SensaCo Ltd.

LMK 351

Screw-in Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
standard: 0.35% FSO
option: 0.25% FSO

Nominal pressure

- from 0 ... 40 mbar up to 0 ... 20 bar

Output signal

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Product characteristics

- pressure port PVDF-version for aggressive media
- pressure port G 1 1/2" for pasty and polluted media

Optional versions

- IS-version
  Ex ia = intrinsically safe for gases and dust
- diaphragm 99.9 % Al_2O_3
- customer specific versions

The screw-in transmitter LMK 351 has been designed for measuring small system pressure and level measurement in container. The LMK 351 is based on an own-developed capacitive ceramic sensor element. Usage in viscous and pasty media is possible because of the flush mounted sensor.

For the usage in aggressive media a pressure port in PVDF and the diaphragm in Al_2O_3 99.9 % is available. An intrinsically safe version completes the range of possibilities.

Preferred areas of use are

- Plant and machine engineering
- Environmental engineering (water – sewage – recycling)

Preferred used for

- Fuel and oil
- Viscous and pasty media

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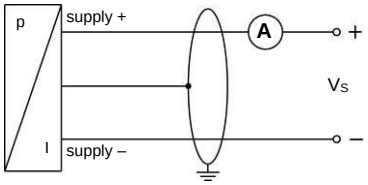
Pressure ranges																
Nominal pressure	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum	[bar]	-0.2		-0.3		-0.5				-1						

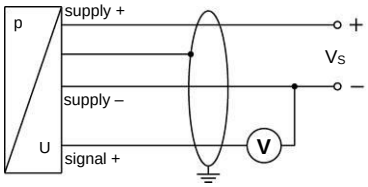
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO	option for p_N ≥ 0.6 bar: ≤ ± 0.25 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	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 at reference conditions	
Turn-on time	700 msec	
Mean measuring time	5/sec	
Response time	mean response time: ≤ 200 msec	max. response time: 380 msec
[1] accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span)		
Tolerance band	≤ ± 1 % FSO	
in compensated range	-20 … 80 °C	
Permissible temperatures		
Permissible temperatures [2]	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C	
[2] for pressure port in PVDF the medium temperature is -30 … 60 °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	
Mechanical stability		
Vibration	10 g RMS (20 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 1 msec	according to DIN EN 60068-2-27
Materials (media wetted)		
Pressure port	standard: stainless steel 1.4404 (316L)	option: PVDF
Housing	standard: stainless steel 1.4404 (316L)	option: PVDF
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 … 8 mm)	
Seals	FKM -40 ... 125 °C FFKM -15 ... 125 °C EPDM -40 ... 125 °C	
Diaphragm	standard: ceramics Al_2O_3 96 %	options: ceramics Al_2O_3 99.9 %
Media wetted parts	pressure port, seals, diaphragm	
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval DX14-LMK 351	IBExU05ATEX1070 X stainless steel-pressure port with connector: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T110 °C Da plastic-pressure port with connector: zone 0/1: II 1/2G Ex ia IIC T4 Ga/Gb zone 20/21: II 1/2D Ex ia IIIC T110 °C Da/Db	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, L_i ≈ 0 µH, C_{gnd} = 27 nF	
Max. permissible temperature for environment	in zone 0: -20 ... 60 °C for p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70 °C	
Connecting cables (by factory)	cable capacity: signal line / shield also signal line / signal line: 220 pF/m cable inductance: signal line / shield also signal line / signal line: 1.5 µH/m	
Miscellaneous		
Current consumption	signal output current: max. 21 mA signal output voltage: max. 5 mA	
Weight	approx. 200 g	
Installation position	any	
Operational life	100 million load cycles	
CE-conformity	EMV-directive: 2014/30/EU	
ATEX Directive	2014/34/EU	

Wiring diagram

2-wire-system (current)



3-wire-system (voltage)

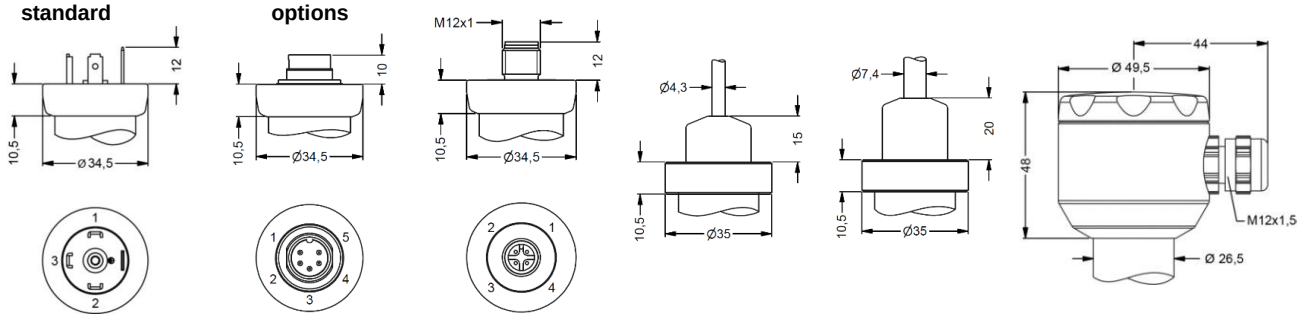


Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	compact field housing	cable colours (IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply –	2	4	2	IN –	BN (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	GN (green)
Shield	ground pin ⏚	5	4	⏚	GNYE (green-yellow)

Electrical connections (dimensions in mm)

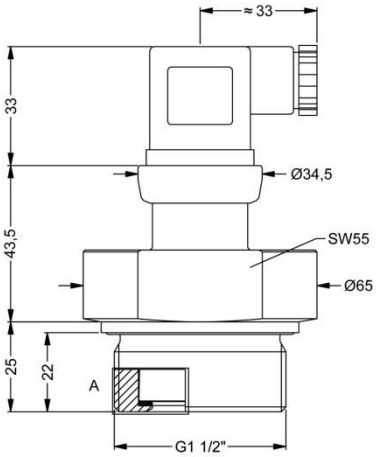
standard **options**

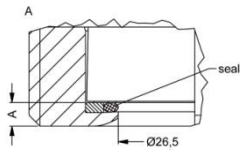


ISO 4400 (IP 65) | Binder series 723 5-pin (IP 67) | M12x1 4-pin (IP 67) | cable outlet with PVC cable (IP 67) [3] | cable outlet, cable with ventilation tube (IP 68) [4] | compact field housing (IP 67)

[3] *standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)*
[4] *different cable types and lengths available, permissible temperature depends on kind of cable*

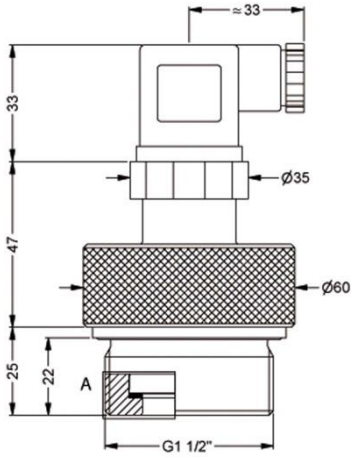
Dimensions (in mm)

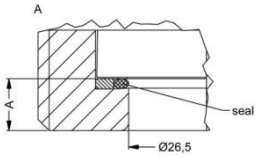




G1 1/2" flush (DIN 3852) stainless steel

material	A
stainless steel	approx. 3
PVDF	approx. 6





G1 1/2" flush (DIN 3852) PVDF [5]

[5] *not possible in combination with compact field housing*

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Ordering code LMK 351

LMK 351 □□□-□□□□-□-□-□□□-□□□-□-□-□-□□□

Pressure				
	in bar	470		
	in mH_2O	471		
Input	**[mH_2O]**	**[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	
	160	16	1602	
	200	20	2002	
	customer		9999	consult
Output				
	4 … 20 mA / 2-wire		1	
	0 … 10 V / 3-wire		3	
	intrinsic safety 4 … 20 mA / 2-wire		E	
	customer		9	consult
Accuracy				
standard:	0.35 % FSO		3	
option for $p_N \geq 0.6$ bar:	0.25 % FSO		2	
	customer		9	consult
Electrical connection				
	male and female plug ISO 4400		100	
	male plug Binder series 723 (5-pin)		200	
	cable outlet with PVC cable (IP67) [1]		TA0	
	cable outlet, cable with ventilation tube (IP68) [2]		TR0	
	male plug M12x1 (4-pin) / metal		M10	
	compact field housing stainless steel 1.4301 (304)		850	
	customer		999	consult
Mechanical connection				
	G1 1/2" DIN 3852 with flush sensor		M00	
	customer		999	consult
Seals				
	FKM		1	
	EPDM		3	
	FFKM		7	
	customer		9	consult
Pressure port				
	stainless steel 1.4404 (316L)		1	
	PVDF [3]		B	
	customer		9	consult
Diaphragm				
	ceramics Al_2O_3 96 %		2	
	ceramics Al_2O_3 99.9 %		C	
	customer		9	consult
Special version				
	standard		000	
	customer		999	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request

[2] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

[3] not possible in combination witn compact field housing; permissible medium temperature: -30 … 60 °C

16.04.2020