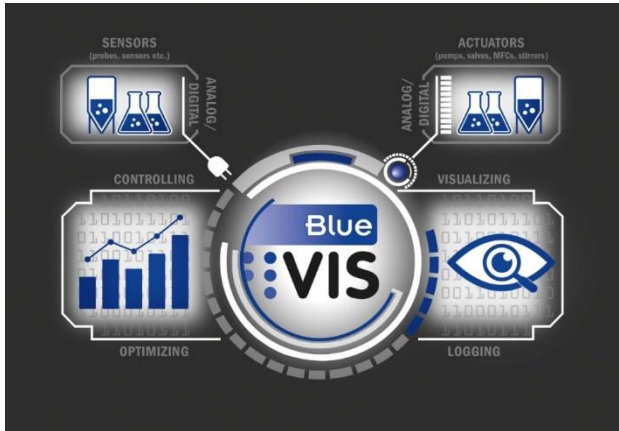


## Operating Manual BlueVIS 4.65

## Software for Monitoring and Control of Bioprocesses



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### 1. About this document

#### 1.1. Purpose

This operating manual provides you with all of the necessary information for the use of the **BlueVIS** software. Please read the operating manual properly, before starting operation. Keep this operating manual in a safe place for future reference.

#### 1.2. Target group

This operating manual is intended for trained laboratory personnel (BTA, CTA, etc). The contents of this manual must be made accessible to the technical staff and implemented by them.

The technical staff must be instructed in and follow the GLP "Good Laboratory Practice" guidelines.

The technical staff must have received safety instructions concerning the applicable safety regulations and the media materials being used.

### 1.3. Symbols



This symbol indicates a situation which could result in danger. It is used in combination with the following signal words:

#### **Danger!**

A hazard with a high degree of risk.

Failure to avoid this risk will result in death or serious injury.

#### **Warning!**

A hazard with a medium degree of risk.

Failure to avoid this risk may result in death or serious injury.

#### **Caution!**

A hazard with a low degree of risk.

Failure to comply may result in a minor or moderate injury.

#### **Notice!**

Non-observance of notices may result in material damage and impair the function of the product.



This symbol indicates a requirement to take an action.



This symbol indicates that the operating manual must be observed.



#### **Notice!**

This symbol indicates helpful, additional information.



#### Reference

This symbol indicates additional information referenced outside this document.



#### List

These list points indicate a list in which the order of the items has no particular significance.

1.

#### Sequence of work steps

These numbers indicate steps that are to be carried out in a certain order.

## 2. For your safety

### 2.1. In general

**BlueVIS** has been tested before it left the factory and was in an operationally ready condition.



Please read this operating manual carefully before installing and commissioning **BlueVIS**.

The operating manual contains safety instructions and warnings that must be followed to ensure safe operation.



Please keep this operating manual in a safe place for future use.

**BlueVIS** is for monitoring and control of bioprocesses in lab environment. With **BlueVIS** it is possible to read different types of sensors, use actors like pumps, stirrers and mass flow controller. In addition, several soft sensors, PID controller or sequencer allow to do calculation, build up control loops or to work with recipes. Data is stored in a MySQL database as soon as **BlueVIS** is opened, no matter if a user is logged in or not.

**BlueVIS** is not intended for use in GMP application and **BlueSens gas sensor GmbH** is not responsible for any loss of data or interruptions of the workflow.

### 2.2. Authorized personnel

The operations described in this operating manual may only be carried out by the trained technical staff who have been authorised by the facility operator.

The technical staff must be instructed in and follow the GLP "Good Laboratory Practice" guidelines.

### 2.3. General safety instructions

The **BlueVIS** may pose application-specific hazards if it is used improperly. Observe the following general safety instructions:

- For all devices to be controlled by **BlueVIS**, the necessary safety precautions must be taken before the initial commissioning.



Notice!

Please pay attention to the further safety and warning notices in all the following chapters.

### 3. Product description

#### 3.1. Content of BlueVIS 4.65 package

**BlueVIS** is delivered on a USB flash drive or can be downloaded on request. To run and log data an additional USB license key (with visible serial number) called “**dongle**” is necessary. This has to be attached to the same computer where **BlueVIS** is running. If it is recognized or not can be seen in the settings under the USB connection section of Windows, or in the license manager menu of **BlueVIS**.

With the included license model one fermenter is activated (log data, control actuators) with just the dongle. Further license keys for up to 4, 8 and 12 fermenters have to be purchased for use of more than one fermenter.

#### 3.2. Hardware Requirements

**BlueVIS** needs the following computer/hardware specification to run without interruptions:

- Operating system Windows 10 64 bit or newer
- Modern processor with at least 4 cores and > 2.6 Ghz (e.g., Intel i5)
- Hard disk: SSD with at least 50GB free space (> 200MB/s data access)
- 8GB RAM
- Display >= 24" 1920x1080px (FHD)
- .net Framework 4.8 (offline installer included)

## 4. Installation

### 4.1. Installation of BlueVIS

Follow the instructions during the installation process. To complete the installation of **BlueVIS** and all additional programs **full administrator privileges** are necessary.

For installation of **BlueVIS**:

1. To start click on the **BlueVIS** Setup executable.  
Verify that the publisher is "**BlueSens gas sensor GmbH**".  
Confirm the following mask with yes:

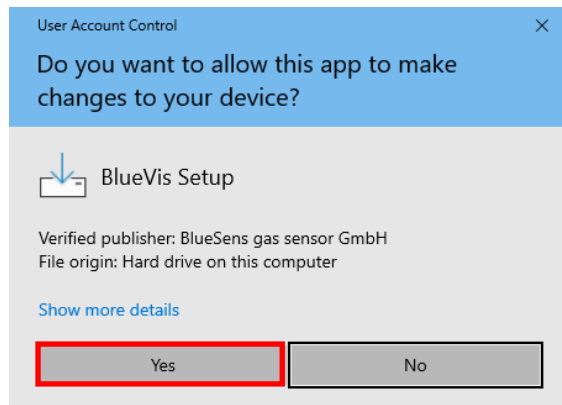


Figure 1

2. Now choose your preferred language and click on "OK".

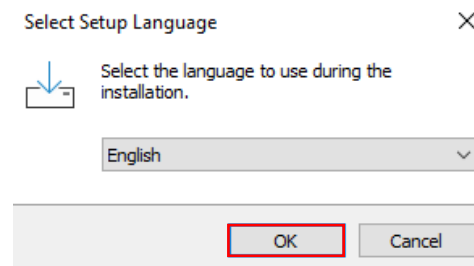


Figure 2



- In the following you can either choose different modes to select the components you want to install or select them individually to choose the modules you need. For example "Common Install". Continue by clicking on "Next".

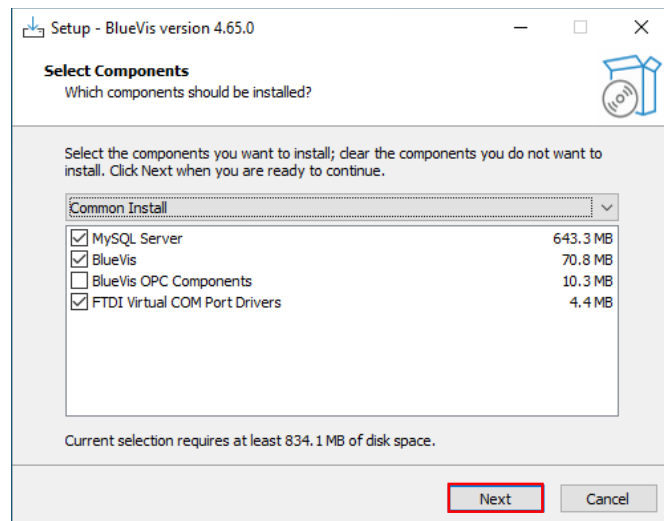


Figure 3

- Afterwards confirm with "Install".

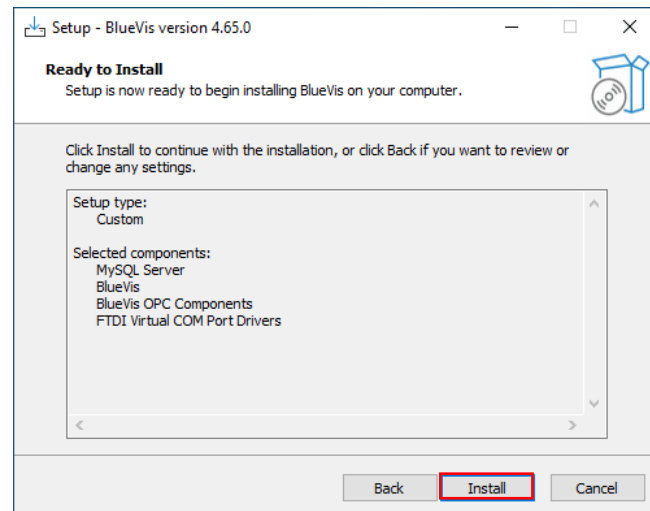


Figure 4

## 4.2. MySQL for BlueVIS Setup

1. Choose your preferred language and click on “OK”.

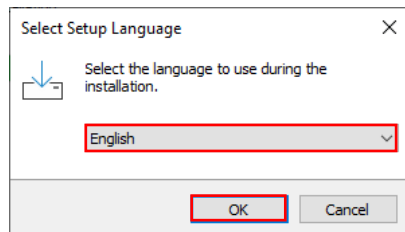


Figure 5

2. Click on “Install”

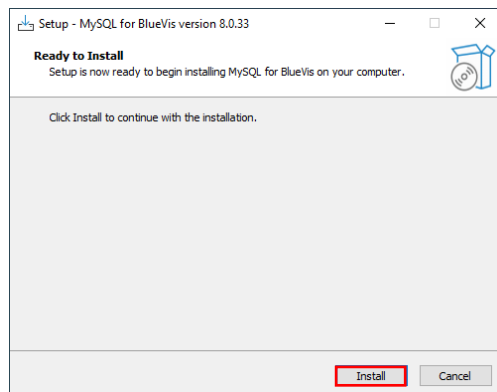


Figure 6

3. Click on “Finish”

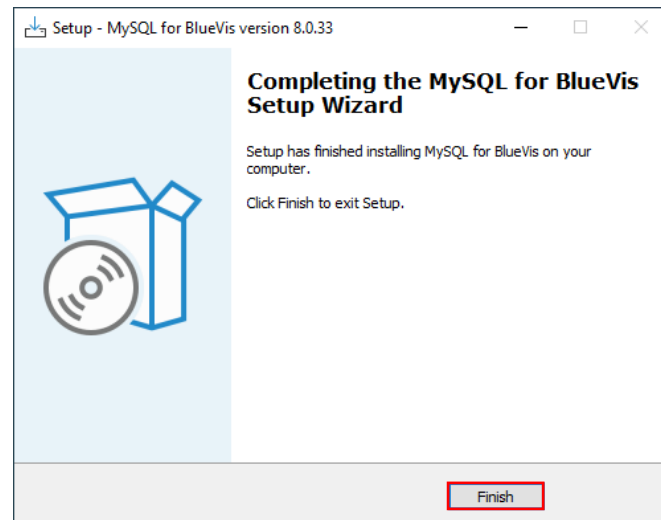


Figure 7

## 4.3. .NET Framework

Setup will detect if you have installed .NET framework 4.8 and silently install it if necessary.

## 4.4. BlueVIS main program

1. Confirm the following mask with "Next>".

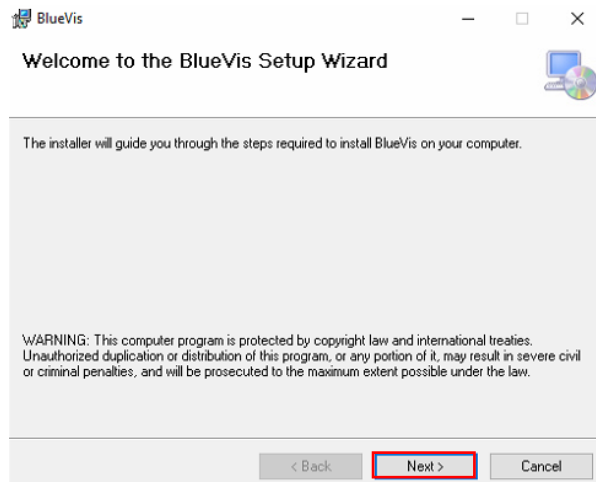


Figure 8

2. Now you have to agree the Licence Agreement with "I Agree" and "Next>".

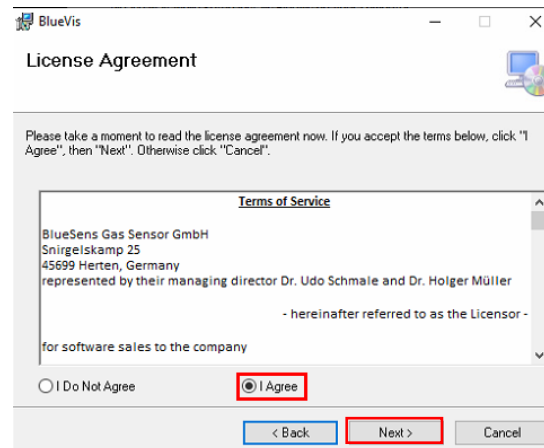


Figure 9

- After that click “Next” for the installation and “Close” as soon as it is ready.

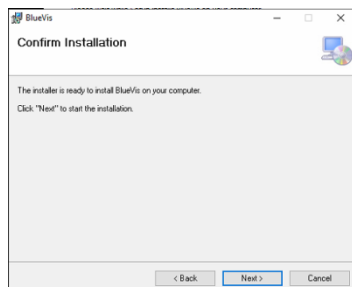


Figure 10

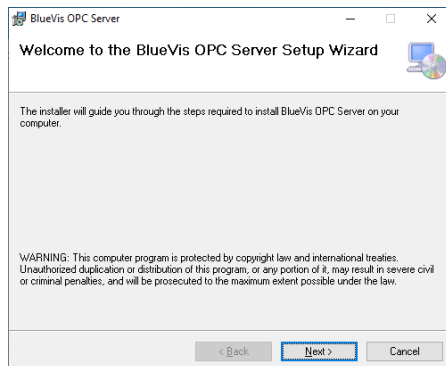


Figure 11

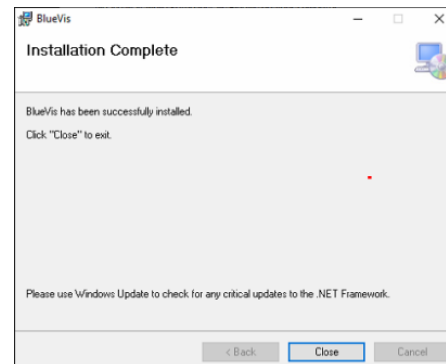


Figure 12

### 4.5. BlueVIS OPC

**BlueVIS** is delivered with an OPC DA server and client by default. OPC is a software / software interface and enables the user to share data within different software application.

The **BlueVIS** OPC Setup Wizard installs without user interaction.

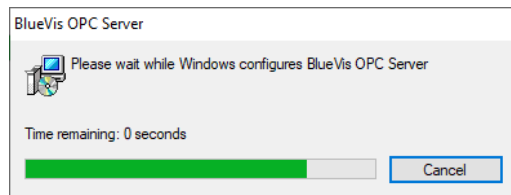


Figure 13

In some cases you are asked to reboot the system. Click “No” and restart manually after finishing the installation.

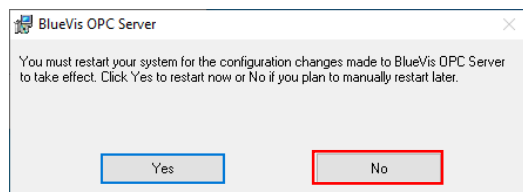


Figure 14

Now the **BlueVIS** OPC Server is installed and you can close the window. In the background a “service” is activated.

As default it is always started and the **BlueVIS.OPC.1** server is running when the computer is rebooted. To change this, go to Task manager / Services and set the **BlueVIS** OPC service to “manual”.

## 4.6. FTDI CDM drivers

For connecting to various devices, FDI USB to RS485 Adapters are used. The drivers are included in the BlueVIS Installer executable.

1. Click “Extract”.

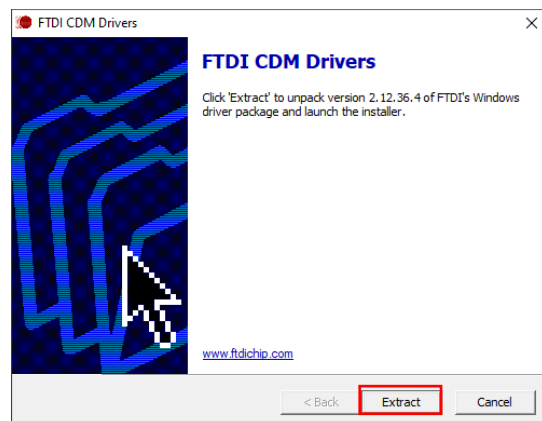


Figure 15

2. Click “Next >”.

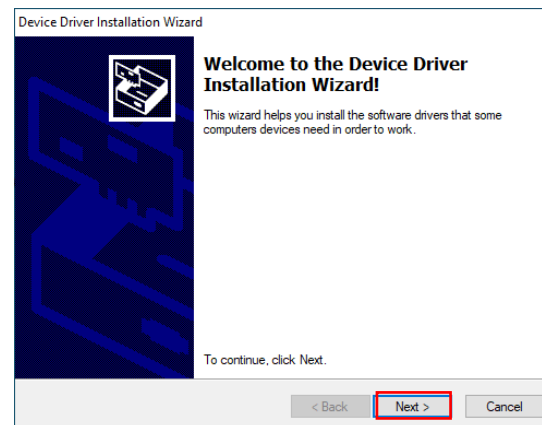


Figure 16

3. Accept the licence agreement and click "Next >".

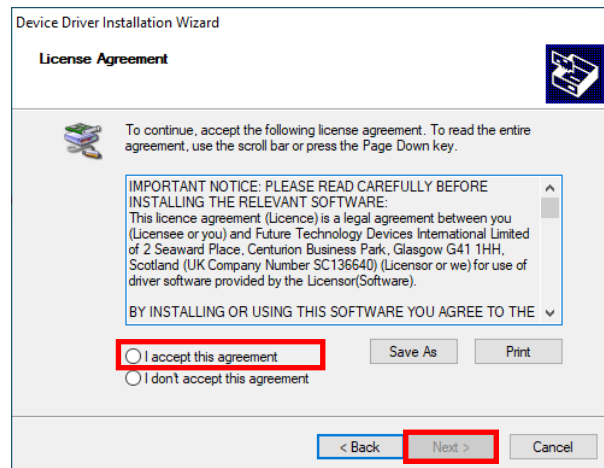


Figure 17

4. Click "Finish"

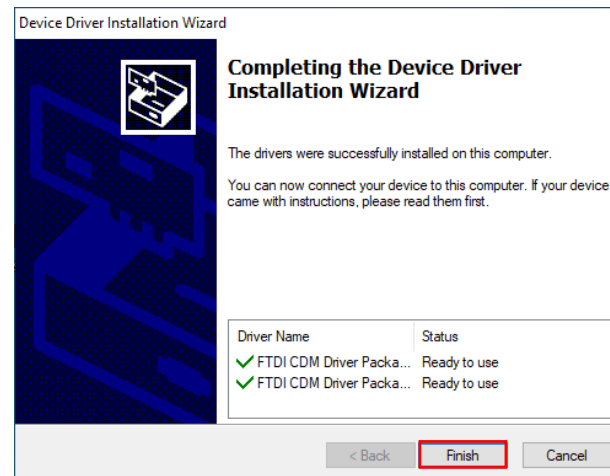


Figure 18

The FTDI drivers are now installed.

### 4.7. Finishing the installation

1. Click “Finish” to exit the installation program.

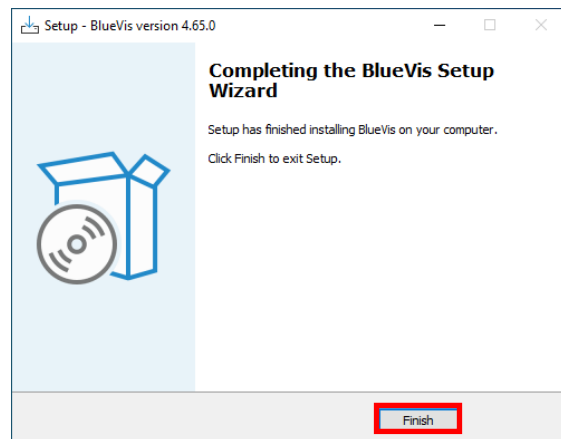


Figure 19

2. If a restart of your system was shown as required during the installation, restart your system now.



## 5. Uninstallation of BlueVIS

For the complete uninstallation open the “apps & features” window.

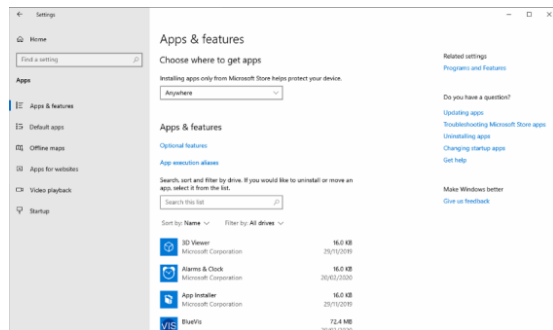


Figure 20

### 5.1. Uninstallation of BlueVIS OPC Server

If the **BlueVIS** OPC Server is installed, it has to be uninstalled as well.

1. Click “Uninstall”.

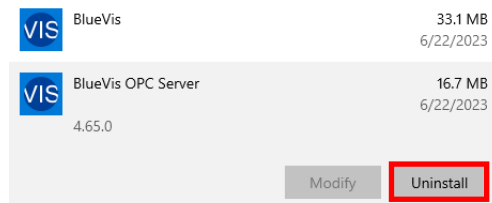


Figure 21

2. Confirm with “Uninstall”.

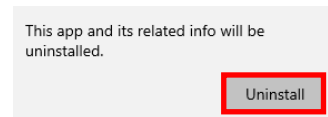


Figure 22

The name of the uninstaller file (here 5fab4a.msi) will differ, but the verified publisher has to be **“BlueSens gas sensor GmbH”**.

3. Confirm the following mask with “Yes”.

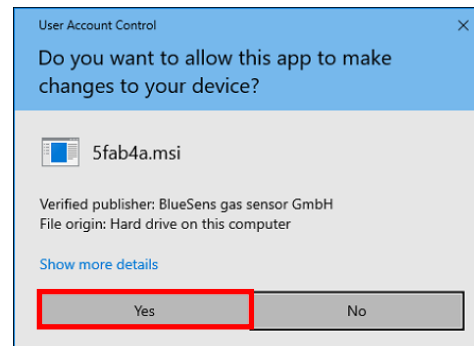


Figure 23

If the next dialog is displayed, click on “OK”.

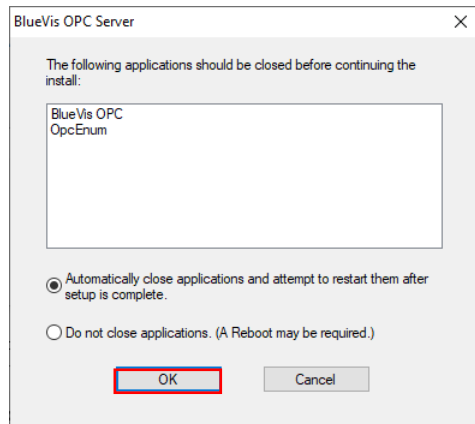


Figure 24

## 5.2. Uninstallation of BlueVIS

1. Select BlueVIS App, click “Uninstall”.

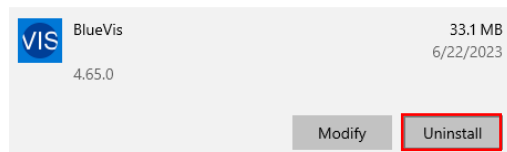


Figure 25

2. Confirm with “Uninstall”.

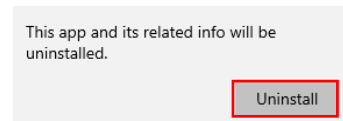


Figure 26

The name of the uninstaller file (here 5fab47.msi) will differ, but the verified publisher has to be “**BlueSens gas sensor GmbH**”.

3. Confirm the following mask with “Yes”.

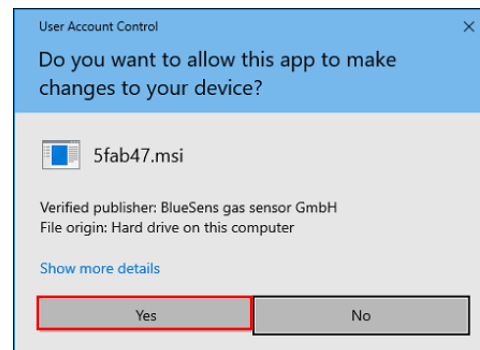


Figure 27

4. In the following window choose “OK”.

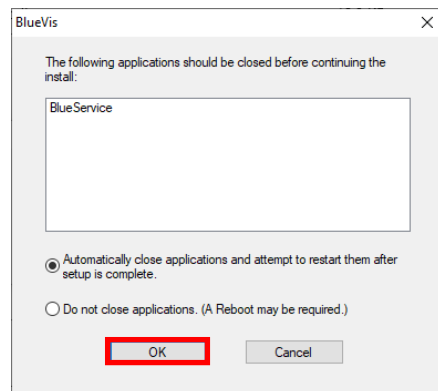


Figure 28

5. After uninstallation the computer needs to be rebooted.

## 6. BlueVIS overview

In the following subchapters you will find information about general handling and the mode of operation of **BlueVIS**.

### 6.1. Data storage and services

The data is stored in a database (MySQL® by Oracle) as soon as the start screen (login) is active. There are several services running in the background. The BlueService connects the configured devices (e.g., sensors or actuators) with the **BlueVIS** GUI and the **BlueVIS** OPC service provides the data as an OPC server to other systems.

### 6.2. Scrolling

Most parts of **BlueVIS** don't show scroll bars. If you want to scroll up and down, simply use the "Up / Down" arrows on the keyboard. Alternatively, place the mouse pointer on the right edge of **BlueVIS** and use the mouse wheel (if available) to scroll up and down.

### 6.3. Log-in

After the start of the user interface BlueVIS GUI a log-in window is displayed. By default, the **log in user** and **password** is:

admin / admin.

On how to change the password, change and add user see chapter 7.2.2

**Be careful:** if the admin password has been changed and it is forgotten, you will not be able to open BlueVIS.

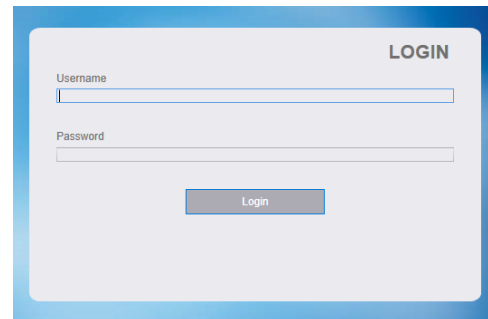


Figure 29

Usually, **BlueVIS** will show the created fermenters and the current sensor values in fermenter tiles:



Figure 30

Otherwise, if no fermenters have been created, a message box will ask you to add at least one sensor.

### 7. BlueVIS Configuration

You can access the configuration area by clicking on “Configuration” in the main menu.



Figure 31

#### 7.1. Licence Manager

To unlock additional features, you will need:

1. A dongle (USB flash drive with serial number)
2. One or more **BlueVIS** key codes (e.g., 2-4 fermenters key)

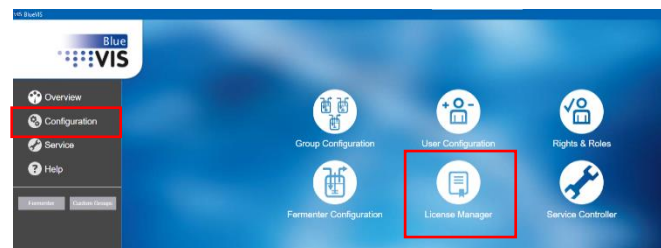
Connect the dongle to a USB-port of the PC and start the License Manager via the configuration tab.



Figure 32

The dongle must stay in the USB port all the time, otherwise no data is logged to the database. If you use the application without the dongle you can only see the measurement of one sensor in Fermenter 1 view (without logging) and you can use the Service Tool for calibration and to change the MODBUS ID.

Use the Licence Manager tool to activate all licenced functionality.



For every licenced feature you have been provided a key:

- Additional number of fermenters
- **BlueVIS** OPC components

With no additional keys entered, logging to database is enabled, OPC is disabled, and maximum number of fermenters is 1.

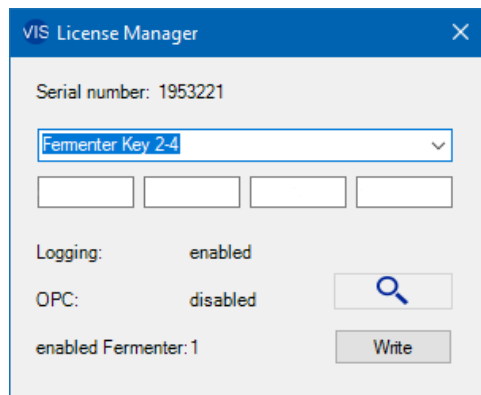


Figure 33

### 7.1.1. Using manual key entry

1. Click on the drop-down menu and select the name of the feature you want to activate. Enter the corresponding key code in the 4 input below. It is important to select the fitting key in the drop-down before entering the code.
2. Select "Write" to apply the key.

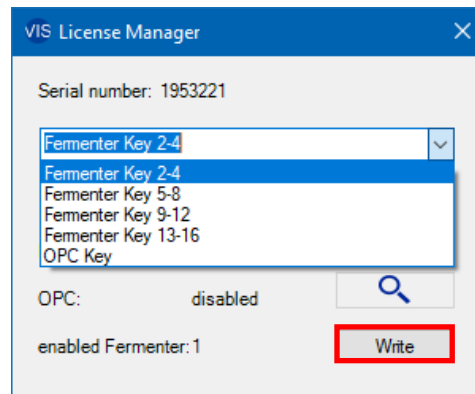



Figure 34

## 7.1.2. Using provided key files

If you have key files, you can copy them into the BlueVIS installation directory (C:\Program Files\BlueSens\BlueVIS\ and click on the magnifier button . Keys fitting to the connected USB dongle will be imported, so no manual entry is needed.

Click on "OK".

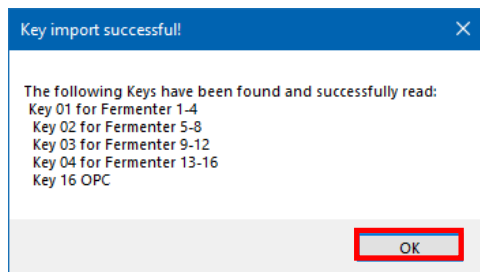


Figure 35

Click on "write" before closing the Licence manager.

## 7.2. Set-up users and rights

In **BlueVIS** you can define different rights and roles.

### 7.2.1. Set-up rights and roles

To set-up rights and roles, first click the left side on "Configuration" to get to the following overview:

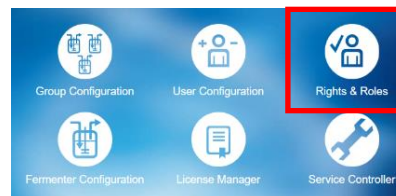


Figure 36

Please select "Rights & Roles" to define the specific rights for different roles:

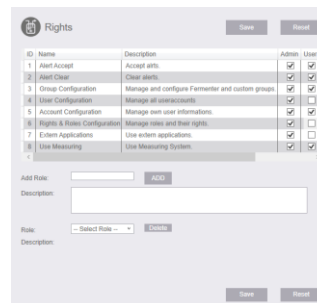


Figure 37

You can create different user roles and grant each group all or a selection of the following rights:

Alert Accept	Alarm was perceived, remains existing but there are no new warnings from this alert.
Alert Clear	The alarm is cleared.  If the alarm is triggered again, the warning reappears.
Group Configuration	Create / edit / delete custom sensor groups
User Configuration	Create / modify / delete user accounts
Account configuration	Edit own user account
Rights & Roles Configuration	Create/edit/delete user rights/roles
External Applications	Edit fermenters, edit sensors, start/stop service, use the sensor service tool, licence management
Use Measuring	View the measurement data, export the graphs and data

To add a new role, enter a name in the “add role” box. You can enter a text in the text field “Description” if you want to provide an explanation or a reminder. Assign all necessary rights for the new role, then click the “Save” button.

## 7.2.2. Set-up users

In the section "User Configuration" different users can be set up.

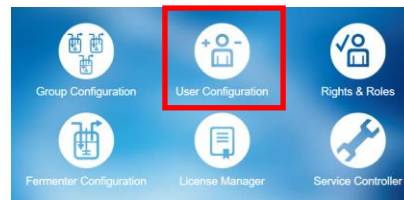


Figure 38

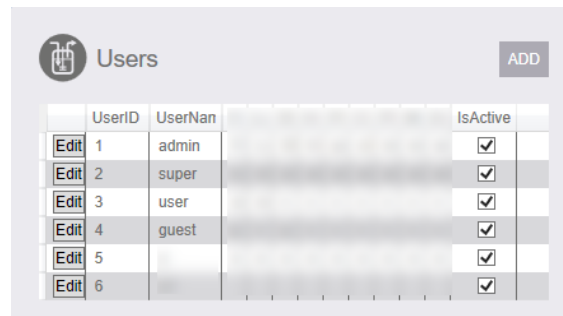


Figure 39



If you want to edit an already existing user, please select the "Edit" button left of the UserID. If you want to create a new user account, press the "ADD" button.

In both cases, the next window will appear:

The image shows a user configuration form for 'admin (ID: 1)'. At the top left is a user icon. To the right of the icon is the text 'admin (ID: 1)'. Further right is a checkbox labeled 'Active' which is checked. To the right of the 'Active' checkbox are two buttons: 'Save' and 'Cancel'. Below this header, the form is divided into several sections. The first section contains 'Username' (with a text box containing 'admin'), 'Firstname' (with an empty text box), and 'Lastname' (with an empty text box). The second section contains 'Password' (with a text box), 'Confirm Password' (with a text box), and 'Phone' (with a text box). The third section contains 'Street' (with a text box), 'Nr.' (with a text box), and 'Mobile' (with a text box). The fourth section contains 'Postcode' (with a text box), 'City' (with a text box), and 'E-Mail' (with a text box). At the bottom left, there is a section titled 'Roles' with three checkboxes: 'Admin' (checked), 'User' (unchecked), and 'Supervisor' (unchecked). Below these is a 'Guest' checkbox which is also unchecked.

Figure 40

Fill required fields to configure the user. If the checkbox "Active" is not checked, login with this user name is disabled. Roles can be assigned in the bottom left corner. Select a role for the new user and press the "Save" button after that.

### 8. Interface and sensor configuration

The term “fermenter” means a vessel as a “measuring point” with sensors and actuators. To add these, click on “Configuration” and after that on “Fermenter-Configuration”:

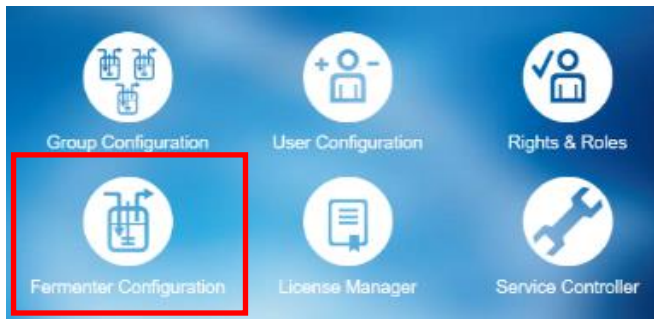


Figure 41

The following window will open:

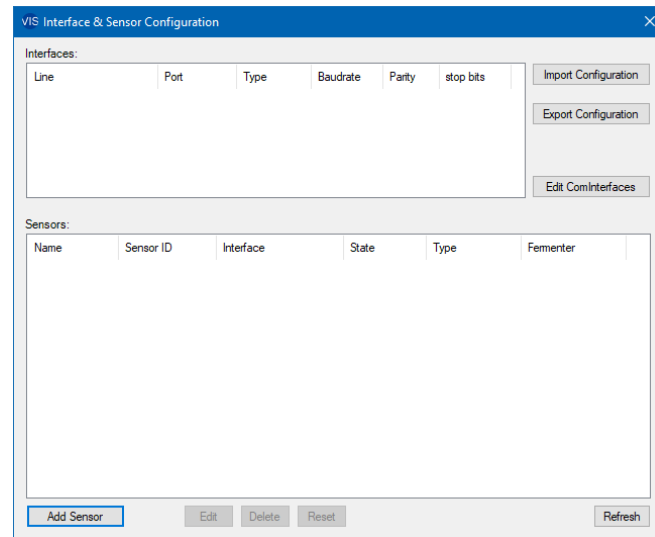


Figure 42

### 8.1. Interfaces and COM-Ports

“Interface” means a digital connection to an external device. This could be RS232, RS485 or Ethernet.

A device with an RS232 or RS485 signal is probably connected to the system via a USB-plug. This USB-plug will create a **COM-port** in Windows.

If a unit is connected to a computer network by Ethernet cable (RJ45) it depends on the protocol that is used.

- MODBUS TCP/IP protocol: No COM-Port is needed or opened.
- Ethernet cable, but RS232 protocol: virtual COM-port(s) created in Windows (e.g., for BACCom).

To check if the COM-port is installed successfully, open your device manager/Ports (COM&LPT). If there is a yellow triangle the driver is not installed. In the case it is an USB-plug that comes with **BlueSens** products a FTDI driver is necessary that could be found on the **BlueVIS** data carrier, too.

For other missing drivers please check the corresponding vendor webpage.

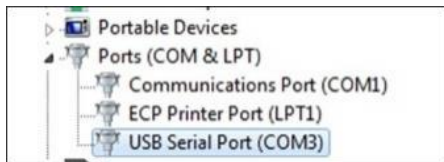


Figure 43

### 8.2. ComLines

For ease of setup and migration between systems, a new intermediate layer between COM-Ports and the logical devices called ComLine has been introduced in BlueVIS.

Like a Com-Port, a ComLine is configured to use a specific protocol (BlueSens, Modbus,...). As with a COM-Port, if a bus protocol like Modbus is used, multiple devices using the same wire protocol may be connected to the same ComLine.

For example, if you want to connect multiple devices via single MODBUS cable, all devices must have the same baud rate and parity **but** each device must have a MODBUS-ID unique to the bus before connecting it.

One ComLine may be connected to “none” or one COM-Port. One COM-Port may only be used by one ComLine.

If the configuration is transferred to a different system or the COM-Port number has changed for other reasons, only the ComLine has to be reassigned to the correct COM-Port, but no sensor has to be reconfigured.

### 8.3. Interface configuration

The installation of interfaces and connection of devices is the most important task when setting up **BlueVIS**. In this step the devices fermenters/measuring points are to be assigned and then become automatically visible in the Overview. These configurations can be exported and imported (import configuration/export configuration), so you do not have to enter everything again even with changing the place of applications.

To configure the COM-Ports and ComLines, click on “Edit ComInterfaces” in the “Interface & Sensor configuration” window.

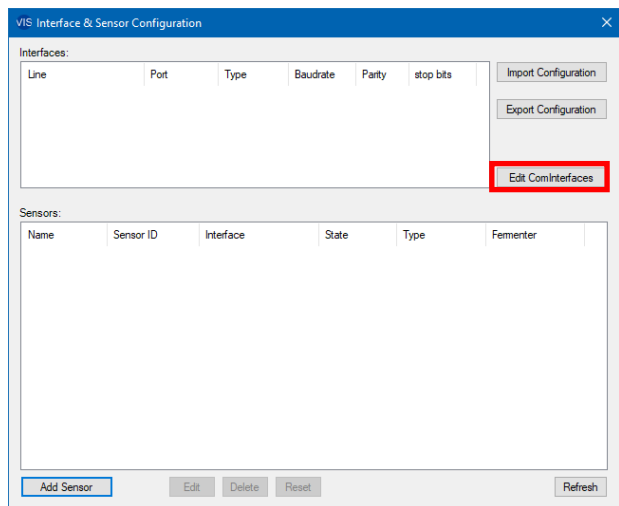


Figure 44

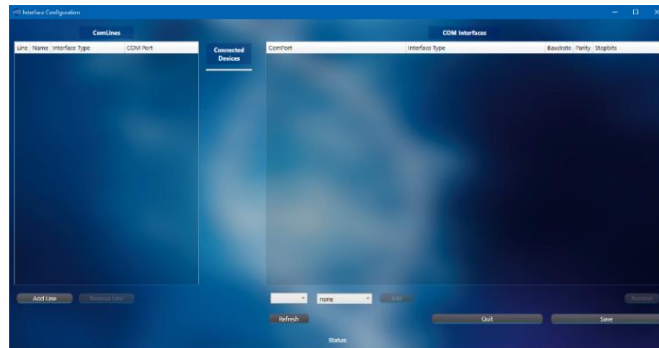


Figure 45

#### 8.3.1. Add or edit a COM-Port

The right part of the interface configuration window displays elements used to configure the COM Interfaces.

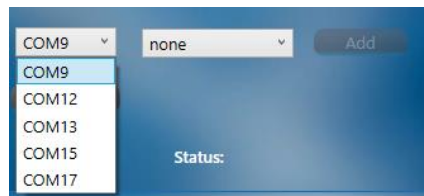


Figure 46

In the interfaces drop down menu all available COM-Ports are displayed. Select the COM-Port you wish to add. If you are not sure which is the right one, disconnect the USB adaptor of the device and click refresh to see which connection is removed from the drop down menu. Then reconnect and click refresh again to select the COM-Port.

Next select the right interface type and click the “Add” button.

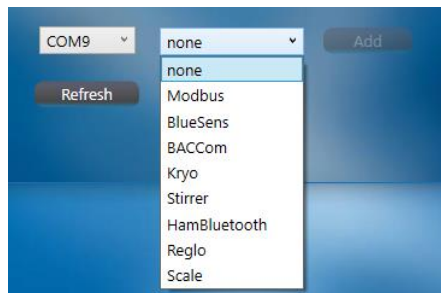


Figure 47

For the **BlueSens** interface types BACCom, Bluesens (RS232) and Modbus (RS485) the correct values are already selected. For other interfaces you will have to change Baudrate, Parity and Stop bits according to the manufacturer's specifications.

To edit an already added Interface, select it in the list and alter the values.

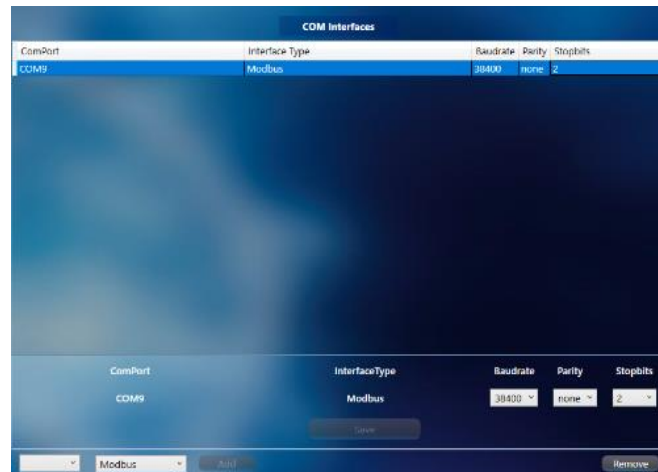


Figure 48

You may only remove an interface if it is not assigned to any ComLine or sensor. If an interface is still in use, the “Remove” button will be disabled. After disconnecting the ComLines, save your changes to enable the button.



### Notice!

Please check the manufacturer's manual for details about the configuration of your device

Save the configuration by clicking on the “Save” button.

### 8.3.2. Add or edit ComLines

The left part of the interface configuration window displays elements used to configure the COMLines.

The name of a ComLine may be chosen freely to support overview of your configuration.

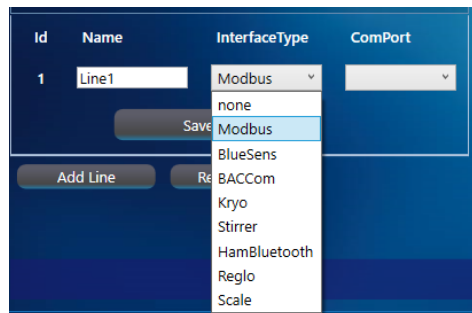


Figure 49

Select an interface type matching your device and – if already configured – the COM-Port where the device is connected. Mind that you may only choose a ComPort with matching interface type.

Click on “Save” to add the ComLine.

If you have connected a sensor to a ComLine, the connected sensors are listed in the middle after selecting a ComLine.

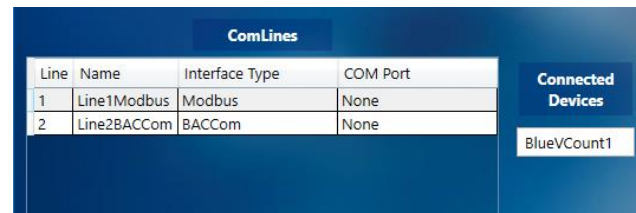


Figure 50



#### Notice!

If your device type never has been connected, there may be communication problems. In this case please directly contact **BlueSens**.

## 8.4. Add or edit devices and softsensors

In the "Fermenter Configuration" select "add sensor" to add a new device or select an already configured device and click "edit".

To delete a device, click on "delete" after selecting in the list and confirm your choice.

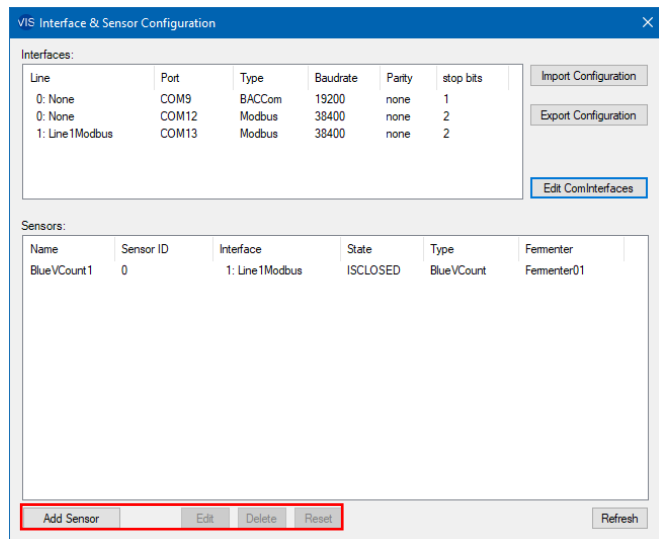


Figure 51

After clicking on "AddSensor" or "Edit", a new window "Sensor Configuration" will be displayed:

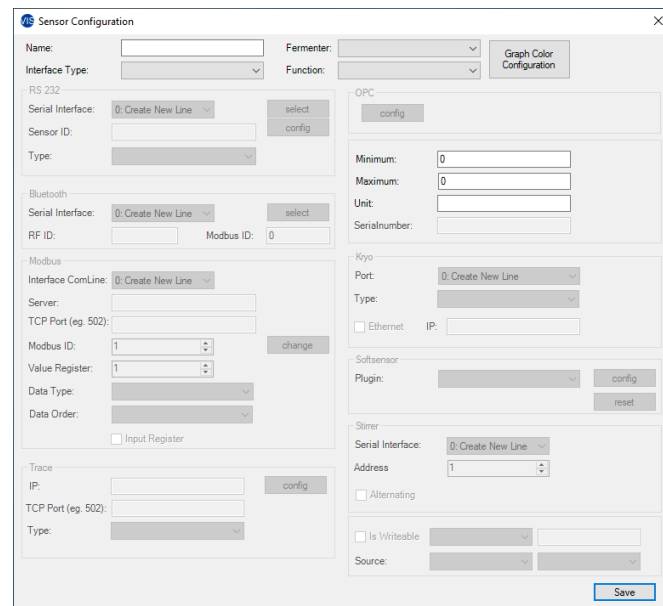


Figure 52

### 8.4.1. Required values

**Table 1**

<b>Name</b>	A unique name is needed. All data will be stored under this name. If the sensor is deleted, data can't be exported anymore. To rescue, a SQL-level export of the complete database will be needed.
<b>Fermenter</b>	Depending on your licence, a different number of fermenters, starting with 01 can be selected. You may select a higher number Fermenter than licenced here, but this will result in a licence error when trying to display the values.  Fermenter "Unused" is to "store" a sensor without logging data to the database
<b>Interface Type</b>	Different "protocols" for devices are available (see next chapter)
<b>Function</b>	Here different descriptions for the connected sensors have to be selected (e.g., pH, pO <sub>2</sub> , etc.) This provides a better overview in sensor tables
<b>Min</b>	May be used as lower alarm level  If Min and Max are set to 0 no alarm is activated
<b>Max</b>	Can be used as lower alarm level  If Min and Max are set to 0 no alarm is activated
<b>Unit</b>	Measuring unit of "non" specified sensors like "Different sensors via ModBus"

<b>Serialnumber</b>	Serial number of "non" specified sensors to write in data base, needs to be entered manually
---------------------	--



### 8.4.2. Sensor Interface Types

**Table 2**

Interface type	Description	Activated section
BlueInOne via Modbus	BlueInOnes connected via RS485-USB	ModBus
BlueInOne via RS232	BlueInOnes connected via RS232-USB	RS232
BlueInOne via BACCom	BlueInOnes connected via BACCom	RS232
BlueVary RTU	BlueVary via RS485-USB	ModBus
BlueVary TCP	BlueVary Via Ethernet	ModBus
BlueVCount	BlueVCount via RS485-USB	ModBus
Single Sensor	BCP series via RS232-USB	RS232
Single Sensor via BACCom	BCP series via BACCom	RS 232
CustomModbus	Modbus devices with multiple channels, extensively configurable	Modbus
Softsensor	Whatever you like to calculate, PID controller, Sequencer, CER, OUR, RQ math calculations	Softsensor / PlugIn

Interface type	Description	Activated section
Kryo	To control a temperature	Kryo
Trace	Glucose / Lactate analyzer, quadruple pump, via ModBus TCP	Trace
Cat Stirrer	Stirrer via RS232	Stirrer
Hamilton	pO <sub>2</sub> , pH etc. ARC probes via ModBus RS485	ModBus
Hamilton Blue-tooth	pO <sub>2</sub> probe	Bluetooth
Different Sensor via Modbus (RTU /TCP)	Different, universal tool	ModBus
Different Sensor via OPC	Read data from other PLC systems via OPC DA Classic (Massflow, Stiring rate etc.)	OPC
Reglo ICC	4 fold peristaltic pompe Cole Parmer®	RS 232
Scale	Choice of different balances	RS232

### 9. Using BlueVIS

#### 9.1. Overview

In the Overview section the fermenter tiles appear as soon as at least one sensor or actuator has been set up. The displayed values in the tile can be minimized by selections in the “Group Configuration” and the selection of the favorites. The goal is to show only values that you want to see.



Figure 53

Table 3

Number	Description
1	Alarms (red), user account, changing the user (Log-out)
2	Menu bar to get back to the Overview, to access the configuration and to the service (to perform the 1/2-point calibration)
3	Click here to view fermenter details: Sensors, graph, measurements
4	Click here to see more sensors in this fermenter
5	Get to Customs Groups (user-created groups such as the CO2 signals of several fermenters in one group)
6	Click here to view fermenter details: Sensors, graph, measurements

## 9.2. Detailed view in the fermenter graph

In the detail window the graph with all sensors is displayed, that have been selected as favorites. In general, all the values of the last 2 hours are shown when you change the window.

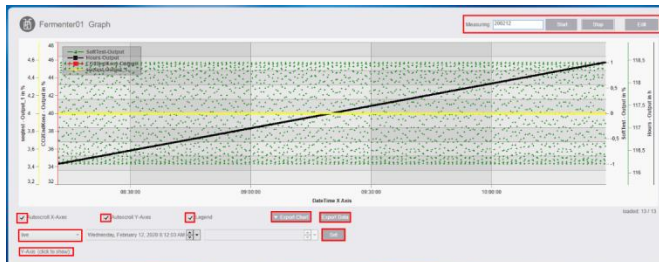


Figure 54

### 9.2.1. Measurements

To better see the data later, you can start "measurements". For this purpose, just enter the desired name above the graphs. It is recommended to begin with the year/ month/ day. By pressing the "Start" button, the name and start time are saved to the database.

Once the "Stop" button is pressed, the stop time will be added to the database and this measurement can be displayed by selecting the name in the drop down menu.

### 9.2.2. Load Historical Data/saved measurement

More information or older data and measurements can be selected in the drop-down menu "live". Here there are the available options "Live", "Manually", or the selection of the stored measurements. By pressing the "Set" button, the corresponding data are loaded to the graph.

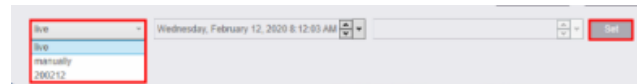


Figure 55

### 9.2.3. Custom groups

The Custom groups have been developed so that the user can gather custom data from different fermenters in one graph. As an example, it is possible to gather all profiles of CO<sub>2</sub> readings of 12 different fermenters in the overview graph.

To do so a new "group" is created by clicking in the "Configuration" in the Group Configuration.



Figure 56

This opens a window. Initially in this window only the fermenters will appear (this is done automatically from the sensor set up). To create a new group, click on "ADD".

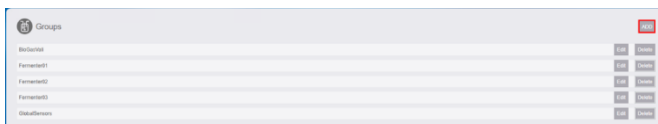


Figure 57

You will see a selection of all existing devices now. Enter a meaningful name to identify the group in the first step. In the second step, the desired device or values can be selected for the new group by clicking on the checkboxes "in Group" and "Favorite".

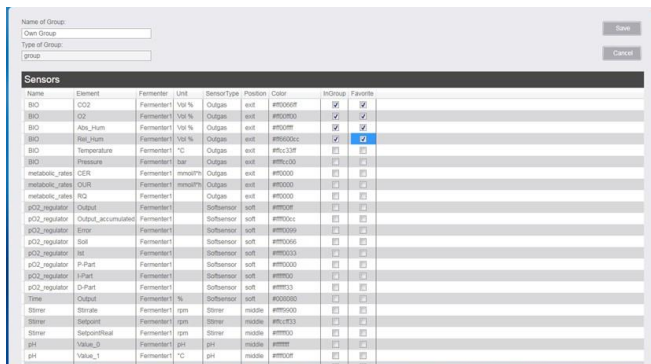


Figure 58

By clicking the "Save" button, the group has been created. Of course, this can be changed at any time, if the currently logged in user has the appropriate rights.

In the overview, you can open the new group next to the fermenter by clicking on "Customs group".

### 9.3. Favorites/color of the graph

The marking of values/devices as favorites facilitates the visualization and thus the speed of building of the graphs. You can select, which measurement values you want to visualize in the graph by choosing them as favorites. To take values out of the visualization the values must not be "removed" but "favorite mark" may simply be removed. In the "Configuration" select "Group Configuration" to proceed.

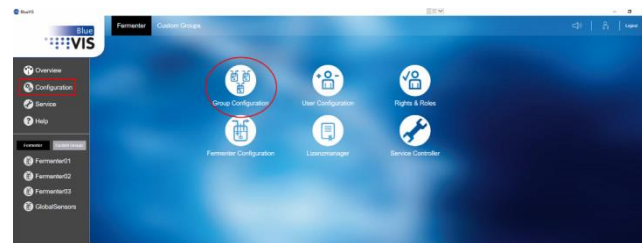


Figure 59

In the following window initially only the fermenters are listed. These are compiled by the added sensors (see chap. **Fehler! Verweisquelle konnte nicht gefunden werden.**). It can create new groups (pooling interesting readings for various fermenters in a graph) are applied or in the fermenter groups only relevant readings (sensors provide some more values than one would see in the graph) are "activated" by so-called favorites.

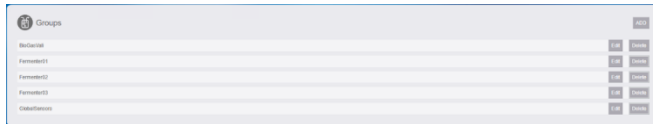


Figure 60

By clicking on "Edit" you get to the overall view:

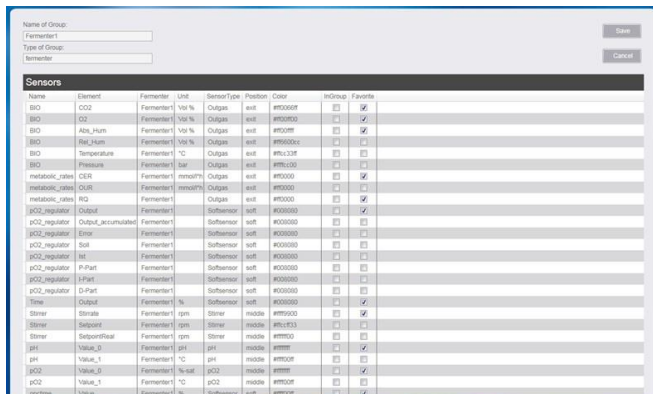


Figure 61

By checking the boxes "ingroup" and "Favorite" the measurement values are activated and will appear automatically in the fermenter tiles, in the overview and also the as values in the graph. Click on "Save" to save the settings. With the appropriate rights, the settings of the favorites can be adjusted at any time.

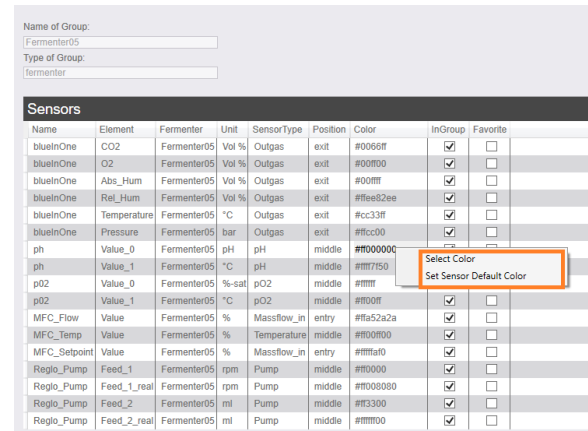


Figure 62

## 9.4. 1-point calibration

This chapter describes the easy calibration of **BlueSens'** sensors. Due to **BlueSens'** design only one measuring point is necessary for adjustment.

To open the sensor service window click on "Service" on the left dashboard.

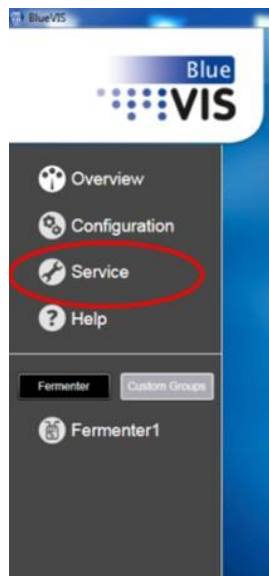


Figure 63

The Sensor Service Tool will open up in a new window. Select a connected sensor for its calibration. The current measurement values for the sensors' gas are shown as soon as the sensor was selected and a "Timeout"-counter will start to count down from 30:00 minutes to 00:00 minutes. On the two graphs the concentrations for up to two gases will be shown.



Figure 64

If you want to calibrate more than just one sensor, the Service Tool can be opened several times, so that you don't have to wait for every single sensor.

The 1-point calibration needs to be done with caution. For at least 30 minutes the sensor has to be flushed with the specified gas as displayed in Sensor Service Tool window and should stay constant for at least 10 minutes. The concentrations required for this differ from sensor to sensor.

Note that this concentration in this manual is just an example. See the values in your window and note the data sheet.

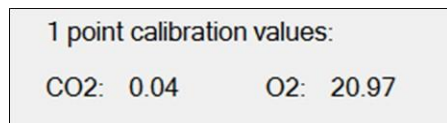


Figure 65



**Notice!**  
Note the corresponding manuals of your device for safety advices. Note the specifications on your data sheet



**Notice!**  
If you are not using the specified gas mixture for a 1-point calibration wrong measurement results will occur! Even smallest variations will result measuring errors

After the flushing with the specified gas the graphs in the main window must show a stable value for at least 10 minutes. If the signal is not stable, continue to flush until the values have stabilized for at least 10 minutes.

Click on "Start 1pt Calibration" to start a 1-point calibration.

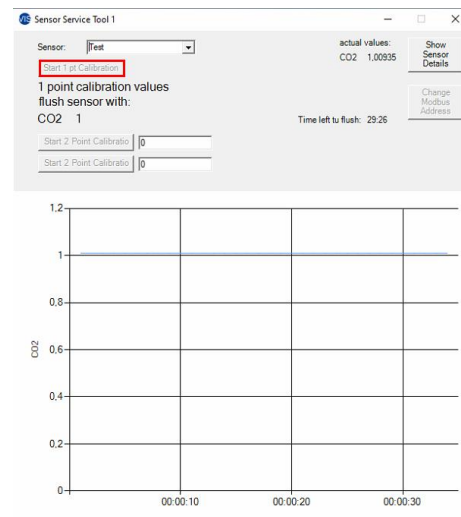


Figure 66

## 9.5. 2-point calibration

After the 1-point calibration a 2-point calibration can be performed. In most cases a 2-point calibration is not necessary. If you are not sure about the 2-point calibration, contact the **BlueSens**' service.



Notice!

Perform a 2-point calibration only after a successful 1-point calibration!



Notice!

If the 2-point calibration is not performed in the right way, irreparable malfunctions of the sensor will occur!

**There is a risk of material damage and functional impairment.**

→ Use this operation with highest caution!

For the 2-point-calibration the sensor also has to be flushed with another specified gas for at least 30 minutes. This gas must be a different gas then the gas that was used for the 1- point calibration This must be a specified test gas with gas concentrations within the measuring range of the sensor and in a known concentration (e.g., a certified gas with 11 Vol. % O<sub>2</sub> and 10 Vol.% CO<sub>2</sub>) **Do not use ambient air for a 2-point-calibration! Do not use gas mixtures with a very low CO<sub>2</sub> concentration!** The best test gas mixture for the 2 point-calibration is a concentration of each gas component close to the full-scale concentration of the analyzer (not below 80 and not over 100% of the full-scale concentration for the respective gas). If you don't have such a test gas, please do not perform a 2-point-calibration. See your data sheet for the specifications of your device. If you have

a sensor with a measuring range up to 10 Vol% full scale CO<sub>2</sub> for example, use a calibration gas with 8-10 Vol.% CO<sub>2</sub> (which is 80-100% of the 10 Vol. %). After receiving a stable sensor signal for at least 10 minutes, you can enter the concentrations of the used certified test gas in the fields "CO<sub>2</sub> Calibration value" and "O<sub>2</sub> Calibration value2 in Vol. %. Please use a dot for the decimal separation. If the signal is not stable, do not start the calibration and continue to flush until the values have stabilized.

At the end, please press the button "Start 2-point-calibration2 of the corresponding channel and the related sensor in the sensor is calibrated at the given value.

It is possible to execute this operation for just one channel (for example just for CO<sub>2</sub> if the O<sub>2</sub> measurement is within the expected results).

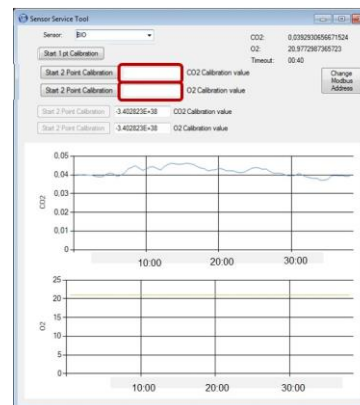


Figure 67



### 9.5.1. Operating hours and other sensor's values

To find out the operating hours of the selected **BlueSens** sensor in the service tool, select "show Sensor Values".

In a new window, all values of the respective **BlueSens** device, including operating hours are listed in detail.

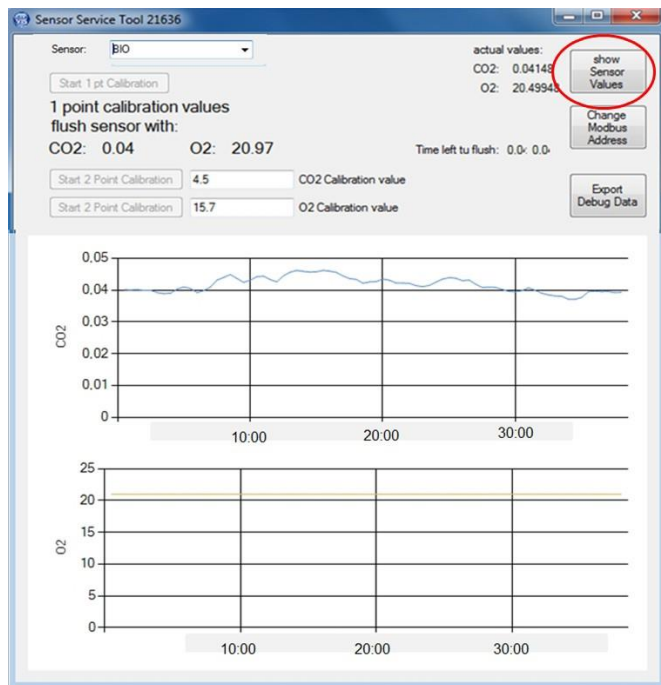


Figure 68

## 10. Troubleshooting

Sometimes not everything is working as expected. In the following we list a few issues that can be solved by the user himself. For other problems/issues just call our service. The latest version could be found here:

<https://www.bluesens.com/service/service-messages/software-updates>



Notice!

You can only update your software from version 4.64 and upwards. For older version contact our service department for support.

In general you will need **ADMIN** rights to open “**Services**” and do necessary changes.

**Table 4**

Problem	Possible reason	Solution
BlueVIS does not start	Service “MySQL for BlueVIS” is not running	Open task manager -> services -> start MySql service (Admin)
Sensor values are not updating	BlueService is not running	Close BlueVIS, open task manager -> services-> start BlueService (Admin)  Start BlueVIS
I can't see a graph / values in the graph	No license dongle attached to the computer	See chapter 7.1

Problem	Possible reason	Solution
COM port is not shown	Drivers not installed?	(Re-) install COM port drivers (FTDI)
I don't know which COM port my device is connected to		Check the device manager, unplug the device to which COM port disappears, see chapter 8.3
My device is not providing values (ID or measurement)	Wrong/no COM port selected	Check/Change COM port settings
	Interface settings wrong?	Check/Change interface settings: Baud rate, Parity
	No power supply for device?	Check power supply
	Wrong cables connected?	Check cables and connections
BlueVary does not answer	Incorrect Modbus settings on BlueVary	See manual BlueVary

### 11. Appendix

#### 11.1. List of abbreviations

<b>CER</b>	carbon dioxide emission rate
<b>CO<sub>2</sub></b>	carbon dioxide
<b>e.g.</b>	exempli gratia = for example
<b>FHD</b>	Full HD 1080p
<b>FTDI</b>	Future Technology Devices International Ltd.
<b>GB</b>	Gigabyte
<b>GHz</b>	Gigahertz
<b>GUI</b>	Graphical user interface
<b>MB</b>	Megabyte
<b>MODBUS</b>	international data communications protocol
<b>Msi-file</b>	Microsoft installer file
<b>O<sub>2</sub></b>	oxygen
<b>OPC</b>	Open platform communication
<b>OPC DA</b>	OPC data access
<b>OUR</b>	oxygen uptake rate
<b>PC</b>	personal computer

<b>pO<sub>2</sub></b>	oxygen partial pressure
<b>pt</b>	point
<b>Px</b>	Pixel
<b>RAM</b>	Random access memory
<b>RQ</b>	respiratory quotient
<b>s</b>	second
<b>SSD</b>	solid state drive
<b>TCP/IP</b>	transmission control protocol/internet protocol
<b>USB</b>	universal serial bus
<b>Vol.%</b>	volume percent

### 11.2. Service and support

Our qualified customer service is available to you as a partner.

If required, please contact your dealer or us directly:

Phone: +49 2366 4995 567 or e-mail to [service@bluesens.de](mailto:service@bluesens.de)

USA: +1 847 201 3124 or e-mail to [service@bluesens.com](mailto:service@bluesens.com)

### 11.3. Legal notice

**BlueVIS** Operating Manual – English

Index Z-BA-ENG-BLUEVIS

Version Rev. 230703 002

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