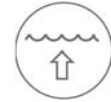


Technical manual BA 0709



Filling level

## SRA – 102

### Filling level limit switch

for conductive filling level supervision  
in electrical conductive liquids

#### Useable

- for filling level resp. limit value detection in liquid container
- as dry run protection for pumps
- for two-position-control in plants

Four different measuring ranges adjustable up to 120k $\Omega$  resp. 8,3 $\mu$ S/cm

On and off switching delays separately adjustable

Different AC and DC supply voltage variants available

**ACS-CONTROL-SYSTEM**  
know how mit system



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## 1. Application

The filling level limit switch **SRA – 102** is used, to evaluate one filling level resp. limit level in electrically conductive liquids with a conductivity of minimum 8,3µS/cm resp. a resistance of maximum 120kΩ.

## 2. Function

### Measuring principle

The signal circuit of the filling level limit switch is connected to the reference electrode or the metallic wall of the container resp. pipe and to the measuring electrode.

The alternating voltage, that is generated by the integrated electronic is then applied either between the electrode rods or between the electrode rods and the metallic wall of the container resp. pipe that is connected to the metallic process connection, realizing the reference electrode.

Due to the use of a alternating voltage the corrosion at the electrode rod and the electrolytic decomposition of the filling liquid is avoided.

As soon as the electrically conductive liquid makes a connection between the electrodes resp. between the electrode and the metallic wall of the container resp. pipe, an alternating current flows, that causes a decrease of the alternating voltage.

### Signal evaluation

An evaluation circuit supervises this alternating voltage. A voltage drop is detected and the evaluation circuit switches the relay, depending on the set safety function.

The switching state of the relays is indicated at the front side of the device by a red LED.

### Switching delay

In some applications it is necessary to compensate heavy signal fluctuations that may be produced by mixing machines or at fill-in resp. emptying of containers, to avoid spurious switching actions.

Two potentiometers at the front side of the device allows the separate adjustment of a on and off switching delay time from 0,1...20 s. Thus simple start-up resp. adaptive scanings can be realized.

### Sensitivity range

For the adjustment of the response threshold to the conductivity of the liquid the four resistance ranges 0,1...1,5 kΩ resp. 0,5...6 kΩ resp. 1,5...20 kΩ resp. 10...120 kΩ are available.

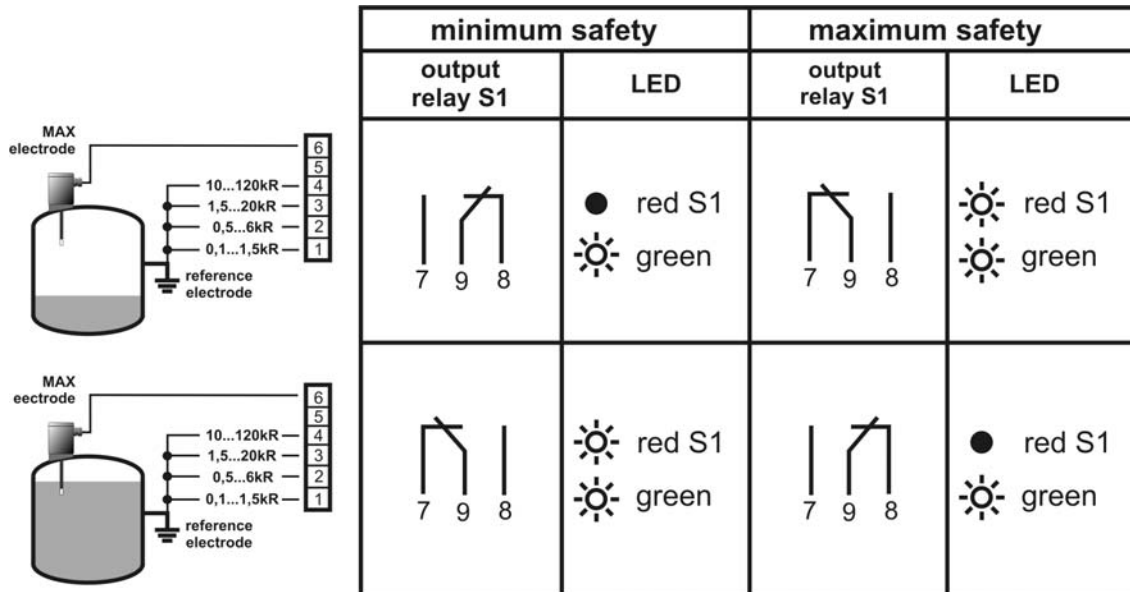
The selection of the range is made by the connection of the reference electrode to four different terminals. Within the configured range a fine adjustment can be carried out by a trimmer at the front side of the device.

Due to the fine adjustable ranges a distinction between liquid and foam is possible.

### Safety function

The safety function defines the operation principle of the output relay

- Maximum safety: The relay switches off, if the switching level is transgressed (liquid connection between measuring and reference electrode), an error occurs or the power supply fails.
- Minimum safety: The relay switches off, if the switching level is underrun (no liquid connection between measuring and reference electrode), an error occurs or the power supply fails.



The selection of the safety function is carried out by a switch at the bottom side of the filling level limit switch.

### Two-position-control Δs (pump control)

#### Two-position-control with minimum safety

filling level	output relay S1	LED	
		green	red S1
		☀	●
		☀	●
		☀	☀
		☀	☀
		☀	●

#### Two-position-control with maximum safety

filling level	output relay S1	LED	
		green	red S1
		☀	☀
		☀	☀
		☀	●
		☀	●
		☀	☀

### 3. Safety notes

Each person that is engaged with inauguration and operation of this device, must have read and understood this technical manual and especially the safety notes.



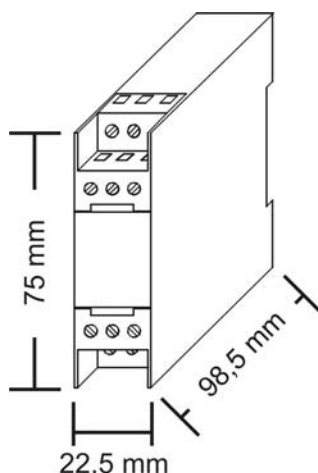
Installation, electrical connection, inauguration and operation of the device must be made by a qualified employee according to the informations in this technical manual and the relevant standards and rules.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The device meets the legal requirements of all relevant EC directives. **CE**

### 4. Installation

The device is conceived for vertical installation on a standard fastening rail acc. to DIN EN 60715 TH 35-7,5 resp. TH35-15.



The device must be installed protected against dust and humidity, e.g. in control stations or in a suitable protection housing with a minimum protection classification IP55 acc. to DIN EN 60529.

The devices must be installed weather and stroke protected, ideally at places without direct solar radiation. This is especially important in warm climatic regions.

### 5. Maintenance

The device is free of maintenance.

### 6. Repair

A repair may only be carried out by the manufacturer. When sending back the device, add a note with the description of the error and the application.

## 7. Electrical connection

The electrical connection of the device must be carried out according to the respective country specific standards. Incorrect installation or adjustment could cause applicationally conditioned risks.

Power supply input, measuring input and relay output channel are safe galvanically isolated from each other.

### Connection of the signaling transmitter resp. measuring transducer – measuring input

For the two or three-wire connection cable between the filling level limit switch and the signaling transmitter resp. measuring transducer a standard installation cable or multi-wire cable for measuring intends with a maximum of 25 Ω per wire can be used.

The use of a shielded signal cable is not required in principle, but is recommended, if strong electromagnetic influences could happens, e.g. due to machines or radio equipment. In that case the shielding of the cable should be connected to earth only at the side of signaling transmitter resp. measuring transducer. The signal cable should be installed separated from power leading wires.

If multiple limit levels with the same reference potential should be evaluated, several filling level limit switches could be connected in parallel. For this purpose only the reference connection of all devices must be connected with each other (see scheme below - right).

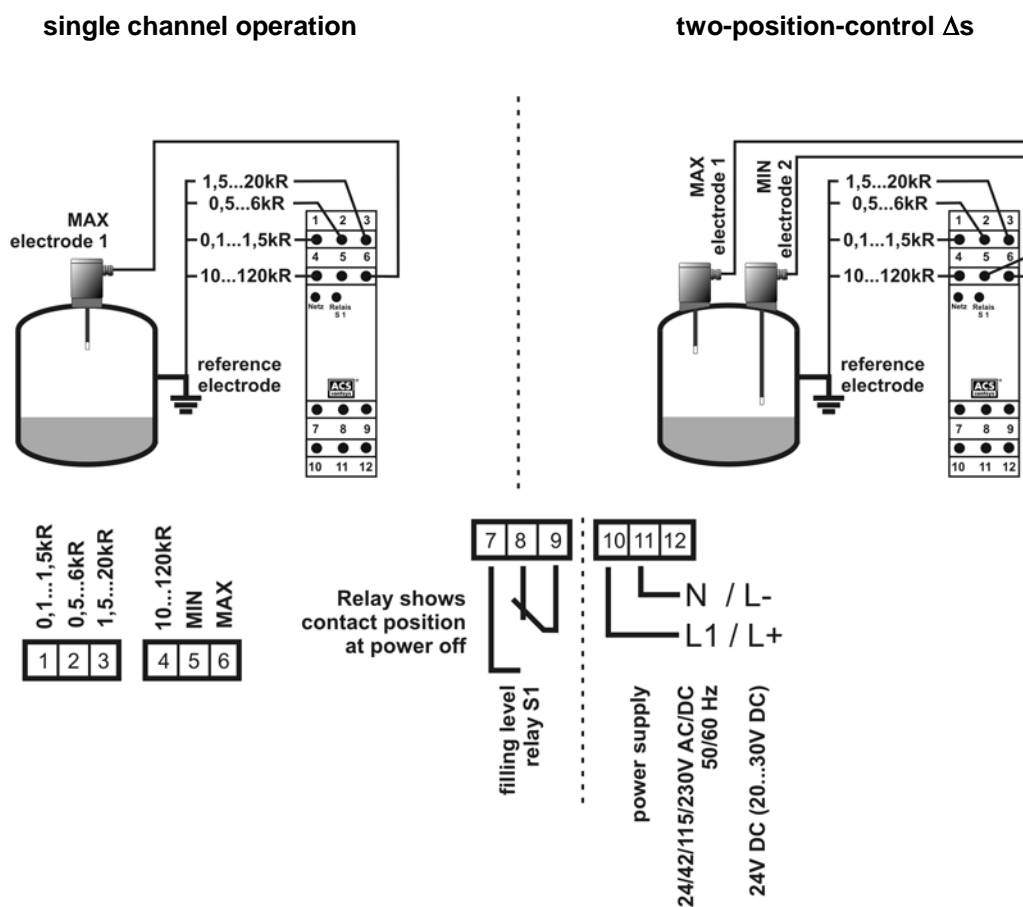
### Connection of the signaling and control equipments – relay output

Inductive loads at the relay contacts, e.g. auxiliary contactors or magnetic vents may only be used with a free-wheeling diode or a RC protection circuit to avoid high voltage peaks.

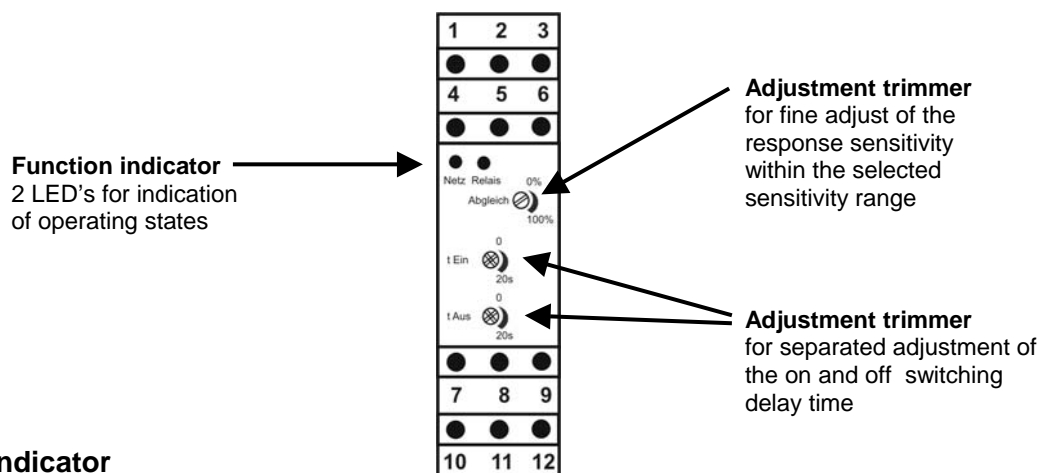
For inauguration it is suggested, to deactivate all connected control devices, to avoid unwanted control reactions.

### Connection of the power supply voltage

A switch, that is marked as separator as well as a over current protection switch (nominal current ≤ 10 A) must be installed near the device into the supply lead.



## 8. Operation



### Function indicator

- Netz → green LED → ready status, power supply voltage on
- Relais → red LED → output relay S1 switched on

### Adjustment trimmer

For fine adjustment of the response sensitivity within the sensitivity range, that is selected by the connection of the reference electrode to the respective terminal.

A turn to the right leads to a switching reaction at a higher liquid resistance.

For adjustment proceed like follows:

- Liquid must create an electrically conductive connection between measuring and reference electrode of the connected measuring transducer
- Select sensitivity range by connection of the reference electrode to the respective terminal
- Turn adjustment trimmer to the left (counterclockwise), till the output relays switches off
- Turn adjustment trimmer to the right (clockwise), till the output relay switches on
- Turn adjustment trimmer by an additional half turn to the right (clockwise)

### Configuration switches – safety function

At the bottom side of the device, the switch for the selection of the safety function is positioned.

- Maximum safety = slide switch left towards front side of the device
- Minimum safety = slide switch right towards back side (fastening rail) of the device



## 9. Technical data

### Auxiliary power supply

Permitted supply voltage:	24 / 42 / 115 / 230 V AC 48...62 Hz 24 V DC (20...30V DC)	reverse polarity protected
Power consumption:	≤ 3,5 VA / 2 W	
Overvoltage category:	II acc. to DIN EN 61010-1	
Protection classification:	II double or reinforced insulation	
Isolation voltage:	1kV~ Auxiliary power to relay outputs to signal inputs	
Galvanic isolation:	All supply, input and output channels among each other are safe galvanically isolated.	

### Relay output

Function:	1x potential-free changeover contact
Switching power of the contacts:	

at U~	maximum I~	maximum P~
30 V	2 A	62,5 VA
250 V	0,3 A	62,5 VA
at U-	maximum I-	maximum P-
30 V	2 A	60 W
220 V	0,3 A	60 W

Switching cycles:	≥ 100.000 switching cycles at maximum contact load
On switching delay:	0,1...20 seconds
Off switching delay:	0,1...20 seconds

### Signal input

Level transducer:	One resp. two filling level electrodes with common reference electrode
Supply voltage:	≤ ± 10 V (100 Hz ± 15 Hz)
Supply current:	≤ ± 1,5 mA
Measuring range:	0,1...1,5 kΩ / 0,5...6 kΩ / 1,5...20 kΩ / 10...120 kΩ

### Materials

Connection housing:	PC – polycarbonate
Terminal housing:	PC – polycarbonate
Sticker:	PE – polyester

### Connection terminals

Number:	4 terminal blocks with each 4 terminals, everlasting screws
Connection cross-section:	maximum 1 x 2,5 mm or 2 x 1,5 mm

### Housing style

Housing:	Series installation housing, 22,5mm wide
Weight:	160 g

### Environmental conditions

Environmental temperature:	– 20°C...+70°C		
Climatic classification:	3K3 resp. 3M2	DIN EN 60721-3-3	
Protection classification:	IP20	DIN EN 60529	
EM – compatibility:	Emission	DIN EN 61326-1	operation device class B
	Immunity	DIN EN 61326-1	industrial range