DS 201P

Electronic Pressure Switch

Pressure Port with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 61298-2:
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

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

Contact [1]	
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-Leiter: contact rating 125 mA, short-circuit resistant
Accuracy of contacts[2]	≤ ± 0.5 % FSO
Repeatability	≤ ± 0.2 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10^6
Delay time	0 ... 100 sec

[1] 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

[2] accuracy according to IEC 61298-2 – limit point adjustment (non-linearity, hysteresis, repeatability)

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 Ex-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 max. 1:5) [3] 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: < 10 msec
Without analogue output	V_S = 15 ... 36 V_{DC}
Accuracy [2]	≤ ± 0.5 % FSO

[3] with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal error (offset and span) [4]	
Thermal error	≤ ± 0.2 % FSO / 10 K
In compensated range	0 ... 85°C

[4] 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 [5]	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element [6]	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	

[5] max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C
[6] 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	20 g RMS / 10 ... 2000 Hz	according to DIN EN 60068-2-6
	10 g RMS / 10 ... 2000 Hz	according to DIN EN 60068-2-6 (with cooling element)
Shock	500 g / 1 msec half sine	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

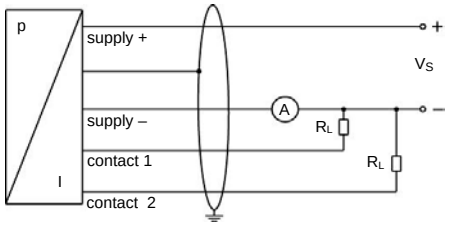
Materials		
Pressure port / housing	stainless steel 1.4404 (316 L)	
Display housing	PA 6.6, Polycarbonate	
Seals	standard: FKM (recommended for medium temperatures ≤ 200 °C)	
	option: FFKM [7] (recommended for medium temperatures < 260 °C)	others on request
Diaphragm	stainless steel 1.4435	
Media wetted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

[7] for pressure ranges p_N ≤ 100 bar

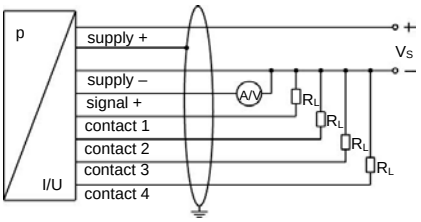
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval AX14-DS 201P	IBExU06ATEX1050 X zone 1: II 2G Ex ia IIC T4 Gb
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH
Max. switching current [8]	70 mA
Max. temperatures for environment	-25 ... 70 °C
Connecting 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 µH/m
[8] 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 (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) [9]
ATEX Directive	2014/34/EU
[9] This directive is only valid for devices with maximum permissible overpressure > 200 bar.	

Wiring diagrams

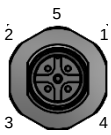
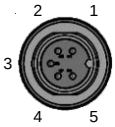
2-wire-system (current)



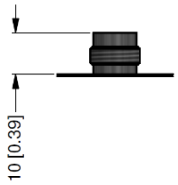
3-wire-system (current/voltage)



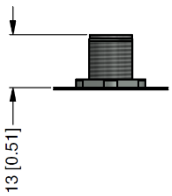
Pin configuration

Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)
					
Supply +	1	1	1	1	1
Supply –	3	3	3	2	3
Signal + (only 3-wire)	2	2	2	3	2
Contact 1	4	4	4	3	4
Contact 2	5	5	5	-	5
Contact 3	-	-	6	-	-
Contact 4	-	-	7	-	-
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact ⏚	plug housing/ pressure port

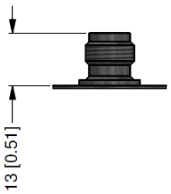
Electrical connections (dimensions mm / in)



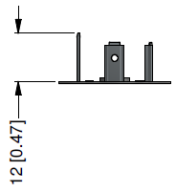
M12x1 plastic
(5-pin)



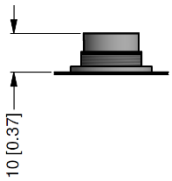
M12x1 metal
(5-pin)



M12x1 plastic
(8-pin)

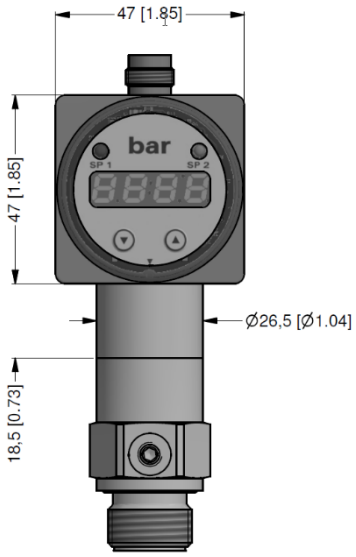


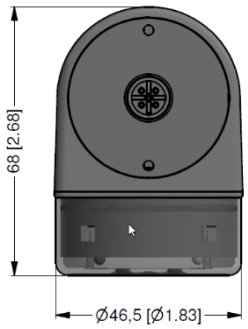
ISO 4400



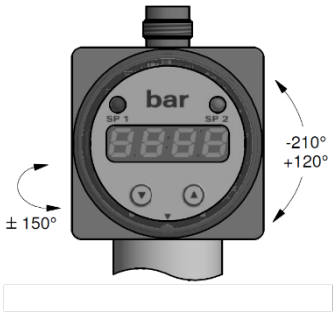
Binder series 723
(5-pin)

Dimensions (mm / in)

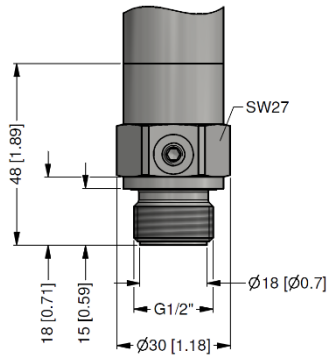




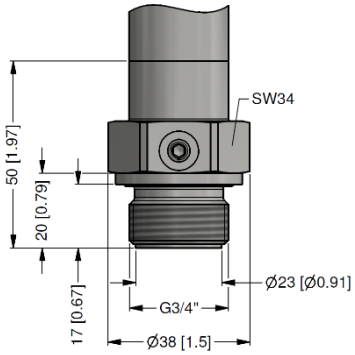
rotatability of display module



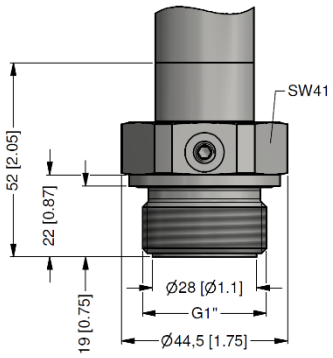
Mechanical connection (dimensions mm / in)



G1/2" flush DIN 3852



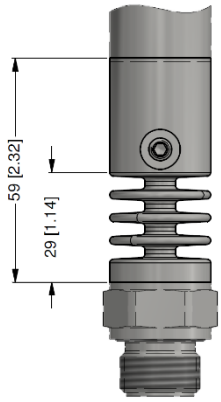
G3/4" flush DIN 3852



G1" flush DIN 3852

⇨ metric threads and other versions on request

Cooling element up to 300 °C [6] (optionally)



possible for $p_N \leq 160$ bar

[6] max. temperature depends on the used sealing material, type of seal and installation

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Ordering code DS 201P

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Pressure																									
gauge				7	8	7																			
absolute				7	8	8																			
Input	**[bar]**																								
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															
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												4													consult
Accuracy																									
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 [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									
customer														9	9	9									consult
Mechanical connection																									
G1/2" DIN 3852 with flush diaphragm																	Z	0	0						
G3/4" DIN 3852 with flush diaphragm																	Z	S	0						
G1" DIN 3852 with flush diaphragm																	Z	S	1						
customer																	9	9	9						consult
Diaphragm																									
stainless steel 1.4435 (316L)																				1					
customer																				9					
Seal																									
FKM																					1				
FFKM [4]																					7				
customer																					9				consult
Filling fluid																									
silicone oil																						1			
food compatible oil																						2			
customer																						9			consult
Special version																									
standard																							0	0	0
with cooling element up to 300°C [5]																							2	0	0
customer																							9	9	9

[1] with IS version max. 1 contact is 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] possible for nominal pressure ranges $p_N \leq 100$ bar

[5] cooling element up to 300°C not possible for pressure range $p_N > 160$ bar

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