▶ MBASS30

MicroBiological Air Sampling System

MicroBiological Air Sampling System

Handbuch - Operating Manual

**Note: Old batteries**

This device contains batteries

1 piece, Type CR2032 lithium button cell for energy buffering of the real-time clock.
1 piece, Type lithium polymer 14.4 Volt industrial battery (rechargeable) for the operation of the device.

Old batteries (rechargeable batteries are also batteries in terms of the Batteries Act) may not be disposed in household waste.

Consumers are obliged to take batteries to an appropriate collection point in the trade or local authority.

The batteries of this device may be returned to us after use.
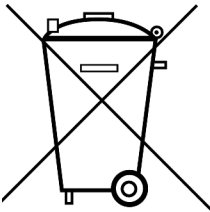
Batteries may contain harmful substances or heavy metals that can harm the environment of personal health.
Batteries are recycled; they contain important raw materials such as iron, zinc, manganese or nickel.

The rubbish bin symbol stands for: batteries and rechargeable batteries may not be disposed of in household waste.
The batteries in this device do not contain lead, cadmium or mercury.

Contents

This manual refers to **MBASS30v2** with USB Connector and colored backlit LC Display

The Air Sampling System   MBASS30

We would like to thank you for having acquired our Air-Sampling System **MBASS30**.

The **MBASS30** system, including the collection heads and other accessories, is a laboratory device and may only be operated by trained staff.

The **MBASS30** system may explicitly only be used for the purposes described in this instruction manual.

Please also note the safety instructions in Chapter 11 of this operating manual.

The following pictograms are intended to help you read this instruction manual.

We recommended reading this paragraph very carefully.

This paragraph contains more detailed information.

The actions listed in this paragraph are dangerous to man and the device, and are not permitted.

This paragraph describes troubleshooting and maintenance tasks.

The pictograms used are subject to the Creative Commons License; the author of the pictograms is the Regional Computing Centre of Erlangen (RRZE).

1

The **M**icro**B**iological **A**ir **S**ampling **S**ystem **MBASS30** has been developed for different sampling methods

Microbiological air sampling with the sampling heads **LKS100** and **LKS 30** to impact the spores and bacteria on nutrient media in standard petri dishes for cultivating.

Microbiological **particle sampling** for detect the overall spore (cultivable and non-cultivable) in the air with the particle sampler **PS 30** for microscopic analysis

Filtration on sterile 80 mm gelatine filter with the filter adapter **FA 30**. This sampling method is indicated when high germ counts are expected.
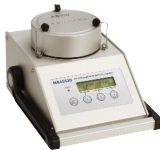
Taking an efficient sampling of antigenic and allergenic proteins in the air with the Allergen sampler **AS100**

The above sampling methods are complementary according to the following table

Cultivation	Microscopic Analysis
Analyses can be done after cultivating time.	Microscopic analysis can be done directly after sampling.
Determining the part that can be cultivated	Determining the total concentration. cultivable and non-cultivable
Every unit that can be cultivated equals a visible unit	Additional information (dust particles, fibers etc.)
Determining the species	Spore clusters as actual clusters visible
Selection of species by type of nutrient media and conditions of cultivation	Transport time and temperature of the samples are uncritical

Fig 1   **MBASS30** with Sampler **LKS100**

2. The characteristics of **MBASS30**

▶ Three pre-selected volumes (can be set prior to start)

▶ Electronic volume/ air flow control at 30 l/min for operating the sampler heads **LKS 30**, **PS 30** and **FA 30** and 100 l/min for operating the air sampler **LKS100**

▶ Four button membrane keyboard with colored backlit LCD - display for menu-driven operation

▶ Sampling-Volume between 10 Liters and 9990 Liters

▶ Start-Delay between 1 second and 59 minutes

▶ Internal memory to log up to 1000 sampling data

▶ Anodized extruded aluminum sheath

▶ Internal battery pack LiPo 14,4 V / 3700 mAh

▶ Fast battery charger for 100 - 240 Volt AC / 50 - 60 Hz

▶ Sample air must be kept closed in, to avoid contamination of the inside of the device.

▶ Optionally feature: **Dual-Sensor-Technology** for more reliability in the sampling process

3. Contents of the Package

The package of the microbial air-sampling system **MBASS30** contents:

3

Fig 2 Package of the MBASS30. The sampling modules are optional

▶ the rugged base device **MBASS30**
▶ fast battery charger for 100 - 240 Volt AC / 50 - 60 Hz
▶ this operating manual
▶ USB (A - B) cable for connecting **MBASS30** to the PC
▶ the programme MBASS30.EXE for set up, remote control, download of sampling data and calibrating the **MBASS30**
▶ spare part fuse 3A slow blow

And to your purchase:
▶ the Air-Sampling module **LKS 30** (air flow: 30 l/min)
▶ the Air-Sampling module **LKS100** (air flow: 100 l/min)
▶ the Particle-Sampling module **PS 30**
▶ the Filter-Adapter module **FA 30**

▶ **DUAL-Sensor** -Technology (second internal volume flow sensor for redundancy check and reliability)

4. Control- and Display Elements

4.1 Overview control- and Display Elements

4

Sealing springs for the sampling modules

2-line LCD-Display with colored backlit

Alarm-LED

Carrying handle with 30°-snap-in positions

Button no. 3

Button no. 2

Button no. 1

Fig 3 **MBASS30**

Button ESC

Sealing springs for the sampling modules

pushbutton switch

Air outlet

Unlock

Unlock

Battery-charger socket
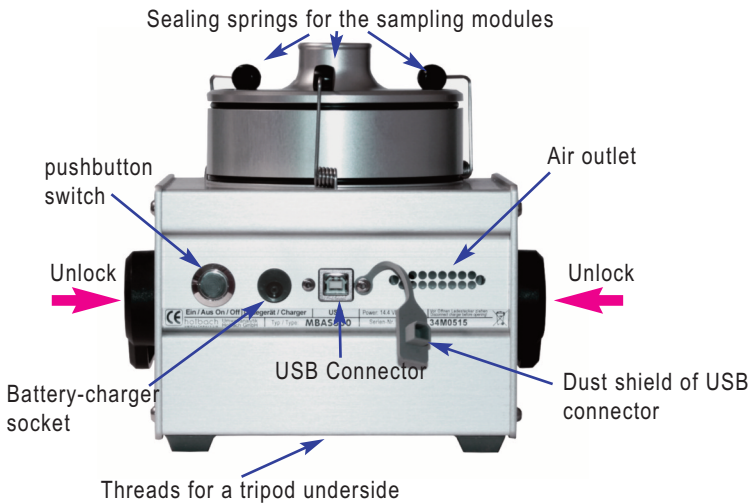
USB Connector

Dust shield of USB connector

Threads for a tripod underside

Fig 4 **MBASS30** View of the back (Dust shield of the USB - connector is removed

4.2 The Carrying Handle

The handle is for comfortable carrying the MBASS30. It snaps in place in 30° steps. To change the position of the handle, press the unlocking buttons on either side of the base simultaneously (see arrows in Fig 4). Turn the handle into the desired position and release the unlocking buttons. The handle will lock into the nearest 30° position.

4

4.3 The LCD-Display

The colored backlit two-line (16 characters each) LCD-Display will help you in the operation of the **MBASS30**. It also indicates the present sampling status. With only a few exceptions (e.g. battery status) the upper line is used as output or reference display. The lower line indicates the present function of the buttons 1 to 3 (soft keys). For this purpose 4 characters above the horizontal line are reserved for each key. The brightness can be adjust in 10 levels. The color of the light shows the status of the **MBASS30.**

4.4 The button keys

MBASS30 is operated by a four button membrane key board. Battery status, set up and escape (one menu level up) are assigned to the left button of the **MBASS30**. The functions of the buttons 1 to 3 are implemented as soft keys, thus their function may vary between the individual operating menus. The present function of the button 1 to 3 will be indicated in the lower line of the LCD-Display right above the corresponding button.

4.5 The Alarm-LED

Malfunctions at the **MBASS30** are signaled with a super bright red light-emitting diode (LED) and a continuous tone. The LED is located next to the LCD-display on the left.

Attention: The LED is very bright - do not look directly into the LED!

For testing functional performance the LED is lights up briefly when switching on **MBASS30**.

4.6 The acoustic signaling device

MBASS30 has an acoustic signaling device that acoustically signals the following events:

Event	Tone sequence	Can be switched off
Switching on	short tone (0,2s)	no
Button pressed	short tone (0,1s)	yes
Delay start time	short tone (0,1s)	yes
Sampling finished	0,2s On; 0,8s Off	yes
An alarm occurred	continuous tone	yes
Sampling with deactivated DUAL-Sensor	short tone (0,2s)	yes
Battery voltage is too low	short tone (0,2s)	no
Switching off	2 short tones	yes

4.7 The sealing springs

The three sealing springs of the **MBASS30** are made of high quality spring steel and are for closing the sampling heads **LKS100**, **LKS 30**, **PS 30** and **FA 30** simply and quickly. The sealing springs are not intended for carrying the **MBASS30**. The shape of the sealing springs is designed that for proper closing only a light force is required. If the black locking knob does not remain in the groove on the sampling module, the sealing spring can be bent a little at the first angle, seen from the knob.

4.8 The tripod threads

Two tripod threads are fitted the base of the **MBASS30**, the UNC 1/4 inch (photo) and the UNC 3/8 inch (microphone).

Only use tripods that carry the weight of the **MBASS30** (approx. 3 kg) and provide a safe stand.
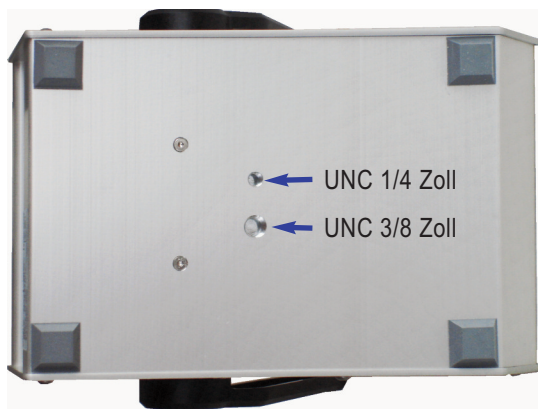
4

Fig. 5 Tripod threads

4.9 Centering of the sampling medium
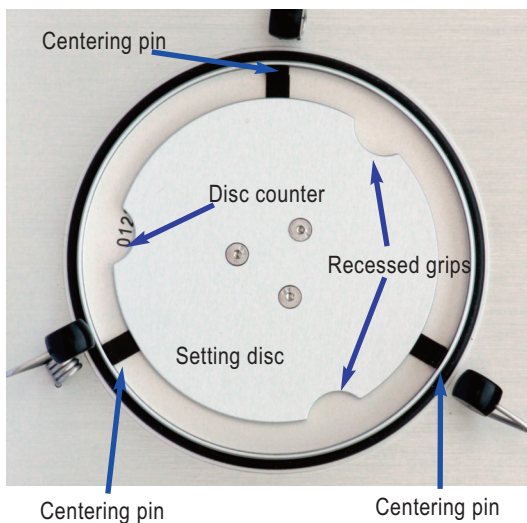
Fig 6 Centering mechanism wide open, setting disc on 0

4. Control- and Display Elements

MBASS30 is equipped with a fast setting mechanism for centering the sampling media (petri dishes and slides).

By turning the setting disk clockwise the centering pins are moved towards the middle (fig 7). The setting disc has 12 snap in positions. For accepting the slide of the particle sampler PS 30 the centering pins must be moved right to the outer edge by turning the disc counter clockwise (fig 6).

For accepting the customary standard petri dishes on the setting disk the adjustment of the centering pins usually matches that of position 7.

4

Fig 7 Centering mechanism narrow, setting disk on 12

Once again in brief:

Turn setting disc clockwise:

➥ **centering pins narrow.**

Turn setting disc counter clockwise:

➥ **centering pins widen.**

5. Connections on the back of the MBASS30

Two connection sockets are in the back of the **MBASS30**:

5.1 The battery charger socket

You attach the plug of battery charger (low voltage plug) that is part of the supply to the round battery charger socket.

Attach only the battery charger that is part of the package. With the use of other battery chargers, electronics, the integrated battery pack and the battery charger itself may be damaged.

Polarization: Inside pin is "plus 14.4 volts", outer wall is "ground".

5.2 The USB connector

Through the USB interface, the interconnecting cable and using the software MBASS30.EXE (part of the package) you can remote control your **MBASS30** and adjust the calibrating values.

The USB connector is protected by a dust shield. Remove the dust shield before using the USB connector.

6. The battery charger

A plug battery charger is part of the package of the MBASS30 in order to charge the integrated LiPo battery pack (14,8 Volts).

Fig 8 The fast battery charger of **MBASS30**

The battery charger can be operated off the mains within a voltage range of 100 Volts to 240 Volts with a frequency between 50 Hz and 60 Hz.

Using the battery charger

Connect the main power plug to the to the main power socket.

The state of the charger will displayed by the multi color state Led. After connecting the main power the state LED lights up in green.

Connect the low voltage plug of the battery charger to the charge jack of the **MBASS30**.

The color of the state LED changes to green

The color of the LED indicate following charge status.

Orange: Fast charge. The charger is in constant current mode. The charge current is maximum.

Yellow: Final charge. The charger is in constant voltage mode. The battery is normally 80 ~ 95 % charged when the color switches from orange to yellow.

Green: Charge completed. The charge current is zero.

Please absolutely consider the safety references in section 11!

7. Operating the MBASS30

The operating of **MBASS30** is simple and consists of the following steps

Before sampling

Place the **MBASS30** safely	Minimum distance of 20 cm to a wall
↓	
Switch the **MBASS30** on	Section 7.1
↓	
Acclimate **MBASS30** by taking 300l sampling air	Only for differences of temperature of > 10 °C between **MBASS30** and air
↓	
Set up **MBASS30**	Volume Air flow

Sampling

Preparing the sampling module	**LKS**: Section 9.1 **PS**: Section 9.2 **FA**: Section 9.3
↓	
Start sampling	Section 7.2 and 7.3

After sampling

Remove the sampling medium	maybe prepare and proceed with an other sampling

Finally, after the last sampling

Switch the **MBASS30** off	Section 7.8

7

7.1 Switching on the MBASS30

For switching on the **MBASS30** operate the pushbutton switch on the back of the device (fig 4). When switching on the device the alarm LED comes on briefly, a peep tone should be audible, and in the display the serial no. is displayed.

The letters "DS" are only displayed with the installed option "dual sensor equipment".

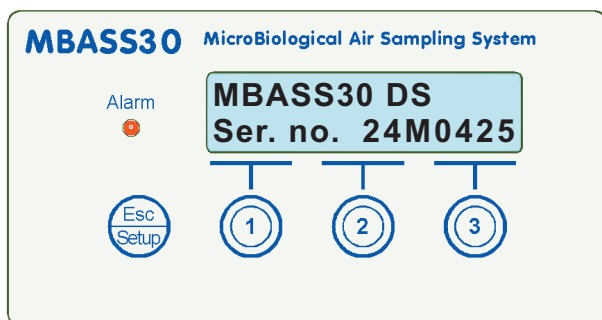Fig 10 Display when switching on

After this the last sampling volume which was taken with **MBASS30** is shown

Fig 11 Display of the last sampling volume

MBASS30 checks the validation of the calibrating data and signals invalid data (section 7.9).
If the sampling data logging is activated and **MBASS30** had been switched off for more than 5 minutes, a new sampling serial can be activated.

```
New serial?     4
yes     no      no
```

Fig 12 Confirmation for a new serial number

Pressing the button no. 1 the sample serial number will be increased (fig 12 from 4 to 5).
Pressing button no. 2 or no. 3 will not increase the serial.
30 Seconds without operating a button is like "no" (button no. 2).

Afterwards the current charging state of the battery is displayed.
If the sampling data logging is activated the top row displays the current battery voltage and the estimated rest capacity of
sampling. The bottom rows displays the current serial number and the next sample number of this serial (fig 13: serial number is 5, next sample number is 1).

```
Batt:15.8V 20600l
  Sample   5-1
```

Fig 13   Battery voltage and rest capacity of sampling,
          current sample serial number and next sample number

If the sampling data logging is deactivated the current battery voltage is displayed in the top row and the estimated rest capacity of sampling is displayed in the bottom row (fig 14).

```
Batt:      15.8 Volt
Av. cap.: 20600 l
```

Fig 14   Battery voltage and
          rest capacity of sampling

The volume is calculated for sampling with the air sampler **LKS100**. If the Air Sampler **LKS 30** is used exclusively, one can count on a higher sampling capacity. Due to the higher fan performance required when sampling with the Filter Adapter **FA 30** a lower sampling capacity has to be expected here.

The indicated remnant quantity may only be considered an approximate. Considerable deviations are possible depending on state of the battery.

After 4 seconds or by pressing the button ESC the main menu screen appears and the **MBASS30** is ready for a sampling (section 7.2).

Notes:

If the battery voltage decreases to less than 13 Volt, **MBASS30** blocks itself automatically for deep-discharge-protection until the battery will be charged and the battery voltage exceeds 13.2 Volt.

With a remaining volume indication of 200 liters the batteries should definitely be recharged (before sampling).

If the low battery voltage takes more than one minute **MBASS30** switches off for protecting the battery.

7
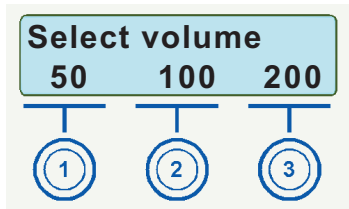
Fig. 15 **MBASS30** main menu, display of volume records

7.2 Selecting the sampling volumes

The last sampling volumes displayed as volume records 1 - 3 in liters are shown above the buttons 1 to 3. When operating one of these buttons the corresponding volume is transferred by the **MBASS30** into the start menu. In this example the button 2 is pressed and thus the sampling volume of 100 l is pre-selected (fig 15 and 16).
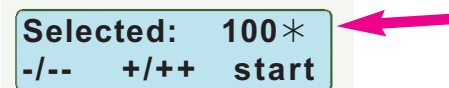
Fig. 16 **MBASS30** is ready for sampling - with start delay

With every short key stroke of button no. 1 the pre-selected volume can be reduced in steps of 10 Liters. When pressing longer than 2 seconds,

the shown sampling volume "runs" down rapidly until 10 liters are reached or after the button is released.

Pressing the button no. 2 leads to a corresponding increase of the sampling volume to a max. of 9990 liters.

When pressing the ESC button, **MBASS30** switches back to the main menu (Fig. 15).

MBASS30 supports a delayed sampling start, when the count down (start delay) function is activated. The mode "sampling start after time delay" is indicated by the sign ✳ in the upper right of the display (fig 16).

7.3 Starting the sampling

The sampling is started by pressing the button no. 3 (start). Before the start the respective sampling module is to be prepared and the sampling medium inserted. Please, check the sections on the sampling modules **LKS100** / **LKS 30** (section 9.1), **PS 30** (section 9.2) and **FA 30** (section 9.3).

Depending on the set up of **MBASS30** the air flow (30 l/min or 100 l/min) has to be selected before sampling start (fig 17).

```
Airflow    30lpm
 30   100   Start
```

Fig 17 Selection of air flow before starting the sampling

By pressing button no. 3 the current air flow is confirmed.While starting the sampling the selected air flow and the sample number will shown (fig 18).
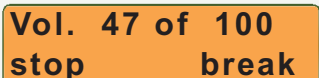
```
Sample 5-1
Airflow    30lpm
```

Fig 18 Display of sample number and air flow

Note: The displayed unit lpm (liters per minute) corresponds to the l/min in this text.

During the sampling the present sampling volume and the programmed sampling volume are displayed in the upper line (fig 19).

```
Vol. 47 of 100
stop        break
```

Fig 19   Sampling is active

By pressing the ESC button the present battery status is displayed while the sampling proceeds (fig 13 and 14).

If the DUAL Sensor technology is installed in the **MBASS30** and this function is deactivated, you are reminded of the missing redundancy feature directly after starting (fig 21).

This info-display lasts for 2 seconds. The alarm indicating LED lights up briefly and with activated alarm peep a short acoustic signal is also given. You can terminate the signal before the end of 2 seconds by pressing button no. 3.

```
Dual sensor is
deactivated!  ok
```

Fig. 20   Reminder of inactivated dual sensor technology

After this the sampling begins normally.

By pressing button no. 1 (stop) the sampling is terminated (fig. 23, section 7.5) and by pressing button no. 3 (break) the sampling is interrupted (fig. 24, section 7.6).

 When a time delay is activated (sign ✳ in the upper right of the display) pressing the button no. 3 (start) will start the count down. At the end of the count down a short acoustic signal is issued and the sampling starts. The start can be canceled by pressing ESC or the button no. 1 (stop). This also brings back the main menu (fig. 15).

Pressing the button no. 3 (now) ends the time delay and the sampling starts immediately (fig. 21).

```
Start in 01:50
stop          now
```

Fig. 21 Time of activated start delay remaining after start

7.4 Finish the sampling

If the pre-selected sampling volume is reached, the **MBASS30** switches the sampling off and signals this event visually in the LCD-display and acoustically with an interval tone (fig. 22). The acoustic signaling can also be turned off.

```
Finished   100 l
Time 00:03:21  ok
```

Fig. 22   Sampling is completed - finished message

Acknowledge the end of sampling by pressing button no. 3 (ok) or the ESC button.
The signaling lasts for max. 60 minutes.
After acknowledging the **MBASS30** switches to the main menu and is ready for the next sampling (fig. 15).
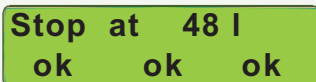
Remove the sampling medium and prepare **MBASS30** for the next sampling.

The Air Sampling System   MBASS30

7.5 Sampling cancelled

Manual terminations of sampling are only signaled visually (fig. 23) and are acknowledged with any button. After acknowledging the **MBASS30** switches back to the main menu (fig. 15).
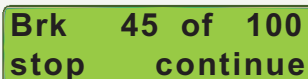
```
Stop  at    48 l
  ok     ok     ok
```

Fig. 23 Sampling was cancelled/terminated

7.6 Sampling interrupted (break)

Unlike a termination (section 7.5) you can continue after an interruption by pressing the buttons no. 2 or 3 (continue) or cancel the sampling with button no. 1.

```
Brk    45  of  100
stop      continue
```

Fig. 24 Sampling was interrupted / paused

7.7 Sampling disruptions

The following disruptions of the **MBASS30** are recognized and indicated while sampling:

▶ Low battery voltage (lower than 13 Volt)

▶ The air intake is blocked, the volume flow cannot be maintained.

▶ No sampling module is mounted on the **MBASS30**

▶ The redundant sensor in equipment with dual sensor technology measures a flow difference between both sensors

In these cases the sampling is terminated and the alarm is signaled visually with the alarm-indicating LED and acoustically with a continuous tone. The acoustic signaling can also be turned off.

Reasons for the alarm are indicated on the LCD display in the upper line (fig. 25).

Alarms are acknowledged with any button. After acknowledging the **MBASS30** switches back to the main menu (fig. 15).

The signaling lasts for max. 60 minutes.

Airflow blocked!
   ok   ok   ok
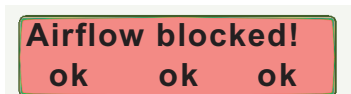
Fig. 25 The alarm signal in this example: the air intake is blocked

7

7.8 Turning MBASS30 off

MBASS30 turns itself off after a predefined time or manually by operating the pushbutton switch on the back (fig. 4).

Manually turning off while sampling is running, **MBASS30** terminates the sampling immediately.

If the "Button beep" (section 8.8) is activated, **MBASS30** signals the power off by 2 short acoustic signals.

The time duration till **MBASS30** automatically will turn off depends on the current state: idle, waiting (alarm).

The automatically turn off can be disabled also (section 8.14).

Note: While **MBASS30** is connected to the program MBASS30.EXE the automatically turn off is disabled.

Shut down active
Good bye
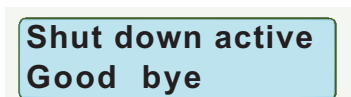
Fig. 26 Display while turning off

Notes:
Is the pushbutton switch on the back (fig. 4) pressed for more than 5 seconds, the internal microcontroller will reset.

7.9 Errors in the calibrating data

The calibrating data are additionally saved with their complementing values in the memory of the micro controller of the **MBASS30**. After switching on and before every sampling the calibrating data are transferred and checked. If a value does not match with the corresponding complementing value, then an alarm is issued. The sensor address number indicates the type of fault in the calibrating data:
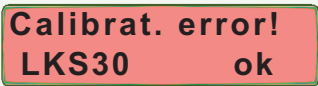
Address	Error in calibrating data
LKS30	Calibrating value "LKS 30" is incorrect
LKS100	Calibrating value "LKS100" is incorrect
PS30	Calibrating value "PS 30" is incorrect
FA30	Calibrating value "FA 30" is incorrect
Open10	Limit value "no sampler" at 13 Volt is incorrect
Open15	Limit value "no sampler" at 17 Volt is incorrect
LKS/PS10	Limit value "LKS->PS" at 13 Volt is incorrect
LKS/PS15	Limit value "LKS->PS" at 17 Volt is incorrect
PS/FA10	Limit value "PS->FA" at 13 Volt is incorrect
PS/FA15	Limit value "PS->FA" at 17 Volt is incorrect
Open10_1	Limit value "no sampler 100lpm" at 13 Volt is incorrect
Open15_1	Limit value "no sampler 100lpm" at 17 Volt is incorrect
DS-LKS30	Calibrating value "Dual Sensor LKS 30" is incorrect
DS-LKS100	Calibrating value "Dual Sensor LKS100" is incorrect
DS-PS30	Calibrating value "Dual Sensor PS 30" is incorrect
DS-FA30	Calibrating value "Dual Sensor FA 30" is incorrect

The DS-xxx values are checked only if the DUAL Sensor option is installed.

Every invalid calibrating data has to acknowledge by pressing button no. 3.

```
Calibrat. error!
LKS30        ok
```

Fig. 27 Calibrating data error

Remedial action at calibrating data errors:

Recalibrate the corresponding value with the PC programme MBASS30.EXE that is part of the supply. The calibrating values can be obtained from us. Please quote the serial no. of your **MBASS30**.

If recalibrating is not successful, send your **MBASS30** to us for repair.

If there invalid calibrating values of the DUAL-Sensor option (DS-xxx) then the DUAL Sensor function will disabled.

7.10 Battery voltage too low
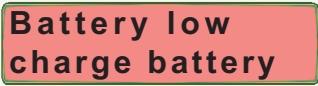
Falls the battery voltage below 13 Volt a running sample will cancelled and an alarm occurs.

Please charge the battery of the **MBASS30** immediately (section 6.1) or turn it off (section 7.8) .

The brightness of the display is reduced to level 1.

Additional **MBASS30** sounds in 10 seconds intervals a short tone and flashes the alarm LED.

One minute later MBASS30 will turn off automatically.

```
Battery low
charge battery
```

Fig. 28 Display battery is discharged

7.11 New sample serial number

If the sampling data logging is activated and a new sample serial should start, press the button ESC in the main menu (fig. 15).

On the top row the current serial number is displayed.

By pressing button no. 1 the current battery voltage will displayed as shown in fig. 13.

By pressing button no. 2 the current serial number will increase.

To back to main menu (fig 15) without change of the serial number press the button no. 3 or the button ESC.

```
Cur.serial:    5
Batt|  new  cont.
```

Fig. 29 Increase the sample serial number

8. Set up of the MBASS30

Set up parameter in **MBASS30** can be changed by the set up mode of **MBASS30** or with the programme MBASS30.EXE which is included in delivery.

In the set up mode the buttons have following functions

Button	Function
ESC **long** pressed	Open / close the set up mode
ESC **short** pressed	Address the previous set up parameter
No. 1	Selects „Off" or a lower value than displayed
No. 2	Selects „On" or a higher value than displayed
No.3	Address the next set up parameter

8

The set-up menu can be opened by pressing the Setup button (the same as the ESC button) in the main menu (fig 12) for longer than 2 seconds.

The set-up mode can be left by pressing the ESC button for longer than 2 seconds any time.

Changes in the set-up are effective immediately.

The sequence of the set up parameters is shown on the next pages. Depending on the set up data and the device version some set up parameter will not displayed.

The set up parameters marked with Info can not changed.

Sequence of set up parameters

```
                    ┌──────────────┐
                    │    Start      │
                    │ ESC long pressed│
                    └──────────────┘
                           │
```

	8.1		8.7
Info	Total run time [hours : minutes)	Adjust start delay No. 1 = min., No. 2 = sec.	

	8.2		8.8
Info	Total sample volume [Liters]	Signaling beep at keystroke No. 1 = off, No. 2 = on	

	8.3		8.9
Info	remaining fan runtime up to the next calibration	Signal at sampling end No. 1 = off, No. 2 = on	

	8.3		8.10
Info	date of the next calibration [month.year]	Signal at alarm No. 1 = off, No. 2 = on	

	8.4		8.11
	Air flow No. 1 = variable, No. 2 = fixed	DUAL Sensor No. 1 = off, No. 2 = on	

	8.4		8.12
	Air flow No. 1 =30 l/min, No. 2 =100 l/min	Brightness of the display No. 1 = darker No. 2 = brighter	

	8.5		8.13
	Logging sampling data No. 1 = off, No. 2 = on	Colored status by display No. 1 = off, No. 2 = on	

	8.5		8.14
	Format Memory ? No. 1 = yes No. 2 = no	Color of display illuminating No. 1 = yes No. 2 = no	

	8.6
	Start delay No. 1 = off, No. 2 = on

(1)

8

continuation set up parameter

(1)

8.15

Setting date and time
No. 1 = Date,   No. 2 = Time

8.16

Setting the turn-off time
No. 1 = yes   No. 2 = no

8.16

time if idle, time on events
No. 1 = previous No. 2 = next

8.17

Setting the baud rate
No. 1 = lower,   No. 2 = higher

8.18

Factory settings
No. 1 = load, No. 2 = Test mode

8.19

Select the country setting
No. 1 = previous No. 2 = next

8.20

Info   Info Hardware version
Info Software version

**jump
to start**

8

8.1 Information total run time

First the total runtime of the fan is indicated in hours and minutes. This fan runtime corresponds to the sum of all sampling times.

```
Total runtime:
 24:18 h:m  next
```

8.2 Info. total sample volume

The sum of all sampling volumes is displayed.

```
Total volume:
145800 l    next
```

8

8.3 Display next calibration

MBASS30 shows the remaining fan runtime up to the next calibration.

The calibrating interval is 150 hours fan runtime (not equipment runtime).

```
Next calib. in
110 hours    next
```

A renewed calibration is necessary when 0 hours are displayed at the latest.

Independently of the fan runtime a maintenance check with calibration is necessary at least every 2 years.

By pressing button no. 3 (next) the date of the next calibration will be displayed

```
Next calib. at
04.2014     next
```

8.4 Air flow

MBASS30 supports the air sampler **LKS 30**, the Particle sampler **PS 30** and the Filter adapter **FA 30** with an air flow of **30 l/min (lpm)** and the air sampler **LKS100** with an air flow of **100 l/min (lpm)**.

If **MBASS30** operates sampler modules with the same air flow only, it is not necessary to confirm the same air flow before sample start. Select with button no. 2 the fixed air flow and choose in the next menu the value of the air flow. If the air flow is variable, the right air flow has to select / confirm before sampling starts.

```
Airflow       fix
vari    fix   next
```

```
Airflow      100L
 30L   100L  next
```

8.5 Logging sampling data

MBASS30 is able to store up to 1000 records of sampling data.

The sampling data can be grouped in sampling serials. Each serial can contain up to 255 samplings.

The serial number can increased before sampling starts (section 7.11). Increasing the serial number reset the sampling number to 1. Every sampling increases the sampling number of the current serial.

The structure of the record of the stored sampling data:

```
Datalogging  on
off     on    next
```

▶ the serial number (1 ... 65535)

▶ the sample number (1 ... 255)

▶ the datetime stamp of sampling start

▶ the predefined sampling volume

▶ the real sampling volume

▶ the state of the sampling (successful, cancelled)

▶ the checksum

The logged data can read out and processed with the program MBASS30.EXE via serial communication.

The logged data are not volatile if **MBASS30** is switched off.

Note:

We recommend to keep records additional on paper due to an error, damage a lost of the logged data is possible.

If the logging of the sampling data is activated, the memory can be formatted in the next set up step.

The formatting process erases the stored sampling data. Therefore a safety confirmation is implemented

```
Format memory
 yes    no    next
```

```
Are you sure?
 no    yes    next
```

The result of the formatting process has to confirm by pressing button no. 1 ~ 3.

```
Memory formatted
 ok      ok      ok
```

8

8.6 (De)activating start delay

You can configure **MBASS30** that the sampling start is carried out only after an adjustable time period of 0 seconds to 60 minutes after pressing the start button.

```
Start delay    on
 off     on    next
```

If a start delay is required, button no. 2. needs to be pressed in this menu. The start delay can be switched off by pressing button no. 1.

By pressing the button no. 3 the setup menu for the start delay is opened.

8.7 Adjusting the start delay

A time delay between 0 to 60 minutes can be adjusted. Pressing the button no. 1 increases the minutes, pressing the button no. 2 increases the seconds of the time delay (fig 41). The numbers run in a continuous circle, i.e. at overflow the value starts at 0 again.

```
Startdelay     1:10
 min.   sec.   next
```

8.8 Signaling beep at keystroke

MBASS30 can acoustically acknowledge every keystroke with a short tone of 0.1 seconds. In this menu this acoustic signal can be turned off by pressing the button no. 1 or turned on with button no. 2.

```
Button beep  on
off     on    next
```

Note:

If the button beep is activated, **MBASS30** sounds 2 short tones while is turning off.

8

8.9 Signal at sampling end

The acoustic signal at sampling end can be switched on (button no.2) and off (button no. 1) in this menu.

```
Beep on end  on
off     on    next
```

8.10 Alarm signal turn on / off

The acoustic signal at alarm events can be switched on/off in this menu.

```
Alarm beep    on
off     on    next
```

8.11 (De)activating DUAL sensor

If dual sensor technology is installed the monitoring function of the additional sensor can be activated and deactivated. If the dual sensor technology is deactivated, a reminder is displayed with every start (section 7.3, fig. 21).

```
Dual sensor  on
off     on    next
```

8.12 Brightness of the display

The LCD display of the **MBASS30** has a backlight for operating in dark environment.

The brightness is adjustable in 10 levels from 0 (off) to 10 (max).

```
Brightness:   5
-/--   +/++   next
```

By pressing button no. 1 the brightness level decreases and by pressing button no. 2 the brightness level increases.

8.13 Color state

The current state of **MBASS30** can displayed by the color of the display illumination.

```
Color state   on
off      on    next
```

State	Color of illumination
Ready / set up mode	cool white, adjustable
Start delay is active	blue
Sampling is active	orange
Sampling is finished	green
Break / canceling	yellow-green
Alarm	light red

8

8.14 Color of display illumination

The color of the display illumination of the state „Ready" and „set up mode" can adjust by mixing of the three colors: red, green and blue.

```
Display Color
yes    no    next
```

Enter the adjust menu by pressing button no. 1 (yes).

The brightness will set to 10 (max.) and a note informs to press button ESC to leave the color adjust menu.

```
Exit with  ESC
Brightness = 10
```

The first color channel for adjusting is red. Pressing button no. 3 (next) changes the color channel to green and blue.

```
Color  red    255
-/--    +/++   next
```

The lowest level is 0 (= off), the highest level is 255 (= max.).

By pressing button no. 1 the color level decreases and by pressing button no. 2 the color level increases.

Pressing the button ESC leaves the set up mode of the color adjust.

8.15 Setting date and time

MBASS30 has a real-time clock. A coin cell powers this real time clock if **MBASS30** is switched off.

```
Time: 17:22:30
Date  Time  next
```

For setting the date and the time press button no. 1 to setting the date and press button no. 2 to setting the time.

After select to set up date or time the note "Exit with ESC" is displayed for one second.

```
Exit with  ESC
```

8

Example for set up the date:

Pressing the button no 1 increases the number of the day. After the day number 31 the day number will reset to 1.

Pressing the button no 2 increases the number of the month. After the month number 12 the month number will reset to 1.

```
Date:  22.04.2012
Day  Month Year
```

Pressing the button no 3 increases the number of the year. After the year number 2040 the year number will reset to 2007.

Pressing the button ESC leaves the set up mode of the date, the select mask will be displayed.

The procedure to set up the time is according to set up the date.

Changes become immediately effective.

8.16 Setting the turn-off time

The switch-off time of the **MBASS30** is selectable.

To select the switch-off time press the button no. 1 (yes) if the text "Setup switch off" is displayed.

```
Setup switch off
 yes    no    next
```

By pressing button no. 1 or button no. 2 one of four possibilities is selectable:

```
Idle:30   Event:60
-/--    +/++   next
```

► Turn off time is disabled ("Never switch off")

► 10 minutes in idle state and 30 minutes on events

► 30 minutes in idle state and 60 minutes on events

► 60 minutes in idle state and 60 minutes on events

Events mean alarm messages, sampling end messages and so on.

Note

If the battery voltage is too low, **MBASS30** will turn-off after one minute, independent of the select.

8.17 Setting the baud rate

The baud rate of the serial communication is adjustable from 4800 Baud (Bits per second) up to 115200 Baud.

```
Baudrate:38400
-/--    +/++   next
```

By pressing button no. 1 the baud rate decreases and by pressing the button no. 2 the baud rate increases.

8.18 Factory settings

By pressing the button no. 1 (load) the following settings can be made in this menu.

After loading the factory settings **MBASS30** will reset.

Button no. 2 (manu) activates the manual mode. The manual mode is for maintenance only. The manual mode can only be left again by pressing the ESC button or by turn-off the device.

```
Factory settings
load   manu   next
```

```
Factory settings
▶ Volume memory 1:  50 liters
▶ Volume memory 2: 100 liters
▶ Volume memory 3:  200 liters
▶ Start delay is off
▶ Start delay is set for 1 minute
▶ Logging of sampling data is off
▶ Button beep is on
▶ Beep on end is on
▶ Alarm beep is on
▶ Dual sensor is activated
▶ Brightness of the display is level 6
▶ Color state is on
▶ Color of illumination: cool white
▶ Turning off time is 30 / 60
▶ Baud rate is 38400
▶ Display text in english
```

8

8.19 Select the country setting

The choice between a German and an English LCD-display text can be made in this menu.

```
Language:English
-/--    +/++   next
```

8.20 Information Version

In the top row the hardware version of **MBASS30** is displayed.
In the bottom row the software version is displayed.
This data are suitable in maintenance.

```
HW: 3.36.01  LiPo
SW: 3.5.2
```

9. The sampling modules

The preparation of the sampling modules used with the **MBASS30** is described in the following. Follow the instructions of the manufacturers of the sampling media.

9.1 The air sampler LKS100 / LKS 30

The air sample modules **LKS100 / LKS 30**:

▶ are round jet impactors for microbial air sampling of growable germs
▶ use standard petri dishes
▶ permit sampling in any attitude due to the mounting mechanism for petri dishes.
▶ function to the principle of round jet impaction.
▶ permit sampling in cavities and tight spaces
▶ are validated according to DIN EN ISO-Norm 14698-1: 2003

9

9.1.1   Functional principle LKS100 / LKS 30

The Air-Sampler **LKS100** and **LKS 30** are designed for sampling viable microbes on nutrient media in standard petri dishes. It functions to the round jet impaction process approved since over thirty years. The sampled air is drawn through the Air-sampler from top to bottom. Due to the aerodynamic shape of the inside of the upper chamber the air stream is spread evenly across the jet surface.The velocity of the flow in the area of the "jet holes" is brought up and accelerates particles in the air in the direction of the petri dish. Due to the raised diameter below the jet surface the flow is slowed down again to such an extent that the vast majority of the particles continue in their direction of ac-celeration because of their inertia and hit the nutrient media in the dish. Note: In the following the sampling with Air-sampler **LKS 30** is de-scribed. The sampling with the Air-sampler **LKS100** is identical, ex-cepting the air flow. **LKS 30** operates with an air flow of 30 l/min and the **LKS100** operates with an air flow of 100 l/min.

Fig. 30 Principle of round jet impactor **LKS100** / **LKS 30**
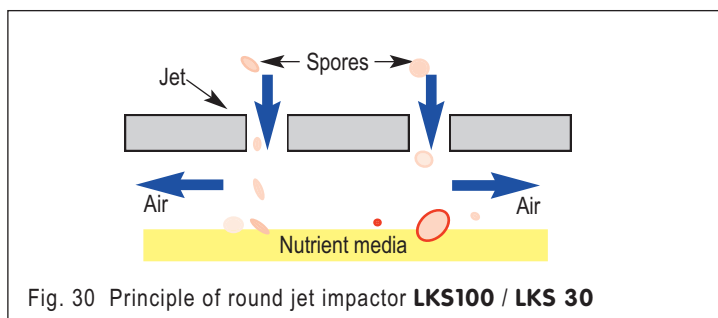
9

Note: The following describes the sampling process for the **LKS100** air sampler. Sampling with the **LKS 30** air sampler is identical, however with the exception, that it is operated with a volume flow rate of 30 l/min**.**

9.1.2   Preparing for sampling

Remove the cover.

Open the sampler by lightly pushing the three black locking knobs to the outside.

Fig. 31 Opening the locking knobs

Fig. 32 Cleaning top

Disinfect the inner surfaces of the components by using a germicidal and fungicidal agent (e.g. 2-Propanol, 70 ~ 80% Isopropanol).

Clean the jets with an air spray.

After drying/evaporating of the cleaning agent, the **LKS100** can be

Fig. 33 cleaning mid section   Fig. 34 Taking off the sampling module

9

assembled again.

Place a closed petri dish with nutrient media in the centre of the setting disk. The centering pins are to be adjusted prior to this (section 4.9).

Remove the lid from the dish and place the top and mid section of the sampler back on the **MBASS30**.

Take care not to contaminate the lid of the petri dish.

Close the **LKS100**.

Sampling can now begin (section 7.3).

Recommend sampling volumes for Air-sampler

in the summer months:	50 Liters ~ 100 Liters
in the winter months:	up to 200 Liters
in clean rooms	1000 Liters ~ 1800 Liters

If the sampling volume is too high, overcrowding is possible.

9.1.3 After sampling

Open the locking mechanism.

Lift the top and mid section from the base and close the petri dish with its lid.

Remove the petri dish from the sampler and put the mid section and top back to the base.

Seal the petri dish with flexible tape or other suitable sealants (e.g. PARAFILM®).

Close the **LKS100**

According to consistency and viscosity of the nutrient media the image of the jet holes may be visible (fig. 35).
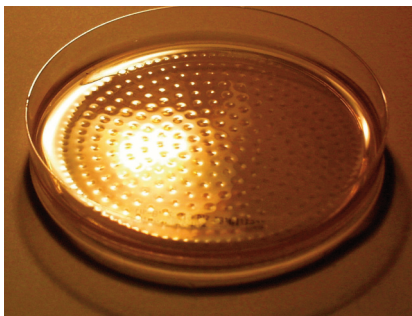
Fig. 35 Petri dish after sampling

9.1.4 Important notes

Avoid wedging the components when assembling the Air-sampler.

Clean the Air-sampler before and after use.

Take care to have the inside of the **LKS100** dried out before replacing the protective covers!

9.2 The Particle-Sampler PS 30

The Particle-Sampler **PS 30**:

▶ samples spores, pollen, bacteria, fibers, dandruff and other air borne micro particles on coated adhesive standard slides (76 mm x 26 mm)

▶ permits microscopic analysis of all micro organisms (including those that can not be cultivated) directly after sampling.

▶ slide mounting allows samples to be taken in any attitude.

▶ functions according to the slot jet impaction process

▶ is an analytical method according the guideline VDI Richtlinie 4300 Part 10 (Germany, www.vdi.de)

9

9.2.1 Functional principle PS 30

he Particle Sampler **PS 30** was designed for sampling airborne spores and other particles (non viable Microbial Sampling).

The sampled air is drawn through the **PS 30** from top to bottom.. The air is drawn from the outside to one of three possible positions of the slot jet. The raised air flow velocity at the jet accelerates the airborne particles and hauls them to the adhesive coating where mostly of them will stick.
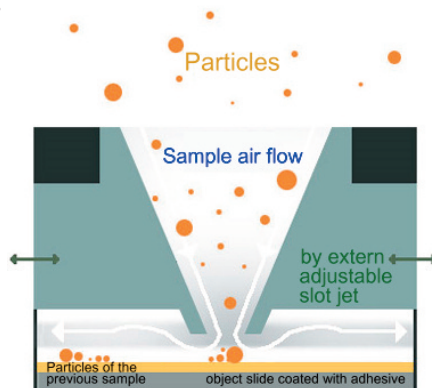

Fig. 36   Functional principle of the **PS 30**

9.2.2 Preparation for sampling

Open the centering mechanism of the **MBASS30** by turning the setting disk counter clockwise (section 4.9).

Clean the individual components (mid section and top) using a germicidal and fungicidal agent (e.g. 2-Propanol, 70 % ~ 80% Isopropanol). The cleaning agent can be sprayed directly through the jet nozzle. Do not tinker with objects on the jet nozzle.

Put the midsection (slide mounting) of the **PS 30** on the **MBASS30**. Remove the coated slide from the shipping box. Refer to details in section 10, "coated slides".

Place the coated slide - with the coating facing up - into the recess of the mounting (fig. 37) and mark it with your sampling specs using a fine tipped waterproof pen.

Avoid touching the coating. It will be contaminated and useless for sampling.

The sample numbers on the slide should match the numbers on the slide mounting.

Remove the cover from the top of the Particle-Sampler **PS 30**.

Place the top of the **PS 30** on **MBASS30** in such a way, that the sample numbers on the top are in alignment with the sample numbers of the slide mounting.

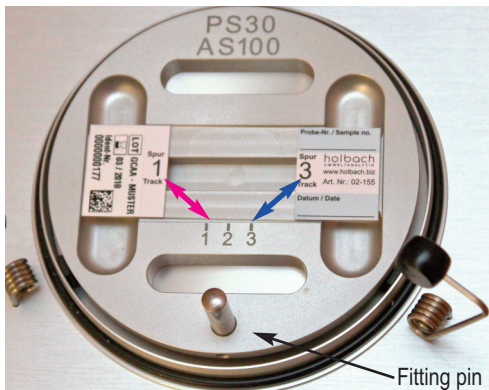Track 1 matches label 1 and Track 3 matches label 3

9

Fig, 37   Slide mounting with inserted slide

The fitting pin on the slide mounting inserts into a guide hole in the top securing the correct alignment of the two parts. The top is tight fitting the base.

Close the **PS 30** by lightly pushing the sealing springs to the inside. Slide the slot jet to the desired sample number.

The Particle Sampler **PS 30** is now ready for sampling.

The locking knobs should visibly and perceptibly snap into place.

9.2.3 Recommendations for sample air volume

Overloading of the object carrier with particles such as gypsum, plaster or skin cells can result in inadequate impaction of the spores. In this case, an analysis is no longer useful, and in the case of an extremely high concentration of particles, often also no longer possible.

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Overloaded samples often also impact on neighboring tracks, which means they also need to be discarded, although they could be analysed. In spaces, where no excessive particle concentration (e.g. due to construction work during measurement or due to a lack of fine cleaning during renovation) is detected, sampling of 200 liters of air is recommended.

An overload of the particle track can usually be detected by very high turbidity of the track and a width of more than approx. 1.1 mm, as well as, if applicable, through visible elevations. If the particle track turns out to be overloaded following sampling, then new sampling at the location of 100 liters or 50 liters, depending on evaluation, is recommended. This significantly reduces the risk of not having taken a sample suitable for analysis.

Notifying the laboratory to only analyse the more suitable particle track of both samples, prevents duplication of analyses.

Fig. 38 Totally overloaded particle tracks (not suitable for analysis)

Sampling can now begin (section 7.3).

9.2.4 After sampling

An other sampling can take place after sliding the slot jet to the next position.

9.2.5 Removing the slide

After all samples have been taken, remove the loaded slide in the following sequence.

Open the sampler by lightly pushing the black locking knobs to the outside.

Remove the loaded slide carefully and with the coating facing down put it back into the shipping box.

When shipping, protect the slide from damage by providing sufficient padding (e.g. using double air cushion envelopes).

9.2.6 Important notes

Avoid wedging the components when putting the **PS 30** together.

Clean the **PS 30** before and after use.

Take care to have the inside of the **PS 30** dried out before replacing the protective covers!

9.3 The Filter-Adapter FA 30

The Filter-Adapter **FA 30**:

▶ samples spores, pollen, bacteria, fibers and other air borne micro particles by filtration using 80 mm filters on mounting devices or disposable units

▶ is ideally suited for air sampling with subsequent processing and analysis according to TRBA 430 (Technische Regeln für biolog-ische Arbeitsstoffe or Technical Specifications for Biological Materials)

9.3.1 Preparation for sampling

9

Clean the Filter-Adapter **FA 30** by using a germicidal and fungicidal agent (e.g. 2-Propanol,70 % ~ 80 % Isopropanol).
Put the Filter-Adapter **FA 30** on the **MBASS30** and close it.
Place the filter mounting with the inserted filter or a disposable unit on the Filter Adapter **FA 30**.
The air stream volume setting depends on the type of filter used. Please consult the specifications of the manufacturer of the filters.

The Filter-Adapter **FA 30** is ready for sampling.

Sampling can now begin (section 7.3).

Fig. 39 Mounting a disposable gel filter unit

9.3.2 After sampling

Remove the filter with the disposable unit and store it according to the instructions of the manufacturer.

9.3.3 Important notice

Avoid wedging the components when mounting the **FA 30** on the **MBASS30**.

Clean the **FA 30** before and after use.

Only use filters with a suitable flow resistance.

The use of filter materials other than gel filters (e.g. poly carbonate) can lead to a termination of sampling because of higher flow resistances.

9

10. The coated slide

For sampling with the **PS 30** we suggest you to use our coated glass slides 76 mm x 26 mm (article-No.: 02-155).
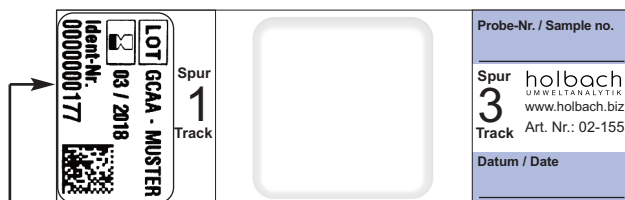
Fig. 40   Coated slide 76 mm x 26 mm
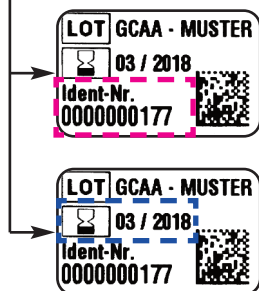
The slides and the shipping container are both identified by a label containing a unique identity number. The information on the label are also present in the DataMatrix code.

The shelf life of the new coated slide is 2 years after production. The expiry date is given in the form month / year.

▶ **Never** touch the coating of the slide!

▶ The coated slides are made of glass. Protect the slides against mechanical stress.

▶ Only use slides with a **plane** surface!

▶ Only use slides that did not yet exceed their shelf live.

▶ Store the slides at room temperature (up to 25 °C).

▶ Usage at temperatures from -30 °C up to +50 °C is possible.

▶ The maximum width for cover glasses for microscopy is 32 mm.

The coated slides are shipped in a white disposable shipping container (Section 10.1).

10.1 The shipping container

The coated slide is delivered in a shipping container which is sealed in a film tubing.

After taking the shipping container out of the film tubing, it can be opened by lifting the cap on one side.

Fig, 41 Opening the shipping container

The slide can be easily pulled out of the container after opening.

Fig, 42 Taking the adhesive coated slide out of the container

Don't tilt the slide when taking it from or inserting it into the container. If it is tilted too much, the coating may be damaged.

Right:

Wrong:

Fig. 43 Position of the slide on taking or inserting

11. Safety instructions

The neglect of the safety instruction can lead to damage to the equipment and may have serious consequences!

▶ **Only use the MBASS30 for its designed purpose!**

▶ **MBASS30 may be used only by technical personnel!**

▶ **Avoid liquids from entering the MBASS30 and charger!**

▶ **Keep the devices away from children!**

▶ **Avoid touching the membrane keyboard with sharp or pointed objects!**

▶ **Do not use not in rooms with danger of explosions!**

▶ **Use the battery charger only in dry rooms!**

▶ **Do not use faulty connection cables!**

▶ **Do not cover charger during operation!**

▶ **Only user the charger for recharging the internal Li-Po-battery!**

▶ **The rechargeable battery pack and the battery must be disposed of properly!**

▶ **Adhere to the application guidelines and instructions by the sampling media manufacturers.**

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12. Cleaning and maintenance

Clean **MBASS30** with a damp and fluff free cloth.

Do not use abrasives.

Do not exert pressure on the LCD-display in the membrane keyboard.

12.1 Calibration interval
The calibration interval of the high performance fan is every 150 hours of operation, at least however, every 2 years.

Note:
When not in use charge the battery pack of the **MBASS30** at least every 12 months with the enclosed battery charger.

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13. Technical specifications

Sampling modules:	Round jet impactor **LKS100**,
	Round jet impactor **LKS 30**,
	Slot jet impactor **PS 30**,
	and Filter-Adapter **FA 30**
Air flow rate:	30 l/min controlled and monitored and
	100 l/min controlled and monitored
Flow sensor:	velocity head (pressure) sensor
Calibration interval:	After 150 hours fan operating time,
	at least every 2 years, however
Sampling air volume:	from 10 to 9990 liters pre-selectable
Negative pressure:	up to 20 mbar (2000 Pascal)
Sampling container:	Standard petri-dish 90 ... 95 mm x 15 mm
	(diameter x height) or
	Slide mounting for Particle-Sample
Electricity supply:	LiPo-Battery-pack 14.4 Volt, 3700mAh
Back-up battery:	Lithium coin cell CR2032 (3Volt)
Dimensions:	180 mm x 160 mm x 255 mm (B x H x D)
Weight:	2330 g without sampling module
	2370 g with sampling module **LKS100** / **LKS 30**
	2930 g with sampling module **PS 30**
	2650 g with sampling module **FA 30**
	2850 g with sampling module **AS100**
Material of the casing:	Anodized extruded aluminum sheath
Tripod thread:	UNC 1/4 inch (photo) and
	UNC 3/8 inch (microphone)
CE-Conformity:	According to EC guidelines about electromag-
	netic compatibility.
Warranty:	24 Months, battery: 12 Months
Option:	**Dual-Sensor-**Technology
Battery charger:	
Input voltage:	100 - 240 Volt, 50 - 60 Hz
Charge current:	2 A maximal
Certified to:	CE

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13. Technical specifications

Sampling module LKS 30:

Sample air volume:	50 to 1800 liters depending on the task
Air flow:	30 l/min
Validation:	According to EN ISO 14698-1:2003
Sampling container:	Standard petri-dish 90 ... 95 mm x 15 mm (diameter x height)
Cut off:	dae50-Size: 0.9 µm (Aerodynamic diameter at a 50 % - probability of separation)
Round jets:	324 jets, each 405 µm diameter
Sample air nozzle:	can be extended with a hose of 5/4 inch internal diameter

Sampling module LKS100v2:

Sample air volume:	50 to 1800 L depending on the task
Air flow:	100 L/min
Validation:	According to EN ISO 14698-1:2003
Sampling container:	Standard petri-dish 90 ... 95 mm x 15 mm (diameter x height)
Cut off:	dae50-Size: 1,1 µm (LKS100V2) (Aerodynamic diameter at a 50 % - probability of separation)
Round jets:	500 jets each 500 µm diameter
Sample air nozzle:	can be extended with a hose of 5/4 inch internal diameter

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13. Technical specifications

Sampling module PS 30:

Sample air volume:	200 liters (recommended with average contamination)
Air flow:	30 l/min
Size of slot jet:	16.0 mm x 1.1 mm
Method:	according VDI Richtlinie 4300 Part 10
Operating attitude:	unrestricted
Sampling medium:	adhesive coated slides 76 mm x 26 mm
Number of samples:	up to three samples per slide due to movable jet
Sample air nozzle:	can be extended with a hose of 1 inch internal diameter

Sampling module FA 30:

Filter size:	filter mounting units and disposable filter units with an inside diameter of 78 mm.
Method:	TRBA 430 / BIA 9420
operating attitude:	unrestricted
negative pressure:	depends on type of filter used

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Note: **Subject to technical modification**

14. Conditions of warranty

Umweltanalytik Holbach GmbH grants 24 months warranty on this product after the date of purchase. In case of malfunctions of operation, please consult your dealer or supplier.

Repair or exchange is subject to our decision. The parts used for this are new or as good as new. Parts taken back change into the property of Umweltanalytik Holbach GmbH. A repair under warranty does not extend the warranty of the parts or the products itself. Excluded from warranty are damages caused by improper treatment, operator error, abuse, external causes, lightening/surge tension, alterations of the product as well as added parts. Furthermore, consumable parts (e.g. batteries, fuses) as well as damages caused by consumable parts (e.g. by the leaking of batteries), transit- and resultant damages, outage-and traveling expenses are also excluded. The warranty expires if repairs are done by non authorized entities or if the serial No. on the products is damaged or made illegible.

The warranty can only be claimed against presentation of an explicit receipt of purchase (invoice or sales receipt).

In case of warranty claim/repair, the device should be shipped carefully packed (if possible in its original packing packed and a shipping box) with a detailed description of the fault, sufficiently post paid to your dealer or to Umweltanalytik Holbach GmbH.

To our regret freight collect shipments can not be accepted

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Issued: 05/2016
Firmware release: 3.5.4
Hardware version 3.37.01
PC-Software version 3.5

15. The program MBASS30.EXE

The program MBASS30.EXE is for operating by remote control, set up the **MBASS30** system, data transfer of sampling data and for setting of the calibration data.

With exception of the setting of the calibration data all remaining attitudes can also be made directly at the **MBASS30** (section 8: Configuration).
The program MBASS30.EXE is not necessary for the local sampling.
The program MBASS30.EXE supports all **MBASS30** systems with a firmware version of 2.0 and higher.
The communication protocol has been switched from binary format to ASCII format with firmware version 2.5. The program MBASS30.EXE detects the used communication protocol of the **MBASS30** if the baud rate corresponds to the connected **MBASS30** system.
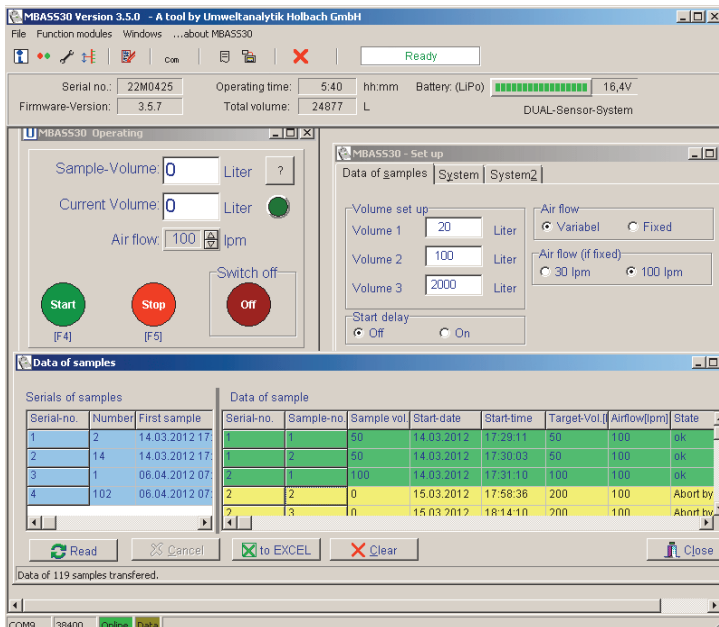
Fig. 44   The program MBASS30.EXE

15.1 Installation of the program MBASS30.EXE

15.1.1 System requirements

For a successful installation of the program MBASS30.EXE is necessary:

▶ A running PC system:
   ▷ with Microsoft Windows XP, Vista, Win7 with USB 2.0 Port
   ▷ depending on the operating system you need the admin rights
▶ The software "Install_MBASS30_En.exe" to install the program. MBASS30.EXE is stored on the included data storage medium or can be downloaded from the web page (extract it from the zip archive).
▶ The USB connecting cable
▶ Microsoft EXCEL for creating the sampling data sheet (not included in delivery)

15.1.2 Installation

Run the program "Install_MBASS30_En.exe" in the directory MBASS30\English\Program" on the data storage medium by double-clicking.
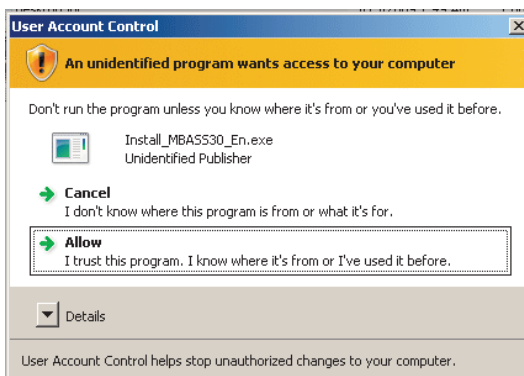
Fig. 45 Security form of the operating systems Vista and Win 7

Depending on the version of the operating system (Vista and Win7) a form pops up to confirmation of the installation. In this case choose „Allow" to continue the installation process (fig. 45).

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The Air Sampling System   MBASS30

15. The program MBASS30.EXE

Fig. 46 The setup wizard

The installer program -
Click „Next" to continue

Fig. 47 The components of the MBASS30.exe
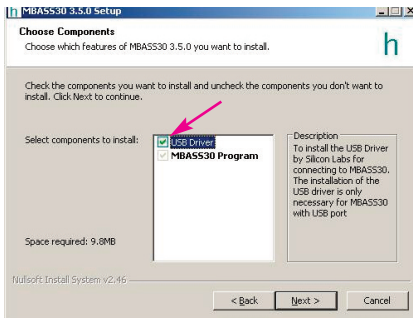
At the first installation of
mbass30.EXE the in-
stallation of the USB
driver is necessary.
Please activate the
check box USB Driver
and click the „Next" but-
ton.

15

Fig. 48 Confirm or change the destination directory
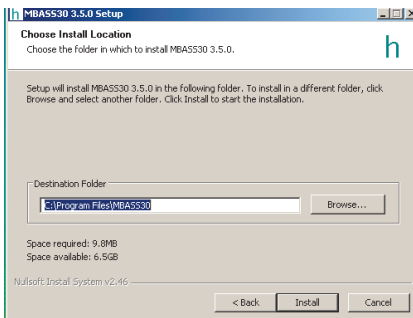
In the next form, you
can change the destina-
tion directory of the
program (fig. 48)

Note: The installation of the USB driver will done in 2 steps:
1. Installation of the USB driver installation program.
2. Installation of the USB driver

The Air Sampling System   **MBASS30**

Fig. 49 The USB installation program in preparing
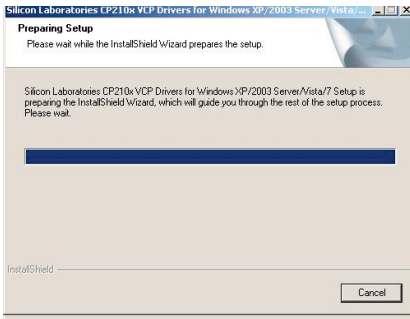
The installation of the USB driver installation program will prepared.

Fig. 50 The USB installation program in preparing
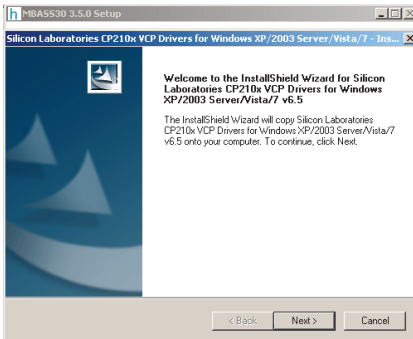
Click the „Next" button to continue the installation of the USB driver installation program.

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Fig. 51 License agreement of the USB driver installation program
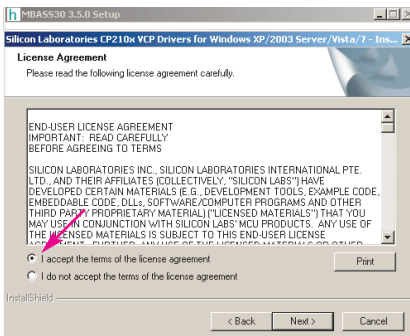
Please read the license agreements and accept.

Continue by clicking the „Next" button.

Fig. 52 The destination directory
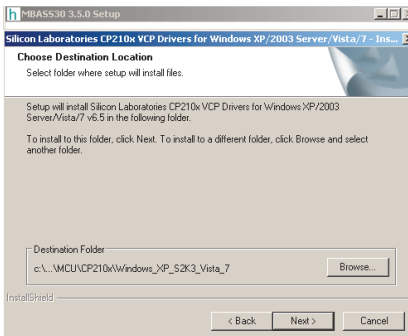
you can change the destination directory of the installation program

To continue click the „Next" button.

Fig. 53 Ready for install
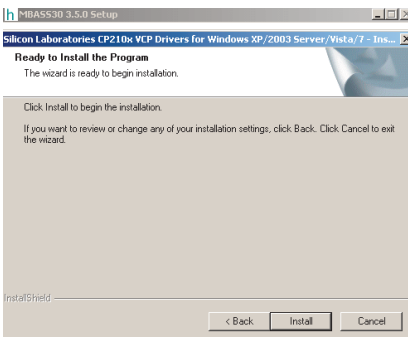
Start the installation by clicking the „Install" button.

Fig. 54 The installation of the USB driver is prepared
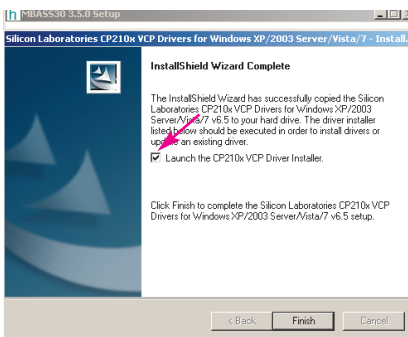
Activate „Launch the CP210x VCP Driver" and click the „Finish" button.
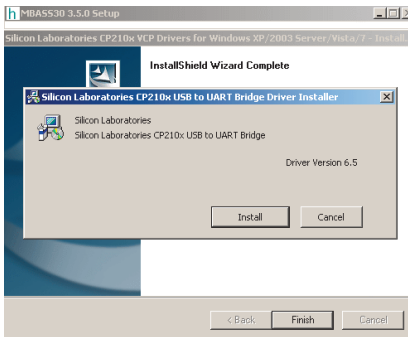
Click the „Install" button to start the USB Driver installation.

Fig. 55 The mask of the USB driver installation program

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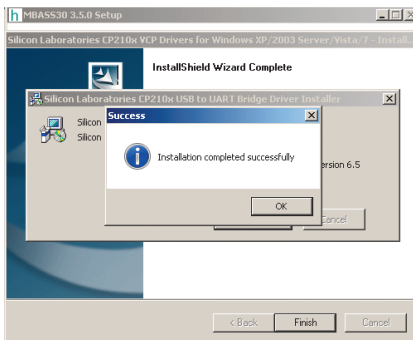
Fig. 56 The installation of the USB driver is completed
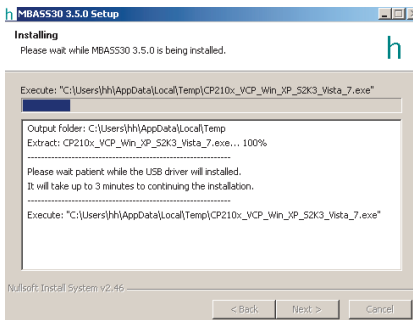
After the installation the installation program of the USB driver will cleaned, than MBASS30.EXE will installed.

Fig. 57 MBASS30.EXE will installed
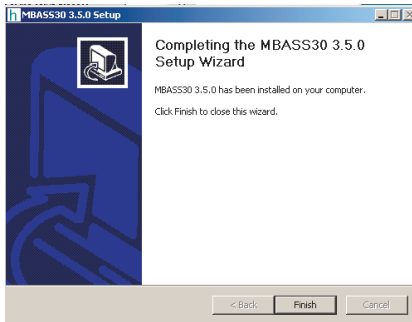
Fig. 58 The installation is completed

After installation has been completed successfully the icon is on the desktop.

Remove the dust shield from the USB Connector of **MBASS30** and connect **MBASS30** with the PC USB Connector.

15.1.3 First start of MBASS30.EXE

Start the program MBASS30.EXE.

15

The main form of MBASS30.EXE will be displayed.
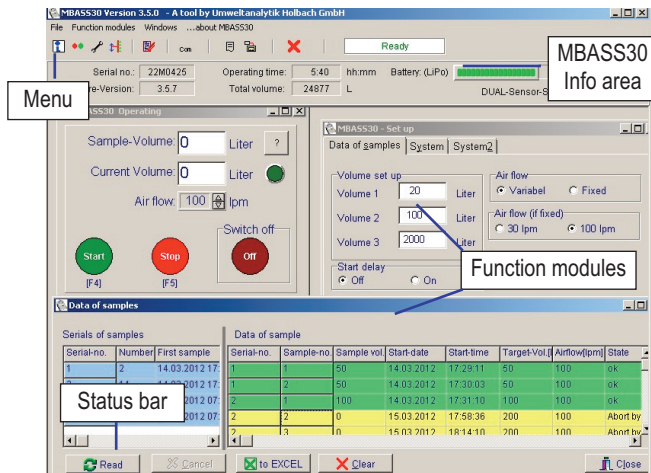
Fig. 59   The program MBASS30.EXE

A successful connection to the MBASS30 will be signalized by the green "online" indicator in the status bar (fig. 61). The serial no of the MBASS30, the operating time, the battery voltage and the state of the connected **MBASS30** will displayed in the info section.

If no connection to the **MBASS30**, please check:

1. Is **MBASS30** switched on?
2. Is the cable connected to the USB socket at the **MBASS30** a n d connected to the PC system?
3. Corresponds the port no. of the virtual serial port to the settings in the program?
4. Corresponds the preset "MBASS30 Version" to the Version of the connected **MBASS30** -System?
5. Corresponds the baud rate of the **MBASS30** -System to the settings of the program MBASS30.EXE?

Note: **MBASS30** - systems with firmware version less than 2.5 operates with baud rate 9600 baud only!
The USB Port will be configured as a virtual serial port.

15.2 Operating MBASS30.EXE

The main form (fig. 59) of MBASS30.EXE includes the sections:

1. Menu and icons to run the function modules
2. MBASS30 Info section
3. Work space of the function modules
4. Status bar for displaying the connection status, baud rate and so on.

15
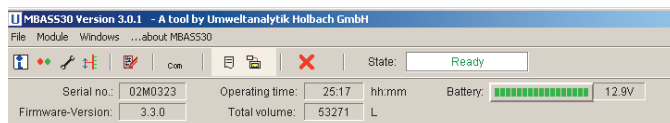
Fig. 60   The menu and the MBASS30 info section

The displayed components of the form depends on the firmware version of **MBASS30**.
The highlighted icons are visible if the service functions are activated.

15.2.1 The menu

You can run following functions via menu, function key or clicking on the icon:

Icon	Menu	Func-key	Function
	File -> System-messages	F3	opens a form with system-messages
	Function Modules -> Operating	F1	Remote control for taking a sample
	Function Modules -> Settings	F2	Opens a form for settings of the **MBASS30**
	Function Modules -> Calibration	F8	Opens a form for input the calibrating values
Com	File -> Program set up	-	Form for settings of the program MBASS30.EXE
			Service-function, depends on the version
			For firmware update of the **MBASS30**
	Function Modules -> Load sampling	F9	Opens a form for read out sampling data
✖	File -> Close	[Alt] + [F4]	Closes MBASS30.EXE

15.2.2 The status bar at the bottom of the main form

The status bar displays:

1. the (virtual) serial port no.
2. the baud rate
3. the status of the communication
4. the transmit event from MBASS30.EXE to **MBASS30**
5. system messages (Alarm-messages will be displayed in red color)

15

Status bar (established connection to the **MBASS30**)

Status bar (without connection to the **MBASS30**)

Status bar (COM port / USB connect is not available)
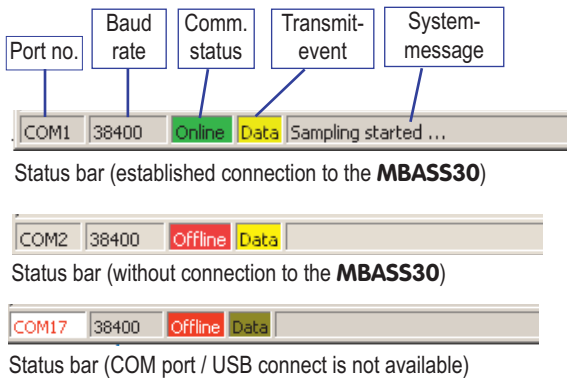
Fig. 61 The status bar

15.2.3 System-messages

System-messages of the program MBASS30.EXE or **MBASS30** are displayed in the status bar and in a separate form. The system message form can show or hidden by function key [F3].

Messages will be displayed in black color, alarm messages will be displayed in red color.

15
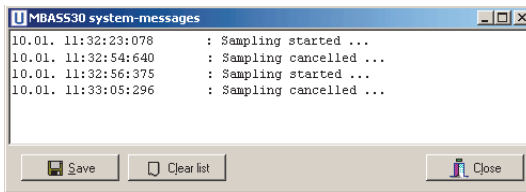
Fig. 62   System-messages

Messages in the system message form can stored in a text file. The position and the height and the width of the form will be saved. The position of this form is not limited by the work space of the main form.

The Air Sampling System   MBASS30

15.2.4 Program settings

With the program settings the program MBASS30.EXE can be adapt to the settings of the **MBASS30** system: In the group "Serial port" -> "Port" will be set the serial port no. which is connected to the **MBASS30**.
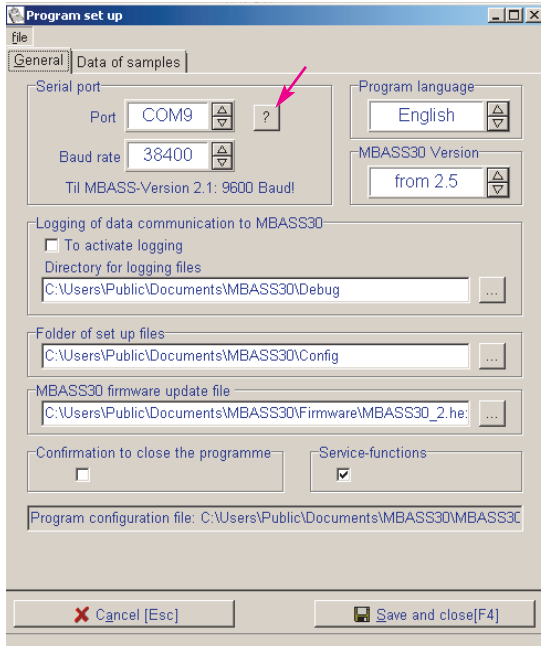
Fig. 63   Program settings, tab General

You can get list of the available serial COM ports by clicking the button „?" (purple colored arrow in fig. 63).
The installed virtual USB COM port is titled with „Silicon Labs CP210x".
With a double click or via clicking the right mouse button the selected COM port (fig. 64) will transfered in the Port selection box   (fig. 63).
You can change the settings by clicking the little arrows also.

The baud rate has to correspond to the current baud rate of the **MBASS30**.

15
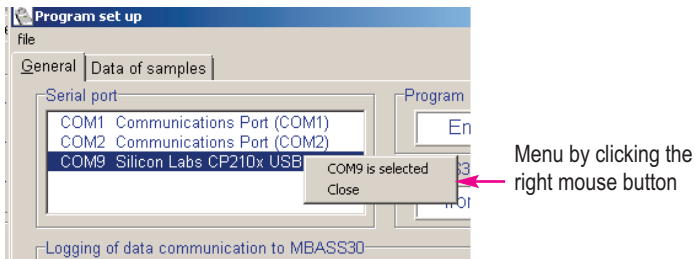
Fig. 64   Available serial COM ports

MBASS30 systems with the firmware version less than 2.4 operates with a baud rate of 9600 Baud.
You can change the settings by clicking the little arrows.

The communication protocol has changed since **MBASS30** firmware version 2.5. In the group "MBASS30 Version" you can set the protocol type of the connected **MBASS30** system.
By setting the type "Auto" the program MBASS30.exe checks the protocol type of the connected MBASS30 system.
In the group "Program language" can be set German or English language of the program MBASS30.EXE.

15

For maintenance it can be helpfully to log the data between the MBASS30 system and the program MBASS30.EXE. Click the check box "To activate logging". The logged data will be saved in a ASCII formated text file. The directory where the logging files are stored can select via a dialog form (fig. 65). A click on the button opens this dialog.
Of course it is possible to create a new directory in the dialog form.
MBASS30 systems with a firmware version 2.5 and higher can be updated via the program MBASS30.EXE.
The firmware file (in INTEL Hex format) can be selected in the group "MBASS30 firmware update file". The update procedure is described in the section 16. The firmware files of the **MBASS30** system can be downloaded from our web pages.
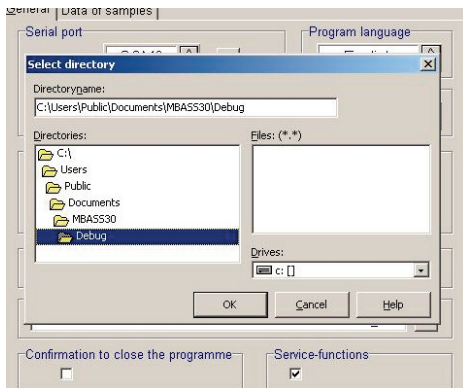
Fig. 65   Dialog to select / create a directory

After upgrading from firmware versions through 3.3.0 to the versions 3.4.0 and higher a new calibrating and new adjustments of limits are necessary!

With the check box "Service-functions" the icons of the functions "Maintenance function read configuration" and "MBASS30 firmware update" can be visible in the menu.

In the tab „Data of samples" the directories regarding the sampling data can be selected.

In the directory „Directory for storage of the data of sample files" the downloaded data from MBASS30 will stored in a formatted ASCII file. The stored data can be reloaded in the offline mode.In the „Directory for storage of the EXCEL files" the generated protocol sheets will be stored here.

15
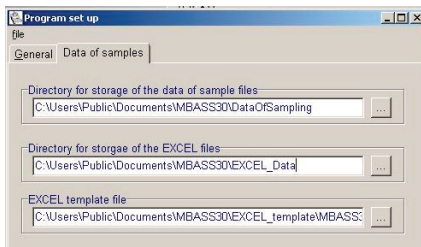
Fig. 66 Program settings, tab Data of samples

The protocol sheet will performed by the template sheet, selected in the group „EXCEL template file". Customize this template file once with your logo, address and so on. The delivered template contains a VBA macro, called „MBASS30_Start" which can also customized to transfer the data to the „printout" work sheet.

Changes will be permanent valid after having saved the settings by clicking the button ▨ Speichern und Schließen [F4]

15.2.5 Remote control of MBASS30

With the function "MBASS30 operating" (function key [F1]) the MBASS30 system can be operated by remote control. A sample can started or canceled.
Furthermore an alarm can be acknowledged with a click on the button "stop" or pressing the function key [F5].
The form can be freely changed in the size and be positioned in the work space. Size and position are stored when closing the form.
The air flow rate 30 l/min or 100 l/min can be selected by clicking the little arrows.
Also the **MBASS30** can switched off by clicking the dark-red button „Off"

15
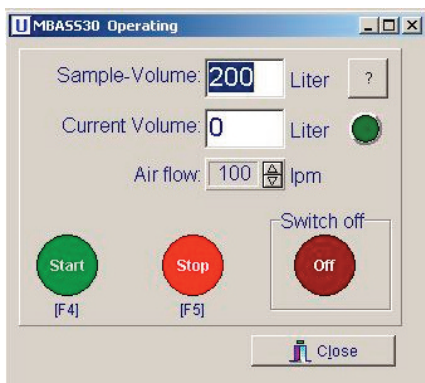
Fig. 67   Remote Control of

The current volume of the sample is displayed in the field "Current volume"

The "Status signal" displays:

dark green: No sampling active
lime: Sampling is active
yellow: Sampling is active, DUAL Sensor is deactivated
red: An alarm is present

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15.2.6 MBASS30 set up

The function module affords to display and change the settings of the MBASS30 system.

The set up form contains 3 tabs. Changes of numerical values will be valid in the MBASS30 system on exit of the numerical filed. The other changes are valid immediately.
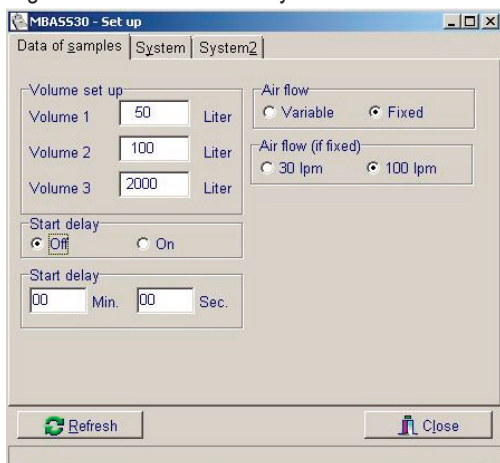
Fig. 68   **MBASS30** settings Tab „Data of samples"

All set up parameter except the function „Adjust to system time" are described in section 8.

Important:

After changing the baud rate of the **MBASS30** system by clicking the button ➡ Set it is also necessary to adjust the baud rate of the program.

15
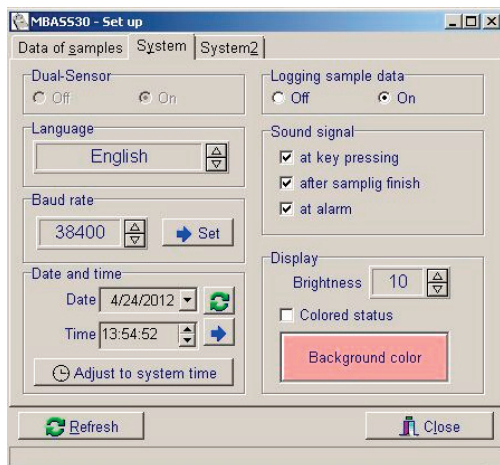
Fig. 69   **MBASS30** settings Tab „System"

In the tab „System2" the automatically turn off time can be configured.

15.2.7 Download the sampling data from **MBASS30**

The sampling data are only stored in **MBASS30** if the logging of sampling data is activated (chapter 8.5).

To open the form „Data of samples" click the button or press the function key [F9].

The form opens and if the status is online, the sampling data will download. To reload the data click the button. The progress is displayed on the top of the form.

The form shows two lists:

Serials of samples　　　data of the samples
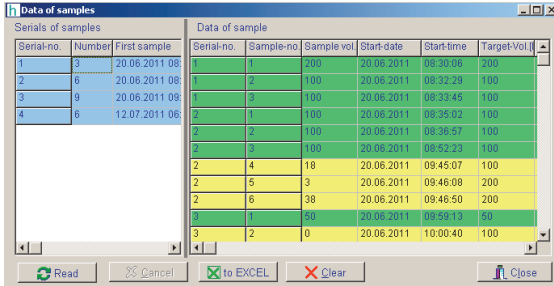
Fig. 70   The form „Data of samples" to generate a sampling protocol

For selecting or deselecting one or more sampling serials click the right mouse button in the list „Serials of samples".

A context sensitive menu offers the functions to selecting and deselecting data of the several serials as shown in fig. 71.

Selected serials are shown in light blue background color, deselected serials in white background color. The shown data of sampling in the right hand list depends on the selected serials. The background color indicates the status of the sampling:

green　　sampling was done without error

yellow　　an error occurred, sampling was aborted

light red　the record of data could not be decoded

red　　　checksum error, data are not reliable

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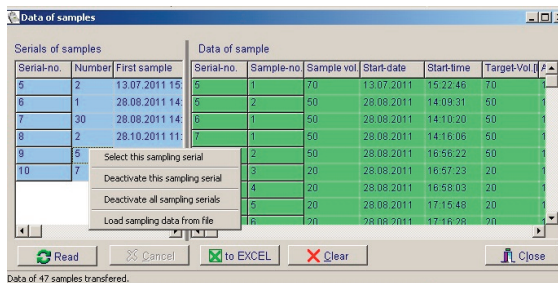
Fig. 71 The context sensitive menu

The downloaded data are stored in the directory which is defined in the program set up in the group „Directory for storage of the data of sample files" (fig. 66).The name of the file is <serial_no of MBASS30>_<date stamp>_<time stamp>.dat.

By the function „load sampling data from file" (fig. 71) the data can be reloaded in the lists. The data of the file are protected against modification by a calculated check sum.

To export the selected sampling data in an EXCEL Sheet click the button ☒ to EXCEL .

The EXCEL template will filled out with the sampling data (fig. 86). After this the EXCEL VBA macro, called MBASS30_start, starts to transfer and sort the data in the printout work sheet (fig. 72).

The example in fig. 73 shows the data of the error-free sampling data only. The EXCEL template can easy customized to the requirements.

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	A	B	C	D	E	F	G
1	Serial No.	02M0323			Template version 1.1		
2	Firmware	3.3.0					
3	Operating time	25:22					
4	Total volume	53804					
5	Transfer date	13.07.11					
6	transfer time	2:09:33 PM					
7							
8							
9							
10							
11							
12	Serial-no.	Sample-no.	Sample vol.[l]	Start-date	Start-time	Target-Vol.[l]	Airflow[lpm]	Sta
13	4	1	70	12.07.2011	6:00:26	70	100	
14	4	2	80	12.07.2011	6:01:24	80	100	
15	4	3	100	12.07.2011	6:02:28	100	100	
16	4	4	100	12.07.2011	6:04:14	100	100	
17	4	5	13	12.07.2011	19:32:54	200	100	
18	4	6	0	12.07.2011	20:44:59	200	100	
19							

Fig. 72   The data in the template work sheet

Insert your company name here   Sampling protocol   Date: 7/13/2011

Object:

Data of device	
Sample system	MBASS30
Serial no.	02M0323
Firmware version	3.3.0
Operating time	25:22 hh:mm
Date of data import	13.07.11

Data of samples   Date   12.07.2011

Serial no.	Sample no.	Volume [l]	Start time	Remark	Media of nutrient
4	1	70	6:00:26 AM	ok	
4	2	80	6:01:24 AM	ok	
4	3	100	6:02:28 AM	ok	
4	4	100	6:04:14 AM	ok	

Fig. 73 The data in the print out work sheet, proceeded by the macro

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15.2.8 Clear the data in MBASS30

The sampling data memory of the **MBASS30** contains up to 1000 data of samples. Every download transfers all sampling data.

To clear the data memory in **MBASS30** click the button ⨯ Clear .
After confirming the safety dialog (fig. 74) all already loaded data will cleared.
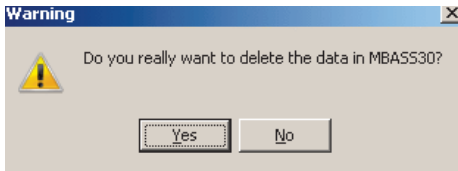
Fig. 74 The safety dialog to delete the data in MBASS30

The delete process will confirmed by a message in the status bar of the function form.

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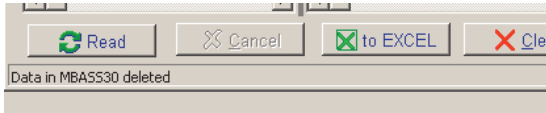
Fig. 75 Confirmation of deleted data.

If there unloaded data in **MBASS30** a special dialog has to confirm.
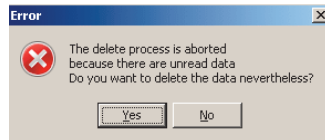
Fig. 76 The safety dialog to delete the unloaded data in MBASS30

After deleting the sampling data in **MBASS30** the sampling serial number will be increased and the running number will reseted to 1.

15.2.9 Calibration of MBASS30

The calibration procedure has changed since the firmware
version 2.5 of the **MBASS30** system. Depending on the version the
appropriate calibration form is opened.

The guideline of the calibration procedure can be requested.

For request we need the serial no. of the MBASS30 system.

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The Air Sampling System   MBASS30

16. Firmware update

The firmware of the **MBASS30** system with a firmware version 2.5 or higher can be updated via serial port.
The current firmware file can be downloaded from our web page.
After upgrading from firmware versions through 3.3.0 to the versions 3.4.0 and higher a new calibrating and new adjustments of limits are necessary!

For firmware update you need:

- ▶ the MBASS30 system
- ▶ the connection cable
- ▶ PC system with installed program MBASS30.EXE
- ▶ the firmware file "MBASS30_2.hex"

Update procedure:
1. Establish the communication between the MBASS30 system and the program MBASS30.EXE.
2. Open the settings form and select the current firmware file in the group "MBASS30 firmware update file"

3. Run the function module "MBASS30 firmware update"

4. Switch off **MBASS30**
5. Switch on **MBASS30** while pressing button no 1 of the **MBASS30** system. If the alarm LED light up than release the button no. 1
6. Click the button   ➡ Start Aktualisierung
7. the firmware update file will be checked, the serial port will reopened and the firmware update file will transfered to the **MBASS30**

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Fig. 74 The firmware update procedure has been finished

Notes:

After cancelling of update process repeat the update procedure. **MBASS30** works only after successful upgrade procedure.

To leave the update mode of the **MBASS30** without start of the update press the pushbutton switch on the back (fig. 4) for more than 7 seconds, the internal microcontroller will reset.

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Increased accuracy with the new
Dual - Sensor - Technology

The microbiological sampling system **MBASS30** can optionally be equipped with the dual sensor technology.

Why Dual - Sensor - Technology?

Imagine the flow sensor in the sampling device has its measured value altered due to a defect and allows an actual flow which is 25 % too high. The electronics compensates the volume flow to the 30 l/min specified by the flow sensor and also increments the volume to 30 l/min over time. However, the defect in the flow sensor means the actual volume flow is only 24 l/min. The sampling volume is thus only 80 l instead of the 100 l displayed.

There are 2 consequences of this:

1. the reduced volume flow may adversely affect the filtration efficiency and

2. the actual sample volume may not correlate with the display.

Here, dual sensor technology is used:

The task of the optional dual sensor unit is to continually monitor for any sampling errors like that explained above during the sampling process and notify their occurrence. The DUAL sensor is a second, redundant flow sensor with dedicated measurement channel, which is fully integrated into the system. The measured values of both flow sensors are continually monitored for any disparities during the sampling. In the event of any difference detected in both flow sensors which exceeds a period of 10 seconds, the sampling process is suspended and an alarm is triggered. In the event of a defect, the DUAL sensor can be deactivated on-site, meaning the sampling need not be suspended. After clarifying the cause of the sensor disparity, the sets of sampling data can be corrected in line with the actual volume flow and sample volumes.

The dual sensor technology is usable with all **MBASS30** systems.

A

Why statistical correction of the colony forming units (CFU)?

With round jet impactors the particles below the jet hole hit the so-called germination spot, and germinate there. The visible colonies are counted and projected to a standard of 1 m³ of air and indicated as number colonies per cubic meter of air.

The aforementioned evaluation corresponds exactly to the reality in the sampled air if:

1. during a sampling only one spore is accelerated towards the sampling medium by a single jet hole respectively,
2. this spore reaches the sampling medium and
3. this spore germinates and thus becomes visible as CFU.

The situation:

In reality these conditions are not always met because:

Point 3.: Whether a spore germinates depends on its ability to germinate. Reasons for the loss of this ability can be for example the age of the spores or damage by the use of fungicides prior to the sampling. But also the sampling medium must be suitable for the germination of a spore with regard to water activity, substratum etc.. The germination of this spore can finally be hindered or even suppressed by the growth of other microorganisms in the neighborhood (e.g. Trichoderma).

B

Point 2: Whether every spore "impacts" on the sampling medium or is extracted from the sampling air depends on the degree of separation of the air sampler in use. It is easily conceivable: the smaller a spore and the lower the mass of this spore is, the sooner it will be carried away with the air drawn through the sampler. Thus the efficiency of an air sampler is defined by its ability to separate even the smallest spores (particles) from the air to the sampling medium. The degree of separation, also called cut off value of a air sampler, quotes the smallest diameter of spherical particles with a standard density of 1000 kg/m³ that are separated by the sampler from the sampling air with a probability of 50%. Naturally the given degree of separation (cut off) only applies to the operation with nominal or rated data, e.g. volume flow. The degree of separation (cut off) deteriorates with decreasing volume flow.

Point 1: Depending on the spore concentration in the air more than one spore per jet hole is going to be accelerated and will hit the respective germination spot during a sampling. The more the germination spots are filled, the lower the probability for a spore to hit a spot that is not occupied or still "available". With an assignment of 90% of the possible germination spots the chance for a spore to "find" a free spot is only 1 to 10. Multiple spores on a germination spot only form a single CFU after germination. To the eye they are not visible as several single colonies. Thus the number of the CFU after cultivation will actually be lower than the "sampled" (impacted) spores.

But by how much?

An attempt at the determination of the actually collected spores is provided by statistics. At the assumption of a uniform distribution of the sampling air over the jet plate the following statistical approach permits a calculation of the actually collected particles from the number of CFUs.

The calculation is done on the basis of the distribution of the occupied spots at a given particle number (n) and known jet hole number (N). Knowing the distribution of the occupied spots (n - 1) in relation to the number of jet holes(N) the distribution of n particles can be computed(conditional probability).

The distribution for 1, 2, ..., n particles can be calculated recursively. The expectation values of this distribution can be calculated according to the following equation in which En equals the number of CFUs at n collected particles.

B

$$E_n = N * \left(1 - \left[\frac{N - 1}{N} \right]^n \right)$$

The function of the particle number determined statistically via the number of CFUs is represented in the following diagram.
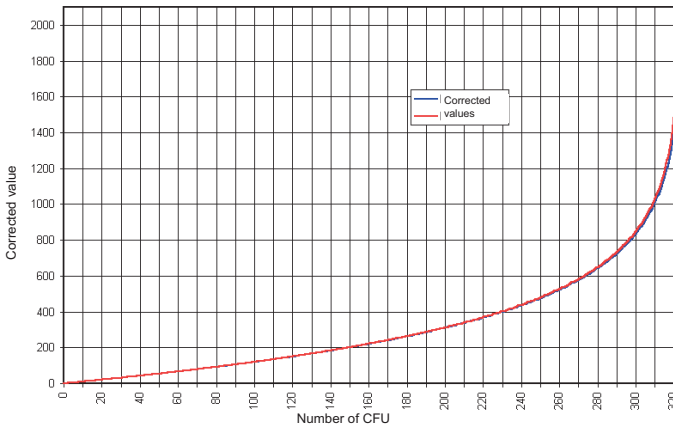
Limits of the statistical correction

A correction of the number of CFUs with the particle number value determined statistically is possible only on the complete spore number. A projection of the CFU numbers with the individual identified species of the CFU is not possible with this statistical procedure.

The programme "Korrektur", which runs under Microsoft-Windows 98, Win2000, XP and NT4, for the statistical correction can be found on the enclosed CD in the folder Doc\statisticalcorrection

B

Appendix C: Table of statistical correction of the LKS 30

CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr
1	1	55	60	109	133	163	227	217	359	271	588
2	2	56	61	110	134	164	229	218	362	272	594
3	3	57	63	111	136	165	231	219	366	273	601
4	4	58	64	112	137	166	233	220	369	274	607
5	5	59	65	113	139	167	235	221	372	275	614
6	6	60	66	114	141	168	237	222	375	276	621
7	7	61	68	115	142	169	239	223	378	277	628
8	8	62	69	116	144	170	241	224	381	278	635
9	9	63	70	117	145	171	243	225	385	279	642
10	10	64	71	118	147	172	245	226	388	280	649
11	11	65	73	119	148	173	248	227	391	281	657
12	12	66	74	120	150	174	250	228	395	282	664
13	13	67	75	121	152	175	252	229	398	283	672
14	14	68	76	122	153	176	254	230	402	284	680
15	15	69	78	123	155	177	256	231	405	285	689
16	16	70	79	124	156	178	258	232	409	286	697
17	17	71	80	125	158	179	261	233	412	287	706
18	19	72	81	126	160	180	263	234	416	288	715
19	20	73	83	127	161	181	265	235	419	289	724
20	21	74	84	128	163	182	268	236	423	290	734
21	22	75	85	129	165	183	270	237	427	291	743
22	23	76	87	130	166	184	272	238	430	292	753
23	24	77	88	131	168	185	274	239	434	293	764
24	25	78	89	132	170	186	277	240	438	294	775
25	26	79	91	133	171	187	279	241	442	295	786
26	27	80	92	134	173	188	282	242	446	296	797
27	28	81	93	135	175	189	284	243	450	297	809
28	29	82	95	136	176	190	286	244	454	298	822
29	30	83	96	137	178	191	289	245	458	299	835
30	31	84	97	138	180	192	291	246	462	300	848
31	33	85	99	139	182	193	294	247	466	301	862
32	34	86	100	140	183	194	296	248	471	302	877
33	35	87	101	141	185	195	299	249	475	303	892
34	36	88	103	142	187	196	301	250	479	304	909
35	37	89	104	143	189	197	304	251	484	305	926
36	38	90	105	144	191	198	306	252	488	306	944
37	39	91	107	145	192	199	309	253	493	307	963
38	40	92	108	146	194	200	312	254	498	308	983
39	42	93	110	147	196	201	314	255	502	309	1004
40	43	94	111	148	198	202	317	256	507	310	1028
41	44	95	112	149	200	203	319	257	512	311	1052
42	45	96	114	150	202	204	322	258	517	312	1079
43	46	97	115	151	203	205	325	259	522	313	1109
44	47	98	117	152	205	206	328	260	527	314	1141
45	48	99	118	153	207	207	330	261	532	315	1177
46	50	100	120	154	209	208	333	262	537	316	1218
47	51	101	121	155	211	209	336	263	542	317	1264
48	52	102	123	156	213	210	339	264	548	318	1318
49	53	103	124	157	215	211	342	265	553	319	1383
50	54	104	125	158	217	212	345	266	559	320	1464
51	55	105	127	159	219	213	347	267	564	321	1573
52	57	106	128	160	221	214	350	268	570	322	1738
53	58	107	130	161	223	215	353	269	576	323	2094
54	59	108	131	162	225	216	356	270	582		

C

Appendix D: Table of statistical correction of the LKS100

CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr	CFU	Corr
1	1	51	54	101	113	151	180	201	257	251	349	301	461	351	606	401	811	451	1165
2	2	52	55	102	114	152	181	202	259	252	351	302	463	352	609	402	816	452	1175
3	3	53	56	103	115	153	183	203	261	253	353	303	466	353	613	403	821	453	1186
4	4	54	57	104	117	154	184	204	262	254	355	304	469	354	616	404	826	454	1197
5	5	55	58	105	118	155	186	205	264	255	357	305	471	355	620	405	832	455	1208
6	6	56	59	106	119	156	187	206	266	256	359	306	474	356	623	406	837	456	1219
7	7	57	61	107	120	157	188	207	267	257	361	307	476	357	627	407	842	457	1231
8	8	58	62	108	122	158	190	208	269	258	363	308	479	358	630	408	848	458	1243
9	9	59	63	109	123	159	191	209	271	259	365	309	481	359	634	409	853	459	1255
10	10	60	64	110	124	160	193	210	272	260	367	310	484	360	637	410	859	460	1267
11	11	61	65	111	126	161	194	211	274	261	369	311	487	361	641	411	864	461	1280
12	12	62	66	112	127	162	196	212	276	262	371	312	489	362	644	412	870	462	1293
13	13	63	67	113	128	163	197	213	278	263	373	313	492	363	648	413	876	463	1307
14	14	64	68	114	129	164	199	214	279	264	376	314	495	364	652	414	882	464	1321
15	15	65	70	115	131	165	200	215	281	265	378	315	497	365	655	415	888	465	1335
16	16	66	71	116	132	166	202	216	283	266	380	316	500	366	659	416	893	466	1350
17	17	67	72	117	133	167	203	217	285	267	382	317	503	367	663	417	900	467	1365
18	18	68	73	118	135	168	205	218	286	268	384	318	506	368	667	418	906	468	1380
19	19	69	74	119	136	169	206	219	288	269	386	319	508	369	670	419	912	469	1397
20	20	70	75	120	137	170	208	220	290	270	388	320	511	370	674	420	918	470	1413
21	21	71	77	121	139	171	209	221	292	271	391	321	514	371	678	421	924	471	1430
22	22	72	78	122	140	172	211	222	294	272	393	322	517	372	682	422	931	472	1448
23	24	73	79	123	141	173	212	223	295	273	395	323	520	373	686	423	937	473	1467
24	25	74	80	124	143	174	214	224	297	274	397	324	522	374	690	424	944	474	1486
25	26	75	81	125	144	175	215	225	299	275	399	325	525	375	694	425	950	475	1506
26	27	76	82	126	145	176	217	226	301	276	402	326	528	376	698	426	957	476	1527
27	28	77	84	127	147	177	219	227	303	277	404	327	531	377	702	427	964	477	1548
28	29	78	85	128	148	178	220	228	305	278	406	328	534	378	706	428	971	478	1571
29	30	79	86	129	149	179	222	229	306	279	408	329	537	379	710	429	978	479	1595
30	31	80	87	130	151	180	223	230	308	280	411	330	540	380	714	430	985	480	1620
31	32	81	88	131	152	181	225	231	310	281	413	331	543	381	719	431	992	481	1646
32	33	82	90	132	153	182	226	232	312	282	415	332	546	382	723	432	1000	482	1674
33	34	83	91	133	155	183	228	233	314	283	418	333	549	383	727	433	1007	483	1703
34	35	84	92	134	156	184	229	234	316	284	420	334	552	384	731	434	1015	484	1735
35	36	85	93	135	157	185	231	235	318	285	422	335	555	385	736	435	1022	485	1768
36	37	86	94	136	159	186	233	236	319	286	425	336	558	386	740	436	1030	486	1804
37	38	87	96	137	160	187	234	237	321	287	427	337	561	387	745	437	1038	487	1842
38	40	88	97	138	162	188	236	238	323	288	429	338	564	388	749	438	1046	488	1884
39	41	89	98	139	163	189	237	239	325	289	432	339	567	389	754	439	1054	489	1929
40	42	90	99	140	164	190	239	240	327	290	434	340	570	390	758	440	1063	490	1979
41	43	91	100	141	166	191	241	241	329	291	436	341	573	391	763	441	1071	491	2035
42	44	92	102	142	167	192	242	242	331	292	439	342	577	392	767	442	1080	492	2097
43	45	93	103	143	168	193	244	243	333	293	441	343	580	393	772	443	1089	493	2169
44	46	94	104	144	170	194	246	244	335	294	444	344	583	394	777	444	1098	494	2252
45	47	95	105	145	171	195	247	245	337	295	446	345	586	395	781	445	1107	495	2352
46	48	96	107	146	173	196	249	246	339	296	449	346	589	396	786	446	1116	496	2478
47	49	97	108	147	174	197	251	247	341	297	451	347	593	397	791	447	1125	497	2646
48	50	98	109	148	176	198	252	248	343	298	453	348	596	398	796	448	1135	498	2901
49	52	99	110	149	177	199	254	249	345	299	456	349	599	399	801	449	1145	499	3450
50	53	100	112	150	178	200	255	250	347	300	458	350	603	400	806	450	1155		

D

Appendix E: Special functions

Pressing the button no. 1, button no. 2 or button no. 3 while the switch on procedure of the **MBASS30** system (section 7.1) effects special functions of the **MBASS30** system:

Button no 1
The **MBASS30** controller activates the internal boot-loader program to update the firmware via serial port.

While the bootloader program is running the alarm LED lights, the display is clear and the backlight of the display is off (section 16).

To quit the bootloader program operate the black pushbutton on the back of the device for more than 5 seconds again.

Button no. 2
The **MBASS30** system starts the input / output test program (manual mode) immediately (section 8.11).

To quit this mode press the button "ESC" for more than two seconds.

Button no. 3
Sets the internal debug flag. Is the debug flag set some debug messages will transmit via the interface.

To reset the internal debug flag switch off the **MBASS30** system and switch it on again.
Note:
This mode is for service and maintenance only.

E

Possible errors for the **MBASS30** and remedies are listed in this Appendix.

Error message	Possible remedy
The **MBASS30** will not turn on	Charge the battery. Hold down the pushbutton switch for more than 15 seconds (reset will be triggered), Have the fuses in the device checked.
MBASS30 does not switch off automatically when inactive.	Check the settings to see if the shut-down is defined by time (Section 8.14)

MBASS30 error messages **after** switching on and **before** sampling

Error message	Possible remedy
Config error!	Check and correct the **MBASS30** settings (section 8)
Calibrat. error!	This is described in section 7.9
Battery low! Charge battery	Charge rechargeable battery (section 6.1) or switch **MBASS30** off (section 7.8)
Error Datalogge-rmanagement Serial no. will set to 1	No remedy possible, the internal sampling data memory is being for-matted.
Error F-Sensor!	The flow sensor displays implausible values, send the **MBASS30** in for repair.
Error D-Sensor! (Only for **MBASS30** with optional DUAL sensor)	Disable the DUAL sensor function (sec-tion 8.11). Send the **MBASS30** in for error rectification.

G

MBASS30 error messages **during** sampling

Error message	Possible remedy
Sensordifference! (Only for **MBASS30** with optional DUAL sensor)	After disabling the DUAL sensor function (section 8.11), further samples can be taken. Send the **MBASS30** in for error rectification. Depending on the cause, sample volumes can be corrected later.
Engine error!	If a start-up noise was audible, restart sampling. Otherwise, send the **MBASS30** in for error rectification.
Battery low! Charge battery	Charge rechargeable battery (section 6.1) or switch **MBASS30** off (section 7.8)
No sampler activ	Check whether the collection head is firmly seated on the base. This error message is also displayed, when the **LKS100** collection head is operated with a volume flow rate of 30 l/min instead of 100 l/min.
Airflow blocked!	Check that the air inlet of the collection head is free of obstacles. Check whether the battery voltage is still above 13.8 volts, if necessary, recharge battery. This error message is also displayed, when a collection head (**LKS 30**, **PS 30**, **FA 30**) is operated with a nominal volume flow rate of 30 l/min is operated at 100 l/min.

G

EG – Konformitätserklärung
CE – Kennzeichnung

Nach　　　　EG-Niederspannungrichtlinie Nr. 2006/95/EG

und　EG-Richtlinie　Elektromagnetische Verträglichkeit Nr. 2004/108/EG

Hiermit erklären wir, dass das Produkt Mikrobiologisches Luftprobenahmesystem, Typ: **MBASS30**, aufgrund der Konzipierung und Bauart den einschlägigen, grundlegenden Sicherheits- und Gesundheitsanforderungen der EG – Richtlinie entspricht.

Elektrische Sicherheit:	EN 61010-1	

Elektromagnetische Verträglichkeit:	EN 55011	
	EN 61000-4-2	Nur 4 kV AD (air discharge)
	EN 61000-4-3	

Hersteller:　　　　　　Umweltanalytik Holbach GmbH
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Stellung im Betrieb:　　Geschäftsführer

Unterschrift:

Datum:　　　　　　　21.10.2010

G