

Float switch

For industrial applications, with temperature output

Model RLS-3000

WIKA data sheet LM 50.06

Applications

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

Special features

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



Fig. left: With cable outlet and spherical float
Fig. right: With circular connector M12 x 1 and cylindrical float

Description

The model RLS-3000 float switch with temperature output combines the recording of the level and temperature of liquids in a single measuring point. 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 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 additional 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	Level	Temperature
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	Up to 3 switch points, depending on the electrical connection: L-SP1, L-SP2 ¹⁾ , L-SP3 ¹⁾	<ul style="list-style-type: none"> ■ Bimetal switch ■ Pt100, 2-wire ■ Pt1000, 2-wire
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-SP3) 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 diameter Ø D = 44 mm [1.7 in], 52 mm [2.0 in] 30 mm [1.2 in], for floats with outer diameter 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	
Switching power		
Floats with outer Ø D = 44 mm [1.7 in] or 52 mm [2.0 in]	Normally open, normally closed: AC 230 V; 100 VA; 1 A; max. 100 Hz DC 230 V; 50 W; 0.5 A Change-over contact: AC 230 V; 40 VA; 1 A; max. 100 Hz DC 230 V; 20 W; 0.5 A	AC 250 V; 2 A (≥ 50 mA) DC 60 V; 1 A (≥ 50 mA)
Floats with outer Ø D = 25 mm [1.0 in] or 30 mm [1.2 in]	Normally open, normally closed: AC 100 V; 10 VA; 0.5 A; max. 100 Hz DC 100 V; 10 W; 0.5 A Change-over contact: AC 100 V; 5 VA; 0.25 A; max. 100 Hz DC 100 V; 5 W; 0.25 A	AC 250 V; 2 A (≥ 50 mA) DC 60 V; 1 A (≥ 50 mA)
Accuracy	±3 mm switch point accuracy incl. hysteresis, non-repeatability	<ul style="list-style-type: none"> ■ Bimetal switch: ±5 °C switch point accuracy, ±20 °C hysteresis ■ Pt100, Pt1000: Class B per DIN EN 60751
Mounting position	Vertical ±30°	
Process connection	<ul style="list-style-type: none"> ■ G 1/8, installation from inside ³⁾ ■ G 1/4, installation from inside ³⁾ ■ G 3/8, installation from inside ³⁾ ■ G 1/2, installation from inside ³⁾ ■ G 1, installation from outside ■ G 1 1/2, installation from outside ■ G 2, installation from outside ■ Flange DN 50, form B per DIN 2527/EN 1092, PN 16, installation from outside 	
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] ⁴⁾ -30 ... +150 °C [-22 ... +302 °F] ⁵⁾	
Ambient	-30 ... +80 °C [-22 ... +176 °F]	
Storage	-30 ... +80 °C [-22 ... +176 °F]	

1) For medium temperatures > 80 °C [> 176 °F] switch points only with float outer diameter Ø D = 44 mm [1.7 in] or 52 mm [2.0 in]

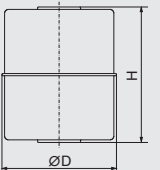
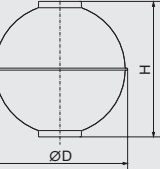
2) Smaller minimum distances on request

3) Only for versions with cable outlet

4) Not with cable material: PVC, PUR; not with float outer diameter Ø D = 25 mm [1.0 in]; not with connection housing 58 x 64 x 36 mm [2.3 x 2.5 x 1.4 in]

5) Only with cable material: Silicone or connection housing 75 x 80 x 57 mm [3.0 x 3.1 x 2.2 in]; not with float outer diameter Ø D = 25 mm [1.0 in]

Electrical connections ¹⁾	Level Max. switch point definition	Ingress protection per IEC/EN 60529 ²⁾	Protection class	Material	Cable length
Circular connector M12 x 1 (4-pin)	■ 1 NO/NC	IP65	II	■ TPU ■ Brass	-
Cable outlet	■ 3 NO/NC ■ 3 SPDT	IP67	II	PVC	■ 2 m [6.5 ft] ■ 5 m [16.4 ft] other lengths on request
Cable outlet	■ 3 NO/NC ■ 3 SPDT	IP67	II	PUR	
Cable outlet	■ 3 NO/NC ■ 1 NO/NC + 1 SPDT	IP67	II	Silicone	
Connection housing "standard" 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]	■ 3 NO/NC ■ 3 SPDT	IP66	I	■ Aluminium ■ Glands from polyamide ■ Brass ■ Stainless steel	-
Connection housing "compact" 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]	■ 3 NO/NC ■ 1 NO/NC + 1 SPDT	IP66	I		

Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder ^{3) 6)}	44 mm [1.7 in]	52 mm [2.0 in]	≤ 16 bar [≤ 232 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m ³ [46.8 lbs/ft ³]	316Ti
	Cylinder ⁴⁾	30 mm [1.2 in]	36 mm [1.4 in]	≤ 10 bar [≤ 145 psi]	≤ 120 °C [≤ 248 °F]	≥ 850 kg/m ³ [53.1 lbs/ft ³]	316Ti
	Cylinder ⁴⁾	25 mm [1.0 in]	17 mm [0.7 in]	≤ 16 bar [≤ 232 psi]	≤ 80 °C [≤ 176 °F]	≥ 750 kg/m ³ [46.8 lbs/ft ³]	Buna / NBR
	Sphere ^{5) 6)}	52 mm [2.0 in]	52 mm [2.0 in]	≤ 40 bar [≤ 580 psi]	≤ 150 °C [≤ 302 °F]	≥ 750 kg/m ³ [46.8 lbs/ft ³]	316Ti

1) Versions with protective conductor on request

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





3) Not with process connection G 1, guide tube length L ≥ 100 mm [L ≥ 3.94 in]


4) Guide tube length L ≤ 1,000 mm [L ≤ 39.37 in], switch points for level max. 2 NO/NC or 1 SPDT definable

5) Not with process connection G 1, G 1 ½, guide tube length L ≥ 100 mm [L ≥ 3.94 in]

6) Not with process connection G ½

Connection diagram

Circular connector M12 x 1 (4-pin)			
	Level	Temperature	
	Normally open/normally closed (NO/NC)	Bimetal switch	Platinum measuring resistor
	Switch point L-SP1	Switch point T-SP	Platinum measuring resistor
			

Cable outlet ¹⁾			
	Level		Temperature
	Normally open/normally closed (NO/NC)		Bimetal switch
	3 switch points L-SP1 L-SP2 L-SP3		Switch point T-SP
	GN YE	GY PK	BU RD
			WH BN
			WH + BN -
	Change-over contact (SPDT)		Bimetal switch
	3 switch points L-SP1 L-SP2 L-SP3		Switch point T-SP
	YE GY PK	BU RD BK	VT GYPK RDBU
			WH BN
			WH + BN -

Aluminium case			
"Standard"	Level		Temperature
	Normally open/normally closed (NO/NC)		Bimetal switch
	3 switch points L-SP1 L-SP2 L-SP3		Switch point T-SP1
	W1 W2	W4 W5	W7 W8
			W10 W11
			W10 + W11 -
	Change-over contact (SPDT)		Bimetal switch
	2 switch points L-SP1 L-SP2 L-SP3		Switch point T-SP1
	W1 W2 W3	W4 W5 W6	W7 W8 W9
			W10 W11
			W10 + W11 -
"Compact" ²⁾	Normally open/normally closed (NO/NC)		Bimetal switch
	1 switch point L-SP1		Switch point T-SP1
	W1 W2		
			W4 W5
			W4 + W5 -
	Change-over contact (SPDT)		Bimetal switch
	1 switch point L-SP1		Switch point T-SP1
	W1 W2 W3		
			W4 W5
			W4 + W5 -

1) For combinations of different switching output functions the PIN assignment is marked on the product label.

2) In variants with 2 or 3 switching outputs for level, the deviating pin assignment is noted on the product label.

Legend

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

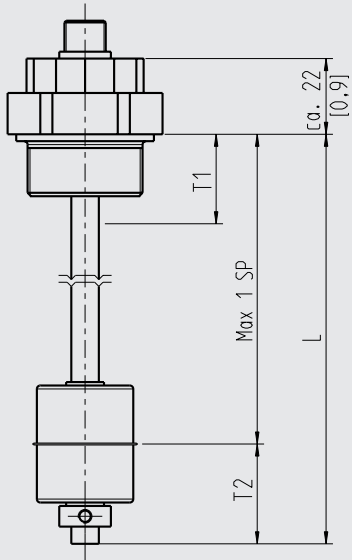
Electrical safety

Insulation voltage

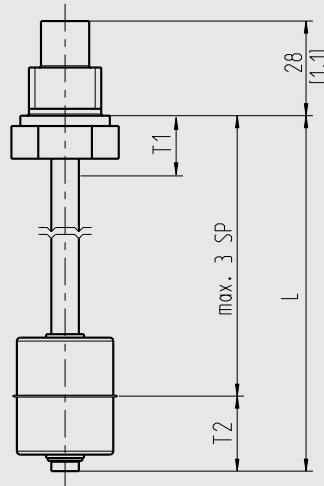
DC 2,120 V

Dimensions in mm [in]

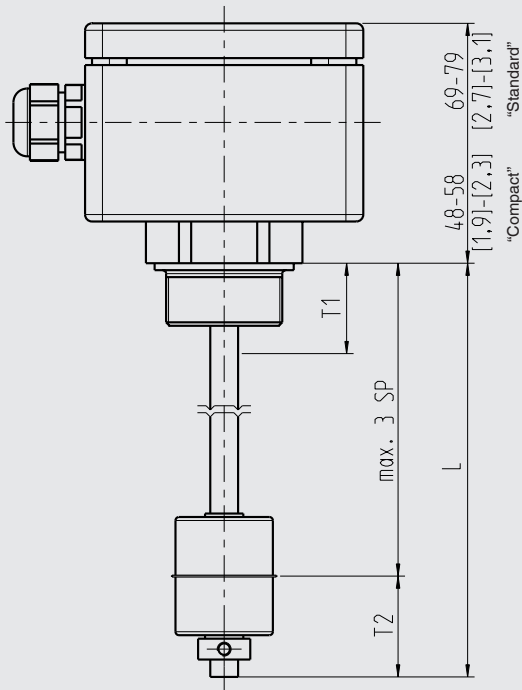
with circular connector M12 x 1



with cable outlet



with connection housing



Legend

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

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

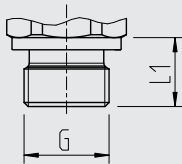
Process connection	Outer diameter float $\varnothing D$			
	$\varnothing 30$ mm [1.2 in]	$\varnothing 44$ mm [1.7 in]	$\varnothing 52$ mm [2.0 in]	$\varnothing 25$ mm [1.0 in]
G 1 (from outside)	35 mm [1.4 in]	-	-	25 mm [1.0 in]
G 1 ½ (from outside)	35 mm [1.4 in]	45 mm [1.8 in]	-	25 mm [1.0 in]
G 2 (from outside)	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]	25 mm [1.0 in]
Flange (from outside)	20 mm [0.8 in]	30 mm [1.2 in]	30 mm [1.2 in]	5 mm [0.2 in]
G ⅛ B (from inside)	30 mm [1.2 in]	-	-	15 mm [0.6 in]
G ¼ B (from inside)	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]	20 mm [0.8 in]
G ⅜ B (from inside)	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]	20 mm [0.8 in]
G ½ B (from inside)	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]	20 mm [0.8 in]

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

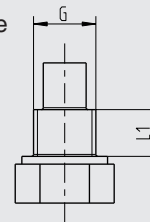
Dead band	Outer diameter float $\varnothing D$			
	$\varnothing 30$ mm [1.2 in]	$\varnothing 44$ mm [1.7 in]	$\varnothing 52$ mm [2.0 in]	$\varnothing 25$ mm [1.0 in]
T2	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]	30 mm [1.2 in]

Process connection

Installation from outside



Installation from inside

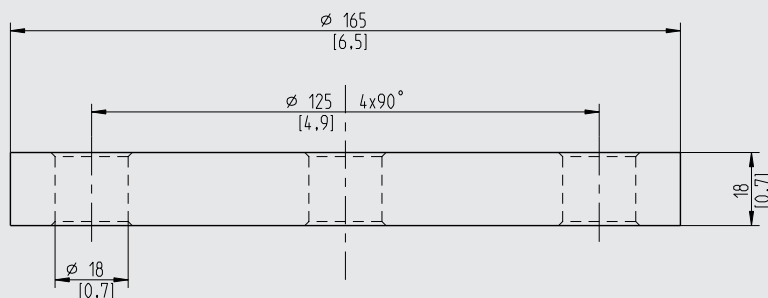


G	L ₁	Spanner width
G 1	16 mm [0.63 in]	41 mm [1.6 in]
G 1 ½	18 mm [0.71 in]	30 mm [1.2 in]
G 2	20 mm [0.79 in]	36 mm [1.4 in]



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

Circular connector M12 x 1 with moulded cable					
	Description	Temperature range	Cable diameter	Cable length	Order no.
	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

Approvals

Logo	Description	Country
	EU declaration of conformity ■ Low voltage directive ■ RoHS directive	European Union

Manufacturer's information and certificates

Logo	Description
-	China RoHS directive

Approvals and certificates, see website

Ordering information

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

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