



# DS 400P

## Intelligent Electronic Pressure Switch Stainless Steel

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

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

### Nominal pressure

from 0 ... 100 mbar up to 0 ... 40 bar

### Contacts

1 or 2 independent PNP contacts,  
freely configurable

### Analogue output

2-wire: 4 ... 20 mA  
3-wire: 4 ... 20 mA  
others on request

### Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module
- ▶ configurable contacts (switch on / switch off points, hysteresis/ window mode, switch on / switch off delay)
- ▶ hygienical version

### Optional versions

- ▶ **IS-version**  
Ex ia = intrinsically safe  
for gases and dusts
- ▶ customer specific versions

The electronic pressure switch DS 400P is the successful combination of

- ▶ intelligent pressure switch
- ▶ digital display

and has been developed for process industry; especially for food industry and pharmacy.

As standard the DS 400P offers a PNP contact and a rotatable display module with 4-digit LED display.

Optional versions like e.g. an intrinsically safe version, max. two contacts and an analogue output complete the profile.

### Preferred areas of use are



Food industry



Pharmacy

### Material and test certificates

- ▶ Inspection certificate 3.1 according to EN 10204
- ▶ Test report 2.2 according to EN 10204



Input pressure range <sup>1</sup>																							
Nominal pressure gauge	[bar]	-1 ... 0	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40							
Nominal pressure absolute	[bar]	-	-	-	-	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40							
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105							
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210							
Vacuum resistance		p <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance								p <sub>N</sub> < 1 bar: on request													
<sup>1</sup> consider the pressure resistance of fitting and clamps																							
Contact <sup>2</sup>																							
Number, type		standard: 1 PNP contact								option: 2 independent PNP contacts													
Max. switching current		contact rating 125 mA, short-circuit resistant; V <sub>switch</sub> = V <sub>S</sub> - 2V																					
Accuracy of contacts <sup>3</sup>		standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO / nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO																					
Repeatability		≤ ± 0.1 % FSO																					
Switching frequency		2-wire: max. 10 Hz							/			3-wire: 50 Hz											
Switching cycles		> 100 x 10 <sup>6</sup>																					
Delay time		0 ... 100 sec																					
<sup>2</sup> with IS-protection max. 1 contact possible																							
Analogue output (optionally) / Supply																							
2-wire current signal		4 ... 20 mA / V <sub>S</sub> = 13 ... 36 V <sub>DC</sub>										permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω		response time: < 10 msec									
2-wire current signal with IS-protection		4 ... 20 mA / V <sub>S</sub> = 15 ... 28 V <sub>DC</sub>										permissible load: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω		response time: < 10 msec									
3-wire current signal		4 ... 20 mA / V <sub>S</sub> = 24 V <sub>DC</sub> ± 10 % adjustable (turn-down of span 1:5) <sup>4</sup>										permissible load: R <sub>max</sub> = 500 Ω		response time: < 30 msec									
Without analogue output		V <sub>S</sub> = 15 ... 36 V <sub>DC</sub>																					
Accuracy <sup>3</sup>		standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO / nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO																					
<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)																							
<sup>4</sup> with turn-down of span the analogue signal is adjusted automatically to the new measuring range																							
Thermal errors (offset and span) <sup>5</sup>																							
Nominal pressure p <sub>N</sub>	[bar]	-1 ... 0					< 0.40					≥ 0.40											
Tolerance band	[% FSO]	≤ ± 0.75					≤ ± 1.5					≤ ± 0.75											
In compensated range	[°C]	-20 ... 85					0 ... 50					-20 ... 85											
<sup>5</sup> 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 <sup>6</sup>		-40 ... 125 °C										-10 ... 125 °C											
Medium with cooling element <sup>7</sup>		overpressure: -40 ... 300 °C					vacuum: -40 ... 150 °C <sup>8</sup>					overpressure: -10 ... 250 °C					vacuum: -10 ... 150 °C <sup>8</sup>						
Electronics / environment		-40 ... 85 °C																					
Storage		-40 ... 100 °C																					
<sup>6</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C																							
<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation																							
<sup>8</sup> also for p <sub>abs</sub> ≤ 1 bar																							
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					10 g RMS / 10 ... 2000 Hz					according to DIN EN 60068-2-6											
Shock		500 g / 1 msec half sine																					
according to DIN EN 60068-2-6 (with cooling element)																							
according to DIN EN 60068-2-27																							
Filling fluids																							
Standard		silicone oil																					
Optional		food compatible oil according to 21CFR178.3570										(Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500)		others on request									
Materials																							
Pressure port		inch thread:					G1" cone, Clamp, dairy pipe, Varivent®:					stainless steel 1.4404 (316 L)											
Diaphragm		stainless steel 1.4435 (316L)																					
Housing / cap		stainless steel 1.4301 (304)																					
Viewing glass		laminated safety glass																					
Seals		standard: FKM (recommended for medium temperatures ≤ 200 °C)					option: FFKM (recommended for medium temperatures < 260 °C)					Clamp, dairy pipe, Varivent®: without											
Media wetted parts		pressure port, seals, diaphragm																					

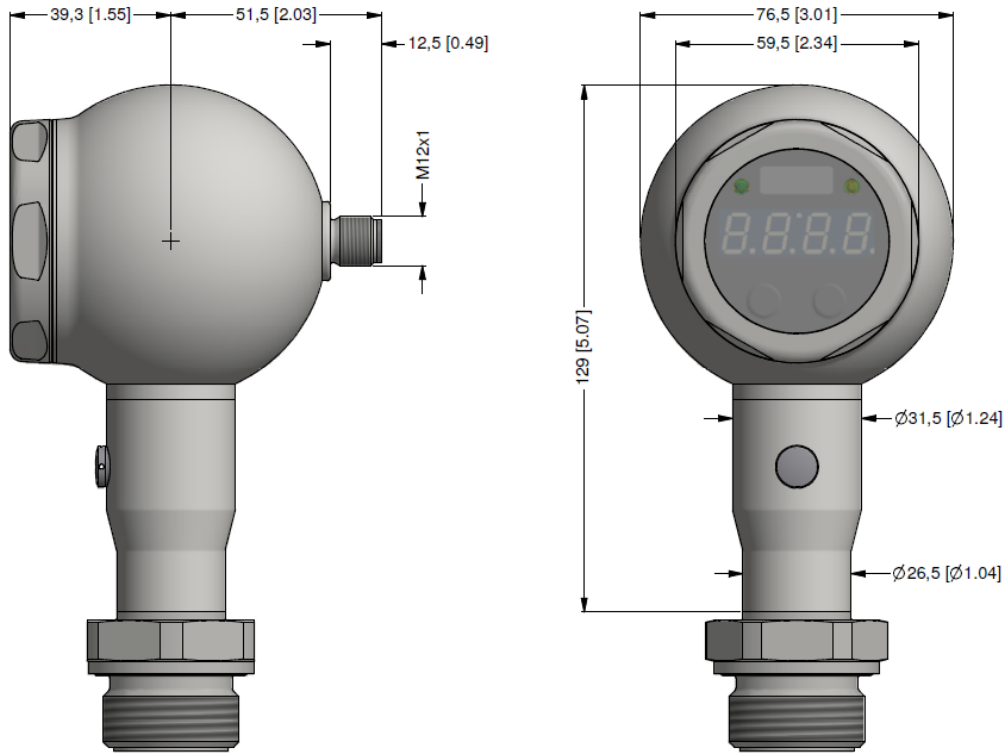
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval AX14-DS 400P	IBExU 06 ATEX 1050 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$	
Max. switching current <sup>9</sup>	70 mA	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -25 ... 70 °C	
<sup>9</sup> the real switching current in the application depends on the power supply unit		
Miscellaneous		
EHEDG certificate Type EL Class I	EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent® (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH	
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% ± 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	
Ingress protection	IP 67	
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for $p_N \leq 4 \text{ bar}$ have to be specified in the order)	
Surface roughness	pressure port $R_a < 0.8 \text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15 \text{ }\mu\text{m}$ weld seam $R_a < 0.8 \text{ }\mu\text{m}$	
Weight	min. 500 g (depending on mechanical connection)	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
Wiring diagrams		
<p>2-wire-system (current)</p>	<p>3-wire-system (current)</p>	
Pin configuration		
Electrical connection	M12x1 / metal (5-pin)	
Supply +	1	
Supply -	3	
Signal + (only 3-wire)	2	
Contact 1	4	
Contact 2	5	
Shield	plug housing / pressure port	
Designs <sup>10</sup>		
<sup>10</sup> all designs in horizontal rotatable housing as standard		

# DS 400P

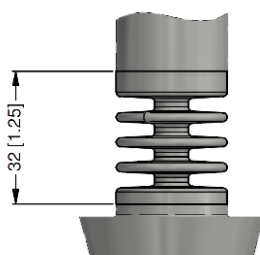
Electronic Pressure Switch

Technical Data

## Dimensions (mm / in)

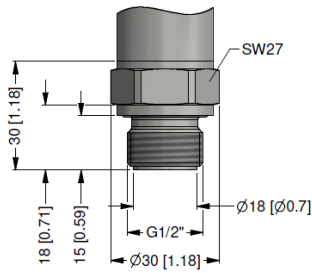


## Cooling element up to 300 °C <sup>7</sup> (optionally)

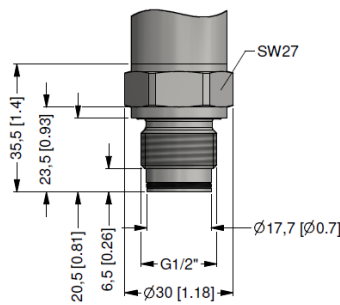


<sup>7</sup> max. temperature depends on the used sealing material, type of seal and installation

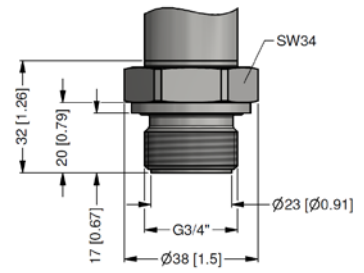
**Mechanical connections (dimensions mm / in)**



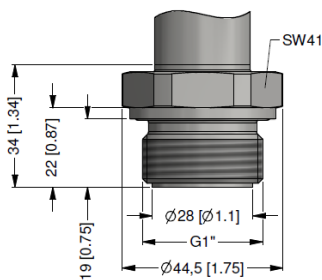
G1/2" flush DIN 3852  
p<sub>N</sub> ≥ 1 bar



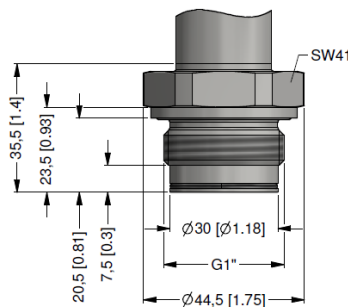
G1/2" flush with radial o-ring  
p<sub>N</sub> ≥ 1 bar



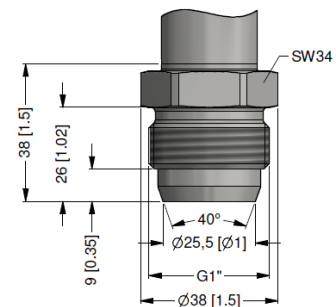
G3/4" flush DIN 3852



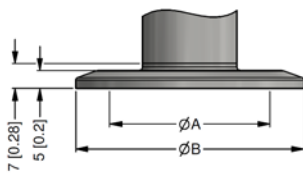
G1" flush DIN 3852



G1" flush with radial o-ring

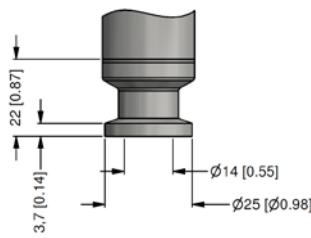


G1" cone

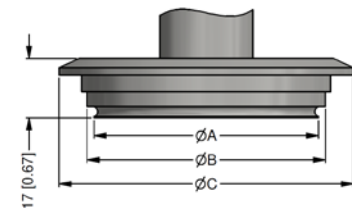


dimensions in mm [in]			
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p <sub>N</sub> [bar]	0.25 ... 16	≤ 16	≤ 16

Clamp (DIN 32676)

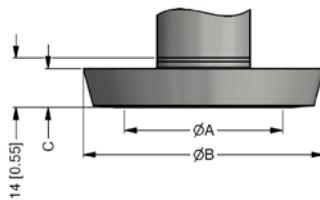


Clamp 3/4" (DIN 32676)  
4 bar ≤ p<sub>N</sub> ≤ 8 bar



dimensions in mm [in]	
size	DN 40/50
A	64 [2.52]
B	68 [2.68]
C	84 [3.31]

Varivent® DN 40/50  
p<sub>N</sub> ≤ 25 bar



dimensions in mm [in]			
size	DN 25	DN 40	DN 50
A	23 [0.91]	32 [1.26]	45 [1.77]
B	44 [1.73]	56 [1.20]	68.5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
p <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 25

dairy pipe (DIN 11851)

⇒ metric threads and other versions on request

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## Ordering code DS 400P

**DS 400P**

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<b>Pressure</b>		gauge		7	A	5																
		absolute <sup>1</sup>		7	A	6																
<b>Input</b>																						
		[bar]																				
		0.10	1	0	0	0																
		0.16	1	6	0	0																
		0.25	2	5	0	0																
		0.40	4	0	0	0																
		0.60	6	0	0	0																
		1.0	1	0	0	1																
		1.6	1	6	0	1																
		2.5	2	5	0	1																
		4.0	4	0	0	1																
		6.0	6	0	0	1																
		10	1	0	0	2																
		16	1	6	0	2																
		25	2	5	0	2																
		40	4	0	0	2																
		-1 ... 0	X	1	0	2																
		customer	9	9	9	9														consult		
<b>Design</b>																						
		side display															K	H				
		45° display															K	4	consult			
<b>Analogue output</b>																						
		without															0					
		4 ... 20 mA / 2-wire															1					
		4 ... 20 mA / 3-wire, adjustable															7J					
		intrinsic safety 4 ... 20 mA / 2-wire <sup>2</sup>															E					
		customer															9	consult				
<b>Contact</b>																						
		1 contact															1					
		2 contacts <sup>2</sup>															2					
<b>Accuracy</b>																						
		standard for p <sub>N</sub> ≥ 0,4 bar:	0.35 % FSO																3			
		standard for p <sub>N</sub> < 0,4 bar:	0.50 % FSO																5			
		option for p <sub>N</sub> ≥ 0,4 bar:	0.25 % FSO																2			
		customer																9	consult			
<b>Electrical connection</b>																						
		male plug M12x1 (5-pin) / metal															N	1	1			
		customer															9	9	9	consult		
<b>Mechanical connection</b>																						
		G1/2" with flush welded diaphragm (DIN 3852) <sup>3</sup>													Z	0	0					
		G3/4" with flush welded diaphragm (DIN 3852)													Z	S	0					
		G1" with flush welded diaphragm (DIN 3852)													Z	S	1					
		G1" DIN 3852 with rad. o-ring and flush diaphragm													Z	S	7					
		G1/2" DIN 3852 with rad. o-ring and flush diaphragm <sup>3</sup>													Z	6	1					
		G 1" cone													K	S	1					
		Clamp DN 25 (DIN 32676) / 3A <sup>4</sup>													C	6	1					
		Clamp DN 32 (DIN 32676) / 3A <sup>4</sup>													C	6	2					
		Clamp DN 50 (DIN 32676) / 3A <sup>4</sup>													C	6	3					
		Clamp 3/4" (DIN 32676) / 3A <sup>4</sup>													C	6	9					
		dairy pipe DN 25 (DIN 11851) <sup>4,5</sup>													M	7	3					
		dairy pipe DN 40 (DIN 11851) <sup>4,5</sup>													M	7	5					
		dairy pipe DN 50 (DIN 11851) <sup>4,5</sup>													M	7	6					
		Varivent® DN 40/50 / 3A <sup>4</sup>													P	4	1					
		customer													9	9	9	consult				
<b>Diaphragm</b>																						
		stainless steel 1.4435 (316L)																1				
		customer																9	consult			
<b>Seals</b>																						
		for clamp, dairy pipe, Varivent®:	none																0			
		for inch thread:	FKM																1			
			FFKM																7	consult		
		customer																9	consult			
<b>Filling fluids</b>																						
		silicone oil																1				
		food compatible oil (FDA) / 3A																2				
		customer																9	consult			
<b>Special version</b>																						
		standard																0	0	0		
		with cooling element up to 300°C / 3A																2	0	0		
		customer																9	9	9	consult	

<sup>1</sup> absolute pressure possible from 1 bar  
<sup>2</sup> with IS version max. 1 contact is possible  
<sup>3</sup> only possible for nominal pressure ranges p<sub>N</sub> ≥ 1 bar  
<sup>4</sup> possible nominal pressure ranges according to data sheet  
<sup>5</sup> The cup nut for dairy pipe has to be mounted by production of pressure transmitter. The cup nut has to be ordered as separate position.  
 Varivent® is a brand name of GEA Tuchenhausen GmbH