

# User manual

## BioMixer BM550

Valid for BioMixer BM550 version 1.01



|      |                             |    |
|------|-----------------------------|----|
| 1    | Introduction.....           | 4  |
| 1.1  | Warranty.....               | 4  |
| 1.2  | Target group.....           | 4  |
| 1.3  | Technical feedback.....     | 4  |
| 1.4  | Version.....                | 4  |
| 2    | Installation.....           | 5  |
| 2.1  | Unpacking.....              | 5  |
| 2.2  | Placement.....              | 5  |
| 2.3  | Connecting.....             | 5  |
| 2.4  | Keyboard.....               | 6  |
| 2.5  | Barcode reader.....         | 6  |
| 2.6  | Clamp.....                  | 6  |
| 2.7  | Check of calibration.....   | 6  |
| 2.8  | Calibration.....            | 7  |
| 2.9  | Cleaning.....               | 7  |
| 2.10 | Transport.....              | 7  |
| 3    | Donation.....               | 8  |
| 4    | Alarm.....                  | 13 |
| 4.1  | Battery alarm.....          | 13 |
| 4.2  | Flow alarm.....             | 13 |
| 4.3  | Time alarm.....             | 13 |
| 4.4  | Over- or underweight.....   | 13 |
| 5    | Errors and events.....      | 13 |
| 5.1  | Communication error.....    | 13 |
| 5.2  | Motor error.....            | 14 |
| 5.3  | Tare error.....             | 14 |
| 5.4  | Calibration error.....      | 14 |
| 5.5  | Battery event.....          | 14 |
| 5.6  | Memory error.....           | 14 |
| 5.7  | Clock error.....            | 14 |
| 6    | Send all donation data..... | 14 |
| 7    | Setup.....                  | 14 |
| 7.1  | General.....                | 15 |
| 7.2  | Donation.....               | 15 |


|     |                               |    |
|-----|-------------------------------|----|
| 7.3 | Donation alarms .....         | 16 |
| 7.4 | Donation volumes .....        | 16 |
| 7.5 | Advanced .....                | 17 |
| 7.6 | Information.....              | 17 |
| 8   | Technical specifications..... | 17 |
|     | Technical data .....          | 17 |

# 1 Introduction

This user manual is valid for BM550. BM550 is hereinafter called BioMixer if not otherwise noted.

## 1.1 Warranty

The manufacturer hereby warrants to the original purchaser that BioMixer is manufactured in a professional and quality manner and, when properly used, will be free from all defects in material and workmanship, for a period of 12 months after delivery from the manufacturer. The warranty includes equipment or components that prove to have faults during the warranty period.

** It is important that the service personnel have been trained and approved by the manufacturer before opening the instrument or making any repair operation, if not, the warranty may be invalid.**

The manufacturer will without cost for the customer, repair or replace the faulty equipment. The warranty is not valid if the equipment has been repaired by anyone else than qualified personnel, approved by the manufacturer. The warranty is not valid for the battery since it is considered to be an expendable supply. The warranty is not valid if the equipment has been changed in any way that according to the manufacturer's opinion, affects the reliability or stability of the instrument. The warranty is not valid when the serial number has been changed, crossed-out or been removed, or if the fault has been caused by misuse or abnormal use. In these cases, the manufacturer or their representative will inform the customer about the decision, and if wished by the client, will repair the equipment for normal rate. An estimated price can be given on request. One important condition for this warranty to be effective is that the BioMixer is used in accordance with the instructions in this technical reference manual.

## 1.2 Target group

This user manual is mainly written for the everyday user. For more detailed information and service information, see the Technical reference manual.

## 1.3 Technical feedback

Abelko Innovation is committed to develop high-quality equipment and technical services to all our customers. We welcome any inputs on technical issues that are encountered so that they can be resolved quickly and in the most appropriate manner. Please submit your comments/feedbacks through your local distributors or alternatively email us directly at [info@abelko.se](mailto:info@abelko.se)

## 1.4 Version

Version 1.01 2019-11-05: First edition of this manual, draft

## 2 Installation

**⚠** The BioMixer is a precision weighing instrument for blood. The BioMixer must be handled with care and the scale should not be exposed to weights over 2000g. The tray should never, under any circumstances, be used for lifting or moving the blood mixer.

### 2.1 Unpacking

Lift the BioMixer up from the box. Make sure that the blood mixer is intact and that all parts are well set. It should be possible to wriggle the tray sideways according to its intended mixing movements.

### 2.2 Placement

In stationary conditions, it is recommended to use BioMixer with BIOLIFT 410 (separate manual). BIOLIFT 410 is a mobile table, with a moving shelf (up and down) designed to fit the BioMixer.

### 2.3 Connecting

The BioMixer can be delivered with different types of communication. How your BioMixer is equipped can be seen on the back of the BioMixer, at its connectors.

If it is equipped with Ethernet, connect to the network using a network cable.

If equipped with RS485, connect to the network using a RJ12 6P6C cable.

If barcodes should be scanned, connect the barcode reader to its connector on the BioMixer marked **USB**. Alternatively, an internal scanner can be used. It is also possible to have both internal and external barcode reader operating in parallel. Always use external barcode readers recommended by the manufacturer. Connection of other barcode readers may damage the reader as well as the mixer.

Make sure that the line voltage is the same as the charger that comes with the BioMixer and also, that the right type of plug is available. Connect the charger in a free socket and to the blood mixer's charger inlet (marked **Power**).

The internal battery is charged as soon as the charger is connected to the BioMixer. The battery status is indicated in the upper right corner on the main menu of the display.

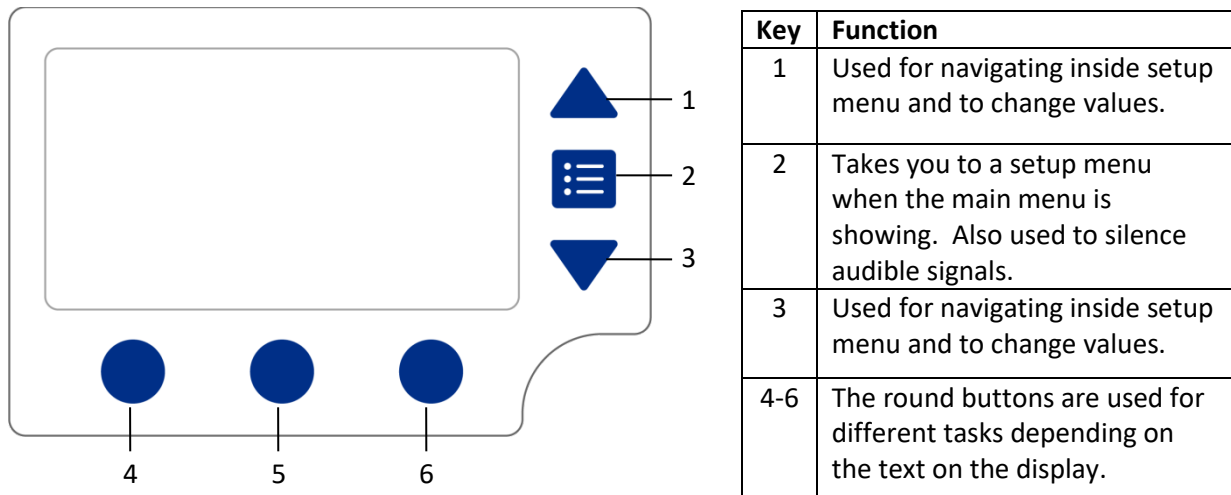
Turn on the BioMixer on the power switch. BioMixer runs a short set-up sequence and when it is finished the main menu is showing on the display. The BioMixer is now ready to be used.



The BioMixer goes to a resting state when it is not being used for a while (see section 6.5.2 for more information on how to change the settings for the resting state). Press any key to switch it on again from its resting state.

## 2.4 Keyboard

The BioMixer has a set of keys for controlling its functions. The same key can be used for different tasks depending on the text on the display.



## 2.5 Barcode reader


If barcodes should be scanned use the barcode reader connected to the BioMixer connector **USB**. The BioMixer can also be equipped with an internal barcode reader located at the front of the display (this is an option for the BioMixer).

## 2.6 Clamp

The clamp which holds the tube in place can have three different status. When open, the tube can be placed in the clamp or removed from the clamp. When closed, the clamp prevents any flow through the tube. When Locked, the clamp allows a flow through the tube during a donation but the tube cannot be removed.

## 2.7 Check of calibration

It is recommended to, on a regular basis check the weighing accuracy of the scale. A sound calibration interval is at least once per week or if the BioMixer is being transported between different type of environments with different type of temperatures.

From the main menu, push the menu-key  and select **Calibration control** in the list. The BioMixer enters a weighing state and show both weight in grams and calculated volume in ml (1ml blood weighs 1.06g). Put a reference weight (available by Ljungberg & Kögel) with 450ml (477g) on the tray. The BioMixer should now be showing 450ml +- 1% (445-455ml). If the calibration is outside these limits, please go to section 2.8.

## **2.8 Calibration**

If the deviation is too big (roughly  $\pm 5$ ml) the calibration can be changed. Remove the reference weight and go back to the main menu and select **Calibrate** from the list. Follow the instructions on the display. Always use a reference weight from Ljungberg & Kögel when calibrating.

## **2.9 Cleaning**

The blood mixer is cleaned by using a mild soap solution or another solution that is non acidic. Bleaching solutions should not be used since this may harm the plastic, making it fragile and start to crack.

The tray should be fixed while cleaning it by holding it firmly but without using any force since this may affect the weighing accuracy. If needed, the tray can be removed by gently sliding it in the direction pointed out by the label on the tray.

## **2.10 Transport**

Always turn the power off during transportation. The BioMixer should be transported in a transport case suitable for BM550 (available by Ljungberg & Kögel).

### 3 Donation

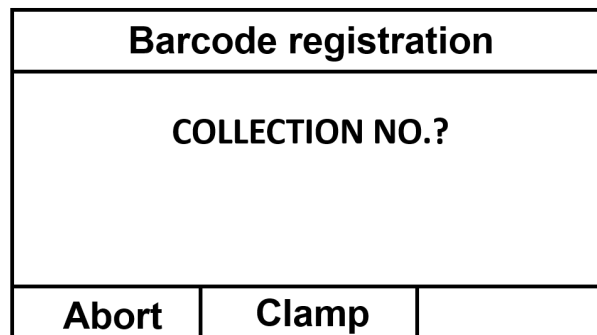
If the BioMixer is in the resting state, push any key to exit the resting state. The main menu will be showing on the display.



- 1 The BioMixer can be configured for scanning barcodes before a donation. If the BioMixer is not configured for scanning barcodes, move on to step 2, else push **Scan**. Please refer to the User's manual for BMCom for information about how to configure the barcodes.



- 1.1 The preprogrammed barcode questions will now be showed on the display one by one. Scan the requested barcodes corresponding to the displayed question text. Use the internal barcode reader located at the front of the BioMixers display or an external barcode reader connected to the BioMixer to the USB outlet. (The text on this part is just an example and may vary depending on the BioMixers preprogrammed questions.).





1.2 When you have scanned all the barcodes the following information is displayed.

|   |              |  |
|---|--------------|--|
| <b>Registration ready</b>                 |              |  |
| <b>Target volume 450ml<br/>Clamp open</b> |              |  |
| <b>Abort</b>                              | <b>Clamp</b> |  |

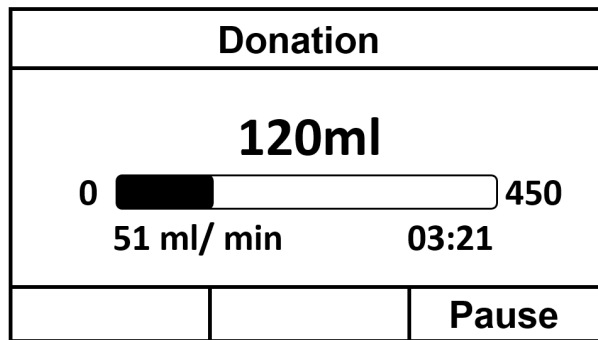
- 2 Place a blood bag on the tray. If a set of bags is being used place the bag, collecting the blood, on top. Do not let any parts of the bags be lying outside of the tray since this may affect the weighing and, in that way, the volume of the donated blood.
- 3 Put the tube in the clamp. Be careful not letting the tube stretch between the blood bag and the clamp. Close the clamp by pushing **Clamp**.

|   |              |              |
|---|--------------|--------------|
| 🕒 12:40                                   | 70% 🔋        |              |
| 📅 21/8-2019                               |              |              |
| <b>Target volume 450ml<br/>Clamp open</b> |              |              |
|   | <b>Clamp</b> | <b>Start</b> |

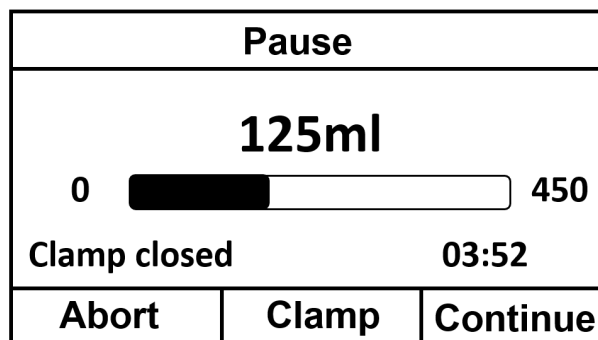
- 4 The blood mixer is now ready to be used. Push **Start** in order to start the donation. The BioMixer will now tare the weight of the blood bag, open the clamp and start the donation.

|                    |  |  |
|--------------------|--|--|
| <b>Taring</b>      |  |  |
| <b>Please wait</b> |  |  |
|                    |  |  |


- 5 The donation can be temporary paused by pushing **Pause**.



- 5.1 During Pause, you can operate the clamp or abort the collection. If enabled, you can also change volume by using the arrow-buttons on the right. To continue the donation, push **Continue**. To cancel the donation, push **Abort** and confirm by pushing **Yes**.




- 6 Two different types of alarms can be activated during a donation; time alarm and flow alarm. The alarms are declared by an audio signal and by blinking the corresponding value.

The audio signal can be turned off by pushing the menu-key  to the right.

**Time alarm:** The donation takes longer than the preselected time limit (see section 6 on how to change the settings of the alarm). The time alarm will be active during the rest of the donation. If silenced, it will sound again when the time limit is reached once again.

**Flow alarm:** The blood flow is higher or lower than the preselected flow limits. The alarm is deactivated as soon as the flow is within limits.


- 7 When the volume is starting to reach the SET-volume the BioMixer stops moving and waits for the right volume to be reached. When the SET-volume is reached the BioMixer automatically closes the clamp, starts to move continuously and activates an audio signal. Push **Finalize** to turn off the alarm.

|                     |   |                 |
|---------------------|---|-----------------|
| <b>Complete</b>     |   |                 |
| <b>450ml</b>        |   |                 |
| 0                   |  | 450             |
| <b>Clamp closed</b> | <b>08:13</b>  |                 |
|                     |   | <b>Finalize</b> |

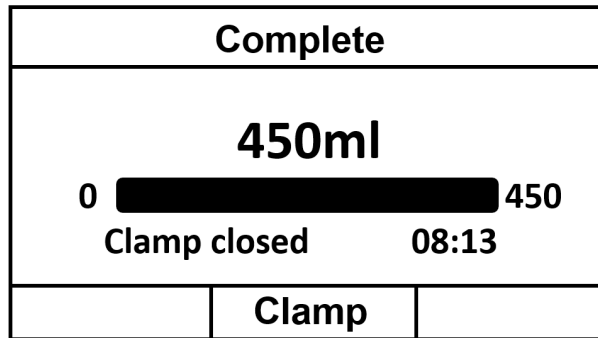
- 7.1 The BioMixer can be configured for scanning barcodes after a donation. (Please refer to the User’s manual for BMCom). The preprogrammed barcode questions will then be showed on the display one by one. Scan the requested barcodes corresponding to the displayed question text. You can use either the internal or external barcode reader. (The text on this part is just an example and may vary depending on the BioMixers preprogrammed questions.)

|                        |               |              |
|------------------------|---------------|--------------|
| <b>Donation</b>        |               |              |
| 51 ml/min              | <b>450 ml</b> | 03:21        |
| <b>Collection no.?</b> |               |              |
|                        |               | <b>Pause</b> |

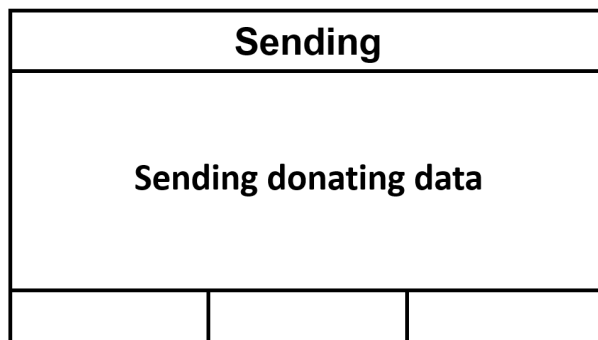
- 7.2 When you have scanned all the barcodes the display goes back to show a status bar.

|                     |   |     |
|---------------------|---|-----|
| <b>Complete</b>     |   |     |
| <b>450ml</b>        |   |     |
| 0                   |  | 450 |
| <b>Clamp closed</b> | <b>08:13</b>  |     |
|                     | <b>Clamp</b>  |     |

- 8 Push **Clamp** which will open the clamp and end the donation.



8.1 If the BioMixer is preset to send the stored information to a PC, it will start to send the donating data.



9 The donation is now complete, and the main menu will be displayed.



## 4 Alarm

A couple of alarms can be activated by the BioMixer and the most common ones are listed here. For more information about the different alarms, see the Technical reference manual. Active alarms will be both audible and visual. The audible alarm can be adjusted between 0-100%.


### 4.1 Battery alarm

Is activated if the battery voltage is too low for being able to use the BioMixer in a safe way.

Change the battery or connect the charger. New batteries are available by Ljungberg & Kögel.


### 4.2 Flow alarm

Is activated if the blood flow during a donation goes over or under the limits that are preset for the alarm (see the Technical reference manual for more details on how to change the limits for the alarm). Both high and low flow alarms can be set in the range 0-999 ml/min.

The alarm is restored automatically when the flow goes back within the preset limits. The audio signal can be turned off by pushing the menu-key  to the right. Please note that if the flow goes back to normal values and then again goes outside of the preset limits the alarm is activated again.

### 4.3 Time alarm

Is activated if a donation takes longer than the preselected time limit (see the Technical reference manual for more details on how to change the settings for the alarm). Valid limits for this alarm is 0-99 min. The user should adjust the time of blood collection depending on state regulation, norms etc.

The audio signal can be turned off by pushing the menu-key  to the right.

### 4.4 Over- or underweight

It may happen that the tray by accident is overloaded with too much weight. If this happens the display will show the text **>999**, which means the volume is more than 999ml.

It may also happen that the tray is loaded with too little weight; for example, if a set of blood bags are removed before the donation is finished. If this happens the display will show a negative volume down to **-99ml**.

If **>999** or **-99ml** is showing on the display when the tray is empty it may be due to the exposure of a heavy weight and the calibration must be checked (for more information, see section 2.6 or the Technical reference manual).

## 5 Errors and events

### 5.1 Communication error

There was a communication error when sending data to the host PC. The data will however still be stored in the internal memory of the mixer. Once the connection is reestablished, the data can be sent.

## 5.2 Motor error

The motor controlling the mixing is either blocked or broken. Check if something is jamming the tray or refer to the Technical reference manual for more information.

## 5.3 Tare error

Automatic tare deduction is always done before collection. If this fails an error message is given with an error message and sound. Collection cannot proceed. Check that the tray is in its weighing position and moves freely. Also make sure that a tare calibration has been performed.

## 5.4 Calibration error

If a calibration has not been made a calibration error is active. If active, a calibration is needed.

## 5.5 Battery event

The battery capacity is too low to allow start of a new donation. Connect a charger to recharge the battery.


## 5.6 Memory error

Stored data from collections are checked at power on. This data is stored in a nonvolatile memory and if data for some reason has been lost or damaged, Memory error is displayed.


## 5.7 Clock error

The clock error is active when the clock is not properly set. This can be caused by a change of battery, after which the clock needs to be reset. Please refer to section 6.1.2 for information about how to set the clock.

# 6 Send all donation data

From the main menu, push the menu-key . Here you can find the feature **Send all donation data**. This feature will send all collection data that has been stored in the memory. This is handy if the information is lost, i.e. collection has been sent to a USB-memory and the USB-memory is lost. Note that ALL data in the memory will be sent, even data that has already been sent.

# 7 Setup

Settings of alarm limits and other functions are done in the **Setup**-menu. From the main menu, push the menu-key  and select **Setup** in the list.

The setup-menu is divided into six submenus: **General**, **Donation**, **Donation alarms**, **Donation volumes**, **Advanced** and **Information**. Navigate by using the arrow-buttons to the right and enter a menu by pushing **Select** or the menu-key. The menu-key can always be used as a **Select**-button when you are operating in the setup-menu.

## 7.1 General

### 7.1.1 Language

Set the desired language by pushing **Select** and then use the arrow-buttons on the right. Confirm by pushing **Save**. There are two different language options available:

- English
- Swedish

Other languages can be added on request.

### 7.1.2 Time

BM550 has a real time clock for precise time registration. Set the minute, hour, year, month and day by using the arrow-buttons to the right and push **Next**. Confirm the settings by pushing **Save**.

### 7.1.3 Daylight saving time

The daylight saving hour can be set to either US or EUR, or be disabled. If selected, the clock will automatically be adjusted at dates for the daylight saving hour according to:

**EUR:** Increment hour the last Sunday of March, and decrement hour the last Sunday of October.

**US:** Increment hour the second Sunday of March, and decrement hour the first Sunday of November.

**None:** Daylight saving hours is disabled.

### 7.1.4 Date format

If set to **mm/dd**, the date format will be mm/dd yyyy. If set to **dd/mm** the date format is dd/mm YYYY.

### 7.1.5 Calibration interval

This setting will not allow a start of a new collection if the number of days since the last calibration check has exceeded. If this value is set to 0, the feature is disabled.

### 7.1.6 Time to sleep

Number of minutes before the BioMixer goes into sleep mode. If set to 0 the mixer will never go into sleep mode. It is recommended to enable the sleep function if no charger is connected to save power. If the mixer is in sleep mode, simply press any button to wake it up.

## 7.2 Donation

### 7.2.1 Donation menu unit

Units that can be used to indicate the donation is **ml**, **%** or **ml (g)**.

### 7.2.2 Change vol. during donation

If set to **Yes**, the SET volume can be changed during a donation by pressing Pause. Use the arrow-buttons on the right to change the volume.

### 7.2.3 **Disinfection timer**

The disinfection timer is activated when all barcodes has been scanned. The mixer will countdown from the selected value and when it reaches zero, the donation might be started.

### 7.2.4 **Store bag tare weight**

If this setting is set to **Yes**, the tare weight of the blood bags will be stored in the collection data.

### 7.2.5 **Send donation data to**

Set to which unit you want the donation data to be send. Choose between the expansion port or USB memory depending on your working process and available unit. If **None** is selected, the donation data will be discarded.

### 7.2.6 **Send donation data automatic**

If set to **Yes**, the data will be automatically sent when a collection is ready. If set to **No**, the data will still be stored in the internal memory for later transmission.

### 7.2.7 **Data overwrite warning**

If this feature is enabled, a warning will be displayed if collection data that has not been sent will be overwritten by the next collection.

## 7.3 **Donation alarms**

### 7.3.1 **Min volume flow alarm**

The minimum volume for flow alarm is used in conjunction with the low and high flow alarm. Low and high flow alarm are disabled if the collected volume is less than this minimum volume.

### 7.3.2 **Alarm limit flow LOW**

If the flow rate in ml/min is less than the low flow alarm limit an alarm will sound.

### 7.3.3 **Alarm limit flow HIGH**

If the flow rate in ml/min is higher than the high flow alarm limit an alarm will sound.

### 7.3.4 **Alarm limit donation time**

If a collection exceeds the time alarm limit an alarm will sound.

### 7.3.5 **Abort donation on time alarm**

If this is set to **Yes** a collection is aborted if the time alarm goes active.

## 7.4 **Donation volumes**

### 7.4.1 **Number of donation volumes**

Choose the number of set volumes that can be programmed. Up to nine volumes can be programmed.

### 7.4.2 **Donation volume 1-9**

Set the donation volumes that can be selected by using the arrow-buttons on the right before a donation.



## 7.5 Advanced

### 7.5.1 Mixing speed

Select the speed of the mixing motor controlling the tray. Select a value between 0-20 cycles/min. The default value of 15 has been proved to work well for most bag systems, however local regulations might demand other settings.

### 7.5.2 Backlight intensity

Here you can set the display's backlight intensity, a value between 0-100 %.

### 7.5.3 Sound signal OK

Here you can choose which alarm signal you want to have for the Ok signal.

### 7.5.4 Sound signal Error

Here you can choose which alarm signal you want to have for the Error signal.

### 7.5.5 Sound level

The sound level of the speaker for the alarms is set with a value between 0-100 %. Setting a value less than about 5 % can cause the speaker to cease.

### 7.5.6 Activate barcode reader

If **Forced scanning** is selected, a donation cannot be started without scanning barcodes. If **No scanning** is selected, a donation is started without scanning barcodes.

### 7.5.7 Barcode configuration

Here you can configure and/or retrieve the barcode information, i.e. the scanning sequence and text to display for each question. Please refer to the User's manual for BMCom for more information.

## 7.6 Information

Under Information you find system information, for example version and which expansion port the system is equipped with.

# 8 Technical specifications

## Technical data

| Parameter                        | Value  | Note |
|----------------------------------|--|------|
| <b>Power supply</b>              | Mains adaptor, 100-240VAC, BM550, 24V/30W (also operates as a battery charger)<br>Internal battery, Li-Ion, 10.8V/2.6Ah for approximately 12 hours operation between charges |      |
| <b>Power consumption</b>         | Max 30VA   |      |
| <b>Fuses (built in)</b>          | PTC (self-recovery for overload protection)  |      |
| <b>Collected volume</b>          | (Collected blood) 0-999ml  |      |
| <b>Accuracy</b>                  | <1% of max weight $\pm$ 1ml  |      |
| <b>Tare range</b>                | 0-600g   |      |
| <b>Mixing cycle</b>              | Selectable between 10-20 cycles/min  |      |
| <b>Internal data storage for</b> | 32.000 characters or a minimum of 80 collections   |      |

|   |   |                         |
|---|---|-------------------------|
| <b>donations</b>  |   |                         |
| <b>External data storage for donations</b>                | USB mass storage device. USB Type A. FAT32 Filesystem                                     | USB-memory not included |
| <b>Tube clamp operation</b>                               | Tube sensing  |                         |
| <b>Mixing tray operation</b>                              | BLDC-motor  |                         |
| <b>PC connection</b>                                      | USB Micro-B for programming   |                         |
| <b>Network connection</b>                                 | RS485, 6/4 modular or Ethernet  | Optional                |
| <b>Barcode reader connection</b>                          | Internal (laser) or external USB Type A   | Optional                |
| <b>Relative humidity incl. storage and transportation</b> | 10-95% not condensing   |                         |
| <b>Operating temperature</b>                              | +10 - +40°C   |                         |
| <b>Storage and transportation temperature</b>             | -40 - +70°C   |                         |
| <b>Dimensions</b>   | Mixer unit: 320 (L) x 180 (W) x 150 (H) mm<br>Display unit: 145 (L) x 110 (W) + 45 (H) mm |                         |
| <b>Weight</b>   | 2kg   |                         |
|   |   |                         |