

Technical Instructions of Transit Time Sensors

(Original technical instructions – German)



as of DSP-Version: 5.13 (NOS)
5.14 (NIS)
5.14 (NIC0)

NIVUS GmbH
Im Taele 2
75031 Eppingen, Germany
Tel. +49 (0) 72 62 / 91 91 - 0
Fax +49 (0) 72 62 / 91 91 - 999
E-mail: info@nivus.com
Internet: www.nivus.com

NIVUS AG

Hauptstrasse 49
8750 Glarus, Switzerland
Phone: +41 (0)55 6452066
Fax: +41 (0)55 6452014
E-Mail: swiss@nivus.com
Internet: www.nivus.de

NIVUS Sp. z o.o.

ul. Hutnicza 3 / B-18
81-212 Gdynia, Poland
Phone: +48 (0) 58 7602015
Fax: +48 (0) 58 7602014
E-Mail: poland@nivus.com
Internet: www.nivus.pl

NIVUS Austria

Mühlbergstraße 33B
3382 Loosdorf, Austria
Phone: +43 (2754) 567 63 21
Fax: +43 (2754) 567 63 20
E-Mail: austria@nivus.com
Internet: www.nivus.de

NIVUS Middle East (FZE)

Building Q 1-1 ap. 055
P.O. Box: 9217
Sharjah Airport International
Free Zone
Phone: +971 6 55 78 224
Fax: +971 6 55 78 225
E-Mail: Middle-East@nivus.com
Internet: www.nivus.com

NIVUS France

14, rue de la Paix
67770 Sessenheim, France
Phone: +33 (0)3 88071696
Fax: +33 (0)3 88071697
E-Mail: france@nivus.com
Internet: www.nivus.com

NIVUS Korea Co. Ltd.

#411 EZEN Techno Zone,
1L EB Yangchon Industrial Complex,
Gimpo-Si
Gyeonggi-Do 415-843,
Phone: +82 31 999 5920
Fax: +82 31 999 5923
E-Mail: korea@nivus.com
Internet: www.nivus.com

NIVUS U.K.

Wedgewood Rugby Road
Weston under Wetherley
Royal Leamington Spa
CV33 9BW, Warwickshire
Phone: +44 (0)1926 632470
E-Mail: info@nivus.com
Internet: www.nivus.com

NIVUS U.K.

1 Arisaig Close
Eaglescliffe
Stockton on Tees
Cleveland, TS16 9EY
Phone: +44 (0)1642 659294
E-Mail: info@nivus.com
Internet: www.nivus.com

Translation

If the device is sold to a country in the European Economic Area (EEA) this instruction handbook must be translated into the language of the country in which the device is to be used.

Should the translated text be unclear, the original instruction handbook (German) must be consulted or the manufacturer contacted for clarification.

Copyright

No part of this publication may be reproduced, transmitted, sold or disclosed without prior permission. Damages will be claimed for violations. All rights reserved.

Names

The use of general descriptive names, trade names, trademarks and the like in this handbook does not entitle the reader to assume they may be used freely by everyone. They are often protected registered trademarks even if not marked as such.

1 Contents

1.1 Table of Contents

1	Contents	4
1.1	Table of Contents	4
2	Overview and use in accordance with the requirements	5
2.1	Overview	5
2.2	Use in accordance with the requirements	10
2.3	Specifications	11
2.3.1	Flow velocity sensor, type: NIS	11
2.3.2	Flow velocity sensor, type: NOS	12
2.3.3	Flow velocity sensor, type: NIC0	13
2.3.4	Accessories (optional)	13
3	General Notes on Safety and Danger	14
3.1	Danger Notes	14
3.1.1	General Danger Notes	14
3.2	Device Identification	15
3.3	Installation of Spare Parts and Parts subject to Wear and Tear	16
3.4	User's Responsibilities	17
3.5	Sensor Versions	17
4	Storing, Delivery and Transport	21
4.1	Receipt	21
4.2	Storing	21
4.3	Transport	21
4.4	Return	21
5	Installation	22
5.1	Sensor Dimensions	22
5.2	Cable end configuration	31
5.3	Sensor cable	31
5.3.1	Cable extension	31
6	Table of Resistiveness	32
7	Maintenance and Cleaning	35
8	Dismantling/Disposal	35
9	Table of Pictures	36
10	Index	37
11	CE Declarations of Conformity (Appendix)	38

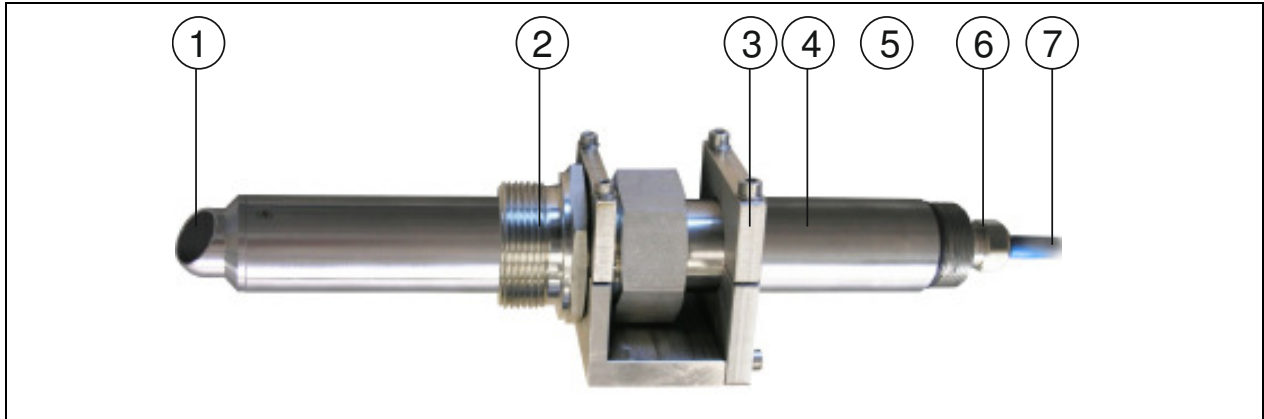
2 Overview and use in accordance with the requirements

2.1 Overview



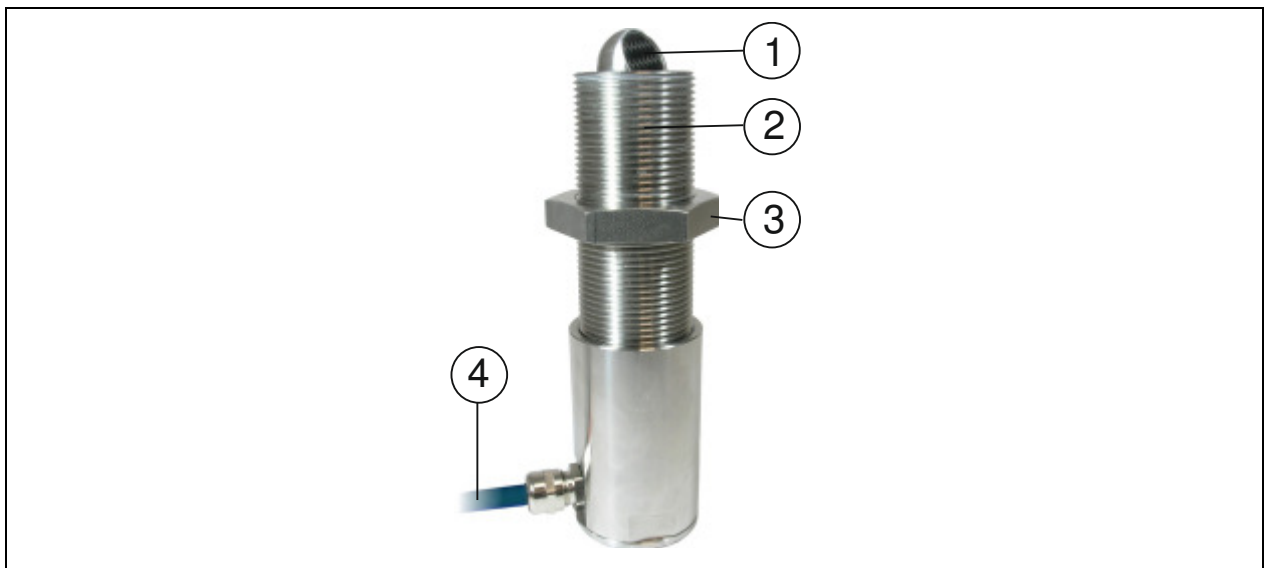
- 1 Flow velocity pipe sensor, type NIS-V200RS
- 2 Flow velocity - Screw-in sensor, type NOS-V2E00
- 3 Flow velocity - Plug-in sensor, type NOS-V2S00
- 4 Flow velocity Hemisphere, sensor face (\varnothing 40 mm) made of CFK, type NOS-V30BX
- 5 Flow velocity - rod sensor with CFK sensor face 65 mm (200 KHz), type NOS-V40
- 6 Flow velocity wedge sensor type NIS-V300KS
- 7 Clamp-on Sensor pair, type NIC0
- 8 Flow velocity rod sensor with CFK sensor face 20 mm, type NOS-V20
- 9 Flow velocity rod sensor with CFK sensor face 40 mm, type NOS-V30

Fig. 2-1 Sensor overview Part 1



- 1 Sensor for flow velocity measurement
- 2 Sensor screw joint (movable)
- 3 Retaining element
- 4 Sensor body
- 5 Installation help, screw M4
- 6 Cable gland
- 7 Sensor cable

Fig. 2-2 Overview pipe sensor, type: NIS-V200



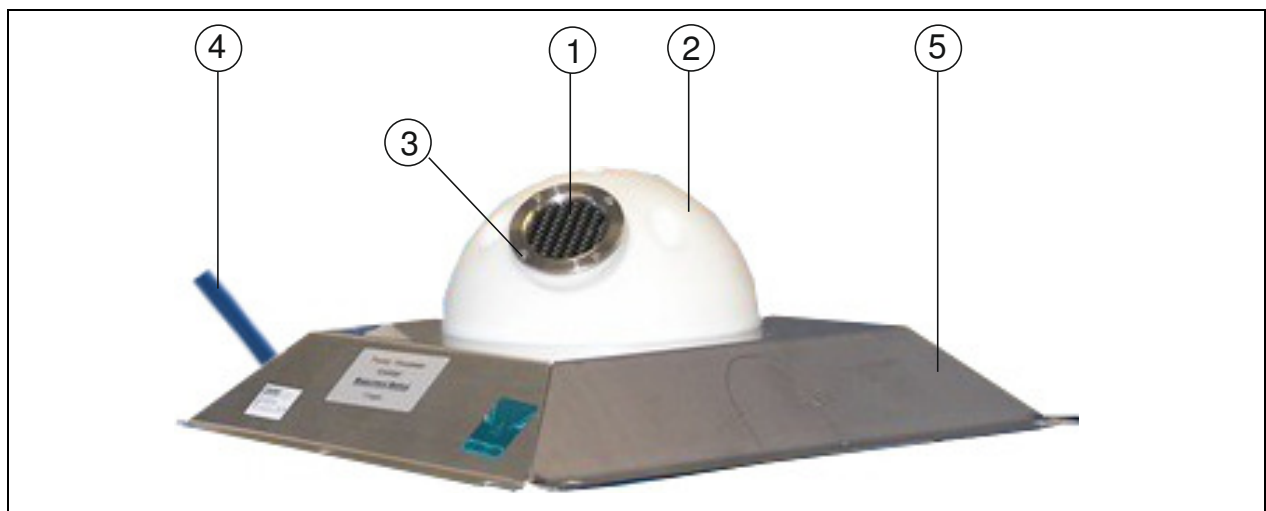
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Screw nut for adjustment and fixation
- 4 Sensor cable

Fig. 2-3 Overview Screw-in sensor, type: NOS-V2E



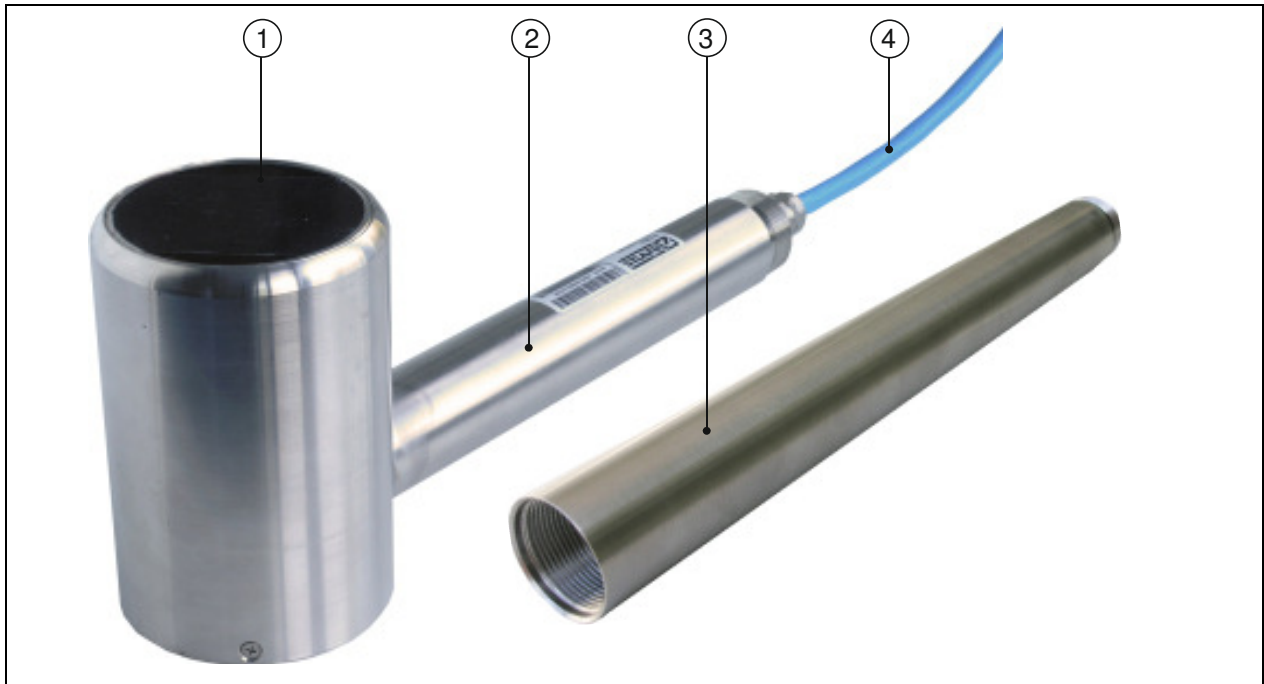
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor cable

Fig. 2-4 Overview Plug-in sensor, type: NOS-V2S



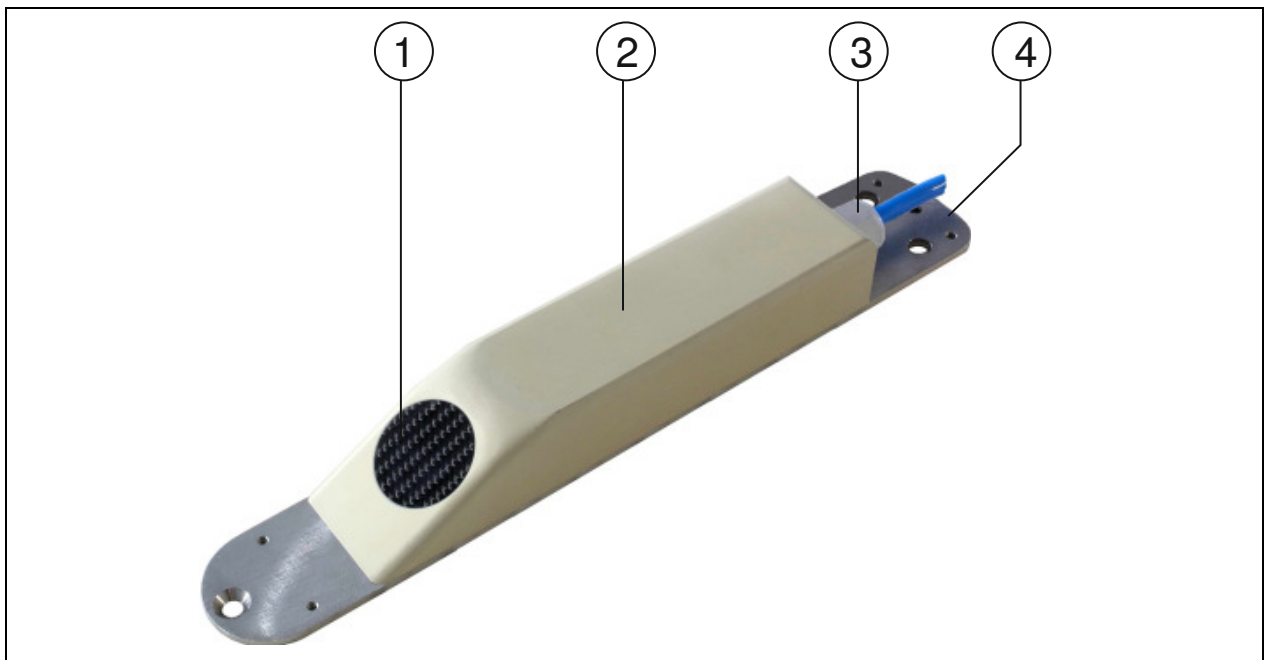
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Screws for the alignment
- 4 Sensor cable
- 5 Underwater plug connection (optional)
- 6 Holder bracket for hemispheres (optional)

Fig. 2-5 Overview Hemisphere, type: NIS-V30B



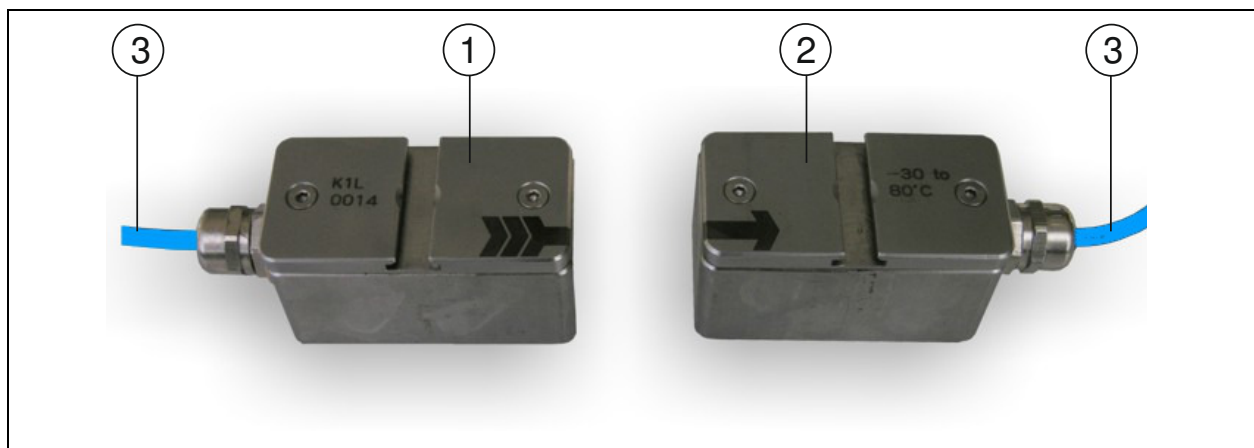
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor extension (optional)
- 4 Sensor cable

Fig. 2-6 Overview rod sensor, type: NOS-4



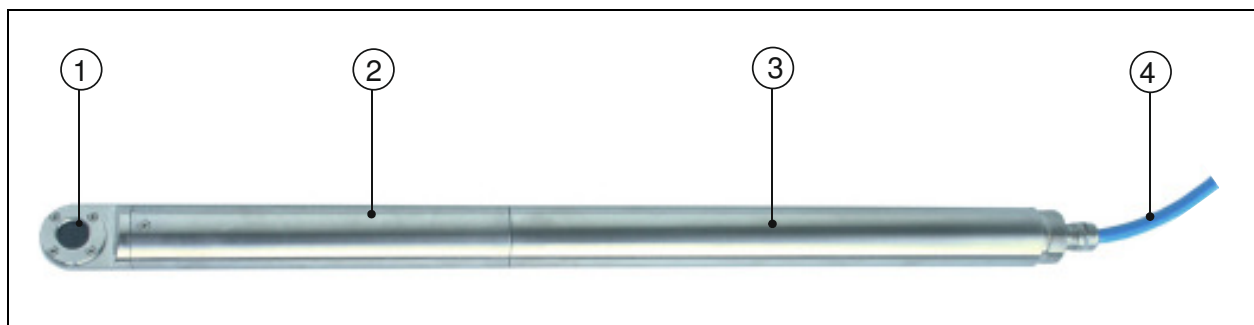
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Cable gland
- 4 Ground plate
- 5 Sensor cable

Fig. 2-7 Overview wedge sensor, type: NIS-V300



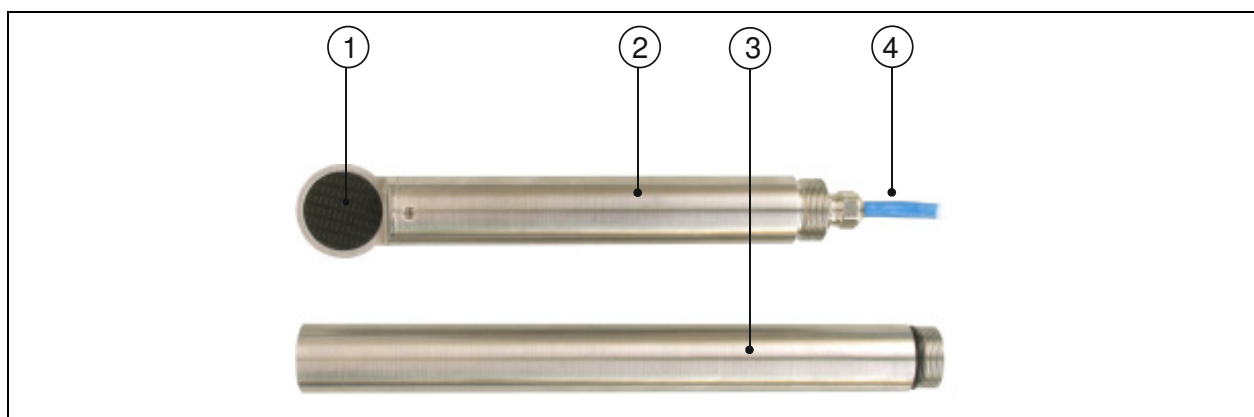
- 1 Sensor for flow velocity measurement against flow direction
- 2 Sensor for flow velocity measurement in flow direction
- 3 Sensor cable

Fig. 2-8 Overview Clamp-On Sensors, type: NIC0



- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor extension (optional)
- 4 Sensor cable

Fig. 2-9 Overview rod sensor, type: NOS-V2



- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor extension (optional)
- 4 Sensor cable

Fig. 2-10 Overview rod sensor, type: NOS-V2

2.2 Use in accordance with the requirements

The different transit time sensors must be used according with the requirements as described below.

Please necessarily observe the maximum permissible limit values as specified in chapter 2.3. Any cases varying from these conditions without being approved by NIVUS GmbH in writing are entirely at owner's risk.

NOS-V2/V3/V4 Sensors

These sensors are designed for flow velocity measurement of clear, clean water to slight polluted media in part filled or full pipes, channels or other waters. Connection to NivuChannel

NOS-V2E/V2S Sensors

These sensors are designed for flow velocity measurement of clear, clean water to slight polluted media in full pipes. Connection to NivuChannel.

NIS Sensors

These sensors are designed for flow velocity measurement of clear, clean water to slight polluted media in full pipes or rectangular channels. Connection to NivuSonic.

NICO Sensors

These sensors are designed for flow velocity measurement of clear, clean water to slight polluted media in full pipes. These sensors are fastened onto the pipe from the outside.

Connection to NivuSonic CO.



The sensors are exclusively intended to be used for purposes as described above. Modifying or using the sensors or Electronic Box for other purposes without the written consent of the manufacturer will not be considered as use in accordance with the requirements.

Damages resulting from this are left at user's risk.

The sensors are designed for a lifetime of approx. 10 years. After that period an inspection in addition with a general overhaul has to be made.

2.3 Specifications

2.3.1 Flow velocity sensor, type: NIS

Measurement principle	ultrasonic transit time
Measurement frequency	1 MHz
Flow velocity range	± 20 m/s
Inner pipe diameter:	0.2 to 12 m (DN200 to DN12000)
Measurement uncertainty	<ul style="list-style-type: none"> - Flow velocity (v_{average}) in path $\pm 0,1$ % of measurement value - Flow rate (Q): $\pm 1-5$ % of measurement value (depending on number of paths as well as hydraulic conditions) - Offset velocity $< \pm 5$ mm/s
Number of measurement paths	1 to 8 paths; according to DIN EN ISO 6416:2004 and IEC 60041 (adapter box required if using 3 paths or more)
Protection	IP 68
Operating temperature	-20 °C to +50 °C
Storage temperature	-30 °C to +70 °C
Cable length	10/15/20/30/50/100 m; (Extension option: sensors connectable to adapter box, cable length between adapter box and transmitter max. 200 m)
Cable type	Twinax 2 x AWG 20
Outside cable diameter	8.5 mm
Sensor types	<ul style="list-style-type: none"> - Pipe sensor for installation in pipes with retaining element - Wedge sensor with ground plate
Medium contacting materials	<ul style="list-style-type: none"> - Pipe sensor: stainless steel 1.4571, CFK (Carbon), NBR, HDPE - Wedge sensor: stainless steel 1.4571, CFK (Carbon), PPO GF30, PA, Polyurethane
Operating pressure	<ul style="list-style-type: none"> - Pipe sensor: max. 16 bar (with retaining element) - Wedge sensor: max. 4 bar
Temperature measurement via sound velocity in the medium	
Measurement range with-in medium	0 °C to +60 °C
Measurement uncertainty	± 1 K

2.3.2 Flow velocity sensor, type: NOS

Measurement principle	ultrasonic transit time
Measurement frequency	1 MHz; 200 KHz (NOS-V4), (other frequencies depending on length of path)
Flow velocity range	± 20 m/s
Channel widths	0,5 m to 40 m; other widths upon request
Measurement uncertainty	<ul style="list-style-type: none"> - Flow velocity (v_{average}) in path $\pm 0,1$ % of measurement value - flow (Q) $\pm 0.5 - 5$ %, (depending on number of measurement paths and hydraulic conditions) - Offset velocity $< \pm 5$ mm/s
Number of measurement paths	1 to 8 measurement paths; according to DIN EN ISO 6416:2004 and IEC 60041 (adapter box required if using 3 paths or more)
Protection	IP 68
Operating temperature	-20° C to +50 °C
Storage temperature	-30° C to +70 °C
Cable length	10/15/20/30/50/100 m; (extension option: sensors can be connected to adapter box, max. cable length between adapter box and transmitter 200 m)
Cable	Configured continuous cable Preconfigured cable with underwater plug connection (optional for NOS-V30B)
Cable type	Twinax 2 x AWG 20
Outside cable diameter	8,5 mm
Sensor types	<ul style="list-style-type: none"> - Rod sensor - Hemisphere - Screw-in sensor/plug-in sensor
Medium contacting materials	<ul style="list-style-type: none"> - Rod sensor/ Screw-in sensor/plug-in sensor: stainless steel 1.4571, CFK (Carbon), Viton® - hemisphere: stainless steel 1.4571, CFK (Carbon), POM, PUR, (underwater plug and socket made of Neoprene)
Temperature measurement via sound velocity in the medium	
Measurement range	0°C to +60 °C
Measurement uncertainty	± 1 K

2.3.3 Flow velocity sensor, type: NIC0

Measurement principle	Ultrasonic transit time as Clamp-on system
Material	PEEK and stainless steel 1.4571
Measurement frequency	1 MHz; other frequencies upon request
Flow velocity range	±20 m/s
Inner pipe diameter:	0.08 m to 1,4 m (DN 80 to DN 1400)
Protection	IP 68
Operating temperature	-30 °C to +80 °C (environment)
Storage temperature	-30 °C to +70 °C
Cable length	10/15/20/30/50 m
Cable type	Twinax 2 x AWG 20
Outside cable diameter	8.5 mm
Sensor types	Clamp-on sensor pair for clamp-on installation on pipes
Measurement uncertainty	- Flow velocity (v_{average}) in path ±0,1 % of measurement value - Flow rate (Q): ±1-5 % of measurement value - offset velocity < ±5 mm/s
Temperature measurement via sound velocity	
Measurement range im Medium	0 °C to +80 °C
Measurement uncertainty	± 1 K

2.3.4 Accessories (optional)

Holder bracket	for hemisphere fastening
Holder bracket	for Rod sensor fastening on vertical walls
Protective sheet	flow-optimised protective sheet for Rod sensors
Extension	for installation tube of rod sensors
Stop ball valve	for removal of pipe sensors from pipes without pressure
Tapping saddles	for installation of pipe sensors 1½" in pipe lines
Fastening system	Clamp-on sensor holder and tensioning belt

3 General Notes on Safety and Danger

3.1 Danger Notes

3.1.1 General Danger Notes



Cautions

are framed and labelled with a warning triangle.



Notes

are framed and labelled with a "hand".



Danger by electric voltage

is framed and labelled with the symbol on the left.



Warnings

are framed and labelled with a "STOP"-sign.

For connection, initial start-up and operation of the sensors the following information and higher legal regulations (e.g. in Germany VDE), such as Ex-regulations as well as safety requirements and regulations in order to avoid accidents, must be adhered to.

All operations, which go beyond steps regarding installation and connection the sensors, are allowed to be carried out by NIVUS staff only due to reasons of safety and guarantee.

3.2 Device Identification

The instructions in this manual apply only for the type of sensor indicated on the title page.

The article number can be found where the cable enters the sensor body as well as on a nameplate on the end of the cable. This nameplate is protected against weathering and abrasion by using a transparent shrunk-on hose and contains the following:

- name and address of manufacturer
- CE label
- type and serial number
- year of manufacture

It is important for enquiries and replacement part orders to specify article number as well as serial number of the respective transmitter or sensor. This ensures correct and quick processing.

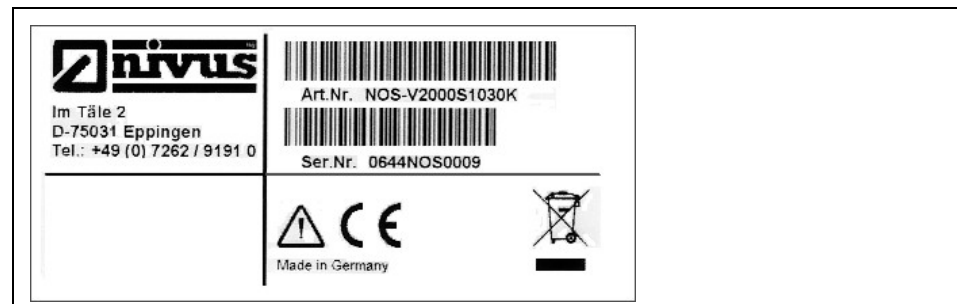


Fig. 3-1 Nameplate flow velocity sensor, type NOS-V2



Fig. 3-2 Nameplate flow velocity sensor, type NOS-V3

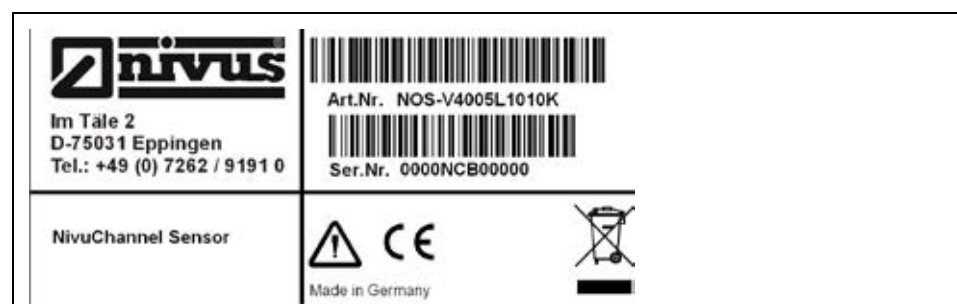


Fig. 3-3 Nameplate flow velocity sensor, type NOS-V4

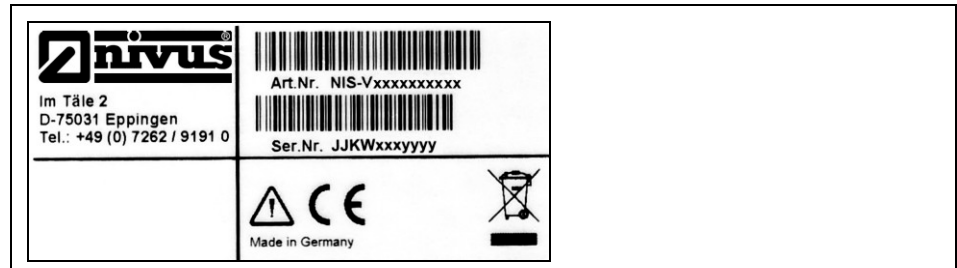


Fig. 3-4 Nameplate flow velocity sensor, type NIS

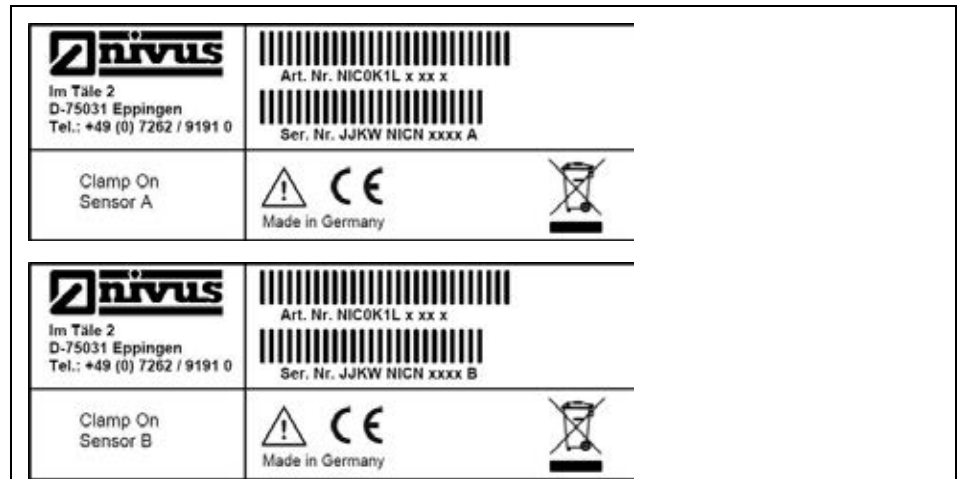


Fig. 3-5 Nameplate flow velocity sensor, type NIC0

3.3 Installation of Spare Parts and Parts subject to Wear and Tear

We herewith particularly emphasize that replacement parts or accessories, which are not supplied by us, are not certified by us, too. Hence, the installation and/or the use of such products may possibly be detrimental to the device's ability to work.

Damages caused by using non-original parts and non-original accessories are left at user's risk.

3.4 User's Responsibilities



In the EEA (European Economic Area) national implementation of the framework directive 89/391/EEC and corresponding individual directives, in particular the directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, are to be observed and adhered to.

In Germany the Industrial Safety Ordinance must be observed.

The customer must (where necessary) obtain any local **operating permits** required and observe the provisions contained therein. In addition to this, he must observe local laws and regulations on

- personnel safety (accident prevention regulations)
- safety of work materials and tools (safety equipment and maintenance)
- disposal of products (laws on wastes)
- disposal of materials (laws on wastes)
- cleaning (cleansing agents and disposal)
- environmental protection.

3.5 Sensor Versions

The sensors are available in various constructions and additionally vary in terms of cable lengths, cable connections as well as various special versions and materials.

The article number can be found where the cable enters the sensor body as well as on a nameplate on the end of the cable. This nameplate is protected against weathering and abrasion by using a transparent shrunk-on hose. Additionally you can find the names of the terminal clamps as well as another hint on the end of the sensor cable.

NOS-	Type				
	V2005	Rod sensor made of 1.471; installation tube length 500 mm diameter 35 mm; sensor head with CFK sensor face (ø20 mm) for 1 MHz; pair of sensors (2 pieces!)			
	V2010	Rod sensor made of 1.471; installation tube length 1000 mm diameter 35 mm; sensor head with CFK sensor face (ø20 mm) for 1 MHz; pair of sensors (2 pieces!)			
	V3005	Rod sensor made of 1.471; installation tube length 500 mm diameter 35 mm; sensor head with CFK sensor face (ø40 mm) for 1 MHz; pair of sensors (2 pieces!)			
	V3010	Rod sensor made of 1.471; installation tube length 1000 mm diameter 35 mm; sensor head with CFK sensor face (ø40 mm) for 1 MHz; pair of sensors (2 pieces!)			
	V30BS	Hemispheres made of POM, sensor face (ø 40 mm) made of CFK (Carbon); pair of sensors (2 pieces!)			
	V30BX	Hemispheres, sensor face (ø 40 mm); special construction; pair of sensors (2 pieces!)			
	V4005	Rod sensor made of 1.471; installation tube length 500 mm diameter 35 mm; sensor head (ø65 mm) für 200 KHz; pair of sensors (2 pieces!)			
	V4010	Rod sensor made of 1.471; installation tube length 1000 mm diameter 35 mm; sensor head (ø65 mm) für 200 KHz; pair of sensors (2 pieces!)			
		Pressure Level			
	L	1,2 bar			
	Path Position				
	1	Path position 45° against flow direction (recommended setup angle)			
	Approvals				
	0	non			
	Cable Length				
	10	10 m pre-configured			
	15	15 m pre-configured			
	20	20 m pre-configured			
	30	30 m pre-configured			
	50	50 m pre-configured			
	99	100 m pre-configured			
	XX	Special length			
	Sensor Connection				
	A	Connection to NivuChannel transmitter via underwater plug connection (only for Type V30B)			
	B	Connection via adapter box* to NivuChannel transmitter via underwater plug connection (only Type V30B)			
	K	Connection to NivuChannel transmitter			
	Z	Connection to NivuChannel transmitter via adapter box*			
NOS-	L	1	0		

Fig. 3-6 Type key for ultrasonic sensors, type NOS

NOS-	Type				
	V2E00	Screw-in sensors for installation in welding nozzle (installation possible only from the <u>outside!</u>); sensor pair (2 pieces!)			
	V2S00	Plug-in sensors for installation in duct (installation only possible from the <u>inside!</u>); sensor pair (2 pieces!)			
	Pressure Level				
	H	80 bar			
	Path Position				
	A	45° Position of path			
	B	Position of path			
	C	Position of path			
	D	Position of path			
	X	Special position			
	ATEX Approvals				
	0	none			
	Cable Lengths				
	10	10 m pre-configured			
	15	15 m pre-configured			
	20	20 m pre-configured			
	30	30 m pre-configured			
	50	50 m pre-configured			
	99	100 m pre-configured			
	XX	Special length			
	Sensor Connection				
	K	Connection to NivuChannel transmitter			
	Z	Connection to NivuChannel transmitter via adapter box*			
NOS-		H		0	

Fig. 3-7 Type key for screw-in/plug-in sensor, type NOS

NIS-	Type					
	V200	Pipe sensor				
	RS	Pipe sensors; 1.4571; with CFK- sensor face (Carbon) ø 20 mm; sensor pair (2 pcs.)				
	RX	Pipe sensors; special construction; sensor pair (2 pcs.)				
	V300	Wedge sensor				
	KS	Wedge sensor made of PPO with CFK-sensor face (Carbon) ø40 mm, ground plate 1.4571; sensor pair (2 pcs.)				
	KX	Wedge sensor, special construction; sensor pair (2 pcs.)				
		ATEX Approvals				
		0	none			
			Cable Lengths			
		10	10 m pre-configured			
		15	15 m pre-configured			
		20	20 m pre-configured			
		30	30 m pre-configured			
		50	50 m pre-configured			
		99	100 m pre-configured			
		XX	Special length upon request			
			Sensor Connection			
		K	Connection to NivuSonic transmitter			
		Z	Connection to NivuSonic transmitter via adapter box* , type NIZ-			
			Pipe length			
		0	(for wedge sensor)			
		2	200 mm (for pipe sensors)			
		3	300 mm (for stop ball valve)			
		X	special length			
NIS-			0			

Fig. 3-8 Type key for ultrasonic sensors, type NIS

4 Storing, Delivery and Transport

4.1 Receipt

Please check your delivery if it is complete and in working order according to the delivery note immediately after receipt. Any damage resulting from transport or transit shall be reported to the carrier instantly. An immediate, written report must be sent to NIVUS GmbH Eppingen as well.

Please report any shortcoming due to delivery to your representative or directly to NIVUS Eppingen within two weeks in writing.



Mistakes cannot be rectified later!

4.2 Storing

The following storing conditions shall be strictly adhered to:

max. temperature:	+70° C (158° F)
min. temperature:	- 30° C (-22° F)
max. humidity:	100 %

The Sensors shall be protected from corrosive or organic solvent vapours, radioactive radiation as well as strong electromagnetic radiation.

4.3 Transport

The Sensors are designed for harsh industrial conditions. However do not expose them to heavy shocks or vibrations.

Transportation must be carried out in the original packaging.

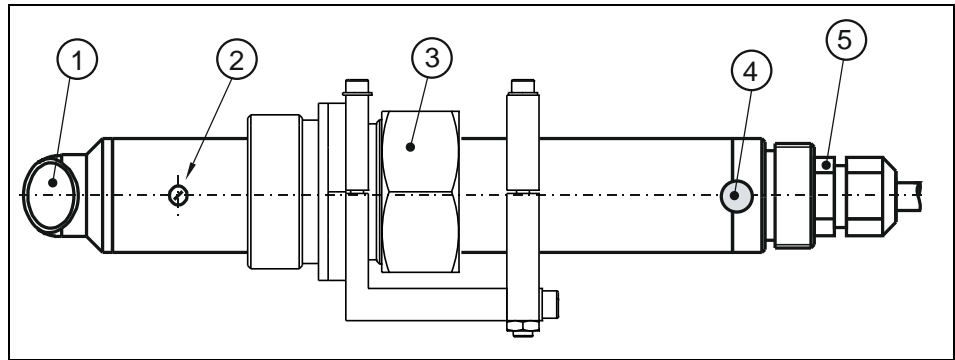
4.4 Return

The units must be returned at customer costs to NIVUS Eppingen in the original packaging.

Otherwise the return cannot be accepted!

5 Installation

5.1 Sensor Dimensions



- 1 Sensor face
- 2 fixing screw for sensor head
- 3 Retaining element
- 4 Sensor screw joint
- 5 Cable gland

Fig. 5-1 Basic construction pipe sensor type NIS

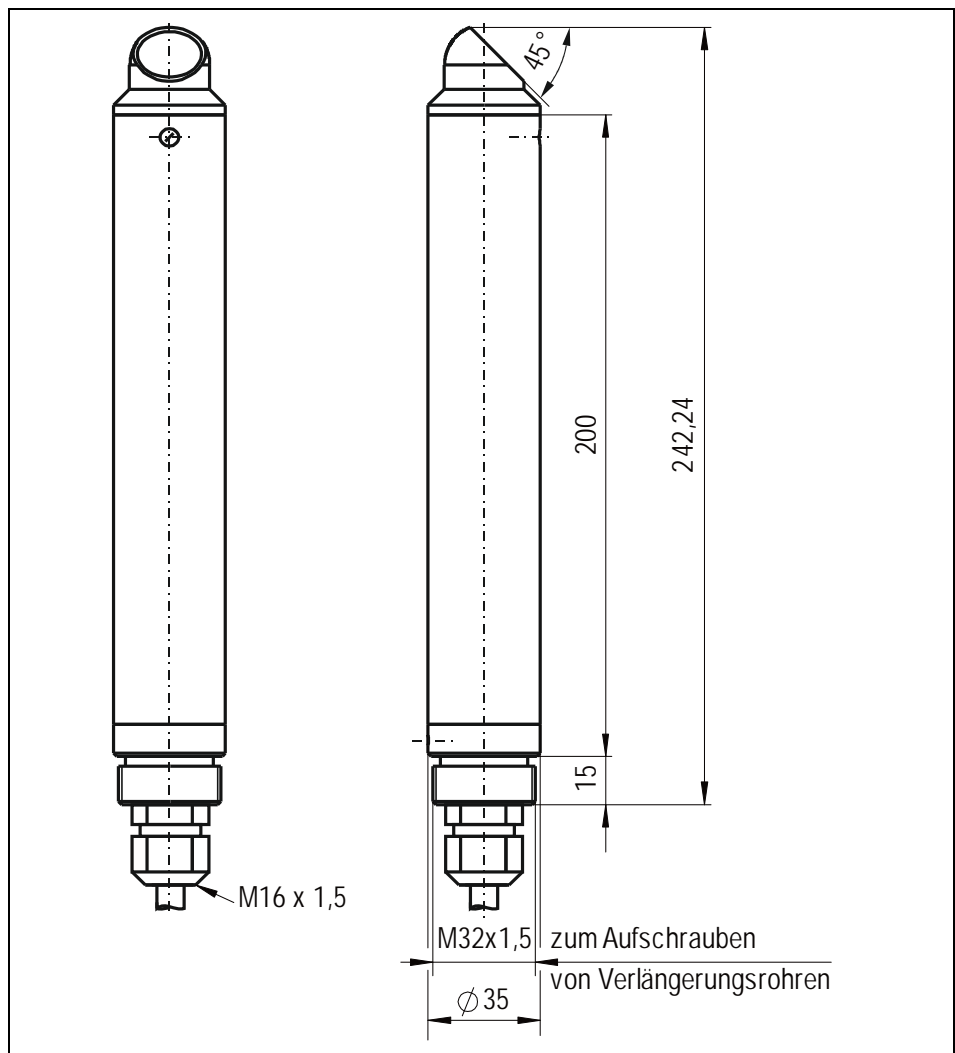
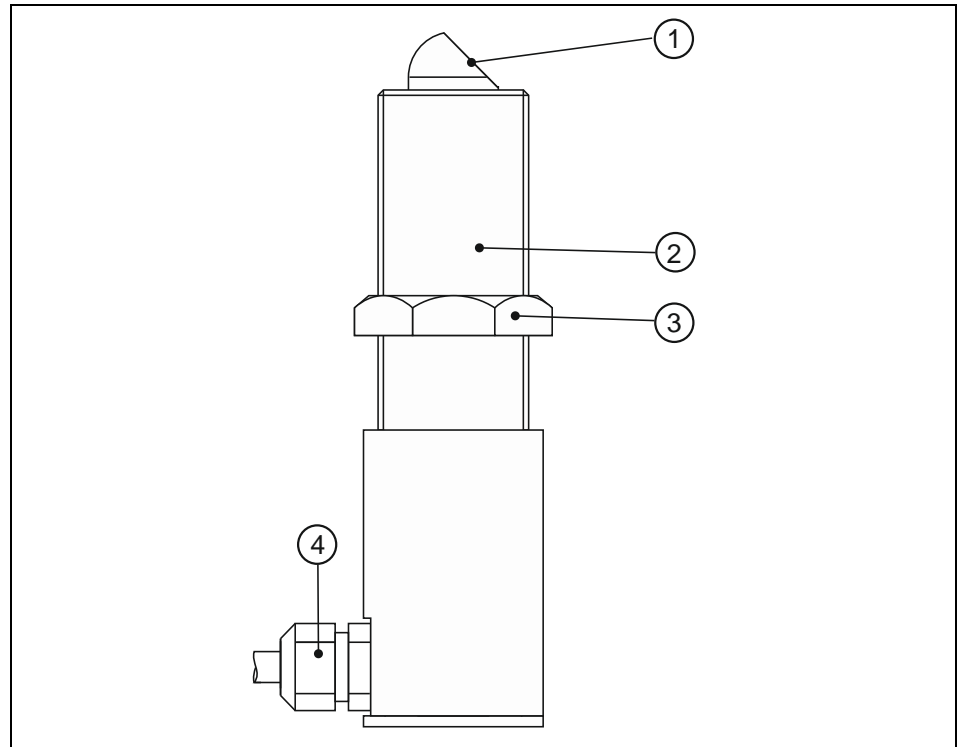


Fig. 5-2 Dimensions pipe sensor type NIS



- 1 Sensor face
- 2 screw-in thread
- 3 Screw nut for adjustment and fixation
- 4 Cable gland

Fig. 5-3 Basic construction screw-in sensor type NOS-V2E

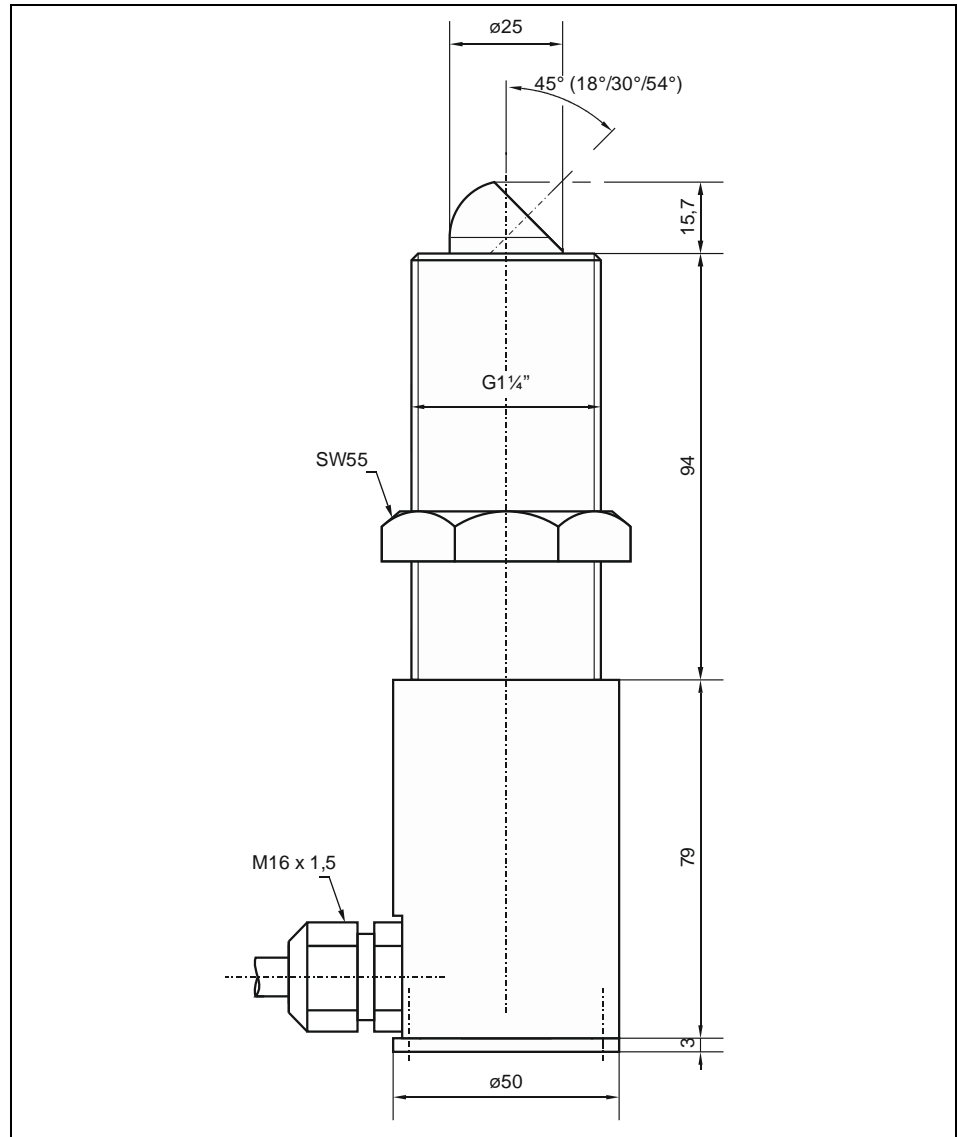
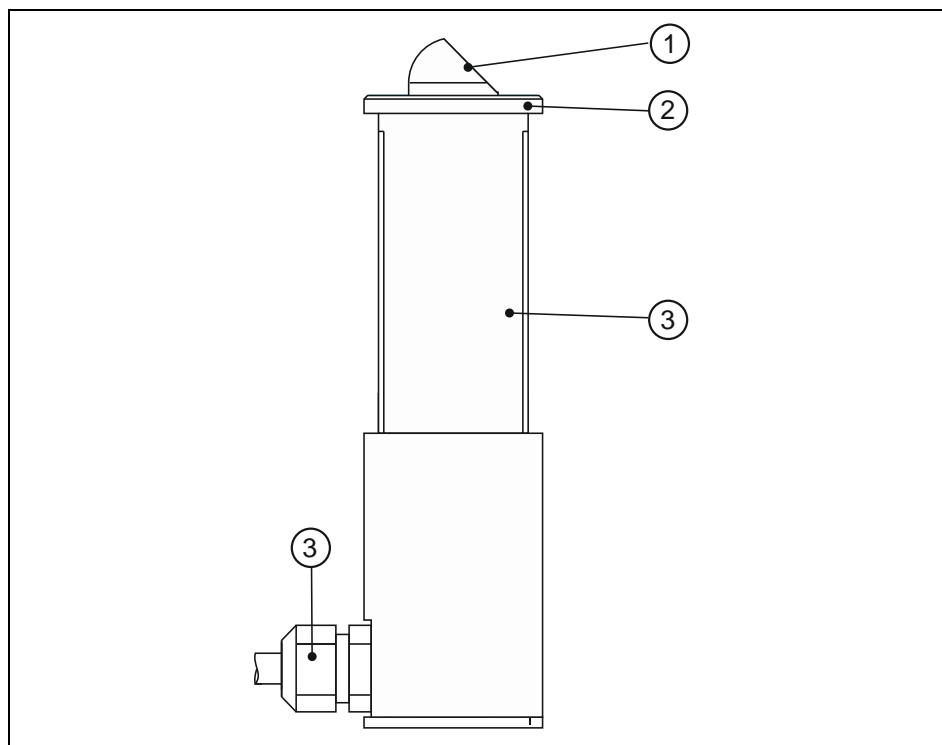


Fig. 5-4 Dimensions screw-in sensor type NOS-V2E



- 1 Sensor face
- 2 Fixation area
- 3 Sensor body
- 4 Cable gland

Fig. 5-5 Basic construction plug-in sensor type NOS-V2S

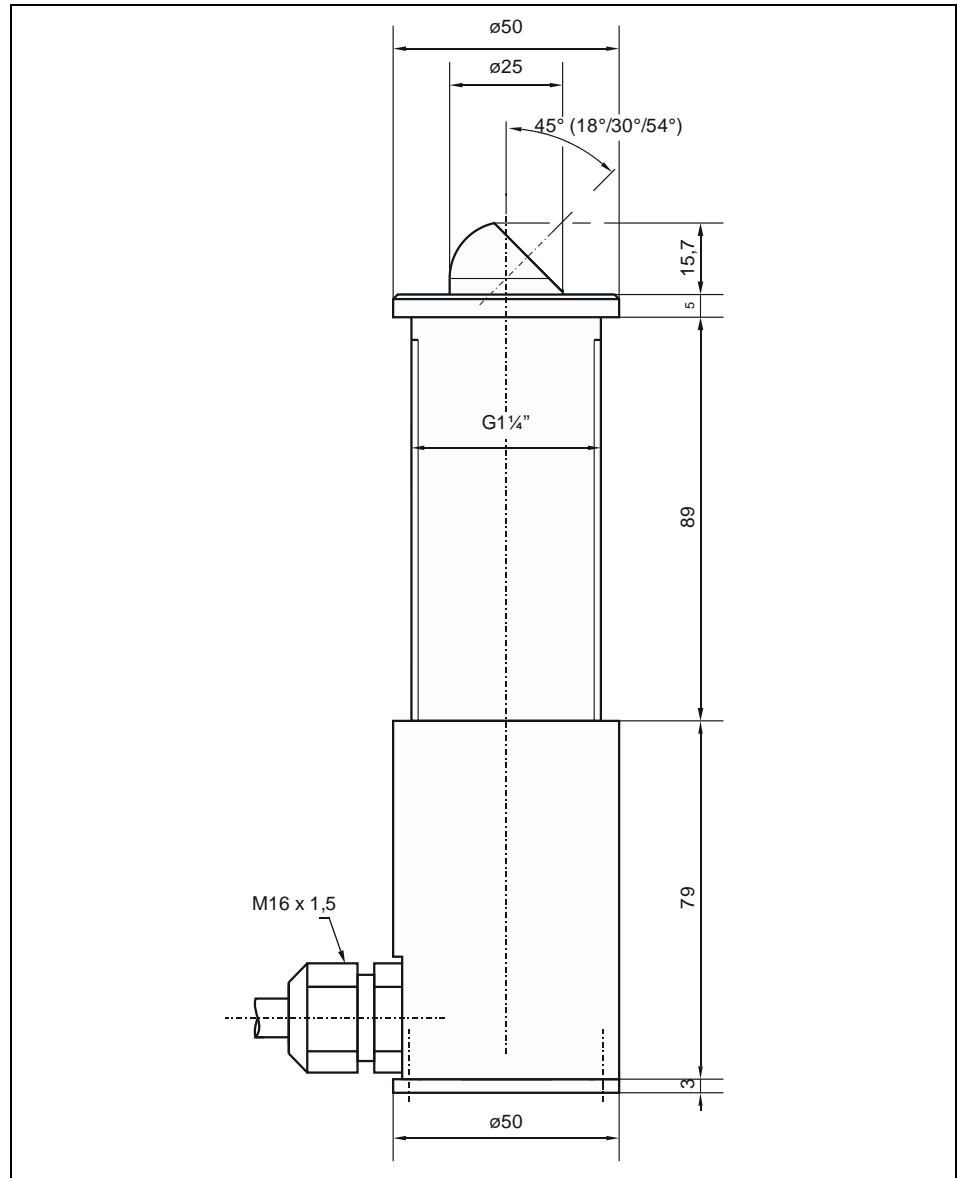
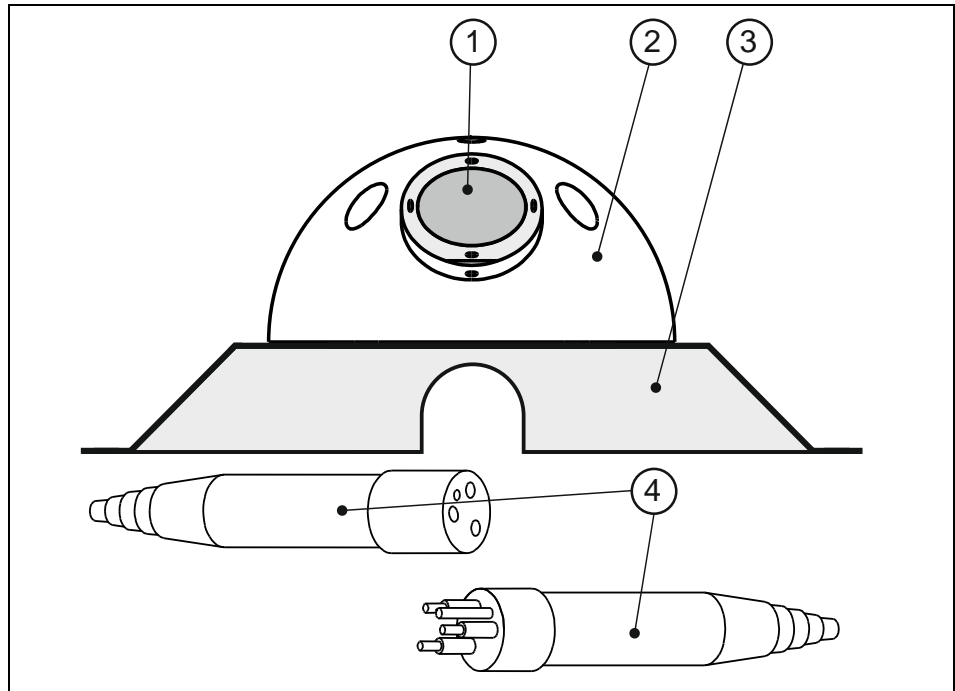


Fig. 5-6 Dimensions plug-in sensor type NOS-V2S



- 1 Sensor face
- 2 Sensor body
- 3 Holder bracket (optional)
- 4 Underwater plug connection (optional)

Fig. 5-7 Basic construction hemisphere type NOS Ø40 mm

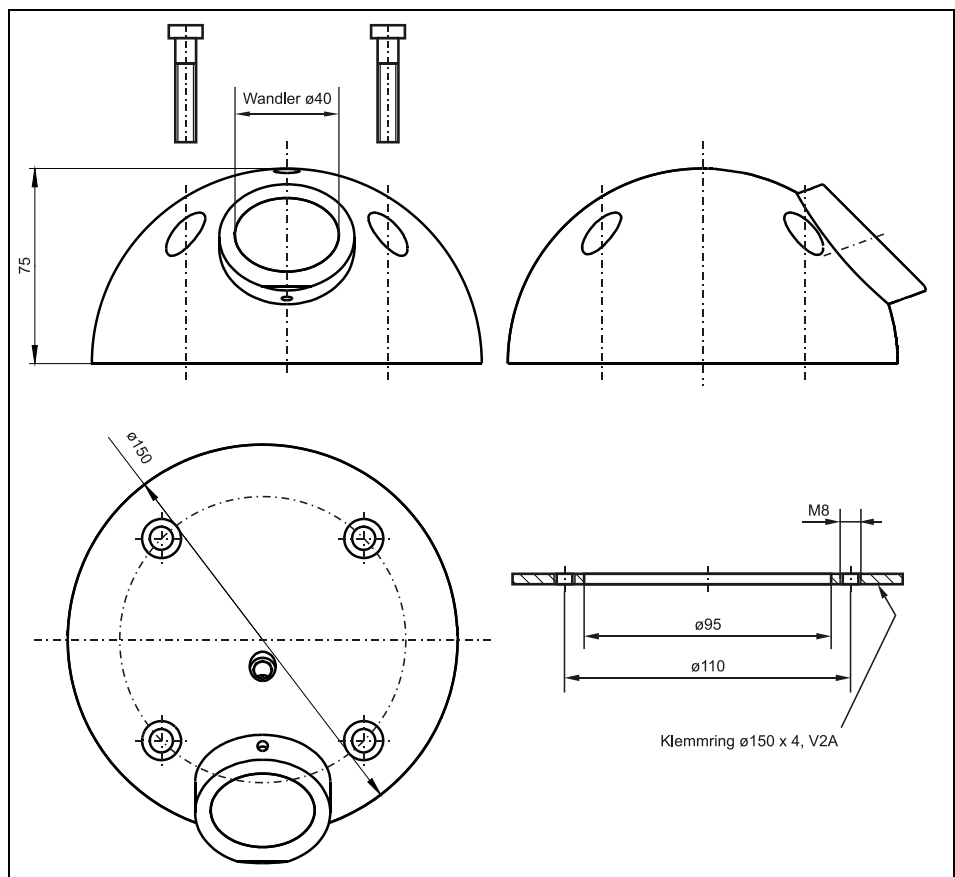
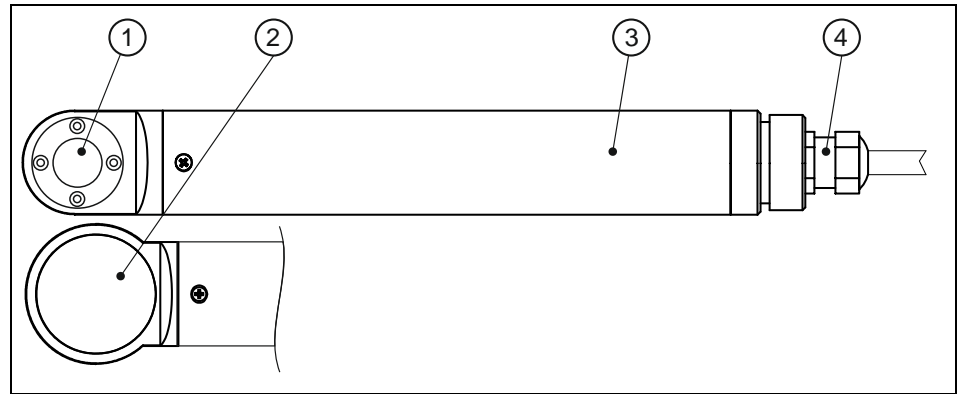


Fig. 5-8 Dimensions hemisphere type NOS Ø40 mm



- 1 Sensor face $\varnothing 20$ mm
- 2 Sensor face $\varnothing 40$ mm
- 3 Sensor body
- 4 Cable gland

Fig. 5-9 Basic construction rod sensor type NOS $\varnothing 20 / 40$ mm

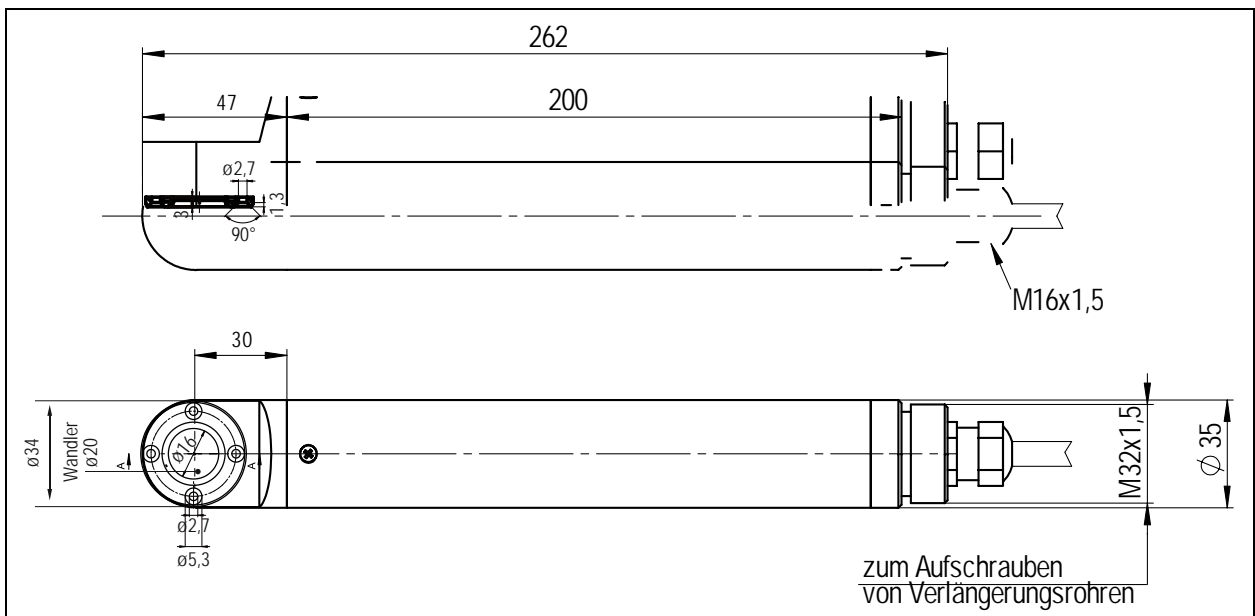
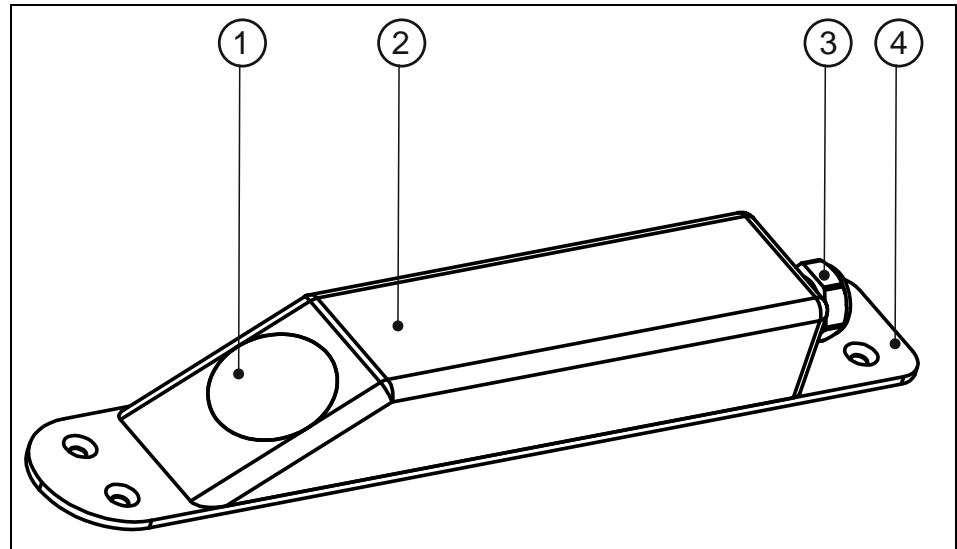


Fig. 5-10 Dimensions rod sensor type NOS $\varnothing 20 / 40$ mm



- 1 Sensor face
- 2 Sensor body
- 3 Cable gland
- 4 Ground plate

Fig. 5-11 Basic construction wedge sensor type NOS Ø20 / 40 mm

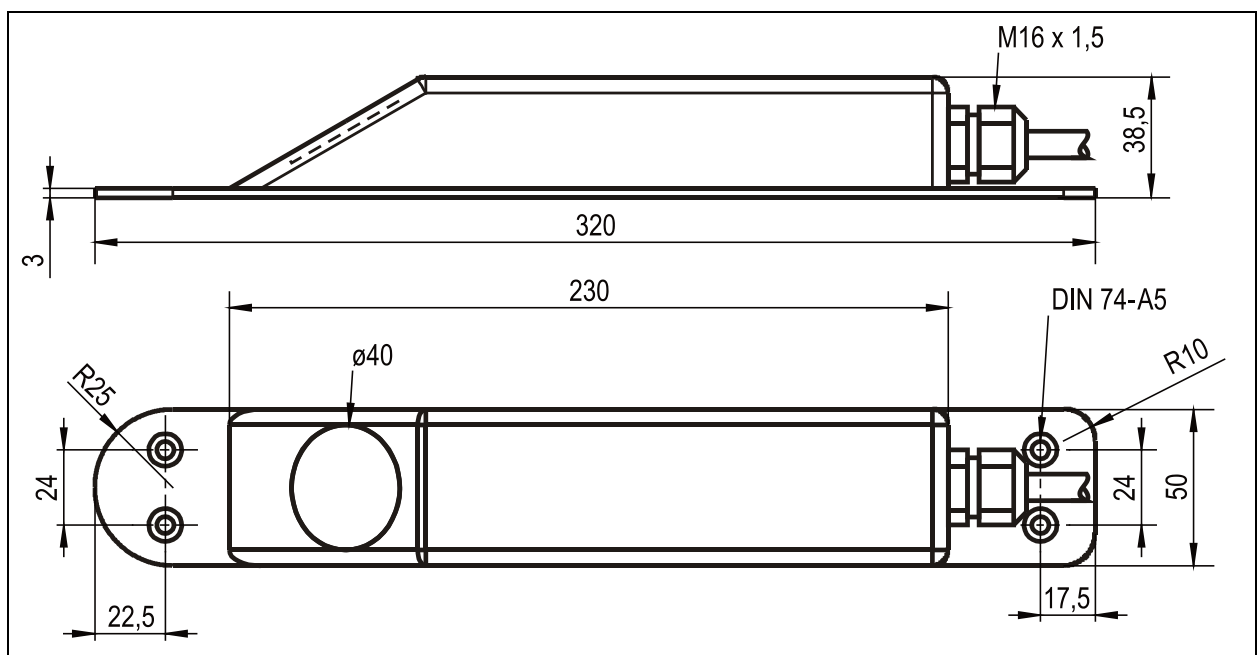
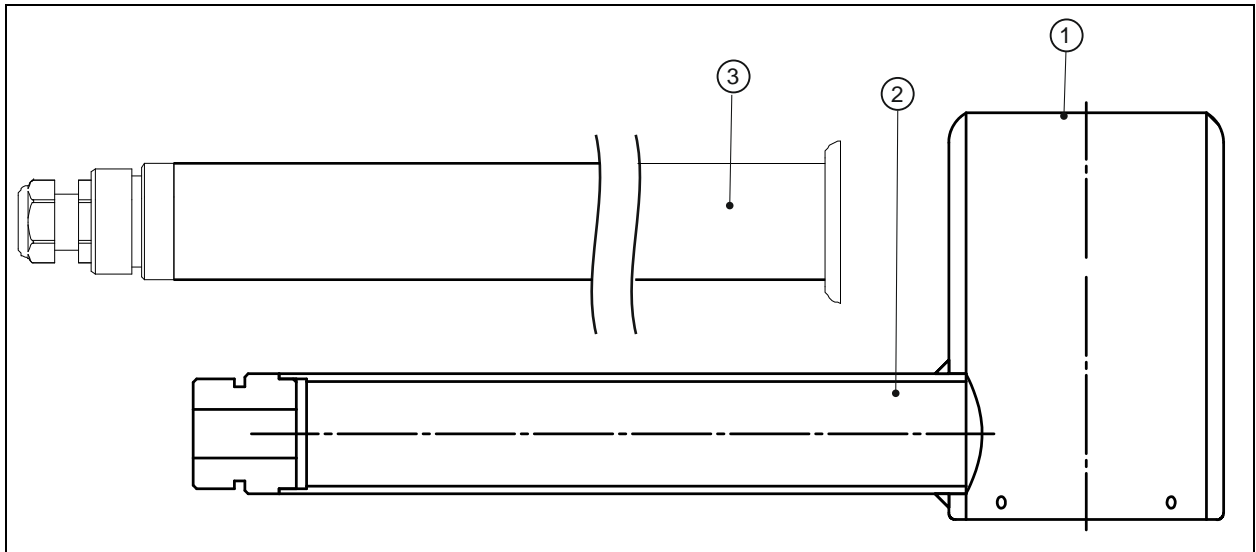


Fig. 5-12 Dimensions wedge sensor type NIS



- 1 Sensor face
- 2 Sensor body
- 3 Sensor extension (optional)

Fig. 5-13 Basic construction rod sensor type NOS-V4

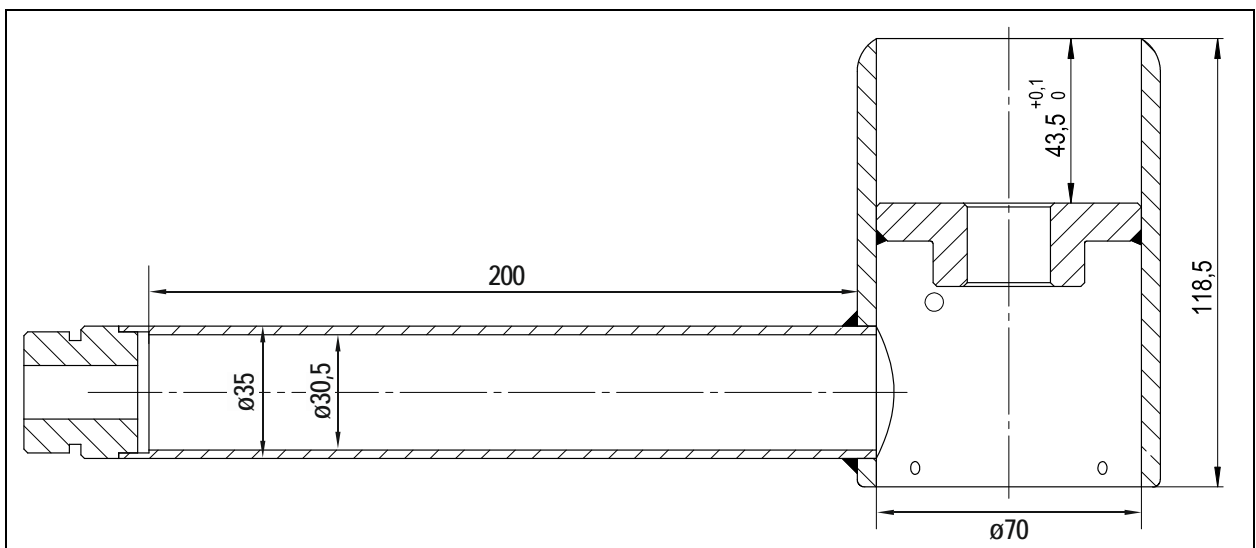
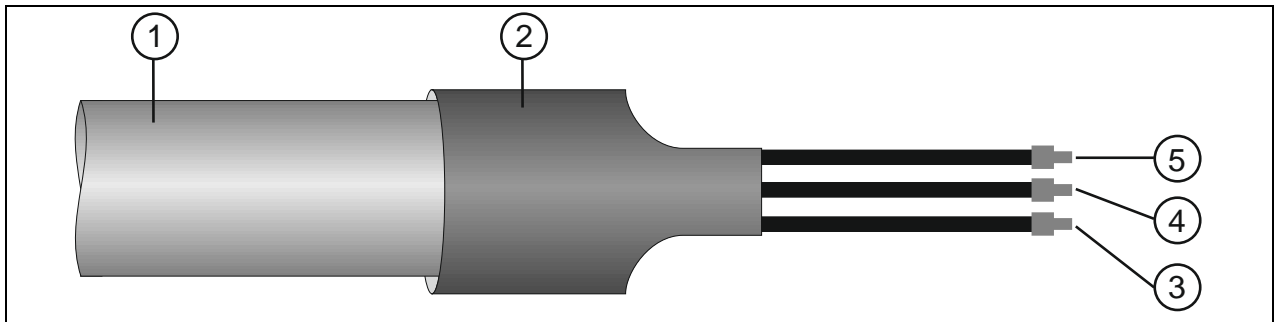


Fig. 5-14 Dimensions rod sensor type NOS-V4

5.2 Cable end configuration



- 1 sensor jacket
- 2 shrunk-on hose
- 3 black; cable shield (no ground)
- 4 copper; CH -
- 5 silver; CH +

Fig. 5-15 Cable end configuration sensors

5.3 Sensor cable

5.3.1 Cable extension

The sensors are equipped with a fixed connection cable, type „Twinax 2x AWG 20“ in different lengths. This cable must not be shortened.

In case of extending the sensor cables please make sure to use exactly the same length and the same cable type for each path.

The sensors of the individual measurement paths are connected directly to the transmitter (one or two sensor pairs) or via an adapter box (if using more than 2 paths or longer cables).



If you wish to extend the sensor cables, please make sure to exclusively use a special cable provided by NIVUS GmbH and the according connection measures (terminal boxes, cable sealing boxes etc.). Do not extend the cables to more than 100 m. Calibration is necessarily required thereafter.



It is not allowed for different applications to share the same cable extensions or to use the same extended signal cables for separate level and flow velocity measurements.



The sensor cables of each path must feature exactly the same length, otherwise disturbances and measurement errors might occur.

6 Table of Resistiveness

The medium-contacting parts of standard sensors are made of:

- V4A (pipe sensor jacket)
- Carbon CFK (sensor surface)
- PEEK (sensor crystal cover) and
- Polyurethane (cable sheath and glands)
- Viton® (PA/PR) (gasket)

The sensor technology is resistant to normal domestic sewages, dirt and rain water as well as mixed water from municipalities and communities. Also in many industrial plants (e.g. Huels, BASF etc.) the resistance does not present any problems. The sensor technology nevertheless is not resistant to all substances and substance mixtures.



As a basic principle, damage might occur in case of using chloride media (pitting corrosion in stainless steel ground plate or sensor jacket), hydrogen sulphide (H_2S – risk of diffusion through cable sheath or sensor body resulting in destruction of copper wires and conductor paths) as well as various organic solvents (may dissolve cable sheath or sensor body)!

Please observe that substance mixtures (several substances being present simultaneously) under certain circumstances may cause catalytic effects which might not occur if the individual substances are in use. Due to infinitely possible combinations these catalytic effects cannot be verified entirely.

If in doubt please contact your NIVUS representative and request a free material sample for long time testing purposes.

MEDIUM	FORMEL	KONZEN- TRATION	HDPE	PPO GF30	PUF	PEEK	FEP	V4A	Hasteloy C 276	Viton (PA/PR)	PA GF30
Acetaldehyd	C ₂ H ₄ O	40 %	3/3	4	4	1	(1)	(1)	0	4/4	2/4
Aceton	C ₃ H ₆ O	40 %	1/1	4	4	1	(1)	1/1	1	4/4	1/0
Allylalkohol	C ₃ H ₆ O	96 %	1/3	2	0	1	1/1	1/1	0	4/4	3/0
Aluminiumchlorid	AlCl ₃	10 %	1/1	2	0	1	1/1	3/4	1	1/0	1/0
Ammoniumchlorid	(NH ₄)Cl	wässrig	1/1	1	0	1	1/1	1/2L	1	1/1	3/4
Ammoniumhydroxid	NH ₃ + H ₂ O	5 %	1/1	2	4	1	1/1	1/1	1	(2)	(2)
Anilin	C ₆ H ₇ N	100 %	1/2	3	4	1	1/1	1/0	1	2/4	3/4
Benzin, bleifrei	C ₅ H ₁₂ - C ₁₂ H ₂₆		2/3	3	2	1	1/1	1/1	1	(1-3)	1/0
Benzol	C ₆ H ₆	100 %	3/4	3/4	2	1	1/1	1/1	1	3/3	2/0
Benzylalkohol	C ₇ H ₈ O	100 %	3/4	3	2	1	1/1	1/1	1	1/0	4/4
Borsäure	H ₃ BO ₃	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/0
Bromsäure	HBrO ₃	konz.	0/0	0	3	1	0/0	(4)	0	(2)	(4)
Butanol	C ₄ H ₁₀ O	techn. rein	1/1	2	3	1	1/1	(1)	1	3/4	1/0
Calciumchlorid	CaCl ₂	alkoholisch	1/0	1	1	1	1/1	1/2L	1	1/1	4/4
Chlorbenzol	C ₆ H ₅ Cl	100 %	3/4	3	4	1	1/1	1/1	1	3/4	4/4
Chlorgas	Cl ₂		4/4	3	3	1	1/1	1/0	0	1/1	4/4
Chlormethan	CH ₃ Cl	techn. rein	3/0	4	4	1	1/0	1/1L	0	4/4	(3)
Chloroform	CHCl ₃	100 %	3/4	4	4	1	1/1	1/1	1	4/4	¼
Chlorwasser	Cl ₂ x H ₂ O		3/0	2	0	1	(1)	2/0L	1	1/0	4/4
Chromsäure	CrO ₃	10 %	1/1	1	0	1	1/1	1/2	1	1/1	4/4
Dieselöl	—	100 %	1/3	2	0	1	(1)	(1)	0	1/1	1/1
Eisen-(III)-chlorid	FeCl ₃	gesättigt	1/1	2	3	2	1/1	4/4	0	1/1	3/0
Essigsäure	C ₂ H ₄ O ₂	10 %	1/1	2	3	1	1/1	1/1	1	(3)	4/4
Essigsäuremethylester	C ₃ H ₆ O ₂	techn. rein	1/0	3	0	1	1/0	1/1	1	4/4	1/0
Ethanol	C ₂ H ₆ O	96 %	1/0	1	1	1	1/1	1/1	1	3/0	1/0
Ethylacetat	C ₄ H ₈ O ₂	100 %	1/3	3	3	1	1/1	(1)	0	4/4	1/0
Ethylenchlorid	C ₂ H ₄ Cl ₂		3/3	4	3	1	1/1	1/1L	1	3/0	3/0
Flusssäure	HF	50 %	1/1	2	3	1	1/1	4/4	2	1/3	4/4
Formaldehydlösung	CH ₂ O	10 %	1/1	1	2	1	1/1	1/1	1	3/0	3/3
Glycerin	C ₃ H ₈ O ₃	90%	1/1	1	2	1	1/1	1/1	1	1/1	1/0
Heptan, n-	C ₇ H ₁₆	90%	2/3	1	1	1	1/1	1/1	1	1/1	1/0
Hexan, n-	C ₆ H ₁₄	100 %	2/3	1	2	1	1/1	1/1	1	1/1	4/4
Isopropanol	C ₃ H ₈ O	techn. rein	1/1	1	2	1	1/1	(1)	1	1/1	1/0
Kaliumhydroxid	KHO	10 %	1/1	1	3	1	1/1	1/1	1	4/4	1/0
Kaliumnitrat	KNO ₃	wässrig	1/1	1	0	1	1/1	1/1	1	1/1	1/0
Magnesiumchlorid	MgCl ₂	wässrig	1/1	1	2	1	1/1	1/0L	1	1/1	1/0
Methanol	CH ₄ O		1/1	1	2	1	1/1	1/1	1	3/4	2/0
Methylbenzol (Toluol)	C ₇ H ₈	100 %	3/4	3	3	1	1/1	1/1	0	3/3	1/0
Milchsäure	C ₃ H ₆ O ₃	3 %	1/1	1	0	1	1/1	1/1	1	1/1	(3)
Mineralöl	—		1/1	1	1	1	1/1	1/1	1	1/1	(1)
Natriumbisulfit	NaHSO ₃	wässrig	1/1	1	0	1	(1)	1/1	1	1/0	1/0
Natriumcarbonat	Na ₂ CO ₃	wässrig	1/1	1	3	1	1/1	1/1	1	1/1	1/0
Natriumchlorid	NaCl	wässrig	1/1	1	2	1	1/1	1/2	1	1/1	1/1
Natriumhydroxid	NaHO	50 %	1/1	1	3	1	1/1	1/3	1	3/3	1/0
Natriumsulfat	Na ₂ SO ₄	wässrig	1/1	1	0	1	1/1	1/1	1	1/1	1/0
Nitrobenzol	C ₆ H ₅ NO ₂		3/4	3	4	1	1/1	1/1	0	4/4	4/4
Ölsäure	C ₁₈ H ₃₄ O ₂	techn. rein	1/3	1	1	1	(1)	1/1	0	2/2	1/0
Oxalsäure	C ₂ H ₂ O ₄ x 2H ₂ O	wässrig	1/1	2	0	1	1/1	1/3	2	1/1	4/4
Ozon	O ₃		3/4	2	2	1	1/1	0/0	0	1/0	4/4
Petroleum	—	techn. rein	1/3	3	1	1	(1)	1/1	0	1/0	1/0
Pflanzliche Öle	—		0/0	1	1	1	(1)	1/1	0	1/0	0/0
Phenol	C ₆ H ₆ O	100 %	2/3	3	2	1	1/1	1/1	1	2/3	4/4
Phosphorsäure	H ₃ PO ₄	85 %	1/1	1	0	1	1/1	1/3	1	1/1	4/4
Quecksilber-(II)-chlorid	HgCl ₂	wässrig	1/1	1	0	1	1/1	(4)	1	1/1	4/4
Salpetersäure	HNO ₃	1-10 %	1/1	1	3	1	1/1	1/1	1	1/1	4/4
Salzsäure	HCl	1-5 %	1/1	1	3	1	1/1	4/4	1	1/1	4/4
Schwefelkohlenstoff	CS ₂	100 %	4/4	2	0	1	1/1	1/1	1	1/0	3/0
Schwefelsäure	H ₂ SO ₄	40 %	1/1	1	3	1	1/1	2/3	1	1/1	4/4
Spiritus	C ₂ H ₆ O	100 %	1/0	1	1	1	1/1	1/1	0	3/0	1/0
Tetrachlorkohlenstoff (Tetra)	CCl ₄	100 %	4/4	3	4	1	1/1	1/1L	1	1/1	4/4
Trichlorethylen (Tri)	C ₂ HCl ₃	100 %	3/4	4	4	1	1/1	1/1L	1	1/3	3/0
Zitronensäure	C ₆ H ₈ O ₇	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/1

Resistiveness Legend

There are two values per medium:

left number = value at +20 °C / right number = value at +50 °C.

- 0 no specifications available
- 1 very good resistance/suitable
- 2 good resistance/suitable
- 3 limited resistance
- 4 not resistant
- K no general specifications possible
- L risk of pitting corrosion or stress corrosion cracking
- () estimated value

Material Names

- HDPE Polyethylene, high density
- FEP Tetrafluoroethylene-Perfluorpropylene
- V4A Stainless steel 1.4401 (AISI 316)
- PPO GF30 Polyphenyloxylyene with 30% glass fibres
- PU Polyurethane
- PEEK Polyetheretherketone
- PA GF30 Polyamide with 30 % glass fibre contents

7 Maintenance and Cleaning

In polluted media tending to sedimentation, algae growth, floating debris and moss formation on the sensor it may be necessary to clean the flow velocity sensor regularly. To do so, please use a brush with plastic bristles, a broom or similar.



No hard objects such as wire brushes, rods, scrapers or similar shall be used to clean the sensor. Cleaning by using a water jet is allowed up to a max. pressure of 4 bar (see Specifications Specifications) (e.g. using a water hose). Never clean flow velocity sensors with pressure measurement cell (types V1D and V1U) by using a water jet!

Using a high pressure cleaner may damage the sensor resulting in measurement failure and is therefore absolutely not allowed

8 Dismantling/Disposal

The device has to be disposed according to the local regulations for electronic products.

9 Table of Pictures

Fig. 2-1	Sensor overview Part 1	5
Fig. 2-2	Overview pipe sensor, type: NIS-V200	6
Fig. 2-3	Overview Screw-in sensor, type: NOS-V2E	6
Fig. 2-4	Overview Plug-in sensor, type: NOS-V2S.....	7
Fig. 2-5	Overview Hemisphere, type: NIS-V30B	7
Fig. 2-6	Overview rod sensor, type: NOS-4.....	8
Fig. 2-7	Overview wedge sensor, type: NIS-V300.....	8
Fig. 2-8	Overview Clamp-On Sensors, type: NIC0.....	9
Fig. 2-9	Overview rod sensor, type: NOS-V2	9
Fig. 2-10	Overview rod sensor, type: NOS-V2	9
Fig. 3-1	Nameplate flow velocity sensor, type NOS-V2	15
Fig. 3-2	Nameplate flow velocity sensor, type NOS-V3	15
Fig. 3-3	Nameplate flow velocity sensor, type NOS-V4	15
Fig. 3-4	Nameplate flow velocity sensor, type NIS.....	16
Fig. 3-5	Nameplate flow velocity sensor, type NIC0.....	16
Fig. 3-6	Type key for ultrasonic sensors, type NOS	18
Fig. 3-7	Type key for screw-in/plug-in sensor, type NOS.....	19
Fig. 3-8	Type key for ultrasonic sensors, type NIS.....	20
Fig. 5-1	Basic construction pipe sensor type NIS.....	22
Fig. 5-2	Dimensions pipe sensor type NIS	22
Fig. 5-3	Basic construction screw-in sensor type NOS-V2E	23
Fig. 5-4	Dimensions screw-in sensor type NOS-V2E.....	24
Fig. 5-5	Basic construction plug-in sensor type NOS-V2S.....	25
Fig. 5-6	Dimensions plug-in sensor type NOS-V2S	26
Fig. 5-7	Basic construction hemisphere type NOS Ø40 mm.....	27
Fig. 5-8	Dimensions hemisphere type NOS Ø40 mm	27
Fig. 5-9	Basic construction rod sensor type NOS Ø20 / 40 mm.....	28
Fig. 5-10	Dimensions rod sensor type NOS Ø20 / 40 mm.....	28
Fig. 5-11	Basic construction wedge sensor type NOS Ø20 / 40 mm	29
Fig. 5-12	Dimensions wedge sensor type NIS	29
Fig. 5-13	Basic construction rod sensor type NOS-V4.....	30
Fig. 5-14	Dimensions rod sensor type NOS-V4	30
Fig. 5-15	Cable end configuration sensors.....	31

10 Index

A		O	
Accessories	13	Operating permits	17
article number	17		
C		P	
Cable		Parts subject to Wear and Tear	16
Configuration	31		
Extension	31		
Cleaning	35		
Copyright	3		
D		R	
Danger by electric voltage	14	Receipt	21
Danger Notes	14	Resistiveness	32
Device Identification	15	Return	21
I		S	
Installation	22	Sensor cable	31
		Sensor Dimensions	22
		Sensor overview	5
		Sensor versions	17
		Specifications	11
		Storing	21
M		T	
Maintenance	35	Translation	3
		Transport	21
N		Type key	18, 19
Nameplate	15		
Names	3	U	
		Use in accordance with the requirements	10

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	Ultraschall - Laufzeitsensoren NivuSonic
<i>Description:</i>	<i>Ultrasonic transit time sensors</i>
<i>Désignation:</i>	<i>Capteurs ultrasoniques temps de transit</i>
Typ / Type:	NIS-...

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:

nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

- 2014/30/EU
- 2011/65/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug die nachfolgend genannten anderen technischen Spezifikationen:

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Täle 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*

Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général*)

Eppingen, den 20.04.2016

Gez. *Marcus Fischer*

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	Ultraschall - Laufzeitdifferenzsensoren NivuChannel
<i>Description:</i>	<i>Ultrasonic transit time sensors</i>
<i>Désignation:</i>	<i>Capteurs par différence de temps de transit via ultrasons</i>
Typ / Type:	NOS-...

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:

nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

- 2014/30/EU
- 2011/65/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug die nachfolgend genannten anderen technischen Spezifikationen:

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Täle 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*

Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général*)

Eppingen, den 20.04.2016

Gez. *Marcus Fischer*

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

Telefon: +49 07262 9191-0
Telefax: +49 07262 9191-999
E-Mail: info@nivus.com
Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	Fließgeschwindigkeitssensor für Laufzeitdifferenzmessung in Aufschnalltechnik
<i>Description:</i>	
<i>Désignation:</i>	<i>Clamp-on flow velocity sensors based on transit time</i> <i>Capteur pour la vitesse d'écoulement par différence de temps de transit, technique "sanglée"</i>
Typ / Type:	NICO K1L0...

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:

we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:

nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

- 2014/30/EU

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug die nachfolgend genannten anderen technischen Spezifikationen:

The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:

L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Täle 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*

Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général*)

Eppingen, den 20.04.2016

Gez. *Marcus Fischer*