



evoQUA
WATER TECHNOLOGIES

**WALLACE & TIERNAN[®] DISINFECTION ANALYZER
DEPOLOX[®] 400 M
Version 1.00 and later**

OPERATING MANUAL



Please note

Original operating manual!

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1. Introduction

1.1 Documentation

1.1.1 Target groups

This operating manual provides the information required for installation, operating and maintenance personnel for the installation, operation and maintenance of the disinfection analyzer DEPOLOX[®] 400 M.

All personnel working with and on the disinfection analyzer must have read and understood the operating manual, particularly the safety instructions.

1.1.2 Structure of the documentation

This operating manual contains important information for the safe, trouble-free and economical operation of the disinfection analyzer. A thorough review of these instructions will help to prevent danger, reduce repair costs and downtimes and increases the reliability and service life of the disinfection analyzer.

The Chapters Installation and Maintenance are intended only for trained and authorized service personnel. These chapters contain important information on the assembly, configuration, start-up, maintenance and repair of the disinfection analyzer, which must be performed by this target group.

Please consult the table of contents and the index to quickly find the information you require.

1.2 Conventions



Please note

This operating manual contains a number of notes with different priorities that are labeled with pictograms.

Pictogram	Note	Meaning
	Danger!	Immediate danger to life and limb! If the situation is not corrected, death or serious injury will result.
	Warning!	Danger to life and limb! If the situation is not corrected, death or serious injury can result.
	Attention!	If this note is not observed, moderate or minor injury or damage to equipment can result.
	Warning!	Electrocution hazard.
	Please note	These notes indicate a material risk or provide useful information to make working with the disinfection analyzer easier.
	Attention!	Environmental hazard! Do not throw away or burn the batteries! Batteries must be disposed of at a collection point.

2. Safety

2.1 Intended use

The disinfection analyzer DEPOLOX® 400 M with installed sensors is designed exclusively for measurement of the parameters free chlorine, total chlorine, chlorine dioxide, ozone, potassium permanganate, pH value, fluoride and temperature in drinking water.

The operational safety of the disinfection analyzer DEPOLOX® 400 M is only guaranteed if it is used in accordance with its intended application. The system may only be used for the purpose defined in the order and under the installation, operating and ambient conditions specified in this operating manual.

All inspection and maintenance work must be carried out at the specified intervals.

Compliance with the intended use also includes reading this operating manual and observing all the instructions therein.

The owner/operator of the installation bears sole responsibility for consequences of any use that does not conform with the installation's intended use.



Danger!

Risk of injury or death!

The disinfection analyzer must not be operated with flammable liquids.

2.2 General safety instructions

The manufacturer places great emphasis on safety when working on or with the disinfection analyzer. This is taken into account, starting with the design of the installation, by the integration of safety features.

Safety regulations

The safety instructions in this documentation must be observed at all times. Additional industry-wide or in-house safety regulations also continue to apply.

Safety instructions on the disinfection analyzer

All safety instructions attached to the disinfection analyzer must be observed. These instructions must always be clearly legible and complete.

<i>State-of-the-art technology</i>	The disinfection analyzer has been constructed in accordance with the technological state-of-the-art and the accepted rules of safety engineering. However, if the disinfection analyzer is used by persons who have not been adequately instructed, danger to the life and limb of such persons or third parties and damage to the unit itself or to other property cannot be ruled out. Work not described in this operating manual must be performed only by authorized personnel.
<i>Personnel</i>	The operator of the overall system must ensure that only authorized and qualified specialist personnel are permitted to work with and on the disinfection analyzer. "Authorized specialist personnel" are trained, skilled personnel employed by the owner/operator, the manufacturer or, if applicable, the service partner. Work on electrical components must be carried out by qualified electricians.
<i>Spare parts / components</i>	Trouble-free operation of the disinfection analyzer is only guaranteed if original spare parts and components are used in precisely the combination described in this operating manual. Failure to observe this instruction may lead to malfunctions or damage to the disinfection analyzer.
<i>Extensions and conversions</i>	Any modifications, extensions or conversions to the disinfection analyzer that could impair its safety require the written approval of the manufacturer.
<i>Electrical power</i>	Only qualified electricians or trained personnel supervised by a qualified electrician are permitted to perform any work on electrical components and must do so in accordance with valid electro-technical regulations. During normal operation, the controller must remain closed. Connect power cables in accordance with the wiring diagram.
	<hr/> <p><i>Danger!</i></p> <p>Risk of injury or death!</p> <p>External voltages may still be connected even if the operating voltage is switched off. In the event of a fault in the electrical power supply, switch the disinfection analyzer off immediately.</p> <hr/>
<i>IT security</i>	<p>The manufacturer offers IT security mechanisms for its products to support secure system operation. We recommend checking on a regular basis to see what information is available regarding IT security developments for your products. Information on this can be found on the Internet.</p> <p>Moreover, for the safe operation of an installation, it is also necessary to integrate the automation components into a holistic IT security concept which comprises the entire system and is in accordance with the state of the art in IT technology. Integrated products from other manufacturers should also be taken into account.</p> <p>During commissioning of the disinfection analyzer, the factory-configured passwords and user names should be replaced with individual ones and the user administration enabled.</p>
<i>Disposal</i>	Ensure safe and environment-friendly disposal of agents and replacement parts. Dispose of electronic waste in accordance with local and national regulations.

2.3 Sample water monitoring



Danger!

Risk of injury or death

If there is a shortage of sample water or the flow rate is too low, there is a risk of uncontrolled dosing of chemicals. To ensure safe operation and prevent injury, the sample water monitoring must never be disabled.

The sample water monitoring must be checked regularly. Without automatic detection of a shortage of sample water or an excessively low flow rate, there is a risk of uncontrolled dosing of chemicals. Never disable the sample water monitoring - even temporarily, e.g. by bridging the signal input. The sample water monitoring deactivates dosing if there is a shortage of sample water and prevents the uncontrolled dosing of chemicals.

2.4 Specific operating phases

Normal operation

Never employ any working methods which could affect safety!

The disinfection analyzer must not be operated with flammable liquids and must be operated with the housing closed at all times.

Inspect the disinfection analyzer at least once daily for externally visible damage and faults! Inform the responsible person/authority immediately of any detected changes (including any changes in the operating performance)!

In the event of malfunctions, always switch the electronic module off immediately! Have malfunctions remedied immediately!

Installation and maintenance work

During installation and maintenance work, secure the disinfection analyzer against being switched back on!

If stipulated, disconnect all parts of the electronic module from the power supply before performing any inspection, maintenance or repair work. Then first test the disconnected components to ensure they do not carry any voltage.

Never use corrosive cleaning agents (e.g. spirit, scouring agents)! We recommend that you use a moist cloth with a neutral household cleaning agent.

2.5 Warranty conditions

The following must be observed for compliance with warranty conditions:

- Installation and commissioning by the manufacturer or trained and authorized specialist personnel, e.g. from contracted companies
- Intended use
- Observation of the operational parameters and settings
- The unit may only be operated by trained personnel
- An operating log book must be kept (only in the public sector)
- Only approved calibration chemicals may be used
- The unit must not be exposed to frost.
- The prescribed maintenance work must be carried out
- Use of original spare parts

If any of the above conditions are not met, the warranty is void.

2.6 Exclusion of liability

We are not liable for any damages incurred during installation or use of these hardware and software components. This applies specifically to trouble-free interaction with the software and hardware components you choose.

We accept no liability for any loss sustained by the buyer (in particular, lost profits, lost information and service interruptions) arising through the use of the disinfection analyzer nor for other damage. You are solely responsible for the installation!

The content of the operating manual has been checked to make sure that it matches the hardware and software described. Nevertheless, deviations cannot be ruled out, and we therefore assume no liability for full conformity. The details in this operating manual are checked regularly and any necessary corrections included in subsequent issues.

3. Description

3.1 General

The disinfection analyzer DEPOLOX[®] 400 M has a modular design structure and comprises an electronic module (Module name E02), a flow cell module (Module name D02) DEPOLOX[®] 5 C or VariaSens C or a Y-style flow-through assembly and sensors. Depending on the sensors installed, the disinfection analyzer can measure the parameters free chlorine, total chlorine, chlorine dioxide, ozone, potassium permanganate, pH value, fluoride and temperature.

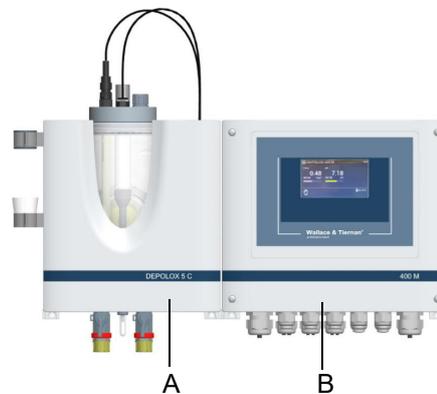


Image 1 Example, disinfection analyzer DEPOLOX[®] 400 M

- A Flow cell module DEPOLOX[®] 5 C with sensors
B Electronic module 400 M

The electronic module 400 M has two measuring inputs. One measuring input is used to measure disinfectants such as free chlorine, total chlorine, chlorine dioxide, ozone or potassium permanganate, the second measuring input to measure the pH value or fluoride.

Various flow cell modules are available. The flow cell module DEPOLOX[®] 5 C has an open 3-electrode cell and the flow cell module VariaSens C holds the membrane sensors. The flow cell modules can be fitted with several sensors. Depending on the application and the sensor used, a pressure-free or pressurized flow cell module must be used; see configuration overview on page 13.

The transparent cell body allows visual monitoring of the sensors and the sample water. An LED glow stick signals the alarm, warning, and error messages by a change in color (red/yellow/orange).

Free chlorine measurement with the DEPOLOX[®] 5 C depends on the pH value. By using a pH measurement, the pH dependency of the measurement can be compensated for within a range of pH 6.00 to pH 8.75 (Cl₂++).

The Y-style flow-through assembly is available in a non-pressurized version and can be used with a pH or fluoride sensor.

3.2 Versions

The following modules are available:

Part No.	Name
Electronic module 400 M (Module name E02)	
W3T441932	Electronic module 400 M with 2-channel disinfection analyzer and 4-way mA output module (factory installed)
Flow cell module (Module name D02)	
W3T389205	Flow cell module DEPOLOX® 5 C, non-pressurized version
W3T389210	Flow cell module DEPOLOX® 5 C, pressurized version
W3T440600	Flow cell module VariaSens C, non-pressurized version
W3T440611	Flow cell module VariaSens C, pressurized version
Y-style flow-through assembly	
W3T167442	Y-style flow-through assembly, non-pressurized version
Sensor measuring modules	
W3T441935	Sensor measuring module TC3 (free chlorine)
W3T441936	Sensor measuring module FC2 (total chlorine)
W3T443072	Sensor measuring module CD7 (chlorine dioxide)
W3T443073	Sensor measuring module OZ7 (ozone)
W3T441938	Sensor measuring module pH
W3T441937	Sensor measuring module fluoride

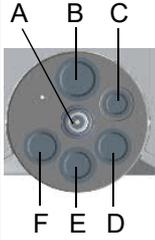
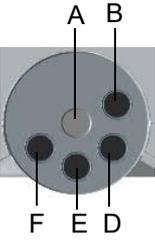
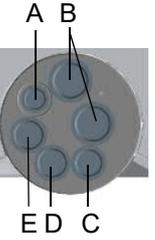
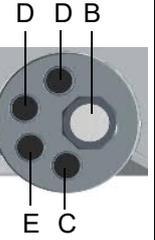
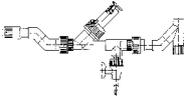
Overview of sensors

The table below contains an overview of the sensors. For further details of the sensors, see Chapter 3.9 "Technical data".

Name	3-electrode cell (DEPOLOX® 5 C)	TC3 (total chlorine)	FC2 (free chlorine)	CD7 (chlorine dioxide)	OZ7 (ozone)
Measuring principle	Potentiostatic 3-electrode cell with platinum electrodes	Membrane-covered, amperometrically operating potentiostatic 3-electrode system with integrated electronics		Membrane-covered 2-electrode system	
Measured value	Free Cl ₂ , ClO ₂ , O ₃ , KMnO ₄ , Cl ₂ ++ for pH-compensated free Cl ₂ measurement	Total chlorine	Free chlorine	Chlorine dioxide (ClO ₂)	Ozone (O ₃)
Area of application	Drinking water, high level of hardness and fast reaction time	Drinking water, suitable for low conductivity and fluctuating pH value		In water with dirt particles < 0.8 mm	

Configuration options

The following configuration options are possible:

Name	DEPOLOX® 5 C pressure-free Version	DEPOLOX® 5 C pressurized Version	VariaSens C pressure-free Version	VariaSens C pressurized Version	Y-style flow-through assembly
					
	<p>A 3-Electrode cell (free chlorine) B Blind plug C Fluoride sensor (only on non-pressurized version) D pH sensor E LED glow stick F Blind plug</p>		<p>A Fluoride sensor (only on non-pressurized version) B Membrane sensors TC3, FC2, CD7, OZ7 C LED glow stick D Blind plug E pH sensor</p>		
3-electrode cell (free chlorine)	X	X	-	-	-
Membrane sensor TC3	-	-	X	X	-
Membrane sensor FC2	-	-	X	X	-
Membrane sensor CD7	-	-	X	X	-
Membrane sensor OZ7	-	-	X	X	-
pH sensor	X	X	X	X	X
Fluoride sensor	X	-	X	-	X
Sample water temperature (multi-sensor)	X	X	X	X	-
Flow rate monitor (multi-sensor)	X	X	X	X	-
Sample water earthing (multi-sensor)	X	X	X	X	-
Sample water fine filter (fine filter), only when using membrane sensors	X	-	X	X	-
LED glow stick	X	X	X	X	-
Ball valve on the sample water inlet	X	X	X	X	-
Ball valve on the sample water outlet	-	X	-	X	-

3.3 Optional accessories

The following optional accessories are available. For part numbers, see Chapter 8. "Spare parts, Accessories and retrofit kits".

- **Mounting plate with accessories**
For simple mounting of the flow cell and electronic module and the strainer.
- **Impedance converter**
In cases where the sensor cable is not long enough and an extension is required, an impedance converter must be screwed onto the pH and fluoride sensor. The impedance converter converts the very high-resistance sensor signal into a low-resistance signal. The impedance converter is supplied by a built-in battery with a battery service life of approximately 5 years. After this time, the impedance converter should be sent to our company to have the battery replaced.
- **Extension cable for sensors**
Where the flow cell and electronic modules are mounted in separate locations, sensor extension cables must be used.
- **Strainer**
To protect the flow cell module against contamination, an external strainer with a mesh width of 0.5 mm should be provided on the sample water inlet.
- **Booster pump**
If the admission pressure is below 0.25 bar, a booster pump must be used.
- **Pressure reducing valve**
If the admission pressure exceeds 3.0 bar, a pressure reducing valve must be used.
- **Hose and tubing connection**
PVC or PE version

3.4 Electronic module

3.4.1 Design

The electronic module 400 M (Module name E02) comprises:

- Plastic housing with removable housing cover
- Motherboard with power supply, terminal strips, electronic components and relays
- Touchscreen
- Cable glands

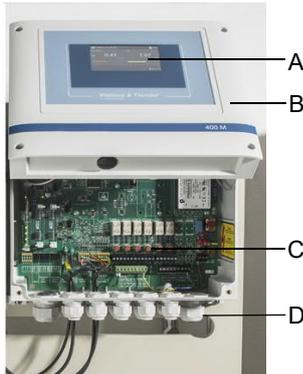


Image 2 Electronic module 400 M

- A Touchscreen/display*
B Plastic housing
C Motherboard
D Cable glands

3.4.2 Functions

The electronic module (Module name E02) is used for the measurement of auxiliary hygiene parameters in drinking water applications.

Examples of typical applications are:

- Measurement of chlorine and pH
- Monitoring and notification of an alarm if limit values exceeded
- Data visualization
- Data transfer to higher-level systems

Potential process measurements include:

- Free chlorine, chlorine dioxide, ozone or potassium permanganate with 3-electrode cell (DEPOLOX[®] 5 C)
- Total chlorine measurement with membrane sensor TC3
- Free chlorine with membrane sensor FC2
- Chlorine dioxide with membrane sensor CD7
- Ozone with membrane sensor OZ7
- pH value
- Fluoride
- Temperature

The color touchscreen shows the following:

- Measurements with bar graph display
- Operation mode and switching states
- Display of limit values
- Setpoint (if applicable)
- Customer-specific measurement designation
- Messages and errors
- Display, USB memory stick
- Time/Date

The menus are used by means of direct entry on the display or by touching the display.

For connection to a visualization system, there is an optional 4-way mA output module, an RS485 interface and an Ethernet interface with Modbus TCP and HTTP protocol.

3.4.3 Controller outputs

The electronic module has a dosing contact for disinfection measurement.

3.4.4 Messages

Alarms, warnings, errors and messages are displayed using a colored message symbol (triangle with an exclamation mark).

Red symbol	Alarm or error active
Yellow symbol	Non-acknowledgeable alarms active
Orange symbol	Maintenance interval or calibration interval has elapsed

Press the symbol and the message window opens. All active text messages are displayed. They are acknowledged via ACK button.

3.4.5 Alarms

The electronic module supports up to eight freely configurable alarms. The alarms can be assigned to a relay contact and noted on the color display. At the same time, a message is displayed in the message window and the message system is displayed. The number of available relays depends on the configuration. A maximum of six alarm relays are possible, depending on if the controller disinfection output is used. The alarm relays can be used, for example, for safety deactivation of dosing when specific values are exceeded or not reached:

Each alarm can be assigned the following functions. Multiple assignment is possible.

Limit value Min 1 Limit value Min 2	=>	all measuring values can be selected individually
Limit value Max 1 Limit value Max 2	=>	all measuring values can be selected individually
Digital inputs	=>	1 to 5 can be selected individually
Error		

Unlatched alarm without acknowledgment option

- The alarm symbol and the message symbol light up in the event of an alarm and go out automatically when the condition is eliminated.
- Unlatched alarms are displayed in yellow as messages.
- The relay is active when the alarm symbol is displayed and the alarm is active.

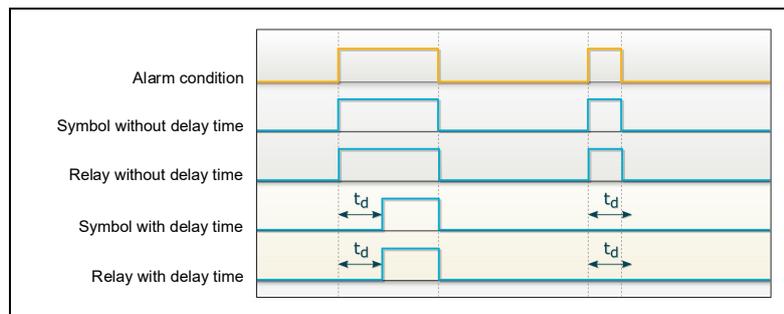


Image 3 Unlatched alarm without acknowledgment option

Latched alarm with reset acknowledgment option

- In the event of an alarm, the alarm symbol and the message symbol flash and the relay is active until acknowledged.
- The alarm symbol and the message go out even if the conditions still apply when the alarm is acknowledged.
- Latched alarms are displayed in red as messages.
- The relay becomes inactive after acknowledgment if the condition is still pending.

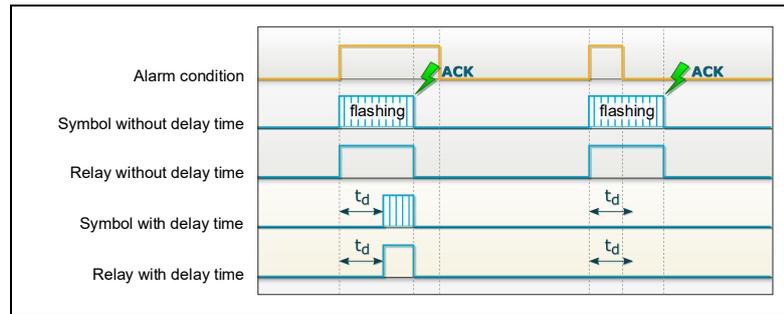


Image 4 Latched alarm with reset acknowledgment option

Latched alarm with confirmation (simple ACK)

- The relay becomes active as soon as the alarm is active.
- In the event of an alarm, the alarm symbol and the message symbol flash until the alarm is acknowledged.
- If the condition is no longer present when the alarm is acknowledged, the alarm symbol goes out and the message disappears.
- If the condition is still present when the alarm is acknowledged, the alarm symbol and the message are reset from flashing to a permanent state. The alarm symbol and the message light up until the condition is eliminated (auto-reset).
- Latched alarms are displayed in red as messages.
- The relay is only deactivated when the condition has been eliminated and acknowledged.

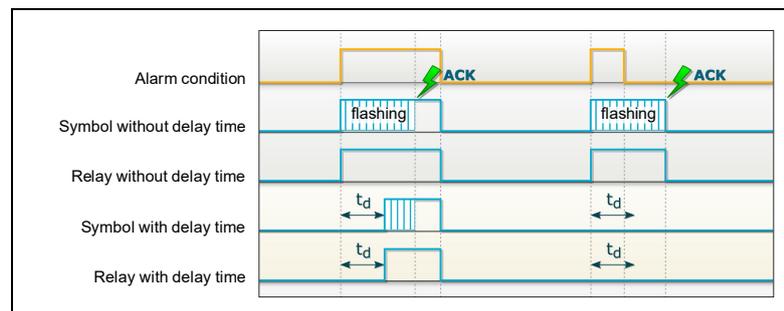


Image 5 Latched alarm with confirmation (acknowledgment option)

3.4.6 Safety functions

The electronic module is equipped with various integrated safety functions to ensure system safety and minimize the risk of accidents. The following safety functions are integrated:

- safety deactivation if the sample water flow is too low and/or if the dosing tank signals that it is empty (depending on the configuration of the digital inputs)
- alarms freely configurable
- external STOP for dosing (depending on the configuration of the digital inputs)
- password protection with three levels

3.4.7 Digital inputs

There are five integrated digital inputs on the CPU board of the electronic module. They are provided for connection of voltage-free contacts (< 100 Ohm) and are supplied internally with 5 V.



Warning!

Do not apply voltages at the digital input terminals!

The functions of the digital inputs can be configured for the specific customer application in the "Input/Output" menu. Digital input 1 is used for sample water monitoring and cannot be changed.

Digital input DI 1

With the help of the voltage-free contact of the flow rate monitor on the flow fitting, the controllers can be influenced:

- before expiry of the sample water monitoring delay time (0 to max. 10 min.):
Dosing continues at the same rate.
The  symbol on the display flashes.
Display: 
- after expiry of the sample water monitoring delay time:
Dosing is switched off.
Display: 
- Controller switch-off is only effective in automatic mode.

Digital input DI 2 to DI 5

Use as an alarm (freely configurable).

3.4.8 Relay outputs

The electronic module has six relays, each with a changeover contact. These switches are assigned various switching tasks depending on the respective application. The corresponding diagrams are defined in Chapter 9. "Wiring diagrams". In order to switch larger capacitive loads, we recommend installing an additional switching element such as a contactor or load relay to guarantee longer service life for the contacts. For details of contact load capacity, see Chapter 3.9 "Technical data" - Relay outputs. To suppress radio interference, the relay contacts are protected internally by suppressor diodes. The relay contacts of the alarm or controller outputs are protected by fuses. They act as overcurrent limiters protecting the terminal and relay connections. The fuses are pluggable and replaceable (replacement fuses Type TR5 3,15AT, see Chapter 8. "Spare parts, Accessories and retrofit kits").

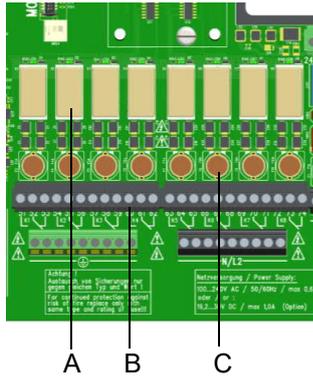


Image 6 Detail of PCB - relay outputs

- A Relay
- B Terminal strips
- C Fuses



Please note

If the internal power supply L1 and N/L2 is used for dosing pumps or other devices, the total current consumption must not exceed 6 A.

3.4.9 Interfaces

The following interfaces are available:

- USB interface
- RS485 interface
- Ethernet interface
- Modbus TCP interface



Please note

The interfaces are described in detail in Chapter 4. "Interfaces".

3.5 Flow cell modules DEPOLOX[®] 5 C

The flow cell module DEPOLOX[®] 5 C (Module name D02) has a 3-electrode cell and is available in a pressure-free or pressurized version. The versions also differ in the number and layout of the sensors that can be installed and in the design of the sample water outlet.

3.5.1 Design

The structure of the flow cell module DEPOLOX[®] 5 C (Module name D02) is as follows:

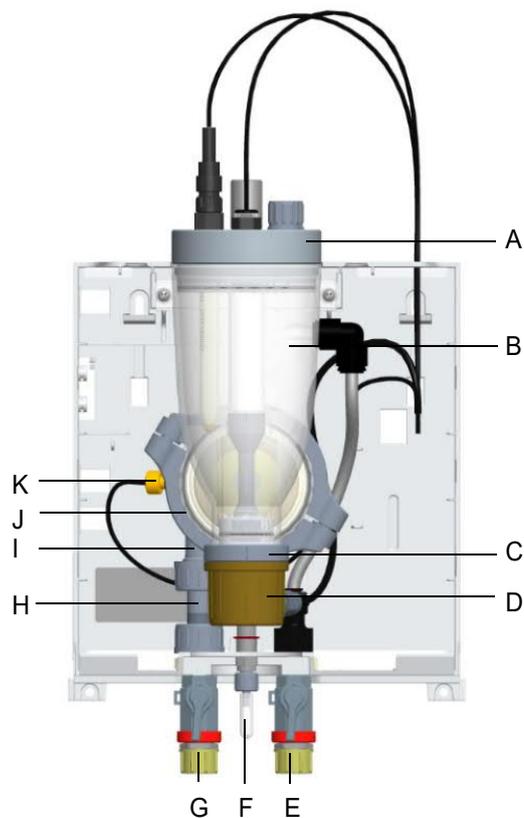


Image 7 Cutaway model, flow cell module DEPOLOX[®] 5 C, pressurized version

- A Cover to hold the sensors and the LED glow stick
- B Cell body
- C 3-electrode cell with electrolyte storage tank
- D Cap of the 3-electrode cell
- E Sample water outlet with ball valve (on non-pressurized version without ball valve)
- F Flow cell drain valve
- G Sample water inlet with ball valve
- H Filter unit
- I Check valve housing
- J Flow control valve
- K Multi-sensor

3.5.2 Function



Please note

The flow cell module DEPOLOX® 5 C (Module name D02) can be used for the measurement of free chlorine, ozone, potassium permanganate and chlorine dioxide. It must be ensured that only one of these disinfection agents is present in the water.

The following section describes the functional principle of the flow cell module DEPOLOX® 5 C from the sample water inlet to the sample water outlet, see Image7 on page21:

Sample water inlet

The sample water is connected on the input side via the G 1/2" connection on the ball valve. The input pressure must be around 0.25 to 3.0 bar. To guarantee a constant flow, the minimum input pressure must not be less than 0.25 bar. If the pressure is lower, an optional booster pump must be used. If the admission pressure exceeds 3.0 bar, an optional pressure reducing valve must be used.

Optional strainer (W3T158721)

The sample water flows over the strainer, which prevents dirt particles penetrating into the flow cell module.

Check valve housing

In the direction of flow, the sample water flows through the filter unit to the check valve housing. The check valve ensures sample water is only in the correct direction.

Multi sensor

The multi-sensor monitors the correct flow following the float principle with reed switch and records the temperature with a Pt1000 sensor. Large-area sample water earth ground is via the stainless steel sensor housing.

Flow control valve

The flow control valve ensures a flow of the sample water that is not dependent on the operating pressure. The correct sample water flow of 33 l/h is preset, checked and documented at the factory. If the inlet pressure increase, the control valve moves to keep the flow constant, if the inlet pressure drops, the control moves to keep the flow constant.

3-electrode cell

The cell body contains the 3-electrode cell with external potentiostatic control loop and a refillable electrolyte storage tank. Working and counter electrode are designed as semi-annular electrodes and made from a special platinum alloy. A silver-silver chloride electrode connected to the sample water via two diaphragms serves as the reference electrode. The reference electrode is dipped into an electrolyte solution which can be refilled as needed.

The sample water flows tangentially into the 3-electrode cell ensures continual hydro-mechanical cleaning of the sensor electrodes with a special cleaning sand and thus prevents the natural contamination of the electrode surfaces. Clean electrode surfaces and a constant flow of sample water are critical for high-quality oxidant measurement and greater responsiveness.

The adjustable cell voltage U_{pot} is output via the potentiostatic control loop. The cell current (μA signal) is proportional to the concentration of disinfection agent in the sample water and is evaluated with the electronic module.

The HOCl characteristic curve describes the influence of the pH value on the DEPOLOX[®] 5 C and the influence of temperature.

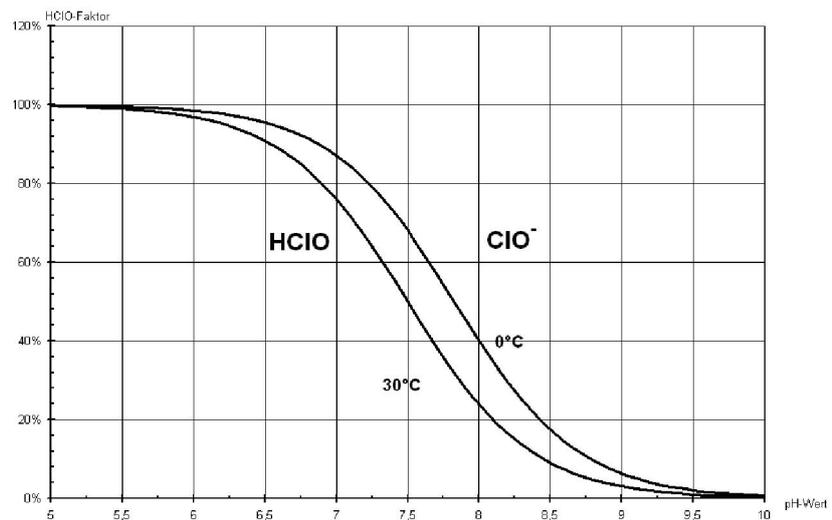


Image 8 HOCl characteristic curve

Cell body

The transparent cell body contains the sensors and the LED glow stick. The sensors are installed in the location holes in the cell body cover with standardized threaded connections or in special sensor holders. The LED glow stick is installed in the cell body cover to visually monitor the sensors and to signal messages and errors in color.

Sample water outlet

On the pressurized version, the sample water supply is connected on the output side via the G 1/2" connection on the ball valve. At this point, a maximum back pressure of 1.5 bar is permitted.

On the non-pressurized version, the sample water runs off via a drain connection for hoses with an internal diameter of 6 mm directly via the cell body outlet at the top.

Flow cell drain valve

The flow cell drain valve can be used to collect a sample for calibration. It is used to draw sample water from the cell body through the low-pressure side of the flow control valve or to drain the cell body for servicing purposes.

Calibration holding clips

Two calibration holding clips are attached in the cover of the flow cell module. For "hands-free" calibration of the sensors with buffer solution or calibration solution (bag or beaker), the two calibration holding clips are pushed into the side of the basic housing at the back.

3.6 Flow cell module VariaSens C

The flow cell module VariaSens C (Module name D02) is available in a pressure-free or pressurized version. The versions also differ in the number and layout of the sensors that can be installed and in the design of the sample water outlet.

3.6.1 Design

The structure of the flow cell module VariaSens C (Module name D02) is as follows:

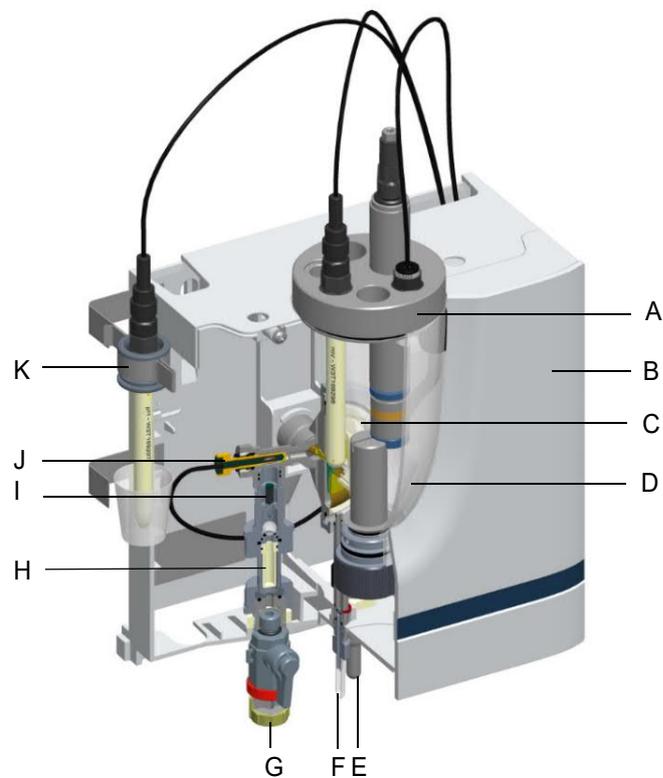


Image 9 Cutaway model, flow cell module VariaSens C, pressure-free version

- A Cover to hold the sensors and the LED glow stick
- B Plastic housing with removable housing cover
- C Flow control valve
- D Cell body
- E Sample water outlet (on the pressurized version, with ball valve)
- F Flow cell drain valve
- G Sample water inlet with ball valve
- H Fine filter
- I Check valve housing
- J Multi-sensor
- K Calibration holding clip

3.6.2 Function



Please note

The flow cell module VariaSens C (Module name D02) can be used in combination with membrane sensors for the measurement of free chlorine, total chlorine, ozone and chlorine dioxide. It must be ensured that only one of these disinfection agents is present in the water and that the cross-sensitivity of the sensors is allowed for.

The following section describes the functional principle of the flow cell module VariaSens C from the sample water inlet to the sample water outlet, see Image9 on page24:

Sample water inlet

The sample water supply is connected on the input side via the G1/2" connection on the ball valve. The input pressure must be around 0.25 to 3.0 bar. To guarantee a constant flow, the minimum input pressure must not be less than 0.25 bar. If the pressure is lower, an optional booster pump must be used. If the admission pressure exceeds 3.0 bar, an optional pressure reducing valve must be used.

Optional strainer (W3T158721)

The sample water flows over the strainer, which prevents dirt particles penetrating into the flow cell module.

Check valve housing

In the direction of flow, the sample water flows through the filter unit or through the installed fine filter (only with membrane sensors) to the check valve housing. The check valve ensures sample water is only in the correct direction.

Fine filter

The fine filter is only used in conjunction with membrane sensors.

Multi-sensor

The multi-sensor monitors the correct flow following the float principle with reed switch and records the temperature with a Pt1000 sensor. Large-area sample water earth ground is via the stainless steel sensor housing.

Flow control valve

The flow control valve ensures a flow of the sample water that is not dependent on the operating pressure. The correct sample water flow of 33 l/h is preset, checked and documented at the factory. If the inlet pressure increase, the control valve moves to keep the flow constant, if the inlet pressure drops, the control moves to keep the flow constant.

Cell body

The transparent cell body contains the sensors and the LED glow stick. The sensors are installed in the location holes in the cell body cover with standardized threaded connections or in special sensor holders. The LED glow stick is installed in the cell body cover to visually monitor the sensors and to signal messages and errors in color.

<i>Sample water outlet</i>	<p>On the pressurized version, the sample water supply is connected on the output side via the G 1/2" connection on the ball valve. At this point, a maximum back pressure of 1.5 bar is permitted.</p> <p>On the non-pressurized version, the sample water runs off via a drain connection for hoses with an internal diameter of 6 mm directly via the cell body outlet at the top.</p>
<i>Flow cell drain valve</i>	<p>The flow cell drain valve can be used to collect a sample for calibration. It is used to draw sample water from the cell body through the low-pressure side of the flow control valve or to drain the cell body for servicing purposes.</p>
<i>Calibration holding clips</i>	<p>Two calibration holding clips are attached in the cover of the flow cell module. For "hands-free" calibration of the sensors with buffer solution or calibration solution (bag or beaker), the two calibration holding clips are pushed into the side of the basic housing at the back.</p>

3.7 Y-style flow-through assembly

The Y-style flow-through assembly is available in a non-pressurized version and can be fitted with a pH or fluoride sensor.

3.7.1 Design

The structure of the Y-style flow-through assembly is as follows:

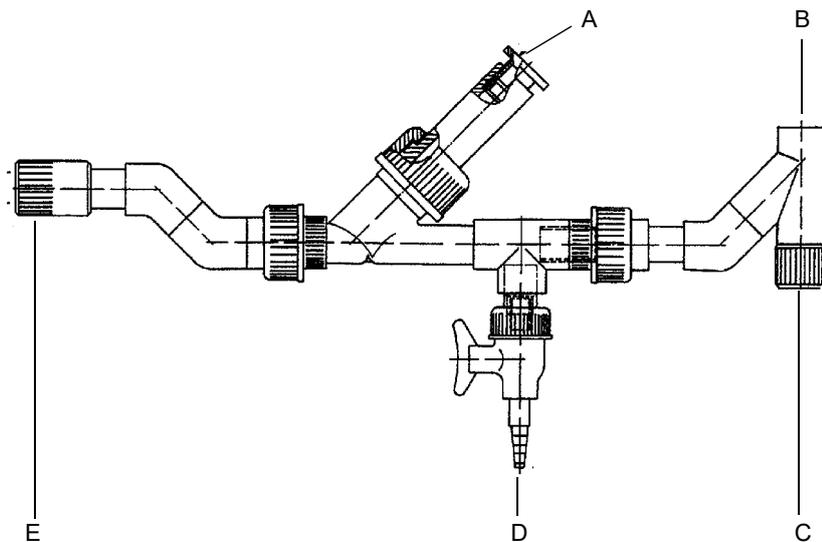


Image 10 Y-style flow-through assembly

- A Sensor holder
- B Outlet (open)
- C Output
- D Sample water valve
- E Sample water inlet

3.7.2 Function

The following section describes the functional principle of the Y-style flow-through assembly from the sample water inlet to the sample water outlet. The installation of a ball valve on the input side is recommended.

- Sample water inlet** The sample water supply is connected on the input side via the 1/2" NPT connection. A ball valve for setting the sample water flow must be provided on site.
- Optional strainer (W3T158721)** The sample water flows over the optional strainer, which has a mesh size of 0.5 mm and prevents dirt particles penetrating into the Y-style flow-through assembly. The strainer must be provided on site.
- Sample water outlet** The sample water supply is connected on the output side via the 1/2" NPT connection. The sample water outlet is not pressurized.
- Sensor holder** The pH or fluoride sensor is mounted in the sensor holder.

3.8 Sensors

The sensors are screwed into the cell body cover of the flow cell module and connected to the electronic module.

The pH and fluoride sensor can also be installed via the Y-style flow-through assembly and connected to the flow cell module.

3.8.1 DEPOLOX[®] 5 C - 3-electrode cell

See "3-electrode cell" on page 22.

3.8.2 pH sensor

The pH sensor is designed as a pH single-rod measuring cell.

The pH-sensitive element is the membrane made of special silicate glass, a rounded tip at the lower end of the pH sensor. The reference electrode is a silver/silver chloride electrode (Ag/AgCl) and, together with the pH electrode, forms the measuring cell. The reference electrode is the stable electrical reference point for voltage measurement.

The electrolyte is a saturated potassium chloride solution. As the chloride concentration of the electrolyte remains almost constant, the potential of the reference electrode is also constant. Salt rings as an additional salt depot further increase the service life of the pH sensor.

A ceramic membrane permeable for the electrolyte provides the electrical connection to the measuring solution. This ceramic membrane is particularly suitable for the treatment of water in swimming pools and baths and drinking water, as the electrolyte can only flow slowly through the pores of the ceramic pin, thus ensuring very long service life for the entire pH sensor.

The glass electrode is installed in an electrolyte reservoir (transport container) with diluted electrolyte which protects the sensitive membrane, keeps the membrane moist and thus ensures that the measuring cell is ready for immediate use. If the pH sensor is not used, e.g. over the winter, the pH sensor must be installed in the transport container with diluted electrolyte (KCl tank with stand and 5 ml KCl solution).

The pH sensor can be installed in the pressure-free and pressurized version of the flow cell modules DEPOLOX[®] 5 C and VariaSens C. The pH sensor can also be installed in the Y-style flow-through assembly for individual measurement.

3.8.3 Fluoride sensor

Fluoride measurement using a fluoride-ion-selective electrode is used for continuous identification of fluoride ions in the solution. To obtain a correct reading, the pH value of the measured medium must be within a range from pH 5 to pH 8.

The reference system is filled with electrolyte.

The fluoride sensor can be installed in the non-pressurized version of the flow cell modules DEPOLOX[®] 5 C and VariaSens C.

The fluoride sensor can also be installed in the Y-style flow-through assembly for individual measurement.



Attention!

Rapid, repeated changes in temperature result in a constant change in the potential. This can cause functional failure of the electrode.

3.8.4 Membrane sensors TC3 (total chlorine) and FC2 (free chlorine)

The membrane sensor is a membrane-covered potentiostatic 3-electrode measuring cell with a specially positioned counter electrode. The measuring electrode is membrane-covered and located, together with the reference electrode, in an electrolyte chamber that is separated from the sample water and contains a special electrolyte.

In this measurement method, chlorine diffuses from the sample water through the membrane and, in combination with the electrolyte, triggers an electrical signal at the measuring electrode. This electrical signal is proportional to the chlorine concentration and is amplified by the membrane sensor electronics. As a result of integrated temperature compensation, the measuring signal is independent of the sample water temperature.

The membrane sensors FC2 and TC3 can be installed in the pressure-free and pressurized version of the flow cell module VariaSens C.

3.8.5 Membrane sensor CD7 (chlorine dioxide)

Membrane sensor CD7 allows selective measurement of the chlorine dioxide content in all types of water, including ultrapure water (LF > 1 μS/cm), without cross-sensitivity to chlorine, bromine and hydrogen peroxide, but cross-sensitive to ozone and peracetic acid. Membrane sensor CD7 does not exhibit pH-dependency and is therefore suitable for water with changing pH values.

Membrane sensor CD7 can be installed in the pressure-free and pressurized version of the flow cell module VariaSens C.

3.8.6 Membrane sensor OZ7 (ozone)

Membrane sensor OZ7 allows selective measurement of the chlorine dioxide content in all types of water, including ultrapure water ($LF > 1\mu\text{S/cm}$), without cross-sensitivity to chlorine, bromine and hydrogen peroxide, but cross-sensitive to chlorine dioxide and peracetic acid. Membrane sensor OZ7 does not exhibit pH-dependency and is therefore suitable for water with changing pH values.

Membrane sensor OZ7 can be installed in the pressure-free and pressurized version of the flow cell module VariaSens C.

3.9 Technical data

3.9.1 Electronic module (Module name E02)

Housing	Dimensions (WxHxD)	320 x 311 x 153mm
	Weight	approx. 3.5 kg
	Protection rating	IP66
	Mains connection	100 to 240 V AC \pm 10% 50 to 60 Hz or 24 V DC, 15 W
Display	4.3" graphic color display with LED backlighting and capacitive touchscreen behind shatterproof glass panel, resolution 480x272 pixels	
Insulation	Overvoltage category	2
	Contamination level	2
	Protection category	1
Approvals	CE, CSA	
Operating conditions	Ambient temperature	0 to 50 °C
	Humidity	< 80 %, non-condensing
	Environment	No direct sunlight
	Atmospheric pressure	75 to 106 kPa
	Max. working height (altitude)	2000 m
	Storage temperature	-20 to +70 °C
	Noise emission	<45 dB
Digital inputs	<ul style="list-style-type: none"> • 5x for voltage-free contact (internal 5 V power supply) • Freely selectable function in menu • When input open: DI active • When input closed: DI inactive 	

Measurement inputs	<ul style="list-style-type: none"> • 3-electrode sensor (measuring range 0 to max. 20 mg/l, end value can be set) or membrane sensor • pH value (measuring range pH 0 to pH14, initial and end value can be set) or fluoride (measuring range 0 to 20 mg/l) • Temperature (measuring range 0 to 50°C/32 to 122°F)
Relay outputs	<ul style="list-style-type: none"> • 6x changeover contact with integrated 3.15 A slow-blow fuse • 5 A, 125/250V AC (contact load capacity of the relays in general use) • 1/6 HP (122 VA) 125/250V AC • 5 A, 30V DC (contact load capacity of the relays at resistive load) • 30W max., 1 A, 30V DC – 0.24 A, 125V DC (inductive load) • B300



Please note

When connecting inductive or capacitive loads (e.g. load with integrated switching power supply), an additional power relay with suitable specification must be provided. Each relay output has an integrated 3.15 A fuse as overcurrent protection.

Typical use of the relay: Enabling contact for external alarm or trigger a dosing devices or dosing pumps in constant flow applications.

Analog outputs	<ul style="list-style-type: none"> • 4-way mA output module 0/4 to 20 mA (optional) • Freely configurable signal assignment • Load max. 500 ohm, accuracy < 0.5 % FS • Galv. isolated up to 50 V relative to earth
Interfaces	<ul style="list-style-type: none"> • RS485 interface with Wallace & Tiernan protocol for connection to OPC server, Process Monitoring System or control system for data visualization • Ethernet interface (HTTP protocol/Modbus TCP protocol) • USB interface for firmware update

3.9.2 Flow cell module DEPOLOX[®] 5 C (Module name D02)



Please note

The pH sensor can be installed in the pressure-free and pressurized version of the flow cell module DEPOLOX[®] 5 C. The fluoride sensor can be installed in the non-pressurized version.

Housing	Dimensions (WxHxD)	253 x 375 x 163 mm
	Weight	approx. 2.5 kg
Connections	non-pressurized version	Inlet: G 1/2" A thread connection Outlet: Connecting nipple for hoses ID 6 mm
	Pressurized version	Inlet and outlet: G 1/2" A thread connection
Flow control valve	Sample water flow	33 l/h, controlled, preset at the factory
	Flow control range	0.25 to 3.0 bar
	Back pressure	Non-pressurized version: free drain Pressurized version: max. 1.5 bar
Multi-sensor	Switching point	21 l/h \pm 3 l/h
	Switching hysteresis	2 l/h
	Temperature sensor	Pt1000
Version	Potentiostatic 3-electrode cell with platinum electrodes, storage tank with reference electrolytes, two diaphragms, Ag/AgCl conductive system	
Range	0 to 50 mg/l (reference value chlorine)	
Working temperature range	0 to 50°C (32 to 122 °F)	
Area of application pH value	Constant, in a range from pH 4 to pH 9	
Influence of the pH value	HOCl characteristic curve (for chlorine)	
Measured value	Free chlorine, chlorine dioxide, ozone, potassium permanganate	
Conductivity	\geq 100 μ S/cm	
Response time	t_{90} = < 20 sec.	
Typical output signal	20 μ A/mg/l (for chlorine)	
Storage temperature	-10 to +50°C (14 to 122°F)	

3.9.3 Flow cell module VariaSens C (Module name D02)*Please note*

The pH sensor and the membrane sensors FC2, TC3, CD7 and OZ7 can be installed in the pressure-free and pressurized version of the flow cell module VariaSens C. The fluoride sensor can be installed in the non-pressurized version.

Housing	Dimensions (WxHxD)	253 x 375 x 163 mm
	Weight	approx. 2.5 kg
Connections	Pressurized and pressure-free version	Inlet and outlet: G 1/2" A thread connection
Flow control valve	Sample water flow	33 l/h, controlled, preset at the factory
	Flow control range	0.25 to 3.0 bar
	Back pressure	Non-pressurized version: free drain Pressurized version: max. 1.5 bar
Multi-sensor	Switching point	21 l/h ±3 l/h
	Switching hysteresis	2 l/h
	Temperature sensor	Pt1000
Operating conditions	Water quality	Brine and pool water acc. to standard
	Storage temperature	-20 to +70 °C

3.9.4 Y-style flow-through assembly

pH/fluoride	Back pressure	Non-pressurized version
	Sample water temperature	Max. +50 °C

3.9.5 pH sensor

Version	Single-rod measuring cell with universal membrane glass, salt reserve, zirconium dioxide diaphragm, polymerized solid electrolyte, Ag/AgCl reference electrode
Range	pH 0 to 12 (temporarily to pH 14)
Working temperature range	-5 to +80 °C (23 to 176 °F)
Operating pressure	0 to 6 bar (6 x 10 ⁵ Pa)
Minimum conductivity of the sample water	50 µS/cm
Installation length	120 mm
Screw-in thread	PG 13.5
Storage temperature	-5 to +30 °C (23 to 86 °F)

3.9.6 Fluoride sensor

Sensor input	Fluoride single-rod electrode
Range	0.2 to 20.0 mg/l
pH range	pH 5 to pH 8

3.9.7 Membrane sensors

	TC3 (total chlorine)	FC2 (free chlorine)
Measured value	Total chlorine (= free chlorine + combined chlorine)	Free chlorine
Range	0.05 to 20.00 mg/l (ppm)	0.05 to 20.00 mg/l (ppm)
Area of application	Swimming pool, drinking and process water	Swimming pool and drinking water
Measuring principle	Membrane-covered, amperometrically operating potentiostatic 3-electrode system with integrated electronics	
pH measuring range	pH 4 to pH 12, reduced pH-value dependency	pH 4 to pH 9, reduced pH-value dependency
Conductivity of the sample water	10 µS/cm to 50 mS/cm	10 µS/cm to 2500 µS/cm
Max. permissible operating pressure	1.5 bar (21.76 PSI) with suitable flow cell module, no pressure surges and/or vibrations. Observe the back pressure of the flow cell module!	
Installation position	Vertical, measuring electrode pointing downward, flow from below	
Operating temperature		5 to 45 °C
Sample water temperature	0 to +45 °C (no ice crystals in the sample water)	
Ambient temperature	0 to +55 °C	
Temperature compensation	Automatic, through integrated temperature sensor. Sudden temperature changes must be avoided.	Automatic, through integrated temperature sensor.
Nominal span (with pH 7.2)	10 µA/ppm	10 to 15 µA/ppm
Running-in time	For first commissioning approx. 2 hours.	
Response time	T ₉₀ : approx. 2 min.	
Zero point alignment	Not necessary.	
Cross-sensitivity/impurities	ClO ₂ : Factor 1 O ₃ : Factor 1.3 Corrosion inhibitors can lead to measurement errors. Water hardness stabilizers can lead to measurement errors.	ClO ₂ : Factor 0.75 O ₃ : Factor 0.8 Combined chlorine can increase the measured value. Corrosion inhibitors can lead to measurement errors. Water hardness stabilizers can lead to measurement errors.
Absence of disinfectant	max. 24 h	
Power supply	10 to 30 V DC, 10 mA	5 to 15 V DC, 10 mA
Electronics	Output signal: analog signal 0 to 200 µA Non-isolated electronics. Analog internal processing of measured values.	
Connection	4-pin connection socket	
Dimensions	Diameter: approx. 25 mm (1"), length: approx. 175 mm (6.9")	
Material	Microporous hydrophilic membrane, PVC-U, stainless steel 1.4571	
Transport	+5 to + 50 °C (membrane sensor, electrolyte, membrane cap)	
CE	DIN EN 61326-1, 61326-2-3 and RoHS-conform	

	CD7 (chlorine dioxide)	OZ7 (ozone)
Measured value	Chlorine dioxide, selective toward Cl ₂ , Br ₂ , H ₂ O ₂ , cross-sensitivity to O ₃ , peracetic acid	Ozone, selective toward Cl ₂ , Br ₂ , H ₂ O ₂ , cross-sensitivity to ClO ₂ , peracetic acid
Power supply	Unipolar +12 – 15 VDC, 11 mA	
Typical output signal	approx. 10 µA per 1 mg/l (ppm) ClO ₂	approx. 10 µA per 1 mg/l (ppm) O ₃
Measuring system	Membrane-covered 2-electrode system	
Reference electrode	Silver / silver halide / potassium halide solution	
Working electrode	Gold	
Further materials	PVC, silicone rubber, stainless steel	
External dimensions	Ø 25 mm (1"), length 175 mm (6.9")	
Connector-cable combination	Cable length 1.2 m	
Electrolyte	Diluted potassium halide solution, 100 ml bottle, store in a dark place at 15°C to 25°C, can be used for a max. of 2 years if still evenly clear	Diluted potassium halide solution, 100 ml bottle, store in a dark place at 15°C to 25°C, can be used for a max. of 1 year if still evenly clear
Range	0.05 – 20 mg/l (ppm) ClO ₂	0.02 – 10 mg/l (ppm) O ₃
Analysis	DPD 1 + DPD 3	
Zero point calibration	Not necessary (zero point signal at 0 mg/l ClO ₂ = 0 µA)	Not necessary (zero point signal at 0 mg/l O ₃ = 0 µA)
Response time T ₉₀	< 20 sec.	< 50 sec.
Influence of the pH value	No signal influence up to stability limit ClO ₂	No signal influence up to stability limit ozone
Temperature compensation	Internal temperature compensation 5 – 45 °C	
Storage temperature	-10 – +45 °C (without electrolyte)	
Max. pressure	1.5 bar (21.76 PSI) with suitable flow cell module, no pressure surges and/or vibrations. Observe the back pressure of the flow cell module!	
Water quality	All types of water, swimming pool, drinking, service and process water (limescale deposits can block the membrane)	All types of water, swimming pool, drinking, service and process water (also containing surfactants), (limescale deposits can block the membrane)
Conductivity	> 1 µS/cm to max. 40 mS/cm	> 1 µS/cm to max. 40 mS/cm
Flow	6 – 35 l/h, as constant as possible	6 – 35 l/h, as constant as possible
Service life	Service life of the electrolyte in operation approx. 6 months, service life of the membrane cap typically 1 year (less with poor water quality, e.g. sand, dirt)	Service life of the electrolyte in operation approx. 6 months, service life of the membrane cap typically 1 year (less with poor water quality, e.g. sand, dirt)
Cross-sensitivity	Ozone, peracetic acid	Chlorine dioxide, peracetic acid
Selectivity	Toward chlorine, bromine, hydrogen peroxide	Toward chlorine, bromine, hydrogen peroxide

4. Interfaces

4.1 USB interface

The electronic module is equipped internally with a USB interface. It is used to update the firmware via USB stick (see Chapter 6.5 “Firmware update”) or for use as a data logger via USB stick.

If a W2T866279 memory stick is permanently installed in the USB port, monthly archive files are saved in CSV format. All measurements, controller outputs and states of the digital inputs are saved every two minutes. Proceed as follows to create data backup:

- 1 De-energize the disinfection analyzer.
- 2 Remove the housing cover.
- 3 Remove the USB stick and copy the archive files.
- 4 Reinsert the USB stick and fit the housing cover again.
- 5 Switch the disinfection analyzer on again.

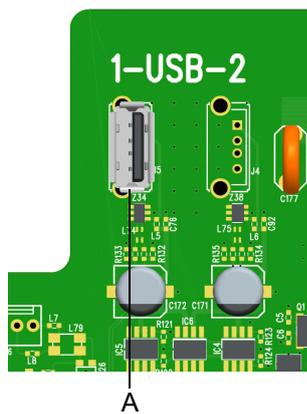
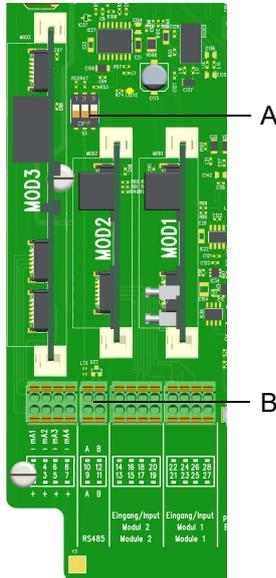


Image 1 Detail of PCB - USB interface

A *USB interface*

4.2 RS485 interface



The RS485 interface is used for data transfer to higher-level control systems such as the Process Monitoring system or other systems that support the Wallace & Tiernan RS485 protocol. For more detailed information, please refer to the operating manual “RS485 interface.” You can request this operating manual from us or download it from our homepage.

The RS485 interface is electrically isolated. It has four integrated terminals, a terminating resistor R_t and balancing resistors R_u and R_d for incorporation into a Wallace & Tiernan bus system.

Image 2 Detail of PCB - RS485 interface

- A DIP switches for activating the resistors:
 DIP switch 1 (left): Balancing resistor R_u
 DIP switch 2 (center): Terminating resistor R_t
 DIP switch 3 (right): Balancing resistor R_d
- B Terminals, RS485 interface

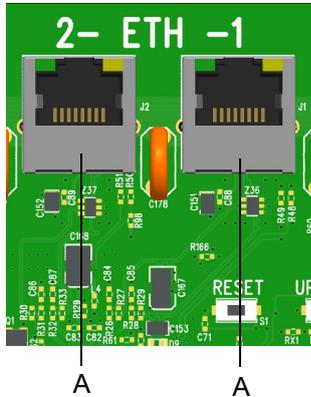


Please note

For installation at the end of the bus, the DIP switch R_t must be activated (position ON). For installation in the middle of the RS485 bus, R_t must be set to OFF.

A shielded, twisted 2-wire cable (twisted pair) with a wire cross-section of at least 0.25 mm² (24 AWG) must be used as the transfer medium. The characteristic impedance of the cable must be between 100 ohms and 130 ohms, the cable capacity if possible < 60 pF/m. The shielding improves the electromagnetic compatibility (EMC). The bus cable is always wired as a bus from device to device. Any stub cable to the bus device must not exceed a length of 0.3 m. Longer branch-offs in the bus cable are not permissible! We recommend the cable W2T504634 - LiYCY(TP) 2 x 0.25 mm².

4.3 Ethernet interface



The electronic module has two integrated Ethernet interfaces (ETH 1 and ETH 2). They are connected internally via an Ethernet switch. The device has an MAC address. The MAC address is displayed in the menu “Settings” - “Connections” - “Network.” The installed LAN interface allows data visualization via an Internet-capable device and HTTP protocol or standard browser. The LAN interface also supports data communication via the Modbus TCP protocol, see Chapter 4.4 “Modbus TCP interface”.

Image 3 Detail of PCB - Ethernet interface

A Ethernet connections

Visualization and operation are effected via the web pages integrated in the electronic module. Wireless access via mobile devices such as tablet computers or smartphones is possible by installing a wireless router on-site and connecting it to the electronic module. The Ethernet- interface supports a transmission rate of 10 or 100 Mbit/s. There are two integrated Ethernet connections. The integrated 2-port switch replaces additional external switch assemblies. To avoid long process times, we recommend that you do not daisy-chain more than three devices via the internal switch. An additional external switch assembly must be provided if several devices are used.

Connection is via a standard Ethernet connection cable. Two special M25 cable glands with slit rubber seals and larger grommets are installed to allow the use of pre-terminated Ethernet cables with connectors. The Ethernet connectors can be inserted through these fittings. For Ethernet connection, see Chapter 4.3.1 “Configuring the Ethernet connection for installation in a network”.



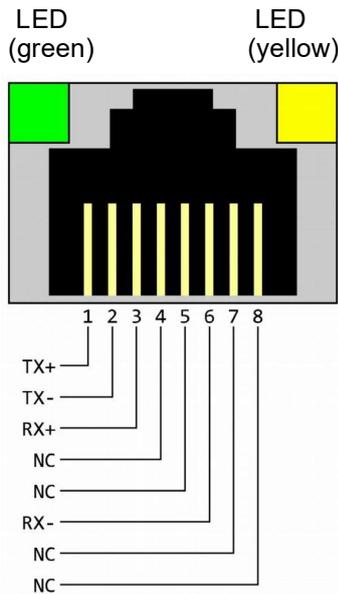
Please note

This operating manual does not cover installation and commissioning in combination with routers or wireless routers. Responsibility for this lies with the operator.



Please note

For security reasons, access to the device should only be granted to authorized personnel. Permanent, unsafe connections via the Internet or WLAN are not permitted. Safe connections can, for example, be set up via a VPN-secured communication channel or an encoded WLAN connection. The electronic module only supports the unencrypted communication protocol “http” and is designed for operation within an Intranet (closed network). Please observe Chapter 2.2 “General safety instructions”, section “IT safety.”



The Ethernet connection is designed in accordance with IEEE 802.3. There are two 8P8C sockets (often referred to as RJ45 sockets) installed. Connection to the HUB or switch can be realized with a 1:1-wire and screened patch cable. Direct connection to a PC network card is possible using a patch cable (1:1) or a crossover cable (crossed network cable). The LEDs are fitted in the 8P8C socket. They display the interface statuses. The meaning of the LEDs is as follows:

Green: lights up	Ethernet connection established
Green: flashes	Data being transferred
Yellow: off	10 Base-T
Yellow: lights up	100 Base-T

The connection runs in Auto negotiation mode. The data transfer rate and full or half duplex are defined automatically with the connected switch/HUB. The adjacent drawing shows the RJ45 terminal assignment.

4.3.1 Configuring the Ethernet connection for installation in a network

The electronic module is delivered with a fixed IP address, i.e. the device can only be addressed via a fixed IP address. Alternatively, the electronic module can be configured with DHCP.

The Ethernet settings of the electronic module can be configured via the menu "Settings"–"Network". The customer-specific IP address and the subnet mask can be entered. To do so, contact the network administrator if the electronic module is being integrated into a network. The MAC address is displayed in the "Information" menu. An Ethernet connection line to a PC or laptop computer must be installed for data visualization via Internet browser and an Internet-capable device.

A network connection is set up between a PC or laptop computer with Ethernet interface (10/100 MB/sec) and the electronic module. In order to operate the electronic module in a network, the network configuration must be adapted to the existing network. If required, you can obtain the necessary information (IP address, subnet mask) from your local network administrator. You can configure the IP address and subnet mask assigned to you in the menu "Settings" - "Network."

Example:

IP address	192.168.200.11 (factory setting)
Network mask	255.255.255.0 (factory setting)
Gateway	0.0.0.0 (factory setting)

Proceed as follows to visualize the web view of the electronic module in the browser:

6 Start the browser, e.g. Firefox or Internet Explorer.

- 7 Enter the IP address of the electronic module, e.g. "http://192.168.200.11/" (in the factory setting). After successful connection, the start screen of the electronic module appears. Depending on the size of the operating device, the measurement windows are displayed side by side or one below the other. The current value, range, setpoint and limit values as arrows are displayed for each measurement. The operation mode and dosing output for the available controllers are also displayed.



Please note

A network connection or connection via WLAN router is required in order to access the web views of the electronic module.

4.3.2 Configuring direct network connection

If the electronic module is not integrated in a network, a direct network connection can be established between a PC or laptop computer with Ethernet interface (10/100 MB/sec) and the electronic module using a network cable.

Proceed as follows:

- 1 Using a network cable, connect the electronic module to a PC or laptop computer.
- 2 Assign a fixed IP address and network mask to the PC or laptop (see Chapter 4.3.3 "Network setting under Windows 10").
- 3 Start the browser, e. g. Firefox or Internet Explorer, and enter the IP address of the electronic module "http://192.168.200.11" (factory setting) in the address input field. After successful connection, the start screen of the electronic module appears.



Please note

The electronic module and the PC or laptop computer must always have the same network mask and an IP address in the same IP address range. The IP address must not be identical.

Example:

	Electronic module	Laptop or PC
IP address	192.168.200.11 (factory setting)	192.168.200.1
Network mask	255.255.255.0 (factory setting)	255.255.255.0
Gateway	0.0.0.0 (factory setting)	

4.3.3 Network setting under Windows 10

Windows 10 automatically establishes a network connection as soon as a network card is detected in the PC or laptop computer. All you need to do is assign a fixed IP address and a network mask.

Windows 10 allows you to define two different configurations, e.g. if a laptop is used in different network environments:

- Windows 10 with static (fixed) IP address
- Windows 10 with an alternative configuration if a DHCP server is available

The network connection can be configured on the PC or laptop under “Settings” – “Network and Internet” – “Ethernet” – “Network and Sharing Center” – “Ethernet.” All network connections can be checked and adjusted in the lower window.

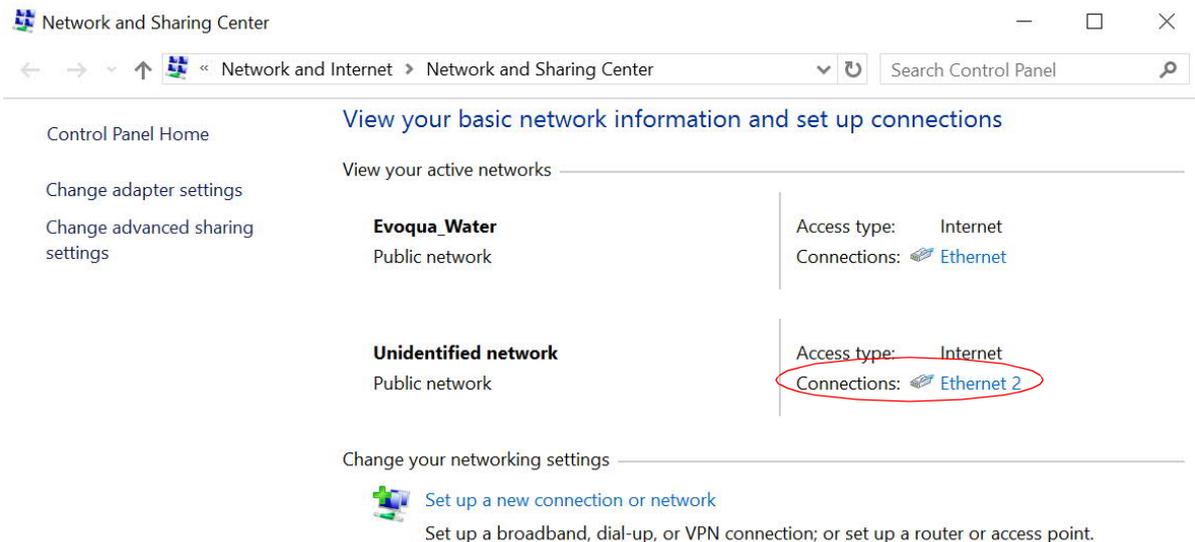


Image 4 Network and Sharing Center



Please note

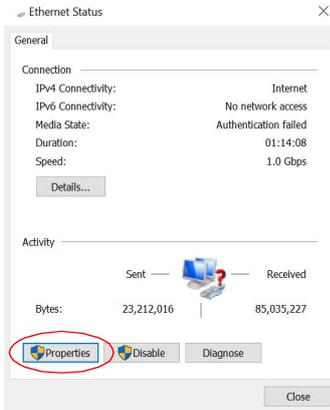
If the PC or laptop is connected to a network, further elements that must not be deleted or changed may be present! In this case, consult your network administrator!

Windows 10 with static (fixed) IP address

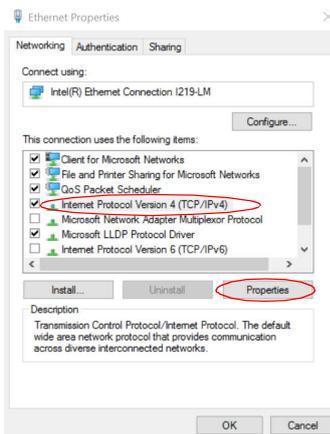
Windows 10 with static (fixed) IP address

With the setting, a fixed IP address is always assigned to the PC or laptop computer.

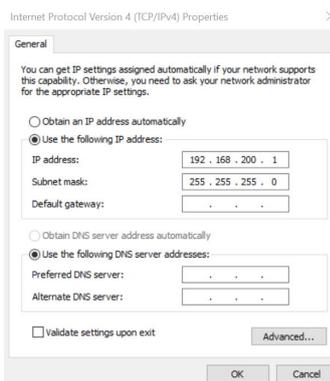
Proceed as follows:



- 1 Under "Connections," click "Ethernet" (see red marking in the illustration). A further menu, "Ethernet status," opens.
- 2 Click the "Properties" button.

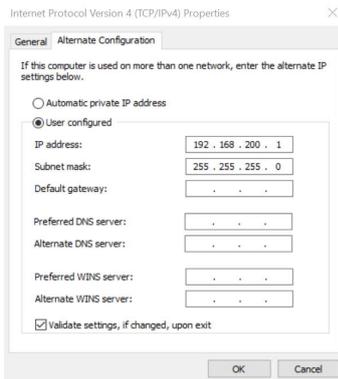


- 3 Under the menu "Ethernet properties," select the element "Internet protocol Version 4 (TCP/Pv4)." Only the element "Internet protocol Version 4 (TCP/IPv4)" is required; all other elements are not necessary for operation of the electronic module.
- 4 Click the "Properties" button to configure the element "Internet protocol Version 4 (TCP/Pv4)."



- 5 Activate the selection "Use following IP address."
- 6 Assign a fixed IP address and network mask. Do not change any other settings.
- 7 Tap the "OK" button twice to confirm and save the entry. In some Windows configurations, it may be necessary to reboot Windows.

Windows 10 with an alternative configuration



Windows 10 with an alternative configuration

With Windows 10, it is also possible to set an alternative configuration.

Proceed as follows:

- 1 Carry out steps 1 to 4 as described under “Windows 10 with static (fixed) IP address” on page 43.
- 2 Now click the “Alternative configuration” button.
- 3 Activate the selection “User-defined.”
- 4 Assign a fixed IP address and network mask. Do not change any other settings.
- 5 Tap the “OK” button twice to confirm and save the entry. In some Windows configurations, it may be necessary to reboot Windows.

The settings of the electronic module for the TCP/IP connection can be made in the menu Connect - Network:

IP address (factory setting)	192.168.200.11
Network mask	255.255.255.0

4.4 Modbus TCP interface

The Ethernet interface integrated in the electronic module supports data communication via Modbus TCP protocol. Various data points are available for data exchange, see Chapter 4.4.2 “Reference list”.

Transmission technology	Ethernet in accordance with IEEE802.3
Connection	RJ45 socket, internal
Communication	Supported commands: FC03: Read Multiple Registers FC16: Write Multiple Registers FC06: Write Single Register

The electronic module works as a Modbus TCP slave (server). The data packages are transferred as TCP/IP data packages via the Ethernet interface. Access is via the Modbus register. The port used for the communication protocol Modbus TCP is 502.

The reference tables have the following structure:

Column	Description
Modbus register	Modbus register address
E-byte	Byte address input data
A-byte	Byte address output data
Module name Profibus DP	Name of the module in the GSD file
Name	Name of the data point
Length	Number of bytes in the data point
Format	Data format of the data point (see Chapter 4.4.2 "Reference list")
Access	Access right: R = Read W = Write RW = Read & Write
Description	Additional information on the data point

4.4.1 Data formats

The table below contains the data format used for transmission of the process data:

Data type	Size (bit)	Typical names	Value range min.	Value range max.
INT8	8	yes	-128	127
UINT8	8	no	0	255
INT16	16	yes	-32,768	32,767
UINT16	16	no	0	65,535
INT32	32	yes	-2,147,483,648	2,147,483,647
UINT32	32	no	0	4,294,967,295
FLOAT	32 (8/23) ^{*1}	yes	$3,4 \cdot 10^{-38}$ ($-3,4 \cdot 10^{-38}$)	$3,4 \cdot 10^{38}$ ($-3,4 \cdot 10^{38}$)
ASCII	n * 8	no	--	--

^{*1} Exponent / mantissa

For the byte sequence in which the various data types are saved in the memory or transferred, see the following figures.

Data type INT8 / UINT8

Example using the figure 50 (32 hex):

Register X															
Byte 1								Byte 2							
00 _H								32 _H							
0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
15															0

Data type INT16 / UINT16

Example using the figure 12589 (312D hex):

Register X															
Byte 1								Byte 2							
31 _H								2D _H							
0	0	1	1	0	0	0	1	0	0	1	0	1	1	0	1
15															0

Data type INT32 / UINT32

Example using the figure 1212117675 (483F72AB hex):

Register X								Register X+1																							
Byte 1				Byte 2				Byte 1				Byte 2																			
72 _H				AB _H				48 _H				3F _H																			
0	1	1	1	0	0	1	0	1	0	1	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	1	1	1
15															0	31															16

Data type FLOAT

The Float or Real values are transferred in accordance with the IEEE754 Standard Format for 32-bit values. Example using the figure 1.25.

Hexadecimal: 3F A0 00 00 (0: + ; 1: -)
 Signed (S): 0
 Exponent (E): 0111 1111
 Mantissa (M): 010 0000 0000 0000 0000

Register X																Register X+1															
Byte 1								Byte 2								Byte 1								Byte 2							
Mantissa																Exponent :								Mantissa							
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	S	E	E	E	E	E	E	E	E	M	M	M	M	M	M	M
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0
15															0	31															16

Data type ASCII

The characters are transmitted in accordance with ASCII Codepage 437. Example "mg/l"

Register X								Register X+1																							
Byte 1				Byte 2				Byte 1				Byte 2																			
67 _H				6D _H				6C _H				2F _H																			
'g'				'm'				'l'				'/'																			
15															0	31															16

4.4.2 Reference list

The following reference list contains all available data points and values that can be read and written via Modbus TCP. It must be noted that write commands should not be set to variables or the Modbus register cyclically or repeatedly set to the same values. Permanent writing of values can cause damage to the device (memory).

Modbus register DEPOLOX[®] 400 M

IP address: IP address of the device. e.g. 192.168.200.11

Port: 502

MB register	Name	Type	No. byte	Access	Max.	Min.	Description
[400001-400099] Info area (read only)							
400001	System name	ASCII	20	RD			e.g. "DEPOLOX 400 M"
400011	Software version	ASCII	10	RD			e.g. "V:1.00"
400016	Current date	ASCII	10	RD			e.g. "21.02.17"
400021	Current time	ASCII	6	RD			e.g. "13:16"
400024	Serial number	ASCII	16	RD			
[400100-400299] Measurements (read only)							
(Ch.1) Disinfection							
400100	Measured value	FLOAT	4	RD	-	-	
400102	Measurement unit	ASCII	10	RD	-	-	mg/l
400107	Range start	FLOAT	4	RD	-	-	
400109	Range end	FLOAT	4	RD	-	-	
400111	Current setpoint	FLOAT	4	RD	Upper range	Lower range	Normal/Eco/Setpoint
400113	Current dosing rate / control value Yout	FLOAT	4	RD	100.0%	0.0%	
(Ch.2) pH/fluoride							
400115	Measured value	FLOAT	4	RD	-	-	
400117	Measurement unit	ASCII	10	RD	-	-	pH / mg/l
400122	Range start	FLOAT	4	RD	-	-	
400124	Range end	FLOAT	4	RD	-	-	
400126	Current setpoint	FLOAT	4	RD	Upper range	Lower range	
400128	Current dosing rate / control value Yout	FLOAT	4	RD	100.0%	0.0%	
400130	--						
400132	--						
400137	--						
400139	--						
400141	--						
400143	--						
400145	--						
400147	--						
400152	--						
400154	--						

MB register	Name	Type	No. byte	Access	Max.	Min.	Description
400156	--						
400158	--						
(Ch.5) Temperature							
400160	Measured value	FLOAT	4	RD	-	-	
400162	Measurement unit	ASCII	10	RD	-	-	°C
400167	Range start	FLOAT	4	RD	-	-	
400169	Range end	FLOAT	4	RD	-	-	
400171	--		4	RD			
400173	--		4	RD			
[400300-400399] Status messages (read only)							
400300	Alarm states	UINT16	2	RD			0x0001 - Alarm 1 0x0002 - Alarm 2 0x0004 - Alarm 3 0x0008 - Alarm 4 0x0010 - Alarm 5 0x0020 - Alarm 6 0x0040 - Alarm 7 0x0080 - Alarm 8
400301	Digital input	UINT16	2	RD			0x0001 - Sample water STOP - DI1 0x0002 - DI 2 0x0004 - DI 3 0x0008 - DI 4 0x0010 - DI 5 (open=1, closed=0)
400302	Relay outputs K1..K8	UINT16	2	RD			0x0001 - Relay K1 0x0002 - Relay K2 0x0004 - Relay K3 0x0008 - Relay K4 0x0010 - Relay K5 0x0020 - Relay K6
400303	---	UINT16	2	RD			
400304	Operation mode controller 1 (Chlorine)	UINT16	2	RD			0x0001 - Manual 0x0002 - Automatic 0x0004 - Controller Off 0x0008 - Auto tune running 0x0010 - 0x0020 - Controller STOP (Yout=0%) 0x0040 - Controller freeze (Yout=Yout) 0x0080 - Controller Yout=100% 0x0100 - 0x0200 - 0x0400 - 0x0800 - Eco mode switchover 0x2000 - Controller Standby
400305	Operation mode controller 2 (pH)	UINT16	2	RD			Bit coding as for controller 1
400306	--						
400307	--						
400308	--						
400310	Fault code Disinfection (Ch.1)	UINT32	4	RD			0x00000001 - Zero point calibration 0x00000002 - DPD calibration
400314	Error code pH/fluoride (Ch.2)	UINT32	4	RD			Bit coding as for error code chlorine

MB register	Name	Type	No. byte	Access	Max.	Min.	Description
400318	--						
400322	--						
400326	Error code temperature (Ch.5)	UINT32	4	RD			Bit coding as for error code chlorine
[401000-401049] Controller parameters (read and write)							
(Ch.1) Disinfection							
401000	Setpoint (W)	FLOAT	4	RW	Upper range	Lower range	
401002	P-element (Xp)	FLOAT	4	RW	1000%	0%	
401004	I-element (Tn)	FLOAT	4	RW	100.0 min	0.0 min	0.0 min means Tn inactive
(Ch.2) pH/fluoride							
401006	Setpoint (W)	FLOAT	4	RW	Upper range	Lower range	
401008	P-element (Xp)	FLOAT	4	RW	1000%	0%	
401010	I-element (Tn)	FLOAT	4	RW	100.0 min	0.0 min	0.0 min means Tn inactive

401012	---						
401014	---						
401016	---						

401018	--						
401020	--						
401022	--						
[401050-401149] Limit value parameters (read and write)							
(Ch.1) Disinfection							
401050	Min. value 1	FLOAT	4	RW	Max. value 1	Lower range	mg/l
401052	Max. value 1	FLOAT	4	RW	Upper range	Min. value 1	
401054	Hysteresis value 1	FLOAT	4	RW	25-digit	1-digit	
401056	Min. value 2	FLOAT	4	RW	Max. value 2	Lower range	
401058	Max. value 2	FLOAT	4	RW	Upper range	Min. value 2	
401060	Hysteresis value 2	FLOAT	4	RW	25-digit	1-digit	
(Ch.2) pH/fluoride							
401062	Min. value 1	FLOAT	4	RW	Max. value 1	Lower range	pH
401064	Max. value 1	FLOAT	4	RW	Upper range	Min. value 1	
401066	Hysteresis value 1	FLOAT	4	RW	25-digit	1-digit	
401068	Min. value 2	FLOAT	4	RW	Max. value 2	Lower range	
401070	Max. value 2	FLOAT	4	RW	Upper range	Min. value 2	
401072	Hysteresis value 2	FLOAT	4	RW	25-digit	1-digit	

MB register	Name	Type	No. byte	Access	Max.	Min.	Description
401074	--						
401076	--						
401078	--						
401080	--						
401082	--						
401084	--						
401086	--						
401088	--						
401090	--						
401092	--						
401094	--						
401096	--						
(Ch.5) Temperature							
401098	Min. value 1	FLOAT	4	RW	Max. value 1	Lower range	°C
401100	Max. value 1	FLOAT	4	RW	Upper range	Min. value 1	
401102	Hysteresis value 1	FLOAT	4	RW	25-digit	1-digit	
401104	Min. value 2	FLOAT	4	RW	Max. value 2	Lower range	
401106	Max. value 2	FLOAT	4	RW	Upper range	Min. value 2	
401108	Hysteresis value 2	FLOAT	4	RW	25-digit	1-digit	

5. Installation

5.1 Scope of delivery

The scope of delivery includes the following, depending on the version selected (see Chapter 3.2 “Versions”):

- Electronic module (Module name E02)
- Flow cell module (Module name D02):
 - DEPOLOX[®] 5 C
non-pressurized or pressurized version
 - VariaSens C
non-pressurized or pressurized version
- Y-style flow-through assembly
non-pressurized version
- Sensors (depending on selected version):
 - Sensor measuring module TC3 (free chlorine)
 - Sensor measuring module FC2 (total chlorine)
 - Sensor measuring module CD7 (chlorine dioxide)
 - Sensor measuring module OZ7 (ozone)
 - Sensor measuring module pH
 - Sensor measuring module fluoride
- LED glow stick (pre-wired)
- Multi-sensor (pre-wired)
- DIN rail
- Assembly accessories
- Operating manual

5.2 Transport and storage

Transport The disinfection analyzer is shipped in standard packaging. During transport, the packaged disinfection analyzer must be handled carefully and should not be exposed to wet weather or moisture.

Check that the transport packaging is undamaged. In the event of damage, please inform the transport company immediately, as your rights to compensation will otherwise be lost.

If a component is damaged, please contact your affiliate immediately.

Keep the packaging until the disinfection analyzer has been commissioned and put into operation.

Storage The disinfection analyzer and the sensors must be stored in dry condition without any residual water in a dry place that is not exposed to the elements. For storage temperature, see Chapter 3.9 "Technical data".

Shut-down The disinfection analyzer may only be taken out of operation by trained and authorized personnel.

5.3 Required ambient conditions



Please note

Correct and safe operation can only be guaranteed if the requirements for the ambient conditions are met. All applicable national and local regulations must be observed!

Installation location

The following points must be observed when installing the disinfection analyzer:

- The disinfection analyzer must be protected against moisture, rain, frost, heat and direct sunlight and may therefore not be installed outdoors.
- Do not use the disinfection analyzer in environments where there are flammable gases, fumes or dust or conductive dust.
- Do not subject the disinfection analyzer to strong shocks or vibrations.
- The air in the room must be non-condensing.

5.4 Mechanical installation



Warning!

Risk of injury or damage to the installation!

Only authorized and qualified electricians are permitted to install the disinfection analyzer. All electrical work on the disinfection analyzer must be carried out by authorized and qualified electricians. Modifications to the device other than those described in this operating manual are not permissible.

Mechanical installation is performed in accordance with the following checklist.

Ser. No.	Work step	Chapter	Done
1	Install the electronic module and flow cell modules DEPOLOX [®] 5 C or VariaSens C with or without DIN rail.	5.4.1	
	Install the electronic module and Y-style flow-through assembly.	5.4.2	
2	Remove the housing cover of the flow cell module	5.4.3	
3	Install the optional strainer (W3T158721)	5.4.5	
4	Connect sample water inlet with tubing connection or rigid pipe-work.	5.4.4	
5	Connect the sample water outlet.	5.4.6	
6	VariaSens C: Install fine filter.	5.4.10	
7	DEPOLOX [®] 5 C: Remove felt ring.	5.4.7	
8	DEPOLOX [®] 5 C: Remove and replace transport plug	5.4.8	
9	DEPOLOX [®] 5 C: Add electrode cleaning sand.	5.4.9	
10	Flow cell: Fit sensors	5.4.11	
	Y-style flow-through assembly: Fit sensor	5.4.13	
11	Fitting calibration aids	5.4.12	
12	Connecting sensors	5.4.14	
13	Fit housing cover	5.4.3	

5.4.1 Installing the flow cell module

The following mounting variants are available for the installation of the electronic module 400 M and the flow cell modules DEPOLOX® 5 C and VariaSens C:

- with DIN rail
- without DIN rail



Please note

We recommend that you install the flow cell module to the left of the electronic module. Leave a clearance of at least 250 mm above the flow cell module for working with the sensors.



Please note

The electronic module is not suitable for electrical connection with permanently installed cable conduits. If the cable glands do not meet local installation rules and regulations, these glands must be replaced with suitable ones.



Please note

If the flow cell module and electronic module are mounted in separate locations, the use of optional sensor extension cables is required. A length of 50 m must not be exceeded. For the pH or fluoride sensor, an optional impedance converter is required when longer cables are utilized.

Mechanical installation with DIN rail

Proceed as follows, see "Dimension drawing" on page 56:

- 1 Secure the DIN rail to a solid wall using the dowels and screws supplied. Screws and dowels for fixing to a solid wall are included in the scope of delivery.



Please note

If the device is to be installed on a suitable lightweight wall, use the corresponding mounting fixtures (not included in the scope of delivery).

- 2 We recommend that you hook the flow cell module on the DIN rail to the left of the electronic module.
- 3 Fasten the flow cell module to the solid wall at the bottom by the holders using dowels and screws.
- 4 Hook the electronic module onto the DIN rail so that it is flush at the right.
- 5 Fasten the electronic module to the solid wall at the bottom by the holders using dowels and screws.

Mechanical installation without DIN rail

Instead of on a DIN rail, the disinfection analyzer can be hooked onto the top clips on suitable tallow-drop screws.



Please note

The dimensions for the drilling pattern can be found on the back of the plastic housing.

Proceed as follows, see “Dimension drawing” on page56:

- 1 Attach the tallow-drop screws and dowels provided to the solid wall. Tallow-drop screws and dowels for fixing to a solid wall are included in the scope of delivery.



Please note

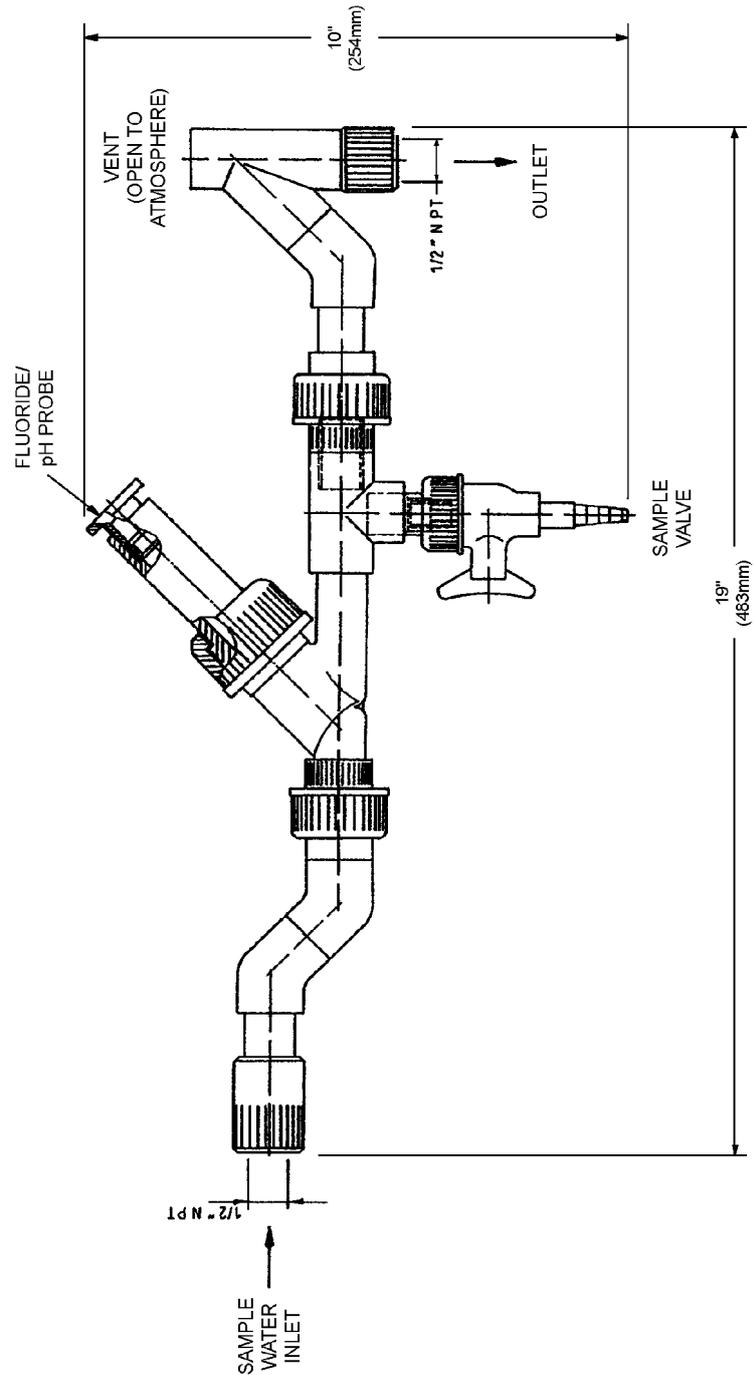
If the device is to be installed on a suitable lightweight wall, use the appropriate mounting fixtures (not included in the scope of delivery).

- 2 Hook the flow cell module onto the screws.
- 3 Fasten the flow cell module to the solid wall at the bottom by the holders using dowels and screws.
- 4 Hook the electronic module onto the screws.
- 5 Fasten the electronic module to the solid wall at the bottom by the holders using dowels and screws.

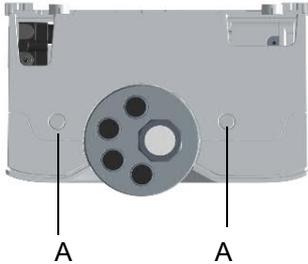
5.4.2 Installing the Y-style flow-through assembly

Proceed as follows:

- 1 Using mounting clamps (not included in the scope of delivery), screw the Y-style flow-through assembly to the solid wall below the electronic module.



5.4.3 Removing and fitting the housing cover



- 1 Remove the housing cover of the flow cell module. To do this, press both unlocking buttons on the top of the housing and carefully remove the cover toward the front.
- 2 Fit and engage the housing cover of the flow cell module. To do this, position the housing cover at the bottom and carefully press it upward until the housing cover engages on the unlocking buttons.

Image 1 View of top of housing cover

A Unlocking buttons

5.4.4 Connecting the sample water inlet



Please note

No water pipes made of copper may be fitted in the installation. They would falsify the measurement.

When connecting the sample water inlet, note the following:

- A distinction must be made between a sample water inlet with tubing connection and a sample water inlet with rigid pipework.
- The pressure in the sample water inlet must always be within a range of min. 0.25 to max. 3.0 bar. The pressure in the sample water inlet must always be 0.25 bar higher than in the sample water outlet.
- If the admission pressure is below 0.25 bar, a booster pump must be used.
- If the admission pressure exceeds 3.0 bar, an optional pressure reducing valve must be used.
- To prevent long loop lag times, ensure that the lines in the sample water inlet are as short as possible.
- An optional strainer (W3T158721) with a mesh size of 0.5 mm can be provided for the sample water inlet.

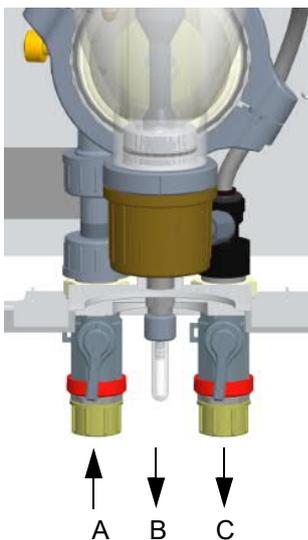


Image 2 Section, flow cell module DEPOLOX® 5 C, pressurized version

- A Sample water inlet with ball valve
 B Flow cell drain valve (drain at the drain screw)
 C Sample water outlet with ball valve

The following two options are possible for the sample water inlet:

- with tubing connection
- with rigid pipework

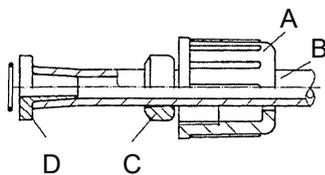
Sample water inlet with tubing connection



Attention!

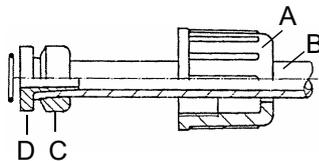
The water-tightness of the hose screw connection is only guaranteed if the following installation instructions are followed!

Proceed as follows:



- 1 Release union nut (A) on the hose screw connection.
- 2 Insert the tubing (B) until it meets the hose bushing (D).
- 3 Push the locking ring (C) out until the union nut (A) engages the connecting threads.

Image 3 Detail of hose screw connection



- A Union nut
B Tubing
C Locking ring
D Hose bushing



Please note

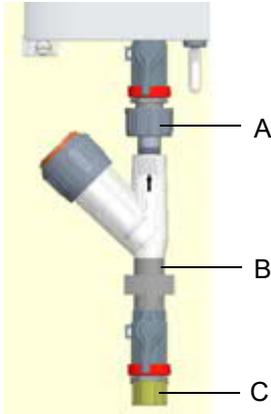
For order numbers, see Chapter 8.3.5 "Tubing to tubing connection".

Sample water inlet with rigid pipes

Proceed as follows:

- 1 Connect the sample water pipework to the connection thread (G1/2" A) of the ball valve.
- 2 Ensure that the sample water pipes are installed free of mechanical stress.

5.4.5 Installing the optional strainer



To install the optional strainer with ball valve (W3T158721) and pipe clamp in the sample water supply line, proceed as follows:

- 1 Release the screw joint on the sample water inlet with ball valve (A) (threaded connection G 1/2" A).
- 2 Connect strainer with pipe clamp (B).
- 3 Connect sample water inlet (C).

Image 4 Section, installation of strainer, straight

A Screw joint on sample water inlet with ball valve

B Strainer with pipe clamp

C Sample water inlet

5.4.6 Connecting the sample water outlet



Please note

No water pipes made of copper may be fitted in the installation. They would falsify the measurement.

Sample water outlet in non-pressurized version

Proceed as follows:

- 1 On the non-pressurized version, no back-pressure is permitted in the cell body.
- 2 The sample water outlet must be open. We recommend using a funnel above the outlet.
- 3 The sample water outlet must be routed in such a way that no siphon effect can arise.

Sample water outlet in pressurized version

Proceed as follows:

- 1 On the pressurized version, a maximum back-pressure of 1.5 bar is permitted on the sample water outlet.
- 2 Ensure that the drain screw (flow cell drain valve) is always closed.

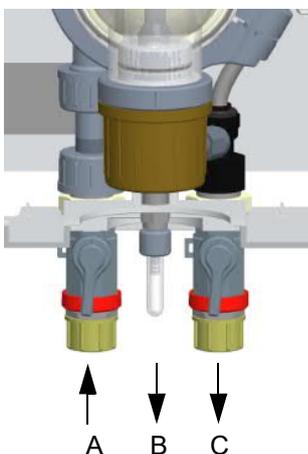


Image 5 Section, flow cell module DEPOLOX® 5 C, pressurized version

A Sample water inlet with ball valve

B Flow cell drain valve (drain at the drain screw)

C Sample water outlet with ball valve

5.4.7 DEPOLOX[®] 5 C Removing the felt ring

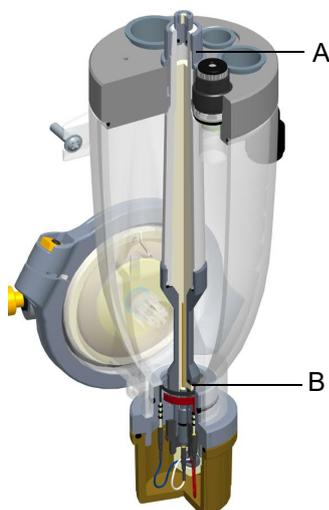
In order to keep the diaphragm in the flow cell module DEPOLOX[®] 5 C moist and prevent crystallization of the electrolyte solution during storage, a moist felt ring is inserted in the space between the electrolyte storage tank and electrode.



Attention!

This felt ring for moistening the diaphragms must be removed before commissioning the flow cell module DEPOLOX[®] 5 C.

Proceed as follows:



- 1 Unscrew the knurled nut (A) on the lid of the electrolyte storage tank.
- 2 Press the entire electrode unit downward out of the cell body.
- 3 Remove the felt ring (B) between electrolyte storage tank and electrode.
- 4 Reinstall the entire electrode unit in the cell body. Position it precisely within the cell body with the help of the positioning pin.
- 5 Press the entire electrode unit upward.
- 6 Screw the knurled nut back onto the electrolyte storage tank.

Image 6 Cutaway model, cell body (example, knurled nut)

- A *Knurled nut*
B *Felt ring*

5.4.8 DEPOLOX[®] 5 C Removing and replacing the transport plug



Please note

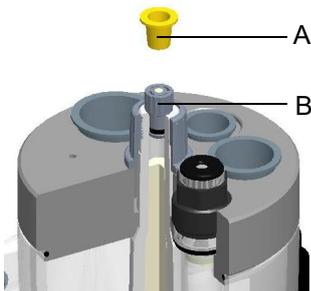
Before commissioning the flow cell module DEPOLOX[®] 5 C, the transport plug must be removed from the electrolyte storage tank and replaced with the stopper provided.

DEPOLOX[®] 5 C non-pressurized version

For the non-pressurized version, proceed as follows:

- 1 Remove the yellow protection plug from the electrolyte storage tank.
- 2 Replace the transport plug with the stopper provided.

Image 7 Section, cell body cover



- A Protection plug (yellow)
B Stopper (with white venting rod)

DEPOLOX[®] 5 C pressurized version



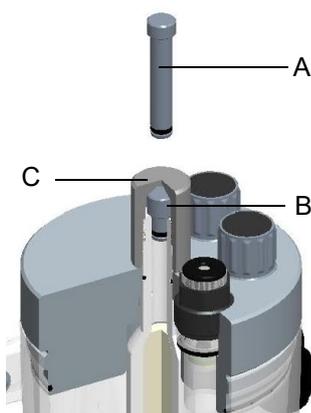
Attention!

During operation, always use the protection plug.

For the pressurized version, proceed as follows:

- 1 Unscrew the knurled nut.
- 2 Remove the long transport plug (A) from the electrolyte storage tank and replace it with the short stopper (B) provided.
- 3 Screw on the knurled nut.

Image 8 Section, cell body cover

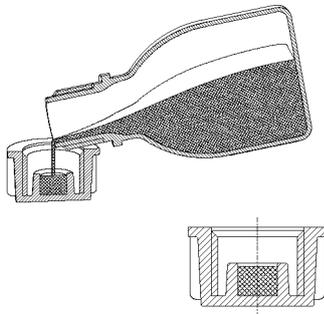


- A Transport plug (long)
B Stopper (short)
C Knurled nut

5.4.9 DEPOLOX[®] 5 C Add electrode cleaning sand

To insert the electrode cleaning sand (W3T158743) into the cell body of the flow cell module DEPOLOX[®] 5 C, proceed as follows:

- 1 Close the ball valve on the sample water inlet.
- 2 Close the ball valve on the sample water outlet on the pressurized version.
- 3 On the non-pressurized version, remove a sealing plug or sensor from the cell body cover.
- 4 On the pressurized version, remove the protection plug or sensor from the cell body cover.
- 5 Fill the cleaning sand cap (plastic bottle) up to one-third and pour the cleaning sand into the cell body via the location hole of a sensor (approx. 1/3 cm³ of cleaning sand).



The electrode cleaning sand (W3T158743) is supplied in a plastic bottle, the cap serves as a measure.

- 6 Make sure that the opening and the thread are clean; if necessary, rinse with distilled water.
- 7 Insert sealing plug or sensor into the cell body cover.
- 8 Open the ball valve on the sample water inlet.
- 9 On the pressurized version, open the ball valve on the sample water outlet.

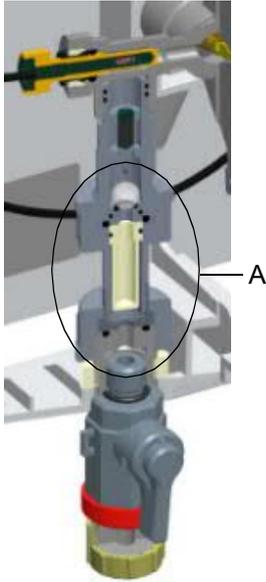
Image 9 Cutaway model, plastic bottle and cleaning sand cap

5.4.10 VariaSens C Installing the fine filter



Please note

A fine filter must only be installed when membrane sensors are employed.



The fine filter must be installed in the flow cell module VariaSens C; proceed as follows:

- 1 Release both knurled nuts (B).
- 2 Remove the entire filter unit (A).
- 3 Push the fine filter (D) into the filter unit. Ensure that the O-ring (C) is fitted correctly.
- 4 Fit the entire filter unit (A). Observe the correct installation position (top/bottom).
- 5 Tighten the knurled nuts (B).

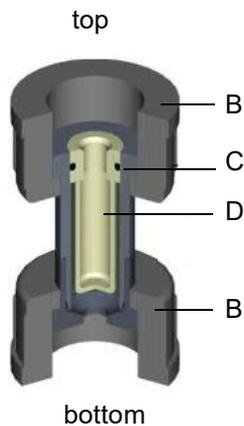


Image 10 Section, flow cell module VariaSens C, - non-pressurized version

Image 11 Cutaway model, filter unit

- A Entire filter unit
- B Knurled nuts
- C O-ring
- D Fine filter

5.4.11 Installing sensors in the flow cell module



Please note

The sensors are inserted or screwed into the location hole in the cell body cover. With the pressurized version, the sensors must be screwed in or secured to prevent them from being pushed out.

Proceed as follows:

- 1 The sensors must be prepared accordingly. Please follow the relevant operating instructions for the sensors!
- 2 On the non-pressurized version, remove the sealing plug from the location hole on the cell body cover.
- 3 On the pressurized version, unscrew the protection plug.
- 4 Remove the pH sensor from the KCl tank with stand.



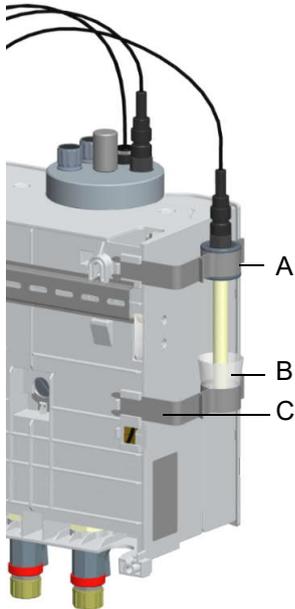
Please note

Keep the KCl tank with stand in a safe place for later use or storage.

- 5 Insert or screw the prepared sensors into the corresponding location hole in the cell body cover.

<p>DEPOLOX[®] 5 C, pressure-free</p>	<p>DEPOLOX[®] 5 C, pressurized</p>	<p>VariaSens C, pressure-free</p>	<p>VariaSens C, pressurized</p>	<p>Y-style flow-through assembly</p>
<p>A 3-electrode cell (free chlorine) B Blind plug C Fluoride sensor (only on pressure-free version) D pH sensor E LED glow stick F Blind plug</p>		<p>A Fluoride sensor (only on pressure-free version) B Membrane sensors TC3, FC2, CD7, OZ7 C LED glow stick D Blind plug E pH sensor</p>		<p>A pH or fluoride sensor</p>

5.4.12 Fitting calibration aids



The flow cell modules DEPOLOX[®] 5 C and VariaSens C have two calibration clips in the housing cover. They are pushed into the side of the basic housing at the back.

The clip with the plastic insert for the sensor is pushed into the top catch (A).

The second clip is for holding calibration solution in a bag or beaker. For solution in a bag, fit the clip in the top position of the bottom catch (B). For solution in a beaker, select the position below this (C).

Image 12 Rear side of the flow cell module DEPOLOX[®] 5 C, pressurized version

- A Top holding clip
- B Position of holding clip for bag
- C Position of holding clip for beaker

5.4.13 Installing a sensor in the Y-style flow-through assembly

Proceed as follows to install the pH or fluoride sensor in the Y-style flow-through assembly:

- 1 Fit the pH or fluoride sensor into the sensor holder.
- 2 Tighten the clamping nut to hold the electrode shaft.

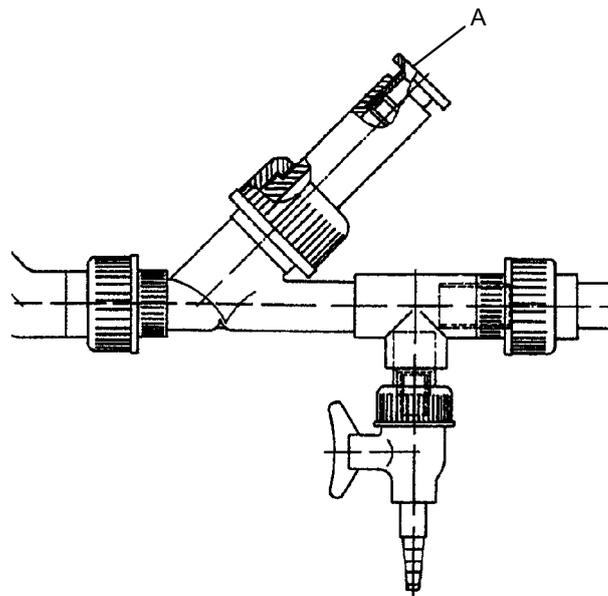


Image 13 Section, Y-style flow-through assembly

- A Sensor holder

5.4.14 Connecting sensors

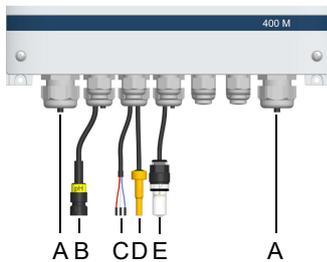


Please note

The sensor cable glands on the electronic module are special cable glands and are already fitted with special sealing inserts at the factory.

Threaded locking bolts are fitted in the cable glands at the factory. These must be removed during installation in order to install the corresponding sensor cables.

Cable glands



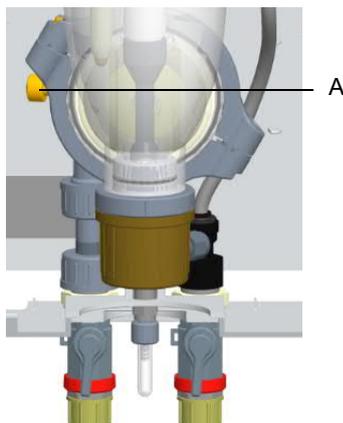
The Ethernet cable(s) are connected via the cable glands with connectors (A, larger opening). A maximum of two cables can be connected with the enclosed double sealing insert. The other cable glands can be used as required. Multiple sealing inserts (4x5 mm, 2x6 mm) are included with the accessories.

Image 14 Section, electronic module - cable glands

- A Cable gland for Ethernet cable
- B Cable gland for pH or fluoride sensor
- C Cable gland for 3-electrode or membrane sensors and multi-sensor
- D Cable gland for LED glow stick

Flow cell module DEPOLOX[®] 5 C and VariaSens C

Proceed as follows to connect the sensors of the flow cell modules with the electronic module:



- 1 Remove the red sealing plug (position A).
- 2 Plug multi-sensor into the flow control valve (position A).
- 3 Route the sensor cable of the 3-electrode cell or the membrane sensor into the electronic module through the corresponding cable gland.

Image 15 Section, flow cell module DEPOLOX[®] 5 C, pressurized version

- A Multi-sensor on the flow control valve

- 4 Connect the sensor cable of the 3-electrode cell or the membrane sensor to the electronic module as shown in the wiring diagrams.

The sensor cable of the DEPOLOX[®] 5 C 3-electrode cell is already pre-wired.

WRK	Working electrode	Red dot	Red cable
CNT	Counter electrode	Blue dot	Blue cable
Ref	Reference electrode		White cable

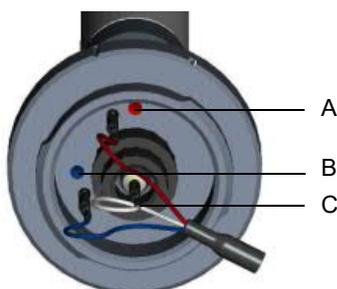


Image 16 Section, 3-electrode cell - color-coding of the electrode connections on the DEPOLOX[®] 5 C

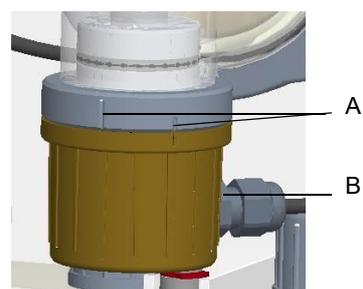


Image 17 Section, cap, flow cell module DEPOLOX[®] 5 C

- | | |
|-------------------------------------|--|
| A Working electrode (red cable) | A Markings for opening and closing the cap |
| B Counter electrode (blue cable) | B M12 threaded connection |
| C Reference electrode (white cable) | |

- 5 Plug or screw the LED glow stick into the location hole of the cell body cover.
- 6 Route the pH or fluoride sensor cable into the electronic module through the corresponding cable gland.
- 7 Connect the sensor cable of the pH or fluoride sensor to the electronic module as shown in the wiring diagrams.

Y-style flow-through assembly

Proceed as follows to connect the pH or fluoride sensor of the Y-style flow-through assembly with the electronic module:

- 1 Route the pH or fluoride sensor cable into the electronic module through the corresponding cable gland.
- 2 Connect the sensor cable of the pH or fluoride sensor to the electronic module as shown in the wiring diagrams.

5.5 Electrical installation



Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off. The electronic module must be de-energized before opening it.



Warning!

Risk of injury or damage to the device!

Only authorized and qualified electricians are permitted to install the disinfection analyzer and open the housing. The electronic module may only be put into operation when the housing is closed, and must be connected to protective earth. Modifications to the device other than those described in this operating manual are not permissible.

The electronic module may only be wired in de-energized state. Connect the electronic module in accordance with the wiring diagrams and applicable local and national regulations.



Warning!

Risk of injury or damage to the device!

The electronic module is not equipped with a mains switch and is in operation as soon as the supply voltage is applied. For this reason, an external switch or circuit breaker with a clearly identifiable "Off" switch position is necessary.

Line cross-section for the mains input side at least 0.75 mm² (AWG 18), on-site mains fuse 6 A with 100 to 240 V AC supply.

When connecting system components (e.g. devices, motors, pumps) as well as when entering operating data, the system components must be switched off in order to prevent uncontrolled activation or incorrect operation.

If devices are connected to the internal voltage supply (e.g. dosing devices) or via fixed connection cables (e.g. connectors), the total power consumption must not exceed 6 A.



Please note

The electronic module is not suitable for electrical connection with permanently installed cable conduits. If the cable glands do not meet local installation rules and regulations, these glands must be replaced with suitable ones.



Warning!

Risk of injury or damage to the device!

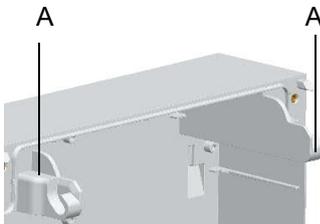
High temperatures at the terminals of the relays and the mains supply! At high ambient temperatures, high temperatures can occur at the terminals, and the connected cables must be designed to withstand such temperatures.



Please note

The electronic module is equipped with a flexible voltage supply input and accepts AC voltages from 100 to 240 volts. Take the power consumption into account when dimensioning. See Chapter 3.9 "Technical data".

5.5.1 Connecting the electronic module electrically



Proceed as follows:

- 1 Open the housing cover of the electronic module. Unscrew the housing cover and hook into the holders (A) on the basic housing.
 - 2 Connect the power supply in accordance with the wiring diagram (see Chapter 9. "Wiring diagrams").
-



Please note

Note the correct polarity of the voltage connections and the correct dimensioning of the wire cross-sections (see „Chapter 3.9 "Technical data" - Power consumption).

- 3 Connect CPU board in accordance with wiring diagram Chapter 9. "Wiring diagrams".
- 4 Make sure that all cable glands are installed correctly.
- 5 Fit the housing cover of the electronic module again. Tighten the housing screws by hand (to a maximum torque of $0.7 \text{ Nm} \pm 0.15 \text{ Nm}$).
- 6 Then put the disinfection analyzer into operation. See Chapter 5.6 "Initial commissioning".

5.6 Initial commissioning



Danger!

Risk of injury or death!

The disinfection analyzer must not be operated with flammable liquids.



Attention!

Risk of injury or damage to the device!

To ensure safe and correct commissioning, knowledge of the operation, connected electrical load, measurement signals, cable assignment and fuse protection of the connected devices and machines and the relevant safety regulations is required.

Startup of the disinfection analyzer may therefore only be performed by qualified and authorized electricians.

Incorrectly connected devices can be damaged, possibly irreparably, or cause faults in other equipment when they are switched on or in operation. Ensure that the measuring and control cables are not confused or make contact with one another. Never connect or disconnect any cables to which voltage is applied.



Warning!

Risk of injury or damage to the device!

When connecting the disinfection analyzer to the power supply, a 6A back-up fuse must be used in the mains supply line.

Procedure Following complete mechanical and electrical installation of the disinfection analyzer, initial commissioning can be carried out in accordance with the table below.

Please check that the following conditions are met:

- The electronic module is wired in accordance with the wiring diagram (circuit diagram) and local regulations.
- The housing cover of the electronic module is fitted.
- Flow cell module and Y-style flow-through assembly are installed.
- Optional strainer is installed.
- Sample water inlet and outlet are connected.
- Sensors are installed in the flow cell module or Y-style flow-through assembly.
- The sensors are connected to the electronic module.
- Ensure that all transport protection was removed.
- Check all connections for leakage.

Proceed as follows:

Ser. No.	Procedure	Done
1	Switch on power supply.	
2	Perform initial configuration: <ul style="list-style-type: none"> • Select the language • Set the date and time • Enter the system name 	
Chlorine, chlorine dioxide, ozone or potassium permanganate measurement		
3	Check the limit values 1 and 2 ("Min" and "Max"), adjust if necessary.	
4	Check the measurement range, adjust if necessary.	
pH/fluoride measurement		
5	Check the limit values 1 and 2 for pH/fluoride (Min and Max), adjust if necessary.	
6	Check the measurement range for pH/fluoride, adjust if necessary.	
7	Configure mA outputs	
8	Carry out initial calibration of the sensors used.	

5.7 Shut-down



Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off.

To shut down, proceed as follows:

- 1 Disconnect the electronic module from the power supply.
- 2 Drain the sample water supply line and drainage line.
- 3 Remove the housing cover of the flow cell module.
- 4 Drain the cell body via the flow cell drain valve.
- 5 Flush out the cleaning sand.
- 6 Dismantle the filter unit and the check valve housing. See Chapter 5.7, "Cleaning the flow rate monitor and non-return ball valve."
- 7 When the remaining water has drained from the flow control valve, refit the filter housing and the check valve housing.
- 8 Remove the sensors from the location hole in the cover of the cell body and disconnect from the electronic module.
- 9 Shut down the sensors. See the relevant operating instructions for the sensors.

Proceed as follows for the pH sensor:

- Install the pH sensor in the transport container with diluted electrolytes (KCl tank with stand and 5 ml KCl solution).
- Store the sensor in a frost-protected location.

- 10 Replace and engage the housing cover of the flow cell module.

5.8 Start-up

See Chapter 5.6 "Initial commissioning".

6. Operation

6.1 Display and control elements

6.1.1 General information

The colored graphic display with capacitive touchscreen is the display and control element. It is used by means of direct entry on the display, i.e. by touching using your finger or a pen (PDA pen) for capacitive touchscreens. As soon as you touch an area on the display, the display reacts and switches to subordinate views or operating menus. Swipe functions for switching between screens or moving parameter lists upward or downward are also supported.



Please note

Damage to the touchscreen!

Touching the touchscreen with pointed or sharp objects or striking the touchscreen with hard objects will damage the glass surface. Only touch the touchscreen with your finger or with a pen designed for that purpose (PDA pen).

6.1.2 Home screen (Home view)

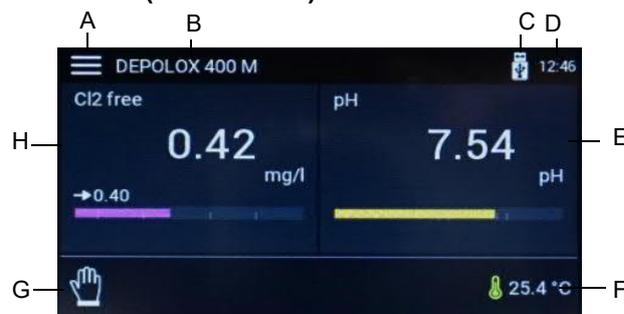


Image 1 Home screen using the example of the measurement for Cl2 free and pH

- A System menu
- B Device name
- C Data logger symbol USB memory stick
- D Current time
- E Menu field Measurement with current measured value for pH, setpoint display and bar graph
- F Current temperature
- G Operation mode
- H Menu field Measurement with current measured value for chlorine, setpoint display and bar graph



Please note

The Home screen view depends on the sensors that are fitted. If the disinfection analyzer is equipped with two sensors, the menu fields “Measurement with the current measured value” are shown wider on the screen.

Menu fields The menu fields are used to carry out functions and to switch between the menu fields, menus and screens.

Buttons The buttons are used to carry out functions.

Symbols The symbols display functions. There are also symbols with underlying functions. This means that functions can be carried out or changed by tapping certain symbols.

The following symbols are used:

Symbols	Meaning
	Numeric keypad
	Enter key - save entry
	Upper-case character keypad
	Delete previous keypad entry
	Limit value Min. 1/2 not reached
	Limit value Max. 1/2 exceeded
	Menu Information
	Temperature display
	Setpoint controller
	Dosing on
	Increase value
	Reduce value
	Switch to Home menu
	Switch to the previous screen
	Logout and Login levels screen Level 1 = white symbol Level 2 = green symbol Level 3 = blue symbol

Symbols	Meaning
	Message/error active Tap the symbol to open the message window. Yellow symbol = alarm that cannot be acknowledged is active Red symbol = alarm that can be acknowledged is active or error message is active Orange symbol = maintenance or calibration interval expired
	Data logger symbol USB memory stick
	Menu Alarms
	Digital input active
	Sample water Stop
	Alarm active (1 to 8)
	Calibration menu
	Settings menu
	Acknowledge button
	Selection disabled
	Selection enabled
	Controller Stop
	Controller manual mode
	Controller constant
	Controller automatic mode
	System menu
	Menu/Measurements display
	Confirmation prompt
	Information
	Note
	Abort/Close

6.2 Menus

6.2.1 Menu structure

The following menu selections are available in the Home screen:

- System menu
- Messages
- Logout/Login level
- Menu field Measurement (depends on the sensors that are fitted)
- Operation mode

From the main menu, you can call up the system settings, the measured values menus and the controller menus. To access the corresponding menus, tap the Measurement menu fields or tap the  "System menu" symbol. The layout of the measurement and control menu is the same.

Home screen
Menu field Measurement
CHLORINE FREE

The preceding screens are listed in the margin to show the user how to access the current screen.

6.2.2 Menu "Measurement"

The menu "Measurement" shows the current measured value and the sensor signal. The menu "Measurement" contains all settings relating to measurements and also the calibration of the corresponding sensor. All settings relating to measurements, such as range, limit values and controller settings, must be made via this menu.

Home screen
Menu field Measurement
CHLORINE FREE

To access the menu "Measurement," proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the desired measurement (e.g. Chlorine free). The menu "Measurement" opens.
- 3 To switch to other menus, press the desired symbol. The following menus are available:

Symbol/Menu	Meaning
	System menu
	Back to previous menu level
	Home menu (Home view)
	Sensor calibration level
	Menu Settings

6.2.3 Menu “Settings”

Home screen
Menu field Measurement
CHLORINE FREE

To access the “Settings” menu for a specific measurement, proceed as follows:

- 1 Call up the Home menu.
- 2 Select the desired measurement (e.g. Chlorine free). The menu “Measurement” opens.
- 3 Tap the  symbol. The settings menu for the selected measurement opens.

Depending on the measurement selected, different setting parameters are displayed. Swipe upward on the touchscreen to access further setting parameters which are further down the list and not currently visible on the screen. You can scroll upward and downward to the top and bottom of the parameter list (length of list depends on the measurement) at any time. The settings menus are subdivided into various areas such as Measurement, Controller and Dosing. To change values, press the corresponding parameter.



Please note

Depending on the user administration configuration and the currently registered users, the changes that can be made are limited. In order to change parameters, login on the corresponding user level is required (see Chapter 6.3.8 “Menu “User administration””).

Chlorine measurement The following parameters are possible for chlorine measurement:

Measurement		
Range		
Range end	1.00 / 2.00 / 5.00 / 10.00 / 20.00 mg/l or ppm 200 / 500 µg/l or ppd	
Unit		
	µg/l / mg/l / ppb / ppm	
Sensor type		
	O3sel(M) / ClO2sel(M) / Cl-tot(M) / Cl2 free(M) / KMnO4 / O3 / ClO2 / Cl2 free / Cl2++	
Measurement filter		
	off/low/middle/strong	
Upot		
	-1000 to 1000 (factory setting 250 mV)	
µA-Range		
	10 µA / 100 µA / 1000 µA (factory setting 100 µA)	
	Please note: Depending on the sensor and the size of the measurement, the µA-Range may need to be adjusted. If the µA-Range is not sufficient, select the next higher µA-Range.	
Limits		
Limit values I		
Max	Within range	
Min	Within range	
Hysteresis	0.01 to 0.25	
Limit values II		
Max	Within range	
Min	Within range	
Hysteresis	0.01 to 0.25	
Maintenance intervals		
Calibration	Message	On/Off
	Interval	2 to 90
	next maintenance on	Date
Cell	Message	On/Off
	Interval	10 to 365
	next maintenance on	Date

pH measurement The following parameter settings are possible for pH measurement:

Measurement		
Range		
Range end	pH 0.00 to pH 14.00	
Range start	pH 0.00 to pH 14.00	
Measurement filter	off/low/middle/strong	
Limits		
Limit values I		
Max	Within range	
Min	Within range	
Hysteresis	1 to 25	
Limit values II		
Max	Within range	
Min	Within range	
Hysteresis	1 to 25	
Maintenance intervals		
Calibration	Message	On/Off
	Interval	2 to 90
	next maintenance on	Date
	Reset maintenance	Execute
Cell	Message	On/Off
	Interval	10 to 365
	next maintenance on	Date
	Reset maintenance	Execute

Fluoride measurement The following parameter settings are possible for fluoride measurement:

Measurement		
Range		
Range end	2.00 / 5.00 / 20.00 mg/l	
Measurement filter	off/low/middle/strong	
Limits		
Limit values I		
Max	Within range	
Min	Within range	
Hysteresis	1 to 25	
Limit values II		
Max	Within range	
Min	Within range	
Hysteresis	1 to 25	
Maintenance intervals		
Calibration	Message	On/Off
	Interval	2 to 90
	next maintenance on	Date
Cell	Message	On/Off
	Interval	10 to 365
	next maintenance on	Date

Temperature measurement The following parameter settings are possible for temperature measurement:

Measurement		
Range		
Range	0 to 50°C / 32 to 122°C	
Sensor type	Pt1000 / Pt100 / Off	
Limits		
Limit values I		
Max	0 to 50 °C	
Min	0 to 50 °C	
Hysteresis	0.1 to 2.5 °C	
Limit values II		
Max	0 to 50 °C	
Min	0 to 50 °C	
Hysteresis	0.1 to 2.5 °C	

6.3 System menu

Access to the operating and configuration level of the electronic module is possible via the System menu. All setting parameters not relating to measured values, for example, Alarms, I/O inputs and outputs, interface parameters etc., are parametrized via the System menu.

Home screen
Symbol "System menu"
SYSTEM MENU

Proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Tap the desired menu. The following menus are available:

Symbol/Menu	Meaning
 Measurements	Home screen
 Operation mode	Menu "Operation mode"
 Calibration	Menu "Calibration"
 Login	Login screen for entry of the password or unlock code
 Inputs/outputs	Configuration of inputs and outputs
 Alarm configuration	Configuration of alarms
 Settings	Settings menu
 Information	Info display



Please note

The individual menus are described in the following chapters.

6.3.1 Menu “Operation mode”



Please note

This function is only available if the parameter “Disinfection controller = On” is set in the menu “Settings – Setup.”

The disinfection controller is only suitable for constant flow applications. The device offers two options for changing the operation mode. Proceed as follows:

Home screen

“Auto” / “Manual” symbol or
Symbol “Settings menu” -> Menu
“Operation mode”

OPERATION MODE

- 1 Call up the Home menu.
- 2 Press symbol  or  .
or
Press the  symbol and then press the menu  Operation mode.
- 3 To switch to “Manual mode,” press the “Change” button. An additional prompt appears, i.e. in order to change the operation mode, you need to confirm the prompt with “Yes” or “No.”
- 4 In “Manual mode,” it is possible to switch the dosing contact on and off manually via the “ON/OFF” button.



Please note

In „Manual mode“, the dosing contact only switches off if the dosing contact is switched off manually.

- 5 In “Automatic mode” it is possible to switch to the settings level by pressing the  symbol.

6.3.2 Menu “Calibration”

In the “Calibration” menu, the measurements are compared in compliance with the prescribed maintenance intervals using calibration solution or buffer solution or via comparative measurements, see Chapter 6.6 “Calibration”. The date of the last calibration and the calibration value entered are displayed. Depending on the desired measurement, the corresponding calibration menus can be selected.

The “Calibration” menu can be opened in two ways:

- via the System menu
- via the menu field Measurement

System menu

Home screen

Symbol "Settings menu"

SYSTEM MENU

To perform calibration via the System menu, proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Press the menu  Calibration.
- 4 Tap the desired measurement (chlorine, pH, fluoride or temperature). The menu "Measurement" opens; the example here shows Chlorine:
- 5 Press calibration selection, see "Calibration selection" on page86.
- 6 To display extended calibration options, tap the "+" symbol. To return to the standard calibration menu, tap the "-" symbol.
- 7 Carry out sensor calibration as described in Chapter 6.6 "Calibration". See also "Example "Chlorine calibration"" on page86.

Menu field Measurement

To perform calibration via the menu field Measurement, proceed as follows:

Home screen

Menu field Measurement (Chlorine, pH)

CHLORINE (EXAMPLE)

- 1 Call up the Home menu.
- 2 Tap the desired measurement (e.g. Chlorine). The menu "Measurement" opens.
- 3 Tap the  symbol. The corresponding menu opens; the example here shows Chlorine.
- 4 Press calibration selection, see "Calibration selection" on page86.
- 5 Carry out sensor calibration as described in Chapter 6.6 "Calibration". See also "Example "Chlorine calibration"" on page86.
- 6 To display extended calibration options, tap the "+" symbol. To return to the standard calibration menu, tap the "-" symbol.

Calibration selection

The following calibration selections are available, depending on the selected measurement:

Chlorine	
Zero point	Calibration of the zero point current of the chlorine measuring cell (only with extended calibration view)
DPD	DPD calibration of the chlorine measurement cell
pH	
pH7	pH7 calibration with buffer solution (only with extended calibration view)
pHX	Span calibration of the pH sensor with buffer solution (only with extended calibration view)
Offset	Offset calibration of the pH sensor
Fluoride	
Calibre lower value	Calibration of lower value for entry in accordance with calibration solution
Calibre upper value	Calibration of upper value for entry in accordance with calibration solution
Offset	Offset calibration of the fluoride sensor
Temperature	
Cal. value	Temperature calibration for entry in accordance with comparative measurement

Example “Chlorine calibration”

Home screen

Symbol “System menu” or
menu field Measurement
Symbol “Calibration”

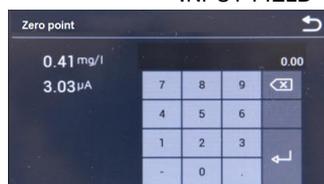
CHLORINE FREE CALIBRATION

To perform the desired calibrations, proceed as follows:

- 1 Tap the menu **CAL** Calibration in the System menu or the **CAL** symbol in the menu Measurement. The menu “Calibration” opens.
- 2 To display extended calibration options, tap the “+” symbol. A zero point calibration is also possible in this view. To return to the standard calibration menu, tap the “-” symbol.
- 3 Press the desired calibration selection. A further screen opens with information describing the calibration process.
- 4 Press the “Calibrate” button to open the input menu.
- 5 Enter the desired values in the input field and save with the Enter key.
- 6 Make any further entries (e.g. DPD).

“Calibration” button

INPUT FIELD



6.3.3 Menu “Inputs and outputs”

The digital inputs and the mA outputs are configured in the “Inputs and outputs” menu.

Home screen
Symbol “System menu”
Menu “Inputs / Outputs”
INPUTS / OUTPUTS

Proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Tap the menu  Inputs/Outputs.
- 4 Press the desired menu “Digital inputs” or “mA outputs.” The following settings can be realized:

Digital inputs	Settings
DI 1	Measurement Stop (cannot be changed)
DI 2	Disabled, Enabled, Controller Stop, Standby
DI 3	Disabled, Enabled, Controller Stop, Standby
DI 4	Disabled, Enabled, Controller Stop, Standby
DI 5	Disabled, Enabled, Controller Stop, Standby

Explanation of digital input settings	
Disabled	Changes at the digital input have no effect.
Enabled	Changes at the digital input have an effect if they are used in the alarm configuration. Active = contact open at digital input
Controller Stop	The controllers switch to Stop (Dosing off) if the digital input is opened (e.g. Circulation off).
Standby	Controller is switched off and measured value display are not displayed when the digital input is opened.

mA outputs 1 / 2 / 3 / 4	Settings
mA output	off, 0 ... 20 mA, 4...20 mA
Measurement	Disinfection, pH, Temperature, Fluoride
Signal	Measured value

Example: To transfer a measurement signal, e.g. Chlorine free, via the mA output, the following setting is required:

mA output	Settings
mA output	0/40 ... 20 mA
Measurement	Chlorine free
Signal	Measured value

6.3.4 Menu “Alarm configuration”

Alarms 1 to 8 are configured in the “Alarm Configuration” menu. The disinfection analyzer offers the option of setting various alarm configurations. It is not necessary to assign a relay switching function to every alarm. An alarm can also be used as an alarm message without a relay. The number of available relays that can be used as alarm relays depends on the dosing output. The use of relays for dosing output takes priority. For example, if dosing contact is used as dosing output for chlorine, relay K2 cannot be used as an alarm relay.

When the alarms become active, they are displayed in color via the message symbol  and shown in the display area for alarms as an alarm symbol. Pressing the message symbol  opens the message window. Here, the alarm is displayed with time-stamp and description. Alarms that can be acknowledged can be confirmed by pressing the green Acknowledge button **ACK** in the message window.

Home screen
 Symbol “System menu”
 Menu “Alarm configuration”
ALARM CONFIGURATION

Proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Tap the menu  Alarm configuration. See also Chapter 3.4.5 “Alarms”.
- 4 Enter the desired setting. The following alarm events can be realized:

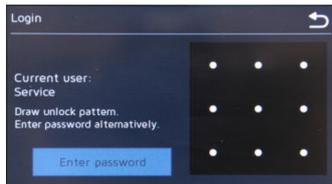
Alarm 1/2/3/4	Setting
Name	A customer-specific alarm name can be defined. This name is displayed in the message window (main menu) when the alarm becomes active.
Assignment	Assignment of the alarm cause. All min. or max. limit values, digital inputs, errors (general) can be assigned as alarm causes. Multiple assignment is possible.
Acknowledge	Input specifies whether an alarm is defined as an alarm without acknowledgment, an alarm with simple acknowledgment or acknowledgment with Reset.
Delay time	Switch-on delay time.
Relay	Disabled 1/2/3/4/5/6
Relay function	Normally Open / N.O Normally Closed / N.C

6.3.5 Menu “Login”

Log in on the desired user level in the “Login” menu.

Home screen
Symbol “System menu”
Menu “Login”

LOGIN



To access the Login menu, proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Tap the menu  Login. The “Login” menu opens.
- 4 Enter locking code or password.



Please note

Depending on the user administration configuration (see Chapter 6.3.8 “Menu “User administration””), three user levels with different rights are available. You can enter either a locking code or a password. The currently logged in user is also displayed in this screen. If the locking code entry is corrected, the pattern is displayed in green. If an incorrect locking code is entered, the pattern is displayed in red. If the user data can no longer be found, please contact your service partner.

6.3.6 Menu “Settings”

The device settings not relating to measured values are configured in the “Settings” menu.



Please note

The control function for the disinfection analyzer is only to be used for constant flow applications and is only an on/off type of controller. Under no circumstances should this control function be used in applications where the process water flow changes for any reason.

Home screen
Symbol “System menu”
Menu “Settings”

SETTINGS

Proceed as follows:

- 1 Call up the Home menu.
- 2 Tap the  symbol.
- 3 Tap the menu  Settings.
- 4 Enter desired settings. The following settings must be entered:
 - System
 - Connections
 - Backup and Reset

System	
Setup	
Controller	
Disinfection controller	On/Off Enables or disables the disinfection controller (only to be used for constant flow application)
Measurement	
Disinfection	On/Off Enables or disables pH measurement and controller
pH/fluoride	Off/pH/fluoride Enables or disables pH or fluoride measurement
General information	
System name	Freely definable
Language	German/English/French/Italian/Croatian/Dutch
Hold function	On/Off The hold function is used to either buffer all measured values or keep them constant during calibration. This prevents the output of invalid control signals by the sensor during the calibration process and also the output of erratic values from measurements via mA-signal and communication interfaces. The function is enabled when the calibration menu is opened and disabled when the menu is closed.
Display	
Brightness	0...100 %
Screensaver	Off, 30 s, 1/5/15/30 min, 1 h
Color scheme	Design 1...5
Calibrate LED	This setting can be used for white balance of the LED glow stick color if color deviations occur. Red 50...100 % Green 50...100 % Blue 50...100 %
Time/Date	
Date	
Time	00:00 ... 24:00 / 00:00 ... 12:00 PM
24h Format	On/Off
Safety	
Sample water delay time	00:00 ... 10:00 min The sample water delay time determines the time after which dosing is deactivated, e.g. in the event of sample water Stop. While the delay time is running, "Const." is displayed in the Automatic symbol.
Feed delay time	00:00 ... 120:00 min The feed delay time delays the start of dosing when the device is switched on, after switch-on, when the operating mode has been changed, after Controller STOP. The rundown of the selected time can be interrupted by selecting the "Start now!" button.

Max. dosing time	00:00 ... 10:00 h This parameter defines a monitoring time which specifies the maximum time the controllers may require before the measured value reaches the setpoint minus monitoring hysteresis. If one of the controllers does not reach the setpoint within the defined maximum dosing time, the corresponding controller is switched off and a message is displayed. When the setting is "00:00:00," this function is switched off. Please note: It is not possible in manual mode!
Monitoring hysteresis	2 ... 50 % This parameter defines a range around the setpoint within which the setpoint is recognized as reached when dosing time monitoring is enabled.
User administration	
Access control	This parameter is used to switch the user administration on and off. Off = no user administration; all parameters can be changed without entering a password On = user administration enabled, password protection or Level 1, 2 and 3 can be configured
Level 3	If access control is enabled, as least Level 3 must be used or configured. Level 3 comprises read and write access to all setting parameters of the device.
Unlock pattern	Menu for entry/definition of a Level 3 unlock pattern. The entry must be repeated as confirmation.
Password	Menu for entry/definition of a Level 3 password. The entry must be repeated as confirmation.
Level 2	If access control is enabled, Level 2 can be enabled or disabled. Level 2 allows access to setting parameters such as limit values, setpoint, date, time and calibration. If Level 2 is enabled, an unlocking pattern and/or a password must be defined.
Unlock pattern	Menu for entry of a Level 2 unlock pattern. The entry must be repeated as confirmation.
Password	Menu for entry of a Level 2 password. The entry must be repeated as confirmation.
Level 1	If access control is enabled, Level 1 can be enabled or disabled. Level 1 allows access to calibration. If Level 2 is not enabled, access to limit values and setpoints is also possible on Level 1. If Level 1 is enabled, an unlocking pattern and/or a password must be defined.
Unlock pattern	Menu for entry/definition of a Level 1 unlock pattern. The entry must be repeated as confirmation.
Password	Menu for entry/definition of a Level 1 password. The entry must be repeated as confirmation.



Please note

For a detailed description of the user administration, see "Menu "User administration"" on page93.

Connections	
Network	
IP address	Enter a fixed IP address (contact network administrator)
Subnet mask	Enter the subnet mask (contact network administrator)
Gateway	Gateway setting
DHCP	On/Off In the setting "DHCP = On," the network configuration is automatically defined by the DHCP server and cannot be configured manually. The network settings are displayed. In the setting "DHCP = Off," the network settings must be configured manually.
RS485 interface	
Function	Off/On or RS485 WT Selection of the RS485 Interface function. The RS485 Interface supports bus communication with the Process Monitoring System or other higher-level systems that support the RS485-WT protocol. RS485-WT protocol (new address reference list)
Bus address	Bus address setting at the RS485 Interface (RS485 WT) 00...31
Backup and Reset	
Reset to factory setting	Under Factory setting, the device can be reset to the factory settings. When the factory settings have been restored, the reset settings have to be entered again. You can select which settings are to be reset.
Reset measurement & control parameters	<input checked="" type="checkbox"/> <input type="checkbox"/>
Reset system settings	<input checked="" type="checkbox"/> <input type="checkbox"/>
Reset user administration	<input checked="" type="checkbox"/> <input type="checkbox"/>



Please note

To reset the selected setting to the factory setting, press the "Execute" button.

6.3.7 Menu “Information”

Various system information, e.g. the installed software version, is described in the menu  Information.

6.3.8 Menu “User administration”

The electronic module offers the option of using up to three user levels. Different rights are assigned to each user level. The colored user symbol in the Home screen shows on what level the user is logged in.



Please note

The user administration of the web visualization via Internet browser differs from the user administration on the display of the electronic module (see Chapter 6.3.9 “User administration web visualization”).

The following user levels are possible in the main menu:

Symbol	Explanation
No symbol	User logged out, read rights for all settings and change of operation mode No symbols are displayed also with disabled access control; in this case, write access to all settings is possible.
User symbol white = Level 1	User logged in on Level 1, read rights for all settings, sensor calibration and change of user
User symbol yellow = Level 2	User logged in on Level 2, read rights for all settings, sensor calibration, change of operation mode, change limit values and set-points and change date and time
User symbol blue = Level 3	User logged in on Level 3, read rights for and write access to all device settings

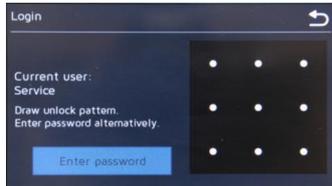


Please note

In as-delivered status, access control and user administration are switched off. We recommend that you enable access control after commissioning and create the desired users.

Home screen
Symbol "System menu"
Menu "Login"

LOGIN



Login

Proceed as follows to log in:

- 1 Call up the Home menu.
- 2 Press the  symbol.
- 3 Tap the menu  Login.
- 4 Enter locking code or password. See Chapter 6.3.3 "Menu "Inputs and outputs"".

Logout

Proceed as follows to log out:

- 1 Tap the user symbol . The user is logged out and the user symbol is no longer displayed.

Symbol "System menu"
Symbol "Logout and display
login level"

Create users

Home screen
Symbol "System menu"
Menu "Settings"
Parameter
"User administration"

USER ADMINISTRATION

In order to create or change the users, log in on Level 3 is required and access control must be enabled. Proceed as follows:

- 1 Call up the Home menu.
- 2 Press the  symbol.
- 3 Tap the menu  Settings.
- 4 Press the "User administration" parameter.
- 5 Set the parameter "Access control" to "On."
- 6 To define or change a password or locking code, the password "3000" (factory setting for Level 3) must be entered.

As an alternative, Level 1 and Level 2 can be enabled. However, this is not mandatory. If Level 1 or Level 2 are not enabled, the device must be operated via the next highest user level.



Please note

When access control is disabled, all passwords and locking codes entered are deleted. "3000" is therefore again enabled as the Level 3 password.

- 7 Press the desired parameter Level 1/Level 2 or Level 3 to enable or change the desired Level, 1, 2 or 3. The display changes to the settings menu for the corresponding level (Example: Level 1).

The parameter Level 1/Level 2 or Level 3 is used to enable or disable user level 1,2 and 3. Enter the setting "enabled" to use the Level. After enabling, an unlock pattern and/or password for login must be defined (at least one of these two login options must be set).

To enter an unlock pattern, proceed as follows:

- 1 Press the "Unlock pattern" parameter.
- 2 Define unlock pattern with the 9 points displayed.
- 3 Press the "Retry" button to correct your entry.
- 4 Press the "Next" button to confirm the entry a second time.
- 5 Enter the same pattern again and save with the "OK" button. The unlock pattern is now set and valid.

To enter a password, proceed as follows:

- 1 Press the parameter "Password."
- 2 Enter the desired password via the input keypad.
- 3 Confirm with the Enter key.
- 4 Enter the same password again.
- 5 Confirm with the Enter key.
- 6 Press the "OK" button to save the changes. The password is now set and valid.

6.3.9 User administration web visualization

User administration via web visualization comprises two levels. At the factory, these two user levels are disabled and preset to "0." For security reasons, the user levels must be enabled during commissioning. The padlock symbol in the menu bar shows whether the user is logged in. Depending on the specific user, the various menus are shown or hidden.

Symbol	Explanation
Padlock symbol red, closed 	User logged out, read rights only
Padlock symbol black, open 	User logged in on Level 1 or 2
No padlock symbol	User administration not enabled

Login Proceed as follows to log in:

- 1 Press the red padlock symbol. Login window for password entry opens.
- 2 Enter password.
- 3 Confirm with the "Save" button.

Logout Proceed as follows to log out:

- 1 Press the black padlock symbol. User is logged out.

Enable user levels

To enable the user levels, proceed as follows:

- 1 Open menu "Settings" - "Configure user administration."
- 2 To change/enable the password on Level 1, click the value for the Level 1 password. The input menu opens.
- 3 Enter a combination of numbers and letters with a maximum of ten characters.
- 4 Confirm with the "Save" button.
- 5 To change/enable the password on Level 2, click the value for the Level 2 password. The input menu opens.
- 6 Enter a combination of numbers and letters with a maximum of ten characters.
- 7 Confirm with the "Save" button.



Please note

To define or change the passwords at a later time, Login on Level 2 is required. To disable the passwords, define the password as "0".

6.4 Web visualization

The web views integrated in the disinfection analyzer allow you to visualize the measurements and setting parameters via a standard browser and Internet-capable devices.

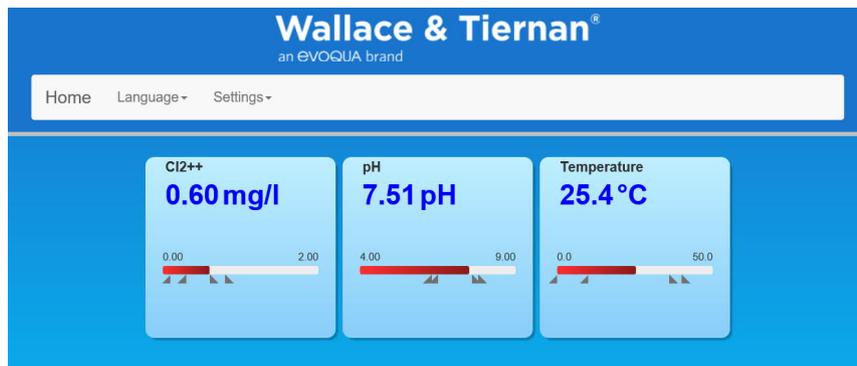


Image 2 Example, web view, DEPOLOX[®] 400 M



Please note

If alarms or errors are active, a yellow or red message symbol is displayed in the menu bar. Pressing the message symbol displays the active alarms or errors.

The menu bar is divided into two main menus:

- Language
- Settings

The following settings are possible under “Settings”:

Parameter Cl2 free	
Setpoint	Within range
Limit value Max 1	Within range
Limit value Min 1	Within range
Limit value Max 2	Within range
Limit value Min 2	Within range
Parameter pH/fluoride	
Limit value Max 1	Within range
Limit value Min 1	Within range
Limit value Max 2	Within range
Limit value Min 2	Within range

Parameter Temperature	
Limit value Max 1	Within range
Limit value Min 1	Within range
Limit value Max 2	Within range
Limit value Min 2	Within range
System	
System name	Customizable, customer-specific device name
Date	Date setting
Time	00:00 ... 24:00
Software version	Display software version
Software number	Display software number
Serial number	Display device serial number
IP configuration	
IP	Enter a fixed IP address (contact the network administrator)
Network mask	Enter the subnet mask (contact the network administrator)
Gateway	Gateway setting
Mac	Display the device Mac address
IP password	124 In order to change the IP address of the device via the web visualization, the IP password must first be set to "124."
IP link 1...3	Enter the IP address for up to three devices with the integrated web visualization. These devices can then be called directly from the selection menu  (top left of the web view links) via Name of Link 1...3.
Name link 1...3	Freely configurable menu name for the devices of the IP link 1...3. A maximum of three IP links is possible. This name is displayed in the menu. See example:
Menu IP-Link 	



Please note

If several DEPOLOX® 400 M electronic modules are connected via the IP link, when entering the IP link, the text "/main.shtml" must be entered after the IP address.

Example: 192.168.200.12/main.shtml

6.5 Firmware update

The firmware for the device is updated using a commercially available USB stick. The memory size should be at least as large as the firmware file itself. For a firmware update, the firmware file “.SREC” and the file “Bootload.ini” must be copied to the USB stick. Do not use subdirectories.



Please note

A firmware update can be downloaded free of charge from the homepage of Evoqua Water Technologies GmbH.



Warning!

Risk of injury or damage to the device!

Only authorized and qualified electricians are permitted to connect the electronic module electrically and to open the housing.



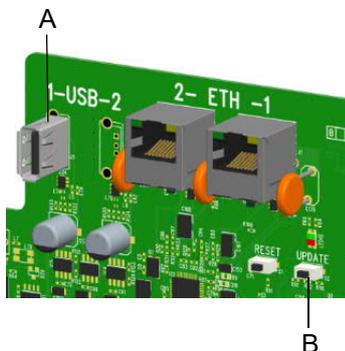
Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off.

Proceed as follows:

- 1 De-energize the electronic module.
- 2 Remove the housing cover of the electronic module. Release the four screws on the housing cover and remove the cover carefully. Hook the housing cover into the holders on the basic housing.
- 3 Insert the USB stick into the USB port (A).
- 4 Switch on mains voltage.
- 5 Using an insulated screwdriver or similar tool, briefly press the Update button (B) on the motherboard.
- 6 The update takes approximately 1 to 2 minutes. The LED flashes green while the update is in progress.
- 7 The update is complete when the green LED no longer flashes.
- 8 The USB stick must now be removed.



- 9 Close the housing cover of the electronic module again. Place the housing cover carefully on the basic housing. Tighten the four housing screws by hand (to a maximum torque of $0.7 \text{ Nm} \pm 0.15 \text{ Nm}$).
- 10 Switch the device on.
- 11 All settings must now be entered again. See Chapter 5.6 "Initial commissioning".
- 12 Calibrate the sensors.

6.5.1 LED glow stick color signaling

The color of the LED glow stick switches between white, yellow and red depending on the operating state, see Chapter 6.3.6 "Menu "Settings"".

The different colors have the following meanings:

White	<ul style="list-style-type: none"> • All OK. • The device is working trouble-free. • No active errors or currently no message in the message system.
Yellow	<ul style="list-style-type: none"> • Alarm that is configured as "unlatched" has been activated. As soon as the cause was rectified and the alarm is inactive, the yellow color signal changes again. • Fault message became active (only with enabled tank monitoring and if the Min message from the Cl₂ or pH tank is present.)
Red	<ul style="list-style-type: none"> • Error message present. • Alarm that is configured with acknowledgment has been activated.
Orange	<ul style="list-style-type: none"> • A message signaling the expiry of the set calibration or maintenance interval is present.

6.6 Calibration

When calibrating the measurements, variations in the calibration solutions, buffer solutions or comparative measurements are adjusted. Calibration is performed for new devices (first commissioning) and to recalibrate existing measuring instruments in accordance with maintenance regulations. See also Chapter 6.3.2 "Menu "Calibration"" and Chapter 5.5 "Electrical installation".



Please note

Calibration must be carried out on first commissioning. The calibration intervals are defined depending on the area of application and water quality. Please observe the prescribed maintenance intervals. See also Chapter 7.1 "Maintenance intervals".



Please note

Always start with the pH 7 calibration!
Before calibration of the pH value with calibration solution, the ball valves on the sample water inlet and sample water outlet must be closed and the pressure released. Open the ball valves again after calibration.



Attention!

Damage to sensor!

Electrodes are highly sensitive! Do not soil or damage! Comply with the safety data sheets for the buffer solutions or calibration solutions.

6.6.1 Calibration interval

The electronic module offers the option of using automatic maintenance and calibration intervals for disinfection and pH/fluoride measurement. In as-delivered status, the maintenance and calibration intervals are disabled. To enable the calibration intervals for disinfection and pH-fluoride measurement, proceed as follows:

- 1 Call up the Home menu.
- 2 Select the desired measurement (e.g. Chlorine free). The menu "Measurement" opens.
- 3 Tap the menu  Settings. The settings menu for the selected measurement opens.
- 4 The menu "Maintenance interval" opens.

- 5 To enable the calibration check interval, set the parameter “Message” to “On” under the heading Calibration and, under “Interval,” enter the number of days after which you wish to receive a reminder to carry out sensor calibration.

When the set interval expires, the disinfection analyzer generates an orange message reminding you to carry out sensor calibration. The message can be acknowledged via the message system.

To reset the calibration check interval, carry out sensor calibration or, in the case of premature calibration, tap the “Execute” button under the heading “Calibration” to reset the calibration interval. The date for the next calibration is recalculated and displayed under “next maintenance on.”

6.6.2 Calibration Disinfection

Free chlorine (Cl₂) calibration

During calibration on the flow cell module DEPOLOX® 5 C (3-electrode cell), a zero point calibration and a measured value calibration (DPD1) must be carried out.



Please note

To prevent non-permissible control signals being output during calibration, the “Hold function” in the system menu should be set to “On”. mA-outputs and controller outputs then remain constant as long as a calibration menu is open.

Zero point calibration

If there are deviations in the zero point, a zero point calibration must be carried out.

System menu
Calibration

MENU DISINFECTION MEASUREMENT

Proceed as follows:

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measured value “Disinfection.”
- 4 Tap “+” for zero point calibration, and the display for the extended calibration menu opens.
- 5 Press the parameter “Zero point.”
- 6 Close the ball valve on the sample water inlet.



Please note

When the sample water supply has been stopped, the display first drops rapidly, and after approximately one minute slowly approaches zero. During first commissioning, it is essential to wait for 5 minutes, even if the display shows “0.00” or flashes after a few seconds.

Measuring value calibration (DPD)

- 7 Wait until the displayed value no longer changes.
- 8 Press the "Calibration" button. An input field opens.
- 9 Press "Enter" to save the zero point.
- 10 Open the ball valve on the sample water inlet.
- 11 After zero point calibration, wait at least 2 minutes.
- 12 Open the flow cell drain valve by approximately 1 turn and extract a specimen of the sample water.
- 13 Determine the disinfectant content in the sample using a photometer.
- 14 Press the parameter "DPD."
- 15 Press the "Calibration" button. An input field opens.
- 16 Use the input keys to enter the determined value.
- 17 Press "Enter" to save the entry.

This concludes the calibration for DPD.

6.6.3 pH calibration



Please note

During pH calibration with pH buffer solution, the buffer solution and the sample water must have the same temperature. If there is a temperature difference of > 5 °C, first bring the buffer solution to the same temperature as the sample water. Also observe the calibration values of the buffer solution at different temperatures.

System menu
Calibration
MENU PH MEASUREMENT

Proceed as follows:

pH7 alignment

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measurement "pH."
- 4 Tap "+" for calibration with pH buffer solution, and the display for the extended calibration menu opens. Otherwise, continue under "Offset alignment."
- 5 Press the parameter "pH 7."
- 6 Close the sample water inlet and sample water outlet and briefly open the flow cell drain valve to release the pressure. Close the flow cell drain valve again.
- 7 Place the beaker in the bottom clip and fill with buffer solution "pH 7.00" or clamp the bag with buffer solution "pH 7.00" in the bottom clip.
- 8 Unscrew and remove the pH sensor from the cover of the cell body of the flow cell module.

pH X-span alignment

- 9 Dip the pH sensor through the top clip at least 2 cm deep into the buffer solution and move slightly until the indicated pH value remains constant.
- 10 Press the "Calibration" button. An input field opens.
- 11 Use the input field to enter the value to be calibrated for the buffer solution.
- 12 Press "Enter" to save the entry.
- 13 Remove the buffer solution "pH 7.00" from the bottom clip.
- 14 Wash the pH sensor in distilled water to prevent carryover of buffer solution.
- 15 Press the parameter "pH X."
- 16 Place the beaker in the bottom clip and fill it with buffer solution "pH 4.65" or clamp a bag with buffer solution "pH 4.65" in the bottom clip.

*Please note*

If buffer solutions other than those stated are used, the pH value of the buffer solution must be lower than pH 6 or higher than pH 8.

- 17 Dip the pH sensor at least 2 cm deep into the buffer solution and move gently until the indicated pH value remains constant.
- 18 Press the "Calibration" button. An input field opens.
- 19 Use the keypad to enter the value to be calibrated.
- 20 Press "Enter" to save the entry.
- 21 Remove the pH sensor from the top clip.
- 22 Screw the pH sensor into the cover of the cell body of the flow cell module.
- 23 Open the sample water inlet and outlet again.

The pH measurement has now been calibrated.

Offset alignment

If there is a difference between the displayed pH value and a pH value measured manually, this difference can be compensated for and the comparative value entered in the Offset menu.

System menu
Calibration
Menu pH measurement

OFFSET

Proceed as follows:

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measurement "pH."

- 4 Press the parameter "Offset."
- 5 Use the keypad to enter the value from the comparative measurement.
- 6 Press "Enter" to save the entry.

This concludes the pH offset.



Please note

The offset calibration is deleted each time a new pH-7 alignment or span alignment is performed with the pH buffer solution.

6.6.4 Fluoride calibration



Please note

During fluoride calibration, the calibration solution and the sample water must have the same temperature. If there is a temperature difference of > 5 °C, first bring the calibration solution to the same temperature as the sample water.



Please note

The first time you use the fluorid sensor, place the fluorid sensor into a 100 mg/l calibration solution overnight and then into the sample water. After one hour the fluorid sensor has stabilized and the first calibration can be started.

System menu
Calibration

MENU FLUORIDE MEASUREMENT

Proceed as follows:

Calibrate lower value

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measured value "Fluoride."
- 4 Tap "+" for calibration with calibration solutions, and the display for the extended calibration menu opens. In the case of single-point calibration, continue under "Offset compensation."
- 5 Tap the parameter "Calibrate lower value."
- 6 Close the sample water inlet.
- 7 Place the beaker in the bottom clip and fill it with calibration solution 0.20 mg/l.
- 8 Remove the fluoride sensor from the cover of the cell body of the flow cell module.
- 9 Dip the fluoride sensor at least 2 cm into the calibration solution through the top clip and move it slightly until the indicated value remains constant.

Calibrate upper value

- 10 Press the "Calibration" button. An input field opens.
- 11 Use the input field to enter the value to be calibrated for the calibration solution.
- 12 Press "Enter" to save the entry.
- 13 Remove the calibration solution from the bottom clip.
- 14 Wash the sensor in distilled water to prevent carryover of calibration solution.
- 15 Tap the parameter "Calibrate upper value."
- 16 Place the beaker in the bottom clip and fill it with calibration solution 2.00 mg/l.
- 17 Dip the fluoride sensor at least 2 cm deep into the calibration solution and move gently until the indicated value remains constant.
- 18 Press the "Calibration" button. An input field opens.
- 19 Use the keypad to enter the value to be calibrated.
- 20 Press "Enter" to save the entry.
- 21 Remove the fluoride sensor from the top clip.
- 22 Insert the fluoride sensor into the cover of the cell body of the flow cell module.
- 23 Open the sample water inlet again.

The fluoride measurement has now been calibrated.

Offset alignment

If there is a constant difference between the displayed fluoride value and a fluoride value measured manually, this difference can be compensated for and the comparative value entered in the Offset menu.

System menu
Calibration
Menu pH measurement

OFFSET

Proceed as follows:

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measured value "Fluoride."
- 4 Press the parameter "Offset."
- 5 Use the keypad to enter the value from the comparative measurement.
- 6 Press "Enter" to save the entry.

This concludes the fluoride calibration.

*Please note*

The offset calibration is deleted each time a new fluoride alignment with calibration solution is performed.

6.6.5 Temperature calibration multi-sensor

System menu
Calibration

TEMPERATURE MEASURE-
MENT MENU

Proceed as follows:

- 1 Press the  symbol.
- 2 Press the menu  Calibration.
- 3 Tap the measurement "Temperature."
- 4 Press the parameter "Cal. value."
- 5 Perform comparative temperature measurement.
- 6 Use the keypad to enter the value to be calibrated.
- 7 Press "Enter" to save the entry.

This concludes the temperature calibration.

6.7 Faults and remedies

6.7.1 Messages, alarms and errors

Messages, alarms and errors are displayed on the electronic module with the colored message symbol . Error messages can occur that can be acknowledged or that can not be acknowledged. If several messages occur at the same time, the number of messages appears next to the symbol. Press the message symbol  to display the message window. Configured alarms, messages that can be acknowledged and errors are displayed as clear text. A time-stamp shows when the message was activated.

Acknowledgeable messages

Acknowledgeable messages are displayed in red. They are acknowledged via the message window and the green ACK button.

Error message	Cause	Remedy
Maximum dosing time?	The maximum dosing time set for a control output has been exceeded.	Identify the cause, e.g. chemicals tank empty. Check the dosing pump.

Non-acknowledgeable messages and errors

Error messages are displayed in red in the message window and can only be rectified by eliminating the cause.

Error message	Cause	Remedy
Measured value display flashes	Measured value is outside the measurement range.	Check measurement range and change, if necessary. Check dosing or controller settings.
DI 1 flashes	Sample water flow rate recently insufficient (delay time running).	Check the sample water flow rate (approx. 33 l/h).
DI 1	Sample water flow rate insufficient for some time (delay time elapsed).	Clean or replace strainer. Multi-sensor incorrectly connected or defective.
DI 2 DI 3 DI 4 DI 5	Digital input 2 active Digital input 3 active Digital input 4 active Digital input 5 active	Check cause depending on use of the digital input, chemicals tank empty, change tank.
Zero point calibration ?	Disinfection sensor: Zero current of sensor > +5 µA or < -5 µA	Upot potential voltage set incorrectly; change if necessary. Electrodes of disinfection sensor are dirty, if necessary clean / service. Sample water is not turned off or check valve leaks; turn off sample water if necessary.
DPD calibration ?	Slope error	Check sensor.
	The current difference required for span alignment over the entire measurement range was less than the minimum value.	Clean electrodes.
	Range: Minimum current difference	Check the pH value of the water (< pH 8).
	Organic chlorine compound (e. g. chlorine stabilizer chloroisocyanurate) in the water.	Do not add any chlorine stabilizers to the water.
	Sensor: Slope error - the sensor current based on 1 mg/l has fallen below the required minimum.	Carry out sensor maintenance, replenish cleaning sand.
pH7 calibration ? pHX calibration ? Calibration ? Offset calibration ?	pH: In pH 7 calibration, the sensor signal is outside the range -100 to +100 mV or the sensor issues a signal outside the range 46 to 70 mV per pH increment, the calibration point distance is smaller than 1 pH increment.	Check the electrode. Check buffer solutions, replace if necessary.
Factory calibration ?	Hardware or electronic error	Contact Service.

Error message	Cause	Remedy
Setpoint ?	Due to modification of the measurement range, the controller setpoint is outside the range.	Reset the controller setpoint or adjust the measurement range.
Limit value ?	Due to modification of the measurement range, the limit value is outside the range.	Reset the limit value or adjust the measurement range.
Temperature error ?	Interruption in the temperature sensor or cable of the multi-sensor.	Check multi-sensor and cable.
mA Output 1 ? mA Output 2? mA Output 3 ? mA Output 4 ?	Load error The mA output cannot drive its mA output current through the connected current loop (500 ohm at 20 mA max.).	Check whether the mA signal is required at all (e.g. for plotter). If not, switch off the output signal in the "INPUTS/OUTPUTS" menu, "Analog output." Check mA signal cable for interruption.
Hardware ?	Hardware or electronic error	Contact Service.
Data storage ?	Hardware or electronic error	Contact Service.
Cell ?	Chlorine sensor: Chlorine sensor not screwed in. No sand cleaning. Sensor, sensor cable or sensor measuring module defective. Sensor measuring module μ A measuring range exceeded. pH and fluoride sensor: Sensor, sensor cable or sensor measuring module defective.	Screw in sensor correctly. Check sand cleaning. Check the sensor, sensor cable or sensor measuring module, replace if necessary. Select higher μ A measurement range. Check the sensor, sensor cable and sensor measuring module, replace if necessary.
Range?	Min. or max. limit value is outside the measuring range.	Check the min/max limit values and change if necessary.

6.7.2 Messages

Message	Cause	Remedy
Cl ₂ free Maintenance! Sensor calibration	Calibration check interval Time expired	Calibrate the measurement, reset maintenance interval after calibration and acknowledge message.
Fluoride Maintenance! Sensor calibration	Calibration check interval Time expired	Calibrate the measurement, reset maintenance interval after calibration and acknowledge message.
pH Maintenance! Sensor calibration	Calibration check interval Time expired	Calibrate the measurement, reset maintenance interval after calibration and acknowledge message.
Cl ₂ free Maintenance! Cell	Sensor maintenance interval expired	Carry out sensor maintenance, reset maintenance interval and acknowledge message.
Fluoride Maintenance! Cell	Sensor maintenance interval expired	Carry out sensor maintenance, reset maintenance interval and acknowledge message.
pH Maintenance! Cell	Sensor maintenance interval expired	Carry out sensor maintenance, reset maintenance interval and acknowledge message.
Sample water	Sample water flow rate too low, dirt filter soiled, sample water inlet or sample water outlet ball valve closed, dirt in inlet, flow control valve or check valve housing.	Open ball valves, clean dirt filter, remove dirt

6.7.3 Faults

The table below shows and explains possible faults. If it is not possible to remedy the fault or error yourself, please contact your affiliate.

Error	Cause	Remedy
No indication on device	No power supply.	Turn external switch or fuse on.
	Device fuse defective.	Check power supply, replace fuse (electrician).
Device not showing a measurement.	Sensor measuring module has been changed or added.	Start device again.
Displayed/output value incorrect.	Change on sensor or in the sample water.	Calibrate
Digital inputs without function	Digital inputs not enabled.	Enable digital inputs, assign function.
Relay switches, but no output.	Relay defective. Fuse on relay defective.	Check (electrician), replace fuse.

7. Maintenance



Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off.



Please note

Liability for defects can only be accepted if maintenance work is performed as specified. Adhere to the applicable standards and national and regional regulations.

7.1 Maintenance intervals

The electronic module offers the option of using automatic maintenance and calibration check intervals for disinfection, and pH and fluoride measurement. In as-delivered status, the maintenance and calibration intervals are disabled. To enable the maintenance intervals for disinfection, pH and fluoride measurement, proceed as follows:

- 1 Call up the Home menu.
- 2 Select the desired measurement (e.g. Chlorine free). The menu "Measurement" opens.
- 3 Tap the menu  Settings. The settings menu for the selected measurement opens.
- 4 The menu "Maintenance interval" opens.
- 5 To enable the maintenance interval, set the parameter "Message" to "On" under the heading Cells and, under the parameter "Interval," enter the number of days after which you wish to receive a reminder to carry out sensor calibration.

When the set interval expires, an orange message appears on the electronic module reminding you to carry out sensor calibration. The message can be acknowledged via the message system.

To reset the maintenance interval, tap the "Execute" button under the heading "Cell." The date on which the next maintenance is due is recalculated and displayed under "next maintenance on."

Activity	Period/Interval	Chapter
Sample water monitoring	regularly	7.2
Check the flow cell module, including all screw connections, for leakage.	daily	7.3
Comparative measurement of chlorine, pH and fluoride Carry out calibration.	in accordance with standard or local regulations	7.8
Check the electrode cleaning sand.	weekly	7.4.1
Replace the electrode cleaning sand.	every six months	7.4.1
Clean or replace optional strainer.	As required	7.6
Replace battery of the electronic module.	Replace the battery after 5 years	7.9



Please note

The parts required for servicing of the flow cell module are included in the maintenance parts kits. Here, we distinguish between maintenance parts kits for wear parts for 1 year and for 4 years. For details, see Chapter 8. "Spare parts, Accessories and retrofit kits".

7.2 Sample water monitoring



Danger!

Risk of injury or death

If there is a shortage of sample water or the flow rate is too low, there is a risk of uncontrolled dosing of chemicals. To ensure safe operation and prevent injury, the sample water monitoring must never be disabled.

The sample water monitoring must be checked regularly. Without automatic detection of a shortage of sample water or an excessively low flow rate, there is a risk of uncontrolled dosing of chemicals. Never disable the sample water monitoring - even temporarily, e.g. by bridging the signal input. It automatically deactivates dosing if there is a shortage of sample water and prevents the uncontrolled dosing of chemicals.

7.3 Checking for leaks

Check the entire flow cell module every day, including all screw connections, for leakage. Repair any leaks immediately.



Please note

Ascending air bubbles in the cell body influence the measuring accuracy. The cause must be determined and remedied.

7.4 Servicing the flow cell module DEPOLOX[®] 5 C

7.4.1 Checking the electrode cleaning sand

Check the flow cell module DEPOLOX[®] 5 C at weekly intervals to make sure that there is enough electrode cleaning sand in the cell body. The cleaning sand must be swirled around in the bottom part of the cell body. The electrode cleaning sand is necessary for cleaning the 3-electrode cell and must be replenished or replaced if necessary.

7.4.2 Replacing the electrode cleaning sand

The electrode cleaning sand necessary for continuous cleaning of the 3-electrode cell wears out in the course of time. The cleaning sand must be replaced regularly. For details of the procedure, see Chapter 5.4.9 "DEPOLOX[®] 5 C Add electrode cleaning sand".

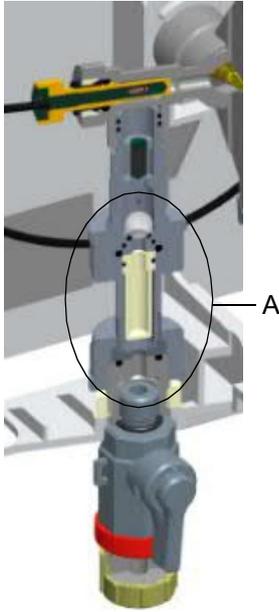


Please note

After adding fresh electrode cleaning sand or replacing it, the electrode current can increase slightly for approximately 2 to 3 hours. Calibration is needed after this. See Chapter 6.6 "Calibration".

7.5 Cleaning the flow rate monitor and check valve

Proceed as follows:



- 1 Close the ball valves on the sample water supply and drainage line.
- 2 Remove the housing cover of the flow cell module.
- 3 Release both knurled nuts. Take out the filter unit toward the front.
- 4 Carefully pull the complete check valve housing (A) down and out.
- 5 Turn the check valve housing upside down and catch the flow ball (C) or if the ball is jammed, release it with a slight knock.
- 6 Now use a suitable blunt tool to push out the ball seat (D) and glass ball (E) against the direction of flow.
- 7 Clean the empty check valve housing, flow ball, ball seat and glass ball with clear water.
- 8 During reassembly, make sure that the ball seat and ball are correctly positioned.
- 9 To help push the assembled check valve housing back into the control valve, we recommend slightly lubricating the gaskets with the Unisilikon grease provided.
- 10 Check that the check valve housing is correctly positioned by the guide lugs on the housing.
- 11 Fit the filter unit again. To do this, tighten the knurled nuts.
- 12 Fit and engage the housing cover of the flow cell module.
- 13 Open the ball valves on the sample water supply and drainage line again.

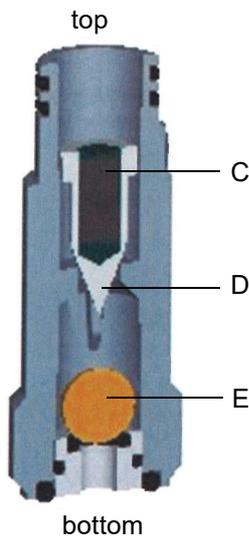


Image 1 Section, flow cell module DEPOLOX® 5 C

Image 2 Cutaway model, filter unit

- A Check valve housing (overall view)
 B Filter unit
 C Flow ball
 D Ball seat
 E Glass ball

7.6 Cleaning or replacing the optional strainer

The optional strainer must be cleaned or replaced regularly to avoid contamination or blockages. The frequency of cleaning or replacement depends on the degree of contamination caused by the sample water.

Proceed as follows:

- 1 Close the ball valve on the sample water supply line in front of the strainer.
- 2 Unscrew the strainer and rinse it with water. Catch escaping water in a container.
- 3 Remove the strainer screen and rinse it under running water or replace it.
- 4 Fit the strainer screen again and reinstall the strainer.
- 5 Open the ball valve on the sample water supply and drainage line again.

7.7 Cleaning

Never use corrosive cleaning agents (e.g. spirit, scouring agents)! We recommend that you use a moist cloth with a neutral household cleaning agent.

7.8 Replacing the fuses on the CPU board



Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off.



Warning!

Only authorized and qualified electricians are permitted to open the housing. The electronic module is not equipped with a mains switch.

The mains input and all relays are protected by fuses of type TR5. 3.15 A (slow-blow) fuses are used for the relays and 1.6 A (slow-blow) fuses for the mains input. Spare fuses are included with the accessories.

Proceed as follows:

- 1 Disconnect the electronic module from the power supply and check that it is de-energized.
- 2 Remove the housing cover of the electronic module. Unscrew the housing cover and remove it carefully. Hook into holder on the basic housing.
- 3 Pull the defective fuse (A) out of the fuse holder and insert new fuse, making sure that the rated data match!
- 4 Fit the housing cover of the electronic module again. Tighten the housing screws by hand (to a maximum torque of 0.7 Nm \pm 0.15 Nm).

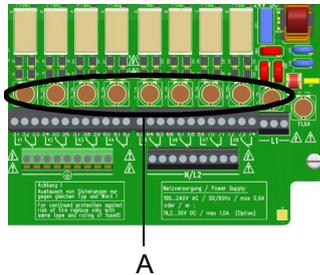


Image 3 Section, electronic module - fuses

7.9 Replacing the battery



Danger!

Risk of injury or death!

External voltages may still be connected even if the operating voltage is switched off.



Warning!

Risk of injury!

Only authorized and qualified electricians are permitted to open the housing. The electronic module is not equipped with a mains switch.

The battery is required for the real time clock in case of a power failure. If the time is not correct or if time-controlled functions show faulty behavior, the battery must be changed. After five years at the latest. Proceed as follows:

- 1 Disconnect the electronic module from the power supply.
 - 2 Remove the housing cover of the electronic module. Unscrew the housing cover and remove it carefully. Hook into holder on the basic housing.
 - 3 Remove the battery from the holder and dispose of it in accordance with the regulations.
-



Attention!

Environmental hazard!

Do not throw away or burn batteries. The batteries must be disposed of in accordance with environmental protection regulations.

- 4 Insert the new battery, type CR2032.
- 5 Fit the housing cover of the electronic module again. Tighten the housing screws by hand (to a maximum torque of 0.7 Nm \pm 0.15 Nm).
- 6 Switch on mains voltage.
- 7 Set date and time, no other settings need to be made.

8. Spare parts, Accessories and retrofit kits



Please note

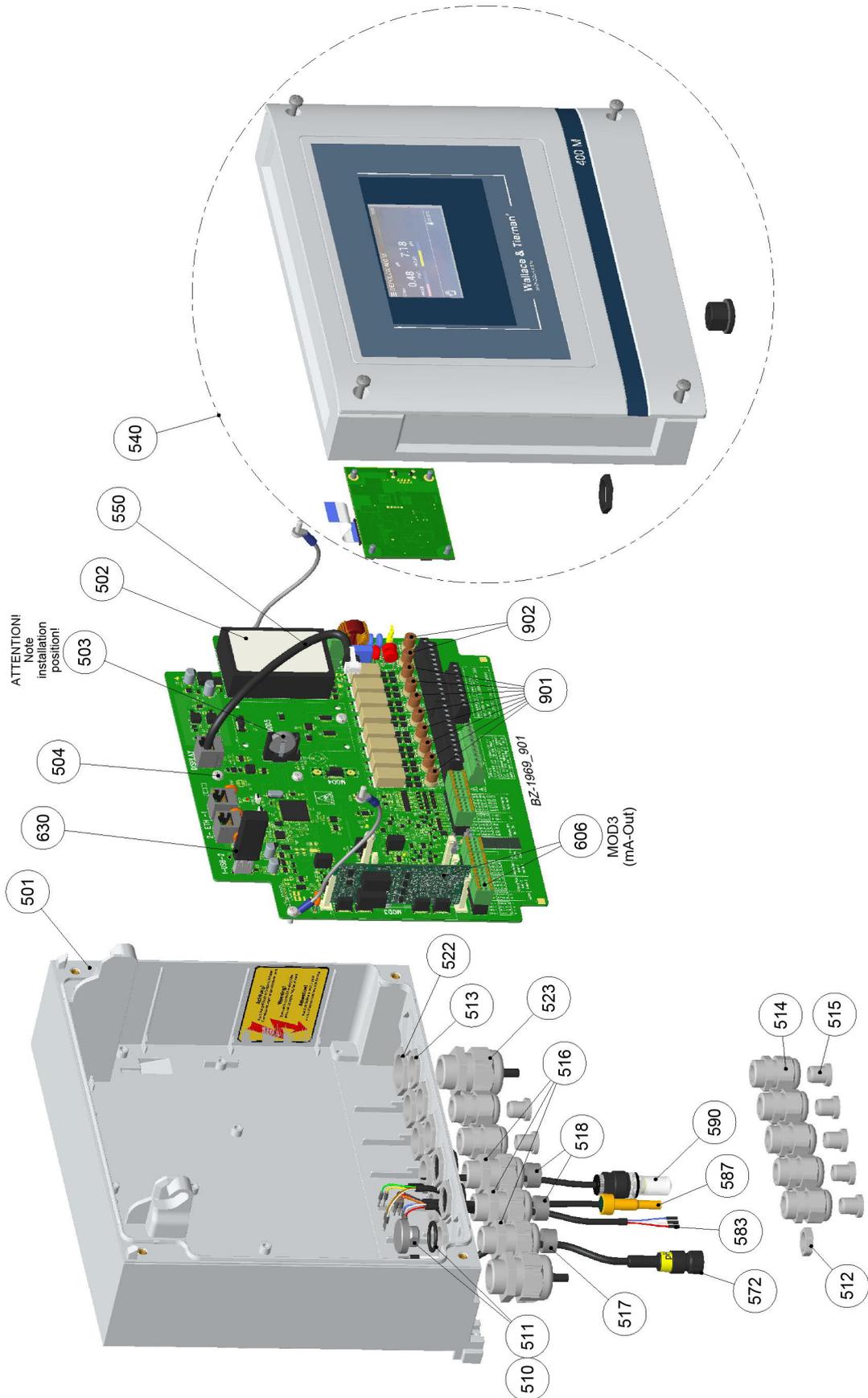
For reasons of safety, only use original spare parts. Please contact our customer service if you need any spare parts.

8.1 Spare parts

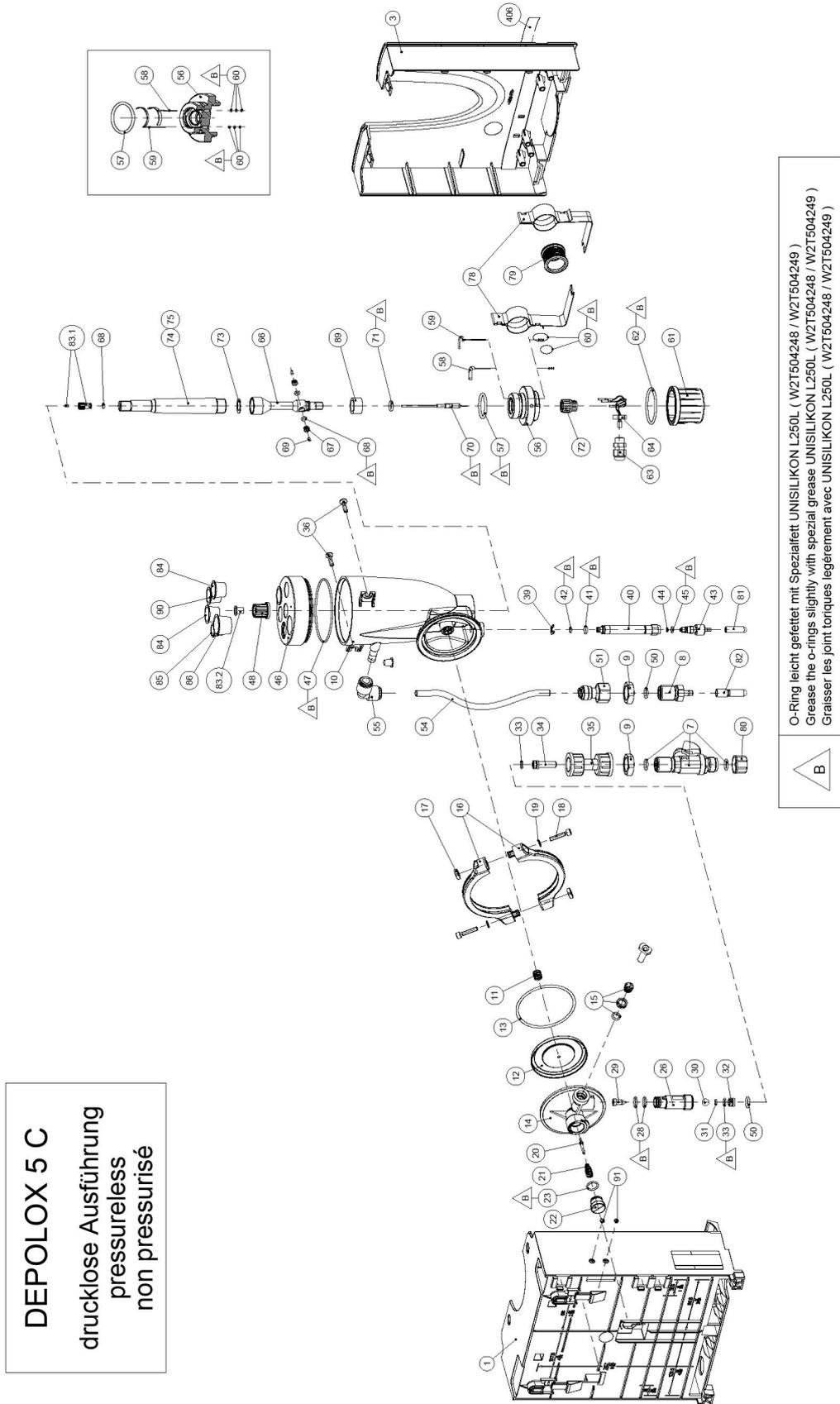
8.1.1 Electronic module 400 M (Module name E02) - W3T441932

Pos.	Part No.	Designation
	W3T391851	Electronic module for Cl ₂ /pH, spare part
501	W3T247667	Basic housing electronic module
502	W3T391862	CPU Board (motherboard spare part)
503	W3T172625	Lithium coin cell battery CR2032
504	W2T504397	Plastic self-tapping screw
510	W3T364164	Drain plug
511	W3T169088	O-ring
512	W3T165349	Counter nut
513	W3T160551	M20x1.5 hex nut
514	W2T504179	M20x1.5 cable gland
515	W2T504212	M20 blind plug
516	W2T833447	Cable gland M20 for sensor cable
517	W3T375710	Multi-cable sealing insert
518	W3T375709	Multi-cable sealing insert
522	W3T160552	M25x1.5 hex nut
523	W2T542498	KM25x1.5 cable gland for assembly of cables with pre-assembled connectors
540	W3T441933	Control panel with cover and display
550	W2T821593	RJ45 connection cable CPU Board/HMI
572	W3T173161	Snesor cable for pH- and fluorid sensor
583	W3T441081	Sensor cable for chlorine sensor DEPOLOX [®] 5 C
587	W3T364409	Multi-sensor
590	W3T391866	LED glow stick
606	W3T391865	4-way mA output module
630	W2T866279	USB memory stick
901	W2T839300	Fuse TR5 3,15A T
902	W2T839299	Fuse TR5 1,6A T
	W2T505559	RS485 data cable (1 m)

Electronic module 400 M (Module name E02) - W3T441932



8.1.2 Flow cell module DEPOLOX® 5 C (Module name D02)
non-pressurized version - W3T389205



DEPOLOX 5 C
drucklose Ausführung
pressureless
non pressurisé

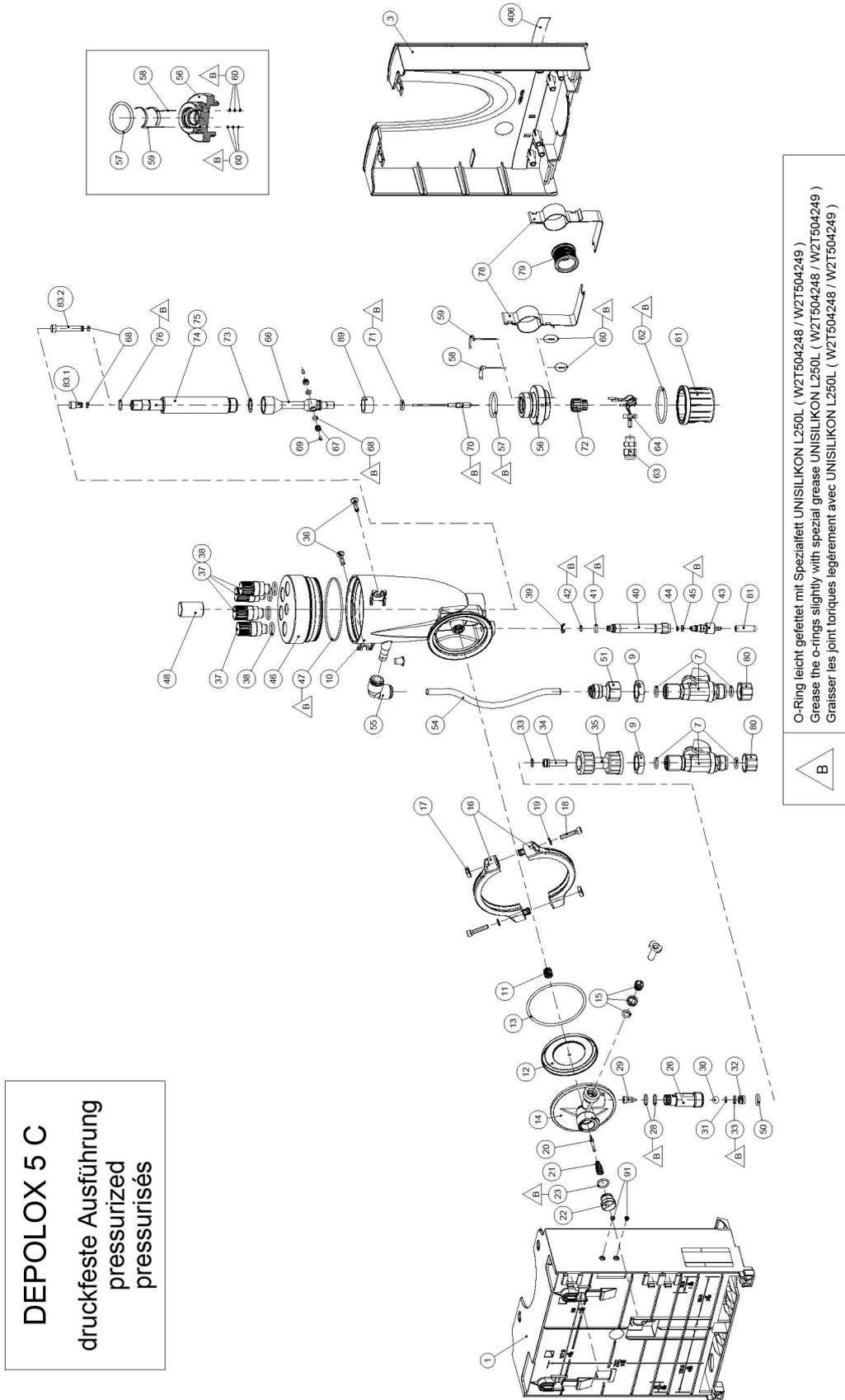
O-Ring leicht gefettet mit Spezialfett UNISILIKON L250L (W2T504248 / W2T504249)
Grease the o-rings slightly with special grease UNISILIKON L250L (W2T504248 / W2T504249)
Graisser les joint toriques légèrement avec UNISILIKON L250L (W2T504248 / W2T504249)



**Flow cell module DEPOLOX® 5 C (Module name D02)
non-pressurized version - W3T389205**

Item	Part No.	Designation	Item	Part No.	Designation
1	W3T247776	Basic housing	54	W3T435413	Hose
3	W3T247777	Housing cover	55	W2T505093	Angle-reducing connector
7	W3T166170	Shut-off valve	56	W3T166209	Electrode mount
8	W3T158593	Discharge nozzle	57	W3T168875	O-ring
9	W2T507615	Flat nut	58	W3T163795	Working electrode
10	W3T158561	Cell body	59	W3T167461	Counter electrode
11	W3T164226	Compression spring	60	W3T168904	O-ring
12	W3T158569	Membrane unit	61	W3T158562	Sealing cap
13	W3T160654	O-ring	62	W3T168868	O-ring
14	W3T158595	Control valve body	63	W2T504177	Cable gland
15	W2T504209	Plastic cartridge	64	W3T160549	Hexagon nut
16	W3T160649	V profile clamp	66	W3T159653	Electrode housing
17	W3T158567	Square nut	67	W3T167242	Diaphragm holder
18	W2T504659	Cheese-head screw	68	W3T168947	O-ring
19	W2T506019	Washer	69	W2T504994	Round rod
20	W3T158572	Valve pin	70	W3T169295	Reference electrode
21	W3T172795	Compression spring	71	W3T161424	O-ring
22	W3T158573	Adjusting screw	72	W3T165267	Knurled nut
23	W3T160357	O-ring	73	W3T161464	Flat gasket
26	W3T160648	Check valve housing	74	W3T168807	Potassium chloride gel
28	W3T161396	O-ring	75	W3T172885	Electrolysis tank
29	W3T169827	Float with magnet	78	W3T166169	Retaining clip, coated
30	W3T172946	Ball	79	W3T172045	Electrode mount
31	W3T172949	O-ring	80	W3T161561	Screw cap
32	W3T159707	Ball seat	81	W3T168162	Protective cap
33	W3T172975	O-ring	82	W3T164588	Protective cap
35	W3T158602	Filter housing	83	W3T161537	Protection plug
36	W2T505463	Pan head screw	84	W3T169029	Protection plug
39	W3T172041	Securing ring	85	W3T169044	Protection plug
40	W3T158576	Outlet drain pipe	86	W3T164574	Protection plug
41	W3T172997	O-ring	89	W3T161452	Felt ring, transport protection
42	W3T164597	O-ring	90	W3T161453	Protection plug
43	W3T158575	Drain screw			
44	W3T166160	EPDM flat gasket			
45	W3T172556	O-ring			
46	W3T320060	Cell body cover			
47	W3T160657	O-ring			
48	W3T165266	Knurled nut			
50	W3T172861	O-ring			
51	W2T863568	Adapter			

8.1.3 Flow cell module DEPOLOX® 5 C (Module name D02)
pressurized version - W3T389210



DEPOLOX 5 C
druckfeste Ausführung
pressurized
pressurisés

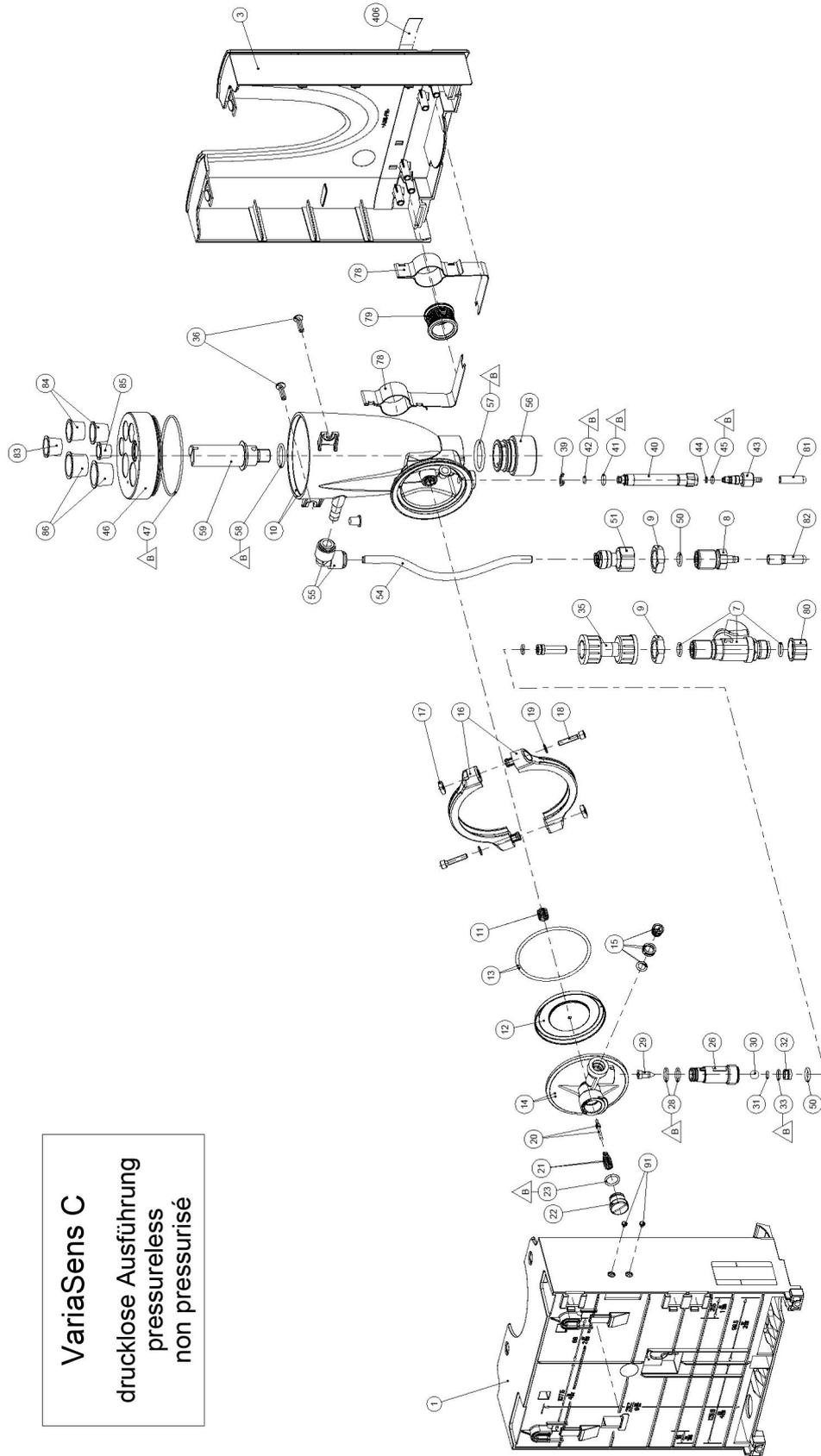
O-Ring leicht gefettet mit Spezialfett UNISILIKON L250L (W2T504248 / W2T504249)
Grease the o-rings slightly with special grease UNISILIKON L250L (W2T504248 / W2T504249)
Graisser les joint toriques légèrement avec UNISILIKON L250L (W2T504248 / W2T504249)



**Flow cell module DEPOLOX® 5 C (Module name D02)
pressurized version - W3T389210**

Item	Part No.	Designation	Item	Part No.	Designation
1	W3T247776	Basic housing	54	W3T438413	Hose
3	W3T247777	Housing cover	55	W2T505093	Angle-reducing connector
7	W3T166170	Shut-off valve	56	W3T166209	Electrode mount
9	W2T507615	Flat nut	57	W3T168875	O-ring
10	W3T158560	Cell body	58	W3T163795	Working electrode
11	W3T164226	Compression spring	59	W3T167461	Counter electrode
12	W3T158569	Membrane unit	60	W3T168904	O-ring
13	W3T160654	O-ring	61	W3T158562	Sealing cap
14	W3T158595	Control valve body	62	W3T168868	O-ring
15	W2T504209	Plastic cartridge	63	W2T504177	Cable gland
16	W3T160649	V profile clamp	64	W3T160549	Hexagon nut
17	W3T158567	Square nut	66	W3T159653	Electrode housing
18	W2T504659	Cheese-head screw	67	W3T167242	Diaphragm holder
19	W2T506019	Washer	68	W3T168947	O-ring
20	W3T158572	Valve pin	69	W2T504994	Round rod
21	W3T172795	Compression spring	70	W3T169295	Reference electrode
22	W3T158573	Adjusting screw	71	W3T161424	O-ring
23	W3T160357	O-ring	72	W3T165267	Knurled nut
26	W3T160648	Check valve housing	73	W3T161464	Flat gasket
28	W3T161396	O-ring	74	W3T168807	Potassium chloride gel
29	W3T169827	Float with magnet	75	W3T171171	Electrolysis tank
30	W3T172946	Ball	76	W3T161396	O-ring
31	W3T172949	O-ring	78	W3T166169	Retaining clip, coated
32	W3T159707	Ball seat	79	W3T172045	Electrode mount
33	W3T172975	O-ring	80	W3T161561	Screw cap
35	W3T158602	Filter housing	81	W3T168162	Protective cap
36	W2T505463	Plastic tapping screw	83	W3T159757	Plug
37	W3T161450	Plug	89	W3T161452	Felt ring, transport plug
38	W3T168859	O-ring			
39	W3T172041	Securing ring			
40	W3T158576	Outlet drain pipe			
41	W3T172997	O-ring			
42	W3T164597	O-ring			
43	W3T158575	Drain screw			
44	W3T166160	EPDM flat gasket			
45	W3T172556	O-ring			
46	W3T320102	Cell body cover			
47	W3T160657	O-ring			
48	W3T171088	Knurled nut			
50	W3T172861	O-ring			
51	W2T863568	Adapter			

8.1.4 Flow cell module VariaSens C (Module name D02)
non-pressurized version - W3T440600



VariaSens C
drucklose Ausführung
pressureless
non pressurisé

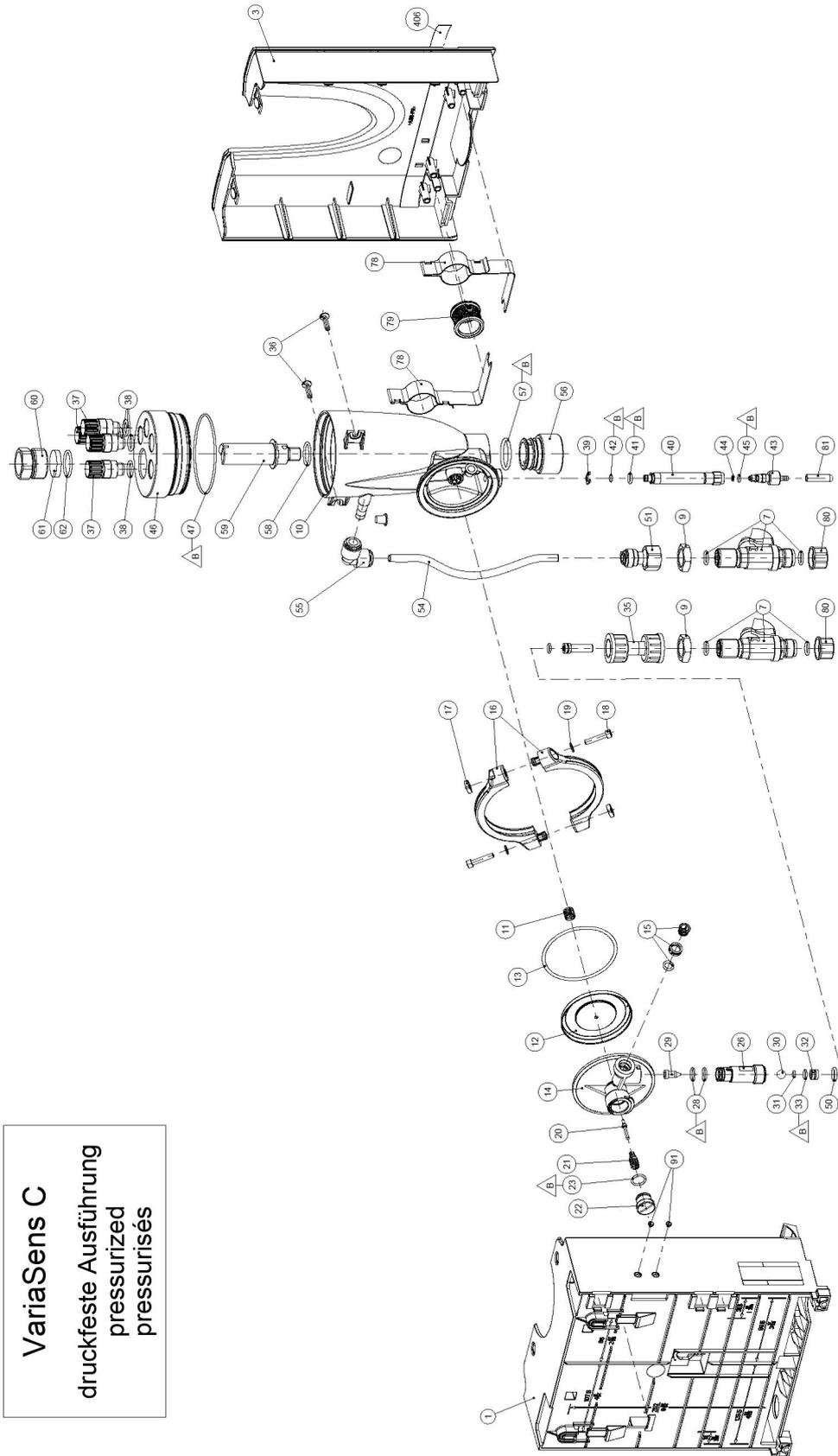
O-Ring gefettet mit Spezialfett UNISILIKON L250L (W2T504248 / W2T504249)
Grease the o-rings slightly with special grease UNISILIKON L250L (W2T504248 / W2T504249)
Graisser les joint toriques légèrement avec UNISILIKON L250L (W2T504248 / W2T504249)



**Flow cell module VariaSens C (Module name D02)
non-pressurized version - W3T440600**

Item	Part No.	Designation	Item	Part No.	Designation
1	W3T247776	Basic housing	59	W3T158739	Flow body
3	W3T247777	Housing cover	78	W3T166169	Retaining clip, coated
7	W3T166170	Shut-off valve	79	W3T172045	Electrode mount
8	W3T158593	Discharge nozzle	80	W3T161561	Screw cap
9	W2T507615	Flat nut	81	W3T168162	Protective cap
10	W3T158561	Cell body	82	W3T164588	Protective cap
11	W3T164226	Compression spring	83	W3T161453	Protection plug
12	W3T158569	Membrane unit	84	W3T169029	Protection plug
13	W3T160654	O-ring	85	W3T169044	Protection plug
14	W3T158595	Control valve body	86	W3T164574	Protection plug
15	W2T504209	Plastic cartridge			
16	W3T160649	V profile clamp			
17	W3T158567	Square nut			
18	W2T504659	Cheese-head screw			
19	W2T506019	Washer			
20	W3T158572	Valve pin			
21	W3T172795	Compression spring			
22	W3T158573	Adjusting screw			
23	W3T160357	O-ring			
26	W3T160648	Check valve housing			
28	W3T161396	O-ring			
29	W3T169827	Float with magnet			
30	W3T172946	Ball			
31	W3T172949	O-ring			
32	W3T159707	Ball seat			
33	W3T172975	O-ring			
35	W3T158602	Filter housing			
36	W2T505463	Pan head screw			
39	W3T172041	Securing ring			
40	W3T158576	Outlet drain pipe			
41	W3T172997	O-ring			
42	W3T164597	O-ring			
43	W3T158575	Drain screw			
44	W3T166160	EPDM flat gasket			
45	W3T172556	O-ring			
46	W3T320103	Cell body cover			
47	W3T160657	O-ring			
50	W3T172861	O-ring			
51	W2T863568	Adapter			
54	W3T438413	Hose			
55	W2T505093	Angle-reducing connector			
56	W3T158740	Sealing plug			
57	W3T168875	O-ring			
58	W3T167941	O-ring			

8.1.5 Flow cell module VariaSens C (Module name D02) pressurized version - W3T440611



VariaSens C
druckfeste Ausführung
pressurized
pressurisés

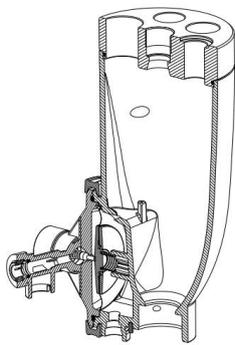
O-Ring leicht gefettet mit Spezialfett UNISILIKON L250L (W2T504248 / W2T504249)
Grease the o-rings slightly with special grease UNISILIKON L250L (W2T504248 / W2T504249)
Graisser les joint toriques légèrement avec UNISILIKON L250L (W2T504248 / W2T504249)



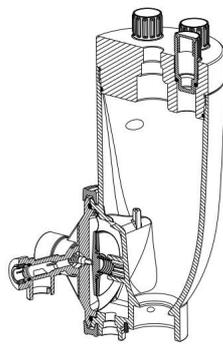
**Flow cell module VariaSens C (Module name D02)
pressurized version - W3T440611**

Item	Part No.	Designation	Item	Part No.	Designation
1	W3T247776	Basic housing	58	W3T167941	O-ring
3	W3T247777	Housing cover	59	W3T158739	Flow body
7	W3T166170	Shut-off valve	60	W3T171788	Union bush
8	W3T158593	Discharge nozzle	61	W3T163376	Dummy disk
9	W2T507615	Flat nut	62	W3T168861	O-ring
10	W3T158561	Cell body	78	W3T166169	Retaining clip, coated
11	W3T164226	Compression spring	79	W3T172045	Electrode mount
12	W3T158569	Membrane unit	80	W3T161561	Screw cap
13	W3T160654	O-ring	81	W3T168162	Protective cap
14	W3T158595	Control valve body	82	W3T164588	Protective cap
15	W2T504209	Plastic cartridge	83	W3T161453	Protection plug
16	W3T160649	V profile clamp			
17	W3T158567	Square nut			
18	W2T504659	Cheese-head screw			
19	W2T506019	Washer			
20	W3T158572	Valve pin			
21	W3T172795	Compression spring			
22	W3T158573	Adjusting screw			
23	W3T160357	O-ring			
26	W3T160648	Check valve housing			
28	W3T161396	O-ring			
29	W3T169827	Float with magnet			
30	W3T172946	Ball			
31	W3T172949	O-ring			
32	W3T159707	Ball seat			
33	W3T172975	O-ring			
35	W3T158602	Filter housing			
36	W2T505463	Pan head screw			
39	W3T172041	Securing ring			
40	W3T158576	Outlet drain pipe			
41	W3T172997	O-ring			
42	W3T164597	O-ring			
43	W3T158575	Drain screw			
44	W3T166160	EPDM flat gasket			
45	W3T172556	O-ring			
46	W3T320104	Cell body cover			
47	W3T160657	O-ring			
48	W3T161450	Plug			
49	W3T168859	O-ring			
50	W3T172861	O-ring			
51	W2T863568	Adapter			
54	W3T438413	Hose			
55	W2T505093	Angle-reducing connector			
56	W3T158740	Sealing plug			
57	W3T168875	O-ring			

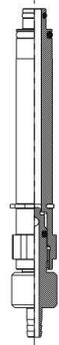
8.1.6 Cell body cover, flow cell module DEPOLOX® 5 C



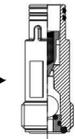
W3T322432
Cell body, complete,
non-pressurized version



W3T322435
Cell body, complete,
Pressurized version



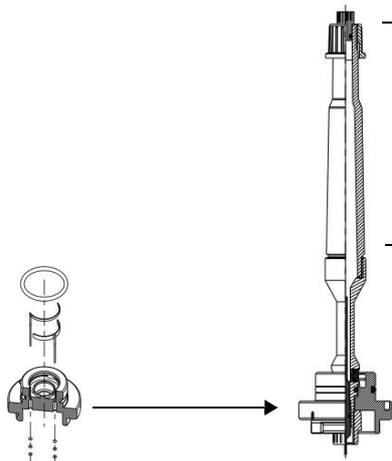
W3T166171
Drain valve
Unit



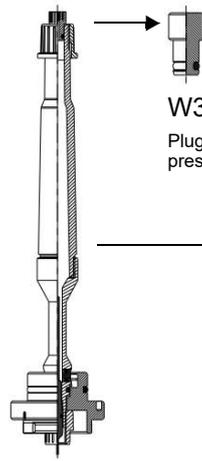
W3T158603
Non-return unit
with float



W3T163739
Spherical seat, complete
PVC/EPDM



W3T166210
Electrode mount
complete, with electrodes



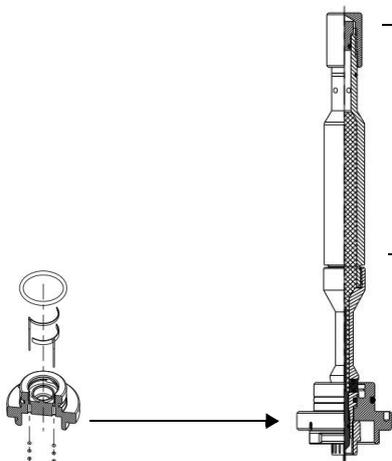
W3T162579
Electrode unit
complete, pressure-free

W3T159961
Plug, complete,
pressure-free

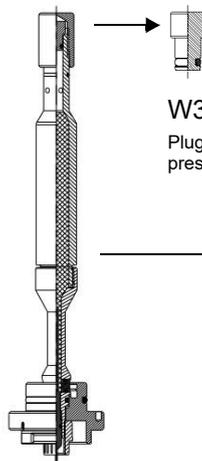


W3T159824
Electrode housing, pressure-free

W3T159870
Diaphragm, complete
(2 required)

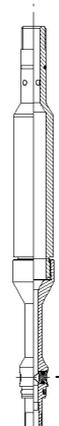


W3T166210
Electrode mount
complete, with electrodes



W3T162580
Electrode unit
complete, pressurized

W3T163746
Plug, complete,
pressurized



W3T159825
Electrode housing, pressurized

W3T159870
Diaphragm, complete
(2 required)

Pre-installed assembly groups

Part no.	Designation
W3T322432	Cell body, fully non-pressurized version
W3T322435	Cell body, fully pressurized version
W3T166171	Flow cell drain valve
W3T158603	Back pressure unit with float
W3T163739	Spherical seat cpl.

8.1.7 Cell body, flow cell module VariaSens C

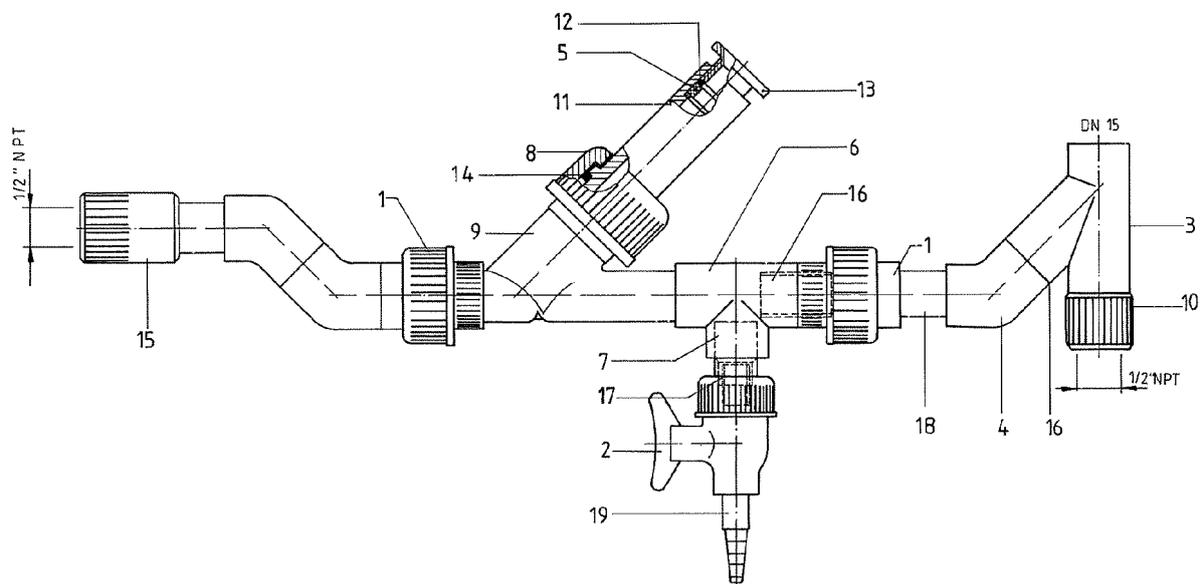
Pre-installed assembly groups

Part. no.	Designation
W3T322438	Cell body, fully non-pressurized version
W3T322439	Cell body, fully pressurized version
W3T166171	Flow cell drain valve
W3T158603	Back pressure unit with float
W3T163739	Spherical seat cpl.
W3T166194	Fine filter with O-ring

8.1.8 Maintenance parts sets for flow cells

Part No.	Designation
Flow cell module DEPOLOX® 5 C, non-pressurized version	
W3T170065	Maintenance parts kit, annual maintenance
W3T170071	Maintenance parts kit, 4 years
W3T158882	Spare parts set for flow control valve
Flow cell module DEPOLOX® 5 C, pressurized version	
W3T158875	Maintenance parts kit, annual maintenance
W3T170072	Maintenance parts kit, 4 years
W3T158882	Spare parts set for flow control valve
Flow cell module VariaSens C, non-pressurized version	
W3T158876	Maintenance parts kit, annual maintenance
W3T158750	Maintenance parts kit, 4 years
W3T158882	Spare parts set for flow control valve
Flow cell module VariaSens C, pressurized version	
W3T158877	Maintenance parts kit, annual maintenance
W3T158879	Maintenance parts kit, 4 years
W3T158882	Spare parts set for flow control valve

8.1.9 Y-style flow-through assembly non-pressurized version - W3T167442



Pos.	Part no.	Designation
1	W2T505181	Union
2	W2T507048	Laboratory ball cock
3	W2T507158	Tee
4	W2T507134	Elbow
5	W3T168889	Gasket rubber
6	W2T507524	Tee
7	W2T505438	Bush red
8	W3T170971	Union nut
9	W3T172856	Transparent housing
10	W3T167194	Adapter nipple

Pos.	Part no.	Designation
11	W3T170970	Electrode support
12	W3T167237	Washer
13	W3T163413	Clamping nut
14	W3T168861	O-ring
15	W3T163387	Adapter socket
16	W2T506051	Pipe
17	W2T506626	Pipe
18	W2T506051	Pipe
19	W2T506240	Hose connector, tapered

8.2 Sensors

8.2.1 3-electrode cell (DEPOLOX® 5 C)

Part No.	Designation
W3T164482	KCl tank with stand and 5 ml KCl solution
W3T160410	Electrolyte solution 3 mol/l KCl, bottle 250 ml
W3T158743	Electrode cleaning sand QJ
W3T158600	Measuring beaker (5 pcs)
W3T441081	Connector-cable combination, 0.9 mm
W3T160703	Connector-cable combination, 5 m
W3T160704	Connector-cable combination, 10 m
W3T160705	Connector-cable combination, 15 m
W3T160706	Connector-cable combination, 25 m
W3T160707	Connector-cable combination, 50 m

8.2.2 pH sensor

Part No.	Designation
W3T169297	pH sensor
W3T161181	Buffer solution pH 7.00, bottle 12 ml
W3T161189	Buffer solution pH 4.65, bottle 12 ml
W3T161181	Buffer solution pH 7.00, bag 12 ml
W3T161189	Buffer solution pH 4.65, bag 12 ml
W3T164482	KCl tank with stand and 5 ml KCl solution
W3T160410	Electrolyte solution 3 mol/l KCl, bottle 250 ml
W3T158600	Measuring beaker (5 pcs)
W3T173161	Connector-cable combination, 1.5 m
W3T164517	Extension cable 5 m (with 2 connector)
W3T164518	Extension cable 10 m (with 2 connector)
W3T164544	Extension cable 15 m (with 2 connector)
W3T164545	Extension cable 25 m (with 2 connector)
W3T164546	Extension cable 50 m (with 2 connector)

8.2.3 Fluoride sensor

Part No.	Designation
W2T840142	Fluoride sensor (manufacturer VanLondon)
W3T161789	Calibration solution, fluoride 0.2 mg/l, 500 ml
W3T161845	Calibration solution, fluoride 2 mg/l, 500 ml
W3T161884	Calibration solution, fluoride 100 mg/l, 500 ml
W3T158600	Measuring beaker (5 pcs)
W3T173161	Connector-cable combination, 1.5 m
W3T164517	Extension cable 5 m (with 2 connector)
W3T164518	Extension cable 10 m (with 2 connector)
W3T164544	Extension cable 15 m (with 2 connector)
W3T164545	Extension cable 25 m (with 2 connector)
W3T164546	Extension cable 50 m (with 2 connector)

8.2.4 Membrane sensor TC3

Part No.	Designation
W3T391561	Membrane sensor TC3
W3T172017	Sensor cable
W3T365500	Membrane cap, incl. lapping paper
W3T391564	Plastic membrane cap, incl. lapping paper For optional use with increased salt concentration!
W3T171793	Electrolyte E-TC, 100 ml bottle
W3T391565	Maintenance parts kit, comprising: membrane cap, lapping paper, electrolyte E-TC, O-ring and elastomer seal
W3T164339	Spare parts kit, comprising: lapping paper, O-ring and elastomer seal
W3T164519	Extension cable 5 m (with 1 connector)
W3T164520	Extension cable 10 m (with 1 connector)
W3T164538	Extension cable 15 m (with 1 connector)
W3T164539	Extension cable 25 m (with 1 connector)
W3T164540	Extension cable 50 m (with 1 connector)

8.2.5 Membrane sensor FC2

Part No.	Designation
W3T365498	Membrane sensor FC2
W3T172017	Sensor cable
W3T365500	Membrane cap, incl. lapping paper
W3T168101	Electrolyte ECS2/gel, 100 ml bottle
W3T365601	Maintenance parts kit, comprising: membrane cap, lapping paper, electrolyte ECS2/gel, O-ring and elastomer seal
W3T164339	Spare parts kit, comprising: lapping paper, O-ring and elastomer seal
W3T164519	Extension cable 5 m (with 1 connector)
W3T164520	Extension cable 10 m (with 1 connector)
W3T164538	Extension cable 15 m (with 1 connector)
W3T164539	Extension cable 25 m (with 1 connector)
W3T164540	Extension cable 50 m (with 1 connector)

8.2.6 Membrane sensor CD7

Part No.	Designation
W3T164493	Membrane sensor CD7
W3T172017	Sensor cable
W3T168103	Membrane cap, incl. lapping paper
W3T168102	Electrolyte CD7, 100 ml bottle
W3T168104	Maintenance parts kit, comprising: membrane cap, lapping paper, electrolyte ECS2/gel, O-ring and elastomer seal
W3T164519	Extension cable 5 m (with 1 connector)
W3T164520	Extension cable 10 m (with 1 connector)
W3T164538	Extension cable 15 m (with 1 connector)
W3T164539	Extension cable 25 m (with 1 connector)
W3T164540	Extension cable 50 m (with 1 connector)

8.2.7 Membrane sensor OZ7

Part No.	Designation
W3T164494	Membrane sensor OZ7
W3T172017	Sensor cable
W3T168106	Membrane cap, incl. lapping paper
W3T168105	Electrolyte OZ7, 100 ml bottle
W3T168107	Maintenance parts kit, comprising: membrane cap, lapping paper, electrolyte ECS2/gel, O-ring and elastomer seal
W3T164519	Extension cable 5 m (with 1 connector)
W3T164520	Extension cable 10 m (with 1 connector)
W3T164538	Extension cable 15 m (with 1 connector)
W3T164539	Extension cable 25 m (with 1 connector)
W3T164540	Extension cable 50 m (with 1 connector)

8.3 Accessories

8.3.1 Mounting plate

Part No.	Designation
W3T395161	Mounting plate with accessories for simple mounting of the flow cell and electronic module, strainer and up to four peristaltic dosing pumps

8.3.2 Impedance converter

Part No.	Designation
W3T165563	Impedance converter for pH or fluoride sensor

8.3.3 Strainer

Part No.	Designation
W3T158721	Strainer with ball valve, straight
W3T389201	Attachment set for strainer

8.3.4 USB memory stick

Part No.	Designation
W2T866279	USB memory stick for data storage with MLC technology

8.3.5 Tubing to tubing connection

PVC tubing, fabric-reinforced (internal diameter x wall thickness)	ø 4 x 3	ø 6 x 3	ø 10 x 3
Tubing	W2T505524	W2T505525	W2T505334
PVC hose connecting parts comprising:	W3T167626	W3T167518	W3T167590
O-ring	W3T172861	W3T172861	W3T169068
Locking ring	W3T163417	W3T161436	W3T159622
Union nut	W3T161502	W3T161502	W3T167297
Hose bushing	W3T172945	W3T161501	W3T167293

PE tubing (internal diameter x wall thickness)	ø 4 x 1	ø 6 x 1	ø 6 x 2	ø 10 x 2
Tubing	W2T507155	W2T505784	W2T505676	W2T505734
Tubing connecting parts made from PVC comprising:	W3T163752	W3T171453	W3T163796	W3T163825
O-ring	W3T172861	W3T172861	W3T172861	W3T169068
Locking ring	W3T172891	W3T169815	W3T163436	W3T163437
Union nut	W3T161502	W3T161502	W3T161502	W3T167297
Hose bushing	W3T172945	W3T161501	W3T161501	W3T167293

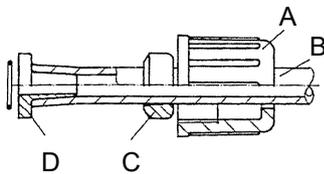
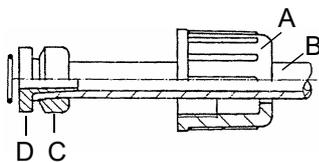
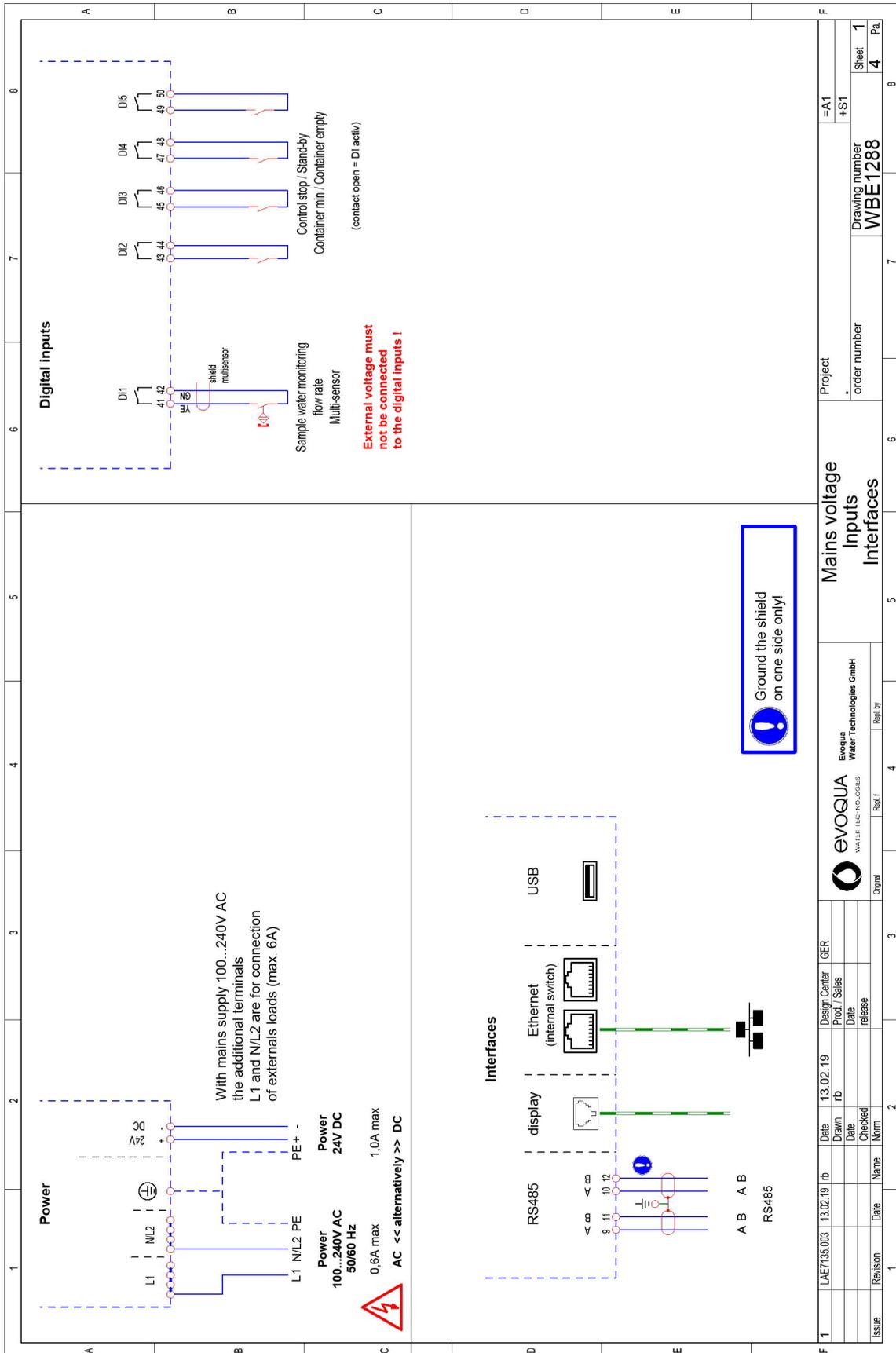


Image 1 Connection example

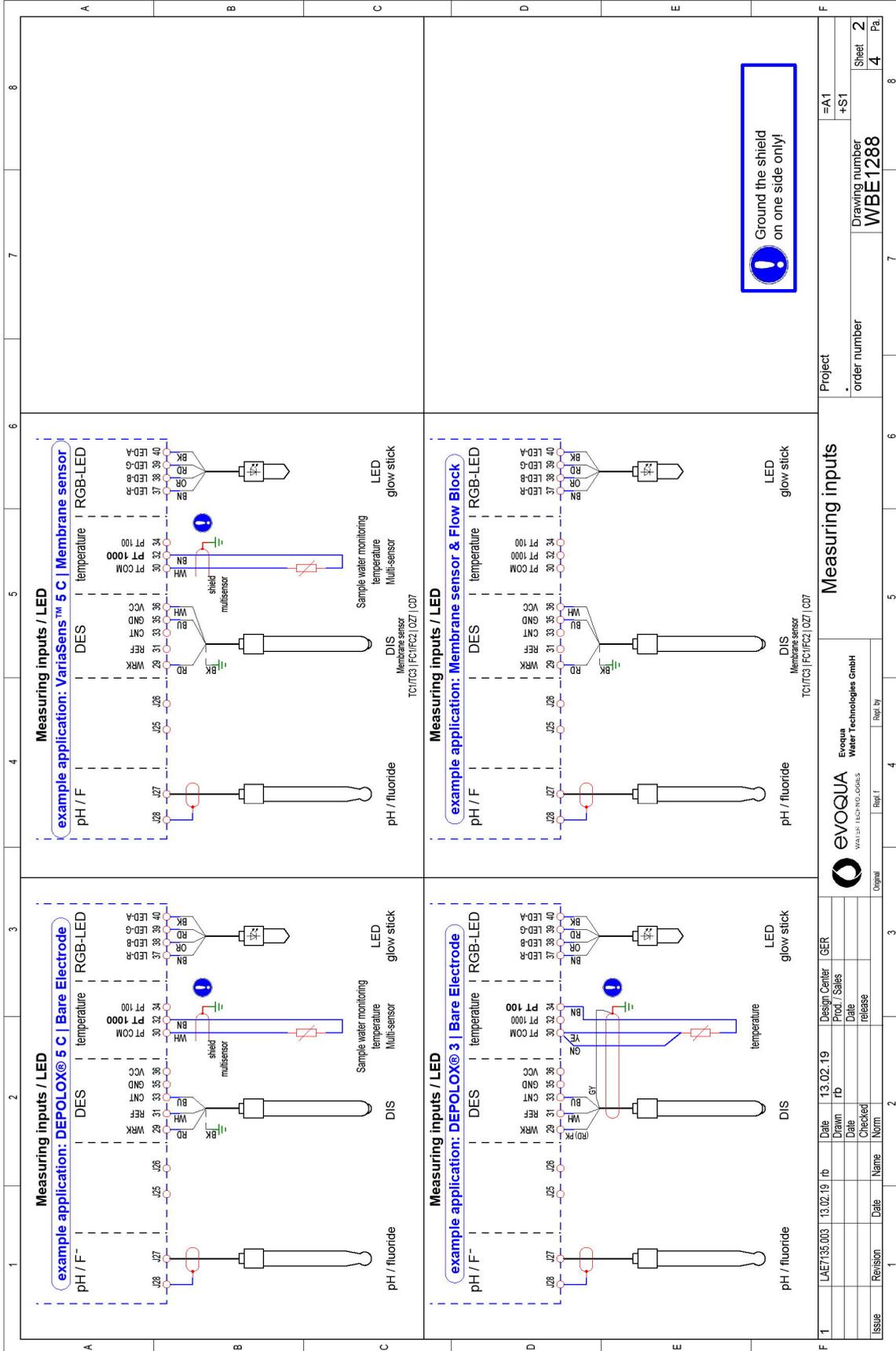


- A Union nut
- B Tubing
- C Locking ring
- D Hose bushing

9. Wiring diagrams

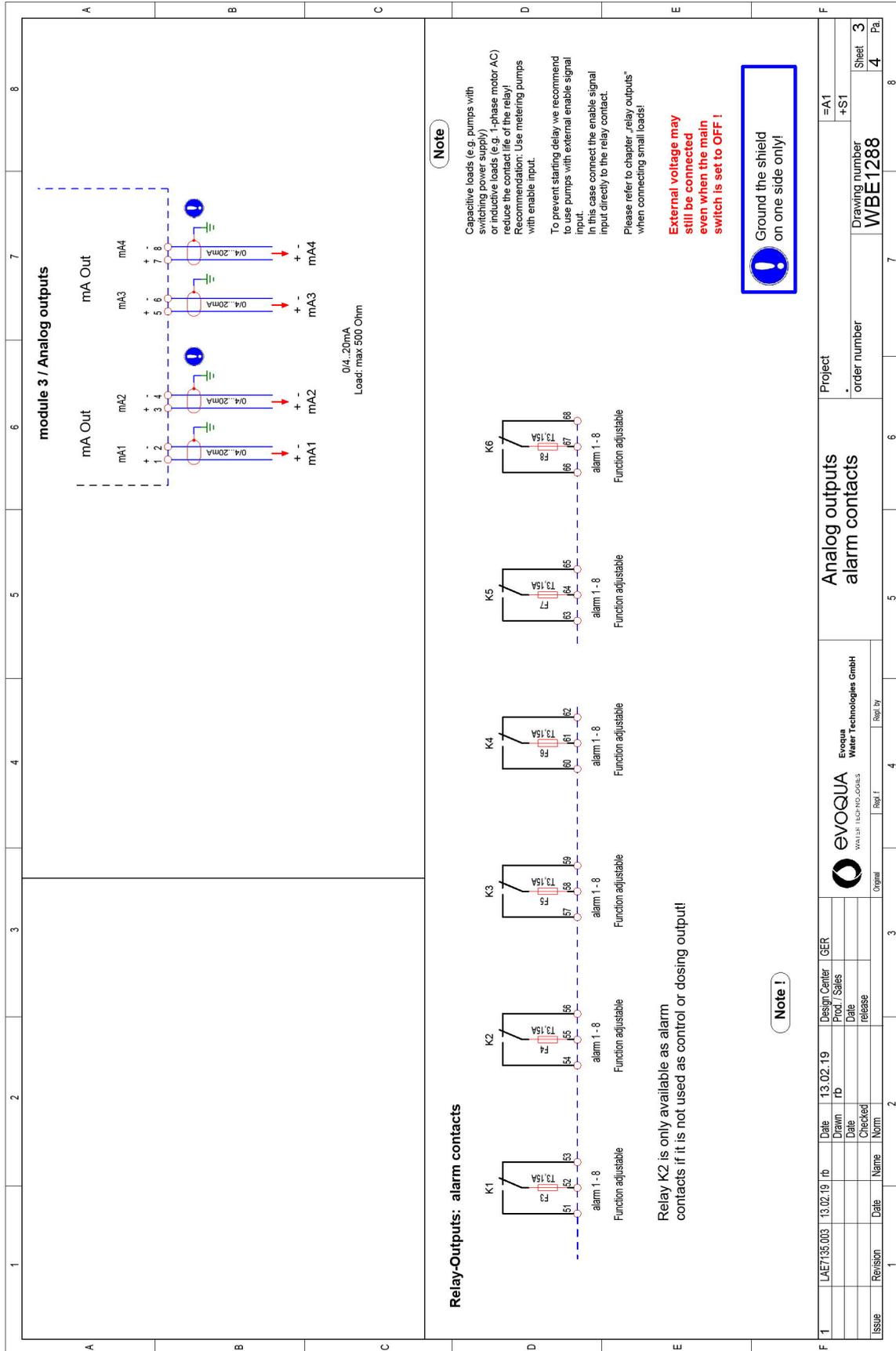


Project		=A1		+S1	
order number		Drawing number		Sheet 1	
		WBE1288		4 Pa.	
Mains voltage		Inputs		Interfaces	
Evoqua Water Technologies GmbH		WALLENFELD-STR. 100-100/15		Repl. I Repl. II	
Design Center GER		Date 13.02.19		Prof./ Sales	
Drawn rd		Date		release	
Checked		Date		Norm	
Issue		Date		Name	
Revision		Date		Name	



Project		=A1	
order number		+S1	
Drawing number		WBE1288	
Sheet		2	
Pa.		4	

evoQUA		Evosua Water Technologies GmbH	
WALDPIEGEL-STR. 100-100/105		Repl. By	
Drawn		Repl. I	
Date		Repl. II	
13.02.19		13.02.19	
Design Center		GER	
Prof. / Sales		rd	
Date		release	
Checked		Norm	
Date		Name	
Revision		Date	
Issue		Name	



10.Explanations and Certificates

10.1 Declaration of Conformity



EG-Konformitätserklärung EC Declaration of Conformity Déclaration CE de conformité

No. MAE1906

Ausgabe/issue/édition 01

Hersteller/Manufacturer/Constructeur:	Evoqua Water Technologies GmbH
Anschrift/Address/Adresse:	Auf der Weide 10, D-89312 Günzburg
Produktbezeichnung:	Messsystem DEPOLOX® 400 M bestehend aus: Elektronik-Modul 400 M (E02) Durchfluss-Modul DEPOLOX® 5 C (D02) Durchfluss-Modul VariaSens C (D02) Schrägsitz-Durchflussarmatur
Product description:	<i>Measuring system DEPOLOX® 400 M comprising: Electronics module 400 M (E02) Flow cell DEPOLOX® 5 C (D02) Flow cell VariaSens C (D02) Y flow-through assembly</i>
Description du produit:	Dispositifs de mesure DEPOLOX® 400 M comprenant : Module électronique 400 M (E02) Module de la cellule de mesure DEPOLOX® 5 C (D02) Module de la cellule de mesure VariaSens C (D02) Conduite de circulation à tête inclinée

Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender europäischer Richtlinien überein:

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

Le produit désigné est conforme, dans la version que nous avons mise en circulation, avec les prescriptions des directives européennes suivantes :

2014/30/EU	Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit. <i>Directive of the European Parliament and of the Council of 26 February 2014 on the approximation of the laws of the Member States relating to electromagnetic compatibility.</i> Directive du Parlement européen et du Conseil du 26 février 2014 relative au rapprochement des législations des Etats membres concernant la compatibilité électromagnétique.
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2014/35/EU Richtlinie des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.
Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.
 Directive du Parlement européen et du Conseil du 26 février 2014 concernant le rapprochement des législations des Etats membres relatives au matériel électrique destiné à être employé dans certaines limites de tension.
 CE-Kennzeichnung / CE marking / Marquage CE: 2019

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung der in der Nachweisdokumentation aufgelisteten Normen.
Evidence of conformity to the Directives is assured through the application of the standards listed in the relevant documentation.
 La conformité avec les directives est assurée par le respect des normes listés dans la documentation technique correspondante.

Benannte Person für technische Unterlagen:

Authorized person for the technical file:

Personne désignée pour la documentation technique:

Name / name / nom: Evoqua Water Technologies GmbH

Adresse / address / adresse: Auf der Weide 10, D-89312 Günzburg

Günzburg, den / the 2019-02-14

Evoqua Water Technologies GmbH

Klaus Andre
Technischer Leiter / Director Engineering

Unterschrift
signature / signature

Helmut Fischer
Leiter QM / Quality Manager

Unterschrift
signature / signature

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the conformity to the specified directives but does not imply any warranty for properties. The safety documentation accompanying the product shall be considered in detail.

La présente déclaration atteste de la concordance avec les directives citées, elle n'offre cependant pas de garantie quant à la nature ou la durabilité selon l'article 443 du code civil allemand. Les consignes de sécurité de la documentation du produit fournie sont à respecter.

10.1.1 CSA certificate



Certificate of Compliance

Certificate: 70027582 **Master Contract:** 226676
Project: 70138021 **Date Issued:** 2017-07-14
Issued to: Evoqua Water Technologies GmbH
Auf der Weide 10
Gunzburg, 89312
GERMANY

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Issued by: *Jean-Philippe Laplante*
Jean-Philippe Laplante

PRODUCTS

CLASS - C363106 - ELECTRICAL MEASUREMENT AND TEST EQUIPMENT

CLASS - C363186 - ELECTRICAL EQUIPMENT FOR MEASUREMENT USE-Certified to US Standards

Water management system, Models:

Main units: W3Ta E01 b; rated: 100-240Vac, 50/60Hz, 48W or 24Vdc, 30W /
W3Ta E02; rated: 100-240Vac, 50/60Hz, 24W or 24Vdc, 15W;
all models: 6A max rating including external loads supplied from the mains input circuit of the
main units via cord outlets or permanently wired

Flow-through units: W3Tc D01 / W3Tc D02, supplied by the main units.

(Where a, b & c are alphanumeric placeholders (different length; including blanks) for non-safety-critical properties and configurations like user interface design and water analysis functions)



Certificate: 70027582

Master Contract: 226676

Project: 70138021

Date Issued: 2017-07-14

Notes:

1. The above models are permanently connected or non-detachable cord (model dependent) Equipment Class I, Pollution Degree 2, Overvoltage category II
2. Mode of operation: Continuous
3. Environmental Conditions: Extended: 0 to 50°C, 2000m max, maximum 80% RH non-condensing.

APPLICABLE REQUIREMENTS

- | | | |
|---|---|--|
| CAN/CSA-C22.2 No. 61010-1-12 | - | Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements |
| UL Std. No. 61010-1 (3 rd Edition) | - | Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements |

CONDITIONS OF ACCEPTABILITY

1. The input pressure for the water management system shall be externally limited to 3 bars (300kPa).
2. The equipment shall be installed to the mains supply system using a disconnecting device with the off-position clearly marked and a 6A back-up fuse must be used in the main supply line (for permanently connected only)
3. Relay connections to external devices shall be connected using 5A fuses as overcurrent protection (model E01 only)
4. This product has not been evaluated for rigid conduit installation. The product shall not be installed using conduits.
5. Equipment is only to be installed by authorized qualified electricians.
6. Maintenance of equipment (including fuse and battery replacements) is only to be performed by authorized qualified electricians.
7. Equipment is not to be used with flammable liquids.



Supplement to Certificate of Compliance

Certificate: 70027582

Master Contract: 226676

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
70138021	2017-07-14	CSA c/us report update for alternate construction (new models E02 & D02) on a Water management system, Models: W3Ta E01 b, W3Ta E02 with flow-through modules: W3Tc D01 / W3Tc D02
70095602	2016-10-19	CSA c/us report update for alternate construction (relay) and model naming changed on a Water management system, Models: W3Txxxxxx-E01 / W3Txxxxxx-D01
70027582	2015-07-09	CSA (c/us) certification of a pool management system for water treatment based on the acceptance of CB test report.

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Wallace & Tiernan® Products worldwide

Australia

+61 3 8720 6597
info.au@evoqua.com

Canada

+1 905 944 2800
canadainfo@evoqua.com

China

+86 10 57076305
sales.cn@evoqua.com

France

+33 1 41 15 92 20
wtfra@evoqua.com

Germany

+49 8221 9040
wtger@evoqua.com

Singapore

+65 6830 7165
sales.sg@evoqua.com

UK

+44 300 124 0500
info.uk@evoqua.com

USA

+1 856 507 9000
wt.us@evoqua.com

Wallace & Tiernan®
an EVOQUA brand



Auf der Weide 10, 89312 Günzburg, Germany

+49 (8221) 904-0 www.evoqua.com

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