



**Design Features**

- Modular pressure transmitter with diaphragm seal technology  
 Signal output::
  - 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 1.5 A switching current, electrically isolated at all sides, without additional auxiliary power
- Function module replacement on site without recalibration "plug and measure"
- Watchdog for electronics modules and measuring cell
- Hygienic design according to EHEDG, FDA und GMP recommendations
- Material and surface quality according to the hygienic requirements
- Limits of measuring range 0...80 mbar to 0...40 bar
- Accuracy: < 0.25% (linearity, hysteresis and repeatability)
- Turndown 5:1
- Explosion protection: II 1/2G EEx ia IIC T6
- Medium temperature up to 160 °C
- Piezoresistive measuring cell, directly aerated, fully welded

**Application**

The pressure transmitter PASCAL CV is suited for measuring the relative and absolute pressures of gases, vapors and liquids. The type series CV3110 has been developed to meet the stringent demands of food processing, pharmaceutical technology, and biotechnology. Special attention has been given to good surface quality. Thus, for instance, roughness values to Ra 0.4 µm can be guaranteed for wetted parts (for welds: Ra < 0.8 µm) or the system can be electropolished as well. 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 3100 for general application
- PASCAL CV 3120 for chemical/petrochemical industry



**SMART SOLUTIONS!**

**Basic module**  
**4...20 mA**

**Function modules**  
**HART®-module**



**PROFIBUS**



**Switching module**



**Display module**



Process connection: all standard screw-in, flange and inline connections

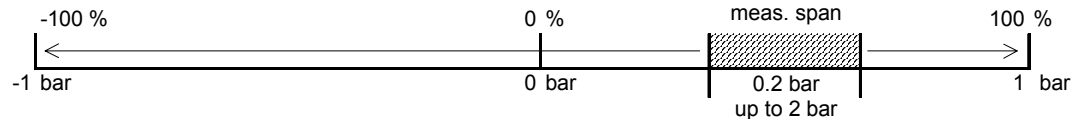
## Technical Data

### Instrument ranges

nominal range	Turndown	measuring ranges	measuring spans		overload limits	vacuum tight at < 50 °C
			min. span	max. span		
0.4 bar	5 : 1	- 0.4...+0.4 bar	80 mbar	0.8 bar	2 bar	400 mbar abs
1 bar		-1 ... + 1 bar	0.2 bar	2 bar	7 bar	40 mbar abs
4 bar		-1 ... + 4 bar	0.8 bar	5 bar	20 bar	20 mbar abs
16 bar		-1 ... + 16 bar	3.2 bar	17 bar	100 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	20 bar abs	20 mbar abs
16 bar abs		0 ... 16 bar abs	3.2 bar abs	16 bar abs	100 bar abs	20 mbar abs

### limits of measuring range

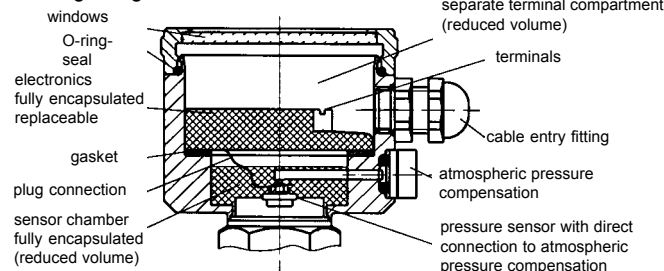
nominal range: e.g. 1 bar



### 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 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	stainless steel mat.-no. 1.4404 or 1.4435 see order code

### 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
Allowed storage temperature	-40...85 °C
Note safety values as per examination certificate!	

### Supply

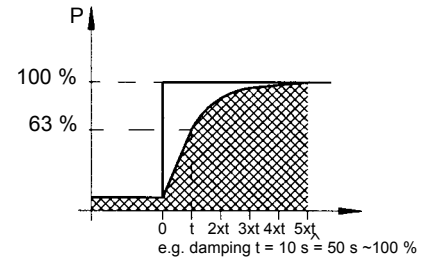
Standard design	12...40 VDC
Ex-proof design	12...30 VDC

### Approval/tests

Interference emission	EN 50081 section 1
Noise immunity	EN 50082 section 2
EU examination certificate	II 1/2G EEx ia IIC T4

### Output

Signal	4...20 mA, two-wire, optional with HART protocol (not yet available)
Current range	3.8 - 20.8 mA
Current limitation	approx. 22 mA
Alarm state	< 3.6 mA, optional > 21 mA
Delay time	approx. 160 ms
measuring cycle	6 measurements / second
Measuring range setting	turndown 5:1
Damping t	0.0 - 120.0 seconds



### Load

$$R < \frac{U - 12V}{22.5 \text{ mA}} \text{ (Ohm)}$$

### Accuracy

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 change
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

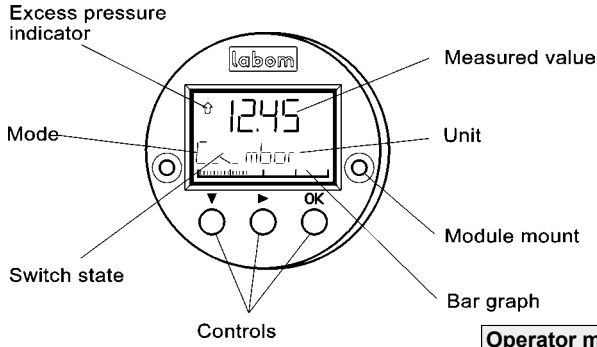
- a) Lower range value / upper range value
- |                        |                               |
|------------------------|-------------------------------|
| in range 0...60°C      | ± 0.15%/10 K of nominal range |
| in range < 0°C, > 60°C | ± 0.2%/10 K of nominal range  |
- b) process connection (diaphragm seal) depending on design
- |                  |                  |
|------------------|------------------|
| flat diaphragm   | 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 | 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.

## Function modules

### Display module (multifunctional display) optional

pluggable with automatic module detection - plug and measure -

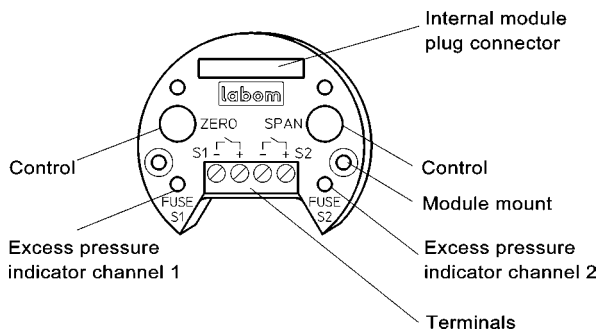


Operator menus
meas. range selection
damping
min-max-value
characteristic
pressure units
measuring circuit test
alarm state
current trimming
pressure trimming
table function
system info
switch points
hysteresis
switching function

- 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)

### Switching module, optional

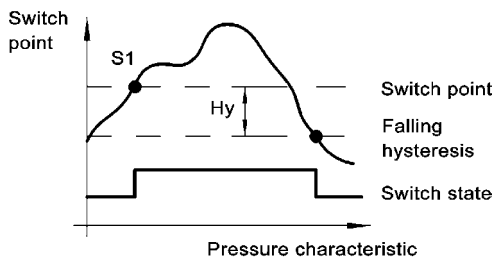
pluggable with automatic module detection - plug and measure -



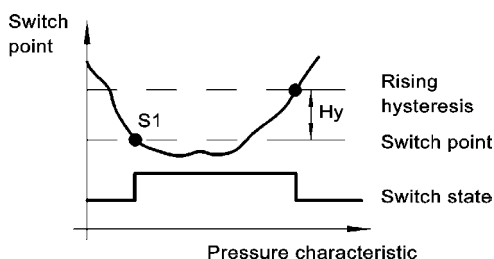
- No additional auxiliary power required
- Module housing made of ABS, encapsulated electronics unit
- 2 limit values, voltage free, short-circuit-proof
- Switching capacity 50 V DC / 500 mA ( $R_i < 1.5 \Omega$ ) or 30 V DC / 1.5 A ( $R_i < 0.3 \Omega$ )
- Overload indicator: LED red, overload or short-circuit
- 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 off 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		function modules		
		variability	standard	4...20 mA	PROFIBUS	switching module	display module	HART <sup>®</sup> -module
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	0.0...120.0 sec.	0.0 sec.	w	x	—	x	x
min-max-values	HI / LO	pressure and temperature resettable	—	—	x	—	x	x
characteristic	FUNC	linear, table	linear	w	—	—	x	x
pressure unit	UNIT	bar, mbar, kPa, MPa, mmH2O, mH2O, kg/cm <sup>2</sup> , psi	bar	w	x	—	x	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% o.n.range span -10...+10 % of nom. range	—	—	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
factory data reset	RESET	—	—	—	x	—	x	x
switch points	SWCH1(2)	0.0...100.0 % of nominal range	50 %	—	x	x	x	x
hysteresis	SWCH1(2)/Hyst.	0.0...100.0 % of nominal range	0,1 % hyster.falling	—	x	w	x	x
switching function	SWCH1(2)/SwTyp	breaker, maker	breaker	—	x	w	x	x
write protection	—	ON, OFF	OFF	x	x	x	x	x

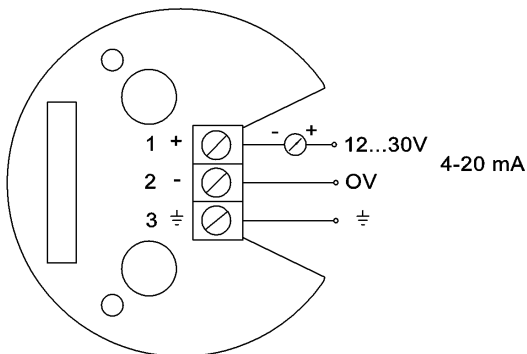
x = configurable

w = factory setting

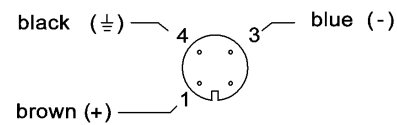
## Connection diagram

### Basic module: 4...20 mA

Internal terminals with cable gland design

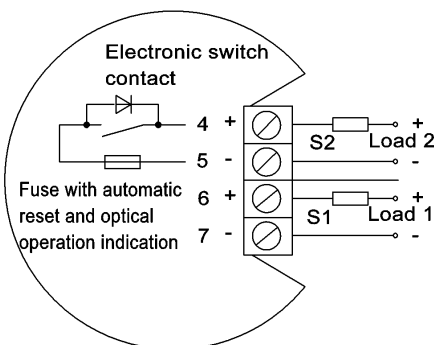


Circular plug connector<sup>1</sup>

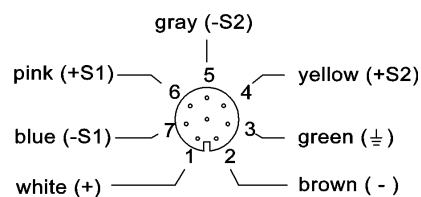


### Switching module

Internal terminals with cable gland design

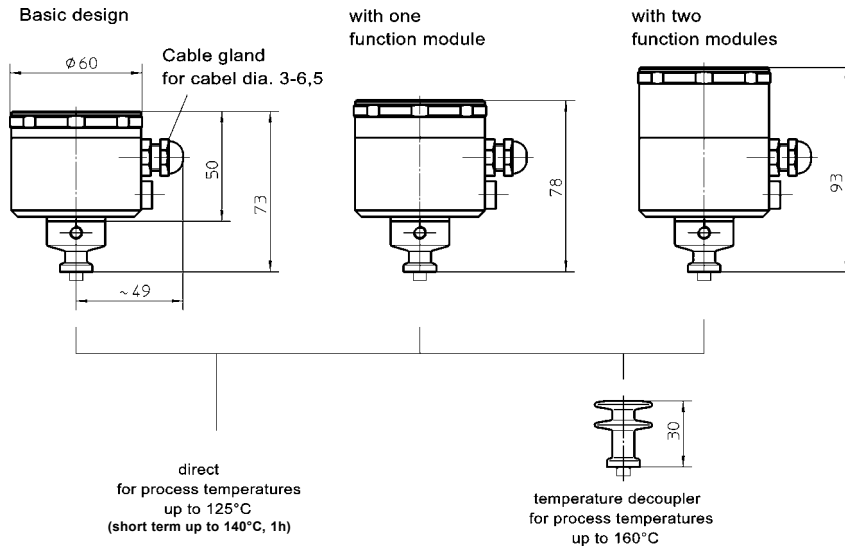


Circular plug connector<sup>1</sup>



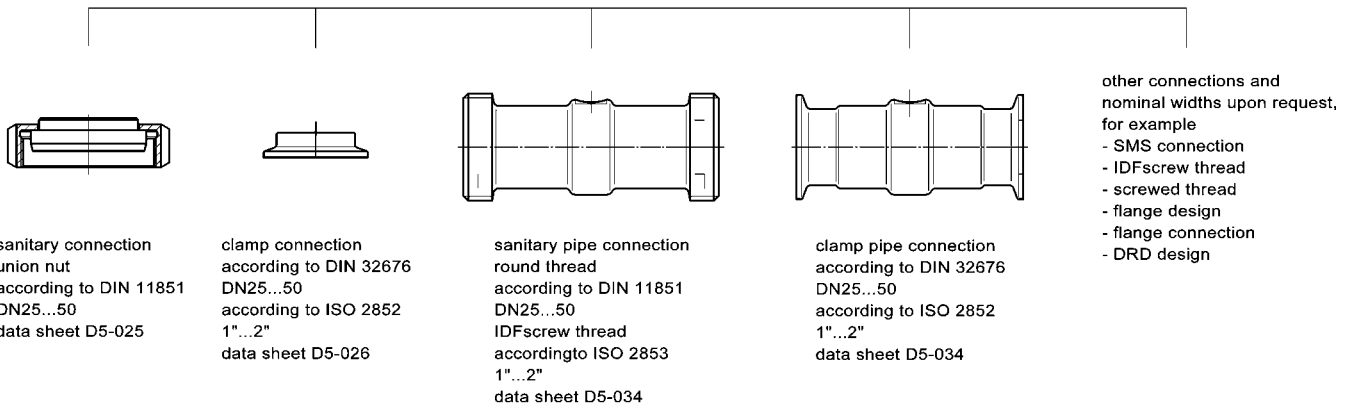
<sup>1</sup> color code as Binder series 763

**Housing**

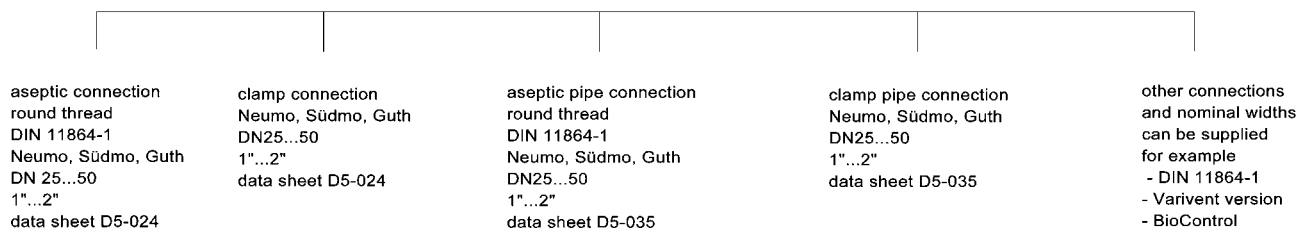


**Process connections**

standard connections

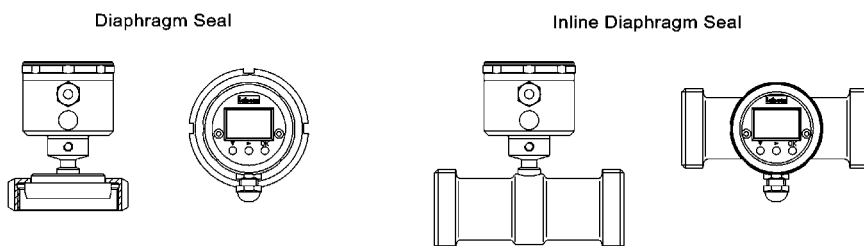


aseptic connections



**Mounting position**

Mounting position: any



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

**Order Details**

- please give additional specifications for models not listed -

PASCAL CV for food/pharmaceuticals/biotechnology		CV311												
explosion protection	· without		0											
	· explosion protection: II 1/2G EEx ia IIC T6		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 <sup>2</sup>		F41											
	0 to nominal range, unit: psi		F50											
	set from... to... unit ( please fill in details )		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											
	PROFIBUS PA		not yet available											
	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											
display module	without		M1											
	multifunctional display with 5-position digital display and bar graph, pluggable		M2											
switching module	without switching module		N10											
	switching module with 2 contacts, pluggable	switching capacity 50V DC / 500 mA	N4 .											
		switching capacity 30V DC / 1.5A	N5 .											
	setting 1)	standard, s."Techn. description of switching module" at the factory, specify as required	0											
			1											
electrical connection	cable gland M 12x1.5	PA black (standard)	T10											
		brass nickel-plated	T11											
		stainless steel	T12											
	circular plug connector	M 12 x1.4 pin	T30											
M 12 x1.8 pin ( required for switching module )		T31												
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											
<b>process connection</b>														
standard connection <sup>2</sup>	flat diaphragm seal	sanitary connection with groove union nut according to DIN 11851	DN											
			· 25	DL2100										
			· 32	DL2200										
			· 40	DL2300										
			· 50	DL2400										
	clamp connection per ISO 2852	· 1"	DL3100											
		· 1 1/2"	DL3200											
		· 2"	DL3300											
		· 25	DL4100											
		· 32	DL4200											
inline diaphragm seal	sanitary pipe connection for pipes per DN 11850 round thread both sides acc. to DIN 11851	· 25	DF1110											
		· 32	DF1120											
		· 40	DF1130											
		· 50	DF1140											
		· 1"	DF3110											
	clamp connection according to DIN 32676, both sides for pipes according to DIN 11850	· 25	DF3110											
		· 32	DF3120											
		· 40	DF3130											
		· 50	DF3140											
		· 1"	DF3210											
clamp connection according to ISO 2852 both sides, for pipes according to O.D. Tubing "inch"BS 4825 Part 1	· 1"	DF3210												
	· 1 1/2"	DF3230												
	· 2"	DF3240												
hygienic	· surface, standard													
	· hygienic version <sup>1</sup> (special surface, see data sheet D1-030)		HY											
diaphragm material	· stainless steel material no. 1.4404, standard													
	· stainless steel material no. 1.4435 other material upon request		A4001 A4007 A4009											
system filling	· foodstuff oil FD1 (USDA-H1 according to FDA) temperature range: -10...+140 °C, standard													
	· foodstuff oil FD1 (USDA-H1 according to FDA) temperature range: -20...+160 °C, standard other liquids and temp. ranges upon request		L22 L23											
<b>order code (example):</b>			CV3110	A1051	F11	H1100	M2	N10	T10	K1085	DL2100	A4001	L22	
<b>additional features</b>														
process connection (diaphragm seal) electropolished			W4035											
material certificate as per EN 10204-3.1B, wetted parts			W1020											
inspection certificate as per EN 10204- 3.1B calibration certificate with 5 measuring points			W1201											