



Features

- Modular pressure and level transmitter temperature compensation up to 0.1 mbar / 10 K by LTC-technology, Output signal:
 - 4...20 mA, 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"
- Measuring range limits 0...80 mbar to 0...40 bar
- Accuracy $\leq 0.15\%$
- Turndown 5:1
- Medium temperature up to 160 °C
- Various process connections available
- Mechanically robust stainless steel membrane

Options

- Approvals/Certificates
 - Certificate of measuring equipment for Russian Federation
 - Explosion protection for gases and dust
 - Classification per SIL2
 - Calibration certificate with 5 measuring points acc. to EN 10204-3.1
 - Material certificate per EN 10204-3.1

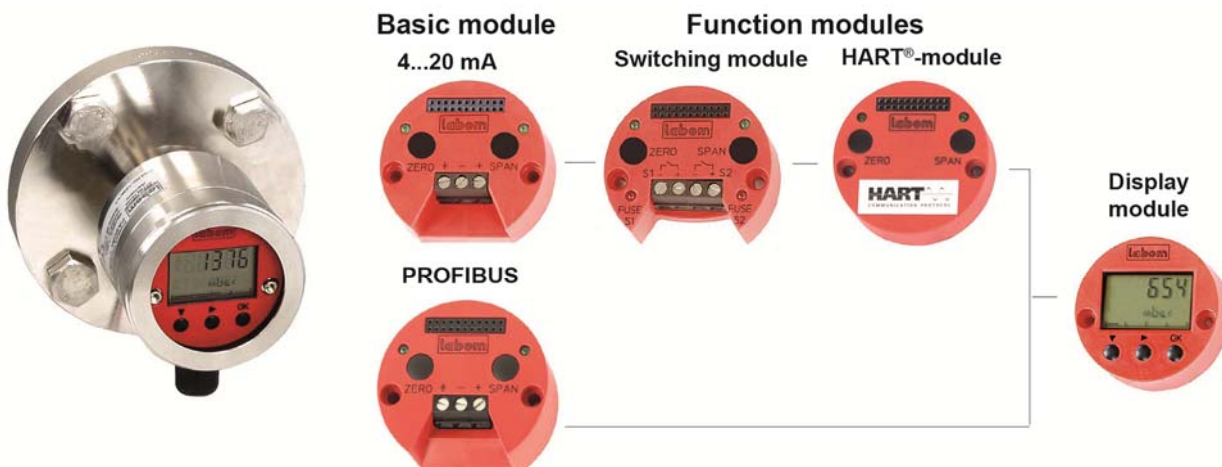


Application area

- Pharmaceutical industry
- Chemical and petrochemical industry

Application

Pressure transmitter monitoring for vessels and tanks designed to minimize process temperature errors. The LTC-membrane technology significantly reduces errors that are related to process temperatures.



Process connection: all standard connections for hygienic applications

Technical data

Measuring ranges

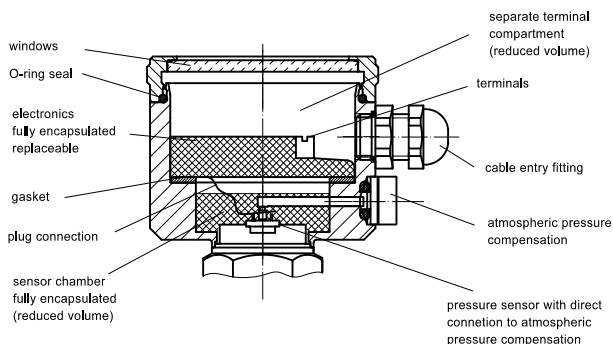
Nominal range	Turndown	Measuring range	Measuring span ²		Overload limit	Vakuum tight at < 50 °C ¹
			min. span	max. span		
0.4 bar	5:1	-0.4...0.4 bar	80 mbar	0.8 bar	1 bar	400 mbar abs
1 bar		-1...1 bar	0.2 bar	2 bar	3 bar	40 mbar abs
4 bar		-1...4 bar	0.8 bar	5 bar	10 bar	20 mbar abs
16 bar		-1...16 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

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

Constructional design / case

Design:	Hygienic case design with screw cap, material: stainless steel mat.no. 1.4301 (304)
Construction:	Two-chamber system, minimum housing volume, excellent moisture and condensate protection
Degree of protection:	IP 66 per EN 60529
Pressure compensation:	PTFE filter system
Window:	Non splintering plastic: Makrolon
Elec. connection:	Screwed terminals 1 mm ²
Cable entry fitting:	Circular connector M12
Climatic category:	EN 60721 3-4, 4K4H
Weight:	Diaphragm seal with DRD-process connection and function modules approx. 2.1 kg



Measuring system

Sensor:	Piezoresistive measuring element
Sensor filling:	Synthetic oil, free of silicone FD1, FDA listed, class USDA-H1

Accuracy

<u>General:</u>	
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
Influence of mounting position	≤ 3.5 mbar
Long-term drift:	≤ 0.1 % / year of nominal range
Temperature effect:	<u>Case:</u> 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

Process temperature:

Temperature compensated by LTC technology

Process connection

Design:	By diaphragm seal, see order code
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Material wetted parts

Material:	Stainless steel mat.no. 1.4404 (316L)
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Active membrane surface	Process temperature error
ca. Ø 80 mm	< 0.1 mbar/10K
ca. Ø 65 mm	< 0.2 mbar/10K
ca. Ø 50 mm	< 0.4 mbar/10K

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 : $R_B \leq (U_V - 12V \text{ DC}) / 22.5 \text{ mA}$ [Ohm]
 U_V = supply voltage

Basic module: PROFIBUS PA

Signal: Digital output signal IEC 61158-2
Protocol: EN 50170-PROFIBUS PA, Profile 3.0
Sensor address: 0...126 (126 = factor setting)
Power consumption: Constantly 11 mA
Fault 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 approval:

Functional range: 12...30 V DC -

Temperature ranges

Ambient: -20...85 °C
Medium: Depending on design, see order code
Storage: -40...85 °C

Tests and certificates

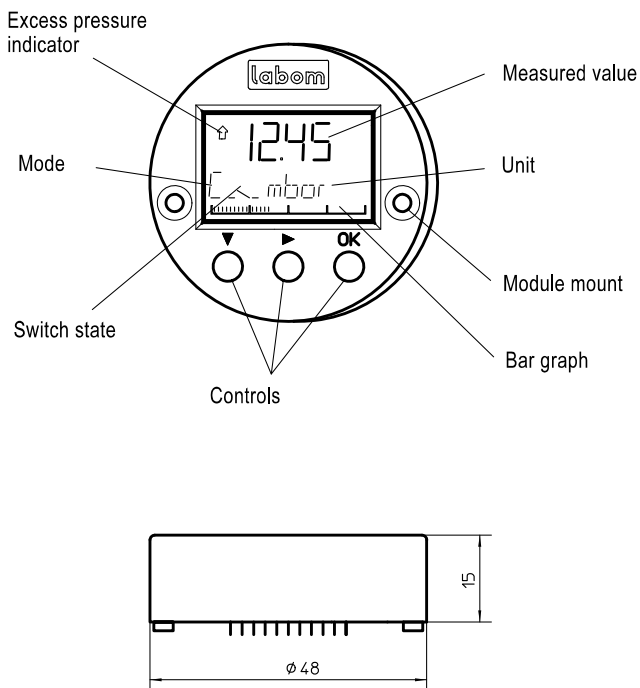
Interference emission: per EN 55011
Noise immunity: per EN 61326
Ex-approval: TÜV 04 ATEX 2387 X
II 1/2G Ex ia IIC T4/T5/T6 (gas)
II 2G Ex ia IIC T4/T5/T6 (gas)
II 2D Ex iaD 21 T 80 °C (dust)
SIL2: Functional safety:
Classification per SIL2, EN 61508
For basic module 4...20 mA, switching module, display module and HART module
TÜV-Reg.-Nr. 44 207 09 555548-001

- Certificate of measuring equipment for Russian Federation

Function modules

Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -

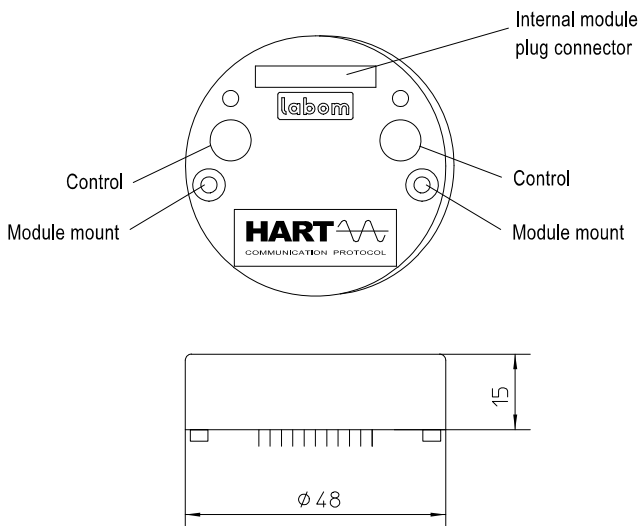


- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menus
- 5-segment pressure read-out with unit
- Read-out display
 - pressure (standard)
 - percent *
 - current *
 - sensor temperature
- Bar graph 36 segment suitable 0...100 %
- Measuring circuit test (current sensing 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.

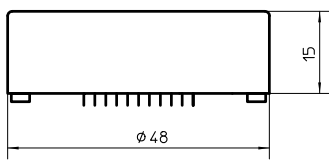
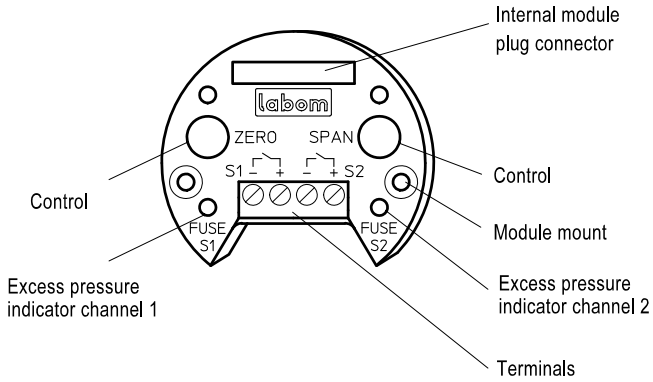
HART® module (for basic module 4...20 mA) optional



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

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

pluggable with automatic module detection - plug and measure -

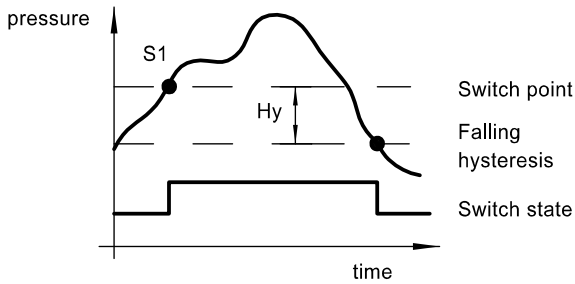


- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ($R_i < 0.3 \Omega$)
- Overload indicator: LED red, overload or short-circuit
- Fusible cut-out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

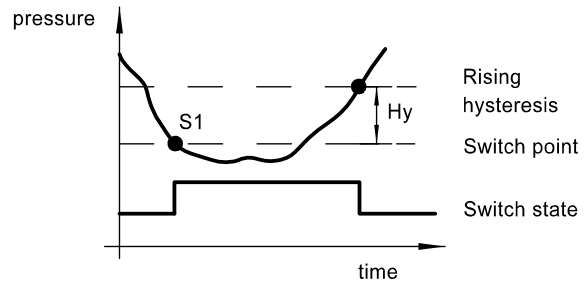
Profibus module description and HART® connection upon request

Hysteresis functions

-falling hysteresis-



-rising hysteresis-



Parameterisation

The module selected determines which parameters can be set.

Operating modus	display of display module	Parameter		Basic module: 4...20 mA				Basic module: PROFIBUS PA		
		Variability	Standard	BM	S M	A M	HM	BM	AM	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 sec.	w	-	x	x	-	-	x
Min-max-value	HI/LO	pressure and temperature resetable	-	-	-	x	x	-	x	x
Characteristic	FUNC	linear, table	linear	w	-	x	x	-	-	x
Pressure unit	UNIT	bar, mbar, kPa, MPa, mmH2O, mH2O, kg/cm ² , PSI	bar	w	-	x	x	-	w	x
Measuring circuit 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 % of n.r. span -10...+10 % of n. range	-	-	-	x	x	x	x	x
Table function	TABLE	2...31 points in table	0% = 4mA 100% = 20mA	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 % v nominal range	50 %	-	x	x	x	-	-	-
Hysteresis	SWCH1(2)/Hyst.	0...100 % v 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	-	EIN/AUS	AUS	x	x	x	x	x	x	x

x = configurable

w = factory setting

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

AM = display module

BM = basic module

SM = switching module

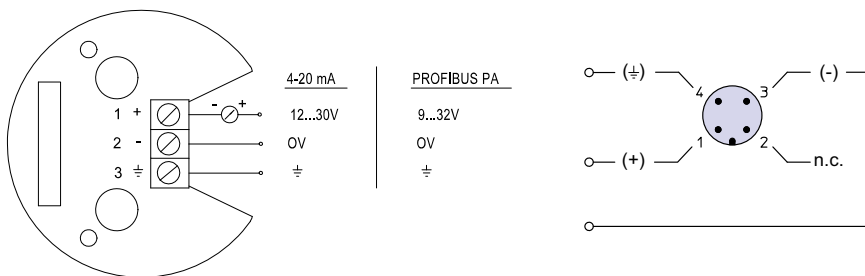
HM = HART®-module

Connection diagram

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

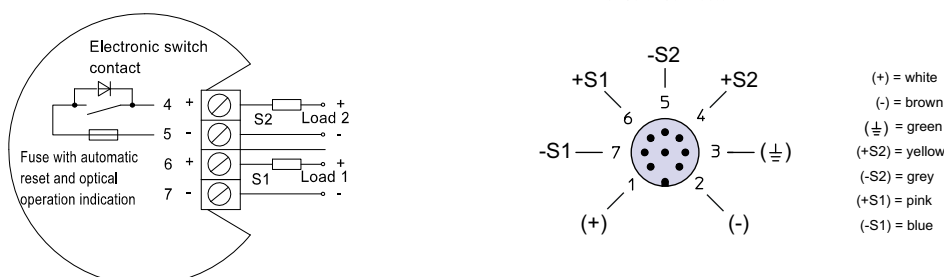
Internal terminals with cable gland design

Circular connector ¹



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

Circular connector ¹



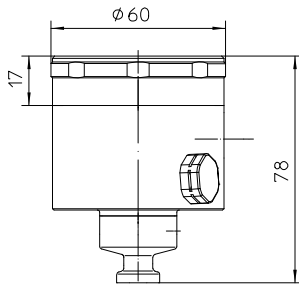
¹ color code as Binder series 763

Dimensions

Case

housing design type 17

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

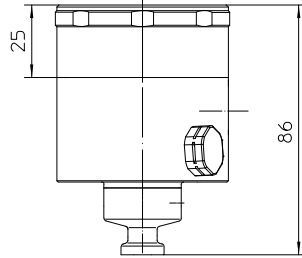


direct

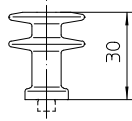
for process temperatures
up to 125°C
(short period up to 140°C, 1h)

housing design type 25

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

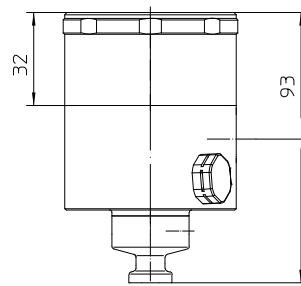


temperature decoupler
for process temperatures
up to 160°C

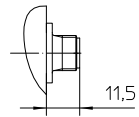


housing design type 32

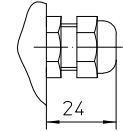
- basic module: 4...20 mA
- with two function modules (optional)



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



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

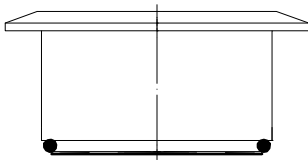


cable gland
M16x1,5 f. cable \varnothing 4,5-10

All dimensions are in mm

Process connection

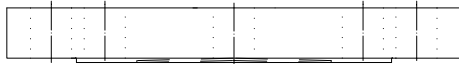
process temperature error
 $\leq 0,1$ mbar/10K
active membrane surface \varnothing 85



tubus-clamp-sterile \varnothing 101mm, 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
 $\leq 0,2$ mbar/10K
active membrane surface \varnothing 65

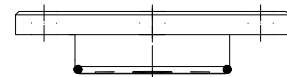


flange-design for sterile application \varnothing 76mm,
type series DL8120 data sheet D5-024-6



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

process temperature error
 $\leq 0,4$ mbar/10K
active membrane surface \varnothing 50



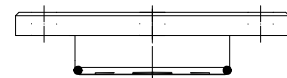
DRD-connection, type series DD4100
data sheet D5-024-4



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

All dimensions are in mm

Order details

Pressure and level transmitter PASCAL CV LEVEL, temperature compensation by LTC-technology, Type series CV311. L

Order details PASCAL CV LEVEL				
CV311.L	Pressure and level transmitter PASCAL CV LEVEL			
0	design	standard		
1		Ex-protection, types of ex-protection as follows		
A1050	nominal range	0.4 bar		
A1053		1 bar		
A1056		4 bar		
A1059		16 bar		
A1061		40 bar		
B1056		4 bar abs.		
B1059		16 bar abs.		
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 PROFIBUS PA		
F81		adjusted and calibrated fromto....., unit (pls.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...120.0 sec..., set to ... (please fill in)
0			alarm state	< 3.6 mA (standard)
1			> 21.0 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 (not with PROFIBUS PA module)	without switching module		
N5 .		switching module with 2 contacts, pluggable, switching capacity 30 V DC / 0.5 A		
0		setting ¹	standard, s. "Techn. description of switching module"	
1	at the factory, specify as required			
T30	electrical connection	circular connector	M12 x 1	4pin
T31				8 pin, required for switching module
T20		cable gland	M16 x 1,5	Polyamid black
T21				brass nickel-plated
T22				stainless steel

K1085	measuring device connection	direct mounting	for process temperature up to 125 °C (short term up to 140 °C), standard	
K2085			for process temperature up to 160 °C (with temperature decoupler)	
K3285		angle adapter	for process temperature up to 160 °C, adjustable	
DL8140 . . .	process connection (by diaphragm seal) membrane in LTC-technology	tubus-clamp-sterile, DN 85 (Data sheet D5-024-61)		
DA1620 . . .		flange type per EN, DN 80, PN 10-40, model B1 (Data sheet D5-030)		
DA51510 . . .		flange type per ASME, DN 3", PN 150 psi, B 16.5 RF 500 RMS (Data sheet D5-030)		
DL2600 . . .		DIN 11851	with union nut	DN 80 (Data sheet D5-025)
DL2500 . . .				DN 80 (Data sheet D5-025)
DL2400 . . .				DN 80 (Data sheet D5-025)
DL8120 . . .		flange design for sterile application DN 65 (Data sheet D5-024-6)		
DD4100 . . .		DRD-connection DN 50/PN 40 (Data sheet D5-024-4)		
DL8080 . . .		VARIVENT, D=68 Varivent case DN40...DN125 and 1 1/2"...6" (Data sheet D5-024-1)		
DL8110 . . .		NEUMO BioControl, Gr. 65 (Data sheet D5-024-2)		

Additional features (to be indicated in case of need, only)				
S66	Ex marking ²	⊕ II 1/2G Ex ia IIC T4/T5/T6		
S68		⊕ II 2G Ex ia IIC T4/T5/T6, II 2D Ex iaD 21 T 80 °C , standard		
. . .	PROFIBUS PA	BUS address	factory setting: 126 (standard)	
Z61			factory setting: pls. specify	
Z62		measuring-point number/identification max. 32 characters, pls. specify		
Z63		measuring-point text max. 32 characters, pls. specify		
W1020	material certificate as per EN 10204-3.1, wetted parts			
W1201	inspection certificate as per EN 10204-3.1, calibration certificate 5 measuring points			
W2602	functional safety as per EN 61508, classification per SIL2 ³			
W2673	certificate of measuring equipment for Russian Federation ⁴			

Accessories		
MC1020	HART Modem for	RS 232 interface
MC1040		USB interface
MC1041		USB interface, Ex

Order code (example): CV311 L - A1051 - F11 - H1100 - M2 - N10 - T20 - K1085 - DD4100 . . . - . . .

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

³ not with PROFIBUS PA

⁴ not for devices with Ex-protection