50100 / 1.3 / 2021-10-25 / MH / EU-NA

External level devices for conductive point level switch

Application/Specified usage

- Point level detection of aqueous, conductive media in tanks with a min. conductivity of 1 µS/cm
- Simple level control for tanks

Application examples

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

Special features

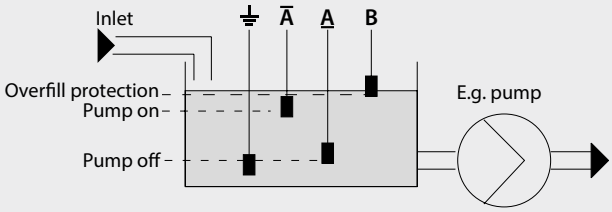
- Measurement signal is absolutely free of DC voltage
- Devices for up to 2 or up to 4 point levels
- Devices for up to 2 level controls and up to 2 point levels
- All devices feature an active output or change-over contact
- Devices with optional wire break monitoring

ZNV-2, VNV-2

Application examples

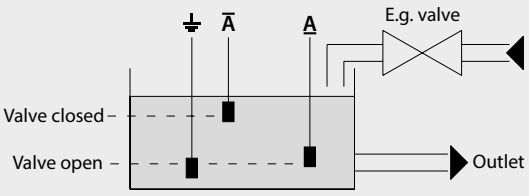
Level control in vessel with additional overfill protection

Medium flows into the vessel through the inlet. When the maximum level Ā is reached, the pump is started and stops as soon as the medium level drops below the minimum level A. The overfill sensor B prevents overflowing of the tank in the event of a malfunction.



Simple level control in vessel

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



Technical data for devices with supply voltage 24 V DC		
Design	DIN standard housing Dimensions VNV-2 Dimensions ZNV-2	Made of ABS for rail mounting as per EN50022 45 x 75 x 105 mm / 1.77 x 2.95 x 4.13 in (W x H x D) 22.5 x 75 x 105 mm / 0.89 x 2.95 x 4.13 in (W x H x D)
Protection class		IP 20; terminals protected against contact
Environment	Operating temperature Humidity	-10...+55 °C / 14...131 °F 0...65 % no condensation
Electrical connection		Screw terminals 2.5 mm², pluggable
Sensor measurement		Free of DC voltage
Sensitivity	Adjustable	0.1...1000 kΩ (devices without wire break monitoring) 0.1...100 kΩ (devices with wire break monitoring)
Symmetrical time delay	1CT(W), 2CT(W) Sensors without time trimmer	0.5...10 s, adjustable per trimmer, at least 50 ms Fixed time delay selectable in order code
Supply voltage		24 V DC (±15 %) 75 mA device + max. 100 mA per active output in use
Output	PNP Change-over contact	24 V DC, max 100 mA (supply voltage -10 %) 250 V AC/3 A or 30 V DC/3A
Line capacity	From device to sensor	Max. 2000 pF
Weight	VNV-2 ZNV-2	Approx. 150 g Approx. 100 g

Technical data for devices with supply voltage 115 V AC, 230 V AC		
Design	DIN standard housing Dimensions	Made of ABS for rail mounting as per EN50022 45 x 75 x 105 mm / 1.77 x 2.95 x 4.13 inch (W x H x D)
Protection class		IP 20; terminals protected against contact
Environment	Operating temperature Humidity	-10...+55 °C / 14...131 °F 0...65 % no condensation
Electrical connection		Screw terminals 2.5 mm², pluggable
Sensor measurement		Free of DC voltage
Sensitivity	Adjustable	0.1...1000 kΩ (devices without wire break monitoring) 0.1...100 kΩ (devices with wire break monitoring)
Symmetrical time delay	1CT(W), 2CT Sensors without time trimmer	0.5...10 s, adjustable per trimmer, at least 50 ms Fixed time delay selectable in order code
Supply voltage		115 V AC/230 V AC (±10 %), 50-60 Hz, max. 3 W
Output	Change-over contact	250 V AC/3 A or 30 V DC/3A
Line capacity	From device to sensor	Max. 2000 pF
Weight	VNV-2 (relay output)	Approx. 200 g

Legend

Advice:
Non observance of this warning notice may cause troubles.

Danger:
Non observance of this warning notice may cause serious injury of persons and / or damages or destruct the unit.

Information:
This symbol indicates useful additional informations.

Note on CE

- Applicable directives:
  - Electromagnetic Compatibility Directive 2014/30/EU
  - Low Voltage Directive 2014/35/EU
- Compliance with the applicable EU directives is identified by the CE label on the product.
- The operating company is responsible for complying with the guidelines applicable to the entire installation.

Global safety instructions

- Mounting, electrical connection, set up and maintenance of the unit must be done by trained and skilled personnel. They must have read and understood these installation and operating instructions. They must follow them carefully.
- Do not use the product where flammable or combustion gases are present.
- Only use the product properly built-in condition. (See assembly instructions)
- This product is not a safety device (SIL). Malfunction of the device may lead to failures of the outputs. Take safety measures, such as installing a separate monitoring system, to ensure safety and to prevent serious accidents caused by such failures, thus ensuring safety.
- Do not open the housing, there are no serviceable parts inside. Inside are high voltage circuits.

Assembly instructions

The devices are designed for integration in switch cabinets and housings.

1. The device is only suitable for installation in permanent and weather-protected switch cabinets and housings with a maximum operating altitude of 2000 m.
   During installation, all lines and connections must be de-energized.
2. The building equipment must feature a disconnecting device such as a switch or circuit breaker in an accessible location and that is labeled as a disconnect for this device. This disconnecting device must be able to disconnect all cables conducting line power.
3. In devices with 115 V AC and 230 V AC supply voltage, the transformer must be protected with a nominal fuse rating of 1 A (slow) on the primary side. A fuse must be provided by the operator for each device.
4. The relay outputs are protected with a normal fuse rating of 3.15 A (slow). The fuse must be provided by the operator for each relay.
5. The devices are suitable for a pollution degree of 2.
6. The rated voltage is 250 V AC and the insulation voltage is 3000 V AC CAT II.
7. In order to ensure undisturbed operation of the devices, it is necessary to lay the lines of the electrode inputs separately from all other supply lines. The electrode lines must be shielded. The shield must be connected to ground at one end near the device.

Transport/Storage

- Use suitable transport packaging only to avoid damage of the equipment!
- No outdoor storage
- Store dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature -40...+70 °C / -40...158 °F
- Relative humidity maximum 95 % no condensation

Cleaning

- The device may only be cleaned with a dry cloth.

Disposal

- Electrical devices should not be disposed of with household trash. They must be recycled in accordance with national laws and regulations.
- Take the device directly to a specialized recycling company and do not use municipal collection points.

Installation

- If multiple devices 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 the connecting terminals of devices with a relay output.
- Only one VNV-2/ZNV-2 device may be connected to a tank. Multiple devices in one tank may lead to detection faults.

Setting the level detection

1. Connect the device according to the drawings.
2. Set the trimmer of the associated sensor to the middle setting (0).
3. Wet the sensor with the medium with the lowest conductivity.
4. Turn the trimmer to the full indicator setting (left half) or to the empty indicator setting (right half) until the output or the relay switches and the status LED for the output lights up.
5. The sensitivity setting is now complete.
6. If there is a trimmer for the time delay (hour glass), an additional on (left half) or off (right half) delay of up to 10 seconds can be set. There is no additional delay in the middle position.
7. If there is no time delay trimmer for a sensor, a fixed time delay applies to the on and off delay that is specified in the order code.

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 the wire break monitoring (only in devices with the option "W")

1. The connection to the sensor is interrupted in a device with wire break detection.
2. All LEDs flash to indicate the break and the „Error" output indicates the error. The output becomes inactive or the relay is switched off.
3. All further outputs are set to inactive or the relays are switched off.

Setting the level detection switching function

The full or empty indicator function is set by positioning the sensitivity trimmer in the left or right half of the rotation range.

Full indicator switching function	
Sensor is wet	Output is active or the relay is switched (LED is illuminated)
Empty indicator switching function	
Sensor is wet	Output is inactive or the relay is not switched (LED is off)

Functional principle of the level control

Full indicator switching function	
Both sensors Immersed	Active output (relay is switched) LED is illuminated
Upper sensor Not immersed Lower sensor Immersed	Previous state is maintained
Both sensors Not immersed	Inactive output (relay is not switched) LED is not illuminated
Switching function of empty indicator	
Both sensors Not immersed	Active output (relay is switched) LED is illuminated
Upper sensor Not immersed Lower sensor Immersed	Previous state is maintained
Both sensors Immersed	Inactive output (relay is not switched) LED is not illuminated

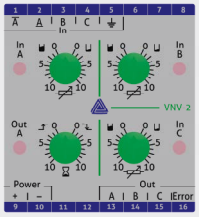
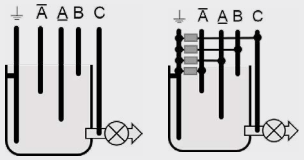
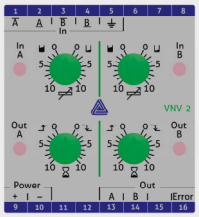
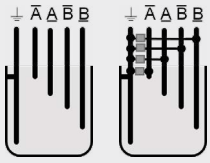
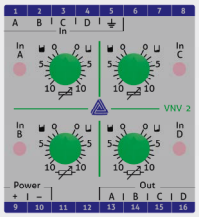
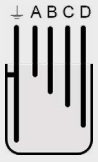
Information

For all devices with level control, the upper sensor can be connected alone instead of the control function. In this case, the upper sensor is used solely for level detection.

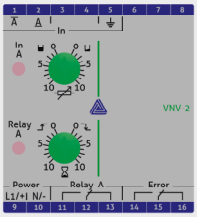
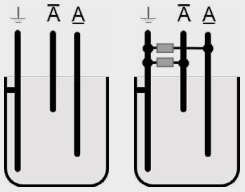
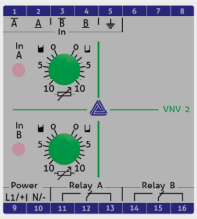
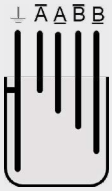
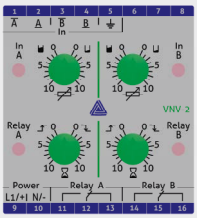
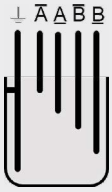
Wiring diagram key	
Label	**Explanation/translation**
⏚	Ground
Ā	Top sensor
A	Bottom sensor
A, B, C, D	Sensor
Power L1 / +	L1 (AC devices) or + supply voltage (DC devices)
Power N / -	N (AC devices) or - supply voltage (DC devices)
Relay A, B	Potential-free change-over contact as output

Wiring diagram key	
Out A, B, C, D	Active output (PNP)
ERROR	Signaling for wire break
LED In A, B, C, D	For level detection: LED indicator of sensor. For level control: LED indicator of top sensor
LED Relay A, B	LED indicator for relay
	Full indicator setting
	Empty indicator setting
	Sensitivity trimmer
	On delay
	Off delay
	Time delay trimmer

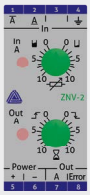
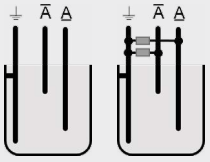
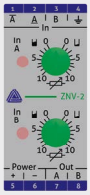
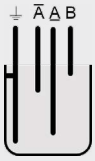
Application examples for devices with active output | VNV-2, supply voltage: 24 V DC

Model	Function	Application	
4A / 1CT2D(W) / t 	· 1 x level/time (A) · 2 x detection (B, C) · t: Time delay factory-set · Option W: Wire break	· 1 x level control with adjustable time delay for A · Time delay for B and C selectable in order code · Sensor B for overflow protection and sensor C for dry running protection · Optional with wire break monitoring	
4A / 2CT(W) / 0050 	· 2 x level/time (A, B) · Time delay adjustable per trimmer · Option W: Wire break	· 2 x level control switch adjustable time delay for A and B · Optional with wire break monitoring	
4A / 4D / t 	· 4 x detection (A, B, C, D) · t: Time delay factory-set	· 4 x level detection · Selectable time delay for A, B, C and D in order code	

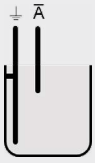
Application examples for devices with relay output | VNV-2, supply voltage: 24 V DC, 115 V AC or 230 V AC

Model	Function	Application	
2R / 1CT(W) / 0050 	· 1 x level/time (A) · Time delay adjustable per trimmer · Option W: Wire break	· 1 x level control with adjustable time delay for A · Optional with wire break monitoring	
2R / 2C / t 	· 2 x levels (A, B) · t: Time delay factory-set	· 2 x level control · Time delay for A and B selectable in order code	
2R / 2CT / 0050 	· 2 x level/time (A, B) · Time delay adjustable per trimmer	· 2 x level control with adjustable time delay for A and B	

Application examples for devices with active output | ZNV-2, supply voltage: 24 V DC

Model	Function	Application	
2A / 1CT(W) / 0050 	· 1 x level/time (A) · Time delay adjustable per trimmer · Option W: Wire break	· 1 x level control with adjustable time delay for A · Optional with wire break monitoring	
2A / 1C1D / t 	· 1 x level (A) · 1 x detection (B) · t: Time delay factory-set	· 1 x level control for A · Time delay for B selectable in order code · Sensor B for overflow protection	

Special Configuration "01" | ZNV-2, supply voltage: 24 V DC

Model	Function	Application	
2A / 1C1D / t / 01 	· 1 x detection (A) · 2 x adjustable sensitivity · t: Time delay factory-set	· 1 x detection of two different medias with single rod A · Sensitivity is independent adjustable for two medias	

Order code for devices with relay output (housing width 45 mm / 1.77 in)

VNV-2

Supply voltage

24VDC	(Supply voltage 24 V DC)
115VAC	(Supply voltage 115 V AC)
230VAC	(Supply voltage 230 V AC)

Output

2R	(2 x relay)

Function scope

1CT	(1 x level control with adjustable time delay)
1CTW	(1 x level control with adjustable time delay, wire break monitoring)
2C	(2 x level control)
2CT	(2 x level control with adjustable time delay)

Time delay

0000	(Adjustable per trimmer; only for 1CT, 1CTW, 2CT)
0050	(50 ms, fixed value)
0150	(150 ms, fixed value)
0750	(750 ms, fixed value)
1000	(1 s, fixed value)
5000	(5 s, fixed value)
9999	(10 s, fixed value)

Configuration

00	Fixed value

VNV-2	**24VDC /**	**2R /**	**2C /**	**0750 /**	**00**

Order code for devices with 24 V DC active output (housing width 45 mm / 1.77 in)

VNV-2

Supply voltage

24VDC	(Supply voltage 24 V DC)

Output

4A	(4 x active output)

Function scope

1CT2D	(1 x level control with adjustable time delay, 2 x level detection)
1CT2DW	(1 x level control with adjustable time delay, 2 x level detection, wire break monitoring)
2CT	(2 x level control with adjustable time delay)
2CTW	(2 x level control with adjustable time delay, wire break monitoring)
4D	(4 x level detection)

Time delay

0000	(Adjustable per trimmer; only for 2CT, 2CTW)
0050	(50 ms, fixed value)
0150	(150 ms, fixed value)
0750	(750 ms, fixed value)
1000	(1 s, fixed value)
5000	(5 s, fixed value)
9999	(10 s, fixed value)

Configuration

00	Fixed value

VNV-2	**24VDC /**	**4A /**	**4D /**	**0750 /**	**00**

Order designation for devices with 24 V DC (housing width 22.5 mm / 0.89 in)

ZNV-2

Supply voltage

24VDC (Supply voltage 24 V DC)

Output

2A (2 x active output)

Function scope

1CT (1 x level control with adjustable time delay)
1CTW (1 x level control with adjustable time delay, wire break monitoring)
1C1D (1 x level control, 1 x level detection)

Time delay

0000 (Adjustable per trimmer; only for 1CT, 1CTW)
0050 (50 ms, fixed value)
0150 (150 ms, fixed value)
0750 (750 ms, fixed value)
1000 (1 s, fixed value)
5000 (5 s, fixed value)
9999 (10 s, fixed value)

Configuration

00 Fixed value

ZNV-2 24VDC / 2A / 1C1D / 0750 / 00

Order designation for devices with 24 V DC (housing width 22.5 mm / 0.89 in) | Special Configuration "01"

ZNV-2

Supply voltage

24VDC (Supply voltage 24 V DC)

Output

2A (2 x active output)

Function scope

1C1D (1 x level detection with two adjustable sensitivities)

Time delay

0050 (50 ms, fixed value)
0150 (150 ms, fixed value)
0750 (750 ms, fixed value)
1000 (1 s, fixed value)
5000 (5 s, fixed value)
9999 (10 s, fixed value)

Configuration

01 2 x detection for rod A

ZNV-2 24VDC / 2A / 1C1D / 0050 / 01

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