version 1.02.0

User’s Guide

AUTOMATIC POULTRY SCALES
BAT2 Lite

VEIT electronics

1. Introduction

The poultry scale BAT2 Lite is designed for automatic weighing of live poultry. Weighing takes place automatically; the weight is automatically stored into the memory after the poultry enters the weighing platform. Results of weighing are displayed on the scale's display. BAT2 Lite contains an archive with statistics from the last 55 days of weighing.

1.1. Scales Description

Power connector and hook for hanging plate are placed in the lower part, which allows for putting on an anti-dust cover. The scales design is shown in the following picture:

The key functions are stated in the following table:

☑	The Enter key, enter the menu, confirm of the entered value
☒	The Esc key, leave the menu, cancel the entered value
›	Move the digit to the right when editing
‹	Move the digit to the left when editing
^	Change the day in the archive, increase the digit when editing
v	Change the day in the archive, decrease the digit when editing

1.2. Basic Technical Parameters

Weight capacity:	up to 100 kg according to the connected platform
Scale division:	selectable 0.001; 0.002; 0.005; and 0.010 kg/lb
Accuracy:	about 0.1 %
Temperature range:	-5 °C to 45 °C

1.3. Factory Setup of the Scales

The scale is programmed from the factory for basic weighing as follows:

Margin above the target:	30 %
Margin below the target:	30 %
Filter:	12
Stabilization:	± 3 %
Stabilization time:	3
Use gain in automatic mode:	yes
Saving mode:	entering and leaving the scale
Units:	kg

Backlight: on

1.4. Installation

1.4.1. Scale

Before installing the scale into a house, it is necessary to stabilize the scale thermally and attempt to limit humidity condensation. The scale is best placed between the feeder and the drinker, to a place where the poultry moves most.

The scales design is adapted for suspending by the upper ring. The scale is best suspended on a hook screwed to a beam or house structure:

If the ceiling of the house is too high, suspend a chain between the hook and the upper ring of the scale.

1.4.2. Hanging plate

The hanging plate is suspended on the hook at the bottom of the scale:

The rod of the hanging plate is made from two parts, so it can be continuously vertically adjusted by inserting the individual parts into each other. For setting the correct length always properly tighten the screw on the rod:

Set the height so that the plate is as close to the ground as possible but does not touch the litter:

1.4.3. Powering

Plug the power cable into the power connector and secure it, best by pulling through the upper ring, at the end.

If the scale is powered from battery, the battery should be kept properly charged. The battery life is about 15 days; the scale doesn't check if the batteries are charged.

1.4.4. Calibration

If we do not use the weighing platform supplied with the scale, it is necessary to calibrate the scale after installation, see chapter 4.5.

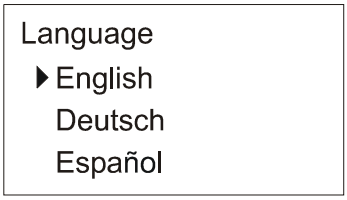
1.5. Turning the Scale ON and OFF

The scale does not have a power switch, it is turned on and off by plugging the power source connector. After turning on the firmware version briefly shows on the display. The scale should stay turned on during the whole time of weighing.

The scale is resistant to power failures, after the power is renewed, the scale is automatically resumed into the condition before the power failure and also all data in the scales memory are retained.

1.6. Language Settings

The scale allows for displaying help on the display in several languages that can vary depending on the scales version. If you want to change the language, turn off the scale, press and hold the ☑ key and turn the scale on again. After the second beep, release the ☑ key. The following menu is displayed:



Use keys ^ and v to choose the required language and press the ✓ key. After choosing the language, the scale is restarted.

Note: each version of the scale can contain different number of languages.

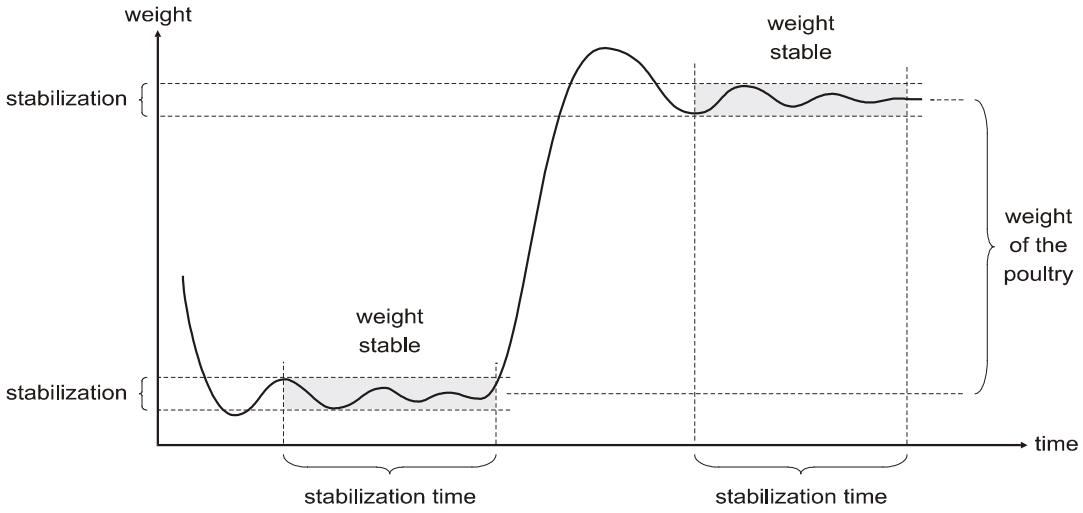
2. Weighing

2.1. Weighing Principle

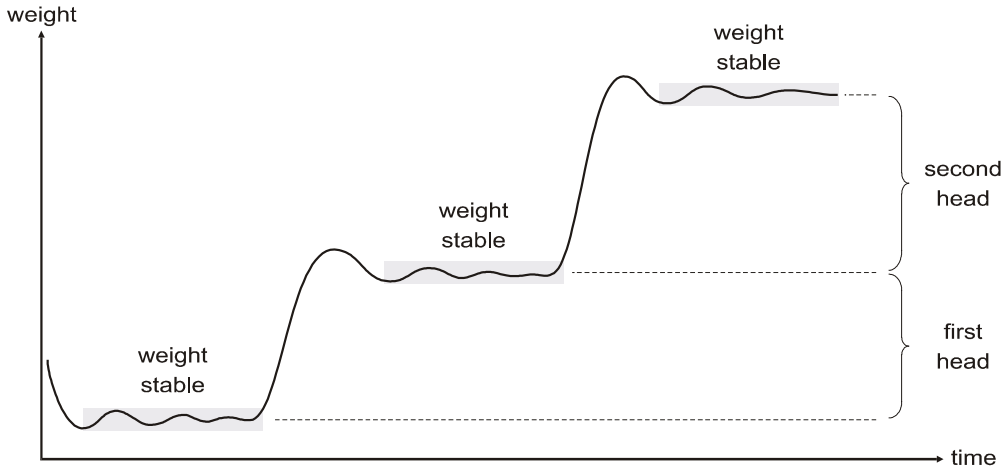
Weighing and its evaluation takes place completely automatically as individual heads enter and leave the weighing platform. The weighing platform is large, so even more heads can stand on it simultaneously.

For correct evaluation of weighing a special increment algorithm is used; the scale periodically reads the weight on the weighing platform and checks for the poultry that is entering and leaving the scale. In the following paragraphs, the weighing principle is described on entering the scale. The scale works the same during leaving the scale.

We assume that the weight of the scale is stabilized before any head enters the scale. If one or more heads enter the scale, first the weight increases, then the weight will oscillate and finally stabilize after a brief moment. The following picture shows an example of one head entering the scale:

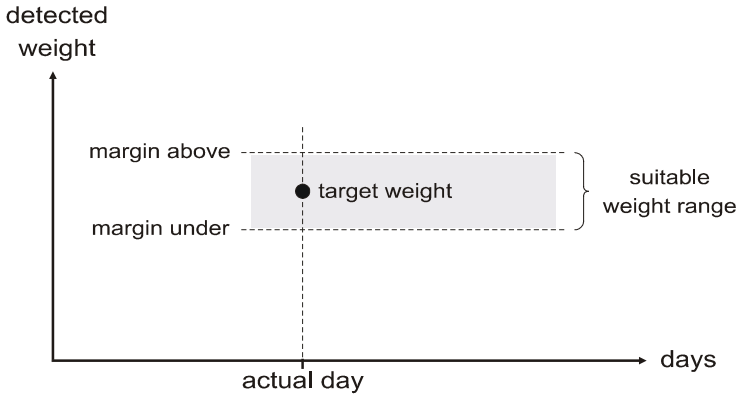


The difference between the two stabilized weights before and after the entry equals the weight of the head that entered the scale. Therefore, the absolute weight on the scale is insignificant; only the weight increment is measured. The scale thus reliably knows the entry of more heads one after another; the accuracy of weighing is not decreased even by gradual pollution of the scale with litter and dirt. An example of entry of two heads one by one is displayed in the following picture:



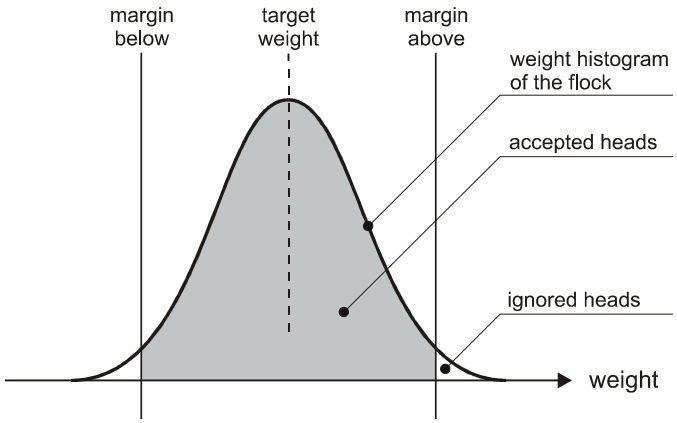
If the head leaves the platform immediately after entry and therefore the weight is not stabilized, the scale does not recognize the entry. The stabilization of weight is defined by parameters *Filter*, *Stabilization* and *Stabilization time* that define the filtration and maximum oscillation of weight for a specified period. If the oscillation during the specified time does not exceed the maximum limit, the weight is evaluated as stabilized. By entering various parameters, we can optimize the scales activity according to the placement of the platform, type and age of poultry, etc.

After a new entry is detected, the scale evaluates whether a valid weighing sample was obtained. This eliminates weighing two heads at the same time, possibly weighing only a partial entry, e.g. when only one leg of poultry is on the scale etc. The evaluation is based on the fact that we approximately know the target weight, i.e. the expected weight of poultry on the given day. Furthermore, we define margins above and below the target weight, which define the tolerance field of weights that are valid for the given day. The following picture describes the situation:



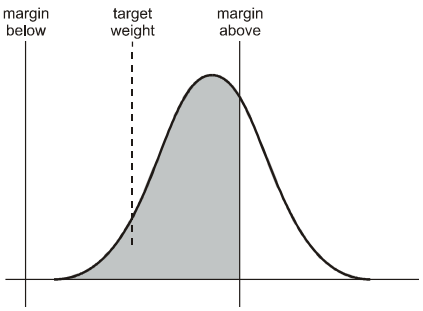
Heads, whose weight falls within the entered tolerance field, are considered as correctly weighed samples and the scale stores them into the memory. Both margins are entered in percents of the target weight.

Correct definition of the target weight and tolerance field is essential for weighing accuracy. The target weight should correspond to the real average weight of the flock as much as possible and the tolerance field should contain maximum number of heads in the flock. When properly set, the scale is able to detect maximum number of heads and the number of ignored heads is minimal:

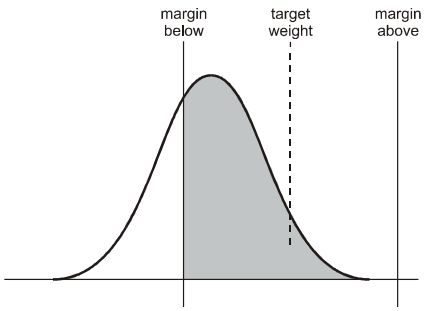


When the target weight or tolerance field is incorrect, heads that should be normally detected are ignored instead:

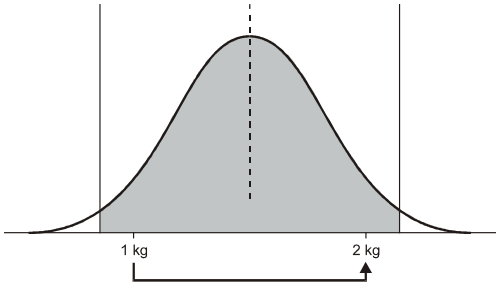
Low target weight:



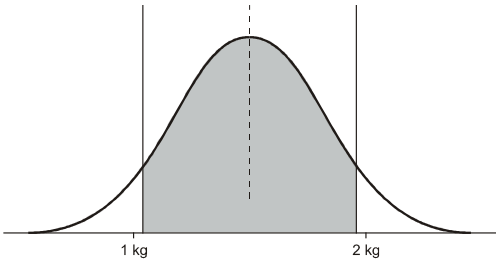
High target weight:



The tolerance field should not be wider than ± 33 % of the target weight. With too wide tolerance field, two light heads that jump on the scale simultaneously could be stored wrong as one heavy head:



This error cannot occur with the tolerance field lower than ± 33 %:

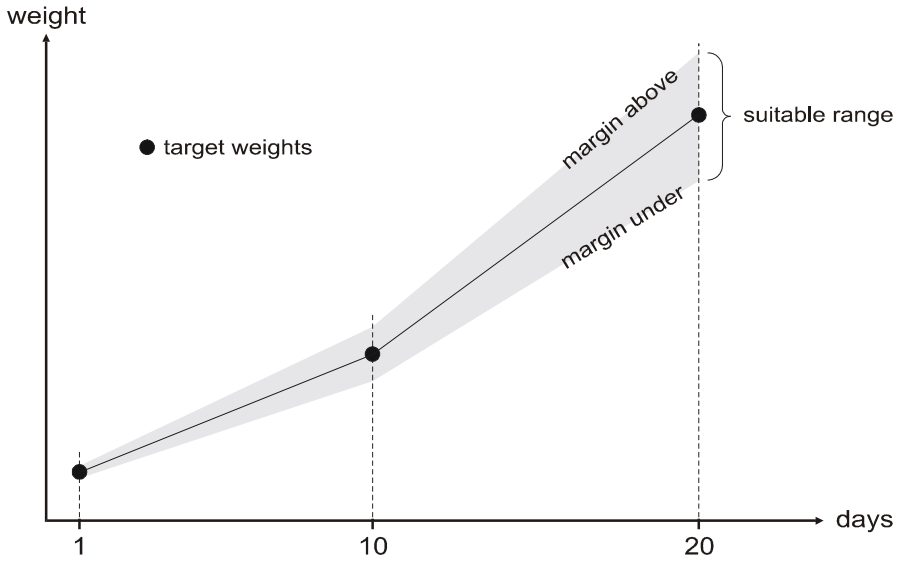


The tolerance field can be entered symmetrically or asymmetrically against the target weight.

The target weight can be determined in three ways:

- The user enters a growth curve for the whole weighing
- The user enters only the weight at the beginning of weighing and the target weight for the following days is calculated automatically (automatic mode)
- Combination of both the growth curve and the automatic mode

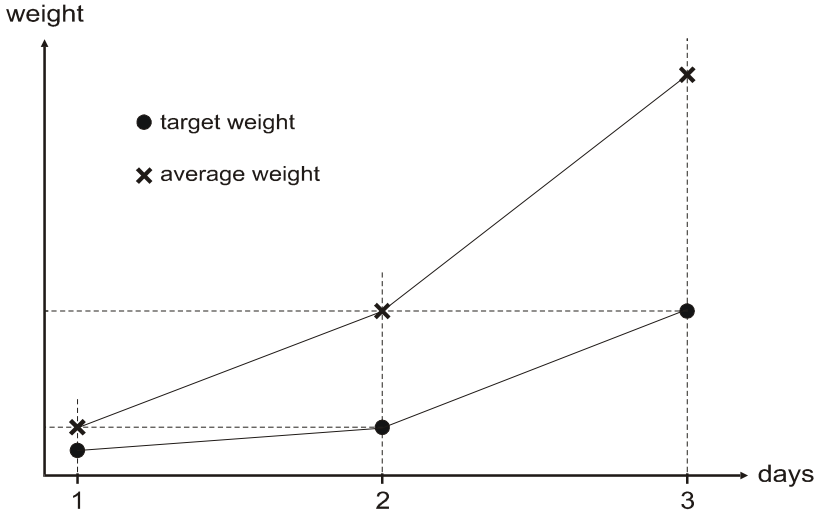
When using the growth curve, we enter the target values in the form of a table, where an exact target weight is defined to certain days. The target weight on other days is calculated as an interpolation from two surrounding days in the table. Weighing according to a growth curve is shown in the following picture:



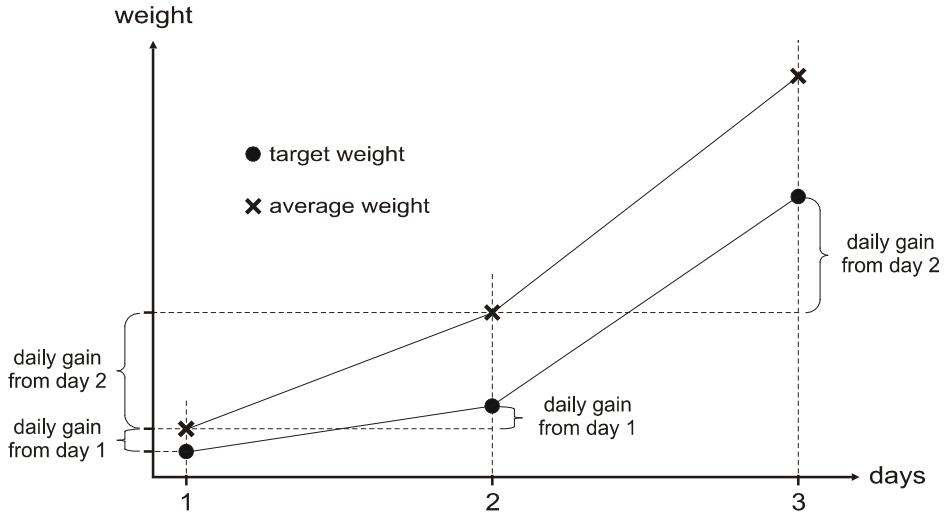
When using the growth curve, we must enter the growth curve before the weighing starts. If we see that the real growth starts to differ from the growth curve during weighing, we can correct the growth curve, but we lose all data that are stored in the memory by that.

In the automatic mode, we enter the target weight at the beginning of weighing only for the first day. On following days, the scale calculates the target weight automatically as an average weight from the last day or as the average weight plus daily gain from the last day. The daily gain is defined as the average weight from the actual day minus the average weight from the previous day. The scale therefore adapts automatically to the real growth of the flock, so it is not necessary to know and enter the growth curve for the whole time of weighing.

Principle of the automatic mode without use of gain is shown in the following picture. The average weight from the previous day is used as the target weight for next day:



The automatic mode with gain significantly improves adaptation during fast growth, for example in broiler flocks. In this mode, the target weight for the actual day is calculated as the average weight from the previous day plus the daily gain from the previous day, so the scale tries to predict the growth more accurately:

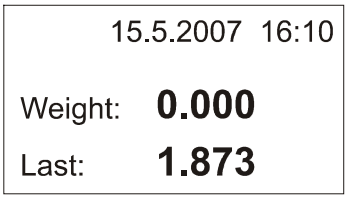


If the weighing is started according to the growth curve, but the growth curve is not defined for the whole weighing, the scale will switch to the automatic mode when the end of the growth curve is reached. For example, if the growth curve is defined only for days 1 to 5, the scale will weigh according to this curve from day 1 to day 5 and it will switch to the automatic mode on day 6 (the curve is not defined for day 6). The scale will keep weighing in the automatic mode until the weighing is stopped. Such a combination of the growth curve and automatic mode is useful when weighing poultry with high and instable growth at the beginning (for example broilers). It is difficult for the automatic mode to adapt to such instable growth during first days, so the growth curve helps to start weighing successfully. Then, after the growth is more stable, the scale can switch to the automatic mode and follow real growth of the flock.

Always at midnight, the current day is stored into the archive (only in the Lite version) and a new day of weighing is started.

2.2. Checking Before Start of Weighing

After turning on, the scale is in the initial condition; weighing is stopped, only the date, time, actual weight on the platform and final average weight from last weighing is shown on the display, e.g. as follows:



Before the start of weighing, check the current date and time in the upper right corner. If the date and time are not set properly, adjust it (see Chapter 4.1).

Furthermore, it is useful to check whether the scale weighs correctly. Put a known weight on the platform and the weight increase shown on the display must correspond to the weight added. If the scale does not weigh correctly, calibrate it (see Chapter 4.5). Empty scale can show a non-zero weight (due to platform pollution etc.), so monitor only the increase of weight upon putting a weight on the platform.

Finally, check if the scale is correctly set to weigh your type of poultry. We recommend using the following settings (see chapter 4 for more information):

Broilers

Use a predefined growth curve for first 4-5 days only. Then, the scale will switch into the automatic mode with gain, which allows the scale to adapt to the real growth of the flock. It is recommended to use a correction curve (chapter 4.4).

Parents

Use the automatic mode without gain for the whole weighing. Only one gender can be weighed.

Turkeys

Use the automatic mode without gain for the whole weighing.

Set other parameters as follows:

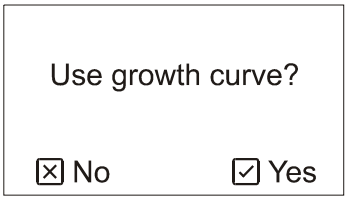
Parameter	Broilers	Parents	Turkeys
Margin above the target weight	30 %	30 %	30 %
Margin below the target weight	30 %	30 %	30 %
Filter	12	12	12
Stabilization	± 3 %	± 3 %	± 3 %
Stabilization time	3	3	3
Use gain in automatic mode	yes	no	no
Saving mode	enter and leave	enter and leave	enter and leave
Use correction curve	recommended	optional	optional

Keep in mind that these parameters are recommended as default. If you experience any problems, adjust the parameters to suit your needs.

If everything is set correctly, the weighing can be started.

2.3. Weighing Start

If you want to start weighing, enter the menu by pressing the ☑ key, select item *Start weighing* and press the ☑ key. The following menu appears:



If you already have a predefined growth curve, according to which you want to weigh, press the ☑ key. When using a growth curve, the curve must be already defined, see Chapter 4.2. If you want to use the automatic mode and enter the initial weight directly, press the ☒ key.

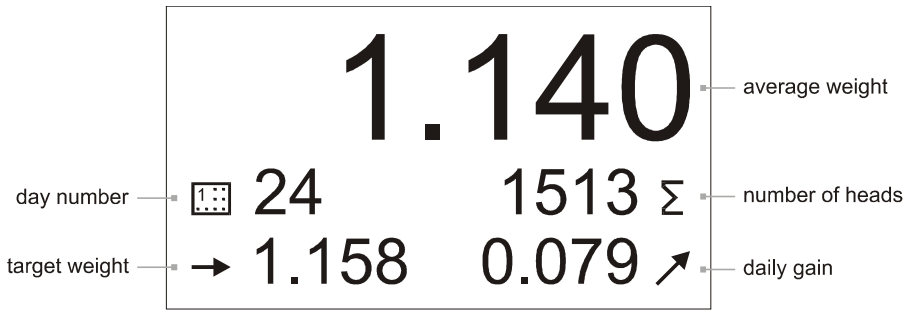
The following menu appears:

Using arrows enter the day of start of weighing (for example 1 for day-old chicks) and press the ☑ key. If you chose to use the automatic mode, the scale will ask for the initial target weight:

Enter exact current weight of poultry and press the ☑ key. The initial weight must be entered as accurately as possible, preferably according to manual weighing of several heads or according to an accurate growth curve of the poultry.

2.4. Monitoring the Weighing Course

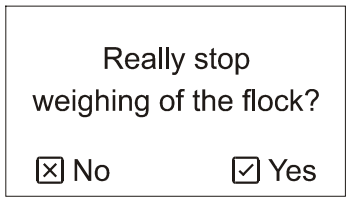
During weighing, the scale displays the following information:



In BAT2 Lite it is also possible to view the archive with results from older days, see Chapter 3.

2.5. End of Weighing

After the weighing has been finished, it is necessary to stop weighing manually in the scale. Enter the menu by pressing the ☑ key, select item *Stop weighing* and press the ☑ key. The following menu appears:



If you want to end the weighing, press the ☑ key. After the end of weighing the results of the current day are stored into the archive (only in BAT2 Lite). Once the weighing is ended, it is impossible to resume flock weighing and continue. It is always necessary to start a new weighing.

In BAT2 Lite, after the end of weighing all data remain stored in the archive until the weighing is started again, see Chapter 3.

3. Processing the Results in the Scale

BAT2 Lite contains an archive with statistics from last 55 days of weighing. If the weighing lasts longer than 55 days, the oldest day is deleted and a new day is stored in its place. The archive therefore always contains the last 55 days; with a longer weighing the days from the beginning of weighing can be lost.

The archive can be viewed during weighing and also after the end of weighing. After the end of weighing the archive remains in the memory until a new weighing is started, when the old archive is deleted and a new archive is being created.

If you want to view the archive, enter the menu by pressing the ☑ key, select item *Archive* and press the ☑ key.

It is possible to switch between individual days of weighing using arrows ⌃ and ⌄. By holding the ⌃ key longer, you skip to the last day in the archive. By holding the ⌄ key longer, you skip to the first day in the archive.

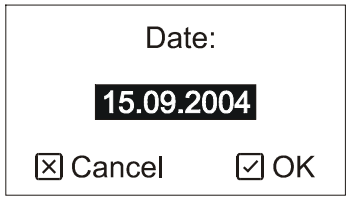
The display in the archive is the same as during weighing (see Chapter 2.4).

4. Scales Settings

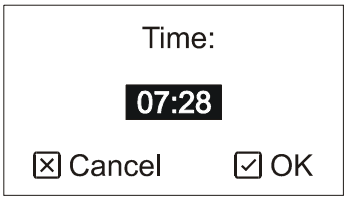
4.1. Date and Time

Date and time can be changed only if weighing is stopped.

If you want to change the current date and time, enter the menu by pressing the ☑ key, select item *Setup*, and press the ☑ key. Furthermore, select item *Date and time* and press the ☑ key. The following menu appears:



Using arrows enter the current date and press the ☑ key. The following menu appears:

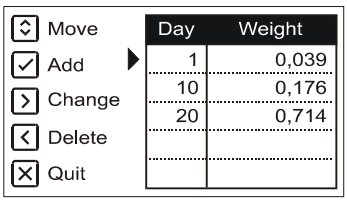


Using arrows enter the current time and press the key.

Note: use format *DD.MM.YYYY* for date, where *DD* means day, *MM* month and *YYYY* year. For time, use 24 hours format.

4.2. Growth Curve

If you want to define or modify a growth curve, enter the menu by pressing the key, select item *Setup*, and press the key. Furthermore, select item *Growth curve* and press the key. The growth curve is entered in the form of a table, where the target weight is specified for individual days:



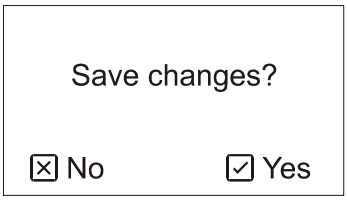
Using keys and move between days in the table.

By pressing the key add a new day into the table. The scale first asks about the number of the day and then about the target weight for the given day. The target weight does not have to be specified for each day of weighing; the target weight for the missing days will be calculated during weighing from two surrounding days.

By pressing the key you can change the target weight of the selected day.

By pressing the key and subsequent confirmation by the key it is possible to delete the selected day from the table.

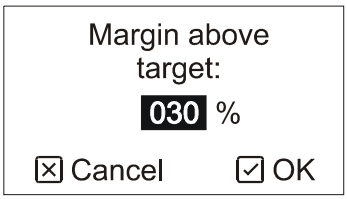
If all days are entered in the table, finish the editing of the growth curve by pressing the key. The following menu appears:



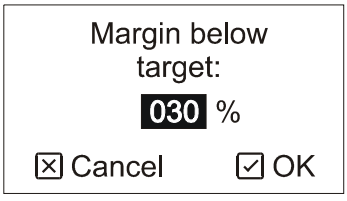
By pressing the key the performed changes in the growth curve are stored.

4.3. Saving parameters

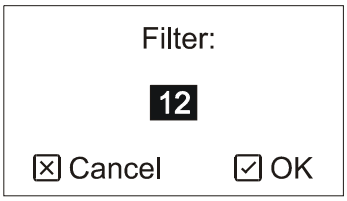
If you want to change the saving parameters, enter the menu by pressing the key, select item *Setup* and press the key. Then select item *Saving parameters* and press the key. The following menu appears:



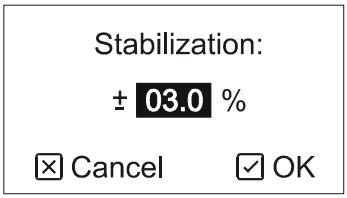
Using arrows enter the margin above the target weight in percentage of the target weight for the given day and press the key. The following menu appears:



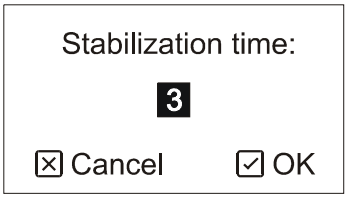
Using arrows enter margin below the target weight and press the ☑ key. The following menu appears:



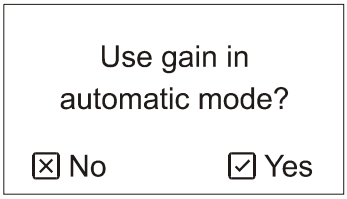
Using arrows enter the filtration of the weight. The higher the filter, the more is the weight filtered. Higher filtration also means slower reaction on fast changes. The scale measures weight internally 8 times per second. The filter value means number of samples that are averaged, i.e. filter 1 means that the scale measures 8 times per second, filter 8 means that the scale measures once per second etc. After entering the value of filter press the ☑ key. The following menu appears:



Using arrows enter the maximum oscillation of weight in percentage of the target weight. The lower the value, the more accurate the weight of stored samples but the worse the stabilization of the scales. After entering the value of stabilization press the ☑ key. The following menu appears:



Using arrows enter the stabilization time, i.e. the time, for which the scale must remain still so that the weight is stable. By extending the time of stabilization you achieve more accurate weight of stored samples but the worse the scale will stabilize. The time unit of stabilization is given by the filter value (for example filter 12 and stabilization time 3 gives total time of stabilization 4.5 seconds). After entering the stabilization time press the ☑ key. The following menu appears:

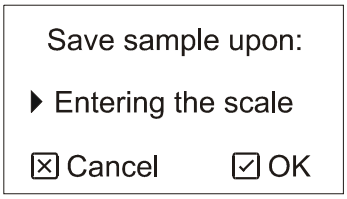


You can choose an algorithm used to calculate the target weight when using the automatic mode. If you choose *No*, the target weight is calculated simply as an average weight from yesterday. If you choose *Yes*, the target weight is calculated as an average weight plus daily gain from yesterday, so the scale tries to predict the correct target weight more accurately.

Since there is no daily gain for the first day of weighing (daily gain is zero), the scale calculates the gain as the average weight minus target weight. This “synthetic” gain is used only for calculation of the target weight for the second day of weighing.

Keep in mind that the gain in automatic mode should be used only when weighing poultry with high and monotonous gains, such as broilers. When weighing poultry with almost steady weight with possible weight oscillations (such as turkeys or parents), don’t use this option. The oscillations in average weight would lead to even higher oscillations in target weight, which could cause the scale to get lost after several days of weighing.

After the algorithm is selected, the following menu appears:



Using arrows select the required saving mode. There are 3 modes available:

Item	Meaning
Entering the scale	The scale is detecting only poultry entering the scale. The sample is stored during entering the scale.
Leaving the scale	The scale is detecting only poultry leaving the scale. The sample is stored during leaving the scale.
Both	The scale is detecting both entering and leaving the scale. The sample is stored during entering and leaving the scale.

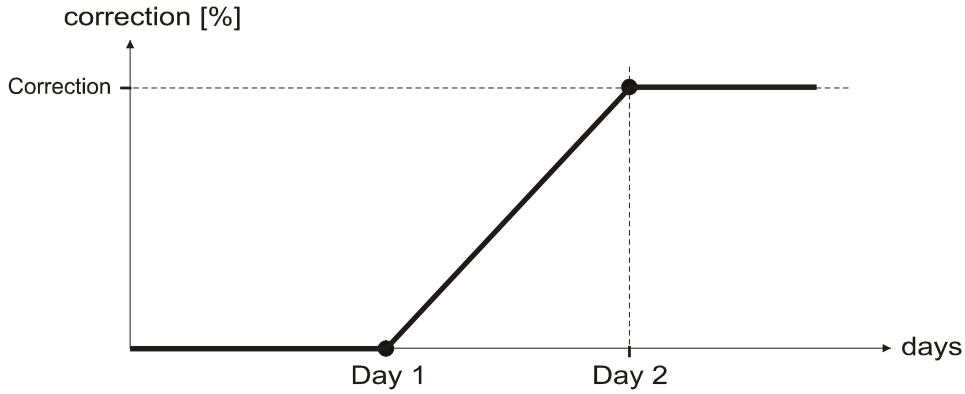
After the saving mode is selected, press the ☑ key.

After confirming the query the entered parameters will be stored.

4.4. Correction curve

It is common behavior during weighing that light birds are more active and use the scale more frequently than heavy birds that tend to ignore the scale. In this case, average weight indicated by the scale can be lower than real average weight of the flock.

Correction curve is used to increase the indicated weight so it better matches real average weight of the flock. The correction curve can be defined in menu *Correction curve*. Individual parameters of the curve are described in the following graph:



The parameters differ for various types of poultry and should be determined by a comparison of results from manual and automatic weighing. Typical parameters for broilers:

Day 1: 14
Day 2: 30
Correction: 5 %

4.5. Display backlight

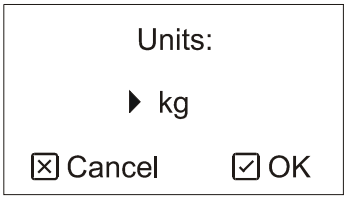
The display backlight can be set permanently off, permanently on or automatic, when it turns off after 10 seconds of inactivity.

If you want to change the backlight mode, enter the menu by pressing the ☑ key, select item *Setup,* and press the ☑ key. Then select item *Backlight* and press the ☑ key. Using arrows select the requested backlight mode and press the ☑ key.

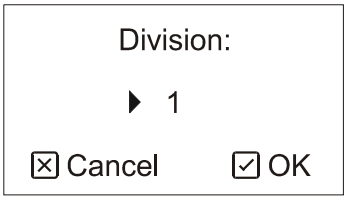
4.6. Calibration

If condensed humidity is visible on the scale, wait for drying of the scale. Then wait at least 1 hour for thermal stabilization of the scale. Then you can calibrate the scale.

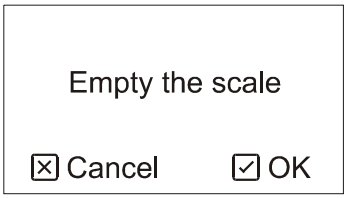
If you want to change units, weight division or calibrate a connected platform, select in the menu *Setup* item *Calibration* and press the ☑ key. The following menu appears:



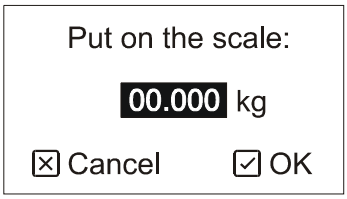
Using arrows select the required units and press the ☑ key. The following menu appears:



Using arrows select the desired division, to which rounding of the last weight digit will take place and press the ☑ key. The following menu appears:



If you want to change units or division of the scale only, press the ☒ key now. Only the new units and division will be stored into memory and calibration will not take place. If you want to perform also calibration, empty the weighing platform and press the ☑. After measuring the zero point the following menu appears:



Put a known weight on the scale, using arrows enter the weight and press the ☑ key. After measuring the range and confirming with the ☑ key, calibration is finished. After confirming the query the calibration is stored.

5. Manufacturer

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