



### **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
- rotable 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

# **DS 400P**

## Intelligent Electronic **Pressure Switch** Stainless Steel

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 61298-2: standard: 0.35 % FSO option: 0.25 % FSO

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 rotable 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





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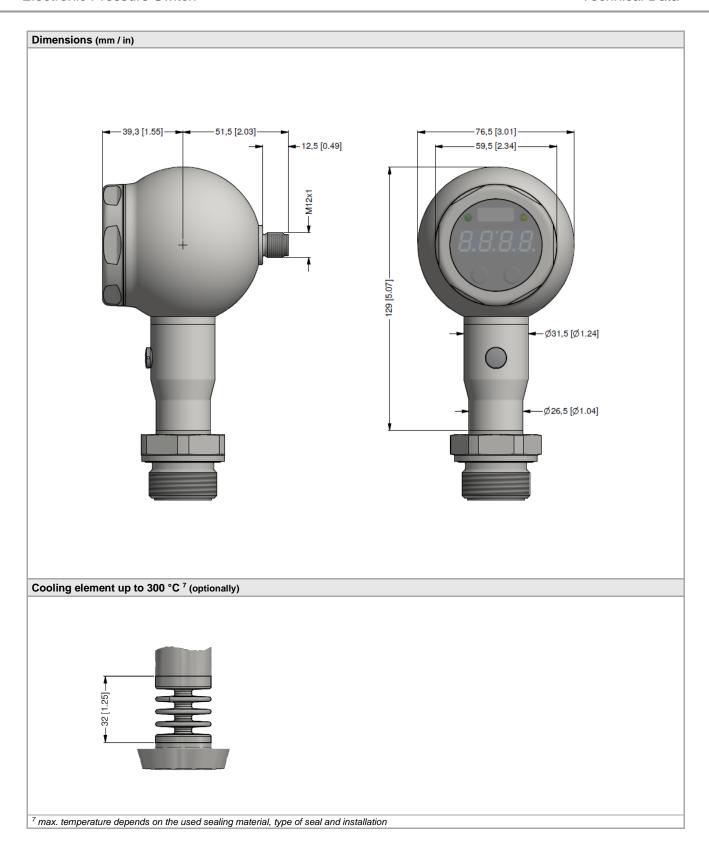


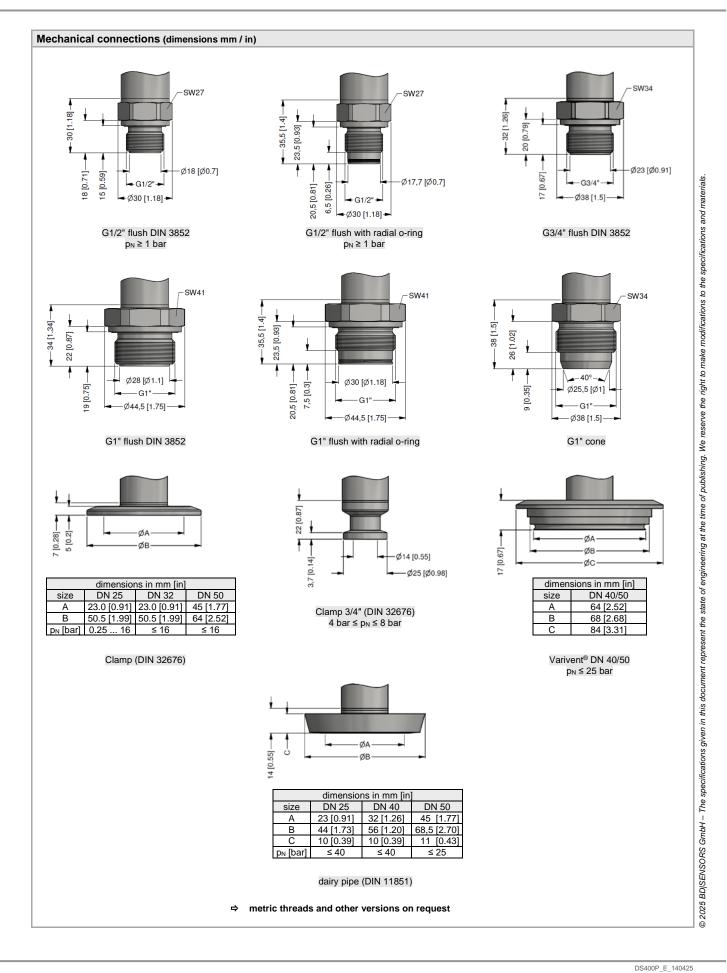
Electronic Pressure Switch

Input pressure range 1																
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]		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 ba			/acuun	n resist				p		bar: on	reaue			
<sup>1</sup> consider the pressure resistanc	e of fitti	1														
Contact <sup>2</sup>																
Number, type		otondoro	l. 1 D	ND oo	otoot			ontion	· 2 in	donone	dont D	NID oor	tooto			
Max. switching current		standard: 1 PNP contact option: 2 independent PNP contacts  contact rating 125 mA, short-circuit resistant; $V_{\text{switch}} = V_{\text{S}} - 2V$														
Accuracy of contacts <sup>3</sup>		standard: nominal pressure < 0.4 bar: $\leq \pm 0.5$ % FSO / nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35$ %								5 % F						
Accuracy of contacts		option:					bar: ≤				minai	prossu	10 = 0.	T Dai.	<u> </u>	<i>J</i> /0 1 C
Repeatability		≤ ± 0.1 %		-		• • • •			. ,							
Switching frequency		2-wire: max. 10 Hz / 3-wire: 50 Hz														
Switching cycles		> 100 x	> 100 x 10 <sup>6</sup>													
Delay time		0 100	sec													
with IS-protection max. 1 conta	ct possi															
Analogue output (optionall																
2-wire current signal	• /	4 20 n	nA / V	$V_{\rm S} = 13$	36 \	V <sub>DC</sub>										
	permissi		-			<sub>min</sub> ) / 0.0	02 A] <u>c</u>	2				respo	onse tin	ne: < 10	) msec	
2-wire current signal with		4 20 n														
IS-protection		permissi	ble loa	ad: R <sub>ma</sub>	<sub>x</sub> = [(V	s – V <sub>S r</sub>	<sub>min</sub> ) / 0.0	02 A] <u>c</u>	2				respo	onse tin	ne: < 10	) msed
3-wire current signal		4 20 n					adjusta	ble (tu	rn-dow	n of sp	an 1:5	5) <sup>4</sup>				
14.00.1		permissi			$_{\rm x} = 500$	Ω							respo	onse tin	ne: < 30	) msed
Without analogue output		V <sub>S</sub> = 15							· Fo					4.1		
Accuracy 3		standard									ninal p	ressur	e ≥ 0.4	1 bar: ≤	$\leq \pm 0.35$	% FS
<sup>3</sup> accuracy according to IEC 6129	18-2 _ lii	option:					bar: ≤			0						
4 with turn-down of span the anal																
Thermal errors (offset and s								<u> </u>								
Nominal pressure p <sub>N</sub>	[bar]		-1	0					0.40					≥ 0.4	0	
	FSO]								± 1.5			≥ 0.40 ≤ ± 0.75				
In compensated range	[°C]	≤ ± 0.75 -20 85					0 50				-20 85					
<sup>5</sup> an optional cooling element can		ce thermal			et and s	pan de	pending			position	and fi	lling cor	ditions			
Permissible temperatures																
Filling fluid				s	ilicone	oil						food	compa	tible oil		
Medium <sup>6</sup>				-40	) 12	5 °C							) 12			
Medium with cooling element	t <sup>7</sup>		overpr	essure	: -40	300	°C ove			overp	pressure: -10 250 °C					
· ·			√acuuı			150					vacuu			150		
		,						-40	) 8	5 °C						
Electronics / environment						-40 100 °C										
Storage																
Electronics / environment Storage 6 max. temperature of the mediur	m for ov	rerpressure									empera	ture of 5	50 °C			
Storage  6 max. temperature of the mediur 7 max. temperature depends on t	m for ov	rerpressure									empera	ture of 5	50 °C			
Storage <sup>6</sup> max. temperature of the mediur <sup>7</sup> max. temperature depends on t <sup>8</sup> also for $p_{abs} \le 1$ bar	m for ov	rerpressure									empera	ture of 5	50 °C			
Storage <sup>6</sup> max. temperature of the mediur <sup>7</sup> max. temperature depends on t <sup>8</sup> also for $p_{abs} \le 1$ bar <b>Electrical protection</b>	m for ov	verpressure d sealing ma	aterial,								empera	ture of t	50 °C			
Storage <sup>6</sup> max. temperature of the mediur <sup>7</sup> max. temperature depends on t <sup>8</sup> also for p <sub>abs</sub> ≤ 1 bar <b>Electrical protection</b> Short-circuit protection	m for ov	verpressure d sealing ma	ent	type of	seal and	d install					empera	ture of t	50 °C			
Storage  f max. temperature of the mediur  max. temperature depends on t  also for pabs ≤ 1 bar  Electrical protection  Short-circuit protection  Reverse polarity protection	m for ov	permane	ent ge, bu	type of	seal and	d install	lation	max. e			empera	ture of t	50 °C			
Storage <sup>6</sup> max. temperature of the mediur <sup>7</sup> max. temperature depends on the state of the s	m for ov	verpressure d sealing ma	ent ge, bu	type of	seal and	d install	lation	max. e			empera	ture of t	50 °C			
Storage <sup>6</sup> max. temperature of the mediun <sup>7</sup> max. temperature depends on the <sup>8</sup> also for p <sub>abs</sub> ≤ 1 bar <b>Electrical protection</b> Short-circuit protection  Reverse polarity protection  Electromagnetic compatibility <b>Mechanical stability</b>	m for ov	permane no dama emission	ent ige, bu	type of a	no fund	d install	lation	max. e	nvironn	nental te						
Storage <sup>6</sup> max. temperature of the mediun <sup>7</sup> max. temperature depends on the <sup>8</sup> also for p <sub>abs</sub> ≤ 1 bar <b>Electrical protection</b> Short-circuit protection  Reverse polarity protection  Electromagnetic compatibility <b>Mechanical stability</b>	m for ov	permane no dama emission	ent ige, bu and i	ut also mmuni 200	no fund ty acco	d install	lation	max. e	nvironn	ing to [	OIN E	N 6006	8-2-6			
Storage <sup>6</sup> max. temperature of the mediun <sup>7</sup> max. temperature depends on the salso for p <sub>abs</sub> ≤ 1 bar <b>Electrical protection</b> Short-circuit protection  Reverse polarity protection  Electromagnetic compatibility <b>Mechanical stability</b> Vibration	m for ov	permane no dama emission  20 g RM 10 g RM	ent ge, bu and i S / 10	ut also mmuni 200 200	no fund ty acco	d install	lation	max. e	accord	ing to [	NE NIC	N 6006	8-2-6 8-2-6 (		oling el	ement
Storage  f max. temperature of the mediun max. temperature depends on the state of the protection  Short-circuit protection  Reverse polarity protection  Electromagnetic compatibility  Mechanical stability  Shock	m for ov	permane no dama emission	ent ge, bu and i S / 10	ut also mmuni 200 200	no fund ty acco	d install	lation	max. e	accord	ing to [	NE NIC	N 6006	8-2-6 8-2-6 (		oling el	ement
Storage  f max. temperature of the mediun max. temperature depends on the also for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids	m for ov	permane no dama emission 20 g RM 10 g RM 500 g / 1	ent ge, bu and i S / 10 S / 10 msec	ut also mmuni 200 200	no fund ty acco	d install	lation	max. e	accord	ing to [	NE NIC	N 6006	8-2-6 8-2-6 (		oling el	ement
Storage  f max. temperature of the medium max. temperature depends on the state of	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1	ent ige, bu a and i S / 10 S / 10 msec	ut also mmuni 200 200 : half si	no func ty acco 0 Hz 0 Hz ne	ction ording	to EN 6	61326	accord accord	ing to [	NE NIC	N 6006	8-2-6 8-2-6 (		oling el	ement
Storage  f max. temperature of the medium max. temperature depends on the state of	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of	ent ige, bu a and i S / 10 S / 10 msec	ut also mmuni 200 200 thalf si	no func ty acco 0 Hz 0 Hz ne	etion ording	to EN 6	61326 78.357	accord accord accord	ing to I	OIN EI	N 6006 N 6006	8-2-6 8-2-6 ( 8-2-27			
Storage  f max. temperature of the medium max. temperature depends on the state of the medium max. temperature depends on the state of	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1	ent ige, bu a and i S / 10 S / 10 msec	ut also mmuni 200 200 thalf si	no func ty acco 0 Hz 0 Hz ne	etion ording	to EN 6	61326 78.357	accord accord accord	ing to I	OIN EI	N 6006 N 6006	8-2-6 8-2-6 ( 8-2-27		oling el	
Storage  f max. temperature of the medium max. temperature depends on the slass for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil Si	ent ige, bu and i S / 10 S / 10 msec	ut also mmuni 200 200 thalf si	no func ty acco 0 Hz 0 Hz ne	etion ording	to EN 6	61326 78.357	accord accord accord r0	ing to I	DIN ENDIN ENDIN EN	N 6006 N 6006 N 6006	8-2-6 8-2-6 ( 8-2-27			
Storage  f max. temperature of the medium max. temperature depends on the slass for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil S)	ent ge, bu and i S / 10 msec bil npatibl HC Cil	ut also mmuni 200 200 c half si e oil acous 32	no func no func ty acco 0 Hz 0 Hz ne	etion ording	tto EN 6	61326 78.357 1; NSF	accord accord accord ro Regis	ing to I ing to I tration	DIN ENDIN EN	N 6006 N 6006 N 6006 41500	8-2-6 8-2-6 ( 8-2-27			
Storage  finax. temperature of the medium max. temperature depends on the sloop of	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food com (Mobil Silicone of Galler one Galler	ent ge, bu and i S / 10 S / 10 msec bil npatibl HC Cil	ut also mmuni 200 200 c half si e oil acous 32 mp, dia	no functy according Category	etion ording og to 2' gory Co	tto EN 6	61326 78.357 1; NSF	accord accord accord ro Regis	ing to I	DIN ENDIN EN	N 6006 N 6006 N 6006 41500	8-2-6 8-2-6 ( 8-2-27			
Storage  f max. temperature of the medium max. temperature depends on the slass for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials Pressure port Diaphragm	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food com (Mobil Si inch three G1" cone stainless	ent ge, bu and i S / 10 S / 10 msec patible HC Cil ead: e, Clar steel	ut also mmuni 200 200 c half si e oil acous 32 mp, dia 1.4435	no func ty acco 0 Hz 0 Hz ne ccordin ; Cateo	ection ording og to 2° gory Co	tto EN 6	61326 78.357 1; NSF	accord accord accord ro Regis	ing to I ing to I tration	DIN ENDIN EN	N 6006 N 6006 N 6006 41500	8-2-6 8-2-6 ( 8-2-27			
Storage  finax. temperature of the medium max. temperature depends on the slass for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials Pressure port  Diaphragm Housing / cap	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil Si inch three G1" cone stainless stainless stainless	ent ge, bu and i S / 10 S / 10 msec bil hpatibl HC Cil e, Clar s steel s steel	ut also mmuni 200 200 c half si e oil ac bus 32 mp, dia 1.4435 1.4301	no func ty acco 0 Hz 0 Hz ne ccordin ; Cateo ary pipe 5 (316L I (304)	ection ording og to 2° gory Co	tto EN 6	61326 78.357 1; NSF	accord accord accord ro Regis	ing to I ing to I tration	DIN ENDIN EN	N 6006 N 6006 N 6006 41500	8-2-6 8-2-6 ( 8-2-27			
Storage  6 max. temperature of the medium 7 max. temperature depends on to the salso for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials Pressure port  Diaphragm Housing / cap Viewing glass	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil Si inch three G1" cone stainless stainless laminate	ent ge, bu and i S / 10 S / 10 msec bil hpatibl HC Cil e, Clar s steel s steel d safe	ut also mmuni 200 200 c half si e oil ac bus 32 mp, dia 1.4435 1.4301 tty glas	no func ty acco 0 Hz 0 Hz ne ccording ; Cateo ary pipe 5 (316L I (304) s	etion ording og to 2° gory Co	to EN 6	61326 78.357 1; NSF	accord accord accord 70 Regis stainles	ing to I ing to I tration	DIN ENDIN EN	N 6006 N 6006 N 6006 41500 O4 (316	8-2-6 8-2-6 ( 8-2-27			
Storage  finax. temperature of the medium max. temperature depends on the slass for pabs ≤ 1 bar  Electrical protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials Pressure port  Diaphragm Housing / cap	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil Si inch three G1" cone stainless stainless standard	ent age, bu and i S / 10 S / 10 msec  bil hpatibl HC Cil ad: e, Clar s steel s steel d safe l: FK	ut also mmuni 200 200 c half si e oil ac bus 32 mp, dia 1.4435 1.4301 tty glas M (	no func ty acco 0 Hz 0 Hz ne ccording ; Cateo ary pipe 5 (316L I (304) s	etion ording og to 2° gory Co	to EN 6	78.357 78.357	accord accord accord 70 Regis stainles	ing to I ing to I tration ss stee	DIN ENDIN E	N 6006 N 6006 N 6006 41500 O4 (316 35 (316	8-2-6 8-2-6 ( 8-2-27	others	on requ	uest
Storage  f max. temperature of the medium max. temperature depends on the state of the protection Short-circuit protection Short-circuit protection Reverse polarity protection Electromagnetic compatibility Mechanical stability Vibration Shock Filling fluids Standard Optional  Materials Pressure port  Diaphragm Housing / cap Viewing glass	m for ov	permane no dama emission  20 g RM 10 g RM 500 g / 1  silicone of food con (Mobil Si inch three G1" cone stainless stainless laminate	ent ge, bu and i S / 10 S / 10 msec bil hpatibl HC Cil e, Clar steel steel d safe I: FK	ut also mmuni 200 200 c half si e oil acous 32 mp, dia 1.4435 1.4301 ty glas M ( KM (	no func ty acco 0 Hz 0 Hz ne ccordin; Cateo iry pipe 5 (316L I (304) s recom	ection ording og to 2° gory Co	to EN 6	78.357 78.357	accord accord accord 70 Regis stainles	ing to I ing to I tration ss stee	DIN ENDIN E	N 6006 N 6006 N 6006 41500 O4 (316 35 (316	8-2-6 8-2-6 ( 8-2-27	others		uest

<sup>10</sup> all designs in horizontal rotatable housing as standard

Explosion protection (only for 4 2	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 μH							
Max. switching current <sup>9</sup>	70 mA								
Permissible temperatures for	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 ba	r up to 1.1 bar							
environment	in zone 1 or higher: -25 70 °C								
<sup>9</sup> the real switching current in the applicat	ion depends on the power supply unit								
Miscellaneous									
EHEDG certificate	EHEDG conformity is only ensured in combinatio								
Type EL Class I	- Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V Varivent® (P41): EPDM-O-ring which is FDA-listed								
Display	- dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann C 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	2-wire signal output current: max. 25 mA	along all assessment							
(without contacts)	3-wire signal output current: approx. 30 mA +	signal current							
Ingress protection	IP 67								
Installation position	any (standard calibration in a vertical position with								
Surface roughness	differing installation position for $p_N \le 4$ bar have to be specified in the order)  pressure port R <sub>a</sub> < 0.8 $\mu$ m (media wetted parts)  diaphragm R <sub>a</sub> < 0.15 $\mu$ m  weld seam R <sub>a</sub> < 0.8 $\mu$ m								
Weight	min. 500 g (depending on mechanical connection	n)							
Operational life	100 million load cycles	7							
CE-conformity	EMC Directive: 2014/30/EU								
·									
ATEX Directive Wiring diagrams	2014/34/EU								
supply –  contact 1  contact 2	Vs o – signal + contact 1 contact 2	A RL							
Pin configuration	·								
Electrical connection	M12x1 / metal (5-pin)	7: **- n							
	1								
Supply + Supply –	3								
Signal + (only 3-wire)	2	3							
Contact 1	4								
Contact 1	5	5							
Shield	plug housing / pressure port	4							
Designs 10	plug flousilig / plessure port								
Designs "									
	pplay	45° display (on request)							







	Ordering code DS 400P	
DS 400P		
Pressure gauge	7 A 5	
absolute <sup>1</sup> Input [bar]	7 A 5 7 A 6	
0.10 0.16	1 0 0 0 1 1 6 0 0	
0.25 0.40	1 6 0 0 0 2 5 0 0 4 0 0 0	
0.60 1.0	6 0 0 0 1	
1.6 2.5	1 6 0 1 2 5 0 1 4 0 0 1	
4.0 6.0	6 0 0 1	
10 16	1 0 0 2 1 6 0 2	
25 40	2 5 0 2 4 0 0 2	
-1 0 customer	1 0 0 2 1 6 0 2 2 5 0 2 4 0 0 2 X 1 0 2 9 9 9 9	consult
Design side display	K H K 4	
Analogue output 45° display		consult
without 4 20 mA / 2-wire	0	
4 20 mA / 3-wire, adjustable intrinsic safety 4 20 mA / 2-wire <sup>2</sup>		
Contact	9	consult
1 contact 2 contacts 2	1 2	
Accuracy standard for $p_N \ge 0.4$ bar: 0.35 % FSO	3	
standard for $p_N < 0.4$ bar: 0.50 % FSO option for $p_N \ge 0.4$ bar: 0.25 % FSO	5 2 9	
Electrical connection male plug M12x1 (5-pin) / metal		consult
customer Mechanical connection	N 1 1 1 9 9 9 9	consult
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 Clamp DN 25 (DIN 32676) / 3A <sup>2</sup>	K S 1	
Clamp DN 32 (DIN 32676) / 3A <sup>2</sup> Clamp DN 50 (DIN 32676) / 3A <sup>2</sup>	C 6 1 C 6 2 C 6 3 C 6 9 M 7 3	
Clamp 3/4" (DIN 32676) / 3A <sup>2</sup> dairy pipe DN 25 (DIN 11851) <sup>2</sup>	C 6 9 N 7 3	
dairy pipe DN 40 (DIN 11851) dairy pipe DN 50 (DIN 11851) dairy pipe DN 50 (DIN 11851)	M 7 5	
Varivent® DN 40/50 / 3A <sup>4</sup> customer	5 M 7 6 P 4 1 9 9 9	ganguit
Diaphragm stainless steel 1.4435 (316L)	9 9 9	consult
customer Seals	9	consult
for clamp, dairy pipe, Varivent <sup>®</sup> : none for inch thread: FKM	0	
FFKM customer	7 9	consult consult
Filling fluids silicone oil	1	Consuit
food compatible oil (FDA) / 3A customer	2 9	consult
Special version standard		0
with cooling element up to 300°C / 3A customer	2   0	consult  consult  consult  consult  consult  consult  0 0 0 9 consult
	3 0	5554.1
absolute pressure possible from 1 bar with IS version max. 1 contact is possible		
only possible for nominal pressure ranges $p_N \ge 1$ bar possible nominal pressure ranges according to data sh		
The cup nut for dairy pipe has to be mounted by produ Varivent <sup>®</sup> is a brand name of GEA Tuchenhagen Gmb	ction of pressure transmitter. The cup nut has to be ordered as separate position. I	
		01.04.2022

<sup>&</sup>lt;sup>1</sup> absolute pressure possible from 1 bar

with IS version max. 1 contact is possible
 only possible for nominal pressure ranges p<sub>N</sub> ≥ 1 bar

 <sup>4</sup> possible nominal pressure ranges according to data sheet
 5 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<sup>®</sup> is a brand name of GEA Tuchenhagen GmbH