



LMK 351

Screw-in 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 cmH₂O up to 0 ... 100 mH₂O)

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

- ▶ 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

Characteristics



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Screw-in Transmitter

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Technical Data

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 [mH ₂ O]	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
Permissible vacuum [bar]	-0.2		-0.3			-0.5					-1		

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: $\leq \pm 0.35 \% \text{ FSO}$	standard: $\leq \pm 0.175 \% \text{ FSO}$
	option: $\leq \pm 0.25 \% \text{ FSO}$	option: $\leq \pm 0.125 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{\max} = [(V_s - V_{s\min}) / 0.02] \Omega$ voltage 3-wire: $R_{\min} = 10 \text{ k}\Omega$	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k Ω	
Long term stability	$\leq \pm 0.1 \% \text{ FSO} / \text{year}$	
Response time	< 200 msec	measuring rate 5/s

Thermal effects	
Temperature error for offset and span	$\leq \pm 0.1 \% \text{ FSO} / 10 \text{ K}$
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-protection only with 4 ... 20 mA / 2-wire DX14-LMK 351	stainless steel pressure port with plug: zone 0 ³ : II 1 G EEx ia IIC T4 zone 20: II 1 D IP6X T=85°C stainless steel pressure port with cable: zone 0 ³ : II 1 G EEx ia IIB T4 zone 20: II 1 D IP6X T=85°C plastic pressure port with plug: zone 0/1 ⁴ : II 1/2 G EEx ia IIC T4 zone 20/21 ⁴ : II 1/2 D IP6X T=85°C plastic pressure port with cable: zone 0/1 ⁴ : II 1/2 G EEx ia IIB T4 zone 20/21 ⁴ : II 1/2 D IP6X T=85°C safety technical maximum values: $U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i = 27 \text{ nF}$, $L_i = 5 \mu\text{H}$

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

¹ version with Al₂O₃ 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 $\leq 60 \text{ mbar}$ the designation is „2G“. With nominal pressure ranges $> 60 \text{ mbar}$ and $< 10 \text{ bar}$ (see item 17 of the type-examination certificate) must be attended!

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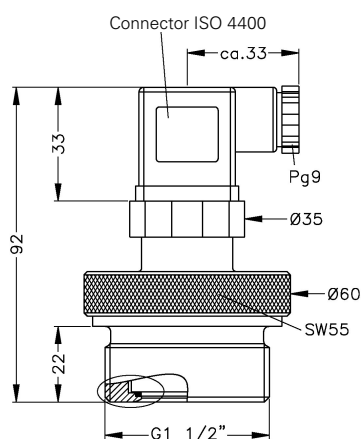
Technical Data

Permissible temperatures ⁵

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

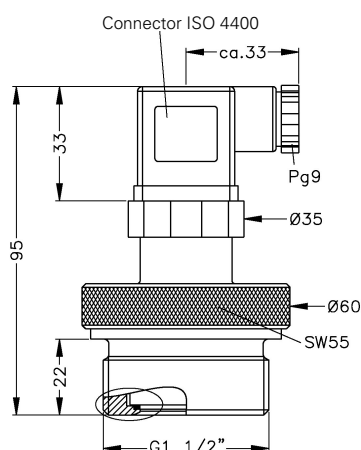
Mechanical connection (dimensions in mm)

Standard

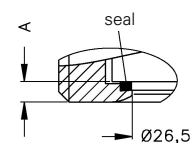


G1 1/2" flush (DIN 3852)
stainless steel version

Optional



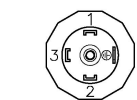
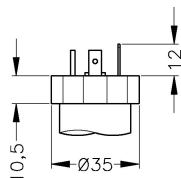
G1 1/2" flush (DIN 3852)
PVC- and PVDF version



material	A
stainless steel	approx. 3
PVC / PVDF	approx. 6

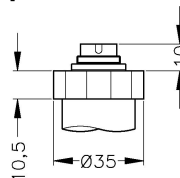
Electrical connection (dimensions in mm)

Standard

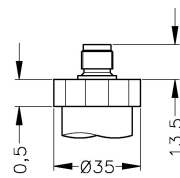


ISO 4400 (IP 65)

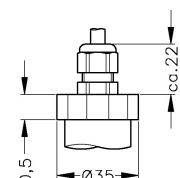
Optional



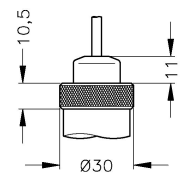
Binder Series 723 (IP 67)



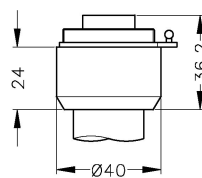
M12x1 4-pin (IP 67)



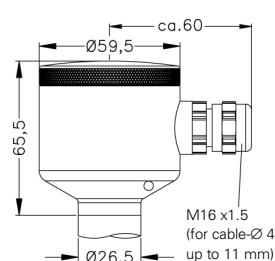
Cable gland (IP 67) ^{6,7}



cable outlet (IP 68) ⁶



Buccaneer (IP 68) ⁸



Field housing (IP 67)

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

⁶ different cable types and lengths available

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

⁸ cable with ventilation tube required

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Technical Data

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

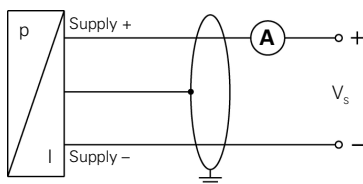
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μ H/m
Current consumption	signal output current: max. 21 mA signal output voltage: max. 5 mA
Weight	approx. 200 g
Installation position	any
Operational life	> 100 x 10 ⁶ cycles

Pin configuration

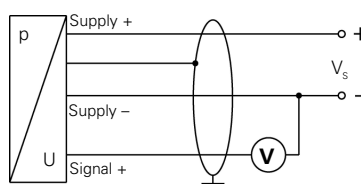
Electrical connection		ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	Field housing	Cable colours (DIN 47100)
2-wire -system	Supply +	1	3	1	1	IN +	white
	Supply -	2	4	2	2	IN -	brown
	Ground	ground pin	5	4	4	\equiv	yellow / green (shield)
3-wire -system	Supply +	1	3	1	1	N +	white
	Supply -	2	4	2	2	IN -	brown
	Signal +	3	1	3	3	OUT +	green
	Ground	ground pin	5	4	4	\equiv	yellow / green (shield)

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)



This data sheet contains product specification, properties are not guaranteed. Subject to change without notice.

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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 Al₂O₃ 99.9% possible for pressure ranges from 0.1 bar up to 1 bar