

# Level Sensors with Reed Switch Chain Technology Model RMG

WIKA Data Sheet LM 20.02



## Applications

- Level measurement for almost all liquid media
- Chemical industry, petrochemical industry, natural gas, offshore, shipbuilding, machine building, power generating equipment, power stations
- Process water and drinking water treatment, food and beverage industry, pharmaceutical industry

## Special Features

- Process and system-specific solutions possible
- Operating limits:
  - Operating temperature:  $T = -80 \dots +200 \text{ }^{\circ}\text{C}$
  - Working pressure:  $P = \text{Vacuum to } 100 \text{ bar}$
  - Limit S. G.:  $\rho \geq 400 \text{ kg/m}^3$
- Wide variety of different electrical connections, process connections and materials
- Optionally with programmable and configurable head-mounted transmitter for 4 ... 20 mA signals, HART®, PROFIBUS® PA and FOUNDATION™ Fieldbus
- Explosion-protected versions

## Description

The WIKA Model RMG sensors with reed chain technology serve as measuring transducers for level measurement in liquid media. They work on the float principle with magnetic transmission.

The float's magnetic system operates a resistance measuring chain within a guide tube, which corresponds to a 3-wire potentiometer circuit. The measurement voltage generated by this is proportional to the fill level.

The measurement voltage is finely-stepped as a result of the contact separation of the measuring chain and is thus virtually continuous.

Depending on the requirements, contact separations from 5 to 18 mm are available.



Level Sensors with Reed Switch Chain Technology,  
Model RMG, Flange Connection

## Further special features




- Large scope of application due to the simple, proven functional principle
- Process connection, guide tube material and float made of stainless steel 1.4571 or plastic
- For harsh operating conditions, long service life
- Continuous measurement of the liquid levels irrespective of physical or chemical changes of state of the measured media, such as: foaming, conductivity, dielectric constant, pressure, vacuum, temperature, vapour, condensation, blistering, effects of boiling, density changes
- Signal transmission over large distances
- Simple installation and commissioning, onetime calibration only, no recalibration necessary.
- Volume-proportional or depth-proportional display of the filling level
- High repeatability
- Interface layer measurement and overall level from  $\Delta$ -density of more than 50 kg/m<sup>3</sup>
- Level sensors with reed switch chain technology qualify as passive electrical equipment in accordance with DIN IEC 60 079-11 and can be installed in 'Zone 1' hazardous areas without certification, as long as the equipment is operated in a certified intrinsically safe circuit with a minimum explosion protection of EEx ib

## Options

- Customer-specific solutions
- Programmable and configurable head-mounted transmitters in terminal box, 4 ... 20 mA output signal, 2-wire, for HART®, PROFIBUS® PA and FOUNDATION™ Fieldbus
- Process connection, guide tube material and float made of stainless steel 1.4435, 1.4539, titanium, Hastelloy (others on request)
- In combination with limit switch module, stepless setting of the limit values over the entire measuring range

## Product programme

Selection of process connection, material and design ⇒ further information on the indicated pages.

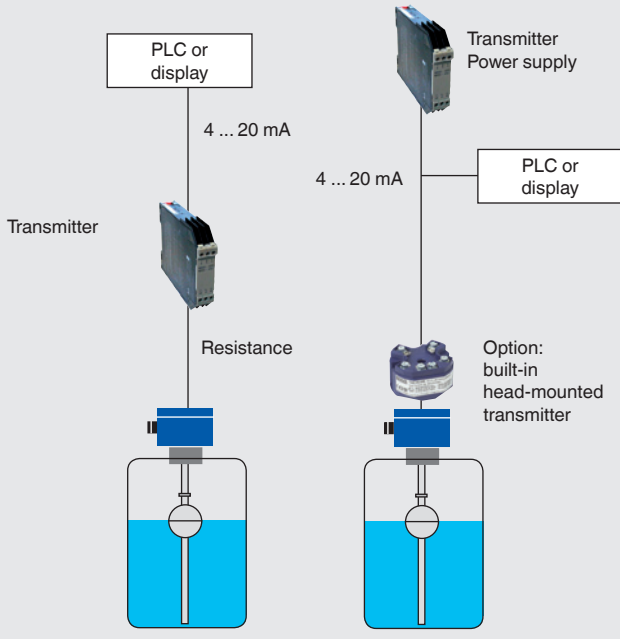
Process connection	Material Stainless steel	Explosion-protected version	Material PVC / PP / PVDF
 <p><b>Mounting thread</b> (without terminal box) G 3/8" ... G 1"</p>	Page 4	-	Page 6
 <p><b>Mounting thread</b> G 1 1/2" ... G 2"</p>	Page 4	Page 5	Page 6
 <p><b>Flange</b> DN 50 ... DN 350 PN 6 ... PN 100</p>	Page 4 Page 7 (E-CTFE coated)	Page 5	Page 6

Float versions: page 8 and 9

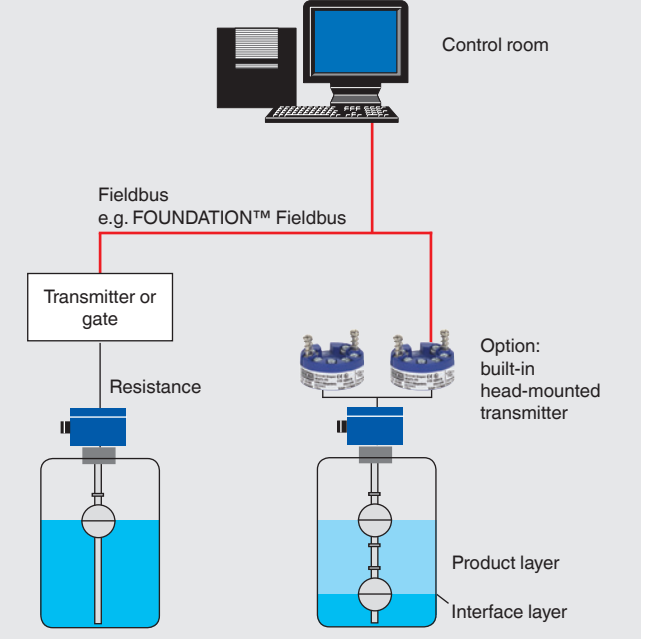
Determination of the max. guide tube length L for explosion-protected versions, intrinsically safe: page 10

# Application examples

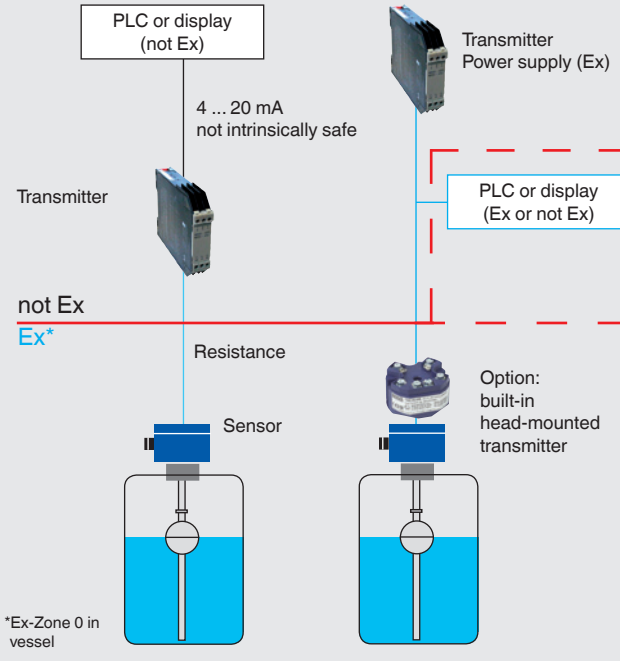
## Standard applications



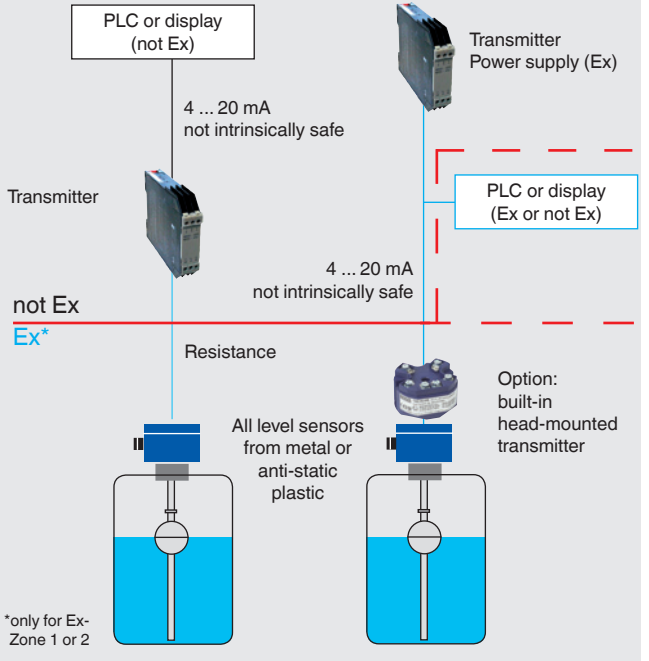
## Connection to bus systems



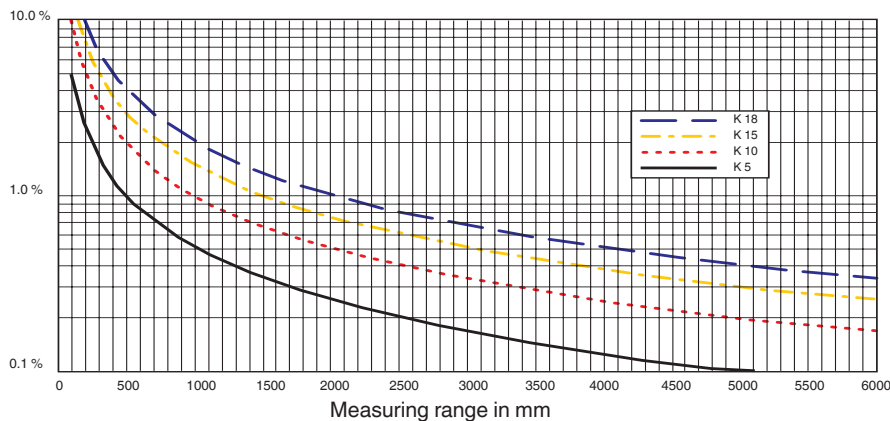
## Applications for Ex-Zone 0



## Applications for Ex-Zone 1, 2



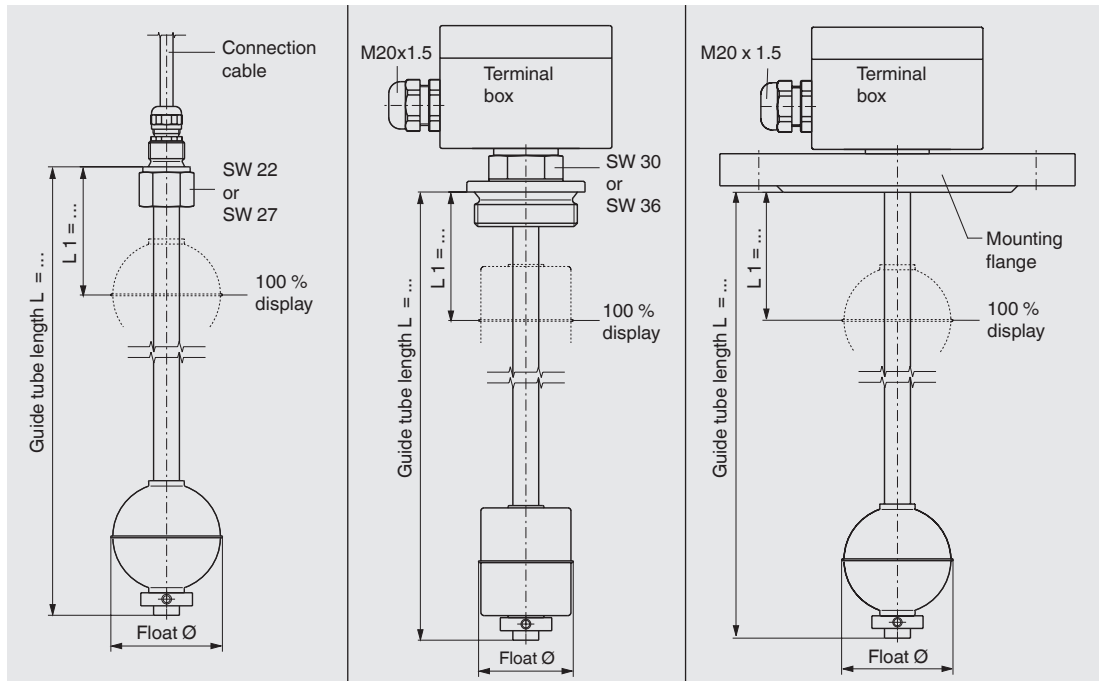
## Measuring accuracy



- Legend
- K 18 Contact separation 18 mm
  - K 15 Contact separation 15 mm
  - K 10 Contact separation 10 mm
  - K 5 Contact separation 5 mm

## Standard version

Process connection, guide tube material and float made of stainless steel 1.4571



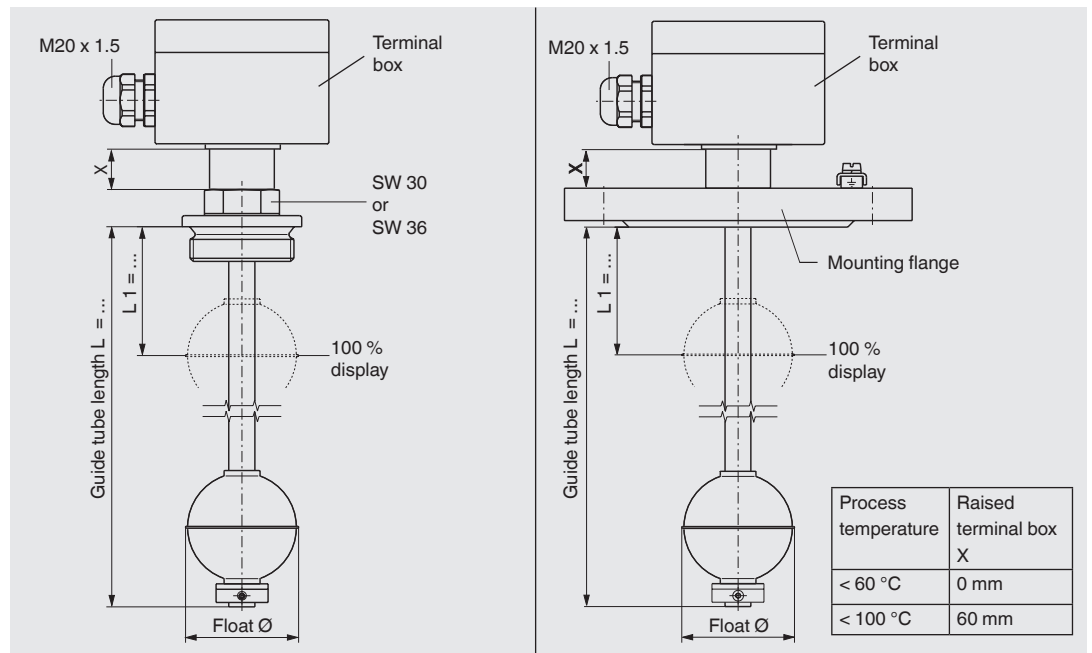
	Mounting thread (without terminal box)		Mounting thread		Flange	
Electrical connection	Connection cable	<ul style="list-style-type: none"> <li>■ PVC grey</li> <li>■ PVC blue</li> <li>■ Silicone</li> <li>■ PUR</li> </ul>	Terminal box	<ul style="list-style-type: none"> <li>■ Aluminium 80 x 75 x 57 mm</li> <li>Option: Polypropylene, polyester, stainless steel</li> </ul>		
Process connection	Mounting thread upwards G 3/8" (others on request)	G 1/2" (others on request)	Mounting thread downwards	Mounting flange <ul style="list-style-type: none"> <li>■ DIN DN 50 ... DN 200, PN 6 ... PN 100</li> <li>■ ANSI 2" ... 8", Class 150 ... 600</li> </ul>		
Guide tube diameter	12 or 14 mm	18 mm	12 or 14 mm	18 mm	12 or 14 mm	18 mm
Guide tube length L max.	3000 mm	6000 mm	3000 mm	6000 mm	3000 mm	6000 mm
Float	Material stainless steel 1.4571 (Option: Buna, titanium) Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 8 and 9)					
Max. working pressure	See table page 8 and 9					
Temperature range standard	PVC / PUR cable -10 ... +80 °C Silicone cable -10 ... +120 °C		-20 ... +120 °C Option: ■ High temperature version: +120 ... +200 °C Option: ■ Low temperature version: -80 ... -20 °C			
Contact separation	K 18 = 18 mm (not with option high and low temperature version) K 15 = 15 mm K 10 = 10 mm K 5 = 5 mm					
Overall resistance of the measuring chain	Length and separation dependent					
Connection cable to transmitter	Cable length max. 2000 m, 3-wire, screened					
Mounting position	Vertical ± 30°					
Ingress protection	IP 65 per EN 60 529 / IEC 529					

# Explosion-protected version, intrinsically safe

II 1/2G EEx ia IIC T4-T6 KEMA 01 ATEX 1052X

II 2D T80 °C IP6X

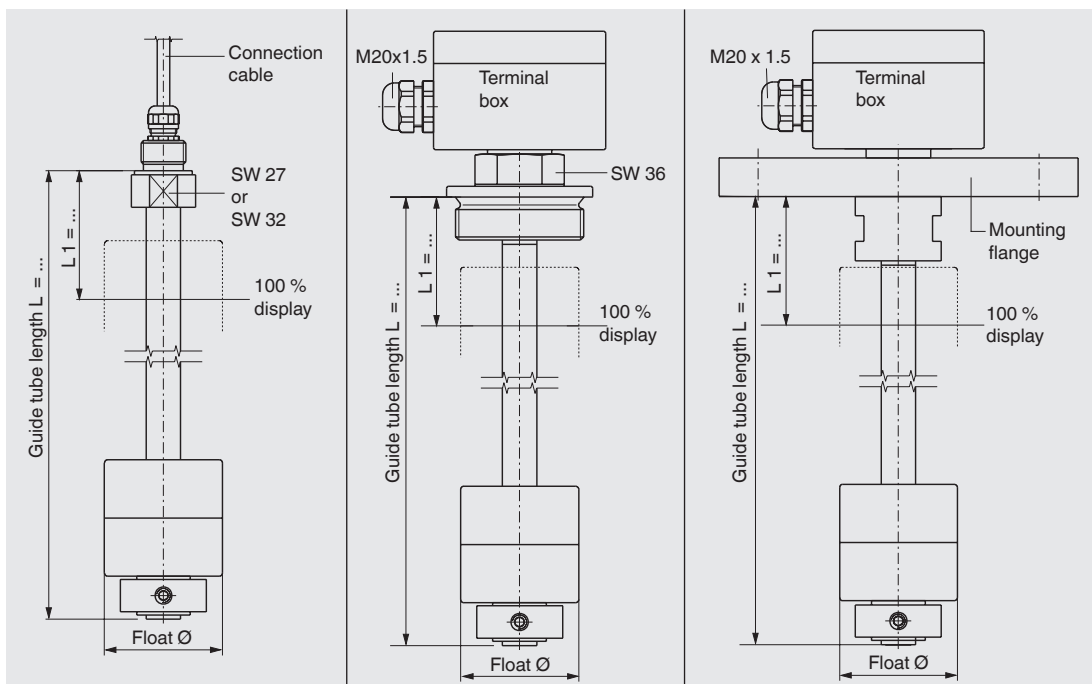
Process connection, guide tube material and float made of stainless steel 1.4571



	Mounting thread	Flange
Electrical connection	Terminal box ■ Aluminium 80 x 75 x 57 mm Option: Polyester, stainless steel	
Process connection	Mounting thread downwards G 1 1/2" or G 2" (others on request)	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", Class 150 ... 600
Guide tube diameter	12, 14 or 18 mm	
Guide tube length L max.	See variants A and B on page 10	
Float	Material stainless steel 1.4571 (Option: Buna, titanium) Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 8 and 9)	
Max. working pressure	See table page 8 and 9	
Temperature class	T4 T5 T6	
Surface temperature	Max. 135 °C 100 °C 85 °C	
Process temperature	Max. 100 °C 65 °C 50 °C	
Ambient temperature at terminal box	Max. 60 °C 60 °C 60 °C	
Contact separation	K 18 = 18 mm K 15 = 15 mm K 10 = 10 mm K 5 = 5 mm	
Overall resistance of the measuring chain	Length and separation dependent 3.2 kΩ ... 50 kΩ	
Control circuit	Ignition protection type EEx ia IIC, only for connection to a certified intrinsically safe control circuit Transmitter external with max. 120 mA, max. 28 V Head-mounted transmitter in accordance with transmitter approvals	
Connection cable to transmitter	Cable length max. 2000 m, 3-wire, screened	
Mounting position	Vertical ± 30°	
Ingress protection	IP 65 per EN 60 529 / IEC 529	

## Plastic version

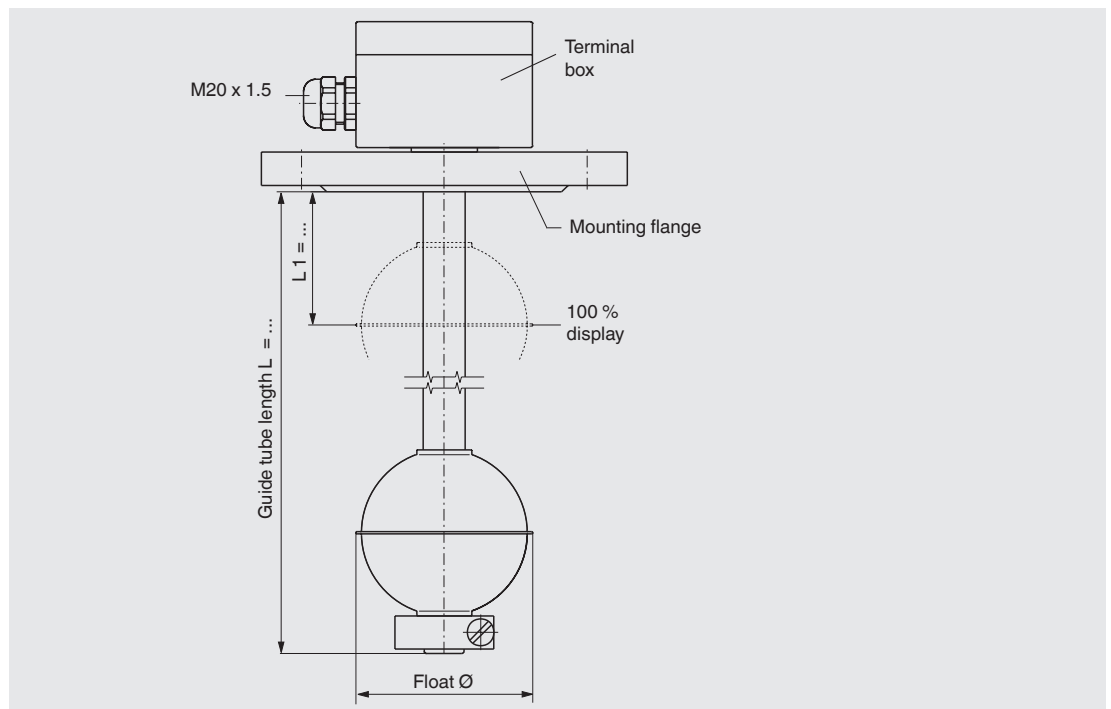
Process connection, guide tube material and float made of PVC, polypropylene or PVDF



	Mounting thread (without terminal box)	Mounting thread	Flange
Electrical connection	Connection cable <ul style="list-style-type: none"> <li>■ PVC grey</li> <li>■ PVC blue</li> <li>■ Silicone</li> <li>■ PUR</li> </ul>	Terminal box	■ Polyester 80 x 75 x 55 mm
Process connection	Mounting thread, upwards <ul style="list-style-type: none"> <li>■ G 1/2" (Guide tube Ø 16 mm)</li> <li>■ G 1" (Guide tube Ø 20 mm) (others on request)</li> </ul>	Mounting thread, downwards G 2" (others on request)	Mounting flange <ul style="list-style-type: none"> <li>■ DIN DN 65 ... DN 125, PN 10, Form A</li> <li>■ ANSI 2 1/2" ... 5", Class 150 FF</li> </ul>
Guide tube diameter	16 or 20 mm (strengthened with a metallic inner tube)		
Guide tube length L max.	<ul style="list-style-type: none"> <li>■ 3000 mm (Guide tube Ø 16 mm)</li> <li>■ 5000 mm (Guide tube Ø 20 mm)</li> </ul>		
Float	Material <ul style="list-style-type: none"> <li>■ PVC</li> <li>■ Polypropylene</li> <li>■ PVDF</li> </ul> Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 8 and 9)		
Max. working pressure	3 bar		
Temperature range	<ul style="list-style-type: none"> <li>■ PVC 0 ... +60 °C</li> <li>■ Polypropylene -10 ... +80 °C</li> <li>■ PVDF -10 ... +100 °C</li> </ul>		
Contact separation	K 18 = 18 mm K 15 = 15 mm K 10 = 10 mm K 5 = 5 mm		
Overall resistance of the measuring chain	Length and separation dependent		
Connection cable to transmitter	Cable length max. 2000 m, 3-wire, screened		
Mounting position	Vertical ± 30°		
Ingress protection	IP 65 per EN 60 529 / IEC 529		

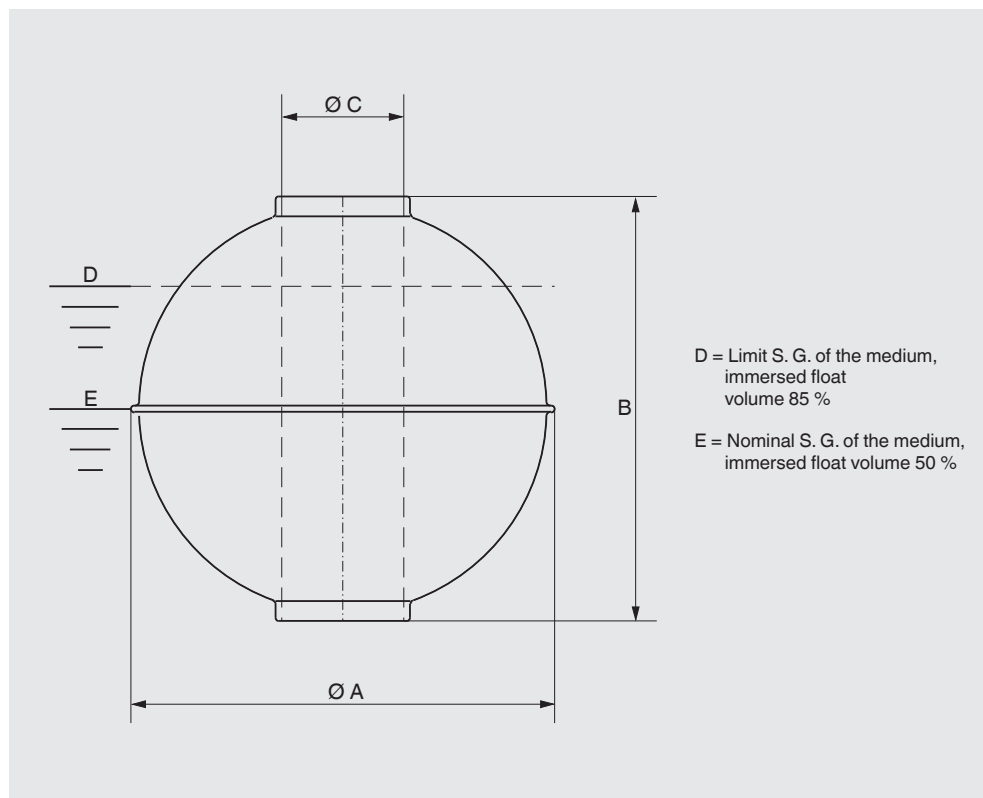
## Stainless steel version, E-CTFE coated

Process connection, guide tube material and float made of stainless steel 1.4571, E-CTFE coated



	Flange (Guide tube diameter 12 mm)	Flange (Guide tube diameter 18 mm)
Electrical connection	Terminal box ■ Aluminium 80 x 75 x 57 mm Option: Polypropylene, polyester, stainless steel	
Process connection	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", Class 150 ... 600	
Guide tube diameter	12 mm	18 mm
Guide tube length L max.	2000 mm	4000 mm
Float	Material stainless steel 1.4571 (E-CTFE coated) Float diameter from 45 ... 121 mm Float selection depending on guide tube diameter and process conditions (see page 8 and 9)	
Max. working pressure	See table on page 8	
Temperature range	Depending on medium	
Contact separation	K 18 = 18 mm K 15 = 15 mm K 10 = 10 mm K 5 = 5 mm	
Overall resistance of the measuring chain	Length and separation dependent	
Connection cable to transmitter	Cable length max. 2000 m, 3-wire, screened	
Mounting position	Vertical ± 30°	
Ingress protection	IP 65 per EN 60 529 / IEC 529	
Option	Coating electrically conductive	

## Spherical floats (K)

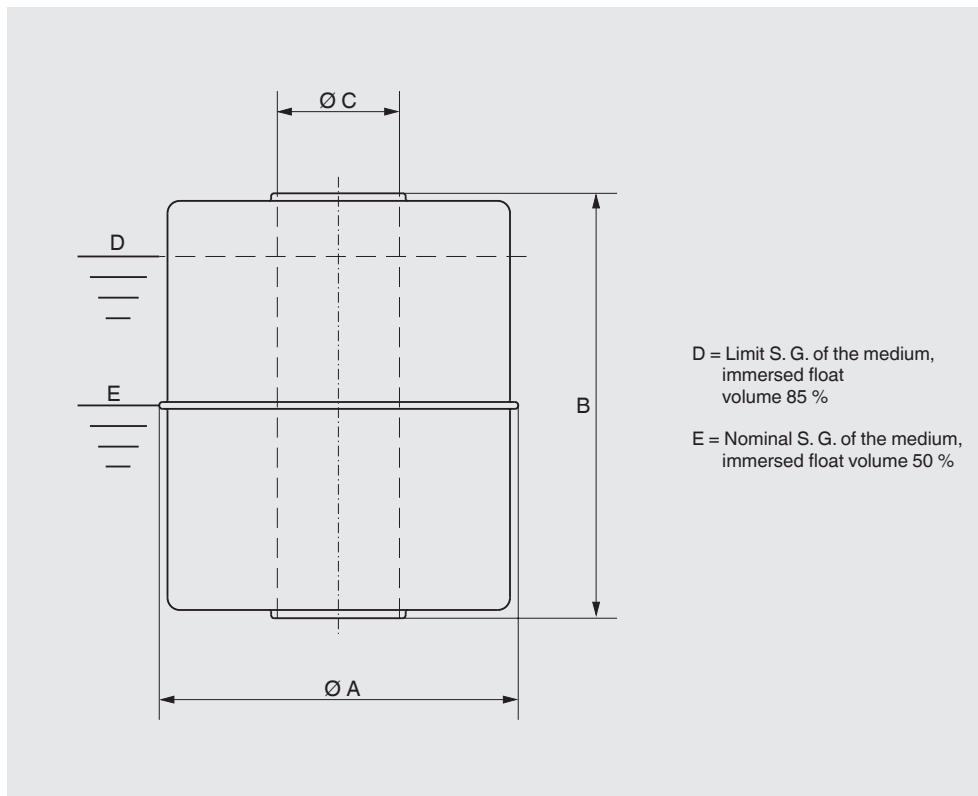


Material	Suits guide tube Ø mm	Ø A mm	B mm	Ø C mm	Max. working pressure bar	Max. operating temperature °C	Limit S. G. 85 % kg/m <sup>3</sup>	Nominal S. G. 50 % kg/m <sup>3</sup>
Stainless steel 1.4571	12	52	52	15	40	250	727	1236
	12	62	61	15	32	250	597	1015
	12	83	81	15	25	250	412	701
	18	80	76	23	25	250	617	1049
	18	98	96	23	25	250	561	954
	18	105	103	23	25	250	520	884
	18	120	117	23	25	250	394	671
	18-30	120	116	38	25	250	537	914
Titanium 3.7035	12	52	52	15	25	250	623	1060
	12	52	52	15	60	250	790	1342
	12	52	52	15	80	250	997	1696
	12	62	62	15	25	250	482	820
	12	83	81	15	25	250	343	583
	18	80	76	23	25	250	866	1473
	18	98	96	23	25	250	536	912
	18	105	103	23	25	250	416	707
	18	120	117	23	25	250	315	535
Stainless steel 1.4571	18	81	77	22	25	depending on medium	634	1077
E-CTFE coated	18	99	97	22	25	depending on medium	653	1111
	18	106	104	22	25	depending on medium	595	1011
	18	121	118	22	3	depending on medium	435	740

Note: The optimum float will be selected after a feasibility test carried out by WIKA.



## Cylindrical floats (Z)



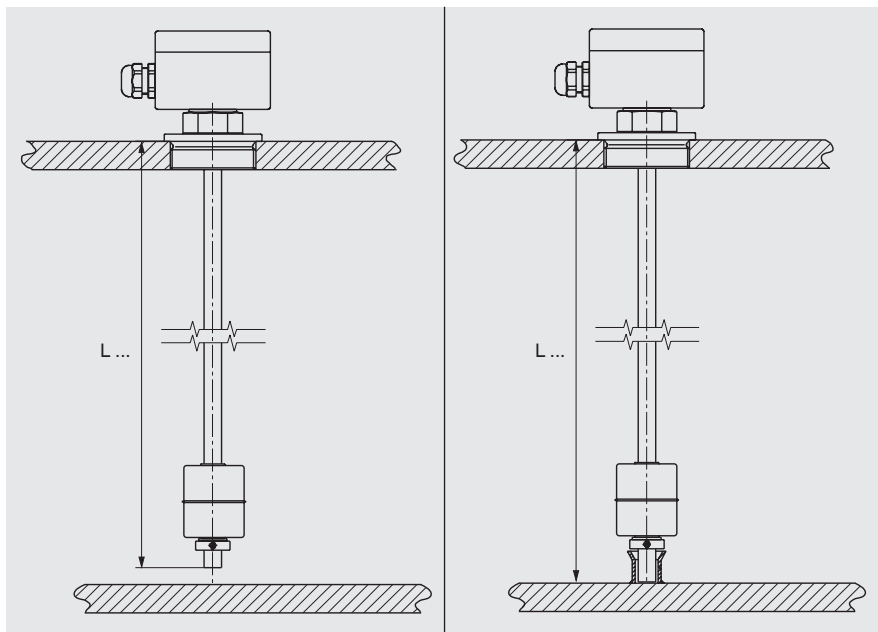
Material	Suits guide tube $\varnothing$ mm	$\varnothing A$ mm	$B$ mm	$\varnothing C$ mm	Max. working pressure bar	Max. working temperature $^{\circ}C$	Limit S. G. 85 % $kg/m^3$	Nominal S. G. 50 % $kg/m^3$
Stainless steel 1.4571	12	44	52	15	16	250	740	1258
Titanium 3.7035	12	44	52	15	16	250	645	1098
PVC	16	55	54	22	3	60	805	1369
	20	55	80	26	3	60	869	1477
	20	80	79	25	3	60	577	981
Polypropylene	16	55	54	22	3	80	592	1007
	20	55	80	26	3	80	630	1071
	20	80	79	25	3	80	438	745
PVDF	16	55	69	22	3	100	809	1375
	20	55	80	26	3	100	1140	1938
	20	80	79	25	3	100	706	1200

Note: The optimum float will be selected after a feasibility test carried out by WIKA.

## Determination of the max. guide tube length L for explosion-protected versions, intrinsically safe

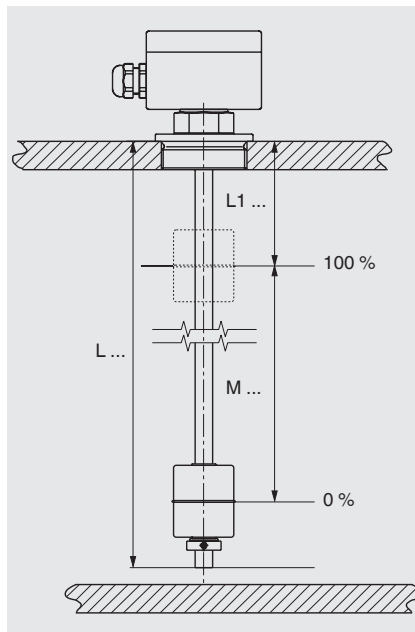
Version A: Fixed to the tank ceiling

Version B: Fixed to the tank ceiling and floor



Guide tube	Max. guide tube length L	
	Version A	Version B
Ø 12 x 1	660 mm	3500 mm
Ø 14 x 1	940 mm	5000 mm
Ø 14 x 2	1600 mm	6000 mm
Ø 18 x 2	3000 mm	6500 mm

## Illustration with the required dimensions for ordering



### Legend

L1 = 100 % Mark (distance sealing face - float center)

M = Measuring range (distance 0 % - 100 %)

L = Guide tube length and/or. insertion length of the sensor

On ordering, the dimension L1 and the guide tube length (immersion length) L must be given.

Subsequent alteration of the measuring range is not possible.

### Ordering information

Model / Version / Electrical connection / Process connection / Guide tube diameter / Guide tube length (insertion length) L / Contact separation / 100 % Mark L1 / Measuring range M (Span 0 % - 100 %) / Process specifications (operating temperature and working pressure, S.G. Limit) / Options

The specifications given in this document represent the state of engineering at the time of publishing. We reserve the right to make modifications to the specifications and materials.



**WIKAI Alexander Wiegand SE & Co. KG**  
 Alexander-Wiegand-Straße 30  
 63911 Klingenberg/Germany  
 Tel. (+49) 9372/132-0  
 Fax (+49) 9372/132-406  
 E-mail info@wika.de  
 www.wika.de