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AlgaeOnlineAnalyser II

User Manual Version 2.10 E1, August 2020





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GENERAL SAFETY PRECAUTIONS

The bbe AlgaeOnlineAnalyser is an instrument for the determination of the concentration of chlorophyll in water. It should only be used for this purpose.

- only instructed staff should operate this instrument.
- consult appropriate safety manual in case of using hazardous compounds and solutions. Wear gloves, coat and safety goggles.
- electrical connection of the instrument should only be carried out by trained staff.
- the instrument should only be opened by authorized staff.
- please refer to the safety instructions of any chemicals used with the AlgaeOnlineAnalyser.
- changes to electrical connections and circuits may cause damage to the instrument and lead to loss of warranty.

THE ALGAEONLINEANALYSER

USE OF THE ALGAEONLINEANALYSER

The AlgaeOnlineAnalyser is an instrument for the analysis of algae in rivers, lakes or reservoirs. It is usually used in a monitoring station. Depending on the configuration of the instrument, there are various parameters which can be determined:

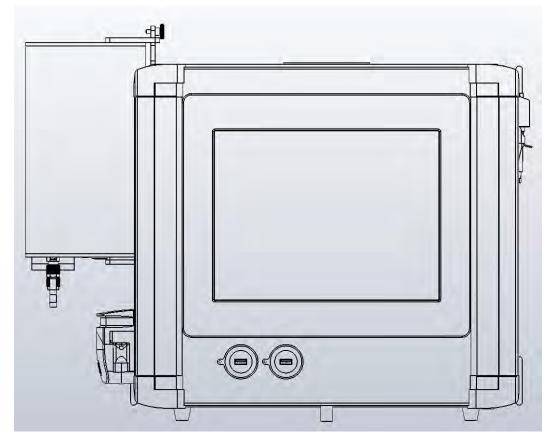
- the total concentration of chlorophyll
- the concentration of up to 5 algae groups (algae differentiation)
- the activity or production rate of these algae groups (Option)
- the transmission of 5 wavelengths (Option)
- detection of yellow substances

The user receives an instrument for the complete survey of the algae content of waterways.

COMPONENTS

The main components of the bbe AlgaeOnlineAnalyser are:

- The sensor unit with cleaning device
- Housing with power-supply and pump (optional valves for multichannel operation)
- PC unit with touchscreen display

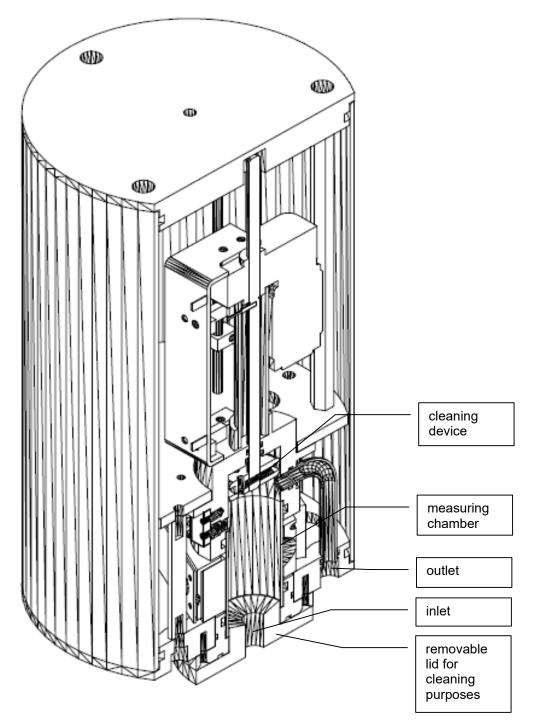


AlgaeOnlineAnalyser front view

THE SENSOR UNIT WITH CLEANING DEVICE

Here the actual measurement is processed. The sample is pumped into the cuvette from below. There the fluorescence is measured with light of different intensity and colour. The data is analysed by a microcontroller integrated into the sensor unit and transferred to the PC. After a certain number of measurements the cuvette is cleaned automatically by the cleaning device.

The humidity detector prevents greater damage to the sensor in case of leakage.



cross-section of the sensor unit (Chlorophyllsensor)

PUMP

The bbe Algae Online Analyser also uses a peristaltic pump – the only degradable part is the hose.

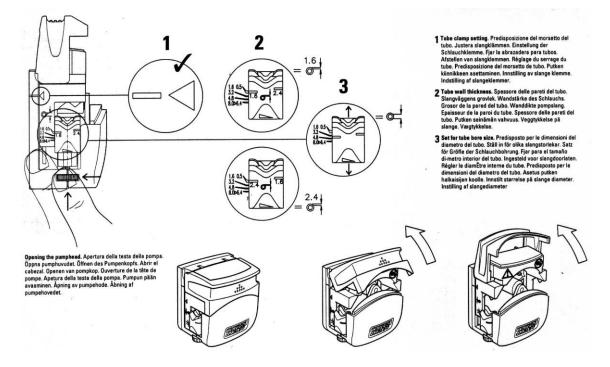
The rolls on the rotor press the hose against the hose saddle and close it at that point. So there is a constant volume between the two rolls that is delivered in the direction of the rotor.

The quantity delivered depends on the number of revolutions of the pump and on the inner diameter of the hose.

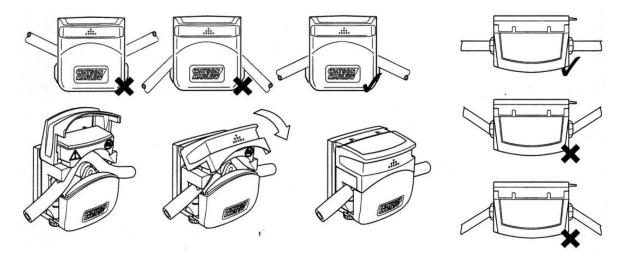
Another advantage is the use of several channels per head. This offers the possibility to have the pumping rates depend on each other and to be determined by the relation of the inner diameters of the hoses.

The hoses of the sample pump are put under considerable strain so we recommended the hoses be changed every 4 weeks.

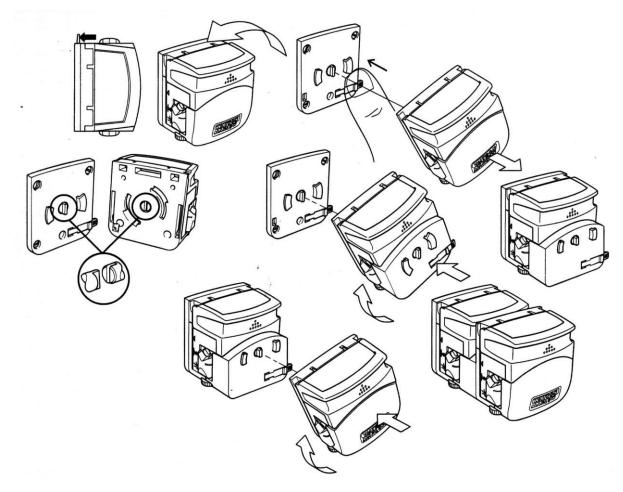
OPERATING



LOADING OF THE TUBE:



FITTING A PUMP HEAD



VALVES (OPTION)

In case of a multichannel instrument, pinch valves are used. Please use the original type of tubes for proper operation.

ENVIRONMENTAL CONDITIONS

For the installation of the bbe Algae Online Analyser a frost-free room has to be chosen. The temperature must not exceed 35°C.

Parameters	Values
Temperature range during use	5 - 35°C
Temperature range during storage	0 - 50°C
Relative humidity	up to 95 %, non-condensed
Exposure to sunlight	No direct exposure to sunlight
Minimum distance from the wall	10 cm
Maximum pressure	0.5 bar above atmospheric pressure

A free drain should also be provided. The bbe Algae Online Analyser is built as a tabletop instrument.

ELECTRICAL CONNECTIONS

SUPPLY CONNECTION

The bbe AlgaeOnline Analyser is supplied with a mains cable with a safety plug. When connecting the instrument, please ensure a waterproof connecting socket.

DATA INTERFACES

RS232 data output

Important:

Please switch off the AlgaeOnlineAnalyser and the external device before connecting the RS232 cable.

The AOA provides a RS232 data output. This is available on a free RS232 port of the external PC or via the RS232 output cable when using an internal PC.

Ethernet

The AOA can be integrated in a LAN. The LAN cable has to be connected directly to the PC. To do so the cable has to be lead through the cable inlet at the right side of the housing.

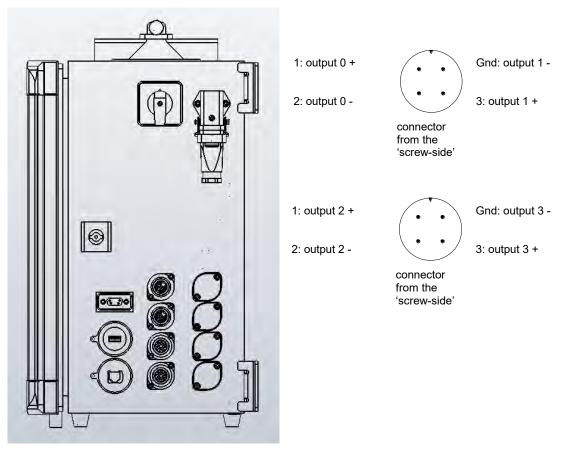




ANALOG OUTPUT - 4-20 MA (OPTION)

Algae Online Analysers can be equipped with 2 or more analog outputs as an option. In this case, there are one or more 4-pin plug connector(s) mounted on the instrument. An extra plug that can be attached to the on-site connection cable is also supplied.

Please note: Common ground lines are not supported. The Ground lines of the 4-20mA outputs must be isolated from each other.



In case of more analog outputs, the following connectors are marked consecutively.

RELAY OUTPUT (OPTION)

The Algae Online Analyser can be equipped with a relay output device.

Connecting the relay output device

There are two (or more) 7-pole connectors on the right side of the instrument. The corresponding cable connector is delivered together with the accessories.

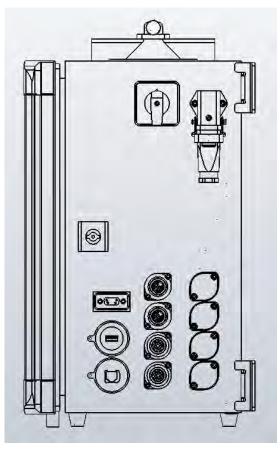
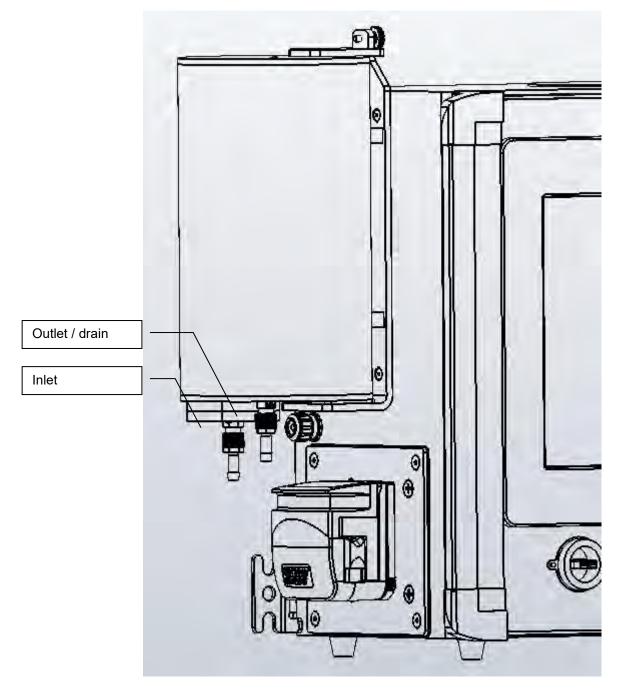


Table of connection:

Connector	Pole	Function
	Printed on the connector	
1	1	Relay 2 / Common
1	2	
1	3	Relay 2 / Normally Open
1	4	Relay 1 / Common
1	5	
1	6	Relay 1 / Normally Open
2	1	Relay 4 / Common
2	2	Relay 4 / Normally Closed
2	3	Relay 4 / Normally Open
2	4	Relay 3 Common
2	5	Relay 3 Normally Closed
2	6	Relay 3 Normally Open

HYDRAULIC CONNECTIONS

CONNECTIONS OF THE CHLOROPHYLL SENSOR



WITHOUT INTEGRATED SAMPLE PUMP

The sample has to flow continuously through the instrument. For this, a maximum pressure of 0.2 bar is allowed. Please ensure that this pressure is not exceeded, even if the effluent is blocked. The inlet is on the bottom in the center of the removable lid.

WITH INTEGRATED SAMPLE PUMP

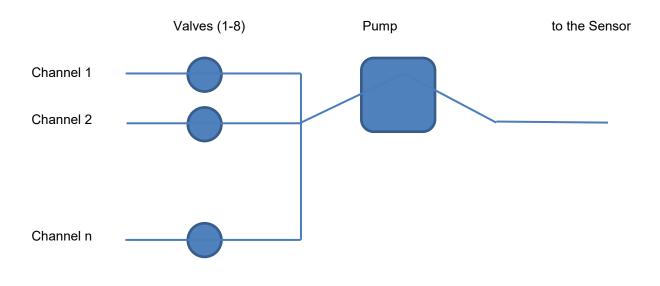
Connect the intake of the integrated pump to the water source and the outlet of the pump to the connector at the bottom of the sensor of the AlgaeOnlineAnalyser.

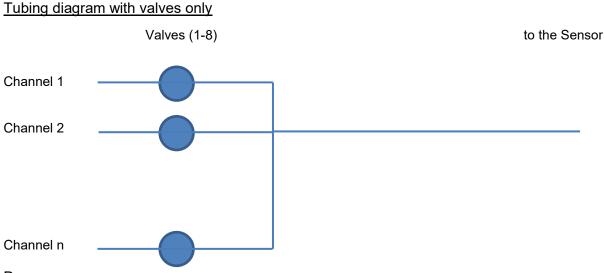
MULTICHANNEL VERSION

Integrating valves in the AOA extends the instrument to a multi-channel device. The valve can be used with and without the peristaltic pump. The pump is required as soon as the pressure of one of the sample streams is not sufficient.



Tubing diagram with valves and pump





DRAIN

The drain of the instrument needs to be fed into an open, pressure-free drain.

QUICK START

- Connect the mains
- Connect the LAN / RS232 / 4-20mA
- Connect the hoses
- Close the peristaltic pump
- Switch the instrument on and let the PC boot
- Adjust pumping time and procedure according to your needs
- Start the measurement using the "start" button
- The measurement can be stopped at any time via the "stop" button

MEASUREMENT PROCEDURES

First of all, a survey of the single steps of a measurement.

MEASURING SEQUENCE (STANDARD SEQUENCE)

- 1. Pumping during startup or opening the sample valve
- 2. Brightness tuning of the internal LED
- 3. Pumping sample or opening the sample valve
- 4. Measurement (including activity measurement if available)
- 5. Cleaning
- 6. Waiting for the next measurement
- 7. Go to step 2

MEASURING SEQUENCE (FLOW THROUGH)

- 1. Flushing during startup
- 2. Brightness tuning of the internal LED
- 3. Measurement (concentration measurement only)
- 4. Cleaning
- 5. Waiting for the next measurement
- 6. Go to step 2

MEASURING SEQUENCE (MULTICHANNEL VERSION)

- 1. Pumping channel 1 during startup or opening the sample valve 1
- 2. Pumping channel 2 to n during startup or opening the sample valve 2 to n
- 3. Brightness tuning of the internal LED
- 4. Pumping sample or opening the sample valve for the current channel
- 5. Measurement (including activity measurement if available)
- 6. Cleaning
- 7. Go to step 2 for channel 1 to n
- 8. Waiting for the next measurement

INTERVAL PUMPING VS. CONTINUOUS PUMPING

Two operation modes for the pump and/or the valves are selectable:

- Interval mode or
- Continuous mode.

Interval mode

The pump is working (or the valve is opening) before each measurement and it is not working during the measurement.

Advantages; This enables to perform activity measurements. The working time of the pump and the tube is short, the lifetime extended.

Disadvantages; Measurement is slower In multichannel applications it takes longer to exchange the sample

Continuous mode.

The pump is working (or the valve is opening) all the time for fat response. Not suitable for activity measurements.

BBE++ SOFTWARE

The bbe++ software is delivered together with bbe instruments. If a PC is delivered with the instrument or integrated in the instrument, the software is already installed.

It provides the following functions:

- operation, control and calibration of bbe instruments
- data analysis and display in tables and diagrams
- export in different formats

This chapter describes the general functions of the bbe++ software. The examples may show data or parameters of other bbe instruments. The data and parameters of your instrument can easily be handled accordingly. Whenever this manual deals with special features of a certain instrument, this will be explained in the special instrument chapter.

The data and parameters of the instruments are stored in a database. A single database may contain the data of different instruments of the same type and also different types of instruments.

SOFTWARE SET-UP

The software is stored on a CD delivered with the instrument. The latest version can also be downloaded from the bbe website after registration (<u>http://www.bbe-moldaenke.de/log-in/</u>).

The Windows autorun function should start the installation automatically. If it does not, open the Explorer and click on **setup.exe** on the CD for installation.

Welcome window: click "NEXT >"



Choose the destination folder and click "NEXT >"

bbe++ Setup			_ 🗆 🗙
Choose Install Location Choose the folder in which you wish to install t	bbe++.		(van)
Setup will install bbe++ in the following folder. select a different folder. Click Next to continue		ifferent folder, (click Browse and
Destination Folder			
C:\Programme\bbe++		Br	rowse
Space required: 5.2MB Space available: 23.5GB			
	< Back	Next >	Cancel

Choose a new start menu folder and click "NEXT >"

🕏 bbe++ Setup	_ 🗆 🗙
Choose Start Menu Folder Choose a Start Menu folder for the bbe++ shortcuts.	North Control of Contr
Select the Start Menu folder in which you would like to create the program's shortc can also enter a name to create a new folder.	uts. You
bbe++	
adIQ - Adwords Combinator 1.5.1 Advantech Automation Alfviewer Demo Algae Online Analyser ASUS ATox Autodesk Autostart Avira bbe++ BlueBox	•
Do not create shortcuts	
< Back Next >	Cancel

Choose your preferred language and click "NEXT >"

nstall Options Select install option. Please select from the option below whether you would like to create a shortcut on desktop. ✓ Create a shortcut on desktop.	
desktop.	
Create a shortcut on desktop.	
Choose language	
English 🔽 English Deutsch	

Final success window of the bbe++ installation. Click "FINISH".



DESKTOP ICON OF THE BBE++ SOFTWARE

The setup installs an icon for the bbe++ software on the desktop (if chosen during installation).



BBE++ SOFTWARE IN THE START MENU

The bbe++ folder in the start menu contains:

- bbe++ software
- installed manuals
- link to the data folder of bbe++



SOFTWARE UPDATE

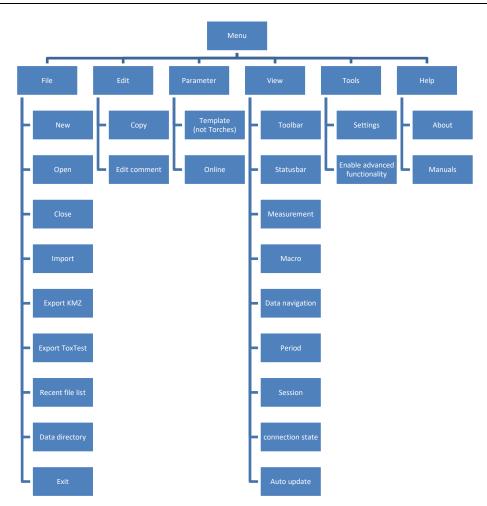
Updates of the bbe++ software and manuals can be downloaded from the bbe website <u>http://www.bbe-moldaenke.de</u> after registration.

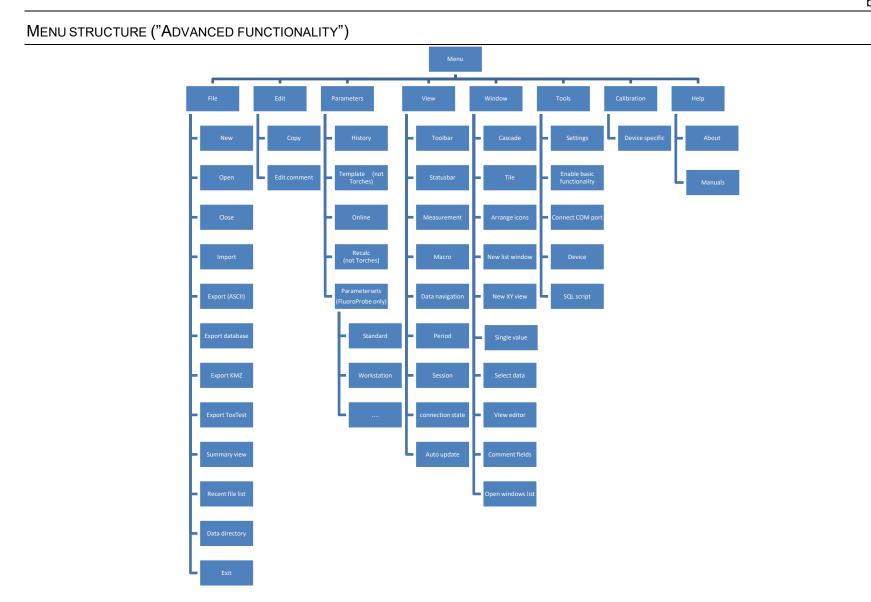
STRUCTURE OF THE SOFTWARE

The following menus are available in the bbe++ software. Whether a menu is displayed, depends on the access level set.

- FILE contains all the input/output functions.
- EDIT contains functions to copy data and graphics.
- PARAMETER contains functions to set the parameters of an instrument and to adapt the parameters of data already measured.
- VIEW contains functions to show and hide toolbars.
- WINDOW contains functions to show the data in different types of tables and graphics as well as editors to change the layout (advanced functionality level only)
- TOOLS contains options to change settings that influence the behaviour of the bbe++ software and the way of operating the instruments.
- CALIBRATION contains the items to calibrate different bbe instruments (advanced functionality level only)
- HELP contains information about the current bbe++ version.

MENU STRUCTURE ("BASIC FUNCTIONALITY")





GENERAL CONSIDERATIONS FOR STORING AND DISPLAYING DATA AND PARAMETERS IN BBE++

WHAT IS STORED IN A BBE++ DATABASE?

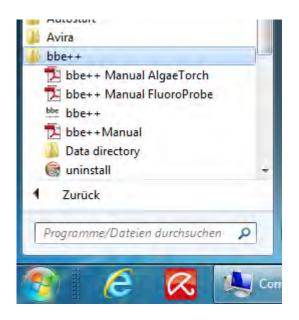
The measuring results and instrument parameters of different bbe instruments are stored. It is possible to retrieve the corresponding instrument parameters for each single result.

In the so-called "Summary View" the serial numbers of the instruments and the time ranges for all data stored in this database are shown. This view can be used to select the desired data as well as the corresponding parameters for display.

The database files are marked with the extension *.bdb (bbe database)

WHERE IS THE DATABASE STORED?

The database of bbe++ is stored in the standard application folder of Windows. The name of the folder depends on the operation system and the language. For example: C:\ProgramData\bbe++ in the Windows 7 English version. To access this folder easily, there is a link in the file menu of bbe++ or start menu of Windows called "Data directory":



HOW TO DISPLAY THE DATA?

In the bbe++ software, different views have been pre-defined for each instrument:

- graphics
- tables
- single dataset
- data export

User-defined views may be added as well.

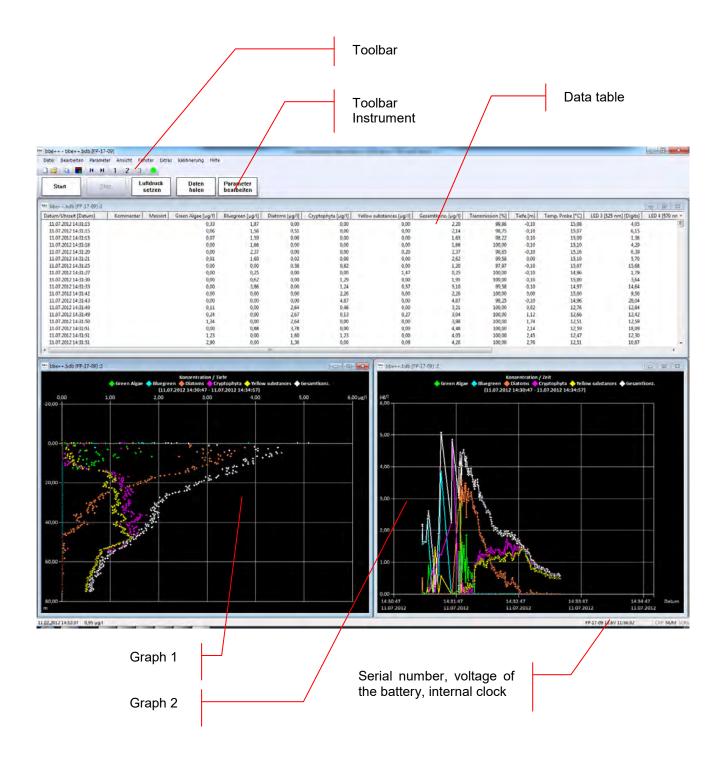
SIMULTANEOUS DISPLAY OF DATA OF DIFFERENT TYPES OF INSTRUMENTS

After opening a database file, the data of different instruments of the same type may be displayed simultaneously. To display the data of another type of instrument from the same database file, this file can be opened more than once.

WHO CAN ACCESS TO THE PARAMETERS OF THE INSTRUMENTS?

The bbe++ software has 2 access levels – basic functionality and advanced functionality. Depending on the different access levels, more or fewer menu items and parameters are shown. There are different settings for reading or writing access. The advanced functionality level can be password protected.

DESKTOP OF THE BBE++ SOFTWARE.



TOOLBAR

Toolbar to navigate within the datasets.

TOOLBAR INSTRUMENT

Toolbar to operate the instrument

GRAPHIC- UND TABLE VIEWS

User configurable windows with graphs and tables.

SERIAL NUMBER, VOLTAGE OF THE BATTERY, INTERNAL CLOCK

Display of the data of the connected instrument: serial number, voltage of the battery and internal clock.

THE MENUS

FILE MENU

The File Menu contains all the input/output functions.

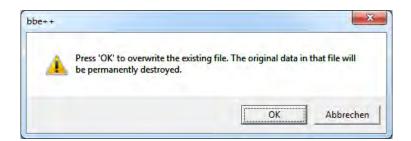
File	Edit	Parameters	View	Window	Tools	Calibratior
	New					Strg+N
2	Open					Strg+O
	Close					
	Import					•
	Export	(ASCII)				•
	Export	(Database)				
	Export	(KMZ / Googl	e Earth)			
	Export	(ToxTest proto	ocol)			
	Summa	ary View				
	2 ALA_ 3 Test_ 4 Stech 5 C:\Us 6 bbe+ 7 S:\Pri 8 TS_21	ogramData\bl DAtenbank_U Algenmischur nlin_Probemes sers\\bbe++ ++ - Kopie.bdl odukte\\bbe I-22_OldbbeD	V-Versuing_11022 ssung_be (2).bdb b 2++.bdb	che_0105202 2014.bdb erechnete Fi	ngerprir	
	Exit	liccioly				
	EXIL					
	Impo	rt				
_						
	Expor	t				

New

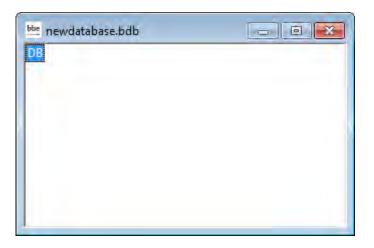
Creates a new database file for data and parameters.

	bbe++	- ← 🖻 📥 -			
Name	*	Änderungsdatum	Тур	Größe	
be bbe-	++.000	26.07,2012 10:38	bbe++ Data File	910 K	,D

If the new database already exists, the existing database is deleted after confirming the following message:



The new and empty database is displayed.



New data can be entered in the database by importing or by starting a measurement.

<u>Open</u>

Opens an existing database. If there are already data in the database, the "Summary View" window appears. The type and serial number of the instrument can be chosen as well as the time range. The following example shows a database containing data from different FluoroProbes.

be newdatabase	bdb	
DB		
FluoroProbe		
FP-21-24	14.07.2011 - 14.07.2011	
FP-21-33	14.07.2011 - 14.07.2011	

<u>Close</u>

Closes the active database.

Import (FluoroProbe / AlgaeTorch / BenthoTorch)

This function is used to import *.FLP files into the database. These files can be results transferred from the FluoroProbe to a USB stick or files generated by the first version of the FluoroProbe software.

To import, please choose the file from the file system:

Öffnen

It is possible to select more than one file by pressing the shift key while selecting the file.

FluoroProbe only: Afterwards choose how to apply the air pressure and hence the calculation of depth.

Apply air pressure as given in file	
Apply air pressure from first data set	
Air pressure: 1000 mbar	

Air pressure as given in file (FluoroProbe and AlgaeTorch 100 only)

Air pressure was measured at the beginning of the measurement. This value is used.

Air pressure from first data set (FluoroProbe and AlgaeTorch 100 only)

The first measurement of air pressure took place in air. This is the appropriate selection if an autostart-plug without a PC was used (for further information see the FluoroProbe-manual).

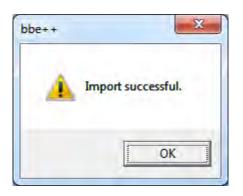
Air pressure (FluoroProbe and AlgaeTorch 100 only)

Allows the entry of a constant value. To be used if the FluoroProbe was submerged for a longer time and unable to measure the air pressure by itself.

In case of FluoroProbe data, the results are recalculated from the raw data after importing.

X
_

The calculation procedure takes place in subsequent steps. After importing all data, a success message is shown.



Export (ASCII)

This item exports the data as an ASCII file to load them into other programs. To select columns to be exported and the separator that is used, please see the description of the View Editor. The view editor allows the user to define different export formats for each instrument. All export formats of the current instrument are shown in the menu:

Export	Export all
--------	------------

The default export view is "Export all".

After clicking on "Export all", the name and folder of the exported file can be selected.

Hint: To transfer data to Excel, use the copy and paste feature in the "Edit" menu.

Export (Database)

This item is used to export parts of a database to a new (and smaller) one. The exported database can be read with bbe++ again. This might be useful when parts of the database are transferred via email.

The currently selected data ("WINDOW \rightarrow SELECT DATA") are exported.

Export (KMZ) – AlgaeTorch / BenthoTorch / FluoroProbe

This item is used to export geo data from instruments with GPS receiver to be displayed in Google Earth.

Export (ToxTest protocol) – AlgaeLabAnalyser only

This item is used to export the results of toxicity tests conducted with the AlgaeLabAnalyser to Excel.

Summary View

Opens a new window that gives an overview of all the data and instruments in the current database:

bbe++.bdb [FP-18-03] :3	<u>_ ×</u>
AlgaeTorch AT-04-002 01.04.2010 - 07.04.2010 FluoroProbe FP-18-07 01.04.2009 - 01.04.2009 FP-18-03 15.06.2009 - 15.06.2009 FP-07-01 30.03.2006 - 30.03.2006 FP-15-02 22.02.2007 - 22.02.2007	

The database bbe++.bdb above contains data of two types of instruments: AlgaeTorch and FluoroProbe.

The serial numbers and the point in time of the first measurement and the last measurement stored in the database are shown below the heading with the name of the instrument.

The header of the window (bbe++.bdb [FP-18-03] :3 has the following meaning:

- the name of the database bbe++.bdb
 the serial number of the instrument for which the data in the data windows are currently shown [FP-18-03]
- the number of the window if there is more than one open window :3

The summary view can be used to directly access the data or parameters of one of the listed instruments. To do so, use the right mouse click on the serial number:

bbe++.bdb [FP-19-01]:4	
DB FluoroProbe FP-19-01 FP-21-34 FP-21-22	11.03.2011 - 12.10.2011 08.07.2011 - 11.07.2011 08.07.2011 - 11.07.2011 08.07.2011 - 11.07.2011 08.07.2011 - 11.07.2011 08.07.2011 - 11.07.2011 08.07.2011 - 11.07.2011	

A selection of different periods and parameters are shown. After selecting one of the given periods, it is shown using the default view.

👑 bbe++.bdb [I	-P-15-02]		<u>_ 🗆 ×</u>
Date/Time [date]	Conc 0 [Green Algae] [µg/l]	Conc 1 [Bluegreen] [µg/l]	Conc 2 [Diatoms] [µ 🔺
22.02.2007 15:27:25	0	1,34	
22.02.2007 15:27:34	0	1,43	
22.02.2007 15:27:40	0	1,41	
22.02.2007 15:27:47	0	1,37	
22.02.2007 15:27:53	0	1,45	:
22.02.2007 15:28:00	0	1,4	
22.02.2007 15:28:06	0	1,34	
22.02.2007 15:28:13	0	1,35	
22.02.2007 15:28:20	0	1,38	
22.02.2007 15:28:26	0	1,42	
22.02.2007 15:28:35	0	1,3	:
22.02.2007 15:28:41	0	1,47	:
22.02.2007 15:28:48	0	1,4	:
22.02.2007 15:28:54	0	1,33	:
22.02.2007 15:29:01	0	1,46	
22.02.2007 15:29:08	0	1,39	
22.02.2007 15:29:14	0	1,37	-
•			

For further information about the parameters window, please see the chapter Parameters.

<u>1. ... 2. ... 3. ...</u>

Names of the last database files opened for quick reload.

Data Directory

Opens the explorer with the current data directory to copy or rename the data base. This is the same function as in the start menu up to Windows 7.

<u>Exit</u>

Terminates the program.

EDIT MENU

This menu contains commands to copy data/graphics from bbe++ and add them to the clipboard.

Edit Parameters View W Copy Ctrl+C Edit Comment Delete Data

<u>Copy</u>

The content of the active window will be copied to the clipboard. Depending on the type of the active window, this is either a graph or a table.

Tables can be pasted to EXCEL directly.

How to copy data to EXCEL:

Use "WINDOW \rightarrow SELECT DATA" to select the data you want to copy to EXCEL. Use the list window type that contains all the columns to be exported. Please note: only the columns from the active view are exported.

bbe++.bdb [FF	⊃-18-03]:1			<u>_ 🗆 ×</u>
Date/Time [date]	Conc 0 [Green Algae] [µg/l]	Conc 1 (Bluegreen) (µg/l)	Conc 2 [Diatoms] [µg/l]	Conc 3 [Cryptophyta] [µg/l] C
15.06.2009 09:10:50	0	0,813	0	0,495 🔜
15.06.2009 09:10:53	0	1,04	0	0
15.06.2009 09:10:55	0	0	0	0
15.06.2009 09:10:57	0	2,28	0	0
15.06.2009 09:11:00	1,08	0,829	0	0
15.06.2009 09:11:02	0	0,142	0	2,09
15.06.2009 09:11:04	0,0475	0,956	0	0,908
15.06.2009 09:11:07	0	0,932	0	0
15.06.2009 09:11:09	0	1,2	0	0
15.06.2009 09:11:12	0	0,74	0	0
15.06.2009 09:11:14	0	0,561	0	0,936
15.06.2009 09:11:16	0	0,698	0	0
15.06.2009 09:11:19	0,945	0,779	0	0
15.06.2009 09:11:21	0	0,804	0	0
15.06.2009 09:11:23	3,35	0	0	0
15.06.2009 09:11:26	1,07	0,488	0	0
15.06.2009 09:11:28	0	0,261	0	2,03
15.06.2009 09:11:31	1,52	0,227	0	0
15.06.2009 09:11:33	0	1,1	0	0
15.06.2009 09:11:35	0	1,58	0	1,97
15.06.2009 09:11:38	5,41	0	0	0,883
15.06.2009 09:11:40	3,26	0	2,18	0
15.06.2009 09:11:42	0,792	0	2,82	0 🚽
15 oc 2000 00.11.45		^	+	

- click on "EDIT → COPY"
- open Excel with an empty datasheet
- click on "EDIT → PASTE" in Excel

					— — —	
	B7 💌	= 1,08				
	A	В	С	D	E	
1	Date/Time	Conc 0 [Green Algae]	Conc 1 [Bluegreen]	Conc 2 [Diatoms]	Conc 3 [Cryptophyta] (Cc
2	date	µg/l	µg/l	µg/l		μg
3	15.06.2009 09:10	0	0,813	0	0,495	
4	15.06.2009 09:10	0	1,04	0	0	
5	15.06.2009 09:10	0	0	0	0	
6	15.06.2009 09:10	0	2,28	0	0	
7	15.06.2009 09:11	1,08	0,829	0	0	
8	15.06.2009 09:11	0	0,142	0	2,09	_
9	15.06.2009 09:11	0,0475	0,956	0	0,908	_
10	15.06.2009 09:11	0	0,932	0	0	_
11	15.06.2009 09:11	0	1,2	0	0	_
12	15.06.2009 09:11	0	0,74	0	0	_
13	15.06.2009 09:11	0	0,561	0	0,936	_
14	15.06.2009 09:11	0	0,698	0	0	_
15	15.06.2009 09:11	0,945	0,779	0	0	_
16	15.06.2009 09:11	0	0,804	0	0	_
17	15.06.2009 09:11	3,35	0	0	0	_
18	15.06.2009 09:11	1,07	0,488	0	0	_
19 20	15.06.2009 09:11 15.06.2009 09:11	0	0,261	0	2,03	_
20	15.06.2009 09:11	1,52	0,227	0	0	_
22	15.06.2009 09:11	0	1,58	0	1,97	-
23	15.06.2009 09:11	5,41	0	0	0,883	_
24	15.06.2009 09:11	3,26	0	2,18	0,003	
25	15.06.2009 09:11	0,792	0	2,10	0	
26	15.06.2009 09:11	2,92	0	1,33	2,85	
27	15.06.2009 09:11	6,68	0	0	1,54	
28	15.06.2009 09:11	6,56	0	0.939	0,492	
29	15.06.2009 09:11	0,00	0,111	1,16	0,402	
30	15.06.2009 09:11	0	0,363	0	0,598	
31	15.06.2009.09:11	4 4	0,000		1.77	-
		(Tabelle2 / Tabelle3 /		•	•	

Now the data can be used for all kinds off calculations within Excel.

Edit Comment - advanced functionality only

To edit the comment of one or more datasets mark the datasets in the table view. A dataset can be marked with a mouse click. Multiple datasets can be marked be pressing Ctrl key while clicking on the dataset required.

bbe++-New.bdb[FP-17-09] ile Edit Parameters View Windv	ow Tools Calibration Help					_0;
	Tools Calibration http					
Start Stop	Set air pressure Get data	a Edit parameters				
🚾 New.bdb [FP-17-09]						_ _ _ _ _
Date/Time [date]	Comment Green Algae [µg/l] Blueg	green [µg/l] Diatoms [µg/l]	Cryptophyta [µg/l]	#5 [µg/l]	Yellow substances [µg/l]	Total conc. [µg/l]
27.12.2011 08:41:23	0,33	1,87 0,00	0,00	0,00	0,00	2,20 -
27.12.2011 08:41:24	0,06	1,58 0,51	0,00	0,00	0,00	2,14
27.12.2011 08:41:24	0,07	1,59 0,00	0,00	0,00	0,00	1,65
27.12.2011 08:41:26	0,00	1,66 0,00	0,00	0,00	0,00	1,66
27.12.2011 08:41:29	0,00	2,37 0,00	0,00	0,00	0,20	2,37
27.12.2011 08:41:30	0,91	1,69 0,02	0,00	0,00	0,00	2,62
27.12.2011 08:41:34	0,00	0,00 0,38	0,82	0,00	0,00	1,20
27.12.2011 08:41:36	0,00	0,25 0,00	0,00	0,00	1,47	0,25
27.12.2011 08:41:39	0,00	0,62 0,00	1,29	0,00	0,00	1,91
27.12.2011 08:41:41	0,00	3,86 0,00	1,24	0,00	0,57	5,10
27.12.2011 08:41:50	0,00	0,00 0,00	2,26	0,00	0,00	2,26
27.12.2011 08:41:51	0,00	0,00 0,00	4,87	0,00	0,00	4,87
27.12.2011 08:41:57	0,11	0,00 2,64	0,46	0,00	0,00	3,21
27.12.2011 08:41:58	0,24	0,00 2,67	0,13	0,00	0,27	3,04
27.12.2011 08:41:59	1,34	0,00 2,64	0,00	0,00	0,00	3,98
27.12.2011 08:41:59	0,00	0,68 3,78	0,00	0,00	0,09	4,46
27.12.2011 08:41:59	1,23	0,00 1,60	1,23	0,00	0,00	4,05
27.12.2011 08:42:00	2,90	0,00 1,36	0,00	0,00	0,09	4,26
27.12.2011 08:42:00	0,95	0,00 2,92	0,14	0,00	0,14	4,01
27.12.2011 08:42:01	0,38	0,00 3,08	0,00	0,00	0,51	3,46
27.12.2011 08:42:01	0,48	0,00 3,57	0,00	0,00	0,00	4,05
27.12.2011 08:42:01	1,63	0,00 2,79	0,00	0,00	0,00	4,43
27.12.2011 08:42:02	0,71	0,00 3,36	0,36	0,00	0,00	4,43
27.12.2011 08:42:02	1,51	0,00 3,02	0,00	0,00	0,00	4,54
27.12.2011 08:42:03	1,53	0,00 2,92	0,00	0,00	0,21	4,45 🗸
						Þ
adv						NUM

Go to Edit \rightarrow Edit comments or use right click on the marked datasets:

	0,07	1,59
	0,00	1,66
	0,00	2,37
	History of Parameters	1,69
	Edit Comment	0,00
	Delete Data	0,25
	Data Fields Selection	0,62
-	0,00	3,86
	0,00	0,00
	0,00	0,00
	0,11	0,00

Enter the new comment for the selected data:

be New.bdb [FP-17-09]									_ 🗆 ×
Date/Time [date]	Comment	Green Algae [µg/l]	Bluegreen [µg/l]	Distance [um/l]	Cryptophyta [µg/l]	#F 5	Yellow substances [µg/l]	Total conc. [µg/l]	Transmission 🔺
				Diatoms [µg/l]		#5 [µg/l]			
27.12.2011 08:41:23		0,33	1,87	0,00	0,00	0,00	0,00	2,20	5
27.12.2011 08:41:24		0,06	1,58	0,51	0,00	0,00	0,00	2,14	9
27.12.2011 08:41:24		0,07	1,59	0,00	0,00	0,00	0,00	1,65	ç
27.12.2011 08:41:26		0,00	1,66	0,00	0,00	0,00	0,00	1,66	10
27.12.2011 08:41:29		0,00	2,37	0,00	0,00	0,00	0,20	2,37	ç
27.12.2011 08:41:30		0,91	1,69	0,02	0,00	0,00	0,00	2,62	Ş
27.12.2011 08:41:34		0,00	0,00	0,38	0,82	0,00	0,00	1,20	9
27.12.2011 08:41:36		0,00	0,25	0,00	0,00	0,00	1,47	0,25	10
27.12.2011 08:41:39		Comments						×	10
27.12.2011 08:41:41									ç
27.12.2011 08:41:50		Title	Туре	Text					10
27.12.2011 08:41:51		Comr	nent Text	🔽 This is the n	new comment				ç
27.12.2011 08:41:57		_							10
27.12.2011 08:41:58									10
27.12.2011 08:41:59		ОК	7						10
27.12.2011 08:41:59		UK						Cancel	10
27.12.2011 08:41:59			<u> </u>				· · · · ·		10
27.12.2011 08:42:00		2,90	0,00	1,36	0,00	0,00	0,09	4,26	10
27.12.2011 08:42:00		0,95	0,00	2,92	0,14	0,00	0,14	4,01	1C
27.12.2011 08:42:01		0,38	0,00	3,08	0,00	0,00	0,51	3,46	10
27.12.2011 08:42:01		0,48	0,00	3,57	0,00	0,00	0,00	4,05	10
27.12.2011 08:42:01		1,63	0,00	2,79	0,00	0,00	0,00	4,43	10
27.12.2011 08:42:02		0,71	0,00	3,36	0,36	0,00	0,00	4,43	10
27.12.2011 08:42:02		1,51	0,00	3,02	0,00	0,00	0,00	4,54	10
27.12.2011 08:42:03		1,53	0,00	2,92	0,00	0,00	0,21	4,45	10 🗸
•									

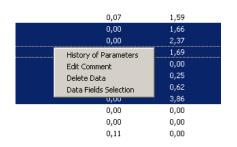
Click OK:

bbe New.bdb [FP-17-09]								_ 0	×
Date/Time [date]	Comment	Green Algae [µg/l]	Bluegreen [µg/l]	Diatoms [µg/l]	Cryptophyta [µg/l]	#5 [µg/l]	Yellow substances [µg/l]	Total conc. [µg/l]	
27.12.2011 08:41:23		0,33	1,87	0,00	0,00	0,00	0,00	2,20	
27.12.2011 08:41:24		0,06	1,58	0,51	0,00	0,00	0,00	2,14	
27.12.2011 08:41:24		0,07	1,59	0,00	0,00	0,00	0,00	1,65	
27.12.2011 08:41:26	This is the new comm	0,00	1,66	0,00	0,00	0,00	0,00	1,66	
27.12.2011 08:41:29	This is the new comm	0,00	2,37	0,00	0,00	0,00	0,20	2,37	
27.12.2011 08:41:30	This is the new comm	0,91	1,69	0,02	0,00	0,00	0,00	2,62	
27.12.2011 08:41:34	This is the new comm	0,00	0,00	0,38	0,82	0,00	0,00	1,20	
27.12.2011 08:41:36	This is the new comm	0,00	0,25	0,00	0,00	0,00	1,47	0,25	
27.12.2011 08:41:39	This is the new comm	0,00	0,62	0,00	1,29	0,00	0,00	1,91	
27.12.2011 08:41:41	This is the new comm	0,00	3,86	0,00	1,24	0,00	0,57	5,10	
27.12.2011 08:41:50		0,00	0,00	0,00	2,26	0,00	0,00	2,26	
27.12.2011 08:41:51		0,00	0,00	0,00	4,87	0,00	0,00	4,87	
27.12.2011 08:41:57		0,11	0,00	2,64	0,46	0,00	0,00	3,21	
27.12.2011 08:41:58		0,24	0,00	2,67	0,13	0,00	0,27	3,04	
27.12.2011 08:41:59		1,34	0,00	2,64	0,00	0,00	0,00	3,98	
27.12.2011 08:41:59		0,00	0,68	3,78	0,00	0,00	0,09	4,46	
27.12.2011 08:41:59		1,23	0,00	1,60	1,23	0,00	0,00	4,05	
27.12.2011 08:42:00		2,90	0,00	1,36	0,00	0,00	0,09	4,26	
27.12.2011 08:42:00		0,95	0,00	2,92	0,14	0,00	0,14	4,01	
27.12.2011 08:42:01		0,38	0,00	3,08	0,00	0,00	0,51	3,46	
27.12.2011 08:42:01		0,48	0,00	3,57	0,00	0,00	0,00	4,05	
27.12.2011 08:42:01		1,63	0,00	2,79	0,00	0,00	0,00	4,43	
27.12.2011 08:42:02		0,71	0,00	3,36	0,36	0,00	0,00	4,43	
27.12.2011 08:42:02		1,51	0,00	3,02	0,00	0,00	0,00	4,54	
27.12.2011 08:42:03		1,53	0,00	2,92	0,00	0,00	0,21	4,45	-
<u> </u>								•	ſ//

Delete Data - advanced functionality only

To delete data, mark the datasets as described above.

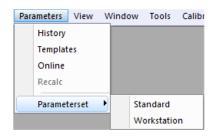
Go to "EDIT \rightarrow DELETE DATA" or use right click on the marked datasets:



Click OK to delete the data.

Delete options	×
You have marked 7 out of 962 data sets.	
Please choose which data sets to delete.	
 Delete marked data sets only Delete all data sets 	
OK Cancel	

PARAMETERS MENU



Item	Function	Available for
History	Display parameters of datasets stored in the database	All instruments
Template	Apply a user-defined selection of parameters to an instrument	All but AlgaeTorch and BenthoTorch
Online	Display and change parameters in the instruments	All but AlgaeTorch and BenthoTorch
Recalc	Recalculate the datasets in the database with another set of calibration parameters	All but AlgaeTorch and BenthoTorch
Parameterset	Select a parameter set from the ones stored in the instrument – see description below.	FluoroProbe with parameter sets

The first 4 selections in the menu lead to one tab of the Parameters window.

Please note: Only parameters of the current type of instrument are shown. It depends on the user level, whether a parameter is shown or not. The higher the user level, the more parameters are shown. For example of parameter listings for user levels, please see the examples below.

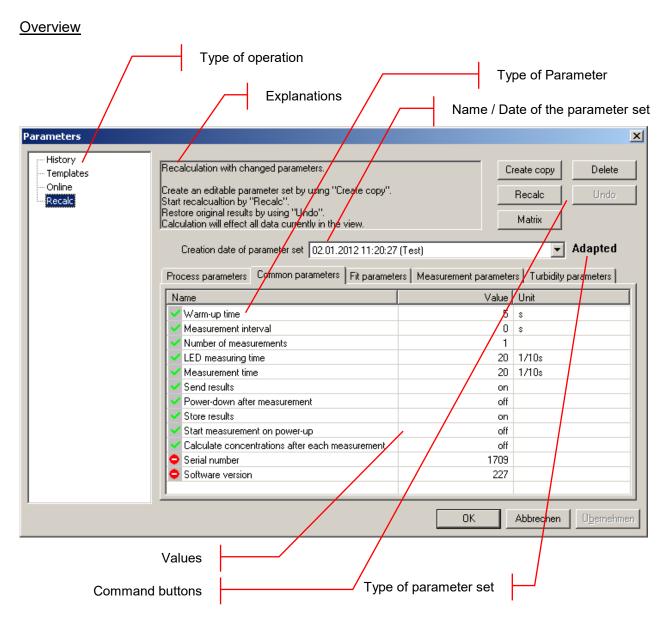
Access level "advanced functionality":

History Templates Online Recalc	Device parameters Parameters can be edited and copied to the clipboard. Changed parameters will be sent to the device when you using the "OK" button.	close this window by	Matrix Clipboard
	Creation date of parameter set 29.12.2011 15:08:00)	▼ Online
	Process parameters Common parameters Fit paramet	ers Measurement paramete	rs Turbidity parameters
	Name	Value	Unit
	Varm-up time	5	s
	Measurement interval	0	s
	Number of measurements	1	
	LED measuring time	20	1/10s
	✓ Measurement time	20	1/10s
	Send results	on	
	Power-down after measurement	off	
	Store results	on	
	Start measurement on power-up	off	
	Calculate concentrations after each measurement	off	
	Serial number	1709	
	Software version	227	

Access level "User":

Parameters			×
Online	Device parameters Parameters can be edited and copied to the clipboard. Changed parameters will be sent to the device when your using the "OK" button.	close this window by	Matrix Clipboard
	Creation date of parameter set 02.01.2012 11:22:25	j	▼ Online
	Process parameters Common parameters Fit parameters	ers Turbidity parameters	
	Name	Value	Unit
	Measurement interval	0	s
	LED measuring time	20	1/10s
	 Measurement time 	20	1/10s
	Power-down after measurement	off	
	Start measurement on power-up	off	
	Calculate concentrations after each measurement	off	
	Serial number	1709	
	Software version	221	
I			
		ОК	Abbrechen Übernehmen

Depending on the parameters and on the access level, the parameters are read only 🧿 or read and write 🗹.



Type of operation

The selection of the type of operation corresponds to the commands in the menu. Depending on the selection, different types of operations can be done.

Explanations

Gives a short introduction to what can be done.

<u>Buttons</u>

Export: exports the current parameter set to another database for recalculation

Clipboard: copies the current parameter set to the clipboard to paste it into another application such as Office Word or Excel etc.

Upload: sends the parameters to the connected instrument

Matrix: shows all the calibration parameters of the connected instrument in one window.

Name of parameter set

Each set of parameters can be identified by its time and date. Edited parameter sets or templates have an additional name given by the user.

Type of parameter

Each tab shows the parameters of a specific topic.

Values

Shows the current values of the parameters. Depending on the type of operation the value can be edited.

Type of parameter set

Indicates the type of parameter set:

Original: this parameter set has been used originally for a measurement, it cannot be deleted.

Adapted: this is a parameter set has been adapted by the user, it can be used to recalculate the datasets.

Shows the current values of the parameters. Depending on the type of operation the value can be edited.

History - advanced functionality only

Displays the parameters of the active dataset.

The history is also available on the Context Menu in table view:

bee New.bdb [FP-17-09]:	1	
Date/Time [da	te]	Comment	Greer
27.12.2011	08:41:23		
27.12.2011	08:41:24		
27.12.2011	08:41:24		
27.12.201 27.12.201 27.12.201 27.12.201 27.12.201 27.12.201	Edit Comm Delete Dal		
27.12.2011 27.12.2011 27.12.2011 27.12.2011 27.12.2011	08:41:59 08:42:00		

Templates	History of parameters		Export	Clipboar
Online	Choose a parameter set by its date of creation. The chosen set can be exported into another database or it can be copied to the clipboard.	-	Matrix	Upload
Recalc	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.			Templat
	Creation date of parameter set 15.05.2012 15:08:56			Original
	Common parameters Fit parameters Measurement parameters Tu	whidity parameter	-	
	Name	Value		
	Warm-up time Measurement interval	5	S	
	Number of measurements	U	S	
	LED measuring time	20	1/10s	
	Measuring type	continuous	17 103	
	Measurement time	20	1/10s	
	Send results	on		
	Power-down after measurement	off		
	Store results	on		
	Start measurement on power-up	off		
	Enter comment at start of measurement	off		
	Air pressure from first measurement	off		
		off		
	Calculate concentrations after each measurement	OII		
		1709		

All parameter sets in the database can be displayed. To choose one parameter set, select the date from the drop-down box:

Creation date of p		1				•	Ori
ocess parameters Name Inter comment at st vir pressure from firs	Common par	25.04.2011 10.08.2011 10.08.2011 20.09.2011 05.10.2011 05.10.2011 12.10.2011 12.10.2011 12.10.2011	15:24:17 13:59:30 14:03:34 14:09:04 12:34:59 15:27:37 15:35:07 11:25:58 12:05:51 12:11:01	(Turbidity compe (Turbidity plato) (Turbidity plato)	enation)		paran
		12.10.2011 12.10.2011					

Template Button

The "Template" button is used to generate a new template from the current parameter set using different schemes. A scheme is a predefined selection of parameter – for example all the fingerprints. The parameter of the selection will be copied to a new template. Parameters that are not in the scheme will not be copied.

This is more convenient, than entering the parameter to a new template by hand.

The new template can be edited as any template.

First step is to choose the scheme with the selection of parameters.

choose a scheme:	
Yellow substances	
All offsets and fingerprin	nts
All offsets and fingerprin	nts.

Giving the new template a name:

Choose a scheme:	
Yellow substances	
To distinguish paramete	
To distinguish paramete assign here an optional	
assign here an optional	

Afterwards the new template can be displayed and edited. It can be used as any other template.

f creation by using "New". of the selected template to the e eter 17.10.2012 10:29:02 (My n meters Measurement paramete	new template)	Matrix	Upload
		•	
	Value	Unit	
370 nm] 590 nm] 470 nm] LED 0 to 5 °C LED 5 to 10 °C LED 10 to 15 °C LED 15 to 20 °C LED 20 to 25 °C LED 25 to 30 °C LED 30 to 35 °C	-547,84	digits	
	590 nm] 470 nm] LED 0 to 5 °C LED 5 to 10 °C LED 10 to 15 °C LED 15 to 20 °C LED 20 to 25 °C LED 25 to 30 °C	590 nm] -547,84 470 nm] -1.308,4 LED 0 to 5 °C - LED 5 to 10 °C - LED 10 to 15 °C - LED 15 to 20 °C - LED 20 to 25 °C - LED 20 to 35 °C - LED 30 to 35 °C -	590 nm] -547,84 digits 470 nm] -1.308,4 digits digits °C/digit LED 0 to 5 °C LED 10 to 15 °C LED 10 to 15 °C LED 15 to 20 °C LED 20 to 25 °C LED 25 to 30 °C LED 30 to 35 °C

Templates

The purpose of parameter templates is to store a partial set of parameters (for example offsets or measuring times or air pressure handling) in one set. This makes it easy to apply different setting to an instrument, depending on the location.

History Templates	Parameter templates			New	Delete
- Online Recalc	Choose a template by its date of creation Create a new (empty) template by using "New". You can upload the parameters of the selected te	emplate to the device.	-	Matrix	Upload
	Creation date of parameter 15.10.2012			•	
	Common parameters Fit parameters Measure	ement parameters 11	Value	unit	-
	Warm-up time	1		s	
	Measurement interval			s	
	Vumber of measurements				
	LED measuring time			1/10s	
	Measuring type				
	Measurement time			1/10s	
	Send results				
	Power-down after measurement				
	Store results				
	Start measurement on power-up				
	Enter comment at start of measurement				
	Air pressure from first measurement				
	*	10			+

Create a new template

Click new, all parameters of the current user-level are shown and empty. To change an entry, double click on the value box. When entering the first value, a name for the parameter set is requested:

Name of Parameter Template	×
To distinguish parameter templates y here an optional name.	vou can assign
My new template	
ОК	Cancel

The name and date is shown in the headline of the table:

Creation date of parameter 09.11.2011 14:58:35 (My new template)	Creation date of parameter	09 11 2011 1 <i>4</i> -58-35	(Mu new template)	
				a Turbiditu paran
s parameters Common parameters Fit parameters Measurement parameters Turbidity para	s parameters common par	ameters Fit paramet		

Depending on the type of parameter, either an input box or a drop-down box is used:

Name of class 7	
LED measurement interval	
chables for his hag black in	
Enabled for fit flag class 5	
	•
Enabled for fit flag class 6	
Enabled for fit flag class 5 Enabled for fit flag class 7	off
	off on

Click OK to store the template.

Upload a template

- 1. connect the instrument to the PC ("TOOLS → CONNECT COM PORT")
- 2. go to "PARAMETER→ TEMPLATES"
- 3. select the template from the drop-down box:

Creation date of parameter	09.11.2011 15:14:53	(My second template)	•
Process parameters Common par	09.11.2011 14:58:35 09.11.2011 15:14:53	(My new template) (My second template)	pa
Name		Value	Unit

4. Click "UPLOAD":

bbe++ loads all the parameters from the instrument:

Parameter import	×
Importing	
Cancel	

and sends the changed parameters back to the instrument.

Parameter transfer	×
Syncing parameters	
Cancel	

All parameters not defined in the template will not be overwritten in the instrument.

Delete a template

- select the template to be deleted
- click delete

<u>Online</u>

The section "Online" is used to change the parameters of the instrument.

This item is available as soon as an instrument is connected.

- 1. connect the instrument to the PC ("TOOLS → CONNECT COM PORT")
- 2. go to "PARAMETERS → ONLINE"

bbe++ loads all the parameters from the instrument:

Parameter import	x
Importing	
Cancel	

The parameters are shown:

listory emplates	Device parameters			
online ecalc	Parameters can be edited and copied to the clipboard. Changed parameters will be sent to the device when you close this windo using the "OK" button.	w by	Matrix	Clipboa
	Creation date of parameter set 16.10.2012 15:11:31			Online
	Common parameters Fit parameters Measurement parameters Turb	idity paramete Value		-
	Warm-up time	5	s	
	Measurement interval	0	s	
	Number of measurements	1		
	LED measuring time	20	1/10s	
	Measuring type	continuous		
	Measurement time	20	1/10s	
	Send results	on		
	Power-down after measurement	off		
	Store results	on		
	Start measurement on power-up	off		
	Enter comment at start of measurement	off		
	Air pressure from first measurement	off		
	11			

- 3. change the parameters as described in the "Template" section.
- 4. click OK to upload the new parameters
- 5. Use the "clipboard" button to copy all the parameters to the clipboard and paste it into EXCEL for example:

	А	В	С	D	E	F
1	Date: 09.11.2011 15:52:32					
2	Device: FP-17-09					
3						
4						
5	Process parameters					
6						
7	Name	Value	Unit			
8	Enter comment at start of measurement	on				
9	Air pressure from first measurement	off				
10						
11						
12	Common parameters					
13						
14	Name	Value	Unit			
15	Measurement interval	0	s			
16	LED measuring time	20	1/10s			
17	Measurement time	20	1/10s			
18	Power-down after measurement	off				
19	Start measurement on power-up	off				
20	Serial number	1709				
21	Software version	227				
22						
23						
24	Fit parameters					
25						
26	Name	Value	Unit			
27	Enabled for fit flag Green Algae	on				
28	Enabled for fit flag Bluegreen	on				
29	Enabled for fit flag Diatoms	on				
30	Enabled for fit flag Cryptophyta	on				
31	Enabled for fit flag sdsds#4	off				
32	Enabled for fit flag #5	off				
33	Enabled for fit flag #6	off				
34	Enabled for fit flag Yellow substances	on				
35	Date of calibration	21.11.2007				
36						
37						
38	Turbidity parameters					
39						
40	Name	Value	Unit			
41	Turbitidy compensation	off				

Recalc - advanced functionality only

The recalculation option is available in all instruments except for the AlgaeTorch. For the BenthoTorch the recalculation is limited to the recalculation by using another parameter set from the BenthoTorch. Editing of the parameter sets and templates are not available for the BenthoTorch.

History Templates	Recalculation with changed parameters.	C	reate copy	Delete
Online	Create an editable parameter set by using "Create copy". Start recalcualtion by "Recalc".		Recalc	Undo
Recalc	Restore original results by using "Undo". Calculation will effect all data currently in the view.		Matrix	
	Creation date of parameter set 15.05.2012 15:08:56		<u>•</u>	Original
	Common parameters Fit parameters Measurement parameter	4		
	Name	Value	Unit	
	Service Warm-up time	5	S	
	Measurement interval	0	S	
	Number of measurements	1		
	LED measuring time	20	1/10s	
	Measuring type	continuous		
	Measurement time	20	1/10s	
	Send results	on		
	Power-down after measurement	off		
	Store results	on		
	Start measurement on power-up	off		
	Enter comment at start of measurement	off		
	Air pressure from first measurement	off	_	
	1			

To change the settings and recalculate the results, the following steps have to be executed:

- 1. Select the instrument and time period ("WINDOW \rightarrow SELECT DATA").
- 2. Go to "PARAMETERS \rightarrow RECALC"
- 3. Select a new dataset from the dropdown box or create a new one by editing a copy. Please note: only copies of an original parameter set can be edited. These sets are marked with "adapted".

History Templates	Recalculation with changed parameters.	Cr	eate copy	Delete
Online	Create an editable parameter set by using "Create copy".		Recalc	Undo
Recalc	Start recalcualtion by "Recalc". Restore original results by using "Undo". Calculation will effect all data currently in the view.		Matrix	
	Creation date of parameter set 16.10.2012 15:13:16 (Test 15.05.2012 15:08:56 Common parameters Fit parameter 16:10.2012 15:13:16 (Test T		<u>.</u>	Adapted
	Name	Value	Unit	
	Warm-up time	5	s	
	Measurement interval	0	5	
	LED measuring time	20	1/10s	
	Measuring type	continuous	17 103	
	Measurement time	20	1/10s	
	Send results	on	10 A.	
	Power-down after measurement	off		-
	Store results	on		
	Start measurement on power-up	off		
	Enter comment at start of measurement	off		
	Air pressure from first measurement	off	-	
	*			+

4. To create a new parameter set (not in the BenthoTorch), select one, click "CREATE COPY" and enter a name for this parameter set.

Name of Parameter Set	×	
To distinguish parameter sets you can assign here an optional name.		
My adapted parameter set		
OK Cancel		
10.08.2011 14:03:34		
25.04.2011 15:24:17 10.08.2011 13:59:30		
10.08.2011 14:03:34		
10.08.2011 14:09:04 20.09.2011 12:34:59 (Turbidity compenation)		
05.10.2011 15:27:37 (Turbidity plato)		
- 05.10.2011 15:35:07 (Turbidity plato) 12.10.2011 11:25:58		
12.10.2011 12:05:51		
12.10.2011 12:11:01		
412.10.2011 12:20:07 412.10.2011 12:26:38		
10.11.2011 08:58:04 (My adapted parameter set)		

5. Select the new parameter set and edit the settings as described in the "Template" section. Please note the number and type of parameters shown depends on the user-level. Only the parameters marked with the green symbol can be changed.

Parameters			X
History Templates Online Recalc	Recalculation with changed parameters. Create an editable parameter set by using "Create copy". Start recalcuation by "Recalc". Restore original results by using "Undo". Calculation will affect all data currently in the view. Creation date of parameter set Process parameters Common parameters) (Turbidity compensition)	Create copy Delete Recalc Undo Adapted
	Name	Value	e Unit
	Enabled for fit flag Green Algae	or	
	 Enabled for fit flag Bluegreen 	or	
	 Enabled for fit flag Diatoms 	or	1
	Enabled for fit flag Cryptophyta	or	1
	Enabled for fit flag #4	of	ŕ
	Enabled for fit flag #5	of	ŕ
	Enabled for fit flag #6	ofi	f
	Enabled for fit flag Yellow substances	or	1
	Date of calibration		
1		OK	Abbrechen Übernehmen

- 6. Click "APPLY" to store the changes in the new parameter set.
- 7. Click "RECALC" to recalculate the data with the new parameters.
- 8. Recalculated data sets are marked in table view at the beginning of each line:

bbe++.bdb [FP-19-01] :1							
Date/Time [date]	Comment	Gr					
12.10.2011 11:25:14	0						
12.10.2011 11:25:36							
12.10.2011 11:25:58							

Restore data with original parameters

The original data of the measurement is not deleted by the recalculation. It is always possible to see the results calculated with the parameters valid when the measurement was taken.

To restore the original data:

- 1. Select the instrument and time period ("WINDOW → SELECT DATA")
- 2. Go to "PARAMETERS → RECALC"
- 3. Click "UNDO". Please note: This item is only available when recalculated data are available in the selected time period.

Delete adapted parameter sets

To delete adapted parameter sets click "DELETE". All unused parameter sets will be shown. Parameter sets that are in use cannot be deleted.

Delete parameter set	×
Please select one or more parameter sets that you wish to delete.	
Only parameter sets created by copy of an original set and not in use for any recalculation are listed below	
20.09.2011 12:34:59 (Turbidity compenation) 05.10.2011 15:27:37 (Turbidity plato) 10.11.2011 08:32:42 (My adapted parameter set)	
Delete	

Select the parameter sets to be deleted and click "DELETE".

Matrix view

For the parameters of the FluoroProbe and the AlgaeLabAnalyser there is another window available to edit the parameters. It is shown when the button "MATRIX" is pushed:

	525 nm	570 nm	610 nm	590 nm	470 nm	370 nm	Temperatu	re correction 0-5°C	5-10°C	10-15°C	15-20°C	20-25°C	
Offsets Offset F (distilled)	2,4955	1,7881	2,2125	3,8136	2,1606	1,3241	LEDs	1	1	1	1	1	
Offset FD (distilled)		-	-	_	-	_	Detector	0,964	0,973	0,982	0,991	1	
Offset FM (distilled)	-	-	Ì-	-	È	-		25-30°C	30-35°C	35-40°C	40-45°C	45-50°C	> 50°C
) (Ifset F (ultrafiltrated)	4,7451	2,7063	3,1151	5,8196	5,9064	10,728	LEDs	1	1	1	1	1	1
Offset FO (ultrafiltrated)	1	<u> </u>	Ť	-	-	<u> </u>	Detector	1,02	1,041	1,062	1,083	1,104	1,125
Offset FM (ultrafiltratec	-	[1			ţ	525 nm	570 nm	610 nm	590 nm	470 nm	370 nm	
Fingerprints	-						Std. devia	ions	-		A		Cellcounts
Green Algae	1,331	0,379	1,447	1,66	6,388	3,061	0,1	0,1	0,1	0,1	0,1	0.1	5,3e+005
Bluegreen	0,937	0,906	3,932	4,36	0,449	0,748	0,1	0,1	0,1	0,1	0,1	0,1	1e+006
Diatoms	3,709	0,593	1,341	1,735	8,121	3,904	0,1	0,1	0,1	0,1	0,1	0,1	4,5e+005
Cryptophyta	2,5426	1,2555	1,898	3,3109	3,4697	1,5914	0,1	0,1	0,1	0,1	0,1	0,1	30.000
\$5	1	1	1	1	1	1	0,1	0,1	0,1	0,1	0,1	0,1	1e+006
#6	1	1	1	1	1	1	0,1	0,1	0,1	0,1	0,1	0,1	1e+006
\$7	Ì	1	1	1	1	1	0,1	0,1	0,1	0,1	0,1	0.1	1e+006
rellow substances	0,933	-0,099	0,105	0,461	5,5	7.93	0,1	0,1	0,1	0,1	0,1	0,1	1
Brightness regulation							- Global con	ection					
DA value	180	143	172	170	174	146	1						
Required value	-497,65	-248,9	-290,47	-547,84	-1.308,4	-442,94							

Changing any parameter here has the same effect as changing the parameter in the standard view.

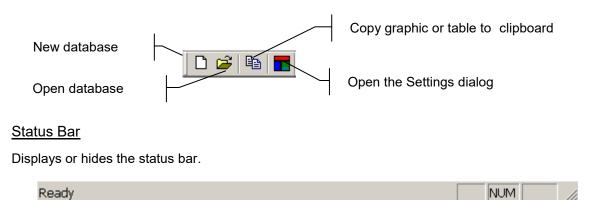
VIEW MENU

View Window Tools Ca	libration Help	
✓ Toolbar		
🖌 Status Bar		
Measurement F10		
Batch		
Macro		
Data navigation		
Period		
Session		
Connection state		
Auto-Update		
Application Look	Windows 2000	
-	Office XP	
	Windows XP	
	Office 2003	
	Visual Studio 2005	
	Visual Studio 2008	
	Office 2007	Blue Style
		Black Style
		Silver Style
		Aqua Style

<u>Toolbar</u>

Displays or hides the toolbar.

The toolbar allows quick access to some important instructions:



Measurement

Displays / hides the measurement toolbar.

The toolbar "Measurement" is different for each type of instrument. It allows quick access to functions such as starting and stopping the measurement or retrieving the parameters.

The measurement toolbar of the FluoroProbe is given here as an example:

Start	Stop	Set air pressure	Get data	Edit parameters
-------	------	---------------------	----------	--------------------

Macro

The toolbar "Macro" contains buttons to access to the user-defined view macros. For details, please see the chapter "TOOLS" \rightarrow "SETTINGS" \rightarrow "MACRO MANAGER".



For the grey buttons, no macro has been defined.

Data Navigation

The toolbar "Data navigation" contains buttons to navigate within the data. "One page" corresponds to the time scale of the Concentration vs. Time graphs.

144 - A - AA1

- go to the first dataset
- one page backwards
- one page forwards
- go to the last dataset

Period

The toolbar "Period" contains buttons to scale the time axes to a given value:



- 1 hour
- 6 hours
- ♦ 1 day
- 7 days

Session

The toolbar "Session" contains buttons to navigate from one measurement to another. One measurement is defined as a number of consecutive data sets that do not differ in the point of measurement by more than a given value. This value can be set in "TOOLS" \rightarrow "SETTINGS" \rightarrow "DISPLAY".

H H

Connection State

The toolbar "Connection state" shows the status of the connection to the connected instrument:



The colour indicates the status:

Black:	Not connected, the PC has not tried to establish a connection
Yellow, blinking:	Not connected, the PC is trying to establish a connection
Green:	Connected

To open the COM port setting click the coneection state button

Auto-Update

If auto-update is activated and a new data-set is generated during the measurement, this data-set is shown in the graphic or list window. If the displayed period does not contain this current point in time, the displayed period is changed automatically, so that the latest data-set is shown.

If auto-update is deactivated, the displayed period does not change. This is useful when doing data analysis during the measurement.

Application look

Changes the style of the application

Window – Advanced functionality only

This menu contains commands to show, arrange and edit different views to display the data.

Window	Tools	Calibration	Н		
New T	able Wir	ndow	۲		
New X	YGraph	Window	×		
Single	Value		۲		
Cascad	de		_		
Tile Ho	rizontal	ly			
Tile Ve	rtically				
Select	Data				
Summary View					
View E	ditor		_		
Comme	ent Field	ls			
1 New	.bdb (Ff	P-17-09] :1			
🖌 2 New	.bdb [Ff	P-17-09] :2			
3 New	.bdb (Ff	P-17-09] :3			

New Table Window

Opens a new window and displays the data according to the selected window type.



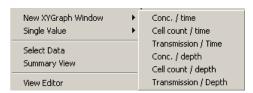
(See below)

Please see the list window "Concentration" of an AlgaeTorch as an example.

🔤 bbe++.bdb [A]	Г-04-002]:4			_ 🗆 🗙
Date/Time [date]	Cyano [µg/l]	Conc Total [µg/l]	Turbidity [FTU]	Depth [
07.04.2010 11:33:33	36,1	77,5	0	
07.04.2010 11:33:47	35,8	76,9	0	
07.04.2010 11:34:02	35,8	76,9	0	
•				I

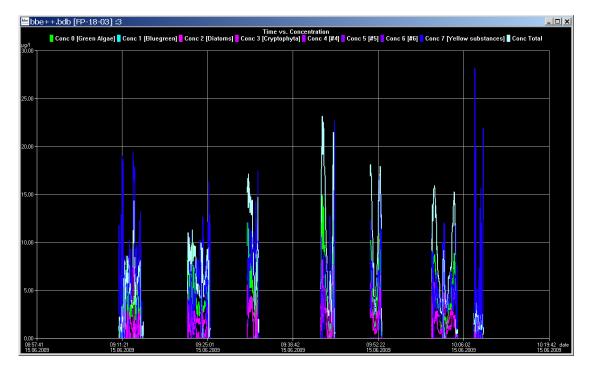
New XYGraph Window

Opens a new window and displays the data according to the selected window type.



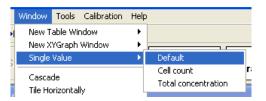
There are some view types pre-defined for each instrument. It is also possible to add new window types by using the view editor.

The following diagram shows the development of different algae classes measured with the bbe FluoroProbe.



New Single Value View

Opens a new window and displays the data of one data-set according to the selected window type.



The data-set is shown in larger digits to help the user read the display even in bright sunlight. The latest dataset is shown.

bbe++.bdb [FP-17-09] :4		
Date/Time [date] 22.08.2012 10:41:51	Green Algae [µg/l] 0,00	Bluegreen [µg/l] 0,00
Diatoms [µg/l] 0,32	Cryptophyta [µg/l] 1,59	Yellow substances [µg/l] 1,32
Total conc. [µg/l] 1,91	Transmission [%] 100,00	Depth [m] 38,27
Temp. Sample [°C] 6,15		

The "Single Value View" can be adapted to the screen by changing size and/or proportion of the window:

🔤 bbe++.bdb [FP-17-09] :4		bbe bbe X
Date/Time [date] 22.08.2012 10:41:51	Green Algae [µg/l] 0,00	22.08.2012 10:41:51 Green Algae (µg/1) 0,00
Bluegreen [µg/l]	Diatoms [µg/l]	Bluegreen [µg/1] 0,00
0,00	0,32	0,32
Cryptophyta [µg/l]	Yellow substances [µg/l]	Cryptophyta [µg/l] 1,59
1,59	1,32	Yellow substances [µg/l] 1,32
Total conc. [µg/l]	Transmission [%]	Total conc. [µg/l] 1,91
1,91	100,00	Transmission [%]
Depth [m] 38,27	Temp. Sample [°C] 6,15	^{Depth [m]} 38,27
00,27	0,10	Temp. Sample [*C] 6,15

bbe++.bdb [FP-17-09] :4				
Date/Time [date] 22.08.2012 10:41:51	Green Algae (µg/l) 0,00	Bluegreen (µg/l) 0,00	Diatoms [µg/l] 0,32	Cryptophyta [µg/ī] 1,59
Yellow substances [µg/l] 1,32	Total conc. [µg/1] 1,91	Transmission [%]	Depth [m] 38,27	Temp. Sample ["C] 6,15

<u>Cascade</u>

Arranges the windows one behind the other.

Tile Horizontally/Vertically

Initiates the organization of the screen into mutually non-overlapping frames.

Select Data

The "Select Data" window can be used to select data of a specific instrument and a specific time range from the current database.

Select data 🔀	Select data
Type AlgaeTorch	Type AlgaeTorch AlgaeTorch
Unit AT-04-002	FluoroProbe Unit AT-04-002
Time range	Time range
last day	last day
From 07.04.2010	From 07.04.2010
To 07.04.2010	To 07.04.2010
OK Cancel	OK Cancel

Type: Unit: shows the types of instruments available in this database.

shows the serial numbers of the type of instruments chosen above available in this database.

<u>Time range</u>

Selects the time range of data to be selected. It is possible to select a fixed time range such as "last month" or to do a manual selection by entering a range FROM "date" TO "date".

T:		
Time range		
	last day	-
From	15.06.2012	<u> </u>
To	25.07.2012	<u>*</u>

After selecting the time range, the data is shown in the default view.

🔤 bbe++.bdb [f	P-15-02]		<u>- 🗆 ×</u>
Date/Time [date]	Conc 0 [Green Algae] [µg/l]	Conc 1 (Bluegreen) (µg/l)	Conc 2 [Diatoms] [µ 🔺
22.02.2007 15:27:25	0	1,34	
22.02.2007 15:27:34	0	1,43	:
22.02.2007 15:27:40	0	1,41	
22.02.2007 15:27:47	0	1,37	:
22.02.2007 15:27:53	0	1,45	·
22.02.2007 15:28:00	0	1,4	
22.02.2007 15:28:06	0	1,34	
22.02.2007 15:28:13	0	1,35	
22.02.2007 15:28:20	0	1,38	
22.02.2007 15:28:26	0	1,42	
22.02.2007 15:28:35	0	1,3	
22.02.2007 15:28:41	0	1,47	: 1
22.02.2007 15:28:48	0	1,4	
22.02.2007 15:28:54	0	1,33	:
22.02.2007 15:29:01	0	1,46	
22.02.2007 15:29:08	0	1,39	
22.02.2007 15:29:14	0	1,37	
•			

View Editor

The View Editor is used to generate your own table or graphic window type as well as a template for the export to text files. The View Editor is an assistant that leads through the whole process.

When starting the View Editor, the current view is selected automatically to be edited or used as a template for a new view. Other views may be selected.

For each instrument there are pre-defined views. These views can be edited but not deleted. Changes in predefined views can be reset to their original status. User-defined views can be edited and deleted.

Generating and editing a table view window

To explain the function of the View Editor, in the following steps a table view showing date/time, total chlorophyll concentration, Bluegreen concentration and depth is generated as an example.

View Selection

1. Open the view editor:

w Selection		
Device FluoroProbe		
Which kind of view do you wish to create or change?		
Table view / single value view		
Graphics view		
C ASCII export		
Cell count		
Default		
Reset		
	<zuruck weiter=""> Abl</zuruck>	prechen
		acchen

2. Choose the type of instrument the view is to be used for (in the example "FluoroProbe").

- 3. Choose the type of view that is to be generated or edited (in the example "Table view / single value view").
- 4. Choose one existing view to edit or as a template for a new one.

In case of a pre-defined view, the view can be reset to the original status ("RESET").

In case of a user-defined view, the view can be deleted (choose a custom view and click "DELETE").

5. Click "NEXT".

Field Configuration

This window shows all available data of the selected instrument. The left column shows the data that is currently not used in the chosen view. In the right column are data that will be displayed in the resulting view. The order in the right column corresponds to the order in the table.

Fields Available Comment [4] Comment [5] Comment [6] Comment [7] Comment [9] Comment [10] Comment [11] Comment [12] Comment [14] Comment [14]	dd -> Date/Time [date] Sensor temp. [*C] Comment Total conc. [µg/l] activity Green Algae [*] Bluegreen [µg/l] Diatoms [µg/l] Diatoms [µg/l] Vellestatist for Alga
---	---

- Click on "Green Algae [µg/l]" and "← REMOVE" to remove the concentration of green algae from the view.
- 7. Repeat with all entries but "Date/Time (date)"; "Bluegreen [µg/I]", "Total conc. [µg/I]" and "Depth [m]".
- 8. Click on "Total conc. [µg/I]" and "UP" to change the order.

Table is sorted according to first entry				X
Available LED 7 (Trans) [590 nm] [dig LED 8 (Trans) [470 nm] [dig Sensor temp. [*C] Green Algae [ug/1] Diatoms [ug/1] Cryptophyta [ug/1] Planktothrix [ug/1] #5 [ug/1] Yellow substances [ug/1] Corren Algae [0/1]	Add -> <- Remove Up Down	Selected Date/Time [date] Total conc. [µg/] Bluegreen [µg/]		
		< Zurück	Weiter >	Abbrechen

9. Click "Next".

General Properties

The General Properties page allows the user to change the background color of a "Single value" view.

eneral Properties		×
Settings for single value presentation:		
Background color		
		-
	< Zurück Weiter >	Abbrechen

10. Click on the color picker box behind "Background color" and choose a new color.



The chosen color is now shown in the color picker box

eneral Properties	×
Settings for single value presentation:	
Background color	

Example of a change in background color:



Save View

11. Enter a name for the view.

Name of view Total concentration	_	
Options for the current view		
List view		
C Single value view		

12. Click "OK" to confirm. The current data is then shown with the new view.

Date/Time [date]	Total conc. [µg/l]	Bluegreen [µg/l]	Depth [m]	-
22.08.2012 10:40:18	3,21	0,00	0,82	
22,08,2012 10:40:18	3,04	0,00	1,12	
22.08.2012 10:40:20	3,98	0,00	1,74	
22,08,2012 10:40:20	4,46	0,68	2,14	
22.08.2012 10:40:21	4,05	0,00	2,45	
22,08,2012 10:40:22	4,26	0,00	2,76	
22.08.2012 10:40:23	4,01	0,00	3,16	
22.08.2012 10:40:23	3,46	0,00	3,47	
22.08.2012 10:40:24	4,05	0,00	3,78	
22,08,2012 10:40:25	4,43	0,00	4,08	
22.08.2012 10:40:26	4,43	0,00	4,39	
22.08.2012 10:40:26	4,54	0,00	4,69	
22.08.2012 10:40:27	4,45	0,00	5,00	
22,08,2012 10:40:28	4,30	0,00	5,31	
22.08.2012 10:40:29	4,33	0,00	5,61	
22.08.2012 10:40:29	4,22	0,00	5,92	
22.08.2012 10:40:30	4,34	0,00	6,23	
22,08,2012 10:40:31	4,03	0,00	6,53	
22.08.2012 10:40:32	4,29	0,00	6,74	
22,08,2012 10:40:33	4,14	0,00	7,14	-

13. The new view is now available in the Window menu.

View	Window Tools Calibration	Help		
H H	New Table Window	•	Default	
S	New XYGraph Window Single Value		Cell count Total concentrat	
-17-09	Cascade Tile Horizontally Tile Vertically			∦v∛rameters
G 39 10	Select Data Summary View		Diatoms [µg/l] 0,00 0,51	Cryptophyta [µg/l] Ye 0,00 0,00
10 11 14	View Editor Comment Fields		0,00	0,00 0,00
47 48 52	1 bbe++.bdb [FP-17-09] :1 2 bbe++.bdb [FP-17-09] :2 ✓ 3 bbe++.bdb [FP-17-09] :3	2	0,00 0,02 0,38	0,00 0,00 0,82
55	•/	, -,	0,00	0,00

Generating and editing a graphic view window

To explain this function, in the following steps a graphic view showing date/time and total chlorophyll concentration is generated as an example.

View Selection

1. Open the view editor:

Device FluoroProbe	
Which kind of view do you wish to create or change?	
* Table view / single value view	
Graphics view	
ASCII export	
ell count / depth ell count / time ell count / time ianktotrix sostion sw/ time emperatur / Zeit Emperatur / Zeit Emperatur / Zeit Emperatur / Zeit	
	<zuruck weiter=""> Abbrechen</zuruck>
w Selection	
W SEICEBBIN	
Device FluoroProbe	
Device FluoroProbe	
Device FluoroProbe Which kind of view do you wish to create or change?	
Device FluoroProbe Which kind of view do you wish to create or change? C Table view / single value view	
Device FluoroProbe Which kind of view do you wish to create or change? C Table view / single value view G Graphics view C ASCII export Cell count / depth Cell count / time Conc. / depth Conc. / time	
Device FluoroProbe Which kind of view do you wish to create or change? C Table view / single value view G Graphics view C ASCII export Cell count / depth Cell count / time Conc. / depth Conc. / time	

- 2. Choose the type of instrument the view is to be used for (in the example "FluoroProbe").
- 3. Choose the type of view that is to be generated or edited (in the example "Graphics view").
- 4. Choose one existing view to edit or as a template for a new one (in the example "Conc. / depth").
 In case of a pre-defined view, the view can be reset to the original status ("RESET").
 In case of a user-defined view, the custom view can be deleted ("DELETE").
- 5. Click "NEXT".

Independent Axis

6. Choose the design according to the given examples (in the example Y-Axis)

Independent Axes		x
ぐ X-Axis		
⑦ ∑-λxis		
	< <u>Z</u> urück <u>W</u> eiter > Abbreche	an

Field Configuration

7. Select the data for the axis chosen and click on "ADD→". Only one of the available entries is possible (in the example "Depth")

vailable			Selected	
Date/Time [date] Trans. 700 nm [digits]		Add ->		
LED 3 [digits] LED 4 [digits]		- Remove		
LED 5 [digits] LED 6 [digits] LED 7 [digits]		Up		
LED 8 [digits] Pressure [bar]	-	Down		
Properties				

8. After choosing one entry all other entries vanish. Removing the entry by clicking "←REMOVE" brings back all available entries.

	Add >	[Depth [m]	
	<- Remove		
	Lip		
	Down		
Properties			
riopenies			

9. Click on "PROPERTIES"

Axis Properties - first axis

Some properties can be set for each axis. For the first axis, this is the position and the direction.

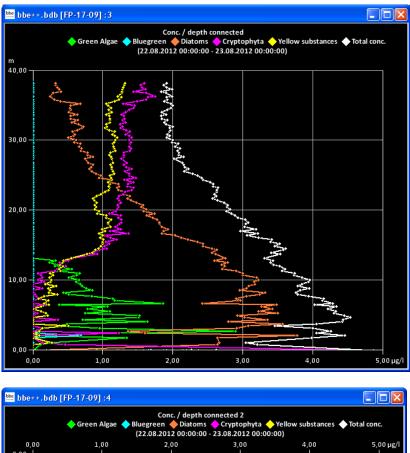
Axis properties	Autoscale limits Lower limit Thigher than	
Мах 🗉	Lower than Upper limit Higher than Lower than	
Scaling attributes	<u>-</u>	
Direction inverted Autoscale on		
ОК		Cancel

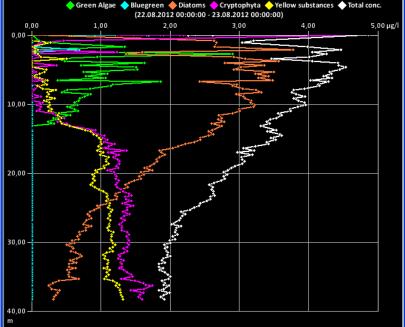
Normally the first axis is on the lower or left side of the graph. The direction is normally defined as:

X-Axis:	left side	\rightarrow low values	right side	\rightarrow	high values

Y-Axis:	bottom	\rightarrow low values	top	→ high values
---------	--------	--------------------------	-----	---------------

To display e.g. chlorophyll concentration versus depth, it is easier to use the top position of the X-axis and to invert the direction of the Y-axis for the depth. Please see the following example: the first picture shows the standard settings, the second one with a direction-inverted Y-axis and inverted position of the X-axis.





- 10. Click "OK" to confirm the settings.
- 11. Click "NEXT".
- 12. Now the data and settings for the other axis can be selected.

Field Configuration - second axis

Available	-		Selected	
Date/Time [date] Trans. 700 nm [digits]		Add ->		
LED 3 [digits] LED 4 [digits]		- Remove	1	
LED 5 [digits] LED 6 [digits] LED 7 [digits]		Up		
LED 7 [digits] LED 8 [digits] Pressure [bar]	-	Down	1	
Properties				

13. After selecting one type of data, only those types which have the same unit(s) remain in the right column.

wailable Conc 2 (µg/l)	Add -> Conc. 1 M	م/۱
Conc 3 [µg/l] Conc 4 [µg/l] Conc 5 [µg/l]	<- Remove	
Conc 6 (µg/l) Conc 7 (µg/l) Conc 8 (µg/l)	Up	
Total conc. [µg/l]	Down	
Properties		

14. For example, "Total chlorophyll concentration" and "Bluegreen" have to be selected here.

wailable Conc 2 [μg/l]	Selected Conc 1 [ug/] Total conc [ug/]		
Conc 3 [µg/l] Conc 4 [µg/l]	interiority [hg/l]		
Conc 5 [µg/] Conc 6 [µg/]	<- Remove		
Conc 7 [µg/l] Conc 8 [µg/l]	Up		
	Down		
Properties			
(Contraction of the contraction			

Axis Properties - second axis

For the second axis, the properties can be set as shown above. Additionally available scaling options are:

Axis properties			X
Manual scaling	Autoscale limits Lower limit Higher than	0	
Max 0	Upper limit Higher than Lower than	0	
Scaling attributes Position inverted Direction inverted Autoscale on			
OK			Cancel

Manual scaling: enter fixed values for the minimum and the maximum of this axis - enter 0 for both to disable this feature.

Auto-scale on: enables the auto-scaling feature - the axis will be scaled so that all selected data are visible.

Auto-scale limits: these settings are used to obtain a nice looking graph in two special situations:

datasets with very low noise:

In the auto-scaling mode, the graph looks as if there are extreme variations, but the range is very small due to the auto-scaling. In this case, it is better to use the option:

- lower limit: lower than and
- upper limit: higher than
- This leads to a minimum span in the graph.
- datasets with outliners:

In this case, it is difficult to analyze the data because the auto-scaling generates a high span value. To prevent this, please use:

lower limit: higher than for outliners with low values and

This leads to an optimized span in the graph.

upper limit: lower than for outliners with high values

15. Click "Next"

Attributes

This sets the color and size of the dots and lines as well as the color of the background.

16. Set the value in the attributes window according to your needs.

No.of pixels per value po	int 2 💌			
Background color	1			
Columns				
Conc 1 [µg/] Total conc. [µg/]				
		- Attributes		
		E Golor		
		Connect	ed	
2				

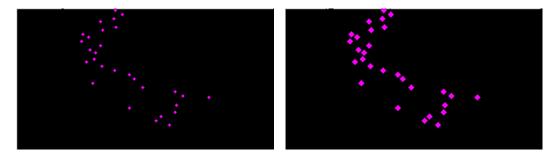
Pixel number:

enter the dot size of the value points.

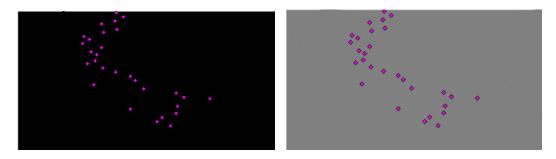
Background color: click on the colored button to change the background color of the graph.

For illustration, please see the examples with connected and unconnected dots, different sizes and background colors.

Different dot sizes:



Different background colors:



Column Attributes

Select a dataset.

Color:

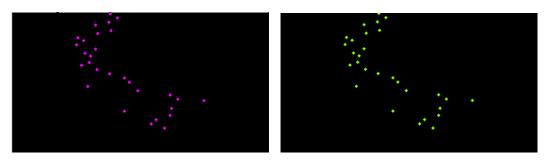
Connected:

select a dataset and click on the colored button to change the color of the dots. check the box to connect the dots in the graph.

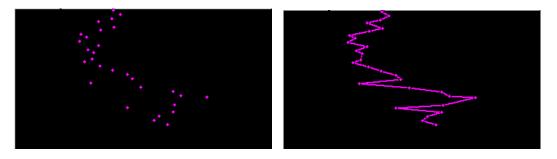
		Farbe
		Grundfarben:
lumn Attributes		
Graphics No.of pixels per value point 2 Background color	•	
- Columns	-	Benutzerdefinierte Farben:
	Attributes	Farben <u>d</u> efinieren >>
	Ealar	OK Abbrechen
	Connected	

Hint: The data points are not connected if the time of measurement differs more than the given value in "TOOLS \rightarrow SETTINGS \rightarrow DISPLAY".

Different dot colors:



Unconnected dots / connected dots:



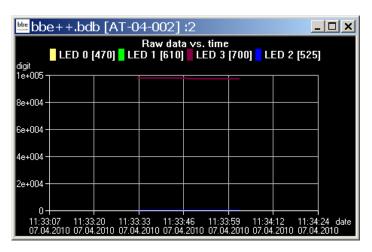
17. Click "Next"

Save view

18. Enter a new name for the view. It is not possible to edit pre-defined views. Please store a view based on a pre-defined view with a new name.

ive View	
Name of view. Conc. 7 depth	
	< Zurück Fertig stellen Abbrechen

19. The current data is shown using the new view after clicking "OK".



Generating and editing an ASCII Export

View Selection

1. Open the view editor:

View selection	×
Unittype AlgaeTorch	•
Which kind of view do you create or change?	u wish to
C List view	
C Graphics view	
Ascii export	
Export all Export cellcounts Export conc.	
	Delete
Cancel	Next

- 2. Choose the type of instrument the export is to be used for (in the example "AlgaeTorch")
- 3. Choose the type of export that is to be generated or edited (in the example "ASCII export")
- 4. Choose one existing view to edit or as a template for a new view. The delete button is used to delete a view. It is not possible to delete pre-defined views.
- 5. Click "NEXT"

Field Configuration

This window shows all available data of the selected instrument. The left column shows data which are not currently used in the chosen view. In the right column are data that are to be displayed in the view. The order in the right column corresponds to the order in the table.

Fields Table is sorted by the first value	LED 0 [470] LED 1 [610] LED 2 [525] LED 3 [700] Temp. Sensor Ccount Cyano Total cellcounts	Add -> <- Remove Up Down	Date/Time Cyano Conc Total Turbidity Depth		×
Previous				Next	

- 6. Select the required datasets from the right column. Use the up and down buttons to determine the order of the data in the export table.
- 7. Click "Next".

Export attri	butes		×
Separator End of line	tabulator tabulator semicolon	•	
Previous		Next	
Export attri	butes		X
Export attri	butes		×
Export attri	butes tabulator	•	×
		•	×

- 8. Define separator and end of line characters according to the needs of the importing software.
- 9. Click "Next".

Save View

10. Enter a new name for the view. It is not possible to edit pre-defined views. Please store a view based on a pre-defined view with a new name.

Save View		×
Profile name:	Export conc.	
Previous		OK

11. The new view is now available in the "File" menu.

Export (ASCII)	Export all
Export (database)	Export conc.

Comment Fields

For each type of instrument, special comments can be defined. These comment fields can be used at the beginning of the measurement. The comments names and types can be defined within this dialog.

Comment	fields		×
Device:	FluoroPr	obe 💌	
Used	Description		Туре 🔺
	Weather		Text
	Name		Text
	Temperature		Number
	pН		Text 💌
	Comment [5]		Text
	Comment [6]		Number
	Comment [7]		Text
	C 101		T
		Save as template	
OK			Cancel

Type of instrument: the type of instrument is defined in the settings "TOOLS \rightarrow SETTINGS \rightarrow ACCESS".

Used:	if tagged, the comment can be used at the start of the measurement, otherwise the comment is hidden.
Description:	name of the comment
Туре:	"Text" allows entry of text, "Number" allows digits only; this is relevant for the way the comments are sorted in a list view.
Template:	stores the comment definition to transfer it to a new database; the transfer is done when opening a new database.

```
<u>1. ... 2. ... 3. ...</u>
```

Shows all the currently opened windows.

TOOLS

Menu (advanced functionality)

Tools	5	Calibration	Help
	Se	ttings	
	En	able basic fur	ictionality
	Co	nnect COM p	ort
	De	vice	+
	sq	L Script	

Menu (basic functionality)

Тоо	ls	Help
	Se	ttings
	En	able advanced functionality

<u>Settings</u>

Here, all the preferences for the general functionality of bbe++ can be set.

Database

The 'Database' tab shows the currently used database. The checkbox can be used to open this database after starting bbe++. We recommend you to store all the data in the same database.

Database Display		modules acro Manager	Text results Logger Settings
\Users\Carsten\AppData\Ro		l.	
	Browse	1	
Open database at program			
Automatic start of measuren	nent		
laintenance			
	olds data of more than		
Auto Archive: if database hi			
 Auto Archive: if database hi days, archive all but last 	30 days.		
	30 days.	_	

Automatic start of measurement

For continuously working instruments (AOA or FluoroProbe / AlgaeTorch) the software can be configurated to start the measurement directly after starting the software. The feature can be used to ensure, that the measurement starts again after a power fail.

Auto Archive

If there are many datasets in the database, navigation in the database becomes slow. The "Auto Archive" function automatically archives older data in the database. If there are data older than – in the example – 60 days, the auto-archive function is started. Only datasets that are a maximum of 30 days old remain in the database.

The archived data is written in a database similar to an exported database. The name corresponds to the date of the first dataset in this database.

<u>Display</u>

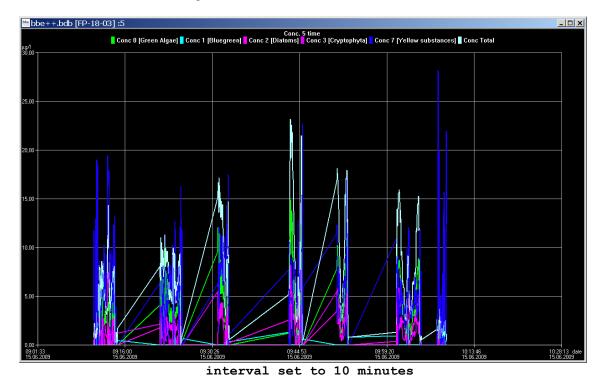
Enter the time period which defines the maximum interval between two measurements of the same series. The setting is used for the "Next measurement" button in the toolbar.

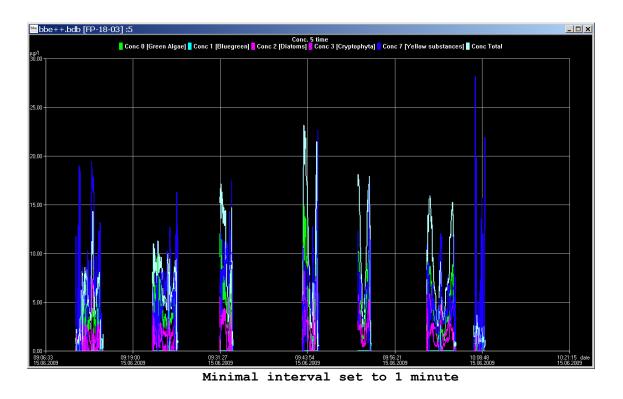
Database Display Access Minimal time interval between measurements -	Macro Manager	Logger Setting:
Minimal time interval between measurements -		
The time interval (hours + minutes) indicates the time period used to navigate between measurements (see "Session Panel") and represents the minimum time period between tw measurements values in a series.		
0 hours		
minutes		

Next and previous measurement buttons in the toolbar.



Furthermore, this setting is used to control the drawing of lines between two dots. If the interval between two measurements is shorter than the given interval, a line is drawn – otherwise not:





<u>Access</u>

Depending on the access level selected, the software shows more or fewer options. The main difference is the number of items shown in the menus and the number of parameters shown.

If an instrument with editable parameters is connected, the same setting is maintained for editing.

ngs		
Shortcuts Language Database Display Access	IO modules Macro Manager	Text results Logger Setting:
Level Advanced functionality	Frotect advanced functionality	
Default device AlgaeLabAnalyser 💌		
Offline mode		
		1
	OK Abbrech	en Ubernel

User-levels:

Level	Access
Basic functionality	Just basic operation of the instrument
	 Measurements with pre-defined parameters only
Advanced functionality	All menus accessible / all parameters customizable

The "Advanced functionality" level can be password-protected. As soon as the checkbox is ticked, a password can be entered. Afterwards the password is required to enter the Advanced functionality level.

Please note:
The "Advanced functionality" level remains until "Basic functionality" level is chosen again.
Even when restarting the software, the "Advanced functionality" level and a given password
will still be valid.

To enable advanced	
functionality, please enter password:	
1	

Default Device

The bbe++ software is able to control different types bbe instruments, but only one type at one time. The type of instrument is entered here. Various settings within the bbe++ software can only be made for the default type instrument. To make entries for an other type of instrument, the default type has to be changed before.

Offline Mode:

Choose the offline mode to display data of different type of instruments. If the offline mode is active, no measurement is possible.

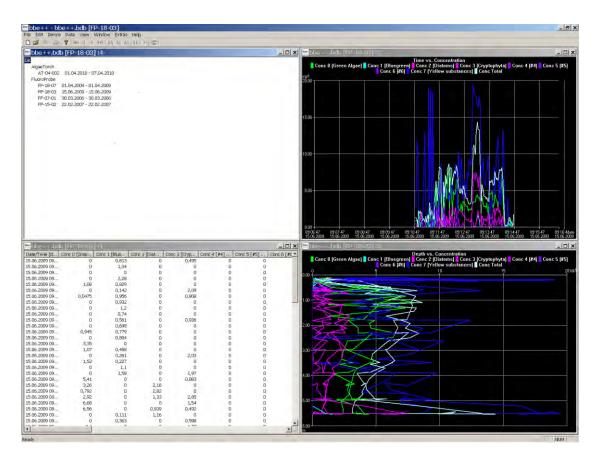
Macro manager

The bbe++ software provides the option to store the arrangement of the view windows. One of the stored views can be used as the default view automatically displayed after starting bbe++.

Macro views	ALA		
ALA			
Use at program start			 1 2
Button position on	_		
Button position on 1 measurement panel	-		
Delete Save			

To generate a new view macro:

- 1. Arrange the windows.
- 2. Enter the name of the new view.
- 3. Check the "Use at program start" box as required.
- 4. Confirm.



Logger settings

The logger settings are used in case of problems with the bbe++ software. Please ask the bbe service for advice.

Depending on the checked options more or less information is stored in the file "error.log" in the program folder of bbe++ software.

Logger modules	
RS232	
▲ [m] ►	

Shortcuts

With the F8 key, one single view can be retrieved. Please enter the single view macro to be used for this.

-16 X

Database Display Access	s Macro Manager Logger Settings
Shortcuts Language	IO modules Text results
Type of single value view for F8 shortcut	-
	Default
	OK Abbrechen Übernehmen
Jane Auto (pri 14 co) (7) Bring Data, New Window Botton, Net K. M.	
Sing (OF-SIN): Get data	
e/Time [date]	Green Algae [µg/l]
e/Time [date] 06.2007	Green Algae [µg/l]
e/Time [date] 06.2007	
e/Time [date] 06.2007 19:31	Green Algae [µg/l]
е/Time [date] 06.2007 19:31 egreen [µg/l]	Green Algae [µg/l] 0,00 Diatoms [µg/l]
e/Time [date] 06.2007 19:31 egreen [µg/l]	Green Algae [µg/l] 0,00
criter e/Time [date] 06.2007 19:31 •green [μg/l]	Green Algae [µg/l] 0,00 Diatoms [µg/l] 0,00
e/Time [date] .06.2007 .19:31 egreen [μg/l] ,77	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l]
е/Time [date] 06.2007 19:31 egreen [µg/l] , 77	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l]
2/Time [date] 06.2007 19:31 green [μg/l] 77 httphyta [μg/l] 00	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l] O,OO
e/Time [date] .06.2007 .19:31 egreen [μg/l] ,77 otophyta [μg/l]	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l]
стите [date] 06.2007 19:31 green [µg/l] ,77 otophyta [µg/l] ,00	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l] O,OO Transmission [%]
e/Time [date] .06.2007 :19:31 egreen [µg/l] ,77 ptophyta [µg/l] ,00	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l] O,OO
e/Time [date] .06.2007 :19:31 egreen [µg/l] ,77 ptophyta [µg/l] ,00 al conc. [µg/l] ,77	Green Algae [µg/l] O,00 Diatoms [µg/l] O,00 Yellow substances [µg/l] O,00 Transmission [%] 98,22
e/Time [date] .06.2007 :19:31 egreen [µg/l] ,77 ptophyta [µg/l] ,00	Green Algae [µg/l] O,OO Diatoms [µg/l] O,OO Yellow substances [µg/l] O,OO Transmission [%]

F8 shows the selected macro

Language

This tab shows a list of the available languages of the bbe++ software. To change the language, choose the language you wish and click "OK". The bbe++ software must be restarted for the changes to take effect.

Database Display Access Shortcuts Language	Macro Manager IO modules	Logger Settings Text results
Please select the languae you would like texts in menus and dialogs to be displayed in.		
English		

IO moduls

This item is used to connect an IO module (for example 4-20mA or relay outputs) to the PC.

Database Shortcuts	Display Access Macro Manager Language IO modules	Logger Settings Text results
Connection (none)	Search module	
(none) COM1 COM2	Search MCU	
	-	

- the COM port can either be chosen from the drop down box or the software can search all COM ports for the selected instrument.
- once an instrument has been found the COM port is stored for the next use.
- To configurate the devices goto Tools -> device -> This item is not available for all instruments.

With "search MCU" a multi channel unit for the AlgaeOnlineAnalyser can be conncted.

Text results

This item is used to do the configuration of writing text files and sending data via RS232.

File output		
File path:	Browse	
View:		
Max. age of files:		
Serial port		
(none) Settings		

File output

If the file output is configured daily text files are written by bbe++. The files are stored in the path given in "file path".

The name is the serial number of the instrument date:

ALA-03-65 20170104.txt	04.01.2017 12:18	Textdokument	1 KB

The format of the output is defined by a "view" of the type "ASCII export". For details please see the chapter "view editor". In the view editor the data columns and the format can be defined.

Files older than given in the "max. age of files" are deleted automatically. If this is set to "0" no files will be deleted.

Enable advanced/basic functionality

Change between advanced and basic functionality. See also Tools -> Settings -> Access.

Connect COM port

COM-Port v	erbinde	n	×
Connection Connection	on	Search device	
Status: s	earching	for device	
	Clo	se	

This item is used to connect an instrument to the PC.

Please note:

- bbe++ is looking for an instrument of the selected type only (Tools → Settings → Access).
- the COM port can either be chosen from the drop down box or the software can search all COM ports for the selected instrument.
- once an instrument has been found the COM port is stored for the next use.

Device

The "Device" submenu varies depending on the selected type of instrument. Each type has its own submenu.

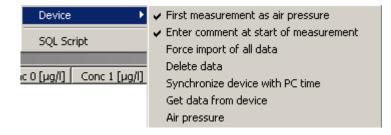
<u>DemoMode</u>

To switch the bbe++ software to the demo mode select FluoroProbe (Tools -> Settings -> Access) and disconnect all instruments. Click on "DEMO mode" in the device submenu. Now, the software can be operated as if a FluoroProbe were connected. Some procedures such as calibrations are limited in function.

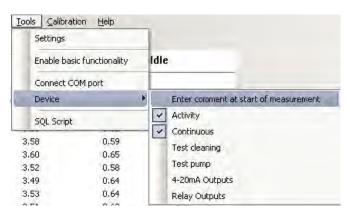
To reset the demo mode, please restart bbe++.

Device DEMO mode

Once the DEMO mode is selected, the submenu changes to the FluoroProbe entries:



AOA device Submenu



Enter comment at start of measurement:

Check to enter one or more comments when starting the measurement procedure.

<u>Activity:</u>

Check to perform activity measurements. If unchecked the activity measurement will be skipped.

Continuous:

Check to perform continuous measurements (standard). If unchecked, only one measurement will be done. This can be used for lab operation.

<u>Test cleaning:</u>

A cleaning procedure can be triggered.

est cleaning		×
Start moving down.		Up
		Down
(time needed: 3.9s)		
	Cancel	

Up/down:

Starts the cleaning piston to move up or down. The travelling time is indicated (normally around 20s)

<u>Test pump:</u>

The pump can be operated manually.



The test pump dialogue can also be used to check the required pumping time to get fresh sample to the instrument.

Analog output (option):

The analog outputs can be configured according to individual needs. The outputs can be used for different parameters and the range for the results can be set for 4-20 mA.

Additionally the sample source can be filtered:

None: All data of the chosen parameter will be applied, in depended from the sample source

Source n: Only data of the sample source n will be applied.

Depending on the number of installed analogue outputs more or less tabs will be displayed. In the screenshot below 8 analogue outputs are installed.

/)εμ μο/Γ
llgu
_
-
ource 2 💌
_
20mA

In this example, on channel 1, 4 mA is supplied at a chorophyll concentration of 0 μ g/l and 20mA at a concentration of 100 μ g/l – for any sample source. Values that are above or underneath these are converted to 20 respectively 4mA.

On channel 2, 4 mA is supplied at a chorophyll concentration of 0 μ g/l and 20mA at a concentration of 200 μ g/l of green algae – for sample source 2.

The current output of channel 1 will only be refreshed after the measurement of sample source 1. The current output of channel 2 will only be refreshed after the measurement of sample source 2.

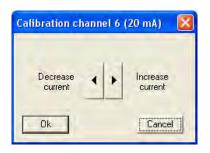
Example for the setting above:

Source measured	Conc. Source 1 [µg/l]	Conc. Source 2 [µg/l]	Output channel 1 [µg/l]	Output channel 2 [µg/l]
			No data filter	Source 2 only
2	50	0	4mA	4mA
1	50	0	12mA	4mA
2	50	100	20mA	10mA
1	50	100	12mA	10mA
2	0	100	20mA	10mA
1	0	100	4mA	10mA

There are also output options for the alarms. If there is no alarm, the output is set to 4mA, otherwise to 20mA.

The Test 4 mA, Test 12 mA and Test 20 mA buttons can be used for test purposes. If one of these buttons is clicked, the current indicated on the button can be measured at the corresponding output.

Depending on the output device, the 4 to 20mA output may also be calibrated. If this option is available, just click on the 4 and 20mA buttons in the calibration section of each output:



Using the arrow buttons it is possible to adjust the corresponding mA value so that the SCADA system shows the same value. Press OK to confirm the settings.

Relay Output (Option)

The relay outputs can be configured according to individual needs. The menu item is only available if a relay board is installed.

hannel 2	Channel 3
(none) Watchdog Alarm for Green Algae Alarm for Diatoms Alarm for Diatoms Alarm for Zryptophyta Alarm for #4 Alarm for #5 Alarm for #6 Alarm for Yellow substances Alarm for Yellow substances Alarm for Jellow substances Sample source 1 Sample source 2	(none) Watchdog Alarm for Green Algae Alarm for Bluegreen Alarm for Cryptophyta Alarm for Cryptophyta Alarm for #4 Alarm for #5 Alarm for #6 Alarm for Yellow substances Alarm total conc. Sample source 1 Sample source 2
Data filter: None None On Source 1	Data filter: None On Off

The relay outputs can be set in the following modes:

Disabled	No function
WatchDog	The relay changes between on and off one time per minute during the measurement. No toggling if a hardware alarm occurs.
Conc. alarm of algae class	The relay switches to the ON position if an alarm of the specified algae class occurs.
Conc. alarm of total chlorophyll	The relay switches to the ON position if an alarm of the total chlorophyll concentration occurs.
Any conc. alarm	The relay switches to the ON position if any concentration alarm occurs.
Hardware alarm	The relay switches to the ON position if any hardware alarm occurs.

Data filter

Select the sample source, the relay of the given channel shall react on.

The ON/OFF buttons can be used to test the relay and the cable connections.

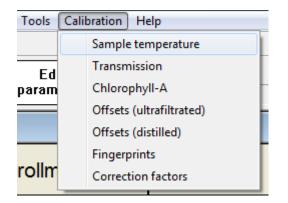
The number of channels depends on the number of connected output devices.

SQL Script

This function can be used to run an SQL script on the database to reorganise it or to do some special calculations. The SQL script is provided by bbe Moldaenke as the case arises.

CALIBRATION

Contains the items to calibrate different bbe instruments (expert level only)



Sample temperature

Shows the actual internal temperature. The calibration of the internal temperature shall only be done by bbe service.

Sensor	Current value Req. value	
fluor.	38,53 °C	Apply

Transmission

Performs a calibration at the offset of the transmission measurement. This is the value that is measured if pure water (100% transmission) or no transmission (0%) is present.

To calibrate 100% transmission, pure water is required.

1. Go to "CALIBRATION → TRANSMISSION". The parameter will be imported and the transmission calibration dialogue will be shown.

			M	easurement	D		Start
	525	570	610	590	470	UV LED	Cancel
Old offset	0,068964	0,211246	0,15214E	0,217370	0,114701	0,45456E	_
New offset	0	0	0	0	0	0	Apply
							Mere

2. Click "START"

A	Please insert then press Of	a cuvette with ultra K.	afiltrated sample water	into the device,

- 3. Fill a clean cuvette with distilled water, place it in the AlgaeLabAnalyser and confirm with "OK".
- 4. Now 10 measurements of the sample will be executed. The number of the current measurement will be shown in the field "Measurement"
- 5. The new gradient for each LED will be shown. "APPLY" starts the transfer of the new parameters to the AlgaeLabAnalyser.

Transmissi	onkalibrie	rung						×
			Me	easurement	10		Start	
	525	570	610	590	470	UV LED	Cancel	
Old offset	0,08067	0,22131	0,19676	0,27305	0,13140	0,49071		-
New offset	0	0	0	0	0	0	Apply	
							<u>M</u> ore	

"MORE" shows the settings for the digital-analog converter that controls the LED. This information is only of value for a maintenance technician.

Chlorophyll-A

This menu item enables an offset measurement with the aid of a filtered sample. In comparison to the other offset measurements, this is characterized by a significantly faster uptake of the offset, since the F0 and Fm measurements are excluded. Please use this offset calibration when the yellow substance measurement is excluded.

<u>Offsets</u>

The offset is the signal without algae that has to be subtracted during the measurement. Two offsets have to be calibrated:

- 1. The offset in distilled water. This water has to be free of algae **and** free of yellow substances. This offset is used when the determination of yellow substances is switched on. The concentration of yellow substances is determined during the measurement.
- 2. The offset in ultrafiltrated water. This water has to be free of algae. This offset is used when the determination of yellow substances is switched off. The concentration of yellow substances is "in" the offset and so filtrated sample water has to be used for the offset.

Calibration solution for the "ultra filtrated water offset and the yellow substances

In the lab, the calibration of the yellow substances can be easily done with tap water. In cases of very small chlorophyll-a concentration, it is recommended to use ultrafiltered sample of the water (from the water to be examined). For this the following equipment is needed:

Type of filter: Nitrocellulose filter, pore size 0.45 µm, diameter 47mm (for example: Sartorius Stedim)

Vessels: Depending on the sample volume flask with 5 L content

Negative pressure of 800mbar. The volume of the sample is determined by the instrument to be calibrated, BBE. For an ALA be about 100ml, requires approximately 5L filtrate for an AOA / AlgaeGuard / A-Tox sensor / AlgaeTorch about 1L and for an immersion probe.

Offsets (ultrafiltrated)

Performs a calibration of the ultrafiltrated sample water offset.

1. Go to "CALIBRATION → OFFSETS (ULTRAFILTRATED)". The calibration parameters will be transferred from the AlgaeLabAnalyser and displayed.

Туре	f0 offset	-			Measure	ment 0			Start
	525	570	610	590	470	UV LED	Trans.	E	Cancel
Old offset	0	0	0	0	0	0	digits		
lew offset	0	0	0	0	0	0	digits	%	Apply

2. Click on "START" to initiate the calibration

ater into th	ne device,
_	Abbrechen
or	ок

- 3. Please fill a clean cuvette with distilled water, place it in the AlgaeLabAnalyser and click "OK".
- 4. Subsequently 3 x 10 measurements are executed:

- Offset of the chlorophyll concentration measurement (F-measurement)
- Offset of the so called fo and fm measurement (Genty parameter).

The current measurement is displayed in the "Type" field. The current number in the "Measurement" field.

- 5. The transmission is displayed for control purposes
- 6. After the calibration, the new calibration values are displayed. Please confirm with "Apply" to transfer the new calibration.

Offsetkalibri	erung (Ult	rafiltriert	es Wasse	r)					×
Тур:	FM-Offset				Measurem	ent 3			Stop
Old offset	525 2,36589	570 1,13209	610 0,47290	590 0,45963	470 5,96178	UV LED	Trans. Digits		Abbrechen
New offset	0,03124	0,05573	0,11227	0,08894	0,00689	0,15569	Digits	%	Anwenden <u>M</u> ehr

"MORE" shows the settings for the digital-analog converter that controls the LED. This information is only of value for a maintenance technician.

Offsets (distilled)

Performs a calibration of the distilled water offset.

1. Go to "CALIBRATION → OFFSETS (DISTILLED)". The calibration parameters will be transferred from the AlgaeLabAnalyser and displayed.

Type	f0 offset	-			Measure	ment 0			Start
	525	570	610	590	470	UV LED	Trans.	E	Cancel
Old offset	0	0	0	0	0	0	digits		
lew offset	0	0	0	0	0	0	digits	%	Apply

- 2. Click on "START" to initiate the calibration
- 3. Please fill a clean cuvette with distilled water, place it in the AlgaeLabAnalyser and click "OK".

A	Please insert a cuvette with distilled water into the device, then press
_	OK.
-	OK.

4. Subsequently 3 x 10 measurements are excecuted.:

- Offset of the chlorophyll concentration measurement (F-measurement)
- Offset of the so called fo and fm measurement (Genty parameter).

The current measurement is displayed in the "Type" field. The current number in the "Measurement" field.

- 5. The transmission is displayed for control purposes
- 6. After the calibration, the new calibration values are displayed. Please confirm with "Apply" to transfer the new calibration.

Offsetkalibri	erung (De	stilliertes	Wasser)						×
Тур:	F-Offset				Measurem	ient 10			Start
	525	570	610	590	470	UV LED	Trans.		Abbrechen
Old offset	2,20743	1,49263	1,88671	0,84044	1,79128	0,22316	Digits		
New offset	0,01745	0,08160	0,05635	0,02822	0,06357	-0,09353	Digits 95,37	%	Anwenden
									<u>M</u> ehr

"MORE" shows the settings for the digital-analog converter that controls the LED. This information is only of value for a maintenance technician.

Fingerprints

This menu item subsumes the fingerprints of algae classes and yellow substances. The fingerprints contain the fluorescence characteristics of the algae classes or yellow substances. The fingerprint of the algae classes shows the signal of the pure solution based on a concentration of $1\mu g/l$. For the fingerprints of yellow substances the concentration is chosen arbitrary. Their classification serves mainly the correction of the fluorescence signal during the classification of algae.

The names of the algae and if a fingerprint is an algae or a yellow substance can be defined in the parameters.

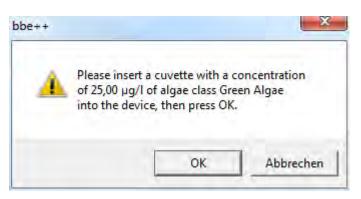
For the calibration of the algae fingerprints, please use pure solutions of the algae division with a known chlorophyll concentration. The concentration should be in the range of 20-80 μ g/l.

1. Go to "CALIBRATION → FINGERPRINTS". Now the parameters are imported from the device and the calibration dialogue is shown.

Igae class	Green Algae	<u> </u>				Measuren	nent 0	Start
ínown conce	entration 0		μg/l			ype of offse Filtrated		C Distilled water
	525	570	610	590	470	UV LED	Trans.	
Old factors	0,433535	0,142361	0,198083	0,131050	1,035245	1,066616		
New factors	0	0	0	0	0	0		Apply
			-					Cance

- 2. Select the algae class to calibrate
- 3. Insert the concentration. Concentration values should be in a range of 20 80 µg/l.
- 4. If the concentration is determined later insert "1" and use the "calibration by factor" feature to adapt the calibration after specifying the concentration.

- 5. Please choose from the "Type of offset"-field if the sample was diluted with filtrated or distilled water.
- 6. Click on "START"



- 7. Please fill the calibration sample in a clean cuvette, place it in the AlgaeLabAnalyser and click "OK".
- 8. After the calibration the new fingerprint is shown.
- 9. Apply the values by clicking "Apply".
- 10. Repeat the procedure with all algae classes activated in the AlgaeLabAnalyser

Correction factors

Go to "Calibration \rightarrow Correction factors". Now the parameters are imported from the device and the fingerprint correction dialogue is shown.

se correction facto xample: entering 2 lease use the corr	2 will doub	le the calcu	ilated result:	s of future n			acífic class
lease only use me							
					A R. L. CONTR.		
Algae class	Green Alg	ae 🙎		Cor	rection fact	or	
	Green Alg	570	610	Cor 590	rection fact 470	or UV LED	
	525		610 0,198				
	525	570		590	470		Арріу

Correction of a fingerprint

This item allows the correction of a specific fingerprint using a particular factor. If one algae class is under- or overestimated compared to your reference, the fingerprint can be changed automatically. Entering for example the factor 2 will double the result for the chosen algae class. After entering the number, the new fingerprint is displayed. Use the "APPLY" button to send it to the sensor.

FACTORY DEFAULT: This option can be used to reset a specific fingerprint to the factory settings. This feature is only available in sensors with an internal software 1.96 or later. Otherwise, this option is greyed out.

Calibration of Fingerprints with Subsequent Wet-Chemical Analysis:

If the AlgaeLabAnalyser is calibrated with a reference solution where the concentration is determined subsequently, the following steps have to be carried out:

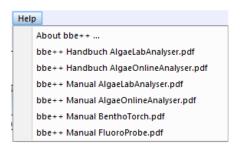
- Do a fingerprint calibration as described above, but enter 1 for the concentration of the reference solution
- Do a wet-chemical analysis
- Use the "Calibration by factor" feature to adapt the calibration to the result of the subsequent wet-chemical analysis.

Example:

The result of the subsequent chlorophyll analysis is 35µg/l. In this case the factor is 35.

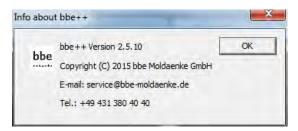
Attention: the AlgaeLabAnalyser is not ready for use until the last step has been carried out.

HELP



About ...

Displays the start-up screen.



For further questions, please contact our service. Please let us know the Software version you are using and the serial number of your instrument.

New version can be downloaded from http://www.bbe-moldaenke.de/.

bbe++ manuals ...

List of currently installed bbe++ manuals. Depending on the selection made during the installation, there may be manuals in different languages and for different instruments.

To make further manual available, please store the PDF files in the following folder:

Windows XP:

C:\Programme\bbe++\ Windows Vista or Windows 7: C:\Programme (x86)\bbe++\)

THE VIEWS

TABLE VIEWS

A table view is opened by "WINDOW \rightarrow NEW TABLE VIEW \rightarrow TABLE VIEW NAME".

Date/Time [date]	Conc 0 [Green Algae] [µg/l]	Conc 1 [Bluegreen] [µg/l]	Conc 2 [Diatoms] [µg/l]	Conc 3 [Cryptophyta] [µg/l]	Conc 4 🔺
15.06.2009 09:10:50	0	0,813	0	0,495	
15.06.2009 09:10:53	0	1,04	0	0	
15.06.2009 09:10:55	0	0	0	0	
15.06.2009 09:10:57	0	2,28	0	0	
15.06.2009 09:11:00	1,08	0,829	0	0	
15.06.2009 09:11:02	0	0,142	0	2,09	
15.06.2009 09:11:04	0,0475	0,956	0	0,908	
15.06.2009 09:11:07	0	0,932	0	0	
15.06.2009 09:11:09	0	1,2	0	0	
15.06.2009 09:11:12	0	0,74	0	0	
15.06.2009 09:11:14	0	0,561	0	0,936	
15.06.2009 09:11:16	0	0,698	0	0	
15.06.2009 09:11:19	0,945	0,779	0	0	
15.06.2009 09:11:21	0	0,804	0	0	
15.06.2009 09:11:23	3,35	0	0	0	
15.06.2009 09:11:26	1,07	0,488	0	0	
15.06.2009 09:11:28	0	0,261	0	2,03	
15.06.2009 09:11:31	1,52	0,227	0	0	
15.06.2009 09:11:33	0	1,1	0	0	
15.06.2009 09:11:35	0	1,58	0	1,97	
15.06.2009 09:11:38	5,41	0	0	0,883	
15.06.2009 09:11:40	3,26	0	2,18	0	
15.06.2009 09:11:42	0,792	0	2,82	0	
15.06.2009 09:11:45	2,92	0	1,33	2,85	
15.06.2009 09:11:47	6,68	0	0	1,54	
15.06.2009 09:11:50	6,56	0	0,939	0,492	
15.06.2009 09:11:52	0	0,111	1,16	0	
5.06.2009 09:11:54	0	0,363	0	0,598	i.
(1				

Within the list view, the right mouse button offers detailed information about the selected data set.

Date/Time [date]		Comment	Comment [1
14.10.2015 14:53:58			
14.10.2015 15	H	istory of Param	eters
14.10.2015 15	Fo	lit Comment	
14.10.2015 15	_		
14.10.2015 16	D	elete Data	
14.10.2015 16	Da	ata Fields Select	tion
14 10 2015 16 5 50	_		

History of Parameters

HISTORY OF PARAMETERS shows the corresponding parameters for the given instrument and time. For details, see the description of the data menu.

ameters		
ommon parameters Fit parameters		
	set: 30.03.2006 09:07:37	💌 Original
Name	Value	Unit
Enabled for fit flag Cloroficeas	on	
Enabled for fit flag Cianoficeas	on	
Enabled for fit flag Diatomeas/Dinofl.	on	
Enabled for fit flag Cryptoficeas	on	
Enabled for fit flag Oscillatoria	off	
Enabled for fit flag #6	off	
Enabled for fit flag #7	off	
Enabled for fit flag Sust. amarillas	on	
,		
Export	OK	Abbrechen Übernehm

Edit comment

EDIT COMMENTS allows the user to change the comments of a specific data set retrospectively.

Co	omments			×
	Title	Туре	Text	
	Comment	Text	First comment	
	Operator	Text	bbe	
	рН	Number	- 7.5	
	OK		Cance	3I

The dropdown list contains previously entered comments (if applicable).

Delete data

To delete data rows from the data base, mark one or more row by clicking on the row.

Hold the Ctrl. key while clicking to add more rows to the selection.

14.10.2015 16:53:58
14.10.2015 17:03:58
14.10.2015 17:12:58
14.10.2015 17:53:58
14.10.2015 18:03:58
14.10.2015 18:12:58
14.10.2015 18:53:58
14.10.2015 19:03:58
14.10.2015 19:12:58
14.10.2015 19:53:58
14.10.2015 20:03:58
14.10.2015 20:12:58
14.10.2015 20:53:58
14.10.2015 21:03:58
14.10.2015 21:12:58
14.10.2015 21:53:58
14.10.2015 22:03:58

Hold the Shift. key while clicking to expand the.

14.10.2015 16:03:58 14.10.2015 16:12:58 14.10.2015 16:53:58	
14.10.2015 17:03:58	
14.10.2015 17:12:58	
14.10.2015 17:53:58	
14.10.2015 18:03:58	
14.10.2015 18:12:58	
14.10.2015 18:53:58	
14.10.2015 19:03:58	
14.10.2015 19:12:58	
14.10.2015 19:53:58	
14.10.2015 20:03:58	
14.10.2015 20:12:58	
14.10.2015 20:53:58	
14.10.2015 21:03:58	
14.10.2015 21:12:58	
14.10.2015 21:53:58	
14.10.2015 22:03:58	
14.10.2015 22:12:58	
14.10.2015 22:53:58	
14.10.2015 23:03:58	
14.10.2015 23:12:58	
14.10.2015 23:53:58	

Select "Delete Data"

14.10.201 14.10.201	
14.10. 14.10. 14.10. 14.10. 14.10. 14.10.	History of Parameters Edit Comment Delete Data Data Fields Selection
14.10. 14.10.201 14.10.201 14.10.201	5 20:03:58 5 20:12:58

All data or the selected only can be deleted. Click OK to delete.



Data Fields Selection

To add or remove columns from the list view use "Data fields selection". The dialog is similar to the dialog of the View Editor.

Field Selection Table is sorted according to first entry Fields		×
Available Trans. 700 nm [digits] LED 2 [525 nm] [digits] LED 3 [570 nm] [digits] LED 4 [610 nm] [digits] LED 5 [370 nm] [digits] LED 6 [590 nm] [digits] LED 7 [470 nm] [digits] Pressure [bar] Temp. LEDs [*C] Temp. Sensor [*C] #44 for 20	Add -> Date/Time [date] Green Algae [µg/l] Bluegreen [µg/l] Diatoms [µg/l] Diatoms [µg/l] Cryptophyta [µg/l] Yellow substances [µg/l] Total conc. [µg/l] Transmission [%] Down Down Depth [m] Temp. Sample [*C]	
[Cancel]	Ok	

Please select or deselect the columns. The list view is updated immediately.

Sorting of the list view

The list view is sorted by date/time. It can be sorted by any other column by clicking on the header of the column. Clicking twice leads to the reversed order.

Sorted by time/date ascending:

Date/Time [date]	Green Algae [µg/l]
26.06.2007 10:04:14	0,00
26.06.2007 10:04:29	0,00
26.06.2007 10:04:45	0,00
26.06.2007 10:05:00	0,00
26.06.2007 10:05:16	0,00
26.06.2007 10:05:32	9,48
26.06.2007 10:05:47	0,00
26.06.2007 10:06:03	0,00
26.06.2007 10:06:19	0,00

Sorted by time/date descending:

Date/Time [date]	Green Algae [µg/l]
26.06.2007 12:19:30	0,00
26.06.2007 12:19:14	0,00
26.06.2007 12:18:59	0,00
26.06.2007 12:18:44	0,00
26.06.2007 12:18:29	0,00
26.06.2007 12:18:13	0,00
26.06.2007 12:17:58	0,00
26.06.2007 12:17:43	0,00
26.06.2007 12:17:28	0,00

Sorted by green algae descending:

Date/Time [date]	Green Algae [µg/l]
26.06.2007 10:05:32	9,48
26.06.2007 10:09:42	2,97
26.06.2007 11:20:26	2,89
26.06.2007 11:28:16	1,98
26.06.2007 10:16:14	1,31
26.06.2007 11:08:26	1,24
26.06.2007 11:55:09	0,32
26.06.2007 10:17:48	0,13
26.06.2007 11:30:53	0,12

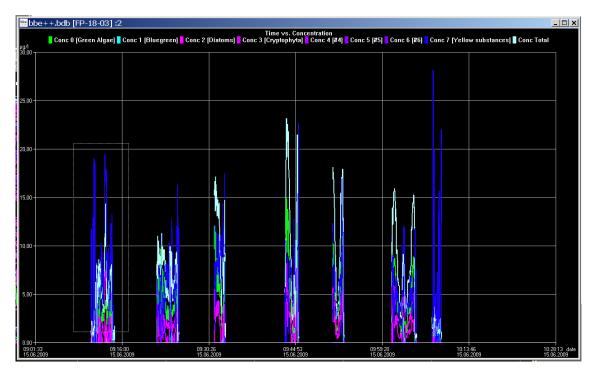
XY GRAPH VIEWS

Features of the XY graph view:

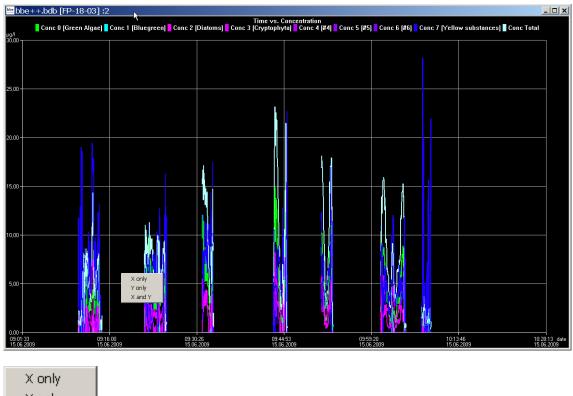
- 1. Select data of interest
- 2. Scaling of the axes (right click)
- 3. Display of the corresponding parameters (right click)
- 4. Editing a XY view, to change colours the type of graph.
- 5. Navigation within the data

Select data of interest

Please click and draw the mouse to select the required data.

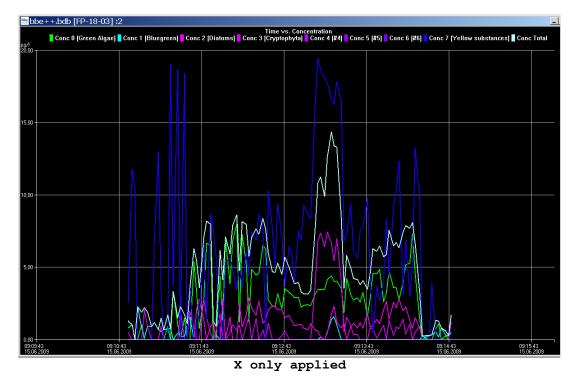


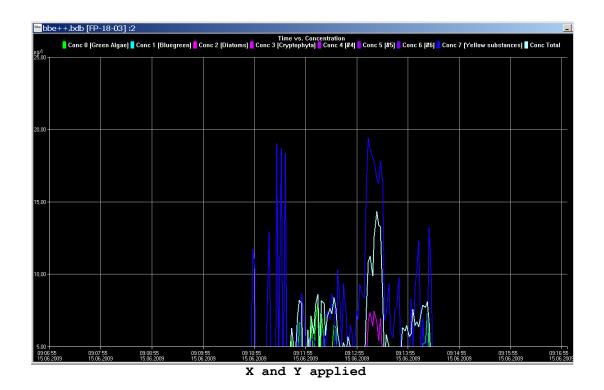
A pop-up window is shown to choose the axis to which the selection is to be applied.



Y only X and Y

- X only only the selection on the horizontal axis is applied.
- Y only only the selection on the vertical axis is applied.
- X and Y the selection on the horizontal and the vertical axis is applied.





Right-click menu

Scale axes
 Autoscale Y
 Parameter
 Default scaling

Features:

- > adjust the scaling .
- > activate and deactivate of the autoscaling feature.
- > show the parameters of a single data-set.
- > return to the default scaling.

Scaling of the axis

By default, scaling is done automatically. This means, all datasets of the selected period are displayed. To have a closer look at the data, it is sometimes useful to change the scaling. In the right-click menu, there is a "Scale axis" option:

In case of a time axis, the scaling tab of this axis is as follows:

Axis scalin	g			×
X-Axis Primar	y Y-Axis			
	Date	Time		
	01.04.2009 💌	10:24:37	•	
First	.04.2003	10.24.37	<u>*</u>	
Last	01.04.2009 💌	16:27:26	* *	
	OK	К. АЬ	brechen	lbernehmen

The first and last point in time have to be entered.

Hint: For more information on scaling an axis please see the "window" section in this manual.

In case of a "non-time axis", more possible adjustments are available:

Axis scaling		×
X-Axis Primary Y-Axis		1
Manual Scaling	Auto Scale Limits Lower limit Higher than Lower than	
Max 0	Upper limit Higher than Lower than	
	OK Abbrechen Übernehr	nen

Manual scaling: enter fixed values for the minimum and the maximum of this axis - enter 0 for both to disable this feature.

these settings are used to obtain a nice looking graph in two special situations:

Auto scale limits

data sets with very low noise:

In the auto-scaling mode, the graph looks as if there are extreme variations, but the range is very small due to the auto-scaling. In this case, it is better to use the options:

lower limit: lower than and

upper limit: higher than

This leads to a minimum span in the graph.

• data sets with outliners:

In this case, it is difficult to analyse the data because the auto scaling generates a high span value. To prevent this, please use the

lower limit: higher than for outliners with low values and

upper limit: lower than for outliners with high values

This leads to an optimised span in the graph.

Autoscaling

Enables the auto-scaling feature. The axis will be scaled so that all selected data are visible.

Parameters

Show the parameters of the data-set

Default scaling

Click here to undo all the changes in the scaling options.

PARAMETERS

The following pages show the parameters that are visible in the service access level. In the user level not all of these parameters are visible.

PROCESS PARAMETERS

These parameters are used to control measuring process

ers ter set by its date of creation. The chosen se her database or it can be copied to the clipb esclected parameter set to the device. switch to "Recalc" on the left panel. of parameter set [9/24/2013 9:15:23 AM ers Alarm parameters Common parameter time terval assurements t duration	oard	Unit	Clipboard Upload Template Original rameters
her database or it can be copied to the clipb re selected parameter set to the device. s switch to "Recalc" on the left panel. of parameter set 9/24/2013 9:15:23 AM ers Alarm parameters Common paramete time terval asurements t duration	oard ts Fit parameters Me Value 50 0 1	asurement par Unit 1/10s	Template Original
ne selected parameter set to the device. s switch to "Recalc" on the left panel. of parameter set 9/24/2013 9:15:23 AM ers Alarm parameters Common parameter time terval asurements t duration	rs Fit parameters Me Value 50 0 1	Unit 1/10s	Original
ers Alarm parameters Common parameter time terval asurements t duration	Value 50 0 1	Unit 1/10s	
time terval asurements t duration	Value 50 0 1	Unit 1/10s	rameters
terval asurements t duration	50 0 1	1/10s	
terval asurements t duration	0		
asurements t duration	ĩ	min	
t duration	1		
	6		
	0	S	
nt duration	1	s	
duration	5	s	
easurement duration	5	s	
centration for activity calculation	3	μα/Ι	-
at start of measurement	false		
	true		
isurements	true		
able sample channels	2		
	Interval		
up	9		
	10		1 50
	entration for activity calculation at start of measurement surements able sample channels	entration for activity calculation 3 at start of measurement false surements true able sample channels 2 Interval up 9	entration for activity calculation 3 µg/l at start of measurement false surements true able sample channels 2 Interval 9 \$

LED measuring time

Controls the LED measuring time in older ALA instruments.

Measurement interval

Interval between the start of one measurement and the start of the next measurement. This is only active in the continuous mode. If the measurement process is longer than the interval, a continuous measurement is performed.

Number of chlorophyll (f) measurements

Number of measurements that are executed and averaged for one data set.

Measurement duration (f, fm, fo, transmission)

Please enlarge the measurement duration to enhance the accuracy of the measurements.

Minimum chlorophyll (f) concentration

Below this concentration no algae activity is calculated.

Enter comment at start of measurement

If enabled, a comment related to the measurement can be entered. Please see window -> comment field for detailed configuration.

<u>Activity</u>

Enables / disables the activity measurement (if available in the instrument)

Continuous measurements

If enabled a continuous measurement is performed.

Number of available sample channels

Shows the number of available sample channels - can only be changed by the bbe service

Pump mode

Please select the way the sample pump is working.

ON: Always working

OFF: Off

Interval: Pump is working at the beginning of each measurement

Pump time start up

Time, the pump is running before the first measurement. This is to get fresh sample and to remove remaining water from the measuring cell.

istory emplates	History of parameters		Export	Clipboar
- Online - Recalc	Choose a parameter set by its date of creation. The chosen exported into another database or it can be copied to the cli You can upload the selected parameter set to the device.		Matrix-	Upload
	To edit parameters switch to "Recalc" on the left panel.			Templat
	Creation date of parameter set 9/24/2013 9:15:23 AM	4	*	Original
			-	
	Process parameters Alarm parameters Common parame	eters Fit parameters Mea	asurement pa	rameters
	Name	Value	Unit	-
	Number of available sample channels	2		
	Pump mode	Interval		
	Pump time start-up	9	\$	
	Pump time fill sensor	18	s	
	Pump time refill	5	s	
	Pump time rinse after cleaning	10	s	
	Pump time rinse hoses (batch)	10	s	
	Cleaning interval	3	h	
	Force cleaning after first measurement	off		
	Valve mode	Interval		
	Pump installed	yes		
	F measurement adaptation time	200	1/10s	
	F0 measurement adaptation time	400	1/10s	
	Integration time of fm measurement	250	1/1000s	
	4			1 +1

Adaptation time (f, fo)

Period of time before the measurement starts. During this time, the LEDs are switched on to adapt the algae to the light conditions.

Integration time fm measurement

Averaging time to smooth the fm results.

ALARM PARAMETERS

These parameters control the alarm generation. Alarms are generated as soon as a threshold is exceeded. For each algae class and the total chlorophyll concentration a threshold can be set. In combination with a relais output, the alarms can be used to trigger an external device (like a sampler).

History	-			
Templates	History of parameters		Export	Clipboard
Online Recalc	Choose a parameter set by its date of creation. The chosen set can t exported into another database or it can be copied to the clipboard.	be 🗌	Matrix	Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.			Template
	Creation date of parameter set 9/24/2013 9:15:23 AM			Original
	Process parameters Alarm parameters Common parameters Fit	parameters Mea	asurement par	ameters
	Name	Value	Unit	1
	Confirmation of alarms	on	1	
	Alarm limit Green Algae	0	μg/I	
	Enable alarm Green Algae	off		
	Alarm limit Bluegreen	0	μg/l	
	Enable alarm Bluegreen	off		
	Alarm limit Diatoms	0	μg/I	
	Enable alarm Diatoms	off		
	Alarm limit Cryptophyta	0	μg/I	
	Enable alarm Cryptophyta	off	1.4	
	Alarm limit #4	0	μg/I	
	Enable alarm #4	off		
	Alarm limit #5	0	μg/l	
	Enable alarm #5	off		
	Alarm limit #6	0	µg/l	
	Cysels stars #C	-11		1.55

ates	History of parameters		Export	Clipboa
	Choose a parameter set by its date of creation. The chosen set can be exported into another database or it can be copied to the clipboard.		Matrix	Uploa
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.	_		Temple
	Creation date of parameter set 9/24/2013 9:15:23 AM		-	Origina
	D Alam parameters 1 c			
	Process parameters Alarm parameters Common parameters Fit p		-	ameters
	Name	Value		
	Alarm limit Diatoms	0	μg/l	
	Enable alarm Diatoms	off		
	Alarm limit Cryptophyta	0	µg/l	
	Enable alarm Cryptophyta	off		
	Alarm limit #4	0	µg/l	
	Enable alarm #4	off		
	Alarm limit #5	0	µg/l	
	Enable alarm #5	off	1	
	Alarm limit #6	0	µg/l	
	Enable alarm #6	off		
	Alarm limit Yellow substances	0	µg/l	
	Enable alarm Yellow substances	off		
		0	µg/l	
	Alarm limit total			
	Alarm limit total Enable alarm total	off		

<u>Alarm limit</u>

Set the threshold for the algae class

Enable alarm

Enables the alarm.

COMMON PARAMETERS

arameters					
History Templates Online Recalc	History of parameters Choose a parameter set by its date of creation. The of exported into another database or it can be copied to You can upload the selected parameter set to the de To edit parameters switch to "Recalc" on the left par	o the clipboard. wice.		Export Metris	Clipboard Upload
	Creation date of parameter set 9/24/2013 9:19		out w	1	Original
	Process parameters Alarm parameters Common	parameters Fit parame	ters ме Value		ameters
	Warm-up time Serial number Software version		5 1723 252	\$	
	1	0		Cancel	Amale

Warm-up time

Period of time, before the measurement starts.

Serial number

Serial number of the ALA.

Software version

Shows the version of the firmware.

FIT PARAMETERS

These parameters control the calculation of the results from the raw data.

History Templates	History of parameters			Export	Clipboard
Recalc	Choose a parameter set by its date of exported into another database or it of			Matrix	Upload
	You can upload the selected parame To edit parameters switch to "Recald	ter set to the device.			Template
	Creation date of parameter set	16.04.2013 15:42:56	(test)		Adapted
	Process parameters Common para	ameters Fit paramete	rs Measurement parameter	s Turbidity ;	parameters
	Name		Value	Unit	
	Name of class 1 Name of class 2 Name of class 3 Name of class 4 Name of class 5 Name of class 5 Name of class 7 Name of class 8 Green Algae enabled for fit Bluegreen enabled for fit Diatoms enabled for fit #4 enabled for fit #5 enabled for fit	11	Green Algae Bluegreen Diatoms Cryptophyta #4 #5 #6 Yellow substances yes yes yes yes no no		
					_

Name of class

Enter the name of the calibrated algae class or the name of the yellow substance.

Enabled for fit

The enabled for fit section allows selecting maximum 5 of 8 calibrated algae classes for the calculation of the concentration of the different classes. Please take care, that all algae classes available in the water are activated.

You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel. Temple	emplates	History of parameters		Export	Clipboar
Name Value Unit #6 enabled for fit no no Yellow substances enabled for fit yes ges Green Algae Algae class Algae class Bluegreen Algae class Algae class Cryptophyta Algae class Algae class #45 Yellow substances Yellow substances Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 5 [510 nm] 0.88344 digits				Matrix	Upload
Process parameters Alarm parameters Common parameters Fit parameters Measurement parameters Name Value Unit #6 enabled for fit no Yellow substances enabled for fit yes Green Algae Algae class Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits	-calc	You can upload the selected parameter set to the device.			Templar
Name Value Unit #6 enabled for fit no Yellow substances enabled for fit yes Green Algae Algae class Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.89347 digits		Creation date of parameter set 9/24/2013 9:15:23/	АМ] Original
#6 enabled for fit no Yellow substances enabled for fit yes Green Algae Algae class Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 5 [670 nm] 0.80347 digits		Process parameters Alarm parameters Common para	meters Fit parameters Me.	asurement p	arameters
Yellow substances enabled for fit yes Green Algae Algae class Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class Yellow substances Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 Ultrafiltrated water offset of LED 5 [610 nm] 0.80347		Name	Value	Unit	
Green Algae Algae class Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Vellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 Ultrafiltrated water offset of LED 4 [570 nm] 0.8944 Ultrafiltrated water offset of LED 5 [610 nm] 0.80347		#6 enabled for fit	no	1	
Bluegreen Algae class Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 Ultrafiltrated water offset of LED 5 [610 nm] 0.8844 Ultrafiltrated water offset of LED 5 [610 nm] 0.80347		Yellow substances enabled for fit	yes		
Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 Ultrafiltrated water offset of LED 4 [570 nm] 0.8944 Ultrafiltrated water offset of LED 5 [610 nm] 0.80347		Green Algae	Algae class	Contract of the second	
Diatoms Algae class Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		Bluegreen	Algae class		
Cryptophyta Algae class #4 Algae class #5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 3 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [510 nm] 0.8844 digits		Diatoms			
#5 Algae class #6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 4 [570 nm] 0.80347 digits		Cryptophyta	Algae class		
#6 Yellow substances Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		#4	Algae class		
Yellow substances Yellow substances Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [510 nm] 0.8844 digits		#5	Algae class		
Ultrafiltrated water offset of LED 1 [0 nm] 0 digits Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		#6	Yellow substances		
Ultrafiltrated water offset of LED 3 [525 nm] 2.4287 digits Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		Yellow substances	Yellow substances		
Ultrafiltrated water offset of LED 4 [570 nm] 0.8844 digits Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		Ultrafiltrated water offset of LED 1 [0 nm]	0	digits	
Ultrafiltrated water offset of LED 5 [610 nm] 0.80347 digits		Ultrafiltrated water offset of LED 3 [525 nm]	2.4287	digits	
Ultrafiltrated water offset of LED 5 (610 nm) 0.80347 digits			0.8844	digits	
OpenStread maters efforts of PD C (270 men) E 0720 disks		Ultrafiltrated water offset of LED 5 [610 nm]			
		100-60-4	E 0710	altaine.	1.66

Yellow Substances Correction

Please select, whether this is a Yellow Substances fingerprint or not. Yellow substances content is not included in the total chlorophyll concentration.

<u>Offsets</u>

The results of the offset calibrations are shown here.

Parameters				
History Templates	History of parameters		Export	Clipboard
Online Recalc	Choose a parameter set by its date of creation. The chosen set exported into another database or it can be copied to the clipb		Matrix	Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.			Template
	Creation date of parameter set 9/24/2013 9:15:23 AM		2] Original
	Process parameters Alarm parameters Common parameter	rs Fit parameters M	easurement p	arameters]
	Name	Valu	e Unit	
	Ultrafiltrated water offset of LED 6 [370 nm]	5.873	8 digits	
	Ultrafiltrated water offset of LED 7 [590 nm]	0.652		
	Ultrafiltrated water offset of LED 8 [470 nm]	2.650	1 digits	
	Distilled water offset of LED 1 [0 nm]		0 digits	
	Distilled water offset of LED 3 [525 nm]	1.462	9 digits	
	Distilled water offset of LED 4 [570 nm]	0.8953	9 digits	
	Distilled water offset of LED 5 [610 nm]	0.7634	2 digits	
	Distilled water offset of LED 6 [370 nm]	0.9563	6 digits	
	Distilled water offset of LED 7 [590 nm]	0.6632	3 digits	
	Distilled water offset of LED 8 [470 nm]	0.7899	9 digits	
	Transmission offset of LED 1 [0 nm]		0 digits	
	Transmission offset of LED 3 [525 nm]		0 digits	
	Transmission offset of LED 4 [570 nm]		0 digits	
	Transmission offset of LED 5 [610 nm]		D digits n	1 2

Transmission offsets / gradients

Shows the result of the transmission offset calibration.

plates	History of parameters	Export	t Clipboa
he alc	Choose a parameter set by its date of creation. The chosen set co exported into another database or it can be copied to the clipboar		Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.		Templa
	Creation date of parameter set 9/24/2013 9:15:23 AM		• Original
	Process parameters Alarm parameters Common parameters	Fit parameters Measureme	ent parameters
	Name	Value Unit	
	Distilled water offset (fm) of LED 6 [370 nm]	1.4893 digits	
	Distilled water offset (fm) of LED 7 [590 nm]	0.52273 digits	
	Distilled water offset (fm) of LED 8 [470 nm]	0.69226 digits	
	Fingerprint of LED 3 [525 nm] Green Algae	0.255 digits/	/μg/l
	Fingerprint of LED 3 [525 nm] Bluegreen	0.26799 digits/	/μg/l
	Fingerprint of LED 3 [525 nm] Diatoms	1.0635 digits/	/μα/Ι
	Fingerprint of LED 3 [525 nm] Cryptophyta	0.96895 digits/	/µg/l
	Fingerprint of LED 3 [525 nm] #4	1 digits,	/µg/I
	Fingerprint of LED 3 [525 nm] #5	1 digits/	/μg/l
	Fingerprint of LED 3 [525 nm] #6	1 digits/	/μg/l
	ringerprint of CED 5 (525 min) #0		Los MI
	Fingerprint of LED 3 [525 nm] Yellow substances	1.107 digits/	/μg/I
		1.107 digits, 0.064 digits,	
	Fingerprint of LED 3 [525 nm] Yellow substances		/µg/l
	Fingerprint of LED 3 [525 nm] Yellow substances Fingerprint of LED 4 [570 nm] Green Algae	0.064 digits/	/μg/l /μg/l

Fingerprints

Displays the results of the algae class calibrations.

Parameters				×
History Templates	History of parameters	-	Export	Clipboard
- Online Recalc	Choose a parameter set by its date of creation. The chosen set or exported into another database or it can be copied to the clipboar		Matrix	Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.			Template
	Creation date of parameter set 9/24/2013 9:15:23 AM		•	Original
	Process parameters Alarm parameters Common parameters	Fit parameters Mea	isurement par	ameters
	Name	Value	Unit	-
	Fingerprint of LED 8 [470 nm] Cryptophyta Fingerprint of LED 8 [470 nm] #4 Fingerprint of LED 8 [470 nm] #5 Fingerprint of LED 8 [470 nm] #6 Fingerprint of LED 8 [470 nm] Yellow substances Standard deviation of LED 3 [525 nm] Green Algae Standard deviation of LED 3 [525 nm] Diatoms Standard deviation of LED 3 [525 nm] Diatoms Standard deviation of LED 3 [525 nm] Cryptophyta Standard deviation of LED 3 [525 nm] #4 Standard deviation of LED 3 [525 nm] #6 Standard deviation of LED 3 [525 nm] #6 Standard deviation of LED 3 [525 nm] Yellow substan Standard deviation of LED 3 [525 nm] Yellow substan	0.83825 1 1 1.971 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.	digits/µg/l digits/µg/l digits/µg/l digits/µg/l digits/µg/l	
		ОК	Cancel	Apply

Standard deviations

Standard deviations of the fingerprints of each algae class. This standard deviation refers to variations within one specific algae class. The greater the standard deviation, the less important the measured value for this algae class

istory	And the second sec			
emplates	History of parameters	1	Export	Clipboar
ecalo.	Choose a parameter set by its date of creation. The chosen s exported into another database or it can be copied to the clip		Matrix	Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.			Templat
	Creation date of parameter set 9/24/2013 9:15:23 AM			Original
	Process parameters Alarm parameters Common parameter	ers Fit parameters Me	asurement p	arameters
	Name	Value	Unit	
	Standard deviation of LED 8 [470 nm] #5	0.1		
	Standard deviation of LED 8 [470 nm] #6	0.1	1	
	Standard deviation of LED 8 [470 nm] Yellow substan	0.1		
	Date of calibration	20130702100942	1	
	Global correction factor	1		
	Cell factor of Green Algae	5.3e+005		
	Cell factor of Bluegreen	1e+006		
	Cell factor of Diatoms	4.5e+005		
	Cell factor of Cryptophyta	30,000	(
	Cell factor of #4	1e+006		
	Cell factor of #5	1e+006	1	
	Cell factor of #6	1e+006		
	Cell factor of Yellow substances	1	1	
	F0 measurement brightness	10	%	
				1 26

Date of calibration

Shows the date of the last factory calibration.

Global correction factor

Factor to adapt all measured chlorophyll results. All results will be multiplied with this factor.

Cell factors

Factors to convert the chlorophyll concentration [µg/l] results to cell counts [cell/l]. These factors can be defined separately for each algae class.

Fo measurement brightness

Brightness of the LED light during the fo measurement in relation to the brightness during the standard chlorophyll measurement.

MEASUREMENT PARAMETERS

			Export Clipboard
Online Recalc	Choose a parameter set by its date of creation. The choser exported into another database or it can be copied to the c		Mato: Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.		Templati
	Creation date of parameter set 9/24/2013 9:15:23 A	M	✓ Original
	Process parameters Alarm parameters Common param	eters Fit parameters Mea	asurement parameters
	Name	Value	Unit
	DA value of LED 3 [525 nm]	162	digits
	DA value of LED 4 [570 nm]	134	
	DA value of LED 5 [610 nm]	129	digits
	DA value of LED 6 [370 nm]	147	digits
	DA value of LED 7 [590 nm]	117	digits
	DA value of LED 8 [470 nm]	152	digits
	Transmission correction coefficient	0	
	Humidity offset	500	digits
	Humidity gradient	-1	bar/digit
	Required value of LED 3 [525 nm]	-1,113	digit
	Required value of LED 4 [570 nm]	-697	digit
	Required value of LED 5 [610 nm]	-884	digit
	Required value of LED 6 [370 nm]	-121	digit
	Required value of LED 7 [590 nm]	-405	digit
	Deministration of CD 02470 and	000	

DA values of the LEDs

Values result of the brightness regulation (service, do not change)

Temperature and Humidity offsets / gradients

Shows the result of the Temperature and humidity sensor calibration.

Required values of the LEDs

Values for the basic calibration of the ALA

es	History of parameters		Export	Clipboar
	Choose a parameter set by its date of creation. The chosen set exported into another database or it can be copied to the clipbo		Matrix	Upload
	You can upload the selected parameter set to the device. To edit parameters switch to "Recalc" on the left panel.	aid		Templa
	Creation date of parameter set 9/24/2013 3:15:23 AM			Original
	Process parameters Alarm parameters Common parameters			rameters
	Name	Value	Unit	
	Required value of LED 8 (470 nm)	-932	digit	
	Sample temperature offset		digits	
	Sample temperature gradient	0.093577		
	Temp. of LED gradient	0.064704	°C/digit	
	Temperature correction of LED 0 to 5 °C	1		
	Temperature correction of LED 5 to 10 °C	1		
	Temperature correction of LED 10 to 15 °C	1		
	Temperature correction of LED 15 to 20 °C	1		
	Temperature correction of LED 20 to 25 °C	1		
	Temperature correction of LED 25 to 30 °C	1		
	Temperature correction of LED 30 to 35 °C	1		
	Temperature correction of LED 35 to 40 °C	1		
	Temperature correction of LED 40 to 45 °C	1		
	Temperature correction of LED 45 to 50 °C	1		
	Temperature secondary all ED v E0 °C	4		1

Temperature correction

Temperature correction factors for the given temperature ranges.

OPERATING PRINCIPLES

PRINCIPLES OF OPERATION

Due to the fact that algae of the same division contain a similar quantity and quality of photosynthetic pigments, their fluorescence excitation spectrum (with a fixed emission wavelength at 680nm) is significant. Thus, it is possible to differentiate divisions of algae by their fluorescence excitation spectrum. In addition to this, other fluorescing matter (for example, yellow substances) is detected to enhance the accuracy.

The bbe fluorometers use 6 LEDs for fluorescence excitation for algae differentiation. The LEDs emit light at 6 selected wavelengths (370nm, 470nm, 525nm, 570nm, 590nm and 610nm).

DETERMINATION OF DIFFERENT ALGAE

The division of *chlorophyceae* (green algae) shows a broad maximum of fluorescence at the 470nm LED, which is caused by chlorophyll-a and -b. The *cyanophyceae* (blue-green algae) have their maximum at 610nm due to the photosynthetic antenna pigment *phycocyanin*. *Cyanophyceae* also contain chlorophyll-a if there is low intensity at 470nm. This is due to the masking effect of the *phycocyanin*. Furthermore, the high peak at the 525nm region for the *bacillariophyceae* originates from *xanthophyll fucoxanthin* and for the *dinophyceae* from *peridin*. The maxima at 470nm are caused by chlorophyll-a and -c. In our last analysed group, *cryptophyceae*, a significant maximum can be found at 570nm, which originates from *phycoerythrin*.

The different divisions of algae are first measured separately to calibrate the instrument. The measured spectra, or fingerprints, are then stored in the FluoroProbe.

During the measurement, the spectrum of the sample is loaded into the storage device of the instrument or sent to an external computer. The computer calculates the content of the different divisions of algae in the sample from the sample spectrum and the spectra of the separately measured algae divisions.

The concentration of every algae division is given in µg chlorophyll-a/l.

DETERMINATION OF YELLOW SUBSTANCES

Yellow substances may fluoresce.

The UV LED (370nm) is used to measure yellow substances in the water. At 370nm it is possible to differentiate between algae (low signal) and yellow substances (high signal). The result of this measurement is given in relative units and not in weight/volume, because very different substances are detected. The result is mainly used to obtain a more accurate determination of algae classes – but it is also possible to determine the variations of the yellow substances.

DATA ANALYSIS

<u>Offset</u>

The LEDs in the bbe fluorometer are switched on one after the other at high frequency. The fluorescence signal for each LED is taken and averaged during a given measuring time. The fluorescence values for each of the LEDs are given at the end. The concentration of the algae has to be calculated from these values.

The first step is to subtract the signal that does not come from the algae. This type of signal is also called offset. There are two types of offsets:

- 1. the signal from the bbe fluorometer itself, from the electronics and the optical system
- 2. the signal from fluorescent substances in the water that are not algae.

The first signal is determined by a measurement with distilled water – water without any fluorescent substance. The second signal can be determined by a measurement in ultra-filtrated sample water. This water only contains fluorescent substances that are not algae. Ultra-filtration is here understood as filtration with a 'mesh size' of 0.2 μ m.

In the case of a varying concentration of these substances in the water, the subtraction fails. This is why the determination of yellow substances has been integrated into the bbe fluorometer. Yellow substances are treated as one algae class. Varying concentrations can be detected – assuming the fingerprint of the calibrated yellow substances matches the yellow substances in the sample.

The first signal only depends on the instrument and only varies within a relatively small range. So there is no need to calibrate these settings. The second signal depends on the sample, so there may be a need to calibrate this.

Algae classes

After subtracting the offset from the measured fluorescence signals, the remaining signals have to be assigned to the different algae classes. A statistical calculation procedure in the software finds the best combination of concentrations of algae classes for the measured pattern of signals.

The total chlorophyll concentration is the sum of all detected concentrations of algae classes.

The signal can only be assigned to algae classes that are calibrated and activated in the instrument. Algae classes in the sample that are not part of the calibration will lead to miscalculations.

The different algae classes used for the statistical fit need to have significantly different fluorescence spectra such as the spectra calibrated by bbe in the bbe fluorometer. In case of queries, please ask **bbe Service**.

MEASUREMENT OF THE ALGAE ACTIVITY

The fluorescence response to a very bright light impulse is measured under two different conditions. There is one measurement with and one without a very bright additional background light.

For the algae the light is the energy source and therefore like food. Without the additional background light, a large amount of the light impulse is used as "food". So hardly any light is emitted in the form of fluorescence. If there is enough light because of the background light, the level of the fluorescence response will increase considerably. If the cell is damaged, the cell will not use the light and even without additional background light there is a greater fluorescence response to the light impulse.

The so-called Genty parameter sums up the process and provides a measure of algae activity:

$$Genty = 100 * \frac{fm - fo}{fm} [\%]$$

This is:

- Genty: shows the activity of the algae in percent whereby up to 75% is reached depending on the algae class and the physiological condition.
- fo: fluorescence response without background light
- fm: fluorescence response with background light

MEASUREMENT OF FURTHER VALUES AND THEIR CALCULATION

IN GENERAL

Generally, all measuring results are read into the PC as a figure between 0 and 4095. These have to be converted into the corresponding measuring values – for example, the transmission. As a unit of measurement for the figures, "digits" is used in the following.

The conversion of the figures into measuring values will generally be calculated by use of the following equation:

Measurement Value = Gradient * (Figure – Offset)

The "offset" is the number which is read in if the measuring value is 0. "Gradient" is the conversion factor from the figures that are read into the measurement value.

Example:

0 digits is the same as -20° C

1200 digits is the same as 100°C

So the offset is 200 [digits] and the gradient 0.1 [°C/digit].

TRANSMISSION

The transmission of the sample is measured at 5 different wavelengths: 470 nm; 525 nm; 570 nm; 590 nm; 610 nm.

The sensor is calibrated in a way that clear water has a transmission of 100% and "perfectly black water" has one of 0 %. The transmission can – in a limited way – also be used to compensate the fluorescence signal in cloudy water.

Calculation of the transmission from the sensor signals

Transmission [%] = Gradient [%/digit]* (Signal [digit] – Offset)

Compensation of the chlorophyll concentration by the transmission

The compensation is based on measurements using clay as a model for turbidity. The coefficients are the same for all ALAs.

Two effects are compensated:

- 1. The higher offset due to additional reflection on the particles
- 2. The change of the signal (raw value) due to the mitigation of the light.

The correction is done separately for each LED.

Offset compensation:

Offset corr. (λ) = Offset(λ) + a * (100-Transmission (λ))² + b * (100-Transmission (λ)) * Average Fingerprint (LED)

a, b are parameters, determined by bbe.

Second step is the complete compensation of the raw value:

Raw corr. (λ) = Raw (λ) * (1 + Factor_{mitigation}(λ) * (100-Transmission))

After doing the correction, the calculation of the chlorophyll concentrations is done as normal.

TEMPERATURE OF THE SENSOR

The very small temperature drift of the sensor can be compensated additionally. Compensation factors for preset temperature ranges can be set.

Calculation of the temperature compensation

Chlorophyll concentration [µg/l] = measured chlorophyll concentration.[µg/l] * correction factor (Temp)

If the measured chlorophyll concentration at an internal temperature of 20°C is 100µg/l and at an internal temperature of 30°C is 101µg/l, the correction factor is 0.99 at 30°C.

BRIGHTNESS OF THE LED

The fluorescence signal depends directly on the brightness of the excitation lamp of the diodes. The brightness is regulated to the target value at the beginning of each measurement. Afterwards the brightness and the correction values are determined regularly.

MEASURING PROCEDURE

The bbe Algae Online Analyser was calibrated before delivery with bbe standard algae types and yellow substances. In case of the presence of algae types that are not calibrated or in case of different types of yellow substances, the bbe Algae Online Analyser needs to be calibrated to these special needs first. This is most important if there are only low concentrations of algae (< $10\mu g/l$).

INITIAL MEASURING PROCEDURE

- Start the instrument and in case of an external PC also the PC and the AOA Software
- Connect the sample tubes to the sample supply and test it by choosing Test Pump
- Start the measurement (Measurement Start).
- A window appears where the COM port has to be chosen.
- At the end of the measurement, stop the measurement. The data are saved automatically in the database .

<u>OFFSETS</u>

The following possibilities are available to deal with the offset:

- The offsets are most important if the concentration of chlorophyll is low, for example lower than 10µg/l. In such cases, the fingerprint of the yellow substances should be recalibrated by using ultra-filtrated sample water (see below).
- 2. In case of stable yellow substance concentrations, the results may become more stable if the yellow substances are deactivated. In this case, the offset "ultra-filtrated water" is used for the calculation. Please calibrate this offset before choosing this option.

MEASURING PROCEDURE FOR LOW CHLOROPHYLL CONCENTRATION

The lower the chlorophyll concentration, the more exact the offsets and the yellow substance offset have to be.

BACKGROUND FLUORESCENCE

The first consideration is whether the background fluorescence (fluorescence of the ultra-filtrated sample) varies its concentration or not.

- In case of a stable background fluorescence, the best choice is to deactivate the yellow substances in the "Parameter of fit" window and perform an offset calibration with ultra-filtrated sample water.
- In case of varying background fluorescence, the best choice is to measure this fluorescence as yellow substances. Please perform a fingerprint calibration of the yellow substances with ultra-filtrated sample water. The yellow substances need to stay activated.

CLEANING

Please ensure that all tubes and the measuring chamber are really clean. Especially after measuring high concentrations of chlorophyll, multiple rinsing is recommended. To check the cleaning status of the whole system, please perform a measurement with distilled water. The result should be 0. If not, take also in consideration that the tubing might be dirty inside.

Please note: Deionized water may also contain fluorescing substances.

MEASURING TIME

For low concentrations of chlorophyll, please prolong the measuring time to 60s for lower noise.

SEDIMENTATION

In case of sedimentation of algae in the sensor, choose the operation mode "Always on" for the internal pump.

SAMPLE PREPARATION

To dilute a sample, please use algae nutrient solution. Tap water may lead to a different status of the algae. The prepared sample is also more stable in a nutrient solution.

Please note: algae may change their fluorescence properties in relatively short time periods.

In case of deactivated yellow substance fingerprints, the dilution has to be carried out with ultra-filtrated sample water.

CALIBRATION PROCEDURE

GENERAL CONSIDERATIONS:

- To add any type of solution to the chlorophyll sensor, please use the syringe supplied as an accessory. Disconnect the internal pump and connect the syringe at the sample outlet. To apply a solution, suck it up into the chlorophyll sensor by using the syringe.
- Make sure that the chlorophyll sensor is really clean! Do a cleaning procedure first.

CALIBRATION OF THE OFFSETS:

- For the calibration of the offsets, please use ultra-filtrated sample water and distilled water.
- Apply distilled water. Start using Calibration -> Offsets (distilled).
- Apply the values after the calibration.
- Apply ultra-filtrated sample water and start using Calibration -> Offsets (ultra-filtrated).
- Apply the values after the calibration.

CALIBRATION OF THE ALGAE FINGERPRINTS:

• Do an offset calibration first.

- For the calibration of the algae fingerprints please use pure solutions of the algae division with a known chlorophyll concentration. The concentration should be in the range of 50-100µg/l.
- Apply the algae solution.
- Choose -> Calibration -> Fingerprints in the software, choose the algae class and enter the concentration.
- Choose the type of dilution water used for the calibration.
- Start the calibration.
- Apply the values after the calibration.

CALIBRATION OF THE YELLOW SUBSTANCES:

- Do an offset calibration first.
- For the calibration of the yellow substances please use ultra-filtrated sample water.
- Apply the solution.
- Choose Calibration -> Fingerprints in the software, choose the yellow substances and enter 1 r.u. as the concentration and start the calibration.
- Apply the values after the calibration.

CALIBRATION BY FACTORS:

The assumption for this type of calibration is that there is a number of results of the Algae Online Analyser and of a reference method that show a certain factor for one algae class. It is highly recommended to use only measurements where this algae class is dominant and the concentration at least 10µg/l.

- Choose -> Calibration -> Correction factor in the software
- Choose the algae class and enter the determined factor.
- Apply the values.

CALIBRATION OF FINGERPRINTS WITH SUBSEQUENT WET-CHEMICAL ANALYSIS:

If the Algae Online Analyser is calibrated with a reference solution where the concentration is determined subsequently, the following steps have to be carried out:

- Do a fingerprint calibration as described above, but enter 1 for the concentration of the reference solution
- Do a wet-chemical analysis
- Use the "Calibration by factor" feature to adapt the calibration to the result of the subsequent wet-chemical analysis.

Attention: the Algae Online Analyser is not ready for use until the last step has not been carried out.

BATCH MODE OPERATION

The batch mode can be used to operate the instrument with single samples for example in the lab. While in the online mode everything is automatically done by the software, in the batch mode every step can be influenced by the user.

To switch in the batch mode, activate "batch" in the view menu. The batch panel to operate the instrument is displayed. Depending on the features of the chlorophyll sensor the Activity and Transmission click boxes are greyed or not greyed.

The sample can be taken from a canister or similar container. To get the sample into the sensor, either the internal pump or a syringe can be used.



Single channel version



Multi-channel version

To perform a measurement, please carry out the following steps:

- 1. Mount the tubes on the instrument so that the container and effluent can easily be reached.
- 2. Put the suction tube in the container and click "Pump". The pump runs as long as the value given in "Fill sensor" in the Parameters. Hint: The pump should work as long as it takes to pump sample out of the effluent of the sensor.

In case of a multi-channel instrument 2 or more pump buttons are available. Please use the button of the appropriated sample.

- 3. Press "Start" to start the measurement. If Transmission measurement and/or cleaning shall be executed at the end of the measurement procedure, click the according checkboxes The measurement times etc. are given in the Parameters menu.
- 4. Put the suction tube in clean water and press pump to rinse the sensor. If there are variations in the different samples, this has to be carried out very carefully, i.e. 3-4 times.

It also helps to use the clean option while pure water is in the chamber. This requires one more rinsing afterwards. If there is enough sample water, it is recommended to use the next sample for rinsing.

DATA EVALUATION

To evaluate the data, either the PC of the instrument itself can be used or any other PC on which the AOA software is installed.

On a desktop PC, please install the bbe++. Now any bbe++ database file (*.BDB) can be opened for evaluation. The file can either be on the PC or in the LAN network.

SERIAL DATA EXCHANGE

To change settings for the serial data exchange go to Tools -> settings -> Text results.

The protocol is ASCII-based. The Algae Online Analyser waits for a character and then sends an answer if a command has been recognised. The following commands are allowed:

- "h" request for the header with the names of the single data.
- "u" request for the units of the single data.
- "d" request for the actual dataset.
- "s" to start the measurement. In this case there will be no answer string.
- "p" to stop the measurement. In this case there will be no answer string.

The answer is a string terminated with CR and LF. Each string contains as fixed number of separated fields. The data fields and setting are defined in the output view chosen in Tools -> setting -> text results.

The commands "h" and "u" always return header and units. Please note the unit string contains the character "µ" ASCII code 230. This might appear as "a" when ANSI coding is applied.

The "d" command always returns the actual dataset. If there is no new dataset since the last request, the same dataset is delivered.

The first 5 data fields are fixed and always transmitted:

Feld	Тур	Inhalt
1	Text	Checksum in the format "Pxx", where xx is a hexadecimal value in text representation for example "P0F" - P: marker for checksum; 0F: hexadecimal representation of 15.
2	Text	Number of software version
3	Zahl	Number of data fields
4	Text	Day, month, year in the format "DD.MM.YYYY"
5	Text	Date and time in the format "hh:mm:ss"

The first field is the checksum of the whole string. The format of the checksum is a P (capital) and a two-digit hexadecimal number. The checksum is an XOR function of the following characters, excluding the TAB directly after the checksum and excluding the CR and LF. All the other TABs are included. The calculation of the checksum starts with 0. The 0 is linked by XOR to the ASCII number of the first character after the first TAB. The result is linked to the ASCII number of the second character, and so on.

"C" example for the calculation of the checksum:

```
char * response; /* response enthält den vollständigen Antwortstring */
int i = 4; /* Prüfsumme und erstes TAB nicht berücksichtigen */
unsigned char checksum = 0; /* Startwert ist 0 */
while (response[i] && (response[i] != '\r') && (response[i] != '\n'))
{
    checksum = checksum ^ response[i];
```

i = i + 1;

}

The value in the checksum has to be the same as the two-digit number after the P.

Examples: The data fields might vary according to the settings:

External device send the request "h". Answer:

```
P1B02.00 33Datum UhrzeitKonz. 1Konz. 2Konz. 3Konz. 4Konz. 5Konz. 6Konz. 7Konz. 8Gesamtkonz. TransmissionTiefe Temp.ProbeZellz. 1Zellz. 2Zellz. 3Zellz. 4Zellz. 5Zellz. 6Zellz. 7Zellz. 8GesamtzellzahlTrans. 700nmLED 3 LED 4LED 5 LED 6 LED 7LED 8 Druck Temp. LEDsTemp. Sensor
```

Externer Rechner sendet "u", Antwort:

P4D	02.00 33	Datum Uhrze	it µg/l	µg/l µg/l	µg/l µg/l	µg/l µg/l	µg/l
	µg/l %	m °C	Zellen/ml	Zellen/ml	Zellen/ml	Zellen/ml	
	Zellen/ml	Zellen/ml	Zellen/ml	Zellen/ml	Zellen/ml	Digits	
	Digits	Digits	Digits	Digits	Digits	Digits	bar
	°C °C						

Externer Rechner sendet "d", Antwort:

P33	02.00	33	25.11.2014	14:27	:38	0,00	1,66	0,00	0,00	0,00	0,00	0,00
	0,00	1,66	100,00	-0,10	15,10	0	1656	0	0	0	0	0
	0	1656	354,22	4,29	4,01	12,29	2,37	7,68	2,59	0,99	16,95	15,46

TECHNICAL DATA

Description	Value
	total chlorophyll [µg Chl-a/l]
	concentration of green algae [µg Chl-a/l]
	concentration of cyanobacteria [µg Chl-a/l]
	concentration of diatoms [µg Chl-a/l]
Measurands	concentration of cryptophytes [µg Chl-a/l]
	yellow substances
	photosynthetic activity (Genty) – Option
	transmission (at 5 wavelengths)
	water temperature
Chlorophyll	0 - 200 μg Chl-a/l
Measurement procedure	spectral fluorometry
Resolution	0.01 μg Chl-a/l
Transmission	0 - 100 %
Measuring chamber cleaning	automatic cleaning piston
Housing material	V4A steel aluminium coated steel plate
Weight	19 kg
Dimensions (H x W x D)	420 x 600 x 200 mm
Protection class	IP 54
Mains voltage	110/ 240V ; 50/60Hz
Power consumption	100 W
Fuse	2 x 3,15A T
Sample temperature	0 – 40° C
Sample volume	30 ml
Temperature range while on transport	0 – 50° C
Relative humidity	Up to 95%, not condensing
Sunlight	indirect
Maintenance interval	> 7 days
Sample inflow	free flow / tube pump
Connection Inlet	6 mm internal hose connection
Connection outlet	6 mm internal hose connection
Sample pump	Marprene Tubing ID = 4.8 mm
Valves (option)	Silicon tubing ID=4.80 / OD=7.90mm
PC	ATOM N270 12" touchastoon papal as 16 OHz 1 OB DAM
	ATOM N270 12" touchscreen panel - ca. 1.6 GHz, 1 GB RAM
OS	Windows XP Pro (SP3)

Description	Value
Hard disk	80 GB
Outputs (options)	Modem
	2 x analogue output 4-20 mA
	2 x relay output
	SDI-12 with bbe converter

MAINTENANCE

WEEKLY MAINTENANCE :

MAINTENANCE WORK THAT HAS TO BE DONE:

- \Rightarrow Check the inflows and drains for blockages
- \Rightarrow Check the instrument for leaks
- \Rightarrow Clean the hose

MONTHLY MAINTENANCE

MAINTENANCE WORK THAT HAS TO BE DONE:

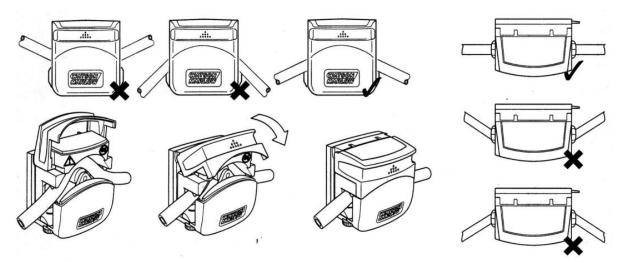
- \Rightarrow Exchange the pump hoses
- \Rightarrow Clean the measuring cuvette

HINTS FOR MAINTENANCE WORK

CLEANING OF THE HOSE SYSTEM

- 1. Stop the measurement
- 2. Open the hose saddle of the sample pump
- 3. Connect the water-filled syringe to the instrument instead of the sample
- 4. Rinse the hose system with pump using the syringe

EXCHANGE THE PUMP HOSES



The pump turns clockwise. Make sure that the outlet at the right side of the pump is connected to the inlet of the sensor at the bottom of the sensor!

Hose diameter and hose types

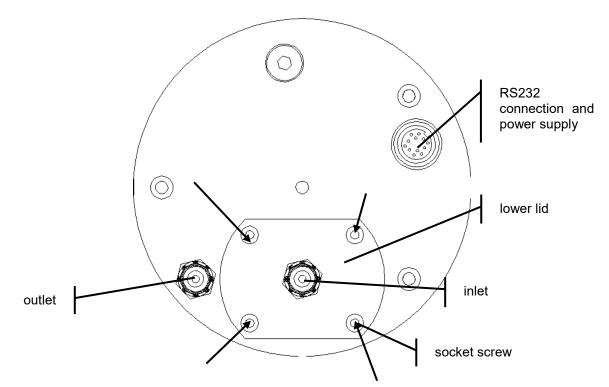
In any case, only hoses in accordance with the specifications must be used!

Marprene hose 4.8 x 1.6 mm (inner diameter x wall thickness)

The inner diameter can be varied according to the flow needed. To vary the diameter, please refer to the chapter 'pump'.

CLEAN THE MEASURING CUVETTE

- 1. Stop the measurement
- 2. Switch the instrument off
- 3. Disconnect influent and effluent tubes directly at the sensor
- 4. Disconnect the electrical connector of the sensor
- 5. Open the mounting screws at the top and the bottom of the sensor
- 6. Take out the sensor and turn it upside down
- 7. Open the 4 small screws around the inlet of the sensor
- 8. Take off the lid
- 9. Clean the cuvette inside and the lid with a smooth cloth
- 10. Mount the lid again and be careful with the seal
- 11. Mount everything again vice versa



View from the bottom of the sensor. Arrows mark the socket screws which have to be removed to demount the removable measuring chamber base (lower lid).

CHANGE FUSES

If the instrument does not start, a fuse may have blown. There are two fuses on the right side of the instrument. To change them:

- Disconnect the mains
- Open the lid
- Take out the fuse
- Replace it (3.1 A T)
- Close the lid

FAULT FINDING

THE ALGAE ONLINE ANALYSER WILL NOT START

- Is the Algae Online Analyser connected to the mains?
- Is the Algae Online Analyser switched on?
- Are the fuses OK?

PUMP IS NOT RUNNING

- Test the pump by using the "Test pump" option.
- Is the pump mode set to "Always off"

NO ALGAE CONCENTRATION SHOWN

- There is no sample in the sensor. Maybe because inlet and outlet of the sensor are mismatched
- No sample supply
- Is the pump mode set to "Always off"

GENTY RESULTS ARE ZERO

• The concentration is lower than the minimum concentration

RESULTS TOO LOW

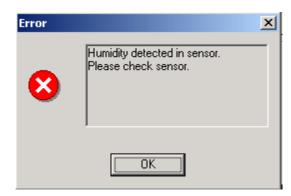
- Measuring cuvette is dirty
- The cleaning device is not working. Please check

RESULTS TOO LOW OR TOO HIGH

• You are using a different method of chlorophyll calibration than HPLC. So a certain factor has to be used

HUMIDITY DETECTED IN SENSOR

• The software shows the following message:



Please disconnect the sensor from the power supply and the sample and contact bbe service.

TROUBLESHOOTING

Please call us:

Tel.: +49 431 380 40-40 (Service) Tel.: +49 431 380 40-0

Fax: +49 431 380 40-10

Or send an email to:

e-mail: bbe@bbe-moldaenke.de www.bbe-moldaenke.de

We will gladly help you.