

DS 401

Intelligent Electronic Pressure Switch Case Stainless Steel

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO



Electronic Pressure Switch

DS 401

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



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



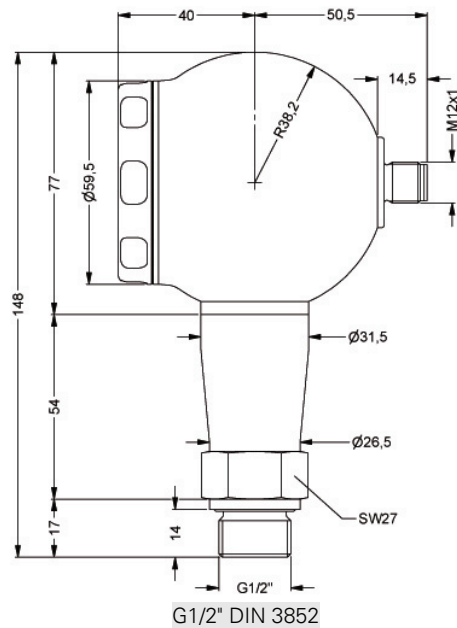
Hydraulic Oil

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	$P_N \geq 1$ 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 / $V_S = 13 \dots 36 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02] \Omega$ response time: < 10 msec																	
2-wire current signal, Ex-protection	4 ... 20 mA / $V_S = 13 \dots 28 V_{DC}$ permissible load: $R_{max} = [(V_S - V_{Smin}) / 0.02] \Omega$ 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) ³ permissible load: $R_{max} = 500 \Omega$ response time: < 30 msec																	
3-wire voltage signal	0 ... 10 V / $V_S = 24 V_{DC} \pm 10\%$ adjustable (turn-down of span 1:5) ³ permissible load: $R_{min} = 10 k\Omega$ response time: < 30 msec																	
Without analogue output	$V_S = 15 \dots 36 V_{DC}$																	
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 $P_N \leq 60$ 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																	

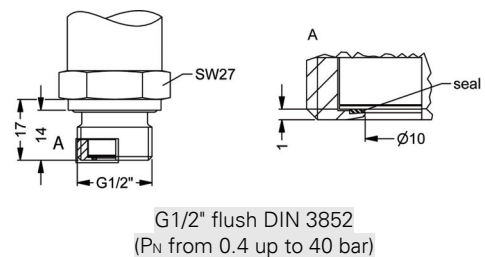
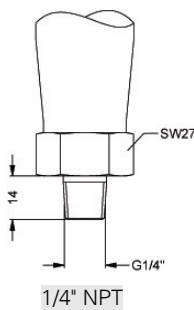
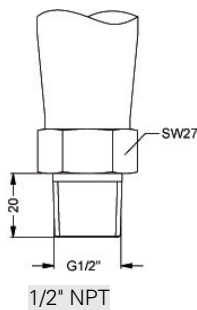
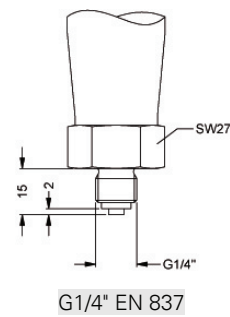
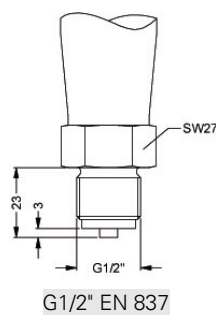
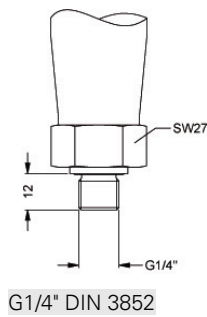
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval AX14-DS 401	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga (connector) / II 1G Ex ia IIB T4 Ga (cable)	
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$	
Max. switching current ⁴	70 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		
2-wire-system (current) 		3-wire-system (current / voltage)
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)		
Design ⁷		
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.

