

# Level sensor

## For industrial applications, stainless steel version

### Model RLT-1000

WIKA data sheet LM 50.02

#### Applications

- Level measurement of liquids in machine building
- Control and monitoring tasks for hydraulic power packs, compressors and cooling systems.

#### Special features

- Media compatibility: Oil, water, diesel, refrigerants and other liquids
- Permissible medium temperature range: -30 ... +120 °C [-22 ... +248 °F]
- Output signal: Resistance in a 3-wire potentiometer circuit, current output 4 ... 20 mA
- Measuring principle: Reed-chain technology
- Accuracy, resolution: 24 mm [0.9 in], 12 mm [0.5 in], 10 mm [0.4 in], 6 mm [0.2 in] or 3 mm [0.1 in]

#### Description

The model RLT-1000 level sensor has been developed for measuring the levels of liquids. The stainless steel used is suitable for a multitude of media, such as, for example, oil, water, diesel and refrigerants.

#### Measuring principle

A permanent magnet built into the float triggers, with its magnetic field, the resistance measuring chain built into the guide tube. The entire assembly corresponds to a 3-wire potentiometer circuit. The measured resistance signal is proportional to the level. The model RLT-1000 is optionally available with a 4 ... 20 mA analogue output.



Fig. left: Mounting thread, angular connector

Fig. right: Mounting thread, circular connector M12 x 1

## Specifications

Level sensor, model RLT-1000	
<b>Measuring principle</b>	Reed-chain technology with optional analogue amplifier
<b>Measuring range M</b>	The measuring range is determined from the selected guide tube length L and the position of the 100 % mark. For dimensions see drawing
<b>Guide tube length L</b>	150 ... 1,500 mm [6 ... 59 in], greater lengths on request
<b>Output signal</b>	<ul style="list-style-type: none"> <li>■ Variable resistance The overall resistance of the reed chain is approx. 1 ... 10 kΩ, depending on the measuring range Max. voltage &lt; DC 40 V</li> <li>■ Current output, 4 ... 20 mA, 2-wire Power supply: DC 12 ... 32 V Load in Ω: ≤ (power supply - 12 V) / 0.02 A</li> </ul>
<b>Accuracy, resolution</b>	<ul style="list-style-type: none"> <li>■ 24 mm [0.9 in] <sup>1)</sup></li> <li>■ 12 mm [0.5 in] <sup>2)</sup></li> <li>■ 10 mm [0.4 in] <sup>3)</sup></li> <li>■ 6 mm [0.2 in] <sup>2)</sup></li> <li>■ 3 mm [0.1 in] <sup>2)</sup></li> </ul>
<b>Mounting position</b>	Vertical ±30°
<b>Process connection</b>	<ul style="list-style-type: none"> <li>■ G 1, installation from outside</li> <li>■ G 1 ½, installation from outside</li> <li>■ G 2, installation from outside</li> <li>■ Flange DN 50, form B per DIN 2527/EN 1092, PN 16, installation from outside</li> <li>■ G ¾, installation from inside <sup>4)</sup></li> <li>■ G ½, installation from inside <sup>4)</sup></li> <li>■ G ¼, installation from inside <sup>4)</sup></li> </ul>
<b>Material</b>	<ul style="list-style-type: none"> <li>■ Wetted</li> <li>■ Non-wetted</li> </ul>
	Process connection, guide tube: Stainless steel 1.4571 (316Ti)      Float: See table on page 3 Case: Stainless steel 1.4571 (316Ti)      Electrical connection: See table below
<b>Permissible temperatures</b>	
<ul style="list-style-type: none"> <li>■ Medium</li> <li>■ Ambient</li> <li>■ Storage</li> </ul>	-30 ... +80 °C [-22 ... +176 °F], option: -30 ... +120 °C [-22 ... +248 °F] <sup>5)</sup> -30 ... +80 °C [-22 ... +176 °F] -30 ... +80 °C [-22 ... +176 °F]

Electrical connections <sup>6)</sup>	Ingress protection <sup>7)</sup>	Material	Cable length
<b>Angular connector DIN 175301-803 A</b>	IP65	PA	-
<b>Circular connector M12 x 1 (4-pin)</b>	IP65	TPU, brass	
<b>Cable outlet</b>	IP67	PVC	■ 2 m [6.5 ft]
<b>Cable outlet</b>	IP67	PUR	■ 5 m [16.4 ft]
<b>Cable outlet</b>	IP67	Silicone	other lengths on request
<b>Connection housing "standard"</b> Dimensions: 75 x 80 x 57 mm [3.0 x 3.1 x 2.2 in] For cable diameter: 5 ... 10 mm [0.2 ... 0.4 in]	IP66	Aluminium, glands from polyamide, brass, stainless steel	-
<b>Connection housing „compact“</b> Dimensions: 58 x 64 x 36 mm [2.3 x 2.5 x 1.4 in] For cable diameter: 5 ... 10 mm [0.2 ... 0.4 in]	IP66		

1) Not with float diameter 30 mm [1.2 in] or 25 mm [1.0 in]

2) Not with float diameter 30 mm [1.2 in]

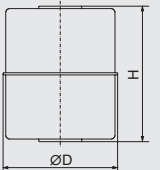
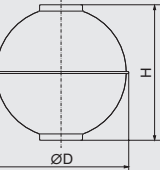
3) Only with float diameter 30 mm [1.2 in]

4) Only with cable outlets

5) Not with cable material: PVC, PUR; float outer diameter Ø D = 30 mm [1.2 in]; not with connection housing 58 x 64 x 36 mm [2.3 x 2.5 x 1.4 in]

6) Cable outlets not available with current output 4 ... 20 mA

7) The stated ingress protection (per IEC/EN 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.


Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder <sup>1)</sup>	44 mm [1.7 in]	52 mm [2.0 in]	≤ 16 bar [≤ 232 psi]	≤ 120 °C [≤ 248 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	1.4571 (316Ti)
	Cylinder <sup>2)</sup>	30 mm [1.2 in]	36 mm [1.4 in]	≤ 10 bar [≤ 145 psi]	≤ 80 °C [≤ 176 °F]	≥ 850 kg/m <sup>3</sup> [53.1 lbs/ft <sup>3</sup> ]	1.4571 (316Ti)
	Cylinder	25 mm [1.0 in]	20 mm [0.8 in]	≤ 16 bar [≤ 232 psi]	≤ 80 °C [≤ 176 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	Buna / NBR
	Sphere <sup>3)</sup>	52 mm [2.0 in]	52 mm [2.0 in]	≤ 40 bar [≤ 580 psi]	≤ 120 °C [≤ 248 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	1.4571 (316Ti)


1) Not with process connection G 1


2) Only with guide tube length ≤ 1,000 mm [39.4 in]

3) Not with process connection G 1, G 1 ½

## Connection diagram

Angular connector DIN 175301-803 A				
	Variable resistance		Current output, 4 ... 20 mA, 2-wire	
	Overall resistance	Pin 2 / 3	U <sub>+</sub>	Pin 1
	100 ... 0 %	Pin 1 / 3	U <sub>-</sub>	Pin 2
	0 ... 100 %	Pin 1 / 2		

Circular connector M12 x 1 (4-pin)				
	Variable resistance		Current output, 4 ... 20 mA, 2-wire	
	Overall resistance	Pin 3 / 4	U <sub>+</sub>	Pin 1
	100 ... 0 %	Pin 1 / 3	U <sub>-</sub>	Pin 4
	0 ... 100 %	Pin 1 / 4		

Cable outlet			
	Variable resistance		
	Overall resistance	green / white	
	100 ... 0 %	white / brown	
	0 ... 100 %	brown / green	

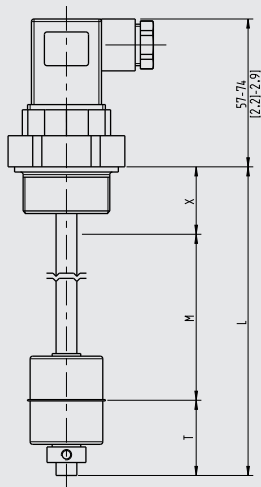
Aluminium case				
	Variable resistance		Current output, 4 ... 20 mA, 2-wire	
	Overall resistance	Terminal W1 / W3	U <sub>+</sub>	Terminal U <sub>+</sub>
	100 ... 0 %	Terminal W1 / W2	U <sub>-</sub>	Terminal U <sub>-</sub>
	0 ... 100 %	Terminal W2 / W3		

## Electrical safety

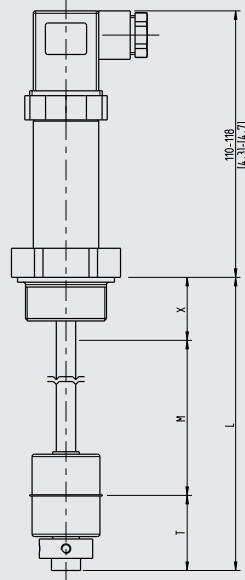
Reverse polarity protection	U+ vs. U-
Insulation voltage	DC 1,500 V
Overvoltage protection	DC 40 V

## Dimensions in mm [in]

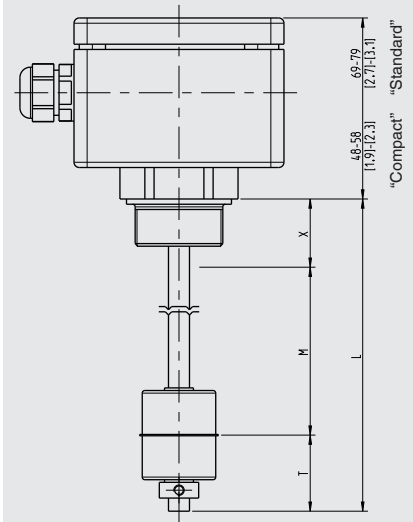
with angular connector form A  
Resistance signal



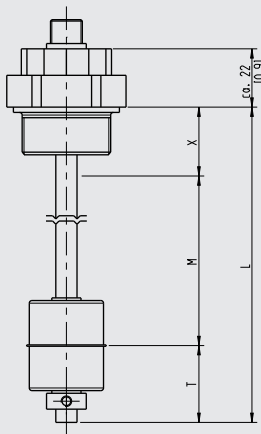
with angular connector form A  
Current output 4 ... 20 mA



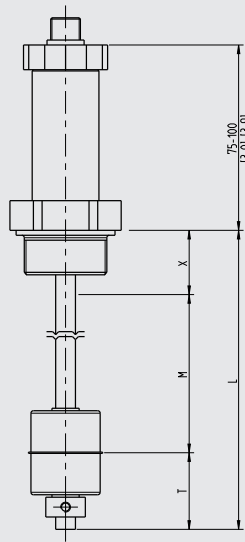
with connection housing



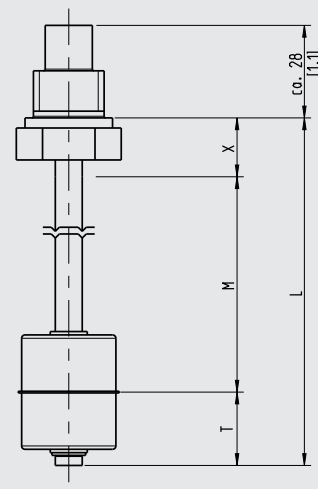
with M12 x 1 circular connector  
Resistance signal



with M12 x 1 circular connector  
Current output 4 ... 20 mA



with cable outlet  
Resistance signal



### Legend

- L Guide tube length
- M Measuring range
- X Distance sealing face to 100 % mark  
( $X \geq$  dead band T in mm [in] (from sealing edge))
- T Dead band (pipe end)

### Float stop at guide tube end

- Adjusting collar, for medium temperature  $\leq 80\text{ °C}$  [ $\leq 176\text{ °F}$ ]
- Pipe clamp, for medium temperature  $> 80\text{ °C}$  [ $> 176\text{ °F}$ ]

### Dead band T float switch in mm [in] (from sealing edge)

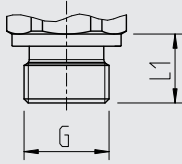
Process connection	Outer diameter float $\varnothing$ D			
	$\varnothing$ 30 mm [1.2 in]	$\varnothing$ 44 mm [1.7 in]	$\varnothing$ 52 mm [2.0 in]	$\varnothing$ 25 mm [1.0 in]
<b>G 1 (from outside)</b>	35 mm [1.4 in]	-	-	-
<b>G 1 ½ (from outside)</b>	35 mm [1.4 in]	45 mm [1.8 in]	-	25 mm [1.0 in]
<b>G 2 (from outside)</b>	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]	25 mm [1.0 in]
<b>Flange (from outside)</b>	20 mm [0.8 in]	30 mm [1.2 in]	30 mm [1.2 in]	5 mm [0.2 in]
<b>G ¼ B (from inside)</b>	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]	20 mm [0.8 in]
<b>G ⅜ B (from inside)</b>	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]	20 mm [0.8 in]
<b>G ½ B (from inside)</b>	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]	20 mm [0.8 in]

### Dead band T in mm [in] (pipe end)

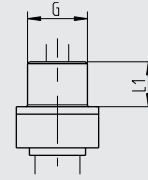
Dead band	Outer diameter float $\varnothing$ D			
	$\varnothing$ 30 mm [1.2 in]	$\varnothing$ 44 mm [1.7 in]	$\varnothing$ 52 mm [2.0 in]	$\varnothing$ 25 mm [1.0 in]
<b>T</b>	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]	45 mm [1.8 in]

## Process connection

Installation from outside



Installation from inside

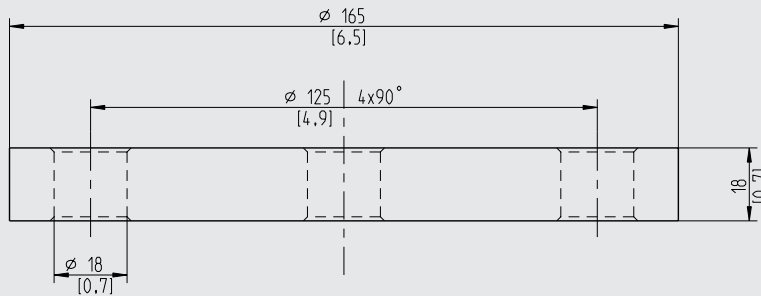


G	L <sub>1</sub>	Spanner width
G 1	16 mm [0.63 in]	41 mm [1.6 in]
G 1 ½	18 mm [0.71 in]	30 mm [1.2 in]
G 2	20 mm [0.79 in]	36 mm [1.4 in]

G	L <sub>1</sub>	Spanner width
G ¼ B	12 mm [0.47 in]	19 mm [0.7 in]
G ⅜ B	12 mm [0.47 in]	22 mm [0.9 in]
G ½ B	14 mm [0.55 in]	27 mm [1.1 in]

### Flange

DN 50, form B per EN 1092-1 (DIN 2527), PN 16



## Accessories

### Circular connector M12 x 1 with moulded cable

	Description	Temperature range	Cable diameter	Cable length	Order number
	Straight version, cut to length, 4-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	2 m [6.6 ft]	14086880
				5 m [16.4 ft]	14086883
				10 m [32.8 ft]	14086884
	Angled version, cut to length, 4-pin, PUR cable, UL listed, IP67	-20 ... +80 °C [-4 ... +176 °F]	4.5 mm [0.18 in]	2 m [6.6 ft]	14086889
				5 m [16.4 ft]	14086891
				10 m [32.8 ft]	14086892