Float switch
For industrial applications
Model RLS-1000

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 ... +150 °C (-22 ... +302 °F)
- Up to 4 switching outputs freely definable as normally open, normally closed or change-over contact
- Potential-free switching reed contacts

Fig. left: Mounting thread, angular connector, float from NBR
Fig. right: Mounting thread, circular connector M12 x 1, float from stainless steel

Description

The model RLS-1000 float switch has been developed for monitoring the level 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 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.

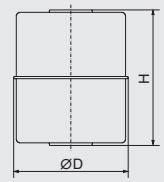
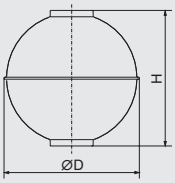
Data sheets showing similar products:
Float switch, plastic version; model RLS-2000; see data sheet LM 50.04
Float switch with temperature output; model RLS-3000; see data sheet LM 50.06
Float switch, intrinsic safety Ex i; model RLS-4000; see data sheet LM 50.07

Specifications

Float switch, model RLS-1000	
Measuring principle	Potential-free switching reed contacts are triggered by a magnet in the float.
Guide tube length L	60 ... 1,500 mm (2.5 ... 59 in), other lengths on request
Output signal	Up to 4 switch points, depending on the electrical connection: SP1, SP2, SP3, SP4
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level
Switch position	Specified in mm, starting from the upper sealing face (SP1 ... SP4) At the end of the guide tube ≈ 45 mm (≈ 1.8 in) cannot be used for switch positions.
Distance between switch points [1]	Minimum distance 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 = 44 mm (1.7 in), 52 mm (2.0 in) 30 mm (1.2 in), for floats with outer Ø = 25 mm (1.0 in), 30 mm (1.2 in) Minimum distance with 3 switch points: 80 mm (3.1 in), either between SP1 and SP2 or SP2 and SP3 Minimum distance with 4 switch points: 80 mm (3.1 in), between SP2 and SP3
Switching power	**Floats with outer Ø = 44 mm (1.7 in), 52 mm (2.0 in)** Normally open, normally closed: AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Change-over contact: AC 230 V; 40 VA; 1 A DC 230 V; 20 W; 0.5 A **Floats with outer Ø = 25 mm (1.0 in), 30 mm (1.2 in)** Normally open, normally closed: AC 100 V; 10 VA; 0.5 A DC 100 V; 10 W; 0.5 A Change-over contact: AC 100 V; 5 VA; 0.25 A DC 100 V; 5 W; 0.25 A
Accuracy	±3 mm switch point accuracy incl. hysteresis, non-repeatability
Mounting position	Vertical ±30°
Process connection	■ G 1, installation from outside ■ 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 [2] [3] ■ G ¼, installation from inside [2] [3] ■ G ⅜, installation from inside [2] ■ G ½, installation from inside [2]
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] [6] -30 … +150 °C (-22 … +302 °F) [5] [6]
■ Ambient	-30 … +80 °C (-22 … +176 °F)
■ Storage	-30 … +80 °C (-22 … +176 °F)

1) Smaller minimum distances on request
2) Only for versions with cable outlet
3) Not with 4 switch points
4) Not with cable material: PVC, PUR; max. 1 change-over contact or 2 normally closed/normally open contacts with float outer diameter Ø D = 30 mm; not with connection housing 58 x 64 x 36 mm
5) Only with cable material: Silicone or connection housing 75 x 80 x 57 mm
6) Not for shipbuilding version

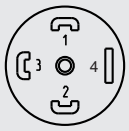
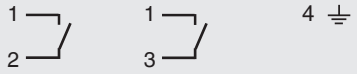
Electrical connections [2]	Max. switch point definition	Ingress protection per IEC/EN 60529 [3]	Protection class	Material	Cable length
Angular connector DIN EN 175301-803 A [1]	■ 2 NO/NC ■ 1 SPDT	IP65	SK I	PA	-
Circular connector M12 x 1 (4-pin) [1]	■ 3 NO/NC ■ 1 NO/NC + 1 SPDT	IP65	SK II	TPU, brass	
Cable outlet [1]	■ 4 NO/NC ■ 4 SPDT	IP67	SK II	PVC	■ 2 m (6.5 ft) ■ 5 m (16.4 ft) ■ other lengths on request
Cable outlet [1]	■ 4 NO/NC ■ 4 SPDT	IP67	SK II	PUR	
Cable outlet [1]	■ 4 NO/NC ■ 2 NO/NC + 1 SPDT	IP67	SK II	Silicone	
Cable outlet "shipbuilding"	■ 4 NO/NC ■ 4 SPDT	IP67	SK II	Polyolefin	
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)	■ 4 NO/NC ■ 4 SPDT	IP66	SK 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)	■ 4 NO/NC ■ 2 NO/NC + 1 SPDT ■ 2 SPDT	IP66	SK I		

Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder [4] [7]	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 [5]	30 mm (1.2 in)	36 mm (1.4 in)	≤ 10 bar (≤ 145 psi)	≤ 120 °C (≤ 248 °F)	≥ 850 kg/m³ (53.1 lbs/ft³)	316Ti
	Cylinder [5] [1]	25 mm (1.0 in)	17 mm (0.7 in)	≤ 16 bar (≤ 232 psi)	≤ 80 °C (≤ 176 °F)	≥ 750 kg/m³ (46.8 lbs/ft³)	Buna / NBR
	Sphere [6] [7]	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

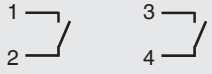
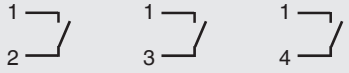
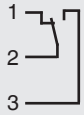
1) Not for shipbuilding version
2) Versions with protective conductor on request
3) The stated ingress protection (per IEC/EN 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.
4) Not with process connection G 1, guide tube length L ≥ 100 mm (L ≥ 3.94 in)
5) Guide tube length L ≤ 1,000 mm (L ≤ 39.37 in), switch points max. 3 NO/NC or 2 SPDT definable
6) Not with process connection G 1, G 1 ½, guide tube length L ≥ 100 mm (L ≥ 3.94 in)
7) Not with process connection G ⅛

Connection diagram

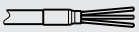
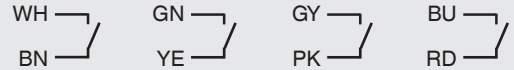
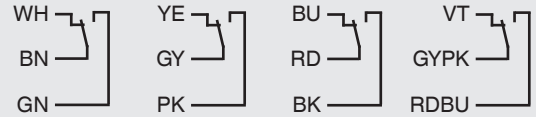
Angular connector DIN EN 175301-803 A

	Normally open/normally closed (NO/NC)	Change-over contact (SPDT)
	2 switch points SP1 SP2 	1 switch point SP1 

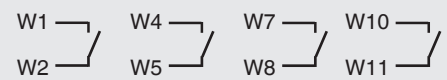
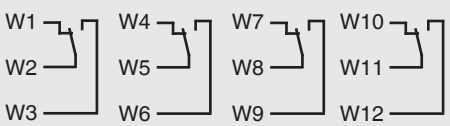
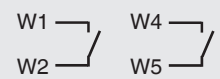
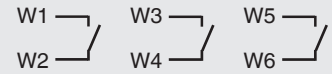
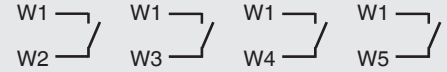
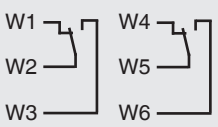
Circular connector M12 x 1 (4-pin)

	Normally open/normally closed (NO/NC)	Change-over contact (SPDT)
	2 switch points SP1 SP2  3 switch points SP1 SP2 SP3 	1 switch point SP1 

Cable outlet [1)]

	Normally open/normally closed (NO/NC)	Change-over contact (SPDT)
	4 switch points SP1 SP2 SP3 SP4 	4 switch points SP1 SP2 SP3 SP4 

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

Aluminium case		
"Standard"	**Normally open/normally closed (NO/NC)**	**Change-over contact (SPDT)**
	4 switch points SP1 SP2 SP3 SP4  	4 switch points SP1 SP2 SP3 SP4 
"Compact" 1)	**Normally open/normally closed (NO/NC)**	**Change-over contact (SPDT)**
	2 switch points SP1 SP2  3 switch points SP1 SP2 SP3  4 switch points SP1 SP2 SP3 SP4  	2 switch points SP1 SP2 

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

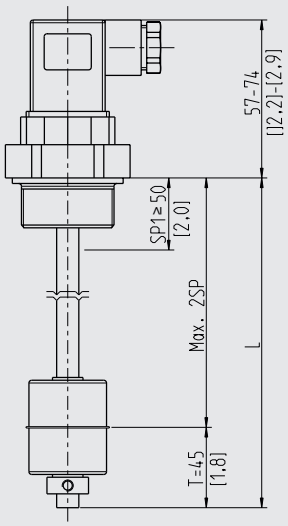
Legend

SP1 - SP4	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

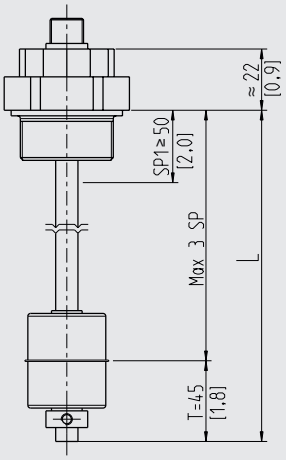
Electrical safety	
Insulation voltage	DC 2,120 V

Dimensions in mm (in)

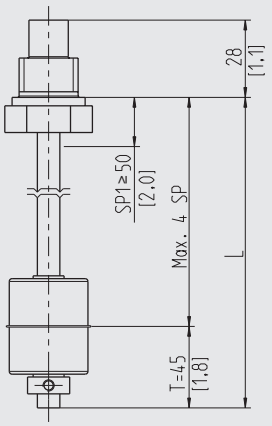
with angular connector form A



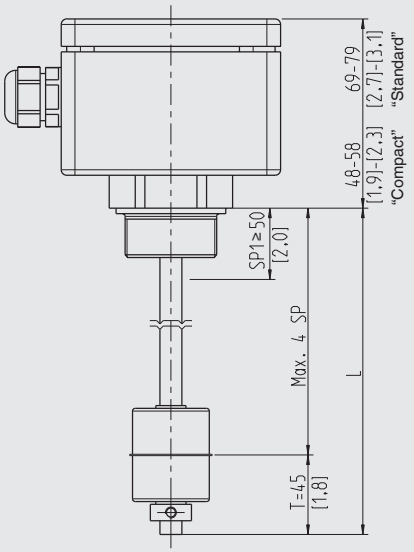
with M12 x 1 circular connector



with cable outlet



with connection housing



Angled version (on request)

Legend

L Guide tube length

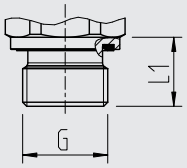
T Non-usable range for switching points

Float stop

- Adjusting collar, for medium temperature ≤ 80 °C (≤ 176 °F)
- Pipe clamp, for medium temperature > 80 °C (> 176 °F) and shipbuilding versions

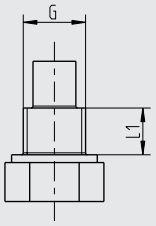
Process connection

Installation from outside



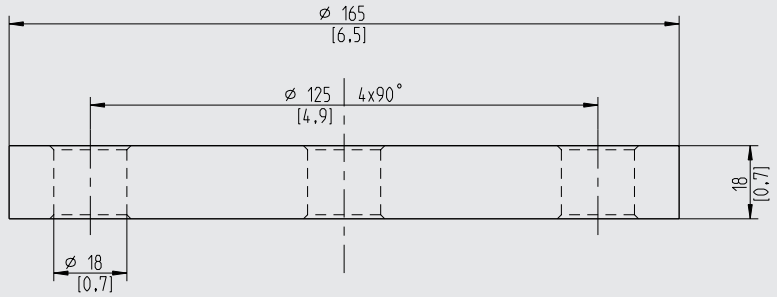
G	L_1
G 1	16 mm (0,63 in)
G 1 ½	18 mm (0,71 in)
G 2	20 mm (0,79 in)

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

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
CE	**EU declaration of conformity** ■ Low voltage directive ■ RoHS directive	European Union
	DNV GL [1] Ships, shipbuilding (e.g. offshore)	International

1) Only for shipbuilding version

Manufacturer‘s information and certificates

Logo	Description
-	**China RoHS directive**

Approvals and certificates, see website

Ordering information
Model / Output signal / Switching function / Electrical connection / Process connection / Guide tube length L / Medium temperature

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