



SIL 2

*SMART SOLUTIONS!*

### Features

- Modular pressure transmitter with internal or flush-mounted diaphragm
- Output signal:
  - 4...20 mA, can be retrofitted with optional HART® protocol
  - PROFIBUS PA
- Function modules
  - Multifunctional display with 5-segment digital display and bar graph
  - HART® protocol
  - Switching module with 2 floating 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"
- Classification per SIL 2
- Limits of measuring range 0...80 mbar to 0...100 bar
- Accuracy: < 0.25% (linearity, hysteresis and repeatability)
- Turndown 5:1
- Explosion protection for gases and types of dust
- Type of protection IP 66
- Piezoresistive measuring cell directly aerated, fully welded, without inside gasket

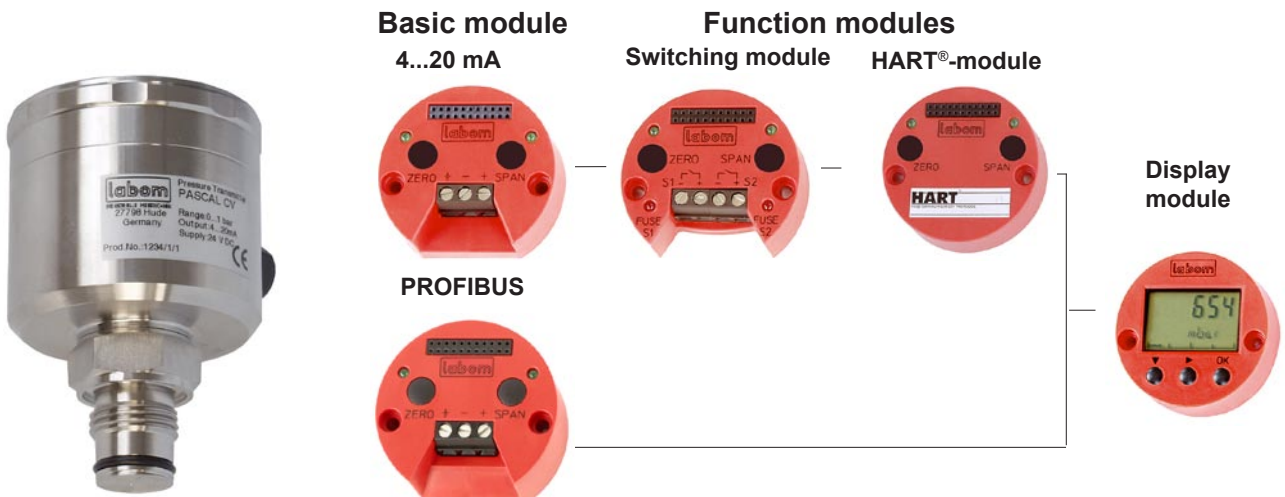
### Application

The pressure transmitter PASCAL CV is suited for measuring the relative and absolute pressures of gases, vapors and liquids. Typical applications are to be found in the chemicals and petrochemicals industries, in process engineering, and general process measurement technology.

The modular design of the pressure transmitter allows users to choose the best possible device for his specific operating requirements. PASCAL CV is equipped with a variety of process connections and uses smart module technology for display, switching and communication purposes. These functional modules can be exchanged or extended with ease without having to remove the transmitter from the process.

Other designs available

- PASCAL CV 3110 for food, pharmaceutical, biotechnology
- PASCAL CV 3120 for chemical/petrochemical industry



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

**Technical Data****Instrument ranges**

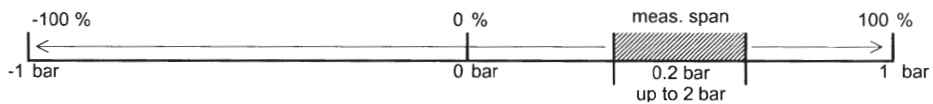
nominal range	Turndown	measuring ranges	measuring spans <sup>2</sup>		overload limits	vacuum tight at < 50 °C <sup>1</sup>
			min. span	max. span		
0.4 bar	5 : 1	-0.4...+0.4 bar	80 mbar	0.8 bar	1 bar	400 mbar abs
1 bar		-1...+1 bar	0.2 bar	2 bar	3 bar	40 mbar abs
4 bar		-1...+4 bar	0.8 bar	5 bar	10 bar	20 mbar abs
16 bar		-1...+16 bar	3.2 bar	17 bar	60 bar	20 mbar abs
40 bar		-1...+40 bar	8 bar	41 bar	100 bar	20 mbar abs
100 bar		-1...+100 bar	20 bar	101 bar	150 bar	20 mbar abs
4 bar abs		0...4 bar abs	0.8 bar abs	4 bar abs	10 bar abs	20 mbar abs
16 bar abs		0...16 bar abs	3.2 bar abs	16 bar abs	60 bar abs	20 mbar abs

<sup>1</sup> Long-term vacuum measurements at temperatures above +50°C may cause changes in the properties of the measurement device. Vacuum-proof designs are available upon request.

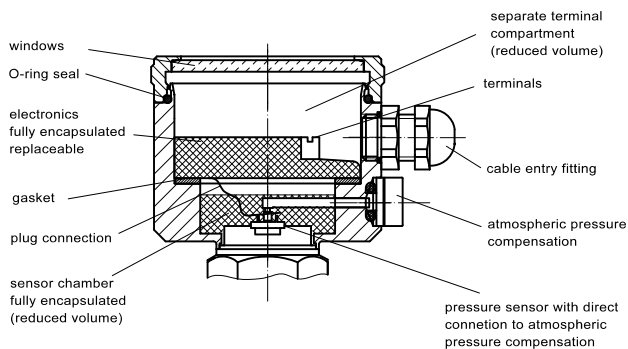
<sup>2</sup> calibrated measuring span for devices with PROFIBUS PA basic module

**limits of measuring range**

nominal range: e.g. 1 bar

**Housing design**

Housing	hygienic housing design with screw cap and window
Material	housing: stainless steel mat.no. 1.4301 window: Macrolon gasket: NBR O-ring
Construction	two-chamber system, minimum housing volume, excellent moisture and condensate protection
Pressure compensation	PTFE filter system
Degree of protection	EN 60529, IP 66
Climatic category	DIN EN 60721 3-4, 4K4H
Electrical connection	· screwed terminals 1 mm <sup>2</sup> , cable entry fitting through screwing · circular plug connector M 12
Weight	standard device with G 1/2 without function modules approx. 0.65 kg

**Housing design****Process connection**

Design	sealed design (without internal gasket)
Internal diaphragm	· G 1/2 B
Flush mounted diaphragm	· G 1/2 B with O-ring
Materials	- diaphragm st. steel mat. no. 1.4404 - socket st. steel mat. no. 1.4404 - gasket EPDM-FDA listed (with flush-mounted diaphragm)

**Measuring system**

Sensor	piezoresistive measuring element
System fill	no silicone, synthetic oil

**Temperature ranges**

Ambient temperature	-20 to 85°C
Process temperature	-20 to 90°C
Allowed storage temperature	-40 to 85°C

Note safety values as per examination certificate!

**Supply**

Basic module	4...20mA	PROFIBUS PA
Standard design	12...40 VDC	9...32 V DC
Ex- proof design	12...30 VDC	

**Output**

<b>General</b>	
Delay time	approx. 160 ms
Measuring cycle	6 measurements / second
Meas. 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	$R \leq \frac{U - 12 V}{22.5 mA}$ (Ohm)

**Basic module: PROFIBUS PA**

Output signal	digital output signal IEC 61158-2
Protocol	EN 50170 - PROFIBUS PA, Profile 3.0
Sensor address	0...126 (126 = factory setting)
Power consumption	constantly 11 mA
Fault current $I_{FDE}$	2 mA
Damping	0...300 seconds
Parameterization	SIMATIC PDM

**Accuracy**

<b>General</b>			
Limit point setting	DIN 16086		
Reference conditions	DIN EN 60770-1		
Calibration position	vertical mounting position		
Basic module	4...20 mA	PROFIBUS PA	ref.
Linearity errors	< 0.15 %	< 0.1 %	of span
	TD 5:1		
Hysteresis	< 0.05 %	< 0.05 %	of nom. range
Repeatability	< 0.05 %	< 0.05 %	of nom. range
Influence of mounting position	< 3.5	< 3.5	mbar
Long-term drift	< 0.1 %	< 0.1 %	year of n.r.
DIN EN 60770-1			
Temperature effect			
Lower range value / upper range value			
range 0...60 °C	± 0.15 %	± 0.15 %	10 K of n.r.
range <0°C, >60°C	± 0.2 %	± 0.2 %	10 K of n.r.

**Approval/tests**

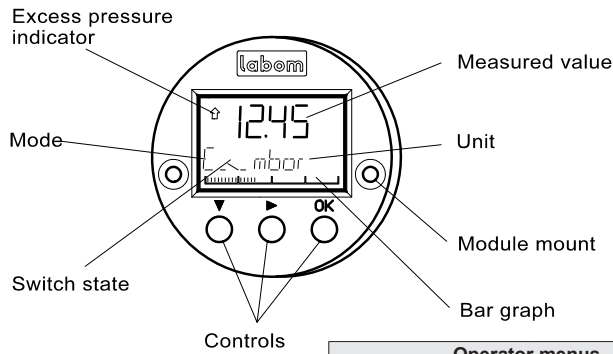
Interference emission	EN 55011
Noise immunity	EN 61326
Ex-approval	TÜV 04 ATEX 2387 X II 1/2G EEx ia IIC T6 (gas) II 2 D T65°C IP 65 (dust)

SIL Level 2 for basic module 4...20 mA, switching module and display module.

**Function modules**

**Display module (multifunctional display) optional**

pluggable with automatic module detection - plug and measure -

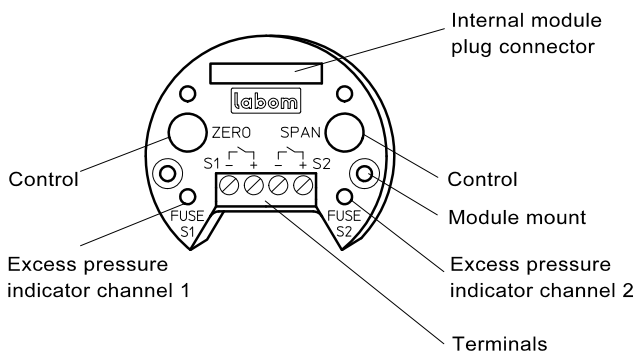


Operator menus	
4...20 mA	PROFIBUS PA
meas. range selection	min-max-value
damping	pressure trimming
min-max-value	system-info
characteristic	factory data reset
pressure units	BUS address
measuring circuit test	
alarm state	
current trimming	
pressure trimming	
table function	
system info	
factory data reset	
switch points	
hysteresis	
switching function	

- 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 segments  $\hat{=}$  0...100%
  - Measuring circuit test (current sensing function) \*  
3.55...22.0 mA \*
  - Alarm indicator on display
  - Switching function indicator (with switching module) \*
- \* not with basic module PROFIBUS PA

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

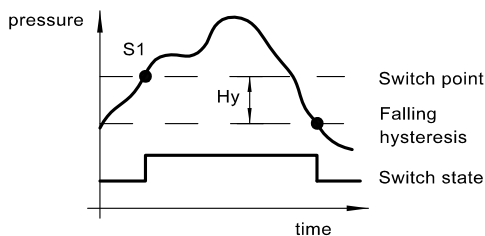
pluggable with automatic module detection - plug and measure -



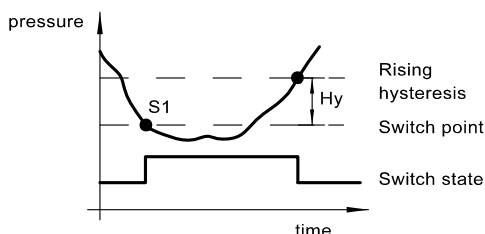
- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ( $R_i < 0.3 \Omega$ )
- Overload indicator: LED red, overload or short-circuit
- Fusible cut-out at overload /short-circuit with automatic reset
- Switch points: 0.0 - 100.0% adjustable  
Standard: 50.0%
- Switching function: maker or breaker, adjustable  
Standard: breaker
- Device of circuit: contact open
- Hysteresis: 0.0% to 100.0%, 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<sup>2</sup>

**Hysteresis functions**

-falling hysteresis-



-rising hysteresis-



## Parameterizing

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	basic module	switching module	display module	HART®-module	basic module	display module	PDM
zero point *	RANGE / Zero	see instrument ranges	nominal range	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.	0.0 sec.	w	—	x	x	—	—	x
min-max-value	HI / LO	pressure and temperature resettable	—	—	—	x	x	—	x	x
characteristic	FUNC	linear, table	linear	w	—	x	x	—	—	x
pressure unit	UNIT	bar, mbar, kPa, MPa, mmH2O, mH2O, kg/cm <sup>3</sup> , PSI	bar	w	—	x	x	—	w	x
measuring circuit test	LOOP	3.55...22 mA	—	—	—	x	x	—	—	—
alarm state	ALARM	<3.6 mA, >21.0 mA	<3.6 mA	w	—	x	x	—	—	—
current trimming	I-CAL	-2 %...+5 %	—	—	—	x	x	—	—	—
pressure trimming	P-CAL	zero point -50...+50 % of n.r. span -10...+10 % of n. range	—	—	—	x	x	x	x	x
table function	TABLE	2...31 points in table	0 % = 4 mA 100 % = 20 mA	—	—	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)	0.0...100.0 % of nominal range	50 %	—	x	x	x	—	—	—
hysteresis	SWCH1(2)/Hyst.	0.0...100.0 % of nominal range	0.1 % hyster.falling	—	w	x	x	—	—	—
switch function	SWCH1(2)/SwTyp	breaker, maker	breaker	—	w	x	x	—	—	—
write protection	—	ON, OFF	OFF	x	x	x	x	x	x	x

x = configurable

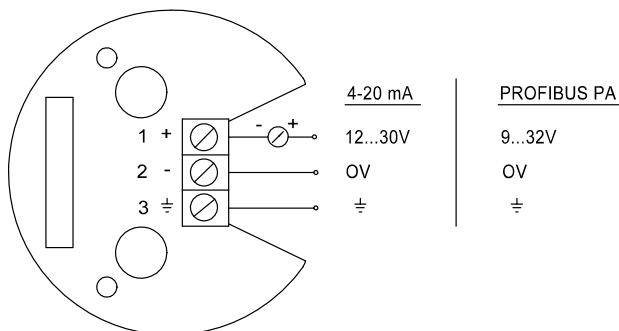
w = factory setting

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

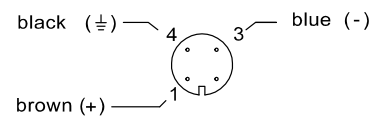
## Connection diagram

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

Internal terminals with cable gland design

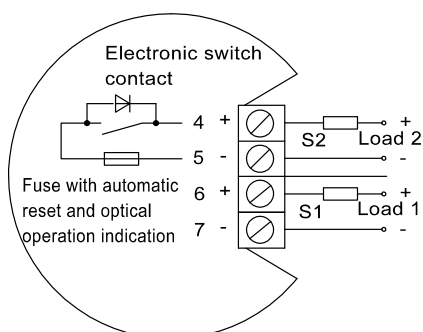


Circular plug connector<sup>1</sup>

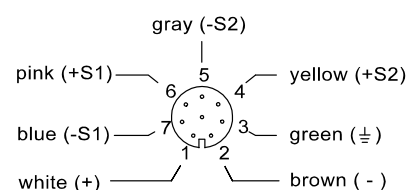


### Switching module (only with basic module: 4...20 mA)

Internal terminals with cable gland design



Circular plug connector<sup>1</sup>



<sup>1</sup> color code as Binder series 763

**Dimensions/Designs**

**Housing**

housing design type 17

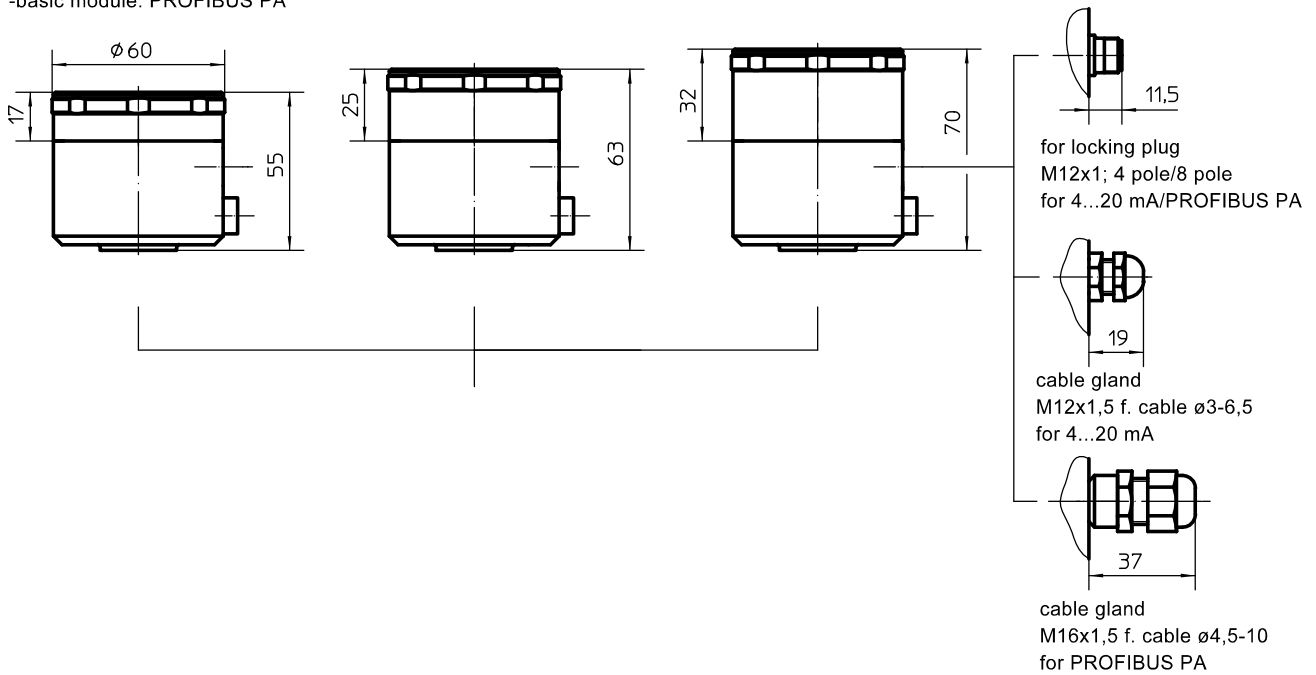
- basic module: 4...20 mA
- with one function module (optional)
- basic module: PROFIBUS PA

housing design type 25

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

housing design type 32

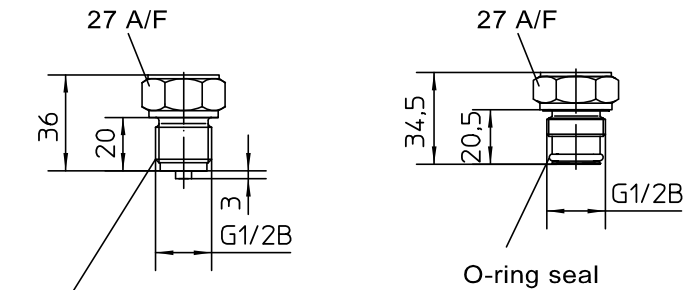
- basic module: 4...20 mA
- with two function modules (optional)



**Process connections**

**Standard internal diaphragm G1/2B**

**Flush mounted diaphragm with O-ring seal G1/2B**

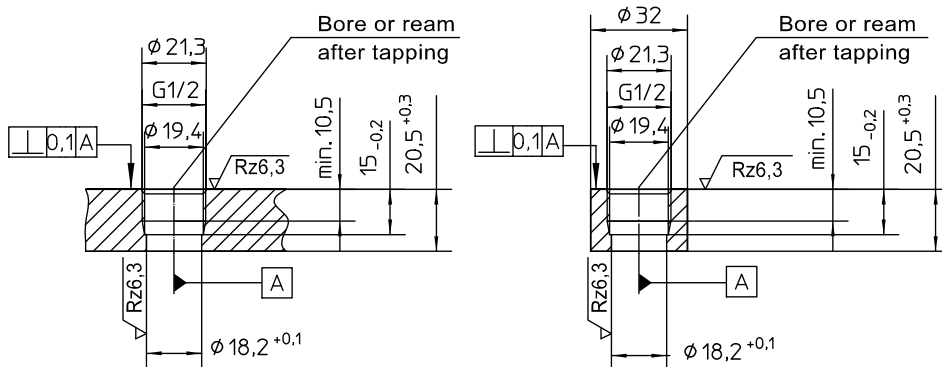


Connection as per DIN EN 837-1

**Screw-in hole/welding nipple for flush mounted diaphragm with O-ring**

**Screw-in hole (process)**

**Welding nipple Stainless steel**



order code: MC 1000-A1

**Order Details** - please give additional specifications for models not listed -

PASCAL CV pressure transmitter for general application				CV310 .
explosion protection	· without			0
	· Ex-protection, types of ex-protection as follows			1
nominal range	nominal range ( Turndown 5:1)	connection G 1/2 B	connection with O-ring G 1/2 B	
	0.4 bar	x	-	A1051
	1 bar	x	x	A1053
	4 bar	x	x	A1056
	16 bar	x	x	A1059
	40 bar	x	x	A1061
	100 bar	x	-	A1063
	4 bar abs	x	x	B1056
16 bar abs	x	x	B1059	
measuring range	0 to nominal range, unit: bar (Standard)			F10
	0 to nominal range, unit: mbar			F11
	0 to nominal range, unit: kPa			F22
	0 to nominal range, unit: MPa			F23
	0 to nominal range, unit: mmH2O			F30
	0 to nominal range, unit: mH2O			F32
	0 to nominal range, unit: kg/cm <sup>2</sup>			F41
	0 to nominal range, unit: psi			F50
	set from... to... unit ( please fill in details ) not with PROFIBUS PA			F80
	adjusted and calibrated from .... to ....., unit (pls.fill in details), see below for calibration report			F81
output signal	4...20 mA, rising characteristic (standard)			H11 . .
	20...4 mA, falling characteristic			H15 . .
	4...20 mA with HART function module not yet available			H21 . .
	setting <sup>1</sup>	damping	0.0 sec. (Standard)	0
			0.0...120.0 sec., set to .... ( please fill in )	1
	alarm state	< 3.6 mA (standard)	0	
> 21.0 mA		1		
PROFIBUS PA, IEC 61158-1, Profile 3.0 (Ex-proof design upon request)			H41	
display module	without			M1
	multifunctional display with 5-position digital display and bar graph, pluggable			M2
switching module (not with PROFIBUS PA)	without switching module			N10
	switching module with 2 contacts, pluggable, switching capacity 30 V DC / 0.5 A			N5 .
	setting 1)	standard, s."Techn. description of switching module" at the factory, specify as required		0 1
electrical connection	circular plug connector	M 12x1 (4 pin)		T30
		M 12x1 (8 pin - required for switching module )		T31
	cable gland	M 12x1.5 polyamide black		T10
		M 16x1.5 brass nickel-plated with PROFIBUS PA cable		T21
process connection	internal diaphragm	G 1/2 B (standard)		K1010
	flush mounted diaphragm	G 1/2 B with O-ring made of EPDM (FDA listed)		K1110
<b>order code (example):</b>				CV3100 A1051 F10 H1100 M2 N10 T10 K1010
<b>additional features (to be indicated in case of need, only)</b>				
explosion protection <sup>2</sup>	· Ex II 1/2G EEx ia IIC T4 / T6			S66
	· Ex II 2G EEx ia IIC T4...T6, II 2 D T65°C IP65, standard			S68
PROFIBUS PA	BUS address	· factory setting: 126 standard		...
		· factory setting: pls. specify		Z61
	measuring-point number/identification max. 32 characters, pls. specify			Z62
	measuring-point text max. 32 characters, pls. specify			Z63
certificates				W1 . . .
material certificate as per DIN EN 10204-3.1, wetted parts				.. 020
inspection certificate as per DIN EN 10204- 3.1, calibration certificate with 5 measuring points				.. 021
SIL 2 certificate				W2602
<b>accessories</b>				
stainless steel welding nipple	· G 1/2"			MC1000-A1

<sup>1</sup> parameterization see page 4<sup>2</sup> Ex-design not possible with switching module