

Gas sensors

Installation and operating instructions



English (GB) Installation and operating instructions

Original installation and operating instructions.

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1. Symbols used in this document



Warning

If these safety instructions are not observed, it may result in personal injury!



If these safety instructions are not observed, it may result in malfunction or damage to the equipment!



Notes or instructions that make the job easier and ensure safe operation.

2. Identification

For the identification of the gas sensors, see section 6. *Technical data.*

3. General information

These installation and operating instructions contain all information important for users of the Grundfos gas sensors:

- technical data
- instructions on commissioning, use and maintenance
- safety information.

Should you require further information, or should you encounter problems that are not handled in sufficient depth in this manual, please contact Grundfos Water Treatment. We shall be pleased to support you with our comprehensive know-how in the fields of measuring and control technology as well as water treatment.

We always welcome suggestions on how to optimise our installation and operating instructions to satisfy our customers.

3.1 Warranty

A guarantee claim in accordance with our general terms of sale and delivery is only valid if the following requirements are fulfilled:

- The product is used in accordance with the information within this manual.
- The product is not dismantled or handled incorrectly.

Typical wear parts are excluded from the warranty.

Warning

These installation and operating instructions are also available on www.Grundfosalldos.com.

Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.



4. Applications

The Grundfos gas sensors are designed for monitoring gas concentrations via a connected microprocessor-based Conex[®] DIS-G or Conex[®] DIA-G gas warning device.

The gas sensors are available as

- amperometric gas sensors for chlorine (Cl₂), chlorine dioxide (ClO₂) or ozone (O₃).
- potentiostatic gas sensors for chlorine (Cl₂), chlorine dioxide (ClO₂), ozone (O₃), ammonia (NH₃) or hydrochloric acid (HCl).



Warning

Other applications are not approved and not permitted. Grundfos cannot be held liable for any damage resulting from incorrect use.

5. Safety

The owner/operations manager of the system is responsible for the following:

- compliance with local safety regulations
- training of operating personnel
- provision of prescribed protective clothing
- implementation of regular maintenance.

5.1 Obligations of the owner/operations manager

The owner/operations manager must ensure that persons working with the sensors described fulfil these requirements:

- They are acquainted with the regulations concerning working safety and accident prevention.
- They have been trained in the use of the sensor.
- They have read and understood the warning information and handling symbols.

The owner/operations manager is also responsible for ensuring that this manual is kept in the immediate vicinity of the sensor and is always available for the operating personnel.

5.2 Avoidance of danger

Warning

Do not dismantle the sensor components!

Installation and connection of the sensor and the associated supplementary components must only be carried out by authorised personnel!

The local safety regulations must be observed!

The sensor is used to monitor for leaks. Constant concentrations cannot be monitored using this sensor.

Installation and maintenance must only be carried out by authorised personnel!



6. Technical data

6.1 Amperometric measurement in combination with Conex[®] DIS-G or Conex[®] DIA-G

6.1.1 Amperometric sensors

- Accuracy: $\pm 10\%$
- Temperature range: $+5\text{ °C}$ to $+45\text{ °C}$
- Response time: 2 seconds
- Recovery time: 10 to 15 minutes
- Expected life: 12 months
- Storage temperature: $+5\text{ °C}$ to $+30\text{ °C}$
- Maximum storage time: 9 months
- Weight: 260 g.

6.1.2 Sensor Cl₂, ClO₂

- Identification: ceramics white
- Measuring range: 0.00 to 5.00 ppm.

6.1.3 Sensor O₃

- Identification: ceramics pink
- Measuring range: 0.00 to 5.00 ppm.

6.1.4 Dimensional sketch

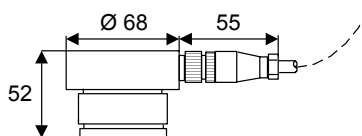


Fig. 1 Dimensional sketch

6.1.5 Accessories

Cables for amperometric gas sensors

Description	Product number
Connection cable, 10 m	96725670 (321-130/10)
Connection cable, 20 m	96725672 (321-130/20)
Connection cable, 50 m	96725673 (321-130/50)

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6.2 Potentiostatic measurement in combination with Conex[®] DIA-G

6.2.1 Potentiostatic sensors

- Recovery time: 1 minute
- Temperature range: -20 °C to +40 °C
- Storage temperature: +4 °C to +10 °C
- Maximum storage time: 3 months
- Weight: 150 g.

6.2.2 Sensor Cl₂

- Identification (label on the sensor + colour code): yellow
- Measuring range: 0.00 to 20.00 ppm
- Resolution: < 0.05 ppm/20 °C
- Linearity: < 5 % of full scale
- Sensitivity drift: < 10 % per 6 months
- Response time t_{90} : < 30 seconds
- Expected life: 24 months.

6.2.3 Sensor NH₃

- Identification (label on the sensor + colour code): brown
- Measuring range: 0 to 100 ppm
- Resolution: < 1 ppm/20 °C
- Linearity: < 10 % of full scale
- Sensitivity drift: < 5 % per 6 months
- Response time t_{90} : < 60 seconds
- Expected life: 24 months.

6.2.4 Sensor ClO₂

- Identification (label on the sensor + colour code): grey
- Measuring range: 0.00 to 1.00 ppm
- Resolution: < 0.03 ppm/20 °C
- Linearity: < 10 % of full scale
- Sensitivity drift: < 10 % per 6 months
- Response time t_{90} : < 120 seconds
- Expected life: 24 months.

6.2.5 Sensor HCl

- Identification (label on the sensor + colour code): pink
- Measuring range: 0.0 to 30.0 ppm
- Resolution: < 0.7 ppm/20 °C
- Linearity: < 5 % of full scale
- Sensitivity drift: < 3 % per 6 months
- Response time t_{90} : < 70 seconds
- Expected life: 24 months.

6.2.6 Sensor O₃

- Identification (label on the sensor + colour code): grey
- Measuring range: 0.00 to 1.00 ppm
- Resolution: < 0.02 ppm/20 °C
- Linearity: < 10 % of full scale
- Sensitivity drift: < 10 % per 6 months
- Response time t_{90} : < 60 seconds
- Expected life: 18 months.

6.2.7 Sensor interface

A potentiostatic sensor must be connected to the Conex[®] DIA-G via a separate sensor interface.

For dimensional sketches, see installation and operating instructions for Conex[®] DIA-G.

6.2.8 Accessories

Cables for potentiostatic gas sensors

Description	Product number
CAN connection cable, 10 m	96725684 (321-322/10)
CAN connection cable, 20 m	96725685 (321-322/20)
CAN connection cable, 50 m	96725686 (321-322/50)
Sensor interface	96725668 (308-2050)

7. Transport and storage

- Do not throw or drop the sensor.
- Store the sensor in a dry and cool place.
- Observe the permissible storage temperature ranges!

7.1 Unpacking

- Check the sensor for damage.
 - Do not install or connect damaged sensors!
- Install the sensor as soon as possible after unpacking.

The sensor disc and the sensor element are supplied in separate packagings.

Caution

Open the packaging of the sensor disc or the sensor element only immediately before the assembly.

Note

Retain the packaging for future storage or return, or dispose of the packaging in accordance with local regulations.

8. Installation

8.1 Installation requirements

- Dry room.
 - The sensor must be installed in a position where it cannot be hit by water, e.g. from the sprinkling system.
- Ambient temperature according to the technical data of the specific sensor.
- Vibration-free location.
- The sensor must not be exposed to direct heat or sunlight or to strong air circulation.
- Permissible air humidity: max. relative humidity: 80 % (non-condensing).

Caution

If the installation requirements are not observed, the sensor may be damaged which may result in inaccurate measurements.

Caution

The sensor needs to be replaced after a gas eruption exceeding the measuring range. Do not expose the sensor to a higher gas concentration, not even during start-up and test.

8.2 Preparation for installation

8.2.1 Amperometric gas sensors in combination with Conex® DIS-G or Conex® DIA-G

Note

The amperometric sensors must not be installed if the maximum storage time has been exceeded.

1. Take the sensor disc (1) out of the packaging.
2. Remove the short-circuit jumper (6).
3. Place the sensor disc into the sensor support (2) with the slot pointing to the back.
 - The sensor disc must be placed between the contact surfaces (3).
4. Insert the bearing ring seal (4), and tighten the screw plug (5) by hand.
 - The bearing ring seal must lie above the contact.

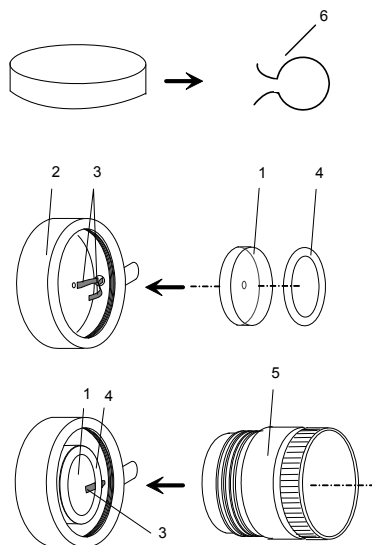


Fig. 2 Preparation of amperometric gas sensor

Pos.	Description
1	Sensor disc
2	Sensor support
3	Contact surfaces
4	Bearing ring seal
5	Screw plug
6	Short-circuit jumper

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Connecting the cable to the sensor

1. Screw open the connector.
2. Insert the cable.
3. Connect the brown conductor (+) to terminal 1.
4. Connect the white conductor (-) to terminal 2.
 - Colour of the conductors of the Grundfos cable for amperometric measurement (2-wire cable with single protection).
 - Maximum cable length: 100 m.
5. Assemble the connector and plug it into the sensor support.

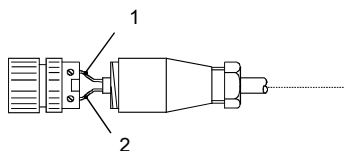


Fig. 3 Electrical connection of amperometric gas sensor

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Pos.	Description
1	Brown (+)
2	White (-)

8.2.2 Potentiostatic gas sensors in combination with Conex® DIA-G

1. Take the sensor element (1) out of the packaging.
2. Read the sensor slope of the sensor element (indicated by an arrow in fig. 4), and note it for later adjustment of the gas warning device.
3. **Caution:** Remove the short-circuit jumper (2) from the sensor element (1). See fig. 4.

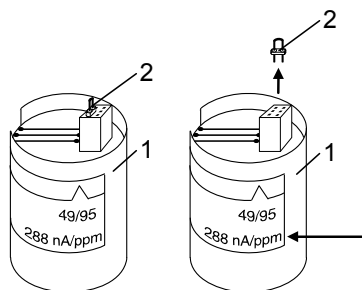


Fig. 4 Removing the short-circuit jumper

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Pos.	Description
1	Sensor element
2	Short-circuit jumper

4. Unscrew the union nut (3) at the sensor support (4). See fig. 5.
5. Check that the sealing insert (5) is fitted correctly.
6. Plug the sensor element (1) into the support (4).
7. Tighten the union nut (3) by hand.

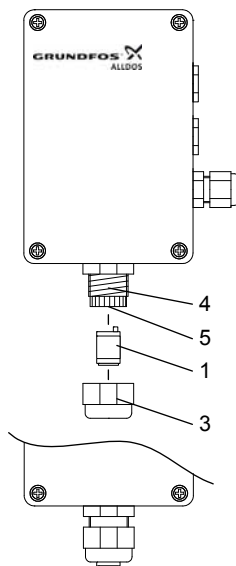


Fig. 5 Fitting the sensor in the sensor interface

Pos.	Description
1	Sensor element
3	Union nut
4	Sensor support
5	Sealing insert

Note

Maximum cable length between the sensor interface and Conex® DIA-G: 500 m.

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8.3 Installing the sensors

8.3.1 Amperometric gas sensors

1. Attach the supplied mounting accessories to the wall so that the sensor is placed about 30 cm above the ground. See fig. 6.
2. Mount the sensor.
 - The sensor element must point downwards.

8.3.2 Potentiostatic gas sensors

- Install the sensor interface in the following way. See fig. 6.
 - For Cl_2 , ClO_2 , O_3 , HCl : about 30 cm above the ground.
 - For NH_3 : about 30 cm below the ceiling.
 - The sensor element must point downwards.

For installation procedure, see installation and operating instructions for Conex[®] DIA-G.

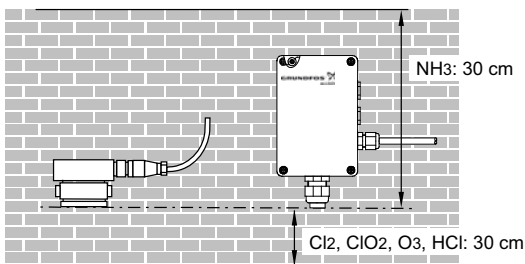


Fig. 6 Mounting the sensor

9. Electrical connections



Warning

Observe the local safety regulations!
Protect the cable connections and plugs from corrosion and moisture.

Observe the installation and operating instructions for the Conex[®] DIS-G or Conex[®] DIA-G gas warning device.

Caution

To ensure electromagnetic compatibility (EMC), the input and current output cables must be screened. The screen must be earthed. Connect the screen to earth on one side only.

- Connect the screen at one end to PE (Protective Earth). Refer to the connection diagram. See installation and operating instructions or the terminal cover of the Conex[®] DIS-G or Conex[®] DIA-G.
- Connect the sensor or sensor interface to Conex[®] DIS-G or Conex[®] DIA-G.

10. Operation

Caution

The sensor needs to be replaced after a gas eruption exceeding the measuring range. Do not expose the sensor to a higher gas concentration, not even during start-up and test.

10.1 Function

The gas sensors are designed for monitoring the concentrations of chlorine (Cl_2), chlorine dioxide (ClO_2), ozone (O_3), ammonia (NH_3) or hydrochloric acid (HCl) together with the microprocessor-based Conex[®] DIS-G or Conex[®] DIA-G gas warning device.

In the sensor, an electric current is produced by an electrochemical reaction with the gas. The electric current is amplified and monitored by Conex[®] DIS-G or Conex[®] DIA-G.

In case of a too high gas concentration, the warning and safety equipment will be activated (via the output of the Conex[®] DIS-G or Conex[®] DIA-G).

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11. Fault finding

Note

For faults during the measurement and for displayed faults, see installation and operating instructions for Conex[®] DIS-G or Conex[®] DIA-G!

Fault	Cause	Remedy
1. Display of Conex [®] DIS-G or Conex [®] DIA-G permanently at zero.	a) Open circuit in cable between sensor and gas warning device.	Check the connection cable and make the connection.
2. Measured-value display of Conex [®] DIS-G or Conex [®] DIA-G unsteady.	a) Interferences on cable from sensor.	Check that the screen is properly connected.
	b) Sensor faulty.	Replace the sensor.
3. Sensor error when Conex [®] DIS-G or Conex [®] DIA-G is switched on.	a) Sensor not connected.	Connect the sensor.
	b) Cable faulty.	Replace the cable.
	c) Sensor faulty.	Replace the sensor.

12. Maintenance



Warning

Maintenance must only be carried out by authorised personnel!

12.1 Amperometric sensors

Replacement of sensor disc

See also section 6.1.

The sensor disc must be replaced

- after the expected life of the sensor element
- after a gas eruption that has exceeded the measuring range
- in case of damage.

A "Change sensor" message is displayed in Conex[®] DIA-G after the expected life if the date of the sensor installation was confirmed. For further details about the "Change sensor" message, see installation and operating instructions for Conex[®] DIA-G.

12.2 Potentiostatic sensors

Replacement of sensor element

See also section 6.2.

The potentiostatic sensor must be replaced

- after the expected life of the sensor element
- after a gas eruption that has exceeded the measuring range
- in case of damage.

A "Change sensor" message is displayed in Conex[®] DIA-G after manufacturing date + maximum storage time + expected life. For further details about the "Change sensor" message, see installation and operating instructions for Conex[®] DIA-G.

13. Spare parts

Amperometric gas sensors for Cl₂, ClO₂ and O₃

Product number	Description
91835237 (314-011)	Amperometric sensor for Cl ₂ , ClO ₂ , complete with wall support
96687714 (314-013)	Amperometric sensor for O ₃ , complete with wall support
91835823 (553-1011)	Spare sensor disc for Cl ₂ , ClO ₂
96688728 (553-1000)	Spare sensor disc for O ₃

Potentiostatic gas sensors for Cl₂, ClO₂, O₃, NH₃ and HCl

Product number	Description
96732268 (314-021)	Cl ₂ gas sensor without sensor interface
95700843 (314-021-10001)	Cl ₂ gas sensor with sensor interface
95700837 (314-041)	ClO ₂ gas sensor without sensor interface
95700844 (314-041-10002)	ClO ₂ gas sensor with sensor interface
95700838 (314-071)	O ₃ gas sensor without sensor interface
95700845 (314-071-10000)	O ₃ gas sensor with sensor interface
95700839 (314-031)	NH ₃ gas sensor without sensor interface
95700846 (314-031-10001)	NH ₃ gas sensor with sensor interface
95700840 (314-061)	HCl gas sensor without sensor interface
95700842 (314-061-10000)	HCl gas sensor with sensor interface

14. Disposal

This product or parts of it must be disposed of in an environmentally sound way. Use appropriate waste collection services. If this is not possible, contact the nearest Grundfos company or service workshop.

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