



Application area

- Machinery construction
- Chemical and petrochemical industry
- General process technology

Features

- Pressure transmitter for the measuring of relative and absolute pressures of gases, vapors and liquids
- High-resolution graphic display with backlight
- Intuitive 4-button operation
- Comprehensive parameterising functions
- Comprehensive simulation and diagnostic functions
- Quick access to device data
- Development according to SIL2
- Nominal range 0.25 bar to 400 bar
- Turndown up to 100:1
- Measuring rate up to 100 Hz
- Accuracy 0.1 %
- 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
- Table function with up to 64 support points
- Stainless steel case in sturdy design, degree of protection IP 65/67
- Media temperature -40...100 °C
- Wetted parts stainless steel
- Process connections: various screw-in thread with internal diaphragm

Options

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

Application

The digital pressure transmitter PASCAL Ci4 is suitable for measuring the relative and absolute pressure of gases, vapors and liquids. Due to the design the transmitter is suitable for highest requirements. The 4 operation buttons allow an easy and fast parameterisation.

Technical data

Measuring ranges

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

Nominal range	Measuring range	Measuring span		Overload capacity	Lower measuring range limit	Type of sensor
		minimum span	maximum span			
0.25 bar rel.	-0.25...0.25 bar rel.	0.0025 bar	0.5 bar	1 bar rel.	750 mbar abs.	Piezoresistive
1 bar rel.	-1...1 bar rel.	0.01 bar	2 bar	3 bar rel.	30 mbar abs.	Piezoresistive
4 bar rel.	-1...4 bar rel.	0.04 bar	5 bar	10 bar rel.	30 mbar abs.	Piezoresistive
16 bar rel.	-1...16 bar rel.	0.16 bar	17 bar	60 bar rel.	30 mbar abs.	Piezoresistive
40 bar rel.	-1...40 bar rel.	0.4 bar	41 bar	100 bar rel.	30 mbar abs.	Piezoresistive
100 bar rel.	-1...100 bar rel.	1 bar	101 bar	200 bar rel.	30 mbar abs.	Thin film
400 bar rel.	-1...400 bar rel.	4 bar	401 bar	750 bar rel.	30 mbar abs.	Thin film
1 bar abs.	0...1 bar abs.	0.01 bar abs.	1 bar abs.	3 bar abs.	0 mbar abs.	Piezoresistive
4 bar abs.	0...4 bar abs.	0.04 bar abs.	4 bar abs.	10 bar abs.	0 mbar abs.	Piezoresistive
16 bar abs.	0...16 bar abs.	0.16 bar abs.	16 bar abs.	60 bar abs.	0 mbar abs.	Piezoresistive

Long-term vacuum measurements at relative measuring ranges may cause changes in the properties of the measuring device. Vacuum-proof designs are available upon request.

Constructional design / case

Design: Two-chamber case, continuously rotatable by $\pm 170^\circ\text{C}$

Material case: Stainless steel mat.no. 1.4301 (304)
Case surface blasted

Material front cover:

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

Gaskets: Silicone / NBR

Degree of protection:

- IP 65 / IP 67 per EN 60529
- IP 69K

Climatic category: EN 60721 3-4, 4K4H

Vibration resistance: per EN 61298-3
10...60 Hz: $\pm 0,35\text{ mm}$
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^2
- Pole terminals up to 2.5 mm^2
- Screwed terminals up to 2.5 mm^2

Weight: Approx. 1.4 kg

Type plate: Laser marking

Process connection

Design:

- G 1/2 B per DIN EN 837-1
- G 1/4 B per DIN EN 837-1
- G 1/4 A per DIN 3852 Form E
- 1/2 " NPT
- 1/4 " NPT

Further process connections upon request

Material wetted parts

Sensor :	Piezoresistive	Thin film
Sensor diaphragm:	1.4404/1.4435 (316L)	1.4542 (630)
Socket:	1.4404/1.4435 (316L)	1.4301/1.4404 (304/316L)

Measuring system

Sensor:	Piezoresistive	Thin film
Sensor filling:	Synthetic oil, free of silicone FD1, FDA listed	without

Accuracy

Reference cond.: per DIN EN 60770-1
 $T_U = \text{const. } (15...25)^\circ\text{C}$
 $\varphi = \text{const. } (45...75) \% \text{ r.F.}$
 $p_U = \text{const. } (860...1060) \text{ mbar}$
 $U_B = 24 \text{ V DC } (\pm 3 \text{ V DC})$
 $R_B = 50 \Omega, \text{ HART: } 250 \Omega$
 Ground connected
 $MBA = 0 \text{ bar}$

Calibration position: Vertical mounting position, bottom connection

Deviation of characteristic:	Refer to the adjusted measuring span (Limit point method per DIN 16086) Nominal range 1-400 bar, 1-16 bar abs. Turndown 5:1 0.1 % Turndown > 5:1 0.02 % x TD Nominal range 0.25 bar Turndown 5:1 0.2 % Turndown > 5:1 0.04 % x TD
Long-term drift:	Refer to nominal range ≤ 0.1 %/year
Operational availability:	< 12 s
Response time t_{90} at current output:	for 20 Hz measuring rate: typically 120 ms for 100 Hz measuring rate: typically 50 ms
Temperature influence, case:	Refer to nominal range Ambient temperature -20...80 °C: Nominal range 1-400 bar 0.1 % /10K, max. 0.3 % Nominal range 0.25 bar 0.15 % /10K, max. 0.4 % Ambient temperature -40...-20 °C: Typical 0.2 % /10K

Indication

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

Temperature ranges

Ambient:	-40...80 °C (Display visibility is limited at temperatures below - 30 °C)
Media:	-40...100 ° C
Storage:	-40...80 ° ° C

Supply voltage

Functional range:	12...30 V DC
Ripple:	± 5 %

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
	Digital communication:	HART ® protocol, version 7
	Communication via:	<ul style="list-style-type: none"> PDM version 6 and 8 Pactware or compatible systems (FDT/DTM) 375 / 475 Field Communicator (in preparation)
Function:	Adjustable:	<ul style="list-style-type: none"> 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:	20 Hz, switchable to 100 Hz	
Resolution:	1 µA	
Current sensing func.	3.55...21.5 mA selectable in steps of 0.001 mA	
Load R_B :	$R_B \leq (U_V - 12V \text{ DC}) / 0.022 \text{ A [Ohm]}$ $U_V = \text{supply voltage}$	

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

For more detailed information see Ex Safety Instruction XA_010

EMC:	Per DIN EN 61326-1, NAMUR NE21
SIL 2:	Classification per SIL2, TÜV-Reg.-Nr. 44 799 13190201
	<ul style="list-style-type: none"> Certificate of measuring equipment for Russian Federation

Parameterisation, simulation and adjustment

Parameterisation

Parameter	Values	Default setting
Device		
device ID	16 digits, freely selectable	LABOM PASCAL Ci4
lower range value	at any value within nominal range	0 bar respectively 0 bar abs.
upper range value	at any value within nominal range	end of nominal range
measuring rate	20 Hz, 100 Hz	20 Hz
damping	0.0...999.9 s	0.0 s
Display and control unit		
pressure unit	mbar, bar, Pa, hPa, kPa, MPa, g/cm ² , kg/cm ² , psi, atm, torr, mmH ₂ O, mH ₂ O, inH ₂ O, ftH ₂ O, mmHg, inHg	bar
temperature unit	° C, ° F, ° R, K	°C
lighting	on, off	on
language	german, english	german
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, pressure (mA), pressure (%), temperature	pressure
secondary values	pressure, pressure (mA), pressure (%), temperature, device ID, HART-TAG, HART descriptor	pressure (mA), pressure (%), device ID, <empty>
Current output		
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
Maintenance counter		
maintenance interval	0...9999 days	0 days
status	on, off	off
HART data		
HART address	0...63	0
number of response preambels	5...20	5
current mode	proportional, constant	proportional

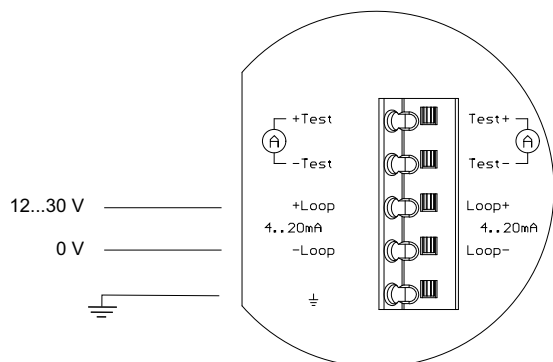
Diagnostic functions

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	/
Process diagnostics		
Maintenance timer	Check of the maintenance cycles	/
Operating hours counter	Capture of operating hours	/
Trailing pointers	Check of minimum and maximum process pressure and sensor temperature	/
Measuring circuit diagnostics		
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 damping and tabular function unlike the current simulation	Nominal range

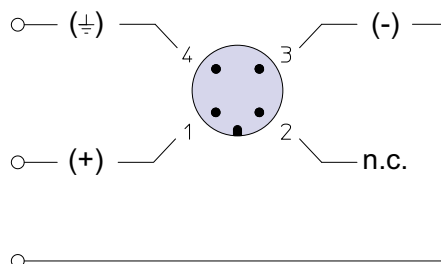
Adjustment

Type	Description
zero point correction	adjusts reading to zero at ambient pressure (for differential and gauge pressure devices)
position correction	adjusts reading of mounted device to zero at ambient pressure
lower adjustment	adjusts reading to applied pressure (affects zero point + span)
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

Connection diagram



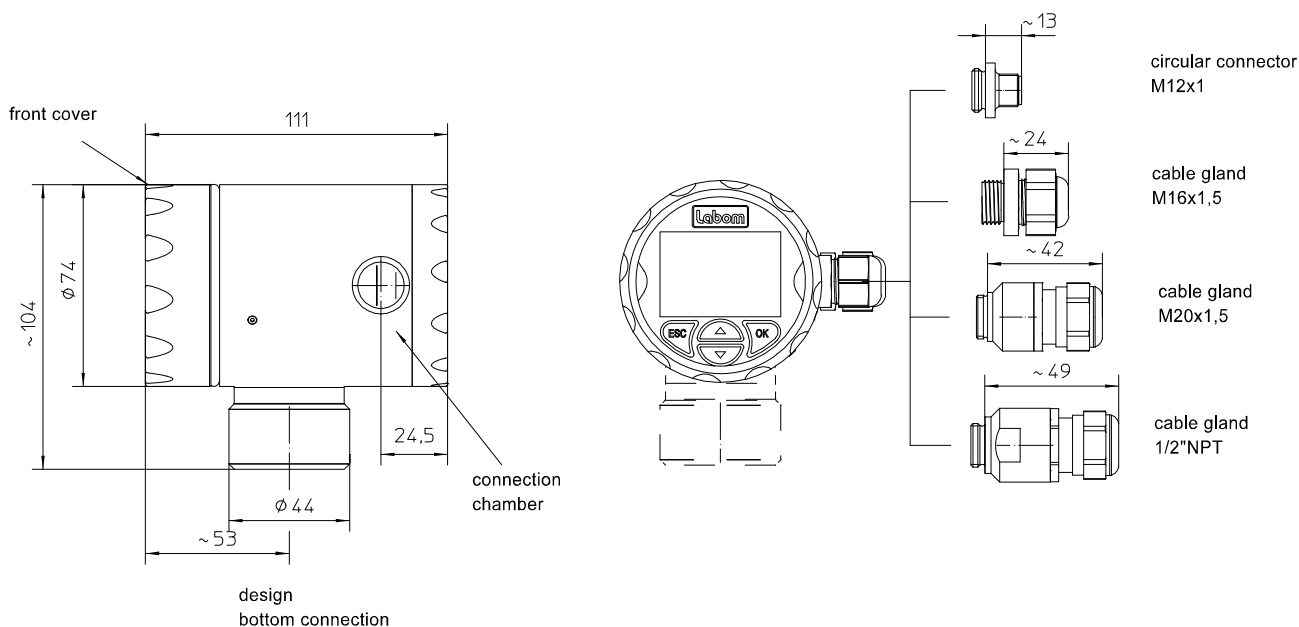
Output (2-wire): 4...20 mA



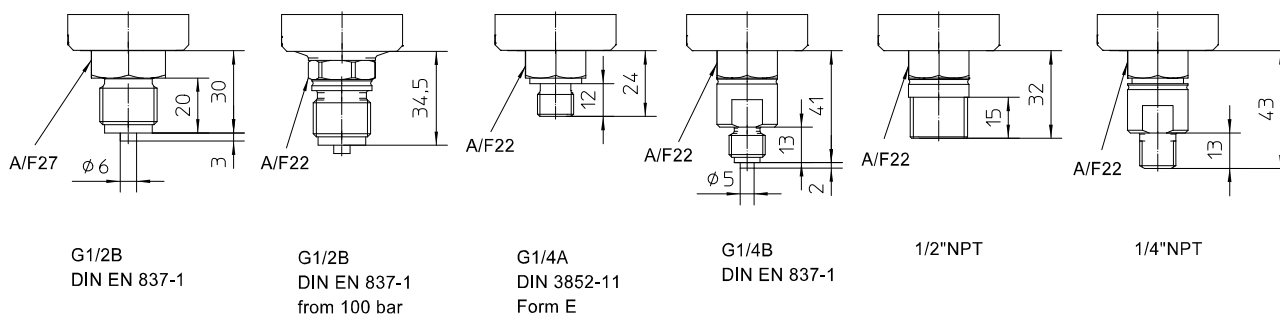
Circular connector M12 x 1

Dimensions

Case

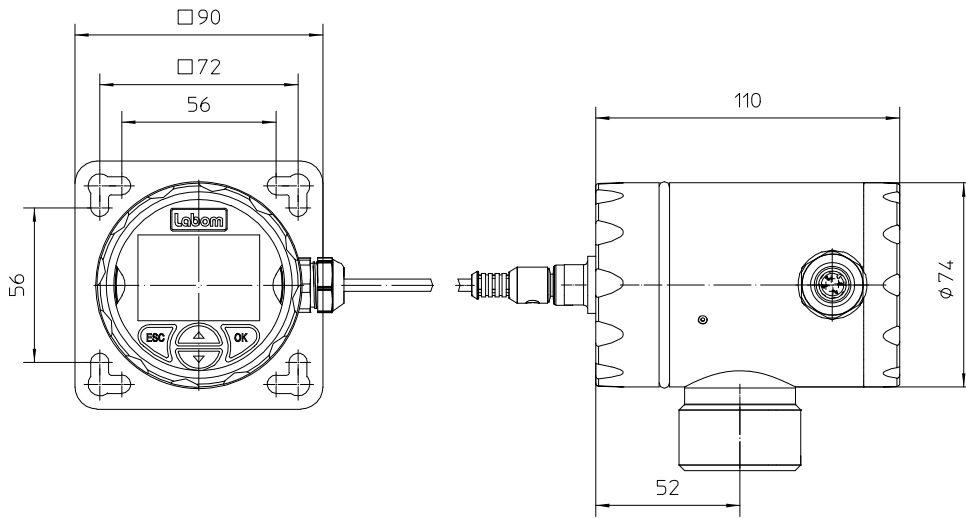


Process connections



All dimensions are in mm

Remote display and control unit (Type series MC1140)



All dimensions are in mm

Order details

Pressure transmitter PASCAL Ci4 for general application Type series CI4100

Order details PASCAL CI4100				
CI4100	pressure transmitter PASCAL Ci4 for general application			
	measuring range	nominal range	overload limit [bar]	sensortyp
A1078		0.25 bar	1	piezoresistive
A1053		1 bar	3	
A1056		4 bar	10	
A1059		16 bar	60	
A1061		40 bar	100	
A3063		100 bar	200	
A3066		400 bar	750	piezoresistive
B1053		1 bar abs.	3	
B1056		4 bar abs.	10	
B1059		16 bar abs.	60	
F1		parameterisation	factory settings (standard)	
F2	as per customer's specification (pls. specify)			
H21	output signal	4...20 mA, with HART-Protokoll		
Y1.	material case	stainless steel mat.-no. 1.4301 (304)		
1	material front cover	polypropylene (black), window Macrolon		
2		stainless steel, window non splintering glass		
T20.	electrical connection	cable gland M16 x 1.5 polyamide, for cable Ø 4.5-10 mm		
T22.		cable gland M16 x 1.5 stainless steel, for cable Ø 5-9.5 mm		
T15.		cable gland M20 x 1.5 polyamide, for cable Ø 7-13 mm		
T17.		cable gland M20 x 1.5 stainless steel, for cable Ø 8-13 mm		
T27.		cable gland 1/2" NPT polyamide, for cable Ø 6-12 mm		
0		cable clamps	spring clamp terminals up to 1.5 mm ²	
5			pole terminals 2.5 mm ²	
6			screwed terminals 2.5 mm ²	
T30	circular connector M12 x 1 (4 pin)			
K1010	process connection	G1/2 B per DIN EN 837-1		
K1002		G1/4 B per DIN EN 837-1		
K1024		G1/4 A per DIN 3852 Form E		
K1070		1/2" NPT		
K1072		1/4" NPT		
K9999		as per indication		

Additional features (to be indicated in case of need, only)				
S66	Ex marking ¹	ATEX	⊗ II 1/2G, II 2G Ex ia IIC TX Ga/Gb, Gb	
			⊗ II 1/2D, II 2D Ex ia IIIC Txx°C Da/Db, Db	
S76		IECEX	Ex ia IIC TX Ga/Gb, Gb	
			Ex ia IIIC Txx°C Da/Db, Db	
T4	degree of protection	IP 69K ¹		
M1	display	without display		
W1020	material certificate	per DIN EN 10204-3.1, wetted parts		
W1201	calibration certificate	per DIN EN 10204-3.1, 5 measuring points		
W2602	Functional safety per IEC/EN 61508, classification per SIL2, TÜV-reg.-no. 44 799 13190201			
W2673	certificate of measuring equipment for Russian Federation ²			

Accessories		
MC1140	PASCAL Ci4 remote display and control unit including wall bracket	
	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 ²
2		pole terminals 2.5 mm ²
3		screwed terminals 2.5 mm ²
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): **CI4100 – A1056 – F1 – H21 – Y12 – T200 – K1010 - ...**

¹ Requires front cover of stainless steel (order code: Y12)

² not for devices with Ex-protection