Vento III Pig

Climate and Production Controller

User Manual

99-94-0963 06/2025 GB • 2025-06-02

Big Dutchman

Software version 9.0

1 Declaration of Conformity

Manufacturer:	**SKOV A/S**
Address:	Hedelund 4, DK-7870 Roslev, Denmark
Telephone:	+45 72 17 55 55

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product:	Vento series
Type, model:	Controller

EU directives:	2011/65/EU	RoHS Directive
	2014/30/EU	Electromagnetic Compatibility (EMC)
	2014/35/EU	Low Voltage Directive (LVD)

Standards:
EN 63000:2018
EN 61000-6-2:2019
EN 61000-6-4:2019
EN 62368-1:2024

We declare as manufacturer that the products meet the requirements of the listed directives and standards.

Location: Hedelund 4, DK-7870 Roslev

Date: 2024.11.01

Tommy Bak

CTO

Product and Documentation Changes

Big Dutchman reserves the right to change this document and the product herein described without further notice. In case of doubt, please contact Big Dutchman.

The date of change appears from the front and back pages.

IMPORTANT

Notes concerning alarm systems

Breakdowns, malfunctions or faulty settings may cause substantial damage and financial losses when regulating and controlling the climate in a livestock house. It is therefore essential to install a separate, independent alarm system that monitors the house climate concurrently with the climate and production controller. According to EU-directive No. 98/58/EU, an alarm system must be installed in all mechanically ventilated houses.

We would like to draw your attention to the fact that the product liability clause of general terms and conditions of sale and delivery specifies that an alarm system must be installed.

In case of an operating error or inappropriate use, ventilation systems can result in production losses or cause loss of lives among livestock.

We recommend that ventilation systems should be mounted, operated and serviced only by trained staff and that a separate emergency opening unit and an alarm system be installed as well as maintained and tested at regular intervals, according to terms and conditions of sale and delivery.

Installation, servicing and troubleshooting of all electrical equipment must be carried out by qualified personnel in compliance with the applicable national and international standard EN 60204-1 and any other EU standards that are applicable in Europe.

The installation of a power supply isolator is required for each motor and power supply to facilitate voltage-free work on the electrical equipment. The power supply isolator is not included.

Note

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2 Guidelines

This user manual deals with the daily operation of the controller. The manual provides fundamental knowledge about the functions of the controller that is required to ensure optimum use of it.

If a function is not used, e.g. **24-hour clock**, it is not shown in the controller user menus. The manual may therefore contain sections that are not relevant to the specific setup of your controller. See also *Technical Manual* or contact service or your dealer, if required.

3 Product description

Vento III is a climate controller for regulating and monitoring of the climate in a livestock house.

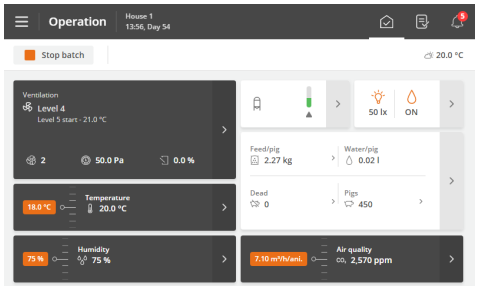
Vento III regulates the climate based on up to 64 set ventilation levels. Each level can be adjusted via a matrix, which allows for an exact climate adjustment required by the user.

In houses with batch operation, Vento III can also control the climate according to curves for temperature, heat and minimum and maximum ventilation levels.

Page layout

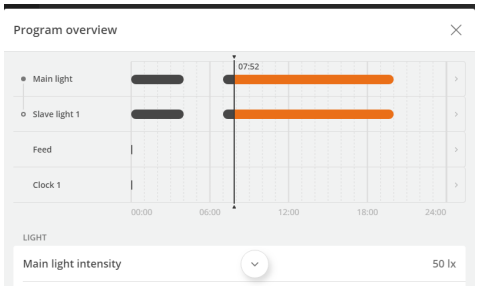
The controller has 5 main pages, which are adapted to the production and a menu page. The pages contain selected functions and views relevant to the daily work.

Figure 1: By selecting the different elements of the pages, there is access to underlying functions and data.



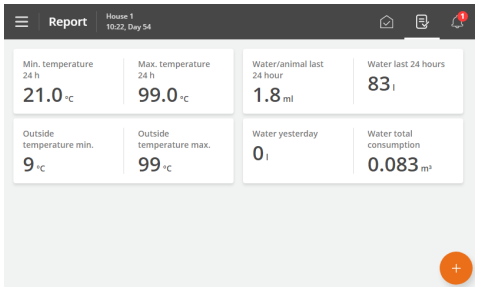
Management

The page is the main page view where the functions that must be used for daily operation are gathered.



Operation | Program overview card

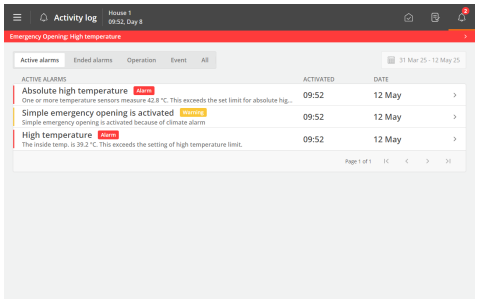
The card shows a collection of all programs with a clear indication of when the individual programs are active.



Reports

The page can be set up according the user's wishes to contain cards with key values showing current data.

It can thus be used to collect values that must be read daily and collect data to be reported.

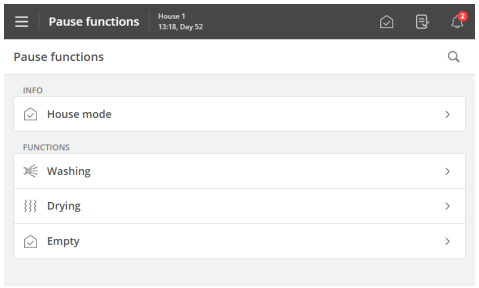


Activity log

The page displays a log of all recorded alarms, operations of the controller and events.

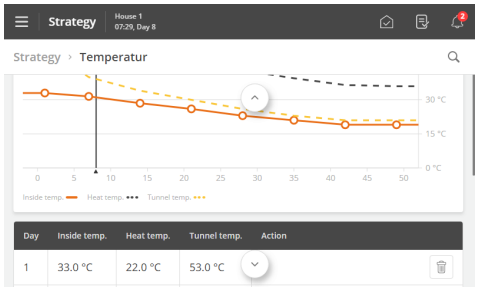
Menu button

The button gives access to a collection of shortcuts to the various pages.



Pause functions

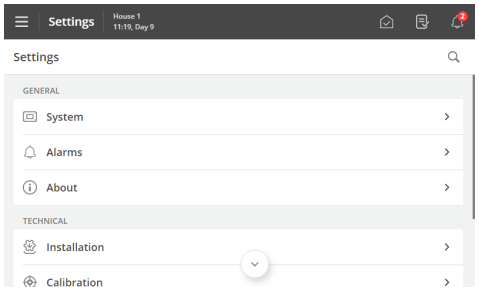
The page gives access to functions designed partly to facilitate the activities you must carry out in the house to clean it and prepare it for the next batch and partly to ensure the air change and temperature in the house while it is empty.



Strategy

The page gives access to determination of the desired production strategy, which must be repeated from batch to batch.

These are, for example, program settings, references, and batch curves.



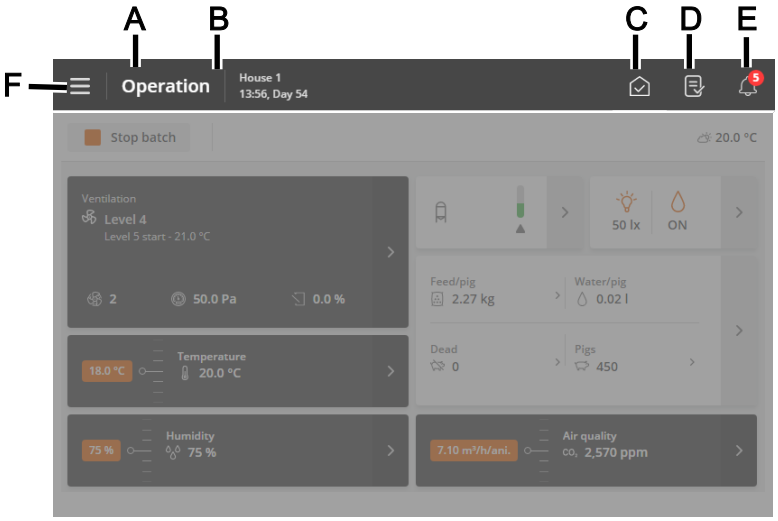
Settings

The page provides access to general settings and alarm limits.

4 Operating instructions

4.1 Operation

Each page is composed by different types of cards that provide information about the operation and quick access to operation.



Shortcut buttons in the top bar of the page allow you to switch between the main pages **Operation** (**C**) , **Reports** (**D**) and **Activity log** (**E**).

A The icon and name of the page.

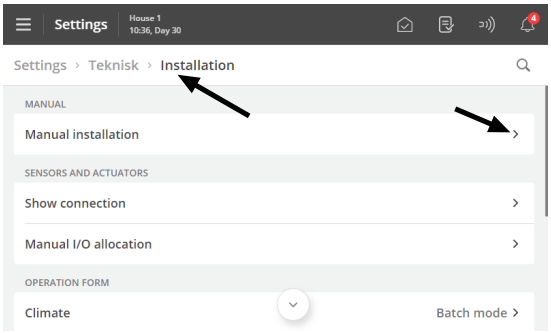
B The house name, time, and possibly week and day number.

C The **Operation** page provides an overview and the ability to operate the functions most needed for your daily work.

D The **Reports** page shows the key values the user wants on the page.

E The **Activity log** page displays active alarms and a complete log of operations, events, and alarms.

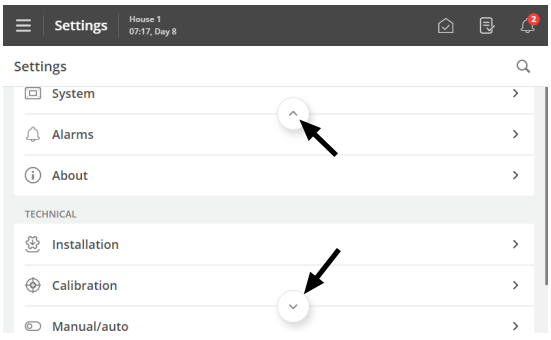
F The menu button gives access to language selection (see section Selection of language [▶ 11]) and other pages: **Pause functions**, **Strategy** and **Setting**.



Navigation menus provide access to sub-menus.

› The right arrow displays a sub-menu.

‹ The left arrow in the upper left corner allows you to take one step back in the menu.



Scroll

If the page is higher or wider than the display, you can scroll.

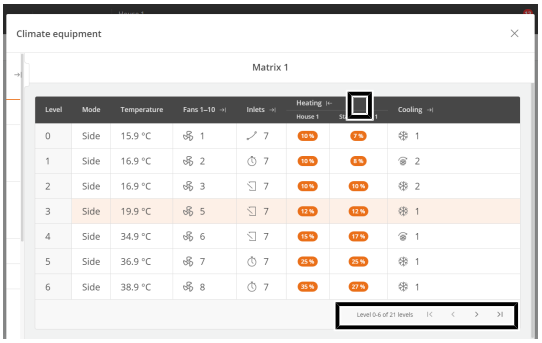
This is shown in the display as scroll bar.

Scroll by sliding your finger over the display.

7" display

Scrolling options are shown as arrows or scroll bars.

Scroll by pressing the arrows or letting your finger slide across the display.



Matrix

At the bottom, you see how many levels there are on the current page and how many levels there are in total.

Press < > to switch one page at a time.

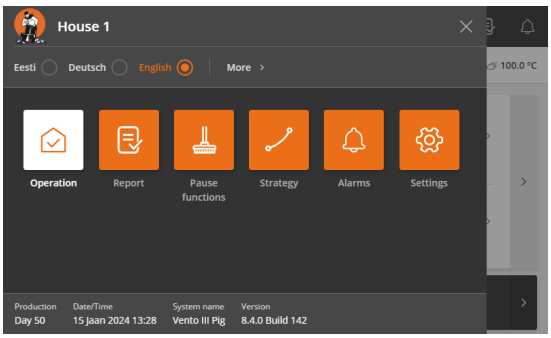
Press |< >| to switch to the first or last page of level.

For the installed devices, these arrows appear |← →|.

Press →| to open settings for each device.

Press |← to close the settings.

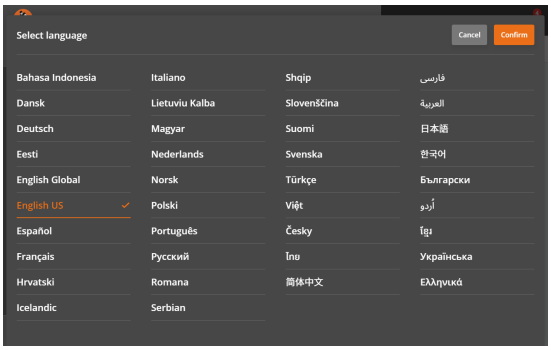
4.1.1 Selection of language



Press the Menu button.

A dot indicates the selected language.

Press **More** if the requested language is not displayed.



Select the language from the list. Press **Confirm**.

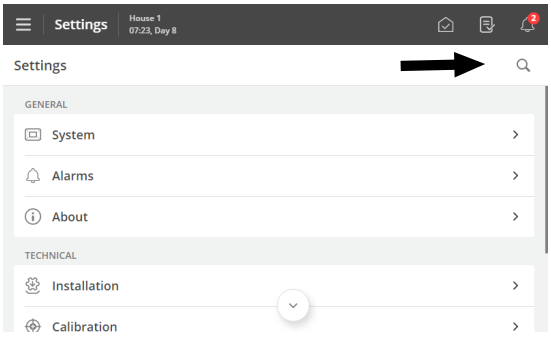
Note that function names (such as 24-hour clocks, water meters, and programs the user can name) are not translated into the selected language.

The factory setting for the names is English.

4.1.2 Search in menus

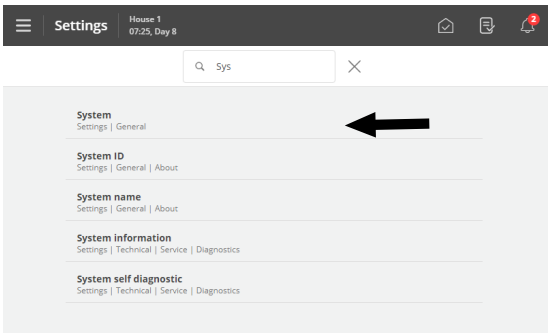
It is easy to search for the individual functions of the controller. There are search fields on the pages: **Pause functions, Strategy** and **Setting**.

A search across the pages is performed.



Use the search field to search in menus.

Enter at least 3 characters to search.



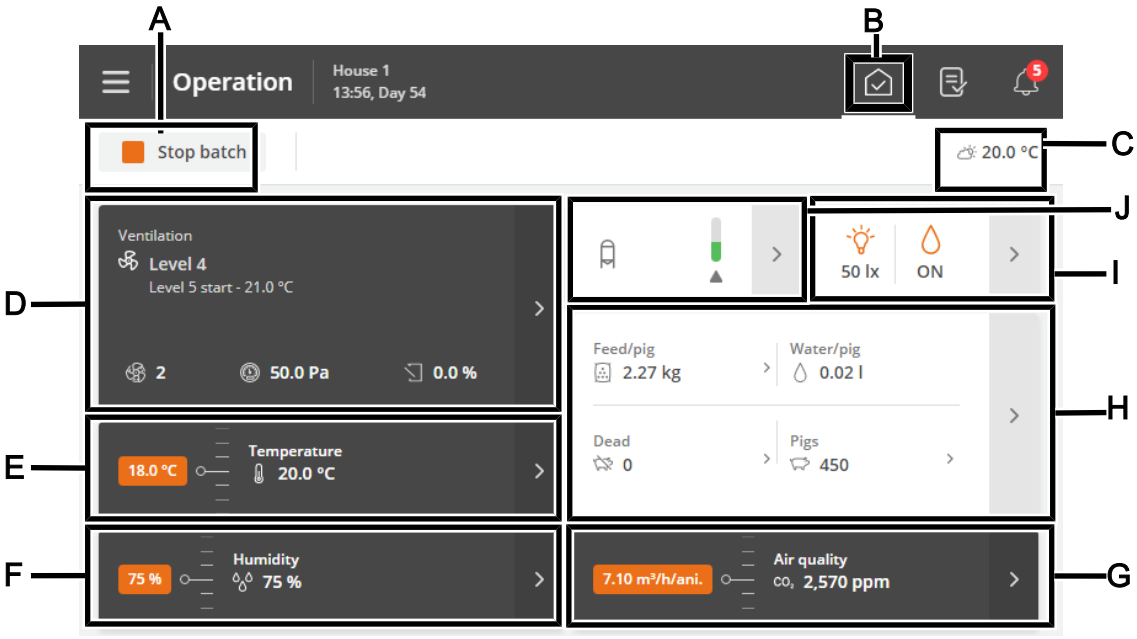
The result is shown below the search field. The path for the individual menus is also shown, for example, under Settings: **General | Alarms | Climate**.

Press a search result to go directly to that menu.

Press the X in the search field to remove the search results again.

4.2 Operation

The page contains views and settings relevant to the daily work in the house.



A The function button **Stop batch/Start batch**. See the section House mode Active house - Empty house [▶ 42].

B **Shortcut to the main page Operation**.

C View of outside temperature and outside humidity.

D Status view for the climate control and access to the ventilation equipment menus and setup of a matrix.

E Temperature settings. See section Temperature [▶ 30].

F Humidity settings. See section Humidity [▶ 31].

G The ventilation function CO_2.

H Display of the development of the key figures for animal weight, feed, and water consumption. In addition, the view of calculated mortality and the current number of animals and shortcuts for recording the number of dead and moved animals.

The view also provides a shortcut to details with information and settings options.

I Status view for climate and production functions controlled by time programs. The views also provide an overview of all applications and their associated settings.

J Status view for silo content. The views provide a shortcut to recording of feed supplies and settings options for silo.

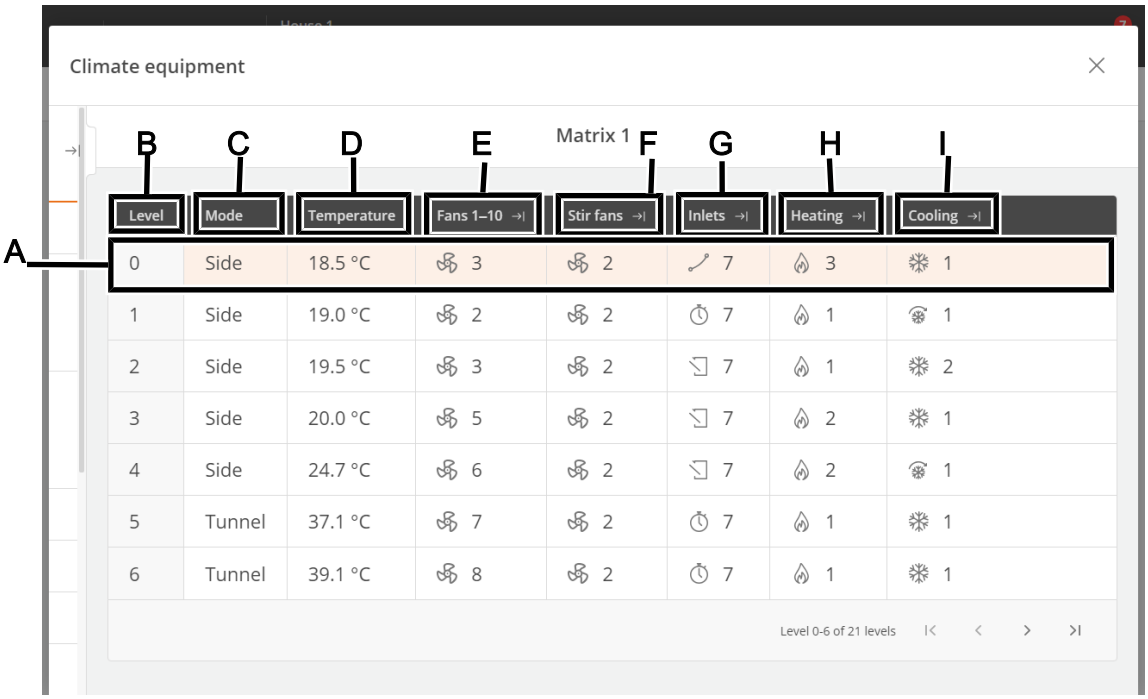
4.2.1 Matrix menu for levels

Operation | Climate equipment card **| Matrix**

The matrix provides an overview of the ventilation levels of the controller and access to setting each level.

The menu's size and structure depend on the controller's installation, e.g., fans, stir fans, heating, and cooling.

During installation, the number of matrix levels is determined. Up to 64 levels can be selected. The ventilation regulation can be set up with 2 matrices and the settings can be made independently of each other. Also, see the Technical Manual.



A Each row in the matrix corresponds to one level. The active level is highlighted.

By pressing a square in the columns, you get access to settings for the various functions. Changes remain highlighted until you exit the matrix.

B Level.

C Setting whether the level should be active as side or tunnel ventilation.

D Setting the **temperature** that activates the level.

When the temperature reaches the setting, the ventilation will switch to the level above when the temperature rises or below when the temperature drops.

E Display of the number of fans for the **air outlet** on each level. See also the section Outlet matrix [▶ 15].

F Display of the number of **stir fans** on each level. See the section Stir fan matrix [▶ 16]

G Display of the number of **air intakes** on each level. See the section Air inlet matrix [▶ 16]

H Display of the number of **heating** units or set heating requirements on each level. See the section Heating matrix [▶ 17]

I Display of the number of **cooling** units on each level. See the section Cooling matrix [▶ 18]

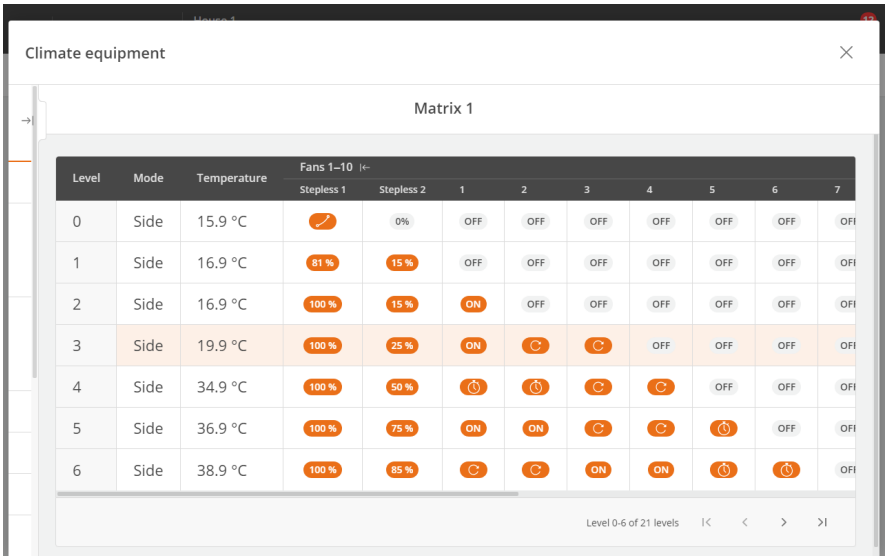
4.2.1.1 Minimum / Maximum level

Operation | Climate equipment card | **Setting | Level settings**

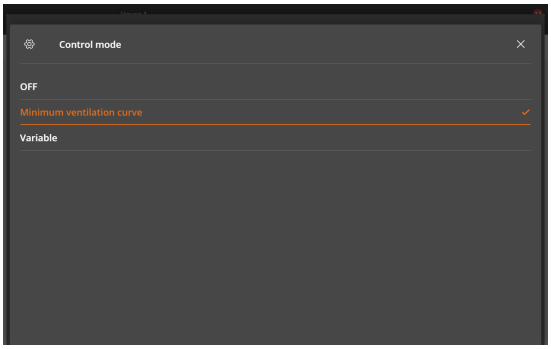
Minimum level	Setting a minimum level limit so the controller provides the house with enough airflow to ensure acceptable air quality, as a minimum. This function is particularly relevant in periods with cold weather when it is not necessary to ventilate to keep down the inside temperature.
Maximum level	Setting a limit for the maximum level. This feature may be relevant to use during very high outside temperatures, when ventilation using the entire capacity of the system may cause the inside temperature to exceed the required temperature. The feature can also prevent, for example, small animals from being exposed to too strong ventilation.

4.2.1.2 Outlet matrix

The air outlet must be set for each level and each fan separately. By default, all fans are set to OFF.



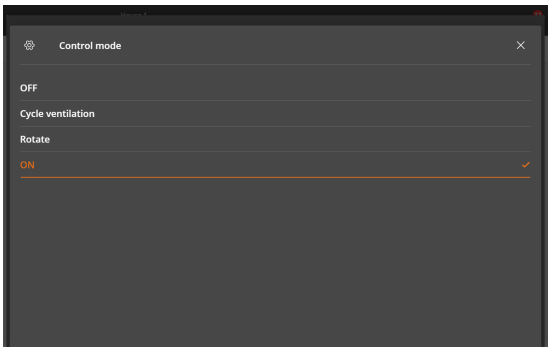
The first are stepless fans and the next are ON/OFF fans.



Stepless fan

Minimum ventilation curve. At level 0, the fans can run according to a minimum ventilation curve. See section Setting curves [▷ 24].

Variable. The stepless fan can regulate the motor performance and the flap opening. Setting of the desired ventilation requirement in percent.



ON/OFF fan

Cycle ventilation. The fan alternately runs and stops.

The total cycle time is calculated and displayed on the **Ventilation** card on the **Operation** page, when cycle ventilation is active.

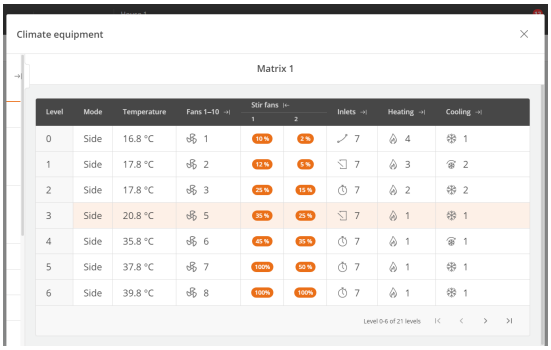
Requirement. Setting of ON-time in percent. If e.g.,a Requirement of 25 % is set, the fan will run for 75 seconds at a total cycle time of 300 seconds.

Rotate. The fan runs alternately with the other fans.

ON. The fan runs all the time.

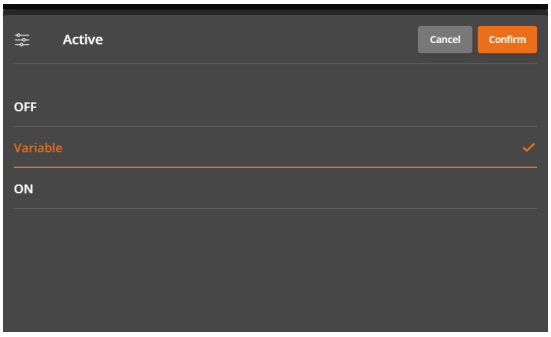
4.2.1.3 Stir fan matrix

A stir fan improves the air circulation and thus provides a more uniform temperature in the house.



Each level and each air stirrer must be set separately.

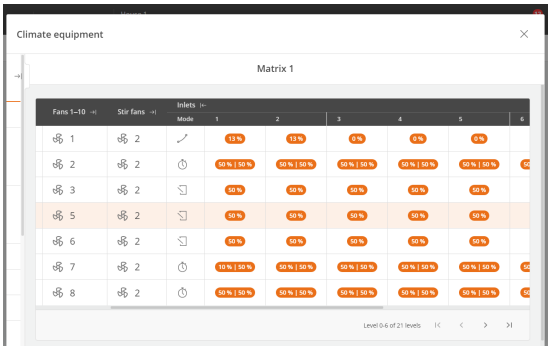
There are 2 ways of regulating a stir fan.



Variable. The stir fan runs up and down in performance by regulating the motor performance. Setting of the desired requirement in percent of maximum output.

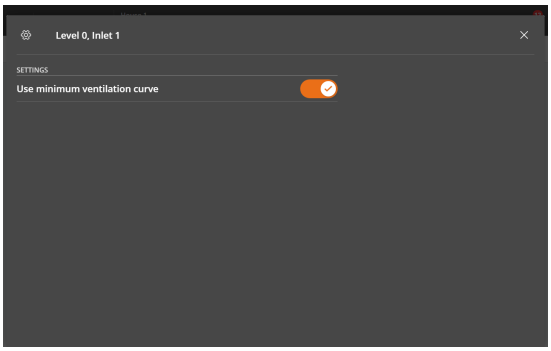
ON. The stir fan runs all the time.

4.2.1.4 Air inlet matrix



There are 3 ways of regulating a stir fan:

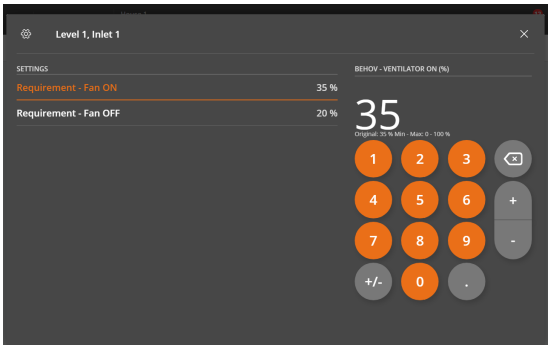
- Minimum ventilation
- Cycle
- Position



Minimum ventilation

At level 0, the air intake can be regulated as minimum ventilation.

Selection of the air inlets that must be part of minimum ventilation.



Cycle

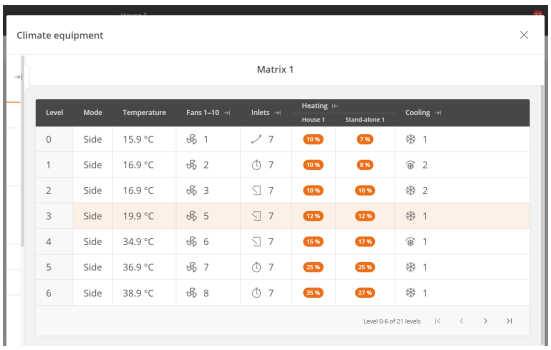
The air intake can be adjusted with different opening degrees for when the fan is ON or OFF.

Setting the degree of opening in percent for the air inlets.

Position

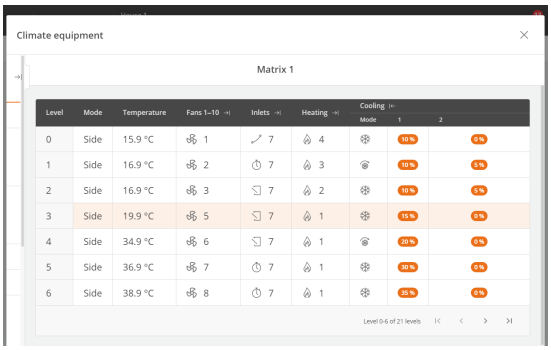
Setting the degree of opening in percent for the air inlets.

4.2.1.5 Heating matrix



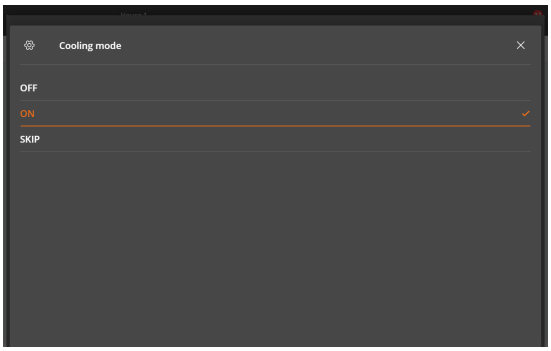
Setting the percentage of the heating capacity that should be active at the level.

4.2.1.6 Cooling matrix



There are 3 ways of regulating cooling.

- ON
- Requirements
- Ignore



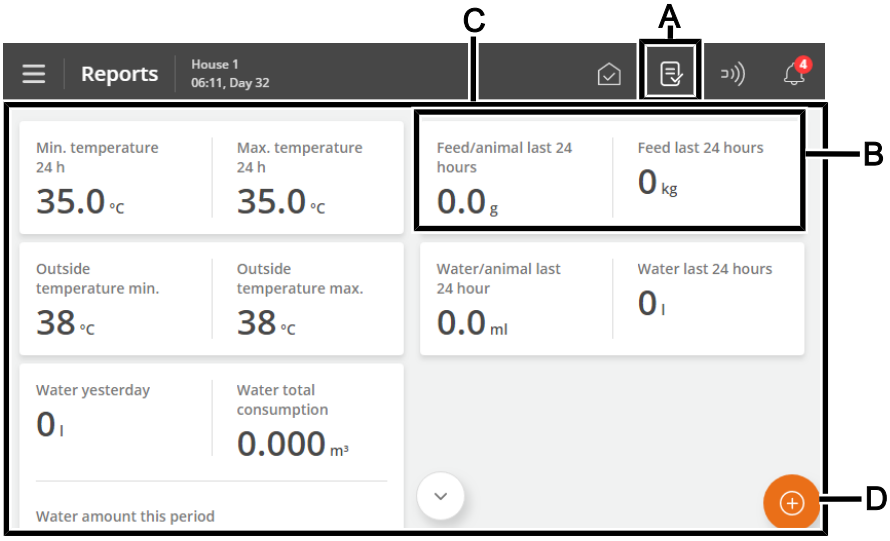
ON. At this level cooling is active all the time.

Skip. When the level rises, the cooling demand from the previous level is used. When the level drops, this cooling requirement is used. Is displayed in the matrix with the icon .

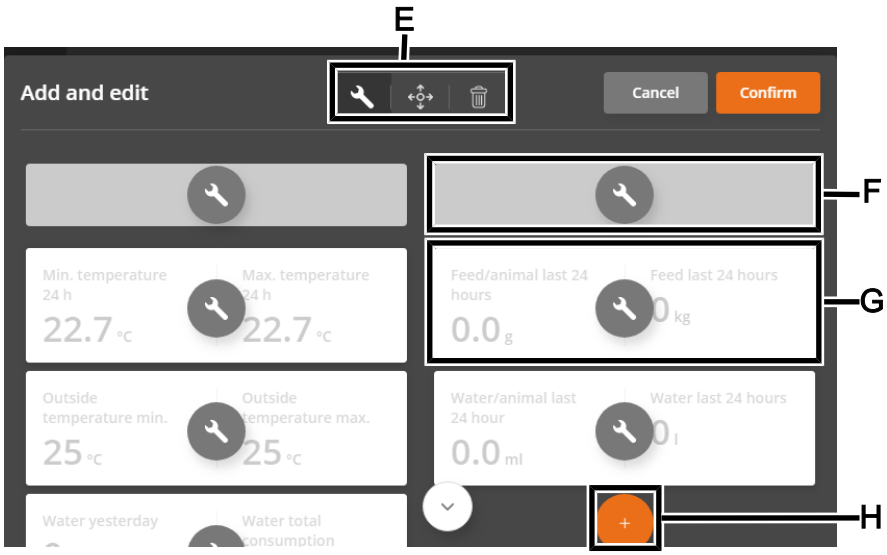
Requirement. Setting the percentage of the cooling system capacity that should be active at the level.

4.3 Report

The user can set up the page to include the key values that give the desired overview of climate and production values.



A	Shortcut to the **Reports** page.
B	Card with the key value. Each card can be set up to include up to 3 key values.
C	The page displays a series of cards with selected key values for, for example, history and current values.
D	Edit button. Gives access to choose between the desired key values.



E Tools for editing headlines or content on cards and moving or deleting cards.

First, press a tool and then make the desired change.

F Column header.

Press to name.

G Card with the key value.

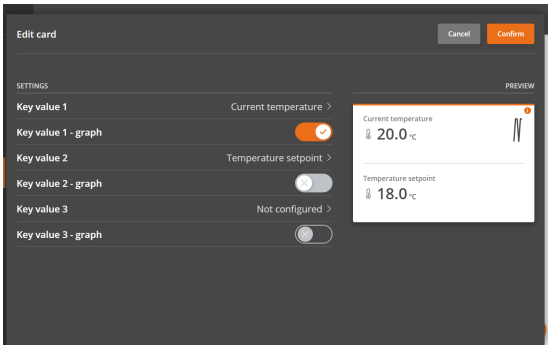
Press to change the key value and set up its view.

H Tool for adding a new card in the column.

Press to add a card and select the desired key value.

Cards with several key values

You can merge several cards to view up to 3 key values in one card.



Press the editing tool.

Press on the key value to be changed.

Select Key value 2 and select the key value to be displayed.

Select Key value 3, if required and select the key value to be displayed.

To the right a preview of the card is shown.

4.4 Activity log

The Activity log page displays a log of alarms, operational changes, and events.

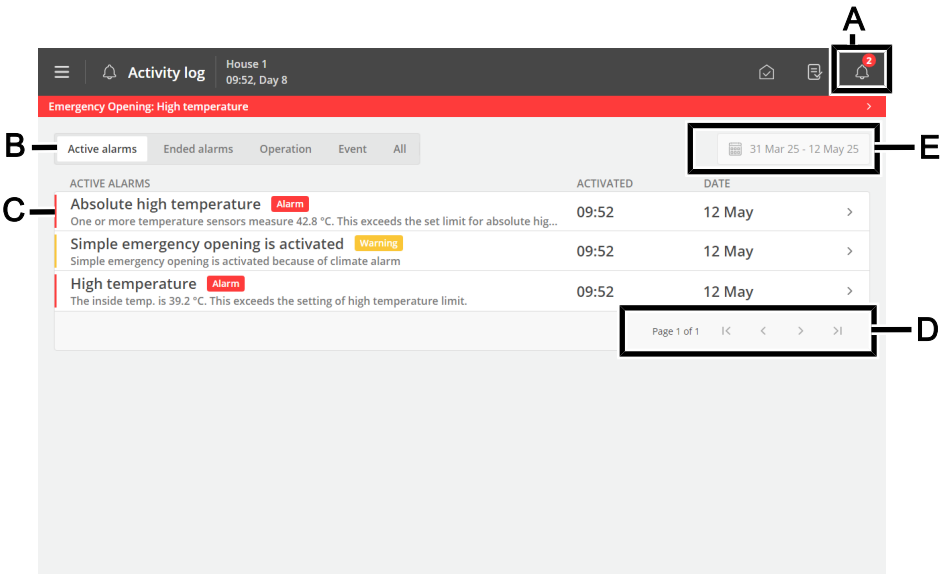
The most recent activity appears at the top. Previous activities can be viewed on the underlying log pages.

The activity log tabs show the different activity categories.

Alarms are divided into active and terminated alarms.

Alarm status colors:

- Red – hard active alarm
- Yellow – soft active alarm (warning)
- Gray – deactivated alarm



A Shortcut to the page **Activity log**.

The icon for the Activity log indicates the number of active alarms as long as an alarm situation has not ceased.

B Filtering options for the various types of activities:

Active alarms: displays alarms where the alarm situation is still present.

Ended alarms: displays alarms where the alarm situation has ceased.

Operation: shows the operation of the controller

Event: shows, for example, reset of the controller

All: shows all types

C Each line shows an activity.

Press the activity line to see details, such as when an alarm was activated and acknowledged. Also, when a value/setting was changed.

Press **Close** to close the details screen again.

D Page view in the activity log.

Switch one page at a time or switch to the first or last page.

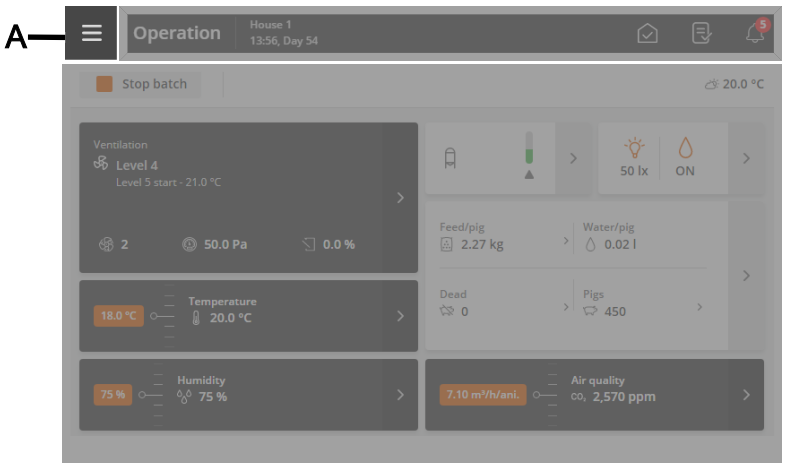
E Filtering option for dates and periods.

Several alarms often follow each other because one defective function also affects other functions. For instance, a flap alarm can be followed by a temperature alarm as the controller cannot adjust the temperature correctly with a defective flap. Thus, the previous alarms allow you to follow an alarming course back in time to detect the error that caused the alarm.

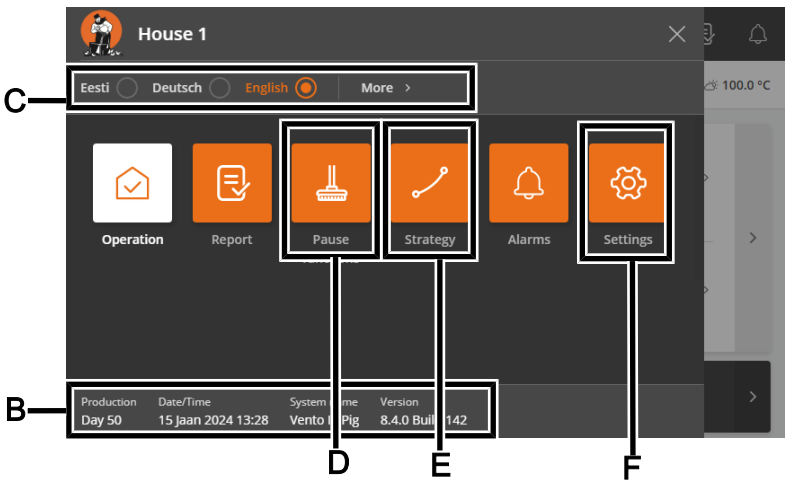
See the description of alarms in the section Alarms [▶ 27].

4.5 Menu button

The menu button gives access to language selection and general settings pages.



A Menu button



B Display house name, day number, time, variant name, and software version.

C Select language. Access other languages under **More**.

Note that function names (such as 24-hour clocks, water meters), and programs the user can name are not translated into the selected language. The factory setting for the names is English.

D Shortcut to the page **Pause functions**.

The page is designed partly to facilitate the activities you must carry out in the house to clean it and partly to ensure the air change and temperature in the house while it is empty.

E Shortcut to the page **Strategy**.

The page provides access to the batch curves, which form the basis for controlling climate and production functions. Also see the section Setting curves [▷ 24]

F Shortcut to the page **Settings**.

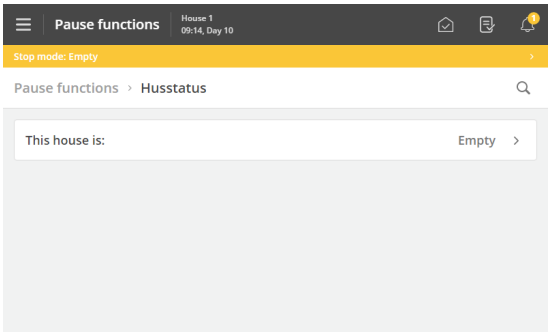
The page provides access to the user settings for **House info**, **Alarm settings,** and **Password**. See the sections System [▷ 25], Alarms [▷ 27], and Password [▷ 25].

In addition, you have access to the technical menus used for setup and service. See the Technical Manual.

4.5.1 In-between functions

The page gives access to functions designed partly to facilitate the activities you must carry out in the house to clean it and partly to ensure the air change and temperature in the house while it is empty.

- Washing
- Drying
- Empty



State

The controller can only activate the functions when the house status is **Empty**.

Empty house status is indicated at the top of the page by a colored bar.

When the time of a function is up, the controller will again regulate according to the settings for **Empty**.

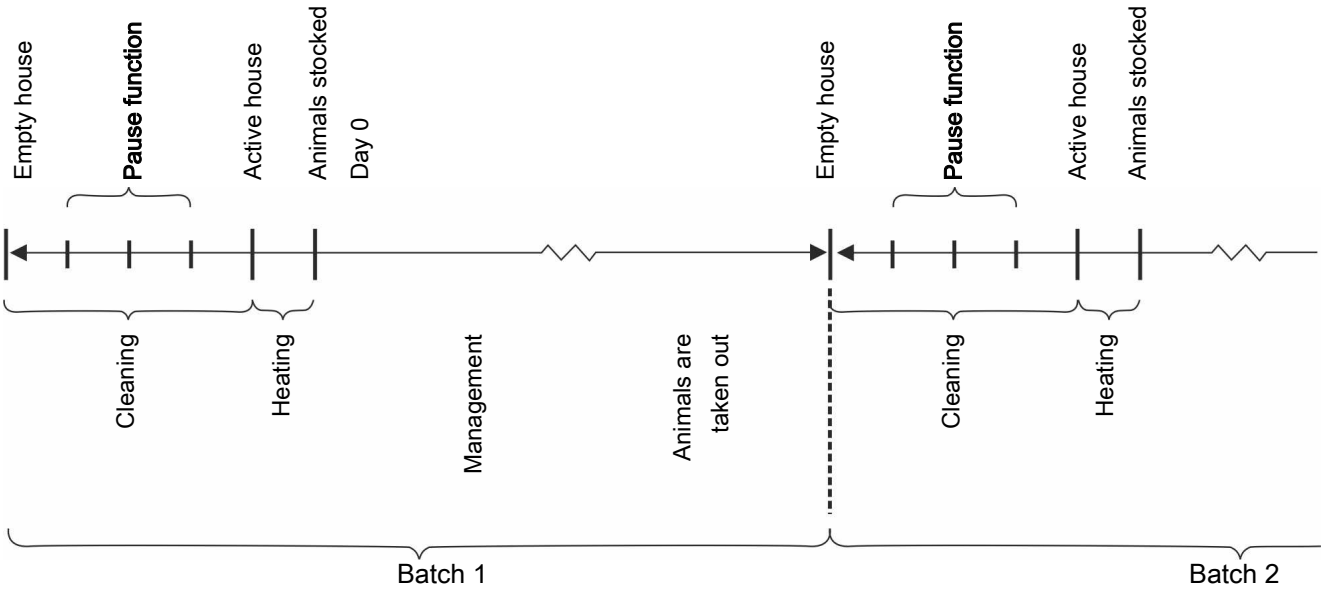


Figure 2: Setup example of Pause functions for batch production

Menu button | **Pause function** | **House status**

This house is:	Function selection menu (only displayed when the house status is **Empty**).
Function remaining time	When a function is activated, the set time counts down (only displayed when the house status is **Empty**).

Also see the section Pause functions [▶ 43] for a description of the various functions.

4.5.2 Strategy

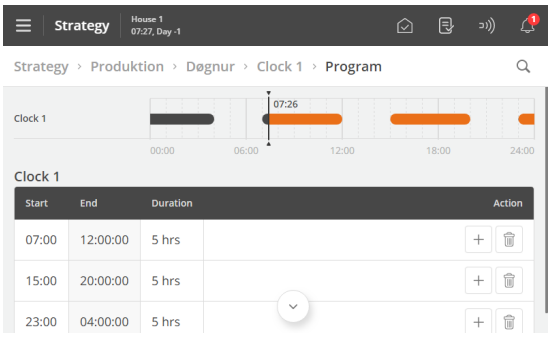
The page provides access to the more constituent function settings that you typically do not need to change during a batch. The strategies are thus determined in light of the overall requirements for the production.

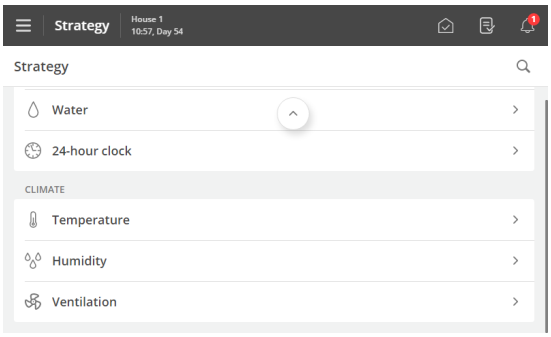
It is where batch curves for temperature and light are set up, sub-functions such as nozzle cleaning for cooling are selected, and limit value settings are made.

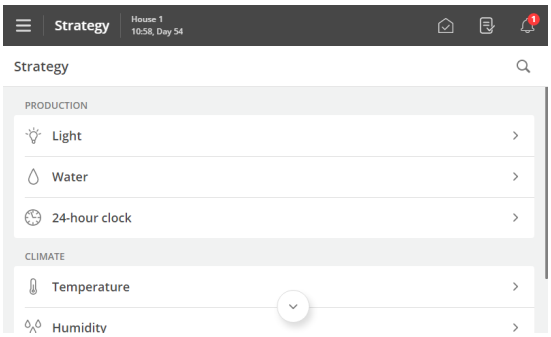
Changes to the strategy curves are grouped here and displayed as **User offset**.

See the relevant section below for a description of the various functions.

Together with other information, the curve settings form the basis of the controller's calculation of climate regulation. The controller can adjust automatically according to the animals' age.







Depending on the type and setup of the controller, the following batch curves may be available:

- Inside temperature
- Heat offset temperature
- Stand-alone heater temperature
- Humidity
- Minimum ventilation
- Maximum ventilation
- …

When the controller is connected to a network with the management program BigFarmNet Manager, curves can also be changed via BigFarmNet.

Together with other information, the curve settings form the basis of the controller's calculation of production regulation.

The controller can adjust automatically according to the animals' age.

When the controller is connected to a network with the management program BigFarmNet Manager, curves can also be changed via BigFarmNet.

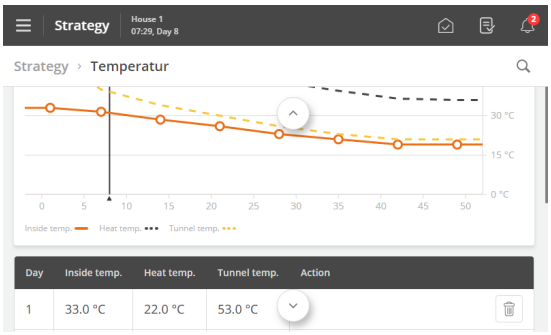
Depending on the type and setup of the controller, different batch curves are available:

- Feed
- Water
- Weight
- Light

When curves are adjusted via BigFarmNet Manager it appears in the menu.

Select if the reference curve from BigFarmNet Manager or the curve from the controller should be used.

4.5.2.1 Setting curves



Menu button | **Strategy**

Set up for each curve:

- A day number for each of the required curve points.
- The desired value of the function for each curve point.

Press + to add the required number of curve points.

Typically, the last day number of the batch curve is set to match the expected production time.

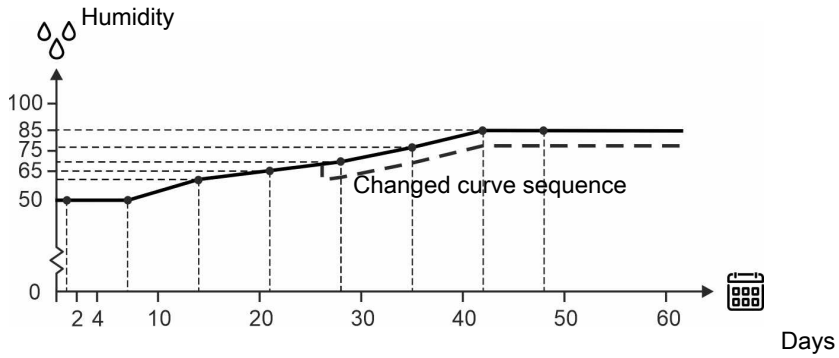


Figure 3: Curve for air humidity

It is generally the case for the curve functions that the controller automatically displaces the rest of a curve sequence in parallel when you change the associated setting during a batch.

4.5.3 Settings

The page provides access to general settings and alarm limits.

4.5.3.1 System

Menu button | **Settings | General | System**

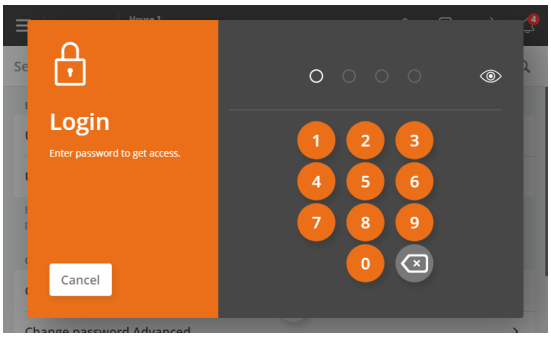
Adjust date and time	Setting current date and time. Correct clock setting is important for several control functions and alarm recording. Thus, all controller programs use date, time, and day number. The clock will not stop in the event of a power failure. **Summer and wintertime** There is no automatic adaptation in summer and winter, as some animal types are very sensitive to changes in their circadian rhythm. If you want the controller to follow the local time for summer and winter, you must manually change the time setting by +/- 1 hour.
Day number	Select whether the day number should show the time since start (house status is active) or the actual age of the animals. When the actual age of the animals is required, the day number must be adjusted until it matches the life expectancy. At midnight, day number 1 counts for every day that passes. Please note that if the day number is changed during a batch, it will shift/destroy the historical data of the batch (feed consumption, etc.). The function **Day number** can also be used to preheat the house by setting a number of minus days.
Week day	Viewing week day.
Start on day	Setting the day on which the batch shall start. Day number can be set as low as -3 so the controller can control the preheating of the house before the animals are stocked.
House name	Setting house name. Each livestock house must have a unique name when the controller is integrated with a LAN network. The house name is transferred through the network, and the livestock house should be identifiable based on the name. Set up a plan for naming all controllers connected to the network.
Password	Decide whether the controller must be protected against unauthorized operation using passwords. See section Password [▶ 25].

4.5.3.1.1 Password

This section is only relevant to houses where the Password function is activated.

The controller can be protected against unauthorized operation using passwords.

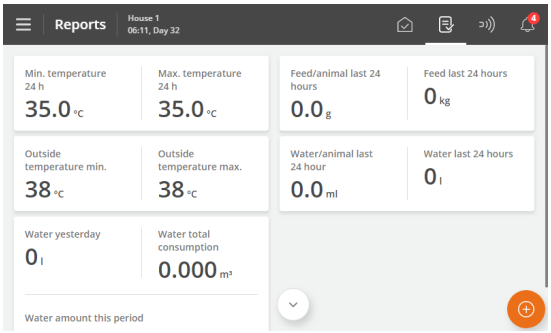
In order to have access to changing a setting, a password must be entered that corresponds to the user level which the relevant function is found at (**Daily**, **Advanced** and **Service**).



Menu button | **Settings** | **General** | **System** | **Password** to access the activation of the function.

Enter a service password.

After entering the password, the controller can be operated at the corresponding user level. After 10 minutes without operation, the user is automatically logged out.



Select a page after an operation. After 1 minute, the controller will request the password again.

Activate the function **Use password for the Technical menu only** to make the controller require the **Service** password only when the user wants to change settings in the menus **Installation**, **Calibration**, and **Service**.

Change password for each of the 3 user levels.

To gain access to changing a password a valid password must first be entered.

Menu button | **Settings** | **General** | **System** | **Password**.

User level	Gives access to	Factory-set code
Daily view (without login)	Entering the number of animals Fine-tuning of temperature, humidity, and air quality Manual climate control	
Daily	Daily: Changing set values	1111
Advanced	Daily + advanced: Changing curves and alarm settings Manual production control	2222
Service	Daily + advanced + service: Changing settings under Technical menu	3333

Access limitation to operate the controller

We recommend that you change the default passwords and subsequently change the password regularly.

Forgotten Password

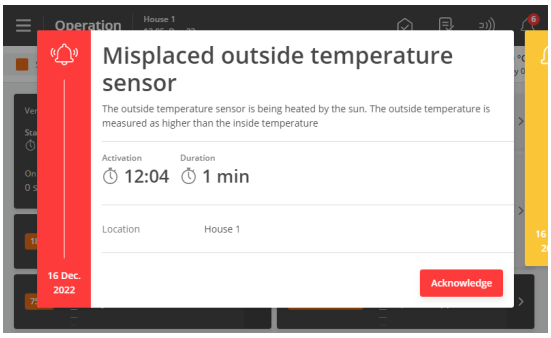
If an incorrect password is entered 3 times, the controller will display its MAC address and UTC date.

These must be provided by contacting a Service Partner who can assist with a new temporary Service Password. The password is specific to the individual controller and only valid on the day it is generated.

4.5.3.2 Alarms

Alarms only work when the status is Active house.

The only exceptions are alarm tests and alarms for CAN communication and temperature surveillance at **Empty**.



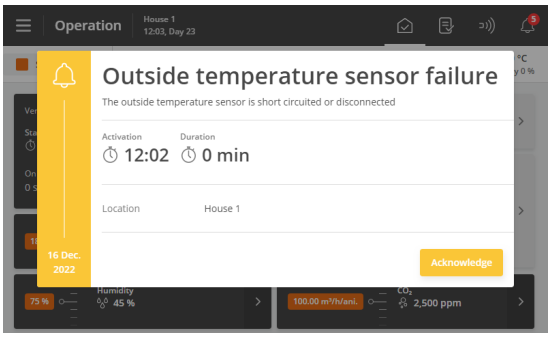
The controller will record the alarm type and time when an alarm occurs.

The information on the type of alarm will appear in a separate alarm window, together with a short description of the alarm situation.

Red: hard alarm

Yellow: soft alarm

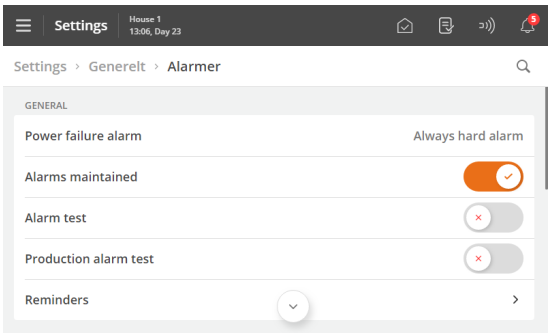
Gray: deactivated alarm (alarm state ceased)



You can choose whether the alarm should be hard or soft for selected climate and production alarms.

Hard alarm: Red alarm pop-ups on the controller and generation through the connected alarm units, e.g., a horn. Only hard alarms trigger the alarm relay.

Soft alarm: Yellow pop-up alert on the house controller. Soft alarms generate a pop-up in the display.

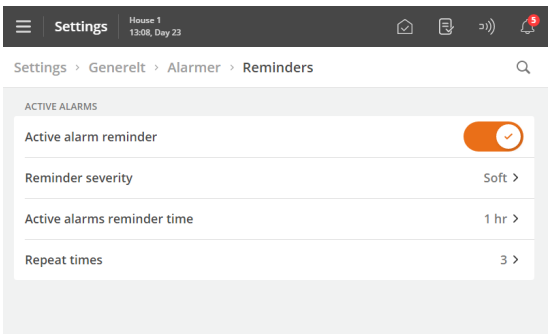


The controller will also trigger an alarm signal, which you can choose to maintain.

The alarm signal will thus continue to sound until you acknowledge the alarm. It also applies even if the situation that triggered the alarm has ceased.

Menu button | **Settings** | **Alarms**

Alarms maintained: Selecting whether the alarm signal should continue after the alarm condition has ceased.



Reminder

The controller can remind you of an ongoing alarm once you have acknowledged a hard alarm. It should ensure that the cause of the alarm is handled.

Reminder settings:

Active alarms reminder time: Setting how long after the alarm, the reminder is to appear.

Repeat times: Setting how many times the reminder is to appear.

See section Climate [▶ 57] for setting the alarm and alarm limits.

4.5.3.2.1 Stopping an alarm signal

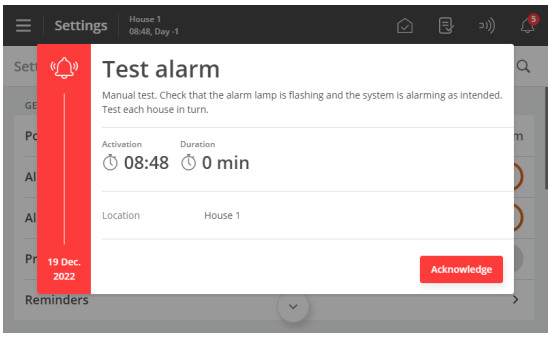
The alarm window disappears, and the alarm signal stops when you acknowledge the alarm by pressing **Acknowledge**.

4.5.3.2.2 Power failure alarm

The controller will always generate an alarm and activate emergency opening in the event of power failure.

4.5.3.2.3 Alarm test

Regular alarm tests help to ensure that the alarms actually work when needed. Therefore you should test the alarms every week.



Activate **Alarm test** to start testing.

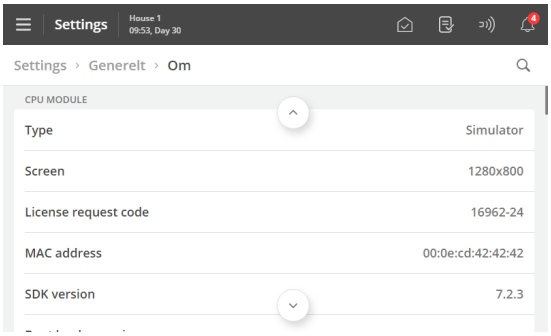
Check that the alarm lamp is flashing.

Check that the alarm system alarms as intended.

Press **Acknowledge** to finish testing.

4.5.3.3 About

The menu item contains information about types and versions of software and hardware.

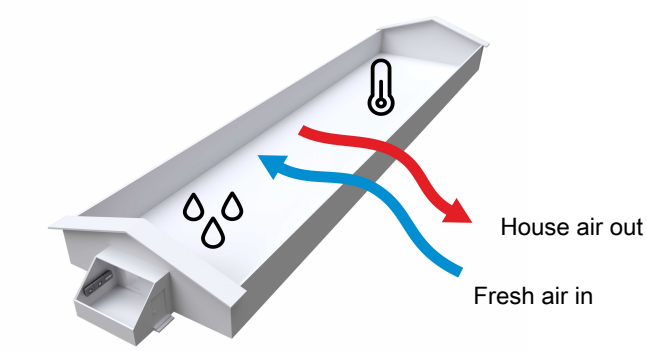


Furthermore, under **CPU module** you can see the license order code, which must be used when ordering additional software, e.g.,production add-ons.

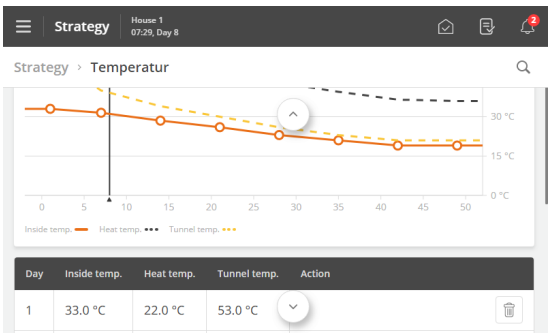
5 Climate

5.1 Automatic climate control

The controller automatically regulates and monitors a large number of factors that are important for the climate in the house - e.g.,air change and temperature. It can regulate very precisely and maintain the required temperature and humidity level in the house.



With correct setup of the controller, the daily user of the house should only exceptionally need to make manual changes to the settings.



The controller will continuously adapt the climate to the animals' age and needs on the basis of the strategy laid out.

In addition, it can via its adaptive functions adapt the regulation to the very current conditions such as e.g., changing outside temperature.

.

Manual mode

Normally the controller must be set to automatic control. During start up, or in a service situation, it may however be convenient to control the individual functions manually.

After the manual operation, you must set the function back to automatic control, so that the controller continues to operate as before.

Operation | Climate equipment card | **See details**

Provide access to manual control of the climate equipment.

Menu button | **Settings | Technical | Manual/auto | Manuel mode overview**

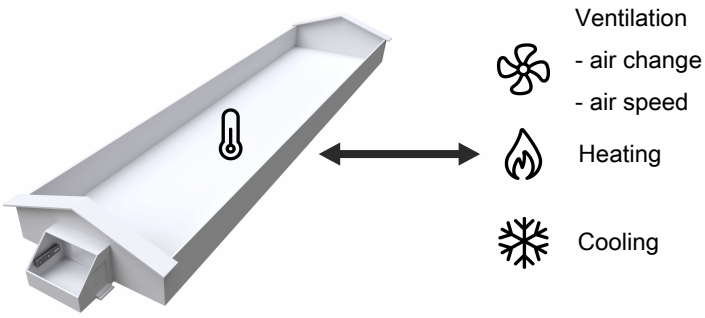
Lists all components currently set to manual mode.

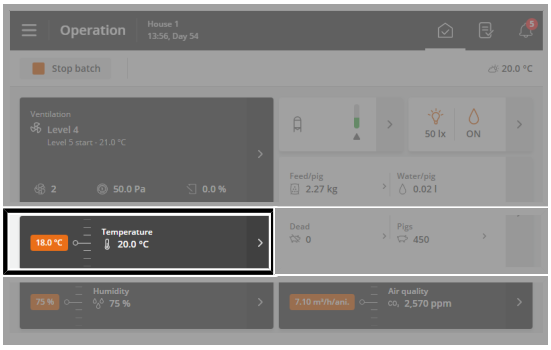
The manual control can also be deactivated here.

5.2 Temperature

The controller adjusts the inside temperature according to the **Temperature setpoint**.

When the inside temperature is too high, the controller increases the ventilation level to supply more fresh air and cool the air if needed. When the inside temperature is too low, the controller reduces the ventilation level to keep the heat in the house. The heating level is increased if needed.



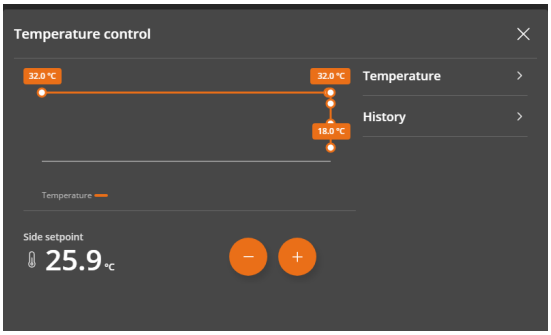


Operation. The most important temperature values can be viewed and adjusted via the card **Temperature**.

The front of the card shows the current inside temperature and the temperature setpoint.

The following sections describe the functions and setting options available for temperature.

5.2.1 Temperature control



Operation | **Temperature** card

The temperature card provides access to easy adjustment of the inside temperature during a batch. This is done via the function **Side setpoint** or **Tunnel setpoint**.

When the inside temperature is desired higher or lower, the **Side setpoint** or **Tunnel setpoint** is adjusted up or down by 0.5 °C. Wait approximately 2 hours and evaluate the status.

When the temperature setpoint is changed, the start temperature for the individual levels in the matrix is automatically updated.

The **Temperature** card provides furthermore access to the following:

- Graphic history curve.

When determining the desired temperature strategy, the following parameters are taken into account:

Menu button | **Strategy** | **Temperature**.

Inside temperature	Setting of batch curves for **Inside temperature** .

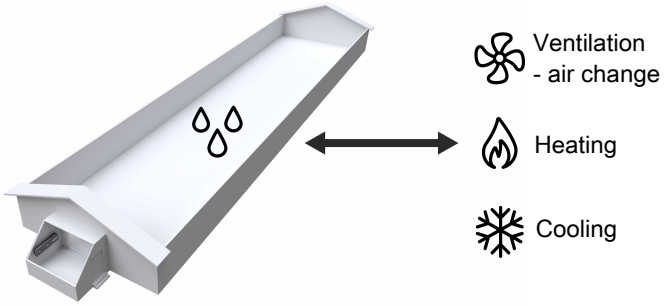
5.3 Humidity

The air humidity in the house is important for the indoor climate and the animals' well-being. Concerning air humidity, the regulation must ensure a suitable level - neither too high nor too low.

When the animals are young, it is especially important to avoid a very high humidity level (> 80%) to reduce the pathogens in their immediate environment. A very low humidity level (<40%) can dry out the house, and the animals.

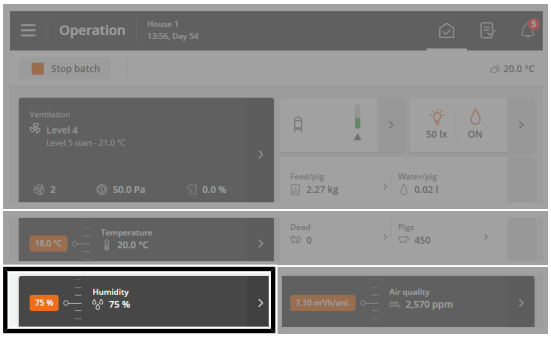
Concerning animal welfare, it is generally more important to keep the correct inside temperature than to keep the humidity within a precise level. Therefore, the controller regulates humidity only when the temperature control allows it.

Note that a high inside temperature and high air humidity (>85%) can be life-threatening to the animals.



Humidity is supplied to the housing air partly from the animals, feed, drinking water, and animal waste and partly from the cooling and humidification functions.

Basically, the humidity in the house can be regulated by increasing or decreasing the ventilation level or increasing or decreasing the heat supply. The controller has several humidity control principles, which you can choose from, depending on what suits the house in question. See section Humidity control mode [▶ 33].



Operation. The most important humidity values can be viewed and adjusted via the card **Humidity**.

The front of the card shows the current inside humidity and the desired air humidity.

The humidity card provides access to easy adjustment of the inside humidity during a batch.

The humidity card provides furthermore access to following humidity related views:

- Graphic history curve. See section History curves.

The following sections describe the functions and setting options available for humidity.

Operation | **Humidity** card

Humidity setpoint	Setting the upper air humidity limit. If you need to adjust the humidity, changing it 3% and waiting 3-4 days is recommended. Then assess whether a further adjustment is necessary.

Operation | **Humidity** card | **Control settings**

Humidity control enabled	Connection and disconnection of humidity control.

	When the humidity control is disconnected, the controller regulates the ventilation exclusively in relation to the inside temperature. Switching off the humidity control during certain outdoor climate conditions may be relevant. It applies to areas with high outside humidity and temperature for a long time. Here, however, the humidity control will have no effect.
Humidity to stop side cooling	The air humidity percentage that makes the controller stop the cooling function. Furthermore, a humidity limit can be set for the tunnel cooling. Cooling is gradually removed 10% before the humidity limit.
Humidity control mode	Selecting type of humidity control. See also the section Humidity control mode [▶ 33].
Maximum humidity ventilation	At temperature reduction. Setting of the degree of ventilation where the humidity ventilation stops. At Humidity heat. Setting of the degree of ventilation where the heat is reduced. If you, e.g., in periods of high outside humidity and temperature, want to limit the humidity ventilation, this setting can be reduced.
Switch humidity control on batch day	Changing the humidity control mode during the batch can be advantageous as the animals' needs change with age. Changing the humidity control mode automatically on a specific batch day is possible. Select the humidity control mode to start with and the mode to switch to and select the day for the switch to take place.
Switch humidity control setup	Selection of the humidity control principle the batch should switch to and selection of the day number where the change takes place.

Menu button | **Strategy** | **Climate**

Humidity	Defining strategy via batch curves for **Humidity** and **Ventilation limit**. The curve values must be set to suit the production method, type of animal, and the area's climate - especially outside humidity. See also the section Strategy [▶ 23].

5.3.1 Humidity control mode

The air humidity can be regulated based on the correlation between the air temperature and its ability to contain moisture. The warmer the air is, the more water vapor it can contain.

It is generally estimated that for every 1 °C temperature change, the humidity will change 5%.

- As the temperature rises, the relative humidity decreases.
- As the temperature falls, the relative humidity increases.

If the temperature falls so much that the relative air humidity reaches 100%, the water vapor will start to condense (dew point).

These general principles can be exploited by choosing the humidity control mode that best suits the requirements of the animals and the individual house (geographical location).

The controller has 2 primary humidity control modes, each of which takes its own area into account.

Temperature reduction	Humidity heating
Animals	Air quality (CO2)

5.3.1.1 Temperature reduction

The controller can control the house humidity according to the humidity control principle with temperature reduction when the animals can tolerate a temperature drop at high air humidity. This function limits the use of heating in the house but cannot keep the air humidity at the humidity setpoint.

Consequences	Method of operation
Less heat consumption Possible to regulate humidity without heat Does not maintain the set humidity The animals must be able to tolerate the temperature drop at high humidity.	The inside temperature that is controlled as it is reduced so that ventilation can be increased.

Temperature reduction with heat supply

When the controller is set to control humidity according to the temperature reduction principle, the controller will adjust a too high humidity level by reducing the inside temperature by a few degrees (reduction).

At a lower temperature setting, the controller will thus increase ventilation and consequently the change of air. When this has made the inside temperature drop, ventilation will decrease to minimum ventilation in order to limit the heat loss from the ventilation.

If this is insufficient to maintain the reduced House heater setpoint, the controller will gradually supply more heat.

Temperature reduction without heat supply

The humidity control process is the same as for heat supply until the point at which ventilation is reduced to minimum ventilation. Without heat supply, the inside temperature could continue to drop below the **Heater setpoint**.

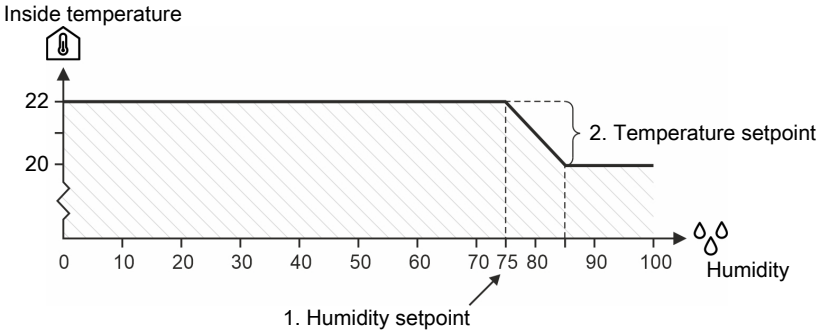


Figure 4: Humidity control with temperature reduction

The controller will lower the set temperature by 1° C each time the air humidity exceeds the humidity setpoint by 5 %.

5.3.1.2 Humidity heat

When the controller has been set to control humidity according to the humidity heat principle, it will reduce a too high humidity level by gradually increasing the heat supply. The increased heat supply will make the inside temperature rise. In order to maintain the temperature, the ventilation system will gradually increase ventilation.

Humid heat makes it possible to keep the house air humidity at the set humidity.

Consequences	Method of operation
Highest heat consumption	Increases heat supply.
Maintains the set humidity	Humidity and heat are removed through ventilation when the temperature gets too high.

Heating costs

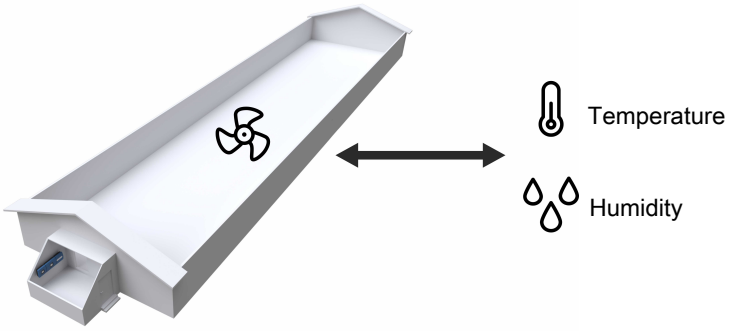
Check the heat consumption at regular intervals when using the principle of humidity heating to regulate the house humidity. Settings for heating and humidity control should be checked to avoid excessive heating costs.

At high outside temperature and high outside air humidity

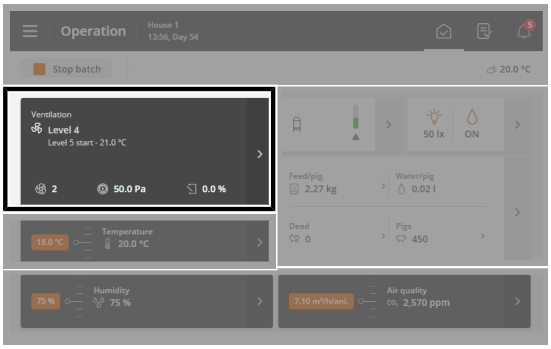
Heat management according to humidity will not provide better litter or air quality. Increased ventilation will basically draw as much humidity into the house as is ventilated out.

5.4 Ventilation

The house ventilation consists of air inlets and air outlets. Apart from supplying fresh air to the house, ventilation is to remove humidity and excess heat, if any.



The controller corrects the ventilation based on the matrix and will thus increase or limit ventilation according to whether the inside temperature is too high or too low.



Operation. The most important ventilation values can be viewed and adjusted via the card **Climate equipment**.

The front of the card shows how the ventilation system is running right now. It applies to the active equipment and the active functions.

The following sections describe the settings options for the page **Strategy**, where the batch curves are set. Also, see Matrix menu for levels [▷ 14].

Menu button | **Strategy** | **Ventilation** | **Minimum ventilation**

Minimum ventilation	Setting of the desired ventilation in m^3/h/animal.
Stepless	Display of how much the stepless fan is active. This is automatically calculated based on the desired minimum ventilation.
Inlet	Setting the required opening degree for air inlet.

Menu button | **Strategy** | **Ventilation** | **Control settings**

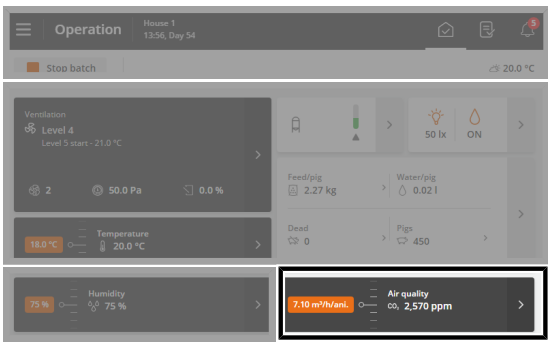
Minimum time at level	Setting the minimum time the controller must remain on a level before it can switch to another level. Increasing this setting makes the ventilation more stable.
Level hysteresis	Setting the minimum temperature difference before the controller can switch from one ventilation level to another.
Fans cycle time	Setting of cycle time for fans in the air out.
Stir fan 1 cycle time	Setting the cycle time for stir fan.

Menu button | **Strategy** | **Ventilation** | **Ventilation level**

Min level	Setting a batch curve for the lowest permissible ventilation level supplies the house with minimum airflow that ensures acceptable air quality.
Max. level	Setting a batch curve for the highest allowed ventilation level.

5.4.1 Air quality

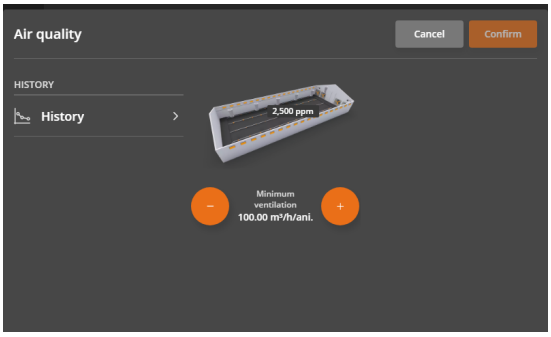
The **Air quality** function provides just the amount of air to the house, which ensures acceptable air quality. The function is particularly relevant in periods with cold weather when it is not necessary to ventilate to keep down the inside temperature.



Operation | Air quality card

The air quality card provides access to easy adjustment of the air quality during a batch.

The front of the card shows the current CO_2 level (ppm) and the fixed level of 3000 ppm.



If the air quality is poor or if the temperature is too low

Adjust the setting up or down and wait and reevaluate the status the next morning.

The controller can regulate according to minimum ventilation (m^3/h/animal) or a limit value for CO_2 (requires a CO_2 sensor).

Menu button | **Strategy | Climate | CO_2 Air quality**

Air quality control	The controller can adjust according to minimum ventilation (m^3/h/animal).

Menu button | **Strategy | Climate | Ventilation**

Minimum ventilation	Setting a lower limit for how little is ventilated in relation to the animals' air requirement (m^3/h/animal). The animals' fresh air requirement varies according to breed and weight. Enter the requirement as m^3/h/animal. The correct number can be found in the technical literature or by asking an advisor. Minimum ventilation must only be adjusted in relation to the desired air quality - not to regulate the inside temperature.

From the factory, the limit for CO_2 is set based on the goal that the CO_2 level in the house must not exceed 3,000-3,500 ppm (in EU max. 3,000 ppm).

It is important that the batch curve is adapted according to the type of animal, local authority requirements, outside climate conditions, and type of heat supply.

When setting batch curves:

- Note that the number of animals must be correct.
- Note that in the case of heat supply with direct combustion, where combustion gas is led out into the house itself (e.g.,gas and oil burners without a chimney), a higher minimum ventilation will be required.
- Note that a high minimum ventilation results in increased heat consumption.

Lack of ventilation in the case of CO2 alarm

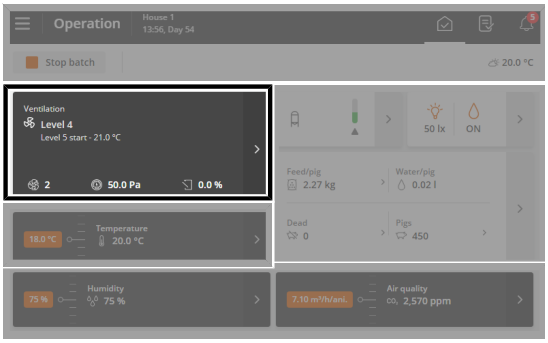
In the case of CO_2 sensor errors or high CO_2 alarm, the controller deactivates the CO_2 function and enables Minimum ventilation. It is to prevent a faulty CO_2 sensor from causing a too-low or too-high ventilation level.

It is therefore essential that Minimum ventilation and Number of animals are correctly set, even when using CO_2 minimum ventilation.

5.4.2 Pressure

Based on measurements from a pressure sensor, the controller regulates the air intakes.

With negative pressure control the controller regulated the inlets so the required pressure is maintained in the house.



Operation. The current pressure level can be seen on the **Climate equipment** card.

Operation | Climate equipment card | **Pressure**

Pressure	Graphic display of the historical values in different time intervals from 24 hours to 2 months.
Pressure setpoint	Setting of the pressure level.
Pressure inlet requirement	Percentage indication of how much the flaps must be open to maintain **Pressure setpoint**.
Active in side mode	Connection and disconnection of pressure control at side ventilation.
Active in tunnel mode	Connection and disconnection of pressure control at tunnel ventilation.

The controller regulates the air inlets based on the measured pressure so the required pressure is maintained in the house.

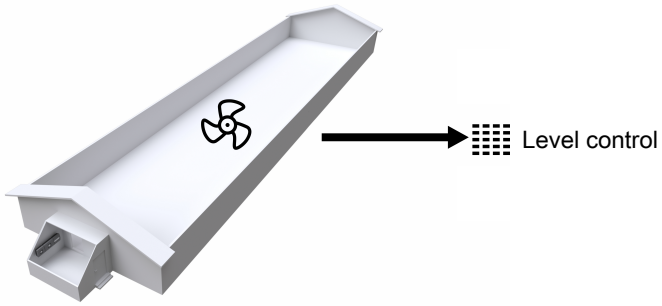
Operation. The current pressure level can be seen on the **Climate equipment** card.

Operation | Air conditioner card | **pressure**

Pressure	Graphic display of the historical values in different time intervals from 24 hours to 2 months.
Pressure	Current pressure.
Pressure inlet requirement	Percentage indication of how much the flaps must be open to maintain the Pressure setpoint.
Active	Connection and disconnection of pressure control.

5.4.3 Stir fan

A stir fan is typically used to improve air circulation inside the house and thus provide a more uniform temperature in the house. Depending on the type, location and connection method, however, it can be used for many different purposes.



Operation | Climate equipment card | **Stir fans | Stir fan 1**

Fan requirement	ON/OFF fan: ON or OFF. Variable fan (0-10 V): fan speed in %.
Control settings	Menu for setting of the individual fan. The content of the menu depends on the stir fan type. See the section below.

5.4.3.1 Regulation via level control

When the stir fan is regulated as a level control, it operates according to the settings for each level in the matrix. See the section Stir fan matrix [▶ 16]

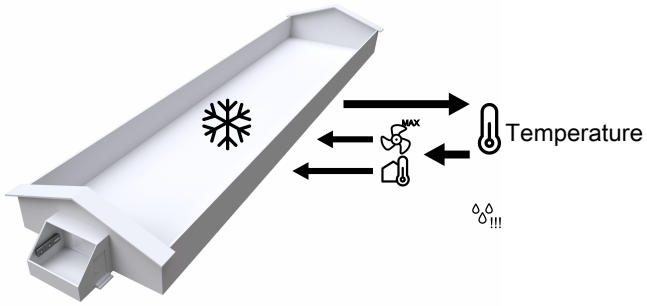
Operation | Climate equipment card | **Stir fans | Stir fan**

Manual fan control	Manual activation or deactivation of the stir fan. - for example, to briefly create increased air movement. Setting the speed that the stir fan must run at when in manual override. Remember to deactivate manual mode again.

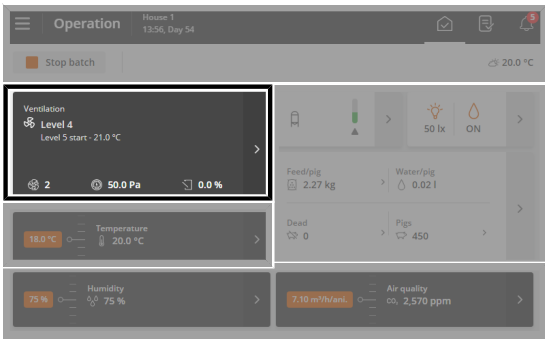
5.5 Cooling

Cooling is used in houses where ventilation alone cannot reduce the inside temperature sufficiently.

Cooling has the advantage over ventilation that it can bring the inside temperature down below the outside temperature. On the other hand, cooling will also increase the air humidity in the house.



The combination of a high inside temperature and high air humidity can be life-threatening to the animals. As cooling makes the house humidity increase, the controller automatically disconnects cooling when the house humidity exceeds **Humidity to stop side cooling** (normally 75-85%, factory setting: 85%).



Operation. The most important cooling values can be viewed and adjusted via the **Climate equipment** card.

When cooling is active, this is shown in the upper right corner of the card.

The following sections describe the functions and setting options available for Side cooling.

Operation | Climate equipment card **| Cooling**

Cooling	Graphic display of the historical values in different time intervals from 24 hours to 2 months.
Cooling sensor	The average temperature from several sensors controlling the cooling.
Requirements	Reading of current cooling requirement.
Start cooling offset	The number of degrees by which the temperature is to exceed Temp. setpoint incl. additions before cooling starts. The controller gradually increases cooling.
Absolute start temperature	Display of the measured inside temperature at which side cooling starts.
Manual mode	Manual activation or deactivation of cooling. Remember to deactivate manual mode again.

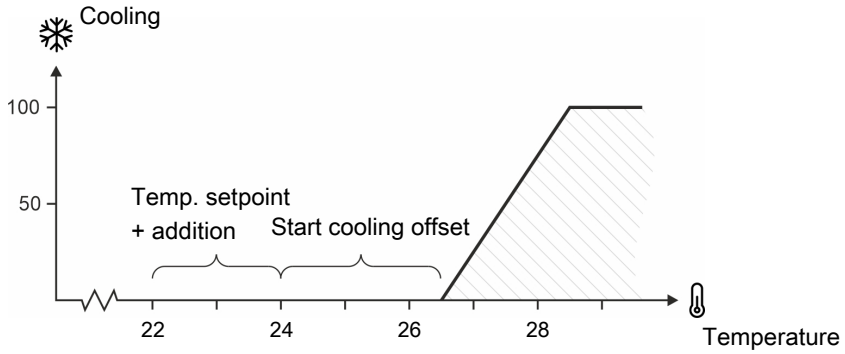


Figure 5: Cooling

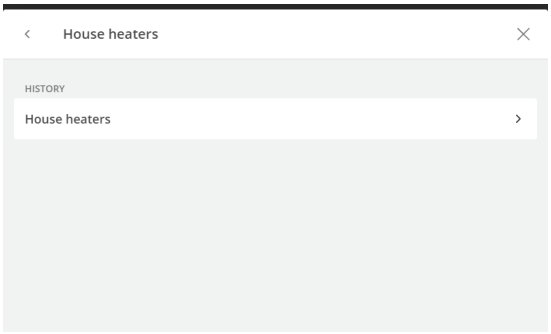
A prerequisite for cooling to be able to start is that ventilation is set to **Maximum ventilation** *or that the outside temperature is above* **Temperature setpoint**.

5.6 Heating

5.6.1 House heaters

Room heaters are used to heat the entire house and cold areas in the house.

During setup, select which sensors are to control the heating demand for each heating unit.



The room heating demand is set for each level in the matrix.

Operation | Climate equipment card **| House heaters**

History	Graphic display of the historical values in different time intervals from 24 hours to 2 months.
Manual control	Manual activation or deactivation of the room heating. Remember to deactivate manual mode again.

Menu button | **Strategy | Heating**

Cycle time	Setting the intervals in which the heating system is active. ON + OFF-time of the heating relay.

Inappropriate regulation

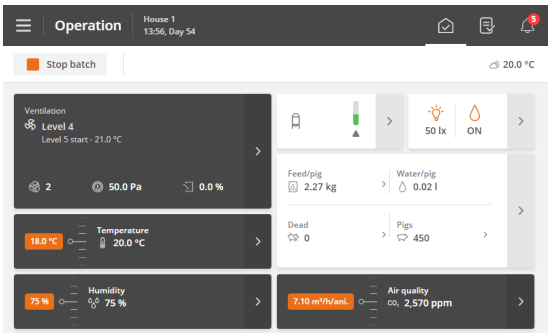
If you turn off the heat supply manually without disconnecting heating on the controller, the regulation of the ventilation will be inappropriate as the controller will try to regulate based the assumption that heating is still available.

5.7 House mode Active house - Empty house

The controller has 2 different modes of operation, one for when there are animals in the house and one for when the house is empty.

With animals in the house – active house. Control takes place according to the automatic settings and strategies and all alarms are active.

Without animals in the house – empty house. Control takes place according to the in-between batches setting **Empty**. Only active alarms are alarms for CAN communication and temperature surveillance for **Empty.**

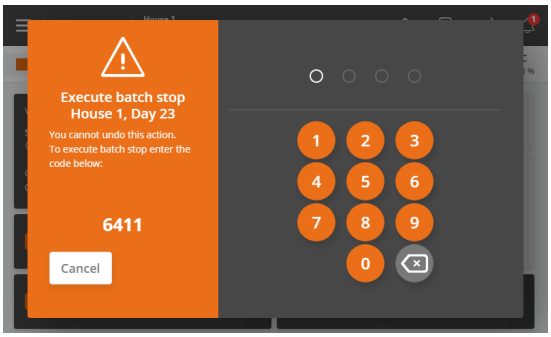


Press **Operation**.

Press **Stop batch** to change house status to **Empty**.

or

Press **Start batch** to change to house status active.



The change between active and empty house is done manually by the user. It is critical for the animals that the change does not happen by mistake. The function is therefore protected with a code entry.

Enter the displayed code to change the house status.

The change takes place immediately when the fourth digit is entered.

.

Active house

It may be an advantage to change the status to active house 1-3 days before stocking the animals. This way the controller has time to adapt the climate to the needs of the animals and to feed in the house.

When the house status changes to active, the day number changes to **Start at day**, and the controller controls according to the automatic settings.

(Be aware that it can cause problems with the history of production data if you change the **Day number** after the house status is set to active. This setting should only be used for service).

Empty house

The house status should not be changed to **Empty** until the house has been depopulated.

Then the controller disconnects the adjustment and controls according to the settings for **Empty**. It protects the animals in case a house is set to **Empty** by mistake.

If the house is to be completely closed, the settings of the function **Empty** must be reset. See the section Empty house [▷ 44].

When the house status changes to **Empty**, the controller resets all settings that deviate from the strategy and settings made during the previous batch.

5.8 Pause functions

5.8.1 Washing

During washing the house manually, ventilation must run again to start changing the air in the house.

Menu button | **Pause functions | Functions | Washing**

Duration of washing	Setting the number of hours during which the function is active.

Inlets	
Inlets	Setting the flap opening for air inlet.

Outlets	
Level	Setting the air outlet level.
Air outlet 1 flap	Setting of flap opening for air outlet When the house is in **Empty** mode, the function is typically used to open the step-less flap.
Air outlet fan speed	Setting of speed control for air outlet. When the house is in **Empty** mode, the function is typically used to turn off the step-less fan.

5.8.2 Drying

Menu button | **Pause functions | Functions | Drying**

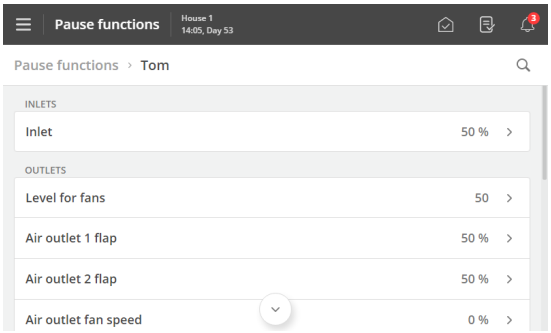
Duration of Drying	Setting the number of hours during which the function is active.

Inlets	
Inlets	Setting the flap opening for air inlet.

Outlets	
Level	Setting the air outlet level.
Air outlet 1 flap	Setting of flap opening for air outlet When the house is in **Empty** mode, the function is typically used to open the step-less flap.
Air outlet fan speed	Setting of speed control for air outlet. When the house is in **Empty** mode, the function is typically used to turn off the step-less fan.

Heating	
Heating	Setting of heat supply.

5.8.3 Empty house



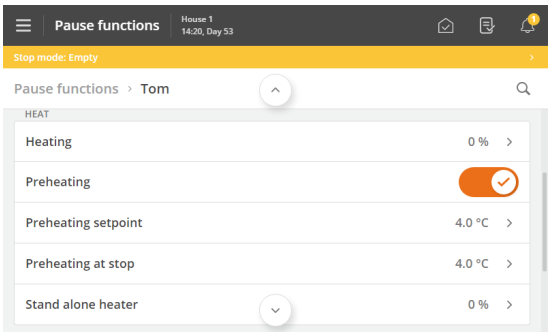
Empty house

The function **Empty** will maintain the air change in the house by allowing ventilation to run at a fixed percentage (50 %) of system capacity. This is to protect the animals in case a house is set to **Empty** by mistake.

When batch status is **Empty**, the controller disables all automatic regulations and operates according to the settings for **Empty**.

All alarm functions - with the exception of temperature monitoring when the house is empty - are switched off. See also the section Temperature surveillance [▶ 45].

5.8.3.1 Preheating



Preheating ensures that the inside temperature does not drop below the set temperature when house status is **Empty** for a longer period of time.

The function can therefore also be used for frost protection of the house.

Heating can be supplied as room heating or floor heating.

At batch production the **Preheating at stop** function maintains an inside temperature of 4°C, for example, between two batches. Note that ventilation must be shut off and the heating system must be connected.

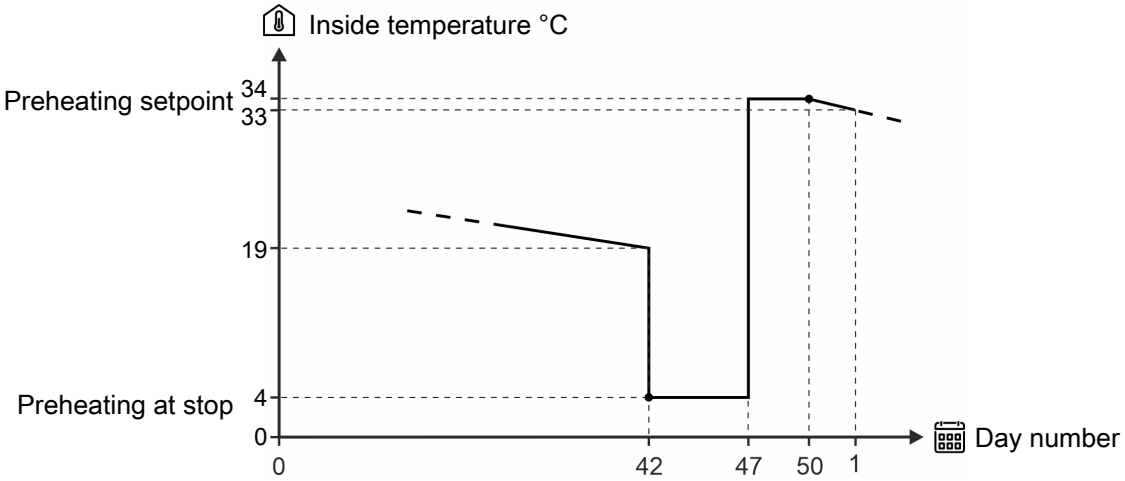


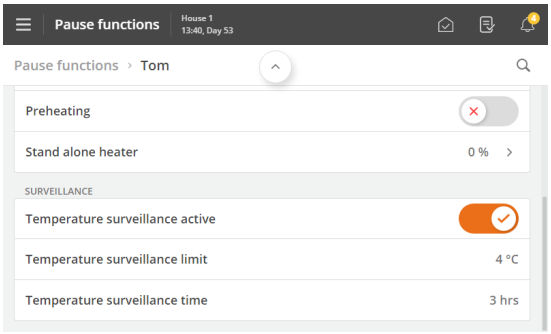
Figure 6: Example of setting of preheating.

Menu button | **Pause function** | **Functions** | **Empty**

Preheating	Connection and disconnection of the function.
Preheating setpoint	Setting of desired inside temperature at start.
Preheating at stop	Setting of desired minimum inside temperature between 2 batches.

Floor preheating set-point	Setting of the percent that the floor heating system shall operate with. The floor heating stops when the inside temperature exceeds the temperature that has been set.

5.8.3.2 Temperature surveillance



The controller can be secured against incorrect setting to the house status **Empty**.

The controller monitors the temperature in the house for 3 hours after changing the batch status to **Empty**. If the temperature increases in this period by more than 4 °C (indicate there are animals in the house), the controller triggers an alarm and activates the ventilation.

This temperature surveillance is interrupted if an in-between function is activated.

Menu button | **Between batches | Functions | Empty**

Temperature surveillance active	Connection and disconnection of the function.
Temperature surveillance limit	Display of the number of degrees the temperature must rise after batch stop.
Temperature surveillance time	Display of the time period when the temperature is monitored after batch stop.

6 Production

6.1 Batch

Information about the number of stocked and moved animals helps to form the basis for the production controller's calculations relating to production control. Key values, such as mortality and feed/animal, are thus dependent on you entering the correct numbers.

The controller continuously calculates the total number of live animals, the number of dead animals yesterday, and the mortality in the livestock house. You can also register the number of stocked animals at the batch start, reasons for culling, etc.

The controller can display whether the registrations were made in the morning or the evening, and a total number of each type of recording for the batch.

Calculations of previous recordings can be viewed in the PC management program BigFarmNet Manager.

Operation. The most important values and settings for animals n the livestock house can be viewed and entered via the **Production results** card.

Animal: entry of the number of moved animals.

Mortality: entry of the number of dead animals in different categories.

In the following section, you will see a description of the functions and setting options available for animals.

Pigs

Operation | Production card **| Animals**

Stocked	Entry of the total number of animals at batch start. If animals are stocked or removed from the livestock house in the course of a batch, it must be recorded in the menu **Add/remove animals** or **Number of dead animals**.
Animals alive	Displays the number of live animals.
Add/remove	Entry of the number of removed or stocked animals in the house in the different categories (**Sold, Moved, Injured** (dead) and **Extra stocked**).

Operation | Production results card **| Mortality**

Number of dead animals	Display of the total number of dead animals. Entry of number of dead animals. These numbers are used to calculate the mortality rate.
Number of dead animals yesterday	Display of the total number of dead animals.
Mortality	Display of the total calculated mortality in percent.

6.2 Feed

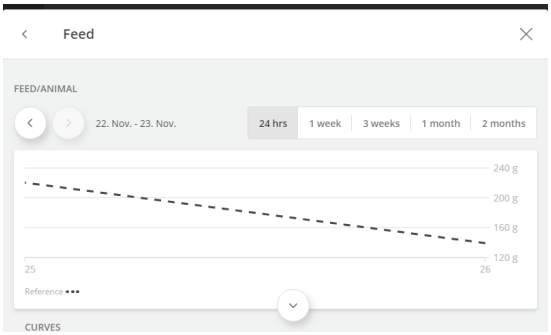
The feed function can be adapted to different types of feeding systems, which enables control of feeding. The feed programs and feeding according to reference values enable fully automatic feeding.

Operation. The **Production** card shows the current feed consumption.

6.2.1 Feed consumption

The controller calculates the feed consumption continuously and updates the consumption as the feed content in the silo is reduced. Consumption for all types of feed is calculated separately.

The controller also displays calculations for feed consumption per animal and water/feed consumption ratio.



Operation | Production card | **Feed**

Feed data is collected and presented in graphs and overviews, including key metrics.

It is also possible to enter the weight of feed manually. For example, it may be appropriate to supply feed if there is not enough feed in the silo and feed is provided through other means, or you feed from sacks due to system errors.

Operation | Program overview card **| Manual feed**

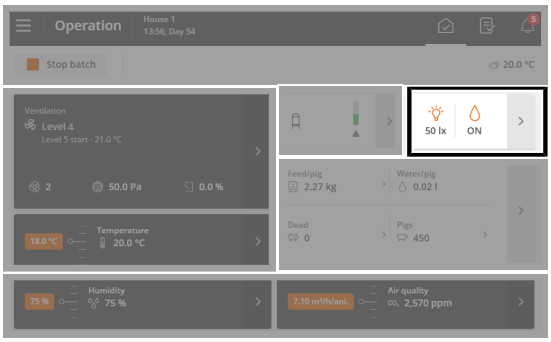
Add feed	Enter the weight of feed available in the feeding system. Enter (max. 1000 kg at a time).
Remove feed	Enter the weight of feed the animals consume. Enter (max. 1000 kg at a time). The controller uses the data entered to make calculations for feed consumption.

6.2.2 Feed control

Depending on the type of feed control, the feed can be regulated in terms of time or the amount of feed.

You can change the amount of feed by:

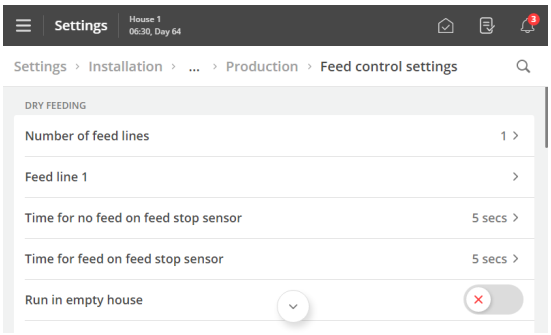
- Increasing/decreasing the amount of feed per day.
- Changing the day number on which the amount of feed is increased in the feed curve.



Operation. When the feeding is in progress, it is displayed with a colored icon on the card **Program overview**.

The card provides access to view and change the program, which is active on the day number.

6.2.2.1 Feed control - dry feeding

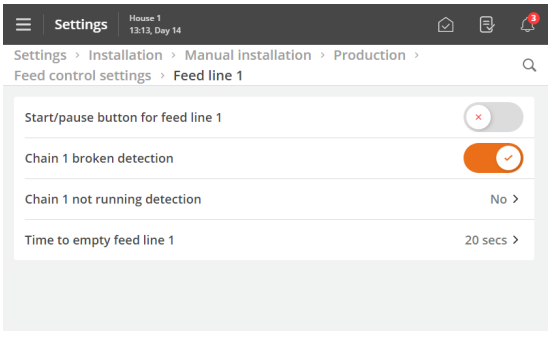


Select the menu **Technical | Installation | Manual installation | Production | Feed control type** and select the required functionality.

6.2.2.1.1 Dry feeding

Time for no feed on feed stop sensor	Setting the time that the feed stop sensor must be free of feed before the feed supply starts.
Time for feed on feed stop sensor	Setting the time that the feed stop sensor must be covered by feed before the feed supply stops.
Run in empty house	Usually, the feeding system will not run when the batch status is **Empty house**. In houses where the feed system also supplies feed to other sections, you can let the system run and alarms be active also when the batch status is **Empty house** .
Stop feed system if no feed is supplied	Setting the time when feeding must stop to ensure that the chain does not run when it is empty. Status changes into **Waiting for feed supply** . The feeding is automatically resumed when there is feed in the chain again.
Minimum time to next filling	Setting the minimum time between a feeding stopping and the next one starting. The pause should ensure that the animals are not fed too often as this will lower the productivity. Note that the settings must be adapted to the times in the feed programs.

6.2.2.1.2 Dry feeding - monitoring of feed chain



The controller can monitor the feed chain, as well as trigger an alarm and stop the feeding if errors occur.

A 0-10 V input terminal is required for each type of monitoring.

Monitoring of feed chain errors

Errors are registered via an input provider.

Monitoring of feed chain ceases to operate

If the feed chain stops in the middle of a feed program, it can be registered via a pulse signal or an input provider.

6.2.2.1.3 Supply auger

It is possible to use a supply auger for each feed line.

When an suppy auger sensor is also used, the supply auger will stop when the sensor is covered in feed.

1. Silo auger
2. Feed weigher
3. Feed demand sensor
4. Feed separation shutter
5. Supply auger
6. Supply auger sensor
7. Winch motor
8. Wire/chain system
9. Winch motor
10. Stop sensor

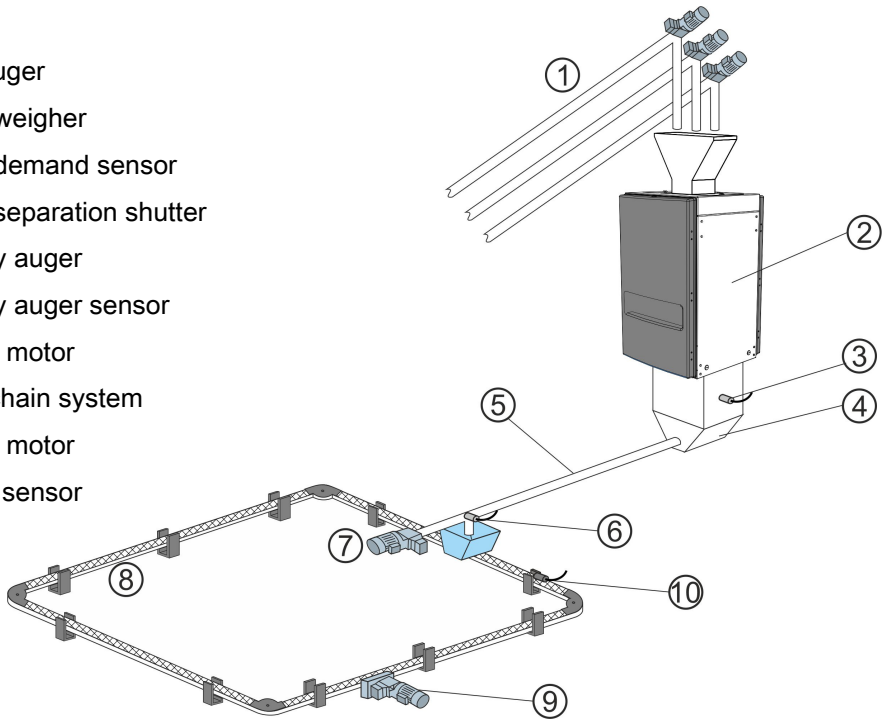


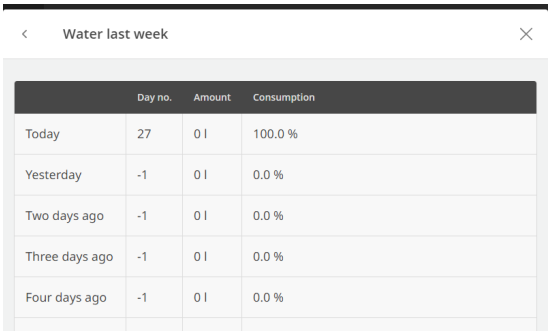
Figure 7: Dry feeding system with supply auger

Time to empty supply auger	Setting the time the supply auger must run after the feed line has been parked to ensure that the system is emptied.

6.3 Water

Operation. The **Production** card displays the current average water consumption.

In the following section, you will see a description of the functions and recording options available for water.



Operation | Production results card | **Water**

Water data is collected and presented in graphs and outlines, including important key figures.

The controller records the water consumption in liters to provide a complete overview. The water consumption is also recorded in percent to make sudden changes visible.

Under normal conditions, the percentages will increase by a few percent per day as the age of the animals increases.

6.3.1 Flushing

Flushing with cold water improves water quality by removing residues of e.g. medicine and reducing biofilm formation in the water lines. This ensures the well-being of the animals and gives them optimal growth conditions.

Flushing can be regulated time-controlled and also temperature-controlled.

An advantage of temperature-controlled flushing compared to time-controlled flushing is that it is performed only when necessary (saving on water) and requires no adjustment during the batch.

Temperature-controlled flushing will thus provide a flush if the temperature in the water lines is too high, e.g. because the light is switched off during the night, so the water consumption decreases, and the water lines are heated up to room temperature.

6.3.1.1 Manual start and stop of flushing

The **Flush** function button allows you to start and stop a flushing of the activated water lines. See also below.

The icon changes color as long as flushing is carried out.

.

Program overview | Flushing

Start	Setting the start time of a flushing. Up to 8 flushes per day. Display of end time and duration of flushing. It is recommended to run flushing before the light is switched on, in that way it is finished before the light is switched on.

Enable	Activating/deactivating the automatic flushing. The function can be used when the animals reach a certain age and it is no longer necessary to rinse the water lines automatically because the water consumption has increased.

Program overview | Flushing | Temperature controlled

Start **End**	Setting the start and end time of a flush. Up to 8 flushes per day.
Enable	Activate/deactivate automatic temperature controlled flushing. The function can be used when the animals reach a certain age and it is no longer necessary to rinse the water lines automatically because the water consumption has increased.

Program overview | Water

Flushing state	Display of the current status for water flushing, options are: **OFF** - water flushing is not ongoing. **Water line x flushes** - the water line is being flushed according to the program. **Paused** – flushing is paused before flushing of the next water line starts. **Manual water line** - a manual water flushing of the water line has been started. **Wait for program off - water flushing is ongoing.**
Water temperature	Displays the current water temperature when a water temperature sensor is connected. The animals prefer a water temperature between 15-20 degrees.

Program overview | Water | Settings for water | Water flushing settings

Enable water flushing lines	Selecting the name and activation of each water line. When a water line is deactivated, it will not be flushed automatically or manually.
Flush all lines	Activating manual water flushing of all water lines in turn.
Flush single line	Activating manual water flushing of a single water line.

6.3.1.2 Strategy for flushing

| Strategy | Water | Flushing | Time-controlled

Enable time controlled	Activate/deactivate automatic time-controlled flushing. The function can be used when the animals reach a certain age and it is no longer necessary to flush the water lines.
Time controlled program	Setting the start time of a flush. Up to 8 flushes per day. Display of end time and duration of flushing. The water lines are flushed one by one in turn for a set period of time (in the menu **| | Technical | Installation | Manual installation | Production | Water settings | Water flushing line time).** The factory setting is 3 minutes. The water flushing is also carried out when the water relay is OFF, for example, at night. We recommend that water flushing is used in periods of low activity in the house, for example just before the light is switched on and outside the feeding periods.

Week program	Setting up which days water flushing should run automatically.

| Strategy | Water | Flushing | Temperature controlled

Enable temperature controlled	Activate/deactivate automatic temperature controlled flushing. The function can be used when the animals reach a certain age and it is no longer necessary to flush the water lines.
Temperature controlled periods	Setting the start and end time of a flush. Up to 8 flushes per day.
Temperature to start flushing	Setting the temperature that activates the water flushing.

6.4 Light

6.4.1 Light program

In principle, the light control works as feed control.

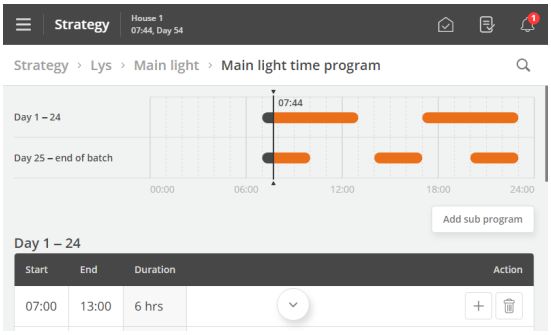
The light program can contain up to 16 programs starting on different days numbers. A program is maintained from one day number to the next day number. If no programs have a higher day number, the program applies to the rest of the batch.

Set for each day number (up to 16):

- Number of periods per day
- Start and stop time

Please note that:

- The light up to the first day number is on 24 hours a day with the same light intensity as for Day 1.
- That there is no access to light outside the periods selected.
- Light is available around the clock if a start time is set from 00:00 to 24:00.



| Menu button **Strategy** | **Light**

Press the field in the column **Start** to change the start time.

Press the field in the column **End** to change the stop time.

Press + to add a new period and set the start and stop time.

Press the field **Start day no.** to change the day number of the period, if required.

Press **Add subprogram** to add a new day number.

The blocks on the timeline show when and how long the light is on.

Press to delete a period.

6.4.2 Main light

The light intensity of the main light is the same throughout the day, but the controller has the reduced light, and dawn and dusk options.

Operation | Program overview card **| Main light settings**

Main light ON intensity setpoint	The setting of light intensity for the main light (with light dimmer).
Main light OFF intensity setpoint	The setting of minimum light intensity (with light dimmer). The setting of light intensity when the lighting program is OFF.

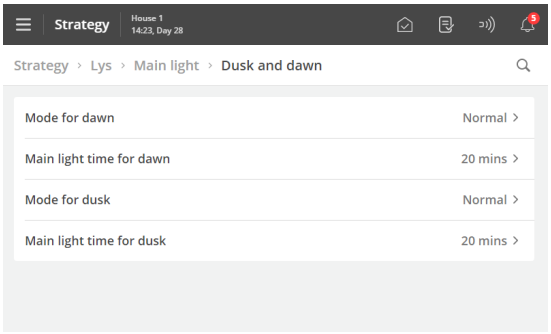
Menu button | **Strategy** | **Light**

Main light time program	The controller automatically regulates the light in the house based on the values you indicate in the **Light time program** menu. The time program is set as described in the section Light program [▶ 53].
Main light intensity curve	The setting the light intensity of each day number.
Dusk and dawn	Settings of periods with increasing and decreasing light intensity for transition between light and darkness in the house. See also the section Dawn and dusk [▶ 54]. Only available in houses with light dimmers.

6.4.3 Dawn and dusk

The function is intended for houses with standard lighting control.

When a light dimmer is used, the light level can be controlled so that a light period starts with "Dawn" where the light is changed from "Night" to "Day". Similarly, a light period ends with "Dusk".



Over a set period, the controller changes the light to the required level.

Periods for dawn and dusk can be set independently.

Set the duration of the individual periods and the value of the light intensity when the period expires.

Start time: 14:00

Dawn: 00:20

Dusk: 00:30

Stop time: 16:00

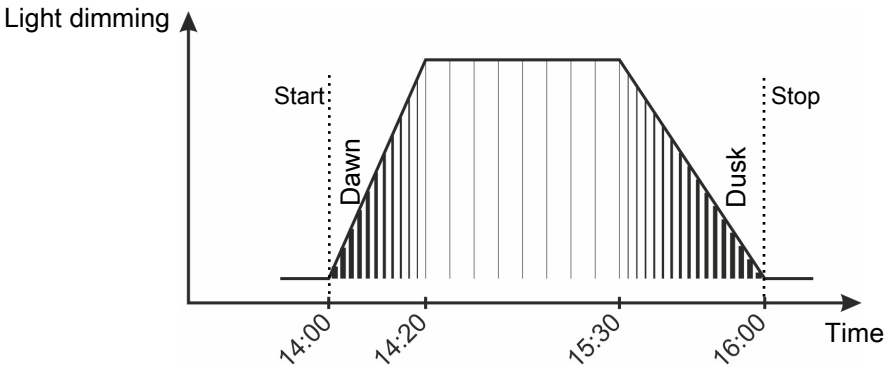


Figure 8: Normal light dimming Dawn and dusk are integrated in the light period.

6.4.4 Slave light

Slave light is a function that is activated offset from the main light. In addition to an alternative light source, for example, curtains that blind the windows.

The offset can be set with a start and stop offset for each slave light.

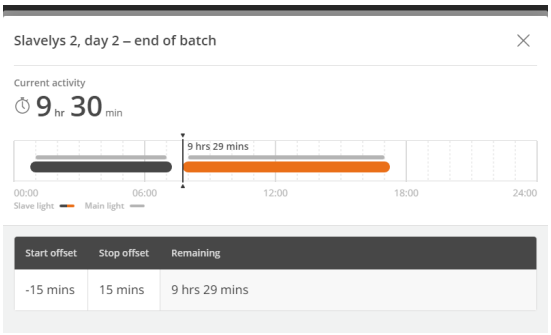
Operation | Program overview card **| Slave light 1 settings**

Slave light 1 intensity setpoint	Changing the light intensity of the slave lights (with dimmer) if you want to change the light intensity according to the program.
Slave light 1 off intensity setpoint	Setting of minimum light intensity (with light dimmer). Changing the light intensity when the lighting program is OFF if you want to change the light intensity according to the program.

Menu button **Strategy	Light| Slave light**	
Slave light 1 time program	Setting the **Start offset** and **Stop offset** program for when the slave light is on in relation to the main light. The offset can be set as a positive or negative value, depending on whether the slave light should switch on before or after the main light.
Slave light 1 intensity curve	Setting the light intensity curve for slave light.
Start offset relates to	Setting if the slave light should switch on with an offset to **Start time** or **Stop time** settings in the light program.

Start offset to when Main light turns on	Setting of curve point for **Start offset** in the slave light program.
Stop offset relates to	Setting if the slave light should switch off with an offset to the settings of **Start time** or **Stop time** in the light program.
Stop offset to when Main light turns off	Setting of curve point for **Stop offset** in the slave light program.
Dusk and dawn	Settings of periods with increasing and decreasing light intensity for transition between light and darkness in the house. See also the section Dawn and dusk [▶ 54]. Only available in houses with light dimmers.

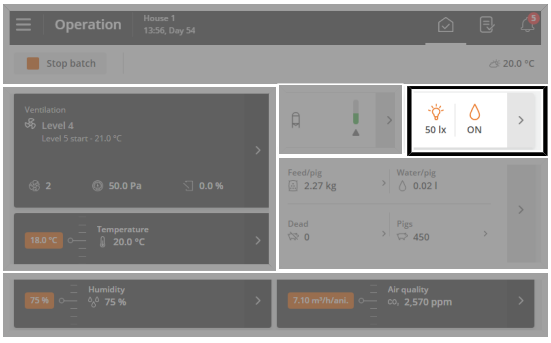
When a light dimmer for the slave light is used, the **Light intensity**, **Light OFF intensity** and **Light intensity offset** settings function as described for main light.



The main light program is shown above the slave light program in the menu.

6.5 24-hour clock

The 24-hour clock function allows you to automatically turn on and off equipment at specific times or time intervals. In addition, the 24-hour clock allows you to choose how often equipment will run in a week. It is done by applying a week program.

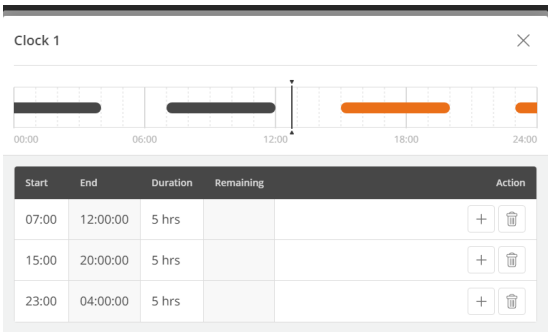


Operation. When 24-hour clock is on, it is displayed with a colored icon on the card **Program overview**.

The card provides access to view and change the programs of all the 24-hour clocks.

In each program you must set the following:

- Start time
- Duration



Operation | Program overview-card | **Clock**

Press the field in the column **Start** to set a start time.

Press the field in the column **Duration** to set the duration of the period.

Press + to add a new period, then set the start time and duration of the period.

The blocks on the timeline show when and how long the 24-hour clock is on.

Outside the selected periods, the 24-hour clock is off.

Press 🗑 to delete a period.

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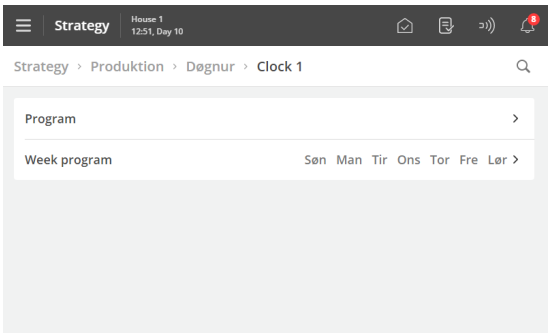
24-hour clock with week program



Menu button | **Strategy | Production | 24-hour clock**

Select which days the 24-hour clock is on.

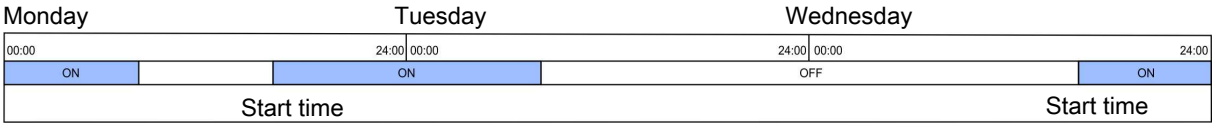


Figure 9: If an ON-time runs past midnight on a day when the 24-hour clock is not active, the function will remain ON until the time has elapsed.

7 Alarm settings

The controller has a number of alarms, which it will activate if a technical error occurs or alarm limits are exceeded. A few of the alarms are always connected, e.g. power failure. The other alarms can be activated / deactivated, and for some of them, you can even set the alarm limits.

The user is always responsible for ensuring that all alarm settings are correct.

See also the section Alarms [▶ 27].

7.1 Climate

7.1.1 Temperature alarms

Menu button | **Settings | General | Alarms | Climate | Temperature**

High temperature limit	The temperature alarm for high temperature is only activated when the batch state is **Active house**. The alarm is set as an excess temperature to **Temperature setpoint**.
Low temperature limit	Alarm for excessively low temperature in relation to the **Temperature setpoint**.
Summer Alarm at 20 °C and 30 °C Outside	The function has a varying alarm limit that monitors changes in the high outside temperature. When the temperature rises, the alarm limit will also rise. It will thus postpone the time when the high temperature alarm is triggered. The controller only triggers the alarm if the inside temperature also exceeds the high temperature alarm.

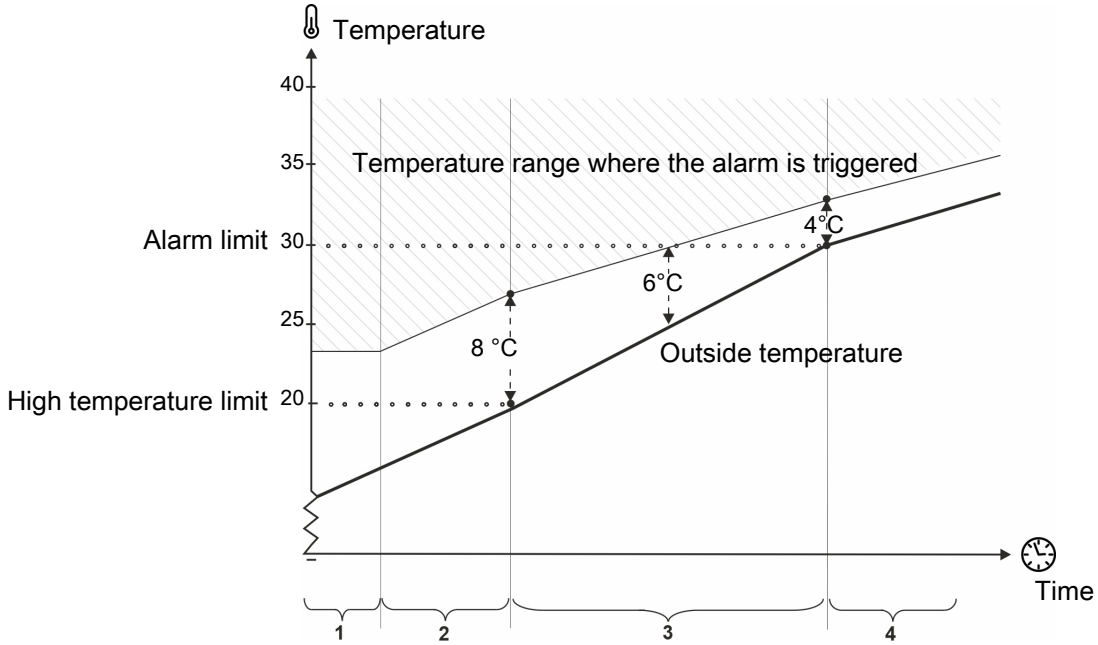


Figure 10: Summer temperature at 20°C and 30°C outside

1. *The alarm limit does not fall below the High temperature limit.*
2. *Below 20°C outside, the alarm limit is 8°C, staggered in relation to the outside temperature.*
3. *Between 20°C and 30°C, there is a gradual transition from 8°C to 4°C. At an outside temperature of, e.g., 25°C, the inside temperature must be 6°C higher (above 30°C) for the alarm to be triggered.*
4. *Above 30°C outside, the alarm limit is 4°C, staggered in relation to the outside temperature.*

Absolute high temperature	The alarm for absolute high temperature is triggered by an actual temperature, such as 32°C. The controller triggers the absolute high temperature alarm when just one inside temperature sensor measures a temperature that exceeds this setpoint. The absolute high temperature alarm is set as a temperature curve.

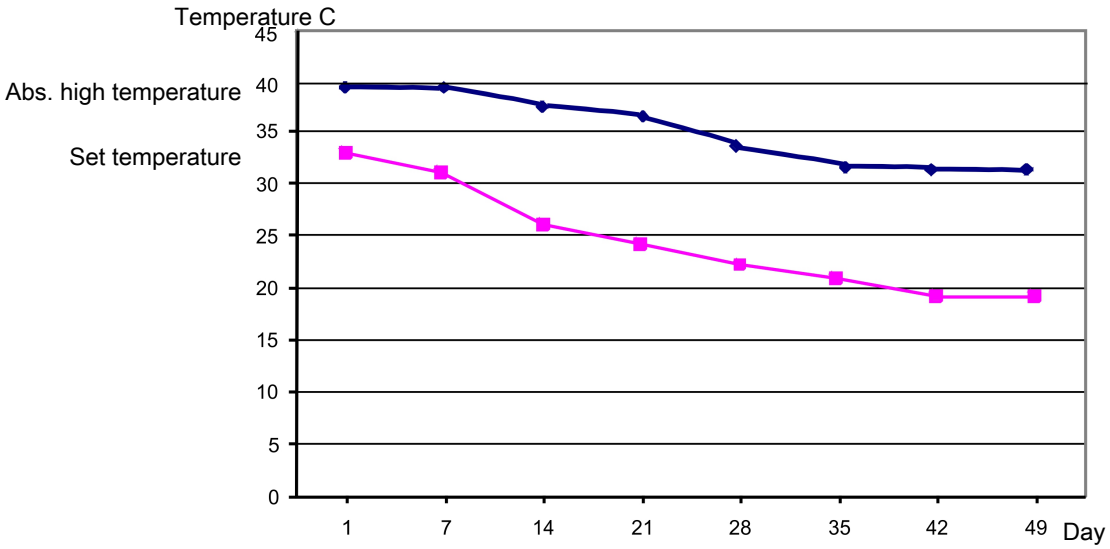


Figure 11: Example of Absolute high temperature alarm.

Alarm for Absolute high temperature is released when the inside temperature exceeds the set value. The value can be set as a curve over a time span of eight day numbers.

House heater alarm **House heater limit**	All active heat temperatures are compared to the temperature in the active growth zone. An alarm is generated if the difference exceeds a set temperature limit. In tunnel mode, alarms are based on the tunnel temperature.

7.1.2 Humidity alarm

Menu button | **Settings** | **Alarms** | **Climate** | **Humidity**

Absolute high humidity limit	The controller triggers the alarm for absolute high humidity when the humidity exceeds the setpoint. This may be due for example to lack of ventilation or a technical sensor error.

7.1.3 Inlet and outlet alarm

Menu button | **Settings** | **Alarms** | **Climate** | **Inlet and outlet alarm**

Inlet and outlet alarm	The inlet and outlet alarms are technical alarms. The controller triggers an alarm if the actual flap position on the air inlet or air outlet deviates from the setpoint that the controller has calculated as correct.

Alarm type	
Missing fan setting	This alarm indicates that the fan voltage has not been set in the **Installation** menu. When a 0-10 V output fan has been selected, a voltage value must be set which corresponds to the fan running at low and full speed.

Tunnel cooling temperature	Alarm for when the inside temperature exceeds the outside temperature. This indicates an error in tunnel opening.

7.1.4 Sensor alarm

Menu button | | **Alarms | Climate**

Error inside temperature sensor	The controller triggers an alarm if the sensor is short-circuited or disconnected. Without this sensor, the controller cannot control the inside temperature, and apart from the alarm, the error will also trigger an emergency control of the ventilation system, which will open 50 %. The alarm is always a hard alarm.
Error outside temperature sensor	The controller triggers an alarm if the outside temperature sensor is short-circuited or disconnected.
Error outside temperature sensor low (-35°C)	Selection of whether the controller should monitor whether there is an error in the outside temperature sensor. The function is intended for use in areas where the outside temperature usually does not fall below -30 °C.
Misplaced outside sensor	The alarm indicates whether the sensor is exposed to solar heating and therefore displays an incorrect outside temperature. The controller triggers an alarm when the inside temperature measured by the controller is the number of degrees below the outside temperature that the function is set to (for example 5°C).
Error humidity sensor **Outside humidity sensor failure**	The controller triggers an alarm when the humidity sensor is disconnected or the air humidity is lower than humidity setpoint.

7.1.5 Pressure sensor

Menu button | **Settings | General | Alarms | Climate**

Pressure sensor	With the function Sensor alarm delay you can postpone the alarm signal so that the alarm is not triggered by transient changes of the pressure level in the house, e.g.,when a door is opened. The controller triggers an alarm when the pressure in the house drops below or exceeds the settings of **Pressure high limit**/**Pressure low limit**.

7.1.6 CO2 alarm

Menu button | **Settings | Alarms | Climate**

CO2 alarm	The controller triggers an alarm if the values for the sensor fall below or exceed the setpoints.

7.1.7 Emergency control

7.1.7.1 Emergency opening

The controller has emergency opening as a standard function regardless of whether an actual emergency opening is installed. As long as there is power, the controller will open the ventilation system 100 % in case of a relevant alarm - even if it is cold outside.

The emergency opening can be activated by five types of alarms.

Activated by	Side	Tunnel (CT, T)
High temperature	Yes	

Activated by	Side	Tunnel (CT, T)
Absolute high temperature	Yes	Yes
Absolute high humidity	Yes	Yes
Pressure high alarm	Yes	Yes
Pressure low alarm (negative pressure)	Yes	Yes
Pressure low alarm (positive pressure)	No	No
Power failure	Yes	Yes

It may be an advantage to disconnect absolute high humidity in houses that are placed in areas with very high outside air humidity and in situations when a technical sensor error emerges.

7.1.7.2 Temperature-controlled emergency opening

Temperature controlled emergency opening is only triggered when the inside temperature exceeds the temperature setpoint for emergency opening (**Emergency opening setpoint**). You can read off the setpoint as an actual temperature figure on the controller's display. The emergency opening is also triggered in the event of power failure.

Emergency opening temperature

You can set the temperature at which emergency opening shall occur directly on the emergency opening's adjustment knob. The setting can be read off in the display together with **Temperature setpoint**.

Warning at emergency temp.

The controller can issue a warning that will flash in the display in the event of the **Emergency opening setpoint** being too high in relation to the **Temperature setpoint** (inside temperature). This is especially relevant at batch production and a falling temperature curve. This is where on an ongoing basis you must adjust the **Emergency opening setpoint** downwards. However, too high a setting can also be caused by an error.

The warning function can be connected and disconnected. The setting here should be the number of degrees by which the **Emergency opening setpoint** must exceed the **Temperature setpoint** for the controller issue a warning.

Battery alarm and battery voltage

Temperature controlled emergency opening has a battery that ensures that the emergency opening will open, despite there being a power failure, if the inside temperature exceeds the **Emergency opening setpoint**.

You can read off the current and the lowest measured voltage on the battery. These readings indicate whether you need to replace the battery or whether there may be a technical fault causing the battery alarm.

The controller can trigger an alarm if the battery that operates emergency opening is not working.

Be careful not to set the **Battery voltage limit** too low, as this will actually deactivate the alarm.

7.2 Production

7.2.1 Feed alarms

Menu button | **Settings** | **Alarm** | **Production** | **Feed**

Dry feeding alarms main circuit

Feed line 1 feed stop sensor defect	The alarm is a technical alarm to ensure that the stop sensor is working. There should not be any feed next to the sensor when **Max. time to free feed stop sensor** runs out. Otherwise, the alarm will be activated. The alarm will stop when there is no more feed next to the sensor. The alarm can be connected and disconnected.
Feeding paused too long	The alarm is triggered when the ongoing feeding has been paused manually longer than the set time (10 min.) The alarm can be connected and disconnected.
Feed line 1 is not filled	The alarm is triggered when the filling of the entire section is not completed within the designated time limit (**Feed line 1 maximum filling time**). The alarm stops when the filling is completed within the time limit. The alarm can be connected and disconnected.
Alarm for chain broken **Alarm for chain not running**	The alarm is triggered when the controller registers that the feed chain is broken or not running properly. The alarm stops the feed program. When the problem is solved, you can run manual feeding or wait for the feed program's next feeding.
A programmed filling was skipped	The alarm may be triggered for several reasons: • The time between the feed program starts is not long enough in relation to the predefined **Minimum time to next filling**. • A filling takes too long - for example, if it has been paused. • A manual feeding has been started too close to a programmed feeding. The alarm can be connected and disconnected. Check if the animals need an extra manual feeding.

Feed weigher

No feed to feed weigher	The alarm is triggered when the feed weigher determines that no feed is coming from the silos. The function can be connected and disconnected. In the event of an alarm, the controller deactivates the silo auger. Set how much time shall pass before the controller triggers an alarm in **Time before alarm**. The alarm remains active until the feed weigher can register feed again. When the alarm is acknowledged, the silo auger starts again. It is possible to set the silo auger to run and stop alternately for shorter periods after the alarm has been acknowledged. When the silo auger is pumping, feeding may start again if the stop was due to a bridge formation in the silo. The pump function can be overridden by setting the **Stop time silo auger** to 0 minutes. This way, the controller will ensure that the silo auger stays turned off until the feed demand sensor is manually removed and reconnected. The controllers will then activate the silo auger once in the set runtime (**Runtime silo auger**).

Feed alarm

Water/feed ratio (with water meter)	The alarm indicates that the water/ feed ratio does not follow the reference curve. Possible reasons: 1) Defective water system 2) Sick animals 3) Feed inaccuracies However, note that the water/ feed ratio may be increased in houses without cooling systems when the outside temperature is high. The alarm is generated if the water and feed consumption ratio within a given period of time (**Time for alarm control**) deviates from the value set (**Water/ feed ratio alarm limit**). Can be disconnected automatically during the first days of a batch (Begin to check at day number). Choose whether the water is to turn off when an alarm is generated. When all water alarms have been acknowledged, the controller turns on the water again.

Silo content	
Feed level too low	Based on the feed consumption of the previous day, the production controller calculates how long it will be until the feed is consumed, and will trigger an alarm once this time is exceeded**(Feed level too low**). A total overall level will be calculated if the same type of feed is in multiple silos.
Silo content low	The displayed silo content is a calculated value. The alarm is generated when the feed amount in a silo is below a set limit.
Silo is empty alarm	The empty silo sensor records that there is no more feed in the silo, and it is impossible to switch to another silo, possibly due to too low silo content.

7.2.2 Water alarms

These alarms can be disconnected automatically at batch/flock start by setting a **Start alarm day**. In the event of major changes to the number of animals in the house, at least 26 hours should pass before the controller can trigger the alarm.

To avoid triggering false alarms, you can indicate how many days should pass before the controller triggers a water alarm.

Menu button | **Settings** | **Alarms | Production | Water**

	Alarms can be automatically disconnected at batch start by setting a **Start alarm day**.
Min. and max. water alarm	The alarms are used for monitoring the animals' drinking patterns. The alarm limits for maximum and minimum water consumption is a set percentage of the normal consumption. The climate controller calculates this normal consumption by comparing the current 24-hour period with the 24-hour period that is two hours older. At 1 P.M., for example, you look at the period from 11 A.M. on the previous day to 11 A.M. on the current day.
	With water control These alarms are used for monitoring leakages and stoppages in the water system.

Not enough water alarm	The alarm is triggered if the water consumption measured by a water meter is too low during a given period of time. It is recommended to set this alarm to 1.0 l/min. and a monitoring time to 30 minutes. An alarm will be generated if consumption is lower than 30 liters each half hour.
Too much water alarm	The alarm is triggered if the water consumption measured by a water meter is too high in a given period. Depending on the capacity of the water supply, the system can supply a certain quantity of water per unit of time. The alarm is triggered when the system has operated at maximum output for too long. If a water relay is installed, the water will be turned off at excessive water consumption. *Guidelines for alarm limit settings*: Measure the amount of water flowing per minute to the current water meter. Set the alarm limit for 1 liter less than the measured. Set the monitoring time to 30 minutes.
Start alarm day	In the event of major changes to the number of animals in the house, at least 26 hours should pass before the house controller can trigger the alarm. To avoid triggering false alarms, you can indicate how many days should pass before the controller triggers a water alarm.

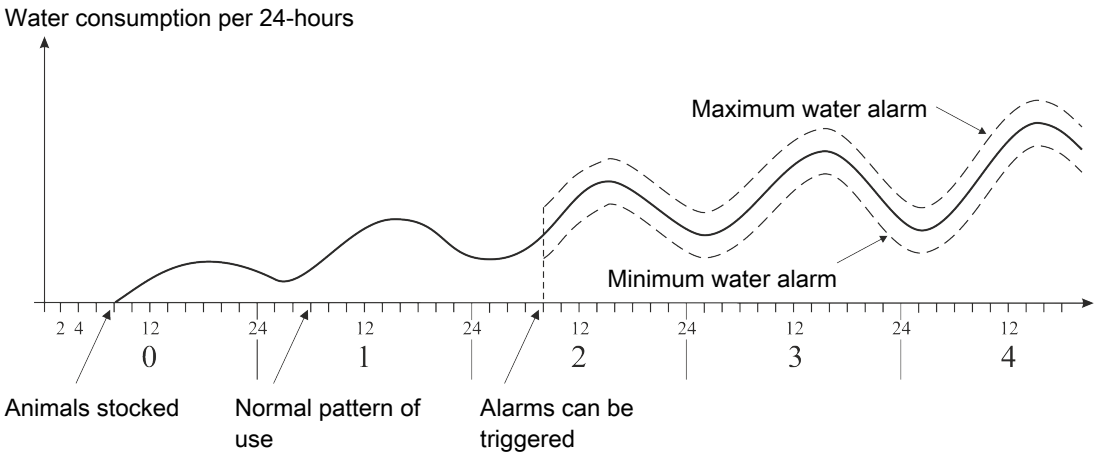


Figure 12: Example of minimum and maximum water alarm

The controller triggers an alarm when the limit for maximum water consumption is exceeded or the consumption is below the limit for minimum water consumption.

There may be various reasons for the fluctuation in the animals' water consumption that will all trigger an alarm. For example, an alarm may be triggered due to stocking more animals or the slaughter of some animals, an outbreak of disease in the livestock or a rupture of the water pipe.

7.2.2.1 Alarms for flushing

All alarms for flushing are factory set as soft alarms. Hence, there is a yellow warning pop-up on the controller, but you are not alerted by, for instance, an alarm signal.

| | | **Alarms | Production | Water | Water flushing temperature**

At temperature-controlled flushing.

Water flushing temperature	Selecting the type of alarm.
Maximum numbers of flushings per day	Setting the number of flushes per day.
Water temperature sensor	Selecting the type of alarm. The sensor alarm is a technical alarm. The controller triggers an alarm if the sensor is short-circuited or disconnected and stops flushing. When the error situation has been resolved, flushing will restart with the status it had before the alarm.

| | | **Alarms | Production | Water | Water flushing supervise**

At supervised flushing.

Water flushing supervise	Selecting the type of alarm.
Maximum water flow during flushing line pause	Setting the alarm limit for maximum liters of water per hour.
Required line supervise time	Display of the calculated time for monitoring a water line.
Close water if too much water	Selecting whether the controller should shut off the water when too much water is detected. The controller reopens the water when the alarm is acknowledged.

| | | **Alarms | Production | Water | Flushing was not possible**

Water flushing not possible	Selecting the type of alarm. A technical alarm indicating that flushing is not possible. The alarm occurs if there is a critical water alarm at the same time as flushing is in operation, which turns off the water relay (e.g. **Too much water**).

At amount-controlled flushing.

Water flushing amount was not reached	Selecting the type of alarm.
Maximum time for flushing a water line	Setting the maximum time for flushing a water line. If the amount of water is not reached within time, the flushning is stopped. In case of an alarm, check if the water pressure is sufficient, if the valve can open and works and if the alarm time setting is as desired.

7.3 Master/Client alarms

If the controller is set up to share equipment with other controllers, it gives an alarm if the connection between the controllers is lost. A ‘Client’ controller will continue to regulate according to the latest received value from the ‘Master’ controller equipment until the network connection is restored.

Menu button | **Settings** | **Alarms**

Connection to Client lost	Select the alarm type **Hard**, **Soft** or **Disabled**.
Connection to Master lost	

8 Maintenance instructions

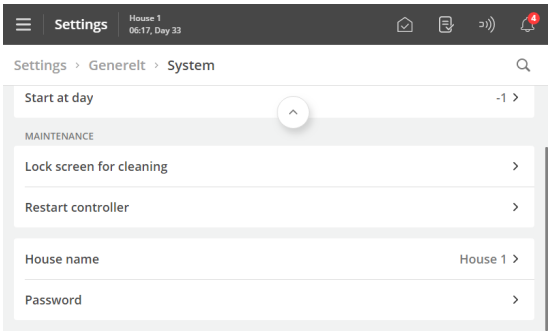
The controller requires no maintenance to function correctly.

You should test the alarm system every week.

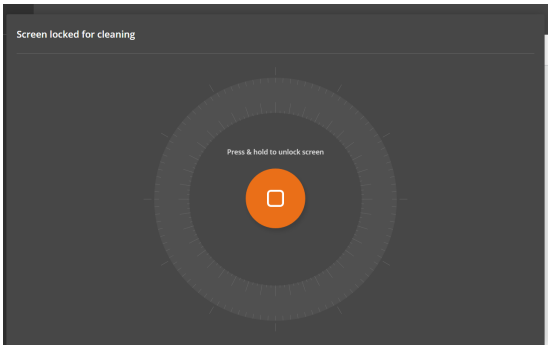
Use only original spare parts.

Note that the service life of the controller will be extended if it stays connected all the time, as this will keep it dry and free from condensation.

Lock screen for cleaning



When the controller is to be cleaned, it is possible to lock the screen to avoid inadvertent operation during cleaning.

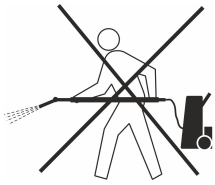


Press Menu button | **Settings | General | System | Maintenance | Lock screen for cleaning** to lock the screen.

Press and hold for 5 seconds to unlock the screen.

The controller automatically cancels the lock after 15 minutes.

8.1 Cleaning



Clean the product with a cloth that has been wrung out almost dry in water and avoid using:

- high-pressure cleaner
- solvents
- corrosive/caustic agents

8.2 Recycling/Disposal

The label indicates that the product must not be disposed of as general refuse disposal and must be treated as electronic waste.

The label indicates that the product is suitable for recycling.

It must be possible for customers to deliver the products to local collection sites/recycling stations in accordance with local instructions. The recycling station will then arrange for further transport to a certified plant for reuse, recovery and recycling.

99-94-0963 06/2025 GB • 2025-06-02 • en-US

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