SensorsONE
Measurement Instrumentation Products

LMK 382

Stainless Steel Probe

Ceramic Sensor

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

Nominal pressure

from 0 ... 40 cmH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- diameter 39.5 mm
- especially for sewage, viscous and pasty media

Optional versions

- IS-protection zone 0
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al_2O_3
- different kinds of cables
- different kinds of elastomers

The stainless steel probe LMK 382 has been designed for continous level measurement in waste water, waste and higher viscosity media.

Basic element is a robust and high overpressure capable capacitive ceramic sensor e.g. for low levels easily.

Preferred areas of use are

Water
drinking water abstraction

Sewage
waste water treatment
water recycling

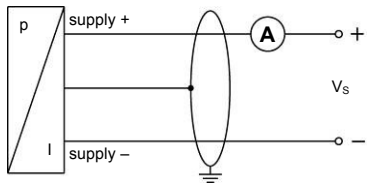
Fuel / Oil
level monitoring in open tanks with low filling heights
fuel storage
tank farms / biogas plants

Input pressure range																
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	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

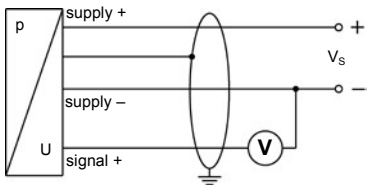
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
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 response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (Offset and Span)		
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 70 °C	
Permissible temperatures		
Permissible temperatures	medium: -25 ... 125 °C electronics / environment: -25 ... 125 °C storage: -25 ... 125 °C	
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection (only for 4 … 20 mA / 2-wire)		
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-25 … 70 °C) black FEP[4] (-25 … 70°C) black TPE (-25 … 125 °C) blue	
[3] shielded cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	stainless steel 1.4404 (316 L)	
Seals	FKM FFKM EPDM others on request	
Diaphragm	standard: ceramics Al_2O_3 96 % Option: ceramics Al_2O_3 99.9 %	
Nose cone	POM	
Explosion protection		
Approval DX14-LMK 382	**IBExU05ATEX1070 X** zone 0 [5]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 27 nF, L_i = 5 ∝H	
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -10 ... 70 °C	
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∝H/m	
[5] for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)		
Miscellaneous		
Current consumption	max. 21 mA	
Weight	approx. 400 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2004/108/EC	

Wiring diagram

2-wire-system (current)



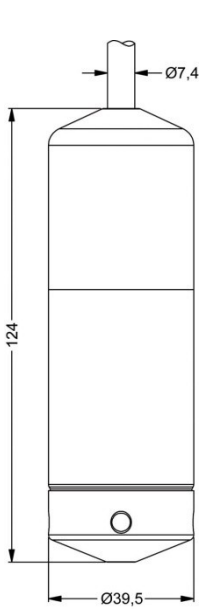
3-wire-system (voltage)



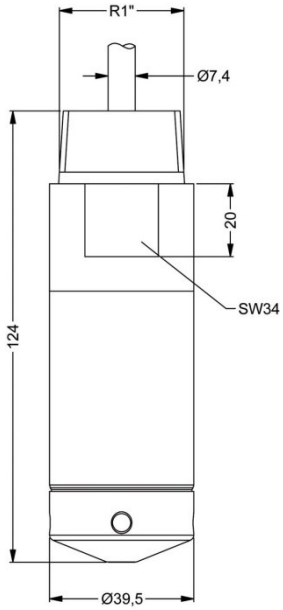
Pin configuration

Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply –	bn (brown)
Signal + (only for 3-wire)	gn (green)
Shield	gn/ye (green / yellow)

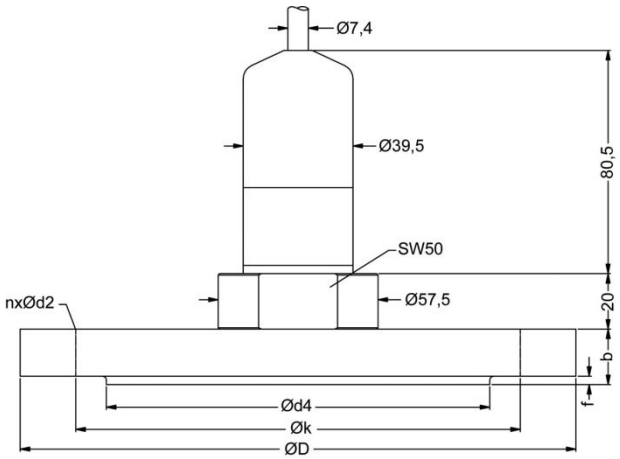
Dimensions (in mm)



LMK 382 standard



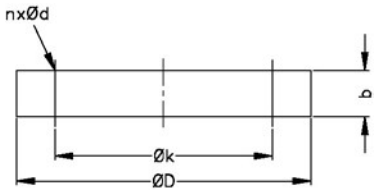
LMK 382 with thread R1"
for stainless steel pipe



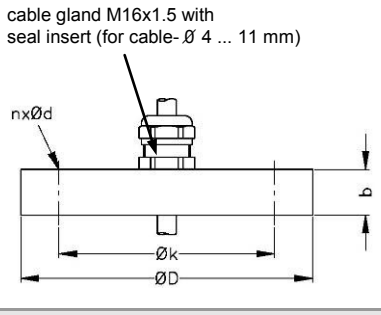
LMK 382
flange version

dimensions in mm				
dimen-sions	DN25 / PN40	DN40/ PN40	DN50 / PN40	DN80 / PN16
D	115	150	165	200
k	85	110	125	160
d4	68	88	102	138
b	18	18	20	20
f	2	3	3	3
n	4	4	4	8
d2	14	18	18	18

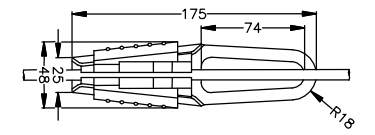
Transmitter flange for flange version		
Technical data		
Suitable for	LMK 382, LMK 382H, LMK 458, LMK 458H	
Flange material	stainless steel 1.4404 (316L)	
Hole pattern	according to DIN 2507	
Version	**Size (in mm)**	**Weight**
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d= 14	1.2 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d= 18	2.6 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d= 18	4.1 kg
Ordering type		**Ordering code**
Transmitter flange DN25 / PN40		ZFS2540
Transmitter flange DN50 / PN40		ZFS5040
Transmitter flange DN80 / PN16		ZFS8016



Mounting flange with cable gland		
Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305 (303); plastic	
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	
Version	**Size (in mm)**	**Weight**
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d= 14	1.4 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d= 18	3.2 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d= 18	4.8 kg
Ordering type		**Ordering code**
DN25 / PN40 with cable gland brass, nickel plated		ZMF2540
DN50 / PN40 with cable gland brass, nickel plated		ZMF5040
DN80 / PN16 with cable gland brass, nickel plated		ZMF8016



Terminal clamp		
Technical Data		
Suitable for	all probes with cable □ 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)	
Weight	approx. 160 g	
Ordering type		**Ordering code**
Terminal clamp, steel, zinc plated		Z100528
Terminal clamp, stainless steel 1.4301 (304)		Z100527



Ordering code LMK 382

LMK 382 □□□-□□□□-□-□-□-□-□-□-□-□□□-□□□

Pressure			
	in bar	565	
	in mH_2O	566	
Input	**[mH_2O]**	**[bar]**	
	0.40	0.04	0400
	0.60	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
Housing			
	Stainless steel 1.4404 (316L)		1
	customer		9 consult
Diaphragm			
	Ceramics Al_2O_3 96%		2
	Ceramics Al_2O_3 99.9%		C
	customer		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
Seals			
	FKM		1
	EPDM		3
	FFKM		7
	customer		9 consult
Electrical connection			
	PVC-cable[1]		1
	PUR-cable[1]		2
	FEP-cable[1]		3
	TPE-cable		4
	customer		9 consult
Accuracy			
standard	0.35 %		3
option	0.25 %		2
	customer		9 consult
Cable length			
	in m		
	standard: 3 m PVC		003
	standard: 5 m PVC		005
	standard: 10 m PVC		010
	standard: 15 m PVC		015
	standard: 20 m PVC		020
	special length PVC		**999**
	standard: 3 m PUR		003
	standard: 5 m PUR		005
	standard: 10 m PUR		010
	standard: 15 m PUR		015
	standard: 20 m PUR		020
	special length PUR		**999**
	standard: 5 m FEP		005
	standard: 10 m FEP		010
	special length FEP		**999**
	special length TPE		**999**
Special version			
	standard		000
	prepared for mounting with stainless steel pipe[2]		502
	flange version		510
	customer		999 consult

[1] cable with integrated air tube for atmospheric pressure reference

[2] stainless steel pipe is not part of the supply

Standard lengths 3 / 5 / 10 / 15 / 20 m are available from stock, special lengths are manufactured order-related, price per meter (see above).