# Zelio Control measurement and control relays

Liquid level control relays model RM4


**RM4 LG01**

## Functions

These devices monitor the levels of conductive liquids.
They control the actuation of pumps or valves to regulate levels, and are also suitable for protecting submersible pumps against running empty, or protecting tanks from “overflow”. They can also be used to control dosing of liquids in mixing processes and to protect heating elements in the event of non immersion.
They have a transparent, hinged flap on their front face to prevent any accidental alternation of the settings. This flap can be directly sealed.

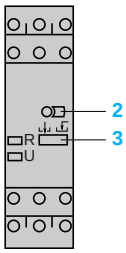
- **Compatible liquids**:
  - spring, town, industrial and sea water,
  - metallic, acid or basic salt solutions,
  - liquid fertilizers,
  - non concentrated alcohol (< 40 %),
  - liquids in the food processing industry: milk, beer, coffee, etc.

- **Non-compatible liquids**:
  - chemically pure water,
  - fuels, liquid gasses (inflammable),
  - oil, concentrated alcohol (> 40 %),
  - ethylene, glycol, paraffin, varnish and paints.

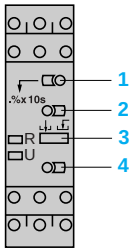

**RM4 LA32**

## Description

**RM4 LG01**
Width 22.5 mm




**RM4 LA32**
Width 22.5 mm




**1** Fine adjustment of time delay (as % of maximum value of setting range).

**2** Fine adjustment of response sensitivity (as % of maximum value of setting range).

**3** Function selector switch:
- empty ⌊↓⌋ or fill ⌈↓⌉.

**4** Switch combining:
- selection of the response sensitivity range,
- selection of time delay on energisation ⊠ or on de-energisation ■ of the relay.

**R** Yellow LED: indicates relay state.
**U** Green LED: indicates that supply to the RM4 is on.

**Table showing details for switch 4**

| Switch position | Time delay | Sensitivity |
|---|---|---|
| 500 ⊠ | On-delay | High = 500 kΩ range |
| 500 ■ | Off-delay | High = 500 kΩ range |
| 50 ⊠ | On-delay | Medium = 50 kΩ range |
| 50 ■ | Off-delay | Medium = 50 kΩ range |
| 5 ⊠ | On-delay | Low = 5 kΩ range |
| 5 ■ | Off-delay | Low = 5 kΩ range |

References : page 28475/4
Characteristics : page 28475/4
Dimensions : page 28475/5
Setting-up : page 28475/5

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## Operating principle

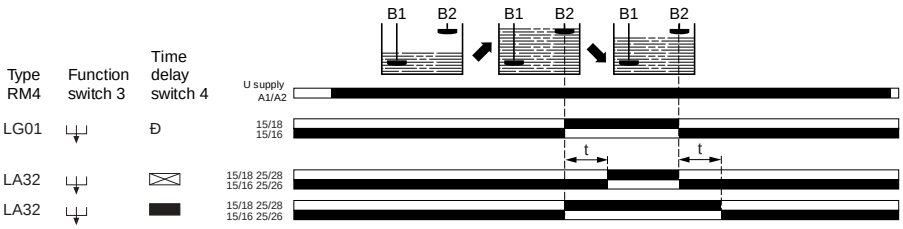
The operating principle is based on a change in the resistance measured between immersed or non immersed electrodes. Low resistance between electrodes: liquid present. High resistance between electrodes: no liquid present. The electrodes may be replaced by other sensors or probes which transmit values representing variations in resistance. The a.c. measuring voltage, which is < 30 V and galvanically insulated from the supply and contact circuits, ensures safe use and the absence of any electrolysis phenomena.

RM4 L relays may be used:
- For detection of a liquid level, operating with 2 electrodes, one reference electrode and one high level electrode, or an LA9 RM201 probe. Example: prevention of tank overflow.
- For regulating a liquid level between a minimum and a maximum level, operating with 3 electrodes, or an LA9 RM201 probe. Example: water tower.

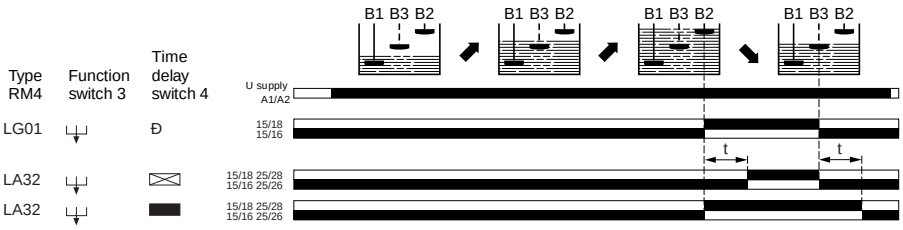
The state of the output relay can be configured:
- Empty function : the output relay is energised when high level electrode B2 is immersed and is de-energised when low level electrode B3 is “dry” (1).
- Fill function : the output relay is energised when the low level electrode is “dry” and is de-energised when the high level electrode is immersed (1).

On model RM4 LA32, a time delay can be set on energisation or de-energisation of the output relay in order to raise the maximum level (function ) or to lower the minimum level (function ).
This function also makes it possible to avoid pulsing of the output relay (wave effect) when operating with 2 electrodes.

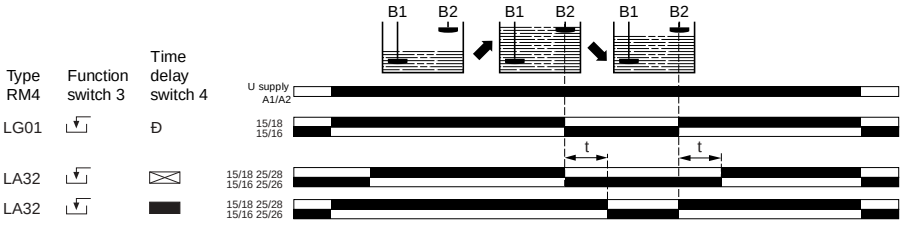
**Empty function, maximum level detection (2 electrodes or 1 probe LA9 RM201)**



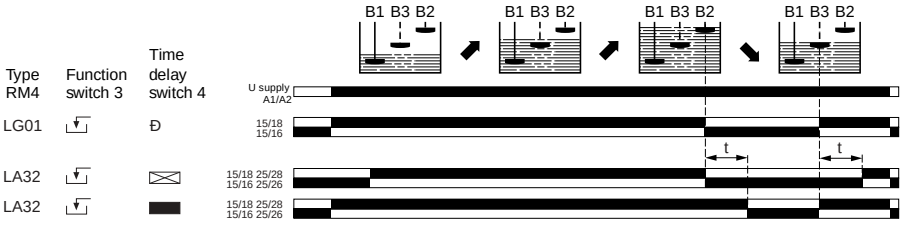

**Empty function, regulation between a maximum and a minimum level (3 electrodes or 2 probes LA9 RM201)**




**Fill function, maximum level detection (2 electrodes or 1 probe LA9 RM201)**




**Empty function, regulation between a maximum and a minimum level (3 electrodes or 2 probes LA9 RM201)**




B1: reference electrode B2: high level electrode B3: low level electrode

(1) When operating with 2 electrodes, the high level electrode performs both high and low level functions.

References : page 28475/4 Characteristics : page 28475/4 Dimensions, schemes : page 28475/5 Setting-up : page 28475/5

# Zelio Control measurement and control relays

Liquid level control relays model RM4

## References


**RM4 LG01**


**RM4 LA32**


**LA9 RM201**

**Liquid level control relays**

| Time delay | Sensitivity scale | Width | Output relay | Basic reference Complete with code indicating the voltage (1) | Weight |
|---|---|---|---|---|---|
| | **kΩ** | **mm** | | | kg |
| **None** | 5...100 | 22.5 | 1 C/O | **RM4 LG01●** | 0.165 |
| **Adjustable 0.1...10 s** | 0.25 ...5<br>2.5 ...50<br>25 ...500 | 22.5 | 2 C/O | **RM4 LA32●●** | 0.165 |

**Liquid level control probe**

| Type of installation | Maximum operating temperature | Reference | Weight |
|---|---|---|---|
| | **°C** | | kg |
| **Suspended by cable** | 100 | **LA9 RM201** | 0.100 |

(1) Standard supply voltages

| | | | | | | |
|---|---|---|---|---|---|---|
| **RM4-LG01** | Volts | | **24** | **110...130** | **220...240** | **380...415** |
| | ∿ 50/60 Hz | | B | F | M | Q |
| **RM4-LA32** | Volts | **24...240** | **24** | **110...130** | **220...240** | **380...415** |
| | ∿ 50/60 Hz | MW | B | F | M | Q |
| | ⎓ | MW | – | – | – | – |

## Power supply circuit characteristics

| **Type of relay** | | | **RM4 LG01** | | | | **RM4 LA32** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rated supply voltage** (Un) | ∿ 50/60 Hz | **V** | 24 | 110...130 | 220...240 | 380...415 | 24…240 | 24 | 110...130 | 220...240 | 380...415 |
| | ⎓ | **V** | – | – | – | – | 24…240 | – | – | – | – |
| **Average consumption at Un** | ∿ | **VA** | 1.9 | 2.6 | 2.4 | 2.9 | 2.7 | 3.1 | 2.7 | 2.6 | 3.4 |
| | ⎓ | **W** | – | – | – | – | 2.4 | – | – | – | – |

## Output relay and operating characteristics

| | | | |
|---|---|---|---|
| **Number of C/O contacts** | | 1 | 2 |
| **Output relay state** | | Can be configured by swich: empty ⊣/fill ⊢ | |

## Electrode circuit characteristics (2)

| | | | | | |
|---|---|---|---|---|---|
| **Sensitivity scale** | **kΩ** | 5...100 (adjustable) | 0.25...5 | 2.5...50 | 25...500 |
| **Maximum a.c electrode voltage** (peak to peak) | **V** | 24 | 24 | | |
| **Maximum current in the electrodes** | **mA** | 1 | 1 | 1 | 1 |
| **Maximum cable capacity** | **nF** | 10 | 200 | 25 | 4 |
| **Maximum cable length** | **m** | 100 | 1000 | 100 | 20 |

(2) The electrodes may also be incorporated in the probes. The probes are normally designed for fixing to a tank by means of a bracket with a seal (closed tanks) or suspended by their own electrical connecting cable (boreholes, etc.). See page 28475/5 “Setting-up” Probe LA9 RM201.

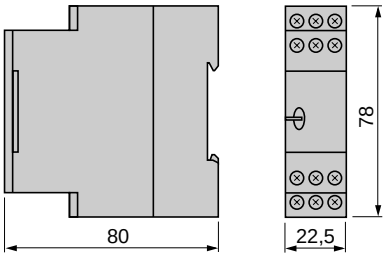
**Presentation : pages 28475/2 and**
**28475/3 Setting-up :**
**page 28475/5**

*Dimensions, schemes, setting-up*

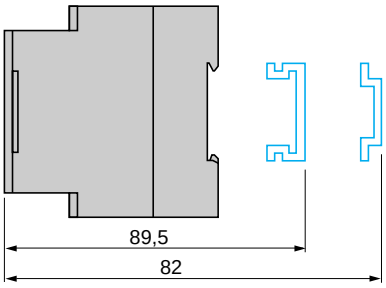
# Zelio Control measurement and control relays

Liquide level control relays

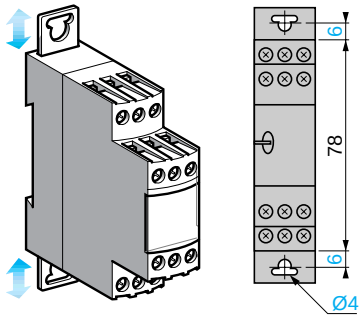
**Dimensions**
**RM4 LG01, LA32**



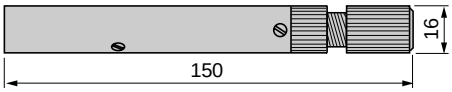

**Rail mounting**



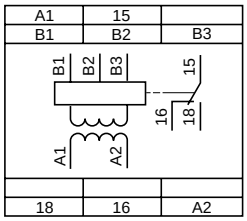

**Screw fixing**



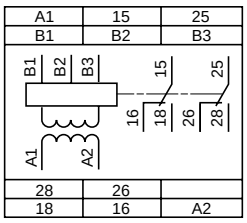

**Probe LA9 RM201**




**Schemes, connection**
**RM4 LG01**




**RM4 LA32**

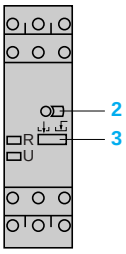



| | |
|---|---|
| **A1-A2** | Supply voltage |
| **B1, B2, B3** | Electrodes (see table opposite) |
| **15-18** | 1st C/O contact |
| **15-16** | of the output relay |
| **25-28** | 2nd C/O contact |
| **25-26** | of th output relay |

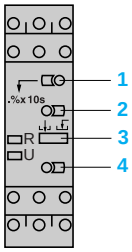
**Electrodes and level controlled**

| | |
|---|---|
| **B1** | Reference or tank earth electrode |
| **B2** | High level |
| **B3** | Low level |

**Setting-up**



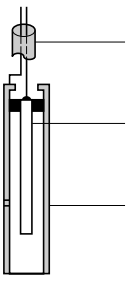

**RM4 LG01**




**RM4 LA32**

- Select the empty /fill function according to the sequence to be performed.
- If necessary, set potentiometer **1** to minimum (time delay).
- Set potentiometer **2** to minimum; on RM4 LA select the lowest sensitivity range using potentiometer **4** (5 or 5 ).
- With all the electrodes immersed, turn the sensitivity potentiometer towards maximum until the relay is energised ( function) or de-energised ( function), then exceed the threshold by about 10 % to compensate for variation in the supply voltage.
  If the relay is not able to energise, a higher sensitivity scale must be used (selector **4** on RM4-LA32) or relay RM4 LG must be replaced by an RM4 LA32 relay and the adjustment procedure must be started again.
- Then check that the relay de-energises ( function) or energises ( function) as soon as electrodes B3 and B2 are out of the liquid. If the relay does not de-energise, select a lower sensitivity scale.
- The electrode connection point must be protected against corrosion by sticking or sealing. In areas where thunderstorms are likely to occur, measures must also be taken to protect the electrode lines.

**Note:** the high level can be raised by means of the adjustable time delay from 0.1 to 10 seconds with function .
The low level can be lowered by means of this same time delay with function .



**LA9 RM201**

2-conductor cable in cylindre sheath (max.∅ 6.3 mm)

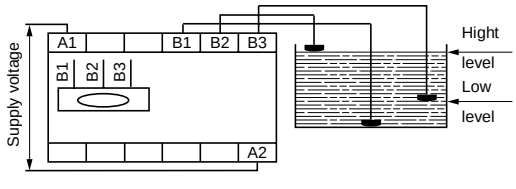
Level electrode

Reference electrode (skirt)

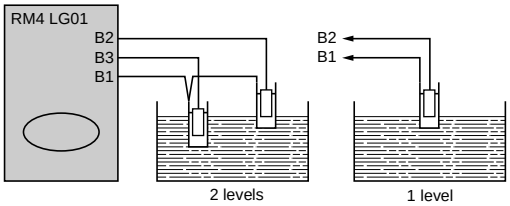
**Probe LA9 RM201**

This probe is of the “suspended” type. It is coaxial, i.e. in addition to the normal (central) electrode, the stainless steel skirt can also act as earth (reference) electrode, which means that there is no need to install a separate reference probe. In this way, for controlling one level, only one probe is required instead of 2; for controlling 2 levels, only 2 probes are required instead of 3.
The connecting cable must be of the “2-conductor” type, with common cylindrical PVC sheath, having a maximum diameter of 6.3 mm. The skirt also acts as a ”calming chamber”, so avoiding inaccuracy due to an agitated surface of the liquid (waves).
Maximum operating temperature: 100 °C.
Probe LA9 RM201 can also be fixed on various containers (cisterns, tanks,...) by means of a bracket or other suitable fixing device.

**Connection examples**
**Control by electrodes**




**Control by probes**





Presentation : pages 28475/2 and
28475/3 References :
page 28475/4 Characteristics :
page 28475/4