



Features

- Modular pressure transmitter with diaphragm seal technology
Output signal:
 - 4...20 mA, can be retrofitted with
 - HART® protocol (rev. 6), option
 - PROFIBUS PA, option
- 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 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...40 bar
- Accuracy: ≤ 0.15 %
- Turndown 5:1
- Degree of protection IP 66
- Piezoresistive measuring cell directly aerated, fully welded

Options

- Explosion protection for gases and dust
- Classification per SIL 2
- Inspection certificates
 - material certificate as per DIN EN 10204-3.1
 - calibration certificate as per DIN EN 10204-3.1



Application area

- Food industries
- Pharmaceutical
- Biotechnology

Application

The modular pressure transmitter PASCAL CV is suited for measuring the relative and absolute pressures of gases, vapors and liquids. Hygienic design according to EHEDG, FDA und GMP recommendations.



Basic module
4...20 mA



PROFIBUS



Function modules
Switching module HART®-module



Display module



Process connection: all standard connections for hygienic applications

Technical Data**Instrument ranges**

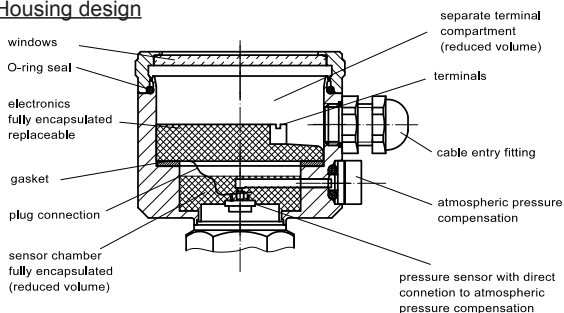
nominal range	Turndown	measuring ranges	measuring spans ²		overload limits	vacuum tight at < 50 °C ¹
			min. span	max. span		
0.4 bar	5 : 1	-0.4...+0.4 bar	80 mbar	0.8 bar	1 bar	400 mbar abs
1 bar		-1...+1 bar	0.2 bar	2 bar	3 bar	40 mbar abs
4 bar		-1...+4 bar	0.8 bar	5 bar	10 bar	20 mbar abs
16 bar		-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
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	standard device without diaphragm seal and function modules approx. 0.65 kg

Housing design**Process connection**

Construction	welded design
Diaphragm	modifications see page 5 or order code
Material	see order code

Measuring system

Sensor	piezoresistive measuring element
System filling	foodstuff oil FD1 (USDA-H1) acc. to FDA

Temperature ranges

Ambient temperature	-20 to 85°C
Process temperature	depending on design
Allowed storage temperature	-40...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	

Approval/tests

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)

Classification per SIL 2 for basic module 4...20 mA, switching module, display module and HART module, TÜV-Reg.-No. 44 207 09 555548-001.

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	$R \leq \frac{U - 12 V}{22.5 \text{ mA}}$ (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	≤ 0.15 % of span TD 5:1 no modification

Hysteresis	≤ 0.05 % of nominal range
Repeatability	≤ 0.05 % of nominal range
Influence of mounting position	≤ 3.5 mbar

Long-term drift	≤ 0.1 % year of nominal range
DIN EN 60770-1	

Temperature effect**a) case**

Lower range value / upper range value	
range 0...60 °C	± 0.15 %/10 K of nominal range
range <0°C, >60°C	± 0.2 %/10 K of nominal range

b) process connection (diaphragm seal) depending on design

flat diaphragm seal	zero point error
DN 25/1"	4.8 mbar/10 K
DN 32/1 1/2"	2.3 mbar/10 K
DN 40	1.6 mbar/10 K
DN 50/2"	0.6 mbar/10 K
inline diaphragm seal	zero point error
DN 25/1"	9.5 mbar/10 K
DN 32/1 1/2"	4.1 mbar/10 K
DN 40	3.9 mbar/10 K
DN 50/2"	3.9 mbar/10 K

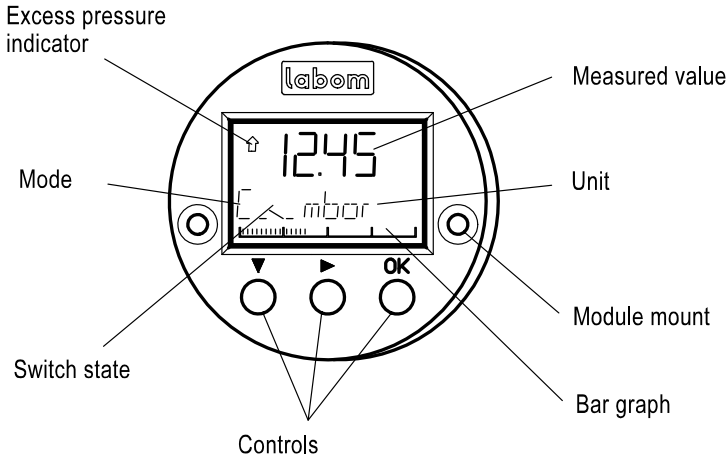
The specified zero error for the process connection is a guide value for a standard design. We can provide a detailed system calculation upon request. Systems with reduced diaphragm seal errors are also available.

* Devices with cable gland or switching outputs might suffer from a short-time measuring deviation in case of strong electromagnetic fields (EN 61000-4-3).

Function modules

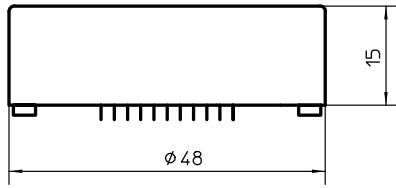
Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -



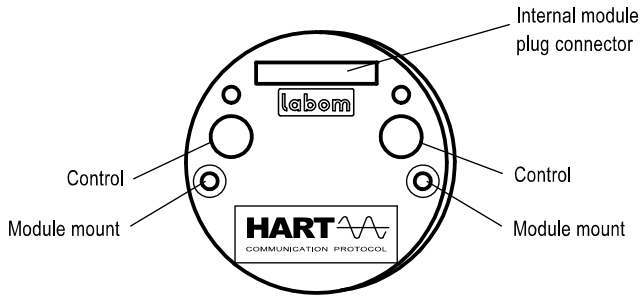
- Module housing made of ABS, encapsulated electronics unit
- Many operating mode menus
- 5-segment pressure read-out with unit
- Read-out display
 - pressure (standard)
 - percent *
 - current *
 - sensor temperature
- Bar graph 36 segments $\hat{=}$ 0...100%
- Measuring circuit test (current sensing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

* not with basic module PROFIBUS PA

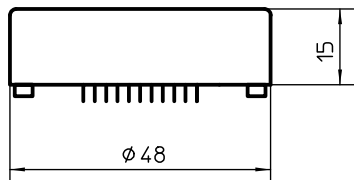


Operator menus	
4...20 mA	PROFIBUS PA
meas. range selection	min-max-value
damping	pressure trimming
min-max-value	system-info
characteristic	factory data reset
pressure units	BUS address
measuring circuit test	
alarm state	
current trimming	
pressure trimming	
table function	
system info	
factory data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

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

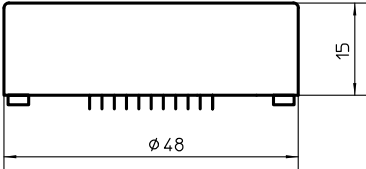
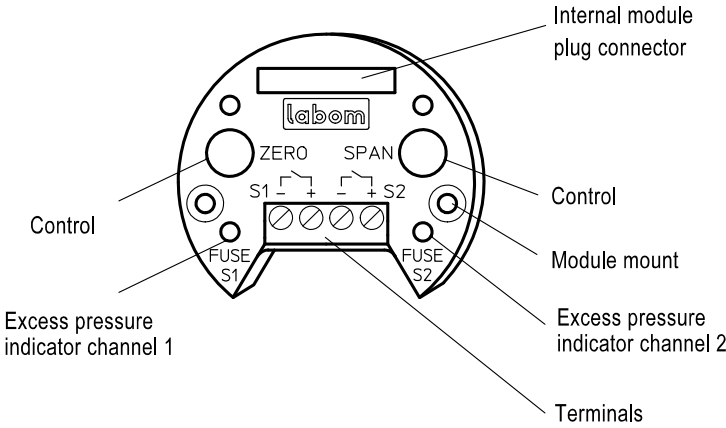


- HART protocol, revision 6.5
- Response characteristic FSK
- Load with HART communication
 - with HART modem 230...500 Ω
 - with HART communicator 230...1100 Ω
- Parameterizing by
 - operating elements
 - HART communication
 - PDM 6.0
 - AMS
 - 375 Field Communicator



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

pluggable with automatic module detection - plug and measure -

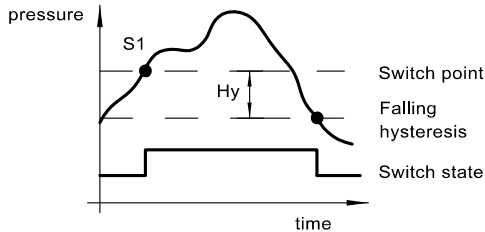


- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- Electronic switch for 2 limit values, voltage free, short-circuit-proof
- Switching capacity 30 V DC / 0.5 A ($R_i < 0.3 \Omega$)
- Overload indicator: LED red, overload or short-circuit
- Fusible cut-out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

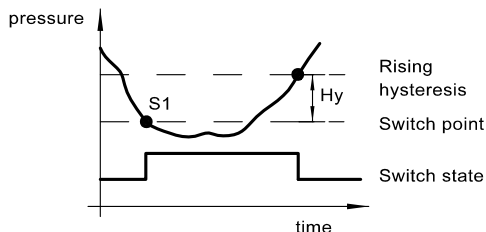
Profibus module description and HART® connection upon request

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/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, >21.0 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

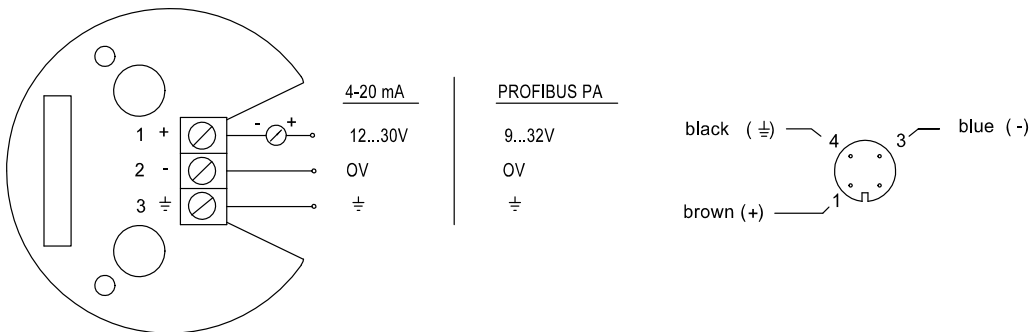
* = calibrated measuring span for devices with PROFIBUS PA basic module

Connection diagram

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

Internal terminals with cable gland design

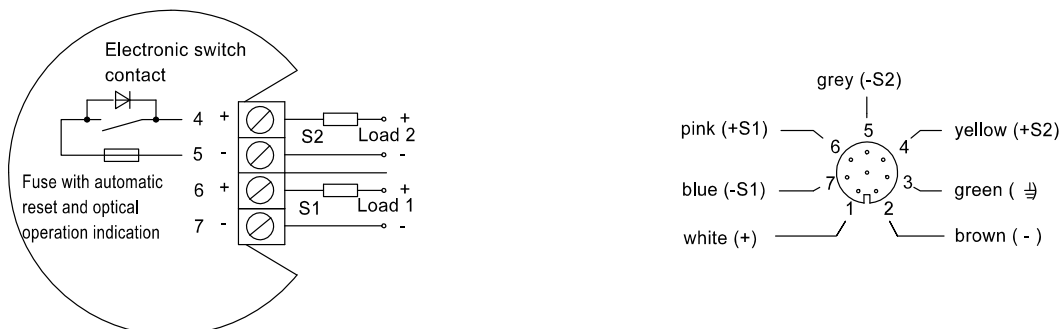
Circular connector ¹



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

Internal terminals with cable gland design

Circular connector ¹



¹ color code as Binder series 763

Dimensions/Designs

Housing

housing design type 17

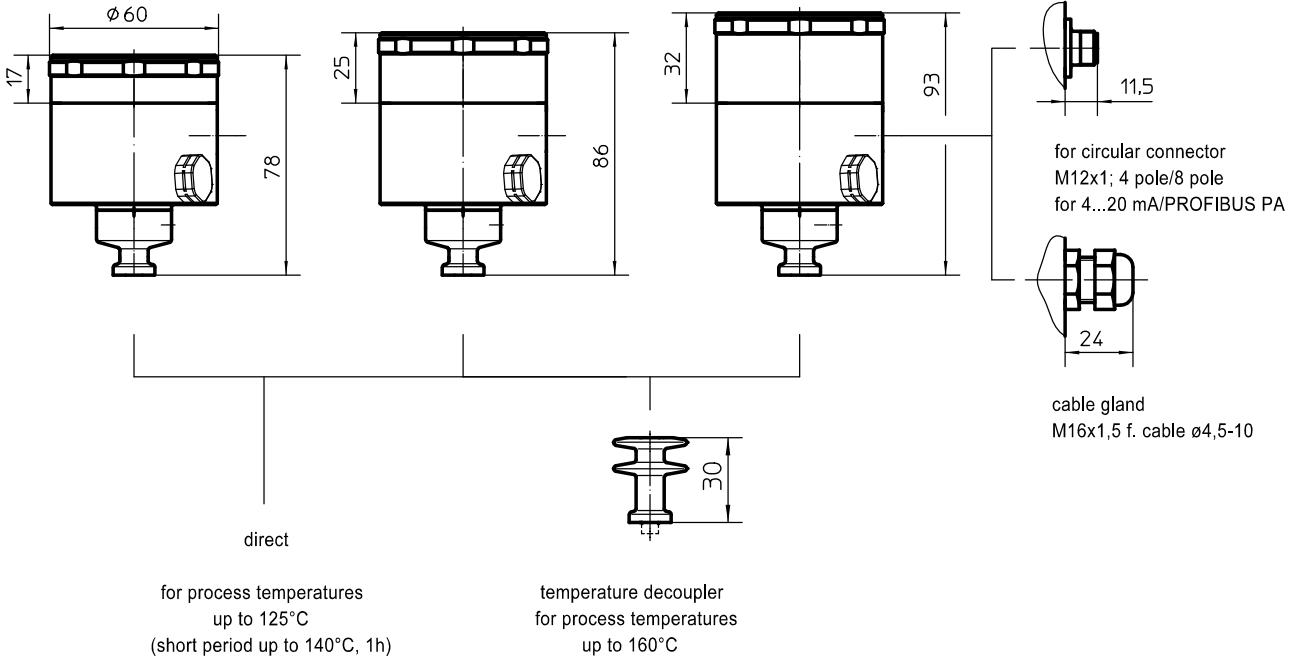
- basic module: 4...20 mA
- with one function module (optional)
- basic module: PROFIBUS PA

housing design type 25

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

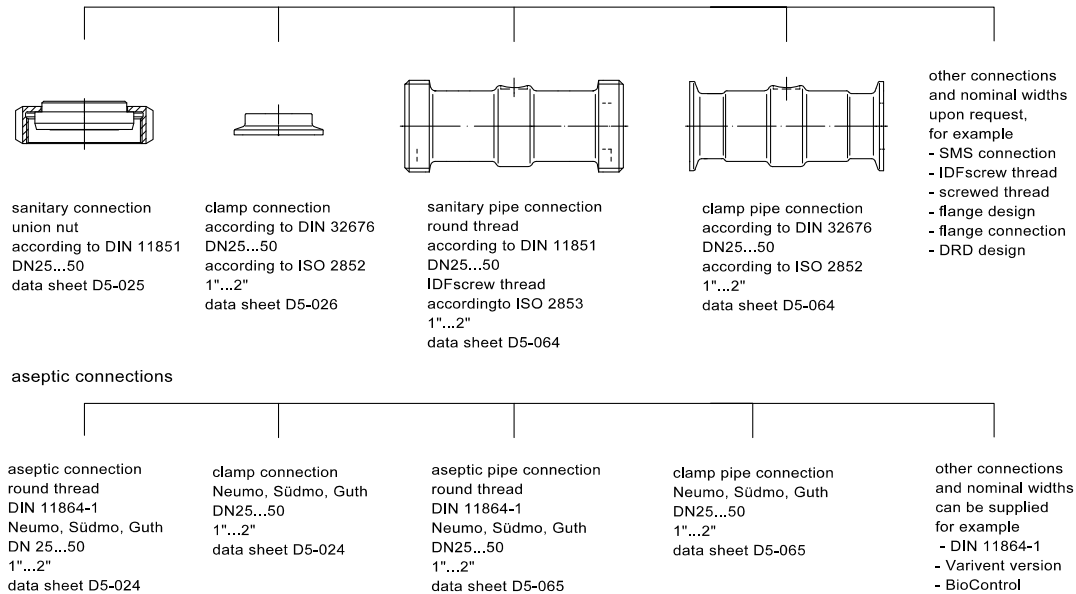
housing design type 32

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



Process connections (standard)

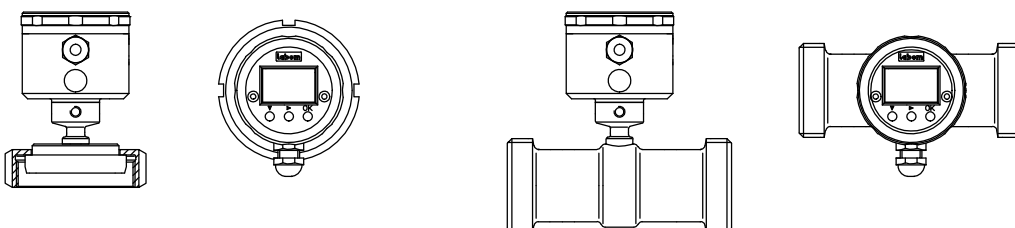
details see order details and relevant data sheets product group D5



Mounting position

Flat Diaphragm Seal

Inline Diaphragm Seal



Standard position of display module and electrical connection. Please state variant arrangement.

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

Pressure transmitter PASCAL CV with diaphragm seals		CV311		
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 adjusted and calibrated from to, unit (pls.fill in details), see below for calibration report	F80 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 ..		
	damping	0		
	0.0 sec. (Standard)	1		
	0.0...120.0 sec., set to (please fill in)	0		
alarm state	0			
< 3.6 mA (Standard)	1			
> 21.0 mA	H41			
PROFIBUS PA, IEC 61158-2, Profile 3.0				
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 .		
	standard, s. "Techn. description of switching module" at the factory, specify as required	0 1		
electrical connection	circular connector	M 12x1 (4 pin)	T30	
		M 12x1 (8 pin, required for switching module)	T31	
	cable gland	M16x1.5	· polyamide black · brass-nickel plated · stainless steel	T20 T21 T22
design	· for process temperature up to 125 °C (short term up to 140 °C), standard	K1085		
	· for process temperature up to 160 °C (with temperature decoupler)	K2085		
process connection (diaphragm seals)				
process connection ²	flat diaphragm seal	DN		
		· 25	DL2100	
		sanitary connection with groove union nut according DIN 11851	· 32	DL2200
		· 40	DL2300	
		· 50	DL2400	
		· 1"	DL3100	
	clamp connection per ISO 2852	· 1 1/2 "	DL3200	
		· 2"	DL3300	
		· 25	DL4100	
		· 32	DL4200	
		· 40	DL4300	
		· 50	DL4400	
	clamp connection per DIN 32676	· 25	DF1110	
		· 32	DF1120	
		sanitary pipe connection for pipes DIN 11850 round thread both sides acc. to DIN 11851	· 40	DF1130
		· 50	DF1140	
		inline diaphragm seal	· 25	DF3110
			clamp connection acc. to DIN 32676, both sides for pipes acc. to DIN 11850	· 32
· 40	DF3130			
· 50	DF3140			
clamp connection acc. to ISO 2852 both sides for pipes per BS 4825 Part 3 and O.D. Tube	· 1"	DF3210		
	· 1 1/2"	DF3230		
· 2"	DF3240			
hygienic	· surface, Standard			
	· hygienic version ¹ (special surface, see date sheet D1-030)	HY		
material wetted parts	· stainless steel mat.-no. 1.4435	A4007		
	other material upon request	A4009		
system filling	· foodstuff oil/DF1 (USDA-H1 acc. to FDA) temperature range: +10...+140 °C, standard	L22		
	· foodstuff oil FD1 (USDA-H1 acc. to FDA) temperature range: -20...+160 °C	L23		
	· other liquids and temperature ranges upon request			
order code (example):		CV3110 A1051 F11 H1100 M2 N10 T20 K1085 DL2100 A4007 L22		
additional features (to be indicated in case of need, only):				
explosion protection ³	· 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 address	· factory setting: 126 standard · factory setting: pls. specify		
	measuring-point number/identification max. 32 characters, pls. specify	Z61 Z62		
	measuring-point text max. 32 characters, pls. specify	Z63		
		W4035		
process connection (diaphragm seal) electropolished		W1020		
material certificate as per DIN EN 10204-3.1, wetted parts (stainless steel)		W1201		
inspection certificate as per DIN EN 10204- 3.1, calibration certificate with 5 measuring points		W2602		
functional safety as per EN 61508, classification per SIL 2 ⁴				
accessories				
HART Modem	· RS 232-Interface	MC1020		
	· USB-Interface	MC1040		
	· USB-Interface, Ex	MC1041		

¹ extensive parameterization is possible when the transmitter is operated with the display module, the HART function module or the PROFIBUS module.² other process connections als well as aseptic designs upon request³ Ex-design not possible with switching module⁴ not with PROFIBUS PA