

## Pressure transmitter/Pressure switch PASCAL CS

for diaphragm seal operation, hygienic

Type series CS2110



### Application area

- Pharmaceutical industry
- Food industry
- Biotechnology

### Features

- Multifunctional pressure transmitter/pressure switch
- Hygienic case with no notches or indentations
- Degree of protection IP 65
- 4 digit LED display, can be mirror-imaged by 180°
- Indication module rotatable by 300°
- Measuring ranges
  - 0...100 mbar up to 0...40 bar rel.
  - 0...1 bar up to 0...6 bar abs.
- Output signal 4...20 mA, 2-wire technology
- Accuracy  $\leq 0,2 \%$
- Easy to program locally (as per VDM standard)
- Galvanic isolation between transmitter and switching outputs
- Various process connections with flush mounted diaphragm, selected connections with EHEDG certificate

### Options

- Labom REconnect quick coupling device for easy and safe separation and connection of diaphragm seal systems; Type series MK1000, see data sheet DB\_D6-022
- Approvals/Certificates
  - Material certificate as per EN 10204-3.1
  - Calibration certificate as per EN 10204-3.1
  - Roughness height rating with inspection certificate acc. to EN 10204-3.1
- As per UKCA regulations
- 2 floating contacts
- Switching contacts with high switching current (1A)
- Wetted parts electropolished
- Degree of protection IP 67
- Hygienic design

### Application

The pressure transmitter/pressure switch PASCAL CS is suited for measuring the relative and absolute pressures of gases, vapors and liquids. The multifunctional PASCAL CS displays the measurement; outputs a current signal proportional to the pressure. It has two optional contacts.

## Technical data

### Constructional design / case

Design:	Hygienic case design, including gasket for seamless design  Fully encapsulated electronics unit
Material:	Stainless steel mat.-no. 1.4301 (304) Indication module: macrolon
Degree of protection per EN 60529:	<ul style="list-style-type: none"><li>■ IP 65</li><li>■ Optional IP 67</li></ul>
Pressure compensation:	Aeration via sintered filter
Electrical connection:	<ul style="list-style-type: none"><li>■ circular connector M12, 4 pin</li><li>■ circular connector M12, 8 pin (necessary for devices with switch function)</li></ul> Incl. sealing ring to ensure case is completely sealed
Climatic category:	4K4H per EN 60721 3-4

### Process connection

Design:	See order details
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### Hygienic design

The surface roughness of the wetted parts made of stainless steel are executed according to EHEDG Doc.8 and ASME BPE SF3.  
In case of choosing the additional feature HY, we guarantee the following surface roughness values:

Diaphragm foil:	$Ra \leq 0.38 \mu\text{m}$
Laser welds:	$Ra \leq 0.76 \mu\text{m}$
Turned parts:	$Ra \leq 0.76 \mu\text{m}$

Further versions of hygienic design upon request.

### Measuring system

Sensor:	Piezoresistive measuring element
System filling:	Synthetic oil FD1, free of silicone, FDA compliant

### Measuring ranges / overload limits

Measuring range / overload limit:	See order details
Vakuum tightness:	Long term vacuum measurements at relative measurement ranges can alter the device characteristics. (piezoresistive measuring system, only)

### Zero settings

Zero point:	Easy zero setting max. $\pm 20 \%$ .
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### Accuracy

Limit point setting:	per DIN 16086
Accuracy (Lin./Hyst./Repr.):	0.2 % v. of mr (mr $\geq 250$ mbar) 0.5 mbar (mr < 250 mbar)
Long-term drift:	$\leq 0.1 \%$ / year per EN 61298-1
Temperature influence:	<u>Range:</u> 0...50 °C: $\leq 0.25 \%$ of mr (mr $\geq 400$ mbar) $\leq 0.4 \%$ of mr (mr < 400 mbar) $\leq 0.5 \%$ of mr (mr < 160 mbar) <u>Range:</u> -20...0 and 50...85 °C: $\leq 0.4 \%$ of mr (mr $\geq 400$ mbar) $\leq 0.6 \%$ of mr (mr < 400 mbar) $\leq 0.8 \%$ of mr (mr < 160 mbar) mr = measuring range

### Process connection:

(zero error)

3/4"	10 mbar/10K
DN 25/1"	4.8 mbar/10K
DN 32/1 1/2"	2.3 mbar/10K
DN 40	1.6 mbar/10K
DN 50/2"	0.6 mbar/10K

### Indication

Type:	4 digit, red LED with 7 segments
Digit high:	8.5 mm
Resolution:	-9999...9999 digit
Accuracy:	$\pm 0,2 \%$ $\pm 1$ digit
Temperature-influence:	$\pm 0,1 \%$ /10K
Alignment:	Can be rotated through 300°, Can be mirror-imaged by 180° when installed upside down
Indication:	Visual confirmation for operator when a button is pressed
Decimal point:	Automatic setting depending on measuring range/unit, max. 3 decimal places Or manual setting 0...3 decimal places

Indication automatically changing from measurement value to measurement unit or indication of unit or value per key-stroke.

Measuring unit: bar, mbar, PSI, kPa, MPa, %, mA

### Output

Signal:	4...20 mA, 2-wire technology
Sampling rate:	10 measurements / second
Current range:	3.8...20.8 mA
Resolution:	2 $\mu\text{A}$

Current limitation:  $\leq 22 \text{ mA}$   
 Alarm state:  $< 3.6 \text{ mA}$   
 Load, R:  $R \leq (U-14V)/0.02 \text{ A } [\Omega]$   
 U = supply voltage

### Switching output (option)

Type: 2 floating contacts with common ground (low side NPN) or common power supply (high side PNP)  
 Switching capacity: 200 mA, short-circuit-proof  
 Optional 1 A  
 Switching status: breakers or makers, programmable, device off circuit: open contact  
 Switching function: window / hysteresis, programmable  
 Setting range: within range limits  
 Hysteresis: within range limits  
 Switching delay: 0,0...999.9 s  
 Repeat accuracy: 0.2 % of full-scale value  
 Temperature influence:  $\pm 0.1 \% / 10K$   
 Galvanic isolation: between transmitter and outputs  
 Switching cycles:  $> 10 \text{ millions}$   
 Voltage drop:  $< 1 \text{ V}$  ( $< 1.5 \text{ V}$ , if current is  $> 100 \text{ mA}$ )  
 Output state indicator: red LED per switching output  
 Parameterisation: 3-key parameterisation

### Supply voltage

Functional range: 14...30 V DC

### Temperature ranges

Ambient:  $-20...85 \text{ }^\circ\text{C}$   
 Medium:  $-20...125 \text{ }^\circ\text{C}$ , short term  $140 \text{ }^\circ\text{C}$ , optional up to  $160 \text{ }^\circ\text{C}$  for 1 h.  
 Higher process temperatures upon request  
 Storage:  $-40...85 \text{ }^\circ\text{C}$

### Tests and certificates

EMC: EMC directives 2014/30/EU

### Mounting information

Mounting position: At choice  
 Calibration position: Vertical

### Parameterisation

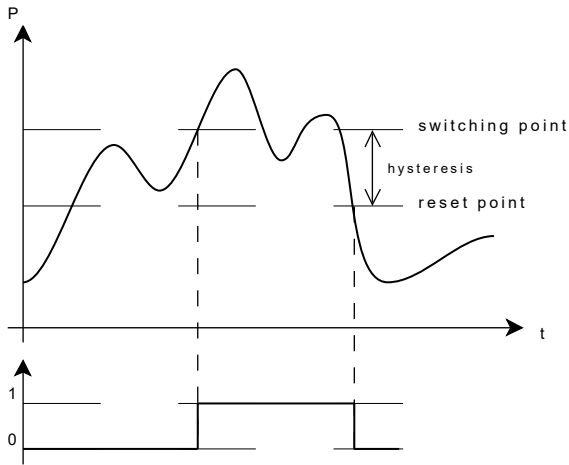
The following parameters can be assigned via 3 keys:

Parameter	Values						
unit	Bar, mbar, PSI, kPa, MPa, %, mA						
pressure trimming	Zero						
min/max-value	between upper range and lower range value, resettable						
display time for measurement	1.0...99.9 s						
display time for unit	0.0...99.9 s						
display rotation	$0^\circ / 180^\circ$ (when installed upside down)						
decimal point	automatic, manual 0...3 decimal places						
switching function	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">hysteresis function</td> <td style="width: 50%; text-align: center;">window function</td> </tr> <tr> <td style="text-align: center;">breakers</td> <td style="text-align: center;">breakers</td> </tr> <tr> <td style="text-align: center;">makers</td> <td style="text-align: center;">makers</td> </tr> </table>	hysteresis function	window function	breakers	breakers	makers	makers
hysteresis function	window function						
breakers	breakers						
makers	makers						
switching point	between upper range value and reset point						
reset point	between lower range value and switching point						
ON delay	0.0...999.9 s						
OFF delay	0.0...999.9 s						

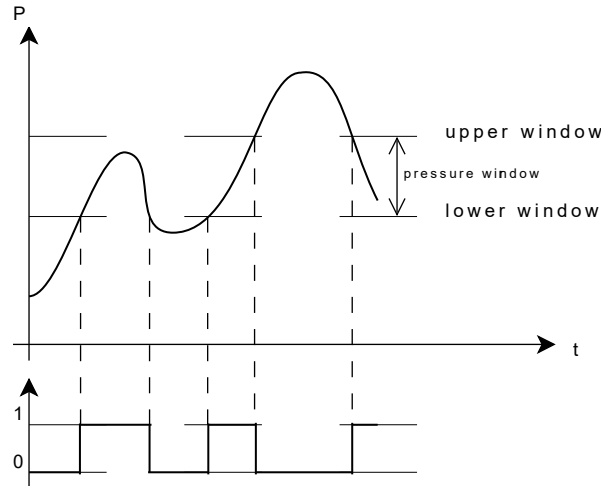
Parameterisation see operating instruction BA\_060.

## Hysteresis functions

Hysteresis function

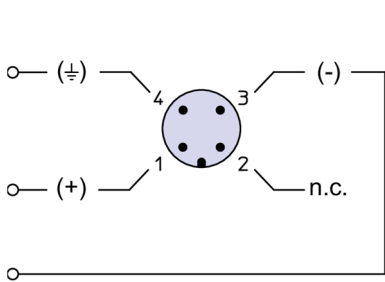


Window function

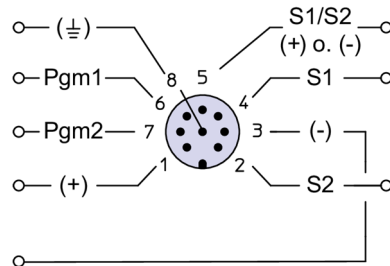


## Connection diagram

4-pin connector



8-pin connector (for switching outputs)

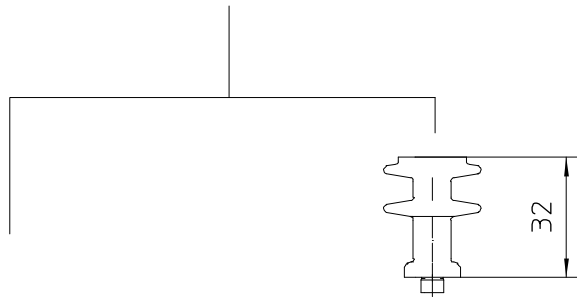
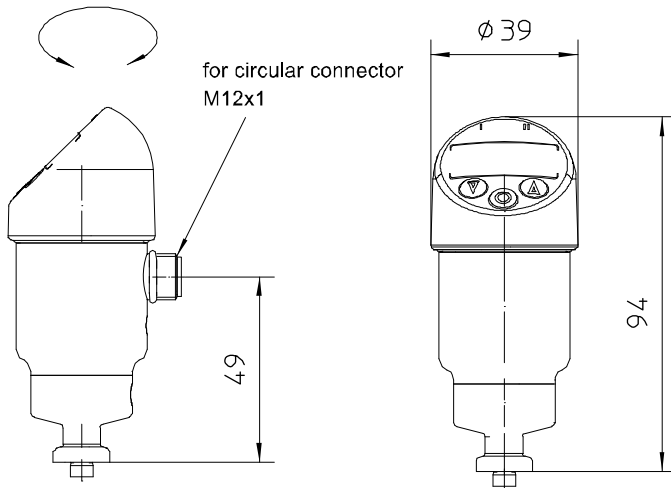


Explanations

(+)	plus-side of supply
(-)	minus-side of supply
n.c.	not connected
S1/S2	common pin of switching outputs (see below)
S1	switching output 1
S2	switching output 2
Pgm 1/2	programming pins

## Dimensions

LED-Display  
~300° rotatable



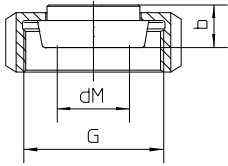
direct

for process temperatures  
up to 125°C  
(short period up to 140°C, 1h)

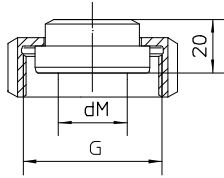
temperature decoupler  
for process temperatures  
up to 160°C

All dimensions are in mm

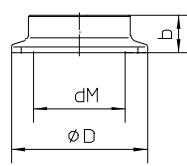
## Process connection



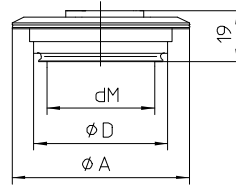
sanitary connection with coupling nut per DIN 11851



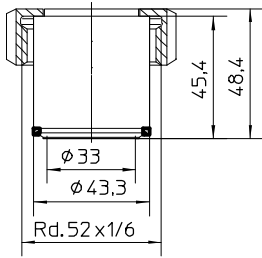
aseptic screw joint collar connection with union nut per DIN 11864-1



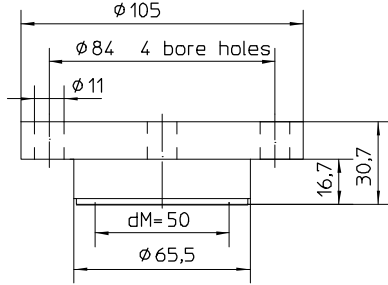
clamp connection per DIN 32676/ISO 2852



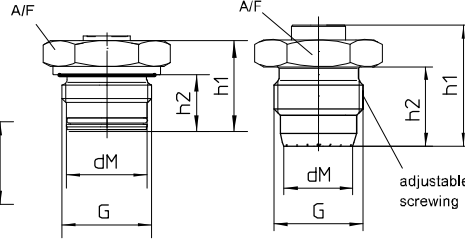
VARIVENT<sup>®</sup> connection for VARINLINE<sup>®</sup> case



HYGENIC-Tubus \*  
Ø43,3 with screwing  
DN25/PN40



DRD-connection DN50 PN40 \*



Screw-in thread \*  
with o-ring-gasket  
and additionally gasket  
per DIN EN ISO 1179-2  
model E (DIN 3852)

HYGENIC-screw-in thread \*  
no gasket  
tightening torque  
20 Nm, max. nominal pressure 10 bar  
50 Nm, max. nominal pressure 50 bar

\* weld-in adapter  
see data-sheet D6-037

All dimensions are in mm

### Sanitary pipe connection with union nut per DIN 11851

DN	PN	dM	b	G
25	40	27	16	Rd.52x1/6"
32	40	34	16	Rd.58x1/6"
40	40	40	16	Rd.65x1/6"
50	25	51	17	Rd.78x1/6"

### Aseptic screw joint collar connection with union nut per DIN 11864-1

DN	PN	dM	G
25	40	24	Rd.52x1/6"
32	40	30	Rd.58x1/6"
40	40	34	Rd.65x1/6"
50	25	48	Rd.78x1/6"

### Clamp connection per DIN 32676 model A (metric) for pipes per EN 10357 (DIN 11850)

DN	PN	dM	b	D
25	25	22.6	14	50.5
32	25	27	12	50.5
40	25	34	12	50.5
50	16	46	14	64

### Clamp connection per DIN 32676 model B (OD, ISO) for pipes per DIN EN ISO 1127

DN	PN	dM	b	D
26.9	25	22.6	14	50.5
33.7	25	27	12	50.5
42.4	25	34	12	64
48.3	16	40	14	64

### Clamp connection per DIN 32676 model C (Tri-Clamp) for pipes per ASME BPE

DN	PN	dM	b	D
3/4"	25	15.5	15	25
1"	25	22.6	14	50.5
1 1/2"	25	34	12	50.5
2"	16	46	14	64

### Clamp connection per ISO 2852 for pipes per ISO 2037

DN	PN	dM	b	D
25	16	22.6	14	50.5
38	16	34	12	50.5
51	16	46	14	64

### VARIVENT<sup>®</sup> connection for VARINLINE<sup>®</sup> access unit

Connection	PN	dM	A	D
Form F	25	40	66	50
Form N	25	58	84	68

### HYGIENIC screw-in thread, gasket without elastomer

G	PN (bar)	dM	h1	h2	SW
G1 A	50	24	45	28.5	36

### Screw-in thread with O ring gasket

G	PN (bar)	dM	h1	h2	SW
G1/2 A	200	15.5	33	20.5	27
G1 A	50	24	33	20.5	41

## Order details

### Pressure transmitter PASCAL CS for diaphragm seal operation, hygienic Type series CS2110

Order details PASCAL CS2110			
CS2110	Pressure transmitter PASCAL CS for diaphragm seal operation, hygienic		
		measuring range	overload limit
A1008	measuring ranges	0...100 mbar	1 bar
A1009		0...160 mbar	1 bar
A1010		0...250 mbar	3 bar
A1011		0...400 mbar	3 bar
A1012		0...600 mbar	3 bar
A1053		0...1 bar	10 bar
A1054		0...1.6 bar	10 bar
A1055		0...2.5 bar	10 bar
A1056		0...4 bar	20 bar
A1057		0...6 bar	20 bar
A1058		0...10 bar	100 bar
A1059		0...16 bar	100 bar
A1060		0...25 bar	100 bar
A1061		0...40 bar	100 bar
A1025		-100...0 mbar	1 bar
A1026		-160...0 mbar	1 bar
A1027		-250...0 mbar	3 bar
A1028		-400...0 mbar	3 bar
A1552		-600...0 mbar	3 bar
A1086		-1...0 bar	10 bar
A1087		-1...0.6 bar	10 bar
A1088		-1...1.5 bar	10 bar
A1089		-1...3 bar	20 bar
A1090		-1...5 bar	20 bar
A1091		-1...9 bar	100 bar
A1092		-1...15 bar	100 bar
A1093		-1...24 bar	100 bar
B1053		0...1 bar abs	10 bar
B1054		0...1.6 bar abs	10 bar
B1055		0...2.5 bar abs	10 bar
B1056		0...4 bar abs	20 bar
B1057		0...6 bar abs	20 bar
A9999			variant as in writing
H11	output signal	4...20 mA, 2-wire technology	
N10	switching output	without	
N70		2 floating contacts	with common ground (NPN), switching capacity 30 V DC, 200 mA
N70.1			with common ground (NPN), switching capacity 30 V DC, 1 A
N71			with common power supply (PNP) switching capacity 30 V DC, 200 mA
N71.1			with common power supply (PNP) switching capacity 30 V DC, 1 A
T30	electrical connection	circular connector M12	4 pin
T31			8 pin <sup>1</sup>

<b>K1085</b>	design	standard	
<b>K2085</b>		with temperature decoupler	
<b>K102</b>	process connection <sup>2</sup> material: ASTM 316L	Sanitary pipe connection with union nut per DIN 11851 <sup>3,4</sup>	DN 25
<b>K103</b>			DN 32
<b>K104</b>			DN 40
<b>K105</b>			DN 50
<b>K162</b>			DN 25
<b>K163</b>		DN 32	
<b>K165</b>		DN 40	
<b>K166</b>		DN 50	
<b>K124</b>		Clamp connection per ISO 2852 for pipes per ISO 2037 <sup>3,4</sup>	DN 25 (1")
<b>K126</b>			DN 38 (1 1/2")
<b>K127</b>			DN 51 (2")
<b>K144</b>		Clamp connection per DIN 32676, model A (metric) for pipes per EN 10357 (DIN 11850) <sup>3,4</sup>	DN 25
<b>K146</b>			DN 32
<b>K147</b>			DN 40
<b>K148</b>			DN 50
<b>K213</b>			DN 26.9
<b>K214</b>		Clamp connection per DIN 32676, model B (OD, ISO) for pipes per EN ISO 1127 <sup>3,4</sup>	DN 33.7
<b>K215</b>			DN 42.4
<b>K216</b>			DN 48.3
<b>K134</b>			DN 3/4" <sup>5</sup>
<b>K136</b>		Clamp connection per DIN 32676, model C (Tri-Clamp) for pipes per ASME BPE <sup>3,4</sup>	DN 1"
<b>K137</b>			DN 1 1/2"
<b>K138</b>			DN 2"
<b>K152</b>			Form F (D=50) for VARINLINE® access unit
<b>K153</b>		VARIVENT® connection <sup>3,4</sup>	Form N (D=68) for VARINLINE® access unit
<b>K172</b>		HYGIENIC Tubus	Ø 43.3 mm with screwing DN 25/PN 40
<b>K185</b>		DRD-connection	nominal width DN 50 / nominal pressure PN 40
<b>K195</b>		Screw-in thread	G1 A with O-ring gasket <sup>6</sup>
<b>K80</b>	G1 A hygienic sealing (no elastomer)		
	surface roughness	standard	
<b>HY</b>	(wetted parts)	Hygienic version as per EHEDG Doc.8 and ASME BPE SF3	

Additional features (to be indicated if required)		
<b>F2</b>	parameterization	as in writing
<b>T1</b>	case degree of protection	IP 67
<b>W1020</b>	material certificate	per EN 10204-3.1, wetted parts (stainless steel)
<b>W2660</b>	As per UKCA regulations	

**Order code (example): CS2110 - A1086 - N70.1 - T30 - K136 - HY - ...**

<sup>1</sup> necessary for devices with switching contact

<sup>2</sup> further process connections (pressure transmitter) upon request

<sup>3</sup> EHEDG certified only in connection with hygienic design (order code option HY)

<sup>4</sup> EHEDG certificate valid only if gaskets are used that are listed in the "EHEDG position paper"

<sup>5</sup> possible for measuring ranges  $\geq 250$  mbar. For a function calculation and optimum system design it is necessary to specify the operation temperature

<sup>6</sup> hygienic design not possible