

Continuous Level Sensor



Application

- Continuous level monitoring in metallic vessels up to 2,5 m, longer rods on request
- Suitable for level measurement of pastes and adhesive media
- Two-rod version for plastic vessels available
- Conductivity 1 μ S / cm min (e.g. distilled water)
- For media with homogenous conductivity

Application Examples

- Continuous level monitoring in small vessels down to 100 mm
- Level control in first running vessels of dosing plants
- Suitable for measuring the level in small vessels with overpressure

Hygienic Design / Process Connection

- By using Negeles weld-in sleeve **EMZ-352** or **EMZ-132** respectively will result a hygienic measurement point, easy to sterilize and with a minimum of flow resistance
- CIP-cleaning up to 100 °C
- With high temperature version CIP-/ SIP-cleaning up to 150 °C / max. 30 min
- All sensor materials with FDA approval
- Available process conn.: TriClamp, diary flange, DRD, Varivent, BioControl
- Sensor is completely made of stainless steel

Features

- No calibration when changing the medium because of **potentiometric measurement principle**
- Defined PG-position
- Defined empty signal
- Galvanic separation between power supply and output

Options / Accessories

- High temperature version up to 150 °C (with neck tube)
- Isolation of rods if the sensor is installed from the top (necessary for splashing, very adhesive media or media causing a film on the rod)
- Installation from the bottom side
- Electrical connection by M12 plug-in / cable for plug-in ex factory



**NSK-157 / O
with weld-in
ball KEM-132**

**NSK-357.2 / OI / H
with TriClamp
adapter AMC-352**

**NSK-358 / OI / H
with weld-in
sleeve EMZ-352**

Attention: Use only Negele weld-in systems to ensure a save function of the measurement point!
We advice absolutely isolated rods (**option OI**) for very adhesive media, media causing a film on the rod (e.g. base) or in CIP-plants.

Conditions for a measuring point according to 3-A-Standard 74-03:

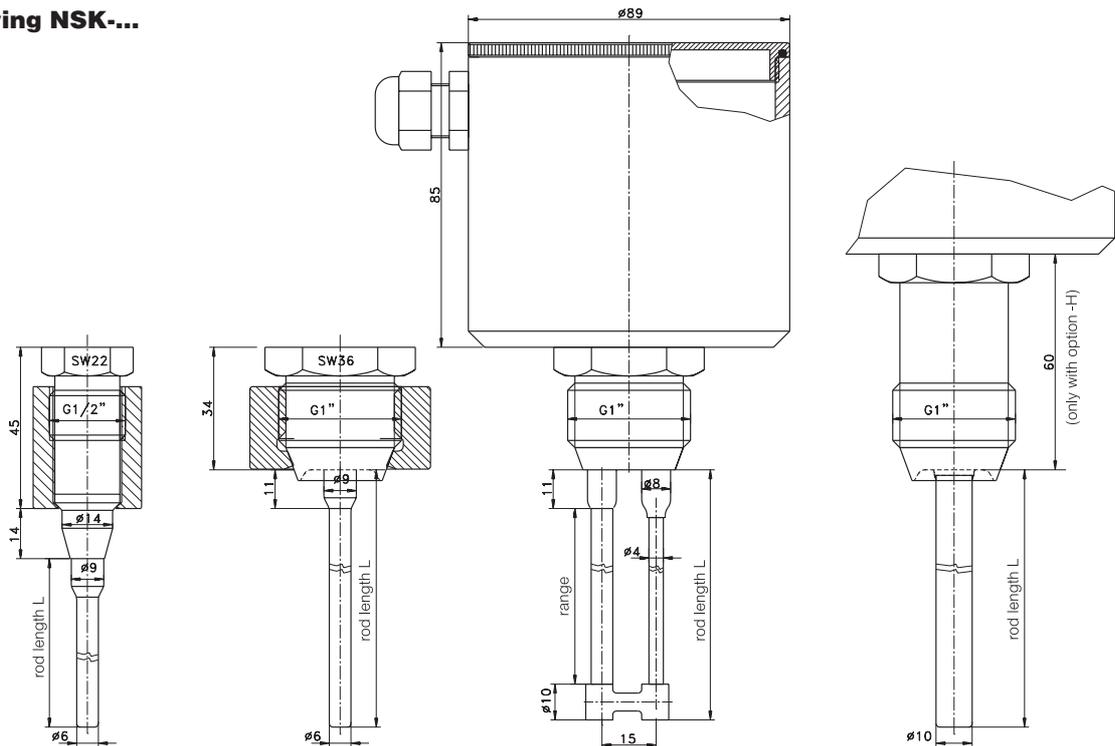
- The sensors NSK-157.1A, -357.1A, -357.2A, -358A are approved according to the 3-A-Standard.
- Only with the build-in system CLEANadapt (EMZ, EMK, Adapter AMC, AMV, AMA and AMB) allowed.
- The welding seam by using of EMZ, EMK has to correspond with 3-A-Standard 74-03, D6.1.4: "The minimum radii for fillets of welds in product contact surfaces shall be not less than 1/4 in. (6.35 mm) except that the minimum radii for such welds may be 1/8 in. (3.18 mm) when the thickness of one or both parts joined is less than 3/16 in. (4.76 mm).
- Self draining has to be warranted by the build-in position
- The process connection needs a self-draining leakage hole.

Specification, Dimensions and Options

Specification

Process connection	thread at the sensor	G1/2" or G1" resp.	Accuracy	≤ 1,0 %
	torque G1/2" / G1"	10 Nm / 20 Nm max.	Linearity	≤ 1,0 %
Materials	head	SS 316 (1.4305)	Electr. connection	2x cable entry
	thread connection	SS 316 (1.4305)		M16 x 1,5
		WW 22 / WW 36 mm		2pin 1,5 mm ²
	isolator	PEEK		cable connetion
	rod	SS 316L (1.4404)		supply voltage
		3, 6 or 10 mm dia.	Output	analog
	rod isolation	PFA		4...20 mA, burden resist. 500 Ω max
Temperature ranges	ambient	0...50 °C	Empty signal	output
	process	-10...100 °C		2,4 mA
	high temp. version	-10...150 °C 30 min max	current consumption	dep. on rodlength and dia.
				250 mA max.
			Type of protection	IP69 K
			Operation pressure	10 bar max.

Dimensioned Drawing NSK-...



Type	NSK-157/...	NSK-357.1/...	NSK-357.2/...	NSK-358/.../H
Thread	G1/2" hygienic	G1" hygienic	G1" hygienic	G1" hygienic
Fitting	EMZ-132	EMZ-352	EMZ-352	EMZ-352
Lengthes	100...500 mm	100...500 mm	200...800 mm	501...2500 mm
Rod Diameter	up to L=200 mm: Ø 3 mm up to L=500 mm: Ø 6 mm	up to L=200 mm: Ø 3 mm up to L=500 mm: Ø 6 mm	sensor rod: Ø 6 mm ground rod: Ø 4 mm	Ø 10 mm
Suitable for	linear vessels made of steel	linear vessels made of steel	plastic vessels or not linear vessels	linear vessels made of steel
Linearisation	via PEM-DD	via PEM-DD		via PEM-DD

Options

-OI sensor position top with isolation	to use if strong adhesions are expected between the higher end of the rod and the vessel wall (e.g. for splashy, very adhesive media or short circuit via cleaning solutions etc.). Isolation length: Ø 6 mm: 50 mm, Ø 10 mm: 100 mm Please notice: No measurement in the range of the isolation possible!
-U sensor position bottom	for installation into the bottom of the vessel
-O sensor position top	for installation into the top of the vessel
-H high temperature	to use for temperatures > 100 °C (neck tube 60 mm integrated)

negele

Mechanical Connection / Installation:

- **Attention!** Don't shorten the sensor rod!
- To guarantee a sure function of the sensor, the G1" thread must have a good electrical contact to the vessel wall! Because of this, **don't use any sealing materials like Teflon** or others!
- If a single rod version, **NSK-157, -357.1/...** and **-358/...**, is used, the sensor rod should be nearly parallel to the vessel wall. If this is not possible you can use the Negele indicator, **PEM-DD**, for a linearisation!
- The sensor rod mustn't have any electrical contact to the vessel wall! Please also attend that the rod may swing if there are turbulences in the vessel!

Recommended Configuration for CIP (see the drawing beside)

for full detection: **NWM-141**
 for empty detection: **NWM-141**
 Spray ball monitoring: **NSK**: 20 mA constant resp. oscillating output.
Level measurement during CIP is only possible with option O1 (with isolation)!

Electrical Connection / First Time Operation

Attention: To guarantee a trouble-free function the power supply cable as well as the signal cable should be shielded and grounded at the electrical control box!

Sensor Calibration

The sensor is delivered exactly calibrated. Normally no more adjustments are necessary.
 If an other calibration is needed, please follow the instructions below.

Zero Adjustment

- Connect power supply as shown in the drawing
- Connect current meter to the output
- Fill the vessel up to the lowest point of the sensor rod
- Set current output to 4 mA by using poti T2

Span Adjustment

- Connect power supply as shown in the drawing
 - Connect current meter to the output
 - Fill the vessel up to the maximum level
 - Use span poti T3 to set the current output to 20 mA
- Please notice the maximum turn down rate is 70 % of the rod length!
 (e.g. Rod length 1000 mm: max. turndown to 700 mm)

Sensitivity Adjustment

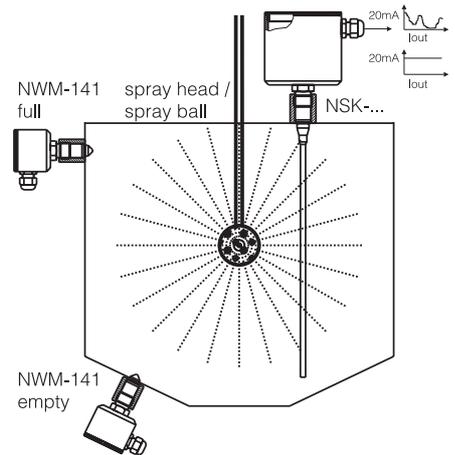
Normally no calibration is necessary.
 If another calibration is needed, use the media with the lowest conductivity to set the sensitivity!

- Connect power supply as shown in the drawing
- Fill the vessel up to the lowest point of the sensor rod
- Take notice of the red LED called "Sonde"(take a look on the table "nsk-sensitivity")
 - if the LED is switched off, turn poti T1 rightwards until the LED is flashing (status 2)
 - if the LED is always shining, turn poti T1 leftwards until the LED is flashing I (status 4)
 - if the LED is flashing, check the pulse-pause ratio: best like status 3 in the table below

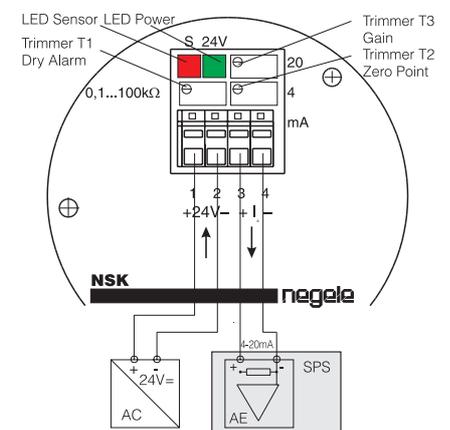
Table NSK-sensitivity

State	LED sensor	4-20mA	0,1...100kΩ
1.		2,4mA	
2.		4-20mA	
3.		4-20mA	
4.		4-20mA	

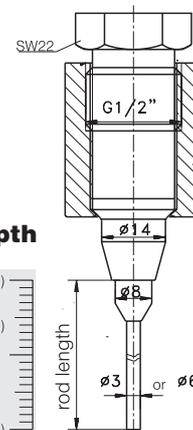
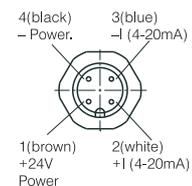
Configuration for CIP



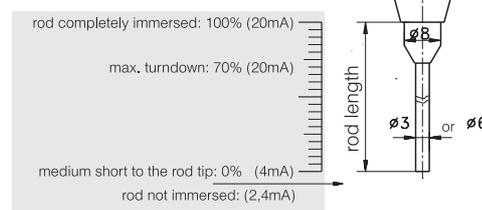
Connecting Diagram NSK-... (drawing shows top-view)



with M12 Plug-in



Description Immersion Depth



Order Code

NSK-157.1	Process connection G1/2" hygienic, only single rod, length 500 mm max, up to 200 mm Ø 3 mm, other length Ø 6 mm
NSK-357.1	Process connection G1" hygienic, single rod sensor, length 500 mm max, up to 200 mm Ø 3 mm, other length Ø 6 mm
NSK-357.2	Process connection G1" hygienic, double rod sensor, length 1500 mm max, sensor rod Ø 6 mm, ground rod Ø 4 mm
NSK-358	Process connection G1" hygienic, single rod sensor, length > 500 mm, Ø 6 mm

Rod Length

Please select rod length in steps of 10 mm, e.g.: 230, 240, 250 etc. length 3000 mm max.

100...3000	(material 1.4404)
100...3000-HAST	(material Hastelloy C)
Sonderlänge	

Installation Position and Isolation

OI	(from top, PFA-isolated)
U	(from bottom, without isolation)
O	(from top, without isolation)

ATTENTION: in plants with CIP-cleaning take always the option "OI"!

High Temperature Version

X	(without)
H	(with spacer, 150 °C short-time)

Electrical Connection

X	(cable entry M16 x 1,5)
M12	(M12-plug V2A)

Example:

NSK-357.2 / 550-HAST / OI / H / M12

Overview of Deliverable Process Connections (Basic device and adapters order separately!)

Process Connection	Negele weld-in sleeve	Adapter G11/2" to G1"	TriClamp	Diary flange (DIN 11851)	Varivent	DRD (press ring optional deliverable)	APV-Inline (only one size necessary)	BioControl
G1" Adapter for: NSK-358 NSK-357.1 NSK-357.2								
Size								
DN25			AMC-352/1"-1,5"	-		-		-
DN40	EMZ-352	AMG-352	AMC-352/1"-1,5"	AMK-352/40		-	AMA-352	-
DN50	(only one size)	(only one size)	AMC-352/2"	AMK-352/50	AMV-352 type 40/50	AMK-352/50		AMB-50/1"
DN65			AMC-352/3"	AMK-352/65	(only one size deliverable)	-		AMB-65/1"
DN80			AMC-352/80	AMK-352/80		-		-
DN100			AMC-352/4"	AMK-352/100		-		-
Order example:	DRD-Adapter:		AMK-352 / 50					