FLOW

Technical Instructions

Transit Time Sensors

Revised manual

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Translation

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

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Names

The use of general descriptive names, trade names, trade-marks 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.

History of changes

Rev.	Changes	Editor in charge	Date
04	Adress NIVUS France updated; chap. “4 Warranty” added; chap. “17 Sensor versions”: product structure NIS0 and NIC-CO01 updated; chap. “18.3 Flow velocity sensor type NIS0”; inner pipe diameter modified; chap. “18.4 Flow velocity sensor type TSP0”: operating temperature for Ex version added; chap. “18.5 Flow velocity sensor type NIC-CO01”: operating temperature for Ex version added; chap. “23 Dismantling/Disposal”: Note to “EC WEEE-Directive” updated; chap. “Approvals and Certificates”: EU declarations of conformity updated	MoG	19.03.2020
03	Cover: device versions deleted; adress NIVUS France updated; history of changes added; chapt. “4 Liability disclaimer”, “5 Use in accordance with the requirements” updated; NIC0 K1L sensor removed; chapt. “11 Storage”, “16 Sensor versions” and “17.6 Accessories (option)” updated; certificates of conformity and other certificates updated; minor changes (order of figures changed and others)	MoG	16.07.2019
02	New sensors added (e. g. NIC-CO01); Layout revised (chap. Safety and others)	MoG	25.08.2017
01	---	---	---
00	First version based on the German document	DMR	15.10.2012

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General

1 About this manual

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.

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

1.1 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 / data logger
- Installation instruction for transit time sensors

These manuals are provided with the auxiliary units or sensors and/or are available as download on the NIVUS homepage.

1.2 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	Refers 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.

Table 1 Structural elements within the manual

Safety Instructions

2 Used symbols and signal words

2.1 Valuation of the accident levels

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.

2.2 Warning notices on the product (option)

General warning label

This symbol is for operators to refer to this instruction manual.
Observing the information contained therein is required in order to maintain protection measures provided by the instrument during installation procedures and operation.

Protective conductor

This symbol refers to the protective conductor of the unit.
Depending on the mode of installation the instrument shall be operated solely connected to an appropriate protective conductor according to applicable laws and regulations.

3 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 ***Check danger through explosive gases***

Prior to beginning mounting, installation and maintenance make sure to observe any regulations on safety at work as well as to check the potential risk due to explosive gases. Use a gas warner to check.
When working in the channel system make sure to avoid electrostatic charge:

- *Avoid unnecessary movements to minimise the risk of static energy accumulating.*
- *Discharge any possible static electricity from your body before you begin to install sensors.*

Disregarding may lead to personal injury or damage your equipment.

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 to personal injury or damage your facility.

4 Warranty

The device has been functionally tested before delivery. If it is used as intended (see Sect. “6 Use in accordance with the requirements”) and the operating instructions, the applicable documents (see Sect. “1.1 Applicable documentation”) and the safety notes and instructions contained therein, are observed, no functional restrictions are to be expected and perfect operation should be possible.

⇨ Please also note in this regard the next Sect. “5 Liability disclaimer”.

Limitation of warranty

In the event of non-compliance with the safety instructions and instructions in this document, the companies of the NIVUS group of companies reserve the right to limit the warranty.

5 Liability disclaimer

The manufacturer assumes no liability

- for damages owing to **a change** of this document. The manufacturer reserves the right to change the contents of this document and this disclaimer at any time and without any notice.
- for damages to persons or objects resulting from **failure to comply** with applicable **regulations**. For connection, commissioning and operation of the devices/sensors all available information and higher local legal regulations (e. g. in Germany VDE regulations) such as applicable Ex regulations as well as safety requirements and regulations in order to avoid accidents shall be adhered to.
- for damages to persons or objects resulting from **improper use**. For safety and warranty reasons, all internal work on the instruments beyond from that involved in normal installation and connection, must be carried out only by qualified NIVUS personnel or persons or companies authorised by NIVUS.
- for damages to persons or objects resulting from the use of instruments in technically **imperfect** condition.
- for damages to persons or objects resulting from the use of instruments **not in accordance with the requirements**.
- for damages to persons or objects resulting from failure to comply with **safety information** contained within this instruction manual.
- for missing or incorrect measurement values or resulting consequential damages due to **improper installation**.

6 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 maximum permissible limit values as specified in chapter “18 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.

TSP 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 Mobile 600 transmitter.

7 Ex Protection

Some of the sensors described here are designed for use in areas with explosive atmospheres. See also chap. “17 Sensor versions”.

As a principle, maintenance and repair measures shall be executed only **out of** Ex areas.

Approval

Sensors		II 2G Ex ib IIB T4 Gb (TÜV 12 ATEX 087812)
		IECEx TUN 18.0023

DANGER

Danger through electrostatic discharge

When working in the channel system make sure to avoid electrostatic charge:

- *Avoid unnecessary movements to minimise the risk of static energy accumulating.*
- *Discharge any possible static electricity from your body before you begin to install sensors.*

Disregarding may lead to personal injury or damage your equipment.

Validity of Ex Approval

The Ex approval is only valid in connection with the respective indication on the sensor nameplate.

Declarations of Conformity and Test Reports

For installation and commissioning the EU Declarations of Conformity and Test Reports of the respective authorities shall be strictly followed.

8 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 e. g. 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.

9 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

Delivery, Storage and Transport

10 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 accompanying Ex certificates) containing any relevant information on how to operate the sensors

Check extra accessories depending on your order and by using the delivery note.

11 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.

12 Storage

The permissible maximum values regarding ambient conditions such as temperature and humidity according to chapter “18 Specifications” shall be necessarily observed.

13 Transport

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

14 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!

Product specification

15 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, GFK sensor face 20 mm
5 Flow velocity hemisphere sensor type NOS-V30BS, CFK sensor face 40 mm
6 Flow velocity rod sensor type NOS-V4005, CFK sensor face 65 mm (200 kHz)
7 Flow velocity wedge sensor type NIS-V280KS0
8 Flow velocity rod sensor type NOS-V2005, CFK sensor face 20 mm, with extension
9 Flow velocity pipe sensor type TSP0V200RL
10 Flow velocity rod sensor type NOS-V3005, CFK sensor face 40 mm
11 Clamp-on sensor pair type NIC-CO01
12 Flow velocity pipe sensor type NIS-V200RL0

Fig. 15-1 Sensor overview

15.1 Single overviews of sensors

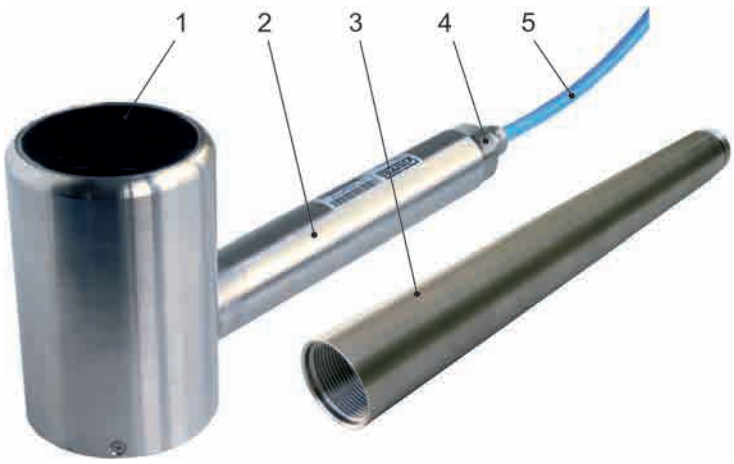
1 Sensor for flow velocity measurement
2 Sensor body
3 Sensor extension (option)

4 Sensor cable

Fig. 15-2 Rod sensor type NOS-V2005

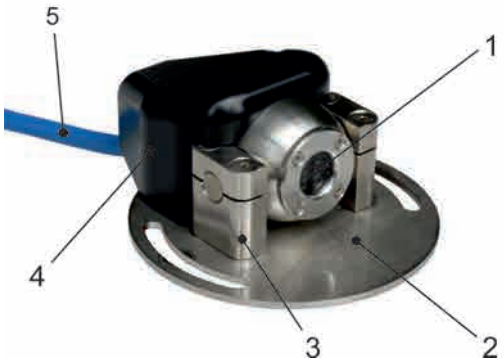
1 Sensor for flow velocity measurement
2 Sensor body
3 Thread to screw on extension
4 Sensor cable
5 Sensor extension (option)

Fig. 15-3 Rod sensor type NOS-V3005



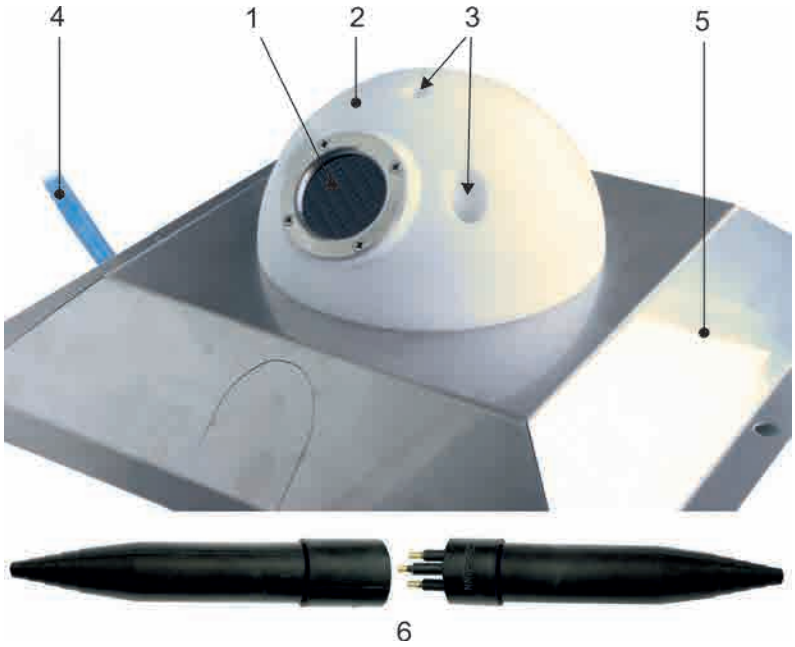
1 Sensor for flow velocity measurement
2 Sensor body
3 Sensor extension (option)
4 Thread to screw on extension
5 Sensor cable

Fig. 15-4 Rod sensor type NOS-V4005



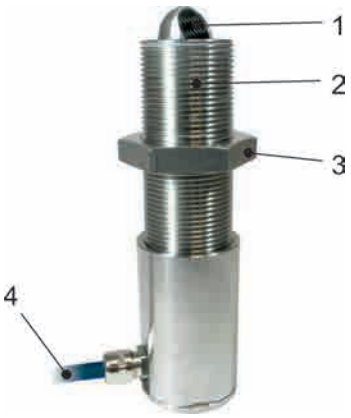
1 Sensor head (rotatable)
2 Fastening plate (adjustable)
3 Clamping elements
4 Cover
5 Cable

Fig. 15-5 Ball head sensor type NOS-V20BS



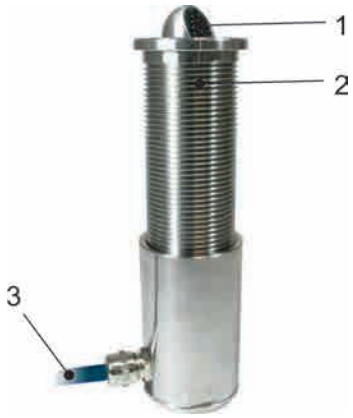
1 Sensor for flow velocity measurement
2 Sensor body
3 Screws for the alignment
4 Sensor cable
5 Holder bracket for hemispheres (option)
6 Underwater plug connection (option)

Fig. 15-6 Hemisphere sensor type NOS-V30BS



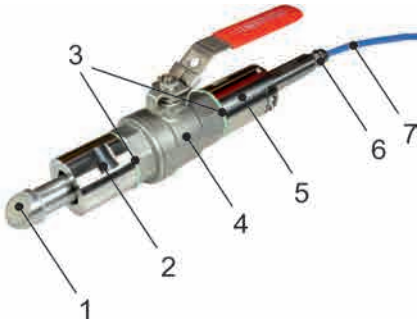
1 Sensor for flow velocity measurement
2 Sensor body
3 Screw nut for adjustment and fixation
4 Sensor cable

Fig. 15-7 Screw-in sensor type NOS-V2E00



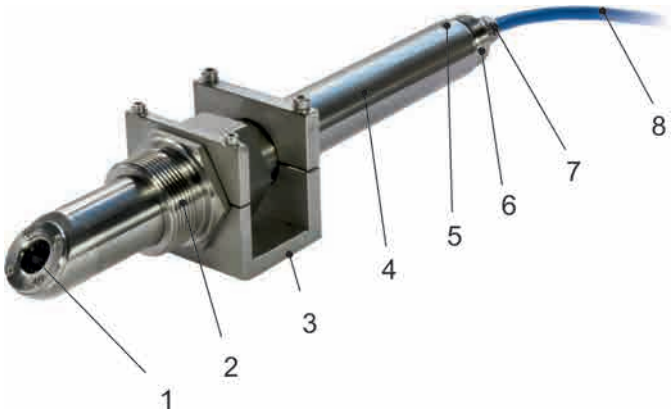
1 Sensor for flow velocity measurement
2 Sensor body
3 Sensor cable

Fig. 15-8 Plug-in sensor type NOS-V2S00



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

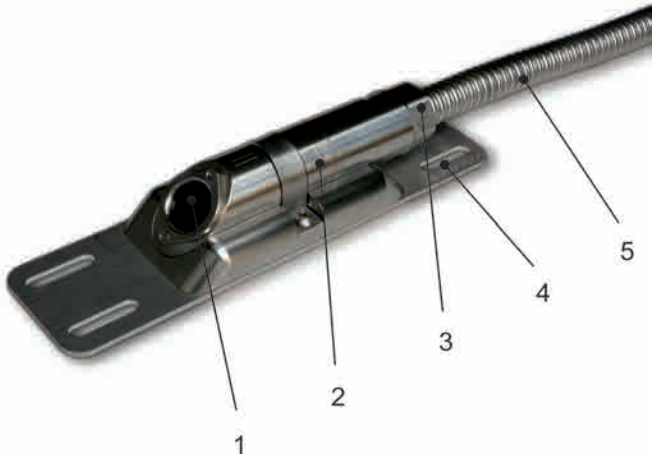
Fig. 15-9 Pipe sensor type NIS0V200RL0



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

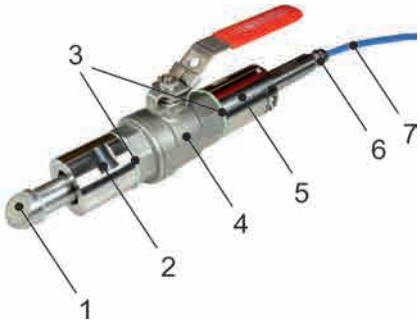
7 Cable gland
8 Sensor cable

Fig. 15-10 Pipe sensor type NIS-V200RT



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

Fig. 15-11 Wedge sensor type NIS-V280KS0



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

Fig. 15-12 Pipe sensor type TSP0V200RL

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

Fig. 15-13 Clamp-on sensors type NIC-CO

16 Device identification

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

The nameplates are located on the cable entry of the sensor body as well as on the other cable end. These nameplates are protected against weathering and abrasion by using a transparent shrunk-on hose and contain the following:

- Name and address of manufacturer
- CE label
- Information on type and series incl. article and series number
- Year of manufacture: the first four digits of the serial number represent the year and the week number of manufacture (1916…..)
- Ex protection label
- Environmental conditions in operation

In case of enquiries and ordering replacement parts it is important to specify article number as well as the serial number of the respective transmitter or sensor. This ensures correct and quick processing.

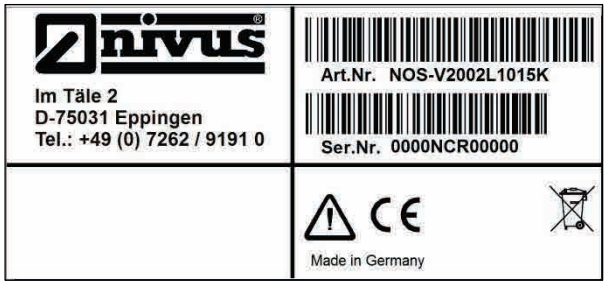


Fig. 16-1 Nameplate of flow velocity sensor, type NOS (example)

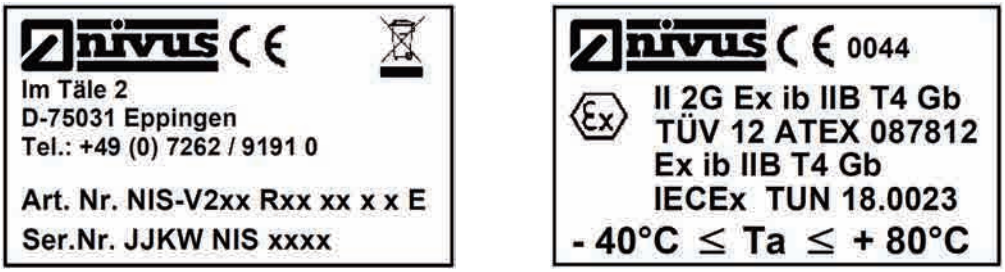


Fig. 16-2 Nameplate of flow velocity sensor, type NIS-V200 / Ex

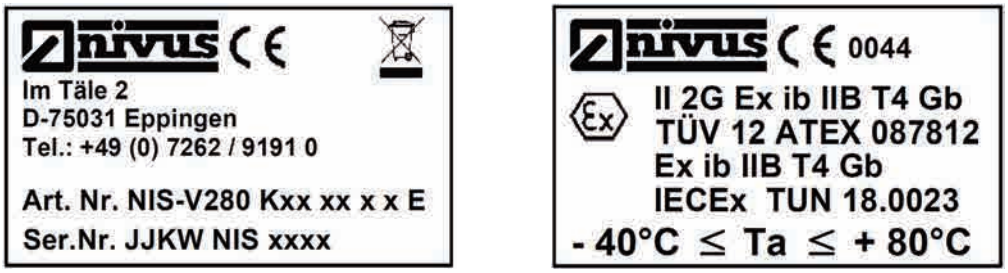


Fig. 16-3 Nameplate of flow velocity sensor, type NIS-V280 / Ex

Fig. 16-4 Nameplate of flow velocity sensor, type NIS (example)

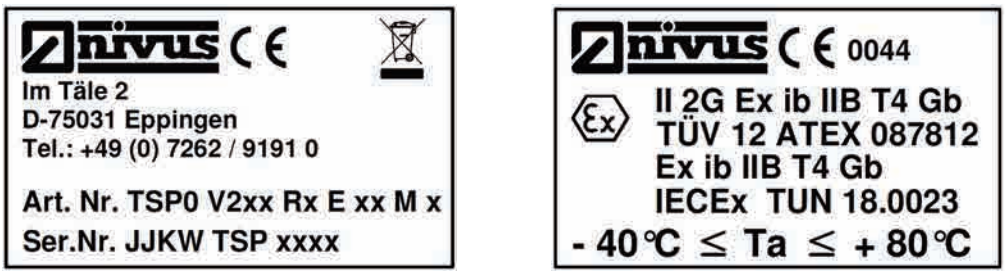


Fig. 16-5 Nameplate of flow velocity sensor, type TSP0 / Ex

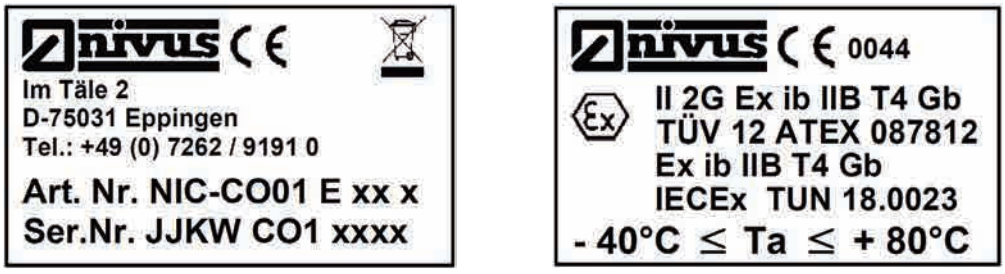


Fig. 16-6 Nameplate of clamp-on sensor, type NIC-CO01 / Ex

Check nameplates

Check the delivered instrument for accordance with your order by identifying the name-plate.

17 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 on the cable entry of the senor body as well as on the other cable end on a nameplate on the cable sheath. These nameplates are 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- **Construction/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
- **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
- **V4005** Rod sensor made of 1.4571; installation tube length 500 mm, diameter 35 mm; sensor head (ø 65 mm) for 200 kHz
- **V20BS** Adjustable ball head sensor made of 1.4571 and POM with GFK sensor face (20 mm); for 1 MHz; flow-optimised
- **V20BX** Adjustable ball head sensor made of 1.4571 and POM with GFK sensor face (65 mm); for 200 or 500 kHz; flow optimised
- **V30BS** Hemispheres made of POM, sensor face 1.4571 (ø 40 mm) made of CFK (Carbon); for 1 MHz; flow optimised
- **V30BX** Hemispheres made of POM, sensor face 1.4571 (ø 40 mm) made of CFK (Carbon); straight sensor head; for 1 MHz; flow optimised

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 600/650 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 600/650 transmitter **Z** Connection to NivuFlow 600/650 transmitter via extension module NFE
NOS-		**L**	**1**	**0**		

Table 2 Type key for ultrasonic sensors type NOS

NOS-	**Construction/Type**					
	V2E00 Screw-in sensors 1¼“ for installation in welding nozzle (installation of sensores 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 corresponding to IEC60041; upon request **D** Position 54°; setting corresponding 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 600/650 transmitter **Z** Connection to NivuFlow 600/650 transmitter via extension module NFE
NOS-		**H**		**0**		

Table 3 Type key for screw-in/plug-in sensors type NOS

NIS-	Construction				
	V200	Pipe sensor			
		Type			
		RT0	Pipe sensor 1½“; 1.4571 with mit CFK sensor face; pressure up to 16 bar max.		
		RT2	Pipe sensor 1½“; 1.4571 with CFK sensor face; pressure up to 16 bar max.; Version with drinking water approval according to WRAS (BS6920)		
		RX	Pipe sensor; special construction		
	V280	Wedge sensor			
		Type			
		KS0	Wedge sensor; 1.4571 with alignment aid; pressure up to 4 bar max.		
			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 NivuFlow 600
				Z	Connection to NivuFlow transmitter 600 via extension module NFE
					Pipe length (0 for wedge sensor)
					0 For wedge sensor (due to system limitations)
					2 200 mm (for pipe sensors), for types RT0 and RT2
					3 300 mm (for stop ball valve)
					X Special length, only for types RT0 and RT2
NIS-					

Table 4 Type key for ultrasonic sensors type NIS

NIS0	Construction			
	V200	Pipe sensor		
		Type		
		RL0	Pipe sensor pair with 1“ stop ball valve and welding nozzle (made of stainless steel), 1 MHz; pressure up to 16 bar max.; use in DN100…DN2500	
			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 600 transmitter	
				Z	Connection to NivuFlow 600 transmitter via Extension module NFE	
					Pipe length	
					3	300 m
NIS0	**V200**	**RL0**			**3**	

Table 5 Type key for ultrasonic sensors type NIS0

TSP0	**Construction**					
	V200	Pipe sensor				
		Type				
		RL	Pipe sensor pair with 1“ stop ball valve and welding nozzle (made of stainless steel); 1 MHz; pressure up to 16 bar max.; use in DN100…DN2500			
			ATEX-Approval			
			0	None		
			E	Zone 1		
				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	
					M	Connection to NivuFlow Mobile 600 transmitter
					Pipe length	
						3 300 m
TSP0	**V200**	**RL**			**M**	**3**

Table 6 Type key for ultrasonic sensors type TSP0

NIC-	**Type**			
	CO01	Clamp-on sensor pair (made of stainless steel/PEEK) for full pipes; measurement range ±10 m/s; DN50…DN6000		
		ATEX approval		
		0	None	
		E	Zone 1 (only in connection with NivuFlow Mobile 600)	
			Cable length	
			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

			XX	Special length	
				Sensor connection	
				K	With plug connector to connect to NivuFlow 600 transmitter
				M	With plug connector to connect to NivuFlow Mobile 600 transmitter
				Z	To connect to NivuFlow 600 transmitter via extension module NFE
NIC-	**CO01**				

Table 7 Type key for Clamp-on sensors type NIC-CO01

18 Specifications

18.1 Flow velocity sensor type NOS

Messurement principle	Ultrasonic transit time
Measurement frequency	1 MHz, 200 kHz and/or 500 kHz
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
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 unterwater plug connection (option for NOS-V30B)
Cable type	Twinax 2x AWG 20
Outside cable diameter	8.5 mm
Sensor types	- Rod sensor - Hemisphere sensor - Plug-in/Screw-in sensor
Medium contacting materials	- Rod sensor/plug-in sensor/screw-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

Table 8 Specifications Type NOS

18.2 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_{medium}) in path ±0.1 % of measurement value - Offset velocity < ±5 mm/s
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

Table 9 Specifications Type NIS

18.3 Flow velocity sensor type NIS0

Measurement principle	Ultrasonic transit time
Measurement frequency	1 MHz
Flow velocity range	±15 m/s
Inner pipe diameter	0.1…2.5 m (DN100…DN2500)
Measurement uncertainty	Flow velocity (v_{medium}) in path ±0.1 % of measurement value Offset velocity < ±5 mm/s
Protection	IP68
Operating temperature	-20 °C…+50 °C
Storage temperature	-30 °C…+70 °C
Cable length	10/15/20/30/50/100 m
Cable type	Twinax 2x AWG 20
Outside cable diameter	8.5 mm
Sensor types	Pipe sensor for installation in pipes with retaining element
Medium contacting materials	Pipe sensor: stainless steel 1.4571, CFK (Carbon), NBR, HDPE
Operating pressure	Pipe sensor: max. 16 bar (with retaining element) (others upon request)
Temperature measurement via sound velocity	
Measurement range	0 °C…+60 °C
Measurement uncertainty	±1 K

Table 10 Specifications Type NIS0

18.4 Flow velocity sensor type TSP0

Measurement principle	Ultrasonic transit time
Measurement frequency	1 MHz
Flow velocity range	±15 m/s
Inner pipe diameter	0.1…2.5 m (DN100…DN2500)
Measurement uncertainty	- Flow velocity (v_{medium}) in path ±0.1 % of measurement value - Offset velocity < ±5 mm/s
Protection	IP68
Operating temperature	-20 °C ≤ Ta ≤ +50 °C Ex version: -40 °C ≤ Ta ≤ 80 °C
Storage temperature	-30 °C…+70 °C
Cable length	10/15/20/30/50/100 m
Cable type	Twinax 2x AWG 20/7
Outside cable diameter	6.0 mm
Sensor types	Pipe sensor for installation in pipes with retaining element
Medium contacting materials	Pipe sensor: stainless steel 1.4571, CFK (Carbon), NBR, HDPE
Operating pressure	Pipe sensor: max. 16 bar (with retaining element) (others upon request)
Temperature measurement via sound velocity	
Measurement range	0 °C…+60 °C
Measurement uncertainty	±1 K

Table 11 Specifications Type TSP0

18.5 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	0.05…6.00 m (DN50…DN6000)
Protection	IP68
Operating temperature	-30 °C ≤ Ta ≤ +80 °C Ex version: -40 °C ≤ Ta ≤ 80 °C
Storage temperature	-30 °C…+80 °C (non-condensing)
Cable length	7/10/15/20/30/50 m
Cable type	Twinax 2x AWG 20/7
Outside cable diameter	6.0 mm
Sensor types	Clamp-on sensor pair for clamp-on installation on pipes
Measurement uncertainty	- Flow velocity (v_{medium}) 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

Table 12 Specifications Type NIC-CO01

18.6 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 rod sensors 1½“ in pipe lines
Fastening system	Clamp-on sensor holder and tensioning belt
	Assembly system for Clamp-On sensors
Double nipple reducer	For tapping saddle installation of 1“ pipe sensors

Table 13 Accessories

Installation and Connection

19 Sensor Dimensions

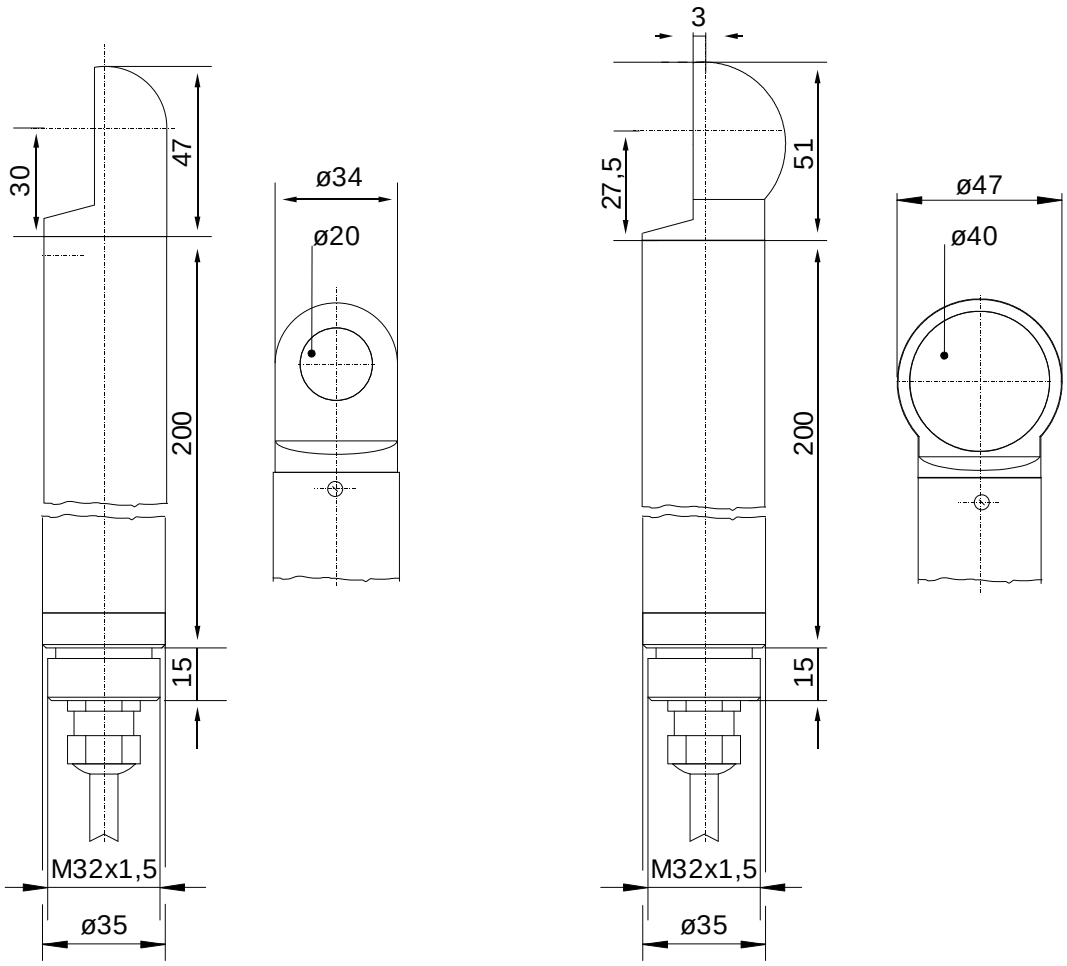


Fig. 19-1 Dimensions rod sensor type NOS ø 20/40 mm

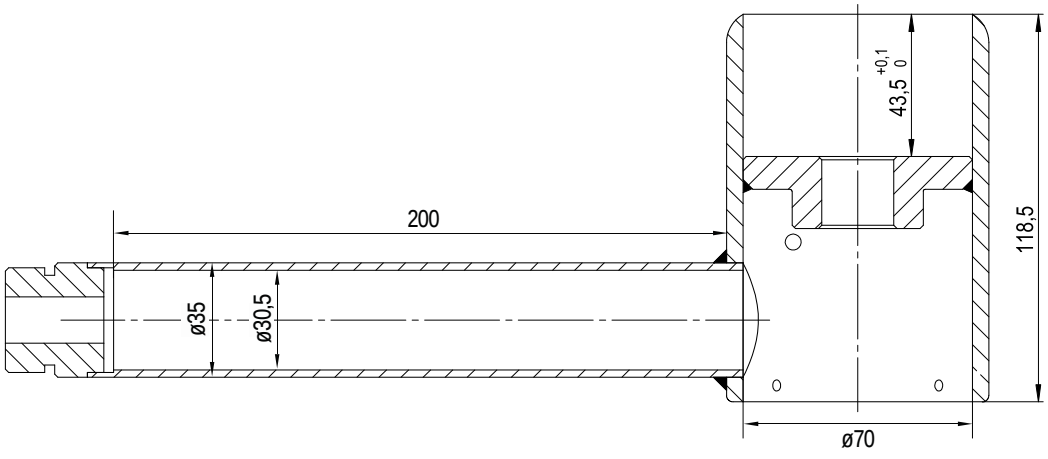


Fig. 19-2 Dimensions rod sensor type NOS-V40

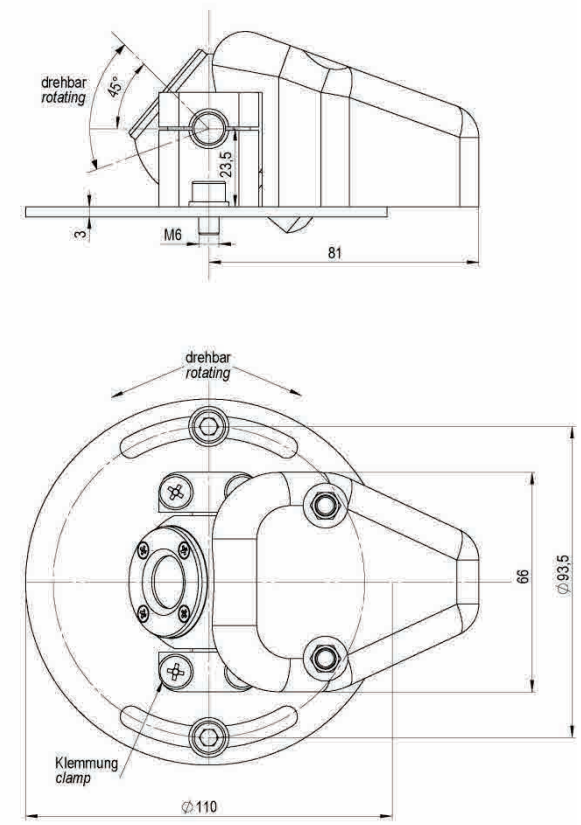


Fig. 19-3 Dimensions ball head sensor type NOS-V20BS

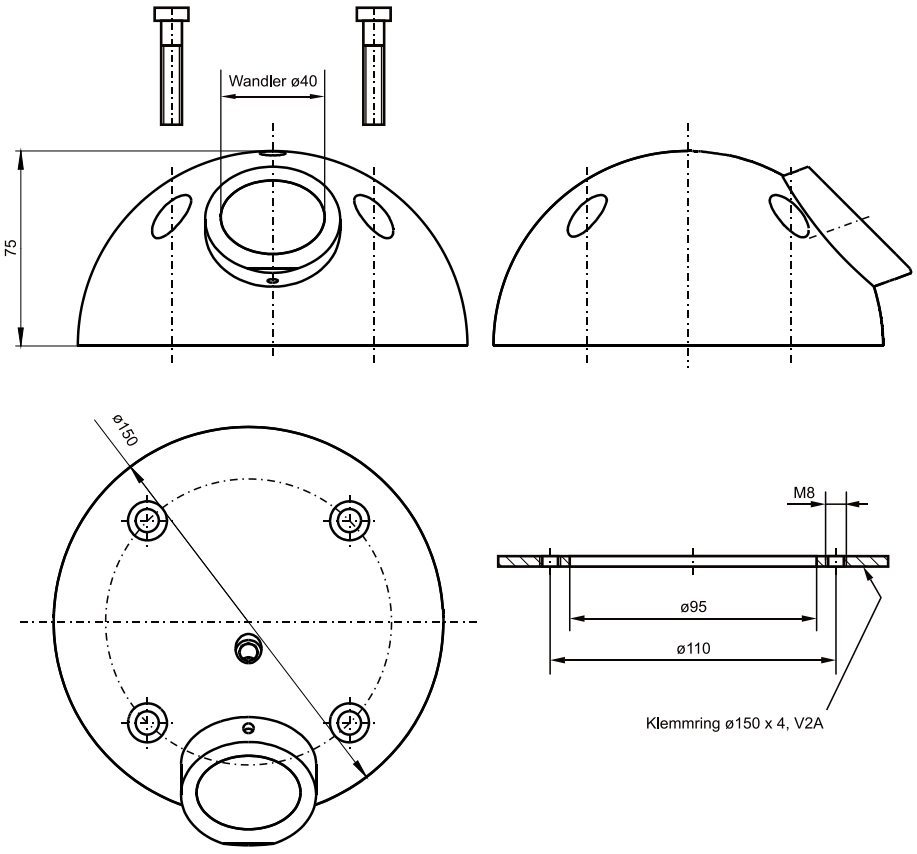


Fig. 19-4 Dimensions hemisphere sensor type NOS ø 40 mm

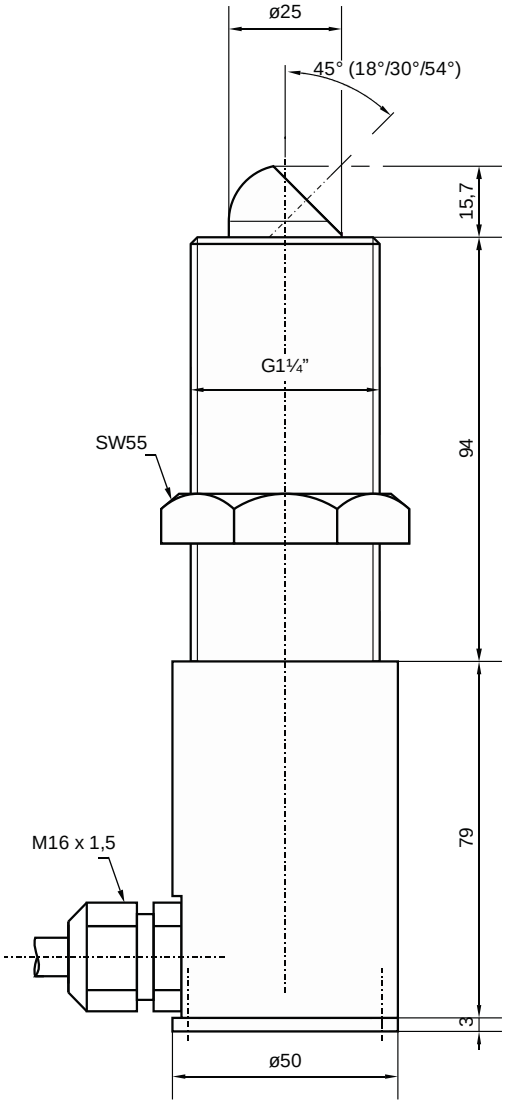


Fig. 19-5 Dimensions screw-in sensor type NOS-V2E00

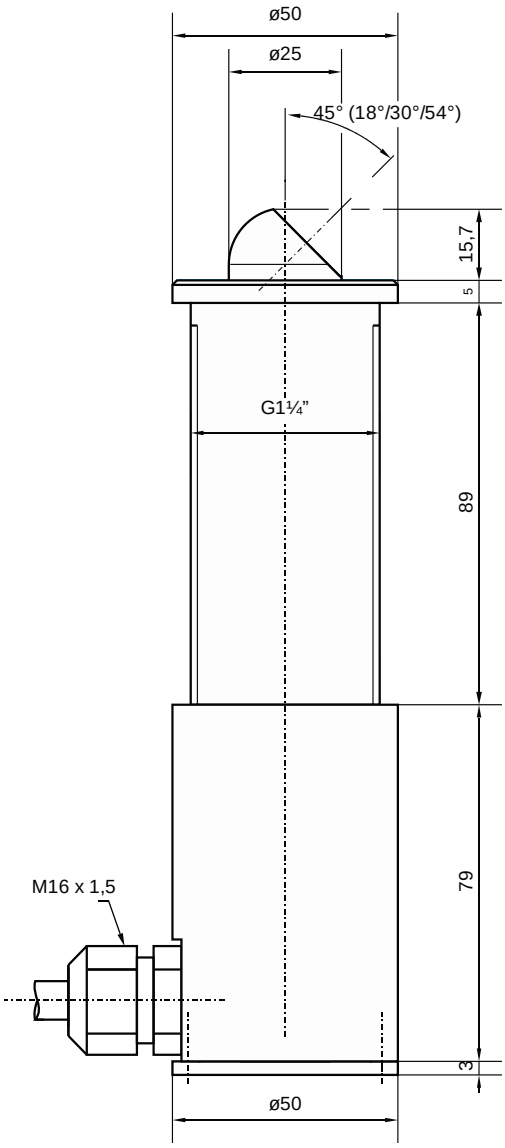
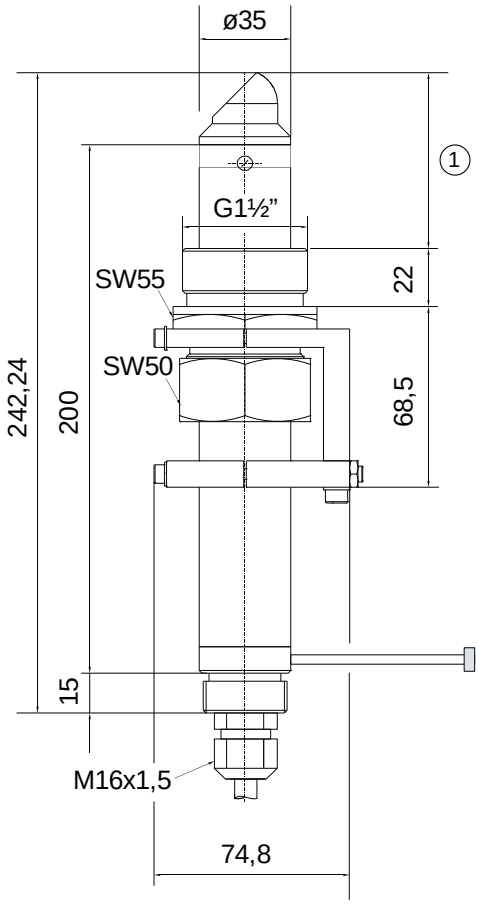


Fig. 19-6 Dimensions plug-in sensor type NOS-V2S00



1 Adjustable

Fig. 19-7 Dimensions pipe sensor Type NIS-V200RT

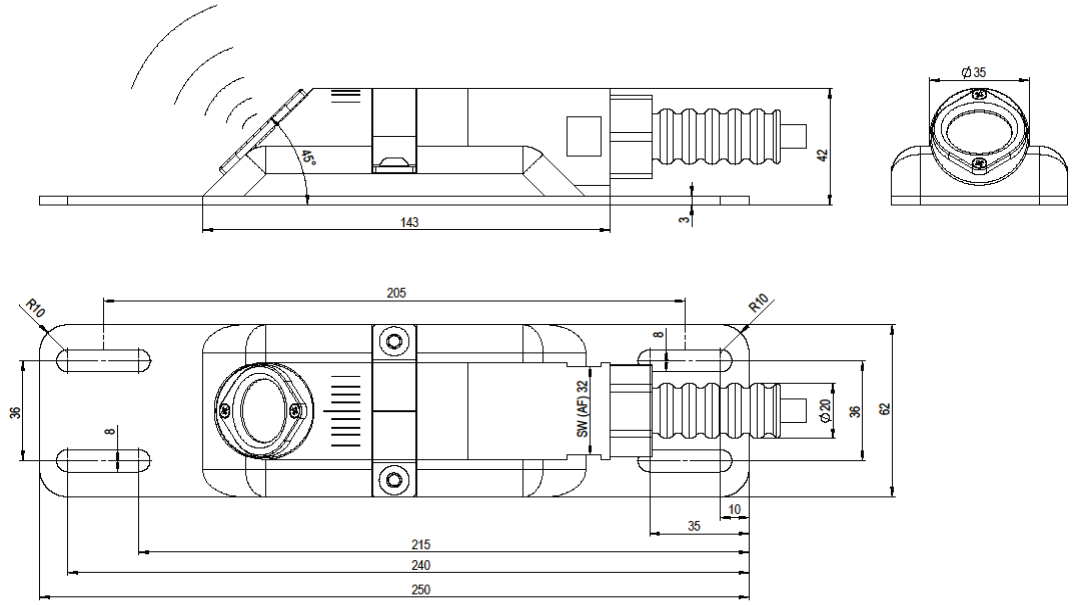


Fig. 19-8 Dimensions wedge sensor type NIS-V280KS

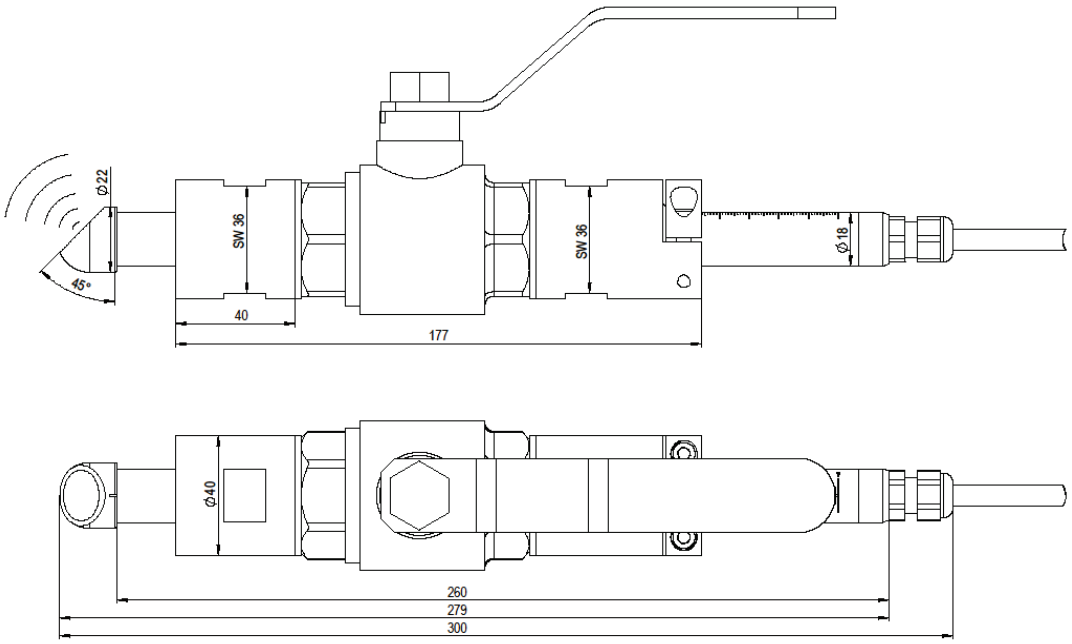


Fig. 19-9 Dimensions pipe sensor type NIS0V200RL0

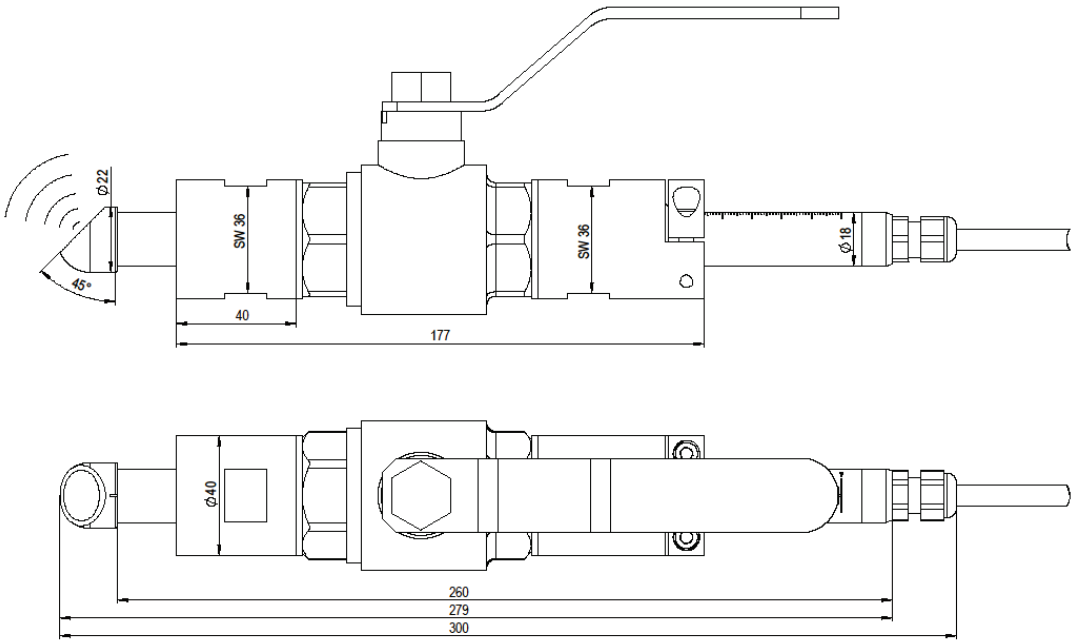


Fig. 19-10 Dimensions pipe sensor type TSP0V200RL

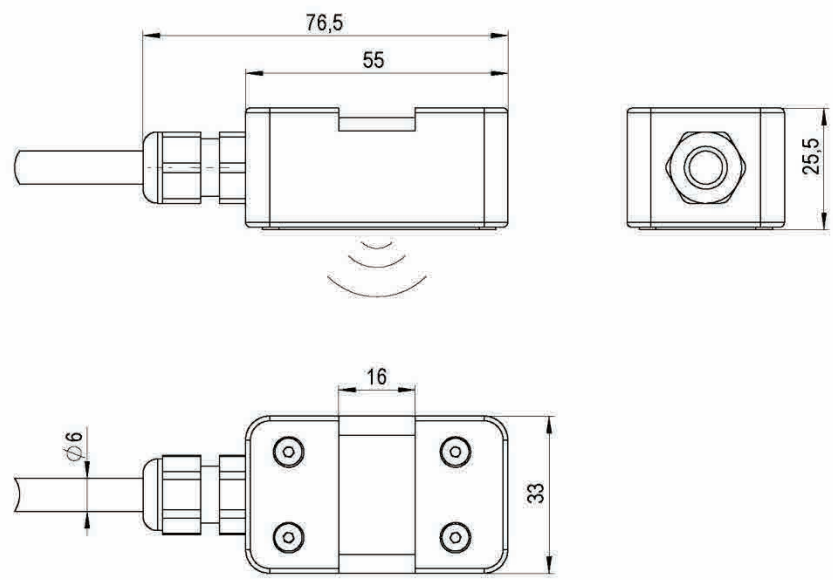
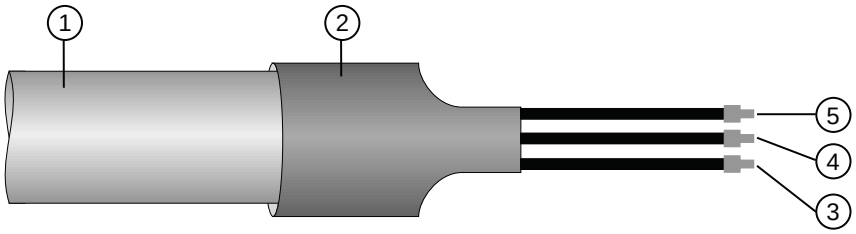


Fig. 19-11 Dimensions Clamp-on sensor type NIC-CO01

19.1 Wiring Diagram



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

Fig. 19-12 Cable end configuration of sensors

19.2 Sensor Cable

19.2.1 Cable Extension

The sensors are equipped with a fixed connection cable, type “Twinax 2x AWG 20” in different lengths.

This cable may not be shortened. In case of extending the sensor cables 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

Cable extension: observe max. cable length and calibrate

If you wish to extend the sensor cables, make sure to exclusively use a special cable provided by NIVUS GmbH and the according connection measures (terminal boxes, cable sealing boxes etc.).

*The **max.** total length of the sensor cable shall not exceed **100 m**.*

***Calibration** is necessarily required thereafter.*

Do not share cable extensions!

*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.*

Cable length within one path must be identical

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

20 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 (H2S – risk of diffusion through the cable sheath) and various organic solvents may damage sensor materials.

*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. Make sure to observe the following list of chemical resistances.*

The medium contacting parts of standard sensors are made of:

- 1.4571 (pipe sensor jacket)
- Carbon CFK (sensor surface)
- PEEK (sensor crystal cover)
- Polyurethane (PUR) (cable sheath)
- 1.4305 (cable gland)
- 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.

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

MEDIUM	FORMULA	CONCEN-TRATION	HDPE	PPO GF30	PUR	PEEK	FEP	V4A	Hastelloy C 276	Viton (PA/PR)	PA GF30	PVDF
Acetaldehyde	C_2H_4O	40 %	3/3	4	4	1	(1)	(1)	0	4/4	2/4	3/0
Acetic acid	$C_2H_4O_2$	10 %	1/1	2	3	1	1/1	1/1	1	(3)	4/4	1/0
Acetone	C_3H_6O	40 %	1/1	4	4	1	(1)	1/1	1	4/4	1/0	3/3
Allyl alcohol	C_3H_6O	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	$(NH_4)Cl$	w atery	1/1	1	0	1	1/1	1/2L	1	1/1	3/4	1/1
Ammonium hydroxide	$NH_3 + H_2O$	5 %	1/1	2	4	1	1/1	1/1	1	(2)	(2)	1/1
Aniline	C_6H_7N	100 %	1/2	3	4	1	1/1	1/0	1	2/4	3/4	1/2
Benzene	C_6H_6	100 %	3/4	3/4	2	1	1/1	1/1	1	3/3	2/0	1/2
Benzyl alcohol	C_7H_8O	100 %	3/4	3	2	1	1/1	1/1	1	1/0	4/4	1/1
Boric acid	H_3BO_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	$C_4H_{10}O$	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 w ater	$Cl_2 \times H_2O$		3/0	2	0	1	(1)	2/0L	1	1/0	4/4	0/0
Chlorobenzene	C_6H_5Cl	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	¾	1/1
Chloromethane	CH_3Cl	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	$C_6H_8O_7$	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	$C_2H_2O_4 \times 2H_2O$	w atery	1/1	2	0	1	1/1	1/3	2	1/1	4/4	1/1
Ethanol	C_2H_6O	96 %	1/0	1	1	1	1/1	1/1	1	3/0	1/0	0/0
Ethyl acetate	$C_4H_8O_2$	100 %	1/3	3	3	1	1/1	(1)	0	4/4	1/0	1/2
Ethyl alcohol	C_2H_6O	100 %	1/0	1	1	1	1/1	1/1	0	3/0	1/0	0/0
Ethylen chloride	$C_2H_4Cl_2$		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_2O	10 %	1/1	1	2	1	1/1	1/1	1	3/0	3/3	1/1
Glycerin	$C_3H_8O_3$	90%	1/1	1	2	1	1/1	1/1	1	1/1	1/0	1/1
Heptane	C_7H_{16}	90%	2/3	1	1	1	1/1	1/1	1	1/1	1/0	1/1
Hexane	C_6H_{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	$C_3H_6O_3$	3 %	1/1	1	0	1	1/1	1/1	1	1/1	(3)	1/2
Isopropanol	C_3H_8O	techn. pure	1/1	1	2	1	1/1	(1)	1	1/1	1/0	0/0
Magnesium chloride	$MgCl_2$	w atery	1/1	1	2	1	1/1	1/0L	1	1/1	1/0	1/1
Mercuric chloride	$HgCl_2$	w atery	1/1	1	0	1	1/1	(4)	1	1/1	4/4	1/1
Methanol	CH_4O		1/1	1	2	1	1/1	1/1	1	3/4	2/0	0/0
Methyl acetate	$C_3H_6O_2$	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	$C_6H_5NO_2$		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_5H_{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_6H_6O	100 %	2/3	3	2	1	1/1	1/1	1	2/3	4/4	1/1
Phenylmethane (Toluol)	C_7H_8	100 %	3/4	3	3	1	1/1	1/1	0	3/3	1/0	1/1
Phosphoric acid	H_3PO_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	w atery	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Sodium bisulphite	$NaHSO_3$	w atery	1/1	1	0	1	(1)	1/1	1	1/0	1/0	1/1
Sodium carbonate	Na_2CO_3	w atery	1/1	1	3	1	1/1	1/1	1	1/1	1/0	1/1
Sodium chloride	NaCl	w atery	1/1	1	2	1	1/1	1/2	1	1/1	1/1	1/1
Sodium sulphate	Na_2SO_4	w atery	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Sulphuric acid	H_2SO_4	40 %	1/1	1	3	1	1/1	2/3	1	1/1	4/4	1/1
Trichloroethylene	C_2HCl_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

Table 14 Chemical resistance list

Chemical resistance list legend

There are two values per medium (e. g. 1/3).
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	Polyphenyloxylen 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 (brand name)
Viton (PA/PR)	Synthetic rubber and fluoropolymer elastomer (brand name)
PA GF30	Polyamide with 30 % glass fibre contents
PVDF	Polyvinylidene fluoride

Maintenance and Cleaning

WARNING

Check danger due to explosive gases

Make sure to observe all regulations regarding safety at work as well as danger due to explosive gases prior to beginning mounting, installation and maintenance works. Use a gas warner.

When working in channel systems make sure to avoid electrostatic charge:

- *Avoid unnecessary movements to minimise the risk of static energy accumulating.*
- *Discharge any possible static electricity from your body before you begin to install the sensor.*

Disregarding may lead to personal injury or damage your facility.

Germ contamination possible

Due to being frequently used in wastewater applications, some portions of the measurement system may be loaded with hazardous germs. This is why precautionary measures shall be taken while being in contact with cables and sensors.

Wear protective clothes.

21 Maintenance

21.1 Maintentance interval

The NIVUS sensors are conceived to be virtually free of calibration, maintenance and wear.

NIVUS, however, recommends having the entire system inspected by the NIVUS customer center **once per year**.

Depending on the area of use the maintenance intervals may vary. Extent and intervals of maintenance depend on the following conditions:

- Measurement principle of sensors
- Material wear
- Measurement medium and hydraulic conditions
- General regulations for the operators of the measurement facility
- Ambient conditions

In addition to the annual inspection NIVUS recommends a complete maintenance of the measurement system by the manufacturer after **ten years the latest**.

In general, the inspection of instruments/sensors is a basic measure which helps to increase operational safety as well as the lifetime.

21.2 Customer Service Information

For annual inspection of the entire measurement system or complete maintenance after ten years the latest contact our customer service:

NIVUS GmbH – Customer center

Tel. +49 (0) 7262 9191 - 922

customercenter@nivus.com

22 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, 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 maximum pressure of 4 bar (see chap. "18 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.

23 Dismantling/Disposal

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

➲ Procedure:

1. Disconnect the measurement system from mains power.
2. Use appropriate tools to remove the connected cables of the measurement transmitter.
3. 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. NIVUS GmbH supports and promotes the recycling and environmentally friendly, separate collection/disposal of waste electrical and electronic equipment in order to protect the environment and human health. Observe the local disposal regulations and laws.

NIVUS GmbH is registered with the EAR, therefore public collection and return points in Germany can be used for disposal.

The unit contains a buffer battery (Lithium coin cell), which must be disposed of separately.

24 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 be 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.

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Approvals and Certificates

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

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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**
Description:	*Ultrasonic transit time sensors*
Désignation:	*Capteurs par différence de temps de transit via ultrasons*
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 Taele 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*

Q:\Formulare\CE...

DE / EN / FR

EU Konformitätserklärung

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Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:
For the following product:
Le produit désigné ci-dessous:

Bezeichnung:	**Ultraschall - Laufzeitsensoren**
Description:	*Ultrasonic transit time sensors*
Désignation:	*Capteurs ultrasoniques temps de transit*
Typ / Type:	**NIS-... / NIS0V2... / TSP0V2...**

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Gerate 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 Taele 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*
Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général)*

Eppingen, den 26.06.2019

Gez *Marcus Fischer*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

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Internet: www.nivus.de

Für das folgend bezeichnete Erzeugnis:
For the following product:
Le produit désigné ci-dessous:

Bezeichnung:	**"Ex" Ultraschall-Laufzeitsensoren**
Description:	*"Ex" ultrasonic transit time sensors*
Désignation:	*"Ex" capteurs ultrasoniques temps de transit*
Typ / Type:	**NIS-V2xxRxExxxx / NIS-V280KxExxxx / NIS0V200RLExxxx / TSP0V200RLExxMx**

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
- 2014/34/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
- EN 60079-0:2012 +A11:2013
- EN 60079-11:2012

Ex-Kennzeichnung / *Ex-designation / Marquage Ex* : Ⓔx II 2G Ex ib IIB T4 Gb

EU-Baumusterprüfbescheinigung / *EU-Type Examination Certificate / Attestation d'examen «UE» de type:*

TÜV 12 ATEX 087812 ISSUE: 01

Notifizierte Stelle (Kennnummer) / *Notified Body (Identif. No.) / Organisme notifié (№ d'identification)*

TÜV Nord CERT GmbH, Am TÜV 1, 30519 Hannover, Allemagne (0044)

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 Taele 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*
Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général*)

Eppingen, den 18.07.2019

Gez. *Marcus Fischer*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

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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**
Description:	*ultrasonic clamp-on sensors*
Désignation:	*capteurs ultrasoniques Clamp-On*
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 Taele 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*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

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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:	**"Ex" Clamp-On Ultraschall-Laufzeitdifferenz-Sensoren**
Description:	*"Ex" ultrasonic clamp-on sensors*
Désignation:	*"Ex" capteurs ultrasoniques Clamp-on*
Typ / Type:	**NIC-CO01E...**

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
- 2014/34/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
- EN 60079-0:2012 +A11:2013
- EN 60079-11:2012

Ex-Kennzeichnung / *Ex-designation / Marquage Ex* : Ⓔx II 2G Ex ib IIB T4 Gb

EU-Baumusterprüfbescheinigung / *EU-Type Examination Certificate / Attestation d'examen «UE» de type:*

TÜV 12 ATEX 087812 ISSUE: 01

Notifizierte Stelle (Kennnummer) / *Notified Body (Identif. No.) / Organisme notifié (№ d'identification)*

TÜV Nord CERT GmbH, Am TÜV 1, 30519 Hannover, Allemagne (0044)

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 Taele 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*
Marcus Fischer (Geschäftsführer / *Managing Director / Directeur général*)

Eppingen, den 19.03.2020

Gez. *Marcus Fischer*

Translation

(1) **EU-Type Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 2014/34/EU**

(3) **Certificate Number** **TÜV 12 ATEX 087812** **issue:** 01

(4) for the product: System "Sensor Family Mini" consisting of the components according to schedule

(5) of the manufacturer: NIVUS GmbH

(6) Address: Im Täle 2
75031 Eppingen

Order number: 8003004431

Date of issue: 2019-04-02

(7) The design of this product and any acceptable variation thereto are specified in the schedule to this EU-Type Examination Certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH, Notified Body No. 0044, in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential ATEX Assessment Report No. 19 203 242039.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012+A11:2013 EN 60079-11:2012

except in respect of those requirements listed at item 18 of the schedule.

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions for Use specified in the schedule to this certificate.

11) This EU-Type Examination Certificate relates only to the design, and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the product shall include the following:

Ex II 2 G Ex ib IIB T4 Gb

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Roder

Hanover office, Am TÜV 1, 30519 Hannover, Tel. +49 511 998-61455, Fax +49 511 998-61590

This certificate may only be reproduced without any change, schedule included.
Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH

P17-F-011 Rev. 01/04.16

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(13) **SCHEDULE**

(14) **EU-Type Examination Certificate No. TÜV 12 ATEX 087812 issue 01**

(15) Description of product

In conjunction with the belonging measuring transducers resp. Ex-Separator-Module, the system "Sensor Family Mini" is used for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via supersonic technology.

The system "Sensor Family Mini" consists of the following components:
Electronic Box Mini type EBM
Sensors type
correlation sensor CSM-V100, CSM-V1D0,
CSM-V100Rx, CSP-V2xx,
distance sensor DSM-L0 and level sensor OCL-LM,
clamp-on sensor NIC-CO,
transit time sensor NIS0 V200, TSP0 V200, NIS-V200 und NIS-V280

The permissible ambient temperature range is:
For EBM: -20 °C ... 40 °C
For all sensors: -40 °C ... 80 °C

Electrical data

Signal and supply circuit (of EBM) ..... (Connection wires (pig tail): red [+], blue [GND]	in type of protection Intrinsic Safety Ex ib IIB only for connection to a certified intrinsically safe circuit Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W The connection to the following measuring transducers of the manufacturer is permissible: type OCP-... type PCP-E... The connection to the following Ex-Separator-Module is permissible: type iXT0 xxx The effective internal capacitance and inductance of the electronics are negligibly small. The capacitances and inductances of the connected cable have to be taken into account.

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Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 issue 01

Interface RS485 (of EBM) ..... in type of protection Intrinsic Safety Ex ib IIB
(Connection wires (pig tail):
white [RxTx+]
green [RxTx-]
blue: GND)

Maximum values:
U_o = 6 V
I_o = 81.9 mA
Angle current: 50 mA
Angle voltage: 4 V
P_o = 200 mW
Characteristic line: angular
The effective internal capacitance and inductance of the electronics are negligibly small.

Ex ib	IIB	
max. permissible external inductance	10 mH	1 mH
max. permissible external capacitance	3.8 µF	11.2 µF

At connection of the interface RS485 to belonging measuring transducers with active intrinsically safe circuits, the rules for interconnection of intrinsically safe circuits have to be taken into account.

Maximum values:
U_i = 12.06 V
I_i = 176 mA
P_i = 531 mW

The interconnection of the electronic box Mini type EBM with the sensors

- Correlation sensor Mini type CSM-V100 or CSM-V1D0 or CSM-V100Rx or CSP-V2xx and
- Distance sensor Mini type DSM (or filling level sensor type OCL-LM)

via a cable of the manufacturer with a length of 20 m is permissible.

Piezo connections ..... in type of protection Intrinsic Safety Ex ib IIB
(Connector Pins A/B or C/D)
Only for connection to the intrinsically safe circuits of the devices "Electronic Box Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation
C_i = 11 nF
L_i = 12 µH

1-Wire temperature sensor,
1-Wire EEPROM ..... in type of protection Intrinsic Safety Ex ib IIB
(Connector Pins E, F and J)
Only for connection to an intrinsically safe circuit
U_i = 6 V
I_i = 188 mA
P_i = 282 mW
C_i = 120 nF
The effective internal inductance is negligibly small.

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Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 issue 01

Pressure cell ..... (Connector Pins E, G, H and J)	in type of protection Intrinsic Safety Ex ib IIB Only for connection to an intrinsically safe circuit U_i = 6 V I_i = 264 mA P_i = 396 mW C_i = 20.15 µF The effective internal inductance is negligibly small.

Details of Change:

The type designations for some sensors were changed. No technical changes were performed.

(16) Drawings and documents are listed in the ATEX Assessment Report No. 19 203 232039.

(17) Specific Conditions for Use

none

(18) Essential Health and Safety Requirements

no additional ones

- End of Certificate -

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IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx TUN 18.0023 Issue No: 1

Certificate history:
Issue No. 1 (2019-06-10)
Issue No. 0 (2018-11-20)

Status: Current

Page 1 of 4

Date of Issue: 2019-06-10

Applicant: NIVUS GmbH
Im Täle 2
76031 Eppingen
Germany

Equipment: System "Sensor Family Mini"; see schedule for details

Optional accessory:

Type of Protection: Intrinsic Safety "i"

Marking: Ex ib IIB T4 Gb

Approved for issue on behalf of the IECEx Certification Body: Christian Roder

Position: Head of IECEx Certification Body

Signature: (for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

TÜV NORD CERT GmbH
Hanover Office
Am TÜV 1, 30519 Hannover
Germany

IECEx Certificate of Conformity

Certificate No:	IECEx TUN 18.0023	Issue No: 1
Date of Issue:	2019-05-10	Page 2 of 4
Manufacturer:	NIVUS GmbH Im Täle 2 75031 Eppingen Germany	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

DE/TUN/ExTR18.0026/01

Quality Assessment Report:

DE/TUN/QAR13.0011/05

IECEx Certificate of Conformity

Certificate No: IECEx TUN 18.0023 Issue No: 1

Date of Issue: 2019-05-10 Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

In conjunction with the belonging measuring transducers resp. Ex-Separator-Module, the system "Sensor Family Mini" is used for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via supersonic technology.

The system "Sensor Family Mini" consists of the following components:

Electronic Box Mini type EBM

Sensors type

correlation sensor CSM-V100, CSM-V1D0,

CSM-V100Rx, CSP-V2xx,

distance sensor DSM-L0 and level sensor OCL-LM,

clamp-on sensor NIC-CO,

transit time sensor NIS0 V200, TSP0 V200, NIS-V200 and NIS-V280

The permissible ambient temperature range is:

For EBM: -20 °C ... 40 °C

For all sensors: -40 °C ... 80 °C

For further details see attachment.

SPECIFIC CONDITIONS OF USE: NO

IECEx Certificate of Conformity

Certificate No: IECEx TUN 18.0023 Issue No: 1

Date of Issue: 2019-06-10 Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

The type designations for some sensors were changed. No technical changes were performed.

Annex:

_Attachment_Sensorfamily Mini_01.pdf

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Hannover Office
Am TÜV 1
30519 Hannover
Germany

Product:

In conjunction with the belonging measuring transducers resp. Ex-Separator-Module, the system "Sensor Family Mini" is used for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via supersonic technology.

The system "Sensor Family Mini" consists of the following components:
Electronic Box Mini type EBM
Sensors type correlation sensor CSM-V100, CSM-V1D0,
CSM-V100Rx, CSP-V2xx,
distance sensor DSM-L0 and level sensor OCL-LM,
clamp-on sensor NIC-CO,
transit time sensor NIS0 V200, TSP0 V200, NIS-V200 and NIS-V280

The permissible ambient temperature range is:
For EBM: -20 °C ... 40 °C
For all sensors: -40 °C ... 80 °C

Electrical data

Signal and supply circuit (of EBM) ..... (Connection wires (pig tail): red [+], blue [GND]	in type of protection Intrinsic Safety Ex ib IIB only for connection to a certified intrinsically safe circuit Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W The connection to the following measuring transducers of the manufacturer is permissible: type OCP-... type PCP-E... The connection to the following Ex-Separator-Module is permissible: type IXT0 xxx The effective internal capacitance and inductance of the electronics are negligibly small. The capacitances and inductances of the connected cable have to be taken into account.
Interface RS485 (of EBM) ..... (Connection wires (pig tail): white [RxTx+] green [RxTx-] blue: GND)	in type of protection Intrinsic Safety Ex ib IIB Maximum values: U_o = 6 V I_o = 81.9 mA Angle current: 50 mA Angle voltage: 4 V P_o = 200 mW Characteristic line: angular The effective internal capacitance and inductance of the electronics are negligibly small.

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Hannover Office
Am TÜV 1
30519 Hannover
Germany

Ex ib	IIB	
max. permissible external inductance	10 mH	1 mH
max. permissible external capacitance	3.8 µF	11.2 µF

At connection of the interface RS485 to belonging measuring transducers with active intrinsically safe circuits, the rules for interconnection of intrinsically safe circuits have to be taken into account.

Maximum values:
U_i = 12.06 V
I_i = 176 mA
P_i = 531 mW

The interconnection of the electronic box Mini type EBM with the sensors

- Correlation sensor Mini type CSM-V100 or CSM-V1D0 or CSM-V100Rx or CSP-V2xx and
- Distance sensor Mini type DSM (or filling level sensor type OCL-LM)

via a cable of the manufacturer with a length of 20 m is permissible.

Piezo connections ..... (Connector Pins A/B or C/D)
in type of protection Intrinsic Safety Ex ib IIB
Only for connection to the intrinsically safe circuits of the devices "Electronic Box Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation
C_i = 11 nF
L_i = 12 µH

1-Wire temperature sensor,
1-Wire EEPROM ..... (Connector Pins E, F and J)
in type of protection Intrinsic Safety Ex ib IIB
Only for connection to an intrinsically safe circuit
U_i = 6 V
I_i = 188 mA
P_i = 282 mW
C_i = 120 nF
The effective internal inductance is negligibly small.

Pressure cell ..... (Connector Pins E, G, H and J)
in type of protection Intrinsic Safety Ex ib IIB
Only for connection to an intrinsically safe circuit
U_i = 6 V
I_i = 264 mA
P_i = 396 mW
C_i = 20.15 µF
The effective internal inductance is negligibly small.

Details of Change:

The type designations for some sensors were changed. No technical changes were performed.

Special Conditions for Safe Use / Notes for Erection:

-none-

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