



DS 401

Intelligent Electronic Pressure Switch Case Stainless Steel

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Electronic Pressure Switch

Nominal pressure:

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

Contacts:

1 or 2 independent PNP contacts,
freely configurable

Analogue output:

2-wire: 4 ... 20 mA
3-wire: 0 ... 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

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The electronic pressure switch **DS 401** is the successful combination of

- ▶ intelligent pressure switch
- ▶ digital display

and has been specially designed for universal usage in industry applications; with flush diaphragm the **DS 401** is suitable for the usage in viscous, pasty or highly contaminated media. The rotatable stainless steel housing is predestined for rough conditions and difficult installing conditions, caused by the high functionality and robustness.

As standard the **DS 401** offers a PNP contact and is optionally available with a second, independent contact. Additionally the **DS 401** could be equipped with an analogue output.

Preferred areas of use are:



Plant and Machine Engineering



Environmental Engineering
(water – sewage – recycling)



Water



Hydraulic Oil

Input pressure ranges																		
Nominal pressure 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 ₂ 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 _N ≥ 1 bar: unlimited vacuum resistance P _N < 1 bar: on request																	

Contact ¹	
Number, type	standard: 1 PNP contact option: 2 independent PNP contacts
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V _{Switch} = V _S - 2V 0 ... 10 V / 3-wire: contact rating 500 mA, short-circuit resistant
Accuracy of contacts ²	≤ ± 0.5 % FSO
Repeatability	≤ ± 0.2 % FSO
Switching frequency	2-wire: max. 10 Hz / 3-wire: 50 Hz
Switching cycles	> 100 x 10 ⁶
Delay time	0 ... 100 sec

¹ with Ex-protection max. 1 contact possible

² 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 ... 36 V _{DC} permissible load: R _{max} = [(V _S - V _{S min}) / 0.02] Ω response time: < 10 msec
2-wire current signal, Ex-protection	4 ... 20 mA / V _S = 13 ... 28 V _{DC} permissible load: R _{max} = [(V _S - V _{S min}) / 0.02] Ω response time: < 10 msec
3-wire current signal	4 ... 20 mA / V _S = 24 V _{DC} ± 10 % adjustable (turn-down of span 1:5) ³ permissible load: R _{max} = 500 Ω response time: < 30 msec
3-wire voltage signal	0 ... 10 V / V _S = 24 V _{DC} ± 10 % adjustable (turn-down of span 1:5) ³ permissible load: R _{min} = 10 kΩ response time: < 30 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 effects (Offset and Span) / Permissible temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures ⁴	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

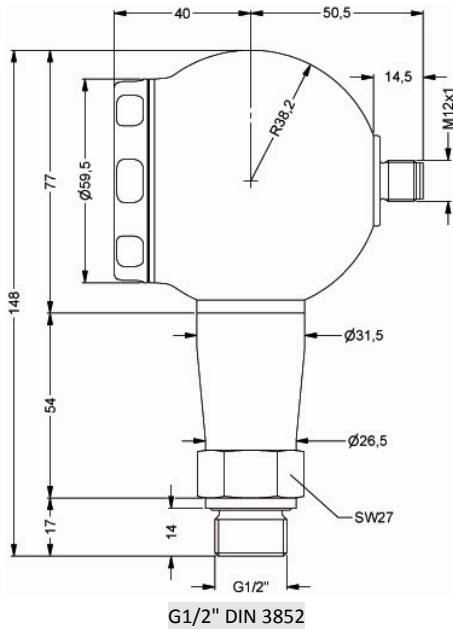
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27

Materials	
Pressure port / housing	1.4404 (316L) PVDF (for P _N ≤ 60 bar)
Display housing	stainless steel 1.4301 (304)
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM option: EPDM, NBR others on request
Diaphragm	ceramics Al ₂ O ₃ 96 %
Media wetted parts	pressure port, seals, diaphragm

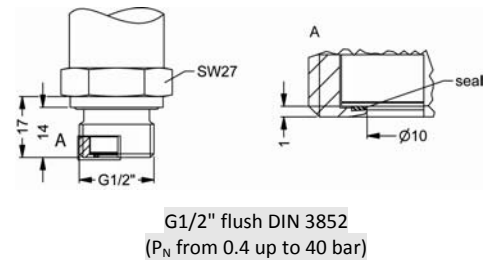
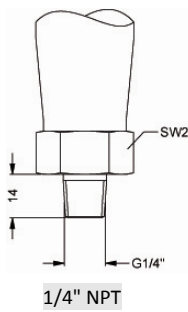
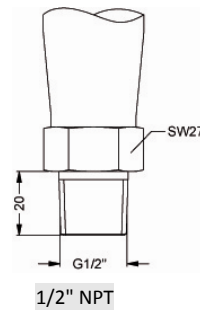
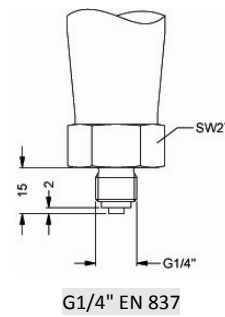
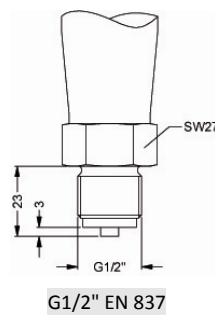
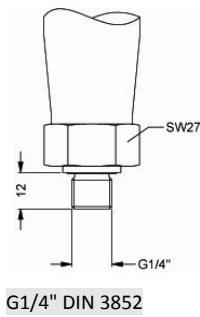
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval AX14-DS 401	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)	
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$	
Max. switching current ⁴	70 mA	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -20 ... 70 °C	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 $\mu\text{H}/\text{m}$	
⁴ 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)	
Option oxygen application ⁵	for $P_N \leq 25 \text{ bar}$: O-ring in special material with oxygen-approval (FKM)	
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 30 mA + signal current 3-wire signal output voltage: approx. 30 mA	
Ingress protection	IP 67	
Installation position	any	
Weight	approx. 400 g	
Operational life	> 100 x 10 ⁶ pressure cycles	
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) ⁶	
⁵ not possible with flush pressure ports		
⁶ This directive is only valid for devices with maximum permissible overpressure > 200 bar		
Wiring diagrams		
<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>2-wire-system (current)</p> </div> <div style="width: 45%;"> <p>3-wire-system (current / voltage)</p> </div> </div>		
Pin configuration		
Electrical connections	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply -	3	bn (brown)
Signal + (only 3-wire)	2	gn (green)
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)
Electrical connections (dimensions in mm)		
<p>M12x1 (5-pin)</p>		
Design ⁷		
<p>side display 45° display (on request)</p>		
⁷ all designs in horizontal rotatable housing as standard		

Mechanical connections (dimensions in mm)

standard



optionally



⇒ metric threads and other versions on request

This data sheet contains product specification, properties are not guaranteed. Subject to change without notice.



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Messgröße		
relativ	7 A 2	
relativ in mH ₂ O	7 A E	
absolut	7 A 3	
Eingang [mH₂O] [bar]		
4	0,4	4 0 0 0
6	0,6	6 0 0 0
10	1	1 0 0 1
16	1,6	1 6 0 1
25	2,5	2 5 0 1
40	4	4 0 0 1
60	6	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
		9 9 9 9
Sondermessbereiche		
auf Anfrage		
Bauform		
Edelstahl-Kugelgehäuse (Anzeige seitlich)	K H	
Edelstahl-Kugelgehäuse (Anzeige 45°)	K 4	
auf Anfrage		
Analogausgang		
ohne	0	
4 ... 20 mA / 2-Leiter	1	
0 ... 10 V / 3-Leiter, verstellbar	3	
4 ... 20 mA / 3-Leiter, verstellbar	7	
Ex-Schutz 4 ... 20 mA / 2-Leiter	E	
andere	9	
auf Anfrage		
Schaltausgang		
1 Schaltausgang	1	
2 Schaltausgänge ¹	2	
Genauigkeit		
0,5 %	5	
andere	9	
auf Anfrage		
Elektrischer Anschluss		
Stecker M12x1 (5-polig) / Metallausführung	N 1 0	
andere	9 9 9	
auf Anfrage		
Mechanischer Anschluss		
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 mit frontbündiger Messzelle ²	F 0 0	
G1/2" DIN 3852 offener Anschluss	H 0 0	
1/2" NPT	N 0 0	
1/4" NPT	N 4 0	
andere	9 9 9	
auf Anfrage		
Dichtung		
FKM	1	
EPDM ³	3	
NBR	5	
andere	9	
auf Anfrage		
Druckanschluss		
Edelstahl 1.4404 (316L)	1	
PVDF ⁴	B	
andere	9	
auf Anfrage		
Trennmembrane		
Keramik Al ₂ O ₃ 96%	2	
andere	9	
auf Anfrage		
Sonderausführungen		
Standard	0 0 0	
Sauerstoff-Ausführung ⁵	0 0 7	
andere	9 9 9	
auf Anfrage		

¹ bei Ex-Ausführung ist max. 1 Schaltausgang möglich
² G1/2" frontbündig bis 25 bar und G3/4" frontbündig bis 60 bar möglich; Absolutdruck auf Anfrage
³ möglich für Nenndruckbereiche P_N ≤ 160 bar
⁴ PVDF-Ausführung nur mit G1/2" DIN 3852 offener Anschluss (bis 60 bar); Ex-Schutz nicht möglich
⁵ Sauerstoff-Ausführung nur mit FKM-Dichtung möglich bis 25 bar

Die Angaben dieser Preisliste enthalten die Spezifikation der Produkte, nicht die Zusicherung der Eigenschaften. Ausführliche Informationen zu den Bestelloptionen können dem Datenblatt entnommen werden. Technische Änderungen vorbehalten.