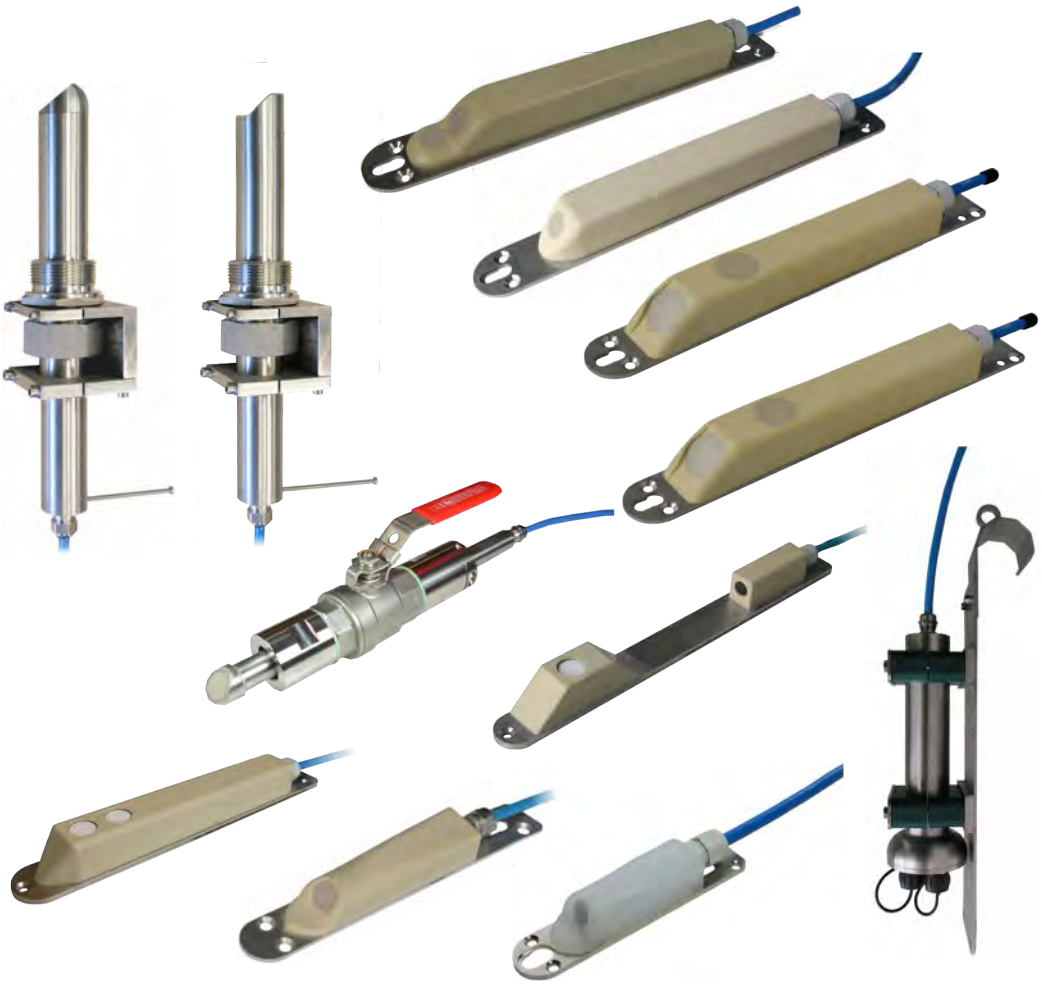
Technical Description for
Correlation Sensors and external Electronic Box



Revised Manual

Document Revision 12 / 04.08.2025

Original Instruction Manual: German, Rev. 12 / 31.08.2025

Always use the Technical Description as a unit with the Installation Instructions for Cross-Correlation and Doppler Sensors

measure analyse optimise

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Should the translated text be unclear, the original instruction manual (German) must be consulted or a member company of the NIVUS-Group must be contacted for clarification.

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Revision History

Rev.	Modifications		Editor	Date
12	EBM-V3L1 integrated into Chapters "*4.4.1 Type Key Sensor CSM*", "*4.4.2 Type Key Sensor DSM*", "*4.4.3 Type Key Electronic Box EBM*", "*4.4.7 Type Key Sensor CSP*", "*5.3.1 Sensors CSM and CSP*" and "*10 Certificates and Approvals*"; Title picture modified; Chap. "*2.4 Ex Protection*" updated; Chap. *„4.2.5 EBM Electronic Box“*: picture updated; Chap. *„4.2.6 Sensor POA-….K“*: picture updated; Chap. *„4.2.9 Sensor CS2-….K“*: pictures updated; Chap. *„4.5.8 Sensor CS2“*: Minimum filling level modified, 10 cm instead of 8 cm; In generell: NFP, PCM Pro and PCM 4 removed		MoG	04.08.2025
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10	NIVUS addresses updated; Sensors POA-V3, CS2-V3 and OCL-L3 incorporated; Chap. "1.1 About this Manual", "1.2 Applicable Documentation", "4 Product Specification", "5.4 Cable Extension" and "Certificates and Approvals" updated; minor changes in wording and layout		MoG	26.08.2024
09	Corrections: Modifications: New Creation:	Chap. 3.1, Fig. 4-7, Fig. 4-11, Chap. 4.3, Chap. 4.5.7, Fig. 6-2, Fig. 6-3, Spelling Corrections Chap. 2.7, Chap. 4.5.3 Chap. 6.6	KG	01.10.2019
08	Complete Revision		KG	08.03.2019

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1 General

1.1 About this Manual

Important

READ CAREFULLY BEFORE USE.

KEEP IN A SAFE PLACE FOR LATER REFERENCE.

This **Technical Description** is for the cross correlation sensors as well as the external Electronic Box and serves their intended use. This instruction manual is oriented exclusively to qualified expert personnel.

The technical description is a supplement to the **Installation Instructions for Cross-Correlation and Doppler Sensors**, which contain all the basic information and procedures for installing the sensors, installation accessories, tools and tips.

Both instructions for the cross correlation sensors must be used as a unit.

Read these instruction manuals carefully and completely prior to installation or connection since they contain 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 a member company of the NIVUS-Group or one of the distributors for further support. The member companies of the NIVUS-Group cannot be held responsible for damage to persons or material due to incorrectly understood information in this instruction.

1.2 Applicable Documentation

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

- Mounting Instruction Cross Correlation and Doppler Sensors
- Instruction Manual for the NivuFlow, NivuFlow Mobile, OCM Pro CF (OCP-S4/M4) transmitters
- Technical Description Ex Separation Module iXT0
- Technical Description Multiplexer MPX
- Mounting Instruction for the RMS Pipe Mounting System
- Instruction Manual for the NIVUS Pipe Profiler (NPP)

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

1.3 Signs and Definitions used

Representation	Meaning	Remarks
	(Action) Step	Execute action steps; should action steps be numbered observe the specified order of the steps
	Cross-reference	Refers to further or more detailed information
	Documentation Reference	Refers to an accompanying documentation
>Text<	Parameter or menu	Indicates a parameter or a menu that is to be selected or is described

Tab. 1 Structural elements within the manual

1.4 Abbreviations used

1.4.1 Colour code for wires and single conductors

The abbreviations of colours for wire and single conductor labelling follow the international colour code according to IEC 60757:

BK	Black	BN	Brown	RD	Red
OG	Orange	YE	Yellow	GN	Green
BU	Blue	VT	Violet	GY	Grey
WH	White	PK	Pink	TQ	Turquoise
GNYE	Green/Yellow	GD	Gold	SR	Silver

1.4.2 Article Names

The following device/subject-related abbreviations are used within the document:

- CSM Cross correlation sensor Mini Sensor Family
- DSM Air-ultrasonic sensor Mini Sensor Family
- EBM Electronic Box for Mini Sensor Family
- POA Cross correlation sensor full and partial filling
- OCL Air-ultrasonic sensor
- CS2 Cross correlation sensor full and partial filling
- CSP Cross correlation sensor full and partial filling
- iXT0 Ex Separation Module
- MPX Multiplexer

2 Safety and Danger Information

2.1 Explanation of used Symbols and Signal Words

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

DANGER

Warning in high degree of risk

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

WARNING

Warning in medium degree of risk

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

CAUTION

Warning for low degree of risk or material damage

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

WARNING

Warning of Electric Current

*Indicates a medium-risk, **imminently** hazardous situation caused by electric shock which will result in death or (serious) injury if not avoided.*

Important Notice

Contains information that needs to be highlighted.
Indicates a potentially harmful situation that may damage the product or something in its environment if not avoided.

Note

Contains tips or information.

2.2 Precautions

When working with the NIVUS equipment, the following safety and precautionary measures must be observed and followed generally and at all times. These warnings and notes are not repeated for each description within the document.

WARNING

Germ Contamination

Due to the frequent use of the sensors in the waste water sector, parts can be contaminated with dangerous germs. Therefore, appropriate precautions must be taken when coming into contact with cables and sensors.

Wear protective clothing

WARNING

Observe Occupational Safety Regulations

Installation, mounting, commissioning and maintenance shall only be carried out by appropriately trained personnel. Before beginning mounting works, compliance with all work safety regulations must always be checked.

Disregarding may lead to personal injury.

WARNING

Do not disable Safety Devices!

It is strictly forbidden to disable the safety devices or to change their mode of operation.

Disregarding may result in personal injury or damage to the system.

WARNING

Check danger due to explosive gases

Before starting assembly, installation and maintenance work, be sure to check that all regulations on safety at work have been observed and that there is no possible risk of explosive gases. Use a gas warner for the check.

When working in the sewer system, make sure that no electrostatic charge can occur:

- *Avoid unnecessary movements to reduce the building-up of static charges.*
- *Discharge any static electricity present on your body before you start installing the sensors.*

Disregarding may result in personal injury or damage to the system.

2.3 Requirements for the Personnel

Installation, commissioning and maintenance may only be carried out by personnel who fulfil the following conditions:

- Qualified personnel with appropriate training
- Authorisation by plant operator

Qualified Personnel

in the sense of these instructions or the warnings on the product itself are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the qualifications appropriate to their job, such as

I. Training and instruction or authorisation to switch circuits and devices/systems on and off, to earth and to label them in accordance with the standards of safety technology.

II. Training or instruction in accordance with safety technology standards in maintenance and use of appropriate safety equipment.

III. First Aid Training

2.4 Ex Protection

CAUTION

The Ex protection expires due to damage

Damage to components may invalidate the explosion protection.

Protect the sensors from shocks, falls or other damage.

The Ex version of the sensors is designed for use in areas with explosive atmospheres of zone 1.

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

Validity of the Ex Approval

The Ex approval is only valid in conjunction with the corresponding marking on the nameplate of the sensor.

The Ex-version of the sensors is matched to the NIVUS transmitters regarding the assessment of intrinsically safe electrical systems according to EN 60079-25.
When using transmitters from other manufacturers, the operator must carry out a system assessment in accordance with EN 60079-25.

The technical data required here for the Ex version of the sensors can be found in the respective EU type examination certificate TÜV 03 ATEX 2262 X or TÜV 12 ATEX 087812.

DANGER

Repair of Ex devices/Ex sensors only by NIVUS or a specialist company authorised by NIVUS

To ensure ex-qualified, fully traceable repairs and their documentation, Ex devices and the associated overall system may only be repaired by qualified NIVUS personnel or by specialist companies authorised by NIVUS.

Damage due to improper repairs can result in serious personal injury and damage to the system. Moreover, the explosion protection may be invalidated.

2.5 Intended Use

Strictly observe and comply with guidelines and requirements

The sensors are intended exclusively for the purpose mentioned below.
Any other use beyond this, any conversion or modification of the sensors without written agreement with the companies of the NIVUS-Group is considered improper use.
The companies of the NIVUS-Group are not liable for any damage resulting from this.

The operator alone bears the risk.

Observe the permissible maximum limit values in Chapter "*4.5 Specifications*".
All cases of use deviating from these limit values are excluded from the liability of NIVUS GmbH.
Any deviating changes must be approved by NIVUS GmbH in writing.

Note

For installation and commissioning observe the following points:

- *Declaration of Conformity*
- *Test certificates of the respective authorities*
- *Applicable national regulations*

The sensors are intended for the following purposes:

Sensor	Measurement	Medium	Area of Use	Connection to Transmitter
OCL-L3	Level	Air	Part filled measurement places	NF7, OCM Pro CF (OCP-S4/M4)
POA-V3	Flow Velocity Level (optional)	Slightly to heavily soiled	Part filled or full channels, pipes, flumes	NF7, OCM Pro CF (OCP-S4/M4)
CS2-V3	Flow Velocity Level (optional)	Slightly to heavily soiled	Part filled or full channels, pipes, flumes with larger shapes	NF7, OCM Pro CF (OCP-S4/M4)

CSP	Flow Velocity Level (optional)	Slightly to heavily soiled	Part filled or full channels, pipes, flumes with larger shapes	NFM750
CSM	Flow Velocity Level (optional)	Slightly to heavily soiled	Part filled or full channels, pipes, flumes with low levels	Without EBM: NFM750; With EBM: NF7
DSM	Level	Air	Pipes with small dimensions	Without EBM: NFM750; With EBM: NF7

Tab. 2 Sensors and their purposes/areas of application

EBM Electronic Box

The EBM Electronic Box is conceived for the connection of CSM and DSM sensors. It contains the remote sensor electronics and is connected to the NivuFlow 750, NivuFlow 7550 or OCM Pro CF (OCP-S4/M4) transmitters.

2.6 Duties of the Operator

Important Notice

In the EEA (European Economic Area), the national transposition of the Framework Directive (89/391/EC) as well as the associated individual directives and, 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, must be observed and complied with. In Germany, the Ordinance on Industrial Safety and Health must be complied with.

Obtain the local operating licence and observe the associated conditions. In addition, you must comply with local legal requirements for the following:

- Safety of personnel (accident prevention regulations)
- Safety of work equipment (protective equipment and maintenance)
- Product Disposal (Waste Management Act)
- Materials Disposal (Waste Management Act)
- Cleaning (Cleaning Agents and Disposal)
- Environmental protection requirements

Connections

As the operator, before activating the measurement system, make sure that the local regulations (e.g. for the electrical connection) have been observed during installation and commissioning.

2.6.1 Keep the Document for future Reference

Keep the Technical Description in a safe place and ensure that it is always available and can be consulted by the user of the product.

2.6.2 Hand over the Document

When selling the sensors, this Technical Description must be handed over with them. The manual is part of the standard delivery.

2.7 Warranty

The sensors and devices were functionally tested prior to shipping. When used for the intended purpose (see Chap. *"2.5 Intended Use"*) and in compliance with the Technical Description, the applicable documents (see Chap. *"1.2 Applicable Documentation"*) and the safety information and instructions contained therein, no functional restrictions are to be expected and flawless operation should be possible.

⇨ Please also refer to the following Chapter *"2.8 Disclaimer"*.

Limitation of Warranty

In case of disregarding the safety notes and instructions in this document, the companies of the NIVUS-Group reserve the right to limit the warranty.

2.8 Disclaimer

The companies of the NIVUS-Group assume no liability

- for consequential damages resulting from **a change** in this document.
  The companies of the NIVUS-Group reserve the right to change the contents of the document including this disclaimer without prior notice.
- for personal injury or damage to property resulting from **failure to comply** with the applicable **regulations**. For connection, commissioning and operation of the devices, all information and higher-level legal regulations of the country (in Germany e.g. the VDE regulations), such as valid Ex regulations as well as the safety and accident prevention regulations applicable to the respective individual case shall be observed.
- for personal injury or damage to property resulting from **improper handling**. For safety and warranty reasons, all work on the equipment that goes beyond the installation and connection-dependent measures may only be carried out by NIVUS personnel or by persons or companies authorised by NIVUS.
- for personal injury or damage to property resulting from the operation of the devices/ sensors in a **technically faulty** condition.
- for personal injury or damage to property resulting from **improper use**.
- for personal injury or damage to property resulting from **failure to observe** the **safety instructions** in this instruction manual.
- for missing or incorrect readings due to **improper installation or faulty parameterisation/programming** and for any consequential damage resulting therefrom.

3 Delivery, Storage and Transport

3.1 Scope of Delivery

The standard delivery of cross correlation sensors includes:

- Cross-correlation sensor and, if necessary, an Electronic Box according to the delivery documents
- This Technical Description (including Declarations of Conformity and approvals) as well as the Installation Instructions for Cross-Correlation and Doppler Sensors.
  These instructions contain all the necessary information and steps for installing and operating the sensor (printed or as a link to the NIVUS download centre).

Check additional accessories according to the order against the delivery note.

3.2 Inspection upon Receipt

Check the delivery for completeness and apparent intactness immediately after receipt. Report any transport damage immediately to the delivering carrier. Also send a written report to NIVUS GmbH in Eppingen.
Incomplete deliveries must be addressed in writing within two weeks to your responsible representative or directly to the head office in Eppingen.

Observe the two-week deadline

Complaints received later will not be recognised.

3.3 Storage

Observe the minimum and maximum values for external conditions such as temperature and humidity according to Chapter *"4.5 Specifications"*.
Protect the sensors from corrosive or organic solvent vapours, radioactive radiation and strong electromagnetic radiation.

3.4 Transport

Protect the sensors from strong impacts, shocks, jolts or vibrations. Transport must be carried out in the original packaging.
Otherwise, the same conditions apply with regard to external influences as for storage (see Chap. *"3.3 Storage"*).

3.5 Return

In the event of a return, send the sensors to NIVUS GmbH in Eppingen carriage paid and in the original packaging.
Items that have not been sufficiently franked will not be accepted.

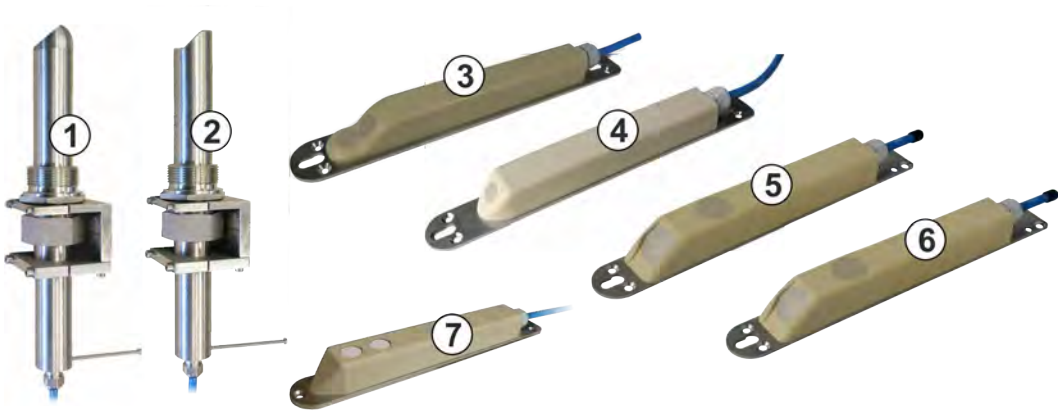
In general, a return note (incl. RMA return number) must be requested from the NIVUS customer service before returning the goods. Without this RMA number, the incoming goods cannot be assigned accordingly.

⇨ See Chap. *"6.8 Customer Service Information"*.

4 Product Specification

4.1 Sensor Overview

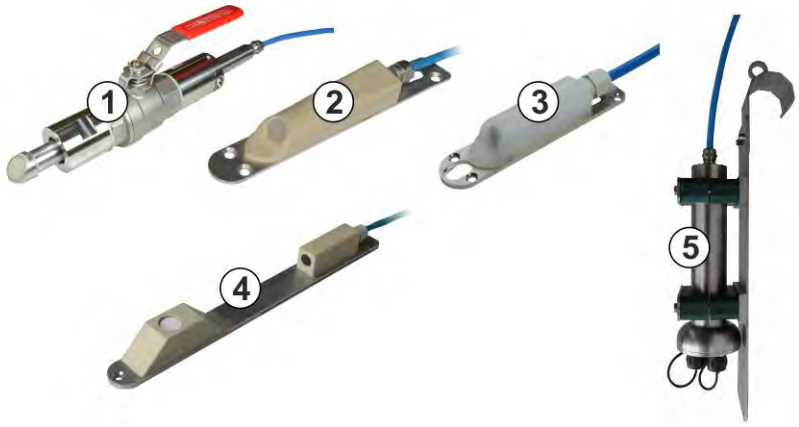
The sensors shown are designed for connection to NIVUS transmitters. You can find an overview of the sensors and suitable transmitters in *Fig. 4-1* and *Fig. 4-2*.



	Sensor	Design	v-Measurement	h-Measurement	NIVUS Transmitter (see also Chap. *"2.5 Intended Use"*)
1	CS2-….R	Pipe sensor	Cross Correlation	-	NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)
2	POA-….R	Pipe sensor	Cross Correlation		NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)
3	POA-VxH1K / POA-VxU1K	Wedge Sensor	Cross Correlation	Water-Ultrasound **or** Pressure Measurement + Water-Ultrasound	NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)
4	POA-Vx00K / POA-VxD0K	Wedge Sensor	Cross Correlation	Without **or** Pressure Measurement	NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)
5	CS2-….K	Wedge Sensor	Cross Correlation	Without **or** Pressure Measurement **or** Water-Ultrasound **or** Pressure Measurement + Water-Ultrasound	NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)
6	CSP	Wedge Sensor	Cross Correlation	Without **or** Pressure Measurement **or** Water-Ultrasound **or** Pressure Measurement + Water-Ultrasound	NivuFlow Mobile 750
7	OCL	Wedge Sensor	-	Air-Ultrasound	NivuFlow 7xx, OCM Pro CF (OCP-S4/M4)

Fig. 4-1 Overview CS2, POA, CSP and OCL Sensors

Sensors from the Mini sensor family may also require the EBM Electronic Box, depending on the transmitter. You will find the relevant information in the following overview.

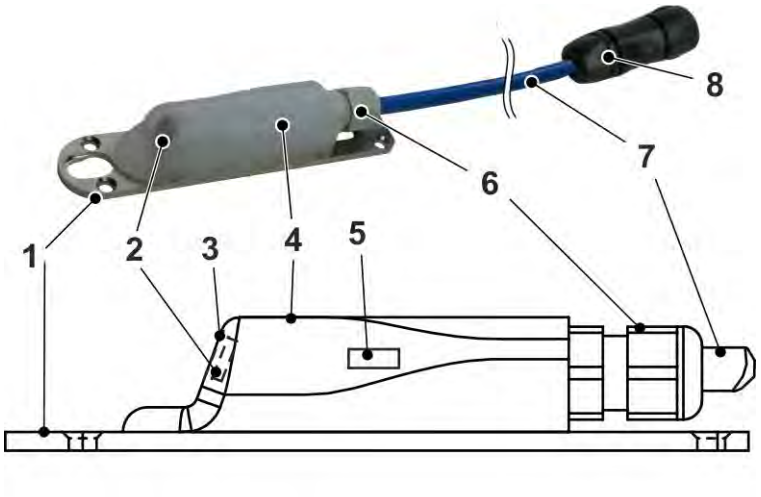


	Sensor/EBM	Design	v-Measure-ment	h-Measure-ment	NIVUS Transmitter	EBM requi-red
1	CSM-V100R7...E	Pipe sensor	Cross Corre-lation	-	NivuFlow 750, OCM Pro CF (OCP-S4/M4)	**X**
	CSM-V100R….R				NivuFlow Mobile 750	-
2	CSM-V1D0K….D	Mini Wedge Sensor	Cross Corre-lation	Pressure Mea-surement	NivuFlow 750, NivuFlow 7550, OCM Pro CF (OCP-S4/M4)	**X**
	CSM-V1D0K….P				NivuFlow Mobile 750	-
3	CSM-V100K….C	Mini Wedge Sensor	Cross Corre-lation	-	NivuFlow 750, NivuFlow 7550, OCM Pro CF (OCP-S4/M4)	**X**
	CSM-V100K….M				NivuFlow Mobile 750	-
4	DSM-L0…….B	Mini Wedge Sensor	-	Air-Ultrasound	NivuFlow 750, NivuFlow 7550, OCM Pro CF (OCP-S4/M4)	**X**
	DSM-L0…….M				NivuFlow Mobile 750	-
5	EBM	Electronic Box				

Fig. 4-2 Overview Mini Sensor Family

4.2 Sensor Structure and Dimensions

4.2.1 Sensor CSM-V100K



1 Mounting Plate/Base Plate
2 Sensor for Flow Velocity Measurement
3 Acoustic coupling layer
4 Sensor body
5 Temperature Sensor
6 Cable gland
7 Sensor cable
8 Plug with Sleeve Nut

Fig. 4-3 Basic Structure Sensor CSM-V100K

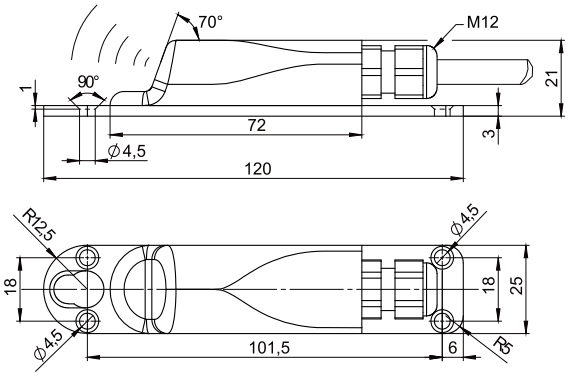
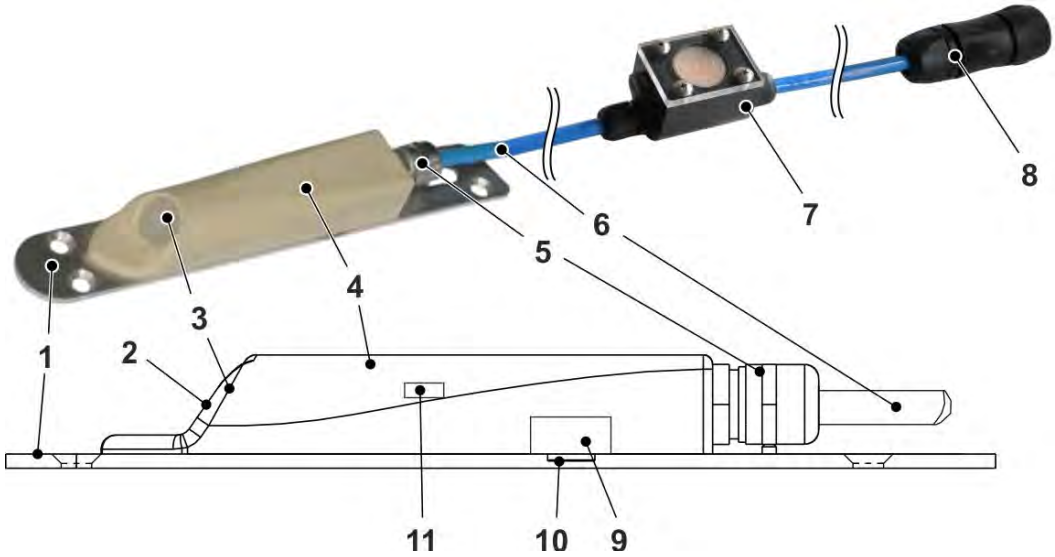


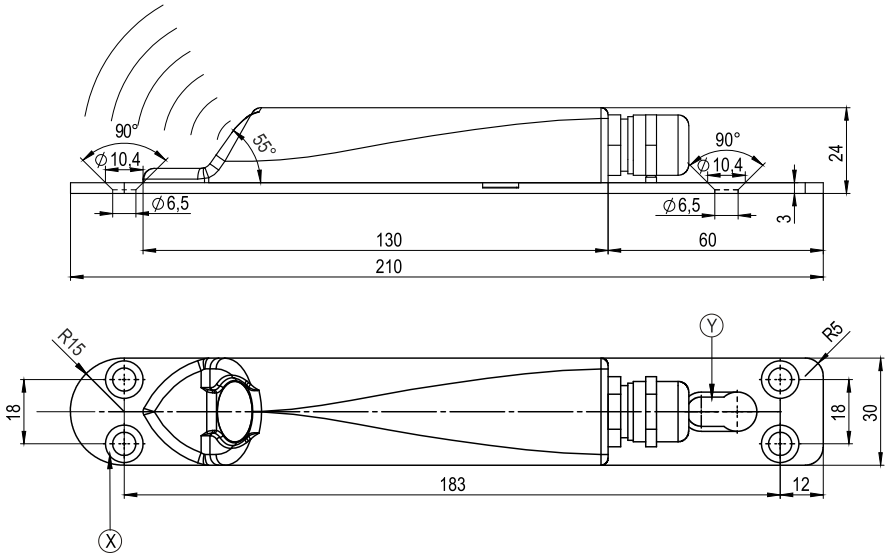
Fig. 4-4 Dimensioned drawing Sensor CSM-V100K

4.2.2 Sensor CSM-V1D0K



1 Mounting Plate/Base Plate
2 Acoustic coupling layer
3 Sensor for Flow Velocity Measurement
4 Sensor body
5 Cable gland
6 Sensor cable
7 Pressure Compensation Element
8 Plug with Sleeve Nut
9 Pressure Measurement Cell
10 Connection duct to pressure measurement
11 Temperature Sensor

Fig. 4-5 Basic Structure Sensor CSM-V1D0K

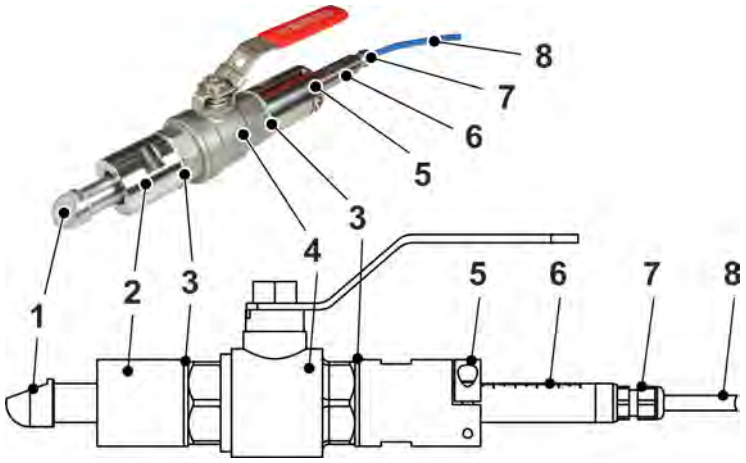


X = 4x countersunk holes with d1 = 6.5 mm for direct fastening

Y = slotted hole for fastening on pipe mounting system

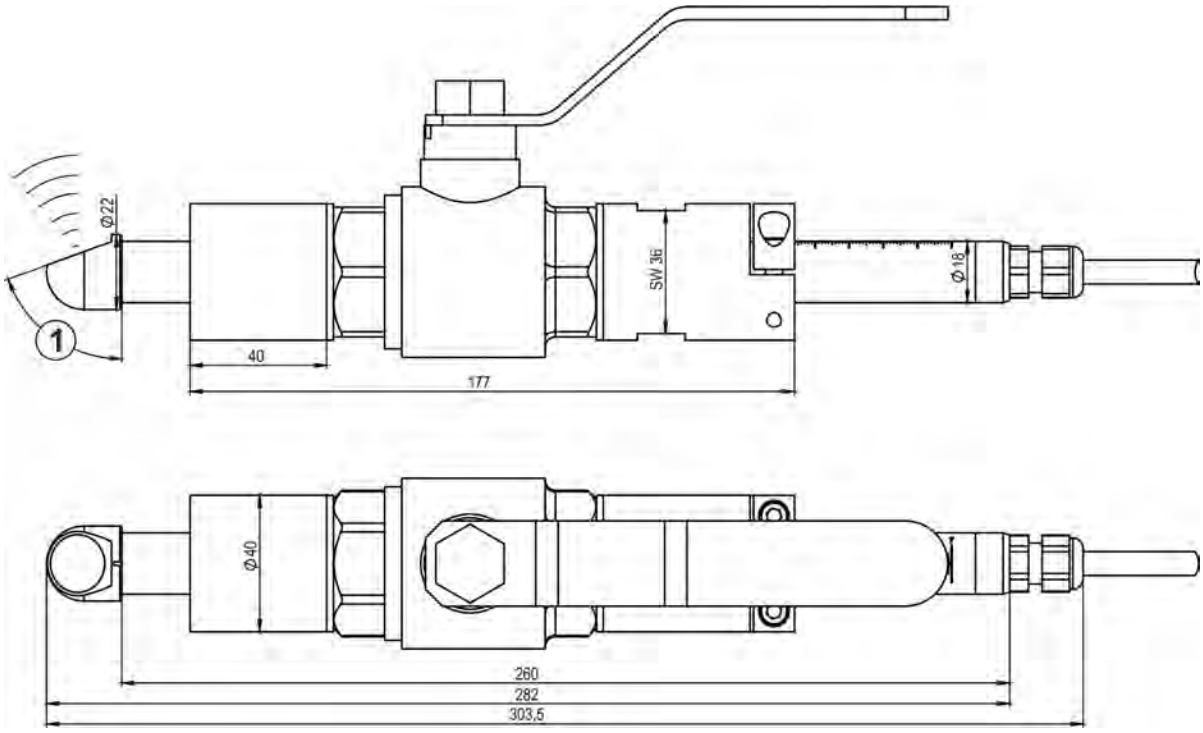
Fig. 4-6 Dimensioned drawing Sensor CSM-V1D0K

4.2.3 Sensor CSM-V100R



1 Sensor for Flow Velocity Measurement
2 Welding Nozzle
3 Flat gasket
4 Stop Ball Valve G1 Inch
5 Sensor clamping
6 Scaling
7 Cable gland
8 Sensor cable

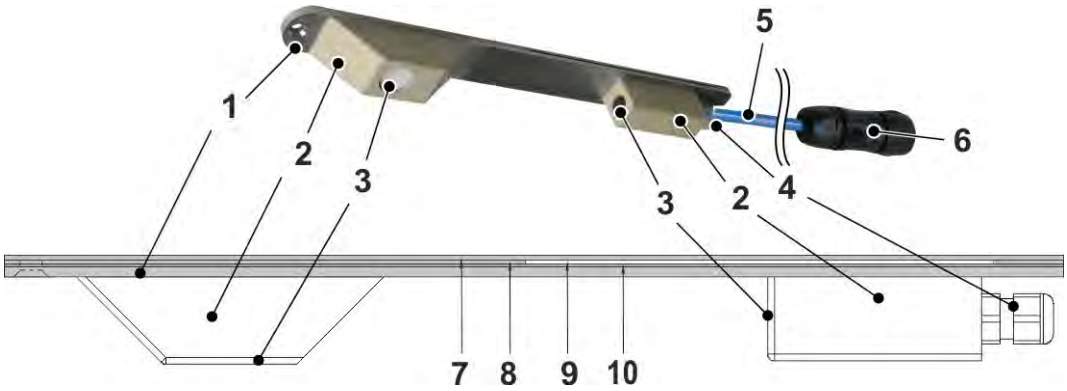
Fig. 4-7 Basic Structure Sensor CSM-V100R



1 VSM-V100R4: 45°
VSM-V100R7: 70°

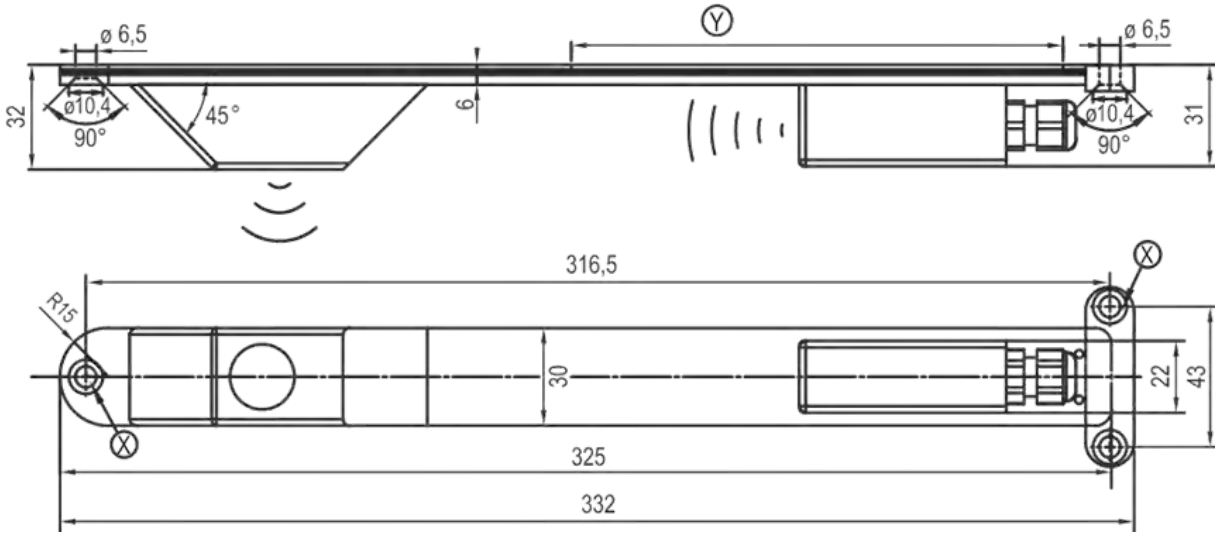
Fig. 4-8 Dimensioned drawing Sensor CSM-V100R

4.2.4 Sensor DSM



1 Base plate
2 Sensor body
3 Sensors for level measurement using air-ultrasound
4 Cable gland
5 Sensor cable
6 Plug with Sleeve Nut
7 Cover sheet
8 Spacer plate short and long
9 Insertion area for the pipe mounting system
10 Intermediate plate

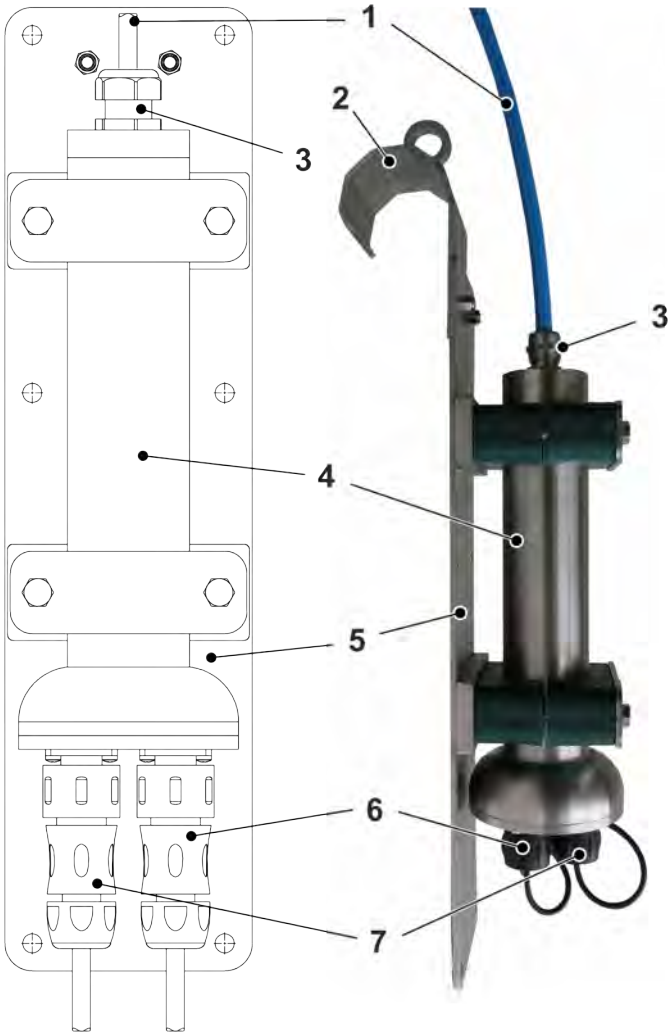
Fig. 4-9 Basic Structure Sensor DSM



X = Mounting shoe and countersink for direct mounting
Y = Insertion area for the pipe mounting sheet

Fig. 4-10 Dimensioned drawing Sensor DSM

4.2.5 EBM Electronic Box



1 Cable to transmitter NivuFlow 750, NivuFlow 7550, OCM Pro CF (OCP-S4/M4)
2 Suspension bracket
3 Cable gland
4 Electronics body
5 Mounting plate
6 Socket for water-ultrasonic sensor, Type CSM
7 Socket for air-ultrasonic sensor, Type DSM

Fig. 4-11 Basic Structure EBM Electronic Box

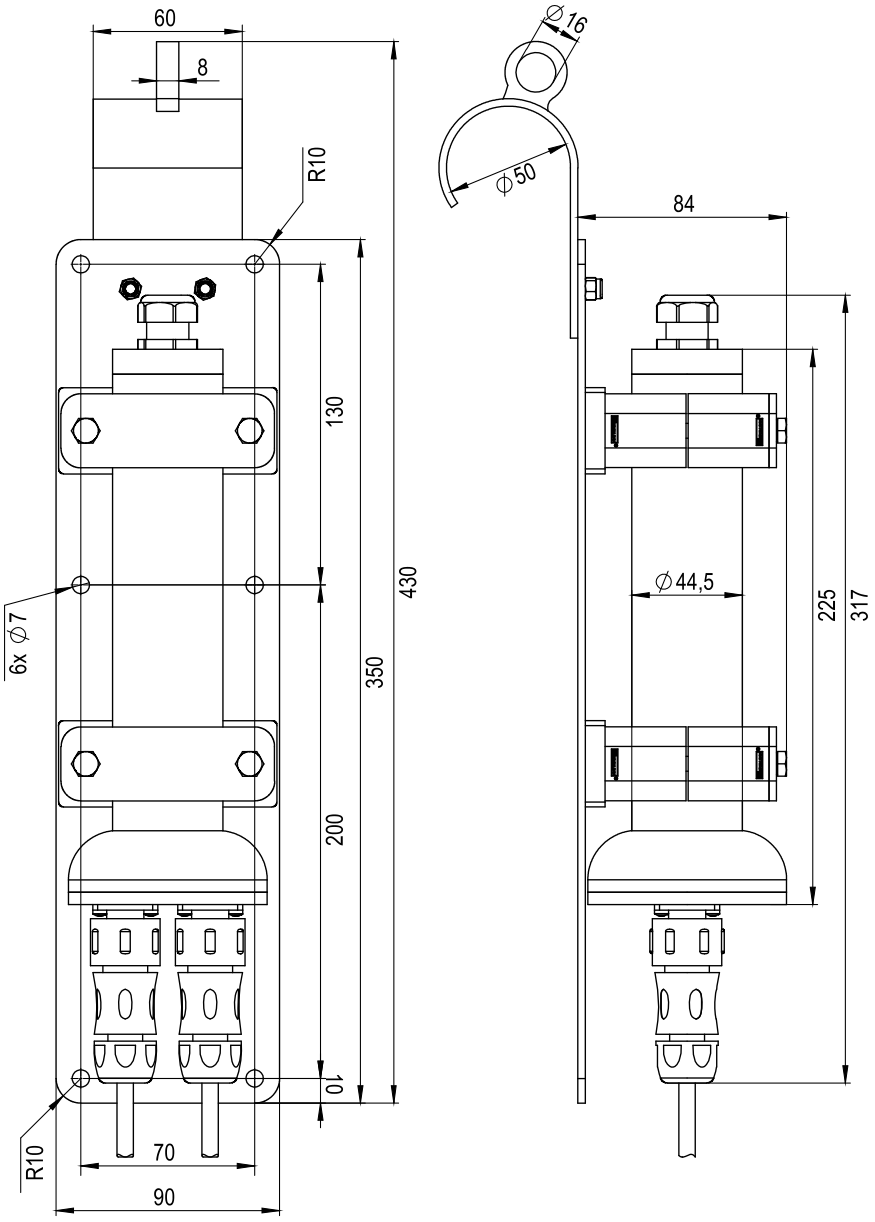
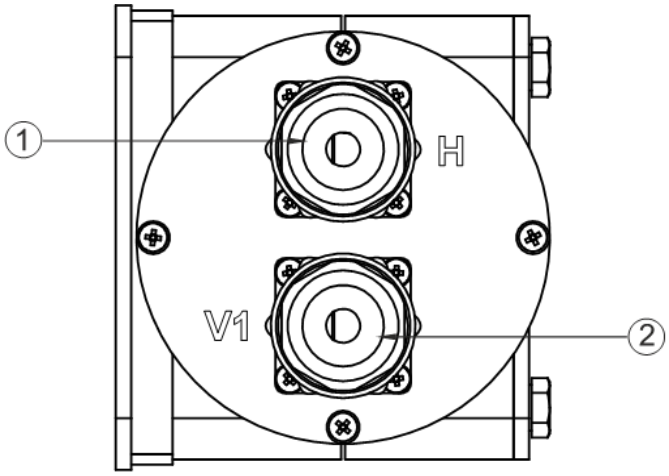


Fig. 4-12 Dimensioned drawing EBM Electronic Box



1 Socket **H** for sensor DSM

2 Socket **V1** for sensor CSM

Fig. 4-13 Overview socket arrangement EBM Electronic Box

Seal unused sockets

The protection class of the entire device is not fulfilled with open sockets.
The device may be damaged if this is not observed.

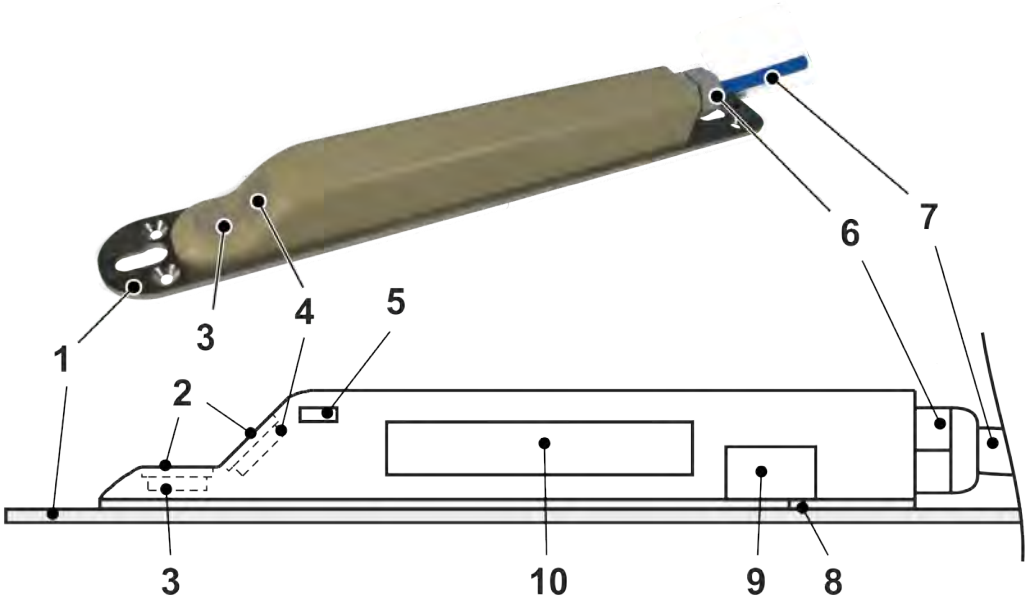
A cover is attached to each socket. Unused sockets must be screwed down before operation. Keep the sockets of the electronics box free of dirt.

➲ **Before sealing the sockets:**

1. Clean the sockets with a lint-free cloth.
2. Seal connection sockets that are not required in a watertight manner.

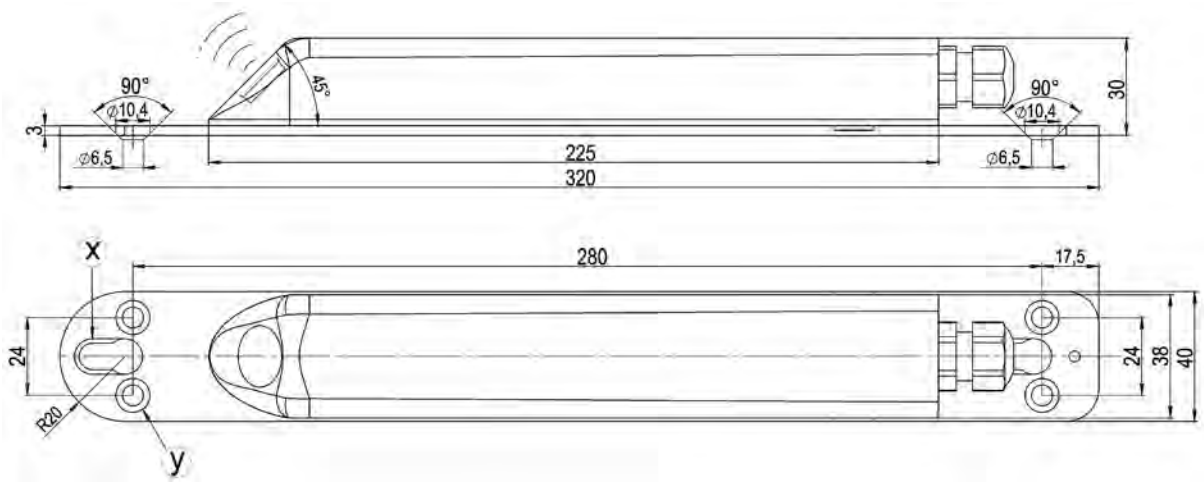
Damaged or possibly lost socket covers can be reordered from NIVUS at a charge.

4.2.6 Sensor POA-….K



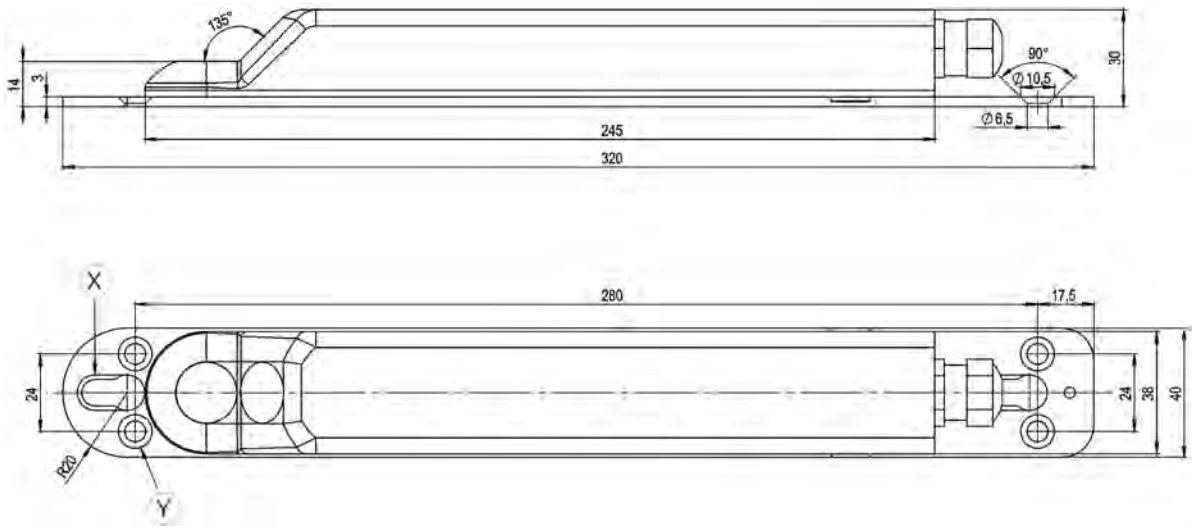
1 Mounting Plate/Base Plate
2 Acoustic coupling layer
3 Sensor for level measurement using water-ultrasound (optional)
4 Sensor for Flow Velocity Measurement
5 Temperature Sensor
6 Cable gland
7 Sensor cable
8 Connection duct to pressure measurement (optional)
9 With pressure measurement cell for level measurement (optional)
10 Electronics

Fig. 4-14 Basic Structure Sensor POA-.... K



X = Slotted holes for fastening on pipe mounting system
Y = 4x countersunk holes with d1 = 6.5 mm for direct fastening

Fig. 4-15 Dimensioned drawing Sensor POA-V300K / POA-V3D0K

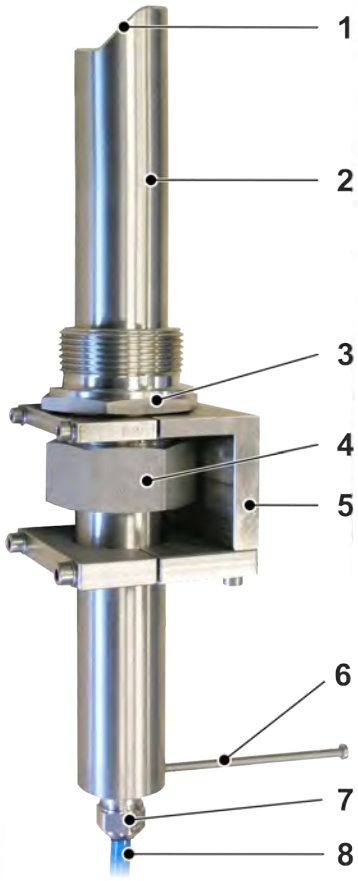


X = Slotted holes for fastening on pipe mounting system

Y = 4x countersunk holes with d1 = 6.5 mm for direct fastening

Fig. 4-16 Dimensioned drawing Sensor POA-V3H1K / POA-V3U1K

4.2.7 Sensor POA-….R



1 Sensor for Flow Velocity Measurement

2 Sensor body

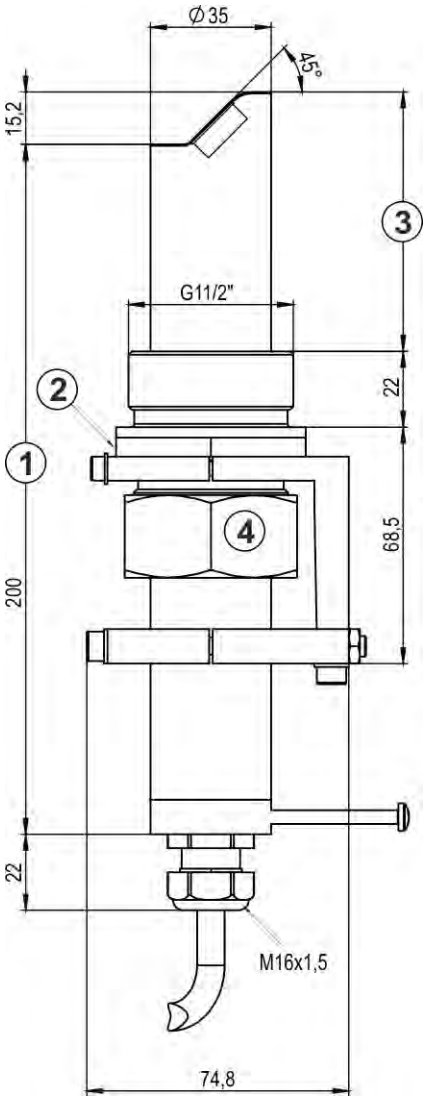
3 Screw thread G1½

4 Sleeve nut SW50

5 Fastening element

6 Screw M4; alignment aid; 180° to flow direction
7 Cable gland
8 Sensor cable

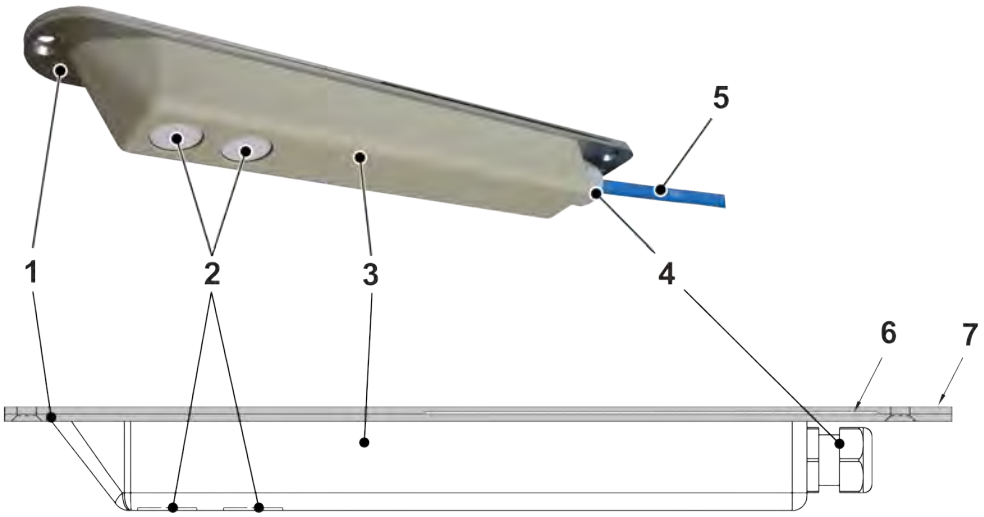
Fig. 4-17 Basic Structure Sensor POA-....R



1 Minimum length 300 mm when using a stop ball valve
2 SW55
3 Movable
4 SW50

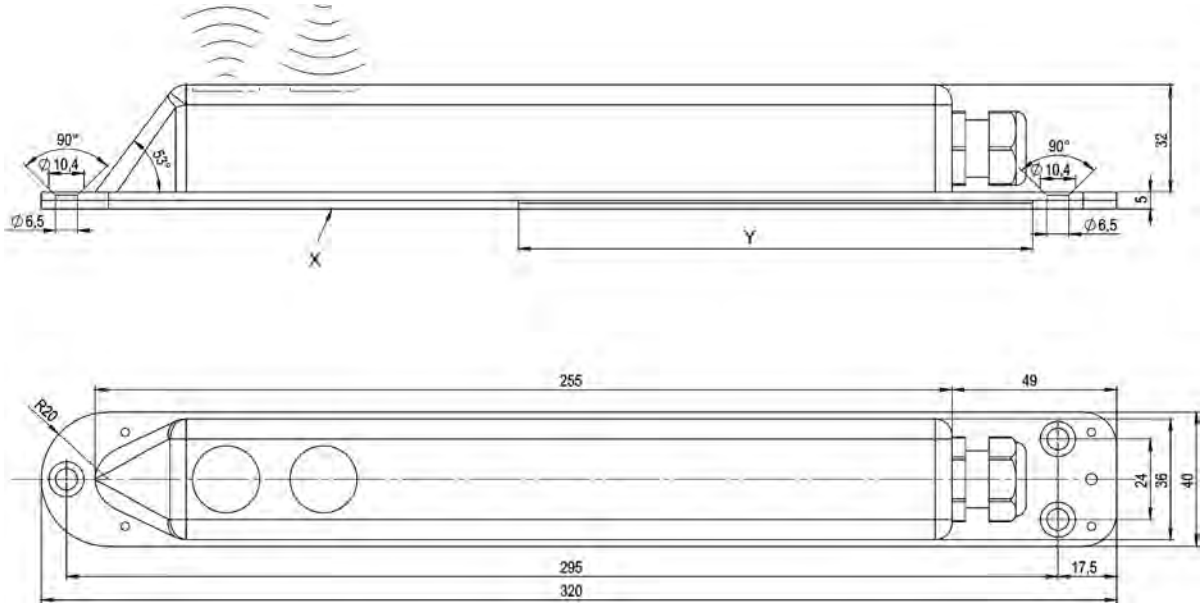
Fig. 4-18 Dimensioned drawing Sensor POA-V300R

4.2.8 Sensor OCL



1 Base plate
2 Sensor for level measurement
3 Sensor body
4 Cable gland
5 Sensor cable
6 Insertion area for pipe mounting system
7 Cover plate (optional for OCL-L3; included in *ZUB0 RMS2*)

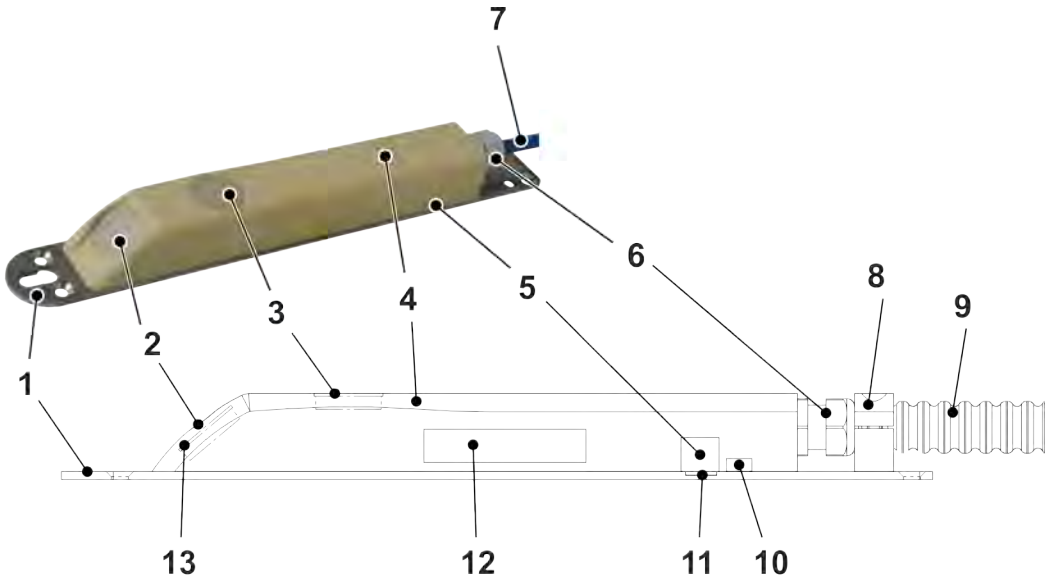
Fig. 4-19 Basic Structure Sensor OCL



X = Cover plate for RMS fastening, optional
Y = Fastening for RMS system

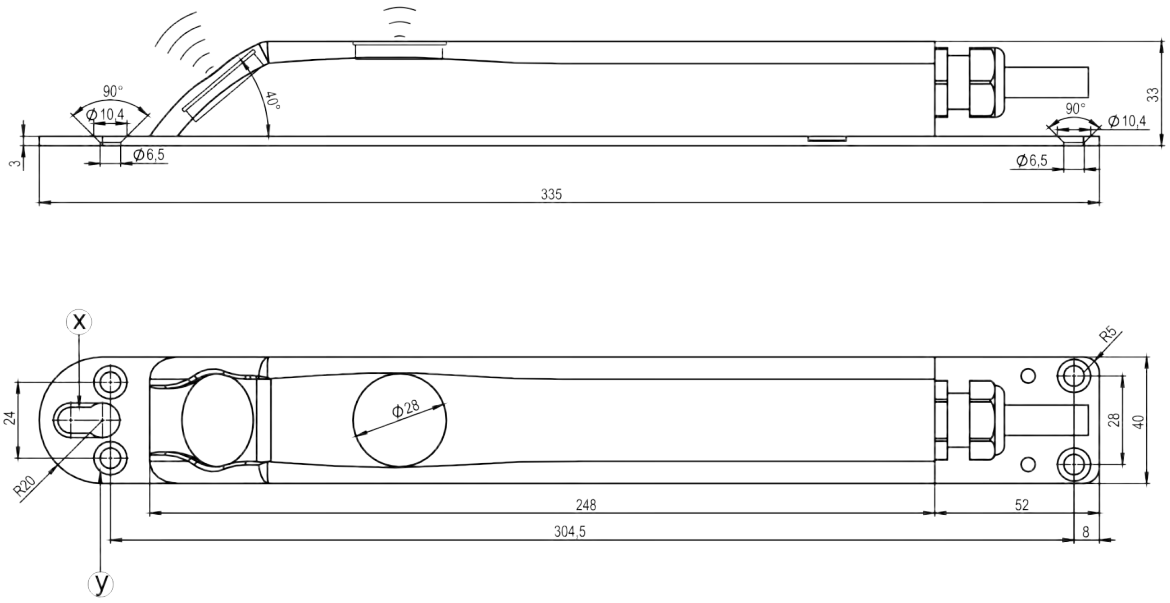
Fig. 4-20 Dimensioned drawing Sensor OCL-L3

4.2.9 Sensor CS2-….K



1	Mounting plate
2	Sensor for Flow Velocity Measurement
3	Sensor for level measurement using water-ultrasound (optional)
4	Sensor body
5	With pressure measurement cell for level measurement (optional)
6	Cable gland
7	Sensor cable
8	Clamp (optional)
9	Cable protection conduit (optional)
10	Temperature sensor (only for sensors without pressure measurement cell)
11	Connection duct to pressure measurement (optional)
12	Electronics
13	Acoustic coupling layer

Fig. 4-21 Basic Structure Sensor CS2-....K

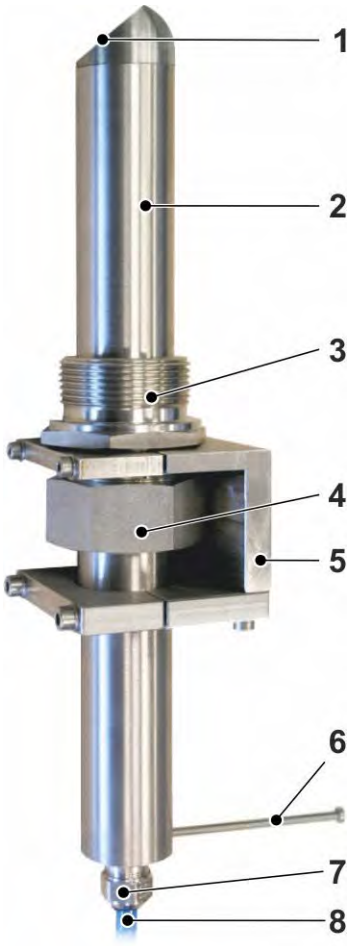


X = Slotted holes for fastening on pipe mounting system

Y = 4x countersunk holes with d1 = 6.5 mm for direct fastening

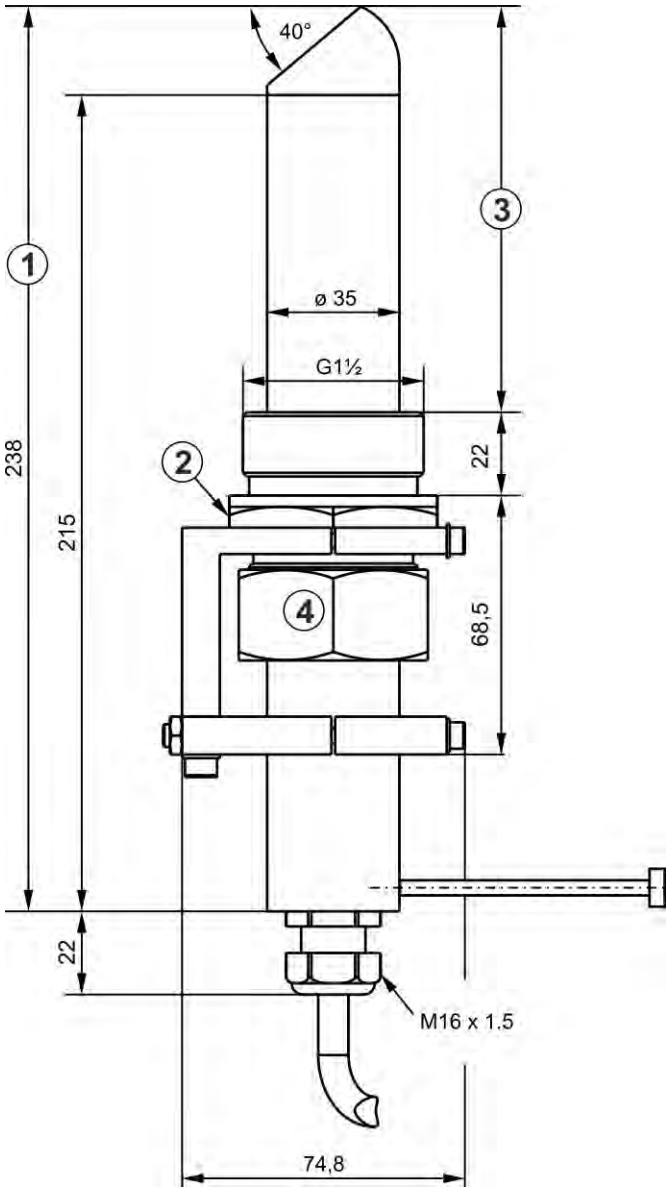
Fig. 4-22 Dimensioned drawing wedge sensor CS2-....K

4.2.10 Sensor CS2-….R



1	Sensor for Flow Velocity Measurement
2	Sensor body
3	Screw thread G1½
4	Sleeve nut SW50
5	Fastening element
6	Screw M4; alignment aid; 180° to flow direction
7	Cable gland
8	Sensor cable

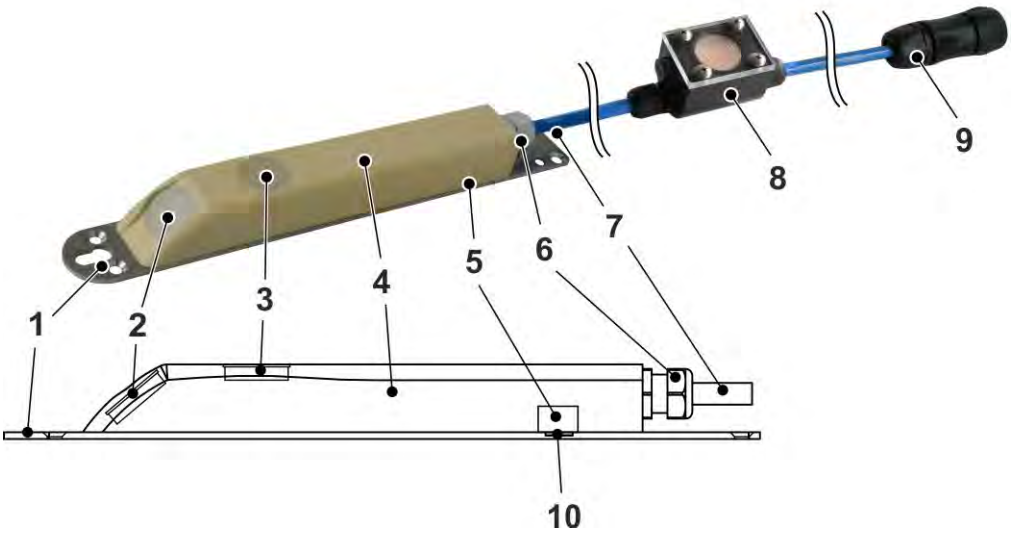
Fig. 4-23 Structure pipe sensor CS2-....R



1 Minimum length 300 mm when using a stop ball valve
2 SW55
3 Movable
4 SW50

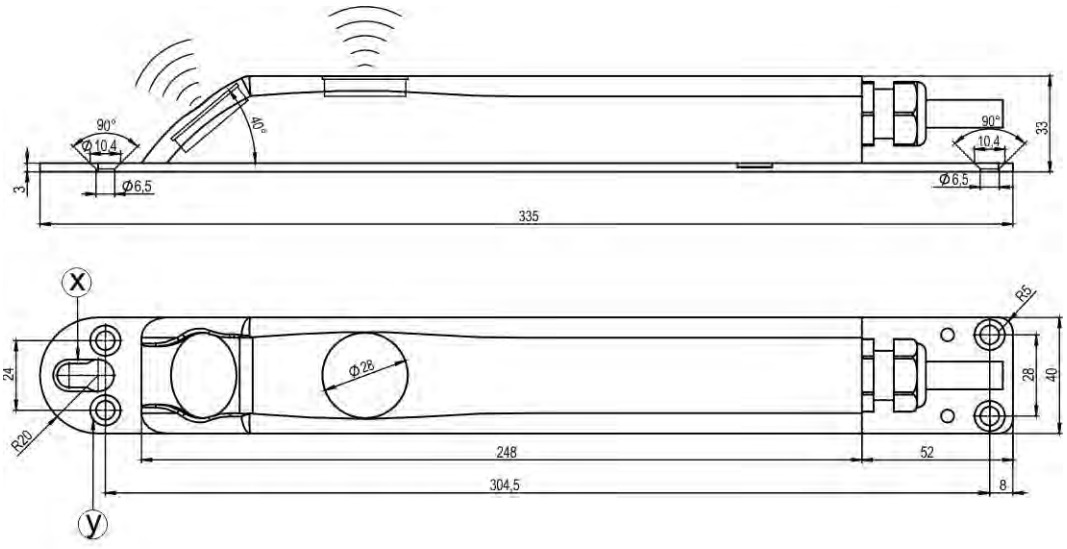
Fig. 4-24 Dimensioned drawing pipe sensor CS2-....R

4.2.11 Sensor CSP



1 Mounting plate
2 Sensor for Flow Velocity Measurement
3 Sensor for level measurement using water-ultrasound (optional)
4 Sensor body
5 With pressure measurement cell for level measurement (optional)
6 Cable gland
7 Sensor cable
8 Pressure compensation element (optional)
9 Plug with sleeve nut
10 Connection duct to pressure measurement (optional)

Fig. 4-25 Basic Structure Sensor CSP



X = Slotted holes for fastening on pipe mounting system
Y = 4x countersunk holes with d1 = 6.5 mm for direct fastening

Fig. 4-26 Dimensioned drawing Sensor CSP

4.3 Device ID

The information in this technical description only apply to the sensors indicated on the title page.
The nameplate is attached to the base plate or the sensor body and contains the following information:

- Name and address NIVUS GmbH
- CE label
- Marking of the series and type with article number and serial number
- Year of manufacture: the first four digits of the serial number refer to the year of manufacture and the week number (2340….)
- for Ex version sensors additionally the Ex marking as mentioned in Chapter "*2.4 Ex Protection*".

It is important for all queries and spare parts orders that the article number and serial number of the respective sensor are specified correctly. This is the only way to ensure proper and fast processing.

Note

- *Check by means of the nameplates whether the supplied sensor corresponds with your order.*
- *Check that the correct control number (ATEX) is indicated on the nameplate.*

The EU Declarations of Conformity and the Type Examination Certificates can be found at the end of this Technical Description.

Nameplates

Fig. 4-27 Nameplate for Sensor CSM-V100K

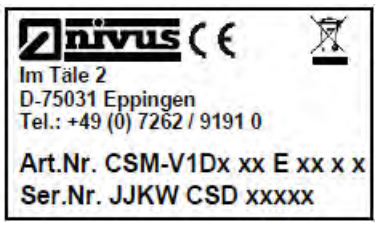


Fig. 4-28 Nameplate for Sensor CSM-V1D0K

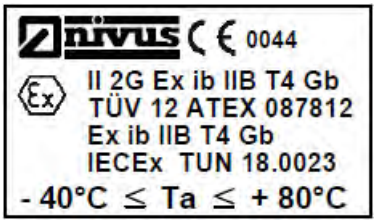


Fig. 4-29 Ex label for Sensor CSM (in addition to nameplate)

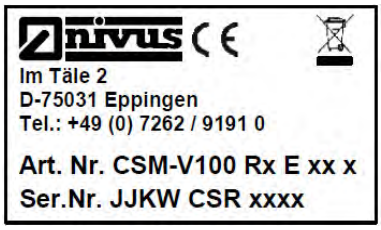


Fig. 4-30 Nameplate for Sensor CSM-V100R

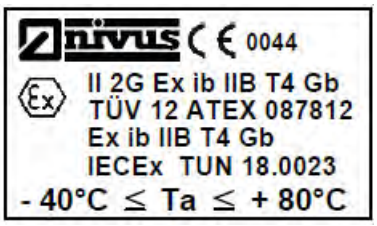


Fig. 4-31 Ex label for Sensor CSM-V100R (in addition to nameplate)

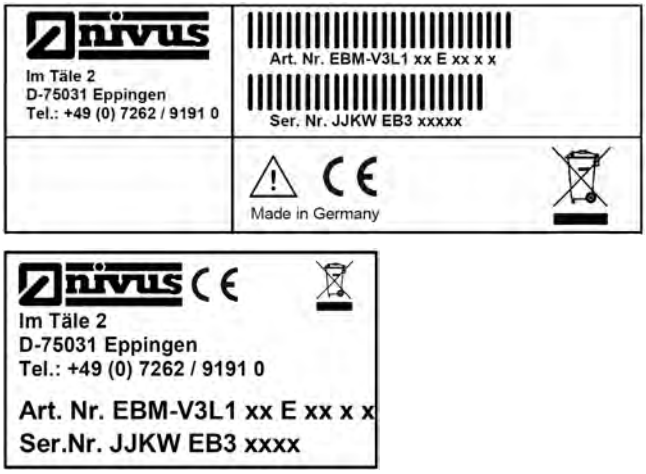


Fig. 4-32 Nameplates Electronic Box, Type EBM-V3

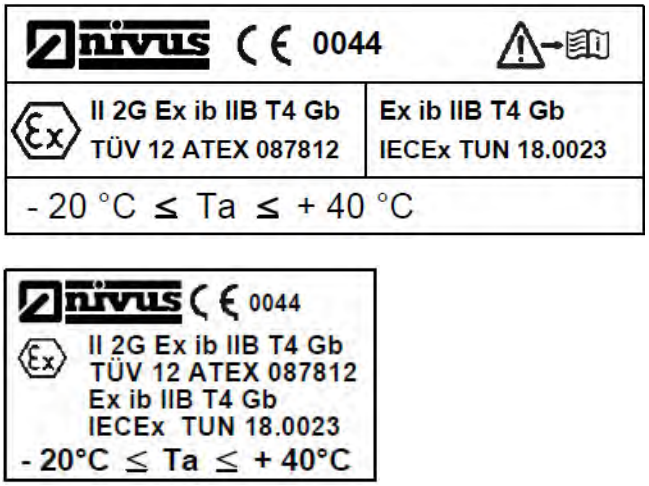


Fig. 4-33 Ex nameplates Electronic Box, Type EBM-V3

Fig. 4-34 Nameplate for Sensor DSM

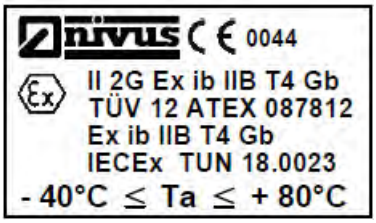


Fig. 4-35 Ex label for Sensor DSM (in addition to nameplate)

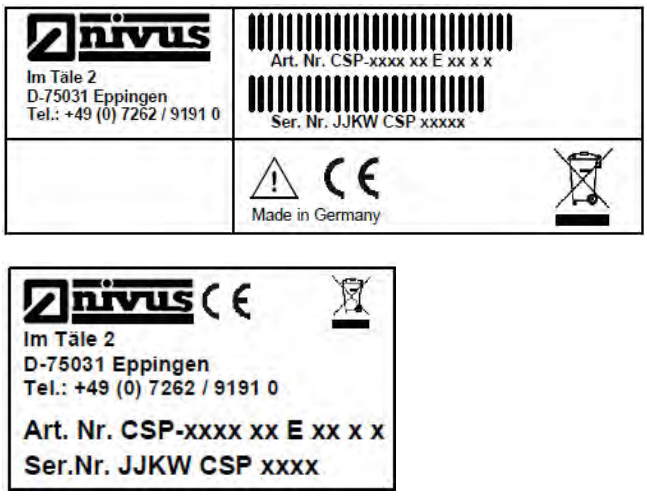


Fig. 4-36 Nameplates for Sensor CSP

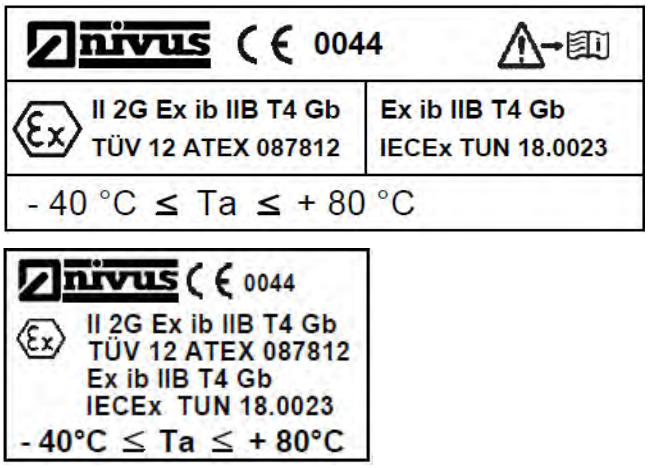


Fig. 4-37 Ex nameplates for Sensor CSP (in addition to nameplate)

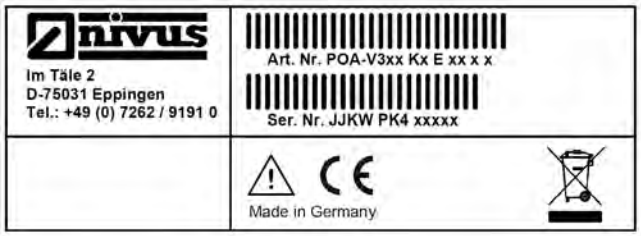


Fig. 4-38 Nameplate for Sensor POA-V3

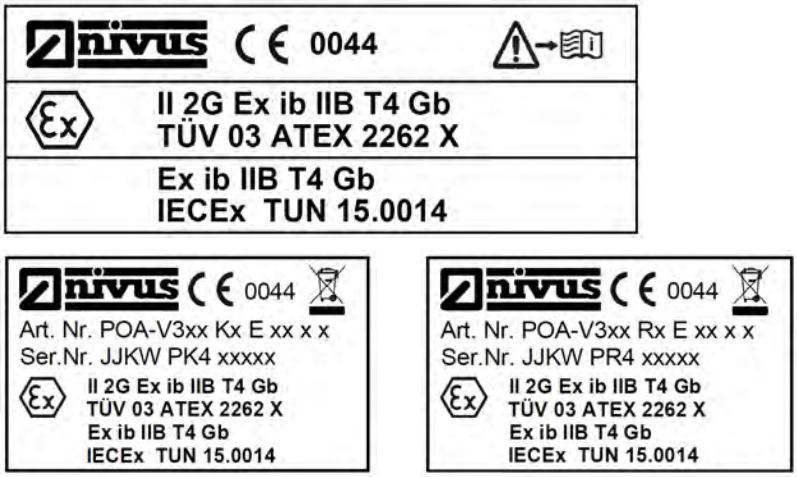


Fig. 4-39 Ex nameplates for Sensor POA-V3 (in addition to nameplate)

Fig. 4-40 Nameplate for Sensor OCL-L3

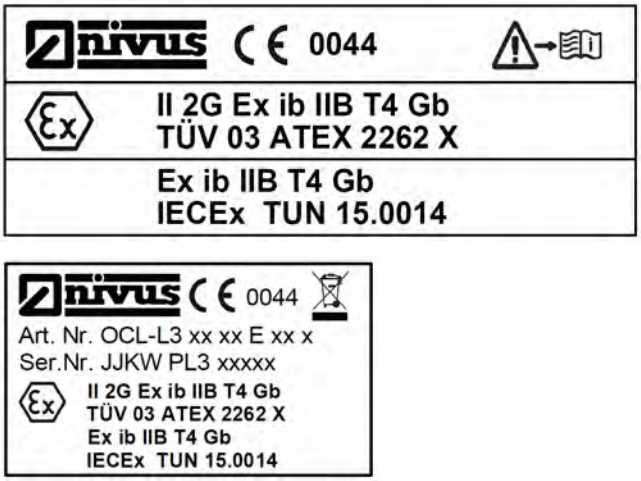


Fig. 4-41 Ex nameplates for Sensor OCL-L3 (in addition to nameplate)

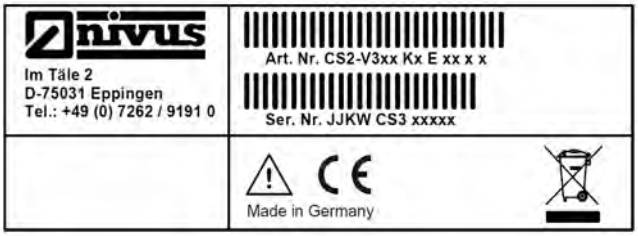


Fig. 4-42 Nameplate for Sensor CS2

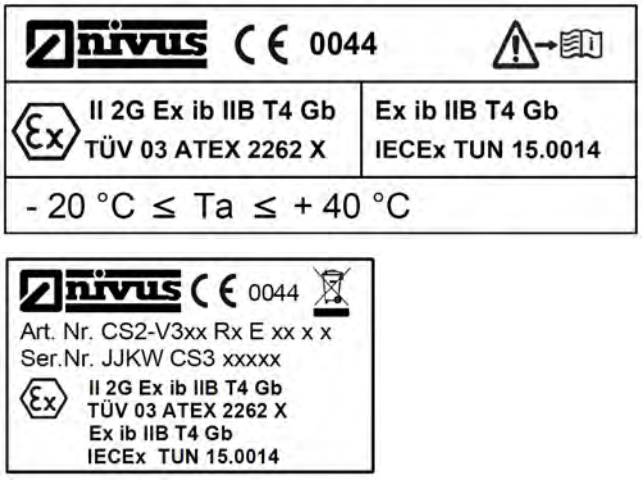


Fig. 4-43 Ex nameplates for Sensor CS2-V3 (in addition to nameplate)

4.4 Sensor Versions

The sensors are manufactured in various designs (wedge and pipe sensors) and also differ in their Ex version, cable lengths, sensor connections (cable tail for direct connection or prefabricated plug/filter element(s) for plugging in) as well as various special designs and materials. The article number is located at the entrance of the cable into the sensor body as well as on the nameplate which is attached to the cable sheaths at the end of the cable. The nameplate is protected against weathering and abrasion by means of a transparent heat shrink tubing.

4.4.1 Type Key Sensor CSM

CSM- Sensor with spatially allocated flow velocity measurement

Type

V100 **without Level Measurement**

- **KT** Wedge sensor made of PVDF; ground plate 1.4571
- **R4** Pipe sensor with 1“ stop ball valve and welding nozzle (stainless steel); beam angle 45° for inside diameter 100...1000 mm; pressure up to max. 16 bar
- **R7** Pipe sensor with 1“ stop ball valve and welding nozzle (stainless steel); beam angle 20° for inside diameter 80...500 mm; pressure up to max. 16 bar
- **RX** Pipe sensor with 1“ stop ball valve and welding nozzle (stainless steel); pressure up to max. 16 bar
- **XX** Special construction

V1D0 **Level measurement with pressure measurement cell**

- **K3** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571; 3 MHz; for connection to NivuFlow Stick or NivuFlow Mobile 750 transmitter
- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571; for connection to Electronic Box EBM-V1, Type RD
- **KN** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571; for connection to NivuFlow Mobile 750 transmitter and Electronic BoxEBM-V3
- **XX** Special construction

ATEX Approval

- **0** none
- **E** Zone 1

Cable length

- **01** approx. 1.3 meter (only for NivuFlow Stick NFS0 3T or NFS0 STG 3TLG 3-piece guide rod)
- **02** approx. 1.6 meter (only for NivuFlow Stick NFS0 02)
- **07** 7 m
- **15** 15 m
- **20** 20 m (only in connection with Type V1D0)

Sensor Connection

- **C** for wedge sensors Type V100KT, for connection to NivuFlow 750 transmitter using the EBM-V1L1 Type RD, incl. plug
- **D** for wedge sensors Type V1D0KT, for connection to NivuFlow 750 transmitter using the EBM-V1L1 Type RD, incl. pressure compensation element and plug

					E	for pipe sensors, for connection to NivuFlow 750 transmitter using the EBM-V1L1 Type RD, incl. plug
					V	for wedge sensors Type V100KT, for connection to NivuFlow Mobile 750 transmitter and EBM-V3L1, incl. plug
					L	for wedge sensors Type V1D0KN or V1D0K3, for connection to NivuFlow Mobile 750, NivuFlow Stick transmitter and EBM-V3L1, incl. pressure compensation element and plug
					T	for pipe sensors, for connection to NivuFlow Mobile 750 transmitter and EBM-V3L1, incl. plug
CSM-						

4.4.2 Type Key Sensor DSM

DSM-L0	Air-ultrasonic sensor for contactless level measurement						
	Design						
	K	Wedge Sensor					
	X	Special construction					
		Sensor construction					
		S	Standard construction PPO, ground plate 1.4571				
		X	Special construction				
			Transmitting frequency				
			12	Standard frequency			
			XX	Special construction			
				ATEX Approval			
				0	none		
				E	Zone 1		
					Cable length		
					07	7 m	
					15	15 m	
						Sensor Connection	
						B	for connection to the NivuFlow 750 transmitter using the Electronic Box EBM-V1L1
						L	for connection to the NivuFlow Mobile 750 transmitter and Electronic Box EBM-V3L1
DSM-L0							

4.4.3 Type Key Electronic Box EBM

EBM-	**V3L1**	Electronic Box for connection of 1x CSM and 1x DSM sensor incl. suspension bracket and mounting plate; IP68				
		Design				
		RD	Standard			
		XX	Special construction			
			ATEX Approval			
			0	none		
			E	Zone 1 (only in connection with NF7 and OCM Pro CF (OCP-S4/M4))		
				Cable length (max. 150 m)		
				03	3 m	
				10	10 m	
				15	15 m	
				20	20 m	
				30	30 m	
				50	50 m	
				99	100 m	
				XX	Special length	
					Sensor Connection	
					K	Cable end pre-assembled for connection to NivuFlow 750 and NivuFlow 7550 transmitters
EBM-	**V3L1**				**K**	

4.4.4 Type Key Sensor POA

POA- Sensor with spatially allocated flow velocity over a maximum of 32 detected and calculated scan layers

Type

V300 **without Level Measurement**

- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
- **KP** Wedge sensor made of high-resistant full PEEK; ground plate 1.4571
- **KX** Wedge sensor, special construction (e.g. made of high-resistant full PEEK with ground plate made of Hastelloy or Titanium)
- **RT** Pipe sensor made of PPO with PEEK sensor face; pipe body 1.4571
- **RP** Pipe sensor made of high-resistant full PEEK; pipe body 1.4571
- **RX** Pipe sensor, special construction

V3H1 **with ultrasound from bottom up for level measurement**

- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
- **KP** Wedge sensor made of high-resistant full PEEK; ground plate 1.4571
- **KX** Wedge sensor, special construction (e.g. made of high-resistant full PEEK with ground plate made of Hastelloy or Titanium)

V3D0 **with pressure measurement cell for level measurement**

- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
- **KX** Wedge sensor, special construction

V3U1 **with pressure measurement cell and ultrasound for level measurement**

- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
- **KX** Wedge sensor, special construction

ATEX Approval

- **0** none
- **E** Zone 1 (Ex Separation Module required)

Cable length (max. 150 m / with pressure cell up to 30 m possible)

- **10** 10 m
- **15** 15 m
- **20** 20 m
- **30** 30 m
- **40** 40 m
- **50** 50 m
- **60** 60 m
- **70** 70 m
- **80** 80 m
- **90** 90 m
- **99** 100 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 Design *
					Sensor Connection		
					K		Cable end pre-assembled, for connection to NivuFlow 750/7550 (Type Vx00 / VxH1) and OCM Pro CF (OCP-S4/M4) transmitters
					L		Cable end pre-assembled, for connection to NivuFlow 750 (Type VxD0 / VxU1) and OCM Pro CF (OCP-S4/M4) transmitters
						Pipe length	
						0	only for wedge sensor
						2	20 cm (standard)
						3	30 cm (minimum length for stop ball valve)
						4	40 cm (minimum length for extraction tool)
						X	Special pipe length in dm
						G	20 cm + extension thread
POA-							

* cable not for Types VxD0 and VxU1

4.4.5 Type Key Sensor OCL

OCL-L3	Air-Ultrasonic Active Sensor					
	Design					
	K	Wedge Sensor				
	X	Special construction				
		Sensor construction				
		S	Standard construction PPO; cable: PUR			
		X	Special construction			
			Transmitting frequency			
			12	120 kHz		
			XX	Special construction		
				ATEX Approval		
				0	none	
				E	Ex Zone 1 (Ex Separation Module required)	
					Cable length (max. 150 m)	
					10	10 m
					15	15 m
					20	20 m
					30	30 m
					40	40 m
					50	50 m
					60	60 m
					70	70 m
					80	80 m
					90	90 m
					99	100 m
					XX	Special length upon request
						Sensor Connection
						K Cable end pre-assembled for connection to NF7 and OCM Pro CF (OCP-S4/M4)
OCL-L3						**K**

4.4.6 Type Key Sensor CS2

CS2- Cross correlation sensor for large dimensions

Type

- **V300** **without Level Measurement**
  - **RP** Pipe sensor made of high-resistant full PEEK; pipe body 1.4571
  - **RX** Pipe sensor, special construction
  - **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
  - **KP** Wedge sensor made of high-resistant full PEEK; ground plate 1.4571
  - **KX** Wedge sensor, special construction
- **V3H1** **with ultrasound from bottom up for level measurement**
  - **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
  - **KP** Wedge sensor made of high-resistant full PEEK; ground plate 1.4571
- **V3D0** **with pressure measurement cell for level measurement**
  - **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571
- **V3U1** **with pressure measurement cell and ultrasound for level measurement**
  - **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571

ATEX Approval

- **0** none
- **E** Zone 1 (Ex Separation Module required)

Cable length (max. 150 m / with pressure cell up to 30 m possible)

- **10** 10 m
- **15** 15 m
- **20** 20 m
- **30** 30 m
- **40** 40 m
- **50** 50 m
- **60** 60 m
- **70** 70 m
- **80** 80 m
- **90** 90 m
- **99** 100 m
- **XX** Special length upon request

Sensor Connection

- **K** for Types V30/V3H: connection to NF7 and OCM Pro CF (OCP-S4/M4)
- **L** for Types V3D/V3U: connection to NF7 and OCM Pro CF (OCP-S4/M4)
- **R** for Type V300R (pipe sensors): connection to NF7 and OCM Pro CF (OCP-S4/M4)

						Pipe length	
						0	only for wedge sensor
						2	20 cm (standard)
						3	30 cm (minimum length for stop ball valve)
						4	40 cm (minimum length for extraction tool)
						X	Special pipe length in dm
						G	20 cm + extension thread
CS2-							

4.4.7 Type Key Sensor CSP

CSP- Sensor with spatially allocated flow velocity measurement for large dimensions; for connection to NFM750

Type

- **V200** without Level Measurement
- **V2H1** with ultrasound from bottom up for level measurement
- **V2D0** with pressure measurement cell for level measurement
- **V2U1** with pressure measurement cell and ultrasound from bottom up for level measurement

Design

- **KT** Wedge sensor made of PPO with PEEK sensor face; ground plate 1.4571

ATEX Approval

- **0** none
- **E** Zone 1

Cable length

- **7** 7 m
- **15** 15 m
- **20** 20 m

Sensor Connection

- **F** for connection to NivuFlow Mobile 750 transmitter, incl. plug and pressure compensation element (only type V2D0/V2U0);
  for connection to NivuFlow Stick, incl. plug and pressure compensation element (only type V2D0)
- **S** for connection to NivuFlow Mobile 750 transmitter, incl. plug

All Versions

- **0** Digit required for technical system reasons

CSP-		**KT**				**0**

4.5 Specifications

4.5.1 Sensor CSM-V100K

Measurement Principle	Correlation with measurement of the real flow profile
Minimum filling level	3 cm
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +70 °C with operating time 15 min -20 °C to +65 °C with continuous operation -40 °C to +80 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 4 bar
Cable Lengths	See Chap. *"4.4.1 Type Key Sensor CSM"*
Cable Types	LiYC11Y Twinax 2x AWG20/7 + 3x AWG28/7
Outside Cable Diameter	6 mm ±0.2 mm
Materials in contact with the medium	Polyurethane, PVDF, stainless steel 1.4571, PA
Flow Velocity Measurement	
Measurement Range	-350 cm/s to +600 cm/s max. measuring span: Δ 700 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point
Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	20°
Temperature Measurement	
Measurement Range	-40 °C to +80 °C
Measurement Uncertainty	±0.5 K

Tab. 3 Specifications CSM-V100K

4.5.2 Sensor CSM-V1D0K

Measurement Principle	Correlation with measurement of the real flow profile
Minimum filling level	5.5 cm
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +50 °C -40 °C to +80 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 1 bar
Cable Lengths	See Chap. *"4.4.1 Type Key Sensor CSM"* Sensors with pressure measurement cell (level measurement type V1D0) have a pressure compensation element after 6 m / 14 m / 19 m.
Cable Types	LiYC11Y 1x (2x AWG24/7 CAT 7) + PA 1.5/2.5mm + (4x AWG26/7)
Outside Cable Diameter	9 mm +/- 0.25 mm
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PA, Pressure compensation element: POM-C, PMMA, PA, stainless steel 1.4571
Flow Velocity Measurement	
Measurement Range	-350 cm/s to +600 cm/s max. measuring span: Δ 700 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point
Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	35°
Level Measurement - Pressure	
Measurement Range	0 to 500 cm
Zero Point Drift	max. 0.75 % of final value (0…50 °C)
Measurement Uncertainty	≤ 0.5 % of final value
Temperature Measurement	
Measurement Range	-40 °C to +80 °C
Measurement Uncertainty	±0.5 K

Tab. 4 Specifications CSM-V1D0K

4.5.3 Sensor CSM-V100R

Measurement Principles	Correlation with measurement of the real flow profile
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-40 °C to +80 °C -40 °C to +80 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 16 bar
Cable Lengths	See Chap. *"4.4.1 Type Key Sensor CSM"*
Cable Types	LiYC11Y Twinax 2x AWG20/7 + 3x AWG28/7
Outside Cable Diameter	6 mm ±0.2 mm
Design	Pipe sensor for installation using nozzle, sensor screw connection and fastening element in pipes
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PEEK, NBR-O-Ring
Measurement Range	-350 cm/s to +600 cm/s max. measuring span: Δ 700 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point
Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Minimum filling level	CSM-V100R7: 3.0 cm CSM-V100R4: 4.7 cm
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	CSM-V100R7: 20° CSM-V100R4: 45°

Tab. 5 Specifications CSM-V100R

4.5.4 Sensor DSM

Measurement Principle	Ultrasound Transit Time
Measurement Frequency	125 kHz/200 kHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +80 °C -40 °C to +80 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 1 bar
Cable Lengths	See Chap. *"4.4.2 Type Key Sensor DSM"*
Cable Type	LiYC11Y 2x (2x28 AWG/7-(ST)12Y) + 4x28 AWG/7
Outside Cable Diameter	6.7 mm ±0.25 mm
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PA
Level Measurement	
Measurement Range	0 to 200 cm
Dead Zone (from base plate)	4 cm
Measurement Uncertainty	< ±5 mm
Zero Point Drift	Absolutely stable zero point
Temperature Measurement	
Measurement Range	-40 °C to +80 °C
Measurement Uncertainty	±0.5 K

Tab. 6 Specifications DSM

4.5.5 EBM Electronic Box

Protection	IP68 (with connection sockets locked)
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +50 °C -20 °C to +40 °C when using the Electronic Box in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 1 bar
Cable Lengths	See Chap. *"4.4.3 Type Key Electronic Box EBM"*
Cable Type	LiYC11Y 2x1.5 + 1x2x0.34
Outside Cable Diameter	8.4 mm ±0.25 mm
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PP

Tab. 7 Specifications EBM

4.5.6 Sensor POA

Measurement Principles	– Ultrasound Transit Time (Level Measurement) – Piezoresistive Pressure Measurement (Level Measurement) – Correlation with measurement of the real flow profile
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +50 °C -20 °C to +40 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 4 bar (for combi sensor with pressure measurement cell max. 1 bar)
Cable length	See Chap. *"4.4.4 Type Key Sensor POA"*, for sensors without plugs (sensor connection type "K" and "L") extendable to max. 250 m cable length. For sensors pressure measurement cell (level measurement Type VxD0/VxU1), a pressure compensation element is required for cable lengths over 30 m, which can also be used to connect the extension.
Cable Types	– Combi sensor with pressure measurement: LiYC11Y 2x1.5 + 1x2x0.34 + PA1.5/2.5 – Sensors without pressure measurement: LiYC11Y 2x1,5 + 1x2x0,34
Outside Cable Diameter	– Combi sensor with pressure measurement: 9.75 mm ±0.25 mm – Sensors without pressure measurement: 8.4 mm ±0.25 mm
Transducers	– Flow velocity sensor with v-measurement by cross-correlation and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using pressure and temperature measurement to compensate for the influence of the latter on the speed of sound (only for wedge sensor) – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and redundantly using pressure as well as temperature measurement to compensate for the influence of the latter on the speed of sound (only for wedge sensor)
Designs	– Wedge sensor for installation on the channel bottom – Pipe sensor for installation using nozzle, sensor screw connection and fastening element in pipes of for installation in floats

Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PA (only wedge sensor), PTFE (only pipe sensors) Option: chemical-resistant sensor made of PEEK, Hastelloy C-276 mounting plate; titanium mounting plate; cable with FEP coating
Flow Velocity Measurement	
Measurement Range	-350 cm/s to +600 cm/s max. measuring span: Δ 700 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point
Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Minimum filling level	6.5 cm
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	45°
Level Measurement - Water-Ultrasound	
Measurement Range	0 to 200 cm; minimum absolute measurable height 5 cm
Zero Point Drift	Absolutely stable zero point
Measurement Uncertainty	< ±2 mm
Level Measurement - Pressure	
Measurement Range	0 to 500 cm
Zero Point Drift	max. 0.75 % of final value (0…50 °C)
Measurement Uncertainty	< 0.5 % of final value
Temperature Measurement	
Measurement Range	-20 °C to +50 °C
Measurement Uncertainty	±0.5 K

Tab. 8 Specifications POA

4.5.7 Sensor OCL

Measurement Principle	Ultrasound Transit Time
Measurement Frequency	120 kHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +50 °C -20 °C to +40 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 1 bar
Cable Lengths	See Chap. *"4.4.5 Type Key Sensor OCL"*
Cable Type	LiYC11Y 2x1.5 + 1x2x0.34
Outside Cable Diameter	8.4 mm ±0.25 mm

Designs	Wedge sensor for installation in the channel crown
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PA
Level Measurement	
Measurement Range	Up to 200 cm
Dead Zone (from base plate)	14 cm
Measurement Uncertainty	≤ 0.5 % of final value
Temperature Measurement	
Measurement Range	-20 °C to +50 °C
Measurement Uncertainty	±0.5 K

Tab. 9 Specifications OCL

4.5.8 Sensor CS2

Measurement Principles	– Ultrasound Transit Time (Level Measurement) – Piezoresistive Pressure Measurement (Level Measurement) – Correlation with digital pattern recognition (Flow Velocity)
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-20 °C to +50 °C -20 °C to +40 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 4 bar (for combi sensor with pressure measurement cell max. 1 bar)
Cable length	See Chap. *"4.4.6 Type Key Sensor CS2"*, for sensors without plugs (sensor connection type "K" and "L") extendable to max. 250 m cable length. For sensors pressure measurement cell (level measurement Type VxD0/VxU1), a pressure compensation element is required for cable lengths over 30 m, which can also be used to connect the extension.
Cable Types	– Combi sensor with pressure measurement: LiYC11Y 2x1.5 + 1x2x0.34 + PA1.5/2.5 – Sensors without pressure measurement: LiYC11Y 2x1.5 + 1x2x0.34
Outside Cable Diameter	– Combi sensor with pressure measurement: 9.75 mm ±0.25 mm – Sensors without pressure measurement: 8.4 mm ±0.25 mm
Sensor Types	– Flow velocity sensor with v-measurement by cross-correlation and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and temperature measurement to compensate for the influence of the latter on the speed of sound

	– Combi sensor with velocity sensor by cross-correlation, level measurement using pressure and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and redundantly using pressure, incl. temperature measurement to compensate for the influence of the latter on the speed of sound
Design	– Wedge sensor for installation on the channel bottom or the channel wall – Pipe sensor for installation using nozzle, sensor screw connection and fastening element in pipes
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PEEK, PA6
Flow Velocity Measurement	
Measurement Range	-350 cm/s to +600 cm/s max. measuring span: Δ 700 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point
Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Minimum filling level	8 cm
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	50°
Level Measurement - Water-Ultrasound	
Measurement Range	0 to 500 cm; minimum absolute measurable height 10 cm (only for wedge sensors)
Measurement Uncertainty	≤ ±2 mm
Level Measurement - Pressure	
Measurement Range	0 to 500 cm
Zero Point Drift	max. 0.75 % of final value (0…50 °C)
Measurement Uncertainty	≤ 0.5 % of final value
Temperature Measurement	
Measurement Range	-20 °C to +50 °C
Measurement Uncertainty	±0.5 K

Tab. 10 Specifications CS2

4.5.9 Sensor CSP

Measurement Principles	– Ultrasound Transit Time (Level Measurement) – Piezoresistive Pressure Measurement (Level Measurement) – Correlation with digital pattern recognition (Flow Velocity)
Measurement Frequency	1 MHz
Protection	IP68
Ex Approval (optional)	II 2G Ex ib IIB T4 Gb (ATEX) Ex ib IIB T4 Gb (IECEx)
Operation Temperature	-40 °C to +80 °C -40 °C to +80 °C when using the sensors in Ex Zone 1
Storage Temperature	-30 °C to +70 °C
Operation Pressure	max. 4 bar (for combi sensor with pressure measurement cell max. 1 bar)
Cable length	See Chap. *"4.4.7 Type Key Sensor CSP"* Sensors with pressure measurement cell (level measurement type V2D0 and V2U1) have a pressure compensation element after 6 m / 14 m / 19 m.
Cable Types	Combi sensor with/without pressure measurement: LiYC11Y 2x(2x AWG24/7-CAT7) + PA 1.5/2.5 + (4x AWG26/7)
Outside Cable Diameter	Combi sensor with/without pressure measurement: 9.7 mm ±0.2 mm
Sensor Types	– Flow velocity sensor with v-measurement by cross-correlation and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using pressure and temperature measurement to compensate for the influence of the latter on the speed of sound – Combi sensor with velocity sensor by cross-correlation, level measurement using water-ultrasound and redundantly using pressure, incl. temperature measurement to compensate for the influence of the latter on the speed of sound
Design	– Wedge sensor for installation on the channel bottom or the channel wall
Materials in contact with the medium	Polyurethane, stainless steel 1.4571, PPO GF30, PEEK, PA6
Flow Velocity Measurement	
Measurement Range	-100 cm/s to +600 cm/s
Number of detected and computed scan layers	max. 32
Zero Point Drift	Absolutely stable zero point

Error limits (per scan layer)	< 1 % of measurement value (v > 1 m/s) < 0.5 % of measurement value +5 mm/s (v < 1 m/s)
Minimum filling level	8 cm
Beam angle	±5 degrees of angle
Angle of incidence to the horizontal	50°
Level Measurement - Water-Ultrasound	
Measurement Range	0 to 500 cm; minimum absolute measurable height 8 cm (only for wedge sensors)
Measurement Uncertainty	≤ ±2 mm
Level Measurement - Pressure	
Measurement Range	0 to 500 cm
Zero Point Drift	max. 0.75 % of final value (0…50 °C)
Measurement Uncertainty	≤ 0.5 % of final value
Temperature Measurement	
Measurement Range	-40 °C to +80 °C
Measurement Uncertainty	±0.5 K

Tab. 11 Specifications CSP

5 Installation and Connection

WARNING

Checking for explosive atmosphere using a gas warner

When connecting sensors to transmitters, the metallic sensor bottom plate must not exceed an earthing resistance of 1 GΩ after installation in a measurement section!

Before carrying out mounting/maintenance work, check explosive atmosphere by means of a gas warning device.

When carrying out this work, make absolutely sure that no electrostatic charge can occur.

5.1 Mounting Instructions

During installation, observe the following instructions on ESD and installation location.

- Ensure proper installation.
- Follow applicable legal or operational guidelines.

Improper handling may result in injury and/or damage to the sensors!

Important Notice

Observe the following instructions for avoiding Electrostatic Discharge (ESD).

The sensitive electronic components inside the sensor can be damaged by static electricity. NIVUS recommend the following steps to prevent damage to the sensor due to electrostatic discharge:

- Discharge any static electricity possibly present on your body before you touch electronic components of the sensor (such as circuit boards and the components on them).
- Avoid unnecessary movements to reduce the building-up of static charges.

5.1.1 Electrical Installation

CAUTION

Always disconnect the measurement system from the mains

Whenever work is carried out on the measuring system or the sensors, the transmitter must be disconnected from the power supply.

Observe the electrical data given on the nameplate.

For the electrical installation, comply with the legal regulations of the country (such as VDE 0100 in Germany).

5.1.2 Notes on Sensor Mounting

Leakage due to removal of components

Removal or loosening of the bottom plate, base plate or cable gland of the sensor will cause leakage and result in failure of the measurement/sensor.

*As a matter of principle, **no parts** may be **removed** from the sensor. Failure to do so will invalidate the warranty and the explosion protection.*

Sensor mounting is described in the *Mounting Instruction Cross Correlation and Doppler Sensors*. Read there:

- correct sensor position
- required calming sections
- sensor mounting and fastening
- cable routing

Please also note the information on sensors with integrated pressure measurement cell in this instruction manual (Chap. *"5.5 Pressure Compensation Elements"*).

5.2 Cable Protection Conduit Mounting Sensors CS2 and CSP

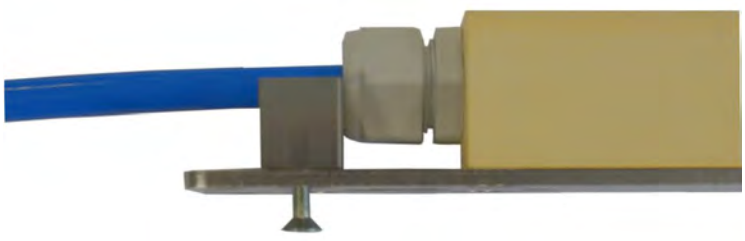
You can optionally fit a cable protection conduit to the sensor. You need the following accessory parts:

- 1 cable protection conduit with length 0.5 m / 1.0 m / 3.0 m
- 1 Clamp
- 4 Screws

These accessories are available on request from NIVUS.

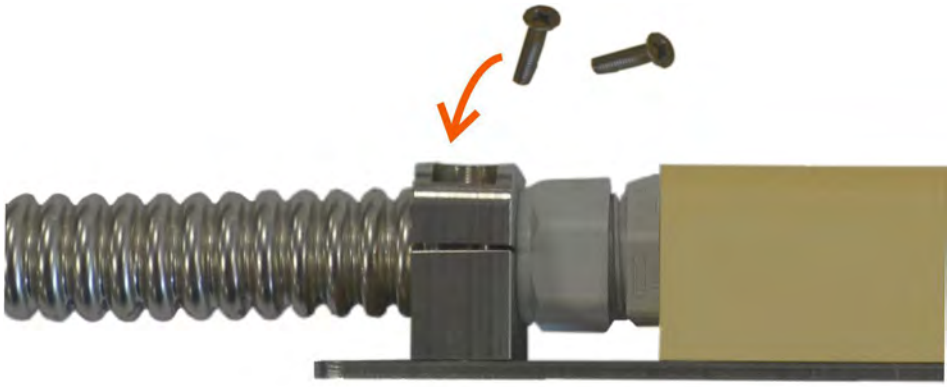
➲ **Procedure**

1. Fasten the lower clamp part to the base plate of the sensor with 2 screws.



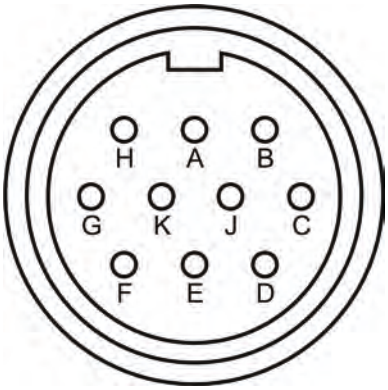
2. Pull the cable protection conduit over the sensor cable and insert it into the clamp.

3. Place the upper part of the clamp and screw tight.



5.3 Plug and Cable Layouts

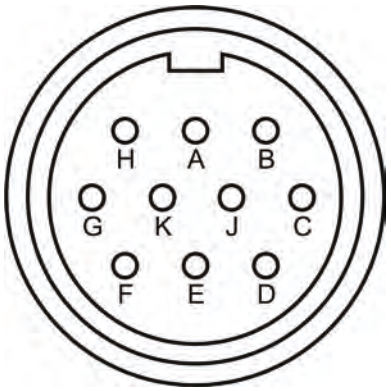
5.3.1 Sensors CSM and CSP



A	Piezo V1 +
B	Piezo V1 -
C	Piezo V2 +
D	Piezo V2 -
E	Press._Temp_GND
F	Temp.-Signal_WUS
G	Press._RxTx -
H	Press._RxTx +
I	Press._Temp_WUS_V +
K	Cable screen

Fig. 5-1 Plug layout Sensors CSM and CSP; connection to NFM 750 and EBM-V3L1

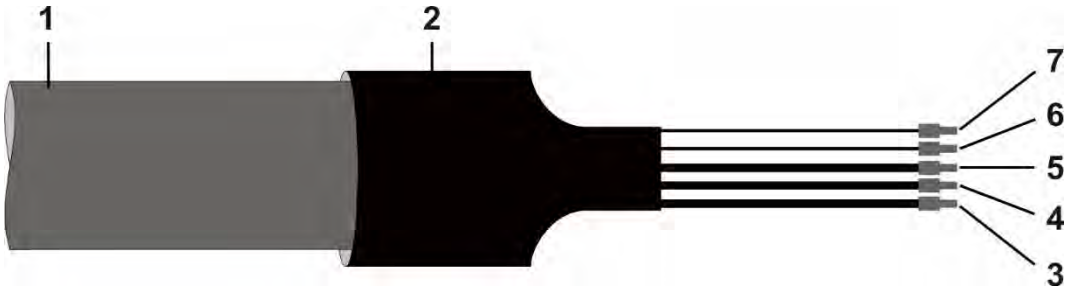
5.3.2 Sensor DSM



A Piezo 125k +
B Piezo 125k -
C Piezo 200k +
D Piezo 200k -
E Press._Temp_GND
F Temp.-Signal_LUS
G Press._RxTx -
H Press._RxTx +
J Druck_Temp_LUS_V +
K Cable screen

Fig. 5-2 Plug Layout DSM

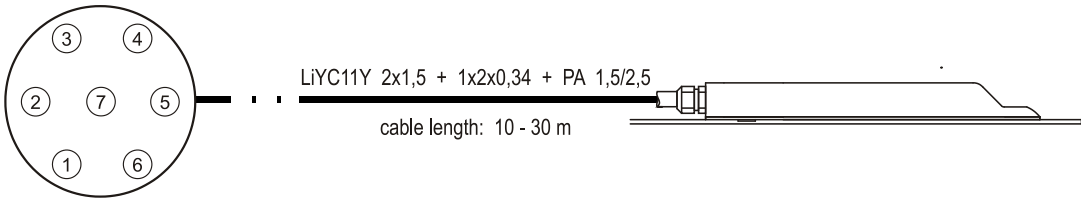
5.3.3 Electronic Box: Type EBM



1 Cable sheath
2 Heat shrink tubing
3 Black; cable shield (no earthing)
4 Red; power supply +; max. 9.9 V
5 Blue; power supply -
6 White; RxTx +
7 Green; RxTx -

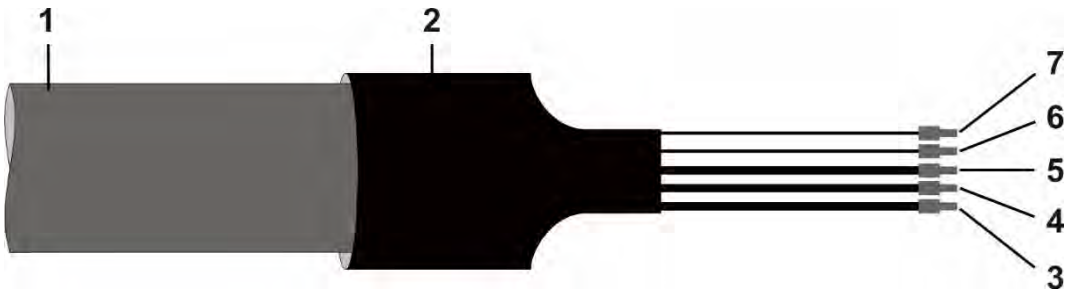
Fig. 5-3 Cable Tail Layout EBM Electronic Box

5.3.4 Sensors POA and CS2



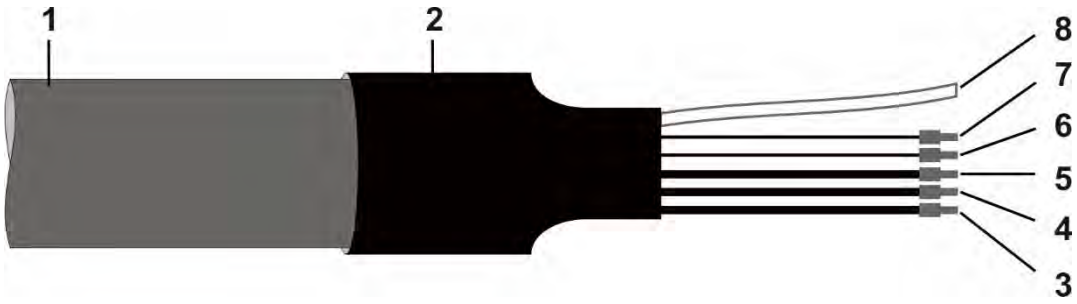
1 UE (voltage input, max. 9.9 V)
2 RxTx + (RS485)
3 unoccupied
4 unoccupied
5 RxTx - (RS485)
6 UE-GND (power supply ground)
7 Shield (cable screen)

Fig. 5-4 Plug Layout Sensors POA and CS2



1 Cable sheath
2 Heat shrink tubing
3 Black; cable shield (no earthing)
4 Red; power supply +;
max. 9.9 V with Ex version;
max. 24 V with non-Ex version
5 Blue; power supply -
6 White; RxTx +
7 Green; RxTx -

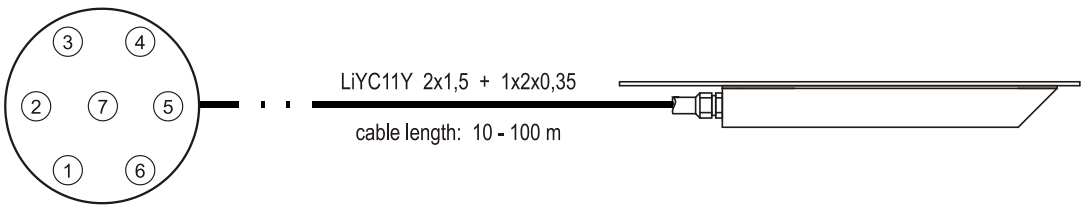
Fig. 5-5 Cable tail layout Sensors POA and CS2 without pressure measurement cell



1 Cable sheath
2 Heat shrink tubing
3 Black; cable shield (no earthing)
4 Red; power supply +;
max. 9.9 V with Ex version;
max. 24 V with non-Ex version
5 Blue; power supply -
6 White; RxTx +
7 Green; RxTx -
8 Air Equalisation Hose

Fig. 5-6 Cable tail layout Sensors POA and CS2 with pressure measurement cell

5.3.5 Sensor OCL



1 UE (voltage input, max. 9.9 V)

2 RxTx + (RS485)
3 + mA (2-wire sensors)
4 - mA (2-wire sensors)
5 RxTx - (RS485)
6 UE-GND (power supply ground)
7 Shield (cable screen)

Fig. 5-7 Plug layout Sensor OCL

5.4 Cable Extension

The sensor cables of the POA, CS2, OCL sensors and the cable of the EBM Electronic Box can be extended depending on the sensor connection version (see table below for details).

DANGER

Risk of personal injury

Observe the maximum possible cable lengths in the Ex area!

- *For POA-Vx, OCL-Lx and CS2-Vx Ex sensors with NIVUS cable, the length of the cable connection must not exceed **150 m**!*

*See **Type Examination Certificates** at the end of this document.*

- *If surge protection elements are used, the cable length is reduced accordingly to **135 metres (one-sided)** and **120 metres (two-sided)**!*

*See **Type Examination Certificates** in the technical description of the iXT0 Ex Separation Module.*

Important Notice

Cable extensions and sensor connections may only be carried out by qualified personnel. This is to prevent damage to the sensor.

Important Notice

Improper connections that create increased contact resistances or the use of incorrect cables may lead to disturbances or measurement failure.

If you extend the sensor cable via a junction box, use a metal junction box. Be sure to connect the shield of the incoming as well as of the outgoing cable to the junction box ground.

Basic Conditions for Cable Extension

If the cables are to be extended, the preparation of an intrinsic safety certificate is required. For this, the following **points/specifications** must be considered/included:

- The cable specifications of the cable extension used and the sensor cable.
- When using overvoltage protection elements, additionally their internal capacitance and inductance.
- The capacitances and inductances that can be connected for the supply circuit.
- The capacitances and inductances that can be connected for the RS485 circuit.

Moreover, the following two **conditions** must be met during project planning, selection and installation in accordance with EN 60079-14:

- $C_o \geq C_i + C_k$
- $L_o \geq L_i + L_k$

with

C_o = maximum permissible external capacitance of the corresponding iXT circuit (see Technical Description / Type Examination Certificate of the iXT0 Ex Separation Module)

C_i = effective internal capacitance of the sensor and, if used, of the overvoltage protection element for the corresponding circuit

C_k = Total cable capacitances of the sensor cable and the cable extension used for the corresponding circuit

L_o = maximum permissible external inductance of the corresponding iXT circuit (see Technical Description / Type Examination Certificate of the iXT0 Ex Separation Module)

L_i = effective internal inductance of the sensor and, if used, of the overvoltage protection element for the corresponding circuit

L_k = Total cable inductances of the sensor cable and the cable extension used for the corresponding circuit

NIVUS Cable Specifications for the Active Sensors POA-Vx, CS2, OCL-Lx and EBM:

- Cable capacitance (blue/red): 100 pF/m
- Cable inductance (blue/red): 0.76 chi/m

These values are of great importance in an Ex application if the operator has to provide an intrinsic safety certificate for his plant and has to consider the connectable external capacitance C_o or inductance L_o.

Laying cables in the Ground:

The cable permanently connected to the sensor is not intended for permanent direct burial. If the cable is to be laid in the ground, sand, gravel or similar, then use additional protective tubes or protective hoses for this. Select the inner diameter, bending radius and type of installation of these additional protective guides in such a way that the installed signal cable can be removed without problems afterwards and a new signal cable can be pulled in.

Possible Cable Extensions:

Sensor Connection		Sensor or EBM	Cable Extension
K	For EBM and for sensors without pressure measurement cell, cable end pre-assembled for connection to NF7, NFP, OCM Pro CF (OCP-S4/M4) *	EBM POA-Vx00 POA-VxH1 CS2-Vx00 CS2-VxH1 OCL-Lx	Cable extension with single shielded signal cable.

L	For sensors with pressure measurement cell, cable end pre-assembled for connection to NF7, OCM Pro CF (OCP-S4/M4) *	POA-VxD0 POA-VxU1 CS2-VxD0 CS2-VxU1	Cable extension is only possible if the pressure compensation element type ZUB0 DAE by NIVUS is used: Connect the sensor cable end to the terminals of the junction box of the pressure compensation element and extend it from there with a single shielded signal cable (see *Fig. 5-12*).
F	For sensors with pressure measurement cell, version incl. plug and filter element	POA-VxD0 POA-VxU1 CS2-VxD0 CS2-VxU1 CSP-V2D0 CSP-V2U1	It is not possible to extend the cable.
S	For EBM and for sensors without pressure measurement cell, version incl. plug	EBM POA-Vx00 POA-VxH1 CS2-Vx00 CS2-VxH1 CSP-V200 CSP-V2H1 OCL-Lx	It is not possible to extend the cable.
**) Connection to OCM Pro CF (OCP-S4/M4); not for POA-V3, CS2-V3 and OCL-L3*			

Tab. 12 Cable extensions

NIVUS Recommendation: Cable type for cable extension

For extension NIVUS recommend cable type A2Y(L) 2Y 6x2x0.8 (or higher number of conductors).

Cable extension with cable type A2Y(L) 2Y:

- Extend the two twisted signal lines (RxTx) for bus communication with one wire each.
- Combine the remaining wires in equal numbers to form two wire strands for UE + and for GND and extend these with one or more parallel-connected wire(s) per connecting cable, depending on the distance between the sensor and the transmitter.
  Solder or crimp parallel wires for UE+ and GND together for each supply line.

The following table shows the **minimum number of conductors per connection** for the signal cable type A2Y(L) 2Y (with 0.8 mm core diameter).

The minimum number of cores per connection is specified as follows: x (y)

x = min. total number of conductors incl. data lines

y = Conductors for power supply + and -

The cable lengths given refer to non-Ex sensors.

Extension to	Minimum number of cores per connection		
	Sensor [1] - NF7x		
	10 m Cable on Sensor	30 m Cable on Sensor	Remarks
30 m	4 (2)	not applicable	
50 m	4 (2)	4 (2)	
70 m	4 (2)	4 (2)	
100 m	4 (2)	4 (2)	
150 m	6 (4)	6 (4)	
200 m	6 (4)	6 (4)	
250 m	8 (6)	8 (6)	**Commissioning by NIVUS service required.**
300 m	8 (6)	8 (6)	
400 m	10 (8)	10 (8)	
500 m	12 (10)	12 (10)	
700 m	14 (12)	16 (14)	
1000 m	20 (18)	20 (18)	

Tab. 13 Required number of cores for cable extensions

Cable Extension with other Cable Types:

- Internationally, signal cables of other types with a minimum core diameter of 0.8 mm and a common cable shield can be used. If you are uncertain about the suitability of the signal cable, contact NIVUS and enclose a detailed cable type data sheet.
- Extension by equivalent cables with other cross-sections on request.

Common cable extension of several sensor cables:

In an application with several flow velocity sensors, you can extend the sensor cables with a common signal cable.

Important Notice

*Joint extensions of different applications or joint extensions of separate level and flow velocity measurements in a common signal cable are **not** permitted.*

[1] Sensors POA-Vx, CS2, OCL and EBM Electronic Box

5.5 Pressure Compensation Elements

5.5.1 General

Sensors with integrated pressure measurement cell may only be operated with a NIVUS pressure compensation element.
The pressure equalisation element is provided with two drying capsules or with drying granulate. These prevent moisture from penetrating and protect the electronics.

- Check the drying capsules / granulate (depending on the environment) at regular intervals.
- Replace the drying capsules / drying granulate if necessary.
- Observe the maintenance information in Chapters "*6.3.2 Pressure Compensation Element for CSM and CSP Sensors"* and *"6.3.3 Pressure Compensation Element for POA and CS2 Sensors".*

CAUTION

Sensor damage due to moisture ingress

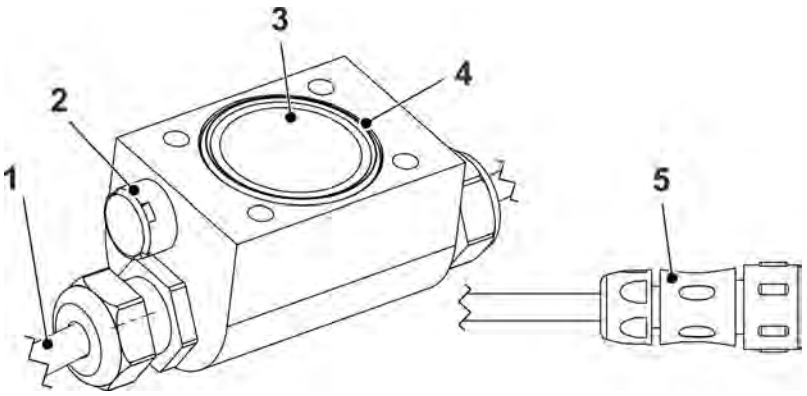
Penetrating moisture can irreparably destroy the electronics inside the sensor!

- *Always operate sensors with integrated pressure measurement cell with pressure compensation element. The drying granulate / drying capsules prevent the ingress of moisture!*
- *Never operate sensors with integrated pressure measurement cell without or with used drying granulate / drying capsules.*
- *Check drying granulate / drying capsules regularly and replace if necessary.*

⇨ Pressure compensation elements, spare filters, drying capsules and granulate see Chap. *"8 Spare Parts and Accessories"*.

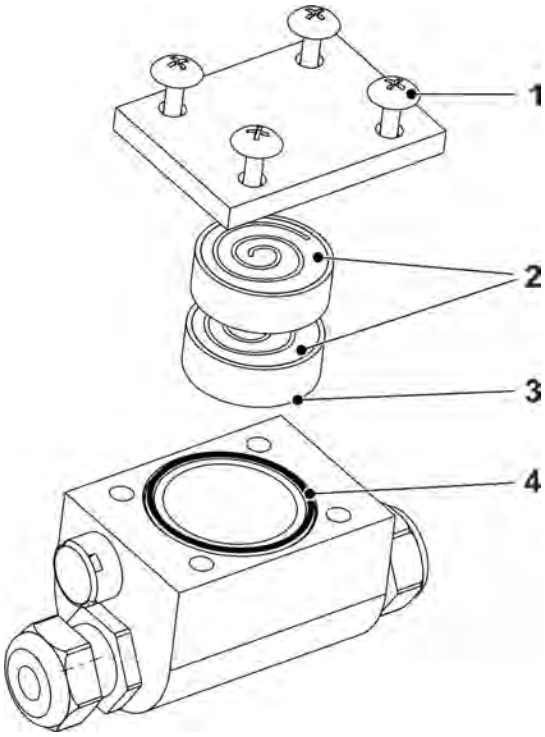
5.5.2 Pressure Compensation Element for CSM and CSP Sensors

The pressure equalisation element for CSM and CSP sensors is provided with two drying capsules.



1 Cable to sensor
2 Pressure equalising diaphragm
3 2x Drying capsule under acrylic glass cover
4 O-Ring – keep free of dirt and observe insertion position (see Chap. *"6.3.2 Pressure Compensation Element for CSM and CSP Sensors"*)
5 Plug for connection to the EBM Electronic Box/NFM 750

Fig. 5-8 Pressure compensation element for connection to EBM



1 Phillips screws to open the cover (acrylic)
2 2x Drying capsules for changing
3 Note: Insert cardboard side down (see Chap. *"6.3.2 Pressure Compensation Element for CSM and CSP Sensors"*)
4 O-Ring – keep free of dirt and observe insertion position (see Chap. *"6.3.2 Pressure Compensation Element for CSM and CSP Sensors"*)

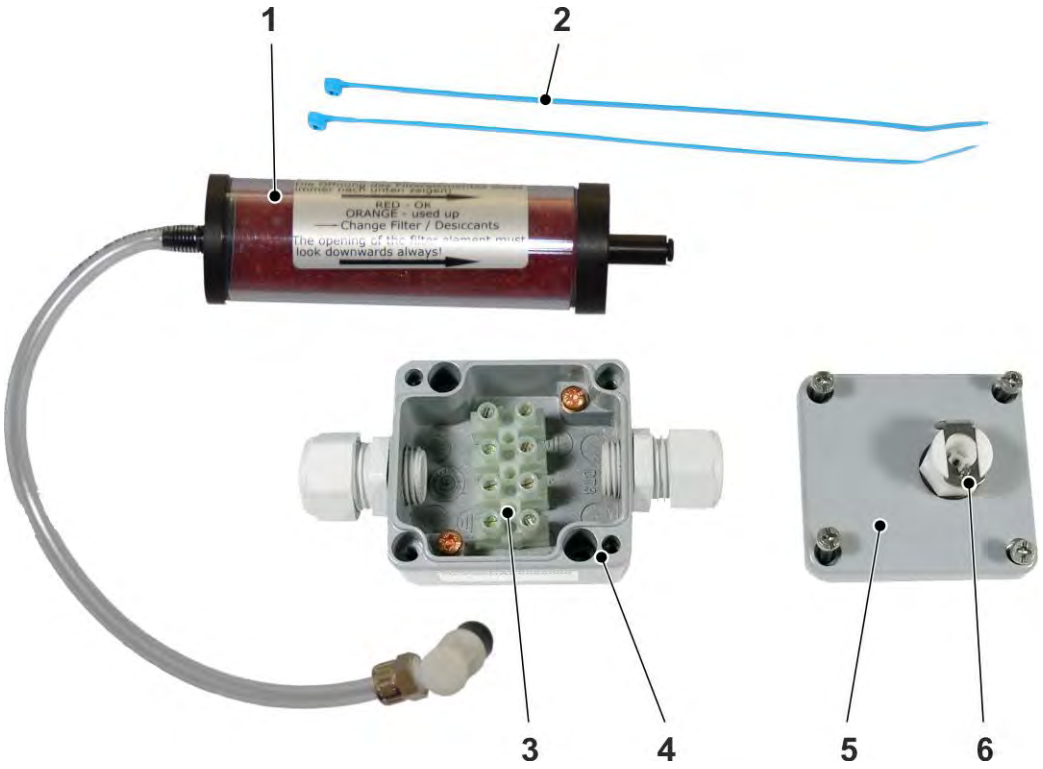
Fig. 5-9 Exploded view of the pressure compensation element

5.5.3 Pressure Compensation Element for POA and CS2 Sensors

To extend the cable of POA/CS2 sensors with a pressure sensing cell (types VxD, VxU), a junction box with a pressure compensation element is required (see *Fig. 5-10*, items 4 and 5). The maximum, uninterrupted sensor cable length from the sensor to the junction box is 30 m.

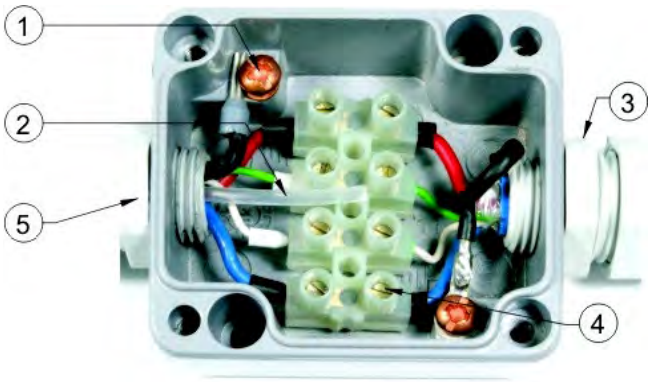
A pressure compensation element is also required if the cable of a sensor with an integrated pressure measuring cell is connected to a transmitter of the types NivuFlow 750, NivuFlow 7550 or OCM Pro CF (OCP-S4/M4).
The pressure compensation element is available from NIVUS under item number *ZUB0 DAE*.

The NIVUS pressure compensation element for POA und CS2 sensors consists of several parts:



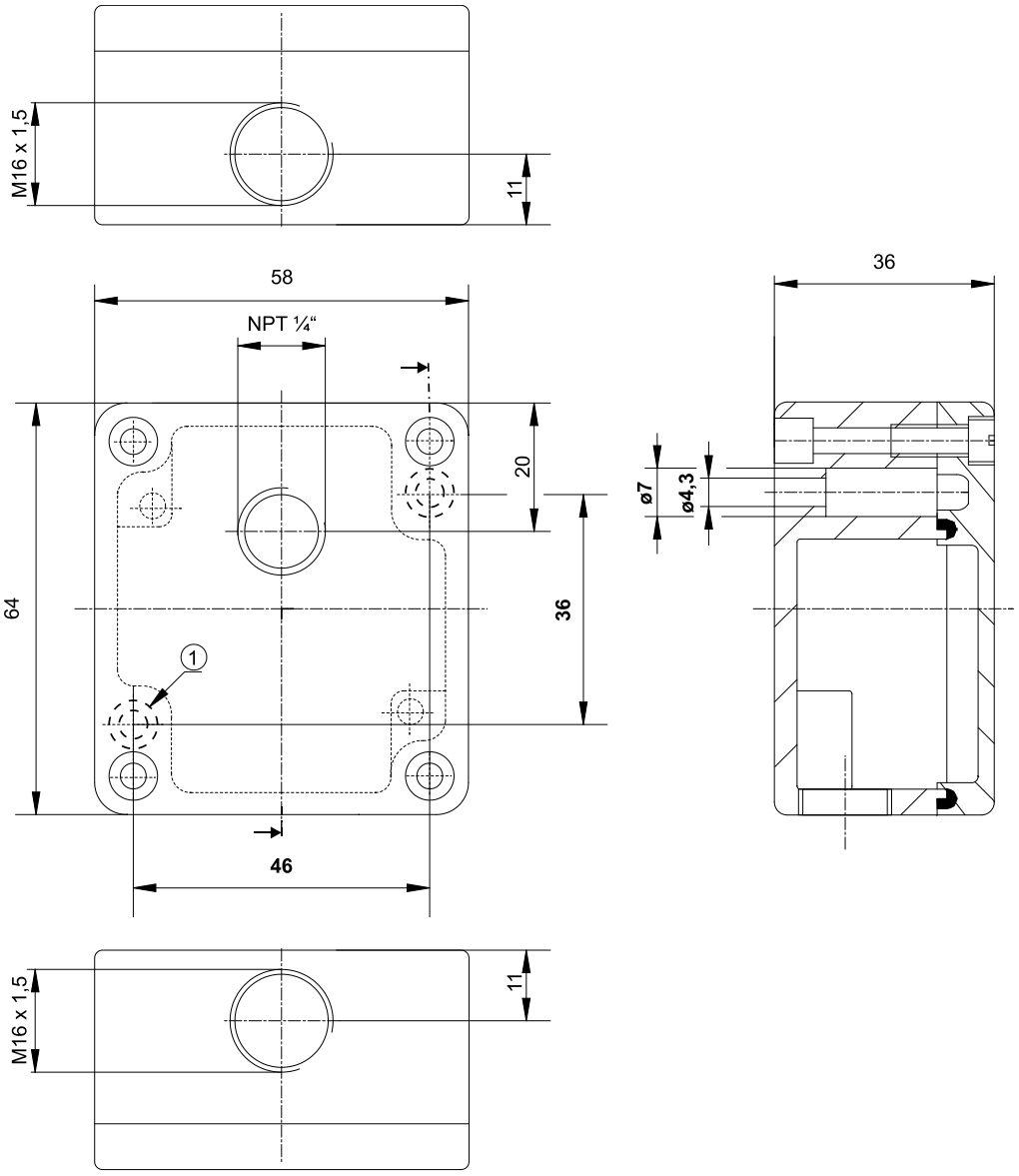
1 Filter element consisting of air filter, air hose and air hose connector
2 Cable tie
3 Terminal Clamps
4 Junction box
5 Junction box cover
6 Self-closing socket for the air hose connector

Fig. 5-10 Parts of the pressure compensation element



1 Shield connection
2 Air hose
3 Side to transmitter
4 Terminal Clamps
5 Side to flow velocity sensor

Fig. 5-11 Junction box in open position



1 Holes for fastening

Fig. 5-12 Dimensions of the junction box

Connecting Pressure Compensation Element and Air Filter

Important Notice

Install the junction box with air pressure compensation in an area where there are no corrosive gases and which is permanently protected from any flooding.

The shield of the incoming cable as well as the shield of the outgoing cable must be connected to the shield connections of the metal junction box. Otherwise, measurements may be distorted or fail.

*The filter cover of the air filter must **always point downwards** to protect it from water drops.*

For the extension from the junction box to the transmitter use a signal cable type A2Y or another suitable signal cable with integrated common shield. Observe the *NIVUS Recommendation* regarding the cable type for cable extension on page *65*.

➲ Procedure

1. Connect the 5-core cable coming from the sensor identically to the terminal strip in the junction box. Make sure that only the power supply (red + blue cable) and the signal bus lines (white + green) are connected to the terminal strip (*Fig. 5-13*).
2. Connect the cable shield (black) to one of the two shield connection terminals located in the box (*Fig. 5-13,* Pos. 1).
3. Attach the air filter to one of the two cables with the two cable ties supplied so that the filter cover points downwards (*Fig. 5-15*).
4. Snap the air hose connector into the socket integrated in the cover (*Fig. 5-12* Pos. 6).
5. Put on the junction box cover and screw it on.

Fig. 5-13 Ready mounted pressure compensation element

Important Notice

The measurement incl. pressure compensation element must not be operated with the air hose connector disconnected, as an automatic self-sealing of the socket integrated in the cover leads to a shift of the zero point of the level measurement.

5.6 Resistance List

CAUTION

Damage due to aggressive media

In principle, there is a risk of pitting on the stainless steel mounting plate or on the pipe sensor jacket with media containing chloride. Hydrogen sulphide (H_2S - danger of diffusion through cable sheath) and various organic solvents can corrode the sensor material.

Only install sensors or cables in media to which they are resistant.

The installation of the sensors or the laying of the cables may only be carried out in media that are resistant to them. Otherwise, the sensors and cables may be destroyed.

The medium-contacting parts of the sensors consist of the following components as standard:

- V4A/AISI 316 Ti (ground plate or pipe sensor jacket)
- PPO GF30 (sensor body)
- PEEK (sensor crystal cover)
- Polyurethane (cable sheath and cable gland)
- PTFE (gasket of the sensor screw joint)
- PVDF (sensor body CSM-V100K)

When using sensors with a pressure measurement cell, the following materials are added:

- Hastelloy® C-276
- Viton® (PA/PR)

The sensor systems are resistant to common domestic wastewater, wastewater and rainwater as well as combined water from municipalities and local authorities. Resistance is also not a problem in many industrial plants (e.g. BASF, Bayer etc.). Nevertheless, sensor systems are not resistant to all substances and substance mixtures.

Observe that in the case of substance mixtures (simultaneous presence of several substances), catalytic effects may occur under certain circumstances, which do not appear in the presence of the individual substance. These catalytic effects cannot be completely tested due to the infinite possibilities of variations.
If in doubt, contact your local NIVUS representative and request a free material sample for long-term testing.
For special applications with highly aggressive media or for media containing solvents, sensors made of solid PEEK with Hastelloy or titanium base plate or corresponding tube sensors made of highly resistant special steels are available. Sensor cables immersed in the medium

can be supplied specially sheathed with FEP (resistance to organic solvents or hydrogen sulphide).

MEDIUM	FORMULA	CONCENTRATION	HDPE	PPO GF30	PUR	PEEK	FEP	V4A	Hastelloy C 276	Viton (PA/PR)	PA	PVDF
Acetaldehyde	C_2H_4O	40 %	3/3	4	4	1	(1)	(1)	0	4/4	2/4	4/4
Acetone	C_3H_6O	40 %	1/1	4	4	1	(1)	1/1	1	4/4	1/0	3/4
Allyl alcohol	C_3H_6O	96 %	1/3	2	0	1	1/1	1/1	0	4/4	3/0	(2)
Aluminium chloride	$AlCl_3$	10 %	1/1	2	0	1	1/1	3/4	1	1/0	1/0	1/1
Ammonium chloride	$(NH_4)Cl$	aqueous	1/1	1	0	1	1/1	1/2L	1	1/1	3/4	1/1
Ammonium hydroxide	$NH_3 + H_2O$	5 %	1/1	2	4	1	1/1	1/1	1	(2)	(2)	(2)
Aniline	C_6H_7N	100 %	1/2	3	4	1	1/1	1/0	1	2/4	3/4	1/4
Petrol, unleaded	C_5H_{12} - $C_{12}H_{26}$		2/3	3	2	1	1/1	1/1	1	(1-3)	1/0	1/1
Benzene	C_6H_6	100 %	3/4	3/4	2	1	1/1	1/1	1	3/3	2/0	1/3
Benzyl alcohol	C_7H_8O	100 %	3/4	3	2	1	1/1	1/1	1	1/0	4/4	1/1
Boric acid	H_3BO_3	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/0	1/1
Bromic acid	$HBrO_3$	conc.	0/0	0	3	1	0/0	(4)	0	(2)	(4)	(1)
Butanol	$C_4H_{10}O$	technically pure	1/1	2	3	1	1/1	(1)	1	3/4	1/0	(2)
Calcium chloride	$CaCl_2$	alcoholic	1/0	1	1	1	1/1	1/2L	1	1/1	4/4	1/1
Chlorobenzene	C_6H_5Cl	100 %	3/4	3	4	1	1/1	1/1	1	3/4	4/4	1/1
Chlorine gas	Cl_2		4/4	3	3	1	1/1	1/0	0	1/1	4/4	1/0
Chloromethane	CH_3Cl	technically pure	3/0	4	4	1	1/0	1/1L	0	4/4	(3)	1/0
Chloroform	$CHCl_3$	100 %	3/4	4	4	1	1/1	1/1	1	4/4	3/4	1/1
Chlorine water	$Cl_2 \times H_2O$		3/0	2	0	1	(1)	2/0L	1	1/0	4/4	1/1
Chromic acid	CrO_3	10 %	1/1	1	0	1	1/1	1/2	1	1/1	4/4	1/1
Diesel oil	—	100 %	1/3	2	0	1	(1)	(1)	0	1/1	1/1	1/1
Iron-(III)-chloride	$FeCl_3$	saturated	1/1	2	3	2	1/1	4/4	0	1/1	3/0	1/1
Acetic acid	$C_2H_4O_2$	10 %	1/1	2	3	1	1/1	1/1	1	(3)	4/4	1/1
Methyl acetate	$C_3H_6O_2$	technically pure	1/0	3	0	1	1/0	1/1	1	4/4	1/0	1/1
Ethanol	C_2H_6O	96 %	1/0	1	1	1	1/1	1/1	1	3/0	1/0	1/1
Ethanol	C_2H_6O	100 %	1/0	1	1	1	1/1	1/1	0	3/0	1/0	1/1
Ethyl acetate	$C_4H_8O_2$	100 %	1/3	3	3	1	1/1	(1)	0	4/4	1/0	1/1
Ethylene chloride	$C_2H_4Cl_2$		3/3	4	3	1	1/1	1/1L	1	3/0	3/0	1/1
Hydrofluoric acid	HF	50 %	1/1	2	3	1	1/1	4/4	2	1/3	4/4	1/1
Formaldehyde solution	CH_2O	10 %	1/1	1	2	1	1/1	1/1	1	3/0	3/3	1/1
Glycerine	$C_3H_8O_3$	90%	1/1	1	2	1	1/1	1/1	1	1/1	1/0	1/1
Heptane, n-	C_7H_{16}	90%	2/3	1	1	1	1/1	1/1	1	1/1	1/0	1/1
Hexane, n-	C_6H_{14}	100 %	2/3	1	2	1	1/1	1/1	1	1/1	4/4	1/1
Isopropanol	C_3H_8O	technically pure	1/1	1	2	1	1/1	(1)	1	1/1	1/0	1/1
Potassium hydroxide	KHO	10 %	1/1	1	3	1	1/1	1/1	1	4/4	1/0	1/1
Potassium nitrate	KNO_3	aqueous	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Magnesium chloride	$MgCl_2$	aqueous	1/1	1	2	1	1/1	1/0L	1	1/1	1/0	1/1
Methanol	CH_4O		1/1	1	2	1	1/1	1/1	1	3/4	2/0	1/1
Methyl benzene (toluene)	C_7H_8	100 %	3/4	3	3	1	1/1	1/1	0	3/3	1/0	1/0
Lactic acid	$C_3H_6O_3$	3 %	1/1	1	0	1	1/1	1/1	1	1/1	(3)	1/1
Mineral oil	—		1/1	1	1	1	1/1	1/1	1	1/1	(1)	1/1
Sodium bisulphite	$NaHSO_3$	aqueous	1/1	1	0	1	(1)	1/1	1	1/0	1/0	1/1
Sodium carbonate	Na_2CO_3	aqueous	1/1	1	3	1	1/1	1/1	1	1/1	1/0	1/1
Sodium chloride	NaCl	aqueous	1/1	1	2	1	1/1	1/2	1	1/1	1/1	1/1
Sodium hydroxide	NaHO	50 %	1/1	1	3	1	1/1	1/3	1	3/3	1/0	1/1
Sodium sulphate	Na_2SO_4	aqueous	1/1	1	0	1	1/1	1/1	1	1/1	1/0	1/1
Nitrobenzene	$C_6H_5NO_2$		3/4	3	4	1	1/1	1/1	0	4/4	4/4	1/1
Oleic acid	$C_{18}H_{34}O_2$	technically pure	1/3	1	1	1	(1)	1/1	0	2/2	1/0	1/1
Oxalic acid	$C_2H_2O_4 \times 2H_2O$	aqueous	1/1	2	0	1	1/1	1/3	2	1/1	4/4	1/1
Ozone	O_3		3/4	2	2	1	1/1	0/0	0	1/0	4/4	(1)
Petroleum	—	technically pure	1/3	3	1	1	(1)	1/1	0	1/0	1/0	1/1
Vegetable oils	—		0/0	1	1	1	(1)	1/1	0	1/0	0/0	1/1
Phenol	C_6H_6O	100 %	2/3	3	2	1	1/1	1/1	1	2/3	4/4	1/1
Phosphoric acid	H_3PO_4	85 %	1/1	1	0	1	1/1	1/3	1	1/1	4/4	1/1
Mercury-(II)-chloride	$HgCl_2$	aqueous	1/1	1	0	1	1/1	(4)	1	1/1	4/4	1/1
Nitric acid	HNO_3	1-10 %	1/1	1	3	1	1/1	1/1	1	1/1	4/4	1/1
Hydrochloric acid	HCl	1-5 %	1/1	1	3	1	1/1	4/4	1	1/1	4/4	1/1
Carbon disulphide	CS_2	100 %	4/4	2	0	1	1/1	1/1	1	1/0	3/0	1/0
Sulphuric acid	H_2SO_4	40 %	1/1	1	3	1	1/1	2/3	1	1/1	4/4	1/1
Carbon tetrachloride (tetra)	CCl_4	100 %	4/4	3	4	1	1/1	1/1L	1	1/1	4/4	1/1
Trichloroethylene	C_2HCl_3	100 %	3/4	4	4	1	1/1	1/1L	1	1/3	3/0	1/0
Citric acid	$C_6H_8O_7$	10 %	1/1	1	1	1	1/1	1/1	1	1/1	1/1	1/1

Tab. 14 Resistance List

5.6.1 Resistance List Legend

Resistances

Two values are given per medium:
left figure = value at +20 °C
right figure = value at +50 °C

0	no information available/no statement possible
1	very good resistance/suitable
2	good resistance/suitable
3	limited resistance
4	no resistance
K	no general information possible
L	risk of pitting or stress corrosion cracking
( )	estimated value

Material Name

HDPE	high density Polyethylene
FEP	Tetrafluoroethylene-Perfluoropropylene
V4A	Stainless steel 1.4401 (AISI 316)
PPO GF30	Polyphenyloxylene with 30 % glass fibre content
PU	Polyurethane
PEEK	Polyetheretherketone
PA	Polyamide
PVDF	Polyvinylidene Fluoride

6 Cleaning and Maintenance

6.1 Principles of Cleaning

WARNING

Germ Contamination

Due to the frequent use of the sensors in the waste water sector, parts can be contaminated with dangerous germs.

In case of contact with sensors and cables:

- *Observe the occupational safety regulations.*
- *Wear protective clothing.*

In heavily polluted media with a tendency to sedimentation, it may be necessary to clean flow velocity sensors at regular intervals. The intervals depend on the application. Use a brush with plastic bristles, a street broom or similar for this purpose.
Clean and dry dirty plug contacts (sensor connection "F" or "S") before reconnecting sensors. Carefully remove dried dirt with compressed air or a brush with plastic bristles (no metal). If necessary, use a contact spray to maintain the contacts.

CAUTION

Damage caused by hard objects

- *Never use hard objects such as wire brushes, rods, scrapers or similar to clean the sensor.*
- *The use of water jet cleaning is only permissible up to a permissible flushing pressure of max. 4 bar (see* Specifications *of the sensors) (e.g. hosing down with a water hose).*
- *As a matter of principle,* ***do not*** *clean flow velocity sensors with pressure measurement cell (Types VxD and VxU)* ***with a water jet****.*
- *Do not clean sensors with high-pressure cleaners. The use of high-pressure cleaners may damage the sensor and lead to measurement failure.*

6.2 Cleaning Wedge Sensors

CAUTION

Material damage and measurement errors due to loose parts

Removal or loosening of bottom plate or cable gland of the sensor will cause leakage and result in failure of measurement and sensor.

Do not remove any parts of the sensor.

Important Notice

If non-removable deposits prevent correct level measurement, the sensor must be serviced by NIVUS. To do this, please send the sensor in the best possible padding and packaging to NIVUS. See Chap. "3.5 Return"*.*

CAUTION

Damage to the pressure measurement cell during cleaning

***Never** clean the pressure measurement cell with a water jet. To clean the pressure measurement cell, simply immerse the sensor in a bucket of water and gently swirl it to clean it.*

The cover of the pressure measurement cell is sealed with a sticker on the bottom plate. This warning sticker must not be damaged or removed under any circumstances. Do not loosen the screws below the sticker.

If these regulations are violated, the NIVUS warranty shall expire. If in doubt, have the pressure probe cleaned by NIVUS.

Rinse the connection duct milled into the mounting plate for pressure measurement with water **immediately after each removal** to prevent deposits from sticking. To do this, immerse the sensor in water several times.

6.3 Maintenance Wedge Sensors

6.3.1 Wedge Sensors with Pressure Measurement Cell

The level measurement of sensors with pressure measurement cell is subject to a long-term drift for physical reasons (see Chap. *"5.5.3 Pressure Compensation Element for POA and CS2 Sensors"*).
Therefore, NIVUS recommend a 0-point calibration after every six months.
The best calibration results are achieved when the water level is as low as possible or when the sensor is dismantled and removed from the medium.

The calibration procedure is described in the operating instructions for the corresponding OCM Pro CF (OCP-S4/M4) or NivuFlow transmitters.

The wedge sensors with pressure measurement cell are additionally equipped with a filter element with drying granulate or with drying capsules at the connection plug or at the pressure compensation element. The drying granulate and the drying capsules are subject to natural wear, which is dependent on:

- Measurement duration
- Measurement interval
- Fluctuations in atmospheric pressure
- Environmental conditions

Check the air filter or the drying capsules at regular intervals or before each use. Wear is indicated by the colour change of the drying granulate or the drying capsules (see sticker on the air filter or pressure compensation element).
If the colour of the drying granulate starts to change, then change the drying granulate or replace the filter element with a new filter element of the same design. When the colour of the drying capsules starts to change, change them.

⇨ For replacement filter element, drying granulate and drying capsules, see Chap. *"8 Spare Parts and Accessories"*.

6.3.2 Pressure Compensation Element for CSM and CSP Sensors

When using CSM and CSP sensors with pressure measurement cell and pressure compensation element, the drying capsules inside (see *Fig. 5-10*) must be checked at regular intervals and replaced if necessary. The intervals depend on the prevailing humidity and can be between 2 and 12 weeks, depending on the application.

Once the drying capsules are used up, they change colour from orange to white. They must then be replaced.

- ORANGE = drying capsule new or not yet used
- WHITE = drying capsule used up - replace both

⇨ Replacement drying capsules are available from NIVUS (see Chap. *"8 Spare Parts and Accessories"*).

Note

When replacing the drying capsules, ensure that the glued-in O-ring remains in the groove. Always keep the O-ring free of dirt. Otherwise, the pressure compensation element may leak.

➲ **Replacing Drying Capsules:**

1. Loosen the four Phillips screws of the acrylic glass cover and remove the acrylic glass cover (see *Fig. 5-9*, Pos.1).
2. Remove used dry capsules (can be disposed of with household waste).
3. Remove the protective aluminium foil from the new drying capsules.
4. Insert the new drying capsules with the cardboard side down.
5. Check the position of the O-ring and reinsert it into the groove if necessary (see *Fig. 5-8* / *Fig. 5-9*, Pos. 4).
6. Replace the cover and secure it again with the 4 Phillips screws.
   Make sure that there is no dirt, sand or similar between the pressure compensation element and the cover.

6.3.3 Pressure Compensation Element for POA and CS2 Sensors

Check the filter element at regular intervals when using POA or CS2 sensors with pressure measurement cell and pressure compensation element. The intervals depend on the prevailing humidity and can be between 2 and 26 weeks, depending on the application. Wear of the air filter is indicated by the colour change of the drying granulate (see sticker on the air filter). If the drying granulate has discoloured by more than 50 %, then you must change it or replace the filter element.

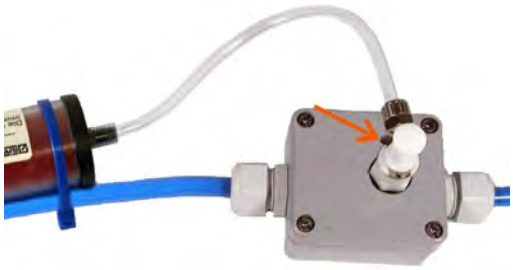
⇨ Replacement filter elements and drying granulate are available from NIVUS (see Chap. *"8 Spare Parts and Accessories"*).

1 Drying granulate
2 Filter disc
3 Filter cover

Fig. 6-1 Air filter, open

➲ **Replacing Drying Granulate:**

1. Cut the cable ties that secure the air filter to the sensor cable.
2. Press the lock (arrow) on the air hose plug to the pressure compensation element.



→ The air hose plug comes loose from the socket.

3. Unscrew the filter cover (*Fig. 6-1*, Pos. 3).
4. Remove the filter disc (*Fig. 6-1*, Pos. 2).
5. Pour out the dry granulate (can be disposed of with household waste).
6. Fill the air filter with new drying granulate.
7. Cover the dry granulate with the filter disc again, the fine side facing the screw connection.
8. Fit the filter cover and screw it shut.
9. Re-insert the air hose plug into the socket of the pressure compensation element.
   → The air hose plug and the lock snap into place.
10. Reattach the air filter to the sensor cable with a new cable tie.

6.4 Cleaning and Maintenance Sensors OCL and DSM

These sensors work contactlessly. After immersing (flooding) in the measurement medium, check whether the transmission surface is unoccupied and the sound beam is free to the water surface.

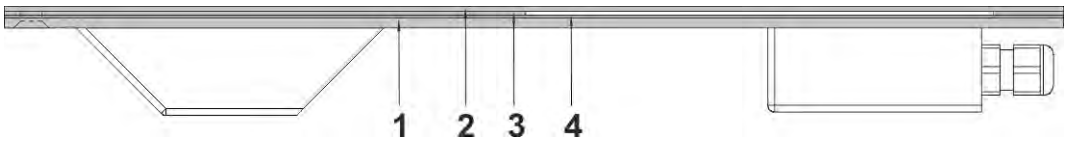
If the sensor is dirty, clean it with water and a cloth or soft brush.

CAUTION

Material damage and measurement errors due to loose or dismantled parts

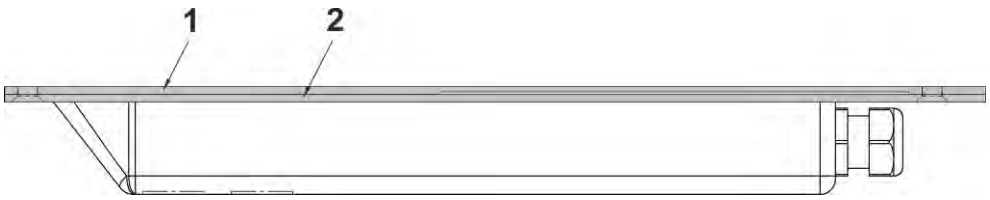
Removing or loosening the mounting plate or the cable gland of the sensor leads to leakage and results in failure of the measurement/sensor.

Never remove any parts from the sensor (exceptions see Fig. 6-2 *and* Fig. 6-3*).*



1 **Never remove** the base plate!
2 Cover sheet, may be dismantled
3 Spacer plate long and short, may be dismantled
4 Intermediate plate, may be dismantled

Fig. 6-2 Sensor DSM: Overview of parts that may / may not be removed



1 Cover sheet, may be removed (optional on OCL-L3)
2 **Never remove** the base plate!

Fig. 6-3 Sensor OCL: Overview of parts that may / may not be removed

6.5 Cleaning and Maintenance Pipe Sensors POA and CS2

The pipe sensor can be easily removed from the pipe for cleaning or inspection. Its position is fixed by the fastening element.

For a description of the fastening element and the sensor screw connection, see *Mounting Instruction Cross Correlation and Doppler Sensors.*

➲ **Dismantling POA or CS2 Pipe Sensor:**

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

2. Loosen the two hexagon socket screws on the rear, upper clamp element of the fastening element.
3. Remove the pipe sensor.
   The two screwed rear clamping elements remain unchanged on the pipe sensor body. The clamping elements serve as a stop and positioning aid when refitting.

➲ **Pipe Sensor Cleaning:**

⇨ See Chap. *"6.1 Principles of Cleaning"*.

➲ **Reinstall POA or CS2 Pipe Sensor:**

1. Replace the O-ring (Art. No. *ZUB0 SCHNEID 15PT*) and white sealing ring (PDFE; Art. No. *E-PMA-ORING35*) of the sensor screw connection and grease lightly.

2. Insert the sensor into the sensor screw connection. The clamp elements must be together again.
3. Tighten the union nut on the sensor.
4. Screw the fastening element back on with the two M5 hexagon socket screws.

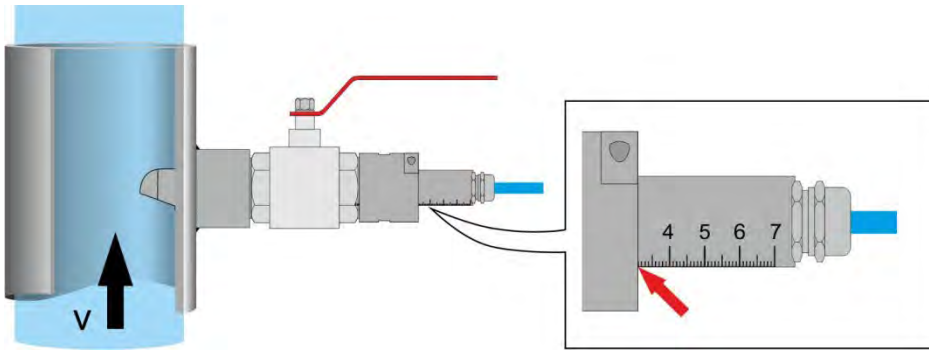
6.6 Cleaning and Maintenance Pipe Sensor CSM

The pipe sensor can be removed from the pipe for cleaning or inspection purposes.

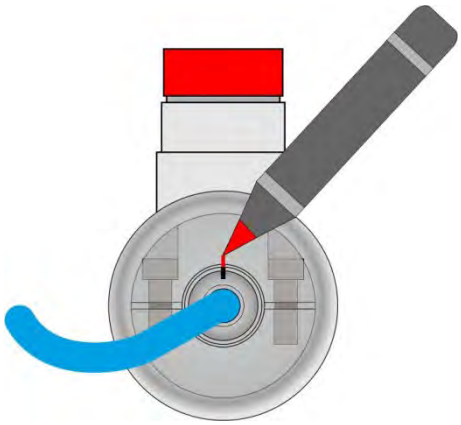
For a description of the CSM Pipe sensor see *Mounting Instruction Cross Correlation and Doppler Sensors.*

➲ **Removing CSM Pipe Sensor:**

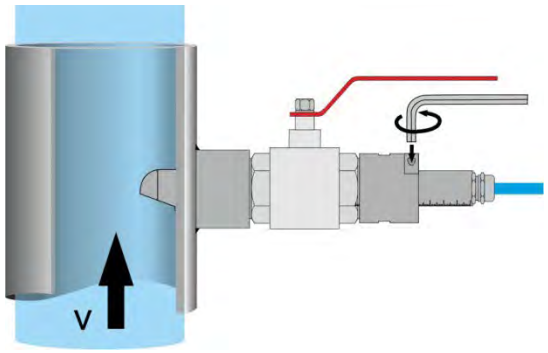
1. Read the insertion depth of the pipe sensor from the scale and write it down.



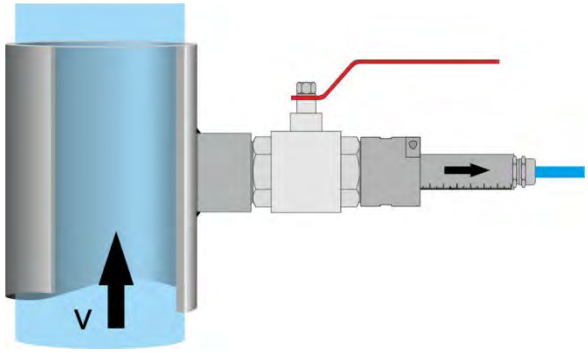
2. Mark the sensor position (scaling on the pipe sensor) on the sensor clamp. You can use this marking to align the pipe sensor when reinstalling it.



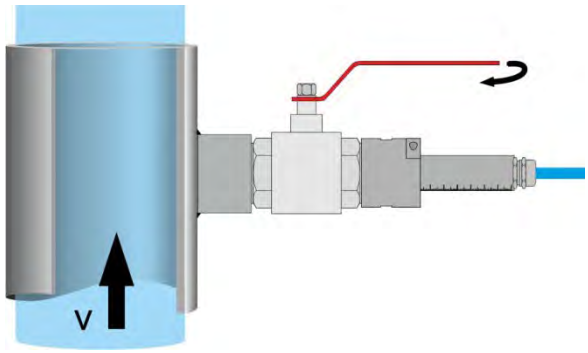
3. Loosen the two M5 cylinder screws on the sensor clamp using a 4 mm Allen key.



4. Pull the pipe sensor out of the pipe as far as it will go.

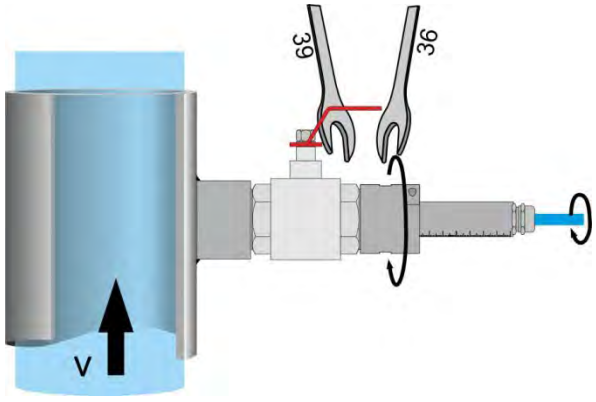


5. Close the stop ball valve immediately.



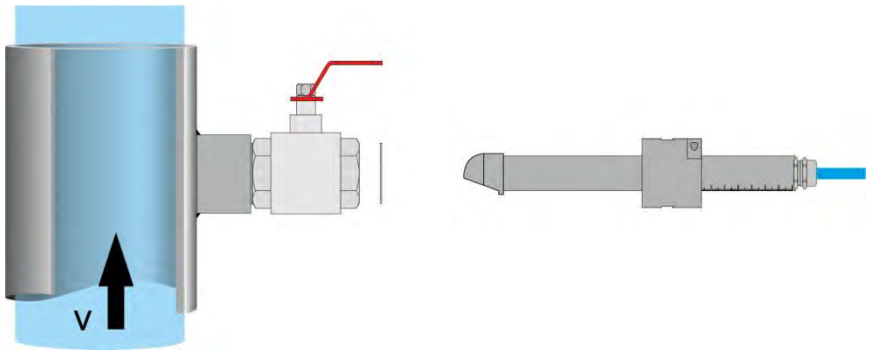
→ No more medium can escape from the pipe.

6. Use 2 spanners (SW36 and SW39) to unscrew the sensor clamp from the stop ball valve, turning the sensor cable at the same time.



→ The pipe sensor is only connected to the sensor clamp.

7. Remove the pipe sensor, the sensor clamp remains loosely connected to the pipe sensor. Make sure that the flat gasket is not lost.



➲ **Pipe Sensor Cleaning:**

⇨ See Chap. *"6.1 Principles of Cleaning".*

➲ **Reinstall the pipe sensor in reverse order:**

1. Push the pipe sensor into the stop ball valve.
2. Tighten the sensor clamping:
   a) Replace the flat gasket between the stop ball valve and the sensor clamp correctly.
   b) Use 2 spanners (SW36 and SW39) to tighten the sensor clamp on the shut-off ball valve to at least 10 Nm, turning the sensor cable at the same time.
3. Open the stop ball valve and push the pipe sensor into the pipe, insertion depth as determined before removal.
4. Align the pipe sensor using the marking you made on the sensor clamp before removing it.
   The centre line of the scaling must point against the direction of flow.
5. Use a 4 mm Allen key to tighten the two screws on the sensor clamp to approx. 3.4 Nm.

   → The pipe sensor is permanently fitted.

6.7 Installation of Spare Parts and Wearing Parts

We expressly draw your attention to the fact that spare parts and accessories which have not been supplied by us have also not been tested and approved by us. The installation and/or use of such products may therefore negatively alter or invalidate the design properties of your measurement system.
NIVUS GmbH are not liable for damage caused by the use of non-original parts and non-original accessories.

⇨ Spare parts and accessories can be found in chapter *"8 Spare Parts and Accessories"* or in the current NIVUS price list.

6.8 Customer Service Information

For the recommended annual inspection of the entire measuring system or complete maintenance after ten years at the latest, contact our customer service:

NIVUS GmbH - Customer Centre

Phone +49 7262 9191-922
customercenter@nivus.com

7 Dismantling/Disposal

Improper disposal may be harmful to the environment.

➲ **Dispose of device components and packaging materials in accordance with the applicable local environmental regulations for electrical products:**

1. Disconnect the measurement system from the mains.
2. Use a suitable tool to disconnect the connected cables from the transmitter.
3. Remove the sensors from the channel bottom.

EU WEEE Directive

This symbol indicates that the requirements of Directive 2012/19/EC on waste electrical and electronic equipment must be observed when disposing of the device.

NIVUS GmbH support and promote the recycling or environmentally sound, separate collection/disposal of waste electrical and electronic equipment to protect the environments and human health. Observe the local laws and regulations on disposal.

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

8 Spare Parts and Accessories

Pressure Compensation Element *ZUB0 DAE*	For connecting sensors with integrated pressure measurement cell and open cable end (cable tail); Material: Aluminium; Plastic; Protection class: IP54 (except filter element)
Replacement filter element *ZUB0 FILTER*	With connector and connection hose for connecting sensors with integrated pressure measurement cell to the pressure compensation element *ZUB0 DAE*.
Drying granulate *ZUB0 FILTER MAT* *ZUB0 FILTER MAT5*	To refill used air filters of the filter element *ZUB0 FILTER.* 1 kg (for approx. 25 refills) 200 g (for approx. 5 refills)
Replacement drying capsules *ZUB0 TROCKENK*	20 Replacement drying capsules (individually packaged) for the pressure compensation element on the CSM or CSP sensor
Pipe Mounting System *ZUB0 RMS2…* *ZUB0 RMS3…* *ZUB0 RMS4…* *ZUB0 RMS5…*	For the temporary installation of POA, CSM and CS2 wedge sensors in pipes from DN200 to a maximum of DN2000; Material: 1.4571
Sensor Adapter *ZUB0 KLEMM…*	Metal junction box incl. terminals for adapting PCM sensors (with plug) to an NF7 or OCM Pro CF (OCP-S4/M4) (in Ex and non-Ex areas)
Extraction Tool *ZUB0 AA*	For inserting and removing 1½" pipe sensors manually under process conditions, pressure-resistant up to 4 bars (not suitable for installation or dismantling)
Stop Ball Valve *ZUB0 HAHN R15*	To remove pipe sensors from pipes without pressure
Tapping Saddle *ZUB0 ABS01…*/ bis *...03*	For installation of 1½" pipe sensors in pipelines
Mounting Plates *ZUB0 ABP15…*	For the installation of 1½" pipe sensors on GRP and concrete pipes
Welding Nozzle *ZUB0 STU15…*	For the installation of 1½" pipe sensors in steel or stainless steel pipes

More accessories for sensor mounting can be found in our current price list/parts list.

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10 Certificates and Approvals

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 03 ATEX 2262 X** **Issue:** 00

(4) for the product: Sensors type POA, OCL and CS2
"See type code for details"

(5) of the manufacturer: **NIVUS GmbH**

(6) Address: Im Täle 2
75031 Eppingen
Germany

Order number: 8003063712
Date of issue: See date of signature

(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. 23 203 358711.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN IEC 60079-0:2018/AC:2020-02 **EN 60079-11:2012**
except in respect of those requirements listed at item 18 of the schedule.

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

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

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

Ex II 2 G Ex ib IIB T4 Gb

TÜV NORD CERT GmbH, Am TÜV 1, 45307 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 deputy head of the notified body

TÜVNORD Digital unterschrieben von Heinen Thomas Datum: 2023.12.20 14:30:19 +01'00'

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

TÜV NORD Certification

(13) **SCHEDULE**

(14) **EU-Type Examination Certificate No. TÜV 03 ATEX 2262 X** **Issue 00**

(15) **Description of product:**
The sensors type POA, OCL and CS2 according to the type code are intended for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via ultrasonic technology.

Type code:
POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-x2xx xx E xx x x resp.
POA-x3xx xx E xx x x, OCL-L3 xx xx E xx K and CS2-x3xx xx E xx x x

POA-	Type	Sensor with location-resolved flow velocity over (up to) 16 scan layers				
	V200 V300	without level measurement				
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571			
		Kx	Wedge sensor special version			
		RT	PPO tube sensor with PEEK insert; tube material 1.4571			
		Rx	Tube sensor special version			
	V2H1 V3H1	With ultrasound from below for level measurement				
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571			
		Kx	Wedge sensor special version			
		RT	PPO tube sensor with PEEK insert; tube material 1.4571			
		Rx	Tube sensor special version			
	V2D0 V3D0	with pressure cell for level measurement				
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571			
		Kx	Wedge sensor special version			
	V2U1 V3U1	with pressure cell and ultrasound from below for level measurement				
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571			
		Kx	Wedge sensor special version			
			ATEX approval			
			0	without		
			E	Zone 1		
				Cable length (max. 150m / with pressure cell up to 30m possible)		
				xx		
					Sensor connection	
					x	
						Tube length (0 for wedge sensor)
						x

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 03 ATEX 2262 X **Issue 00**

OCL-L1 OCL-L3	Type + design	Air ultrasonic sensor
	KS	Wedge sensor standard version PPO; cable: PUR
	xx	Special version
		Transmission frequency
		12 120 kHz
		xx Special version
		ATEX approval
		0 without
		E Zone 1
		Cable length (max. 150m)
		xx
		Sensor connection
		K Cable end prefabricated

CS2-	Type	Correlation sensor for large geometries
	V200 V300	without level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
		RP Tube sensor made of highly resistive solid PEEK; tube material 1.4571
		Rx Tube sensor special version
	V2H1 V3H1	With ultrasound from below for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
	V2D0 V3D0	with pressure cell for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
	V2U1 V3U1	with pressure cell and ultrasound from below for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
		ATEX approval
		0 without
		E Zone 1
		Cable length (max. 150m / with pressure cell up to 30m possible)
		xx
		Sensor connection
		x
		Tube length (0 for wedge sensor)
		x

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 03 ATEX 2262 X Issue 00

Electrical data:

POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-x2xx xx E xx x x:

Signal- and supply circuit (Cabel tail; Connection wires: Red (X6): + Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 90 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-... according to TÜV 00 ATEX 1572 or
Type PCP-... according to TÜV 03 ATEX 2268 or
Type IXT0-... according to TÜV 14 ATEX 142076

Connection wire black (X10)	Shield
RS485 interface (Cabel tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 6 V I_o = 81.9 mA (long time; for calculation of P_o) I_o = 154 mA (short time; for calculation of L_o, C_o) P_o = 123 mW Characteristic line: linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	12.88	9.88	0.38	0.083
	C_o [µF]	7.08	8.38	21.98	29.98

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.

Or

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 03 ATEX 2262 X Issue 00

RS485 interface (Cabel tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	Maximum values: U_i = 12.06 V I_i = 176 mA P_i = 531 mW
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 70 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X1..X4) and temperature circuit (X12;X5;X7) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

POA-x3xx xx E xx x x, OCL-L3 xx xx E xx K and CS2-x3xx xx E xx x x:

Signal- and supply circuit (Cabel tail; Connection wires: Red (X1): + Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 90 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-... according to TÜV 00 ATEX 1572 or
Type PCP-... according to TÜV 03 ATEX 2268 or
Type IXT0-... according to TÜV 14 ATEX 142076

Connection wire black (X3)	Shield
RS485 interface (Cabel tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 5.4 V I_o = 76 mA (long time; for calculation of P_o) I_o = 124.93 mA (short time; for calculation of L_o, C_o) P_o = 102.6 mW Characteristic line: linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 03 ATEX 2262 X Issue 00

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	19.88	9.88	0.38	0.08
	C_o [µF]	7.98	11.98	27.98	36.98

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.

Or

RS485 interface (Cabel tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	Maximum values: U_i = 10.7 V I_i = 236.3 mA P_i = 634.4 mW
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 70 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X6..X9) and temperature circuit (X10;X11;X12) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

Thermal data:
Permissible ambient temperature range during operation: -20 °C ≤ Ta ≤ +40 °C

(16) Drawings and documents are listed in the ATEX Assessment Report No. 23 203 358711

(17) **Specific Conditions for Use:**
The reactances of the used cable of the variant POA-x2xx xx E xx x x, OCL-L1 xx xx E xx xx K and CS2-x2xx xx E xx x x are considered for this issue 00 of TÜV 03 ATEX 2262 X. Consequently, these data in the EC type-examination certificate and these associated supplements are no longer valid and are to be replaced by the values in this issue 00 of the EU type-examination certificate.

(18) **Essential Health and Safety Requirements:**
No additional ones.

- End of EU-Type Examination Certificate -

IECEx Certificate of Conformity

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

Certificate No.:	**IECEx TUN 15.0014**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 2	Issue 1 (2015-07-24) Issue 0 (2015-06-11)
Date of Issue:	2023-12-20		
Applicant:	**NIVUS GmbH** Im Täle 2 75031 Eppingen **Germany**		
Equipment:	**Sensors type POA, OCL and CS2 "See type code for details"**		
Optional accessory:			
Type of Protection:	**Intrinsic safety**		
Marking:	Ex ib IIB T4 Gb		

Approved for issue on behalf of the IECEx Certification Body: **Thomas Heinen**

Position: **Deputy Head of the IECEx Certification Body**

Signature: (for printed version)

Date: (for printed version)

TÜVNORD Digital unterschrieben von Heinen Thomas Datum: 2023.12.20 14:25:40 +01'00'

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 www.iecex.com or use of this QR Code.

Certificate issued by:

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

TÜV NORD

IECEx Certificate of Conformity

Certificate No: **IECEx TUN 15.0014** Page 2 of 4

Date of issue: 2023-12-20 Issue No: 2

Manufacturer: **NIVUS GmbH**
Im Täle 2
75031 Eppingen
Germany

Manufacturing locations:

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

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

This Certificate **does not** indicate compliance with 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/ExTR15.0032/01

Quality Assessment Report:

DE/TUN/QAR13.0011/09

IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 15.0014** Page 3 of 4

Date of issue: 2023-12-20 Issue No: 2

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

Description:

The sensors type POA, OCL and CS2 according to the type code are intended for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via ultrasonic technology.

Type code; Electrical data:

Refer to the attachement to IECEx TUN 15.0014issue No.2

Thermal data:

Permissible ambient temperature range during operation: -20 °C ≤ Ta ≤ +40 °C

SPECIFIC CONDITIONS OF USE: NO

IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 15.0014** Page 4 of 4

Date of issue: 2023-12-20 Issue No: 2

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
Proof of conformity of the sensors type POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-xxxx xx E xx x x to the current versions of the standards IEC 60079-0:2017 and IEC 60079-11:2011.

Annex:

Attachment to IECEx TUN 15.0014 issue No.2.pdf

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Am TÜV 1
30519 Hannover
Germany

TÜV NORD
Zertifizierung

Page 1 of 5
Attachment to IECEx TUN 15.0014 issue No.: 2

Description:
The sensors type POA, OCL and CS2 according to the type code are intended for measurement of the flow speed and the flow level in partly or fully filled pipes and channels via ultrasonic technology.

Type code:
POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-x2xx xx E xx x x resp.
POA-x3xx xx E xx x x, OCL-L3 xx xx E xx K and CS2-x3xx xx E xx x x

POA-	Type	Sensor with location-resolved flow velocity over (up to) 16 scan layers
	V200 V300	without level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
		RT PPO tube sensor with PEEK insert; tube material 1.4571
		Rx Tube sensor special version
	V2H1 V3H1	With ultrasound from below for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
		RT PPO tube sensor with PEEK insert; tube material 1.4571
		Rx Tube sensor special version
	V2D0 V3D0	with pressure cell for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
	V2U1 V3U1	with pressure cell and ultrasound from below for level measurement
		KT Wedge sensor made of PPO with PEEK insert; base plate 1.4571
		Kx Wedge sensor special version
		ATEX approval
		0 without
		E Zone 1
		Cable length (max. 150m / with pressure cell up to 30m possible)
		xx
		Sensor connection
		x
		Tube length (0 for wedge sensor)
		x

OCL-L1 OCL-L3	Type + design	Air ultrasonic sensor
	KS	Wedge sensor standard version PPO; cable: PUR
	xx	Special version
		Transmission frequency
		12 120 kHz
		xx Special version
		IECEx approval
		0 without
		E Zone 1
		Cable length (max. 150m)
		xx
		Sensor connection
		K Cable end prefabricated

P17-F-610 Rev. 01 / 06.18

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Hannover Office
Am TÜV 1
30519 Hannover
Germany

TÜV NORD Zertifizierung

CS2-	Type	Correlation sensor for large geometries					
	V200 V300	without level measurement					
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571				
		Kx	Wedge sensor special version				
		RP	Tube sensor made of highly resistive solid PEEK; tube material 1.4571				
		Rx	Tube sensor special version				
	V2H1 V3H1	With ultrasound from below for level measurement					
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571				
		Kx	Wedge sensor special version				
	V2D0 V3D0	with pressure cell for level measurement					
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571				
		Kx	Wedge sensor special version				
	V2U1 V3U1	with pressure cell and ultrasound from below for level measurement					
		KT	Wedge sensor made of PPO with PEEK insert; base plate 1.4571				
		Kx	Wedge sensor special version				
			ATEX approval				
			0	without			
			E	Zone 1			
				Cable length (max. 150m / with pressure cell up to 30m possible)			
				xx			
					Sensor connection		
					x		
						Tube length (0 for wedge sensor)	
						x	

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Germany

TÜV NORD Zertifizierung

Page 3 of 5
Attachment to IECEx TUN 15.0014 issue No.: 2

Electrical data:

POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-x2xx xx E xx x x:

Signal- and supply circuit (Cabel tail; Connection wires: Red (X6): + Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 90 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-...
Type PCP-...
Type IXT0-...

Connection wire black (X10)	Shield
RS485 interface (Cabel tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 6 V I_o = 81.9 mA (long time; for calculation of P_o) I_o = 154 mA (short time; for calculation of L_o, C_o) P_o = 123 mW Characteristic line: linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	12.88	9.88	0.38	0.083
	C_o [µF]	7.08	8.38	21.98	29.98

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.

Or

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30519 Hannover
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TÜV NORD Zertifizierung

Page 4 of 5
Attachment to IECEx TUN 15.0014 issue No.: 2

RS485 interface (Cabel tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	Maximum values: U_i = 12.06 V I_i = 176 mA P_i = 531 mW
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 70 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X1..X4) and temperature circuit (X12;X5;X7) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

POA-x3xx xx E xx x x, OCL-L3 xx xx E xx K and CS2-x3xx xx E xx x x:

Signal- and supply circuit (Cabel tail; Connection wires: Red (X1): + Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values:
	U_i = 10.5 V I_i = 640 mA P_i = 6.72 W
Effective internal capacitance C_i	Capacitance of the permanently connected cable C_c C_c = 90 pF/m x L*
Effective internal inductance L_i	Inductance of the permanently connected cable L_c L_c = 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-...
Type PCP-...
Type IXT0-...

Connection wire black (X3)	Shield
RS485 interface (Cabel tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values:
	U_o = 5.4 V I_o = 76 mA (long time; for calculation of P_o) I_o = 124.93 mA (short time; for calculation of L_o, C_o) P_o = 102.6 mW Characteristic line: linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

P17-F-610 Rev. 01 / 06.18

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TÜV NORD Zertifizierung

Ex ib IIB	L_o [mH]	19.88	9.88	0.38	0.08
	C_o [µF]	7.98	11.98	27.98	36.98

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.

Or

RS485 interface
(Cabel tail;
Connection wires:
White (X5): RxTx+
Green (X4): RxTx-
Blue (X2): GND)

Maximum values:
U_i = 10.7 V
I_i = 236.3 mA
P_i = 634.4 mW

Effective internal capacitance C_i

Capacitance of the permanently connected cable C_c
C_c = 70 pF/m x L*

Effective internal inductance L_i

Inductance of the permanently connected cable L_c
L_c = 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X6..X9) and temperature circuit (X10;X11;X12) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

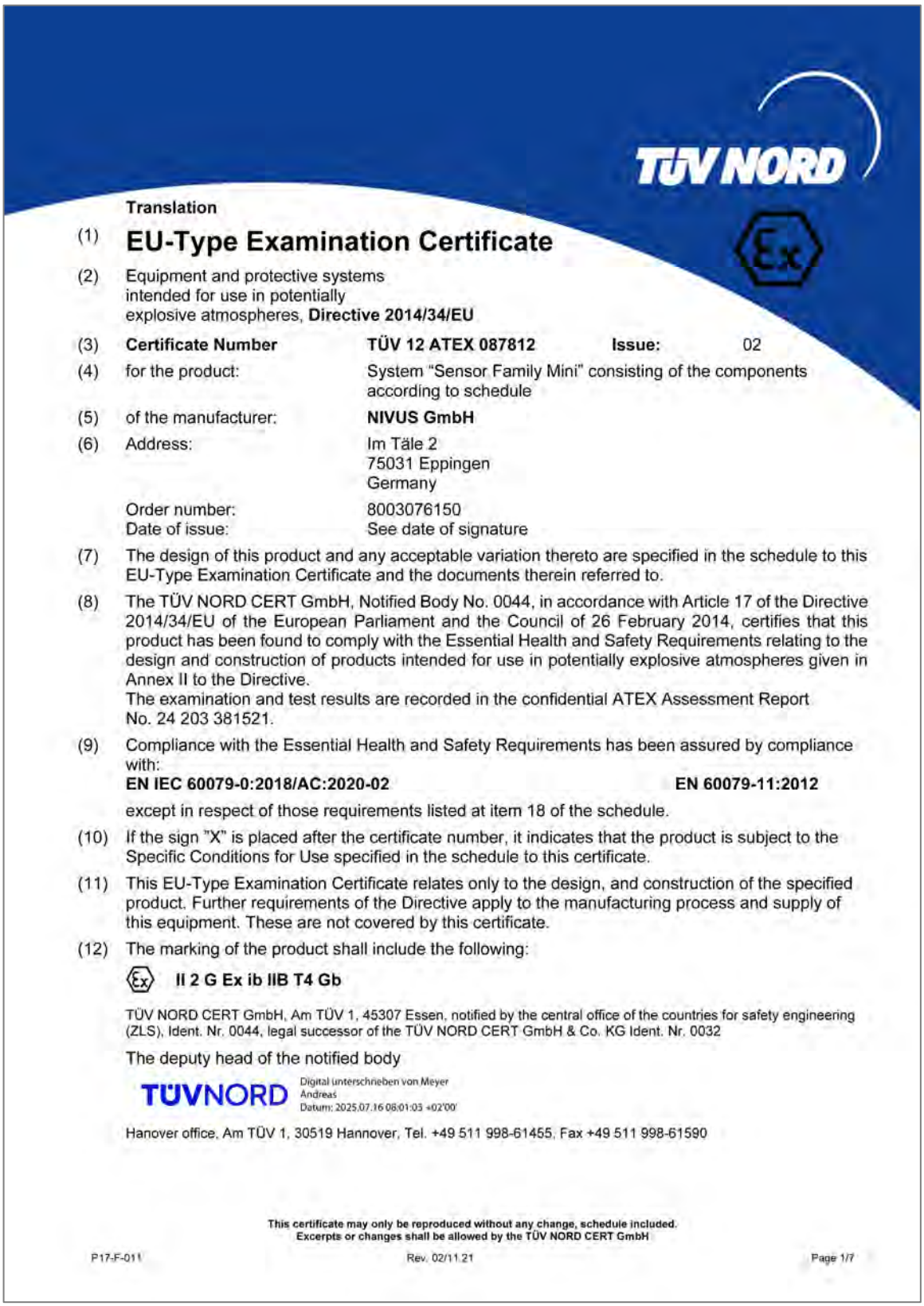
Thermal data:
Permissible ambient temperature range during operation: -20 °C ≤ Ta ≤ +40 °C

Details of change:
Proof of conformity of the sensors type POA-x2xx xx E xx x x, OCL-L1 xx xx E xx K and CS2-xxxx xx E xx x x to the current versions of the standards IEC 60079-0:2017 and IEC 60079-11:2011.

Specific Conditions of Use:
None.

The Mini sensor family system consists of the following components:

- Electronic Box Mini Type EBM
- Correlation Sensor Mini Type CSM or CSM-D
- Distance Sensor Mini Type DSM
- Correlation-Sensor Type CSP



TÜV NORD

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:** 02

(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
Germany

Order number: 8003076150
Date of issue: See date of signature

(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. 24 203 381521.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN IEC 60079-0:2018/AC:2020-02 **EN 60079-11:2012**
except in respect of those requirements listed at item 18 of the schedule.

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

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

(12) The marking of the product shall include the following:
Ex II 2 G Ex ib IIB T4 Gb

TÜV NORD CERT GmbH, Am TÜV 1, 45307 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 deputy head of the notified body

TÜVNORD Digital unterschrieben von Meyer Andreas
Datum: 2025.07.16 08:01:05 +02'00'

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**

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TÜV NORD Certification

(13) **S C H E D U L E**

(14) **EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02**

(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 EBM type V1L1 or type V3L1
- 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

Type code:

Electronic-Box-Mini EBM	Sensors	
Type V1L1 or Type V3L1	Correlation sensor	Type CSM-V100, CSM-V1D0, CSM-V100Rx, CSP-V2xx
	Distance sensor	Type DSM-L0 und Füllstandsensor OCL-LM
	Clamp-on sensor	Type NIC-CO
	Transit time sensor	Type NIS0 V200, TSP0 V200, NIS-V200 und NIS-V280

EBM	Type							
	Type							Electronic-Box-Mini for connecting for connecting 1 x CSM and 1 x DSM sensor
	V1L1 **V3L1**							Internal construction with POA-V2 sensor generation **Internal construction with POA-V3 sensor generation**
		Design						
		RD						Standard design
		xx						Special design
			ATEX- Approval					
			0					Without
			E					ATEX-Approval Zone 1
				Cable length (max. 150 m)				
				03				3 m
				10				10 m
				99				100 m
				xx				Special length
					K			Cable end pre-assembled for connection to the NivuFlow 750 and NivuFlow 7550 transmitters via the Ex-Separator-Module iXT0

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02

Electrical data:

System "Sensor Family Mini" with the Elektronik-Box-Mini EBM type V1L1:

Signal- and supply circuit (Cable tail; Connection wires: Red (X6): + Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W Effective internal capacitance C_i = Capacitance of the permanently connected Cable = 90 pF/m x L* Effective internal inductance L_i = Inductance of the permanently connected Cable = 0.76 µH/m x L*

L*: Length of the connected Cable has to not exceed 150 m.

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-... according to TÜV 00 ATEX 1572 or
Type PCP-... according to TÜV 03 ATEX 2268 or
Type IXT0-... according to TÜV 14 ATEX 142076

Connection wire black (X10)	Shield
RS485 interface (Cable tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 6 V I_o = 81.9 mA (long time; for calculation of P_o) I_o = 154 mA (short time; for calculation of L_o, C_o) P_o = 123 mW Characteristic line: Linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	12.88	9.88	0.38	0.083
	C_o [µF]	7.08	8.38	21.98	29.98

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.

Or

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02

RS485 interface (Cable tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	Maximum values: U_i = 12.06 V I_i = 176 mA P_i = 531 mW Effective internal capacitance C_i = Capacitance of the permanently connected Cable C_c C_c = 70 pF/m x L* Effective internal inductance L_i = Inductance of the permanently connected Cable L_c L_c = 0.78 µH/m x L*

L*: Length of the connected Cable has to not exceed 150 m.

The internal pressure circuit (X1..X4) and temperature circuit (X12;X5;X7) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

The interconnection of the Electronic-Box-Mini EBM with the sensors

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

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

Piezo connections (Connector Pins A/B or C/D)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to the intrinsically safe circuits of the devices "Electronic-Box-Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation C_i = 11 nF L_i = 12 µH
1-Wire temperature sensor 1-Wire EEPROM (Connector Pins E, F and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 188 mA P_i = 282 mW Effective internal capacitance C_i = 120 nF Effective internal inductance is negligibly small.
Pressure cell (Connector Pins E, G, H and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 264 mA P_i = 396 mW Effective internal capacitance C_i = 6.484 µF Effective internal inductance is negligibly small.

All intrinsically safe circuits are galvanically interconnected with each other via GND potential and safely galvanically separated from earth potential.

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02

System "Sensor Family Mini" with the Elektronik-Box-Mini EBM type V3L1:

Signal- and supply circuit (Cable tail; Connection wires: Red (X1): + Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W Effective internal capacitance C_i = 2.2 µF + Capacitance of the permanently connected Cable = 2.2 µF + 90 pF/m x L* Effective internal inductance L_i = 4.7 µH + Inductance of the permanently connected Cable = 4.7 µH + 0.76 µH/m x L*

L*: Length of the connected Cable has to not exceed 150 m.

The connection to the following measuring transducers of the manufacturer NIVUS is permissible:
Type OCP-... according to TÜV 00 ATEX 1572 or
Type PCP-... according to TÜV 03 ATEX 2268 or
Type IXT0-... according to TÜV 14 ATEX 142076

Connection wire black (X3)	Shield
RS485 interface (Cable tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 5.4 V I_o = 76 mA (long time; for calculation of P_o) I_o = 124.93 mA (short time; for calculation of L_o, C_o) P_o = 102.6 mW Characteristic line: Linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	19.88	9.88	0.38	0.08
	C_o [µF]	7.98	11.98	27.98	36.98

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.

Or

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02

RS485 interface (Cable tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	Maximum values: U_i = 10.7 V I_i = 236.3 mA P_i = 634.4 mW Effective internal capacitance C_i = Capacitance of the permanently connected Cable C_c C_c= 70 pF/m x L* Effective internal inductance L_i = 1.5 mH + Inductance of the permanently connected Cable L_c L_c = 1.5 mH + 0.78 µH/m x L*

L*: Length of the connected Cable has to not exceed 150 m.

The internal pressure circuit (X6..X9) and temperature circuit (X10;X11;X12) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

The interconnection of the Electronic-Box-Mini EBM with the sensors

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

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

Piezo connections (Connector Pins A/B or C/D)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to the intrinsically safe circuits of the devices "Electronic-Box-Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation C_i = 11 nF L_i = 12 µH
1-Wire temperature sensor 1-Wire EEPROM (Connector Pins E, F and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 188 mA P_i = 282 mW Effective internal capacitance C_i = 120 nF Effective internal inductance is negligibly small.
Pressure cell (Connector Pins E, G, H and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 264 mA P_i = 396 mW Effective internal capacitance C_i = 6.484 µF Effective internal inductance is negligibly small.

All intrinsically safe circuits are galvanically interconnected with each other via GND potential and safely galvanically separated from earth potential.

TÜV NORD Certification

Schedule to EU-Type Examination Certificate No. TÜV 12 ATEX 087812 Issue 02

Thermal data:
Permissible ambient temperature range during operation:

- Electronic-Box-Mini EBM: -20 °C … +40 °C
- For all Sensors: -40 °C … +80 °C

(16) Drawings and documents are listed in the ATEX Assessment Report No. 24 203 381521

(17) **Specific Conditions for Use:**
None.

(18) **Essential Health and Safety Requirements:**
No additional ones.

- End of EU-Type Examination Certificate -

IECEx Certificate of Conformity

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

Certificate No.:	**IECEx TUN 18.0023**	Page 1 of 4	Certificate history:
Status:	**Current**	Issue No: 2	Issue 1 (2019-05-10) Issue 0 (2018-11-20)
Date of Issue:	2025-07-16		
Applicant:	**NIVUS GmbH** Im Täle 2 75031 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: **Andreas Meyer**

Position: **Deputy Head of the IECEx Certification Body**

Signature: (for printed version)

Date: (for printed version)

TÜVNORD Digital unterschrieben von Meyer Andreas Datum: 2025.07.16 09:45:16 +02'00'

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 www.iecex.com or use of this QR Code.

Certificate issued by:

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

TÜV NORD

IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 18.0023** Page 2 of 4

Date of issue: 2025-07-16 Issue No: 2

Manufacturer: **NIVUS GmbH**
Im Täle 2
75031 Eppingen
Germany

Manufacturing locations:

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 equipment 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 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

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

This Certificate **does not** indicate compliance with 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/ExTR18.0026/02

Quality Assessment Report:

DE/TUN/QAR13.0011/10

IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 18.0023** Page 3 of 4

Date of issue: 2025-07-16 Issue No: 2

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 to IECEx TUN 18.0023X issue No.2

SPECIFIC CONDITIONS OF USE: NO

IECEx Certificate of Conformity

Certificate No.: **IECEx TUN 18.0023** Page 4 of 4

Date of issue: 2025-07-16 Issue No: 2

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
The subject of IECEx TUN 18.0023 issue No.2 is the use of the new POA-V3 sensor electronics (IECEx TUN 15.0014 Issue 2) within the Electronic-Box-Mini EBM, new Ex add-on PCB, new front panel PCB and update to the standards IEC 60079-0:2017 and IEC 60079-11:2011

IECEx TUN 18.0023 issue No.1
Electronic-Box-Mini EBM type V1L1
Internal construction with POA-V2 sensor generation

IECEx TUN 18.0023 issue No.2
Electronic-Box-Mini EBM type V3L1
Internal construction with POA-V3 sensor generation

Note: All outputs are linear due to the electronic changes.

Annex:

Attachment to IECEx TUN 18.0023 issue No.2.pdf

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30519 Hannover
Germany

TÜV NORD Zertifizierung

Attachment to IECEx TUN 18.0023 issue No.: 2

General product information:

Description:
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 EBM type V1L1 or type V3L1
- 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

Type code:

Electronic-Box-Mini EBM	Sensors	
Type V1L1 or Type V3L1	Correlation sensor	Type CSM-V100, CSM-V1D0, CSM-V100Rx, CSP-V2xx
	Distance sensor	Type DSM-L0 und Füllstandsensor OCL-LM
	Clamp-on sensor	Type NIC-CO
	Transit time sensor	Type NIS0 V200, TSP0 V200, NIS-V200 und NIS-V280

•

EBM	Type							
EBM	Type							Electronic-Box-Mini for connecting for connecting 1 x CSM and 1 x DSM sensor
	V1L1 **V3L1**							Internal construction with POA-V2 sensor generation **Internal construction with POA-V3 sensor generation**
		Design						
		RD						Standard design
		xx						Special design
			IECEx- Approval					
			0					Without
			E					IECEx-Approval Zone 1
				Cable length (max. 150 m)				
				03				3 m
				10				10 m
				99				100 m
				xx				Special length
					K			Cable end pre-assembled for connection to the NivuFlow 750 and NivuFlow 7550 transmitters via the Ex-Separator-Module iXT0

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Attachment to IECEx TUN 18.0023 issue No.: 2

Electrical data:

System "Sensor Family Mini" with the Electronic-Box-Mini EBM type V1L1:

Signal- and supply circuit (Cable tail; Connection wires: Red (X6): + Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W Effective internal capacitance C_i = Capacitance of the permanently connected cable = 90 pF/m x L* Effective internal inductance L_i = Inductance of the permanently connected cable = 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The connection to the measuring transducer type IXT0-xxx (IECEx TUN 14.0014) of the manufacturer NIVUS is permissible.

Connection wire black (X10)	Shield
RS485 interface (Cable tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 6 V I_o = 81.9 mA (long time; for calculation of P_o) I_o = 154 mA (short time; for calculation of L_o, C_o) P_o = 123 mW Characteristic line: Linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	12.88	9.88	0.38	0.083
	C_o [µF]	7.08	8.38	21.98	29.98

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.

Or

RS485 interface (Cable tail; Connection wires: White (X14): RxTx+ Green (X13): RxTx- Blue (X8): GND)	Maximum values: U_i = 12.06 V I_i = 176 mA P_i = 531 mW Effective internal capacitance C_i = Capacitance of the permanently connected cable C_c C_c = 70 pF/m x L* Effective internal inductance L_i = Inductance of the permanently connected cable L_c L_c = 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X1..X4) and temperature circuit (X12;X5;X7) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

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The interconnection of the Electronic-Box-Mini EBM with the sensors

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

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

Piezo connections (Connector Pins A/B or C/D)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to the intrinsically safe circuits of the devices "Electronic-Box-Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation: C_i = 11 nF L_i = 12 µH
1-Wire temperature sensor 1-Wire EEPROM (Connector Pins E, F and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 188 mA P_i = 282 mW Effective internal capacitance C_i = 120 nF Effective internal inductance is negligibly small.
Pressure cell (Connector Pins E, G, H and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 264 mA P_i = 396 mW Effective internal capacitance C_i = 6.484 µF Effective internal inductance is negligibly small.

All intrinsically safe circuits are galvanically interconnected with each other via GND potential and safely galvanically separated from earth potential.

System "Sensor Family Mini" with the Electronic-Box-Mini EBM type V3L1:

Signal- and supply circuit (Cable tail; Connection wires: Red (X1): + Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 10.5 V I_i = 640 mA P_i = 6.72 W Effective internal capacitance C_i = 2.2 µF + Capacitance of the permanently connected cable = 2.2 µF + 90 pF/m x L* Effective internal inductance L_i = 4.7 µH + Inductance of the permanently connected cable = 4.7 µH + 0.76 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The connection to the measuring transducer type IXT0-xxx (IECEx TUN 14.0014) of the manufacturer NIVUS is permissible.

Connection wire black (X3)	Shield

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TÜV NORD Zertifizierung

Page 4 of 5
Attachment to IECEx TUN 18.0023 issue No.: 2

RS485 interface (Cable tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	In type of protection intrinsic safety Ex ib IIB with maximum values: U_o = 5.4 V I_o = 76 mA (long time; for calculation of P_o) I_o = 124.93 mA (short time; for calculation of L_o, C_o) P_o = 102.6 mW Characteristic line: Linear Effective internal capacitance C_i = 10.5 nF Effective internal inductance L_i = 117 µH

The maximum permissible values for the external inductance L_o and the external capacitance C_o can be found in the following table:

Ex ib IIB	L_o [mH]	19.88	9.88	0.38	0.08
	C_o [µF]	7.98	11.98	27.98	36.98

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.

Or

RS485 interface (Cable tail; Connection wires: White (X5): RxTx+ Green (X4): RxTx- Blue (X2): GND)	Maximum values: U_i = 10.7 V I_i = 236.3 mA P_i = 634.4 mW Effective internal capacitance C_i = Capacitance of the permanently connected cable C_c C_c = 70 pF/m x L* Effective internal inductance L_i = 1.5 mH + Inductance of the permanently connected cable L_c L_c = 1.5 mH + 0.78 µH/m x L*

L*: Length of the connected cable has to not exceed 150 m.

The internal pressure circuit (X6..X9) and temperature circuit (X10;X11;X12) are designed in type of protection intrinsic safety Ex ib IIB and are not accessible to the user.

The interconnection of the Electronic-Box-Mini EBM with the sensors

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

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

Piezo connections (Connector Pins A/B or C/D)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to the intrinsically safe circuits of the devices "Electronic-Box-Mini" EBM or the "NivuFlow Mobile" NFM of the manufacturer with safe energy limitation: C_i = 11 nF L_i = 12 µH
1-Wire temperature sensor 1-Wire EEPROM (Connector Pins E, F and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 188 mA P_i = 282 mW Effective internal capacitance C_i = 120 nF Effective internal inductance is negligibly small.

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Pressure cell (Connector Pins E, G, H and J)	In type of protection Intrinsic Safety Ex ib IIB Only for connection to certified intrinsically safe circuits. Maximum values: U_i = 6 V I_i = 264 mA P_i = 396 mW Effective internal capacitance C_i = 6.484 µF Effective internal inductance is negligibly small.

All intrinsically safe circuits are galvanically interconnected with each other via GND potential and safely galvanically separated from earth potential.

Thermal data:
Permissible ambient temperature range during operation:

- Elektronik-Box-Mini type EBM: -20 °C … +40 °C
- For all Sensors: -40 °C … +80 °C

Details of change:
The subject of IECEx TUN 18.0023 issue No.2 is the use of the new POA-V3 sensor electronics (IECEx TUN 15.0014 Issue 2) within the Electronic-Box-Mini EBM, new Ex add-on PCB, new front panel PCB and update to the standards IEC 60079-0:2017 and IEC 60079-11:2011

IECEx TUN 18.0023 issue No.1	IECEx TUN 18.0023 issue No.2
Electronic-Box-Mini EBM type V1L1 Internal construction with POA-V2 sensor generation	Electronic-Box-Mini EBM type V3L1 **Internal construction with POA-V3 sensor generation**

Note: All outputs are linear due to the electronic changes.

Specific Conditions of Use:
None.

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DE / EN / FR

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:	**Ultraschallsensoren CSM / CSP / DSM / OCL-LM**
Description:	*Ultrasonic sensors*
Désignation:	*Capteurs ultrasoniques*
Typ / Type:	**CSM-V100K... / CSM-V1D0K... / CSM-V100R... / CSP-V2... / DSM-L0... / OCL-LM...**

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:
we declare under our sole responsibility that the equipment made available on the Union market as of the date of signature of this document meets the standards of the following applicable Union harmonisation legislation:
nous déclarons, sous notre seule responsabilité, à la date de la présente signature, la conformité du produit pour le marché de l'Union, aux directives d'harmonisation de la législation au sein de l'Union:

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

Bei der Bewertung wurden folgende einschlägige harmonisierte Normen zugrunde gelegt bzw. wird die Konformität erklärt in Bezug die nachfolgend genannten anderen technischen Spezifikationen:
The evaluation assessed the following applicable harmonised standards or the conformity is declared in relation to other technical specifications listed below:
L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:
This declaration is submitted on behalf of the manufacturer:
Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Allemagne

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

Eppingen, den 21.11.2018

Gez. *Marcus Fischer*

DE / EN / FR

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**
Description:	*"Ex" ultrasonic sensors*
Désignation:	*"Ex" capteurs ultrasoniques*
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 auf 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 IEC 60079-0:2018/AC:2020-02
- EN 60079-11:2012

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

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

TÜV 12 ATEX 087812 ISSUE: 02

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

TÜV Nord CERT GmbH, Am TÜV 1, 45307 Essen, Germany (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
Germany

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

Eppingen, den 25.07.2025

Gez. *Marcus Fischer*

DE / EN / FR

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:	**Externe Elektronikbox EBM**
Description:	*external electronic Box*
Désignation:	*boîtier électronique externe*
Typ / Type:	**EBM-...**

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

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This declaration is submitted on behalf of the manufacturer:
Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Allemagne

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

Eppingen, den 20.04.2016

Gez. *Marcus Fischer*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

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Im Täle 2
75031 Eppingen

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

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

Bezeichnung:	**"Ex" Externe Elektronikbox EBM**
Description:	*"Ex" external electronic Box*
Désignation:	*"Ex" boîtier électronique externe*
Typ / Type:	**EBM-V1L1xxE..., EBM-V3L1xxE...**

erklären wir in alleiniger Verantwortung, dass die auf dem Unionsmarkt ab dem Zeitpunkt der Unterzeichnung bereitgestellten Geräte die folgenden einschlägigen Harmonisierungsvorschriften der Union erfüllen:
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- 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 auf die nachfolgend genannten anderen technischen Spezifikationen:
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- EN IEC 60079-0:2018/AC:2020-02
- EN 60079-11:2012

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

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

TÜV 12 ATEX 087812 ISSUE: 02

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

TÜV Nord CERT GmbH, Am TÜV 1, 45307 Essen, Germany (0044)

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NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

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

Eppingen, den 25.07.2025

Gez. *Marcus Fischer*

DE / EN / FR

EU Konformitätserklärung

EU Declaration of Conformity

Déclaration de conformité UE

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75031 Eppingen

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

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

Bezeichnung:	**Ultraschall-Aktivsensoren POA / OCL / CS2**
Description:	*Ultrasonic active sensors*
Désignation:	*Capteurs actifs ultrasoniques*
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:
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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:
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L'évaluation est effectuée à partir des normes harmonisées applicable ou la conformité est déclarée en relation aux autres spécifications techniques désignées ci-dessous:

- EN 61326-1:2013

Diese Erklärung wird verantwortlich für den Hersteller:
This declaration is submitted on behalf of the manufacturer:
Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Allemagne

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

Eppingen, den 20.04.2016

Gez. *Marcus Fischer*

DE / EN / FR

EU Konformitätserklärung

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75031 Eppingen

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

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

Bezeichnung:	**"Ex" Ultraschall-Aktivsensoren POA / OCL / CS2**
Description:	*"Ex" Ultrasonic active sensors*
Désignation:	*"Ex" capteurs actifs ultrasoniques*
Typ / Type:	**POA-x2xxxxE... / POA-x3xxxxE... / OCL-L1xxxxE... / OCL-L3xxxxE... / CS2-x2xxxxE... / CS2-x3xxxxE...**

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

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

TÜV 03 ATEX 2262 X Ausgabe 00

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

TÜV Nord CERT GmbH, Am TÜV 1, 45307 Essen, Germany (0044)

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This declaration is submitted on behalf of the manufacturer:
Le fabricant assume la responsabilité de cette déclaration:

NIVUS GmbH
Im Taele 2
75031 Eppingen
Germany

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

Eppingen, den 11.01.2024

Gez. *Marcus Fischer*