Float switch
For industrial applications, intrinsic safety Ex i
Model RLS-4000 (models with approval: EX-SR 10 ... EX-SR 21)

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.

Data sheets showing similar products:
Float switch; model RLS-1000; see data sheet LM 50.03
Float switch, plastic version; model RLS-2000; see data sheet LM 50.04
Float switch with temperature output; model RLS-3000; see data sheet LM 50.06

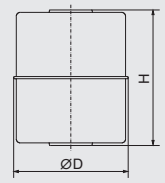
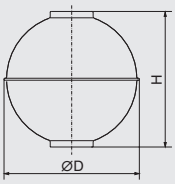
Specifications

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]	■ 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	Alternatively normally open (NO) or 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, I_i = 100 mA, P_i = 0.9 W, C_i = 0 nF, L_i = 0 µH	
Accuracy	±3 mm switch point accuracy incl. hysteresis, non-repeatability	■ Bimetal switch: ±5 °C switch point accuracy, ±20 °C hysteresis ■ Pt100, Pt1000: Class B per DIN EN 60751
Mounting position	Vertical ±30°	
Process connection	■ G 1, installation from outside [3] ■ G 1 ½, installation from outside ■ G 2, installation from outside ■ Flange DN 50, form B per EN 1092-1 (DIN 2527), PN 16, installation from outside	■ G ⅛, installation from inside [3] [4] [5] ■ G ¼, installation from inside [3] [4] ■ G ⅜, installation from inside [4] ■ G ½, installation from inside [4]
Material ■ Wetted ■ Non-wetted	Process connection, guide tube: Stainless steel 316Ti Case: Stainless steel 316Ti	Float: See table on page 3 Electrical connection: See table on page 3
Permissible temperatures ■ Medium ■ Ambient ■ Storage	-30 … +80 °C (-22 … +176 °F) -20 … +80 °C (-4 … +176 °F) -20 … +80 °C (-4 … +176 °F)	-30 … +120 °C (-22 … +248 °F) [6]
		-30 … +150 °C (-22 … +302 °F) [7]

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
7) Only with cable material: Silicone or connection housing 75 x 80 x 57 mm

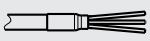
Electrical connections	Level Max. switch point definition	Ingress protection per IEC/EN 60529	Protection class	Material	Cable length
Cable outlet	■ 4 NO/NC ■ 4 SPDT	IP54	II	PVC	■ 2 m (6.5 ft) ■ 5 m (16.4 ft) other lengths on request
Cable outlet	■ 4 NO/NC ■ 4 SPDT	IP54	II	PUR	
Cable outlet	■ 4 NO/NC ■ 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)	■ 4 NO/NC ■ 4 SPDT	IP54	I	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)	■ 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)	52 mm (2.0 in)	≤ 16 bar (≤ 232 psi)	≤ 150 °C (≤ 302 °F)	≥ 750 kg/m³ (46.8 lbs/ft³)	316Ti
	Cylinder [2]	30 mm (1.2 in)	36 mm (1.4 in)	≤ 10 bar (≤ 145 psi)	≤ 80 °C (≤ 176 °F)	≥ 850 kg/m³ (53.1 lbs/ft³)	316Ti
	Sphere [3]	52 mm (2.0 in)	52 mm (2.0 in)	≤ 40 bar (≤ 580 psi)	≤ 150 °C (≤ 302 °F)	≥ 750 kg/m³ (46.8 lbs/ft³)	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)

Connection diagram

Cable outlet [4]



Level — **Normally open/normally closed (NO/NC)**

4 switch points

L-SP1	L-SP2	L-SP3	L-SP4
WH BN	GN YE	GY PK	BU RD

Temperature (option) — **Bimetal switch**

Switch point T-SP: WH, BN

Temperature (option) — **Platinum measuring resistor**

Pt100/Pt1000: WH (+), BN (-)

Level — **Change-over contact (SPDT)**

4 switch points

L-SP1	L-SP2	L-SP3	L-SP4
WH BN GN	YE GY PK	BU RD BK	VT GYPK RDBU

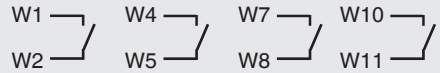
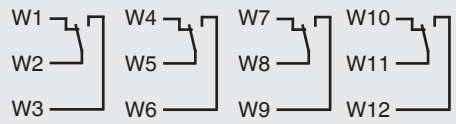
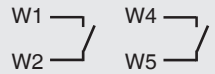
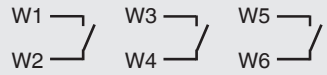
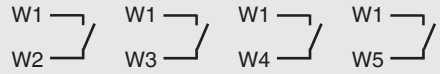
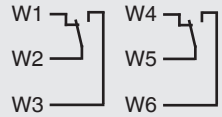
Temperature (option) — **Bimetal switch**

Switch point T-SP: WH, BN

Temperature (option) — **Platinum measuring resistor**

Pt100/Pt1000: WH (+), BN (-)

4) 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)	**Bimetal switch**	**Platinum measuring resistor**
	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)	**Bimetal switch**	**Platinum measuring resistor**
	2 switch points L-SP1 L-SP2  	Switch point T-SP1  	Pt100/Pt1000 W4 + W5 -

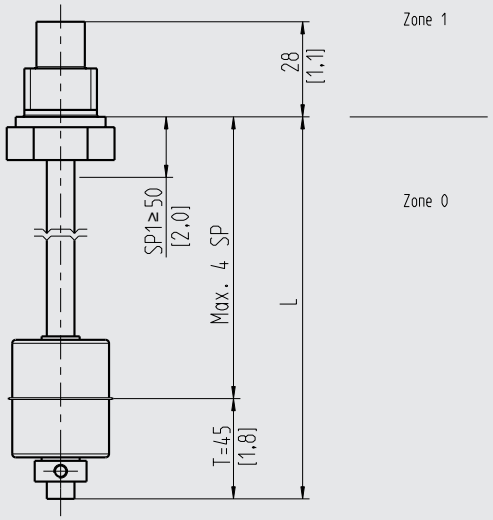
Legend

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				

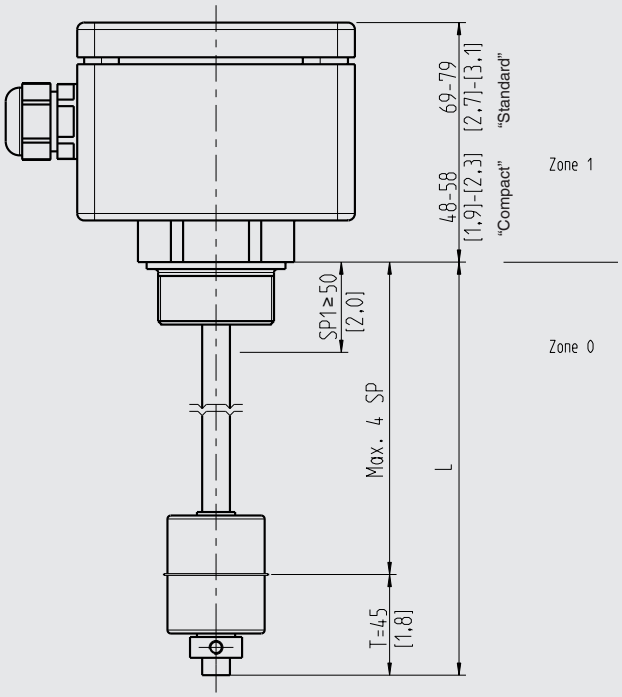
Electrical safety	
Insulation voltage	DC 2,120 V

Dimensions in mm (in)

with cable outlet



with connection housing



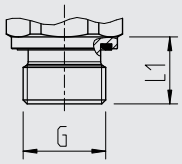
Legend

L Guide tube length

T Non-usable range for switch positions

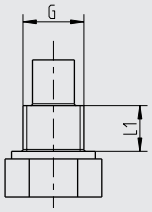
Process connection

Installation from outside



G	L_1
G 1	16 mm (0.63 in)
G 1 ½	18 mm (0.71 in)
G 2	20 mm (0.79 in)

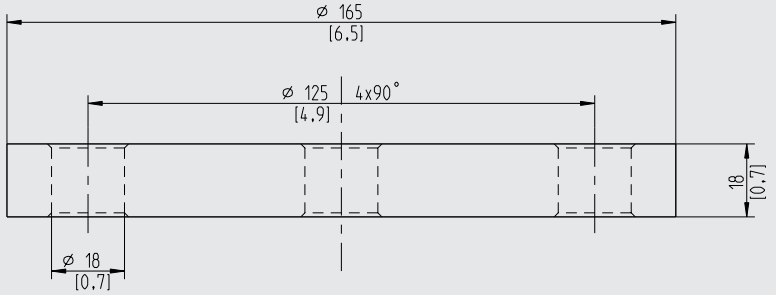
Installation from inside



G	L_1
G ⅛ B	12 mm (0.47 in)
G ¼ B	12 mm (0.47 in)
G ⅜ B	12 mm (0.47 in)
G ½ B	14 mm (0.55 in)

Flange

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



Accessories

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

Approvals

Logo	Description	Country
CE Ex	**EU declaration of conformity** ■ 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
IEC IECEx	**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 / Electrical connection / Process connection / Guide tube length L / Medium temperature

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