

# Float switch

## For industrial applications, intrinsic safety Ex i

### Model RLS-4000 (models with approval: EX-SR 10 ... EX-SR 21)

WIKA data sheet LM 50.07



#### Applications

- Combined level and temperature measurement of liquids in machine building
- Control and monitoring tasks for hydraulic power packs, compressors and cooling systems

#### Special features

- Media compatibility: Oil, diesel, refrigerants and other liquids
- Level: Up to 4 switching outputs, freely definable as normally open, normally closed or change-over contact
- Level and temperature: Up to 3 switching outputs, freely definable as normally open, normally closed or change-over contact and 1 bimetal temperature switch or Pt100/Pt1000, accuracy: Class B
- Potential-free switching reed contacts



Float switch, cable outlet, model RLS-4000

#### Description

The model RLS-4000 float switch with optional temperature output has been designed for the recording of level and temperature at hazardous measuring points. The stainless steel used is suitable for a multitude of media, such as, for example, oil, diesel and refrigerants.

#### Measuring principle

A permanent magnet built into the float triggers, with its magnetic field, the potential-free reed contacts built into the guide tube. The triggering of the reed contacts by the permanent magnet is contact-free and thus free from wear.

Depending on customer wishes, the switching functions of normally open, normally closed or change-over can be realised for the defined liquid level.

The optional temperature output enables the medium temperature to be monitored by means of a preconfigured bimetal temperature switch or a Pt100/Pt1000 resistance signal.

## Specifications

Float switch, model RLS-4000	Level	Temperature (option)		
<b>Measuring principle</b>	Potential-free switching reed contacts are triggered by a magnet in the float	Bimetal switch or Pt100/Pt1000 measuring resistor in pipe end		
<b>Measuring range</b>	Guide tube length L: 60 ... 1,500 mm [2.5 ... 59 in], other lengths on request	Bimetal switch: 30 ... 150 °C [86 ... 302 °F] Pt100/Pt1000		
<b>Output signal <sup>1)</sup></b>	Up to 4 switch points, depending on the electrical connection: L-SP1, L-SP2, L-SP3, L-SP4 <sup>1)</sup>	<ul style="list-style-type: none"> <li>■ Bimetal switch</li> <li>■ Pt100, 2-wire</li> <li>■ Pt1000, 2-wire</li> </ul>		
<b>Switching function</b>	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact <sup>1)</sup> - on rising level	Normally closed (NC)		
<b>Switch position</b>	Specified in mm, starting from the upper sealing face (L-SP1 ... L-SP4) At the end of the guide tube ≈ 45 mm [≈ 1.8 in] cannot be used for switch positions.			
<b>Distance between switch points <sup>2)</sup></b>	Minimum distance L-SP1 to the upper sealing face: 50 mm [2.0 in] Minimum distance between the switch points: 50 mm [2.0 in], for floats with outer Ø D = 44 mm [1.7 in], 52 mm [2.0 in] 30 mm [1.2 in], for floats with outer Ø D = 25 mm [1.0 in], 30 mm [1.2 in] Minimum distance with 3 switch points: 80 mm [3.1 in], either between L-SP1 and L-SP2 or L-SP2 and L-SP3 Minimum distance with 4 switch points: 80 mm [3.1 in], between SP2 and SP3			
<b>Safety-related maximum values</b>	Only for connection to a certified intrinsically safe circuit with max.: $U_i = 30 \text{ V}$ $C_i = 0 \text{ nF}$ $I_i = 100 \text{ mA}$ $L_i = 0 \text{ µH}$ $P_i = 0.9 \text{ W}$			
<b>Accuracy</b>	±3 mm switch point accuracy incl. hysteresis, non-repeatability	<ul style="list-style-type: none"> <li>■ Bimetal switch: ±5 °C switch point accuracy, ±20 °C hysteresis</li> <li>■ Pt100, Pt1000: Class B per DIN EN 60751</li> </ul>		
<b>Mounting position</b>	Vertical ±30°			
<b>Process connection</b>	<ul style="list-style-type: none"> <li>■ G 1/8, installation from inside <sup>3) 4) 5)</sup></li> <li>■ G 1/4, installation from inside <sup>3) 4)</sup></li> <li>■ G 3/8, installation from inside <sup>4)</sup></li> <li>■ G 1/2, installation from inside <sup>4)</sup></li> <li>■ G 1, installation from outside <sup>3)</sup></li> <li>■ G 1 1/2, 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> </ul>			
<b>Material</b>				
Wetted	Process connection, guide tube: Stainless steel 316Ti Float: See table on page 3			
Non-wetted	Case: Stainless steel 316Ti Electrical connection: See table on page 3			
<b>Permissible temperatures</b>				
Medium	-30 ... +80 °C [-22 ... +176 °F] -30 ... +120 °C [-22 ... +248 °F] <sup>6)</sup> -30 ... +150 °C [-22 ... +302 °F] <sup>7)</sup>			
Ambient	-20 ... +80 °C [-4 ... +176 °F]			
Storage	-20 ... +80 °C [-4 ... +176 °F]			
<b>Permissible temperatures</b>	depending on the temperature class			
	T3	T4	T5	T6
Surface temperature	≤ 150 °C [≤ 302 °F]	≤ 135 °C [≤ 275 °F]	≤ 100 °C [≤ 212 °F]	≤ 85 °C [≤ 185 °F]
Process temperature	≤ 150 °C [≤ 302 °F]	≤ 130 °C [≤ 266 °F]	≤ 95 °C [≤ 203 °F]	≤ 80 °C [≤ 176 °F]
Ambient temperature	≤ 60 °C [≤ 140 °F]	≤ 60 °C [≤ 140 °F]	≤ 60 °C [≤ 140 °F]	≤ 60 °C [≤ 140 °F]

1) Version with 4 switching outputs for level is not available with temperature output

2) Smaller minimum distances on request

3) Up to 3 switching outputs for level

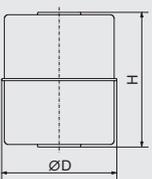
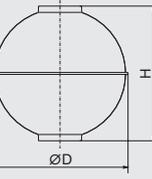
4) Only for versions with cable outlet

5) Only with float outer diameter Ø D = 30 mm [1.2 in]

6) Not with cable material: PVC, PUR; not with connection housing 58 x 64 x 36 mm [2.3 x 2.5 x 1.4 in]

7) Only with cable material: Silicone or connection housing 75 x 80 x 57 mm [3.0 x 3.1 x 2.2 in]

Electrical connections	Level Max. switch point definition	Ingress protection per IEC/EN 60529	Protection class	Material	Cable length
Cable outlet	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP54	II	PVC	<ul style="list-style-type: none"> <li>■ 2 m [6.5 ft]</li> <li>■ 5 m [16.4 ft]</li> </ul> other lengths on request
Cable outlet	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP54	II	PUR	
Cable outlet	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 2 NO/NC + 1 SPDT</li> </ul>	IP54	II	Silicone	
<b>“Standard” connection housing</b> Dimensions: 75 x 80 x 57 mm [2.9 x 3.1 x 2.2 in] For cable diameter: 5 ... 10 mm [0.2 ... 0.4 in]	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP54	I	<ul style="list-style-type: none"> <li>■ Aluminium</li> <li>■ Glands from polyamide</li> <li>■ Brass</li> <li>■ Stainless steel</li> </ul>	-
<b>“Compact” connection housing</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]	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 2 NO/NC + 1 SPDT</li> <li>■ 2 SPDT</li> </ul>	IP54	I		

Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder <sup>1)</sup>	44 mm [1.7 in] <sup>4)</sup>	52 mm [2.0 in]	≤ 16 bar [≤ 232 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	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> ]	316Ti
	Sphere <sup>3)</sup>	52 mm [2.0 in] <sup>4)</sup>	52 mm [2.0 in]	≤ 40 bar [≤ 580 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	316Ti

- 1) Not with process connection G 1, guide tube length L ≤ 100 mm (≤ 3.94 in)  
 2) Guide tube length ≤ 1,000 mm (≤ 39.4 in), switch points max. 3 NO/NC or 2 SPDT without bimetal switch, when a Pt100/Pt1000 is selected - max. 3 NO/NC or 1 SPDT  
 3) Not with process connection G 1, G 1 ½, guide tube length L ≤ 100 mm (≤ 3.94 in)  
 4) Not with process connection G ½

## Connection diagram

Cable outlet <sup>5)</sup>			
	Level		Temperature (option)
	Normally open/normally closed (NO/NC)		Bimetal switch
	4 switch points L-SP1    L-SP2    L-SP3    L-SP4 WH ——— GN ——— GY ——— BU ——— BN ——— YE ——— PK ——— RD ———		Platinum measuring resistor Pt100/Pt1000 WH + BN -
	Change-over contact (SPDT) 4 switch points L-SP1    L-SP2    L-SP3    L-SP4 WH ——— YE ——— BU ——— VT ——— BN ——— GY ——— RD ——— GYPK ——— GN ——— PK ——— BK ——— RDBU ———		Bimetal switch Platinum measuring resistor Pt100/Pt1000 WH + BN -

5) When choosing a temperature output signal, the PIN assignment of the level switch points deviates (see product label).

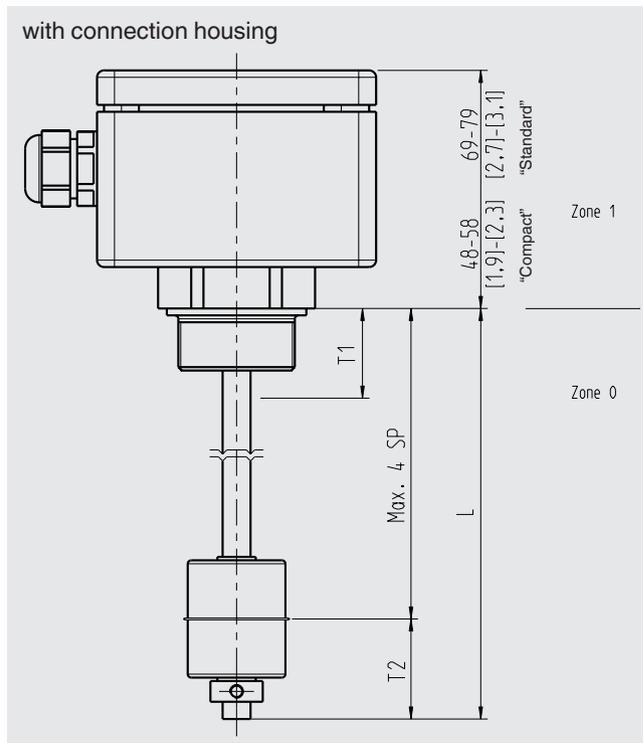
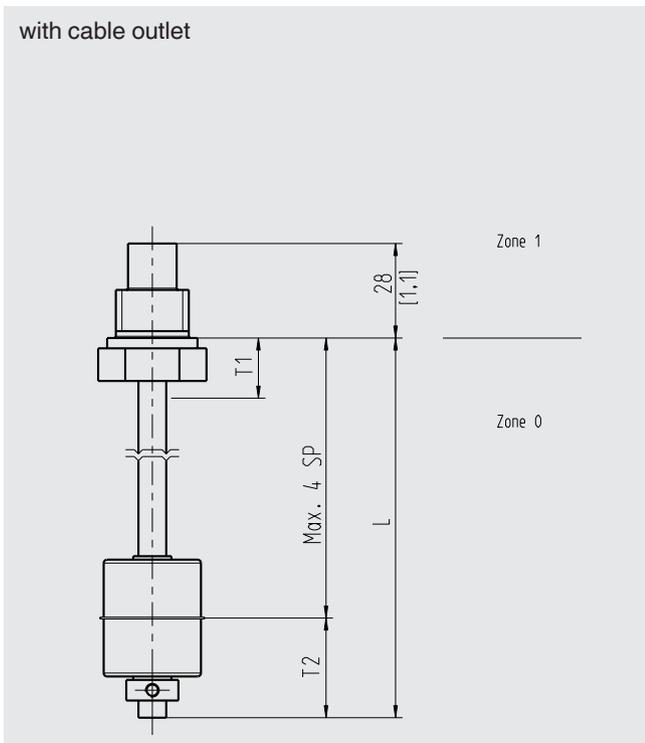
Aluminium case			
"Standard"	Level	Temperature (option)	
	Normally open/normally closed (NO/NC)	Bimetal switch	Platinum measuring resistor
	4 switch points L-SP1   L-SP2   L-SP3   L-SP4 	Switch point T-SP1 	Pt100/Pt1000 W10 + W11 -
	<b>Change-over contact (SPDT)</b> 4 switch points L-SP1   L-SP2   L-SP3   L-SP4 	Switch point T-SP1 	Pt100/Pt1000 W10 + W11 -
"Compact"	Normally open/normally closed (NO/NC)	Bimetal switch	Platinum measuring resistor
	2 switch points L-SP1   L-SP2 	Switch point T-SP1 	Pt100/Pt1000 W4 + W5 -
	3 switch points L-SP1   L-SP2   L-SP3 		
	4 switch points L-SP1   L-SP2   L-SP3   L-SP4 		
	<b>Change-over contact (SPDT)</b> 2 switch points L-SP1   L-SP2 		

Legend

SP1 - SP3	Switch points	GY	Grey	BK	Black
WH	White	PK	Pink	VT	Violet
BN	Brown	BU	Blue	GYPK	Grey/Pink
GN	Green	RD	Red	RDBU	Red/Blue
YE	Yellow				

Electrical safety	
Insulation voltage	DC 2.120 V

## Dimensions in mm [in]



### Legend

- L Guide tube length
- T1 Dead band (from sealing edge)
- T2 Dead band (pipe end)

### Dead band T1 in mm [inch] (from sealing edge)

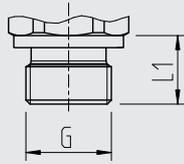
Process connection	Outer diameter float $\varnothing$ D		
	$\varnothing$ 30 mm [1.2 in]	$\varnothing$ 44 mm [1.7 in]	$\varnothing$ 52 mm [2.0 in]
G 1 (from outside)	35 mm [1.4 in]	-	-
G 1 ½ (from outside)	35 mm [1.4 in]	45 mm [1.8 in]	-
G 2 (from outside)	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]
Flansch (from outside)	20 mm [0.8 in]	30 mm [1.2 in]	30 mm [1.2 in]
G ⅛ B (from inside)	30 mm [1.2 in]	-	-
G ¼ B (from inside)	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]
G ⅜ B (from inside)	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]
G ½ B (from inside)	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]

### Dead band T2 in mm [inch] (pipe end)

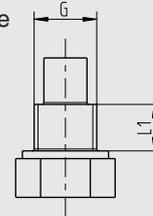
Dead band	Outer diameter float $\varnothing$ D		
	$\varnothing$ 30 mm [1.2 in]	$\varnothing$ 44 mm [1.7 in]	$\varnothing$ 52 mm [2.0 in]
T2	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]

## Process connection

Installation from outside



Installation from inside

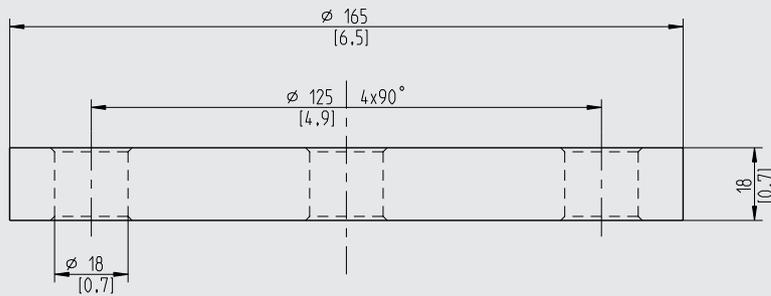


G	L <sub>1</sub>	Spanner width
G 1	16 mm [0.63 in]	41 mm [1.6 in]
G 1 ½	18 mm [0.71 in]	30 mm [1.2 in]
G 2	20 mm [0.79 in]	36 mm [1.4 in]

G	L <sub>1</sub>	Spanner width
G ¼ B	12 mm [0.47 in]	14 mm [0.5 in]
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

Description	Order number
 <p><b>Intrinsically safe repeater power supply, model IS Barrier</b>            Input 0/4 ... 20 mA, supplying and non-supplying            Bidirectional HART® signal transmission</p> <p>For details see data sheet AC 80.14</p>	14117118

## Approvals

Logo	Description	Country
 	<b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ Low voltage directive</li> <li>■ RoHS directive</li> <li>■ ATEX directive</li> </ul> Hazardous areas II 1/2G Ex ia IIC T3...T6 Ga/Gb II 2D Ex ib IIIC T85°C...T150°C Db	European Union
 	<b>IECEX</b> Hazardous areas Ex ia IIC T3...T6 Ga/Gb Ex ib IIIC T85°C...T150°C Db	International

## Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Approvals and certificates. see website

### Ordering information

Model / Level and temperature (option) output signals / Switching function / Switch point position / Electrical connection / Process connection / Guide tube length L / Medium temperature / Float

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Ihr WIKA Vertriebspartner



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