Operating Manual

Potentiometric Level Sensor
NSL-F / NSL-FR

Table of contents

1 Application/intended use

- Continuous level monitoring in metallic vessels up to 3m in height
- Ideal for highly adhesive and pasty media
- Filling level measurement of foamy media
- Hygienic use for float sensors
- Media with a conductivity of 50 µS/cm or higher (media with a lower conductivity require individual clarification regarding the tank contour, temperature, assembly, etc.)
- Not suitable for explosive areas
- Not suitable for safety-related unit parts (SIL)

2 Conformity with standards

The basic safety and health requirements are met through fulfillment of

- 2014/30/EU Electromagnetic Compatibility
- 1935/2004/EU Consumer Goods Ordinance
- Directive (EU) 10/2011 (articles in contact with food)
- EN 61000-6-2:2005 (Interference Immunity)
- EN 61000-6-4:2007 + A1:2011 (Interference Emissions)

3 Safety instructions

These safety instructions must be followed to

- Avoid endangering persons and the environment
- Avoid damage to the sensors
- Prevent faulty batches during production

The electrical connections may only be performed by persons with the necessary technical skills (e.g. certified electricians or persons with technical training in electrics) and by persons with the necessary authorization from the operator.

The power supply and the control circuit inputs and outputs must be properly wired. The current state-of-the-art of electrical connections must be adhered to. See also section 9 "Wiring diagram".

The following details must be noted in particular:

- Safety instructions
- Electrical connection data

1. All persons involved with the setup, commissioning, operation, service and maintenance of the sensor must be suitably qualified.
2. This operating manual must be followed precisely. The operator must ensure that the personnel has read and fully understood the operating manual.
3. All work must be performed with utmost care and may only be performed by authorized and trained personnel. The regulations effective in the country of use regarding the opening and repair of the devices must be adhered to.
4. The operating manual must be stored in the vicinity of the measurement equipment in an easily accessible location.
5. The sensor must be de-energized prior to alterations and maintenance.
6. The working area of the operator must offer enough space to minimize the risk of injury.
7. The technical data specified in the operating manual and on the type label must be adhered to.

Warranty coverage shall not be granted for any damage that can be attributed to improper execution of work.

4 Special features/advantages

- Installation in tanks and feed vessels from above, below and diagonally (types NSL-F-00 and NSL-F-02)
- Lateral installation in tanks by means of an angulated sensor and various clamping systems (type NSL-F-01)
- Four-conductor sensor with 4...20-mA output signal or optional IO-Link
- Due to the potentiometric measuring principle, calibration is not required after a change in medium
- Individual setting/programming via PC, IO-Link or display
- Current signal for measuring range, dry-run message and error message can be adjusted
- The M12 plug connection can be aligned by turning the sensor head
- 2 individual configurable LEDs on the display unit

5 Options/accessories

- Simple User Interface with small or large display (retrofittable)
- Programming adapter MPI-200 (PC-based)
- Tool for releasing the signal module
- Preassembled PVC cable

PVC cable with M12 coupling of stainless steel 1.4305, IP 69k, unshielded

- **M12-PVC/4–5 m** PVC cable, 4-pin, 5 m in length
- **M12-PVC/4-10 m** PVC cable, 4-pin, 10 m in length
- **M12-PVC/4-25 m** PVC cable, 4-pin, 25 m in length

PVC cable with M12 coupling of nickel-plated brass, IP 67, shielded

- **M12-PVC/4G–5 m** PVC cable, 4-pin, 5 m in length
- **M12-PVC/4G–10 m** PVC cable, 4-pin, 10 m in length
- **M12-PVC/4G–25 m** PVC cable, 4-pin, 25 m in length

6 Installation and connection

Information on mounting position

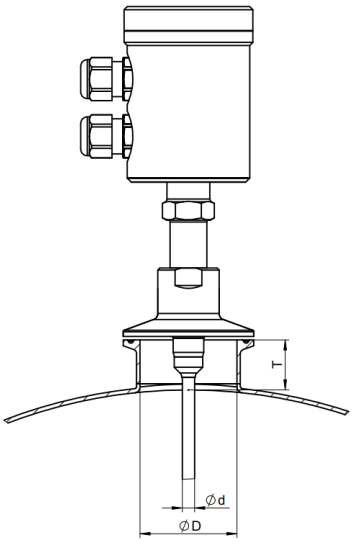
If the sensor is installed in the tank, the measurement signal will not be reliable in an area of 20 mm (35 mm) from the sealing edge (see dimensional drawing). This means that the 4 mA or 20 mA signal is located on the bottom weld seam of the measuring rod.

6.1 Requirements for hygienic installation

Conditions for hygienic installation according 3A and EHEDG

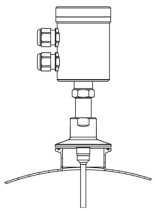
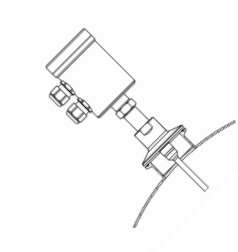
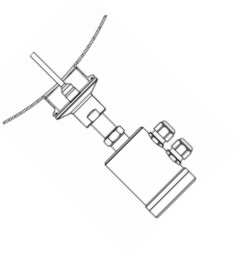
- The NSL-F / NSL-FR is designed for CIP/SIP cleaning. The sensor can withstand a maximum of 143 °C / 120 min.
- Self-draining installation position and the avoidance of dead spaces must be ensured.
- When using Tri-Clamp process connections, observe the requirements of the current 3A and EHEDG regulations regarding installation position, process connections and approved seals.

Dimensions for hygienic installation with Tri-Clamp

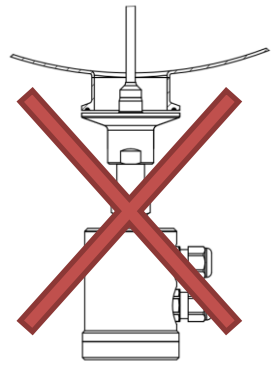


Tri-Clamp: T < (D-d)

Permitted mounting positions

		
NSL-F from top	NSL-F from side, top	NSL-F from side, bottom

Not permitted mounting position for Tri-Clamp


NSL-F (Tri-Clamp) from bottom

The continuous level sensor NSL-F is set to operate in aqueous media without requiring special settings. In case of highly critical media or special tank contours (with inside fittings such as a pipe), it may be necessary to adjust some parameters. The parameterization may be changed using the PC-based MPI-200 programming adapter or the Simple User Interface. The setting can either be set or changed directly on location or in the office in a dry simulation.

When setting the parameters, it must be ensured that the various authorization levels are enabled (see "Associated setup mode" column). The Monitor and Adjust levels are not required for setting the NSL-F sensor. These levels can be individually protected with a password and thus made available to specific users/service personnel. The software in both the PC/MPI-200 and Simple User Interface features a tree structure.

List of parameters to be configured

4...20-mA signal • Filling level height for 4/20-mA signal • "Dry run" warning signal	**Filling level measurement** • Filling level zero point/offset • Filling level slope/gain

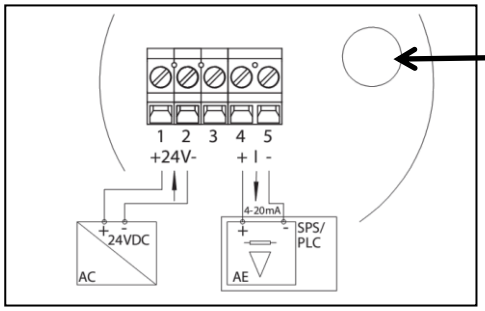
• "Failure" error signal • "Underdrive/overdrive" signal limit • "Underflow/overflow" error signal • Signal simulation (3.95...20.05 mA)	• Damping/filter • Physical unit **Mounting Position** • Top or bottom

A list of the parameter settings in the continuous level sensor is included with the delivery. These default parameter values, and the parameter values changed by the user, can be printed out using the MPI-200 programming adapter software.

When making the settings, note the help texts in the MPI software. These contain additional useful information on changing the selected parameter.

6.2 Setup using the MPI-200 programming adapter

The MPI-200 programming adapter is connected to the NSL-F continuous level sensor via the external MPI-200-F adapter piece. It must be ensured that the NSL-F continuous level sensor is permanently connected to the supply voltage while the parameters are being set.



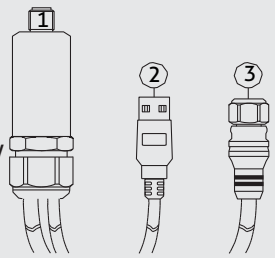
Connection plug for MPI-200-F adapter as an intermediate plug between the NSL-F electronics and the MPI-200 connection 3 (see next figure).

Connection of the programming adapter MPI-200

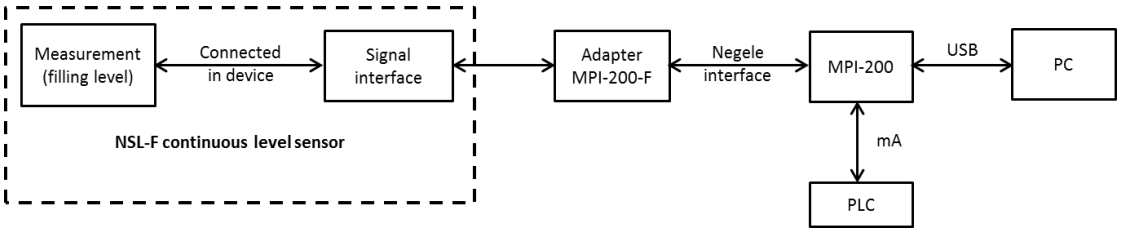
1: Connection for M12 connector (external power supply)

2: USB port for connecting to a PC incl. power supply if not supplied externally

3: Connecting cable to adapter for NSL-F



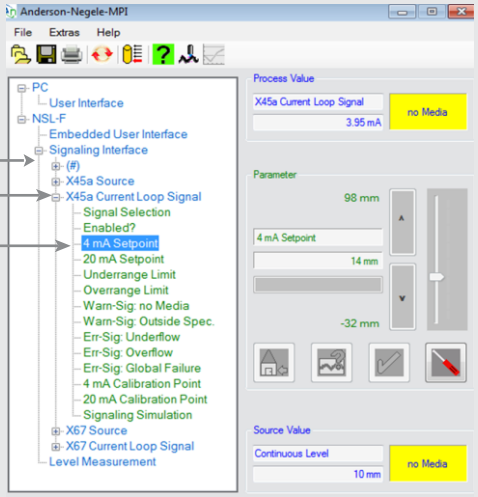
Signal flow during programming



The correlation between the table below and the software is as follows:

MPI-200 software: e.g. 4-mA set value display on PC

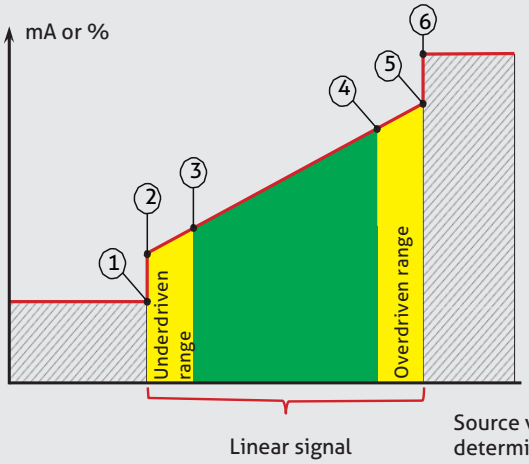
Node	Value name	Parameter name
Signal interface	X45a Current loop signal	4 mA setpoint



Note:

For further settings, please see also the description in the MPI-200 product information

Parameters/signal curve



1: Error signal: value underflow
2: Underdrive limit
3: 4 mA set value
4: 20 mA set value
5: Overdriven limit
6: Error signal: value overflow

Warning signal: no medium
Sensor is not submerged in the medium

Signal can be adjusted between 2.40...22.00 mA

Parameter	Node/module	Value name
4 mA Setpoint	Signal Int	x45a I-Out
20 mA set value	Signal Int	x45a I-Out
Underrange limit	Signal Int	x45a I-Out
Overrange limit	Signal Int	x45a I-Out
Warn-Sig: no Media	Signal Int	x45a I-Out
Warn-Sig: out of Spec.	Signal Int	x45a I-Out
Err-Sig: Overflow	Signal Int	x45a I-Out
Err-Sig: Underflow	Signal Int	x45a I-Out
Err-Sig: Global Failure	Signal Int	x45a I-Out
Mounting Orientation	Measure	(#)
Zero-Point (Offset)	Measure	Level
Slope (Gain)	Measure	Level
Damping	Measure	Level

Sensitivity Optimization	Measure	Dry Run D.
Threshold Fine Tuning	Measure	Dry Run D.

6.3 Setup using the Simple-User- / Large-User-Interface

The software structure of the Simple User Interface is similar to that of the PC version.

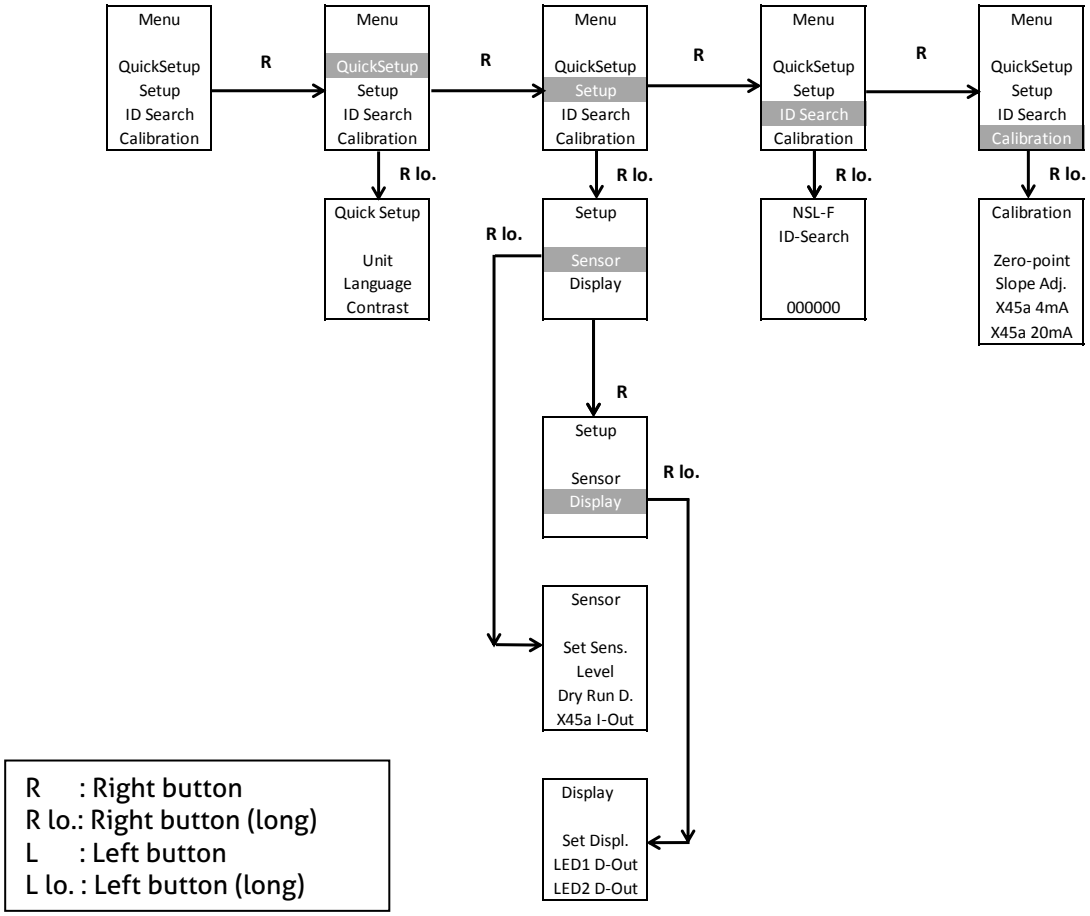
The system is operated using two control buttons to the left and right of the display. The button functions are as follows:

Right button, press briefly	R	Jump to next node, parameter
Right button, press and hold	RL	Edit a node, parameters
Left button, press briefly	L	Jump back to previous node, parameter ...
Left button, press and hold	LL	Leave the editing mode without saving, return to the next higher level
Right or left button briefly	R/L	scroll up or down
Press and hold both buttons		Press both buttons for 10 seconds, then jump back to the beginning of the menu (attention this is not a reset)

Note:

The abbreviations in column 2 refer to the following programming example.

Menu flowchart to change a parameter



Notes on setting using an ID number

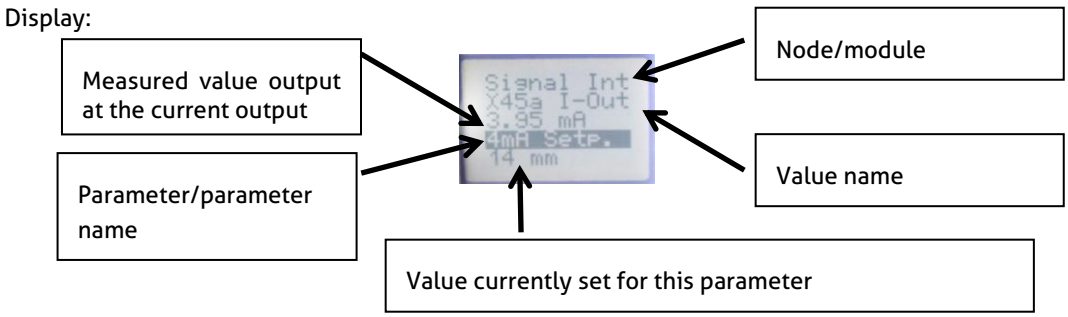
1) Press and hold the right button, the display jumps to the menu.
2) Confirm right key 2x briefly to position "ID search".
3) Press and hold the right key and select the desired item "ID Search
4) Press and hold the right key, then enter the ID number from right to left.

Proceed as follows:

a) Select the desired position (navigation with right/left - press the left key): Change position to the left, press right key, change position to the right.)
b) Press and hold the right-hand key at the desired position until the field is highlighted in grey, then enter the numerical value with the right/left keys and confirm with the right-hand key for a long time until the number is no longer stored. Then enter the next digit.
c) When all digits have been entered, press the left or right key until all digits are highlighted in gray.
d) Next, press and hold the right key. The system then jumps to the selected parameter and this can now be entered / changed in the same way. Start here - again, press and hold the right button.
e) For some system-relevant parameters, a confirmation prompt will appear asking whether the change should be saved or not.

5) The input can be aborted by pressing and holding the left button. The setup can be canceled by pressing and holding the left button several times.

- Pressing the right button means that the parameter is changed or saved.
- Pressing the left button means leaving the setting without changing it.



For adjusting parameters directly in the sensor (see chapter **6.3 Setup using the Simple-User- / Large-User-Interface**) you have to use the ID-codes from the table below.

List of ID-codes:

Parameter	Possibility of adjust-ment	Adjustable values / Units	ID-Code
Quick Setup			
Unit		mm or %	000010
Language		Deutsch or English	451010
Contrast		Values from 00 to 31	451020
Setup			
Sensor			
Set Sens.			
	Mounting	Mounting Top or Bottom	012140
Level			
	Damping	inactive, 100ms, 200ms, 500ms, 1s, 2s, 5s	000020
	Unit	mm or %	000010
	Adhesive >	Values from 100.0 to 200.0	012170
	Adh. Hyst.	Values from 000.0 to 200.0	012175
Dry Run D.			
	Sense. Opt.	Universal, Foam, Foam ++	012180
	Thrld fine	Values from -0.05 to -1.95 in 0.05er steps	012121
	Hysteresis	Values from 0.05 to 0.50 in 0.05er steps	012185
	Dry Cal.	Values from 000 to 180	012190
X45a I-Out			
	Signal Sel	001 to 254	330031
	Underrange	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA	330141
	Overrange	20.00 mA, 20.05 mA, 20.50 mA, 21.00 mA, 21.20 mA, 21.40 mA, 21.60 mA, 21.80 mA, 22.00 mA	330211
	no Media =	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA	330121
	Out Spac. =	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA	330221
	Underflow =	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA, 20.00 mA, 20.05 mA, 20.50 mA, 21.00 mA, 21.20 mA, 21.40 mA, 21.60 mA, 21.80 mA, 22.00 mA	330151
	Overflow =	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA, 20.00 mA, 20.05 mA, 20.50 mA, 21.00 mA, 21.20 mA, 21.40 mA, 21.60 mA, 21.80 mA, 22.00 mA	330161
	Failure =	2.40 mA, 3.20 mA, 3.40 mA, 3.60 mA, 3.80 mA, 3.95 mA, 4.00 mA, 20.00 mA, 20.05 mA, 20.50 mA, 21.00 mA, 21.20 mA, 21.40 mA, 21.60 mA, 21.80 mA, 22.00 mA	330131
	Simulation	-050.0 to 150.0 in 0.1er steps	330201
Display			
Set Displ.			
	Language	Deutsch or English	451010
	Contrast	Values from 00 to 31	451020
	Scrs delay	never, 2 min, 5 min, 10 min	451050
	Password	any 4-digit value	450103
LED1 D-Out			
	Signal Sel	001 to 254	330034
	Function	State Src., Discrimin., Threshold	331111
	Inp.Method	Sw.Pnt + Hys, 2Pt MinMax	331131

	Switch.Pnt	-025.0 % to 125.0 % in 0.1er Steps	331141
	Hysteresis	00.0 % to 50.0 % in 0.1er Steps	331251
	ON Delay	00.0 to 30.0 s in 0.1er Steps	331171
	OFF Delay	00.0 s to 30.0 s in 0.1er Steps	331181
	no Media =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331191
	Out Spec =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331201
	Underflow =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331211
	Overflow =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331221
	Failure =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331231
	Simulation	Output OFF, Output ON, Slow Blink, Fast Blink	331241
LED2 D-Out			
	Signal Sel	001 to 254	330035
	Function	State Src., Discrimin., Threshold	331112
	Direction	Norm. Open, Norm. Clsd	331122
	Inp. Method	SP + Hyst., 2Pt MinMax	331132
	Switch.Pnt	-025.0 % bis 125.0 % in 0.1er Steps	331142
	Hysteresis	00.0 % bis 50.0 % in 0.1er Steps	331252
	ON Delay	00.0 s bis 30.0 s in 0.1er Steps	331172
	OFF Delay	00.0 s bis 30.0 s in 0.1er Steps	331182
	no Media=	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331192
	Out Spec. =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331202
	Underflow =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331212
	Overflow =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331222
	Failure =	No Effect, Fast Blink, Slow Blink, Output ON, Output OFF	331232
	Simulation	Output OFF, Output ON, Slow Blink, Fast Blink	331242
ID Search			
		Submission of 6-digit ID-Code, if it is known, Sensor jumps directly to this menu item	
Calibr.			
Zero-Point		-50.0 % to 50.0 % in 0.1 steps	012130
Slope Adj.		50.0 % to 150.0 % in 0.1 steps	012135
X45a 4mA		-50.0 % to 150.0 % in 0.1 steps	330111
X45a 20mA		-50.0 % to 150.0 % in 0.1 steps	330191

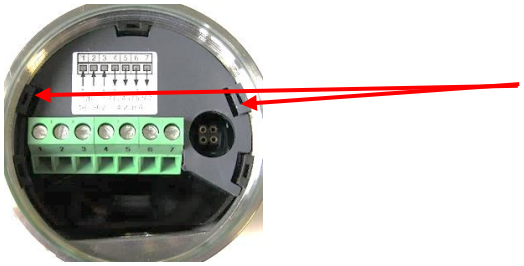
7 Installation of the „Large User Interface" (LUI)

1. Remove the plastic cover (continue with step 4), or remove the puck with the mounted small display (continue with step 2)
2. Remove the small display
3. Install the puck in the sensor head
4. Mount the large display

Hot-plug function: The large display can be installed while the sensor is energized, but this requires the usual precautionary measures when working with electronic components.

If the display is being installed while energized, it is necessary to press both buttons simultaneously for > 10 s after the display is installed to activate the display.

7.1 Retrofitting the display if a display was not yet installed



Remove the plastic cover: To do so, bend the tabs slightly inwards with a screwdriver to be able to remove the cover easily.

After removing the plastic cover, the large display can be inserted in the head of the sensor. The tabs (Fig. 2) must be inserted in the appropriate openings on the puck (Fig. 1). Then the display can be easily pressed onto the puck. No wiring is required.

Note: After the Large User Interface is mounted, the sensor can only be operated on this display since the display conceals the connector for the MPI-200 adapter. If operating the sensor using the programming software is preferred, the display must be removed. Then the connector of the programming adapter can be plugged in.

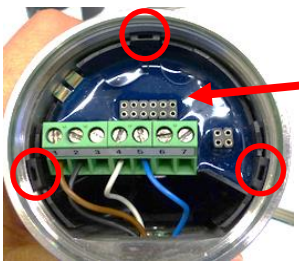


Fig. 1

Fig. 2

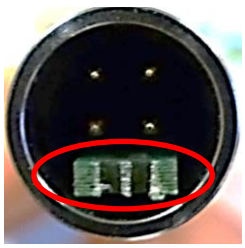


Fig. 3

Attention: The connector of the programming adapter (Fig. 3) must be connected in the correct direction → the green spacer must face the cable exit (M12 connector or PG).

7.2 Retrofitting the display if a small display (SUI) was already installed

First the puck with the mounted display needs to be removed using the puck puller tool (Fig. 4). To do so, detach the wires from the cable terminal. Then insert the five arms of the puck puller in the plastic tabs of the puck (Fig. 5).

Fig. 4

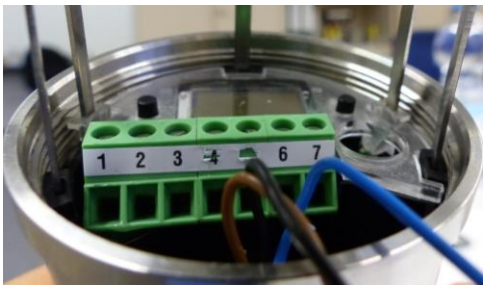
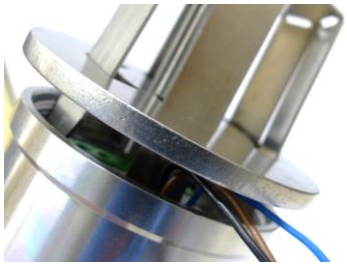


Fig. 5

Push the puck puller all the way into the sensor head and push the disk as far as possible toward the sensor head so that the arms of the puck puller firmly grasp the puck.
Pull the puck with the display out of the sensor housing and pull the small display off the puck.



Now the puck without the display can be properly positioned and installed back in the sensor head and the wiring can be reconnected to the cable terminal. Then the large display can be mounted → see chapter **7.1 Retrofitting the display if a display was not yet installed**.

7.3 Operating the large display

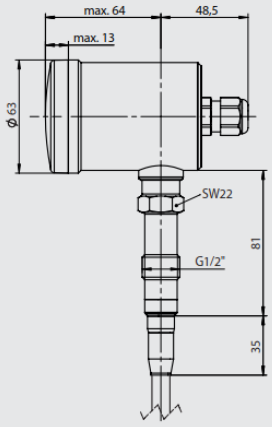
The large display (LUI) is operated in the same way as the small display (SUI). It is operated using two operating buttons below the display:

After the sensor is started, the screen saver appears in which the process values of the sensor are displayed one after the other. To reach the start page from here, press one of the two buttons briefly. Further information on operating the display can be found in the quick start manual and in the operating manual.

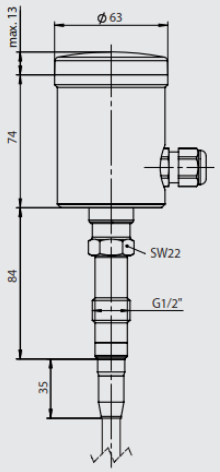
8 Dimensions

NSL-F (Straight Version)

NSL-F ... with horizontal head



NSL-F ... with vertical head



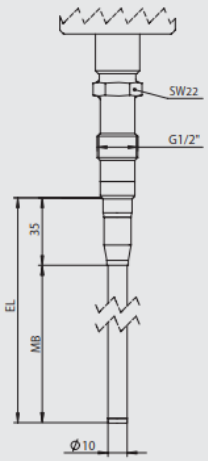
Rod diameter

Rod diameter is depending on rod length (EL). For exact diameter see below-mentioned tables.

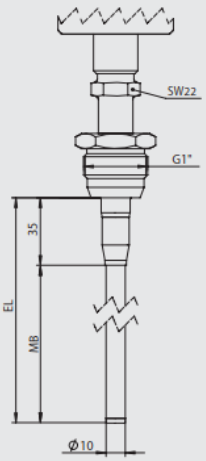
Rod diameter NSL-F-00	
EL	**Ø D**
50...199 mm	6 mm
200...3000 mm	10 mm

Rod diameter NSL-F-01, NSL-FR-01	
EL	**Ø D**
80...1500 mm	10 mm

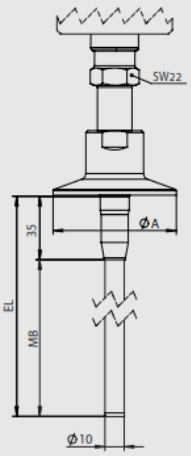
NSL-F-00/.../S00/... with EL > 200 mm



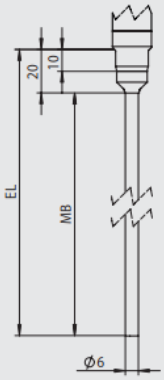
NSL-F-00/.../S01/... with EL > 200 mm



NSL-F-00/... /TC1/... with EL > 200 mm



NSL-F-00/... with EL < 200 mm



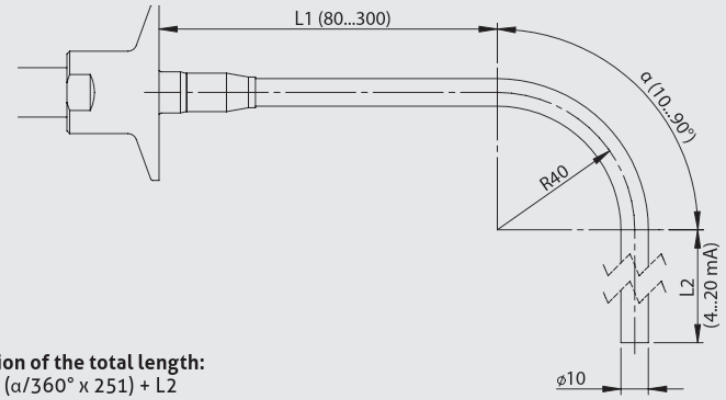
Tri-Clamp diameter	
Typ	**Ø A**
TC1	50.5 mm
TC2	64.0 mm
T25	77.5 mm
TC3	91.0 mm

NSL-F-01 (Curved Version)

The following figure only contains information on the rod design. The sizes of the head and process connection can be gathered from the drawings for NSL-F-00.

Version NSL-F-01

The NSL-F sensor is optionally available as version NSL-F-01 and NSL-FR-01 with a curved rod.

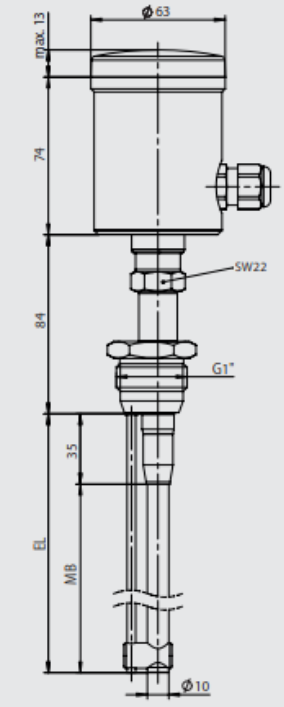


Calculation of the total length:
EL = L1 + (α/360° x 251) + L2

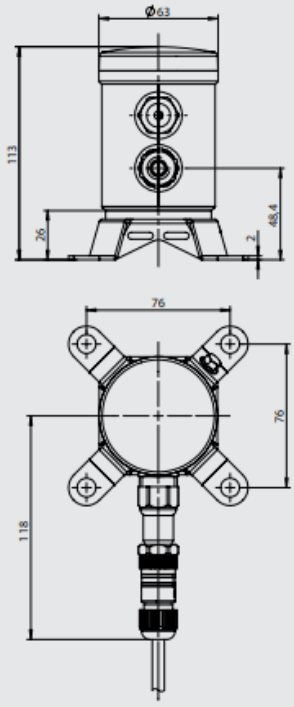
NSL-F-02 (Double Rod Version)

Except for the rod length of 200 mm up to max. 1500 mm, the NSL-F-02 is identical to the NSL-F-00.

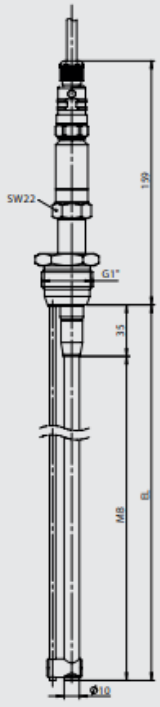
Drawing NSL-F-02



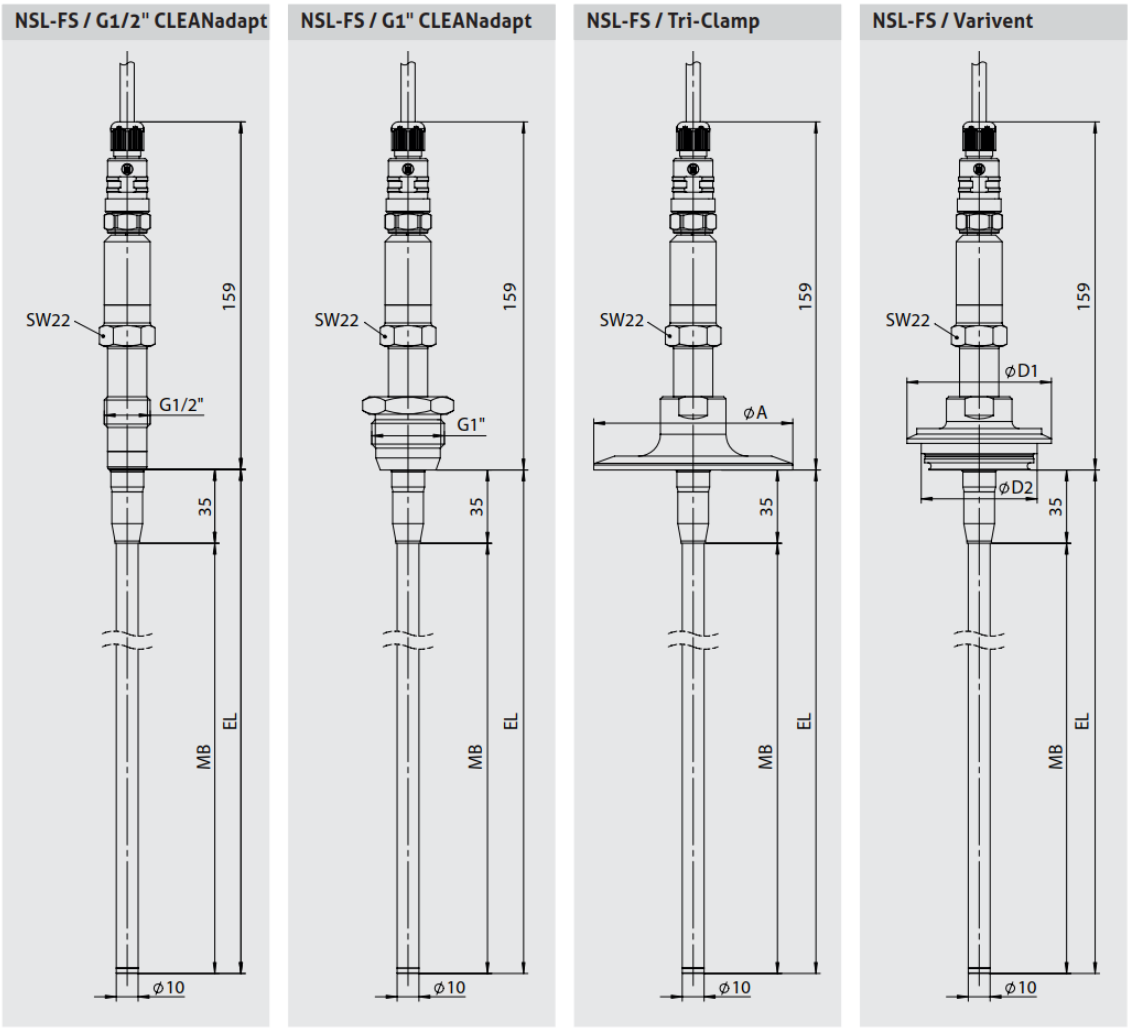
HUR | Head unit remote version

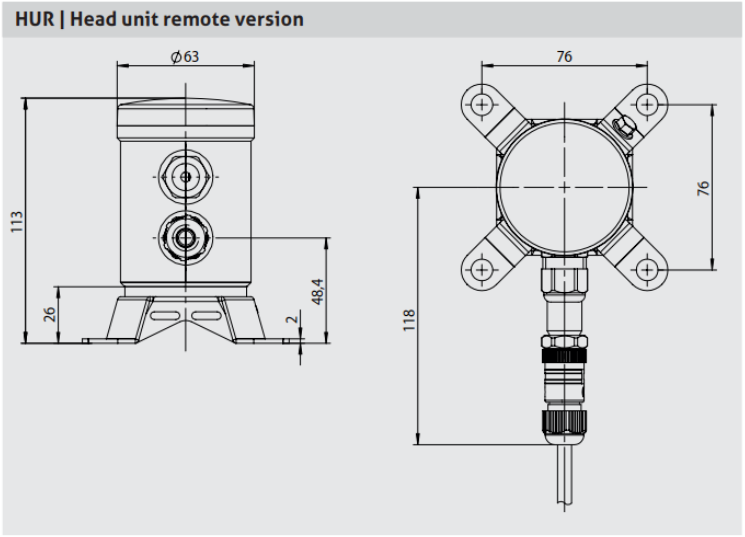


Drawing NSL-FS-02



NSL-FR (Remote Version)





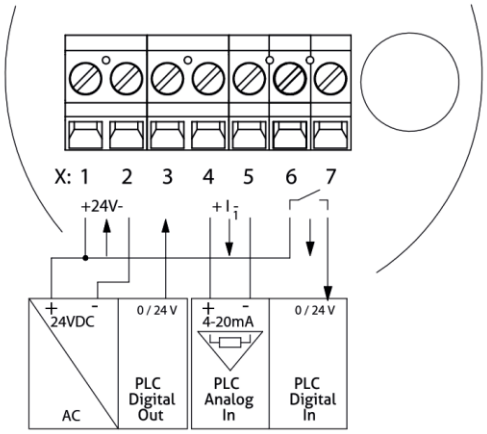
Dimensions table Varivent®

Type	Varivent® Type	D1 [mm]	D2 [mm]
V10	B	52.7	31.0
V25	F	66.0	50.0
V40	N	84.0	68.0

9 Electrical Connection Analog Signal Modules

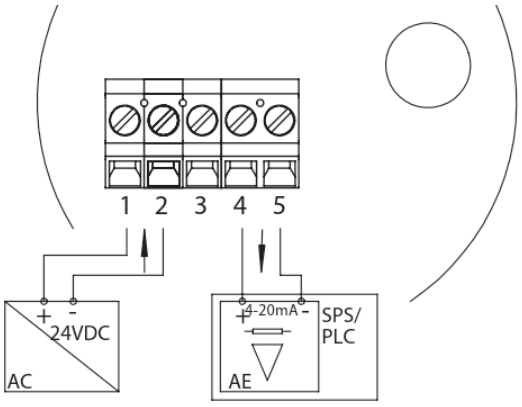
9.1 Terminal Block of A5x Series

X	A52	A53
X1	Power Supply +	
X2	Power Supply -	
X3	Not assigned	Digital Input X3
X4	Analog Output X45 +	
X5	Analog Output X45 -	
X6	Relay Output 67	
X7	Relay Output 67	

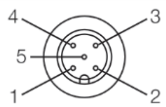


9.2 Terminal Block of A4x Series

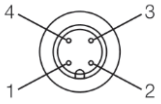
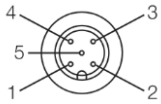
X	A42
X1	Power Supply +
X2	Power Supply -
X3	Not assigned
X4	Analog Output X45 +
X5	Analog Output X45 -

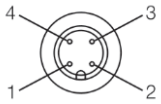
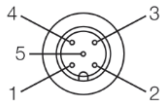


9.3 M12 connector cables color

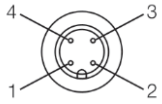
M12 Connector	Pin	Standard Color	Anderson Color
	1	Brown	Red
	2	White	Black
	3	Blue	Green
	4	Black	Not assigned
	5	Grey	White

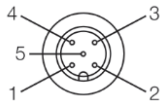
9.4 M12 Connector of A5x Series

Electrical Connection „N“				
M12 Connector		**Signal Module**		
Connector	**Pin**	**A52**	**A53**	**X**
	1	Analog Output X45 +		X4
	2	Relay Output X67		X6
	3	Relay Output X67		X7
	4	Analog Output X45 -		X5
	1	Power Supply +		X1
	2	Not assigned		-
	3	Not assigned		-
	4	Power Supply -		X2
	5	Not assigned	Digital Input X3	X3

Electrical Connection „A“				
M12 Connector		**Signal Module**		
Connector	**Pin**	**A52**	**A53**	**X**
	1	Analog Output X45 -		X5
	2	Analog Output X45 +		X4
	3	Power Supply +		X1
	4	Power Supply -		X2
	1	Relay Output X67		X6
	2	Not assigned		-
	3	Not assigned		-
	4	Relay Output X67		X7
	5	Not assigned	Digital Input X3	X3

9.5 M12 Connector of A4x Series

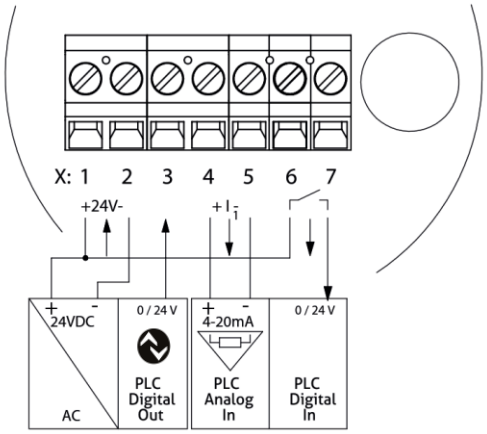
M12 Connector		Electrical Connection „M“	
Connector	**Pin**	**Signal Module A42**	**X**
	1	Power Supply +	X1
	2	Analog Output X45 +	X4
	3	Analog Output X45 -	X5
	4	Power Supply -	X2

M12 Connector		Electrical Connection „L“	
Connector	**Pin**	**Signal Module A42**	**X**
	1	Power Supply +	X1
	2	Power Supply -	X2
	3	Analog Output X45 -	X5
	4	Not assigned	-
	5	Analog Output X45 +	X4

10 Electrical Connection Digital Signal Modules

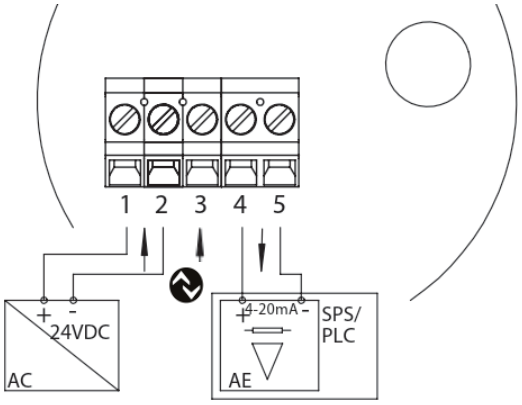
10.1 Terminal Block of I5x Series

X	A52	A53
X1	Power Supply +	
X2	Power Supply -	
X3	IO-Link	IO-Link / Digital Input X3
X4	Analog Output X45 +	
X5	Analog Output X45 -	
X6	Relay Output 67	
X7	Relay Output 67	

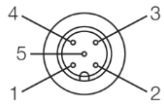


10.2 Terminal Block of I4x Series

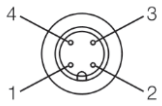
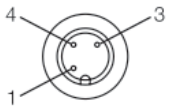
X	I42
X1	Power Supply +
X2	Power Supply -
X3	IO-Link
X4	Analog Output X45 +
X5	Analog Output X45 -



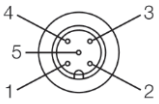
10.3 M12 connector cables color

M12 Connector	Pin	Standard Color	Anderson Color
	1	Brown	Red
	2	White	Black
	3	Blue	Green
	4	Black	Not assigned
	5	Grey	White

10.4 M12 Connector of I5x Series

Electrical Connection „R“			
M12 connector		**Signal Module**	
Connector	**Pin**	**A52**	**A53**
	1	Analog Output X45 +	
	2	Relay Output X67	
	3	Relay Output X67	
	4	Analog Output X45 -	
IO-Link 	1	Power Supply +	
	3	Power Supply -	
	4	IO-Link	IO-Link / Digital Input X3

10.5 M12 Connector of I4x Series

M12 Connector		Electrical Connection „C“	
Connector	**Pin**	**Signal Module I42**	**X**
IO-Link 	1	Power Supply +	X1
	2	Analog Output X45 -	X5
	3	Power Supply -	X2
	4	IO-Link	X3
	5	Analog Output X45 +	X4

11 Repair and maintenance

The level sensor described here is maintenance-free and contains components that could be repaired.

12 Technical data

Rod length EL	Product-contacting	Max. 3000 mm (NSL-F-00) Max. 1500 mm (NSL-F-01 / NSL-F-02)
Measurement range		50...199 mm (rod diameter 6 mm) 200...max. EL (rod diameter 10 mm)
Process connection	Thread Tri-Clamp Varivent	CLEANadapt G ½", G1" hygienic 1.5", 2", 2.5", 3" DN 25 (type F) DN 40/50 (type N)
Process pressure		Max. 16 bar
Tightening torque		10 Nm (CLEANadapt system)
Materials	Connecting head Threaded connector Insulating part Rod	Stainless steel 1.4308 Stainless steel 1.4305 PEEK (FDA approval: 21 CFR 177 2415) Stainless steel 1.4404; Ra ≤0.8 µm
Temperature ranges	Environment Storage temperature Process CIP/SIP	0...70 °C -40...85 °C -10...140 °C 143 °C max. 120 min
Resolution	Rod length >500 mm Rod length <500 mm	<0.1% of rod length <0.5 mm
Accuracy	Media with conductivity >50 µS/cm (beer, milk) Media with conductivity <50 µS/cm	<1% of rod length Depending on temperature, tank contour, medium, distance to tank wall
Linearity		<1.0% of rod length
Reproducibility	Rod length >500 mm Rod length <500 mm	<0.2% of rod length <1.0 mm
Temperature drift	At 25°C	≤0.1%
Response time t90		<100 ms
Electrical connection	Cable gland Cable connection Supply Protection class	2x M16 x 1.5 2x M12 connector 1.4301 (AISI 304) 18...36 V DC IP 69 K
Communication	Analog Digital	1x Analog Output 4...20 mA, potential-free 1x Relay Output (optional), 1x Digital Input (optional) IO-Link v1.1
Weight		920 g at length of 1.5 m

Negele Messtechnik GmbH | Raiffeisenweg 7 | 87743 Egg an der Guenz | Germany | Phone: +49 83 33 . 92 04 – 0 | Fax: +49 83 33 . 92 04 - 49
Anderson Instrument Company Inc. | 156 Auriesville Road | Fultonville, NY 12072 | Phone: +1 518-922-5315 | Fax: +1 518-922-8997