Conex® DIA-G

Gas warning controller

Installation and operating instructions

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Original installation and operating instructions

CONTENTS

Warning

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

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

1. Symbols used in this document

Warning

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

Caution

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

Note

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

2. Device settings

Note the key settings for the Conex® DIA-G.

Note: The set values can be stored in the "Setup / Factory setting" menu so that you can access them again later.

Setup

Sensor 1

- ☐ Off
- ☐ Cl_2 sensor 91835237 (314-011)
- ☐ Cl_2 sensor 96732268 (314-021)
- ☐ ClO_2 sensor 95700837 (314-041)
- ☐ ClO_2 sensor 91835237 (314-011)
- ☐ O_3 sensor 95700838 (314-071)
- ☐ O_3 sensor 96687714 (314-013)
- ☐ HCl sensor 95700840 (314-061)
- ☐ NH_3 sensor 95700839 (314-031)

Sensor 2

- ☐ Off
- ☐ Cl_2 sensor 91835237 (314-011)
- ☐ Cl_2 sensor 96732268 (314-021)
- ☐ ClO_2 sensor 95700837 (314-041)
- ☐ ClO_2 sensor 91835237 (314-011)
- ☐ O_3 sensor 95700838 (314-071)
- ☐ O_3 sensor 96687714 (314-013)
- ☐ HCl sensor 95700840 (314-061)
- ☐ NH_3 sensor 95700839 (314-031)

Limit relay

Fail safe

- ☐ On (N.C.)
- ☐ Off (N.O.)

Confirm. LV 2

- ☐ Yes
- ☐ No

Alarm relay

Fail safe

- ☐ On (NC)
- ☐ Off (NO)

Confirmation

- ☐ Yes
- ☐ No

Alarm sensor 1

Limit value 1

- ☐ On
- ☐ Off

Limit value 2

- ☐ On
- ☐ Off

Test sensor

- ☐ On
- ☐ Off

Alarm sensor 2

Limit value 1

- ☐ On
- ☐ Off

Limit value 2

- ☐ On
- ☐ Off

Test sensor

- ☐ On
- ☐ Off

Current output

Sensor 1

☐ 0-20 mA
☐ 4-20 mA
☐ Others:

Assignment

_____ min. ppm =
_____ mA
_____ max. ppm =
_____ mA

Current output

Sensor 2

☐ 0-20 mA
☐ 4-20 mA
☐ Others:

Assignment

_____ min. ppm =
_____ mA
_____ max. ppm =
_____ mA

Sensor 1

Auto. test S1

☐ Off
☐ On
_____ days testing interval

Limit value 1

☐ Off
☐ On
_____ ppm

Limit value 2

☐ Off
☐ On
_____ ppm
_____ sec delay

Limit value 1/2

_____ ppm hysteresis

Alarm S1

☐ Off
☐ On
_____ sec delay

Sensor 2

Auto. test S2

☐ Off
☐ On
_____ days testing interval

Limit value 1

☐ Off
☐ On
_____ ppm

Limit value 2

☐ Off
☐ On
_____ ppm
_____ sec delay

Limit value 1/2

_____ ppm hysteresis

Alarm S2

☐ Off
☐ On
_____ sec delay

2.1 Sensor types

Sensor type	Measuring parameter	Sensor
Amperometric sensor (disc)	Cl_2, ClO_2	91835237 (314-011)
	O_3	96687714 (314-013)
Potentiostatic sensor	Cl_2	96732268 (314-021)
	NH_3	95700839 (314-031)
	ClO_2	95700837 (314-041)
	HCl	95700840 (314-061)
	O_3	95700838 (314-071)

3. General information

These installation and operating instructions contain all information important for users of the Conex® DIA-G gas warning controller.

- 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.

4. Applications

The Conex® DIA-G gas warning controllers are used to evaluate suitable sensors for monitoring the concentration of chlorine (Cl_2), chlorine dioxide (ClO_2), ozone (O_3), ammonia (NH_3) or hydrochloric acid (HCl) and to trigger warning and protective systems in the framework of the possible uses described in this manual with the sensor types listed here.

Caution

The Conex® DIA-G cannot be used for measuring a gas concentration continuously or for control according to the German MAK standard regarding maximum allowable concentration. Use only calibrated gas measuring devices for measuring gas concentration.

Ensure a sufficient safety level when setting the limit values for the Conex® DIA-G.

Warning

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

5. Safety

This manual contains general instructions that must be observed during installation, operation and maintenance. This manual must therefore be read by the installation engineer and the relevant qualified personnel/operators prior to installation and start-up and must be available at the installation location of the Conex® DIA-G at all times.

It is not only the general safety instructions described in this section *5. Safety* that must be observed, but all special safety instructions that are provided in the other sections.

5.1 Risks when safety instructions are not observed

If safety instructions are not observed, it may result in personal injury or damage to the Conex® DIA-G. If safety instructions are not observed, this may lead to the loss of any claims for damages.

If individual safety instructions are not observed, this may cause for example the following damage:

- failure of specified methods for recording gas concentrations and secondary safety equipment
- harm to humans from exposure to electrical, mechanical and chemical influences.

5.2 Obligations of the owner/operations manager

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

- They are acquainted with the regulations concerning working safety and accident prevention.
- They have been trained in use of the device.
- 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 device and is always available for the operating personnel and that the local safety regulations are observed when setting the limit values for the sensors.

5.3 Avoidance of danger

Warning

Do not use the device for monitoring constant concentrations. The device is designed for detecting leaks.

Warning

Installation and connection of the device and the associated supplementary components must only be carried out by qualified specialists!

The local safety regulations must be observed!

Warning

Switch off the power supply before connecting the power supply cable and relay contacts!

Do not dismantle the device! Maintenance and repairs must only be carried out by authorised specialists!

Caution

The mounting location must be selected so that the housing is not subjected to mechanical loading.

Check that all settings are correct before starting up the device!

5.3.1 Safety instructions for the operator

Damage caused by electrical energy must be prevented. For more details, see for example the regulations of the VDE, German Association for Electrical, Electronic and Information Technologies, and the local power supply company.

5.3.2 Safety instructions for maintenance, inspection and installation work

The operator is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorised and qualified personnel, who have been adequately trained by reading the installation and operating instructions.

All safety and protective equipment must be immediately restarted or put into operation once work is complete.

Observe the points described in the initial start-up section prior to subsequent start-up.

6. Identification

6.1 Nameplate

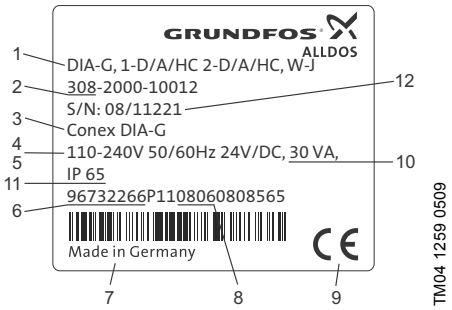

Fig. 1 Nameplate, Conex® DIA-G

Pos.	Description
1	Type designation
2	Model
3	Product
4	Voltage [V]
5	Frequency [Hz]
6	Product number
7	Country of origin
8	Year and week of production
9	Marks of approval, CE mark, etc.
10	Power consumption [VA]
11	Enclosure class
12	Serial number

6.2 Type key, gas warning controllers

Example: DIA-G, 1-D/A/HC 2-D/A/HC, W-J

Example:		DIA-G	1-D/A/HC	2-D/A/HC	W	-J
Conex® gas warning system						
DIA-G	Dosing Instrumentation Advanced with gas detection					
Sensor 1						
D	Chlorine gas/chlorine dioxide gas/ozone gas					
A	Ammonia gas					
HC	Hydrochloric acid gas					
Sensor 2						
D	Chlorine gas/chlorine dioxide gas/ozone gas					
A	Ammonia gas					
HC	Hydrochloric acid gas					
Mounting						
W	Wall-mounted					
P	Panel-mounted					
Voltage						
G	1 x 230/240 V, 50/60 Hz					
H	1 x 115/120 V, 50/60 Hz					
J	110-240 V, 50/60 Hz, 24 VDC					

6.3 Type key, gas warning systems, prepacked (with sensors and sensor equipment)

Example: DIA-G-P, CLP-OP-B, W-J

Example:	DIA-G	-P.	CLP-	OP-	B.	W	-J
Conex® gas warning system							
DIA-G	Dosing Instrumentation Advanced with gas detection						
P	Prepacked						
Sensor 1							
CCA	Chlorine gas/chlorine dioxide gas, amperometric measurement						
OA	Ozone gas, amperometric measurement						
CLP	Chlorine gas, potentiostatic measurement						
CDP	Chlorine dioxide gas, potentiostatic measurement						
OP	Ozone gas, potentiostatic measurement						
AP	Ammonia gas, potentiostatic measurement						
HCP	Hydrochloric acid gas, potentiostatic measurement						
Sensor 2							
CCA	Chlorine gas/chlorine dioxide gas, amperometric measurement						
OA	Ozone gas, amperometric measurement						
CLP	Chlorine gas, potentiostatic measurement						
CDP	Chlorine dioxide gas, potentiostatic measurement						
OP	Ozone gas, potentiostatic measurement						
AP	Ammonia gas, potentiostatic measurement						
HCP	Hydrochloric acid gas, potentiostatic measurement						
Option							
B	Battery backup						
X	No battery backup						
Mounting							
W	Wall-mounted						
P	Panel-mounted (not available at the moment)						
Voltage							
G	1 x 230/240 V, 50/60 Hz						
H	1 x 115/120 V, 50/60Hz						
J	110-240 V, 50/60 Hz, 24 VDC						

7. Product description and accessories

This universal device offers high-precision measuring of chlorine, chlorine dioxide, ozone, ammonia or hydrochloric acid.

- comprehensive limit value functions
- comprehensive alarm functions
- logbook function: chronological recording of key events with date and time
- user coding function as a means of protection against access by unauthorised persons and for system administration
- error message function for indication of non-functioning sensors
- automatic monitoring of the sensor service life with warnings about sensors that require renewal.

7.1 General description

The Conex® DIA-G is a gas warning controller for monitoring gas concentrations, for example in storage or dosing rooms. With a maximum of two independently connected sensors, the gas concentration of chlorine, ozone, chlorine dioxide, hydrochloric acid or ammonia can be displayed and monitored. Amperometric sensors (sensor discs) can be connected directly to the Conex® DIA-G, and potentiostatic sensors can be connected to a preceding Conex® DIA-G sensor interface.

Each of the two sensors is provided with electrically isolated current outputs (potential-free to power supply) to output the measured concentration, two electrically isolated limit value transmitters and an alarm relay to control the warning and safety equipment.

The Conex® DIA-G meets the high safety requirements through permanent sensor monitoring, alarm relays and optional backup mode (connection of an external backup battery for supplying power to the Conex® DIA-G in case of short-term power supply interruptions).

How the system operates

- The gas sensors generate a current which is proportional to the gas concentration in the air.
- The Conex® DIA-G gas warning controller
  - amplifies the sensor current
  - triggers an initial warning, for example when the first limit value is exceeded
  - activates the relevant warning and safety equipment when the second limit value is exceeded
  - outputs the measured concentration at both sensors as a 0 (4) - 20 mA signal via the current outputs (for example for recording).

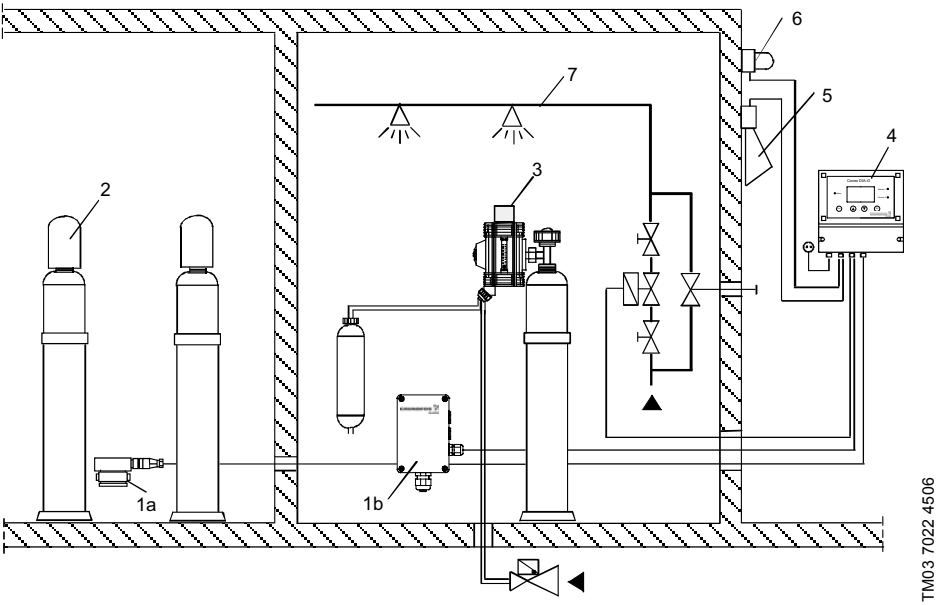

Fig. 2 Gas warning system

Pos.	Description
1a	Amperometric gas sensor
1b	Potentiostatic gas sensor with Conex® DIA-G sensor interface
2	Gas container
3	Gas dosing unit
4	Conex® DIA-G gas warning controller
5	Horn
6	Flashing warning system
7	Sprinkling installation

The complete gas warning system comprises:

- gas sensors in the gas container and gas dosing unit area
- the Conex® DIA-G gas warning controller
- warning and safety equipment: horn, flashing warning system, sprinkling installation.

7.2 Dimensional sketches

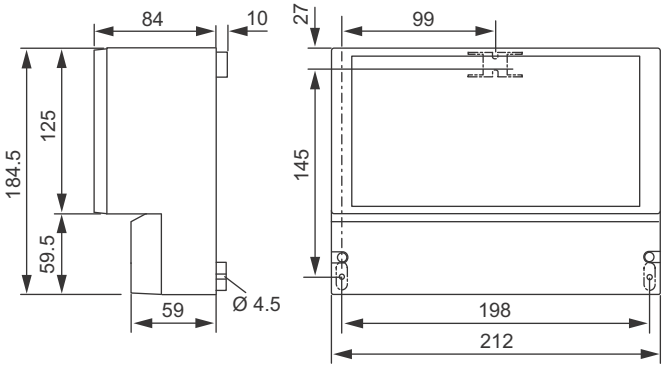

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Fig. 3 Conex® DIA-G

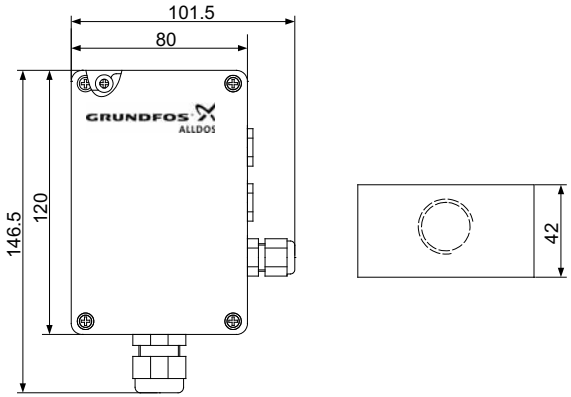

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Fig. 4 Conex® DIA-G sensor interface

8. Technical data

Caution Observe the permissible temperature range of the sensors!

Note Observe the accuracy of the sensor!

Electronics	16-bit microprocessor technology
Display	Backlit plain-text display
Display languages	German, English, French, Spanish, Russian and Polish
Indication mode	In ppm for measured values of both sensors
Permissible temperatures	Conex® DIA-G and sensor interface (without sensor): • operation: 0 to +40 °C • storage: 0 to +65 °C
Permissible relative air humidity	Maximum 90 % at 40 °C (no condensation)
Power supply	• 110-240 V - 10 %/+ 10 % (50/60 Hz) • 24 VDC
Power consumption	Approximately 30 VA
Material (enclosure)	ABS, resistant to chemicals
Enclosure class	IP65 for Conex® DIA-G wall-mounting enclosure and sensor interface
Weight	Approximately 1.5 kg
Connections	Screw terminals for cables up to maximum 2.5 mm^2
Safety functions	• Permanent sensor monitoring or automatic sensor test, interval between tests adjustable from 0.5 to 30 days • Wire breakage monitoring of all current outputs • Optional backup battery with backup indication on the display, allowing Conex® DIA-G to work for at least one hour after power failure • Automatic adjustment of data specific to the sensor (for example calibration data) • Display of the sensor exchange intervals with a plain-text message
Backup battery	All devices can be equipped with an external backup battery as an option. The backup battery supplies the gas warning controller, including the electrically isolated relays, but no external devices (for example signal lamp, aeration, sprinkler system, etc.). The battery lasts for about one hour after power supply failure.

8.1 Signal inputs and outputs

Relay outputs	Five potential-free relay outputs, switchable to NO (normally open) or NC (normally closed) (fail safe); maximum 250 V / 6 A, maximum 550 VA ohmic load: • two relays for the limit values of each of the two sensors • one alarm relay; free assignment to the limit values or to sensor test (see below)
Signal inputs	• Two measured value inputs (for amperometric sensors 1 and 2) • Internal CANBus, including connections for two sensor interfaces, each for the operation of one potentiostatic sensor
Signal outputs	Two potential-free current outputs (0) 4 - 20 mA, maximum load of 500 Ω, with cable breakage monitoring; assignment of 0 (4) - 20 mA to the measuring range of the selected sensor, or linear assignment of the current output (0-20 mA) to the measuring value (within the measuring range of the selected sensor)

8.2 Setting ranges for alarms / limit values

Switching point for limit values	• Limit value 1 (warning if exceeded) can be set to any value within the measuring range. • Limit value 2 (warning if exceeded) can be set to any value within the measuring range. • Limit value 2 can be delayed between 0-180 seconds. • Hysteresis: 0-50 % of measuring range. • Limit value 1 and 2 can be acknowledged. The acknowledgement is stored in a list of events.
Alarm relay	• The alarm relay can be freely assigned to the limit values and/or the sensor test. • The alarm can be delayed between 0-180 seconds.

8.3 Sensors

Amperometric sensor disc Cl_2, ClO_2 and O_3

Connection via 2-wire cable 0.5 mm^2 with single screen. Maximum length (maximum distance between the sensor disc and gas warning controller): 100 metres.

91835237 (314-011)/96687714 (314-013) include the wall housing with sensor disc.

Potentiostatic sensor Cl_2, ClO_2, O_3, NH_3, HCl

The sensor is plugged directly into the interface. The interface is connected to the gas warning controller using a 4-wire cable with single screening (special cable for CAN connections). Maximum length (maximum distance between Conex® DIA-G sensor interface and gas warning controller): 500 metres.

8.4 Measuring and setting ranges

8.4.1 Measuring parameter and working range for amperometric sensors

Measuring parameter	Measuring range	Accuracy	Temperature range	Product number
	[ppm]	[%]	[°C]	
Cl_2, ClO_2	0.00 - 5.00	± 10	+5 to +45	91835237 (314-011)
O_3	0.00 - 5.00	± 10	+5 to +45	96687714 (314-013)

8.4.2 Measuring parameter and working range for potentiostatic sensors

Measuring parameter	Measuring range	Resolution at 20 °C	Linearity	Sensitivity drift per 6 months	Temperature range	Product number
	[ppm]	[ppm]	[%] of full scale	[%]	[°C]	
Cl_2	0.00 - 20.00	< 0.05	< 5	< 10	-20 to +40	96732268 (314-021)
NH_3	0 - 100	< 1	< 10	< 5	-20 to +40	95700839 (314-031)
ClO_2	0.00 - 1.00	< 0.03	< 10	< 10	-20 to +40	95700837 (314-041)
HCl	0.0 - 30.0	< 0.7	< 5	< 3	-20 to +40	95700840 (314-061)
O_3	0.00 - 1.00	< 0.02	< 10	< 10	-20 to +40	95700838 (314-071)

Note The measuring ranges depend on the set sensors and cannot be modified.

9. Installation

Warning

Before assembling, disconnect the power supply!

Enclosure class IP65 is only guaranteed if the terminal covers are closed and the appropriate cable glands or dummy caps fitted.

9.1 Transport

Caution Risk of malfunction or damage to the Conex® DIA-G! Do not drop the device.

9.1.1 Delivery

The Conex® DIA-G is delivered in a cardboard box. Leave the device in the packaging during transport and intermediate storage.

9.1.2 Return

Return the Conex® DIA-G in its original packaging or equivalent.

Caution Risk of malfunction or damage to the Conex® DIA-G! Grundfos accepts no liability for damage caused by incorrect transportation or missing or unsuitable packaging of the device!

9.2 Intermediate storage

Permissible storage temperature: -20 °C to +65 °C.

Note For information on storing the sensors, see the manual of the gas sensors.

9.3 Unpacking

1. Check the device for damage. Install as soon as possible after unpacking.
2. Do not install or connect damaged devices!

Note Retain the packing material or dispose of it according to local regulations.

9.4 Installation requirements

Conex® DIA-G

- Dry room
- Room temperature: 0 °C to +40 °C
- Vibration-free location.

Sensors

- Dry room.
  - Avoid the sensor getting wet! Make sure to locate it outside the range of the sprinkling installation.
- Room temperature according to the technical data for the relevant sensor.
- Vibration-free location.
- Protect the sensor from direct heat, sunlight and strong draughts!

Caution The sensor must be replaced after a gas eruption that has exceeded the measuring range. Do not expose the sensor to a higher gas concentration, even during start-up and test.

Caution Gas sensors should not be mounted close to major sources of interference such as large machines, etc.

Caution If these assembly requirements are not observed, there may be damage to the measuring device or incorrect measurements!

9.5 Installation notes

Amperometric sensor discs are connected directly to the Conex® DIA-G. If potentiostatic sensors are used, one Conex® DIA-G sensor interface per sensor is required.

Maximum cable lengths:

- Amperometric sensors: 100 metres
- DIA-G sensor interface for potentiostatic sensors (CANBus connection): 500 metres.

9.6 Installation of the Conex® DIA-G

Warning

Switch off the power supply before installing!

Enclosure class IP65 is only guaranteed if the terminal covers are closed and the appropriate cable glands or dummy caps fitted.

1. Drill three holes (∅8 mm) as shown in the diagram, and insert the supplied dowels.
2. Unscrew the terminal cover on the device.
3. Tighten the upper middle screw (A).
4. Place the device on this screw (A).
5. Secure the device through the enclosure using the two other screws (B).
6. Replace the terminal cover.

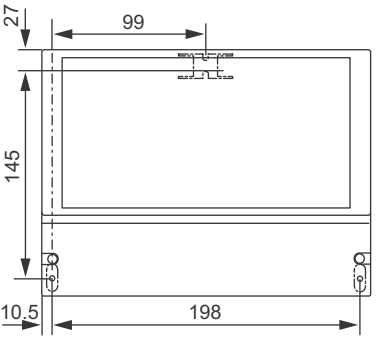

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Fig. 5 Drilling diagram of the Conex® DIA-G

Caution

Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed!

Do not damage the terminal cover gasket!

The terminal cover gasket must fit exactly!

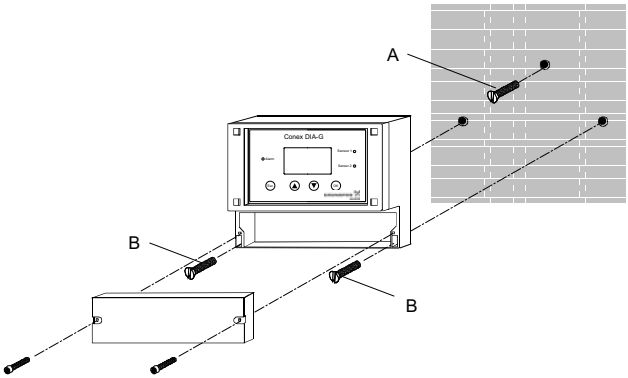

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Fig. 6 Mounting drawing

9.7 Assembling the Conex® DIA-G sensor interface

If potentiostatic sensors are used, a separate Conex® DIA-G sensor interface must be installed.

Warning

Switch off the power supply before installing!

Enclosure class IP65 is only guaranteed if the terminal covers are closed and the appropriate cable glands or dummy caps fitted.

1. Drill four holes (∅6 mm) as shown in the diagram, and insert the supplied dowels.

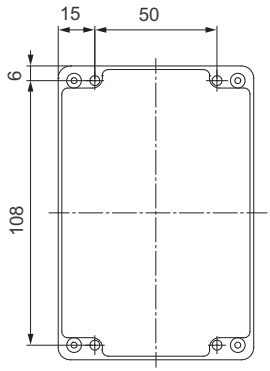

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Fig. 7 Drilling diagram of Conex® DIA-G sensor interface

2. Unscrew the device cover.
3. Secure the device with the four supplied screws.
4. Replace the device cover.

Caution

Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed!

Do not damage the terminal cover gasket!

The terminal cover gasket must fit exactly!

10. Commissioning/electrical connections

Warning

Switch off the power supply before installing!

Enclosure class IP65 is only guaranteed with the front panel of the terminals enclosure closed and with appropriate cable glands or dummy caps.

Warning

Disconnect the power supply before connecting the power supply cable and the relay contacts! For safety reasons, the protective conductor must be connected correctly!

Observe the local safety regulations!

Protect the cable connections and plugs against corrosion and humidity.

Before connecting the power supply cable, check that the supply voltage specified on the nameplate corresponds to the local conditions!

An incorrect supply voltage may destroy the device!

Caution

To guarantee electromagnetic compatibility (EMC), the input and current output cables must be screened.

Connect the screening to the screen ground on one side!

Refer to the wiring diagram! Route the input, current output and power supply cables in separate cable channels.

Caution

Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed! Do not damage the gasket on the terminal cover!

The terminal cover gasket must fit exactly!

Note

Unused terminals must remain open.

1. Remove the terminal cover on the front of the device.
2. Use the appropriate cable entries, and tighten the screws carefully.
3. Connect the cables used to the terminals according to the Conex® DIA-G terminal assignment.
4. Close the terminal cover again with correctly positioned gasket.

10.1 Conex® DIA-G terminal assignment

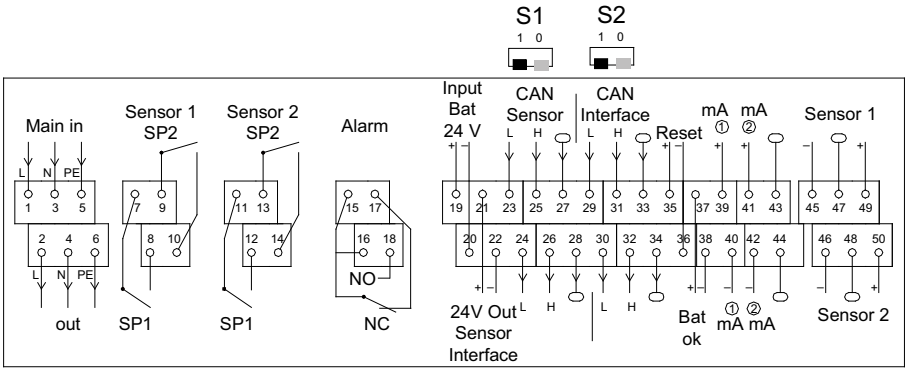


Fig. 8 Conex® DIA-G terminal

Key for Conex® DIA-G terminal diagram

Assignment		Terminal	Description
Main in	L	1	Power supply connection
	N	3	
	PE	5	
Main out	L	2	Supply for electrically isolated contacts
	N	4	
	PE	6	
Sensor 1/SP 1		7, 8	Limit value relay (setpoint) 1, sensor 1
Sensor 1/SP 2		9, 10	Limit value relay (setpoint) 2, sensor 1
Sensor 2/SP 1		11, 12	Limit value relay (setpoint) 1, sensor 2
Sensor 2/SP 2		13, 14	Limit value relay (setpoint) 2, sensor 2
Alarm	NO	18	Alarm relay with terminal 15, 16 and terminal 18: normally open contact, or terminal 17: normally closed contact
	NC	17	
		15, 16	
Input Bat 24 V	+	19	Input for external battery supply (UPS)
	-	20	
24 V Out Sensor Interface	+	21	24 V supply output for sensor interface
	-	22	
CAN sensor (sensor interface connection)	L	23, 24	Terminal 23: input... or terminal 24: output...
	H	25, 26	Terminal 25: input... or terminal 26: output...
	Screen	27, 28	Terminal 27: input... or terminal 28: output...
CAN interface (CANBus connection)	L	29, 30	Terminal 29: input... or terminal 30: output...
	H	31, 32	Terminal 31: input... or terminal 32: output...
	Screen	33, 34	Terminal 33: input... or terminal 34: output...
Reset	+	35	External alarm acknowledgement using switching contact
	-	36	

Assignment		Terminal	Description
Bat ok	+	37	Battery backup: working
	-	38	
mA	+	39	Analog output sensor 1
	-	40	
	⏀ Screen	43	
mA	+	41	Analog output sensor 25
	-	42	
	⏀ Screen	44	
Sensor 1	-	45	Connection for amperometric sensor 1
	⏀ Screen	47	
	+	49	
Sensor 2	-	46	Connection for amperometric sensor 2
	⏀ Screen	48	
	+	50	
S1			Selection switch for sensor interface termination resistor
	1		Position 1: On
	0		Position 0: Off
S2			Selection switch for CAN interface termination resistor
	1		Position 1: On
	0		Position 0: Off

10.2 Power supply connection

Caution

Before connecting, check that the values for the supply voltage and frequency correspond to the values on the nameplate.

Voltage supply for Conex® DIA-G at 110-240 V:

- Connect the protective conductor (PE) to terminal 5.
- Connect the neutral conductor (N) to terminal 3.
- Connect the phase (L1) to terminal 1.

Voltage supply for Conex® DIA-G at 24 VDC:

- Connect + to terminal 19.
- Connect - to terminal 20.

Note

Switch the device on and off by switching the power supply on and off accordingly. The device itself is not equipped with a separate on/off switch.

Voltage supply for electrically isolated relay contacts:

- Connect the protective conductor (PE) to terminal 6.
- Connect the neutral conductor (N) to terminal 4.
- Connect the phase (L1) to terminal 2.

10.3 Connecting a backup battery

Voltage supply via backup battery:

- Connect + to terminal 19.
- Connect - to terminal 20.

Backup battery monitoring function:

- Connect + to terminal 37.
- Connect - to terminal 38.

10.4 Relay outputs

Note

The connection of the relay outputs depends on the application and the final control elements used.
Therefore the connections described below should only be considered as guidelines.

With inductive loads (including relays and contactors), interference suppression is necessary. If this is not possible, protect the relay contacts using a suppressor circuit as described below.

- With AC voltage:

Current up to	Capacitor C	Resistor R
60 mA	10 µF, 275 V	390 Ω 2 W
70 mA	47 µF, 275 V	22 Ω, 2 W
150 mA	100 µF, 275 V	47 Ω, 2 W
1.0 A	220 µF, 275 V	47 Ω, 2 W

- With DC voltage: Connect the free-wheeling diode in parallel to relay or contactor.

Caution

Provide the relay outputs with a corresponding backup fuse!

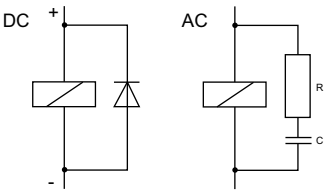


Fig. 9 Suppressor circuit DC/AC

10.5 Current output

Caution

Ensure correct polarity! Maximum load: 500 Ω.

The current output can be set to one of the two standard ranges "0-20 mA" or "4-20 mA", or it can be freely adjusted.

- Connect the screen to earth (PE) at one end.

Output 1: sensor 1

This current output emits the displayed measured value as an analog current signal.

Use of current signal for measured values:

- As input signal for another indicator.

1. Connect the + conductor to terminal 39.
2. Connect the - conductor to terminal 40.

Output 2: sensor 2

This current output emits the displayed measured value as an analog current signal.

Use of current signal for measured values:

- As input signal for another indicator

1. Connect the + conductor to terminal 41.
2. Connect the - conductor to terminal 42.

10.6 Terminal assignment for Conex® DIA-G sensor interface

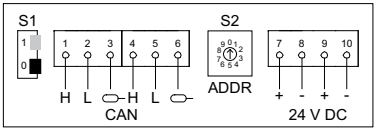


Fig. 10 Conex® DIA-G sensor interface terminal

Key for Conex® DIA-G sensor interface terminal diagram

Assignment		Terminal	Description
CAN	H	1	CAN connection to DIA-G (sensor)
	L	2	CAN connection to DIA-G (sensor)
	Screen	3	Screen connection (CAN)
CAN	H	4	CAN connection to DIA-G (sensor)
	L	5	CAN connection to DIA-G (sensor)
	Screen	6	Screen connection (CAN)
S1			Selection switch for sensor interface termination resistor
	1		Position1: On
	0		Position0: Off
S2	ADDR		Selection switch for CAN address
24 VDC	+	7	Voltage input, 24 VDC, from Conex® DIA-G
	-	8	
	+	9	
	-	10	

10.7 Connection of sensors

Caution Connect the screening to screen ground on one side only!

10.7.1 Amperometric sensors

Connection via 2-wire cable 0.5 mm^2 with single screen. Maximum length (maximum distance between the sensor disc and gas warning controller): 100 metres.

Cables for amperometric gas sensors

Description	Product number
Connection cable for amperometric gas sensors, 10 metres	96725670 (321-130/10)
Connection cable for amperometric gas sensors, 20 metres	96725672 (321-130/20)
Connection cable for amperometric gas sensors, 50 metres	96725673 (321-130/50)

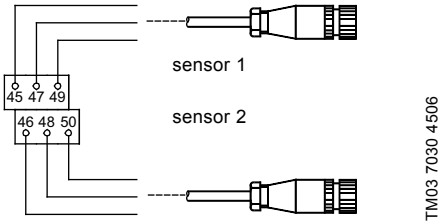


Fig. 11 Connection of amperometric sensor

Assignment		Terminal	Wire
Sensor 1	-	45	white
	⬭	47	screen
	+	49	brown
Sensor 2	-	46	white
	⬭	48	screen
	+	50	brown

The wire colours refer to Grundfos cable.

Sensor 1:

- Connect the brown wire (+) to terminal 49.
- Connect the white wire (-) to terminal 45.
- Connect the screen to terminal 47.

Sensor 2:

- Connect the brown wire (+) to terminal 50.
- Connect the white wire (-) to terminal 46.
- Connect the screen to terminal 48.

10.7.2 Potentiostatic sensors

The sensor is plugged directly into the interface. The interface is connected to the gas warning controller using a 4-wire cable with single screening (special cable for CAN connections). Maximum length (maximum distance between Conex® DIA-G sensor interface and gas warning controller): 500 metres.

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)

Connection example 1:

Note

In this example, the termination resistors on the Conex® DIA-G and at sensor interface 2 must be set to 1 = On.

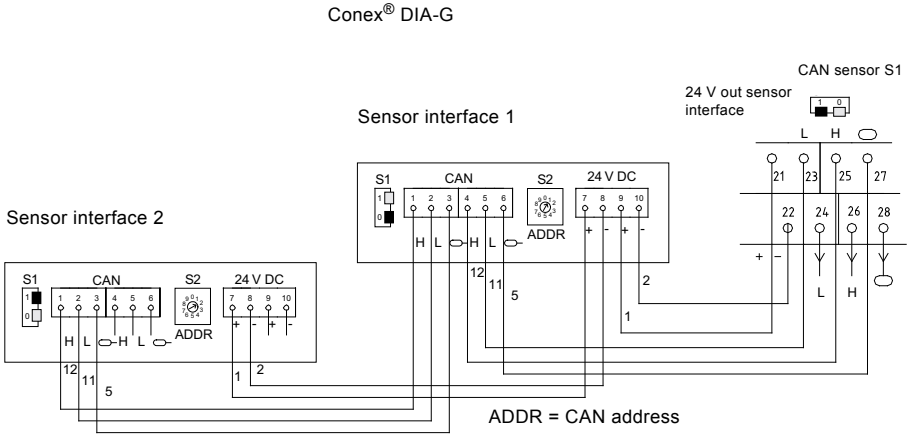


Fig. 12 Connection example 1

Caution

Connect the screening to screen ground on one side only!

Connection example 2:

Note

In this example, the termination resistors at both sensor interfaces must be set to 1 = On.

Terminals 21 and 22 on the Conex® DIA-G have two cables. Twin ferrules must be used for connections at these terminals.

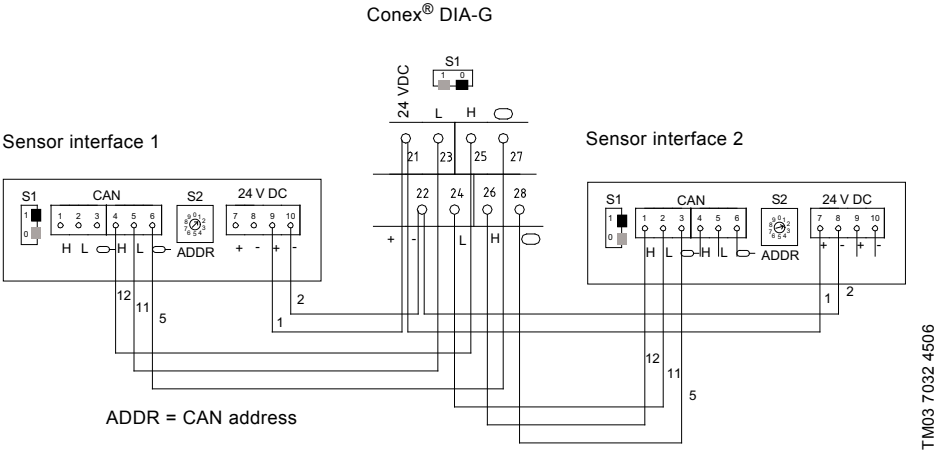


Fig. 13 Connection example 2

Caution

Connect the screening to screen ground on one side only!

Pos.	Component
1	Brown
2	White
5	Screen
11	Yellow
12	Green

The wire colours refer to the Grundfos cable.

Sensor interface 1:

Signal and screen:

- H: Connect the green wire to terminal 25.
- L: Connect the yellow wire to terminal 23.
- Screen: Connect the screen to terminal 27.

Voltage supply:

- Connect the brown wire (+) to terminal 21.
- Connect the white wire (-) to terminal 22.

Addressing:

- The sensor interface address is specified on the round selection switch for the CAN address (S2 ADDR) as follows:
  - Sensor interface 1: address 1
  - Sensor interface 2: address 2
- Set the address by turning the switch using a small screwdriver

Termination resistor:

- Termination resistors ensure fault-free measurement for the sensors via the CAN interface. The termination resistor (S1) is fitted on the last devices in the row and set to 1 = On.

Note

A second sensor interface can be connected either to the Conex® DIA-G or to the first sensor interface. See the connection examples.

11. Operation

11.1 Initial start-up

Caution

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

Note

If a sprinkling installation is connected, first shut off the water supply. On initial start-up, the relevant limit value may be exceeded during the sensor start-up routine, which could trigger the sprinkling installation.

Preparations for start-up

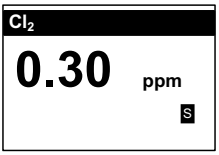
1. Check that all electrical connections are correct.
2. Switch on the power supply.
3. Familiarise yourself with the operation of the Conex® DIA-G.
4. Make all necessary settings, and note them down.
5. Check that all settings are correct.
6. Check that all connected warning and safety equipment is ready for operation.
   – The device is now ready for operation.

Gas sensor start-up

1. Connect the sensors before switching on the device.
2. By default, the device starts with the following settings:
   – Sensor 1: Cl_2 sensor 91835237 (314-011) (amperometric gas sensor)
   – Sensor 2: "Off".
3. During setup, select the sensors used:
   – Main menu
   – Setup
   – Sensor 1 or 2.

- If you are using amperometric sensors, select the "New sensor" menu in the sensor menu. This indicates to the device that a new sensor is being used. The installation and replacement data in the "Sensor data" service menu are updated automatically. At the end of the sensor's service life, the device will show the message "Warning Sensor change".
  – Main menu
  – Sensor 1 or 2
  – New sensor.
- If you are using potentiostatic sensors, the device detects automatically that a new sensor is being used. The sensor data is read and can be viewed in the service menu under "Sensor data".

On the display, the icon "S" appears in inverted format as soon as a sensor interface is connected and detected by the Conex® DIA-G:



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11.2 Control and display elements

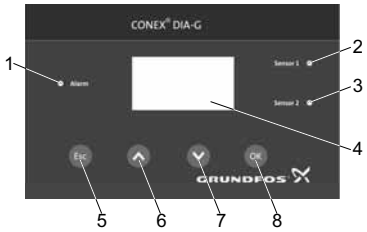

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Fig. 14 Conex® DIA-G control panel

Pos.	Description
Display elements	
1	Red alarm LED • Flashes in case of faults or incorrect entries.
2	Red sensor 1 LED • Flashes or lights up when a limit value is exceeded for sensor 1.
3	Red sensor 2 LED • Flashes or lights up when a limit value is exceeded for sensor 2.
4	Display
Operating button	
5	[Esc] button • Returns to the previous menu. • The data which were entered last are not changed.
6	[Up] button • Moves one line upward (the selected line is displayed inversely). • Increases values.
7	[Down] button • Moves one line downward (the selected line is displayed inversely). • Decreases values.
8	[OK] button • Enters the selected menu. • Confirms the selected line or value.

11.3 Operating modes

- Display mode: This is the standard operating mode. The device automatically starts up in this operating mode. In this operating mode it is possible to:
  - read current measured values
  - read error messages
  - acknowledge messages.
- Menu mode: You can change to this mode by pressing [OK]. In this operating mode you can access various submenus in order to make device settings, carry out tests, display data, etc. You can return to the display mode from any menu by pressing [Esc].

11.4 Display elements during initial commissioning

On initial start-up, the "Language" selection menu appears once the power supply has been switched on, directly after the initial display.

Sprache..Language..
Deutsch
English
Español
Français

- The word "Language" appears in the header in each of the available languages, changing about once every second.

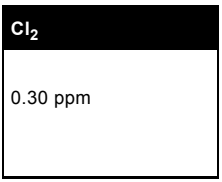
Start the device by selecting the relevant operating language:

1. Press the [Up] or [Down] button to select the desired language.
   - The selected language is displayed in inverted format (white on black).
2. Confirm using [OK].

Note The selected language remains set for any subsequent device start-up and can be changed again, if necessary, via the "Setup" and "Language" selection menus (these menus will be shown in the previously selected language). See section *11.8.1 Selecting the operating language*.

Once the language selection has been confirmed using [OK], the measured value for the measured variable "Chlorine" appears on initial start-up.

On subsequent start-ups, the last selected measured variable appears in the display.



11.5 Operating instructions

11.5.1 Navigation in the menus

The operating keys are used for navigation in the menus.

Press [OK] to access the main menu from the display menu or to select the highlighted submenu from other menus (row is in inverted format).

Within selection lists (submenus or settings), press the [Up] and [Down] buttons for navigation.

Press [Esc] to exit the current menu and move to the previous menu.

Note

When scrolling (using the [Up] or [Down] button), the submenus above/below are displayed.

11.5.2 Selecting and confirming settings

Numerical values such as limit values can be increased and decreased using the [Up] and [Down] buttons.

[OK] confirms the set value or the selection.

[Esc] exits the menu, and unconfirmed values are not saved.

11.5.3 Display

Note

Apart from in the display level, the display is generally in 5-line format.

Note

Menu selection "Sensor 1" or "Sensor 2" for parameterisation is displayed depending on the preselection in the "Setup" menu.

Memory display on changes

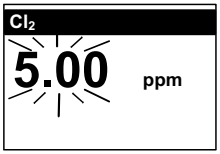
If settings are changed in the submenus, this is displayed within the relevant submenu on closing or exiting this submenu.

This message is only displayed if changes are implemented. It does not apply to the repeated display of settings that have already been made and are not changed.

Measuring range exceeded

When a value exceeds the selected measuring range, the display of the measured value remains at the upper or lower measured value limit, and the measured value flashes on the display.

See section *8.4 Measuring and setting ranges*.



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11.6 Software overview

11.6.1 "Setup" menu

Main menu > Setup			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Language	German		
	English		
	Spanish		
	French		
	Russian		
	Polish		
Sensor 1	Off		
	Chlorine 314-011		
	Chlorine 314-021		
	ClO_2 314-041		
	ClO_2 314-011		
	Ozone 314-071		
	Ozone 314-013		
	HCl 314-061		
	NH_3 314-031		
Sensor 2	Off		
	Chlorine 314-011		
	Chlorine 314-021		
	ClO_2 314-041		
	ClO_2 314-011		
	Ozone 314-071		
	Ozone 314-013		
	HCl 314-061		
	NH_3 314-031		
Limit relay	Fail safe	On (N.C.)	
		Off (N.O.)	
	Confirm. LV 2	Yes	
		No	

Main menu > Setup			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Alarm relay	Fail safe	On (N.C.)	
		Off (N.O.)	
	Confirmation	Yes	
		No	
	Sensor 1	Limit value 1 (S1)	on
			off
		Limit value 2 (S1)	on
			off
		Test sensor	on
			off
	Sensor 2	Limit value 1 (S2)	on
			off
		Limit value 2 (S2)	on
			off
		Test sensor	on
			off
Battery backup	Off		
	N.O. contact		
	N.C. contact		
Date/time	Time		
	Date		
	Daylight sav.t.	Start	Time
			Date
		End	Time
			Date
		Time shift	+ 1/+ 2 h
		Off	
Code function	Level 1 rights	Change	
		Delete	
	Level 2 rights	Change	
		Delete	
Display	Display		
	Contrast		
Factory setting	Setup	Save	
		Activate	
	Reset	Code: xxxx	
CAN interface	Activation	On	
		Off	
	Address adjust.	Address: x	

Main menu > Setup			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Current output	Sensor 1	0-20 mA	
		4-20 mA	
		Others (S1)	Min. ppm = mA
			Max. ppm = mA
	Sensor 2	0-20 mA	
		4-20 mA	
		Others (S2)	Min. ppm = mA
			Max. ppm = mA
Program version			

11.6.2 "Sensor 1/Sensor 2" menu

Main menu > Sensor 1 (Sensor 2)				
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**	**Submenu 5**
Test sensor	Man. test	Activate		
		Abort		
	Aut. test	On	x.x days testing interval	
		Off		
Limit value	Limit value 1	Off		
		On	x.xx ppm	
	Limit value 2	Off		
		On	x.xx ppm	xxx sec delay
	Hysteresis	x.xx ppm hysteresis		
Alarm delay	xxx sec delay			
New sensor	New sensor confirmation			

The menu structure for sensor 1 and sensor 2 is identical.

11.6.3 "Service" menu

Main menu > Service		
Submenu 1	**Submenu 2**	**Submenu 3**
Sensor 1	List of events	
	Measured value	
	Aut. test	
	Sensor data	
	Settings (S1)	Limit values
		Alarm relay
Sensor 2	List of events	
	Measured value	
	Aut. test	
	Sensor data	
	Settings (S2)	Limit values
		Alarm relay
Test current	Current output 1	0/4 mA: on
		10/12 mA: off
		20 mA: off
	Current output 2	0/4 mA: on
		10/12 mA: off
		20 mA: off
Test relay	Relay 1: off	
	Relay 2: off	
	Relay 3: off	
	Relay 4: off	
	Alarm: off	
Test display		

11.6.4 "Fine adjustment" menu

Main menu > Fine adjustment			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Sensor 1	Manual zero pt. (S1)	Change	xx.xx ppm xxx.x nA
		Delete	
	Calibration	Measured value (S1)	xx.xx ppm Cell xxxx.x nA
		Result (S1)	xx.xx nA/ppm Slope
	Sensitivity (S1)	xx nA/ppm Slope	
	Display	xx damping	
Sensor 2	Manual zero pt. (S2)	Change	xx.xx ppm xxx.x nA
		Delete	
	Calibration	Measured value (S2)	xx.xx ppm Cell xxxx.x nA
		Result (S2)	xx.xx nA/ppm Slope
	Sensitivity (S2)	xx nA/ppm Slope	
	Display	xx damping	

11.7 Main menu

- From display mode, press [OK] or from the submenus, press [Esc] the relevant number of times to access the main menu.

Selection options in the main menu

- "Sensor 1 / Sensor 2": parameterisation of sensors. Menu selection "Sensor 1" or "Sensor 2" for parameterisation is displayed in the "Setup" menu, depending on the preselection.
- "Service" diagnostic menu (list of events): display of measured values, current output, relay and display test. Values cannot be changed in this mode.
- "Setup" menu: settings for language, sensors, relays, battery backup, current output, etc.
- "Fine adjustment" menu: sensor calibration and display damping.

Note

In the following, unlike the menu sequence, the device setup is described first because it is completed first when setting the device for the first time.

11.8 Setup

Main menu > Setup
Submenu 1
Language
Sensor 1
Sensor 2
Limit relay
Alarm relay
Battery backup
Date/time
Code function
Display
Factory setting
CAN interface
Current output
Program version

All standard settings of the device can be configured in the "Setup" menu. During initial commissioning, basic functions are configured which after that should only be altered rarely or even not at all.

Note

Once the code has been set, access to the "Setup" menu requires level 2 rights. See section *11.8.8 Code function*.

11.8.1 Selecting the operating language

In the "Language" submenu, the language is selected for all subsequent entries and displayed text.

The word "Language" appears in the header in each of the available languages, changing about once every second. The list of available languages (English, German, French, Spanish, Russian, Polish) is displayed.

Select the desired language.

Sprache..Language..
Deutsch
English
Español
Français

Note

Changing the language does not affect any set values.

11.8.2 Defining sensor 1

Main menu > Setup	
Submenu 1	**Submenu 2**
Sensor 1	Off
	Chlorine 314-011
	Chlorine 314-021
	ClO_2 314-041
	ClO_2 314-011
	Ozone 314-071
	Ozone 314-013
	HCl 314-061
	NH_3 314-031
Sensor 2	Off
	Chlorine 314-011
	Chlorine 314-021
	ClO_2 314-041
	ClO_2 314-011
	Ozone 314-071
	Ozone 314-013
	HCl 314-061
	NH_3 314-031

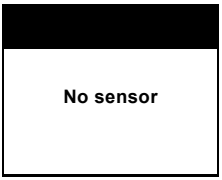
In the "Sensor 1" submenu, the first sensor type is selected.

11.8.3 Defining sensor 2

In the "Sensor 2" submenu, a second sensor type is selected or, if there is no second sensor type, it is set to "Off".

Note

If both sensors are set to "Off", the following message is displayed:



11.8.4 Setting the function of the limit value relay for the sensors

Main menu > Setup		
Submenu 1	**Submenu 2**	**Submenu 3**
Limit relay	Fail safe	On (N.C.)
		Off (N.O.)
	Confirm. LV 2	Yes
		No

In the "Limit relay" submenu, the switching direction (fail safe) and confirmation of the limit value relay can be set.

The fail safe selection defines whether the limit value relays (two per defined sensor) operate as N.C. or N.O. contacts. In case N.C. is adjusted, a cable breakage leads to a fault.

- Fail safe
  - – On (N.C.)
  - – Off (N.O.).

In addition, the confirmation of the relays at limit value 2 can be set. The selection then applies to both sensors.

If limit value 2 is exceeded by one of the two sensors, a sprinkling installation is usually triggered, for example to bond the leaking chlorine.

Normally the relay for limit value 2 remains activated until the measured value drops down below limit value 2. However, it may be necessary to switch off the sprinkling installation, for example to implement countermeasures. In this case, limit value 2 can be set to allow confirmation.

"Confirmation" means that the relay for limit value 2 is switched off again (and therefore also, for example, the connected sprinkling installation), even though the risk caused by the increased gas concentration remains.

- Confirm. LV 2
  - – Yes
  - – No.

Limit value 1 can always be confirmed.

Warning

Only use the "Confirm. LV 2" function if you are certain there is no major gas leak!

Note

A switching delay for the relay for limit value 2 can be set in the relevant sensor menu in the main menu.

11.8.5 Assigning and setting the alarm relay

Main menu > Setup			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Alarm relay	Fail safe	On (N.C.)	
		Off (N.O.)	
	Confirmation	Yes	
		No	
	Sensor 1	Limit value 1 (S1)	On
			Off
		Limit value 2 (S1)	On
			Off
		Test sensor	On
			Off
	Sensor 2	Limit value 1 (S2)	On
			Off
		Limit value 2 (S2)	On
			Off
		Test sensor	On
			Off

The following faults are output as alarm messages, and the alarm relay switches automatically:

- battery backup fault
- open circuit current output.

If the alarm state is removed, the relay immediately falls back automatically (no delay).

In addition, this submenu contains the following settings for the alarm relay:

- Selection of whether the alarm relay operates as N.C. (fail safe) or N.O. contact
- Confirmation of alarm messages.

In addition, for each sensor certain events can be output to the alarm relay:

- - exceeding of limit value 1
- - exceeding of limit value 2
- - fault during sensor test.

Note

An alarm delay can be set in the relevant sensor menu in the main menu.

11.8.6 Defining battery backup

In case of a power supply failure, the Conex® DIA-G can be supplied with 24 VDC using an external backup battery (UPS), for example Grundfos backup battery, order no. 96725709 (336-308). A contact from an integrated standby display on the battery backup to an electrically isolated input on the Conex® DIA-G indicates that the battery backup is ready for operation.

The battery backup function is switched on in the "Battery backup" submenu, and a setting defines whether the integrated relay for the battery backup has an N.C. or N.O. function:

- Battery backup
  - – OFF.
  - – N.O. contact: Electrically isolated contact on the UPS closes if the battery backup is faulty.
  - – N.C. contact: Electrically isolated contact on the UPS opens if the battery backup is faulty.

11.8.7 Setting the date/time

Main menu > Setup			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Date/time	Time		
	Date		
	Daylight sav.t.	Start	Time
			Date
		End	Time
			Date
		Time shift	+ 1/+ 2 h
		Off	

In the "Date/time" submenu, the current date and time is set as well as the dates for daylight saving settings, if applicable.

- In the "Time" submenu, set the current time in the format hh.mm.ss.
- In the "Date" submenu, set the current date in the format mm.dd.yyyy (when a language other than English is set as the operating language, the format is dd.mm.yyyy).
  - – The corresponding day of the week (Mon to Sun) is then displayed automatically.
- In the "Daylight.sav.t." submenu, the beginning and end of daylight saving time is set and the time change selected (+ 1 h or + 2 h).
- Open the relevant submenu.
  - – The activated numerical field flashes.
  - – Press the [Up] or [Down] button to modify the numerical values.
  - – Press [OK] to move to the next numerical field.
- Hold down the key to increase the setting speed dynamically.

11.8.8 Code function

Codes (a numerical value between 1 and 9999) can be used to protect the device from unauthorised access.

The Conex® DIA-G has two levels with different rights:

- Level 1: Access to limit value and alarm value confirmation and to the service menu
- Level 2: Unrestricted access to all menus: "Service" menu, "Sensor 1 or 2" menu in "Main menu", "Setup" and "Fine adjustment". Confirmation of limit value and alarm value.
  - – If an access code is set, entry of the relevant code (up to four digits) provides access to the corresponding user functions for a period of 60 minutes in level 1 and 2.
  - – If no code has been specified, users have unrestricted access to the relevant menu.
  - – The code no. 0000 (default) is not displayed or requested.

Note

If the wrong code is entered, the following occurs:

- Access to the corresponding menus is denied.
- An error message is output (duration: 5 seconds).
- The system returns to the main menu.

In the "Code function" submenu, the codes can be set and changed.

Code function
Level 1 rights
Level 2 rights

1. Select the desired access level, and press [OK] to move to the corresponding menu.
2. The code can be deleted (reset to default setting) or modified. Select the desired function.
3. Enter the current (old) access code using the [Up] or [Down] button, and confirm using [OK] (the first time, enter code 0000). One of the following occurs:
   - – The access code is now reset if "Delete" was selected.
   - – The new code can be entered.
4. Enter the new four-digit access code using the [Up] or [Down] button, and confirm using [OK].
5. In the screen that appears, enter the new four-digit access code again using the [Up] or [Down] button, and confirm using [OK].

Reset function

Entering code "**1998**" deletes all previously activated codes. All previous access codes are deleted and reset to "Code: 0000".

The reset function can be activated in the code menu or directly when the code is requested.

11.8.9 Setting the display contrast

In the "Display" submenu, the contrast (brightness) of the display can be set from 0-100 %.

Note

If the contrast setting is too high, it may not be possible to read the display. Hold down the [Down] button until the contrast setting is low enough to be read again.

11.8.10 Saving / accessing user settings

In the "Factory setting" submenu, the current device setting can be saved so that it can be reactivated later, or a saved setting can be activated.

- Setup
  - – Save setup: Saves all current device settings from the menus (not just the "Setup" settings)
  - – Activate setup: Resets the device to the last saved setup.

Note

In this menu, save your device settings once you have set all the values in the "Setup" and "Sensor 1/2" menus. You can then activate them again at any time (even after a factory reset)!

11.8.11 Factory setting reset

In the "Factory setting" submenu, the Conex® DIA-G can also be reset to the factory setting using code 6742.

Caution

Only use this function in an emergency. All device settings are lost and must be re-entered!

Do not disconnect the device from the power supply during the reset!

Resetting the Conex® DIA-G to the factory setting

- Reset
  - Code 0000 is displayed.
  - Press the [Up] or [Down] button to set code 6742, and confirm using [OK].

The device is now returned to the original factory setting.

Caution

Before subsequent start-up:

Check all parameters, and set the device again according to your application!

11.8.12 General factory settings

Language

- The device waits for language selection. The languages "Deutsch/English/Français...." appear alternately.

Setup

- Sensor 1: Chlorine 314-011
- Sensor 2: Off
- Optional limit value relay: Off
- Optional alarm values: Off
- Battery backup: Off
- Daylight saving time: Off
- Code number: 0000 (Level 1 and Level 2)
- Display contrast: 50 %
- CAN interface: Off
- Current outputs 0-20 mA.

Sensor menu

- Test sensor: Off
- Limit values: Off.

11.8.13 Setting the CAN Interface

In the "CAN interface" submenu, the external CAN interface (if connected) is activated or deactivated, and the CAN address is set.

- CAN interface
- Activation
  - On
  - Off.
- Address setting
  - Address 1 to 12.

Note

This menu is used to activate the external CAN interface. The function is independent of any potential sensor that may be connected via the internal CAN interface.

11.8.14 Selecting the operating mode for the current outputs

In the "Current output" submenu, the ranges for the current outputs are selected and set.

- The two standard ranges for current outputs, "0-20 mA" and "4-20 mA", are available. The assignment is proportional to the measuring range of the sensor.
  - 0 ppm corresponds to 0 or 4 mA.
  - The top end of the measuring range is 20 mA.
- In addition, the current outputs can be freely assigned to the measuring range within the interval 0-20 mA.
  - The settings are made in the "Others" submenu.
  - Two value pairs ... ppm (depending on the measuring range of the set sensor) must be set in the range 0 to 20 mA. When the value flashes, press the [Up] or [Down] button to set the desired value, and confirm using [OK].
  - The assignment of the measured value to the current output is then linear through both set value pairs.

11.8.15 Program version

In the "Program version" submenu, you can view the existing software components with software status:

Program version	
Conex® DIA-G	
v1.00.1	20050811

- Version, for example v1.00.1
- Software status 11th august 2005.

11.9 Parameterising the sensors

In the "Sensor 1 or 2" menu, the sensors are parameterised, for example setting of limit values and alarms or carrying out sensor tests.

Note

Once the code has been set, access to the "Sensor 1/Sensor 2" menu requires the code for level 2. See section *11.8.8 Code function*.

Note

The sensor menus are only displayed when the sensor is selected (in the "Setup" menu).

Caution

All settings in the sensor menus are reset to the default setting if the sensor type is changed in the "Setup" menu.

All sensor settings must be repeated following replacement of a sensor.

11.9.1 Sensor test

Main menu > Sensor 1 (Sensor 2)			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Test sensor	Man. test	Activate	
		Abort	
	Aut. test	On	x.x days testing interval
		Off	

The menu structure for sensor 1 and sensor 2 is identical.

The activity of the sensor element can be tested using polarity reversal. This sensor test can be started automatically at regular intervals or manually at specific times.

In the "Test sensor" submenu, an automatic sensor test can be set.

- Auto. test S1/S2
  - – On
  - – Off.

When "Aut. test On" is selected, a test interval of 0.5 to 30 days can be entered.

In addition to the automatic sensor test, a manual sensor test can be carried out at any time.

- Manual test S1/S2
  - – Activate.

During the sensor test, a progress bar is shown in the display, and once the sensor test is complete, the result "Sensor test O.K." or "Test sensor error" is displayed. If the sensor is faulty, the LED for the relevant sensor will light up and, depending on the setting in the "Setup" menu, an alarm is output via the alarm menu.

Caution

If the sensor test fails, there is a risk of an undetected gas leak! Check the sensor and cable connections. Faulty sensors must be replaced!

11.9.2 Setting limit values for the sensors

Main menu > Sensor 1 (Sensor 2)				
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**	**Submenu 5**
Limit value	Limit value 1	Off		
		On	x.xx ppm	
	Limit value 2	Off		
		On	x.xx ppm	xxx sec delay
	Hysteresis	x.xx ppm hysteresis		

The menu structure for sensor 1 and sensor 2 is identical.

In the "Limit values" menu, two limit values per sensor can be entered within the sensor measuring range. When these limit values are reached, the limit value relay is activated and an alarm is triggered, if applicable.

If limit value 2 is exceeded by one of the two sensors, a sprinkling installation is usually triggered to bond the leaking chlorine.

To prevent the immediate triggering of alarm measures when the value is exceeded only briefly, a delay time can be entered. When limit value 2 is exceeded, the relay for limit value 2 is only activated once this delay time has elapsed.

The alarm delay time begins when the measured value for a sensor exceeds its value for limit value 2.

Other settings for limit values (switching direction, confirmation, alarms) are made in the "Setup" menu. See section *11.8.4 Setting the function of the limit value relay for the sensors*.

Defining limit values

In the "Limit values" submenu, the limit values can be set within the measuring range.

- Limit value 1 or 2
  - Off
  - On.
- Limit value 1 or 2
  - x.xx ppm.

For limit value 2, a delay from 0 to 180 seconds can be set (default is 60 seconds).

- Limit value 2
  - xxx sec delay.

Setting the switching hysteresis

A hysteresis can be set for the limit values of each sensor (the sensors are set separately, but the hysteresis of the two limit values of one sensor is equal) to prevent constant switching when the limit value is reached.

In the "Limit values" submenu, a hysteresis can be set.

- Hysteresis
  - x.xx ppm.
- Setting range: 0-50 % of measuring range.

Example: Limit value 3.00 ppm, hysteresis 0.04 ppm

- The hysteresis band is symmetrical around the switching point.
- Point of switch on = limit value + 1/2 hysteresis
- Point of switch off = limit value - 1/2 hysteresis.

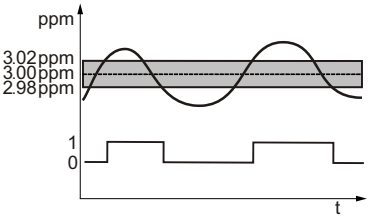


Fig. 15 Switching hysteresis

11.9.3 Setting the alarm delay

Main menu > Sensor 1 (Sensor 2)	
Submenu 1	**Submenu 2**
Alarm delay	xxx sec delay

The menu structure for sensor 1 and sensor 2 is identical.

The alarms for limit value 1, limit value 2 and/or the sensor test assigned in the "Setup" submenu (see *11.8.5 Assigning and setting the alarm relay* on page 35) can be output with a delay. The alarm relay is then switched with the set delay independently of the relevant limit value relay.

For the alarm, a delay from 0 to 180 seconds can be set.

- Alarm S1/S2
  – xxx sec delay.

Note

The alarms must be assigned to the relevant limit values or sensor tests in the "Setup" menu!

11.9.4 Replacing/changing a sensor

Message: Change sensor

Caution

Faulty sensors must be replaced! The potentiostatic sensor or the sensor disc of the amperometric sensor must be replaced in the following cases:

– after the expected life of the sensor element
– after the sensor has been exposed to a gas concentration that has exceeded the measuring range
– in case of damages.

See the manual of the gas sensors.

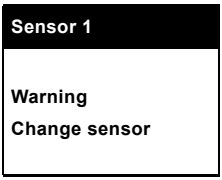
Amperometric sensors: The expected life of the sensor is determined when a sensor is installed, following confirmation in the "New sensor" menu.

Caution

If the replacement of an amperometric sensor is not confirmed in the "New sensor" menu, the "Change sensor" message cannot be displayed at the right time. There is a risk of malfunction due to expired sensors!

Potentiostatic sensors: The calibration date in the sensor chip (date of manufacturing) is used to monitor the expected life of the sensor element.

If the expected life is exceeded, the following message appears:



- This message must be confirmed using [OK].

Amperometric sensors

The "Change sensor" message is displayed for amperometric sensors once the expected life has elapsed, if the date of the sensor installation was confirmed in the "New sensor" menu.

Note

The sensor must not be installed after the maximum storage time.

Sensor type	Measuring parameter	Maximum storage time (months)	Expected life (months)	Product number
Amperometric sensor (disc)	Cl_2, ClO_2	9	12	91835237 (314-011)
	O_3	9	12	96687714 (314-013)

Potentiostatic sensors

For every sensor is noted the manufacturing date as well as the maximum storage time and the expected life. The useful life of the sensor ends once the maximum storage time + the expected life have elapsed. It does not matter when the sensor was actually installed.

The "Change sensor" message is displayed for potentiostatic sensors:

Manufacturing date + maximum storage time + expected life.

Sensor type	Measuring parameter	Maximum storage time (months)	Expected life (months)	Product number
Potentiostatic sensor	Cl_2	3	24	96732268 (314-021)
	NH_3	3	24	95700839 (314-031)
	ClO_2	3	24	95700837 (314-041)
	HCl	3	24	95700840 (314-061)
	O_3	3	18	95700838 (314-071)

The following messages are only displayed when potentiostatic sensors are used with the sensor interface:

If the sensor(s) is/are connected via an interface, the EPROM is read cyclically, and sensor data is sent to the Conex® DIA-G.

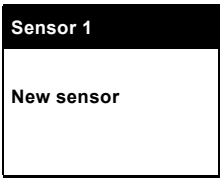
Message when sensor is removed

When the sensor element is removed, the following message appears after 10 seconds:

- The message must be confirmed using [OK].

Message on a new sensor

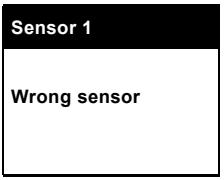
When the sensor element is replaced (detected by the serial number), the following message appears:



- The message must be confirmed using [OK].
- When the sensor element is replaced, any settings previously made in the "Fine adjustment" menu are deleted.
- Manual sensitivity correction.
- Manual zero point correction.

Installation of wrong sensor type

If a sensor is installed that does not correspond to the sensor type specified in the "Setup" menu, the following message appears:



- This message cannot be confirmed. The sensor type setting must be adapted to the installed sensor. The message remains on the display until the fault is removed in the "Setup" menu.

11.10 Requesting settings in the service menu

Main menu > Service		
Submenu 1	**Submenu 2**	**Submenu 3**
Sensor 1	List of events	
	Measured value	
	Aut. test	
	Sensor data	
	Settings (S1)	Limit values
		Alarm relay
Sensor 2	List of events	
	Measured value	
	Aut. test	
	Sensor data	
	Settings (S2)	Limit values
		Alarm relay
Test current	Current output 1	0/4 mA: on
		10/12 mA: off
		20 mA: off
	Current output 2	0/4 mA: on
		10/12 mA: off
		20 mA: off
Test relay	Relay 1: off	
	Relay 2: off	
	Relay 3: off	
	Relay 4: off	
	Alarm: off	
Test display		

In the "Service" menu, the most recent messages (list of events), the measuring data for the sensors, the data for the auto test and the sensor data can be displayed for the relevant sensor.

In addition, the current outputs, relays and the display can be tested, i.e. the proper operation of the Conex® DIA-G and connected warning and safety equipment can be checked.

Sensor 1/2

In the "Sensor 1" or "Sensor 2" submenu, the following menu points are available:

- List of events
- Measured value
- Auto test
- Sensor data
- Settings.

List of events: The last 10 events (limit value exceeded or sensor fault) are stored chronologically with date and time and can be viewed. The events are shown in the display as follows:

List of events
Number: 1
Event: LV 1 On
Date: dd.mm.yyyy
Time: hh:mm:ss

Event:

- LV 1 On = Limit value 1 On
- LV 1 Off = Limit value 1 Off
- LV 2 On = Limit value 2 On
- LV 2 Off = Limit value 2 Off
- Sensor fault.

Measured value: Display example of measured value, Sensor 1.

Sensor 1
xx.xx ppm
xxxx nA
xxxx.x nA/ppm

The following data is displayed:

- xx.xx ppm = Current measured value in ppm
- xxxx nA = Current input current in nA or µA
- xxxx.x nA/ppm = Sensor sensitivity in nA/ppm or µA/ppm.

Auto test: The current set test interval and the remaining time until the next sensor test is displayed.

This menu only appears if the automatic function has been selected in the main menu under "Sensor 1" or "Sensor 2".

Aut. test S1
Interval
xx.x day
Next test
xx.x day

- Interval: Displays the preset test interval. See also *11.9.1 Sensor test*.
- Next test: Displays the remaining time in days and hours until the next automatic test function.

Sensor data: Sensor-specific data is displayed.

The replacement date is displayed according to the calibration date (EPROM) and installation date (detection of new sensor). See section *11.9.4 Replacing/changing a sensor*.

Sensor data
Sensor
Slope
... µA/ppm
Assembly
... dd.mm.yyyy
Change
... dd.mm.yyyy

Note

For amperometric sensors, this data only updates when the "New sensor" menu item is selected.

Settings: The settings for limit values and the alarm relay are displayed here so that the values can be checked without accessing the relevant menus in the "Setup" menu.

Display examples:

Limit values	
LV 1	0.50 ppm
LV 2	1.80 ppm
Fail safe	N.O.
Conf.	No
Delay	30 sec
Hyst.	0.02 ppm

Alarm relay	
Test sensor	
Limit value 2	
Fail safe	N.O.
Delay	30 sec
Conf.	Yes

Test current (check operation of the current outputs)

Depending on the configuration of the current loops, the current outputs can be switched on with the following current values, and the current value can be output to the system:

- Selection of 0, 10, 20 mA when standard range 0-20 mA is selected
- Selection of 4, 12, 20 mA when standard range 4-20 mA is selected or for freely configured current loops

1. Access the "Test current" menu by pressing [OK].
2. Access "Current output 1" for sensor 1 or "Current output 2" for sensor 2 by pressing [OK].
3. Press the [Up] or [Down] button to select the current values.
4. Select the row, and press [OK] to set the status of the current output with the relevant value to "On".
5. Select another row, and press [OK] to switch off the previous current value and set the new current value to "On".
6. For every current value, use a suitable measuring device to check that current is present at the relevant current output.
   – If the relevant current value is present: Function is OK.
   – If the relevant current value is not present: The current output is faulty.
7. Press [Esc] to exit the test menu. When you exit the menu, the latest current values for the sensors are output to the system again.

Test relay (check operation of the relays)

Note

All warning and safety equipment connected to the limit value and alarm relays, for example a sprinkling installation, is still triggered during the relay test according to the default settings!

1. Access the "Test relay" menu by pressing [OK].
2. Press the [Up] or [Down] button to select the relay to be checked, and switch on or off using [OK]
   – If the relay switches (audibly) and the connected warning or safety equipment is activated: Function is OK.
   – If the relay does not switch: The relay is faulty.
   – If the connected warning or safety equipment is not activated: Check the connected warning or safety equipment and cabling. Repair if necessary.
3. Press [Esc] to exit the test menu.

When you exit the menu, all relays switch back to their previous switching status.

Test display (check operation of the display)

1. Access the "Test display" menu by pressing [OK]. If the display is completely dark: Function is OK.
   – If some parts of the display remain light, the display is faulty in these areas.
2. Press [Esc] to exit the test menu.

11.11 Fine adjustment menu

Main menu > Fine adjustment			
Submenu 1	**Submenu 2**	**Submenu 3**	**Submenu 4**
Sensor 1	Manual zero pt. (S1)	Change	xx.xx ppm xxx.x nA
		Delete	
	Calibration	Measured value (S1)	xx.xx ppm Cell xxxx.x nA
		Result (S1)	xx.xx nA/ppm Slope
	Sensitivity (S1)	xx nA/ppm Slope	
	Display	xx damping	
Sensor 2	Manual zero pt. (S2)	Change	xx.xx ppm xxx.x nA
		Delete	
	Calibration	Measured value (S2)	xx.xx ppm Cell xxxx.x nA
		Result (S2)	xx.xx nA/ppm Slope
	Sensivity (S2)	xx nA/ppm Slope	
	Display	xx damping	

The "Fine adjustment" menu can be used to:

- Perform a manual zero point correction for the relevant sensor
- Perform a calibration
- Set the sensitivity of the current output
- Damp the display with the measured value so that the display does not change as often if the measured value fluctuates.

Note

Once the code has been set, access to the "Fine adjustment" menu requires level 2 rights. See section *11.8.8 Code function*.

11.11.1 Manually setting the zero point for the sensors

Warning

If this function is used incorrectly, there is a risk of measuring faults or measurement failure!

The sensors may indicate a deviation from the zero point, i.e. a concentration is indicated even though there is no gas in the air. To compensate this value, a zero point deviation of up to 5 µA can be corrected. In the event of greater deviations, the sensor is defective and must be replaced.

To set the zero point for the sensor:

- Place the sensor in an **environment containing absolutely no measured gas**.

Warning

Never set the zero point in the room that is to be monitored by the sensor! Any gas concentration in this environment will be subtracted from the measured value in future as the offset!

In the "Sensor 1"/"Sensor 2" submenu, the zero point can be set manually.

- Man. zero pt. S1 / S2
  - – Change
  - – Delete.

The "Change" option can be used to enter a new zero point.

- – 0.00 ppm = x.xx µA or nA.

The "Delete" option deletes a previously set zero point. The value pair is reset to 0.00 ppm/0 µA or nA.

11.11.2 Performing a calibration

Warning

If this function is used incorrectly, there is a risk of measuring faults or measurement failure!

The sensors may indicate a deviation from the actual gas level in the air. To compensate for this deviation, the sensor can be calibrated. To do this, a precise comparative measurement is absolutely essential (for example calibrated gas measuring device).

Note

The Conex® DIA-G is a gas detector. It is not suitable for continuous measuring of a gas concentration or for MAC monitoring.

In the "Sensor 1"/"Sensor 2" submenu, the calibration can be performed.

1. Transfer the sensor to an atmosphere containing gas, and carry out a concentration measurement with a gas measuring device.

- Calibration S1/S2
  - – Measured value
  - – Result.

The "Measured value" option can be used to perform the calibration.

2. Press the [Up] or [Down] button to enter the concentration of the comparative measurement in ppm.
   - – The row below displays the actual current of the cell in nA or µA.

Calibration
x.xx ppm
Cell 22.2 µA

3. Press [OK] to save the calibration.
   - – The calibrated increase is displayed in the "Result" menu.
   - – The increase is also transferred to the sensor data in the "Service" menu.

11.11.3 Setting the sensitivity of the sensor

Warning

If this function is used incorrectly, there is a risk of measuring faults or measurement failure!

In the "Sensor 1"/"Sensor 2" submenu, the sensitivity can be entered manually.

- Sensitivity S1/S2
  - – Press the [Up] or [Down] button to enter the sensor sensitivity in nA/ppm or µA/ppm.
  - – Save using [OK].

11.11.4 Damping the measured value display

The mean value generation of the display (and therefore also of the current output) can be modified in order to dampen a frequently changing measuring signal. This stabilises the display of the measured and the signal for the current output.

In the "Sensor 1"/"Sensor 2" submenu, the damping can be entered in a range from 1-60 (factory setting: 1 = no damping).

- Display S1/S2
  - Press the [Up] or [Down] button to enter the numerical value (= number of measured values used for mean value generation).
  - Save using [OK].

11.12 Actions during operation

11.12.1 Display options

Display with two parameters

Cl_2	Cl_2
0.30	ppm
0.35	ppm

Large display of measured values for both sensors. The inverted header indicates the two sensors aligned to the left and right.

The value for sensor 1, displayed on the left, is shown in the first row, and the value for sensor 2, displayed on the right, is shown in the second row under the header.

Display with one parameter

Cl_2	
0.30	ppm

Large display of the measured value. The selected sensor is indicated in the header.

Alarm messages

A sensor-specific alarm refers to the sensor that is flashing in the header. Alarms that do not relate to sensors are displayed in the bottom row. There is no flashing display for this type of alarm.

If several alarm messages are displayed, they can be scrolled using the [Up] or [Down] button. They are listed in chronological order. The selected alarm message is displayed in inverted format. The system then switches to the previously set display option.

Display for active alarms with two parameters

Cl_2	Cl_2
0.30	**4.00**
Alarm row 1	
Alarm row 2	

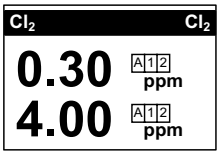
The sensors are displayed in the header aligned to the left and right, with the measured values for the sensors listed underneath. Depending on the affected sensor, half of the header flashes in case of an alarm.

Display for active alarms with one parameter

Cl_2	
0.30	ppm
Alarm row 1	
Alarm row 2	

Large display of the measured value. The selected sensor is indicated in the header.

Display with activated alarm and limit values



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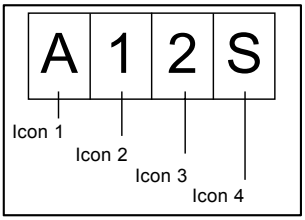
Activated alarm and limit values for sensor 1 or 2 are displayed in the icons next to the relevant measured values.

Sensors 1 and 2 each have two limit value relays, and an alarm value can be activated for each sensor.



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Icon	Display	Description
Icon 1	A	For configured alarm relay (inverted display on active alarm)
Icon 2	1	For configured limit value 1 (inverted display when value exceeded)
Icon 3	2	For configured limit value 2 (inverted display when value exceeded)
Icon 4	S	For configured potentiostatic sensor (inverted display on active connection to sensor interface)

Display for active battery backup

Active battery backup mode (device supplied with 24 VDC externally) is indicated in the display as follows:

Cl_2	Cl_2
0.30	**4.00**
Alarm row 1	
Alarm row 2	

Battery	backup
0.30	**4.00**
Alarm row 1	
Alarm row 2	

The display changes cyclically between the standard header and the display text "Battery backup".

Display option for no sensors

No sensor

Special display if no sensor is set in the "Setup" menu.

Reading measured values

In display mode, the current measured values can always be read.

If one sensor is connected:

Cl_2	
0.30	ppm

If two sensors are connected:

Cl_2	Cl_2
0.30	ppm
0.35	ppm

11.12.2 Reading error messages

Error messages are displayed directly on the display.

Cl_2	Cl_2
0.30	**4.00**
Alarm row 1	
Alarm row 2	

In case of several error messages, they are displayed one after another. They can be viewed by pressing the [Up] or [Down] button.

11.12.3 Exceeding limit values

If **Limit value 1** is exceeded for a sensor:

- The LED of the relevant sensor flashes.
- ICON 1 is shown as "active" (inverted).
- The relay for limit value 1 is triggered.
- If the alarm relay is assigned to the exceeded limit value, the alarm is triggered once any set delay time has elapsed. See below.

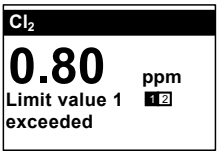
If **Limit value 2** is exceeded for a sensor:

- The LED for the relevant sensor lights up.
- ICON 2 is shown as "active" (inverted).
- The relay for limit value 2 is triggered (once any set delay time has elapsed).
- If the alarm relay is assigned to the exceeded limit value, the alarm is triggered once any set delay time has elapsed. See below.

Display of the message for limit value exceeded:

To read the message:

- The message is displayed directly on the display.
- For example, if a limit value is exceeded, the following message appears:



TM03 7039 4506

Resetting actions after a limit value is exceeded

When the measured value has dropped below the limit value, all actions, which were triggered by the limit value being exceeded are reset automatically.

Confirmation of limit value 2

The relay for limit value 2 usually remains activated until the measured value has dropped below limit value 2. "Confirmation" means that when the limit value is exceeded, the relay for limit value 2 is switched off again using [Esc] (and therefore also, for example, the connected sprinkling installation), even though the risk caused by the increased chlorine concentration remains.

Indication of the exceeded limit value remains active on the LED and display.

Warning

Only use this function if you are certain there is no major chlorine leak!

Note

Confirmation of limit value 2 must be set in the "Setup/Limit value relay/ Confirm. LV 2" menu.

1. In display mode, press the [Up] button to scroll up until the message for the exceeded limit value 2 appears:
2. Press [Esc].
   – The relay for limit value 2 (and therefore also the connected sprinkling installation) is switched off again.
3. Remove the cause of the exceeded limit value.

11.12.4 When an alarm is triggered

- If assigned in "Setup", the alarm relay is triggered (once any set delay time has elapsed).
- The alarm message appears in the display when the following occurs:
  – an exceeded limit value, for example "Limit value 1 exceeded"
  – a sensor test fault, for example "Sensor 1, error test"
  – a fault in the plausibility check for calibration data sensitivity: "Slope error"
  – a current loop fault, for example open circuit current output 1.
- The alarm LED flashes.
- ICON A is shown as "active" (inverted).
- The header flashes.

11.12.5 Confirming an alarm

Confirmation is not possible during an alarm if a limit value is exceeded or in case of a fault in the plausibility check for calibration data sensitivity, but is possible in case of a sensor test fault or current loop fault. Reset the alarm relay by pressing [Esc].

Indication of the alarm remains active on the LED and display.

If the alarm condition is no longer met, all actions which were triggered by the alarm are reset automatically.

12. Error messages and fault finding

Note

In case of measurement faults, see the manual of the gas sensors.

12.1 Error messages

Error message	Cause	Remedy
1. Sensor test error.	a) Manual/automatic sensor test failed.	Check the sensor and the connecting line.
		Replace the sensor.
2. CANBus interface error.	a) Address of sensor interface incorrect.	Check and modify the CAN address on the sensor interface.
3. Sensitivity error.	a) Calibration in "Fine adjustment" menu results in a sensitivity outside the limits that can be tolerated.	Check the sensor.
		Check the concentration of comparative measurement.
4. Battery backup error.	a) Monitoring relay for backup battery in alarm state.	Check the connecting lines to the backup battery.
		Check the power supply for the backup battery.
5. Open circuit current output.	a) Connecting line at the relevant current output disconnected.	Check the connecting lines at the current output.
		Check the connected device.

12.2 Fault finding

Fault	Cause	Remedy
1. No display following start-up.	a) No power supply.	Connect the power supply.
	b) Display contrast too light/too dark.	Set the contrast in the "Setup" menu. See section *11.8.9 Setting the display contrast*.
2. Display permanently at zero.	a) Open circuit in cable between sensor and gas warning device.	Check the connecting cable, and establish connection.
3. Display with measured value unsteady.	a) Interferences on cable from sensor.	Check that the display is properly connected.
		Route the cable separately from the power supply cables.
	b) Sensor faulty.	Replace the sensor.
4. Measured value display slow or no measured value display.	a) Sensor too old.	Replace the sensor.
	b) Sensor dirty.	Replace the sensor.
5. Sensor zero point increases disproportionately.	a) Sensor has been subjected to humidity.	Replace the sensor.
6. Sensor fault (amperometric sensor).	a) Sensor not connected.	Connect the sensor.
	b) Cable faulty.	Replace the cable.
	c) Sensor faulty.	Replace the sensor.
7. Sensor fault (potentiostatic sensor).	a) Cable faulty.	Replace the cable.
	b) Sensor faulty.	Replace the sensor.
	c) CAN address on sensor interface set incorrectly.	Check and modify the CAN address on the sensor interface.
	d) Termination resistor not set on sensor interface and/or on Conex® DIA-G.	Check and modify the termination resistor on the sensor interface and/or on the Conex® DIA-G.
8. CAN interface fault.	a) Connecting line interrupted.	Check the connecting line, and establish connection.
9. Data for potentiostatic sensors not read.	a) CAN address on sensor interface set incorrectly.	Check and modify the CAN address on the sensor interface.
	b) Termination resistor not set on sensor interface and/or on Conex® DIA-G.	Check and modify the termination resistor on the sensor interface and/or on the Conex® DIA-G.
10. Potentiostatic sensor provides faulty measured values.	a) Sensor faulty.	Replace the sensor.
11. Device cannot be set.	a) Incorrect code set (device is protected from any adjustments).	See section *11.8.8 Code function*.

13. Maintenance

The device is maintenance-free.

Repairs can only be carried out in the factory by authorised personnel.

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.

The 2006/66/EC guideline requires users to return all used and worn-out batteries and accumulators. They must not be disposed of in normal domestic waste.

Declaration of conformity

GB: EU declaration of conformity

We, Grundfos, declare under our sole responsibility that the products Conex® DIA-G, DIS-G, DIS-D, DIS-PR, to which the declaration below relates, are in conformity with the Council Directives listed below on the approximation of the laws of the EU member states.

DE: EU-Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass die Produkte Conex® DIA-G, DIS-G, DIS-D, DIS-PR, auf die sich diese Erklärung beziehen, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EU-Mitgliedsstaaten übereinstimmen.

ES: Declaración de conformidad de la UE

Grundfos declara, bajo su exclusiva responsabilidad, que los productos Conex® DIA-G, DIS-G, DIS-D, DIS-PR a los que hace referencia la siguiente declaración cumplen lo establecido por las siguientes Directivas del Consejo sobre la aproximación de las legislaciones de los Estados miembros de la UE.

FR: Déclaration de conformité UE

Nous, Grundfos, déclarons sous notre seule responsabilité, que les produits Conex® DIA-G, DIS-G, DIS-D, DIS-PR, auxquels se réfère cette déclaration, sont conformes aux Directives du Conseil concernant le rapprochement des législations des États membres UE relatives aux normes énoncées ci-dessous.

GR: Δήλωση συμμόρφωσης ΕΕ

Εμείς, η Grundfos, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα Conex® DIA-G, DIS-G, DIS-D, DIS-PR, στα οποία αναφέρεται η παρακάτω δήλωση, συμμορφώνονται με τις παρακάτω Οδηγίες του Συμβουλίου περί προσέγγισης των νομοθεσιών των κρατών μελών της ΕΕ.

HR: EU deklaracija sukladnosti

Mi, Grundfos, izjavljujemo s punom odgovornošću da su proizvodi Conex® DIA-G, DIS-G, DIS-D, DIS-PR, na koja se izjava odnosi u nastavku, u skladu s direktivama Vijeća dolje navedene o usklađivanju zakona država članica EU-a.

IT: Dichiarazione di conformità UE

Grundfos dichiara sotto la sua esclusiva responsabilità che i prodotti Conex® DIA-G, DIS-G, DIS-D, DIS-PR, ai quale si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri UE.

LT: ES atitikties deklaracija

Mes, Grundfos, su visa atsakomybe pareiškiame, kad produktai Conex® DIA-G, DIS-G, DIS-D, DIS-PR, kuriems skirta ši deklaracija, atitinka žemiau nurodytas Tarybos Direktyvas dėl ES šalių narių įstatymų suderinimo.

NL: EU-conformiteitsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat de producten Conex® DIA-G, DIS-G, DIS-D, DIS-PR, waarop de onderstaande verklaring betrekking heeft, in overeenstemming zijn met de onderstaande Richtlijnen van de Raad inzake de onderlinge aanpassing van de wetgeving van de EU-lidstaten.

PL: Deklaracja zgodności UE

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze produkty Conex® DIA-G, DIS-G, DIS-D, DIS-PR, których deklaracja niniejsza dotyczy, są zgodne z następującymi dyrektywami Rady w sprawie zbliżenia przepisów prawnych państw członkowskich.

PT: Declaração de conformidade UE

A Grundfos declara sob sua única responsabilidade que os produtos Conex® DIA-G, DIS-G, DIS-D, DIS-PR, aos quais diz respeito a declaração abaixo, estão em conformidade com as Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da UE.

RO: Declaraţia de conformitate UE

Noi Grundfos declarăm pe propria răspundere că produsele Conex® DIA-G, DIS-G, DIS-D, DIS-PR, la care se referă această declaraţie, sunt în conformitate cu Directivele de Consiliu specificate mai jos privind armonizarea legilor statelor membre UE.

RS: Deklaracija o usklađenosti EU

Mi, kompanija Grundfos, izjavljujemo pod punom vlastitom odgovornošću da je proizvod Conex® DIA-G, DIS-G, DIS-D, DIS-PR, na koji se odnosi deklaracija ispod, u skladu sa dole prikazanim direktivama Saveta za usklađivanje zakona država članica EU.

RU: Декларация о соответствии нормам ЕС

Мы, компания Grundfos, со всей ответственностью заявляем, что изделия Conex® DIA-G, DIS-G, DIS-D, DIS-PR, к которым относится нижеприведённая декларация, соответствуют нижеприведённым Директивам Совета Евросоюза о тождественности законов стран-членов ЕС.

TR: AB uygunluk bildirgesi

Grundfos olarak, aşağıdaki bildirim konusu olan Conex® DIA-G, DIS-G, DIS-D, DIS-PR ürünlerinin, AB Üye ülkelerinin direktiflerinin yakınlaştırılmasıyla ilgili durumun aşağıdaki Konsey Direktifleriyle uyumlu olduğunu ve bununla ilgili olarak tüm sorumluluğun bize ait olduğunu beyan ederiz.

– Low Voltage Directive (2014/35/EU)*.
  Standard used:
  EN 61010-1:2011-07.
– EMC Directive (2014/30/EU).
  Standards used:
  EN 61326-1:2013,
  EN 61000-3-2:2015,
  EN 61000-3-3:2014.
– RoHS Directives (2011/65/EU and 2015/863/EU).
  Standard used: EN 50581:2012.

* Only for products with operating voltage > 50 VAC or > 75 VDC.

This EU declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (publication numbers 96709884, 95716767, 96681460, 96798355, 96681484, 95716759).

Pfinztal, 1st March 2018

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Person authorised to compile technical file and empowered to sign the EU declaration of conformity.

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