

Product information VNV-E, -D, -DU, -V, -S, -WEV, -WD, -WDV, ZNV-Z **CONTROLS**

Evaluation electronics for conductive point level switch

Application / Specified Usage

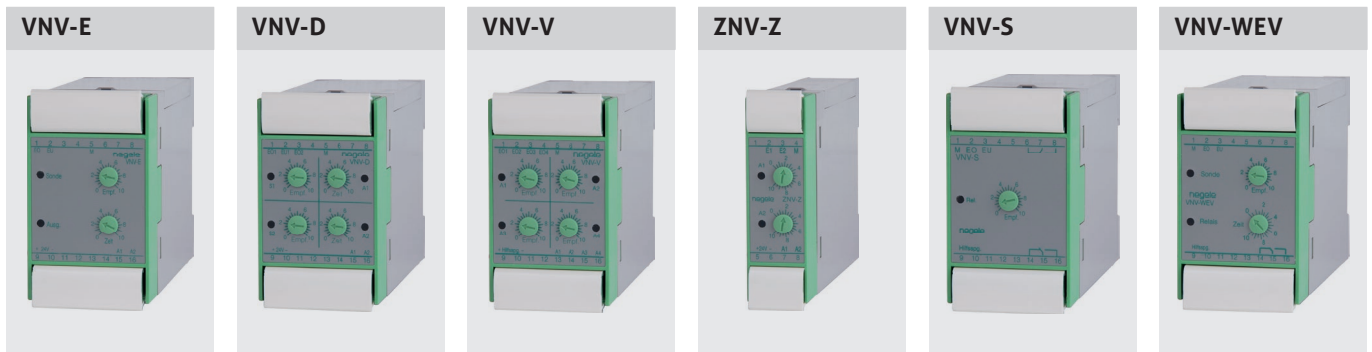
- Point level detection of aqueous, conductive media in tanks (minimum conductivity 1 µS/cm, depending on evaluation device)

Application examples

- Empty/full indication in tanks and pipes
- Level control in tanks
- Overflow protection in tanks
- Dry running protection in pipes (e.g. before pumps)

Special features

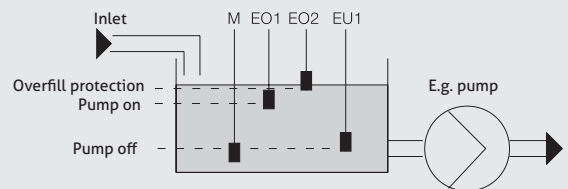
- Measurement signal is absolutely free of DC voltage
- Only one device for up to 4 point levels



Application examples

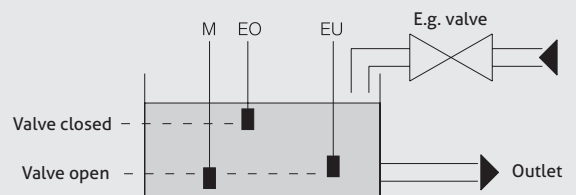
Level control in vessel with additional overflow protection (e.g. with VNV-WD)

Medium flows into the vessel through the inlet. When the maximum level EO1 is reached, the pump is started and stops as soon as the medium level drops below the minimum level EU1. The overflow electrode EO2 prevents overflowing of the tank in the event of a malfunction.



Simple level control in vessel (e.g. with VNV-E)

Medium is continuously removed from the vessel at the outlet. When the medium level drops below the minimum level EU, medium is added at the inlet until the maximum level EO is reached. An after-run period can be set using the time setting.



Variant with 24 V DC active output, supply voltage 24 V DC		
Type	Sensitivity	Function
VNV-E	0.1...100 kΩ	1 level control**, switch-on/off delay (0.5...10 s)
VNV-D	0.1...100 kΩ	1 level control** and 1 level detection*, switch-on/off delay (0.5...10 s)
VNV-DO	0.1...100 kΩ	1 level control** and 1 level detection*, without switch-on/off delay
VNV-DU	0.1...100 kΩ 0.1...10 kΩ	1 level control** and 1 level detection*, switchable sensitivity
VNV-DH	0.1...1 MΩ	1 level control** and 1 level detection*, switch-on/off delay (0.5...10 s)
ZNV-Z	0.1...100 kΩ	2 level detections*, switching time approx. 750 ms
ZNV-ZS	0.1...100 kΩ	2 level detections*, switching time approx. 150 ms
ZNV-ZES	0.1...100 kΩ	2 level detections*, switching time <60 ms
VNV-V	0.1...100 kΩ	4 level detections*
VNV-VES	0.1...100 kΩ	4 level detections*, switching time <70 ms

Technical data for variants with supply voltage 24 V DC		
Design	DIN standard case dimensions VNV-X dimensions ZNV-Z	made of ABS for rail mounting as per EN 50022 45 x 75 x 105 mm (W x H x D) 22.5 x 75 x 105 mm (W x H x D)
Protection class		IP 20; terminals protected against contact
Environment	operation temperature storage temperature humidity	0...+55 °C -10...+55 °C 0...95 % no condensation
Electrical connection		screw terminals 2.5 mm ² , pluggable
Electrode voltage	free of DC voltage	1.5...2 V AC/150 Hz
Sensitivity	adjustable	0.1...100 kΩ time delay (on/off)
Supply voltage		24 V DC (20...30 V DC) 75 mA device + max. 100 mA per used active output
Output		normal, invert
Error message	active reference: neg. pole of supply voltage	24 V DC, max 100 mA (power supply -10%)
Noise immunity	EMC as per	EN 50081-2 from 03/94 EN 50082-2 from 02/96
Line capacity	Sensor device	Max. 2000 pF
Weight		162 g

Explanation as per VNV-WD

* For the function, see the table on page 4: Setting the level detection switching function

** For the function, see the table on page 4: Functional principle of the level control

Variant with relay output, supply voltage 230 V AC (option: 115 V AC, 24 V AC)		
Type	Sensitivity	Function
VNV-S	0.1...100 kΩ	1 level control**
VNV-SH	0.1...1 MΩ	1 level control**
VNV-SD	0.1...50 kΩ	1 level control**, with wire break monitoring
VNV-WEV	0.1...100 kΩ	1 level control**, switch-on/off delay (0.5...10 s)
VNV-WEVH	0.1...1 MΩ	1 level control**, switch-on/off delay (0.5...10 s)
VNV-WD	0.1...100 kΩ	1 level control** and 1 level detection*
VNV-WDV	0.1...100 kΩ	1 level control** and 1 level detection*, switch-on/off delay (0.5...10 s)
VNV-WDH	0.1...1 MΩ	1 level control** and 1 level detection*
VNV-W	50 kΩ fixed	1 level detection*

Technical data for variants with supply voltage 230 V AC, 115 V AC, 24 V AC		
Design	DIN standard case dimensions	made of ABS for rail mounting as per EN 50022 45 x 75 x 105 mm (W x H x D)
Protection class		IP 20; terminals protected against contact
Environment	operating temperature storage temperature humidity	0...+55 °C -10...+55 °C 0...65 % without condensation
Electrical connection		screw terminals 2.5 mm ² , pluggable
Electrode voltage	free of DC voltage	8...14 V AC / 50 Hz
Sensitivity	VNV-S, -WD, -WDV, -WEV VNV-SD VNV-W option H	0.1...100 kΩ 0.1...50 kΩ 50 kΩ fixed 0.05...1 MΩ
Time delay (on/off)	VNV-WEV, -WEVH, -WDV, -WDVH	0.5...10 s adjustable
Supply voltage	standard optional	230 V AC 115 V AC, 42 V AC, 24 V AC; max. 5 W Please note the advices on page 7.
Output	change-over contact	250 V AC / 3 A
Noise immunity	EMC as per	EN50081-2 von 03/94 EN50082-2 von 02/96
Low Voltage Directive	Sensor device	EN 61010 from 1995
Line capacity (Sensor device)	VNV-S, -WD, -WDV, -WEV VNV-SD, -W with option H	max. 6000 pF max. 25000 pF max. 600 pF
Weight		approx. 350 g AC device approx. 150 g DC device

Installation



- If multiple device are installed next to each other (series), they must be separated by at least 5 mm.
- Ensure that the terminals are secure before switching the device on. This is especially important for level switches with a relay output.

Starting up

1. Configure the device as required for the device type on page 3.
 - Set the full/empty function
 - Set the time delay (switch-on/off) via the decode switches (**only for VNV-D, VNV-DU and VNV-WEV**)
 - Set the required delay time on the potentiometer (**only for VNV-D, VNV-DU, -WDV and VNV-WEV**)
2. Connect the device as per the wiring diagrams on page 6.
3. Set the sensitivity potentiometer all the way to the left (0).
4. Wet the sensor with the medium with the poorest conductivity.
5. Turn the potentiometer to the right (clockwise) until the output or the relay switches and the status LED for the output lights up.
6. The settings are now complete.

Note



To simulate the sensors, a wire bridge can be connected between the corresponding terminals. This does not damage the evaluation electronics (short-circuit-proof).

Control of wire break monitor (only for VNV-SD and VNV-W)



- 1: Disconnect the cable between the sensor and level switch directly at the sensor.
- 2: The "Wire break" LED must light up and the "Filling level" and "Wire break" relays must switch off.

Setting the level detection switching function

The switching function is set via the integrated "full/empty" selection switch (see page 5).

"Full" switching function

Sensor is wet	Output is active or the relay is switched (LED is lit)
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"Empty" switching function

Sensor is wet	Output is inactive or the relay is not switched (LED is not lit)
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Note on switching function



- For devices with wire break monitoring (VNV-SD and VNV-W), the switching function is permanently set to "empty".
- The switching function in VNV-WD with relay output (change-over relay) can be defined by using the n.c. contact (= "empty" switching function) or n.o. contact (= "full" switching function).

Functional principle of the level control

"Full" switching function

Both sensors immersed	Output active (relay switched) LED lit
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Upper sensor not immersed Lower sensor immersed	Output active (relay switched) LED lit
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Neither sensor immersed	Output inactive (relay not switched) LED not lit
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"Empty" switching function

Both sensors immersed	Output inactive (relay not switched) LED not lit
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Upper sensor not immersed Lower sensor immersed	Output inactive (relay not switched) LED not lit
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Neither sensor immersed	Output active (relay switched) LED lit
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Setting the time delay (switch-on and switch-off delay at the output)

VNV-E, VNV-D, VNV-DU, VNV-DO, VNV-V, ZNV-Z: The switch-on and switch-off delay can be set for each output.

Switch set to "on"	Switch-on delay at output
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Switch set to "off"	Switch-off delay at output
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VNV-WEV: Switch-on and switch-off delay can be set individually.

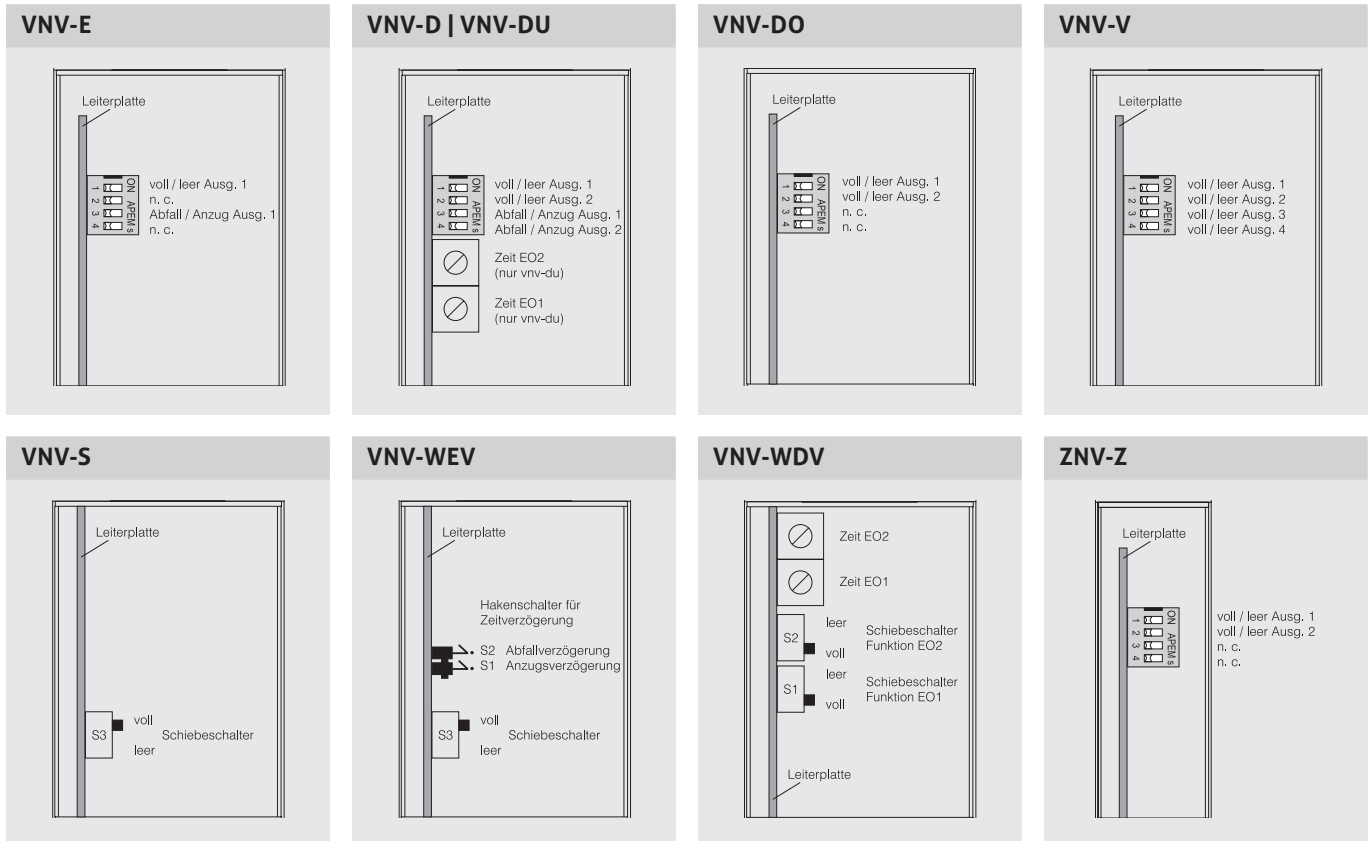
Switch S1 closed	Switch-on delay
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Switch S2 closed	Switch-off delay
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Switches S1 and S2 closed	Switch-on and switch-off delay
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VNV-WDV: always switch-on and switch-off delay

Views with open cover



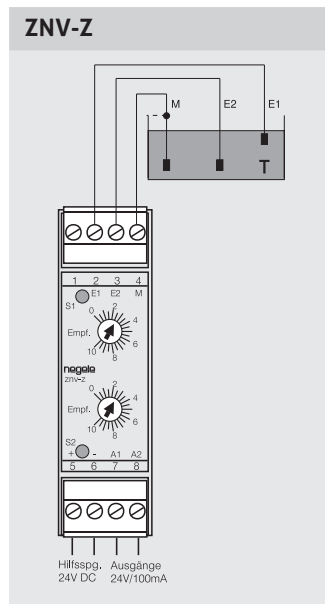
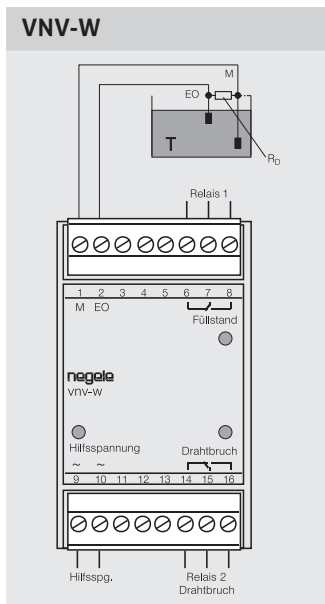
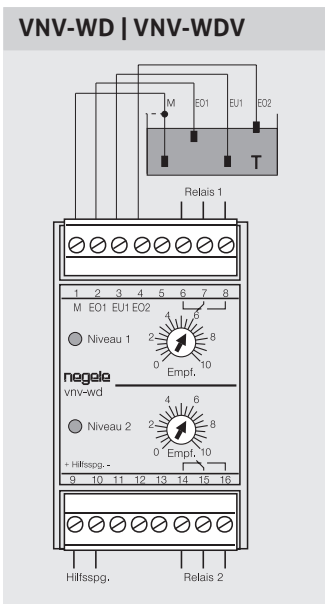
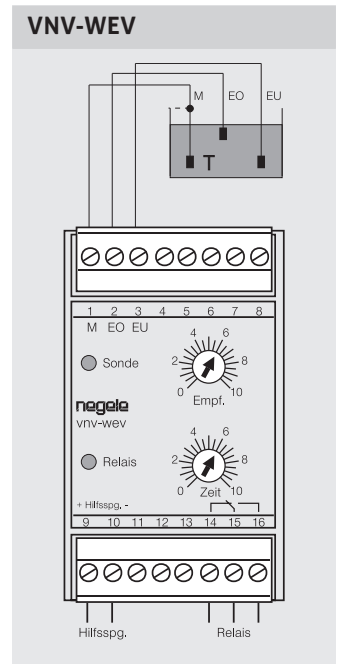
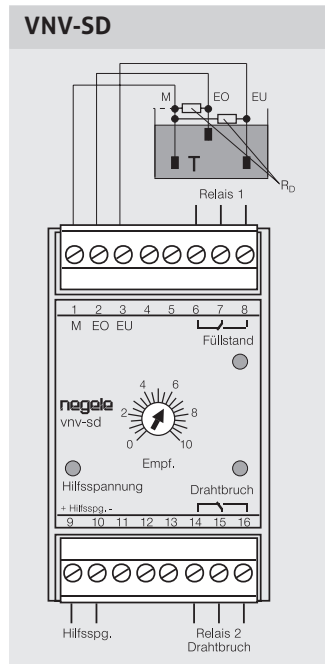
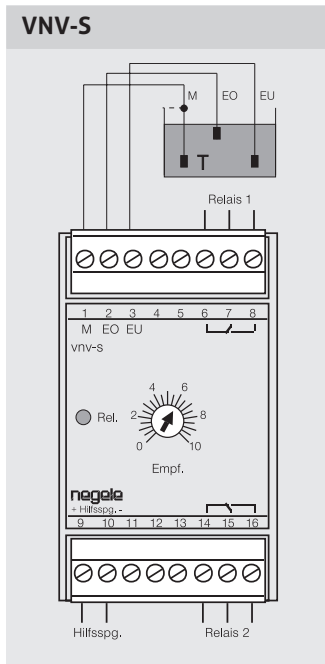
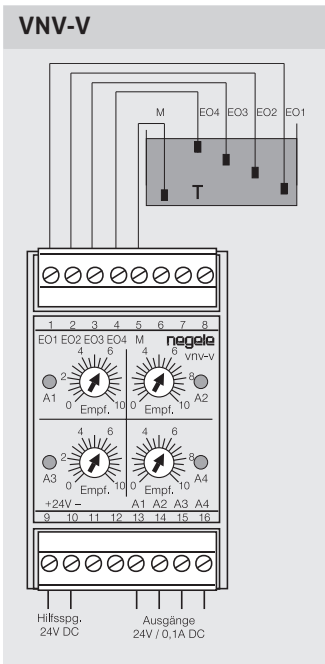
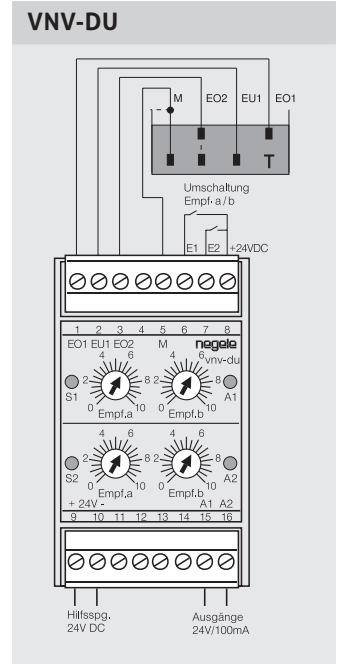
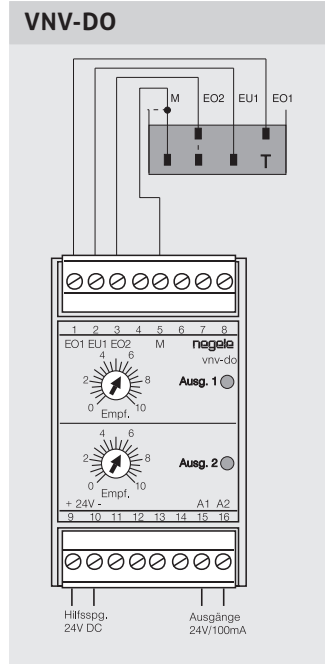
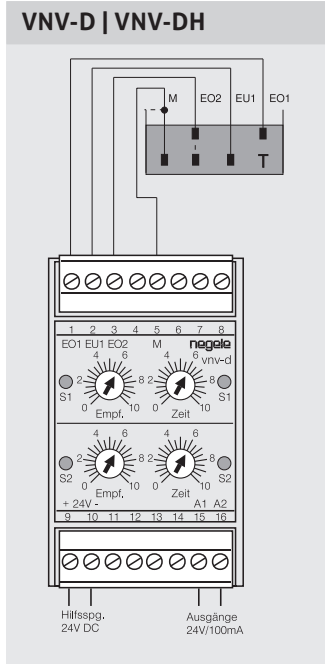
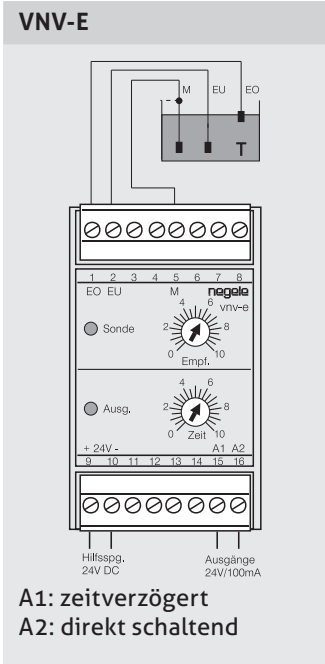
Note

Devices of type VNV-WD have no setting options. The sensitivity can be set on the front of the device.



Wiring diagram key

Label	Explanation/translation
Board	Board
"Full" board/"Empty" board x	Level detection switching function: full switch/empty switch (see also the table at the top of page 4)
Switch-off/switch-on output x	Time delay setting (see also the table at the bottom of page 4)
Sx full	VNV-S and VNV-WEV: Sliding switch set to full function
Sx empty	VNV-S and VNV-WEV: Sliding switch set to empty function
S1 Switch-on delay	VNV-WEV: Setting the time delay (see also the table at the bottom of page 4)
S2 Switch-off delay	VNV-WEV: Setting the time delay (see also the table at the bottom of page 4)
Time EO1	Adjustable time delay, output 1
Time EO2	Adjustable time delay, output 2



Attention

In devices with a 230-V AC or 115-V AC supply voltage, the transformer must be protected on the primary side with a 1 AT (slow blow) fuse. This must be provided by the operator for each device.

Attention

For devices with power supply 24 V DC: Ground wires of multiple devices may only be connected if the associated sensors are located in different tanks (or else the signals will be canceled)

Information on "Switchover sens. a/b" on VNV-DU

E1 and E2 are not switched or 0 V	Sensitivity of 0.1...10 kΩ adjustable on left potentiometers (a)
E1 and E2 are switched with 24 V DC	Sensitivity of 0.1...100 kΩ adjustable on right potentiometers (b)
LEDs S1 and S2	Indicate the logical status of the sensors
LEDs A1 and A2	Show the logical status of the switching outputs

Wiring diagram key

Label VNV series	Label ZNV-Z	Explanation/translation
M	M	Ground
EO	E1	Top electrode
EU	E2	Bottom electrode
E	E	Electrode
T	T	Tank, vessel
A	A	Output
Sensor		LED electrode
Outp.		LED output
Outputs	Outputs	Outputs
Sens.	Sens.	Potentiometer for sensitivity setting
Time		Potentiometer for time delay at output
Level		Level
Wire break		Wire break
Supply volt.	Supply volt.	Supply voltage
Relay		Relay contact or relay contacts status display
R _D		Wire break resistor, installed in sensor
	E1	Input 1
	E2	Input 2

Order designation for variants with relay output (housing width 45 mm)

VNV-

Function

- S** (Sensitivity 0.1...100 kΩ; 1 level control)
- SH** (Sensitivity 0.1...1 MΩ; 1 level control)
- SD** (Sensitivity 0.1...50 kΩ; 1 level control with wire break control)
- WEV** (Sensitivity 0.1...100 kΩ; 1 level control; with adjustable time delay)
- WEVH** (Sensitivity 0,1...1 MΩ; 1 level control; with adjustable time delay)
- WD** (Sensitivity 0.1...100 kΩ; 1 level control; 1 level detection)
- WDV** (Sensitivity 0.1...100 kΩ; 1 level control; 1 level detection and switch-on/off delay 0.5...10 s)
- WDH** (Sensitivity 0.1...1 MΩ; 1 level control; 1 level detection)
- W** (Sensitivity 50 kΩ; 1 level detection with wire break control)

Supply voltage

- 230VAC** (Supply voltage 230 V AC)
- 115VAC** (Supply voltage 115 V AC)
- 42VAC** (Supply voltage 42 V AC)
- 24VAC** (Supply voltage 24 V AC)

VNV- WD / 230VAC

Order designation for variants with 24-V DC active output (housing width 45 mm)

VNV-

Function

- E** (Sensitivity 0.1...100 kΩ; 1 level control; with adjustable time delay)
- D** (Sensitivity 0.1...100 kΩ; 1 level control; 1 level detection; with adjustable time delay)
- DO** (like VNV-D but without a time delay, switching time approx. 150 ms)
- DH** (like VNV-D but sensitivity 0.1...1 MΩ)
- DU** (like VNV-D but sensitivity 0.1...100 kΩ / 0.1...10 kΩ switchable)
- V** (Sensitivity 0.1...100 kΩ; 4 level detections)
- VES** (like VNV-V but with a switching time < 70 ms)

Supply voltage

- 24VDC** (Supply voltage 24 V DC)
- special** (Special voltage (DC only))

VNV- V / 24VDC

Order designation for variants with 24-V DC active output (housing width 22.5 mm)

ZNV-

Function

- Z** (Sensitivity 0.1...100 kΩ; 2 level detections)

Fast switching

- X** (Switching time approx. 750 ms)
- S** (Switching time approx. 150 ms)
- ES** (Switching time < 60 ms)

Supply voltage

- 24VDC** (Supply voltage 24 V DC)
- special** (Special voltage (DC only))

ZNV- Z / X / 24VDC