

Instruction Manual

NIVUS Pipe Profiler



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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 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

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Change History

Rev.	Date	Changes	Editor
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1 About this manual



Important Note

READ CAREFULLY BEFORE USE!

KEEP IN A SAFE PLACE FOR LATER REFERENCE!

This instruction manual is required for the Installation of the NIVUS Pipe Profiler 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.

If you should have problems to understand information contained within this instruction 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.

1.1 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 transmitter

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

1.2 Signs and definitions used

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

Tab. 1 Structural elements within the manual

Article Name

- NPP NIVUS Pipe Profiler

2 Safety Instructions

2.1 Used symbols and signal words

2.1.1 Valuation of the accident level



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 and of personal injury



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

Warning of personal injury or material damage



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.

2.1.2 Warning notice on the NPP



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 measured provided by the instrument during installation procedures and operation.

2.1.3 Safety instructions on the pipe sensor

WARNING



Risk of injury

The safety instructions on the pipe sensor are part of the standard delivery. Disregarding may lead to personal injury.

- *Observe the safety instructions*
 - *Do not remove the safety instructions*
-

!!! Important Information – Please note !!!

- 1 Pipeline under pressure!
Relieve from pressure prior to sensor replacement**
 - 2 Donot operate the pipe sensor without retaining element**
 - 3 Do not damage outer cable sheathing**
 - 4 Avoid kinks or sharp bends on sensor cables**
 - 5 Please refer to instruction manual prior to installation**
-

2.2 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**

Before starting installation work, observing the work safety regulations need to be checked.

Disregarding may lead to 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.

WARNING**Danger by electric voltage**

Maintenance, cleaning and/or repairs (by qualified personnel only) may only be performed when de-energised.

Disregarding may lead to electric shocks.

CAUTION**Avoid electromagnetic discharge**

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.

**Putting into operation by trained experts only**

The entire measurement system shall be installed and put into operation by trained expert personnel only.

2.3 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 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**.

2.4 Use in accordance with the requirements



Note

The instrument is intended solely for the purpose described below. Modifying or using the instruments 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 NIVUS Pipe Profiler is a pipe measuring section designed to extend the PCM Pro, PCM 4 or NFM 750 portable flow measurement systems. The NIVUS Pipe Profiler is for flexible use to implement more measurement tasks even in case of low discharge volumes or poor hydraulic flow conditions within sewer systems.

The NIVUS Pipe Profiler is designed and manufactured in accordance with the current state of the art and with the recognised safety rules and regulations applicable at the time this document is issued. Danger to persons or material damage cannot be completely ruled out, however.

The maximum permissible limit values as specified in chapter 4.5. 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.

2.5 Ex-Approval

CAUTION



Damages invalidate the Ex protection.

The sensor then is not allowed to be used in Ex zone 1 any longer.

- *Protect the sensor from shocks, drops or other damage.*

The Ex-version of the sensors is designed to be used in areas with explosive atmospheres (zone 1).

Approval ATEX / IECEx



II 2G Ex ib IIB T4 Gb / Ex ib IIB T4 Gb



Important Note

The approval is only valid in connection with the respective indication on the sensors nameplate. The Ex-version sensors are matched to the NIVUS transmitters regarding the assessment of intrinsically safe electrical systems according to EN 60079-25.

In case of using other manufacturer's transmitters the operator is obliged to implement a system assessment according to EN 60079-25.

The required specifications for Ex-version sensors can be taken from the EC-type examination certificate TÜV 03 ATEX 2262 or TÜV 12 ATEX 087812.

2.6 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.

Keep Manual

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

Provide Manual

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

2.7 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.*
-

3 Delivery, Storage and Transport

3.1 Delivery

The standard delivery of the NIVUS Pipe Profiler contains:

- An NPP with built-in pipe sensor
- The instruction manual including the certificate of conformity and approvals. It contains any relevant information on how to operate the measurement system.

Check additional accessories such as safety filling valve depending on your order and according to the delivery note.

3.2 Reception inspection

Check the shipment immediately upon receipt to ensure it is complete and intact. Immediately report any discovered transport damages to the delivering carrier. Also notify NIVUS GmbH in writing about this without delay.

Report any incompleteness of the delivery to the responsible representative or directly to the company headquarters of the manufacturer within two weeks.



The deadline of two weeks must be strictly complied with.

Mistakes cannot be rectified later.

3.3 Storing

Observe the minimum and maximum values on environmental conditions such as temperature and humidity according to chapter 4.5.

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

Always store the instrument in its original packaging.

3.4 Transport

Do not expose the system to heavy shocks or vibrations.

Use the original packaging for transport.

3.5 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.



Returning defective equipment

Once the NPP or the pipe sensor should be defective always return the entire unit since it needs recalibration after repair.

4 Product specification

The NIVUS Pipe Profiler (NPP) is a pipe measuring section used to extend the possibilities of portable flow measurement systems. The flexible measurement system ensures highly accurate flow metering under difficult conditions. The NPP is suitable for low discharge volumes or poor hydraulic flow conditions.

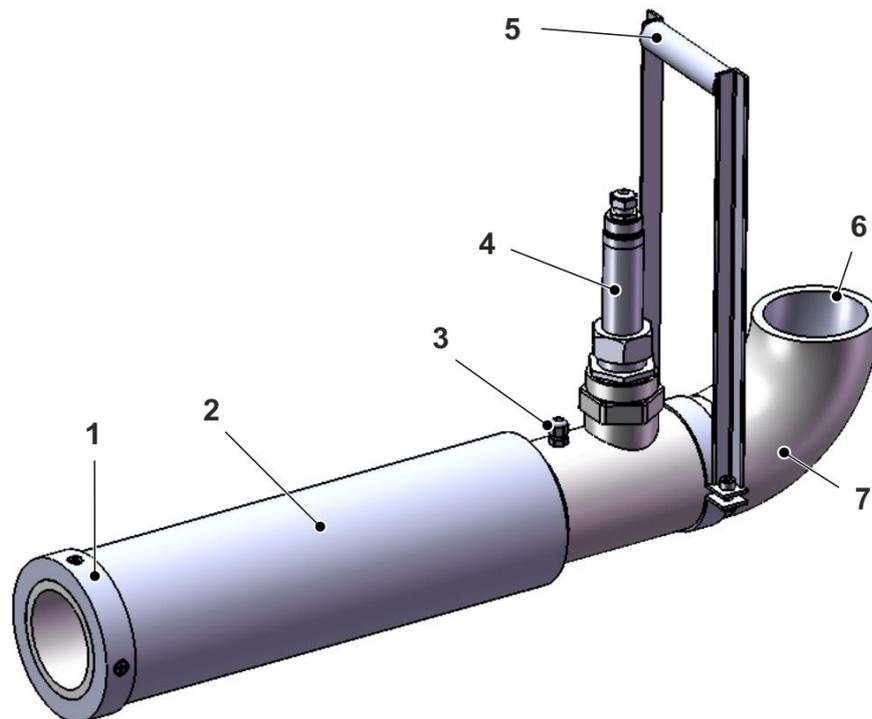
NIVUS Pipe Profiler (NPP) is available in 2 different versions:

- NPP0 DN...: for connection to PCM 4 or PCM Pro transmitters with built-in POA-V200RT...SG pipe sensor
- NPP0 DN...V2: for connection to NFM 750 transmitter with built-in CSM-V100RNE15R pipe sensor

⇒ Complete overview on all device versions see chapter 4.3.

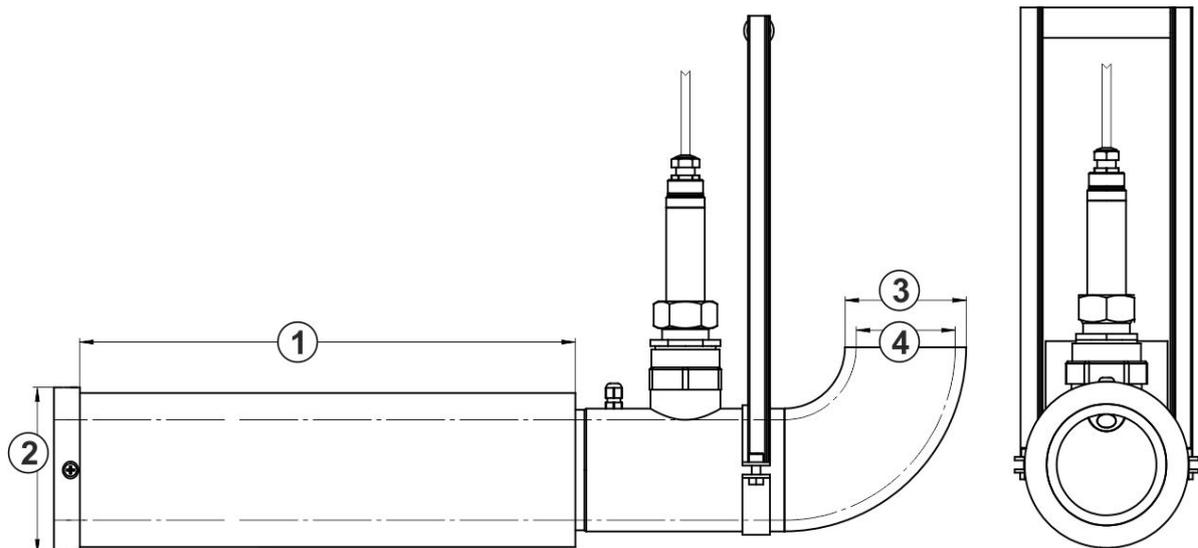
4.1 Versions and dimensions

4.1.1 NPP0 DN...



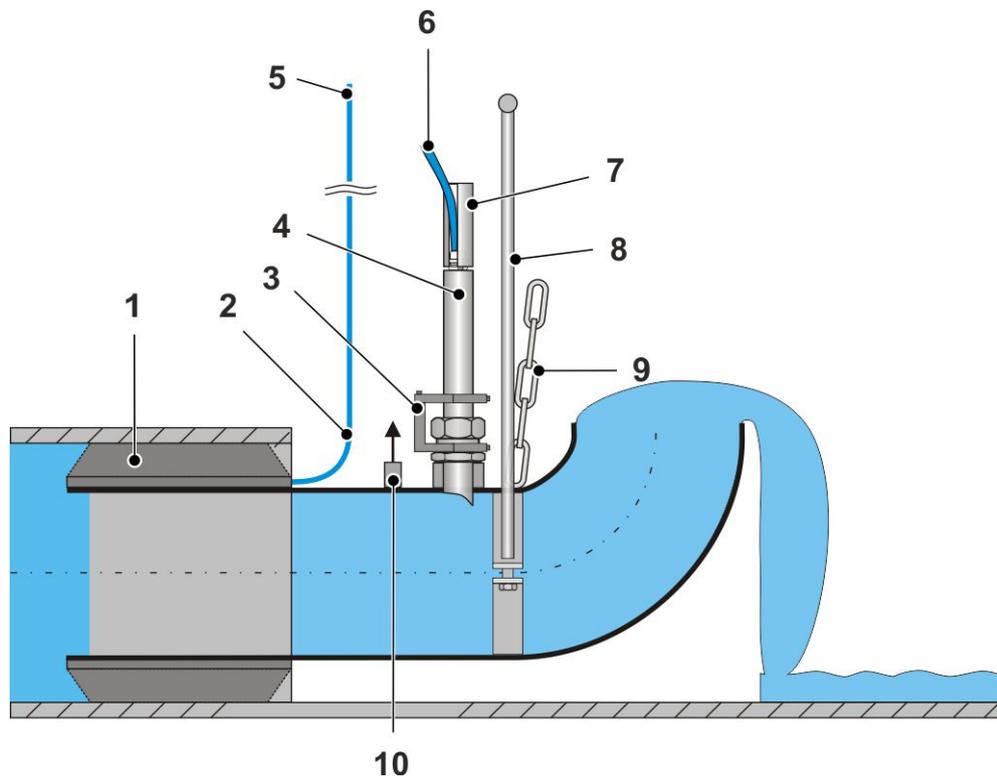
- 1 Clamp ring
- 2 Balloon
- 3 Ventilation
- 4 Pipe sensor POA-V200RT...SG
- 5 Handhold
- 6 Discharge elbow
- 7 Pressure pipe

Fig. 4-1 Overview NPP0 DN... with built-in pipe sensor POA-V200RT...SG



	DN 150	DN 200	DN 300	DN 350
1	450 mm	550 mm	600 mm	600 mm
2	Ø 148 mm	Ø 190 mm	Ø 290 mm	Ø 320 mm
3	Ø 110 mm	Ø 160 mm	Ø 225 mm	Ø 280 mm
4	Ø 90 mm	Ø 141,8 mm	Ø 199,4 mm	Ø 248,2 mm

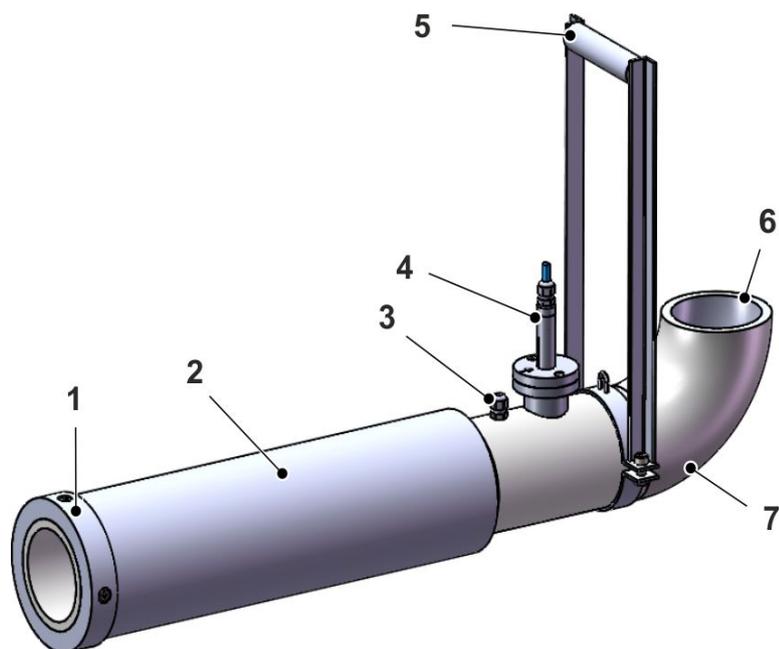
Fig. 4-2 Dimensions NPP0 DN... with built-in pipe sensor POA-V200RT...SG



- 1 Balloon expansion
- 2 Air hose for pumping up
- 3 Sensor retaining element
- 4 Pipe sensor
- 5 Hose coupling with air vent plug
- 6 Sensor cable
- 7 Cable protection jacket
- 8 Hand hold
- 9 Chain
- 10 Ventilation

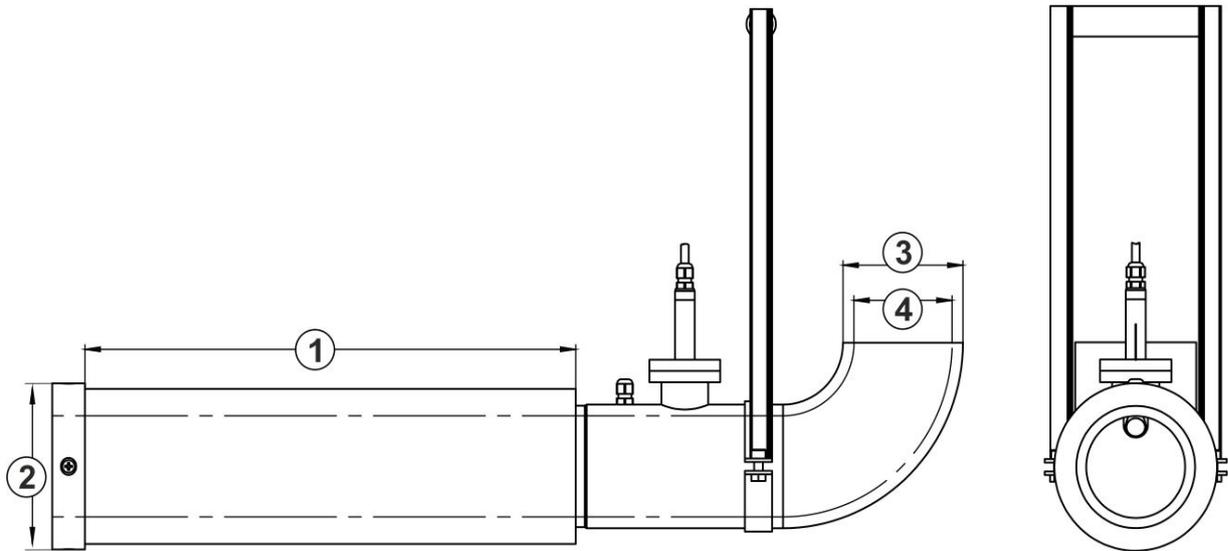
Fig. 4-3 Schematic construction NPP0 DN... with built-in pipe sensor POA-V200RT...SG

4.1.2 NPP0 DN...V2



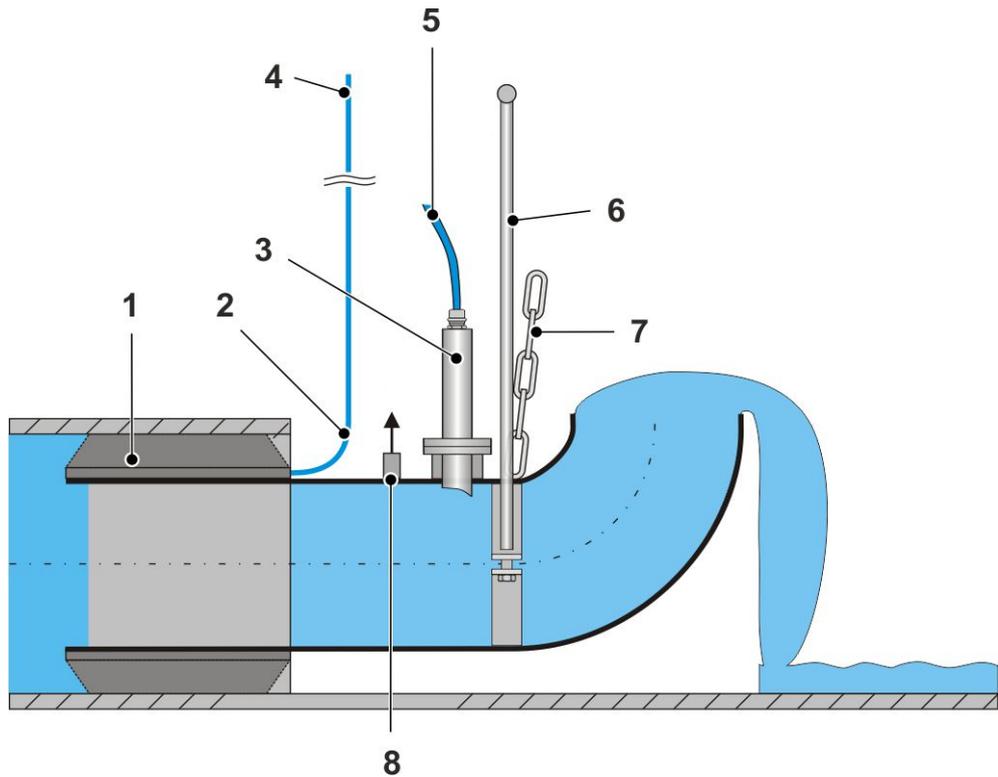
- 1 Clamp ring
- 2 Balloon
- 3 Ventilation
- 4 Pipe sensor CSM-V100RNE15R
- 5 Handhold
- 6 Discharge elbow
- 7 Pressure pipe

Fig. 4-4 Overview NPP0 DN...V2 with built-in pipe sensor CSM-V100RNE15R



	DN 150	DN 200	DN 300
1	450 mm	550 mm	600 mm
2	Ø 148 mm	Ø 190 mm	Ø 290 mm
3	Ø 110 mm	Ø 160 mm	Ø 225 mm
4	Ø 90 mm	Ø 141,8 mm	Ø 199,4 mm

Fig. 4-5 Dimensions NPP0 DN...V2 with built-in pipe sensor CSM-V100RNE15R



- 1 Balloon expansion
- 2 Air hose for pumping up
- 3 Pipe sensor
- 4 Hose coupling with air vent plug
- 5 Sensor cable
- 6 Handhold
- 7 Chain
- 8 Ventilation

Fig. 4-6 Schematic construction NPP0 DN...V2 with built-in pipe sensor CSM-V100RNE15R

4.2 Safety filling valve

In order to inflate the NPP balloon NIVUS strongly recommend to use the NPP0 BEF SICH 1500 safety filling valve.

⇒ See chapter 11.



Fig. 4-7 Safety filling valve

4.3 Device Types

The NIVUS Pipe Profiler is available in 2 designs and in different versions each. The tables below provide an overview on the various designs and versions.

From the article number the type of device can be specified.

4.3.1 NPP for connection to PCM Pro or PCM 4

NPP0	Pipe measuring section as extension of the portable flow measurement systems	
	Unit for inner pipe diameters	
	DN	All options
	Type	
	150	For inner pipe diameters of 150 - 300 mm
	200	For inner pipe diameters of 195 - 500 mm
	300	For inner pipe diameters of 265 - 600 mm
	350	For inner pipe diameters of 295 - 600 mm
NPP0	DN	

Tab. 2 Type key NPP for connection to PCM Pro or PCM 4

The NPP for connection to PCM Pro or PCM 4 can be combined only with the following pipe sensor.

POA-	Sensor with special allocation of flow velocities covering a maximum of 16 scan layers				
	V200	Without level measurement			
	RT	Pipe sensor made of PPO with PEEK sensor face; pipe body 1.4571			
	Approvals (ATEX)				
	0	None			
	E	Ex zone 1			
	Cable length (max. 150 m)				
	10	10 m			
	15	15 m			
	20	20 m			
	30	30 m			
	50	50 m			
	99	99 m			
	XX	Special length upon request			
	1B	10 m, FEP coated			
2B	20 m, FEP coated				
3B	30 m, FEP coated				
5B	50 m, FEP coated				
9B	100 m, FEP coated				
XB	Special length / special construction				
	S	Sensor connection: Connection to PCM Pro and PCM 4, portable version incl. plug			
	G	Pipe length 20 cm + extension thread			
POA-	V200	RT		S	G

Tab. 3 Type key pipe sensor POA for NPP

4.3.2 NPP for connection to NFM 750

NPP0	Pipe measuring section as extension of the portable flow measurement systems	
	Unit for inner pipe diameters	
	DN	All options
	Type	
	150 V2	For inner pipe diameters of 150 - 300 mm
	200 V2	For inner pipe diameters of 195 - 500 mm
	300 V2	For inner pipe diameters of 265 - 600 mm
NPP0	DN	

Tab. 4 Type key NPP for connection to NFM 750

The NPP for connection to NFM 750 is delivered only with the following built-in pipe sensor.

CSM-	Sensor with spatial allocation of flow velocities				
	V100	Without level measurement			
		RN	1" pipe sensor made of stainless steel 1.4571 with PEEK sensor face; for NPP0DN... V2		
			E	Approvals (ATEX): Ex-zone 1	
				15	Cable length 15 m
					R Sensor connection: connection to NFM 750, incl. plug
CSM-	V100	RN	E	15	R

Tab. 5 Type key pipe sensor CSM for NPP

4.4 Device identification

The instructions contained within this manual are valid only for the NIVUS Pipe Profiler. NPP as well as the sensor are equipped with a nameplate providing the following specifications:

- Name and address of the manufacturer
- CE label
- Information on type and series, serial no. if available
- Year of manufacture: the first four digits of the serial number represent the year and the week number of manufacture (1904....)
- Additionally with Ex label if the POA sensor is in Ex version or with integrated CSM sensor as mentioned in chapter 2.5.

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



Fig. 4-8 Nameplate NPP0DN...



Fig. 4-9 Nameplate sensor POA

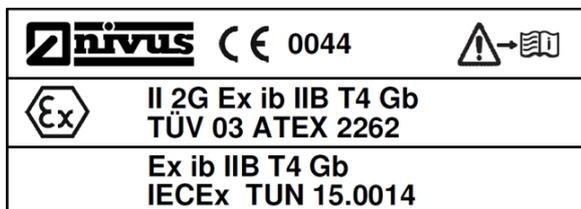


Fig. 4-10 Ex label sensor POA



Fig. 4-11 Nameplate NPP0DN...V2

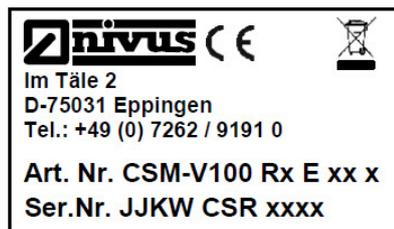


Fig. 4-12 Nameplate sensor CSM-V100 R

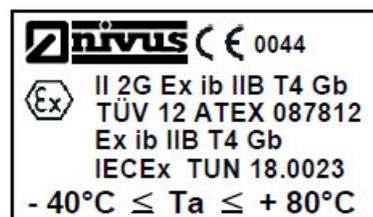


Fig. 4-13 Ex nameplate sensor CSM-V100 R



Check the nameplate

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

Check the nameplate for correct specification of the power supply.

- ⇒ The EU-Type examination certificate (incl. appendix) and the declaration of conformity are located at the end of the manual.

4.5 Specifications

4.5.1 NPP0 DN...

NIVUS Pipe Profiler – Complete Unit	
Max. Fülldruck	1.5 bar
Operating temperature	-10 °C to +50 °C (14 °F to 122 °F) -10 °C to +40 °C (14 °F to 104 °F) for applications in Ex Zone 1
Storage temperature	-20 °C to +60 °C (-4 °F to 140 °F)
Sensor seat	G1.5" inner thread
Material handhold	Stainless steel
Material clamping ring	PP-H
Medium contacting materials	Pressure pipe: PP-H Balloon: natural rubber Pipe sensor POA: stainless steel 1.4571, PPO, PEEK
Pipe sensor POA	
Measurement principle	Correlation with real flow profile measurement
Measurement frequency	1 MHz
Protection	IP68
Ex-Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEX)
Material Sensorverschraubung und Befestigungselement	Stainless steel
Operating pressure	Max. 4 bar
Cable length	10/15/20/30/50/100 m
Type of cable	LiYC11Y 2x1.5 + 1x2x0.34
Outside cable diameter	8.40 mm ±0.25 mm
Sensor	Flow velocity sensor with v-measurement using cross correlation and temperature measurement to compensate the temperature effect on the velocity of sound.
Type of construction	Pipe sensor for installation in pipes with sensor screw joint and retaining element
Measurement range	-100 cm/s to +600 cm/s
Number of scans	Max. 16
Zero point drift	Absolutely stable zero point
Error limits (per scan layer)	<1% of measurement value (v > 1m/s) < 0.5% of measurement value +5 mm/s (v <1 m/s)
Sonic beam angle	±5 degrees
Beam angle to the horizontal	45°

Temperature measurement	
Measurement range	-20 °C to +50 °C (-4 °F to 122 °F)
Measurement uncertainty	±0.5 K

Tab. 6 Specifications NPPDN... for connection to PCM Pro or PCM 4

4.5.2 NPP0 DN...V2

NIVUS Pipe Profiler - Complete Unit	
Max. Fülldruck	1.5 bar
Operating temperature	-10 °C to +70 °C (14 °F to 158 °F) -40 °C to +80 °C (-40 °F to 176 °F) for applications in Ex Zone 1
Storage temperature	-20 °C to +60 °C (-4 °F to 140 °F)
Sensor seat	1" nozzle with connection flange
Material handhold	Stainless steel
Material clamping ring	PP-H
Medium contacting materials	Pressure pipe: PP-H Balloon: natural rubber Pipe sensor CSM: stainless steel 1.4571, Peek
Pipe sensor CSM	
Measurement principle	Correlation with real flow profile measurement
Measurement frequency	1 MHz
Protection	IP68
Ex-Approval	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEX)
Operating pressure	Max. 4 bar
Cable length	15 m
Type of cable	LiYC11Y special cable
Outside cable diameter	6 mm ±0.2 mm
Type of construction	1" pipe sensor with connection flange
Measurement range	-100 cm/s to +600 cm/s
Number of scans	Max. 16
Zero point drift	Absolutely stable zero point
Error limits (per scan layer)	<1% of measurement value (v > 1m/s) < 0.5% of measurement value +5 mm/s (v < 1 m/s)
Sonic beam angle	±5 degrees
Beam angle to the horizontal	45°

Tab. 7 Specification NPPDN...V2 for connection to NFM 750

5 Installation

5.1 General Information for Installation

Make sure to fulfill the requirements mentioned below:

- Observe that the installation shall be carried out only by qualified expert personnel.
- For electric installation follow the legal requirements of the according country (in Germany: e. g. VDE 0100).
- Observe further (local) statutory standards, regulations and technical rulings.
- Before feeding the rated voltage the installation of transmitter and sensors must be completed. Verify whether the installation is correct.



Important hints on installation

- *Ensure proper installation.*
 - *Follow applicable legal or operational guidelines.*
 - *Improper handling may lead to personal injuries and/or equipment damage.*
-

5.2 Selecting the Mounting Place

The mounting place for the device has to be selected according to certain criteria. Please strictly avoid:

- direct sunlight (use weatherproof cover if necessary)
- heat emitting objects (max. ambient temperature see chapter 4.5.
- objects with strong electromagnetic fields (e. g. frequency converters or similar)
- corrosive chemicals or gas
- mechanical shocks
- installation close to footpaths or travel ways
- vibrations
- radioactive radiation

5.3 Hints on how to avoid electrostatic discharge (ESD)

When connecting the NIVUS Pipe Profiler the following warnings and hints shall be observed right as the warnings and hints found in the according chapters on installation.

WARNING**Risk of electric shocks**

Before you begin to carry out maintenance, cleaning and / or repair works (expert personnel only):

- *Disconnect the transmitter from mains power and secure it against being switched on again.*
- *Disconnect the NPP from transmitter.*

The sensitive electronic components inside of the instrument may be damaged by static electricity which may impair the instrument's performance or even lead to instrument failure. The manufacturer recommends the following steps to avoid equipment damage due to electrostatic discharge:

- Discharge static electricity from your body before touching the instrument's electronic components such as circuit boards and the components installed on the boards. To do so touch a grounded metal surface such as the unit's enclosure frame or a metal pipe.
- Avoid unnecessary movements to reduce the risk of building up static electricity.
- Transport statically sensitive components in antistatic containers or packing materials.
- To discharge your body and to stay free of static electricity wear an anti-static wristband grounded through a cable.
- Only touch components that are sensitive to electric charges in an anti-static working area. If possible, use antistatic mats and work pads.

5.4 Required Aids

To install the NPP you need:

- Compressor
- Safety filling valve by NIVUS

⇒ Safety filling valve see chapter 4.2 and 11.

5.5 Prepare Measurement Place

Before installation observe:

- Inspection of the measurement place (sludge, faulty connection etc).
- Check the canal situation. Sharp edges or glass fragments within the canal may damage the balloon.

5.6 Install NIVUS Pipe Profiler

**Important Note**

For installing a NIVUS Pipe Profiler (as usual with channel works), two persons are necessary for mounting.

**Important Note**

*The position of the built-in flow velocity sensor is set by default.
In order to maintain the accuracy of the system*

- *do not twist the sensor*
-

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.

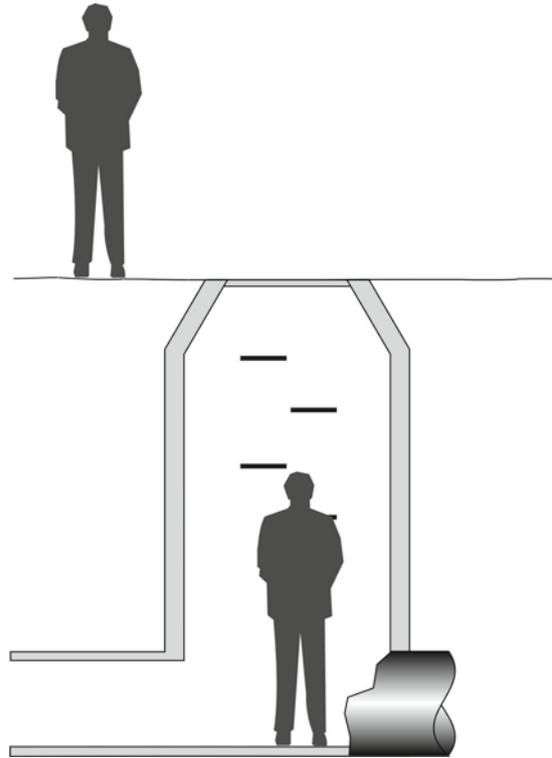
When working in the channel system make sure to avoid electrostatic charge:

- *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.

Procedure:

1. One Person is entering the manhole while the other person will stay out of the manhole for support and security purposes.

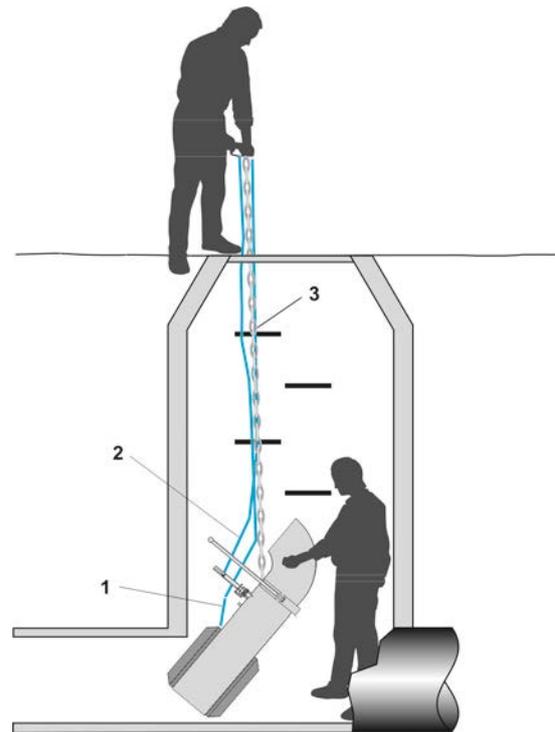


CAUTION***Risk of material damage***

The NPP or the pipe sensor may be damaged due to improper handling.

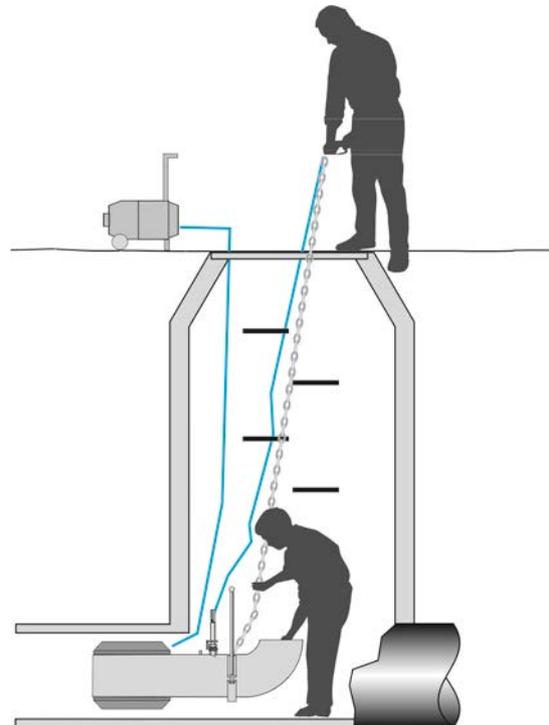
- *Use only the chain to lower the NPP down into the shaft.*
 - *Make sure to keep air hose and sensor cable free of suspending loads.*
-

2. Lower NPP down into the shaft on the chain (3).



- 1 Air hose
- 2 Sensor cable
- 3 Chain

3. Insert NPP into the channel and adjust.



- a) Adjust the NPP so that the opening of the measurement pipe is pointing vertically upwards. Observe horizontal alignment of the NPP.
- b) Connect the safety filling valve between compressor and NPP.
- c) Use the compressor to apply a small amount of pressure into the balloon. The balloon shall inflate only as wide as to fix the NPP into the channel on the channel walls.

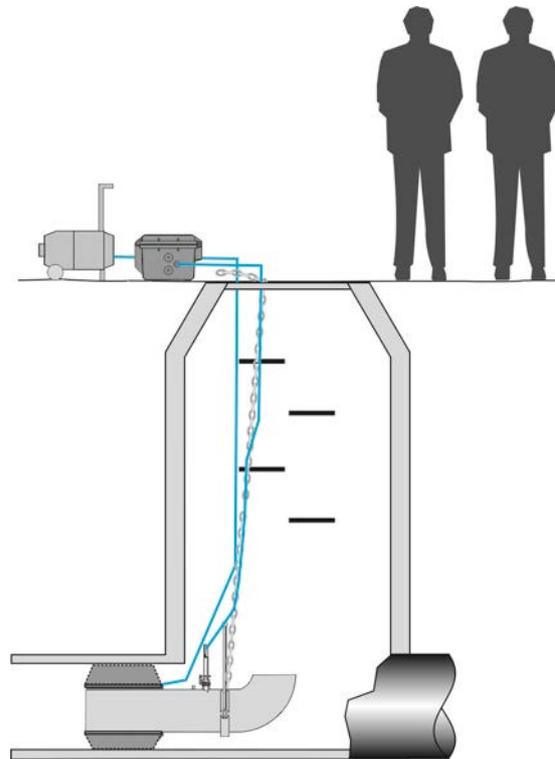
WARNING**Risk of personal injury and material damage**

- *Overpressure may damage the balloon. A blast wave or flying objects may injure persons or damage your equipment.*
- *Exit shaft / channel before inflating the NPP balloon.*

CAUTION**Risk of material damage**

Damage of NPP due to improper balloon inflation.

- *Inflate the NPP balloon only with the safety filling valve.*
- *Maximum pressure: 1.5 bar!*

4. Exit the shaft and inflate the balloon

- a) Make sure there are no persons in the shaft.
- b) Inflate the balloon with a maximum pressure of 1.5 bar.
In case of excessive pressure you can hear a hissing sound from the safety filling valve.
- c) Stop the compressor and disconnect from the safety filling valve.

5. Fasten sensor cable, compressed air hose and chain on the step irons in the man-hole.

6 Initial start-up

6.1 Notes to the user



Required documentation

To put the entire system into operation it may be necessary to additionally consult the instruction manuals of the following accessories as well.

- *Instruction Manual for transmitter*

These manuals are provided with the delivery of the accessories.

Before connecting and operating the NIVUS Pipe Profiler the instructions below shall be followed.

This Instruction Manual contains all information required for the setting of parameters and for the use of the NIVUS Pipe Profiler. The manual is intended for qualified personnel. Appropriate knowledge in the areas of measurement systems, automation technology, control engineering, information technology and wastewater hydraulics are preconditions for putting the NIVUS Pipe Profiler into operation.

Read this instruction manual carefully in order to guarantee proper function of the NIVUS Pipe Profiler. The NIVUS Pipe Profiler shall be wired according to chapter 5 *Installation*.

In case of doubt regarding installation, connection or the setting of parameters contact our hotline:

- +49 (0) 7262 9191 955

6.2 General principles

The system shall not be put into operation before the installation has been finished and checked. To exclude faulty programming this Instruction Manual must be read before the initial start-up.

After transmitter and sensors are connected the parameters must be set according to the respective instruction manual.

7 Table of Resistiveness

CAUTION***Damage due to aggressive media***

As a basic principle, damage might occur in case of using chloride media (pitting corrosion in stainless steel ground plate or sensor jacket), hydrogen sulphide (H₂S – risk of diffusion through cable sheath or sensor body resulting in destruction of copper wires and conductor paths) as well as various organic solvents (may dissolve cable sheath or sensor body)!

Sensors and cables shall be installed exclusively in media according to the table of resistiveness below.

Sensor installation and cable layout shall be executed exclusively in media according to the table of resistiveness below! Otherwise the measurement system may be damaged irreversibly.

The medium contacting parts of the sensors consist of:

- V4A (ground plate or pipe sensor jacket)
- PPO GF30 (sensor body)
- PEEK (sensor crystal cover)
- Polyurethane (cable sheath and glands)
- PTFE (gasket of sensor screw joint)

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.

For use in special applications with high aggressive or solvent-containing media there are sensors made of full PEEK available with ground plates made of Hastelloy or Titanium as well as pipe sensors made of high resistant special steel. Sensor cables which have to be immersed into the medium are available with a special FEP coating (resistant to organic solvents or hydrogen sulphide).

7 Table of Resistiveness

MEDIUM	FORMULA	CONCENTRATION	HDPE	PPO GF30	PUR	PEEK	FEP	V4A	Hastelloy C 276	Viton (PA/PR)	PA	PPH
Acetaldehyde	C ₂ H ₄ O	40%	3/3	4	4	1	(1)	(1)	0	4/4	2/4	3/4
Acetic acid	C ₂ H ₄ O ₂	10%	1/1	2	3	1	1/1	1/1	1	(3)	4/4	1/1
Acetone	C ₃ H ₆ O	40%	1/1	4	4	1	(1)	1/1	1	4/4	1/0	1/3
Allyl alcohol	C ₃ H ₆ O	96%	1/3	2	0	1	1/1	1/1	0	4/4	3/0	2/2
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	0/0
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	2/3
Benzene	C ₆ H ₆	100%	3/4	3/4	2	1	1/1	1/1	1	3/3	2/0	3/4
Benzyl alcohol	C ₇ H ₈ O	100%	3/4	3	2	1	1/1	1/1	1	1/0	4/4	4/4
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)	3/0
Butanol	C ₄ H ₁₀ O	techn. pure	1/1	2	3	1	1/1	(1)	1	3/4	1/0	1/2
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	4/4
Carbon tetrachloride	CCl ₄	100%	4/4	3	4	1	1/1	1/1L	1	1/1	4/4	4/4
Caustic soda	NaHO	50%	1/1	1	3	1	1/1	1/3	1	3/3	1/0	1/1
Chlorine	Cl ₂		4/4	3	3	1	1/1	1/0	0	1/1	4/4	4/4
Chlorine water	Cl ₂ x H ₂ O		3/0	2	0	1	(1)	2/0L	1	1/0	4/4	3/4
Chlorobenzene	C ₆ H ₅ Cl	100%	3/4	3	4	1	1/1	1/1	1	3/4	4/4	3/4
Chloroform	CHCl ₃	100%	3/4	4	4	1	1/1	1/1	1	4/4	3/4	3/4
Chloromethane	CH ₃ Cl	techn. pure	3/0	4	4	1	1/0	1/1L	0	4/4	(3)	4/4
Chromic acid	CrO ₃	10%	1/1	1	0	1	1/1	1/2	1	1/1	4/4	1/1
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	1/3
Ethanedioic acid	C ₂ H ₂ O ₄ x	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	1/1
Ethyl acetate	C ₄ H ₈ O ₂	100%	1/3	3	3	1	1/1	(1)	0	4/4	1/0	1/3
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	3/4
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	0/0
Hexane	C ₆ H ₁₄	100%	2/3	1	2	1	1/1	1/1	1	1/1	4/4	2/3
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	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	1/1
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	1/1
Methyl acetate	C ₃ H ₆ O ₂	techn. pure	1/0	3	0	1	1/0	1/1	1	4/4	1/0	1/3
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	2/4
Oleic acid	C ₁₈ H ₃₄ O ₂	techn. pure	1/3	1	1	1	(1)	1/1	0	2/2	1/0	1/3
Ozone	O ₃		3/4	2	2	1	1/1	0/0	0	1/0	4/4	3/4
Petrol, unleaded	C ₅ H ₁₂ - C ₁₂ H ₂₆		2/3	3	2	1	1/1	1/1	1	(1-	1/0	3/4
Petroleum	—		1/1	1	1	1	1/1	1/1	1	1/1	(1)	1/3
Petroleum	—	techn. pure	1/3	3	1	1	(1)	1/1	0	1/0	1/0	1/3
Phenol	C ₆ H ₆ O	100%	2/3	3	2	1	1/1	1/1	1	2/3	4/4	1/2
Phenylmethane	C ₇ H ₈	100%	3/4	3	3	1	1/1	1/1	0	3/3	1/0	3/4
Phosphoric acid	H ₃ PO ₄	85%	1/1	1	0	1	1/1	1/3	1	1/1	4/4	1/2
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	4/4
Vegetable oils	—		0/0	1	1	1	(1)	1/1	0	1/0	0/0	1/3

7.1 Resistiveness Legend

Resistiveness

There are two values per medium:

left number = value at +20 °C /

right number = value at +50 °C.

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

Material Names

HDPE	Polyethylene, high density
FEP	Tetrafluorethylene-Perfluorpropylene
V4A	Stainless steel 1.4401 (AISI 316)
PPO GF30	Polyphenyloxylene with 30% glass fibres
PU	Polyurethane
PEEK	Polyetheretherketone
PA	Polyamide
PP-H	Polypropylene

8 Maintenance and Cleaning

WARNING



Risk of electric shocks

Before you begin maintenance, cleaning and/or repair works (expert persone only):

- *Disconnect the transmitter from mains power and secure it from being switched on again.*
 - *Disconnect the NPP from transmitter.*
-

WARNING



Contamination by hazardous germs

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 the system, cables and sensors.

- *Wear protective clothing.*
-

8.1 Maintenance

8.1.1 Maintenance interval

The NIVUS Pipe Profiler is conceived to be virtually free of calibration, maintenance and wear (requirements of the Industrial Safety Regulations are unaffected).

NIVUS recommends having the entire measurement system inspected by the NIVUS customer service **once per year**.

Depending on the area of use the maintenance intervals however may vary.

Extent and intervals of maintenance depend on the following conditions:

- Sensor measurement principle
- Material wear
- Fluid and channel hydraulics
- General regulations for the operators of the measurement facility
- Ambient conditions

NIVUS recommends having the measurement system completely be inspected by the manufacturer after **latest ten years**.

Generally the verification of instruments and sensors is a basic measure in order to improve operational reliability and to increase the lifetime.

8.1.2 Customer Service Information

For the recommended annual inspection of the entire measurement system and/or the extensive inspection after latest ten years contact our customer service:

NIVUS GmbH - Customer Service

Phone +49 (0) 7262 9191 – 922

Kundencenter@nivus.com

8.2 Cleaning

WARNING *Disconnect instrument from mains*



Disconnect the instrument from mains power before cleaning.

Disregarding may lead to electric shocks.

8.2.1 NIVUS Pipe Profiler

WARNING *Danger of ignition*



Cleaning the NPP plastic pipe with a dry cloth results in electrostatic charge.

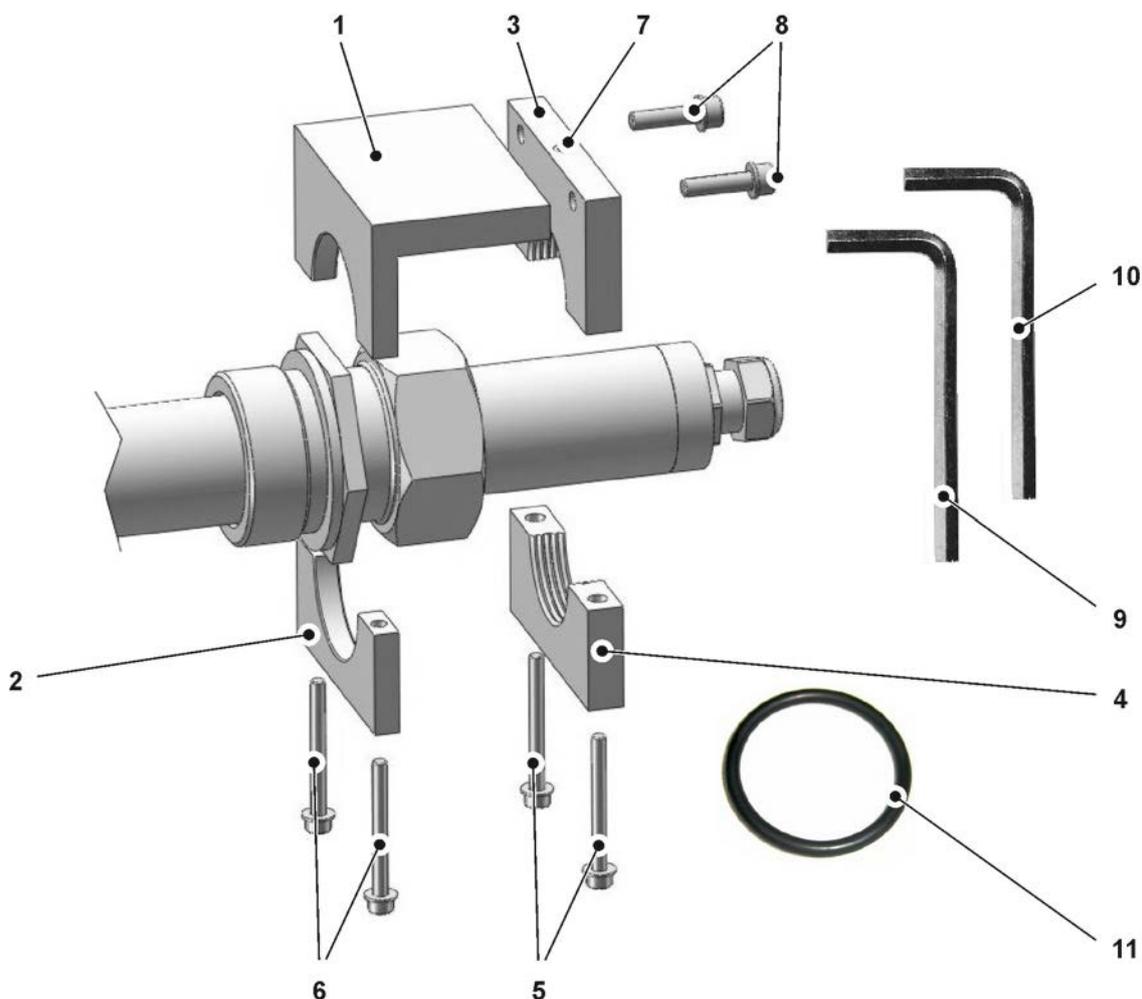
- *clean the plastic pipe of the NPP only with a damp cloth.*
-

8.2.2 Pipe sensor

In heavily polluted media tending to sedimentation it may be necessary to clean the flow velocity sensor regularly. The intervals are depending on the application.

8.2.2.1 NPP0DN...: Installation and Deinstallation of the POA Pipe Sensor for Cleaning

For cleaning or control purposes the pipe sensor can be removed from the NPP without any problems. The sensor position is fixed by the retaining element.



- 1 Upper front clamp element (1x)
- 2 Lower front clamp element (1x)
- 3 Upper rear clamp element (1x)
- 4 Lower rear clamp element (1x)
- 5 Allen® head screw M5 (2x)
- 6 Allen® head screw M4 (2x)
- 7 Welded headless screw (as additional clamp lock)
- 8 Allen® head screw M5 (2x)
- 9 Allen key® – 1 x 2.5 mm
- 10 Allen key® – 1 x 3 mm
- 11 O-Ring, spare part for sensor screw connection

Fig. 8-1 Retaining element for pipe sensors

Rohrsensor POA ausbauen:

1. Loosen the sleeve nut of the sensor screw connection.



2. Loosen both Allen[®] head screws on the retaining element (*Fig. 8-1, Pos. 8*).
3. Remove the pipe sensor.
Both screwed clamping elements remain to be unchanged on the pipe sensor body.
The clamping elements serve as a stop and positioning aid during reinstallation.



Clean the POA pipe sensor:

- ⇒ See chapter 8.2.2.3



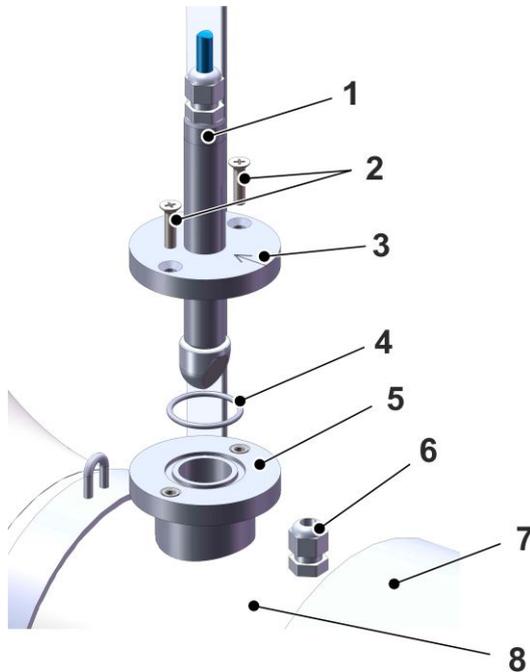
Fig. 8-2 Sensor screw connection

Reinstall POA pipe sensor:

1. Replace o-ring and white gasket ring (PDFE) and apply a small amount of grease (see *Fig. 8-2*).
2. Insert the sensor into the sensor screw connection. The clamping elements must be connected again.
3. Tighten the sleeve nut on the sensor.
4. Fasten the retaining element again with both M5 Allen® head screws.

8.2.2.2 NPP0DN...V2: Installation and Deinstallation of the CSM Pipe Sensor for Cleaning

For cleaning or control purposes the CSM pipe sensor can be removed from the NPP without any problems.



- 1 CSM pipe sensor
- 2 Sensor screws: 2x M5x20 countersunk screws
- 3 Indication of flow direction
- 4 O-ring Ø28x2.65
- 5 NPP flange nozzle
- 6 NPP ventilation
- 7 NPP balloon
- 8 NPP pressure pipe

Fig. 8-3 CSM Pipe sensor (exploded view) on NPP

Remove CSM Pipe Sensor:

1. Unscrew the sensor screws (*Fig. 8-3*, Pos. 2).
2. Pull out sensor upwards.
Make sure to not lose the o-ring.

Clean Pipe Sensor:

⇒ See chapter 8.2.2.3

Reinstall CSM Pipe Sensor:

1. Insert o-ring (*Fig. 8-3*, Pos.4) into the flange nozzle (Pos. 5) if necessary.
2. Insert CSM pipe sensor into the NPP flange nozzle again.
3. Align pipe sensor and observe the indication of the flow direction (*Fig. 8-3*, Pos. 3).
4. Insert and tighten the sensor screws (*Fig. 8-3*, Pos. 2).

8.2.2.3 Cleaning Pipe Sensors

CAUTION**Damage through hard objects**

- *Never use hard objects such as wire brushes, rods, scrapers or similar to clean the sensor.*
 - *For cleaning use a brush with plastic bristles, a broom or similar.*
 - *Cleaning by using a water jet is allowed up to a maximum pressure of 4 bar (see chapter 4.5) (e.g. by using a water hose).*
 - *Do not clean the sensors with a high-pressure cleaner. Using a high-pressure cleaner may damage the sensor resulting in measurement failure.*
-

Procedure:

1. Flush pipe sensor with water hose (max. 4 bar).
2. Remove dried dirt carefully with compressed air or by using a brush with plastic bristles (no metal).
3. Clean and dry dirty plug contacts (sensor connection F or S) before reconnecting the sensors. Use contact spray for the maintenance of the contacts if required.

8.3 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.

⇒ You can find original manufacturer accessories in chapter 11 and/or in the valid price list.

9 Dismantling



Important Note

The position of the built-in flow velocity sensor is set by default.

In order to maintain the accuracy of the measurement system:

- *do not twist the sensor*

9.1 Venting

An air vent plug is fixed at the air hose on the end which is connected to the compressor (see *Fig. 4-3* und *Fig. 4-6*). This plug is required to release the air from the balloon while dismantling the NPP.



Fig. 9-1 Air vent plug for NPP

9.2 Remove NIVUS Pipe Profiler



Important Note

Two persons are required to deinstall a NIVUS Pipe Profiler. For deinstallation proceed right as careful as for installation.

Procedure:

1. Person 1 climbs into the manhole.
Person 2 stays out of the manhole for safety and support.
Ensure safe footing on the manhole entry.
2. Person 1: Loosen the fastening if compressed air hose, sensor cable and chain are fastened to the step irons in the manhole.



Important Note

Dam-up or blockage within the NPP may induce strong forces which may damage the NPP.

- *Prior to deinstallation use the chain and a tripod to secure the NPP against floating away.*

- Person 1: secure NPP against being washed away. Observe possibly occurring strong tractive forces (e.g. due to water pressure).
- Person 2: push the air vent plug carefully into the coupling valve at the end of the air hose (see Fig. 9-1).

CAUTION



Risk of personal injury

While deflating the balloon the air will escape with a pressure of up to 1.5 bar. This may lead to personal injury.

- *Do not point the compressed air hose at persons!*



Important Note

The dammed-up water will pour out into the shaft once the air escapes from the balloon.

- *Ensure safe footing within the shaft.*

- Person 1: Ensure safe footing in the shaft.
- Person 2: Deflate the balloon.
 - The air will escape slowly from the balloon. The water dammed up behind will push the NPP out of the pipe.

CAUTION



Risk of material damage

Improper handling may damage the NPP or the pipe sensor.

- *Use only the chain to pull the NPP out of the shaft.*
- *Make sure that air hose and sensor cable are free of suspended loads.*

- Pull the NPP on the chain out of the shaft.

10 Disposal

Improper disposal may be harmful to the environment.

Always dispose equipment components and packaging materials according to applicable local regulations on environmental standards for electronic products:



EC WEEE-Directive logo

This symbol indicates that the Directive 2012/19/EG on waste electrical and electronic equipment requirements shall be observed on the disposal of the equipment. The unit contains a buffer battery (Lithium coin cell), which must be disposed separately.

11 Accessories

Safety filling valve

NPP0 BEF SICH 1500

Safety filling valve 1.5 bar for NIVUS Pipe Profiler

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Approvals and certificates



Translation

(1) EC-TYPE EXAMINATION CERTIFICATE

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - **Directive 94/9/EC**



(3) EC-Type Examination Certificate Number

TÜV 03 ATEX 2262

(4) Equipment: Sensor type POA/... resp. OCL/...

(5) Manufacturer: Nivus GmbH

(6) Address: D-75031 Eppingen, Im Täle 2

(7) This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 03 YEX 550797.

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

EN 50 014: 1997

EN 50 020: 2002

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. 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 equipment or protective system must include the following:

II 2 G EEx ib IIB T4

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2003-09-18

Head of the
Certification Body



TÜV CERT A4 04.02 10.000 L6

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

page 1/2



SCHEDULE

(13)

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 03 ATEX 2262**

(15) Description of equipment

The sensor type POA/... resp. OCL/... is intended together with the associated measuring transformers for the measurement of the flow speed and the flow level in partly or fully filled pipes and channels via supersonic technology.

Electrical data

Signal and supply circuit
(plug/prefabricated cable)

in type of protection Intrinsic Safety EEx ib IIB
only for the connection to associated measuring
transducer type OCP/... according to TÜV 00 ATEX 1572

Maximum values: $U_i = 10.5 \text{ V}$
 $I_i = 500 \text{ mA}$

or

type PCP/... according to TÜV 03 ATEX 2268
Maximum values: $U_i = 9.9 \text{ V}$
 $I_i = 640 \text{ mA}$

The effective internal inductance and capacitance are negligibly small.

(16) Test documents are listed in the test report No.: 03 YEX 550797.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones



Translation

1. SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 03 ATEX 2262

of the company: NIVUS GmbH
Im Täle 2
D-75031 Eppingen

In the future, the sensors type POA/... resp. OCL/... may also be manufactured and operated according to the test documents listed in the test report.

The amendments concern the electrical data.

Electrical data

Signal- and supply circuit
(plug/prefabricated cable)

in type of protection Intrinsic Safety EEx ib IIB
only for the connection to associated measuring
transducer type OCP/... according to TÜV 00 ATEX 1572
Maximum values: $U_i = 10,5 \text{ V}$
 $I_i = 640 \text{ mA}$

or

type PCP/... according to TÜV 03 ATEX 2268
Maximum values: $U_i = 9,9 \text{ V}$
 $I_i = 629 \text{ mA}$

The effective internal inductance and capacitance are
negligibly small.

All other data apply unchanged for this amendment.

Test documents are listed in the test report N° 04 YEX 551201.

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hannover, 2004-01-30

Head of the
Certification Body

Translation
2. SUPPLEMENT

to Certificate No.	TÜV 03 ATEX 2262
Equipment:	Sensors types POA-x2xx xx E xx x x, OCL-L1 x x xx E xx K and CS2-xxxx xx E xx x x
Manufacturer:	NIVUS GmbH
Address:	Im Täle 2 75031 Eppingen, Germany
Order number:	8000555804
Date of issue:	2010-06-21

In the future, the sensors type POA/... resp. OCL/... may be produced and operated according to the documents listed in the test report.

The changes refer to

- the execution of the sensor electronics for the new sensor types
- a new dual sensor with type designation CS2-xxxx xx E xx x x in an new sensor housing with 4 ultrasonic transducers
- the changes of the origin type designations: POA-x2xx xx E xx x x and OCL-L1 x x xx E xx K
- a new RS485 interface with data for the protection level ib
- the marking.

The new marking reads: II 2 G Ex ib IIB T4

The permissible ambient temperature range of the sensors is -20 °C ... 40 °C.

Electrical data

Signal- and supply circuit (Plug in connector/cable tail connection wires: red: + blue: GND)	in type of protection Intrinsic Safety Ex ib IIB only for connection to a certified intrinsically safe circuit maximum values: $U_i = 10.5 \text{ V}$ $I_i = 640 \text{ mA}$ The connection to the following measuring transducers is permissible: type OCP/... according to TÜV 00 ATEX 1572 or type PCP/... according to TÜV 03 ATEX 2268 The effective internal capacitance and inductance of the electronics are negligibly small.
--	---

RS485 interface (Plug in connector/cable tail connection wires: white: RxTx+ green: RxTx- blue: GND)	in type of protection Intrinsic Safety Ex ib IIB maximum values: $U_o = 6 \text{ V}$ $I_o = 154 \text{ mA}$ $P_o = 230 \text{ mW}$ characteristic line: linear The effective internal capacitance and inductance of the electronics are negligibly small.
---	--

2. Supplement to Certificate No. TÜV 03 ATEX 2262

Ex ib	IIB	
max. permissible external inductance	9.5 mH	1 mH
max. permissible external capacitance	5.1 μ F	13 μ F

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

maximum values:

$$U_i = 12.06 \text{ V}$$

$$I_i = 176 \text{ mA}$$

The equipment according to this supplement meets the requirements of these standards:

EN 60079-0:2006

EN 60079-11:2007

(16) The test documents are listed in the test report No. 10 203 555804.

(17) Special conditions for safe use

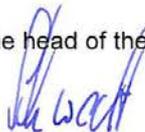
none

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, accredited 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 certification body



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

Translation
3. SUPPLEMENT

to Certificate No.	TÜV 03 ATEX 2262
Equipment:	Sensors types POA-xxxx xx E xx x x, OCL-L1 x x xx E xx K and Vector Profiler CS2-xxxx xx E xx x x
Manufacturer:	NIVUS GmbH
Address:	Im Täle 2 75031 Eppingen, Germany
Order number:	8000398817
Date of issue:	2012-03-27

In the future, the sensors type POA-... bzw. OCL-... bzw. CS2-... may be produced and operated according to the documents listed in the test report.

The changes refer to

- the execution of the sensor electronics,
- a new sensor of the generation „Vector Profiler“ type CS2-xxxx Rx E xx x x,
- a new sensor type POA-xxxx Rx E xx x x
- new key sensor bodies for the sensors POA-... and
- the marking.

The new marking reads: II 2 G Ex ib IIB T4 Gb

The electrical data as well as all other details remain unchanged.

The equipment according to this supplement meets the requirements of these standards:

EN 60079-0:2009 EN 60079-11:2007

(16) The test documents are listed in the test report no. 12 203 087811.

(17) Special conditions for safe use

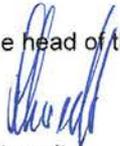
none

(18) Essential Health and Safety Requirements

no additional ones

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



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

Translation
4. SUPPLEMENT

<p>to Certificate No. Equipment:</p> <p>Manufacturer: Address:</p> <p>Order number: Date of issue:</p>	<p>TÜV 03 ATEX 2262 Sensors types POA-x2xx xx E xx x x, OCL-L1 x x xx E xx K and CS2-xxxx xx E xx x x NIVUS GmbH Im Täle 2 75031 Eppingen 8000442088 2015-06-11</p>
---	--

In the future, the sensors types

POA-x2xx xx E xx x x
 OCL-L1 x x xx E xx K and
 CS2-xxxx xx E xx x x

may also be manufactured and operated according to the documents listed in the test report.
 The changes refer to

- changes in the layout and regarding components,
- constructional changes at the housings and
- the electrical data.

A standard update was performed.

Electrical data

<p>Signal and supply circuit (Cable tail; connection wires: red [+], blue [GND]</p>	<p>in type of protection Intrinsic Safety Ex ib IIB only for connection to a certified intrinsically safe circuit Maximum values: $U_i = 10.5 \text{ V}$ $I_i = 640 \text{ mA}$ $P_i = 6.72 \text{ W}$ The connection to the following measuring transducers is permissible: type OCP-... according to TÜV 00 ATEX 1572 or type PCP-E... according to TÜV 03 ATEX 2268 or type IXT0-... according to TÜV 14 ATEX 142076 The effective internal capacitance and inductance of the electronics are negligibly small.</p>
--	---

<p>RS485 interface (Cable tail; connection wires: white: RxTx+ green: RxTx- blue: GND)</p>	<p>in type of protection Intrinsic Safety Ex ib IIB maximum values: $U_o = 6 \text{ V}$ $I_o = 81.9 \text{ mA}$ (long time; for calculation of P_o) $I_o = 154 \text{ mA}$ (short time; for calculation of L_o, C_o) $P_o = 123 \text{ mW}$ characteristic line: linear The effective internal capacitance and inductance of the electronics are negligibly small.</p>
---	--

4. Supplement to Certificate No. TÜV 03 ATEX 2262

Ex ib	IIB	
max. permissible external inductance	9.5 mH	1 mH
max. permissible external capacitance	5.1 μ F	13 μ F

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

maximum values:

$$U_i = 12.06 \text{ V}$$

$$I_i = 176 \text{ mA}$$

$$P_i = 531 \text{ mW}$$

All other data apply unchanged.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2012

EN 60079-11:2012

(16) The test documents are listed in the test report No. 15 203 123378.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

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



Meyer

Hanover office, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590



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 15.0014** issue No.:1
Status: **Current**
Date of Issue: **2015-07-24** Page 1 of 4
Applicant: **NIVUS GmbH**
Im Tale 2
75031 Eppingen
Germany
Electrical Apparatus: **Sensors type POA-..., OCL-L1... and CS2-... (see below)**
Optional accessory:
Type of Protection: **Intrinsic safety**
Marking: **Ex ib IIB T4 Gb**
Approved for issue on behalf of the IECEx Certification Body: **Andreas Meyer**
Position: **Head of IECEx Certification Body**
Signature:
(for printed version)
Date: **2015-07-24**

Certificate history:
Issue No. 1 (2015-7-24)
Issue No. 0 (2015-6-11)

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 15.0014
Date of Issue: 2015-07-24 Issue No.: 1
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 electrical 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 Explosive atmospheres - Part 0: General requirements
Edition: 6.0
IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I"
Edition: 6.0

*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/ExTR15.0032/00

Quality Assessment Report:
DE/TUN/QAR13.0011/01



IECEX Certificate of Conformity

Certificate No.: IECEx TUN 15.0014

Date of Issue: 2015-07-24

Issue No.: 1

Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

Together with the associated measuring transformers the sensors type

POA-x2xx xx E xx x x

OCL-L1 x x xx E xx K and

CS2-xxxx xx E xx x x

are intended for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via supersonic technology.

The permissible ambient temperature range of the sensors is -20 °C ... 40 °C.

See annexe for further information

CONDITIONS OF CERTIFICATION: NO



IECEx Certificate of Conformity

Certificate No.: IECEx TUN 15.0014

Date of Issue: 2015-07-24

Issue No.: 1

Page 4 of 4

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

Purpose of this issue no. 1 was to correct a fault on page 1.
The correct marking is:
Ex ib IIB T4 Gb
No other changes were done.

Annex: Annexe_COC_POA_OCL_CS2.pdf

Translation

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

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**



(3) **Certificate Number** TÜV 12 ATEX 087812

(4) for the equipment: System sensor family Mini

(5) of the manufacturer: NIVUS GmbH

(6) Address: Im Täle 2
75031 Eppingen
Germany

Order number: 8000391048

Date of issue: 2012-02-17

(7) The design of this equipment or protective system and any acceptable variation thereto are specified in the schedule to this EC-Type-Examination Certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 12 203 087812.

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

EN 60079-0:2009

EN 60079-11:2007

If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

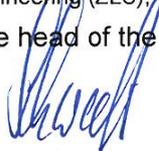
(10) This EC-type-examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:

 **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



Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

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Excerpts or changes shall be allowed by the TÜV NORD CERT GmbH

(13) **SCHEDULE**

(14) **EC-Type-Examination Certificate No. TÜV 12 ATEX 087812**

(15) Description of equipment

In conjunction with the belonging measuring transducers, 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,
- Correlation sensor Mini type CSM and
- Distance sensor Mini type DSM or filling level sensor type OCL-LM

The permissible ambient temperature range of the system is -20 °C ... 40 °C.

Electrical data

Signal and supply circuit in type of protection Intrinsic Safety Ex ib IIB
 (Connection wires (pig tail): only for connection to a certified intrinsically safe circuit
 red [+], blue [GND] Maximum values:
 $U_i = 10.5 \text{ V}$
 $I_i = 640 \text{ mA}$
 The connection to the following measuring transducers is permissible:
 type OCP-... according to TÜV 00 ATEX 1572 or
 type PCP-E... according to TÜV 03 ATEX 2268
 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 in type of protection Intrinsic Safety Ex ib IIB
 (Connection wires (pig tail):
 white [RxTx+]
 green [RxTx-]
 blue: GND) Maximum values:
 $U_o = 6 \text{ V}$
 $I_o = 154 \text{ mA}$
 $P_o = 230 \text{ mW}$
 Characteristic line: linear
 The effective internal capacitance and inductance of the electronics are negligibly small.

	Ex ib	IIB
max. permissible external inductance	9.5 mH	1 mH
max. permissible external capacitance	5.1 µF	13 µF

Schedule EC-Type Examination Certificate No. TÜV 12 ATEX 087812

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:

$$U_i = 12.06 \text{ V}$$

$$I_i = 176 \text{ mA}$$

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

- Correlation sensor Mini type CSM and
- Distance sensor Mini type DSM (or filling level sensor type OCL-LM)

via a cable of the manufacturer with a length of 10 m is permissible.

(16) The test documents are listed in the test report No. 12 203 087812

(17) Special conditions for safe use

None

(18) Essential Health and Safety Requirements

no additional ones

Translation
1. SUPPLEMENT

to Certificate No.	TÜV 12 ATEX 087812
Equipment:	System sensor family Mini
Manufacturer:	NIVUS GmbH
Address:	Im Täle 2 75031 Eppingen
Order number:	8000426406
Date of issue:	2014-04-30

In the future, the "System sensor family Mini" may also be manufactured and operated according to the documents listed in the test report.

The changes refer to

- a new sensor type CSM-V1D0 with integrated pressure sensor and,
- the electrical data.

A standard update was performed.

Electrical data

Signal and supply circuit in type of protection Intrinsic Safety Ex ib IIB
 (Connection wires (pig tail): only for connection to a certified intrinsically safe circuit
 red [+], blue [GND] Maximum values:
 $U_i = 10.5 \text{ V}$
 $I_i = 640 \text{ mA}$
 $P_i = 6.72 \text{ W}$
 The connection to the following measuring transducers is permissible:
 type OCP-... according to TÜV 00 ATEX 1572 or
 type PCP-E... according to TÜV 03 ATEX 2268
 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 in type of protection Intrinsic Safety Ex ib IIB
 (Connection wires (pig tail):
 white [RxTx+]
 green [RxTx-]
 blue: GND) Maximum values:
 $U_o = 6 \text{ V}$
 $I_o = 81.9 \text{ mA}$
 Angle current: 50 mA
 Angle voltage: 4 V
 $P_o = 200 \text{ mW}$
 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

1. Supplement to Certificate No. TÜV 12 ATEX 087812

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:

$$U_i = 12.06 \text{ V}$$

$$I_i = 176 \text{ mA}$$

$$P_i = 531 \text{ mW}$$

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

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

via a cable of the manufacturer with a length of 15 m is permissible.

All other data apply unchanged for this supplement.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2012

EN 60079-11:2012

(16) The test documents are listed in the test report No. 14 203 129937.

(17) Special conditions for safe use

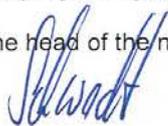
none

(18) Essential Health and Safety Requirements

no additional ones

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



Schwedt

Hanover office, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

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:

 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


Rodér

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

(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) in type of protection Intrinsic Safety Ex ib IIB
(Connection wires (pig tail): only for connection to a certified intrinsically safe circuit
red [+], blue [GND])

Maximum values:

$U_i = 10.5 \text{ V}$

$I_i = 640 \text{ mA}$

$P_i = 6.72 \text{ W}$

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.

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:
 $U_o = 6 \text{ V}$
 $I_o = 81.9 \text{ mA}$
 Angle current: 50 mA
 Angle voltage: 4 V
 $P_o = 200 \text{ mW}$
 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:
 $U_i = 12.06 \text{ V}$
 $I_i = 176 \text{ mA}$
 $P_i = 531 \text{ mW}$

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
 $C_i = 11 \text{ nF}$
 $L_i = 12 \mu\text{H}$

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
 $U_i = 6 \text{ V}$
 $I_i = 188 \text{ mA}$
 $P_i = 282 \text{ mW}$
 $C_i = 120 \text{ nF}$
 The effective internal inductance is negligibly small.

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

Pressure cell in type of protection Intrinsic Safety Ex ib IIB
(Connector Pins E, G, H and J) Only for connection to an intrinsically safe circuit
 $U_i = 6 \text{ V}$
 $I_i = 264 \text{ mA}$
 $P_i = 396 \text{ mW}$
 $C_i = 20.15 \mu\text{F}$
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 -



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 Töle 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, 30619 Hannover
Germany





IECEX Certificate of Conformity

Certificate No: IECEX TUN 18.0023

Issue No: 1

Date of Issue: 2019-06-10

Page 2 of 4

Manufacturer: NIVUS GmbH
Im Täl 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:5.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:5.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety 'T'

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: 2019-06-10

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: 2019-05-10

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](#)

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: $U_i = 10.5 \text{ V}$ $I_i = 640 \text{ mA}$ $P_i = 6.72 \text{ W}$ 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: $U_o = 6 \text{ V}$ $I_o = 81.9 \text{ mA}$ Angle current: 50 mA Angle voltage: 4 V $P_o = 200 \text{ mW}$ 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:
 $U_i = 12.06 \text{ V}$
 $I_i = 176 \text{ mA}$
 $P_i = 531 \text{ mW}$

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
 $C_i = 11 \text{ nF}$
 $L_i = 12 \text{ µH}$

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
 $U_i = 6 \text{ V}$
 $I_i = 188 \text{ mA}$
 $P_i = 282 \text{ mW}$
 $C_i = 120 \text{ nF}$
The effective internal inductance is negligibly small.

Pressure cell in type of protection Intrinsic Safety Ex ib IIB
(Connector Pins E, G, H and J) Only for connection to an intrinsically safe circuit
 $U_i = 6 \text{ V}$
 $I_i = 264 \text{ mA}$
 $P_i = 396 \text{ mW}$
 $C_i = 20.15 \text{ µF}$
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-

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Täle 2
75031 Eppingen

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

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	"Ex" Ultraschallsensoren CSM / CSP / DSM / OCL-LM
<i>Description:</i>	<i>"Ex" ultrasonic sensors</i>
<i>Désignation:</i>	<i>"Ex" capteurs ultrasoniques</i>
Typ / Type:	CSM-V100KxE... / CSM-V1D0KxE... / CSM-V100RxE... / CSP-V2xxxxE... / DSM-L0xxxxE... / OCL-LMxxxxE...

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* :

 II 2G Ex ib IIB T4 Gb

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

TÜV 12 ATEX 087812 ISSUE: 00

Notifizierte Stelle (Kennnummer) / *Notified Body (Identif. No.)* / *Organisme notifié (N° 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 Täle 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*

EU Konformitätserklärung*EU Declaration of Conformity**Déclaration de conformité UE*

NIVUS GmbH
 Im Täle 2
 75031 Eppingen

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

Für das folgend bezeichnete Erzeugnis:

For the following product:

Le produit désigné ci-dessous:

Bezeichnung:	Ultraschall-Aktivsensoren POA / OCL / CS2
<i>Description:</i>	<i>Ultrasonic active sensors</i>
<i>Désignation:</i>	<i>Capteurs actifs ultrasoniques</i>
Typ / Type:	POA-... / OCL-... / CS2-...

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

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

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

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

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

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

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

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:

This declaration is submitted on behalf of the manufacturer:

Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Täle 2
75031 Eppingen
Allemagne

abgegeben durch / *represented by / faite par:*

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

Eppingen, den 20.04.2016

Gez. Marcus Fischer

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

NIVUS GmbH
Im Taele 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:	“Ex“ Ultraschall-Aktivsensoren POA / OCL / CS2
<i>Description:</i>	<i>“Ex“ Ultrasonic active sensors</i>
<i>Désignation:</i>	<i>“Ex“ capteurs actifs ultrasoniques</i>
Typ / Type:	POA-x2xxxxE... / OCL-L1xxxxE... / CS2-xxxxxxE...

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* :

 II 2G Ex ib IIB T4 Gb

EG-Baumusterprüfbescheinigung / *EC-Type Examination Certificate / Attestation d'examen «CE» de type:*

TÜV 03 ATEX 2262 (4. Ergänzung)

Notifizierte Stelle (Kennnummer) / *Notified Body (Identif. No.) / Organisme notifié (N° 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 26.07.2017

Gez. *Marcus Fischer*