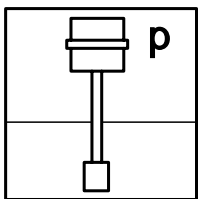


Hydrostatic pressure sensor



BARCON LHC-M

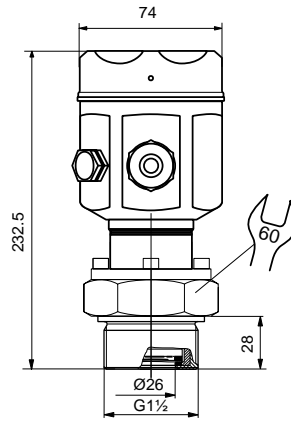


Features

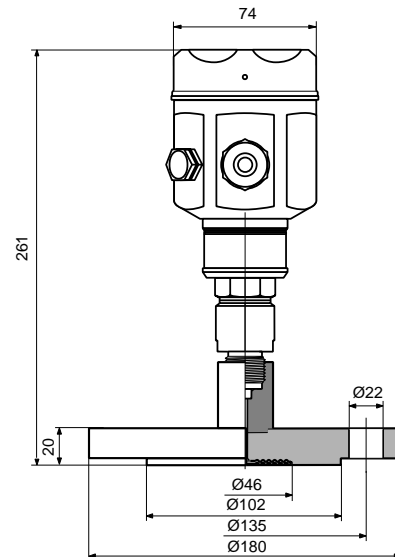
- Accuracy of measurement: Linearity better than 0.3 % of set span, adjustable measuring range with TD 10:1, long-term stability better than 0.1 %
- Sensors: Dry capacitive ceramic sensor up to 40 bar – corrosion and abrasion resistant with high overload protection and vacuum-tightness piezoresistive metal sensor for measuring ranges up to 400 bar.
- Electronics: Analogue, SMART or PROFIBUS PA
- Housing: fulfills the special hygienic requirements of the foodstuff and pharmaceutical industries. The polyester-epoxy coated aluminium housing has been field-proven in the process industry
- Process connections: Change of media-touched material by replacing the sensor with a pressure transmitter is possible.
- Process connection in acc. to EHEDG

Dimensions

LHC-M20 with process connection G51



LHC-M40 with process connection F76



Function

The hydrostatic pressure sensor LHC measure absolute and relative pressure in gases, vapours, liquids and can be used in all areas process engineering. The modular design of the BARCON pressure transmitter enables it to be used in all industrial environments.

A characteristic material or a special connection method depending on the process have to be used, for example,

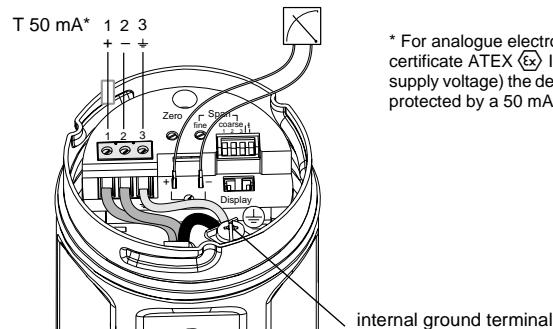
- mounting without dead volume for special hygienic applications
- flush-mounted installation for solidified or crystallising media
- special material for aggressive media

Electrical connection


Example connection I2/IB analogue electronics

More connection types see section electrical connections.

Analogue electronics 11.5 ... 45 V DC Test 4 ... 20 mA



* For analogue electronics versions with certificate ATEX Ex II 1/3 D (non Ex supply voltage) the device must always be protected by a 50 mA (slow-blow) fuse.

<p>Application</p> <p>Description</p> <p>Function principle</p>	<p>BARCON LHC-M</p> <p>Device for absolute and relative pressure measuring in gases, vapours and liquids</p> <p>Ceramic sensor (LHC-M20) The pressure causes a slight deflection of the ceramic diaphragm of the sensor. The changes in the capacitance is proportional to the pressure and is measured by the electrodes of the ceramic sensor. Volume of chamber: approx. 2 mm³.</p> <p>Advantages:</p> <ul style="list-style-type: none"> • guaranteed resistance to overload up to 40-times nominal pressure (max. 60bar) • extremely high resistance, comparable with Hastelloy or tantalum • for use with vacuum • ideal for hygienic processes as the Al₂O₃ ceramic material is recognised as safe (FDA listet) <p>Metal sensor (LHC-M40) The process pressure acting on the metallic separating diaphragm of the sensor is transmitted via a fill liquid to a resistance bridge. The change in the output voltage of the bridge is proportional to the pressure and is then measured. Volume of chamber: smaller than 1 mm³.</p> <p>Advantages:</p> <ul style="list-style-type: none"> • for process pressures up to 400 bar • excellent long-term stability • guaranteed resistance to overload up to 4-times nominal pressure (max. 600 bar) • a compact solution for small hygienic connections 																																																																																																																																																								
<p>Function and system design</p> <p>Equipment architecture</p>	<ul style="list-style-type: none"> • Measuring system with analogue output 4 ... 20 mA and auxiliary energy, e.g. via transmitter power pack, calibration across potentiometer for lower range-value and upper range-value, optionally analogue display for measuring value indication • Measuring system with SMART electronics with current output 4 ... 20 mA and HART communication signal and auxiliary energy, e. g. via transmitter power pack, calibration via two keys on the device, handheld terminal or PC, e. g. with operating program PACTware, optional digital display for measured variable indication • Measuring system with PROFIBUS PA electronics with digital communication signal PROFIBUS PA and segment coupler for connection to PLC or PC with operating program, e. g. PACTware from Pepperl+Fuchs, optional digital display for measured variable indication 																																																																																																																																																								
<p>Input characteristics</p> <p>Measured variable</p> <p>Measuring range</p>	<p>absolute or relative pressure</p> <table border="1" data-bbox="555 1171 1508 1626"> <thead> <tr> <th colspan="4">LHC-M20</th> <th colspan="4">LHC-M40</th> </tr> <tr> <th>Pressure type</th> <th>Meas. limits in bar</th> <th>min. span in bar</th> <th>Overload in bar</th> <th>Pressure type</th> <th>Meas. limits in bar</th> <th>min. span in bar</th> <th>Overload in bar</th> </tr> </thead> <tbody> <tr><td>gauge</td><td>0 ... +0.1</td><td>0.01</td><td>4</td><td>rel. pressure</td><td>0 ... +1</td><td>0.1</td><td>4</td></tr> <tr><td>gauge</td><td>0 ... +0.4</td><td>0.04</td><td>7</td><td>rel. pressure</td><td>0 ... +4</td><td>0.4</td><td>16</td></tr> <tr><td>gauge</td><td>0 ... +1</td><td>0.1</td><td>10</td><td>rel. pressure</td><td>0 ... +10</td><td>1</td><td>40</td></tr> <tr><td>gauge</td><td>0 ... +4</td><td>0.4</td><td>25</td><td>rel. pressure</td><td>0 ... +40*</td><td>4</td><td>160</td></tr> <tr><td>gauge</td><td>0 ... +10</td><td>1</td><td>40</td><td>rel. pressure</td><td>0 ... +100*</td><td>10</td><td>400</td></tr> <tr><td>gauge</td><td>0 ... +40</td><td>4</td><td>60</td><td>rel. pressure</td><td>0 ... +400*</td><td>40</td><td>600</td></tr> <tr><td>gauge</td><td>-0.1 ... +0.1</td><td>0.02</td><td>4</td><td>rel. pressure</td><td>-1 ... +1</td><td>0.2</td><td>4</td></tr> <tr><td>gauge</td><td>-0.4 ... +0.4</td><td>0.08</td><td>7</td><td>rel. pressure</td><td>-1 ... +4</td><td>0.5</td><td>16</td></tr> <tr><td>gauge</td><td>-1 ... +1</td><td>0.2</td><td>10</td><td>rel. pressure</td><td>-1 ... +10</td><td>1.1</td><td>40</td></tr> <tr><td>gauge</td><td>-1 ... +4</td><td>0.5</td><td>25</td><td></td><td></td><td></td><td></td></tr> <tr><td>gauge</td><td>-1 ... +10</td><td>1.1</td><td>40</td><td></td><td></td><td></td><td></td></tr> <tr><td>abs. pressure</td><td>0 ... +0.4</td><td>0.04</td><td>7</td><td>abs. pressure</td><td>0 ... +1</td><td>0.1</td><td>4</td></tr> <tr><td>abs. pressure</td><td>0 ... +1</td><td>0.1</td><td>10</td><td>abs. pressure</td><td>0 ... +4</td><td>0.4</td><td>16</td></tr> <tr><td>abs. pressure</td><td>0 ... +4</td><td>0.4</td><td>25</td><td>abs. pressure</td><td>0 ... +10</td><td>1</td><td>40</td></tr> <tr><td>abs. pressure</td><td>0 ... +10</td><td>1</td><td>40</td><td>abs. pressure</td><td>0 ... +40</td><td>4</td><td>160</td></tr> <tr><td>abs. pressure</td><td>0 ... +40</td><td>4</td><td>60</td><td>abs. pressure</td><td>0 ... +100</td><td>10</td><td>400</td></tr> <tr><td></td><td></td><td></td><td></td><td>abs. pressure</td><td>0 ... +400</td><td>40</td><td>600</td></tr> </tbody> </table> <p style="text-align: right;">*absolute pressure sensors</p> <p>The given overload will apply for the sensor. Please note the permissible maximum gauge pressure of the diaphragm seals.</p> <p>Vacuum resistance: to 10 mbar_{abs}</p>	LHC-M20				LHC-M40				Pressure type	Meas. limits in bar	min. span in bar	Overload in bar	Pressure type	Meas. limits in bar	min. span in bar	Overload in bar	gauge	0 ... +0.1	0.01	4	rel. pressure	0 ... +1	0.1	4	gauge	0 ... +0.4	0.04	7	rel. pressure	0 ... +4	0.4	16	gauge	0 ... +1	0.1	10	rel. pressure	0 ... +10	1	40	gauge	0 ... +4	0.4	25	rel. pressure	0 ... +40*	4	160	gauge	0 ... +10	1	40	rel. pressure	0 ... +100*	10	400	gauge	0 ... +40	4	60	rel. pressure	0 ... +400*	40	600	gauge	-0.1 ... +0.1	0.02	4	rel. pressure	-1 ... +1	0.2	4	gauge	-0.4 ... +0.4	0.08	7	rel. pressure	-1 ... +4	0.5	16	gauge	-1 ... +1	0.2	10	rel. pressure	-1 ... +10	1.1	40	gauge	-1 ... +4	0.5	25					gauge	-1 ... +10	1.1	40					abs. pressure	0 ... +0.4	0.04	7	abs. pressure	0 ... +1	0.1	4	abs. pressure	0 ... +1	0.1	10	abs. pressure	0 ... +4	0.4	16	abs. pressure	0 ... +4	0.4	25	abs. pressure	0 ... +10	1	40	abs. pressure	0 ... +10	1	40	abs. pressure	0 ... +40	4	160	abs. pressure	0 ... +40	4	60	abs. pressure	0 ... +100	10	400					abs. pressure	0 ... +400	40	600
LHC-M20				LHC-M40																																																																																																																																																					
Pressure type	Meas. limits in bar	min. span in bar	Overload in bar	Pressure type	Meas. limits in bar	min. span in bar	Overload in bar																																																																																																																																																		
gauge	0 ... +0.1	0.01	4	rel. pressure	0 ... +1	0.1	4																																																																																																																																																		
gauge	0 ... +0.4	0.04	7	rel. pressure	0 ... +4	0.4	16																																																																																																																																																		
gauge	0 ... +1	0.1	10	rel. pressure	0 ... +10	1	40																																																																																																																																																		
gauge	0 ... +4	0.4	25	rel. pressure	0 ... +40*	4	160																																																																																																																																																		
gauge	0 ... +10	1	40	rel. pressure	0 ... +100*	10	400																																																																																																																																																		
gauge	0 ... +40	4	60	rel. pressure	0 ... +400*	40	600																																																																																																																																																		
gauge	-0.1 ... +0.1	0.02	4	rel. pressure	-1 ... +1	0.2	4																																																																																																																																																		
gauge	-0.4 ... +0.4	0.08	7	rel. pressure	-1 ... +4	0.5	16																																																																																																																																																		
gauge	-1 ... +1	0.2	10	rel. pressure	-1 ... +10	1.1	40																																																																																																																																																		
gauge	-1 ... +4	0.5	25																																																																																																																																																						
gauge	-1 ... +10	1.1	40																																																																																																																																																						
abs. pressure	0 ... +0.4	0.04	7	abs. pressure	0 ... +1	0.1	4																																																																																																																																																		
abs. pressure	0 ... +1	0.1	10	abs. pressure	0 ... +4	0.4	16																																																																																																																																																		
abs. pressure	0 ... +4	0.4	25	abs. pressure	0 ... +10	1	40																																																																																																																																																		
abs. pressure	0 ... +10	1	40	abs. pressure	0 ... +40	4	160																																																																																																																																																		
abs. pressure	0 ... +40	4	60	abs. pressure	0 ... +100	10	400																																																																																																																																																		
				abs. pressure	0 ... +400	40	600																																																																																																																																																		
<p>Output characteristics</p> <p>Output signal</p> <p>Signal on alarm</p> <p>Load</p> <p>Integration time</p>	<p>Analogue electronics: 4 ... 20 mA SMART electronics: 4 ... 20 mA with HART protocol, resolution 1 µA PROFIBUS PA electronics: digital communication signal</p> <p>Analogue electronics: signal overrun (> 20.5 mA) or signal underrun (< 3,6 mA) SMART electronics: optional 3.6 mA, 22 mA or last current value will be hold</p> <p>Analogue electronics, SMART electronics: max. 1522 Ω max. 840 Ω,  EEx ia IIC T6</p> <p>Analogue electronics: directly on device using DIP switches, switch position "off" 0 s, "on" 2 s SMART electronics: directly on device using DIP switches, switch position "off" 0 s, "on": 2 s or with handheld terminal or using operating program, e. g. PACTware: 0 ... 40 s PROFIBUS PA electronics: 0 ... 40 s via communication</p>																																																																																																																																																								

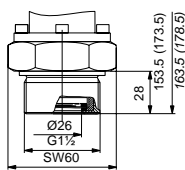
Date of issue 22.05.2002

Auxiliary energy	BARCON LHC-M
Supply voltage	Analogue electronics: 11.5 ... 45 V DC SMART electronics: 11.5 ... 45 V DC, 11.5 ... 30 V DC (Ex i) PROFIBUS PA electronics: 9 ... 32 V DC, 9 ... 24 V DC (Ex i)
Current consumption	PROFIBUS PA electronics: 10 mA ± 1 mA
Performance characteristics	
Linearity	<ul style="list-style-type: none"> including hysteresis and repeatability (based on the limit point method to DIN IEC 770) ± 0.2 % of set span special information for the linearity at low absolute pressure ranges are necessary (due to the performance limits of currently available DKD calibration rigs), for $\geq 40 \text{ mbar}_{\text{abs}}$ up to $< 100 \text{ mbar}_{\text{abs}}$: ± 0.3 % of set span
Long-time drift	with reference to the span ± 0.1 % per year, ± 0.25 % per 3 years
Setting time	Analogue electronics: 180 ms SMART electronics: 600 ms PROFIBUS PA electronics: 600 ms
Warming-up time	Analogue electronics: 200 ms SMART electronics: 1 s PROFIBUS PA electronics: 1 s
Rise time	Analogue electronics: 60 ms SMART electronics: 220 ms PROFIBUS PA electronics: 220 ms
Operating conditions	
Mounting conditions	
Mounting position	any position, zero point shift due to position can be corrected
Vibrations	without influence (4 mm in path peak-to-peak 5 Hz ... 15 Hz, 2 g: 15 Hz ... 150 Hz, 1g: 150 Hz ... 2000 Hz)
Ambient conditions	
Ambient temperature	-40 ... +85 °C (233 ... 358 K)
Ambient temperature limit	LHC-M40: -40 ... +85 °C (233 ... 358 K) LHC-M20: -40 ... +100 °C (233 ... 373 K)
Storage temperature	-40 ... +85 °C (233 ... 358 K)
Climatic class	4K4H to DIN EN 60721-3
Protection class	IP66 for devices with cable gland, cable entry or Harting plug Han7D IP68 for devices with assembled cable or M12 plug
Electromagnetic compatibility	Emitted interference to EN 61326, CLASS B equipment Interference immunity to EN 61326; annex A (industrial sector) and NAMUR EMC recommendation (NE 21) EMC influence: ≤ 0.5 % HART and PROFIBUS PA electronics: twisted, screened pairs must be used.
Process conditions	
Medium temperature	LHC-M40: -40 ... +85 °C (233 ... 358 K) LHC-M20: -40 ... +100 °C (233 ... 373 K)
Medium temperature range	LHC-M40 with filling made of: silicone oil max. 250 °C (523 K), high temperature oil max. 350 °C (623 K), fluorolube max. 175 °C (448 K), glycerine max. 200 °C (473 K), vegetable oil max. 200 °C (473 K)
Medium pressure limits	corresponds to permissible overload, see section measuring range
Mechanical construction	
Dimensions	<p>LHC-M20:</p> <p>Measure L depends on process connection and lid.</p>

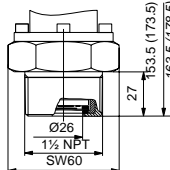
BARCON LHC-M

Process connections with threads

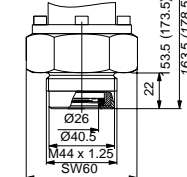
G51, G1½



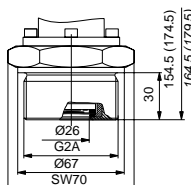
N51, 1½ NPT



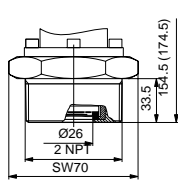
MM1, M44 x 1.25



G61, G2

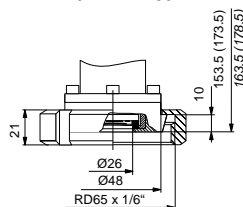


N61, 2 NPT

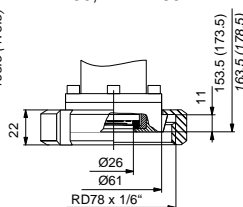


Sanitary couplings

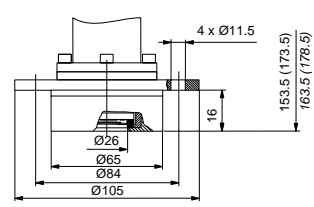
M65, dairy coupling
DN40, DIN 11851



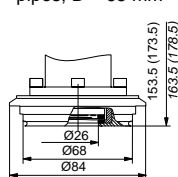
M75, dairy coupling
DN50, DIN 11851



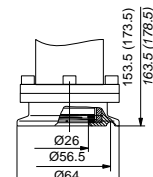
DR1, DRD, D = 65 mm



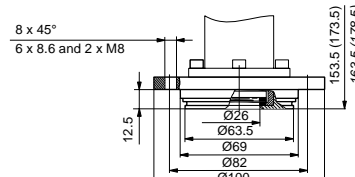
V11, Varivent for
pipes, D = 65 mm



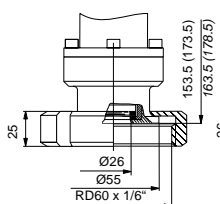
T65, Triclamp 2"



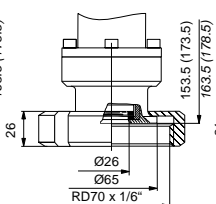
SP6, APV-Inline



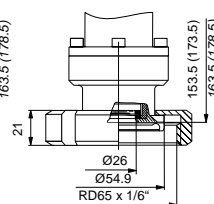
S55, SMS 1½", PN40



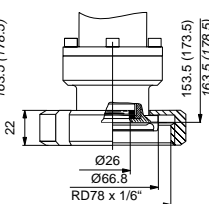
S65, SMS 2", PN40



SA6, DN40, aseptic
DIN 11864-1-A



SA7, DN50, aseptic
DIN 11864-1-A

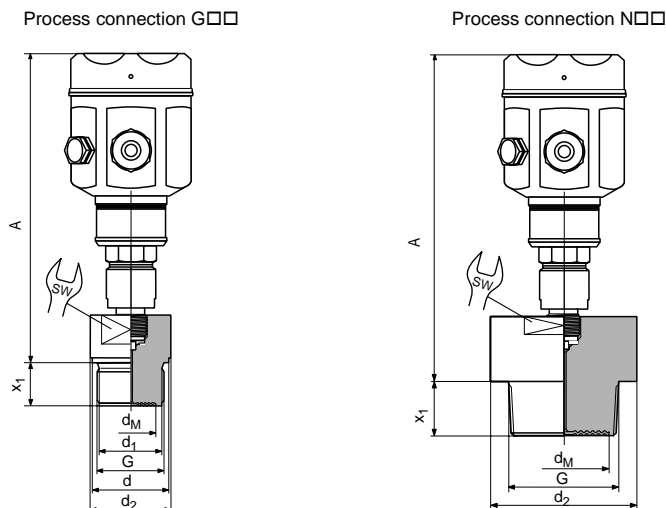


Process connections with flange on demand at P+F

BARCON LHC-M

LHC-M40:

Process connections with threads



Process connection	Threads						Housing		
	Threads	Diameter	Diameter	Diameter	Thread length	Key distance	Diaphragm diameter	Installation height stainless steel	Installation height aluminium
		d ₁	d	d ₂	x ₁	SW	d _M	max. A	max. A
	inch	mm	mm	mm	mm	mm	mm	mm	mm
G31	G1	29	39	39	21	41	28	231.5	236.5
G51	G1½	44	55	58	30	41	38	232.5	237.5
G61	G2	56	68	78	30	60	46	237.5	242.5
N31	1 NPT	-	-	-	23	41	23	235.5	240.5
N51	1½ NPT	-	-	52	30	46	32	233.5	238.5
N61	2 NPT	-	-	78	30	65	36	233.5	238.5

Process connections with flange on demand at P+F

LHC-M20: stainless steel 1500 g, aluminium 1700 g

LHC-M40: 1.5 ... 16.8 kg, depends from process connection

Weight

Material

- Housing: stainless steel 1.4404 or cast aluminium housing with protective polyester based powder coating
- Nameplates: engraved on housing with laser (stainless steel housing) or 1.4301 (aluminium housing)
- Process connections (in contact with the medium): stainless steel 1.4435
- Slotted nuts: stainless steel 1.4307
- Process diaphragm (in contact with the medium):
LHC-M20: Al₂O₃ aluminium oxide ceramic (FDA listet), 96 %, extremely clean 99.9%
LHC-M40: stainless steel 1.4435, Hastelloy C276, tantalum, PTFE folio 0.09 mm on 1.4435 (not for vacuum), PTFE folio 0.25 mm on 1.4435 (not for vacuum)
- Seals: FKM Viton (also in versions grease-free and for oxygen use), NBR, FFKM Kalrez, FFKM Chemraz, EPDM
- O-ring for cover sealing: stainless steel housing silicone, aluminium housing NBR
- Mounting accessories for pipe and wall mounting: stainless steel 1.4301
- Measurement cell:
LHC-M20: without oil filling, dry sensor,
LHC-M40: oil filling: optional silicone oil, vegetable oil, glycerine, high temperature oil, fluorolube grease-free for oxygen use

Surface quality

Standard surface roughness of parts in contact with the medium Ra < 0.8 µm, reduces surface roughness on request.

Process connection

All customary versions of diaphragm seal, thread versions and flush-mounted connections, see type code.

Housing

Stainless steel or aluminium housing

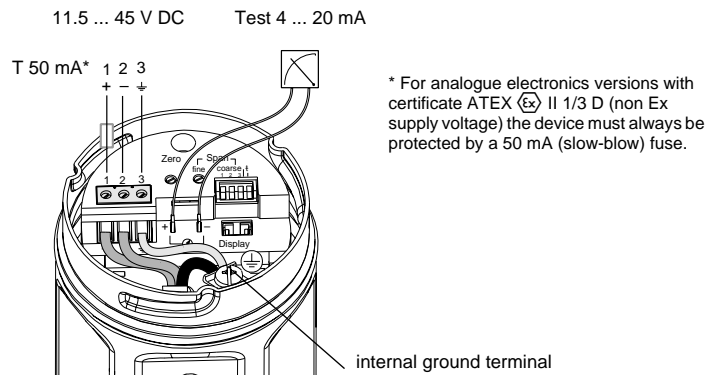
Connection

- Housing □1: cable gland M 20 x 1.5
- Housing □2: cable gland ½ NPT
- Housing □3: cable gland G½
- Housing □4: Harting plug (Han7D)
- Housing □5: M12 x 1 plug
- Housing □6: assembled cable with pressure compensation, 5 m

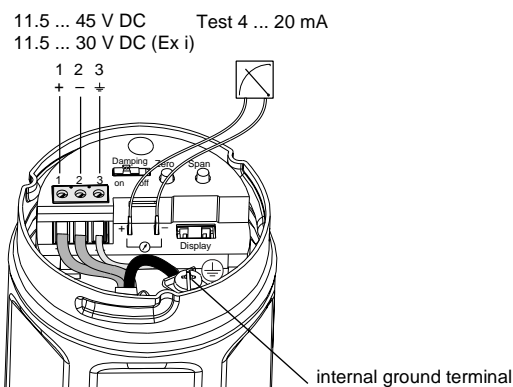
BARCON LHC-M																												
Indication and operation																												
Display elements	<p>Plug-in display in two versions:</p> <ul style="list-style-type: none"> • Analogue electronics: The analogue display gives the current pressure value related to the measuring range in the form of a bar graph (30 segments). • SMART electronics: The digital display gives the pressure in the form of a four-digit number. The appropriate current value from 4 ... 20 mA is shown as a bar graph (28 segments) underneath. • PROFIBUS PA electronics: The digital display gives the pressure in the form of a four-digit number. The digital display shows the current pressure value in the form of a bar graph (28 segments). <p>Display resolution:</p> <ul style="list-style-type: none"> • Analogue display: bar graph, 1 segment equals 3.33 % of the set span • Digital display: 0.1 %, bar graph, 1 segment equals 3.57 % of the set span. 																											
Operating elements	<p>Three versions of BARCON operations are available, depending on the electronics.</p> <ul style="list-style-type: none"> • Analogue: 4 ... 20 mA Operation directly at the measuring point with one potentiometer each for lower range value and upper range value and a three-step range switch as well as an on/off switch for damping. • SMART: 4 ... 20 mA with HART protocol Operation <ul style="list-style-type: none"> - at the measuring point via two push buttons for lower range value and upper range value as well as an on/off switch for damping, or - via the handheld terminal at any point along the 4 ... 20 mA line, or - via a PC with an operating program, e. g. PACTware from Pepperl+Fuchs. • PROFIBUS PA: Operation mode: <ul style="list-style-type: none"> - using a PC with an operating program, e. g. PACTware from Pepperl+Fuchs. - with two keys for lower-range value and upper-range value 																											
Certificates and approvals																												
Ex approval	see type code																											
Type of protection	see type code																											
Other standards and guidelines	<p>EN 60529: Protection provided by housings (IP-Code) EN 61010: Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte EN 61326: Störaussendung (Betriebsmittel der Klasse B), Störfestigkeit (Anhang A - Industriebereich) NAMUR: Normenarbeitsgemeinschaft für Mess- und Regeltechnik in der Chemischen Industrie</p>																											
General information																												
Conformity of standards	<table border="0"> <tr> <td>Certificate</td> <td>DMT XX ATEX XXX</td> <td>DMT XX ATEX XXY</td> </tr> <tr> <td>EN 61326</td> <td>Not yet available.</td> <td>Not yet available.</td> </tr> <tr> <td>EN 61010-1</td> <td>EN 61326-1</td> <td>EN 61326-1</td> </tr> <tr> <td>EN 50021</td> <td>EN 61010-1</td> <td>EN 50081-1</td> </tr> <tr> <td></td> <td>EN 50014</td> <td>EN 50082-1</td> </tr> <tr> <td></td> <td>EN 50020</td> <td>EN 61010-1</td> </tr> <tr> <td></td> <td>EN 50081-1</td> <td>EN 50281-1</td> </tr> <tr> <td></td> <td>EN 50082-1</td> <td></td> </tr> <tr> <td></td> <td>EN 50284</td> <td></td> </tr> </table>	Certificate	DMT XX ATEX XXX	DMT XX ATEX XXY	EN 61326	Not yet available.	Not yet available.	EN 61010-1	EN 61326-1	EN 61326-1	EN 50021	EN 61010-1	EN 50081-1		EN 50014	EN 50082-1		EN 50020	EN 61010-1		EN 50081-1	EN 50281-1		EN 50082-1			EN 50284	
Certificate	DMT XX ATEX XXX	DMT XX ATEX XXY																										
EN 61326	Not yet available.	Not yet available.																										
EN 61010-1	EN 61326-1	EN 61326-1																										
EN 50021	EN 61010-1	EN 50081-1																										
	EN 50014	EN 50082-1																										
	EN 50020	EN 61010-1																										
	EN 50081-1	EN 50281-1																										
	EN 50082-1																											
	EN 50284																											
Supplementary information	www.pepperl-fuchs.com																											
Accessories																												
Designation	<p>Cover LHC-Z10 with glass window for intrinsically safe units Cover LHC-Z11 with glass window of polycarbonate for standard units Cover LHC-Z10 with glass window for intrinsically safe units Set LHC-Z30 for wall and pipe mounting LHC-M20 Set LHC-Z31 for wall and pipe mounting LHC-M40 Digital display LHC-Z40 for electrical outputs IA and PB Analogue display LHC-Z41 for electrical output IB</p>																											

Electrical connection

- Connection with analogue electronics



- Connection with SMART electronics



- Connection with PROFIBUS PA electronics

