BD|SENSORS
pressure measurement

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 contaminated media.

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

Preferred areas of use are

Plant and Machine Engineering

Environmental Engineering
(water – sewage – recycling)

CE Ex

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Input pressure range [1]																		
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_2O]	-	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	$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request																	
[1] PVDF pressure port possible for nominal pressure ranges up to 60 bar																		

Contact [2]	
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 [3]	≤ ± 0.5 % FSO
Repeatability	≤ ± 0.2 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec
[2] 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_S = 13 ... 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 ... 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 = 19 ... 30 V_{DC} adjustable (turn-down of span 1:5) [4] permissible load: R_{max} = 500 Ω	response time: < 0,5 sec
3-wire voltage signal	0 … 10 V / V_S = 15 ... 36 V_{DC} permissible load: R_{min} = 10 kΩ	response time: < 3 msec
Without analogue output	V_S = 15 ... 36 V_{DC}	
Accuracy [3]	≤ ± 0.5 % FSO	
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] 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	-25 ... 85 °C	
Permissible temperatures [5]	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C	
[5] 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

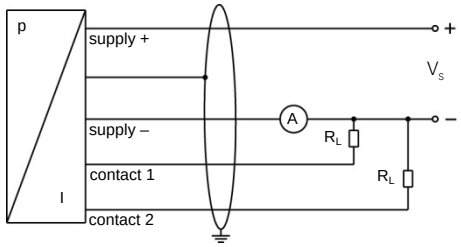
Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Materials			
Pressure port / housing		pressure port	housing
	Standard:	stainless steel 1.4404	stainless steel 1.4404
	Option for G1/2" open port (up to 60 bar):	PVDF	stainless steel 1.4404
	Options for G3/4" flush (0.6 bar ≤ P_N ≤ 25 bar):	PVDF	PVDF
Display housing	PA 6.6, polycarbonate		
Seals (media wetted)	standard: FKM option: EPDM ($P_N \leq 160$ bar) others on request		
Diaphragm	ceramics Al_2O_3 96 %		
Media wetted parts	pressure port, seals, diaphragm		

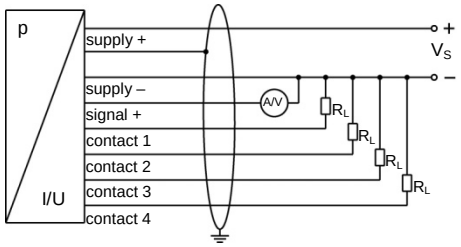
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 201	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)
Safety tech. maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [6]	70 mA
Permissible 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 µH/m
[6] 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)
Option oxygen application [7]	for P_N ≤ 15 bar: O-ring in 70 EPDM 281 (with BAM-approval); permissible maximum values are 15 bar / 60° C and 10 bar / 90° C for P_N ≤ 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. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA
Ingress protection	IP 65
Installation position	any
Weight	approx. 200 g
Operational life	> 100 x 10^6 cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) [8]
[7] not possible with flush pressure ports *[8] This directive is only valid for devices with maximum permissible overpressure > 200 bar*	

Wiring diagrams

2-wire-system (current)



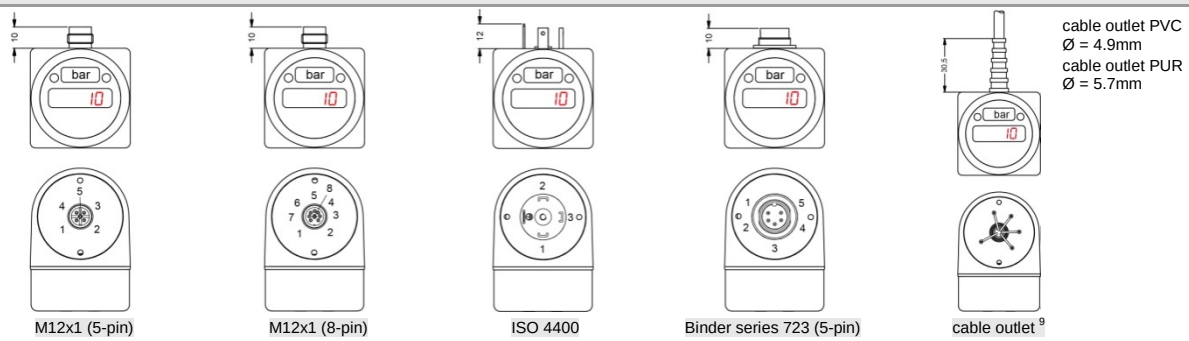
3-wire-system (current / voltage)



Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (DIN 47100)
Supply +	1	1	1	1	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 con-tact	plug housing/ pressure port	ye/gn (yellow/green)

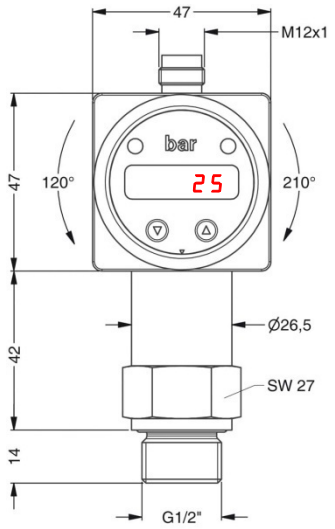
Electrical connections (dimensions in mm)

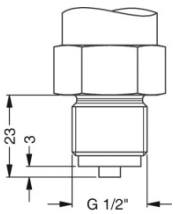


M12x1 (5-pin) | M12x1 (8-pin) | ISO 4400 | Binder series 723 (5-pin) | cable outlet [9]

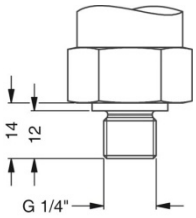
[9] different cable types and lengths available, permissible temperature depends on kind of cable;
standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

Mechanical connections (dimensions in mm)

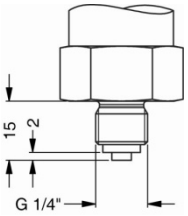




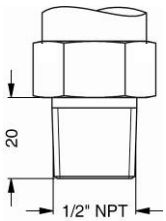
G1/2" EN 837



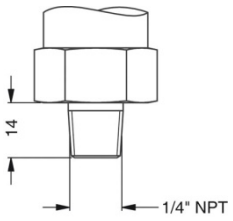
G1/4" DIN 3852



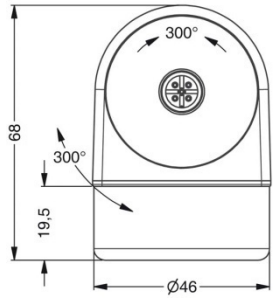
G1/4" EN 837

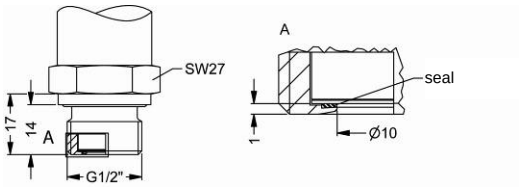


1/2" NPT

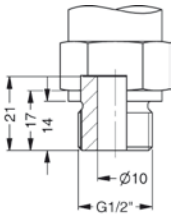


1/4" NPT





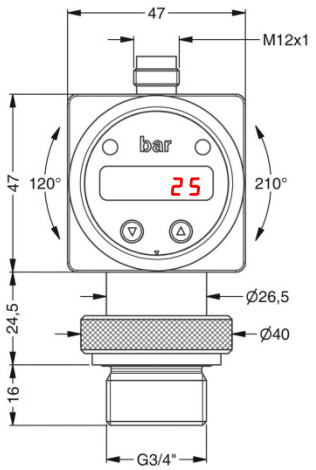
G1/2" (DIN 3852)
semi-flush; M20x1.5 [10]



G1/2" open port

⇨ **metric threads and others on request**

optionally for P_N from 0.6 up to 60 bar gauge



G3/4" flush (DIN 3852)

[10] *possible for nominal pressure ranges $P_N \leq 40$ bar*

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Ordering code DS 201

DS 201 [ ][ ][ ] - [ ][ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ] - [ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ]

Pressure																									
gauge in bar				7	8	2																			
gauge in mH_2O				7	8	E																			
absolute in bar				7	8	3																			
Input	**[mH_2O]**	**[bar]**																							
	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																consult
Analogue output																									
without										0															
4 … 20 mA / 2-wire										1															
0 … 10 V / 3-wire										3															
4 … 20 mA / 3-wire, adjustable										7															
Intrinsic safety 4 … 20 mA / 2-wire [1]										E															
customer										9															consult
Contact																									
1 contact [1,2]											1														
2 contacts [1,2]											2														
4 contacts [3]											4														
Accuracy																									
0.5 %												5													
customer												9													consult
Electrical connection																									
Male plug M12x1 (5-pin) / plastic version													N	0	1										
Male plug M12x1 (8-pin) / plastic version [3]													M	5	0										
Male plug M12x1 (5-pin) / metal version													N	1	1										
Male and female plug ISO 4400 [2]													1	0	0										
Male plug Binder series 723 (5-pin)													2	0	4										
Cable outlet incl. cable [4]													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 with flush sensor [5]																F	0	0							
G3/4" DIN 3852 with flush sensor [6]																K	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						
EPDM [7]																			3						
customer																			9						consult
Pressure port																									
Stainless steel 1.4404 (316L)																				1					
PVDF [8]																				B					
customer																				9					consult
Diaphragm																									
Ceramics Al_2O_3 96%																					2				
customer																					9				consult
Special version																									
standard																						0	0	0	
oxygen application [9]																						0	0	7	
customer																						9	9	9	consult
Prices EXW Thierstein, excluding package																									

[1] with Ex version max.1 contact possible

[2] with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible

[3] 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request

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

[5] possible for nominal pressure ranges $P_N \geq 0.6$ bar up to PN ≤ 25 bar gauge, absolute on request

[6] possible for nominal pressure ranges $P_N \geq 0.6$ bar up to $P_N \leq 60$ bar gauge

[7] possible for nominal pressure ranges $P_N \leq 160$ bar

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

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

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