Resistive level controller
ES2001

SAFETY INSTRUCTIONS

- Installation, initial start-up and maintenance may only be performed by trained personnel.
- The device may only be connected to supply power which complies with the specifications included in the technical data and on the serial plate (observe polarity for DC).
- The device must be disconnected from all sources of power during installation and maintenance work.
- The device may only be operated under the conditions specified in the operating instructions.

DESCRIPTION

The ES2001 resistive level controller is used as level limit switch for conductive liquids.
Its operating principle is based on the electrical conductivity of the liquid; The liquid provides an electrical bridge between the immersed electrodes.
The response sensitivity for a specific liquid is set (potentiometer) from 1 to 150 kΩ
The hysteresis between switching the output relay on and off is approx. 20% of the set value.
Such a hysteresis makes it possible to avoid faulty control due to a leakage current caused by a mist, foam or condensed vapours.
With the help of timer, the control/detection can be set as simply as possible and unwanted triggering due to waves can be avoided.
One relay per switching point is required for a limit value detection.

Application limits:
Conductive level controls are not suitable for liquids that contain oil or grease or where electrically insulating deposits can form.

Control:
Interval switching (Min./ Max. levels) with three electrodes; Monitoring of 1 level point (overflow / dry run alarm) with 2 electrodes; Metalic containers can be used as the reference electrode.

TECHNICAL DATA

Power supply	230, 115, 48, 24 V ±10% AC 50/60 Hz; 24, 12 V DC
Connected load	≤ 2 VA
Relay output	2 changeover contacts, potential-free AC: Max. 250 V, 5 A, 500 VA DC: Max. 125 V, 1 A, 40 W
Measuring circuit	Galvanically isolated, AC voltage < 6 V / < 2 mA
Hysteresis	About 20% of the set sensitivity value
Response sensitivity	2 adjustable ranges 1 to 70 kΩ & 5 to 150 kΩ
Working principle	Open / Closed curent lopp
Delay	ON/OFF delay adjustable: 0.5 to 3 s Adjustment through potentiometer
Ambient temperature	-15 ... +45 °C

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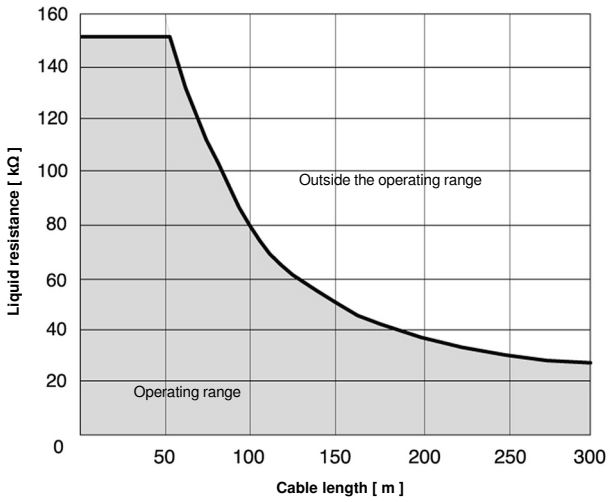
TECHNICAL FEATURES (continuation)

Dimension	22.5 x 75 x 100 mm
Housing	IP40, mounting DIN rail 35x7.5 mm (EN 50 022); Option: IP55 wall-mount cabinet 88x150x130mm
Electrical connections	IP20, screw terminals, cable cross-section max 2.5 mm²
Signalling	1x LED: "Operating" 1x LED: "Status of relay"

EC Conformity: The instrument meets the legal requirements of the current European Directives.

OPERATING RANGE

The capacitive resistance of long cables reduces the sensitivity of the detection.
A standard 3-wire PVC cable has a capacitance of 100 pF/m
The range therefore depends on the liquid resistance and on the cable length between the electrode and the relay ES2001.
This results in an operating range according to the diagram below:



RECOMMENDATIONS FOR THE CABLE

- Use a multi-core cable of 0.5 mm².
- This cable must be separated from other cables.
- Above 25 m length, it is necessary to use a shielded cable.

SETTINGS

The transparent front panel can be removed by levering it out, gently, with a screwdriver.

Sensitivity	Potentiometer P1 and DIP S2 To adaptat the sensitivity to the liquid conductivity.
Note	The poorer the liquid conductivity and greater the distance between electrodes, the higher the response sensitivity must be set.
Caution	An excessive sensitivity leads to faulty triggering.
Open / Closed current loop	DIP S1
Delay	Potentiometer P2: To prevent multiple switching with waves on the liquid surface.

Poti	**Anticlockwise**	**Right stop**
P1 Sensitivity	Minimum	Maximum
P2 Delay	About 0.5 s	About 3 s
DIP switch	**ON**	**OFF**
1	Current in the loop	No current
2	High sensitivity 5 to 150 kΩ	Low sensitivity 1 to 70 kΩ

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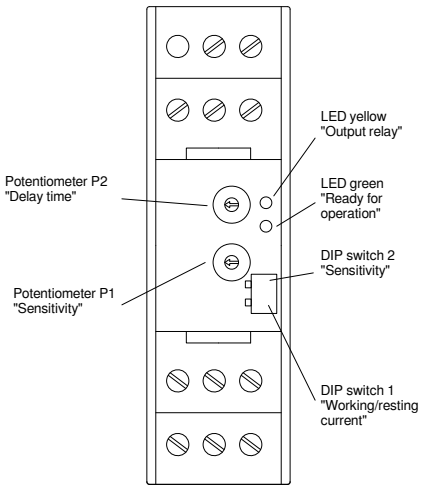
SETTINGS (continuation)

Signalling:

Green LED lights up	Unit ready for operation
Yellow LED lights up	Output relay status is changed



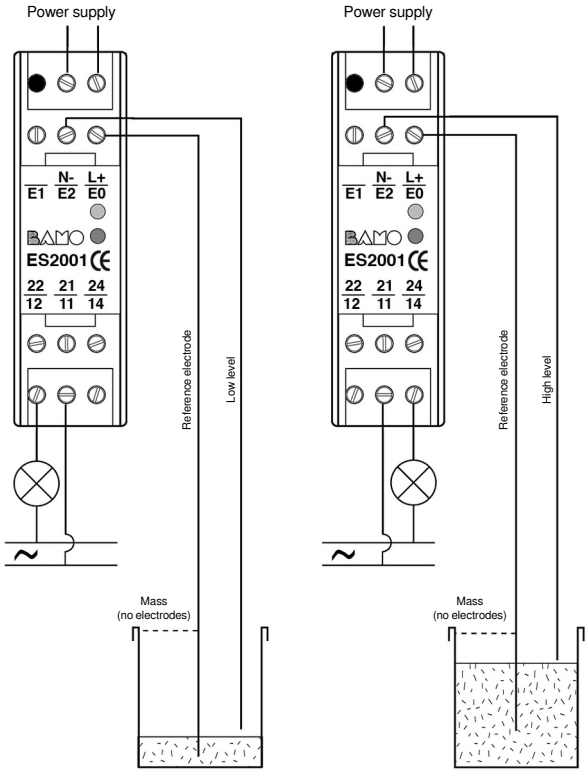
MAINTENANCE

When used as intended, the device is maintenance-free.

ELECTRICAL CONNECTIONS

1/ One trigger point: 2 electrodes

The relay is energised as soon as the liquid forms an electrical bridge between the level electrode and the reference electrode (or metal tank wall).



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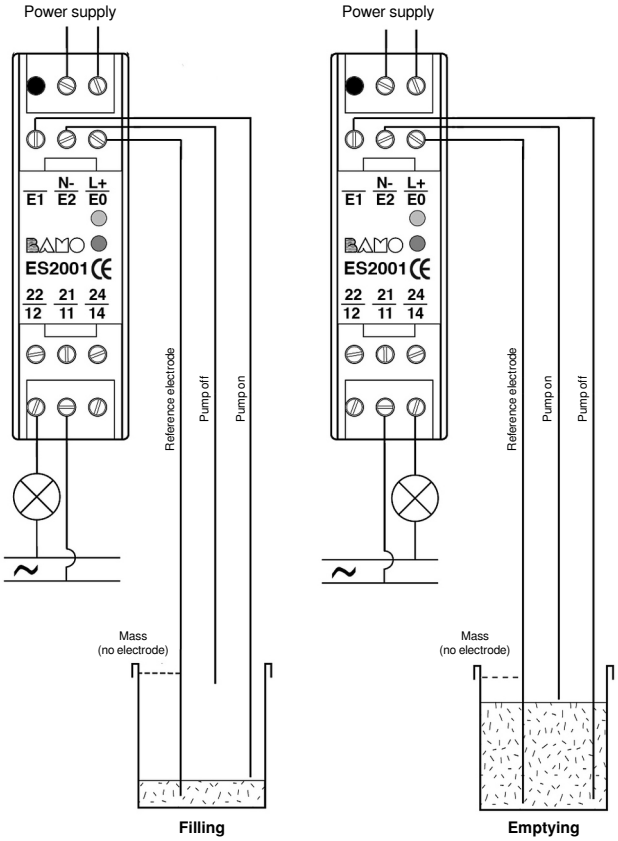
ELECTRICAL CONNECTIONS (continuation)

2/ Automation of filling or draining: 3 electrodes
The self-holding function between two trigger points is carried out via the third electrode.
A diode on the front panel indicates the status of the relay.
It lights up as soon as the relay is energised.



TESTING THE RELAY:
- Disconnect the electrodes from the relay ES2001
- Short circuit E0 and E2 → the relay is activated (alarm function)
- Short circuit in the order E0, E2 and E1 → Enable E2 then E1 (control function)

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