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: Angular connector, float from NBR
Fig. right: 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

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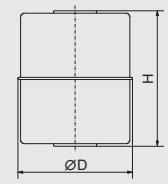
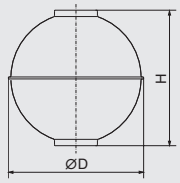
Specifications

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; 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 **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; 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
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 [1.2 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]
6) Not for shipbuilding version

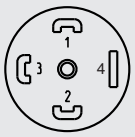
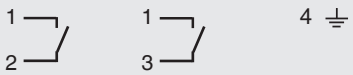
Electrical connections [1]	Max. switch point definition	Ingress protection per IEC/EN 60529 [2]	Protection class	Material	Cable length
Angular connector DIN EN 175301-803 A [3]	■ 2 NO/NC ■ 1 SPDT	IP65	I	PA	-
Circular connector M12 x 1 (4-pin) [3]	■ 3 NO/NC ■ 1 NO/NC + 1 SPDT	IP65	II	TPU, brass	
Cable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

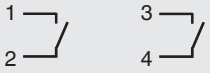
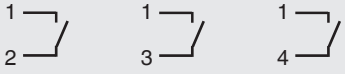
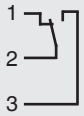
1) Versions with protective conductor on request
2) The stated ingress protection (per IEC/EN 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.
3) Not for shipbuilding version
4) Not with process connection G 1, guide tube length L ≥ 100 mm [L ≥ 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

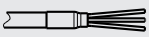
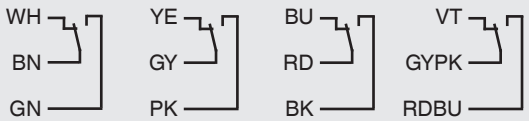
Angular connector DIN EN 175301-803 A

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

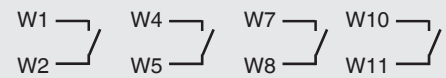
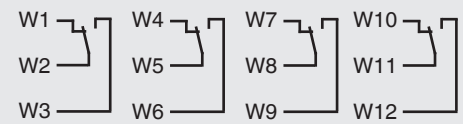
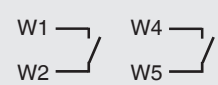
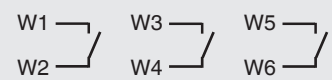
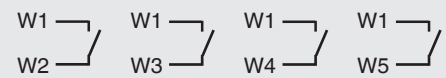
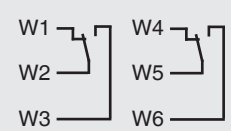
Circular connector M12 x 1 (4-pin)

	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.

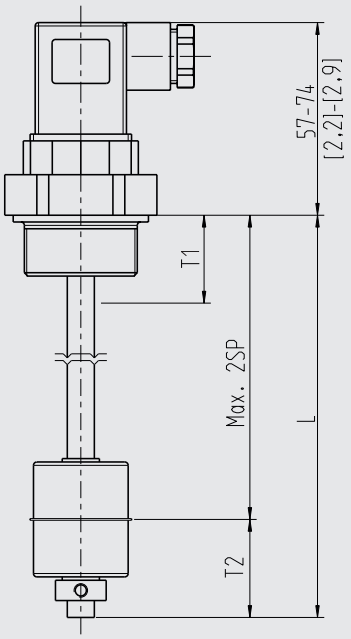
Legend

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

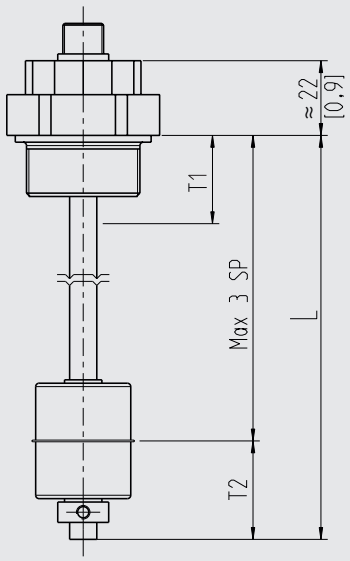
Electrical safety	
Insulation voltage	DC 2,120 V

Dimensions in mm [in]

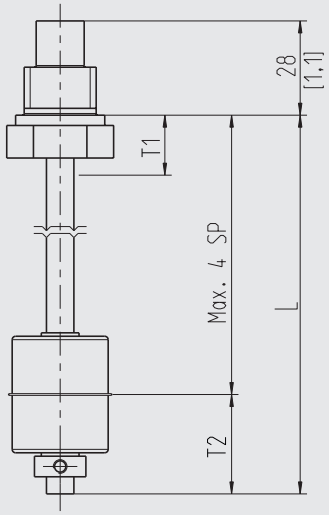
with angular connector form A



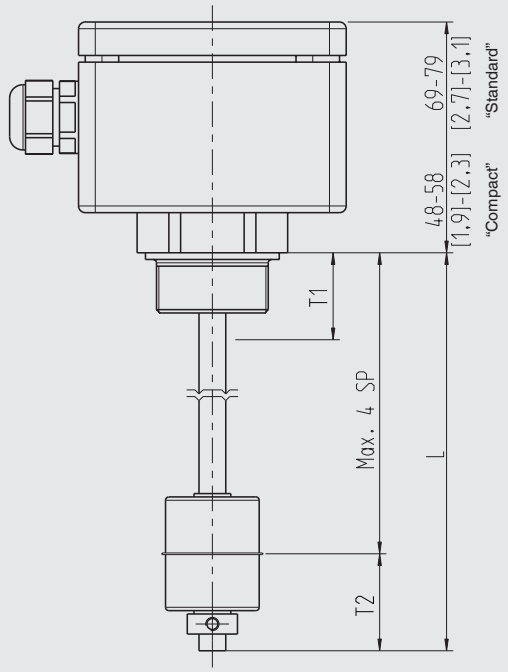
with M12 x 1 circular connector



with cable outlet



with connection housing



Legend

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

Float stop

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

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

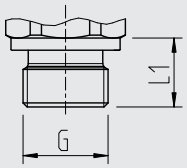
Process connection	Outer diameter float Ø D			
	Ø 30 mm [1.2 in]	Ø 44 mm [1.7 in]	Ø 52 mm [2.0 in]	Ø 25 mm [1.0 in]
G 1 (von außen)	35 mm [1.4 in]	-	-	25
G 1 ½ (from outside)	35 mm [1.4 in]	45 mm [1.8 in]	-	25 mm [1.0 in]
G 2 (from outside)	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]	25 mm [1.0 in]
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 [in] (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]	Ø 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]

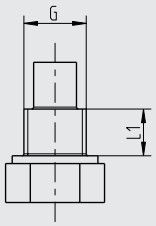
Process connection

Installation from outside



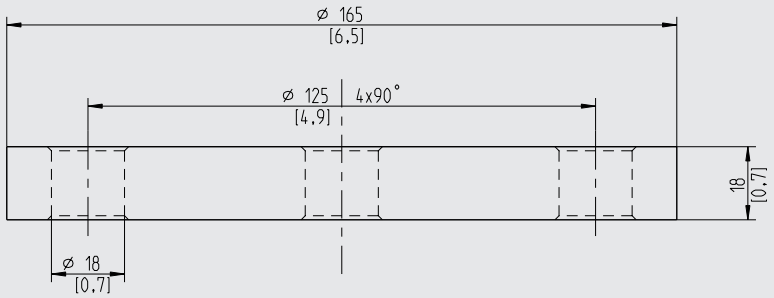
G	L_1	Spanner width
G 1	16 mm [0.63 in]	41 mm [1.6 in]
G 1 ½	18 mm [0.71 in]	30 mm [1.2 in]
G 2	20 mm [0.79 in]	36 mm [1.4 in]

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

Circular connector M12 x 1 with moulded cable					
	Description	Temperature range	Cable diameter	Cable length	Order number
	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 (option) [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 / Switch point position / Electrical connection / Process connection / Guide tube length L / Medium temperature / Float

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