

## CCA-P-331Pi



- precision pressure transmitter
- nominal pressure: from 0...400 mbar up to 0...40 bar
- output signals: 2-wire: 4...20 mA; 3-wire: 0...10 V
- flush welded stainless steel diaphragm
- accuracy 0.1 % span
- excellent temperature response 0.04 % span / 10K
- turn-down 10:1
- processing of the sensor signal using digital electronics
- process connections suitable for hygienic application
- vacuum resistant



The precision pressure transmitter **CCA-P-331Pi** demonstrates the further development of well-tried industrial pressure transmitter CCA-P-331P. The signal from the specially designed piezoresistive stainless steel sensor is processed by the newly developed digital electronic system, performing thus an active compensation of sensor specific deviations such as hysteresis, thermal errors and non-linearity. The temperature range of -40 ... 125 °C can be extended by the integration of a cooling element up to 300°C.

### PREFERRED AREAS OF USE ARE



Laboratory techniques



Food and Beverage



Pharmaceutical Industry

### TECHNICAL DATA

Pressure ranges <sup>1</sup>								
Nominal pressure gauge / absolute <sup>2</sup>	[bar]	0.4	1	2	4	10	20	40
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure ≥	[bar]	3	7,5	15	25	50	120	210
Vacuum resistance		P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request						
<sup>1</sup> On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.								
<sup>2</sup> absolute pressure permissible from 1 bar								
Vacuum ranges								
Nominal pressure *	[bar]	-0.4 ... 0.4	-1 ... 1	-1 ... 2	-1 ... 4	-1 ... 10		
Overpressure	[bar]	2	5	10	20	40		
Burst pressure ≥	[bar]	3	7.5	15	25	50		
*for 0 ... 1 bar abs. or -1 ... 0 bar gauge max. temperature 70°C								
Output signal / Supply								
Standard		2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub>						
Options		2-wire: 4 ... 20 mA with communication interface <sup>3</sup> 3-wire: 0 ... 10 V / V <sub>S</sub> = 14 ... 36 V <sub>DC</sub> 0 ... 10 V with communication interface <sup>3</sup>						
<sup>3</sup> only possible with el. connection Binder series 723 (7-pin)								
Performance								
Accuracy <sup>4</sup> performance after turn-down - TD ≤ 5:1 - TD > 5:1		IEC 60770: ≤ ± 0.1 % span no change of accuracy <sup>5</sup> for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 5): ≤ ± [0.1 + 0.015 x turn-down] % span with turn-down = nominal pressure range / adjusted range e.g. with a turn-down of 10:1 following accuracy is calculated: ≤ ± (0.1 + 0.015 x 10) % span i.e. accuracy is ≤ ± 0.25 % span						
Permissible load		current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S</sub> min) / 0.02 A] Ω voltage 3-wire: R <sub>min</sub> = 10 kΩ						
Influence effects		supply: 0.05 % span / 10 V load: 0.05 % span / kΩ						
Long term stability		≤ ± (0.1 x turn-down) % span / year						
Response time		current 2-wire: approx 5ms voltage 3-wire: 25 ms						
Adjustability		configuration of following parameters possible (interface / software necessary <sup>6</sup> ): - electronic damping: 0 ... 100 sec - offset: 0 ... 90 % span - turn down of span: max. 10:1						
<sup>4</sup> accuracy according to EN IEC 62828-2— limit point adjustment (non-linearity, hysteresis, repeatability)								
<sup>5</sup> except nominal pressure ranges ≤ 0.40 bar; for these calculation of accuracy is as follows: ≤ ± (0.1 + 0.02 x turn-down) % span e.g. turn-down of 3:1: ≤ ± (0.1 + 0.02 x 3) % span i.e. accuracy is ≤ ± 0.16 % span								
<sup>6</sup> software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)								



Thermal effects <sup>7</sup> (Offset and Span) / Permissible temperatures			
Tolerance band [% span]	$\leq \pm (0.35 \times \text{turn-down})$	in compensated range	0 ... 80 °C
TC, average [% span / 10 K]	$\leq \pm (0.035 \times \text{turn-down})$	in compensated range	0 ... 80 °C
Permissible temperatures	medium <sup>8</sup> :	-40 ... 125 °C for filling fluid silicon oil	
		-10 ... 125 °C for filling fluid food compatible oil	
	electronics / environment: storage:	-25 ... 85 °C -40 ... 100 °C	
Permissible temperature medium for cooling element <sup>9</sup>	filling fluid silicon oil	overpressure: -40 ... 300 °C	vacuum: -40 ... 150 °C <sup>10</sup>
	filling fluid food compatible oil	overpressure: -10 ... 250 °C	vacuum: -10 ... 150 °C <sup>10</sup>
<sup>7</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.			
<sup>8</sup> max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C			
<sup>9</sup> max. temperature depends on the used sealing material, type of seal and installation			
<sup>10</sup> also for $P_{\text{abs}} \leq 1$ 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		
Filling fluids			
Standard	silicon oil		
Options	food compatible oil with FDA approval (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request		
Mechanical stability			
Vibration (DIN EN 60068-2-6)	G 1/2": 20 g RMS (25 ... 2000 Hz); others except G 1/2": 10 g RMS (25 ... 2000 Hz)		
Shock (DIN EN 60068-2-27)	G 1/2": 500 g / 1 msec; others except G 1/2": 100 g / 1 msec		
Materials			
Pressure port	stainless steel 1.4404 (316 L)		others on request
Housing	stainless steel 1.4404 (316 L)		
Option field housing	stainless steel 1.4301 (304), cable gland M16x 1.5 brass, nickel plated (clamping range 2....8 mm)		
Seals (O-ring)	standard:	FKM (recommended for medium temperatures $\leq 200$ °C)	
	option:	FFKM (recommended for medium temperatures < 260 °C) others on request	
	clamp and dairy pipe:	without	
Diaphragm	standard: stainless steel 1.4435 (316L) option: Hastelloy <sup>®</sup> C-276 (2.4819) and Tantalum on request		
Media wetted parts	pressure port, diaphragm		
Miscellaneous			
Current consumption	signal output current: max. 25 mA	signal output voltage: max. 7 mA	
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 <sup>®</sup> (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH		
Surface roughness	pressure port	Ra < 0.8 $\mu\text{m}$ (media wetted parts)	
	diaphragm	Ra < 0.15 $\mu\text{m}$	
	weld seam	Ra < 0.8 $\mu\text{m}$	
Weight	approx. 200 g		
Installation position	any <sup>11</sup>		
Operational life	100 million load cycles		
CE-conformity	EMC Directive: 2014/30/EU		

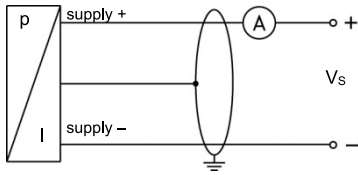
<sup>11</sup> Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges  $P_N \leq 1$  bar.



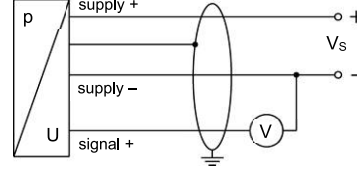
## ELECTRICAL CONNECTION

### Wiring diagrams

#### 2-wire-system (current)



#### 3-wire-system (voltage)



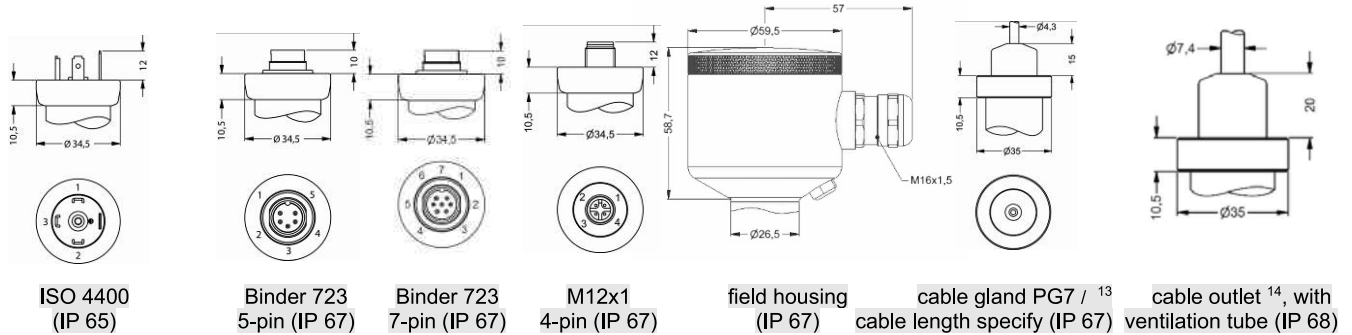
### Pin configuration

Electrical connections	ISO 4400	Binder 723 (5-pin)	Binder 723/423 (7-pin)	M12x1/ metal (4-pin)	field housing	cable colours (IEC 60757)
Supply +	1	3	3	1	IN +	wh (white)
Supply -	2	4	1	2	IN -	bn (brown)
Signal + (only for 3-wire)	3	1	6	3	OUT +	gr (green)
shield	ground pin $\oplus$	5	2	4	$\oplus$	ye/gn yellow / green
Communication interface <sup>12</sup>						
RxD	-	-	4	-	-	-
TxD	-	-	5	-	-	-
GND	-	-	7	-	-	-

<sup>12</sup> may not be connected directly with the PC (the suitable adapter is available as accessory)

### standard

### options

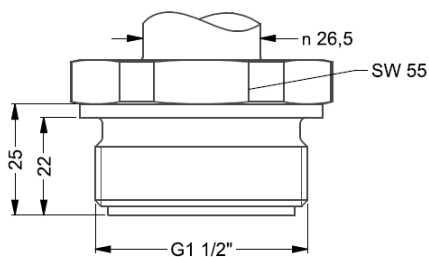


<sup>13</sup> standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

<sup>14</sup> different cable types and lengths available, permissible temperature depends on kind of cable

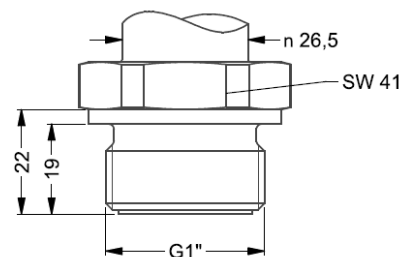
## DIMENSION DRAWINGS

### standard



G1/2" flush DIN 3852

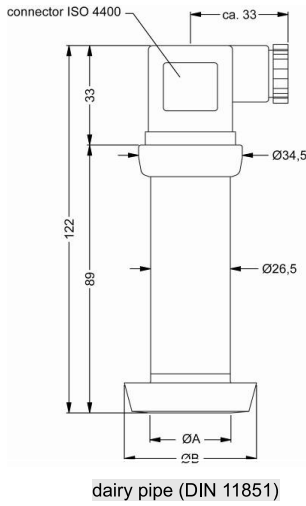
### option



G1" flush DIN 3852

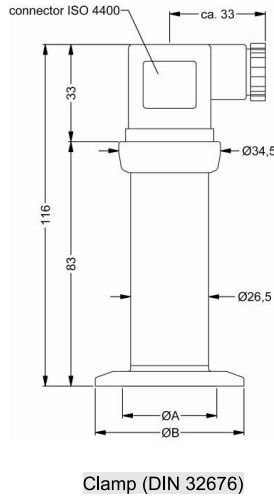


# Pressure transmitters



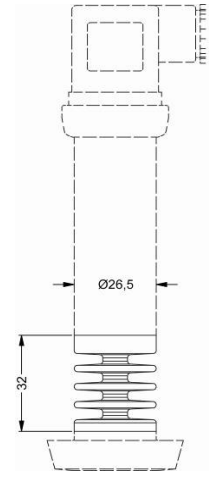
dairy pipe (DIN 11851)

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
$P_N$ [bar]	≤ 40	≤ 40	≤ 25



Clamp (DIN 32676)

dimensions in mm			
size	DN 25	DN 32	DN 50
A	23	32	45
B	50.5	50.5	64
$P_N$ [bar]	≤ 16	≤ 16	≤ 16



cooling element up to 300 °C<sup>9</sup>

⇒ metric threads and others on request

## ORDER CODE

CCA-P-331Pi- [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ]

Option	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8	Digit 9	Digit 10	Digit 11	Digit 12	Digit 13	Digit 14	Digit 15	Digit 16	Digit 17	Digit 18	Digit 19	Digit 20
<b>Pressure</b>																				
Gauge	5	0	0																	
Absolute <sup>1</sup>	5	0	1																	
<b>Input [bar]</b>																				
0 ... 0,4 <sup>1</sup>			4	0	0	0														
0 ... 1			1	0	0	1														
0 ... 2			2	0	0	1														
0 ... 4			4	0	0	1														
0 ... 10			1	0	0	2														
0 ... 20			2	0	0	2														
0 ... 40			4	0	0	2														
-0,4... 0,4			S	4	0	0														
-1 ... 0 (temperature max. 70°C)			X	1	0	2														
-1 ... 1 (temperature max. 70°C)			S	1	0	2														
-1 ... 2 (temperature max. 70°C)			V	2	0	2														
-1 ... 4 (temperature max. 70°C)			V	4	0	2														
-1 ... 10 (temperature max. 70°C)			V	1	0	3														
Customer			9	9	9	9														
Customer - underpressure (temperature max. 70°C)			X	X	X	X														
<b>Output</b>																				
4 ... 20 mA / 2-wire																				
0 ... 10 V / 3-wire																				
Customer																				
<b>Accuracy</b>																				
0,1 % - standard range																				
0,1 % - standard range including Calibration Certificate																				
0,1 % - customer range																				
0,1 % - customer range including Calibration Certificate																				
0,2 % ( $P_N < 0,1$ bar)																				
Customer																				
<b>Electrical connection</b>																				
Connector DIN 43650 (ISO 4400) (IP 65)																				
Connector Binder 723 5-pin (IP 67)																				
Cable gland PG7 / cable length specify (IP 67)																				
+ PVC cable / 1 m																				
Connector Buccaneer (IP 68)																				
Field housing stainless steel, cable gland M 16 x 1,5 (IP 67)																				
Field housing stainless steel, cable gland M 20 x 1,5 (IP 67)																				
Connector Binder 723 and 423 7-pin (IP 67) (for RS 232)																				
Connector DIN 43650 (ISO 4400) - Potting compound inside (IP 67)																				
Connector M12 x 1, 4-pin (IP 67)																				
Connector M12 x 1, 4-pin (IP 67) - metal																				
Cable outlet, cable with ventilation tube (IP 68) <sup>2</sup>																				
+ PVC cable / 1 m																				
Customer																				

