307Pro - 310Pro CE

Central in/out

Technical User Guide

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Big Dutchman

Software version 9.0

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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1 Guidelines

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

The first part of the manual describes the general operation of the controller and all climate functions. The second part of the manual describes the technical manual which deals with the installation of the controller. Installation guide [▸ 34]

2 Product description

310Pro is a one- or two-house climate controller for pig houses, which can regulate and monitor the climate in the house.

The CE in/out variant is used for controlling the pressure in an exhaust duct for central exhaust ventilation system. It can also be used in houses where fresh air needs to be heated up or cooled down before it enters the house.

3 Operating instructions

3.1 Operation

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

From the top bar of the page, there are shortcut buttons that allow you to switch between the main pages **Operation** (**C**), **Report** (**D**)**, Auxiliary** (**E**) and **Activity log** (**F**).

A The icon and name of the page.

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

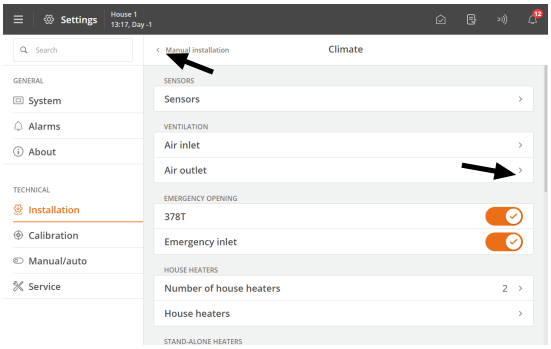
C The **Operation** page provides an overview and the ability to operate the functions most needed for your daily work.

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

E The **Auxiliary** page displays the consumption figures and auxiliary equipment status (if installed).

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

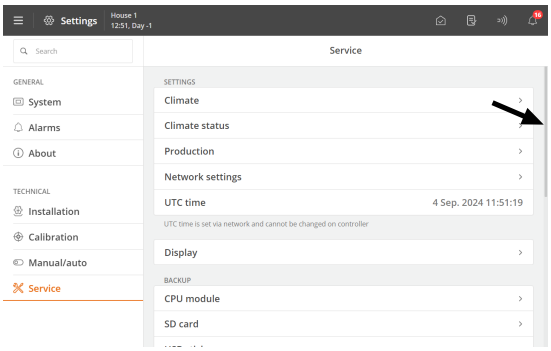
G The menu button gives access to language selection (see section Selection of language [▶ 10]) and other pages: **Pause functions**, **Strategy** and **Setting**.



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.

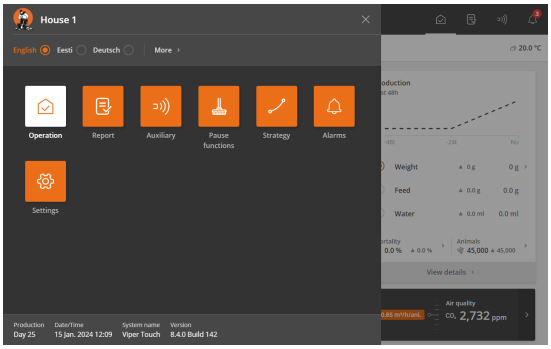
Scroll by sliding your finger over the display.

7” Display

This is shown in the display as arrows or scroll bar.

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

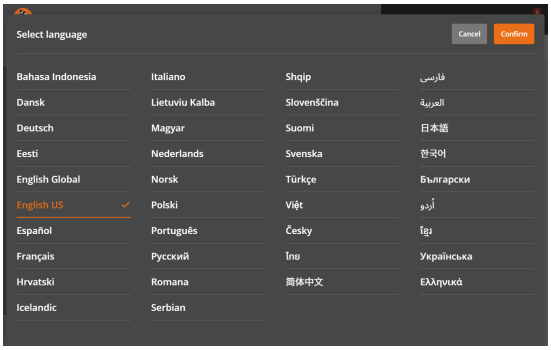
3.1.1 Selection of language



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**.

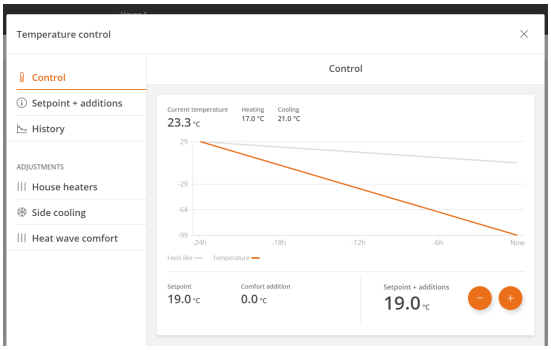
Note that function names (such as 24-hour clocks, water meters, and programs the user can name) are not translated into the selected language.

The factory setting for the names is English.

3.1.2 Climate card with daily settings

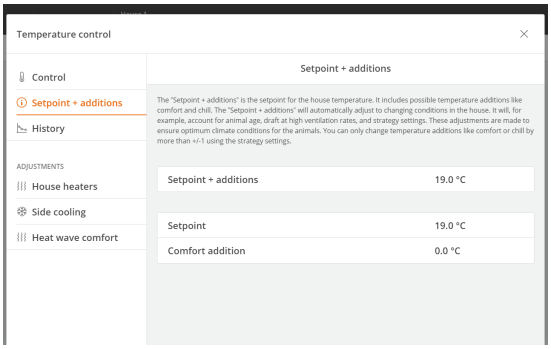
Press **Operation**.

The climate cards at the bottom of the page **Operation** provide an overview of the current climate in the house for daily users.



The climate cards provide easy adjustment of temperature, humidity and CO_2, for a graphical display of climate data over the last 24 hours, and for a number of settings and data in the settings menu.

When adjusting the temperature setting, the controller shows how the adjustment will affect the climate control, such as whether the ventilation will increase or decrease, for example.



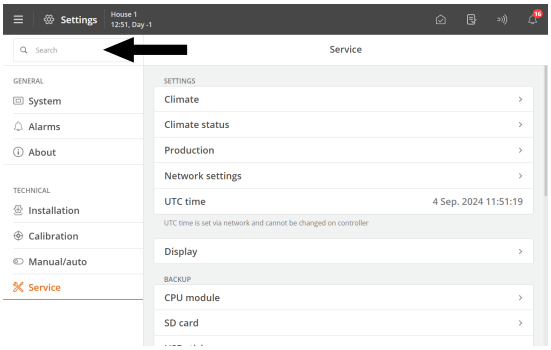
Temperature card. Setpoint + additions

Displays the parameters that determine the current temperature control.

3.1.3 Search in menus

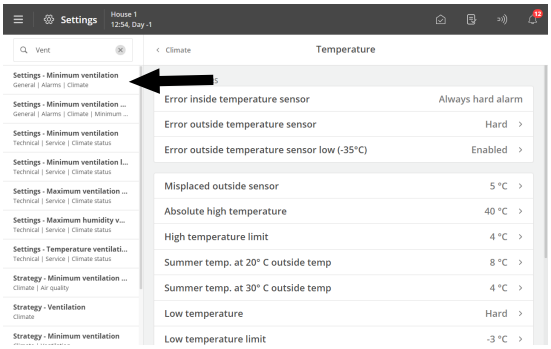
It is easy to search for the individual functions of the controller. There are search fields on the pages: **Auxiliary, Pause functions, Strategy,** and **Settings**.

A search across the pages is performed.



Use the search field to the left to search in menus.

Enter at least 3 characters to search.



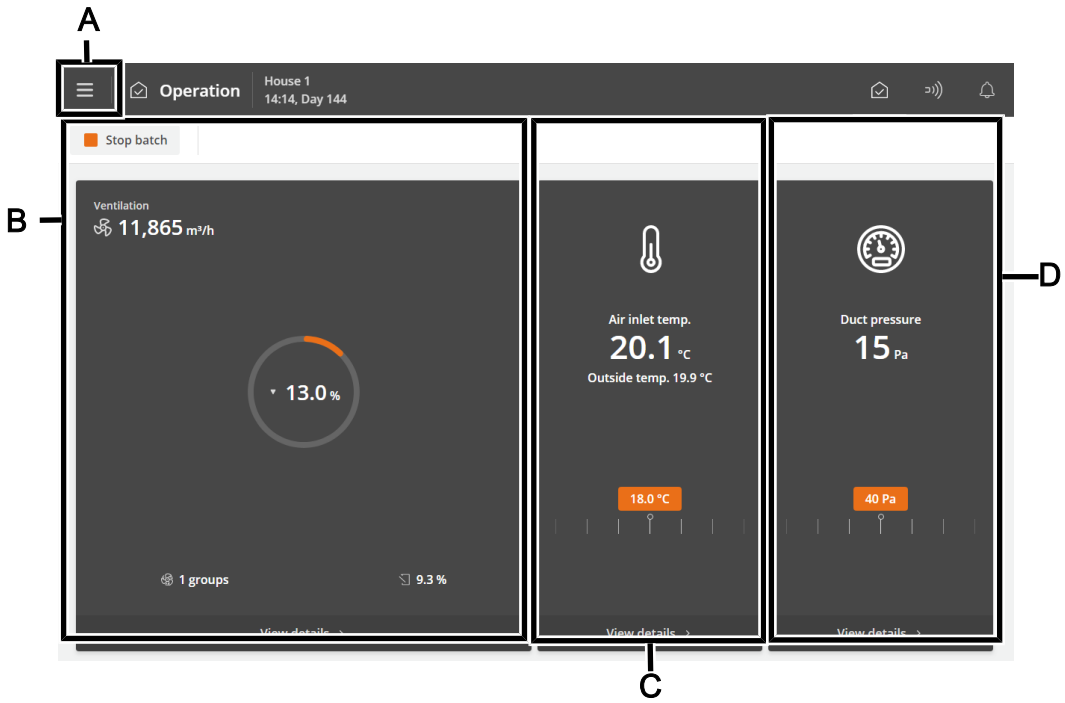
The result is shown below the search field. The path for the individual menus is also shown, for example, under Settings: **General | Alarms | Climate**.

Press a search result to go directly to that menu.

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

3.2 Operation

The page **Operation** contain selected views and settings relevant to the daily work.



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

B Status view for the climate control and access to the ventilation equipment menus.

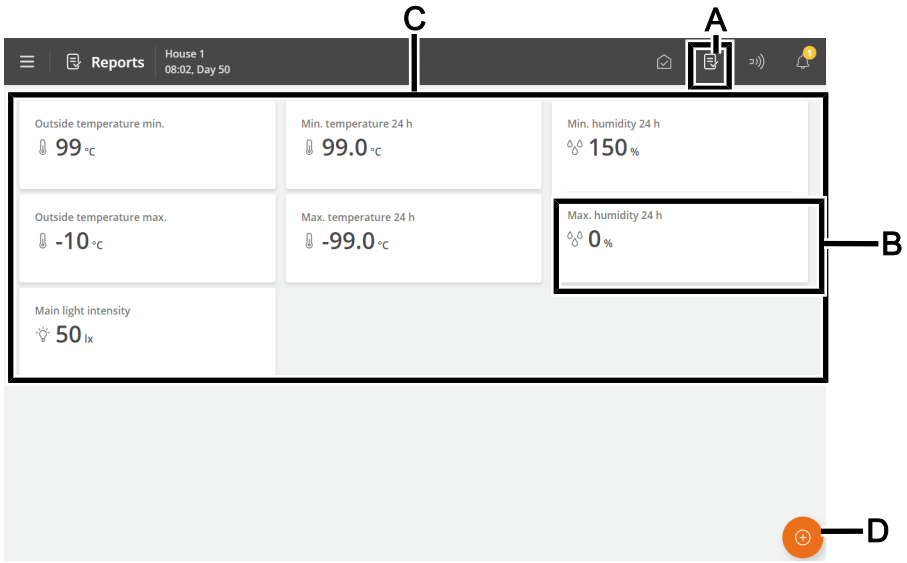
The card also provides a shortcut for manual control of the climate equipment. This is intended for situations where equipment must be stopped.

C Displays the current **Air inlet temperature** and **Outside temperature**. Provide furthermore access to set the desired **Air inlet temperature** and to view history.

D Displays the current **Duct pressure**. Provide furthermore access to set the desired **Duct pressure** and to view history.

3.3 Report

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

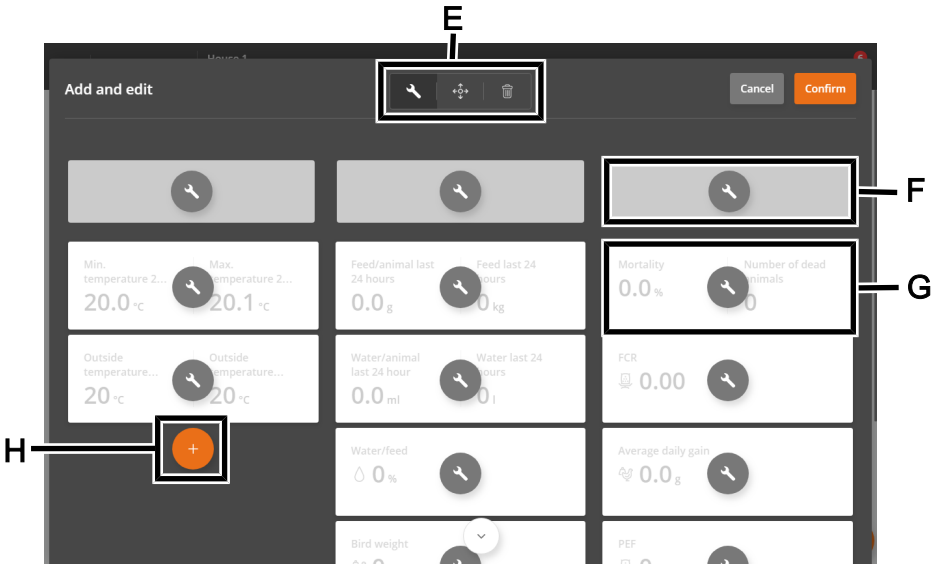


A Shortcut to the **Reports** page.

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.

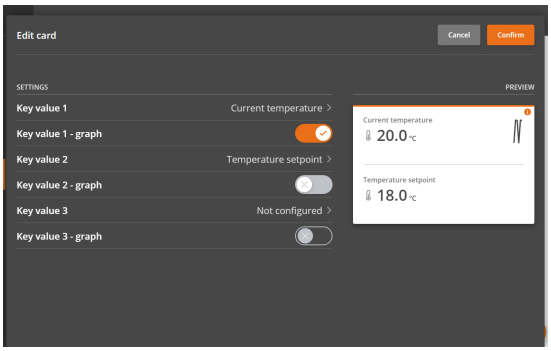
Press to change the key value and set up its view.

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.

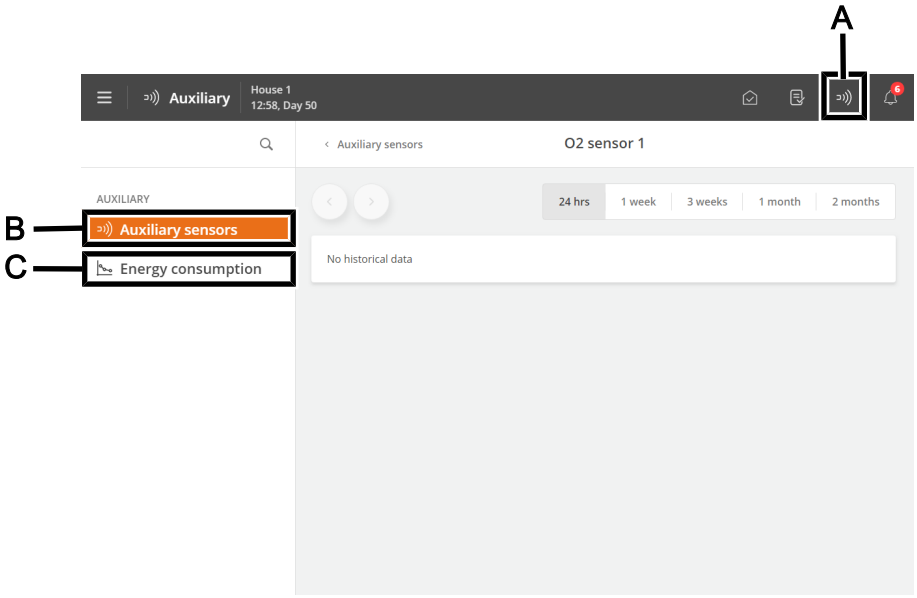
Select Key value 2 and select the key value to be displayed.

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

To the right a preview of the card is shown.

3.4 Auxiliary

The page provides access to recordings from different types of equipment (auxiliary sensors and energy meters), which can be used for monitoring, as an example.



A Shortcut to the page **Auxiliary**.

B The **Auxiliary sensors** menu provides an overview of the controller recordings supplied by the auxiliary sensors in a graphical view.

The auxiliary sensors do not influence the regulation.

The controller records the content of CO_2, NH_3, O2 in the air as well as humidity, pressure, and temperature. You can also connect air velocity and wind direction sensors that can measure the wind direction and wind velocity outside the house.

The values measured by each sensor are viewed in intervals of 24 hours to 2 months.

C The menu **Energy consumption** shows the current consumption in W and total consumption in kWh. The menu content depends on the type and the setup of the controller.

3.5 Activity log

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

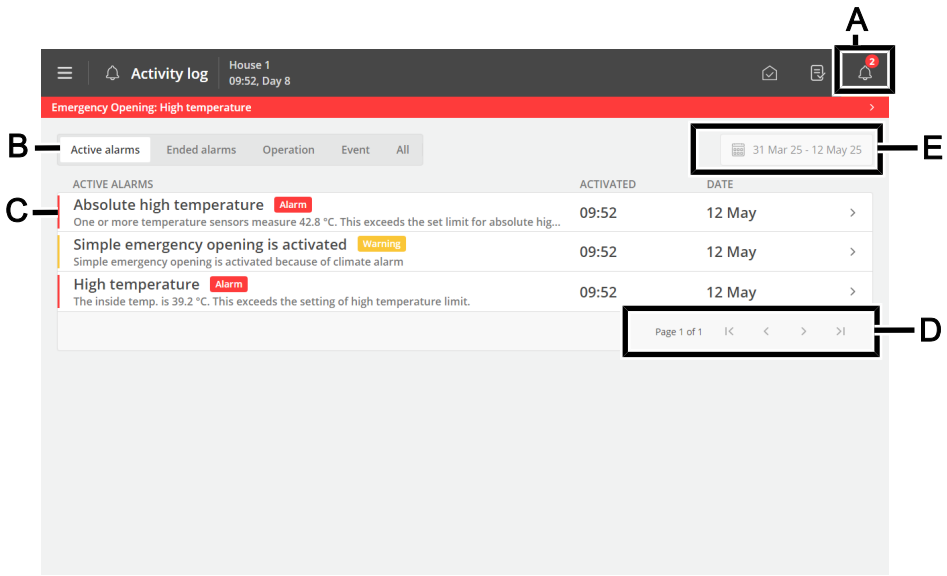
The most recent activity appears at the top. Previous activities can be viewed on the underlying log pages.

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.

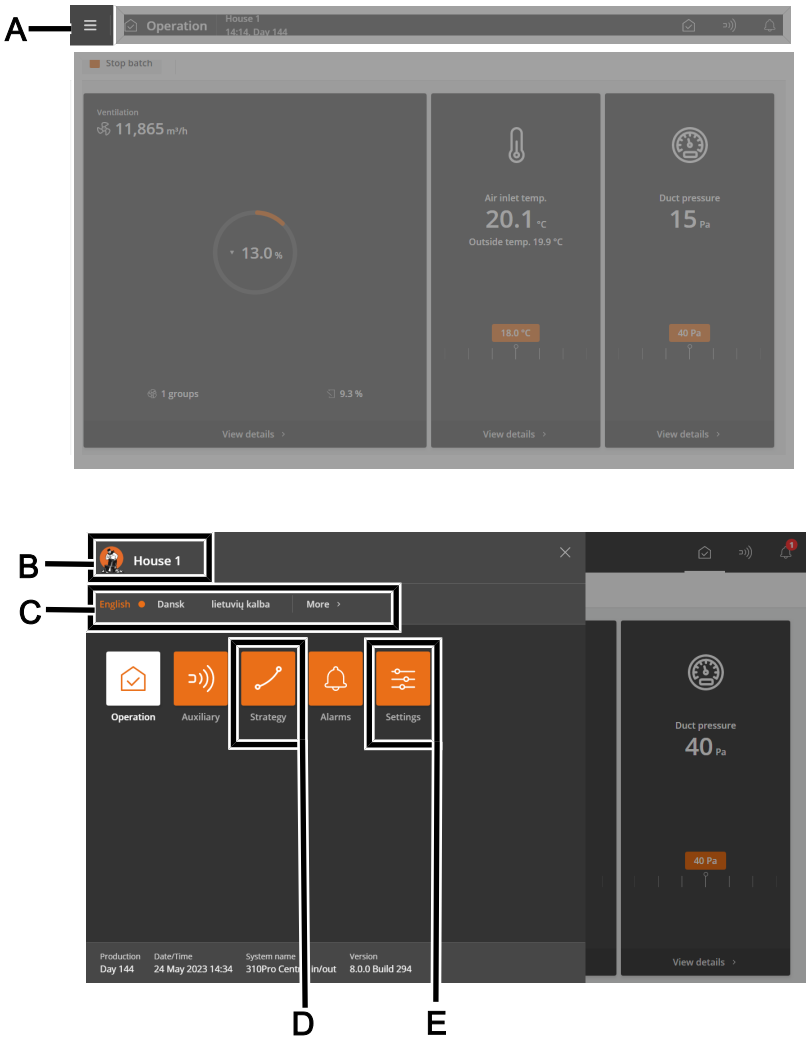
E Filtering option for dates and periods.

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 [▶ 20].

3.6 Menu button

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



A Menu button

B Displaying house name, day number, time, week number, if required, 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 **Strategy**.

The page provide access to pressure curves according to which the climate function is regulated.

E Shortcut to the page **Settings**.

The page provides access to the user settings for **House info**, **Alarm settings,** and **Password**. See the sections System [▷ 17], Alarms [▷ 20], and Password [▷ 18].

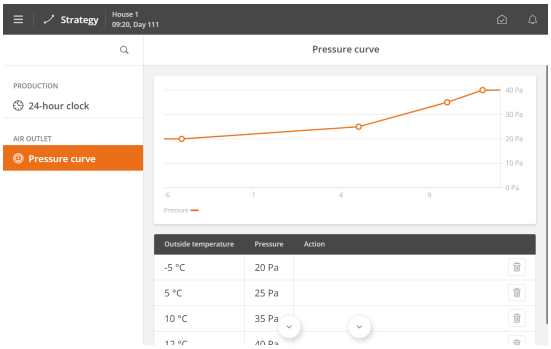
In addition, you have access to the technical menus used for setup and service. See the Technical Manual.

3.6.1 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 e.g.,here the batch curve for pressure is set so that the regulation automatically adapts in relation to the outside temperature.

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



The regulation changes gradually between the curve points. If the pressure e.g., set to 15 Pa at 5 °C and 20 Pa at 10 °C, then the pressure regulation of 7.5 °C will be 17 Pa.

3.6.2 Settings

The page provides access to general settings and alarm limits.

3.6.2.1 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.

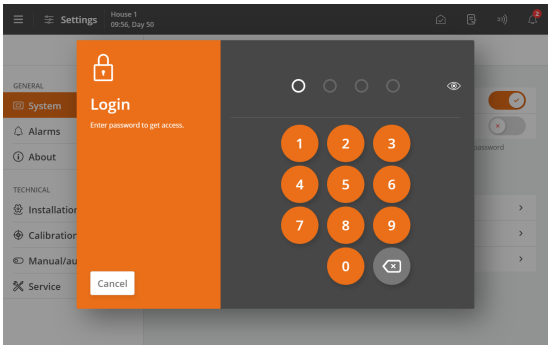
	Each livestock house must have a unique name when the controller is integrated with a LAN network. The house name is transferred through the network, and the livestock house should be identifiable based on the name. Set up a plan for naming all controllers connected to the network.
Password	Decide whether the controller must be protected against unauthorized operation using passwords. See section Password [▶ 18].

3.6.2.1.1 Password

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

The controller can be protected against unauthorized operation using passwords.

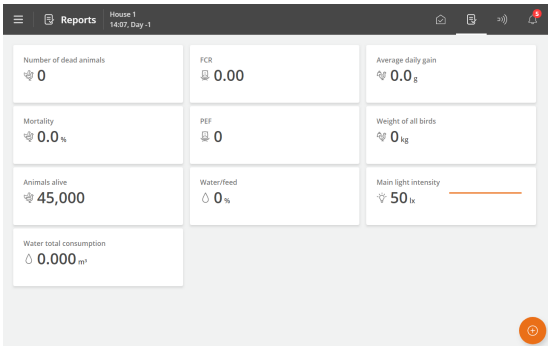
In order to have access to changing a setting, a password must be entered that corresponds to the user level which the relevant function is found at (**Daily**, **Advanced** and **Service**).



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

User level	Gives access to	Factory-set code
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

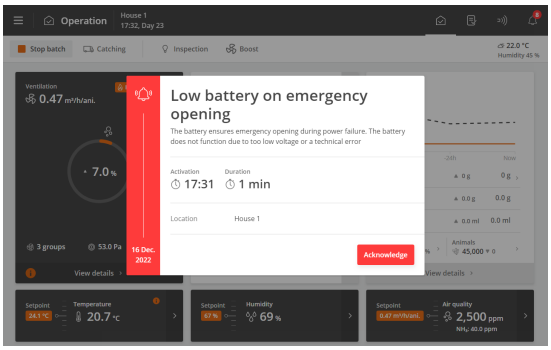
If an incorrect password is entered 3 times, the controller will display its MAC address and UTC date.

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.

3.6.2.2 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**.



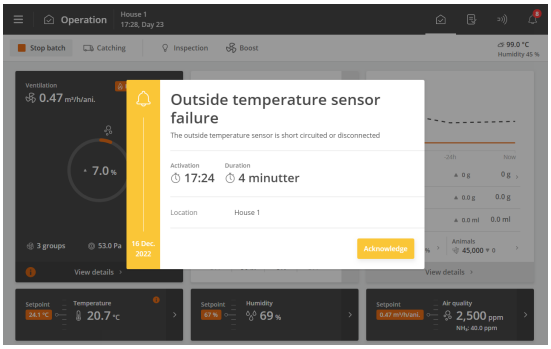
The controller will record the alarm type and time when an alarm occurs.

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

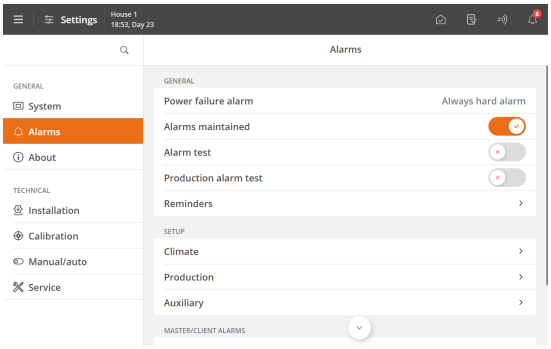
Gray: deactivated alarm (alarm state ceased)



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.

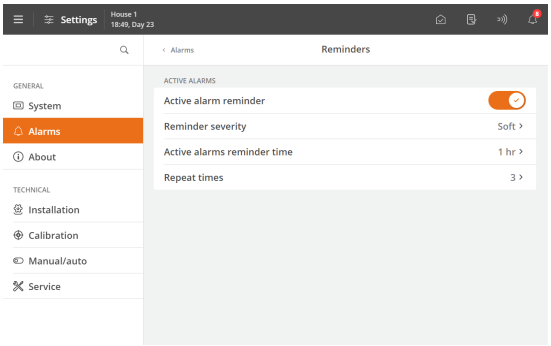


The controller will also trigger an alarm signal, which you can choose to maintain.

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

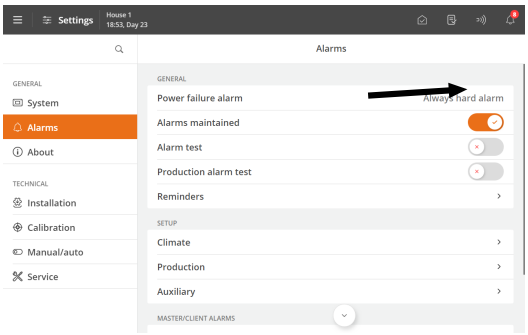
The controller can remind you of an ongoing alarm once you have acknowledged a hard alarm. It should ensure that the cause of the alarm is handled.

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 for setting the alarm and alarm limits.



Switch change

When the controller is connected to an override switch module, an alarm is available for changing the module's switch position.

Changes in the switch position are logged in the Aktivitet-sloggen.

3.6.2.2.1 Stopping an alarm signal

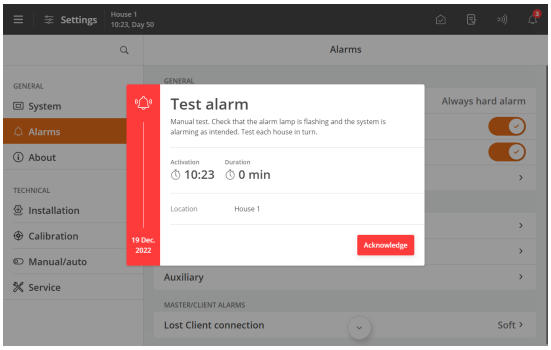
The alarm window disappears, and the alarm signal stops when you acknowledge the alarm by pressing **Acknowledge**.

3.6.2.2.2 Power failure alarm

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

3.6.2.2.3 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.

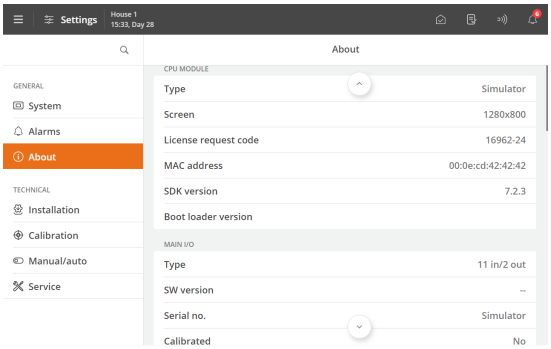
Check that the alarm lamp is flashing.

Check that the alarm system alarms as intended.

Press **Acknowledge** to finish testing.

3.6.2.3 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.

4 Climate

4.1 Central air intake

The central air intake function is used to adjust the temperature of the fresh air before it enters the sections. The air is taken into an air mixing room where it may be heated up or cooled down.

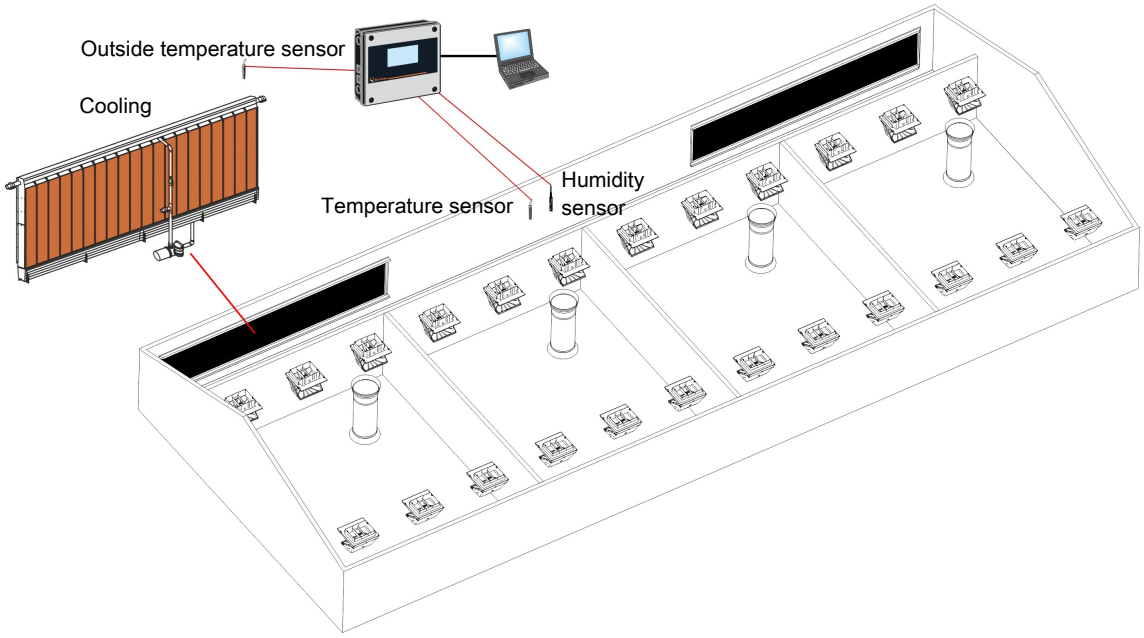


Figure 1: House with central air intake from air mixing room for adjusting the temperature of outdoor air

Press **Central air intake | Temperature**

Cooling temperature	Setting for the inside temperature that activates the cooling. It is set as an absolute temperature but also functions as an offset for the **Air intake setpoint**. It means that the Cooling setpoint changes accordingly when the **Air intake setpoint** is adjusted.
Air intake setpoint	Setting for the inside temperature that activates the ventilation. To increase the **Air intake setpoint** without increasing the heating/cooling temperature, you must adjust **Cooling setpoint**/**Heating setpoint** with the corresponding number of degrees after you have adjusted the **Air intake setpoint**.
Heating setpoint	Setting for the inside temperature that activates the heating. It is set as an absolute temperature but also functions as an offset for the **Air intake setpoint**. It means that the **Heating setpoint** changes accordingly when the Air intake setpoint is adjusted.
Outside temperature	Display of the current outside temperature.
Air intake temperature	View of the temperature at which air inlets are regulated.
Air intake sensor 1	View of the current temperatures of the individual sensors. Up to four temperature sensors can be connected. The controller will regulate the temperature in relation to an average of their registrations.

Press **Central air intake | Heating**

Heating active	Connection and disconnection of heat supply.

Heating requirement	Current heat supply for the installed heat sources.
Heater 1 requirement	Current heat supply for the individual heater.

Press **Central air intake | Cooling**

Cooling active	Connection and disconnection of cooling.
Cooling requirement	View of current cooling requirement.
Actual humidity	Display of current air humidity.
Humidity to stop cooling	Setting for the percentage of air humidity that stops the controller from cooling.

Press **Central air intake | Inlet**

Ventilation requirement	Displays the current ventilation requirement.
Inlet position	View of how much the air inlet is open.

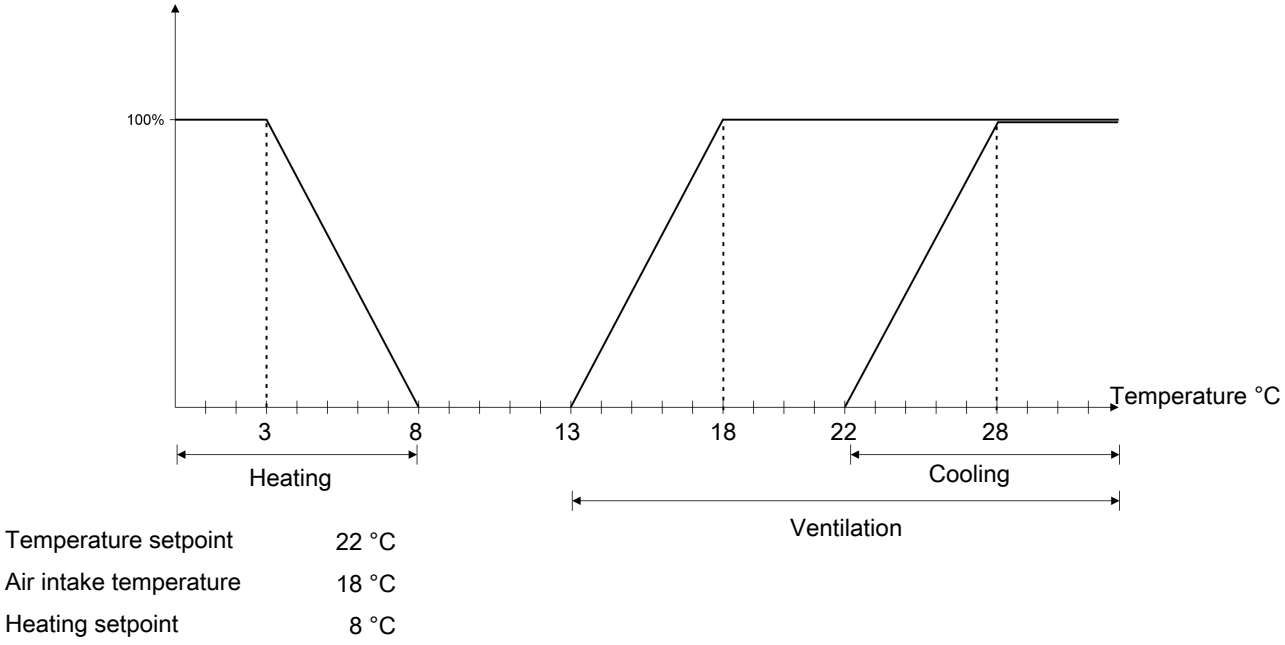


Figure 2: Adjusting the temperature with central air outlets.

Note that when you change the Air intake temperature, the Cooling setpoint and Heating setpoint changes correspondingly so that the offset between the two settings will always be the same.

4.1.1 Central air intake menu

Temperature	Cooling temperature	
	Air intake setpoint	
	Heating setpoint	
	Info	Outside temperature
		Air intake temperature
		Air intake sensor 1
Heating	Heating active	

	Heating requirement
	Heater 1 requirement
Cooling	Cooling active
	Cooling requirement
	Actual humidity
	Humidity to stop cooling
Inlet	Ventilation requirement
	Minimum ventilation
	Inlet 1 position

4.2 Central exhaust

The Central exhaust regulates the exhaust output in relation to the pressure measured in the central duct. More house sections can be connected to the central duct.

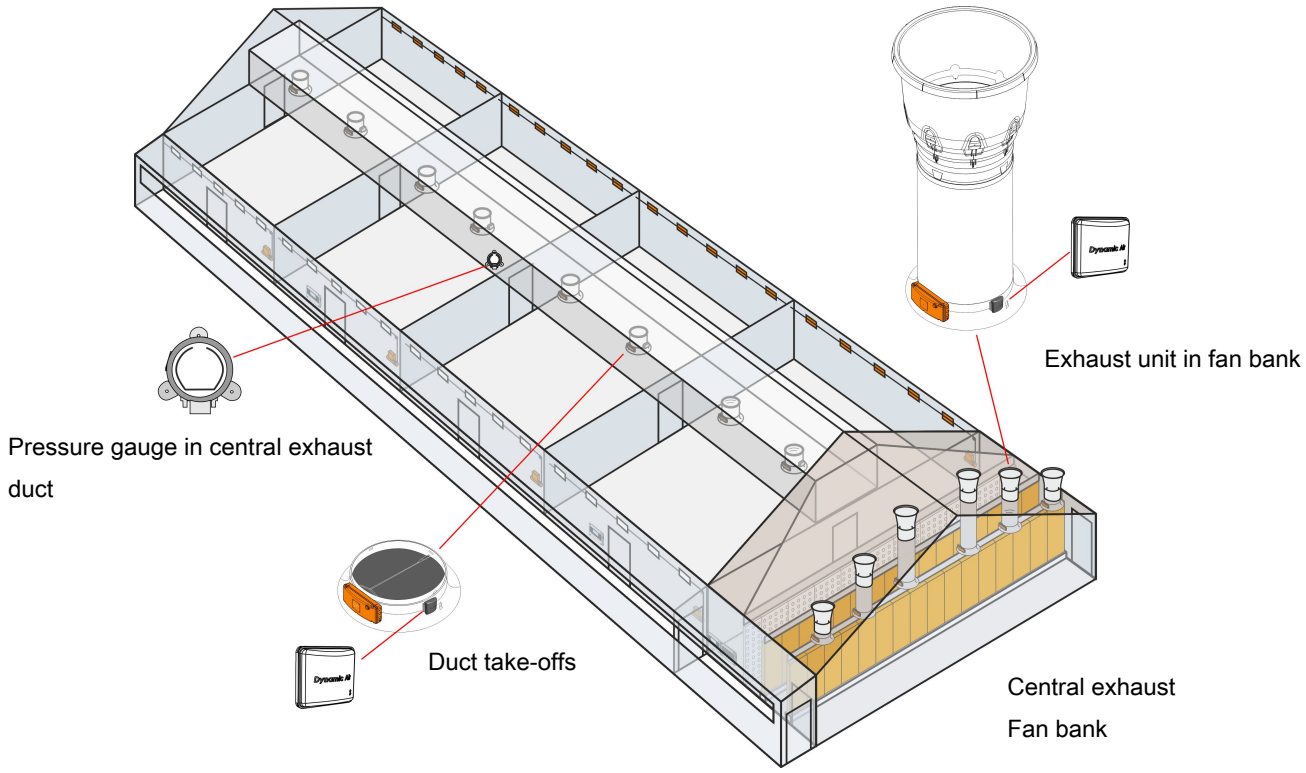


Figure 3: House with central exhaust via central duct

Press | **Central exhaust | Status**

Central exhaust status	Setting whether the central exhaust is active/inactive.
Outside temperature	Display of the current outside temperature.

Press | **Central exhaust | Ventilation**

Pressure control	Displays the current pressure control.
Ventilation requirement	Display of ventilation requirement for the central exhaust as a percentage of the total exhaust output.
Dynamic Air total capacity	Dynamic Air. Display of current output for the total number of stepless units.
Dynamic Air capacity stepless 1	Dynamic Air. Display of current output for the individual stepless unit.
Outlet	Dynamic MultiStep. Display of the current regulation mode for the MultiStep system (Low/High).
Duct pressure	Display of the current pressure in the central duct.
Set duct pressure	Setting of required pressure in the central duct.
Set requirement manually	For selecting whether it should be possible to enter ventilation requirement manually.
Enter new requirement here	Manual entry of requirement.

Press  | **Central exhaust | Ventilation | Ventilation status**

Ventilation status	Display of current output on the individual ventilation unit.

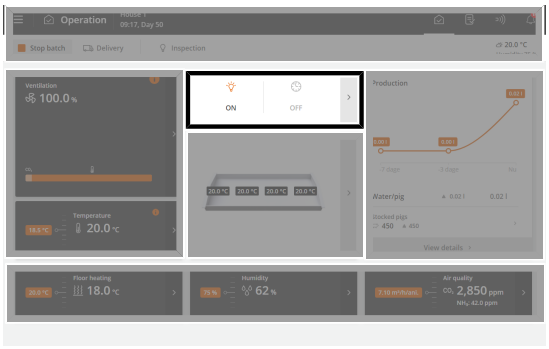
4.2.1 Central exhaust menu

Status	Central exhaust	Central exhaust status	Active
			Inactive
	Temperature	Outside temperature	
Ventilation	Status	Pressure control	
	Ventilation	Ventilation requirement	
		Dynamic Air total capacity	
		Dynamic Air capacity stepless 1	
		Air outlet	
		Duct pressure	
		Duct pressure setpoint	
		Set requirement manually	
		Enter new requirement here	
		Ventilation status	Outlet 1
			Stepless 1
			MultiStep 1 variable
			CE MultiStep 1

5 Production

5.1 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.

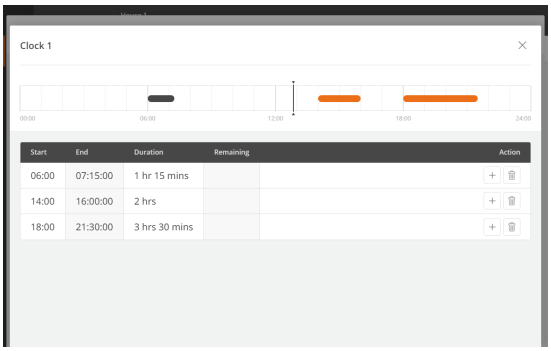


Operation. When 24-hour clock is on, it is displayed with a colored icon on the card **Program overview**.

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.

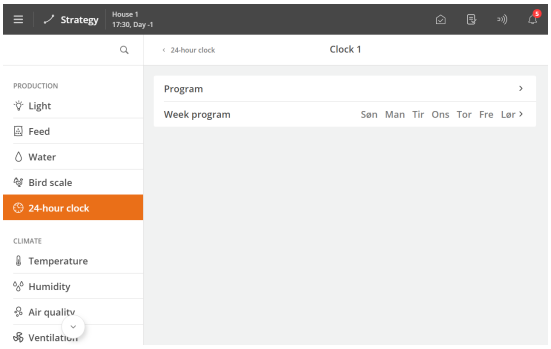
The blocks on the timeline show when and how long the 24-hour clock is on.

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

Press to delete a period.

.

24-hour clock with week program



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

Select which days the 24-hour clock is on.

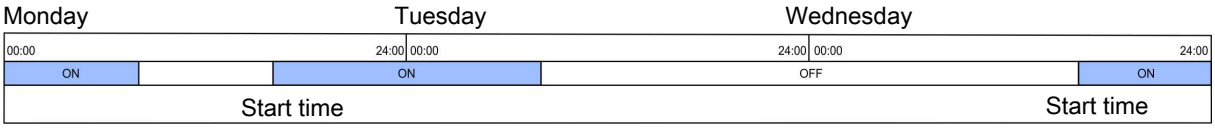


Figure 4: If an ON-time runs past midnight on a day when the 24-hour clock is not active, the function will remain ON until the time has elapsed.

6 Alarms

6.1 Alarms for central air intake

Menu button | **Settings** | **Alarms** | **Central air inlet**

Temperature alarms	
Low temperature	An alarm is triggered by the controller when the temperature is at - 20 °C. The alarm can be disconnected and set to be hard or soft.
High temperature	An alarm is triggered by the controller when the temperature is at - 40 °C. The alarm can be disconnected and set to be hard or soft.

Air intake alarms	
Inlet	The inlet alarms are technical alarms. The controller provides an alarm if the actual opening of the air inlet deviates from the setting that the controller calculated as correct.

Humidity alarm	
Absolute high humidity	The controller triggers an alarm when the humidity exceeds the setting of the **Abs. high humidity limit**. The alarm can be triggered by, e.g. lack of ventilation or a technical error in one of the sensors.
Error humidity sensor	The controller triggers an alarm when the humidity sensor is disconnected or the air humidity is lower than humidity setpoint. The alarm limit is factory preset at such a low level (5 %) that the alarm is only triggered by an actual sensor error.

6.2 Alarms for central exhaust

Menu button | **Settings** | **Alarms** | **Central exhaust**

Pressure alarms	
	With the function **Sensor alarm delay**, you can postpone the alarm signal so that transient changes of the pressure level in the livestock house, e.g., when opening a door, do not trigger the alarm. The controller activates an alarm when the pressure in the livestock house drops below or exceeds the settings of **Pressure low limit**/ **Pressure high limit**. You can connect and disconnect the alarms and set an alarm limit.

Outlet alarms	
	Outlet alarms are technical alarms. The controller triggers an alarm if the flap position of the air outlet deviates from the setting which the controller calculated as correct. You can connect and disconnect the alarm.

6.3 Auxiliary

6.3.1 Auxiliary sensor alarm

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

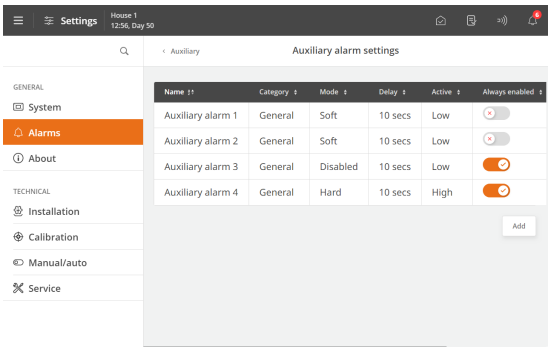
Auxiliary sensors	The controller triggers an alarm if the values for the sensor fall below or exceed the setpoints.

6.3.2 Auxiliary alarms

It is possible to create a number of auxiliary alarms. For example, the controller may give an alarm from a connected motor controller, a water pump or other equipment.

The alarms can be sorted within each column by pressing the heading.

Menu button | **Settings** | **Alarms** | **Auxiliary** | **Auxiliary alarm settings**



Press **Add** to add a new alarm.

Press **Name** to name the alarm.

Press **Category** to add the alarm to a category.

Select the alarm type **Hard**, **Soft** or **Disabled**.

Set a delay, if required. In this way, the alarm signal can be delayed so that the alarm is not triggered when the alarm limit is briefly exceeded.

Set the activation to take place in the event of high or low input.

Select if the alarm should be active always or from a specific day number.

To delete an auxiliary alarm, press the icon.

After creating the alarm, see the menu | **Installation** | **Show connection** for information about where to connect the extra equipment.

6.4 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	

6.5 Emergency control

6.5.1 Emergency opening

Emergency opening is a standard function in the controller . The controller will activate the ventilation system in case of a relevant alarm, see the levels in section Control parameters [▶ 57].

Activated by	CE
Pressure low alarm	Yes
Pressure high alarm	Yes

6.6 Alarms menu

General	Power failure alarm [▶ 21]	Always hard alarm
	Alarms maintained	
	Alarm test [▶ 21]	
Active Alarms	Reminder severity	
	Active alarms reminder time	
	Repeat times	
Central air intake		
Central exhaust		
Auxiliary		

6.7 Alarm menu - Climate

Central air intake	Temperature alarms	Low temperature alarm	
		High temperature alarm	
	Inlet alarms	Error inlet 1	
		Error inlet 2	
	Humidity alarm	Absolute high humidity	
		Abs. high humidity limit	100%
		Error humidity sensor (5%)	
Central exhaust	Pressure sensor	Sensor alarm delay	3 min
		Pressure high alarm	
		Pressure high limit	55 Pa
		Pressure low alarm	
		Pressure low limit	5 Pa
	Dynamic Air	Dynamic Air alarm	
		Pressure deviation limit	10%
	Outlet alarms	Error outlet 1	
Auxiliary	Auxiliary sensors	Auxiliary sensors	
	Auxiliary alarms	Auxiliary alarm settings	

7 Maintenance instructions

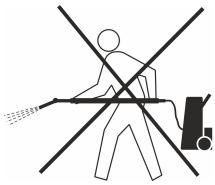
The controller requires no maintenance to function correctly.

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.

7.1 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 Work routine

This technical manual deals with the installation of the controller and and is aimed primarily at the technicians and electricians who will be mounting, installing and testing the controller.

According to current national and in Europe also EU regulations, the installation must be carried out by expert personnel.

Note that electrical equipment may not be opened without removing the supply voltage, and only competent personnel may carry out servicing operations and troubleshooting.

The following checklist indicates the main points of the work flow regarding set up of the controller.

Mounting

1. Controller.
2. Emergency opening, if applicable.

Installation

1. Connect cables according to the circuit diagrams for the emergency opening of the system.
2. Set voltage in the controller.
3. Connect mains voltage to the controller.
4. Select components in the controller menu **Technical | Installation | Installation wizard** by reviewing all the installation menu items in the Installation wizard.
5. Connect the individual components by means of the controller's menu **Technical | Installation | Show connections** and the circuit diagrams.
6. Adjust the system.
7. Test the system.

Start-up

1. Setting and calibration.

9 Technical Menus

Installation		
	Wizard	Installation wizard
	Manual	Manual installation
	Connection terminals	Show connection
		Manual I/O allocation
	Operation form	Climate
	Week number	View week number
	Unit	Unit of measurements
Calibration	Central air inlet	
	Central exhaust	
	Auxillary sensors	
Manual/auto	Common	Manual mode overview
		Alarm relay status
	Equipment	Climate
		Production
		Management
Service	Settings	Central air inlet
		Central exhaust
		Network settings
		UTC time
	Display	
	Backup	CPU module
		SD card
		USB stick
	General	Save logs
		Install software
	Control parameters	
	Negative pressure	
	Stepless	
	System	Reset
		Diagnostics

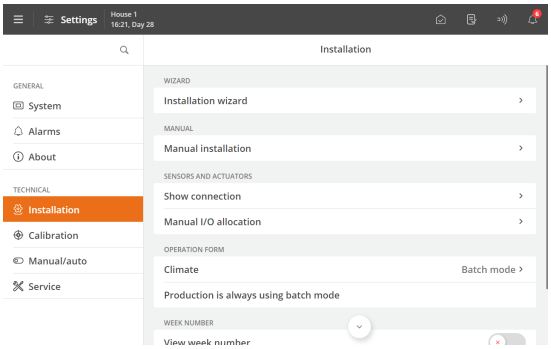
10 Installation guide

10.1 Selecting components

There are two ways to install the controller.

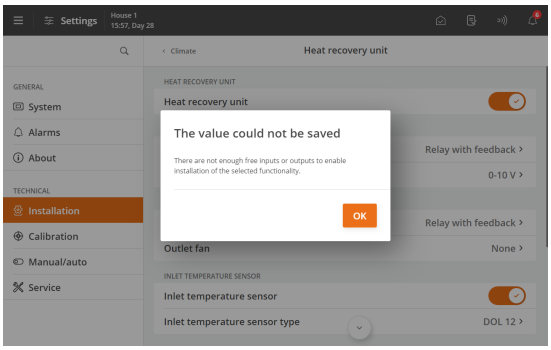
At the initial installation: Use Installation wizard which will guide you through all the options of the functions.

If making adjustments to the existing installation: Use the menu **Manual installation** to go directly to the relevant function.



Select components in the installation menu of the controller.

Installation | Installation wizard or **Manual installation**.

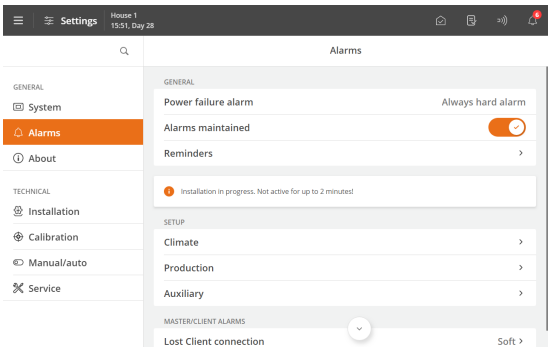


It is impossible to select more components than there are available I/O.

Therefore, you must observe that the controller accepts your requests to connect a component.

If missing I/O, you can:

- Install extra I/O modules (if these are available).
- Uninstall components.



While functions are selected in the set-up menus **Installation** and **Show connection**, all alarms will be delayed. Thus, no alarms will be generated until 2 minutes after the last change is completed n the installation menu.

It is indicated as info in the alarm menu for as long as the delay is active.

However, it does not apply to alarms from CAN bus communication (I/O modules).

10.2 Slave relays

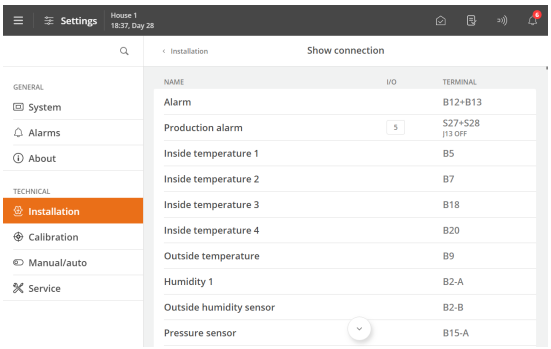
Using slave relays, the power may be distributed on multiple relays. This is especially useful if the power load is larger than the max. current of the relays.

For several functions it is possible to select a slave relay which will work in the same way as the master relays - however, with a delay of up to 1 sec. When the controller is set to Manual, the slave relays will also follow the master relays.

For heating - when the master is 0-10 V output, the slave relay relay will switch on when the heating is switched on.

10.3 Connecting components

The majority of the connection terminals are universal. Therefore, installing different components in the individual terminals is possible.



When you select a component from the menu **Installation | Manual installation**, the controller allocates I/O based on a list. It means that the controller selects the first available I/O on the list and that the components are allocated I/O in the order they are selected.

The same I/O allocation in several controllers – i.e. when the individual components are connected to the same terminal numbers – is ensured by saving the set-up on a USB stick and entering the set-up into several controllers.

10.3.1 The menu Show connection

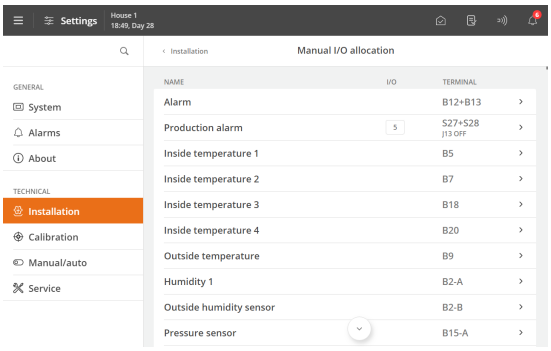
When you have selected all the components in the installation menu, the controller will show you where to connect the individual components.

See the menu **Show connection** for where exactly to connect the individual components.

When a wiring diagram in the Circuit Diagrams and Cable Plans reads "See Show connection", it refers to this menu.

10.3.2 Manual I/O allocation

If you want to determine the I/O allocation for one or more components, you can manually change it under the menu option **Manual I/O allocation**.



Select the menu **Installation | Manual I/O allocation** and press the component to be changed.

Choose between the listed terminals. Note whether a terminal is already allocated to another function.

Press the required terminal.

If you use a terminal currently used by another function, the controller will change the I/O allocation for this function.

In the menu **Show connection,** ensure that the controller moves the first allocated function to another terminal.

The controller will change the I/O allocation instantly.

If the I/O allocation can be changed, the controller will accept it.

If the I/O allocation cannot be changed, the controller will reject it, and the I/O allocation will remain unchanged.

10.4 View week number

View week number	View of week number at the top of all pages.

10.5 Select type of Unit of measurements

The unit and temperature display selection is divided up to allow the combination of metric units with °F.

Dimensions	Selection of unit display in metric or US units.
Temperature	Selection of temperature display in °C or °F.

10.6 Climate

10.6.1 Central air intake

Central air intake can be used alone or in conjunction with central exhaust.

Central air intake is installed by selecting up to two air inlets and up to four temperature sensors that are positioned in relation to the air inlets of the sections.The sensors provide an input for regulating the air intake of the air mixing room, heating and cooling.

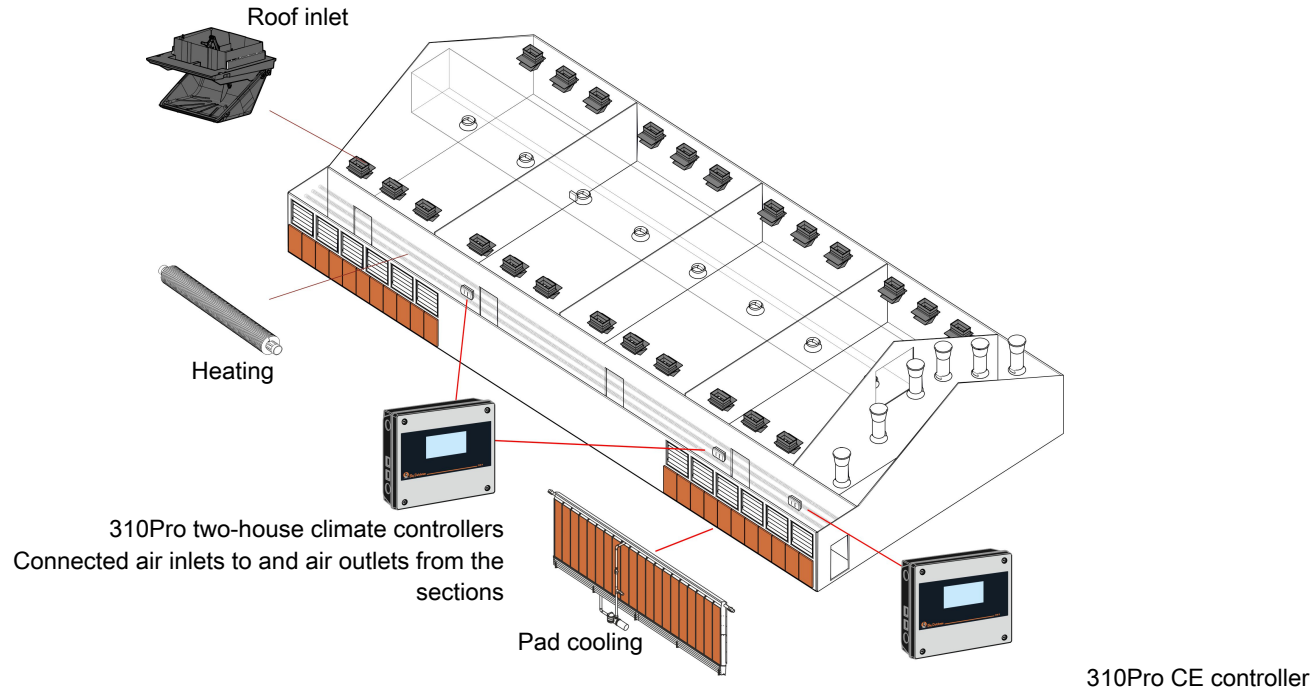


Figure 5: Central air intake

10.6.2 Central exhaust

10.6.2.1 Air outlet

10.6.2.1.1 Speed control

Internal Fan Speed Controller

With an internal fan speed controller, it is necessary to enter the typical voltage of the mains supply to obtain the correct control of the fan. Measure the voltage by means of a voltmeter or possibly contact an electrician.

Select the menu **Technical | Installation | Manual installation | Outlets | Fan speed control**

Power supply	Enter the typical mains supply voltage to obtain correct control of the fan.

0-10 V speed control

When the fan is controlled by a 0-10 V speed control, voltages must be set corresponding to the fan stopped and the fan running at full speed. This settings will depend on the type of fan speed controller used.

Select the menu | **Technical | Installation | Manual installation | Outlets | Fan speed control**

Stop fan	Voltage at 0 % fan capacity.
Full speed	Voltage at 100 % fan capacity.

Note that the factory setting for both menu items is 5.0 V. The controller will send an alarm if the settings are not adjusted.

10.6.2.1.2 Dynamic MultiStep

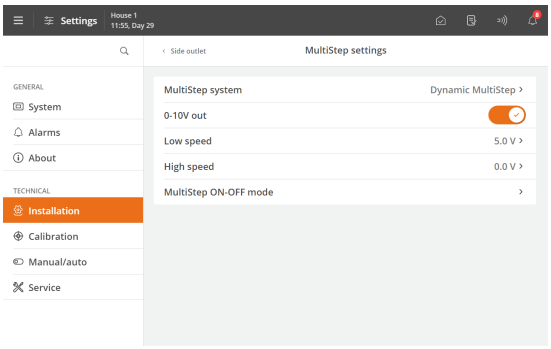
See the section Setting of Exhaustion (MultiStep) for a general description of MultiStep.

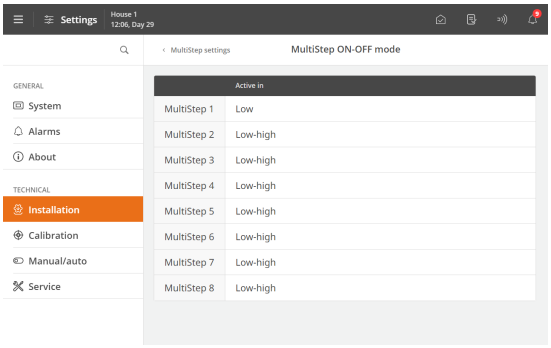
Dynamic MultiStep makes it possible to reduce power consumption for the fans in the MultiStep system. It is achieved by the fans' ability to run at two speeds (Low and High) and by letting them run as long as possible at low speed.

When a low level of ventilation is needed ventilation is carried out as an ordinary MultiStep system, but the fan output is limited so that it can only provide a percentage of the fan's maximum capacity.

All exhaust units that are set up to run only in the low area in the Dynamic MultiStep system must be able to run at reduced capacity.

At a high ventilation requirement, the fan output varies steplessly from low to full speed and the flaps are fully open.





0-10 volt output

The 0-10 V output makes it possible to run at low speeds on the fan, and from here to run the fan steplessly up to full speed.

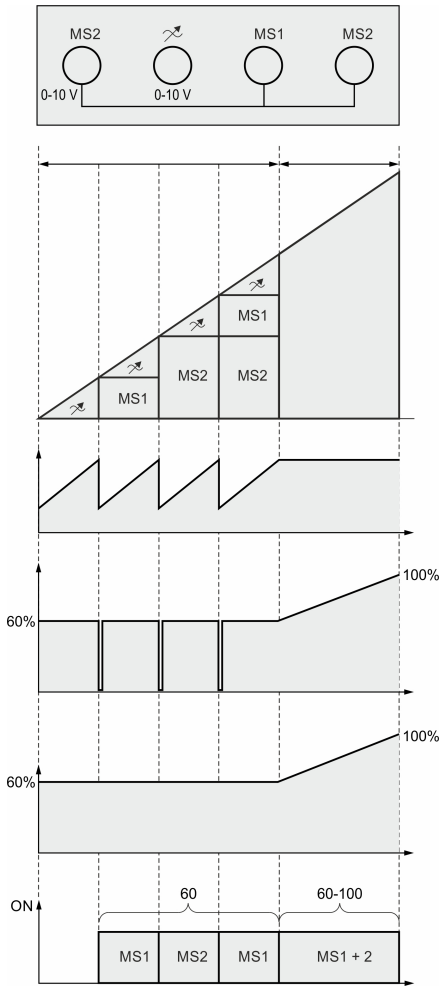
Low speed and Full speed

When a fan connect to a 0-10 V output has been selected, a voltage value must be set which corresponds to the fan running at low and full speed.

Please note that most fan types have stopped at 10 volt.

Depending on which type of fan has been selected, the voltage is set at low speed to 4-6 volts.

For each MultiStep unit, set whether it should be activated when the Dynamic MultiStep system runs at high speed, at low speed, or with both.



The livestock house's ventilation system

1 stepless unit

2 MultiStep units

Ventilation sequence

From low to high regulation

Method of Operation

Flap in stepless unit: The stepless ventilation sequence is achieved by opening and closing the flap.

Fan in stepless unit: The stepless fan runs as long as possible at low speed.

Variable ON/OFF: 0- 10 V control signal to fan in stepless ON/OFF.

Max. output in % at low and high regulation.

Figure 6: Principle diagram of Dynamic MultiStep system.

Outputs	Low	High
Stepless unit	8.5	13
MultiStep 1	8.5	13
MultiStep 2	17	26
	34	**52**

Table 1: Examples of outputs

10.6.2.1.3 Dynamic Air at central exhaust

Dynamic Air allows better detection of the actual airflow in the duct and is often used in conjunction with air cleaning. Dynamic Air is thus used for monitoring but does not provide input to the regulation.

Dynamic Air is installed by selecting the number of Dynamic Air sensors that are placed in the air outlet. The sensors can be placed both in the central exhaust's fan bank and in the central duct. For each stepless unit, it is possible to use a number of parallel controlled exhaust units/duct saddles and a number of Dynamic Air sensors.

Measuring the varying stepless output provides an accurate expression of the output of the ventilation system according to which regulation can be carried out by varying fan revolutions/the flap position.

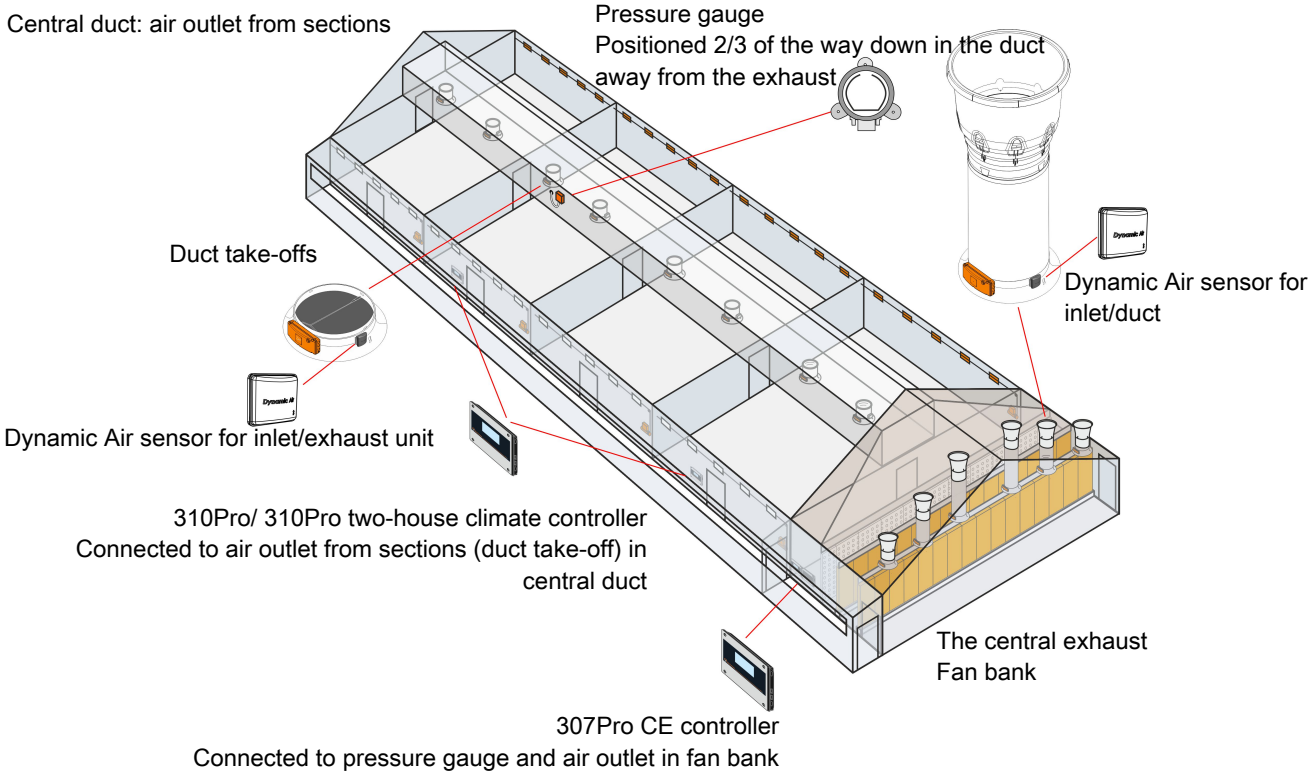


Figure 7: Dynamic Air with central exhaust. The Dynamic Air sensors are placed in the fan bank of the central exhaust.

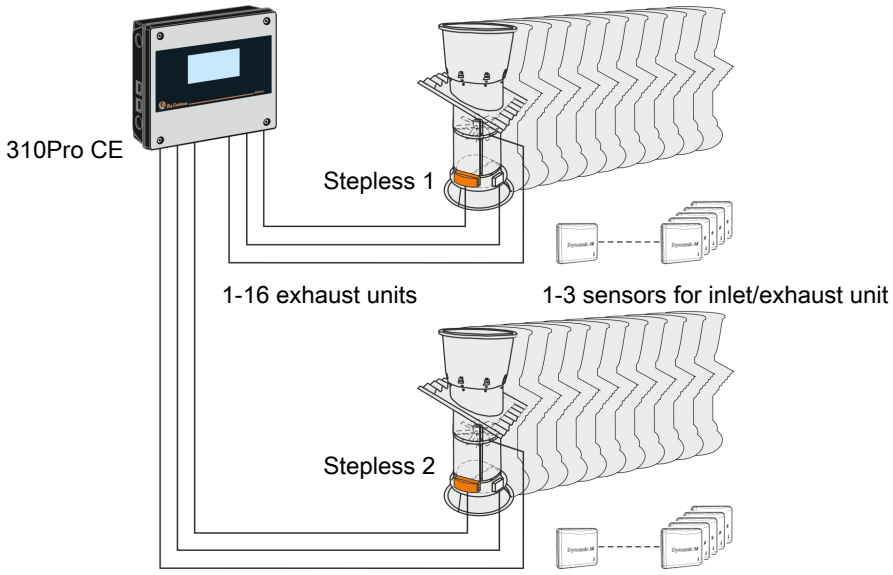
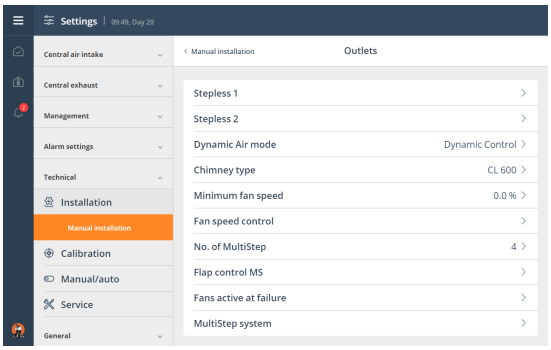


Figure 8: Number of Dynamic Air sensors for central exhaust in fan bank

Technically, one sensor is sufficient for 16 exhaust units, but Big Dutchman usually recommends that a Dynamic Air sensor be installed in every other stepless exhaust unit to ensure optimum regulation. The controller regulates stepless units without sensors based on a calculated output.



When using Dynamic Air for central exhaustion, the regulation mode must be **Dynamic Flow**.

Install Dynamic Air in the menu **Technical | Installation | Manual installation | Central exhaust | Air outlet | Stepless 1 | Dynamic Air stepless 1**.

Dynamic air mode	Then select **Dynamic Flow**. The controller measures the fan unit's output. Ventilation control proceeds according to a curve value of the stepless air outlet(s).
Chimney type	Enter in which kind of air outlet (chimney) the Dynamic Air sensor is placed so that the controller can adjust the atmospheric measurement according to the dimensions of the air outlet.
Minimum fan speed	When applying frequency-controlled stepless fan speed controller (0-10 V), a minimum fan speed can be entered, so it does not run too slowly.

10.6.3 Active functions in the event of control failure

When installing MultiStep air outlet and side cooling, you must decide how these functions is to react in an emergency situation.

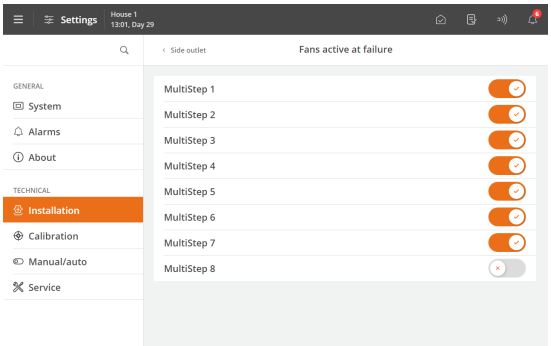
Active Functions in the Event of Control Failure

Depending on the local power supply, limiting the number of active fans during and immediately after a fault may be desirable, e.g., on the controller or the power supply.

If a MultiStep is not to be active, the connection is changed in case of an error:

- From NO to NC at **Gradual start** (SKOV fans)
- From NC to NO at **Immediate start** (third party fans)

When installing the MultiStep air outlet, deciding how these functions should react in a fault situation is necessary.



Activated: When the control fails, the air outlet is active.

Deactivated: When the control fails, the air outlet is inactive.

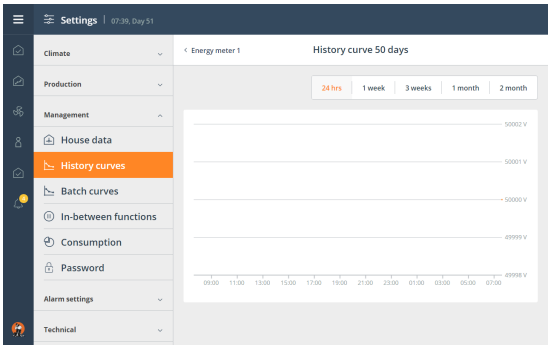
10.7 Production

10.7.1 24-hour clock

24-hour clock 1 follow week program	Setting whether the 24-hour clock can be deactivated on the individual weekdays. The week program is set under **Strategy**.
Name	Naming the 24-hour clock according to function so it can be recognized in the menus.
Timer	Select whether the 24-hour clock should regulate according to **Stop time** or **ON time**. Stop time: Set the time for start and stop. ON time: Set a start time and how long the function will run. They are set under **Program overview**.

10.8 Management

10.8.1 Energy monitoring



The history curves for monitoring electricity show current consumption calculated over different periods.

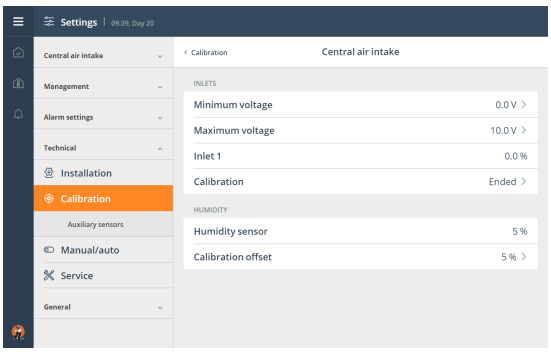
10.8.2 Auxiliary

No. of auxiliary sensors	Select a number of auxiliary sensors.
Auxiliary sensor setup	Select the required type of auxiliary sensor. Name the auxiliary sensor according to function to make it recognizable in alarms and other info.

11 Calibration

11.1 Calibration

Calibration of central air intake



Calibration of inlets

Select **ON** to start the calibration.

Check that the correct inlet(s) open(s) and close(s) correctly.

Wait until the calibration is completed and the display shows **Ended** again.

Carry out the calibration in the same way for air inlet 2.

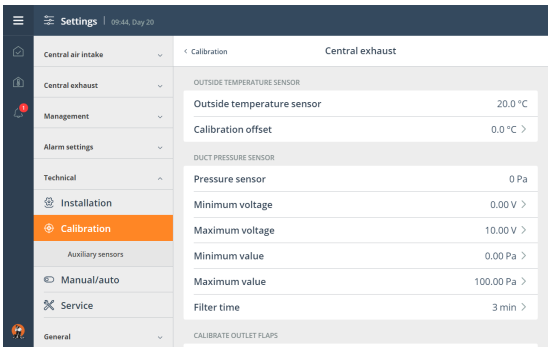
Calibration of humidity sensor

The controller displays the air humidity measured.

The humidity sensor can be calibrated with an offset.

If, in connection with manual measurements, the current value is measured to a level that differs from the registrations provided by the installed sensors, you can adjust the read-out value so that it corresponds to that which can be observed.

Calibration of central exhaust



Calibration of pressure sensor

Adapt the controller to the sensors after installation.

When the sensor is controlled by 0-10 V, you can adjust the output voltage via the minimum voltage as well as the maximum voltage.

When **Min. value** and **Max. value** are set, you should also indicate the range within which the sensor can measure.

Pressure sensor

The pressure regulation can be set with a **Filter time**, which makes the regulation more stable.

The controller does not adjust the regulation until a change in pressure exceeds the set **Filter time**.

Calibration of the air outlet

The controller must be adapted to the winch motor after installation.

Winch motors with feedback must be calibrated.

The winch motors without feedback calibrate automatically when a time is set for **Recalibrate set time**.

During the automatic calibration, the air outlets open and close completely for a short time and then return to the position calculated by the controller.

Winch motor without feedback	
Running time	Setting of the time it takes to run from fully open to fully closed.
Recalibrate set time	Setting of the time of day when the automatic calibration shall run.

Runs before recalibration	Setting of the number of times the inlet flap has to run before it calibrates automatically.
Minimum voltage **Maximum voltage**	When the air outlets are 0-10 V controlled, the output voltage can be adjusted via the min. voltage as well as th max. voltage.

In the menu **Technical | Calibration | Central exhaust | Central exhaust air outlet flap**.

Select **ON** to start the calibration.

Check that the correct flap(s) open(s) and close(s) correctly.

Wait until the calibration is completed and the display shows **Ended** again.

Carry out the calibration in the same way for air outlet 2.

12 Start-up test

After installation of the system a thorough test must be carried out, to ensure that the system works as intended.

12.1 Testing basis components

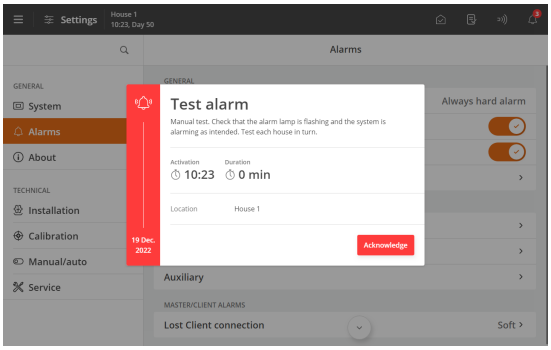
12.1.1 Testing temperature and air humidity sensors

Read the current inside temperature and humidity

1. Check that the temperature displayed corresponds to what you can measure in the house/outside.
2. Check that the temperature increases in the display when you warm the sensor in your hand.
3. Check that the humidity displayed corresponds to what you can measure in the house.
4. Check that the humidity rises when you breathe on the sensor, for example.

12.1.2 Testing Alarm

Select  **Alarm settings**.



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.

The test should then be made every week.

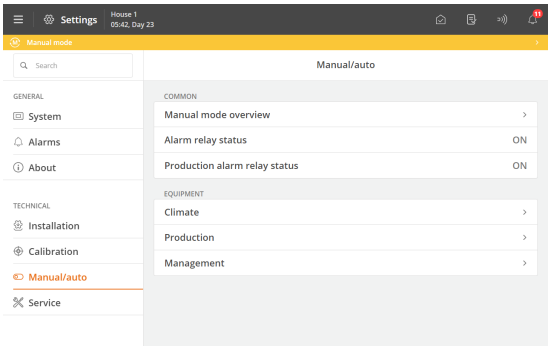
12.2 Testing optional components: Manual control

During testing, and in a service situation, the individual components connected to the climate or production controller and be switched from automatic to manual control. Thus, you can easily test the optional components such as winch motors, etc.

In the menu **Manual/auto** the controller displays the components selected in the menu **Installation**.

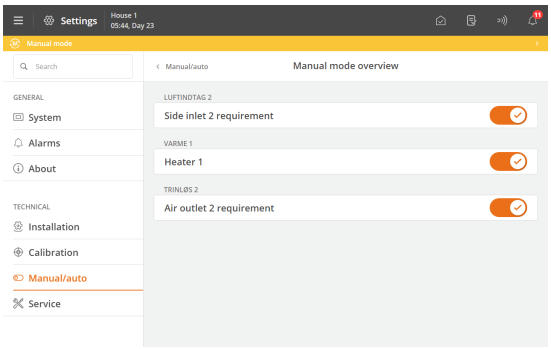
Automatic control: Normally the controller must be set to automatic control.

Manual control: During start up, or in a service situation, it may be convenient to control the individual functions manually.



The components currently set for manual mode are listed in the menu  **Manual/auto | Manual mode overview**.

The manual control can also be deactivated here.



Select the function to be tested and test the components one at a time.

A colored bar at the top of the page indicates that a component is set to manual mode.

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

I/O will remain at the setting that it was at the moment the component was set to manual. It means that operation continues when it is returned to automatic control.

12.2.1 Testing climate functions

12.2.1.1 Testing the central air intake

Select **Operation | Climate equipment** card **|** Function | Mode | and activate Manual mode.

Testing heating

The test should indicate if it is possible for the system to be started and stopped.

Select **Heating** and set to 0% to check that the heat source stops.

Select **Heating** and set to 100% to check that the heat source provides constant heating.

Testing cooling relay

The test should indicate if it is possible for the system to be started and stopped.

Activate the **Cooling relay**.

Check that the system (cooling) is on.

Deactivate the **Cooling relay**.

Check that the system (cooling) is off.

Testing air inlets

The test is to show whether the air inlets can open and close completely.

Set 100%.

Check that the correct air inlet opens completely.

Set 0 %.

Check that the correct air inlet closes completely

Set the air inlet to the required setting.

Repeat the test for all installed air inlets.

12.2.1.2 Testing of central exhaust

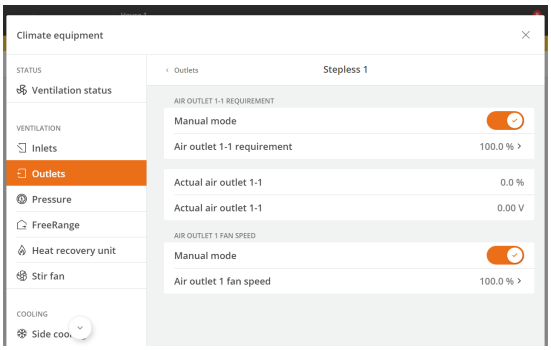
12.2.1.2.1 Stepless fans

Testing setting and placement of stepless fans

The test is to show if the connected stepless fan(s) are set correctly, i.e., if they can run at minimum and maximum speeds, and whether they are placed correctly.

In internal fan speed controller mode, the emergency change-over switch AUT/MAN (automatic/manual) on the side of the controller must be set to AUT (see the section Emergency Change-over Switch AUT/MAN [▶ 46]).

Select **Climdate equipment** card **| Air outlets | Stepless 1 |** and activate **Manual mode**.



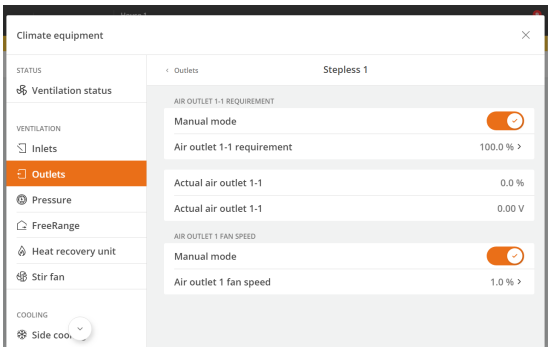
Set the **Air outlet required** (flap) to 100%.

Activate **Manual mode** for Air outlet fan speed and set the **Air oulet fan speed** to 100%.

Check that the fan is placed in the livestock house.

Check that the fan sucks air out of the house (e.g., by means of a smoke test).

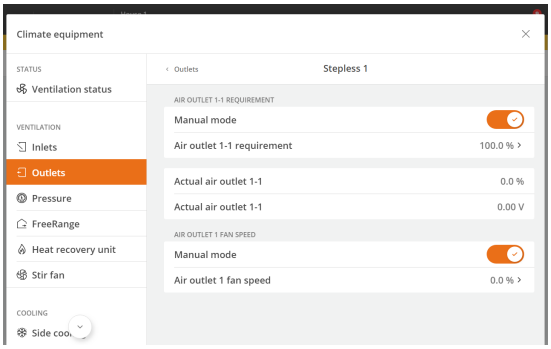
Check that the fan is running at maximum speed.



Set the **Air outlet fan speed** to 1%.

Check that the fan sucks air out of the house (e.g., by means of a smoke test).

Check that the fan is running down to minimum speed.



Set the **Air outlet fan speed** to 0 %.

Check that the fan stops completely.

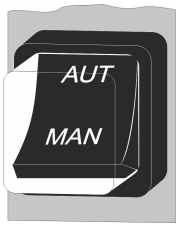
If the fans are connected as 3-wire, they should not stop completely, but instead run at minimum speed.

Repeat the test for each of the stepless fans.

Test an external stepless fan speed controller in the same way as an internal controller.

12.2.1.3 Emergency Change-over Switch AUT/MAN

Only at internal fan speed controller.



Set the change-over switch to MAN (manual).

Check that the speed of the stepless fan(s) increase(s) to maximum revolutions.

Set the change-over switch to AUT (automatic).

Check that the stepless fan(s) reduce(s) the speed to the currently required speed.

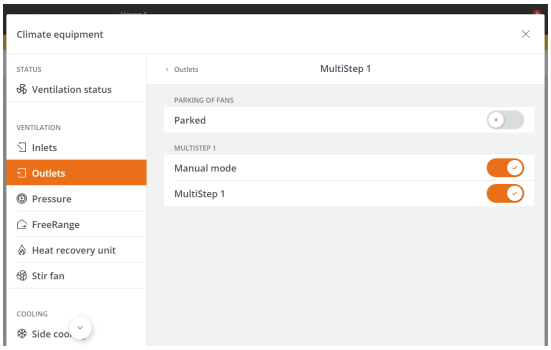
If you are unsure whether the fan responds as expected, test the stepless fan. See section Stepless fans [▶ 45].

12.2.1.4 MultiStep

This test is to show that flaps and fans in the chimneys work in relation to each other.

The installed MultiStep units should be tested in the same way for each step, by checking the exhaust units individually.

Then select **Climate equipment** card **| Air outlets | MultiStep 1** and activate **Manual mode**.



Activate **MultiStep 1**.

Check that the swivel shutter in the chimney opens completely.

When the shutter is approx 15 % open, the MultiStep 1 fan must start at full speed.

Check that the fan sucks air out of the house (e.g., by means of a smoke test).

Deactivate **MultiStep 1**.

Check that the swivel shutter in the chimney closes again.

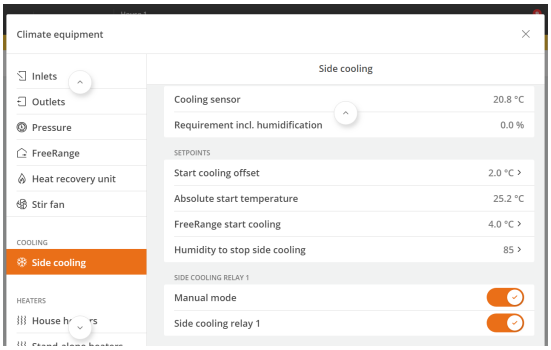
When the shutter is less than approx. 15% open, the fan must stop.

Repeat the above steps for every MultiStep unit.

12.2.1.5 Testing relay functions

The test is to show whether the systems can start and stop. The systems are tested in the same way; each system must be checked individually.

Then select **Climate equipment** card | and for instance **Side cooling** and activate **Manual mode**.



Activate the relay for side cooling.

Check that the system (cooling) is on.

Deactivate the relay for side cooling.

Check that the system (cooling) is off.

Heating

- Check that the unit which you activate in the controller is the unit intended for the house.

Relay heating

- Check the direction of rotation of the fan in the heating units.
- Check that the heating system can start and stop.

0-10 V heating

- Check that the shunt valve can open and close and find a rest position, e.g., 50%.
- Check that the minimum and maximum voltage is suited for the relevant shunt.
- To test heating systems, set 0% first and then 100% to check that the heat source can stop the heat supply and can supply heat continuously.

Stir fan

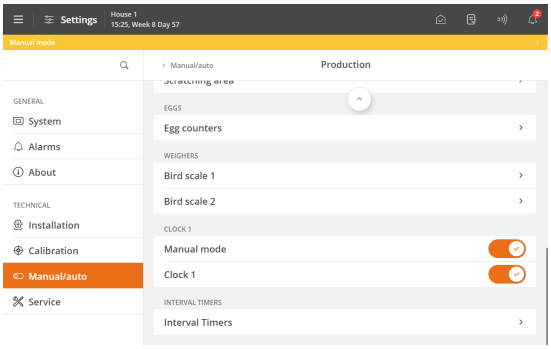
- Check that the ventilation can start and stop.

12.2.2 Testing production functions

12.2.2.1 Testing relay for 24-hour clock

Select the menu  **Manual/auto.**

Then select **Production | 24-hour clock** and activate **Manual mode**.



Activate the testing and check that the 24-hour clock is on.

Deactivate the testing and check that the 24-hour clock is off.

12.2.3 Testing auxiliary functions

12.2.3.1 Testing auxiliary sensor

This section is only relevant to livestock houses where auxiliary sensors are installed.

Check that the current voltage displayed corresponds to what you can measure on the sensor or the connection terminals with a multimeter.

12.3 Testing network connection

If the controller is integrated in a network which can be accessed through the PC management program BigFarmNet Manager, the individual controllers must be visible in BigFarmNet. Also see BigFarmNet Manager Technical Manual regarding testing of the network connection.

13 Service

13.1 Settings

13.1.1 Central air inlet

13.1.1.1 Setting of heating

Pre runtime	Time from the heating relay is picked up until heating is physically supplied (flush time)
Adjust heaters 0-10V	
Heater min. voltage	At heating requirement, the analogue voltage will never be lower than **Minimum voltage.**
Heater max. voltage	The heating shunt works at maximum output at this voltage

13.1.2 Central exhaust

13.1.2.1 Setting of exhaustion (MultiStep)

MultiStep is a method for controlling one or more exhaust units in steps, so that the exhaust output becomes stepless.

The controller controls one or two exhaust units stepless from zero to 100 %, while the rest of the exhaust units are switched on in steps as required. The controller can regulate up to 8 MultiStep units. The two stepless exhaust units can be connected in parallel or sequentially.

Every exhaust unit is equipped with a CL 74C swivel shutter motor, which can open and close the swivel shutter.

The CL 74CV is used for the stepless exhaust unit(s). The internal fan speed controller in the climate controller or an external fan speed controller controls the fan revolutions. The fan must always be single-phase, or else an external MC 31 must be used.

The CL 74CO ON/OFF is used for the other exhaust units. When the shutters open, the fans start via an integrated switch. These fans will then run at their maximum. The fans can be single-phase or three-phase. If three-phase fans are used, the CL 74CO ON/OFF winch motors must be equipped with contactors, which are controlled by an integrated switch.

The system can also handle an air-operated shutter (wall fan).

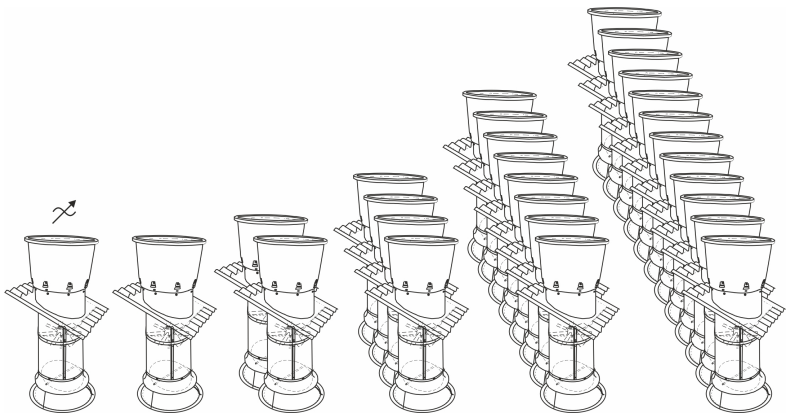
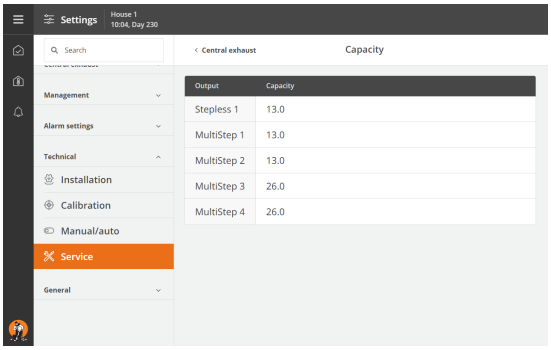


Figure 9: MultiStep exhaustion

In order to obtain correct adjustment of the house climate with MultiStep, you must adjust the climate controller using the ventilation system data:

- Nominal air output of the system in m^3/h (air requirement of the animals).
- Exhaustion capacity of the stepless exhaustion unit(s)
- Exhaustion capacity of the various steps, MultiStep



When two stepless fans are used, they can be set up to work in parallel or sequentially.

13.1.3 Network settings

The management program BigFarmNet Manager has access to the controllers through the network of the farm.

If a DHCP server is not available in the network, the names of the individual units integrated in the network are laid down in a plan, and an IP address is assigned to each unit. All names and IP addresses must be unique.

Thus, the entire network must be described in a plan, so it is possible to distinguish between the individual controllers. See also the BigFarmNet Manager Technical Manual.

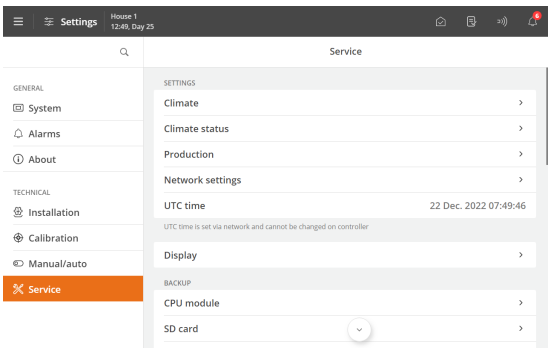
Select the menu **Technical | Service | Network settings | IP- configuration**

MAC address	MAC address of the controller. It is, for example, used in connection with error tracing in the network.
IP configuration mode	DHCP or Static IP.
IP address	The IP address of the controller: e.g. 192.168.1.101.
Net mask	The Netmask of the controller: e.g. 255.255.255.0.
Gateway IP address	The Gateway address of the controller: e.g. 192.168.1.1.
Edit	**IP configuration mode**: Selecting Static IP / DHCP Entering IP address, Netmask and Gateway IP address. Netmask and gateway must only be set when selecting Static IP. The controller is set to Static IP by default. Big Dutchman recommends that you follow a standard network setup (also see BigFarmNet Manager Technical manual).

13.1.4 UTC time

The controller uses two different time settings. A user-selectable local time (menu button **| Settings | System | Adjust date and time**) and the so-called UTC time (Coordinate Universal Time), which is the internal time in the controller, for example, used for time-stamping of alarms. However, the time viewed by the user is always the local time.

For controllers in a network, the management program Big Dutchman will automatically make sure the UCT time is correct.



As for controllers not in a network or without access to an NTP (Network Time Protocol) server, the UTC time can be adjusted in the menu **Technical | Service | UTC time.**

UTC is a default setting and both time settings of the controller are supported by a battery backup function. The UTC time thus only needs to be set in those cases where the climate controllers have been without battery backup.

Find the current UTC time, for example on the website

http://www.timeanddate.com/worldclock

13.1.5 The menu Settings

Central air intake	Heating	Pre runtime
		Adjust heaters 0-10V
		Heat control
Central exhaust	Output in $m^3/h*100$	
	Capacity	Stepless
		MultiStep
	Power up delay	30 sec.
	Stepless distribution	Parallel/Sequential
Network settings	IP configuration	IP configuration mode
		IP address
		Net mask
		Gateway IP address
	Link Status	Ethernet 1 link state
	Hardware	MAC address
UTC-time		

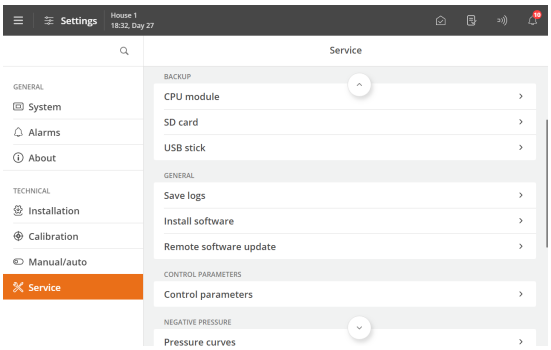
13.2 Display

Select the menu **Service | Display**

Backlight	Adjust the brightness of the display to best suit the current location of the controller.
Backlight (Dimmed)	Set the brightness of the display when the controller is not being used.
Backlight timeout	Setting the time from when the controller was operated and until the backlight dimmes.

13.3 Backup

Select the menu **Service**



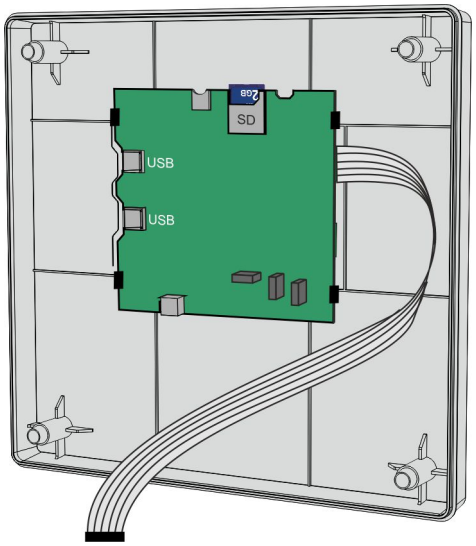
It is possible to save and load a backup of the current settings and report page.

It can be done either on the controller's internal CPU module, SD card, or USB stick.

If settings are to be copied to other controllers, use an SD card or a USB stick.

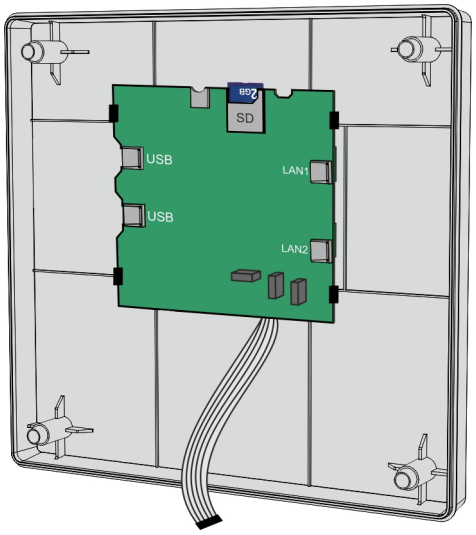
13.3.1 Backup of historical data

ARM based CPU module (one LAN port)



This CPU module will automatically save all historical data to the SD card, regardless of how menu settings have been made.

IMX based CPU module (two LAN ports)



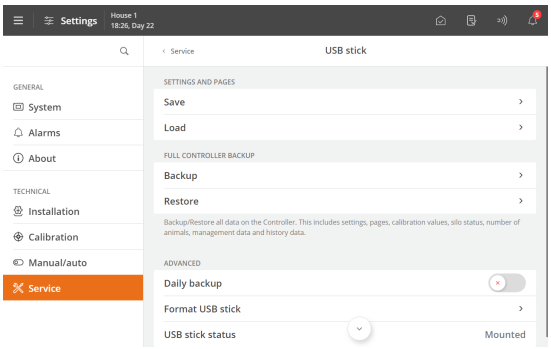
This CPU module will automatically save all historical data to the internal memory and only use the SD card as backup media.

13.3.2 SD card and USB stick

Using an SD card or a USB stick, it is possible to backup the controller setup and data including settings, pages, historical data, house name, IP address, calibration values, etc.

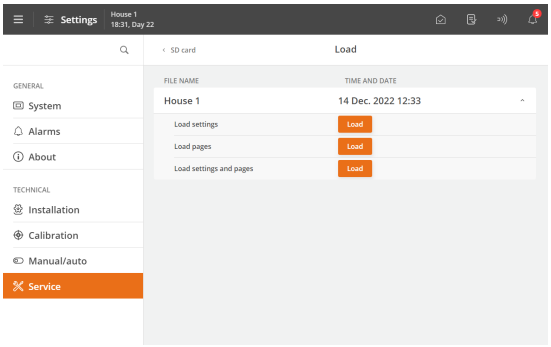
To prevent data loss when replacing a defective controller or individual hardware parts, it is possible to restore all types of data from the SD card.

The USB stick can also be used to copy data from one controller to another and to store data on a PC.



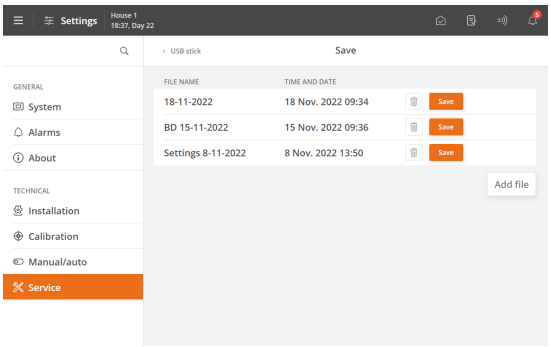
It is possible to make a daily backup of the controller data.

Activate the function **Daily backup** under **SD card** or **USB stick.**



When the settings and the report page are saved on the SD card, the house name, date, and time are automatically added.

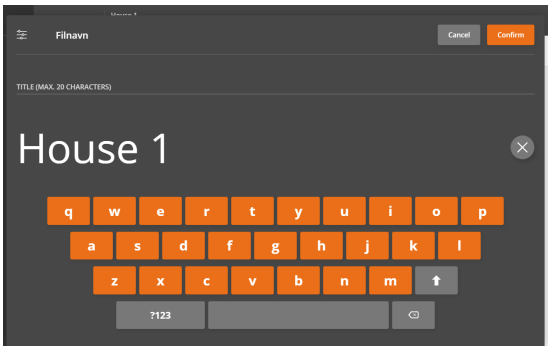
Please note that software version 7.X cannot transfer page display to software version 8.X.



When settings are saved on the USB stick, a name can be added to the file.

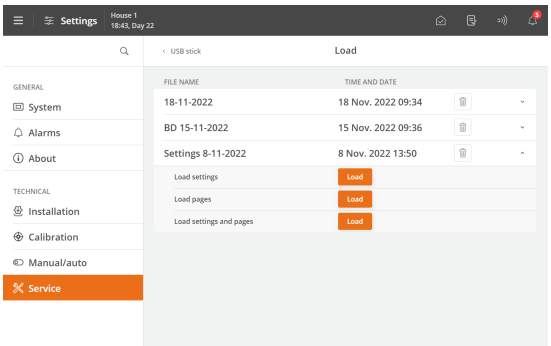
Press **Add file** to create a new file to save settings and report page.

Press the icon for the recycle bin to delete a file.



Name the file.

Each file is saved with the chosen name, time, and date.



Note that the CAN protocol and IP setup is also saved when using the backup function.

Please note that there should only be one USB stick in the CPU module at a time when it is used for storage of data and logs.

Save	Save settings and report page from the controller on the SD card or USB stick.
Load	Load settings and report page from the SD card or USB stick to the controller.
Backup	Create a backup copy of the controller data. Data includes settings, report page, historical data, house name, IP address, calibration values, etc.
Restore	Restore data on the controller from the backup. Data includes settings, report page, historical data, house name, IP address, calibration values, etc.
Daily backup	Activate backup of the controller data every night at 01:30.
Format SD card **Format USB stick**	Erases all data from the SD card or USB stick.
SD card status **USB stick status**	See the status of the SD card or USB stick.

Big Dutchman recommends that you always save the setup on a USB stick before updating a program.

13.4 Software update

Important information

Loading a new program usually takes up to two minutes.

During the update, the power supply must not be interrupted and the USB stick must not be removed before the software update has completely finished, i.e. before the graphic user interface is accessible and usable again.

We advise against updating software when there are animals in the house.

During the update, all relays are released, e.g. to the shutter motors. The ventilation system will thus be open, and all other functions will disconnect.

Should it be necessary to update the software while there are animals in the house, the update should be carried out in the presence of an animal expert and observing the following precaution:

- Evaluate which climate climate functions are to be run in manual mode during the update, and activate the manual switch for each of them to ensure that these conditions are maintained during the software update.
- Remove the power supply (230 V and battery) from the emergency opening, if the air inlet and air outlet should remain closed during updating.

CAN Protocol will remain unchanged after a software update. See also the Circuit Diagrams and Cable Plans document.

13.4.1 Preparing for a software update

1. Note or take pictures of the report page.
2. Note or take pictures of current configuration under the menu **Show connections** (software updates from old to new software will reallocate individual inputs or outputs in some instances).

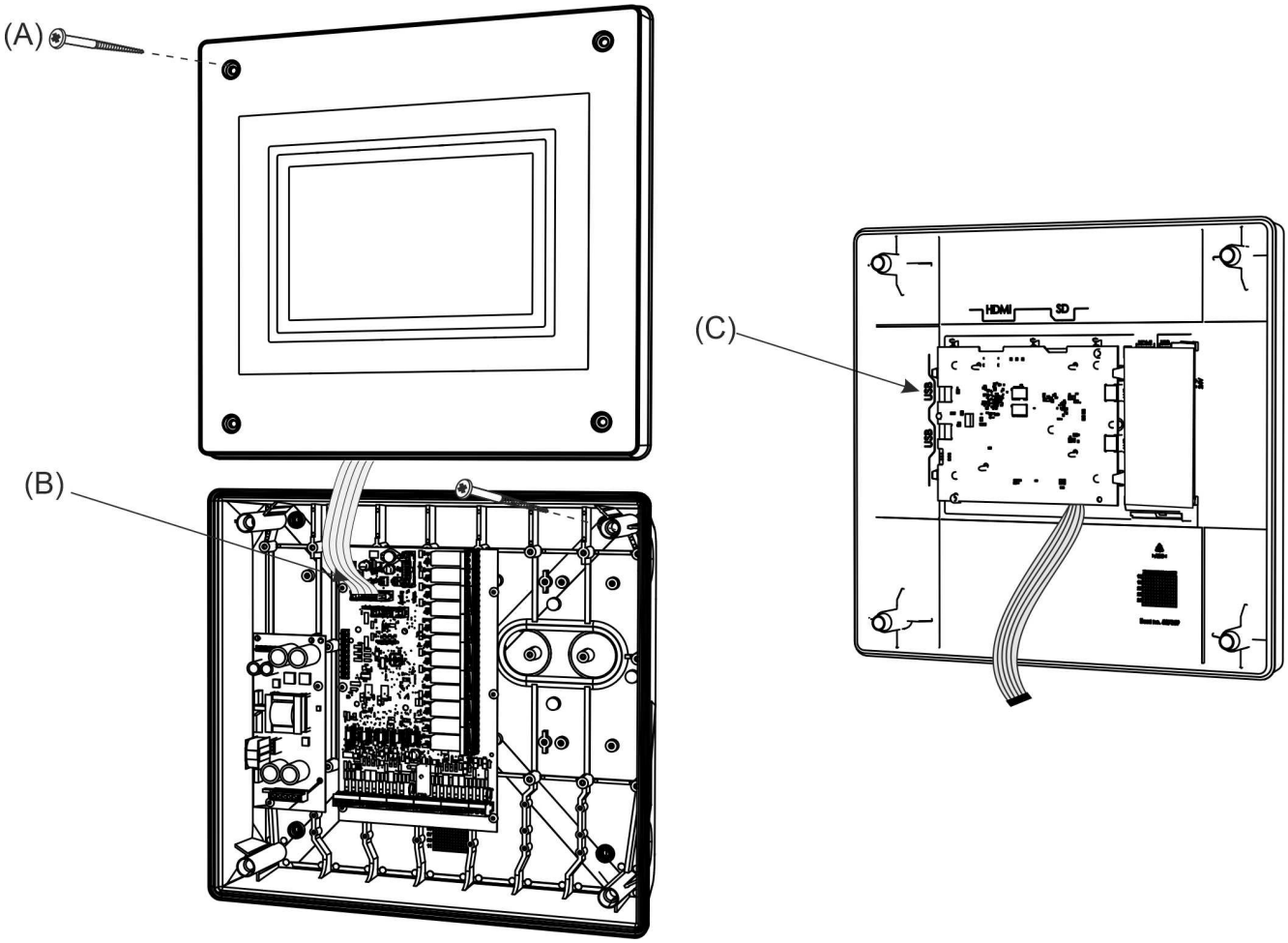
3. Note or take pictures of the management and climate values that are described in the chart below.
   If there are animals in the house, it is very important to note the values that are described in the chart: (*If installed).

Menu	Function	Setpoint
Operation	Batch day no.	
	Number of stocked animals	
Climate	Temperature setpoint	
	Heater temperature setpoint*	
	Humidity setpoint*	
	Minimum ventilation	
	Maximum ventilation	
Production	Number of dead animals	
	Silo 1, 2, 3, 4, 5	

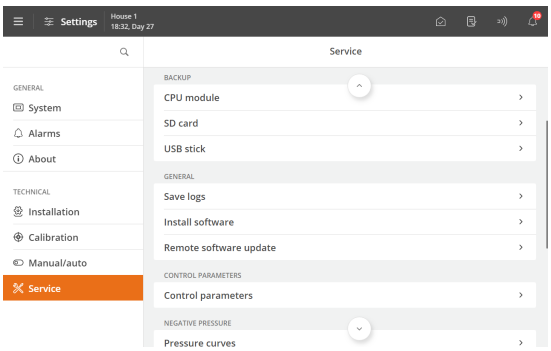
If there are animals in the house, climate and production functions which need to be run manually during the update must be activated now.

13.4.2 Carrying out the software update

1. Loosen the screws (**A**) that hold the front panel in place.
2. Lift out the front panel.
   Make sure not to pull the flat cable so that the plug (**B**) is damaged.
3. Insert the USB stick containing the software update in the USB port (**C**) on the CPU module.



Select the menu **Service | Installer software**



Select the required software version.

The installation process begins.

Settings are automatically saved before the update starts and are loaded after the restart.

During the software update, the controller will restart.

It is VERY important not to disconnect the power supply during update.

Do not remove the USB stick until the installation is fully completed. In other words, when the graphical user interface is accessible and usable.

The software update is now complete.

If necessary, check the software version via the menu **About**.

13.4.3 Check after software update

It is very important to check that the controller works as it did before the update, as a few connections may switch in connection with an update. The controller will provide a warning, but will not indicate which connection has been moved.

If there are animals in the livestock house, it is very important to check the recorded values after the update, so the day number and all other settings are correct again.

1. Check configuration after the update in the menu **Show connections**.
   Check that the connections are as noted or as in the pictures taken before the update.
2. **Set/check that operation and climate values are the same as before the update according to the notes entered in the form.**
3. **Reset the climate components to automatic mode.**
4. Check that the controller works as it should by testing all components.
   It can be done in the menu **Manual/Auto**. You can test each function by activating manual mode.
5. **If the set-up has been copied from another controller, all winch motors must be recalibrated.**
   The controller will only load the calibration if it comes from the same controller. Therefore, a calibration is required if it comes from another controller.
6. **Set the function Use password as required.**

13.5 Control parameters

13.5.1 Control parameters

Central air intake

Select the menu | **Technical | Service | Control parameters**

Heating	
Cycle time	Relay heat. ON + OFF-time of the heating relay.
Minimum ON time	Relay heat. At heating requirement: The heating relay is ON for minimum this time.
Minimum OFF time	Relay heat. When the heating relay is released, it is OFF for minimum this time.
P-band	0-10 V heating. Working range for 0-10 V heating.
Integration time	0-10 V heating. Reaction time for heating.
	Longer time: slow reaction.
	Shorter time: faster reaction.
Cooling	
Cycle time	Relay cooling. ON + OFF time of the cooling relay.
Minimum ON time	Relay cooling. At cooling requirement: The cooling relay is ON for minimum this time.
P-band	0-10 V cooling. Working range for 0-10 V cooling.
Integration time	0-10 V cooling. Reaction timer of the cooling.
	Short time: Immediate reaction.
	Long time: Slow reaction
Inlet	
P band	With feedback. Working range of the ventilation
Accept band	Without feedback. Air intake is only regulated if the current position deviates more than the tolerance band from the desired position.

Air inlet hysteresis	The position of the air intake changes when the current opening + hysteresis is less/greater than the ventilation requirement needs.

Central exhaust

Select the menu | **Technical | Service | Control parameters**

Dynamic pressure	
Outside temperature	When the outdoor temperature is low, the pressure in the ducting can be reduced. The required ventilation is achieved with the flaps fully open and a lower fan output.
Pressure	

MultiStep correction

Min. switch point	When there is a requirement for 5% or more than the stepless unit can provide, the system changes to the next MultiStep.
Stepless unit open	When switched, the stepless starts to open after this time
Stepless unit closed	When switched, the stepless starts to close after this time.
Motor control open	When switched, a motor-controlled flap starts to open after this time.
Motor control close	When switched, a motor-controlled flap starts to close after this time.
Air control open	When switched, an air-controlled flap starts to open after this time.
Air control close	When switched, an air-controlled flap starts to close after this time.

P band	Pressure control working range.
Integration time	**Reaction time of the pressure control.** Short time: Immediate reaction. Long time: Slow reaction.
Requirement at low sensor failure	Required ventilation if the pressure sensor gives alarm for low pressure.
Requirement at high sensor failure	Required ventilation if the pressure sensor gives alarm for high pressure.

13.6 Adjustment of pressure

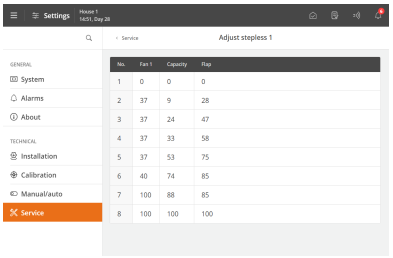
13.6.1 Adjustment of stepless unit

For the controller to set the correct relation between the fan voltage and the flap position and thereby supply the correct ventilation, it is important the the stepless units are correctly set. This is also important to maintain pressure stability.

Fan	Output	Flaps
0.0	0.0	0.0
58.0	15.0	32.0
58.0	25.0	41.0
54.0	45.0	58.0
55.0	55.0	66.0
55.0	85.0	86.0

100.0	90.0	85.0
100.0	100.0	100.0

Table 2: Curve values for stepless unit



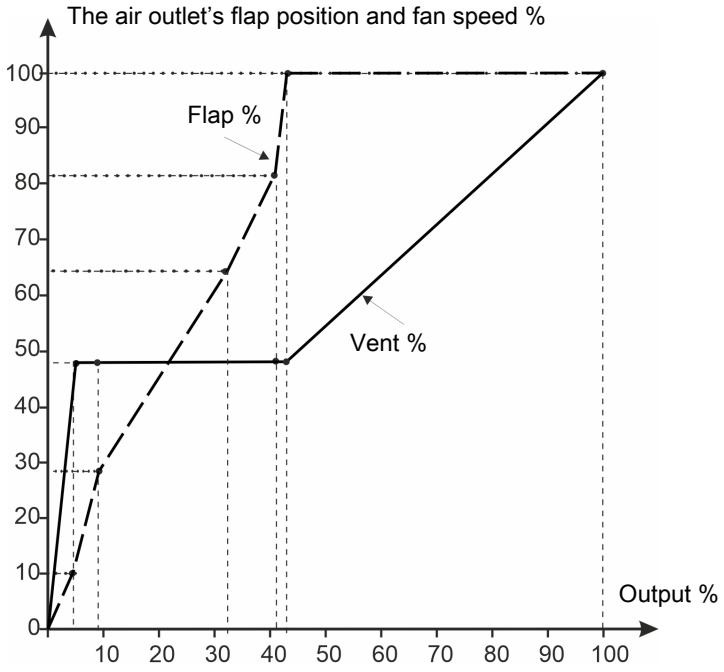


Figure 10: Adjustment of stepless unit

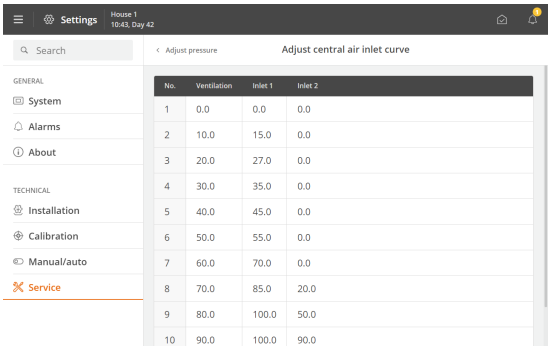
Vent [%]	Fan voltage
Output [%]	Output for the stepless fan
Flap [%]	Flap position for air outlet

With Dynamic MultiStep, two set-ups must be carried out for the stepless units for low regulation and high regulation respectively. Also see section Dynamic MultiStep [▶ 37]

13.6.2 Adjust pressure

Central air intake

Select the menu | **Technical | Service | Adjust pressure**.



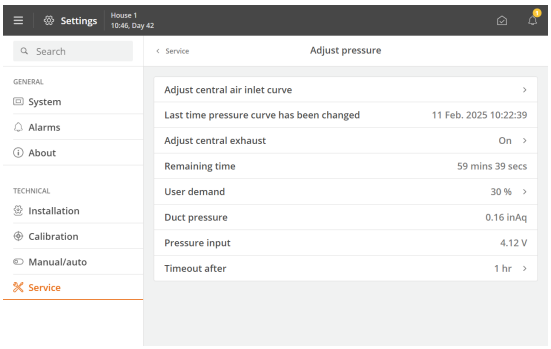
The controller can regulate the air inlets according to their respective curves in relation to the current ventilation requirement. It is therefore possible to use one air inlet for winter ventilation and both air inlets for summer ventilation.

Central exhaust

Select the menu | **Technical | Service | Adjust pressure**.

The controller controls the ventilation by measuring the pressure in a central duct and regulating the fans in a fan bank.

While it is carrying out pressure adjustments, the controller does not regulate the ventilation. After a set period (**Timeout after**), the controller returns to automatic regulation.



Set a period for how long the adjustment is expected to last and when the controller should return to automatic regulation (**Timeout after**). When the adjustment is activated, the time counts down (**Remaining time**).

Activate **Adjust central exhaust**.

Set **User demand** to the desired ventilation level in relation to the total output of the system.

Then set the other controllers in the livestock house to the required pressure in the individual sections.

13.6.2.1 The menu adjust pressure

Adjust central air intake curve			
	Ventilation	Inlet 1	Inlet 2
	0	0	0
	10	15	0
	20	27	0
	30	35	0
	40	45	0
	50	55	0
	60	70	0
	70	85	20
	80	100	50
	90	100	90
	100	100	100
Adjust the central exhaust			
Remaining time			
User demand			
Duct pressure			
Pressure input			
Timeout after			

13.7 System

13.7.1 Resetting data

Please note that the controller will restart after it has been reset.

Select the menu | **Technical | Service | Reset**

Reset settings and pages	The controller deletes all settings and restores the factory settings.
Reset BigFarmNetdata	The controller deletes all data that has been saved in connection with the management program. The house must be set up again in the program's configurator.
Factory reset	The controller deletes all settings and restores the factory settings. It also deletes all data that has been saved in connection with the management program (the house must be set up again in the program’s configurator).

14 Troubleshooting instructions

- Is there 230 V current on terminals A1+ A2 (if not, check installation fuses and fault current relay)
- Is the change-over switch of the fan speed controller MAN/AUT set on AUT?
- Is the controller set to automatic control?
- Are the temperature sensors OK?
- Is the motor relay/switch of the fan OK?
- Is the source of heating and its supply OK?
- Is the winch motor and its change-over switches OK?
- Is the electrical connection of the winch motors correct? See the circuit diagrams; please pay extra attention to the supply voltage via the relays.
- Is the potentiometer of the winch motor adjusted?
- Is the controller installed correctly?

14.1 Display troubleshooting

Fault symptom	Error	Solution
The display does not respond during operation. The controller shows a display cleaning message, but the display is not dirty.	The controller is disturbed by electrical noise from the motor drive/frequency converter.	Place the motor drive/frequency converter at a distance of at least 1 meter from the controller. The motor cable from the motor drive/frequency converter shall be routed separately from the control cables of the controller.

14.2 Temperature sensor control table

14.2.1 Table relating to DOL 114 temperature sensor control

°C	V	°C	V	°C	V
-40	0.00	6	4.60	28	6.80
-35	0.50	7	4.70	29	6.90
-30	1.00	8	4.80	30	7.00
-25	1.50	9	4.90	31	7.10
-20	2.00	10	5.00	32	7.20
-15	2.50	11	5.10	33	7.30
-10	3.00	12	5.20	34	7.40
-9	3.10	13	5.30	35	7.50
-8	3.20	14	5.40	36	7.60
-7	3.30	15	5.50	37	7.70
-6	3.40	16	5.60	38	7.80
-5	3.50	17	5.70	39	7.90
-4	3.60	18	5.80	40	8.00
-3	3.70	19	5.90	41	8.10
-2	3.80	20	6.00	42	8.20
-1	3.90	21	6.10	43	8.30
0	4.00	22	6.20	45	8.50
1	4.10	23	6.30	50	9.00
2	4.20	24	6.40	55	9.50
3	4.30	25	6.50	60	10.00
4	4.40	26	6.60		
5	4.50	27	6.70		

14.2.2 Table relating to DOL 12 temperature sensor control

°C	kΩ*	V	°C	kΩ*	V	°C	kΩ*	V
-40	82.50	8.08	15	20.71	5.29	38	10.72	3.73
-35	76.84	7.96	16	20.09	5.22	39	10.45	3.67
-30	70.60	7.83	17	19.48	5.15	40	10.19	3.61
-25	63.97	7.68	18	18.90	5.07	41	9.94	3.55
-20	57.18	7.49	19	18.33	5.00	42	9.70	3.50
-15	50.50	7.26	20	17.79	4.93	43	9.47	3.44
-10	44.12	7.00	21	17.26	4.85	44	9.24	3.39
-5	38.22	6.70	22	16.76	4.78	45	9.03	3.34
0	32.91	6.37	23	16.27	4.71	46	8.82	3.29
1	31.92	6.30	24	15.79	4.64	47	8.62	3.24
2	30.96	6.23	25	15.34	4.57	48	8.43	3.19
3	30.02	6.16	26	14.90	4.50	49	8.24	3.14
4	29.11	6.09	27	14.48	4.43	50	8.06	3.09
5	28.23	6.02	28	14.07	4.36	55	7.26	2.87
6	27.37	5.95	29	13.68	4.30	60	6.59	2.68
7	26.53	5.88	30	13.30	4.23	65	6.04	2.51
8	25.72	5.81	31	12.93	4.16	70	5.57	2.36
9	24.94	5.73	32	12.58	4.10	75	5.18	2.23
10	24.17	5.66	33	12.24	4.03	80	4.86	2.11
11	23.44	5.59	34	11.91	3.97	85	4.58	2.02
12	22.72	5.51	35	11.60	3.91	90	4.35	1.95
13	22.03	5.44	36	11.30	3.85	95	4.15	1.91
14	21.36	5.37	37	11.01	3.79	100	3.99	1.90

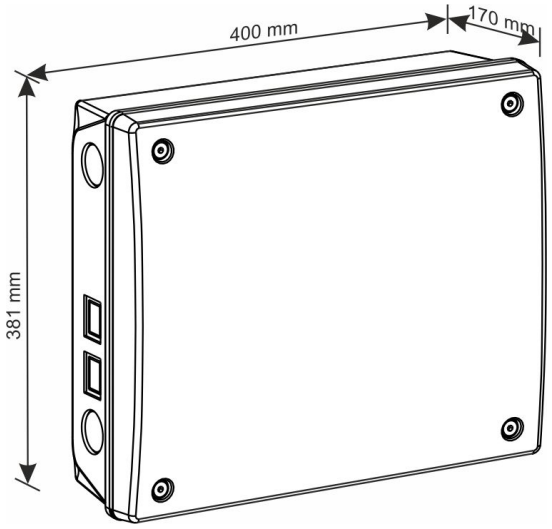
*Zero power measurement

15 Technical data

Electrical		
Rated voltage	V AC	115*, 200* and 230/240 (*not speed controller)
Operating voltage	V AC	103.5-264
Frequency	Hz	50/60
Output	W	75
Max. current consumption	A	0.7
RCD		To be installed in accordance with applicable laws and standards. RCCB can be used in front of the controller.
Max. fuse in front of the controller	A	10
Main module		
Configurable main module.		Number 0-10 V: -11 inputs and 2 outputs – or - 9 inputs and 4 outputs – or - 7 inputs and 6 outputs
Inputs		7 x 0-10 V DC input impedance 2.1 MOhm.
Pulsing Inputs (E.g., water meter, energy meter)		Minimum pulse length: 75 ms. Minimum pulse interval: 75 ms. Maximum frequency/pulse per sec.: 6 Hz.
Outputs/power supply		2 x 15 V DC power supply +/- 10 % max. 40 mA in total.
		2 x motor supply 24 V DC +/- 20 % max. 0.4 A (in total for the entire controller).
		2 x supply for winch motor potentiometer 10 V DC max. 40 mA in total.
		2 x 0-10 V DC. Output impedance 100 Ohm.
Relays		12 x NO/NC potential free. Max. voltage/current at resistive load (**resistive load**) 250 V AC / 5 A AC. Max. voltage/current at inductive load (**inductive load**) 250 V AC / 2 A AC CosPhi 0.8.
		1 x alarm relay NC, max. 24 V 2 A, min. 12 V 10 mA (**resistive load**).
I/O module type 3		
IO type 3, 10RL 8AI 8AO		With jumpers for configuration of inputs.
Inputs		8 x 0-10 V DC input impedance 2.1 MOhm.
Pulsing Inputs (E.g., water meter, energy meter)		Minimum pulse length: 75 ms. Minimum pulse interval: 75 ms. Maximum frequency/pulse per sec.: 6 Hz.
Outputs/power supply		8 x 0-10 V DC output impedance 10 Ohm.
		1 x motor supply 24V DC +/- 20% 0.4 A.
Relays		10 x NO/NC potential free max. Max. voltage/current at resistive load (**resistive load**) 250 V AC / 5 A AC. Max. voltage/current at inductive load (**inductive load**) 250 V AC / 2 A AC CosPhi 0.8.
Network		
Network interface		2 x 10/100 BASE+TX RJ 45
USB		2 x USB 2.0 A type

Accessories			
Speed control (output)		Motor load max. 6.8 A 230-240 V AC/min. 150 W.	
Environment			
Temperature, operation	°C	-10 to +45	
Temperature, storage	°C	-25 to +60	
Ambient humidity, operation	% RH	0-80	
Protection class	IP	54 (splash-proof). It is assumed that the base is level, i.e. ≤ 1.5 mm difference of height and that the screws of the front panel are tightened with min. 1.5 Nm.	
Mechanical			
Cable knock-out holes			
		20 x M25 For metrical cable glands	
Shipment			
Dimensions (H x W x D)	mm	381 x 400 x 170	
Dimensions crated H x W x D	mm	425 x 555 x 195	
Weight	g	5800	
Shipping weight	g	6900	

15.1 Dimensioned sketch



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