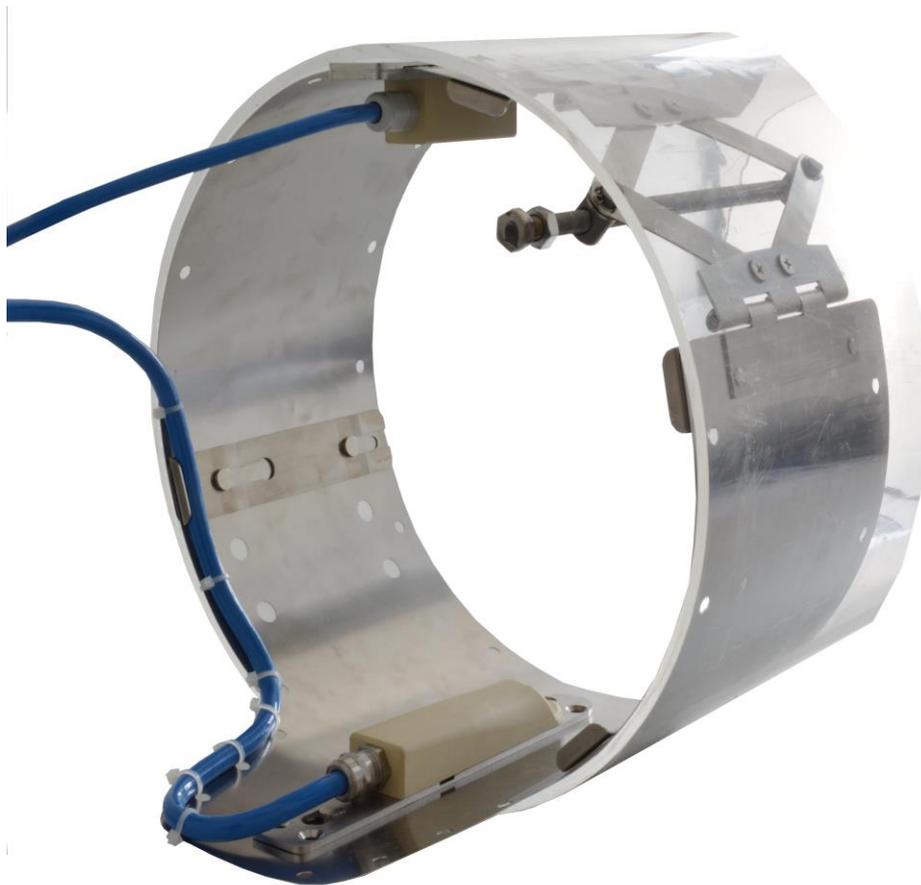# Installation Instruction for

Pipe Mounting Systems RMS

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(Original Manual: German)

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Translation

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

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

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Names

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

Table of contents

General

> **!**
>
> ***Important Note***
>
> *READ CAREFULLY BEFORE USE!*
> *KEEP IN A SAFE PLACE FOR LATER REFERENCE.*

This manual is an original instruction for the pipe mounting systems RMS and is for the intended use of the device. This manual is oriented exclusively to qualified expert personnel. Read this manual carefully and completely prior to installation and connection since it contains relevant information on this product. Observe the notes and particularly follow the warning notes and safety instructions.

If you should have problems to understand information contained within this manual either contact the manufacturer or one of the distributors for further support. The manufacturer cannot be held responsible for damage to persons or material due to incorrectly understood information in this instruction.

1   Applicable documentation

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

- Installation Instruction for Correlation and Doppler Sensors
- Technical Instructions for Correlation Sensors and external Electronic Box
- Technical Instruction for Doppler Sensors

These manuals are provided with the sensors.

2   Required Tools/Utilities

The following tools/utilities are required to install the pipe mounting systems

- hammer (300 g)
- cable ties
- ring or open-end spanner, spanner gap 13 (for RMS 2)
- Phillips screw driver Pozidriv size 2
- wire cutter

RMS 5 only

The following tools are required to modify the air-ultrasonic sensors:

- ring or open-end spanner, spanner gap 22
- Phillips screw driver Phillips size 1

The tools are not part of the standard delivery.

3 Signs and definitions used

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

3.1 Abbreviations used

Item designation

- CS2   Cross correlation sensors for use in part filled and full pipes and open channels
- CSM   Cross correlation sensors of the Mini sensor family
- DSM   Air-Ultrasonic sensor of the Mini sensor family
- KDA   Doppler sensor
- OCL   Air-Ultrasonic sensor
- POA   Cross correlation sensors for use in part filled and full pipes and open channels
- RMS   Pipe mounting system

Safety Instructions

4   Used symbols and signal words

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

WARNING   *Warnings at medium level risk and risk of personal injury*

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

CAUTION   *Warnings at low level risk or property damages*

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

Important Note

Contains information that should be highlighted.
Indicates a potentially damaging situation which can result in a damage of the product or an object in its environment if not avoided.

Note

Contains information and facts.

4.1   Protective conductor

WARNING   *Germ contamination*

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

WARNING   *Observe occupational safety regulations*

Before starting installation work, check whether the occupational safety regulations are observed.
Disregarding may lead in personal injury.

CAUTION   *Risk of injury*

The pipe mounting system sheets have very sharp edges. There is a risk of injury from cuts.
Wear protective gloves.

5 Use in accordance with the requirements

Important note

The pipe mounting systems and all corresponding components are intended solely for the purpose described below.

The pipe mounting systems are designed for the temporary installation of sensors in pipes. Modifying or using the instruments for any other purposes without the manufacturer's written consent will not be considered as use in accordance with the requirements.
The manufacturer cannot be held responsible for any damage resulting from improper use. The user alone bears any risk.

5.1 User's Responsibilities

Important Note

In the EEA (European Economic Area) national implementation of the frame-work di-rective 89/391/EEC and corresponding individual directives, in particular the directive 2009/104/EC concerning the minimum safety and health requirements for the use of work equipment by workers at work, as amended, are to be observed and adhered to.
In Germany the Industrial Safety Ordinance must be observed.

5.1.1 Manual Keeping

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

5.1.2 Manual Handover

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

5.2 Liability Disclaimer

The manufacturer reserves the right to change the contents of this document including this liability disclaimer without prior notice and cannot be held responsible in any way for pos-sible consequences resulting from such changes.
For installation of the pipe mounting systems the following information and higher legal regulations of the respective country (e. g. VDE regulations in Germany) such as applica-ble safety requirements and regulations in order to avoid accidents shall be observed.
All operations on the instruments which go beyond installation shall be carried out by NIVUS staff or personnel authorised by NIVUS due to reasons of safety and guarantee.

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

Product specification

This installation manual exclusively refers to the installation of pipe mounting systems in pipelines. The pipe mounting systems are mainly used for portable flow measurements. All pipe mounting systems are made of stainless steel 1.4404.

The pipe mounting systems are installation aids for the following wedge sensors:

- CS2
- CSM
- KDA
- POA

Air-ultrasonic sensors below can be installed too:

- DSM
- OCL

The technical data of the sensors are listed in the corresponding manuals.

6 Overview Pipe Mounting Systems

Four different sets are available:

- RMS 2 – Pipe mounting set for pipes DN200 to DN800
- RMS 3 – Pipe mounting set for pipes DN150 to DN300
- RMS 4 – Combination of RMS 2 and RMS 3.
  Pipe mounting set for pipes DN150 to DN800
- RMS 5 – Pipe mounting set for pipes DN700 to DN2000

Pipe mounting sets consist of the following elements:

- Clamping device
- Base plate
- Clamps
- Extension sheets
- Completion plate (optional)

The individual parts of the RMS 2, RMS 3 and RMS 4 pipe mounting systems are compatible with each other.
The RMS 5 system uses thicker materials and hence cannot be combined with components of other sets.

Details on the scope of delivery can be found in the according overview of the individual mounting sets.

6.1 Overview Pipe Mounting System RMS 2

Scope of Delivery set RMS 2:

- 1x Carrying bag, blue
- 1x Base plate
- 1x Clamping device with rotary toggle
- 2x Extension sheet V5
- 2x Extension sheet V10
- 2x Extension sheet V15
- 8x Clamp
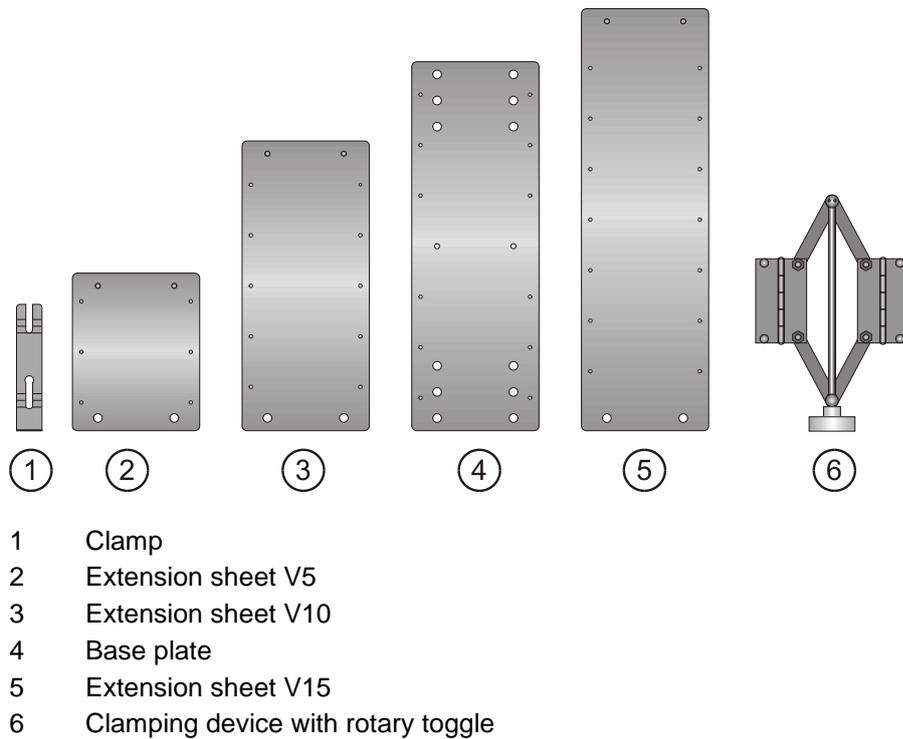

1   Clamp
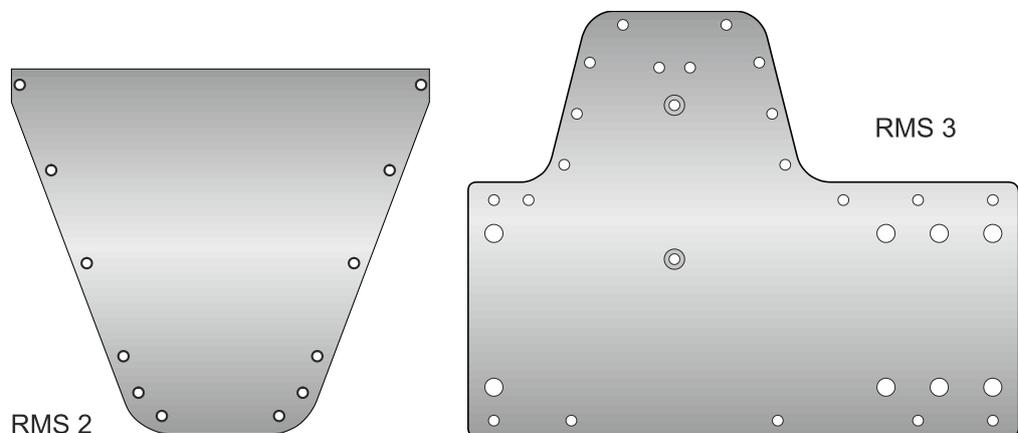2   Extension sheet V5
3   Extension sheet V10
4   Base plate
5   Extension sheet V15
6   Clamping device with rotary toggle

Fig. 6-1   Parts of RMS 2

Fig. 6-2   Completion plates (optional) of RMS 2 and RMS 3

Inside-ø [mm]	BST Base plate	SPV Clamping device	V5 Extension sheet	V10 Extension sheet	V15 Extension sheet
200	1 Hole outside	1			
250	1 Hole inside	1	2		
300	1 Hole outside	1	2		
350	1 Hole inside	1		2	
400	1 Hole outside	1		2	
450	1 Hole inside	1	2	2	
500	1 Hole outside	1	2	2	
600	1 Hole outside	1	2		2
700	1 Hole outside	1		2	2
800	1 Hole outside	1	2	2	2

Fig. 6-3   List of required plates and sheets RMS 2

6.2   Overview Pipe Mounting System RMS 3

Scope of Delivery set RMS 3:

- 1x Carrying bag, blue
- 1x Base plate
- 1x Clamping device
- 1x Extension sheet V5
- 1x Extension sheet V10
- 4x Clamp
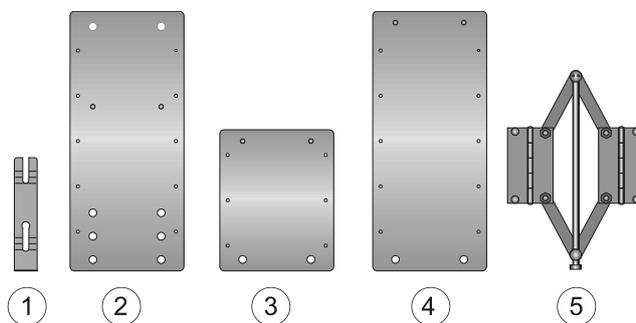
1   Clamp
2   Base plate BST
3   Extension sheet V5
4   Extension sheet V10
5   Clamping device

Fig. 6-4   Parts of RMS 3

Inside-ø [mm]	BST Base plate	SPV Clamping device	V5 Extension sheet	V10 Extension sheet
150	1 Hole inside	1	1	
200	1 Hole inside	1		1
250	1 Hole inside	1	1	1
300	1 Hole outside	1	1	1

Fig. 6-5 List of required plates RMS 3

6.3 Overview Pipe Mounting System RMS 4

The pipe mounting system RMS 4 is combined out of RMS 2 and RMS 3.

⇨ See tables in Fig. 6-3 and Fig. 6-5.

Scope of Delivery set RMS 4:

- 1x Carrying bag, blue
- 1x Base plate RMS 2
- 1x Base plate RMS 3
- 1x Clamping device RMS 2
- 1x Clamping device RMS 3
- 2x Extension sheet V5
- 2x Extension sheet V10
- 2x Extension sheet V15

6.4 Overview Pipe Mounting System RMS 5

Scope of Delivery set RMS 5:

- 1x Carrying bag, blue
- 1x Base plate
- 1x Clamping device
- 4x Extension sheet VS
- 4x Extension sheet VM
- 4x Extension sheet VL
- 10x Clamp
- 1x Distance plate for DSM-L0 (two parts)
- 1x Distance plate for OCL-L1
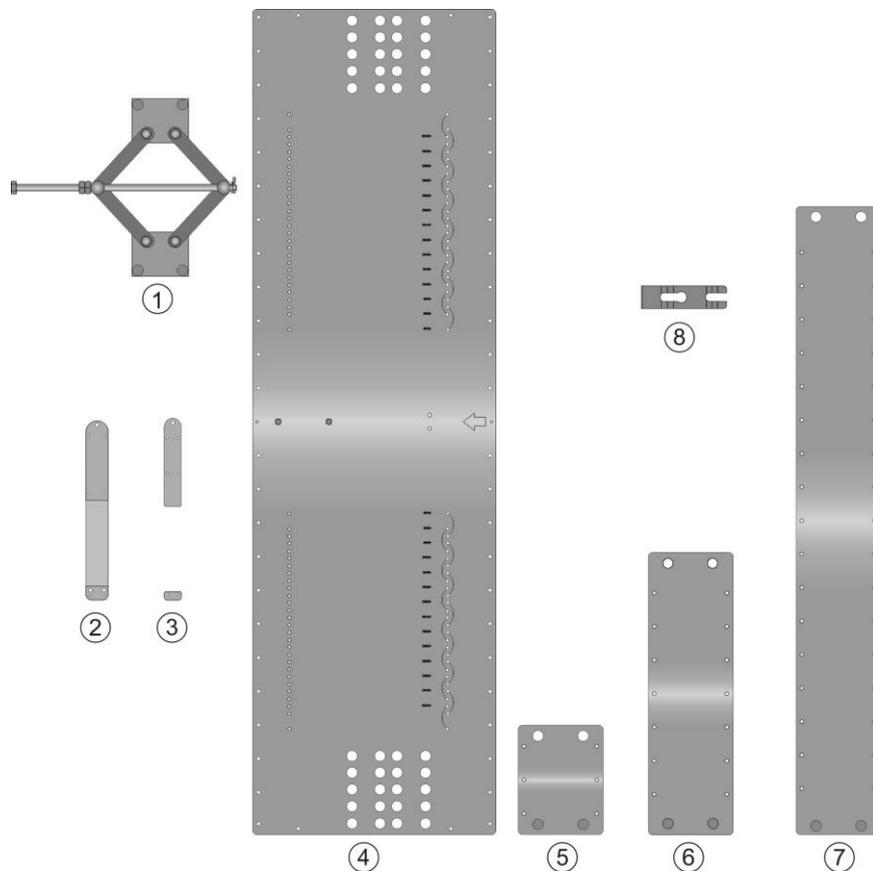
1   Clamping device
2   Distance plate for OCL-L1
3   Distance plate for DSM-L0 (two parts)
4   Base plate BST
5   Extension sheet VS
6   Extension sheet VM
7   Extension sheet VL
8   Clamp

Fig. 6-6   Parts of RMS 5

Number of plates							
Inside-ø [mm]		Without Air-Ultrasonic sensor			With Air-Ultrasonic sensor		
	Base plate	short (VS)	middle (VM)	long (VL)	short (VS)	middle (VM)	long (VL)
700	1	4			1	1	
800	1		2		3	1	
900	1	2	2		2	2	
1000	1	4	2		1	3	
1100	1		4		3	3	
1200	1	2	4		2	4	
1300	1	2		2	2		2
1400	1	4		2	1	1	2
1500	1		2	2	3	1	2
1600	1	2	2	2	2	2	2
1700	1	4	2	2	3	3	2
1800	1		4	2	3	3	2
1900	1	2	4	2	2	4	2
2000	1	2		4	2		4

Fig. 6-7   **List of required plates RMS 5**

Assembly

7 Assembly of the Pipe Mounting Systems

WARNING	***Check hazards caused by explosive gases!***
⚠️	*Prior to executing mounting works in sewer systems always check compliance with all regulations on safety at work.* *Check possible hazards caused by explosive gases by using a gas detector.* *Disregarding may lead to personal injury.*

CAUTION	***Risk of injury***
⚠️	*The pipe mounting system sheets have very sharp edges. There is a risk of injury from cuts.* *Wear protective gloves.*

ℹ️	***Note***
	In larger pipe diameters it may be necessary to additionally secure the pipe mounting system from being washed away due to high flow velocities. *Use stainless steel screws for this purpose.*

7.1 Principles of Installation

The number of sheets depends on the existing inner pipe diameter.
The mounting steps for the individual pipe mounting systems are described in chapter >Mounting<.

The following applies for the mounting of pipe mounting systems:

- Observe the selection list of mounting sheets.

- Place the clamping device always in the pipe crown (except when using an air-ultrasonic sensor).

- Place the base plate on the pipe bottom.

- Install the same number of required extension plates left and right between clamping device and base plate (except when using an air-ultrasonic sensor).

- Install plates parallel to the pipe walls.

- Insert clamps towards the flow direction flush with the mounting plates.

- Observe appropriate contact pressure on the pipe walls to prevent the mounting system from getting loose.

- In larger channel diameters it may be necessary to additionally fix the pipe mounting system on the channel walls by using stainless steel screws.

- No gap shall remain between mounting plate and sensor as well as between base plate and channel bottom (risk of build-up).

7.2   Principles of Sensor Fastening

The following applies for using air-ultrasonic sensor and wedge sensor at the same time:

- Place air-ultrasonic sensor on pipe crown.
- Align air-ultrasonic sensor plane parallel to water surface.
- Install clamping device immediately adjacent to air-ultrasonic sensor.
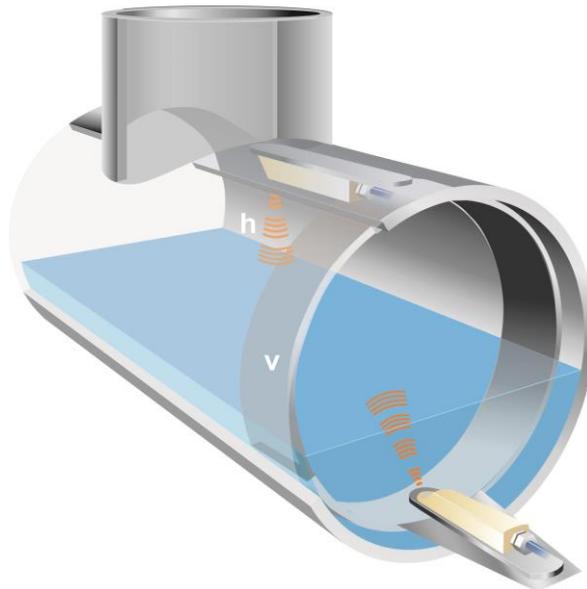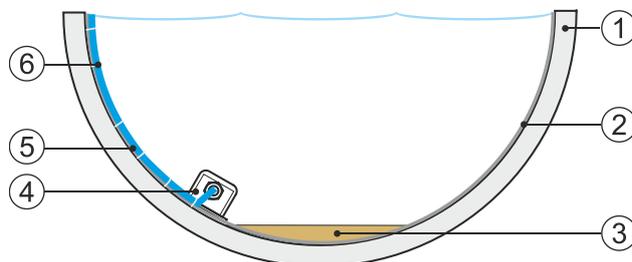- Use completion plate (optional for RMS 2-4) for wedge sensor (Fig. 6-2).

Fig. 7-1   Basic sensor fastening

With heavy dirt load or sedimentation:

- Place wedge sensor off centre (towards step irons).
- Lay the sensor cable to the same side as the sensor. Do not lay cables across channel bottom.
- Fix sensor cables to RMS using cable ties and lay upwards.

1   Pipe wall
2   Pipe mounting system
3   Sedimentation
4   Sensor
5   Cable
6   Cable tie

Fig. 7-2   Install sensor off centre

7.3   Assembly of pipe mounting system RMS 2

Measure the pipe diameter before you begin installation.
The table in Fig. 6-3 shows which sheets to use for which pipe diameter.
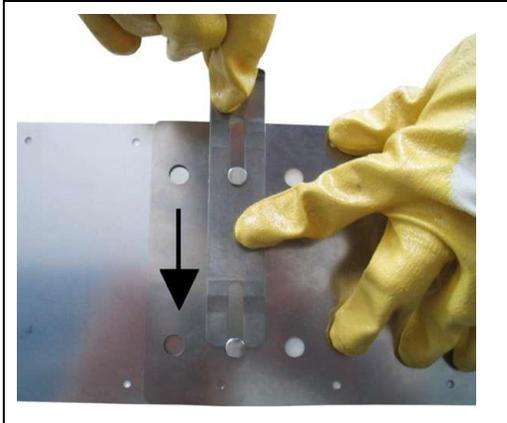
⮑ Put the RMS components on a plane surface.

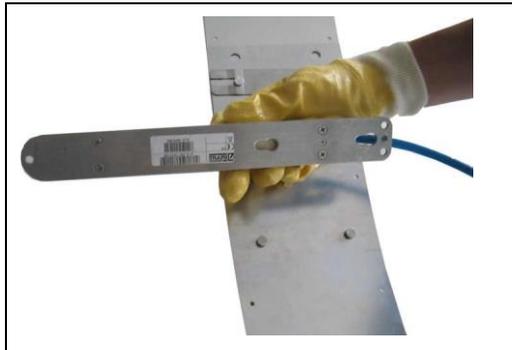Assemble base plate and extension plate.

Insert the spigots of the base plate into the holes of the extension sheet.

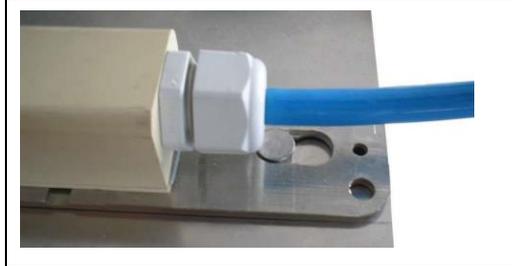Insert the clamp towards the flow direction flush with the mounting plate.

If the clamp cannot be fastened easily use a hammer to carefully hammer the clamp into position.

Place flow velocity sensor

Put the flow velocity sensor onto the base plate with the slotted holes down.

Pull sensor backwards on the base plate.

Sensor shall be arrested flush with the base plate.

Assemble RMS completely

When the inner pipe diameter is reached:

Assemble clamping device and extension sheet.

Insert the spigots of the clamping device into the holes of the extension sheet.

Fasten clamping device to extension sheets on both sides using clamps.

Prior to installation in the channel fully close the clamping device by rotating clockwise.

Insert the complete pipe mounting system into the pipe and align accordingly.

Open the clamping device by rotating counterclockwise until the pipe mounting system is clamped firmly within the pipe.

Note

Always fix the cable to the RMS (small holes) by using cable ties. Do not lay the sensor cable across the invert centre.
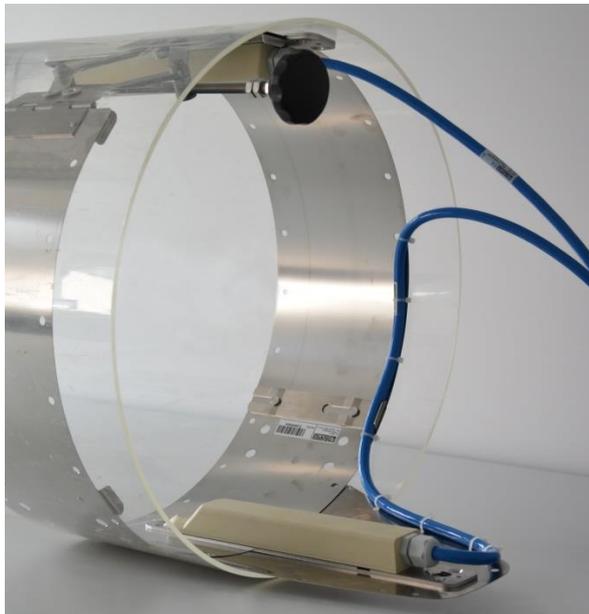
Fig. 7-3   RMS 2 with mounted POA and air-ultrasonic sensor

7.4   Assembly of pipe mounting system RMS 3

➲ Proceed as described under RMS 2.

1. Measure the pipe diameter.

2. Select the required plates from the set (see table in Fig. 6-5).

3. Put the components on a plane surface.

4. Assemble base plate and extension sheets as seen with RMS 2.

Insert Mini Sensor family flow velocity sensor

CSM:

Put the CSM flow velocity sensor with the slotted holes down onto the base plate.

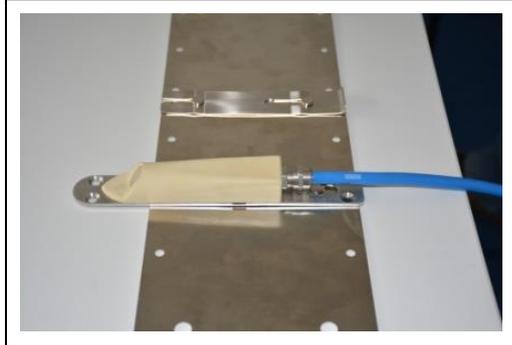Pull sensor backwards on the base plate until arrested.

Important:

The cable side of the sensor is not flush with the base plate.

CSM-D:

Put the CSM-D flow velocity sensor with the slotted holes down onto the base plate.

Pull sensor backwards on the base plate until arrested.
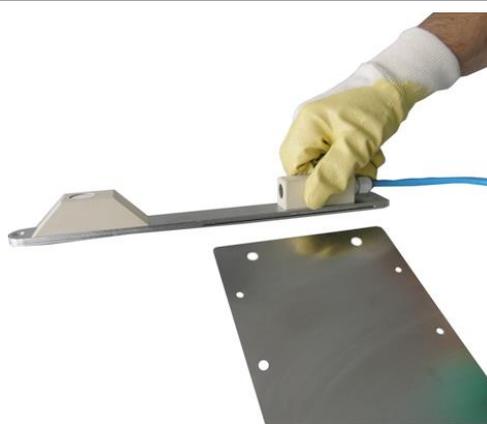
Flow velocity sensor and air-ultrasonic sensor

CSM-D on completion plate:

Put the flow velocity sensor with the slotted holes down onto the completion plate.

Pull sensor backwards on the completion plate until arrested.

Put the DSM air-ultrasonic sensor alongside the extension sheet.

Push extension sheet through the slot between sensor mounting plate and cover plate.

Slot see Fig. 7-10.

RMS 3 pipe mounting system with completion plate for common installation of wedge sensor and air-ultrasonic sensor.

The clamping device is placed laterally to the air-ultrasonic sensor.

7.5   Assembly of pipe mounting system RMS 4

The RMS 4 is a combination of RMS 2 and RMS 3.
The selection of base plate and clamping device depends on the sensor used.
Extension sheets are determined based on the pipe diameter.

➲ For installation proceed as described under RMS 2 and RMS 3.

## 7.6 Assembly of pipe mounting system RMS 5

Note

Since the dimensions of the RMS 5 complicate the handling of the individual components NIVUS recommends 2 persons to assemble and to install the RMS 5.

The RMS 5 pipe mounting system is designed for large inner pipe diameters. This is why the sheets are much larger than those of the other pipe mounting systems.

➲ Firstly equip the base plate with sensors and wedge supports if required.

➲ Do not assemble the RMS 5 completely before you are on site.

7.6.1 Base plate RMS 5

Several mounting aids can be found on the base plate.
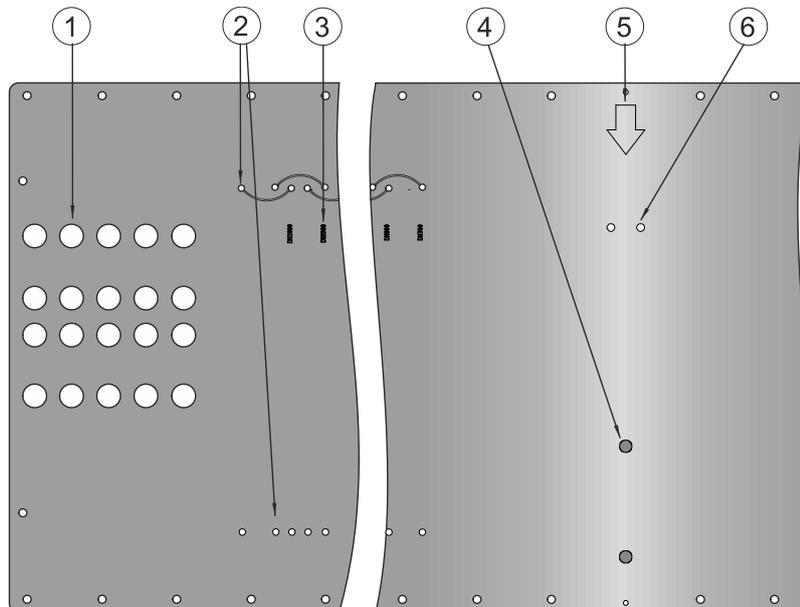
1   Fastening holes for extension sheets
2   Fastening holes for outer sensors or wedge supports
3   Specification of nominal diameter according to Gauss. Positioning aid for three flow velocity sensors
4   Fastening for centre flow velocity sensor sensor
5   Indication of flow direction
6   Optional / additional fastening with cable ties

Fig. 7-4   Mounting aids on the RMS 5 base plate

Place sensors on the base plate

Up to 3 flow velocity sensors can be fixed on the base plate.
The centre flow velocity sensor shall be installed so that the slotted holes lock into the spigots on the base plate. Here the sensor tip must face the arrow on the base plate (Fig. 7-4, point 5).
When using the flow velocity sensors below observe to use both rear slotted holes for locking:

- CS2
- KDA
- POA

The position of both outer sensors depends on the inner pipe diameter and is based on the Gauss specifications. The according sensor positions are marked on the base plate specifying a DN figure.
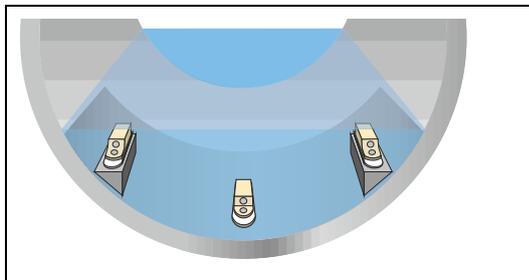
Mount outer sensors horizontally

To mount both outer flow velocity sensors horizontally two wedge supports (30°) must be installed first.
The wedge supports are available from NIVUS.

⇨ See accessories on page 31.

The wedge supports shall be fastened at the according positions (DN markings) on the base plate by using the accompanying countersunk head screws.
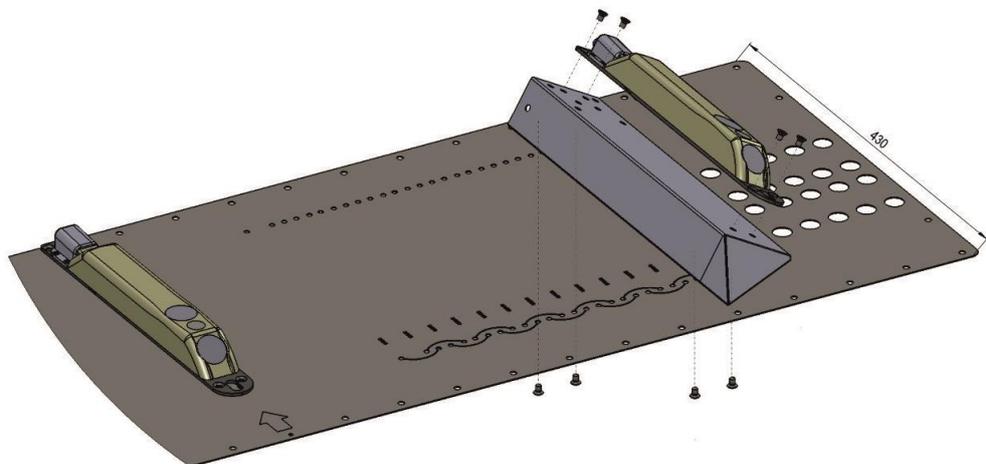Then fix the sensor on the wedge support by using the accompanying countersunk head screws.

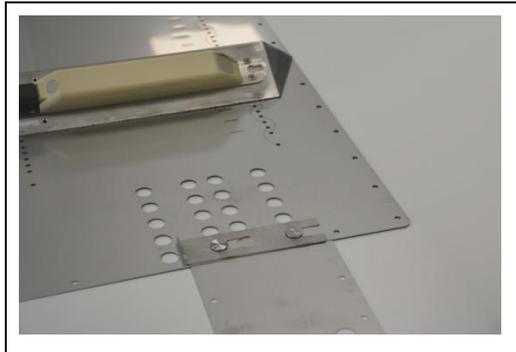RMS 5 with three sensors.

For horizontal mounting:

Mount both outer sensors on wedge supports (30°).

Fig. 7-5   RMS 5 mounted horizontally (before installation)

7.6.2   Extension sheet RMS 5

Insert the spigots of the RMS 5 extension sheet into the holes of the base plate and fix the sheet with a clamp.

Use the front pairs of holes to assemble extension sheets and base plate if an air-ultrasonic sensor is to be installed at the pipe crown.
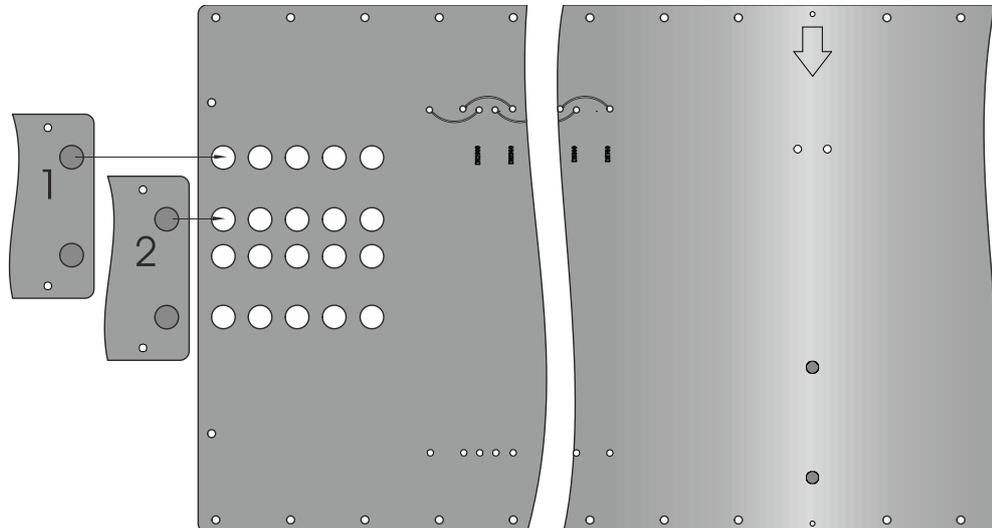
1   Fastening of extension sheets using an air-ultrasonic sensor
2   Fastening of extension sheets using flow velocity sensors only

Fig. 7-6   Fastening the extension sheets

7.6.3 Assembling the clamping device

➲ Proceed as described in the RMS 2 mounting instructions.

1. Assemble clamping device and extension sheet.
2. Insert the spigots of the clamping device into the holes of the extension sheet.
3. Fix the clamping device at the extension sheets on both sides by using clamps.

Fig. 7-7   Clamping device fully assembled

7.7 Air-Ultrasonic sensors in the RMS 5 pipe mounting system

The type OCL and DSM air-ultrasonic sensors are conceived for temporary clamped fastening in a pipe mounting system.

As per default both air-ultrasonic sensors feature slots to slide the RMS sheets through.

The installation of air-ultrasonic sensors is described on page 23.
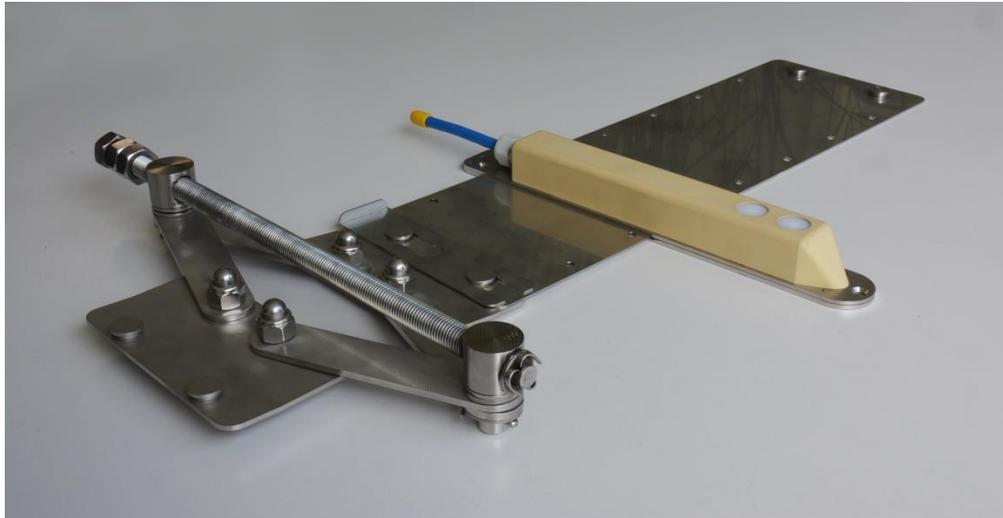
Fig. 7-8   Pre-installed air-ultrasonic sensor on RMS sheet

Exception:

Air-ultrasonic sensors in RMS 5. Here the slot needs to be enlarged.

Air-Ultrasonic sensor in RMS 5

Note

Type OCL or DSM air-ultrasonic sensors must be modified to be used with a RMS 5 pipe mounting system.

The RMS 5 pipe mounting system is conceived for larger pipe diameters. This is why the individual sheets and plates are designed with extra material thickness.

Due to this the slots of the air-ultrasonic sensor types OCL and DSM need to be larger.

The distance plates for the according air-ultrasonic sensor are part of the standard delivery of the RMS 5.

➲ RMS 5 standard delivery see Fig. 6-6.

Modification of Air-Ultrasonic sensor

➲ To modify a type OCL air-ultrasonic sensor proceed as follows:

1. Loosen screws of the cover plate (2) with Phillips screwdriver Phillips size 1.
2. Remove cover plate.
3. Screw on the OCL-L1 distance plate.
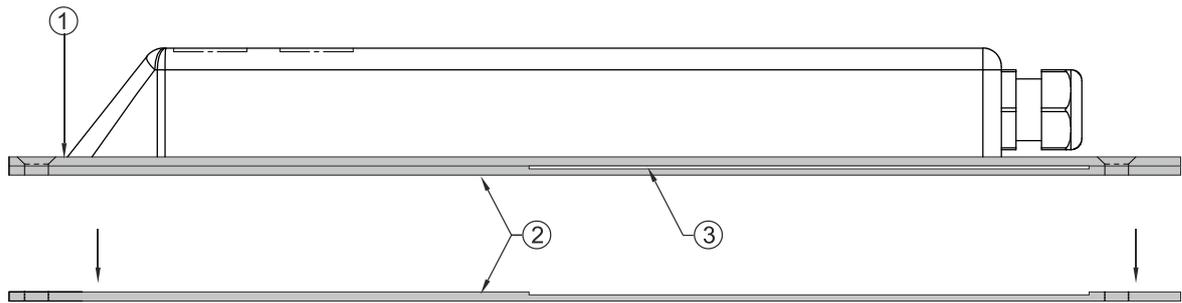
1   Mounting plate
2   Cover plate
3   Slot for pipe mounting system

Fig. 7-9   Mounting plates of type OCL air-ultrasonic sensor

➲ To modify a type DSM air-ultrasonic sensor proceed as follows:

1. Loosen screws of the cover plate (5) with Phillips screwdriver Phillips size 1.

2. Remove cover plate and both distance plates (3).

3. Replace distance plates with DSM distance plates from RMS 5.

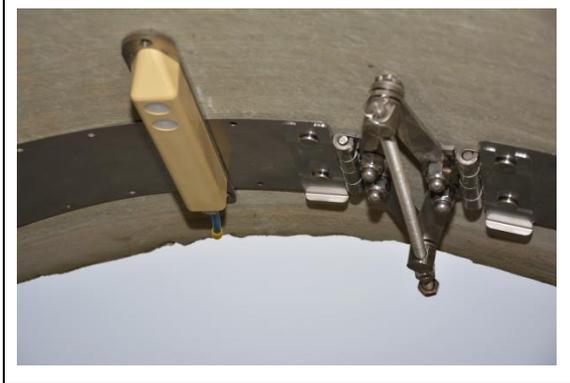4. Screw on distance plates together with cover plate.
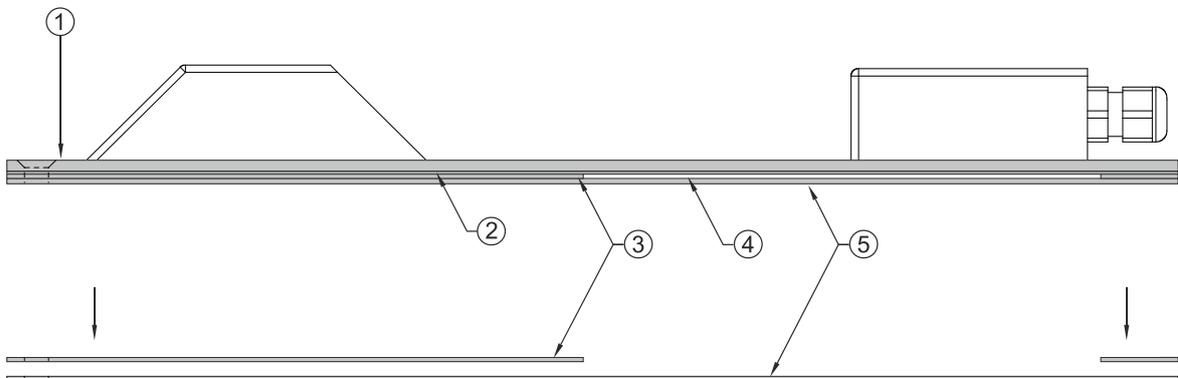
1   Mounting plate
2   Extra plate
3   Distance plate (two parts) short and long
4   Slot for pipe mounting system
5   Cover plate

Fig. 7-10   Mounting plates of type DSM air-ultrasonic sensor

Clamping sheets installed with CS2 sensors

Clamping device installed with air-ultrasonic sensor

Fig. 7-11   Mounting plates and sheets fully installed with sensors

Maintenance

8 Maintenance

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

The pipe mounting systems are made of stainless steel and thus virtually maintenance-free.

8.1 Spare parts and accessories

Wedge supports 30° ZUB0 KS00 L30V4A	Wedge support left 30° for POA and CS2 sensor; for horizontal sensor installation in pipes. Material: stainless steel 1.457
Wedge supports 30° ZUB0 KS00 R30V4A	Wedge support right 30° for POA and CS2 sensor; for horizontal sensor installation in pipes. Material: stainless steel 1.457
Distance plate DSM	Extra distance plate to enlarge the RMS 5 slot
Distance plate OCL	Extra distance plate to enlarge the RMS 5 slot
Base plate RMS 2 ZUB0 RMS2 BSB	Spare part for pipe mounting system RMS 2
Base plate RMS 3 ZUB0 RMS3 BSB	Spare part for pipe mounting system RMS 3
Base plate RMS 5 ZUB0 RMS5 BSB	Spare part for pipe mounting system RMS 5
Completion plate ZUB0 RMS2 EB	RMS 2 completion plate for parallel installation of POA, CS2 and KDA wedge sensors and air-ultrasonic sensors, suitable for pipelines starting at DN250

The accessories are optionally available.
More accessories for our pipe mounting systems can be found in our current price list.

9 Dismantling/Disposal

- Remove sensors from base plate.

- Remove wedge supports from the RMS 5 base plate.

- The stainless steel sheets and plates of the pipe mounting systems can be recycled as regular scrap metal.