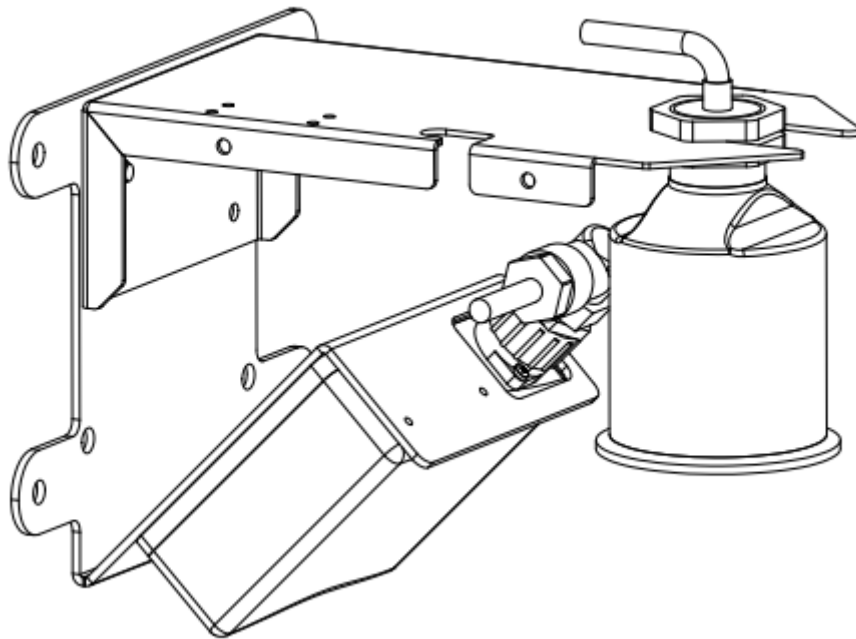


## Technical and Installation Instruction for Radar sensors OFR



Original Manual: German

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---

### **Important Note**

*This instruction manual may exclusively - even in parts - be copied or translated in any other way with the express written consent of NIVUS GmbH.*

---

### **Translation**

If the device is sold to a country in the European Economic Area (EEA) this instruction handbook must be translated into the language of the country in which the device is to be used. Should the translated text be unclear, the original instruction handbook (German) must be consulted or the manufacturer contacted for clarification.

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### **Names**

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

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## General

### 1 About this manual

---

**Important**

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

---

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

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

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

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

#### 1.1 Applicable documentation

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

- Instruction manual for the flow measurement units:
  - OCM Pro CF
  - NivuFlow 550
  - NivuFlow 7550
- Technical Instructions for Ex-Separator Module iXT
- Technical Instructions for intelligent i-series sensors

These manuals are provided with the auxiliary units or sensors and/or are available at the NIVUS-Homepage to be downloaded.

## Safety instructions

### 2 Used signs and definitions

#### 2.1 Valuation of the accident level



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

**DANGER**

**Warnings in high degree of risk**



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

**WARNING**

**Warnings in medium degree of risk**



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

**CAUTION**

**Warnings in low-risk or property damages**



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

**WARNING**

**Danger by electric voltage**



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



**Important Note**

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



**Note**

*Contains information and facts.*

### 3 Safeguards and Precautions

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

---

**WARNING****Prevention of electrostatic discharge**

*Before beginning mounting or maintenance works a gas detector shall be used to eliminate the risk of explosive atmospheres.*

*When carrying out this work make sure that no electrostatic charge can occur!*

*Discharge possible static electricity from your body before beginning the installation.*

*See chapters 12 "Maintenance" and 13 "Cleaning".*

---

**WARNING****Germ contamination**

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

*Wear protective clothing.*

---

**WARNING****Observe occupational safety regulations**

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

*Disregarding may lead in personal injury.*

---

**WARNING****Do not disable safety devices**

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

*Disregarding may lead in personal injury.*

---

**WARNING****Danger by electric voltage**

*Maintenance, cleaning and/or repairs (by qualified personnel only) may only be performed when deenergised. Disconnect the systems from mains.*

*Disregarding may lead to electric shocks!*

---

**Important Note**

*The entire measurement system shall be installed and put into service exclusively by qualified expert personnel.*

---



## 4 Liability disclaimer

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

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

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

Operate the Radar sensor only in technically perfect working order.

### **Improper Use**

Not being operated in accordance with the requirements may impair the safety. The manufacturer is not responsible for failures resulting from improper use.

## 5 Use in accordance with the requirements



### Note

*The Radar sensors are exclusively intended to be used for purposes as described below. Modifying or using the sensors for other purposes without the written consent of the manufacturer will not be considered as use in accordance with the requirements. Damages resulting from this are left at user's risk.*

The various Radar sensors have to be used in accordance to their regulations as described below.

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

Please necessarily observe the maximum permissible limit values as specified in chapter 8.5 "Specifications". Any cases varying from these conditions without written consent of NIVUS GmbH are entirely left at owner's risk.

### OFR-F00/G00

The Radar sensors are designed to measure the flow velocity on the surface of liquid media.

- The OFR-F00 sensor has to be connected to the NIVUS measurement transmitter, type OCM Pro CF.
- The OFR-G00 sensor has to be connected to the NIVUS measurement transmitter, type NivuFlow 550 or NivuFlow 7550.

### Ex protection

The Ex-version of OFR-EV0 sensors is designed for use in areas with explosive atmospheres (zone 1).

To use the sensors in Ex-areas an Ex-Separator Module Type iXT shall be installed between transmitter and sensors.

For wiring diagrams refer to the according instruction manual.

### Ex identification ATEX/IECEX

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



### Important note

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

*In the event of using transmitters by third-party manufacturers the operator shall carry out a system review according to EN 60079-25!*

*The required specifications for Ex-version sensors can be taken from the EC type examination certificates of the iXT Ex-Separator Module.*

## 6 User's Responsibilities



### **Important Note**

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

The customer must (where necessary) obtain any local operating permits required and observe the provisions contained therein. In addition to this, he must observe local laws and regulations on

- personnel safety (accident prevention regulations)
- safety of work materials and tools (safety equipment and maintenance)
- disposal of products (laws on wastes)
- disposal of materials (laws on wastes)
- cleaning (cleansing agents and disposal)
- environmental protection

### **Connections**

As an operator make sure prior to activating the Radar sensor system that during installation and initial start-up, if executed by the operator himself, the local regulations (such as regulations for electrical connection) are observed.

## 7 Personnel requirements

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

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



### **Qualified personnel**

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

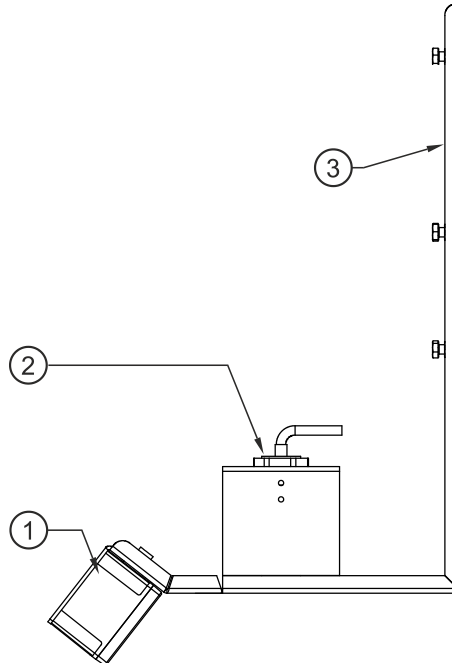
- I. *Training, instruction or authorisation to activate/deactivate, isolate, ground, and mark electric circuits and devices/systems according to the safety engineering standards.*
- II. *Education and instruction according to the standards of safety engineering regarding the maintenance and use of adequate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

## Product specification

### 8 Overview and use

#### 8.1 Overview of holders

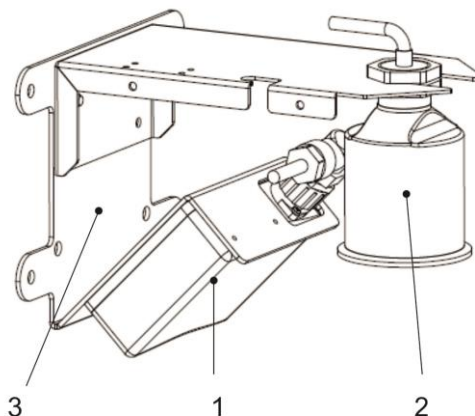
##### 8.1.1 For OCM PRO CF



- 1 Sensor OFR
- 2 Sensor for level measurement (P-Series or i-series sensors)
- 3 Combi holder made of stainless steel (ZUB0OFRHAL)

Fig. 8-1 Overview Radar, level sensor and holder

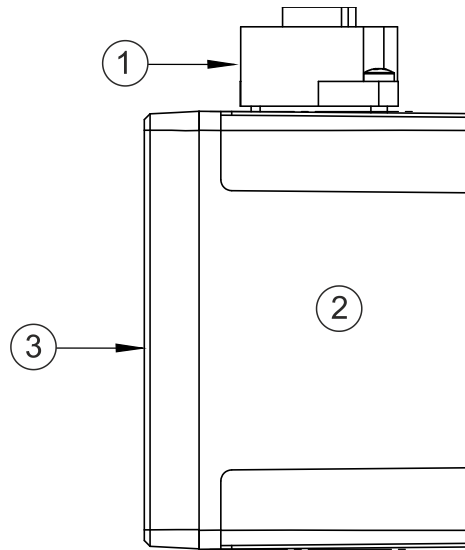
##### 8.1.2 For NivuFlow 550 and NivuFlow 7550



- 1 Sensor OFR
- 2 Sensor for level measurement (P-Series or i-series sensors)
- 3 Combi holder made of stainless steel (ORH-AL0)

Fig. 8-2 Overview Radar, level sensor and holder

8.2 Design and Dimensions of OFR Sensor



- 1 Connection fitting
- 2 Sensor body
- 3 Face of the sensor/Antenna

Fig. 8-3 Basic construction Radar sensor type OFR

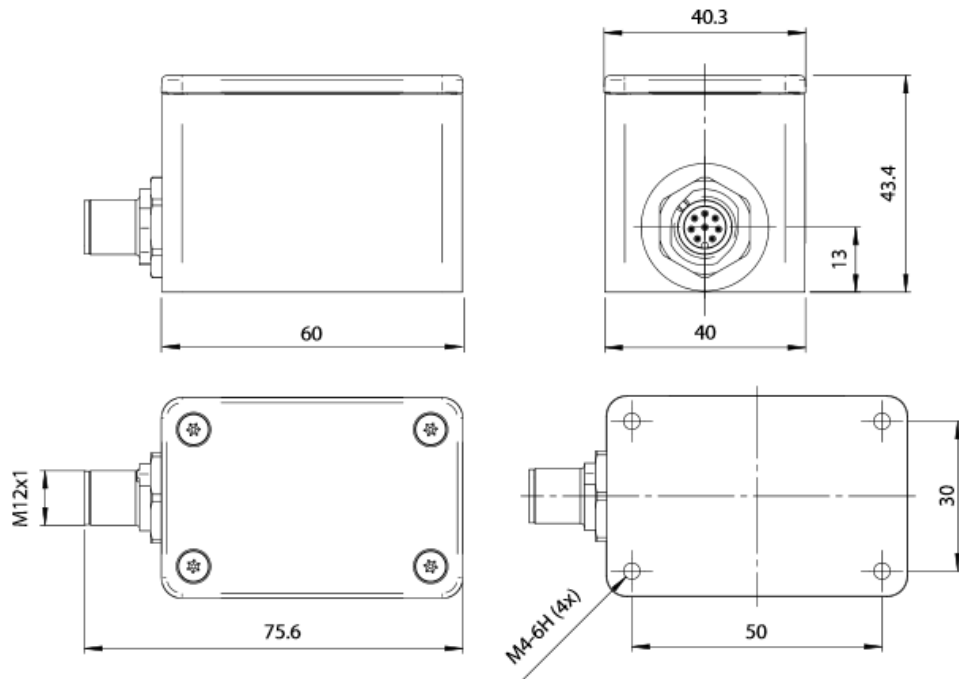


Fig. 8-4 Dimensions, type OFR without housing

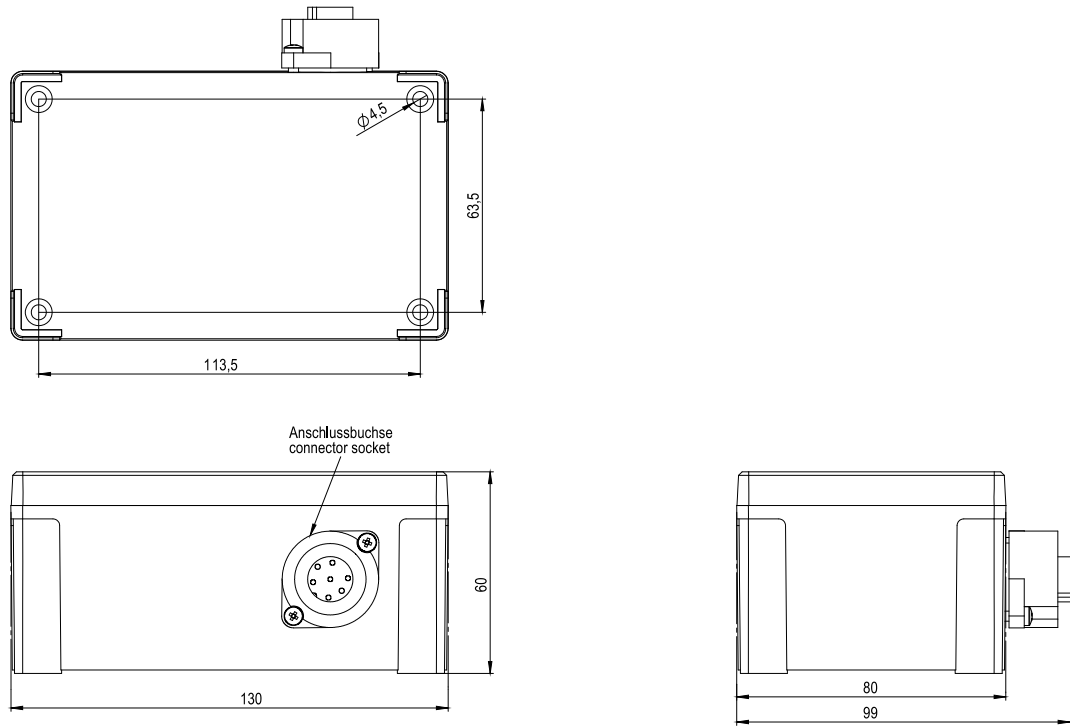


Fig. 8-5 Dimensions, type OFR-F00 with housing

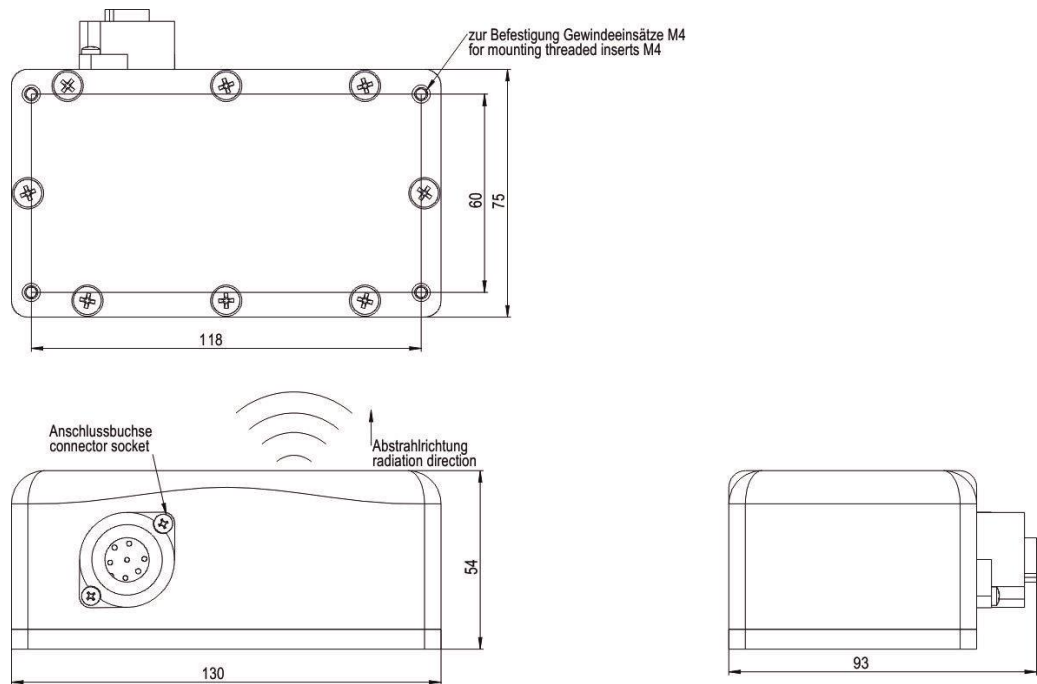


Fig. 8-6 Dimensions, type OFR-G00/EV0 with housing

### 8.3 Device Identification

The instructions in this technical description are valid only for the type of sensor indicated on the title page.

The article number can be found where the cable enters the sensor body as well as on a nameplate on the end of the cable. This nameplate is protected against weathering and abrasion by using a transparent shrunk-on hose and contains the following:

- Name and address of manufacturer
- CE label
- Type labelling and series identification (serial number)
- Year of manufacture
- Ex-label according to chapter 5 “Use in accordance with the requirements” with Ex-version sensors.

It is important for queries and replacement part orders to specify type, year of manufacture and serial number (Article no. if necessary). This ensures correct and quick processing.

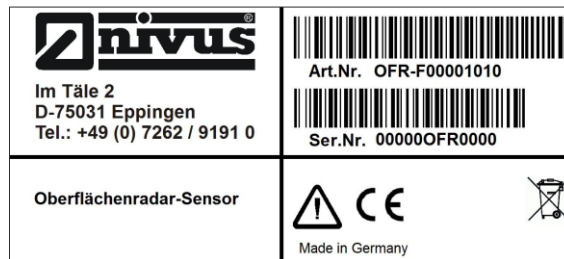


Fig. 8-7 Nameplate flow velocity sensor, type OFR

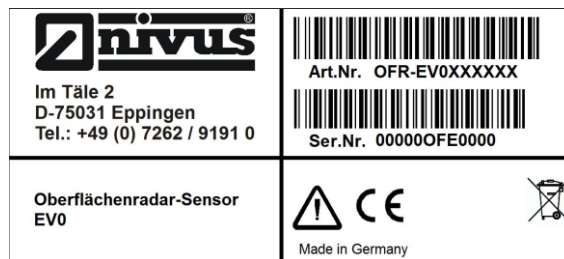


Fig. 8-8 Nameplate flow velocity sensor, type OFR-EV0

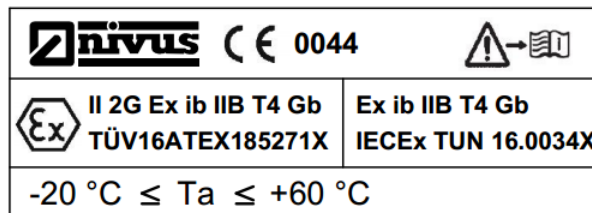


Fig. 8-9 Ex- Nameplate flow velocity sensor, type OFR-EV0

## 8.4 Sensor versions

The Radar sensors are available in various constructions and additionally vary in cable length, cable connection as well as various special versions and materials.

The article number can be found where the cable enters the sensor body as well as on a nameplate on the end of the cable. This nameplate is protected against weathering and abrasion by using a transparent shrunk-on hose.

**OFR-** Open Channel Surface Radar: Sensor for contactless surface velocity measurement of liquid media

<b>Enclosure</b>	
<b>F00</b>	Field enclosure made of plastic (grey, length 130 mm, width 80 mm, height 60 mm), IP68, for use in areas subject to flood risk
<b>G00</b>	Extremely robust plastic enclosure (black, length 130 mm, width 75 mm, height 54 mm), IP68, for use in areas subject to flood risk
<b>E00</b>	Extremely robust plastic enclosure (black, length 130 mm, width 75 mm, height 54 mm) for use in ATEX Zone 1, IP68, for use in areas subject to flood risk
<b>Measurement range</b>	
<b>001</b>	Single-Array Radar for distances to surface between 0.3 and 10 m Velocity determination from 0.15 to 10 m/s
<b>Cable length</b>	
<b>010</b>	10 m
<b>020</b>	20 m
<b>030</b>	30 m
<b>050</b>	50 m
<b>099</b>	100 m
<b>0XX</b>	Special length upon request

Fig. 8-10 Type key for Radar sensors, type OFR



## 8.5 Specifications

Measurement principle	Radar Doppler
Measurement frequency	24 GHz ISM Band
Velocity range	0,15 ... 10 m/s (depending on RCS*)
Measurement uncertainty	<ul style="list-style-type: none"> <li>• flow velocity (<math>v_{\text{average}}</math>) within path <math>\pm 2\%</math> of measurement value</li> <li>• velocity offset <math>&lt; \pm 5</math> mm/s</li> </ul>
Protection	IP54, IP68
Operating temperature	- 20 °C ... + 60 °C
Storage temperature	- 30 °C ... + 70 °C
Cable length	10/15/20/30/50/100 m
Type of cable	LiYC11Y 2x1,5+1x2x0,34
Outside cable diameter	8,5 mm
Sensor types	OFR-F00, OFR-G00, OFR-EV0

\*RCS= Radar Cross Section

The specifications of the measurement transmitter, refer to the instruction manual of stationary flow measurement transmitters >OCM Pro CF<, >NivuFlow 550< or >NivuFlow 7550<.

### Storing

Strictly observe the storing conditions below:

- max. temperature: + 70 °C
- min. temperature: - 30 °C
- max. humidity: 80 %

When storing, protect the sensors from corrosive or organic solvent vapours, radioactive radiation and strong electromagnetic radiation.

## 8.6 Equipment

### 8.6.1 Delivery

The standard delivery of the Radar sensor contains:

- The technical instruction with the EC Declaration of Conformity and approvals where all necessary steps to correctly install and to operate the Radar sensors are listed
- One Radar sensor OFR, depending on enclosure type

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

### 8.6.2 Receipt

Check the delivery according to the delivery note for completeness and intactness immediately after receipt. Report any damage in transit to the carrier instantly.

Send an immediate, written report to NIVUS GmbH in Eppingen as well.

Incomplete delivery shall be directly reported to the headquarters in Eppingen or your local distributor in written form within two weeks.



---

**Note**

*Mistakes cannot be rectified later!*

---

### 8.6.3 Transport

Protect the Radar sensor from shock and impact loads and vibrations.  
The transportation must be carried out in the original packaging.

### 8.6.4 Return

The units must be returned at customer costs to NIVUS Eppingen in the original packaging.  
Otherwise the return cannot be accepted!

### 8.6.5 Installation of Spare Parts and Parts subject to wear and tear

We herewith particularly emphasize that replacement parts or accessories, which are not supplied by us, are not certified by us, too. Hence, the installation and/or the use of such products may possibly be detrimental to the device's ability to work.

Damages caused by using non-original parts and non-original accessories are left at user's risk. Appropriate accessories and spare parts can be found in chapter 11 "Accessories and Mounting aids".

## Role

### 9 Operating principle

The OFR measurement system utilises the Doppler Effect to detect surface velocities. The Radar sensor transmits radar waves onto the water surface in a defined angle. These radar waves are reflected from the water surfaces due to formation of waves and are detected by the sensor subsequently. Both signals are correlated with each other and then are evaluated using the Doppler Effect.

The results are used to calculate the surface velocity.  
The Radar sensor must not contact the water surface.

## Installation

### 10 Sensor Mounting and Fastening

#### 10.1 General Installation regulations

---



##### **Important Note**

*In order to prevent the Radar sensor from being damaged the steps described within this section of the manual shall be executed by trained expert personnel exclusively.*

*The executing company shall have extensive expertise and a sufficient back-ground on installation and commissioning of ultrasonic measurement systems in part filled applications.*

*In other cases either contact the NIVUS commissioning service or an authorised specialist company.*

---

##### **WARNING**



##### **Danger prevention measures**

*Please ensure to observe all regulations on safety at work as well as danger due to explosive gases prior to the beginning of installation works. Respective measures to avert danger shall be taken if required.*

*The non-observance may result in injury to persons!*

---

##### **CAUTION**



##### **Regulations for health and safety at work have to be observed**

*Using divers can be necessary for the installation of Radar sensors and cable layout. Diving works require compliance with particular regulations on safety at work. Carefully prepare such measures separately and consult the respective authorities for according approvals in time.*

*Instructed installation companies will require sufficient expertise as well as valid approvals for underwater installation.*

---



##### **Norms and Standards**

*The knowledge of standards is an indispensable requirement for a safe and proper measurement site selection and sensor fastening in waters or rivers.*

*See DIN EN ISO 748 and DIN EN ISO 6416.*

---



##### **Permissions from public authorities**

*Prior to the sensors installation at bridge piers, embankments, groynes etc.; at the laying of cables as well as the operation of the facilities in public waters, a written authorisation from the competent authority must be obtained.*

---

**It is strongly recommended to carefully read the General Installation Regulations as well as the Hints on Sensor Installation prior to installation.**

The non-observance of these notes may cause interferences in the measurement. The manufacturer explicitly states that all approvals and work regulations shall be obtained and observed.

The sensors shall be fastened durably and reliably.

Use only non-corrosive fastening material!

The optional fastening material is designed for normal flow conditions at the measurement place. Do not install the sensor in floodable areas.

Sensor fastening shall be implemented as follows (e. g. by using the combi holder available from NIVUS GmbH):

- the horizontal level adjustment must be independent from the vertical level adjustment
- $\pm 2^\circ$  max. permissible deviation of vertical and horizontal alignment
- easy removal of sensors for maintenance or cleaning, no divers or special equipment should be required if possible
- Realignment after maintenance shall be avoided if possible

## 10.2 Choosing Calming Sections

### 10.2.1 General Notes

Clear and defined hydraulic conditions are indispensable prerequisites for accurate measurements. This is why one has to be especially attentive to the required hydraulic calming sections.

When measuring in open channels and waters the measurement place must have a defined and constant flow cross section. Moreover there must be a well-developed flow profile featuring a stable flow velocity if possible available.

The measurement place generally should be such to comply with DIN EN ISO 748 and DIN EN ISO 6416.

Strictly avoid falls, steps or obstructions, fittings, changes of the channel profiles, changes in slopes or supplies from the side upstream as well as downstream of the measurement site!

The drawings Fig. 10-1 to Fig. 10-5 give an example of appropriate, ill-suited and problematic applications.

The drawings illustrate the features of appropriate measurement places. Furthermore the drawings explain critical hydraulic conditions which might prevail.

In case of being uncertain regarding choice or assessment of planned measurement sections please your NIVUS representative or the flow department ([hotline-worldwide@nivus.com](mailto:hotline-worldwide@nivus.com)) at NIVUS GmbH in Eppingen.

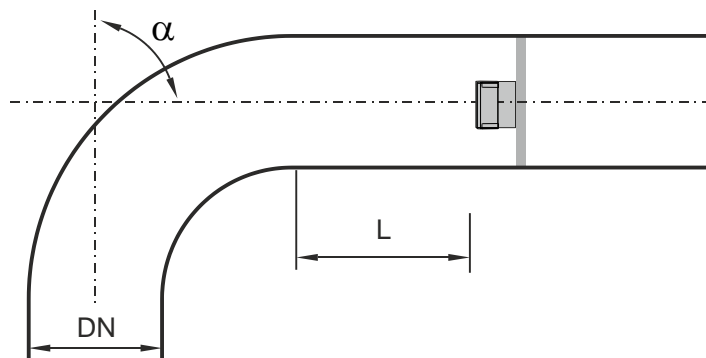
In order to assess the measurement place the following documents shall be available:

- Sketches or drawings
- Photos of planned measurement sections

## 10.2.2 Conditions in waters and open channels

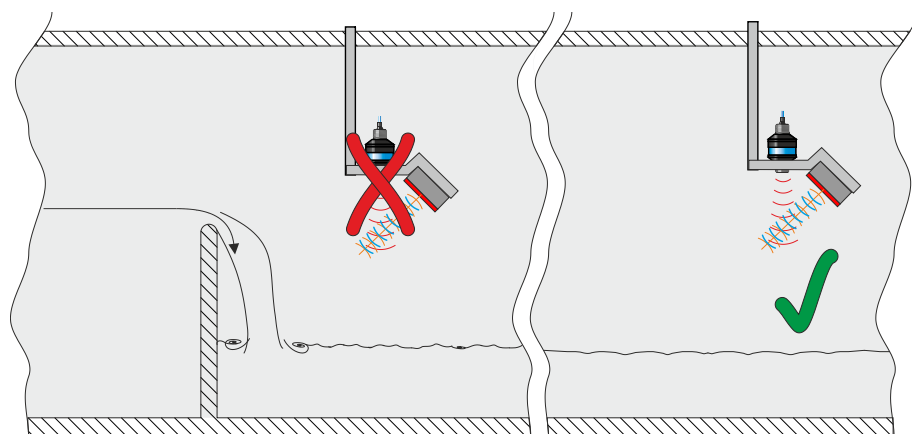
In waters the following criteria must be respected:

- As a basic requirement, the surface on the chosen measurement place shall feature wave movement since smooth water surfaces cannot reflect the radar waves back to the sensor.
- The water bed should be stable and free of sedimentation or scour holes.
- The bank should have a definite shape and a stable formation and do not have a disposition to changes.
- There should be no weeds, stones, piles, steps, sills or similar within the measurement path. Such obstructions affect the flow profile and cannot be detected by the OFR.
- The surface movement must have the same velocity as the entire flow cross section. Gusts e. g. might influence the wave velocity on the surface.



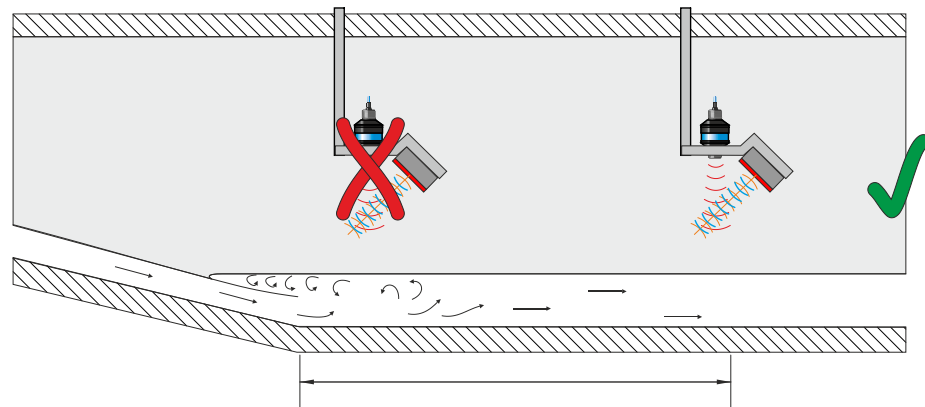
	$v \leq 1 \text{ m/s}$	$v > 1 \text{ m/s}$
$\alpha \leq 15^\circ$	$L \geq \text{min. } 3x \text{ DN}$	$L \geq \text{min. } 5x \text{ DN}$
$\alpha \leq 45^\circ$	$L \geq \text{min. } 5x \text{ DN}$	$L \geq \text{min. } 10x \text{ DN}$
$\alpha \leq 90^\circ$	$L \geq \text{min. } 10x \text{ DN}$	$L \geq \text{min. } 15\text{-}20x \text{ DN}$

Fig. 10-1 Sensor position behind curves or elbows



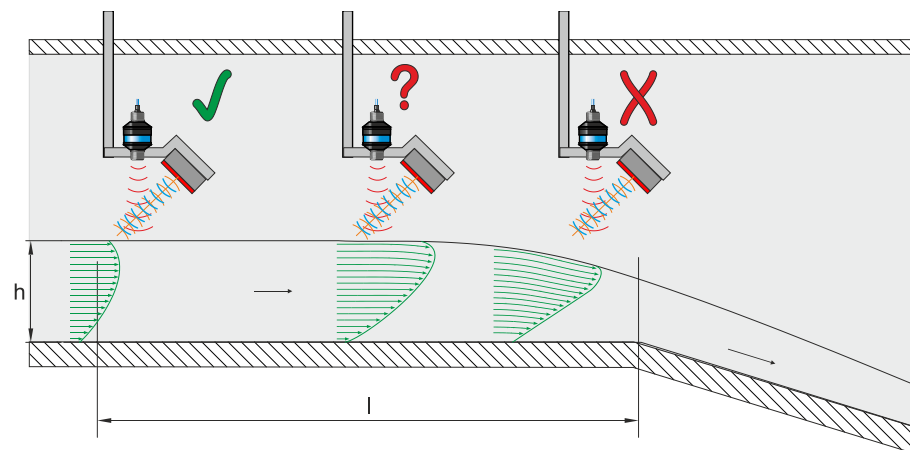
- ✘ = Error! Indefinable flow conditions
- ✓ = Sufficient distance to obtain straight flow  
(10 ... 50x diameter depending on application)

Fig. 10-2 Measuring behind fall – turbulence



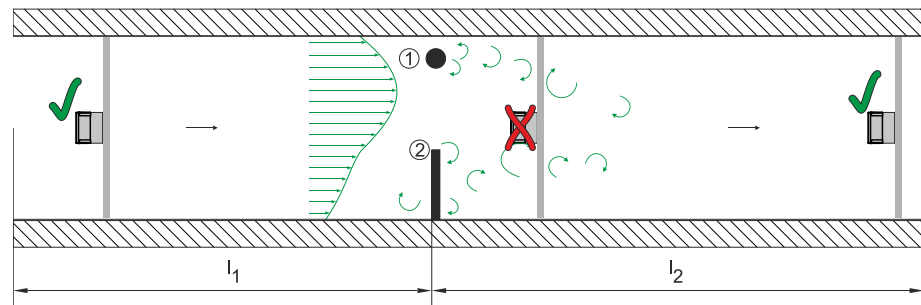
- ✘ = Error! Alternation of slope = alternation of flow profile
- ✓ = Distance depending on slope and flow velocity value  
 $l = \text{min. } 20 \times \text{diameter}$

Fig. 10-3 Error caused by alternation of slope



- ✘ = Error! Transition from flowing to shooting  
 Faulty level and velocity measurement
- ? = Critical measurement point, not recommended! Begin of sinking flow
- ✓ = Distance  $l = \text{min. } 5 \times h_{\text{max}}$  at place of installation

Fig. 10-4 Error caused by alternation of flow profile in front of slope alternation or fall



- ① = Fixtures  
 ② = Obstruction  
 $h_{max}$  = max. level/height  
 x = Error caused by vortex formation!  
 ✓ = Distance I1 (upstream of obstruction) = min. 5x DN  
     Distance I2 (downstream of obstruction) = min. 10x DN  
     in case of flow velocities > 1 m/s

Fig. 10-5 Errors caused by fixtures or obstructions (top view)

### 10.3 Installation Instructions

- Ensure proper installation!
- Comply with existing legal standards or operational guidelines!

Injuries or/and damage to the sensors can be caused by improper handling!

The Radar sensor of the measurement system must be installed in a centred position above the geometry to measure.



#### Note

*High accurate, vibration-free and firm installation and sensor alignment are necessarily required to ensure the measurement to operate properly!*

### 10.4 Electrical Installation

#### WARNING



#### Warning of electrical shock

*Work on the electrical connections may only be performed with the supply voltage is turned off.*

*Always observe the electrical data specified on the nameplate. Disconnect the supplying transmitter from mains!*

*Disregarding may lead to electric shocks.*

For electric installation the regulations in the respective countries must be referred to. For installation in wet environments or in areas featuring the risk of flooding it may be necessary to install extra protective measures such as a residual current device (RCD) if required. Transmitters and sensors shall be installed completely before feeding the supply voltage. Check that the installation is correct. The installation shall be carried out by qualified personnel only. Legal standards, provisions and technical regulations need to be observed.



## 10.4.1 Sensor cable laying



### Important Note

To avoid disturbances from electrical interferences, the sensor cable must not be laid close to engine (motor) lines or main power lines.

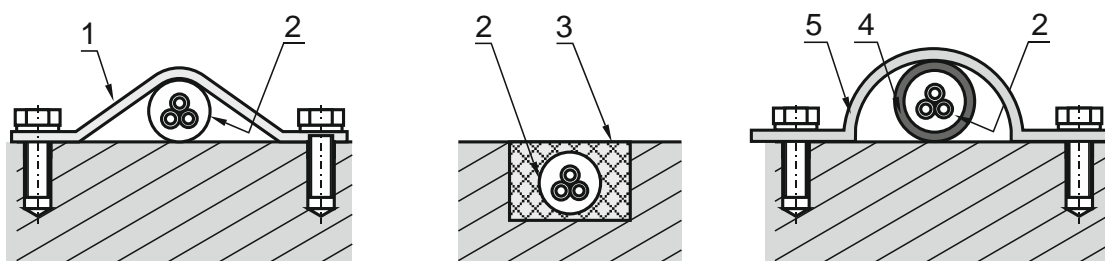
The installation of sensors in open channels or water bodies always requires previous planning. A measuring point inspection is required. Mounting options might be very individual.



### Risk of cable break!

The minimum bending radius of the standard signal cable is 10 cm (3.94 in). Smaller radii may result in cable break!

Sensor cables shall be laid according to applicable VDE installation regulations. Required cable covers and/or empty cable conduits can be purchased from NIVUS (see chapter 11 „Accessories and Mounting aids“).



- 1 Stainless steel sheet/cable cover, e. g. Type ZMS 140
- 2 Cable
- 3 Permanently elastic material
- 4 Empty conduit
- 5 Pipe clamp

Fig. 10-6 Suggested cable layout

## 10.5 Connection to transmitter

### 10.5.1 Configuration of cables

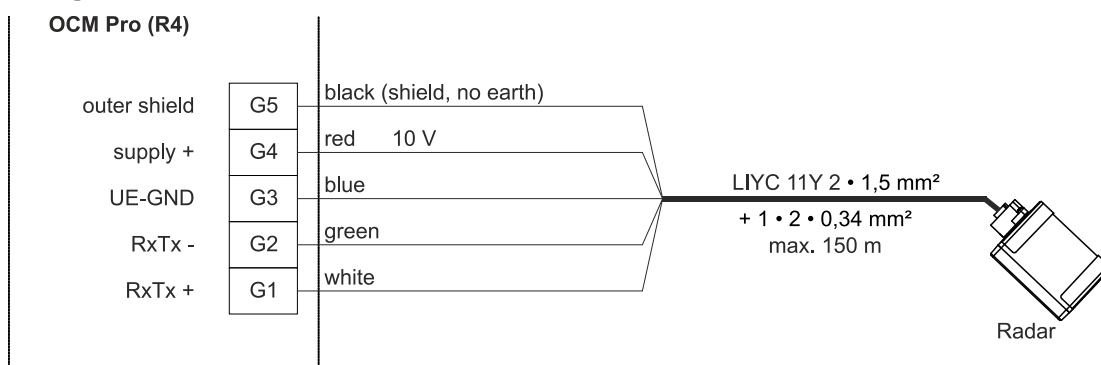


Fig. 10-7 Configuration of cables to transmitter, type OCP-R4



---

**Note**

*The configuration of cables for the measurement transmitters NivuFlow 550 and NivuFlow 7550 are shown in the respective Instruction Manuals.*

---

**10.5.2 Sensor cable/Configuration of cables**

The sensors are pre-equipped with a cable Type „LiYC11Y 2x1.5 +1x2x0.34 mm<sup>2</sup>“ in various possible lengths.

Extend cables only by using the same cable type.

Improper wiring leading to increased contact resistances or the use of wrong cables may lead to interference or measurement failure.



---

**Observe allowed cable extension**

*Extensions from different applications or extensions from separate level and flow velocity measurements shall never share the same signal cable!*

---

## 11 Accessories and Mounting aids

### 11.1 Combi holding device for Radar sensor and Level sensor



**Note**

Please observe to install the holding device accurately in horizontal and vertical position. We recommend using a spirit level as installation aid.

There are several holder versions available for fastening of OFR sensors on vertical walls, bridges or similar.

Ordered Radar sensors are delivered pre-installed on a combi holder.

The holders are supplied including the fastening materials below:

- 4x drop-in anchor

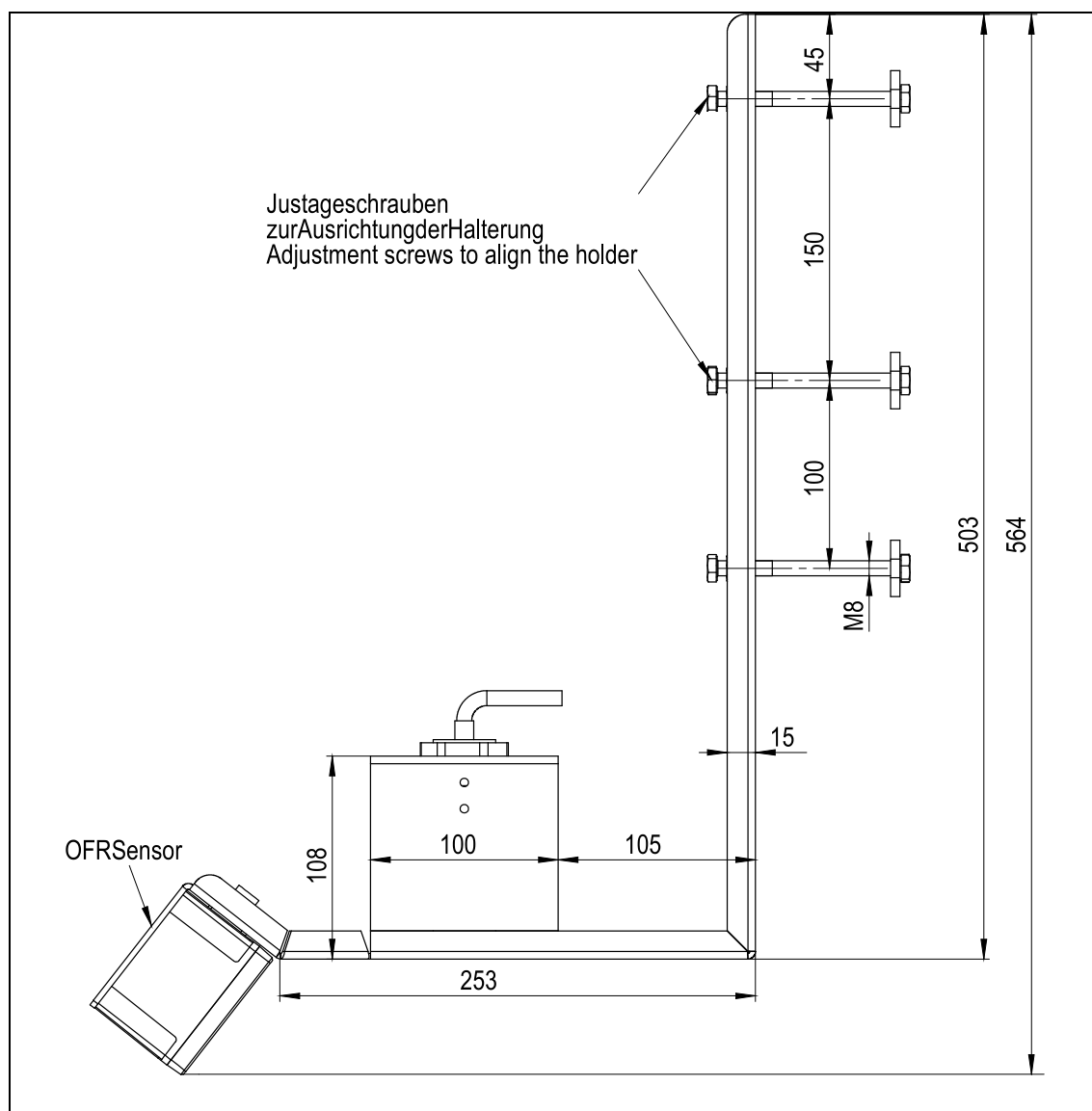


Fig. 11-1 Holders for Radar sensor Type ZUB0OFRHAL

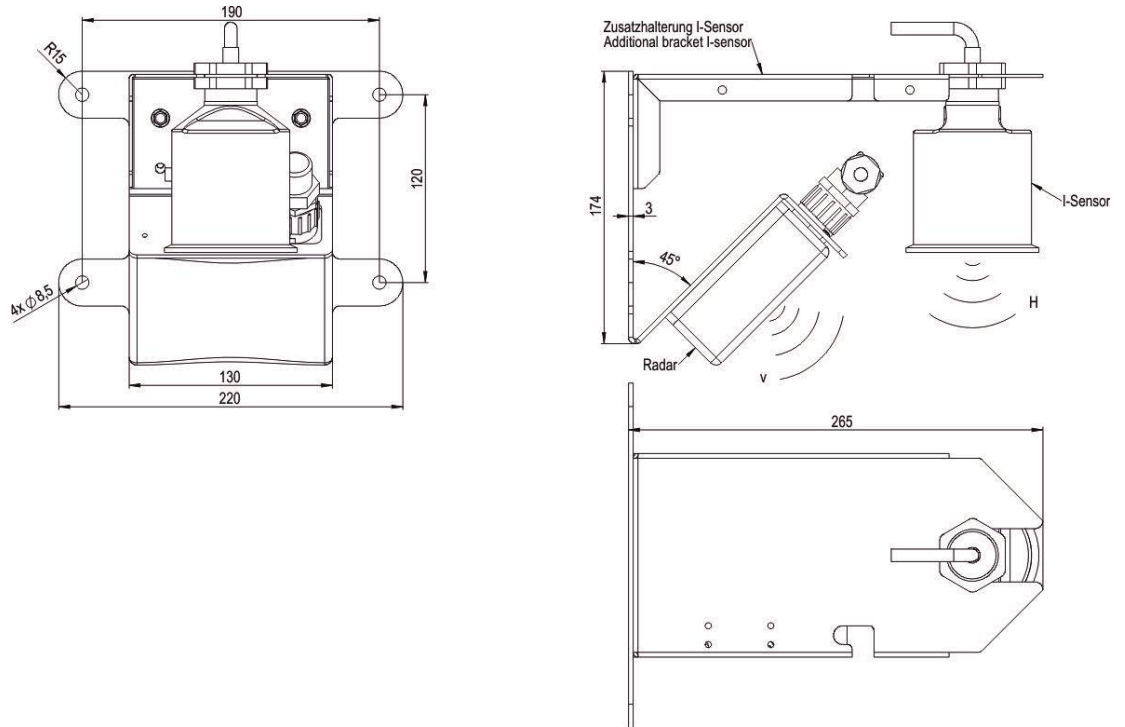


Fig. 11-2 Holders for Radar sensor type ORH-AL0 incl. i-Sensor

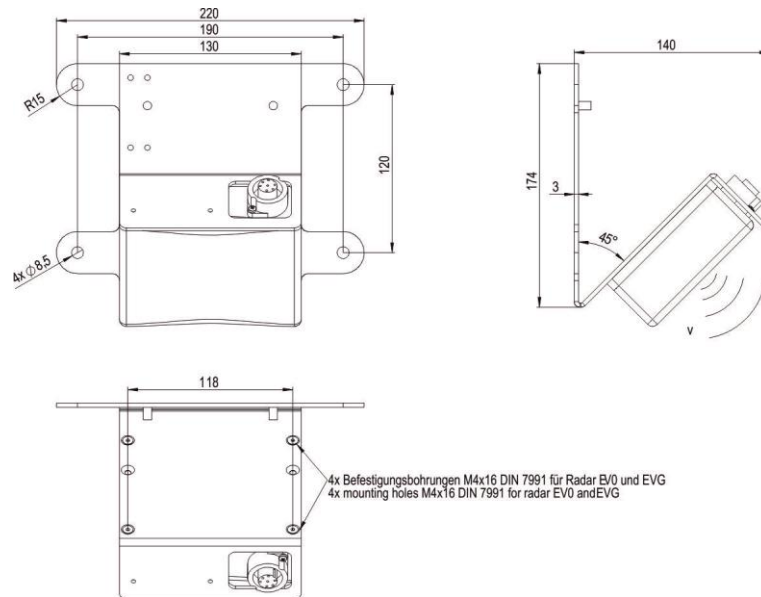


Fig. 11-3 Holders for Radar sensor type ORH-A00

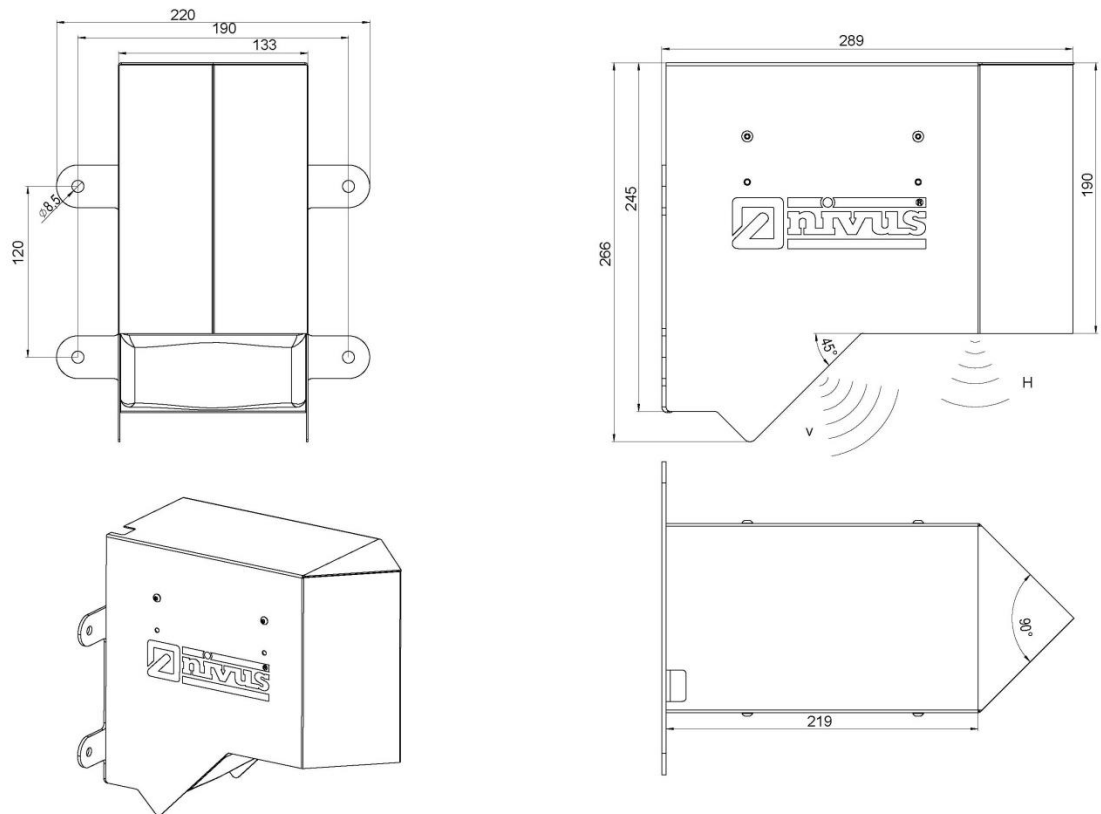


Fig. 11-4 Measurements of enclosure for the types OFR-G00/EV0

## Maintenance and Cleaning

### 12 Maintenance

#### 12.1 Maintenance interval

The Radar sensors OFR are conceived to be virtually free of calibration, maintenance and wear (requirements of the Industrial Safety Regulations are unaffected).

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

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

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

#### 12.2 Customer Service Information

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

**NIVUS GmbH – Customer Service**

Phone +49 (0) 7262 9191 - 922

[Kundencenter@nivus.com](mailto:Kundencenter@nivus.com)

### 13 Cleaning

**DANGER**



***Danger from electrostatic discharge (ESD)***

*Clean the sensors using a damp cloth.*

*Disregarding will void the explosion proof rating due to possible electrostatic charge which hence is no longer assured for this device.*

*The device then is dangerous to the user's health and life and may ignite potentially explosive atmospheres.*

**WARNING**



***Disconnect the device from mains power***

*Make sure that the device is disconnected from mains power.*

*Non-observance may result in personal injuries.*



***Damage by hard objects***

*No hard objects such as wire brushes, rods, scrapers or similar shall be used to clean the sensor.*

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

*Risk of damage of the sensor.*

The measurement place must be checked periodically.

Probably the measurement place has to be cleaned and must be kept free from vegetation. It may be necessary to clean the flow velocity sensor regularly in cause of pollution.

For cleaning the sensor, use a brush with plastic bristles, a broom or similar.

Do **not** use sharp cleansing agents or solvents. Light household cleaners or soapy water can be used.

Do **not** remove built-in parts while cleaning the sensor.

The Radar sensor needs “clear view” to the surface of the measured media.

### 14 Dismantling/Disposal

Improper disposal may be harmful to the environment.

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

1. Disconnect the measurement system from mains power.
2. Use appropriate tools to remove the connected cables to the transmitter.
3. Remove the Radar sensor from the holder.
4. Remove the backup battery and dispose it following local regulations.



---

#### **EU WEEE-Directive:**

*This symbol indicates that the Directive 2002/96/EG on waste electrical and electronic equipment requirements shall be observed on the disposal of the equipment.*

*The built-in lithium button cell should be disposed separately.*

---

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# 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:*

<b>Bezeichnung:</b>	<b>Oberflächenradar</b>
<i>Description:</i>	<i>surface radar</i>
<i>Désignation:</i>	<i>surface radar</i>
<b>Typ / Type:</b>	<b>OFR-G00...</b>
	<b>OFR-H00...</b>

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:*

- 2014/53/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 61010-1:2010
- EN 62311:2008
- EN 301 489-1 V2.2.3
- EN 301 489-3 V2.1.1
- EN 300 440 V2.2.1

Diese Erklärung wird verantwortlich für den Hersteller:

*This declaration is submitted on behalf of the manufacturer:*

*Le fabricant assume la responsabilité de cette déclaration:*

**NIVUS GmbH**  
**Im Täle 2**  
**75031 Eppingen**  
**Allemagne**

abgegeben durch / represented by / faite par:

**Udo Steppe** (Geschäftsführer / Managing Director / Directeur général)

Eppingen, den 02.09.2020

Gez. *Udo Steppe*

# 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:*

<b>Bezeichnung:</b>	<b>"Ex" Oberflächenradar</b>
<i>Description:</i>	<i>"Ex" surface radar</i>
<i>Désignation:</i>	<i>"Ex" surface radar</i>
<b>Typ / Type:</b>	<b>OFR-EV0-xxx...</b> <b>OFR-EVG-xxx...</b>

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:*

- 2014/53/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:

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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 61010-1:2010
- EN 62311:2008
- EN 301 489-1 V2.1.1
- EN 301 489-3 V2.1.0
- EN 300 440 V2.1.1
- EN IEC 60079-0:2018
- EN 60079-11:2012

Ex-Kennzeichnung / *Ex-designation* / *Marquage Ex* :

 II 2G Ex ib IIB T4 Gb

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

TÜV 16 ATEX 185271 X Issue: 00

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

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 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 Täle 2**  
**75031 Eppingen**  
**Allemagne**

abgegeben durch / *represented by* / *faite par:*

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

Eppingen, den 06.07.2021

Gez. *Marcus Fischer*

Translation

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

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



(3) **Certificate Number** TÜV 16 ATEX 185271 X **issue:** 00

(4) for the product: Surface radar sensors type OFR-EV0 and OFR-EVG

(5) of the manufacturer: NIVUS GmbH

(6) Address: Im Täle 2  
75031 Eppingen

Order number: 8000462886

Date of issue: 2016-12-14

(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. 16 203 185271.

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


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

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

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

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

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

 II 2 G Ex ib IIB T4 Gb

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

The Deputy head of the notified body

  
Roder

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



(13) **SCHEDULE**

(14) **EU-Type Examination Certificate No. TÜV 16 ATEX 185271 X issue 00**

(15) Description of product

The surface radar sensors type OFR-EV0 and OFR-EVG are intended for contactless velocity measurement on the surface of liquid media particularly in wastewater areas via radar technology.

The permissible ambient temperature range of the sensors is -20 °C ... 60 °C.

Electrical data

Signal- and supply circuit ..... in type of protection Intrinsic Safety Ex ib IIB  
 (Plug connector only for connection to  
 pin 1 [+Vin] a certified intrinsically safe circuit  
 pin 6 [GND] maximum values:  
 $U_i = 10.5 \text{ V}$   
 $I_i = 640 \text{ mA}$   
 $P_i = 6.72 \text{ W}$   
 The effective internal capacitance is negligibly small.  
 Effective internal Inductance: 3.5  $\mu\text{H}$

RS485 interface ..... in type of protection Intrinsic Safety Ex ib IIB  
 (Plug connector maximum values:  
 pin 2 [RXTx+]  $U_o = 10.2 \text{ V}$   
 pin 5 [RXTx-]  $I_o = 119 \text{ mA}$   
 $P_o = 304 \text{ mW}$   
 characteristic line: linear  
 The effective internal capacitance is negligibly small.  
 Effective internal inductance: 53  $\mu\text{H}$

	Ex ib	IIB
max. permissible external inductance	10 mH	0.95 mH.
max. permissible external capacitance	2.2 $\mu\text{F}$	5.1 $\mu\text{F}$

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

Maximum values:  
 $U_i = 15.1 \text{ V}$   
 $I_i = 168 \text{ mA}$   
 $P_i = 634 \text{ mW}$

(16) Drawings and documents are listed in the ATEX Assessment Report No. 16 203 185271.

**Schedule to EU-Type Examination Certificate No. TÜV 16 ATEX 185271X issue 00**

(17) Specific Conditions for Use

1. At the plastic parts there is a danger of ignition by electrostatic discharge.  
Observe manual of the manufacturer and warning label.
2. The metallic parts of the protective cover, if used, have to be connected with ground potential.

(18) Essential Health and Safety Requirements

no additional ones

- End of Certificate -



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEx TUN 16.0034X Issue No: 0 Certificate history:  
Status: Current Page 1 of 3 Issue No. 0 (2016-12-14)  
Date of Issue: 2016-12-14  
Applicant: NIVUS GmbH  
Im Täle 2  
75031 Eppingen  
Germany  
Equipment: Radar sensor type OFR-EV0 and OFR-EVG  
*Optional accessory:*  
Type of Protection: Intrinsic safety "I"  
Marking: Ex ib IIB T4 Gb

Approved for issue on behalf of the IECEx  
Certification Body:

Christian Roder

Position:

Deputy Head of the IECEx Certification Body

Signature:  
(for printed version)

Date:

2016 - 12 - 14

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:

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





# IECEX Certificate of Conformity

Certificate No: IECEX TUN 16.0034X

Issue No: 0

Date of Issue: 2016-12-14

Page 2 of 3

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

Additional Manufacturing location(s):

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

#### STANDARDS:

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

**IEC 60079-0 : 2011** Explosive atmospheres - Part 0: General requirements  
Edition:6.0

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

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

#### TEST & ASSESSMENT REPORTS:

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

Test Report:

[DE/TUN/EXTR16.0046/00](#)

Quality Assessment Report:

[DE/TUN/QAR13.0011/03](#)



# IECEX Certificate of Conformity

Certificate No: IECEX TUN 16.0034X

Issue No: 0

Date of Issue: 2016-12-14

Page 3 of 3

## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

The radar sensors type OFR-EV0 and OFR-EVG are used for contact less measurement of the flow rate of liquid media, especially in waste water areas.

The permissible ambient temperature range is  $-20\text{ }^{\circ}\text{C}$  ...  $+60\text{ }^{\circ}\text{C}$ .

For further information see attachment.

### CONDITIONS OF CERTIFICATION: YES as shown below.

1. At the plastic parts there is a danger of ignition by electrostatic discharge.  
Observe manual of the manufacturer and warning label.
2. The metallic parts of the protective cover, if used, have to be connected with ground potential.

### Annex:

[Annexe\\_Surface Radar OFR\\_xxx\\_TUN16.0034X.pdf](#)



The surface radar sensors type OFR-EV0 and OFR-EVG are intended for contactless velocity measurement on the surface of liquid media particularly in wastewater areas via radar technology.

The permissible ambient temperature range of the sensors is -20 °C ... 60 °C.

Electrical data

Signal- and supply circuit ..... in type of protection Intrinsic Safety Ex ib IIB  
 (Plug connector only for connection to  
 pin 1 [+Vin] a certified intrinsically safe circuit  
 pin 6 [GND] maximum values:  
 $U_i = 10.5 \text{ V}$   
 $I_i = 640 \text{ mA}$   
 $P_i = 6.72 \text{ W}$   
 The effective internal capacitance is negligibly small.  
 Effective internal Inductance: 3.5  $\mu\text{H}$

RS485 interface ..... in type of protection Intrinsic Safety Ex ib IIB  
 (Plug connector maximum values:  
 pin 2 [RxTx+]  $U_o = 10.2 \text{ V}$   
 pin 5 [RxTx-]  $I_o = 119 \text{ mA}$   
 $P_o = 304 \text{ mW}$   
 characteristic line: linear  
 The effective internal capacitance is negligibly small.  
 Effective internal inductance: 53  $\mu\text{H}$

	Ex ib	IIB
max. permissible external inductance	10 mH	0.95 mH
max. permissible external capacitance	2.2 $\mu\text{F}$	5.1 $\mu\text{F}$

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

Maximum values:  
 $U_i = 15.1 \text{ V}$   
 $I_i = 168 \text{ mA}$   
 $P_i = 634 \text{ mW}$

Specific condition of Use:

1. At the plastic parts there is a danger of ignition by electrostatic discharge.  
 Observe manual of the manufacturer and warning label.
2. The metallic parts of the protective cover, if used, have to be connected with ground potential.