s::can
Intelligent. Optical. Online.

# Manual

# chlodi::lyser V1
# hyper::lyser V1
# peroxy::lyser V1

December 2017 Release

# Table of Contents

# 1 General

This manual contains, firstly, general information (chapter 1) and safety guidelines (chapter 2). The next chapter (chapter 3) provides a technical description of the s::can product itself as well as information regarding transport and storage of the product. In further chapters the installation (chapter 4) and the initial startup (chapter 5) are explained. Furthermore information regarding calibration of the device (chapter 6), data management (chapter 7), how to perform a functional check (chapter 8) and maintenance (chapter 9) can be found in this manual. Information regarding troubleshooting (chapter 10), the available accessories (chapter 11) and the technical specifications (chapter 12) complete the document.

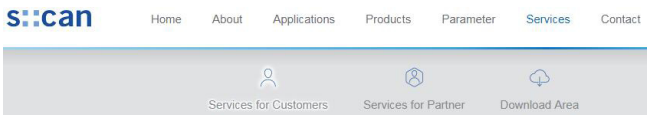
Each term in this document that is marked *italic and underlined*, can be found on the display of your controller for operation or as lettering on your s::can product.

In spite of careful elaboration this manual may contain errors or incompletion. s::can does not assume liability for errors or loss of data due to such faults in the manual. The original manual is published in English and German by s::can. This original manual serves as the reference in case discrepancies occur in versions of the manual after translation into third languages.



This manual, at the time of its publication (see release date printed on the top of this document), concerns the s::can products listed in chapter 3. Information and technical specifications regarding these items in s::can manuals from earlier release dates are herewith replaced by this manual.

The electronic version (pdf-document) of this manual is available on the s::can Customer Portal (Services for Customer) of the s::can Homepage (www.s-can.at).



# 2 Safety Guidelines

Installation, electrical connection, initial startup, operation and maintenance of any s::can product as well as complete s::can measuring systems must only be performed by qualified personnel. This qualified personnel has to be trained and authorised by the plant operator or by s::can for these activities. The qualified personnel must have read and understood this manual and have to follow the instructions contained in this manual.

For proper initial startup of complete s::can measuring systems, the manuals for the controller and software used for operation (e.g. con::lyte, con::cube, con::nect, moni::tool), the connected probes and sensors as well as the used additional devices (e.g. compressor) have to be consulted.

The operator has to obtain the local operating permits and has to comply with the joint constraints associated with these. Additionally, the local legal requirements have to be observed (e.g. regarding safety of personnel and means of labour, disposal of products and materials, cleaning, environmental constraints). Before putting the measuring device into operation, the operator has to ensure that during mounting and initial startup – in case they are executed by the operator himself – the local legislation and requirements (e.g. regarding electrical connection) are observed.

All s::can products are leaving our factory in immaculate technical and safety conditions. Inappropriate or not intended use of the product, however, can cause danger! The manufacturer is not responsible for damage caused by incorrect or unauthorised use. Any kind of manipulation of the instrument is strictly prohibited - except for the activities described in this document. Conversions and changes to the device must not be made, otherwise all certifications and guarantee / warranty become invalid. For details regarding guarantee and warranty please refer to our general conditions of business.

## 2.1 Declaration of Conformity

This s::can product has been developed, tested and manufactured for electromagnetic compatibility (EMC) and according to applicable European standards, as defined in the declaration of conformity.

CE-marks are applied on the device. The declaration of conformity related to this marking can be requested from s::can or your local s::can sales partner or can be downloaded from the s::can Customer Portal.

## 2.2 Special Hazard Warning

Because the s::can measuring systems are frequently installed in industrial and communal waste water applications, one has to take care during mounting and demounting of the system, as parts of the device can be contaminated with dangerous chemicals or pathogenic germs. All necessary precautions should be taken to prevent endangering of one’s health during work with the measuring device.

Some electrolytes contain diluted acids. Do not swallow the electrolyte. Avoid contact of the electrolyte with skin and eyes. Otherwise wash with a lot of water. In case of eye inflammation, contact a doctor.

# 3 Technical Description

## 3.1 Intended Use

The chlodi::lyser, hyper::lyser and peroxy::lyser are electrochemical based sensors designed for continuous monitoring of chlorine dioxide, hydrogen peroxide and peracetic acid in water. For this purpose three different sensor types are available. The value is expressed in mg/l. All sensor types provide the measured temperature as an additional parameter.

The sensors are not suitable for checking the absence of these substances.

These sensors were developed for use in drinking water, pool water and different types of water treatment. The use in waste water is possible, but has to be evaluated in the specific application. These sensors have only a low dependence on fluctuations of the measuring flow. Nevertheless a constant flow of the measuring medium is recommended.

In all types of applications, the respective acceptable limits, which are provided in the technical specifications in the respective s::can manuals, have to be observed. All applications falling outside of these limits, and which are not authorised by s::can Messtechnik GmbH in written form, do not fall under the manufacturer's liability.

The device must only be used for the purpose described in this manual. Use in applications not describes in this manual, or modification of the device without written agreement from s::can, is not allowed. s::can is not liable for claims following from such unauthorised use. In such a case, the risks are the sole responsibility of the operator.

## 3.2 Functional Principle

The chlodi::lyser, hyper::lyser and peroxy::lyser are membrane covered amperometric 2 electrode sensors. The measuring electrode with the combined working and reference electrode are inside the membrane cap which is filled with electrolyte. The substances will diffuse out of the water, through the membrane and will cause an electrical signal at the measuring electrode. This signal is proportional to the concentration.

Due to an integrated temperature compensation, the measurement is independent from the temperature.

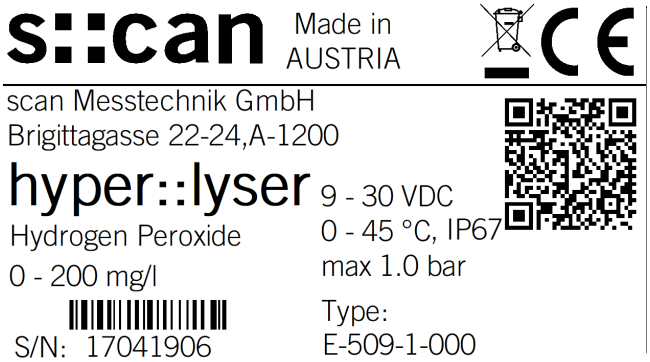
## 3.3 Product

The following device variants of sensors are available. Regarding detailed information of the device variants please refer to the technical specifications located at the end of this manual.

| Type (part-no.) | Specification | Range |
|---|---|---|
| E-508-1-000 | chlodi::lyser for chlorine dioxide ($ClO_2$) with plug connection | 0 - 2 mg/l |
| E-508-2-000 | chlodi::lyser for chlorine dioxide ($ClO_2$) with plug connection | 0 - 20 mg/l |
| E-509-1-000 | hyper::lyser for hydrogen peroxide ($H_2O_2$) with plug connection | 0 - 200 mg/l |
| E-509-2-000 | hyper::lyser for hydrogen peroxide ($H_2O_2$) with plug connection | 0 - 2000 mg/l |
| E-515-1-000 | peroxy::lyser for peracetic acid ($CH_3CO_3H$) with plug connection | 0 - 200 mg/l |
| E-515-2-000 | peroxy::lyser for peracetic acid ($CH_3CO_3H$) with plug connection | 0 - 2000 mg/l |
| E-508-1/2-EL | Chlorine dioxide electrolyte | |
| E-508-1/2-SET | Chlorine dioxide membrane cap | |
| E-509-1/2-EL | Hydrogen peroxide electrolyte | |
| E-509-1/2-SET | Hydrogen peroxide membrane cap | |
| E-515-1/2-EL | Peracetic acid electrolyte | |
| E-515-1/2-SET | Peracetic acid membrane cap | |

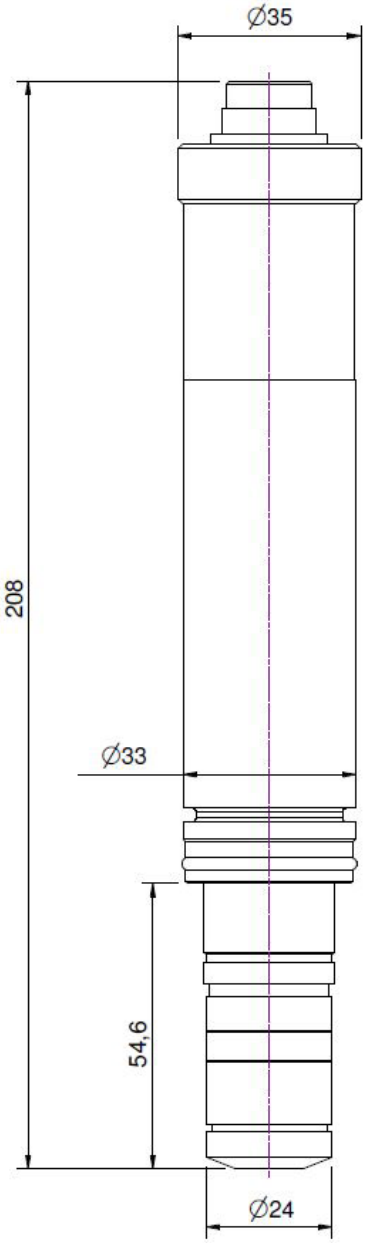
The device is typified by a type label, as shown on the right, that contains the following information:

- Manufacturer's name and country of origin
- Several certification marks
- Device name
- Measuring range
- Bar code
- Device serial number (S/N)
- Information on power supply
- Acceptable temperature limits
- Environment rating (IP)
- Acceptable pressure limits
- Part number (Type)
- QR code to s::can Support



1. Connector for sensor cable
2. Sensor housing
3. Membrane cap
4. O-ring
5. Membran
6. Reference electrode
7. Electrode finger
8. Goldelectrode




Dimensions of chlodi::lyser, hyper::lyser and peroxy::lyser in mm

## 3.4 Storage and Transport

The temperature limits for device storage and transport, which are described in the section technical specifications, have to be observed at all times. The device shall not be exposed to strong impacts, mechanical loads or vibrations. The device should be kept free of corrosive or organic solvent vapours, nuclear radiation as well as strong electromagnetic radiation.

For short term storage (up to 24 hours) the sensor can stay in the flow cell with water or can be covered with the protective cap filled with water to prevent the sensor from drying out.

For long term storage the membrane cap has to be unscrewed. Then the membrane cap, the spacer and electrode must be rinsed with clean water. Finally the dry membrane is screwed onto the sensor loosely, to protect the electrode finger. The membrane itself should not touch the electrode finger. For recommissioning after long term storage please refer to section 9.2.

Damage to the sensor caused by wrong storage will not be covered by warranty.

Membrane caps that have been in operation for more than one day cannot be used again after storage.

Transport should be done in a packaging that protects the device (original packaging or protective covering if possible).

This product is marked with the WEEE symbol to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EC. The symbol indicates that this product should not be treated as household waste. It must be disposed and recycled as electronic waste. Please assist to keep our environment clean.

## 3.5 Scope of Delivery

Immediately upon receipt, please check the received consignment for completeness on the basis of the delivery note and check for any possible damage incurred during shipping. Please inform the delivering dispatcher and s::can immediately in case of any damages in transit.

The following parts should be included in the delivery:

- s::can sensor (part-no. E-5xx-x-000), electrolyte and membrane cap are packed seperately
- Connection cable (part-no. C-1-010-sensor)
- s::can manual chlodi::lyser, hyper::lyser, peroxi::lyser (part-no. S-298-m)

The following parts could be included in the delivery if ordered as an option:

- Extension cable (part-no. C-210-sensor, C-220-sensor or C-230-sensor)
- Flow cell setup tap water for single sensor (part-no. F-45-sensor)
- Flow cell setup tap water for four sensors (part-no. F-45-four)
- Flow cell setup tap water for i::scan and three sensors (part-no. F-46-four-iscan)
- Carrier for single sensor (part-no. F-12-sensor)
- Automatic flow restrictor (part-no. F-45-flow-1)
- Electrolyte (part-no. E-5xx-x/y-EL)
- Membrane cap (part-no. E-5xx-x/y-SET)

In case of incompleteness please contact your s::can sales partner immediately!

## 3.6 Product Updates, Other

The manufacturer reserves the rights to implement, without prior notice, technical developments and modifications in the light of continuous product care.

# 4 Installation

## 4.1 Environment

The correct installation of measuring instruments is an important prerequisite for satisfactory operation. Therefore the following checklist for the installation can be used to ensure that all sources for potential operational problems can be ruled out to the greatest possible extent during the installation, allowing the monitoring system to operate properly.

- Favourable flow conditions (little turbulence, acceptable flow rate, pressure, etc.)
- Unadulterated, representative measuring medium
- Measuring medium is in equilibrium state (no gas release, no precipitation, etc.)
- No external interferences (no electric and electro-magnetic interferences by leakage current, earth fault of pumps, electric motors, electric power lines, etc.)
- Easy accessibility (mounting, sampling, functional check, demounting)
- Availability of sufficient space (probe / sensor, installation fitting, controller, etc.)
- Adherence to limit values (see technical specifications located at the end of this manual)

- Power supply for controller (operational reliability, voltage, power, peak free)
- Best possible weather and splash water proof conditions
- Shortest possible distances between system components (probe / sensor – controller – compressed-air supply – energy supply)
- Correct dimensioning, mounting and protection of all cables and lines (non-buckling, no risk of stumbling, no damage etc.)

## 4.2 Assembling of chlodi::lyser, hyper::lyser and peroxy::lyser

The chlodi::lyser, hyper::lyser and peroxy::lyser are not ready for use after shipment. This sections will guide you through the steps needed to prepare the sensors for measurment. Please mind the following important notes when handling with the sensors:

- Never touch the surface of the membrane, the electrode finger or the gold electrode at the tip of it with your fingers.

- Do not shake the electrolyte bottle, store it always upside-down and fill the membrane cap slowly to avoid air bubbles within the electrolyte. Air bubbles between gold electrode and membrane will falsify your readings.


- Please note the correct handling of electrolyte bottle during filling, to avoid air bubbles entering the electrolyte

1 Press bottle when upside down for filling.

2 Turn your hand to brings the bottle upright.

3 Only now open hand to let air flow into the bottle.



1 Place the sensor package and a clean plastic sheet onto a flat table. Carefully put the provided parts (sensor with membrane cap and protective cap, electrolyte, spacer and tweezer) onto the clean plastic sheet.




2 Place the bottle of electrolyte upside down. Ideally some days before

3 Unscrew the membrane cap from the sensor body.

4 Remove the protective cap carefully. Don‘t touch the membrane.

5 Place the membrane cap onto the clean plastic with the opening upwards.



6 Take the bottle with electrolyte and open it and keep it always upside down. Let the electrolyte flow onto the plastic sheet. Wet the spacer with electrolyte. Don‘t stop the flow.

7 Now move the bottle over the membrane cap without stopping the flow. Let the electrolyte flow slowly along the edge into the membrane cap up to the top. This procedure will avoid air bubbles within the electrolyte.



8 Take the spacer with the tweezer and submerse it with the opening upwards carefully into the filled membrane cap.

9 Check visually if the spacer is placed centric with opening upwards and no air bubbles are visible. In case of any air bubble, empty the membrane cap and start again filling with electrolyte.

10 Hold the sensor upright and immerge the electrode tip slowly into the filled membrane cap.



11 Screw the membrane cap onto the sensor body. Electrolyte will escape while screwing.

12 Ensure the red O-ring is positioned correctly.

13 The membrane cap is correctly screwed when the cap nearly hits the sensor body completely (only o-ring inbetween). Check again the position of the red O-ring.



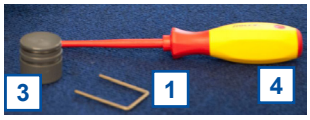
14 Spill the excessive electrolyte from the sensor body with tap water.



Once the sensor has been assembled, it should be supplied with power as soon as possible and ensure that the sensor is always wetted with disinfected water.

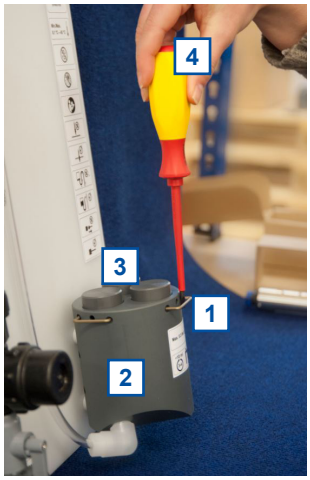
## 4.3 Mounting in Flow Cell Tap Water

This section explains how the sensors can be installed in a flow cell using either the single sensor flow cell setup (part-no. F-45-sensor) or the four sensor flow cell setup (part-no. F-45-four or part-no. F-46-four-iscan). Regarding the dimensions of these installation accessories please refer to section 11.1.4.



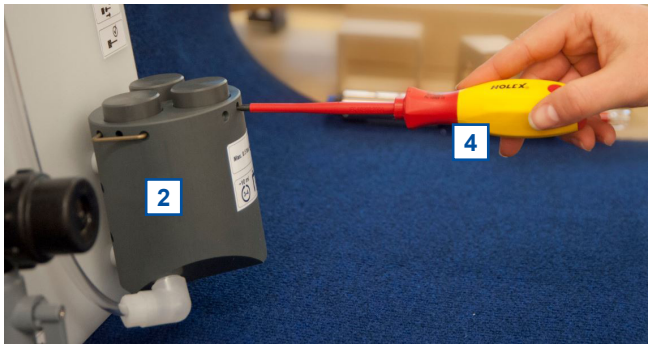

After the sensor is prepared as described in section 4.2, the installation in the flow cell is performed by the following steps:

Please note the sensor has to be placed into an opening located after the flow restrictor (i.e. position 3 or 4 in case of F-46-four-iscan).




- Pull out the metal bracket [1] from the flow cell [2] that fixes the plug [3]. A flat screw driver [4] can be used to do this, if needed.

- Remove the plug [3] from the flow cell [2]. To remove the plug insert a flat screw driver [4] into the small hole on the side of the flow cell and move the plug out by moving the screw driver downwards.




- Remove the protective cap from the sensor, if existing.
- Insert sensor [5] in the opening of the flow cell [2] and push sensor down carefully until O-ring snaps into the correct sensor position.
- Push the metal bracket [1] back into the flow cell [2] to secure the sensor [5] in place. The metal bracket can only be inserted if sensor is in the correct position.
- Ensure that all other openings of the flow cell [2] are covered with plugs [3] before putting the monitoring station into operation.
- To demount the sensor [5] use a flat screw driver [4] to remove the metal bracket [1] first and pull the sensor out.


The flow cell [2] is mounted onto the panel [7] of the micro- / nano::station with two fixing holders [6]. The position of the flow cell is secured by a metal bracket [1].

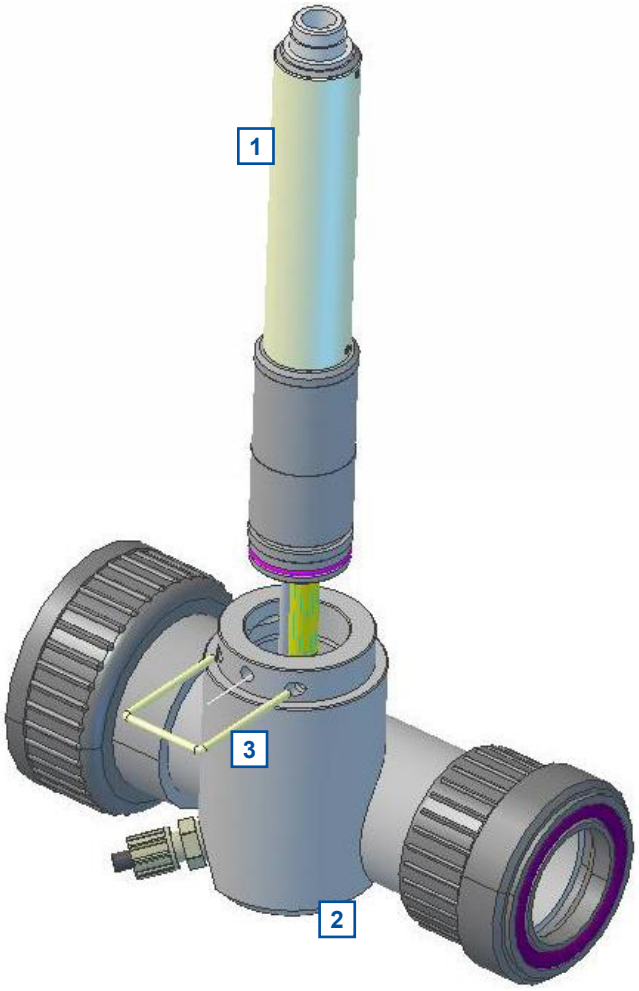
## 4.4 Mounting in Flow Cell Waste Water

This section explains how the sensor can be installed in the flow cell for waste water (part-no. F-48-sensor). Regarding the dimensions of this flow cell please refer to section 11.1.5.

Please note that all specifications regarding flow conditions are kept in mind to receive good measurements.

After the sensor is prepared as described in section 4.2, the installation in the flow cell is performed by the following steps:

- Remove the protective cap from the sensor, if existing.
- Pull out the metal bracket [3] with a screw driver as explained in section 4.3.
- Insert sensor [1] in the opening of the flow cell [2] and push sensor down carefully until O-ring snaps into the correct sensor position.
- Push the metal bracket [3] into the two holes on the side of the flow cell to secure the sensor in place. The metal bracket can only be inserted if sensor is in the correct position.
- Connect pipes / tubes for medium supply to the inlet and to the outlet of the flow cell setup (please refer to section 11.1.5 for dimension of fittings).
- To demount the sensor use a flat screw driver to remove the metal bracket first and pull the sensor out.



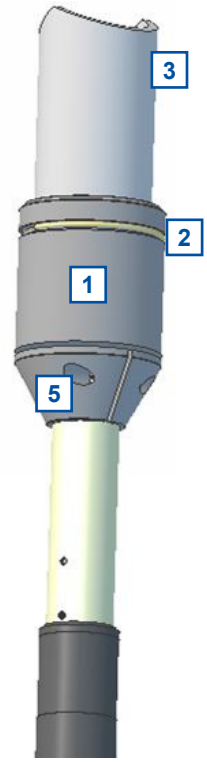
## 4.5 Mounting with Probe Carrier

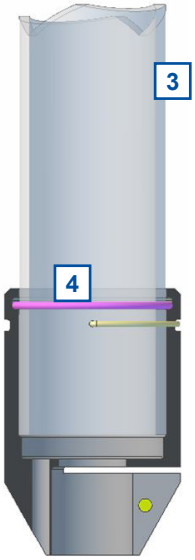
This section explains how the sensor can be installed in the probe carrier (part-no. F-12-sensor). Regarding the dimensions of this installation accessories please refer to section 11.1.3.

Please note that all specifications regarding flow conditions are kept in mind to receive good measurements.

After the sensor is prepared as described in section 4.2, the installation in the flow cell is performed by the following steps:


- Remove retaining clip [2] from the probe carrier [1].




- Put extension pipe OD 50mm or $1^1/_2$ inch [3] - to be provided by the customer - into the probe carrier [1].
- Drill two holes into the correctly positioned extension pipe [3]. Use the two existing holes [6] for the retaining clip [2] in the probe carrier [1] as guiding help.
- Snap the retaining clip [2] into both holes [6]. Doing this the probe carrier [1] will be fixed onto the extension pipe [3].

Depending on the extension pipe's OD you can use one of the two O-rings [4], included in delivery to stabilize the position of the pipe. O-ring 50 x 2.5 mm can be used for 50 mm and O-ring 50 x 3.5 mm can be used for $1^1/_2$ inch.

- Lead the sensor cable and the air hose for automatic probe cleaning through the probe carrier (see left figure below).
- Push the sensor into the probe carrier (see middle figure below).
- Tight the screw [5] on the probe carrier using a screw driver until the sensor is firmly fixed (see right figure below).



# 5 Initial Startup

Once the assembling, mounting and installation of the sensor have been completed and checked (see chapter 4) the initial startup of the s::can monitoring system will require the following actions, in the order presented below:

- Connect the sensor to the controller used for operation (see section 5.1 and 5.2).
- Establish power supply to the controller (please refer to the manual of the controller) and wait until the operation software has started up.
- Perform probe initialisation of the sensor. Refer to section 5.3.1 in case of using a con::lyte D-31x, refer to section 5.3.2 in case of using a con::lyte D-320 and refer to section 5.3.3 in case of using moni::tool.
- Perform parameterisation of the sensor. Refer to section 5.4.1 in case of using a con::lyte D-31x, refer to section 5.4.2 in case of using a con::lyte D-320 and refer to section 5.4.3 in case of of using moni::tool.
- Configure the measuring interval; additional information can be found in the respective manual of the controller.
- In case required, configure the digital, analogue and fieldbus outputs of the controller.
- Check the readings obtained for plausibility after sufficient running-in time (see section 12 regarding running-in time).
- If necessary calibrate the readings of the sensor in stable water quality (see chapter 6).

## 5.1 Controller for Operation

For proper operation of the sensor you will need one of the following controller and operating software respectively.

| Controller | Type | Software | Remark |
|---|---|---|---|
| con::lyte | D-318, D-319 | V5.01 or higher | With preset Modbus address 1 - 9 only. |
| con::lyte | D-320 | V6 or higher | |
| con::cube | D-315 | moni::tool V1.3 or higher | |

s::can recommends to use the most actual version of the operating software on the controller. For service operation with ana::pro please refer to section 10.3.4.

## 5.2 Connection to the Controller

The sensor will be delivered with a plug connection on the sensor itself only, the connection cable C-1-010 has to be used to connect the sensor to a compatible socket provided on the controller. Ensure that the sensor plug and the connector are dry and clean. Otherwise communication errors and / or device damage might occur.

In case the controller does not supply enough sockets, the distribution box for sensors C-41-hub can be used.

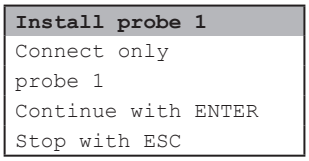
## 5.3 Probe Initialisation

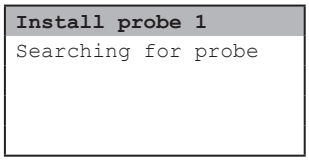
For operating one or several probes / sensors with one opertation controller, it is necessary to allocate an individual address to every probe / sensor. This will be done during probe initialisation process, at which the connected measuring device has to be recognized by the controller for operation first, and then a modification of the actual (preset) probe / sensor address might be performed. The corresponding address will be stored on the respective measuring device. For s::can probes and sensors of the same type, the same address is preset ex factory.

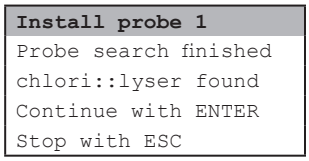
### 5.3.1 Probe Initialisation using con::lyte D-31x

The con::lyte should not be powered down or switched off during the initialisation process. In case of rebooting of the con::lyte during the initialisation process (e.g. caused by loss of power supply) the complete procedure of probe initialisation has to be repeated.

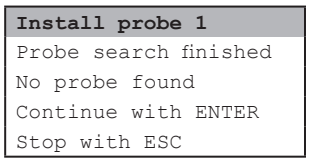
- Establish the power supply to the con::lyte and select entry *Settings / Parameter settings / Install Probes* in the main menu.
- Connect the probe / sensor to the con::lyte (see section 5.2).
- Push the button *Enter*, which starts the automatic search procedure for the connected measuring device. Once it is found, address 1 will be allocated. This procedure can last several seconds (see figures below).
- The successful completion of the initialisation will be displayed over a user message. If this message is displayed the initialisation procedure can be finished by pushing the button *Esc*.



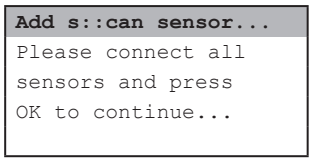

A user message will also be displayed when no probe is detected. In this case please check the following before repeating the procedure for probe initialisation:




- Is only one probe connected to the con::lyte?
- Is the probe connected in properly?
- Are all wires of the con::lyte socket in the terminal compartment tight?

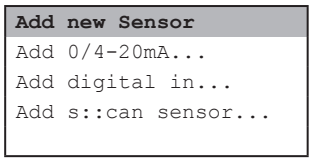
### 5.3.2 Probe Initialisation using con::lyte D-320

At the initial start-up the con::lyte D-320 provides an automatic probe and sensor initialisation procedure (see screen on the right). After connecting all probes and sensors to the appropriate plugs of the con::lyte (see section 5.2) and pushing the *OK* button, the probe and sensor initialisation starts.

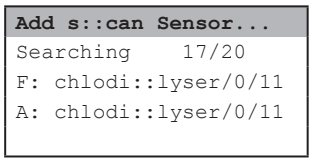



If sensor will be initialized at a later date, the following steps are needed:

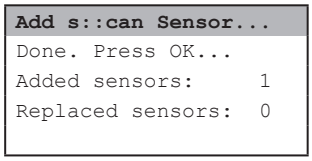
- Switch to Status display by using the *Left-* or *Right* button.
- Push *Function* button, select menu *Manage sensors...* and confirm with *OK*.
- Select menu *Add sensor ...* and confirm with *OK*.
- Connect sensor to the D-320 (see section 5.2).
- Select menu *Add s::can sensor ...* and confirm with *OK*.




As soon as the entry is confirmed by pushing the *OK* button, the con::lyte will automatically search the Modbus port for a new sensor and will add the new sensor to the sensor list.

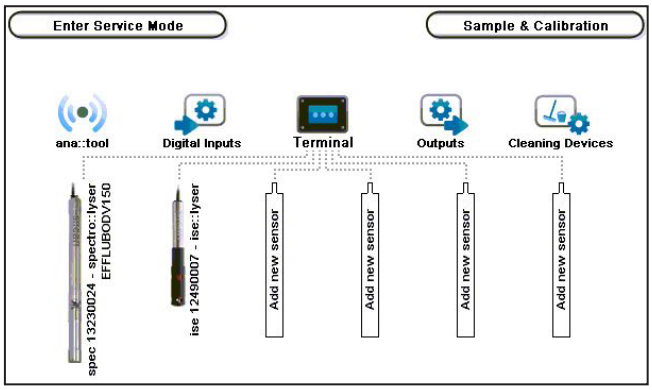



After adding a new probe or sensor, the parameters will be displayed in the parameter screen. Furthermore single parameter can be added manually (see section 5.4.2 and menu *Add parameters...*). In case the installation failed, the message *Error adding!* will be displayed.



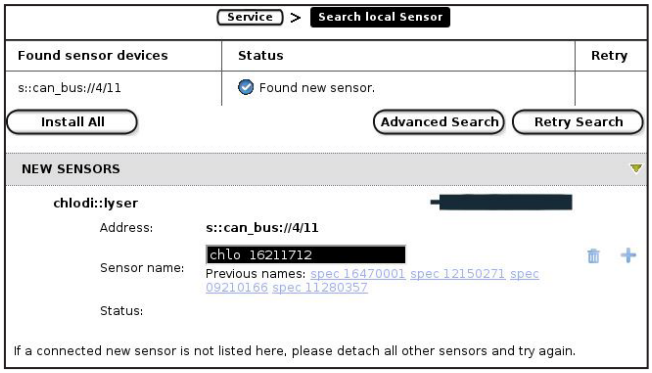
### 5.3.3 Probe Initialisation using moni::tool

- Click the *Service* tab of the moni::tool screen and logon as *Administrator*.
- Click on an empty sensor icon (*Add new Sensor*) to initiate the initialisation process.
- An automatic search procedure will start, searching for the connected sensor.

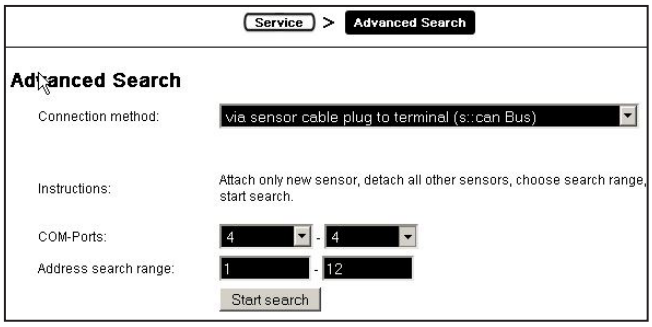




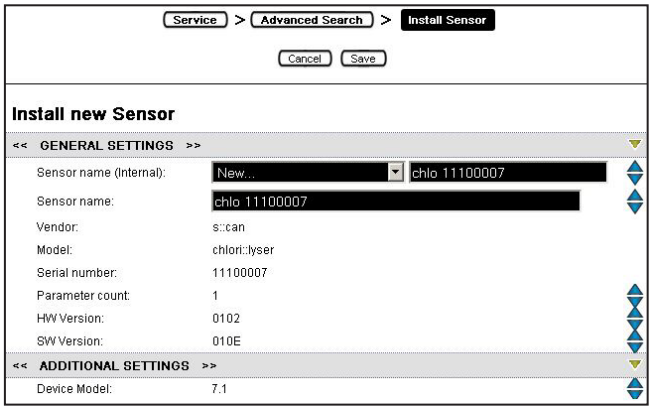
- When the automatic search prodedure is finished, moni::tool will display all connected probes and sensors. Those sensors that are connected for the first time will have the Status *Found new sensor* (also listed as *New Sensors* below).
- If needed *Sensor name* can be modified now, which can be any descriptive name you desire or select one of the previous names listed below this entry field.
- To install the new sensor click on the blue + sign on the right side of the sensor or push the button *Install All*.
- moni::tool will install the sensor and switch to the *Service* tab showing the new sensor in the system overview. Now pushing the button *Leave Service Mode* located on the upper left side to start the measuring process.




- When pushing the button *Advanced Search* (see 2nd and 3rd figure from the top), the method you connected the sensor (*Connection method)*, the used *COM-Port* and the *Address* can be defined. A click on button *Start search* will start search procedure within the defined range.




- After the *Advanced Search* is finished, the *Install Sensor* screen is displayed. Depending on the used *Service Level* (*Basic*, *Advanced* or *Expert*) only the basic or all information received from the sensor are listed up.
- To install the new sensor push the button *Save* in the upper part of the window.



## 5.4 Probe Parameterisation

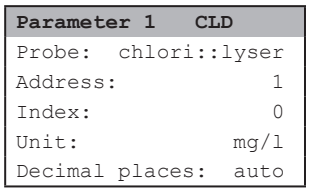
The following table is an overview of the parameters that can be measured with these sensors:

| Sensor / Part-no. | Previous Version | Parameter-index | Name [Unit] | Decimal places |
|---|---|---|---|---|
| chlodi::lyser E-508-1 | Chlorine dioxide | 0 | CLD [mg/l] | 3 |
| | Temperature | 1 | Temp. [°C] | 1 |
| chlodi::lyser E-508-2 | Chlorine dioxide | 0 | CLD [mg/l] | 2 |
| | Temperature | 1 | Temp. [°C] | 1 |
| hyper::lyser E-509-1 | Hydrogen peroxide | 0 | HYP [mg/l] | 1 |
| | Temperature | 1 | Temp. [°C] | 1 |
| hyper::lyser E-509-2 | Hydrogen peroxide | 0 | HYP [mg/l] | 0 |
| | Temperature | 1 | Temp. [°C] | 1 |
| peroxy::lyser E-515-1 | Peracetic acid | 0 | PAA [mg/l] | 1 |
| | Temperature | 1 | Temp. [°C] | 1 |
| peroxy::lyser E-515-2 | Peracetic acid | 0 | PAA [mg/l] | 0 |
| | Temperature | 1 | Temp. [°C] | 1 |

### 5.4.1 Probe Parameterisation using con::lyte D-31x

After successful probe initialisation (see section 5.3.1) the measuring parameters of the sensor will be displayed on the display of the con::lyte automatically. If needed the measuring parameters can be configured individually using the menu item *Settings / Parameter settings / Parameter n* (*Settings / Parameterconfig / Parameter n* with older versions).

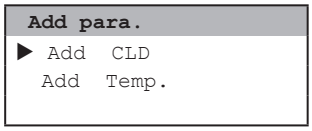
The name of the *Probe* or sensor used as a source of the parameter is displayed in the upper line (e.g. chlori::lyser). If several probes or sensors are installed the instrument from which a parameter needs to be displayed can be selected here. Under the entry Probe the *Address* that has been allocated to that probe is displayed as an additional information. The *Index* specifies the place of the corresponding parameter onto the allocated probe. The *Unit* of the selected parameter is displayed in the line below. The item *Decimal places* enables settings of the number of displayed decimal places (between *0* and *4*). With the default setting *auto* the number of decimal places will be automatically set by the sensor.




### 5.4.2 Probe Parameterisation using con::lyte D-320

After successful probe initialisation (see section 5.3.2) the needed measuring parameters of the sensor have to be added to the parameter display. This is performed by the following steps:

- Switch to status display with *Left-* or *Right* button.
- Push *Function* button, select menu *Manage sensors...* and confirm with *OK*.
- Select *chlodi::lyser/0/x* and confirm with *OK*.
- Select menu *Add parameters...* and confirm with *OK*.
- Select needed parameter and confirm with *OK*.



The display position of the parameter can be changed. This can be done by the following steps:

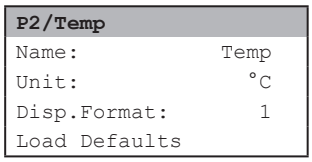
- Select the parameter in der parameter display with *Up-* or *Down* button.
- Push *Function* button.
- Select entry *Move up* or *Move down* and confirm with *OK*. This will move the parameter one position upwards or downwards.

Each parameter will be displayed with default settings. These settings can be modified by the following steps:

- Select the parameter in der parameter display with *Up-* or *Down* button.
- Push *Function* button.
- Select entry *Display settings* and confirm with *OK*.

Now the following parameter information will be displayed:

- *Name* Displays the actual name of the paramter.
- *Unit* Displays the actual unit of the paramter.




To change the name or unit of the parameter, select the entry with *Up-* and *Down* buttons and by pushing the *OK* button the name can be changed with *Up-*, *Down-*, *Left-* and *Right* buttons. Pushing the *OK* button confirms the new name. Please note that change of parameter name or unit will not change the parameter configuration itself.

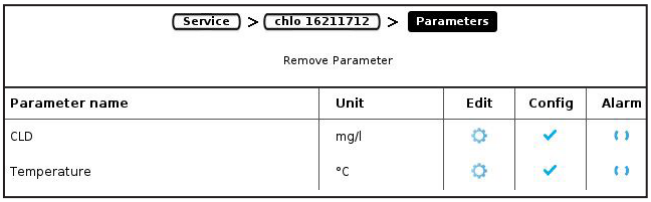
- *Disp.Format* Within this line the number of displayed decimal places (between 0 and 5) can be set. Please note that in case of too many digits high values can not be displayed and the parameter reading will switch to plus signs (++.+++++).

- *Load Defaults* Confirming this entry by pushing the *Ok* button will restore the default display settings from the sensor.

All modifications performed by the operator within these settings menu will be documented in the logfile of the con::lyte (see manual con::lyte D-320).

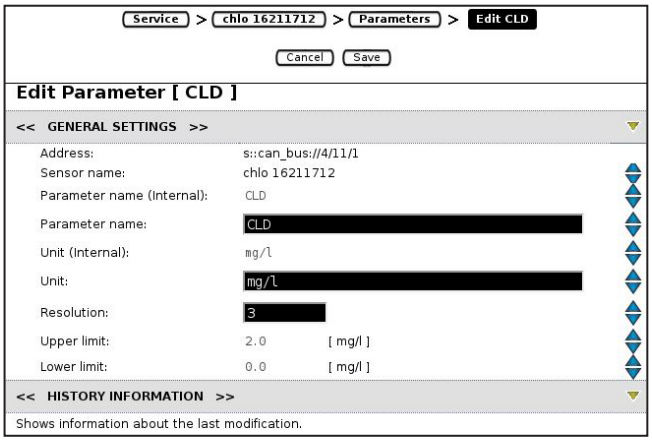
### 5.4.3 Probe Parameterisation using moni::tool

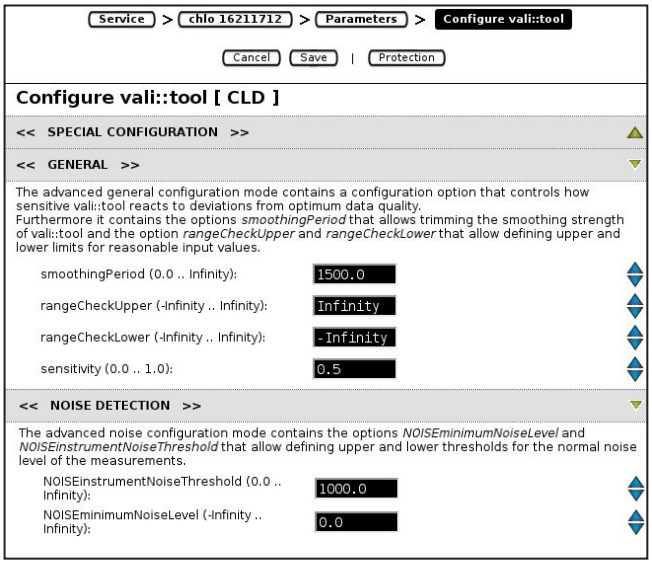
After successful probe initialisation (see section 5.3.3) all parameters available on the probe will be installed and automatically displayed on the *Value* screen of moni::tool. If not all new parameters are displayed, please check maximal number of parameters of your moni::tool license. If you want to configure the measuring parameters induvidually, this can be done using the menu item *Service / Terminal / Parameter*.

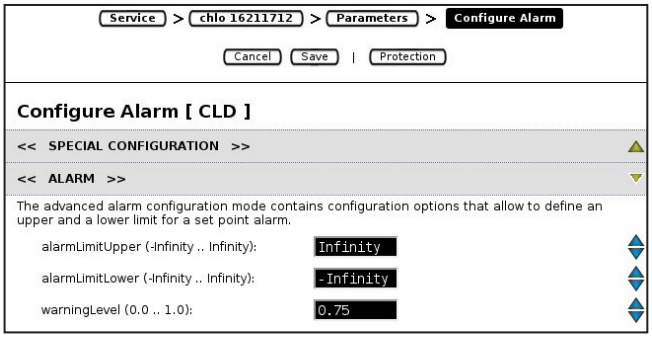



After selecting that menu item a list of all installed parameters is displayed. After selecting one or several parameters by clicking on them the following activities can be performed:

- Moving the selected parameter to a higher position in the *Value* display by pushing the entry *Up*.
- Moving the selected parameter to a lower position in the *Value* display by pushing the entry *Down*.
- Deleting the selected parameter from *Value* display by pushing the entry *Remove Parameter*.
- A new parameter can be added by pushing the entry *Add Parameter*.
- Click on the blue wheel (*Edit*) on the right hand side of the parameter will display the actual parameter settings. Depending on the actual *Service Level* different settings are displayed and can be edited (*Parametername*, *Unit* and *Resolution*).
- Click on the blue check mark (*::tool*) or on the blue sign (*Alarm*) on the right hand side of the parameter to check or modify the settings for vali::tool and parameter alarm. Please refer to manual moni::tool for further information.



# 6 Calibration

The sensors are delivered with membrane cap and electrolyte separately. Therefore the electrode slope needs to be calibrated after initial startup (see chapter 5). Subsequently a calibration is needed whenever maintenainces activities (changing the electrolyte or the membrane cap) have been performed. The zero point is precalibrated in the factory and does not need to be recalibrated in the field.

- Before performing any kind of calibration ensure appropriate conditioning time (at least 2 hour after initial operation or longer, depending on the sensor type, please refer to technical specifications).
- Before performing any kind of calibration the correct function of the sensor should be ensured (sensor is clean and properly assembled - see section 8 also).
- For highest accuracy the same environment conditions (temperature, flow velocity, pH) have to be ensured during the calibration as for the normal operation. Therefore the calibration should always be performed with the installed sensor directly in the medium and only in exeptional cases outside the flow cell.
- When calibration is performed outside the flow cell in a small beaker, ensure constant medium flow and check that the sensor is not in direct contact with the wall or bottom.

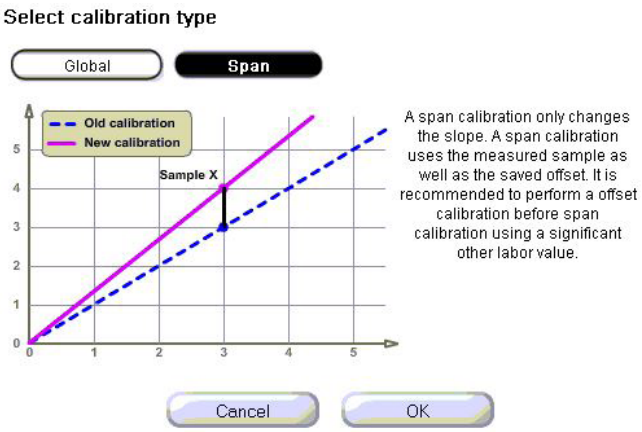
- Take a sample from the medium at the same time when pushing the sample button in the calibration menu (actual measurement will be stored).
- Perform laboratory analysis for actual concentration of the sample as fast as possible.
- As reference method for chlorine dioxide (chlodi::lyser) the DPD method can be used.
- For highest accuracy use a photometer for measuring chlorine dioxide concentration of the sample and perform zero-point calibration of the photometer before usage.
- For hyper::lyser and peroxy::lyser s::can recommends to use standard titration methods to archieve adequate accuracy.
- The calibration will not be executed and used till the menu item *Calibrate!* is confirmed.
- When performing a parameter calibration the result will be checked for plausibility. In case of faulty calibration an error message will be displayed to the operator. Please refer to section 10.2 regarding possible error messages and notes for removal.

## 6.1 Types of Calibration

For calibration of the measuring parameter a span calibration can be performed. This local calibration adapts the global slope of the calibration to the actual monitored medium. The temperature value of the internal compensation cannot be calibrated.

### 6.1.1 Span Calibration

- The sensor is equipped with a global calibration (reference slope) ex factory. You can switch back to this factory setting at any time.
- The local calibration shall either be performed directly in the medium or in a calibration standard.
- When using a calibration standard the value of the used standard shall be close to the measuring range of the application.
- For span calibration only one sample is needed. This sample will be stored onto the sensor.
- The result of the span calibration will be stored directly onto the sensor and will be used until a new span calibration is performed successfully or you switch back to the default slope.



## 6.2 Performing a Calibration

### 6.2.1 Calibration using con::lyte D-31x

The *Calibration* entry in the con::lyte main menu leads you into the menu that enables the calibration of the sensor. When *Calibration* is selected a password must be entered (password = 1) before the calibration can be started. The next step is selection of the parameter to be calibrated (e.g. CLD) in the selection field *Param Calibration*.

| Parameter Calib. | |
|---|---|
| Local cal.: | CLD |
| Local cal.: | Temp |

Now the menu for local calibration will appear as displayed on the right hand side.

As long as sensor is working with factory calibration (default) the entry *Calib.* shows *global* and no *Type* can be selected.

| Local cal.: | CLD |
|---|---|
| Calib.: | global |
| Type: | None |
| Set reference slope | |
| Calibrate! | |

To perform a local calibration the entry *Calib.* has to be changed to *local*. Then below the entry *Type* will show *Span* as possible type of calibration.

The display shows the reading for the concentration measured actually (*Value*) as well as the concentration stored on the sensor for calibration (*Sample 1*). As long as no sample is stored on the sensor the display will show dashes. When confirming the entry *Sample 1* by pushing *Enter* the actually measured value will be stored as new sample on the sensor. On the entry *Lab 1* the result corresponding to the reading stored under *Sample 1* can be entered here.

| Local cal.: | CLD |
|---|---|
| Calib.: | local |
| Type: | Span |
| Value: | 1.27 |
| Sample 1: | --.-- |
| Lab 1: | --.-- |
| Set reference slope | |
| Calibrate! | |

When the entry *Calibrate!* is confirmed by pushing *Enter*, a calibration is performed. Successful calibration is shown in a user message (*Local calib. o.k.*). If the calibration was not successful (user message *Local calib. Error!*) the calibration used up to now will be used further on.

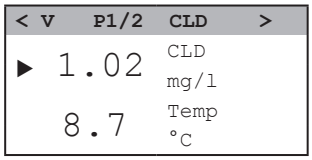
When selecting the entry *Set reference slope* after performing a local calibration, the new slope will be stored as a reference. This reference can be used to compare further slope calibrations and to document ageing of the membrane / electrolyte. The procedure is confirmed by the message *Reference slope was set successfully. Continue with ENTER*.

The possibility to store a new reference slope is only supported by this s::can operation controller. Therefore it is disadviced to use this possibility and keep the slope set ex factory instead for internal check of electrode ageing.

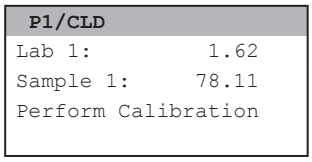
For temperature reading no local calibration is possible.

### 6.2.2 Calibration using con::lyte D-320

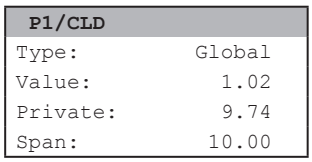
This operating controller provides, beside normal calibration procedure (see further down), the possibility for a quick calibration call directly from the parameter view. This is performed by following steps:




- Select the parameter in the parameter display with *Up-* or *Down* button.
- Push *OK* button, which directly displays the calibration screen.
- Select *Sample 1* and confirm with *OK* to store the raw signal of the actual reading.
- Take a water sample to analyse real concentration.
- Enter the result from laboratory analyse into the field *Lab 1*.
- Select entry *Perform Calibration* and confirm with *OK*.
- Leave the calibration screen with *Back* button.

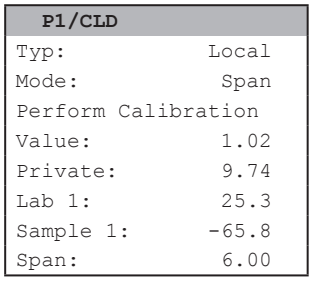



The advanced local calibration provides extensive possibilities for calibration of measurement parameter. After selecting the parameter in the parameter display, pushing the *Function* button, selecting the menu *Calibrate expert...* and pushing the *OK* button, the calibration screen is displayed.




- *Type* — Two different types of calibration are available: *Local* or *Global*. By default *Local* is selected. This is the normal calibration performed by the operator. As soon as *Global* is selected an confirmed with OK a reset of the sensor to factory calibration is performed and the actual reading (*Value*), the raw signal (*Private*) and the default slope (*Span*) will be displayed.

- *Mode* — The only mode available is *Span* which is preset.




- *Perform Calibration* — Confirming this entry by pushing the *Ok* button will execute the local calibration, using the *Lab* and *Sample* values displayed on the calibration screen.

- *Value* — Displays the measured value of the probe or sensor like on the parameter screen also (i.e. using the actual calibration). The value will be updated permanently.

- *Private* — Displays the according raw value of the displayed reading. The value will be updated permanently.

- *Lab 1* — Within this line the reference value for the measured *Sample 1* has to be entered. The entered *Lab* value can be either the laboratory result of the sample taken or the concentration of the standard solution, which is used for calibration. The unit of the lab value has to be in accordance with the measuring parameter.

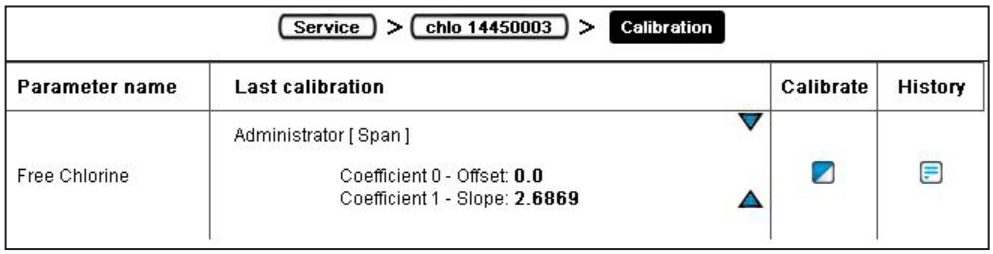
  An entered *Lab* value can be deleted by selecting it and pushing the *Function* button so that it will not be used in the calibration.

- *Sample 1* — When confirming this entry by pushing the *Ok* button, a measurement will be performed and stored as sample 1 for the local calibration. The sample for the laboratory should be taken at the same time. The displayed and stored value, which will be used for the calibration might be a raw value (e.g. mV value) and therefore might also be negative. Existing readings (*Sample 1*) are overwritten whenever a new measurement is triggered by pushing the *Ok* button. If no sample measurement was performed or if the measurement was invalid, the message *Measure!* will be displayed instead of a numerical value.

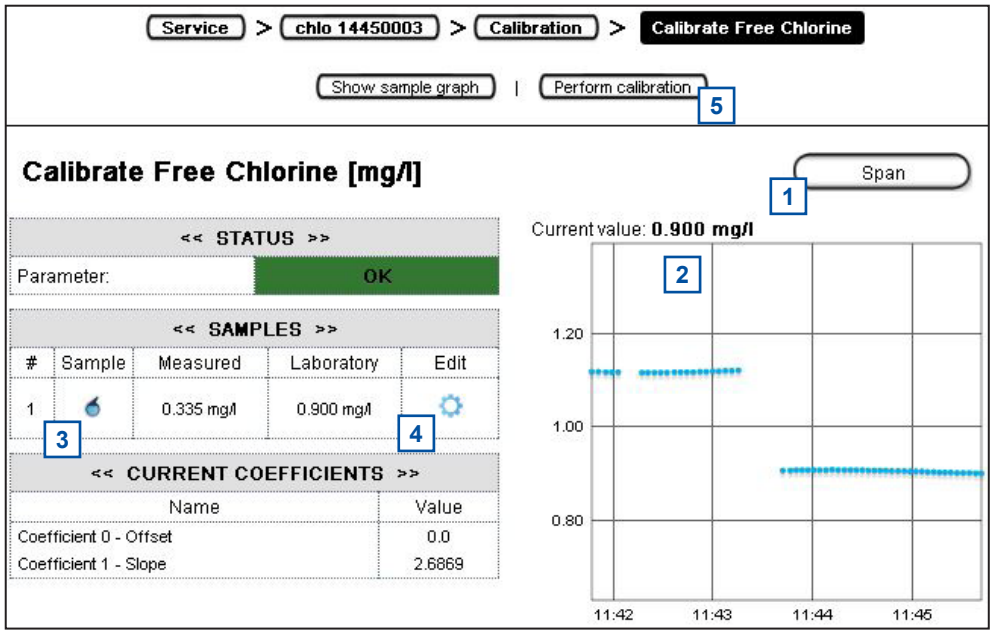
- *Span* — Displays the used slope of the actual calibration. It is not possible to edit this value manually.

### 6.2.3 Calibration using moni::tool

- Click the *Service* tab of the moni::tool screen and logon as *Administrator*.
- Click the icon of the probe / sensor you want to calibrate in the shown system overview.
- Click the icon *Calibrate sensor* in the next screen.
- Now the screen will show a list of all parameters being measured by this probe / sensor (see figure on the right).
- Clicking on the blue triangles will open more information about actual used calibration for this parameter.




- Furthermore a click on the *History* icon rightmost opens a logbook showing all up to now with this con::cube performed calibration procedures.
- Open the calibration screen by clicking on the *Calibrate* icon on the right hand side of the parameter you want to calibrate.




1 This button displays the actual used calibration (*Global* or *Span*). Push this button to select the type of calibration you want to perform (see section 6.1).

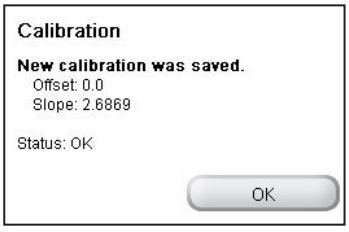
2 Watch the current sensor readings being displayed numerically and graphically on the calibration screen. Wait until readings are stable.

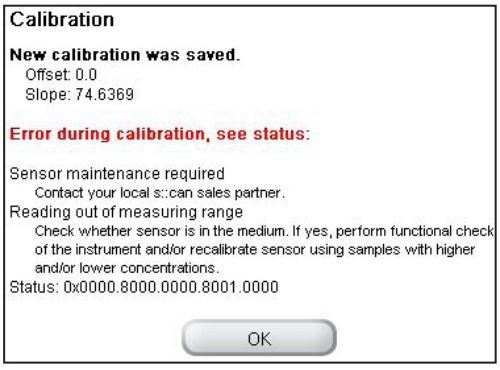
3 Push the *Sample* icon to store the actual reading onto the sensor. Please note that the displayed value is the raw value (mV or nA reading).

4 Push the *Edit* icon to enter the result of the laboratory analysis and store it onto the sensor.

5 Push the button *Perform calibration* to start the calibration procedure.

After the calibration procedure is finished a user message will inform you, if the local calibration was successful. The new calibration coefficients will be displayed also. In case of an error the reason will be displayed as well as possible solutions and the detailed error code.



# 7 Data Management

## 7.1 Data Storage

The following information are stored directly on the sensor:

- Result of slope calibration
- Default slope
- Measured sample used for slope calibration
- Device information (e.g. type, serialnumber, address, please refer to section 10.3)

There is no possibility to store readings onto the sensor itself.

## 7.2 Data Transfer

The measurements are performed on the sensor and the readings are transfered to the controller via the sensor cable using RS485.

## 7.3 Data Visualisation

For visualisation of the sensor readings one of the following s::can controller can be used:

- con::lyte
- con::cube
- con::nect with PC

# 8 Functional Check

A functional check might be required for one of the following reasons:

- Initial startup
- Routine functional check
- Suspicion of monitoring system malfunction
- Modification of monitoring system (e.g. integration of additional sensor or device)
- Change of measuring location

Depending on the application (water composition), the sensors connected and the environmental conditions a regular functional check (weekly to monthly) is recommended. The following sections provide an overview of all the actions that have to be performed to check the monitoring system quickly (see section 8.1), to check the plausibility of the collected readings (see section 8.2) and to check the integrity of a single sensor (see section 8.3).

## 8.1 Check of System / Monitoring Station

| Check | con::lyte | moni::tool / con::cube | What to do if check failed |
|---|---|---|---|
| Power supply controller | Green LED is on?<br>Text is visible on the display? | LED on housing cover is on or at least flashing?<br>moni::tool screen is displayed after touching the screen? | Check power supply of controller.<br>Power off controller for 5 minutes and power on again. |
| System running (up-to-date) | Displayed system time is current and is updated every second? | Click on system clock at the bottom of the screen shows current time and last measurement.<br>Both are current? | Check for displayed error messages.<br>Check if Service mode is acitvated or automatic measurement is paused. |
| System status | No error messages or error symbols are displayed? | LED of con::cube is blue and *Status* icon of moni::tool is not blinking yellow? | See section 10 for Troubleshooting. |
| Reason for bad system status | Check logbook entries since last functional check. | Open *Status* tab and select symbol of affected sensor for more information. | See section 10 for Status- and Errorcodes. |

| Check | Remark |
|---|---|
| Monitoring station (by-pass) | All tubes and fittings are tight and all probes and sensors are supplied with medium?<br>No air bubbles within the tubes? |
| Installation submersed (in-situ) | Mounting equipment of all devices is ok and all probes and sensors are submersed? |
| Data transfer | Check if displayed readings on local controller are equal with displayed readings on customer display system. |

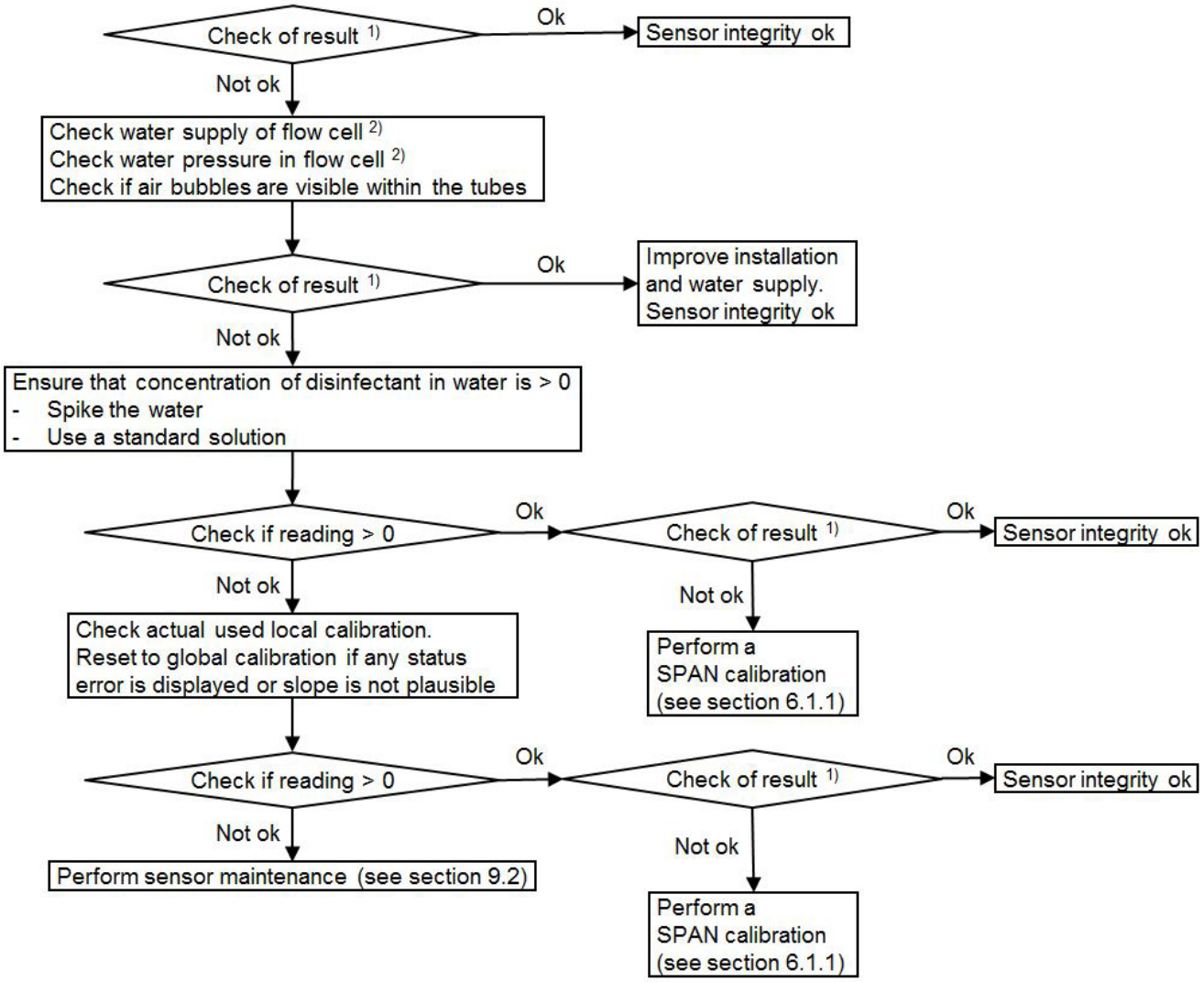
## 8.2 Check of Results

| Check | con::lyte | moni::tool / con::cube | What to do if check failed |
|---|---|---|---|
| Current readings displayed completely | No *NaN* and no dashes (- - - -,- -) or plus sign (++++,++) are displayed. Use arrow buttons to scroll through all displayed parameters. | No *NaN* displayed. | Check if parameter is outside the measuring range. Check parameterdisplay settings (number of digits). |
| Current parameter status of displayed readings | D-31x: Check logbook entries since last functional check. D-320: Parameter name is flashing in case of any error. | Red background for parameter indicates an error or alarm. Grey background indicates reading is not current. | See section 10 for Status- and Errorcodes. D-320: Use menu function *Monitore...* to check actual parameter status. |

| Check | Reason / possible error | Remark |
|---|---|---|
| Up-to-date: Readings actualised on regulary base? | - Measuring interval is too long<br>- Automatic measurement has been stopped manually<br>- Service mode activated | Consider measuring interval and smoothing. |
| Continuity: Check historical data (timeseries) for inter-ruptions or discontinuities | - Change of medium<br>- Local calibration<br>- Maintenance of sensor (cleaning, etc.)<br>- Readings out of range<br>- System failure (loss of power, communication error, etc.) | Only possible if timeseries are availbale. |
| Plausibility: Timeseries look plausible with daily or seasonal fluctuation | - Drift of readings (can be caused by fouling)<br>- Increasing noise (can be caused by flow conditions)<br>- Fixed readings / no fluctuation | Check logbook of plant operator if possible. Refer to section 10 for Troubleshooting. |
| Measuring range: Readings are within the specified and calibrated measuring range? | | Quality of results might be reduced outside the specified range. |
| Accuracy: Difference between laboratory values and readings of the sensor | In case of significant difference a calibration has to be performed (please refer to section 6) | To verify the accuracy of the displayed readings, only a reliable and validated comparison method has to be used. |

## 8.3 Check of Probe - Sensor Integrity

When there is any doubt regarding the integrity of the sensor, please use the following flowchart to check sensor and installation:




1) Use DPD or titration methods for check of real concentration

2) Note the technical specifications in section 12

# 9 Maintenance

Please note that during any cleaning or maintenance activity of the sensor the following important notes have to be obtained:

- Never touch the surface of the membrane, the electrode finger or the gold electrode at the tip of it with your fingers.
- Do not use any acids on the electrode finger, the spacer or the housing.
- Do not power off the sensor for more than 24 hours when it is in operation.
- Do not shake the electrolyte bottle, store it always upside-down and fill the membrane cap slowly to avoid air bubbles within the electrolyte. Air bubbles between gold electrode and membrane will falsify your readings.
- Please note the correct handling of electrolyte bottle during filling, to avoid air bubbles entering the electrolyte (see section 4.2)

## 9.1 Cleaning of Membrane Cap

If the membrane has a coating or is covered with organic material, it can be cleaned with hand warm tap water carefully. If this cleaning procedure will not improve the measurement, the membrane cap and the electrolyte have to be replaced.

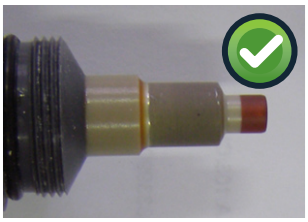
## 9.2 Replacement of Electrolyte and Membrane Cap

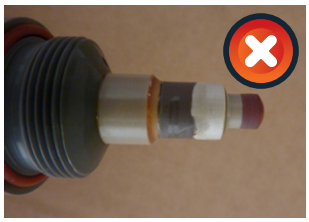
Electrolyte and membrane cap have to be replaced on regular interval. The maintenance interval depends on the sensor type and the measured medium. The typical maintenance intervals are:

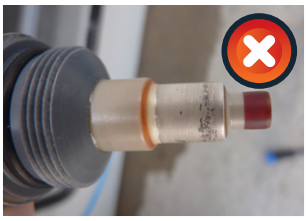
- Replacement of membran cap once per year
- Replacement of electrolyte every 3 - 6 months

In case of troubles outside the scheduled maintenance interval (see section 10) the following step by step procedure is recommended:

- Cleaning of membrane cap (see section 9.1).
- Visual check of the electrode finger (see figures below). If electrode finger looks not ok, please check your application for unexpected aggressive substances.
- Replacement of electrolyte and cleaning of gold electrode (tip of electrode finger), as describes afterwards.
- Replacement of electrolyte and membran cap and cleaning of gold electrode (tip of electrode finger), as described afterwards.







The electrolyte need to be replaced every 3 - 6 months and membrane cap need to be replaced every 12 months. A replacement is also needed if the local calibration failed (see section 6). The replacement is performed by the following steps:

1 Clean the sensor as explained in section 8.1.

2 Unscrew the membrane cap.

3 Empty the used electrolyte.



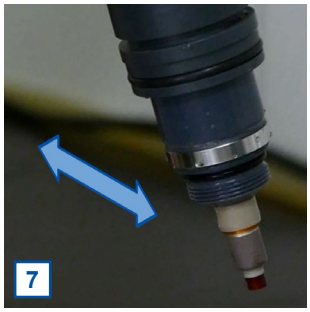
4 Take care not to loose the spacer in case only electrolyte will be replaced.

5 In case the electrolyte has to be changed only, spill the membrane cap and the spacer with clean tap water or distilled water before refilling.



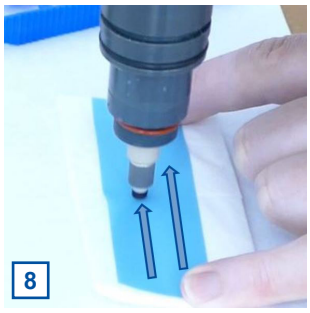
6 Clean the membrane finger with clean tap water or distilled water without touching it directly.

7 Shake excessive water off the electrode finger. Do not use tissues to dry the electrode finger or the inner of the membrane cap.


8 Place the supplied fine polishing paper onto a soft surface (e.g. a paper tissue) and fix it with your fingers. Clean the gold electrode by softly wiping the electrode finger three times over the fine polishing paper. Keep the sensor upright.

9 Perform refilling with electrolyte and fixing of the new membrane cap as explained in section 4.2.2.



# 10 Troubleshooting

## 10.1 Typical Error Pattern

| Error | Reason | Removal |
|---|---|---|
| Drift of readings | ■ Change in the medium | ■ Check measuring medium for plausibility (reference method) |
| | ■ Fouling of the membrane | ■ Check sensor head for cleanliness |
| | ■ Electrolyte aged | ■ Replace electrolyte |
| | ■ Membrane aged | ■ Replace membrane cap |
| Drift of readings after change of electrolyte or membrane cap or after loss of power supply | ■ Sensor not fully conditioned | ■ Condition sensor after recommissioning in the medium (see section 12 for conditioning time) |
| | ■ Medium flow insufficient | ■ Check water supply, check inlet strainer |
| | ■ Membrane not clean | ■ Check membrane cap for cleanliness |
| | ■ Air bubbles in electrolyte | ■ Replace electrolyte |
| | ■ Electrolyte aged (e.g. due to wrong storage conditions) | ■ Use a new bottle of electrolyte and store it correctly |
| Periodical deviation of the readings (outliers of readings) | ■ Periodical fluctuation of pressure | ■ Ensure pressure conditions are stable (use flow restrictor F-45-flow-1) |
| | ■ Attaching and detaching of air bubbles on the membrane | ■ Ensure no air bubbles are within the tubes and flow cells |
| | ■ Periodical fluctuation of flow | ■ Check medium supply and installation |
| Unstable readings (scattering of readings) | ■ Air bubbles on the membrane | ■ Increase flow rate for short time to remove all air bubbles and ensure stable medium flow without bubbles |
| | ■ Air bubbles in the electrolyte | ■ Replace electrolyte and do refilling carefully |
| | ■ Membrane destroyed | ■ Check membrane visually and replace it |
| No response to changes in concentration | ■ No power supply for more that 24 hours | ■ Clean membrane cap and replace electrolyte |
| | ■ Longterm measurement in medium without desinfectant | ■ Store sensor in correct medium and check it again after 20 minutes |
| | ■ Flow too low | ■ Check water supply, check inlet strainer |
| | ■ Electrolyte aged | ■ Perform calibration or replace electrolyte |
| | ■ Membrane aged | ■ Perform calibration or replace membrane cap |
| Measurement results deviate from laboratory results | ■ Cross-sensitivity of the reference method (e.g. ammonium) | ■ Obey limits of the reference method regarding pH and cross sensitivities |
| | ■ Incorrect calibration | ■ Perform calibration again |
| | ■ Different pH value during calibration and measurement | ■ Calibration should be done on the expected mean of the pH value. |
| | ■ Reference method | ■ Be aware that all reference methods are limited in accuracy |
| | ■ Too low or too high flow | ■ Check water flow |
| Sensor cannot be calibrated | ■ Start-up time too short | ■ See section 12 for start-up / conditioning time |
| | ■ No electrolyte in the membrane cap | ■ Perform correct sensor assembly according to manual |
| | ■ Protective cap still on the sensor head | ■ Remove protectice cap from the sensor head |
| | ■ Measurement with reference method performed incorrect | ■ Perform lab measurement according the instruction |
| | ■ Sensor with filled membrane cap without power for longer time | ■ Repeat calibration after 24 hours of operation |

## 10.2 Error Messages and Status Messages

During execution of a measurement the monitoring system (system status), the measuring device itself (device status) and the result (parameter status) will be checked for possible errors and for plausibility. In case of an error (status bit will be set from 0 to 1) a user message will be displayed to the operator.

Depending on the used operation controller these messages will be shown on the display (Menu *Logbook & data* in case of con::lyte D-31x, function *Monitor...* in case of con::lyte D-320, *Status* tab in case of moni::tool and *Show Context Help* and *System-Status* in case of ana::pro) and also stored within the result files or logfiles. Additional to the user message (general error reason and recommendations for removal) the detailled status code will be displayed either in binary form (0000, 0001, 0010, 0011, 0100, etc.) or as a hex number (0x0001, 0x0002, 0x0004, 0x0008, 0x0010, etc).

Up to 16 status bits are used for different errors. If several errors occur at the same time the con::lyte and moni::tool will add up all the status bits. This detailed information might be important if you request s::can support. Below you will find examples how to translate these combined hex codes:

| Hex | Bin | Bits |
|---|---|---|
| 0x8000 | 1000 0000 0000 0000 | b15 |
| 0x8001 | 1000 0000 0000 0001 | b0, b15 |
| 0x4011 | 0100 0000 0001 0001 | b0, b4, b14 |

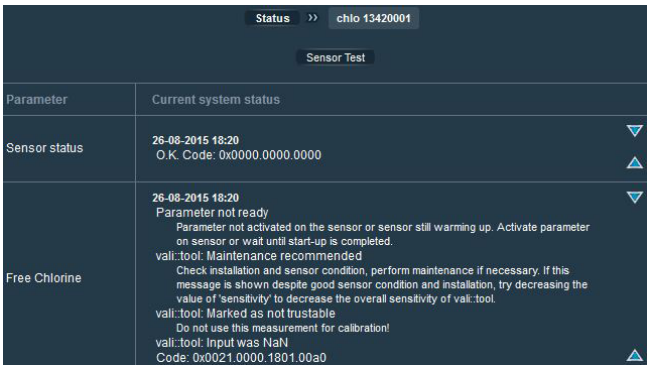
Within moni::tool the complete status code of a simple parameter has the following format: 0xTTTT.SSSS.PPPP.pppp.VVVV.vvvv.

| Code | Status Type | Remark |
|---|---|---|
| 0xTTTT | System status sensor | visible in the second column of all moni::tool parameter result files (e.g. Error 0x0010 or Ok 0x0002) |
| 0xSSSS | Sensor status general | valid for all sensors |
| 0xssss | Sensor status private | valid for respective sensor |
| 0xPPPP | Parameter status general | valid for all parameters |
| 0xpppp | Parameter status private | valid for respective parameter |
| 0xVVVV | vali::tool status general | valid for all clean values of vali::tool software |
| 0xvvvv | vali::tool status private | valid for respective clean values of vali::tool software |

Within the moni::tool *Status* tab of the sensor you will see the system status sensor and the sensor status as clear text and as status code (0xTTTT.SSSS.ssss).

Within the moni::tool *Status* tab of the parameter you will see the parameter status and in case of activated vali::tool the vali::tool status also (0xPPPP.pppp.VVVV.vvvv).

Within the moni::tool results file of the sensor parameter the status (0xTTTT.SSSS.PPPP.pppp) will be stored in the column beside the measured value and the vali::tool status (0xVVVV.vvvv) in the column beside the cleaned value.



The table below shows all errors regarding the operation terminal (system status) when this type of sensor is connected incl. the user message, the reason of the error and notes for troubleshooting. If the error can't be removed although the suggested procedure was executed several times, please contact your s::can sales partner.

| System Status Error 0xTTTT | Display con::lyte (D-31x / D-320) | Message moni::tool | Reason | Removal |
|---|---|---|---|---|
| 0x0001 - b0 | ES007 / COMM! Probe not detected. Check power-supply and connection cable. | No communication between sensor and terminal. | No communication between sensor and operation terminal. Replacement sensor was not installed correctly. | Check sensor cable and connector. Disconnect and reconnect sensor. |
| 0x0002 - b1 | 0002 | Invalid sensor | Sensor serial number has changed. | Connect the previously installed sensor or perform sensor replacement (moni::tool) or new sensor installation (con::lyte). |

The table below shows all errors regarding the used sensor incl. the user message, the reason of the error and notes for trouble shooting. If the error can't be removed although the suggested procedure was executed several times please contact your s::can sales partner.

| Sensor Status Error 0xSSSS | Display con::lyte (D-31x / D-320) | Message moni::tool | Reason | Removal |
|---|---|---|---|---|
| 0x0001 - b0 | ES100 / 0001 Probe reports an error. Call service! Param.Status error. Status Code: .... | General sensor error | Sensor reports error during internal check. At least one internal sensor check failed. | For details see additional status message below. In case no further messages are shown, note the error code and contact your s::can sales partner. |
| 0x0002 - b1 | ES101 / 0002 MISUSE Medium temperature. Take probe out of medium, immediately! | SENSOR MISUSE | Operation outside the specification (e.g. temperature too high). This can damage the device permanently. | Take the sensor out of the medium immediately and check environmental conditions. |
| 0x8000 - b15 | ES115 / 8000 Device maintenance required Code 8000 0000 | Sensor mainentance required | At least one internal sensor check reports a warning. | Perform function check of the sensor according the manual. |

The table below shows all errors regarding the measured parameters incl. the user message, the reason of the error and notes for trouble shooting. If the error can't be removed although the suggested procedure was executed several times please contact your s::can sales partner.

| Parameter Status Error 0xPPPP | Display con::lyte (D-31x / D-320) | Message moni::tool | Reason | Removal |
|---|---|---|---|---|
| 0x0001 - b0 | EP 100 / 0001<br>Status error.<br>Code: 0001.0000<br>Details in following log messages. | General parameter error | At least one internal parameter check failed. | Note additional status message below. If no further message is displayed, note the error code and contact your local s::can sales partner. |
| 0x0002 - b1 | EP 100 / 0002<br>Parameter failure, hardware failure | Parameter error, Hardware error | Electrode signal not ok. An electrode is missing, too old or defect. | Check the electrode or replace the electrode. |
| 0x0004 - b2 | | Parameter error, configuration error | Parameter error, configuration error | Change the local calibration or swirch back to global calibration. |
| 0x0008 - b3 | | Parameter error, Wrong medium | Sensor outside of the medium or in incorrect medium. | Check supply of medium and medium itself. |
| 0x0010 - b4 | EP 100 / 0010<br>Parameter failure, calibration failure | Parameter error, Incorrect calibration | Invalid sensor configuration. At least one calibration coefficient is invalid. | Check readings and lab values.<br>Set back to factory settings. Repeat local calibration. |
| 0x0020 - b5 | EP 100 / 0020 | Parameter not ready | Parameter not activated on the sensor or sensor still warming up. | Activate parameter or wait until sensor is fully operational. |
| 0x8000 - b15 | EP 115 / 8000<br>Out of range<br>Code 8000 0000<br>The parameter is out of measurement range | Reading out of measuring range | Measured parameter is outside the defined measuring range. | Check if sensor is in the medium. Perform functional check. |

The table below shows all errors regarding clean parameters of the vali::tool software incl. the user message, the reason of the error and notes for trouble shooting. If the error can't be removed although the suggested procedure was executed several times please contact your s::can sales partner.

| Parameter Status Error 0xVVVV | Message moni::tool | Reason | Removal |
|---|---|---|---|
| 0x0001 - b0 | vali::tool reports an error | At least one internal check reports a warning. | Check further status messages. |
| 0x0800 - b11 | Maintenance recommended | Parameter check reports a warning. | Check system and sensor, perform functional check. |
| 0x1000 - b12 | Marked as not trustable | Parameter check reports a warning. | Do not use this value for calibration. |

## 10.3 Device Settings

In case detailed sensor information or configuration settings have to be checked, the following sections will explain how to find these information when operating the sensor with a s::can operation controller.

There is no need to modify any device settings of the sensor.

### 10.3.1 Check of Device Settings using con::lyte D-31x

The main menu entry *Information* of the con::lyte operation software enables you to check internal sensor settings. After selecting the parameter of your interest by pushing the *Enter* button the display will show the *upper limit* and the *lower limit* of the selected parameter.

| CLD [mg/l] | |
|---|---|
| Upper limit: | 2.000 |
| Lower limit: | 0.000 |
| Span: | 0.000 |
| Probe | |

When confirming the lowest entry *Probe* with *Enter* all internal settings of the sensor will be displayed. The most important are:

- Internal sensor identifier (*M-Version* and *Model*)
- Sensor name (e.g. *chlodi::lyser*)
- Serialnumber of the sensor (*S/N*)
- Hardware version of the sensor (*H/W-Version*)
- Software version of the sensor (*S/W-Version*)

### 10.3.2 Check of Device Settings using con::lyte D-320

Select the entry *Manage sensors...* in the main menu of the status screen. Select the name *chlodi::lyser/0/1* in the list of installed sensors, in which the second number (*1*) indicates the address assigned to the sensor. After confirming the entry *Configure...* as well as the entry *Probesettings* in the next view the following information of the sensor will be displayed:

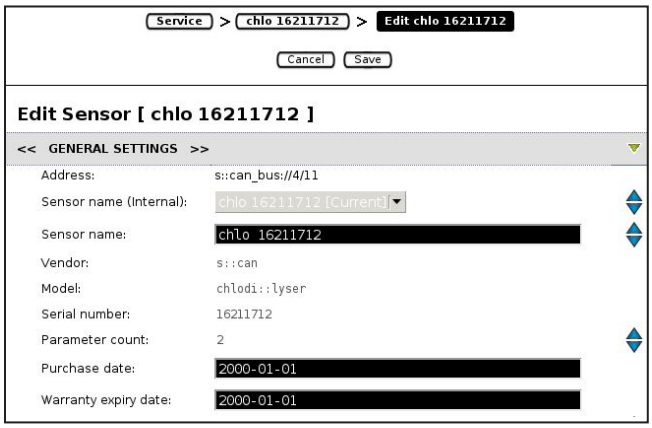
- Internal sensor identifier (*M-Version* and *Model*)
- Sensor name (e.g. *chlodi::lyser*)
- Serialnumber of the sensor (*S/N*)
- Hardware version of the sensor (*H/W-Version*)
- Software version of the sensor (*S/W-Version*)

| P1/CLD | |
|---|---|
| Sen.: | chlodi::lyser |
| Name: | CLD |
| Unit: | mg/l |
| Disp. Format: | 3 |
| P. lower: | 0,0000 |
| P. upper: | 2,0000 |
| Al. lower: | ----,--- |
| Al. upper: | ----,--- |

Information of the single measuring parameter can be retrieved via the entry *Parameter info...* from the main menu of the parameter display. In addition to parameter name (*Name*), unit of measurement (*Unit*) the number of decimal places (*Disp. Format*), also the lower and upper limit of the parameter range (*P. lower* / *P. upper*) and the adjusted alarm range (*Al. lower* / *Al. upper*) is displayed.

### 10.3.3 Check of Device Settings using moni::tool

Selecting *Service / chlo / Edit chlo* will list up internal settings of the chlori::lyser. Depending on the *Service Level* some or all of the following information will be displayed:

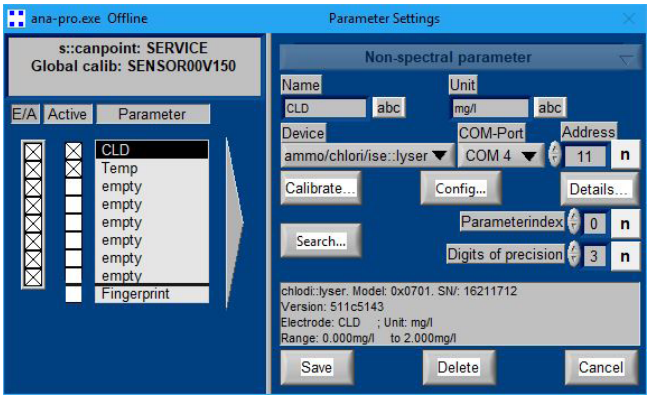



- Interface (COM-port, *Address*) of the sensor
- *Sensor name (Internal)* allocated to the device. Should not be changed by the operator.
- *Sensor name* for the display allocated to the device by the operator at installation.
- Manufacturer name of the sensor (*Vendor*)
- Type of the sensor (*Model*)
- Serial number of the sensor (*Serial Number*)
- Number of internal parameters of the sensor (*Parameter count*)
- Information regarding the purchase (*Purchase date*, *Warranty expiry date*). Can be entered by the operator at initial start-up.
- Actual hardware and software version of the sensor (*HW Version* *SW Version*)
- Internal type number of the sensor (*Sensor Model*) and information regarding cleaning and logging (not available for this sensor)
- Information regarding the installation and last modification of the sensor (date, name and reason)

### 10.3.4 Check of Device Settings using ana::pro

In the operating - and service software ana::pro the sensor can be initialised over the menu item *Parameter / Settings*. In case the parameters of interest are not yet displayed by default in the Parameter Settings window, they can be selected as follows:

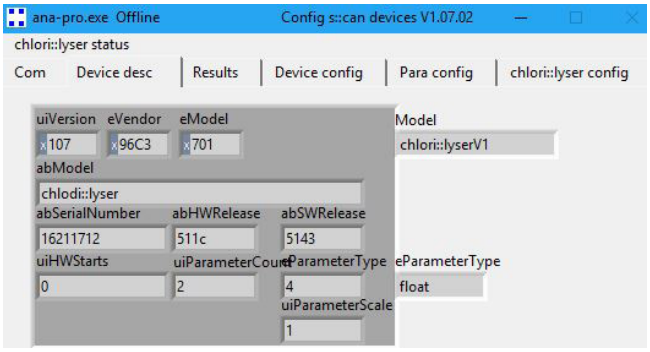
- Double click on the parameter field that you want to correspond with the parameter to be displayed.
- After double clicking, the window will enlarge and show detailed information belonging to this parameter.
- Select *Non-spectral parameter* in the upper selection bar.
- Select *ammo/chlori/ise::lyser* under *Device*.
- The *COM-Port* is the interface to which the chlori::lyser is connected (e.g. COM-Port of the con::nect).
- Enter the address allocated to the sensor in the RS485 network in the entry *Address.*
- Push the button *Search…* (when an incorrect COM-Port and / or sensor address are selected, the *Search…* function will still find the sensor if only one instrument is connected).



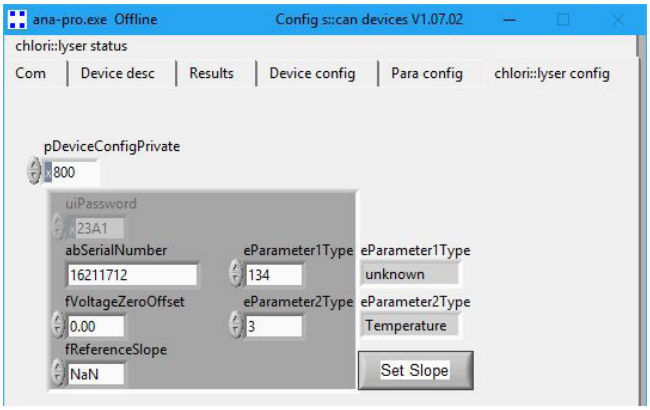

As soon as the sensor has been detected, information will be shown in the grey text field in the lower part of the dialogue window (model and serial number, version, electrodes and measuring range).

Now the internal settings of the sensor can be checked, but this should be done by s::can Service or after instruction from s::can only.

- Push button *Config...* in menu *Parameter / Settings*.
- Push button *Search...* in register card *Com*. As soon as the sensor will be detected, the checkbox (*status source*) in the lower right corner switches to ok (green check mark) and further register cards become visible.
- In register card *Device desc* the sensor type (*abModel*), the serial number of the sensor (*abSerialNumber*), the actual hardware (*abHWRelease*) and software (*abSWRelease*) are displayed.

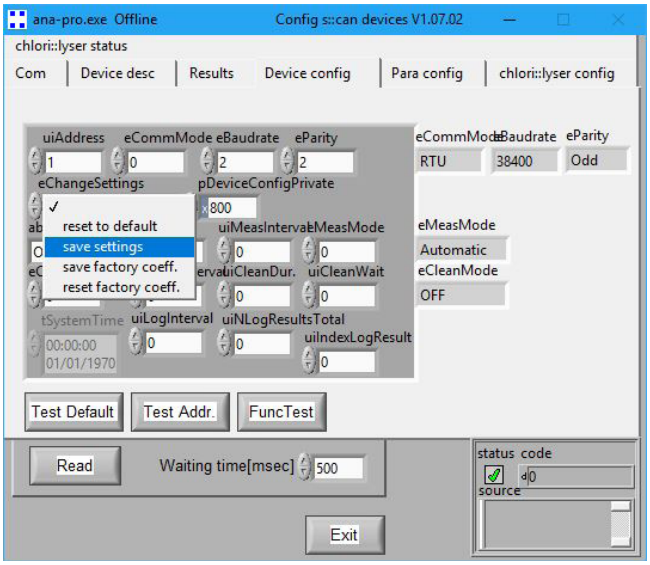



- In register card *chlori::lyser config* the reference slope (*fReferenceSlope*) is displayed. This entry should be set to NaN.
- You can finish the configuration menu by pushing the button *Exit*.




In case the sensor address has to be changed manually, this can be done within the register card *Device config*. The new address has to be entered in the field *uiAddress* and then the entry *save settings* has to be selected in the field *eChangeSettings* (see figure on the right).

After address modification please restart the sensor (unplug and replug) and check if new address was saved correctly on the sensor.




## 10.4 Return Consignment (RMA)

Return consignments of the s::can monitoring system, or parts of the system, shall be done in a packaging that protects the device (original packaging or protective covering if possible). Before returning a consignment, you have to contact your s::can sales partner or s::can customer support (support@s-can.at). An RMA number will be assigned for each device, independent if the reason of the return consignment is service, repair or demo equipment.

RMA numbers can be requested from the s::can Costomer Portal available on the s::can homepage directly. Return consignments without an RMA number will not be accepted. The customer always has to bear the costs for return consignment.

# 11 Accessories

## 11.1 Installation

### 11.1.1 Connection Cable

For operation of the sensor a connection cable is necessary. This is included in the standard order.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | C-1-010-sensor | |
| Cable lenght | 1 m | |
| Assembling | ex works | |
| Dimensions plug | 20 mm | outer diameter |
| Material | PU | Cable sheathing |
| Housing environment rating | IP 68 | |
| Interface connection | IP 67, RS 485, 12 VDC | to s::can sensors |

### 11.1.2 Extension Cable

The cable of the sensor can be elongated when necessary with an extension cable (10 m or 20 m length). The extension cable is attached using the sensor cable connector plug.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | C-210-sensor<br>C-220-sensor | |
| Cable lenght | 10 m<br>20 m | C-210-sensor<br>C-220-sensor |
| Assembling | ex works | |
| Dimensions plug | 20 mm | outer diameter |
| Material | PU | Cable sheathing |
| Housing environment rating | IP 68 | |
| Interface connection | IP 67, RS 485, 12 VDC | to s::can sensors |

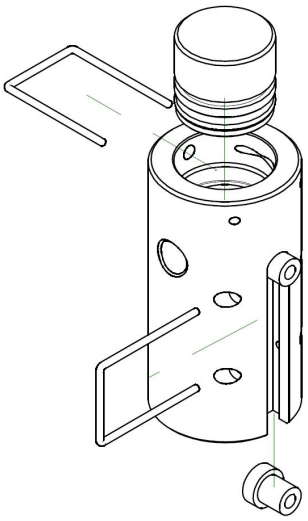
### 11.1.3 Sensor Mounting

For proper and easy submersed installation of the sensor a separate sensor carrier is available. This part can be fixed to the sensor directly and can be extended by a pipe (to be provided by the customer).

| Name | Specification | Remark |
|---|---|---|
| Part-no. | F-12-sensor | |
| Material | PVC, stainless steel | |
| Dimensions | 60 / 91 mm | Diameter / height |
| Weight | approx. 150 g | |
| Process connection | DN 50 inside | for extension pipe |
| Installation / mounting | submersed | |

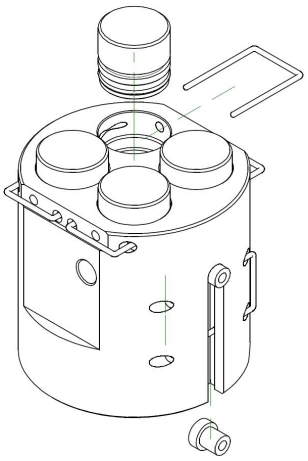
 

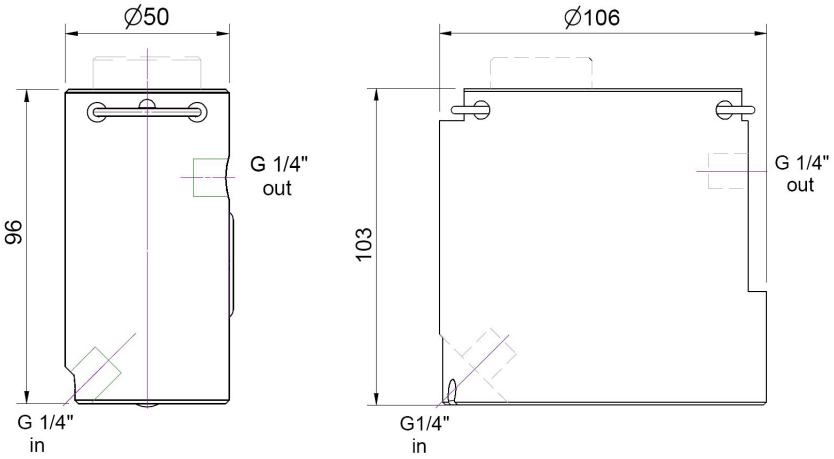
### 11.1.4 Flow Cell Setup Tap Water



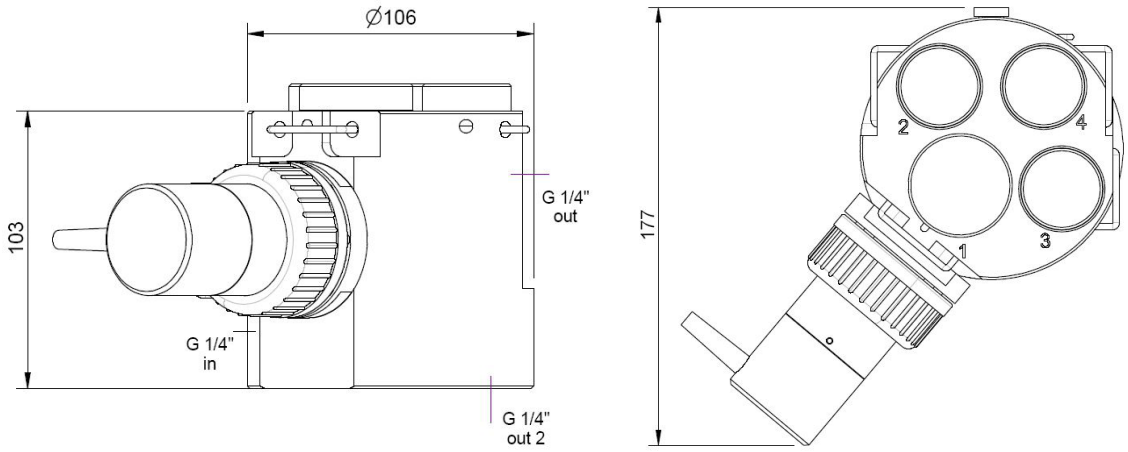
For recommended standard installation of the sensor outside the medium, different types of flow cells are available.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | F-45-sensor<br>F-45-four<br>F-46-four-iscan | for one single sensor<br>for up to four sensors<br>for one i::scan and up to three sensors |
| Housing material | POM-C | |
| Dimensions | F-45-sensor: 50 / 96 mm<br>F-45-four: 106 / 103 mm<br>F-46-four-iscan:106/103mm | Diameter / lenght<br><br>177/103 mm with autobrush |
| Weight | F-45-sensor: ~ 0,25 kg<br>F-45-four: ~ 1.0 kg<br>F-46-four-iscan: ~ 1.0 kg | <br><br>without autobrush |
| Process connection | $^1/_4$ inch inside | for inlet and outlet |
| Installation | flow-through | |
| Mounting | 2 mounting holders | |
| Operating temperature | 0 to 50 °C (32 to 122 °F) | |
| Operating pressure | 0 to 6 bar (0 to 87 psi) | |






Dimension of flow cell setup in mm (F-45-sensor left side, F-45-four right side)

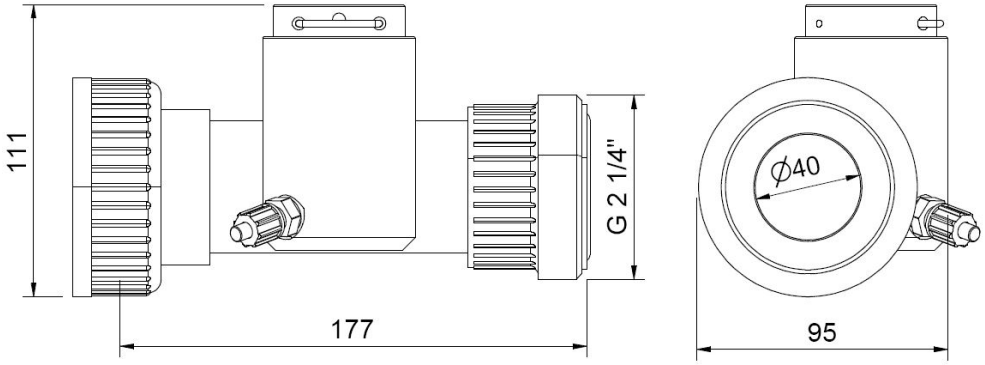



Dimension of flow cell setup in mm (F-46-four-iscan)

### 11.1.5 Flow Cell Setup Waste Water

For measurement of a waste / raw water sample stream outside the medium with chlori::lyser E-507-x-0xx a separate flow –through installation is available.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | F-48-sensor | for one single sensor |
| Housing material | PVC | |
| Dimensions | 177 / 95 / 111 mm | W / H / D |
| Weight | ~ 0,5 kg | |
| Process connection | 1 inch inside (G 1“)<br>40 mm ID | via F-48-process<br>direct connection to G 1“ |
| Installation | flow-through (by-pass) | |
| Discharge | < 40 l/min | recommended |
| Operating temperature | 0 to 50 °C (32 to 122 °F) | |
| Operating pressure | 0 to 6 bar (0 to 87 psi) | |




Dimension of flow cell setup in mm (F-48-sensor)

### 11.1.6 System Panel micro::station / nano::station

For easy attachment of a complete s::can monitoring system (s::can operation terminal, flow cell setup, sensor) different types of separate system panels are available. The process connections of these panels can be ordered in DIN standard (EU) or in National Pipe Standard (US).

| Name | Specification | Remark |
|---|---|---|
| Part-no. | F-501-eco-xx<br>F-506-panel-xx<br>F-508-panel | Main paneel micro::station<br>Main panel nano::station<br>Waste water panel |
| Material | PP<br>PE | F-501, F-508<br>F-506 |
| Dimensions<br>W / H / D | 450 / 750 / 10 mm<br>280 / 750 / 10 mm<br>375 / 690 / 10 mm (per part) | F-501-eco<br>F-506-panel<br>F-508-panel (2 parts) |
| Weight | ~ 4.9 kg | |

## 11.2 Spare Parts

### 11.2.1 Electrolyte

For maintenance of the sensors the electrolyte to fill up the membrane cap is available as spare part. Different types of electrolyte have to be used for the different types of sensors.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | E-508-1/2-El<br>E-509-1/2-El<br>E-515-1/2-EL | for chlodi::lyser E-508-x<br>for hyper::lyser E-509-x<br>for peroxy::lyser E-515-x |
| Volume | 100 ml | approx. 5 times refilling |
| Storage duration | | check date of expiry |
| Storage temperature | 10 to 35 °C (50 to 95 °F) | |

### 11.2.2 Membrane Cap

For maintenance of the sensors the replaceable membrane cap is available as spare part. Different types of membrane caps have to be used for the different types of sensors.

| Name | Specification | Remark |
|---|---|---|
| Part-no. | E-508-1/2-SET<br>E-509-1/2-SET<br>E-515-1/2-SET | for chlodi::lyser E-508-x<br>for hyper::lyser E-509-x<br>for peroxy::lyser E-515-x |
| Scope of delivery | Membrane cap (1 pcs)<br>Spacer (1 pcs)<br>Polishing paper<br>Tweezers<br>O-ring | |
| Volume membrane cap | approx. 8 ml Electrolyte | |
| Storage note | | only new caps or cleaned caps with max. 24 operating hours can be stored |

# 12 Technical Specifications

| Name | chlodi::lyser E-508-x | hyper::lyser E-509-x | peroxy::lyser E-515-x | Remark |
|---|---|---|---|---|
| Measuring parameter | Chlorine dioxide (CLD), Temperature | Hydrogen peroxide (HYP), Temperature | Peracetic acid (PAA), Temperature | |
| Measuring range | E-508-1: 0 - 2 mg/l<br>E-508-2: 0 - 20 mg/l | E-509-1: 0 - 200 mg/l<br>E-509-2: 0-2000 mg/l | E-515-1: 0 - 200 mg/l<br>E-515-2: 0-2000 mg/l | |
| Measuring principle | amperometric 2 electrode sensor, membrane covered | | | |
| Compensation | Temperature | Temperature | Temperature | |
| Resolution | E-508-1: 0.001 mg/l<br>E-508-2: 0.01 mg/l | E-509-1: 0.1 mg/l<br>E-509-2: 1 mg/l | E-515-1: 0.1 mg/l<br>E-515-2: 1 mg/l | |
| Accuracy | E-508-1:<br>+/- 0.02 at 0.4<br>+/- 0.02 at 1.6<br>E-508-2:<br>+/- 0.02 at 1.5 | E-509-1:<br>+/- 4 at 40<br>+/- 4 at 160<br>E-509-2:<br>+/- 10 at 400<br>+/- 40 at 1600 | E-515-1:<br>+/- 4 at 40<br>+/- 4 at 160<br>E-515-2:<br>+/- 10 at 400<br>+/- 40 at 1600 | in [mg/l] after calibration in drinking water at 25°C and pH 7.2 |
| Response time ($T_{90}$) | 1 min | 8 min | 5 min at 10°C (50 °F)<br>1.5 min at 45°C (113 °F) | |
| Running in time (start up) | 1 h | 3 h | E-515-1: 3 h<br>E-515-2: 1 h | |
| Operating temperature | 0 - 50 °C (32 - 122 °F) | 0 - 45 °C (32 - 113 °F) | 0 - 45 °C (32 - 113 °F) | |
| Operating pressure | 0 to 1 bar (0 to 14.5 psi) | 0 to 1 bar (0 to 14.5 psi) | 0 to 1 bar (0 to 14.5 psi) | no pressure peaks and / or pressure fluctuation |
| Operating discharge / flow (recommended) | 15 - 30 l/h | 15 - 30 l/h | 15 - 30 l/h | low discharge dependency |
| Operating pH range | 2 - 11 | 2 - 11 | 1 - 6<br>> 6: peracetic anion present that cannot be measured | |
| Cross sensitivity | $O_3$: 25 times higher than $ClO_2$ | $O_3$, $Cl_2$ and PAA must not be present. Sulfide poisons membrane. Aqueous solution with Phenolic > 3% destroys membrane. | $O_3$: reading 2500 times increased<br>$ClO_2$: 100 % | |
| No cross sensitivity to | HOCl | | $H_2O_2$ | |
| Absence of disinfectant | max. 24 h | max. 24 h | max. 24 h | biofilm will clog membrane |

| Name | chlodi::lyser E-508-x, hyper::lyser E-509-x and peroxy::lyser E-515-x | Remark |
|---|---|---|
| Power supply | 9 to 30 VDC | power supply and output signal galvanically isolated |
| Power consumption | 0.5 W (typ) | |
| Dimension | 35 x 208 mm | |
| Weight | 150 g | |
| Housing material | PVC-U, stainless steel 1.4571 | |
| Interface connection | sys plug (IP 67), RS 485 to controller unit CU 382 | |
| Sensor cable length | 1.0 m (plug connector on top of sensor) | |
| Sensor cable specification | PUR (polyurethane jacket), 22 AWG, 6.3 mm (outside diameter); -30 to 80 °C (-22 to 176 °F) | |
| Sensor cable assignment | Pin 1: Data - (green cable strand)<br>Pin 2: Data + (pink cable strand)<br>Pin 3: +12 VDC (red cable strand)<br>Pin 4: Ground (black cable strand)<br>Pin 5: not used<br>Pin 6: Shielding (blank cable strand) | |
| Environment rating | IP 67 (due to connection plug on sensor) | |
| Installation | in flow cell | |
| Storage temperature | Sensor: 0 to 45 °C (32 to 113 °F)<br>Electrolyte: 10 to 35 °C (50 to 95 °F) | frost free<br>in original bottle |
| Storage of sensor | dry, without electrolyte and cleaned membrane cap only | with protective cap to avoid contamination of membrane |
| Typical lifespan (application) | Membrane: 12 months<br>Electrolyte: 3 - 6 months | depending on medium |
| Typical lifespan (storage) | 1 - 2 years for electrolyte in original bottle, protected from sun light | check date of expiry on package |
| Conformity - EMC | EN 61326-1:2013<br>EN 61326-2-3:2013 | |

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