Measurement and control relays - Zelio Control

Industrial relays

Liquid level control relays RM4 L

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 avoid any accidental alteration of the settings. This flap can be directly sealed.

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

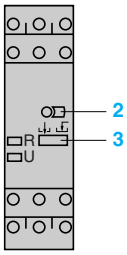
■ **Non-compatible liquids**:
- chemically pure water,
- fuels, liquid gasses (inflammable),
- oil, concentrated alcohol (> 40 %),
- ethylene, glycol, paraffin, varnish and paints.

RM4 LA32

Description

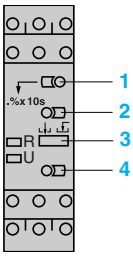
RM4 LG01

Width 22.5 mm



RM4 LA32

Width 22.5 mm



1 Fine adjustment of time delay (as % of setting range max. value).
2 Fine adjustment of response sensitivity (as % of setting range max. value).
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

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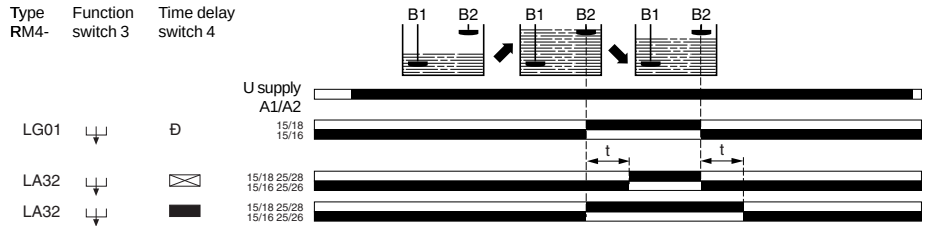
Operating principle

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 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, one reference electrode, one low level electrode and one high level electrode, or two LA9 RM201 probes.
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 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 .

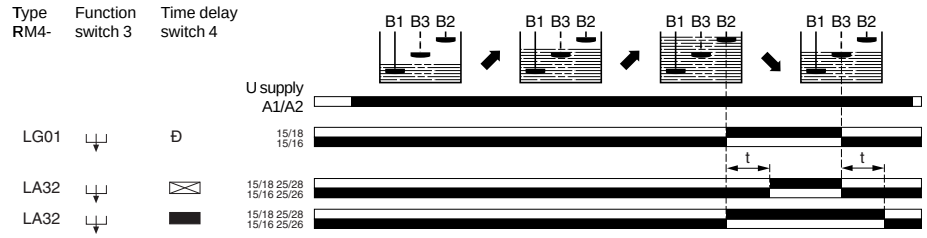
Function diagrams

■ **Empty function**

□ Maximum level detection (2 electrodes or 1 probe LA9 RM201)

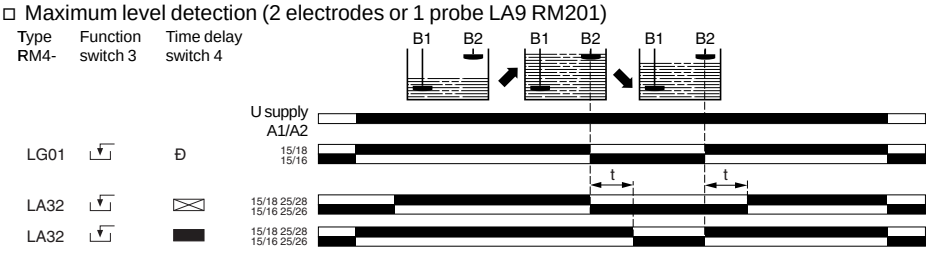


□ Regulation between a maximum and a minimum level (3 electrodes or 2 probes LA9 RM201)

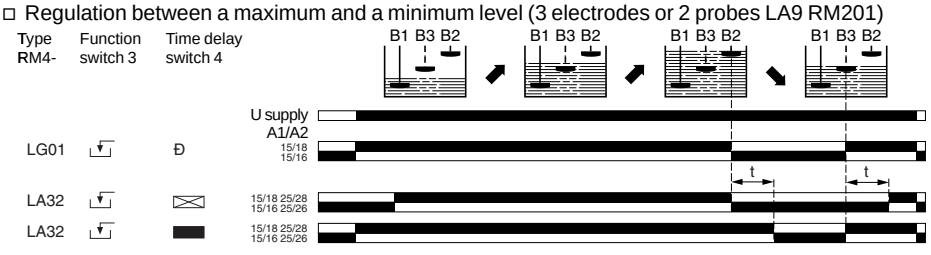


■ **Full function**

□ Maximum level detection (2 electrodes or 1 probe LA9 RM201)



□ 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.

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RM4 LG01

RM4 LA32

LA9 RM201

Liquid level control relays

Time delay	Sensitivity scale	Width	Output relay	Basic reference, to be completed by adding the voltage code *(1)*	Weight
	kΩ	mm			kg
Without	5…100	22.5	1 C/O	**RM4 LG01●**	0.165
Adjustable 0.1...10 s	0.25 ...5 2.5 ...50 25 ...500	22.5	2 C/O	**RM4 LA32●●**	0.165

Level control probe for liquid

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	–	–	–	–

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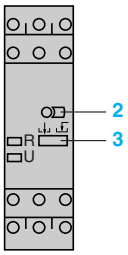
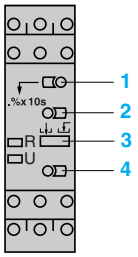
Setting-up

■ 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.



RM4 LG01

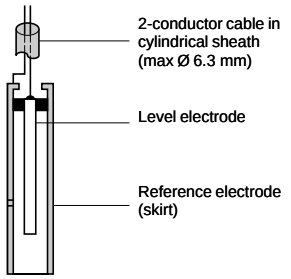


RM4 LA32

■ 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 .

Probe LA9 RM201

This probe is of the “suspension” 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.

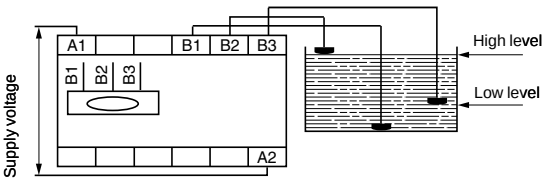
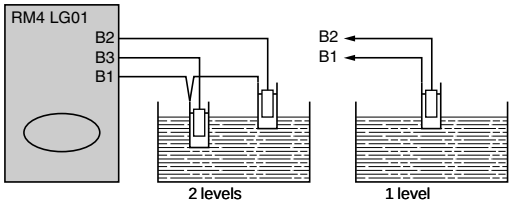


LA9 RM201

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**