

# Float switch

## For industrial applications

### Model RLS-1000

WIKA data sheet LM 50.03



#### Applications

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

#### Special features

- Maximum reliability thanks to high-quality reed contacts
- Very high variety and customer-specific solutions possible
- Simple and fast installation

#### Description

The RLS-1000 is a robust, reliable and inexpensive float switch. Since the monitoring of levels as well as dry-run protection and overflow protection are cost-sensitive applications in the machine-building industry, a float switch is the ideal solution for many plants. The RLS-1000 reliably detects the level in vessels with water, oil, diesel or other liquids by means of a permanent magnet and frictionless reed contacts at max. 4 defined switch points and can be used in a medium temperature range from -30 to +150 °C [-22 to +302 °F].

The compact float switch is simple, convenient and fast to integrate, because it does not need to be calibrated or set during the installation. This greatly improves the ease of handling, especially in confined installation situations. Also, since its robust design makes it resistant to vibrations and shocks, maintenance costs are minimal



**Fig. left: Angular connector, float from NBR**  
**Fig. right: Circular connector M12 x 1, float from stainless steel**

# Specifications

Float switch, model RLS-1000		
<b>Measuring principle</b>	Potential-free switching reed contacts are triggered by a magnet in the float.	
<b>Guide tube length L</b>	60 ... 1,500 mm [2.5 ... 59 in], other lengths on request	
<b>Output signal</b>	Up to 4 switch points, depending on the electrical connection: SP1, SP2, SP3, SP4	
<b>Switching function</b>	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
<b>Switch position</b>	Specified in mm, starting from the upper sealing face (SP1 ... SP4) At the end of the guide tube $\approx$ 45 mm [ $\approx$ 1.8 in] cannot be used for switch positions.	
<b>Distance between switch points <sup>1)</sup></b>	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 $\varnothing$ = 44 mm [1.7 in], 52 mm [2.0 in] 30 mm [1.2 in], for floats with outer $\varnothing$ = 18 mm [0.7 in], 22 mm [0.9 in], 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	
<b>Switching power <sup>2)</sup></b>	<b>Floats with outer diameter <math>\varnothing</math> D = 44 mm [1.7 in], 52 mm [2.0 in]</b> Normally open, AC 230 V; 100 VA; 1 A; 50 ... 60 Hz normally closed: DC 230 V; 50 W; 0.5 A Change-over contact: AC 230 V; 40 VA; 1 A; 50 ... 60 Hz DC 230 V; 20 W; 0.5 A  <b>Floats with outer diameter <math>\varnothing</math> D = 18 mm [0.7 in], 22 mm [0.9 in], 25 mm [1.0 in], 30 mm [1.2 in]</b> Normally open, AC 100 V; 10 VA; 0.5 A; 50 ... 60 Hz normally closed: DC 100 V; 10 W; 0.5 A Change-over contact: AC 100 V; 5 VA; 0.25 A; 50 ... 60 Hz DC 100 V; 5 W; 0.25 A	
<b>Accuracy</b>	$\pm$ 3 mm switch point accuracy incl. hysteresis, non-repeatability	
<b>Mounting position</b>	Vertical $\pm$ 30°	
<b>Process connection</b>	<ul style="list-style-type: none"> <li>■ G 1/2, installation from outside <sup>3)</sup></li> <li>■ G 3/4, installation from outside <sup>4)</sup></li> <li>■ G 1, installation from outside</li> <li>■ G 1 1/2, installation from outside</li> <li>■ G 2, installation from outside</li> <li>■ Flange DN 50, form B per EN 1092-1 (DIN 2527), PN 16, installation from outside</li> <li>■ G 1/8, installation from inside <sup>5) 6)</sup></li> <li>■ G 1/4, installation from inside <sup>5) 6)</sup></li> <li>■ G 3/8, installation from inside <sup>5)</sup></li> <li>■ G 1/2, installation from inside <sup>5)</sup></li> </ul>	
<b>Material</b>		
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
<b>Permissible temperatures</b>		
Medium	-30 ... +80 °C [-22 ... +176 °F] -30 ... +120 °C [-22 ... +248 °F] <sup>7) 9)</sup> -30 ... +150 °C [-22 ... +302 °F] <sup>8) 9)</sup>	
Ambient	-30 ... +80 °C [-22 ... +176 °F]	
Storage	-30 ... +80 °C [-22 ... +176 °F]	

1) Smaller minimum distances on request

2) Higher switching power ratings on request

3) Only with outer diameter float  $\varnothing$  D = 18 mm [0.7 in]

4) Only with outer diameter float  $\varnothing$  D  $\leq$  22 mm [0.9 in]

5) Only for versions with cable outlet

6) Not with 4 switch points

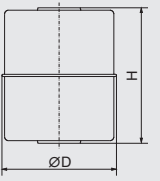
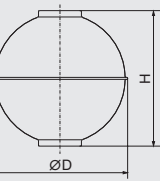
7) Not with cable material: PVC, PUR; max. 1 change-over contact or 2 normally closed/normally open contacts with float outer diameter  $\varnothing$  D  $\leq$  30 mm [1.2 in];

not with connection housing 58 x 64 x 36 mm [2.3 x 2.5 x 1.4 in]

8) Only with cable material: Silicone or connection housing 75 x 80 x 57 mm [3.0 x 3.1 x 2.2 in]

9) Not for shipbuilding version

Electrical connections <sup>1)</sup>	Max. switch point definition	Ingress protection per IEC/EN 60529 <sup>2)</sup>	Protection class	Material	Cable length
<b>Angular connector</b> DIN EN 175301-803 A <sup>3) 4)</sup>	<ul style="list-style-type: none"> <li>■ 2 NO/NC</li> <li>■ 1 SPDT</li> </ul>	IP65	II	PA	<ul style="list-style-type: none"> <li>■ 2 m [6.5 ft]</li> <li>■ 5 m [16.4 ft]</li> <li>■ other lengths on request</li> </ul>
<b>Circular connector M12 x 1 (4-pin) <sup>4)</sup></b>	<ul style="list-style-type: none"> <li>■ 3 NO/NC</li> <li>■ 1 NO/NC + 1 SPDT</li> </ul>	IP65	II	TPU, brass	
<b>Cable outlet <sup>4)</sup></b>	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP67	II	PVC	
<b>Cable outlet <sup>4)</sup></b>	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP67	II	PUR	
<b>Cable outlet <sup>4)</sup></b>	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 2 NO/NC + 1 SPDT</li> </ul>	IP67	II	Silicone	
<b>Cable outlet "shipbuilding"</b>	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP67	II	Polyolefin	
<b>Connection housing "standard"</b> 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]	<ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>	IP66	I	Case from aluminium, cable gland from polyamide	-
<b>Connection housing "compact"</b> 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"> <li>■ 4 NO/NC</li> <li>■ 2 NO/NC + 1 SPDT</li> <li>■ 2 SPDT</li> </ul>	IP66	II		

Float	Form	Outer diameter Ø D	Height H	Operating pressure	Medium temperature	Density	Material
	Cylinder <sup>4) 7)</sup>	44 mm [1.7 in]	52 mm [2.0 in]	≤ 16 bar [≤ 232 psi]	-30 ... +150 °C [-22 ... +302 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	316Ti
	Cylinder <sup>5)</sup>	30 mm [1.2 in]	36 mm [1.4 in]	≤ 10 bar [≤ 145 psi]	-30 ... +120 °C [-22 ... +248 °F]	≥ 850 kg/m <sup>3</sup> [53.1 lbs/ft <sup>3</sup> ]	316Ti
	Cylinder <sup>5) 3)</sup>	25 mm [1.0 in]	17 mm [0.7 in]	≤ 16 bar [≤ 232 psi]	-30 ... +80 °C [-22 ... +176 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	Buna / NBR
	Cylinder <sup>4) 6) 9)</sup>	25 mm [1.0 in]	23 mm [0.9 in]	≤ 4 bar [≤ 58.0 psi]	-25 ... +80 °C [-13 ... +176 °F]	≥ 700 kg/m <sup>3</sup> [43.7 lbs/ft <sup>3</sup> ]	PP
	Cylinder <sup>4) 6) 9)</sup>	25 mm [1.0 in]	23 mm [0.9 in]	≤ 4 bar [≤ 58.0 psi]	-25 ... +80 °C [-13 ... +176 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	PA6.6
	Cylinder <sup>5) 9)</sup>	22 mm [0.9 in]	29 mm [1.1 in]	≤ 16 bar [≤ 232 psi]	-30 ... +120 °C [-22 ... +248 °F]	≥ 850 kg/m <sup>3</sup> [53.1 lbs/ft <sup>3</sup> ]	316Ti
	Cylinder <sup>4) 6) 9)</sup>	18 mm [0.7 in]	32 mm [1.3 in]	≤ 16 bar [≤ 232 psi]	-30 ... +80 °C [-22 ... +176 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	Buna / NBR
	Sphere <sup>6) 7)</sup>	52 mm [2.0 in]	52 mm [2.0 in]	≤ 40 bar [≤ 580 psi]	-30 ... +150 °C [-22 ... +302 °F]	≥ 750 kg/m <sup>3</sup> [46.8 lbs/ft <sup>3</sup> ]	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 1/2

4) Not for shipbuilding version

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

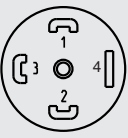


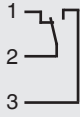
6) Guide tube length L ≤ 1,000 mm [L ≤ 39.37 in], switch points max. 3 NO/NC or 2 SPDT definable




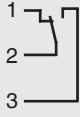



7) Not with process connection G 1, G 1 ½, guide tube length L ≥ 100 mm [L ≥ 3.94 in]

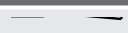




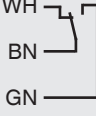
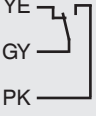
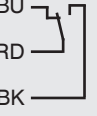
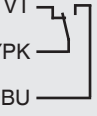
8) Not with process connection G ½

9) Not with process connection G 1 1/2, G 2, flange DN 50

## 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  	1 switch points SP1 
	3 switch points SP1            SP2            SP3   	

Cable outlet <sup>1)</sup>		
	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 	2 switch points SP1      SP2 
	3 switch points SP1      SP2      SP3 	
	4 switch points SP1      SP2      SP3      SP4 	

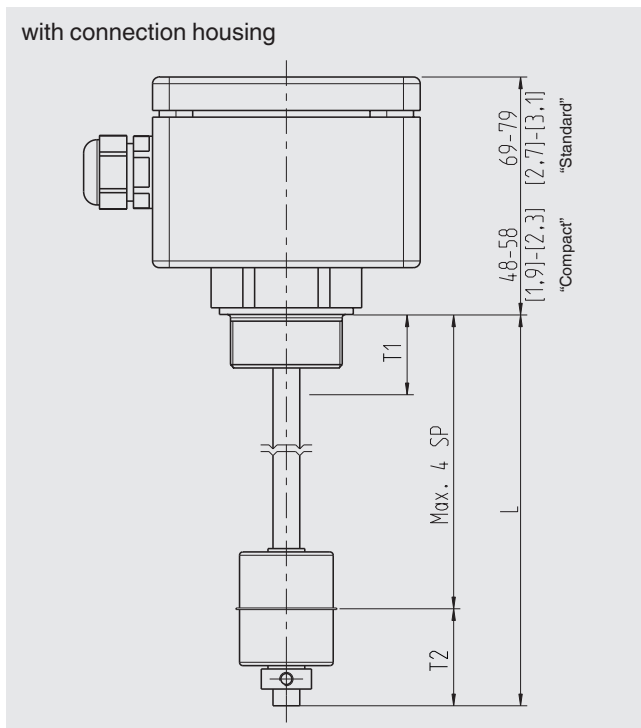
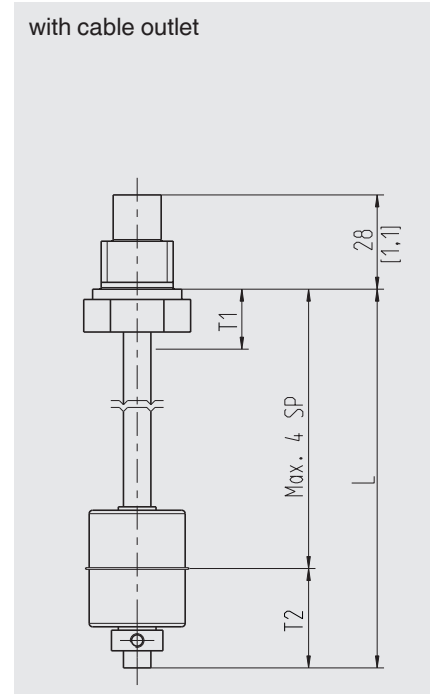
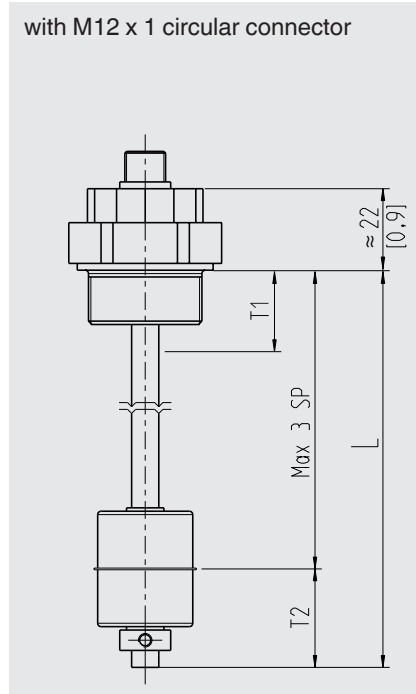
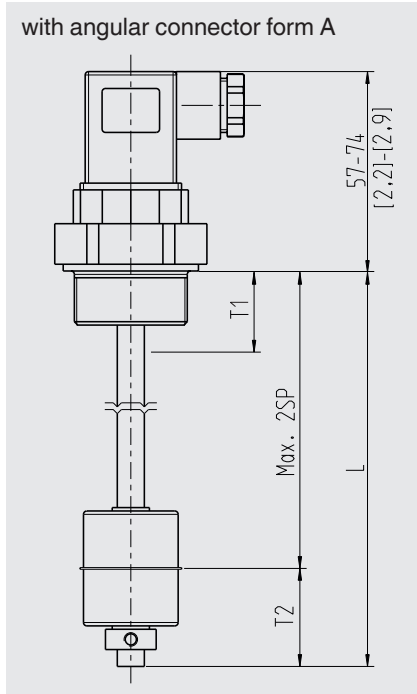
1) For combinations of different switching output functions the PIN assignment is marked on the product label.

#### 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]



### Legend

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

### Float stop

- Adjusting collar, for medium temperature  $\leq 120\text{ °C}$  [ $\leq 248\text{ °F}$ ]
- Pipe clamp, for medium temperature  $> 120\text{ °C}$  [ $> 248\text{ °F}$ ]  
and shipbuilding versions
- Retaining ring

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

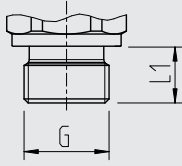
Process connection	Dead band in mm						
Outer diameter float $\varnothing D$	$\varnothing 18\text{ mm}$ [0.7 in]	$\varnothing 22\text{ mm}$ [0.9 in]	$\varnothing 25\text{ mm}$ [1.0 in]	$\varnothing 25\text{ mm}$ [1.0 in]	$\varnothing 30\text{ mm}$ [1.2 in]	$\varnothing 44\text{ mm}$ [1.7 in]	$\varnothing 52\text{ mm}$ [2.0 in]
Float height H	H 32 mm [1.3 in]	H 29 mm [1.1 in]	H 17 mm [0.7 in]	H 23 mm [0.9 in]	H 36 mm [1.4 in]	H 52 mm [2.0 in]	H 52 mm [2.0 in]
<b>G 1/2 (from outside)</b>	35 mm [1.4 in]	-	-	-	-	-	-
<b>G 3/4 (from outside)</b>	35 mm [1.4 in]	35 mm [1.4 in]	-	-	-	-	-
<b>G 1 (from outside)</b>	35 mm [1.4 in]	35 mm [1.4 in]	25 mm [1.0 in]	35 mm [1.4 in]	35 mm [1.4 in]	-	-
<b>G 1 ½ (from outside)</b>	-	-	25 mm [1.0 in]	-	35 mm [1.4 in]	45 mm [1.8 in]	-
<b>G 2 (from outside)</b>	-	-	25 mm [1.0 in]	-	40 mm [1.6 in]	50 mm [2.0 in]	50 mm [2.0 in]
<b>Flange (from outside)</b>	-	-	5 mm [0.2 in]	-	20 mm [0.8 in]	30 mm [1.2 in]	30 mm [1.2 in]
<b>G ¼ B (from inside)</b>	15 mm [0.6 in]	20 mm [0.8 in]	15 mm [0.6 in]	20 mm [0.8 in]	30 mm [1.2 in]	-	-
<b>G ¼ B (from inside)</b>	20 mm [0.8 in]	25 mm [1.0 in]	20 mm [0.8 in]	25 mm [1.0 in]	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]
<b>G ¾ B (from inside)</b>	20 mm [0.8 in]	25 mm [1.0 in]	20 mm [0.8 in]	25 mm [1.0 in]	35 mm [1.4 in]	40 mm [1.6 in]	40 mm [1.6 in]
<b>G ½ B (from inside)</b>	20 mm [0.8 in]	25 mm [1.0 in]	20 mm [0.8 in]	25 mm [1.0 in]	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]

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

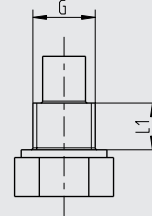
Dead band in mm							
Outer diameter float $\varnothing D$	$\varnothing 18\text{ mm}$ [0.7 in]	$\varnothing 22\text{ mm}$ [0.9 in]	$\varnothing 25\text{ mm}$ [1.0 in]	$\varnothing 25\text{ mm}$ [1.0 in]	$\varnothing 30\text{ mm}$ [1.2 in]	$\varnothing 44\text{ mm}$ [1.7 in]	$\varnothing 52\text{ mm}$ [2.0 in]
Float height H	H 32 mm [1.3 in]	H 29 mm [1.1 in]	H 17 mm [0.7 in]	H 23 mm [0.9 in]	H 36 mm [1.4 in]	H 52 mm [2.0 in]	H 52 mm [2.0 in]
<b>T2</b>	30 mm [1.2 in]	30 mm [1.2 in]	30 mm [1.2 in]	25 mm [1.0 in]	35 mm [1.4 in]	45 mm [1.8 in]	45 mm [1.8 in]

## Process connection

Installation from outside



Installation from inside

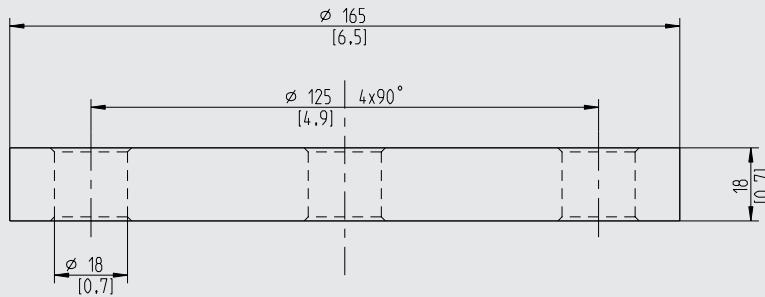


G	L <sub>1</sub>	Spanner width
G 1/2	15 mm [0.59 in]	27 mm [1.1 in]
G 3/4	15 mm [0.59 in]	31 mm [1.2 in]
G 1	16 mm [0.63 in]	41 mm [1.6 in]
G 1 ½	18 mm [0.71 in]	30 mm [1.2 in]
G 2	20 mm [0.79 in]	36 mm [1.4 in]

G	L <sub>1</sub>	Spanner width
G ¼ 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
	<b>EU declaration of conformity</b> <ul style="list-style-type: none"><li>■ Low voltage directive</li><li>■ RoHS directive</li></ul>	European Union
	<b>DNV GL (option) <sup>1)</sup></b> 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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