

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 % Al₂O₃
- ▶ 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.

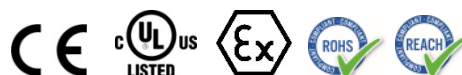
For the usage in aggressive media a pressure port in PVDF and the diaphragm in Al₂O₃ 99.9 % is available. An intrinsically safe version completes the range of possibilities.

Preferred areas of use are

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

Preferred used for

-  Fuel and oil
-  Viscous and pasty media



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 ₂ O]	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: $\leq \pm 0.35\%$ FSO option for p _N ≥ 0.6 bar: $\leq \pm 0.25\%$ FSO
Permissible load	current 2-wire: R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω voltage 3-wire: R _{min} = 10 kΩ
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	$\leq \pm 0.1\%$ 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	$\leq \pm 1\%$ 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 ₂ O ₃ 96 % options: ceramics Al ₂ O 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 T85 °C Da plastic-pressure port with connector: zone 0/1 ³ : II 1/2G Ex ia IIC T4 Ga/Gb zone 20/21 ⁴ : II 1/2D Ex ia IIIC T85 °C Da/Db

Safety technical maximum values	U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 27 nF, L _i = 5 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)	capacity: signal line / shield also signal line / signal line: 160 pF/m inductance: signal line / shield also signal line / signal line: 1 μH/m

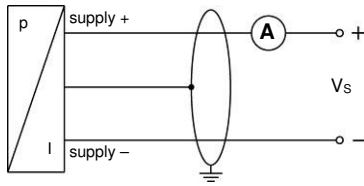
³ The designation depends on the used pressure range. With nominal pressure ranges ≤ 60 mbar the designation is "2G".

⁴ With nominal pressure ranges > 60 mbar and < 10 bar (see item 17 of the type-examination certificate) must be attended!

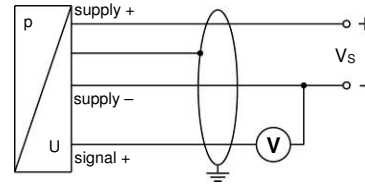
Miscellaneous	
Current consumption	signal output current: max. 21 mA signal output voltage: max. 5 mA
Weight	approx. 200 g
Installation position	any
Operational life	100 million load cycles
CE-conformity	EMV-directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagram

2-wire-system (current)



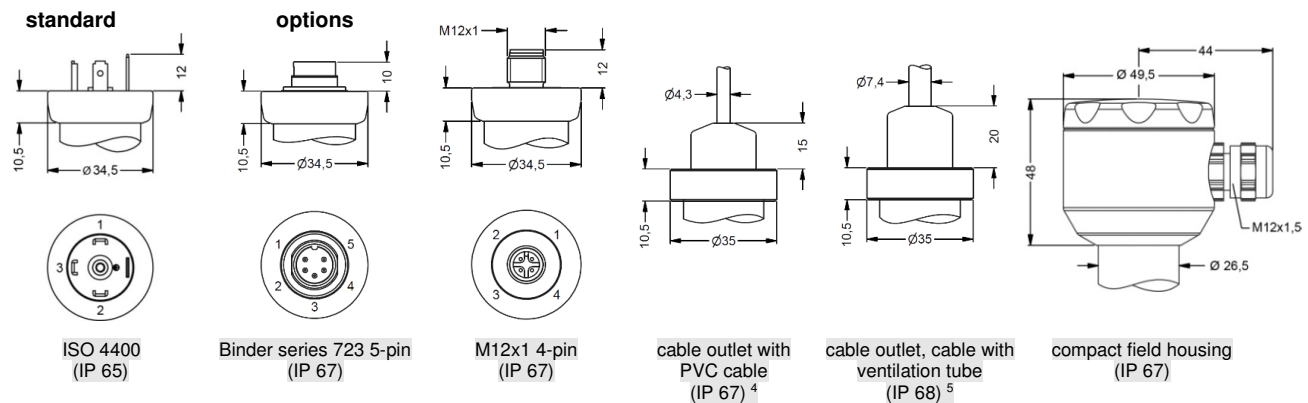
3-wire-system (voltage)



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 \oplus	5	4	\oplus	GNYE (green-yellow)

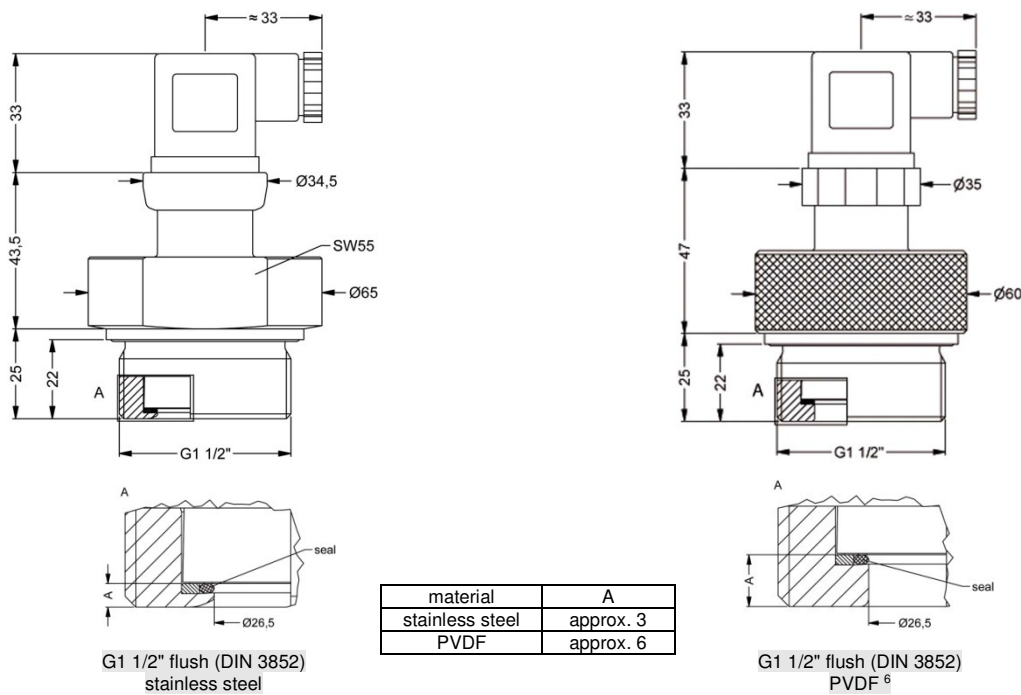
Electrical connections (dimensions in mm)



⁴ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)

⁵ different cable types and lengths available, permissible temperature depends on kind of cable

Dimensions (in mm)



⁶ not possible in combination with compact field housing

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Ordering code LMK 351

LMK 351

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Pressure																				
	in bar		4	7	0															
	in mH ₂ O		4	7	1															
Input	[mH ₂ O]	[bar]																		
	0.4	0.04		0	4	0	0													
	0.6	0.06		0	6	0	0													
	1.0	0.10		1	0	0	0													
	1.6	0.16		1	6	0	0													
	2.5	0.25		2	5	0	0													
	4.0	0.40		4	0	0	0													
	6.0	0.60		6	0	0	0													
	10	1.0		1	0	0	1													
	16	1.6		1	6	0	1													
	25	2.5		2	5	0	1													
	40	4.0		4	0	0	1													
	60	6.0		6	0	0	1													
	100	10		1	0	0	2													
	160	16		1	6	0	2													
	200	20		2	0	0	2													
		customer		9	9	9	9													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 ≥ 0.6 bar:	0.25 % FSO					2													
	customer						9													consult
Electrical connection																				
	male and female plug ISO 4400						1	0	0											
	male plug Binder series 723 (5-pin)						2	0	0											
	cable outlet with PVC cable (IP67) ¹						T	A	0											
	cable outlet,						T	R	0											
	cable with ventilation tube (IP68) ²						T	R	0											
	male plug M12x1 (4-pin) / metal						M	1	0											
	compact field housing						8	5	0											
	stainless steel 1.4301 (304)						9	9	9											consult
	customer						9	9	9											
Mechanical connection																				
	G1 1/2" DIN 3852 with									M	0	0								
	flush sensor									9	9	9								consult
	customer									9	9	9								
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 ₂ O ₃ 96 %									2										
	ceramics Al ₂ O ₃ 99.9 %									C										
	customer									9										consult
Special version																				
	standard									0	0	0								
	customer									9	9	9								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 with compact field housing; permissible medium temperature: -30 ... 60 °C