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Manual

con::lyte D-320

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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.

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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.

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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 operation of complete s::can measuring systems, the manuals for the controller (con::lyte, con::stat, con::cube or PC / notebook with con::nect), the operating software (ana::lyte, ana::pro or moni::tool) as well as the connected probes and sensors 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 steering of the automatic cleaning devices. Optional an integrated data logger and several control functions (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 specific environmental and operation limits, which are provided in the technical specifications in the respective s::can manuals, have to be observed. All applications falling outside of these limits, and which are not authorised by s::can Messtechnik GmbH in written form, do not fall under the manufacturer's liability.

The device must only be used for the purpose described in this manual. Use in applications not described in this s::can 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 spectrometer probe and several sensors with wide range AC power supply

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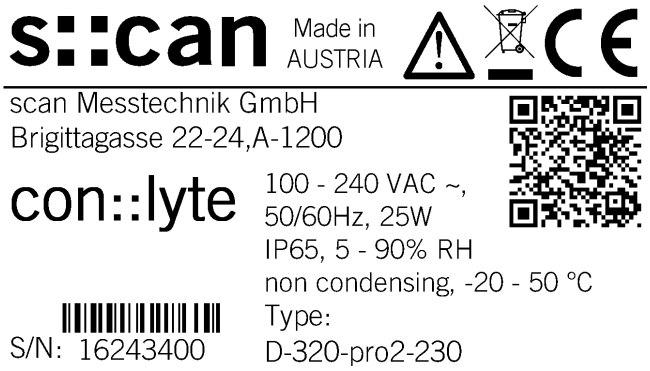
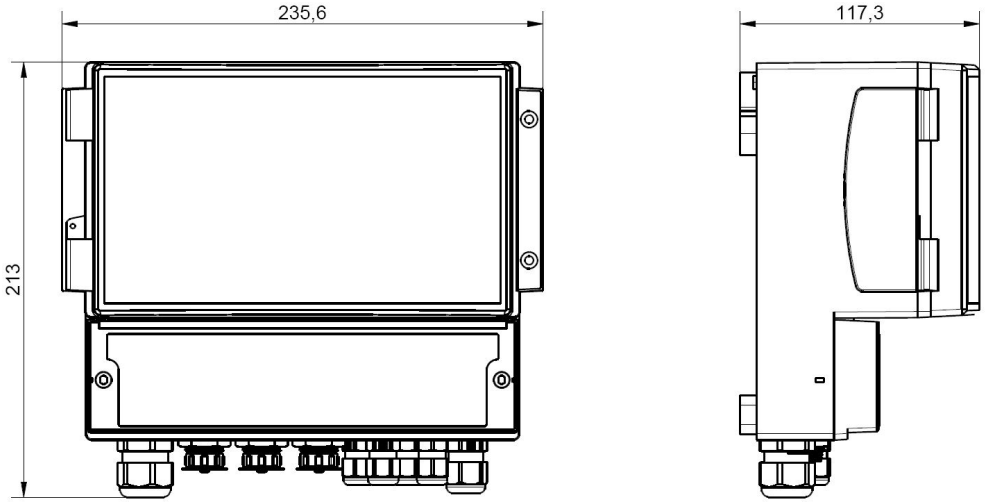
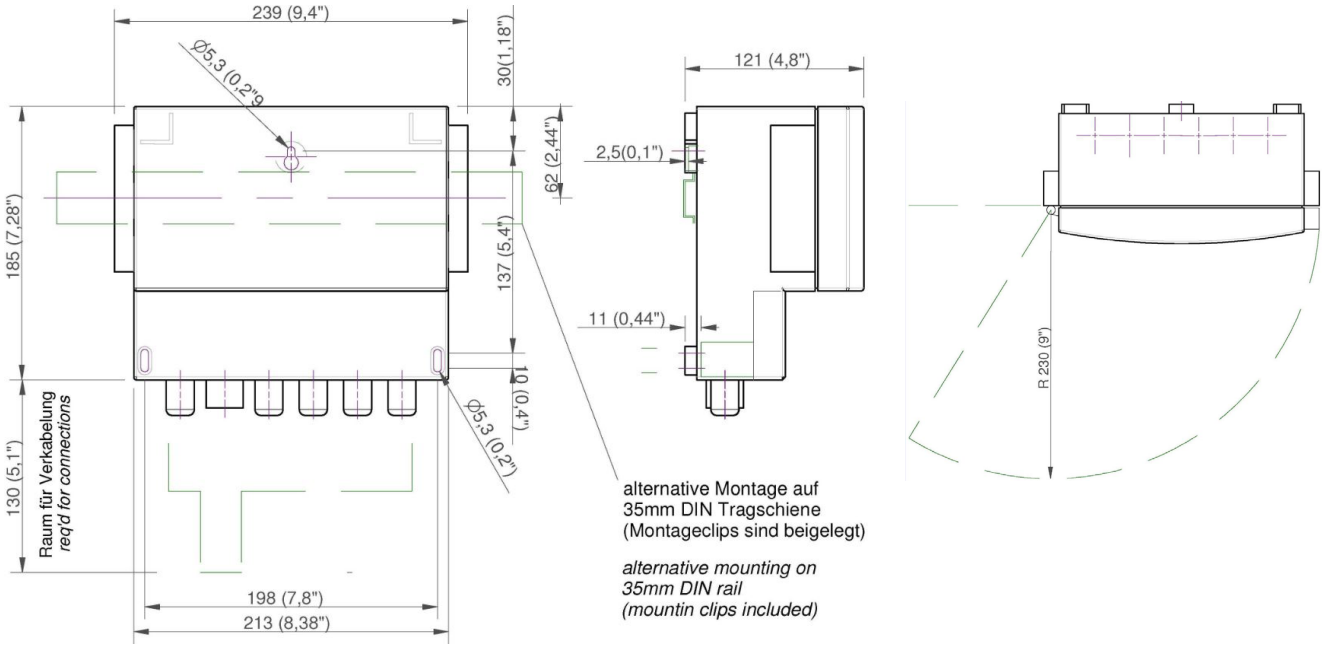
The device is identified by a type label, as displayed on the right, that contains the following information:

- 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



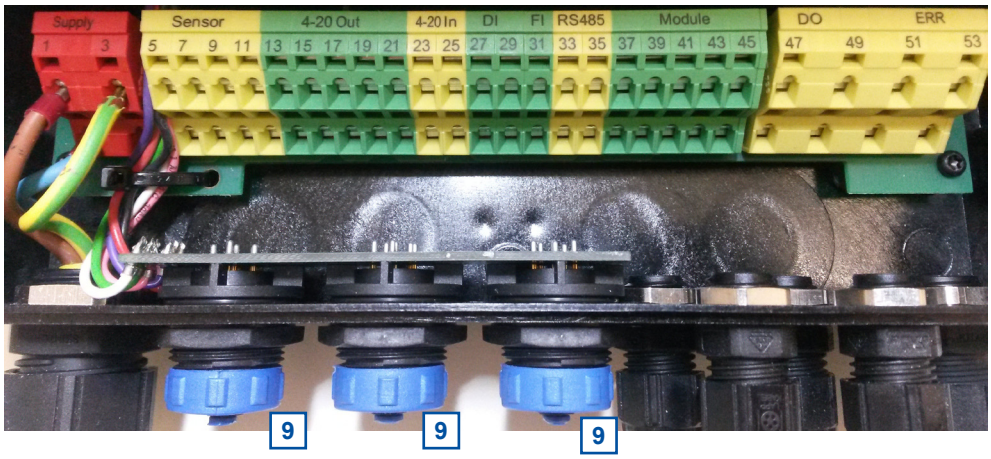
The figures below display the general dimensions of the con::lyte in [mm]:





The figures below display the main parts of the con::lyte and the details of the opened terminal compartment

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. connector for s::can spectrometer probe
9. connector for s::can ISE probe or sensor
10. Cable glands



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.)

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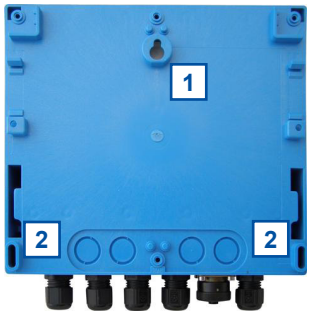
4.2 Mounting

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)

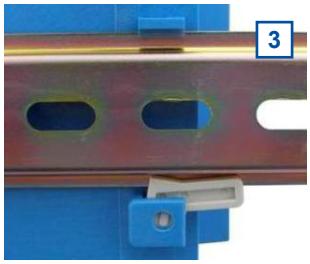
The con::lyte can be mounted quickly and easily onto a flat wall using one of the following methodes (see figures on the right also):

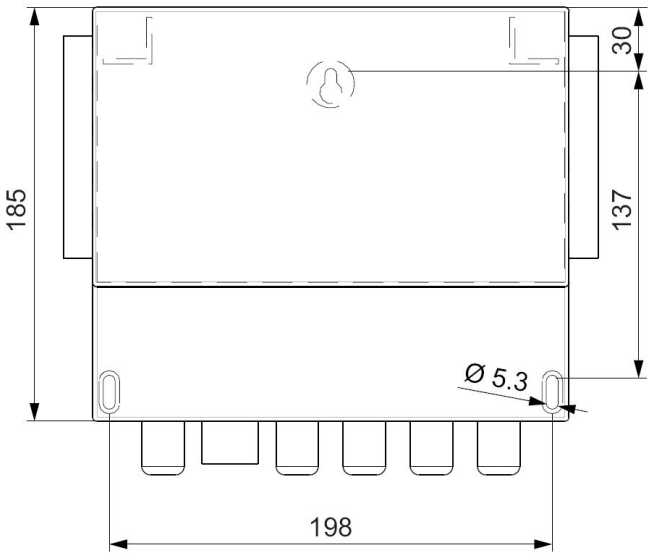


- Fixing onto a hook using the opening [1] centric on top of the backside
- Fixing with 2 screws (max. M5, not included in delivery) on both sides on bottom of the con::lyte [2].
- Fixing onto a DIN-rail (35mm top-hat rail) [3]. The two mounting clips (included in delivery) [4] have to be fasten onto 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 startup 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).
- Check whether the cleaning system works properly.
- Connection and parameterisation of data transfer when desired.

5.1 Plan of Terminal Connections

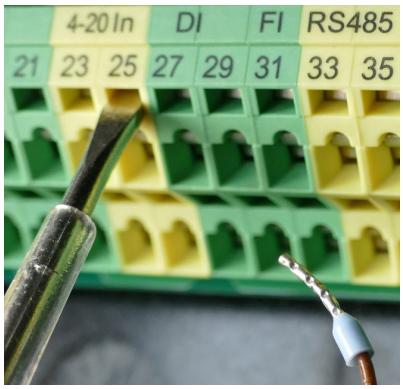
Once the cover has been opened (two phillips head screws removed) you have access to the cable terminal compartment of the con::lyte.

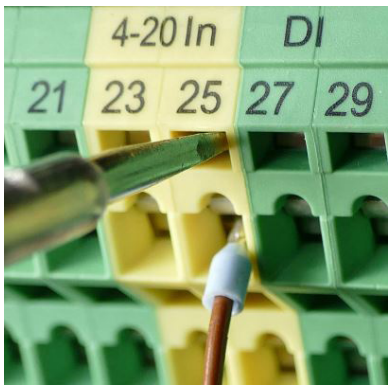
Opening of the cable terminal compartment of the con::lyte must be carried out by authorised persons only (see section 2) and after disconnecting the power supply!

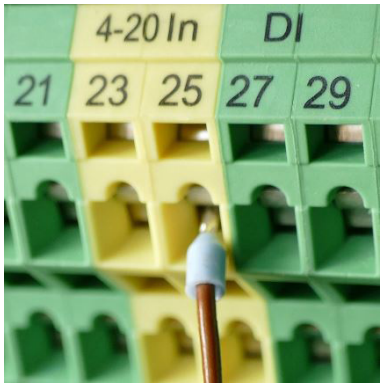
The con::lyte is equipped with spring terminals that enable quick and easy wiring.

- Insert a small screwdriver into the slot above the cable clamp you want to connect (see left picture below).
- Move the screwdriver upwards, which opens the cable clamp, and insert the wire (see middle picture below).
- Move the screwdriver downwards and remove it. Now wire is locked in the cable clamp (see right picture below).

s::can recommends to use wires with isolated end sleeves for power supply and dater transfer.







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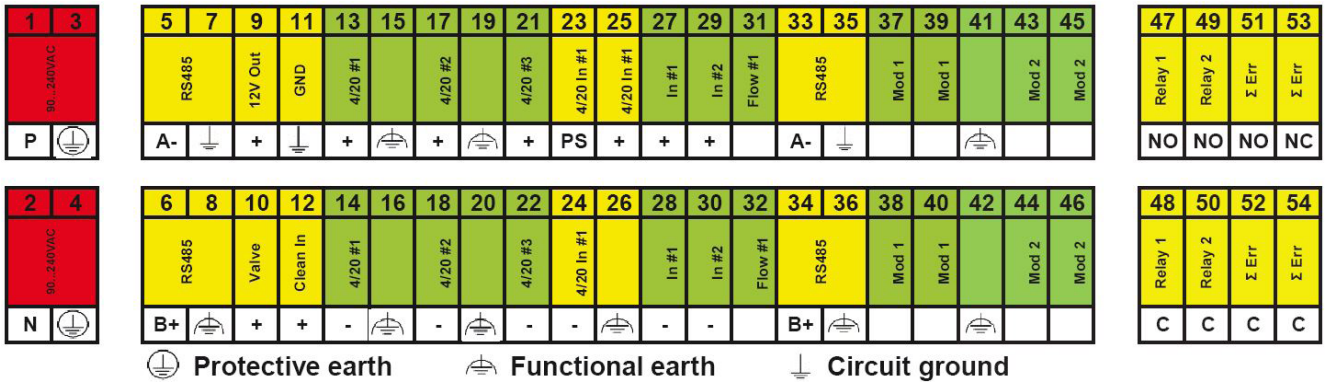


Plan of cable terminal connections for con::lyte D-320-xxx-230

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.8 in the figure of section 3.3.

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 steered via a digital relay output (*Relay 1* or *Relay 2*). The table on the right displays the different possibilities of connection.

Once the cleaning device has been electrically connected, the device needs to be parameterised 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.

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

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.

No.	Colour of wire	Labeling	Terminal no.
flow detector	Black	Flow #1	31
flow detector	Black	Flow #1	32
pressure sensor	Brown	4/20 In #1 PS	23
pressure sensor	Blue	4/20 In #1 -	24

5.5 Connection of Main Power Supply

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

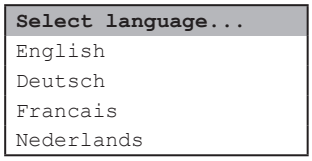
The con::lyte has to be connected to the appropriate power supply. The connection of power supply must be done with an earthed conductor wire (PE - „protective earth“)!

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) is to be made properly. Proper grounding implies suitable wiring for grounding which includes proper wire size and a suitable equipment ground. Process medium (e.g. waste water) must be connected to the same earth ground with less than 0.5 Ohm.

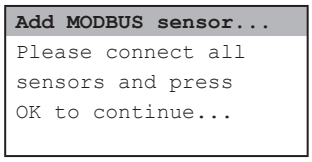
5.6 Starting up of Operation Software

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.



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.



5.8 Parameter Initialisation

All sensor parameters will be displayed on the parameter screen after successful probe and sensor initialisation. Please refer to section 6.3.2 if a parameter needs to be added manually.

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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

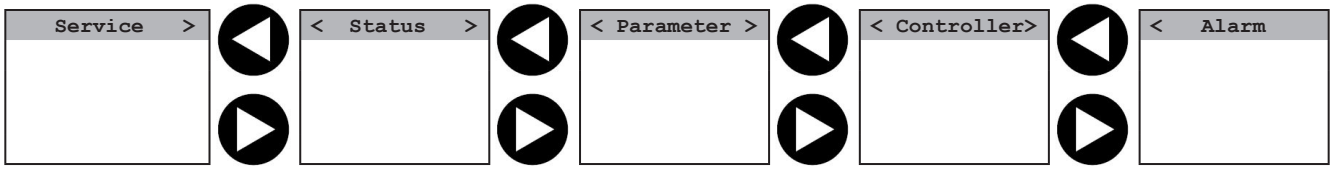
Ok button
- Enters the selected menu
- Confirms the selected line or value
- Confirms alarms in the alarm screen
- Opens quick parameter calibration

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.



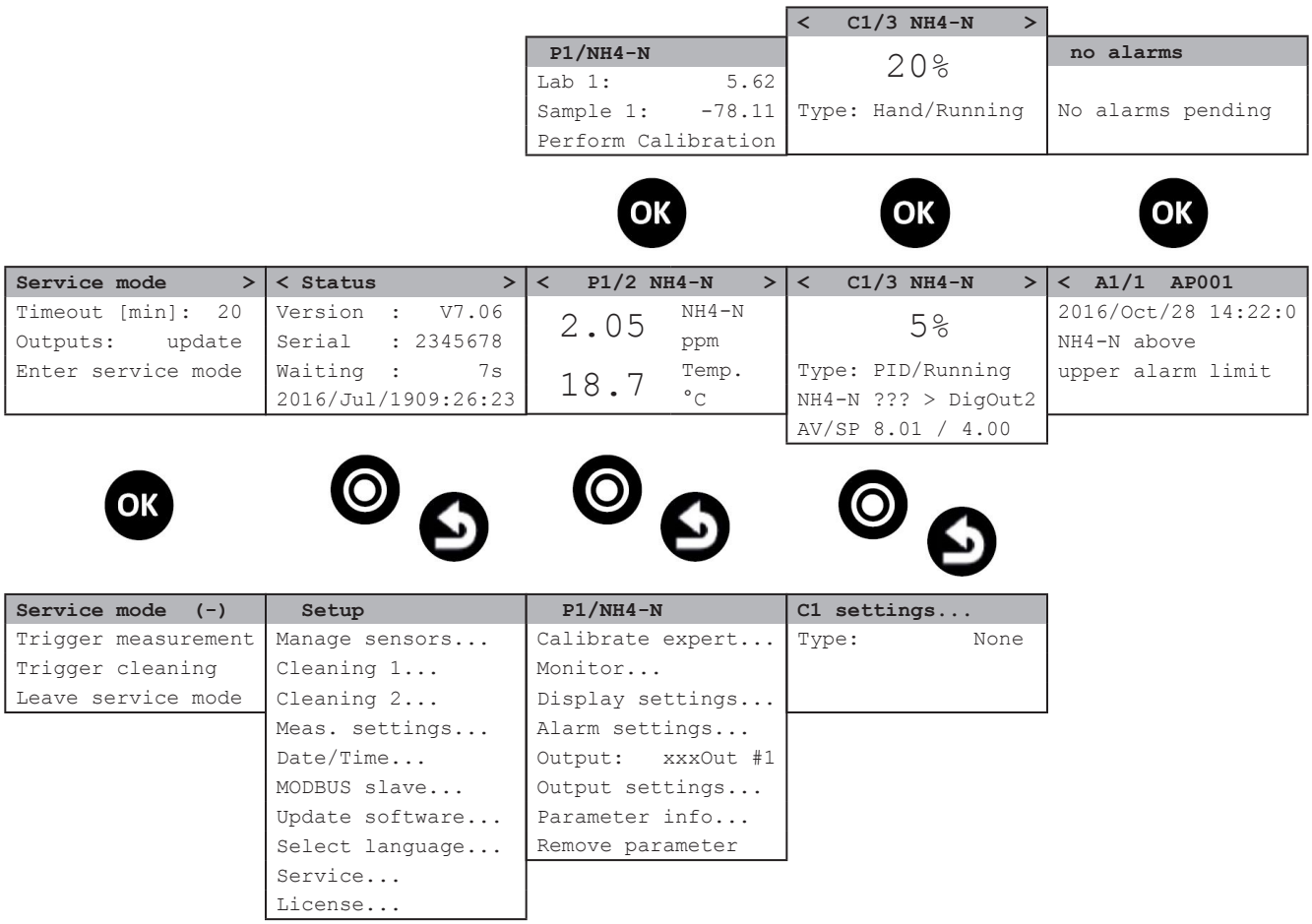
Pushing the *Function* button or the *OK* button in one of the main views provides direct access to different options. Pushing the *Back* button several times (depends on the level of setting sub menu) will always bring you back to one of the main screens. The information and figure below provide a general 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 screen (see section 6.3)
- Parameter — opens parameter setup screen (see section 6.4)
- Controller — opens controller setup screen (see section 6.5)
- Alarm — no effect

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



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.

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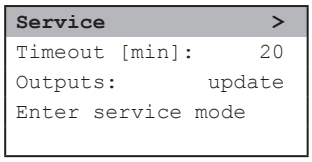
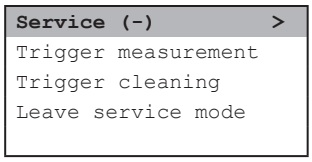
6.2.1 Service Screen

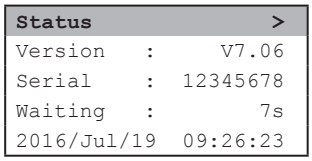


The most left screen contains all menues that are needed for service or maintenance activities. Before you activate the service mode by confirming the entry *Enter service mode*, you can change the *timeout* and the status of the outputs during the service mode is active (*update*, *hold* or *force*).



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 the timeout, if no actions are performed on the screen.

6.2.2 Status Screen



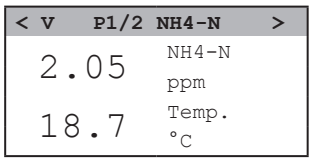
The first row displays the version of the software. In case you need to contact s::can customer support, the *Status screen* enables the operator to easily identify the software version (*Version*) and the serial number (*Serial*) of the actual con::lyte.

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).

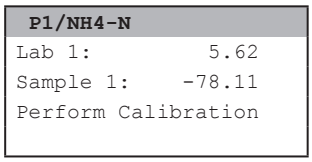
6.2.3 Parameter Screen and Quick Calibration Option



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:

- 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.



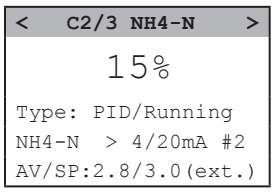
Pushing the *Ok* button within the *Parameter* screen will open the quick calibration menu. Within this menu a simple calibration (offset) can be performed for the related parameter.

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.

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* or *2-P*) is activated.



The first row represents the output of the controller. The unit of the output is %.

The second row (*Type*) displays the type of the controller and his status. Types can be *PID* or *2-P* (see section 6.5). *Hand* is displayed if the controller output was fixed manually by pushing the *OK* button.

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.

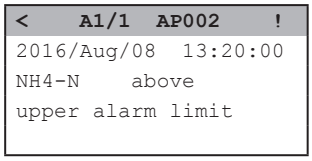
The second row (*Type*) also displays the status of the controller (*Running* or *Stopped*). *Running* means the controller is activated and *Stopped* means the controller is deactivated. Please refer to section 6.4.4 (*Stop an Alarm*) and 6.5 (*Stop on Error*) for more information what can cause the controller to stop.

The third 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 forth 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.

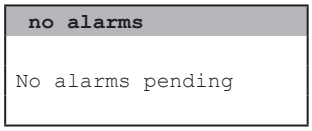
The screen displayed on the right hand side above, indicates controller 2 (*C2*) with *15 %* output. The controller type is Proportional-Integral-Derivate (*PID*) and it is running; used input for controlling is parameter *NH4-N* and output is analog output *4/20mA #2*. The actual value for NH4-N is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

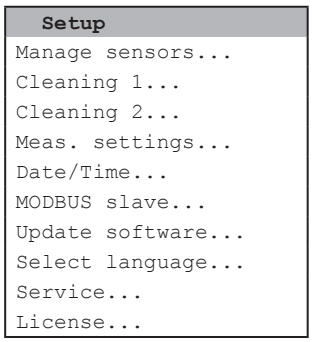
The header displays the amount of alarms and the number of the selected alarm. The first row displays date and time the alarm has occurred the first time. In the following rows the alarm text is displayed.



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 Screen

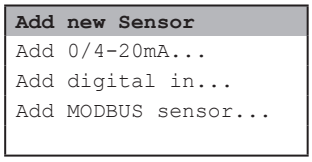
Pushing the *Function* button while the con::lyte displays the *Status* screen, will open up the general *Setup* screen. Within this screen several menus are available to configure the monitoring station. A short overview of all menu entries is listed below and more detailed explanation of the important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



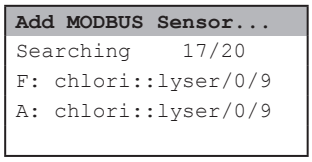
- *Manage sensors…* Within this menu new probes, sensors or devices can be installed (*Add sensor...*, see section 6.3.1). Once the measuring device is installed it can be configured (*Configure...*), further parameters of the device can be installed (*Add parameter...*) or the complete device can be 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 between 1s and 1hour (3600s). The value has to be entered in seconds (see section 6.3.3).
- *Date/Time...* In this submenu date and time of the internal device clock (system time) can be adjusted (see section 6.3.4).
- *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 6.3.5).
- *Update software…* Selecting this menu will initialize a software update of the con::lyte via the USB port.
- *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 6.3.6).

6.3.1 Installation of Probes, Sensors or Input Modules - [Manage sensors / Add sensor...]

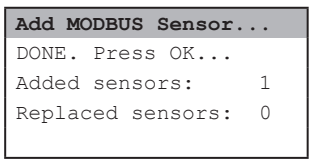
A new probe, sensor or measuring device can be added to the con::lyte within the general *Setup* screen by selecting the entry *Add sensor…* with *Up-* and *Down* buttons and pushing the *OK* button. In the next screen all installed devices are displayed. The last entry *Add sensor...* has to be selected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



For all s::can probes or sensors connected via a plug to the con::lyte, the entry *Add MODBUS 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.



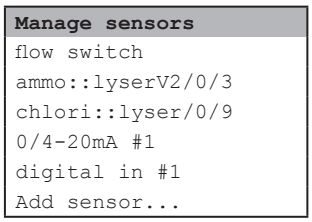
Select *Add 0/4-20mA…* to add an analog sensor. A digital sensor can be added by selecting *Add digital in...* . After confirming your selection with the *OK* button, the con::lyte will install the input modul and the text *ADDED!* is displayed in the header line. If the modul is already installed, the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

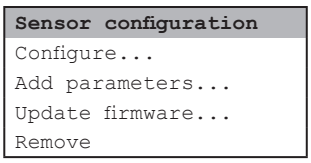


After adding a new probe or sensor, the parameters will be displayed in the parameter screen. Furthermore single parameter can be added manually (see section 6.3.2 and menu *Add parameters...*).

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

All available sensors (e.g. *ammo::lyser*, *chlori::lyser*) and configured inputs 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, up to four entries are available.

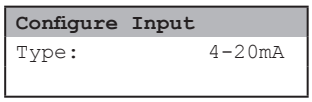




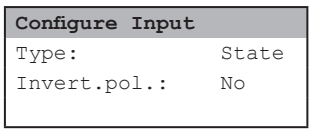
- *Configure...* Depending on the selected sensor different configuration settings will be displayed.

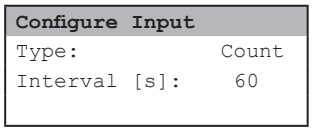
For the connected s::can probes and sensors the internal configuration (*Probesettings*) will be displayed as information.

For a devices connected via analog or digital input modules, the input types can be defined within this menu. An analog input can be defined either *0-20mA* or *4-20mA*.



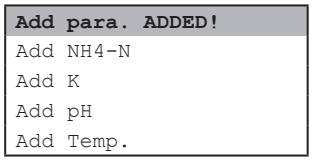
A digital input can be defined either *State* or *Count*. The result for a digital *State* input will be 1 or 0 depending on the polarization of the digital input. With the setting *Invert pol.* the polarization of the digital input can be changed. The result of a digital *Count* input are the summed up digital pulses within a certain time interval. This *Interval* can be defined in seconds [s].





- *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.

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.



- *Update firmware...* Some sensors provide the possibility to perform a firmware update via the con::lyte. Please refer to the sensor manual for further details.

- *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 6.4.7 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, all parameters have to be removed from the display and added again in the correct sequence.

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6.3.3 Configuration of Measurement and Cleaning Interval

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:

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

- *Interval* Time between two cleaning cycles in seconds. 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.
- *Wait* Waiting time in seconds between end of cleaning process and start of next action (either second cleaning cylce or measurement itself).
- *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*).

Within the submenu of the measurement settings (*Meas. settings...*) two settings can be made:

Meas. settings	
Interval:	60
Average:	3

- *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).

If both cleaning outputs are activated, the cycle will start with *Cleaning 1* followed by *Cleaning 2* and finally the measurement (*Measuring*) itself. After the measurement is finished there will be the waiting time (*Waiting*) until the next measurement cycle starts.

6.3.4 Configuration of System Date and Time - [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

6.3.5 Configuration of Modbus slave - [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 address for the con::lyte can be set between *1* and *247*. Each device must have a unique address within the Modbus environment. *Parity* and *Baudrate* defines the communication settings for the RS 485 bus. These entries cannot be changed. Finally the *Resolution* of the submitted parameter values can be set bewteen *0* and *3*.

MODBUS slave	
Address:	0
Parity:	Odd
Baudrate:	38400
Resolution:	2

6.3.6 License - [License...]

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

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.

6.4 Parameter Setup 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/NH4-N
Calibrate expert...
Monitor...
Display settings...
Alarm settings...
Output:      xxxOut #1
Output settings...
Parameter info...
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).

- *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).
- *Remove parameter* Within this submenu the selected parameter can be removed by pushing the *OK* button (see section 6.4.7).

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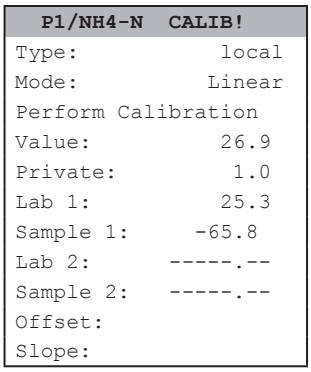
6.4.1 Advanced Calibration - [Calibrate expert...]

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 *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 possible entries within the display of the advanced calibration. Depending on the selected calibration *Type* and calibration *Mode* several of these entries will be visible.



- *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 sensors.
- *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).
- *Perform Calibration* — Confirming this entry by pushing the *Ok* button will execute the local calibration, using the *Lab* and *Sample* values displayed on the calibration screen.
- *Value* — Displays the measured value of the probe or sensor like on the parameter screen also (i.e. using the actual calibration).
- *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 not possible to edit this value.
- *Slope* — Displays the used slope of the actual calibration. It is not possible to edit this value.

6.4.2 Check Parameter Reading - [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) *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 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.

6.4.3 Parameter Display settings - [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 paramter.
- *Unit* Displays the actual unit of the paramter.
- *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. 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 - [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).

P2/NH4-N	
Require ack.:	No
Al. lower:	0.1
Al. upper:	55.0

- *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).

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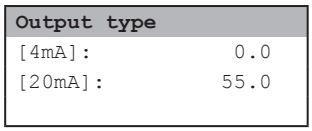
6.4.5 Parameter Output settings - [Output settings...]

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*.

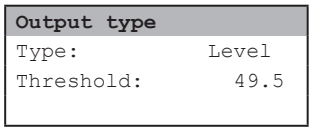
If an analog output is chosen, *[4 mA]* defines the parameter value for 4 mA and *[20mA]* defines the parameter value for 20 mA. Parameter values between these two limits will be calculated according to a linear calibration.



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:

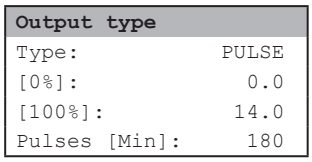
For type *Level* the following settings can be configured:

- *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).



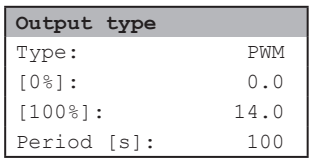
For type *Pulse* the following settings can be configured:

- *[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.



For type *PWM* the following settings can be configured:

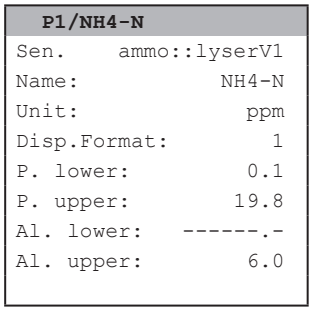
- *[0%]* This value defines the parameter value for 0 % output (0 pulses/min).
- *[100%]* This value defines the parameter value for 100 % output (max.pulses / min).
- *Period [s]* This value defines the duration of one pulse for 100 % output. Numbers between 1 and 100 can be entered.



6.4.6 Parameter Information - [Output info...]

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

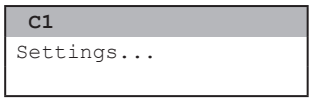
- *Sen.* Probe / sensor used to measure this parameter.
- *Name* Name of the parameter, as displayed on the parameter screen.
- *Unit* Unit of the parameter, as displayed on the parameter screen.
- *Disp.Format* Number of digits used for display of parameter reading.
- *P. lower* Lower measuring range 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.



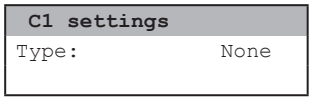
6.4.7 Remove Parameter

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. Because this entry should not be confirmed by mistake, an *Access code* (*0001*) has to be entered before the parameter is deleted.

6.5 Controller Setup Screen

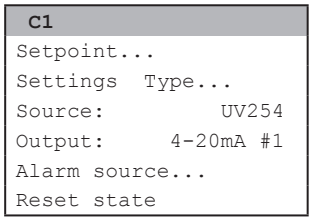


Pushing the *Function* button while the con::lyte displays the controller screen, will open up the controller setup screen of the selected controller. Please note that controller the screen is only visible if it is licensed (see section 6.3.6). Within this screen several menus are available to configure 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.



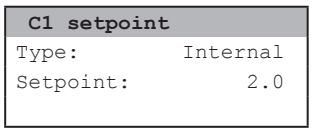
- *Type* The type of controller can be either defined as *PID* or *2-P*. To deactivate the controller, the type has to be set to *None*.

6.5.1 General Controller Settings

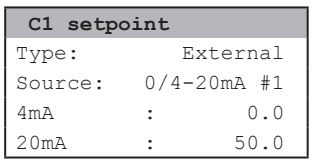


- *Setpoint...* Within this menu the setpoint of the controller can be configured (see section 6.5.2).
- *Settings...* Within this menu the parameters for the *PID* (see section 6.5.3) or the *2-P* (see section 6.5.4) controller can be configured.
- *Source*: Within this menu the input (i.e. feedback) of the controller can be selected. The source will be a measured parameter.
- *Output*: Within this menu the output of the controller can be selected. The output can be assigned to an analog or digital output (see section 6.5.5).
- *Output settings...* In this menu the output for the controller can be configured. This submenu is only visible if a digital output is defined.
- *Alarm settings...* In this menu the alarms for this controller can be configured (see section 6.5.6).
- *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).

6.5.2 Controller Setpoint Settings - [Setpoint...]

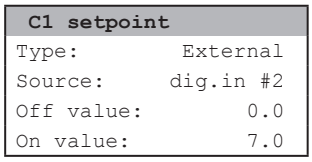


The setpoint of the controller can either be defined directly (*Type: Internal*) or via an external input (*Type: External*). External adjustment can be done via analog or digital input (*Source*).



For the *internal* adjustment the setpoint will be entered manually in the con::lyte (*Setpoint*) using the operating buttons.

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



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

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6.5.3 PID Controller Settings

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 and 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.

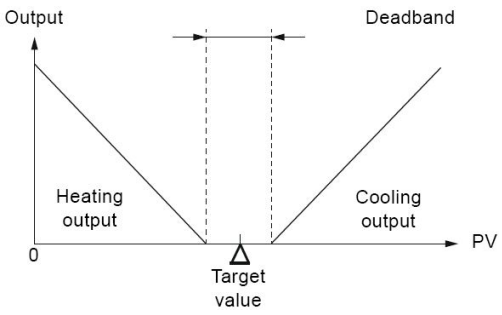
C1 settings	
Type:	PID
Kp [%]:	1.0
Ti [s]:	++++++.+
Td [s]:	0
Stop on Error:	No
Max. 100%[s]:	-----
Disturb.:	Temp.
D. factor:	1.0
Direction:	up
Deadband:	0.0

- *Kp [%]* This value defines the proportional part of the PID-controller with a range of 0 % - 100 %. The unit of this parameter is [%].
- *Ti [s]* This value defines the integral part of the PID-controller with a range of 1 - 3000 s. The unit for this parameter is seconds. The integral part can be disables 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 disables 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 *Stopped*. Please also refer to the Stop on Alarm setting, which is configurated in 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 decrease the controller output if setpoint is below the parameter. If *down* is selected, the controller decrease controller output if setpoint is above the parameter and increase 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).



6.5.4 2-P Controller Settings

Within the screen, that can be accessed by confirming the entry *Settings 2-P...*, the 2-P controller (2-point) can be configured. To change any configuration of the controller, select the menu entry with *Up-* and *Down* buttons and 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:	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 *Stopped*. Please also refer to the Stop on Alarm setting, which is configurated in 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
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 decrease the controller output if setpoint is below the parameter. If *down* is selected, the controller decrease controller output if setpoint is above the parameter and increase controller output if setpoint is below the parameter.

6.5.5 Controller Output Settings

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, two different types can be defined (*PULSE* and *PWM*). Within the menu *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.

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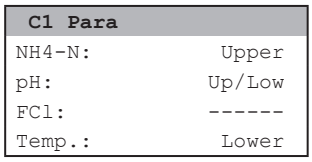
6.5.6 Controller Alarm Settings - [Alarm source...]

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.



7 Data Management

7.1 Data Storage

The con::lyte is equipped with an onboard memory. The current readings of the parameters monitored by the installed probes and sensors will be stored on the con::lyte. Besides the parameter readings themselves, the status of the parameter as well as the status of the probes and sensors are stored. If controller functions are installed on the con::lyte, the related inputs, outputs and the status will be stored also. Finally all modifications performed by the operator on the con::lyte are logged.

7.2 Transfer of Data Storage to 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. To use this functionality the data logger has to be licensed (see section 6.3.6).

```
USB data transfer
Copy results
Delete results
Copy logfile
Delete logs
Update software...
Copy license
```

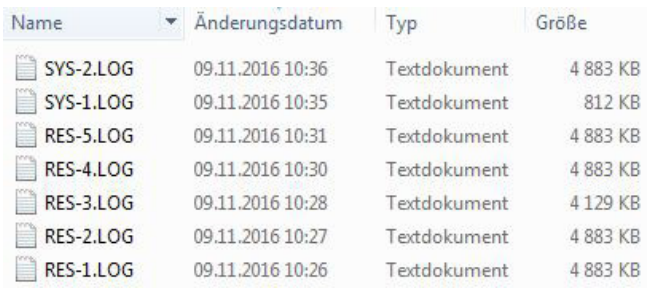
As soon as a USB stick is plugged into the USB slot of the con::lyte, the menu as displayed on the right side will become visible. The menu entries can be selected with the *Up-* and *Down* buttons and have to be confirmed by pushing the *OK* button.

With *Copy results* all parameter and controller data (parameter values, controller values, status, parameter info,…) will be copied to the USB stick. The entry *Delete results* will delete all data actually stored on the con::lyte. Please refer to section 7.2.1 for further details.

With *Copy logfiles* all logged system information will be copied to the USB stick. The entry *Delete logs* will delete all logbook entries actually stored on the con::lyte. This option is available without data logger license also. Please refer to section 7.2.2 for further details.

The names of the result- and logfiles are always the same, 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 results and logs will be splitted into several files (*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.



Name	Änderungsdatum	Typ	Größe
SYS-2.LOG	09.11.2016 10:36	Textdokument	4 883 KB
SYS-1.LOG	09.11.2016 10:35	Textdokument	812 KB
RES-5.LOG	09.11.2016 10:31	Textdokument	4 883 KB
RES-4.LOG	09.11.2016 10:30	Textdokument	4 883 KB
RES-3.LOG	09.11.2016 10:28	Textdokument	4 129 KB
RES-2.LOG	09.11.2016 10:27	Textdokument	4 883 KB
RES-1.LOG	09.11.2016 10:26	Textdokument	4 883 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 *RES-1.LOG*. In general this file contains two types of information. The parameter readings and the corresponding status messages of all parameters as well as all changes of the system-, sensor- or parameter configuration.

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:

- Timestamp — Date and time of measurement (as integer number in seconds since Jan. 1st 1970)
- Timestamp — Date and time of measurement (in format Year / Month / Day / Hour / Minute / Second (YYYYMMTT „T“ hhmmss)

- P — 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 private — Parameter specific quality status (see section 10.2)
- Upper alarm triggered — Alarm info (if the upper alarm was triggered a *U* is displayed, otherwise a - is displayed)
- Lower alarm triggered — Alarm info (if the lower alarm was triggered a *L* is displayed, otherwise a - is displayed)

C	Marks the beginning of the controller data block	
Controller output [%]	Output of controller	
Disturbance input	Input of disturbance control	
Controller status	Status of the controllers	0x0001 - General error 0x0002 - Input error 0x0004 - Output error 0x0008 - Disturbance error
Controller operating mode	Operating mode of controller	0 - Stopped 1 - Running 2 - Hold

Whenever a modification of the monitoring system is performed, the new configuration will be written into the resultfiles. In that way the measured values stored in the resultfiles can be better interpreted. This information block starts with the header line *# *** configuration has changed ****. All following lines start with a # sign, to enable easy sorting of these information from the logged readings. The actual values of the following configuration settings will be available within the information block.

# serial:	serial number of con::lyte
# firmware:	firmware installed actually
# measurement interval:	used measuring interval
# cleaning 1:	used cleaning configuration for cleaning 1
# cleaning 2:	used cleaning configuration for cleaning 2
# 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 resultfile is displayed as an example.

```
1478522460;20161107T124100;P;3.619999;0011;0003;-;-;22.300001;0000;0000;-;-;5.000000;0003;0000;-;-;6.860000;8001;0000;-;-;C
1478522466;20161107T124106;P;3.619999;0011;0003;-;-;22.300001;0000;0000;-;-;5.000000;0003;0000;-;-;6.860000;8001;0000;-;-;C
1478522469;20161107T124109;P;3.619999;0011;0003;-;-;22.300001;0000;0000;-;-;5.000000;0003;0000;-;-;6.860000;8001;0000;-;-;C
# *** configuration has changed ***
# serial: 99999999
# firmware: V7.07B5
# measurement interval: 1
# cleaning 1: (interval=0, delay=0, waiting=0)
# cleaning 2: (interval=0, delay=0, waiting=0)
# parameter settings:
#  P1: NH4-N/ppm, fmt=2, limit=[0.100000:20.000000], alarm=[0.100000:10.000000], sensor=1:P1, alarm req. ack=0
#  P2: Temp./°C, fmt=1, limit=[-10.000000:100.000000], alarm=[nan:nan], sensor=1:P4, alarm req. ack=0
#  P3: K/ppm, fmt=0, limit=[1.000000:1000.000000], alarm=[nan:nan], sensor=1:P2, alarm req. ack=0
#  P4: pH/pH, fmt=2, limit=[2.702430:1.924279], alarm=[nan:nan], sensor=1:P3, alarm req. ack=0
# installed sensors:
#  S1: MODBUS s::can, name=ammo::lyserV2, serial=14440005, address=3, port=1
#  S2: 0/4-20mA mapping=[0/4mA=4.000000, 20mA=20.000000], physical = 1
#  S3: digital, state, invert=0, physical=1
#  S4: MODBUS s::can, name=chlori::lyser, serial=12345678, address=9, port=1
# S5: digital, pulse, period=60.000000, physical=2
# controller configuration:
# output configuration:
# 4-20mA outputs configuration:
# O1, internal, sample 1=6.164000, sample 2=18.488001, physical=1
# O2, internal, sample 1=6.164000, sample 2=18.488001, physical=2
# O3, internal, sample 1=6.164000, sample 2=18.488001, physical=3
# 4-20mA inputs configuration:
# I1, internal, 4mA=777, 16mA=3873, physical=1
```

7.2.2 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 Data Transfer via Modbus Interface

The con::lyte ist equipped with a Modbus interface for continuous data transfer (D-319-out-modbus). This interface can be activated via license and enables data transfer via RS 485 using the Modbus RTU for integration of the parameters into a superior control systems (e.g. SCADA).

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 types and the location of the registers is described in the following sections.

7.3.1 Modbus Datatypes

Each accessible data item can be allocated to one of the types shown in the table below. For all datatypes the Big-Endian encoding is used.

Type	Description	Size (Bytes)	Prefix	Note
unit16	unsigned 16 bit integer	2	ui	NaN = UINT16_MAX
enum	enum type	2	e	
bitmask	bitmask of 16 bits	2	bm	
char[x]	string	x	ab	ASCII
float	IEEE754 floating pints	4	f	NaN = 0xFFFF FFFF
timestamp [1)]	timestamp	12	ts	TAI64N

[1)] Please refer to http://cr.yp.to/proto/tai64.txt

7.3.2 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	128
	xP1Value	0x0082	float	2	R	Para.1 result	130
parameter 2 result	bmP2Status	0x0088	bitmask	1	R	Para.2 status	136
	xP2Value	0x008A	float	2	R	Para.2 result	138
parameter 3 result	bmP3Status	0x0090	bitmask	1	R	Para.3 status	144
	xP3Value	0x0092	float	2	R	Para.3 result	146
parameter 4 result	bmP4Status	0x0098	bitmask	1	R	Para.4 status	152
	xP4Value	0x009A	float	2	R	Para.4 result	154
parameter 5 result	bmP5Status	0x00A0	bitmask	1	R	Para.5 status	160
	xP5Value	0x00A2	float	2	R	Para.5 result	162
parameter 6 result	bmP6Status	0x00A8	bitmask	1	R	Para.6 status	168
	xP6Value	0x00AA	float	2	R	Para.6 result	170

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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	Parameter outside of measuring range
b4	parameter error calibration not o.k.	NaN	at least one calibration coefficient invalid
b1	parameter error hardware error	NaN	
b0	parameter error general	NaN or value	at least one internal parameter check failed

7.3.3 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
mirrored input registers 0 - 144	uiVersion	0x0708	unit16	1	R		1800
	...			186			...
	xP8Value	0x07C2	float	2	R		1986
	xP8PrivValue	0x07C4	-	2	R		1988

[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 of System

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 possible error messages, are displayed in the header line.
System status	No error messages or error symbols are displayed in the header line	See section Troubleshooting
Installation of con::lyte	Housing, plastic cover and cable connections should be 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
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.
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 of 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 settings
Parameter status	No flashing background on the displayed readings.	Check for possible error messages
System status	No error messages or error symbols are displayed in the header line	See section Troubleshooting
Controller status	Check if controller works according to the configuration	Check used input and output parameter of the controller.

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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 of con::lyte

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

9.2 Maintenance of System

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
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 ■ Other reason	■ Adjust clock in setup menu (see section 6.3.4) ■ 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 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
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 detailled status code will be displayed either in binary form (0000, 0001, 0010, 0011, 0100, etc.) or as a hex number (0x0001, 0x0002, 0x0004, 0x0008, 0x0010, etc).

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

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

Within the *Monitor...* function of the con::lyte moni::tool the sensor and parameter status code of a simple parameter has the following format:

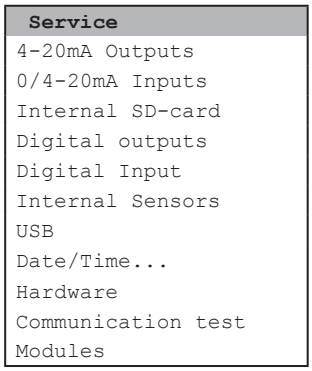
Code	Status Type	Remark
0xSSSS	Sensor status general	valid for all sensors
0xssss	Sensor status private	valid for respective sensor
0xPPPP	Parameter status general	valid for all parameters
0xpppp	Parameter status private	valid for respective parameter

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

10.3 Check of Device for s::can Service

Within the general setup screen (see section 6.3) the menu 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.

The *4-20mA Outputs* menu can be used to check the function of the output modules. After selecting a module (e.g. *4-20mA #1*) either a defined mA signal (*Test [mA]*) or a defined number of counts (*Test [CNT]*) can be sent to the analog output. Now a multimeter can be connected to the corresponding output pins on the terminal block to check the real signal. The *Test* values can be manually changed.

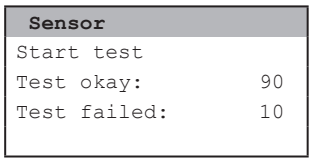


Note: *CNT* means counts. The mA outputs have a digital to analog converter, CNT is the integer value of this DAC. So, 4 mA is approx. 640 counts, 20 mA approx. 3200 counts.

The *Status* will be displayed as *okay* if the module works well. If needed the entries *Sample 1* and *Sample 2* can be used to perform a linear calibration of the output module.

The *0/4-20mA Inputs* menu can be used to check the function of the input module. After selecting a module (e.g. *0/4-20mA in mod. 1*) the value for the input will be displayed (*In [mA]*). If needed the entries *Sample 4mA* and *Sample 20mA* can be used to perform a linear calibration of the input module.

- *Internal SD-card* displays the number of *Sectors* and *Byte/Sec* on the screen. Also a *Format* and *Bechmark* option is available.
- *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 will be displayed.
- *Date/Time...* system date and time can be set within this menu.
- *Hardware* displays the version of the *Mainboard* and provides a possibility to check the internal memory (*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.
- *Modules* this menu provides the possibility to check the two internal connection places for input / output modules.



10.4 Return Consignment (RMA)

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

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

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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

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

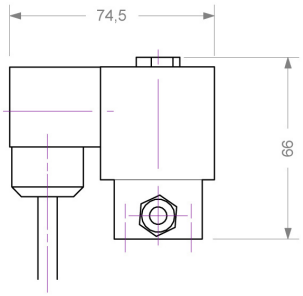
Name	Specification	Remark
Part-no.	C-41-hub	
Cable length	1 m connection cable (C-010-sensor)	included in delivery
Weight	approx. 200 g	
Dimensions	146 / 48 / 30 mm	W / H / D (incl. protective caps)
Housing material	Aluminium anodized	
Other materials	PU grouting	
Mounting	2 holes (5 mm) at 136 mm distance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

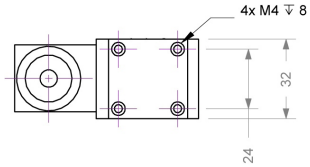
11.2 Automatic Cleaning

11.2.1 Cleaning Valve

For steering 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::nect
Connection fitting compressed air side	B-44: Standard DIN 7.2 coupler B-44-2: coupler screw connection 6/4 mm, nickel-plated brass	*P* inlet pipe compressor (compressed air side)
Connection fitting probe side	B-44: Hose ID $^{3}/_{8}$ inch B-44-2: plug-in fitting (6 mm OD)	*A* inlet pipe probe (probe side)
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.

11.3.1 Analog Output Module

Each con::lyte is equipped with 3 analog outputs (hardware). These internal output modules can be used by ordering the according licence (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. That means a con::lyte can provide in total maximal 7 analog outputs for data transfer to PLC system.

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Name	Specification	Remark
Part-no.	D-319-out-mA D-320-out-mA	Hardware modules Licence for internal modules
Interface		via terminal block, stripped wire, AWG 28-12
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
Assembling D-320-out-mA	licence has to be uploaded via USB stick	

11.3.2 Profibus Module

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

Name	Specification	Remark
Part-no.	D-319-out-profibus	
Interface		via terminal block, stripped wire, AWG 28-12
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 interface for data transfer to PLC-System.

Name	Specification	Remark
Part-no.	D-319-out-modbus	
Interface		via terminal block, stripped wire, AWG 28-12
Assembling	a license code has to be uploaded via USB stick	Modbus also 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	
Assembling	a license code has to be uploaded via USB stick	

12 Technical Specifications

Name	Specification	Remark
Part-no.	D-320-eco-230 D-320-pro1-230 D-320-pro2-230	for 1 sensor for several sensors (max. 6 parameter) for 1 spectrometer probe and sensors
Dimensions housing	236 / 185 / 118 mm 236 / 213 / 118 mm	W / H / D (without cable glands) 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 50°C (-4 to 122°F)	
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	85 to 264 VAC 47 to 63 Hz, cos phi >= 0.12	wide range power supply unit
Power consumption	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 500 Ohm max. load resistance 0 Ohm min. load resistance 20 mA max. output current 12 bit resolution of readings < 1ms response time -50 to -10 µA (at 10mA) drift < 30 µA uncertainty	to system ground/earth > 10Mq over full temperature range after calibration (20°C)
Analog Input	1 intput 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 < 1ms 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)

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Name	Specification	Remark
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 operating cycles	depending on load, an additional snubber circuits might be required as external potection
Digital Intput	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
Interface to automatic cleaning	1 digital output for s::can cleaning devices	2nd cleaning device via normal digital output
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	3 x sys plug connector 1 x terminal block (RS485, 12 VDC) 7 W constant < 15 W peak	only 1 sys plug on D-320-eco-230
Interface to automatic cleaning	1 x cleaning output 12 V+15%, max. 14.5 W total load or max. 3500µF capacitive loading	available power capacity is shared with sensors.
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
Integrated RTC	Accuracy < 2 minutes / month at 25°C	
Interface to SCADA / PC	1 x USB Type B connector 1 x RS485 Modbus RTU (optional via license) Profibus DP (optional via modul)	USB interface is galvanically isolated on internal cable terminals
RS485 termination	electrically isolated 1 kV internal network termination 120 Ohm	
Conformity - ECM	EN 61326-1:2013 EN 61326-2-3:2013	
Conformity - safety	EN 61010-1:2010	
Approvals / Certifications	CE, cTUVus, C-Tick and Gost	
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)	

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