



Features

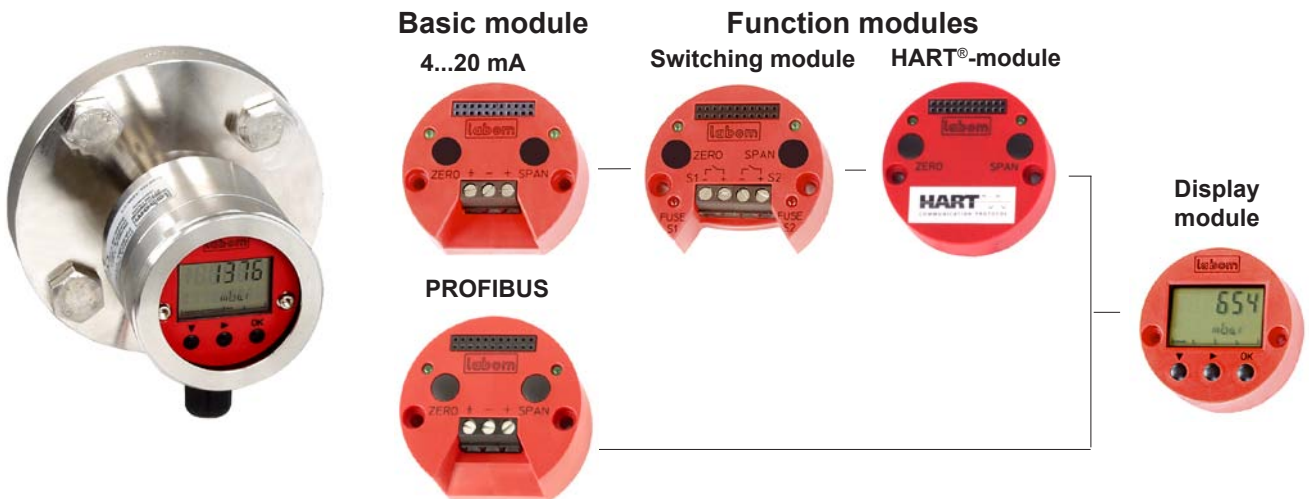
- Modular pressure and level transmitter temperature compensation up to 0.1 mbar / 10 K by LTC-technology
Output signal:
 - 4...20 mA, can be retrofitted with HART® protocol (rev. 6), option
 - PROFIBUS PA
- Function modules
 - Multifunctional display
 - Switching module with 2 floating channels
- Function module replacement on site without recalibration "plug and measure"
- Classification per SIL 2
- Limits of measuring range 0...80 mbar to 0...40 bar
- Accuracy: $\leq 0.15\%$
- Turndown 5:1
- Explosion protection for gases and types of dust
- Medium temperature up to 160 °C
- Various process connections available
- Mechanically robust stainless steel membrane

Application

The modular pressure and level transmitter PASCAL CV LEVEL has been specially designed for applications with temperature changes in continuous level measurement. With the next generation LTC membrane (LTC = Low Temperature Coefficient), the temperature coefficient of the diaphragm seal is compensated by ≤ 0.1 mbar/10 K. The more robust construction of the new membrane also means that it is significantly more resistant to chemical and mechanical stresses. 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.



SMART SOLUTIONS!



Technical Data**Instrument ranges**

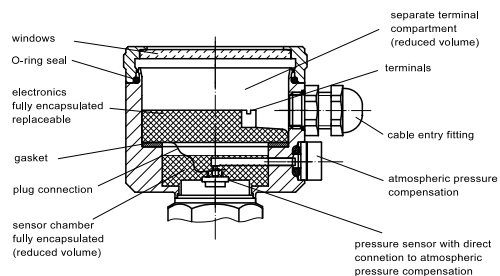
nominal range	Turndown	measuring ranges	measuring spans ²		overload limits	vacuum tight at < 50 °C ¹
			min. span	max. span		
1 bar	5 : 1	-1...+1 bar	0.2 bar	2 bar	3 bar	40 mbar abs
4 bar		-1...+4 bar	0.8 bar	5 bar	10 bar	20 mbar abs
16 bar		-1...+16 bar	3.2 bar	17 bar	60 bar	20 mbar abs
40 bar		-1...+40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

¹ 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.

² calibrated measuring span for devices with PROFIBUS PA basic module

**Housing Design**

Housing	hygienic housing design with screw cap
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 ² , cable entry fitting through screwing · circular connector M 12
Weight	diaphragm seal with DRD-process connection and function modules approx. 2.1 kg

Housing design**Process connection**

process connections by diaphragm seal, see order code

Membrane

Flush mounted welded membrane in LTC-technology
Material: stainless steel SS 316 L

Measuring system

Sensor piezoresistive measuring element
System fill foodstuff oil FD1 (USDA-H1) according to FDA

Temperature ranges

Ambient temperature -20 to 85°C
Process temperature depending on design, max. -40...+160 °C

Allowed storage temperature -40...85 °C

Other designs for higher process temperatures upon request.
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**General**

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**General**

Limit point setting DIN 16086
Reference conditions DIN EN 60770-1
Calibration position vertical mounting position
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
Influence of mounting position ≤ 3.5 mbar
Long-term drift $\leq 0.1\%$ year of nominal range
DIN EN 60770-1

Temperature effect**a) case**

Lower range value / upper range value
range 0...60 °C $\pm 0.15\%/10$ K of nominal range
range <0°C, >60°C $\pm 0.2\%/10$ K of nominal rangeb)
process temperature, temperature compensated by LTC-technology
active membrane surface process temperature error
approx. Ø 80 mm < 0.1 mbar / 10 K
approx. Ø 65 mm < 0.2 mbar / 10 K
approx. Ø 50 mm < 0.4 mbar / 10 K

Approval/tests

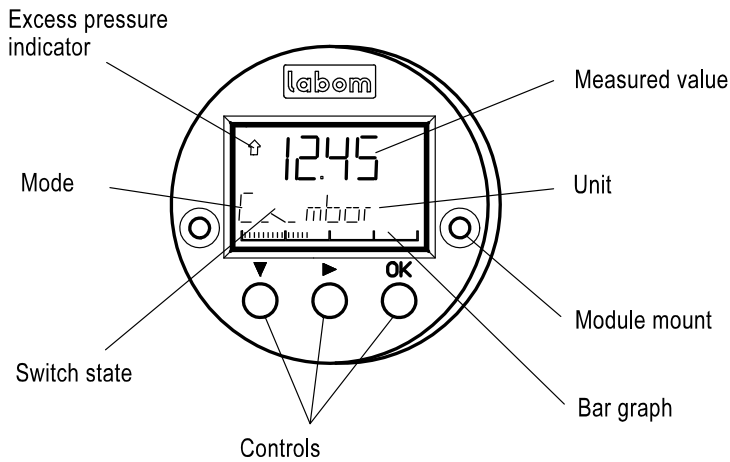
Interference emission EN 55011
Interference emission EN 55011
Noise immunity EN 61326
Ex-approval TÜV 04 ATEX 2387 X
II 1/2 G Ex ia IIC T4/T5/T6 (gas)
II 2 G Ex ia IIC T4/T5/T6 (gas)
II 2 D Ex iaD 21 T xx °C (dust)

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

Function modules

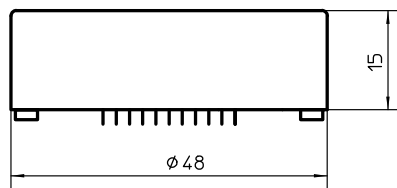
Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -



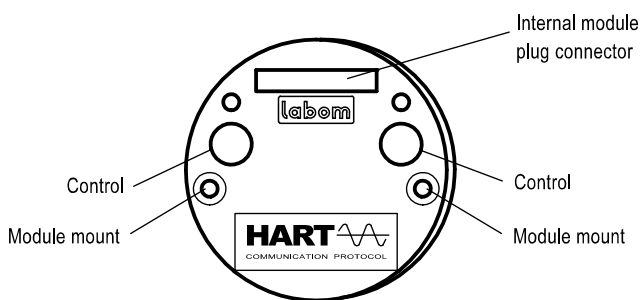
- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menus
- 5-segment pressure read-out with unit
- Read-out display
 - pressure (standard)
 - percent *
 - current *
 - sensor temperature
- Bar graph 36 segments $\hat{=}$ 0...100%
- Measuring circuit test (current sensing function) *
3.55...22.0 mA *
- Alarm indicator on display
- Switching function indicator (with switching module) *

* not with basic module PROFIBUS PA

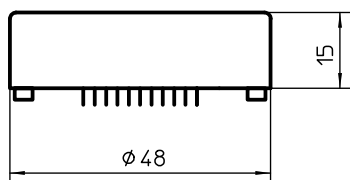


Operator menus	
4...20 mA	PROFIBUS PA
meas. range selection	min-max-value
damping	pressure trimming
min-max-value	system-info
characteristic	factory data reset
pressure units	BUS address
measuring circuit test	
alarm state	
current trimming	
pressure trimming	
table function	
system info	
factory data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

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

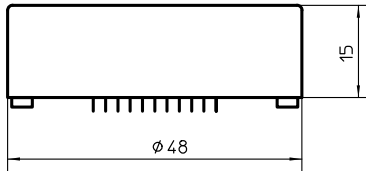
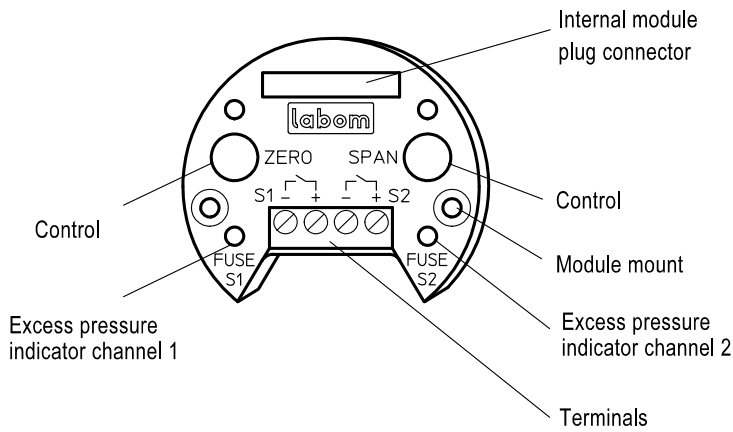


- HART protocol, revision 6.5
- Response characteristic FSK
- Load with HART communication
 - with HART modem 230...500 Ω
 - with HART communicator 230...1100 Ω
- Parameterizing by
 - operating elements
 - HART communication
 - PDM 6.0
 - AMS
 - 375 Field Communicator



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

pluggable with automatic module detection - plug and measure -

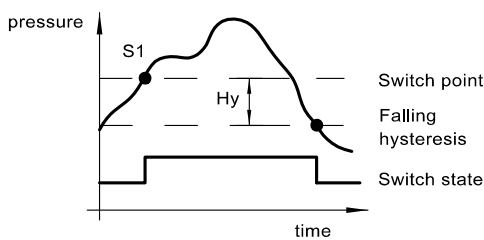


- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ($R_i < 0.3 \Omega$)
- Overload indicator: LED red, overload or short-circuit
- Fusible cut-out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

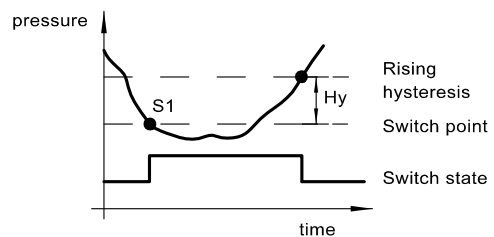
Profibus module description and HART® connection upon request

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/cm², 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	—	—	—
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 = factory setting

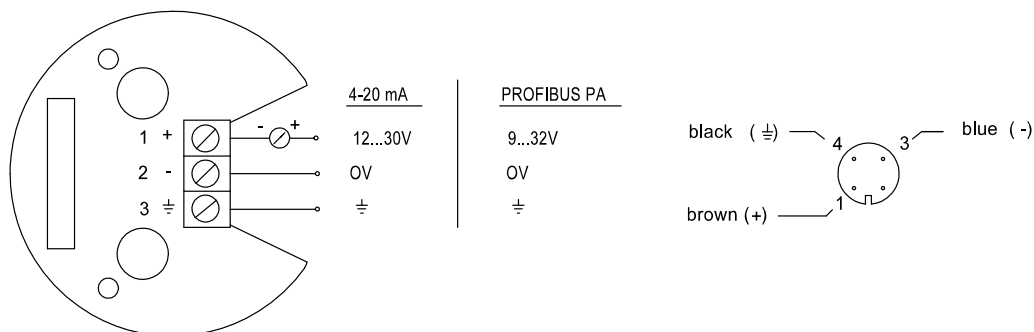
* = calibrated measuring span for devices with PROFIBUS PA basic module

Connection diagram

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

Internal terminals with cable gland design

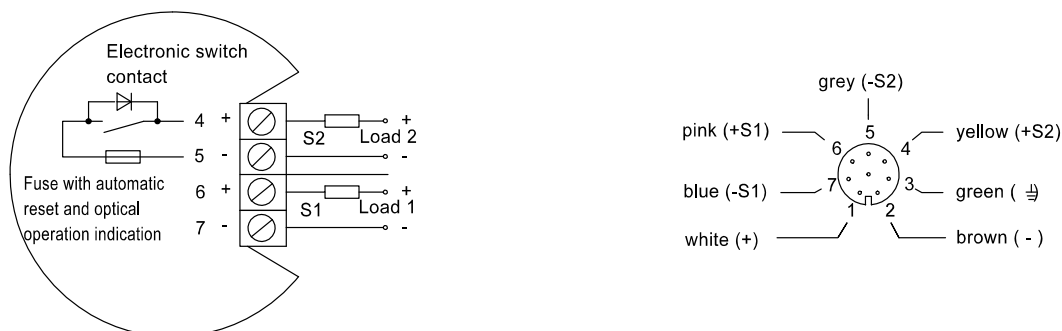
Circular connector



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

Internal terminals with cable gland design

Circular connector



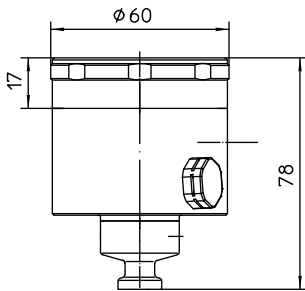
¹ color code as Binder series 763

Dimensions/Versions

Housing

housing design type 17

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

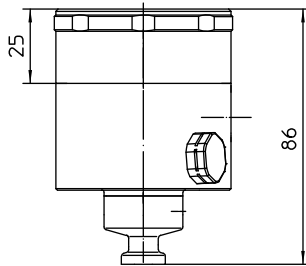


direct

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

housing design type 25

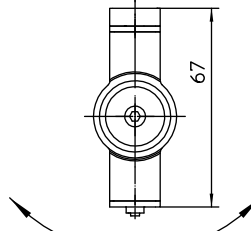
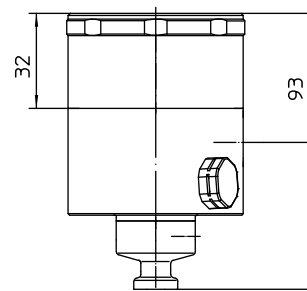
- basic module: PROFIBUS PA
- with display module (optional)



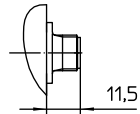
temperature decoupler for process temperatures up to 160°C

housing design type 32

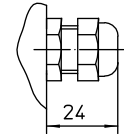
- basic module: 4...20 mA
- with two function modules (optional)



ball-and-socket joint continuously adjustable up to 180°C



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

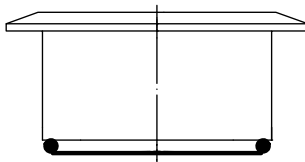


cable gland M16x1,5 f. cable ø4,5-10

Process connections

Process connections with LTC-technology. Process temperature error depending on design. Other process connections upon request.

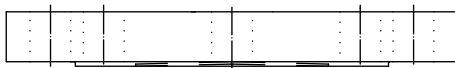
process temperature error ≤ 0,1 mbar/10K
active membrane surface ø85



tubus-clamp-sterile ø101mm, type series DL8140 data sheet D5-024-61



union nut DIN 11851 DN80, type series DL2600 data sheet D5-025



flange type per DIN EN 1092-1 DN80 PN10-40, type series DA... data sheet D5-030

process temperature error ≤ 0,2 mbar/10K
active membrane surface ø65

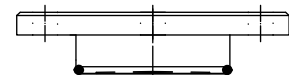


flange-design for sterile application ø76mm, type series DL8120 data sheet D5-024-6



union nut DIN 11851 DN65, type series DL2500 data sheet D5-025

process temperature error ≤ 0,4 mbar/10K
active membrane surface ø50



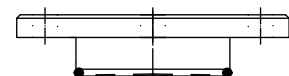
DRD-connection, type series DD4100 data sheet D5-024-4



union nut DIN 11851 DN50, type series DL2600 data sheet D5-025



VARIVENT D=68, type series DL8080-D58 data sheet D5-024-1



NEUMO BioControl Gr.65, type series DL8110-D12 data sheet D5-024-2

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

Pressure and level transmitter PASCAL CV LEVEL			CV311. L	
explosion protection	· without		0	
	· Ex-protection, types of ex-protection as follows		1	
nominal range	0.4 bar		A1051	
	1 bar		A1053	
	4 bar		A1056	
	16 bar		A1059	
	40 bar		A1061	
	4 bar abs		B1056	
	16 bar abs		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 ²		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, HART protocol rev. 6		H21 ..	
	setting ¹	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 61158-2, Profile 3.0		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 connector	M12x1	(4 pin) (8 pin, required for switching module)	T30 T31
		cable gland	M16x1.5	· Polyamid black (standard) · brass nickel-plated · stainless steel
	connection of measuring instrument		direct mounting	· for process temperature up to 125 °C (short term up to 140 °C), standard · for process temperature up to 160 °C (with temperature decoupler)
		angle adapter	· for process temperature up to 160 °C, adjustable	
process connection (by diaphragm seal)		tubus-clamp-sterile, DN 85 flange type per DIN EN, DN 80, PN 10-40, model B1 flange type per ASME, DN 3", PN 150 psi, B 16.5 RF 500 RMS	data sheet D5-024-61 data sheet D5-030	DL8140 ... DA1620 ... DA51510 ...
membrane in LTC-technology	DIN 11851	with union nut	· DN 80 · DN 65 · DN 50	data sheet D5-025 DL2600 ... DL2500 ... DL2400 ...
			flange design for sterile application DN 65	data sheet D5-024-6
	DRD-connection DN 50/PN 40		data sheet D5-024-4	DD4100 ...
	VARIVENT, D=68, Varivent housing DN40...DN125 and 1 1/2"...6"		data sheet D5-024-1	DL8080 ...
NEUMO BioControl, Gr. 65		data sheet D5-024-2	DL8110 ...	
order code (example):			CV3110 L A1051 F11 H1100 M2 N10 T20 K1085 DD4100 ...	

additional features (to be indicated in case of need, only)

explosion protection ²	· Ex II 1/2 G Ex ia IIC T4/T5/T6	S66
	· Ex II 2 G Ex ia IIC T4/T5/T6, II 2 D Ex iaD 21 T xx °C , Standard	S68
PROFIBUS PA	BUS	· factory setting: 126 (standard)
	address	· factory setting: pls. specify
	measuring-point number/identification max. 32 characters, pls. specify	Z61
	measuring-point text max. 32 characters, pls. specify	Z62 Z63
accessories		
inspection certificate as per DIN EN 10204-3.1, calibration certificate 5 measuring points		W1201
certificate SIL 2		W2602

¹ Extensive parameterization is possible when the transmitter is operated with the display module, the HART function module or the PROFIBUS module.

² Ex-design not possible with switching module