s::can
A Badger Meter® Brand

Manual

con::lyte D-320

October 2022 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 operation 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 ducument.

Each term in this document that is marked _italic and underlined_, can be found on the display of your controller 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 and all information and figures contained therein are copyrighted. All rights (publishing, reproduction, printing, translation, storage) are reserved by s::can GmbH. Each reproduction or utilisation outside the permitted limits of the copyright law is not allowed without previous written consent from s::can GmbH. The reproduction of product names, registered trade names, designation of goods etc. in this manual does not imply that these names can be used freely by everyone; often these are registered trade marks, even if they are not marked as such.

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 website (www.s-can.at).
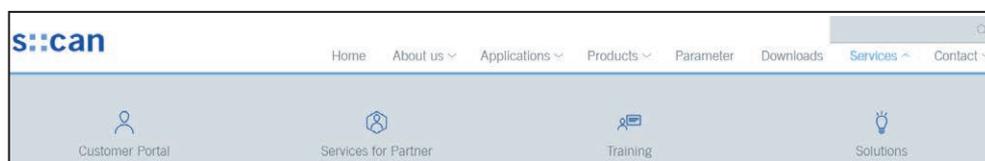
2   Safety Guidelines

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 terms and conditions.

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.

3   Technical Description

3.1   Intended Use

The con::lyte is a terminal for on-line operation of one spectrometer probe and / or several sensors. It ensures power supply and user interaction with all connected probes and sensors, display and transfer of the monitored parameters and operation of the automatic cleaning devices. Optional an integrated data logger and several control functions (e.g. PID-controller) are available.

The type and number of probes and sensors that can be operated by one con::lyte, depends on the type (see section 3.3).

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 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 described 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 con::lyte is equipped with a display and can be operated via the 7 buttons on the front panel of the device. The operating software starts automatically when the con::lyte is powered on. The con::lyte collects readings from all probes and sensors using a digital bus connection. It displays the data and enables further purposes (e.g. control function, transfer).

3.3   Product

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

Type	Specification
D-320-ECO-230	con::lyte for up to 2 parameters of one sensor with wide range AC power supply
D-320-PRO1-230	con::lyte for up to 6 parameters of several sensors with wide range AC power supply
D-320-PRO2-230	con::lyte for up to 6 parameters of one spectrometer probe and several sensors with wide range AC power supply
D-319-OUT-MA	Module for 2 additional analog outputs
D-320-OUT-MA	License to enable up to 3 internal analog outputs
D-319-OUT-PROFIBUS	Module for Profibus output
D-319-OUT-MODBUS	License for Modbus RTU
D-320-PID	License to enable up to 3 PID controller
D-319-LOGGER	License to enable the internal data logger

The device is identified by a type label, as displayed below, that contains the following information:

- Manufacturer's name and country of origin
- Several certification marks
- Device name (con::lyte)
- Bar code
- Device serial number (S/N)
- Information on power supply
- Environment rating (IP)
- Acceptable humidity limits
- Acceptable temperature limits
- Item number (Type)
- QR code

s::can Made in AUSTRIA

s::can GmbH
Brigittagasse 22-24, A-1200

con::lyte

100 - 240 VAC ~
50/60Hz, 25W
IP65, 5 - 90% RH
non condensing, -20 - 50°C
Type:
D-320-pro2-230

S/N: 16253408

The figures below display the general dimensions of the con::lyte in [mm]:

alternative Montage auf
35mm DIN Tragschiene
(Montageclips sind beigelegt)

*alternative mounting on
35mm DIN rail
(mountin clips included)*

The figures below display the main parts of the con::lyte (all three types):

1	Clip to open housing cover
2	Control LED (green = powered; yellow = communication)
3	USB connector for data download, software update
4	Display
5	Operating buttons
6	Screw to open terminal compartment
7	Cover of terminal compartment
8	Cable glands
9	Connector for s::can probes or sensors
10	Connector for s::can spectrometer probe

D-320-PRO2-230

D-320-ECO-230

D-320-PRO-1

www.s-can.at
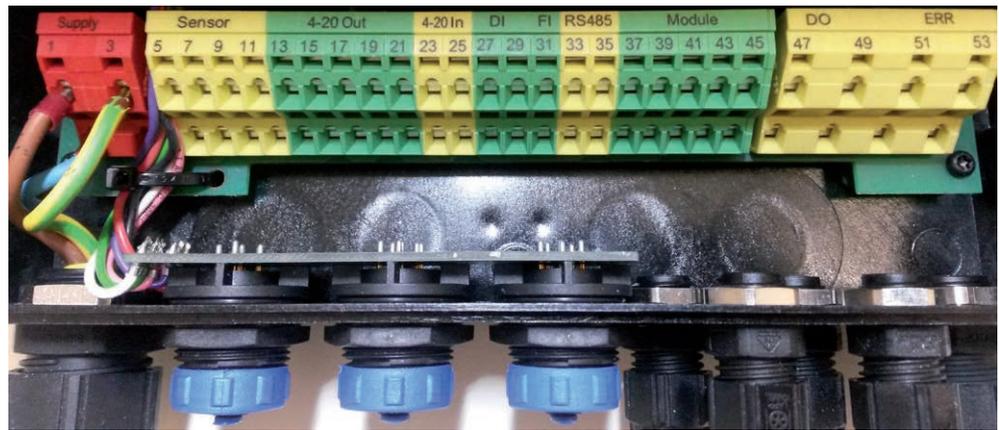
Terminal connections for D-320

3.4 Storage, Transport and Disposal

The temperature and humidity limits for device storage and transport, which are described in the section technical specifications, are 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.

Transport should be done in a packaging that protects the device (original packaging 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 con::lyte (part-no. D-320-xxx-230)
- ■ s::can manual con::lyte (part-no. S-46-M)

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

- ■ Cleaning valves (part-no. B-44)
- ■ Cable for power supply (part-no. C-31-xx)
- ■ Distribution box (part-no. C-41-HUB)

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 con::lyte is designed according to environmental protection rating IP65 and is resistant against effects of the weather , like heavy rain or splash water (only in case of the housing cover is securely closed). Nevertheless, please avoid extreme conditions (e.g. excessive heat, strong electromagnetic fields, corroding chemicals, mechanical loads, vibrations).

⚠️ Enclosure class IP65 protection is only guaranteed if the terminal compartment cover and the transparent housing cover are correctly sealed and closed and the appropriate cable glands or dummy caps fitted tightly. Any damage caused by intrusion of water will not be covered by the warranty.

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 s::can monitoring system to operate properly.

Installation site:

■ Easy accessibility (mounting, sampling, functional check, demounting)

■ Availability of sufficient space (probe / sensor, installation fitting, controller for operation, etc.)

■ Adherence to limit values (see technical specifications located at the end of this manual)

■ Best possible weather and splash water proof set-up

Infrastructure (energy, data and compressed air):

■ Power supply for controller for operation (operational reliability, voltage, power, peak free)

■ Oil- and particle free compressed-air supply (optional for automatic probe / sensor cleaning)

■ Shortest possible distances between system components (probe – 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   Mounting

For mounting and electrical installation the following tools and materials are necessary:

- Phillips screw driver (size 2) to open cable terminal compartment
- Small screw driver (max. 3 mm) for wiring on cable terminals
- Power supply cable (C-31-xx, if required)
- Stripping tool for power supply line
- Cable end sleeves and crimper
- Torx wrench key (size TX 10) to remove front panel (for optional replacement of internal I/O modules)
- 1 hook for fastening the con::lyte on the wall (if required)
- 2 screws (M5) for fastening the con::lyte on the wall (if required)
- 2 mounting clips for fastening the con::lyte on a top hat DIN-rail (if required)

The con::lyte can be mounted quickly and easily onto a flat wall using one of the following methods (see figures on the right also):

- Fixing onto a hook using the opening [1] centric on top of the backside
- Fixing with 2 screws (max. M5, not included in delivery) on both sides on bottom of the con::lyte [2].
- Fixing onto a DIN-rail (35mm top-hat rail) [3]. The two mounting clips (included in delivery) [4] have to be fasten onto the middle of the backside. The con::lyte can be placed on the top hat DIN-rail and the mounting clips have to be turned into horizontal position (see figures on the right). The distance between the upper edge of the housing to the mid of the DIN-rail is 62 mm.

For the correct dimensioning and space required for mounting please refer to the figure below as well as the figure in section 3.3 and the technical specifications.

⚠️ Please note that approx. 3 cm of space are left on both sides of the con::lyte to enable easy opening and closing of the housing cover.
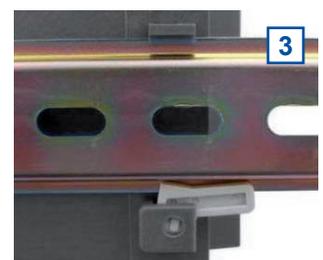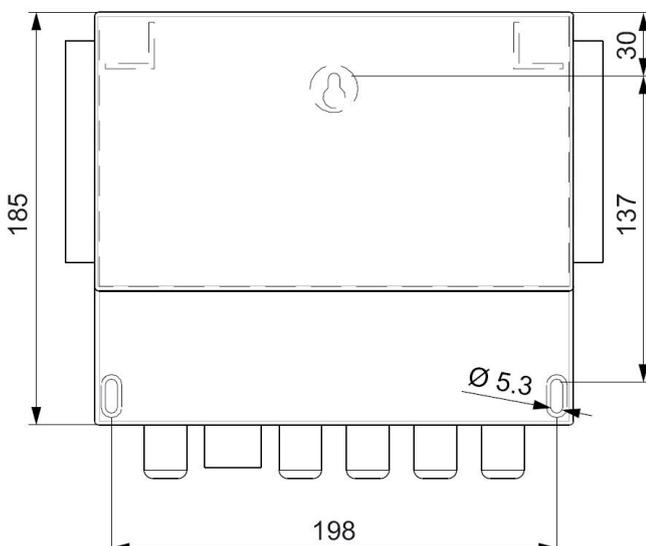
5   Initial Startup

Once mounting and installation of the con::lyte have been completed and checked (see section 4) the initial star-
tup of the s::can monitoring system will require the following actions, in the order presented below:

- Connect the s::can probes and sensors (see section 5.2).
- Connect the cleaning devices to the proper terminal connections in the cable terminal compartment (see
  section 5.3).
- Connect of optional devices used for the s::can nano::station or micro::station, e.g. flow detector F-
  45-ALARM or pressure sensor F-500-P (see section 5.4).
- Establish main power supply to the con::lyte (see section 5.5).
- Select language and start probe initialisation of monitoring station (see section 5.6 and 5.7).
- Configure the measurement and cleaning settings (see section 6.3.3 and 6.3.4).
- Check whether the cleaning system works properly.
- Connection and parameterisation of data transfer when desired.
- Configuration of controller and alarms when desired (see section 6.5).

5.1   Plan of Terminal Connections

Once the cover has been opened (two phillips head screws removed) you have
access to the cable terminal compartment of the con::lyte.

⚠ Opening of the cable terminal compartment of the con::lyte must be car-
ried out by authorised persons only (see section 2) and after disconnecting
the power supply!

The con::lyte is equipped with spring terminals that enable quick and easy wiring.

1   Insert a small screwdriver into the slot above the cable clamp you want
to connect.

2   Move the screwdriver upwards, which opens the cable clamp and insert
the wire.

3   Move the screwdriver downwards and remove it. Now wire is locked in
the cable clamp.

s::can recommends to use wires with isolated end sleeves for power supply and
data transfer.
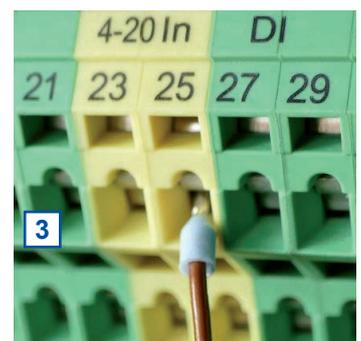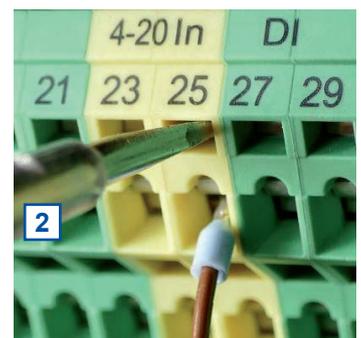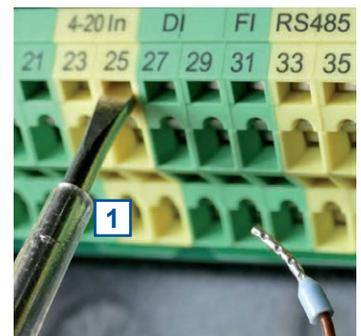
In case the con::lyte is equipped with additional modules (see section 11.3.1 and 11.3.2) or datatransfer via Modbus RTU is used, the correct wiring is displayed in the table below.

■ Connection of mA-out module:

Module / Slot	Connection	Terminal-no.	Connection	Terminal-no.
D-319-OUT-MA / Slot 1	+ mA out 1	37	- mA out 1	38
	+ mA out 2	39	- mA out 2	40
D-319-OUT-MA / Slot 2	+ mA out 1	43	- mA out 1	44
	+ mA out 2	45	- mA out 2	46

■ Connection of Profibus module:

Module / Slot	Connection	Terminal-no.	Pin no. of Sub-D9 plug
D-319-ProfibusDP / Slot 1	GND	37	5
	+ 5V	38	6
	PB -	39	8
	PB +	40	3

■ Connection datatransfer RS485:

Module / Slot	Connection	Terminal-no.
RS485 Data -	A -	33
RS485 Data +	B +	34
Ground		36

⏚ **Protective earth**   ⏛ **Functional earth**   ⏚ **Circuit ground**
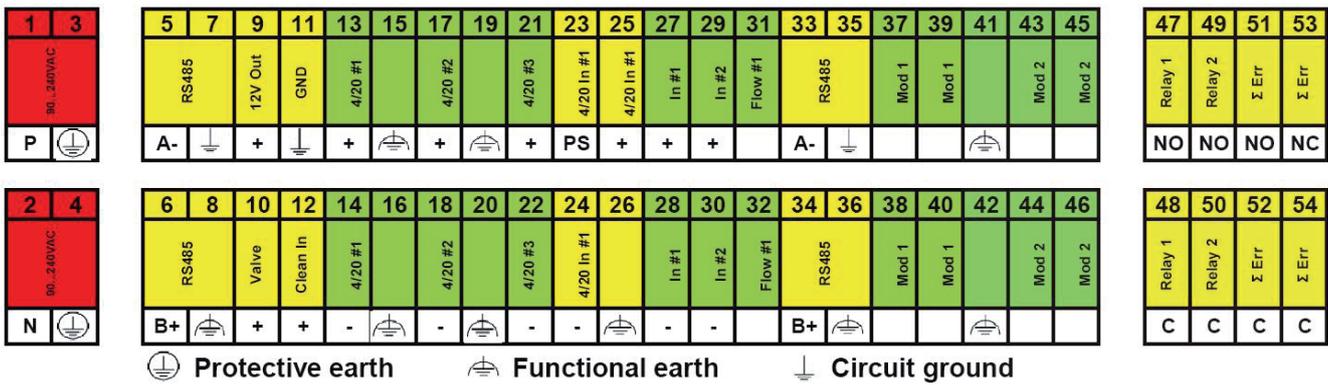
Plan of cable terminal connections for con::lyte D-320-xxx-230

5.2   Connection of s::can Probes and Sensors

All s::can probes and sensors can be connected to the con::lyte using the sys plug connectors, which are marked with no.9 in the figure of section 3.3. Depending on the con::lyte type, different number of sys plug connectors are available. If necessary, the distribution box (B-41-HUB) has to be used to increase the number of plugs.

On con::lyte D-320-PRO2-230 an s::can spectrometer probe can be connected to the external connector for spectrometer probes marked with no.10 in the figure of section 3.3. When connecting an s::can spectrometer probe V3 the connection cable C-32-V3 has to be used.

Before connecting the probes or sensors, ensure that the sensor plug and connector on the con::lyte are dry and clean. Otherwise communication errors and / or device damage might occur. Connectors not in use should always be covered with the protective cap.

5.3   Connection of Cleaning Devices

For the automatic cleaning of the probe and sensors connected, the cleaning devices have to be wired to the con::lyte within the cable terminal compartment. Depending on the type and amount of cleaning devices, different ways of wiring are possible. The first cleaning device can be wired directly to the appropriate terminals. The second cleaning device has to be operated via a digital relay output (*Relay 1* or *Relay 2*). The table on the right displays the different possibilities of connection.

Device	Colour of wire	Labeling	Terminal no.
1st cleaning valve	Blue	Valve +	10
	Brown	GND	11
2nd cleaning valve - relay 1	Blue	Relay 1 NO	47
	Brown	GND	11
	Terminals *+ 12V Out* and *Relay 1 C* have to be connected with a seperate wire		9 <---> 48
Autobrush	Black (brown [1])	GND	11
	Red (white [1])	+ 12V Out	9
	Purple (yellow [1])	Valve +	10
ruck::sack	Black (brown [1])	GND	11
	Red (white [1])	+ 12V Out	9
	Purple (yellow [1])	Valve +	10

[1]   previous / alternatively used cable version

Once the cleaning device has been electrically connected, the cleaning process needs to be configured within the operating software (please refer to section 6.3.3).

The cleaning devices will be triggered from the con::lyte directly. If needed, the cleaning device can be triggered from external using the terminal no. 12. This possibility is not possible when using a con::lyte D-320-PRO2.

5.4   Connection of Optional Station Devices

The optional ordered station devices (e.g. s::can flow detector F-45-ALARM, s::can pressure sensor F-500-P) can be wired to the con::lyte as explained in the table on the right.

Device	Colour of wire	Labeling	Terminal no.
Flow detector	Black	Flow #1	31
	Black	Flow #1	32
Pressure sensor	Blue	4/20 In #1 PS	23
	Brown	12V Out	9
	Terminals *GND* and *4/20 In #1-* have to be connected with a seperate wire		11 <---> 24

5.5   Connection of Main Power Supply

⚠   This type of work must be performed by authorised persons only (see section 2)!

The con::lyte has to be connected to the appropriate power supply. The connection of power supply must be done with an earthed conductor wire (PE - „protective earth")!

Connection of power supply for con::lyte D-320-xxx-230	
Terminal no / Labelling	Assignment
1 / P	Conductor or phase, resp.
2 / N	Neutral wire
3 or 4	Protective earth

The power supply earth (PE) has to be done properly according to the corresponding norms / standards with a max. resistance between earth grounding of power supply and site's earth grounding of 0.1 OHM.

Process medium (e.g. waste water) must be connected to the same earth ground with less than 0.5 Ohm.

⚠ A switch or circuit-breaker must be included in the power supply. It must be suitable located and easily reachable. It must be marked as a disconnecting device for the monitoring equipment.

5.6   Starting up of Operation Software

Once the con::lyte is connected to the power supply (see section 5.5), it will display the s::can logo for a few seconds while starting up. If the con::lyte starts up the first time, it will start with the selection of the language as displayed on the right. Select the needed language with the _Up_ and _Down_ button and push the _OK_ button afterwards.

```
Select language...
English
Deutsch
Francais
China
Nederlands
Espanol
Polski
Italiano
Suomi
Türke
```
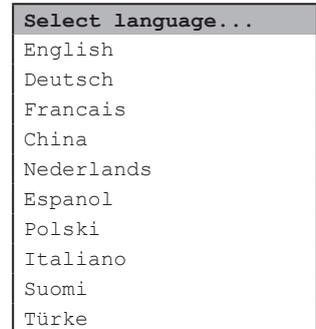
5.7   Probe and Sensor Initialisation

At the initial start-up the con::lyte 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. Please refer to section 6.3.1 if a single sensor needs to be initialized manually.

```
Add s::can sensor...
Please connect all
sensors and press
OK to continue...
```
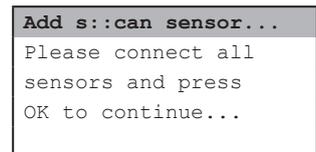
⚠ When connecting a spectrometer V3 please wait until the LED ring of the probe stops flashing before starting the initialisation process.

5.8   Parameter Initialisation

Once the automatic probe and sensor installation is finished, the con::lyte switches to the parameter display. The display will only show the reading of the flow sensor, which is always installed by default. Push the _Left_ button to switch to the _Status_ display. Then push the _Function_ button to open the _Setup_ menu and select _Manage sensors..._ to install the needed parameter. Please refer to section 6.3.2 for more details.

```
<   P1/1 Flow    >
          Flow
▶     0
```
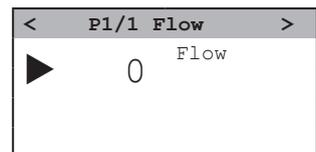
6   Operation of con::lyte

6.1   Operating Buttons

An LCD display and 7 operating buttons are available for operation of the con::lyte. Within this section the general function of the operating buttons are explained.

Back button
- Leaves the current menu

_Up_ button
- Moves one line upwards (the selected line has a triangle as first character)
- Increases values

Function button
- Enters the settings menus
- Disables / deletes values

Left button
- Moves left in views or values

_Ok_ button
- Enters the selected menu
- Confirms the selected line or value
- Confirms alarms in the alarm screen
- Opens quick parameter calibration

Right button
- Moves right in views or values

Down button
- Moves one line downwards (the selected line has a triangle as first character)
- Decreases values

6.2   Main Screens

The con::lyte has five different main views (_Service mode_, _Status_, _Parameter_, _Controller_, _Alarm_) which can be selected by using the _Right_- and _Left_-button. The default screen (i.e. after restart) is the _Parameter_ screen.
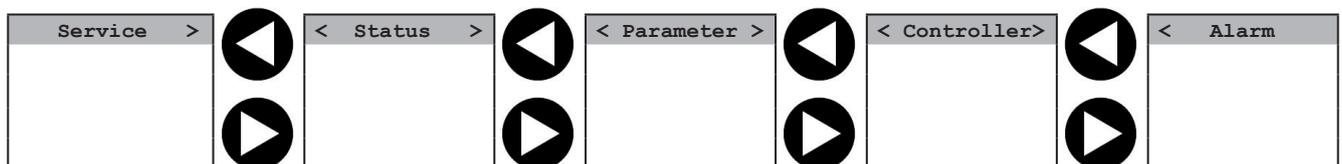
Pushing the *Function* button or the *OK* button in one of the main views provides direct access to different options. Pushing the *Back* button several times (depends on the level of setting sub menu) will always bring you back to one of the main screens.The information and figure below provide a general overview of the most important screens and the navigation between the different screens.

◎   Pushing the *Function* button in one of the five main screens will have the following effect:

- ■ Service mode   No effect
- ■ Status   Opens general setup menu (see section 6.3)
- ■ Parameter   Opens general parameter menu (see section 6.4)
- ■ Controller   Opens general controller menu (see section 6.5)
- ■ Alarm   No effect

OK   Pushing the *OK* button in one of the five main screens will have the following effect:

- ■ Service mode   Activates the service mode (see section 6.2.1)
- ■ Status   No effect
- ■ Parameter   Opens the quick calibration menu (see section 6.2.3)
- ■ Controller   Activates manual setpoint modification (see section 6.5.1)
- ■ Alarm   Confirms pending alarm messages

P1/NH4-N	< C1/3 NH4-N >	no alarms
Lab 1: 5.62 Sample 1: -78.11 Perform Calibration	M 20%	No alarms pending

OK   **OK**   **OK**

Service >	< Status >	< P1/2 NH4-N >	< C1/3 NH4-N >	< A1/1 AP001

Timeout [min]: 20
Outputs: update
Enter service mode
	Version : V7.12B1
	Serial : 12345678
	Waiting : 7s
	2016/Jul/1909:26:23
		2.05 NH4-N
		         ppm
		18.7 Temp.
		         °C
			▶ 5%
			
			NH4-N ??? > DigOut2
			AV/SP 8.01 / 4.00
				2016/Oct/28 14:22:0
				NH4-N above
				upper alarm limit

OK   ◎ ↩   ◎ ↩   ◎ ↩

Service (-)	Setup	P1/NH4-N	C1 settings...
Trigger measurement Trigger cleaning Leave service mode	Manage sensors... Cleaning 1... Cleaning 2... Meas. settings... Date/Time... MODBUS slave... Update software... Select language... Service... License...	Calibrate expert... Monitor... Display settings... Alarm settings... Output: xxxOut #1 Output settings... Parameter info... Move up Move down Remove parameter	Type: None

All displayed menu entries, that will end with 3 dots (e.g. *Cleaning 1...*) will open a new screen, where further submenus or configuration settings will be available.

6.2.1   Service Screen

The most left screen contains all menues that are needed for service or maintenance activities. Before you activate the service mode by confirming the entry _Enter service mode_, you can change the _timeout_ (between 20 and 120 minutes) and the status of the outputs during the service mode is active.

```
Service              >
Timeout [min]:      20
Outputs:        update
Enter service mode
```

- ■ _update_   Outputs are following the parameter or controller
- ■ _hold_   Outputs stay unchanged like actual status
- ■ _force_   Outputs behaviour is the same like during reading is NaN (error)

```
Service (-)          >
Trigger measurement
Trigger cleaning
Leave service mode
```
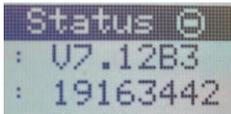
As long as the _Service mode_ is active, no measurements will be performed. A specific symbol (circle with white bar) in the header line of all screens will indicate that the monitoring system is in _Service mode_. Using the entries _Trigger measurement_ and _Trigger cleaning_ enables the operator to start a single measurement or single cleaning procedur manually. The _Service mode_ can be finished by confirming the entry _Leave service mode_ or will end automatically after a certain time (_Timeout_), if no actions are performed on the screen.

6.2.2   Status Screen

The first row displays the version of the software. In case you need to contact s::can customer support, the _Status screen_ enables the operator to easily identify the software version (_Version_) and the serial number (_Serial_) of the actual con::lyte.

```
Status               >
Version    :   V7.12B1
Serial     :  12345678
Waiting    :        7s
2016/Jul/19  09:26:23
```

The third row displays the actual action performed by the con::lyte (_Waiting_, _Cleaning_ or _Measuring_) and the remaining time until the next action will start. The duration of each action can be set via menu _Meas. Settings…_ in the _General Setup_ view (see section 6.3.3).

The last row (_YYYY/MM/DD_) displays current date and time. This can be used to check if the device is working in general. The date and time can be set via menu _Date/Time..._ in _General Setup_ (see section 6.3.4).

Pushing the _Function_ button within the _Status_ screen will open the _Setup_ menu (see section 6.3).

6.2.3   Parameter Screen and Quick Calibration Option

This is the default screen and it displays two measured values at once. In addition to the reading, the parameter name (_NH4-N_) and unit (_ppm_) is displayed. The inverted font in the header (_P1/2 NH4-N_) displays the selected parameter which is marked with a triangle symbol on the left side of the screen. To scroll through the list of configured parameters, use _Up-_ and _Down_ buttons. Depending on the device type, up to 6 parameters can be configured and therefore displayed. These displayed parameters can be:

```
< v    P1/2 NH4-N    >
 2.05         NH4-N
              ppm
18.7          Temp.
              °C
```

- ■ Probe or sensor reading
- ■ Analog input reading
- ■ Digital input reading
- ■ Flow guard status

Pushing the _Function_ button within the _Parameter_ screen will open the menu to change parameter settings.

Pushing the *Ok* button within the *Parameter* screen will open the quick calibration menu. Within this menu a simple calibration (offset) can be performed for the related parameter.

The value that should be used for local calibration (e.g. validated result of the laboratory analysis) has to be entered as *Lab 1*. To store the sensor raw value of the actual displayed parameter reading at the time when the sample is taken, the entry *Sample 1* has to be selected and *OK* button has to be pushed. As soon as both values needed for quick calibration have been entered, the calibration can be executed by selecting *Perform Calibration* and pushing the *OK* button. The quick calibration menu will be closed and the new calibration coefficient will be used for measurement.

```
P1/NH4-N
Lab 1:           5.62
Sample 1:      -78.11
Perform Calibration
```

Please refer to section 6.4.1 for further details regarding local calibration of a parameter.

6.2.4   Controller Screen

This screen is only visible if the license for the con::lyte controller function is activated (see section 6.3.6). Up to 3 controllers can be configured and therefore displayed. Besides the actual controller output value, several information about the actual status of the controller are displayed. The typical displays differs, depending which type of controller - *PID* (Proportional-Integral-Derivate) or *2-P* (2 point) - is activated.

The first row represents the output of the controller. The unit of the output is %. The controller status is symolized in front of the value. If the controller is running (controller activated) a black triangle is visible, if the controller is stopped (controller deactivated) the symbol switches to a black rectangle. In addition *M* is displayed, if the controller output was fixed manually by pushing the *OK* button.

```
<    C2/3 NH4-N    >
▶  M 15%
NH4-N  > 4/20mA #2
AV/SP:2.8/3.0(ext.)
```

To adjust the output by hand, the *OK* button has to be pushed. The font of the output value will get inverted and with *Up-* and *Down* buttons the value can be set. To accept a value push *OK* button again. Now the type of the controller will change to *Hand*. To go back to automatic controll, the *OK* button has to be pushed again. To clear the manual value of the output, the *Function* button has to be pushed. That will change the value to ---. Confirming this with *OK* button, will get the controller back to *2-P* or *PID* mode.

Please refer to section 6.5 for more information what can cause the controller to stop.

The second row displays the input parameter used for controller (e.g. *NH4-N*) and the confirgured output of the controller (e.g. *4/20 mA #2*). Please refer to section 6.5.1 for more information regarding possible inputs and outputs.

The third row displays the actual value of the parameter reading (*AV*) of the chosen parameter and the setpoint (*SP*) for the controller. The additional information *ext.* or *man.* indicates if the source for the setpoint is external or manually configurable.

The screen displayed on the right hand side above, indicates controller 2 (*C2*) with *15 %* output. The controller type is Proportional-Integral-Derivate (*PID*) and it is running; used input for controlling is parameter *NH4-N* and output is analog output *4/20mA #2*. The actual value for NH4-N is 2.8 and the setpoint for the controller is 3.0, the source for the sepoint is external.

6.2.5   Alarm Screen

This screen displays all messages of the configured alarm limits or alarm parameter.

```
<    A1/1  AP002      !
2016/Aug/08  13:20:00
NH4-N     above
upper alarm limit
```

The header displays the amount of alarms and the number of the selected alarm. The first row displays date and time the alarm has occurred the first time. In the following rows the alarm text is displayed.

```
no alarms

No alarms pending
```
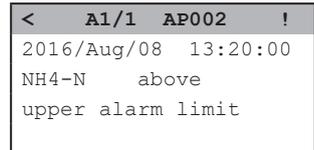
Pending alarms can be confirmed by pushing the _OK_ button. If the reason for the occurrence of the alarm is still present, a new alarm will be generated immediately after the next measuring cycle.
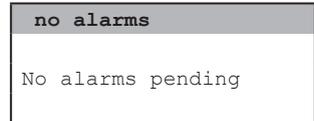
6.3   General Setup Menu of Status Screen

Pushing the _Function_ button while the con::lyte displays the _Status_ screen, will open up the general _Setup_ screen. Within this screen several menus are available to configure the monitoring station. A short overview of all menu entries is listed below and more detailed explanation of the important menus can be found in the following sub sections.

```
Setup
Manage sensors...
Cleaning 1...
Cleaning 2...
Meas. settings...
Date/Time...
MODBUS slave...
Update software...
Select language...
Service...
License...
```

■ _Manage sensors…_ Within this menu new probes, sensors or devices can be installed (_Add sensor..._, see section 6.3.1). Once the measuring device is installed it can be configured (_Configure..._), further parameters of the device can be installed (_Add parameter..._) or the complete device can be deleted (_Remove_). All these possibilities will be explained in section 6.3.2.

■ _Cleaning 1 / 2…_   Cleaning devices for the installed probes and sensors can be configured here (see section 6.3.3).

■ _Meas. Settings…_   In this submenu the interval of the automatic measurement can be set in seconds. Further settings are available (see section 6.3.4).

■ _Date/Time..._   In this submenu date and time of the internal device clock (system time) can be adjusted (see section 6.3.5).

■ _MODBUS slave…_   If the con::lyte is equipped with a modbus license and used as Modbus slave, the Modbus settings can be configured in this submenu (see section 6.3.6).

■ _Update software…_ Selecting this menu will initialize a software update of the con::lyte via the USB port (see section 6.3.7).

■ _Select language..._ In this submenu the operating language can be chosen (see section 5.6).

■ _Service..._   Selecting this menu gives access to additional submenus, which should be used by Service personal only. Therefore the menu is protected by a password (_Access code_, see section 10.3).

■ _License..._   Selecting this menu will provide an overview of the actual functionality of the con::lyte (see section 6.3.8).
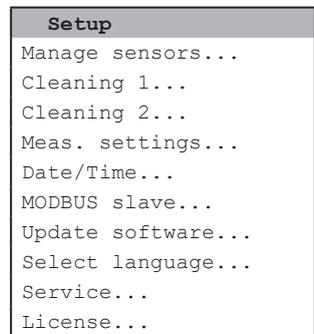
6.3.1 Installation of Probes, Sensors or Input Modules -
[*Status / Manage sensors / Add sensor...*]

A new probe, sensor or measuring device can be added to the con::lyte within the general *Setup* screen by selecting the entry *Add sensor…* with *Up-* and *Down* buttons and pushing the *OK* button. In the next screen all installed devices are displayed. The last entry (*Add sensor...)* has to be selected and confirmed with *OK* button. In the next screen the type of measuring device has to be selected.

```
Add new Sensor
Add 0/4-20mA...
Add digital in...
Add s::can sensor...
```
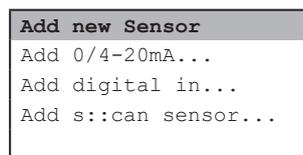
For all s::can probes or sensors connected via a plug to the con::lyte, the entry *Add s::can sensor…* has to be selected. As soon as the entry is confirmed by pushing the *OK* button, the con::lyte will automatically search the Modbus port for a new sensor and will add the new sensor to the sensor list.

```
Add s::can Sensor...
Searching    17/20
F: chlori::lyser/0/9
A: chlori::lyser/0/9
```
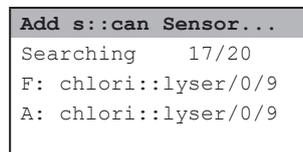
Select *Add 0/4-20mA…* to add an analog sensor. A digital sensor can be added by selecting *Add digital in...* . After confirming your selection with the *OK* button, the con::lyte will install the input modul and the text *ADDED!* is displayed in the header line. If the modul is already installed, the text *EXISTS!* is displayed. Please refer to section 6.3.2 for how to configure these imput modules.

```
Add s::can Sensor...
Done. Press OK...
Added sensors:     1
Replaced sensors:  0
```
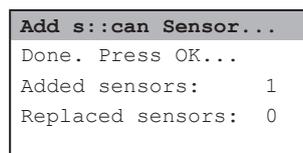
After installation is finished the new probe or sensor will be added to the sensor list. Now the single parameter can be added manually (see section 6.3.2 and menu *Add parameters...*). In case the installation failed, the message *Error adding!* will be displayed.

6.3.2 Configuration of Probe, Sensor or Parameter -
[*Status / Manage sensors...*]

All available sensors (e.g. *spectro::lyser*, *chlori::lyser*) and configured input devices (digital or analog) are listed within the *Manage sensors* screen. Pushing the *OK* button on a selected sensor or device will open up the configuration menu (*Sensor configuration*) for this device. Depending on the device type, different entries are available.

```
Manage sensors
flow switch
spectro::lyser/0/1
chlori::lyser/0/9
0/4-20mA #1
digital in #1
Add sensor...
```
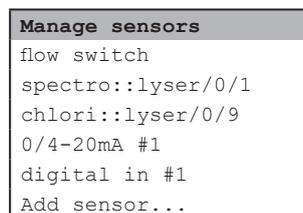
■   *Status / Manage sensors / Configure...*   Depending on the selected sensor different configuration settings will be displayed.

```
Sensor configuration
Configure...
Add parameters...
Remove
```
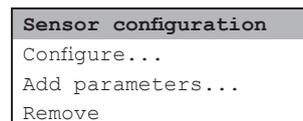
For the configuration of an i::scan or a spectrometer probe, the specific menu items *Execute check!* (for starting the functional check) and *Set reference zero* (for performing a new zero reference in clean distilled water) can be selected by pushing the *OK* button.

```
Conf spectro::lyser
Execute check!
Set reference zero
Global calibration
Probesettings
```
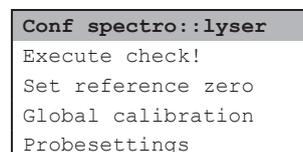
For changing the used global calibration of a spectrometer probe, the menu item *Global calibration* can be used. This option is not available for spectrometer probes V3. To change the global calibration of a V3 probe the software lo::Tool has to be used.

For all connected s::can probes and sensors the internal configuration (*Probesettings*) will be displayed as information by pushing the *OK* button.

For the configuration of a sensor connected via analog input module, the device type (*Type*) can be defined either *0-20mA* or *4-20mA*.

```
Sensor configuration
Type:           4-20mA

```

For the configuration of a sensor connected via digital input module, the device type (*Type*) can be defined either *State* or *Count*. The result for a digital *State* input will be 1 or 0 depending on the polarization of the digital input. With the setting *Invert pol.* the polarization of the digital input can be changed. The result of a digital *Count* input are the summed up digital pulses within a certain time interval. This *Interval* can be defined in seconds [s] between 0 and 600.

```
Configure Input
Type:         State
Invert.pol.:    No

```

```
Configure Input
Type:         Count
Interval [s]:   60

```

■ *Status / Manage sensors / Add parameters...*

New parameters of the selected sensor / device can be added to the parameter screen and therefore can be used as input for one of the controllers.

```
Add para. ADDED!
Add NH4-N
Add K
Add pH
Add Temp.
```

After confirming the entry *Add parameters...* by pushing the *OK* button, all parameters measured by the selected sensor or device will be displayed. Select the parameter that needs to be added with the *Up-* and *Down* button (e.g. *Add Temp.*) and push the *OK* button afterwards. The con::lyte will confirm your selection by displaying *ADDED!* in the header line. In case the selected parameter is already displayed, the con::lyte will display the message *EXISTS!* in the header line.

■ *Status / Manage sensors / Remove*

Confirming this menu entry by pushing the *OK* button will remove the selected sensor and also the parameters which were provided by this sensor. If an input of a controller is linked to this sensor or parameter, the controller will be deactivated.

⚠ Please note that the *Remove* option will remove the sensor or device itself and therfore all parameters. Refer to section 6.4.8 how single parameters can be removed from the display screen. In case you have removed the complete sensor, you have to install it again with the menu *Add sensor...* (see section 6.3.1).

⚠ To change the position or sequence of the displayed parameters please refer to section 6.4.7.

6.3.3 Configuration of Cleaning Interval - [_Status / Cleaning..._]

In the _Cleaning_ menu a connected cleaning device (e.g. cleaning valve, autobrush) can be configured. _Cleaning 1_ is available by default and related to the terminals 9 to 12. _Cleaning 2_ can be configured in addition and triggers either _Relay 1_ or _Relay 2_. Please refer to section 3.6 for how to wire the cleaning devices correctly.

Within the configuration screen for the cleaning device the following settings can be made:

■ _Interval_ Time between two cleaning cycles in seconds. The longest interval is 30.000. The shortest possible cleaning interval is the measuring cycle itself (cleaning before each measurement).

■ _Duration_ Time the cleaning device is active (e.g. valve open or autobrush rotating) in seconds. The duration can be set between 0 and 60.

■ _Wait_ Waiting time in seconds between end of cleaning process and start of next action (either second cleaning cylce or measurement itself). The time can be set between 0 and 600.

■ _Output_ Defines the digital relay that can be used to connect the cleaning device (only needed for _Cleaning 2_).

■ _Clean now!_ Cleaning device will start operation as soon as this entry is confirmed by pushing the _OK_ button. The cleaning will be activated permanently until it is deactivated by pushing the _Ok_ button again (_Cleaning off_).

```
Cleaning 2...
Interval [s]:      360
Duration [s]:        3
Wait [s]:           20
Output:     DigOUT #1
Clean now!
```

If both cleaning outputs are activated, the cycle will start with _Cleaning 1_ (Duration 1 + Waiting 1) followed by _Cleaning 2_ (Duration 2 + Waitung 2) and finally the measurement (_Measuring_) itself. After the measurement is finished, there will be no action until the next measurement cycle starts.

6.3.4 Configuration of Measuring Interval - [_Status / Meas. settings..._]

Within the submenu of the measurement settings (_Meas. settings..._) four settings can be made:

■ _Interval_ The interval of the automatic measurement can be set between 1s (_1_) and 1hour (_3600_). The value has to be entered in seconds. The minimal possible interval depends on the used probes and sensors and the settings for the automatic cleaning.

■ _Average_ When setting a value > 1 the displayed parameter value is a moving average of the actual and the previous measurements (smoothing). Values up to 10 can be entered, by default this value is set to 1 (no smoothing).

```
Meas. settings
Interval:           60
Average:             3
Log.Interval:        1
Use Fahrenheit:     No
Ignore limits:      No
```

■ _Log.Interval_ With this setting the number of stored readings can be reduced.For example: If _Interval_ is set to 30 and _Log.Interval_ is set to 10 a reading will be stored every 5 minutes. Values up to 60 can be entered, by default this value is set to 1 (all readings are stored).

■ _Use Fahrenheit_ When switching this setting from _No_ (default) to _Yes_, all Temperature readings will be displayed in unit Fahrenheit instead of °Cel.

■ _Ignore limits_ When switching this setting from _No_ (default) to _Yes_, limits for analog outputs etc. can be configured outside the measuring range of the sensor also. This function is needed in case of ammo::lyser quite often.

6.3.5   Configuration of System Date and Time - [*Status / Date/Time...*]

The actual date and time displayed in the main *Status* screen can be changed within the submenu *Date/Time...* . The single settings can be selected with *Up-* and *Down* buttons (triangle on the left side of the screen) and pushing the *Ok* button. Now the cursor is visible on the right side of the selected entry and the modification can be performed using the *Up-* , *Down-*, *Left-* and *Right* button. Finaly the modification has to be confirmed by pushing the *Ok* button.

```
Date/Time
Year       :   2016
Month      :   Nov
Day        :   3
Hour       :   14
Minute     :   56
```

6.3.6   Configuration of Modbus Slave - [*Status / MODBUS slave...*]

If the con::lyte is equipped with a Modbus license, the device can be used as a Modbus slave. Within the submenu *MODBUS slave...* the communication settings for the RS485 bus can be defined. The resolution of the transfered parameter readings is fixed to 2 decimal places.

- ■ *Address*   The address for the con::lyte can be set between *1* and *247*. Each device must have a unique address within the Modbus environment.
- ■ *Parity*   The parity can be set to *Odd*, *Even* or *None*.
- ■ *Baudrate*   The baudrate can be set to *57600*, *38400*, *19200* or *9600*.

```
MODBUS slave
Address:          1
Parity:         Odd
Baudrate:     38400
```

⚠ Two stopbits must be used when the parity is set to *none*. For parity *odd* or *even* 1 stopbit is sufficent.

6.3.7   Software Update - [*Status / Update software...*]

With this menu entry an update of the operating software can be started. First push the Function button. Then plug in a USB stick (FAT/FAT32) with the new operating software (*image.hex*) and the update will start automatically.

```
Update software
Press FUNC key and
keep pressed!
```

```
s::can Loader 1.3
Waiting for USB...
Press OK for Reset
```

⚠ Alternatively the USB stick can be plugged in directly and the menu entry for software update can be selected from the menu list which will pop up automatically (see section 7.2). In addition there is the possibility to reboot the con::lyte with pressed *function* button to enter the software update menu directly.

6.3.8   License - [*Status / License...*]

⚠ Each con::lyte is equipped with an individual license. The available features will be displayed on the screen when selecting the entry *License...* and pushing the *OK* button. If additional features are needed, note the serial number of your con::lyte and contact your local s::can Sales Partner regarding a license upgrade.

The name of the license file has to be *license.txt* and shall not be renamed.

```
Available licenses
Number of para.:    6
4-20mA inputs:      1
4-20mA outputs:     3
PID control:        3
MODBUS slave:     Yes
Datalogger:       Yes
```

6.4 General Menu of Parameter Screen

Pushing the _Function_ button while the con::lyte displays the parameter screen, will open up the parameter setup screen of the selected parameter. Within this screen several menus are available to calibrate, check, configure or remove this parameter. A short overview of all menu entries is listed below and a more detailed explanation of the important menus can be found in the following sub sections.

```
P1/abc
Calibrate expert...
Monitor...
Display settings...
Alarm settings...
Output:     xxxOut #1
Output settings...
Parameter info...
pH compensation...
Move up
Move down
Remove parameter
```

- _Calibrate expert…_   In this submenu a parameter can be calibrated using all calibration options supoported by this sensor (see section 6.4.1).

⚠ A quick calibration can be performed by pushing the _OK_ button directly in the parameter screen (see section 6.2.3). This option is not supported by all sensors.

- _Monitor…_   This submenu displays the raw value and the status of the parameter and the sensor (see section 6.4.2).

- _Display settings…_   In this submenu the display of the parameter in the parameter screen can be configured (see section 6.4.3).

- _Alarm settings…_   In this submenu the alarm thresholds for the parameter can be configured (see section 6.4.4).

- _Output_   Within this submenu the parameter value can be allocated to a digital output relay (_DigOut #1_ or _DigOut #2_) or an mA output relay (_4-20 mA #1_).

- _Output settings…_   In this submenu the allocated digital output relay for the parameter can be configured (see section 6.4.5).

- _Parameter info…_   This submenu displays several information of the selected parameter (see section 6.4.6).

- _pH compensation…_   This submenu is only visible in case of chlori::lyser installed. Possible settings are _Manual_ (with entering a fixed value), _Auto_ (with selection of parameter used for compensation) or _Disabled_.

- _Move up / Move down_   These two submenus enable a quick change of the parameter display sequence (see section 6.4.7).

- _Remove parameter_   Within this submenu the selected parameter can be removed by pushing the _OK_ button (see section 6.4.8).
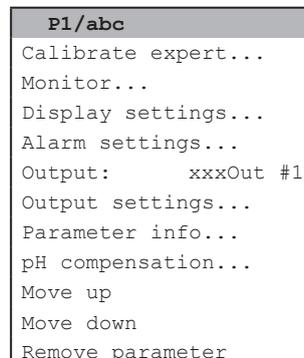
6.4.1 Advanced Calibration - [_Parameter / Calibrate expert..._]

Depending on the connected probe or sensor several types of calibration can be performed within this menu. If a local calibration cannot be performed to a parameter (e.g. slope of local calibration too low or too high) the con::lyte will display the message _CALIB!_ in the header line. More detailed error information will be availbable using the _Monitor..._ function.

⚠ Before performing a calibration be sure that the function of the probe or sensor is ok and the parameter value is stable!

The figure on the right displays all entries which are available in the menu of the advanced calibration. Depending on the selected calibration _Type_ and calibration _Mode_ several of these entries will be visible. The entries are explained in detail below.

- **_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. The _Global_ calibration is used, to switch back to the factory calibration of the sensor.

- **_Mode_** Three different local calibration modes can be chosen: _Offset_, _Linear_ and _Span_. The availability of these modes depends on the probe or sensor type (see the related probe or sensor manual).

⚠ A local calibration can be performed either starting from type _Global_ or _Local_. Depending on this either the global slope or the local slope will be used when perfoming an offset calibration.

```
 P1/NH4-N  CALIB!
Type:           Local
Mode:          Linear
Perform Calibration
Value:           26.9
Private:          1.0
Lab 1:           25.3
Sample 1:       -65.8
Lab 2:        -----.--
Sample 2:     -----.--
Offset:
Slope:
```

- **_Perform Calibration_**   Confirming this entry by pushing the _Ok_ button will execute the 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).

- **_Private_** In case the sensor provides a quality mark of the measured parameter, this value is displayed here.

- **_Lab 1_** Within this line the correct 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_ or _Sample 2_) 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.

- **_Lab 2_** Within this line the correct value for _Sample 2_ has to be entered. _Lab 2_ is needed for linear calibration only.

- **_Sample 2_** Confirming this entry by pushing the _Ok_ button will store the actual reading as sample 2 for the linear calibration of the sensor.

- **_Offset_** Displays the used offset of the actual calibration. It is possible to edit this value in type _local_ when using a spectrometer probe or an i::scan.

- **_Slope_** Displays the used slope of the actual calibration. It is possible to edit this value in type _local_ when using a spectrometer probe or an i::scan.

6.4.2   Check Parameter Reading - [*Parameter / Monitor...*]

This menu displays the raw value and status information of the selected parameter and sensor. In case of any problem with a parameter (e.g. calibration failure, no display, flashing background) the *Monitor...* option enables the operator to easily identify problems with the sensors.

```
P1/NH4-N
Value:          5.43
Private:        0.96
S-Status:       0000
S-Status(Pri):  0000
P-Status:       0011
P-Status(Pri):  0003
```

- ■ *Value*   Within this line the actual value of the sensor parameter as displayed on the parameter screen (i.e. using the actual calibration) is displayed and continuously updated.

- ■ *Private*   This value is the raw value of the sensor parameter currently measured. In case an ISE probe, a pH::lyser or a redo::lyser is connected, this value is the quality factor of the sensor. 0 means bad and 1 means perfect quality of measurement.

- ■ *S-Status*   General quality status of the sensor (see section 10.2 and sensor manual for further details).
  0000 means sensor status is ok.

- ■ *S-Status(Pri)*   Sensor specific quality status (see section 10.2 and sensor manual for further details).
  0000 means sensor status is ok.

- ■ *P-Status*   General parameter status of the monitored parameter (see section 10.2 and sensor manual for further details).
  0000 means parameter status is ok.

- ■ *P-Status(Pri)*   Parameter specific quality status (see section 10.2 and sensor manual for further details).
  0000 means parameter status is ok.

⚠ After pushing the *OK* button a detailed error message of the status code will be displayed.

6.4.3   Parameter Display Settings - [*Parameter / Display settings...*]

In the *Display settings* menu, settings like decimal places, units or parameter name can be edited.

```
P2/NH4-N
Name:          NH4-N
Unit:            ppm
Disp.Format:       1
Load Defaults
```

- ■ *Name*   Displays the actual name of the parameter.
- ■ *Unit*   Displays the actual unit of the parameter.
- ■ *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 (++.+++++).

⚠ 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. The max. lengths is 8 signs but only the first 6 signs are visible on the display. Please note that change of parameter name or unit will not change the parameter configuration itself (e.g. if you change the parameter name NO_3-N to NO_3 the reading will still be NO_3-N).

- ■ *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 section 7.2.2).

6.4.4   Parameter Alarm Settings - [*Parameter / Alarm settings...*]

In the *Alarm settings...* menu a lower and upper limit for an alarm can be defined. An exceeding of these limits will generate an alarm and may stop the controller, depending on the controller settings (see table below and section 6.5 Controller settings).

■ *Require ack.*   Setting if confirmation of an alarm needed (*Yes*) or not (*No*).

■ *Al. lower*   Value of lower alarm threshold (parameter reading below this value will give an alarm).

■ *Al. upper*   Value of high alarm threshold (parameter reading above this value will give an alarm).

■ *Output*   Used digital output for alarm transmission.

■ *Invert pol.*   Change default configuration of used digital output.

■ *Use Sys-Error*   Configuration of parameter alarm to system error relay. If *Yes* is selected, the system error relay indicates an error in case of a system error or a parameter alarm. If *No* is selected, this parameter will have no influence to the system error relay in case an alarm is triggered. Each parameter can be linked individuall to the system error relay.

```
P2/NH4-N
Require ack.:      No
Al. lower:        0.1
Al. upper:       55.0
Output:    DigOut #1
Invert pol.        No
Use Sys-Error:    Yes
```

6.4.5   Parameter Output Settings - [*Parameter / Output settings...*]

This menu item enables the user to configure the output settings of a paramter. The parameter can be allocated to a digital relay output or analog mA output within the menu item *Output*. The default setting is *None*.

If an analog output is chosen, *[4mA]* defines the parameter value for 4 mA and *[20mA]* defines the parameter value for 20 mA. Parameter values between these two limits will be calculated according to a linear calibration.

```
Output type
[4mA]:            0.0
[20mA]:          55.0
```

If a digital output is chosen, three different types (*Level*, *PULSE*, *PWM*) can be defined. The explanation of all possible output types is given below:

For digital output type *Level* the following settings can be configured:

■ *Threshold*   The *Threshold* of the output type *Level* defines the limit for 0 or 1. Below this value the digital relay output is 0 (Relay NO = open), above this threshold the output is 1 (Relay NO = closed).

```
Output type
Type:           Level
Threshold:       49.5
```

For digital output type *Pulse* the following settings can be configured:

■ *[0%]*   This value defines the parameter value for 0 % output (0 pulses/min).

■ *[100%]*   This value defines the parameter value for 100 % output (max. pulses / min).

■ *Pulses [Min]*   This value defines the maximum number of pulses per minutes for 100 % output. Numbers between 1 and 180 can be entered.

```
Output type
Type:           PULSE
[0%]:             0.0
[100%]:          14.0
Pulses [Min]:     180
```

For digital output type _PWM_ the following settings can be configured:

■ _[0%]_   This value defines the parameter value for 0 % output (0 pulses/min).

■ _[100%]_   This value defines the parameter value for 100 % output (max.pulses / min).

■ _Period [s]_   This value defines the duration of one pulse for 100 % output. Numbers between 1 and 100 can be entered.

```
Output type
Type:              PWM
[0%]:              0.0
[100%]:           14.0
Period [s]:        100
```

6.4.6   Parameter Information - [_Parameter / Parameter info..._]

Within this menu screen a summary of all important parameter settings of the selected parameter are displayed. The following information will be available:

■ _Sen._   Probe / sensor used to measure this parameter.

■ _Name_   Name of the parameter, as displayed on the parameter screen.

■ _Unit_   Unit of the parameter, as displayed on the parameter screen.

■ _Disp.Format_ Number of digits used for display of parameter reading.

■ _P. lower_   Lower measuring range of the parameter.

■ _P. upper_   Upper measuring range of the parameter.

■ _Al. lower_   Lower threshold set for parameter alarm.

■ _Al. upper_   Upper threshold set for parameter alarm.

```
P1/NH4-N
Sen.      ammo::lyserV2
Name:             NH4-N
Unit:               ppm
Disp.Format:          1
P. lower:           0.1
P. upper:          19.8
Al. lower:      ------.-
Al. upper:          6.0
```

6.4.7   Change Position of Parameter Display - [_Parameter / Move up_]

When confirming the entry _Move up_ by pushing the _Ok_ button, the selected parameter will be moved upwards by one position in the parameter screen. Confirming the entry _Move down_ will effect that the selected parameter will be moved downwards by one position in the parameter secreen.

6.4.8   Remove Parameter - [_Parameter / Remove Parameter_]

When confirming this entry by pushing the _Ok_ button, the selected parameter that is displayed in the header line of the screen will be deleted.

6.5   General Menu of Controller Screen

Pushing the *Function* button while the con::lyte displays the controller screen, will open up the controller setup screen of the selected controller. The controller screen is only visible if the controller feature is licensed (see section 6.3.7). Within this screen several menus are available to configure this controller. A short overview of all menu entries is listed below and a more detailed explanation of the important menus can be found in the following sub sections.

```
C1
Settings...
```

```
C1 settings
Type:           None
```

■ *Type*   The type of controller can be either defined as *PID* or *2-P*. To deactivate the controller, the type has to be set to *None*.

■ *Setpoint...*   Within this menu the setpoint of the controller can be configured (see section 6.5.1).

■ *Settings...*   Within this menu the parameters for the *PID* (see section 6.5.2) or the *2-P* (see section 6.5.3) controller can be configured.

```
C1
Setpoint...
Settings   Type...
Source:         UV254
Output:     4-20mA #1
Alarm source...
Reset state
```

■ *Source*:   Within this menu the input (i.e. feedback) of the controller can be selected (see section 6.5.4).

■ *Output*:   Within this menu the output of the controller can be selected. The output can be assigned to an analog or a digital output (see section 6.5.5).

■ *Output settings...*   In this menu the digital output is configured (see section 6.5.5).

■ *Alarm settings...*   In this menu the alarms for this controller can be configured (see section 6.5.6).

■ *Reset state*   Within this menu a reset of the controller can be performed (see section 6.5.7).

6.5.1   Controller Setpoint Settings - [*Controller / Setpoint...*]

The setpoint of the controller can either be defined directly (*Type: Internal*) or via an external input (*Type: External*). External adjustment can be done via analog or digital input or flow monitor (*Source*).

For the *internal* adjustment the setpoint will be entered manually in the con::lyte (*Setpoint*) using the operating buttons. The value of the setpoint can be set between 0 and 100 000.

```
C1 setpoint
Type:        Internal
Setpoint:         2.0
```

In case of *external* adjustment via analog input the corresponding values for *4mA* and *20mA* have to be entered.

```
C1 setpoint
Type:        External
Source:   0/4-20mA #1
4mA      :        0.0
20mA     :       50.0
```

In case of external adjustment via digital input the corresponding values to switch the controller (*Off value* and *On value*) have to be entered.

```
C1 setpoint
Type:        External
Source:      dig.in #2
Off value:        0.0
On value:         7.0
```

⚠ The setpoint can also be modified from remote via Modbus (see section 7.5.2). For this option the *Type* has to be set to *Internal*.

6.5.2   PID Controller Settings - [*Controller / Settings PID...*]

Within the screen, that can be accessed by confirming the entry *Settings PID...*, the PID (Proportional Integral Derivative) controller can be configured. To change any configuration of the controller, select the menu entry with *Up-* and *Down* buttons. By pushing the *OK* button the setting can be modified with *Up-*, *Down-*, *Left-* and *Right* buttons. Pushing the *OK* button will confirm the selection or modification.

```
  C1 settings
Type:            PID
Kp [%]:          1.0
Ti [s]:          1.0
Td [s]:            0
Stop on Error:    No
Max. 100%[s]:   -----
Disturb.:       Temp.
D. factor:       1.0
Direction:        up
Deadband:        0.0
```

- *Kp [%]*   This value defines the proportional part of the PID-controller with a range of 0 % - 100 %. The unit of this parameter is [%]. The input range is 1 to 100 000.

- *Ti [s]*   This value defines the integral part of the PID-controller with a range of 1 - 10 000 s. The unit for this parameter is seconds. The integral part can be disabled by pushing the *Function* button and the *OK* button. The displayed value for a disabled integral part *Ti [s]* will be ++++++.++.

- *Td [s]*   This value defines the derivative part of the PID-controller with a range of 0 - 1000 s. The unit of this parameter is seconds. The derivative part can be disabled by pushing the *Function* button and the *OK* button. The displayed value for a disabled derivative part *Td [s]* will be *0.00*

- *Stop on Error*   If *Yes* is selected, the controller will stop if a sensor device error occurs. The status of the controller changes to deactivated. Please also refer to the Stop on Alarm setting, which is configurated in section 6.5.6.

- *Max. 100 %*   This value defines the maximum dosing time with a controller output of 100 %. The unit is seconds. The input range is 60 to 3600.

- *Disturb.*   This value defines the source for the disturbance control. The following sources can be selected: Analog outputs (*4-20 mA*), Digital outputs (*PULSES* or *PWM*) or parameter.

- *D. factor*   As soon as a disturbance source is selected, a multiplicative factor can be entered within this line.

The controller output with disturbance included is defined by following equation:

Out-dist = Out * Disturb. value * Disturb. factor

For example:
Controller output value = 50 %
Disturb. source value of Analog Input = 1.2 mA
Disturbance factor = 0.5

Out-dist = 50 [%] * 1.2 [mA] * 0.5 [1/mA]
Out-dist = 30 [%]

- *Direction*   This setting defines the direction of the controller. If *up* is selected, the controller increases the controller output if setpoint is above the parameter and decreases the controller output if setpoint is below the parameter. If *down* is selected, the controller decreases controller output if setpoint is above the parameter and increases controller output if setpoint is below the parameter.

- *Deadband*   If one parameter (e.g. temperature) is used for controlling a heating and cooling system, a dead band has to be defined to avoid repeated activation / deactivation cycles (see figure below). The value of the deadband can be set between 0 and 100 000.
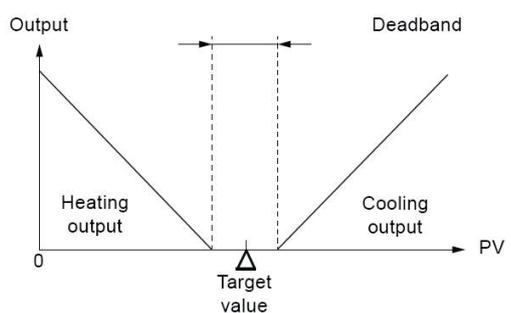
6.5.3   2-P Controller Settings - [*Controller / Settings 2-P...*]

The 2-P controller (2-point) can be configured by confirming the entry *Settings 2-P...* . To change any configuration within the screen, select the menu entry with *Up-* and *Down* buttons, push the *OK* button and modify the settings with *Up-*, *Down-*, *Left-* and *Right* buttons. Pushing the *OK* button will confirm the selection or modification.

```
┌─────────────────────────┐
│  C1 settings            │
├─────────────────────────┤
│ Type:            2-P    │
│ Hysteresis:      0.1    │
│ Stop on Error:    No    │
│ Max. 100%[s]:   -----   │
│ Disturb.:       Temp.   │
│ D. factor:       1.0    │
│ Direction:        up    │
└─────────────────────────┘
```

- ■ *Hysteresis*   This value defines the hysteresis for the 2-P-controller. The switching points for the controller are: Setpoint ± Hysteresis

- ■ *Stop on Error*   If *Yes* is selected, the controller will stop if a sensor device error occurs. The status of the controller changes to deactivated. Please also refer to the Stop on Alarm setting, which is configured in section 6.5.6.

- ■ *Max. 100 %*   This value defines the maximum dosing time with a controller output of 100%. The unit is seconds.

- ■ *Disturb.*   This value defines the source for the disturbance control. The following sources can be selected: Analog outputs (*4-20 mA*), Digital outputs (*PULSES* or *PWM*) or parameter.

- ■ *D. factor*   As soon as a disturbance source is selected, a multiplicative factor can be entered within this line.

The controller output with disturbance included is defined by following equation:

Out-dist = Out * Disturb. value * Disturb. factor

For example:
Controller output value = 50 %
Disturb. source value of Analog Input = 1.2 mA   Out-dist = 50 [%] * 1.2 [mA] * 0.5 [1/mA]
Disturbance factor = 0.5   Out-dist = 30 [%]

- ■ *Direction*   This setting defines the direction of the controller. If *up* is selected, the controller increases the controller output if setpoint is above the parameter and decreases the controller output if setpoint is below the parameter. If *down* is selected, the controller decreases controller output if setpoint is above the parameter and increases controller output if setpoint is below the parameter.

6.5.4   Controller Input - [*Controller / Source*]

When pushing the *OK* button on this menu item, one of the already installed and measured parameters can be assigned as input value for the actual selected controller.

6.5.5   Controller Output - [*Controller / Output*]

When pushing the *OK* button on this menu item, one of the installed analog or digital interfaces can be assigned as output of the actual selected controller.

Due to the fact that controller output range is from 0 % to 100 %, no mapping is necessary. If analog output is selected, the controller output is automatically mapped to 0/4mA = 0 % and 20mA = 100 %.

If a digital output is selected, three different types can be defined (*PULSE*, *PWM* and *Level*). Within the menu *Controller / Output settings...* the digital output can be configured.

```
Output type
Type:           PULSE
Pulses [Min]:     180
```

- ■ *PULSE*   0 % defines the parameter value for 0 % output (0 pulses / min) and 100 % defines the parameter value for 100 % output (max. pulses / min). This maximum number of pulses per minutes can be defined by the operator (*Pulses [Min]*). The highest number that can be entered is 180.

```
Output type
Type:             PWM
Period [s]:       100
```

- ■ *PWM*   0 % defines the parameter value for 0 % output (0 pulses / min) and 100 % defines the parameter value for 100 % output (max. pulses / min). This duration of one pulse for 100 % output can be defined by the operator (*Period [s]*). The highest number that can be entered is 100.

```
Output type
Type:           Level
```

- ■ *Level*   This type can only be used for 2-P controller.

6.5.6   Controller Alarm Settings - [*Controller / Alarm source...*]

In the submenu *Stop on alarms…* the behaviour of the controller for every parameter alarm can be defined. If *Stop on Error* is *Yes*, the controller will stop if a sensor device error occurs. The status of the controller changes to *Stopped*.

If one of the available parameters generates an alarm, the behaviour of the controller can be defined for every parameter alarm separately. If a parameter alarm is set, the controller stops to dose if the chosen alarm occurs.

The following settings are possible:

- ■ *Upper*   Controller stops if the upper alarm limit is reached.
- ■ *Lower*   Controller stops if the lower alarm limit is reached.
- ■ *Up/Low*   Controller stops if the upper or lower alarm limit is reached.
- ■ *------*   No reaction or stop of controller if parameter is on alarm.

```
 C1 Para
NH4-N:          Upper
pH:            Up/Low
FCl:           ------
Temp.:          Lower
```

6.5.7   Reset Controller - [*Controller / Reset state...*]

Confirming this entry by pushing the *OK* button will set the state of the controller to 0. For the PID-controller all three parts will be set to zero (P=0, I=0, D=0).

7 Data Management

7.1 Data Storage

The con::lyte is equipped with an onboard memory to store the following data and information:

- Readings of the parameters monitored by the installed probes and sensors (resultfile, see section 7.2.1).
- Status of the parameters and probes / sensors (resultfile, see section 7.2.1).
- Inputs, outputs and the status of installed controller functions (resultfile, see section 7.2.1).
- Complete configuration of the con::lyte (configuration file, see section 7.2.2).
- All modifications performed by the operator on the con::lyte (configuration file, see section 7.2.2).
- Complete internal communication between con::lyte and connected devices (logfile, see section7.2.3).

⚠️ With a measuring interval of 1 minute the con::lyte D-320-ECO (2 parameters) can store the readings of at least 7 months and the con::lyte D-320-PRO1 (6 parameter) can store the readings of at least 3 months.

7.2 Data Transfer via USB Stick

The con::lyte provides the possibility to transfer all data of the internal data storage (see section 7.1) directly to a USB stick. Configuration- and logfiles can always be downloaded, for download of parameter and controller readings the data logger option has to be licensed (see section 6.3.7).

```
 USB data transfer
Copy results
Delete results
Copy log/cfg
Delete log/cfg
Update software...
Copy license
Config backup
Config restore
```

Besides these data download feature the USB stick can be used for further transfer of data and information. As soon as a USB stick is plugged into the USB slot of the con::lyte, the menu as displayed on the right side will become visible. The menu entries can be selected with the _Up-_ and _Down_ buttons and have to be confirmed by pushing the _OK_ button.

- _Copy results_ will copy all parameter and controller data (readings and status info) to the USB stick. Please refer to section 7.2.1 for further details.
- _Delete results_ will delete all parameter and controller data actually stored on the con::lyte.
- _Copy log/cfg_ will copy all logged system information as well as configuration settings and changes to the USB stick. Please refer to section 7.2.2 and 7.2.3 for further details.
- _Delete log/cfg_ will delete all logbook and configuration entries actually stored on the con::lyte. Immediately after this action a new config file with the actual configuration will be created.
- _Update software_ will update the operation software (upload of software file image.hex).
- _Copy license_ will install a new license on the con::lyte (upload of license file license.txt).
- _Config backup_ will copy a backup of the actual configuration to the USB stick. This can be used for security reason or to configure another con::lyte in the same way (name.CFG).
- _Config restore_ will restore the configuration stored on the USB stick to the con::lyte.

The names of the result-, configuration- and logfiles only contain the serial number of the con::lyte, which means copying the files once again to the same USB stick will overwrite the previous ones. In case the size is more than 4MB, the files will be splitted (*SYS-1.LOG*, *SYS-2.LOG*, *SYS-3.LOG*, etc.).

The downloaded files are simple text files and can be opend with a standard editor or any tabulation program.

The finalisation of the copying process will be confirmed by the entry *copy: okay* in the upper menu bar.

Name	Änderungsdatum	Typ	Größe
4_20.CFG	22.02.2019 15:10	CFG-Datei	1 KB
4_20_IN.CFG	22.02.2019 15:10	CFG-Datei	1 KB
CTL.CFG	22.02.2019 15:10	CFG-Datei	1 KB
DIGOUT.CFG	22.02.2019 15:10	CFG-Datei	1 KB
MAIN.CFG	22.02.2019 15:10	CFG-Datei	1 KB
OUTPUT.CFG	22.02.2019 15:10	CFG-Datei	1 KB
PARA.CFG	22.02.2019 15:10	CFG-Datei	1 KB
SENSOR.CFG	22.02.2019 15:10	CFG-Datei	1 KB
image.hex	22.02.2018 08:40	HEX-Datei	957 KB
CFG_1-16113420.log	09.05.2017 12:45	Textdokument	10 KB
license.txt	19.11.2018 17:07	Textdokument	1 KB
RESULT_1-16113420.log	19.04.2018 10:23	Textdokument	4 883 KB
RESULT_2-16113420.log	19.04.2018 09:15	Textdokument	1 KB
SYS_1-16113420.log	09.05.2017 12:45	Textdokument	4 883 KB
SYS_2-16113420.log	09.05.2017 12:45	Textdokument	702 KB

7.2.1   Format of Resultfiles

The name of the result file, that can be downloaded to a USB stick when using the menu item *Copy result*, is *RESULT-1.LOG*. In general this file contains two types of information. The file starts with a header line. Depending on the number of installed parameters and controllers there are several columns available. The columns are seperated by a semicolon and the general structure is defined as follow:

- ■ Datetime — Date and time of measurement (YYYY-MM-DD hh:mm:ss)
- ■ System status — General status of the monitoring system. In case of a system status error a call sign will be displayed in the header line.
  - 0x0001 - General error (at least one parameter is NaN)
  - 0x0002 - Input error (at least one sensor status bit is active)
  - 0x0004 - Output error (at least one alarm is active)
  - 0x0008 - Disturbance error
- ■ Parameter section — P marks the beginning of the parameter data block with the following data
- ■ Parameter value — Measured reading of the parameter
- ■ Parameter status — General status of the measured parameter (see section 10.2)
- ■ Parameter priv. status — Parameter specific quality status (see section 10.2)
- ■ Parameter alarm upper — Alarm info (if the upper alarm was triggered a *U* is displayed, otherwise a *-* is displayed)
- ■ Parameter alarm lower — Alarm info (if the lower alarm was triggered a *L* is displayed, otherwise a *-* is displayed)
- ■ Controller section — C Marks the beginning of the controller data block
- ■ Controller output — Output of controller
- ■ Controller disturbance input — Input of disturbance control
- ■ Controller status — Status of the controller
- ■ Controller mode — Operating mode of the controller
  - 0 - Stopped
  - 1 - Running
  - 2 - Hold

In the figure below the typical layout of a downloaded resultfile is displayed as an example.

```
datetime;system status;parameter section;pH[] value;pH[] status;pH[] priv. status;pH[] alarm upper;pH
[] alarm lower;Temp.[C] value;Temp.[C] status;Temp.[C] priv. status;Temp.[C] alarm upper;Temp.[C]
alarm lower;controller section;CO output; CO disturbance input; CO status; CO mode
2017-05-09 11:04:59;0000;P;8.372124;0000;0000;-;-;23.900000;0000;0000;-;-;C;1.000000;nan;0001;1
2017-05-09 11:05:59;0000;P;8.365996;0000;0000;-;-;23.900000;0000;0000;-;-;C;1.000000;nan;0001;1
2017-05-09 11:06:59;0000;P;8.361912;0000;0000;-;-;23.900000;0000;0000;-;-;C;0.000000;nan;0001;0
```

7.2.2   Format of Configurationfiles

Whenever a modification of the monitoring system is performed, the new entry will be written into the configuration-file and a new resultfile will be created. In that way the measured values stored in the resultfiles can be better interpreted. Each information block starts with the timestamp and the following configuration settings will be available afterwards.

- *# time:*   Date and time of configuration change
- *# serial:*   Serial number of con::lyte
- *# firmware:*   Firmware installed actually
- *# measurement interval:*   Used measuring interval
- *# average interval:*   Used number of measurements for smoothing of parameter readings
- *# logging interval:*   Used interval of measurements to be stored in the resultfile
- *# cleaning 1:*   Used cleaning configuration for cleaning 1
- *# cleaning 2:*   Used cleaning configuration for cleaning 2
- *# brightness:*   Display bightness
- *# mainboard hardware version:*   Hardware version of application board
- *# use fahrenheit:*   Used unit for all temperature measurements
- *# MODBUS slave address:*   Used Modbus address
- *# MODBUS baudrate:*   Used Modbus baudrate
- *# MODBUS parity:*   Used Modbus parity
- *# parameter settings:*   All settings of each parameter installed
- *# installed sensors:*   All settings of each probe and sensor installed
- *# controller configuration:*   All settings of each controller installed

In the figure below the typical layout of a downloaded configurationfile is displayed as an example.

```
# time: 2017-05-09 11:03:02
# serial: 16113420
# firmware: V7.08B9
# measurement interval: 15
# average interval: 1
# logging interval: 4
# cleaning 1: (interval=0, delay=0, waiting=0)
# cleaning 2: (interval=0, delay=0, waiting=0)
# brightness: 100
# mainboard hardware version: 1024
# use fahrenheit: 0
# MODBUS slave address: 1
# MODBUS baudrate: 38400
# MODBUS parity: odd
# parameter settings:
#  P1: pH/, fmt=2, limit=[0.000000:14.000000], alarm=[nan:nan], warning=[nan:nan], sensor=1:P1, alarm req. ack=0, comp=none
#  P2: Temp./C, fmt=1, limit=[-5.000000:100.000000], alarm=[21.000000:29.000000], warning=[nan:nan], sensor=1:P3, alarm req.
# installed sensors:
#  S1: MODBUS s::can, name=ise::lyser, serial=10520007, address=1, port=1
# controller configuration:
# output configuration:
# 4-20mA outputs configuration:
# O1, internal, sample 1=6.243000, sample 2=18.698002, physical=1
# O2, internal, sample 1=6.200001, sample 2=18.580006, physical=2
# O3, internal, sample 1=6.185000, sample 2=18.549999, physical=3
# 4-20mA inputs configuration:
# I1, internal, 4mA=744, 16mA=3714, physical=1
```

7.2.3 Format of Logfiles

The name of the logfile, that can be downloaded to a USB stick when using the menu item *Copy logfile*, is *SYS-1. LOG*. There are three columns within the logfile, seperated by a semicolon, that contain the following information:

- Timestamp   Date and time of log entry (as integer number in seconds since Jan. 1st 1970)
- Timestamp   Date and time of log entry (in format Year / Month / Day / Hour / Minute / Second (YYYYMMTT „T" hhmmss)
- Log   Detailed logbook message

The logfile contains internal log messages, that will help your local s::can Customer Support to identify possible problems of the monitoring system.

7.3 Used Data Types

All s::can interfaces use a common representation of data types. Each accessible data item can be allocated to one of the types shown in the table below. The type of a given item can always be found by checking the Modbus mapping. In addition the name of the data item are prefixed by one or two letters to indicate the data type. Data types which are non standard need special attention and are marked specially. Data from Modbus mapping are directly mapped to the according Profibus address space.

Type	Description	Size (Bytes)	Prefix	Note
char[x]	string	x	ab	ASCII
bitmask	bitmask of 16 bits	2	bm	
int16	signed 16 bit integer	2	i	NaN = INT 16_MAX
unit16	unsigned 16 bit integer	2	ui	NaN = UNIT 16_MAX
float	IEEE-754 floating pints	4	f	NaN = 0xFFFF FFFF NaN = 0x7FC0 0000
enum	enum type	2	e	
timestamp TAI64N	timestamp format	6	ts	see http://cr.yp.to/proto/tai64.txt

⚠ For all data types the Big-Endian encoding is used.

7.4 Data Transfer via Profibus Interface

The con::lyte can be equipped with a Profibus interface module for continuous data transfer (D-319-OUT-PROFIBUS). This interface enables data transfer using Profibus DP for integration of the parameters into a superior control systems (e.g. SCADA).

The mapping of the parameter readings is displayed in the table on the right. The Profibus address can be set via the *Service* menu (see section 10.3).

Reading of Parameter	Type	Byte
Parameter 1	Float	7 - 10
Parameter 2	Float	13 - 16
Parameter 3	Float	19 - 22
Parameter 4	Float	25 - 28
Parameter 5	Float	31 - 34
Parameter 6	Float	37 - 40

⚠ The needed gsd-file can be downloaded from the s::can Customer Portal (*Software / con::lyte ProfiBUS*).

7.5 Data Transfer via Modbus Interface

The con::lyte is equipped with a Modbus interface for continuous data transfer (D-320-OUT-MODBUS). This interface can be activated via license and enables data transfer via RS485 using the Modbus RTU for integration of the parameters into a superior control systems (e.g. SCADA).

⚠ The parameter assignment sequence to the modbus output interface is conform to the sequence of the parameter on the con::lyte display.

Access to the parameter readings and information is possible by reading input registers and / or holding registers. For reading of these registers the con::lyte Modbus supports the following Modbus function codes:

Function	Function code	Description (used for)
Read Holding Register	0x03	Device and parameter configuration settings, Mirrored input registers (for support of limited Modbus master devices)
Read Input Register	0x04	Device status Parameter status Parameter values

The type and the location of the registers is described in the following sections.

7.5.1 Modbus Mapping Input Register

The details of the register mapping are described in the following tables. Please note that all input registers are mirrored to holding registers starting at address 1800 to support limited Modbus master devices.

Mapping of Parameter specific Input Register							
Input register, 16bit, RO	Tag name	Address	Type	Length	R/W	Description	Address
device status public	bmDeviceStatus	0x0078	bitmask	1	R	Device status	120
parameter 1 result	bmP1Status	0x0080	bitmask	1	R	Para.1 status gen.	128
	bmP1PrivateStatus	0x0081	bitmask	1	R	Para.1 status indiv.	129
	xP1Value	0x0082	float	2	R	Para.1 result	130
parameter 2 result	bmP2Status	0x0088	bitmask	1	R	Para.2 status gen.	136
	bmP2PrivateStatus	0x0089	bitmask	1	R	Para.2 status indiv.	137
	xP2Value	0x008A	float	2	R	Para.2 result	138
parameter 3 result	bmP3Status	0x0090	bitmask	1	R	Para.3 status gen.	144
	bmP3PrivateStatus	0x0091	bitmask	1	R	Para.3 status indiv.	145
	xP3Value	0x0092	float	2	R	Para.3 result	146
parameter 4 result	bmP4Status	0x0098	bitmask	1	R	Para.4 status gen.	152
	bmP4PrivateStatus	0x0099	bitmask	1	R	Para.4 status indiv.	153
	xP4Value	0x009A	float	2	R	Para.4 result	154

Mapping of Parameter specific Input Register							
Input register, 16bit, RO	Tag name	Address	Type	Length	R/W	Description	Address
parameter 5 result	bmP5Status	0x00A0	bitmask	1	R	Para.5 status gen.	160
	bmP5PrivateStatus	0x00A1	bitmask	1	R	Para.5 status indiv.	161
	xP5Value	0x00A2	float	2	R	Para.5 result	162
parameter 6 result	bmP6Status	0x00A8	bitmask	1	R	Para.6 status gen.	168
	bmP6PrivateStatus	0x00A9	bitmask	1	R	Para.6 status indiv.	169
	xP6Value	0x00AA	float	2	R	Para.6 result	170
Controller 1	bmC1Status	0x1000	unit16	1	R	Contr.1 status	4096
	bmC1RunStatus	0x1001	unit16	1	R	Contr.1 running status	4097
	xC1Value	0x1002	float	2	R	Contr.1 value 0.01 = 1 %	4098
	xC1Process	0x1004	float	2	R	Contr.1 process value	4100
	xC1Disturbance	0x1006	float	2	R	Contr.1 disturbance input value	4102
	xC1Setpoint	0x1008	float	2	R	Contr.1 setpoint value	4104
Controller 2	bmC2Status	0x1100	unit16	1	R	Contr.2 status	4352
	bmC2RunStatus	0x1101	unit16	1	R	Contr.2 running status	4353
	xC2Value	0x1102	float	2	R	Contr.2 value 0.01 = 1 %	4354
	xC2Process	0x1104	float	2	R	Contr.2 process value	4356
	xC2Disturbance	0x1106	float	2	R	Contr.2 disturbance input value	4358
	xC2Setpoint	0x1108	float	2	R	Contr.2 setpoint value	4360
Controller 3	bmC3Status	0x1200	unit16	1	R	Contr.3 satus	4608
	bmC3RunStatus	0x1201	unit16	1	R	Contr.3 running status	4609
	xC3Value	0x1202	float	2	R	Contr.3 value 0.01 = 1 %	4610
	xC3Process	0x1204	float	2	R	Contr.3 process value	4612
	xC3Disturbance	0x1206	float	2	R	Contr.3 disturbance input value	4614
	xC3Setpoint	0x1208	float	2	R	Contr.3 setpoint value	4616

The representation of the device / parameter status (b_{15} ... b_0) is shown in the table below. Each bit of the status integer reperesents a condition (1=error, 0=o.k.)

Mapping of Device Status			
Bit	bmDeviceStatus	xPxValue	Description
b0	device error internal check fail	NaN	Communication failure to connected devices

Mapping of Parameter Status			
Bit	bmDeviceStatus	xPxValue	Description
b15	out of range	NaN	Reading outside of measuring range
b4	parameter error, calibration not o.k.	NaN	at least one calibration coefficient is invalid
b1	parameter error, hardware error	NaN	
b0	parameter error general	NaN or value	at least one internal parameter check failed

7.5.2   Modbus Mapping Holding Register

Mapping of Parameter specific Holding Register							
Holding register, 16bit, RW	Tag name	Address	Type	Length	R/W	Description	Address
parameter 1 configuration public	abP1Name	0x0078	char[8]	4	RW	Name of parameter 1[1]	120
	abP1Unit	0x007C	char[8]	4	RW	Unit of parameter 1[1]	124
	xP1UpperLimit	0x0080	-	2	RW	Upper measuring range of parameter 1	128
	xP1LowerLimit	0x0082	-	2	RW	Lower measuring range of parameter 1	130
parameter 2 configuration public	abP2Name	0x00F0	char[8]	4	RW	Name of parameter 2[1]	240
	abP2Unit	0x00F4	char[8]	4	RW	Unit of parameter 2[1]	244
	xP2UpperLimit	0x00F8	-	2	RW	Upper measuring range of parameter 2	248
	xP2LowerLimit	0x00FA	-	2	RW	Lower measuring range of parameter 2	250
parameter 3 configuration public	abP3Name	0x0168	char[8]	4	RW	Name of parameter 3[1]	360
	abP3Unit	0x016C	char[8]	4	RW	Unit of parameter 3[1]	364
	xP3UpperLimit	0x0170	-	2	RW	Upper measuring range of parameter 3	368
	xP3LowerLimit	0x0172	-	2	RW	Lower measuring range of parameter 3	370
parameter 4 configuration public	abP4Name	0x01E0	char[8]	4	RW	Name of parameter 4[1]	480
	abP4Unit	0x01E4	char[8]	4	RW	Unit of parameter 4[1]	484
	xP4UpperLimit	0x01E8	-	2	RW	Upper measuring range of parameter 4	488
	xP4LowerLimit	0x01EA	-	2	RW	Lower measuring range of parameter 4	490

Mapping of Parameter specific Holding Register							
Holding register, 16bit, RW	Tag name	Address	Type	Length	R/W	Description	Address
parameter 5 configuration public	abP5Name	0x0258	char[8]	4	RW	Name of parameter 5[1]	600
	abP5Unit	0x025C	char[8]	4	RW	Unit of parameter 5[1]	604
	xP5UpperLimit	0x0260	-	2	RW	Upper measuring range of parameter 5	608
	xP5LowerLimit	0x0262	-	2	RW	Lower measuring range of parameter 5	610
parameter 6 configuration public	abP6Name	0x02D0	char[8]	4	RW	Name of parameter 6[1]	720
	abP6Unit	0x02D4	char[8]	4	RW	Unit of parameter 6[1]	724
	xP6UpperLimit	0x02D8	-	2	RW	Upper measuring range of parameter 6	728
	xP6LowerLimit	0x02DA	-	2	RW	Lower measuring range of parameter 6	730
controller configuration private	xC1ControllerSetpoint	0x0400	float	2	RW	Contr.1 Setpoint value	1024
	xC2ControllerSetpoint	0x0402	float	2	RW	Contr.2 Setpoint value	1026
	xC3ControllerSetpoint	0x0404	float	2	RW	Contr.3 Setpoint value	1028
parameter configuration private	fP1LowerAlarmLimit	0x0500	float	2	R	Para.1 lower alarm limit	1280
	fP1UpperAlarmLimit	0x0502	float	2	R	Para.1 upper alarm limit	1282
	fP2LowerAlarmLimit	0x0520	float	2	R	Para.2 lower alarm limit	1312
	fP2UpperAlarmLimit	0x0522	float	2	R	Para.2 upper alarm limit	1314
	fP3LowerAlarmLimit	0x0540	float	2	R	Para.3 lower alarm limit	1344
	fP3UpperAlarmLimit	0x0542	float	2	R	Para.3 upper alarm limit	1346
	fP4LowerAlarmLimit	0x0560	float	2	R	Para.4 lower alarm limit	1376
	fP4UpperAlarmLimit	0x0562	float	2	R	Para.4 upper alarm limit	1378
	fP5LowerAlarmLimit	0x0580	float	2	R	Para.5 lower alarm limit	1408
	fP5UpperAlarmLimit	0x0582	float	2	R	Para.5 upper alarm limit	1410
	fP6LowerAlarmLimit	0x05A0	float	2	R	Para.6 lower alarm limit	1440
	fP6UpperAlarmLimit	0x05A2	float	2	R	Para.6 upper alarm limit	1442
mirrored input							1800
device status public	bmDeviceStatus	0x0780	bitmask	1	R	Device status	1920
parameter 1	bmP1Status	0x0788	bitmask	1	R	Para.1 status gen.	1928
	bmP1PrivateStatus	0x0789	bitmask	1	R	Para.1 status indiv.	1929
	xP1Value	0x078A	float	2	R	Para.1 result	1930
...							
parameter 6	bmP6Status	0x07B0	bitmask	1	R	Para.6 status gen.	1968
	bmP6PrivateStatus	0x07B1	bitmask	1	R	Para.6 status indiv.	1969
	xP6Value	0x07B2	float	2	R	Para.6 result	1970

[1]   filled with spaces when name is shorter than 8 characters

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 probes and 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 probe or sensor (please refer to the according manuals of the connected probes and sensors).

8.1   Check System / Monitoring Station

What to check	How to check	What to do if check failed
Power supply	Green LED is on and text is visible on the display?	Check power supply of con::lyte.
System running (up-to-date)	System time in the status screen is current and is updated every second?	Check for displayed error messages.
Measurement activ	Measured readings are actualized? Service mode not activ?	Check measuring settings Leave Service mode
System status	No error messages or error symbols are displayed in the header line?	See section 10 for Troubleshooting
Installation of con::lyte	Housing, plastic cover and cable connections are undamaged and tight?	Repair or replace damaged parts, that might influence the IP65 protection (see section 4.1).
Function of automatic cleaning	Wait for next cleaning cycle or activate cleaning manually (*Trigger cleaning*)	Check electrical connection, air tubes and cleaning device itself.
Efficiency of automatic cleaning	Perform functional check of the probes and sensors connected to the automatic cleaning	Improve automatic cleaning settings. Replace cleaning brush.
Data transfer	Compare the readings displayed on the con::lyte screen with those readings received by the used SCADA system.	Check data transfer settings on the con::lyte. Use test functions to check correct data transfer (see section 10.3).
Alarms	Any warnings or alarms pending in the Alarm screen?	Confirm the alarms and wait if alarm comes back after next measurement.

8.2   Check Results

What to check	How to check	What to do if check failed
Parameter readings	Actual displayed readings are completely (i.e. no dashes (----,--) or plus signs (++++,++) instead of numbers)?	Check the parameter status and -settings. In case of plus signs reduce number of digits (see section 6.4.6).
Parameter- and sensor status	No flashing background on the displayed readings?	Check for possible error messages (see section 6.4.2).
Controller status	Controller works according to the configuration?	Check used input and output parameter of the controller.

9 Maintenance

In general no maintenance on the con::lyte operation terminal is required. Nevertheless, there are a few notes to keep the device in good condition. Furthermore all information of section 4.1 have to be considered to ensure the IP65 protection all the times.

9.1 Cleaning con::lyte

The device housing and the cover are made of plastic. Only use a wet, soft cloth tissue and drinking water with mild detergents (e.g. dish washing soap) for cleaning.

9.2 Maintenance System / Monitoring Station

Before performing any maintenance activity that will influence the online measurement and the controller, activate the Service mode (see section 6.2.1). Please refer to the according manuals of the connected probes and sensors how to do the maintenance.

10   Troubleshooting

10.1   Typical Error Pattern

Error	Reason	Removal
No measurements performed	■ Service mode is active	■ Leave the service mode (see section 6.2.1) or wait until service mode stops automatically (after 20 minutes by default)
	■ Measuring interval is too large	■ Check measuring interval
	■ Communication failure between con::lyte and sensor (*COMM!*)	■ Check connection between con::lyte and sensor
Display not readable	■ Backlight of display is switched off	■ Push one operating button to activate backlight of the display
Power supply LED is off and display is dark	■ No power supply	■ Check power supply connection
Displayed system time is not current or is not updated every second	■ Internal clock not adjusted	■ Adjust clock in setup menu (see section 6.3.4)
	■ Other reason	■ Restart the con::lyte
Parameter value is not displayed or background is flashing	■ Parameter not available or error has occured	■ Select parameter and use function *Monitor...* to check sensor- and parameter status for error reason (see section 10.2)
Controller screen is not displayed	■ No valid license for controller function installed	■ Order needed license and upload controller license with USB stick
Call sign is displayed in the header line Status : V7.12B3	■ Sensor status is not ok	■ Check sensor
	■ Parameter is NaN	■ Use function *Monitor...* to check error reason (see section 10.2)
	■ Alarm is active	■ Confirm alarm and remove reason
COMM! is displayed in the header line	■ No communication between con::lyte and sensor	■ Check if sensor is connected
		■ Unplug and replug the sensor
		■ Check sensor cable and plug for any damage
CALIB! is displayed in the header line	■ Last local calibration performed for this parameter failed	■ Check detailed failure reason within *Monitor...* function
		■ Repeat local calibration
		■ Carefully check used sample and lab values
EXISTS! is displayed in the header line	■ The parameter or device that should be added is installed already	■ Check existing parameters and devices
NO MEM! is displayed in the header line	■ The max. number of parameters and controllers is reached	■ Order new license for more parameters
		■ Delete not used parameters
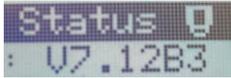
10.2   Error Messages / Status Messages

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 terminal these messages are displayed (*Monitor...* function in case of con::lyte D-320, *Logbook* in case of con::lyte D-31x, *Show Context Help* and *System-Status* in case of ana::xxx and *Status* tab in case of moni::tool) and also stored within the result files or logfiles. Additional to the user message (general error reason and recommendations for removal) the detailed 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 the *Monitor...* function of the con::lyte the sensor and parameter status code of a simple parameter has the following format:

Code	Status Type	Remark
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

Within the con::lyte results file the parameter status will be stored in the column beside the measured value.

10.3   Inspection of Device for s::can Service - [*Status / Service...*]

Within the general settings menu of the setup screen (see section 6.3) the entry *Service...* can be selected. After pushing the *OK* button the *Access code 0001* has to be entered to enable further navigation in the sub menu. The following items become available on the screen.

```
   Service
4-20mA Outputs
0/4-20mA Inputs
Internal SD-card
Digital outputs
Digital Input
Internal Sensors
USB
Date/Time...
Hardware
Communication test
Modules
```

■   *4-20mA Outputs*   This menu can be used to check the function of the mA outputs. There are up to 3 internal and 4 additional outputs via modules available.

```
  4-20mA test
4-20mA #1
4-20mA #2
4-20mA #3
4-20mA M1/1
4-20mA M1/2
4-20mA M2/1
4-20mA M2/2
```

After selecting a module (e.g. _4-20mA #1_) connect a multimeter to the corresponding output pins on the terminal block to check the real signal. The _Test [mA]_ values can be manually changed after pushing the _OK_ button.

```
┌─────────────────────────┐
│     4-20mA #1           │
├─────────────────────────┤
│ Test [mA]:       4.00   │
│ Test [CNT]        645   │
│ Status:         open!   │
│ Sample 1:       6.204   │
│ Sample 2:      18.614   │
│ Errormode:      3.5mA   │
└─────────────────────────┘
```

The _Status_ will be displayed as _open_ and should change to _okay_ as soon as a multimeter is connected.

The outputs are precalibrated ex factory. If needed, the entries _Sample 1_ and _Sample 2_ can be used to perform a linear calibration of the output module as explained below:

- Select entry _Sample 1_
- Push button _OK_
- Measure the mA output with multimeter
- Enter the measured mA value as _Sample 1_
- Push _OK_
- Select _Sample 2_ and repeat the same procedure for _Sample 2_

Finally the error mode (_Errormode_) for this output can be defined. The default setting is 3.5 mA but it can be changed to 4 mA, 20 mA, 22 mA or hold.

- **_0/4-20mA Inputs_**   This menu can be used to check the function of the mA input module. After selecting a module (e.g. _0/4-20mA in mod. 1_) the value for the input will be displayed (_In [mA]_). When pushing the _Function_ button, the mA value of the input will be measured again. If needed the entries _Sample 4mA_ and _Sample 20mA_ can be used to perform a linear calibration of the input module.

- **_InternalSD-card_**   This menu displays the number of sectors (_Sectors_) and the speed (_Byte/sec_) of the SD-card. The last menu entry enables a formating of the SD-card. This will be done after confirming the entry with _OK_ twice and will restore the factory status of the con::lyte.

```
┌─────────────────────────┐
│   Interne SD-Karte      │
├─────────────────────────┤
│ Sectors:       964608   │
│ Byte/sec:         512   │
│ Format                  │
└─────────────────────────┘
```

- **_Digital Outputs_**   Each digital output relay can be switched from _Off_ to _On_ manually.

- **_Digital Input_**   After selecting a digital input the _State_ and the _Pulse/Sec_ can be set manually.

- **_Internal Sensors_**   When selecting this menu, the internal temperature (_Temp._) and the power consumption (_Voltage_ and _Current_) are displayed.

- **_USB_**   Information about the USB stick (_Vendor_, _Benchmark_) will be displayed.

- **_Date/Time..._**   System date and time can be set within this menu.

- **_Hardware_**   Via the entry _Backlit_ the time can be set, after which the backlight of the display is switched off. As soon as any operating button is pushed, the backlight is switched on again. The time can be set between 1 and 120 minutes. Furthermore a check of the internal memory (_Test EEPROM_) can be performed.

```
┌─────────────────────────┐
│   Hardware              │
├─────────────────────────┤
│ Backlit [min]:     10   │
│ Test EEPROM             │
└─────────────────────────┘
```

■ *Communication test*   This menu provides the possibility to check the communication to a connected probe or sensor (*Sensor*) or any other device (*Extra*). After starting the test by confirming the enry *Start test* with the *Ok* button, the result will be displayed on the screen.

```
 Sensor
Start test
Test okay:        90
Test failed:      10
```

■ *Modules*   This menu provides the possibility to check the two internal connection places for input / output modules. If a *Profibus DP* module is installed, the Profibus *address* can be set between *1* and *126* within this menu entry.

```
 Modules
Test 0/4-20mA
Not installed
```

10.4 Return Consignment (RMA - Return Material Authorization)

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). A 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 website 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 Power Supply Cord

For connection of the con::lyte to power supply, a power supply cable is available.

Name	Specification	Remark
Part-no.	C-31-EU or C-31-US	
Cable length	2 m	
Weight	approx. 300 g	
Material	PU	jacket
Process connection	CEE-7 shockproof plug NEMA 5-15 plug	C-31-EU C-31-US
Environment rating (IP)	IP 44 IP 55	C-31-EU C-31-US

11.1.2 Distribution Box Sensors

For connection of additional s::can sensors equipped with the system plug, a distribution box is available. That box can be connected to an existing system plug and will provide three additional plugs.

| Name	Specification	Remark
Part-no.	C-41-HUB	
Cable length	1 m connection cable (C-010-SENSOR)	included in delivery
Weight	approx. 200 g	
Dimensions	146 / 48 / 30 mm	W / H / D (incl. protective caps)
Housing material	Aluminium anodized	
Other materials	PU grouting	
Mounting	2 holes (5 mm) at 136 mm distance	
Process connection	1x SysPlug In (Bucc. 6p m) 3x SysPlug Out (Bucc. 6p f)	
Environment rating (IP)	IP 68 IP 67	Housing Plug connection
Operating temperature	-20 to 60 °C (-4 to 140 °F)	

11.2   Automatic Cleaning

11.2.1 Cleaning Valve

For operation of the automatic air cleaning system, a cleaning valve is available.

| Name	Specification	Remark
Part-no.	B-44 B-44-2	
Cable length	2.5 m 1.0 m	B-44 B-44-2
Assembling	ex works, with cable end sleeves	+ blue - brown
Dimensions	85 / 75 / 70 mm	W / H / D
Material	Brass,stainless steel 1.4305 FPM	Housing Sealing material
Environment rating (IP)	IP 65	
Media that can be handled	neutral gases and liquids	
Temperature limits	-10 to 90 °C (14 to 194 °F) -30 to 60 °C (-22 to 140 °F)	of medium of environment
Operation voltage	12 VDC	supply by con::lyte
Connection fitting compressed air side P	Standard DIN 7.2 coupler coupler screw connection 6/4 mm, nickel-plated brass	B-44 B-44-2
Connection fitting probe side A	Hose ID $^3/_8$ inch plug-in fitting (6 mm OD)	B-44 B-44-2
Direct connection valve	$^1/_8$ inch	if fittings supplied ex works are removed
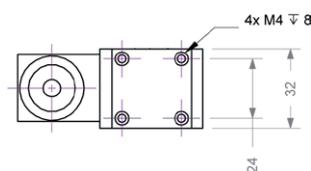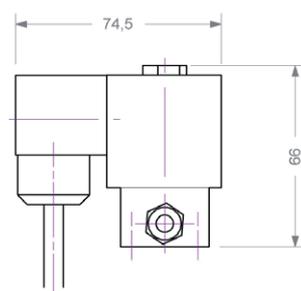
11.3 Optional Features

The con::lyte can be equipped with several optional features. Depending on the feature either a license code is needed or an additional modul has to be integrated into the device.

⚠️ Integration of additional modules into the con::lyte must be carried out by authorised persons only (see section 2) and disconnected power supply.

The following steps have to be performed:

- Power off the con::lyte and ensure ESD protected environment.
- Unscrew the 4 screws (TX10) located in each edge of the con::lyte front panel.
- Remove the front panel carefully. Take care not to damage the flat ribbon cable.
- Plug the additional modules into slot 1 or slot 2 according to the module type and the needed configuration.
- Place the front panel back on it's original position.
- Fasten the 4 screws with max. 0.9 Nm.
- Power on the con::lyte.
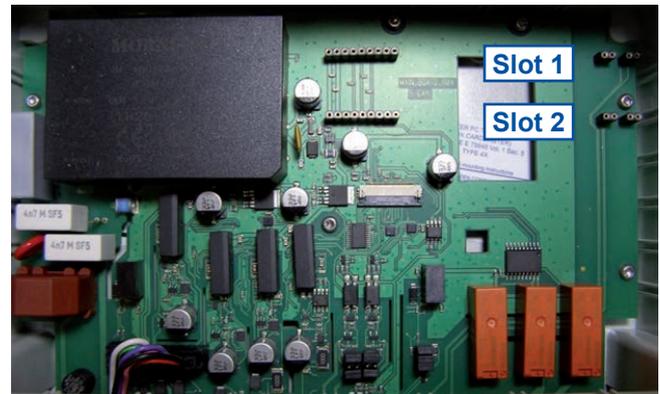
The entry Modules in the Service menu displays, which modules are actually installed (see section 10.3).

11.3.1 Analog Outputs (internal and additional)

The hardware of each con::lyte is equipped with 3 analog outputs (4-20mA). These internal output modules can be used by ordering the according license (D-320-out-mA). In case more outputs are needed, up to 2 additional analog outputs modules (D-319-out-mA) can be physically plugged into the con::lyte. Each of this additional modul provides 2 analog outputs (0/4-20mA). That means a con::lyte can provide in total maximal 7 analog outputs for data transfer to PLC system.

Name	Specification	Remark
Part-no.	D-319-OUT-MA D-320-OUT-MA	Hardware modules Licence for internal modules
Output D-319-OUT-MA	2 x 4 - 20 mA	
Output D-320-OUT-MA	4 - 20 mA	1 - 3 outputs
Interface	AWG 28-12, stripped wire	via terminal block, see section 5.1 for correct wiring
Assembling D-319-OUT-MA	front panel has to be removed to plug the module onto the application board	con::lyte can be equipped with max. 2 modules (see section 11.3)
Assembling D-320-OUT-MA	licence has to be uploaded via USB stick	

11.3.2 Profibus Module

This optional module provides a Profibus DP interface for data transfer to PLC-System.

Name	Specification	Remark
Part-no.	D-319-OUT-PROFIBUS	
Interface	AWG 28-12, stripped wire	via terminal block, see section 5.1 for correct wiring
Assembling	front panel has to be removed to plug the module onto the application board	con::lyte can be equipped with max. 2 modules

11.3.3 Modbus Interface

This option provides a Modbus RTU interface for data transfer to PLC-System.

Name	Specification	Remark
Part-no.	D-320-OUT-MODBUS	
Interface	AWG 28-12, stripped wire	via terminal block, see section 5.1 for correct wiring
Assembling	a license code has to be uploaded via USB stick	Modbus possible in combination with up to 2 modules

11.3.4 PID Controller

This option provides the usage of the controller function (PID, 2-P) on the con::lyte.

Name	Specification	Remark
Part-no.	D-320-PID	max. 3 controllers
Assembling	a license code has to be uploaded via USB stick	

11.3.5 Datalogger

This option enables the usage of the internal datalogger in the con::lyte.

Name	Specification	Remark
Part-no.	D-319-LOGGER	
Assembling	a license has to be uploaded via USB stick	
Interface	Download via USB connector	circular memory with 5 files (5 x 4.8 MB)

12   Technical Specifications

Name	Specification	Remark
Part-no.	D-320-ECO-230	for 1 sensor
	D-320-PRO1-230	for several sensors (max. 6 parameters)
	D-320-PRO2-230	for 1 spectrometer probe and sensors (max. 6 parameters)
Dimensions housing	236 / 185 / 118 mm	W / H / D (without cable glands)
	236 / 213 / 118 mm	W / H / D (with cable glands)
Required space	300 / 340 / 330 mm	W / H / D (incl. cable glands and MIL plug)
Weight	approx. 1.3 kg	
Material housing	Polycarbonate, RAL 9005	
Material other	Polyamide, Polyurethane, EPDM	
Environment rating (IP)	IP 65	if customer's cable connections are sealed off and housing cover closed tightly
Operation humidity	5 to 90 %	non-condensing
Operation temperature	-20 to 45 °C (-4 to 113 °F)	D-320-ECO-230, D-320-PRO1-230
	-20 to 50 °C (-4 to 122 °F)	D-320-PRO2-230
Operation altitude	max. 3000 m	
Mounting	Hook centrally placed and 2 screws (max. M5) or 2 mouinting clips	for mounting on walls from the front side or for mounting on DIN rail
Power supply	100 to 240 VAC	wide range power supply unit
	50 to 60 Hz, cos phi >= 0.12	
Power consumption	25 W (max.)	
	33 VA, cos phi = 0.66	
	< 30 A (max.), AC inrush current	
	< 0.15 A, AC current	
Cable type power supply	3-wire cable with minimum of 1.5 mm^2 effictive copper area	fixed installation via M20 cable gland entry: A switch or circuit breaker has to be installed. It has to be suitable located, easily reachable and marked as disconnecting device for the equipment.
Terminal connections	4 x M12 cable gland entry	
	1 x M16 cable gland entry	
	1 x M20 cable gland entry for power supply	
Analog Output	3 outputs 4-20 mA	via terminal block (AWG 28-12), stripped wire
Analog Output - Specification	1 kV galvantic isolation	to system ground/earth > 10Mq
	500 Ohm max. load resistance	
	0 Ohm min. load resistance	
	20 mA max. output current	
	12 bit resolution of readings	
	< 1 ms response time	
	-50 to -10 μA (at 10mA) drift	over full temperature range
	< 30 μA uncertainty	after calibration (20°C)

Name	Specification	Remark
Analog Input	1 input 0/4-20 mA	via terminal block (AWG 28-12), stripped wire
Analog Intput - Specification	1 kV galvantic isolation 100 Ohm input resistance 0 mA min. input current 20 mA max. intput current 12 bit resolution of readings < 1 ms response time +30 to 0 μA (at 10mA) drift < 30 μA uncertainty	to system ground/earth > 10Mq over full temperature range after calibration (20°C)
Digital Output	2 outputs (normal open) 1 error output (normal open or closed)	via terminal block (AWG 28-12), stripped wire
Digital Output - Specification	< 6 A max. RMS current < 250 VAC max. working voltage < 6 A max. switchable load < 600 VA max. number of opera ting cycles	depending on load, an additional snubber circuits might be required as external potection
Digital Input	2 inputs for external mechanical relay / switch	via terminal block (AWG 28-12), stripped wire
Digital Input - Specification	no galvanic isolation 100 Hz max. input frequency < 7 V low input voltage > 8 V high input voltage > 1 kOhm input resistance	to be done by external relay / switch
Interface to flow detector	1 digital input for s::can flow detector unit F-45-ALARM	incl. external 12 VDC power supply, via terminal block no. 31 and 32 (see section 5.4)
Interface to automatic cleaning	1 digital output for s::can cleaning devices 12 V+15%, max. 14.5 W total load or max. 3500μF capacitive loading	2nd cleaning device via normal digital output. Available power capacity is shared with sensors.
Connection of s::can spectrometer probe	1 x MIL-plug connector (RS485, 12 VDC)	only on D-320-PRO2-230
Connection of s::can ISE probes or sensors	1 to 3 x sys plug connector 1 x terminal block (RS485, 12 VDC) 7 W constant < 15 W peak	depending on type (see section 3.3)
Display	128 x 64 graphical LCD display 70 x 40 mm viewing area	trans reflective, white background
Memory onboard	512 MB	industrial grade SLC
Data download	USB host mode support	FAT / FAT32
Firmware update	USB host mode support	FAT / FAT32

Name	Specification	Remark
Integrated RTC	Accuracy < 2 minutes / month at 25°C	
Interface to SCADA / PC	1 x USB Type A connector	USB interface is galvanically iso-lated
	1 x RS485	on internal cable terminals
	Modbus RTU	optional via license
	Profibus DP	optional via modul
RS485 termination	electrically isolated 1 kV internal network termination 120 Ohm	
Conformity - ECM	EN 61326-1:2013	
Conformity - safety	EN 61010-1:2010	
Conformity - RoHS 2	EN IEC 63000:2018	
Approvals / Certifications	CE	all device types
	cTUVus	D-320-ECO-230, D-320-PRO1-230
Storage temperature / humidity	-20 to 50 °C (-4 to 122 °F) 5 - 90 % (not condensing)	Device has to be acclimatised to operation temperature before initial operation.
Typical lifespan (application)	8 years (typical)	200 k MTTF (mean time to failure)
Typical life time (storage)	8 years (typical)	
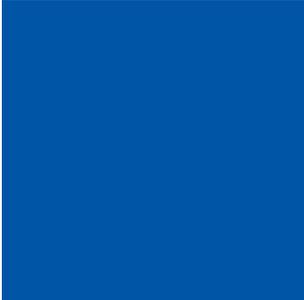
s::can GmbH

Brigittagasse 22-24
1200 Vienna, Austria
Tel.: +43 (0) 1 219 73 93 - 0
Fax: +43 (0) 1 219 73 93 - 12
office@s-can.at
www.s-can.at