

**Product Information NVS-50, -110, -120, -345** **FOOD**

# Conductive Multilevel Sensor



**Application/intended use**

- Point level measurement in aqueous, conductive media in tanks and pipes with minimum conductivity. The conductivity depends on the evaluation device: 1 µS/cm when using external evaluation units, e.g. VNV series or ZNV-Z, and 10 µS/cm when using the internal level transmitter MNV-1C.

**Application examples**

- Empty/full indication in tanks
- Level control in tanks
- Overfill protection in dosing systems

**Hygienic design/process connection (NVS-345 and NVS-50 only)**

- Hygienic and easy-to-sterilize measuring point (EHEDG certification, 3-A certificates)
- Elastomer-free sealing system for gap-free sensor installation without dead space
- CIP/SIP cleaning up to 143 °C/120 min
- Sensor made entirely of stainless steel and PEEK; PFA coating
- Adapters for all standard process connections
- Product-contacting parts are compliant with EU Regulation 10/2011 and FDA (NVS-345 and NVS-50)
- Conformity with 3-A standard (NVS-345 only)

**Special features/advantages**

- Defined position of the cable entry (NVS-345 only)
- Available with or without an integrated level transmitter MNV-1C
- Choice of different electrical connections
- Electrodes can be shortened and bent as required

**Options/accessories**

- Version with rope electrodes available (NVS-110.SEIL)

**Selection of the right sensor type**



**Coating:**  
 For foamy, adhesive (e.g. yogurt) and/or wetting media (e.g. alkaline solutions), we suggest using a sensor with a coated electrode. Sensors with an uncoated electrode are recommended for aqueous, non-adhesive and non-wetting media. If rod lengths are greater than 500 mm, the coated version should be used since the electrodes may come into contact with each other and lead to incorrect readings.

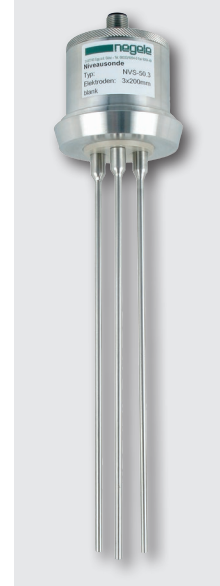
**Authorizations**



**NVS-345/...B**



**NVS-50/...N**



**NVS-120/...B**



**NVS-110.SEIL/...**



Technical data				
<b>Type</b>	NVS-50	NVS-345	NVS-110	NVS-120
<b>Process connection</b>	Milk pipe DIN11851 DN50; hygienic	Thread G1"; hygienic	Thread G1" standard; not hygienic	Thread G1½" standard; not hygienic
<b>Electrodes</b>				
Quantity	Max. 5	Max. 4	Max. 4	Max. 5
Length [mm]	200; 500; 850; 1000; 1500; 2000	200; 500; 850; 1000; 1500; 2000	200; 500; 850; 1000; 1500; 2000	200; 500; 850; 1000; 1500; 2000
Diameter	4mm (8mm optional)	4mm (8mm optional)	4mm (8mm optional)	4mm (8mm optional)
<b>Temperature ranges*</b>				
Ambient	-10...+60°C	-10...+60°C	-10...+60°C	-10...+60°C
Process	0...110°C	0...110°C	0...90°C	0...90°C
CIP/SIP cleaning	143°C/120min.	143°C/120min.		
<b>Process pressure</b>	Max. 10bar	Max. 10bar	Max. 10bar "SEIL"(rope) option: Max. 1bar	Max. 10bar
<b>Tightening torque</b>	-	10...20Nm	-	-
<b>Materials</b>				
Connecting head (Threaded) connector	Stainless steel (1.4305) Stainless steel (1.4305)	Stainless steel (1.4305) Stainless steel (1.4305)	PP hard plastic PP hard plastic	PP hard plastic PP hard plastic
Electrodes	Stainless steel (1.4404)	Stainless steel (1.4404)	Stainless steel (1.4404) Stainless steel (1.4401)/ Stainless steel (1.4404)	Stainless steel (1.4404)
Ropes/ rope weights	-	-	-	-
Insulator	PEEK	PEEK	-	-
Coating (electrodes)	PFA	PFA	PFA	PFA
Coating (rope)	-	-	Polyamide PA6	-
<b>Rope electrodes available</b>	No	No	Yes (NVS-110.SEIL)	No
<b>Electrical connection</b>	M12 plug connection (1.4305) Cable gland M16 x 1.5			
<b>Protection class</b>	IP69 K (with M12 plug connection) IP67 (with cable gland)			

\*) When using the integrated level transmitter MNV-1C, please note the temperatures specified below in the technical data of the level transmitter.

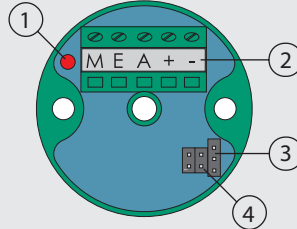
Technical data of level transmitter MNV-1C		
<b>Temperature</b>	Operation	-10...+60 °C
	Storage	-20...+60 °C
<b>Humidity</b>	Without condensation	0...95 % r. F.
<b>Supply voltage</b>		15...36 V DC
<b>Electrode E</b>	Voltage	1.5...2VAC/300Hz, no DC signal
<b>Adjustable sensitivity</b>	MNV-1C	0.1; 1; 10; 100 kΩ
<b>Output</b>	Short-circuit-proof	Active 50mA
<b>Delay</b>	Fixed	0.5 s
<b>Switching function</b>	Selectable min./max.	MNV-1C jumper

## Explanation of switching states

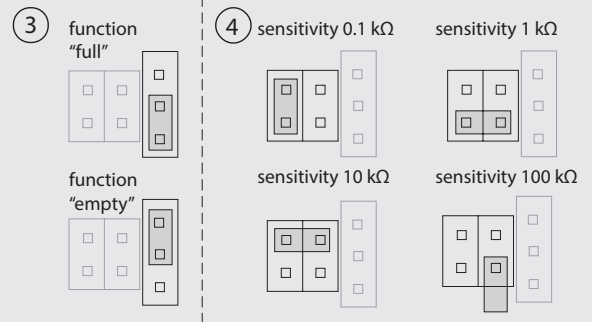
**Full indicator:** The output is active when immersed  
**Empty indicator:** The output is active when not immersed

## Level transmitter MNV-1C

- 1: LED sensor  
(lights up when the sensor is immersed in the medium, regardless of the switching function)
- 2: Terminal block
- 3: Empty/full jumper
- 4: Sensitivity jumper



## Configuration of level transmitter MNV-1C



Standard setting on delivery  
 3: full  
 4: 10 kΩ

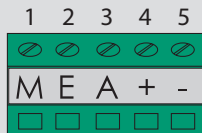
## Setting up level transmitter MNV-1C



- Connect the supply voltage.
- Set the switching function. See the adjacent configuration description.
- Set the lowest sensitivity. See the adjacent configuration description.
- Wet the sensor with the least conductive medium.
- If the output switches, the selected sensitivity can be retained and the calibration is finished. If the output does not switch, please continue as follows:
- Increase the sensitivity until the output switches. Once this happens, calibration is finished.

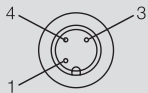
## Electrical connection with MNV-1C

## Terminal block



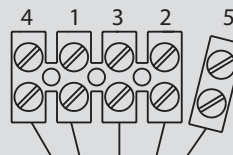
- 1: Ground (sensor)
- 2: Electrode (sensor)
- 3: Active output
- 4: Supply voltage
- 5: 15...36 V DC

## M12 connector

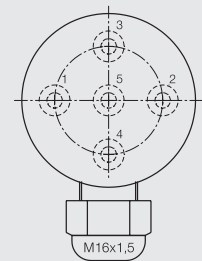


## Electrical connection

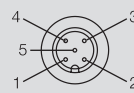
## Terminal block



## Top view



## M12 connector

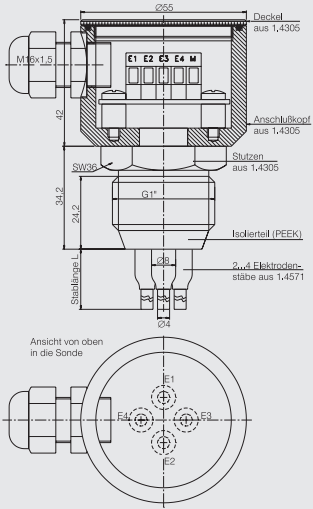


## General setup procedure

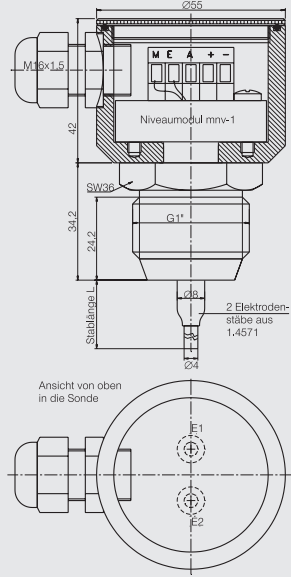


- If necessary, cut the electrodes to the required lengths. In doing so, ensure that the compound between the rod and the thread connector is not strained excessively. If using coated electrodes, do not damage the insulation of the rod part that remains on the sensor.
- Strip 5 mm of insulation off the tip of insulated rods.
- Screw the sensor into the sleeve and connect as shown in the wiring diagram. Do not damage the coating when inserting the sensor into the sleeve.

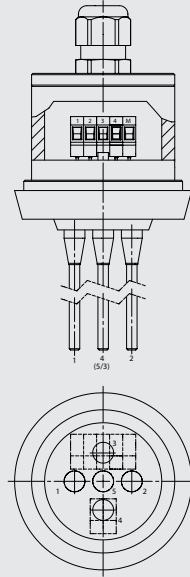
NVS-345



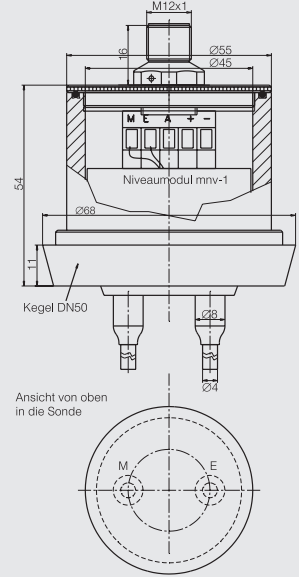
NVS-345.2/M



NVS-50

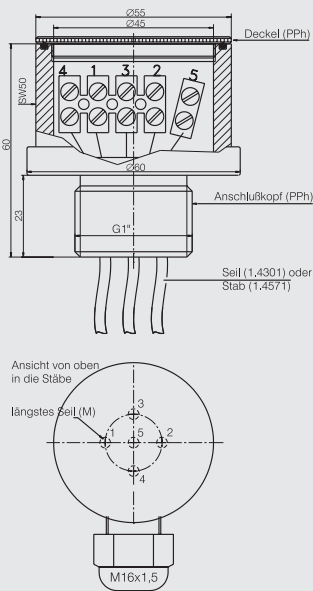


NVS-50.2/M



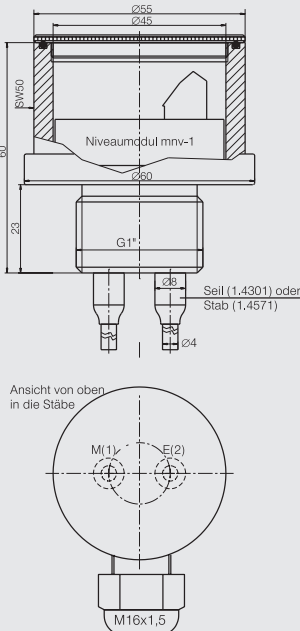
NVS-110 / NVS-110.SEIL

This sensor does not conform to hygienic requirements.



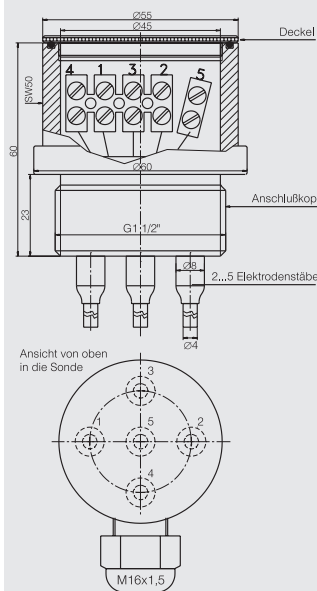
NVS-110.2/M

This sensor does not conform to hygienic requirements.



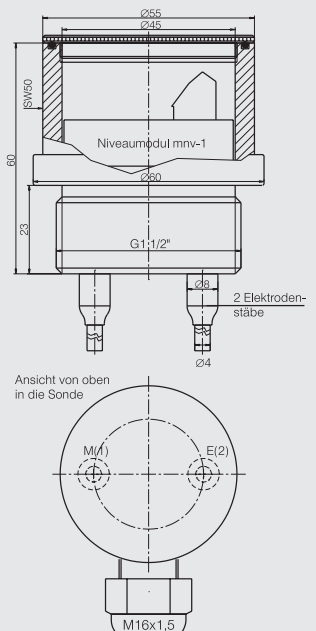
NVS-120

This sensor does not conform to hygienic requirements.



NVS-120.2/M

This sensor does not conform to hygienic requirements.



**Requirements for a measuring point compliant with the 3-A Sanitary Standard 74-06**

- The sensors of the NVS-345 series conform to the 3-A Sanitary Standard.
- The sensors are designed for CIP/SIP cleaning at a maximum temperature of 143 °C for 120 minutes.
- Only approved in combination with the **CLEANadapt** build-in system (EMZ, EMK, EHG with pipe diameters >DN25, ISO 20 and 1", adapters AMC and AMV).
- When using the EMZ and EMK weld-in sleeves, the weld must comply with the requirements of the current 3-A Sanitary Standard.
- Mounting position: The mounting position, self-draining properties and position of the leakage hole must be in accordance with the current 3-A Sanitary Standard.

**Note on material conformity as per European Regulation 1935/2004 or 10/2011**

- The plastics used in the NVS-345 and NVS-50 sensors are materials approved by European Regulations 1935/2004 and 10/2011 for contact with food.
- The materials of the NVS-110, NVS-110.SEIL and NVS-120 sensors are not in accordance with the European regulations specified above.

**Mounting instructions**

- When installing the NVS-345, only use Negele weld-in systems to ensure proper functioning of the measuring point.
- When screwing in the sensors, do not exceed the maximum permissible torque (see the technical data on page 2).
- If the tank wall is being used as the reference electrode (only possible with NVS-345 and NVS-50), ensure that the sensor process connection makes good electrical contact with the pipe and tank wall. Do not use insulating sealants such as Teflon. The tank wall must be made of metal in this case.
- When installing the sensors, ensure that the electrode emerges from the medium when it is drained.
- When tightening and loosening the sensor, only use the wrench flats provided this purpose, never the connecting head.

**Cleaning/Maintenance**

- When using a pressure washer, do not point the nozzle directly at the electrical connections.

**Reshipment**

- Sensors and process connection must be clean and must not be contaminated with hazardous media and/or heat-conductive paste. Note the cleaning information!
- To avoid damage of the equipment, use suitable transport packaging only.

**Notice on conformity****Applicable guidelines:**

- Electromagnetic Compatibility Directive 2004/108/EC
- The CE label confirms compliance of this product with the applicable EC directives.
- You have to guarantee the compliance of all guidelines applicable for the entire equipment.

**Transport/Storage**

- No outdoor storage
- Store in an area that is dry and dust-free
- Do not expose to corrosive media
- Protect against solar radiation
- Avoid mechanical shock and vibration
- Storage temperature 0...40 °C
- Relative humidity max. 80%

**Standards and guidelines**

- Compliance with the applicable regulations and directives is mandatory.

**Disposal**

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Give the instrument directly to a specialized recycling company and do not use the municipal collecting points.

## Order code for rope sensors

**NVS-110.SEIL** (Head diameter 55mm of plastic with G1" process connection and rope electrodes)

**Electrode 1**

[m] (lengths in m)

**Electrode 2**

(selection options: see Electrode 1)

**Electrode 3**

(selection options: see Electrode 1, evaluation unit not possible)

**Electrode 4**

(selection options: see Electrode 1, evaluation unit not possible)

**Electrode 5**

(selection options: see Electrode 1, evaluation unit not possible)

**Evaluation unit / level transmitter**

**X** (without)

**M** (integrated in the head; only for 2 electrodes)

**Open circuit alarm**

(only possible with external evaluation unit)

**X** (without)

**D** (with open circuit resistance, only possible with 2 electrodes)

**Electrical connection**

**X** (cable gland M16x1.5)

**M12** (M12 connector 1.4305)

NVS- 110.SEIL / 10 / 8 / X / X / X / X / X / M12

## Order code for standard multilevel sensors

## NVS

-345 (Head diameter 55mm of stainless steel with CLEANadapt G1" hygienic process connection)

-110 (Head diameter 55mm of plastic with G1" process connection)

-120 (Head diameter 55mm of plastic with G1½" process connection)

-50 (Head diameter 55mm of stainless steel with dairy flange DN50 as per DIN11851)

## Electrode1

200N (uncoated 200mm, diameter 4 mm)

200N-8 (uncoated 200 mm, diameter 8 mm)

200B (coated 200 mm, diameter 4 mm)

200B-8 (coated 200 mm, diameter 8 mm)

500N (uncoated 500 mm, diameter 4 mm)

500N-8 (uncoated 500 mm, diameter 8 mm)

500B (coated 500 mm, diameter 4 mm)

500B-8 (coated 500 mm, diameter 8 mm)

850N (uncoated 850 mm, diameter 4 mm)

850N-8 (uncoated 850 mm, diameter 8 mm)

850B (coated 850 mm, diameter 4 mm)

850B-8 (coated 850 mm, diameter 8 mm)

1000N (uncoated 1000 mm, diameter 4 mm)

1000N-8 (uncoated 1000 mm, diameter 8 mm)

1000B (coated 1000 mm, diameter 4 mm)

1000B-8 (coated 1000 mm, diameter 8 mm)

1500N (uncoated 1500 mm, diameter 4 mm)

1500B (coated 1500 mm, diameter 4 mm)

2000N (uncoated 2000 mm, diameter 4 mm)

2000B (coated 2000 mm, diameter 4 mm)

2500N (uncoated 2500 mm, diameter 4 mm)

[mm]N Special length, uncoated

[mm]B Special length, coated

[m] (length in m; only for NVS-110.SEIL)

## Electrode 2

(selection options: see Electrode 1)

## Electrode 3

(selection options: see Electrode 1, evaluation unit not possible)

## Electrode 4

(selection options: see Electrode 1, evaluation unit not possible)

## Electrode 5

(not for NVS-345, selection options: see Electrode 1, evaluation unit not possible)

## Evaluation unit / level transmitter

X (without)

M (integrated in head; only for 2 electrodes)

## Open circuit monitoring

(only possible with external evaluation unit)

X (without)

D (with open circuit resistance, only possible with 2 electrodes)

## Electrical connection

X (cable gland M16x1.5)

M12 (M12 connector 1.4305)

NVS- 345

200B/

500B /

850B /

850B /

X/

X/

X/

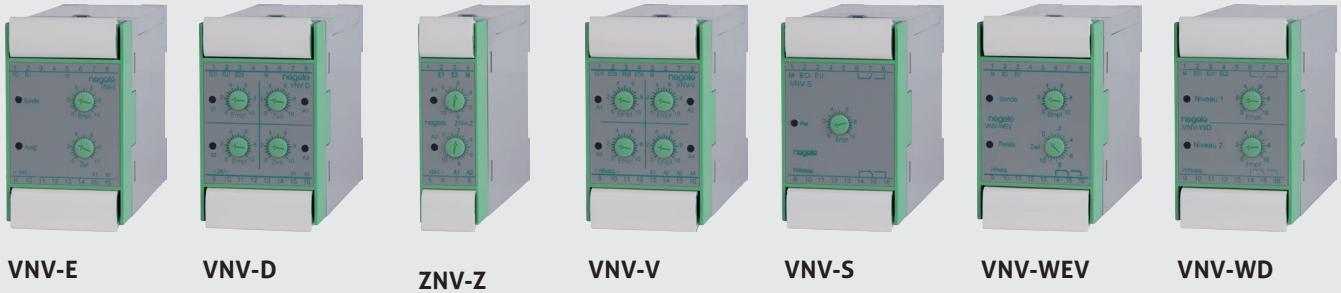
M12

## Accessories



Instead of the integrated level transmitter, standard multilevel sensors can also be used with external devices for installation on DIN rails, for example. The full selection of external evaluation units, the technical data and the order code can be found in the „Evaluation units for conductive multilevel sensors“ product information.

## Overview of the evaluation units for conductive multilevel sensors for DIN-rail installation



## Advice



For level measurement according to German Water Management Act, please use the separate product information NVS-146.w, NVS-116.2w, NVS-345.2w.

## Notes