

Continuous Level Sensor NSL-M-00

Range of application

- Continuous level measurement in metallic vessels up to 10 ft (3 meters) in height
- Ideal for adhesive and pasty media
- Level measurement of foaming media
- Minimum product conductivity typically from 50 $\mu\text{S}/\text{cm}$ (available on request for lower values)
- Hygienic substitute for float sensors

Application examples

- Process such as ballance tanks and fillers
- Level measurement for both vented and pressurized storage vessels
- Level monitoring in pressurized vessels

Hygienic design/Process connection

- Fixed fittings conform to 3-A 74-06 Sanitary Standard
- Product contacting materials compliant to FDA
- Option to use Negele CLEANadapt a EHEDG compliant hygienic installation accommodates broad range of process connection adapters
- Sensor made of stainless steel (protection class NEMA 4X and IP 69 K)
- CIP-/ SIP-cleaning up to 143 °C / max. 120 minutes

Features

- Compact and robust sensor easily accommodated on tight tank top real-estate
- Simple 2-wire sensor with 4...20 mA output signal, with M12-plug as electrical connection
- Accommodates wide range of process media with little or no required adjustment
- Individual parameter adjustment or programming via optional PC interface
- Adapts for both top down or bottom up measurement via optional PC interface
- Alarms signal (dry, internal error) user adjustable via PC interface

Options/Accessories

- PVC Molded M12 shielded cord-set
- Programming adapter MPI-200 with PC software

Function principle

The potentiometric measuring principle measures the change in the voltage ratio between the electrode rod of the sensor and the metallic wall of the filled tank. An electric flow field arises in the medium due to the conductivity of the medium and its capacitive properties. This gives rise to a voltage ratio that is proportional to the immersed part of the rod.

Because only the ratio of the voltages is considered, the properties of the medium, in particular the electrical conductivity of 50 $\mu\text{S}/\text{cm}$ and higher, do not enter into the measurement result. The sensor also provides information on the immersion situation of the electrode rod in the medium by means of a second, patent-pending measurement system.

This system analyzes electrical resonance properties to detect foam and suppress it in the results, and to reliably prevent erroneous measurements due to adhesions.

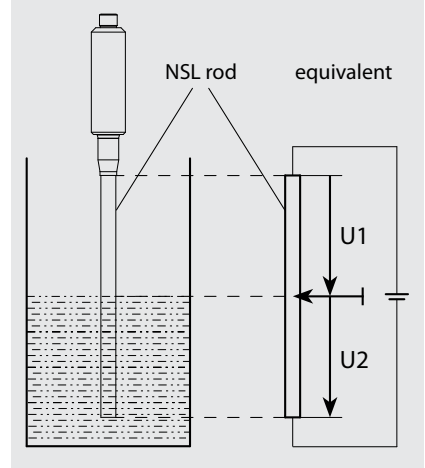
Authorizations



Level sensor NSL-M-00



Function principle



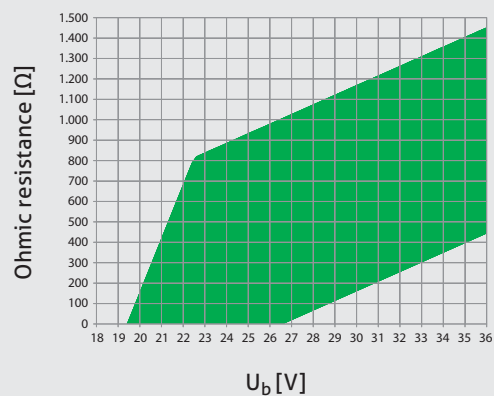
Specification		
Rod length EL	product contacting	3000 mm max.
Measurement range		20...199 mm (rod diameter 6 mm) 200...3000 mm (rod diameter 10 mm)
Process connection	fixed Tri-Clamp CLEANadapt thread	1"...1½", 2", 3" Range of CLEANadapt fittings. Accommodates G1/2" or G1" Tightening torque: 88 lbf-in (10Nm)
Process pressure		230psi (16bar)
Materials	head adapter insulating part rod	stainless steel 1.4305 stainless steel 1.4301 PEEK (FDA approval number: 21 CFR 177 2415) stainless steel 1.4404, $R_a \leq 0.8 \mu\text{m}$
Temperature range	ambient storage process CIP-/SIP-cleaning	32...158°F (0...70°C) -40...185°F (-40...85°C) 14...284°F (-10...140°C) 290F (143°C) max 120 min
Resolution	rod length > 500 mm rod length < 500 mm	< 0.1 % of upper range value (= rod length) < 0.5 mm
Accuracy	media with conductivity > 50 $\mu\text{S/cm}$ (e.g. beer, milk, beverages) media with conductivity < 50 $\mu\text{S/cm}$	< 1% of rod length on request since dependent on installation situation and tank design
Linearity*		< 1.0 % of upper range value (= rod length)
Reproducibility*	rod length > 500 mm rod length < 500 mm	< 0.2 % of upper range value (= rod length) < 1.0 mm
Temperature drift	at 25 °C	$\leq 0.1 \%$
Response time		< 100 ms
Electrical connection	supply protection class output signal ohmic resistance	19...36 V DC M12-plug, 1.4301, 4-pin NEMA 4X and IEC IP69k analog 4...20 mA, galvanic separated to housing, 2-wire loop see table
Weight		550 g with rod length 1.5 m

* For homogenous media at constant temperature

Possible parameter/Settings	
4...20 mA current signal	
Underrange	3.80; 3.95; 4.00 mA
Overrange	20.00; 20.05; 20.50 mA
Warning and failure signal (e.g. dry run)	3.80; 3.95; 4.00mA 20.00; 20.05; 20.50; 21.00; 21.20 mA
Level measurement	
Zero/Gain	-50...50 % / 50...150 %
Damping	0; 0.1; 0.2; 0.5; 1; 2; 5 s

Ohmic resistance

Max. ohmic resistance [Ω] at supply voltage [V]



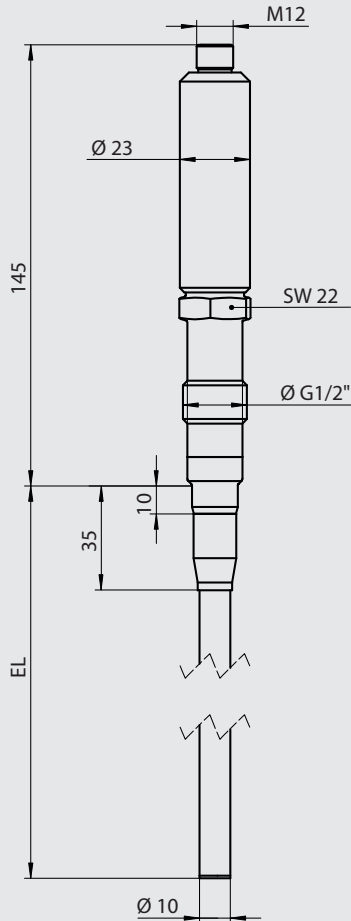
Conventional usage



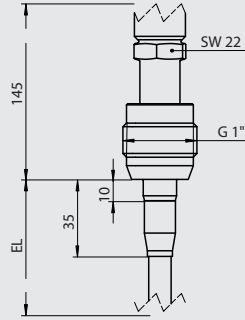
- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipment (SIL).



Drawing NSL-M ... / 10 / S0 / ...



Drawing NSL-M ... / 10 / S1 / ...



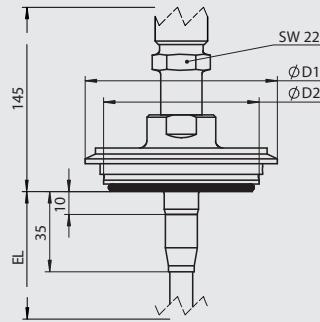
Rod diameter

Rod diameter is depending on rod length (EL). For exact diameter see adjoining chart.

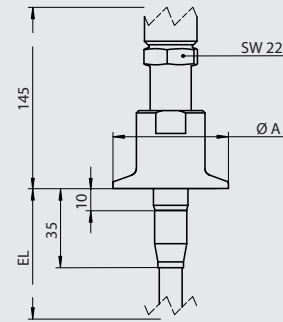
Rod diameter

EL	Ø D
50...199 mm	6 mm
200...3000 mm	10 mm

Drawing NSL-M ... / 10 / Vx / ...



Drawing NSL-M ... / 10 / TCx / ...



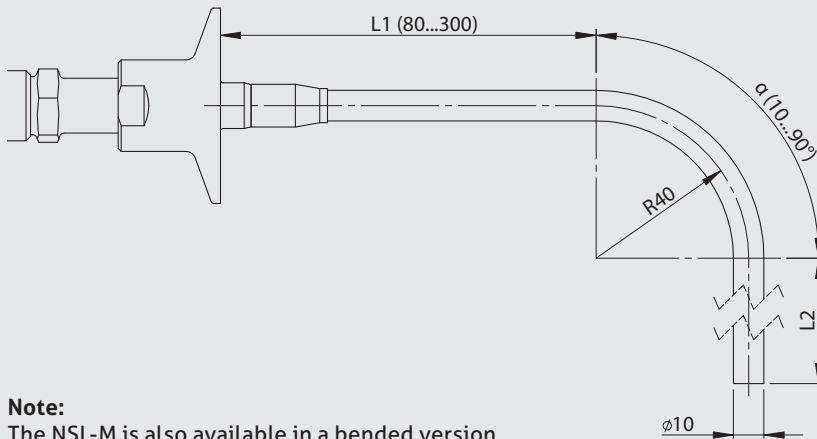
Varivent® dimensional table

Type	Varivent® Type	D1 [mm]	D2 [mm]
V25	F	66	50
V40	N	84	68

Tri-Clamp diameter

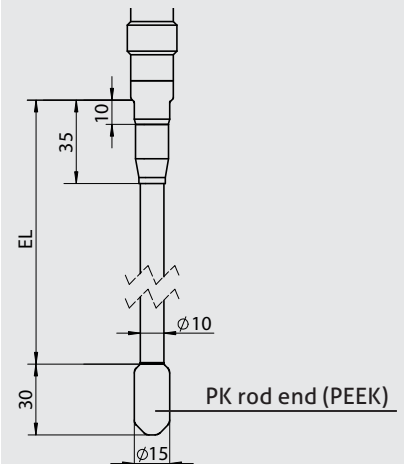
Type	Ø A
TC1	50.5 mm
TC2	64 mm
TC3	91 mm

Drawing NSL-M-01 / ... / 10 / TCx / ...

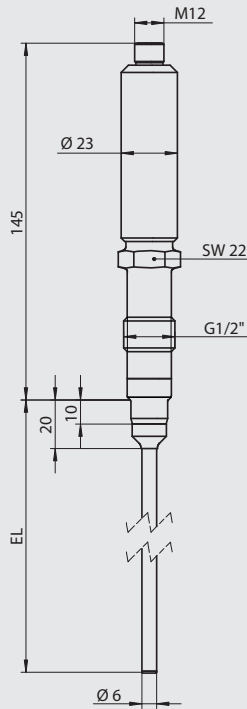


Note:
The NSL-M is also available in a bended version.
See product information NSL-M-01

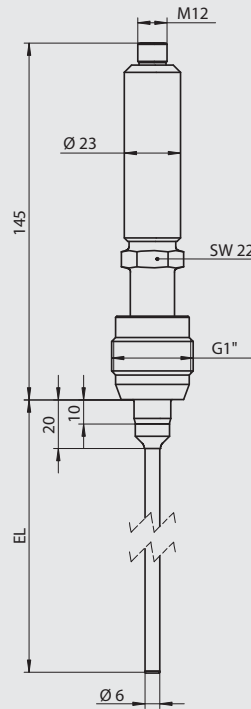
Drawing option PK



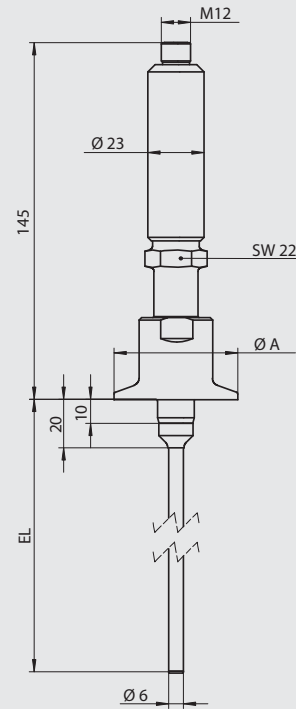
Drawing NSL-M ... / 6 / S0 / ...



Drawing NSL-M ... / 6 / S1 / ...



Drawing NSL-M ... / 6 / TCx / ...



Conditions for a measuring point according to 3-A Sanitary Standard 74-06



- The sensors NSL-M conforming to the 3-A Sanitary Standard.
- The sensors are designed for CIP-/ SIP-cleaning. Maximum 143 °C / 120 minutes.
- Only with the build-in system **CLEANadapt** (EMZ, EMK, Adapter AMC and AMV) allowed.
- Using the weld in sleeve EMZ, EMK the weld must comply to the requirements of the current 3-A Sanitary Standard.
- Mounting position, self draining and the position of the leakage detection hole must be in accordance to current 3-A Sanitary Standard.

Mounting position



If NSL-sensor is mounted into a vessel, there is a range of 20 mm or 35 mm (from sealing edge on) where no level can be measured. The 4 mA resp. 20 mA signal starts with the bottom bevel seam of the rod.

Cable with M12-plug and LED



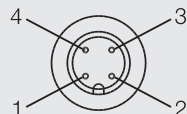
The NSL sensor is a 2-wire sensor with 4...20 mA output signal. Use of a cable with internal LEDs will cause a measurement error!

M12-plug with LED



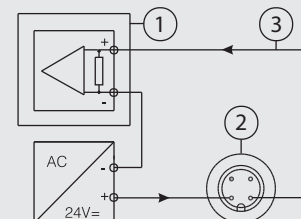
Configuration M12-plug

- 1: +supply
- 2: -supply 4...20 mA
- 3: data link to PC interface, must not be connected
- 4: data link to PC interface, must not be connected



Connecting 2-wire system

- 1: PLC
- 2: M12-plug
- 3: 4...20 mA current loop

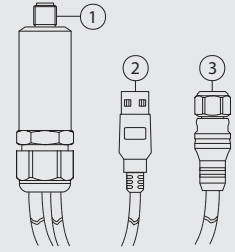


Programming adapter MPI-200

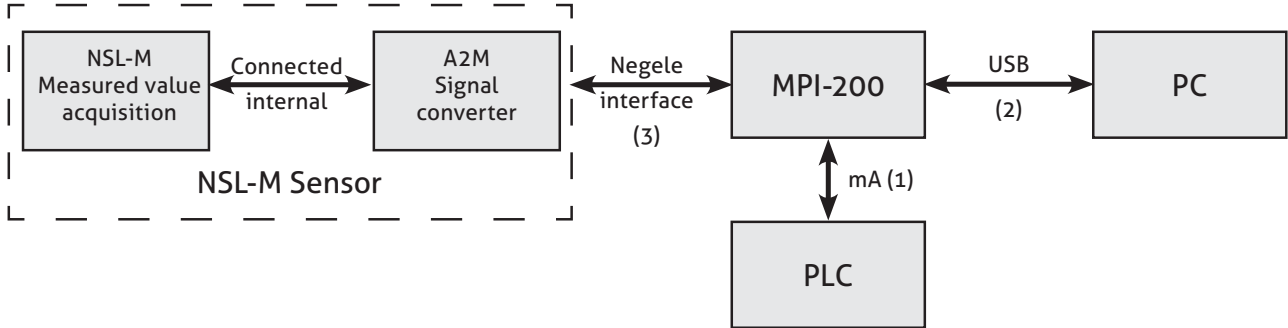


Connection of programming adapter MPI-200

- 1: External power supply via M12-plug (optional)
- 2: USB port for connection to PC incl. power supply if not supplied external
- 3: Connection cable to NSL-sensor



Signal flow while parametrization



Adjustment of NSL parameters

Using the PC based software and the programming adaptor MPI-200 the following NSL-M parameters can be adjusted or changed in situ (with vessel) or alternatively on the bench (in simaton mode): e.g.

4...20 mA Signal

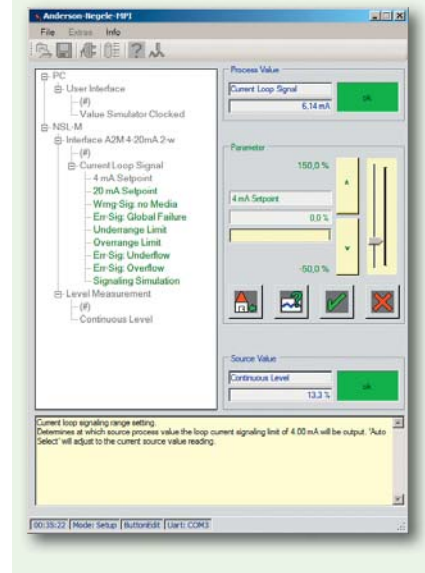
- Level for (4 / 20) mA output signal
- Warning signal "dry run"
- Error signal "failure"
- Signallimit for under- and overrange
- Error signal "over- and underflow"
- Signal simulation (3.80...21.20 mA)

Level measuring

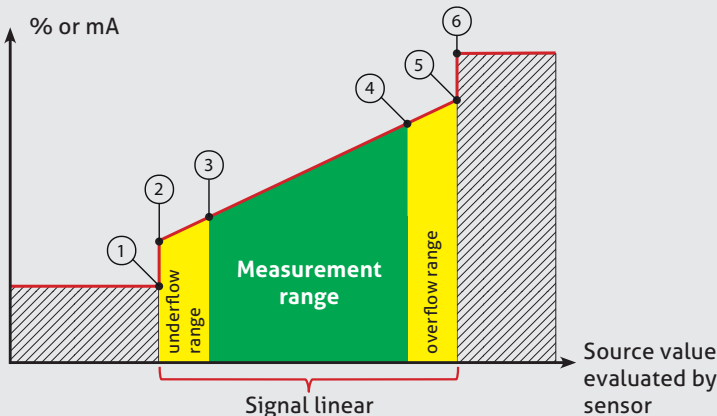
- Level zero/offset
- level slope/gain
- Damping/filter
- Physical Unit

Mounting position

Configuration software



Parameter/Signal sequence



- 1: Error signal: underflow
- 2: Underflow limit
- 3: 4 mA-setpoint
- 4: 20 mA-setpoint
- 5: Overflow limit
- 6: Error signal: overflow

Warning signal: dry run

- Sensor is not immersed into a media
- Signal can be adjusted from 3.8 up to 21.2 mA



Note

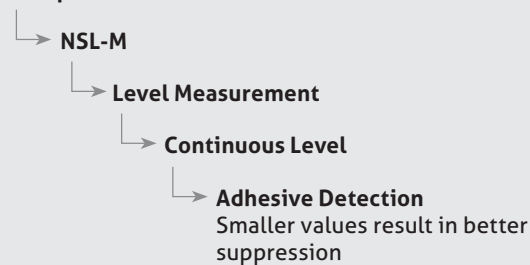
- A list of the parameter settings in the level switch is supplied with the device. These parameter settings and those changed by the user can be printed out in the software using the MPI-200 programming adapter.
- When making settings, note the help texts in the MPI software. They provide useful information on changing the selected parameter.

The default setting of the NSL-M level switch is for operation with aqueous media without requiring special adjustments. In exceptional cases involving highly critical media or special tank contours (with internal structures such as a pipe), it may be necessary to make adjustments to some of the parameters (the parameter can be found under the path specified below):

Coarse adjustment of adhesion detection

For installation from above or adhesions between the rod end and wall for installation from below

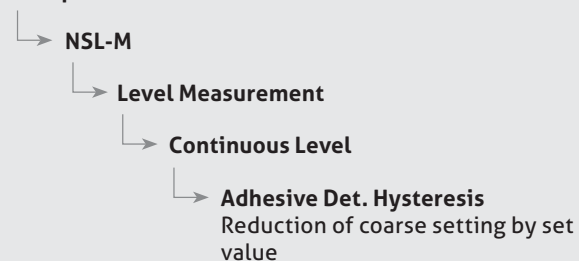
Setup Menue



Fine adjustment of adhesion detection

For installation from above or adhesions between the rod end and wall for installation from below

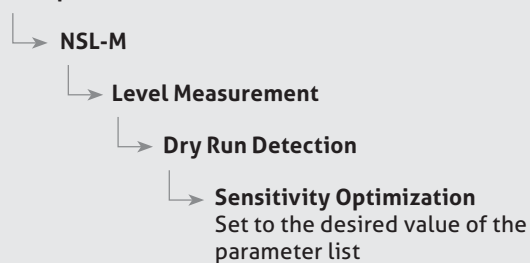
Setup Menue



Coarse adjustment of the sensitivity

In case of foam or adhesions to the lower end of the switch (4 mA signal)

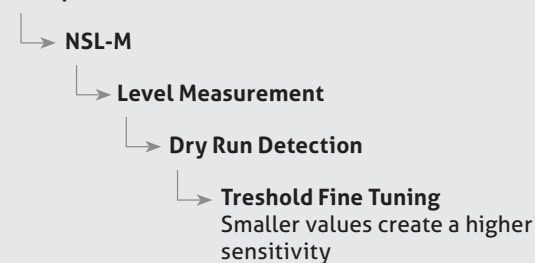
Setup Menue



Fine adjustment of the sensitivity

Fine adjustment for detecting the medium

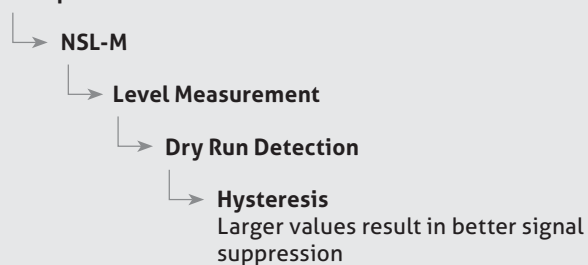
Setup Menue



Prevention of signal jumps in turbulent media

To damp signal jumps at the lower end of the sensor (4 mA signal)

Setup Menue



Note

Some parameters are password-protected. The password can be obtained from the Anderson-Negele hotline if needed.

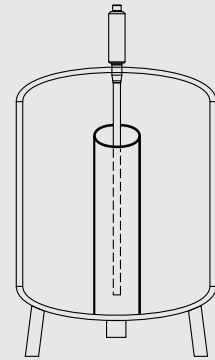
Adjustment to built-in components in vessel

Setup Menu

- ↳ NSL-M
 - ↳ Level Measurement
 - ↳ Dry Run Detection
 - ↳ Dry Run Calibration

By pressing the button "System parameter suggestion" a self test will be executed.
Confirm this value by saving.

Vessel with built-in components



System parameter suggestion

To generate the system parameter suggestion, there should be no media in the vessel.

Transport/Storage

- No outdoor storage
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature -40...+85 °C
- Relative humidity maximum 98 %

Reshipment

- Sensors and process connection shall be clean and must not be contaminated with dangerous media and/or heat-conductive paste! Note the advice for cleaning!
- Use suitable transport packaging only to avoid damage of the equipment!

Cleaning/Maintenance

- In case of using pressure washers, don't point nozzle directly to electrical connections!

Standards and Guidelines

- You have to comply with applicable regulations and directives

Advice to EMC

- Applicable guidelines: Electromagnetic compatibility 2004/108/EC
- The accordance with applicable EU-guidelines is confirmed with CE-labeling of the device.
- You have to guarantee the compliance of all guidelines applicable for the entire equipment.

Disposal

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

Accessories

**M12 connector Molded PVC Cord-set.
Foil shielded with unlanded drain ground.**

NEMA 4x, 6P and IEC IP68, IP69k. Length 25ft, 50ft, 100ft

P/N 42117K0025 (25ft), 42117K0050 (50ft), 42117K0100 (100ft)

**Programming adapter
MPI-200**

Incl. PC software

Option PK



Order code

NSL-M- (Potentiometric level sensor for food application, 2-wire technology)

Design for food and beverage

00 (standard, straight version, maximum length EL = 3000 mm)

Rod length EL, choose length in a 10 mm raster, e.g.: 0220, 0230, 0240 etc., max length 3000 mm.
(intermediate sizes in 1-mm steps on request.)

0050...3000 (material 1.4404)

Rod diameter

06 (Ø 6 mm, up to rod length 199 mm)

10 (Ø 10 mm, from rod length 200 mm)

Process connection version

TC1 (Tri-Clamp 1...1½")

TC2 (Tri-Clamp 2")

TC3 (Tri-Clamp 3")

S00 (CLEANadapt G1/2" hygienic)

S10 (CLEANadapt G1" hygienic)

V25 (Varivent Type F; DN25)

V40 (Varivent Type N; DN40/50)

Surface roughness

8 ($R_a \leq 0.8 \mu\text{m}$)

Material certificate

0 (no certificate, standard)

Z (with 3.1 material certificate for 1.4404)

Installation position

0 (installation from top)

U (installation from bottom)

Output signal

A2M (4...20 mA, analog, 2-wire)

Electrical connection

M12 (M12-plug 1.4305)

Insulation at rod end

XX (without, standard)

PK (PEEK insulation)

Parameter configuration

X (standard)

1 (write out details)

NSL-M- 00/ 1500/ 10/ S0/ 8/ 0/ U/ A2M/ M12/ XX/ X