BD SENSORS
pressure measurement

LMK 351

Screw-in Pressure Transmitter with Capacitive Ceramic Sensor

- flush mounted sensor
- diaphragm
  96% or 99.9% ceramics
- accuracy:
  0.175 % / 0.125 % FSO BFSL
  (0.35 % / 0.25 % FSO IEC 60770)
- nominal pressure ranges from
  0 ... 40 mbar up to 0 ... 10 bar
  (0 ... 40 cmWC up to 0 ... 100 mWC)

The screw-in transmitter LMK 351 has been designed especially for level and process measurement. The pressure sensors are flush mounted allowing the use also in viscous or contaminated media.

By using a capacitive ceramic sensor an excellent measuring performance is being achieved. Because of its material the capacitive ceramic sensor features high compatibility against aggressive media. Sealing of the sensor against the pressure port is made with a FKM seal. Other elastomers are available on request.

The pressure port can be made of stainless steel 1.4571 (316Ti) or – for very aggressive media – of PVDF or PVC. Additional it is possible to suit the screw-in-transmitter LMK 351 in explosive area (zone 0).

Preferred areas of use are:

- level measurement
- chemical industry
- medical technology
- pharmaceutical technology

Characteristics

- ceramic sensor without oil filling and with high resistance against aggressive media such as acids and lyes
- small thermal effect
- good long term stability
- option Ex version
  (only for 4 ... 20 mA / 2-wire)
  IBExU 05 ATEX 1070 X
- customer specific versions:
  - special pressure ranges
  - other designs on request

CE Ex

LMK 351
Screw-in Pressure Transmitter

TÜV CERT DIN EN ISO 9001

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Input pressure range [1]

Nominal pressure gauge [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level [mWC]	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10	16	25	40	60	100
Permissible overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35

Output signal / Supply

Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 36 V_{DC}	Ex-protection: V_S = 12 ... 28 V_{DC}
Optional	3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC} (on request)	

Performance

Accuracy	IEC 60770 [2]	BFSL
	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	standard: ≤ ± 0.175 % FSO option: ≤ ± 0.125 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02]\ \Omega$ voltage 3-wire: R_{min} = 10 kΩ	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year	
Response time	< 200 msec	measuring rate 5/s

Thermal effects

Temperature error for offset and span	≤ ± 0.1 % FSO / 10 K
in compensated range	0 ... 85 °C

Electrical protection

Short-circuit protection	Permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Option Ex-protectiononly with 4 ... 20 mA / 2-wire DX14-LMK 351	stainless steel housing with plug: zone 0 [3]: II 1 G EEx ia IIC T4 zone 20: II 1 D EEx IP6x T=85°C stainless steel housing with cable: zone 0 [3]: II 1 G EEx ia IIB T4 zone 20: II 1 D EEx IP6x T=85°C plastic housing with plug: zone 0/1 [4]: II 1/2 G EEx ia IIC T4 zone 20/21 [4]: II 1/2 D EEx IP6x T=85°C plastic housing with cable: zone 0/1 [4]: II 1/2 G EEx ia IIB T4 zone 20/21 [4]: II 1/2 D EEx IP6x T=85°C safety technical maximum values: V_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 27 nF , L_i = 5 µH

Mechanical stability

Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 ms

[1] version with Al_2O_3 99,9% possible for pressure ranges from 0.1 bar up to 1 bar

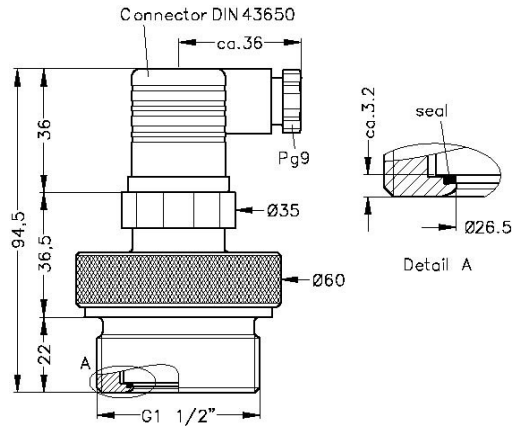
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

[3] approved for atmospheric pressure from 0.8 bar up to 1.1 bar

[4] The designation depends on the used pressure range. With nominal pressure ranges ≤ 60 mbar the designation is „2G“.
With nominal pressure ranges > 60 mbar and < 10 bar (see item 17 of the type-examination certificate) must be attended!

Permissible temperatures [5]			
Medium	-25 ... 125 °C		
Electronics / environment	-25 ... 85 °C	Ex-protection:	application in zone 0: -20 ... 60 °C application in zone 1 or higher: -25 ... 70 °C
Storage	-40 ... 100 °C		

Mechanical connection

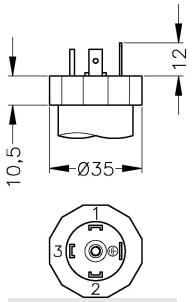


G1 1/2“ flush DIN 3852

⇨ Drawing shows stainless steel version; plastic version is 3.5 mm longer!

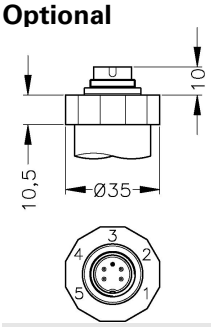
Electrical connection

Standard

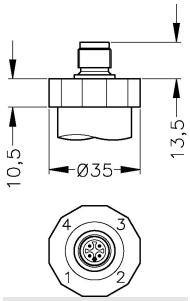


DIN 43650 (IP 65)

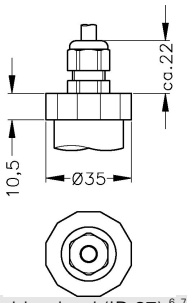
Optional



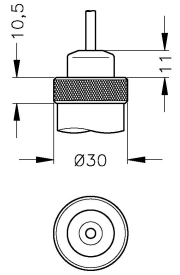
Binder Serie 723 (IP 67)



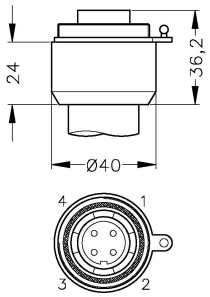
M12x1 4-pin (IP 67)



Cable gland (IP 67) [6,7]



cable outlet (IP 68) [6]



Buccaneer (IP 68) [8]

[5] for pressure port of PVC the maximum permissible temperature is 50 °C

[6] different cable types and lengths available

[7] standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube

[8] cable with ventilation tube required

Materials

Pressure port	standard: stainless steel 1.4571 (316Ti) optional: PVC grey / PVDF
Housing	stainless steel 1.4305 (303)
Seals (media wetted)	FKM / EPDM / FFKM
Diaphragm	Standard: ceramics Al_2O_3 96 % Option: ceramics Al_2O_3 99.9 % (for pressure ranges from 0.1 bar up to 1 bar)
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous

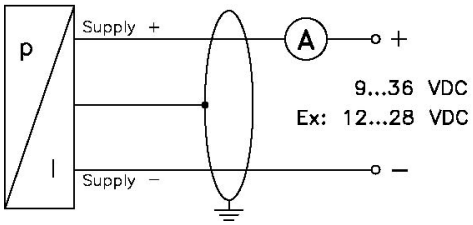
Cable capacitance [9]	cable without air tube: cable with air tube:	signal line/shield: 160 pF/m signal line/shield: 150 pF/m	signal line/signal line: 120 pF/m signal line/signal line: 100 pF/m
Cable inductance [9]	cable without air tube: cable with air tube:	signal line/shield: 0.65 µH/m signal line/shield: 1.0 µH/m	signal line/signal line: 0.65 µH/m signal line/signal line: 1.0 µH/m
Current consumption	signal output current: signal output voltage:	max. 21 mA max. 5 mA	
Weight	approx. 200 g		
Installation position	any		
Operational life	> 100 x 10^6 cycles		

Pin configuration

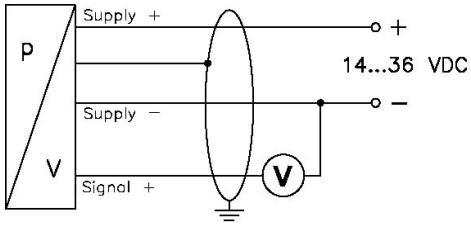
Electrical connection		DIN 43650	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	Cable colours [9] (DIN 47100)
2-wire-system	Supply + Supply –	1 2	3 4	1 2	1 2	white brown
	Ground	ground pin	5	4	4	yellow / green (shield)
3-wire-system	Supply + Supply – Signal +	1 2 3	3 4 1	1 2 3	1 2 3	white brown green
	Ground	ground pin	5	4	4	yellow / green (shield)

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)



[9] if the electrical connection is a mounted cable by factory

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Ordering code LMK 351

LMK 351 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Pressure									
in bar	470								
in mWC	471								
Input [mWC] [bar]									
0,4 0,04		0400							
0,6 0,06		0600							
1,0 0,10		1000							
1,6 0,16		1600							
2,5 0,25		2500							
4,0 0,40		4000							
6,0 0,60		6000							
10 1,0		1001							
16 1,6		1601							
25 2,5		2501							
40 4,0		4001							
60 6,0		6001							
100 10		1002							
customer		9999							
Output									
4 ... 20 mA / 2-wire			1						
0 ... 10 V / 3-wire			3						
Intrinsic safety 4 ... 20 mA / 2-wire			E						
customer			9						
Accuracy									
standard 0,35 %				3					
option 0,25 %				2					
customer				9					
Electrical connection									
Male and female plug DIN 43650					100				
Binder series 723 (5-pin)					200				
Cable gland incl. Cable [1, 2]					400				
Cable outlet [1]					TR0				
Male plug Buccaneer IP68 [3]					500				
M12x1 (4-pin)					M00				
customer					999				
Mechanical connection									
G1 1/2" DIN 3852 with flush sensor						M00			
customer						999			
Seals									
FKM							1		
EPDM							3		
FFKM							7		
customer							9		
Pressure port									
Stainless steal 1.4571 (316Ti)								1	
PVC								A	
PVDF								B	
customer								9	
Diaphragm									
Ceramics Al_2O_3 96%									2
Ceramics Al_2O_3 99,9% [4]									C
customer									9
Special version									
standard									000
customer									999

Note: Special version codes occupy the final three-digit block.

[1] different cable types and lengths deliverable
[2] standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube
[3] cable with ventilation tube required
[4] diaphragm Al_2O_3 99,9% possible for pressure ranges from 0.1 bar up to 1 bar

This ordering code contains product specification; properties are not guaranteed. Subject to change without notice.

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