



DS 400

Intelligent Electronic Pressure Switch Stainless Steel

Stainless Steel Sensor

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

Electronic Pressure Switch

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: 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 sensor welded
- ▶ 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 ball 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)

DS 400



Input pressure range												
Nominal pressure gauge / abs.	[bar]	-1 ... 0	0.10	0.16	0.25	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 / abs.	[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		$P_N \geq 1$ 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	Standard: Nenndruck < 0,4 bar : $\leq \pm 0,5$ % FSO; Nenndruck $\geq 0,4$ bar: $\leq \pm 0,35$ % FSO Option: Nenndruck $\geq 0,4$ 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

¹ with IS-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 with IS-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	$\leq \pm 0,25$ % FSO

³ 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	[bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	$\leq \pm 0,75$	$\leq \pm 1$	$\leq \pm 0,75$
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 (316L)
Housing	stainless steel 1.4404 (316L)
Viewing glass	laminated safety glass
Seals (media wetted)	standard: FKM option: NBR; welded version ⁴ on request others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

⁴ welded version only for pressure ports according to EN 837; possible for nominal pressure ranges $P_N \leq 40$ 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 (connector) / II 1G Ex ia IIB T4 Ga (cable)
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 ⁵	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: -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 $\mu\text{H}/\text{m}$

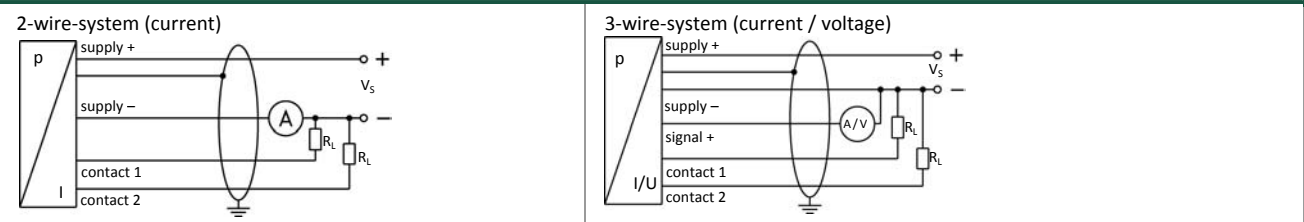
⁵ the real switching current in the application depends on the power supply unit

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 3-wire signal output voltage: approx. 30 mA
Ingress protection	IP 67
Installation position	any ⁶
Weight	approx. 400 g
Operational life	> 100 x 10 ⁶ cycles
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) ⁷

⁶ 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 $P_N \leq 1 \text{ bar}$.

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

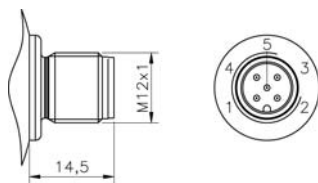
Wiring diagrams



Pin configuration

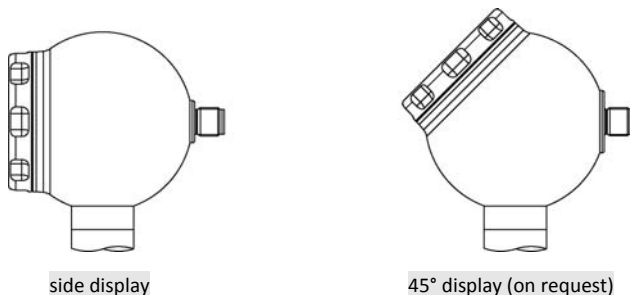
Electrical connection	M12x1 metal (5-pin)	cable colours (DIN 47100)
Supply +	1	wh (white)
Supply -	3	bn (brown)
Signal + (only 3-wire)	2	gn (green)
Contact 1	4	gr (grey)
Contact 2	5	pn (pink)
Shield	plug housing / pressure port	gn/ye (green / yellow)

Electrical connection (dimensions in mm)



M12x1 (5-pin)

Designs⁸



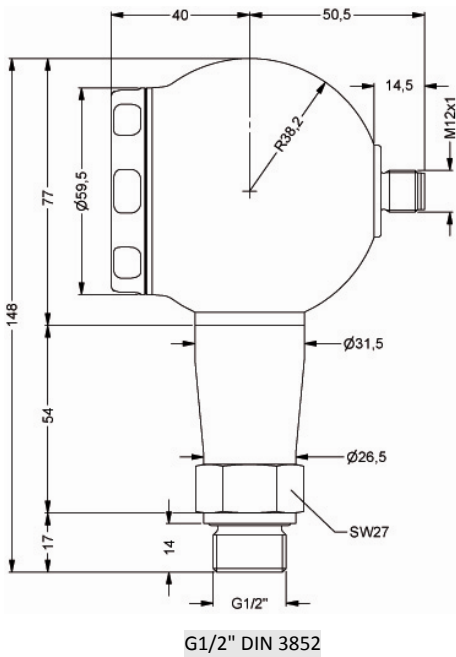
side display

45° display (on request)

⁸ all designs in horizontal rotatable housing as standard

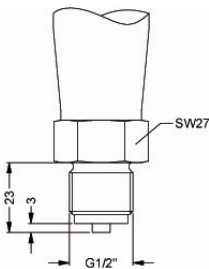
Mechanical connections (dimensions in mm)

standard

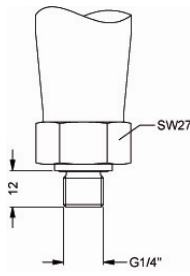


⇒ for nominal pressure $P_N > 400$ bar increases the length of devices with IS-veision by 19 mm and of devices without IS-version by 39 mm

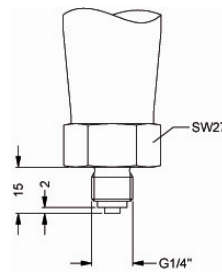
optionally



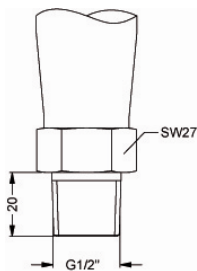
G1/2" EN 837



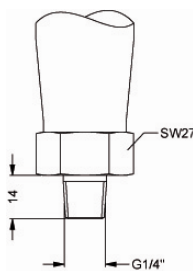
G1/4" DIN 3852



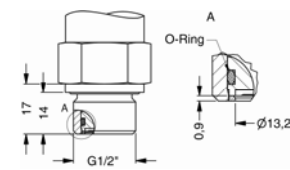
G1/4" EN 837



1/2" NPT



1/4" NPT



G1/2" flush DIN 3852
(P_N from 0.1 up to 40 bar)

⇒ metric threads and other versions on request

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

