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Operating Manual NS43V

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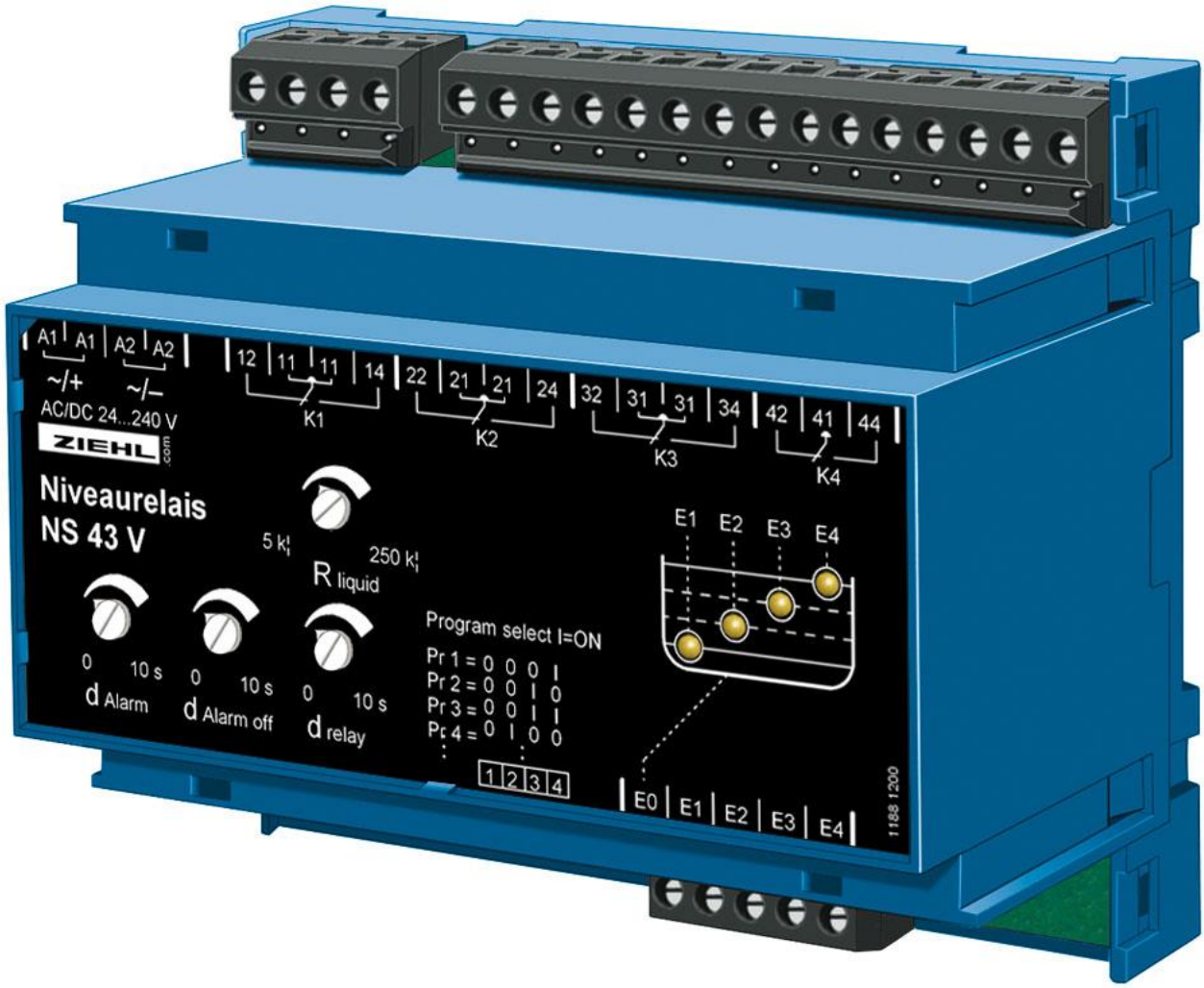
For more information and help about this product please scan the QR-Code or choose the following link: NS43V

Operating manual, Quick guide, Datasheet, Connection diagram, CAD Data
Firmwareupdates, FAQ, Videos about installation and settings, Certificates

- Level relay



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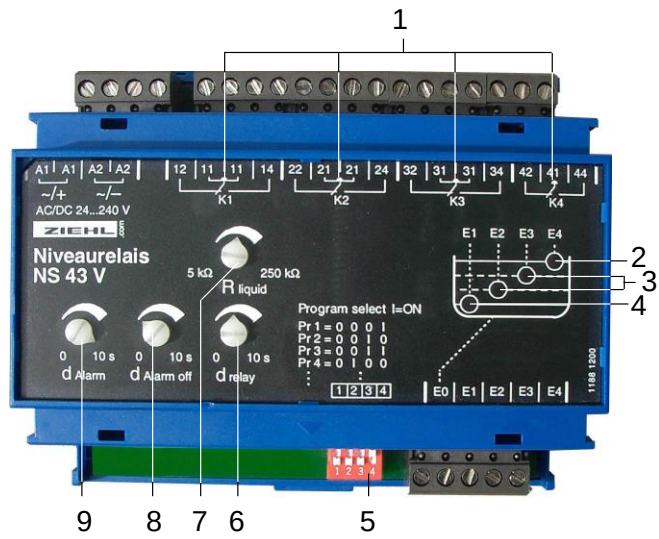
1 General Notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, commissioning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

2 Display and controls



1. K1 – K4 lights up yellow when the associated relay is energized.
2. E4 lights up red when message overflow
3.
4. E4 lights up yellow when the associated electrode is immersed and the liquid resistance is less than the set value Rliquid
5. E2 – E3 lights up yellow when the associated electrode is immersed and the liquid resistance is less than the set value RLiquid
6. E1 lights up red when dry run is reported
7.
8. E4 lights up yellow when the associated electrode is immersed and the liquid resistance is less than the set value Rliquid
9. four-pole DIP switch for selecting the desired program (Pr1...Pr6)
10. Potentiometer for setting the relay delay time (0…10s)
11. Potentiometer for adjusting the sound threshold to the conductivity of the liquid in the range of 5kΩ...250kΩ
12. Potentiometer for setting the alarm reset delay time (0...10s)
13. Potentiometer for setting the alarm trip delay time (0…10s)

3 Application and short description

The NS43V level relay is an electronic device for monitoring levels in conductive liquids. The monitoring is carried out via electrodes which are immersed or not depending on the liquid level. A satisfactory level detection of up to 250kΩ liquid resistance between the electrodes makes it possible to monitor all conductive liquids, but preferably water at various hardness levels. For adaptation to the conductivity of the liquid, the switching threshold can be set in the range of 5kΩ ... 250kΩ. Thus, for example, it is possible to distinguish between the liquid itself and foam above it.
The NS protects aggregates and systems from leakage damage, from unnecessary loss of liquids and from dry run and overflow. It controls and monitors liquid levels in wastewater engineering, swimming pools, fish farming and wherever a specific level needs to be maintained.
Depending on the application and the set program, it regulates the liquid level between 2 or 3 electrodes by controlling the inlet and outlet of the container. The uppermost and the lowermost electrodes protect aggregates and equipment's from dry run and overflow.
Since a pure AC measuring path is used, electrolytic decomposition of the stainless steel electrodes, as well as oxyhydrogen gas formation, are excluded.
The universal control voltage AC/DC 24-240V enables the supply from all common power networks. The electrical isolation to the control voltage reliably prevents malfunctions due to accidental energization even with DC control voltages.

4 Overview of functions

- Monitoring of up to 4 levels
- 4 output relays each 1 changeover contact
- Response threshold adjustable 5...250kΩ
- Response delay for relay adjustable 0...10s
- Switch-on and switch-off delay for alarms adjustable 0...10s
- Basic programs (adjustable with DIP switches) for various applications
- Universal control voltage AC/DC 24-240V
- Pluggable connection terminals
- Distributor housing 6 TE, installation depth 55 mm

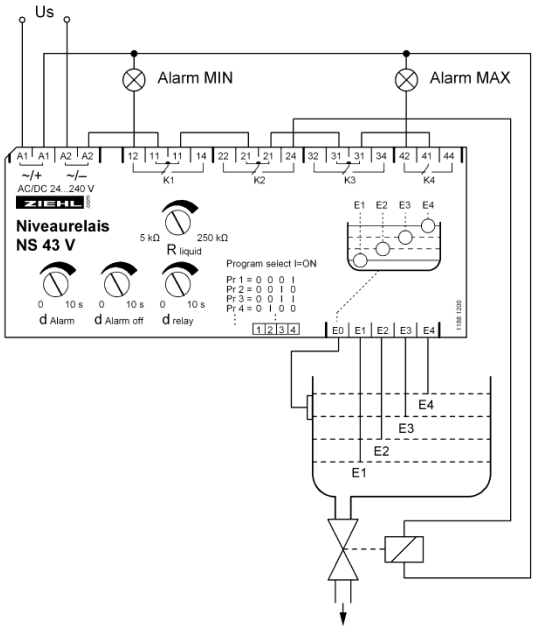
5 Connecting diagram and Function Chart

Pr 1: Inflow or outflow

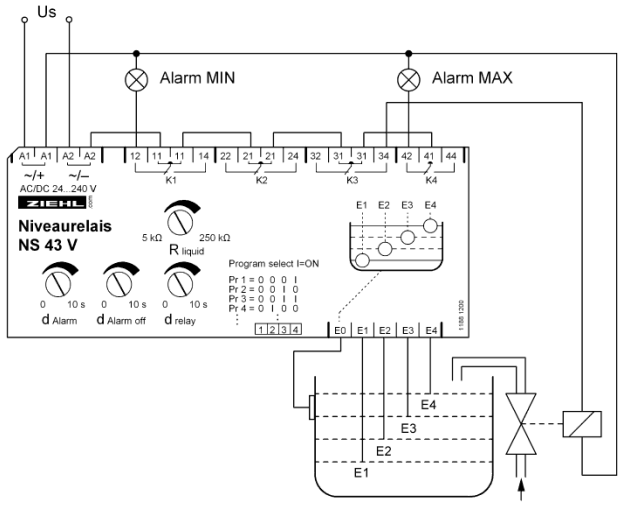
The program Pr 1 controls the inflow **or** outflow and reports the overflow and dry run.
The level is regulated between the electrodes E2 and E3.
In the case of outflow control, the valve is controlled by relay K2.
In the case of inflow control, the valve is controlled by relay K3.
The relay K1 de-energizes when the level falls below the electrode E1.
The relay K4 de-energizes when the level rises above the electrode E4.

connection plan:

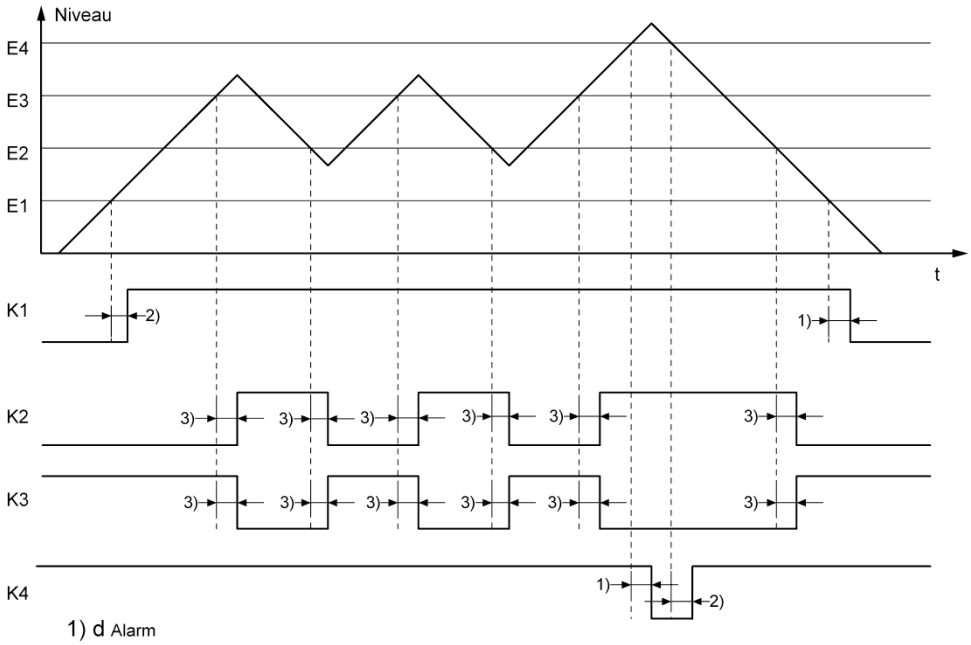
flow control:



inflow control:



Function:

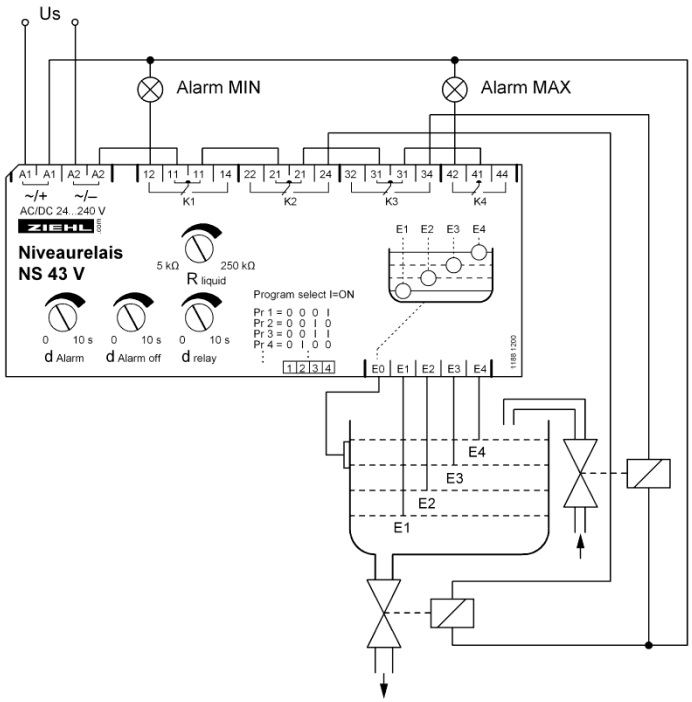


1) d Alarm
2) d Alarm off
3) d relay

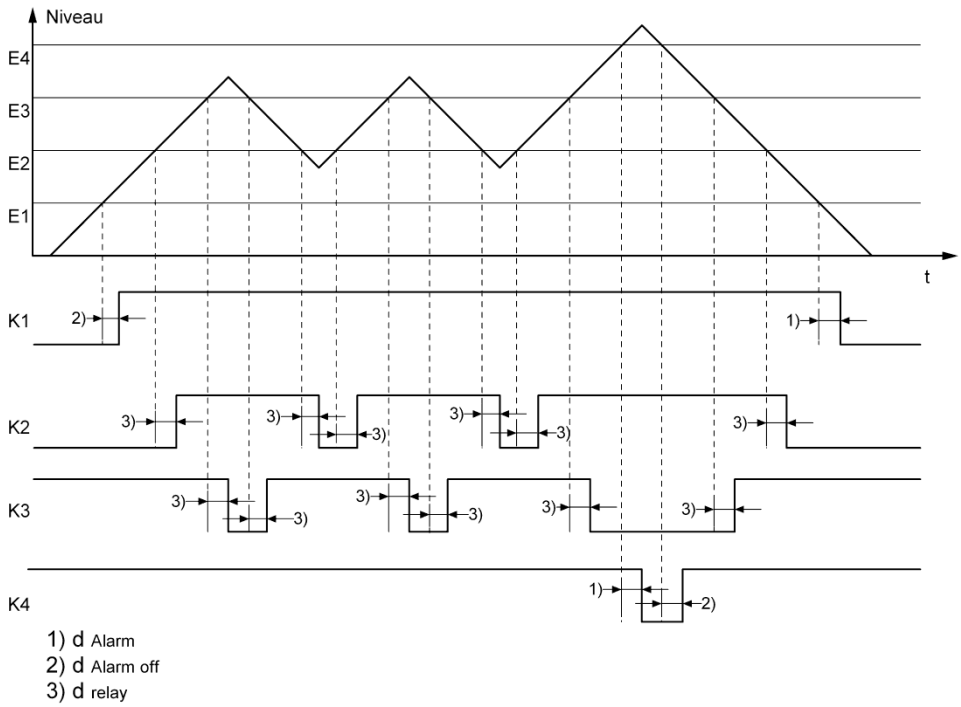
Pr 2: Inflow and outflow between 2 electrodes

The program Pr 2 controls the inflow **and** outflow and reports the dry run and the overflow. The level is regulated between the electrodes E2 and E3.
The outflow valve is controlled by relay K2.
The inflow valve is controlled by relay K3.
If the inflow quantity is greater than the outflow quantity, the level around the electrode E3 will be adjusted. If the inflow quantity is smaller than the outflow quantity, the level around the electrode E2 will be adjusted. In order to avoid a continuous switching on and off of the valves or pumps, the time d relay should be selected to be as large as possible.
The relay K1 de-energizes when the level falls below the electrode E1.
The relay K4 de-energizes when the level rises above the electrode E4.

connection plan:



Function:

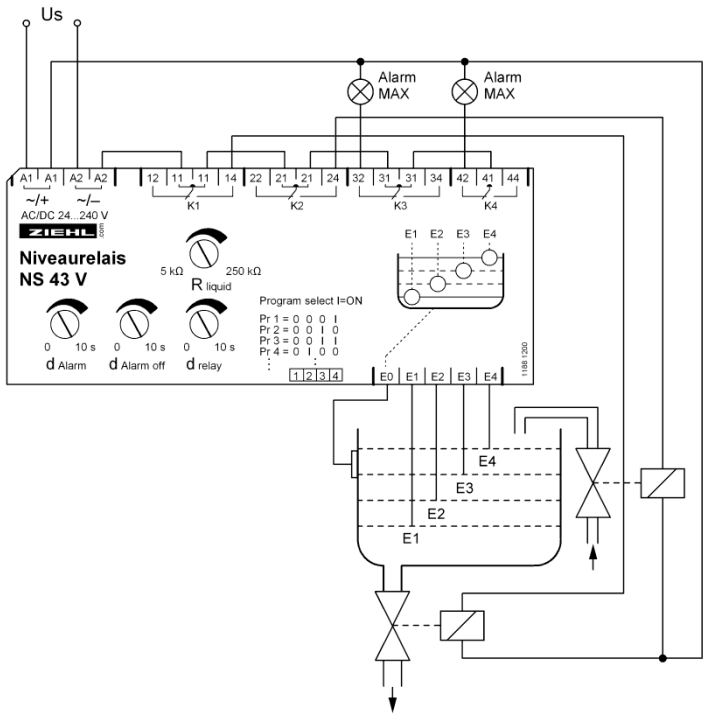


1) d Alarm
2) d Alarm off
3) d relay

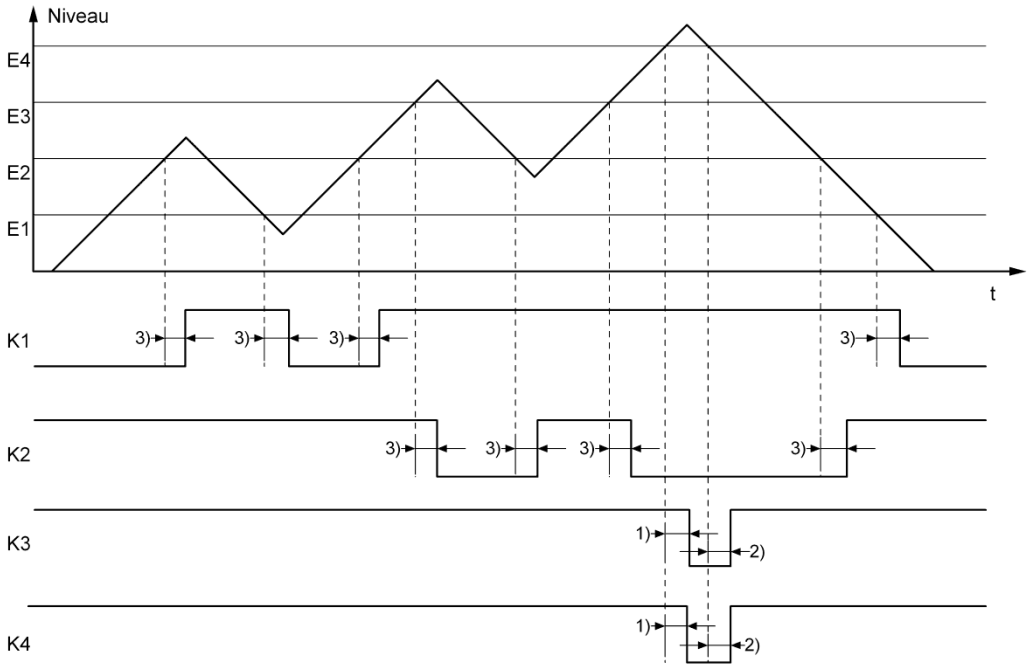
Pr 3: Inflow and outflow between 3 electrodes

The program Pr 3 controls the inflow and outflow and reports the overflow.
The level is regulated between the electrodes E1, E2 and E3.
The outflow valve is controlled by relay K1 between the electrodes E1 and E2.
The inflow valve is controlled by relay K2 between the electrodes E2 and E3.
The relays K3 and K4 de-energize when the level rises above the electrode E4.

connection plan:



Function:

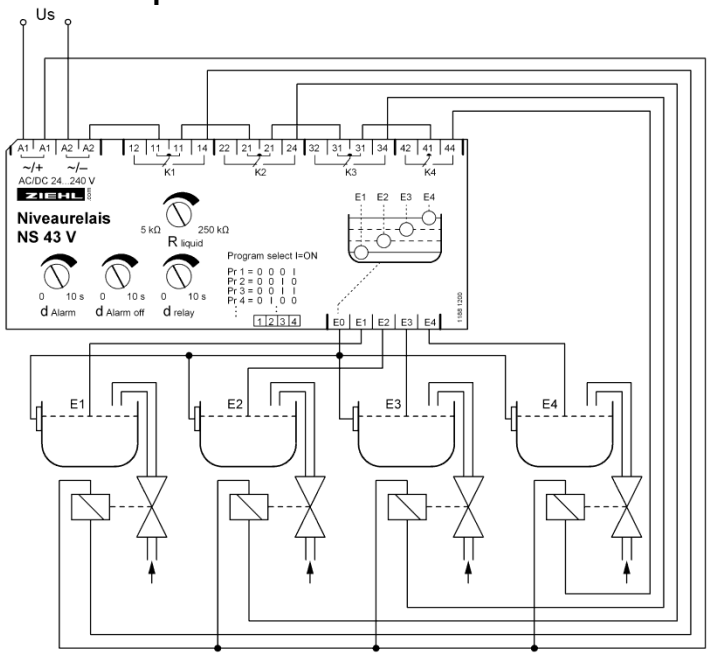


1) d Alarm
2) d Alarm off
3) d relay

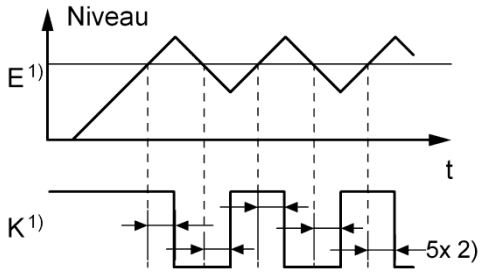
Pr 4: Four times single level monitoring, relay OFF when the electrode is immersed

Replaces 4 devices with 2 electrodes. The reference electrode E0 is common to all four containers. The electrodes E1 to E4 are respectively assigned to the relays with the same number.
When not submerged, the relays are energized. If an electrode is immersed, the associated relay de-energizes after the delay d relay has elapsed. The adjustable time d relay delays the relays when energizing and when de-energizing.

connection plan:



Function:

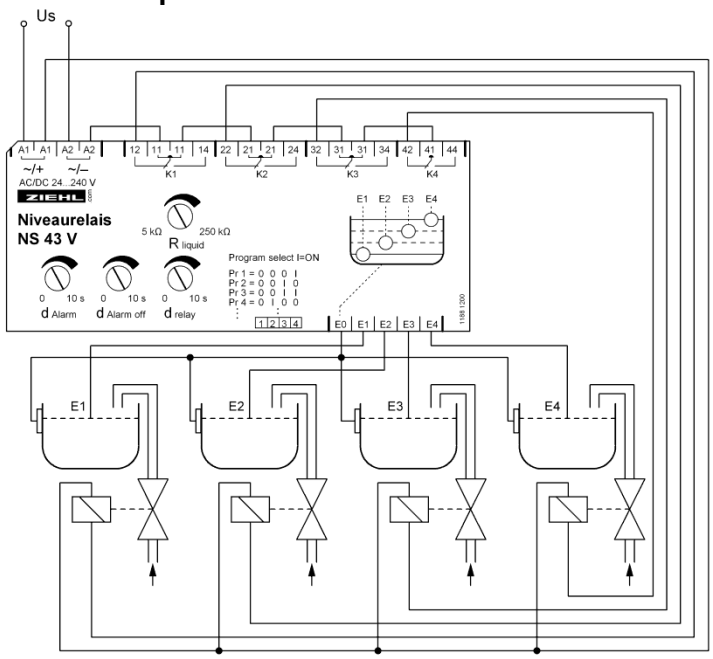


1) Zuordnung:
E1-K1 ; E2-K2 ; E3-K3 ; E4-K4
2) d relay

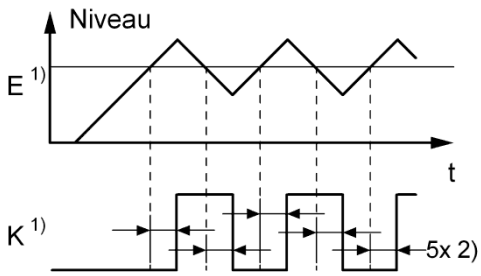
Pr 5: Four times single level monitoring, relay ON when electrode is immersed

Replaces 4 devices with 2 electrodes. The reference electrode E0 is common to all four containers. The electrodes E1 to E4 are respectively assigned to the relays with the same number.
When not submerged, the relays are de-energized. When an electrode is immersed, the associated relay energizes after the d relay delay has elapsed. The adjustable time d relay delays the relays when energizing and when de-energizing.

connection plan:



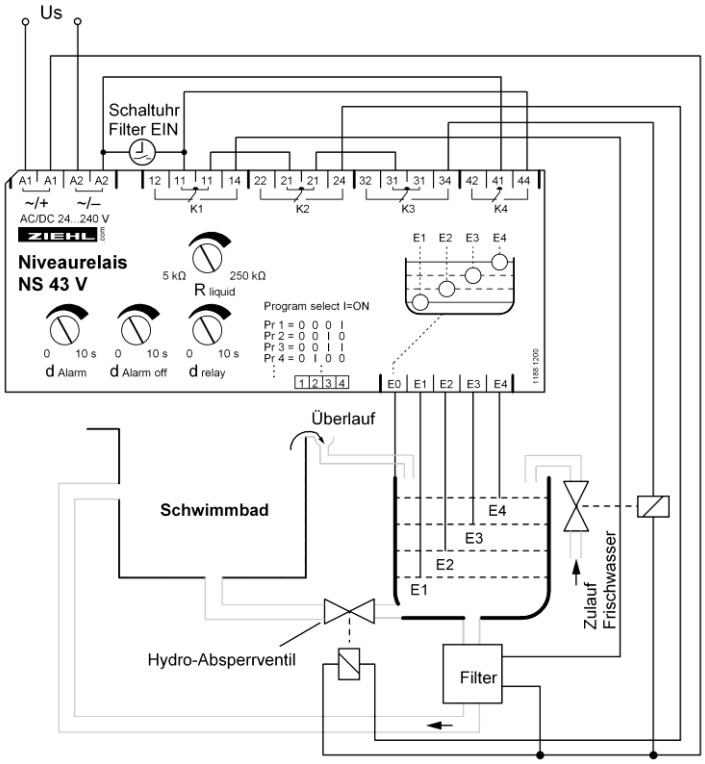
Function:



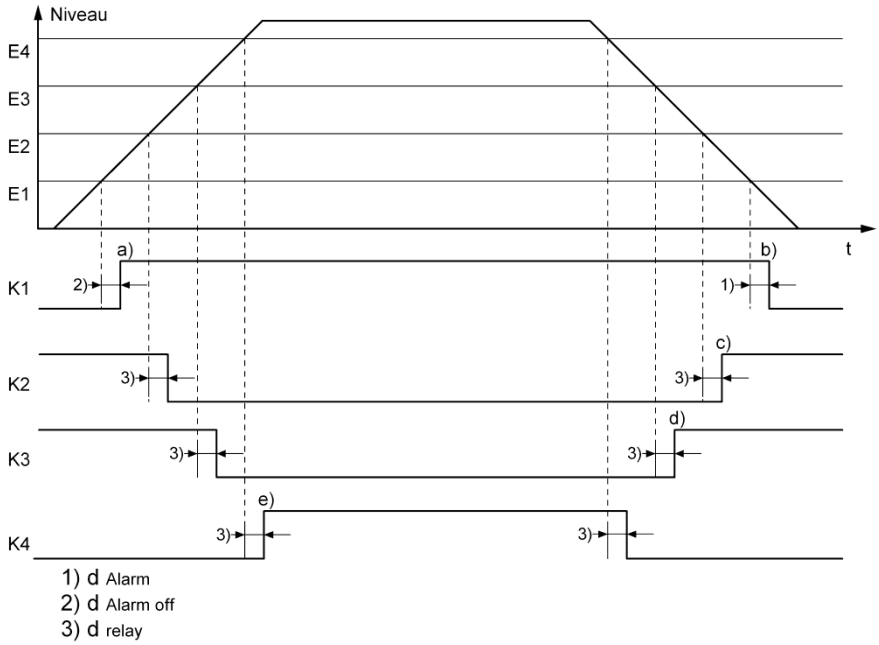
1) Zuordnung:
E1-K1 ; E2-K2 ; E3-K3 ; E4-K4
2) d relay

Pr 6: Swimming pool controller for overflow pool

connection plan:



Function:



a) Filter release
b) Filter forced shutdown
c) Hydraulic shut off valve EIN
d) Fresh water inflow EI

6 Important Information

DANGER!
Hazardous voltage!
Will cause death or serious injury. Turn off and lock out all power supplying this device before working on this device.

Attention!
The NS43V was built as a Class A device. The use of this product in Residential areas could cause radio interference.

To use the equipment flawless and safe, transport and store properly, install and start professionally and operate as directed.
Only let persons work with the equipment who are familiar with installation, start and use and who have appropriate qualification corresponding to their function. They must observe the contents of the instruction's manual, the information which are written on the equipment and the relevant security instructions for the setting up and the use of electrical units.
The equipment is built according to DIN VDE/EN/IEC and checked and leave the plant according to security in perfect condition. If, in any case the information in the instruction's manual is not sufficient, please contact our company or the responsible representative.
In order to maintain this status, you must observe the safety regulations entitled "caution" in this operating manual. Failures to follow the safety regulations can result in death, personal injury or property damage to the device itself and to other devices and facilities.
To maintain this condition, you must observe the safety instructions in this instruction manual titled "Important Information". Failure to follow the safety instructions may result in death, personal injury, or property damage to the equipment itself and other equipment and facilities.
Instead of the industrial norms and regulations written in this instruction manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

7 Installation

- mount on 35 mm mounting rail according to EN 60715
- wall-mount with 3 x screws M4
- connecting wires refer to the connection plan to prevent miss-operation and malfunction.

8 Commissioning

Response sensitivity adjustment:

- Commissioning first with setting for maximum resistance (Poti R_{liquid} on right stop)
- in case of malfunctions due to excessive cable lengths (cable capacity) or wetting with foam, reduce resistance (turn Poti R_{liquid} to the left)

9 Error search

- Device does not switch:

- Check whether the control voltage is correctly applied to terminal A1, A2 and corresponds to the voltage specification on the name plate.
- Check whether the electrodes are connected correctly.

- Device switches although the electrodes are not wetted:

- Check if electrodes are bridged by moisture film or foam
- Cable capacity too high

Error can usually be corrected in both cases by selecting a less sensitive setting (turn Poti R_{liquid} to the left)
When the device is switched on or when the program is changed, the following is displayed by rapid flashing of the yellow LEDs:

- The K1-K4 displays the active program number

  (e.g. K4 flashes for program 1).
- The displays E1-E4 show the software status.

The display is binary, i.e. read from left to right: 8 - 4 - 2 - 1

If all four relay LEDs (K1 - K4) and two red LEDs (E1, E4) flash, no valid program is selected. Check the switch position of the DIP switches.

→ In the case of other errors, send in the device with error information for review.

10 Technical data

Control voltage Us	AC/DC 24 – 240 V, 0/50/60 Hz	< 3 W / 6 VA
Tolerance	DC 20,4 - 297 V	AC 20 - 264 V

Level electrodes (E1, E2, E3, E4)		
max. voltage	< 3 Veff	
max. current	<100 µA	
response value	adjustable 5 kΩ ... 250 kΩ ± 25 %	
response value	cable length max.	line capacity max.
5 kΩ	500 m	100 nF
250 kΩ	50 m	10 nF
Hysteresis	ca. 15% + 5 kΩ	
On/off delay	adjustable 0,1 – 10 s	

Relay output	EN 60947-5
Contacts	1 Change-over contact
Switching voltage	max. AC 415 V
Switching current	max. 6 A
Switching power (resistive load)	max. 2000 VA max. 120 W at DC 24 V
Nominal operating current Ie for changers	3A AC15 250 V 2A DC13 24 V
Recommended back-up fuse	3,15 A time-lag (gL)
Mechanical contact life	3 x 10^7 operations
Electrical contact life	1 x 10^5 operations at 240 V / 6 A
Factor of reduction at cos cosφ = 0,3	0,5

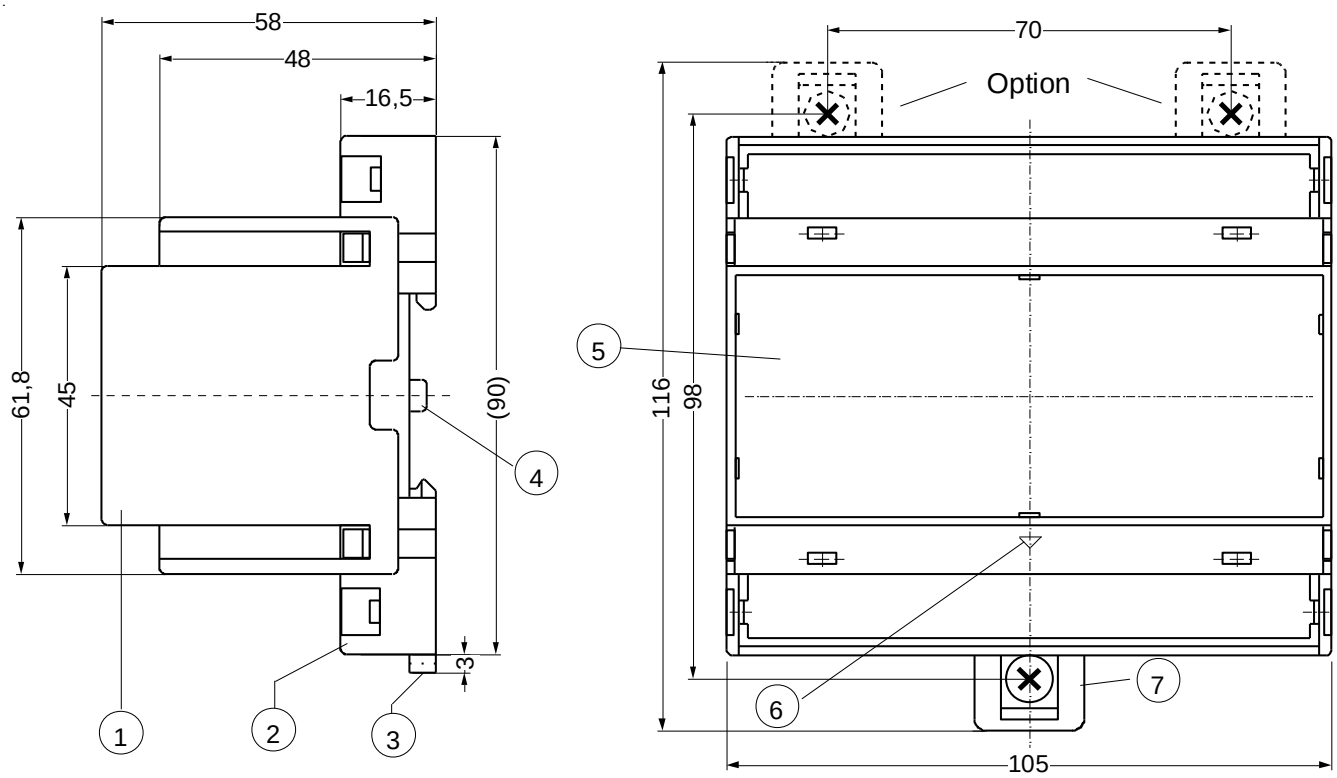
Testing conditions	EN 50178
Rated impulse voltage	4000 V
Overvoltage category	III
Pollution degree	3
Rated insulation Ui	250 V
Maximum terminal current	6 A
Safe isolation against electrodes	EN 61558-2-6 (VDE 0551)
On period	100 %
permissible ambient temperature	-20 °C ... +55 °C EN 60068-2-2 dry warmth
EMC immunity (industry)	EN 61000-6-2
EMC emission	EN 61000-6-3
Vibration resistance EN 60068-2-6	2…25 Hz ±1,6 mm 25 ... 150 Hz 5 g

Housing	Design V 6
Mounting height / Width (DIN 43880)	55 mm/6 TE
Dimensions (B x H x T) mm	105 x 90 x 58
Connection cross-section – solid-core	1x0.5…2.5mm² each
fine wire with ferrules	1x0.14mm² to 1.5mm² each
Degree of protection (EN60529) Housing / Terminals	IP 30 /IP 20
Fitting position	any
Weight	app. 250 g

Subject to technical changes

11 Housing Type V6

Dimensions in mm



1 cover
2 base
3 bar for snap mounting
4 latch for sealing
5 front panel
6 position downward
7 for fixing to wall with screws, Ø 4,2 mm

12 Disposal

Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.
ZIEHL is registered with the EAR Foundation under WEEE no.: DE 49 698 543.