Anton Paar

Measure
what is measurable
and make measurable
that which is not.

Galileo Galilei (1564-1642)

Instruction Manual and Safety Information

L-Dens 7000 (Ex d)
L-Com 5500 (Ex d)
Inline Pump 300 (Ex d)

Original Instructions

Disclaimer

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Further information

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Inline Pump 300 (Ex d)

Original Instructions

Contents

1 Safety Instructions

- Read the documentation before using the instrument.
- Follow all hints and instructions contained in the documentation to ensure the correct use and safe functioning of the instrument.
- The documentation is a part of the product. Keep this document for the complete working life of the product and make sure it is easily accessible to all people involved with the product. If you receive any additions or revisions to the documentation from Anton Paar GmbH, these must be treated as part of the documentation.

1.1 General Safety Instructions

Liability

- This document does not claim to address all safety issues associated with the use of the instrument and process fluids. It is your responsibility to establish health and safety practices and determine the applicability of regulatory limitations.
- Anton Paar GmbH only warrants the proper functioning of the instrument if no adjustments have been made to the mechanics, electronics, and firmware.
- Only use the instrument for the purpose described in the documentation. Anton Paar GmbH is not liable for damages caused by incorrect use of the instrument.

Installation and use

- Comply with local workplace safety regulations.
- Attention must be paid to all parts of the instrument.
- Sensors without an Ex-marking are not explosion-proof instruments and therefore must not be operated in areas with risk of explosion.
- Sensors with Ex-marking are intended for use in areas with risk of explosion. Special Safety Instructions must be read and followed for installation and use (see Chapter 1.2).
- The installation procedure should only be carried out by authorized personnel who are familiar with the installation instructions.
- Do not use any accessories or spare parts other than those supplied or approved by Anton Paar GmbH.
- Make sure all operators are trained to use the instrument safely and correctly before starting any applicable operations.
- In case of damage or malfunction, do not continue operating the instrument. Do not operate the instrument under conditions which could result in damage to goods and/or injuries and loss of life.
- Check the instrument for chemical resistance to the process fluids and cleaning fluids.
- Do not operate the instrument beyond its electrical, thermal and mechanical specifications.
- Do not step on the instrument.

Maintenance and service

- The results delivered by the instrument not only depend on the correct functioning of the instrument, but also on various other factors. We therefore recommend you have the results checked (e.g. plausibility tested) by skilled personnel before consequential actions are taken based on the results.
- Service and repair procedures may only be carried out by authorized personnel or by Anton Paar GmbH.

Disposal

- Concerning the disposal of the instrument, observe the legal requirements in your country.

Returns

- For repairs send the cleaned instrument to your Anton Paar representative. Only return the instrument together with the filled out RMA (Return Material Authorization) and the form "Safety Declaration for Instrument Repairs". Please download the Safety Declaration form from our website www.anton-paar.com.
- Do not return instruments which are contaminated by radioactive materials, infectious agents or other harmful substances that cause health hazards.

1.2 Special Safety Instructions

Additional safety instructions are in the documents supplied depending on the ordered sensor version and process adapter. The additional documents are an integral part of this instruction manual. Always comply strictly with the instructions in the additional documents. Example for an additional document: Installation information of the process adapters.

Operation in Hazardous Areas

This manual also provides the safety instructions and specifications of instruments designed for use in hazardous areas according to the Directive 2014/34/EU (ATEX), IECEx, FM and CSA.

Instruments approved to be installed in hazardous areas are marked with an Ex-sign.

DANGER

Explosion
In areas with risk of explosion, only operate instruments marked with an Ex-sign.

By attaching the Ex-sign, Anton Paar confirms that the instruments meet the requirements of the examination certificate (see Ex-certificates collected in XDPIB041EN).

It is your responsibility to ensure that the set-up, installation, commissioning, operation, maintenance and service of the measuring instrument is in full compliance with

- corporate, local and national regulations and electrical codes,
- the data on the type plate,
- the signs and Ex-signs on the instrument,
- the certificates (Ex-certificates collected in XDPIB041EN) and
- the instructions given in the instruction manual and supplementary documentation.

Set-up, installation, commissioning, operation, maintenance and service of the instrument must be carried out by personnel who fulfill the following requirements:

- Be qualified for these tasks
- Be trained in explosion protection
- Be familiar with federal/national regulations (e.g. IEC/EN 60079-14)
- Be authorized by the plant owner/operator

Before starting work, the authorized person must have read and understood the instructions in the instruction manual and the supplements to the instruction manual and in the certificates (depending on the application).

Refer to the technical specification for the relationship between the permitted process and ambient temperature depending on the temperature class.

Modifications on the instrument, repair work and/or change of components are not permitted.

In the event of potentially explosive gas/air mixtures, only operate the instrument under atmospheric conditions.

- Pressure: 80 to 110 kPa (0.8 to 1.1 bar)
- Air with normal oxygen content, usually 21 % (V/V)

Integrate the instrument into the local potential equalization.

If the ground connection has been established via the pipe, it is also possible to integrate the instrument into the potential equalization system via the pipe.

Only open the electronics housing in a de-energized state (once a delay of 10 minutes has elapsed after switching off the power supply) or in environments which do not have a potentially explosive atmosphere.

Do not remove the USB port sealing plug in a potentially explosive atmosphere. The USB connection must only be used in non-explosive atmospheres.

DANGER

Explosion
The plastic transport sealing plugs do not meet this requirement and must therefore be replaced during installation.

If a cable gland or conduit entry part is not used, it must be sealed by using an appropriate flameproof/explosion proof sealing plug with the plug entered to a depth of at least five threads.

If connected by a conduit entry approved for this purpose, mount the associated sealing unit directly at the housing.

Do not disconnect the electrical connections (power supply, communication) when energized in potentially explosive atmospheres.

Choose the cables' diameters to ensure optimal sealing at the cable gland.

Take mechanical stress into consideration when choosing the connecting cables. Strain relief is provided by the correct assembly of the cable gland.

The specification of the connecting cables must comply with all applicable regulations for the environment of operation and with the instructions in the appropriate instruction manual.

Only use certified cable entries and cable glands or conduits suitable for the application. Observe selection criteria as per federal/national regulations (e.g. IEC/EN 60079-14).

Battery Replacement (Pico 3000)

Replace battery with the same battery type:

- CR1225
- Le/MnO2 Battery 3V, 48 mAh

Marking of the sensors (Ex d version)

- ATEX: Ex II 2G Ex db IIB T4/T5 Gb
- IECEx: Ex db IIB T4/T5 Gb
- CSA/UL/FM: Class I Division 1 Gr CD T4/T5
  Ex db IIB T4/T5 Gb
  Class I Zone 1,
  AEx db IIB T4/T5 Gb
- UKEX: Ex II 2G Ex db IIB T4/T5 Gb

Marking of the Inline Pump 300 Ex d

- ATEX:
  Pump unit: Ex II 2G Ex h IIB T4 Gb
  DC motor: Ex II 2G Ex db IIB T4 Gb
- IECEx:
  Inline Pump 300 Ex d: Ex h IIB T4 Gb
  Ex 60079-46 IIB T4 Gb
  DC motor: Ex db IIB T4 Gb
- CSA/UL/FM:
  DC motor: Class I Division 1 Gr CD T4
  Class I Zone 1 AEx db IIB T4 Gb
  Ex db IIB T4 Gb
- UKEX: Ex II 2G Ex db IIB T4 Gb

1.3 Conventions for Safety Messages

The following conventions for safety messages might be used in this document:

DANGER

Description of risk.
Danger indicates a hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING

Description of risk.
Warning indicates a hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION

Description of risk.
Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Description of risk.
Notice indicates a situation which, if not avoided, could result in damage to property.

***TIP** gives extra information about the situation at hand.*

1.4 Safety Signs on the Instrument

On non-Ex-sensors:

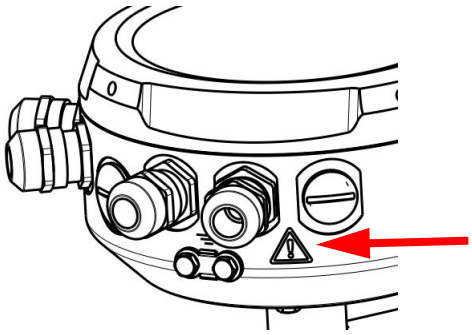


*Fig. 1: Position of the warning sign on the **non-Ex-sensors***

On Ex-sensors:

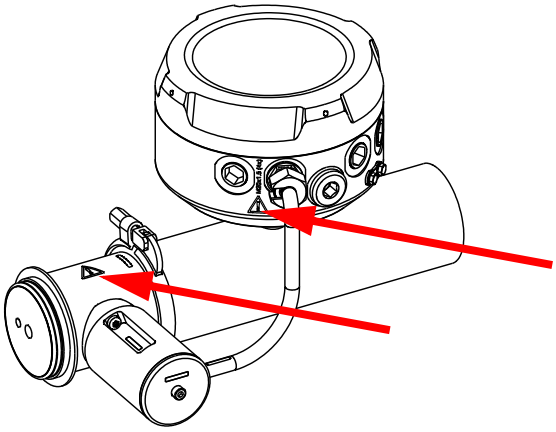


*Fig. 2: Position of the warning signs on the **Ex-sensors** with and without Inline Pump 300 Ex d*

On process adatpers:

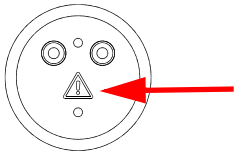


*Fig. 3: Position of the warning sign on the **process adapter for L-Dens 7500/L-Com 5500***

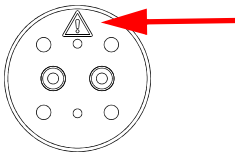


*Fig. 4: Position of the warning sign on the **process adapter for L-Dens 7300/7400***

WARNING

Follow all warnings and cautions listed in this instruction manual.

NOTICE

Take care that the warning symbol remains clearly legible.

1.5 Special Conditions in Use

WARNING

Explosion

- There is a risk of static charge of the packaging. The measuring system must be unpacked outside the hazardous area.
- Do not open the instrument when an explosive atmosphere may be present.
- Seal all conduits within 18 inches (0.46 m).
- Field wiring must be suitable for a minimum of 90 °C.
- For cable entrances use only already certified Ex d or Ex db cable glands suitable for application and rated for a minimum of 80 °C.
- Unused openings must be closed by use of already certified Ex d or Ex db stopping plugs (blind plugs) suitable for application and rated for a minimum of 80 °C.
- The plastic transport sealing plugs do not meet this requirement and must therefore be replaced during installation.
- The usage of all components of the instrument (sensor, adapter, Inline Pump, ...) must be checked according to the technical specification in the manual and can only be used if all necessary requirements are approved.

1.5.1 Inline Pump 300 Ex d

WARNING

Explosive Hazard
Read and follow the installation instructions
Avertissement
Risque d'éxplosion - voir le manuel d'utilisation.

WARNING

Explosion

- The usage of the Inline Pump 300 Ex d is only allowed in combination with the density sensors L-Dens 7000 or the combined density and sound velocity sensors L-Com 5500 made by the same manufacturer Anton Paar GmbH, Austria.
- When in application with L-Dens 7000 (IECEx QPS 18.0002X Issue No. 0) and/or L-Com 5500 (IECEx QPS 19.0001X Issue No. 0), the Specific Conditions of Use given through the aforementioned individual certificates remain unchanged.
- No modifications may be made to the tube-to-adapter cylindrical flame path without consulting the manufacturer’s drawings.
- Make sure that the pipe, where the sensor is installed, is filled with fluid and the sensor is supplied with power before you put it into operation.
- The usage of the Inline Pump 300 (Ex d) is only allowed with liquids with a maximum viscosity of 20 mPas and a conductivity of min. 0.01 pS/m.
- It is not allowed to disassemble the Inline Pump 300 (Ex d) during operation or at the line.
- The requirements of the IEC 60079-32-1 in the latest revision must be fulfilled in order to be authorized to put the pump into operation (e.g. relaxation area; no insulated conductors).

WARNING

Éxplosion

- L'application de la pompe en ligne 300 Ex dest limitée à une utilisation avec la serie L-Dens 7000 et L-Com 5500 de capteurs de densité et de vitesse du son fabriqués par le même fabricant Anton Paar GmbH, Autriche.
- En cas d'application avec L-Dens 7000 (IECEx QPS 18.0002X Issue No. 0) et/ou L-Com 5500 (IECEx QPS 19.0001X Issue No. 0), les conditions spécifiques d'utilisation données par les certificats individuels susmentionnés restent inchangées.
- Aucune modification ne peut être apportée au trajet de la flamme cylindrique du tube à l'adaptateur sans consulter les dessins du fabricant.
- Assurez-vous que le tuyau, où le capteur est installé, est rempli de fluide et que le capteur est alimenté en électricité avant de le mettre en service.
- L'utilisation de la pompe Inline 300 (Ex d) n'est autorisée qu'avec des liquides d'une viscosité maximale de 20 mPas et d'une conductivité de min. 0,01 pS/m.
- Il est interdit de démonter la pompe Inline 300 (Ex d) pendant le fonctionnement ou sur la ligne.
- Les exigences de la norme CEI 60079-32-1 dans sa dernière révision doivent être satisfaites afin d'être autorisé à mettre la pompe en service (par exemple, zone de détente; pas de conducteurs isolés).).

1.5.2 Cable, wire entry systems and closure elements

WARNING

Explosion

- All requirements of the EN 60079-14 standard, section 9.3, must be taken into account when selecting and installing the cables.
- All requirements of the EN 60079-14 standard, section 10, must be taken into account when selecting and installing the cable, wire entry systems and closure elements.
- Cable and wire entry, must comply with one of the following:
  - a minimum length of the connected cable / wire of 3 m or
  - cable and wire glands, must be sealed with a hardening sealing compound (shut-off cable gland), and be certified according to IEC 60079-1 and be certified as a device.

2 An Overview

The instruments represent the third generation of Anton Paar density sensors L-Dens 7300/7400/7500 and the combined density and sound velocity sensor L-Com 5500. They are used for continuous monitoring of product quality and product specifications during production.

The instruments have a modular design with different process connections to suit your plant. The optional Process Instrumentation Controller Pico 3000 can be integrated in the sensor. It is a transmitter which uses a communication signal compatible with your plant.

2.1 L-Dens 7000 Density Sensors Series

Fig. 5: Density sensors of the L-Dens 7000 series

2.1.1 Intended Use of the Instrument

The L-Dens 7300/7400/7500 is a process measuring instrument that is used for the measurement of density values of low viscous liquids in the process.

2.1.2 Designation of L-Dens Density Sensors

Example: L-Dens 7400 Version SST NPT Ex d

Numbers	Material of wetted parts	Special feature
Sensor type **7**: 7 mm oscillating tube diameter Feature/accuracy class **3:** 5 x 10^{-4} g/cm^3 **4:** 1 x 10^{-4} g/cm^3 **5**: 5 x 10^{-5} g/cm^3 Generation **00**: Generation 1	**SST**: Stainless steel 1.4404 **HAS**: Alloy C-276, 2.4819 **INC**: Alloy 825, 2.4858 **TAN**: Tantalum	**HP**: High pressure version **EX d**: Ex d approval **NPT**: 1/2" NPT threads for Ex d cable glands

2.2 L-Com 5500 Density and Sound Velocity Sensor

L-Com 5500 represents the new generation of Anton Paar's density and sound velocity sensor combination. It consists of an L-Dens 7500 density sensor which is expanded with a sound velocity module.

Fig. 6: L-Com 5500

2.2.1 Intended Use of the Instrument

The L-Com 5500 is a process measuring instrument that is used for the measurement of density and sound velocity values of low viscous liquids in the process.

The clever combination of process density and sound velocity sensors enables highly sophisticated concentration measurement of 3-component mixtures with one single instrument. The wetted parts are made of Alloy C-276 to make the sensor fit for use with aggressive products. Various process connections and electrical interfaces are suitable for applications within the beverage or chemical industry.

2.2.2 Designation of L-Com 5500

Example: L-Com 5500 Version HAS

Numbers	Material of wetted parts	Special Feature
Sensor type **5**: Combination of density/sound velocity Feature/accuracy class **5**: 5 x 10^{-5} g/cm^3 Generation **00**: Generation 1	**HAS**: Alloy C-276, 2.4819	**NPT:** 1/2" NPT threads for Ex d cable glands **Ex d:** Ex d approval

2.3 Inline Pump 300 (Ex d)

2.3.1 Intended Use of the Instrument

The Inline Pump 300 (Ex d) is a small integrated pump for non-corrosive, low viscous liquids. It supplies L-Dens 7000 (Ex d) and L-Com 5500 (Ex d) with a constant product flow.

Features and benefits

- Robust housing made of stainless steel for operation under harsh process conditions in interior and exterior areas
- Maintenance-free
- Housing with degree of protection IP 67
- Integrated dry-running protection

2.3.2 Working Principle

The Inline Pump 300 (Ex d) is a centrifugal pump with a magnetic coupling.

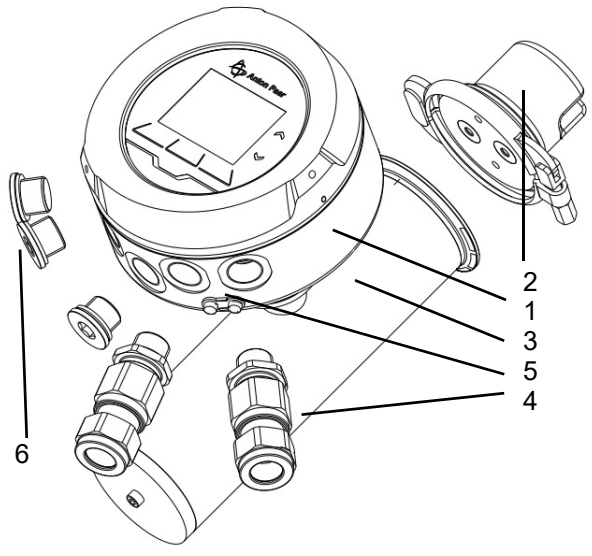
2.3.3 Designation of the Inline Pump 300 (Ex d)

Example: Inline Pump 300 Ex d

Numbers	Special Features
3: Size	Ex d: Ex-approved version
0: Place holder	
0: Generation 1	

TIP
Inline Pump 300 → Information only valid for non-Ex version
Inline Pump 300 Ex d → Information only valid for Ex version
Inline Pump 300 (Ex d)→ Information valid for non-Ex version and Ex version

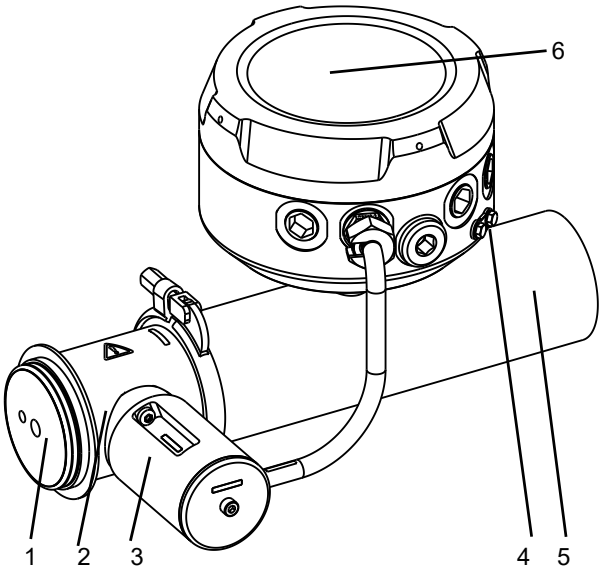
2.4 Components without Inline Pump 300 (Ex d)



1 Electronics housing with optional Pico transmitter and HMI
2 Exemplary process connection by inline adapter VARIVENT®
3 Sensing element including the oscillating U-tube and temperature measurement
4 Cable glands (Ex-version optional)
5 External ground terminal
6 Blanking plugs (Ex-version optional)

Fig. 7: Components of the instrument

2.5 Components with Inline Pump 300 (Ex d)



1 Exemplary flange VARIVENT® N
2 Pump unit of the Inline Pump 300 Ex d
3 DC motor of the Inline Pump 300 Ex d
4 External ground terminal
5 Sensing element including the oscillating U-tube and temperature measurement
6 Electronics housing with optional Pico transmitter and HMI

Fig. 8: Components of the instrument with Inline Pump 300 (Ex d)

3 Installing the Instrument

WARNING

- Installations shall comply with the intended area of use and the relevant national regulations and requirements.
- Installation, maintenance and service work must only be carried out by trained and authorized personnel.
- Personnel for set-up, installation, commissioning, operation, maintenance and service of the instrument must be trained according to the operating guideline 1999/92/EG.
- Make sure that the main line is empty and unpressurized before mounting or dismounting the sensor.
- The lines and instruments can be hot or cold. Wait until the entire station has reached a harmless temperature.

1. Verify that the technical specifications of all parts of the instrument (sensor, process adapter, Inline Pump 300 (Ex d)) are suitable for the application. For example:
   - resistance of all wetted parts
   - max. and min. ambient and process temperature
   - max. and min. flow
   - max. pressure
   - hazardous area specifications
   - specification of the sealings

NOTICE

Electronics overheating due to thermal insulation! The electronics housing must be completely uninsulated.

The instrument has been designed according to EN 61000-4-3 Class 3 and is able to be installed in an environment with strong electromagnetic fields (nominal power of 2 W and more). The distance between instrument and sender must be at least 1 meter.

3.1 Mechanical Installation

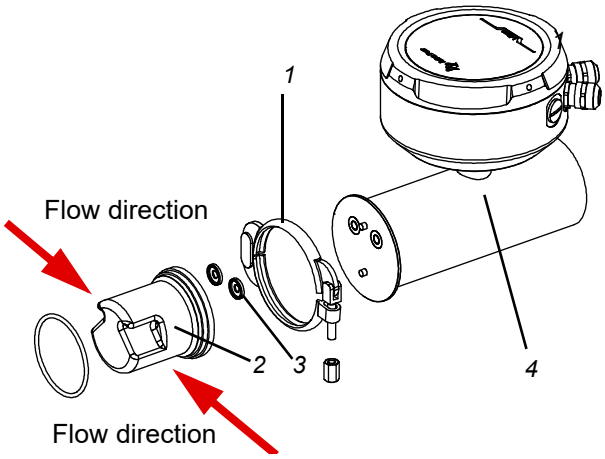
As long as the U-tube is free of bubbles or deposits and the flow rate is sufficient to ensure proper temperature equilibrium, the sensor will deliver a high precision density measurement.

3.1.1 Assembling the Sensor with the Process Adapter

Consider all instructions of the assembling instructions which are delivered together with the process adapter.

Process adapter with clamp

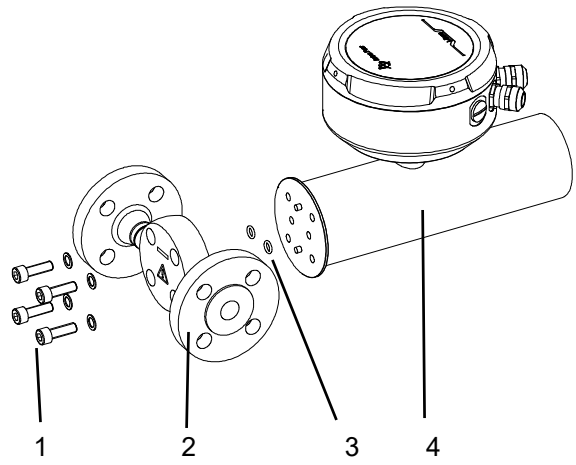
This example is a process adapter with a clamp. This assembly is usually used for Inline Adapters. The size of the clamp is the same as used for VARIVENT® N.



1 Clamp (VARIVENT®N)
2 Process adapter
3 Flat washer
4 Sensor

Fig. 9: Assembling sensor with process adapter with a clamp

Process Adapter with hexagon socket screws



1 Hexagon socket screws ISO 4762 M8
2 Process adapter
3 O-rings (7x2)
4 Sensor

Fig. 10: Assembling sensor with process adapter with hexagon socket screws

3.1.2 Full Flow Installation

If the flow rate of the main pipe is within the flow rate specification of the sensor (see Appendix A), the sensor can be installed into the main pipe with the flow adapters.

3.1.3 Bypass Installation

If the flow rate of the main pipe is out of the flow rate specification of the sensor, it can be installed with a bypass system.

3.1.4 Inline Adapter Installation

If the flow rate of the main pipe exceeds the flow rate specification of the sensor, it can be installed with an inline adapter. The inline adapter installation is a very cost-efficient solution for a density sensor.

The recommended minimum flow speed in the main pipe depends on the viscosity of the fluid:

	Inline Adapter
η = 1 mPas	1.3 m/s
η = 5 mPas	1.6 m/s
η = 15 mPas	2.0 m/s

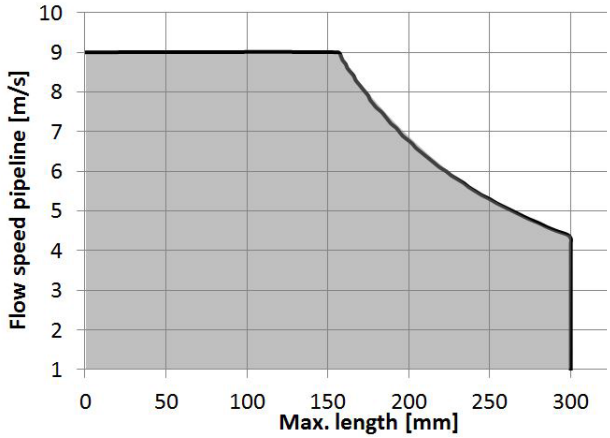


Fig. 11: Maximum flow speed allowed in the main pipe

The maximum speed in the main line depends on the length of the Pitot tubes.

3.1.5 Installation with the Inline Pump (300 Ex d)

The installation with the Inline Pump 300 (Ex d) is the perfect solution to ensure a suitable constant flow through the sensor with minimum space and support requirements for liquids with a viscosity below 10 mPa.s for the Inline Pump 300 and 20 mPas for the Inline Pump 300 Ex d. The Inline Pump 300 (Ex d) also ensures fast response times during frequent start/stop conditions.

NOTICE
For installations with the Inline Pump 300 (non-Ex version!) the position of the electronics housing must be turned to -90° (refer to Chapter 4.1.4)

Consider that the opening of the inlet Pitot tube of the Inline Pump 300 Ex d with EN 1092-1 or ANSI B16.5 flange looks against the direction of the flow (see Fig. 12)

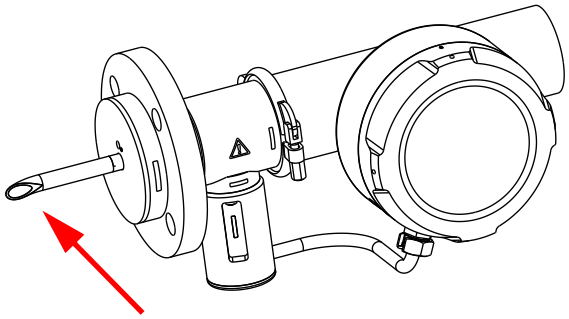


Fig. 12: Orientation of the inlet Pitot tube of the Inline Pump 300 Ex d with EN 1092-1 or ANSI B16.5 flange

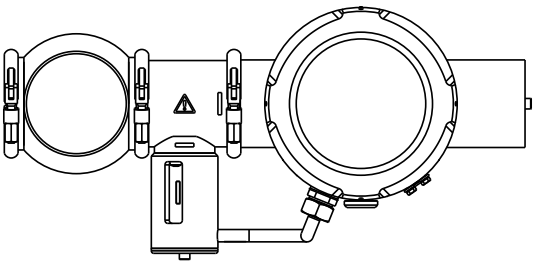


Fig. 13: Installation L-Dens 7000/L-Com 5500 with Inline Pump 300 (Ex d) in horizontal pipe

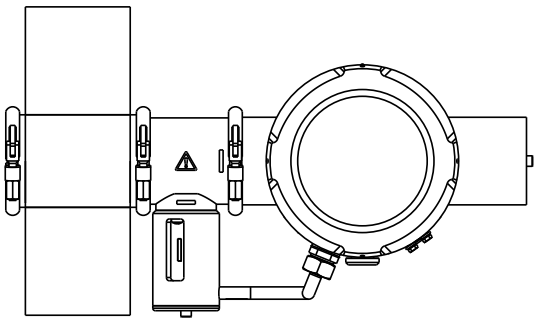


Fig. 14: Installation L-Dens 7000/L-Com 5500 with Inline Pump 300 (Ex d) in vertical pipe

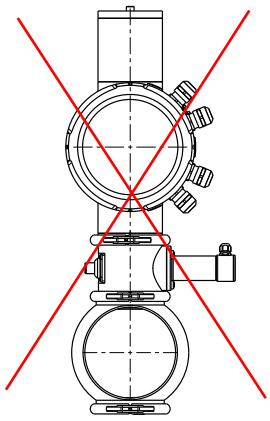


Fig. 15: Installation NOT allowed in a horizontal pipe

WARNING

The Inline Pump 300 Ex d is not self-priming. The instrument installed upwards or the power unit of the Inline Pump 300 Ex d installed upward can cause a pump dry-running.

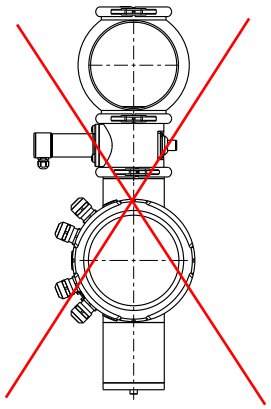


Fig. 16: Installation NOT recommended in horizontal pipe

- The density sensor downwards can cause trouble by deposits in the sensor.
- The Inline Pump 300 (Ex d) upwards can cause trouble by bubbles/air during filling.
- The Inline Pump 300 (Ex d) is not self-priming.
- To avoid deposits or bubbles in the U-tube the sensor must be mounted horizontally no matter if the main pipe is horizontal or vertical. The housing of the DC motor of the Inline Pump 300 (Ex d) must always be downwards.

TIP: *Electrical wiring of the Inline Pump 300 see chapter 4.2.3.3.*

4 Electrical Installation

Electrical installation and setup depends on the hardware configuration of the instrument. The following chapters describe the electrical wiring for installation of sensor models **without** the integrated transmitter Pico 3000. Installation of sensor models **with** an integrated transmitter is described in the instruction manual of "Pico 3000 Process Instrumentation Controller".

WARNING

- The instruments have a functional insulation. Protection against potentially hazardous touch current has to be ensured by the customer in accordance to local regulations.
- Installation, maintenance and service work must only be carried out by trained and authorized personnel.
- Installations shall comply with the intended area of use and the relevant national regulations and requirements.
- The sensor must always be disconnected from the power supply when connecting/disconnecting wires to/from the sensor.

4.1 General Information

The instrument has been designed according to EN 61000-4-3 Class 3 and is able to be installed in an environment with strong electromagnetic fields (nominal power of 2 W and more). The distance between instrument and sender must be at least 1 meter.

4.1.1 Explosion Protection

The instruments marked with an Ex-type plate on the electronics housing are explosion-proof instruments.

4.1.2 Grounding

The instrument must be solidly grounded. If the process adapter is grounded, no additional grounding is necessary. If the process adapter is not grounded, the sensor must be connected to earth via the external or internal ground terminal (Fig. 17 and Fig. 18).

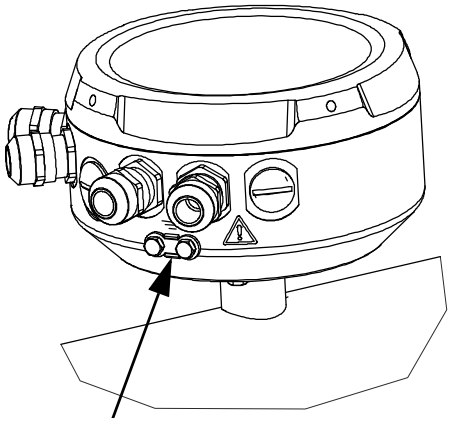


Fig. 17: External ground connection

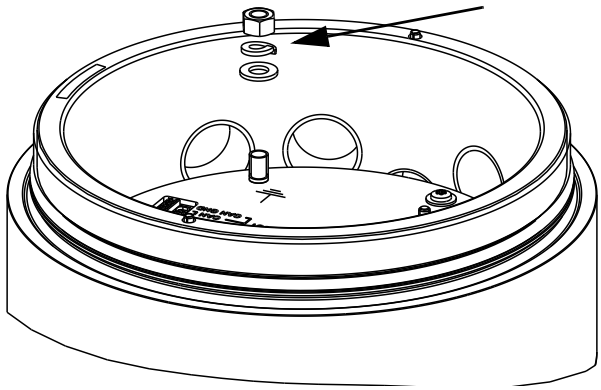


Fig. 18: Internal ground connection

4.1.3 Power Supply

It is recommended to use an insulated high quality power supply with low ripple to supply the instrument. Refer to Appendix A for the technical specifications.

4.1.4 Positioning the Electronics Housing

WARNING

The Inline Pump 300 Ex d is delivered wired. Do not change the orientation of the electronics housing, the measuring system will lose its Ex-protection.

You can adapt the orientation of the cable glands to your installation requirements by turning the electronics housing on the sensor by ± 90°, if necessary.

If the sensor is exposed to water, e.g. due to cleaning activities or outdoor mounting, the housing must be turned to a position where the cable glands do not point upwards.

NOTICE
Rotating the housing by more than ± 90° will damage the sensor.

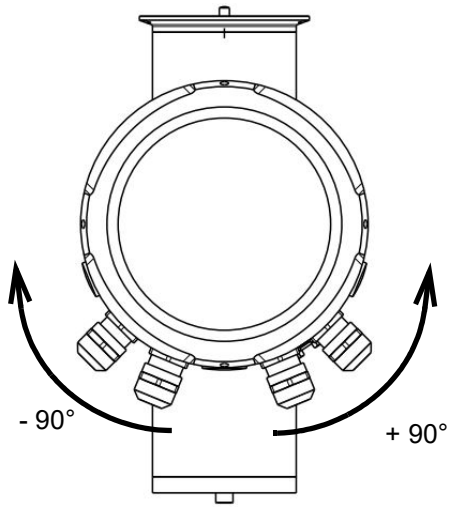


Fig. 19: Turning the electronics housing on the sensor by ± 90°

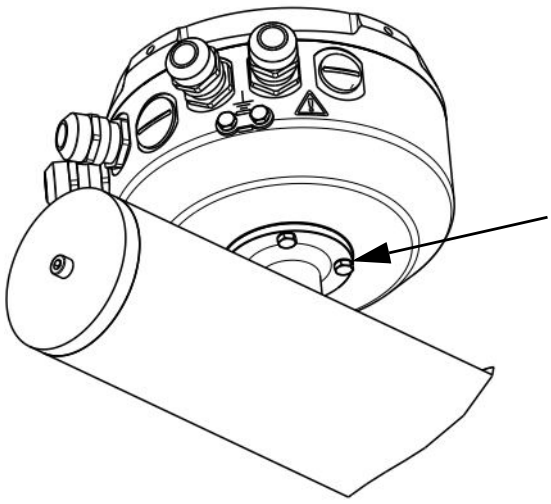


Fig. 20: Fixation screws of the electronics housing to be tightened

Proceed as follows:

1. Remove the 4 screws (AF 7)
2. Turn the housing to the required position by plus or minus 90°.
3. Tighten all 4 screws crosswise with 3 Nm torque.

WARNING

- The sensor is only explosion-protected when all four screws are tightened.
- All screws must be type A4-70.

4.1.5 Electronics Housing Ex d

The cover (cover ring) of the housing is part of the explosion protection. The cover (cover ring) must be locked all the way to the stop with the delivered hook spanner (Fig. 21). There must be no gap between cover (cover ring) and housing.

To be able to lock the ring (cover ring) completely:

- Make sure that the O-ring of the housing is in the intended position (Fig. 22).
- Make sure that the optional display is in the correct position (no gap between display and housing).

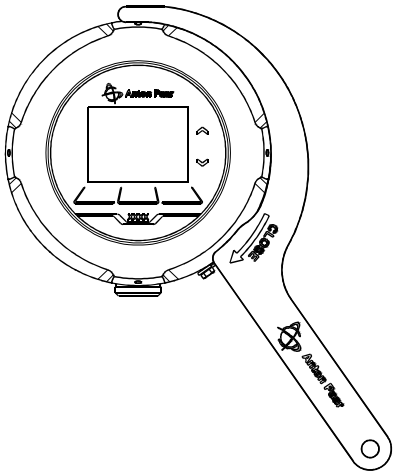


Fig. 21: Locking the cover/cover ring with the hook spanner

In addition, the cover (cover ring) must be secured with the locking screw (Fig. 23). In order for the cover (cover ring) to have an electrical connection with the lower part of the housing, the hex socket screw must be tightened with 0.8 Nm.

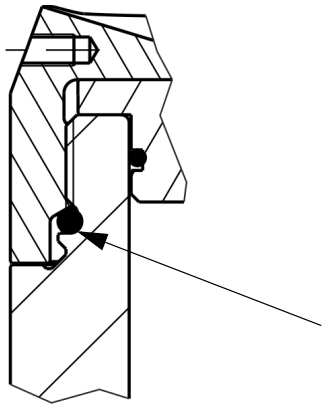


Fig. 22: Position of the O-ring

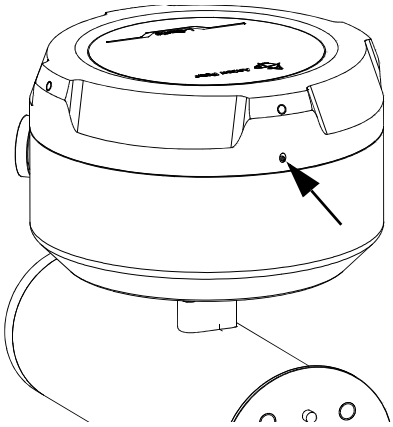


Fig. 23: Locking screw to secure the cover/cover ring

4.1.6 Cable Glands

Mount the blanking plugs and the cable glands to the position you need them.

- Make sure to position the cable glands or plugs at the bottom and tighten them properly.
- Use cable glands with shield clamping.
- Make sure the cable is mounted with a loop to avoid water ingress.

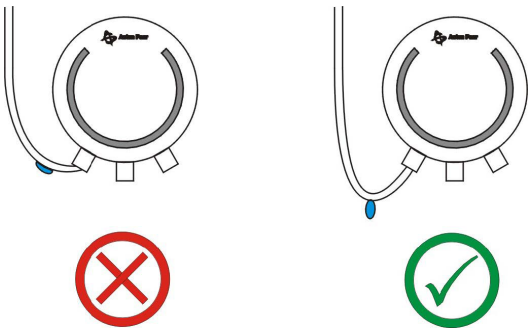


Fig. 24: Cable inlet

The central entry in the electronics housing is a port to the USB connector and cannot be used to wire the sensor.

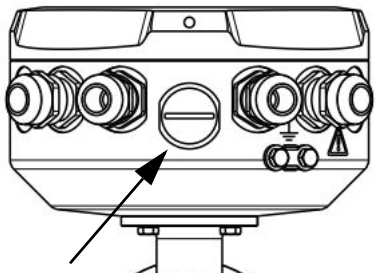


Fig. 25: USB service connector

WARNING

- The interface between a cable entry device and its associated enclosure will require additional sealing to achieve ingress protection (IP) ratings higher than IP54. The minimum protection level is IP54 for explosive gas atmospheres. Parallel threads require a sealing washer to maintain IP66. It is the installer's responsibility to ensure the IP rating is maintained at the interface.
- The torque for the blanking plug of the central USB service connector is 10 Nm.

4.1.7 Cable Glands and Sealing Plugs for Ex d Housing

In addition to the requirements given in Chapter 1.5 "Special Conditions in Use", and Chapter 4.1.6 "Cable Glands", the thread of any cable gland and sealing plug must not protrude into the electronics housing.

The maximum thread length L permitted depends on the thickness of the seal when mounted.

For deliveries until end of 2020 the maximum permitted thread length L [mm] = s [mm] + 14 for **all** cable entries and the central USB service entry.

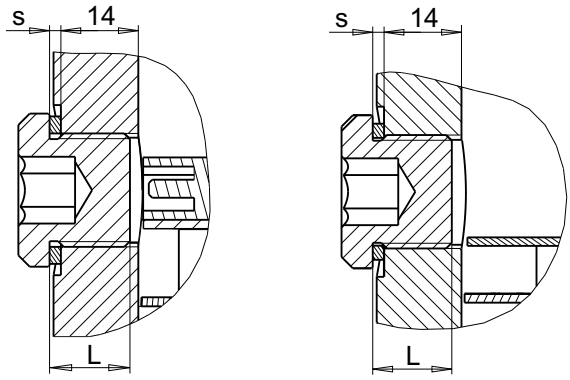


Fig. 26: Maximum permitted thread length L of all cable entries for deliveries until end of 2020 (left central USB entry, right all other ports).

For deliveries **after** 2020 the maximum permitted thread length **only** for the central USB service entry is L [mm] = s [mm] +14. All other threads can be longer.

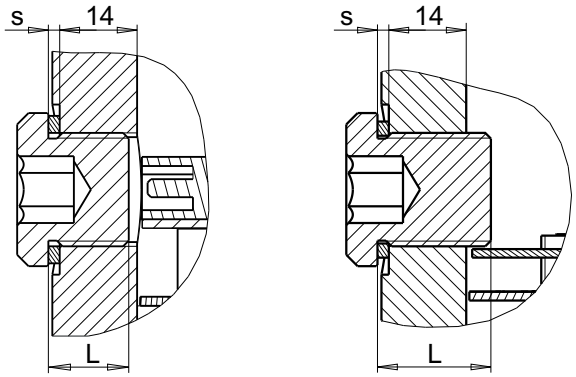


Fig. 27: Maximum permitted thread length L for deliveries after 2020 (left central USB entry, right all other ports)

4.1.8 Cables and Preparation

WARNING

- The connecting cables must correspond to the local ambient conditions and the national regulations.
- Take mechanical stress into consideration when choosing the connecting cables.
- Choose the cables' diameters to ensure optimal sealing at the cable gland.
- Strain relief is provided by the correct assembly of the cable gland.

NOTICE

- Only use shielded cables.
- If connectors/plugs are used instead of cable glands, make sure that the connectors including cable are rated IP 67.

Recommended cables (non Ex-version):

Power supply	
Suggested cable type	LiYCY Shielded 2 pole cable
Wire cross section	min. 0.34 mm², max. 1.5 mm² without wire end ferrule; max.0.75 mm² with wire end ferrule
Diameter of cables	4.5 to 10 mm to ensure optimal sealing against the cable gland

CANopen	
Cable type	CANopen/DeviceNet cable 120 Ω shielded twisted pair
Wire cross section	min 0.25 mm², max. 1.5 mm² without wire end ferrule; max. 0.75 mm² with wire end ferrule

CANopen	
Diameter of cables	4.5 to 10 mm to ensure optimal sealing against the cable gland
Max. length	250 m

Cable preparation of the non-Ex cable glands

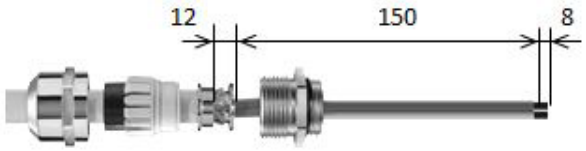


Fig. 28: Cable preparation

4.2 Wiring

In order to get access to the terminals it is necessary to remove the cover from the sensor.

Proceed as follows:

1. The electronics housing of the Ex-version has a cover locking screw. Make sure this cover locking screw is not tightened.

Unscrew the cover and remove it.

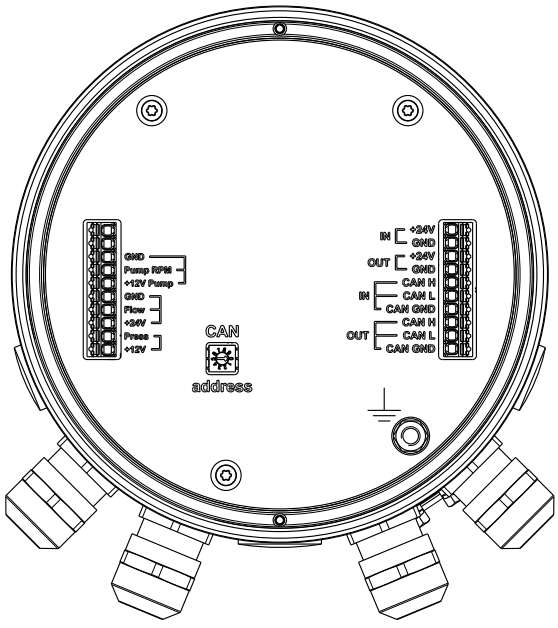


Fig. 29: Terminals of the instrument

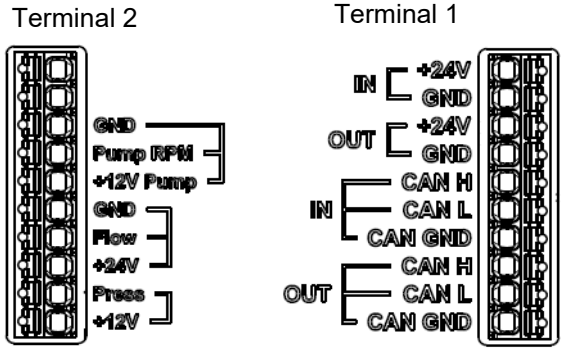


Fig. 30: Detailed view of terminals of the instrument (without Pico 3000)

Terminal 1 is used to connect the power supply and the CAN bus to the sensor.

Terminal 2 is used to connect optional peripheral components like a pressure sensor or a pump from Anton Paar.

Terminal	
Type	Push-in spring connection
Wire cross section	0.2 to 1.5 mm² / AWG 24 to 16 (with ferrules without plastic sleeve)
Stripping length	8 mm / 0.3 inch

Proceed as follows to **connect** wires to the terminal:

- Push in the white spring with a small screw driver (size 3.5 mm / 1/8").
- Insert the wire into the correct pin and release the spring.

Proceed as follows to **disconnect** wires from the terminal:

- Push in the white spring with a small screw driver (size 3.5 mm / 1/8").
- Pull out the wire and release the spring.

Fig. 31: Clamping terminal with springs

NOTICE
Damage of electronics board
Pushing the connector spring with excessive force may damage the electronics board.

4.2.1 Shielding

Shield the cables on both sides.

The connection of the shielding at the cable gland is shown in Fig. 28.

4.2.2 Wiring the Sensor and mPDS 5 or Pico 3000 RC

All sensors communicate with the mPDS 5 or Pico 3000 RC via a CANopen bus network. The mPDS 5 or Pico 3000 RC is the CAN-master, all sensors are slaves.

All sensors have CAN IN and CAN OUT terminals. A CAN network wiring of more than one sensor can be done simply without cable stubs.

The CAN bus needs a 120 Ω termination at each end. The sensor is delivered with a 120 Ω terminating resistor at CAN OUT. To build up a network with more sensors, the terminating resistor at CAN OUT must be removed so that the next sensor can be connected at CAN out.

If several sensors of the same sensor board are connected together, the CAN address must be set on each sensor board of the same type to be unique in the network.

NOTICE
Please note that L-Com 5500 delivered before October 2020 has 2 sensor boards (density and sound velocity measurement) with 2 separate CAN switches. Both CAN switches must be changed. This is not possible without disassembling the electronic boards. Please contact your Anton Paar representative.

For installations with more than one sensor the power supply is looped through from "Power IN" to "Power OUT".

CAN-cable assignment for CAN-cable (mat. no. 94268) if a separate power cable is used:

	Wire color
CAN H	Yellow (#1)
CAN L	Green (#2)
CAN GND	Brown (#3)
Not used	White (#4)

CAN-cable assignment for CAN cable (mat. no. 184415) with power supply:

	Wire color
CAN H	Yellow (#1)
CAN L	Green (#2)
CAN GND	Brown (#3)
+24 V	White (#4)

4.2.2.1 Wiring with mPDS 5

For details of connecting the sensor to mPDS 5, also refer to the instruction manual and/or reference manual for mPDS 5.

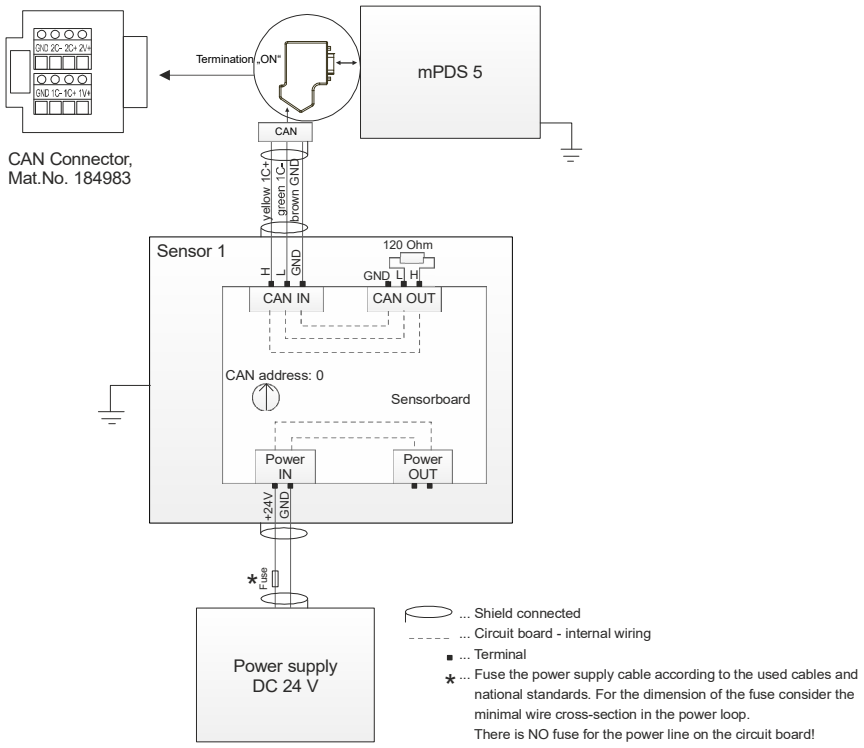


Fig. 32: Wiring mPDS 5 and a sensor with separate CANopen and power supply cables

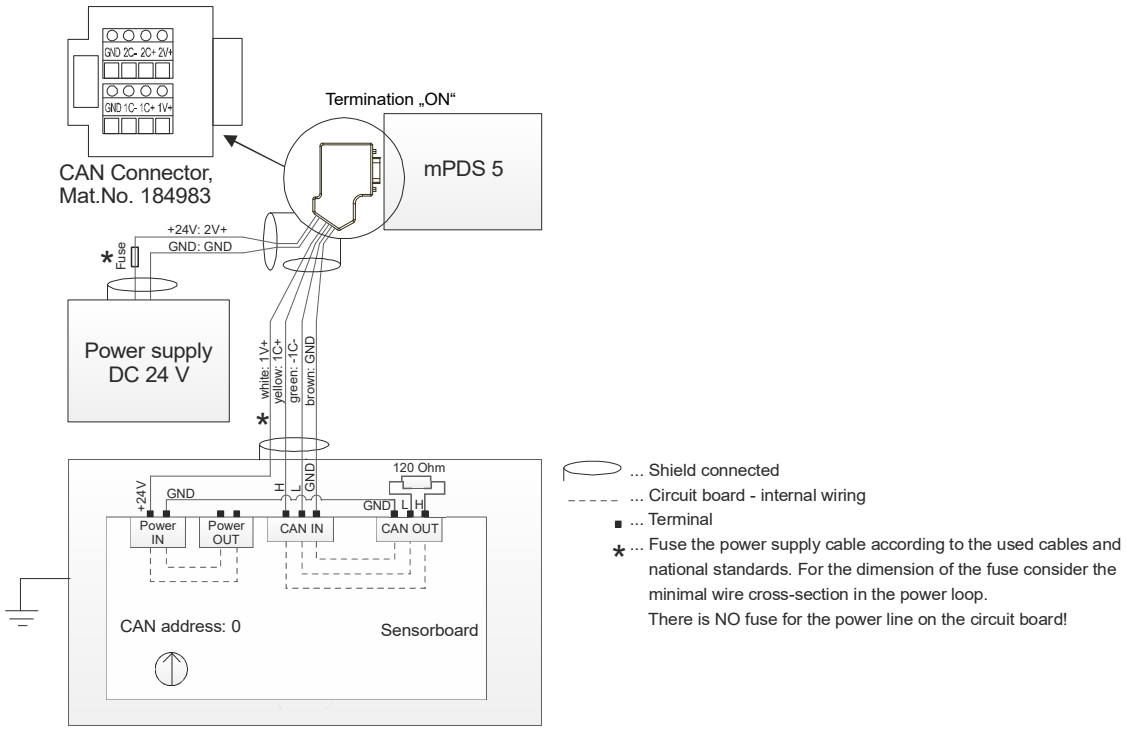


Fig. 33: Wiring mPDS 5 and a sensor with a combined CANopen and power supply cable

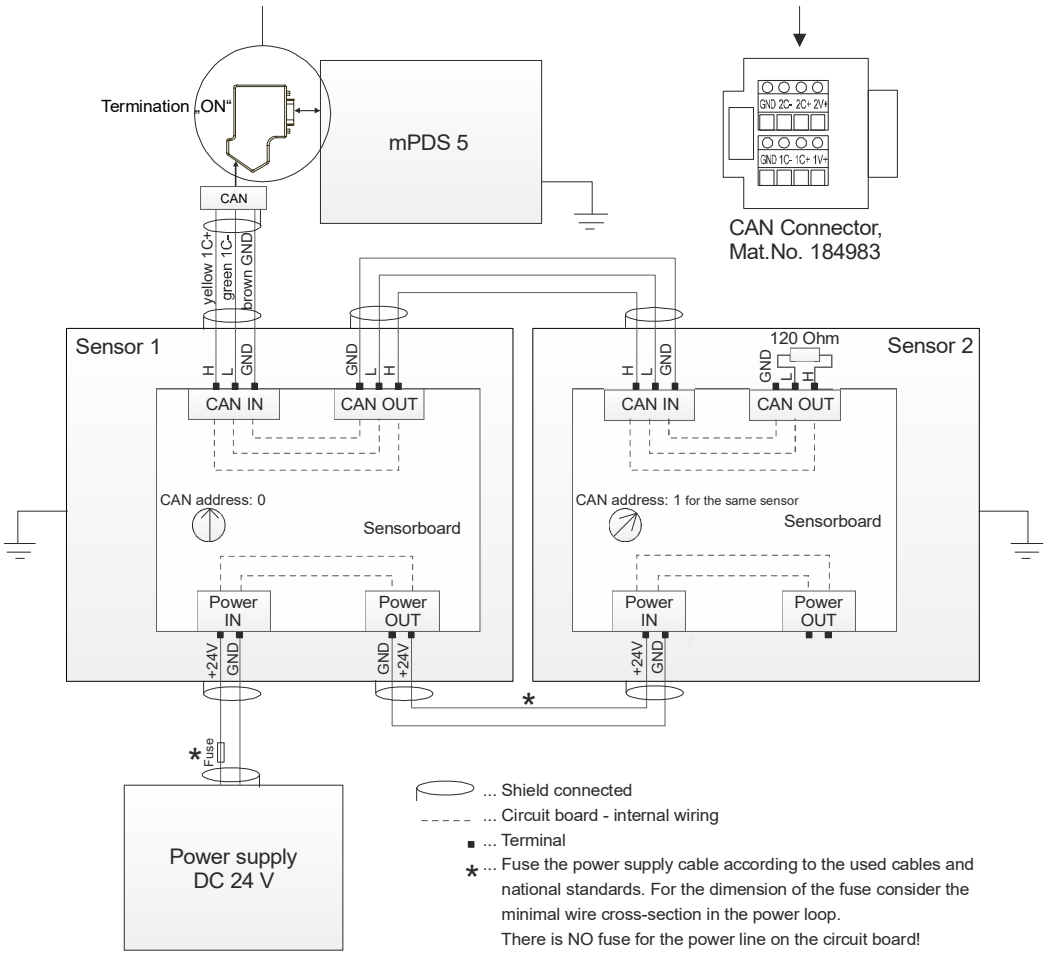


Fig. 34: Wiring mPDS 5 with two sensors with separate CANopen and power supply cables

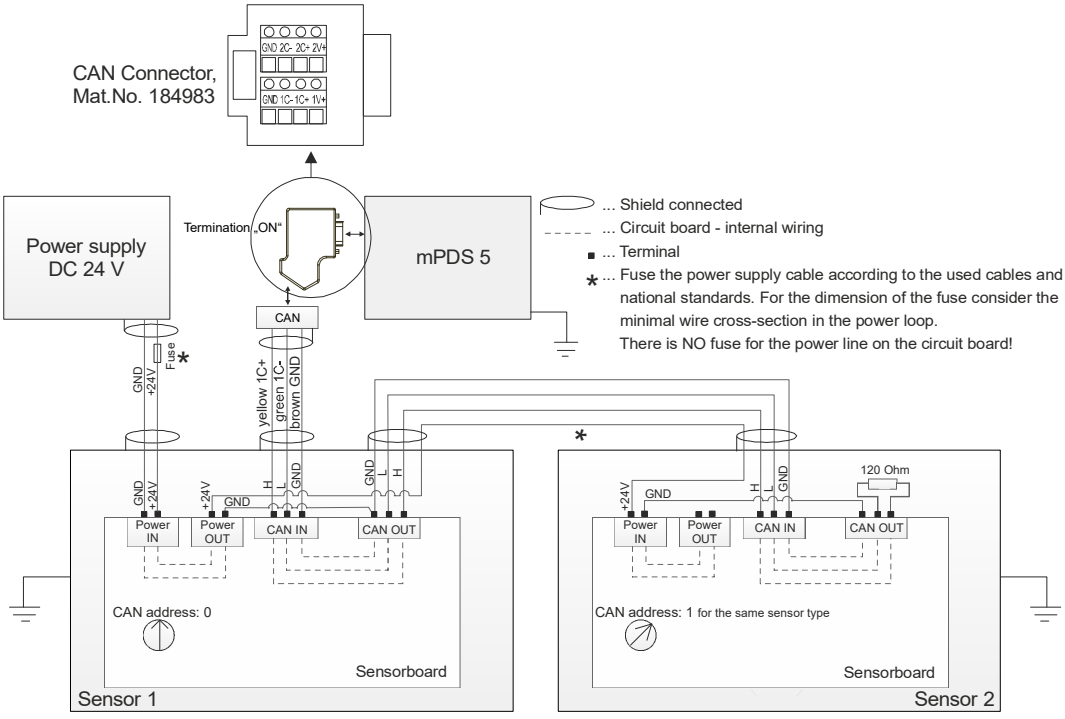


Fig. 35: Wiring mPDS 5 with separate CANopen and power supply cales, the following sensors with one single cable

4.2.2.2 Wiring with Pico 3000 RC

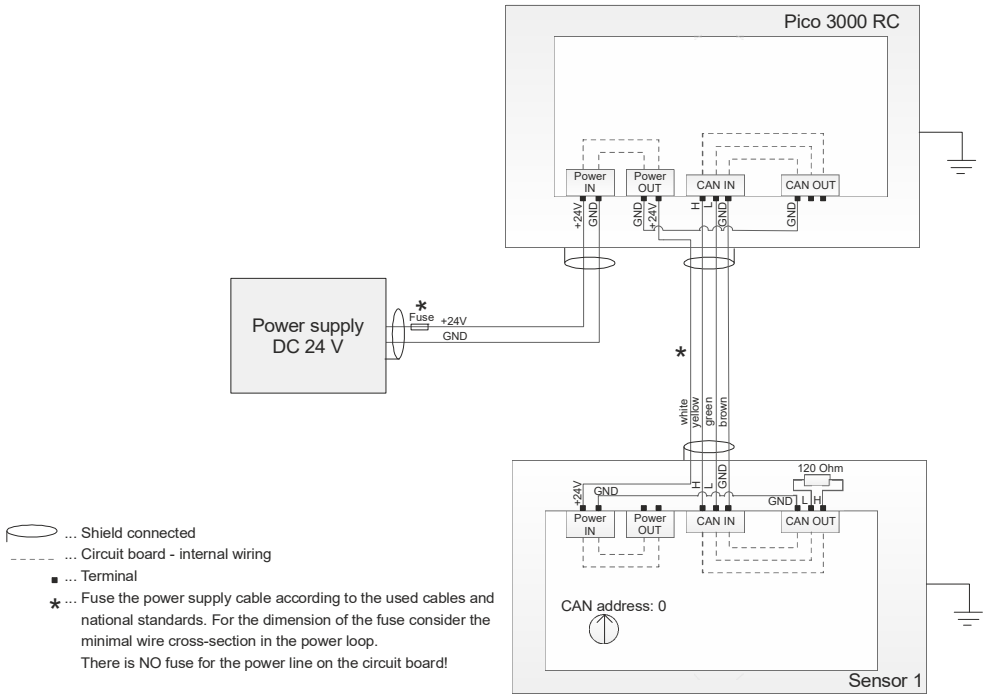


Fig. 36: Wiring with Pico 3000 RC

4.2.3 Wiring Optional Peripheral Components (Terminal 2)

4.2.3.1 Connecting a Pressure Sensor

The pressure sensor of the Anton Paar adapter (Mat.No. 183470) can be connected to these terminals. This input is an active 4 to 20 mA analog input with a supply voltage of 12 V. It can also be used for other passive pressure sensors.

If the pressure sensor is connected, the sensor compensates the influence of the pressure on the sensor and the water.

Terminal	Wire color
Press	White
+12 V	Blue

TIP: *The description how to configure the pressure input of the sensor is in the Pico 3000 and mPDS 5 manual. Please note that the pressure input has to be activated via Pico 3000 or mPDS 5.*

4.2.3.2 Connecting the Flow Monitor

The optional flow monitor from Anton Paar (Mat.no. 22754) can be connected to these terminals. The switching threshold for "high" is 20 V.

Terminal	Wire color
GND	Blue
Flow	Black
+ 24 V	Brown

TIP: *The description how to configure the flow monitor input of the sensor is in the Pico 3000 and mPDS 5 manual.*

4.2.3.3 Connecting the Inline Pump 300

The Inline Pump 300 from Anton Paar can be connected to these terminals.

Terminal	Wire color
GND	Brown
Pump RPM	Orange
+ 12 V	Red
not connected	Black

The Inline Pump 300 Ex d is always delivered wired.

TIP: *The description how to configure the input is in the Pico 3000 and mPDS 5 manual. Please note that this input has to be activated via Pico 3000 or mPDS 5.*

Dry run detection of the Inline Pump 300 (Ex d):
The Inline Pump 300 (Ex d) can detect a dry run. The line may be dry for a certain time when switching from one product to another.

NOTICE
The Inline Pump 300 (Ex d) switches off automatically after about 30 minutes dry run.

Inside the housing of the Inline Pump 300 Ex d there are two bi-metal switches that cut off the power supply if the temperature reaches 100 °C.

5 Upkeep and Cleaning

To ensure trouble-free operation and operational safety, the sensor must be checked and cleaned regularly. We recommend the following intervals, however, these have to be adapted to existing process conditions:

Daily

- Check the instrument, the flow computer, the evaluation unit or PLC for error messages.

Once a week

- Check the sensor and all associated fittings or connections for leaks
- Optical check for damages
- Optical check for corrosion

Once a year

- Replace the wetted O-rings and/or gaskets. (see chapter 5.1)

Customer specified intervals

- In general we recommend to exchange the sealing once a year. Under certain process conditions (aggressive fluids, temperature, pressure,..) the exchange interval has to be adapted depending on the sealing material and the process conditions.
- Verify the validity of the measurement results in order to identify any malfunction or deterioration in sensor performance.
- If a deviation is detected, flush the sensor with a cleaning liquid, perform a calibration and adjust the sensor as needed.
- Only use cleaning agents to which the wetted materials are resistant.

5.1 Replacing the O-Rings of the Inline Pump 300 Ex d

The following tools are required:

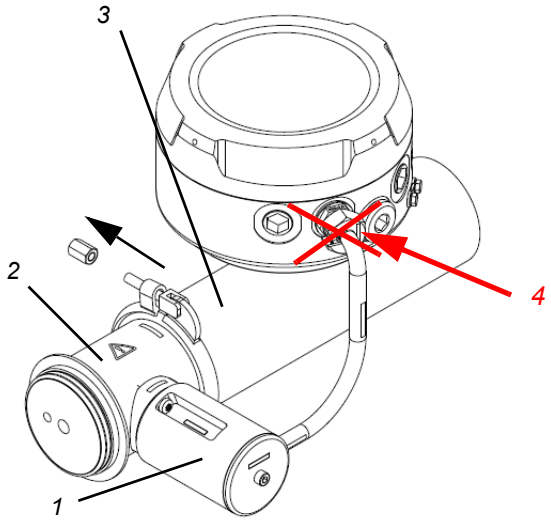
- Hexagon wrench 10 mm
- Allen wrench 6 mm
- Screwdriver Torx T25

Procedure:

- Any work at the sensor must be carried out in accordance to the operating guideline 1999/92/EC (e.g. only use non-sparking tools).
- Wear appropriate personal protective equipment.
- Make sure that there is no risk of a spark caused by a potential difference for example due to missing grounding or electrostatic charge.
- Remove the instrument with the Inline Pump 300 Ex d from the line as described in chapter 5.6.
- Clean, rinse and dry the instrument and the Inline Pump 300 Ex d before disassembling the pump.
- Put the instrument with the Inline Pump 300 Ex d on a work bench outside the hazardous area.

WARNING

The M20 fitting on the electronics housing must not be opened, otherwise the explosion protection will be lost (Fig. 37).



1 DC motor of the Inline Pump 300 Ex d
2 Pump unit of the Inline Pump 300 Ex d
3 Sensor
4 M20 fitting

Fig. 37: Removing the clamp

- Loosen the screw connection of the clamp using the hexagon wrench 10 mm and then remove the clamp between sensor and pump housing. (see Fig. 37).

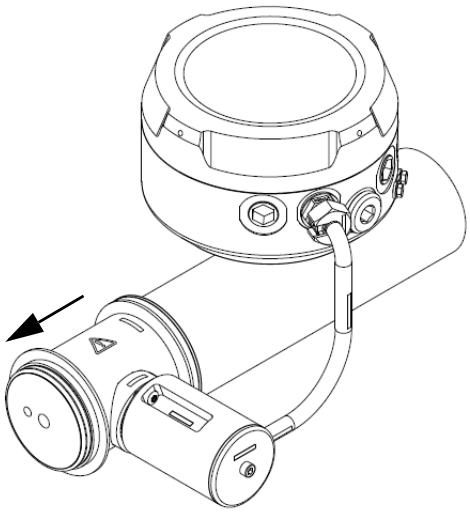
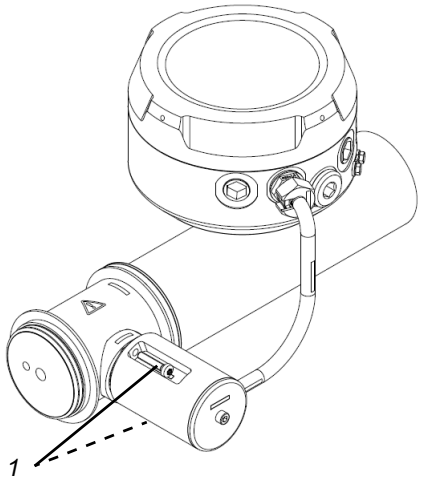


Fig. 38: Uncouple the pump housing from the sensor housing

- The pump unit can be pulled away from the instrument with little force as two short cylindrical pins inside align the pump unit (Fig. 38).



1 M5 screws

Fig. 39: Loosening the pump unit

- Loosen the two M5 screws between DC motor and pump unit using the screwdriver Torx T25 (Fig. 39).
- Now the pump unit can be removed from the sensor and the DC motor.

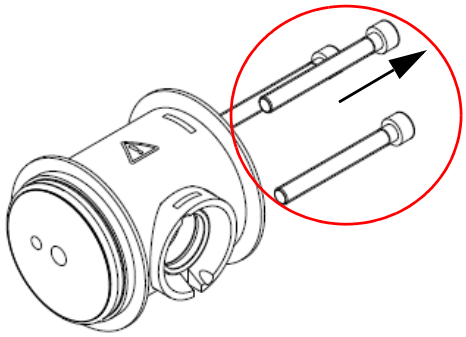
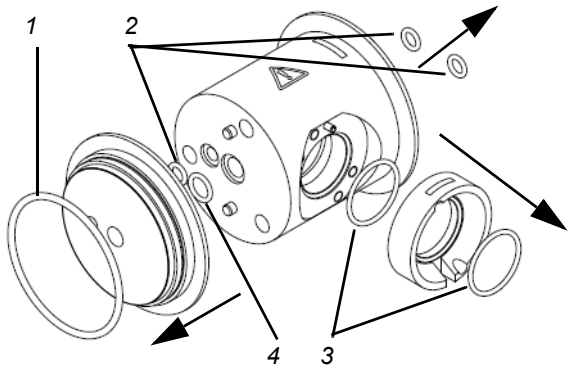


Fig. 40: Disassembling the flange from the pump unit

- Disassemble the pump unit by loosening the three M8 screws.

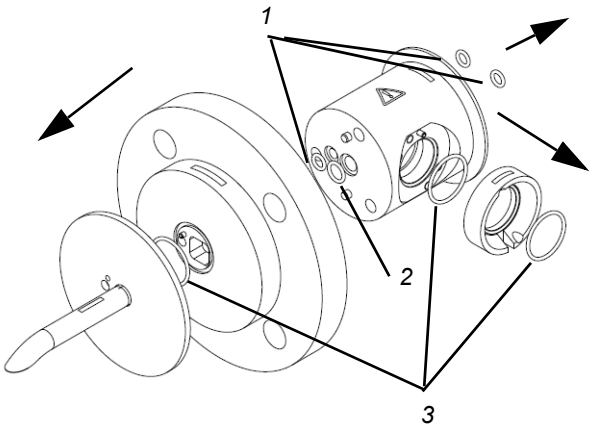
- **Replace the O-rings (VARIVENT® flange)**
  - remove the flange by pulling it out
  - pull the centering ring of the DC motor which is fixed by a spring pin
  - replace all O-rings, EPDM O-ring set (Mat. no. 245137)



1 O-ring 60x3 (VARIVENT® O-ring)
2 3 pcs O-ring 7x2
3 2 pcs O-ring 27x2
4 O-ring 10x2

Fig. 41: VARIVENT® flange

- **Replace the O-rings (flange with Pitot tube)**
  - remove the flange by pulling it out
  - pull the Pitot tube with the gasket plate
  - pull the centering ring
  - replace all O-rings
  - choose the right O-ring set for your application (EPDM O-ring set Mat. no. 245134 or FKM-LT O-ring set Mat. no. 245135)



1 3 pcs O-ring 7x2
2 1 pcs O-ring 10x2
3 3 pcs O-ring 27x2

Fig. 42: Flange with Pitot tube

- Assemble the pump housing in reverse order. All screws are equipped with a Tuflok mechanical locking which can be used several times. If you also want to exchange the screws, please order the screw set Inline Pump 300 Ex d (Mat. no. 245136)
  - first, after replacing the O-rings, put back the process adapter and the centering ring on the pump housing (assemble the Pitot tube, mind the direction of the flow so that the open end of the tube faces the flow.)
  - then tighten the three M8 screws, make sure nothing gets jammed (22 Nm)
  - assemble the pump unit with the DC motor
  - tighten the two M5 screws between DC motor and the pump unit (5 Nm)
  - Join the pump unit with the sensor. Mind that you follow the fitting pins and make sure nothing gets jammed.
  - put the clamp back between the sensor and the pump housing and tighten the nut (1 Nm)
- Consider that the opening of the inline Pitot tube of the Inline Pump 300 Ex d with EN 1092-1 or ANSI B16.5 flange looks against the direction of the flow (see Fig. 12)
- Perform a pressure test after mounting the instrument to the line.
- Check the measuring results. If necessary, perform an adjustment.

5.2 Software Administration

NOTICE
The sensor does not need to be updated. We recommend an update only after written demand from your Anton Paar representative.

If a sensor is installed in combination with a Pico 3000, the sensor firmware can be updated with the Pico 3000 Software.
If the sensor is connected to an mPDS 5 you need an mPDS 5 update package from your Anton Paar representative.

5.3 Cleaning

- Clean the sensor to prevent contamination or buildup of deposits.
- Clean the sensor housing avoiding chemicals that could corrode or damage the housing or the seals (e.g. use warm water).
- If a high-pressure washer or steam is used, do not aim the seams, gaskets, electronics housing or HMI.

5.4 Wetted Parts

Please see Appendix A.1 for the wetted parts of the sensors.
Please see Appendix B for the wetted parts of the process adapters.

5.5 Storing and Transporting the Instrument

- Only use the original packaging for the storage and transportation.
- Do not store outdoors and avoid direct sunlight. Store the instrument in a dry, clean place.
- Do not remove the transportation protection until installation. Consider national regulations regarding the weight and lifting the instrument.

5.6 Removing the Instrument from the Line

WARNING

- Beware of hazardous process conditions like temperature, pressure or aggressive fluids.
- Beware of the heavy weight of the instrument.
- Follow the safety instructions.

- Wear personal protective equipment.
- Switch off the instrument (power supply, communication, ...).
- If the sensor is in a bypass system, close the bypass valves and lock the bypass valves if required.
- The lines and instruments can be hot or cold. Wait until the entire process line has reached a harmless temperature.
- Ensure the line is empty and unpressurized before removing the sensor! For example: if the sensor is in a bypass system, open the sample valve and make sure no pressure remains in the bypass.
- Disassemble the sensor.

6 Maintenance and Repair

WARNING

Maintenance and repair
Maintenance and repair must only be carried out by trained and authorized Anton Paar service engineers.

6.1 Maintenance Performed by an Authorized Anton Paar Service Engineer

The instrument does not require any regular maintenance performed by an authorized Anton Paar Service Engineer. However, under certain conditions (aggressive fluids, temperature, pressure...) the internal sealings of the cut-off adapters have to be replaced. The replacement interval has to be defined by the customer according to the sealing materials and the process conditions.

Following parts are generally excluded from the warranty (wear and tear parts):

- O-rings
- Seals and gaskets

6.2 Repair Performed by an Authorized Anton Paar Representative

In case your instrument needs repair, contact your local Anton Paar representative, who will take care of the necessary steps. If your instrument needs to be returned, request an RMA (Return Material Authorization Number). It must not be sent without the RMA and the filled "Safety Declaration for Instrument Repairs". Please make sure it is cleaned before return.

TIP *Find the contact data of your local Anton Paar representative on the Anton Paar website (contact).*

Appendix A: Technical Data

Appendix A.1: Technical Specifications

DANGER

- The Pico 3000 versions PROFINET IO, EtherNet/ IP, Modbus TCP **MUST NOT** be installed in a hazardous area.
- If L-Dens 7300/7400/7500 (Ex d) and/or L-Com 5500 (Ex d) is used in combination with an Inline Pump 300 (Ex d), the technical specifications of the Inline Pump 300 (Ex d) **MUST** also be observed.

NOTICE

"AAA" stands for the material options HAS, SST, TAN or INC.

The min. and max. ambient and process temperature is listed in the following tables. The max. process temperature depends on the temperature classification:

Table A-1: Permitted Temperatures L-Dens 7000 AAA Ex d Series

	Ambient Temperature	Process Temperature Temp. Class T4	Process Temperature Temp. Class T5
L-Dens 7300 SST Petro Ex d L-Dens 7300 SST Petro NPT Ex d L-Dens 7300 SST Petro Ex d (with Pico 3000) L-Dens 7300 SST Petro NPT Ex d (with Pico 3000) L-Dens 7400 AAA Ex d L-Dens 7400 AAA NPT Ex d L-Dens 7400 AAA Ex d (with Pico 3000) L-Dens 7400 AAA NPT Ex d (with Pico 3000) L-Dens 7400 HAS HP Ex d L-Dens 7400 HAS HP NPT Ex d L-Dens 7400 HAS HP Ex d (with Pico 3000) L-Dens 7400 HAS HP NPT Ex d (with Pico 3000) L-Dens 7500 HAS Ex d L-Dens 7500 HAS NPT Ex d L-Dens 7500 HAS Ex d (with Pico 3000) L-Dens 7500 HAS NPT Ex d (with Pico 3000)	-40 to 70 °C	-40 to 125 °C	-40 to 95 °C
L-Dens 7300 SST Petro Ex d (with Pico 3000 and HMI) L-Dens 7300 SST Petro NPT Ex (with Pico 3000 and HMI) L-Dens 7400 AAA Ex d (with Pico 3000 and HMI) L-Dens 7400 AAA NPT Ex d (with Pico 3000 and HMI) L-Dens 7400 HAS HP Ex d (with Pico 3000 and HMI) L-Dens 7400 HAS HP NPT Ex d (with Pico 3000 and HMI) L-Dens 7500 HAS Ex d (with Pico 3000 and HMI) L-Dens 7500 HAS NPT Ex d (with Pico 3000 and HMI)	-20 to 60 °C	-40 to 125 °C	-40 to 95 °C

Table A-2: Permitted Temperatures L-Com 5500 HAS Ex d Series

	Ambient Temperature	Process Temperature Temp. Class T4	Process Temperature Temp. Class T5
L-Com 5500 HAS Ex d L-Com 5500 HAS NPT Ex d	-25 to 65 °C	-25 to 125 °C	-25 to 95 °C
L-Com 5500 HAS Ex d (with Pico 3000) L-Com 5500 HAS NPT Ex d (with Pico 3000)	-25 to 55 °C	-25 to 125 °C	-25 to 95 °C
L-Com 5500 Ex d (with Pico 3000 and HMI) L-Com 5500 NPT Ex d (with Pico 3000 and HMI)	-20 to 55 °C	-25 to 125 °C	-25 to 95 °C

Table A-3: Permitted Temperatures Inline Pump 300 Ex d

	Ambient Temperature	Process Temperature Temp. Class T4
Inline Pump 300 Ex d	-25 to 60 °C	-25 to 80 °C

Table A-4: Specifications L-Dens 7000 Series

	L-Dens 7300	L-Dens 7400	L-Dens 7500
Operating conditions			
Process density	max. 1500 kg/m^3	max. 3000 kg/m^3	max. 2000 kg/m^3
Standard adjustment range:	600 to 1200 kg/m^3		
Measurement interval	1 second		
Process temperature non-Ex version*	-40 to 125 °C		
SIP temperature and duration non-Ex version	145 °C for max. 30 min.		
Process fluid types	Liquids, liquefied gases		
Process pressure* absolute	50 bar		
Process pressure* absolute High Pressure Sensor (HP)	--	max. 180 bar ($T_{process} \leq 70$ °C) max. 140 bar ($T_{process} \leq 145$ °C) CRN: max. 170 bar	--
Recommended flow rate**	100 to 500 L/h		

* *Attention: also consider the specification of the process connection*

** *The recommended minimum flow rate ensures a high accurate density measurement even with big differences between ambient and process temperature. The U-tube measuring principle can also measure without flow. The recommended upper flow rate is to avoid possible cavitation within the U-tube.*

Table A-4: Specifications L-Dens 7000 Series

	L-Dens 7300	L-Dens 7400	L-Dens 7500
Metrological data			
Repeatability density Accuracy density Accuracy temperature	0.2 kg/m^3 0.5 kg/m^3 0.1 °C	0.02 kg/m^{3**} 0.1 kg/m^{3***} 0.1 °C	0.01 kg/m^3 0.05 kg/m^3 0.1 °C
** Tantalum 0.05 kg/m^3, *** Tantalum 0.5 kg/m³			
All specifications are valid for correct installation, constant measuring conditions and vibration levels < 1e^{-3} (m/s^2)^2/Hz in the adjusted range. Anton Paar density sensors do not have a temperature-dependent error. All sensors are within specification in the adjusted range.			

Table A-5: Specifications L-Com 5500

	L-Com 5500
Operating conditions	
Process density	max. 2000 kg/m^3
Sound velocity range	800 to 2000 m/s
Standard adjustment range	700 to 1200 kg/m^3
Process temperature non-Ex version*	- 25 to 125 °C
SIP temperature and duration non-Ex version	145 °C for max. 30 min.
Process fluid types	Liquids
Process pressure* absolute	max. 50 bar
Recommended flow rate**	100 to 500 L/h
* *Attention: also consider the specification of the process connection* ** *The recommended minimum flow rate ensures a high accurate density measurement even with big differences between ambient and process temperature. The U-tube measuring principle can also measure without flow. The recommended upper flow rate is to avoid possible cavitation within the U-tube.*	
Metrological data	
Repeatability density Accuracy density Repeatability sound velocity Accuracy temperature	0.01 kg/m³ 0.05 kg/m³ 0.01 m/s 0.1 °C
All specifications are valid for correct installation, constant measuring conditions and vibration levels < 1e^{-3} (m/s^2)^2/Hz in the adjusted range. The Anton Paar density and sound velocity sensors do not have a temperature-dependent error. All sensors are within specification in the adjusted range.	

Table A-6: General Specifications

	L-Dens 7300/7400/7500	L-Com 5500
Housing material - Sensor housing - Electronics housing non-Ex-version - Electronics housing Ex-version - HMI	Stainless steel Stainless steel Hard anodized aluminium Glass	
Wetted parts - L-Dens 7300 SST Petro - L-Dens 7400/7500 HAS - L-Dens 7400 TAN - L-Dens 7400 INC - L-Dens 7400 SST - L-Com 5500 HAS	Stainless steel 1.4404 Alloy C-276, 2.4819 Tantalum Alloy 825, 2.4858 Stainless steel 1.4404 Alloy C-276, 2.4819	
Dimensions Inner diameter of oscillator	6.3 mm	
Ambient conditions		
Temperature (non Ex-versions)	-40 to 70 °C without Pico 3000 -40 to 70 °C** with Pico 3000 -20 to 60 °C with Pico 3000 and HMI	-25 to 65 °C without Pico 3000 -25 to 55 °C* with Pico 3000 -20 to 55 °C* with Pico 3000 and HMI
	) Pico 3000 Version PROFINET IO, EtherNet/IP, Modbus TCP max 50 °C* *) Pico 3000 Version PROFINET IO, EtherNet/IP, Modbus TCP max. 60 °C*	
Humidity	0 to 90 % rH (non condensing)	
Degree of Protection	IP 66 / 67 / NEMA 4X (Ex-version: IP66 / NEMA 4X)	
Installation and use in hazardous areas	acc. to Ex-marking	
Electrical data		
Supply voltage	SELV/PELV DC 24 V ± 20%	
Power consumption	max. 2 W without Pico 3000 max. 5 W with Pico 3000	max. 5 W without Pico 3000 max. 8 W with Pico 3000
CAN interface	acc. to ISO 11898	
Analog input for optional pressure	4 to 20 mA with auxiliary voltage DC 12 V	
Digital input (optional)	for flow monitor mat. no. 22754	
Pump input (optional)	for Anton Paar Inline Pump 300 (Ex d)	
Connection terminals	Push-in spring connection, 0.2 to 1.5 mm² / AWG 24 to 16	
Cable gland type	M16x1.5, EMC cable glands, metric, earthing cones acc. to DIN 89345 brass nickel-plated for cable OD 4.5 to 10 mm	
Cable gland type Ex-version (supplied optionally)	M 20x1.5, shielded or 1/2 " - 14 NPT, shielded	

Table A-6: General Specifications

	L-Dens 7300/7400/7500	L-Com 5500
Cables	Cables must comply with the intended area of use, the cable gland type and the relevant national regulations and requirements. The Special Safety Instructions must be read and followed for installation and use of sensors with Ex-marking.	
Voltage supply cable	Suggested cable type: LiYCY, shielded 2 pole Wire cross section: min. 0.34 mm², max. 1.5 mm² without wire end ferrule; max. 0.75 mm² with wire end ferrule Diameter of cables: 4.5 to 10 mm to ensure optimal sealing against the cable gland	
CANopen cable	Cable type: CANopen/DeviceNet cable 120 Ω, shielded twisted pair Wire cross section: min. 0.20 mm², max. 1.5 mm² without wire end ferrule; max. 0.75 mm² with wire end ferrule Diameter of cables: 4.5 to 10 mm to ensure optimal sealing against the cable gland	

All inputs and outputs (including relay outputs) connected to mPDS 5 have to be in accordance with PELV (Protective Extra Low Voltage) of EN 61140 or with SELV specification of EN 60950, i.e. maximum voltage U_{max} must not exceded 24 V + 20 % = 28.8 V and a maximum current I_{max} = 0.75 A.

Table A-7: Specifications of the Inline Pump 300 (Ex d)

	Inline Pump 300 Ex d	Inline Pump 300
Ambient temperature	see table A-3	-5 to 60 °C
Process temperature	see table A-3	-5 to 105 °C (145 °C for max. 30 min, not suitable for steam cleaning)
Pressure absolute	1 to 50 bar for process temperature up to 70 °C 1 to 16 bar for process temperature up to 80 °C	1 to 16 bar
Viscosity	min. 0.35 mPas; max. 20 mPas	min. 0.35 mPas; max. 10 mPas
Power consumption	max. 10.5 W	
Wetted parts	see table A-8	
Weight	1.2 kg	
Conductivity of process media	min. 0.01 pS/m	

NOTICE
Also consider the specifications of the process connection in table A-9 and table A-10.

Appendix A.2: Dimensions of L-Dens 7000, L-Com 5500

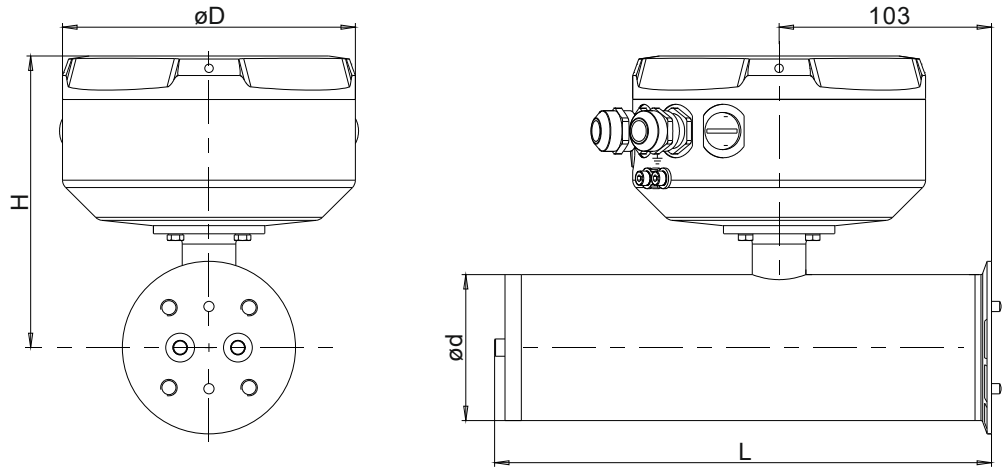


Fig. A-1: Dimensions of the sensor

	Dimensions					Weight
	H without HMI [mm]	**H with HMI [mm]**	**L [mm]**	**D [mm]**	**d [mm]**	**[kg]**
L-Dens 7300 SST Petro Ex d	163	160	241	156	71	4.5
L-Dens 7400	142	141	241	142	71	4.8
L-Dens 7400 Ex d	163	160	241	156	71	4.5
L-Dens 7400 HAS HP	142	141	243	142	75	5.8
L-Dens 7400 HAS HP Ex d	163	160	243	156	75	5.5
L-Dens 7500 HAS	142	141	188	142	71	4.5
L-Dens 7500 HAS Ex d	163	160	188	156	71	4.2
L-Com 5500 HAS	156	155	258	142	71	5.3
L-Com 5500 HAS Ex d	178	175	258	156	71	5.0

Appendix A.3: Dimensions Inline Pump 300 Ex d (with Sensor)

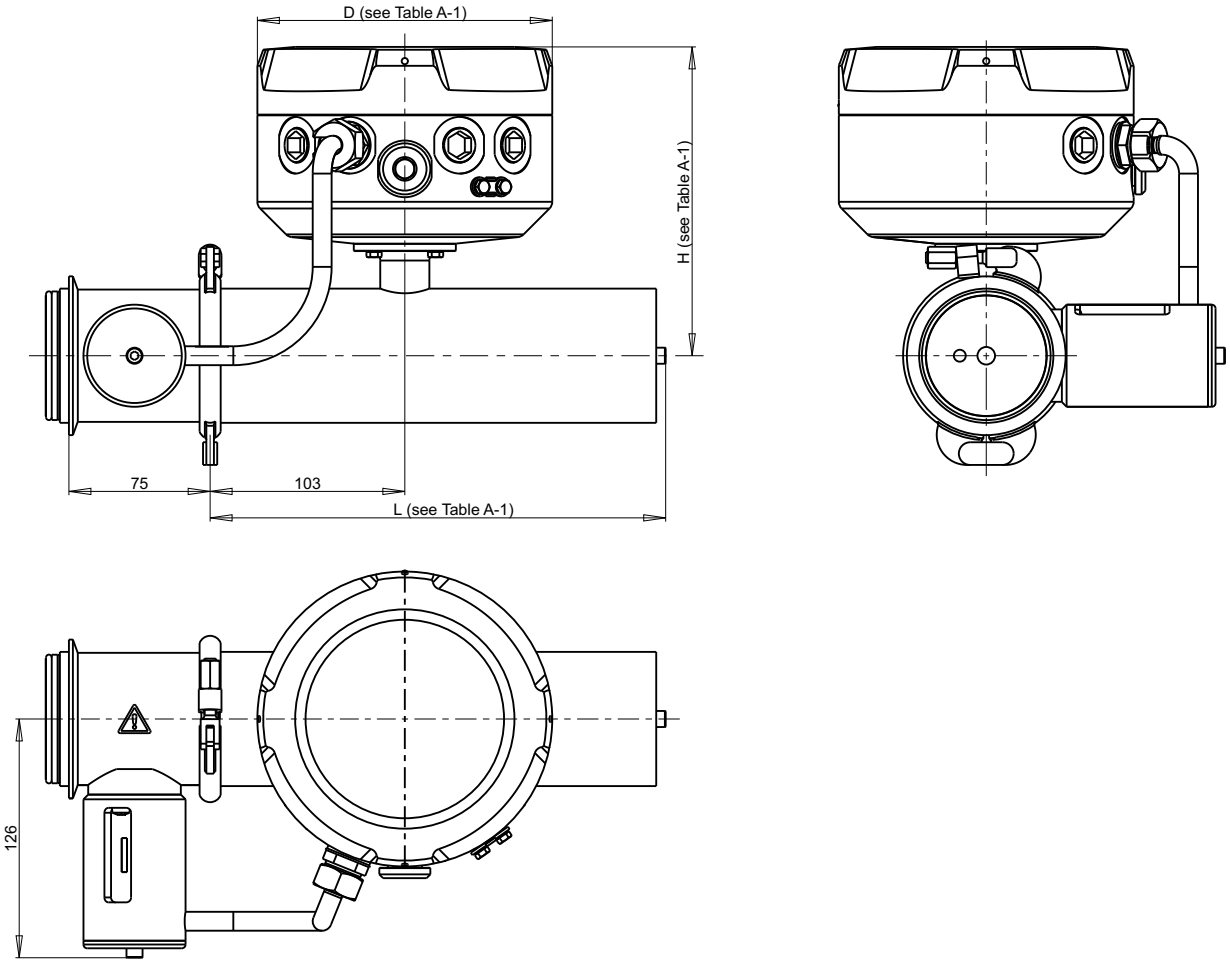


Fig. A-2: Dimensions of the Inline Pump 300 Ex d with VARIVENT® N flange and sensor

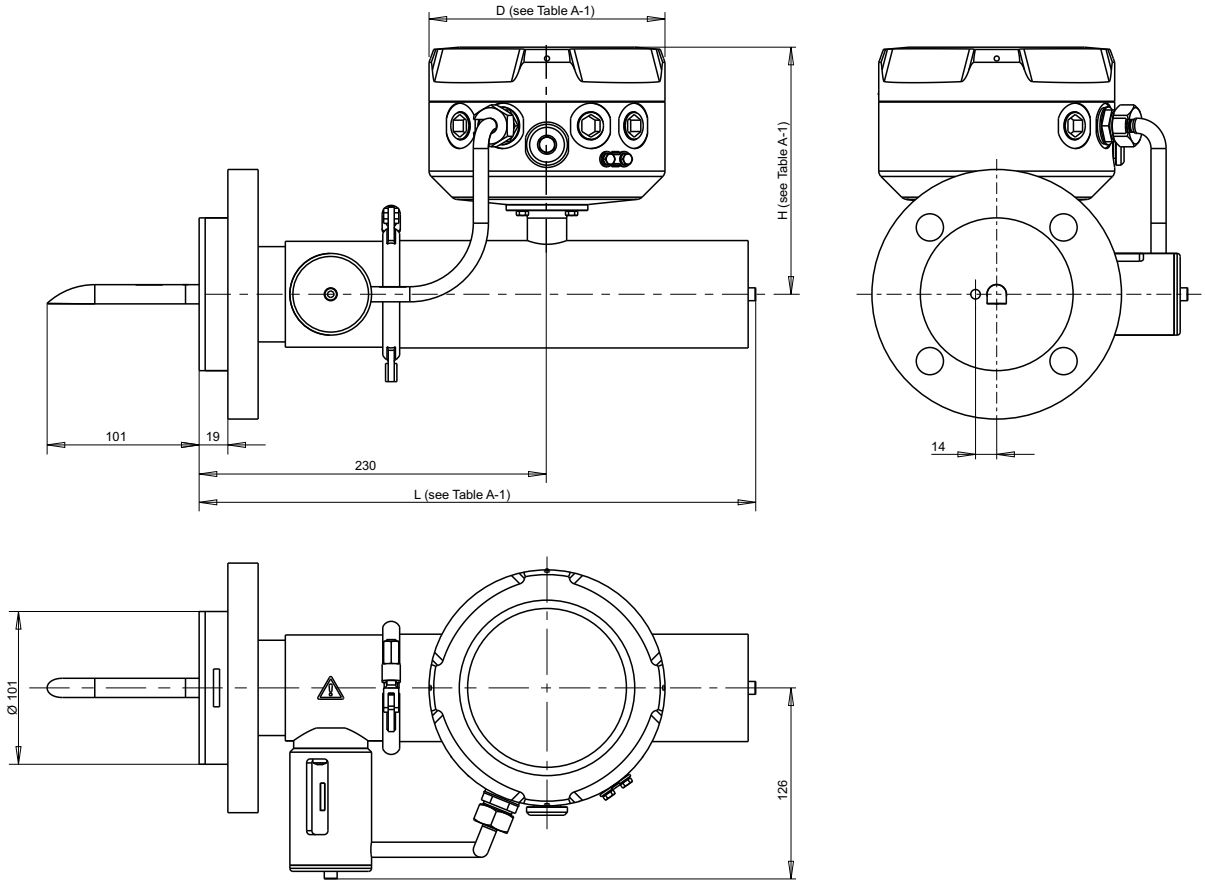


Fig. A-3: Dimensions of the Inline Pump 300 Ex d with EN 1092-1 or ANSI B16.5 flange and sensor

Table A-8: Inline Pump 300 Ex d

Mat. No.	Article	Wetted Parts
229763	Inline Pump 300 Ex d with EPDM O-rings for L-Dens 7400 Ex d	1.4404, SSiC, WC, EPDM
244471	Inline Pump 300 Ex d with FKML O-rings for L-Dens 7400 Ex d	1.4404, SSiC, WC, FKM-LT
229764	Inline Pump 300 Ex d with EPDM O-rings for L-Dens 7500 Ex d	1.4404, SSiC, WC, EPDM
244472	Inline Pump 300 Ex d with FKML O-rings for L-Dens 7500 Ex d	1.4404, SSiC, WC, FKM-LT
229765	Inline Pump 300 Ex d with EPDM O-rings for L-Com 5500 Ex d	1.4404, SSiC, WC, EPDM

Table A-9: VARIVENT® N process connection for Inline Pump 300 Ex d

Mat. No.	Article	Wetted Parts	Pressure range	Weight
244477	Inline Pump 300 Ex d flange VARIVENT® N with EPDM sealing	1.4404, EPDM	1 to 16 bar	2.7 kg

Table A-10: EN 1092-1 / ANSI B16.5 process connection for Inline Pump 300 Ex d

Mat. No.	Article	Wetted Parts	Pressure Range	Weight
244478	Inline Pump 300 Ex d flange EN 1092-1 DN 50 PN 16, SST, EPDM	1.4404, EPDM	Min. 1 bar; max. acc. to PN 16	6.8 kg
244482	Inline Pump 300 Ex d flange EN 1092-1 DN 50 PN 16, SST, FKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 16	6.8 kg
244479	Inline Pump 300 Ex d flange EN 1092-1 DN 50 PN 40, SST, EPDM	1.4404, EPDM	Min. 1 bar; max. acc. to PN 40	7.0 kg
244483	Inline Pump 300 Ex d flange EN 1092-1 DN 50 PN 40, SST, FKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 40	7.0 kg
244480	Inline Pump 300 Ex d flange ANSI B16.5 2" CL 150, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 150	6.4 kg
244484	Inline Pump 300 Ex d flange ANSI B16.5 2" CL 150, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 150	6.4 kg
244481	Inline Pump 300 Ex d flange ANSI B16.5 2" CL 300, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 300	7.3 kg
244485	Inline Pump 300 Ex d flange ANSI B16.5 2" CL 300, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 300	7.3 kg

Appendix A.4: Pressure Equipment Directive (PED) 2014/68/EU

All sensors and adapters are not pressure equipment according to the Pressure Equipment Directive 2014/68/EU, however, they may be components of a pressure equipment. According to Article 4, paragraph 3, these products must be designed and manufactured in accordance with good engineering practice in force in a member state to ensure that they can be used safely. If documentation or testing is required for installation in category 1 or 2 pressure equipment, this must be ordered separately.

Appendix B: Process Adapters

O-rings

Table B-1: O-ring, Application

Designation	Material	Temperature range	Approvals/Certifications	Recommended for
EPDM	EPDM AP 372	-40 °C to 140 °C	- FDA 21. CFR 177.2600 - Elastomer Guideline - Regulation (EC) No. 1935/2004 - DGVW W 270 and W 534 - NSF/ANSI Standard 61 - ÖNORM B 5014/1 - AS/NZS 4020:2005 - WRAS BS 6920 - CLP - CIP inspected - SIP inspected - ADI free	Beverage Chemical
FFKM	FFKM COG Resist® RS 75 HS	-15 °C to 260 °C	- USP Class VI up to +121 °C - FDA 21. CFR 177.2400 - FDA 21. CFR 177.2600 - 3-A Sanitary Standard - CIP inspected - SIP inspected - ADI free	Beverage Chemical
FKM-LT (FKML)	FKM Vi 840	-46 °C to 200 °C	- DVGW DIN EN 682 - GBL - NORSOK M-710 (Annex B) - ISO 23936-2 - NACE TM0187 - Conformance to DIN EN 14141 - Fulfils the API 6A & 6D standards	Petroleum Chemical

PVDF and PVDF-EL Adapter

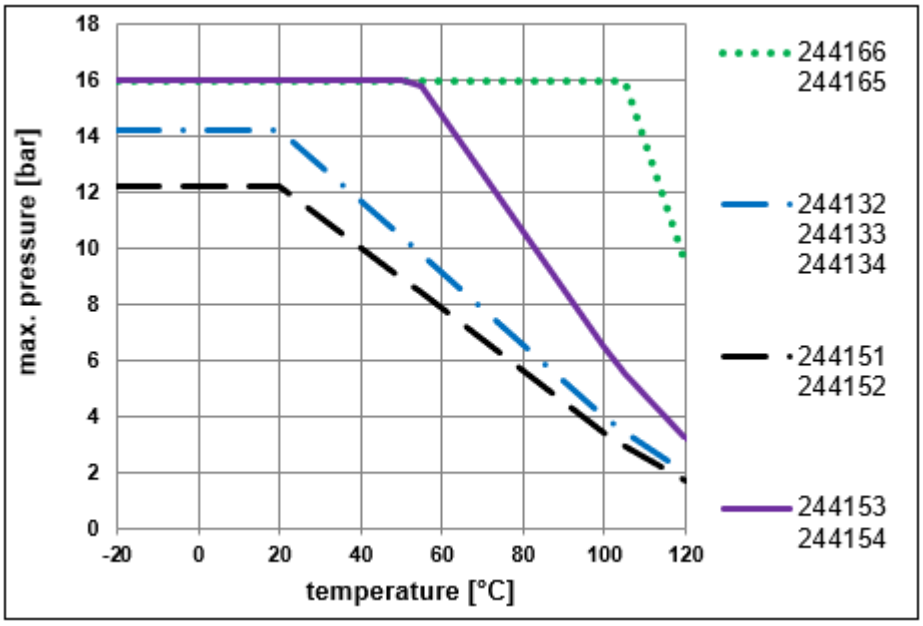


Fig. B-1: Max. pressure PVDF and PVDF-EL adapters

Adapters for L-Dens 7400 (Ex d)

Table B-2: Adapters Full Flow

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244099	L-Dens 7400 F-adapter set tube OD 12 mm, SST, EPDM	1.4404, EPDM	1 bar to 180 bar	-40 °C to 140 °C
244102	L-Dens 7400 F-adapter set tube OD 12 mm, SST, FFKM	1.4404, FFKM	1 bar to 180 bar	-15 °C to 145 °C
244101	L-Dens 7400 F-adapter set tube OD 12 mm, SST, FKM-LT	1.4404, FKM-LT	1 bar to 180 bar	-40 °C to 145 °C
244103	L-Dens 7400 F-adapter set tube OD 1/4", SST, EPDM	1.4404, EPDM	1 bar to 180 bar	-40 °C to 140 °C
244106	L-Dens 7400 F-adapter set tube OD 1/4", SST, FFKM	1.4404, FFKM	1 bar to 180 bar	-15 °C to 145 °C
244105	L-Dens 7400 F-adapter set tube OD 1/4", SST, FKM-LT	1.4404, FKM-LT	1 bar to 180 bar	-40 °C to 145 °C
244107	L-Dens 7400 F-adapter set ISO 228-1 G3/8", SST, EPDM	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C
244118	L-Dens 7400 F-adapter set ISO 228-1 G3/8", SST, FKM-LT	1.4404, FKM-LT	1 bar to 50 bar	-40 °C to 145 °C

Table B-2: Adapters Full Flow

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244119	L-Dens 7400 F-adapter set ISO 228-1 G3/8", INC, FFKM, PCTFE	Alloy 825, FFKM, PCTFE	1 bar to 50 bar	-15 °C to 145 °C
244120	L-Dens 7400 F-adapter set ISO 228-1 G3/8", TAN, FFKM, PCTFE	Tatalum , FFKM, PCTFE	1 bar to 50 bar	-15 °C to 145 °C
244121	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 40, SST, EPDM	1.4404, EPDM	Min. 1 bar; max. acc. to PN 40	-40 °C to 140 °C
244122	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 40, SST, FFKM	1.4404, FFKM	Min. 1 bar; max. acc. to PN 40	-15 °C to 145 °C
244123	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 40, SST, FFKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 40	-40 °C to 145 °C
244124	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 150, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 150	-29 °C to 140 °C
244125	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 150, SST, FFKM	AISI 316L, FFKM	Min. 1 bar; max. acc. to Class 150	-15 °C to 145 °C
244126	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 150, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 150	-29 °C to 145 °C
244127	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 300, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 300	-29 °C to 140 °C
244128	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 300, SST, FFKM	AISI 316L, FFKM	Min. 1 bar; max. acc. to Class 300	-15 °C to 145 °C
244129	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 300, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 300	-29 °C to 145 °C
244130	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 40, HAS, FFKM	Alloy C-276, FFKM	Min. 1 bar; max. acc. to PN 40*	-15 °C to 145 °C
244131	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 150, HAS, FFKM	Alloy C-276, FFKM	Min. 1 bar; max. acc. to Class 150*	-15 °C to 145 °C
244132**	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 16, PVDF, FFKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244133**	L-Dens 7400 F-adapter set ANSI B16.5 1/2" CL 150, PVDF, FFKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244134	L-Dens 7400 F-adapter set EN 1092-1 DN 15 PN 16, PVDF-EC, FFKM	PVDF-EC, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244136	L-Dens 7400 F-adapter set Tri-clamp ASME BPE 2009 OD 1/2", SST, EPDM	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C
244138	L-Dens 7400 F+P-adapter set tube OD 12 mm, SST, EPDM, G1/4" F. PR-SEN.	1.4404, EPDM	1 bar to 180 bar	-40 °C to 140 °C

**) The adapters have a lapped flange made of 1.4404 / 316L.*

***) Must not be installed in explosive areas*

Table B-3: Adapter Venturi Principle

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244139	L-Dens 7400 V-adapter set tube OD 1", SST, EPDM	1.4404, EPDM	1 bar to 180 bar	-40 °C to 140 °C
244140	L-Dens 7400 V-adapter set tube OD 1", SST, FFKM	1.4404, FFKM	1 bar to 180 bar	-15 °C to 145 °C
244141	L-Dens 7400 V-adapter set EN 1092-1 DN 25 PN 40, SST, EPDM	1.4404, EPDM	Min. 1 bar; max. acc. to PN 40	-40 °C to 140 °C
244142	L-Dens 7400 V-adapter set EN 1092-1 DN 25 PN 40, SST, FFKM	1.4404, FFKM	Min. 1 bar; max. acc. to PN 40	-15 °C to 145 °C
244274	L-Dens 7400 V-adapter set EN 1092-1 DN 25 PN 40, SST, FKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 40	-40 °C to 145 °C
244143	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 150, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 150	-29 °C to 140 °C
244144	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 150, SST, FFKM	AISI 316L, FFKM	Min. 1 bar; max. acc. to Class 150	-15 °C to 145 °C
244299	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 150, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 150	-29 °C to 145 °C
244145	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 300, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 300	-29 °C to 145 °C
244146	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 600, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 600	-29 °C to 145 °C
244147	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 900, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 900	-29 °C to 145 °C
244148	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 900 RJT, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 900	-29 °C to 145 °C
244149	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 300, SST, FKM-LT, L530	AISI 316L FKM-LT	Min. 1 bar; max. acc. to Class 300	-29 °C to 145 °C
244150	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 300, SST, FKM-LT, L1027	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 300	-29 °C to 145 °C
244151*	L-Dens 7400 V-adapter set EN 1092-1 DN 25 PN 16, PVDF, FFKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244152*	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 150, PVDF, FFKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244153	L-Dens 7400 V-adapter set EN 1092-1 DN 25 PN 16, PVDF-EC, FFKM	PVDF-EC, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244154	L-Dens 7400 V-adapter set ANSI B16.5 1" CL 150, PVDF-EC, FFKM	PVDF-EC, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244155	L-Dens 7400 V-adapter set Tri-clamp ASME BPE 2009 OD 1", SST, EPDM	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C

**) Must not be installed in explosive areas*

Table B-4: Inline Adapters

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244158	L-Dens 7400 I-adapter set VARIVENT® N min. DN 40, SST, EPDM,	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C
244159	L-Dens 7400 I-adapter set VARIVENT® N min. DN 65, SST, EPDM,	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C
244300	L-Dens 7400 I-adapter set EN 1092-1 DN 50 PN 16, SST, EPDM	1.4404, EPDM	Min. 1 bar; max. acc. to PN 16	-40 °C to 140 °C
244301	L-Dens 7400 I-adapter set EN 1092-1 DN 50 PN 16, SST, FFKM	1.4404, FFKM	Min. 1 bar; max. acc. to PN 16	-15 °C to 145 °C
244160	L-Dens 7400 I-adapter set EN 1092-1 DN 50 PN 16, SST, FKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 16	-40 °C to 145 °C
244161	L-Dens 7400 I-adapter set EN 1092-1 DN 50 PN 40, SST, FKM-LT	1.4404, FKM-LT	Min. 1 bar; max. acc. to PN 40	-40 °C to 145 °C
244302	L-Dens 7400 I-adapter set ANSI B16.5 2" CL 150, SST, EPDM	AISI 316L, EPDM	Min. 1 bar; max. acc. to Class 150	-29 °C to 140 °C
244163	L-Dens 7400 I-adapter set ANSI B16.5 2" CL 150, SST, FFKM	AISI 316L, FFKM	Min. 1 bar; max. acc. to Class 150	-15 °C to 145 °C
244162	L-Dens 7400 I-adapter set ANSI B16.5 2" CL 150, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 150	-29 °C to 145 °C
244164	L-Dens 7400 I-adapter set ANSI B16.5 2" CL 300, SST, FKM-LT	AISI 316L, FKM-LT	Min. 1 bar; max. acc. to Class 300	-29 °C to 145 °C
244165	L-Dens 7400 I-adapter set EN 1092-1 DN 50 PN 16, PVDF, FFKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
244166	L-Dens 7400 I--adapter set ANSI B16.5 2" CL 150, PVDF, FKM	PVDF, FFKM	Min. 1 bar; max. acc. to Fig. B-1	-15 °C to 120 °C
251198	L-Dens 7400 I-adapter set 1.5" Tri-clamp SST, EPDM	1.4404, EPDM	Min. 1 bar; max 25 bar	-40 °C to 140 °C

Table B-5: Inline Pump 300 non-Ex and Adapters for Inline Pump 520

Mat. No.	Designation	Wetted parts	Press. range	Temp. range
NOTE: *The Inline Pump 300 and the Inline Pump 520 are not suitable for steam cleaning!*				
244168	Inline Pump 300 + adapter VARIVENT® N for L-Dens 7400, SST, EPDM	1.4404, EPDM	1 bar to 16 bar	Process: -5 °C to 105 °C (145 °C for max. 30 min) Ambient: -5 °C to 60°C
244169	L-Dens 7400 P-adapter set for Inline Pump 520, Var N, SST, EPDM, G3/8"	1.4404, EPDM	1 bar to 16 bar	Process: -5 °C to 105 °C (120 °C for 30 min) Ambient: -20 °C to 55 °C

Table B-6: Special Adapters, Connectors

Mat. No.	Designation	Wetted parts	Pressure range	Temperature range
244304	L-Dens 7400 S-adapter set cut-off SST, EPDM	1.4404, EPDM	1 bar to 180 bar	-40 °C to 140 °C
244170	L-Dens 7400 S-adapter set cut-off SST, FKM-LT	1.4404, FKM-LT	1 bar to 180 bar	-40 °C to 145 °C

Adapters for L-Dens 7500 (Ex d) and L-Com 5500 (Ex d)

Table B-7: Adapters Full Flow

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244173	L-Dens 7500/L-Com 5500 F-adapter set tube OD 12 mm, SST, EPDM	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C
244176	L-Dens 7500/L-Com 5500 F-adapter set tube OD 12 mm, SST FFKM	1.4404, FFKM	1 bar to 50 bar	-15 °C to 145 °C
244175	L-Dens 7500/L-Com 5500 F-adapter set tube OD 12 mm, SST, FKM-LT	1.4404, FKM-LT	1 bar to 50 bar	-40 °C to 145 °C
244177	L-Dens 7500/L-Com 5500 F-adapter set tube OD 12 mm, HAS, FFKM	Alloy C-276, FFKM	1 bar to 50 bar	-15 °C to 145°C
244178	L-Dens 7500/L-Com 5500 F-adapter set ISO 228-1 G3/8", SST, EPDM	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C
244180	L-Dens 7500/L-Com 5500 F-adapter set ISO 228-1 G3/8", SST, EPDM, DPRn BRACKET	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C
244181	L-Dens 7500/L-Com 5500 F+P-adapter set ISO 228-1 G3/8", SST, EPDM, P-SEN. BEV.	1.4404, EPDM	1 bar to 16 bar	Process: -10 °C to 80 °C ** Ambient: -5 °C to 60 °C
244182	L-Dens 7500/L-Com 5500 F-adapter set tri-cl. ASME BPE 2009 OD 1/2", SST, EPDM	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C
244183	L-Dens 7500/L-Com 5500 F-adapter set EN 1092-1 DN 15 PN 40, HAS, FFKM	Alloy C-276, FFKM	Min. 1 bar; max. acc. to PN 40*	-15 °C to 145 °C
244184	L-Dens 7500/L-Com 5500 F-adapter set ANSI B16.5 1/2" Class 150, HAS, FFKM	Alloy C-276, FFKM	Min. 1 bar; max. acc. to Class 150*	-15 °C to 145 °C
244185	L-Dens 7500/L-Com 5500 F-adapter set EN 1092-1 DN 15 PN 40, HAS, FFKM, vacuum	Alloy C-276, FFKM	Min. 0.1 bar; max. acc. to PN 40*	-15 °C to 145 °C

*) The adapters have a lapped flange made of 1.4404 / 316L
**) calibrated up to 40 °C, 125 °C for max. 30 min. without measurement values

Table B-8: Inline Adapters with VARIVENT® N

Mat. No.	Designation	Wetted parts	Pressure range	Temp. range
244186	L-Dens 7500/L-Com 5500 I-adapter set VARIVENT® N min. DN 40, SST, EPDM,	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C
244187	L-Dens 7500/L-Com 5500 I-adapter set VARIVENT® N min. DN 65, SST, EPDM,	1.4404, EPDM	1 bar to 16 bar	-40 °C to 140 °C

Table B-9: Inline Pump 300 non-Ex and Adapters for Inline Pump 520

Mat. No.	Designation	Wetted parts	Pressure range	Temperature range
NOTE: *The Inline Pump 300 and the Inline Pump 520 are not suitable for steam cleaning!*				
244188	Inline Pump 300 + adapter Var. N for L-Dens 7500/L-Com 5500, SST, EPDM	1.4404, EPDM	1 bar to 16 bar	Process: -5 to 105 °C (145 °C for max. 30 min) Ambient: -5 to 60 °C
244189	Inline Pump 300 + adapter Var. N for L-Dens 7500/L-Com 5500, SST, FFKM	1.4404, FFKM	1 bar to 16 bar	Process: -5 to 105 °C (145 °C for max. 30 min) Ambient: -5 to 60 °C
244190	Inline Pump 300 + adapter Var. N for L-Dens 7500/L-Com 5500, SST, EPDM, P-SEN	1.4404, EPDM	1 bar to 16 bar	Process: -5 to 80 °C (calibrated up to 40 °C, 125 °C for max. 30 min. without meas. values) Ambient: -5 to 60 °C
244305	Inline Pump 300 + adapter Var. N for L-Dens 7500/L-Com 5500, SST, FFKM, P-SEN	1.4404, FFKM	1 bar to 16 bar	Process: -5 to 80 °C (calibrated up to 40 °C, 125 °C for max. 30 min. without meas. values) Ambient: -5 to 60 °C
244191	L-Dens 7500/L-Com 5500 P-adapter set for Inline Pump 520, Var N, SST, EPDM, G3/8"	1.4404, EPDM	1 bar to 16 bar	Process: -5 to 105 °C (120 °C for 30 min) Ambient: -20 to 55 °C

Table B-10: Special Adapters, Connectors

Mat. No.	Designation	Wetted parts	Pressure range	Temperature range
244192	L-Dens 7500/L-Com 5500 S-adapter set cut-off, SST, EPDM	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C
244193	L-Dens 7500/L-Com 5500 S-adapter set to use L-Dens 7400 adapter, SST EPDM	1.4404, EPDM	1 bar to 50 bar	-40 °C to 140 °C

Appendix C: Certificates

NOTICE
Please find a collection of all Ex-certificates including the CE and UKCA Declarations of Conformity for the Ex d version of the sensors in the document XDPIB041EN.