

## Float switch For industrial applications, plastic version Model RLS-2000

WIKA data sheet LM 50.04

### Applications

- Level measurement of liquids in machine building
- Control and monitoring tasks for critical media: Oil, corrosive liquids and aqueous media

### Special features

- Highest reliability in aggressive media
- Optimum process safety thanks to SMD production
- Simple and fast installation

### Description

The RLS-2000 is a reliable and inexpensive float switch made of high-quality plastic. It is particularly suited for measuring the levels of aggressive and corrosive media, such as bases and acids. Float switches are an ideal solution for cost-sensitive applications such as the monitoring of levels or overflow and dry-run protection.

The RLS-2000 detects the level by means of a permanent magnet and frictionless reed contacts at up to 4 defined switch points, without contact and thus free from wear. Integration as a limit level switch is simple, convenient and fast, because no adaptation or calibration is required during installation. Its robust design minimises service and maintenance costs.



**Fig. left: Mounting thread, angular connector**  
**Fig. right: Cable outlet**

# Specifications

| Float switch, model RLS-2000                        |   |   |
|---|---|---|
| <b>Measuring principle</b>                          | Potential-free switching reed contacts are triggered by a magnet in the float.  |   |
| <b>Guide tube length L</b>                          |   |   |
| PP version  | 100 ... 1,500 mm [4 ... 59 in]  |   |
| PVDF version  | 120 ... 1,500 mm [4.7 ... 59 in]  |   |
| PVC version   | 70 ... 1,500 mm [2.8 ... 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)   |   |
| PP and PVC version                                  | At the end of the guide tube $\approx 45$ mm [ $\approx 1.8$ in] cannot be used for switch positions.   |   |
| PVDF version  | At the end of the guide tube $\approx 65$ mm [ $\approx 2.6$ 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]<br>Minimum distance between the switch points: 50 mm [2.0 in]<br>Minimum distance with 3 switch points: 80 mm [3.1 in], either between SP1 and SP2 or SP2 and SP3<br>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 D = 44</math> mm [1.7 in], 55 mm [2.2 in]</b><br>Normally open, normally closed: AC 230 V; 100 VA; 1 A; 50 ... 60 Hz<br>DC 230 V; 50 W; 0,5 A<br>Change-over contact: AC 230 V; 40 VA; 1 A; 50 ... 60 Hz<br>DC 230 V; 20 W; 0,5 A<br><br><b>Floats with outer diameter <math>\varnothing D = 18</math> mm [0.7 in], 25 mm [1.0 in]</b><br>Normally open, normally closed: AC 100 V; 10 VA; 0.5 A; 50 ... 60 Hz<br>DC 100 V; 10 W; 0.5 A<br>Change-over contact: AC 100 V; 5 VA; 0.25 A; 50 ... 60 Hz<br>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 $\pm 30^\circ$   |   |
| <b>Process connection</b>                           | ■ G 1/2, installation from outside <sup>3)</sup> ■ G 1 1/2, installation from outside <sup>5)</sup> ■ G 3/8, installation from inside <sup>6)</sup><br>■ G 3/4, installation from outside <sup>3)</sup> ■ G 2, installation from outside    ■ G 1/2, installation from inside <sup>6)</sup><br>■ G 1, installation from outside <sup>4)</sup>   |   |
| <b>Material</b>                                     |   |   |
| Wetted  | Process connection, guide tube  | PP, PVC or PVDF   |
|   | Float   | See table on page 3   |
| Non-wetted  | Case  | PP, PVDF (option)   |
|   | Electrical connection   | See table on page 3   |
| <b>Permissible temperatures</b>                     |   |   |
| Medium  | PP version  | -10 ... +80 °C [14 ... 176 °F]  |
|   | PVDF version  | -10 ... +80 °C [14 ... 176 °F] <sup>7)</sup><br>Option: -30 ... +120 °C [-22 ... +248 °F] <sup>7)</sup> |
|   | PVC version   | -10 ... +60 °C [14 ... 140 °F]  |
| Ambient   | PP version  | -10 ... +80 °C [14 ... 176 °F]  |
|   | PVDF version  | -30 ... +80 °C [-22 ... +176 °F]  |
|   | PVC version   | -10 ... +60 °C [14 ... 140 °F]  |
| Storage   | PP version  | -10 ... +80 °C [14 ... 176 °F]  |
|   | PVDF version  | -30 ... +80 °C [-22 ... +176 °F]  |
|   | PVC version   | -10 ... +60 °C [14 ... 140 °F]  |

1) Smaller minimum distances on request

2) Higher switching power ratings on request

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

4) Only with float outer diameter  $\varnothing D \leq 25$  mm [1.0 in]

5) Only with float outer diameter  $\varnothing D = 44$  mm [1.7 in] from PP, not with 3 x change-over contact

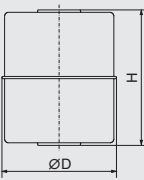
6) Only with cable outlet

7) Not with PVC cable

| 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<br/>DIN EN 175301-803 A</b>  | <ul style="list-style-type: none"> <li>■ 2 NO/NC</li> <li>■ 1 SPDT</li> </ul>           | IP65  | II               | PA  | -  |
| <b>Circular connector M12 x 1<br/>(4-pin)</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</b>   | <ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>           | IP67  | II               | PVC   | <ul style="list-style-type: none"> <li>■ 2 m [6.5 ft]</li> <li>■ 5 m [16.4 ft]</li> </ul> other lengths on request |
| <b>Cable outlet</b>   | <ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 2 NO/NC + 1 SPDT</li> </ul> | IP67  | II               | Silicone  |  |
| <b>Connection housing</b><br>Dimensions: 80 x 82 x 55 mm<br>[3.1 x 3.2 x 2.2 in]<br>For cable diameter: 5 ... 10 mm<br>[0.2 ... 0.4 in] | <ul style="list-style-type: none"> <li>■ 4 NO/NC</li> <li>■ 4 SPDT</li> </ul>           | IP66  | II               | Polycarbonate,<br>glands from<br>polyamide, brass,<br>stainless steel | -  |

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.

| Float  | Form  | Outer diameter<br>Ø D | Height H       | Operating<br>pressure   | Medium<br>temperature                | Density  | Material      |
|--|---|-----------------------|----------------|-------------------------|--------------------------------------|--|---------------|
|  | Cylinder <sup>1)</sup><br><sub>2) 3) 5)</sub> | 44 mm [1.7 in]        | 44 mm [1.7 in] | ≤ 3 bar<br>[≤ 43.5 psi] | ≤ 80 °C<br>[≤ 176 °F]                | ≥ 500 kg/m <sup>3</sup><br>[31.2 lbs/ft <sup>3</sup> ] | PP            |
|  | Cylinder <sup>2)</sup><br><sub>3) 4)</sub>    | 55 mm [2.2 in]        | 55 mm [2.2 in] | ≤ 3 bar<br>[≤ 43.5 psi] | ≤ 80 °C<br>[≤ 176 °F]                | ≥ 500 kg/m <sup>3</sup><br>[31.2 lbs/ft <sup>3</sup> ] | PP            |
|  | Cylinder <sup>2)</sup><br><sub>3) 4)</sub>    | 55 mm [2.2 in]        | 65 mm [2.6 in] | ≤ 3 bar<br>[≤ 43.5 psi] | ≤ 120 °C<br>[≤ 248 °F]               | ≥ 800 kg/m <sup>3</sup><br>[49.9 lbs/ft <sup>3</sup> ] | PVDF          |
|  | Cylinder <sup>2)</sup><br><sub>4) 5)</sub>    | 25 mm [1.0 in]        | 23 mm [0.9 in] | ≤ 4 bar<br>[≤ 58 psi]   | -25 ... +80 °C<br>[-13 ... +176 °F]  | ≥ 700 kg/m <sup>3</sup><br>[43.7 lbs/ft <sup>3</sup> ] | PP            |
|  | Cylinder <sup>2)</sup><br><sub>4) 5)</sub>    | 25 mm [1.0 in]        | 23 mm [0.9 in] | ≤ 4 bar<br>[≤ 58 psi]   | "-25 ... +80 °C<br>[-13 ... +176 °F] | ≥ 750 kg/m <sup>3</sup><br>[46.8 lbs/ft <sup>3</sup> ] | PA6.6         |
|  | Cylinder <sup>2)</sup><br><sub>4) 5)</sub>    | 25 mm [1.0 in]        | 17 mm [0.7 in] | ≤ 16 bar<br>[≤ 232 psi] | -30 ... 80 °C<br>[-22 ... 176 °F]    | ≥ 750 kg/m <sup>3</sup><br>[46.8 lbs/ft <sup>3</sup> ] | Buna /<br>NBR |
|  | Cylinder <sup>2)</sup><br><sub>4) 5)</sub>    | 18 mm [0.7 in]        | 32 mm [1.3 in] | ≤ 16 bar<br>[≤ 232 psi] | -30 ... 80 °C<br>[-22 ... 176 °F]    | ≥ 750 kg/m <sup>3</sup><br>[46.8 lbs/ft <sup>3</sup> ] | Buna /<br>NBR |

1) Permissible guide tube length L ≤ 500 mm [19.68 in]

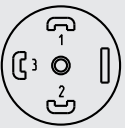


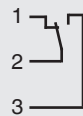
2) Not possible with G 1/2 installation from outside and G 3/4 installation from outside

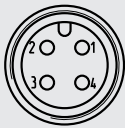


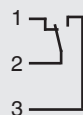



3) Not possible with G 1 installation from outside






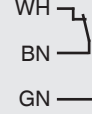
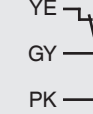
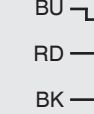
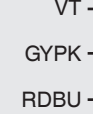
4) Not possible with G 1 1/2 installation from outside





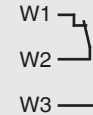

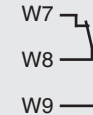
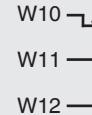
5) Not possible with G 2 installation from outside

## Connection diagram

| Angular connector DIN EN 175301-803 A   |  |   |
|---|--|---|
|   | Normally open/normally closed (NO/NC)  | Change-over contact (SPDT)  |
|  | 2 switch points<br>SP1          SP2<br>  | 1 switch point<br>SP1<br> |
|   |  |   |

| Circular connector M12 x 1 (4-pin)  |   |   |
|---|---|---|
|   | Normally open/normally closed (NO/NC)   | Change-over contact (SPDT)  |
|  | 2 switch points<br>SP1          SP2<br>   | 1 switch point<br>SP1<br> |
|   | 3 switch points<br>SP1          SP2          SP3<br>   |   |

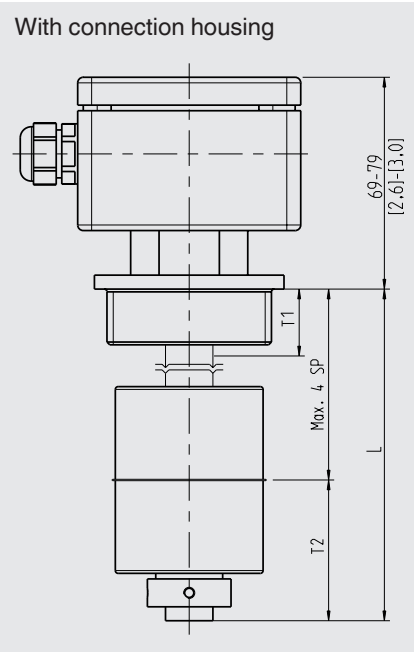
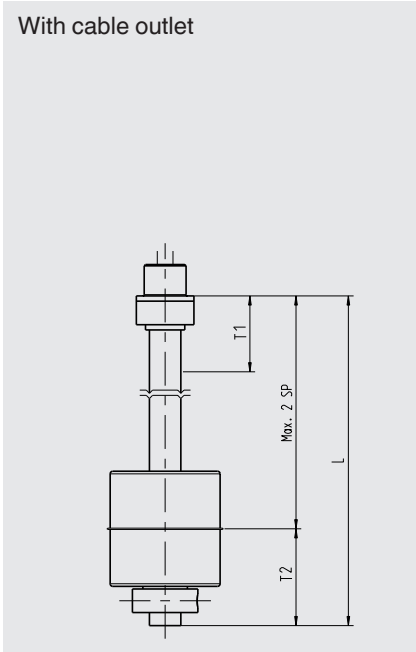
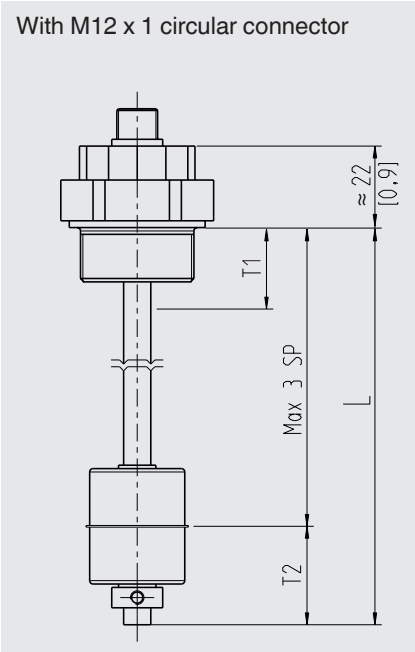
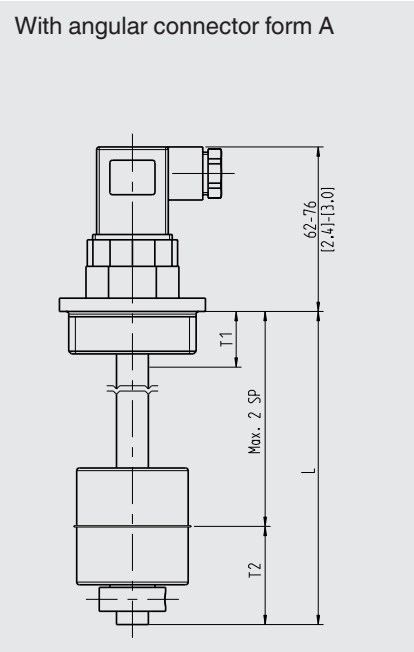
| Cable outlet  |  |  |
|---|--|--|
|   | Normally open/normally closed (NO/NC)  | Change-over contact (SPDT)   |
|  | 4 switch points<br>SP1          SP2          SP3          SP4<br>    | 4 switch points<br>SP1          SP2          SP3          SP4<br>    |

| Connection housing   |   |  |  |
|--|---|--|--|
| Normally open/normally closed (NO/NC)  | Change-over contact (SPDT)  |  |  |
| 4 switch points<br>SP1          SP2          SP3          SP4<br>    | 4 switch points<br>SP1          SP2          SP3          SP4<br>    |  |  |

### Legend

|           |               |    |      |      |           |
|-----------|---------------|----|------|------|-----------|
| SP1 - SP4 | 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        |    |      |      |           |

# Dimensions in mm [in]



**Legend**

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

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

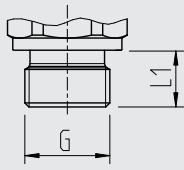
| Process connection          | Dead band in mm     |                     |                     |                     |                     |                     |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Outer diameter float<br>Ø D | Ø 18 mm<br>[0.7 in] | Ø 25 mm<br>[1.0 in] | Ø 25 mm<br>[1.0 in] | Ø 44 mm<br>[1.7 in] | Ø 55 mm<br>[2.2 in] | Ø 55 mm<br>[2.2 in] |
| Float height H              | H 32 mm<br>[1.3 in] | H 17 mm<br>[0.7 in] | H 23 mm<br>[0.9 in] | H 52 mm<br>[2.0 in] | H 55 mm<br>[2.2 in] | H 65 mm<br>[2.6 in] |
| <b>G ½ (from outside)</b>   | 35 mm [1.4 in]      | -                   | -                   | -                   | -                   | -                   |
| <b>G ¾ (from outside)</b>   | 35 mm [1.4 in]      | -                   | -                   | -                   | -                   | -                   |
| <b>G 1 (from outside)</b>   | 35 mm [1.4 in]      | 25 mm [1.0 in]      | 35 mm [1.4 in]      | -                   | -                   | -                   |
| <b>G 1 ½ (from outside)</b> | -                   | -                   | -                   | 45 mm [1.8 in]      | -                   | -                   |
| <b>G 2 (from outside)</b>   | -                   | -                   | -                   | -                   | 55 mm [2.2 in]      | 65 mm [2.6 in]      |
| <b>G ¾ B (from inside)</b>  | 20 mm [0.8 in]      | 20 mm [0.8 in]      | 25 mm [1.0 in]      | 50 mm [2.0 in]      | 55 mm [2.2 in]      | 60 mm [2.4 in]      |
| <b>G ½ B (from inside)</b>  | 20 mm [0.8 in]      | 20 mm [0.8 in]      | 25 mm [1.0 in]      | 50 mm [2.0 in]      | 55 mm [2.2 in]      | 60 mm [2.4 in]      |

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

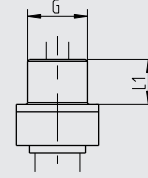
| Dead band in mm             |                     |                     |                     |                     |                     |                     |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Outer diameter float<br>Ø D | Ø 18 mm<br>[0.7 in] | Ø 25 mm<br>[1.0 in] | Ø 25 mm<br>[1.0 in] | Ø 44 mm<br>[1.7 in] | Ø 55 mm<br>[2.2 in] | Ø 55 mm<br>[2.2 in] |
| Float height H              | H 32 mm<br>[1.3 in] | H 17 mm<br>[0.7 in] | H 23 mm<br>[0.9 in] | H 52 mm<br>[2.0 in] | H 55 mm<br>[2.2 in] | H 65 mm<br>[2.6 in] |
| <b>T2</b>                   | 30 mm [1.2 in]      | 30 mm [1.2 in]      | 25 mm [1.0 in]      | 40 mm [1.6 in]      | 45 mm [1.8 in]      | 55 mm [2.2 in]      |

## Process connection

Installation from outside



Installation from inside



| G     | L <sub>1</sub>  | Spanner width  |
|-------|-----------------|----------------|
| G ½   | 15 mm [0.59 in] | 27 mm [1.1 in] |
| G ¾   | 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 | 16 mm [0.63 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 ⅝ B | 12 mm [0.47 in] | 22 mm [0.9 in] |
| G ½ B | 14 mm [0.55 in] | 27 mm [1.1 in] |

## Approvals

| Logo | Description   | Country        |
|------|---|----------------|
| CE   | <b>EU declaration of conformity</b> <ul style="list-style-type: none"> <li>■ Low voltage directive</li> <li>■ RoHS directive</li> </ul> | European Union |

## 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 / Material / Process connection / Guide tube length L / Medium temperature / Float

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