Usermanual

Amacs Egg Counting and Egg Collection

Code No. 99-97-1924

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Program version

The product described in this manual is computer-based, and most functions are realised by software. This manual corresponds to:

Software Version: V2.0.0

Product- and Documentation changes:

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IMPORTANT

Notes concerning the alarm system

Where climatic control is used in livestock buildings, break-downs, malfunctions or faulty settings may cause substantial damage and financial losses. It is therefore **most important to install a separate, independent alarm system**, which monitors the house concurrently with climatic control. Please note that the product liability clause of **BIG DUTCHMAN**'s general terms and conditions of sale and delivery specifies that an alarm system **must be installed**.

We want to draw your attention to EU-directive No. 998 of 14/12-1993 concerning minimum requirements for domestic animals, which specifies that an alarm system must be installed in any house, which is mechanically ventilated. In addition to this, there must be a suitable emergency system.

1 Egg counting

In a laying system, the number of eggs produced is the most important production value.

The more accurate the differentiation between egg numbers, the more conclusions that can be drawn from the production outputs of the individual houses, rows and tiers.

The differentiation can be made from the number of eggs per house up to the number per longitudinal belt.

The screens shown in this chapter, for example, picture a house with four rows and four tiers.

Furthermore, a reference file is selected for the egg numbers, which enables the laying output of the rows and tiers to be displayed in colour.

1.1 Position of the egg counter

The positions and numbers of egg counters in a system can vary greatly. This is taken into account by the service technician during commissioning and displayed accordingly in the overview screen on the system.

A particular distinguishing feature is whether the eggs are counted on the cross belt, on the longitudinal belt or on the lift.

Longitudinal belts are those egg belts which convey the eggs out of the rows to the cross belt.

The **cross belt**, in turn, conveys the eggs to the packer or to the grader.

The **lift** moves the cross belt from one tier to another, in order to collect the eggs from the longitudinal belts.

1.1.1 Egg counter cross belt with a group of longitudinal belts

If longitudinal belts are in a group, it means that all the longitudinal belts are controlled as one.

1.1.1.1 One counter per house

If only a single counter is installed, it counts all eggs from the house.

The counter value is then divided evenly over the individual rows and tiers.

Figure 1-1: Overview of one counter per house

1.1.1.2 One counter per row

If one counter per row is installed on the cross belt, they count the eggs from each row.

The numbers are then divided over the individual tiers of the row in question.

Figure 1-2: Overview of one counter per row

1.1.1.3 Two counters per row

If two counters per row are installed on the cross belt, they count the eggs from each side of a row.

The numbers are then divided over the individual tiers of the row in question.

Figure 1-3: Overview of two counters per row

1.1.2 Egg counter cross belt with two groups of longitudinal belts

Two groups of longitudinal belts means that the longitudinal belts are divided into two groups, each of which is controlled separately.

This may be necessary if, for example, an elevator is used which has insufficient capacity to convey the eggs from all the longitudinal belts on a particular row onto the cross belt.

The two groups of longitudinal belts never run simultaneously. The active group of longitudinal belts is displayed at the bottom in the overview screen (highlighted in red **(R)** in the following image).

The longitudinal belts are divided into these two groups by the service technician during system configuration.

The following examples show a house with four tiers, whereby the lower two tiers belong to the first group of longitudinal belts and the top two tiers to the second group.

1.1.2.1 One counter per house

If a counter is installed, it is used separately for each group of longitudinal belts, meaning that two counters are shown in the overview, each displaying the value for its respective group of longitudinal belts.

The numbers are then divided over the individual rows and tiers of the particular group of longitudinal belts.

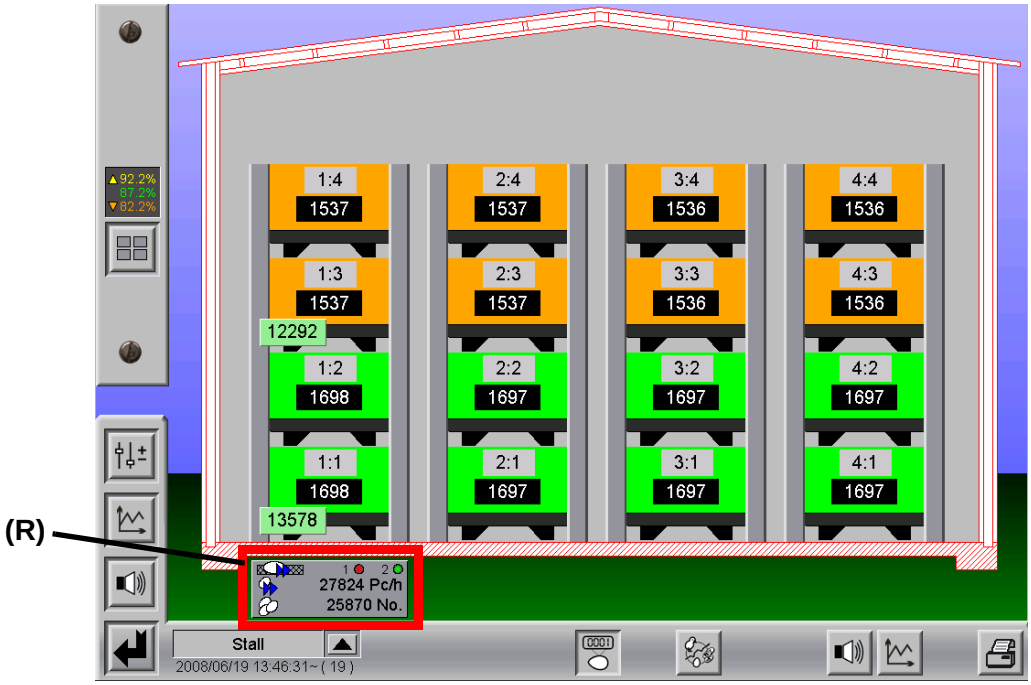


Figure 1-4: Overview of one counter per house

1.1.2.2 One counter per row

If one counter is installed on the cross belt per row, they are used separately for each group of longitudinal belts, meaning that twice as many values appear in the overview as the number of counters actually installed. The values of the respective rows of a group of longitudinal belts are displayed.

The values are then divided over the individual tiers of the associated rows of the particular group of longitudinal belts.

Figure 1-5: Overview of one counter per row

1.1.2.3 Two counters per row

If two counters are installed on the cross belt per row, they are used separately for each group of longitudinal belts, meaning that twice as many values appear in the overview as the number of counters actually installed. The values for the sides of the respective row of a group of longitudinal belts are displayed.

The values are then divided over the individual tiers of the associated rows of the particular group of longitudinal belts.

Figure 1-6: Overview of two counters per row

1.1.3 Egg counter on a longitudinal belt

Where egg counters are installed on the longitudinal belts, the values for each row and tier are measured by a separate counter.

Among other things this has the advantage that, by regulating the longitudinal belts, the egg flow can be measured even before any elevator.

1.1.3.1 One counter per row

The number of eggs for a particular row or tier are measured by a single counter.

This is possible if there is only one longitudinal belt for transporting the eggs out of the row per row and tier, or if there is a mechanical requirement to bring the eggs from both longitudinal belts of a row and tier together under a single egg counter.

Figure 1-7: Overview of one counter per row

1.1.3.2 Two counters per row and tier

In general, each row and tier has two longitudinal belts, which transport the eggs out from each side of the row.

In this case, the eggs are counted separately for each longitudinal belt.

The sum of the two values gives the total number of eggs from the row and tier.

Figure 1-8: Overview of two counters per row

1.1.4 Egg counter on a lift

A lift system is a cross belt which is raised or lowered to enable collection from the different heights of each tier.

In this case, the egg counters are fitted to and move with the lift/cross belt.

The program uses position feedback signals (highlighted in red **(R)** in the following image) to detect which tier the lift is located in and which rows and tiers the values must be assigned to.

The position of the lift is displayed on the overview screen.

1.1.4.1 One counter per house

If a counter is installed on the lift, it counts the eggs for each tier separately. In the overview, a counter appears for each tier, even though there is only one in reality.

The values are then divided over the individual rows of the associated tier.

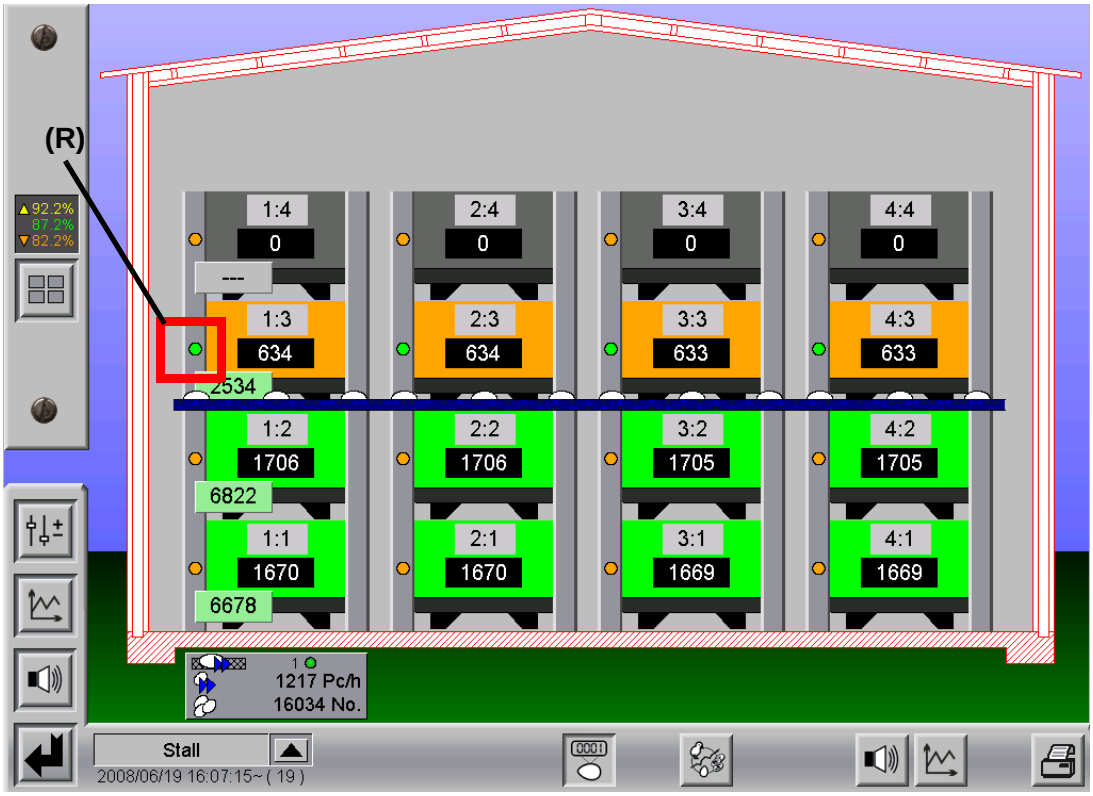


Figure 1-9: Overview of one counter per house

1.1.4.2 One counter per row

If a counter is installed on the lift for each row, it counts the eggs for each row of a tier separately.

In the overview, a counter appears for each tier and row, even though there is only one per row in reality.

The values are then assigned to the individual rows and tiers.

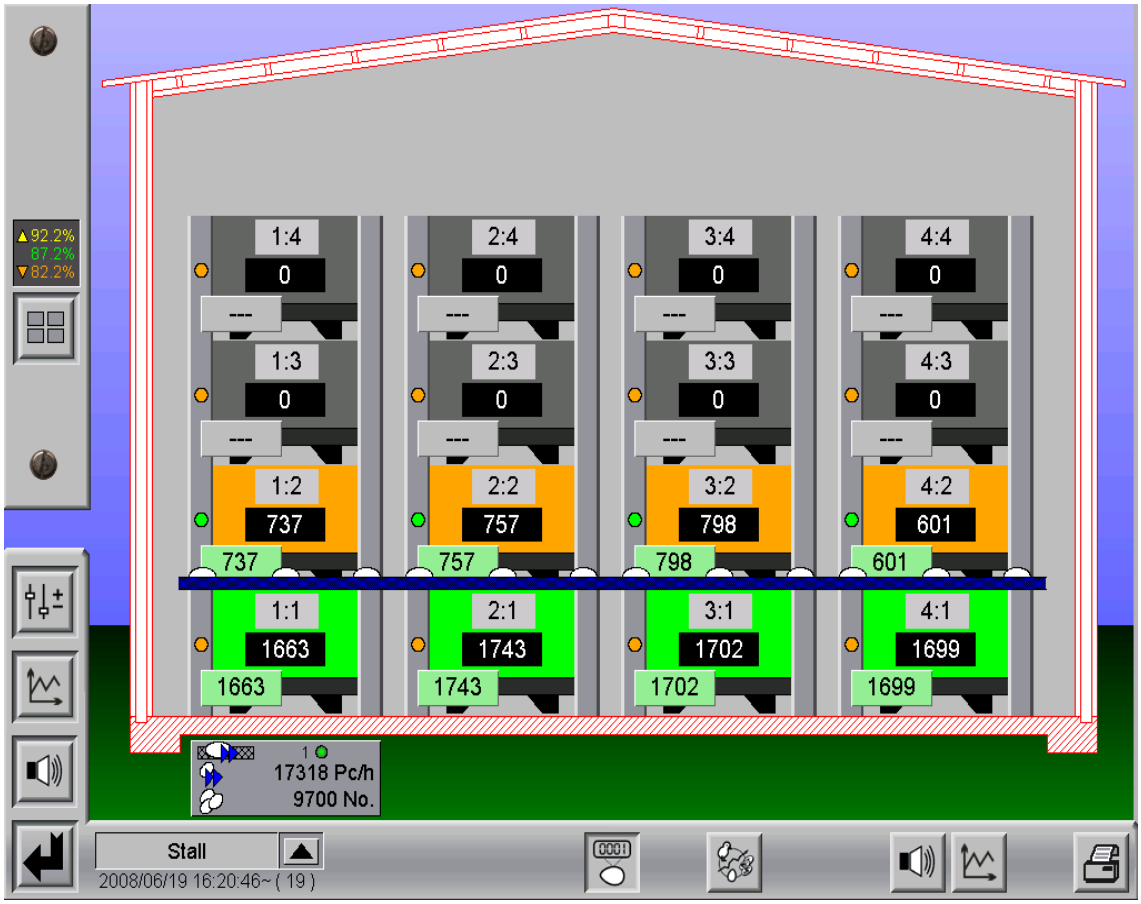


Figure 1-10: Overview of one counter per row

1.1.4.3 Two counters per row

If two counters are installed on the lift for each row, they count the eggs for each longitudinal belt of a row separately.

In the overview, a counter appears for each longitudinal belt, even though there are only two per row in reality.

The values are then assigned to the individual longitudinal belts.

The sum of the two values gives the total number of eggs from the row and tier.

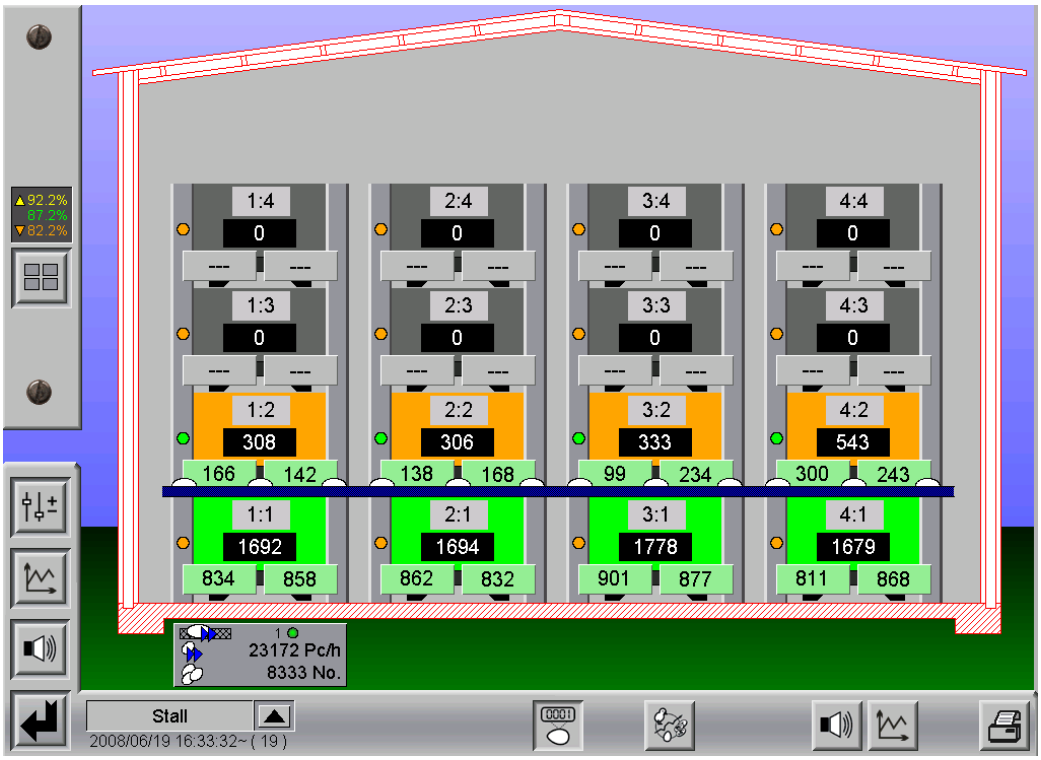


Figure 1-11: Overview of two counters per row

1.2 Overview screen

The overview screen displays the layout of the house as it appears in reality. This provides the operator with a rapid overview.

The maximum permissible house size is twelve rows and twelve tiers. As the individual rows and tiers would be relatively small in such an installation, the overview screen is provided with a zoom function, which can be controlled with the mouse wheel.

You can pan around the zoomed image by moving the mouse while pressing and holding the mouse button.

Figure 1-12: Overview of egg counting

The current values are displayed under the house.

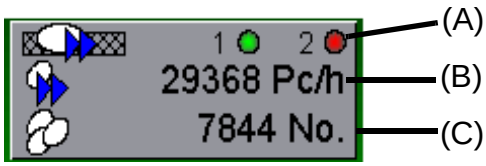


Figure 1-13: House information

The first item is the currently active collection group (group of longitudinal belts), which is displayed in green **(A)**. A red dot indicates that the group of longitudinal belts is not active and that no eggs are being counter for this group. If there is only a single group of longitudinal belts, only a single dot is displayed, along with its status (red or green).

The second line displays the current output rate at which the eggs are being conveyed out of the rows in Pc/h **(B)**.

Under this is the number of eggs for the whole house **(C)**. This value is reset to zero at the end of each day.

1.2.1 Information for each row and tier

Information is ascertained and displayed for each row and tier. This view may differ depending on the number of egg counters installed. The following image shows an example where the eggs from the two groups of longitudinal belts are being counted separately.

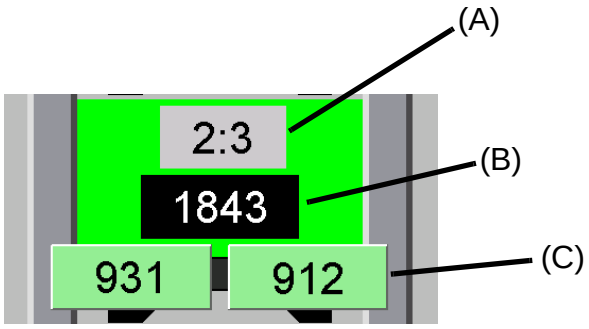


Figure 1-14: Information for each row and tier

The top part **(A)** shows the position in the form “(Row):(Tier)”. The laying output in % also appears alternatively in the same location.

In the middle **(B)** the current number of eggs is displayed from the sum of the values for each longitudinal belt **(C)**.

At the end of the day, the values are reset to zero.

The colour of a row and tier changes depending on the number of eggs counted (see chapter 1.2.2 "Laying output".

1.2.2 Laying output

The laying output can be calculated from the number of birds, age of the birds and their breed.

To obtain a precise analysis of laying output, the number of birds per row and tier must be kept up to date.

The procedure for moving birds into or out of the house and for specifying birds which have died or been moved out is explained in the production manual.

This manual also explains how to enter the birds' age and breed.

Analysis of laying output is only possible if a reference curve for this breed has been selected (see production manual). If no reference file has been selected, the information on the left-hand side (current reference output with tolerance and control to display the laying output per row and tier) is absent. The individual rows and tiers are then not colour coded according to laying output, and thus remain grey.

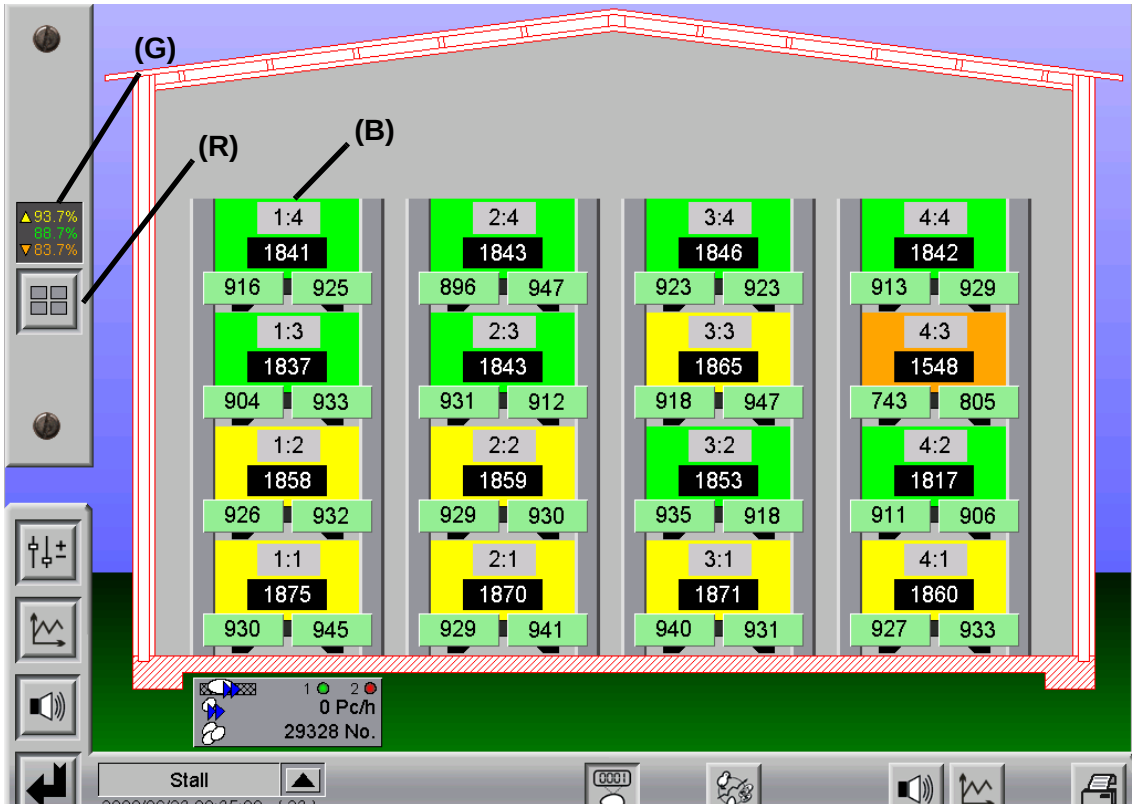


Figure 1-15: Display of laying output

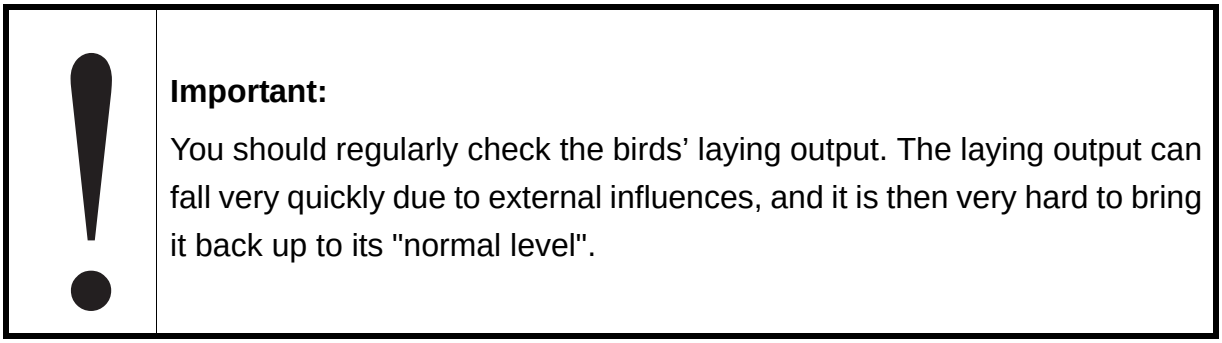
At the left-hand edge of the screen, the current reference output, including a tolerance, is provided **(G)**. This value is read from the reference file for the current age of the bird. The tolerance can be set manually, and is responsible for the colour coding of the rows and tiers.

The colours signify:

Green:	Laying output within tolerance
Yellow:	Laying output above tolerance
Orange:	Laying output below tolerance

Such colour-coding of the rows and tiers allows possible problems to be quickly identified. An issue of greater importance than dirt on the egg counter may be to blame, such as illness, climate, light, water, feed, etc.

There is also a button **(R)** for displaying the laying output for each row and tier. Pressing this displays the current laying output (in %) for each row and tier, instead of the position number (e.g. 2:3) **(B)**.



Important:

You should regularly check the birds' laying output. The laying output can fall very quickly due to external influences, and it is then very hard to bring it back up to its "normal level".

1.3 Optical Egg Sensors (OES)

Alongside simple egg counters, thanks to camera technology, Optical Egg Sensors (OES) can sort the eggs into classes, etc.

If the house is equipped with Optical Egg Sensors (OES), an extra button **(G)** appears on the left-hand side of the overview screen.

Pressing this button opens a selection menu containing the options “Overview", “Statistics", “Addressing" and “Colour-coding".

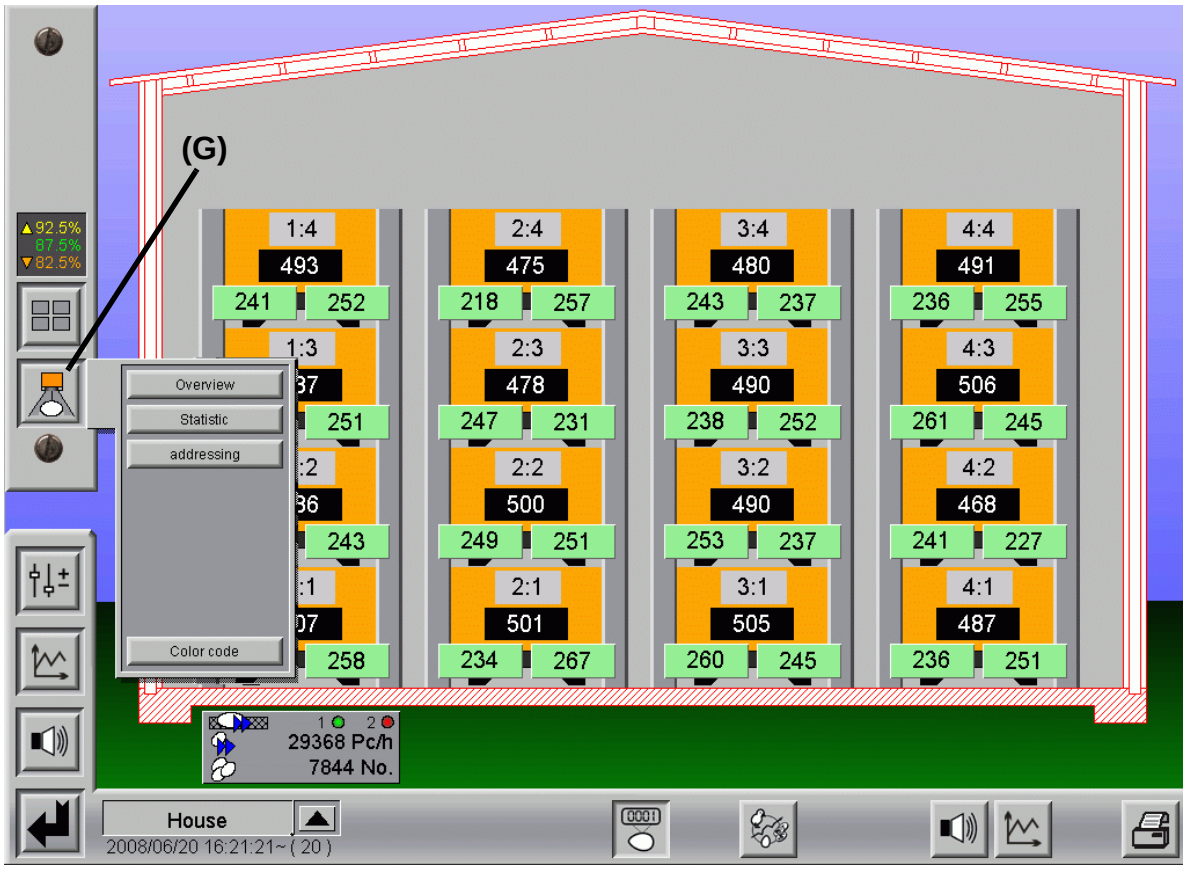


Figure 1-16: Overview of egg counting

1.3.1 Overview

This button switches the overview screen back to the normal view with the current counter values.

1.3.2 Statistics

Pressing this button switches from the view showing the current counter values to a view with data from the production database. Additional information and controls are displayed.

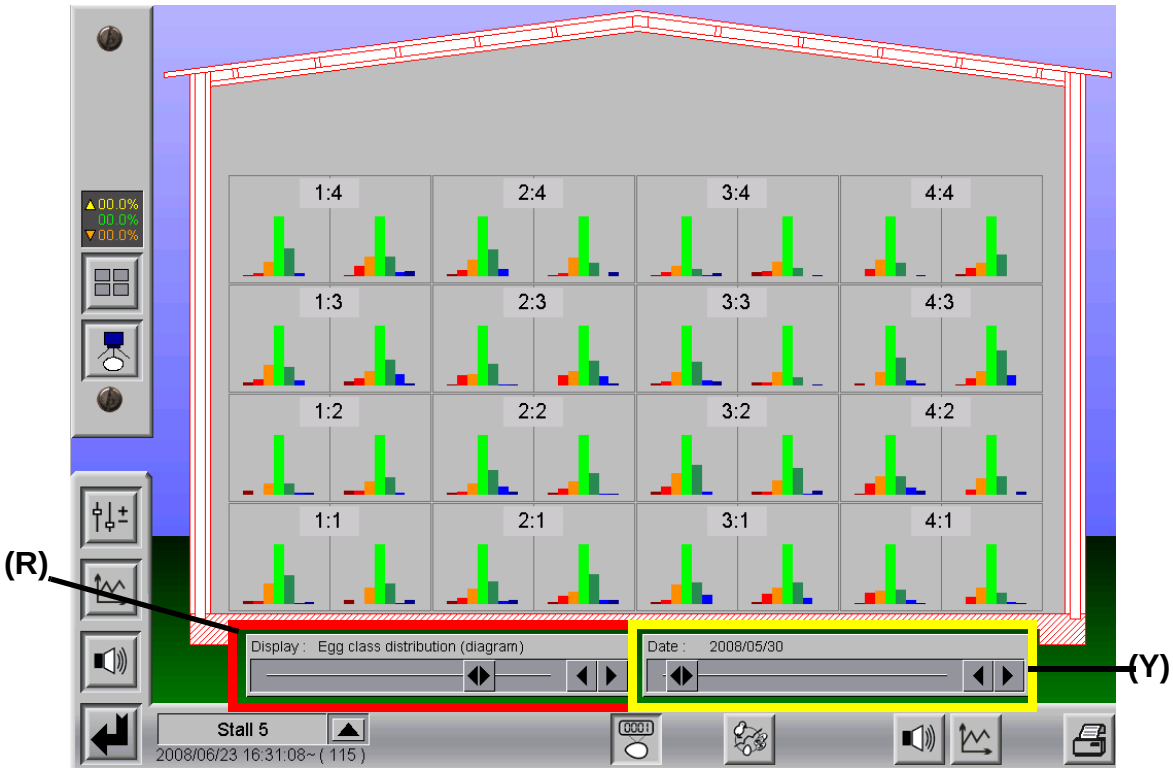


Figure 1-17: Egg class distribution

Two sliders are now displayed underneath the house, which can be used to very easily call up the data from the database.

The left-hand slider (highlighted in red **(R)**) is used to select the value you want to look at.

In addition to the normal value, you can select the values for each class of egg and various graph types for egg class distribution.

The above example shows the egg class distribution in the form of a bar chart.

The right-hand slider (highlighted in yellow **(Y)**) can be used to select a date. Thanks to the user-friendly slider function, it is very easy to illustrate trends which have developed over a longer period of time.

1.3.3 Addressing

This button is only used by the service technician for commissioning the egg counters.

OES configuration cannot be selected by a normal operator, and is greyed-out.

However, it is still possible to address individual OESes, as described in the chapter 1.3.5 "Detailed data for each counter".

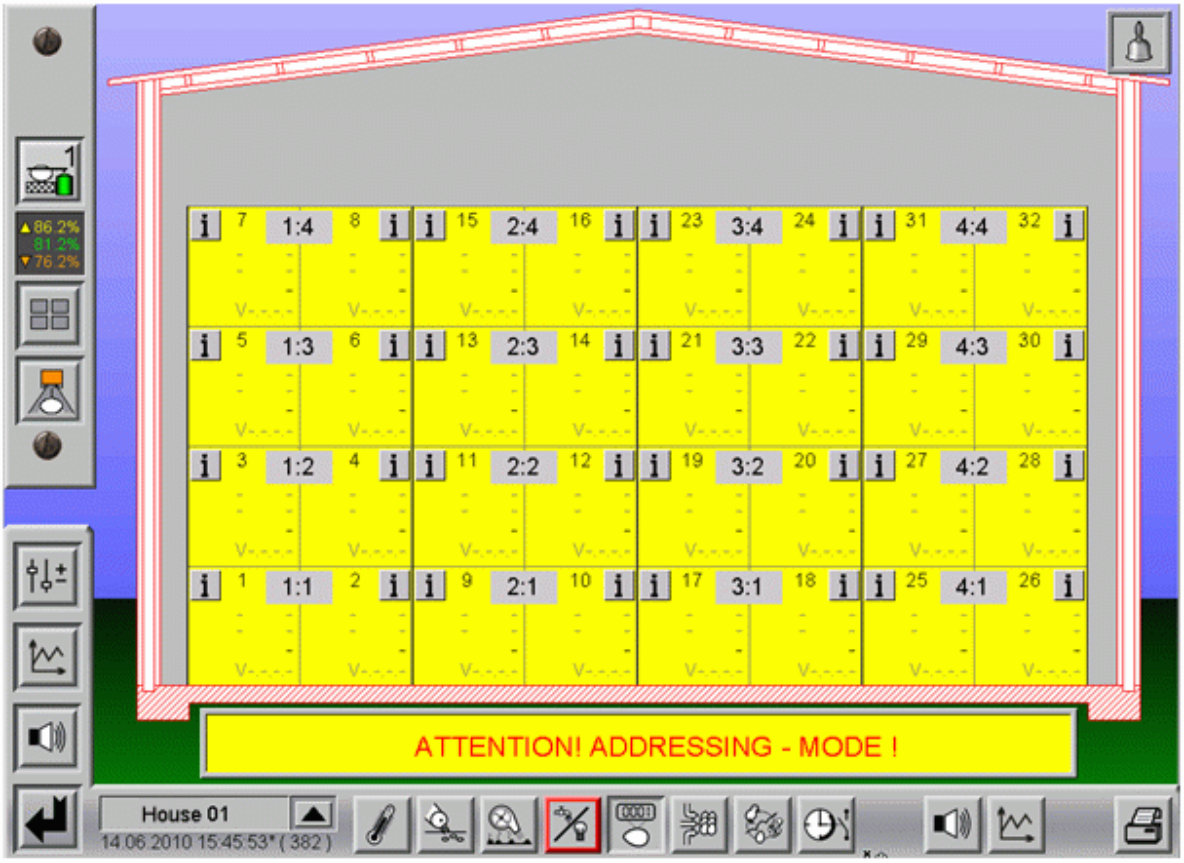


Figure 1-18: Addressing mode

Since the OESes are only connected to the house control system via the network, they must be assigned with a unique position in the house system.

To do this, note the following steps:

a) In order to address the OES to a position in the house, click on the field on which the OES is located.

- The field changes colour from orange to yellow.

b) Then the OES must be connected to the interface module.

Important:

When connecting the OES to the interface module, ensure that you **wait approx. 60 sec.** between plugging in one OES and the next OES.

Only then will the positions in the system be issued properly.

- The OES starts up.

c) When the OES is booted, it obtains an IP address (the DHCP server on the farm controller must be switched on) and is assigned a position in the system as a whole (House - Row - Tier - Left/Right).

d) When the OES has received its IP address and position, the field changes colour from yellow to green.

- The connection is successfully established.

e) Information from the OES is sent to the farm controller and the base unit.

- The top two lines of the field display the IP address.
- The third line shows the last three digits of the MAC address (serial number).
- The bottom line indicates what software version is installed on the OES.

f) Should you wish to address several OESes at once, you can click on the corresponding fields.

The field whose position is issued first gets a 1, the second a 2, the third a 3, etc.

The addressing sequence is always specified as shown in the previous image.

1.3.4 Colour-coding

To give you an overview of the different meanings of the status colours, as you can see in the following image, there is a small overview.

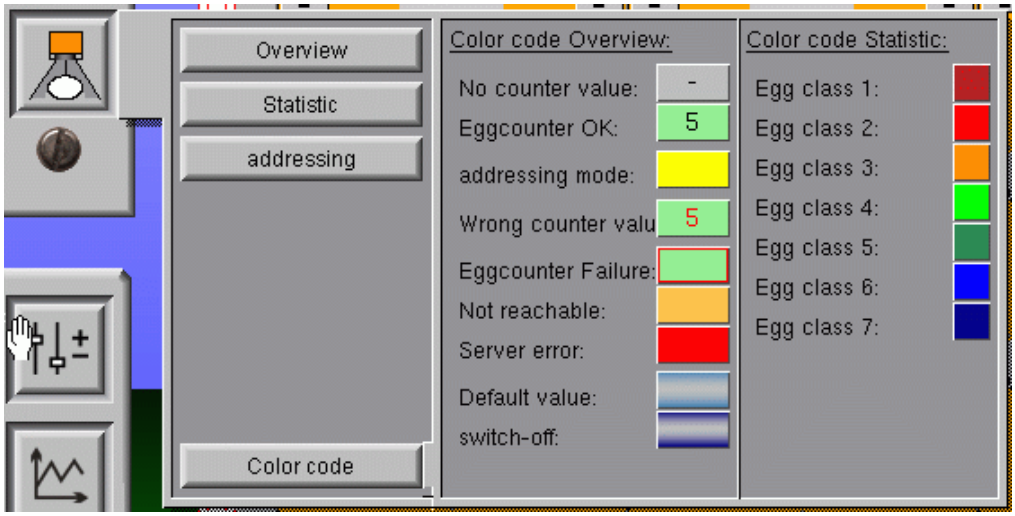


Figure 1-19: Colour-coding

a) **Status colour codes:**

- **No counter value:** egg counter is working properly. No eggs have been counted yet.
- **Egg counter OK:** egg counter is working properly. In the example 5 eggs have been counted.
- **Addressing mode:** the addressing mode was activated for the position.
- **Wrong counter value:** the value of the egg counter deviates too far from the average of the other egg counters in the group of longitudinal belts.
- **Egg counter failure:** the egg counter reports an internal error.
- **Not reachable:** no egg counter is connected, or the egg counter cannot be reached.
- **Server error:** the driver of the egg counter cannot be reached.
- **Default value:** the egg counter has been switched to its default value. The displayed value is the average of all activated egg counter in the group of longitudinal belts.
- **Switch-off:** the egg counter has been deactivated in the software. No eggs will be counted at this position.

b) **Egg-class colour-codes (statistics)**

- **Egg class X:** a simple overview of the colours selected for different egg classes in the statistics.

1.3.5 Detailed data for each counter

Clicking on a counter displays detailed information on that counter.

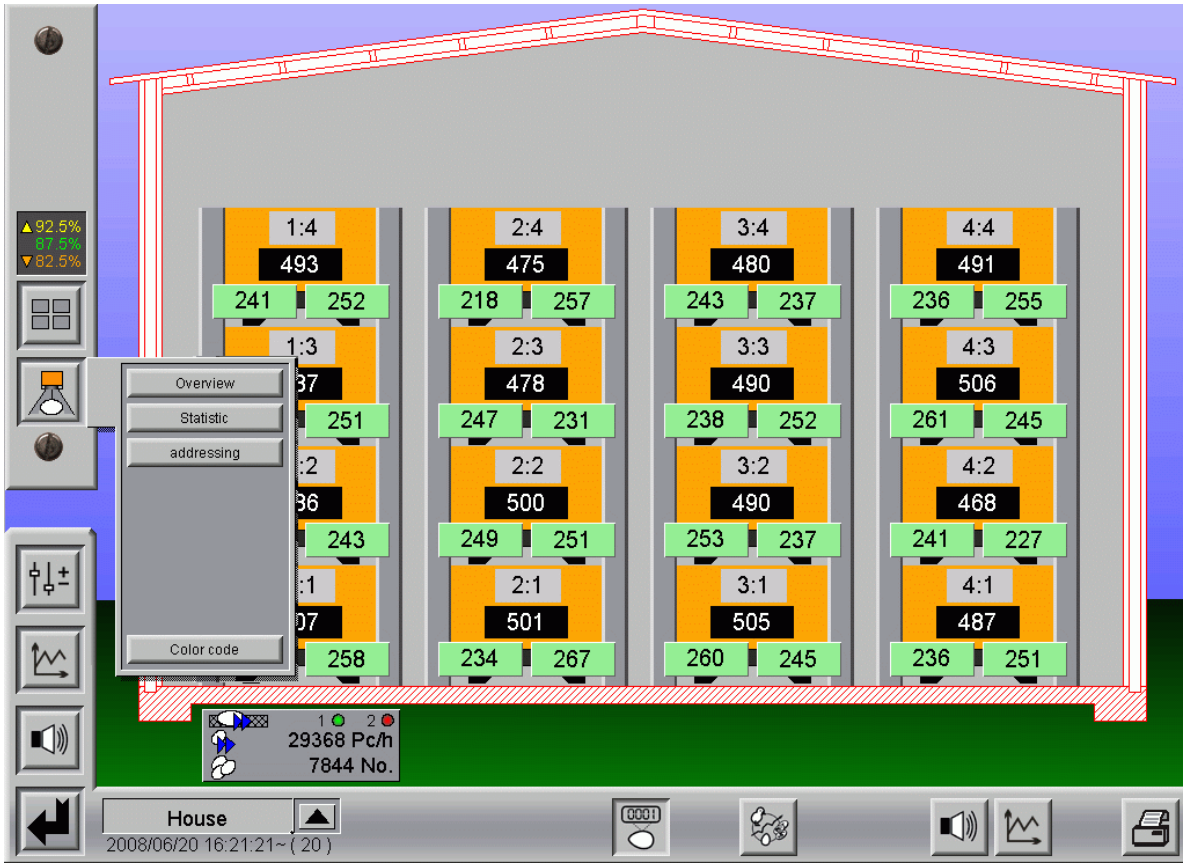


Figure 1-20: Detailed data for each counter

1.3.5.1 Data

The Data screen shows all the information supplied by the OES.

It shows general status, hardware and software information, and the daily and egg class counters.

As well as requesting information, it is also possible to set the OES to the default value from here or to switch it off completely.

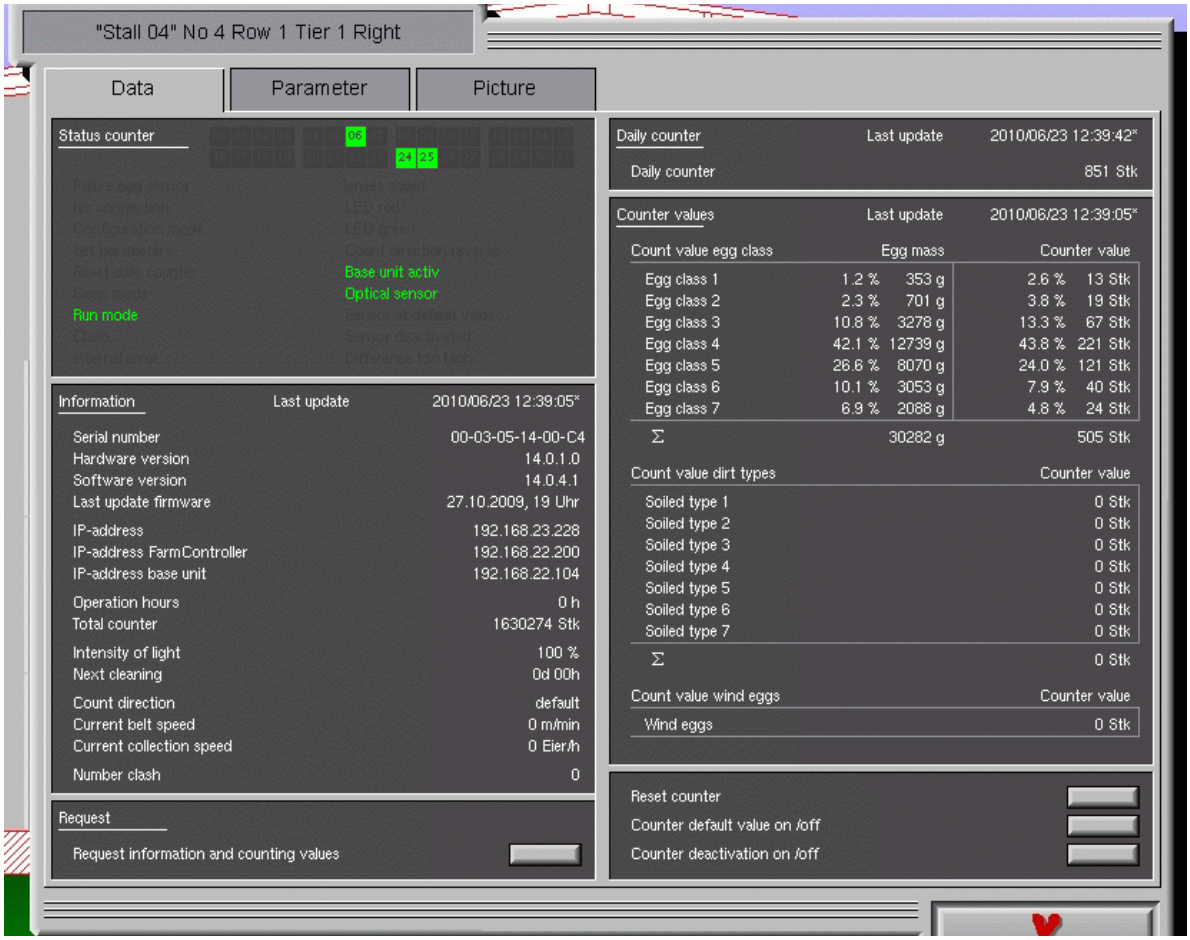


Figure 1-21: OES detailed information

a) **Status counter**

The status information gives a quick overview of the current state and configuration of the OES.

The information is sent from the OES to the farm controller, and vice-versa.

The colours signify:

- **Green =** all functions/settings are working properly.
- **Yellow =** parameters which are set on the OES.
- **Light blue =** position switched to default value.
- **Dark blue =** position was switched off.
- **Orange =** internal error in the OES.
- **Red =** function not reachable.

This menu contains three status fields: Farm controller, OES and Base unit.

The information appears multiple times, as each unit sends and receives status messages and settings.

b) **Information:**

This is where you can find the serial number, hardware and software version, the IP addresses, and the OES-specific settings for each counter. The values shown are only for informational purposes.

c) **Requests:**

All values are updated when the menu is opened. Pushing the “Request" button requests the information and counter statuses again and updates them.

“Date" and “Last update” show the last time information was requested.

The status information and daily counter are continually updated.

d) **Daily counter:**

The daily counter shows how many eggs the OES has already counted. At the end of the day or if a reset is performed, this value is set to zero.

e) **Counter values:**

The counter values indicate which egg classes the OES has sorted the counted eggs into, whether any soiled eggs have been counted and how many wind eggs this included.

The eggs are sorted into the different classes depending on the parameter settings.

f) **Set status:**

In the event of an error, you have the option to reset the OES, to set it to the default value or to switch it off.

- **Reset OES:** All counter values are set to zero.
- **Set OES to default value**: The counter value is ignored and the average value of all active egg counters in the same group and house is used.
- **Switch off OES**: The computer sets the values for the position permanently to zero.

1.3.5.2 Parameter

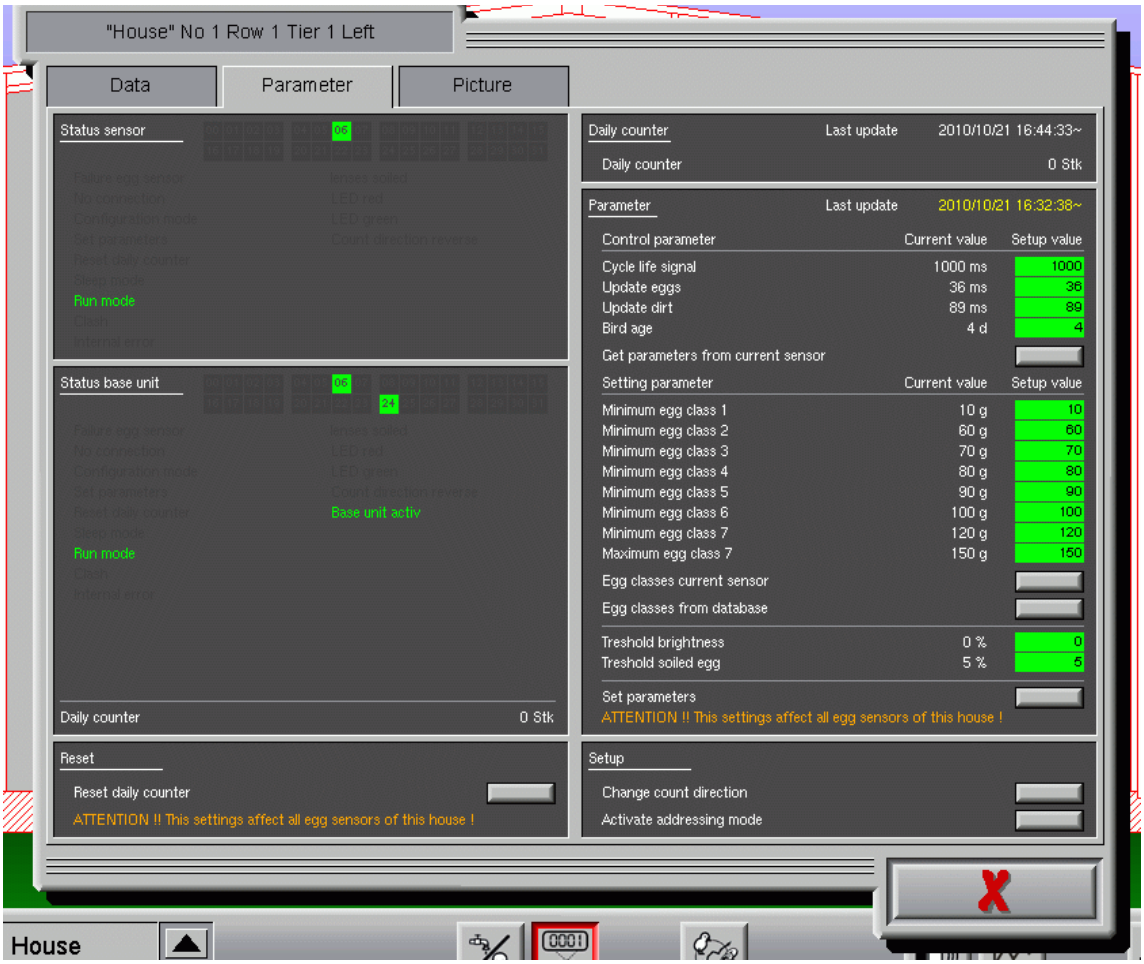


Figure 1-22: OES setting parameters

a) **Status sensor**

The status information from the OES provides a rapid overview of the current state and configuration of the OES.

The information comes straight from the OES or from a base unit.

The colours signify:

- **Green =** all functions/settings are working properly.
- **Yellow =** parameters which are set on the OES.
- **Orange =** internal error in the OES.
- **Red =** function not reachable.

This menu contains three status fields: Farm controller, OES and Base unit.

The information appears multiple times, as each unit sends and receives status messages and settings.

b) **Reset**:

Pressing the Reset button resets all OESes in the house. This means that all OES daily values are set to zero.

c) **Daily counter**:

The daily counter shows how many eggs the OES has already counted. At the end of the day or if a reset is performed, the value is reset to zero.

d) **Parameters**:

This is where you can see how the OES is configured. The left column displays the values which the OES is currently working with.

In the right-hand column, when the field is green, it is possible to change the value.

If the field is grey, you do not have authorisation to modify this setting. The settings in this menu are only saved to all OESes in the house by pressing the “Set parameters" button. The value will then be displayed in the left-hand column. Under Control parameters, you can set the threshold for the brightness at which the alarm will be triggered. The alarm is triggered if the picture deviates too far from the default.

It is also possible to enter a threshold for egg soiling here, so that the soiled eggs can be categorised. If the button “Get parameters from current sensor" is pressed, the entries are deleted and overwritten with those of the OES. The setting parameters are used to arrange the measured eggs into egg classes. The button “Egg classes from database” overwrites the values of the egg classes with those from the production database.

e) **Setup**:

When installing OESes, you may have issues with the cable in certain positions.

There is no rule that the OES has to count from left to right, or vice-versa; the count direction can be changed.

To change this setting, simply press the “Change count direction" button. You will see an indication in the status fields that the count direction has been changed.

If the count direction is not changed, the OES detects automatically after 100 eggs that it is not counting properly and changes the count direction automatically.

The **"Default"** count direction means that the cable of the OES is pointing in the direction from which the eggs are coming.

The Changed count direction means that the eggs are running in the same direction as the cable.

If you do not have input authorisation for the addressing mode of the OES, you are given the option again here to address a particular OES.

Clicking on the “Activate addressing mode” button means that the next OES which is plugged into the interface module is addressed to this position.

You can find more information on addressing in chapter 1.3.3.

Pressing the “Activate addressing mode" button again or closing the menu deactivates addressing mode.

1.3.5.3 Picture

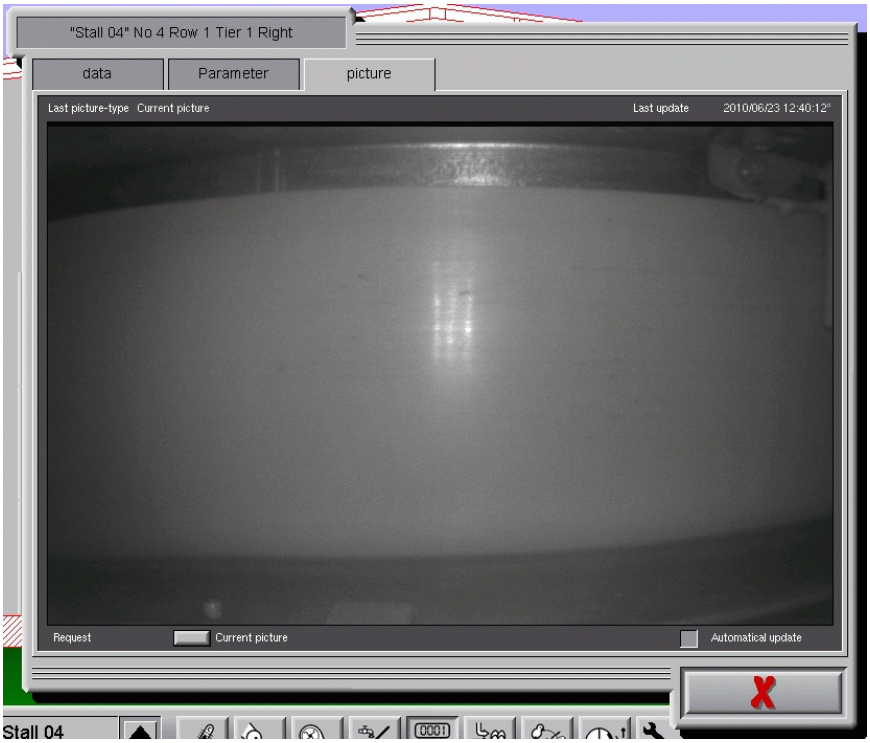


Figure 1-23: OES picture

Via menu item “Picture”, you can call up a current picture of the OES. In order to request a current picture, you need to press the button “Request … Current picture” at the bottom of the menu.

While the picture is loading, its status is displayed at the top left of the menu.

“Current picture” means that the image has been transferred.

“Unknown” means that a picture could not be loaded.

The date and time when the picture was taken is displayed in the top right. If the text is white, the picture is current. Yellow means that the picture is older than 5 minutes, and red that it is older than an hour. If you want the picture to update automatically every 5 seconds, “Automatic update" must be activated, followed by clicking once on “Request … Current picture".

A current picture is called up and the timer counts down until a new one is loaded.

1.4 Manual operation

If you only have an egg-counting system, counting is its sole function. In this case, there are no active elements which can be controlled by hand.

If your configuration is a combined egg collection and counting system, you will also be able to operate the longitudinal belts manually from the overview screen.

1.5 Settings

You can use the button **(R)** with the two sliders at the left side of the screen to switch between the settings and the overview screen for the production area in question.

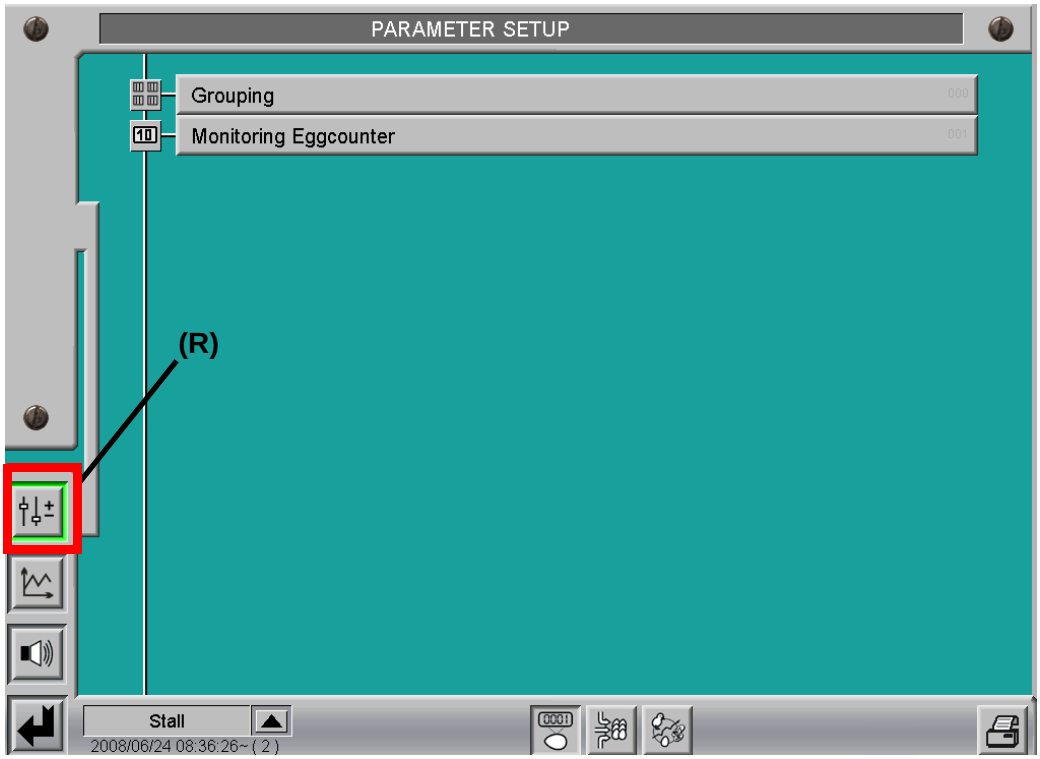


Figure 1-24: Selecting settings

1.5.1 Monitoring the egg counter

Inside the settings menu, you can set various parameters for monitoring and analysing the egg counters.

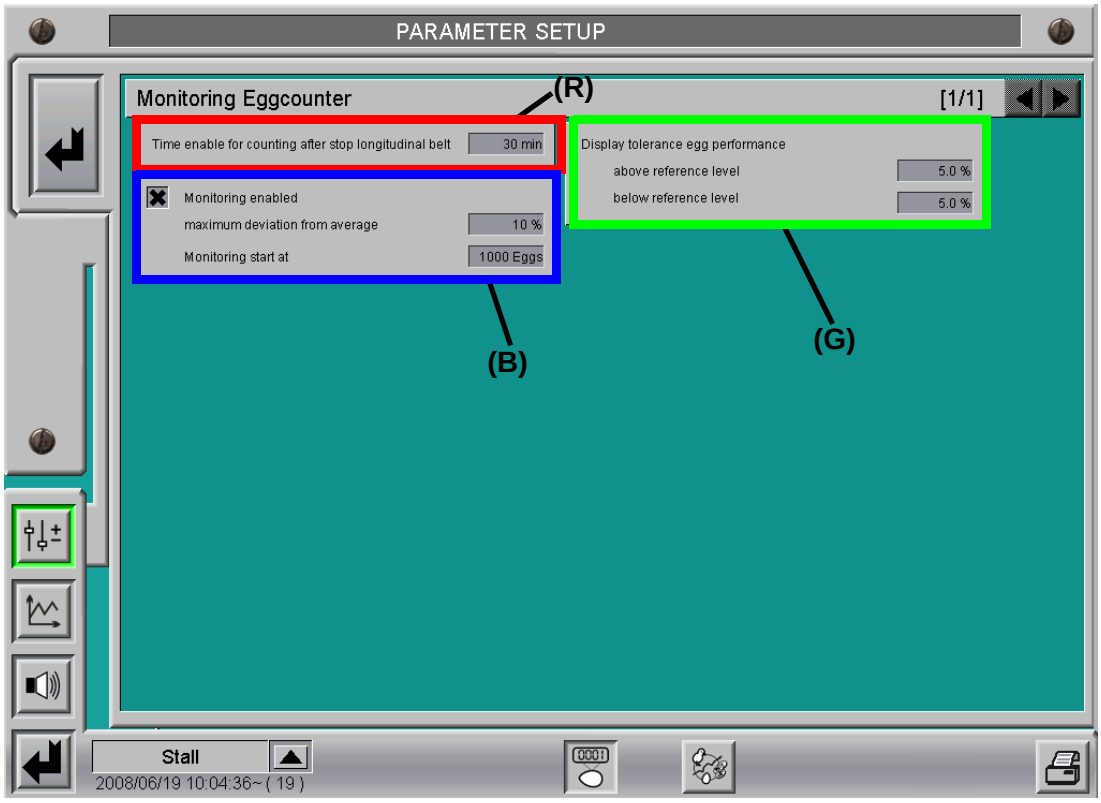


Figure 1-25: Monitoring the egg counter

First of all, you can set the **"Time enable for counting after stop longitudinal belt" (R)**. This specifies for how long after shutdown of a group of longitudinal belts, counting values should still be accepted as eggs.

This delay is necessary, because rolling eggs or other electromechanical time lags in the longitudinal belt drive, can cause eggs to still be counted after shutdown. Disabling counting is desirable so that things other than eggs (e.g. mice) are not counted while collection is halted.

These settings **(B)** only appear if more than one counter is installed per house, because such an analysis would otherwise have no content, thus making it superfluous.

If monitoring is active, the egg counters are continually compared with the average value for their associated group of longitudinal belts.

If the deviation exceeds the maximum permissible value, an alarm message is issued.

The associated value is then displayed in red on the overview screen. Such deviations may be caused by faulty counters (dirt, orientation, defect) or also by torn or jammed longitudinal belts.

Since when collection starts the percentage differences are significant, you can set a value at which monitoring should begin. The adjustable value corresponds to the average of the eggs counted per row and tier of a group of longitudinal belts.

You can also set the tolerance limits for displaying laying output in the overview screen **(G)**. These settings only appear if a reference file for laying output has also been selected.

1.6 Production data

The egg numbers are stored in the house's production database. They can be called up from each house's main production screen **(R)**.

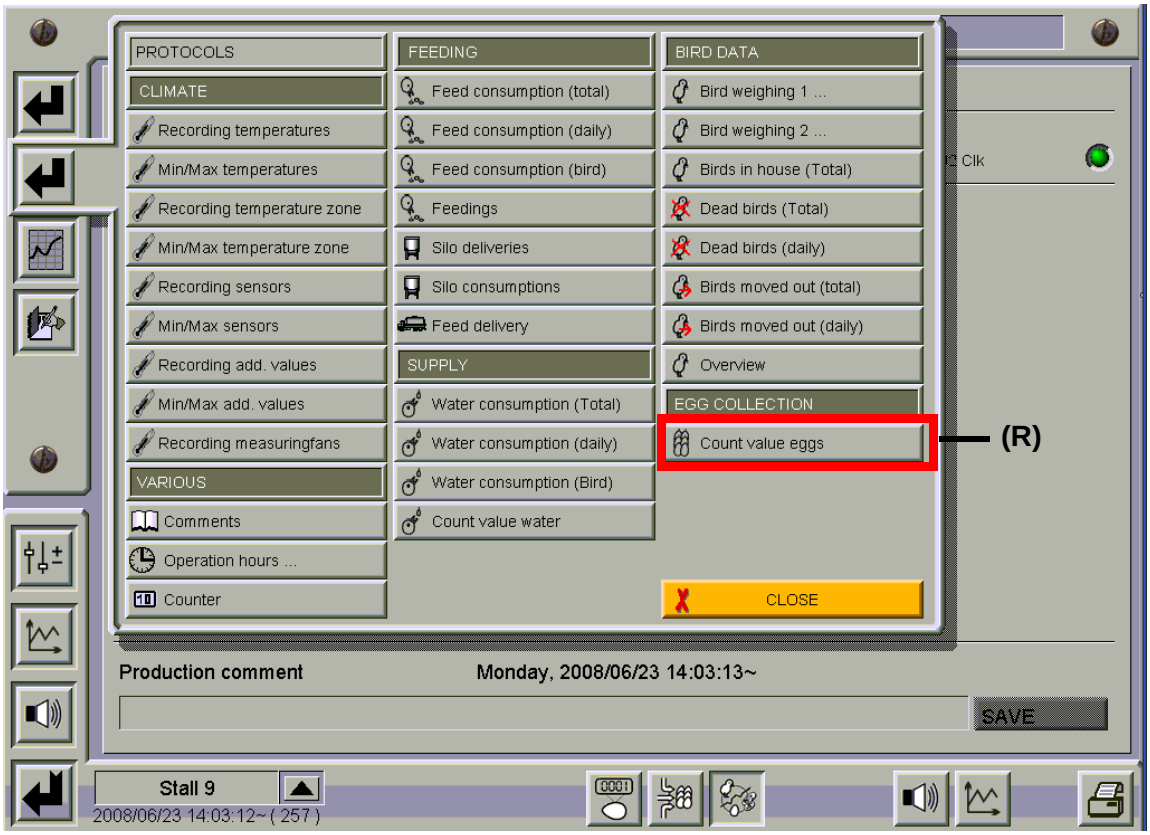


Figure 1-26: Selecting production data

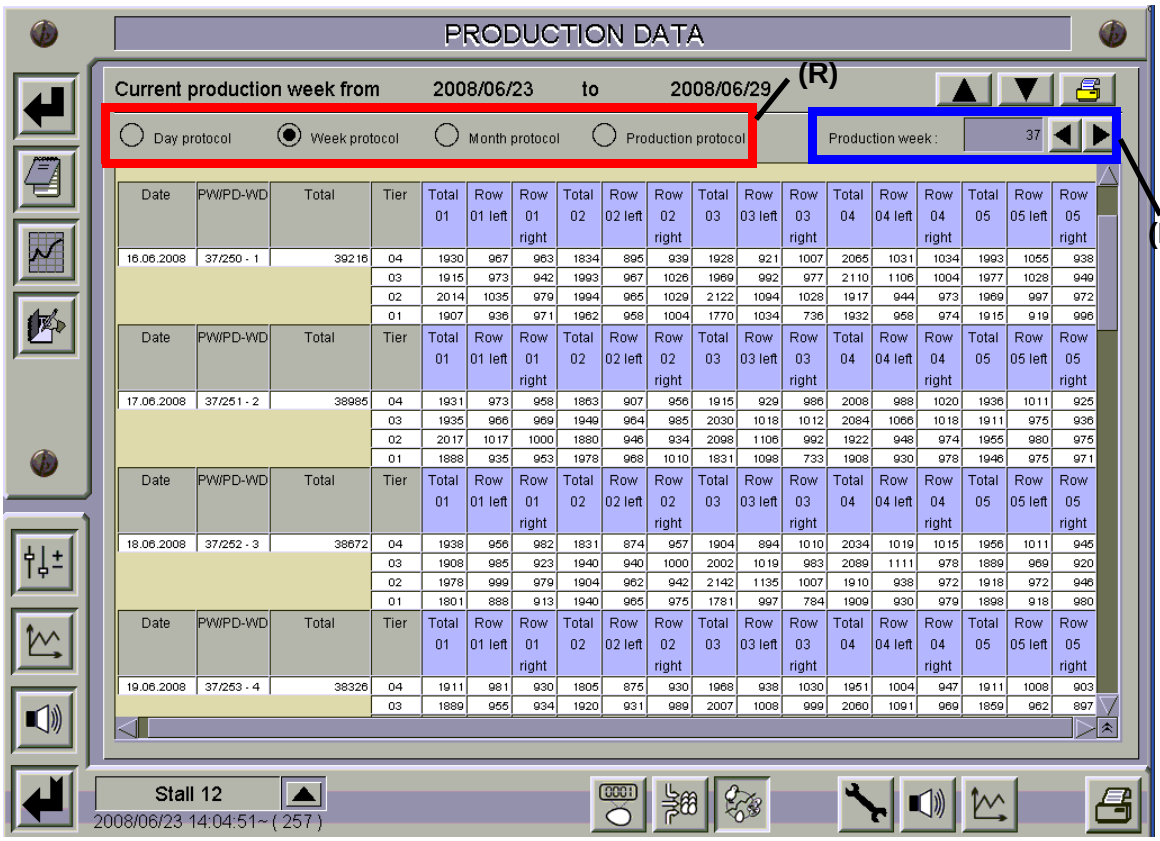


Figure 1-27: Table of production data

This example shows a house with five rows and four tiers in which the eggs are counted separately on each longitudinal belt.

If the numbers of rows, tiers and counters differs from this example, the view will be automatically adjusted accordingly.

This data can be output in the form of a daily, weekly, monthly or production protocol **(R)**.

On the weekly protocol displayed above, you can change which production week is displayed **(B)**.

At this same point on the daily protocol, the date can be selected accordingly.

You can also use the values from the production databases to generate curves.

The follow image shows the laying output for a house **(P)** alongside the reference laying output **(O)**.

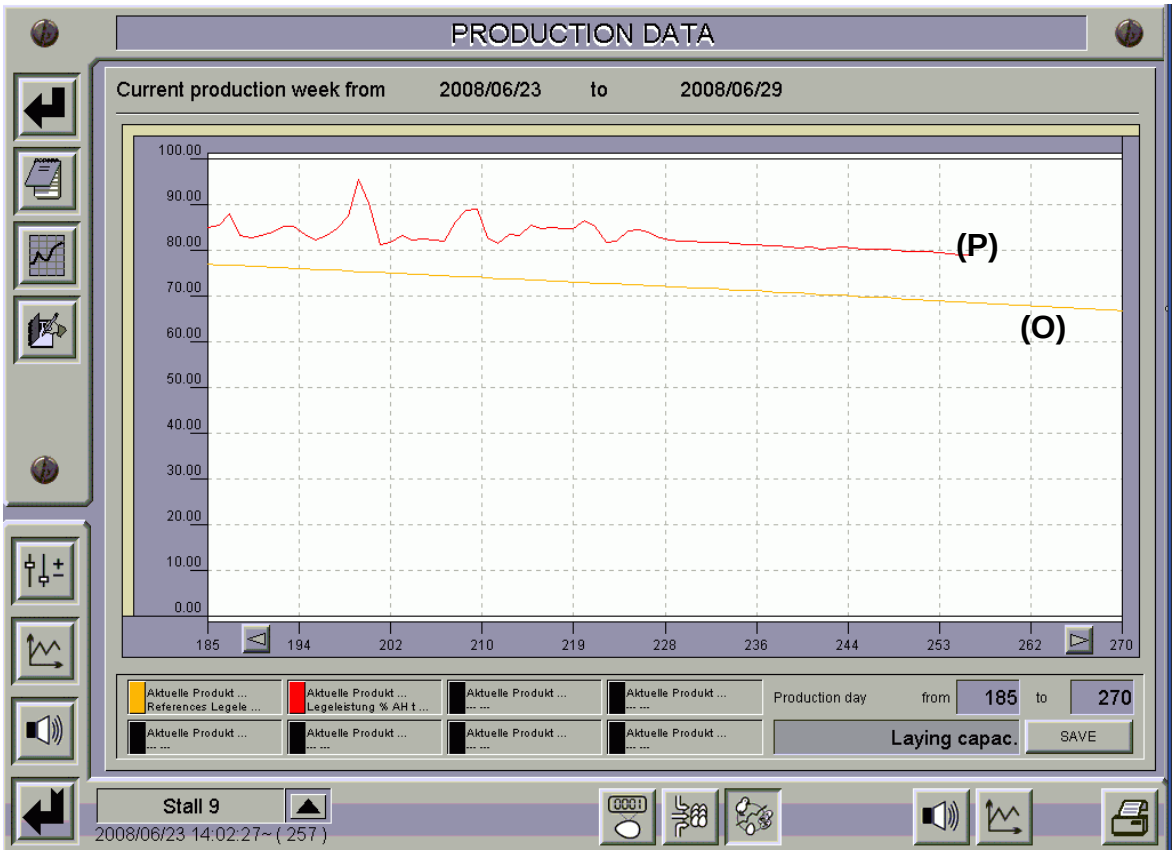


Figure 1-28: Production data displayed as a curve

Ten such charts can be defined per house. In each chart you can compare eight production values.

This gives you a free choice of which data is displayed. For example, you could also compare the values per row and tier, the laying output with the climate values, the values for different houses, the values for past production with the latest values, etc.

How to generate these curves is described in detail in the production manual.

1.7 Alarms

The button with the alarm symbol **(R)** at the left-hand edge of the screen, allows you to switch back and forth between the alarm settings and the overview screen for the production area in question.

The alarms which have a particular bearing on egg collection are described here. You can find additional descriptions on the alarm settings in the chapter “Alarm menu” of the user manual.

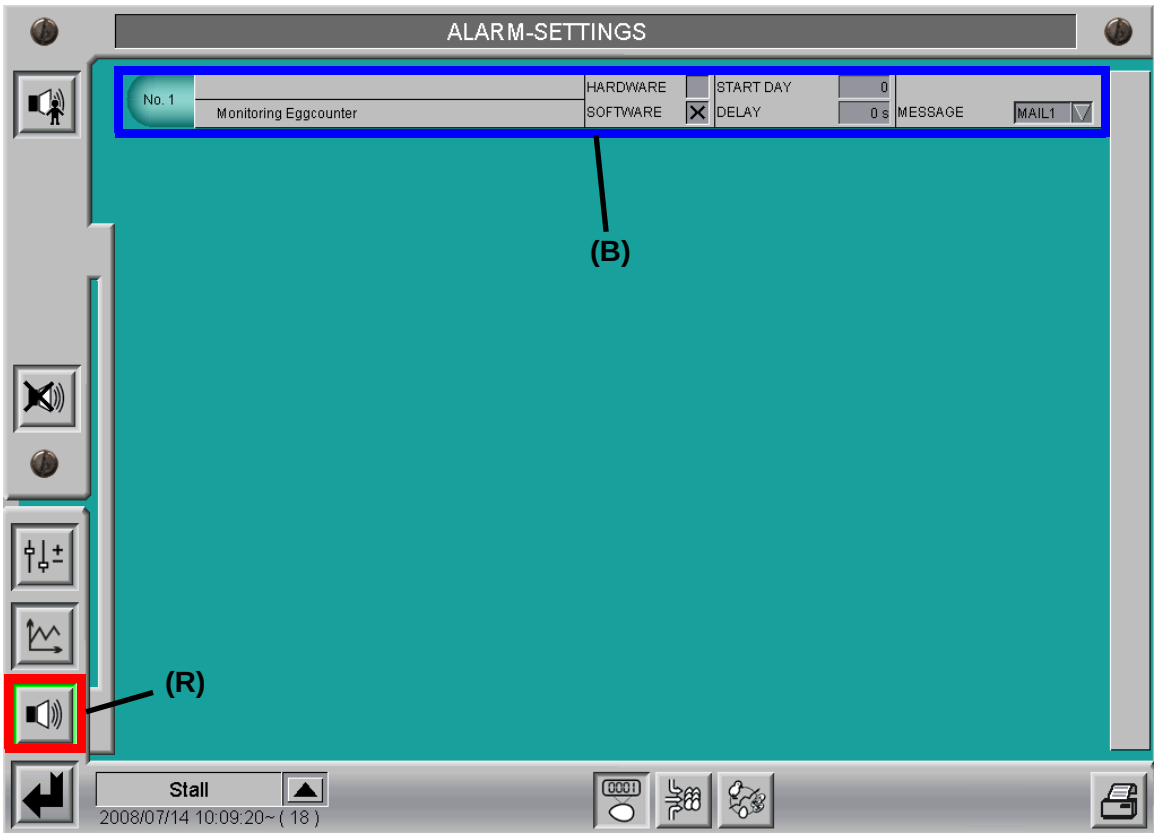


Figure 1-29: Alarm settings

Monitoring egg counter (B):

This alarm only appears if more than one counter is installed per house, because such an analysis would otherwise have no content, thus making it superfluous.

The egg counters are continually compared with the average value for their associated group of longitudinal belts. If the deviation exceeds the maximum permissible value, an alarm message is issued.

The associated value is then displayed in red on the overview screen.

Such deviations may be caused by faulty counters (dirt, orientation, defect) or also by torn or jammed longitudinal belts.

1.8 Notes

2 Single-house egg collection

In the case of single-house egg collection, the system is “released” to begin collection via an input signal. The longitudinal belts, which are controlled by a frequency converter, are then actuated so as to maintain the desired egg output for the particular house.

When the progress of the longitudinal belts reaches 100%, collection is complete and the longitudinal belts are switched off.

If two groups of longitudinal belts are installed they run successively.

2.1 Overview screen

There is no separate overview screen for single-house egg collection. Controls for operating and displaying the status of the longitudinal belts appear under the house in the egg counting overview screen.

The following screens show a house with two groups of longitudinal belts. If there is only a single group of longitudinal belts, the second is not displayed.

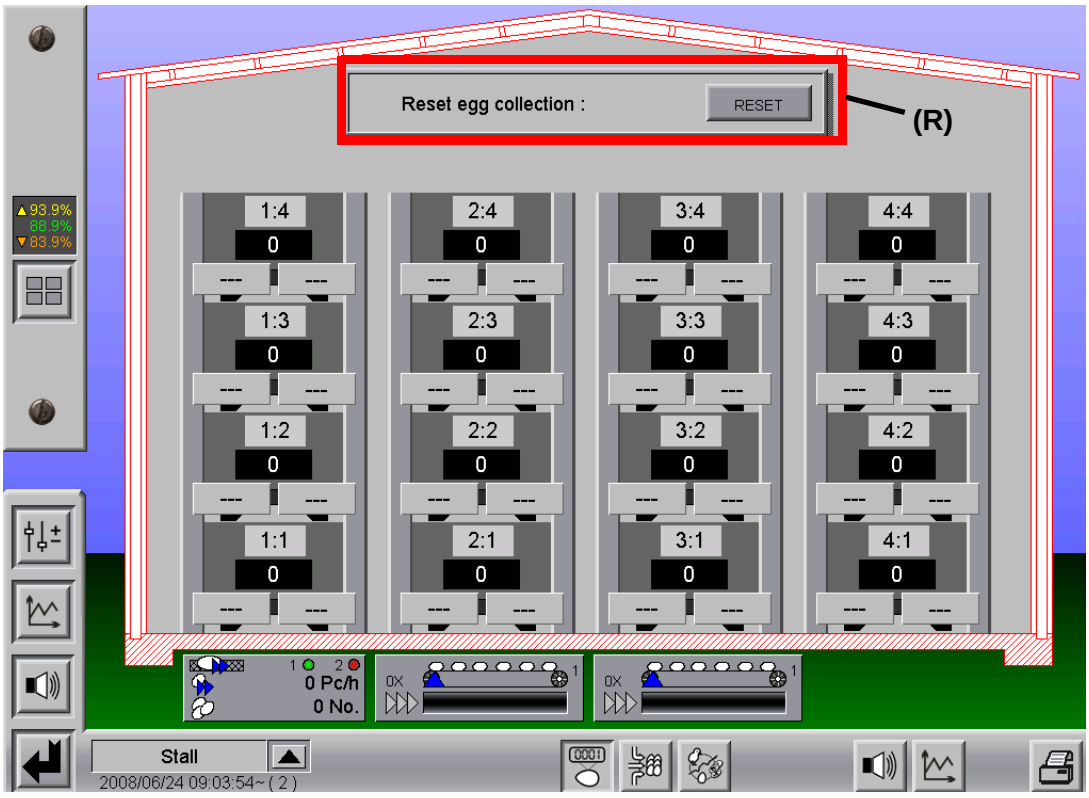


Figure 2-1: Overview screen for single-house egg collection

2.1.1 Resetting egg collection

Normally the status of egg collection is reset at the end of every day. Using this control, you have the option to reset the progress of the longitudinal belt to zero again (**(R)** in the previous image).

The egg counter values are retained, they are only reset at the end of the day.

This simple operation makes it possible to repeat a collection which has already been started or finished. Pressing the button issues a safety prompt in order to avoid unintentional reset.

2.1.2 Longitudinal belt status

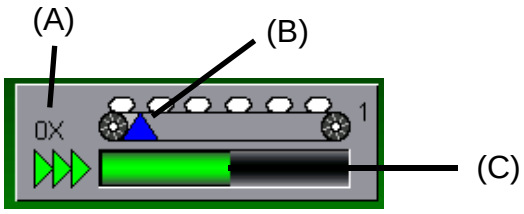


Figure 2-2: Longitudinal belt status

Number of cycles (A):

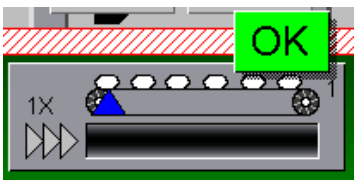
An indicator shows how many cycles the longitudinal belt has already made. During a normal collection, this will read "0X", because the longitudinal belt only cycles round once from 0 to 100%. If the longitudinal belt is controlled manually or the collection is reset, it is of course possible to allow the longitudinal belt to continue running. In this case, the actual number of cycles is displayed here.

Longitudinal-belt progress (B):

The blue triangle represents the progress of the longitudinal belt. During collection, it progresses from left (0%) to right (100%). Once the longitudinal belt has cycled once, it starts to run again from left to right, and the cycle counter increments.

Longitudinal belt speed (C):

The green bar shows the current speed setting for the longitudinal belt.



End-of-collection status:

Once collection has finished for a particular longitudinal belt, this is displayed in the longitudinal-belt status indicator by "OK".

Figure 2-3: Longitudinal-belt end-of-collection status

2.1.3 Overview screen during collection

During collection, additional controls appear in the gable of the house.

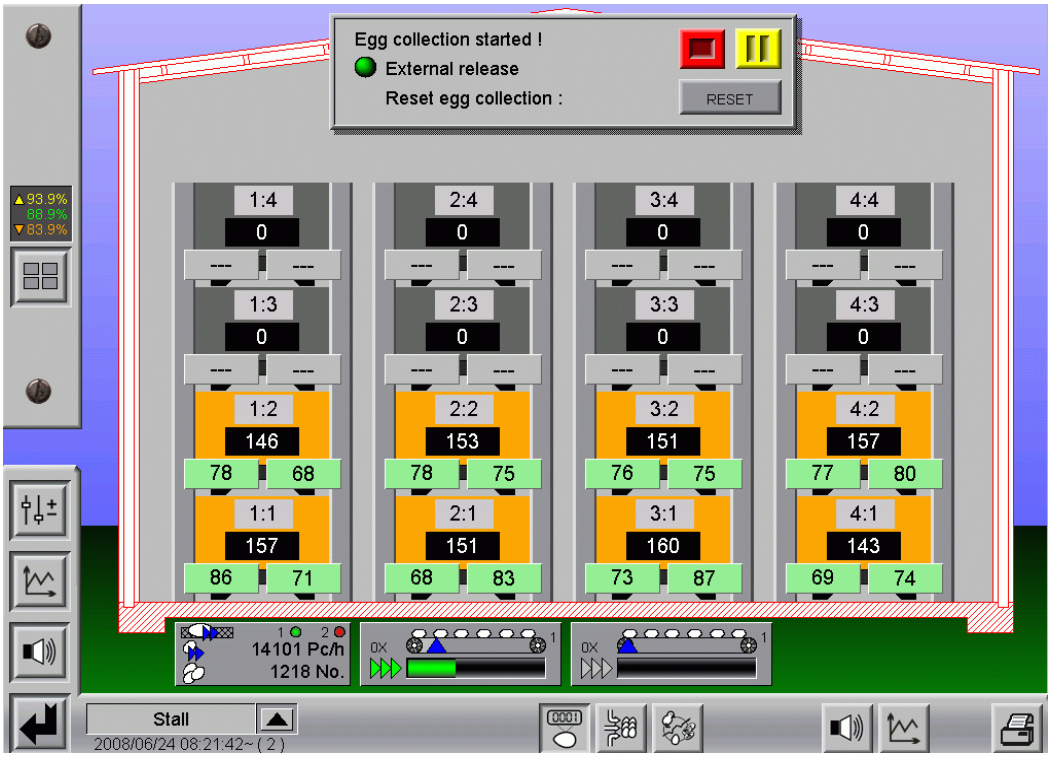


Figure 2-4: Overview screen during collection

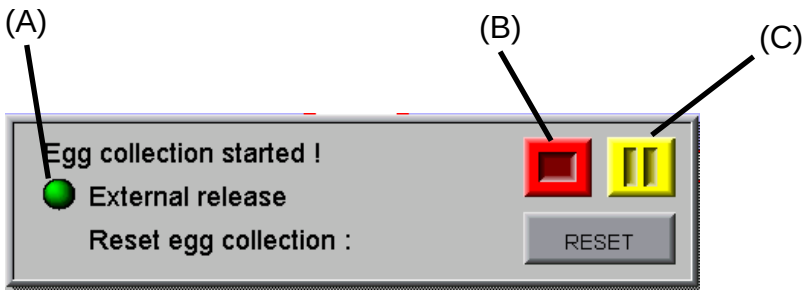


Figure 2-5: Control

External release (A):

Collection begins as soon as the “release” is received via an input signal. This “release” may be issued right from a packer or grader or by a button, operated manually.

The dot and its colour represent the input signal for external “release” visually:

Point = red: no release
Point = green: release

If the “release” is revoked during collection (e.g. “disturbance” on the grader), the longitudinal belts are stopped. They only restart after another “release” is received.

Abandon collection (B):

Pressing this button abandons the current collection process for all longitudinal belts in the house and indicates that it has been stopped. When the button is pressed, a safety prompt is issued in order to avoid accidental presses.

Pause collection (C):

Pressing this button pauses collection and halts the longitudinal belts. A start button for resuming collection then appears in the place of the pause button.

2.2 Manual operation

The longitudinal belts can be controlled manually from the overview screen.

With a simple click of the mouse on the longitudinal-belt status indicator, underneath the house, a controls opens allowing you to conveniently switch the longitudinal belt from Automatic to Manual mode and back.

In Manual mode, by simply moving the slider, you can adjust the speed of the longitudinal belt.

Once the longitudinal belt is set to Manual mode, its status indicator turns orange **(R)** and an orange dot **(B)** appears in the bar at the bottom of the screen, in order to inform the operator that something is not set to Automatic mode in this part of the system.

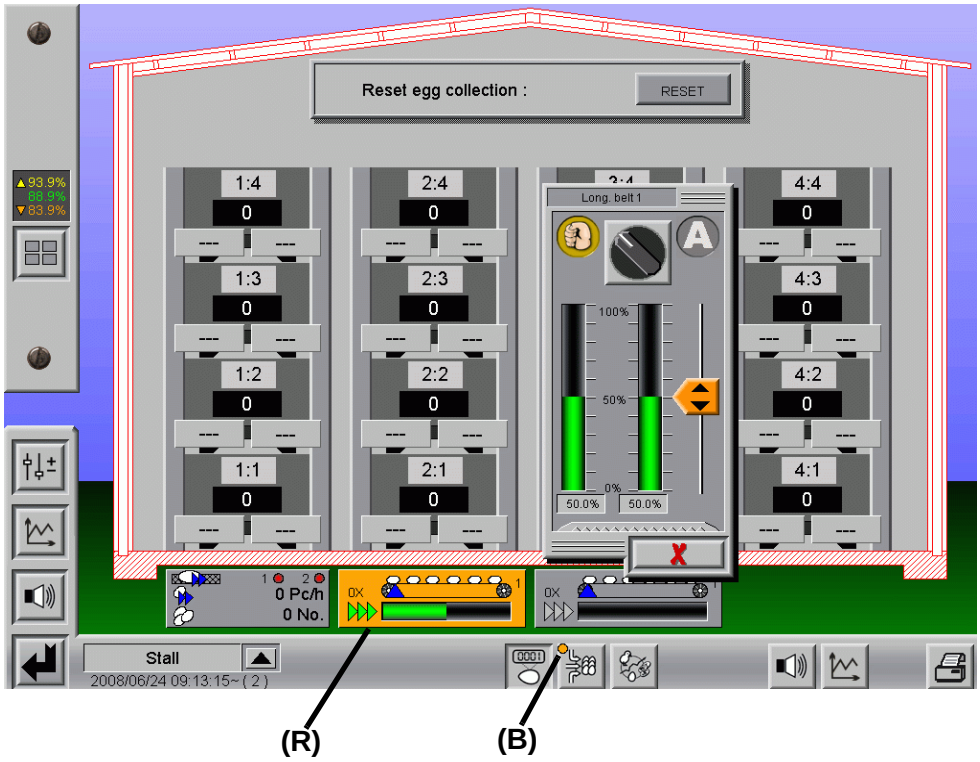


Figure 2-6: Manual mode for the longitudinal belts

2.3 Settings

While there is no overview screen for single-house egg collection, there are certainly menus for collection settings.

The button with the two sliders **(R)** at the left-hand edge of the screen, allows you to switch back and forth between the settings and the overview screen for the production area in question.

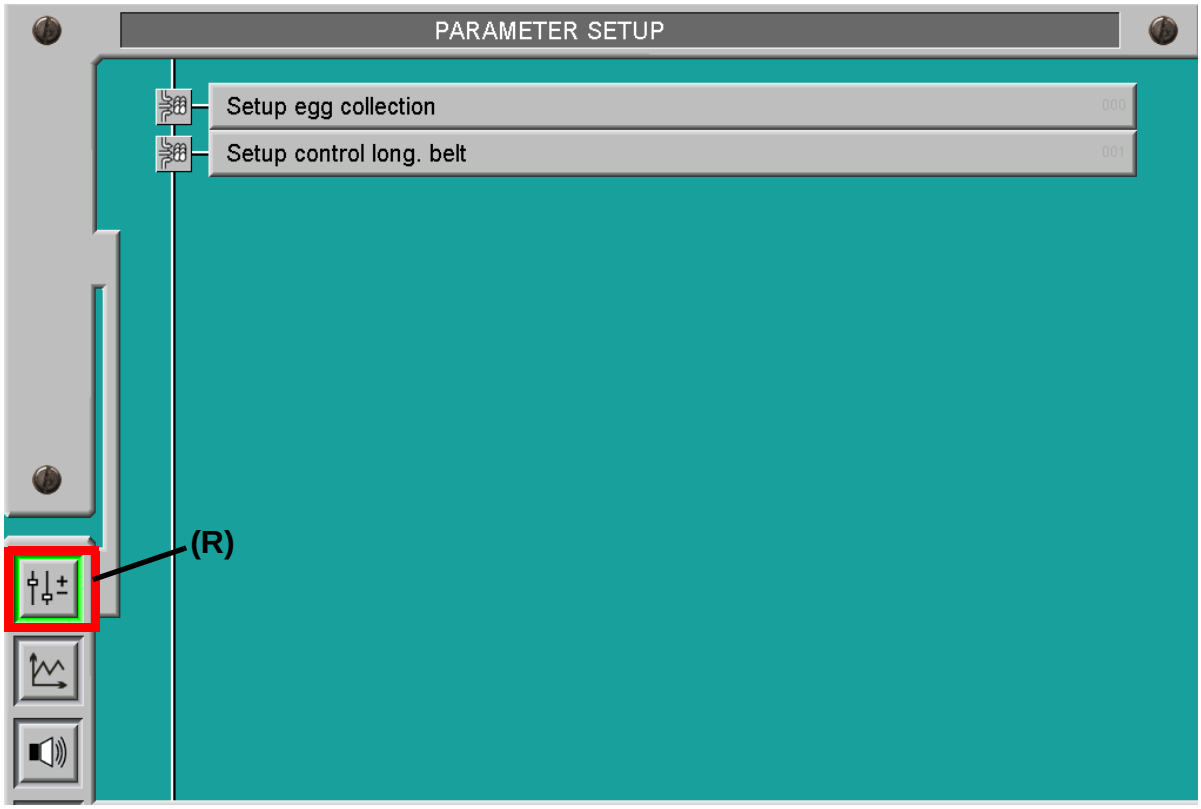


Figure 2-7: Selecting settings

2.3.1 Setup egg collection

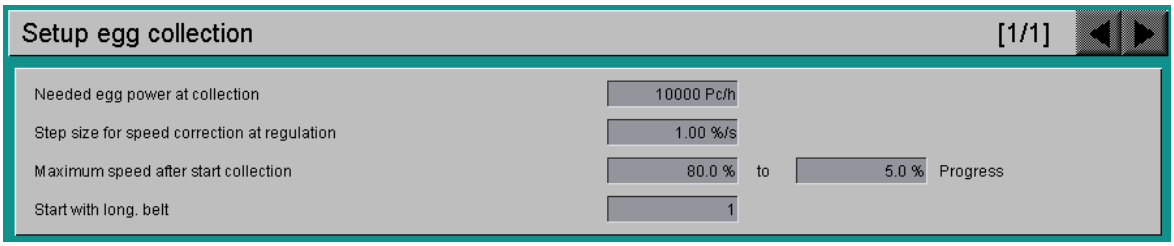


Figure 2-8: Setup egg collection

Needed egg power at collection:

This is where you can set the desired egg “power” (output) during collection, in eggs per hour. This setting is determined by various factors, such as elevator power, cross belt capacity, grader output, etc.

Step size for speed correction at regulation:

Automatic mode causes the desired egg output to always be maintained by correcting the speed of the longitudinal belt.

Using these parameters, you can configure with what level of sensitivity the system should react to variations in the flow of eggs measured by the egg counters.

The value describes the influence of the required speed correction in percent per second on the current speed.

Maximum speed after start collection:

Since it always takes a certain time until the eggs reach the counter and the current egg output can be calculated, you have the option here to specify a set speed for the first so many percent of longitudinal-belt progress. In the above example, the longitudinal belt is operated for the first 5% of belt progress at a speed of 80%.

Start with long. belt:

This setting is only displayed if the house is configured with two groups of longitudinal belts.

This is where you can specify which group of longitudinal belts collection should begin with.

2.3.2 Setup control long. belt

The following screen shows the settings for a house with two groups of longitudinal belts.

If there is only a single group of longitudinal belts, the settings for the second are not displayed.

You can determine the progress of the longitudinal belts by two methods:

1. By time
2. Using pulse counters

Both methods are represented in the following image for clarification.

For longitudinal belt 1, the progress of the belt is determined using the time elapsed and the drive speed.

For longitudinal belt 2, a pulse counter is installed to measure the progress of the belt.

You can calculate the progress of the longitudinal belt by time (e.g. if there is a fault with the pulse counter) at any stage by unchecking the box “Belt progress with pulse counter".

For this reason, during commissioning, the values for calculating belt progress by time must also be determined and entered.

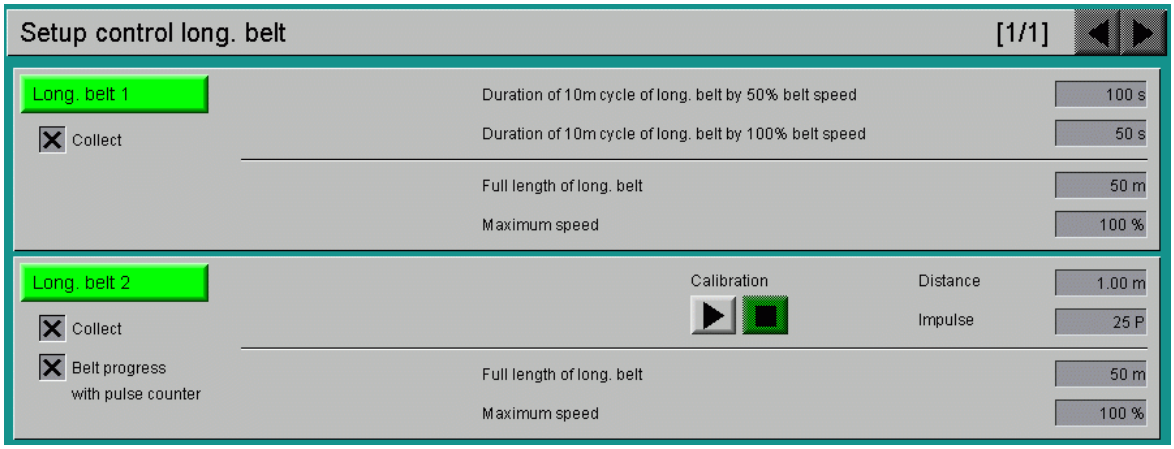


Figure 2-9: Setup control long. belt

Collect:

If there is no checkmark here, this group of longitudinal belts will not be activate during collection.

This makes it possible, for instance, to deactivate empty houses.

Full length of long. belt:

This is where the length of the longitudinal belt is entered, from the furthest back block of a row up to the point the eggs are handed over to the cross belt, elevator or collecting table. This information is required so that the system recognises when a longitudinal belt has completed a full cycle.

Maximum speed:

If necessary, you can enter a limit on the speed of the longitudinal belts here.

Calibration of belt progress by time:

Duration of 10m cycle of long. belt at 50% belt speed and Duration of 10m cycle of long. belt at 100% belt speed:

These settings are used to calibrate the longitudinal belts. Calibration is achieved by means of time/distance measurements with two support points, from which the system can calculate a curve.

The process is very simple, and generally only needs to be performed once during commissioning by the service technician. The longitudinal-belt speed must also be manually set to 50% or 100%. Finally, the time taken to complete a distance of 10m is measured and entered here.

Belt progress with pulse counter:

Start / Stop calibration

In order to start calibration, the longitudinal belt must be in Automatic mode.

Once calibration is started, the stop button has a red background until the pulse is actually registered.

If the stop button is pressed during this period, calibration is cancelled and the old calibration values are retained.

After the start phase, the stop button turns green; you may now stop calibration at any time.

The number of pulses is then carried over. The distance travelled must then be entered manually.

The longer the calibration process lasts, the more precise it becomes.

Distance and pulse

Once calibration has been performed using the two buttons, the system fills out the field with the number of pulses registered.

All you need to do is enter the distance which was covered during calibration.

If you already know the two values, you can also enter them yourself directly.

2.4 Notes

3 Multi-house egg collection

In the case of multi-house egg collection, the collection process is optimised by the system across the different houses.

Among other features, houses can be merged into separate collection groups, which then successively fill the cross belt to the collection point. In order to achieve maximum possible utilisation of the grader, the control regulates the longitudinal belts in the different houses so that the cross belt is always filled to the optimum amount.

This chapter explains the functions of the optimised egg collection process using examples which contain a communal cross belt.

However, this system can also perform collections where up to 5 higher-level cross belts are synchronised and then feed a communal grader.

The particular issues created by synchronising the cross belts are described in chapter 4 ”Multi-house egg collection with multiple cross belts”.

3.1 Main screen

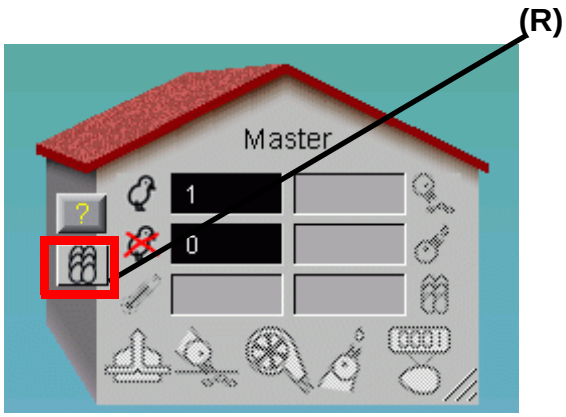


Figure 3-1: Master

Pressing this button **(R)** takes you right to the egg-collection overview screen.

Due to the functionality of the master control, it is necessary to start production from here as well, so that a production database is created.

In order to start production, you must enter into the system that a bird is in the house. Of course, this bird does not actually have to be there.

3.2 Overview screen

So that the operator has a clear view of the current status of collection, the collection process on the egg-collection overview screen is represented graphically.

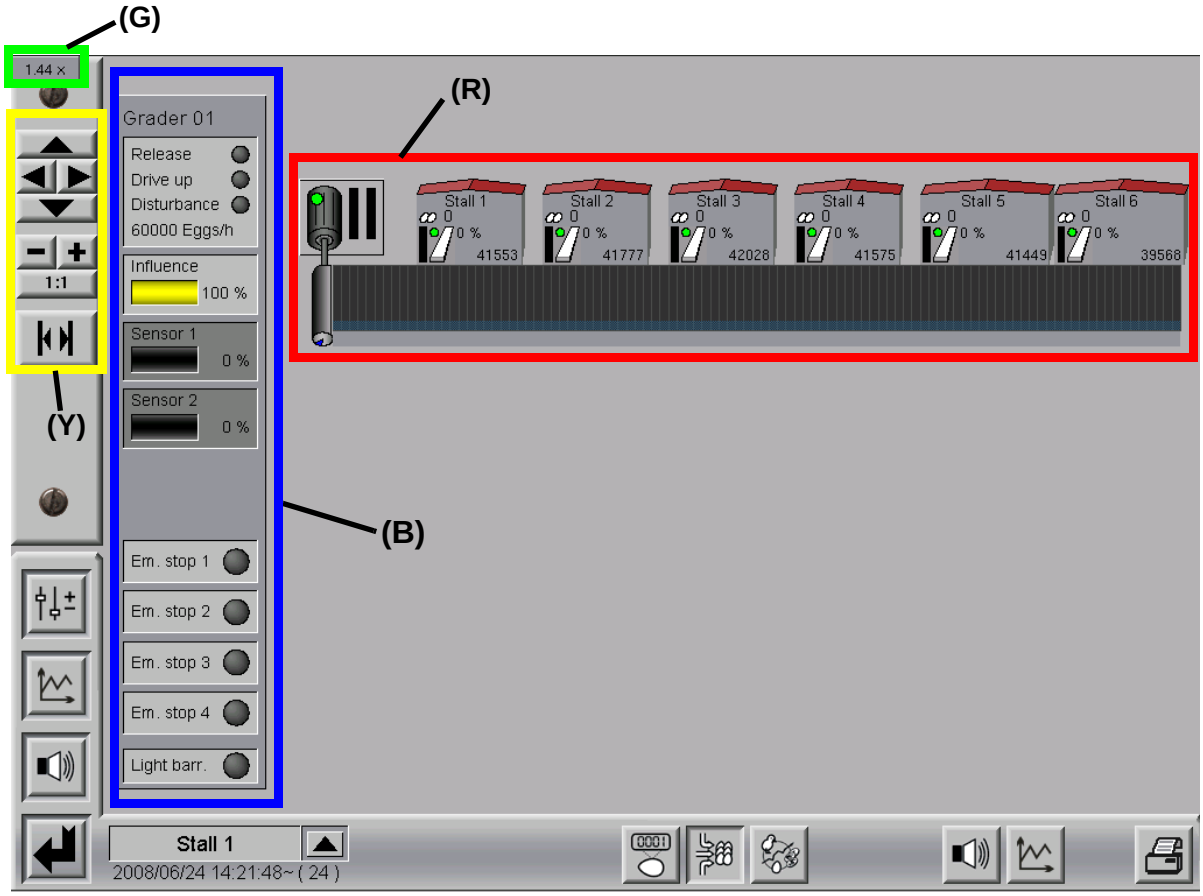


Figure 3-2: Egg-collection overview screen

The cross belt and the connected houses are represented on screen **(R)**.

The display of the houses matches their actual size and position on the cross belt.

These settings are set by the service technician during commissioning.

Information pertaining to the grader is displayed on the left-hand side **(B)**.

The cross belt can be up to 1000 m long, which is represented by the ability to pan around the screen by moving the mouse while pressing and holding the mouse button.

Using the mouse wheel, it is possible to zoom in and out on the image. The current zoom factor is displayed at the top left **(G)**. Clicking on the current zoom factor resets the zoom.

Your position and the zoom factor are retained when you leave this screen.

At the left-hand edge of the screen there are more buttons **(Y)** which are useful for navigating around the overview screen, particularly for local control.

The **arrow buttons** pan the view of the overview screen in the relevant direction.

You can use the **Plus / Minus buttons** to zoom the view in or out.

The **1:1 button** resets the zoom.

The **button at the bottom** is used to shrink down the houses on the cross belt so that all of them can be seen on one page if the cross belt is particularly long. This hides the cross belt between the houses.

3.2.1 Packer status information

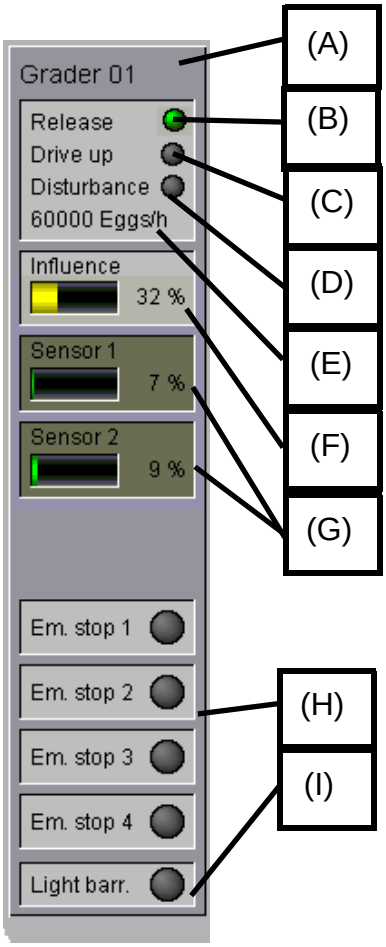


Figure 3-3: Packer status

Current grader (A):

There can be up to four graders, each with a different configuration (capacity, number of sensors, etc.). The grader which is currently in use is indicated here.

Release (B):

The green dot here indicates that the grader has issued a “release” for the collection. If the “released” is revoked, the collection stops until the signal is present again.

Drive up (C): One convenient function of the collection process is the ability to drive the eggs up as far as the grader without receiving a “release” from the grader. This means that, when work begins, the cross belt leading to the grader is already filled, and so collection can start immediately.

The Drive up status is set at the end of the day, at which point the green indicator dot is displayed. If collection is then started manually or automatically at a particular point in time, the eggs are driven up to the grader until a certain sensor value is reached. After the “release” is received from the grader, the “Drive up” status is reset until the end of the day and the indicator turns grey.

Disturbance (D):

The system has an input signal for “disturbances”. This signal can be issued by the grader, as well as by other components which play an important role in the collection process. If a “disturbance” is detected, the colour of the indicator changes from grey to orange and an alarm message is issued. The input signal can be reversed and also deselected in the settings of the grader.

Grader capacity (E):

This is where the capacity of the grader is displayed. The cross belt is filled by the system such that the grader is being used to capacity when the belt is at full speed. This also makes it possible to minimise the number of stops for a unregulated cross belt.

Influence (F):

The speed of the cross belt is influenced by the pressure sensors on the collecting table. The sensitivity of the influence can be defined in the settings, which is described more precisely at a later stage. An influence value of 0% means that the cross belt can run at full speed. An influence value of 32% (for example) means that the cross belt can run at 68%.

Sensor (G):

Up to four pressure sensors can be installed on the collecting table, which are triggered by the eggs being driven up, thus indicating the fill level of the collecting table upstream of the grader. In order to calculate the influence on the cross-belt speed, the highest sensor value is always used. For overview purposes, the current values of all sensors are displayed here.

Em. stop (H):

The system is able to evaluate up to four emergency-stop signals and then to interrupt collection. If an emergency stop is triggered, the colour of the indicator changes from grey to orange and an alarm message is issued.

Light barr. (I):

For additional safety, a light barrier can be connected to the system, which has the ability to interrupt collection. This light barrier is usually fitted at the transfer point between the cross belt and the packer or grader and is triggered if the eggs begin to pile up at this point.

If the light barrier is triggered, the colour of the indicator changes from grey to orange and an alarm message is issued.

3.2.2 Cross-belt status information

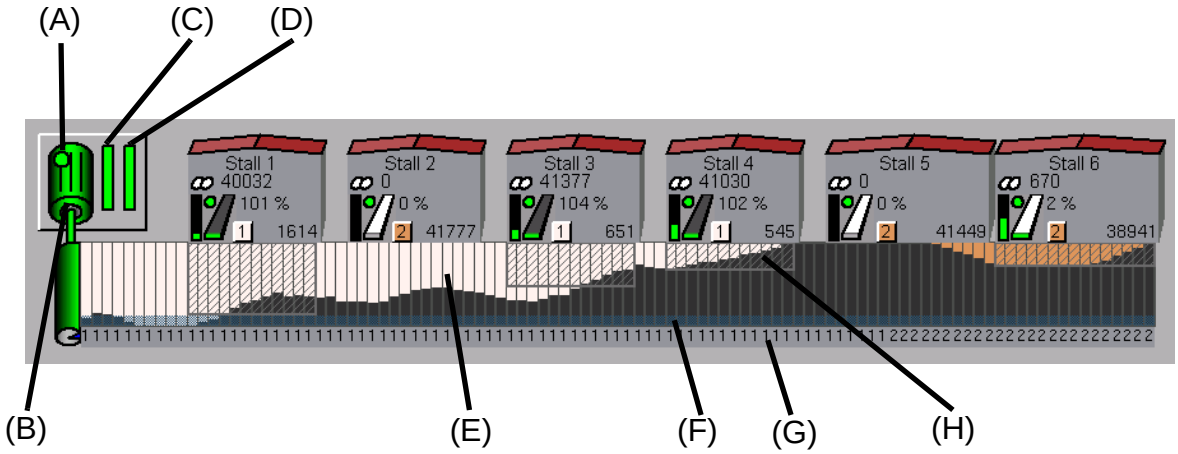


Figure 3-4: Cross-belt status

Operating mode (A):

The small dot indicates the cross-belt operating mode

Green = Automatic

Orange = Manual

Drive active (B):

When the cross belt is switched on, the cross-belt motor and drive shaft, pictured on screen, are shown in green. In addition, the rotation of the roller is simulated for each metre of the longitudinal belt with the blue triangle on the bottom end of the roller.

Measured speed (C):

The actual speed of the cross belt is measured by pulse emitters and displayed in bar form. If the green bar is full, this means that the cross belt is running at 100% of its top speed.

Speed selected (D):

The current speed setting for the cross belt is displayed in bar form. If the green bar is full, this means that the cross belt is running at 100% of the selected speed.

Eggs on the cross belt (E):

The egg filling level of the cross belt is shown for each metre of the cross belt. They are given different colours, depending on collection group, which provides a clearer overview to the operator.

Cross-belt limit (F):

The thin blue stripe at the bottom edge of the cross belt appears if grader output is lower than the capacity of the cross belt. The limit is calculated such that the grader is used to its capacity when the cross belt is operating at full speed.

Collection group (G):

The number of the collection group to which the eggs belong is specified for each metre, underneath the cross belt.

Allocation of the houses on the cross belt (H):

The grey hatched area under each active house on the cross belt indicates how much of the cross belt is allocated to the house in question. This area is recalculated each time the cross belt progresses by a metre, in order to optimise the collection process.

3.2.3 Additional cross-belt information

Because a plethora of additional information comes from a cross belt, not all of which can be displayed on the overview screen, you can access this by simply clicking to the right **(R)** of the cross-belt drive.

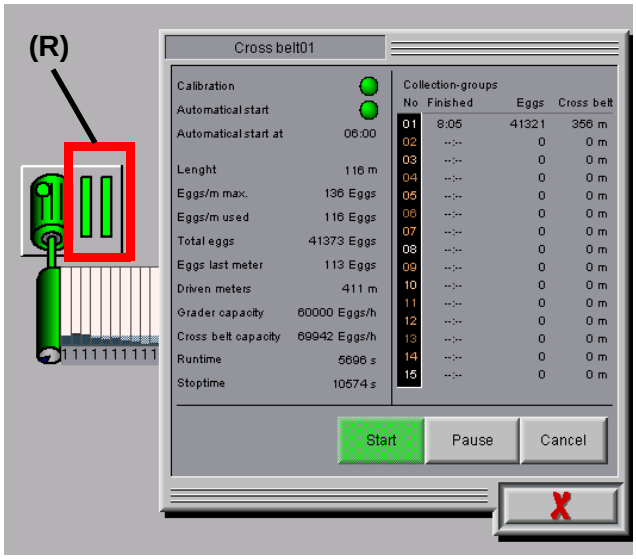


Figure 3-5: Additional cross-belt information

Calibration:

The green dot indicates that the cross belt is calibrated in its settings. Calibration is performed by the service technician during commissioning.

Automatical start:

The green point shows that the current collection process was begun automatically at the set time. If no collection process is currently active or if it was started manually, the indicator dot is orange.

Automatical start at:

This is where the time is indicated when collection should start.

Length:

This value specified the total length of the cross belt.

Eggs/m max.:

This information comes from the capacity of the cross belt and shows the maximum number of eggs which can be accommodated on each metre of the belt.

Eggs/m used:

This is calculated from the grader output and cross-belt capacity. It corresponds to the number of eggs which need to be accommodated by one metre of the cross-belt in order to use the grader to capacity at the top speed of the cross belt.

Total eggs:

Total number of eggs delivered to the grader during this collection.

Eggs last metre:

The value corresponds to the number of eggs located on the last metre of the grader.

Driven metres:

Number of metres travelled by the cross belt during this collection.

Grader capacity:

This is where the output of the grader is displayed.

Cross belt capacity:

The stated value corresponds to the maximum capacity of the cross belt and can be defined in the settings.

Runtime:

The runtime specifies the time taken so far by this collection.

Stop time:

The stop time specifies the amount of time that the cross belt has spent stopped during a collection. Stops can result from faults, pauses, no “release” being received from the grader, etc.

Collection groups:

On the right side of the additional information, data is displayed on the individual collection groups. The collection groups are numbered sequentially from 1 to 15 and are shown in the same colours used on the cross belt.

In the **”Finished”** column, the estimated time is displayed, at which the last eggs of the relevant collection group will reach the grader. In addition, the **”Eggs”** column specifies the number of eggs in this collection group which have reached the grader.

The data in the **”Cross belt”** column is for the number of metres which were used by the respective collection group on the cross belt.

Start, Pause, Cancel:

These buttons are used to control collection manually and are described in greater detail with information about the manual functions (“Starting collection manually").

3.2.4 House status information

Each house is displayed on the longitudinal belt in accordance with its position and size.

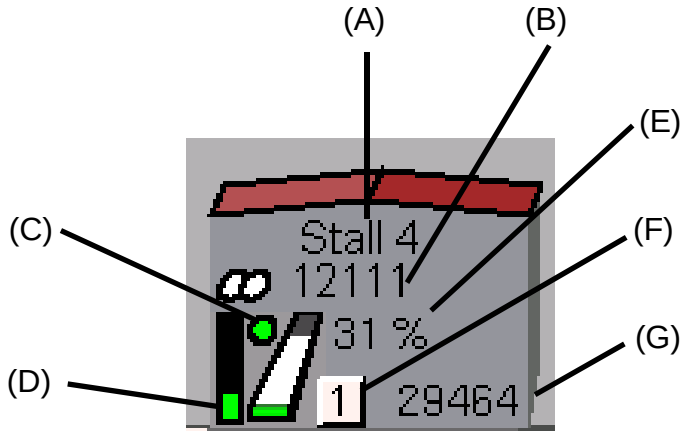


Figure 3-6: House status

House name (A):

The name of the house is written in the gable.

Number of eggs collected (B):

Alongside the symbol of two eggs, the actual number of eggs collected from this house is displayed.

Longitudinal-belt operating mode (C):

The small dot indicates the longitudinal-belt operating mode

Green = Automatic

Orange = Manual

Longitudinal-belt speed (D):

The current speed for the longitudinal belt is displayed in bar form. If the green bar is full, this means that the longitudinal belt is running at 100% of its top speed.

Longitudinal-belt progress (E):

The progress of the longitudinal belt is shown as a percentage. There is also a graphical display of how far the the longitudinal belt has progressed.

The green indicator at the bottom end of the longitudinal belt symbol indicates that the longitudinal belt is active. If the longitudinal belt is switched off, this is grey.

Collection group (F):

This is where the collection group is displayed in which the eggs of this house are being collected. The colour of the indicator provides a rapid overview and matches the colour used to display the eggs of a group on the cross belt.

Forecast of number of eggs still to come (G):

In order to optimise the egg collection process, at the end of each day, a forecast of the expected number of eggs from a house is calculated. The forecast comes from the number of birds and the reference curve for laying output, taking account of the birds' age and breed.

The eggs already collected are continually deducted from the forecast. This means that the system is able to synchronise the houses, so that a unified end of collection can be achieved on the cross belt. Moreover, the forecasted egg counts can be used to start other collection groups, even if the previous collection group has not been fully collected yet.

If a house contains two groups of longitudinal belts, this is also clarified on the overview screen. The first group is always the bottom one. The total number of eggs, displayed in the house gable, relates to the house as a whole.

During collection, the longitudinal belts are never collected at the same time. If they are part of the same collection group, they are actuated automatically, one after another. However, the groups of longitudinal belts can also be assigned to different collection groups.

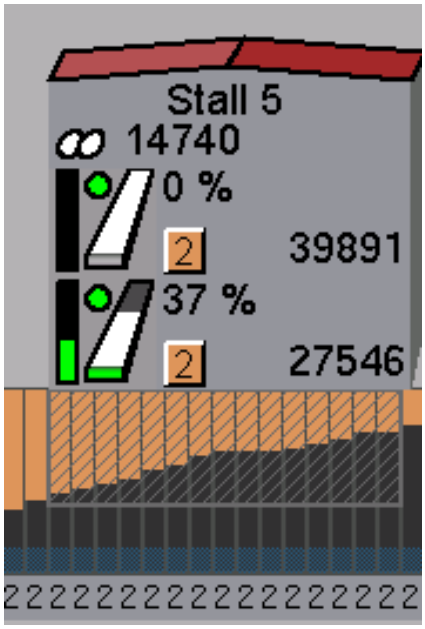


Figure 3-7: House with two groups of longitudinal belts

3.2.5 Additional house information

Because a plethora of information comes from a house, not all of which can be displayed on the overview screen, you can access this by simply clicking to the right-hand side **(R)** of the house. If there is only a single group of longitudinal belts in the house, the data for the second group is not displayed.

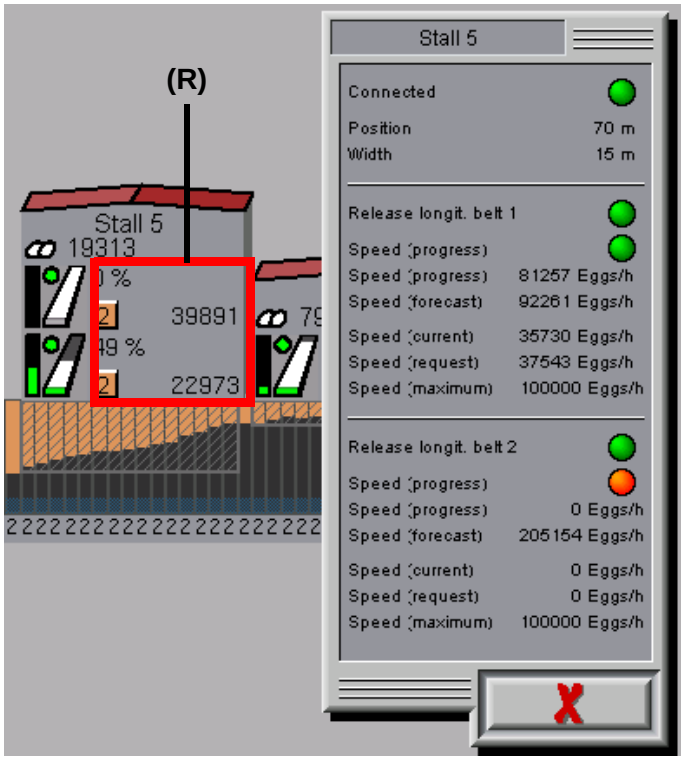


Figure 3-8: Additional house information

Connected:

The green dot indicates that communications are established between the house control system and the master control. If the dot is orange, the network connection has been interrupted.

Position:

This is where the position of the house on the cross belt is specified. This value is set by the service technician during commissioning.

Width:

The width of the house which it uses to fill the cross belt is listed here. This value is set by the service technician during commissioning.

Release longit. belt:

The dot indicates that the longitudinal belt has been “released” for the collection process. If it has not been “released”, the dot is orange. This is so if the longitudinal belt has not been calibrated or if there are no birds in the house.

Speed (progress):

When collection starts, since no eggs have yet been counted, no meaningful information can be provided on the actual feed input from the progress of the longitudinal belt. This is because the eggs must first cover a certain distance from the laying area to the counter.

However, the system requires this information in order to control the speed of the longitudinal belt. For this reason, for the first 3% of belt progress after collection has begun, a forecasted speed (“Speed (forecast)”) is used. Only after the progress of the longitudinal belt has exceeded 3% is it controlled using the progress-based calculation. The status changes from orange to green.

Speed (progress):

This value is used after the progress of the longitudinal belt has exceeded 3%. It specifies the current possible feed capacity at 100% of the belt’s top speed. This value is recalculated after each percent of progress of the longitudinal belt, to take account of the eggs counted.

Speed (forecast):

This value is calculated from the forecast number of eggs remaining in the house which can be accepted onto the remaining portion of the longitudinal belt before 100% belt progress is reached. The value is only of consequence for controlling the first 3% of longitudinal-belt progress. This is recalculated after each percent of progress of the longitudinal belt.

Speed (current):

The current speed of the longitudinal belts is displayed here.

Speed (request):

This is where the speed is specified which is currently being requested by the control of the house’s longitudinal belts, in order to fill the cross belt. This value is recalculated with each metre that the cross belt travels.

Speed (maximum):

The speed of the longitudinal belt can be limited from the settings, and this setting is then displayed here. Limits are necessary if, for instance, an elevator is installed which only has a limited capacity.

3.3 Manual operation

One particular distinguishing feature of this system is that the system components can be operated very clearly and conveniently from the graphical interface.

3.3.1 Cross belt

With a simple click of the mouse on the cross-belt drive **(A)**, a menu appears for switching operating modes and selecting manual operation.

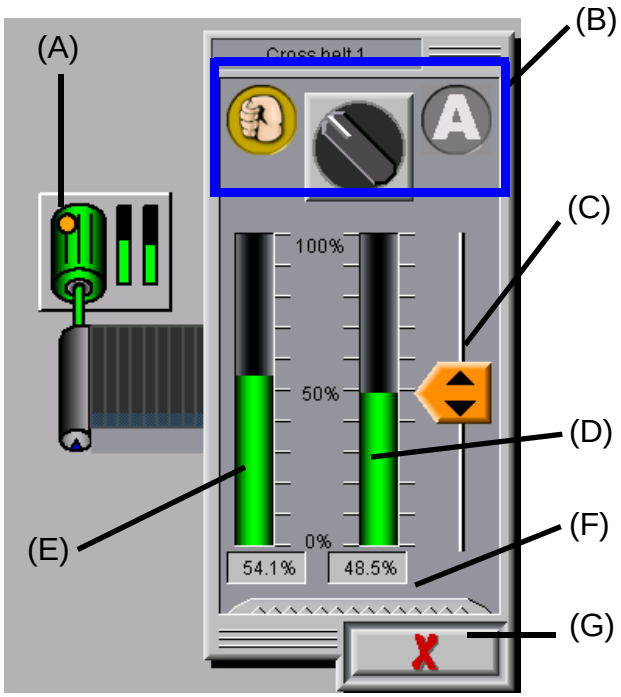


Figure 3-9: Manual operation of the cross belt

Selecting the desired operating mode (B):

The operating modes are represented in graphical form. The closed hand means Manual and the "A" means Automatic. A simple click on one of these two symbols switches straight to the corresponding operating mode. Clicking on the selector switch in the middle switches from one operating mode to the other and back. The mode which is inactive is greyed out.

Slider (C):

In manual mode, the slider can be used to alter the target value for cross belt speed.

Target value for cross-belt speed (D):

The target speed value is displayed in bar form and as a numerical percentage value.

Actual value for cross-belt speed (E):

The cross belt is equipped with a pulse emitter, which is used to measure the actual speed. The speed is displayed in bar form and as a numerical percentage of the maximum speed.

Display of operating hours (F):

Clicking on the zig-zag button displays the current operating hours of the drive.

Close menu (G):

Clicking on this button closes the menu.

3.3.2 Longitudinal belt

With a simple click of the mouse on the longitudinal belt element **(R)**, a menu appears for switching operating modes and selecting manual operation. The longitudinal-belt drives have three operating modes. The third operating mode (“Semi-automatic”) is only present for longitudinal belts during optimised egg collection.

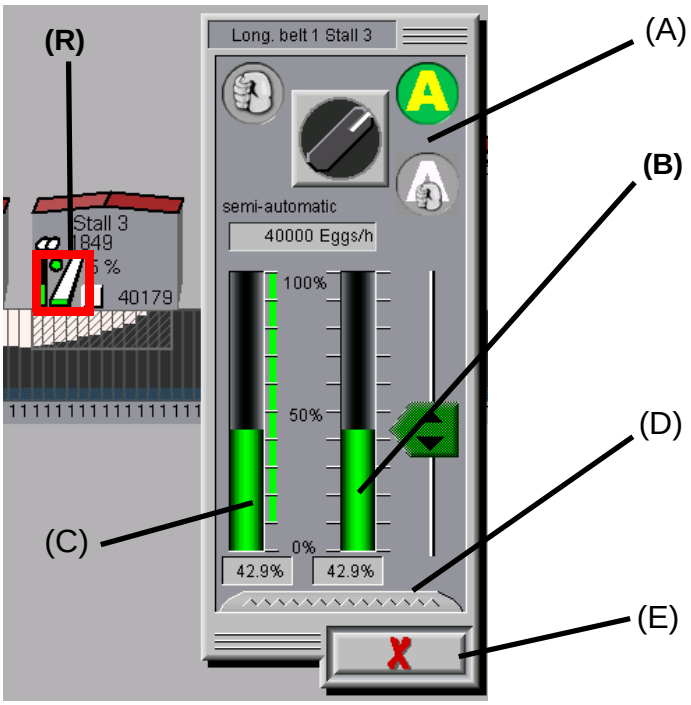


Figure 3-10: Longitudinal belt in automatic mode

Selecting the desired operating mode (A):

The operating modes are represented in graphical form.

The closed hand means Manual, the "A" means Automatic, and the combination of the two stands for Semi-automatic.

A simple click on one of these symbols switches straight to the corresponding operating mode. Clicking on the selector switch in the middle switches operating mode in a clockwise direction. The modes which are inactive are greyed out.

Target value for longitudinal-belt speed (B):

The target speed value is displayed in bar form and as a numerical percentage value.

Actual value for longitudinal-belt speed (C):

The speed is displayed in bar form and as a numerical percentage value. Since there is no feedback of the actual speed on longitudinal belts, in this case, the actual value and the target value are the same.

Alongside the bar chart a green area is shown, which displays the control range of the longitudinal belt. In this example, the control range of the longitudinal belt is between 10% and 100%. This means that at a target value of less than 10%, the longitudinal belt does not run, and is only actuated from a value of 10%.

Display of operating hours (D):

Clicking on the zig-zag button displays the current operating hours of the drive. The current progress of the longitudinal belt and the actual set value for actuation are also displayed.

Close menu (E):

Clicking on this button closes the menu.

Manual:

In manual mode, the slider **(A)** can be used to alter the target value for longitudinal-belt speed. When switching from Automatic to Manual, the last target value set in automatic mode is retained.

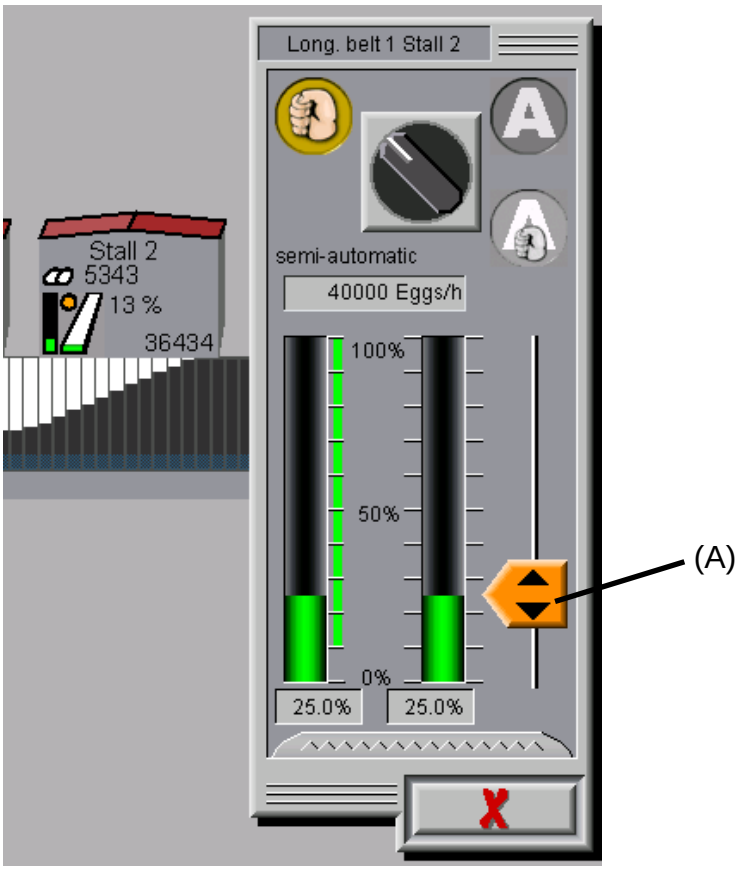


Figure 3-11: Longitudinal belt in manual mode

Semi automatic:

Using this operating mode, it is possible to specify a fixed target value for the speed of the longitudinal belt in Eggs/h.

When using this operating mode, remember that the control does not take account of any eggs which are already on the cross belt. Furthermore, the limits are not reflected in the selected cross-belt and grader capacity **(risk of overfilling!)**.

	**Important:** When using this operating mode there is a **risk of overfilling** the **cross belt and the grader!**

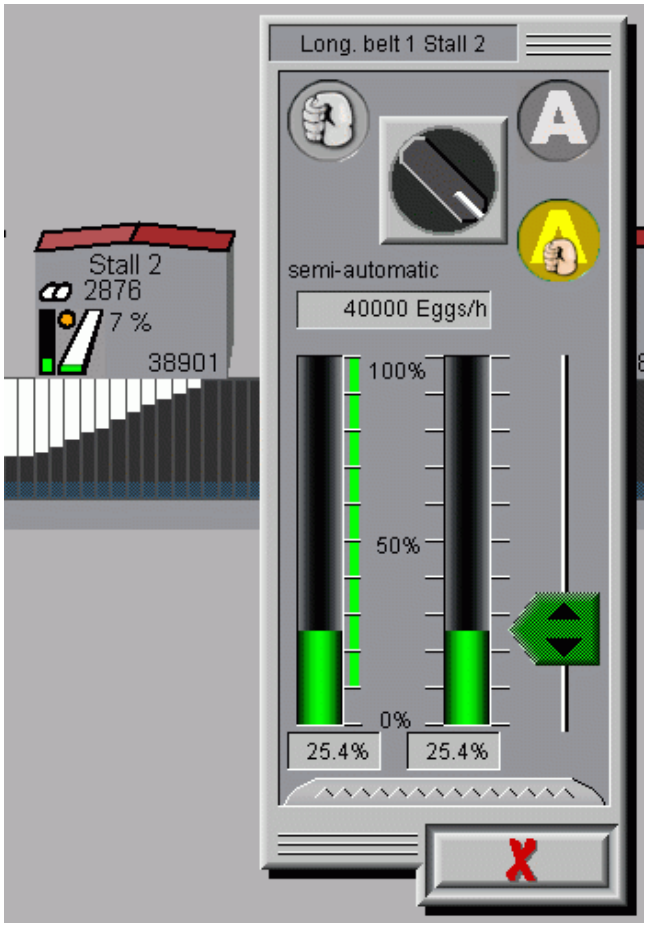


Figure 3-12: Longitudinal belt in semi-automatic mode

3.3.3 Egg diverter

During optimised egg collection, it is possible to install up to 16 egg diverters on a cross belt. It is the task of the egg diverters to move the eggs over to one side of the cross belt, making it easier to add eggs from subsequent houses. This makes it possible to achieve optimum utilisation of the cross belt.

The egg diverters are shown under the cross belt, in accordance with their actual position. The current opening of the egg diverter in centimetres is shown in the overview screen. In addition, the opening of the egg diverter is shown on the cross belt in the form of a yellow bar.

Due to technical limitations of the program, the eggs cannot be shown being moved over on the cross belt in the display of the fill level.

3.3.3.1 Analogue egg diverter without feedback

With a simple click of the mouse on the egg diverter **(R)**, a menu appears for switching operating modes and calibration.

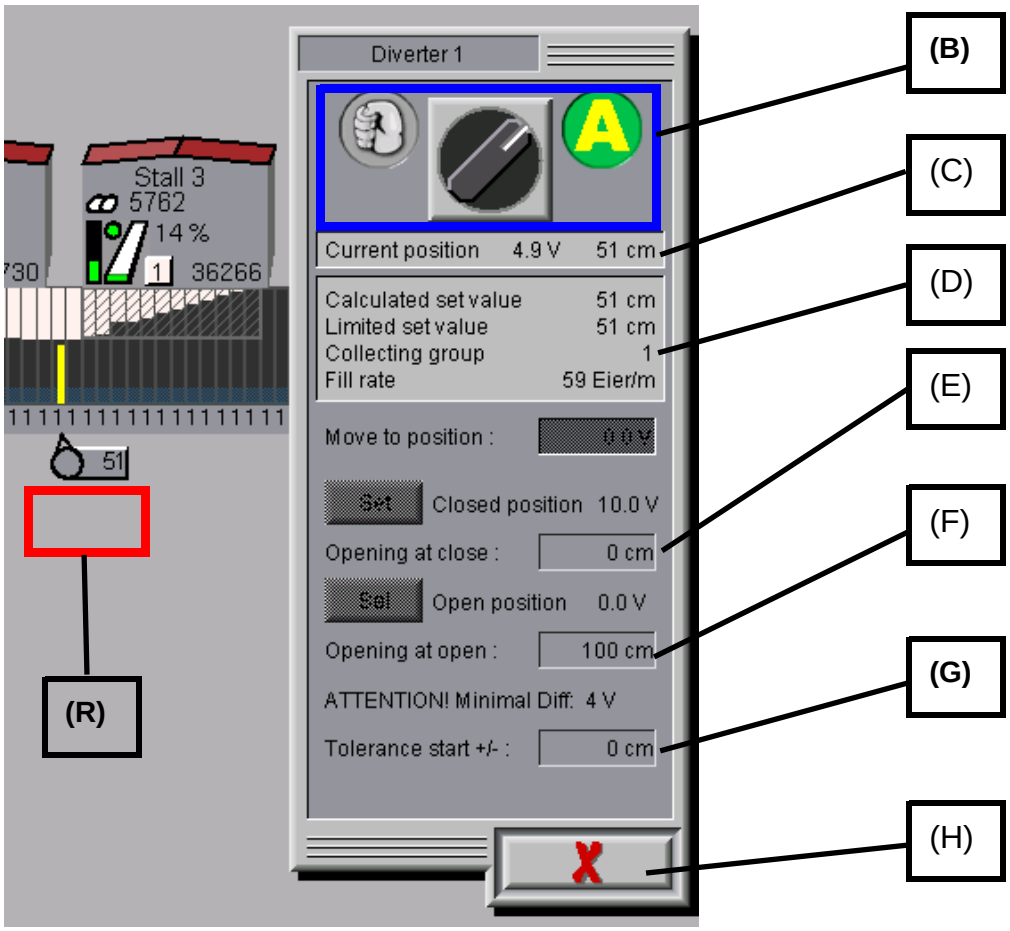


Figure 3-13: Egg diverter in automatic mode

Selecting the desired operating mode (B):

The operating modes are represented in graphical form. The closed hand means Manual and the "A" means Automatic.

A simple click on one of these two symbols switches straight to the corresponding operating mode. Clicking on the selector switch in the middle switches from one operating mode to the other and back.

The mode which is inactive is greyed out. The egg diverter is highlighted orange on the overview screen if it is not in automatic mode.

Current position (C):

For an analogue egg diverter without feedback, the current output signal (0-10V analogue output) and the resulting opening of the egg diverter are displayed.

Additional information (D):

The value **”Calculated set value”** is calculated from the required opening for the current **”Fill rate"** of the cross belt at this point. The behaviour of the egg diverter can be configured differently for each collection group. For this reason the current **”Collection group”** is also specified here.

The value **”Limited set value"** specifies the maximum possible opening of the egg diverter.

Opening at close (E):

For mechanical reasons, it is possible that the egg diverter may still have an opening even if it is fully closed. So that this is taken into account by the control, the remaining opening is specified here.

Opening at open (F):

This is where it is stated how far the egg diverter can open. The control requires this value in order to calculate the target value for positioning.

Tolerance start +/- (G):

In order to avoid overly sensitive adjustment of the egg diverter, a tolerance can be entered here. The value describes the permissible deviation between the actual position and the target position, before automatic mode will readjust the position.

Close menu (H):

Clicking on this button closes the menu.

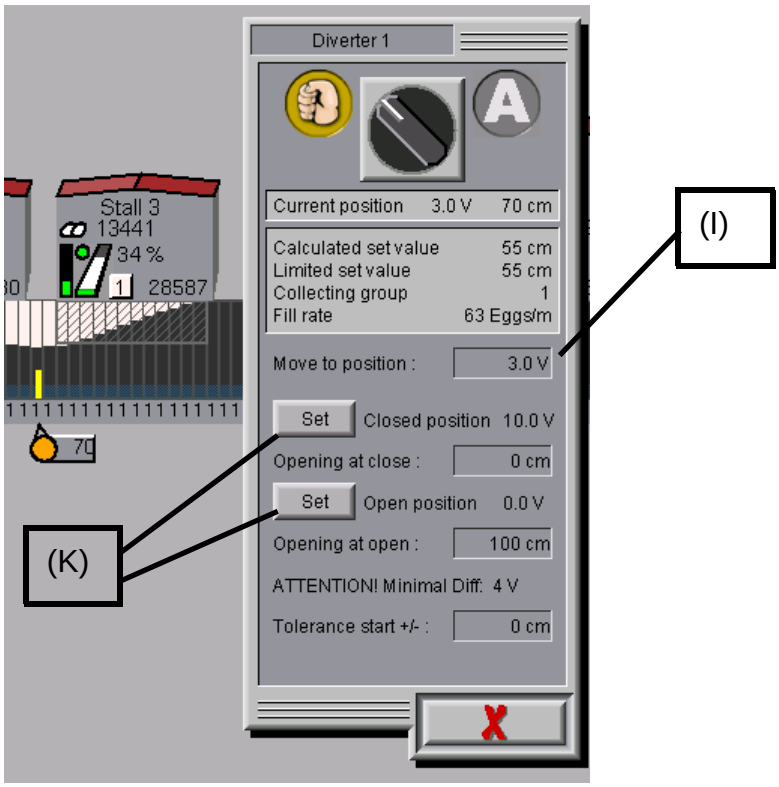


Figure 3-14: Egg diverter in manual mode

Move to position (I):

In manual mode, the output signal (0-10V analogue output) to the egg diverter can be specified manually.

Set (K):

For mechanical reasons, it is possible that the egg diverter will reach its mechanical limit position before the end of the control range (0-10V). For calibration, the egg diverter is driven to the precise positions for its closed or open state by manually specifying the output signal. These settings are saved with the “Set” button.

The two positions must have a specified minimum gap of 4V. Otherwise this position will not be accepted by the control.

3.3.3.2 Analogue egg diverter with feedback

With a simple click of the mouse on the egg diverter **(R)**, a menu appears for switching operating modes and calibration.

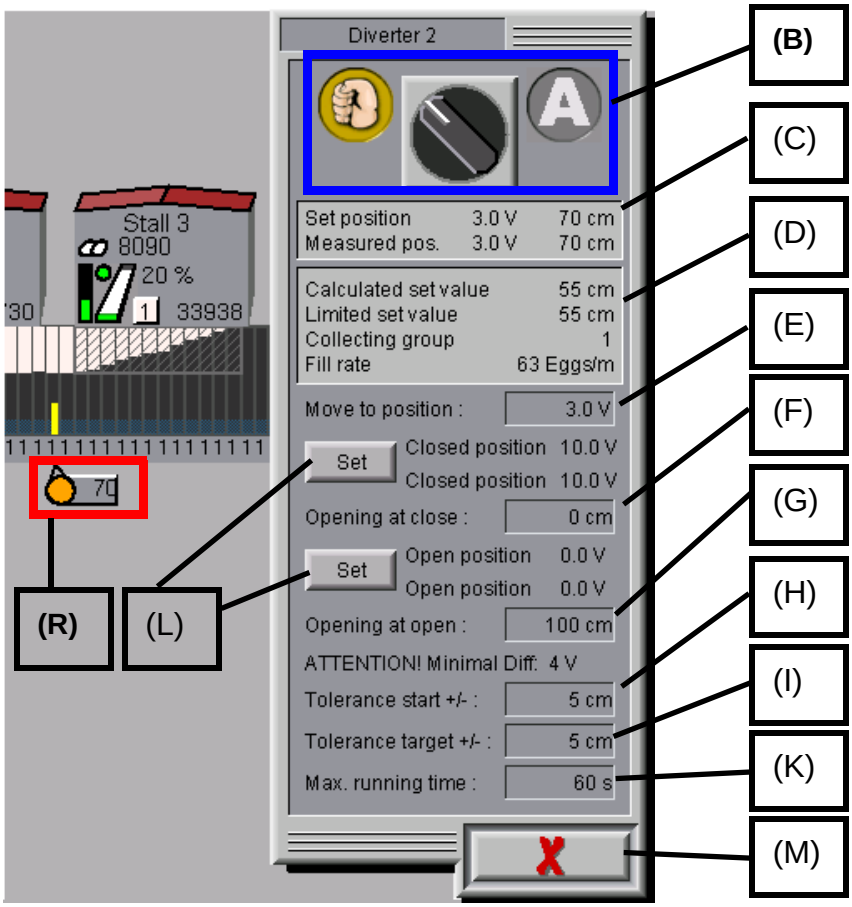


Figure 3-15: Egg diverter II in manual mode

Selecting the desired operating mode (B):

The operating modes are represented in graphical form. The closed hand means Manual and the "A" means Automatic.

A simple click on one of these two symbols switches straight to the corresponding operating mode. Clicking on the selector switch in the middle switches from one operating mode to the other and back. The mode which is inactive is greyed out.

The egg diverter is highlighted orange on the overview screen if it is not in automatic mode.

Set/measured position (C):

For an analogue egg diverter with feedback, the current output signal (0-10V analogue output) and the measured input signal (0-10V analogue input) are displayed. The resulting target and actual position of the egg diverter is displayed.

Additional information (D):

The value **”Calculated set value”** is calculated from the required opening for the current **”Fill rate"** of the cross belt at this point. The behaviour of the egg diverter can be configured differently for each collection group. For this reason, the current **”Collection group”** is also displayed here. The value **”Limited set value"** specifies the maximum possible opening of the egg diverter.

Move to position (E):

In manual mode, the output signal (0-10V analogue output) to the egg diverter can be specified manually.

Opening at close (F):

For mechanical reasons, it is possible that the egg diverter may still have an opening even if it is fully closed. So that this is taken into account by the control, the remaining opening is specified here.

Opening at open (G):

This is where it is stated how far the egg diverter can open. The control requires this value in order to calculate the target value for positioning.

Tolerance start +/- (H):

In order to avoid overly sensitive adjustment of the egg diverter, a tolerance can be entered here. The value describes the permissible deviation between the actual position and the target position, before automatic mode will perform a readjustment.

Tolerance target +/- (I):

In order to avoid overly sensitive adjustment of the egg diverter due to variations in the input signal, a tolerance can be entered here. The value describes the permissible deviation between the actual position and the target position, before automatic mode will perform a readjustment.

Max. running time (K):

Feedback from the egg diverter is monitored. If it has not reached its target position in the time specified here, an alarm is issued and collection is switched to pause mode.

Set (L):

For mechanical reasons, it is possible that the egg diverter will reach its mechanical limit position before the end of the control range (0-10V). For calibration, the egg diverter is driven to the precise positions for its closed or open state by manually specifying the output signal. These settings are saved with the “Set” button.

For each position, the set output signal is stored with the associated input signal. The two positions must have a specified minimum gap of 4V. Otherwise this position will not be accepted by the control.

Close menu (M):

Clicking on this button closes the menu.

3.3.3.3 Relay-controlled egg diverter

With a simple click of the mouse on the egg diverter **(R)**, a menu appears for switching operating modes, manual operation, and calibration.

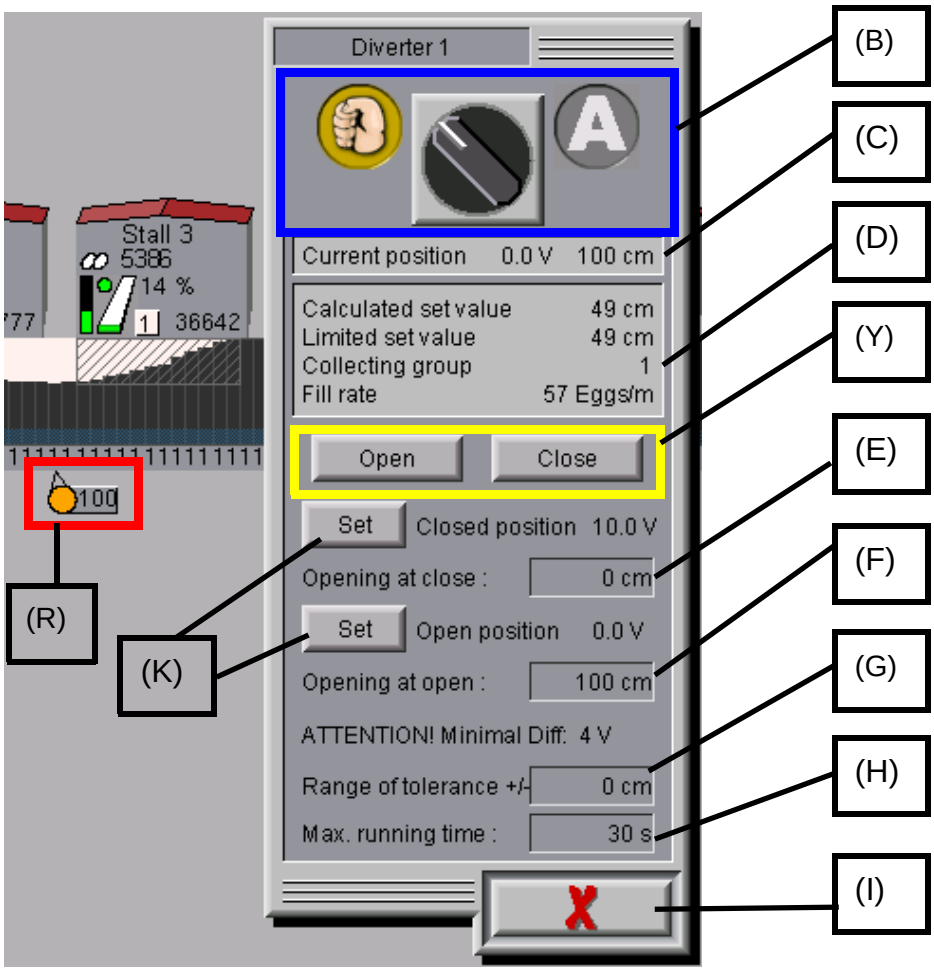


Figure 3-16: Egg diverter in manual mode

Selecting the desired operating mode (B)

The operating modes are represented in graphical form.

The closed hand means Manual and the "A" means Automatic.

A simple click on one of these two symbols switches straight to the corresponding operating mode. Clicking on the selector switch in the middle switches from one operating mode to the other and back.

The mode which is inactive is greyed out. The egg diverter is highlighted orange on the overview screen if it is not in automatic mode.

Current position (C):

A relay-controlled egg diverter has a feedback (0-10V analogue input). The measured value is displayed, as well as the resulting opening of the egg diverter.

Additional information (D):

The value **”Calculated set value”** is calculated from the required opening for the current **”Fill rate"** of the cross belt at this point. The behaviour of the egg diverter can be configured differently for each collection group. For this reason, the current **”Collection group”** is also displayed here. The value **”Limited set value”** specifies the maximum possible opening of the egg diverter.

Open/Close (Y):

In manual operation, it is possible to directly actuate the relay for opening or closing from here. The output only remains active while the corresponding button is pressed.

Opening at close (E):

For mechanical reasons, it is possible that the egg diverter may still have an opening even if it is fully closed. So that this is taken into account by the control, the remaining opening is specified here.

Opening at open (F):

This is where it is stated how far the egg diverter can open. The control requires this value in order to calculate the target value for positioning.

Range of tolerance +/- (G):

In order to avoid overly sensitive adjustment of the egg diverter, a tolerance can be entered here. The value describes the permissible deviation between the actual position and the target position, before automatic mode will perform a readjustment.

Max. running time (H):

Feedback from the egg diverter is monitored. If it has not reached its target position in the time specified here, an alarm is issued and collection is switched to pause mode.

Set (K):

For mechanical reasons, it is possible that the egg diverter will reach its mechanical limit position before the end of the measuring range (0-10V). For calibration, the egg diverter is driven to the precise positions for its closed or open state. These settings are saved with the “Set” button.

The two positions must have a specified minimum gap of 4V. Otherwise this position will not be accepted by the control.

Close menu (I):

Clicking on this button closes the menu.

3.3.4 Starting collection manually

As an alternative to the automatic start of collection, it can also be started manually from the egg-collection overview screen. A simple click of the mouse to the right-hand side **(R)** of the cross-belt drive calls up the additional information for the cross belt, which also contains the controls for manual operation **(B)**.

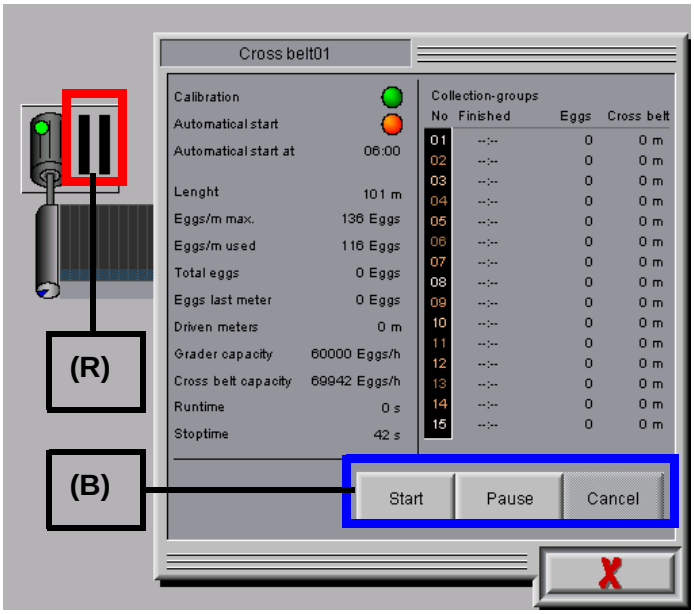


Figure 3-17: Starting collection manually

Start:

Collection is started with the Start button. This can only be pressed if there is no collection running at the moment. Pressing the button issues a safety prompt in order to avoid accidental presses.

Cancel:

The Cancel button cancels the collection currently running. As can be expected, it is only possible to press it if a collection is actually happening. Pressing the button issues a safety prompt in order to avoid accidental presses.

If the collection is cancelled, the values for longitudinal-belt progress and eggs already counted are retained.

The fill level also continues to be displayed on the cross belt. However, the indication of the different collection groups is reset.

Eggs which do not belong to a collection group are shown in white for the cross-belt fill level.

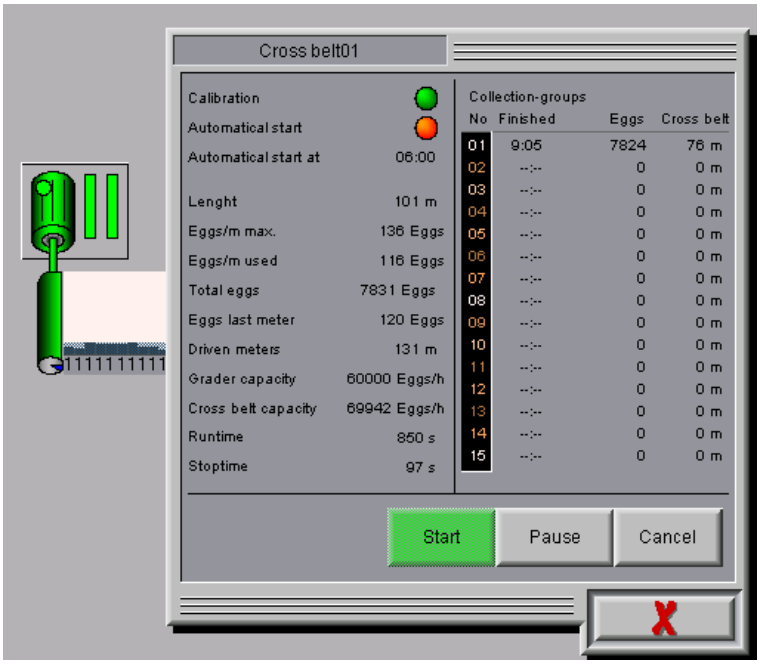


Figure 3-18: Collection started

Pause:

The Pause button switches the collection into pause mode. It can be pressed at any time, even if no collection is active. Pause continues until the pause button is pressed again.

The Pause symbol **(R)** also appears on the overview screen, on the cross-belt drive. It is also possible to unpause collection again by pressing the symbol.

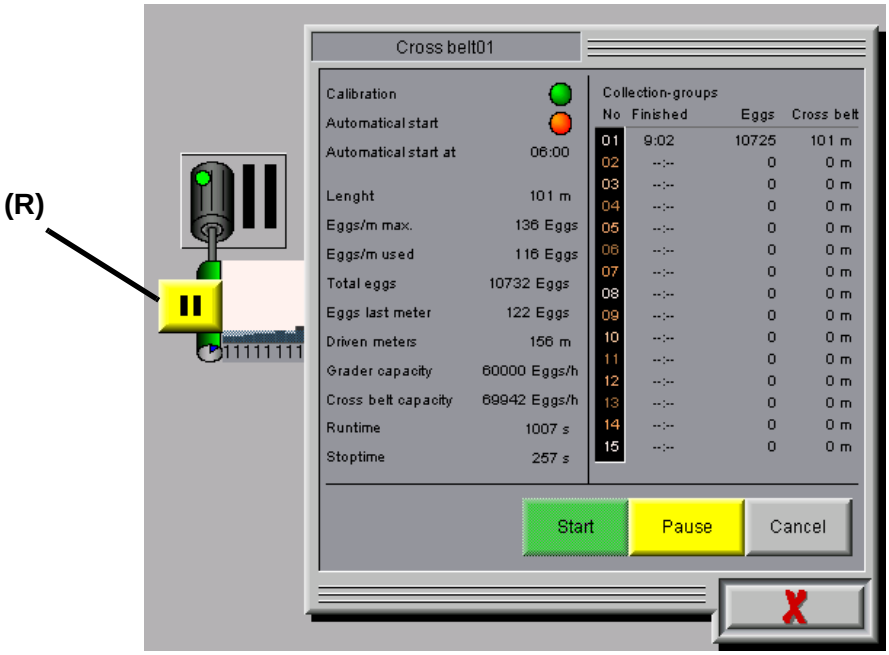


Figure 3-19: Collection in Pause

3.4 Settings

The button with the two sliders at the left-hand edge of the screen **(R)** allows you to switch between the settings and the overview screen for the production area in question.

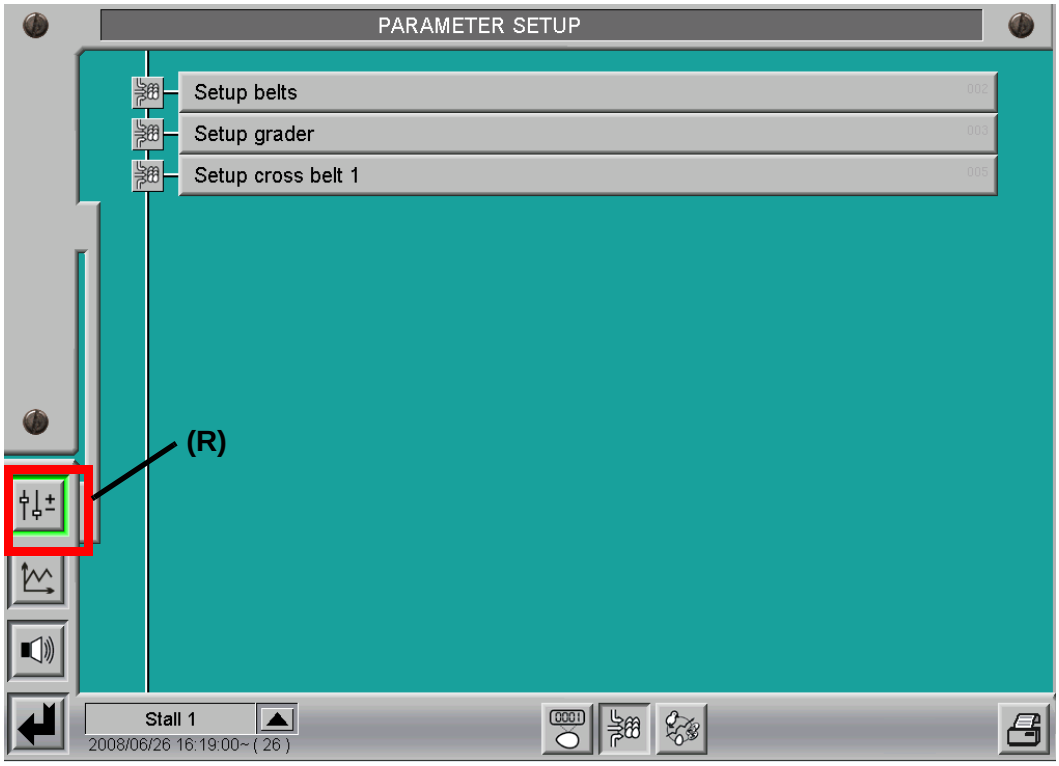


Figure 3-20: Selecting settings

The button for the belt settings is present in all houses. The settings for the grader and cross belt are only present in the house where the master control for the collection process is installed.

3.4.1 Belt settings

If the master control is also configured in a house, as in the following image, this house will have both settings for the longitudinal belt and for the cross belt.

If a separate control takes on the role of the master, only the settings for the cross belt will be present for this control.

In the case of normal houses, only the settings for the longitudinal belts are present. Should a house have two groups of longitudinal belts, separate settings options will appear for each belt group.

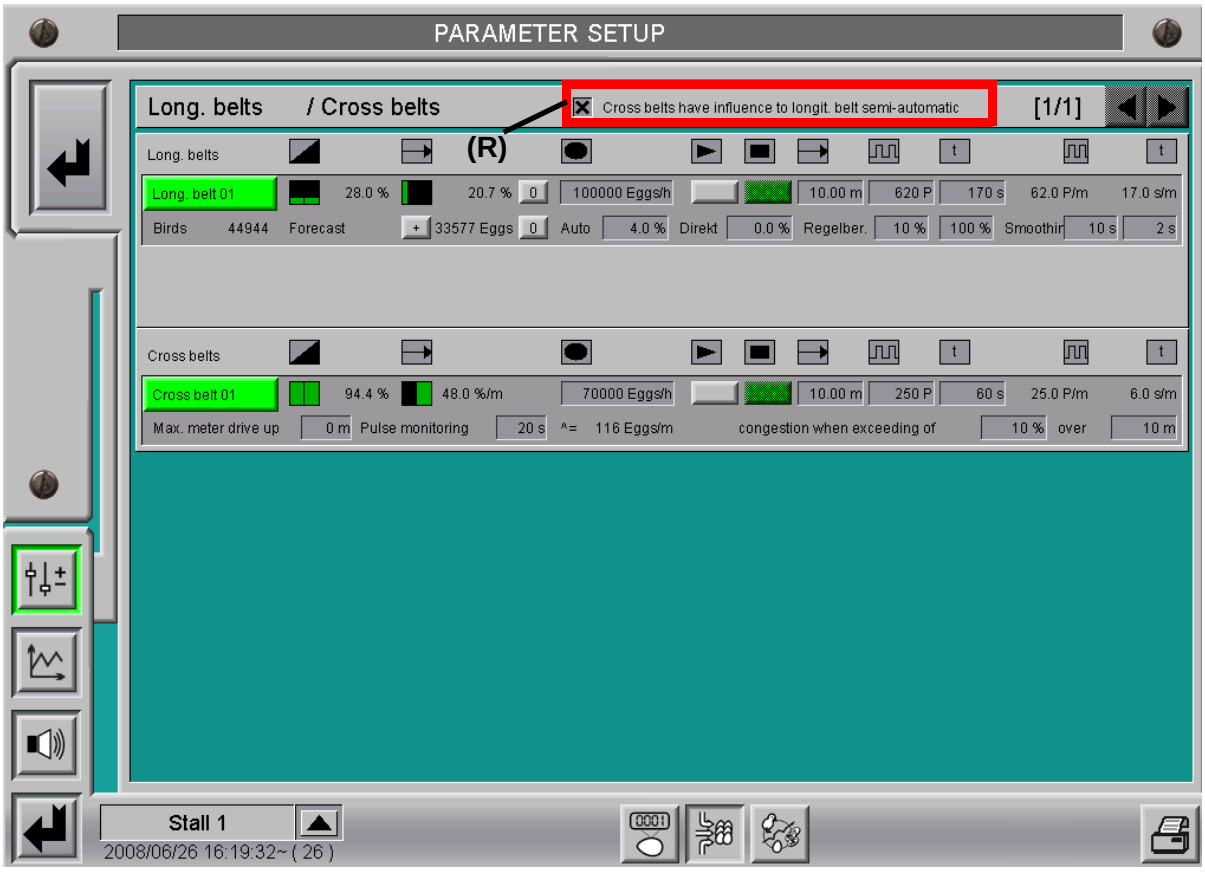


Figure 3-21: Belt settings

Cross belts have influence to longit. belt semi-automatic (R):

For the “semi-automatic” longitudinal-belt mode, you can select here whether the speed of the cross belt should be considered in the activation of the longitudinal belts.

3.4.1.1 Longitudinal-belt settings

The settings for the longitudinal belt basically deal with calibration and correction options for forecasting egg numbers.

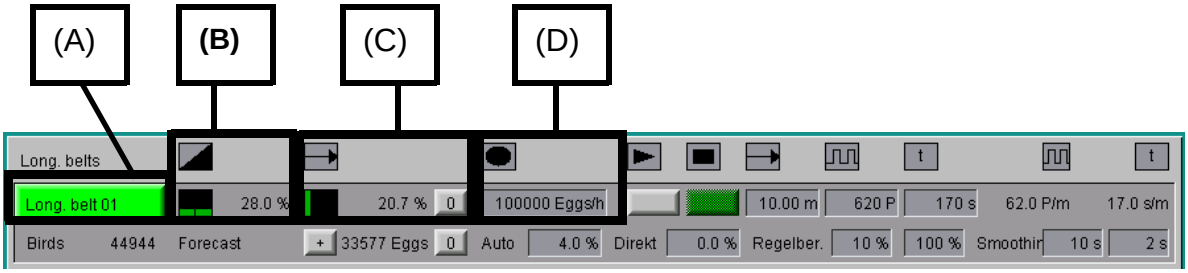


Figure 3-22: Longitudinal-belt settings

Operation (A):

The menu for manual operation can also be accessed from the settings by clicking on this button.

When the the belt is in automatic mode, the button is highlighted green.

If the longitudinal belt is in Manual or Semi-automatic, the button is highlighted orange.

Speed (B):

The current speed for the longitudinal belt is displayed in bar form and as a percentage value.

Progress (C):

This is where the current progress of the longitudinal belt is displayed in bar form and as a percentage value, in relation to its total length.

The progress of the longitudinal belt is automatically reset at the end of the day.

The operator also has the option here to reset progress by pressing the “0” button.

Limit (D):

If necessary, you can input a limit here for the maximum feed capacity in Eggs/h. This also helps you to protect elevators with a limited capacity from overfilling.

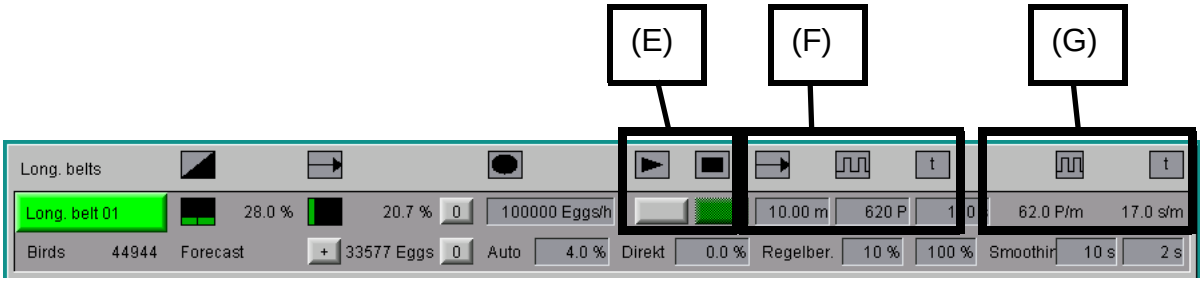


Figure 3-23: Calibrating the longitudinal belt

Start/Stop calibration (E):

In order to start calibration, the longitudinal belt must be in Automatic mode. Once calibration is started, the stop button is highlighted red for a few seconds. If the stop button is pressed during this period, calibration is cancelled and the old calibration values are retained.

This gives the longitudinal belt time initially to reach its maximum speed.

After this start phase, the stop button turns green; you may now stop the calibration run at any time. The number of pulses and the duration are then carried over.

The distance travelled must then be entered manually.

The longer the calibration process lasts, the more precise it becomes.

Calibration values (F):

Once calibration has been performed using the two buttons, the system fills out the fields with the number of pulses registered and the duration of the calibration. All you need to do is enter the distance which was covered during calibration. If you already know all the values, you can also enter them yourself directly.

Information on calibration (G):

This is where the values resulting from calibration are displayed for the control.

The values in question are the number of pulses per metre (P/m) and the required number of seconds per metre (s/m) at maximum speed.

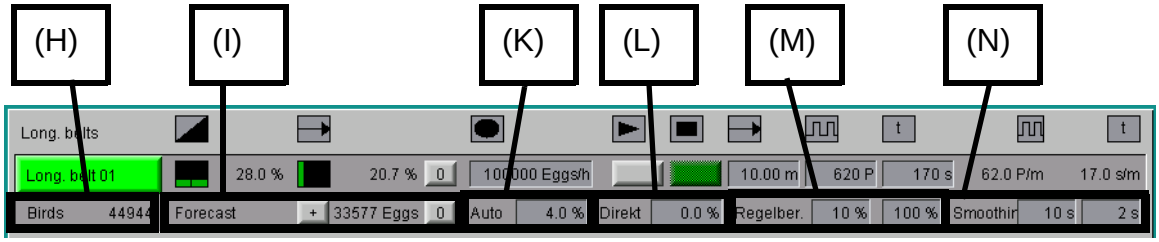


Figure 3-24: Forecast adjustment

Number of birds (H):

The number of birds assigned to this group of longitudinal belts is displayed for information.

Current forecast (I):

This is where the number of eggs is displayed which, according to the forecast, are still in the house. The forecast is calculated at the end of the day and is reduced during collection as each egg is counted.

If at the end of the day the forecast number of eggs are still in the house, then they will be automatically added to the forecast for the following day - provided that longitudinal-belt progress is below 100%. Therefore, for example, even a day without a collection can be automatically taken into account with a double forecast. If required, the "0" button provides the opportunity to manually reset the forecast to zero.

Pressing the "+" button recalculates the forecast and adds it to the current forecast.

"Auto" forecast adjustment (K):

If a value is entered here, it is entered at the end of the day into the calculation for the forecast for the following day. The forecast for the current day is not modified.

The value describes the percentage deviation of the actual laying output from the reference curve. Negative values can also be entered.

The more precise the forecast of the number of eggs, the more effective optimisation of the collection process will be. Laying output should be constantly observed and, if necessary, the forecast adapted to this value.

The longitudinal-belt progress and the eggs remaining according to the forecast on the egg-collection overview screen are an indication of the deviation between the forecast and the actual number of eggs.

If, for example, the progress of the longitudinal belt is less each day, this is an indication that the laying output is exceeding expectations.

Conversely, if the progress is more each day, under some circumstances reaching the max. limit of the longitudinal belt and causing some forecast eggs to be left in the house, this is an indication of a too generous forecast.

Observation should always take place over a period of several days, because other influences, such as the climate, can affect laying output.

“Direct” forecast adjustment (L):

When a value is entered, the forecast is adjusted for the current day. The forecast value is directly adjusted and the entered value is reset to 0.0%. Negative values can also be entered.

Longitudinal-belt control range (M):

As the longitudinal-belt frequency converters always have a minimum frequency, they will run with even a slight input signal (e.g. 5%) at their minimum frequency - set on the frequency converter- of 30Hz (for example). Since, during egg collection, this can lead to the overfilling of the cross belt under certain circumstances, the control range of the longitudinal belt can be taken into account here.

In this example, the control range of the longitudinal belt is set between 10% and 100%. This means that at a target value of less than 10%, the longitudinal belt does not run, and is only actuated from a value of 10%. In manual operation, the control range is displayed as a green area alongside the bar chart for the actual value.

Longitudinal-belt smoothing (N):

When the belt is in automatic mode, its aim is always to achieve the desired fill level of the cross belt by adjusting the speed of the longitudinal belt.

This parameter is used to set how quickly the speed of the longitudinal belt should be adjusted. The first parameter (e.g. 10 s) determines how quickly the speed is increased, in case the currently measured flow of eggs is insufficient to fill the cross belt.

The second parameter (e.g. 2 s) is for reducing it, in case the current flow of eggs from the longitudinal belt is too much.

These parameters can be used to compensate for “downtimes”, in cases where the eggs are not counted directly on the longitudinal belt, but rather on the cross belt. This means that an alteration of longitudinal-belt speed does not have an immediate effect on the flow of counted eggs.

This is particularly the case if there is an elevator on the cross belt between the longitudinal belt and the counter.

3.4.1.2 Cross-belt settings

The cross-belt settings are mostly made up of the setting options for calibration.

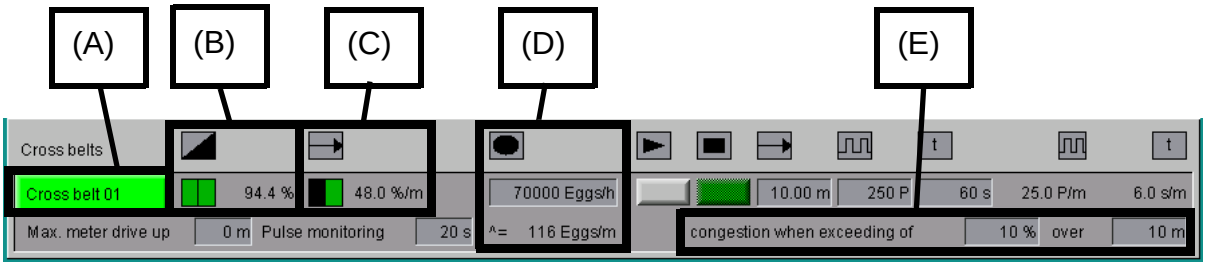


Figure 3-25: Cross-belt settings

Operation (A):

The menu for manual operation can also be accessed from these settings by clicking on this button. When the the belt is in automatic mode, the button is highlighted green.

If the cross belt is in manual mode, the button is highlighted orange.

Speed (B):

The current speed for the cross belt is displayed in bar form and as a percentage value.

Progress (C):

This is where the current progress of the cross belt in metres is displayed in bar form and as a percentage value. The display of the fill level and some other parameters are recalculated after each metre travelled by the cross belt.

This indication is only provided for informational purposes, and does not have any other significance to the operator.

Limit (D):

Because a cross belt only has a limited capacity, here you can see the maximum feed capacity in Eggs/h at full speed. This avoids congestion and allows the fill level of the cross belt to be accurately displayed.

The system calculates the maximum number of eggs which can fit on a metre of the cross belt from the specified feed capacity and the calibration.

Congestion when exceeding of (E):

These two values specify from what percentage congestion value - over a prescribed, continuous length of the cross belt - an alarm should be triggered.

Important:

The congestion alarm does not halt collection!

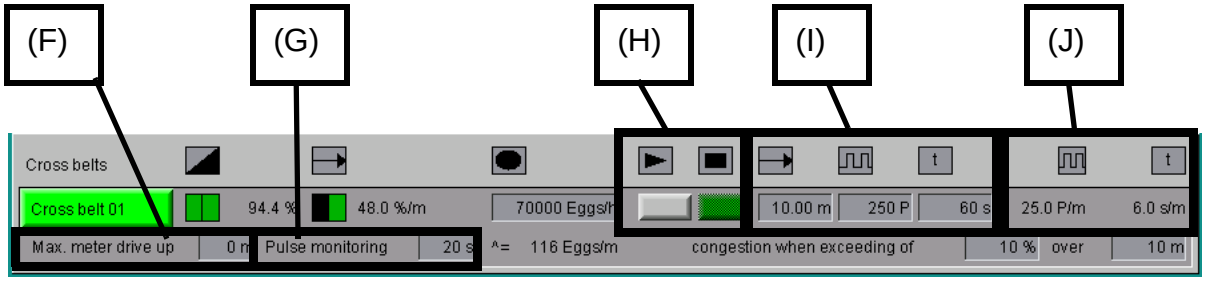


Figure 3-26: Cross-belt calibration

Max. metre drive up (F):

As an additional safety measure when the eggs are being driven up to the grader, a distance can be specified here for how far the collection group displayed on the cross belt can be fed into the grader.

When the value is reached, collection is paused and a message is issued. If the system is unpaused again, the eggs continue to move forward. Entering a value of 0m deactivates this function.

Pulse monitoring (G):

If no signal is registered by the pulse emitter on the cross belt during this set period, egg collection is switched to pause and a message is issued.

Start/Stop calibration (H):

In order to start calibration, the cross belt must be in Automatic mode. Once calibration is started, the stop button is highlighted red for a few seconds.

If the stop button is pressed during this period, calibration is cancelled and the old calibration values are retained.

This gives the cross belt time initially to reach its maximum speed.

After this start phase, the stop button turns green; you may now stop calibration at any time.

The number of pulses and the duration of calibration are then carried over.

The distance travelled must then be entered manually.

The longer the calibration process lasts, the more precise it becomes.

Calibration values (I):

Once calibration has been performed using the two buttons, the system fills out the fields with the number of pulses registered and the duration of the calibration.

All you need to do is enter the distance which was covered during calibration.

If you already know all the values, you can also enter them yourself directly.

Information on calibration (G):

This is where the values resulting from calibration are displayed for the control.

The values in question are the number of pulses per metre (P/m) and the required number of seconds per metre (s/m) at maximum speed.

3.4.2 Packer settings

These settings contain all the parameters relating to the grader and which are needed in order to optimise collection.

You can choose between up to four graders, each with their own settings.

If multiple graders are installed, each one has its own page with settings for capacity, sensor influences, etc.

You can switch between the pages by clicking on the arrow buttons **(R)**.

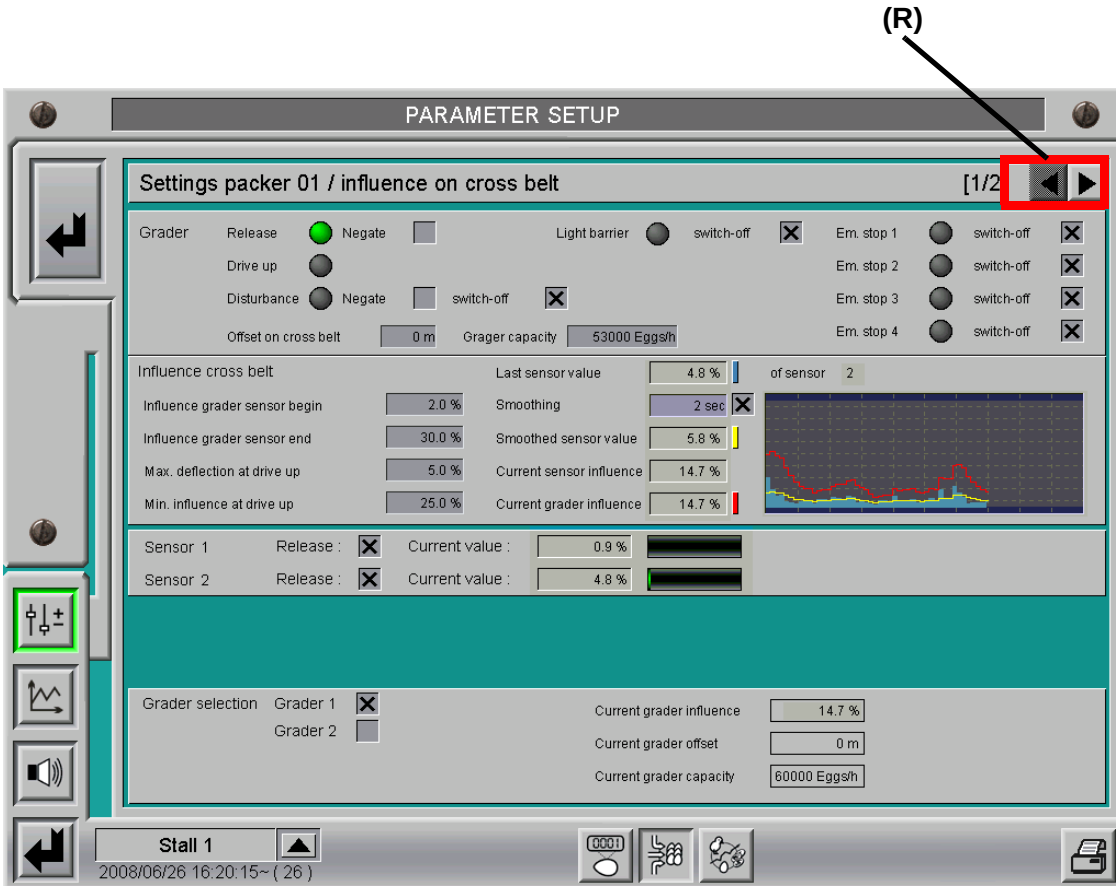


Figure 3-27: Packer settings

3.4.2.1 Grader “release”

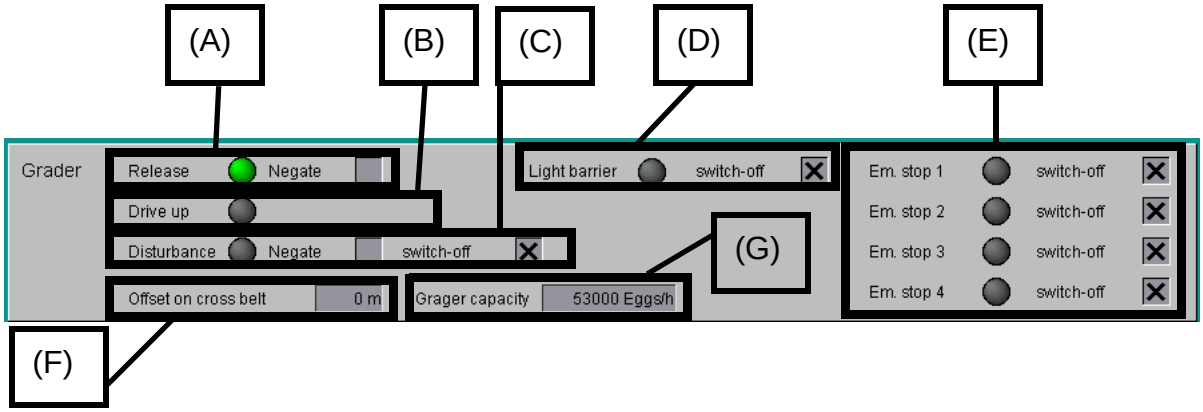


Figure 3-28: Grader “release”

Release (A):

The green dot indicates that the “release” has been issued by the grader. If no “release” has been issued, a grey dot is shown. You can find the same indicator on the overview screen. The input signal can also be negated.

Drive up (B):

A convenient function of egg collection is the ability to drive the eggs up to the grader, without a “release” from the grader. This means that, when work begins, the cross belt leading to the grader is already filled, and so collection can start immediately.

The Drive up status is set at the end of the day, at which point the green indicator dot is displayed. If collection is then started manually or automatically at a particular point in time, the eggs are driven up to the grader until a certain sensor value is reached.

After the “release” is received from the grader, the “Drive up” status is reset until the end of the following day and the indicator turns grey.

Disturbance (C):

The system has an input signal for “disturbances”. This signal can be switched by the grader and also by other components which are important for collection.

If a “disturbance” is detected, the colour of the indicator changes from grey to orange and an alarm message is issued. The input signal can be negated.

The “Switch off” checkbox determines how the collection process responds to a “disturbance”. If there is no checkmark for “Switch off”, only an alarm message is issued, without halting collection.

Light barrier (D):

A light barrier can be connected to each grader. In general this is installed at the transfer point from the cross belt to the grader.

This light barrier is a safety device which stops the cross belt if eggs are piling up in this location. When the light barrier is broken, the dot changes colour from grey to red.

The “switch off” checkbox determines how the light barrier should react. If there is no checkmark for “switch off”, the system will ignore the light barrier for this grader and it is no longer shown on the overview screen. The input signal is low-active, meaning that if the light barrier is broken there is a low signal at the input.

Em. stop (E):

The control monitors four input signals on each grader for an “EMERGENCY STOP". If there is an Emergency Stop signal, the dot changes colour from grey to red.

The “Switch off” checkbox determines how the collection process should react to an Emergency Stop. If there is no checkmark for “Switch off”, the system will ignore the input signal for this grader and the Emergency Stop is not shown on the overview screen.

The input signal is low-active, meaning that when an Emergency Stop is triggered, there is a low signal at the input.

Offset on cross belt (F):

If a value is entered here, the program causes the grader to advance along the cross belt towards the first house. This value is required so that, if there are several graders, their respective positions on the cross belt can be taken into consideration.

Negative values are not allowed. The grader which is furthest away has an offset of "0m". The offset is shown on the cross belt in the overview.

Packer capacity (G):

This is where the capacity of the grader is specified, so that the system is able to optimise the fill level of the cross belts to match.

3.4.2.2 Cross-belt influence

The terms grader sensor or sensor are always used to refer to the pressure sensor(s) before the collection point.

Via their sensor value, these pressure sensors supply the fill level of the packing or collecting table. This allows the speed of the cross belt to be adjusted. The speed of the cross belt also has an immediate effect on the activation of the longitudinal belts.

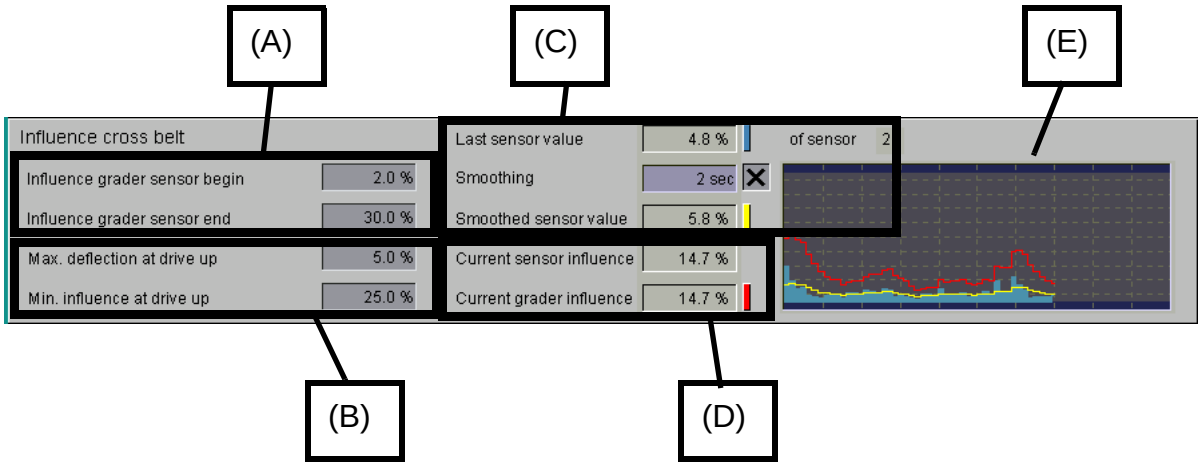


Figure 3-29: Influence on cross belts

Packer sensor influence range (A):

The two fields are for setting the range of influence of the sensors on cross-belt speed.

In the example shown, the influence begins from a sensor value of 2.5%. If the sensor value is below this value, the cross-belt speed is not influenced.

The influence ends, in this example, at a sensor value of 25%. This means that the influence of the sensors on the cross-belt speed at this value is 100% and the cross belt comes to a halt.

If the sensor value is between these two limits, the influence is calculated in a linear fashion from 0 to 100%.

Drive-up settings (B):

These values are used by the system for driving up the eggs. During the process, the two limits under **(A)** are not considered. Drive-up remains active while the “release” has yet to be issued by the grader. It ends when the “release” is issued by the grader and is only set again at the end of the day, in readiness for the following collection.

Max. deflection at drive up: Provided that the sensor value is below this value for the sensor, the cross-belt speed is only influenced by **"Min. influence at drive up"**. Above this sensor value, the influence on the cross belt is 100% and the belt comes to a stop. If a value of 0.0% is entered here, drive-up does not occur.

Min. influence at drive up: Here you can enter a fixed value for the influence on the cross-belt speed, to ensure that the cross belt does not run at maximum speed during the drive-up phase. If a value of 100.0% is entered here, drive-up does not occur.

In the example shown here, the cross belt was actuated up to a sensor value of 8% at a speed of 75%.

Smoothed sensor value (C):

There can be up to four sensors per grader. For calculation purposes, the sensor with the highest value is the one taken into account. This value is displayed as **Last sensor value** with the number of the relevant sensor.

So that the adjustment of the cross-belt speed is not overly sensitive, a time for smoothing the sensor value can be specified. **Smoothing** can be switched off by unchecking the box.

The **Smoothed sensor value** used for adjustment is displayed.

Current grader influence (D):

The influence on the cross-belt speed resulting from the settings and sensor values is shown as **Current sensor influence**.

Current grader influence describes the value used to throttle the maximum speed of the cross belt. Alongside the sensor influence, this also takes account of the "release" from the grader, faults, emergency stops, etc.

If, for example, the "release" from the grader is revoked during collection, a grader influence of 100% is set immediately and the cross belt stops.

Curve display (E):

This window displays the values for the influence on the cross-belt speed. The time period is approx. 1 minute.

Blue:	last sensor value
Yellow:	smoothed sensor value
Red:	current grader influence

The three colours are also displayed, for overview purposes, alongside their numerical values in small coloured boxes.

3.4.2.3 “Releasing” sensors

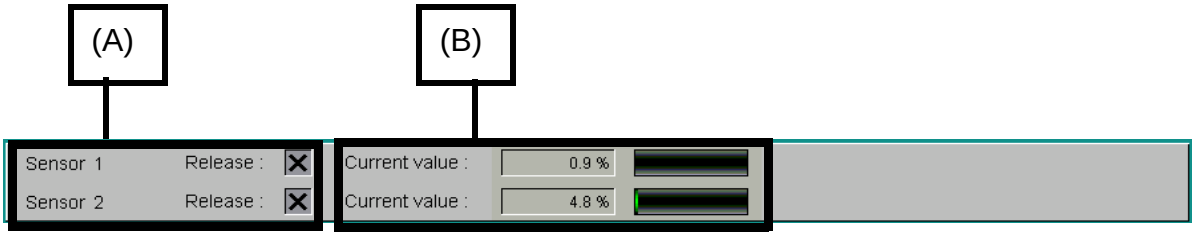


Figure 3-30: “Releasing” sensors

Release (A):

The number of sensors for the grader in question are displayed. If a sensor is defective, it can be deselected here by simply unchecking the corresponding box. It will then no longer be taken into account in calculations and appears greyed-out on the overview screen.

Current value (B):

The current value of the sensor is shown in numerical form and with a bar representation.

3.4.2.4 Packer selection

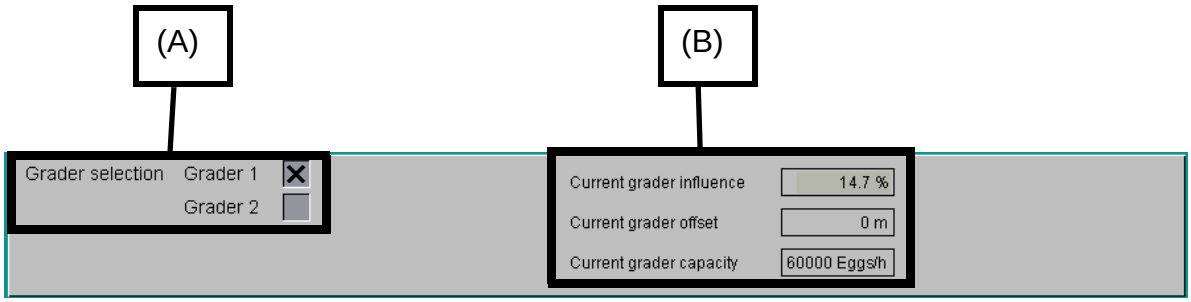


Figure 3-31: Packer selection

Packer selection (A):

There can be up to four graders, each with a different configuration (capacity, number of sensors, etc.). This is where the grader is selected which is to be used.

If there is only a single grader, this selection is not available.

Current values (B):

This is where you can view the values for the selected grader for informational purposes.

3.4.3 Cross-belt settings

On the **first page** of these settings you can configure the collection.

The status of the collection which is currently running is displayed on the **second page**.

The menu also contains the setup parameters for the egg diverters on the **third page** (if installed).

On the **fourth page** you can find settings for belt controls (if installed).

You can switch between the pages by clicking on the arrow buttons **(R)**.

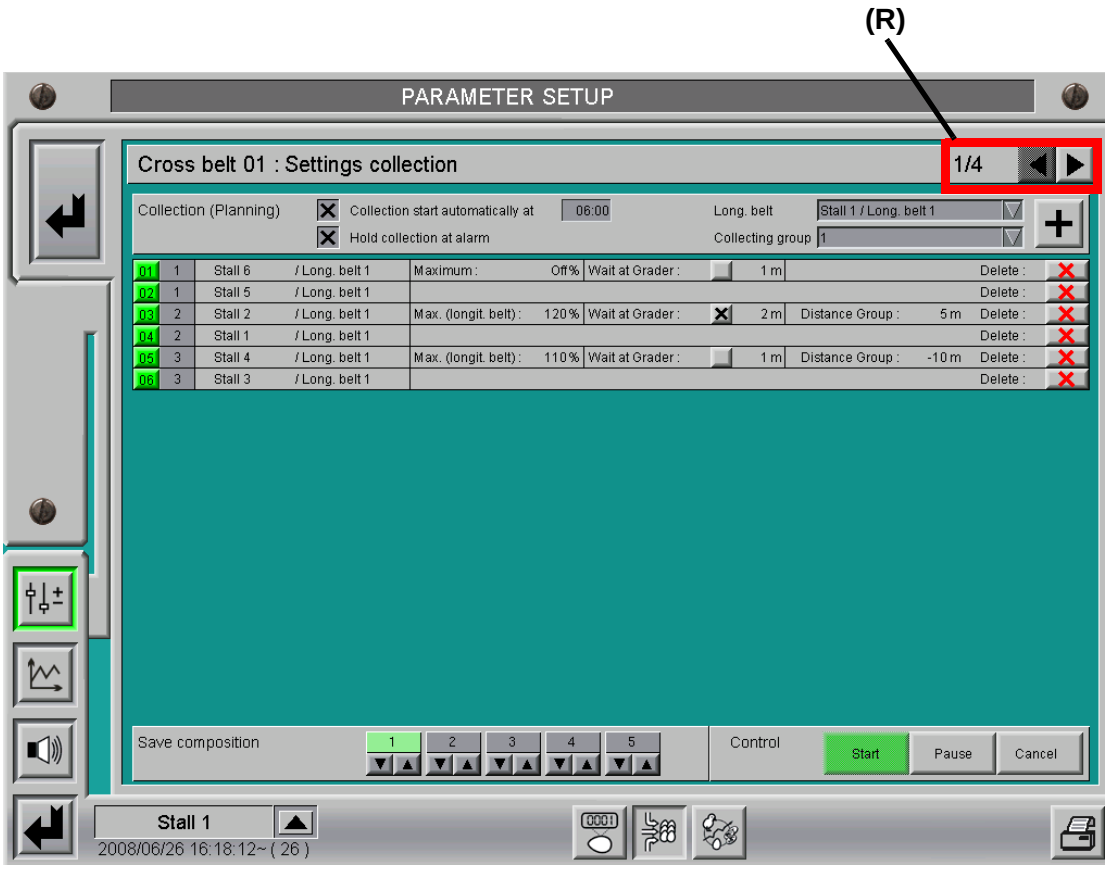


Figure 3-32: Cross-belt settings

3.4.3.1 Collection settings:

This menu is where you can plan the following collection from. Additions and modifications have no influence on the collection which is already running.

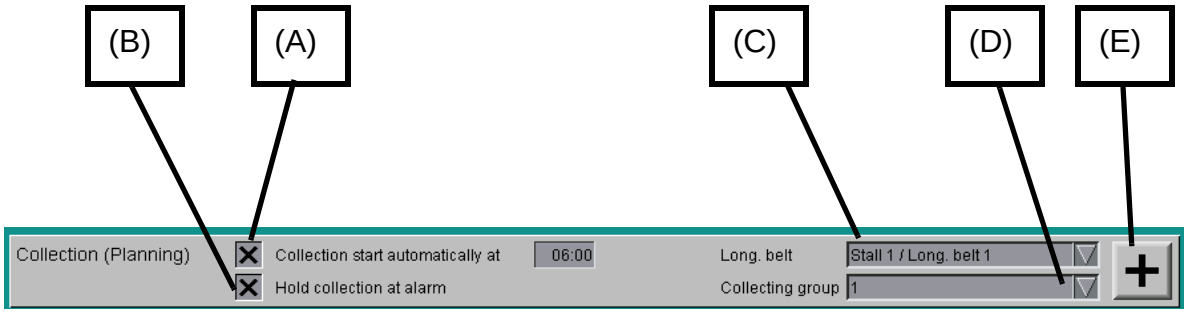


Figure 3-33: Collection planning

Start collection automatically at (A):

From here you can start the collection automatically by setting the checkmark and setting a clock for the start.

Hold collection at alarm (B):

Checking this box pauses the collection in the event of an alarm from the belt control (motor alarm or chain crack alarm), and brings the belts to a stop.

Deactivating this function causes an alarm message to be issued by the belt control in the event of an alarm, without the collection being stopped.

Longitudinal-belt selector (C):

Clicking in the box opens a dropdown list displaying all houses with their groups of longitudinal belts, which are connected to this cross belt.

Should a house have two belt groups, each longitudinal belt can be assigned to a different collection group. If two belt groups are assigned to one collection group, they start automatically, one after another.

Collection-group selector (D):

Clicking on this box opens a dropdown list with the 15 possible collection groups to which the longitudinal belts can be assigned. Collection groups 10-15 are indicated by letters, so that they can be displayed on the overview screen under the cross belt.

Add to collection list (E):

In order to add a belt to the collection list, you simply need to click on this button and the selected longitudinal belt is inserted automatically into the selected collection group of the collection list at the right point.

Information and settings for the collection list:

The following example shows a collection with six houses, each of which has a group of longitudinal belts. The six houses are divided into three collection groups of two houses each.

This list is sorted by the system so that it always starts with the house which is the furthest away from the collection point.

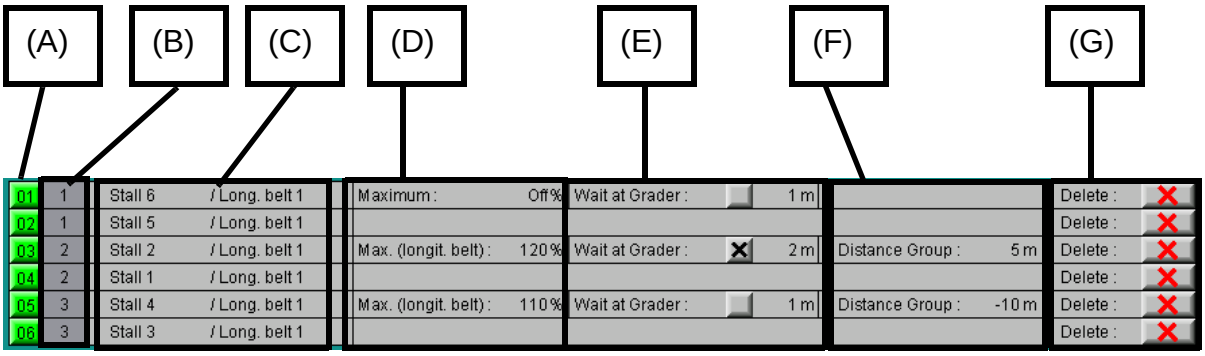


Figure 3-34: Collection list

List entry position (A):

The entries in the collection list are numbered sequentially. If, for example, during collection a subscriber cannot be reached over the network by the master control, the alarm message will refer to this position in the collection list.

In addition, clicking on the button for a subscriber can deactivate it without having to remove it from the collection. If a subscriber is deselected, its position is shown in red. This function may be useful, for example, if a house is empty.

Collection group (B):

This is where the collection group is displayed. This value can also be edited, enabling you to rapidly move a list entry into a different collection group, without having to delete and then recreate it.

House name and group of longitudinal belts (C):

The stall name and group of longitudinal belts is displayed for each subscriber in the collection group.

Maximum (D):

Here you can specify a maximum value for the longitudinal belts of each collection group.

Entry of 0: If you enter 0%, this function is switched off and “Off" is displayed. Eggs are collected from the longitudinal belt until the forecast number of eggs is reached.

Entry of 30-99: If you enter a value between 30% and 99%, shutdown of the longitudinal belts occurs in relation to the forecast.

In this case, the speed of the longitudinal belt is optimised such that the set percentage from the forecast is achieved at the end of the collection group.

This allows you, for instance, to divide the eggs from one group of longitudinal belts over multiple collection groups.

Entry over 100: If you enter a value over 100%, this relates to the desired longitudinal-belt progress.

If the collection process begins, space is reserved on the cross belt for this collection group based on the forecast number of eggs. This space on the cross belt is then adjusted during the collection process with the help of the actual number of eggs collected.

This means that, even if the forecast number of eggs has already been reached before this point, collection continues up to the desired progress value. Conversely, if the forecast was too high, the space required on the cross belt is reduced accordingly and the belt is switched off after this progress value.

Wait at grader (E):

Clicking on the checkbox activates or deactivates this function. If the function is selected, the collection process is paused once this collection group has reached the set distance from the grader.

Distance group (F):

Here you can set the distance between one collection group and the next. A negative distance means that the two collection groups will be merged together. Values up of to +/- 30m can be set.

Delete (G):

Pressing the button with the red cross removes the corresponding entry from the collection list.

Save composition and manual control:

Another convenient function is the ability to save different compositions.

Five different settings can be stored per cross belt.

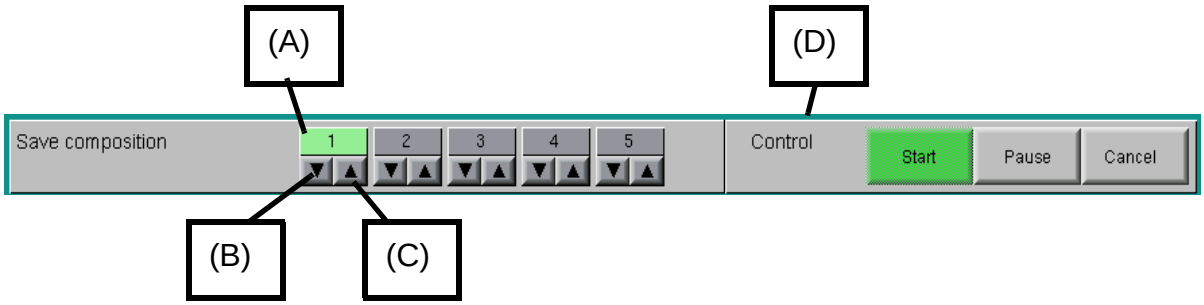


Figure 3-35: Save composition and manual start

Storage slot (A):

When a composition is saved, the storage slot is highlighted bright green.

Save a composition (B):

Clicking on the downwards arrow stores the composition, after displaying a safety prompt.

Load a composition (C):

Clicking on the upwards arrow loads the composition again, after displaying a safety prompt.

Manual control (D):

These buttons are used to control collection manually and are described in greater detail with information about the manual functions (“Starting collection manually").

You can find the same buttons on the overview screen for additional cross-belt information.

3.4.3.2 Collection sequence

The second page displays the current collection. If no collection is currently running, this page is left blank.

The collection list is structured in the same way as when the collections were composed on the first page.

Modifications to the distance between groups, waiting at the grader or changes to the collection groups can no longer be carried out after a collection has begun.

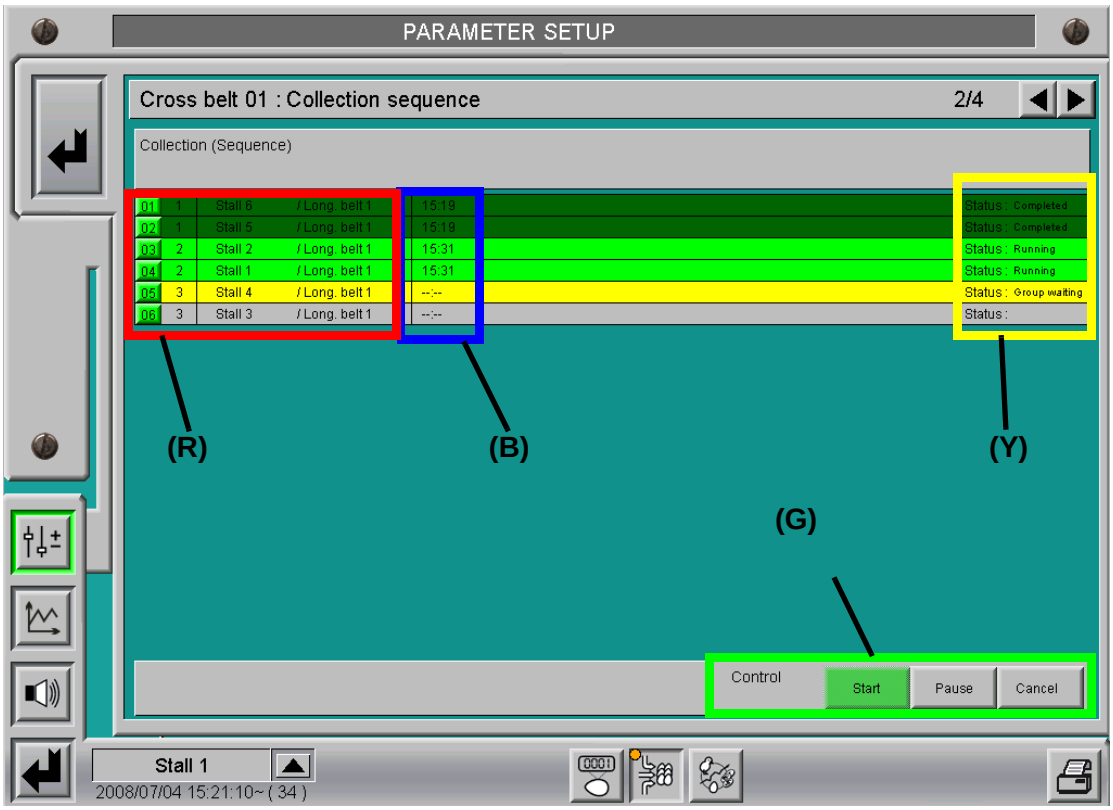


Figure 3-36: Current collection

List entry (R):

The display of list position, collection group, house name and group of longitudinal belts is the same as on the composition screen.

Clicking on the button for the position here makes it turned red and stops collection by the relevant subscriber in the current collection process.

The remaining houses will then fill up the cross belt accordingly. If the subscriber is reactivated by pressing the button again, and if the collection group which it belongs to has still not been completed, collection in this house continues.

Estimated end (B):

The time at which the last eggs from this collection group will reach the grader is calculated and displayed here. You can also find these times on the overview screen for additional cross-belt information.

Status (Y):

The current status of the subscriber is indicated here. The status also determines the colour of the list entry, giving the operator a rapid overview.

Completed:	Collection on this group of longitudinal belts is complete
Running:	The group of longitudinal belts is collecting
Belt waiting:	The collection group is active, the longitudinal belt is waiting for the collection group to arrive at this house so it can fill the cross belt
Group waiting:	The collection group has not yet started and is waiting until the previous collection group no longer needs to occupy the cross belt in front of this house.

Manual control (G):

These buttons are used to control collection manually and are described in greater detail with information about the manual functions (“Starting collection manually").

You can find the same buttons on the overview screen under the additional cross-belt information.

3.4.3.3 Egg diverters

During optimised egg collection, it is possible to install up to 16 egg diverters on a cross belt. It is the task of the egg diverters to move the eggs over to one side of the cross belt.

This makes it easier to add eggs from subsequent houses and allows you to achieve optimum utilisation of the cross belt.

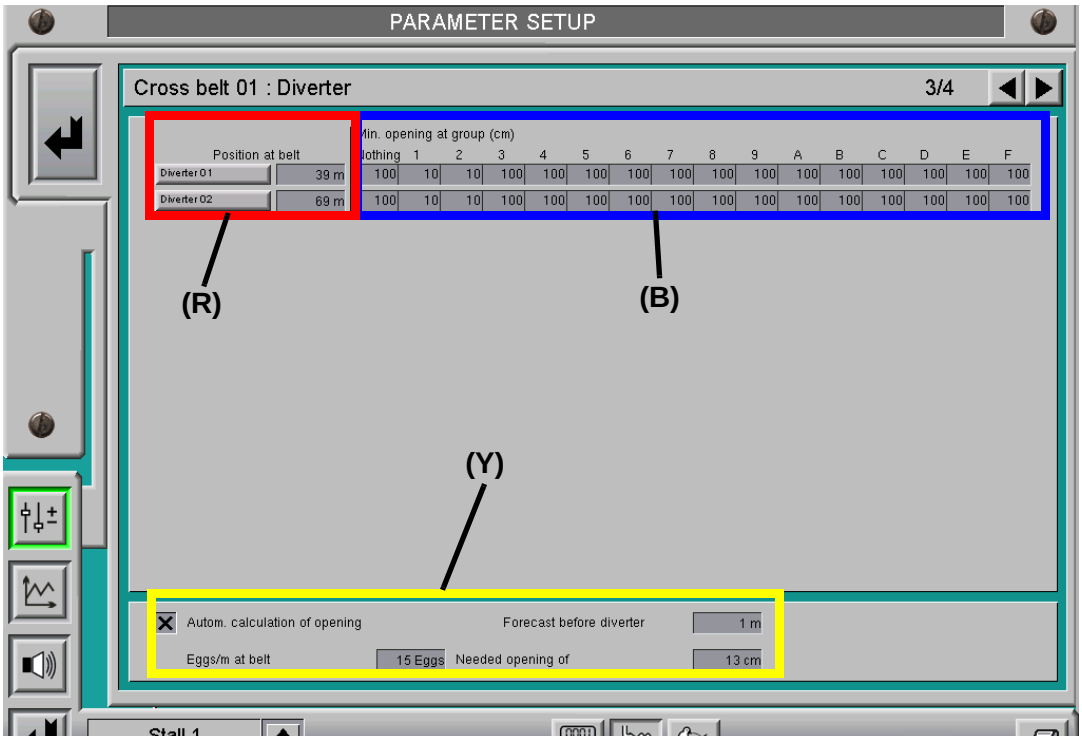


Figure 3-37: Egg diverter settings

Position at belt (R):

The position of the egg diverters on the cross belt is set here.

If the position is given as “0m”, the egg diverter is inactive, will not issue alarms and is hidden on the overview screen. Manual operation is not possible in this case.

Clicking on the button opens the manual operation menu for manually controlling the egg diverters, as already shown in the egg-collection overview screen.

Min. opening at group (B):

Each egg diverter can have a totally different minimum-opening setting for each different collection group. The opening required depends on the position on the cross belt and the composition of the collection.

If automatic calculation of the opening is not activated, this minimum opening matches the opening in cm.

Autom. calculation of opening (Y):

If this function is selected, the system uses the fill level on the cross belt to automatically calculate the required opening for the egg diverters.

This calculation takes account of the minimum opening. To perform the calculation, the system requires a set of parameters consisting of a number of eggs and the associated value for the opening.

Forecast before diverter:

This parameter is used to determine how far ahead the egg diverter should look on the cross belt.

For the calculation, the system uses the fill level of the cross belt within a predetermined distance before the egg diverter.

3.4.3.4 Belt controls

There can be up to 50 belt controls per cross belt. Each belt control can trigger a motor alarm.

At each belt control, a chain monitor can be connected which uses a sensor to monitor the running of the cross belt.

Moreover, using the belt controls, it is possible to perform partial belt shutdowns of the cross belt.

Partial belt shutdown means that the system evaluates whether the section of the cross belt before the position of the belt control is still required. Partial belt shutdown cannot be operated manually.

If the cross belt is operated manually, all the belt sections always run in concert.

The belt controls are configured (partial belt shutdown, chain crack, motor alarm) during the commissioning of the system, by the service technician.

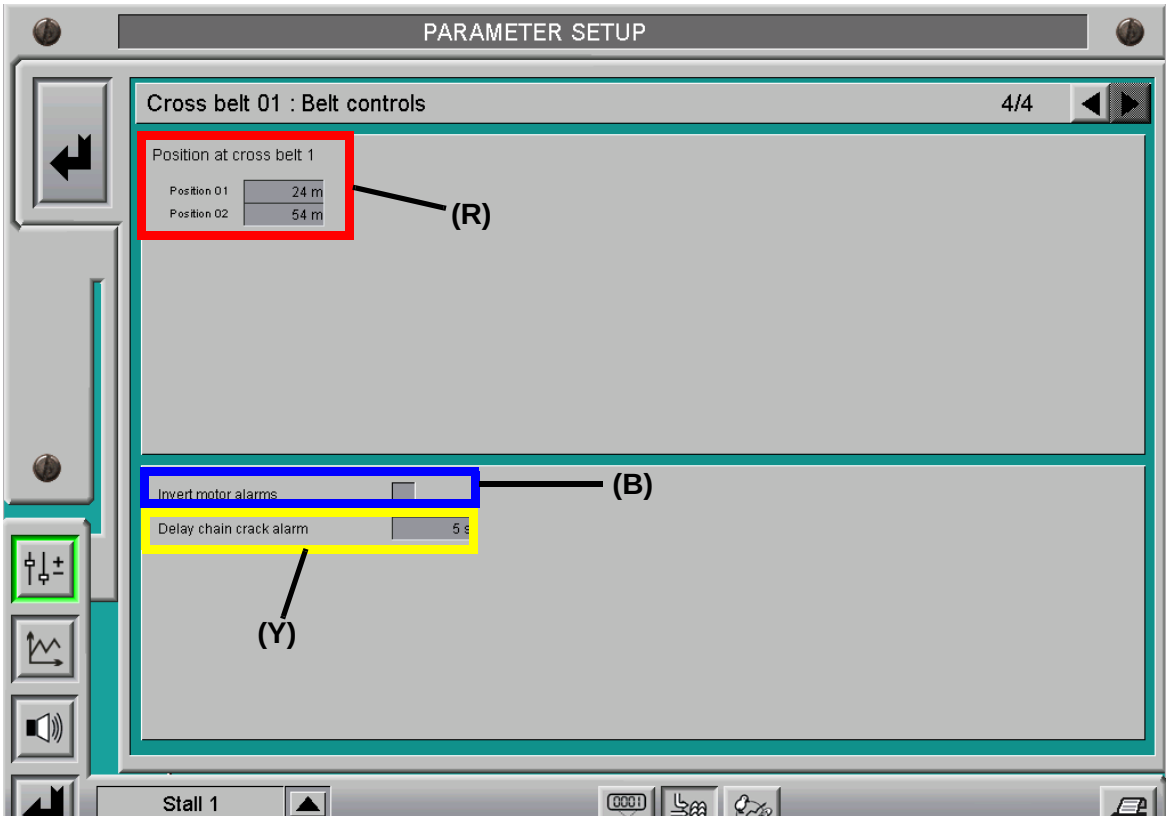


Figure 3-38: Belt control settings

Position at belt (R):

You can configure the position of the belt controls on the cross belt here. If the position is given as “0m”, the belt control is inactive, will not issue alarms and is hidden on the overview screen.

Invert motor alarms (B):

The querying of input signals for the motor alarms can be inverted by marking the checkbox.

Delay chain crack alarm (Y):

The chain monitor (cross belt as rod belt) is analysed by a sensor attached to the cross belt (rod belt), which sends pulses while the cross belt is running.

The delay time represents the maximum permissible time for a signal change before an alarm is triggered.

3.5 Alarms

The button with the alarm symbol at the left-hand edge of the screen **(R)**, allows you to switch between the alarm settings and the overview screen for the production area in question. The number if alarms may differ based upon the configuration for each house.

The alarms which have a particular bearing on egg collection are described here. You can find additional descriptions on the alarm settings in the **"Alarm menu"** chapter.

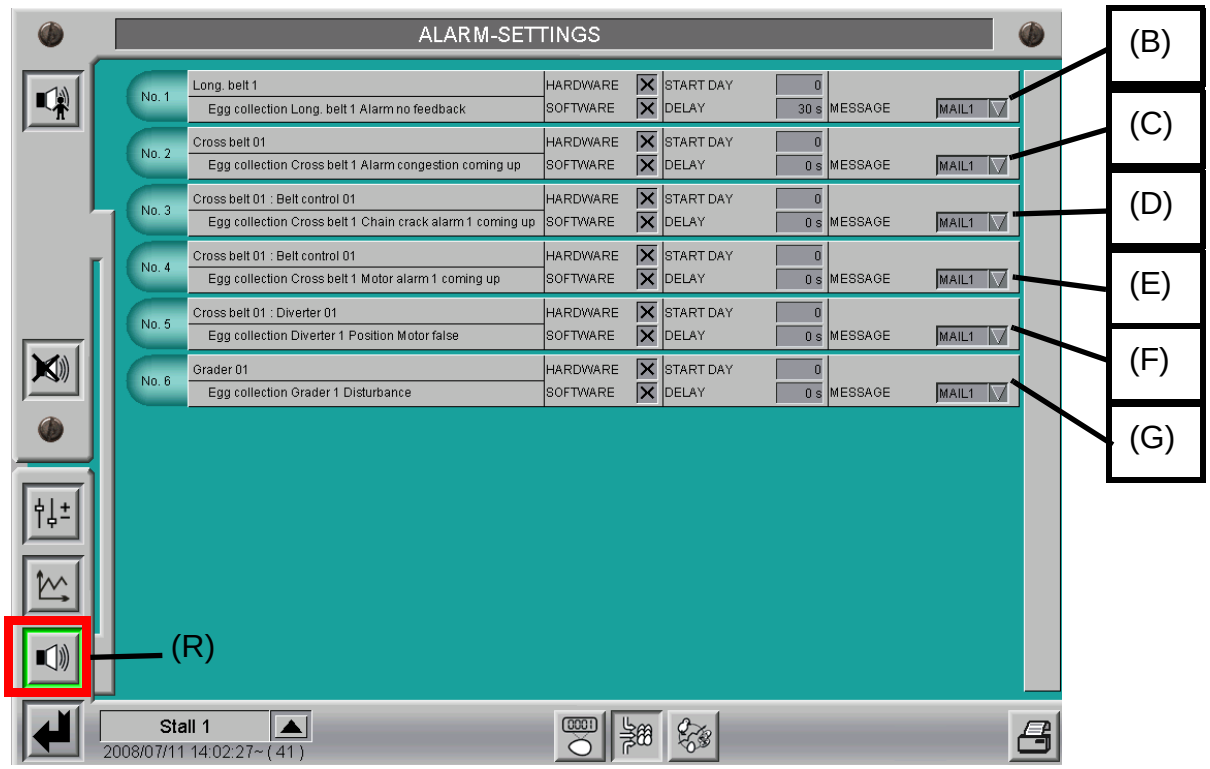


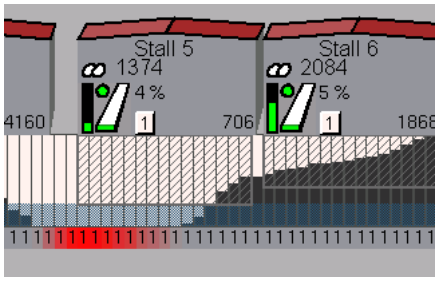
Figure 3-39: Alarms

Egg collection long. belt 1 alarm no feedback (B):

This alarm exists in every house, once per group of longitudinal belts, and monitors the signal change of the pulse emitter on the longitudinal belt.

The pulse emitter is used to calculate the progress of the longitudinal belt. If the longitudinal belt is switched on and no signal change is registered within the chosen delay period, this alarm is triggered.

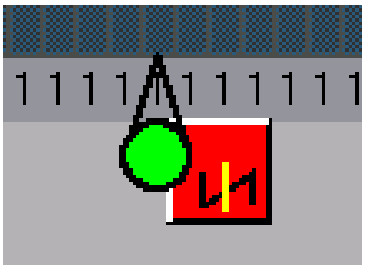
Egg collection cross belt alarm congestion coming up (C):



If the fill level of the cross belt exceeds the belt capacity, an alarm is issued. In addition, the congestion on the cross belt is indicated by the area marked in red. **This alarm does not have any influence on the collection process.** Congestion may be caused by manual operating commands, overshooting when starting up the longitudinal belts, etc.

Figure 3-40: Cross belt congestion

Egg collection cross belt chain crack alarm coming up (D):



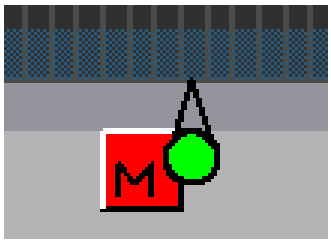
If a chain crack alarm is configured for a belt control, it is displayed as an alarm message. In addition, the alarm for the particular belt control is displayed on the cross belt. The alarm setting is only present in the master control which is responsible for controlling and monitoring the cross belt.

Figure 3-41: Chain crack alarm

If the chain crack alarm cannot be cancelled (e.g. defective sensor), it is possible to switch of this alarm until the next collection, by using the button which appears on the overview screen.

Figure 3-42: Resetting the chain crack alarm

Egg collection cross belt motor alarm coming up (E):



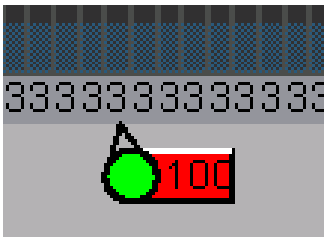
If a motor alarm is configured for a belt control, it is displayed as an alarm message. In addition, the alarm for the particular belt control is displayed on the cross belt.

The alarm setting is only present in the master control which is responsible for controlling and monitoring the cross belt.

Figure 3-43: Motor alarm

Egg collection diverter position motor false (F):

Egg diverters which have a position feedback ability will have their position monitored. If the input signal does not match the desired position within the preset delay period, this alarm appears.



In addition, if there is an alarm on a particular egg diverter, the position indicator turns red.

The alarm setting is only present in the master control which is responsible for controlling and monitoring the cross belt.

Figure 3-44: Egg diverter

Egg collection grader “disturbance” (G):

The input signal for a “disturbance” on the grader is issued as an alarm. The alarm setting is only present in the master control which is responsible for controlling and monitoring the cross belt.

3.6 Notes

4 Multi-house egg collection with multiple cross belts

In the case of multi-house egg collection, the collection process is optimised by the system across the different houses.

If the grader is supplied by several cross belts, it is also possible to automatically synchronise them, so that the total feed capacity of the cross belts is regulated according to grader capacity.

The system then controls the collection groups on the individual cross belts so that they can arrive at the grader and be finished at the same time across all cross belts.

Up to five cross belts can be synchronised.

The particular issues and additional functionalities which arise from synchronising the cross belts are described in this chapter.

For information on all other functions and settings, please see the previous chapter (**"Multi-house egg collection"**).

4.1 Overview screen

On the left-hand side of the overview screen you can find additional controls for master control of the collection **(A).**

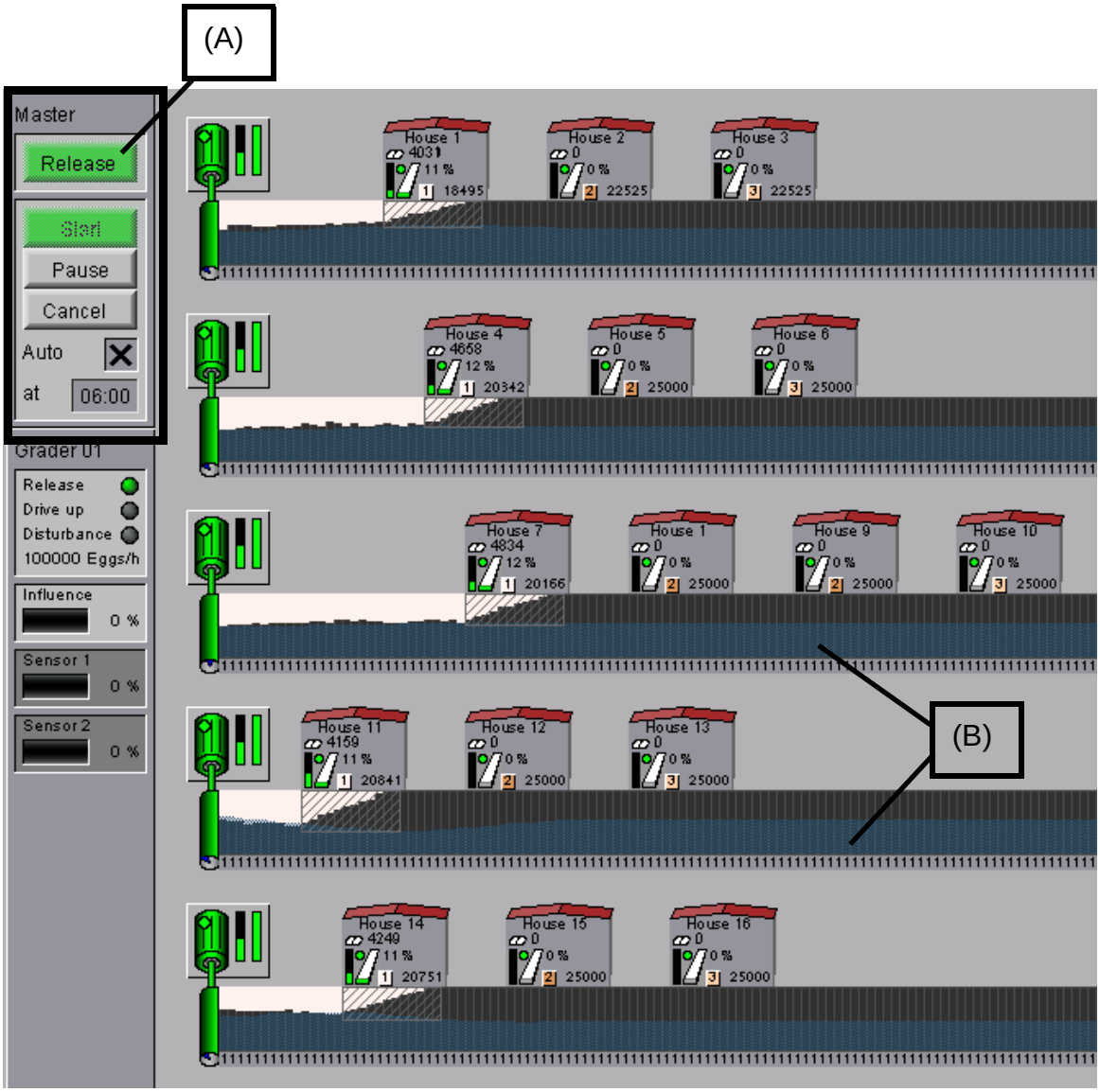


Figure 4-1: Overview screen

Cross-belt synchronisation (B):

The blue area at the bottom edge of the cross belts is used to limit the fill level of the cross belts.

The limit is calculated such that the grader is used to its capacity when the cross belt is operating at full speed, and so that houses belonging to individual collection groups will finish at the same time.

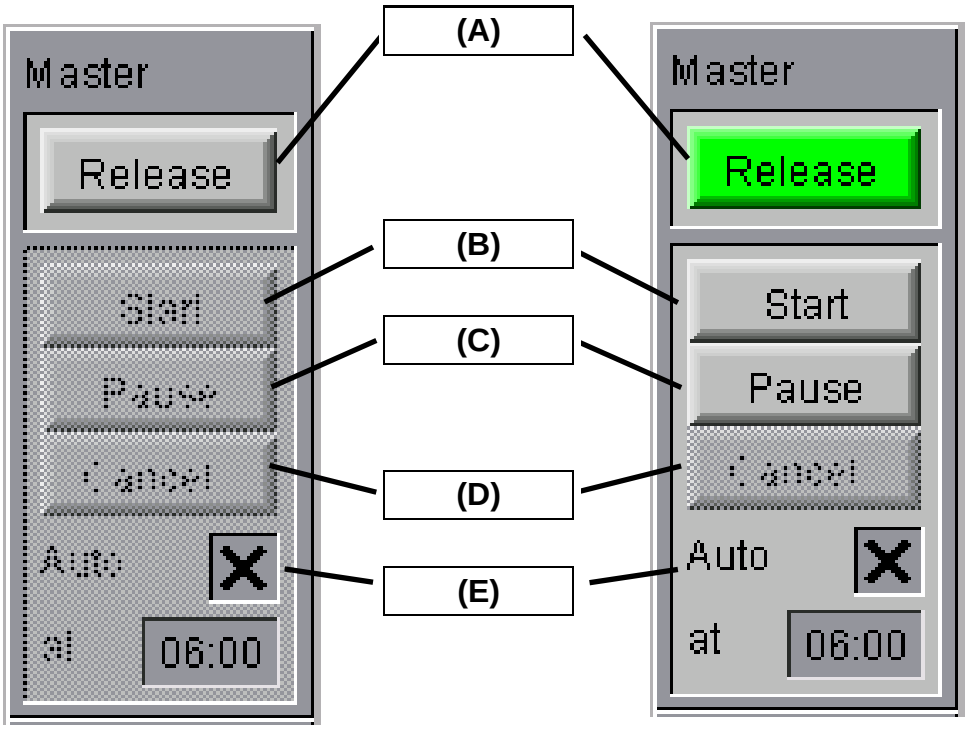
4.2 Operating the master control

The master Start and cross-belt synchronisation can be selected and deselected.

If this function is not active, eggs can be collected from each cross belt independently, as described in the previous chapter. The controls for master collection then appear greyed-out. In this case, collecting times are set and the belts operated separately.

If the master control is selected, the separate controls for starting collection on each cross belt are greyed-out (see chapter 3.4.3 "Cross-belt settings").

A notice is displayed informing the operator that the master control has been selected. The starting time for each cross belt is ignored.



Master = deselected Master = selected

Release (A):

Pressing this button releases or unreleases master collection. In its selected state, the button turns green. This can only be reset if no collection is currently running.

Start (B):

Collection is started manually with the Start button. It can only be pressed if the master control is “released” and no collection is still running. Pressing the button issues a safety prompt in order to avoid accidental presses.

Pause (C):

The Pause button switches the collection into pause mode. It can be pressed at any time, even if no collection is active. Pause continues until the pause button is pressed again.

The Pause symbol also appears on the overview screen, on all cross-belt drives. However, with the cross belts synchronised, the drives may only be unpaused using this button, because it applies universally to all cross belts.

Cancel (D):

The Cancel button cancels the collection currently running. As can be expected, it is only possible to press it if a collection is actually happening.

Pressing the button issues a safety prompt in order to avoid accidental presses.

If the collection is cancelled, the values for longitudinal-belt progress and for eggs already counted are retained.

The fill level continues to be displayed on the cross belts. However, the indication of the different collection groups is reset.

Eggs which do not belong to a collection group are shown in white for the cross-belt fill level.

Start collection automatically (E):

From here you can start the collection automatically by setting the checkmark and setting a clock for the start.

Collection will start at the set time if “Release” is selected on the master control and there is no collection running at the time.

4.3 Settings

The button with the two sliders at the left-hand edge of the screen allows you to switch between the settings and the overview screen for the production area in question.

Compared to a system with only one cross belt, an extra menu entry **"Master settings"** is listed here **(R)**. There is also an entry for each cross belt for planning and setting up collection.

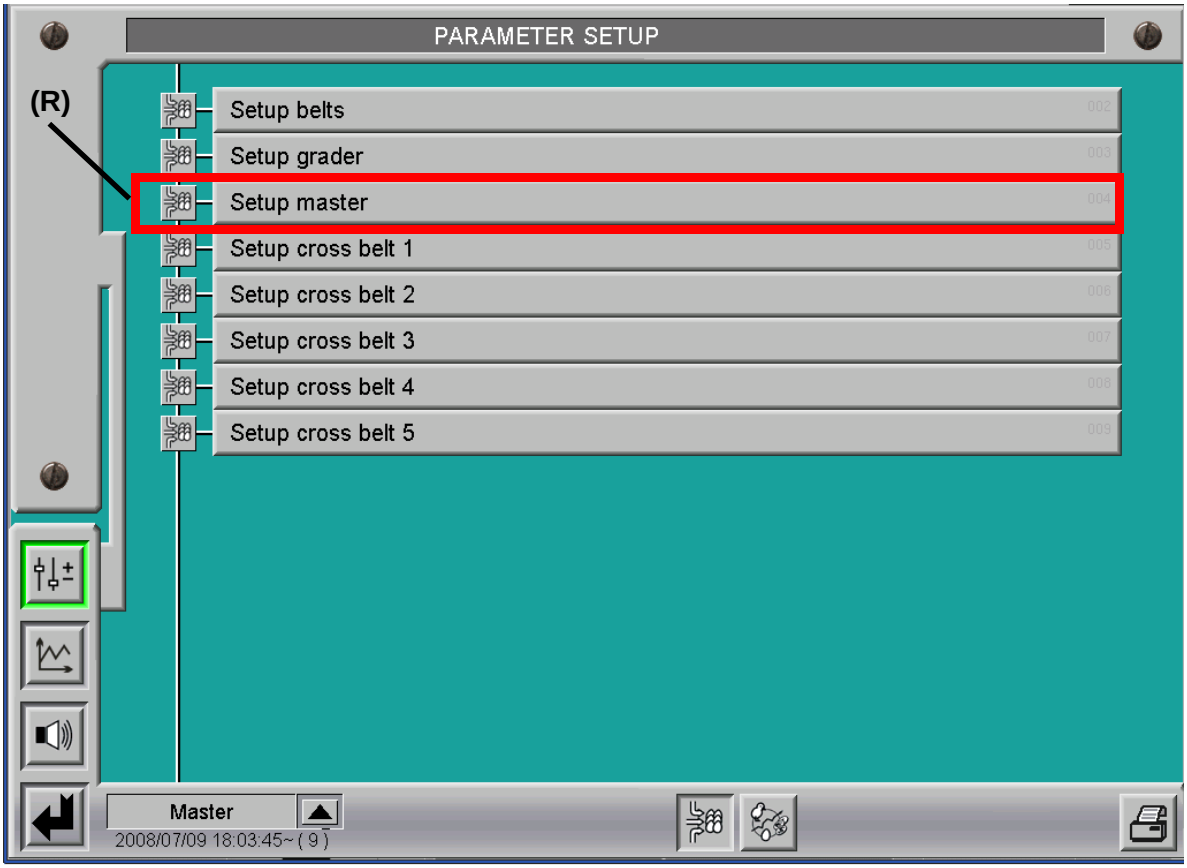


Figure 4-2: Selecting settings

4.3.1 Master settings

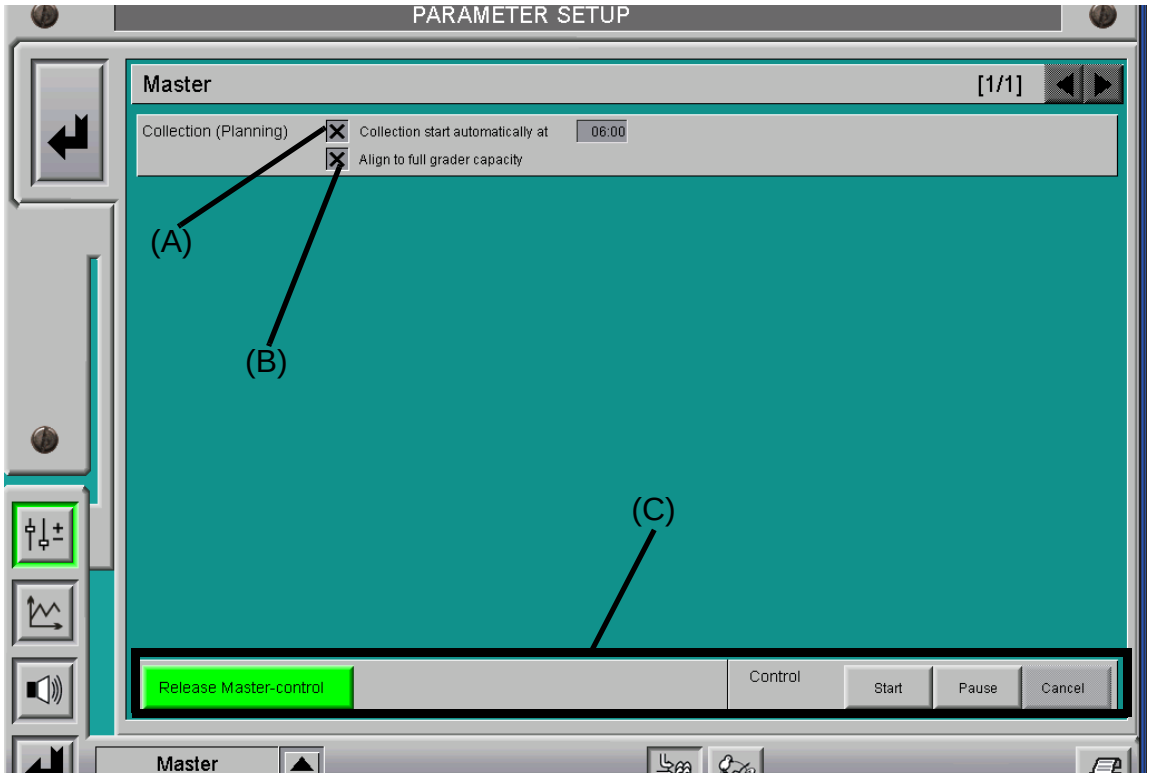


Figure 4-3: Master settings

Start collection automatically at (A):

This is where you can activate the automatic start of collection with cross-belt synchronisation (master control) and set a time for the start.

Align to full grader capacity (B):

The master control uses cross-belt synchronisation to divide the fill level over the different cross belts, such that the collection groups finish at the same time. For mechanical reasons (e.g. cross-belt capacity) this may mean that the grader is not used to its full capacity.

Marking this checkbox assigns a higher fill level to cross belts which still have capacity free, so that the grader is filled. This will however mean that the houses served by these cross belts will finish first. When planning collection groups, the capacities and feed capacities of the houses, cross belts and grader should be taken into consideration, in order to achieve optimum utilisation of the system.

Master control (C):

The function and display of the controls for the master control are the same as those on the overview screen and are already described in that part of the documentation.

4.3.2 Cross-belt settings

As described in the previous chapter, the collection process can be planned separately for each cross belt.

If master control is selected, the buttons for manual operation of collection are greyed-out **(R)**.

Furthermore, the indication "Master" appears to point to the fact that master cross-belt synchronisation has been selected.

The time for automatic start of the collection for each cross belt is also disregarded if master control is activated.

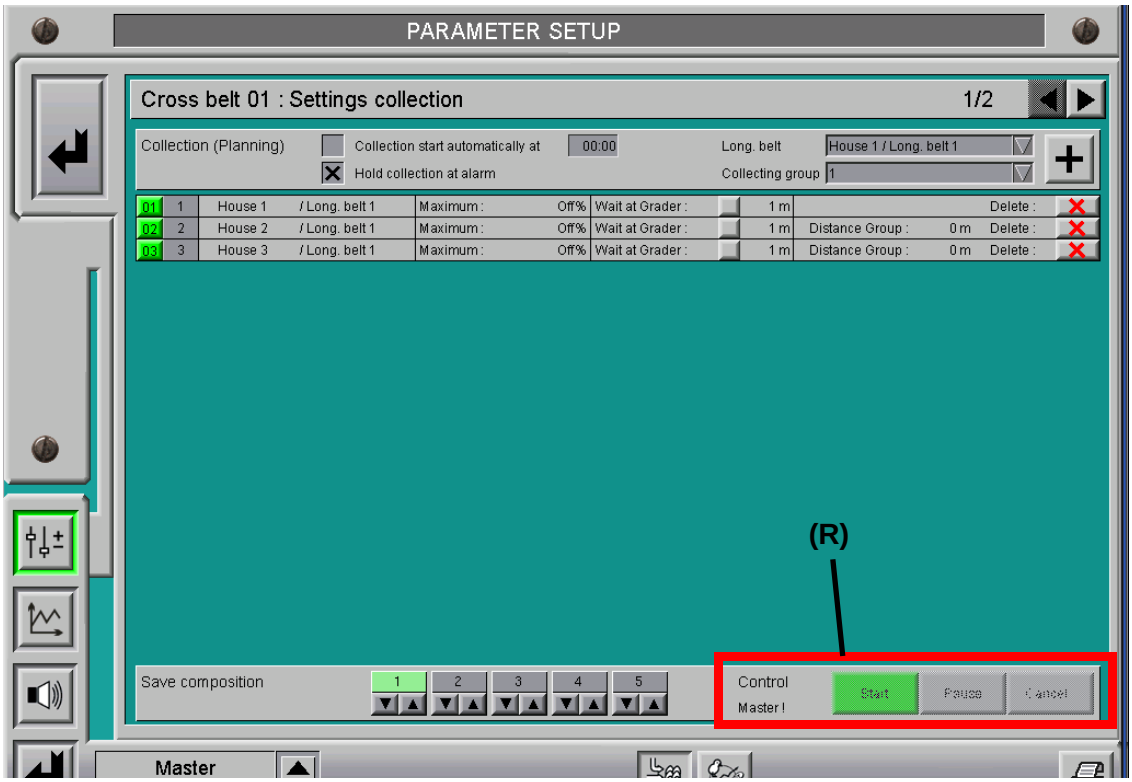


Figure 4-4: Cross-belt settings

4.3.3 Collection-group distance

The houses are activated starting with the furthest away for the collection group in question, across all cross belts. This allows the system to evaluate the required allocation for the previous collection group, across all cross belts.

The distance between groups for activating the next house is determined based upon the next house to be activated. Therefore, when planning the collection, ensure that the distance between the groups is set the same for all cross belts.

You can see in the following screen that "House 9" is about to switch on. A distance of 0 metres was entered for this house for groups 1 + 2 The calculated end of the previous collection will always vary slightly due to cross-belt synchronisation.

For the start of collection for the house, when the system is activated, allocation on the bottom cross belt is evaluated, because it is the furthest back.

Figure 4-5: Activating the next group

4.3.4 Waiting at the grader

If the intention is for a collection group to wait at the grader, all cross belts are stopped when the collection group on this cross belt reaches the grader. The message “**Egg group waiting”** then appears on the corresponding cross belt.

In the following screenshot, the third collection group on the first cross belt has been configured to wait at the grader at a distance of 10m. Pressing the pause button on the master control **(R)** continues the collection.

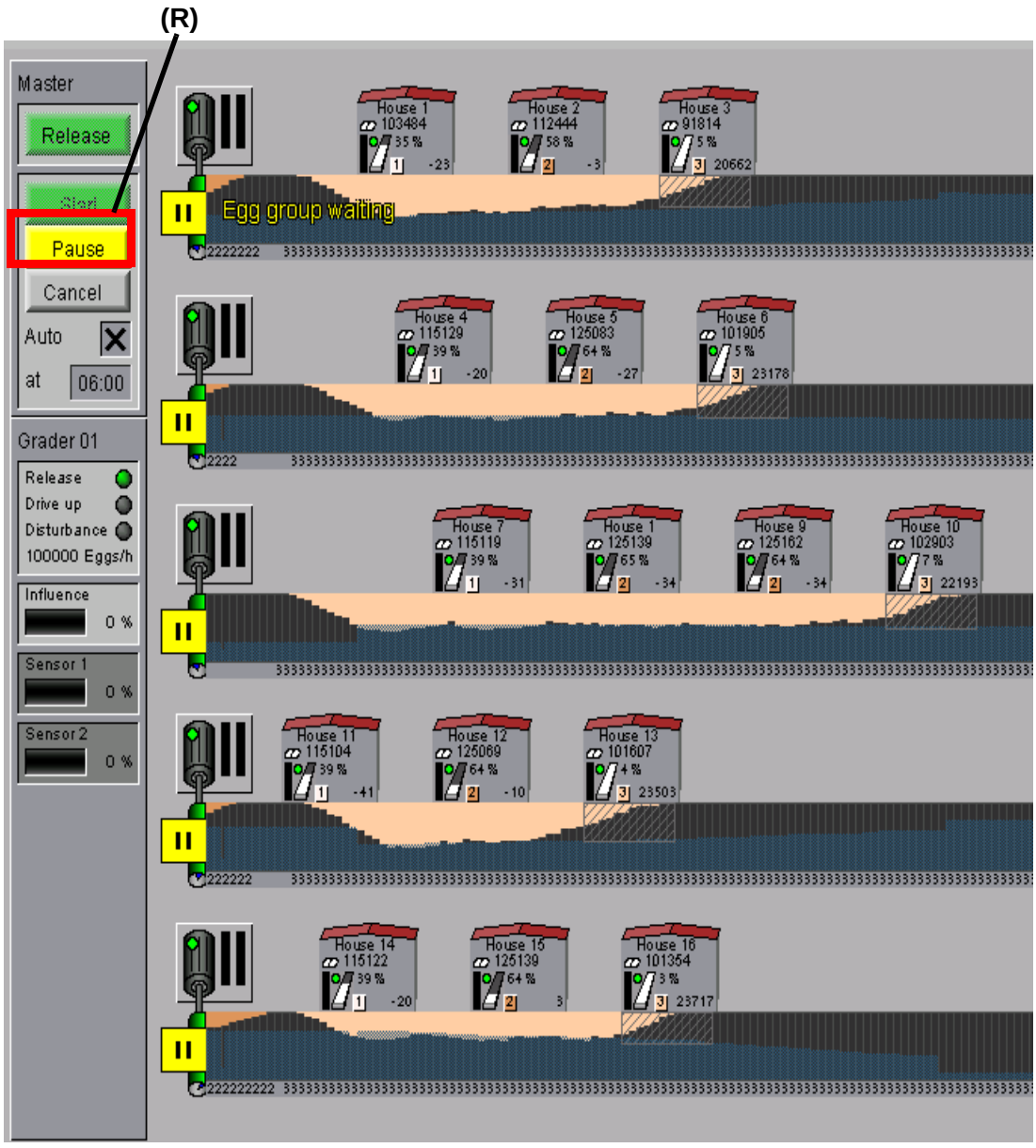


Figure 4-6: Waiting at the grader

4.4 Notes

5 Egg Saver

The Egg Saver prevents the eggs from rolling unimpeded out of the cage onto the longitudinal belt and damaging other eggs.

It consists of a wire, which is raised to allow eggs to roll onto the longitudinal belt.

5.1 Overview screen

The Egg Saver appears on the left-hand side of the overview screen for egg collection **(R)**.

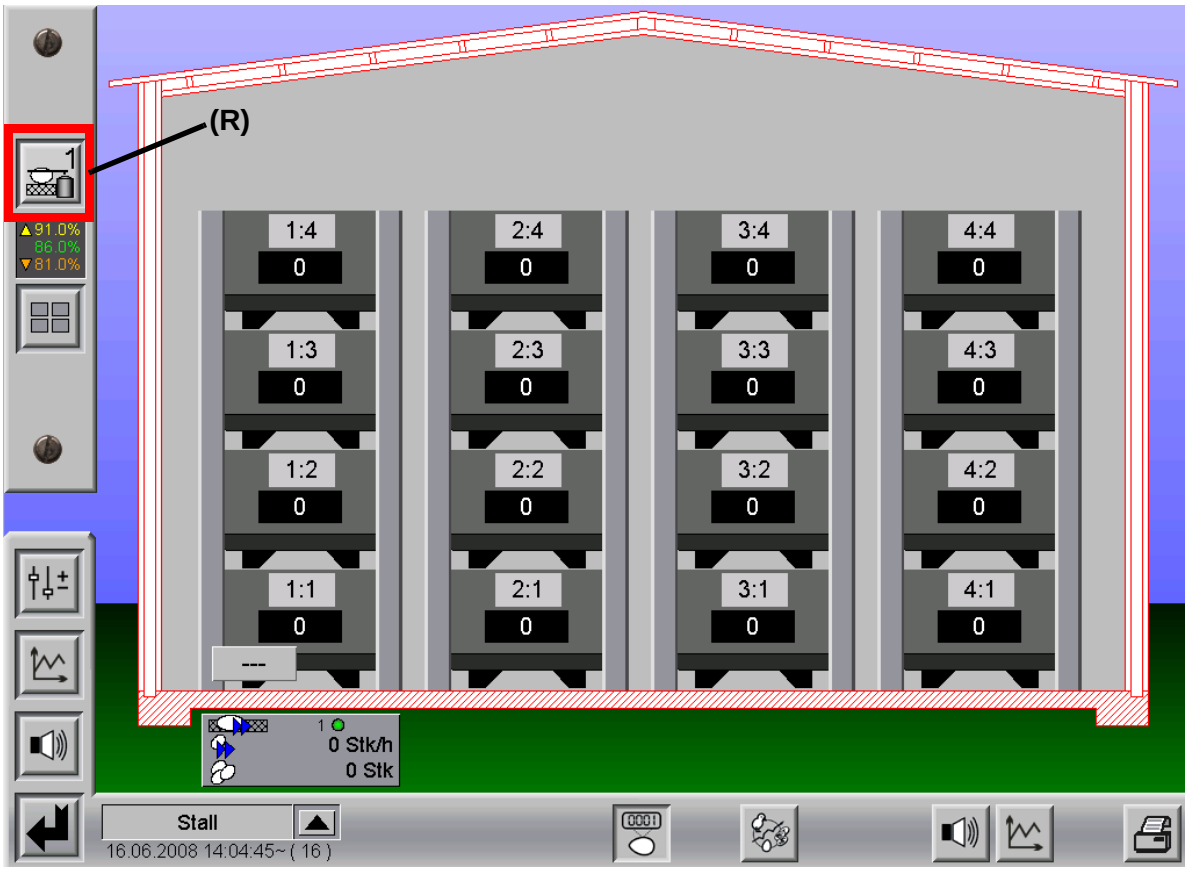


Figure 5-1: Egg Saver overview

The symbol indicates the current status of the Egg Saver.

Figure 5-2: "Auto" operating mode, “not active”, position “down”

Figure 5-3: "Auto” operating mode, “active”, position “down"

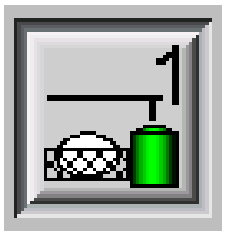


Figure 5-4: "Auto” operating mode, “active”, position “up”

Figure 5-5: “Manual” operating mode, position “down"

Each house can have two groups of longitudinal belts, which means that the Egg Savers can also be controlled in two groups.

If two Egg Savers are installed, an additional Egg Saver appears on the left-hand side with the number "2".

5.2 Manual operation

From the overview screen, the Egg Saver can be operated manually by clicking on the button **(R)**, in the usual way for **AMACS**.

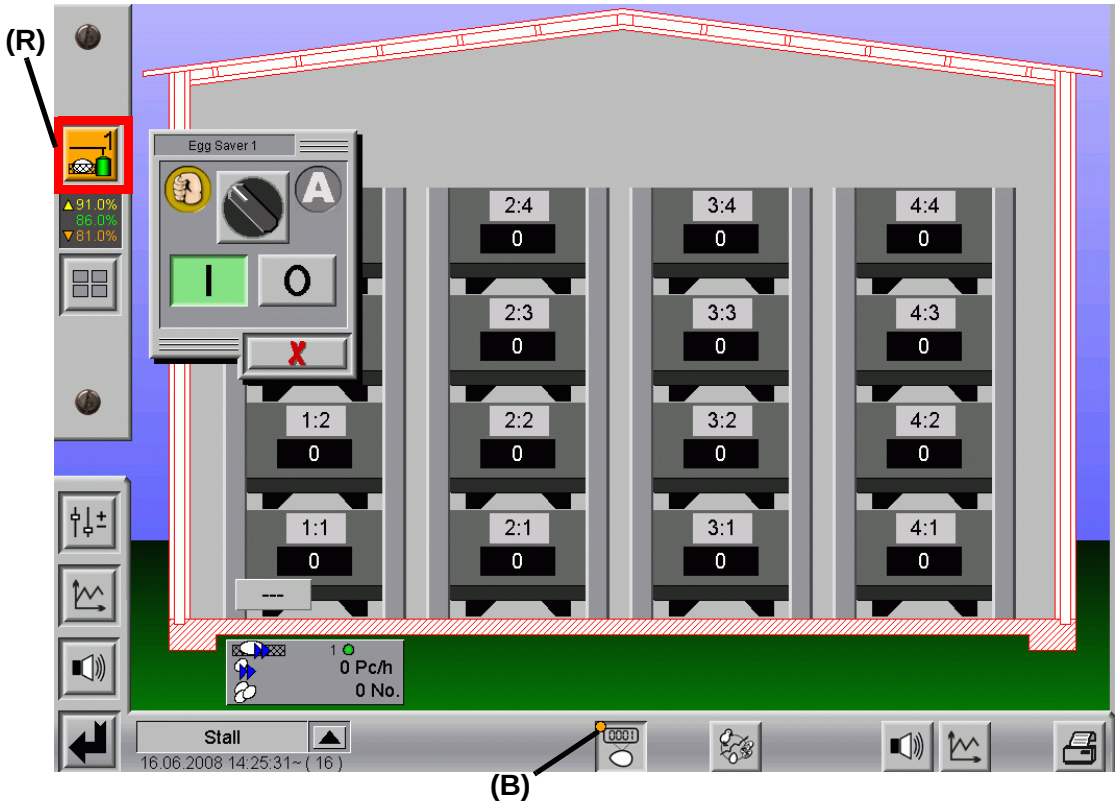


Figure 5-6: Egg Saver manual operation

When the Egg Saver is in “Manual” operating mode, an orange dot **(B)** also appears in the bar across the bottom of the screen.

This point serves to inform the user that something in the module is being operated manually.

5.3 Settings

5.3.1 Switch times

You can set twelve time ranges for each Egg Saver. Each time range has a duration which can be set using the “On-time” and “Off-time”.

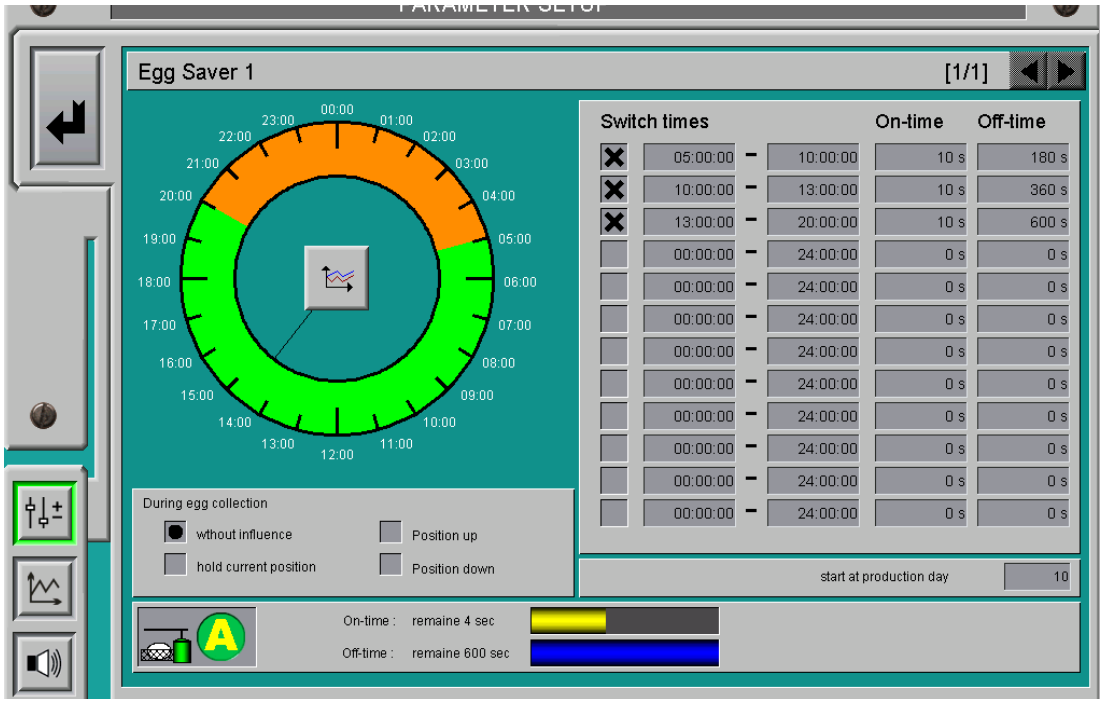


Figure 5-7: Egg Saver switch-time settings

When a switch time is activated, the remaining “On-time” and “Off-time” are represented graphically in the bottom portion of the screen, as well as the current position of the Egg Saver.

Moreover, you can set the production day from which the Egg Saver should be active.

The times at which the Egg Saver is active and following the specified On and Off-times are shown in green on the on-screen “clock”.

Times when the Egg Saver is not activated, and therefore will not switch on or off, are marked in orange.

At times when the Egg Saver is not activated, it remains in the “down” position, so that no eggs are able to roll onto the egg belt.

	An output is generated for each Egg Saver. The 1-signal means that the Egg Saver is raised, so that the eggs can roll onto the belt. With a 0-signal the Egg Saver is lowered, so that the eggs cannot roll onto the egg belt.

5.3.2 Behaviour during egg collection

The behaviour of the Egg Saver during egg collection can be customised. The operator is able to choose between the following settings **(R)**:

a) Without influence

b) Hold current position

c) Position up

d) Position down

	For operating modes b), c) and d), the Egg Saver must be installed to a **AMACS** egg collection system.

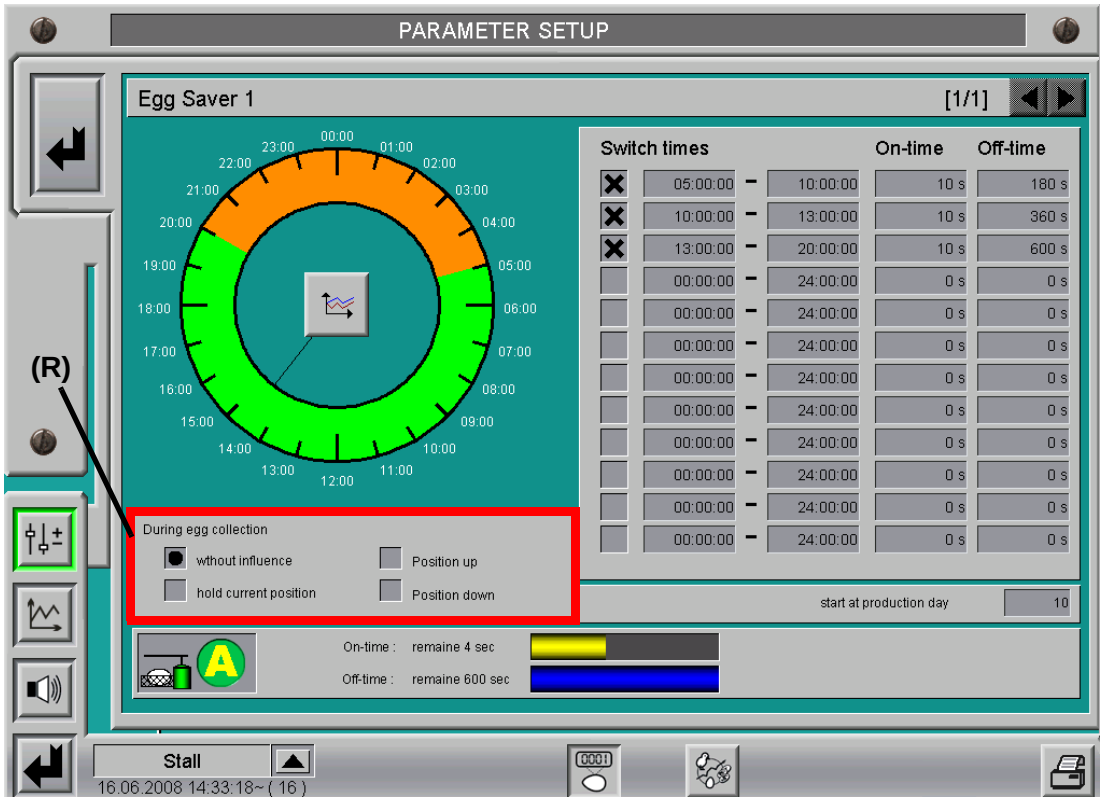


Figure 5-8: Settings for behaviour during egg collection

5.3.3 Chart of switch times

Clicking on the symbol marked in red **(R)** in the centre of the on-screen “clock” displays a diagram with the date and time of the most recent switch times.

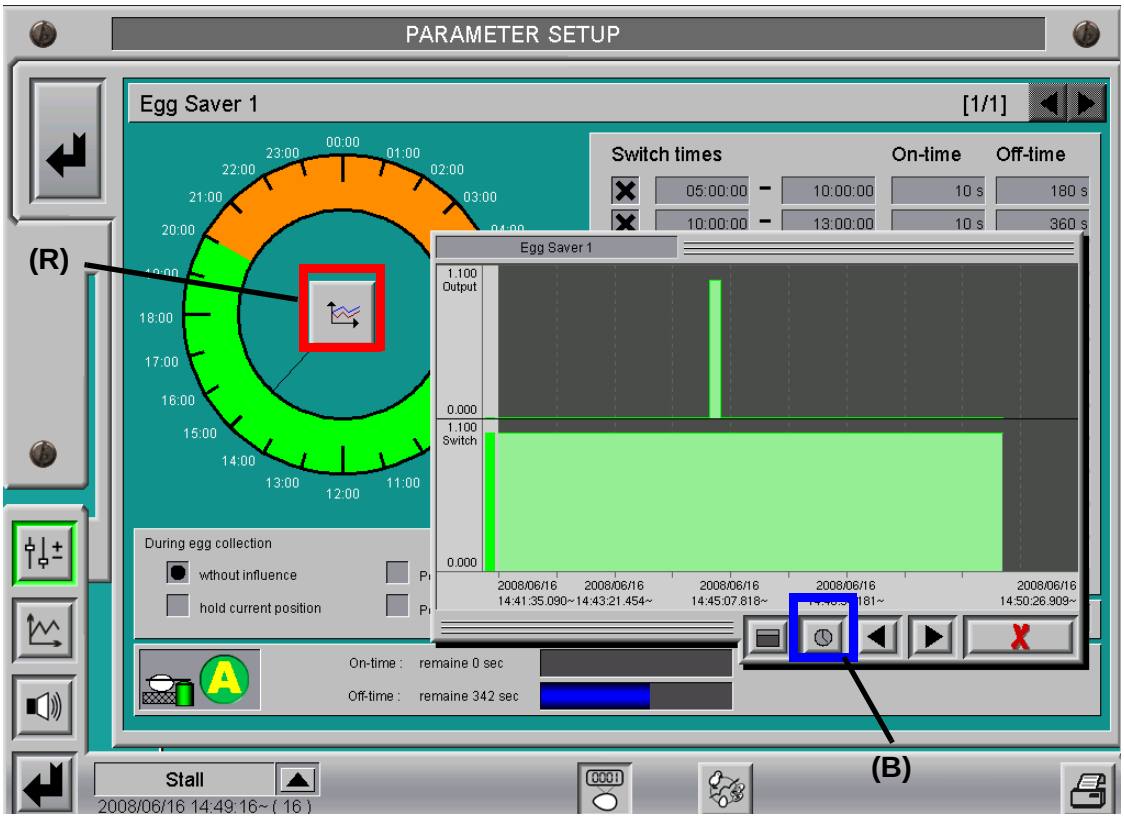


Figure 5-9: Chart of switch times

This window allows you to view all the statuses of the Egg Saver.

The bottom portion of the window displays the time range when the Egg Saver was active.

The upper part displays its output. Clicking on the symbol marked in blue **(B)** allows you to select the date and time for the desired period of time.

5.4 Notes

6 Time-controlled movement of the longitudinal belt

The **"Move longitudinal belt on"** function spreads the eggs out on the longitudinal belt.

This is necessary because in many types of cage (e.g. small aviary) the eggs only roll onto the egg belt in the nest area, thus causing congestion on the belts, elevators, etc. Furthermore, even distribution of the eggs is an advantage during collection for controlling the belts.

Moving the belt on is relevant to the period from the start of the laying phase until the start of egg collection. After egg collection starts, the longitudinal belt is not moved on any more until the end of the next day.

There are up to two groups of longitudinal belts in each house, so even "Move longitudinal belt on" can be set separately for each group of longitudinal belts. The following sections explain the function with reference to a group of longitudinal belts.

6.1 Settings

6.1.1 Times

The time-controlled moving on of the longitudinal belt is regulated by the operator setting twelve individual times and a production day from which moving on should begin.

If a time comes after the start of egg collection the belt is not moved on. The belt is also not moved on if the maximum distance has been reached.

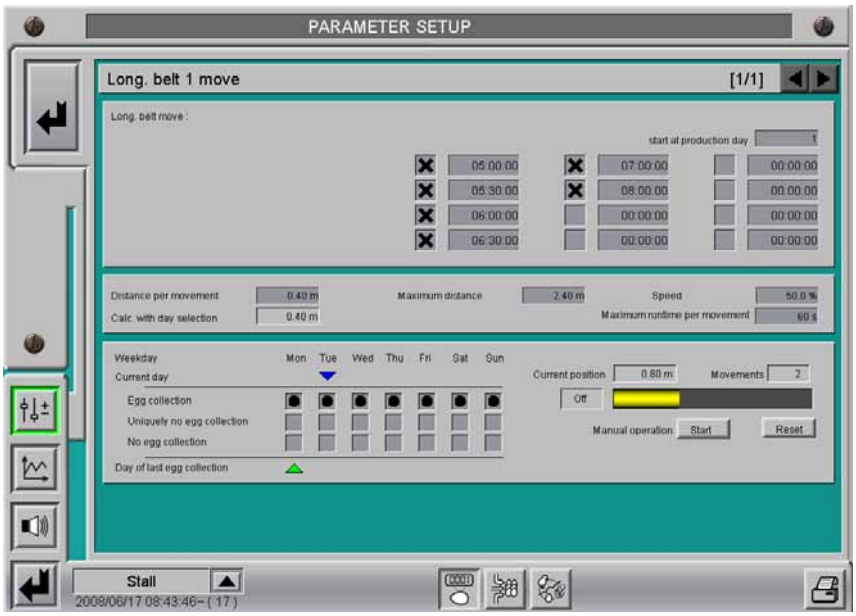


Figure 6-1: Times settings

6.1.2 Distance

The distance for each individual movement, the maximum distance and the speed can be adjusted by the user. They are particularly dependent on the aviary and nest width.

It is also possible to set a **"Maximum runtime per movement"**. If for some reason the position has not been reached after the time set, the belt comes to a stop and an alarm message is issued.

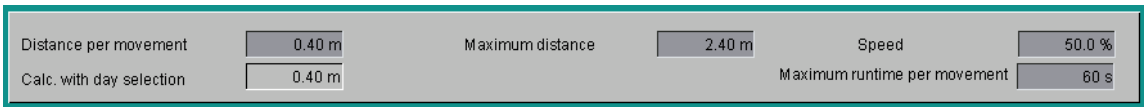


Figure 6-2: Distance settings

The setting **"Calc. with day selection"** displays the latest distance covered for each movement. It takes account of the day selection, in which the days are specified on which no collection occurs. The distance is then reduced, thus spreading the available distance over several days.

6.1.3 Day selection

Day selection makes it possible to take account of days where a collection or no collection will take place. The operator is able to choose between the following settings for each individual day of the week:

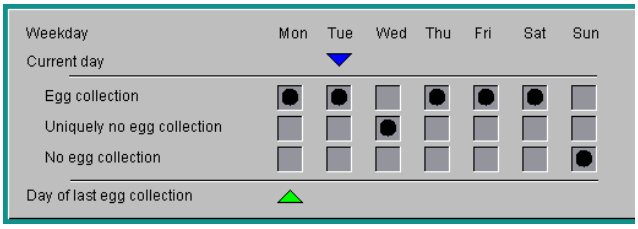
a) Egg collection

b) Uniquely no egg collection (e.g. public holiday)

c) No egg collection (e.g. Sunday)

On days when no egg collection will take place, the values for the movement distance are reduced.

If “Uniquely no egg collection” is selected for a particular day, “Egg collection” is automatically selected for the following day.



For clarity’s sake, the current day of the week is indicated with a blue triangle and the day when the last egg collection was performed with a green triangle.

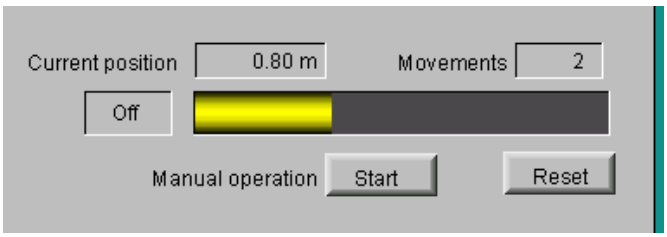
Figure 6-3: Day selection

6.1.4 Status

The current movement status is indicated here. The movement distance and number of movements are specified. Furthermore, the current distance in comparison to the maximum possible distance is represented graphically.

If egg collection for the current day has begun, the belt is not moved on any more until the end of the day.

The message “Egg collection started" is shown at the current position.



If egg collection is cancelled or a cycle is completed, the values “Current position" and “Movements" are reset.

Figure 6-4: Status

6.1.5 Starting and resetting manually

The operator has the option to start the **”Move longitudinal belt on"** function manually using the “Start” button.

The movement status can be reset by clicking on "Reset". This resets the values for **”Current distance"** and **”Number of movements”**.

6.2 Notes

7 Move longitudinal belt on by weighing

The **"Move longitudinal belt on"** function spreads the eggs out on the longitudinal belt.

This is necessary because in many types of cage (e.g. small aviary) the eggs only roll onto the egg belt in the nest area, thus causing congestion on the belts, elevators, etc. Furthermore, even distribution of the eggs is an advantage during collection for controlling the belts.

The function **"Move on by weighing"** weighs the mass of the eggs on the longitudinal belt in front of the nests and moves the belt on by a predefined distance when a certain threshold value is reached.

Moving the belt on is relevant to the period from the start of the laying phase until the start of egg collection. After egg collection starts, the longitudinal belt is not moved on any more until the end of the next day.

There are up to two groups of longitudinal belts in each house, so even "Move longitudinal belt on" can be set separately for each group of longitudinal belts. The following sections explain the function with reference to a group of longitudinal belts.

7.1 Overview screen

On the overview screen for egg collection, bars are displayed for the rows and tiers. They show the ratio between the egg mass already laid and that still anticipated.

The anticipated egg mass is produced from the "Maximum distance", "Distance per movement" and the "Weigh value for movement". The already laid egg mass is determined from the current weigh value, plus the egg mass already moved on.

Up to eight weighing units can be installed per group of longitudinal belts.

Their positions (row, tier, side) are configured by the service technician during installation of the system, so that they appear in the appropriate position on the overview screen.

If a weighing unit is deactivated, it is shown with a red outline in the house view.

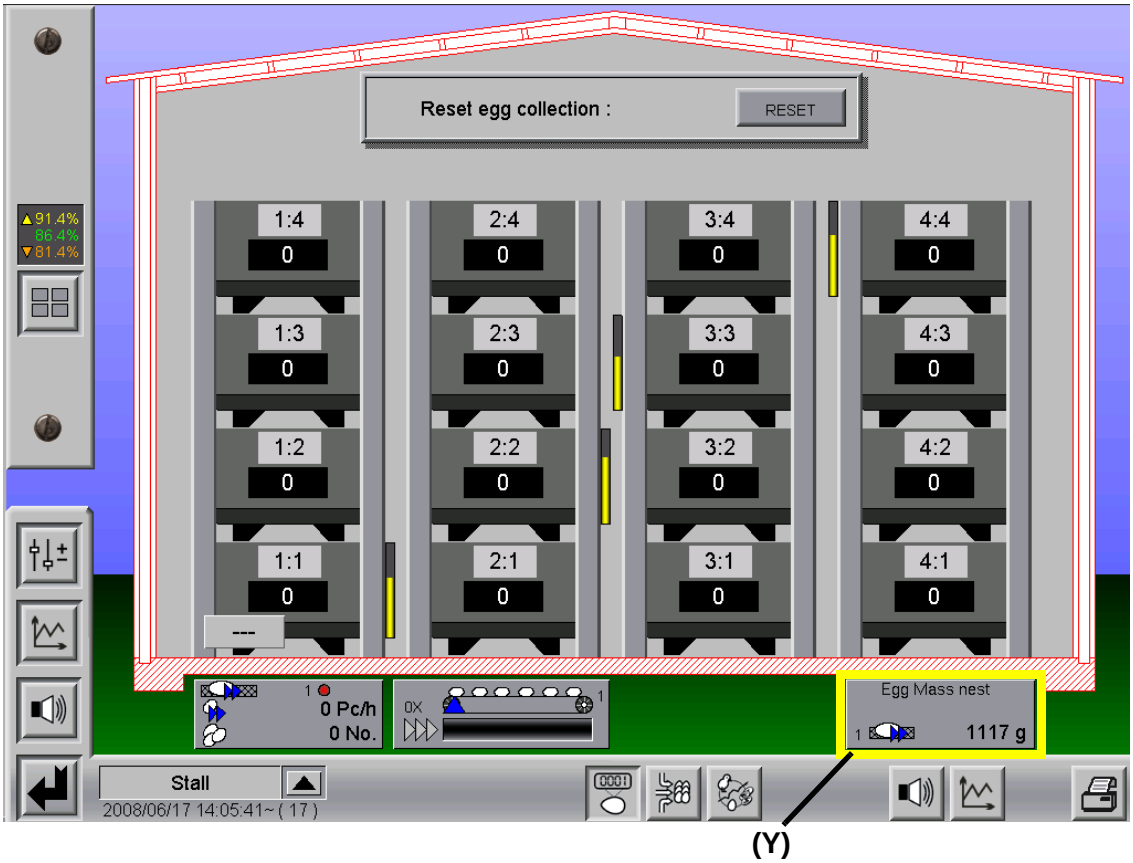


Figure 7-1: Overview screen

The bottom part of the screen **(Y)** shows the average egg mass per nest in grammes. It is generated from the average of all weighings.

The displayed weight corresponds to the current weigh value, plus the egg mass already moved on.

The number "1" refers to that fact that this is the value for the first group of longitudinal belts.

If there is a second group of longitudinal belts, this is represented by the number "2".

7.2 Settings

The settings are divided over **two pages**.

On the **first page**, you can enter settings for moving the belt on.

The **second page** is used for calibrating and activating/deactivating the weighing channel.

The page number of displaced at the top right of the screen. You can switch between the pages by clicking on the arrow buttons.

7.2.1 Mode selection

If a longitudinal-belt weighing unit is installed in front of the nests, the operator can select between the following settings for moving the belt on:

- **Weighing nest:**

  The longitudinal belts are moved on based on their weight, as described further down in this chapter.

- **Time-steered:**

  The longitudinal belts are moved on on a time-controlled basis, with no regard for weight, as described in the previous chapter 8.

  The values for the current egg mass and the average egg masses per nest are, however, still recorded.

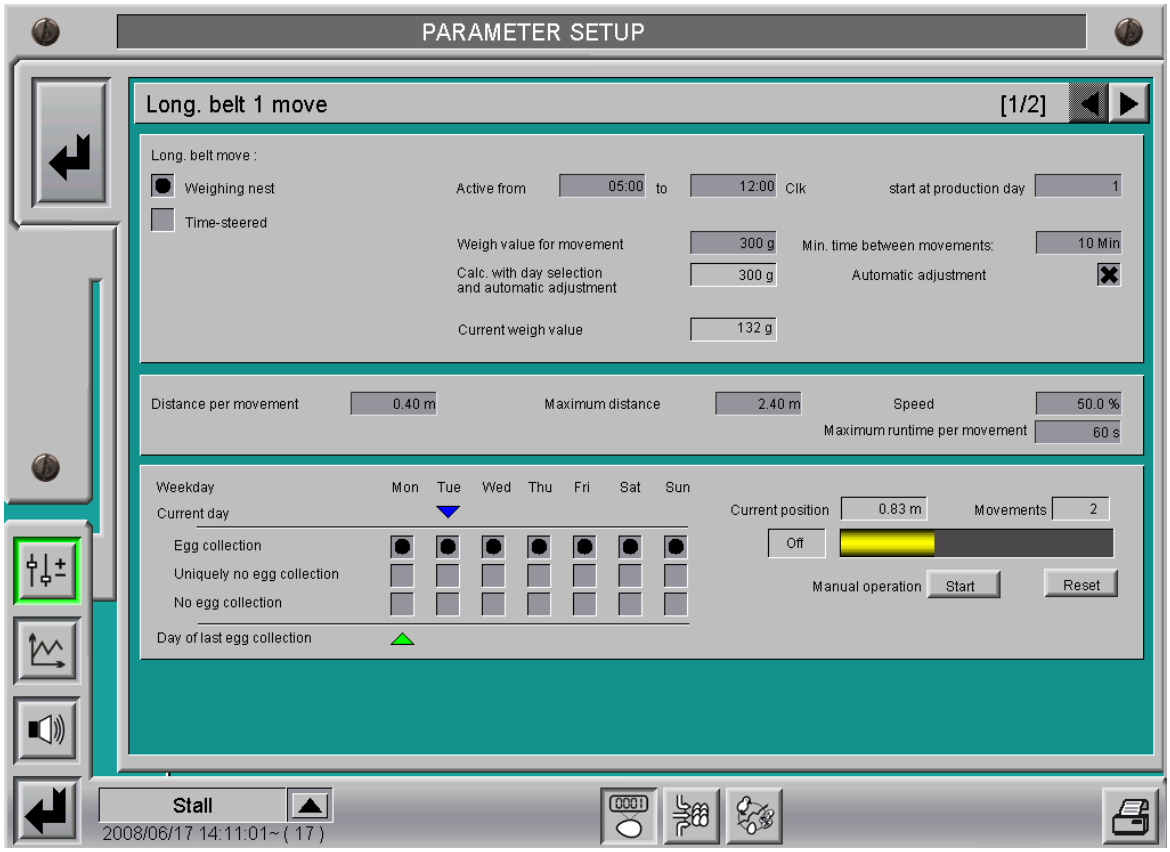


Figure 7-2: Settings: weighing or time-controlled

7.2.2 Weigh values

On the first page of settings, you can enter the values for the movements.

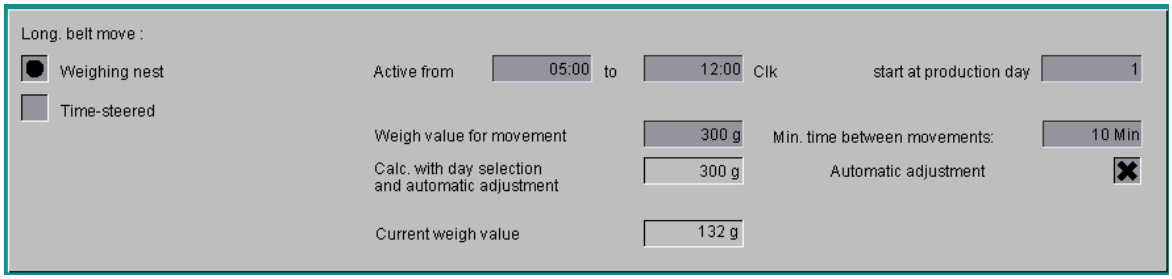


Figure 7-3: Weigh value settings

The first setting is for a **time period** during which the **”Move longitudinal belt on”** function is active, and the **production day** from which moving on of the belt is to begin.

Under the menu item **”Weigh value for movement”**, the egg mass from which the longitudinal belt should start up is entered. The weight for moving the longitudinal belt on is specified by the user. This weight is compared with the average of all active weighing units. If the average is higher than the specified weight, the longitudinal belt is moved on one step.

It is possible to set a **”Min. time between movements”**, in order to prevent overly sensitive adjustment.

You also have the possibility to have the weight which triggers a movement adjust itself automatically. This evaluates the average egg mass per nest from the last laying cycle (from one egg collection to the next) and adjusts the weight slightly. The advantage of this is that if laying output rises or falls, the weight for moving the belt on is adjusted automatically, meaning that it does not have to be corrected manually.

The setting **”Calc. with day selection and automatic adjustment”** shows the current threshold value from which the longitudinal belt will be moved on. It takes account, on the one hand, of the day selection, so that on days where no collection takes place the movement weight is increased accordingly, and on the other it varies the weight based on the automatic adjustment setting.

”Current weigh value” displays the current average weight.

7.2.3 Distance

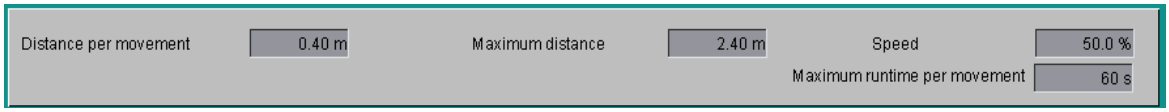


Figure 7-4: Distance settings

The distance for each individual movement, the maximum distance and the speed can be adjusted by the user. They are particularly dependent on the aviary and nest width.

It is also possible to set a **"Maximum runtime per movement"**. If for some reason the position has not been reached after the time set, the belt comes to a stop and an alarm message is issued.

7.2.4 Day selection

Day selection makes it possible to take account of days where a collection or no collection will take place. The operator is able to choose between the following settings for each individual day of the week:

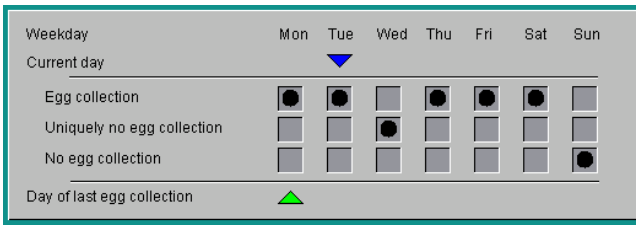
a) Egg collection

b) Uniquely no egg collection (e.g. public holiday)

c) No egg collection (e.g. Sunday)

On days when no egg collection will take place, the values for the movement distance are reduced.

If “Uniquely no egg collection” is selected for a particular day, “Egg collection” is automatically selected for the following day.



For clarity’s sake, the current day of the week is indicated with a blue triangle and the day when the last egg collection was performed with a green triangle.

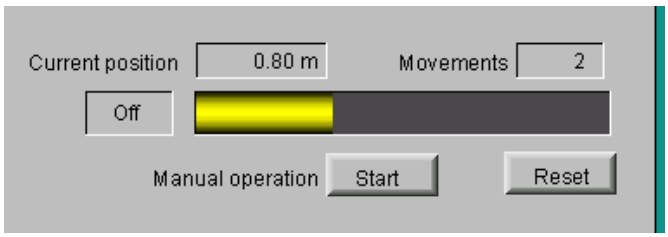
Figure 7-5: Day selection

7.2.5 Status

The current movement status is indicated here. The movement distance and number of movements are specified. Furthermore, the current distance in comparison to the maximum possible distance is represented graphically.

If egg collection for the current day has begun, the belt is not moved on any more until the end of the day.

The message “Egg collection started" is shown at the current position.



If egg collection is cancelled or a cycle is completed, the values “Current position" and “Movements" are reset.

Figure 7-6: Status

7.2.6 Starting and resetting manually

The operator has the option to start the **”Move longitudinal belt on"** function manually using the “Start” button.

The movement status can be reset by clicking on "Reset". This resets the values for **”Current distance"** and **”Number of movements”**.

7.2.7 Weighing units

Up to eight weighing units can be installed per group of longitudinal belts. These weighing units are located in the nest area of the longitudinal belt. A 0-10V or DMS signal can be used as a weighing value. Calibration of the weighing units is performed by the service technician during commissioning and should be repeated at regular intervals. The procedure for calibration is exactly the same as that used for the silo or bird weighing units, and is not described here in any more detail.

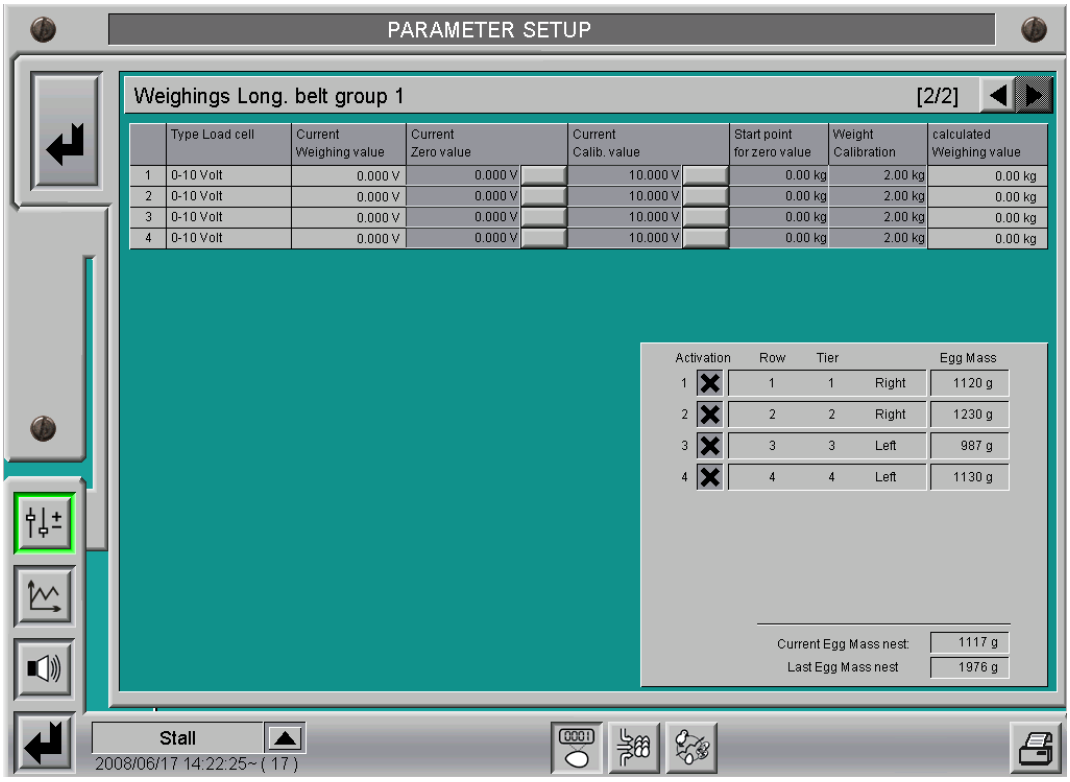


Figure 7-7: Weighing units

If there is a malfunction, a weighing unit can be deactivated.

The average movement is then evaluated from the remaining active weighing units.

In addition, the current egg mass is displayed for each weighing unit (current + moved-on weight).

This is used to generate the “Current egg mass nest” which is also displayed on the overview screen.

For information, “Last egg mass nest“ shows the egg mass for the last laying cycle.

7.3 Notes