

# Conex® DIA-2

Instrument amplifier and controller

Installation and operating instructions



# English (GB) Installation and operating instructions

## Original installation and operating instructions

## CONTENTS

|                                                                                 | Page      |
|---------------------------------------------------------------------------------|-----------|
| <b>1. Symbols used in this document</b>                                         | <b>2</b>  |
| <b>2. A few words in advance</b>                                                | <b>3</b>  |
| <b>3. Instrument settings</b>                                                   | <b>4</b>  |
| <b>4. General information</b>                                                   | <b>6</b>  |
| <b>5. Applications</b>                                                          | <b>6</b>  |
| <b>6. Safety</b>                                                                | <b>6</b>  |
| 6.1 Obligations of the owner/operations manager                                 | 6         |
| 6.2 Avoidance of danger                                                         | 6         |
| <b>7. Identification</b>                                                        | <b>7</b>  |
| 7.1 Nameplate                                                                   | 7         |
| 7.2 Type key, Conex <sup>®</sup> DIA-2 controllers                              | 8         |
| 7.3 Type key, Conex <sup>®</sup> DIA-2 preassembled systems                     | 9         |
| <b>8. Technical data</b>                                                        | <b>10</b> |
| 8.1 Design / enclosure class                                                    | 10        |
| 8.2 General data                                                                | 10        |
| 8.3 Electronic data and functions                                               | 10        |
| 8.4 Measuring ranges                                                            | 11        |
| 8.5 Dimensions                                                                  | 12        |
| <b>9. Installation</b>                                                          | <b>13</b> |
| 9.1 Transport and storage                                                       | 13        |
| 9.2 Unpacking                                                                   | 13        |
| 9.3 Installation requirements                                                   | 13        |
| 9.4 Installation in control panel                                               | 13        |
| 9.5 Installation of wall-mounted enclosure                                      | 14        |
| <b>10. Commissioning / electrical connections</b>                               | <b>15</b> |
| 10.1 Terminals                                                                  | 16        |
| 10.2 Power supply connection                                                    | 18        |
| 10.3 Relay outputs                                                              | 18        |
| 10.4 Current output                                                             | 19        |
| 10.5 Connections of controller stop, sample-water sensor and temperature sensor | 19        |
| 10.6 Connection of measuring cells                                              | 20        |
| <b>11. Operation</b>                                                            | <b>24</b> |
| 11.1 Control and display elements                                               | 24        |
| 11.2 Display elements during initial commissioning                              | 25        |
| 11.3 Software overview                                                          | 27        |
| 11.4 Main menu                                                                  | 28        |
| 11.5 Setup                                                                      | 29        |
| 11.6 Selection, configuration and parameterisation of the controller            | 35        |
| 11.7 "Alarm" menu                                                               | 40        |
| 11.8 Checking the settings in the "service" menu                                | 42        |
| 11.9 Calibration                                                                | 44        |
| 11.10 Manual operation                                                          | 48        |

|                          |           |
|--------------------------|-----------|
| <b>12. Fault finding</b> | <b>51</b> |
| <b>13. Maintenance</b>   | <b>51</b> |
| <b>14. Disposal</b>      | <b>51</b> |



### Warning

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



These complete installation and operating instructions are also available on [www.grundfos.com](http://www.grundfos.com).

## 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. A few words in advance

The **Conex® DIA-2** is a multipurpose device designed to carry out high-precision measurements and controls of the following:

- a value from parameter group 1:
  - chlorine, chlorine dioxide, ozone or hydrogen peroxide
- a value from parameter group 2:
  - pH value.

The integrated controller, the high-resolution graphics display and the multilingual plain-text user interface make complicated measuring and control tasks in water chemistry much easier.

Just a few button inputs lead you to your goal. The potentiostat helps save even more time, being automatically matched to the various input variables.

The safety standard of the dosing process is raised by the automatic open-circuit monitoring of the current outputs.

Properties of the **Conex® DIA-2** measuring amplifier and controller include the following:

- all control functions including PID and continuous-action controls
- setpoint control
- manual or automatic temperature compensation
- logbook function: chronological recording of calibration values 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.

3. Instrument settings

| Parameter 1                                                   |                                                                                                                |                                                           |                                                                                        |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------|
| Setup                                                         |                                                                                                                | Controller                                                | Alarm                                                                                  |
| Parameter                                                     | Controller                                                                                                     | Proportional Xp<br>%                                      | Alarm<br>On:_<br>Off: _                                                                |
| Chlorine:_<br>Chlorine dioxide:_<br>Ozone:_<br>Peroxide: _    | <b>Setpoint contrl.</b><br>Off:_<br>Limit:_<br>Interpulse ctrl.:_<br>Pulse freq. ctrl:_<br>Cont. controller: _ | <b>Reset time TN</b><br>(PI/PID control)<br><br>sec.      | <b>Alarm value 1</b><br>Switching point                                                |
| <b>Temp. meas.</b><br>Yes:_<br>No: _                          | <b>Limit contact</b><br>Downward viol.:_<br>Upward violation: _                                                | <b>Deriv. action Tv</b><br>(PID control)<br><br>sec.      | <b>Alarm value 1</b><br>Switching direction<br>Upward violation:_<br>Downward viol.: _ |
| <b>Temp. comp.</b><br>Yes:_<br>No: _                          | <b>Ctrl. direction</b><br>Downward control:_<br>Upward control: _                                              | <b>Int.pulse period</b><br>(interpulse ctrl.)<br><br>sec. | <b>Alarm value 2</b><br>Switching point                                                |
| <b>pH compensation</b><br>Yes:_<br>No: _                      | <b>Type of control</b><br>P: _<br>PI: _<br>PID: _                                                              | <b>Min. ON time</b><br>(interpulse ctrl.)<br><br>sec.     | <b>Alarm value 2</b><br>Switching direction<br>Upward violation:_<br>Downward viol.: _ |
| <b>Measuring ranges</b><br><br>mg/l (ppm)                     |                                                                                                                | <b>Max. frequency</b><br>(pulse freq. ctrl)<br><br>n/min  | <b>Hysteresis</b>                                                                      |
| <b>Current output 1</b><br><br>mA                             |                                                                                                                | <b>Setpoint</b><br>(limit contact)                        | <b>Alarm delay</b><br><br>sec.                                                         |
| <b>Measuring cell</b>                                         |                                                                                                                | <b>Constant load</b><br><br>%                             | <b>Dos. time monit.</b><br>On:_<br>Off: _                                              |
| <b>Measuring cell type</b>                                    |                                                                                                                | <b>Max. dosing flow</b><br><br>%                          | <b>Dos. time monit.</b><br>Max. dosing time<br><br>min                                 |
| <b>Cleaning motor</b><br>Monitoring on:_<br>Monitoring off: _ |                                                                                                                | <b>Limit</b><br>(limit contact)                           |                                                                                        |
| <b>Water sensor</b><br>On:_<br>Off: _                         |                                                                                                                | <b>Hysteresis</b><br>(limit contact)                      |                                                                                        |

| Parameter 2                               |                                                                                                                 |                                                           |                                                                                         |  |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------|--|
| Setup                                     |                                                                                                                 | Controller                                                | Alarm                                                                                   |  |
| Parameter                                 | Controller                                                                                                      | Proportional Xp<br>%                                      | Alarm<br>On:_<br>Off: _                                                                 |  |
| pH                                        | <b>Setpoint ctrl.</b><br>Off: _<br>Limit: _<br>Interpulse ctrl: _<br>Pulse freq. ctrl: _<br>Cont. controller: _ | <b>Reset time TN</b><br>(PID control)<br><br>sec.         | <b>Alarm value 1</b><br>Switching point                                                 |  |
| <b>Temp. meas.</b><br>Yes: _<br>No: _     | <b>Limit contact</b><br>Downward viol.: _<br>Upward violation: _                                                | <b>Deriv. action TV</b><br>(PID control)<br><br>sec.      | <b>Alarm value 1</b><br>Switching direction<br>Upward violation: _<br>Downward viol.: _ |  |
| <b>Temp. comp.</b><br>Yes: _<br>No: _     | <b>Control direction</b><br>Downward control: _<br>Upward control: _                                            | <b>Int.pulse period</b><br>(interpulse ctrl.)<br><br>sec. | <b>Alarm value 2</b><br>Switching point                                                 |  |
| <b>pH compensation</b><br>Yes: _<br>No: _ | <b>Type of control</b><br>P: _<br>PI: _<br>PID: _                                                               | <b>Min. ON time</b><br>(interpulse ctrl.)<br><br>sec.     | <b>Alarm value 2</b><br>Switching direction<br>Upward violation: _<br>Downward viol.: _ |  |
| <b>Measuring ranges</b><br><br>mg/l (ppm) |                                                                                                                 | <b>Max. frequency</b><br>(pulse freq. ctrl)<br><br>n/min  | <b>Hysteresis</b>                                                                       |  |
| <b>Current output 1</b><br><br>mA         |                                                                                                                 | <b>Setpoint</b><br>(limit contact)                        | <b>Alarm delay</b><br><br>sec.                                                          |  |
|                                           |                                                                                                                 | <b>Constant load</b><br><br>%                             | <b>Dos. time monit.</b><br>On: _<br>Off: _                                              |  |
|                                           |                                                                                                                 | <b>Max. dosing flow</b><br><br>%                          | <b>Dos. time monit.</b><br>Max. dosing time<br><br>min                                  |  |
|                                           |                                                                                                                 | <b>Limit</b><br>(limit contact)                           |                                                                                         |  |
|                                           |                                                                                                                 | <b>Hysteresis</b><br>(limit contact)                      |                                                                                         |  |

## 4. General information

These installation and operating instructions contain all information important for users of the **Conex® DIA-2**:

- 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. 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.

## 5. Applications

The **Conex® DIA-2** instrument amplifier and controller is suitable for measuring chlorine ( $\text{Cl}_2$ ), chlorine dioxide ( $\text{ClO}_2$ ), ozone ( $\text{O}_3$ ), hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) and pH and for controlling these variables using appropriate actuators within the applications described in this manual.



### Warning

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

## 6. Safety

### 6.1 Obligations of the owner/operations manager

The owner/operations manager must ensure that persons working with the **Conex® DIA-2** instrument amplifier and controller 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.

### 6.2 Avoidance of danger



### Warning

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

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 repair must only be carried out by authorised personnel!

**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!

7. Identification

7.1 Nameplate

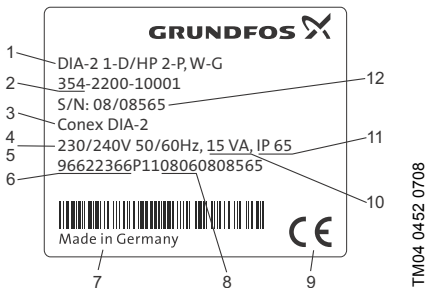


Fig. 1     Nameplate, Conex® DIA-2

| Pos. | Description                      |
|------|----------------------------------|
| 1    | Type designation                 |
| 2    | Model                            |
| 3    | Product name                     |
| 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                    |

7.2 Type key, Conex® DIA-2 controllers

Type key example: DIA-2, 1-D/HP 2-P, W-G

| Example:                                  |                                                                                              | DIA | -2 | 1-D/HP | 2-P | -W | -G |
|-------------------------------------------|----------------------------------------------------------------------------------------------|-----|----|--------|-----|----|----|
| <b>Measuring amplifier and controller</b> |                                                                                              |     |    |        |     |    |    |
| DIA-2                                     | Dosing Instrumentation Advanced with 2 inputs                                                |     |    |        |     |    |    |
| <b>Input parameter 1</b>                  |                                                                                              |     |    |        |     |    |    |
| D                                         | Chlorine (Cl <sub>2</sub> ), chlorine dioxide (ClO <sub>2</sub> ) or ozone (O <sub>3</sub> ) |     |    |        |     |    |    |
| HP                                        | Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )                                           |     |    |        |     |    |    |
| <b>Input parameter 2</b>                  |                                                                                              |     |    |        |     |    |    |
| P                                         | pH                                                                                           |     |    |        |     |    |    |
| <b>Mounting</b>                           |                                                                                              |     |    |        |     |    |    |
| W                                         | Wall-mounted                                                                                 |     |    |        |     |    |    |
| P                                         | Panel-mounted                                                                                |     |    |        |     |    |    |
| <b>Voltage</b>                            |                                                                                              |     |    |        |     |    |    |
| G                                         | 1 x 230 V, 50/60 Hz                                                                          |     |    |        |     |    |    |
| H                                         | 1 x 120 V, 50/60 Hz                                                                          |     |    |        |     |    |    |
| I                                         | 24 VDC                                                                                       |     |    |        |     |    |    |



### 7.3 Type key, Conex® DIA-2 preassembled systems

Type key example: DIA-2-A, D1-P-PT-PCB-QS-T, W-G

| Example:                                 |                                                  | DIA | -2 | -A | D1 | -P | -PT | -PCB | -QS | -T | W | -G |
|------------------------------------------|--------------------------------------------------|-----|----|----|----|----|-----|------|-----|----|---|----|
| <b>Units for measurement and control</b> |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| DIA-2                                    | Dosing Instrumentation Advanced, with 2 inputs   |     |    |    |    |    |     |      |     |    |   |    |
| <b>Assembly</b>                          |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| A                                        | Preassembled                                     |     |    |    |    |    |     |      |     |    |   |    |
| <b>Cell type</b>                         |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| D1                                       | Pressure-proof, with cleaning motor              |     |    |    |    |    |     |      |     |    |   |    |
| D11                                      | Pressure-proof, with cleaning motor              |     |    |    |    |    |     |      |     |    |   |    |
| D2                                       | Pressure-proof, with hydro-mechanical cleaning   |     |    |    |    |    |     |      |     |    |   |    |
| D12                                      | Pressure-proof, with hydro-mechanical cleaning   |     |    |    |    |    |     |      |     |    |   |    |
| D3                                       | Pressureless, with hydro-mechanical cleaning     |     |    |    |    |    |     |      |     |    |   |    |
| D13                                      | Pressureless, with hydro-mechanical cleaning     |     |    |    |    |    |     |      |     |    |   |    |
| D4                                       | For total chlorine measurement                   |     |    |    |    |    |     |      |     |    |   |    |
| D5                                       | For free chlorine measurement with buffer dosing |     |    |    |    |    |     |      |     |    |   |    |
| P/R                                      | pH or redox (ORP) only                           |     |    |    |    |    |     |      |     |    |   |    |
| P                                        | With pressure retention valve                    |     |    |    |    |    |     |      |     |    |   |    |
| X                                        | Without pressure retention valve                 |     |    |    |    |    |     |      |     |    |   |    |
| <b>Disinfection electrodes</b>           |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| AU                                       | Gold                                             |     |    |    |    |    |     |      |     |    |   |    |
| PT                                       | Platinum                                         |     |    |    |    |    |     |      |     |    |   |    |
| X                                        | No disinfection measuring                        |     |    |    |    |    |     |      |     |    |   |    |
| <b>Other electrodes</b>                  |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| PCB                                      | pH, ceramic diaphragm, incl. buffer solution     |     |    |    |    |    |     |      |     |    |   |    |
| PTB                                      | pH, PTFE diaphragm, incl. buffer solution        |     |    |    |    |    |     |      |     |    |   |    |
| PKB                                      | pH, KCl filling, incl. buffer solution           |     |    |    |    |    |     |      |     |    |   |    |
| PGB                                      | pH, gel filling incl. buffer solution            |     |    |    |    |    |     |      |     |    |   |    |
| PCX                                      | pH, ceramic diaphragm, excl. buffer solution     |     |    |    |    |    |     |      |     |    |   |    |
| PTX                                      | pH, PTFE diaphragm, excl. buffer solution        |     |    |    |    |    |     |      |     |    |   |    |
| PKX                                      | pH, KCL filling, excl. buffer solution           |     |    |    |    |    |     |      |     |    |   |    |
| PGX                                      | pH, gel filling, excl. buffer solution           |     |    |    |    |    |     |      |     |    |   |    |
| X                                        | No electrode                                     |     |    |    |    |    |     |      |     |    |   |    |
| <b>Flow sensor</b>                       |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| QS                                       | Flow sensor integrated                           |     |    |    |    |    |     |      |     |    |   |    |
| X                                        | No flow sensor                                   |     |    |    |    |    |     |      |     |    |   |    |
| <b>Temperature sensor</b>                |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| T                                        | With Pt100                                       |     |    |    |    |    |     |      |     |    |   |    |
| X                                        | No temperature sensor                            |     |    |    |    |    |     |      |     |    |   |    |
| <b>Mounting</b>                          |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| W                                        | Wall-mounted                                     |     |    |    |    |    |     |      |     |    |   |    |
| P                                        | Panel-mounted                                    |     |    |    |    |    |     |      |     |    |   |    |
| <b>Voltage</b>                           |                                                  |     |    |    |    |    |     |      |     |    |   |    |
| G                                        | 1 x 230 V, 50/60 Hz                              |     |    |    |    |    |     |      |     |    |   |    |
| H                                        | 1 x 120 V, 50/60 Hz                              |     |    |    |    |    |     |      |     |    |   |    |
| I                                        | 24 VDC                                           |     |    |    |    |    |     |      |     |    |   |    |

## 8. Technical data

### 8.1 Design / enclosure class

|                                                                   |                                                                                                                                                        |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wall-mounted enclosure (distance from sensors up to three metres) | IP65                                                                                                                                                   |
| Control panel enclosure including separate potentiostat           | IP54 (front) / IP65 (sensor interface) (distance from sensor interface up to 100 metres, distance from sensor interface to sensors up to three metres) |

### 8.2 General data

|                                 |                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Input power                     | Approximately 15 VA                                                                                                                         |
| Permissible ambient temperature | 0 °C to +45 °C                                                                                                                              |
| Permissible storage temperature | -20 °C to +65 °C                                                                                                                            |
| Maximum relative humidity       | 90 % (non-condensing)                                                                                                                       |
| Weight                          | 1.5 kg                                                                                                                                      |
| Enclosure                       | Plastic (control panel enclosure: noryl, wall-mounted enclosure: ABS)                                                                       |
| Power supply versions           | <ul style="list-style-type: none"> <li>• 230/240 V (50/60 Hz) (standard model)</li> <li>• 115/120 V (50/60 Hz)</li> <li>• 24 VDC</li> </ul> |

## 8.3 Electronic data and functions

### 8.3.1 Electronics

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electronics                                          | 16-bit microprocessor                                                                                                                                                                                                                                                                                                                                                                     |
| Display                                              | High-resolution graphics LCD with background light                                                                                                                                                                                                                                                                                                                                        |
| Potential-free relay outputs                         | 1 alarm relay, 2 controller relays (250 V / 6 A, maximum 550 VA)                                                                                                                                                                                                                                                                                                                          |
| Signal inputs                                        | Controller stop; water sensor                                                                                                                                                                                                                                                                                                                                                             |
| Signal outputs                                       | 4 analog outputs 0/4 to 20 mA, freely adjustable, maximum load 500 Ω                                                                                                                                                                                                                                                                                                                      |
| Freely adjustable analog outputs for measured values | <ul style="list-style-type: none"> <li>• Parameter group 1: chlorine, chlorine dioxide, ozone or peroxide</li> <li>• Parameter group 2: pH</li> <li>• For temperature or continuous control (0/4 to 20 mA) of the parameters from group 2 (pH)</li> <li>• For continuous control (0/4 to 20 mA) of the parameters from group 1 (chlorine, chlorine dioxide, ozone or peroxide)</li> </ul> |

### 8.3.2 Functions of the instrument amplifier

|                          |                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------|
| Display mode             | Measured-value display: measured value with its unit, temperature display: in °C or °F |
| Temperature compensation | Manual or automatic with Pt100                                                         |
| Calibration              | Manual, or with automatic recognition of buffer solution                               |

### 8.3.3 Setpoint controller functions

|                              |                                                                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Controller output            | Limit monitor, interpulse controller (P, PI, PID), pulse frequency controller (P, PI, PID), continuous controller (P, PI, PID) |
| Limit                        | 0 to 100 % of measuring range, adjustable in the unit of the measured value (only with limit monitor)                          |
| Hysteresis                   | 0 to 50 % of full-scale value, adjustable in the unit of the measured value (only with limit monitor)                          |
| Setpoint input               | 0 to 100 % of measuring range, adjustable in the unit of the measured value                                                    |
| Proportional band $X_p$      | 0.1 to 3000.0 %                                                                                                                |
| Reset time $T_n$             | 1 to 3000 seconds, resolution 1 second (only with PI, PID controllers)                                                         |
| Derivative action time $T_v$ | 0 to 1000 seconds, resolution one second (only with PID controller)                                                            |
| Interpulse period            | 1 to 100 seconds (only with interpulse controller)                                                                             |
| Minimum ON time $T_{min}$    | 0.1 to 10.0 seconds (only with interpulse controller)                                                                          |
| Maximum frequency            | 1 to 180 pulses per minute (only with pulse frequency controller)                                                              |
| Basic load                   | 0 to 50 % of dosing rate                                                                                                       |
| Maximum dosing rate          | Value (basic load + 1) to 100 % of dosing rate                                                                                 |
| Control direction            | Adjustable to upward or downward control                                                                                       |
| Controller stop              | Adjustable to NC or NO                                                                                                         |

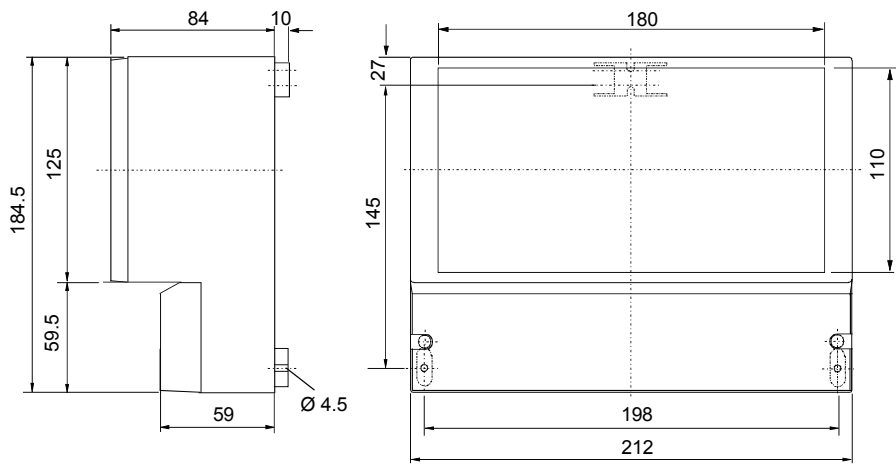
### 8.4 Measuring ranges

| $Cl_2$       | $ClO_2$      | $O_3$       | $H_2O_2$ | pH           | Pt100      |
|--------------|--------------|-------------|----------|--------------|------------|
| mg/l         | mg/l         | mg/l        | mg/l     | pH           | °C         |
| 0.00 - 0.50  | 0.00 - 0.50  | 0.00 - 0.50 | 0-100    | 0.00 - 14.00 | -5 to +120 |
| 0.00 - 1.00  | 0.00 - 1.00  | 0.00 - 1.00 | 0-500    | 2.00 - 12.00 |            |
| 0.00 - 2.00  | 0.00 - 2.00  | 0.00 - 2.00 | 0-1000   | 5.00 - 9.00  |            |
| 0.00 - 5.00  | 0.00 - 5.00  | 0.00 - 5.00 | 0-2000   |              |            |
| 0.00 - 10.00 | 0.00 - 10.00 |             |          |              |            |
| 0.00 - 20.00 |              |             |          |              |            |

**Note**

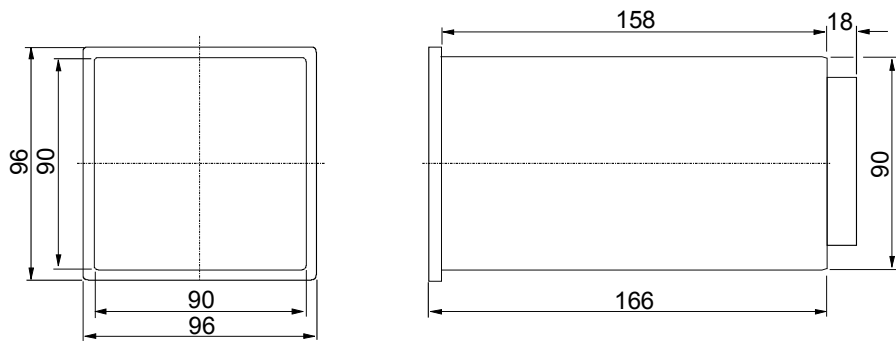
The measuring ranges are also freely adjustable (within the above-mentioned range limits).

8.5 Dimensions



TM03 6687 4506

Fig. 2 Wall-mounted enclosure Conex® DIA-2



TM03 6688 4506

Fig. 3 Control panel enclosure Conex® DIA-2

## 9. Installation

### 9.1 Transport and storage

- Transport the device carefully, do not drop!
- Store at dry and cool location.

### 9.2 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.

### 9.3 Installation requirements

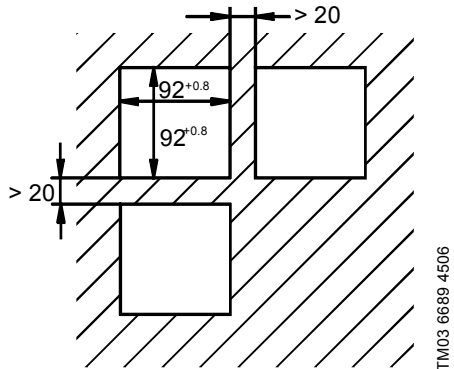
- Dry room
- Room temperature: 0 °C to 45 °C
- Vibration-free location.

#### Caution

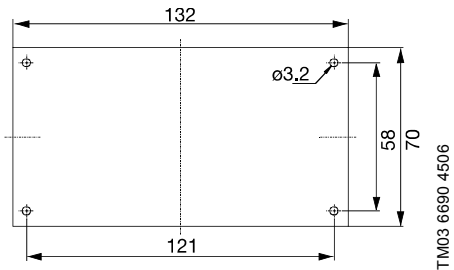
If you do not observe the installation requirements, the device may be damaged!

The measurements may not be correct!

### 9.4 Installation in control panel



**Fig. 4** Control panel enclosure Conex® DIA-2



**Fig. 5** Sensor interface

1. Make an opening of  $92 + 0.8$  mm x  $92 + 0.8$  mm in the control panel.
2. Slip on the supplied gasket.
3. Insert the **Conex® DIA-2** into the opening from the front.

#### Caution

Do not damage the gasket!

The gasket must be fitted exactly!

1. Hook the clamps into the tightening cones on the sides at the top and bottom.
2. Secure the device from the rear using a screwdriver.
3. Install a separate sensor interface near the sensors (maximum distance of three metres).

## 9.5 Installation of wall-mounted enclosure

### Warning

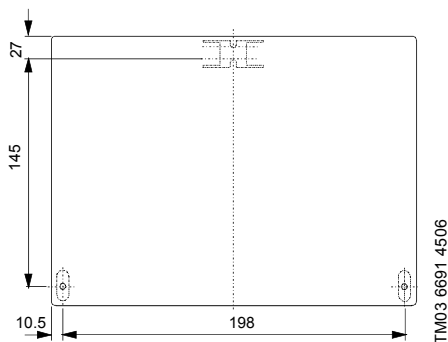
Switch off the power supply before installing!



Enclosure class IP65 is only guaranteed if the terminal cover is correctly sealed, if the front panel of the terminal enclosure is closed and the appropriate cable glands or dummy caps fitted.

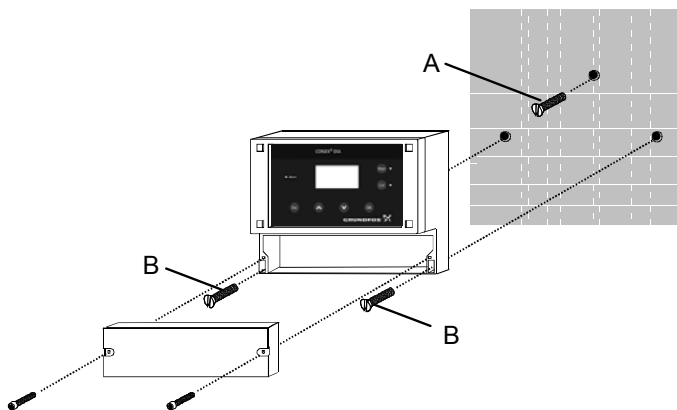
### Caution

Do not damage the terminal cover gasket! The terminal cover gasket must fit exactly!



**Fig. 6** Wall-mounted enclosure Conex® DIA-2

1. Drill three holes ( $\varnothing 8$  mm) as shown in the diagram, and insert the supplied dowels.
2. Screw the screw (A) into the top centre dowel until it projects by approximately 1 cm. See fig. 7.
3. Loosen the fastening screws of the front panel, and remove the front panel.
4. Hang the instrument onto the screw (A).
5. Tighten the instrument with the two screws (B).
6. Mount the front panel of the enclosure.



**Fig. 7** Mounting drawing

TM03 6692 4506

## 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

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

Observe the local safety regulations!

Protect the cable connections and plugs from corrosion and moisture.

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.

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

### Caution

The gasket on the terminal cover must be positioned precisely!

Do not damage the gasket!

### Note

Unused terminals must remain open.

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

10.1 Terminals

10.1.1 Wall-mounted enclosure Conex® DIA-2

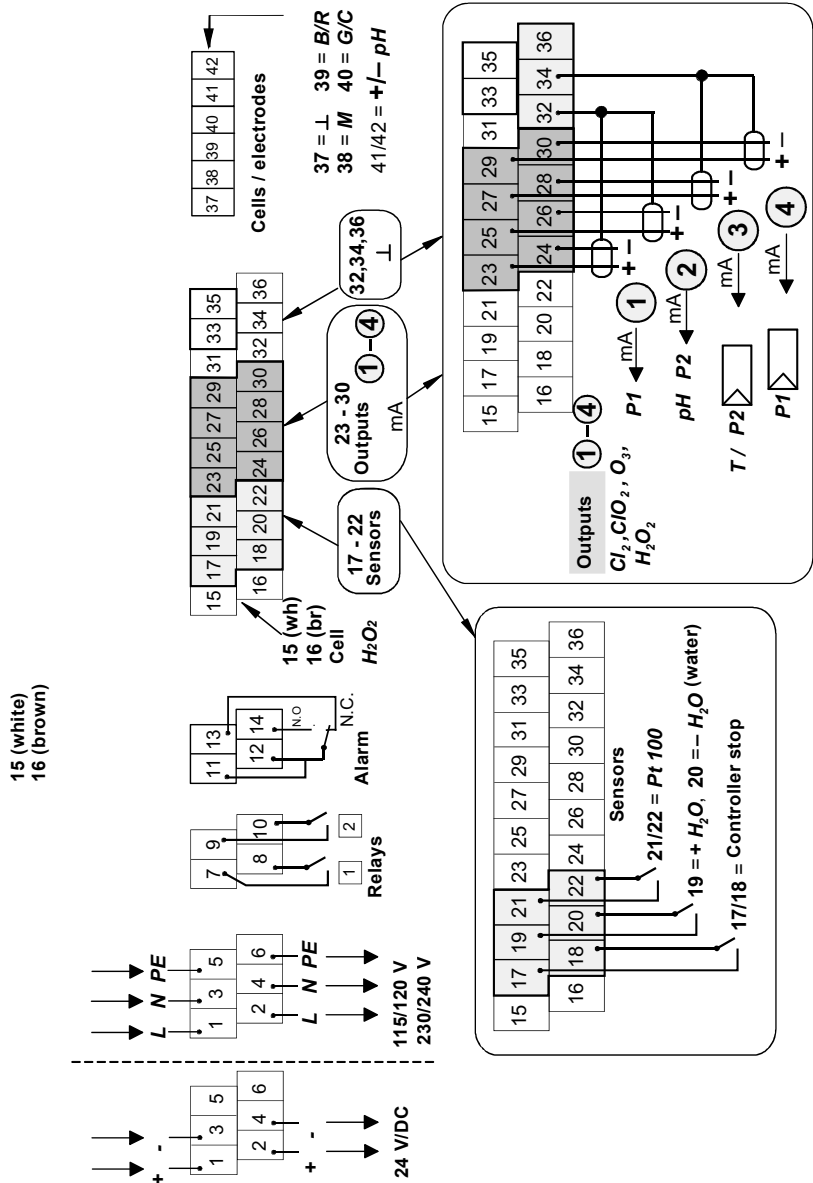
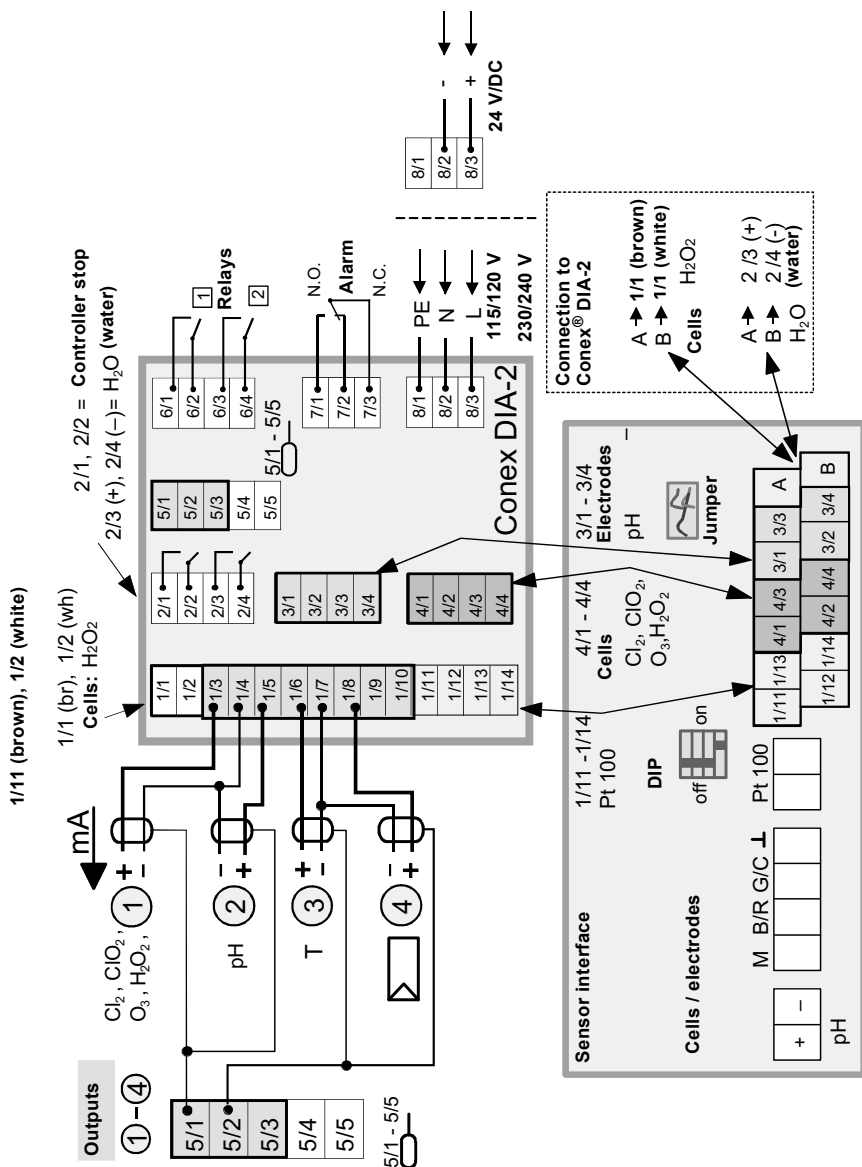


Fig. 8 Terminals of wall-mounted enclosure





**Fig. 9** Terminals of control panel enclosure

Legend of terminals

| Pos.             | Description                                                                                                                                           |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relays           | Relay 1 + 2                                                                                                                                           |
| Alarm            | Alarm relay<br>– <b>N.O.:</b> normally open<br>– <b>N.C.:</b> normally closed                                                                         |
| Pt100            | Temperature sensor                                                                                                                                    |
| H <sub>2</sub> O | Water sensor                                                                                                                                          |
| Stop             | Controller stop<br>(NO or NC selectable)                                                                                                              |
| Outputs          | Current outputs [mA]                                                                                                                                  |
| 1                | Cl <sub>2</sub> (chlorine),<br>ClO <sub>2</sub> (chlorine dioxide),<br>O <sub>3</sub> (ozone) or<br>H <sub>2</sub> O <sub>2</sub> (hydrogen peroxide) |
| 2                | pH                                                                                                                                                    |
| 3                | T/P2: temperature / continuous<br>controller parameter 2                                                                                              |
| 4                | P1: output of continuous controller<br>parameter 1                                                                                                    |
| Electrodes       | Measuring cells, electrodes and<br>single-rod measuring chains                                                                                        |
| M                | Measuring electrode                                                                                                                                   |
| B/R              | Reference electrode                                                                                                                                   |
| G/C              | Counter electrode                                                                                                                                     |
| Earth            |                                                                                                                                                       |
| mV               | pH electrode                                                                                                                                          |
| Screen           |                                                                                                                                                       |

Control panel enclosure **Conex® DIA-2**

- **Conex® DIA-2:** for installation in the control panel.
- Sensor interface: for installation near the sensors.

10.2 Power supply connection

1. Control panel enclosure: Plug the plug strip into the corresponding terminal strip at the rear side of the device. Ensure correct orientation.
2. Connect the protective earth conductor (PE) to terminal 5 (wall-mounted enclosure) or terminal 8/1 (control panel enclosure).
3. Connect the neutral conductor (N) (or the - conductor with 24 V version) to terminal 3 (wall-mounted enclosure) or terminal 8/2 (control panel enclosure).
4. Connect phase (L1) (or the + conductor with 24 V version) to terminal 1 (wall-mounted enclosure) or 8/3 (control panel enclosure).

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.

10.3 Relay outputs

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.

**Note**

With inductive loads (also 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 nF, 275 V  | 390 Ω, 2 W |
| 70 mA         | 47 nF, 275 V  | 22 Ω, 2 W  |
| 150 mA        | 100 nF, 275 V | 47 Ω, 2 W  |
| 1.0 A         | 220 nF, 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!

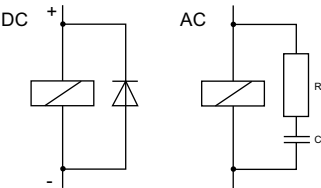


Fig. 10 Suppressor circuit, DC/AC

TM03 7209 2813

## 10.4 Current output

### Caution

Make sure that the polarity of the current output is correct!

Maximum load: 500  $\Omega$ .

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: chlorine, chlorine dioxide, ozone, hydrogen peroxide (parameter 1)

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

Use of current signal for measured values:

- as input signal for another indicator
  - as input signal for an external controller.
1. Connect the + conductor to terminal 23 (wall-mounted enclosure) or terminal 1/3 (control panel enclosure).
  2. Connect the - conductor to terminal 24 (wall-mounted enclosure) or terminal 1/4 (control panel enclosure).

### Output 2: pH (parameter 2)

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

Use of current signal for measured values:

- as input signal for another indicator
  - as input signal for an external controller.
1. Connect the + conductor to terminal 25 (wall-mounted enclosure) or terminal 1/5 (control panel enclosure).
  2. Connect the - conductor to terminal 26 (wall-mounted enclosure) or terminal 1/4 (control panel enclosure).

### Output 3: continuous controller parameter 2 (or temperature)

Shows the calculated actuating variable signal of the controller as an analog current signal.

Use of actuating variable signal:

- as input signal for a final control element with current input

or temperature output:

Shows the temperature measured by the optional temperature sensor as an analog current signal.

Use of temperature current signal:

- as input signal for another indicator.
1. Connect the + conductor to terminal 27 (wall-mounted enclosure) or terminal 1/6 (control panel enclosure).
  2. Connect the - conductor to terminal 28 (wall-mounted enclosure) or terminal 1/7 (control panel enclosure).

### Output 4: continuous control parameter 1

This current output shows the calculated actuating variable signal as an analog current signal.

Use of actuating variable signal:

- as input signal for a continuous final control element.
1. Connect the + conductor to terminal 29 (wall-mounted enclosure) or terminal 1/8 (control panel enclosure).
  2. Connect the - conductor to terminal 30 (wall-mounted enclosure) or terminal 1/7 (control panel enclosure).

## 10.5 Connections of controller stop, sample-water sensor and temperature sensor

### Connecting the controller stop

1. Connect the + conductor to terminal 17 (wall-mounted enclosure) or terminal 2/1 (control panel enclosure).
2. Connect the - conductor to terminal 18 (wall-mounted enclosure) or terminal 2/2 (control panel enclosure).

### Connecting the sample-water sensor

Cable colours and marking: See connections of measuring-cell types AQC-D1/-D11/AQC-D2/-D12/AQC-D3/-D13.

1. Connect the + conductor to terminal 19 (wall-mounted enclosure) or terminal 2/3 (control panel enclosure).
2. Connect the - conductor to terminal 20 (wall-mounted enclosure) or terminal 2/4 (control panel enclosure).

### Note

When using measuring cell AQC-D2/-D12, the water sensor must always be connected and activated!

### Connecting the Pt100 temperature sensor

1. Connect the + conductor to terminal 21 (wall-mounted enclosure) or terminal 1/11 (control panel enclosure).
2. Connect the - conductor to terminal 22 (wall-mounted enclosure) or terminal 1/12 (control panel enclosure).

## 10.6 Connection of measuring cells

### Jumper setting

- All cell types: position 1 (standard).



Fig. 11 Jumper setting

### 10.6.1 Connection of wall-mounted enclosure Conex® DIA-2

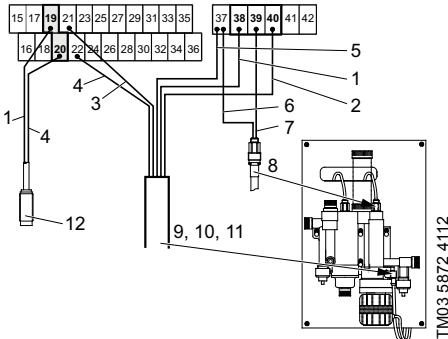


Fig. 12 Connection to measuring cells AQC-D1/AQC-D2/AQC-D3

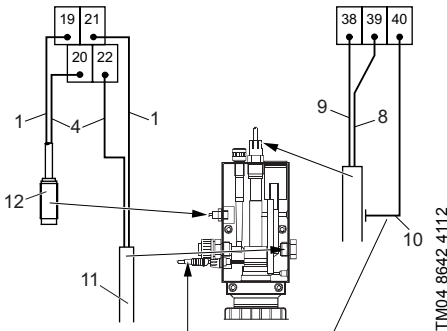


Fig. 13 Connection to measuring cell AQC-D11

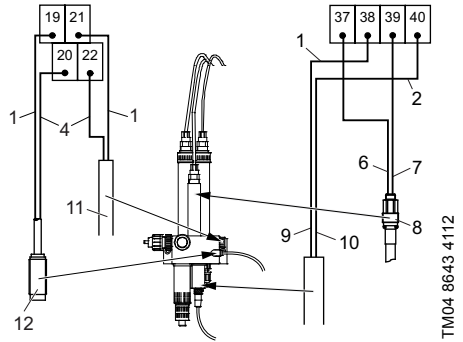


Fig. 14 Connection to measuring cell AQC-D12

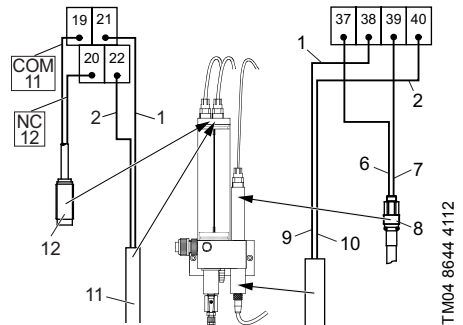


Fig. 15 Connection to measuring cell AQC-D13

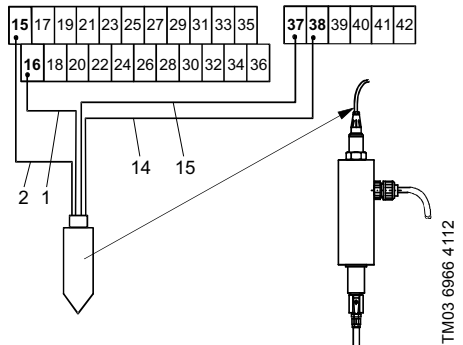
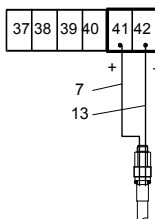


Fig. 16 Connection to measuring cells HP (peroxide)

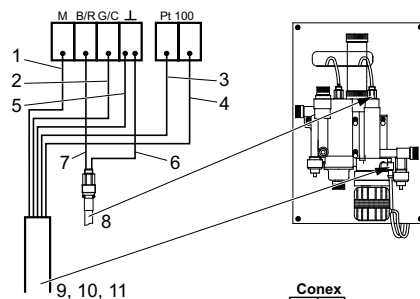


**Fig. 17** Connection to single-rod measuring chains for pH, redox

TM03 6967 4506

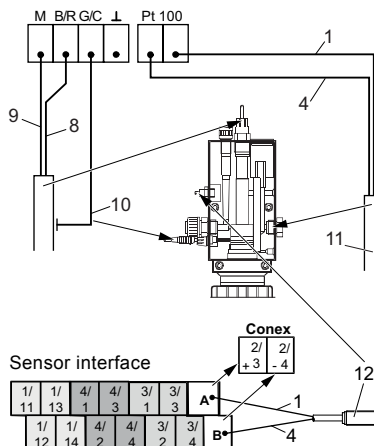
| Pos. | Description              |
|------|--------------------------|
| 1    | Brown                    |
| 2    | White                    |
| 3    | Black                    |
| 4    | Blue                     |
| 5    | Screen                   |
| 6    | Outer conductor (screen) |
| 7    | Inner conductor          |
| 8    | Reference electrode      |
| 9    | Measuring electrode      |
| 10   | Counter electrode        |
| 11   | Pt100 temperature sensor |
| 12   | Water sensor             |
| 13   | Outer conductor          |
| 14   | Yellow                   |
| 15   | Green                    |

## 10.6.2 Connection of control panel enclosure Conex® DIA-2



**Fig. 18** Connection to measuring cells  
AQC-D1/AQC-D2/AQC-D3

TM03 5871 4212



**Fig. 19** Connection to measuring cell  
AQC-D11

TM04 8645 4112

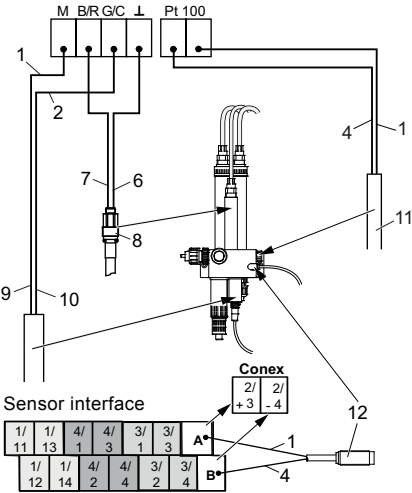


Fig. 20 Connection to measuring cell AQC-D12

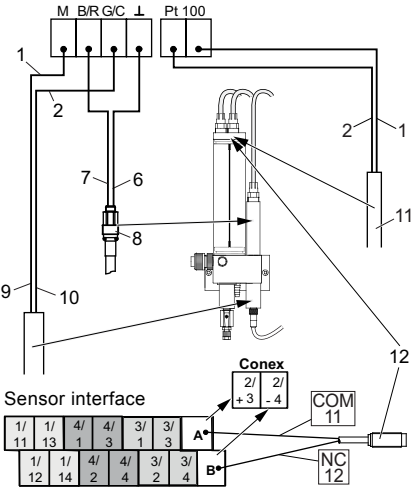


Fig. 21 Connection to measuring cell AQC-D13

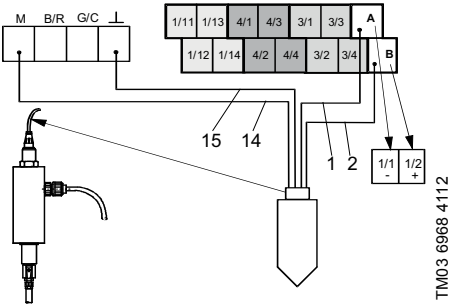


Fig. 22 Connection to measuring cells HP (peroxide)

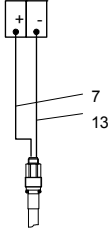


Fig. 23 Connection to single-rod measuring chains for pH, redox

| Pos. | Description              |
|------|--------------------------|
| 1    | Brown                    |
| 2    | White                    |
| 3    | Black                    |
| 4    | Blue                     |
| 5    | Screen                   |
| 6    | Outer conductor (screen) |
| 7    | Inner conductor          |
| 8    | Reference electrode      |
| 9    | Measuring electrode      |
| 10   | Counter electrode        |
| 11   | Pt100 temperature sensor |
| 12   | Water sensor             |
| 13   | Outer conductor          |
| 14   | Yellow                   |
| 15   | Green                    |

### Peculiarities for the connection at the control panel enclosure of Conex<sup>®</sup> DIA-2

1. First connect the measuring cells, the single-rod measuring chains and the water sensor (if present) to the separate sensor interface.
2. Secondly, connect the sensor interface to the Conex<sup>®</sup> DIA-2 control panel enclosure.

### Connecting the sensor interface to the Conex<sup>®</sup> DIA-2 (see back side of device)

- **Measuring cells**  
**AQC-D1/-D11/AQC-D2/-D12/AQC-D3/-D13/ HP (peroxide)**  
Connect terminals 4/1 to 4/14 of the sensor interface to the corresponding terminals of the Conex<sup>®</sup> DIA-2.
- **Measuring cells HP (peroxide)**  
In addition, connect terminal A to terminal 1/1 and terminal B to terminal 1/2 of the Conex<sup>®</sup> DIA-2.
- **Single-rod measuring chains (pH)**  
Connect terminals 3/1 to 3/4 of the sensor interface to the corresponding terminals of the Conex<sup>®</sup> DIA-2.
- **Sample-water deficiency sensor**  
Connect terminal A to terminal 2/3 and terminal B to terminal 2/4 of the Conex<sup>®</sup> DIA-2.

#### Note

When using measuring cell AQC-D2/-D12, the water sensor must always be connected and activated!

### DIP switch

- If necessary, set the DIP switch for the desired measured value to "On" (move the switch to the right, top switch 1 is not used).

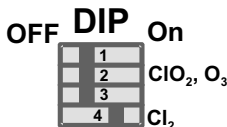


Fig. 24 DIP switch

TM03 6699 4506

## 11. Operation

### 11.1 Control and display elements

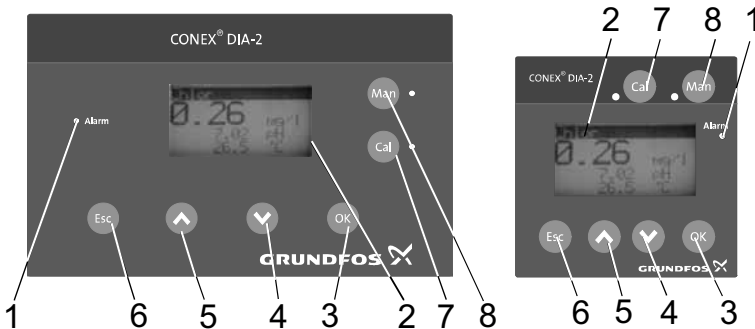


Fig. 25 Wall-mounted enclosure and control panel enclosure

TM03 9528 4107

| Pos.                                    | Description                                                                                                                                                                                                                |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control elements</b>                 |                                                                                                                                                                                                                            |
| 1                                       | Red alarm LED <ul style="list-style-type: none"> <li>Flashes in case of faults or incorrect entries.</li> </ul>                                                                                                            |
| 2                                       | Display                                                                                                                                                                                                                    |
| <b>Operating buttons</b>                |                                                                                                                                                                                                                            |
| 3                                       | [OK] button <ul style="list-style-type: none"> <li>Enters the selected menu.</li> <li>Confirms the selected line or value.</li> </ul>                                                                                      |
| 4                                       | [Down] button <ul style="list-style-type: none"> <li>Moves one line downward (the selected line is displayed inversely).</li> <li>Decreases values.</li> </ul>                                                             |
| 5                                       | [Up] button <ul style="list-style-type: none"> <li>Moves one line upward (the selected line is displayed inversely).</li> <li>Increases values.</li> </ul>                                                                 |
| 6                                       | [Esc] button <ul style="list-style-type: none"> <li>Returns to the previous menu. <ul style="list-style-type: none"> <li>The data which were entered last are not changed.</li> </ul> </li> </ul>                          |
| <b>Function buttons with yellow LED</b> |                                                                                                                                                                                                                            |
| 7                                       | [Cal] button <ul style="list-style-type: none"> <li>Switches between calibration and measuring mode. <ul style="list-style-type: none"> <li>In calibration mode, the corresponding LED illuminates.</li> </ul> </li> </ul> |
| 8                                       | [Man] button <ul style="list-style-type: none"> <li>Switches between automatic and manual modes. <ul style="list-style-type: none"> <li>In manual mode, the corresponding LED illuminates.</li> </ul> </li> </ul>          |



## 11.2 Display elements during initial commissioning

When connected to the power supply on the device's initial commissioning and following the start-up indication, the display shows the "Sprache/language" menu.

| Language/Langue... |
|--------------------|
| Deutsch            |
| English            |
| Français           |
| Nederlands         |

- The word "language" in the header is displayed in all available languages successively at intervals of approximately one second.

Start the **Conex® DIA-2** by selecting the desired operating language:

- Select the desired language using the [Up] and [Down] buttons.
  - The selected language is displayed inversely (white letters on black background).
- Press [OK] to confirm.

The selected language is stored and will remain the operating language when the device is rebooted. If necessary, the operating language can be changed in the "language" submenu in the "setup" menu.  
See section [11.5 Setup](#).

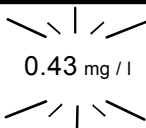
### Note

The translations for the words "**setup**" and "**language**" into the currently available languages are:

| Deutsch         |                  |          |
|-----------------|------------------|----------|
| Hauptmenü       | Grundeinstellung | Sprache  |
| English         |                  |          |
| main menu       | setup            | language |
| Français        |                  |          |
| Menu principal  | Paramétrage      | Langue   |
| Nederlands      |                  |          |
| hoofdmenu       | basisinstelling  | taal     |
| Español         |                  |          |
| Menu principal  | Ajuste básico    | Idioma   |
| Italiano        |                  |          |
| Menu principale | programm. fond.  | lingua   |
| Português       |                  |          |
| Menu principal  | Posição inicial  | Língua   |
| Русский         |                  |          |
| главное меню    | станд. настройка | язык     |
| Polski          |                  |          |
| menu główne     | ustawienia       | język    |

| chlorine  |
|-----------|
| 0.43 mg/l |

- After selecting and confirming the operating language by pressing [OK] during initial commissioning, the display shows "chlorine" as the value to be measured.
  - On subsequent start-ups, the display will show the measured value selected the previous time.

| chlorine                                                                                         |
|--------------------------------------------------------------------------------------------------|
| <br>0.43 mg / l |
| 5.20 pH c                                                                                        |
| 22 °C c                                                                                          |

- On upward or downward violation of the selected measuring range, the display will show the upper or lower limit and flash.

See sections [8.4 Measuring ranges](#) and [11.5.4 Setting the measuring ranges for chlorine, chlorine dioxide, ozone, peroxide and pH](#).

TM03 6704 4506

11.2.1 Display modes

Switching between display modes 1 and 2:

- 1. Use the [Up] and [Down] buttons to switch between the two display modes:

Display mode 1 with two parameters

| ClO <sub>2</sub> | pH   |
|------------------|------|
| 0.30             | mg/l |
| 4.00             | pH   |

The large display shows the measured values for the two parameters (for example ClO<sub>2</sub> and pH). The inverted font in the header displays the two parameters left-justified and right-justified.

The measured value for the left-justified parameter 1 is displayed in the first line, and the measured value for the right-justified parameter 2 is displayed in the second line underneath the header. The measured value for a possibly active temperature measurement is not output in this display mode.

Display mode 2 with two parameters

| ClO <sub>2</sub> | pH   |
|------------------|------|
| 0.30             | mg/l |
| 4.00             | pH c |
| 100.0            | °C c |

The large display shows the measured values for parameter 1, and the small display shows the measured values for parameter 2 and the possibly active temperature measurement. "c" is displayed if the compensation functions are active.

Display with one parameter

| ClO <sub>2</sub> |
|------------------|
| 0.30             |
| mg/l             |
| 100.0            |
| °C c             |

The large display shows the measured values, and the selected parameter is displayed in the header. The measured value for a possibly active temperature measurement is shown in the second line. "c" is displayed if the compensation functions are active.

Alarm signals

A parameter-based alarm refers to the flashing parameter in the header. Parameter-independent alarms are displayed in the bottom line, but the display does not flash for this alarm.

If several alarms are present, they can be scrolled using the [Up] and [Down] buttons. They are displayed in chronological order. The selected alarm signal is displayed with inverted font. Subsequently, the display is switched to the last display mode set.

Display mode with active alarms and two parameters

| ClO <sub>2</sub> | pH   |
|------------------|------|
| 0.30             | 4.00 |
| alarm line 1     |      |
| alarm line 2     |      |

The parameters are displayed left-justified and right-justified in the header, and the measured values of the parameters are displayed directly underneath. The measured value for a possibly active temperature measurement and the display "c", if the compensation functions are active, are suppressed.

Display mode with active alarms and one parameter

| ClO <sub>2</sub> |
|------------------|
| 0.30             |
| mg/l             |
| alarm line 1     |
| alarm line 2     |

The large display shows the measured values, and the selected parameter is displayed in the header. The measured value for a possibly active temperature measurement and the display "c", if the compensation functions are active, are suppressed.

## 11.3 Software overview

### Note

Provided that the code numbers for access right have been set, some menus (and submenus) as well as the functions Cal and Man are protected against unauthorised access. The protected menus are marked with "C" (calibration rights) or "F" (full rights).

### Main menus

- Controller 1/2, see section [Controller 1/2](#).
- Alarm 1/2, see section [Alarm 1/2](#).
- Service, see section [Service](#).
- Setup, see section [Setup](#).

### Function buttons

- Cal, see section [Calibration function](#).
- Man, see section [Manual operation](#).

### Controller 1/2

"F" (full rights)

Setting the parameters

- Relay 1/2
  - setpoint
  - controller parameters.
- Continuous controller
  - setpoint
  - controller parameters.

### Alarm 1/2

"F" (full rights)

- Alarm settings
  - alarm 1/2 values (switching points)
  - effective direction
  - hysteresis
  - alarm delay.
- Dosing time monitoring
  - maximum dosing time (at constant dosing flow level of 100 %).

### Service

- Calibration logbook 1/2
  - the last 10 calibrations.
- Calling up the controller 1/2 settings
- Test of functioning of current outputs
- Test of functioning of relays
- Test of functioning of display.

### Setup

"F" (full rights)

- Selecting language
- Parameter 1/2: selecting measured values
- Selecting measuring cell
- Selecting measuring range
- Configuration of controller 1/2
- Switching on/off water sensor
- Time setting
- Code function
- Display contrast
- Calling up factory settings
- Current output: assignment of current outputs to measuring ranges
- Calling up program version.

### Calibration function

"C" (calibration rights)

- Calibration of selected parameters
  - chlorine, chlorine dioxide, ozone, peroxide, pH.

### Manual operation

"C" (calibration rights)

- Running the configured controllers manually.

## 11.4 Main menu

1. Switch to "main menu" by pressing [OK] or, if necessary, by pressing [Esc] several times.

### Options in "main menu"

| main menu  |
|------------|
| controller |
| alarm      |
| service    |
| setup      |

- **"controller"**  
In this submenu, a controller can be parameterised. This option will only be displayed if a type of controller has been selected in the "setup" menu.
- **"alarm"**  
In this submenu, the measured value is compared with the permitted value, and an alarm is triggered, if necessary.
- **"service"**  
Diagnosis submenu. The measured values and the last 10 alterations of calibration data can be viewed. In this mode, values cannot be altered. If measuring cell AQC-D2/-D12 is selected, the data of the water sensor can be viewed.
- **"setup"**  
In this submenu, the settings for language, parameters, measuring ranges, controllers, etc. can be adjusted.

### Selecting the functions "calibration" and "manual operation"

See the buttons [Cal] and [Man] to the right of the display.

- **Calibration:** Press [Cal] to switch to the calibration menu (the yellow LED illuminates).
- **Manual operation:** Press [Man] to switch to manual operation (the yellow LED illuminates).

#### Note

Switching to manual operation is only possible if a controller type has been selected in the "setup" menu. The functions "Cal" and "Man" can only be accessed by persons with calibration rights or full rights.

## 11.5 Setup

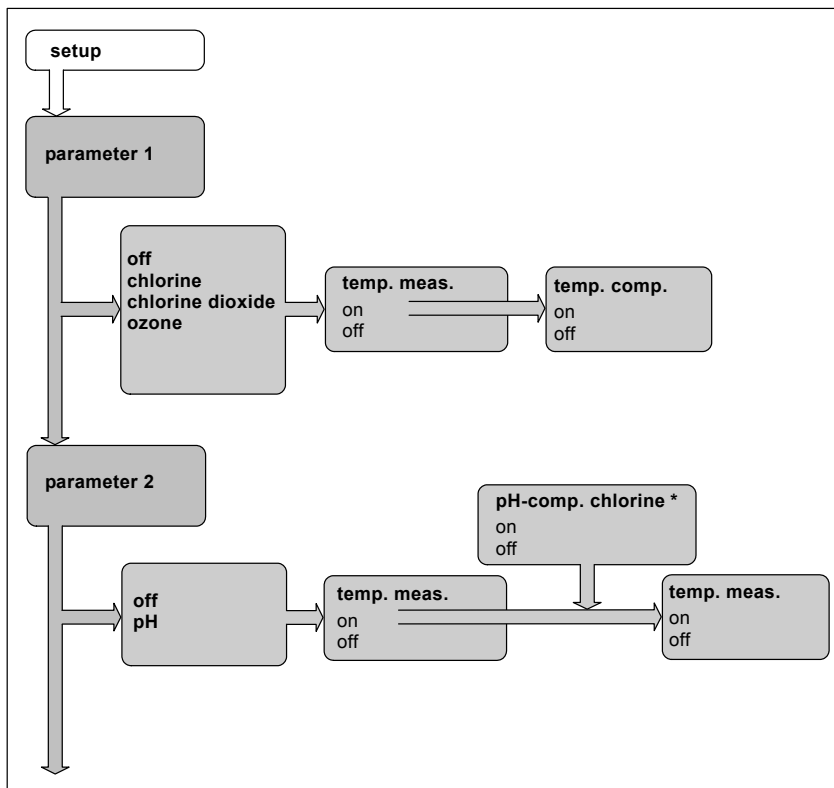
All standard settings of the device can be defined in the "setup" menu. During initial commissioning, basic functions are configured which after that should only be altered rarely or even not at all.

The "setup" menu can only be accessed by persons having full rights.

See section [11.5.8 Code function](#).

Enter the code number.

### 11.5.1 Selection of measured values for chlorine, chlorine dioxide, ozone, peroxide and pH



**Fig. 26** Selection of measured value in menus "parameter 1" and "parameter 2"

\* pH-comp. chlorine is only available if chlorine and pH have been selected as parameters.

1. Select the line "parameter 1" / "parameter 2" using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.
2. Use the [Up] and [Down] buttons to select the measured variable (parameter). Press [OK] to confirm.
3. Use the [Up] and [Down] buttons to select further settings. Press [OK] to confirm.

TM03 6733 4506

### 11.5.2 pH and temperature compensation

#### pH compensation with chlorine measurement

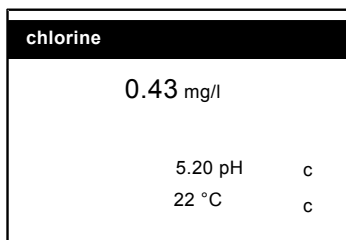
The dissociation of hypochlorous acid (HOCl) into the hypochlorit-anion (OCl<sup>-</sup>) leads to a loss of slope (loss of sensitivity) of the sensor for chlorine measuring.

Using a mathematical compensation function, this loss of sensitivity can be eliminated.

#### Temperature compensation

Using a compensation function, the influence of temperature on the measurement can be eliminated mathematically.

#### Control field for pH value, pH compensation, temperature and temperature compensation in the display of measured value



**Fig. 27** Chlorine measurement with pH and temperature compensation

- Press [Esc] once or twice to change to the display with the measured value.

See sections [11.2 Display elements during initial commissioning](#) and [11.6.3 Controller control fields on the display](#).

In addition to the current measured value, the current pH value and the temperature of the sample water are indicated as well.

With activated pH compensation or temperature compensation, the letter "c" for "compensation" is displayed at the end of the line.

With deactivated temperature measurement, the water temperature for compensation should be entered manually after calibration.

See section [11.9.2 Calibrating the pH value](#).

### 11.5.3 Selection of measuring cell

#### Note

The "measuring cell" submenu is shown only if the measured values chlorine, chlorine dioxide or ozone were selected during the parameterisation.

#### Names of the measuring cells contained in the software

- AQC-D1/-D11
- AQC-D2/-D12
- AQC-D3/-D13

The measuring cell that corresponds to the selected measured value can be selected:

- AQC-D1/-D11/AQC-D2/-D12/AQC-D3/-D13 with chlorine, chlorineHdioxide or ozone

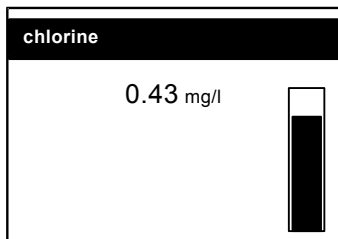
#### Monitoring the cleaning motor

##### (measuring cells AQC-D1/-D11)

Having selected measuring cell type AQC-D1/-D11, pressH[OK] to get to the "cleaning motor" submenu.

- Switch the monitoring of the cleaning motor on/off.

#### Measuring cell AQC-D2/-D12/-D3/-D13 selected



**Fig. 28** Chlorine measurement with AQC-D2/-D12/-D3/-D13

A black bar on the display indicates the actual data of the water sensor.

See installation and operating instructions for the potentiostatic measuring cell AQC-D2/-D12/-D3/-D13.

TM03 6703 4506

TM03 6708 4506

#### 11.5.4 Setting the measuring ranges for chlorine, chlorine dioxide, ozone, peroxide and pH

In the "measuring ranges" menu, the corresponding measuring ranges are assigned to the measured values which have been selected in the "parameters" menu.

- In the "measuring ranges" menu, the following options are available:
  - standard measuring ranges
  - "others".

See section [8.4 Measuring ranges](#).

- The measuring ranges for temperature can be defined in °C (Celsius) or in °F (Fahrenheit).

The "temperature" submenu is only shown if the temperature measurement has been switched on in the "parameter" menu, or if parameter pH has been selected.

#### Note

#### 11.5.5 Controller parameters 1/2

See section [11.6 Selection, configuration and parameterisation of the controller](#).

#### 11.5.6 Water sensor

In the "wat. def. sensor" menu, the water sensor can be switched on/off.

In the event of sample-water deficiency, the following will occur:

- The malfunction-indicating relay is activated, and the alarm message "fault water sensor" is triggered.
- With devices with control functions, the actuators are switched to passive or closed.

#### Caution

The water sensor must be switched on for the measuring cell AQC-D2/-D12!

#### 11.5.7 Setting the current time (date/time/summer time)

1. Switch from the "setup" menu to the "date/time" menu.

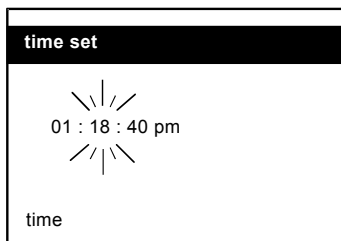


Fig. 29 Time setting

2. Set the device to the current time in the "time set" menu in the format hh.mm.ss.
  - Press [OK] to switch to the next number field. The number field which is currently activated flashes.
  - Alter the settings by pressing the [Up] and [Down] buttons.
  - Pressing the buttons continuously makes the adjustment dynamically faster.
3. Set the device to the current date in the "date" menu in the format mm.dd.yyyy with English as operating language or the format dd.mm.yyyy for all other languages similarly to the adjustment of time. The corresponding day of the week (Mo...Su) is displayed automatically.
4. If necessary, enter the beginning and end date of the summer time, the kind of time shift and the number of hours of the time shift.

TM03 6709 4506

### 11.5.8 Code function

The code function is designed to protect the device from unauthorised access.

#### Entering the four-digit code number and changing it

1. Select the line "code function" in the "setup" menu using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.

There are two types of access rights:

**Calibration rights:** The owner of calibration rights has access to the calibration menu and to manual operation.

The owner of access rights may do the following:

- alter calibration data
- operate control relays manually.

**Full rights:** The owner of full rights has full access to all settings including calibration data.

The owner of full rights may do the following:

- alter calibration data
- alter setup
- parameterise the controller
- alter alarm settings
- run the device manually.

#### cal right

|          |      |
|----------|------|
| code     | 0000 |
| old code |      |

2. Select the desired type of access rights, and press [OK] to get to the corresponding menu.
  3. If an old code exists, confirm the old code number first (on first use, confirm code 0000).
  4. Select "change".
  5. Enter the old code in the submenu (see the comment line at the bottom of the display) using the [Up] and [Down] buttons, and press [OK] to confirm and switch to the query "new code" (see the comment line at the bottom of the display).
  6. Enter a new four-digit code number using the [Up] and [Down] buttons. Press [OK] to confirm.
  7. Repeat to confirm: Set a new four-digit code number using the [Up] and [Down] buttons, and press [OK] to confirm.
  8. Access rights can be cancelled by deleting the corresponding code number in the "delete" submenu.
- Entering a valid four-digit code number gives the operator access to the corresponding functions for a limited time of 60 minutes.
  - If no code was entered previously, the desired menu can be accessed without restrictions. The code number 0000 will not be displayed / the operator will not be asked to enter it.

#### Note

If a wrong code is entered, access to the corresponding menus is denied. An error message is triggered (duration: five seconds), and the device will return to "main menu".

### 11.5.9 Reset function

- Entering the code number "1998" deletes all previously entered code numbers.
- All prior access codes are deleted and reset to "0000".

### 11.5.10 Adjusting display contrast

In the "display" menu, the contrast of the display can be adjusted.

1. Switch from the "setup" menu to the "display" menu using the [Up] and [Down] buttons, and press [OK] to confirm.

#### 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.

### 11.5.11 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", "controller" and "alarm" menus. You can then activate them again at any time (even after a factory reset)!



### 11.5.12 Factory setting reset

In the "factory setting" submenu, the **Conex® DIA-2** 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-2 to the factory setting

- Reset
  - Code: 0000 is displayed.
  - Set code 6742 using the [Up] and [Down] buttons, and press [OK] to confirm.

The device is now returned to the original factory setting.

Before subsequent start-up:

#### Caution

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

### General factory settings

- Language\*\*: The **Conex® DIA-2** is waiting for language input. The languages "Deutsch/English Français...." are indicated alternately.
- Summer time: off.
- Code numbers: 0000 calibration rights, 0000 full rights.
- Current outputs 1-4: 0-20 mA.
- Dosing monitoring: off.
- Parameter 1: chlorine.
- Parameter 2: off.

\*\* For the first calibration, the default value = last setting.

### Default values for parameter group 1

|                         | Cl <sub>2</sub> | ClO <sub>2</sub> /O <sub>3</sub> | H <sub>2</sub> O <sub>2</sub> |
|-------------------------|-----------------|----------------------------------|-------------------------------|
| Measuring range [mg/l]  | 0.00 - 2.00     | 0.00 - 1.00                      | 0-100                         |
| Measuring cell          | AQC-D1/-D11     | AQC-D1/-D11                      | AQC-D1/-D11                   |
| Temperature measurement | off             | off                              | off                           |
| Water sensor            | off             | off                              | off                           |

### Default values for parameter group 2

|                         | pH           |
|-------------------------|--------------|
| Measuring range         | 0.00 - 14.00 |
| Temperature measurement | off          |
| Water sensor            | off          |

### 11.5.13 Current outputs

In the "current output" menu, the operator can assign the selected values to the current outputs and then assign the current outputs to the selected measuring ranges.

In the "current output" menu, the selected parameters are listed in the following order:

#### current output

chlorine

pH

temperature

- Output 1: parameter group 1: chlorine, chlorine dioxide, ozone, hydrogen and peroxide
- Output 2: parameter group 2: pH
- Output 3: temperature or continuous controller for parameters from group 2
- Output 4: continuous controller for parameters from group 1.

#### Assignment of the current outputs to the measuring range (example: chlorine measurement)

There are two standard ranges, "0-20 mA" and "4-20 mA" which can be assigned to the current outputs. They are assigned to the measuring range linearly.

The start-of-scale and full-scale values can be freely defined within 0 to 20 mA in an optional setting for the current outputs 1 and 2 as well as for current output 3 with temperature measurements.

#### chlorine

0-20 mA

4-20 mA

others

- In the corresponding submenu (for example chlorine), select the line "others" using the [Up] and [Down] buttons. Press [OK] to confirm.

- In the subsequent display "0.00 mg/l", enter the start-of-scale value of the range using the [Up] button. Press [OK] to confirm.
  - In the same line, "= 0 mA" is displayed.

#### chlorine

0.20 mg/l = 0 mA

- Enter the associated start-of-scale current value using the [Up] button. Press [OK] to confirm.
  - An additional line is displayed with the scan for the full-scale value of the range "20.00 mg/l".
- Enter the full-scale value of the range using the [Down] button. Press [OK] to confirm.
  - In the same line, "= 20 mA" is displayed.

#### chlorine

0.20 mg/l = 0 mA

15.00 mg/l = 20 mA

- Enter the associated full-scale current value using the [Down] button. Press [OK] to confirm and return to the "current output" menu.

### 11.5.14 Program version

#### program version

Conex DIA-2

v0.20.1      20030304

In case problems make it necessary to contact our service department, the "program version" menu enables the operator to easily identify the software components of the actual device.

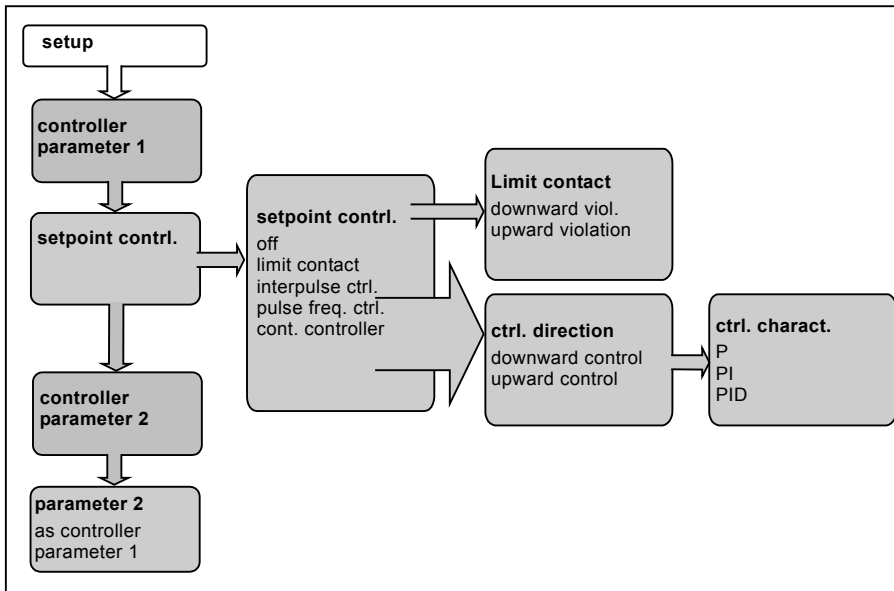
- Version, for example **v0.20.1**.
- Last update: **yyyymmdd**.

## 11.6 Selection, configuration and parameterisation of the controller

It takes two steps to set up the controller:

- First: selection and configuration of the controller type in the "setup" menu, "controller" submenu.
- Secondly: parameterisation of the selected controller type in "main menu", "controller" submenu.

### 11.6.1 Selection and configuration of the controller



TM04 6964 4 506

**Fig. 30** Selection and configuration of the controller

- In the "setup" menu, select the line "controller parameter 1" or "controller parameter 2" using the [Up] and [Down] buttons, and select the menu with the same name using [OK].

## Selection and configuration of the setpoint controller

1. Mark the "setpoint ctrl" line using the [Up] and [Down] buttons, and select using [OK].
2. Select the controller using the [Up] and [Down] buttons as one of the following:

- off
- limit contact
- interpulse controller (two-position controller)
- pulse frequency controller (two-position controller)
- continuous controller

and confirm using [OK].

If "limit contact" is selected:

3. Use the [Up] and [Down] buttons to select the switching direction as one of the following:
  - downward violation
  - upward violation

and confirm using [OK].

If "interpulse ctrl.", "pulse freq. ctrl" or "cont. controller" is selected:

4. Use the [Up] and [Down] buttons to select the control direction as one of the following:
  - downward control (switches with upward violation of setpoint)
  - upward control (switches with downward violation of setpoint)

and confirm using [OK].

5. Use the [Up] and [Down] buttons to select the control response as one of the following:
  - P (proportional controller)
  - PI (proportional-plus-integral controller)
  - PID (proportional-plus-integral-plus-derivative controller)

and confirm using [OK].

### 11.6.2 Setting the controller parameters

1. Select a controller in the "setup" menu and configure it.

See section [11.5.5 Controller parameters 1/2](#).

2. Select the line "controller" in "main menu" using the [Up] and [Down] buttons, and press [OK] to switch to the "controller" menu.

See section [11.4 Main menu](#).

#### Note

The "controller" option in "main menu" is only available if a controller has been selected in the "setup" menu!

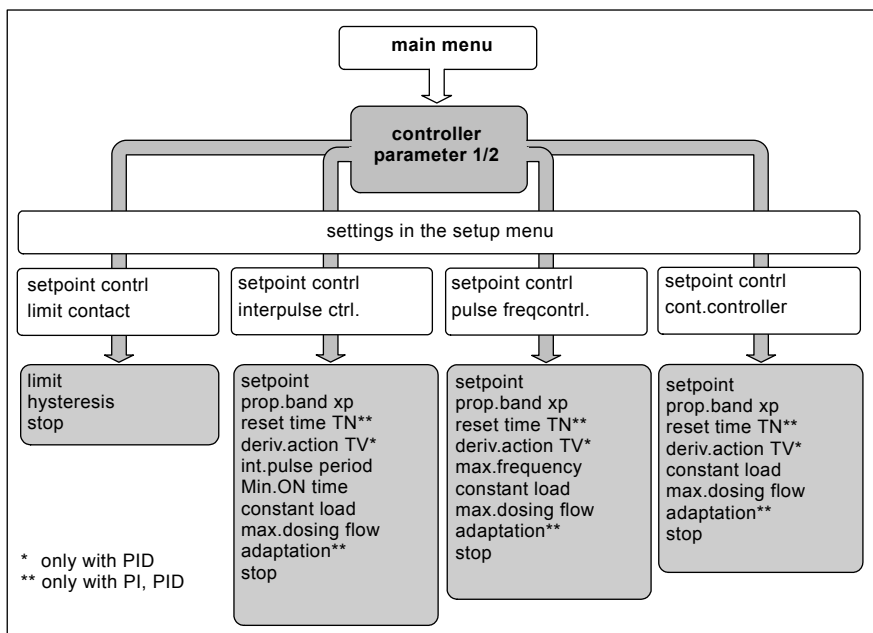
The options available in the "controller" submenu (main menu) correspond to the configuration made in the "setup" menu.

1. Use the [Up] and [Down] buttons to change internal setpoints within the selected measuring range.

See section [8.4 Measuring ranges](#).

2. Select the displayed controller parameters using the [Up] and [Down] buttons, press [OK] to switch to the desired submenu, and use the [Up] and [Down] buttons to adjust the setpoints as needed within the permitted ranges.

See section [8.3 Electronic data and functions](#).

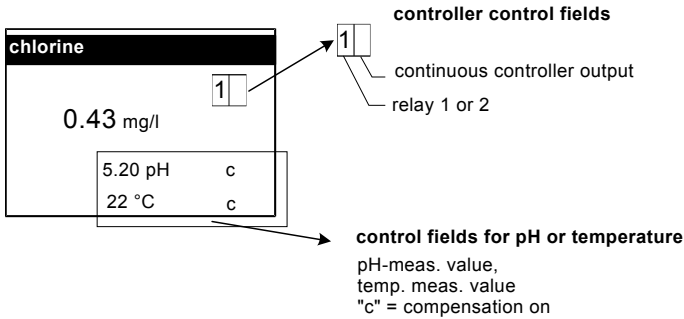


**Fig. 31** Settings for setpoint controllers

### 11.6.3 Controller control fields on the display

1. Press [Esc] once or twice to switch to the display "measured value".

See sections [11.2 Display elements during initial commissioning](#) and [11.2.1 Display modes](#).



**Fig. 32** Chlorine measurement with pH and temperature compensation

- The control fields for relays 1 and 2 appear as follows for configured limit monitors / two-position controllers:

Unfilled field for relay off:



Filled field (displayed inversely) for relay on:



- The control field for the continuous controller is empty, partially filled or completely filled depending on the set dosing rate - and when configured accordingly - and the filling of the bar always refers to 100 % of dosing rate.

Example:

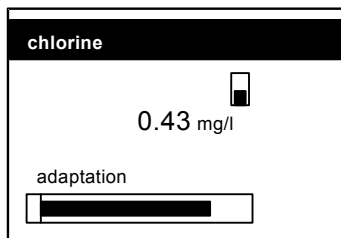


### 11.6.4 Adaptation

An adaptation can be started to simplify the setting of the controller parameters.

The adaptation is only available for PI and PID controllers.

1. Start adaptation in the "controller" menu (main menu) under "adaptation" by pressing "start".



TM03 6715 4506

**Fig. 33** Chlorine measurement with adaptation of continuous controller

2. Return to the display "measured value" automatically. A black bar on the display indicates the adaptation process. The LED next to the [Man] button flashes during the whole adaptation. A progress bar shows the advancement of the adaptation.
- The configured controllers can only be adapted separately.
- On upward control, the measuring value has to be more than 20 % below the setpoint.
- On downward control, the measuring value has to be more than 20 % above the setpoint.

In case of a fault, the message "Start conditions false" is shown directly after the start.

3. The message "adaptation successful" is shown after ending the adaptation.
4. Press [OK] or [Esc] to quit. The determined controller settings are automatically adapted by the parameterisation of the controller. They are displayed in the adaptation menu under "adapt. result".
5. If the adaptation was not successful, the message "adaption abortive" is shown. Press [OK] or [Esc] to quit.

The adaptation may be aborted in the following cases:

- If an error message was shown during the adaptation.
- If the controller is set to manual operation.
- If the standstill time was more than one hour.
- If the total measuring time was more than two hours.

**Note**

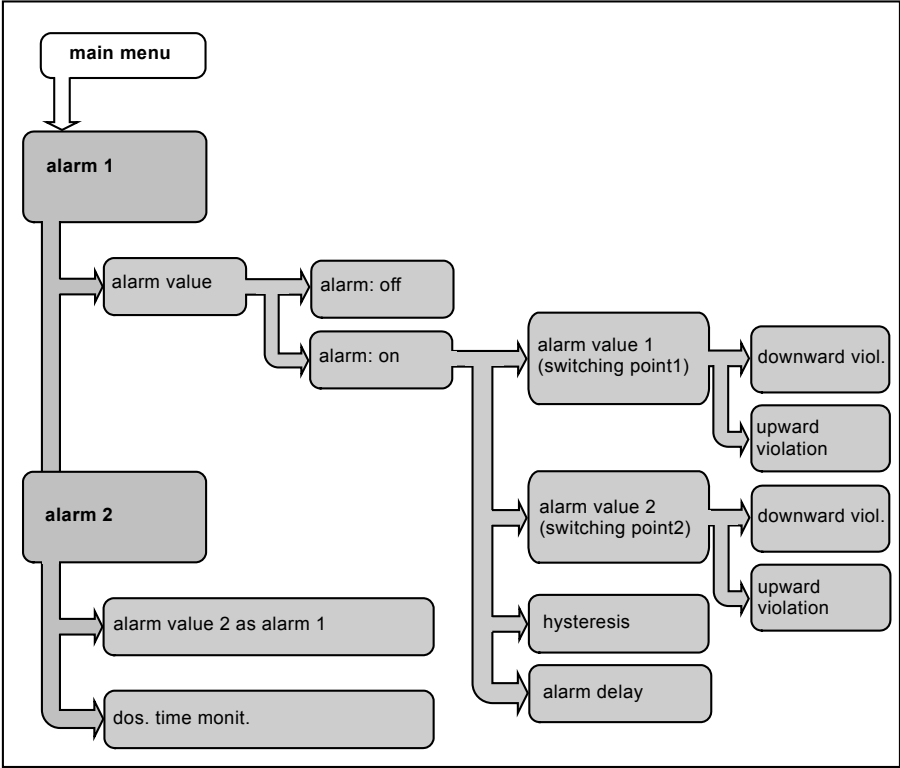
With selected temperature/pH measurement, the temperature value, pH value and their compensations will not be displayed during the adaptation.

11.7 "Alarm" menu

With the help of the alarm function, the measured value can be monitored and compared with the permitted range.

If the measured value exceeds the limits of the measuring range, an alarm is triggered.

- The alarm relay is activated after the selected alarm delay time.
- When the cause of the alarm has been removed, the relay is deactivated immediately (without delay).



TM04 6965 1210

Fig. 34 "Alarm" menu in "main menu"



1. Select the line "alarm" in "main menu" using the [Up] and [Down] buttons.
2. Press [OK] to switch to the "alarm" menu.

Two functions are available there:

| alarm            |
|------------------|
|                  |
| alarm values     |
| dos. time monit. |

- **alarm values:** If the measured value exceeds the permitted range, the alarm relay is activated and an alarm message is triggered. The red alarm LED starts flashing.
- **dos. time monit.:** If the dosing flow constantly remains at 100 % during a selected maximum dosing time, the alarm relay is activated and an alarm message is triggered. The red alarm LED starts flashing.

### Setting the alarm values

1. Select the line "alarm values" using the [Up] and [Down] buttons. Press [OK] to switch to the "alarm on/alarm off" submenu.
2. Confirm the line "alarm on" using [OK], and select the "alarm values" selection menu.

### Setting the upper and lower switching point (limits)

1. Select the line "alarm value 1" or "alarm value 2". Press [OK] to confirm and switch to the desired menu.

| alarm value 1    |
|------------------|
|                  |
| 0.00 mg/l        |
| switching point1 |

2. Set switching points between 0 and the upper limit of the measuring range defined earlier using the [Up] and [Down] buttons (in the unit of the measured value, the resolution depends on the selected measuring value and measuring range).

See section [8.4 Measuring ranges](#).

3. Press [OK] to switch to the "eff. direction" menu.

Options: alarm message in the event of upward/downward violation of the selected switching point.

4. Select the desired line using the [Up] and [Down] buttons.
5. Press [OK] to return to the "alarm values" menu automatically.

6. Select the line "hysteresis" in the "alarm values" menu, and press [OK] to switch to the corresponding submenu.

| alarm values |
|--------------|
|              |
| 0.00 mg/l    |
| hysteresis   |

7. Set the hysteresis to a value between 0 and half of the measuring range using the [Up] and [Down] buttons.

The hysteresis ensures that the relays switch less frequently in the event of upward or downward violation of the limits.

8. Press [OK] to return to the "alarm values" menu.
9. Select the line "alarm delay" in the "alarm values" menu, and press [OK] in the corresponding submenu.

| alarm values |
|--------------|
|              |
| 0 sec        |
| alarm delay  |

10. Set the alarm delay to a value between 0 and 300 seconds using the [Up] and [Down] buttons.

### 11.7.1 Dosing time monitoring

This function can be used to monitor the dosing process. If the dosing flow remains at a constant level of 100 % during a selected period, an alarm message is triggered.

| dos. time monit. |
|------------------|
|                  |
| 10 min           |
| max. dosing time |

1. Select the line "dos. time monit." in the "alarm" menu, and press [OK] to switch to the corresponding submenu.

In the "dos. time monit." menu, the monitoring function can be switched on or off.

- If "off" has been selected, the device returns to the "alarm" menu.
  - If "on" has been selected, the "dos. time monit." submenu is displayed.
2. Set the maximum dosing time to a value between 0 and 600 minutes using the [Up] and [Down] buttons.

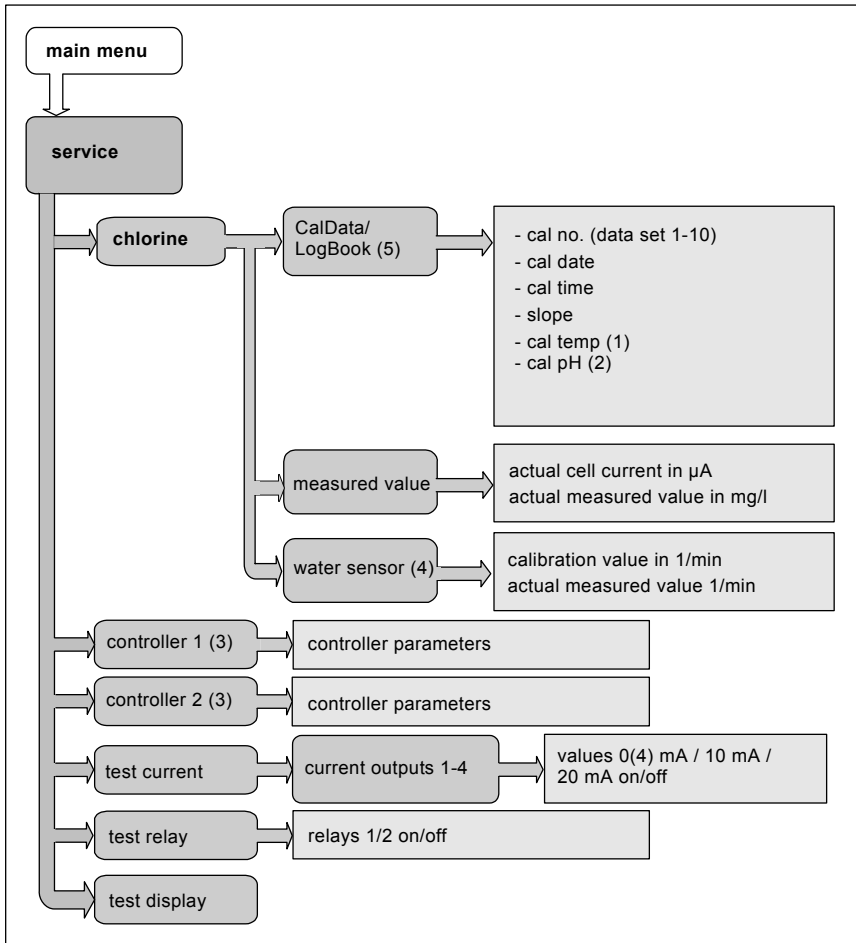
## 11.8 Checking the settings in the "service" menu

In the "service" menu, the operator can check all important settings and test the functions of the device in the event of problems that make service necessary.

**Note**

In the "service" menu, calibration data and controller settings cannot be altered. Therefore the menu can be accessed without an access code.

Select the line "service" in "main menu", and press [OK] to switch to the corresponding menu.



**Fig. 35** Example: chlorine measurement

Notes to figures in fig. 35:

|     |                                                                                                                                     |
|-----|-------------------------------------------------------------------------------------------------------------------------------------|
| (1) | "cal temp." will only be displayed if temperature measurement or temperature compensation has been switched on in the "setup" menu. |
| (2) | "cal pH" will only be displayed if pH measurement or pH compensation has been switched on in the "setup" menu.                      |
| (3) | "controller" will only be displayed if a controller has been selected and configured in the "setup" menu and in the "main menu".    |
| (4) | "water sensor" will only be displayed if measuring cell AQC-D2/-D12 has been selected in the "setup" menu.                          |
| (5) | "CalData/LogBook" will only be displayed if a calibration has already been made.                                                    |

| service      |
|--------------|
|              |
| chlorine     |
| test current |
| test relay   |

In the "service" menu, the following items are listed:

- "parameter": displaying data of the previous 10 calibrations
- "controller": checking controller settings
- "test current": testing the functioning of the current outputs
- "test relay": testing the functioning of the relays
- "test display": testing the functioning of the display.

#### "parameter": logbook registration of calibration data

The calibration data of all activated measuring values are registered in chronological order by a logbook function.

**Example:** With pH measurement, the logbook lists the following data:

- calibration number with date/time
- slope (sensitivity of the electrode)
- asymmetric potential of the electrode
- temperature of the buffer solution used.

Under "measured value", the following data are displayed:

- current measured value
- current cell voltage or cell current.

Under "water sensor", the following data are displayed:

- speed of water sensor during last calibration
- actual speed of the water sensor.

#### "controller" (checking controller settings)

1. Select the [Up] or [Down] button depending on the controller, and select the corresponding menu using [OK].
  - In the first line, the configured type of controller is displayed, and in the subsequent lines the current controller settings are listed. (Select the value  $y_{out}$  using [OK]).

#### "test current" (testing the functioning of the current outputs)

1. Select the current output to be tested using the [Up] and [Down] buttons, and press [OK] to switch to the corresponding menu.

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

- test currents of 0, 10, 20 mA with selected standard range 0-20 mA
  - test currents of 4, 12, 20 mA with selected standard range 4-20 mA or with freely adjusted current outputs.
2. Select the current values using the [Up] and [Down] buttons.
    - When a line is selected, the state of the current output with the corresponding value is automatically set to "on".
    - As soon as another line is selected, the previous current value is automatically switched off, and the new current value is set to on.

#### "test relay" (testing the functioning of the relays)

1. Select the relay to be tested using the [Up] and [Down] buttons, and press [OK] to switch it on or off.

If either of the lines "relay 1", "relay 2" or "alarm" has been selected, the relay that was the last one activated before entering the test menu is switched off. Considering the current alarm values and controller values, the relay is switched on again when the test menu is left.

#### "test display" (testing the functioning of the display)

- If the display turns completely dark: The display functions OK.
- If the display stays partly bright: The display is faulty.
- Press [OK] to leave the test menu.

## 11.9 Calibration

1. Press [Cal] to switch to the calibration menu.  
– The LED next to [Cal] illuminates.
2. Depending on the set access rights, it may be necessary to enter the four-digit code number using the [Up] and [Down] buttons. Confirm using [OK].
3. Select a parameter for the calibration.

In order to avoid an overdosing, the controllers are switched off, and the final control elements are closed.

### 11.9.1 Peculiarities for the calibration of chlorine with pH compensation

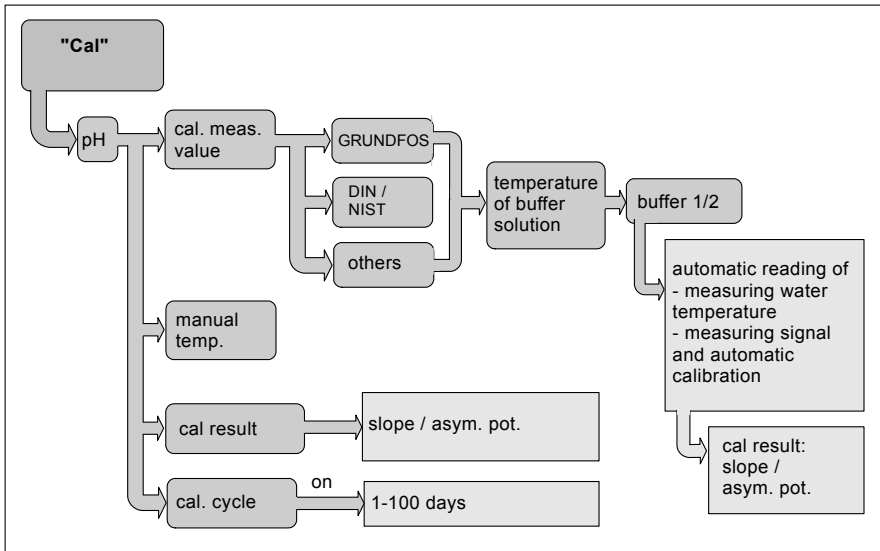
**Caution**

pH calibration is of prime importance, since during the calibration of the chlorine value, the device uses the already calibrated measured value for pH as a reference value.

Therefore the pH value must be calibrated first!

Only then calibrate the chlorine value!

### 11.9.2 Calibrating the pH value



**Fig. 36** Calibrating the pH value

TM03 6718 4506

The pH calibration is carried out as a two-point calibration.

| pH               |
|------------------|
|                  |
| cal. meas. value |
| cal result       |
| cal. cycle       |

1. Press [Cal] to switch to the calibration function. Select the line "pH", and press [OK] to switch to the "pH" calibration menu.
2. Select "cal. meas. value", and press [OK] to switch to the corresponding menu.

### Selecting buffer types and buffer values, reading in buffer values and calibrating

Three optional buffer types are available:

- GRUNDFOS: buffer values pH 4.01, 7.00, 9.18.
- DIN/NIST: buffer values pH 4.01, 6.86, 9.18.
- "others": Lower and upper buffer values can be freely adjusted (difference at least 1 pH) within the configured pH value measuring range ("setup" menu).

| buffer   |
|----------|
|          |
| GRUNDFOS |
| DIN/NIST |
| others   |

1. Select a buffer type using the [Up] and [Down] buttons.
2. Press [OK] to jump to the "temperature" menu automatically.
3. Enter the temperature of the buffer solution used.
4. Press [OK] to jump to the "buffer value 1" menu automatically.

| buffer value 1 |
|----------------|
|                |
| 4.01 pH        |
| 7.00 pH        |
| 9.18 pH        |

5. Select one of the three optional buffer values offered for the buffer solutions GRUNDFOS or DIN/NIST.
6. Fill buffer 1 from the storage bottle into a clean calibration cup.
7. Dip the electrode into the buffer solution.

8. Press [OK] to start the automatic reading function (reading in of measured signal) and the calibration.
  - The display shows the message "please wait" during the calibration.
  - The automatic reading function during pH calibration has the effect that the correct electrode signal for the buffer value is read in only when the measuring signal remains stable during a defined interval.
9. Dispose of the first buffer solution (i.e. do not return it to the storage bottle!), and rinse the electrode with water.
10. Press [OK] to jump to the "buffer value 2" menu automatically.

| buffer value 2 |
|----------------|
|                |
| 7.00 pH        |
| 9.18 pH        |

It is only possible to choose between the two remaining buffer values.

1. Fill buffer solution 2 from the respective storage bottle into a clean calibration cup.
2. Dip the electrode into the second buffer solution.
3. Press [OK] to start the automatic reading function and the calibration.
4. After that, dispose of the buffer solution and rinse the electrode with water.

| CALDATA pH      |
|-----------------|
| slope           |
| - 60.17 mV / pH |
| asym. pot.      |
| 19 mV           |

Immediately after the calibration, its result is displayed automatically:

- sensor slope in mV/pH
- asymmetry potential of the electrode in mV.

### Error messages during the reading in of the voltage signal of the pH electrode

The calibration may be aborted in the following cases:

- If the electrode is faulty or a wrong buffer has been used.
  - The message "fault of electrode/buffer" is displayed.
- If the electrode does not reach a stable measuring signal in 120 seconds.
  - The message "calibration time exceeded" is displayed.
- If the result of the plausibility testing of the pH calibration data is upward/downward violation of the slope range of -50 to -62 mV/pH.
  - The message "slope error" is displayed.
- Downward/upward violation of the precision/exactness range from -60 to +60 mV.
  - The message "error asym. pot." is indicated.

The calibration process will be aborted in all four cases.

- Press [OK] to return to the "calibration" menu automatically.

If the process is aborted, the old calibration date will not be overwritten!

### Manual temperature compensation

With deactivated temperature measurement, the water temperature for compensation should be entered manually after calibration. The default value is 25 °C.

1. Determine the water temperature with a thermometer.
2. Press [Cal] to switch to the calibration function. Select the line "pH", and press [OK] to switch to the "pH" calibration menu.
3. Select "manual temp.", and press [OK] to switch to the corresponding menu.

| manual temp. |
|--------------|
| 25 °C        |

4. Enter the water temperature.
  - The water temperature is shown in °C (Celsius) or in °F (Fahrenheit), as selected in the "setup" menu "measuring ranges".
5. Press [OK] to return to the "calibration" menu automatically.

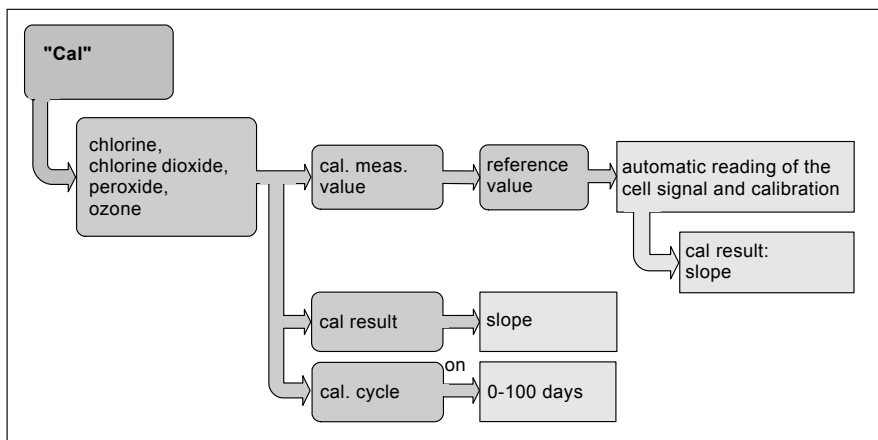
### Cal. cycle

- Following selection of "cal. cycle" in the "measured value" menu, a countdown function is started which triggers the alarm signal "calibrate sensor" following expiry of a defined time interval of 1-100 days.

### Cal result

- The result of the current (last) calibration can be displayed at any time using the "cal result" menu item.

### 11.9.3 Calibration of the parameters chlorine, chlorine dioxide, peroxide and ozone



TM03 6719 4506

**Fig. 37** Calibration of the parameters chlorine, chlorine dioxide, peroxide and ozone

Having switched to the calibration function by pressing [Cal], the display is in the mode "measured value" and indicates the current measured value.

1. Press [OK] to switch to the calibration menu (the first line reads "chlorine", for instance").

| chlorine         |
|------------------|
|                  |
| cal. meas. value |
| cal result       |
| cal. cycle       |

2. Select the line "cal. meas. value", and press [OK] to switch to the corresponding menu.

- In the bottom line, the entry field (value in mg/l) for the reference value (determined photometrically or analytically) and the present cell current or electrode current (in  $\mu\text{A}$ ) are displayed.

| cal. meas. value          |
|---------------------------|
|                           |
| 0.45 mg/l                 |
| I-cell 10.4 $\mu\text{A}$ |

3. Enter a reference value (for example determined photometrically with the Grundfos DIT photometer).
4. Press [OK] to start calibration.
  - An automatic reading function reads in the sensor data, and the calibration is carried out.
  - The slope (sensitivity) of the sensor is calculated.
- Immediately after calibration, the result of the calibration is indicated automatically (first line: "cal. meas. value"):
  - The slope of the sensor in  $\mu\text{A/ppm}$  is displayed.

| CALDATA chlorine                 |
|----------------------------------|
| slope                            |
| 34.67 $\mu\text{A} / \text{ppm}$ |
|                                  |

## 11.10 Manual operation

The manual operation mode is used to switch off the automatic control and run the control relays manually.

### Note

Manual operation is only possible after a controller has been configured.

Manual operation can only be accessed with calibration rights or full rights.

1. Press [Man].

### manual operation

controller  
stop

2. Depending on the set access rights, it may be necessary to enter the four-digit code number using the [Up] and [Down] buttons.
  - The LED next to [Man] illuminates.

3. The display reads "controller stop": All configured controllers are switched off.
  - With configured two-position and continuous controllers, the actuating variable is set to 0.
  - With configured-limit contacts, the corresponding relay is switched off.

### manual operation

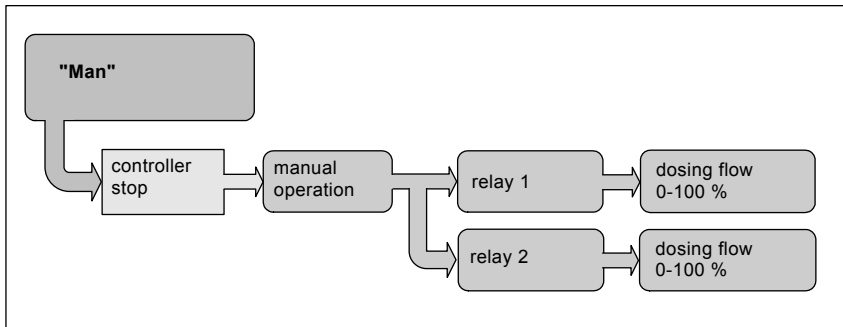
controller  
active

4. Press [Man] to return to automatic operation.
  - The LED next to the button goes out.
  - The message "controller active" is shown on the display for five seconds.
  - After that, the device automatically returns to the menu from which the manual operation was started.

### Note

Every time the manual-operation mode is entered, every single controller type must be activated again.

### 11.10.1 Manual operation with configured two-position and continuous controllers



**Fig. 38** Manual operation with configured two-position and continuous controllers



With configured two-position controllers, the relay outputs 1 and 2 as well as the output "cont. controller" can be separately run manually.

By selecting the desired relay output, the dosing flow of the pump/pumps can be changed.

| manual operation |
|------------------|
| controller       |
| stop             |

- Having switched to manual operation, the message "controller stop" is displayed for five seconds.
  - All controllers are switched off.
  - The final control elements are closed (set to 0).

| manual operation                                                          |
|---------------------------------------------------------------------------|
| 0.01 mg/l <span style="border: 1px solid black; padding: 0 5px;">1</span> |
| 5.20 pH c                                                                 |
| 22 °C c                                                                   |

TM03 6739 4506

- After that, the device automatically switches to the mode "display measured value" (first line: "manual operation").
  - The controller control display is shown on the right side of the display window. Either control field 1 is present for relay 1, or there is a field for the continuous controller.

See section [11.6.3 Controller control fields on the display](#).

- Since switching to manual operation will cause all controllers to be switched off, none of the control fields are filled (there are no areas displayed inversely).

- Press [OK] to switch to the subsequent menu.

Three options are available:

- relay output 1
- relay output 2
- continuous controller.

| manual operation |
|------------------|
|                  |
| relay output 1   |
| relay output 2   |
| cont. controller |

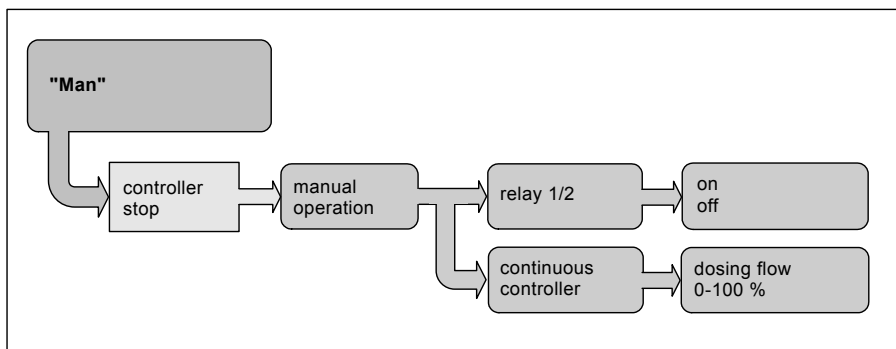
- Select relay output 1 using the [Up] and [Down] buttons. Press [OK] to switch to the corresponding menu.
- Set the desired dosing rate of the pump using the [Up] and [Down] buttons.

| relay 1     |
|-------------|
| 0 %         |
| dosing flow |

- For relay output 2 and the output continuous controller, proceed similarly to relay output 1.
- Press [OK] to start the controller at the selected dosing flow.
  - The display shows the controller control display in its dependence on the selected dosing flows.

See section [11.6.3 Controller control fields on the display](#).

### 11.10.2 Manual operation with configured limit contact and continuous controller



TM03 6721 4506

**Fig. 39** Manual operation with configured limit contact and continuous controller

Manual operation with configured limit contacts is largely similar to manual operation with two-position and continuous controllers.

**The difference:** When the desired relay output is selected, the relay can be switched on or off.

Press [OK] to start the controller.

- The display shows the controller control display which depends on the switching state of the relay or the selected dosing flow with continuous control.

See section [11.6.3 Controller control fields on the display](#).

## 12. Fault finding

**Note**

Faults during the measurement, see installation and operating instructions for the electrode or measuring cell.

| Fault                                                                                                                                                   | Cause                                                                                                                                                                                                                                                                                | Remedy                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. No display following start-up.                                                                                                                       | a) No power supply.                                                                                                                                                                                                                                                                  | Connect the power supply.                                                                                                                                                                                                                                                                                            |
| 2. With pH measurement:<br>Display permanently indicates pH approximately 7.<br>– With measurement of oxidisers:<br>Display permanently indicates zero. | a) Short-circuit in cable between measuring cell and instrument amplifier, moisture in connectors.                                                                                                                                                                                   | Check the connection cable and eliminate short-circuit and moisture.                                                                                                                                                                                                                                                 |
| 3. Display permanently at full-scale value.                                                                                                             | a) Open circuit in cable between measuring cell and instrument amplifier.                                                                                                                                                                                                            | Check the connection cable and reestablish connection.                                                                                                                                                                                                                                                               |
| 4. Display with measured value unsteady.                                                                                                                | a) Interferences on cable from electrode/measuring cell.<br>b) pH and redox measurement: air in sample-water flow.<br>c) pH measurement: sample-water flow interrupted.<br>d) Cable between electrode/measuring cell and instrument amplifier broken.<br>e) Sensor/electrode faulty. | Check that the display is properly connected.<br>Check the sample-water supply system (pipes, etc.) and make changes, if necessary.<br>Check the sample-water supply system (pipes, etc.) and make changes, if necessary.<br>Check the connection cable and reestablish connection.<br>Replace the sensor/electrode. |
| 5. With measurement of oxidisers: insufficient sensitivity of measuring cell.                                                                           | a) Measuring cell contaminated or passivated by deposits.                                                                                                                                                                                                                            | Disassemble the measuring cell, and clean the electrode surface.                                                                                                                                                                                                                                                     |
| 6. With pH measurement:<br>Display with measured value reacts extremely slowly.                                                                         | a) Electrode aged.<br>b) Electrode dirty.                                                                                                                                                                                                                                            | Replace the electrode.<br>Clean the electrode.                                                                                                                                                                                                                                                                       |
| 7. With pH measurement:<br>error message during calibration.                                                                                            | a) Wrong buffer solution used.<br>b) Electrode aged.<br>c) Electrode dirty.                                                                                                                                                                                                          | Use the correct buffer solution.<br>Replace the electrode.<br>Clean the electrode.                                                                                                                                                                                                                                   |
| 8. Device cannot be set.                                                                                                                                | a) Incorrect code set (device protected against adjustment).                                                                                                                                                                                                                         | See section <a href="#">11.5.8 Code function</a> .                                                                                                                                                                                                                                                                   |
| 9. Faulty control.                                                                                                                                      | a) Device is incorrectly parameterised.                                                                                                                                                                                                                                              | Check the settings and match them to the local conditions.<br>If necessary, reset the device to the factory settings.                                                                                                                                                                                                |

## 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.

Declaration of conformity

GB: EU declaration of conformity

We, Grundfos, declare under our sole responsibility that the products Conex® DIA-1, DIA-2, DIA-2Q, 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.

ES: Declaración de conformidad de la UE

Grundfos declara, bajo su exclusiva responsabilidad, que los productos Conex® DIA-1, DIA-2, DIA-2Q 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.

HR: EU deklaracija sukladnosti

Mi, Grundfos, izjavljujemo s punom odgovornošću da su proizvodi Conex® DIA-1, DIA-2, DIA-2Q, na koja se izjava odnosi u nastavku, u skladu s direktivama Vijeća dolje navedene o usklađivanju zakona država članica EU-a.

NL: EU-conformiteitsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat de producten Conex® DIA-1, DIA-2, DIA-2Q, 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.

PT: Declaração de conformidade UE

A Grundfos declara sob sua única responsabilidade que os produtos Conex® DIA-1, DIA-2, DIA-2Q, 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.

SI: Izjava o skladnosti EU

V Grundfosu s polno odgovornostjo izjavljamo, da je izdelek Conex® DIA-1, DIA-2, DIA-2Q, na katerega se spodnja izjava nanaša, v skladu s spodnjimi direktivami Sveta o približevanju zakonodaje za izenačevanje pravnih predpisov držav članic EU.

DE: EU-Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass die Produkte Conex® DIA-1, DIA-2, DIA-2Q, auf die sich diese Erklärung beziehen, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EU-Mitgliedsstaaten übereinstimmen.

FR: Déclaration de conformité UE

Nous, Grundfos, déclarons sous notre seule responsabilité, que les produits Conex® DIA-1, DIA-2, DIA-2Q, 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.

IT: Dichiarazione di conformità UE

Grundfos dichiara sotto la sua esclusiva responsabilità che i prodotti Conex® DIA-1, DIA-2, DIA-2Q, ai quali si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri UE.

PL: Deklaracja zgodności UE

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze produkty Conex® DIA-1, DIA-2, DIA-2Q, których deklaracja niniejsza dotyczy, są zgodne z następującymi dyrektywami Rady w sprawie zbliżenia przepisów prawnych państw członkowskich.

RU: Декларация о соответствии нормам ЕС

Мы, компания Grundfos, со всей ответственностью заявляем, что изделия Conex® DIA-1, DIA-2, DIA-2Q, к которым относится нижеприведённая декларация, соответствуют нижеприведённым Директивам Совета Евросоюза о тождественности законов стран-членов ЕС.

TR: AB uygunluk bildirgesi

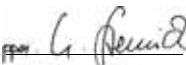
Grundfos olarak, aşağıdaki bildirim konusu olan Conex® DIA-1, DIA-2, DIA-2Q ürünlerinin, AB üye ülkelerinin direktiflerinin yakınlştırılmasıyla ilgili durumun aşağıdaki Konsey Direktifleriyle uyumlu olduğunu ve bununla ilgili olarak tüm sorumluluğun bize ait olduğunu beyan ederiz.

- 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 91834770, 95708321, 96681475, 96681473, 95708322, 96681468, 95708712).

Pfintzal, 1st March 2018



Ulrich Stemick  
Technical Director  
Grundfos Water Treatment GmbH  
Reetzstr. 85, D-76327 Pfintzal, Germany

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



## Argentina

Bombas GRUNDFOS de Argentina S.A.  
Ruta Panamericana km. 37.500 Centro  
Industrial Garin  
1619 - Garin Pcia. de B.A.  
Phone: +54-3327 414 444  
Telefax: +54-3327 45 3190

## Australia

GRUNDFOS Pumps Pty. Ltd.  
P.O. Box 2040  
Regency Park  
South Australia 5942  
Phone: +61-8-8461-4611  
Telefax: +61-8-8340 0155

## Austria

GRUNDFOS Pumpen Vertrieb  
Ges.m.b.H.  
Grundfosstraße 2  
A-5082 Grödig/Salzburg  
Tel.: +43-6246-883-0  
Telefax: +43-6246-883-30

## Belgium

N.V. GRUNDFOS Bellux S.A.  
Boomsesteenweg 81-83  
B-2630 Aartselaar  
Tel.: +32-3-870 7300  
Télécopie: +32-3-870 7301

## Belarus

Представительство ГРУНДФОС в  
Минске  
220125, Минск  
ул. Шафарнянская, 11, оф. 56, БЦ  
«Порт»  
Тел.: +7 (375 17) 286 39 72/73  
Факс: +7 (375 17) 286 39 71  
E-mail: minsk@grundfos.com

## Bosnia and Herzegovina

GRUNDFOS Sarajevo  
Zmaja od Bosne 7-7A,  
BH-71000 Sarajevo  
Phone: +387 33 592 480  
Telefax: +387 33 590 465  
www.ba.grundfos.com  
e-mail: grundfos@bih.net.ba

## Brazil

BOMBAS GRUNDFOS DO BRASIL  
Av. Humberto de Alencar Castelo  
Branco, 630  
CEP 09850 - 300  
São Bernardo do Campo - SP  
Phone: +55-11 4393 5533  
Telefax: +55-11 4343 5015

## Bulgaria

Grundfos Bulgaria EOOD  
Slatina District  
Iztochna Tangenta street no. 100  
BG - 1592 Sofia  
Tel. +359 2 49 22 200  
Fax. +359 2 49 22 201  
email: bulgaria@grundfos.bg

## Canada

GRUNDFOS Canada Inc.  
2941 Brighton Road  
Oakville, Ontario  
L6H 6C9  
Phone: +1-905 829 9533  
Telefax: +1-905 829 9512

## China

### Grundfos Alldos

**Dosing & Disinfection**  
ALLDOS (Shanghai) Water Technology  
Co. Ltd.  
West Unit, 1 Floor, No. 2 Building (T 4-2)  
278 Jinhu Road, Jin Qiao Export  
Processing Zone  
Pudong New Area  
Shanghai, 201206  
Phone: +86 21 5055 1012  
Telefax: +86 21 5032 0596  
E-mail:  
grundfosalldos-CN@grundfos.com

## China

GRUNDFOS Pumps (Shanghai) Co. Ltd.  
10F The Hub, No. 33 Suhong Road  
Minhang District  
Shanghai 201106  
PRC  
Phone: +86-21 6122 5222  
Telefax: +86-21 6122 5333

## COLOMBIA

GRUNDFOS Colombia S.A.S.  
Km 1.5 via Siberia-Cota Conj. Potrero  
Chico,  
Parque Empresarial Arcos de Cota Bod.  
1A,  
Cota, Cundinamarca  
Phone: +57(1)-2913444  
Telefax: +57(1)-8764586

## Croatia

GRUNDFOS CROATIA d.o.o.  
Buzinski prilaz 38, Buzin  
HR-10010 Zagreb  
Phone: +385 1 6595 400  
Telefax: +385 1 6595 499  
www.hr.grundfos.com

## GRUNDFOS Sales Czechia and Slovakia s.r.o.

Čapkovského 21  
779 00 Olomouc  
Phone: +420-585-716 111

## Denmark

GRUNDFOS DK A/S  
Martin Bachs Vej 3  
DK-8850 Bjerringbro  
Tlf.: +45-87 50 50 50  
Telefax: +45-87 50 51 51  
E-mail: info\_GDK@grundfos.com  
www.grundfos.com/DK

## Estonia

GRUNDFOS Pumps Eesti OÜ  
Peterburi tee 92G  
11415 Tallinn  
Tel: + 372 606 1690  
Fax: + 372 606 1691

## Finland

OY GRUNDFOS Pumput AB  
Trukkikuja 1  
FI-01360 Vantaa  
Phone: +358-(0)207 889 500

## France

Pompes GRUNDFOS Distribution S.A.  
Parc d'Activités de Chesnes  
57, rue de Malacombe  
F-38290 St. Quentin Fallavier (Lyon)  
Tél.: +33-4 74 82 15 15  
Télécopie: +33-4 74 94 10 51

## Germany

GRUNDFOS Water Treatment GmbH  
Reetzstraße 85  
D-76327 Pfinztal (Söllingen)  
Tel.: +49 7240 61-0  
Telefax: +49 7240 61-177  
E-mail: gwt@grundfos.com

## Germany

GRUNDFOS GMBH  
Schlüterstr. 33  
40699 Erkrath  
Tel.: +49-(0) 211 929 69-0  
Telefax: +49-(0) 211 929 69-3799  
E-mail: infoservice@grundfos.de  
Service in Deutschland:  
E-mail: kundendienst@grundfos.de

## Greece

GRUNDFOS Hellas A.E.B.E.  
20th km. Athinon-Markopoulou Av.  
P.O. Box 71  
GR-19002 Peania  
Phone: +0030-210-66 83 400  
Telefax: +0030-210-66 46 273

## Hong Kong

GRUNDFOS Pumps (Hong Kong) Ltd.  
Unit 1, Ground floor  
Siu Wai Industrial Centre  
29-33 Wing Hong Street &  
68 King Lam Street, Cheung Sha Wan  
Kowloon  
Phone: +852-27861706 / 27861741  
Telefax: +852-27858664

## Hungary

GRUNDFOS Hungária Kft.  
Tópark u. 8  
H-2045 Törökbálint,  
Phone: +36-23 511 110  
Telefax: +36-23 511 111

## India

GRUNDFOS Pumps India Private  
Limited  
118 Old Mahabalipuram Road  
Thoraiakkam  
Chennai 600 097  
Phone: +91-44 4596 6800

## Indonesia

PT. GRUNDFOS POMPA  
Graha Intirub Lt. 2 & 3  
Jln. Cililitan Besar No.454. Makasar,  
Jakarta Timur  
ID-Jakarta 13650  
Phone: +62 21-469-51900  
Telefax: +62 21-460 6910 / 460 6901

## Ireland

GRUNDFOS (Ireland) Ltd.  
Unit A, Merrywell Business Park  
Ballymount Road Lower  
Dublin 12  
Phone: +353-1-4089 800  
Telefax: +353-1-4089 830

## Italy

GRUNDFOS Pompe Italia S.r.l.  
Via Gran Sasso 4  
I-20060 Truccazzano (Milano)  
Tel.: +39-02-95838112  
Telefax: +39-02-95309290 / 95838461

**Japan**

GRUNDFOS Pumps K.K.  
1-2-3, Shin-Miyakoda, Kita-ku  
Hamamatsu  
431-2103 Japan  
Phone: +81 53 428 4760  
Telefax: +81 53 428 5005

**Korea**

GRUNDFOS Pumps Korea Ltd.  
6th Floor, Aju Building 679-5  
Yeoksam-dong, Kangnam-ku, 135-916  
Seoul, Korea  
Phone: +82-2-5317 600  
Telefax: +82-2-5633 725

**Latvia**

SIA GRUNDFOS Pumps Latvia  
Deglava biznesa centrs  
Augusta Deglava iela 60, LV-1035, Rīga,  
Tālr.: + 371 714 9640, 7 149 641  
Fakss: + 371 914 9646

**Lithuania**

GRUNDFOS Pumps UAB  
Smolensko g. 6  
LT-03201 Vilnius  
Tel: + 370 52 395 430  
Fax: + 370 52 395 431

**Malaysia**

GRUNDFOS Pumps Sdn. Bhd.  
7 Jalan Peguam U1/25  
Glenmarie Industrial Park  
40150 Shah Alam  
Selangor  
Phone: +60-3-5569 2922  
Telefax: +60-3-5569 2866

**Mexico**

Bombas GRUNDFOS de México S.A. de  
C.V.  
Boulevard TLC No. 15  
Parque Industrial Stiva Aeropuerto  
Apodaca, N.L. 66600  
Phone: +52-81-8144 4000  
Telefax: +52-81-8144 4010

**Netherlands**

GRUNDFOS Netherlands  
Veluwezoom 35  
1326 AE Almere  
Postbus 22015  
1302 CA ALMERE  
Tel.: +31-88-478 6336  
Telefax: +31-88-478 6332  
E-mail: info\_gnl@grundfos.com

**New Zealand**

GRUNDFOS Pumps NZ Ltd.  
17 Beatrice Tinsley Crescent  
North Harbour Industrial Estate  
Albany, Auckland  
Phone: +64-9-415 3240  
Telefax: +64-9-415 3250

**Norway**

GRUNDFOS Pumper A/S  
Strømsveien 344  
Postboks 235, Leirdal  
N-1011 Oslo  
Tlf.: +47-22 90 47 00  
Telefax: +47-22 32 21 50

**Poland**

GRUNDFOS Pompy Sp. z o.o.  
ul. Klonowa 23  
Baranowo k. Poznań  
PL-62-081 Przeźmierowo  
Tel: (+48-61) 650 13 00  
Fax: (+48-61) 650 13 50

**Portugal**

Bombas GRUNDFOS Portugal, S.A.  
Rua Calvet de Magalhães, 241  
Apartado 1079  
P-2770-153 Paço de Arcos  
Tel.: +351-21-440 76 00  
Telefax: +351-21-440 76 90

**Romania**

GRUNDFOS Pompe Română SRL  
Bd. Biruintei, nr 103  
Pantelimon county Ilfov  
Phone: +40 21 200 4100  
Telefax: +40 21 200 4101  
E-mail: romania@grundfos.ro

**Russia**

ООО Грундфос Россия  
ул. Школьная, 39-41  
Москва, RU-109544, Russia  
Тел. (+7) 495 564-88-00 (495)  
737-30-00  
Факс (+7) 495 564 8811  
E-mail grundfos.moscow@grundfos.com

**Serbia**

Grundfos Srbija d.o.o.  
Omladinskih brigada 90b  
11070 Novi Beograd  
Phone: +381 11 2258 740  
Telefax: +381 11 2281 769  
www.rs.grundfos.com

**Singapore**

GRUNDFOS (Singapore) Pte. Ltd.  
25 Jalan Tukang  
Singapore 619264  
Phone: +65-6681 9688  
Telefax: +65-6681 9689

**Slovakia**

GRUNDFOS s.r.o.  
Prievozská 4D  
821 09 BRATISLAVA  
Phona: +421 2 5020 1426  
sk.grundfos.com

**Slovenia**

GRUNDFOS LJUBLJANA, d.o.o.  
Leskoškova 9e, 1122 Ljubljana  
Phone: +386 (0) 1 568 06 10  
Telefax: +386 (0)1 568 0619  
E-mail: tehnika-si@grundfos.com

**South Africa**

Grundfos (PTY) Ltd.  
16 Lascelles Drive, Meadowbrook Estate  
1609 Germiston, Johannesburg  
Tel.: (+27) 10 248 6000  
Fax: (+27) 10 248 6002  
E-mail: lgraidge@grundfos.com

**Spain**

Bombas GRUNDFOS España S.A.  
Camino de la Fuentequilla, s/n  
E-28110 Algete (Madrid)  
Tel.: +34-91-848 8800  
Telefax: +34-91-628 0465

**Sweden**

GRUNDFOS AB  
Box 333 (Lunnagårdsgatan 6)  
431 24 Mölndal  
Tel.: +46 31 332 23 000  
Telefax: +46 31 331 94 60

**Switzerland**

GRUNDFOS Pumpen AG  
Bruggacherstrasse 10  
CH-8117 Fällanden/ZH  
Tel.: +41-44-806 8111  
Telefax: +41-44-806 8115

**Taiwan**

GRUNDFOS Pumps (Taiwan) Ltd.  
7 Floor, 219 Min-Chuan Road  
Taichung, Taiwan, R.O.C.  
Phone: +886-4-2305 0868  
Telefax: +886-4-2305 0878

**Thailand**

GRUNDFOS (Thailand) Ltd.  
92 Chaloen Phrakiat Rama 9 Road,  
Dokmai, Pravej, Bangkok 10250  
Phone: +66-2-725 8999  
Telefax: +66-2-725 8998

**Turkey**

GRUNDFOS POMPA San. ve Tic. Ltd.  
Sti.  
Gebze Organize Sanayi Bölgesi  
İhsan dede Caddesi,  
2. yol 200. Sokak No. 204  
41490 Gebze/ Kocaeli  
Phone: +90 - 262-679 7979  
Telefax: +90 - 262-679 7905  
E-mail: satis@grundfos.com

**Ukraine**

Бізнес Центр Європа  
Столичне шосе, 103  
м. Київ, 03131, Україна  
Телефон: (+38 044) 237 04 00  
Факс.: (+38 044) 237 04 01  
E-mail: ukraine@grundfos.com

**United Arab Emirates**

GRUNDFOS Gulf Distribution  
P.O. Box 16768  
Jebel Ali Free Zone  
Dubai  
Phone: +971-4- 8815 166  
Telefax: +971-4-8815 136

**United Kingdom**

GRUNDFOS Pumps Ltd.  
Grovebury Road  
Leighton Buzzard/Beds. LU7 4TL  
Phone: +44-1525-850000  
Telefax: +44-1525-850011

**U.S.A.**

GRUNDFOS Pumps Corporation  
9300 Loiret Blvd.  
Lenexa, Kansas 66219  
Phone: +1-913-227-3400  
Telefax: +1-913-227-3500

**Uzbekistan**

Grundfos Tashkent, Uzbekistan The  
Representative Office of Grundfos  
Kazakhstan in Uzbekistan  
38a, Oybek street, Tashkent  
Телефон: (+998) 71 150 3290 / 71 150  
3291  
Факс: (+998) 71 150 3292

Addresses revised 15.01.2019

|                      |
|----------------------|
| <b>96681473</b> 0419 |
| ECM: 1260226         |

Trademarks displayed in this material, including but not limited to Grundfos, the Grundfos logo and 'be think innovate' are registered trademarks owned by The Grundfos Group. All rights reserved.  
© 2019 Grundfos Holding A/S, all rights reserved.