

Level sensor

For industrial applications, stainless steel version

Model RLT-1000

WIKA data sheet LM 50.02

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 ... +120 °C [-22 ... +248 °F]
- Output signal: Resistance in a 3-wire potentiometer circuit, current output 4 ... 20 mA
- Measuring principle: Reed-chain technology
- Accuracy, resolution: 24 mm [0.9 in], 12 mm [0.5 in], 10 mm [0.4 in], 6 mm [0.2 in] or 3 mm [0.1 in]



Fig. left: Mounting thread, angular connector
Fig. right: Mounting thread, circular connector M12 x 1

Description

The model RLT-1000 level sensor has been developed for measuring the levels 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 resistance measuring chain built into the guide tube. The entire assembly corresponds to a 3-wire potentiometer circuit. The measured resistance signal is proportional to the level. The model RLT-1000 is optionally available with a 4 ... 20 mA analogue output.

Specifications

| Level sensor, model RLT-1000 | |
|---------------------------------|--|
| Measuring principle | Reed-chain technology with optional analogue amplifier |
| Measuring range M | The measuring range is determined from the selected guide tube length L and the position of the 100 % mark. For dimensions see drawing |
| Guide tube length L | 150 ... 1,500 mm [6 ... 59 in], greater lengths on request |
| Output signal | <ul style="list-style-type: none"> ■ Variable resistance The overall resistance of the reed chain is approx. 1 ... 10 kΩ, depending on the measuring range Max. voltage < DC 40 V ■ Current output, 4 ... 20 mA, 2-wire Power supply: DC 12 ... 32 V Load in Ω: ≤ (power supply - 12 V) / 0.02 A |
| Accuracy, resolution | <ul style="list-style-type: none"> ■ 24 mm [0.9 in] ¹⁾ ■ 12 mm [0.5 in] ²⁾ ■ 10 mm [0.4 in] ³⁾ ■ 6 mm [0.2 in] ²⁾ ■ 3 mm [0.1 in] ²⁾ |
| Mounting position | Vertical ±30° |
| Process connection | <ul style="list-style-type: none"> ■ G 1, installation from outside ■ G 1 ½, installation from outside ■ G 2, installation from outside ■ Flange DN 50, form B per DIN 2527/EN 1092, PN 16, installation from outside ■ G ¾, installation from inside ⁴⁾ ■ G ½, installation from inside ⁴⁾ ■ G ¼, installation from inside ⁴⁾ |
| Material | <ul style="list-style-type: none"> ■ Wetted ■ Non-wetted Process connection, guide tube: Stainless steel 1.4571 (316Ti) Float: See table on page 3 Case: Stainless steel 1.4571 (316Ti) Electrical connection: See table below |
| Permissible temperatures | <ul style="list-style-type: none"> ■ Medium ■ Ambient ■ Storage -30 ... +80 °C [-22 ... +176 °F], option: -30 ... +120 °C [-22 ... +248 °F] ⁵⁾ -30 ... +80 °C [-22 ... +176 °F] -30 ... +80 °C [-22 ... +176 °F] |

| Electrical connections ⁶⁾ | Ingress protection ⁷⁾ | Material | Cable length |
|--|----------------------------------|---|--------------------------|
| Angular connector DIN 175301-803 A | IP65 | PA | - |
| Circular connector M12 x 1 (4-pin) | IP65 | TPU, brass | - |
| Cable outlet | IP67 | PVC | ■ 2 m [6.5 ft] |
| Cable outlet | IP67 | PUR | ■ 5 m [16.4 ft] |
| Cable outlet | IP67 | Silicone | other lengths on request |
| 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] | IP66 | 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] | IP66 | | |

1) Not with float diameter 30 mm [1.2 in] or 25 mm [1.0 in]

2) Not with float diameter 30 mm [1.2 in]

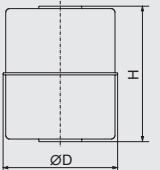
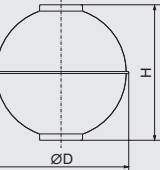
3) Only with float diameter 30 mm [1.2 in]

4) Only with cable outlets

5) Not with cable material: PVC, PUR; 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]

6) Cable outlets not available with current output 4 ... 20 mA

7) 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 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] | ≤ 120 °C [≤ 248 °F] | ≥ 750 kg/m ³ [46.8 lbs/ft ³] | 1.4571 (316Ti) |
| | Cylinder ²⁾ | 30 mm [1.2 in] | 36 mm [1.4 in] | ≤ 10 bar [≤ 145 psi] | ≤ 80 °C [≤ 176 °F] | ≥ 850 kg/m ³ [53.1 lbs/ft ³] | 1.4571 (316Ti) |
| | Cylinder | 25 mm [1.0 in] | 20 mm [0.8 in] | ≤ 16 bar [≤ 232 psi] | ≤ 80 °C [≤ 176 °F] | ≥ 750 kg/m ³ [46.8 lbs/ft ³] | Buna / NBR |
|  | Sphere ³⁾ | 52 mm [2.0 in] | 52 mm [2.0 in] | ≤ 40 bar [≤ 580 psi] | ≤ 120 °C [≤ 248 °F] | ≥ 750 kg/m ³ [46.8 lbs/ft ³] | 1.4571 (316Ti) |


1) Not with process connection G 1


2) Only with guide tube length ≤ 1,000 mm [39.4 in]

3) Not with process connection G 1, G 1 ½

Connection diagram

| Angular connector DIN 175301-803 A | | | | |
|---|---------------------|-----------|-------------------------------------|-------|
|  | Variable resistance | | Current output, 4 ... 20 mA, 2-wire | |
| | Overall resistance | Pin 2 / 3 | U ₊ | Pin 1 |
| | 100 ... 0 % | Pin 1 / 3 | U ₋ | Pin 2 |
| | 0 ... 100 % | Pin 1 / 2 | | |

| Circular connector M12 x 1 (4-pin) | | | | |
|---|---------------------|-----------|-------------------------------------|-------|
|  | Variable resistance | | Current output, 4 ... 20 mA, 2-wire | |
| | Overall resistance | Pin 3 / 4 | U ₊ | Pin 1 |
| | 100 ... 0 % | Pin 1 / 3 | U ₋ | Pin 4 |
| | 0 ... 100 % | Pin 1 / 4 | | |

| Cable outlet | | | |
|---|---------------------|---------------|--|
|  | Variable resistance | | |
| | Overall resistance | green / white | |
| | 100 ... 0 % | white / brown | |
| | 0 ... 100 % | brown / green | |

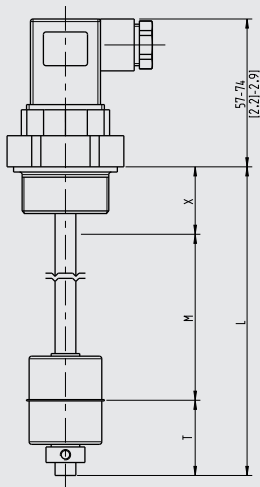
| Aluminium case | | | | |
|---|---------------------|------------------|-------------------------------------|-------------------------|
|  | Variable resistance | | Current output, 4 ... 20 mA, 2-wire | |
| | Overall resistance | Terminal W1 / W3 | U ₊ | Terminal U ₊ |
| | 100 ... 0 % | Terminal W1 / W2 | U ₋ | Terminal U ₋ |
| | 0 ... 100 % | Terminal W2 / W3 | | |

Electrical safety

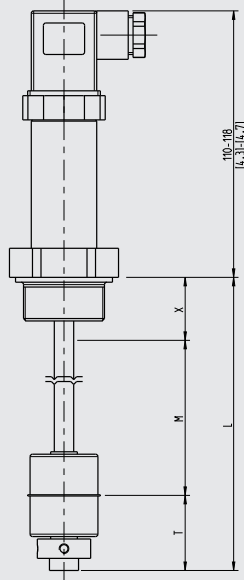
| | |
|-----------------------------|------------|
| Reverse polarity protection | U+ vs. U- |
| Insulation voltage | DC 1,500 V |
| Overvoltage protection | DC 40 V |

Dimensions in mm [in]

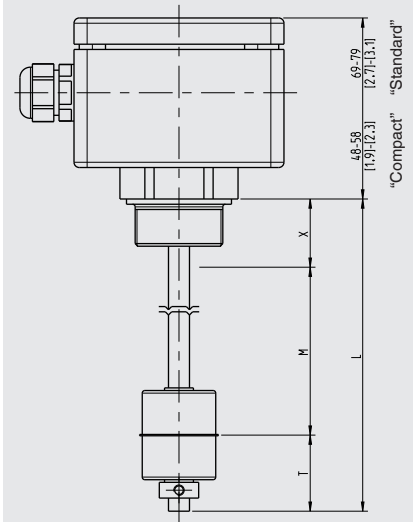
with angular connector form A
Resistance signal



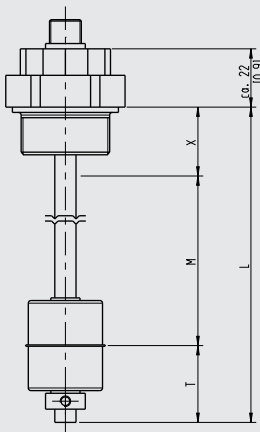
with angular connector form A
Current output 4 ... 20 mA



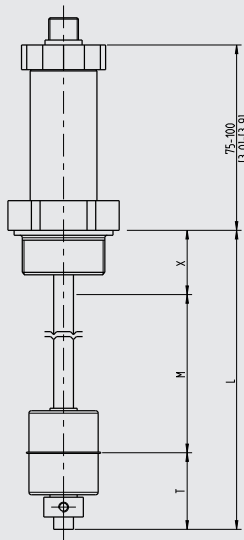
with connection housing



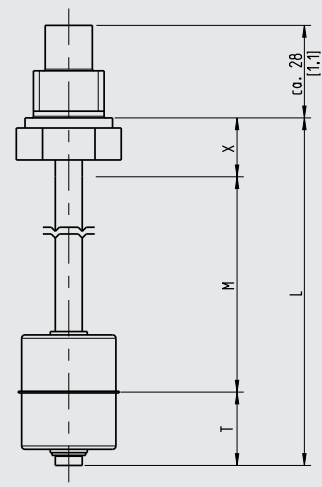
with M12 x 1 circular connector
Resistance signal



with M12 x 1 circular connector
Current output 4 ... 20 mA



with cable outlet
Resistance signal



Legend

- L Guide tube length
- M Measuring range
- X Distance sealing face to 100 % mark
($X \geq$ dead band T in mm [in] (from sealing edge))
- T Dead band (pipe end)

Float stop at guide tube end

- Adjusting collar, for medium temperature $\leq 80\text{ °C}$ [$\leq 176\text{ °F}$]
- Pipe clamp, for medium temperature $> 80\text{ °C}$ [$> 176\text{ °F}$]

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

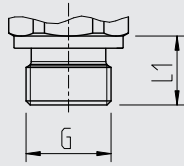
| Process connection | Outer diameter float \varnothing D | | | |
|------------------------------|--------------------------------------|------------------------------|------------------------------|------------------------------|
| | \varnothing 30 mm [1.2 in] | \varnothing 44 mm [1.7 in] | \varnothing 52 mm [2.0 in] | \varnothing 25 mm [1.0 in] |
| G 1 (from outside) | 35 mm [1.4 in] | - | - | - |
| 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 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 T in mm [in] (pipe end)

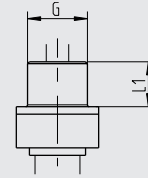
| Dead band | Outer diameter float \varnothing D | | | |
|-----------|--------------------------------------|------------------------------|------------------------------|------------------------------|
| | \varnothing 30 mm [1.2 in] | \varnothing 44 mm [1.7 in] | \varnothing 52 mm [2.0 in] | \varnothing 25 mm [1.0 in] |
| T | 35 mm [1.4 in] | 45 mm [1.8 in] | 45 mm [1.8 in] | 45 mm [1.8 in] |

Process connection

Installation from outside



Installation from inside

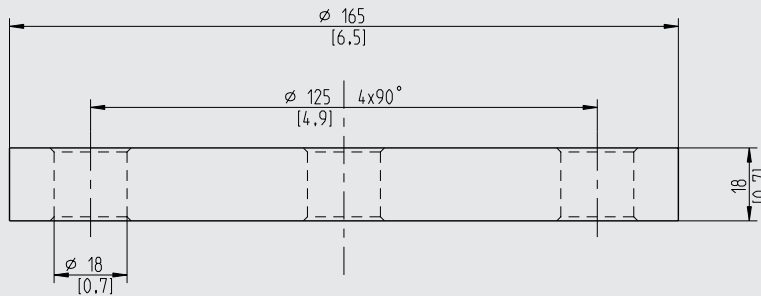


| G | L ₁ | Spanner width |
|-------|-----------------|----------------|
| G 1 | 16 mm [0.63 in] | 41 mm [1.6 in] |
| G 1 ½ | 18 mm [0.71 in] | 30 mm [1.2 in] |
| G 2 | 20 mm [0.79 in] | 36 mm [1.4 in] |

| G | L ₁ | Spanner width |
|-------|-----------------|----------------|
| 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 |
|---|--|----------------|
|  | EU declaration of conformity <ul style="list-style-type: none">■ EMC directive■ EN 61326 emission (group 1, class B) and interference immunity (industrial application)■ RoHS directive | European Union |

Manufacturer's information and certifications

| Logo | Description |
|------|----------------------|
| - | China RoHS directive |

Approvals and certificates, see website

Ordering information

Model / Output signal / Electrical connection / Process connection / Guide tube length L / 100 % mark (optional) / Accuracy, resolution / Medium temperature / Float

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