

Differential pressure transmitter PASCAL CV Delta P for general applications Type series CV3300



Application area

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

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 $\leq 0,15\%$
- Output signal:
 - 4...20 mA
 - alternative with PROFIBUS PA
- 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

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

Basic module

4...20 mA

PROFIBUS PA

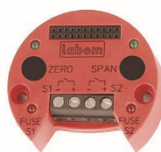


Function modules

Switching module

HART®-module

Display module



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:	Non splintering plastic: Makrolon
Case seal:	O-ring: NBR
El. connection:	Screw terminal 1 mm ²
Cable gland:	<ul style="list-style-type: none"> ■ 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 <ul style="list-style-type: none"> ■ Process connection 1/4 – 18 NPT Mounting thread 7/16 – 20 UNF ■ 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.
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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:	$R \leq (U-12V \text{ DC})/0.022 \text{ A } [\Omega]$ U = supply voltage

Basic module: PROFIBUS PA

Signal:	digital per IEC 61158-2
Protocol:	EN 50170-PROFIBUS PA, Profile 3.0
Sensor address:	0...126 (126 = factory setting)
Power consumption:	constantly 11 mA
Alarm current I_{FDE} :	2 mA
Damping:	0...300 seconds
Parameterisation:	SIMATIC PDM

Supply voltage

Basic module:	<u>4...20 mA</u>	<u>PROFIBUS PA</u>
<u>Standard design:</u>		
Functional range:	12...40 V DC	9...32 V DC
<u>Ex-design:</u>		
Functional range:	12...30 V DC	9...17.5 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 ⊕ II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb ⊕ II 2G Ex ia IIC T4/T5/T6 Gb ⊕ II 2D Ex ia IIIC Txx °C Db
UKEX:	CML 21UKEX21176X ⊕ II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb ⊕ II 2G Ex ia IIC T4/T5/T6 Gb ⊕ II 2D Ex ia IIIC Txx °C Db

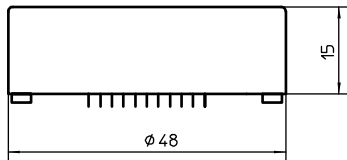
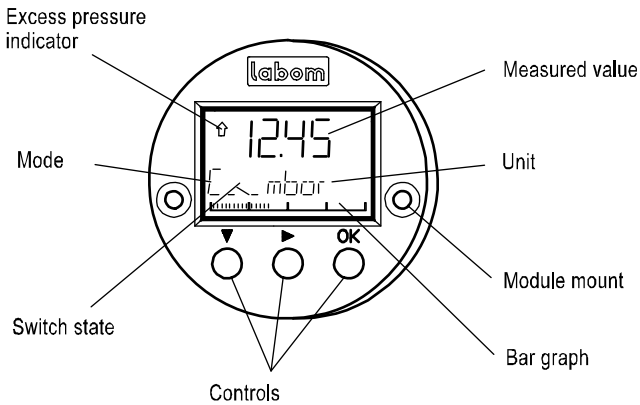
For detailed Information see Ex Safety Instruction XA_015 and XA_020.

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.
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Function modules

Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -

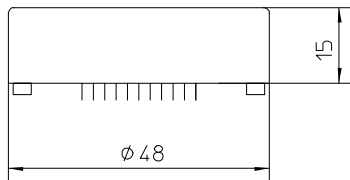
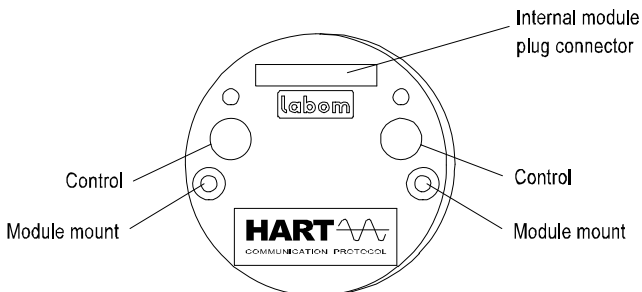


- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menus
- 5-segment pressure read-out with unit
- Read-out display
 - pressure (standard)
 - percent *
 - current *
 - sensor temperature
- Bar graph 36 segment suitable 0...100 %
- Loop test (current sensing function) 3.55...22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

* not with basic module PROFIBUS PA

Details of the operator menu see parameterisation.

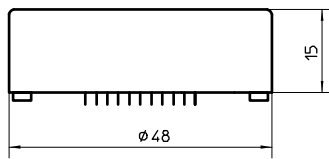
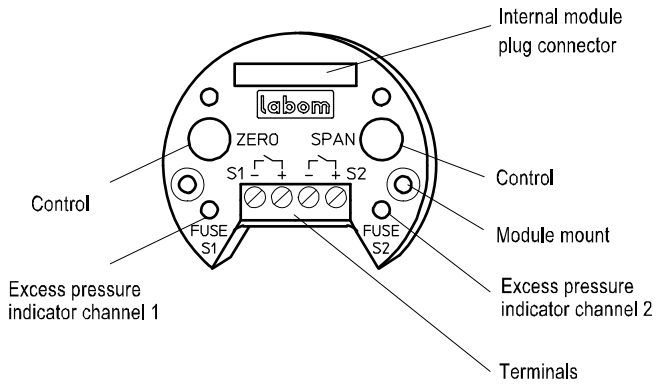
HART® module (for basic module 4...20 mA) optional



- HART®-protocol, revision 6.5
- Response characteristic FSK
- Load with HART® communication
 - with Hart® modem 230...500 Ω
 - with Hart® communicator 230...1100 Ω
- Parameterisation via
 - operating elements
 - HART® communication
- PDM 6.0
- AMS
- 375 Field Communicator

Switching module, (not with basic module PROFIBUS PA) optional

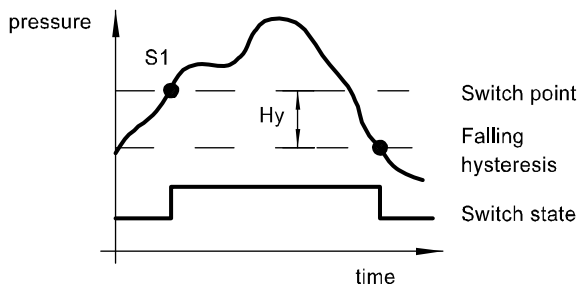
pluggable with automatic module detection - plug and measure -



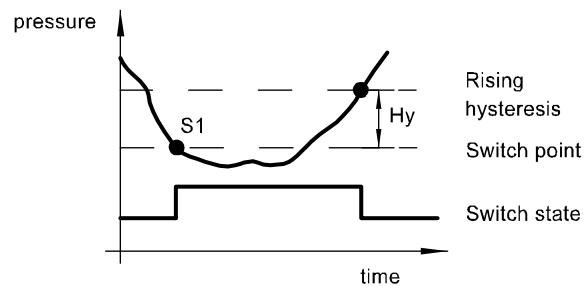
- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ($R_i < 0.3 \Omega$)
- Indicator: red LED, indicates overload or short-circuit
- Cut-out 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 mm²

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				basic module: PROFIBUS PA		
		variability	standard	BM	SM	AM	HM PDM AMS 475	BM	AM	PDM
zero point *	RANGE/Zero	see instrument ranges	0 bar	x	x	x	x	-	-	x
measuring span *	RANGE/Span	see instrument ranges	nominal range	x	x	x	x	-	-	x
damping	DAMP	4...20 mA: 0...120 sec. Profibus: 0...300 sec.	0 sec.	w	-	x	x	-	-	x
min-max-value	HI/LO	pressure and temperature reset-table	-	-	-	x	x	-	x	x
characteristic	FUNC	linear, table	linear	w	-	x	x	-	-	x
pressure unit	UNIT	bar, mbar, kPa, MPa, mmH2O, mH2O, kg/cm2, PSI	bar	w	-	x	x	-	w	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	x	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	-	x	x
factory data reset	RESET	-	-	-	-	x	x	-	x	x
BUS adress	BUS	0...126	126	-	-	-	-	w	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	x	x

x = configurable

w = factor setting

* = calibrated measuring span for devices with PROFIBUS PA basic module

DM = display module

BM = basic module

SM = switching module

HM = HART-module

PDM = Siemens Process Device Manager

AMS = Asset Management Solutions

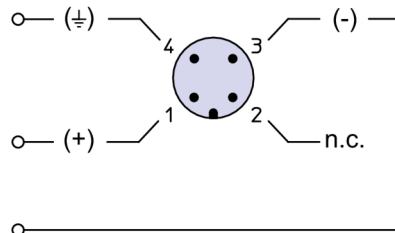
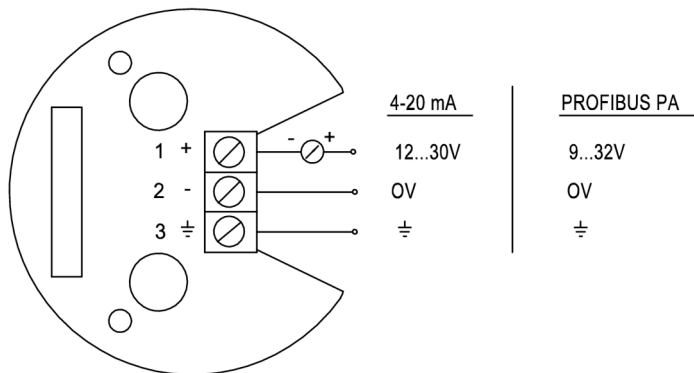
475 = Emerson Handheld Communicator

Connection diagram

Basic module: 4...20mA / PROFIBUS PA

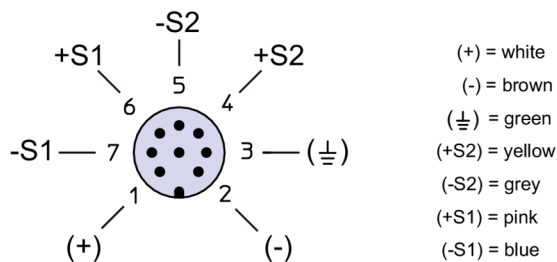
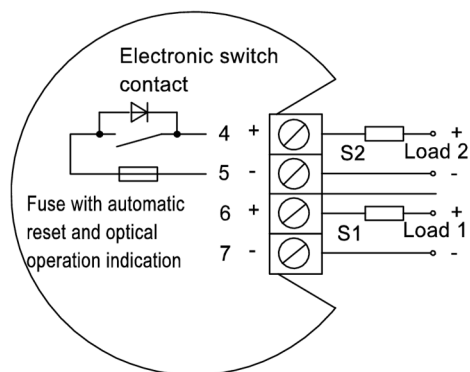
Internal terminals with cable gland design

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

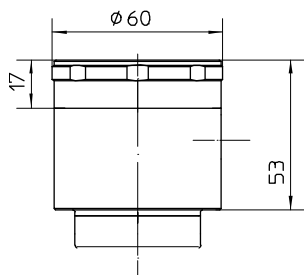
Dimensions

Case

Dimensions/versions

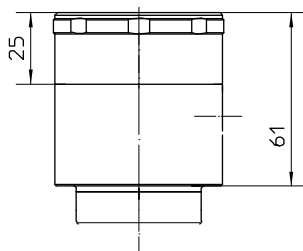
housing design type 17

- basic module: 4...20 mA
- with one function modul (optional)
- basic module: PROFIBUS PA



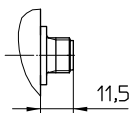
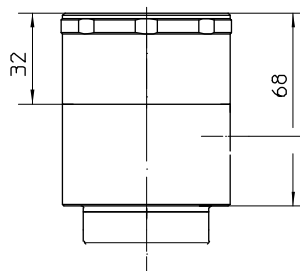
housing design type 25

- basic module: PROFIBUS PA
- with display module (optional)

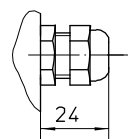


housing design type 32

- basic module: 4...20 mA
- with two function modules (optional)

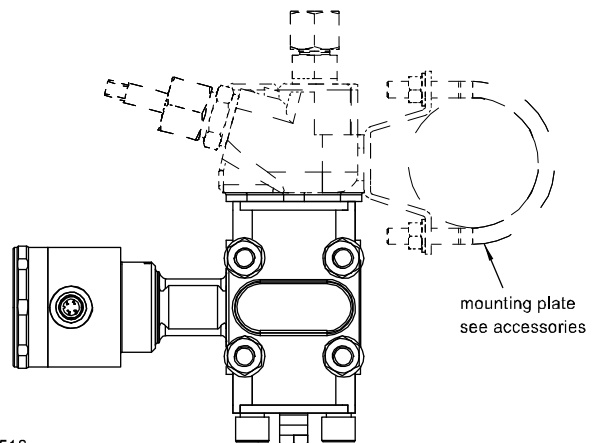
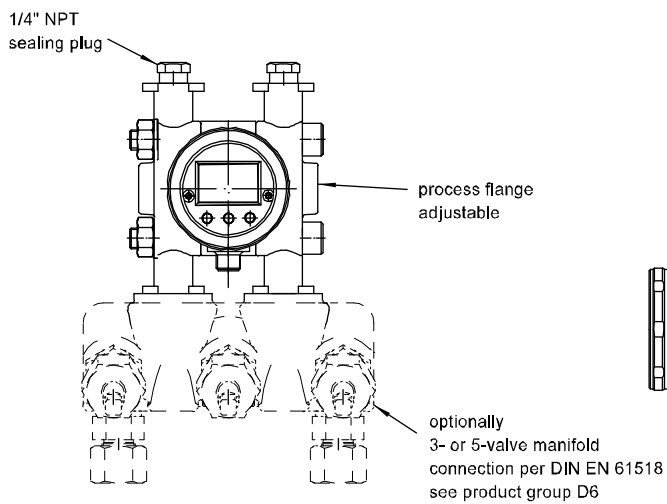
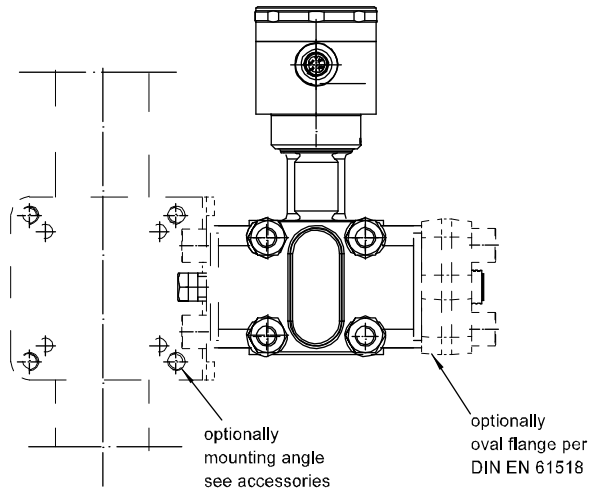
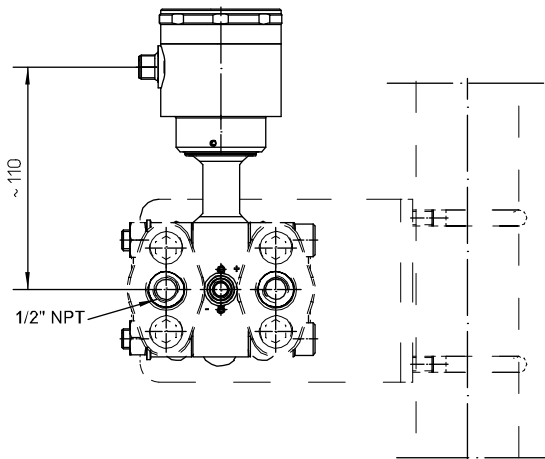
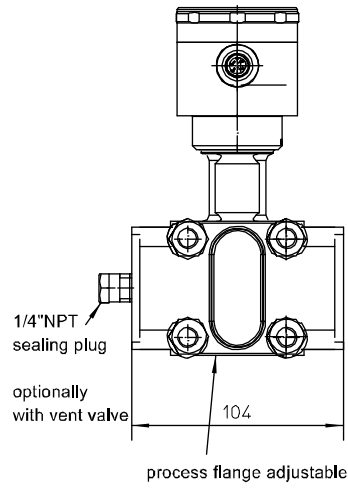
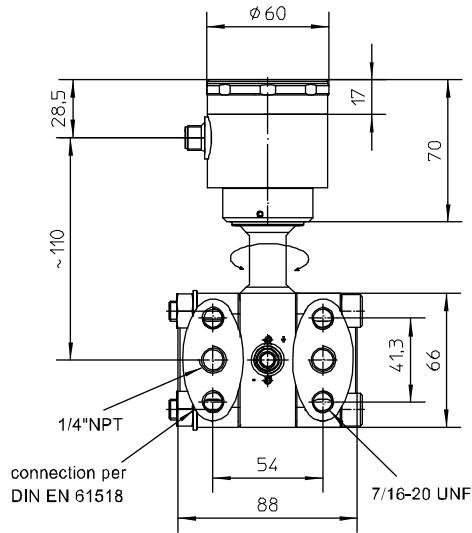


for circular connector
M12x1; 4 pol./8 pol.
for 4...20 mA/PROFIBUS PA



cable gland
M16x1,5 for cable ϕ 4,5-10

Case and process connections



Order details

Pressure transmitter PASCAL CV Delta P for general applications

Type series CV3300

Order details PASCAL CV Delta P CV3300				
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 (please fill in details) not with PROIBUS PA		
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, HART® protocol rev. 6		
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
H41		Profibus PA, IEC 61158-2, Profil 3.0		
M1	display module	without		
M2		multifunctional display with 5-position digital display and bar graph, pluggable		
N10	switching module ^{2,3}	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 flange with connection dimension per DIN EN 61518 - process connection 1/4 – 18 NPT, mounting thread 7/16 – 20 UNF	
1	process connection	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)		
G1	diaphragm material	stainless steel mat.-no. 1.4404/1.4435 (316L)		

Additional features (to be indicated if required)			
S68	Ex-marking ²	ATEX	⊕ II 2G Ex ia IIC T4/T5/T6 Gb, ⊕ II 2D Ex ia IIIC Txx°C Db
S66			⊕ II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
S88		UKEX	⊕ II 2G Ex ia IIC T4/T5/T6 Gb, ⊕ II 2D Ex ia IIIC Txx°C Db
S86			⊕ II 1/2G Ex ia IIC T4/T5/T6 Ga/Gb
Z61	PROFIBUS PA	factory setting, please specify	
Z62		measuring point number/identification max. 32 characters, please specify	
Z63		measuring point text max. 32 characters, please specify	
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 ³		
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

³ not with PROFIBUS PA