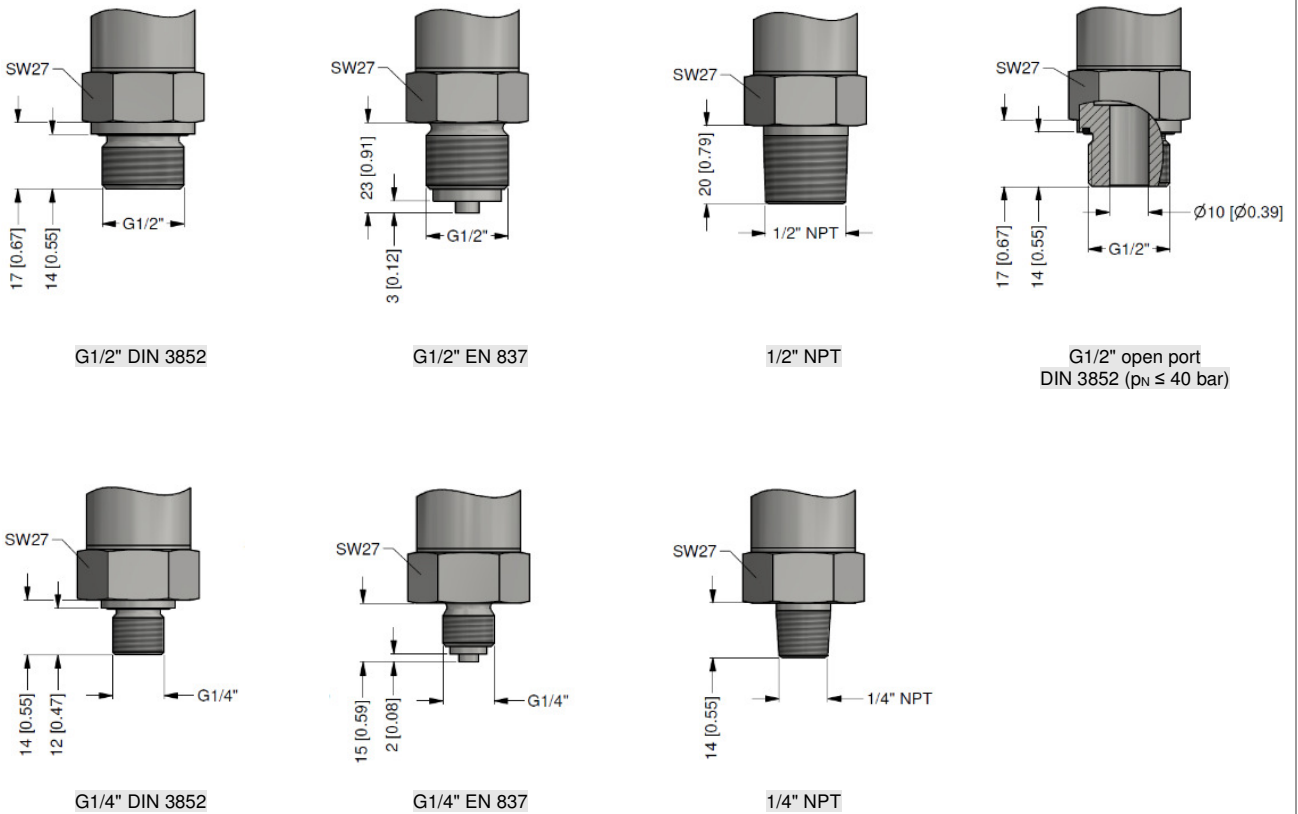
**Electrical connection**

Pin configuration	Description	M12x1 (4-pin), metal	
Supply +	supply	1	
Supply -	supply	3	
Output signal 1	IO-Link / SIO (PNP / NPN)	4	
Output signal 2	4 ... 20 mA - 3-wire / 0 ... 10 V - 3-wire (PNP / NPN)	2	
Shield	shielding	plug housing	

**Dimensions (mm / in)**



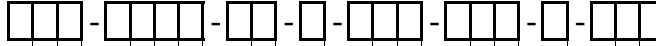
**Mechanical connections (dimensions mm / in)**



⇒ metric threads and other versions on request

Ordering code DS 350

DS 350



<b>Pressure</b>											
	gauge	7	E	0							
	absolute <sup>1</sup>	7	E	1							
<b>Input</b>											
	[bar]										
	0.10 <sup>1</sup>	1	0	0	0						
	0.16 <sup>1</sup>	1	6	0	0						
	0.25 <sup>1</sup>	2	5	0	0						
	0.40	4	0	0	0						
	0.60	6	0	0	0						
	1.0	1	0	0	1						
	1.6	1	6	0	1						
	2.5	2	5	0	1						
	4.0	4	0	0	1						
	6.0	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						
	100	1	0	0	3						
	160	1	6	0	3						
	250	2	5	0	3						
	400	4	0	0	3						
	600	6	0	0	3						
	customer	9	9	9	9					consult	
<b>Output</b>											
	IO-Link + PNP/NPN + analogue output <sup>2</sup>					I	X				
<b>Accuracy</b>											
	standard for p <sub>N</sub> ≤ 0.4 bar	0.50 % FSO								5	
	standard for p <sub>N</sub> > 0.4 bar	0.35 % FSO								3	
	option for p <sub>N</sub> ≥ 0.4 bar	0.25 % FSO								2	
	customer									9	
											consult
<b>Electrical connection</b>											
	male plug M12x1 (4-pin) / metal							M	1	B	
	customer							9	9	9	
											consult
<b>Mechanical connection</b>											
	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 port <sup>3</sup>							H	0	0	
	1/2" NPT							N	0	0	
	1/4" NPT							N	4	0	
	customer							9	9	9	
											consult
<b>Seal</b>											
	FKM									1	
	EPDM									3	
	without (welded version) <sup>4</sup>									2	
	customer									9	
											consult
<b>Special version</b>											
	standard									0	
	customer									9	
										9	
											consult

<sup>1</sup> absolute pressure possible from 0.4 bar  
<sup>2</sup> contact PNP/NPN switchable; analogue output 0 ... 10 V / 4 ... 20 mA switchable  
<sup>3</sup> not possible for nominal pressure p<sub>N</sub> > 40 bar  
<sup>4</sup> welded version only with pressure ports according to EN 837, possible for p<sub>N</sub> ≤ 40 bar



# DS 351

## Electronic Pressure Switch with IO-Link Interface

Ceramic Sensor

accuracy according to IEC 60770:  
0.5 % FSO

### Nominal pressure

from 0 ... 0.4 bar up to 0 ... 600 bar gauge  
from 0 ... 0.6 bar up to 0 ... 600 bar absolute

### Digital output signal

IO-Link according to specification V 1.1  
smart sensor profile  
data transfer 38.4 kbit/sec

### Switchable output signal

PNP / NPN / 4 ... 20 mA / 0 ... 10 V

### Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ parameter settings via IO-Link or menu (VDMA-conform)
- ▶ additional information via IO-Link accessible

### Optional versions

- ▶ different mechanical connections
- ▶ pressure port in PVDF
- ▶ customer specific versions



The DS 351 has been designed for applications in machine tools or pneumatic and hydraulic systems. In combination with the optionally available PVDF pressure port also the usage in aggressive media is possible, whereby material resistance has to be checked in advance.

It offers an IO-Link interface as standard, which provides process data, diagnostics reports and status messages as well as other features, which are helpful for service / maintenance and condition analysis of a machine or plant.

The parameters are set either also via control level or via VDMA-compliant menu system, which can be carried out in situ by using two buttons.

The multiple, infinitely variable adjustability of the display as well as the individually parameterizable output signal (switching or analogue signal (mA / V)) support the user in realizing the measurement task.

### Preferred areas of use are

-  Plant and machine engineering
-  Environmental engineering  
(water – sewage – recycling)



Input pressure range																				
Nominal pressure gauge	[bar]	-1...0	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600	
Nominal pressure absolute	[bar]	-	-	0.6	1	1.6	2.5	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 $\geq$	[bar]	7	2	4	4	5	5	12	12	25	50	50	120	120	250	500	500	650	880	
Vacuum resistance	[bar]	$p_N \geq 1$ bar: unlimited vacuum resistance $p_N < 1$ bar: on request																		

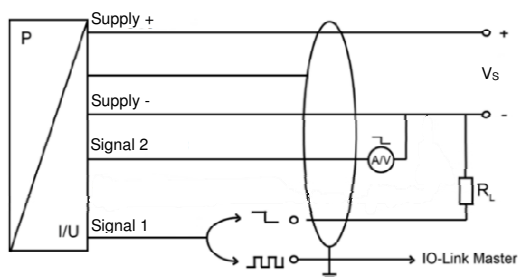
Supply	
Voltage supply	$V_S = 18 \dots 30 V_{DC}$
Output signals	
Output signal 1	IO-Link / SIO (PNP / NPN) switchable
Output signal 2	4 ... 20 mA / 3-wire or 0 ... 10 V / 3-wire or PNP / NPN switchable
Signal characteristics switching signal	
Accuracy of switching points <sup>1</sup>	$\leq \pm 0.5$ % FSO
Repeatability	$\leq \pm 0.1$ % FSO
Max switching current	150 mA
Switching frequency	max. 170 Hz
Delay time	0.0 ... 50.0 sec
Response time	< 12 msec
Signal characteristics analogue signal	
Accuracy <sup>1</sup>	$\leq \pm 1$ % FSO
Long term stability	$\leq \pm 0.3$ % FSO / year at reference conditions
Load (4 ... 20 mA / 3-wire)	$R_{max} = 330 \Omega$
Load (0 ... 10 V / 3-wire)	$R_{min} = 10 k\Omega$
Influence effects	supply: 0.05% FSO load: $\leq 0.1$ % FSO
Adjustability	offset: $\pm 5$ % span: -10 %
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span)	
Thermal error	$\leq \pm 0.3$ % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures	
Permissible temperatures <sup>2</sup>	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C
<sup>2</sup> for pressure port of PVDF the minimum 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
IO-Link	
Interface	IO-Link 1.1; slave
Data transfer	38.4 kbit/sec (COM 2)
Mode	SIO / IO-Link
Standard	IEC 61131-2 IEC 61131-9
Mechanical stability	
Vibration	10 g / 25 Hz ... 2 kHz according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Materials	
Display housing	PA 6.6
Housing	stainless steel 1.4404 (316L)
Pressure port	standard: stainless steel 1.4404 (316L) option for G1/2" open port (with $p_N \leq 60$ bar): PVDF
Seal	standard: FKM option: EPDM (for $p_N \leq 160$ bar) others on request
Diaphragm	ceramics $Al_2O_3$ 96 %
Media wetted parts	pressure port, seal, diaphragm

Miscellaneous	
Display	4-digit, 7-segment-LED display on black base body, white, blue foil, digit height 7 mm, range of indication -1999 ... +9999, visible range 22.5 x 10.5 mm 4 LEDs for unit switching (bar, mbar, PSI, MPa) LED status display for IO-Link and contacts
Operation	2 buttons
Featured	functions according to VDMA 24574-1
Turn-on time	110 msec
Weight	approx. 230 g
Operational life	100 million load cycles
Current consumption	< 50 mA (without contacts)
Ingress protection	IP 67
Installation position	any
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>3</sup>

<sup>3</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.

### Wiring diagram

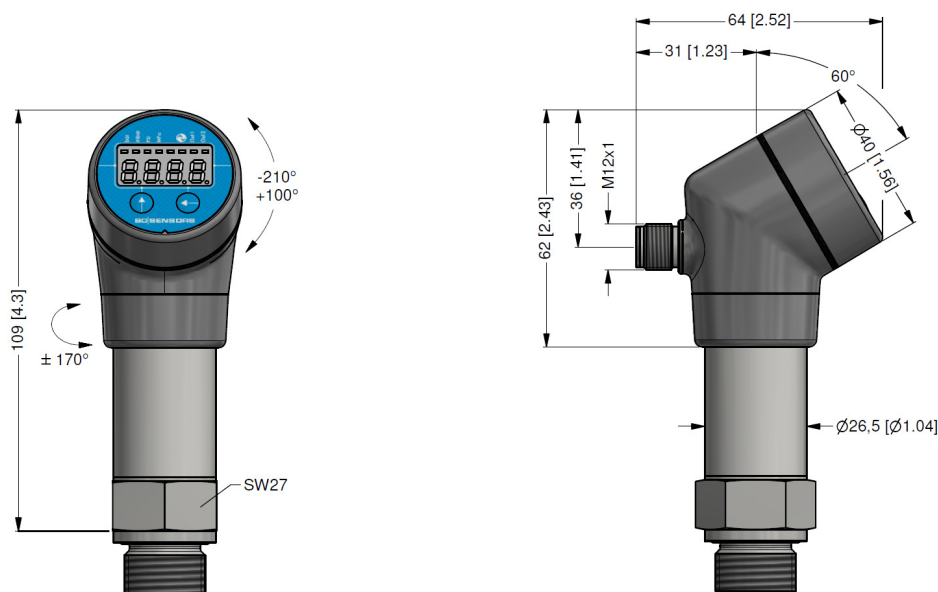
3-wire-system (IO-Link / SIO with contact, analogue output)



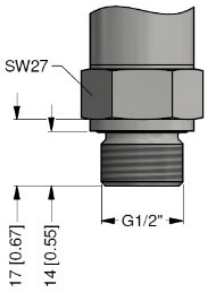
### Electrical connection

Pin configuration	Description	M12x1 (4-pin), metal	
Supply +	supply	1	
Supply -	supply	3	
Output signal 1	IO-Link / SIO (PNP / NPN)	4	
Output signal 2	4 ... 20 mA - 3-wire / 0 ... 10 V - 3-wire (PNP / NPN)	2	
Shield	shielding	plug housing	

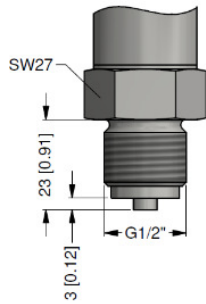
### Dimensions (mm / in)



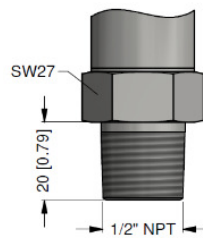
**Mechanical connections (dimensions mm / in)**



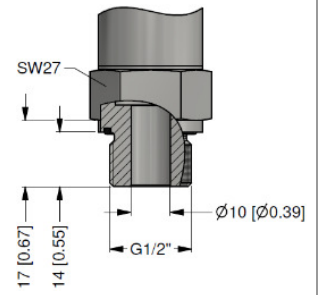
G1/2" DIN 3852



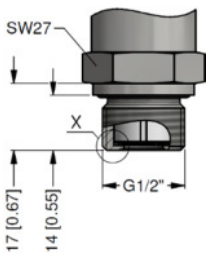
G1/2" EN 837



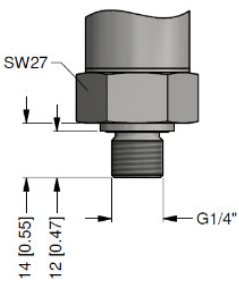
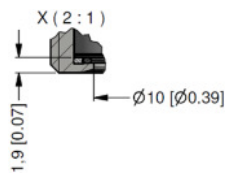
1/2" NPT



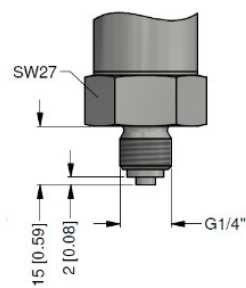
G1/2" DIN 3852 open port <sup>4</sup>



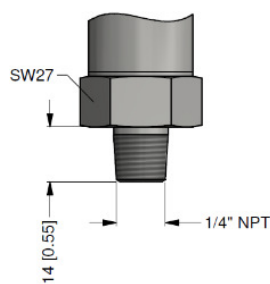
G1/2" DIN 3852 with semi-flush diaphragm  
p<sub>N</sub> ≤ 40 bar



G1/4" DIN 3852



G1/4" EN 837



1/4" NPT

⇒ metric threads and other versions on request

<sup>4</sup> pressure port in PVDF only possible for p<sub>N</sub> ≤ 60 bar

Ordering code DS 351										
DS 351		[ ]	[ ]	[ ]	-	[ ]	[ ]	[ ]	[ ]	[ ]
<b>Pressure</b>										
	gauge	7	E	2						
	absolute	7	E	3						
<b>Input</b>										
	[bar]									
only gauge	0.40	4	0	0	0					
	0.60	6	0	0	0					
	1.0	1	0	0	1					
	1.6	1	6	0	1					
	2.5	2	5	0	1					
	4.0	4	0	0	1					
	6.0	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					
	100	1	0	0	3					
	160	1	6	0	3					
	250	2	5	0	3					
	400	4	0	0	3					
	600	6	0	0	3					
	-1 ... 0	X	1	0	2					
	customer	9	9	9	9					consult
<b>Output</b>										
	IO-Link + PNP/NPN + analogue output <sup>1</sup>					I	X			
<b>Accuracy</b>										
	0.5 % FSO					5				
	customer					9				consult
<b>Electrical connection</b>										
	male plug M12x1 (4-pin) / metal					M	1	B		
	customer					9	9	9		consult
<b>Mechanical connection</b>										
	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		
p <sub>N</sub> ≤ 40 bar:	G1/2" DIN 3852					F	0	0		
	with semi-flush sensor									
	G1/2" DIN 3852 open port					H	0	0		
	1/2" NPT					N	0	0		
	1/4" NPT					N	4	0		
	customer					9	9	9		consult
<b>Seal</b>										
	FKM					1				
p <sub>N</sub> ≤ 160 bar:	EPDM					3				
	customer					9				consult
<b>Pressure port</b>										
	stainless steel 1.4404 (316L)					1				
	PVDF <sup>2</sup>					B				
	customer					9				consult
<b>Diaphragm</b>										
	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %					2				
	customer					9				consult
<b>Special version</b>										
	standard						0	0	0	
	customer						9	9	9	consult

<sup>1</sup> contact PNP/NPN switchable; analogue output 0 ... 10 V / 4 ... 20 mA switchable

<sup>2</sup> PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar); min. permissible temperature -30°C





# DS 200

## 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-version**  
**Ex 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. four 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												
Nominal pressure gauge <sup>1</sup>	[bar]	-1...0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Level gauge <sup>1</sup>	[mH <sub>2</sub> O]	-	1	1.6	2.5	4	6	10	16	25	40	60
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 gauge <sup>1</sup> / abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Level gauge <sup>1</sup>	[mH <sub>2</sub> O]	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		P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance; P <sub>N</sub> < 1 bar: on request									
<sup>1</sup> from 60 bar: measurement starts with ambient pressure											

Contact <sup>2</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	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V <sub>switch</sub> = V <sub>S</sub> - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</sup>	standard: P <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.25 % 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 signal with plug ISO 4400 as well as 2-wire current signal with IS-protection  
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω 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 1:5) <sup>4</sup> 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 V <sub>DC</sub> permissible load: R <sub>min</sub> = 10 kΩ response time: < 3 msec
without analogue output	V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>
Accuracy <sup>3</sup>	standard: P <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO; P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.25 % FSO

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span)				
Nominal pressure P <sub>N</sub>	[bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 70	-20 ... 85

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 60068-2-27

Materials	
Pressure port	stainless steel 1.4404 (316 L)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, polycarbonate
Seals (media wetted)	standard: FKM option: welded version <sup>5</sup> others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

<sup>5</sup> welded version only for pressure ports according to EN 837; possible for nominal pressure ranges P<sub>N</sub> ≤ 40 bar

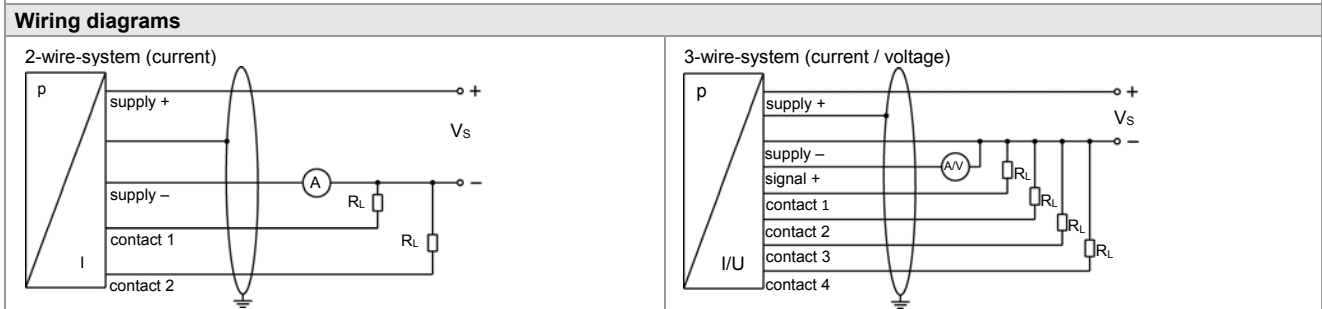
<b>Explosion protection (only for 4 ... 20 mA / 2-wire)</b>	
Approval AX14-DS 200	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$
Max. switching current <sup>6</sup>	70 mA
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 $\mu\text{H/m}$

<sup>6</sup> the real switching current in the application depends on the power supply unit

<b>Miscellaneous</b>	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % $\pm$ 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 <sup>7</sup>
Weight	min. 160 g (depending on mechanical connection)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>8</sup>
ATEX Directive	2014/34/EU

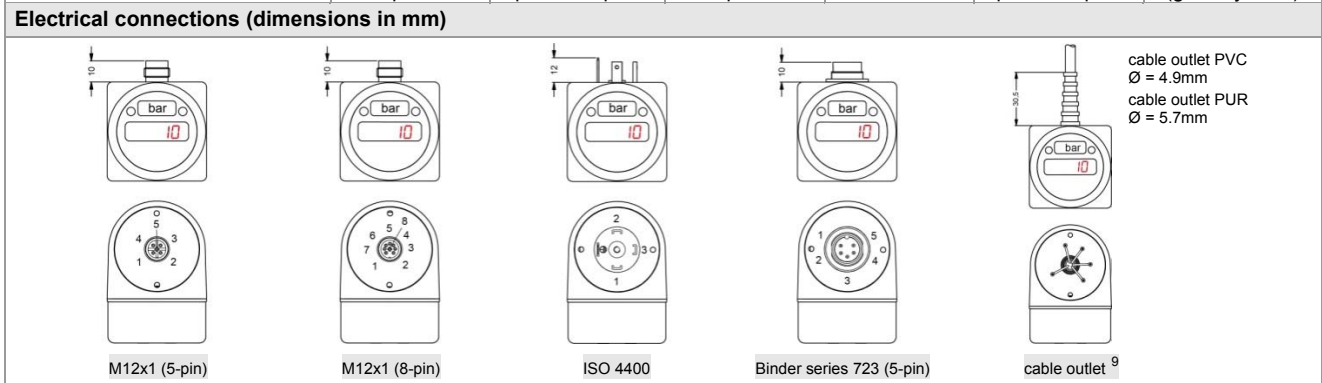
<sup>7</sup> Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges  $P_N \leq 1 \text{ bar}$ .

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



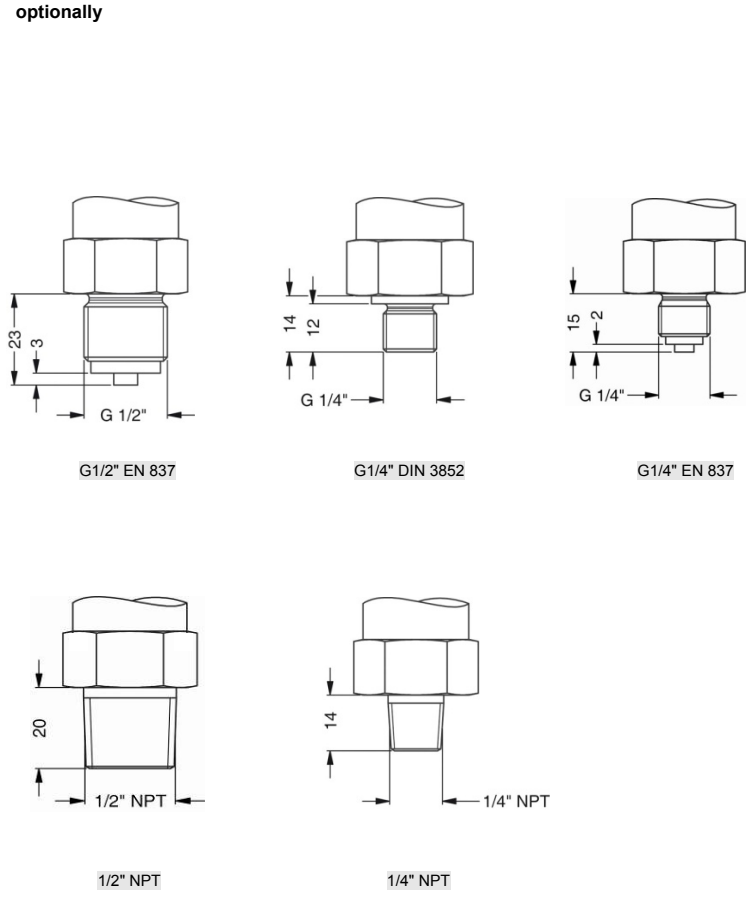
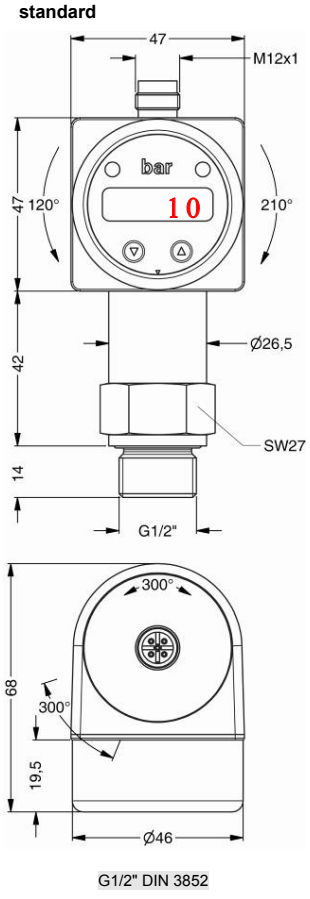
**Pin configuration**

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gnye (green-yellow)



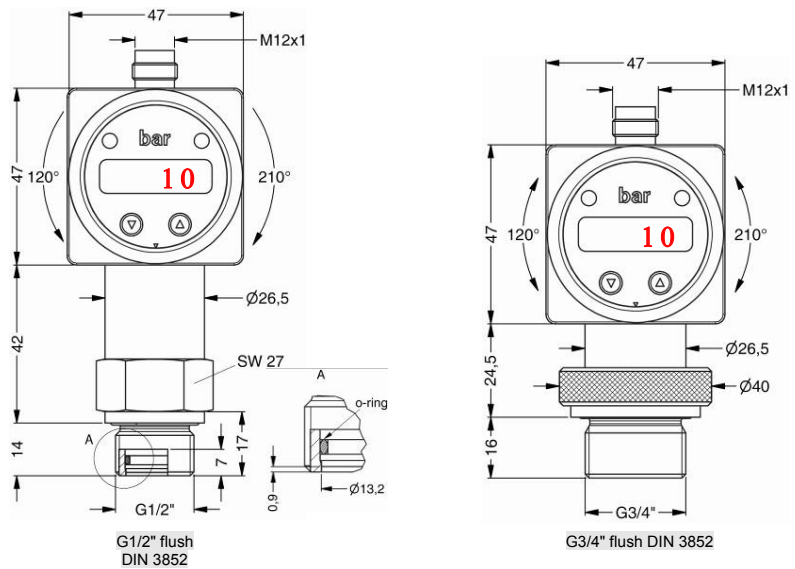
<sup>9</sup> different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

**Mechanical connections (dimensions in mm)**



⇒ for nominal pressure  $P_N > 400$  bar increases the length of devices without IS-version by 19 mm and of devices with IS-version by 39 mm

**optionally for  $P_N$  from 0.1 up to 40 bar**



⇒ metric threads and other versions on request

**Ordering code DS 200**

DS 200		[ ] [ ] [ ] [ ]	-	[ ] [ ] [ ] [ ] [ ]	-	[ ]	-	[ ]	-	[ ] [ ] [ ] [ ]	-	[ ] [ ] [ ] [ ]	-	[ ] [ ] [ ] [ ]	-	[ ] [ ] [ ] [ ]	
<b>Pressure</b>		gauge in bar <sup>1</sup>	7	8	0												
		gauge in mH <sub>2</sub> O <sup>1</sup>	7	8	H												
		absolute in bar <sup>2</sup>	7	8	1												
<b>Input</b>	[mH <sub>2</sub> O]	[bar]															
	1.0	0.10 <sup>2</sup>	1	0	0	0											
	1.6	0.16 <sup>2</sup>	1	6	0	0											
	2.5	0.25 <sup>2</sup>	2	5	0	0											
	4.0	0.40	4	0	0	0											
	6.0	0.60	6	0	0	0											
	10	1.0	1	0	0	1											
	16	1.6	1	6	0	1											
	25	2.5	2	5	0	1											
	40	4.0	4	0	0	1											
	60	6.0	6	0	0	1											
	100	10	1	0	0	2											
	160	16	1	6	0	2											
	250	25	2	5	0	2											
	400	40	4	0	0	2											
	600	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											
		600	6	0	0	3											
		-1 ... 0	X	1	0	2											
		customer	9	9	9	9											consult
<b>Analogue output</b>																	
		without				0											
		4 ... 20 mA / 2-wire				1											
		0 ... 10 V / 3-wire				3											
		4 ... 20 mA / 3-wire, adjustable				7J											
		intrinsic safety 4 ... 20 mA / 2-wire <sup>3</sup>				E											
		customer				9											consult
<b>Contact</b>																	
		1 contact <sup>3,4</sup>					1										
		2 contacts <sup>3,4</sup>					2										
		4 contacts <sup>5</sup>					4										
<b>Accuracy</b>																	
		standard for p <sub>N</sub> > 0.4 bar:	0.35	%	FSO		3										
		standard for p <sub>N</sub> ≤ 0.4 bar:	0.50	%	FSO		5										
		option for p <sub>N</sub> ≥ 0.4 bar:	0.25	%	FSO		2										
		customer					9										consult
<b>Electrical connection</b>																	
		male plug M12x1 (5-pin) / plastic version						N	0	1							
		male plug M12x1 (8-pin) / plastic version <sup>5</sup>						M	5	0							
		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	4							
		cable outlet with PVC cable <sup>6</sup>						T	A	0							
		customer						9	9	9							consult
<b>Mechanical connection</b>																	
		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 with <sup>7</sup> flush sensor						F	0	0							
		G3/4" DIN 3852 with <sup>7</sup> flush sensor						K	0	0							
		1/2" NPT						N	0	0							
		1/4" NPT						N	4	0							
		customer						9	9	9							consult
<b>Seals</b>																	
		FKM									1						
		without (welded version) <sup>8</sup>									2						
		customer									9						consult
<b>Special version</b>																	
		standard									0	0	0				
		customer									9	9	9				consult

<sup>1</sup> from 60 bar: measurement starts with ambient pressure  
<sup>2</sup> absolute pressure possible from 0.4 bar  
<sup>3</sup> with IS version max. 1 contact is possible  
<sup>4</sup> with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible  
<sup>5</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>6</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request  
<sup>7</sup> not possible for nominal pressure p<sub>N</sub> > 40 bar; for G3/4" flush nominal pressure abs. on request  
<sup>8</sup> welded version only with pressure ports according to EN 837; possible for nominal pressure ranges p<sub>N</sub> ≤ 40 bar



# DS 201

## 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 polluted media.

As standard the DS 201 offers a PNP contact and a rotatable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. four 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 <sup>1</sup>																		
Nominal pressure gauge [bar]	-1...0	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: unlimited vacuum resistance p <sub>N</sub> < 1 bar: on request																	

<sup>1</sup> PVDF pressure port possible for nominal pressure ranges up to 60 bar

Contact <sup>2</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	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V <sub>switch</sub> = V <sub>S</sub> - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</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

<sup>2</sup> max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection  
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω 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 1:5) <sup>4</sup> permissible load: R <sub>max</sub> = 500 Ω 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 <sub>min</sub> = 10 kΩ response time: < 3 msec
Without analogue output	V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>
Accuracy <sup>3</sup>	≤ ± 0.5 % FSO

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
In compensated range	0 ... 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 in PVDF the medium temperature is -30 ... 60 °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	standard:	pressure port	housing
	option for G1/2" open port (up to 60 bar): options for G3/4" flush (0.6 bar ≤ p <sub>N</sub> ≤ 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 <sub>N</sub> ≤ 160 bar) 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: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety tech. maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$
Max. switching current <sup>6</sup>	70 mA
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 $\mu\text{H}/\text{m}$

<sup>6</sup> the real switching current in the application 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 % $\pm$ 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)
Option oxygen application <sup>7</sup>	for $p_N \leq 25 \text{ bar}$ : 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. 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 million load cycles
CE-conformity	EMC Directive: 2014/30/EU                      Pressure Equipment Directive: 2014/68/EU (module A) <sup>8</sup>
ATEX Directive	2014/34/EU

<sup>7</sup> not possible with flush pressure ports

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

Wiring diagrams	
<p>2-wire-system (current)</p>	<p>3-wire-system (current/voltage)</p>

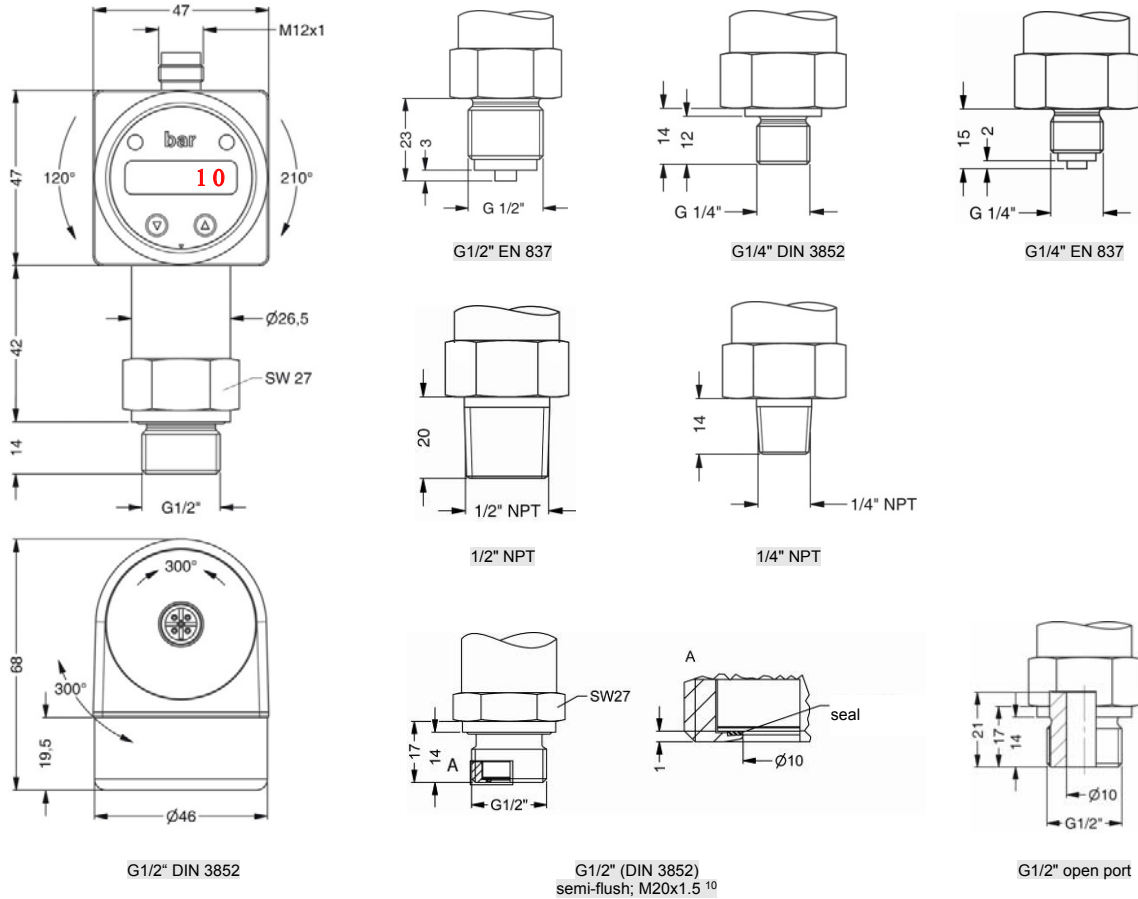
Pin configuration	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	WH (white)
Supply -	3	3	3	2	3	BN (brown)
Signal + (only 3-wire)	2	2	2	3	2	GN (green)
Contact 1	4	4	4	3	4	GY (grey)
Contact 2	5	5	5	-	5	PK (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/pressure port	via pressure port	ground pin	plug housing/pressure port	GNYE (green-yellow)

Electrical connections (dimensions in mm)					
					cable outlet PVC $\varnothing = 4.9\text{mm}$ cable outlet PUR $\varnothing = 5.7\text{mm}$
M12x1 (5-pin)	M12x1 (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable outlet <sup>9</sup>	

<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)

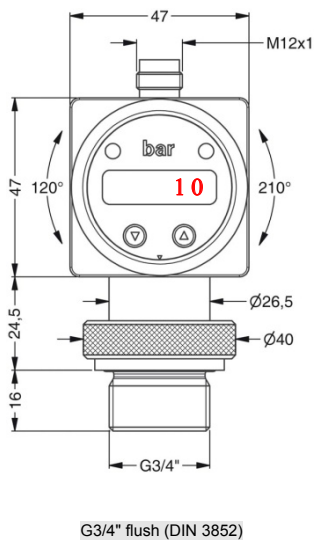


**Mechanical connections (dimensions in mm)**



⇒ metric threads and others on request

optionally for  $p_N$  from 0.6 up to 60 bar gauge



<sup>10</sup> possible for nominal pressure ranges  $p_N \leq 40$  bar

Ordering code DS 201

DS 201



<b>Pressure</b>	gauge in bar	7	8	2																	
	gauge in mH <sub>2</sub> O	7	8	E																	
	absolute in bar	7	8	3																	
<b>Input</b>	[mH <sub>2</sub> O]																				
	[bar]																				
	4	0	4	0	0	0															
	6	0	6	0	0	0															
	10	1	0	0	0	1															
	16	1	6	0	0	1															
	25	2	5	0	0	1															
	40	4	0	0	0	1															
	60	6	0	0	0	1															
	100	1	0	0	0	2															
	160	1	6	0	0	2															
	250	2	5	0	0	2															
	400	4	0	0	0	2															
	600	6	0	0	0	2															
	100	1	0	0	0	3															
	160	1	6	0	0	3															
	250	2	5	0	0	3															
	400	4	0	0	0	3															
	600	6	0	0	0	3															
	-1 ... 0	X	1	0	2																
	customer	9	9	9	9																consult
<b>Analogue output</b>	without																				
	4 ... 20 mA / 2-wire					0															
	0 ... 10 V / 3-wire					1															
	4 ... 20 mA / 3-wire, adjustable					3															
	intrinsic safety 4 ... 20 mA / 2-wire <sup>1</sup>					7															
	customer					E															consult
	customer					9															
<b>Contact</b>	1 contact <sup>1,2</sup>					1															
	2 contacts <sup>1,2</sup>					2															
	4 contacts <sup>3</sup>					4															
<b>Accuracy</b>	0.5 % FSO					5															
	customer					9															
<b>Electrical connection</b>	male plug M12x1 (5-pin) / plastic version																				
	male plug M12x1 (8-pin) / plastic version <sup>3</sup>																				
	male plug M12x1 (5-pin) / metal version																				
	male and female plug ISO 4400 <sup>2</sup>																				
	male plug Binder series 723 (5-pin)																				
	cable outlet with PVC cable <sup>4</sup>																				
	customer																				consult
<b>Mechanical connection</b>	G1/2" DIN 3852																				
	G1/2" EN 837																				
	G1/4" DIN 3852																				
	G1/4" EN 837																				
	G1/2" DIN 3852 with <sup>5</sup> flush sensor																				
	G3/4" DIN 3852 with <sup>6</sup> flush sensor																				
	G1/2" DIN 3852 open pressure port																				
	1/2" NPT																				
	1/4" NPT																				
	customer																				consult
<b>Seals</b>	FKM																				
	EPDM <sup>7</sup>																				
	customer																				consult
<b>Pressure port</b>	stainless steel 1.4404 (316L)																				
	PVDF <sup>8</sup>																				
	customer																				consult
<b>Diaphragm</b>	ceramics Al <sub>2</sub> O <sub>3</sub> 96%																				
	customer																				consult
<b>Special version</b>	standard																				
	oxygen application <sup>9</sup>																				
	customer																				consult

<sup>1</sup> with IS version max. 1 contact 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

<sup>5</sup> possible for nominal pressure ranges p<sub>N</sub> ≥ 0.6 bar up to p<sub>N</sub> ≤ 25 bar gauge, absolute on request

<sup>6</sup> possible for nominal pressure ranges p<sub>N</sub> ≥ 0.6 bar up to p<sub>N</sub> ≤ 60 bar gauge

<sup>7</sup> possible for nominal pressure ranges p<sub>N</sub> ≤ 160 bar

<sup>8</sup> 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 ≤ p<sub>N</sub> ≤ 25 bar); permissible medium temperature: -30 ... 60 °C

<sup>9</sup> oxygen application with FKM-seal up to 25 bar possible, flush version on request



# DS 202

## 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-version**  
**Ex 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 rotatable 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]	12	20	32	50	80	120	200	320	500	800	1 200	
Burst pressure $\geq$ [bar]	30	50	80	125	200	300	500	800	1 400	2 000	3 000	
Vacuum resistance	unlimited											

Contact <sup>1</sup>	
Number, type	standard: 1 PNP contact option: 2 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; $V_{\text{switch}} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>2</sup>	$\leq \pm 0.5\%$ FSO
Repeatability	$\leq \pm 0.1\%$ FSO
Switching frequency	max. 10 Hz
Switching cycles	$> 100 \times 10^6$
Delay time	0 ... 100 sec

<sup>1</sup> with IS-protection max. 1 contact possible

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / $V_S = 15 \dots 28 V_{DC}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{DC}$ adjustable (turn-down of span up to 1:5) <sup>3</sup> permissible load: $R_{\text{max}} = 500 \Omega$ response time: < 0.5 sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 \dots 36 V_{DC}$ permissible load: $R_{\text{min}} = 10 \text{ k}\Omega$ response time: < 3 msec
Without analogue output	$V_S = 15 \dots 36 V_{DC}$
Accuracy <sup>2</sup>	$\leq \pm 0.5\%$ FSO

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span)	
Thermal error	$\pm 0.3\%$ FSO / 10 K
in compensated range	0 ... 70 °C
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 60068-2-27

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

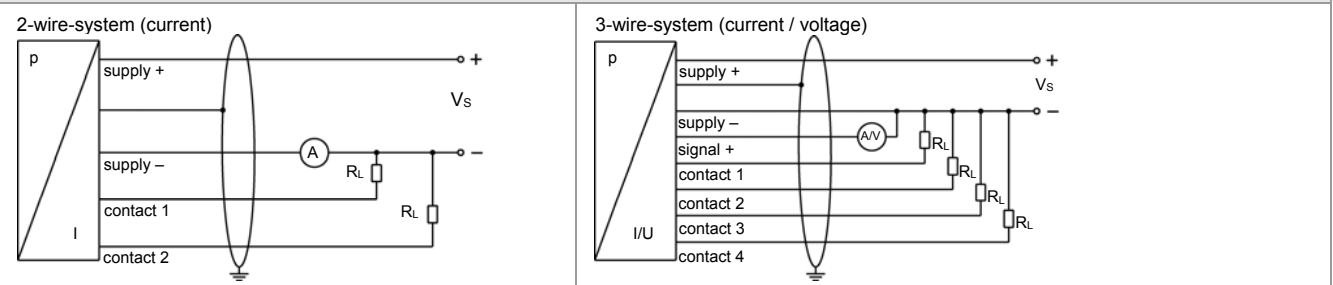
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval AX14-DS 202	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$
Max. switching current <sup>4</sup>	70 mA
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 $\mu\text{H}/\text{m}$

<sup>4</sup> the real switching current in the application depends on the power supply unit

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)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU      Pressure Equipment Directive: 2014/68/EU (module A) <sup>5</sup>
ATEX Directive	2014/34/EU

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

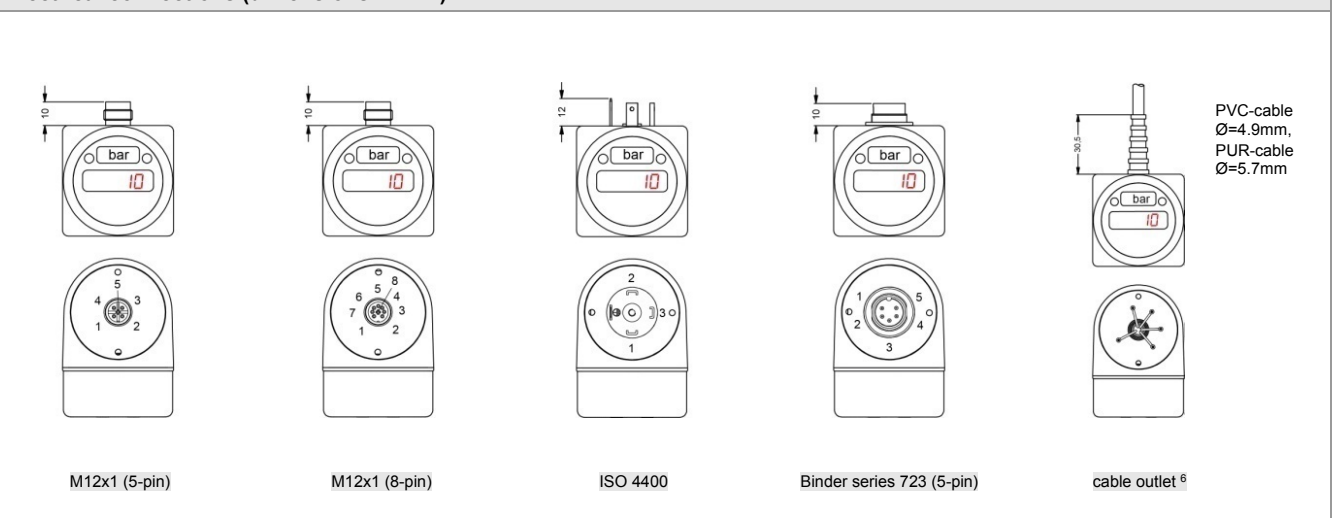
**Wiring diagrams**



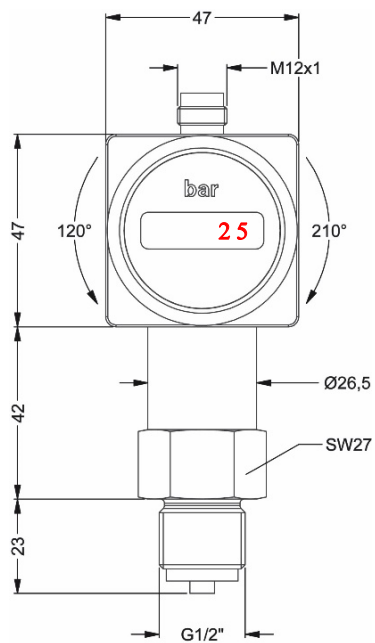
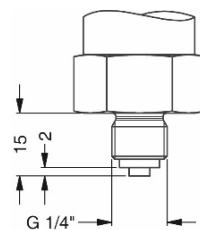
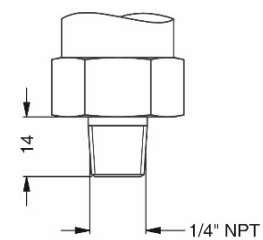
**Pin configuration**

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gnye (green-yellow)

**Electrical connections (dimensions in mm)**



<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)

**Mechanical connections (dimensions in mm)**
**Standard**

**G1/2" EN 837**
**Option**

**G1/4" EN 837**

**1/4" NPT**

 ⇨ **metric threads and other versions on request**

Ordering code DS 202

DS 202



<b>Pressure</b>									
gauge in bar <sup>1</sup>	7	8	4						
<b>Input</b>									
[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					
100	1	0	0	3					
160	1	6	0	3					
250	2	5	0	3					
400	4	0	0	3					
600	6	0	0	3					
customer	9	9	9	9					consult
<b>Analogue output</b>									
without				0					
4 ... 20 mA / 2-wire				1					
0 ... 10 V / 3-wire				3					
4 ... 20 mA / 3-wire				7					
intrinsic safety 4 ... 20 mA / 2-wire <sup>2</sup>				E					
customer				9					consult
<b>Contact</b>									
1 contact <sup>2</sup>					1				
2 contacts					2				
4 contacts					4				
<b>Accuracy</b>									
0.5 % FSO					5				
customer					9				consult
<b>Electrical connection</b>									
male plug M12x1 (5-pin) / plastic version						N	0	1	
male plug M12x1 (8-pin) / plastic version <sup>3</sup>						M	5	0	
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	4	
cable outlet with PVC cable <sup>5</sup>						T	A	0	
customer						9	9	9	consult
<b>Mechanical connection</b>									
G1/2" EN 837						2	0	0	
G1/4" EN 837						4	0	0	
1/4" NPT						N	4	0	
customer						9	9	9	consult
<b>Seals</b>									
without (welded version)								2	
customer								9	consult
<b>Special version</b>									
standard							0	0	0
oxygen application							0	0	7
customer							9	9	9

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

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

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



# DS 210

## 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 4-digit 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 rotatable display module. Additional features like e.g. an intrinsically safe version, max. four contacts and an analogue output complete the profile.

### Preferred areas of use are

-  Plant and machine engineering
-  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	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>2</sup>	standard: $\leq \pm 0.35$ % FSO nominal pressure $\leq 100$ mbar: $\leq \pm 0.5$ % FSO
Repeatability	$\leq \pm 0.1$ % FSO
Switching frequency	max. 10 Hz
Switching cycles	$> 100 \times 10^6$
Delay time	0 ... 100 sec

<sup>1</sup> max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with Ex-protection  
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0,02 A] \Omega$ response time: $< 10$ msec
2-wire current signal with Ex-protection	4 ... 20 mA / $V_S = 15 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0,02 A] \Omega$ response time: $< 10$ msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{DC}$ adjustable (turn-down of span max. 1:5) <sup>3</sup> permissible load: $R_{max} = 500 \Omega$ response time: $< 3$ sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 \dots 36 V_{DC}$ permissible load: $R_{min} = 10 k \Omega$ response time: $< 3$ msec
Without analogue output	$V_S = 15 \dots 36 V_{DC}$
Accuracy <sup>2</sup>	standard: $\leq \pm 0.35$ % FSO nominal pressure $\leq 100$ mbar: $\leq \pm 0.5$ % FSO

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span)					
Nominal pressure $P_N$	[mbar]	-1000 ... 0	$\leq 100$	$\leq 400$	$> 400$
Tolerance band	[% FSO]	$\leq \pm 0.75$	$\leq \pm 1.5$	$\leq \pm 1$	$\leq \pm 0.75$
in compensated range	[°C]	-20 ... 85	0 ... 50	0 ... 70	-20 ... 85

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 60068-2-27

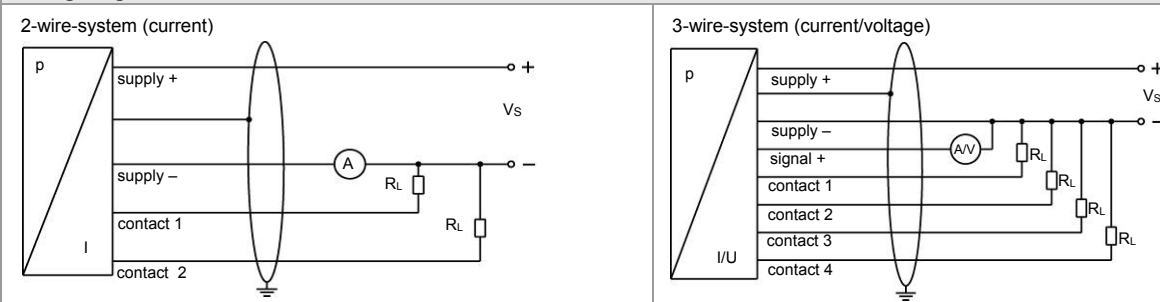
Materials	
Pressure port	stainless steel 1.4404 (316L)
Housing	stainless steel 1.4404 (316L)
Display housing	PA 6.6, Polycarbonate
Seal (media wetted)	FKM
Sensor	stainless steel 1.4404 (316L), silicon, Epoxy or RTV, glass
Media wetted parts	pressure port, seal, sensor

Explosion protection (for 2-wire current signal)	
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	$U_i = 28 V$ , $I_i = 93 mA$ , $P_i = 660 mW$ , $C \approx 0 nF$ , $L_i \approx 0 \mu H$
Max. switching current <sup>4</sup>	70 mA
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 $\mu H/m$

<sup>4</sup> the real switching current in the application 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
Weight	approx. 180 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

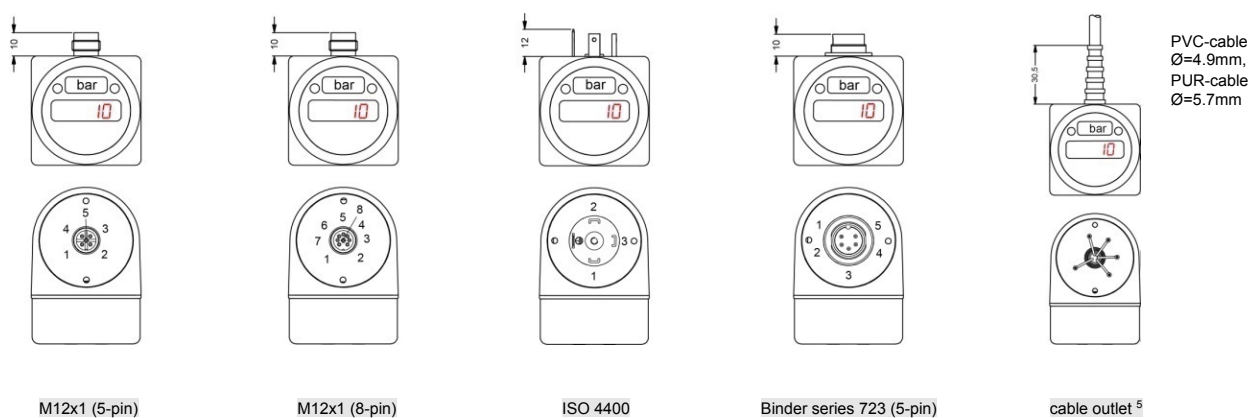
### Wiring diagrams



### 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 (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gnye (green-yellow)

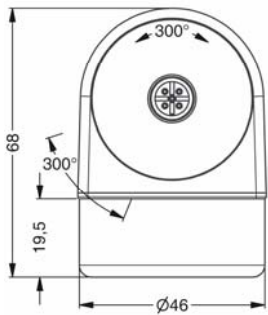
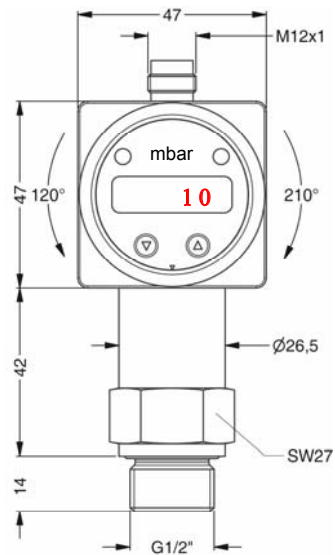
### Electrical connections (dimensions in mm)



<sup>5</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)

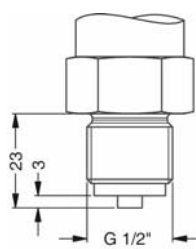
**Mechanical connections (dimensions in mm)**

**standard**

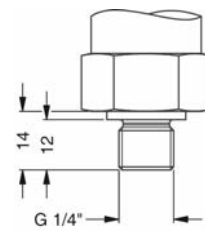


G1/2" DIN 3852

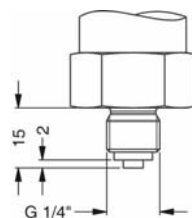
**optionally**



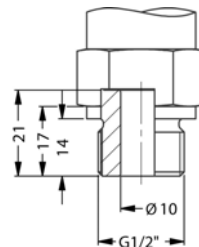
G1/2" EN 837



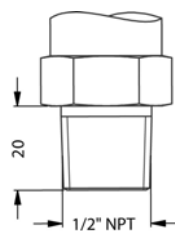
G1/4" DIN 3852



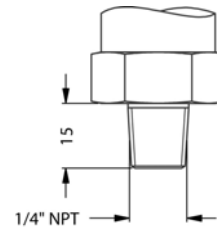
G1/4" EN 837



G1/2" open port



1/2" NPT

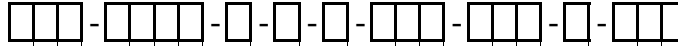


1/4" NPT

⇒ metric threads and other versions on request

## Ordering code DS 210

DS 210



Pressure		7	8	A														
gauge																		
Input	[mbar]																	
	10	0	1	0	0													
	16	0	1	6	0													
	25	0	2	5	0													
	40	0	4	0	0													
	60	0	6	0	0													
	100	1	0	0	0													
	160	1	6	0	0													
	250	2	5	0	0													
	400	4	0	0	0													
	600	6	0	0	0													
	1000	1	0	0	1													
	-1000 ... 0	X	1	0	2													
	customer	9	9	9	9													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 <sup>1</sup>				E													
	customer				9													consult
Contact																		
	1 contact <sup>1,2</sup>				1													
	2 contacts <sup>1,2</sup>				2													
	4 contacts <sup>3</sup>				4													
Accuracy																		
	standard for $p_N > 0.1$ bar:	0.35 % FSO			3													
	standard for $p_N \leq 0.1$ bar:	0.5 % FSO			5													
	customer				9													consult
Electrical connection																		
	male plug M12x1 (5-pin) / plastic version								N	0	1							
	male plug M12x1 (8-pin) / plastic version <sup>3</sup>								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	4							
	cable outlet with PVC cable <sup>4</sup>								T	A	0							
	customer								9	9	9							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								H	0	0							
	1/2" NPT								N	0	0							
	1/4" NPT								N	4	0							
	customer								9	9	9							consult
Seals																		
	FKM										1							
	customer										9							consult
Special version																		
	standard											0	0	0				
	customer											9	9	9				consult

<sup>1</sup> with IS 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



# DS 214

## 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 ... 2 200 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 long-  
term 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 2 200 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



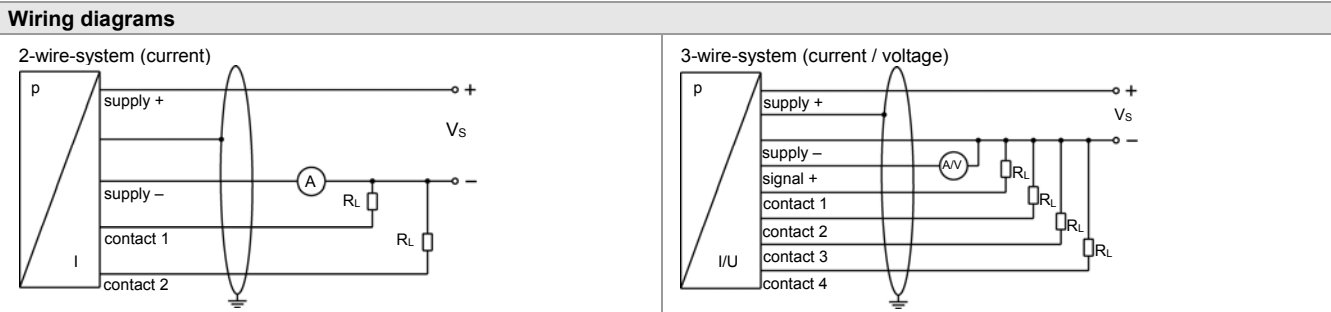
Plant and machine engineering



Commercial vehicles and  
mobile hydraulics

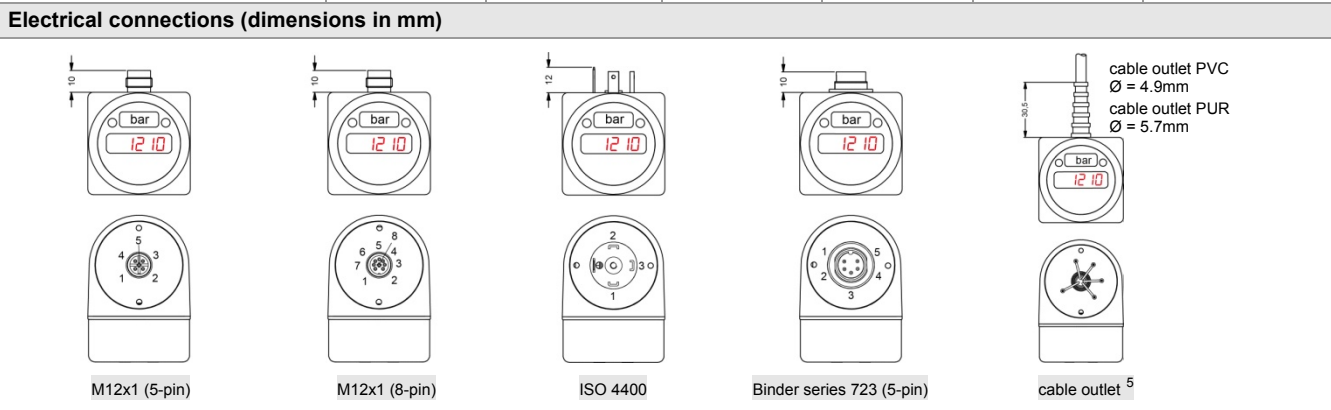


Input pressure range	
Nominal pressure gauge [bar]	600 <sup>1</sup> 1000      1600      2000      2200
Overpressure [bar]	800      1400      2200      2800      2800
<sup>1</sup> only available with pressure port G1/2" EN 837	
Contact <sup>2</sup>	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{\text{switch}} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</sup>	$\leq \pm 0.35\%$ FSO
Repeatability	$\leq \pm 0.1\%$ FSO
Switching frequency	max. 10 Hz
Switching cycles	$> 100 \times 10^6$
Delay time	0 ... 100 sec
<sup>2</sup> max. 1 contact for 2-wire current signal with plug ISO 4400 no contact possible with 3-wire in combination with plug ISO 4400	
Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 \dots 36 V_{\text{DC}}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$ response time: $< 10$ msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{\text{DC}}$ adjustable (turn-down of span 1:5) <sup>4</sup> permissible load: $R_{\text{max}} = 500 \Omega$ response time: $< 3$ sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 \dots 36 V_{\text{DC}}$ permissible load: $R_{\text{min}} = 10 \text{ k}\Omega$ response time: $< 3$ msec
Without analogue output	$V_S = 15 \dots 36 V_{\text{DC}}$
Accuracy <sup>3</sup>	$\leq \pm 0.35\%$ FSO IEC 60770
<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) <sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range	
Thermal effects (Offset and Span)	
Thermal error	$\leq \pm 0.25\%$ FSO / 10 K
in compensated range	-20 ... 85 °C
Permissible temperatures	
Permissible temperatures	medium: -40 ... 140 °C electronics / environment: -25 ... 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)
Shock	100 g / 11 msec
Materials	
Pressure port	stainless steel 1.4542 (17-4 PH)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, polycarbonate
Seals (media wetted)	none (welded version)
Diaphragm	stainless steel 1.4542 (17-4 PH)
Media wetted parts	pressure port, diaphragm
Miscellaneous	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy $0.1\% \pm 1$ 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 3-wire signal output voltage: approx. 7 mA + signal current
Ingress protection	IP 65
Installation position	any
Weight	min. 200 g (depending on mechanical connection)
Operational life	$p_N = 600$ bar: 100 million load cycles $p_N > 600$ bar: 10 million load cycles
CE-conformity	EMC Directive: 2014/30/EU      Pressure Equipment Directive: 2014/68/EU (module A)

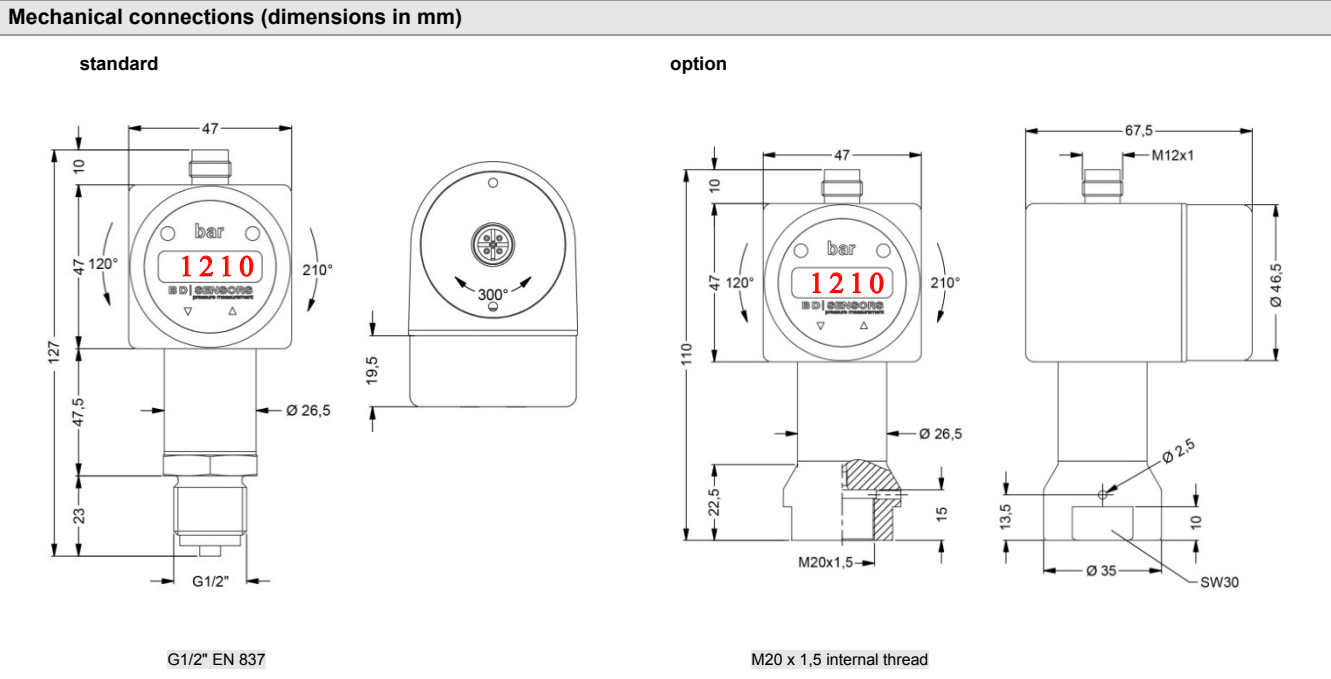


**Pin configuration**

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/pressure port	via pressure port	ground contact	plug housing/pressure port	gnye (green-yellow)



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



## Ordering code DS 214

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

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

<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, others on request

<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  $R_p > 260 \text{ N/mm}^2$  in accordance with DIN 17440. The maximum allowed pressure is 1600 bar!





# DS 233

## Differential Pressure Switch for Gases and Compressed Air in Compact Version

Silicon Sensor

accuracy according to IEC 60770: 0.35% FSO

### Differential pressure

from 0 ... 6 mbar up to 0 ... 1000 mbar

### Output signal

2-wire: 4 ... 20 mA

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

### Special characteristics

- ▶ aluminium housing
- ▶ LED display
- ▶ rotatable and configurable display module
- ▶ suited for non aggressive gases and compressed air

### Optional versions



- ▶ 1 / 2 PNP contacts
- ▶ customer specific versions

The DS 233 is a differential pressure switch with digital display for non-aggressive gases and compressed air. Because of its compact and robust aluminium housing it is particularly suited for machine and plant engineering.

Basic element of the DS 233 is a piezoresistive silicon pressure sensor, which features high accuracy and excellent long term stability.

As standard the DS 233 offers a PNP contact and a rotatable display module with 4-digit LED display for representing the differential pressure. Optional up to two freely configurable contacts are available.

### Preferred areas of use are

-  Plant and machine engineering
-  Heating and air conditioning



Input pressure range											
Nominal pressure $P_N$ (over, differential pressure) [mbar]	0...6	0...10	0...20	0...40	0...60	0...100	0...160	0...250	0...400	0...600	0...1000
Nominal pressure $P_N$ symmetric (differential pressure) [mbar]	± 6	± 10	± 20	± 40	± 60	± 100	± 160	± 250	± 400	± 600	± 1000
Overpressure [mbar]	100	100	200	350	350	1000	1000	1000	1000	3000	3000

Contact <sup>1</sup>	
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; $V_{\text{Switch}} = V_S - 2V$ 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>2</sup>	$P_N > 160$ mbar: ≤ ± 0.35 % FSO 40 mbar ≤ $P_N$ ≤ 160 mbar: ≤ ± 1 % FSO $P_N < 40$ mbar: ≤ ± 2 % 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 with plug ISO 4400, no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 ... 36 V_{DC}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{min}}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 ... 30 V_{DC}$ adjustable (turn-down of span 1:5) <sup>3</sup> permissible load: $R_{\text{max}} = 500 \Omega$ response time: < 3 sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 ... 36 V_{DC}$ permissible load: $R_{\text{min}} = 10 k\Omega$ response time: < 3 msec
Without analogue output	$V_S = 15 ... 36 V_{DC}$
Accuracy <sup>2</sup>	$P_N > 160$ mbar: ≤ ± 0.35 % FSO 40 mbar ≤ $P_N$ ≤ 160 mbar: ≤ ± 1 % FSO $P_N < 40$ mbar: ≤ ± 2 % FSO

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Performance	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k
Long term stability	≤ ± 0.2 % FSO / year

Thermal effects (Offset and Span) / Permissible temperatures				
Nominal pressure $P_N$ [mbar]	≤ 10	≤ 20	≤ 250	> 250
Tolerance band [% FSO]	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 0.5
TC, average [% FSO / 10 K]	± 0.3	± 0.25	± 0.15	± 0.08
in compensated range	0 ... 60 °C			
Permissible temperatures	medium:	-25 ... 125 °C		
	electronics / environment:	-25 ... 85 °C		
	storage:	-40 ... 100 °C		

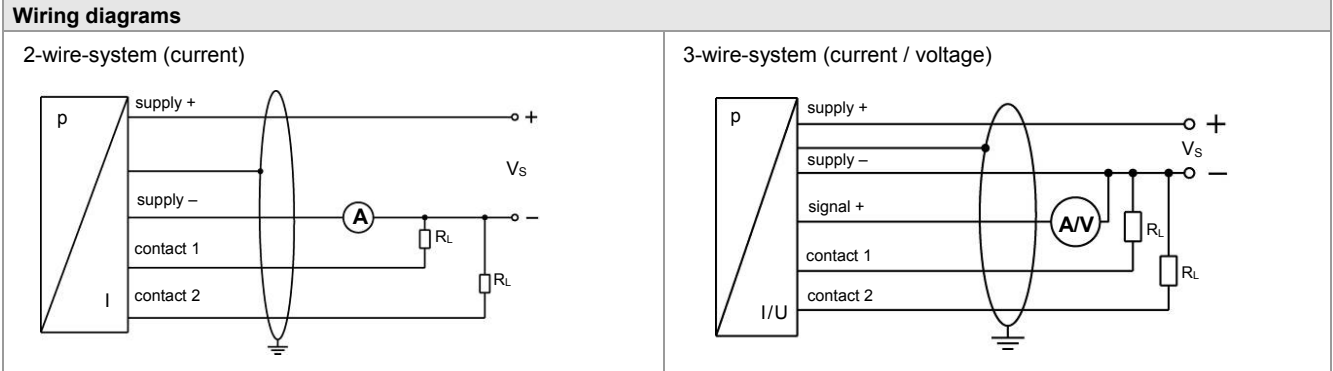
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 11 msec according to DIN EN 60068-2-6

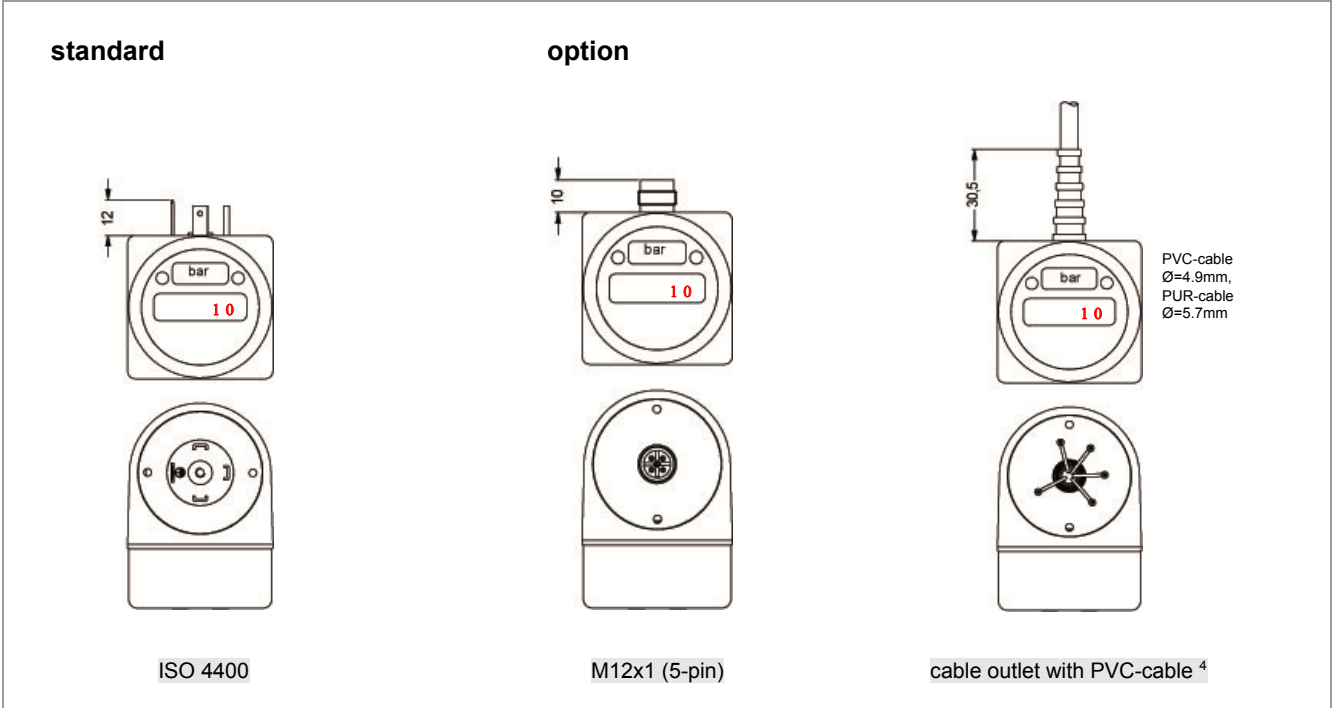
Materials	
Pressure port	aluminium, silver anodized
Housing	aluminium, silver anodised
Display housing	PA 6.6, polycarbonate
Seal	PUR
Sensor	silicon, RTV, ceramics $Al_2O_3$ , Epoxy, stainless steel
Media wetted parts	pressure port, housing, seal, sensor

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
Weight	approx. 350 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU

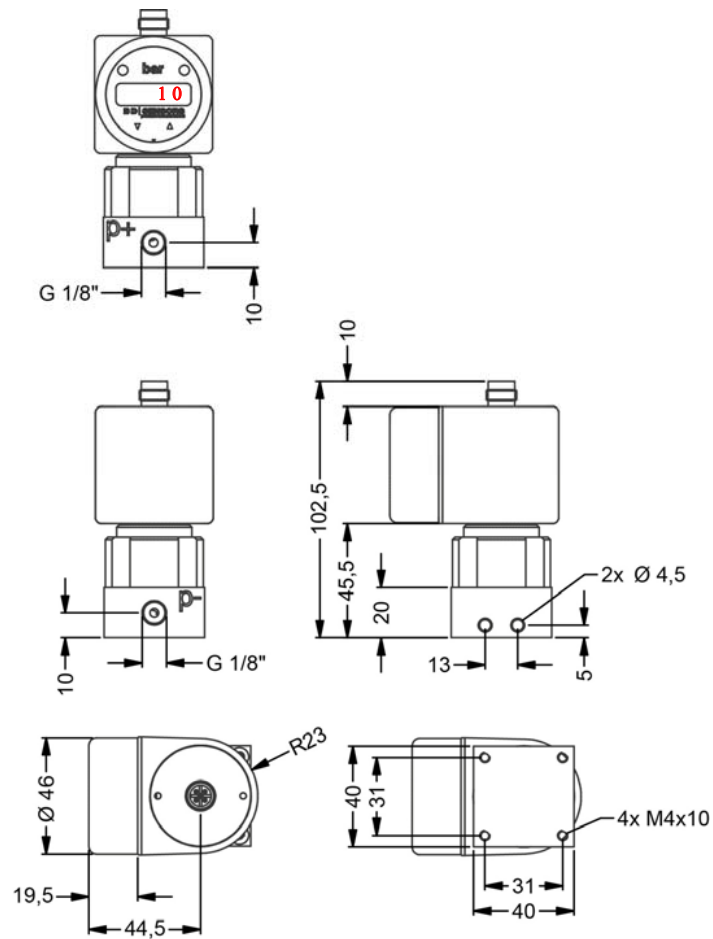
Pin configuration				
Electrical connection	ISO 4400	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	wh (white)
Supply -	2	3	3	bn (brown)
Signal + (only 3-wire)	3	2	2	gn (green)
Contact 1	3	4	4	gy (grey)
Contact 2	-	5	5	pk (pink)
Shield	ground contact	via pressure port	plug housing/pressure port	gnye (green-yellow)



**Electrical connections (dimensions in mm)**



<sup>4</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), optionally cable with ventilation tube

**Mechanical connection (dimensions in mm)**

G1/8" internal

Ordering code DS 233

DS 233



Pressure		3	3	5																		
differential pressure		3	3	5																		
gauge pressure		3	3	6																		
Input																						
[mbar]																						
6		0	0	6	0																	
10		0	1	0	0																	
20		0	2	0	0																	
40		0	4	0	0																	
60		0	6	0	0																	
100		1	0	0	0																	
160		1	6	0	0																	
250		2	5	0	0																	
400		4	0	0	0																	
600		6	0	0	0																	
1000		1	0	0	1																	
-6 ... 6		S	0	0	6																	
-10 ... 10		S	0	1	0																	
-20 ... 20		S	0	2	0																	
-40 ... 40		S	0	4	0																	
-60 ... 60		S	0	6	0																	
-100 ... 100		S	1	0	0																	
-160 ... 160		S	1	6	0																	
-250 ... 250		S	2	5	0																	
-400 ... 400		S	4	0	0																	
-600 ... 600		S	6	0	0																	
-1000 ... 1000		S	1	0	2																	
customer		9	9	9	9																	consult
Output																						
without																				0		
4 ... 20 mA / 2-wire <sup>1</sup>																				1		
0 ... 10 V / 3-wire																				3		
4 ... 20 mA / 3-wire																				7		
customer																				9		
																					consult	
Contact																						
1 contact																				1		
2 contacts																				2		
Accuracy																						
standard for P <sub>N</sub> > 160 mbar		0.35 %																		3		
standard for 40 mbar ≤ P <sub>N</sub> ≤ 160 mbar		1.0 %																		8		
standard for P <sub>N</sub> < 40 mbar		2.0 %																		G		
customer																				9		
																					consult	
Electrical connection																						
plastic male plug M12x1 (5-pin)																				N	0	1
metal male plug M12x1 (5-pin)																				N	1	1
male and female plug ISO 4400 <sup>1</sup>																				1	0	0
cable outlet with PVC cable <sup>2</sup>																				T	A	0
customer																				9	9	9
																						consult
Mechanical connection																						
G1/8" internal thread																				Q	0	0
∅ 6.6 x 11 (for flex. tubes ∅ 6)																				Y	0	0
customer																				9	9	9
																						consult
Seals																						
PUR, bonded																				6		
Special version																						
standard																				0	0	0
customer																				9	9	9
																						consult

<sup>1</sup> max. 1 contact for 2-wire current signal with plug ISO 4400, no contact possible with 3-wire in combination with plug ISO 4400

<sup>2</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)



# DS 400P

## Intelligent Electronic Pressure Switch Stainless Steel

Pressure Ports and 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

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)
- ▶ hygienical version

### Optional versions

- ▶ **IS-version**  
Ex ia = intrinsically safe  
for gases and dusts
- ▶ 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 industry and pharmacy.

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. two contacts and an analogue output complete the profile.

### Preferred areas of use are



Food industry



Pharmacy

### 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 gauge	[bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40
Nominal pressure absolute	[bar]	-	-	-	-	0.4	0.6	1	1.6	2.5	4	6	10	16	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		$p_N \geq 1$ bar: unlimited vacuum resistance										$p_N < 1$ bar: on request				

<sup>1</sup> consider the pressure resistance of fitting and clamps

Contact <sup>2</sup>	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	contact rating 125 mA, short-circuit resistant; $V_{switch} = V_S - 2V$
Accuracy of contacts <sup>3</sup>	standard: nominal pressure < 0.4 bar: $\leq \pm 0.5$ % FSO / nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35$ % FSO option: nominal pressure $\geq 0.4$ bar: $\leq \pm 0.25$ % FSO
Repeatability	$\leq \pm 0.1$ % FSO
Switching frequency	2-wire: max. 10 Hz / 3-wire: 50 Hz
Switching cycles	$> 100 \times 10^6$
Delay time	0 ... 100 sec

<sup>2</sup> with IS-protection max. 1 contact possible

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$ response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / $V_S = 15 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 24 V_{DC} \pm 10$ % adjustable (turn-down of span 1:5) <sup>4</sup> permissible load: $R_{max} = 500 \Omega$ response time: < 30 msec
Without analogue output	$V_S = 15 \dots 36 V_{DC}$
Accuracy <sup>3</sup>	standard: nominal pressure < 0.4 bar: $\leq \pm 0.5$ % FSO / nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35$ % FSO option: nominal pressure $\geq 0.4$ bar: $\leq \pm 0.25$ % FSO

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal errors (offset and span) <sup>5</sup>				
Nominal pressure $p_N$	[bar]	-1 ... 0	< 0.40	$\geq 0.40$
Tolerance band	[% FSO]	$\leq \pm 0.75$	$\leq \pm 1.5$	$\leq \pm 0.75$
in compensated range	[°C]	-20 ... 85	0 ... 50	-20 ... 85

<sup>5</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

Permissible temperatures			
Filling fluid		silicone oil	food compatible oil
Medium <sup>6</sup>		-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element <sup>7</sup>		overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C <sup>8</sup>	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C <sup>8</sup>
Electronics / environment		-40 ... 85 °C	
Storage		-40 ... 100 °C	

<sup>6</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C

<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation

<sup>8</sup> also for  $p_{abs} \leq 1$  bar

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 (DIN EN 60068-2-6)	G 1/2": 20 g RMS (25 ... 2000 Hz)	others except G 1/2": 10 g RMS (25 ... 2000 Hz)
Shock (DIN EN 60068-2-27)	G 1/2": 500 g / 1 msec	others except G 1/2": 100 g / 1 msec

Filling fluids	
Standard	silicone oil
Optional	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

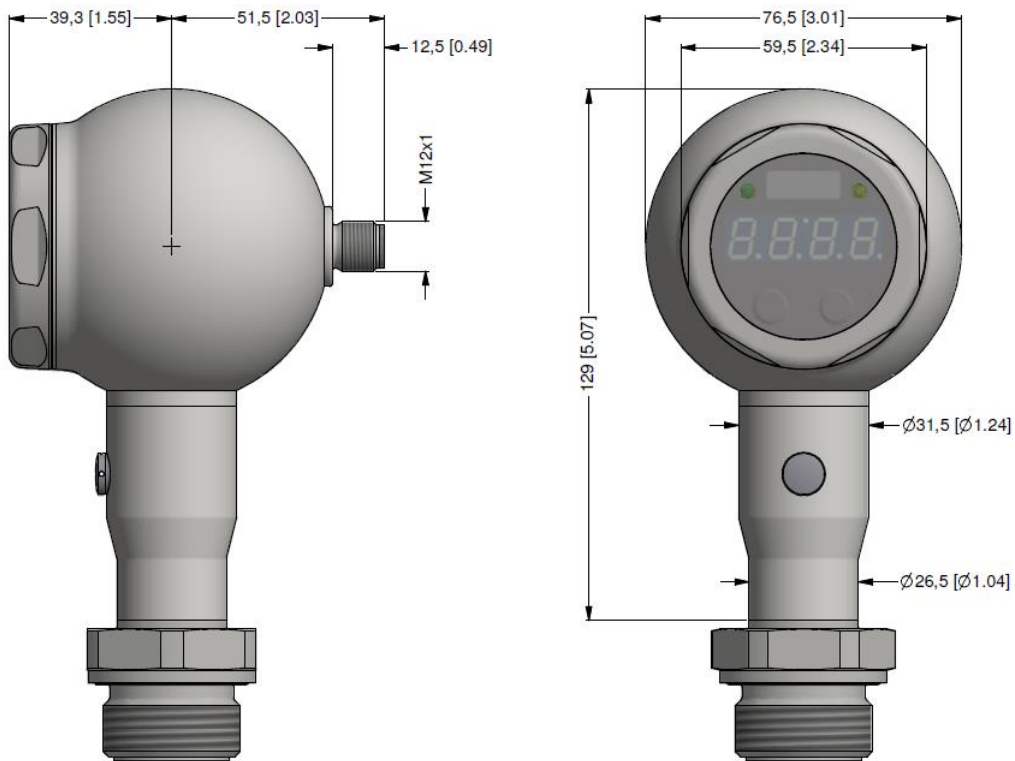
Materials	
Pressure port	inch thread: stainless steel 1.4404 (316 L) G1" cone, Clamp, dairy pipe, Varivent®: stainless steel 1.4435 (316 L)
Diaphragm	stainless steel 1.4435 (316L)
Housing / cap	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals	standard: FKM (recommended for medium temperatures $\leq 200$ °C) option: FFKM (recommended for medium temperatures < 260 °C) others on request Clamp, dairy pipe, Varivent®: without
Media wetted parts	pressure port, seals, diaphragm

<b>Explosion protection (only for 4 ... 20 mA / 2-wire)</b>		
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$	
Max. switching current <sup>9</sup>	70 mA	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -25 ... 70 °C	
<sup>9</sup> the real switching current in the application depends on the power supply unit		
<b>Miscellaneous</b>		
EHEDG certificate Type EL Class I	EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH	
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	
Ingress protection	IP 67	
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for $p_N \leq 4 \text{ bar}$ have to be specified in the order)	
Surface roughness	pressure port $R_a < 0.8 \text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15 \text{ }\mu\text{m}$ weld seam $R_a < 0.8 \text{ }\mu\text{m}$	
Weight	min. 500 g (depending on mechanical connection)	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
<b>Wiring diagrams</b>		
2-wire-system (current)	3-wire-system (current)	
<b>Pin configuration</b>		
Electrical connection	M12x1 / metal (5-pin)	
Supply +	1	
Supply -	3	
Signal + (only 3-wire)	2	
Contact 1	4	
Contact 2	5	
Shield	plug housing / pressure port	
<b>Designs <sup>10</sup></b>		
side display	45° display (on request)	

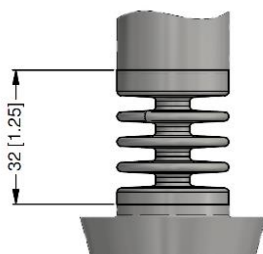
<sup>10</sup> all designs in horizontal rotatable housing as standard



### Dimensions (mm / in)

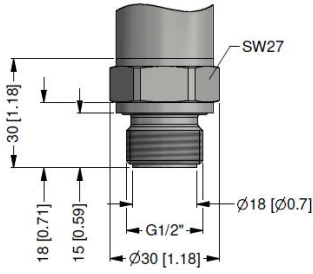


### Cooling element up to 300 °C <sup>7</sup> (optionally)

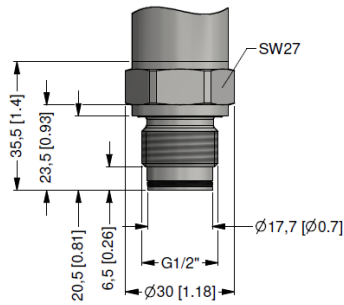


<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation

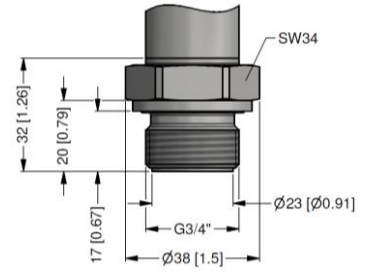
**Mechanical connections (dimensions mm / in)**



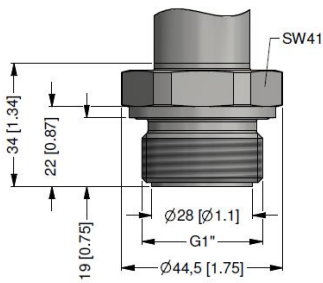
G1/2" flush DIN 3852  
p<sub>N</sub> ≥ 1 bar



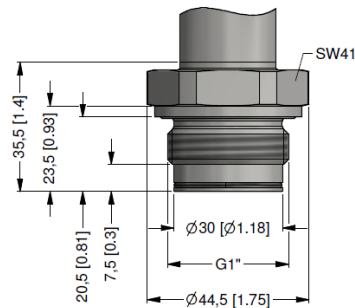
G1/2" flush with radial o-ring  
p<sub>N</sub> ≥ 1 bar



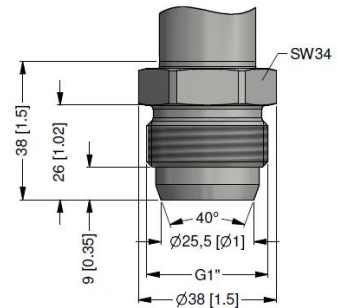
G3/4" flush DIN 3852



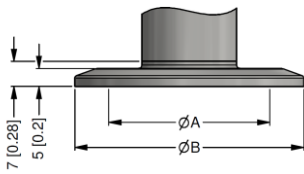
G1" flush DIN 3852



G1" flush with radial o-ring

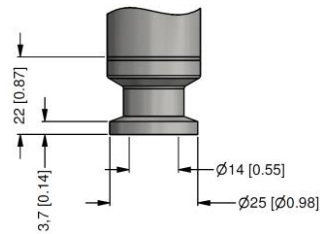


G1" cone

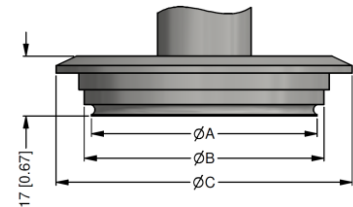


dimensions in mm [in]			
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p <sub>N</sub> [bar]	0.25 ... 16	≤ 16	≤ 16

Clamp (DIN 32676)

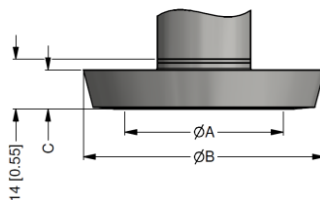


Clamp 3/4" (DIN 32676)  
4 bar ≤ p<sub>N</sub> ≤ 8 bar



dimensions in mm [in]	
size	DN 40/50
A	64 [2.52]
B	68 [2.68]
C	84 [3.31]

Varivent® DN 40/50  
p<sub>N</sub> ≤ 10 bar



dimensions in mm [in]			
size	DN 25	DN 40	DN 50
A	23 [0.91]	32 [1.26]	45 [1.77]
B	44 [1.73]	56 [1.20]	68.5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
p <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 25

dairy pipe (DIN 11851)

⇒ metric threads and other versions on request

Ordering code DS 400P

DS 400P																				
<b>Pressure</b>																				
gauge	7	A	5																	
absolute <sup>1</sup>	7	A	6																	
<b>Input</b>																				
[bar]																				
0.10	1	0	0																	
0.16	1	6	0																	
0.25	2	5	0																	
0.40	4	0	0																	
0.60	6	0	0																	
1.0	1	0	0																	
1.6	1	6	0																	
2.5	2	5	0																	
4.0	4	0	0																	
6.0	6	0	0																	
10	1	0	0																	
16	1	6	0																	
25	2	5	0																	
40	4	0	0																	
-1 ... 0	X	1	0																	
customer	9	9	9																	
<b>Design</b>																				
side display				K	H															
45° display				K	4															
<b>Analogue output</b>																				
without							0													
4 ... 20 mA / 2-wire							1													
4 ... 20 mA / 3-wire, adjustable							7J													
intrinsic safety 4 ... 20 mA / 2-wire <sup>2</sup>							E													
customer							9													
<b>Contact</b>																				
1 contact							1													
2 contacts <sup>2</sup>							2													
<b>Accuracy</b>																				
standard for p <sub>N</sub> ≥ 0,4 bar:	0.35 % FSO						3													
standard for p <sub>N</sub> < 0,4 bar:	0.50 % FSO						5													
option for p <sub>N</sub> ≥ 0,4 bar:	0.25 % FSO						2													
customer						9														
<b>Electrical connection</b>																				
male plug M12x1 (5-pin) / metal							N	1	1											
customer							9	9	9											
<b>Mechanical connection</b>																				
G1/2" with flush										Z	0	0								
welded diaphragm (DIN 3852) <sup>3</sup>										Z	S	0								
G3/4" with flush										Z	S	1								
welded diaphragm (DIN 3852)										Z	S	7								
G1" with flush										Z	6	1								
welded diaphragm (DIN 3852)										K	S	1								
G1" DIN 3852 with rad. o-ring										C	6	1								
and flush diaphragm										C	6	2								
G1/2" DIN 3852 with rad. o-ring										C	6	3								
and flush diaphragm <sup>3</sup>										C	6	9								
G 1" cone										M	7	3								
Clamp DN 25 (DIN 32676) / 3A <sup>4</sup>										M	7	5								
Clamp DN 32 (DIN 32676) / 3A <sup>4</sup>										M	7	6								
Clamp DN 50 (DIN 32676) / 3A <sup>4</sup>										P	4	1								
Clamp 3/4" (DIN 32676) / 3A <sup>4</sup>										9	9	9								
dairy pipe DN 25 (DIN 11851) <sup>4,5</sup>																				
dairy pipe DN 40 (DIN 11851) <sup>4,5</sup>																				
dairy pipe DN 50 (DIN 11851) <sup>4,5</sup>																				
Varivent® DN 40/50 / 3A <sup>4</sup>																				
customer																				
<b>Diaphragm</b>																				
stainless steel 1.4435 (316L)													1							
customer													9							
<b>Seals</b>																				
for clamp, dairy pipe, Varivent®:	none												0							
for inch thread:	FKM												1							
	FFKM												7							
customer												9								
<b>Filling fluids</b>																				
silicone oil													1							
food compatible oil (FDA) / 3A													2							
customer													9							
<b>Special version</b>																				
standard													0	0	0					
with cooling element up to 300°C / 3A													2	0	0					
customer													9	9	9					

<sup>1</sup> absolute pressure possible from 1 bar  
<sup>2</sup> with IS version max. 1 contact is possible  
<sup>3</sup> only possible for nominal pressure ranges p<sub>N</sub> ≥ 1 bar  
<sup>4</sup> possible nominal pressure ranges according to data sheet  
<sup>5</sup> 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.  
 Varivent® is a brand name of GEA Tuchenhaagen GmbH



# DS 350P

## Electronic Pressure Switch with IO-Link Interface

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

Stainless Steel Sensor

accuracy according to IEC 60770:  
standard: 0.5 % FSO / 0.35 % FSO  
option: 0.25 % FSO

### Nominal pressure

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

### Digital output signal

IO-Link according to specification V 1.1  
smart sensor profile  
data transfer 38.4 kbit/sec

### Switchable output signal

PNP / NPN / 4 ... 20 mA / 0 ... 10 V

### Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ parameter settings via IO-Link or menu (VDMA-conform)
- ▶ additional information via IO-Link accessible

### Optional versions

- ▶ different mechanical connections
- ▶ cooling element for medium temperatures up to 300 °C
- ▶ customer specific versions

The DS 350P is an electronic pressure switch which has been designed for food industry and pharmacy. In addition to a large number of flush process connections, a multi-rotatable display module as standard is offered. This makes it easier for the user to read / operate it also in unusual display positions due to installation conditions on-site.

The integrated IO-Link interface provides process data, diagnostics, and status messages as well as other features, which are helpful for service and maintenance.

The switchability of the output signal as switching signal or analogue signal (mA / V) increases flexibility and integration in different applications.

### Preferred areas of use are



Food industry



Pharmacy

### 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 gauge	[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Nominal pressure absolute	[bar]	-	-	-	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Overpressure (static)	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance	[bar]	p <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance										p <sub>N</sub> < 1 bar: on request			

<sup>1</sup> consider the pressure resistance of fitting and clamps

Supply	
Voltage supply	V <sub>S</sub> = 18 ... 30 V <sub>DC</sub>
Output signals	
Output signal 1	IO-Link / SIO (PNP / NPN) switchable
Output signal 2	4 ... 20 mA / 3-wire or 0 ... 10 V / 3-wire or PNP / NPN switchable
Signal characteristics switching signal	
Accuracy of switching points <sup>2</sup>	≤ ± 0.35 % FSO
Repeatability	≤ ± 0.1 % FSO
Max switching current	150 mA
Switching frequency	max. 170 Hz
Delay time	0.0 ... 50.0 sec
Response time	< 12 msec
Signal characteristics analogue signal	
Accuracy <sup>2</sup>	standard: nominal pressure < 0.4 bar: ≤ ± 0.50 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar ≤ ± 0.25 % FSO
Long term stability	≤ ± 0.3 % FSO / year at reference conditions
Load (4 ... 20 mA / 3-wire)	R <sub>max</sub> = 330 Ω
Load (0 ... 10 V / 3-wire)	R <sub>min</sub> = 10 kΩ
Influence effects	supply: 0.05% FSO load: ≤ 0.1 % FSO
Adjustability	offset: ± 5 % span: -10 %
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span) <sup>3</sup>	
Nominal pressure p <sub>N</sub> [bar]	< 0.40 ≥ 0.40
Tolerance band [%FSO]	≤ ± 1.5 ≤ ± 0.75
in compensated range [°C]	0 ... 50 -20 ... 85
<sup>3</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions	
Permissible temperatures	
Filling fluid	silicone oil food compatible oil
Medium <sup>4</sup>	-40 ... 125 °C -10 ... 125 °C
Medium with cooling element <sup>5</sup>	overpressure: -40 ... 300 °C overpressure: -10 ... 250 °C vacuum: -40 ... 150 °C vacuum: -10 ... 150 °C
Electronics / environment / storage	-40 ... 85 °C
<sup>4</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C	
<sup>5</sup> max. temperature depends on the used sealing material, type of seal and installation	
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
IO-Link	
Interface	IO-Link 1.1; Slave
Data transfer	38.4 kbit/sec (COM 2)
Mode	SIO / IO-Link
Standard	IEC 61131-2, IEC 61131-9
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 1 msec according to DIN EN 60068-2-27
Filling fluids	
Standard	silicone oil
Optional	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

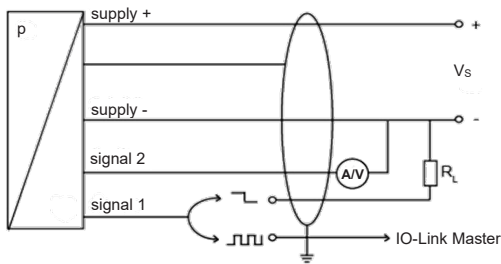
Materials	
Display housing	PA 6.6
Housing	stainless steel 1.4404 (316 L)
Pressure port	stainless steel 1.4404 (316 L) Clamp, Varivent®, G1" cone: stainless steel 1.4435 (316 L)
Diaphragm	stainless steel 1.4435 (316 L)
Seal	standard: FKM (recommended for medium temperatures $\leq 200\text{ °C}$ ) option: EPDM (recommended for medium temperatures $\leq 140\text{ °C}$ ) others on request G1" cone, Clamp, Varivent®: without
Media wetted parts	pressure port, seal, diaphragm
Miscellaneous	
EHDG certificate Type EL Class I	EHDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed
Display	4-digit, 7-segment-LED display on black base body, white, blue foil, digit height 7 mm, range of indication -1999 ... +9999, visible range 22.5 x 10.5 mm 4 LEDs for unit switching (bar, mbar, PSI, MPa) LED status display for IO-Link and contacts
Operation	2 buttons
Featured	functions according to VDMA 24574-1
Turn-on time	110 msec
Surface roughness	pressure port $R_a < 0.8\ \mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15\ \mu\text{m}$ weld seam $R_a < 0.8\ \mu\text{m}$
Weight	approx. 250 g
Operational life	100 million load cycles
Current consumption	< 50 mA (without contacts)
Ingress protection	IP 67
Installation position	any <sup>6</sup>
CE-conformity	EMC Directive: 2014/30/EU

<sup>6</sup> The pressure switch is calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges  $p_N \leq 1\text{ bar}$ .

### Wiring diagrams

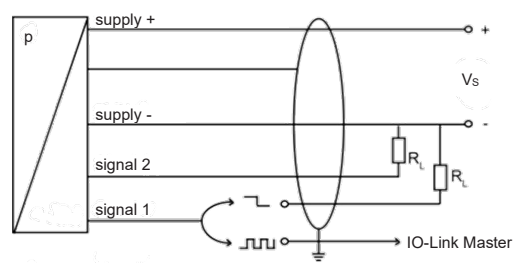
3-wire-system / configuration of analogue output:

signal 1: IO-Link or contact  
signal 2: analogue output



3-wire-system / configuration of contact:

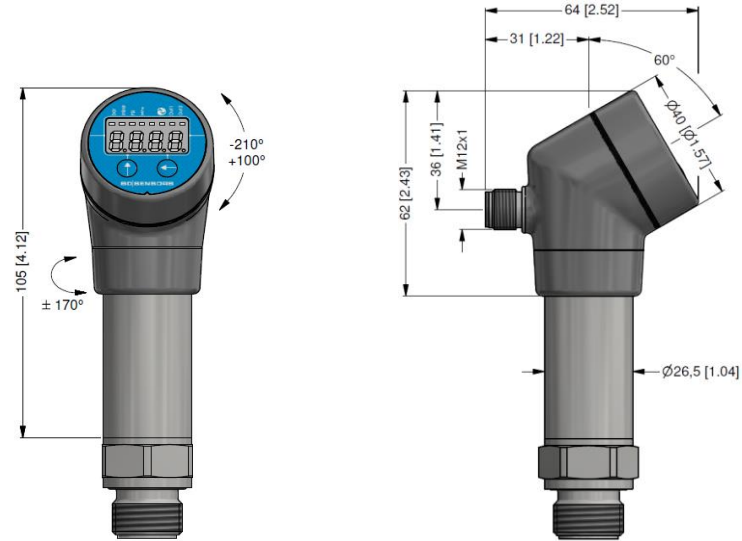
signal 1: IO-Link or contact  
signal 2: contact



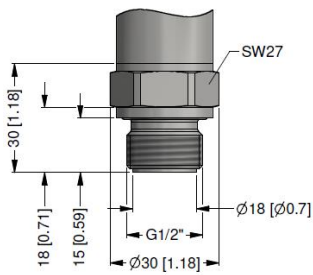
### Electrical connection

Pin configuration	Description	M12x1 (4-pin), metal	
Supply +	supply	1	
Supply -	supply	3	
Output signal 1	IO-Link / SIO (PNP / NPN)	4	
Output signal 2	4 ... 20 mA – 3-wire / 0 ... 10 V – 3-wire (PNP / NPN)	2	
Shield	shielding	plug housing	

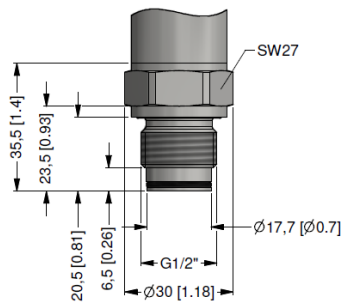
### Dimensions (mm / in)



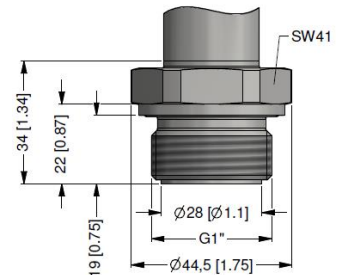
### Mechanical connection (dimensions mm / in)



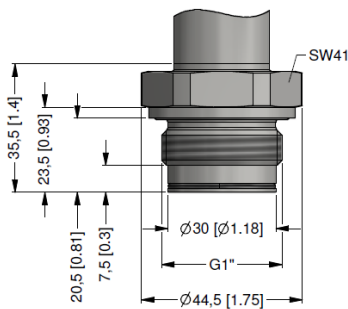
G1/2" DIN 3852 flush  
p<sub>N</sub> ≥ 1 bar



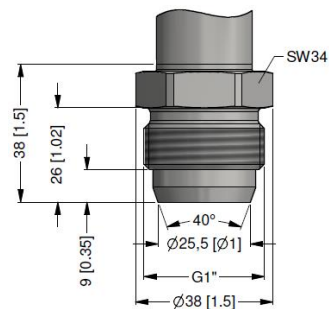
G1/2" DIN 3852 with 2x o-ring  
p<sub>N</sub> ≥ 1 bar



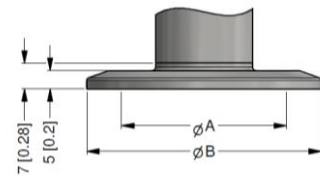
G1" DIN 3852 flush



G1" DIN 3852 with 2x o-ring  
p<sub>N</sub> ≤ 2 bar

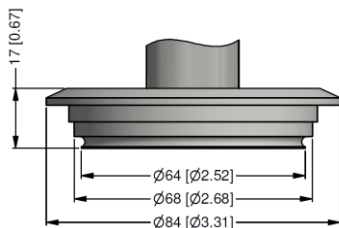


G1" cone

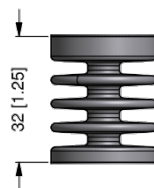


Clamp (DIN 32676)  
p<sub>N</sub> ≤ 16 bar

dimensions in mm / in		
size	DN 25 / 1"	DN 50 / 2"
A	23,0 [0.91]	45 [1.77]
B	50,5 [1.99]	64 [2.52]



Varivent® DN 40/50  
p<sub>N</sub> ≤ 25 bar



cooling element up to 300 °C<sup>5</sup>

⇒ metric threads and other versions on request

<sup>5</sup> max. temperature depends on the used sealing material, type of seal and installation

## Ordering code DS 350P

DS 350P



Pressure										
gauge	7	E	A							
absolute <sup>1</sup>	7	E	C							
Input [bar]										
0.10	1			1	0	0	0			
0.16	1			1	6	0	0			
0.25	1			2	5	0	0			
0.40				4	0	0	0			
0.60				6	0	0	0			
1.0				1	0	0	1			
1.6				1	6	0	1			
2.5				2	5	0	1			
4.0				4	0	0	1			
6.0				6	0	0	1			
10				1	0	0	2			
16				1	6	0	2			
25				2	5	0	2			
40				4	0	0	2			
customer				9	9	9	9			consult
Output										
IO-Link + PNP/NPN + analogue output <sup>2</sup>								I	X	
Accuracy										
standard for $p_N \leq 0.4$ bar	0.50% FSO									5
standard for $p_N > 0.4$ bar	0.35% FSO									3
option for $p_N \geq 0.4$ bar	0.25% FSO									2
customer										9
										consult
Electrical connection										
male plug M12x1 (4-pin) / metal								M	1	B
customer								9	9	9
										consult
Mechanical connection										
G1/2" DIN 3852 flush ( $p_N \geq 1$ bar)								Z	0	0
G1/2" DIN 3852 with 2x o-ring ( $p_N \geq 1$ bar)								Z	6	1
G1" DIN 3852 flush								Z	S	1
G1" DIN3852 with 2x o-ring ( $p_N \leq 2$ bar)								Z	S	7
G1" cone								K	S	1
Clamp DN 25 DIN 32676 ( $p_N \leq 16$ bar)								C	6	1
Clamp DN 50 DIN 32676 ( $p_N \leq 16$ bar)								C	6	3
Varivent® DN 40/50 ( $p_N \leq 25$ bar)								P	4	1
customer								9	9	9
										consult
										consult
Diaphragm										
stainless steel 1.4435 (316L)										1
customer										9
Seal										
for Clamp, cone, Varivent®:	without									0
	FKM									1
	EPDM									3
customer										9
										consult
Filling fluids										
silicone oil										1
food compatible oil (FDA)										2
customer										9
Special version										
standard										0
cooling element up to 300 °C										2
customer										9
										9
										9
										consult

<sup>1</sup> absolute pressure possible from 0.4 bar

<sup>2</sup> contact PNP/NPN switchable; analogue output 0 ... 10 V / 4 ... 20 mA switchable

Varivent® is a brand name of GEA Tuchenhausen GmbH





# DS 200P

## Electronic Pressure Switch

Pressure Ports and 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 delay)

### 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. four contacts and an analogue output complete the profile.

### Preferred areas of use are



Food industry



Pharmacy



Input pressure range <sup>1</sup>																
Nominal pressure gauge	[bar]	-1 ... 0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6	10	16	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 bar: unlimited vacuum resistance								p <sub>N</sub> < 1 bar: on request						

<sup>1</sup> consider the pressure resistance of fitting and clamps

Contact <sup>2</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	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V <sub>Switch</sub> = V <sub>S</sub> - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>3</sup>	standard: p <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO      p <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: p <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.25 % 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 signal with plug ISO 4400 as well as 2-wire current signal with IS-protection

no contact possible with 3-wire in combination with plug ISO 4400

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω      response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub> permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω      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 1:5) <sup>4</sup> permissible load: R <sub>max</sub> = 500 Ω      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 <sub>min</sub> = 10 kΩ      response time: < 10 msec
Without analogue output	V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>
Accuracy <sup>3</sup>	standard: p <sub>N</sub> < 0.4 bar: ≤ ± 0.5 % FSO      p <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.35 % FSO option: p <sub>N</sub> ≥ 0.4 bar: ≤ ± 0.25 % FSO

<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal errors (offset and span) <sup>5</sup>				
Nominal pressure p <sub>N</sub>	[bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 1.5	≤ ± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 50	-20 ... 85

<sup>5</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

Permissible temperatures			
Filling fluid	silicone oil		food compatible oil
Medium <sup>6</sup>	-40 ... 125 °C		-10 ... 125 °C
Medium with cooling element <sup>7</sup>	overpressure: -40 ... 300 °C	vacuum: -40 ... 150 °C <sup>8</sup>	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C <sup>8</sup>
Electronics / environment	-40 ... 85 °C		
Storage	-40 ... 100 °C		

<sup>6</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C

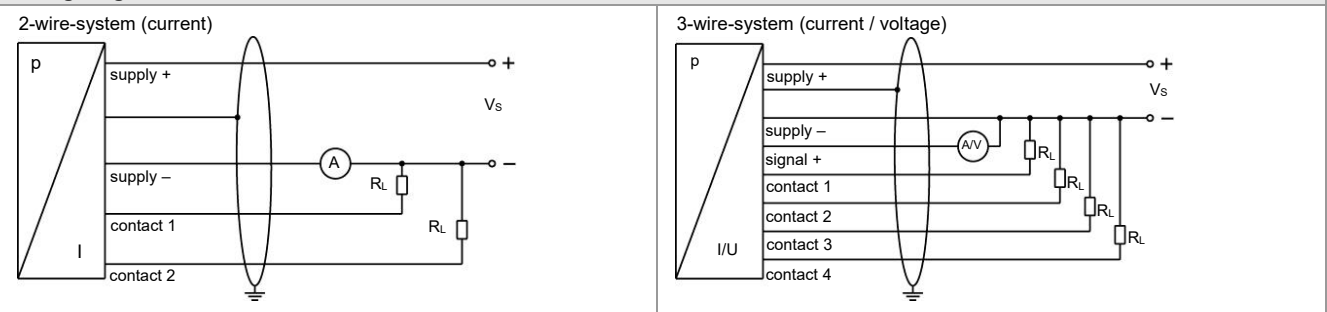
<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation


<sup>8</sup> also for p<sub>abs</sub> ≤ 1 bar

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	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	silicone oil
Options	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500)

Materials	
Pressure port	stainless steel 1.4435 (316 L)    others on request
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, Polycarbonate
Seals (media wetted)	standard: FKM (recommended for medium temperatures $\leq 200\text{ }^\circ\text{C}$ ) option: FFKM (recommended for medium temperatures $< 260\text{ }^\circ\text{C}$ )    others on request Clamp, dairy pipe, Varivent®: without
Diaphragm	standard: stainless steel 1.4435 (316 L) option: Hastelloy® C-276 (2.4819); Tantalum on request
Media wetted parts	pressure port, seals, diaphragm
Explosion protection (only for 4 ... 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	$U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ , $P_i = 660\text{ mW}$ , $C \approx 0\text{ nF}$ , $L_i \approx 0\text{ }\mu\text{H}$
Max. switching current <sup>9</sup>	70 mA
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 $\mu\text{H/m}$
<sup>9</sup> the real switching current in the application depends on the power supply unit	
Miscellaneous	
EHEDG certificate Type EL Class I	EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH
Display	4-digit, red 7-segment-LED display; digit height 7 mm; range of indication -1999 ... +9999; accuracy 0.1 % $\pm$ 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 $p_N \leq 2\text{ bar}$ have to be specified in the order)
Surface roughness	pressure port $R_a < 0.8\text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15\text{ }\mu\text{m}$ weld seam $R_a < 0.8\text{ }\mu\text{m}$
Weight	approx. 160 ... 250 g
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

**Wiring diagrams**

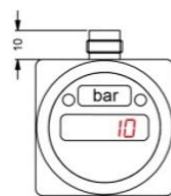


Pin configuration						
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	WH (white)
Supply -	3	3	3	2	3	BN (brown)
Signal + (only 3-wire)	2	2	2	3	2	GN (green)
Contact 1	4	4	4	3	4	GY (grey)
Contact 2	5	5	5	-	5	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	GNYE (green-yellow)

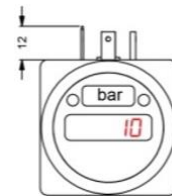
### Electrical connections (dimensions in mm)



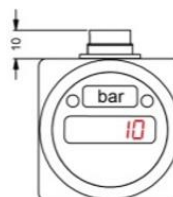
M12x1 (5-pin)



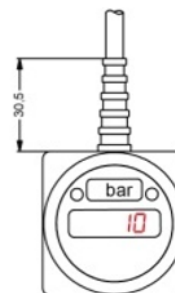
M12x1 (8-pin)



ISO 4400



Binder series 723 (5-pin)

cable outlet <sup>10</sup>

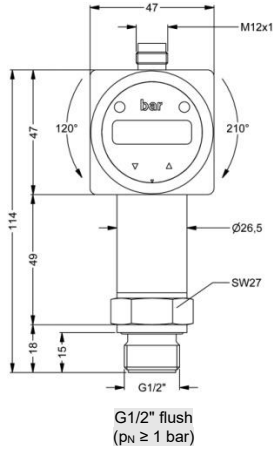
cable outlet PVC  
 $\varnothing = 4.9 \text{ mm}$   
 cable outlet PUR  
 $\varnothing = 5.7 \text{ mm}$



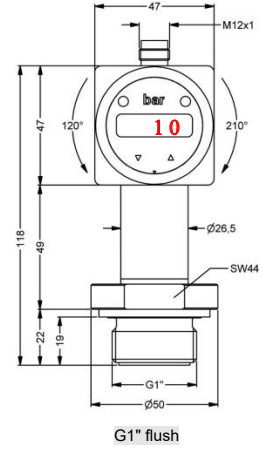
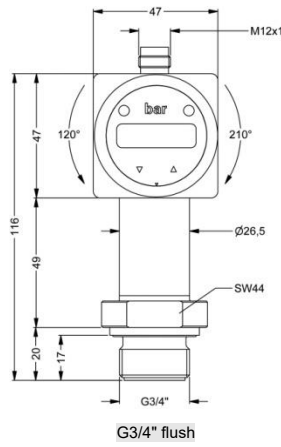
<sup>10</sup> different cable types and lengths available, permissible temperature depends on kind of cable; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70°C)

**Mechanical connections (dimensions in mm)**

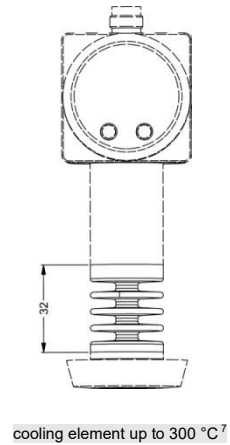
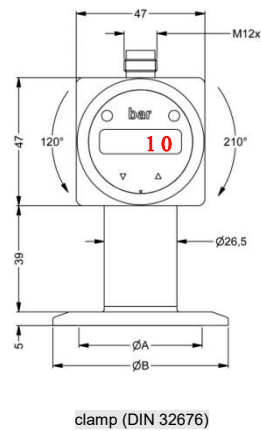
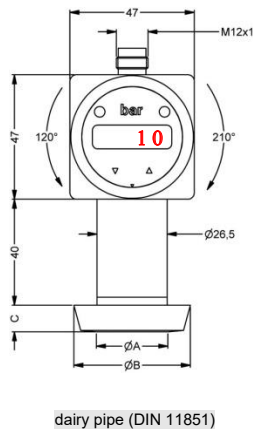
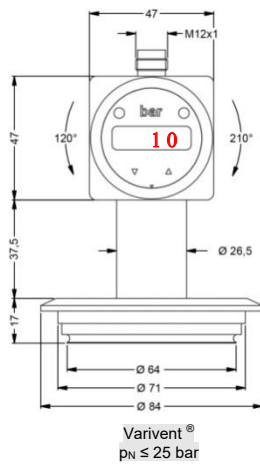
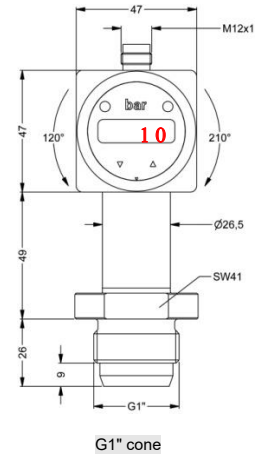
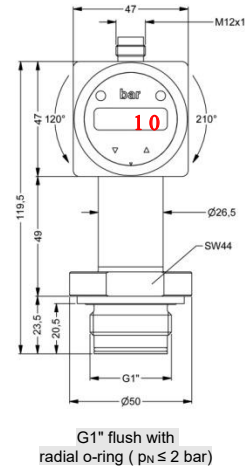
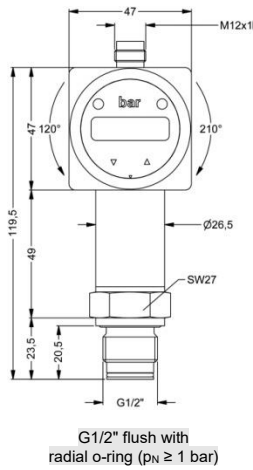
**Standard**



**Option**



**Option**



dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
C	10	10	11
p <sub>N</sub> [bar]	≥ 0.25 ≤ 40	≥ 0.25 ≤ 40	≥ 0.25 ≤ 25

dimensions in mm				
size	3/4"	DN 25	DN 32	DN 50
A	14	23	32	45
B	25	50.5	50.5	64
p <sub>N</sub> [bar]	≥ 4 ≤ 8	≥ 0.25 ≤ 16	≤ 16	≤ 16

↕ SIL- and SIL-Ex version: total length increases by 26.5 mm!  
 ↕ metric threads and other versions on request

<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation

Ordering code DS 200P			
DS 200P		[ ][ ] - [ ][ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ] - [ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ]	
<b>Pressure</b>			
gauge	7 8 5		
absolute	7 8 6		
<b>Input</b>			
[bar]			
0.10	1 0 0 0		
0.16	1 6 0 0		
0.25	2 5 0 0		
0.40	4 0 0 0		
0.60	6 0 0 0		
1.0	1 0 0 1		
1.6	1 6 0 1		
2.5	2 5 0 1		
4.0	4 0 0 1		
6.0	6 0 0 1		
10	1 0 0 2		
16	1 6 0 2		
25	2 5 0 2		
40	4 0 0 2		
-1 ... 0	X 1 0 2		
customer	9 9 9 9		consult
<b>Analogue output</b>			
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 <sup>1</sup>		E	
customer		9	consult
<b>Contact</b>			
1 contact <sup>1,2</sup>		1	
2 contacts <sup>1,2</sup>		2	
4 contacts <sup>3</sup>		4	
<b>Accuracy</b>			
standard for p <sub>N</sub> > 0,4 bar:	0.35 % FSO	3	
standard for p <sub>N</sub> ≤ 0,4 bar:	0.50 % FSO	5	
option for p <sub>N</sub> ≥ 0,4 bar:	0.25 % FSO	2	
customer		9	consult
<b>Electrical connection</b>			
male plug M12x1 (5-pin) / plastic		N 0 1	
male plug M12x1 (8-pin) / plastic <sup>3</sup>		M 5 0	
male plug M12x1 (5-pin) / metal		N 1 1	
male and female plug ISO 4400 <sup>2</sup>		1 0 0	
male plug Binder series 723 (5-pin)		2 0 4	
cable outlet with PVC cable <sup>4</sup>		T A 0	
customer		9 9 9	consult
<b>Mechanical connection</b>			
G1/2" with flush welded diaphragm (DIN 3852) for p <sub>n</sub> ≥ 1 bar		Z 0 0	
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-ring and flush diaphragm (for p <sub>n</sub> ≤ 2 bar)		Z 5 7	
G1/2" DIN 3852 with rad. o-ring and flush diaphragm (for p <sub>n</sub> ≥ 1 bar)		Z 6 1	
G 1" cone		K 3 1	
Clamp DN 25 / 1" (DIN 32676) / 3A		C 6 1	
Clamp DN 32 / 1 1/2" (DIN 32676) / 3A		C 6 2	
Clamp DN 50 / 2" (DIN 32676) / 3A		C 6 3	
Clamp 3/4" (DIN 32676) / 3A		C 6 9	
dairy pipe DN 25 (DIN 11851) <sup>5</sup>		M 7 3	
dairy pipe DN 40 (DIN 11851) <sup>5</sup>		M 7 5	
dairy pipe DN 50 (DIN 11851) <sup>5</sup>		M 7 6	
Varivent® DN 40/50 / 3A		P 4 1	
customer		9 9 9	consult
<b>Diaphragm</b>			
stainless steel 1.4435 (316L)		1	
tantalum		T	consult
Hastelloy® C-276 (2.4819)		H	
customer		9	consult
<b>Seals</b>			
for Clamp, dairy pipe, Varivent®:	without	0	
for inch thread:	FKM	1	
	FFKM	7	
customer		9	consult
<b>Filling fluids</b>			
silicone oil		1	
food compatible oil (FDA) / 3A		2	
customer		9	consult
<b>Special version</b>			
standard		0 0 0	
with cooling element up to 300°C / 3A		2 0 0	
customer		9 9 9	consult

<sup>1</sup> with IS 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<sup>5</sup> 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.

Varivent® is a brand name of GEA Tuchenhaeden GmbH. Hastelloy® is a brand name of Havnes International Inc.



# 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 polluted 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 $\geq$ [bar]	120	250	500	500	650

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	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; $V_{\text{switch}} = V_S - 2V$ 0 ... 10 V / 3-Leiter: contact rating 125 mA, short-circuit resistant
Accuracy of contacts <sup>2</sup>	$\leq \pm 0.5\%$ FSO
Repeatability	$\leq \pm 0.2\%$ FSO
Switching frequency	max. 10 Hz
Switching cycles	$> 100 \times 10^6$
Delay time	0 ... 100 sec

<sup>1</sup> max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with Ex-protection no contact possible with 3-wire in combination with plug ISO 4400

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{min}}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
2-wire current signal with Ex-protection	4 ... 20 mA / $V_S = 15 \dots 28 V_{DC}$ permissible load: $R_{\text{max}} = [(V_S - V_{S \text{min}}) / 0.02 \text{ A}] \Omega$ response time: < 10 msec
3-wire current signal	4 ... 20 mA / $V_S = 19 \dots 30 V_{DC}$ adjustable (turn-down of span max. 1:5) <sup>3</sup> permissible load: $R_{\text{max}} = 500 \Omega$ response time: < 0.5 sec
3-wire voltage signal	0 ... 10 V / $V_S = 15 \dots 36 V_{DC}$ permissible load: $R_{\text{min}} = 10 \text{ k}\Omega$ response time: < 10 msec
Without analogue output	$V_S = 15 \dots 36 V_{DC}$
Accuracy <sup>2</sup>	$\leq \pm 0.5\%$ FSO

<sup>3</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal error (offset and span) <sup>4</sup>	
Thermal error	$\leq \pm 0.2\%$ FSO / 10 K
in compensated range	0 ... 85°C

<sup>4</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium <sup>5</sup>	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element <sup>6</sup>	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C
Electronics / environment	-40 ... 85 °C	
Storage	-40 ... 100 °C	

<sup>5</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C

<sup>6</sup> max. temperature depends on the used sealing material, type of seal and installation

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	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	silicone oil
Optional	food compatible oil with FDA approval (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

Materials	
Pressure port	stainless steel 1.4435 (316 L)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, Polycarbonate
Seals	standard: FKM (recommended for medium temperatures $\leq 200$ °C) option: FFKM <sup>7</sup> (recommended for medium temperatures < 260 °C) others on request
Diaphragm	stainless steel 1.4435
Media wetted parts	pressure port, seals, diaphragm

<sup>7</sup> for pressure ranges  $p_N \leq 100$  bar

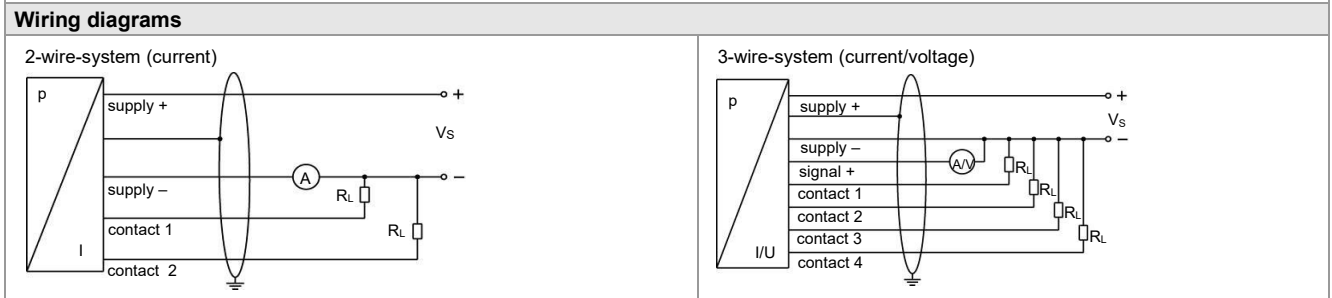


<b>Explosion protection (only for 4 ... 20 mA / 2-wire)</b>	
Approval AX14-DS 201P	IBExU06ATEX1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety technical maximum values	$U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ , $P_i = 660\text{ mW}$ , $C \approx 0\text{ nF}$ , $L_i \approx 0\text{ }\mu\text{H}$
Max. switching current <sup>8</sup>	70 mA
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 $\mu\text{H}/\text{m}$

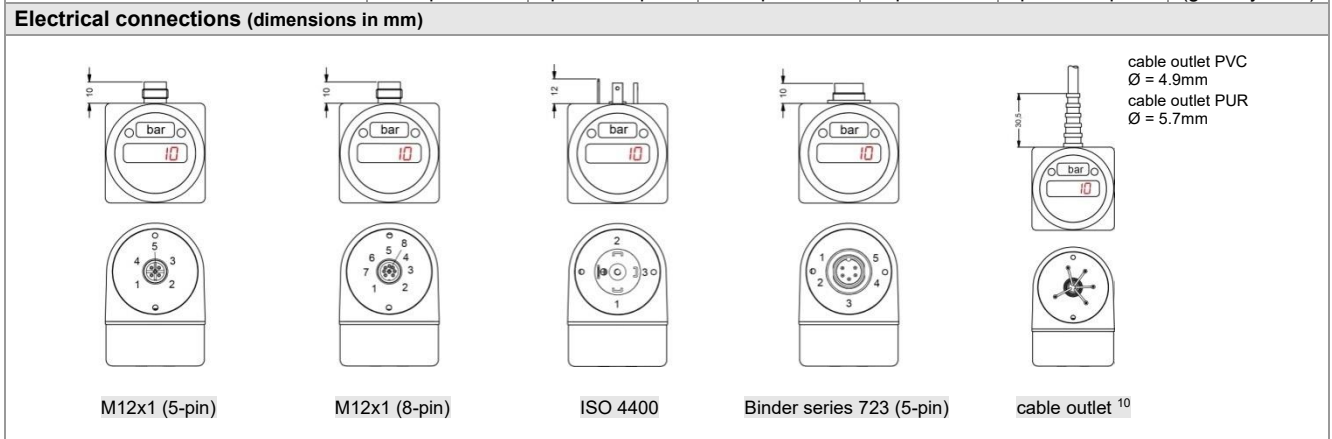
<sup>8</sup> the real switching current in the application depends on the power supply unit

<b>Miscellaneous</b>	
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % $\pm$ 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 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>9</sup>
ATEX Directive	2014/34/EU

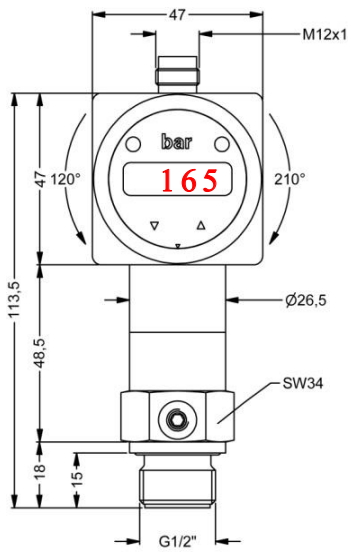
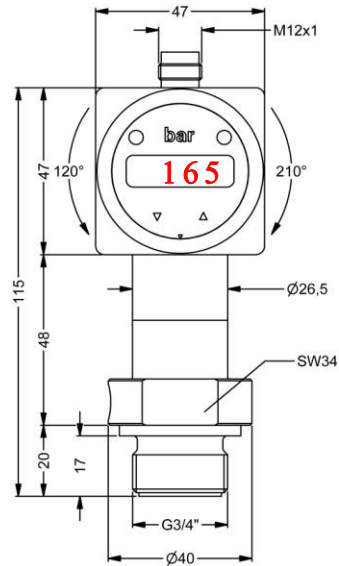
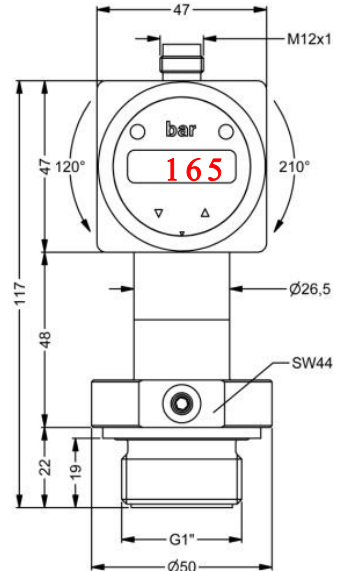
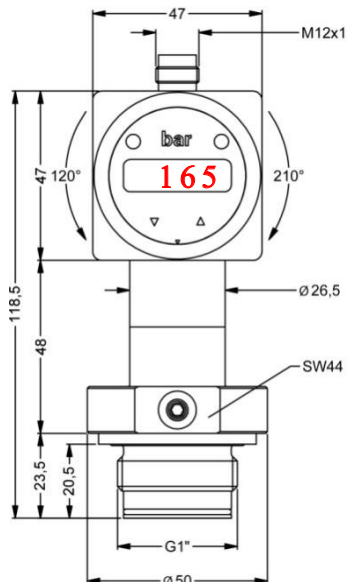
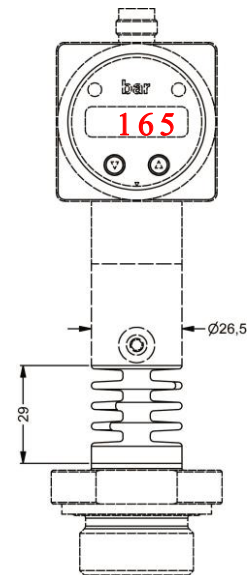
<sup>9</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.



<b>Pin configuration</b>						
Electrical connection	M12x plastic (5-pin)	M12x metal (5-pin)	M12x plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	WH (white)
Supply -	3	3	3	2	3	BN (brown)
Signal + (only for 3-wire)	2	2	2	3	2	GN (green)
Contact 1	4	4	4	3	4	GN (grey)
Contact 2	5	5	5	-	5	PK (pink)
Contact 3	-	-	6	-	-	-
Contact 4	-	-	7	-	-	-
Shield	via pressure port	plug housing/pressure port	via pressure port	ground pin $\oplus$	plug housing/pressure port	GNYE (green-yellow)



<sup>10</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)

**Mechanical connection (dimensions in mm)**
**Standard**

**G1/2" flush**
**Optional**

**G3/4" flush**

**G1" flush**
**Optional**

**G1" flush  
with radial o-ring**

**cooling element  
300 °C <sup>11</sup>**

⇨ **metric threads and other versions on request**

<sup>11</sup> for pressure ranges  $p_N \leq 160$  bar; max. temperature depends on the used sealing material, type of seal and installation





# DS 217

## 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

<b>Input pressure range</b>												
Nominal pressure gauge	[bar]	6	10	16	25	40	60	100	160	250	400	600
Overpressure (static)	[bar]	12	20	32	50	80	120	200	320	500	800	1 200
Burst pressure $\geq$	[bar]	30	50	80	125	200	300	500	800	1 400	2 000	3 000
Vacuum resistance		unlimited										
<b>Contact</b>												
Number / type		standard: 1 PNP contact optionally: max. 2 independent PNP contact; 1 analogue output										
Switching current		standard: contact rating max. 125 mA, short-circuit resistant										
Accuracy of switching points <sup>1</sup>		$\leq \pm 1.5\%$ FSO										
Repeatability		$\leq \pm 0.5\%$ FSO										
Switching frequency		max. 10 Hz										
Switching cycles		$> 100 \times 10^6$										
Delay time		0 ... 100 sec										
<b>Analogue output (optionally) / Supply</b>												
3-wire current signal		4 ... 20 mA / $V_S = 24 V_{DC} \pm 10\%$										
Accuracy <sup>1</sup>		$\leq \pm 0.5\%$ FSO										
Permissible load		3-wire: $R_{max} = 500 \Omega$										
Influence effects		supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k $\Omega$										
Measuring rate		10 Hz										
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)												
<b>Thermal effects (Offset and Span) / Permissible temperatures</b>												
Thermal error		$\leq \pm 0.5\%$ FSO / 10 K in compensated range -25 ... 85 °C										
Permissible temperatures		medium: -25 ... 125 °C electronics / environment: -25 ... 85 °C storage: -40 ... 85 °C										
<b>Electrical protection</b>												
Short-circuit protection		permanent										
Reverse polarity protection		no damage, but also no function										
Electromagnetic compatibility		emission and immunity according to EN 61326										

<b>Mechanical stability</b>		
Vibration	10 g (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27
<b>Materials</b>		
Pressure port / housing	stainless steel 1.4571 (316 Ti) / stainless steel 1.4301 (304)	
Display housing	PA 6.6, polycarbonate	
Seal sensor	none (welded)	
Diaphragm	stainless steel 1.4542 (17-4PH)	
Media wetted parts	pressure port, seal pressure port, diaphragm	
<b>Miscellaneous</b>		
Weight	approx. 160 g	
Display	4-digit, red 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)	
Long term stability	≤ ± 0.3 % FSO / year at reference conditions	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) <sup>2</sup>
<sup>2</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar.		
<b>Wiring diagrams</b>		
3-wire-system (current)		
<b>Pin configuration</b>		
Electrical connections	M12x1 (5-pin) plastic	
supply +	1	
supply -	3	
signal + (only for 3-wire)	2	
contact 1	4	
contact 2	5	
shield	via pressure port	
<b>Connections (dimensions in mm)</b>		
	<b>Mechanical connections - optional</b> 	<b>Electronical connections</b> 





# DS 230

## 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



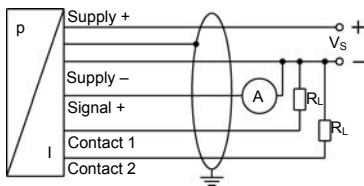
### Technical Data

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 $V_s$		24 V <sub>DC</sub> ± 10 %							
Current consumption		< 40 mA (without analogue output and without contacts)							
Output signal									
Number, type		standard: 1 PNP contact optional: max. 2 independent PNP contacts; 1 analogue output							
Contact (Standard)									
Switching current		standard: contact rating max. 125 mA, short-circuit resistant							
Accuracy of contacts <sup>1</sup>		≤ ± 1.5 % FSO BFSL							
Repeatability <sup>1</sup>		≤ ± 0.5 % FSO BFSL							
Switching frequency		max. 100 Hz							
Switching cycles		> 100 x 10 <sup>6</sup>							
Functions		hysteresis- / compare mode n/o / n/c							
Delay time		0 ... 99.99 sec							
Analogue output (optionally)									
Signal output		4 ... 20 mA (3-wire)							
Linearity, hysteresis, repeatability		≤ ± 0.5 % FSO BFSL							
Calibration accuracy		≤ ± 1 % FSO BFSL (2 % FSO)							
Permissible load		$R_{max} = 500 \Omega$							
Response time		< 10 msec							
<sup>1</sup> depending on nominal pressure range									
Thermal effects (Offset and Span) / Permissible temperatures									
Thermal error for offset		≤ ± 0.5 % FSO / 10 K	in compensated range		0 ... 85 °C				
Permissible temperatures		medium: -25 ... 125 °C	electronics / environment:		-25 ... 85 °C			storage: -40 ... 85 °C	

<b>Electrical protection</b>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
<b>Mechanical stability</b>	
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
<b>Materials</b>	
Pressure port / housing	stainless steel 1.4301 (304)
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
<b>Miscellaneous</b>	
Display	4-digit, red LED display, digit size 7 mm, digit width 4.85 mm (angle 10 °); 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
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) <sup>2</sup>

<sup>2</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

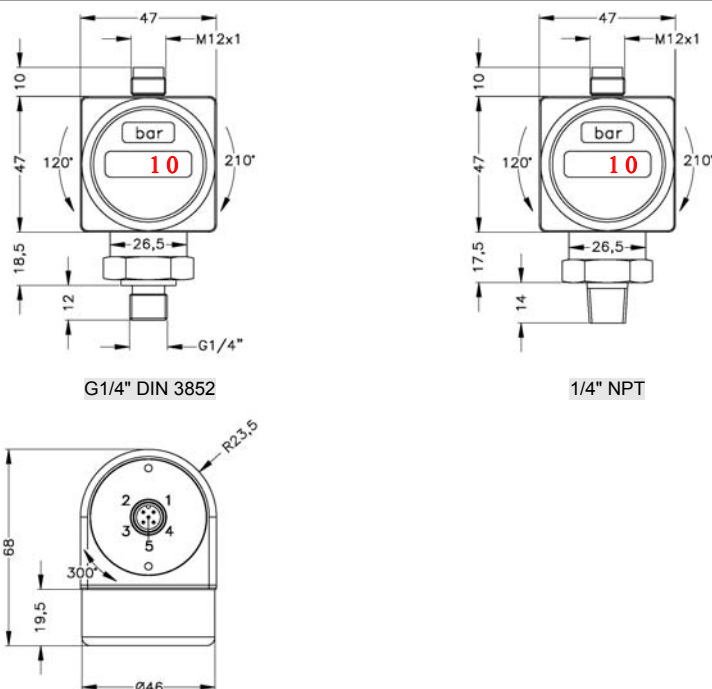
#### Wiring diagram



#### Pin configuration

Electrical connection	M12x1 (5-pin), plastic
Supply +	1
Supply -	3
Signal +	2
Contact 1	4
Contact 2	5
Shield	via pressure port

#### Dimensions (in mm)





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



# iS 4

## Electronic OEM Pressure Switch Pneumatics with IO-Link Interface

### Applications:

- ▶ Pneumatics
- ▶ Vacuum technology

### Characteristics:

- ▶ nominal pressure ranges from 0 ... 1 bar up to 0 ... 10 bar also -1 ... 0 bar
- ▶ compact design
- ▶ IO-Link according to specification V 1.1

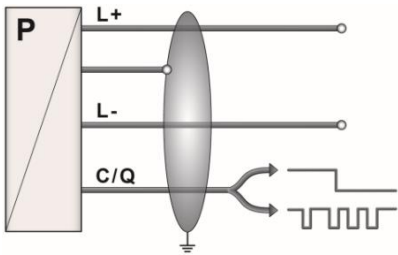
### Technical Data



Input pressure range					
Nominal pressure gauge	[bar]	-1 ... 0	1	3.5	10
Overpressure	[bar]	2	2	7	13
Output signal / Supply					
Standard	IO-Link (measured value and status transmission) / $V_S = 18 \dots 30 \text{ V}_{DC}$ SIO (switching output), status indication via LED (green)				
IO-Link	V 1.1 / Slave / Smart Sensor Profile				
Data transfer	COM2 38.4 kbit/s				
Mode	SIO / IO-Link (COMx)				
Standard	IEC 61131-2, IEC 61131-9				
Performance					
Accuracy <sup>1</sup>	$\leq \pm 0.5 \% \text{ FSO}$				
Switching current (SIO-Mode)	max. 200 mA				
Switching frequency	max. 200 Hz				
Switching cycles	$> 100 \times 10^6$				
Long term stability	$\leq \pm 0.3 \% \text{ FSO} / \text{year}$ at reference conditions				
Turn-on time	SIO mode: ca. 20 msec				
Response time	SIO mode: < 4 msec				
Measuring rate	400 Hz				
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)					
Thermal effects (Offset and Span) / Permissible temperatures					
Tolerance band	$\leq \pm 2 \% \text{ FSO}$		in compensated range 0 ... 50 °C		
TC, average	$\leq \pm 0.4 \% \text{ FSO} / 10 \text{ K}$		in compensated range 0 ... 50 °C		
Permissible temperatures	medium / electronics / environment: -25 ... 85 °C				storage: -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)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
Materials		
Pressure port	aluminium	
Housing	PA 6.6 black	
Seal (media wetted)	NBR	
Sensor	silicon, RTV	
Media wetted parts	pressure port, seal, sensor	
Miscellaneous		
Media	compressed air, non-aggressive gases	
Weight	approx. 25 g	
Current consumption	max. 15 mA	
Operational life	100 million load cycles	
Installation position	any	
Ingress protection	IP 54	
CE-conformity	EMC Directive: 2014/30/EU	

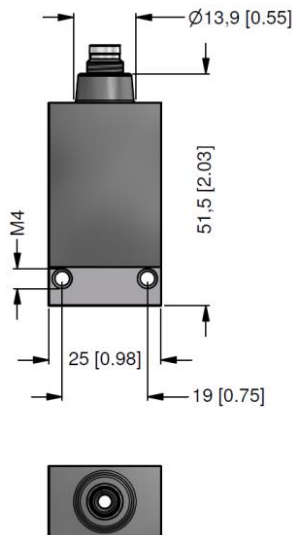
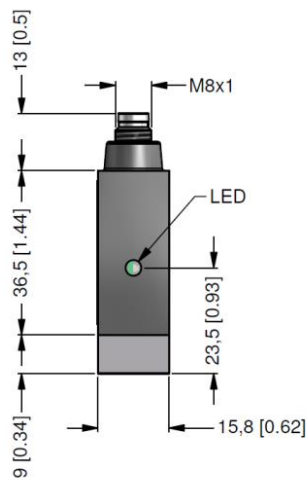
**Wiring diagram**



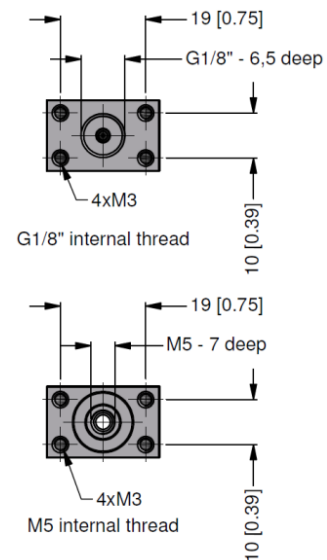
**Pin configuration**

Electrical connection		M8x1 / metal (4-pin)
(L+) Supply +		1
(L-) Supply -		3
C/Q IO-Link (COMx) / SIO		4
Shield		housing

**Dimensions (mm / in)**



**Mechanical connections (view X)**



IO-Link interface								
<b>1. General device information</b>			<b>4. Process data</b>					
Baud rate	COM2 (38.4 kbit/s)		The process data length of the sensor is 16 bits. The switch state (BCD1) as well as the current measured values are transmitted. The 14 bits of the measured value are scaled according to the measuring range.					
Input process data length	2 byte							
Minimum cycle time	5 msec							
IO-Link version	V 1.1		15 bit	14 ... 2	1	0		
SIO mode	yes		Signed Bit	measurement	0	BDC1 / output 1		
<b>2. SIO mode (standard IO mode)</b>			<b>5. Error message</b>					
In this mode the sensor operates like a normal pressure sensor with standard output signals. The digital output is always on Pin 4 of the connector plug.			<b>Error Codes</b>			<b>Description</b>		
			0x8011			Index not available		
			0x8012			Subindex not available		
			0x8023			Access Denied		
			0x8030			Parameter Value out of Range		
			0x8033			Parameter length overrun		
0x8034			Parameter length underrun					
<b>3. IO-Link mode (communication mode)</b>			<b>6. Event codes</b>					
The pressure sensor switches into IO-Link communication mode when operating under an IO-Link master. IO-Link communication is only possible via Pin connector.				<b>Event-Codes IO-Link 1.1</b>	<b>Event-Codes IO-Link 1.0</b>	<b>Device status</b>	<b>Type</b>	
			No malfunction	0x0000	0x0000	0	Notification	
			General malfunction-unknown error	0x1000	0x1000	4	Error	
			Process variable range over-run - Process Data uncertain	0x8C10	0x8C10	2	Warning	
			Process variable range under-run. Process Data uncertain	0x8C30	0x8C10	2	Warning	
<b>7. Parameter data</b> (The parameter data for the pressure sensor correspond to the Smart Sensor profile.)								
<b>Index hex</b>	<b>Subindex hex</b>	<b>Object name</b>	<b>Single Value</b>			<b>Default</b>	<b>Comment</b>	
0x02	0x00	System Commands	0x81 = delete Min-/Max-Wert 0x82 = res 0xA0 = Set0				The action is executed by writing in the subindex	
0x03	0x00	Data Storage Index	0x01: Upload Start 0x02: Upload End 0x03: Download Start 0x04: Download End 0x05: Datastorage Break					
0x0C	0x00	Device Access Lock	0x00: Unlocked 0x01: IO-Link Lock 0x02: Datastorage Lock 0x04: Parameterization Lock 0x08: User Interface Lock 0x03: IO-Link Lock + Datastorage Lock 0x05: IO-Link Lock + Parameterization Lock 0x09: IO-Link Lock + User Interface Lock 0x06: Datastorage Lock + Parameterization Lock 0x0A: Datastorage Lock + User Interface Lock 0x07: Datastorage Lock + IO-Link Lock + Parameterization Lock 0x0B: Datastorage Lock + IO-Link Lock + User Interface Lock			0x00: Unlocked		
0x24	0x00	Device Status	0x00 Device is operating properly 0x02 Out-of-Specification 0x04 Failure					
0x3D	0x02	Switch Point mode	0x80: Hysteresis NO 0x81: Hysteresis NC 0x82: Window NO 0x83: Window NC			0x80: HNo		
<b>Index hex</b>	<b>Subindex hex</b>	<b>Object name</b>	<b>Access</b>	<b>Length</b>	<b>Value Range</b>	<b>Gradient</b>	<b>Unit</b>	<b>Default</b>
0x3C	0x01	SetPoint 1 = SP	R/W	2 Byte	Process Data			100%
0x3C	0x02	SetPoint 2 = rP	R/W	2 Byte	Process Data			0%
0xD0	0x00	Delay Switching Time	R/W	2 Byte	0 ... 500	0.1	sec	0
0xD1	0x00	Delay Back Switching Time	R/W	2 Byte	0 ... 500	0.1	sec	0
0xD5	0x00	Min Pressure Value	R	2 Byte	Process Data			
0xD6	0x00	Max Pressure Value	R	2 Byte	Process Data			
0xD7	0x00	Measure damping	R/W	2 Byte	0...1000 in 10 ms steps	1	msec	0

**Ordering code iS 4**

iS 4		□□□	-	□□□□	-	□	-	□□□	-	□□□	-	□	-	□□□
<b>Pressure</b>		gauge	6	8	S									
<b>Input</b>		[bar]												
	1.0		1	0	0	1								
	3.5		3	5	0	1								
	10		1	0	0	2								
	-1 ... 0		X	1	0	2								
	customer		9	9	9	9								consult
<b>Signal output</b>		IO-Link / SIO					IO							
<b>Electrical connection</b>		M8x1 (4-pin) / metal						Q	0	0				
	customer							9	9	9				consult
<b>Mechanical connection</b>		G1/8" internal thread						Q	0	0				
	M5 internal thread with slot for O-ring <sup>1</sup>							R	0	0				
	customer							9	9	9				consult
<b>Seals</b>		NBR								5				
	customer									9				consult
<b>Special version</b>		standard									0	0	0	
	customer										9	9	9	consult

<sup>1</sup> suitable for flange installation



# DS 4

## 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



Input pressure range					
Nominal pressure gauge	[bar]	-1 ... 0	1	3.5	10
Overpressure	[bar]	2	2	7	13

Supply	
Supply voltage	$V_s = 12 \dots 30 V_{DC}$
Current consumption	max. 14 mA (without contacts)
Output signal / Contact <sup>1</sup>	
Number	standard: 1 option: 2
Type	PNP
Switching performance	max. 300 mA, short-circuit proof
Accuracy of contacts <sup>2</sup>	$\leq \pm 1 \% FSO$
Repeatability	$\leq \pm 0.2 \% FSO$
Status indication	SP 1: green SP 2: yellow
Switching function <sup>3</sup>	standard: n/o option: n/c
Switching mode <sup>3</sup>	standard: hysteresis mode option: window mode
Switch on point <sup>3</sup>	standard: factory setting 80 % FSO others: specify on order; adjustable range 0 ... 100 % FSO
Switch off point <sup>3</sup>	standard: factory setting 75 % FSO others: specify on order; adjustable range 0 ... 100 % FSO
Switch on / switch off delay <sup>3</sup>	standard: off others: specify on order, adjustable range from 10 msec up to 90 sec (step 10 msec)
Switching frequency	200 Hz (without switching delay)
Switching cycles	$> 100 \times 10^6$

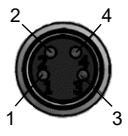
<sup>1</sup> with optional analogue output max. 1 contact possible

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

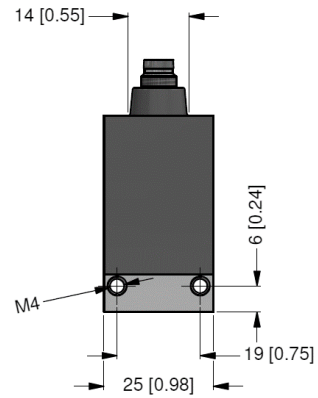
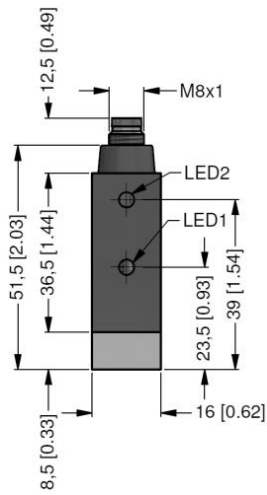
<sup>3</sup> Parameters can be programmed by customer either with the programming kit CIS680/CIS681 or with the programming device P6 (available as accessories).

Output signal / Analogue output <sup>1</sup> (optionally)		
Analogue output	1 ... 5 V / 3-wire	
Accuracy <sup>2</sup>	≤ ± 2 % FSO	
Permissible load	R <sub>min</sub> = 10 kΩ	
<sup>1</sup> with optional analogue output max. 1 contact possible		
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span)		
Tolerance band	≤ ± 2 % FSO	in compensated range 0 ... 50 °C
TC, average	≤ ± 0.4 % FSO / 10 K	in compensated range 0 ... 50 °C
Permissible temperatures		
Medium	-25 ... 85 °C	
Electronics / environment	-25 ... 85 °C	
Storage	-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)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
Materials		
Pressure port	aluminium	
Housing	PA 6.6 black	
Seal (media wetted)	NBR	
Sensor	silicon, RTV	
Media wetted parts	pressure port, seal, sensor	
Miscellaneous		
Media	compressed air, non-aggressive gases	
Weight	approx. 50 g	
Installation position	any	
Operational life	100 million load cycles	
Ingress protection	IP 54	
CE-conformity	EMC Directive: 2014/30/EU	
Wiring diagrams		
1 contact, without analogue output		
2 contacts, without analogue output		
1 contact, with analogue output		

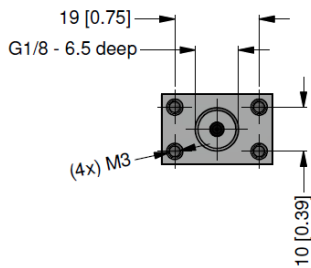
**Pin configuration**

Electrical connection	M8x1 / metal (4-pin)			
	1 contact	2 contacts	1 contact, 1 analogue output	
Supply +	1	1	1	
Supply -	3	3	3	
Signal +	-	-	2	
Contact 1	4	4	4	
Contact 2	-	2	-	
Shield	housing	housing	housing	

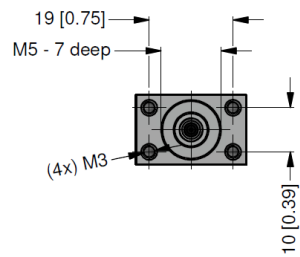
**Dimensions (mm / in)**



**Mechanical connections (dimensions mm / in)**



G1/8" internal thread



M5 internal thread



Ordering code DS 4																						
DS 4		□	□	□	-	□	□	□	□	□	□	-	□	□	□	□	□	□	□	□		
<b>Pressure</b>																						
	gauge	6	8	0																		
<b>Input</b>																						
	[bar]																					
	1.0	1	0	0	1																	
	3.5	3	5	0	1																	
	10	1	0	0	2																	
	-1 ... 0	X	1	0	2																	
	customer	9	9	9	9																consult	
<b>Number of contacts</b>																						
	1 contact																1					
	2 contacts <sup>1</sup>																2					
<b>Analogue output</b>																						
	without analogue output																0					
	1 ... 5 V / 3-wire <sup>1</sup>																C					
<b>Electrical connection</b>																						
	M8x1 (4-pin) / metal																Q	0	0			
	customer																9	9	9	consult		
<b>Mechanical connection</b>																						
	G1/8" internal thread																Q	0	0			
	M5 internal thread with slot for O-ring <sup>2</sup>																R	0	0			
	customer																9	9	9	consult		
<b>Seals</b>																						
	NBR																5					
	customer																9	consult				
<b>Setting code</b>																						
	BD SENSORS standard <sup>3</sup>																0	0	0			
	setting according to customer <sup>3</sup>																9	9	9	consult		
<b>Special version</b>																						
	standard																0	0	0			
	customer																9	9	9	consult		

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

<sup>2</sup> suitable for flange installation

<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).



# DS 5

## Electronic OEM Pressure Switch Heavy Duty

### Applications:

- ▶ mobile hydraulics
- ▶ presses
- ▶ oxygen application

### Characteristics:

- ▶ stainless steel sensor, welded
- ▶ nominal pressure ranges from 0 ... 16 bar up to 0 ... 600 bar
- ▶ configurable via PC or programming device P6
- ▶ optionally: oil and grease free version

## Technical Data



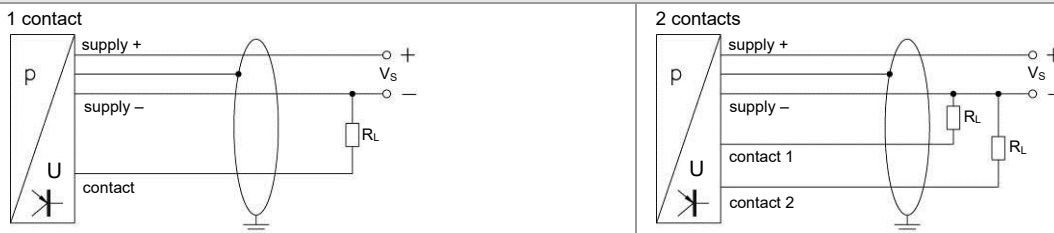
Input pressure range										
Nominal pressure gauge	[bar]	16	25	40	60	100	160	250	400	600
Overpressure (static)	[bar]	50	50	80	120	200	320	500	800	1200
Burst pressure $\geq$	[bar]	125	125	200	300	500	800	1250	2000	2000

Supply	
Supply voltage	$V_S = 12 \dots 30 V_{DC}$
Current consumption	max. 14 mA (without contacts)
Contacts	
Number	standard: 1 <span style="float: right;">option: 2</span>
Type	PNP
Switching performance	max. 300 mA, short-circuit proof
Accuracy of contacts	IEC 60770: $\leq \pm 1 \% FSO$
Repeatability	$\leq \pm 0.2 \% FSO$
Minimum hysteresis of contacts	$\leq \pm 0.5 \% FSO$
Status indication	SP 1: green <span style="float: right;">SP 2: yellow</span>
Switching function <sup>1</sup>	standard: n/o <span style="float: right;">option: n/c</span>
Switching mode <sup>1</sup>	standard: hysteresis mode <span style="float: right;">option: window mode</span>
Switch on point <sup>1</sup>	standard: factory setting 80 % FSO others: specify on order; adjustable range 5 ... 100 % FSO
Switch off point <sup>1</sup>	standard: factory setting 75 % FSO others: specify on order; adjustable range 5 ... 100 % FSO
Switch on / switch off delay <sup>1</sup>	standard: off others: specify on order, adjustable range from 10 msec up to 90 sec (step 10 msec)
Switching frequency	200 Hz (without switching delay)
Switching cycles	$> 100 \times 10^6$
<sup>1</sup> Parameters can be programmed by customer either with the programming kit CIS-G or with the programming device P6 (available as accessories).	
Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	$\leq \pm 0.2 \% FSO / 10 K$ <span style="float: right;">in compensated range -20 ... 80 °C</span>
Permissible temperatures	medium: -40 ... 125 °C <span style="float: right;">electronics / environment / storage: -40 ... 85 °C</span>

<b>Electrical protection</b>		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
<b>Mechanical stability</b>		
Vibration	10 g RMS (20 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
<b>Materials</b>		
Pressure port	stainless steel 1.4404 (316L)	
Housing	stainless steel 1.4305 (303)	
Seal of pressure port	FKM	others on request
Seal of sensor	none (welded)	
Sensor	stainless steel 1.4548 (17-4PH)	
Media wetted parts	pressure port, seal, sensor	
<b>Miscellaneous</b>		
Option for mechanical connections 1/4" NPT, R 1/4" and 7/16"-20 UNF	oxygen application	
Weight	approx. 90 g	
Installation position	any	
Operational life	100 million load cycles	
Ingress protection	IP 67	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) <sup>2</sup>

<sup>2</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

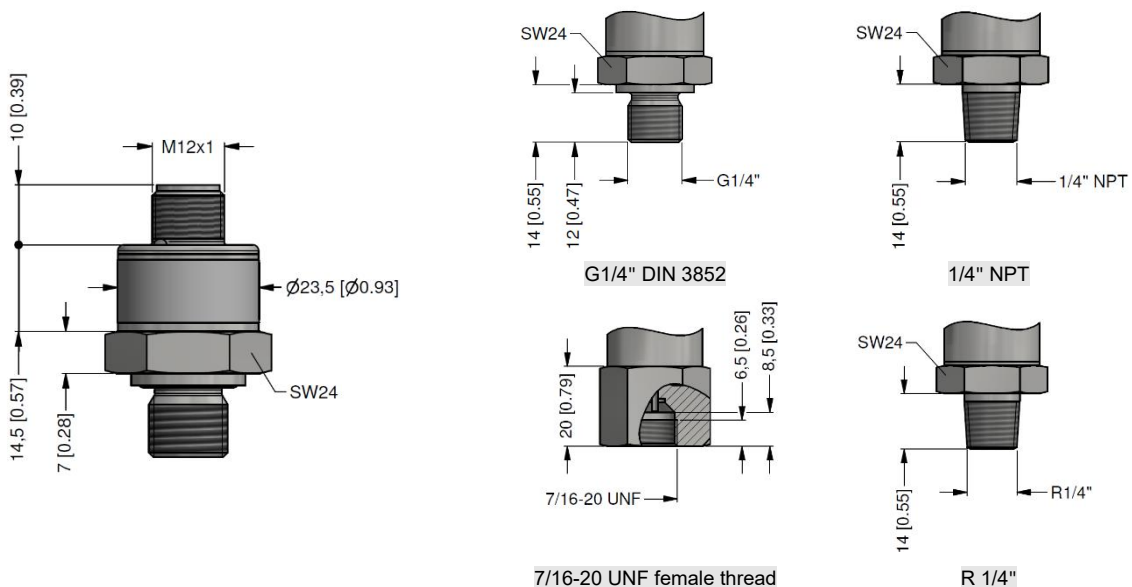
**Wiring diagrams**



**Pin configuration**

Electrical connection	M12x1 (4-pin), metal	
Supply +	1	
Supply -	3	
Contact 1	4	
Contact 2	2	
Shield	plug housing	

**Dimensions / Mechanical connections (mm / in)**



## Ordering code DS 5

DS 5

□	□	□	-	□	□	□	□	-	□	-	□	□	□	-	□	□	□	-	□	□	□
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Pressure																							
	gauge	6	8	M																			
Input [bar]																							
	16				1	6	0	2															
	25				2	5	0	2															
	40				4	0	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															
	600				6	0	0	3															
	customer				9	9	9	9													consult		
Number of contacts																							
	1 contact								1														
	2 contacts								2														
Electrical connection																							
	M12x1 (4-pin), metal								M	1	3												
	customer								9	9	9										consult		
Mechanical connection / Seal																							
	G1/4" DIN 3852 /																						
	on pressure port: FKM									3	0	0	P										
	1/4" NPT / without									N	4	0	2										
	R1/4" / without									R	4	0	2										
	7/16"-20 UNF female thread / without									S	0	1	2										
	customer									9	9	9	9								consult		
Setting code																							
	BD SENSORS standard <sup>1</sup>																			0	0	0	
	setting according to customer <sup>1</sup>																			9	9	9	
																						consult	
Special version																							
	standard																				0	0	0
	oxygen application <sup>2</sup>																				0	0	7
	oil and grease free																				0	0	8
	customer																				9	9	9
																							consult

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

<sup>2</sup> not possible with G1/4" DIN 3852



# DS 6

## Electronic OEM Pressure Switch

### Applications:

- ▶ mechanical engineering / 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

### Technical Data



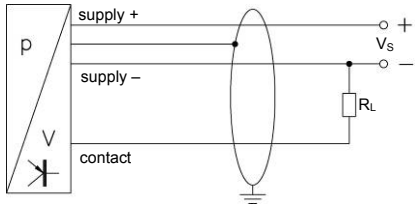
Input pressure range									
Nominal pressure gauge	[bar]	2	5	10	20	50	100	200	400
Nominal pressure abs.	[bar]	2	5	10	20	50	100	200	400
Overpressure	[bar]	7	12	25	50	120	250	400	600
Supply									
Supply voltage	$V_S = 12 \dots 30 V_{DC}$								
Current consumption	max. 14 mA (without contacts)								
Contacts									
Number	standard: 1				option: 2				
Type	PNP								
Switching performance	max. 300 mA, short-circuit proof								
Accuracy of contacts	IEC 60770: $\leq \pm 1 \% FSO$								
Repeatability	$\leq \pm 0.2 \% FSO$								
Minimum hysteresis of contacts	$\leq \pm 0.5 \% FSO$								
Status indication	SP 1: green				SP 2: yellow				
Switching function <sup>1</sup>	standard: n/o				option: n/c				
Switching mode <sup>1</sup>	standard: hysteresis mode				option: window mode				
Switch on point <sup>1</sup>	standard: factory setting 80 % FSO others: specify on order; adjustable range 5 ... 100 % FSO								
Switch off point <sup>1</sup>	standard: factory setting 75 % FSO others: specify on order; adjustable range 5 ... 100 % FSO								
Switch on / switch off delay <sup>1</sup>	standard: off others: specify on order, adjustable range from 10 msec up to 90 sec (step 10 msec)								
Switching frequency	200 Hz (without switching delay)								
Switching cycles	$> 100 \times 10^6$								
<sup>1</sup> Parameters can be programmed by customer either with the programming kit CIS-G or with the programming device P6 (available as accessories).									
Thermal effects (Offset and Span) / Permissible temperatures									
Thermal error	$\leq \pm 0.3 \% FSO / 10 K$				in compensated range 0 ... 85 °C				
Permissible temperatures	medium / electronics / environment: -25 ... 85 °C				storage: -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)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec	according to DIN EN 60068-2-27
Materials		
Pressure port	stainless steel 1.4301 (304)	
Housing	stainless steel 1.4305 (303)	
Seals (media wetted)	standard: FKM	option: EPDM
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %	
Media wetted parts	pressure port, seals, diaphragm	
Miscellaneous		
Weight	approx. 90 g	
Installation position	any	
Operational life	100 million load cycles	
Ingress protection	IP 67	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) <sup>2</sup>

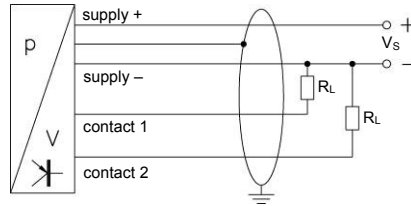
<sup>2</sup> This directive is only valid for devices with maximum permissible overpressure > 200 bar

#### Wiring diagrams

1 contact



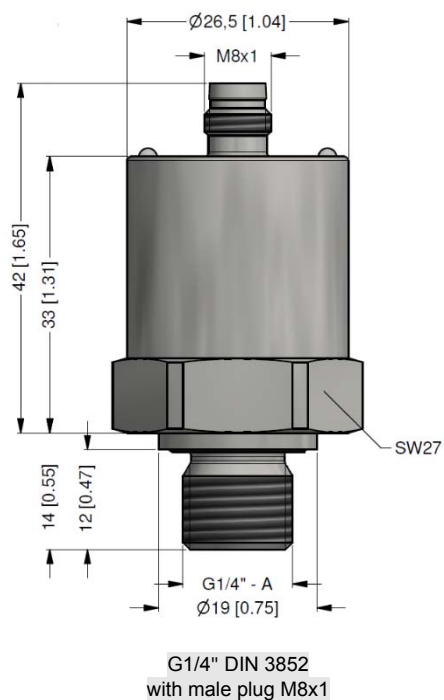
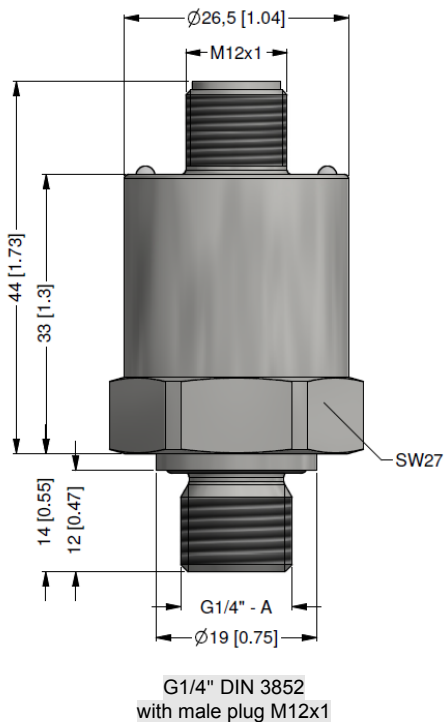
2 contacts



#### Pin configuration

Electrical connection	M12x1 (4-pin), metal		M8x1 (4-pin), metal	
Supply +	1		1	
Supply -	3		3	
Contact 1	4		4	
Contact 2	2		2	
Shield	plug housing		plug housing	

#### Dimensions (mm / in)



Ordering code DS 6

DS 6



<b>Pressure</b>												
gauge	6	8	5									
absolute	6	8	6									
<b>Input [bar]</b>												
2				2	0	0	1					
5				5	0	0	1					
10				1	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					
customer				9	9	9	9			consult		
<b>Number of contacts</b>												
1 contact									1			
2 contacts									2			
<b>Analogue output</b>												
without analogue output									0			
<b>Electrical connection</b>												
M12x1 (4-pin), metal								M	1	3		
M8x1 (4-pin), metal								Q	0	0		
customer								9	9	9		
<b>Mechanical connection</b>												
G1/4" DIN 3852									3	0	0	
customer									9	9	9	
<b>Seals</b>												
FKM										1		
EPDM										3		
customer										9		
<b>Setting code</b>												
BD SENSORS standard <sup>1</sup>									0	0	0	
setting according to customer <sup>1</sup>									9	9	9	
<b>Special version</b>												
standard										0	0	0
oil and grease free										0	0	8
customer										9	9	9

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

## COMPETENCE

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Industrial pressure measurement technology from 0.1 mbar up to 8000 bar

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

BD|SENSORS has the right pressure measuring device at the right price.

## PRICE / PERFORMANCE

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Pressure measurement at the highest level

The concentration on electronic pressure transmitter has led to extraordinary efficiency and economical pricing.

BD|SENSORS is certain to be one of the most economical suppliers on the world market, given equal technical and commercial conditions.

## RELIABILITY

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Projectable delivery times and strict observance of deadlines

Short delivery times and firm deadlines, even for special designs, make BD|SENSORS a reliable partner for our customers.

BD|SENSORS reduces the level of your stock-keeping and increases your profitability.

## FLEXIBILITY

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We have special solutions for your individual requirement.

We solve your problem in industrial pressure measurement quickly and economically, not only with large-scale production lines, but also for smaller requirements.

BD|SENSORS is especially flexible when technical support and quick assistance are required in service case as well as for rush orders.



## INDUSTRIES



plant and machine engineering



chemical and biochemical industry



energy industry



renewable energy



semiconductor industry /  
cleanroom technology



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



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aggressive media



colours



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