Manual

Bröring EggQuality

System 3.0

Table of Contents

Deutsch

Deutsch (FEST)

English

English (FEST)

1 Hardware

Please take all standard safety precautions when operating the EggQuality-System. The measuring device is electrically connected to the housing of the PC. This PC has to be in perfect technical condition. A defective PC or AC outlet can potentially cause hazardous voltages at the measuring devices. If there are any doubts about the installation, please consult a qualified electrician.

The data generated by this system is only as accurate as the previously conducted calibration. Incorrect calibration may lead to significant errors in measurement. It is important to use the utmost precision when carrying out the described calibration. For instructions on how to perform a calibration please refer to chapter 2.5.2.

1.1 Connecting the Mini-Data-Processor

1: Serial port for the electronic scale

2: Port for Albumen-Height-Gauge

3: Mini-USB connection to PC
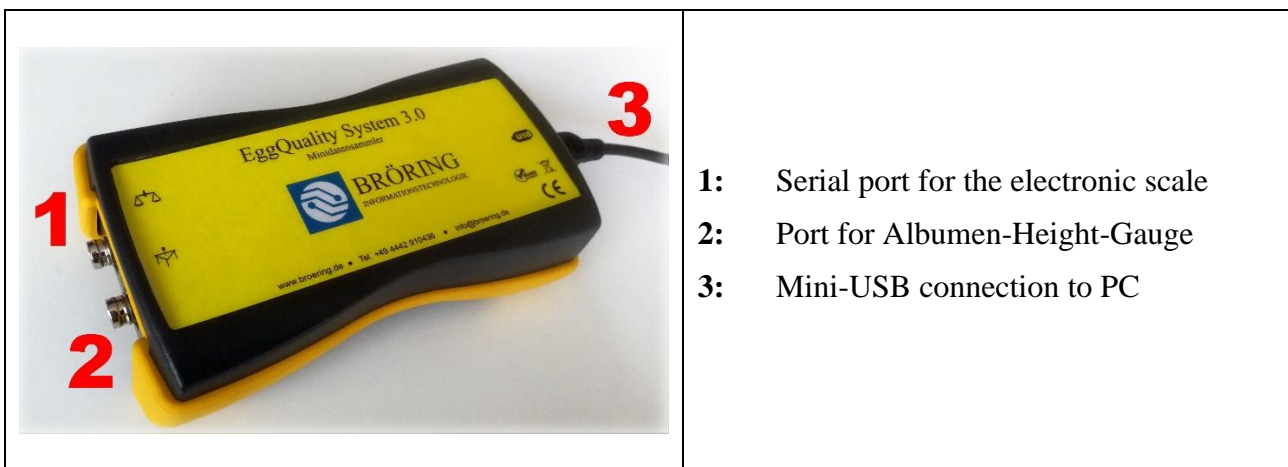
1.2 Installation EggQuality System 3.0

First connect your PC to the Mini-Data-Processor using the detachable Mini-USB cable. In the Windows device manager the Mini-Data-Processor will be listed as a virtual COM port.

Then connect the electronic scale to port 1. The last step is to connect the albumen-height-gauge to port 2 of the Mini-Data-Processor.

Additional devices such as the Egg-Shell-Tester FEST or the colorimeter BCOR can be connected directly to the PC using USB or serial interface.

2 Software

This chapter describes the installation and use of the EggQuality-System software.

2.1 Installation

Insert the included USB stick into your PC. The USB stick contains drivers, instructions, tools and brochures. To install the software start the "EggQuality_Setup.exe". A window will appear and an install wizard will guide you through the EggQuality installation. First select a language for the install wizard.

Click "Next >" and follow the instructions of the install wizard.

It is recommended to use the default installation path. The default installation path is "Broering\EggQuality" located on your system drive, e.g. drive C.

When the installation process is completed successfully, the program is ready to be started. If there are any problems during the installation, please contact the support.

For your convenience the devices are preconfigured in the software and do not need to be adjusted.

But it is crucial to adjust the COM Port of the Mini-Data-Processor and other measuring devices connected directly to the PC. After that you have to calibrate all devices before use.

The adjusting of the COM Port is described in chapter 2.4.2.

If there are any questions during the installation or operation of the program, please contact:

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Gewerbering 4
49393 Lohne
Deutschland
Phone: +49 4442 910436
E-Mail: info@broeringtech.com
www.broeringtech.com

English

2.2 Starting the program

First check if all the equipment is supplied with electricity and turned on, then start the program. After starting the program first time, you will see the following screen. The program configures all connected measuring devices. If a device is not automatically detected, check the adjusting of the COM Port in chapter 2.4.2.
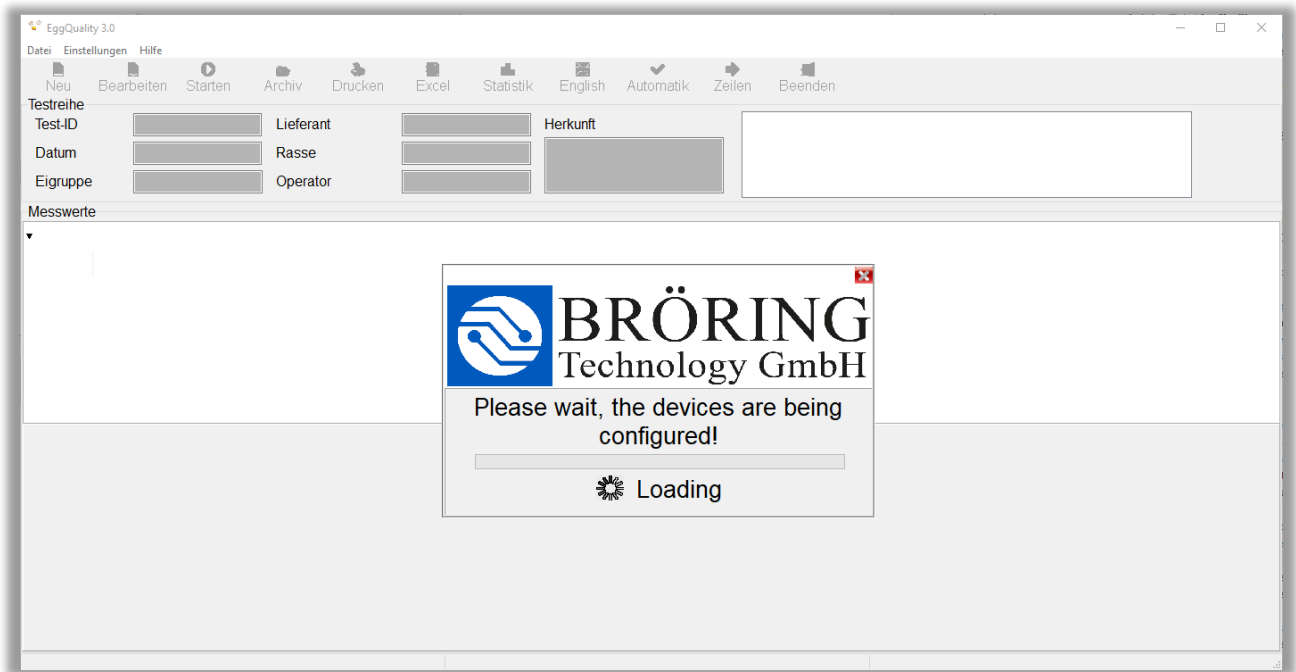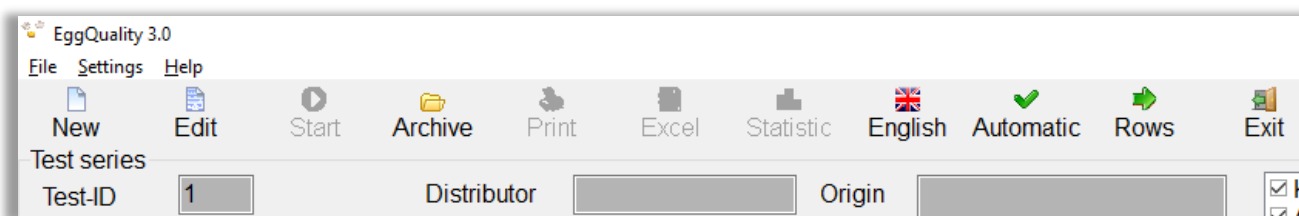
The top part of the window contains two menu bars. The upper menu bar contains the following elements:

File: New test series, Data backup, Print or Exit program

Settings: Setup devices or select language

Help: View Manuals and show information about the program

The lower menu bar contains the following elements:

New: Create a new test series

Edit: Edit the active test series

Start: Start measuring cycle

Archive: Open existing/archived test series

Print: Print the current test series

Excel: Export data to a CSV file

Statistic: Display statistics

English: Set program language to English

Automatic: Start/end automatic mode

Rows/Columns: Switch between row- and column-measurement

Exit: Exit the program

English

2.3 Program operations

2.3.1 Create or edit a new test series

To create a new test series, click on "New" in the menu bar or press the "F5" Key. This opens the following window:

After the necessary information has been entered, it can be saved by clicking the "Save" button. Afterwards the measurements for the new test series can begin. The selection of the supplier is described in section 2.4.4.

Clicking the "Delete" button will erase all inputs and new values can be entered.

The "Abort" button closes the window without saving the changes.

2.3.2 Types of measurement

Two different types of measurement can be selected.

The **automatic mode** controls how and when the individual measurements are performed. If the automatic mode is active, the readings from the devices are automatically accepted. For example, if an egg is placed on the electronic scale, the system will read the weight without further confirmation by the user. If the automatic mode is disabled, the user has to press the "Measure" button to trigger the measuring of the weight.

In addition, there are two types of measurement sequences. The system distinguishes between row measurement and column measurement.
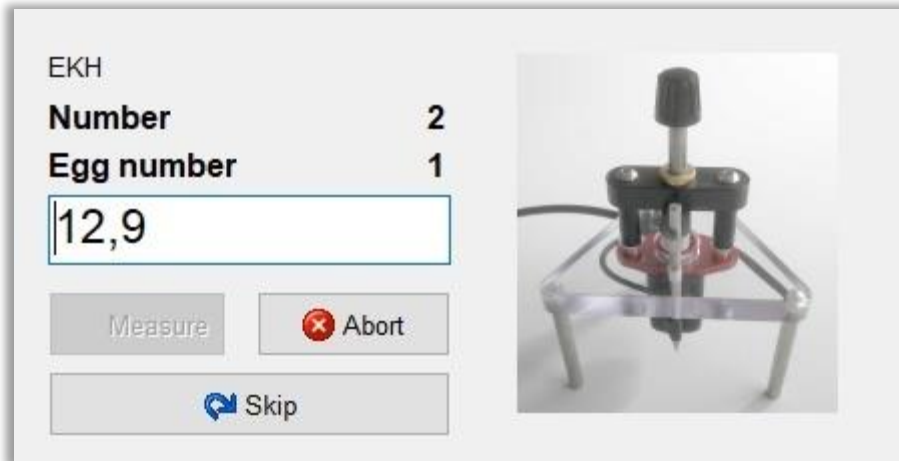
When **row measurement** is active, the system will switch from device to device and measure a single egg at all measurement devices before proceeding with the next egg. This is the standard setting.

If **column measurement** is selected the measurement proceeds vertically, meaning that at first the measurements of the selected device are performed for all eggs. After the device recorded the value of an egg, the next egg can be measured in the same device. To start a column measurement, the column of the device has to be selected first.

2.3.3 Starting a measurement

The measurement is started by clicking on the "Start" button. This requires either a new test series to be created (see Section 2.3.1) or an already started test series to be loaded from the archive and continued (see Section 2.3.5). The measurement is performed using the previously set options (see 2.3.2 Types of measurement). The order of the devices depends on the settings of the devices (see 2.5.1).

During the measuring process the following section (in this example the albumen-height-gauge) appears in the bottom of the screen:
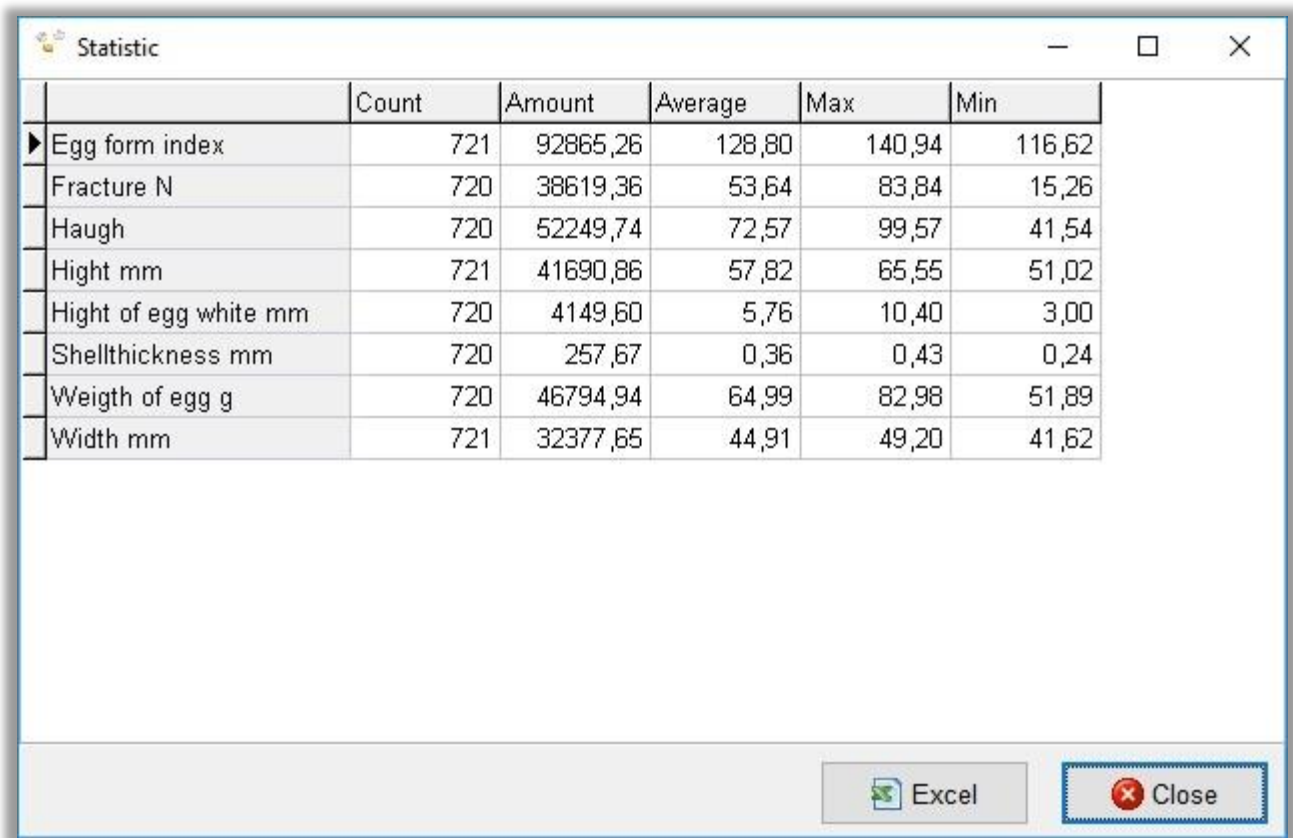
- **Number:** If the number input is enabled (refer to 2.4.1), a cage number can be entered, which is displayed here

- **Egg number:** Number of the egg currently being measured. It is based on the hen count (can be entered while creating a new test series)

- **Value:** The current measurement value is displayed in the white field

- **"Measure":** *Automatic mode enabled:* The button is disabled. The measurement is triggered automatically

  Automatic mode disabled: The button is enabled. Every measurement has to be triggered by clicking on the button

- **"Abort":** Aborts the measurement

- **"Skip":** The pending measurement will be skipped and possibly executed later

All recorded measurement values are displayed in the table in the main window.

2.3.4 Statistic

The following graphic shows an example of the statistical analysis of the current measurement series:

	Count	Amount	Average	Max	Min
▶ Egg form index	721	92865,26	128,80	140,94	116,62
Fracture N	720	38619,36	53,64	83,84	15,26
Haugh	720	52249,74	72,57	99,57	41,54
Hight mm	721	41690,86	57,82	65,55	51,02
Hight of egg white mm	720	4149,60	5,76	10,40	3,00
Shellthickness mm	720	257,67	0,36	0,43	0,24
Weigth of egg g	720	46794,94	64,99	82,98	51,89
Width mm	721	32377,65	44,91	49,20	41,62

The statistics and their corresponding values are displayed for every type of measurement in the column on the left-hand side. The number of measurement categories can vary.

By clicking the "Excel" button it is possible to save the displayed data into an **CSV file** in order to process it further. This file is generated by the EggQuality Software. No Microsoft® Excel® or similar software needs to be installed on your PC. Additional software is only needed to open the exported file later.

2.3.5 Archive

The archive can be opened from the main window by clicking on the "Archive" button. This will open the following window:

The Archive window lists all available test series. These can be processed by the icons in the title bar.

The button "New" creates a new test series as described in section 2.3.1.

In addition, test series can be edited, deleted, exported or printed.

All data from the archive can be exported to a CSV file, using the "Excel" button.

You can also select several test series by pressing CTRL while left clicking the desired test series and export, print or delete them with the right mouse button.

The white input boxes in the "Search" area can be used to filter the archive according to various criteria.

By double-clicking on the desired test series in the archive, it can be resumed to perform further measurements. The archive window is then closed and the data is transferred to the main window.

2.3.6 Print

The "Print" function prints the currently selected test series with all its data. A window opens after pressing the "Print" button showing a preview of the page and options to select and to configure a printer.

2.4 Settings

The settings are accessed via the top menu item "Settings". The individual options (measuring devices, language and distributors) are explained below.
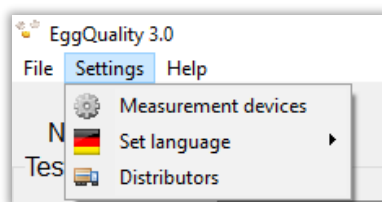
2.4.1 Measurement device settings

The following window opens when selecting the item "Measuring devices" in the settings menu:
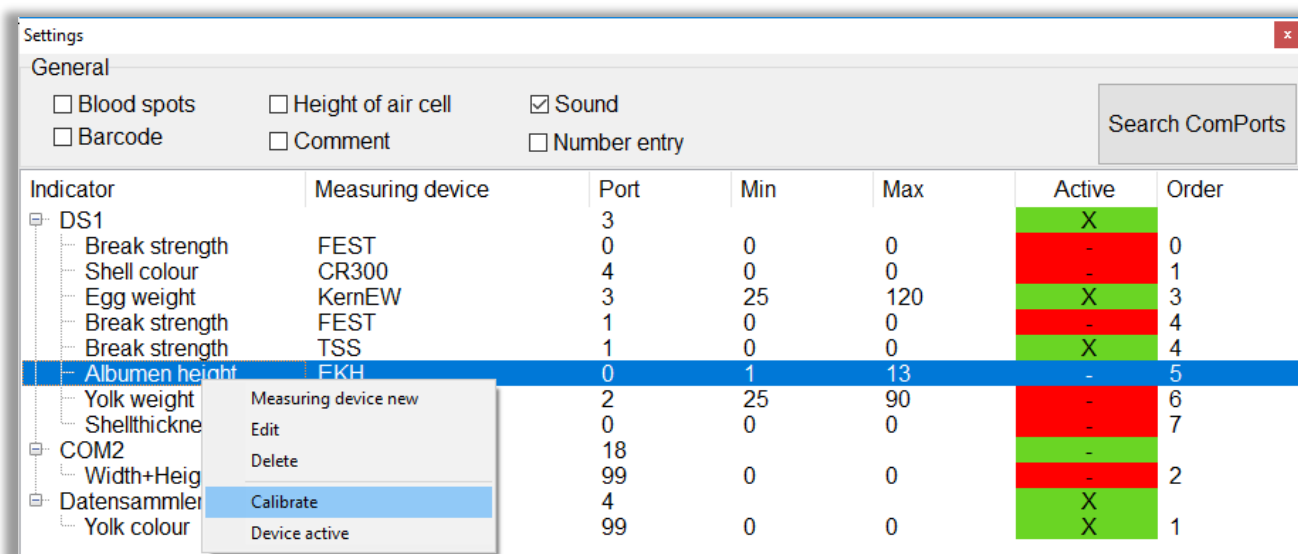
This is where basic settings are made for the operation of the system. Settings not related to a specific device can be configured within the "General" area:

- **Blood Spots:**   Allows to manually enter the number of blood spots

- **Height of air cell:** Allows to manually enter the air cell height

- **Sound:**   Allows to disable the confirmation sound after each measurement

- **Barcode:**   Allows to scan barcodes on an egg with a barcode scanner.
  Without a barcode scanner information can be entered manually.

- **Comment:**   Allows to manually enter a comment

- **Number entry:**   Allows to manually enter a number entry.
  For example, it could describe the number of a cage. Only positive whole numbers can be entered.

- **Search ComPorts:** Automatic configuration of the measuring devices. For this, all devices must be connected and switched on.

Right-clicking on the device list opens a menu, in which the available functions are listed. Individual devices can be edited, deleted or calibrated and new devices can be added. The procedures are described in chapter 2.5.

2.4.2 Change COM Port of the Mini-Data-Processor

The COM port to which the Mini-Data-Processor is connected can be changed in the settings window of the measuring instruments (2.4.1). To do this, click with the right mouse button on the entry of the data processor and select "Edit". A new window opens in which the COM Port of the Mini-Data-Processor can be edited.

Change these settings only if you know the serial ports of your PC, after looking up the "Ports (COM & LPT)" section in the device manager of your computer or after contacting support.

2.4.3 Select language

The language used in the software can be changed here. All available languages are displayed in a new menu by clicking on "Settings" → "Set language".

To quickly switch the programs language to English, press the "English" button in the menu bar of the main window.
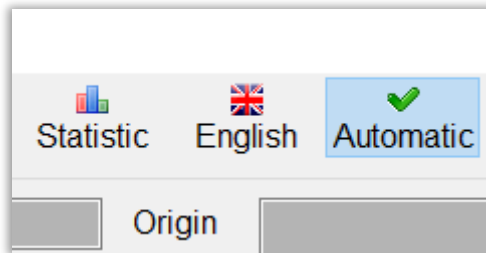
2.4.4 Distributors
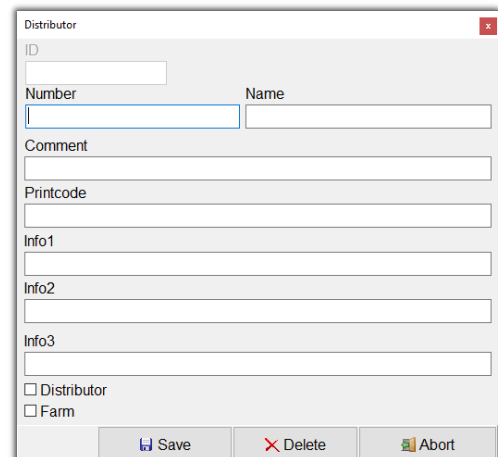
Click on the "Distributors" menu item to open the following window:
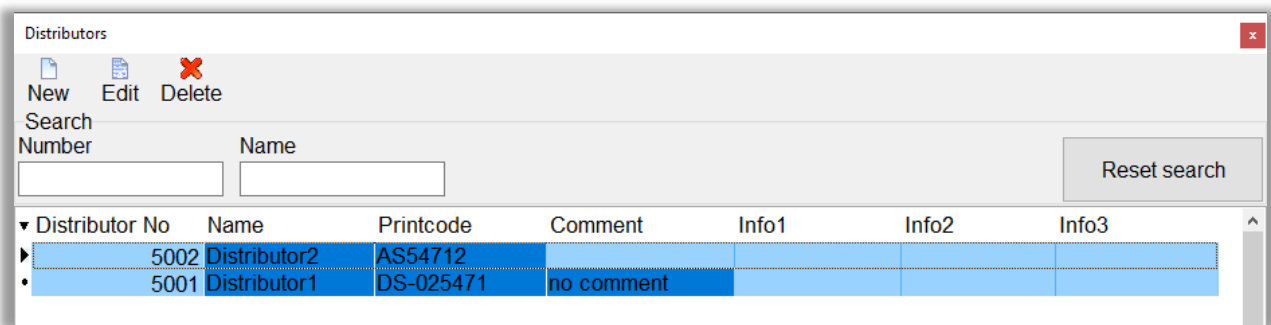
All created distributors are listed in the window. These can be processed using the icons in the title bar.

The distributors list can be filtered according to various criteria using the fields in the "Search" area.

The distributors can be created or edited using the "New" or "Edit" button.
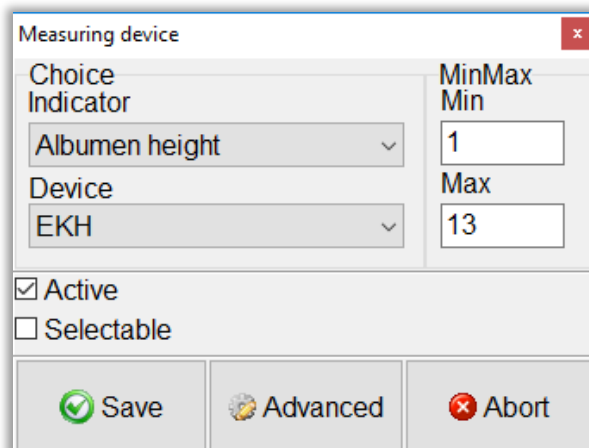
2.5 Measurement devices

The EggQuality software can work with different combinations of measurement devices. These devices may need to be configured in the program. This will be described below.
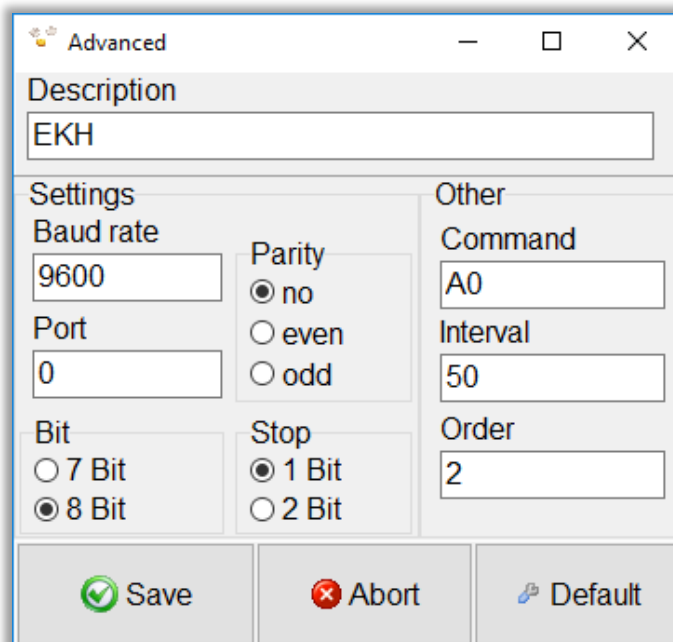
2.5.1 Create and edit

A new measurement device can be created in the "Settings" window. Click with the right mouse button into the blank space of the white table and select the item "New measuring device" in the menu. This opens the following window:

- **Indicator:**   E.g. albumen height, egg weight, egg shell strength etc.
- **Device:**   Selection of the device used to measure the indicator
- **Min:**   Minimal value accepted during measurement
- **Max:**   Maximal value accepted during measurement
- **Active:**   If the checkmark is set, the device will be used immediately in the next test series
- **Selectable:**   If the checkmark is set, the device can be enabled or disabled in the main window in the top right.

The advanced settings are opened using the "Advanced" button. Here the settings for the communication between a measuring device and the PC can be configured. These values are pre-set. Change these settings only after contacting the technical support.

2.5.2 Calibration

For precise measurements, some equipment must be calibrated prior to use. This process is explained in the following chapters. To start the calibration mode of a device, click on "Settings" in the title bar and then on "Measuring devices". Then right-click on the device to be calibrated and select the menu item "Calibrate".

On our YouTube channel "Broering IT" you can find videos showing the calibration of the measuring devices.

URL: https://www.youtube.com/user/BroeringIT/

2.5.2.1 Albumen/Yolk height gauge

The Mini-Data-Processor converts a voltage measured at the albumen/yolk height gauge into a digital value. This value is transferred to the PC and the program.
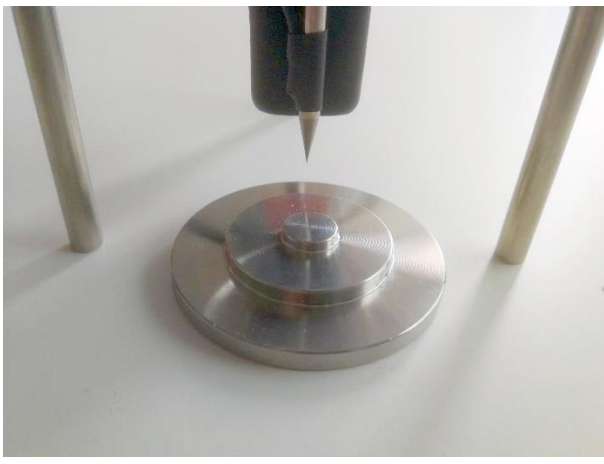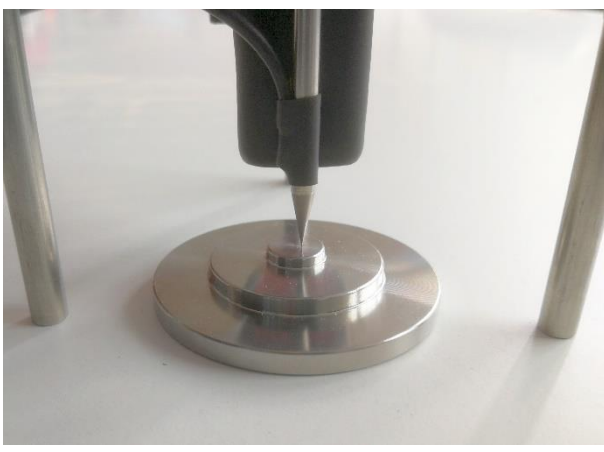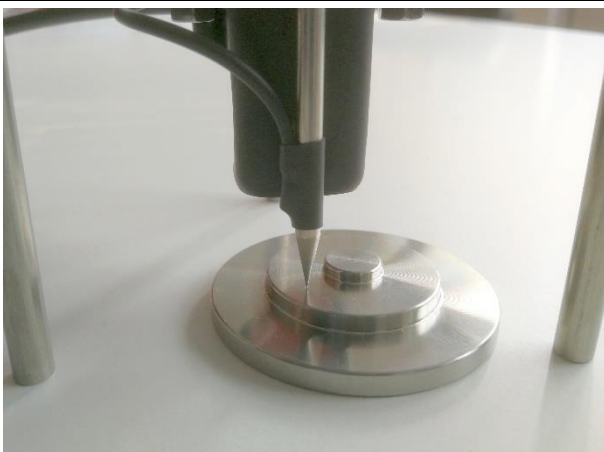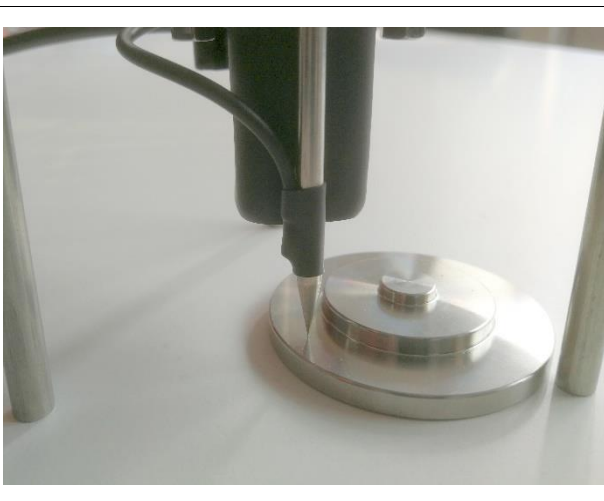
To determine the correct albumen/yolk height, the albumen/yolk height gauge must be calibrated. The calibration should be repeated periodically, e.g. every 2 months. In addition, a calibration should be performed after every relocation, transport, software reinstallation, repair, cleaning etc.

Required for the calibration of the albumen/yolk height gauge is:

- The albumen/yolk height gauge
- The Mini-Data-Processor
- For albumen
    - The calibration plate (4 mm, 7 mm, 9 mm steps)
- For yolk
    - The calibration elements (17 mm, 20 mm, 22 mm)
- A flat work surface (e.g. the worktable)
- PC with the installed EggQuality software

If necessary clean all the equipment used (especially the worktable, the albumen/yolk height gauge and the calibration plate/elements).

Place the calibration plate/elements on the work table and place the albumen/yolk height gauge next to it.

English

1		First, you will be asked to bring the albumen/yolk height gauge to resting position. The measuring tip is in the highest position and not touched. Then confirm by pressing "Measure" in the EggQuality software. If you receive an error message at this point, the communication between the PC and the Mini-Data-Processor may not work properly.
2		You will then be prompted to move the probe tip to the **top** level of the calibration plate, for the yolk the 22 mm element. Place the probe accordingly and press the probe tip to the topmost position of the calibration plate, for the yolk the 22 mm element. Confirm by pressing "Measure" in the EggQuality software **while** the tip touches the plate.
3		Next, you will be prompted to place the probe tip on the **middle** level of the calibration plate, for the yolk the 20 mm element. Proceed in the same way as in Pos. 2.
4		Finally repeat the process with the **lowest** level, for the yolk the 17 mm element. Now the albumen/yolk height gauge is calibrated. You can test the proper function and calibration by measuring each level of the calibration plate. Compare the displayed values with the level heights of the calibration plate or another comparison measure: • top level: 9.00 mm (22,00 mm) • middle level: 7.00 mm (20,00 mm) • lowest level: 4.00 mm (17,00 mm) The deviations should be less than ± 0.02 mm.

2.5.2.2 Yolk colour sensor BCOR

To determine the correct yolk colour, the colorimeter has to be calibrated. The calibration should be repeated every day. In addition, the calibration should be performed after each relocation, every shipment, software reinstallation, repair, etc.

Required for the calibration of the colorimeter is:

- The colorimeter
- The yolk colour fan
- The black / white calibration plate

First put the black and white calibration plate with the black side down over the colour sensor and click on "Next".

Step1 Black Balance			Step2 White Balance		
Intensity 8274		L* 29,99	Intensity 35702		L* 96,81
Red 2912		a* -6,45	Red 12382		a* -21,42
Green 2680		b* 38,57	Green 11858		b* 94,24
Blue 2571		Roche 0,0	Blue 11183	back / next	Roche 0,0
back / next			✔ B 8282 2915 2682 2574		
Save	Abort		Save	Abort	

The next step is to measure the colour fan samples 1 to 15.

Step 3 FAN 1			Step 17 FAN 15		
Intensity 18053		L* 96,81	Intensity 16647		L* 66,83
Red 7358		a* -21,42	Red 8726		a* 42,72
Green 6019		b* 94,24	Green 4359		b* 73,84
Blue 4442	back / next	Roche 0,0	Blue 3653	back / next	Roche 0,0
✔ W 18073 7368 6025 4446			✔ F14 10701 3631 3538 3371		
Save	Abort		Save	Abort	

To do this, place the fan 1 to 15 one after the other on the sensor and click on "Next". After all fans have been calibrated, you must complete the calibration by clicking on "OK".

Information ×

(i) Calibration completed successfully!

OK
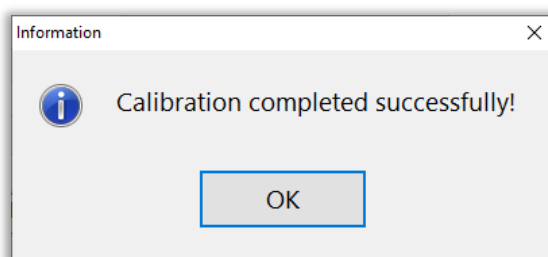
2.5.2.3 Shell colour sensor SCOR

To determine the correct shell colour, the colorimeter has to be calibrated. The calibration should be repeated every day. In addition, the calibration should be performed after each relocation, every shipment, software reinstallation, repair, etc.

Required for the calibration of the colorimeter is:

- The colorimeter
- The black calibration card
- The white calibration card

First place the colorimeter on the black calibration card and press the red button on the device. Then repeat this with the white calibration card.

Intensity	**Step1**	L*		Intensity	**Step2**	L*
8274	**Black Balance**	29,99		35702	**White Balance**	96,81
Red		a*		Red		a*
2912		-6,45		12382		-21,42
Green		b*		Green		b*
2680		38,57		11858		94,24
Blue		Roche		Blue	⟵ back ⟶ next	Roche
2571		0,0		11183		0,0
	back ⟶ next			✔ B 8282 2915 2682 2574		
	Save	Abort			Save	Abort

The calibration is completed by clicking on "OK".

> **Information**   ✕
>
> ⓘ Calibration completed successfully!
>
> **OK**
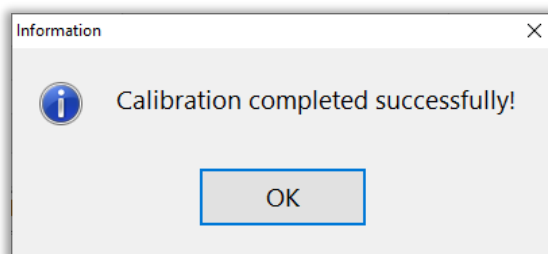
2.5.2.4 Fast-Egg-Shell-Tester

For information on calibration of the Fast-Egg-Shell-Tester (FEST) please refer to chapter 6.7 of this manual.

2.5.2.5 Other devices

For information on the calibration of other devices please refer to the corresponding manuals.

2.6 Uninstall

To uninstall the EggQuality software, select "Uninstall" from "EggQuality" in the Windows Start menu.

Alternatively, you can uninstall the EggQuality software, using the Windows "Apps & Features" (or "Programs & Features") function of the Control Panel.

Please confirm the following security question with by clicking the "Uninstall" button:
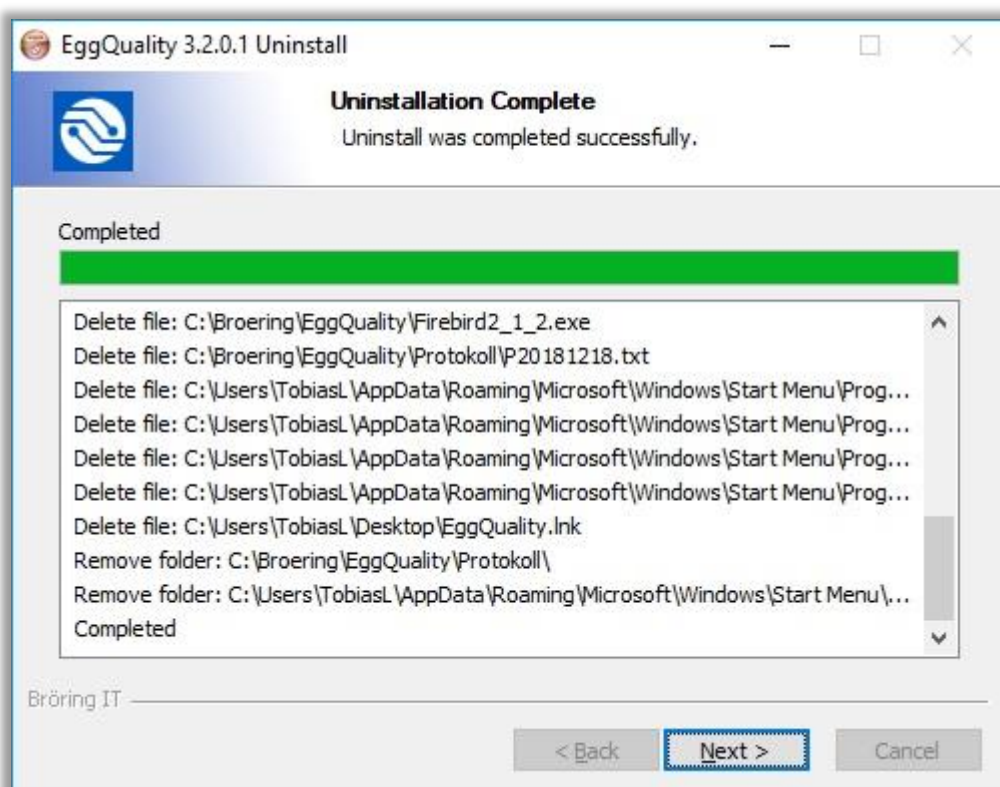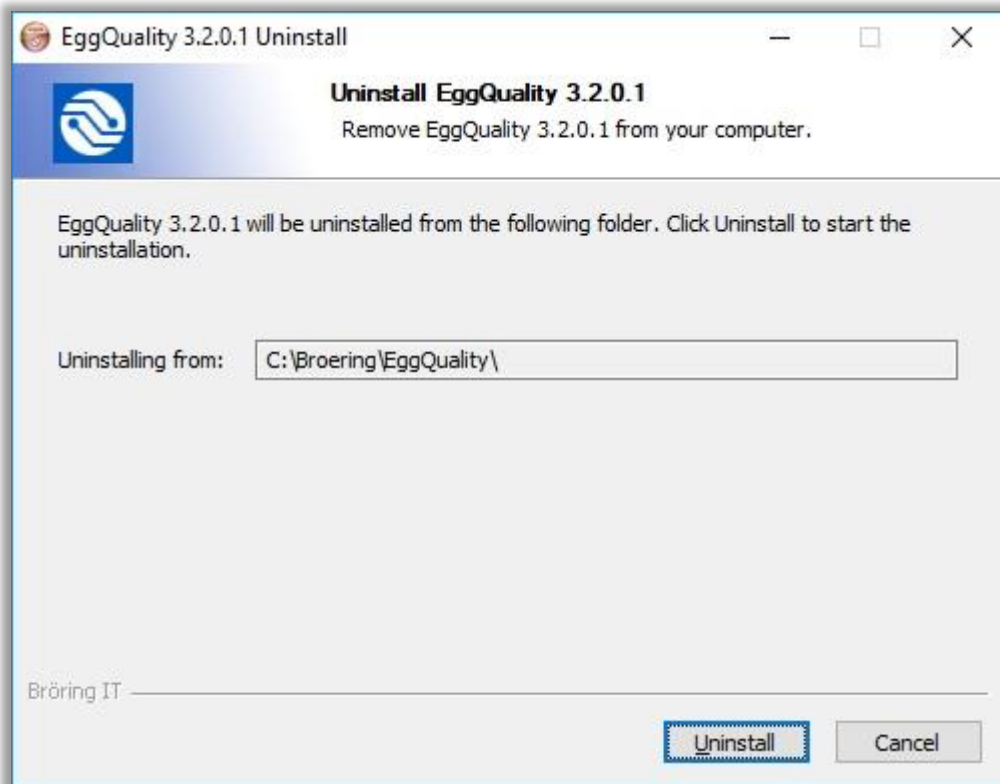
When the uninstallation is complete, the following message is shown:

Now the program is uninstalled from the computer.

2.6.1 Uninstall Firebird

The EggQuality Software installs Firebird as its database system.

Firebird is not deleted automatically, because the uninstaller cannot make sure that Firebird is not used by any other programs.

If you are sure that you do not need the Firebird software for any other programs, uninstall it using the Windows Control Panel function "Apps & features" (or "Programs and Features").

For more Information, please see the Firebird user manual.

2.7 Backup
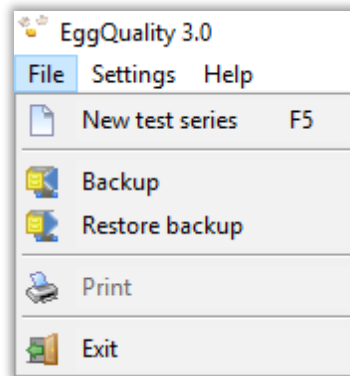
To **create a backup**, select "File" from the top menu and then select "Backup". A new window opens where you can select the location for the backup file.

IMPORTANT: it is recommended to save the backup on an external data storage medium, like an USB flash drive.

Once a location is selected, click on "Save" and a backup file is created in that location. If the process was completed properly, a confirmation window appears.

To **restore a backup**, select the option "Restore backup" within the "File" menu. The following security question will appear:
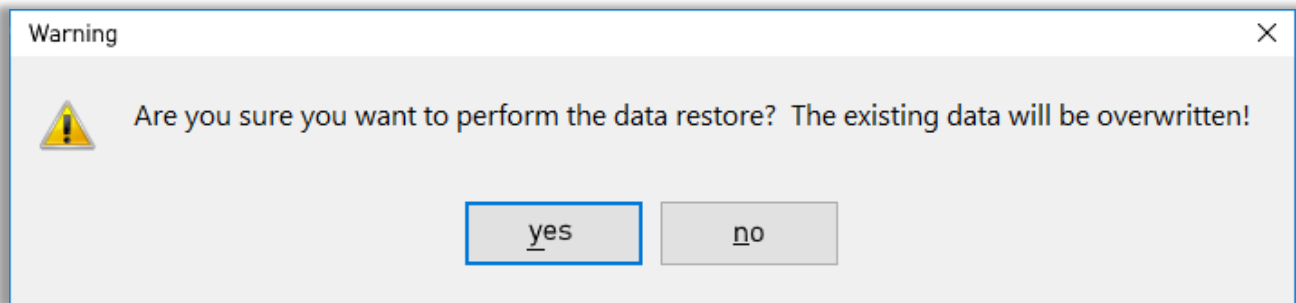
Confirm the warning with "Yes" to restore a backup of the old data.

WARNING: The operation cannot be undone.

If the operation is continued, a new window appears, where a backup file can be selected to be restored.

2.8 Help

By selecting "Help" from the top menu you can access this and other manuals as PDF-files.

2.9 Column settings

In the main window, you will find a small triangular arrow pointing downwards (▼) in the upper left corner of the measuring results table. A click on this arrow opens a window listing the names of the values / table columns. The corresponding table columns can be shown or hidden by setting or removing the checkmarks to the left of the labels. This function is also possible in the archive.

The individual column widths can be adjusted by dragging the rear edge of the column of the top row of the table (header row) to the left or right with the left mouse button pressed.

3 Troubleshooting

While the program is operating, errors are handled and error messages for troubleshooting are displayed.

If there are problems you cannot solve on your own, please note the error message and contact the support.

4 Mode of Operation

The Data is transferred via a serial interface (USB or RS-232) to a PC. For this a standard Mini-USB cable with a USB 2 Type-A connector is used. The system can be operated on any USB port.

The albumen height gauge consists of a position sensor working according to the principle of a linear-potentiometer. This potentiometer is connected to an AD-Converter with 12-bit resolution.

The data from the scale is transmitted via a serial interface. The system is designed for operation with a standard PC system without any modification.

5 System requirements

- Currently supported operating systems are Microsoft® Windows 7 to 10
- Minimum display resolution of 1024x768

English

6 Manual Fast-Egg-Shell-Tester (FEST)

6.1 Introduction:

The Fast-Egg-Shell-Tester (FEST) serves as a measuring device for the breaking strength of hen´s eggs. It can be used as a stand-alone device or connected either to a printer or a PC.

Fig.: Front view FEST

6.2 First-time operation:

Unpack the Fast-Egg-Shell-Tester and place it on a suitable surface. The four plastic legs at the bottom of the device serve as adjustment screws. If necessary, use these screws to compensate for any unevenness or inclination.

For operation a power supply is needed, e.g. 230 V 50 Hz. The device itself needs a DC voltage of 12 V and has a power consumption of about 1 A. This voltage is provided by an included external power supply. If the machine is operated on an electricity network other than the German 230 V 50 Hz standard, we can provide a matching external power supply.

We also offer a suitable printer for the Fast-Egg-Shell-Tester. The printer will be delivered including a matching connection cable.

Alternatively, the Egg-Shell-Tester can be connected to a PC. A corresponding connection cable and software can be supplied. The device can also be used with an existing EggQuality 3.0 software. How to set up the Egg-Shell-Tester in the software is described in chapter 2.5.

English (FEST)

6.3 Configuration:

To enter the configuration menu, hold the left button pressed down while starting the Egg-Shell-Tester until the display shows "Enter menu...". Shortly after the first menu page will open:

```
Configuration Menu:
Speed: 100


next          select
```

The first option is "Speed" and the current value of this option is 100.

Press the left button "next" to scroll through the various options available:

Speed: Controls the speed of the motor. Possible values are from 15 (slow) to 100 (fast; factory default).

Minimum: Optionally you can set a minimum value in Newton. Measurements below this value are not included in the statistics. Possible values are from 0 N (no minimum; factory default) to 75 N.

Datamode: Here you can select the output mode for the serial interface:
        00: Output for printer (factory default)
        01: „123,45<cr><lf>" in Newton for EggQuality 3.0
        02: „2345 g" in gram, without <cr><lf>
        03: „35<cr><lf>" in Newton
        04: „345<cr><lf>" → 34.5 in Newton
        05: „34567<cr>" → 34,567 in Newton

Debugmode: Option for troubleshooting.
        00 = off (factory default)
        01 = on

Elastmode: Switches the device into elasticity mode.
        00 = Breaking strength measurement (factory default)
        01 = Elasticity measurement

Elastmin: Start value of the elasticity measurement. Values between 2 N (default) and "Elastmax" (see below) are possible.

Elastmax: Final value of the elasticity measurement. Values between "Elastmin" and 80 N are possible. The factory default is 20 N.

Exit: Exit the menu.

If you want to change an entry, tap the left button ("next") until the entry you want to change is displayed. Now press the right button ("select") and the bottom of the screen will show "change" and "ready".

With each push of the left button ("change") the value is incremented by 1. The button can also be held down for larger changes. If the maximum value is exceeded the value is reset to the minimum (e.g. if at Speed: 98 the left button is pushed four times, the resulting values are: 99, 100, 15, 16).

```
Configuration Menu:
Speed: 100


change        ready
```

When pressing the right button, the current value is saved and the next menu option is displayed.

6.4 Operation with printer:

Connect the printer to the Fast-Egg-Shell-Tester with the supplied printer cable (9-pin D-sub (FEST) to 25-pin D-sub (printer)).

Connect the printer using the supplied AC adapter to a power socket (230 V / 50 Hz) and turn on the printer. Located on the control panel of the printer are to two LEDs. Both LEDs should glow when the printer is in use. If the right LED (SEL) does not glow, you have to set the printer to SEL pushing the SEL button. If the SEL-LED is dark, you can trigger a line feed with the LF-button. Only when the SEL-LED is glowing the printer accepts data from the Egg-Shell-Tester.

Now connect the Fast-Egg-Shell-Tester to the power supply and switch it on. The power switch of the Egg-Shell-Tester is on the back side of the device.

If everything is connected correctly, the printer will output the print head for the measurement after a few seconds. When this is finished, the Egg-Shell-Tester is ready to operate.

After the initialisation the message „Press left to start" is displayed.

Place an egg on the guide rods as illustrated in the picture above (Fig.: Front view FEST).

Now you can press the left key on the Egg-Shell-Tester to start a new measurement.

You can measure the breaking strength along the poles as shown in the picture above or across the equator of the egg. Simply place the egg in the appropriate position in the Fast-Egg-Shell-Tester.

After you have pressed the left key on the Egg-Shell-Tester, the right piston starts moving. The piston moves towards the left and presses the egg against the force sensor located on the left side of the Egg-Shell-Tester. When the piston reaches the egg, the egg breaks and the result is shown on the display of the Egg-Shell-Tester and is send to the printer.

If the force needed to break the egg is too high, you get the message „overload".
If the egg is too weak or was broken before, you get the message „weak egg". These results do not influence the statistics.

If the measurement was successful, the following readings are shown:

```
Press left to start
   1: 2.8kg  27.53N
mean: 2.84 var: 0.0
weak: 0 no: 0 ol:0
```

Here, we see the result of the first measurement. The result was 27.53 Newton or 2.8 kg. The mean value is also about 2.84 kg and the variance is 0.

To start the next measurement, you have to remove the broken egg and place the next egg in the Egg-Shell-Tester. After this, simply press the left key again.

Please note that after the measurement, the piston only retracts approx. 1 cm. Normally this should be sufficient to insert the next egg of a series of measurements. If the space should not be sufficient, the piston can be retracted further by pressing the right key shortly. This will also execute the "auto zero" function to tare the force transducer.

Now you can successively test all eggs of the test series. After the measurements the display of the Egg-Shell-Tester will look like the following:

```
Press left to start
  23: 4.5kg 44.15N
mean: 4.03 var: 0.37
weak: 2 no: 0 ol:0
```

After each measurement the result is also printed on the printer or transferred to a PC.

To finish a series of measurements, hold the right key down for about 3 seconds. You will then receive a printout with the statistical data as shown in the example printout on the right:

```
****************************************
*        Egg-Shell-Tester V2.06        *
*      Broering IT   D-49393 Lohne      *
*         Tel. +49 4442 910436          *
****************************************
Datum      :
Legedatum  :
Stall      :
Herde      :
Woche      :
Bediener   :
----------------------------------------
1:    4.35kg     42.67N
2:    4.83kg     47.39N
3:    5.20kg     51.05N
4:    4.50kg     44.15N
5:    4.99kg     49.00N
6:    4.92kg     48.22N
7:    6.36kg     62.44N
8:    5.04kg     49.40N
9:    6.06kg     59.49N
10:   5.73kg     56.21N
----------------------------------------
total      :      10
good       :      10
weak       :       0
no egg     :       0
overload   :       0
mean value :      5.20kg     51.00N
variance   :      0.39kg      3.81N
```

A new form head is then printed and a new measurement series begins.

If you want to switch off the Egg-Shell-Tester, you should move the piston to the right position. This can easily be done by starting a measurement without an egg in the machine. The machine tries to break the egg, moves the piston to the left, gives the message "no egg" and moves the piston to the rightmost position. Afterwards you can switch off the device using the switch on the rear panel.

6.5 Operation with the EggQuality 3.0 Software:

The procedure is basically the same as for the printer (see above). Connect the Fast-Egg-Shell-Tester to a PC on which the EggQuality 3.0 software has been installed and start the program. Normally your EggQuality software should be preconfigured for operation with the FEST device. Information about the manual configuration can be found in chapter 2.5.

6.6 Elasticity-Mode (deformation measurement):

The operation of the instrument in Elasticity-Mode does not differ fundamentally from the measurement of breaking strength.

To activate the Elasticity-Mode set the value "Elastmode" in the settings to 1 (see chapter 6.3). In addition, the settings "Elastmin" and "Elastmax" define the start and end force of the measurement in Newton (Caution: Too large Elastmax values can lead to broken eggs).

During the elasticity measurement the egg is not broken. Although repeated measurements of the same egg with high Elastmax values can break the egg.
The results of the measurement are displayed in Newton per second:

```
Press left to start
  13:     415 N/s
mean: 492 var: 372
        no: 0 weak:0
```

Average and variance are displayed as "mean" and "var" the same way they are during the breaking strength test. The same goes for "no egg" and "weak Egg". An "Overload" cannot occur due to the type of measurement.

If you completed a series of measurements by pressing and holding the right button, a summary is printed on the printer. The final protocol looks for example like this:

```
**************************************
*        Egg-Shell-Tester V2.06      *
*      Broering IT  D-49393 Lohne     *
*         Tel. +49 4442 910436        *
**************************************
Datum     :
Legedatum :
Stall     :
Herde     :
Woche     :
Bediener  :
---------------------------------------
1:      884 N/s
2:      894 N/s
3:      889 N/s
4:      890 N/s
5:      885 N/s
---------------------------------------
total    :        5
good     :        5
weak     :        0
no egg   :        0
mean value:     884 N/s
variance :       14 N/s
```

6.7 Calibration:

A YouTube video showing the calibration of the FEST can be found at the link below:

www.youtube.com/user/BroeringIT

The calibration should be repeated at regular intervals, e.g. every 2 months. Calibration should also be carried out after each change of location, transport, repair, etc.

To calibrate the device, you need a 1kg calibration weight. It is important that this calibration weight is not too high. You may need to remove the right stamp attachment by carefully unscrewing it without using tools.

Attention: Never try to remove the stamp on the left side. This could damage the force sensor.

Place the Egg-Shell-Tester on a flat surface with the left side down as shown in the illustration (but for now without the test weight).

Now switch on the device while holding down the right (upper) button.

If the instrument reports "enter calibration" in the bottom line, you can release the key.

The message "Calibration, auto zero" now appears on the display.

After a few seconds the following information will be displayed:

```
Calibration:
Calibrate 1kg
Calibration:
          4203
```

4203 is the currently measured value in this example.
This value can vary slightly (approx. +- 10).

Now place the 1 kg weight on the force sensor stamp (see figure above). Make sure that the weight lies cleanly on the stamp and does not touch the egg support rails. The measured value will increase to for example 11350. This value can also fluctuate slightly.

If everything is OK, briefly press the right (upper) button. The calibration is then performed automatically and the calibration data is stored internally.

Finally, the following display appears:

```
Calibration OK
Please remove weight
And restart machine
1.0000 kg  9.8067 N
```

The bottom line shows the currently measured values in kilograms and Newtons.

At this point it is possible to test the linearity of the force transducer by exchanging the 1 kg weight for a 500 g weight, for example.

If the result is satisfactory, you can switch off the device and remove the weight. Now you can put the Egg-Shell-Tester back on its feet and perform measurements as usual.

6.8 Maintenance:

Normally no maintenance work is necessary. After each measurement, the equipment should be cleaned with a dry cloth. Any cleaning products or solvents leaking into the casing may damage the equipment. If there is a problem with your Egg-Shell-Tester or if any part of the equipment seems to be defect, please contact the following address:

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Deutschland
Phone: +49 4442 910436
E-Mail: info@broeringtech.com
www.broeringtech.com

6.9 Appendix:

Specifications:

Designation:	Fast-Egg-Shell-Tester Ver. 2
Power supply:	12 V DC, 1 A, external power supply
Power consumption:	about 9 Watt
Protection:	IP40, protection against contact
Operating Temp.:	10 ° C to 45 ° C, Storage 0 to 60 ° C
Humidity:	max. 90% non-condensing
Measuring range:	max 80N
Dimensions:	300 x 100 x 130 mm (w, h, d)
Weight:	5.5 kg
Accessories:	AC adapter (output 12V/1A, input 100-240 V / 50-60 Hz)
	manual
	carrying case
Optional:	roll printer with data cable
	data cable for PC
	adaptor RS232 to USB
	software CD
	pedal switch
	calibration weight 1 kg

Safety:

This device fulfills the conditions of 2004/108/EC (Electromagnetic Compatibility) and 2006/95/EC (Low Voltage) as amended by 93/68/EC (CE marking).

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Important notes regarding the Egg-Shell-Tester in battery operation

The battery pack of the Egg-Shell-Tester consists of 10 Eneloop AA NiMH Cells with a capacity of about 2 Ah.

About 2000 eggs can be tested with a fully charged Egg-Shell-Tester in battery mode.

Only use the included 12 V 1000 mA power plug to charge the battery pack. Do not use any other power supplies. Using a different power plug can lead to damage on the Egg-Shell-Tester.

After being idle for some time, the Egg-Shell-Tester displays the current voltage of the battery pack. The voltage should be around 12 V to 14 V.

To recharge the Egg-Shell-Tester, simply plug in the included power plug. The Egg-Shell-Tester will charge even if it is off. To stop the recharging, remove the power plug from the Egg-Shell-Tester.

It is also possible to use the Egg-Shell-Tester with a connected power supply. For that, the voltage should be at least 12 V. When the voltage drops below 12 V, an error message is displayed.

The Egg-Shell-Tester is equipped with an overcharge protection. Still it is recommended to unplug the power supply when the battery is fully charged.

A reduced battery life indicates that the battery pack has a malfunction. Do not charge the Egg-Shell-Tester when this happens. The battery pack has to be replaced.

Safety Warnings:

Battery packs are potentially dangerous and should not be used when they are damaged.

- Only use the included power supply to charge the Egg-Shell-Tester.

- Do not use the Egg-Shell-Tester when the battery pack has a malfunction.

- It takes about 12 hours to charge the device when the battery is flat. Unplug the power supply when the battery is fully charged.

English (FEST)

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Declaration of conformity

Konformitätserklärung für Geräte mit CE-Zeichen
Deklaracja zgodności dla urządzenia ze znakiem CE
Déclaration de conformité pour appareils portant la marque CE
Declaración de conformidad para aparatos con marca CE
Dichiarazione di conformità per apparecchi contrassegnati con la marcatura CE

Konformitätserklärung: Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.

Declaration of conformity: We hereby declare that the product to which this declaration refers conforms with the following standards.

Declaración de conformidad: Manifestamos en l a presente que el producto al que s e refiere esta declaración está de acuerdo con las normas siguientes

Déclaration de conformité: Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.

Dichiarazione di conformità: Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.

Digitales Messsystem: EggQuality

EMV-Richtlinie 2004/108/EG EN 55022:2010 EN 61000-3-2:2006+A1:2009+A2:2009 EN 61000-3-3:2008 EN 55024:2010

Lohne, Jan. 1, 2018

Notizen / Notes:

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Notizen / Notes:

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