

Technical Instructions for Transit Time Sensors



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Important Note

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Translation

If the device is sold to a country in the European Economic Area (EEA) this manual 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 manual (German) must be consulted or the manufacturer contacted for clarification.

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Names

The use of general descriptive names, trade names, trademarks and the like in this manual 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.

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General**Important Note**

READ CAREFULLY BEFORE USE.

KEEP IN A SAFE PLACE FOR LATER REFERENCE.

This manual is an original instruction for transit time sensors and is for the intended use of the device. This manual is oriented exclusively to qualified expert personnel.

Read this instruction manual carefully and completely prior to installation and connection since it contains relevant information on this product. Observe the notes and particularly follow the warning notes and safety instructions.

Keep this manual in a safe place and make sure it is available for the users of this product at any time.

If you should have problems to understand information contained within this manual either contact the manufacturer or one of the distributors for further support.

The manufacturer cannot be held responsible for damage to persons or material due to incorrectly understood information in this instruction.




1 Applicable documentation

For the installation and operation of the complete system extra instruction manuals or technical descriptions may be required apart from this manual.

- Instruction manual for the particular measurement transmitter NivuFlow
- Installation instruction for transit time sensors

These manuals are provided with the particular delivery and/or are available as download on the NIVUS homepage.

2 Signs and definitions used

Image	Meaning	Remark
	(Action) Step	Action to be performed by you. Note the numbering of action steps. Observe the order of the working steps!
	Cross-reference	Reference to further or detailed information.
>Text<	Parameter or Menu	Indicates a parameter or a menu that is selected or described.
	Reference to document	Refers to an accompanying documentation.

Safety Instructions

3 Used symbols and signal words



The general warning symbol indicates the risk of personal injuries or death. In the text section the general warning symbol is used in conjunction with the signal words described below.

DANGER



Warnings in high degree of risk

Indicates a high-risk, imminently hazardous situation which will result in death or serious injury if not avoided.

WARNING



Warnings in medium degree of risk

Indicates a possible danger with medium risk which may result in a life-threatening situation or (severe) bodily injury if it is not avoided.

CAUTION



Warnings in low-risk or property damages

Indicates a possible danger with moderate risk which may result in minor or moderate personal injury or material damage if not avoided.

WARNING



Danger by electric voltage

Indicates a hazard with a high risk of electric shock which may result in a life-threatening situation or (severe) bodily injury if it is not avoided.



Important Note

*Contains information that should be highlighted.
Indicates a potentially damaging situation which can result in a damage of the product or an object in its environment.*



Note

Contains information and facts.

3.1 Safeguards and Precautions

Working with NIVUS instruments requires to observe and to follow the safety measures and precautions below generally and at any time. These notes and warnings will not be repeated for each description within the document.

WARNING**Germ contamination**

Please note that due to the operation in the waste water field the measurement system and cables may be loaded with dangerous disease germs. Respective precautionary measures must be taken to avoid damage to one's health.

Wear protective clothing.

WARNING**Observe occupational safety regulations!**

Installation, mounting, commissioning and maintenance shall be executed by trained expert personnel exclusively. Before starting installation work, observing the work safety regulations need to be checked.

Disregarding may lead in personal injury.

WARNING**Do not disable safety devices!**

It is strictly prohibited to disable the safety devices or to change the way they work.

Disregarding may lead in personal injury.

WARNING**Check hazards due to explosive gases**

Prior to beginning mounting works observe to follow any regulations on safety at work and check possible risks due to explosive atmospheres.

While working in channel systems observe to avoid electrostatic charge:

- *Avoid unnecessary movement to reduce the risk of building up electrostatic charge.*
- *Discharge possible electrostatic charge from your body before you begin to install the sensor.*

Disregarding may lead to personal injury or damage your facilities.

3.2 Personnel requirements

Installation, commissioning and maintenance shall be executed only by personnel meeting the demands as follows:

- Expert personnel with relevant training and appropriate qualification
- Personnel authorised by the plant operator



Qualified personnel

within the context of this documentation or the safety notes on the product itself are persons who are sufficiently familiar with installation, mounting, starting up and operation of the product and who have the relevant qualifications for their work; for example:

- I. *Training, instruction or authorisation to activate/deactivate, isolate, ground, and mark electric circuits and devices/systems according to the safety engineering standards.*
 - II. *Education and instruction according to the standards of safety engineering regarding the maintenance and use of adequate safety equipment.*
 - III. *First aid training.*
-

4 Use in accordance with the requirements



Important Note

The sensors are intended solely for the purpose described below.

Modifying or using the sensors for any other purposes without the manufacturer's written consent will not be considered as use in accordance with the requirements. The manufacturer cannot be held responsible for any damage resulting from improper use.

The user alone bears any risk.

The sensors are designed for a lifetime of approx. 10 years. After that period the sensors shall undergo a thorough inspection and a general overhaul.

The maximum permissible limit values as specified in chapter „7 Specifications“ shall be necessarily observed. Any case varying from these conditions which is not approved by NIVUS GmbH in written form is left at the owner's risk.



Note

For installation and commissioning observe the following points:

- *EU Declaration of Conformity*
 - *Test certificates issued by the respective authorities*
 - *Applicable local regulations*
-

NOS-V2/V3/V4 sensors

These sensors are designed for flow velocity measurement in clear and clean water to slightly polluted media in part filled and full pipes, channels or water bodies.

Connect to NivuFlow 650 flow transmitter.

NOS-V2E/V2S sensors

These sensors are designed for flow velocity measurement in clear and clean water to slightly polluted media in full pipes.

Connect to NivuFlow 600 and NivuFlow 650 flow transmitters.

NIS sensors

These sensors are designed for flow velocity measurement in clear and clean water to slightly polluted media in full pipes or rectangular channels.

Connect to NivuFlow 600 flow transmitter.

NIC sensors

These sensors are designed for flow velocity measurement in clear and clean water to slightly polluted media in full pipes. The sensors are installed on the pipe outside.

Connect to NivuFlow 600 / NivuFlow Mobile 600 flow transmitters.

4.1 User's Responsibilities

**Important Note**

In the EEA (European Economic Area) national implementation of the framework directive 89/391/EEC and corresponding individual directives, in particular the directive 2009/104/EC 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.

Make sure to have a local operating permit available and observe the associated conditions. In addition to this you must observe environmental requirements and local laws on the following points:

- 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)

Connections

Operators shall make sure prior to operating the instrument that during installation and initial start-up the local regulations (such as regulations for electrical connection) are observed.

4.1.1 Keep the manual

Keep this manual in a safe place and make sure it is available for the users of this product at any time.

4.1.2 Provide the manual

In case of selling the instruments this manual shall be provided to the purchaser since it is a part of the standard delivery.

5 Liability disclaimer

The manufacturer reserves the right to change the contents of this document including this liability disclaimer without prior notice and cannot be held responsible in any way for possible consequences resulting from such changes.

For connection, initial start-up and operation as well as maintenance of the unit the following information and higher legal regulations of the respective country (in Germany e. g. VDE regulations) such as applicable Ex regulations as well as safety requirements and regulations in order to avoid accidents shall be observed.

All operations on the sensors which go beyond installation or connection measures in principle shall be carried out by NIVUS staff or personnel authorised by NIVUS due to reasons of safety and guarantee.

Operate the sensors only in technically perfect working order.

Improper Use

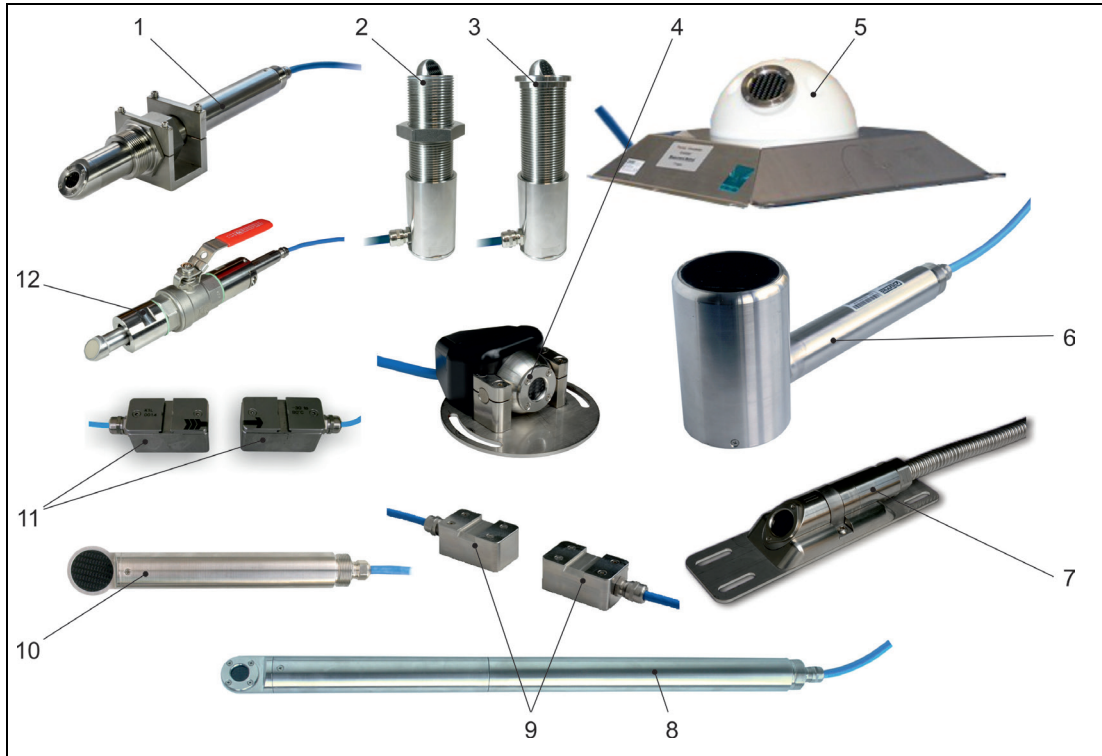
Not being operated in accordance with the requirements may impair the safety.

The manufacturer is not responsible for failures resulting from improper use.

Product specification

6 Sensor overview

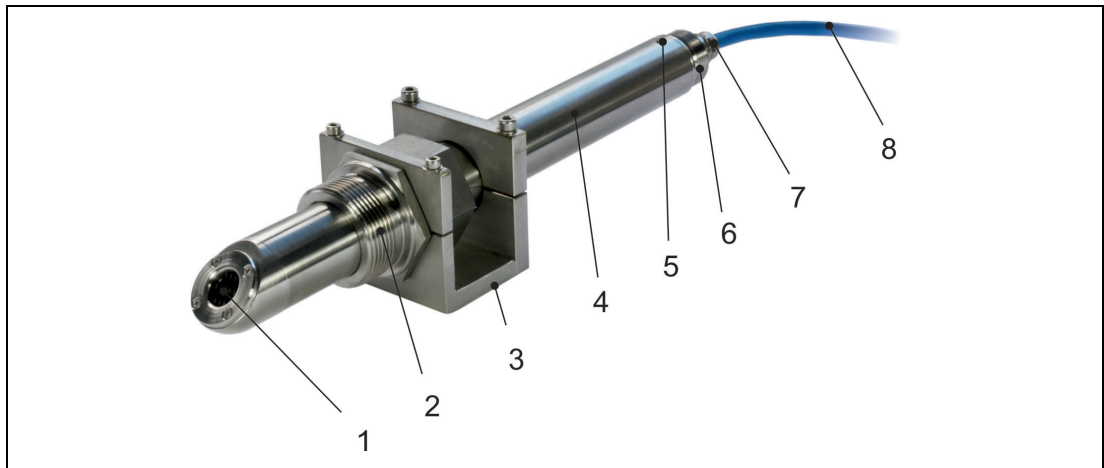
The depicted sensors are conceived for connection to NIVUS transmitters.



- 1 Flow velocity pipe sensor, type NIS-V200RT
- 2 Flow velocity screw-in sensor, type NOS-V2E00
- 3 Flow velocity plug-in sensor, type NOS-V2S00
- 4 Flow velocity ball head sensor, type NOS-V20BS, CFK sensor face 20 mm
- 5 Flow velocity hemisphere sensor, type NOS-V30BS, CFK sensor face 40 mm, with holder
- 6 Flow velocity rod sensor, type NOS-V40, CFK sensor face 65 mm (200 KHz)
- 7 Flow velocity wedge sensor, type NIS-V280KS
- 8 Flow velocity rod sensor, type NOS-V20, CFK sensor face 20 mm, with extension
- 9 Clamp-on sensor pair, type NIC-CO01
- 10 Flow velocity rod sensor, type NOS-V30 CFK sensor face 40 mm
- 11 Clamp-on sensor pair, type NIC0
- 12 Flow velocity pipe sensor, type NIS-V200RL

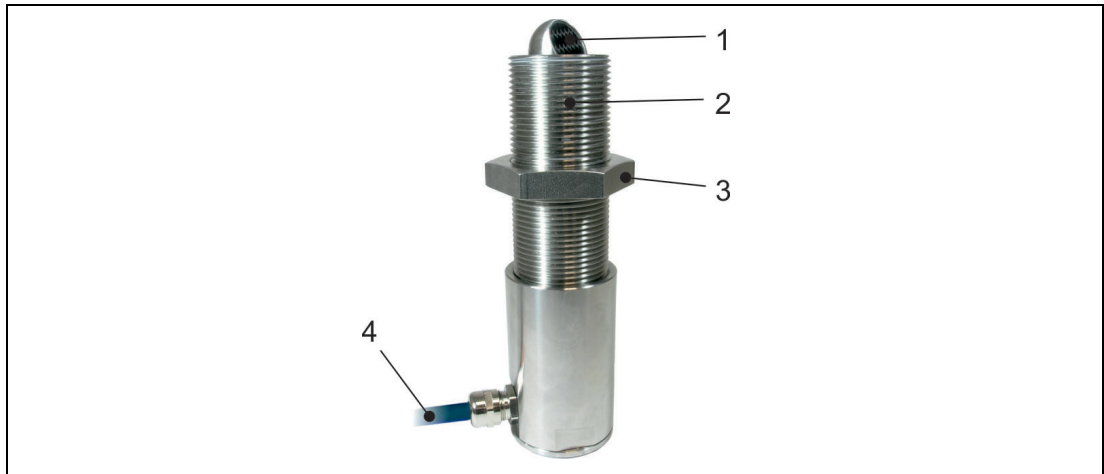
Fig. 6-1 Sensor overview

6.1 Single overviews of sensors



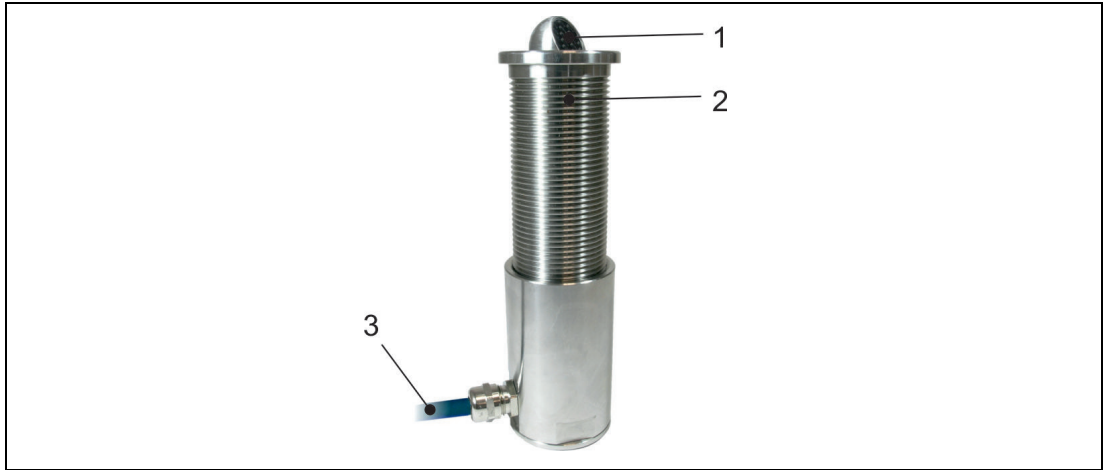
- 1 Sensor for flow velocity measurement
- 2 Sensor screw joint (movable)
- 3 Retaining element
- 4 Sensor body
- 5 Thread for alignment aid, M4 screw
- 6 Thread to screw on extension
- 7 Cable gland
- 8 Sensor cable

Fig. 6-2 Pipe sensor, type NIS-V200RT



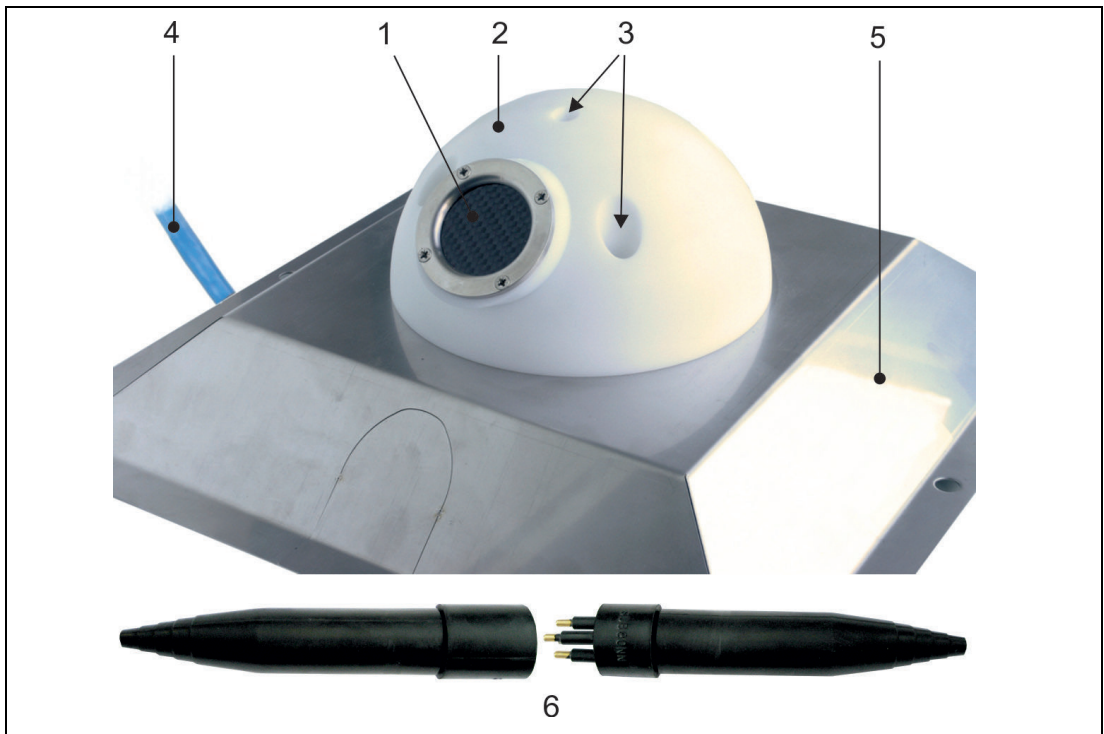
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Screw nut for adjustment and fixation
- 4 Sensor cable

Fig. 6-3 Screw-in sensor, type NOS-V2E00



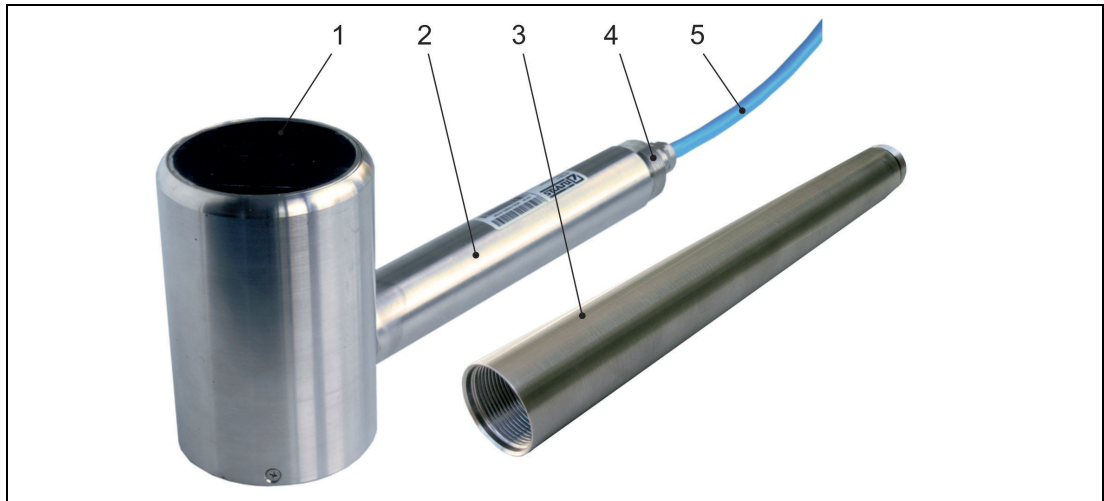
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor cable

Fig. 6-4 Plug-in sensor, type NOS-V2S00



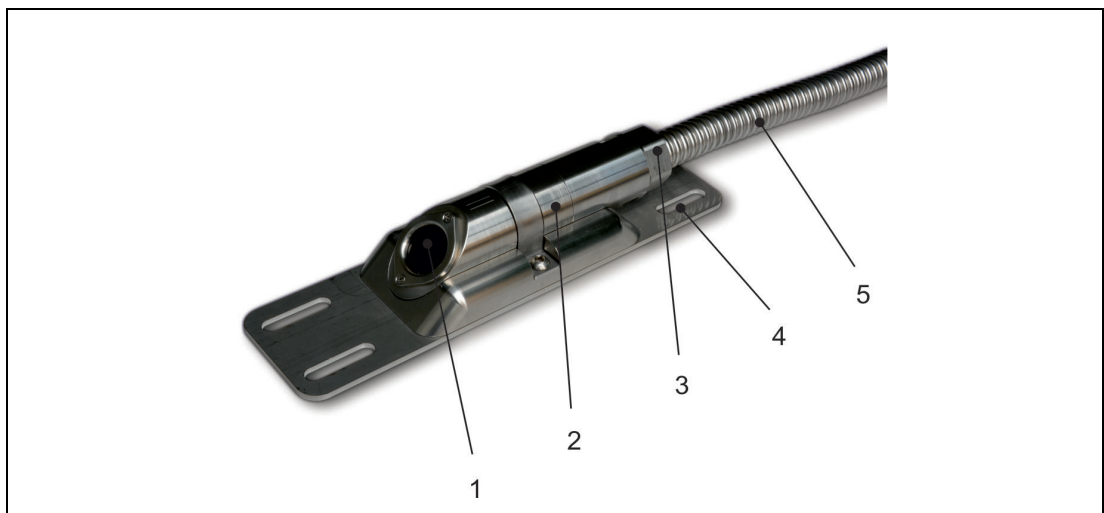
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Screws for the alignment
- 4 Sensor cable
- 5 Holder bracket for hemispheres (option)
- 6 Underwater plug connection (option)

Fig. 6-5 Hemisphere sensor, type NOS-V30BS



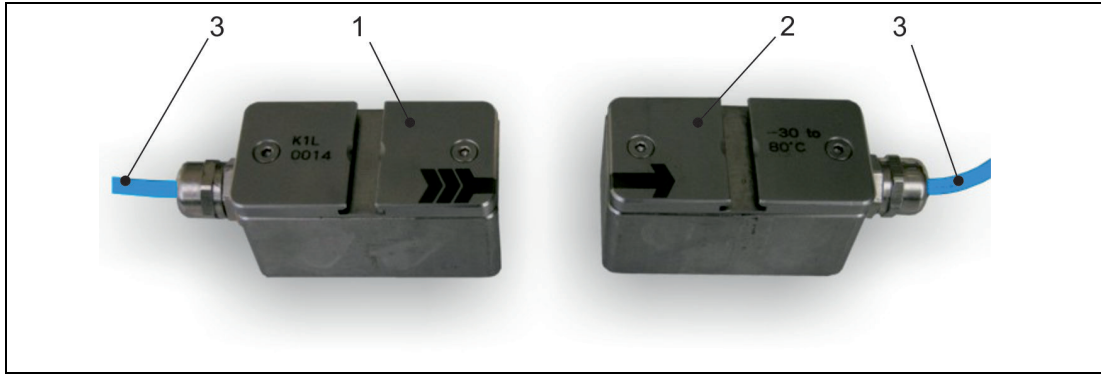
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor extension (option)
- 4 Thread to screw on extension
- 5 Sensor cable

Fig. 6-6 Rod sensor, type NOS-V40



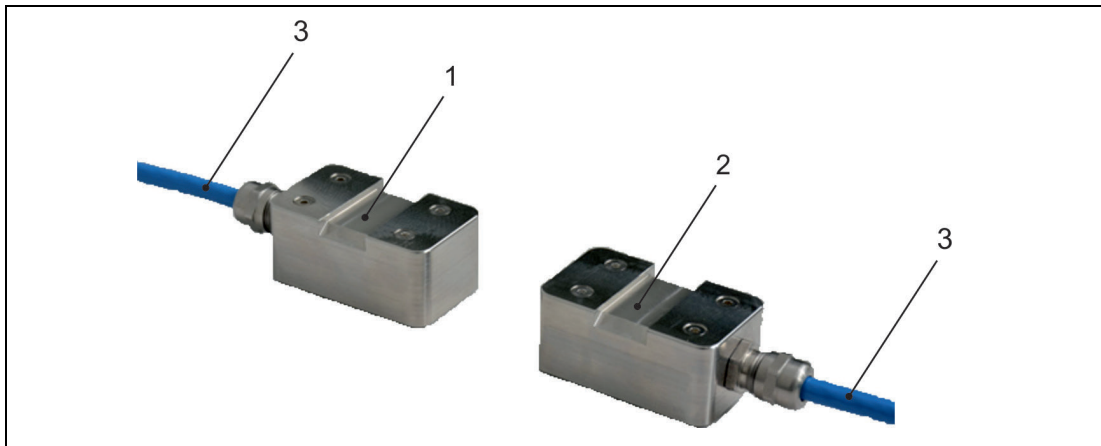
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Cable gland
- 4 Mounting plate
- 5 Sensor cable (option with flexible hose)

Fig. 6-7 Wedge sensor, type NIS-V280KS



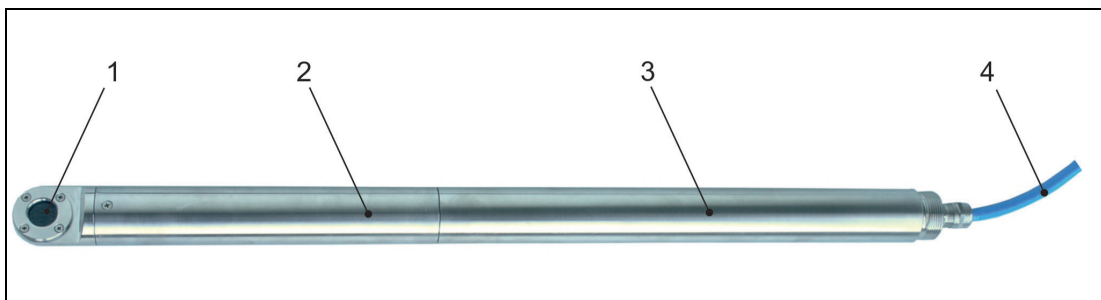
- 1 Sensor for flow velocity measurement
- 2 Sensor for flow velocity measurement
- 3 Sensor cable

Fig. 6-8 Clamp-on sensors, type NIC0



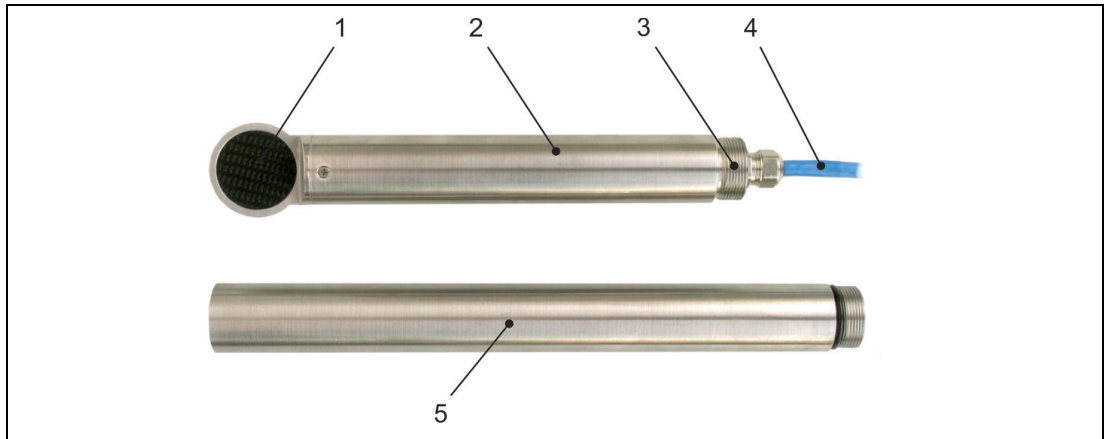
- 1 Sensor for flow velocity measurement
- 2 Sensor for flow velocity measurement
- 3 Sensor cable

Fig. 6-9 Clamp-on sensors, type NIC-CO01



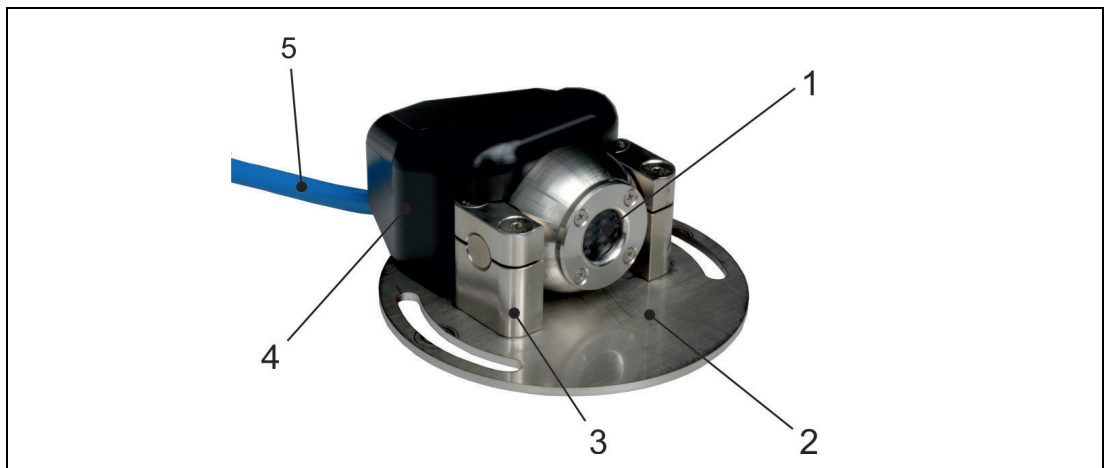
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Sensor extension (option)
- 4 Sensor cable

Fig. 6-10 Rod sensor, type NOS-V20



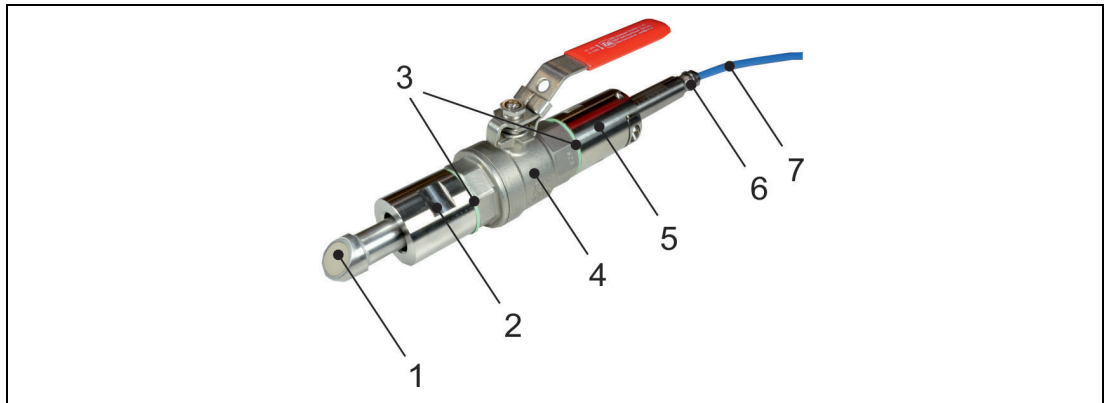
- 1 Sensor for flow velocity measurement
- 2 Sensor body
- 3 Thread to screw on extension
- 4 Sensor cable
- 5 Sensor extension (option)

Fig. 6-11 Rod sensor, type NOS-V30



- 1 Sensor head (rotatable)
- 2 Fastening plate (adjustable)
- 3 Clamping elements
- 4 Cover
- 5 Cable

Fig. 6-12 Ball head sensor, type NOS-V20BS



- 1 Sensor head
- 2 Weld-on nozzle
- 3 Flat gasket
- 4 Ball valve
- 5 Retaining and sealing element
- 6 Cable gland
- 7 Cable

Fig. 6-13 Pipe sensor, type NIS-V200RL

6.1 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.



Note

Check the delivered instrument for accordance with your order by identifying the nameplate.

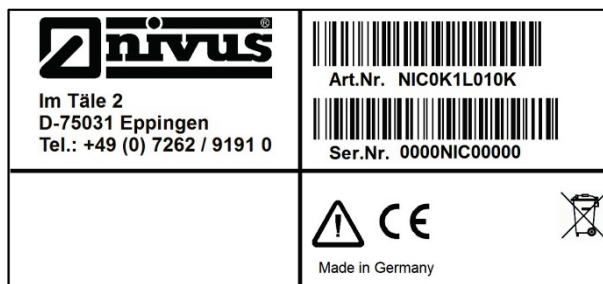


Fig. 6-14 Nameplate of flow velocity sensor, type NIC0

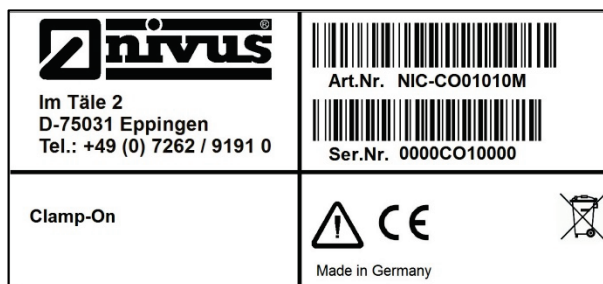


Fig. 6-15 Nameplate of flow velocity sensor, type NIC-CO01



Fig. 6-16 Nameplate of flow velocity sensor, type NIS

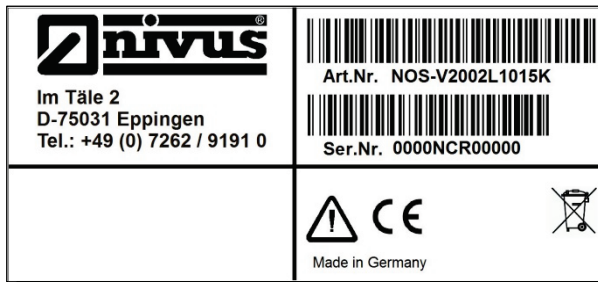


Fig. 6-17 Nameplate of flow velocity sensor, type NOS

6.2 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 1.4571; installation tube length 500 mm, diameter 35 mm; sensor head with CFK sensor face (ø 20 mm) for 1 MHz V20BS Adjustable ball head sensor made of 1.4571 and POM with GFK sensor face (20 mm) V3005 Rod sensor made of 1.4571; installation tube length 500 mm, diameter 35 mm; sensor head with CFK sensor face (ø 40 mm) for 1 MHz V30BS Hemispheres made of POM, sensor face 1.4571 (ø 40 mm) made of CFK (Carbon); for 1 MHz V30BX Hemispheres made of CFK (Carbon), sensor face 1.4571 (ø 40 mm); special construction V4005 Rod sensor made of 1.4571; installation tube length 500 mm, diameter 35 mm; sensor head (ø 65 mm) for 200 KHz
	Pressure level L 1,2 bar
	Path position 1 Path position 45° against flow direction (recommended setup angle)
	ATEX approval 0 None
	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 NivuFlow transmitter via underwater plug connection (only for type V30B) B Connection via extension module NFE to NivuFlow transmitter via underwater plug connection (only for type V30B) K Connection to NivuFlow transmitter Z Connection to NivuFlow transmitter via extension module NFE
NOS-	L 1 0

Fig. 6-18 Type key for ultrasonic sensors, type NOS

NOS-	Type				
	V2E00	Screw-in sensors 1¼" for installation in welding nozzle (installation of sensors only possible from the outside)			
	V2S00	Plug-in sensors for installation in duct (installation of sensors only possible from the inside)			
		Pressure level			
		H	80 bar		
		Path position			
		A	45°		
		B	Position 18°; setting corresponding to IEC60041; upon request		
		C	Position 30°; setting according to IEC60041; upon request		
		D	Position 54°; setting according to IEC60041; upon request		
		X	Special position		
		ATEX approval			
		0	None		
		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			
		K	Connection to NivuFlow transmitter		
		Z	Connection to NivuFlow transmitter via extension module NFE		
NOS-		H		0	

Fig. 6-19 Type key for screw-in/plug-in sensor, type NOS

NIS-	Type				
	V200	Pipe sensor			
		RL0	Pipe sensor 1" for 1" stop ball valve (2 pcs. required), 1 MHz; pressure up to 16 bar max.; use in DN100...DN500		
		RT0	Pipe sensor 1½"; 1.4571 with CFK sensor face; starting at DN100; pressure up to 16 bar max.		
		RT2	Pipe sensor 1½"; 1.4571 with CFK sensor face; starting at DN100; pressure up to 16 bar max.; Version with drinking water approval according to WRAS (BS6920)		
		RX	Pipe sensors; special construction		
	V280	Wedge sensor			
		KS0	Wedge sensor; 1.4571 with alignment aid		
			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 upon request		
			Sensor connection		
		K	Connection to NivuFlow transmitter		
		Z	Connection to NivuFlow transmitter via extension module NFE		
			Pipe length (0 for wedge sensor)		
		0	Only for wedge sensor (due to system limitations)		
		2	200 mm (for pipe sensors)		
		3	300 mm (for stop ball valve)		
		X	Special length		
NIS-					

Fig. 6-20 Type key for ultrasonic sensors, type NIS

NIC0	Type				
	K1L	Clamp-on sensor pair made of stainless steel/PEEK for connection to NivuFlow 600 transmitter; measurement range: ±20 m/s; DN80...DN6000			
		ATEX approval			
		0	None		
			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		
			Sensor connection		
		K	Connection to NivuFlow 600 transmitter		
NIC0	K1L	0		K	

Fig. 6-21 Type key for Clamp-on sensors, type NIC0

NIC-	Type CO01	<p>Clamp-on sensor pair for full pipes, made of stainless steel/PEEK; measurement range: ±10 m/s; DN100...DN2500; temperature range: -20 °C...+70 °C</p> <p>ATEX approval</p> <p>0 None E Zone 1</p> <p>Cable length</p> <p>7 7 m pre-configured 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</p> <p>Sensor connection</p> <p>K With plug connector to connect to NivuFlow 600 transmitter M With plug connector to connect to NivuFlow Mobile 600 transmitter</p>		
NIC-	CO01			

Fig. 6-22 Type key for Clamp-on sensors, type NIC-CO01

7 Specifications

7.1 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...40 m; other widths upon request
Measurement uncertainty	- Flow velocity (v_{average}) in paths ±0.1 % of measurement value - Offset velocity < ±5 mm/s
Number of measurement paths	- 1...8 measurement paths; according to DIN EN ISO 6416:2004 and IEC 60041; extension module required if using 4 paths or more
Protection	IP68
Operating temperature	-20 °C...+50 °C
Storage temperature	-30 °C...+70 °C
Cable length	10/15/20/30/50/100 m; extension option: sensors can be connected to extension modules NFE, cable length between NFE and transmitter max. 200 m
Cable model	Configured continuous cable; pre-configured cable with underwater plug connection (option for NOS-V30B)
Cable type	Twinax 2x AWG 20
Outside cable diameter	8.5 mm
Sensor types	- Rod sensors - Hemisphere sensors - Screw-in sensor / Plug-in sensor
Medium contacting materials	- Rod sensor / screw-in sensor / plug-in sensor: stainless steel 1.4571, CFK (Carbon), Viton® - Hemisphere sensor: stainless steel 1.4571, CFK (Carbon), POM, PUR, underwater plug and socket made of Neoprene - Ball head sensor: stainless steel 1.4571, CFK (Carbon), POM
Temperature measurement via sound velocity	
Measurement range	0 °C...+60 °C
Measurement uncertainty	±1 K

7.2 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...12 m (DN200...DN12000)
Measurement uncertainty	Flow velocity (v_{average}) in path ±0.1 % of measurement value
Number of measurement paths	1...8 paths; according to DIN EN ISO 6416:2004 and IEC 60041; extension module required if using 4 paths or more
Protection	IP68
Operating temperature	-20 °C...+50 °C
Storage temperature	-30 °C...+70 °C
Cable length	10/15/20/30/50/100 m; extension option: sensors can be connected to extension modules NFE, cable length between NFE and transmitter max. 200 m
Cable type	Twinax 2x AWG 20
Outside cable diameter	8.5 mm
Sensor types	- Pipe sensor for installation in pipes with retaining element - Wedge sensor with ground plate to fasten the sensor at the channel wall
Medium contacting materials	- Pipe sensor: stainless steel 1.4571, CFK (Carbon), NBR, HDPE - Wedge sensor: stainless steel 1.4571, CFK (Carbon)
Operating pressure	- Pipe sensor: max. 16 bar (with retaining element) - Wedge sensor: max. 4 bar
Temperature measurement via sound velocity	
Measurement range	0 °C...+60 °C
Measurement uncertainty	±1 K

7.3 Flow velocity sensor, type NIC0

Measurement principle	Ultrasonic transit time as Clamp-on system
Material	PEEK and stainless steel
Measurement frequency	1 MHz; other frequencies upon request
Flow velocity range	±20 m/s
Inner pipe diameter	0.08...6 m (DN80...DN6000)
Protection	IP68
Operating temperature	0 °C...+80 °C (environment)
Storage temperature	0 °C...+80 °C (non-condensing)
Cable length	10/15/20/30/50/100 m
Cable type	Twinax 2x 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 - Offset velocity < ±5 mm/s
Temperature measurement via sound velocity	
Measurement range	0 °C...+80 °C
Measurement uncertainty	±1 K

7.4 Flow velocity sensor, type NIC-CO01

Measurement principle	Ultrasonic transit time as Clamp-on system
Material	PEEK and stainless steel 1.4301
Measurement frequency	1 MHz; other frequencies upon request
Flow velocity range	± 10 m/s
Inner pipe diameter	0.1...2.5 m (DN100...DN2500)
Protection	IP68
Operating temperature	0 °C...+70 °C (environment)
Storage temperature	-20 °C...+70 °C (non-condensing)
Cable length	7/10/15/20/30/50 m
Cable type	Twinax 2x AWG 20
Outside cable diameter	7.0 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 - Offset velocity $< \pm 5$ mm/s
Temperature measurement via sound velocity	
Measurement range	0 °C...+70 °C
Measurement uncertainty	± 1 K

7.5 Accessories (option)

Holder bracket	For hemisphere sensor 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

8 Configuration

8.1 Delivery

The standard delivery of transit time sensors contains:

- Transit time sensors (number and type according to the shipping documents)
- Technical Instructions incl. EU Declaration of Conformity and approvals

Check additional accessories depending on your order and according to the delivery note.

8.2 Reception inspection

Check the packaging for visible damage immediately after receipt. Any possible damage in transit shall be instantly reported to the carrier. Furthermore a written report shall be sent to NIVUS GmbH in Eppingen.

Incomplete deliveries shall be reported in writing either to your local representative or directly to the NIVUS head office in Eppingen within two weeks.



Note

Mistakes cannot be rectified later.

8.3 Transport

Do not expose the system to heavy shocks or vibrations. Use the original packaging for transport.

8.4 Return

In case of a required reshipment return the unit at customer cost to NIVUS GmbH in Eppingen using the original packaging.

Insufficiently franked shipments will not be accepted!

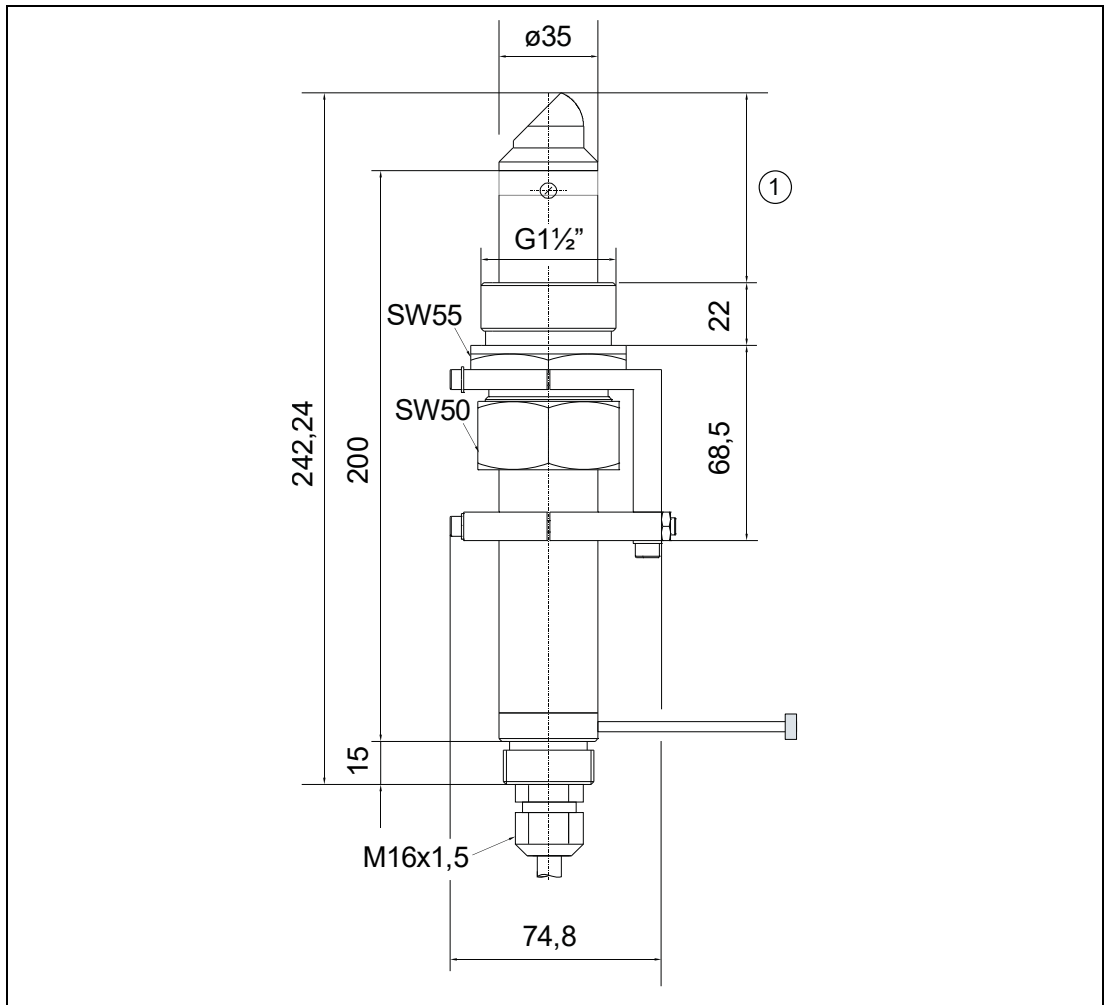
8.5 Installation of spare parts and parts subject to wear and tear

We herewith particularly emphasise that replacement parts or accessories not supplied by NIVUS moreover are not certified and approved by NIVUS too. Installation and/or the use of such products hence may negatively influence predetermined constructional characteristics of the measurement system or even lead to instrument failures.

NIVUS cannot be held responsible for any damage resulting due to the use of non-original parts and non-original accessories.

Installation and connection

9 Sensor dimensions



1 Adjustable

Fig. 9-1 Dimensions pipe sensor, type NIS-V200RT

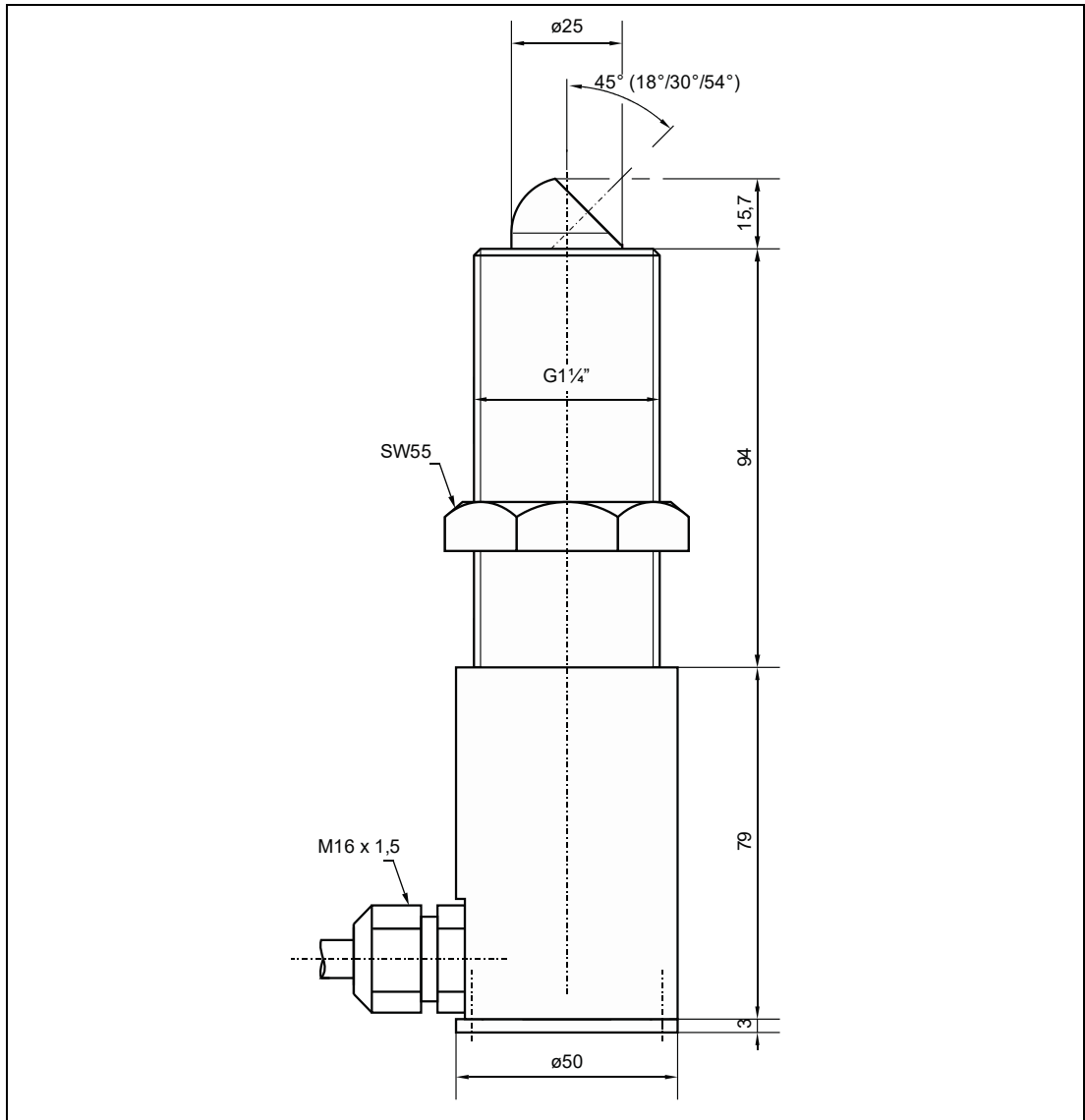


Fig. 9-2 Dimensions screw-in sensor, type NOS-V2E00

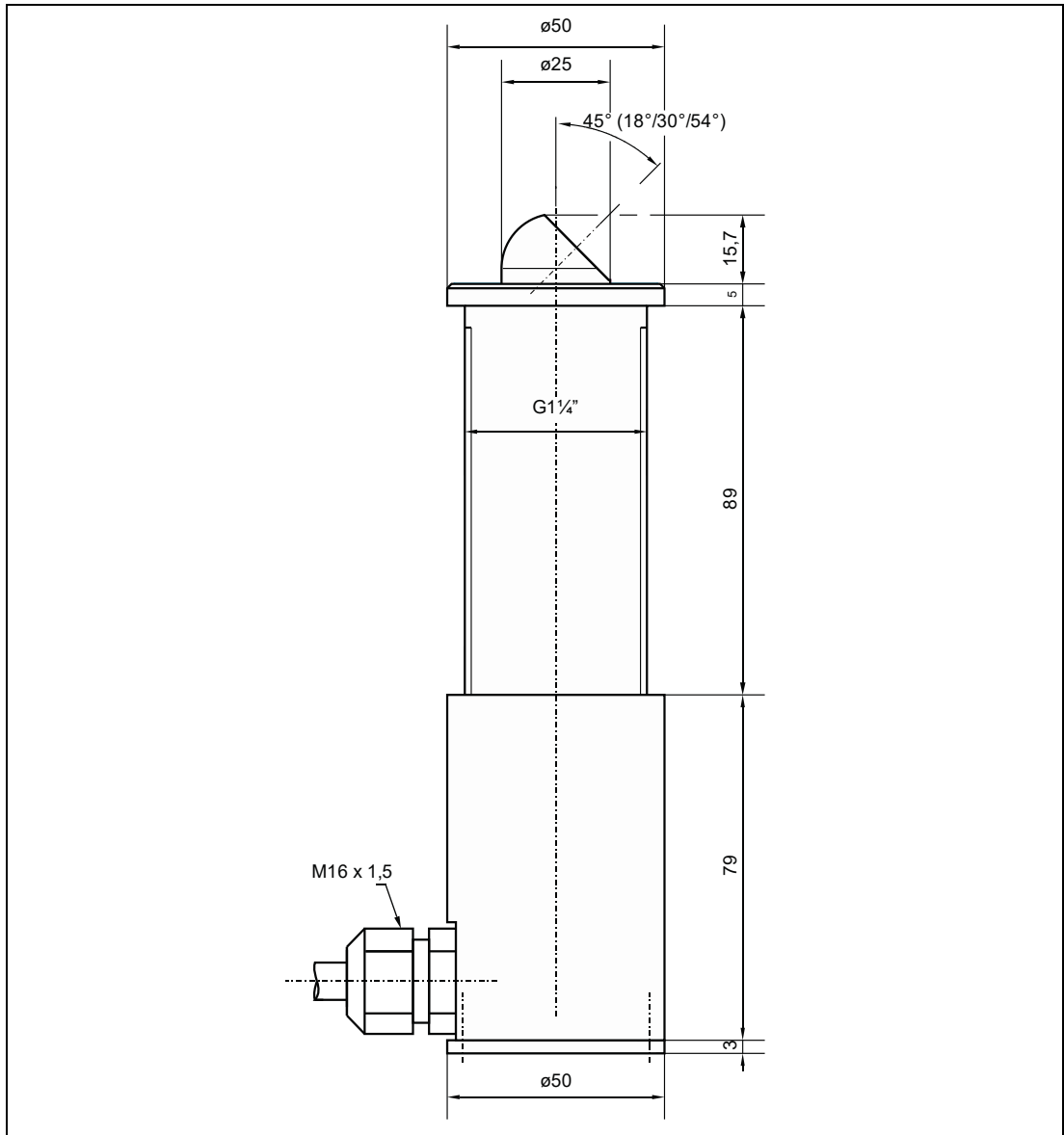


Fig. 9-3 **Dimensions plug-in sensor, type NOS-V2S00**

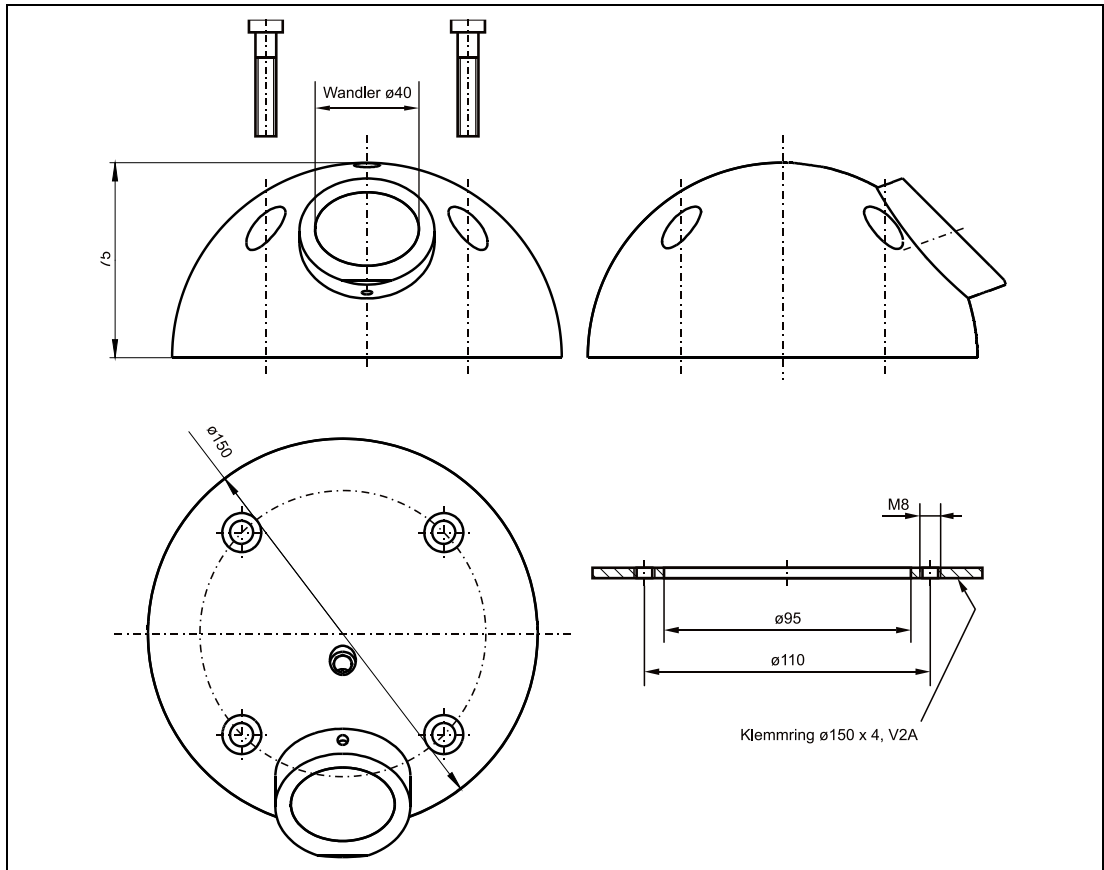


Fig. 9-4 Dimensions hemisphere sensor, type NOS ø 40 mm

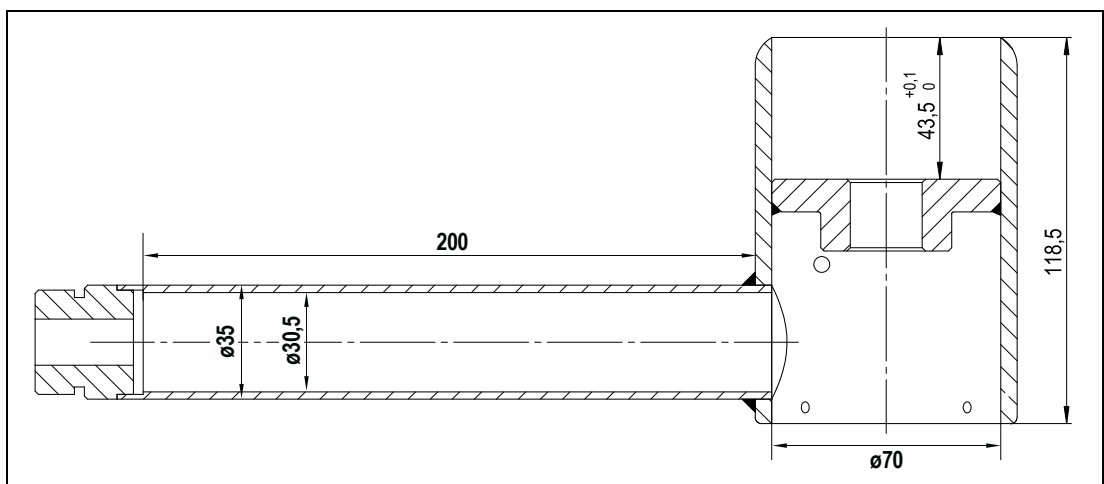


Fig. 9-5 Dimensions rod sensor, type NOS-V40

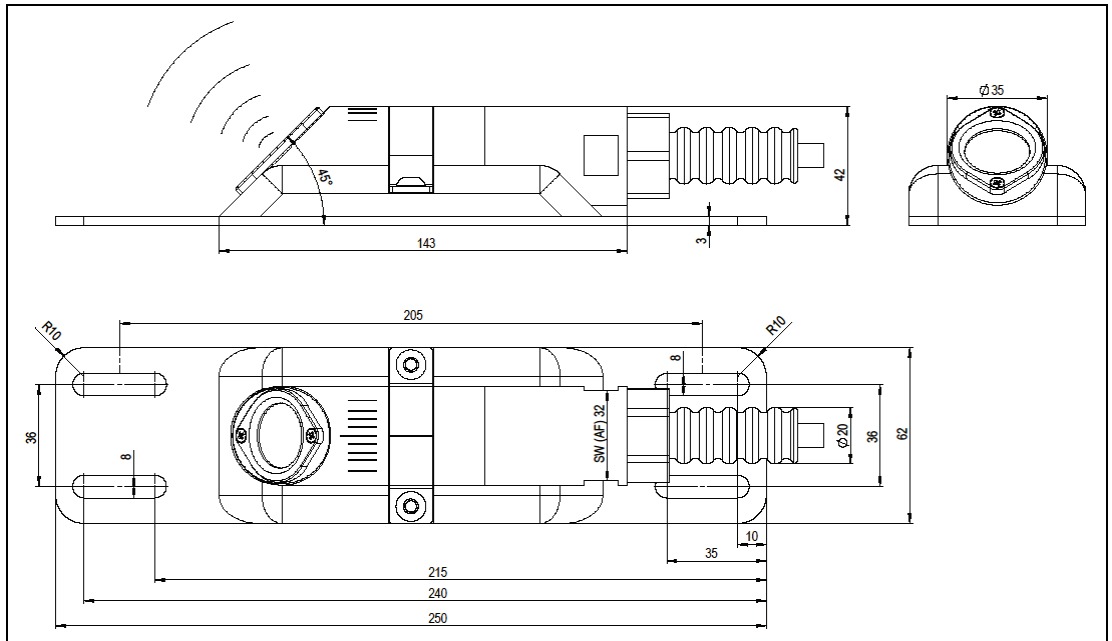
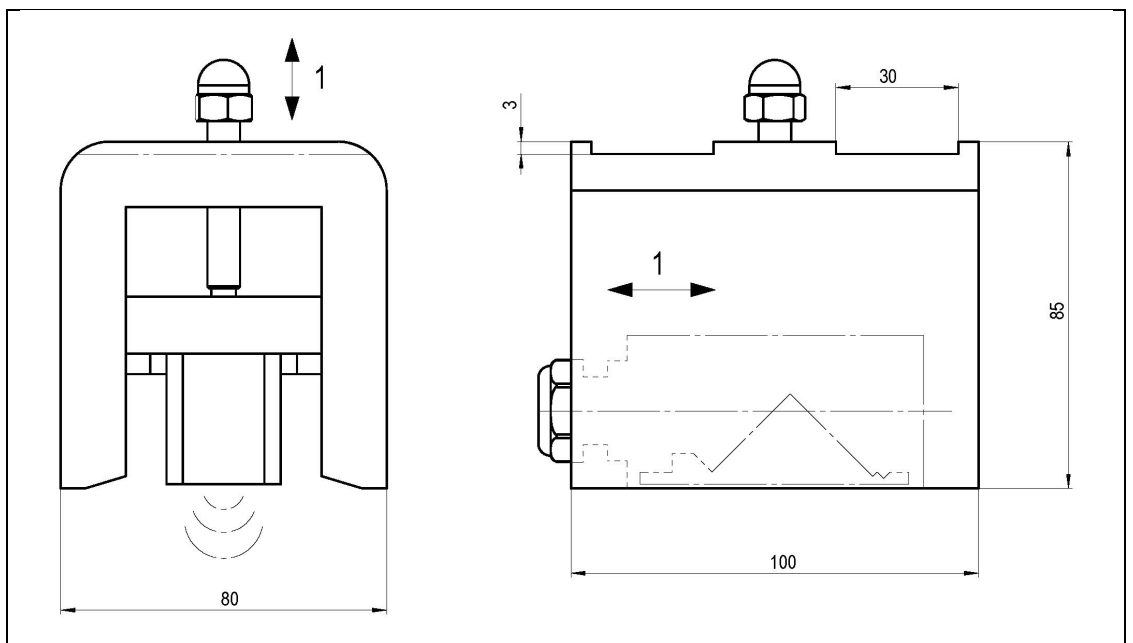


Fig. 9-6 Dimensions wedge sensor, type NIS-V280KS



1 Movable

Fig. 9-7 Dimensions Clamp-on sensor, type NIC0

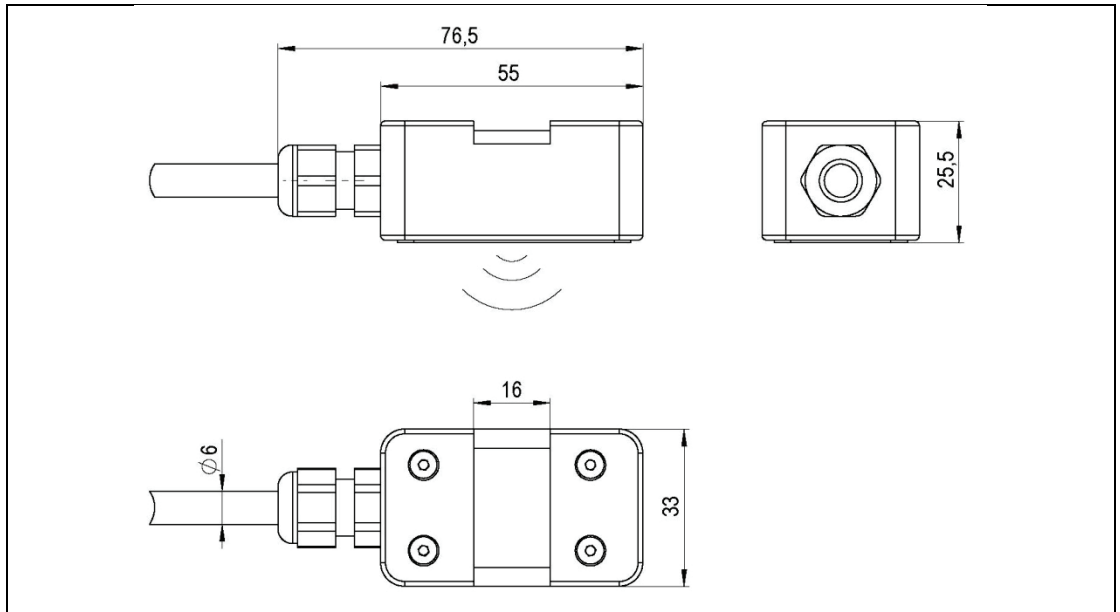


Fig. 9-8 Dimensions Clamp-on sensor, type NIC-CO01

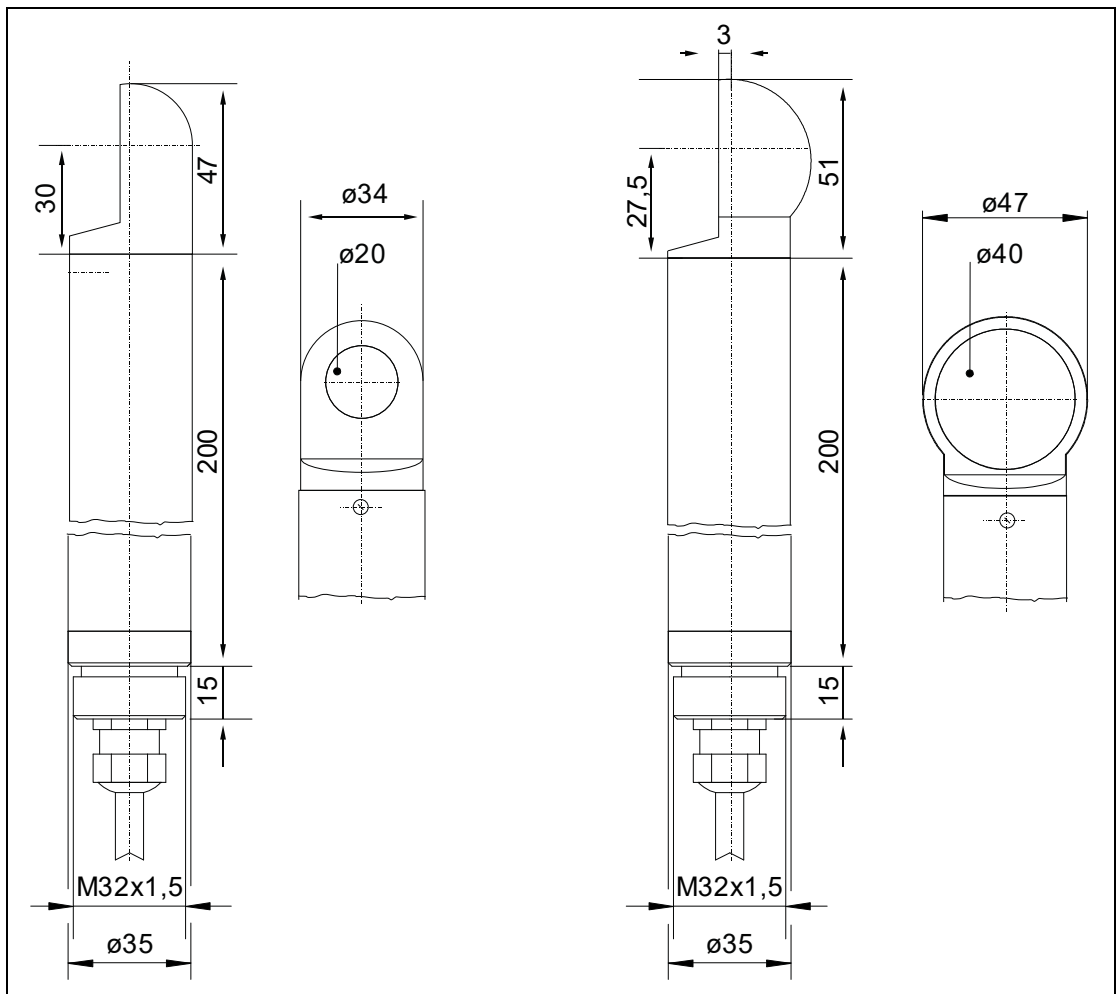


Fig. 9-9 Dimensions rod sensor, type NOS $\phi 20/40$ mm

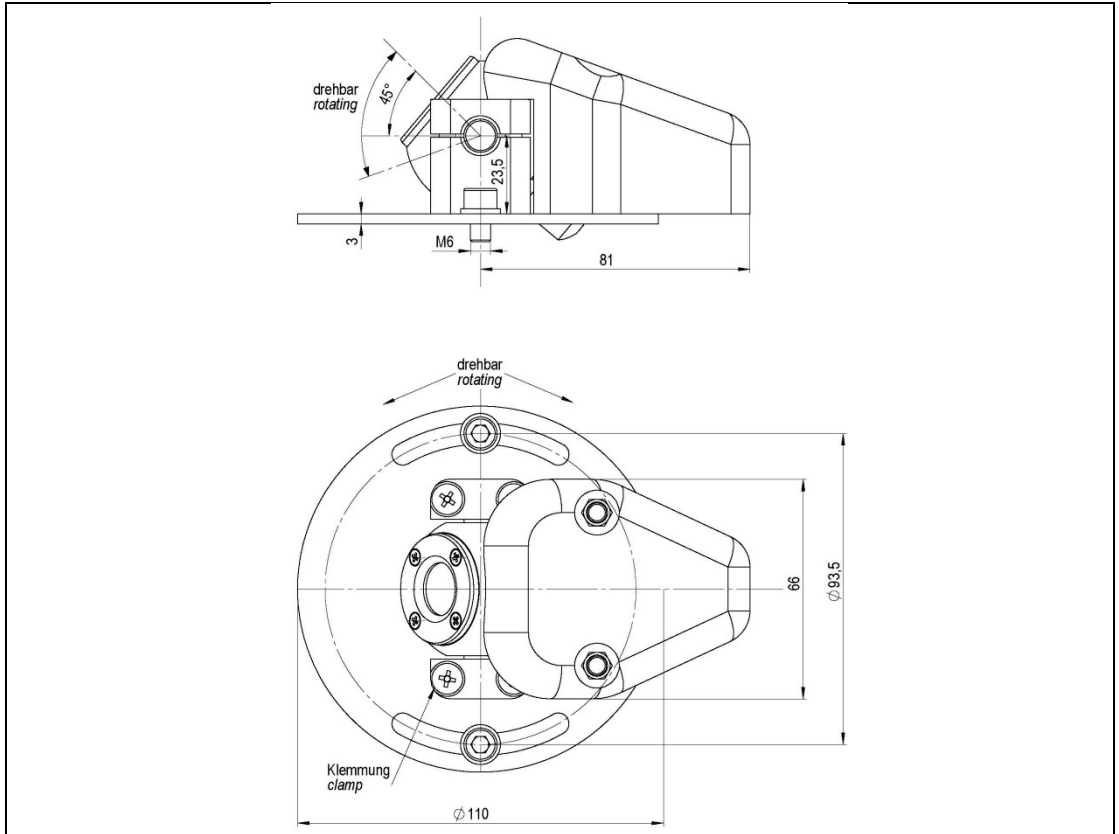


Fig. 9-10 Dimensions ball head sensor, type NOS-V20BS

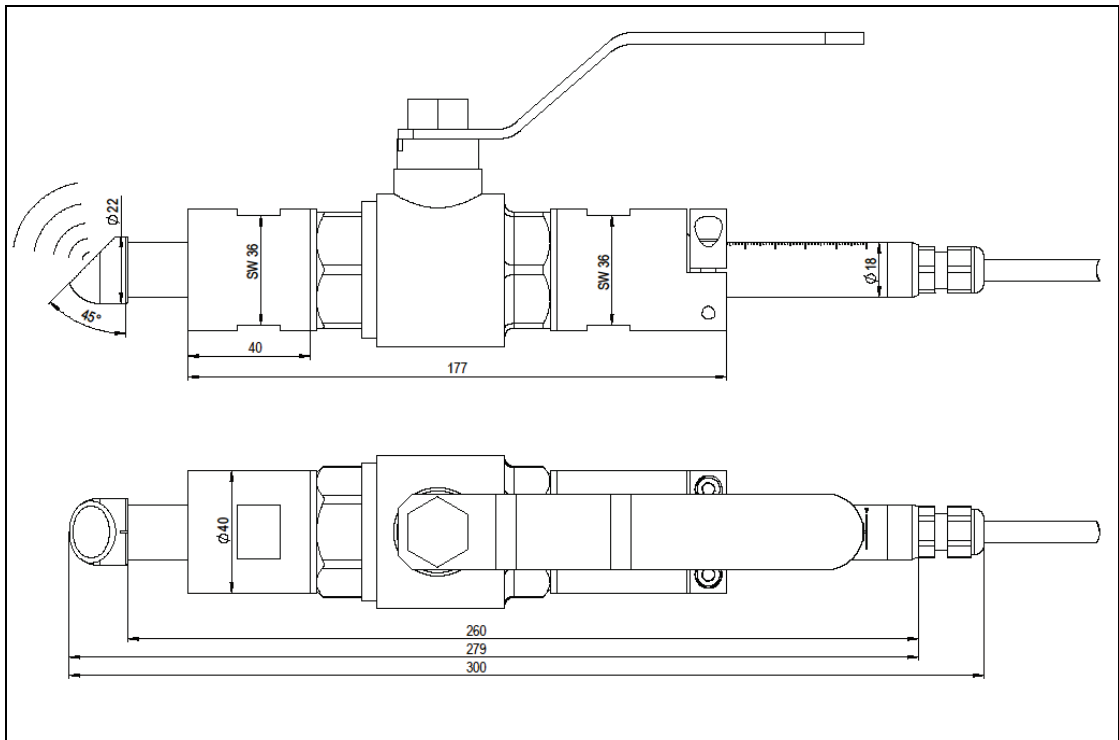
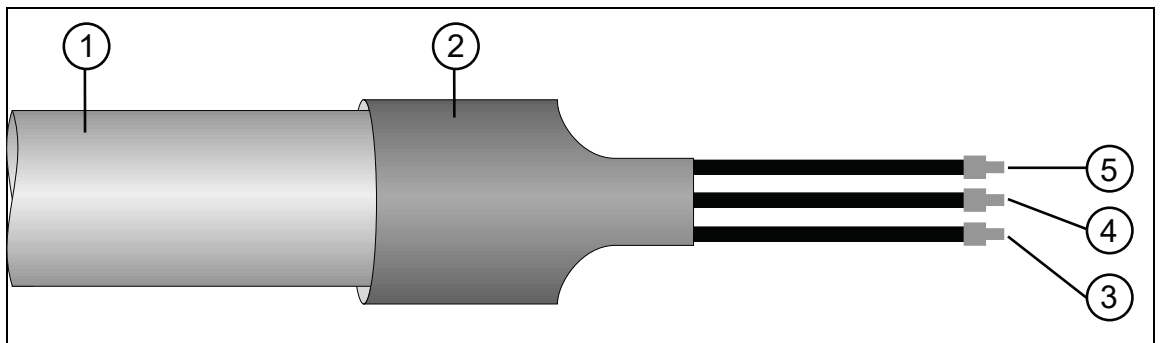


Fig. 9-11 Dimensions pipe sensor, type NIS-V200RL

9.1 Cable end configuration



- | | |
|---|---------------------------------|
| 1 | Cable sheath |
| 2 | Shrunk-on hose |
| 3 | Black; cable shield (no ground) |
| 4 | Copper; CH - |
| 5 | Silver; CH + |

Fig. 9-12 Cable end configuration sensors

9.2 Sensor cable

9.2.1 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 (connection free of contact resistance).

The sensors of the individual measurement paths are connected directly to the transmitter (two or four sensor pairs) or via an extension module NFE (if using more than four paths for cable length 0...200 m).

CAUTION



*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.

CAUTION



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.

CAUTION



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

10 Chemical resistance list

CAUTION



Damage due to aggressive media

Basically, there is a risk of pitting corrosion for stainless steel mounting plates or pipe sensor bodies in chloride media. Hydrogen sulphide (H_2S – risk of diffusion through the cable sheath) and various organic solvents may damage sensor materials.

Install sensors or cables only in media to which they are resistant.

Sensors shall be installed and cables shall be laid only in media to which the components are resistant. Otherwise sensors and cables may be destroyed.

The medium contacting parts of standard sensors are made of:

- 1.4571 (pipe sensor jacket)
- Carbon CFK (sensor surface)
- PEEK (sensor crystal cover)
- Polyurethan (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.

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	FORMULA	CONCENTRATION	HDPE	PPO GF30	PUR	PEEK	FFEP	V4A	Hastelloy C 276	Viton (PA/PP)	PA GF30	PVDF
Acetaldehyde	C ₂ H ₄ O	40 %	3/3	4	4	1	(1)	(1)	0	4/4	2/4	3/0
Acetic acid	C ₂ H ₄ O ₂	10 %	1/1	2	3	1	1/1	1/1	1	(3)	4/4	1/0
Acetone	C ₃ H ₆ O	40 %	1/1	4	4	1	(1)	1/1	1	4/4	1/0	3/3
Allyl alcohol	C ₃ H ₆ O	96 %	1/3	2	0	1	1/1	1/1	0	4/4	3/0	0/0
Aluminium chloride	AlCl ₃	10 %	1/1	2	0	1	1/1	3/4	1	1/0	1/0	1/1
Ammonium chloride	(NH ₄)Cl	watery	1/1	1	0	1	1/1	1/2L	1	1/1	3/4	1/1
Ammonium hydroxide	NH ₃ + H ₂ O	5 %	1/1	2	4	1	1/1	1/1	1	(2)	(2)	1/1
Aniline	C ₆ H ₇ N	100 %	1/2	3	4	1	1/1	1/0	1	2/4	3/4	1/2
Benzene	C ₆ H ₆	100 %	3/4	3/4	2	1	1/1	1/1	1	3/3	2/0	1/2
Benzyl alcohol	C ₇ H ₈ O	100 %	3/4	3	2	1	1/1	1/1	1	1/0	4/4	1/1
Boric acid	H ₃ BO ₃	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/0	1/1
Bromic acid	HBrO ₃	concentr.	0/0	0	3	1	0/0	(4)	0	(2)	(4)	1/1
Butanol	C ₄ H ₁₀ O	techn. pure	1/1	2	3	1	1/1	(1)	1	3/4	1/0	1/1
Calcium chloride	CaCl ₂	spirituous	1/0	1	1	1	1/1	1/2L	1	1/1	4/4	1/1
Carbon disulphide	CS ₂	100 %	4/4	2	0	1	1/1	1/1	1	1/0	3/0	1/0
Carbon tetrachloride	CCl ₄	100 %	4/4	3	4	1	1/1	1/1L	1	1/1	4/4	1/1
Caustic soda	NaHO	50 %	1/1	1	3	1	1/1	1/3	1	3/3	1/0	0/0
Chlorine	Cl ₂		4/4	3	3	1	1/1	1/0	0	1/1	4/4	1/1
Chlorine water	Cl ₂ x H ₂ O		3/0	2	0	1	(1)	2/0L	1	1/0	4/4	0/0
Chlorobenzene	C ₆ H ₅ Cl	100 %	3/4	3	4	1	1/1	1/1	1	3/4	4/4	1/1
Chloroform	CHCl ₃	100 %	3/4	4	4	1	1/1	1/1	1	4/4	½	1/1
Chloromethane	CH ₃ Cl	techn. pure	3/0	4	4	1	1/0	1/1L	0	4/4	(3)	0/0
Chromic acid	CrO ₃	10 %	1/1	1	0	1	1/1	1/2	1	1/1	4/4	0/0
Citric acid	C ₆ H ₈ O ₇	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/1	1/1
Diesel	—	100 %	1/3	2	0	1	(1)	(1)	0	1/1	1/1	1/1
Ethanedioic acid	C ₂ H ₂ O ₄ x 2H ₂ O	watery	1/1	2	0	1	1/1	1/3	2	1/1	4/4	1/1
Ethanol	C ₂ H ₆ O	96 %	1/0	1	1	1	1/1	1/1	1	3/0	1/0	0/0
Ethyl acetate	C ₄ H ₈ O ₂	100 %	1/3	3	3	1	1/1	(1)	0	4/4	1/0	1/2
Ethyl alcohol	C ₂ H ₆ O	100 %	1/0	1	1	1	1/1	1/1	0	3/0	1/0	0/0
Ethylen chloride	C ₂ H ₄ Cl ₂		3/3	4	3	1	1/1	1/1L	1	3/0	3/0	1/2
Ferric chloride	FeCl ₃	saturated	1/1	2	3	2	1/1	4/4	0	1/1	3/0	1/1
Formaldehyd dilution	CH ₂ O	10 %	1/1	1	2	1	1/1	1/1	1	3/0	3/3	1/1
Glycerin	C ₃ H ₈ O ₃	90%	1/1	1	2	1	1/1	1/1	1	1/1	1/0	1/1
Heptane	C ₇ H ₁₆	90%	2/3	1	1	1	1/1	1/1	1	1/1	1/0	1/1
Hexane	C ₆ H ₁₄	100 %	2/3	1	2	1	1/1	1/1	1	1/1	4/4	1/1
Hydrochloric acid	HCl	1-5 %	1/1	1	3	1	1/1	4/4	1	1/1	4/4	1/1
Hydrofluoric acid	HF	50 %	1/1	2	3	1	1/1	4/4	2	1/3	4/4	1/1
Hydroxypropionic acid	C ₃ H ₆ O ₃	3 %	1/1	1	0	1	1/1	1/1	1	1/1	(3)	1/2
Isopropanol	C ₃ H ₈ O	techn. pure	1/1	1	2	1	1/1	(1)	1	1/1	1/0	0/0
Magnesium chloride	MgCl ₂	watery	1/1	1	2	1	1/1	1/0L	1	1/1	1/0	1/1
Mercuric chloride	HgCl ₂	watery	1/1	1	0	1	1/1	(4)	1	1/1	4/4	1/1
Methanol	CH ₄ O		1/1	1	2	1	1/1	1/1	1	3/4	2/0	0/0
Methyl acetate	C ₃ H ₆ O ₂	techn. pure	1/0	3	0	1	1/0	1/1	1	4/4	1/0	0/0
Nitric acid	HNO ₃	1-10 %	1/1	1	3	1	1/1	1/1	1	1/1	4/4	1/1
Nitrobenzene	C ₆ H ₅ NO ₂		3/4	3	4	1	1/1	1/1	0	4/4	4/4	1/2
Oleic acid	C ₁₈ H ₃₄ O ₂	techn. pure	1/3	1	1	1	(1)	1/1	0	2/2	1/0	1/1
Ozone	O ₃		3/4	2	2	1	1/1	0/0	0	1/0	4/4	1/1
Petrol, unleaded	C ₈ H ₁₂ - C ₁₂ H ₂₆		2/3	3	2	1	1/1	1/1	1	(1-3)	1/0	1/1
Petroleum	—		1/1	1	1	1	1/1	1/1	1	1/1	(1)	1/1
Petroleum	—	techn. pure	1/3	3	1	1	(1)	1/1	0	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	1/1
Phenylmethane (Toluol)	C ₇ H ₈	100 %	3/4	3	3	1	1/1	1/1	0	3/3	1/0	1/1
Phosphoric acid	H ₃ PO ₄	85 %	1/1	1	0	1	1/1	1/3	1	1/1	4/4	1/1
Potassium hydroxide	KHO	10 %	1/1	1	3	1	1/1	1/1	1	4/4	1/0	1/1
Potassium nitrate	KNO ₃	watery	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Sodium bisulphite	NaHSO ₃	watery	1/1	1	0	1	(1)	1/1	1	1/0	1/0	1/1
Sodium carbonate	Na ₂ CO ₃	watery	1/1	1	3	1	1/1	1/1	1	1/1	1/0	1/1
Sodium chloride	NaCl	watery	1/1	1	2	1	1/1	1/2	1	1/1	1/1	1/1
Sodium sulphate	Na ₂ SO ₄	watery	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Sulphuric acid	H ₂ SO ₄	40 %	1/1	1	3	1	1/1	2/3	1	1/1	4/4	1/1
Trichloroethylene	C ₂ HCl ₃	100 %	3/4	4	4	1	1/1	1/1L	1	1/3	3/0	1/1
Vegetable oils	—		0/0	1	1	1	(1)	1/1	0	1/0	0/0	0/0

Chemical resistance list 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
- PPO GF30 Polyphenyloxyn with 30 % glass fibre contents
- PUR/PU Polyurethane
- PEEK Polyetheretherketone
- FEP Tetrafluorethylene-Perfluorpropylene
- V4A/Stainless steel 1.4571 (AISI 316Ti) or 1.4301 (AISI 304)
- Hastelloy C276 Highly corrosion-resistant nickel-molybdenum alloy
- Viton (PA/PR) Synthetic rubber and fluoropolymer elastomer (brand name)
- PA GF30 Polyamide with 30 % glass fibre contents
- PVDF Polyvinylidene fluoride

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.

CAUTION



Damage by hard objects

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 chapter "Specifications") (e. g. using a water hose).

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

11 Dismantling/Disposal

Dispose the equipment according to applicable local regulations on environmental standards for electronic products.

- Disconnect the measurement system from mains power.
- Use appropriate tools to remove the connected cables of the measurement transmitter.
- Remove the sensors.



EC WEEE-Directive

This symbol indicates that the Directive 2012/19/EU on waste electrical and electronic equipment requirements shall be observed on the disposal of the equipment.

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EU Declaration of Conformity (Annex)

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE



NIVUS GmbH
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75031 Eppingen

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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*

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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 Talle 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 Talle 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>Clamp-on flow velocity sensors based on transit time</i>
<i>Désignation:</i>	<i>Capteur pour la vitesse d'écoulement par différence de temps de transit, technique "sangle"</i>
Typ / Type:	NICO K1LO...

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:

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Eppingen, den 20.04.2016

Gez. *Marcus Fischer*

EU Konformitätserklärung

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Im Täle 2
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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:	Clamp-On Ultraschall-Laufzeitdifferenz-Sensoren
<i>Description:</i>	<i>ultrasonic clamp-on sensors</i>
<i>Désignation:</i>	<i>capteurs ultrasoniques Clamp-On</i>
Typ / Type:	NIC-CO...

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 14.07.2017

Gez. *Marcus Fischer*