

## Differential pressure transmitter PASCAL Ci4 Delta P for high static working pressure, PN 160, Type series CI4340



### Application area

- General process engineering
- Chemical industry
- Petrochemical industry
- General process technology
- Power generation
- Environmental engineering
- Water / wastewater

### Features

- Simultaneous display of differential pressure and static pressure
- Long-term stability 0,1 % within 5 years
- Stainless steel case in sturdy design, degree of protection IP 65/67
- Reference accuracy 0.07 %
- High-resolution graphic display with intuitive operation and backlight
- Comprehensive parameterising functions
- Comprehensive simulation and diagnostic functions
- Quick access to device data
- Development according to SIL2
- Nominal range 100 mbar bar to 16 bar
- Turndown up to 100:1
- Maximum working pressure 160 bar
- Measuring rate up to 50 Hz
- Output signal 4...20 mA with HART® protocol
- Configuration memory
- Digital communication via PDM, FDT/DTM, 375/475 Field Communicator
- Output functions: linear, invers, square root, table function with up to 64 support points
- Wetted parts stainless steel
- Operating software LAB4Level for intuitive parameterisation of level measurements (upon request)
- EAC declaration (upon request)

### Options

- Approvals/Certificates
  - Explosion protection for gases and dust
  - Classification per SIL2
  - Certificate of measuring equipment for Russian Federation
  - Calibration certificate per DIN EN 10204
- Removable display and control unit
- Degree of protection IP 69K
- Front cover of stainless steel with window of non-splintering glass

### Application

The digital differential pressure transmitter PASCAL Ci4 Delta P for high static working pressure is suitable for the use in sturdy ambient conditions for the measurement of differential pressure in filters and pumps. Is also suitable for deriving values as flow and filling level.

Data sheet D4-071 Rev. 1C7

## Technical data

### Measuring ranges

Up to a turndown of 100:1 the measuring span can be freely selected.

Nominal range	Measuring span		Measuring limits		Static excess pressure and overload capacity
	min. span	max. span	lower limit	upper limit	
100 mbar	1 mbar	200 mbar	-100 mbar	100 mbar	one-sided (+/-) / double-sided 160 bar
500 mbar	5 mbar	1 bar	- 500 bar	500 mbar	160 bar
3 bar	30 mbar	6 bar	-3 bar	3 bar	160 bar
16 bar	160 mbar	32 bar	- 16 bar	16 bar	160 bar

Minimum permissible static pressure: 5 mbar abs (at reference conditions)

### Constructional design / case

Design: Two-chamber case, continuously rotatable by  $\pm 170^\circ$   
Case surface blasted

Material case:

- Stainless steel mat.no. 1.4301/1.4305 (304/303)
- Stainless steel mat.no. 1.4404 (316L)

Material front cover:

- Polypropylene, black
- Stainless steel mat.no. 1.4305 (303)
- Stainless steel mat.no. 1.4404 (316L)

Gaskets: Silicone / NBR

Degree of protection per EN 60529:

- IP 65 / IP 67
- IP 69K

Climatic category per EN 60721 3-4: 4K4H

Vibration resistance per EN 61298-3:

- 10...60 Hz:  $\pm 0.35$  mm
- 60...1000 Hz: 5 g

Material window:

- Macrolon
- Non-splintering glass (requires front cover of stainless steel)

Elec. connection:

- Circular connector M12
- Cable gland M16x1.5, PA black
- Cable gland M16x1.5, stainless steel
- Cable gland M20x1.5, PA black
- Cable gland M20x1.5, stainless steel
- 1/2" NPT, PA black

Further connections upon request

Terminal blocks:

- Spring clamp terminals up to 1.5 mm<sup>2</sup>
- Pole terminals up to 2.5 mm<sup>2</sup>
- Screw terminals up to 2.5 mm<sup>2</sup>

Weight: approx. 2.9 kg

Type plate: Laser marking

### Process connection

Design: Process flange with connection dimension per EN 61518 and with mounting thread 7/16 – 20 UNF

- Process connection 1/4 – 18 NPT

- Process connection 1/2 – 14 NPT via oval flange (see accessories)

Further process connections upon request.

Ventilation:

- without, with sealing plug 1/4" NPT
- with ventilation valve 1/4" NPT

Gasket:

- EPDM, FDA compliant (standard) temperature range -40...85 °C
- FKM (Viton) temperature range -20...85 °C

### Material wetted parts

Process flange: Stainless steel mat.no. 1.4404 (316L)

Diaphragm: Stainless steel mat.-no. 1.4404 (316L)

Gasket: EPDM or FKM

Oval flange: Stainless steel mat.-no. 1.4404 (316L)

Ventilation valve: Stainless steel mat.-no. 1.4404 (316L)

Sealing plug: Stainless steel mat.-no. 1.4404 (316L)

### Measuring system

Sensor: Piezoresistive measuring element

System filling: Silicone oil

### Accuracy

Reference cond. per EN 61298-1:

- $T_U = \text{const. (15...25) } ^\circ\text{C}$
- $\varphi = \text{const. (45...75) \% r.F.}$
- $p_U = \text{const. (860...1060) mbar}$
- $U_B = 24 \text{ V DC } (\pm 3 \text{ V DC})$
- $R_B = 50 \text{ } \Omega, \text{ HART: } 250 \text{ } \Omega$
- Ground connected
- Lower range value = 0 bar

Calibration position: Process connection bottom: vertical

Data sheet D4-071 Rev. 1C7

Reference accuracy:

Per EN 61298-2 incl. non-linearity, hysteresis and repeatability refer to the adjusted measuring span:		
Nominal range	Turndown < 10:1	Turndown > 10:1
100 mbar	≤ ± 0.07 %	≤ ±(0.01 % x TD-0.0325 %)
500 mbar		≤ ±(0.005 %x TD+0.0175 %)
3 bar		≤ ±(0.005 %x TD+0.0175 %)
16 bar		≤ ±(0.01 % x TD-0.0325 %)

Long-term drift: Refer to nominal range  
≤ 0.1 % within 5 years

Temperature influence of ambient temperature:

Refer to measuring range (per IEC 61298-3):	
Nominal range	Temperature range: -10...60 °C
100 mbar	≤ ±(0.15 % + 0.15 % x TD)
500 mbar	≤ ±(0.15 % + 0.05 % x TD)
3 bar	≤ ±(0.15 % + 0.05 % x TD)
16 bar	≤ ±(0.15 % + 0.15 % x TD)
Nominal range	Temperature range: -40...80 °C
100 mbar	≤ ±(0.15 % + 0.2 % x TD)
500 mbar	≤ ±(0.2 % + 0.06 % x TD)
3 bar	≤ ±(0.2 % + 0.06 % x TD)
16 bar	≤ ±(0.15 % + 0.2 % x TD)

Temperature influence output (-40...80 °C):  
≤ ±(0,04 % / 10 K)

Influence static pressure (per EN 61298-3):  
Refer to nominal range:  
≤ ±(0.1 % + 0.1 % x TD)

Indication	
Display:	<ul style="list-style-type: none"> <li>High-resolution graphic display with backlight</li> <li>4-button operation</li> <li>Freely configurable display modes</li> <li>continuously rotatable by ± 170 (detent every 90°)</li> <li>Optional: Remote display and control unit, can be used up to 10 m away from measuring point</li> </ul>
Configuration memory:	<ul style="list-style-type: none"> <li>All parameterisation data can be copied from the device into the configuration memory in the display module. The data is permanently stored there, even in the event of power failure.</li> <li>The parameters can be transferred simply and quickly to other devices.</li> </ul>

## Output

Signal:	2-wire technology	4...20 mA
	Lower limit	3.8...4 mA
	Upper limit	20...21 mA
	Lower alarm current	< 3.6 mA
	Upper alarm current	> 21 mA
	Current limitation	22 mA
	Operational availability	< 12 s
	Response time t <sub>90</sub> at current output	typically 200 ms
	Digitale communication	HART® protocol, version 7

Communication via:

- Siemens PDM
- Pactware or compatible systems (FDT/DTM)
- 375 / 475 Field Communicator

Function:

- linear
- inverse response
- by square root
- table function with up to 64 support points

Turndown: max. 100:1

Damping: 0...999.9 s selectable in steps of 0.1 s

Measuring rate: 50 Hz

Resolution: 0.5 µA

Current sensing func.: 3.55...21.5 mA selectable in steps of 0.001 mA

Load R<sub>B</sub>: R<sub>B</sub> ≤ (U<sub>V</sub>-12V DC)/0,022 A [Ohm]  
U<sub>V</sub> = supply voltage  
for HART communication: R<sub>B</sub> ≥ 230 Ω

## Supply voltage

Functional range:	12...30 V DC, protected against polarity reversal
Ripple:	< 5 %

## Temperature ranges

Ambient:	-40...80 °C (Display visibility is limited at temperatures below - 30 °C)
Media	-40...85 °C ( at the measuring cell)
Storage:	-40...80 °C

Data sheet D4-071 Rev. 1C7

## Tests and certificates

### Ex approvals

ATEX: TÜV 13 ATEX 120264 X

⊕ II 1/2G Ex ia IIC TX Ga/Gb

⊕ II 1/2D Ex ia IIIC Txx °C Da/Db

⊕ II 2G Ex ia IIC TX Gb

⊕ II 2D Ex ia IIIC Txx °C Db

IECEX: IECEX TUN 13.0018X

Ex ia IIC TX Ga/Gb

Ex ia IIIC Txx °C Da/Db

Ex ia IIC TX Gb

Ex ia IIIC Txx °C Db

EMC : per EN 61326-1, NAMUR NE21

SIL2: In preparation:  
Functional safety per EN 61508,  
classification per SIL2.

- EAC declaration upon request
- Certificate of measuring equipment for Russian Federation

For more detailed information see Ex Safety Instruction  
XA\_022.

## Parameterisation, simulation and adjustment

### Parameterisation \*

Parameter	Values	Default setting
<b>Device</b>		
device ID	16 digits, freely selectable	LABOM PASCAL Ci4
lower range value	at any value within nominal range	0 bar
upper range value	at any value within nominal range	end of nominal range
damping	0.0...999.9 s	0.0 s
<b>Display and control unit</b>		
pressure unit	mbar, bar, Pa, hPa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , psi, atm, torr, mmH <sub>2</sub> O, mH <sub>2</sub> O, inH <sub>2</sub> O, ftH <sub>2</sub> O, mmHg, inHg	bar
static pressure unit	mbar, bar, Pa, hPa, kPa, MPa, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , psi, atm, torr, mmH <sub>2</sub> O, mH <sub>2</sub> O, inH <sub>2</sub> O, ftH <sub>2</sub> O, mmHg, inHg	bar
temperature unit	°C, °F, °R, K	°C
lighting	on, off	on
language	English, German	German
	English, Chinese	as ordered
	English, Spanish, French	as ordered
	English, Polish, German	as ordered
	English, Turkish, German	as ordered
decimal point	auto, x.xxxx, xx.xxx, xxx.xx, xxxx.x, xxxxx	auto
display mode	five values, four values, three values, two values, big display	four values
main value	pressure, current in %, current in mA	pressure
secondary values	pressure, static pressure, current in %, current in mA, sensor temperature, device ID, HART-TAG, HART-Descriptor, <empty>	current in %, current in mA, device ID
<b>Current output</b>		
output function	linear, inverse response, by square root, table function	linear
lower current limit	3.8...4.0 mA	3.8 mA
upper current limit	20...21 mA	20.5 mA
alarm current	low (<3.6 mA), high (> 21.0 mA)	low (<3.6 mA)
position correction (mounting position)	on, off	off
<b>Maintenance counter</b>		
maintenance interval	0...9999 days	0 days
status	on, off	off
<b>HART data</b>		
HART address	0...63	0
number of response preambels	5...20	5
current mode	proportional, constant	proportional

### Diagnostic functions

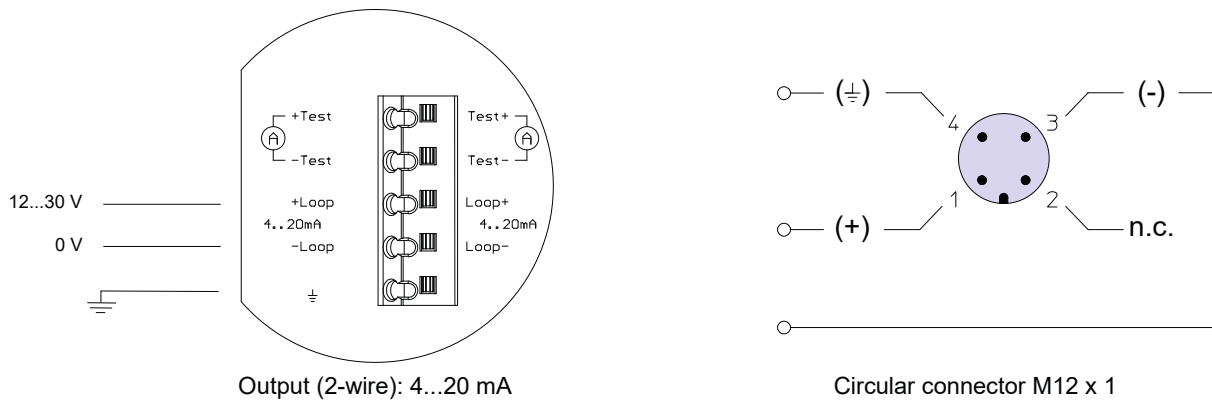
Self-diagnosis	Description	Value range
RAM-Test	Permanent check of the read/write memory	/
ROM-Test	Permanent check of the checksum via the program memory	/
Bridge circuit test	Permanent check of the bridge circuit	/
CRC parameterisation test	Permanent check of the checksum via the parameter memory	/
Electronics temperature monitoring	Permanent check of the electronics temperature	/
<b>Process diagnostics</b>		
Maintenance timer	Check of the maintenance cycles	/
Operating hours counter	Capture of operating hours	/
Min/Max values	Check of minimum and maximum process pressure and sensor temperature	/
<b>Measuring circuit diagnostics</b>		
loop-test	Setting of a fixed current value at the output	3,55...21,5 mA
pressure simulation	Setting a fixed pressure value, it also considers dampingk and tabular function unlike the current simulation	Nominal range

### Adjustment

Type	Description
zero point correction	adjusts reading to zero at same pressure on both connections
position correction	adjusts reading of mounted instrument to zero at same pressure on both connections
lower adjustment	adjusts reading to applied pressure (affects zero point)
upper adjustment	adjusts reading to applied pressure (affects span only)
current adjustment	adjusts current output to achieve 4 resp. 20 mA at the end of the measurement chain

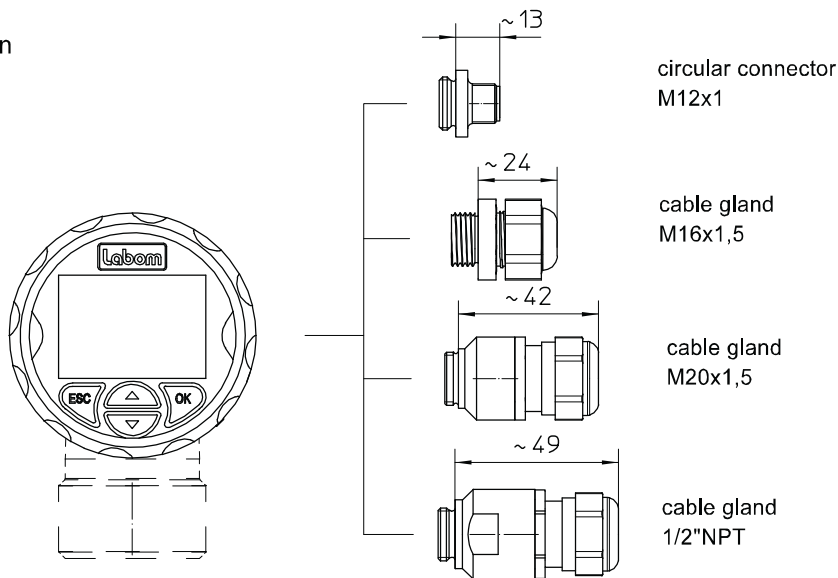
\* Operating software LAB4Level for intuitive parameterisation of level measurements upon request

### Connection diagram



### Electrical connection

#### Electrical connection

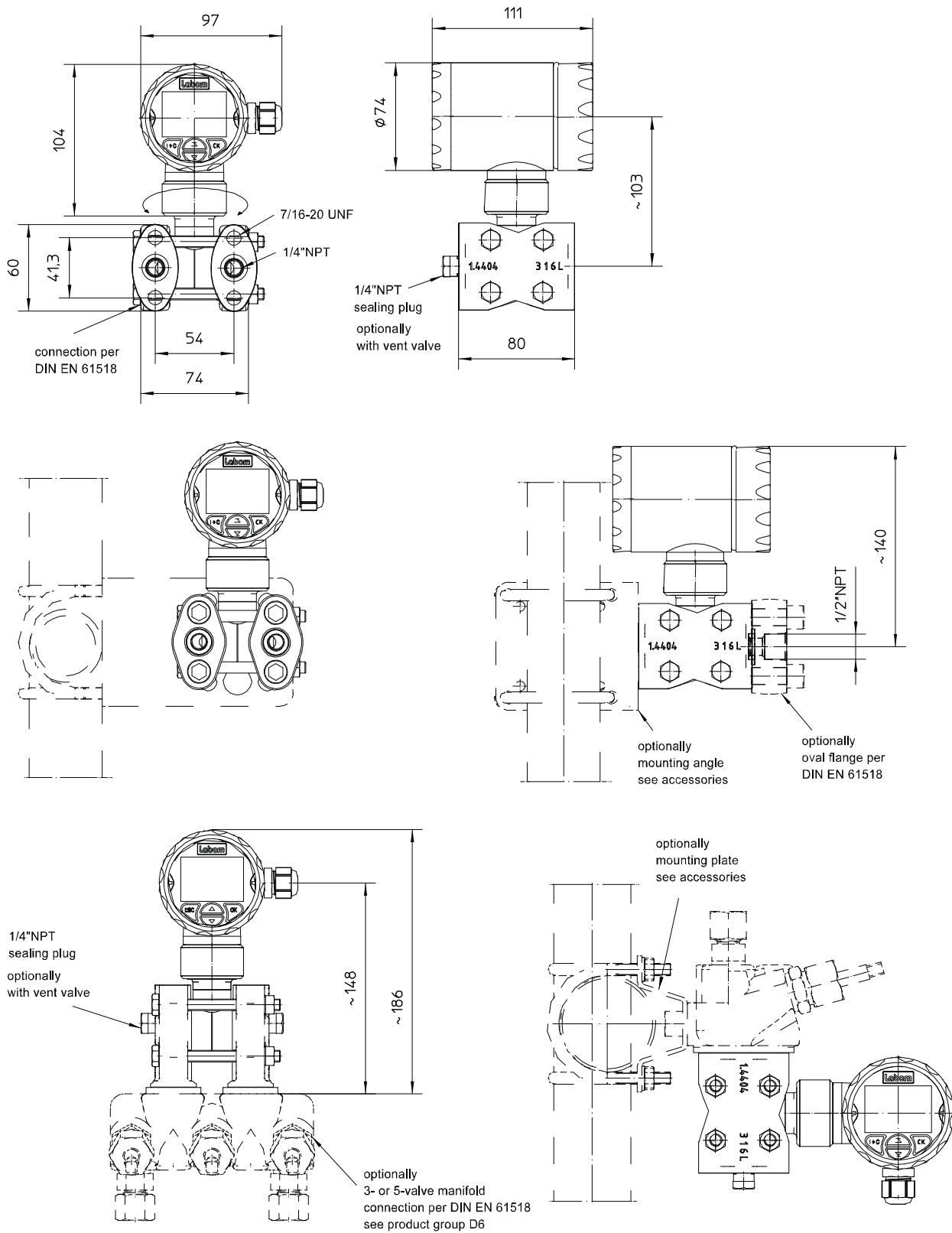


All dimensions are in mm.

Data sheet D4-071 Rev. 1C7

## Dimensions

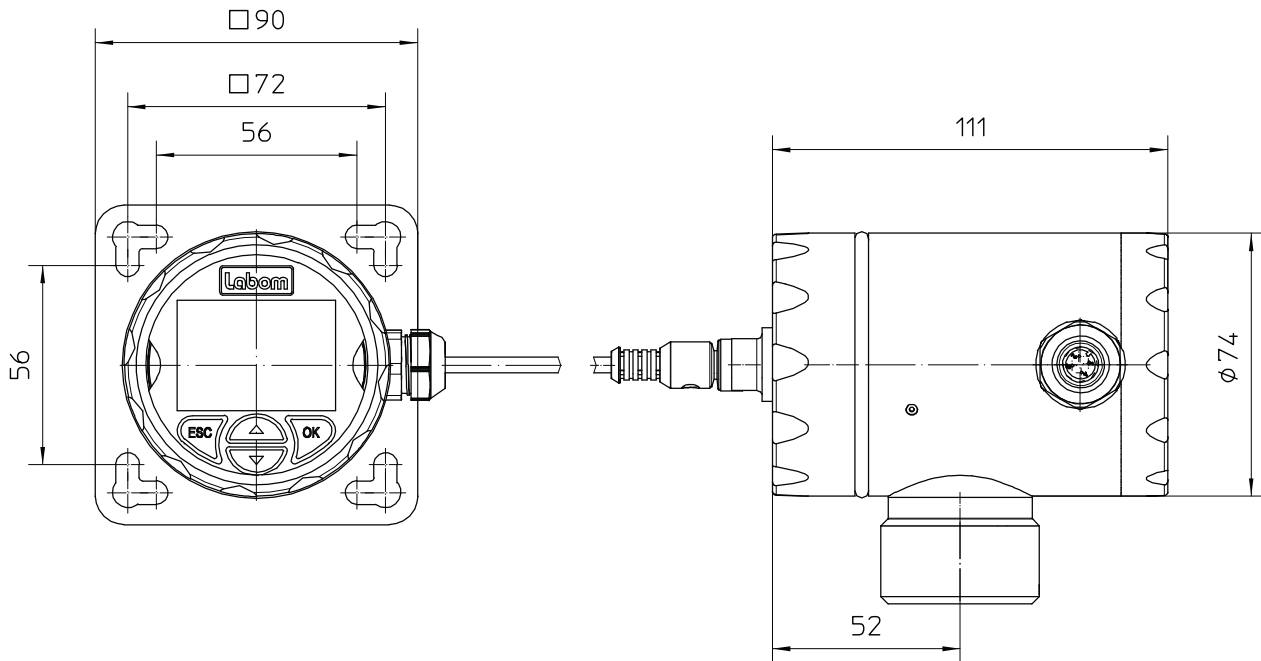
### Case and process connections



All dimensions are in mm.

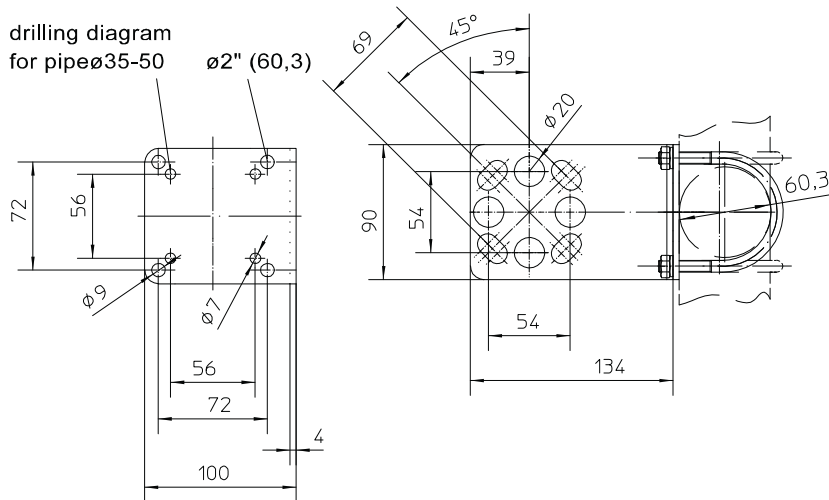
Data sheet D4-071 Rev. 1C7

**Remote display and control unit (Type series MC1140)**



All dimensions are in mm

**Mounting angle for wall and pipe-mounting (Type series MM1500)**



All dimensions are in mm

Data sheet D4-071 Rev. 1C7



## Order details

### Differential pressure transmitter PASCAL Ci4 Delta P for high static working pressure, Type series CI4340

Order details PASCAL Ci4 Delta P CI4340				
<b>CI4340</b>	Differential pressure transmitter PASCAL Ci4 Delta P for high static working pressure, up to PN 160			
<b>A1008.2</b>	measuring range	100 mbar		
<b>A1573.2</b>		500 mbar		
<b>A1618.2</b>		3 bar		
<b>A1059.2</b>		16 bar		
<b>F1</b>	parameterisation	factory settings (standard)		
<b>F2</b>		as per customer's specification (pls. specify)		
<b>H21</b>	output signal	4...20 mA, with HART-protocol		
<b>Y1.</b>	material case	stainless steel mat.-no. 1.4301/1.4305 (304/303)		
<b>Y2.</b>		stainless steel mat.-no. 1.4404 (316L)		
<b>1</b>	material front cover	polypropylene (black), window Macrolon		
<b>2</b>		stainless steel (see case), window non-splintering glass		
<b>3</b>		stainless steel (see case), closed, without window		
			default language	available language
<b>M21.1</b>	display	High-resolution graphic display with backlight, intuitive 4-button operation, quick access to device data	German (standard)	English, German
<b>M22.1</b>			English	
<b>M22.2</b>			English	English, Chinese
<b>M23.1</b>			Chinese	
<b>M23.2</b>			English	English, Spanish, French
<b>M23.3</b>			Spanish	
<b>M25.1</b>			French	
<b>M25.2</b>			English	English, Polish, German
<b>M25.3</b>			Polish	
<b>M26.1</b>			German	
<b>M26.2</b>			English	English, Turkish, German
<b>M26.3</b>			Turkish	
<b>M26.3</b>			German	
<b>M1</b>				without display
<b>T20.</b>	electrical connection	cable gland	M16 x 1.5 polyamide, for cable Ø 4.5-10	
<b>T22.</b>			M16 x 1.5 stainless steel, for cable Ø 5-9.5 mm	
<b>T15.</b>			M20 x 1.5 polyamide, for cable Ø 7-13 mm	
<b>T17.</b>			M20 x 1.5 stainless steel, for cable Ø 8-13 mm	
<b>T27.</b>		1/2" NPT polyamide, for cable Ø 6-12 mm		
<b>0</b>		cable clamps	spring clamp terminals up to 1.5 mm <sup>2</sup>	
<b>5</b>			pole terminals 2.5 mm <sup>2</sup>	
<b>6</b>	screw terminals 2.5 mm <sup>2</sup>			
<b>T30</b>		circular connector M12 x 1 (4-polig)		
<b>K511..</b>	process connection	process flange	stainless steel 316L, connection per DIN EN 61518, - process connection 1/4 – 18 NPT - mounting thread 7/16 – 20 UNF	
<b>K532..</b>			stainless steel 316L, connection per DIN EN 61518, process flange turned by 90°, compact design - process connection 1/4 – 18 NPT bottom - mounting thread 7/16 – 20 UNF bottom - ventilation lateral	
<b>3</b>		ventilation	without, with sealing plug of stainless steel 316L	
<b>4</b>			with vent valve of stainless steel 316L	
<b>2</b>		gasket	EPDM, FDA compliant, temperature range -40...85 °C (standard)	
<b>1</b>	FKM (Viton), temperature range -20...85 °C			
<b>G1</b>	diaphragm material	stainless steel mat.-no. 1.4404 / 1.4435 (316L)		

Additional features (to be indicated if required)			
S62	Ex marking <sup>1</sup>	ATEX	<div style="display: flex; justify-content: space-between;"> <span>⊕ II 1/2G, II 2G Ex ia IIC TX Ga/Gb, Gb</span> </div> <div style="display: flex; justify-content: space-between;"> <span>⊕ II 1/2D, II 2D Ex ia IIIC Txx°C Da/Db, Db</span> </div>
		IECEX	<div style="display: flex; justify-content: space-between;"> <span>Ex ia IIC TX Ga/Gb, Gb</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Ex ia IIIC Txx°C Da/Db, Db</span> </div>
T4	degree of protection	IP 69K <sup>1</sup>	
W1201	calibration certificate	per EN 10204-3.1, 5 measuring points	
W2673	certificate of measuring equipment for Russian Federation		
Accessories			
MM1500-A11	mounting angle	for wall and pipe-mounting Ø 35-50 mm of stainless steel, incl. screws 7/16-20 UNF	
MM1500-A12		for wall and pipe-mounting Ø 2" of stainless steel, incl. screws 7/16-20 UNF	
MC1060-A132	oval flange	oval flange 1/2-14 NPT per EN 61518, modal A of stainless steel mat.-no. 1.4404 (316L), incl. 2 screws 7/16-20 UNF, material stainless steel, incl. gasket PTFE	
MC1060-A133		oval flange 1/2-14 NPT per EN 61518, modal A of stainless steel mat.-no. 1.4404 (316L), incl. 2 screws 7/16-20 UNF, material stainless steel, incl. gasket FKM Viton	
MC1140	PASCAL Ci4 remote display and control unit including device holder		
	material stainless steel, incl. front ring with seal and blind cap with circular connector M12x1		
A1.	connection cable	length: 10 m, material: PUR, with circular connector M12 x1	
1	internal cable clamps	spring clamp terminals up to 1.5 mm <sup>2</sup>	
2		pole terminals 2.5 mm <sup>2</sup>	
3		screw terminals 2.5 mm <sup>2</sup>	
T1	degree of protection	IP 65 / IP 67 (standard)	
MZ8120-A11	mounting set for wall bracket	2 mounting brackets for pipe and frame mounting Ø 30-50 mm, incl. nuts and washers	
MZ8120-A12		2 mounting brackets for pipe and frame mounting Ø 40-64 mm, incl. nuts and washers	
MC1020	HART-Modem	RS 232 -interface	
MC1040		USB-interface	
MC1041		USB-interface, Ex	

Order code (example): CI4340 – A1573.2 – F1 – H21 – Y12 – T200 – K51132 – G1 - ...

<sup>1</sup> Requires front cover of stainless steel