

# 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<sub>2</sub>O<sub>3</sub>
- ▶ 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.

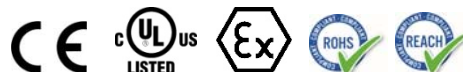
For the usage in aggressive media a pressure port in PVDF and the diaphragm in Al<sub>2</sub>O<sub>3</sub> 99.9 % is available. An intrinsically safe version completes the range of possibilities.

### 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 <sub>2</sub> 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	4	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 <sub>S</sub> = 9 ... 32 V <sub>DC</sub>
Option IS-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>
Option 3-wire	3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	standard: $\leq \pm 0.35$ % FSO      option for P <sub>N</sub> $\geq 0.6$ bar: $\leq \pm 0.25$ % FSO
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω      voltage 3-wire: R <sub>min</sub> = 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: $\leq 200$ msec      max. response time: 380 msec

<sup>1</sup> accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span) / -Permissible temperatures			
Tolerance band	$\leq \pm 0.1$ % FSO / 10 K	in compensated range - 20 ... 80 °C	
Permissible temperatures <sup>2</sup>	medium: -40 ... 125 °C	electronics / environment: -40 ... 85 °C	storage: -40 ... 100 °C

<sup>2</sup> for pressure port of PVDF the minimum permissible temperature is -30 °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 <sub>2</sub> O <sub>3</sub> 96 % options: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Media wetted parts	pressure port, seals, diaphragm

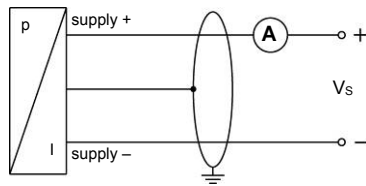
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval DX14-LMK 351	IBExU05ATEX1070 X stainless steel-pressure port with connector: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da plastic-pressure port with connector: zone 0/1 <sup>3</sup> : II 1/2G Ex ia IIC T4 Ga/Gb zone 20/21 <sup>4</sup> : II 1/2D Ex ia IIIC T85 °C Da/Db
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 27 nF, L <sub>i</sub> = 5 μH, C <sub>gnd</sub> = 27 nF
Max. permissible temperature for environment	in zone 0: -20 ... 60 °C for p <sub>atm</sub> 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

<sup>3</sup> The designation depends on the used pressure range. With nominal pressure ranges  $\leq 60$  mbar the designation is „2G“.  
<sup>4</sup> With nominal pressure ranges  $> 60$  mbar and  $< 10$  bar (see item 17 of the type-examination certificate) must be attended!

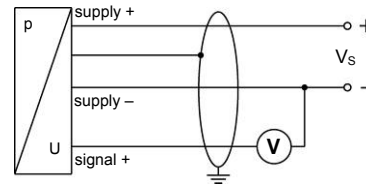
Miscellaneous	
Current consumption	signal output current: max. 21 mA      signal output voltage: max. 5 mA
Weight	approx. 200 g
Installation position	any
Operational life	100 million load cycles
CE-conformity	EMV-directive: 2014/30/EU
ATEX Directive	2014/34/EU

### Wiring diagram

2-wire-system (current)



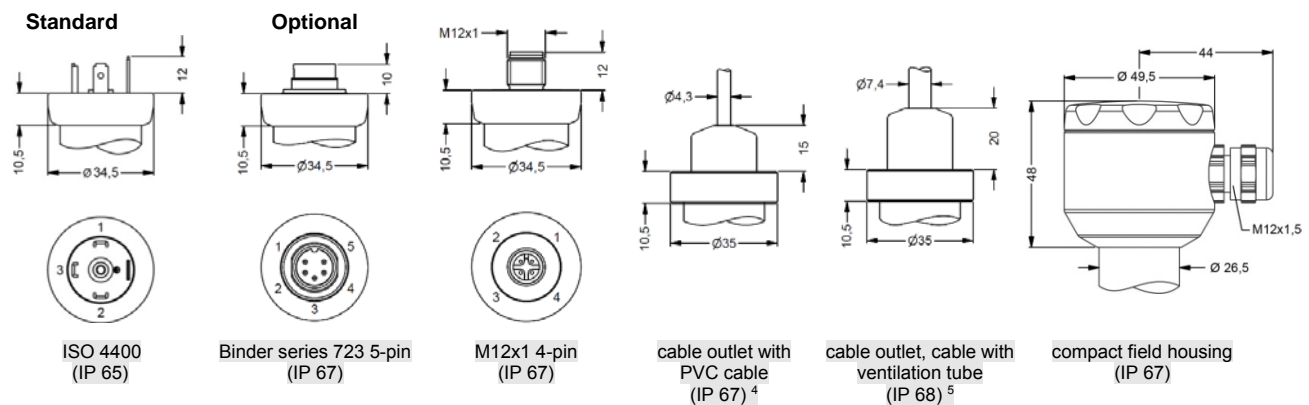
3-wire-system (voltage)



### 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)

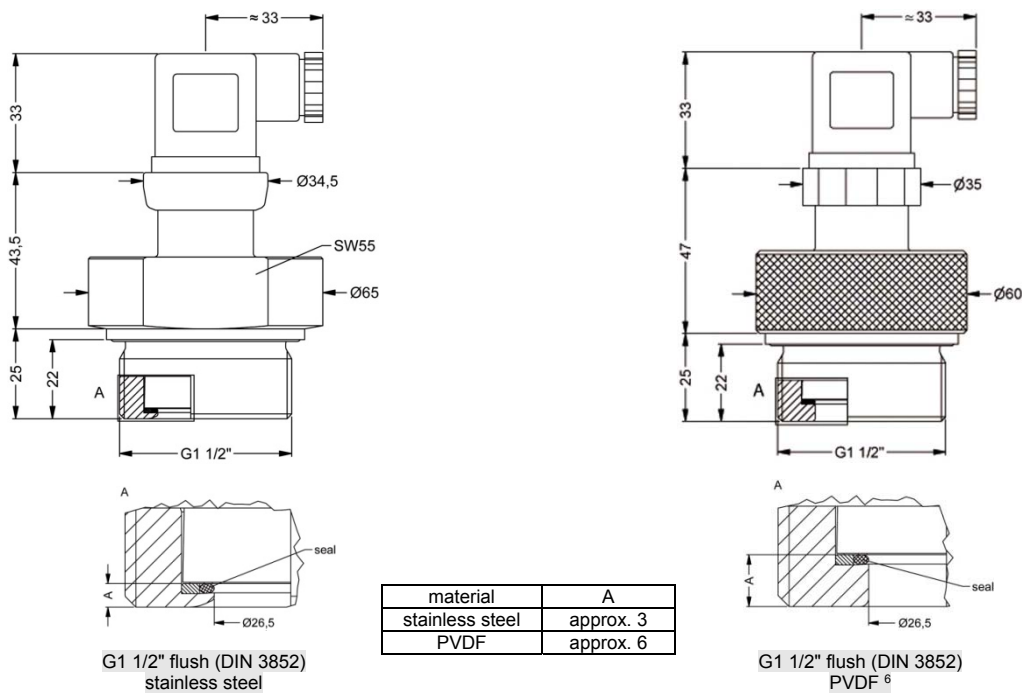
### Electrical connections (dimensions in mm)



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

<sup>5</sup> different cable types and lengths available, permissible temperature depends on kind of cable

### Dimensions (in mm)



<sup>6</sup> 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 <sub>2</sub> O	4	7	1																	
Input		[mH <sub>2</sub> 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 PN ≥ 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) <sup>1</sup>							T	A	0											
	cable outlet,																				
	cable with ventilation tube (IP68) <sup>2</sup>							T	R	0											
	male plug M12x1 (4-pin) / metal							M	1	0											
	compact field housing																				
	stainless steel 1.4301 (304)							8	5	0											
	customer							9	9	9											consult
Mechanical connection																					
	G1 1/2" DIN 3852 with								M	0	0										
	flush sensor																				
	customer								9	9	9										consult
Seals																					
	FKM											1									
	EPDM											3									
	FFKM											7									
	customer											9									consult
Pressure port																					
	stainless steel 1.4404 (316L)												1								
	PVDF <sup>3</sup>												B								
	customer												9								consult
Diaphragm																					
	ceramics Al <sub>2</sub> O <sub>3</sub> 96%													2							
	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%													C							
	customer													9							consult
Special version																					
	standard															0	0	0			
	customer															9	9	9			consult

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

<sup>2</sup> code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

<sup>3</sup> not possible in combination with compact field housing; min. permissible temperature -30 °C

