

Pressure transmitter PASCAL CV for general applications, Type series CV310.



Application area

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

Features

- Modular pressure transmitter with internal or flush mounted diaphragm
Output signal:
 - 4...20 mA
 - HART® protocol (rev. 6), option
 - PROFIBUS PA, option
- Function modules
 - Multifunctional display with 5-segment digital display and bar graph
 - Switching module with 2 flating channels, maximum 0.5 A switching current, electrically isolated at all sides, without additional auxiliary power
- Function module replacement on site without recalibration "plug and measure"
- Limits of measuring range 0...80 mbar to 0...400 bar
- Accuracy $\leq 0,15 \%$
- Turndown 5:1
- Degree of protection IP 66, piezoresistive measuring cell directly aerated
- EAC declaration (upon request)

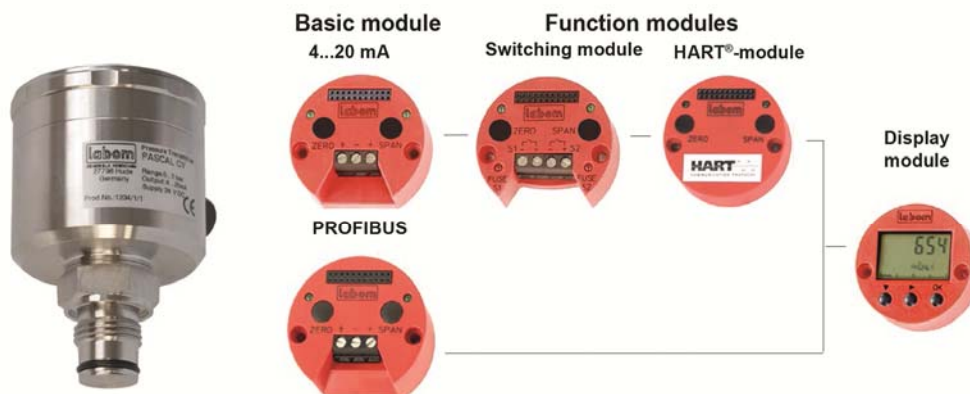
Options

- Approvals/Certificates
 - Explosion protection for gases and dust
 - Certificate of measuring equipment for Russian Federation
 - Material certificate as per EN 10204-3.1
 - Calibration certificate as per EN 10204-3.1
 - Classification per SIL2
- Degree of protection IP 69K

Application

The modular pressure transmitter PASCAL CV is suited for measuring the relative and absolute pressures of gases, vapors and liquids.

PASCAL CV – the modular pressure transmitter



Process connection: all standard thread variants with internal or flush-mounted diaphragm

Technical data

Measuring ranges

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

Nominal range	Measuring span		Overload capacity	Lower measuring range limit ***
	min.	max.		
0...0,4 bar *	80 mbar	0,8 bar	1 bar rel.	600 mbar abs
0...1 bar *	0,2 bar	2 bar	3 bar rel.	100 mbar abs
0...4 bar rel. *	0,8 bar	5 bar	10 bar rel.	100 mbar abs
0...16 bar rel. *	3,2 bar	17 bar	60 bar rel.	100 mbar abs
0...40 bar rel. *	8 bar	41 bar	100 bar rel.	100 mbar abs
0...100 bar rel.	20 bar	101 bar	200 bar rel.	0 mbar abs
0...400 bar rel.	80 bar	401 bar	750 bar rel.	0 mbar abs
0...4 bar abs	0,8 bar abs.	4 bar abs.	10 bar abs.	30 mbar abs
0...16 bar abs	3,2 bar abs.	16 bar abs.	60 bar abs.	30 mbar abs

* Short term or sporadic measurement in vacuum permitted up to lower measuring limit. Lower range value up to -1 bar rel. adjustable.

** High overload-proof design upon request

*** Vacuum-proof designs are available upon request.



Constructional design / case

Design: Two-chamber case design with screw cap, continuously rotatable by $\pm 170^\circ$
Minimum case volume, excellent moisture and condensate protection

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

Degree of protection per EN 60529:

- IP 66
- optional: IP 69K

Climatic category per EN 60721 3-4: 4K4H

Pressure compensation: PTFE filter system

Window: Non splintering plastic: Makrolon

El. connection: Screw terminal 1 mm²

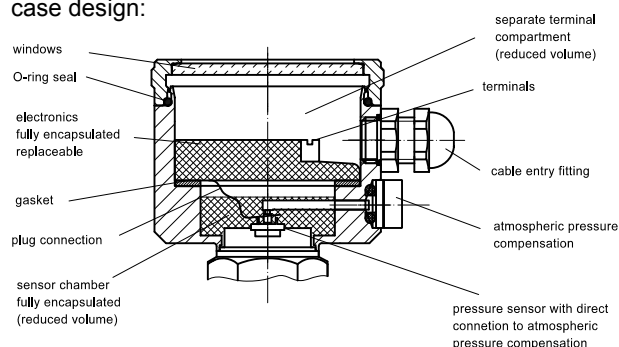
Cable gland:

- Cable gland M16, material: PA
- Circular connector M12 (necessary for design with switching module)

Further cable glands upon request.

Weight: standard device with G1/2 without function modules approx. 0.65 kg

case design:



Process connection

Variants / material: See order code

Material wetted parts

Sensor :	piezoresistive	thin film
Sensor diaphragm:	1.4404/1.4435 (316L)	1.4542 (630)
Socket:	1.4404/1.4435 (316L)	1.4301/1.4404 (304/316L)
Gasket:	EPDM-FDA listed	

Measuring system

Sensor:	Piezoresistive	Thin film
Sensor filling:	Synthetic oil, free of silicone FD1, FDA listed	without

Accuracy

General:

Limit point setting: per DIN 16086

Reference conditions: per EN 60770-1

Linearity errors: $\leq 0.15\%$ of span
TD 5:1 no modification

Hysteresis: $\leq 0.05\%$ of nominal range

Repeatability: $\leq 0.05\%$ of nominal range

Calibration position: Vertical mounting position

Influence of mounting position: ≤ 3.5 mbar

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

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

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_B : $R_B \leq (U_V - 12V \text{ DC}) / 0.022A$ [Ohm]
 U_V = 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

Parameterization: SIMATIC PDM

Supply voltage

Basic module: 4...20 mA PROFIBUS PA

Standard design:

Functional range: 12...40 V DC 9...32 V DC

Ex-design:

Functional range: 12...30 V DC 9...17.5 V DC

Temperature ranges

Ambient: -20...85 °C

Media: -20...90 °C

Storage: -40...85 °C

Note safety values as per examination certificate!

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

For detailed Information see Ex Safety Instruction XA_015 and XA_020.

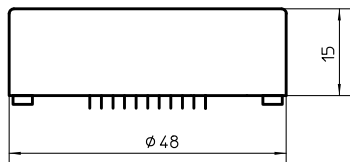
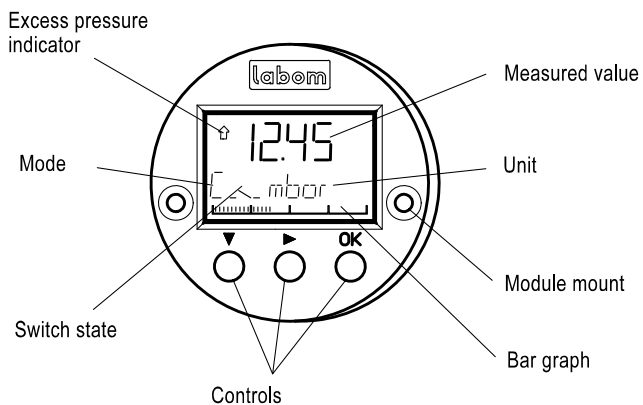
SIL2: Functional safety per EN 61508, Classification per SIL2.
 For basic module 4...20 mA, switching module, display module and HART® module
 TÜV-Reg.-No. 44 799 13190201

- EAC declaration upon request
- Certificate of measuring equipment for Russian Federation

Function modules

Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -

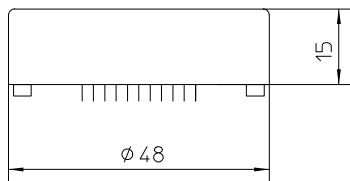
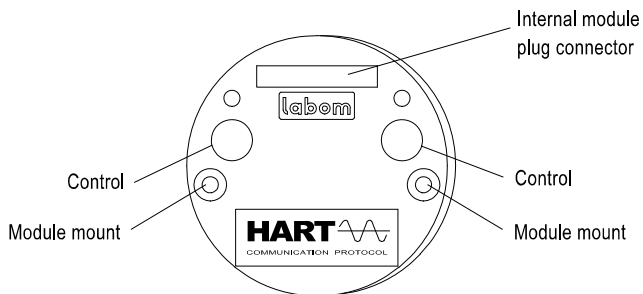


- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menus
- 5-segment pressure read-out with unit
- Read-out display
 - pressure (standard)
 - percent *
 - current *
 - sensor temperature
- Bar graph 36 segment suitable 0...100 %
- Loop test (current sensing function) 3.55...22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

* not with basic module PROFIBUS PA

Details of the operator menu see parameterisation.

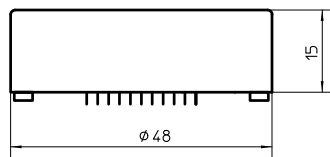
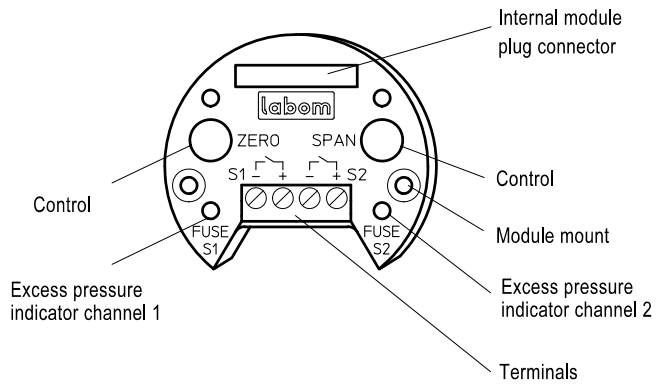
HART® module (for basic module 4...20 mA) optional



- 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

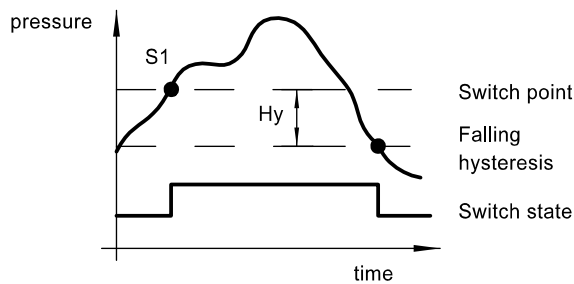
pluggable with automatic module detection - plug and measure -



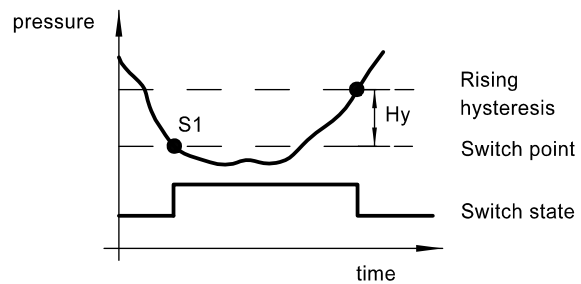
- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ($R_i < 0.3 \Omega$)
- Indicator: red LED, indicates overload or short-circuit
- Cut-out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

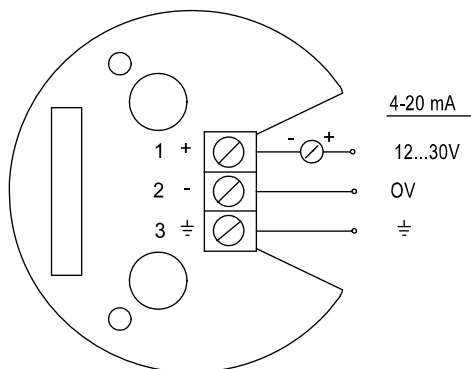
475 = Emerson Handheld Communicator

Connection diagram

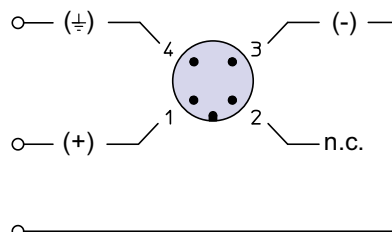
Basic module: 4...20mA / PROFIBUS PA

Internal terminals with cable gland design

Circular connector ¹

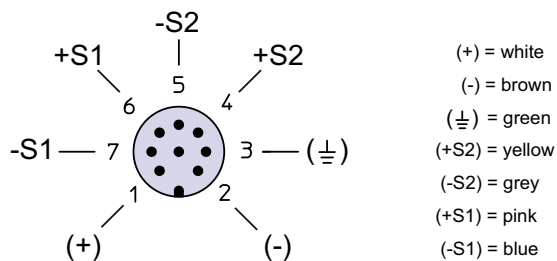
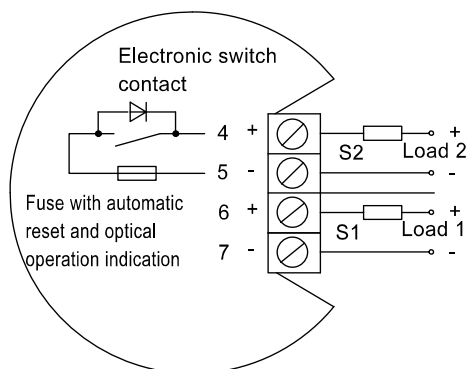


PROFIBUS PA
9...32V
0V
⏏



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

Circular connector ¹



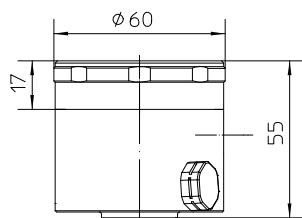
¹ color code as Binder series 763

Dimensions

Housing

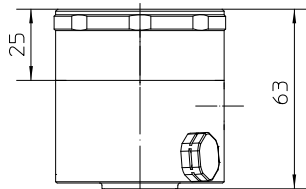
housing design type 17

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



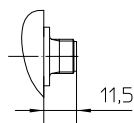
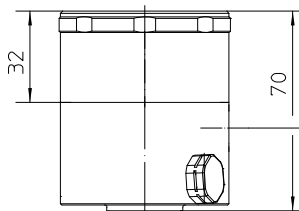
housing design type 25

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

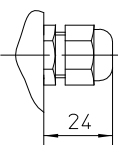


housing design type 32

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



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

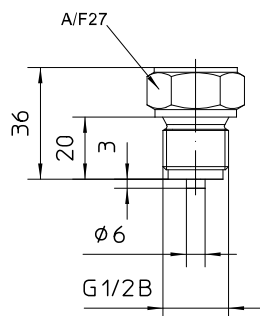


cable gland
M16x1,5 f. cable 4,5-10

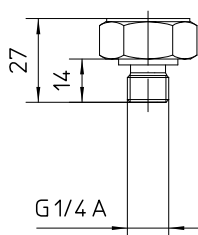
Instruments without LCD module come with closed cover
(with no glass face cover).

All dimensions are in mm

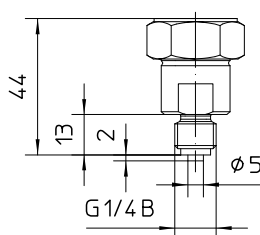
Process connections piezoresistive, internal diaphragm



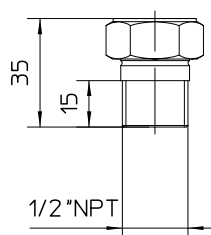
standard
G1/2B DIN EN 837-1



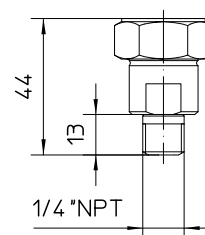
G1/4A DIN EN ISO 1179-2
(DIN 3852-11) model E



G1/4B DIN EN 837-1



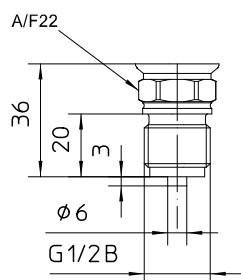
1/2"NPT



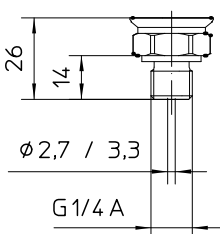
1/4"NPT

All dimensions are in mm

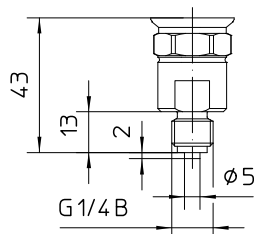
Process connections thin film, internal diaphragm



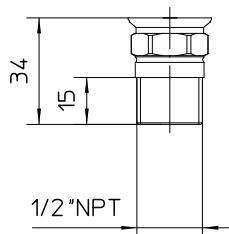
standard
G1/2B DIN EN 837-1



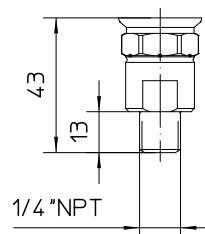
G1/4A DIN EN ISO 1179-2
(DIN 3852-11) model E



G1/4B DIN EN 837-1



1/2"NPT



1/4"NPT

All dimensions are in mm

Order details

Pressure transmitter PASCAL CV for general application Type series CV3100, CV3101

Order details PASCAL CV3100, CV3101

CV310.	Pressure transmitter PASCAL CV for general application			
0	design	standard		
1		Ex-protection, types of ex-protection as follows		
	nominal range	nominal range (Turndown 5:1)	overload limit	sensor type
A1051		0,4 bar	1 bar	piezoresistive
A1053		1 bar	3 bar	
A1056		4 bar	10 bar	
A1059		16 bar	60 bar	
A1061		40 bar	100 bar	
A1063		100 bar	200 bar	
A3066		400 bar	600 bar	thin film
B1056		4 bar abs	10 bar	piezoresistive
B1059		16 bar abs	60 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 deails), 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				at 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	
K1002	process connection	internal diaphragm	G1/4 B per EN 837-1	
K1010			G1/2 B per EN 837-1	
K1024			G1/4 A per DIN EN ISO 1179-2 (DIN 3852-11) Form E	
K1070			1/2" NPT	
K1072			1/4" NPT	

Additional features (to be indicated if required)		
S68	Ex-marking ²	Ⓔ 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
T4	degree of protection	IP 69K
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 ⁴
W1201	calibration certificate	per EN 10204-3.1, 5 measuring point
W2602	functional safety per EN 61508, classification per SIL2 ³	
W2673	certificate of measuring equipment for Russian Federation	

accessories		
MC1020	HART® Modem	RS 232-Interface
MC1040		USB-Interface
MC1041		USB-Interface, Ex
MC1000-A1	stainless steel welded socket G1/2"	

Order code (example): CV3100 – A1051 – F10 – H1100 – M2 – N10 – ...

¹ see parameterization

² Ex-design not possible with switching module

³ not with PROFIBUS PA

⁴ only for piezoresistive measuring systems