Differential pressure transmitter PASCAL CV Delta P

for general applications

Type series CV3300

Features

- Modulare differential pressure transmitter with metallic diaphragm
- Function modules:
  - Multifunctional display with 5-segment digital display and bar graph
  - Switching module with 2 floating channels, maximum 0.5 A switching current, electrically isolated to all sides, without additional auxiliary power
  - with HART® module
- Function module replacement on site without recalibration, „plug and measure“
- Nominal ranges 0.4 up to 40 bar
- Turndown 5:1
- Accuracy ≤ 0,15 %
- Output signal:
  - 4…20 mA
- Output functions: linear, invers, table function with up to 31 support points
- Stainless steel case in sturdy design, degree of protection IP 69K
- Media temperature -40...100 °C
- Wetted parts stainless steel

Application area

- Chemical and petrochemical industry
- General process engineering
- General process technology

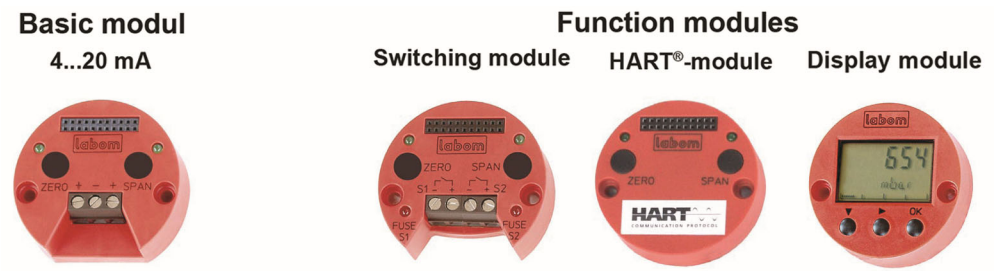
Options

- Approvals/Certificates
  - Explosion protection (ATEX/IECEx/UKEX) for gases and dust
  - Material certificate as per EN 10204-3.1
  - Calibration certificate as per EN 10204-3.1
  - Classification per SIL2
- As per UKCA regulations

Application

The digital differential pressure transmitter PASCAL CV Delta P is suitable for level measurement in pressure vessels and filter monitoring.

PASCAL CV – the modular pressure transmitter



Technical data

Measuring ranges

Up to a turndown of 5:1 the measuring span can be freely selected.

Nominal range	Measuring span		Overload capacity		Static excess pressure both sides
	min. span	max. span	plus-side	minus-side	
-0.4...0.4 bar rel.	0.08 bar	0.8 bar	10 bar rel.	5 bar rel.	75 bar
-1...1 bar rel.	0.2 bar	2 bar	20 bar. rel.	10 bar rel.	75 bar
-1...4 bar rel.	0.8 bar	5 bar	50 bar rel.	25 bar rel.	75 bar
-1...16 bar rel.	3.2 bar	17 bar	100 bar rel.	75 bar rel.	100 bar
-1...40 bar rel.	8 bar	41 bar	100 bar rel.	75 bar rel.	100 bar

Minimum permissible static pressure: 30 mbar abs

Constructional design / case

Design: Two-chamber case design with screw cap, continuously rotatable up to 170°
Minimum case volume, excellent moisture and condensate protection

Material: Stainless steel mat.-no. 1.4301 (304)

Degree of protection: IP 69K per EN 60529

Climatic category: 4K4H per EN 60721 3-4

Window: Polycarbonate

Case seal: O-ring: NBR

El. connection: Screw terminal 1 mm²

Cable gland:
- Cable gland M16, material: PA
- Circular connector M12

Further details see order code and upon request.

Weight: 3,7 kg

Process connection

Design: Process flange with connection dimension per DIN EN 61518

- Process connection 1/4 – 18 NPT
  Mounting thread 7/16 – 20 UNF
- Cutting ring fitting stainless steel per DIN 2353
  - for pipe ø 6 mm, mounted
  - for pipe ø 8 mm, mounted
  - for pipe ø 10 mm, mounted
  - for pipe ø 12 mm, mounted
- Process connection 1/2 – 14 NPT via oval flange (see accessories)

Process flange incl. 1/4“ NPT sealing plug, alternative with vent valve.

The process flange is rotatable.

Further process connections upon request.

Material wetted parts

Process flange: Stainless steel, mat.-no. 1.4408

Diaphragm: Stainless steel, mat.-no. 1.4404/1.4435 (316L)

Gasket: FKM Viton

Ventilation valve: Stainless steel, mat.-no. 1.4404 (316L)

Sealing plug: Stainless steel, mat.-no. 1.4571 (316Ti)
Option: stainless steel 316L

Measuring system

Sensor: Piezoresistive measuring element

System filling: Synthetic oil FD1, free of silicone, FDA compliant

Accuracy

Limit point setting: per DIN 16086

Reference conditions: per EN 60770-1

Linearity errors: ≤ 0.15 % of span
TD 5:1 no modification

Hysteresis: ≤ 0.05 % of nominal range

Repeatability: ≤ 0.05 % of nominal range

Calibration position: Vertical mounting position (display facing upwards)

Long-term drift: (EN 60770-1) ≤ 0.1 % / year of nominal range

Temperature influence of case: Lower range value / upper range value
Range 0…60 °C:
± 0.15 % / 10K of nominal range
Range < 0 °C, > 60 °C:
± 0.2 % / 10K of nominal range

Influence static pressure:	Refer to nominal range	
	0.4 bar	0.12 % x stat. pressure [bar] x TD
	1 bar	0.03 % x stat. pressure [bar] x TD
	4 bar	0.02 % x stat. pressure [bar] x TD
	16 bar	0.002 % x stat. pressure [bar] x TD
	40 bar	0.001 % x stat. pressure [bar] x TD

Output

General:

Delay time:	approx. 160 ms
Measuring cycle:	6 measurements / second
Measuring range setting:	Turndown 5:1

Basic module: 4…20 mA

Signal:	4…20 mA, 2-wire
Current range:	3.8…20.8 mA
Current limitation:	approx. 22 mA
Alarm state:	< 3.6 mA, optional > 21 mA
Damping:	0…120 seconds
Load R:	R ≤ (U-12V DC)/0.022 A [Ω] U = supply voltage

Supply voltage

Basic module:	4…20 mA

Standard design:

Functional range:	12…40 V DC

Ex-design:

Functional range:	12…30 V DC

Temperature ranges

Ambient:	-20…85 °C
Media:	-40…100 °C
Storage:	-40…85 °C

Tests and certificates

Interference emission:	per EN 55011
Noise immunity:	per EN 61326-1 *, NAMUR NE21 *

* Devices with cable gland or switching outputs might suffer from a short-time measuring deviation if exposed to strong electromagnetic fields (EN 61000-4-3).

Ex approvals

ATEX:	TÜV 04 ATEX 2387 X Ⓔx II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb Ⓔx II 2G Ex ia IIC T4/T5/T6 Gb Ⓔx II 2D Ex ia IIIC Txx °C Db
UKEX:	CML 21UKEX21176X Ⓔx II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb Ⓔx II 2G Ex ia IIC T4/T5/T6 Gb Ⓔx II 2D Ex ia IIIC Txx °C Db

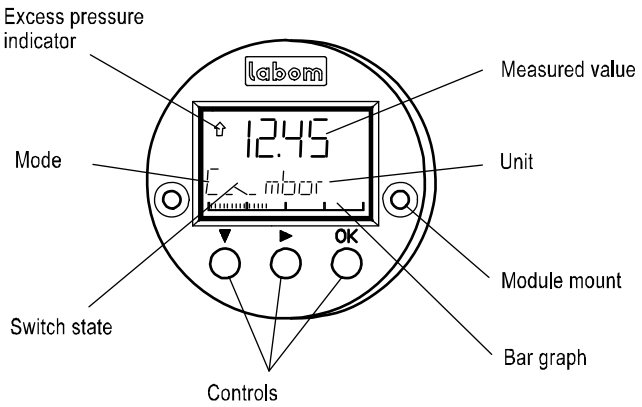
For detailed Information see Ex Safety Instruction XA_015.

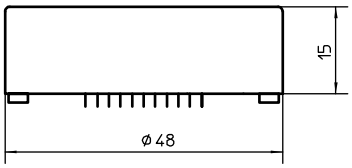
SIL2:	Functional safety per EN 61508, Classification per SIL2. For basic module 4…20 mA, switching module, display module and HART® module. For detailed information see manufacturer declaration HE_075.

Function modules

Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -

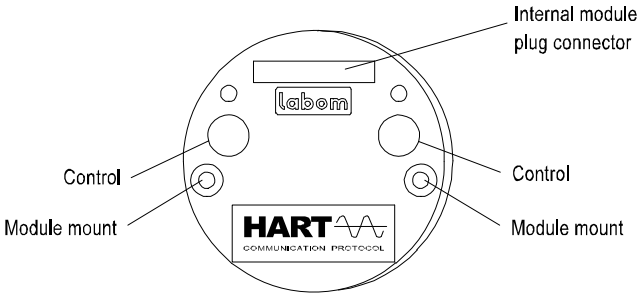


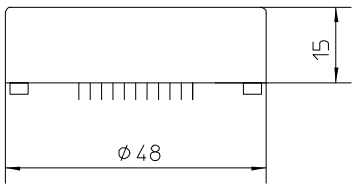


- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menues
- 5-segment pressure read-out with unit
- Read-out display
  - pressure (standard)
  - percent
  - current
  - sensor temperature
- Bar graph 36 segment suitable 0…100 %
- Loop test (current sensing function) 3.55…22 mA
- Alarm indicator on display
- Switching function indicator

Details of the operator menue see parameterisation.

HART® module optional

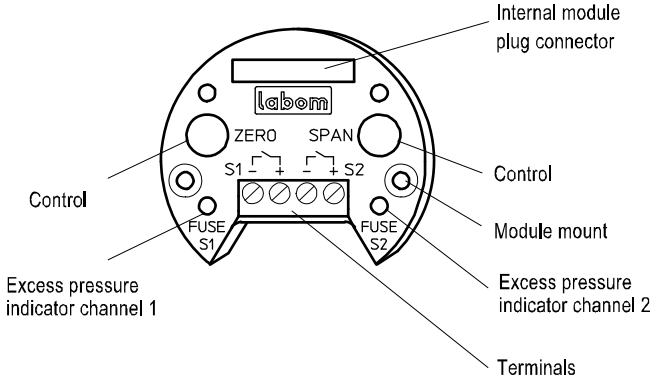


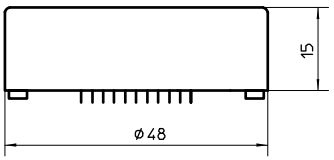


- HART® communication, HART 6
- Response characteristic FSK
- Parameterisation via
  - operating elements
  - HART® communication
- Siemens PDM
- Emerson 375/475 Field Communicator

Switching module optional

pluggable with automatic module detection - plug and measure -

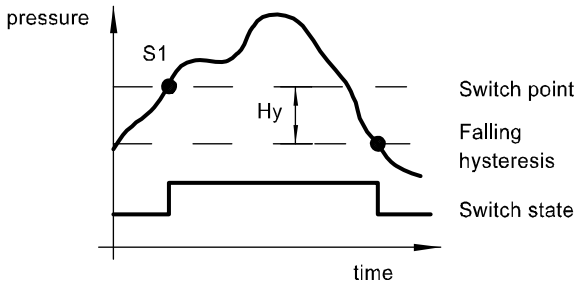




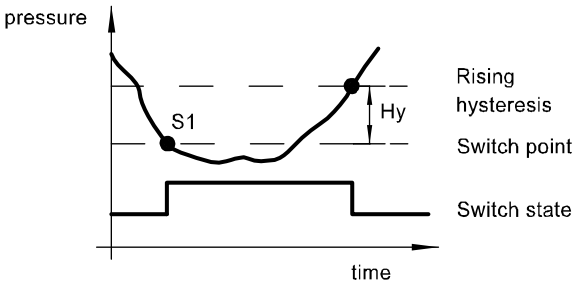
- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A (Ri < 0.3 Ω)
- Indicator: red LED, indicates overload or short-circuit
- Cut-out fuse protects against overload / short-circuit with automatic reset
- Switch points: 0.0 - 100.0% adjustable, Standard: 50.0%
- Switching function: maker or breaker, adjustable, Standard: breaker
- Contact open when device switched off
- Hysteresis: 0.0…100 % adjustable, Standard 0.1 %
  - falling or rising, adjustable, standard: falling
- Switching rate: 6 Hz
- Electrically isolated to all sides, Insulation voltage: 500 V, 2.5 kV/2 sec.
- Electrical connection: terminal blocks 1 mm^2

Hysteresis functions

-falling hysteresis-



-rising hysteresis-



Description of switching module and HART® module upon request.

Parameterisation

The module selected determines which parameters can be set

operating menus	display of display module	parameter		basic module: 4...20 mA			
		variabilty	standard	BM	SM	DM	HM PDM 475
zero point	**RANGE/Zero**	see instrument ranges	0 bar	x	x	x	x
measuring span	**RANGE/Span**	see instrument ranges	nominal range	x	x	x	x
damping	**DAMP**	4…20 mA: 0…120 sec.	0 sec.	w	-	x	x
min-max-value	**HI/LO**	pressure and temperature resettable	-	-	-	x	x
characteristic	**FUNC**	linear, table	linear	w	-	x	x
pressure unit	**UNIT**	bar, mbar, kPa, MPa, mmH2O, mH2O, kg/cm2, PSI	bar	w	-	x	x
loop test	**LOOP**	3.55…22 mA	-	-	-	x	x
alarm state	**ALARM**	< 3.6 mA, > 21 mA	< 3.6 mA	w	-	x	x
current trimming	**I-CAL**	-2…5 %	-	-	-	x	x
pressure trimming	**P-CAL**	zero point: -50…50 % v.N span: -10…10 % v.N	-	-	-	x	x
table function	**TABLE**	2…31 points of table	0% = 4 mA 100% = 20 mA	w	-	x	x
system info	**INFO**	software, serial number, revision level	-	-	-	x	x
factory data reset	**RESET**	-	-	-	-	x	x
switch points	**SWCH1(2)**	0…100 % of nominal range	50 %	-	x	x	x
hysteresis	**SWCH1(2)/Hyst.**	0…100 % of nominal range	0,1 % hyster. falling	-	w	x	x
switch function	**SWCH1(2)/SwTyp**	breaker, maker	breaker	-	w	x	x
HART® address	**HART/Adres**	0…63	0	-	-	x	x
HART® current	**HART/CUrr**	fixed/float	float	-	-	x	x
write protection	**-**	ON/OFF	OFF	x	x	x	x

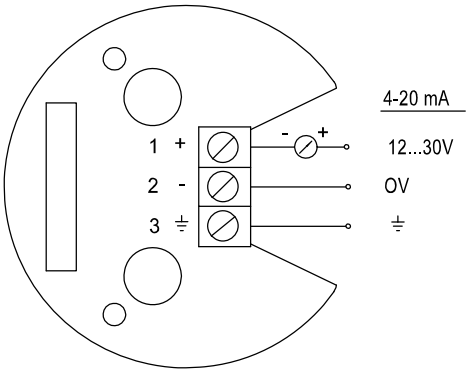
x = configurable
w = factor setting

DM = display module
BM = basic module
SM = switching module
HM = HART-module
PDM = Siemens Process Device Manager
475 = Emerson Handheld Communicator

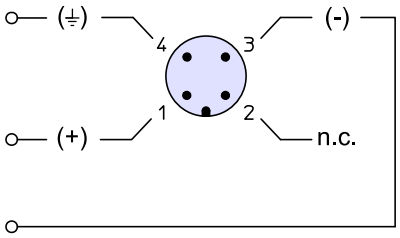
Connection diagram

Basic module: 4…20mA

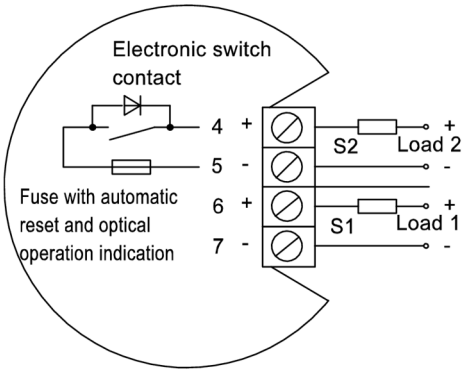
Internal terminals with cable gland design



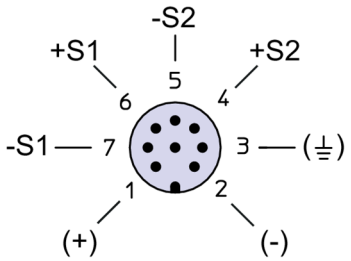
Circular connector [1]



Switching module: (only with basic module 4…20 mA)



Circular connector [1]



(+) = white
(-) = brown
(⏚) = green
(+S2) = yellow
(-S2) = grey
(+S1) = pink
(-S1) = blue

[1] color code as Binder series 763

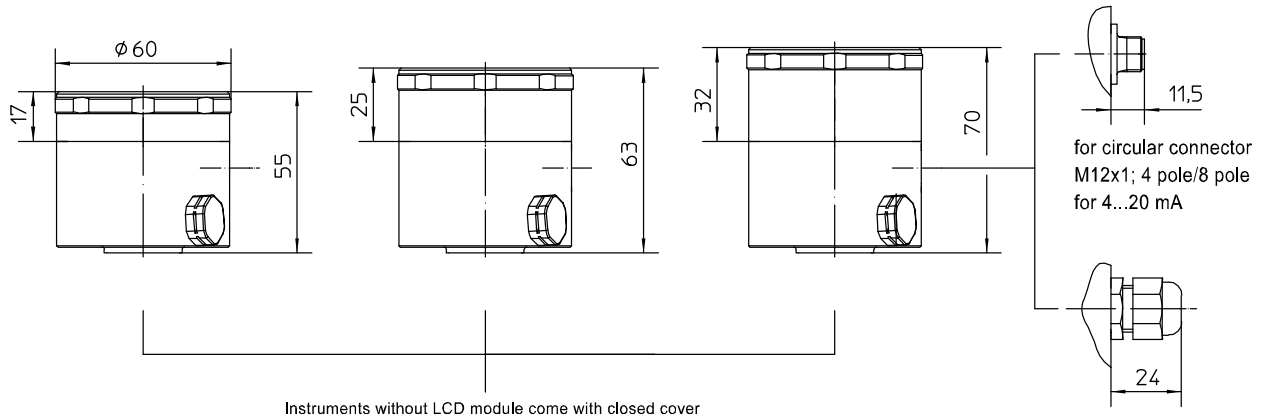
Dimensions

Case

housing design type 17
-basic module: 4...20 mA
with one function module (optional)

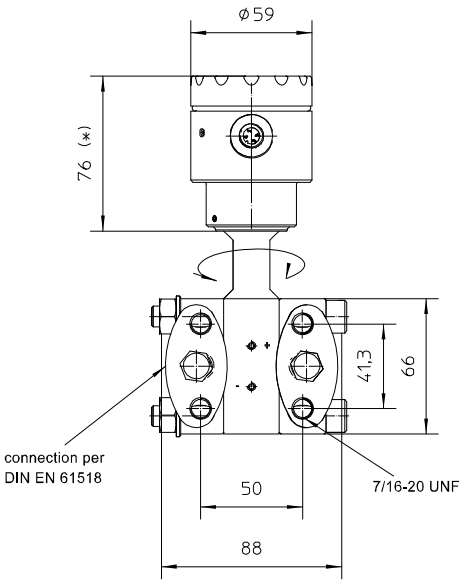
housing design type 25
with display module (optional)

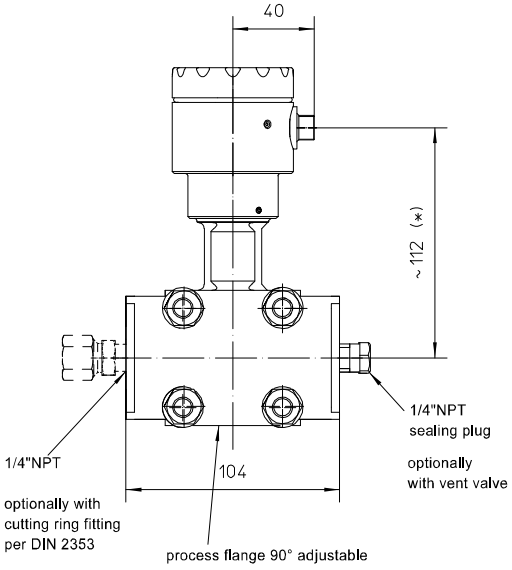
housing design type 32
-basic module: 4...20 mA
with two function modules (optional)

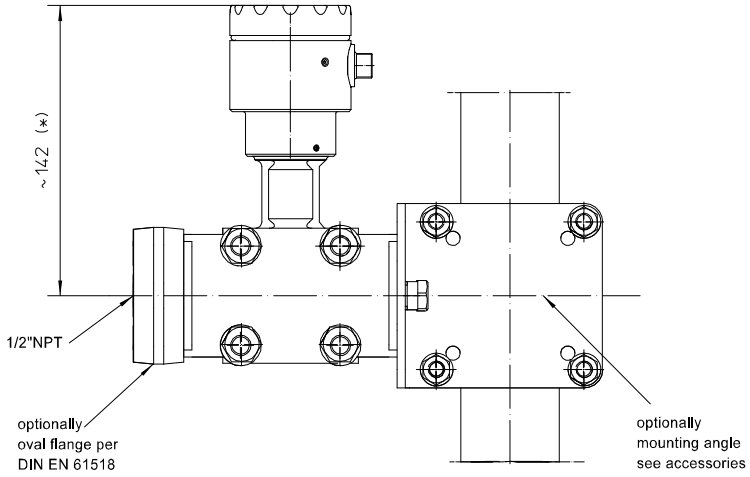


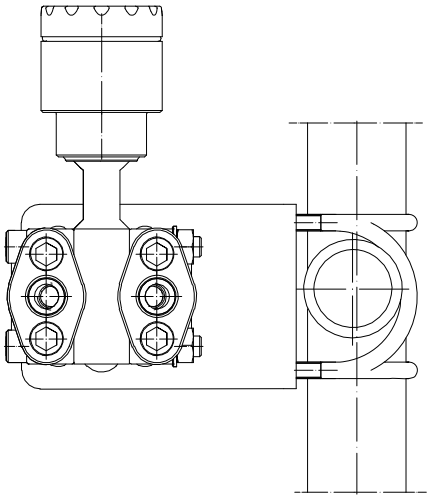
Instruments without LCD module come with closed cover (with no glass face cover).

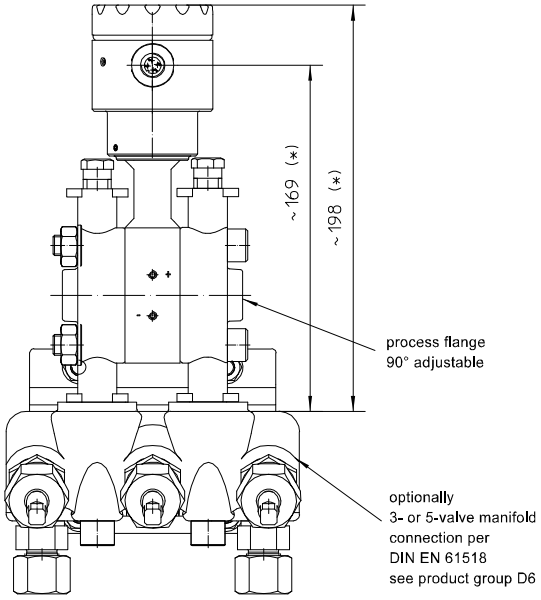
Case and process connections

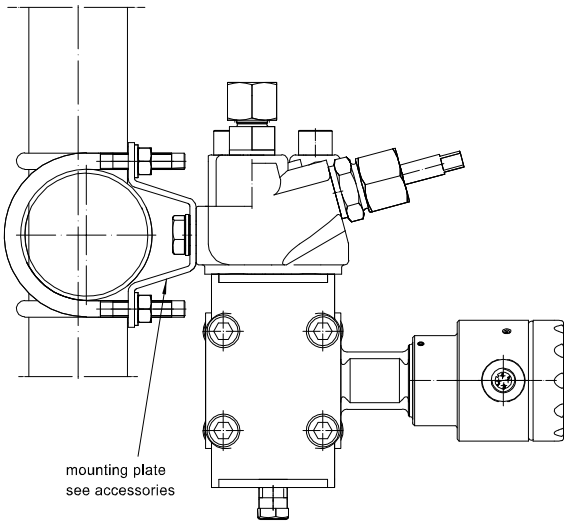












Order details

Pressure transmitter PASCAL CV Delta P for general applications				
CV3300	Pressure transmitter PASCAL CV Delta P for general applications			
A1051	nominal range	-0.4...0.4 bar		
A1053		-1...1 bar		
A1056		-1...4 bar		
A1059		-1...16 bar		
A1061		-1...40 bar		
F10	measuring range	0 to nominal range, unit: bar (standard)		
F11		0 to nominal range, unit: mbar		
F22		0 to nominal range, unit: kPa		
F23		0 to nominal range, unit: MPa		
F30		0 to nominal range, unit: mmH2O		
F32		0 to nominal range, unit: mH2O		
F41		0 to nominal range, unit: kg/cm^2		
F50		0 to nominal range, unit: PSI		
F80		set from... to... unit		
F81		adjusted and calibrated from .... to ...., unit (please fill in details), see below for calibration report		
H11	output signal	4...20 mA, rising characteristic (standard)		
H15		20...4 mA, falling characteristic		
H21		4...20 mA with HART® function module		
0		setting [1]	damping	0.0 sec. (standard)
1				0.0…120 sec., set to .... (please fill in
0			alarm state	< 3.6 mA (standard)
1				> 21 mA
M1	display module	without		
M2		multifunctional display with 5-position digital display and bar graph, pluggable		
N10	switching module [2]	without switching module		
N5.		switching module with 2 contacts, pluggable, switching capacity 30 V DC / 0.5 A		
0		setting [1]	standard	
1			by the factory, specify as required	
T30	electrical connection	circular connector	M12x1 (4 pin)	
T31			M12x1 (8 pin, required for switching module)	
T20		cable gland M16x1,5	polyamide black	
T21			brass nickel-plated	
T22			stainless steel	
K41..	process connection	process flange with connection dimension per DIN EN 61518 - process connection 1/4 – 18 NPT - mounting thread 7/16 – 20 UNF		
1		with sealing plug of stainless steel mat.-no.1.4571 (316Ti)		
3		with sealing plug of stainless steel 316L		
4		with vent valve of stainless steel mat.-no. 1.4404 (316L)		
1.		gasket of FKM (Viton)		
	threaded pipe connection	without cutting ring fitting		
1		incl. 2 x cutting ring fittings	stainless steel per DIN 2353 for pipe ø 6 mm, mounted	
2			stainless steel per DIN 2353 for pipe ø 8 mm, mounted	
3			stainless steel per DIN 2353 for pipe ø 10 mm, mounted	
4			stainless steel per DIN 2353 for pipe ø 12 mm, mounted	
G1	diaphragm material	stainless steel mat.-no. 1.4404/1.4435 (316L)		

Additional features (to be indicated if required)			
S68	Ex-marking [2]	ATEX	Ⓔx II 2G Ex ia IIC T4/T5/T6 Gb, Ⓔx II 2D Ex ia IIIC Txx°C Db
S66			Ⓔx II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
S88		UKEX	Ⓔx II 2G Ex ia IIC T4/T5/T6 Gb, Ⓔx II 2D Ex ia IIIC Txx°C Db
S86			Ⓔx II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
W1020	material certificate	per EN 10204-3.1, wetted part	
W1201	calibration certificate	per EN 10204-3.1, 5 measuring point	
W2602	functional safety per EN 61508, classification per SIL2		
W2660	as per UKCA regulations		

Accessories		
MM1500-A11	mounting angle	for wall and pipe-mounting Ø 35-50 mm of stainless steel, incl. screws 7/16-20 UNF
MM1500-A12		for wall and pipe-mounting Ø 2“ of stainless steel, incl. screws 7/16-20 UNF
MC1060-A132	oval flange	oval flange 1/2-14 NPT per DIN EN 61518, modal A of stainless steel mat.-no. 1.4404 (316L), incl. 2 screws 7/16-20 UNF, material stainless steel, incl. gasket PTFE
MC1060-A133		oval flange 1/2-14 NPT per DIN EN 61518, modal A of stainless steel mat.-no. 1.4404 (316L), incl. 2 screws 7/16-20 UNF, material stainless steel, incl. gasket FKM Viton

Order code (example): CV3300 – A1051 – F10 – H1100 – M2 – N10 – …

[1] Settings see parameterisation.
[2] Ex-design not possible with switching module.