

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)		
Measuring principle	Potential-free switching reed contacts are triggered by a magnet in the float	Bimetal switch or Pt100/Pt1000 measuring resistor in pipe end		
Measuring range	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		
Output signal ¹⁾	Up to 4 switch points, depending on the electrical connection: L-SP1, L-SP2, L-SP3, L-SP4 ¹⁾	<div>■ Bimetal switch</div> <div>■ Pt100, 2-wire</div> <div>■ Pt1000, 2-wire</div>		
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact ¹⁾ - on rising level	Normally closed (NC)		
Switch position	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.			
Distance between switch points ²⁾	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			
Safety-related maximum values	Only for connection to a certified intrinsically safe circuit with max.: U _i = 30 V C _i = 0 nF I _i = 100 mA L _i = 0 µH P _i = 0.9 W			
Accuracy	±3 mm switch point accuracy incl. hysteresis, non-repeatability	<div>■ Bimetal switch: ±5 °C switch point accuracy, ±20 °C hysteresis</div> <div>■ Pt100, Pt1000: Class B per DIN EN 60751</div>		
Mounting position	Vertical ±30°			
Process connection	<div>■ G ⅛, installation from inside ^{3) 4) 5)}</div> <div>■ G ¼, installation from inside ^{3) 4)}</div> <div>■ G ⅜, installation from inside ⁴⁾</div> <div>■ G ½, installation from inside ⁴⁾</div> <div>■ G 1, installation from outside ³⁾</div> <div>■ G 1 ½, installation from outside</div> <div>■ G 2, installation from outside</div> <div>■ Flange DN 50, form B per DIN 2527/EN 1092, PN 16, installation from outside</div>			
Material				
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			
Permissible temperatures				
Medium	-30 ... +80 °C [-22 ... +176 °F] -30 ... +120 °C [-22 ... +248 °F] ⁶⁾ -30 ... +150 °C [-22 ... +302 °F] ⁷⁾			
Ambient	-20 ... +80 °C [-4 ... +176 °F]			
Storage	-20 ... +80 °C [-4 ... +176 °F]			
Permissible temperatures	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

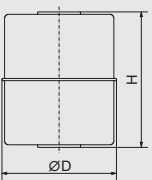
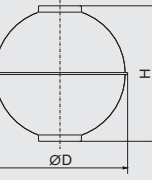
4) Only for versions with cable outlet

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"> 4 NO/NC 4 SPDT 	IP54	II	PVC	<ul style="list-style-type: none"> 2 m [6.5 ft] 5 m [16.4 ft] other lengths on request
Cable outlet	<ul style="list-style-type: none"> 4 NO/NC 4 SPDT 	IP54	II	PUR	
Cable outlet	<ul style="list-style-type: none"> 4 NO/NC 2 NO/NC + 1 SPDT 	IP54	II	Silicone	
“Standard” connection housing 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"> 4 NO/NC 4 SPDT 	IP54	I	<ul style="list-style-type: none"> Aluminium Glands from polyamide Brass Stainless steel 	-
“Compact” connection housing 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"> 4 NO/NC 2 NO/NC + 1 SPDT 2 SPDT 	IP54	I		

Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder ¹⁾	44 mm [1.7 in] ⁴⁾	52 mm [2.0 in]	≤ 16 bar [≤ 232 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m ³ [46.8 lbs/ft ³]	316Ti
	Cylinder ²⁾	30 mm [1.2 in]	36 mm [1.4 in]	≤ 10 bar [≤ 145 psi]	≤ 80 °C [≤ 176 °F]	≥ 850 kg/m ³ [53.1 lbs/ft ³]	316Ti
	Sphere ³⁾	52 mm [2.0 in] ⁴⁾	52 mm [2.0 in]	≤ 40 bar [≤ 580 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m ³ [46.8 lbs/ft ³]	316Ti

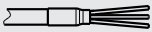
1) Not with process connection G 1, guide tube length L ≤ 100 mm (≤ 3.94 in)

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

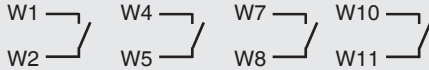
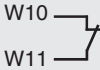
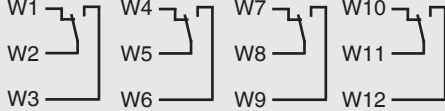
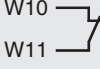
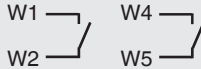
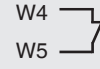
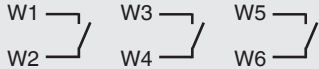
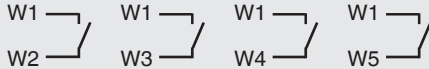
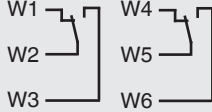
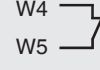
3) Not with process connection G 1, G 1 ½, guide tube length L ≤ 100 mm (≤ 3.94 in)

4) Not with process connection G ½

Connection diagram

Cable outlet ⁵⁾			
	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 WH ——— GN ——— GY ——— BU ——— BN ——— YE ——— PK ——— RD ———	Switch point T-SP WH ——— BN ———	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 ———	Switch point T-SP WH ——— BN ———	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 -
	Change-over contact (SPDT) 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 		
	Change-over contact (SPDT) 2 switch points L-SP1 L-SP2 	Switch point T-SP1 	Pt100/Pt1000 W4 + W5 -

Legend

SP1 - SP3 Switch points
 WH White
 BN Brown
 GN Green
 YE Yellow

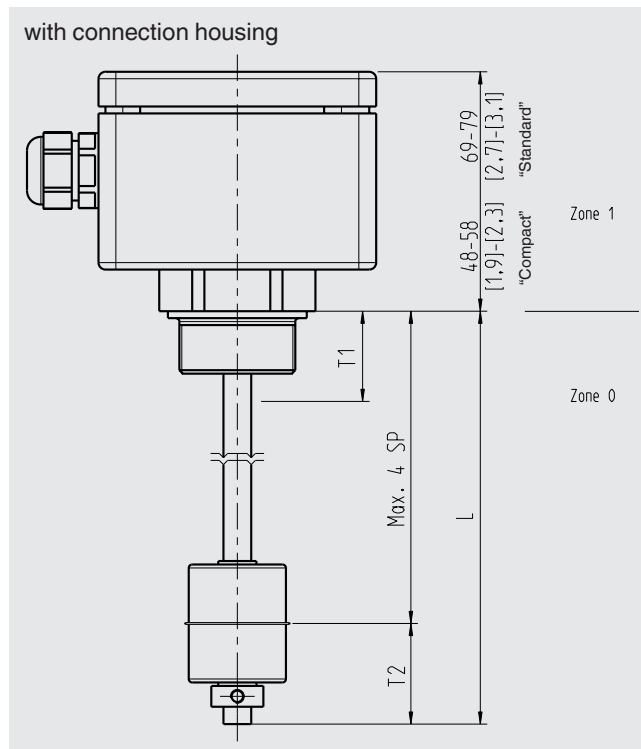
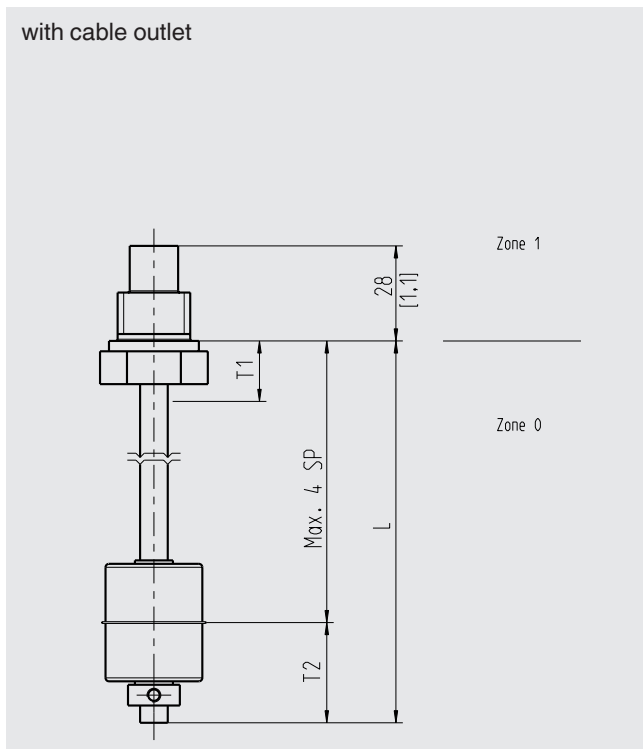
GY Grey
 PK Pink
 BU Blue
 RD Red

BK Black
 VT Violet
 GYPK Grey/Pink
 RDBU Red/Blue

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)

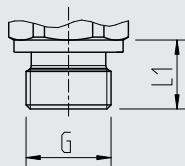
Process connection	Outer diameter float Ø D		
	Ø 30 mm [1.2 in]	Ø 44 mm [1.7 in]	Ø 52 mm [2.0 in]
G 1 (from outside)	35 mm [1.4 in]	-	-
G 1 ½ (from outside)	35 mm [1.4 in]	45 mm [1.8 in]	-
G 2 (from outside)	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]
Flansch (from outside)	20 mm [0.8 in]	30 mm [1.2 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 Ø D		
	Ø 30 mm [1.2 in]	Ø 44 mm [1.7 in]	Ø 52 mm [2.0 in]
T2	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]

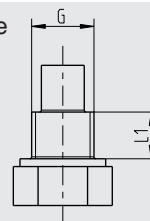
Process connection

Installation from outside



G	L ₁	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]

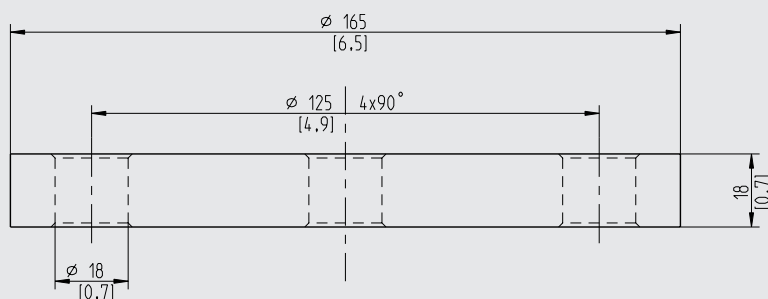
Installation from inside




G	L ₁	Spanner width
G ⅛ 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>Intrinsically safe repeater power supply, model IS Barrier 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
 	EU declaration of conformity <ul style="list-style-type: none"> ■ Low voltage directive ■ RoHS directive ■ ATEX directive Hazardous areas II 1/2G Ex ia IIC T3...T6 Ga/Gb II 2D Ex ib IIIC T85°C...T150°C Db	European Union
 	IECEX 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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