135Pro Climate Computer

User's Manual

Code no. 99-97-0181 GB

Edition: 06/2013

Big Dutchman

Program Version

The product described in this manual contains software. This manual corresponds to:

- Software version CPU 7.2

It was released in 2013.

Product and Documentation Changes

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

Latest date of change appears from the back page.

IMPORTANT

NOTES CONCERNING THE ALARM SYSTEM

Where climatic control is used in livestock buildings, breakdowns, malfunctions or faulty settings may cause substantial damage and financial losses. It is therefore most important to install a separate, independent alarm system, which monitors the house concurrently with the climate computer. According to EU-directive No. 98/58/EU an alarm system must be installed in any house that is mechanically ventilated.

Please note that the product liability clause of Big Dutchman's general terms and conditions of sale and delivery specify that an alarm system must be installed.

In case of misoperation or improper use, ventilation systems can result in production loss or cause loss of lives among animals.

Big Dutchman 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 Big Dutchman's terms and conditions of sale and delivery.

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1 Introduction

This user's manual deals with the operation of the climate computer 135Pro. The user's manual gives fundamental knowledge concerning the functions of the computer, which is necessary to utilize the 135Pro optimally.

The main section of the user's manual "Operation of 135Pro Climate Computer" gives a full description of all functions in the climate computer, and it is built up in a way that follows the menu structure of the computer. As the software of 135Pro is built up in modules, this user's manual will contain sections, which are not relevant to the setup of your computer. Contact Big Dutchman Service or your dealer if necessary.

135Pro is a climate computer, which can control and monitor the climate in all types of livestock houses, whether there are one or two house sections. 135Pro will, as a two-house computer, control the two house sections independently of each other, but with common outside temperature sensorand alarm relay.

135Pro provides LAN plug for network connection and two USB ports.

Optimised regulation

By means of a new method for climate control, 135Pro improves the correlation between the humidity and temperature regulation in the house. The method is based on heating and ventilation as the crucial regulation parameters but the result is a much softer and smoother regulation. The present climate is thus currently being optimised by using the collected historical data.

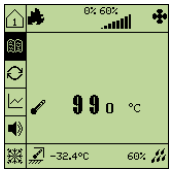
Big Dutchman congratulate you on your choice of a new

135Pro Climate Computer

1.1 Changing Language

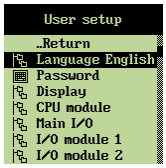
As regards language, the factory setting of 135Pro is English.

In the menu **`User setup`** / **`Language`**, the language can be changed to other available languages.



Click when the icon of the main menu  is selected.

Turn until **`User setup`** is selected and press.



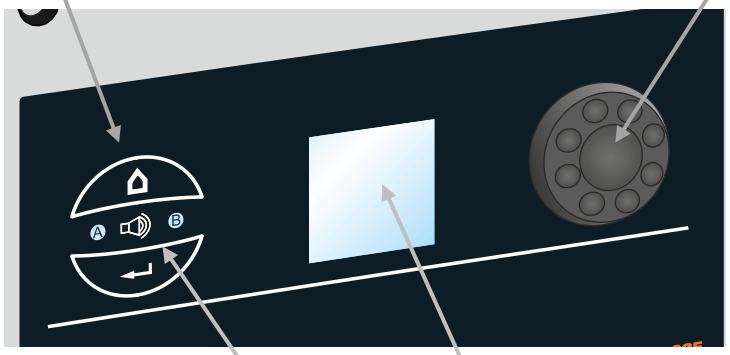
Turn until **`Language`** is selected and press.

Select the required language in the list.

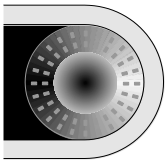
2 User's Guide

Keys

Survey menu
- with shortcuts to setting



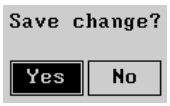
Adjustment knob



Turn adjustment knob:
- change menu item
- set values

Press adjustment knob:

- connect/disconnect 

- confirm 

- change level 

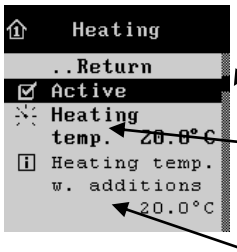
Alarm lamps

Fast flashing
- alarm

Slow flashing
- alarm that has been acknowledged

Constant light
- a non-acknowledged alarm, the error has disappeared

Display



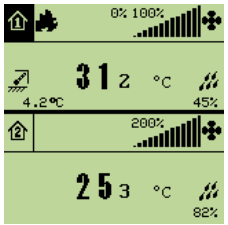
A scroll bar in the right side of the display shows you how long the menu is, and where in it you are.

You can change the values and functions highlighted in **bold writing**.

The values that are readings or calculations are in `normal writing`

2.1 Survey Menu

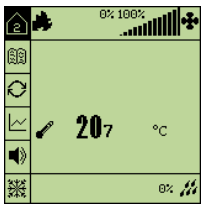
By pressing the survey key,  you get access to the survey menu, which gives you a survey of the current conditions in the house. Here you can read the values most frequently needed in your daily work.



→ In the outline menu of a two-house computer, you can read information for both house sections.

→ Press the adjustment knob when the house icon is selected in order to see values of the section in question.

2.1.1 Shortcuts



Shortcuts from the outline menu make it easy for you to change settings.

→ Press the rotary button when the required function is highlighted

Main menu

Batch status
(Active house/Empty house)

Trend curves

Active alarms

Cooling temperature

Temp. setpoint

Humidity setpoint

Min. vent. per animal

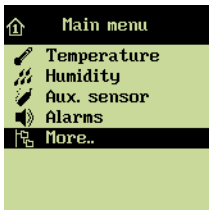
Heating temperature

The display returns to the survey menu when the computer has not been operated for ten minutes.

2.2 Function Menus

→ the icon in the headline indicates which house is selected

Via these menus, you have access to all functions of the 235Pro. (You will find a survey of the functions in the individual menus at the beginning of each section concerning the menus).



→ In order to facilitate the operation, each of the 235Pro menus is divided into three levels.

→ The display will start by showing you the ordinary functions most often needed. The more advanced functions are on two underlying levels.

→ The whole menu appears when you select the menu item **More**, which appears at the end of the various menus

2.2.1 Icons

Setting

Reading

Connection

Disconnection

Options

More submenus

Curve setting

Entry of code / name

3 Function Menus

3.1 Temperature

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
Inside temperature	**Temp. setpoint 22.0 °C**		
	Temp. setpoint w. additions 22.0 °C		
	Heating temp 20.0 °C		
	Current temp. 21.8 °C		
	Outside temp. 8 °C		
	Lowest 24h temp. 21.2 °C		
	Highest 24h temp. 22.2 °C		
	Trend curve		
	More...	**Comfort temp. 2 °C**	
		Heat wave comfort	
			Active
			Outside temp. Limit
			Activation time
			Mode Keep Remove
		Extra vent. 2 °C	
Heating	**Active**		
	Heating temp. 20.0 °C		
	User offset 0.0 °C		
	Heating temp. w. additions 20 °C		
	More...	Heating requirement 24 %	
		More...	**Minimum heating 0 %**
			Min. heating activate -5 °C
De-icing	**De-icing active - 10 °C**		
Combi-Diffuse intake	**Inside temp. limit 3.0 °C**	Temp./ Inlet	
	Outside temp. Limit 18.0 °C		
	Stepless opening		
	Combi-Diffuse inlet 60 %		
	Combi-Diffuse inlet relay ON		

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
Cooling	Cooling requirement 0 %		
	Cooling temp 2 °C		
	Stop cooling 85 %		
	Control parameters	Start time 07:00	
		Stop time 07:00	
		P-band 2.0 °C	
		Cycle time 180 s.	
		Min. run time 20 s.	
	Nozzle cleaning	Interval time 06:00 t:m	
		ON time 00:20 m:s	
Spraying	Active		
	Spraying requirement 0 %		
	Min. spraying 0 %		
	More...	Keep clean	
			Spraying time 00:00
			Remaining time 00:00
			ON-time 0
			Cycle time 0
		Control parameters	
			Stop at outs. temp. 5 °C
			Start time 07:00:00
			Stop time 20:00:00
			Start at outs. temp. 19 °C
			0-100% spraying
			Temp ON Cycle
Floor heating (+ sensor) (- sensor) (Outside temp. control)		Floor temp. 31.4 °C	
		Floor temp. setpoint 32.0 °C	
		Floor heating setpoint 35 %	
		Stop at outside temp. 0.00 °C	
		More...	Floor heating requirement 35 %
			Min. floor heating 0 %

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
			Outside temp. control
Night setback		Actual setback 0 **Night temp. - 2 °C** More...	**Start time 20:00:00** **Stop time 07:00:00**

Table 1: Survey of the temperature menu (you can change the values highlighted in bold writing)

3.1.1 Inside Temperature

135Pro controls the inside temperature according to the set temperature. The house is heated by the heat generated by the animals and possibly by a heating system.

Temp. setpoint is the basis of the calculations, which the 135Pro makes of the ventilation requirement in the house

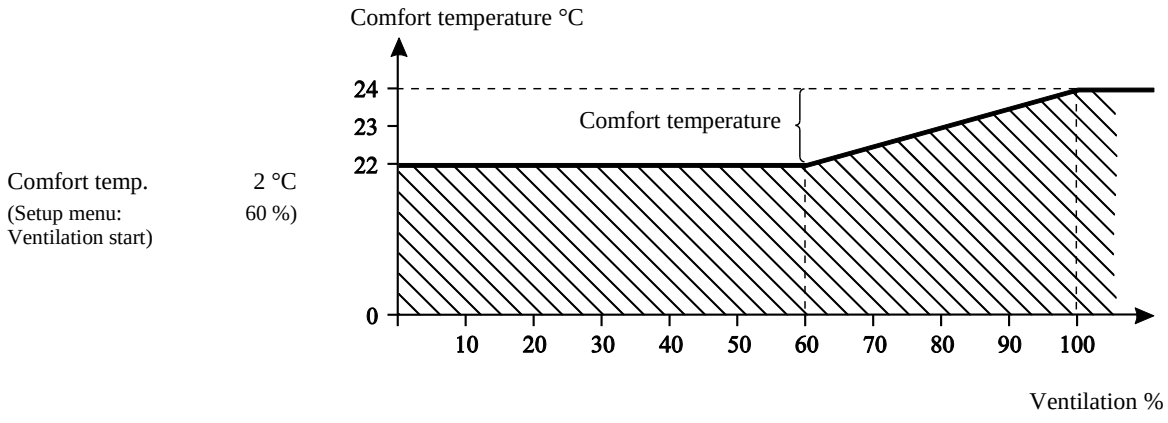
If the computer is set up with the functions comfort temperature or humidity control at temperature reduction, the computer will adjust the temperature setpoint by an increase or a reduction of a few degrees and calculates the ventilation requirement from this.

Comfort control is a function, which automatically increases the inside temperature to minimize possible draught problems in the house at extreme ventilation.

When 135Pro increases the ventilation on warm days to keep down the inside temperature, the higher air velocity in the house will make the air feel colder on the animals. Thus, for example 20 °C in calm weather feels warmer than 20 °C in windy weather.

To counteract the fact that the animals are chilled because of the higher air velocity, 135Pro increases the inside temperature by the set **`Comfort temperature`**. The inside temperature will then increase gradually by this number of degrees before the ventilation increases to maximum. 135Pro activates the function **`Comfort temperature`** when the ventilation requirement is higher than the degree of ventilation to which the setting **`Start vent.`** is adjusted at setup.

Example 1: Comfort temperature at continuous production



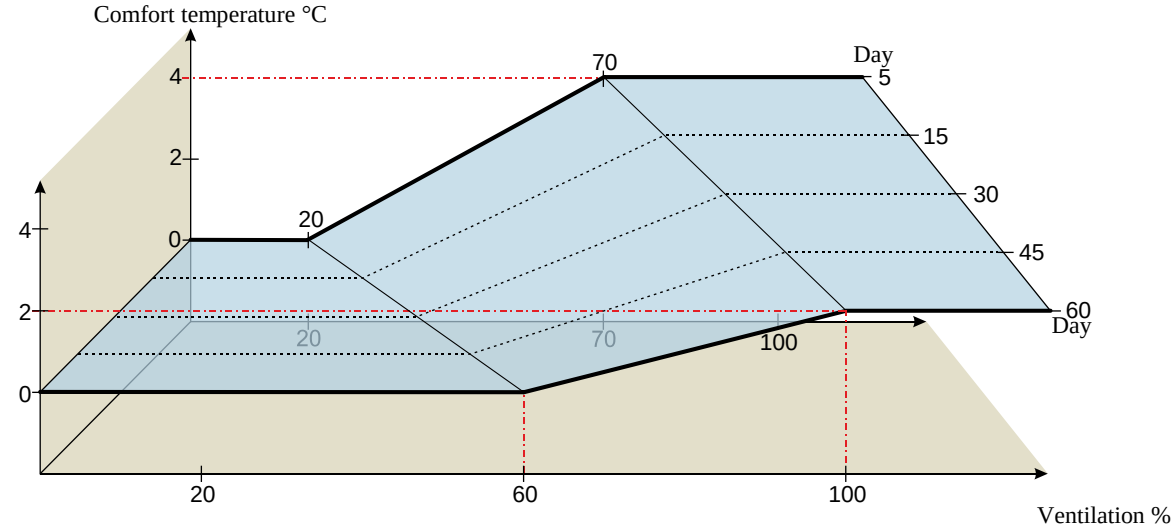
Comfort temp. 2 °C
(Setup menu: Ventilation start) 60 %)

*You must set the **`Comfort temperature`** to the number of degrees by which the indoor temperature is to increase before the ventilation goes up to maximum.*

At batch production, the comfort temperature can be set as a curve over two day numbers. Ventilation can thus be increased later for the small animals.

Example 2: Comfort temperature at batch production

	Comfort temp.	Vent.	Max.
Day 5	4 °C	20 %	70 %
Day 60	2 °C	60 %	100 %



In the technical ***Service/ Control parameters/Comfort/ Comfort ventilation*** *menu, comfort start and max. ventilation are also set over two day numbers.*

See also section 3.6.3 for a description of batch curves.

Draught is a combination of high air velocity and low temperature. Problems with draught in the house may therefore be caused by the fact that the indoor temperature is set too low. Problems with draught may also be created in situations with extreme ventilation in warm weather. The animals will go away from the areas in the house where they feel draught.

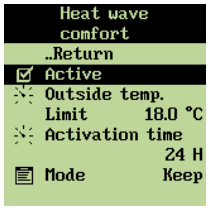
3.1.1.1 Heat Wave Comfort

Heat wave comfort adjusts the comfort temperature at high outside temperatures round the clock.

If, for a set period of time (**Activation time**), the temperature has exceeded the limit set (**Outside temp. limit**), 235Pro changes comfort regulation of ventilation.

This function can be adapted to both pigs and poultry.

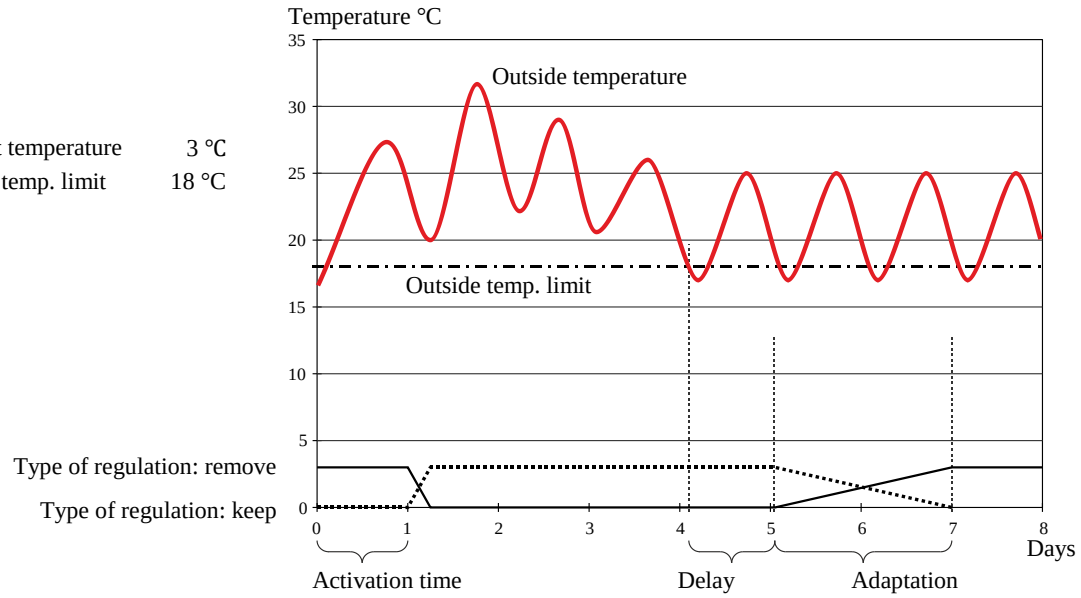
When you want … to connect or disconnect heat wave comfort, open the **Temperature/Heat wave comfort** menu, and



→ turn until **Active** is highlighted, and press to connect or disconnect

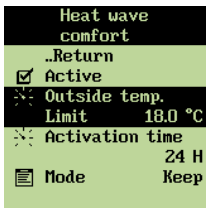
Example 3: Heat wave comfort

Comfort temperature 3 °C
Outside temp. limit 18 °C



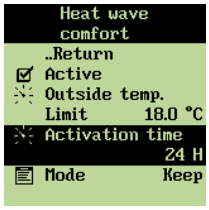
*Select the **Keep** type of regulation for pig production and **Remove** for poultry production.*

When you want … to set a temperature limit which activates the function, open the **Temperature/Heat wave comfort** menu, and



→ turn until **Outside temp. limit** is highlighted, and press
→ turn to set the temperature

When you want … to set the length of the period which is to activate the function, open the **Temperature/Heat wave comfort** menu, and



→ turn until **Activation time**, and press
→ turn to set the temperature

When you want … to select type of regulation for the function, open the **Temperature/Heat wave comfort** menu, and

→ turn until **Regulation (Keep/Remove)**, and press
→ turn to select

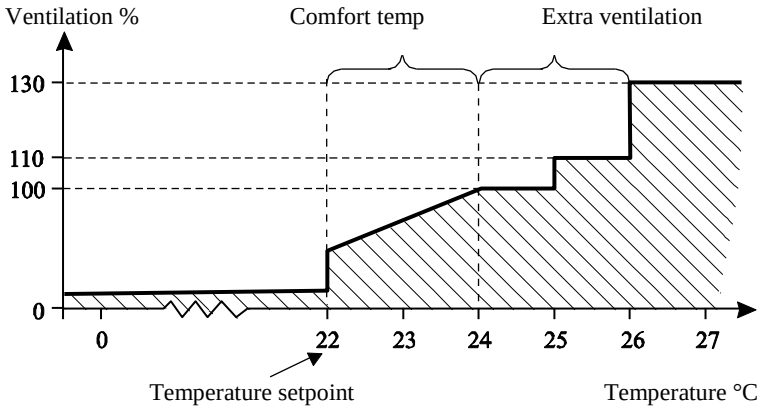
Extra ventilation is a function, which automatically increases the ventilation to cool the animals even at high outside temperatures.

The extra ventilation works by means of capacity in the ventilation system, which exceeds the calculated air requirement of the animals. It is not possible to bring the inside temperature below the outside temperature, but the increased air velocity in the house will cool the animals.

135Pro climate computer activates the function extra ventilation so that the ventilation is increased gradually in steps when the inside temperature at maximum ventilation rises more above **`Temperature setpoint`** than the number of degrees to which **`Comfort temperature`** is set.

Example 4: Extra ventilation

Temp. setpoint	22 °C
Comfort temp	2 °C
Extra ventilation	2 °C



*You must set **`Extra ventilation`** to the number of degrees by which the temperature is to increase before all ventilation is connected.*

The air velocity is of great importance to the animals. The higher the air velocity is the more it cools. When it is warm weather, a high air velocity feels like a pleasant breeze. Even a low air velocity feels like an unpleasant draught when it is cold weather.

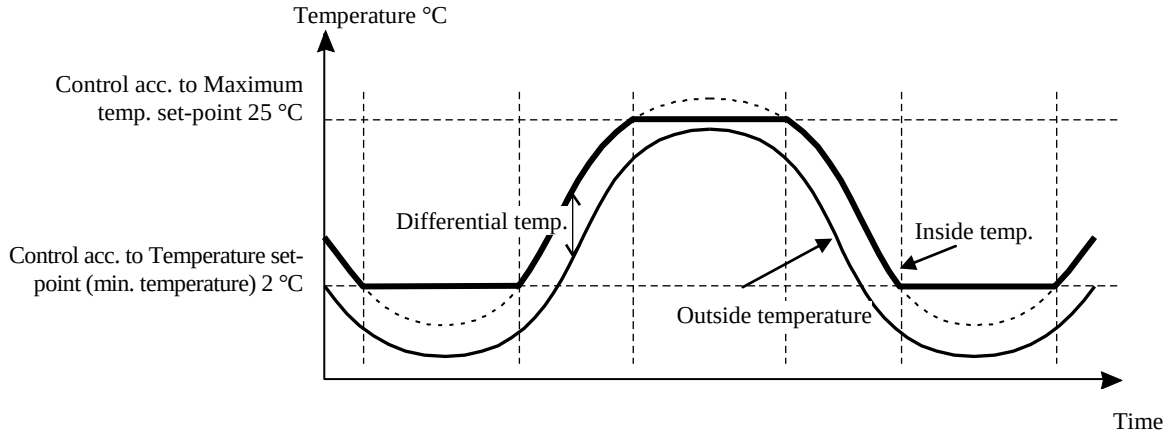
Differential temperature This section is only relevant to houses with natural ventilation where the 135Pro is set up to adjust the inside temperature and the air humidity according to the so-called DiffControl-principle. DiffControl is a principle, which is mainly used for non-insulated houses.

DiffControl works as an alternative temperature control principle. Contrary to any other climate controller, which maintains a fid inside temperature, the DiffControl lets the inside temperature vary as it follows the outside temperature.

Thus DiffControl adjusts the ventilation according to the fact that there must be a fid temperature difference, **`Differential temperature`**, between the inside temperature and the outside temperature. This temperature difference also influences the air humidity in the house, which DiffControl will keep as low as possible.

- **`Temperature setpoint`** (minimum temperature)
- **`Maximum temperature setpoint`** (upper temperature limit)
- **`Differential temperature`** (difference between the inside and the outside temperature)

Example 5: DiffControl



In DiffControl, the inside temperature can vary between 2 °C and 25 °C with a fid difference (differential temperature) compared to the outside temperature. 135Pro will keep the temperature within this range of temperatures.

3.1.2 Heating

☐ Active

In houses with heating system, the heat can be connected or disconnected by activating or deactivating the function on the computer.

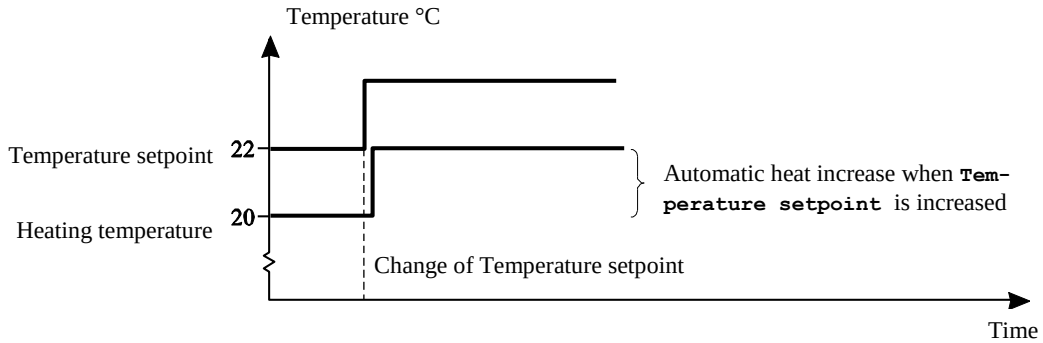
When you disconnect heating in a house with a humidity sensor, 135Pro will automatically adjust the air humidity according to the principle of temperature reduction (see the section on Humidity/ Humidity principles).

Heating temp.

The 135Pro climate computer adjusts the inside temperature according to the set temperature and a lower temperature limit, **`Heating temperature`**. 135Pro will gradually supply more heating when the inside temperature falls below Heating temperature.

NB Note that when you increase the **`Temperature setpoint`**, the **`Heating temperature`** will automatically be increased correspondingly, this means that the number number of degrees between the two settings is still the same.

Example 6: Heating



*If you want to increase **`Temperature setpoint`** without increasing **`Heating temperature`**, you must, after having adjusted **`Temperature setpoint`**, reduce **`Heating temperature`** by the corresponding number of degrees. You must set **`Heating temperature`** to the lowest temperature allowed in the house.*

Minimum heating

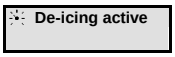
Minimum heating is a function, which 135Pro will activate in cold weather. Minimum heating can for example minimize ice formation in the fresh air inlet.

When the outside temperature falls to the temperature setpoint for **Minimum heating**, 135Pro climate computer supplies heating. The heating system will start with a set percentage of its capacity.

The computer will not switch off the heating system again until the outside temperature increases by more than 2 °C above **Minimum heating active**. This prevents the heating system from connecting and disconnecting continuously when the outside temperature fluctuates around the temperature setpoint.

3.1.3 De-icing

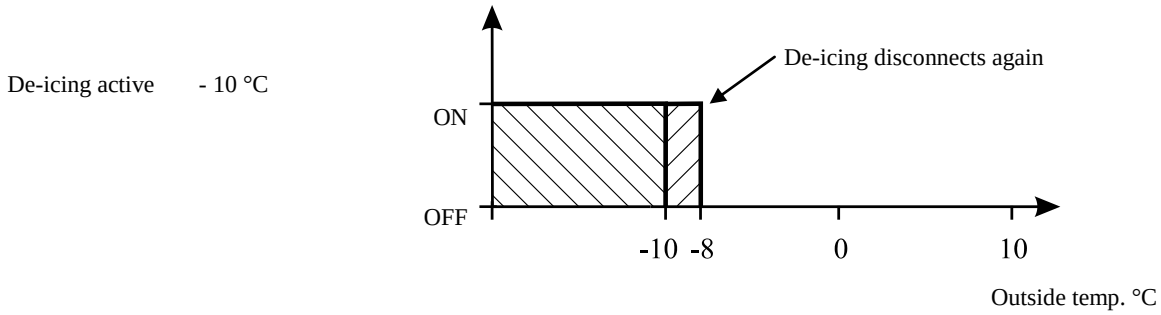
This section is only relevant to houses where the de-icing function is installed.



De-icing is a function, which changes the regulation of the ventilation to **Cycle time** at low temperatures to prevent ice formation in the air inlets.

135Pro activates de-icing when the outside temperature falls below the setting for **De-icing active.**

Example 7: Activation of de-icing

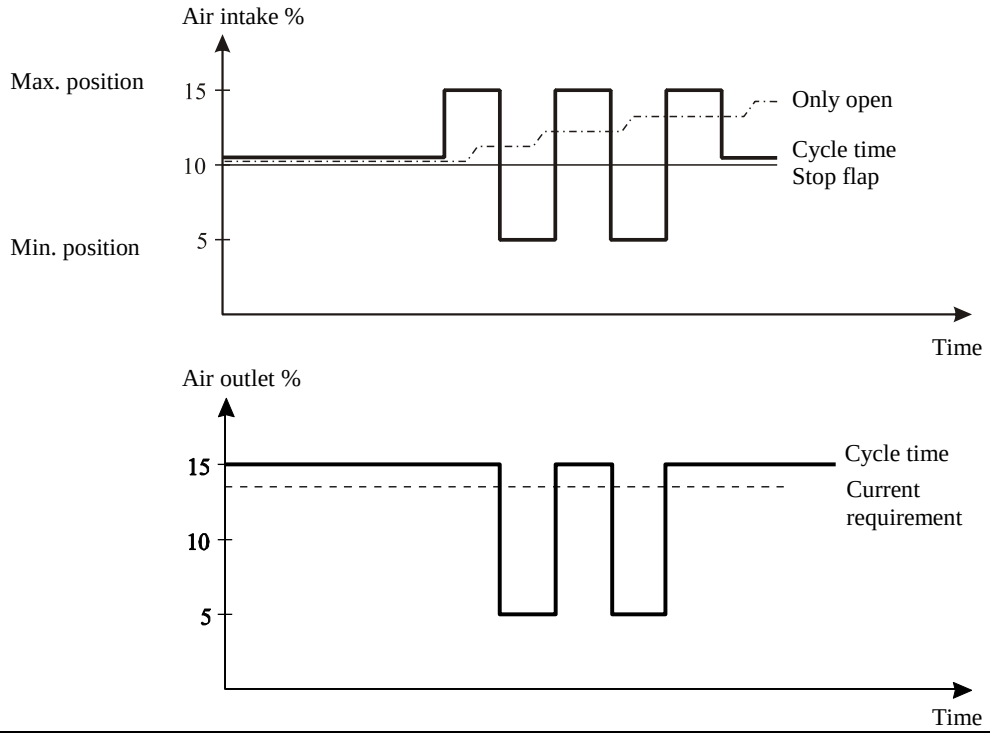


*You must set **De-icing active** to the number of degrees to which the outside temperature must fall until 135Pro activates the de-icing function.*

135Pro will regulate the air outlet according to **Cycle time**. At installation of the air intake, you must (in the menu **Setup**/**Installation**) select which of the following four control systems is to regulate the air intake:

1) **Cycle time**: The flap in the air inlet is regulated according to the cycle time
2) **Stop flap**: The flap in the air inlet remains in the current position regardless of the ventilation level
3) **Only open**: The flap in the air inlet remains in the current position, but can open more if the ventilation requirement increases

Example 8: Control systems for air intake and air outlet with de-icing



In the **Service** menu, the de-icing function can, in a cycle, be set to stop the ventilation completely for a short period, e.g. two minutes. This will also contribute to prevent ice formation in the air inlets.

3.1.4 Combi Diffuse inlet

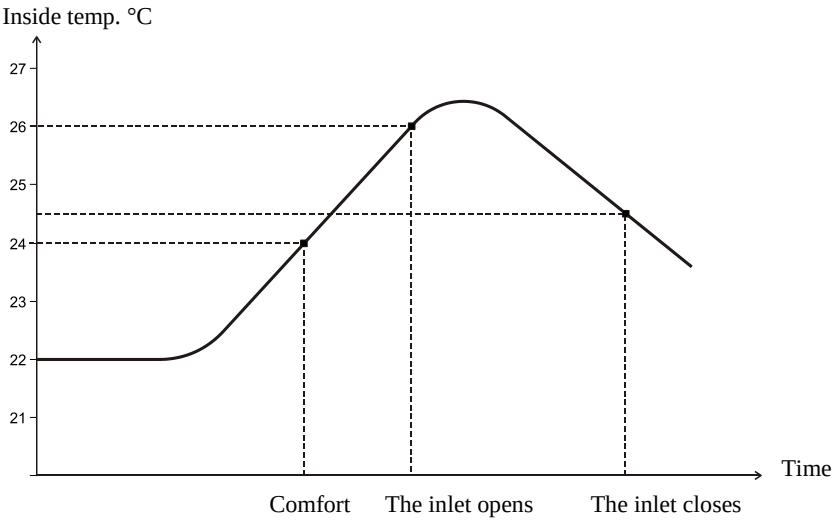
In Combi-Diffuse houses, 235Pro can open ceiling inlets at a given inside or outside temperature or at a combination of both inside and outside temperatures. The inlets also allow stepless opening over a four-point curve.

Inside temp. limit

The inside temperature is set as an addition to **Temperature setpoint** while the outside temperature is set as an absolute temperature. At batch production, the outside temperature can be set as a curve.

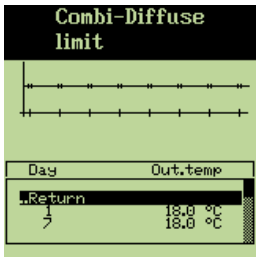
Example 9: Combi-Diffuse inlet – inside temp. adjusted

Temp. setpoint	22 °C
Comfort temp.	2 °C
Inside temp. limit	2 °C



The inlet opens when the inside temperature exceeds ***Temperature setpoint + Comfort temperature*** *by the number of degrees to which the* ***Inside temp. limit*** *has been set. The inlet closes again when the temperature has dropped 1.5° C.*

For outside temperature adjustment, the inlet closes again when the outside temperature has dropped 1° C below the setting.



At batch production, the outside temperature can be set as a curve over four curve points so that the opening of the inlets can be increased when the temperature increases.

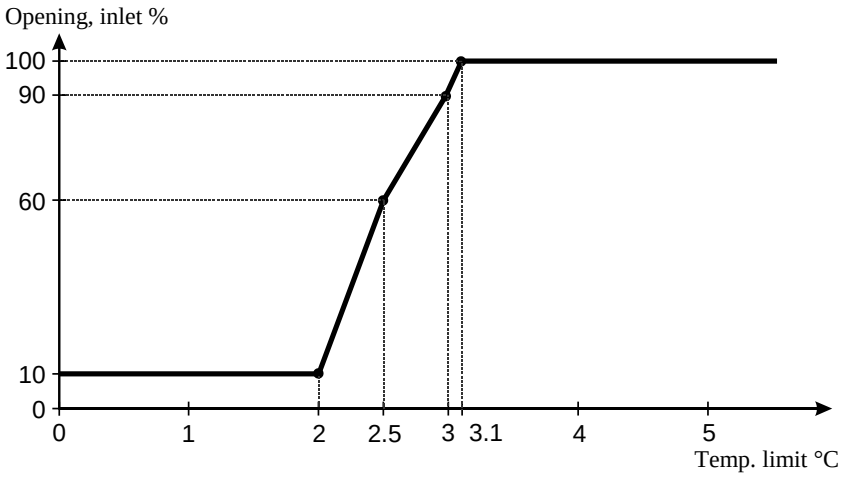
See the **Operation/ Batch curves/ Combi-Diffuse inlet.**

See also section 3.6.3 on batch curves.

3.1.4.1 Stepless Opening of Combi-Diffuse Inlets

Example 10: Combi-Diffuse inlets – stepless opening based on inside and outside temperatures

Temp. limit	Inlet
2.0 °C	10 %
2.5 °C	60 %
3.0 °C	90 %
3.1 °C	100 %

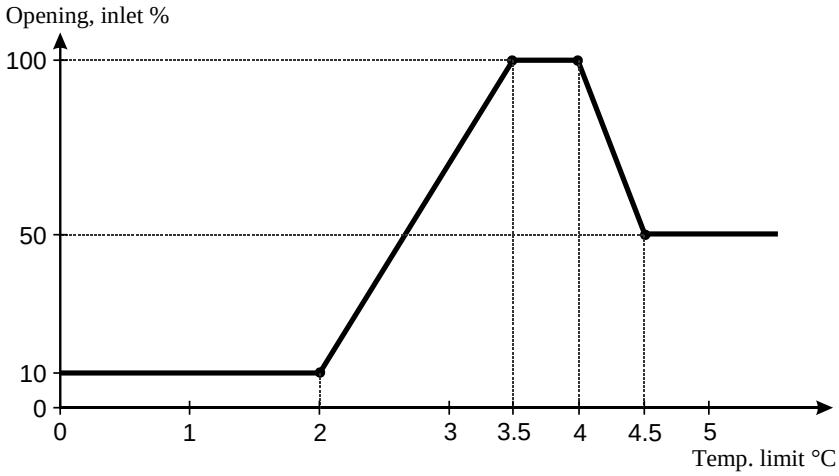


The stepless inlets can be opened gradually over four curve points. Temperature limits are set as an excess temperature for the inside temperature or the outside temperature. For an inside temperature limit, the first point in the curve is equal to the ***Inside temp. limit****.*

For regulation according to both the inside and outside temperatures, the inlet is closed for as long as the outside temperature is below the outside temperature limit. When it is above the outside temperature limit, the inlet will be regulated according to the inside temperature limit.

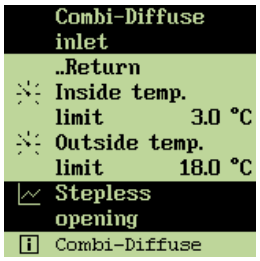
Example 11: Combi-Diffuse inlets – reduced stepless opening at high outside temperatures

Temp. limit	Inlet
2.0 °C	10 %
3.5 °C	100 %
4.0 °C	100 %
4.5 °C	50 %



Set the stepless inlet with reduced opening at high outside temperatures in order to increase the air speed.

When you want… to set the inside temperature limit to gradual opening of Combi-Diffuse inlets, open the **`Temperature`**/**`Combi-Diffuse inlet`** menu, and



→ turn until **`Stepless opening`** is highlighted, and press

→ set the four curve values

3.1.5 Cooling

This section is only relevant to houses with cooling system.

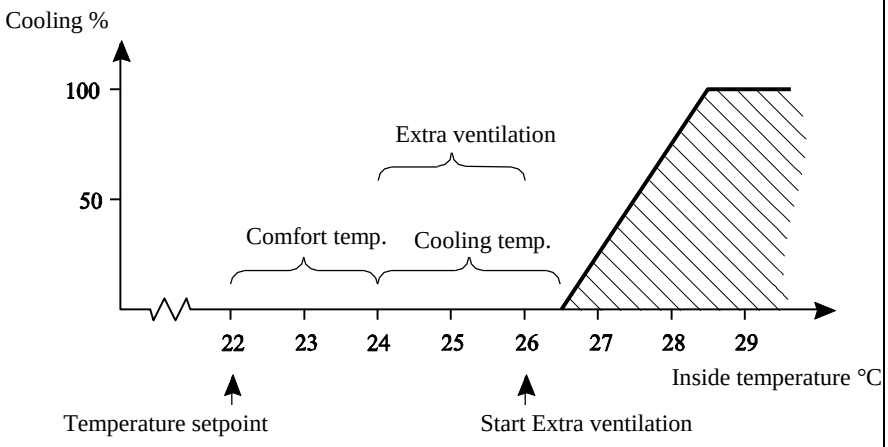
Cooling is used in houses where ventilation alone cannot reduce the inside temperature sufficiently.

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

135Pro activates cooling when the inside temperature rises more above **`Temperature setpoint`** than the number of degrees to which **`Comfort temperature`** and **`Cooling`** is set.

Example 12: Cooling

Temp. setpoint	22 °C
Comfort temp	2 °C
Extra ventilation	2 °C
Cooling temp	2,5 °C



*You must start **`Cooling`** after **`Extra ventilation`** to avoid increasing the house humidity too much. Therefore, the degree figure that activates **`Cooling`** must be higher than the degree figure for **`Extra ventilation`**.*

Stop cooling

The combination of high inside temperature and high air humidity can be life threatening to the animals. As cooling makes the house humidity increase, 135Pro will automatically disconnect cooling when the house humidity exceeds **`Stop cooling`** (normally 75-85 %).

Over the last 10% RH (e.g. from 75% to 85%), maximum cooling is gradually reduced from 100% to 0%.

3.1.5.1 Control Parameters for Cooling

Start time It is possible to limit cooling to operate within a set period of time. Cooling, for example, can therefore be disconnected at night.

`Start time` and **`Stop time`** are set by the factory to the same time; this means that cooling is active all the time.

P-band The P-band indicates the temperature increase that makes the cooling system run from 0 to 100% (see also Example 7).

Cycle time 135Pro adjusts cooling in a cycle sequence. **`Cycle time`** is the total ON+OFF time for cooling. 135Pro calculates the cooling ON time on the basis of the given cooling requirement.

Min. runtime

Switching on and off quickly puts a strain on a relay. For the sake of the relay service life, 135Pro can therefore be set to a **Min. runtime**; this is the minimum period of time which the relay is on.

3.1.5.2 Nozzle Cleaning

Stop cooling

In order to keep the nozzles clean, 135Pro can activate high-pressure cleaning independently of the cooling requirement of the house. Cooling will thus operate for a set period of time (**ON time**) at set intervals.

If the cooling period of time is limited, for example at night, the nozzle cleaning function will not operate during this period.

3.1.6 Spraying

Spraying helps the animals to cool and can control behaviour, among other things with regard to the distribution of animals in the house.

☑ Active

You can adjust the spraying course itself and adjust the spraying to run independently of inside and outside temperature and/or time. You can connect or disconnect this function.

Minimum spraying

is a function, which will make the spraying system run at a set percentage of its capacity. The function can for example be used to control behaviour and change the distribution of animals in the house. However, **Minimum spraying** will usually be set to 0 %.

Keep clean

The **Keep clean** function activates spraying for a period of up to 99 hours. This function has its own set cycle time which is added to the normal spraying function calculated on the basis of the inside temperature.

Stop at outside temp.

Spraying can only start when the outside temperature is above the temperature for **Stop at outside temperature**, and only within the set period.

If you want to make spraying independent of the outside temperature, you can override the function by setting **Stop at outside temperature** to e.g. -10 °C.

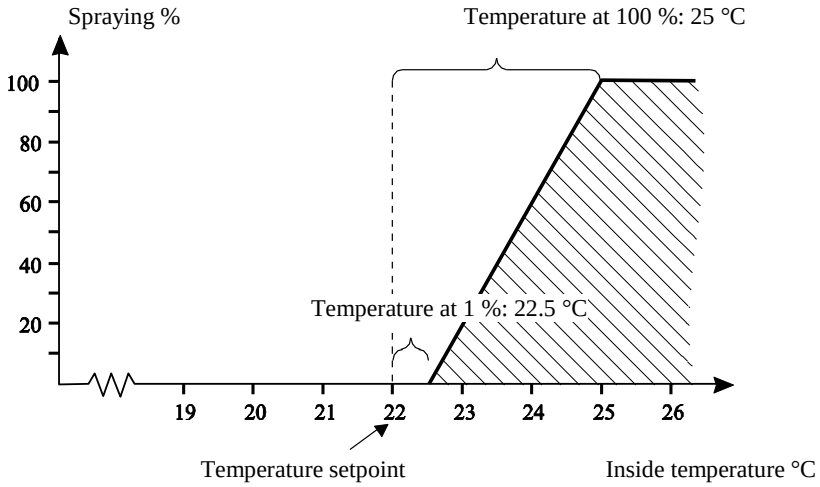
Temp. at 1 %

Temp. at 100 %

Spraying automatically starts when the inside temperature exceeds the temperature limit which you have set. Spraying is increased automatically the more the temperature increases.

Example 13: Spraying *a*ccording to inside temperature

Temp. setpoint	22,0 °C
Temperature at 1 %	0,5 °C
Temperature at 100 %	3,0 °C



You must set the function to the number of degrees by which the temperature is to exceed ***Temperature setpoint*** *before spraying starts.*
If you want to make spraying independent of the inside temperature, you can override the function by setting both settings for ***Temperature at x*** *% to e.g. -1 °C.*

Spraying increases the air humidity in the house. This has a cooling effect and may therefore, when spraying is used for controlling behaviour, lead to increased heat consumption.

3.1.6.1 Limitation of Spraying

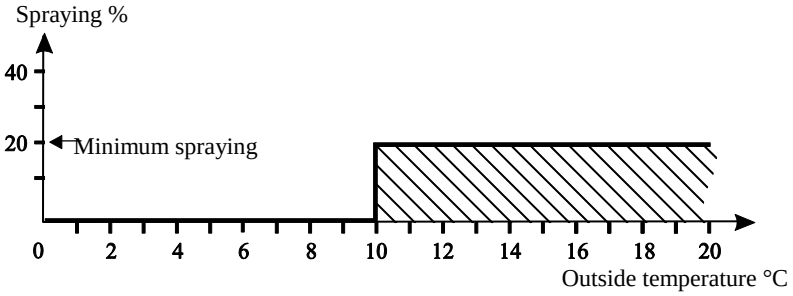
The other settings of the spraying menu can work as starting requirements, which have to be fulfilled before spraying can start.

Spraying can only start when the outside temperature is above the temperature for **Stop at outside temperature**, and only within the set period.

However, an upper outside temperature limit can be set which will also activate spraying outside the period of the time set, if the inside temperature is sufficiently high.

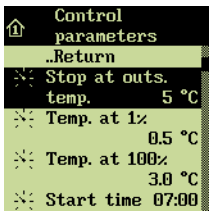
Example 14: Spraying according to outside temperature

Min. spraying	20 %
Stop spraying	10 °C



If you want to make spraying independent of the outside temperature, you can override the function by setting ***Stop at outside temperature*** *to e.g. -10 °C.*

When you want to … limit spraying at low outside temperatures,
open the **Temperature/Spraying/Control parameters** menu, and

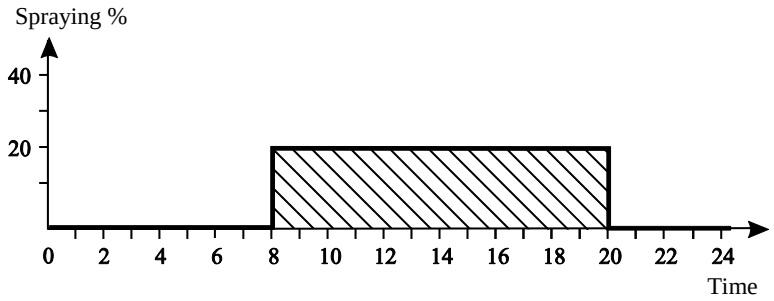


→ turn until **Stop at outside temperature** is selected, and press

→ turn to set a temperature

Example 15: Spraying according to time

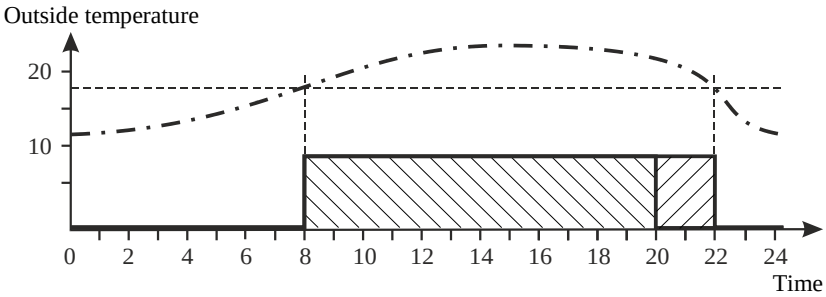
Min. spraying	20 %
Start time	8:00 h:m
Stop time	20:00 h:m



*If you want the spraying function to be active all the time, you can override the function by setting **Start time** and **Stop time** to the same time.*

Example 16: Spraying according to time and outside temperature

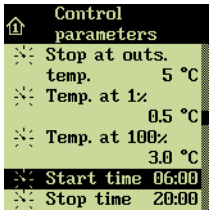
Start at outside temp.	18 °C
Min. spraying	20 %
Start time	08:00 h:m
Stop time	20:00 h:m



Spraying continues after the stop time when the outside temperature is above the limit.

Spraying according to outside temperature does not start unless the inside temperature limits have been exceeded.

When you want to … limit spraying within a period of time,
open the **Temperature/Spraying/Control parameters** menu, and

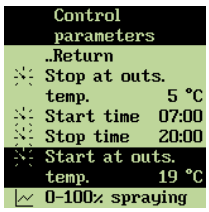


→ turn until **Start time** is selected, and press

→ turn to set the time

Set **Stop time** in the same way.

When you want … to set an upper outside temperature which will activate spraying even during the stop period, open the **Temperature/Spraying/Control parameters** menu, and



→ turn until **Start at outside temp.** is highlighted, and press

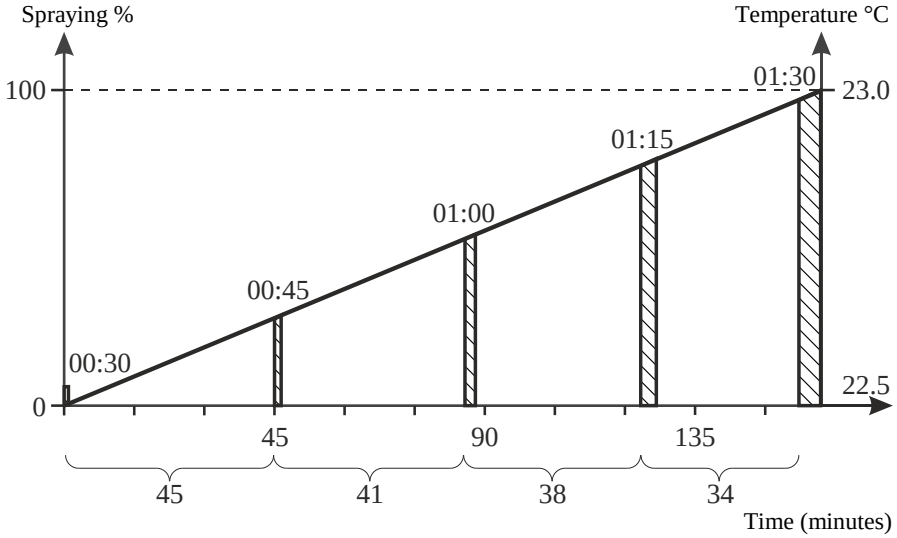
→ turn to set a temperature

3.1.6.2 Setting of Spraying Course

The warmer it is in the house, spraying can be set to run more often and for longer periods.

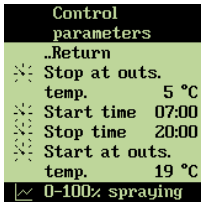
Example 17: Spraying course: ON-time and cycle time

Temp. setpoint	22 °C
ON-time 1 %	00:00:30
Cycle time 1 %	00:45:00
ON-time 100 %	00:01:30
Cycle time 100 %	00:30:00

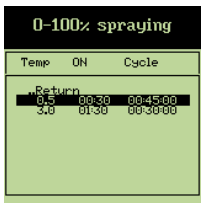


100 % spraying means that the spraying function runs according to its maximum setting, not that the system is running continuously.

When you want to … set the spraying course,
open the **Temperature/Spraying/Control parameters** menu, and



→ turn until **0-100% spraying** is selected, and press



→ turn and press to be able to set any curve point

3.1.7 Floor Heating

Floor heating is used in, for example, piglet houses where it partly contributes to controlling the distribution of pigs in the house, and partly works energy-saving compared to heating of all the house air.

Floor temp. setpoint

135Pro climate computer can control floor heating with or without floor temperature sensor. With a sensor, the computer will keep the floor heating on a set floor temperature. Without a sensor, the computer will supply heating with a set percentage of the heating system capacity.

Min. floor heat %

Minimum floor heating is used for temperature controlled floor heating (with sensor) and is a function, which will make the floor heating system run as a minimum with the set percentage of the system capacity. Even if the floor temperature is then higher than **`Floor temperature setpoint`**, the system will continue to supply floor heating.

Minimum floor heating can be used for maintaining a certain floor heating in the house, thus influencing the distribution of the animals.

Outside temp. control

This function which is intended for areas with high day temperatures makes it possible to switch off floor heating during the day. When the outside temperature exceeds the setting, 135Pro disconnects floor heating.

3.1.8 Night Setback

Night setback is designed for lowering the inside temperature for a set period every night to support the natural behaviour of the animals. Thus, a lower inside temperature has the effect that the animals experience a normal circadian rhythm. Furthermore, the ventilation level will be relatively higher, and this will provide a better air quality.

When the function is activated, you can read the current night setback in the display.

NB The function cannot be activated when the house is set to empty house.

Night temp.

The function is designed for a nightly setback, but it can be set to run at any time and to let the temperature rise (by setting the value to a positive figure).

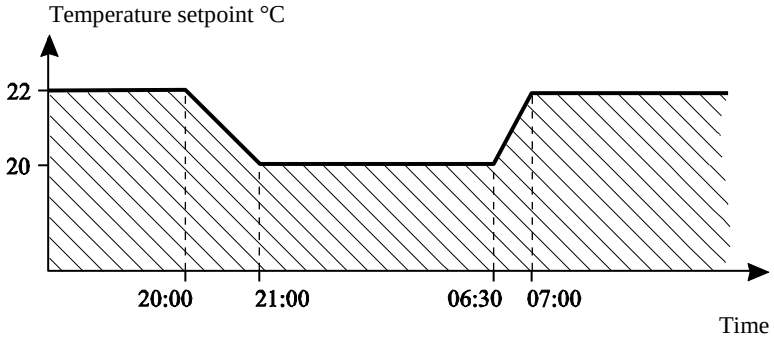
Start time

Stop time

At batch production, the function can be set to lower the temperature automatically during the batch. See the **`Management`** / **`Batch curves`** menu for how to set a curve.

Example 18: Night setback

Temp. setpoint	22 °C
Start time	20:00:00
Stop time	07:00:00
Night temperature	2 °C



The inside temperature will gradually adapt to the night setback within the period of time the setback is set to last.

3.2 Humidity

This section is only relevant to houses with humidity sensor.

	Ordinary operation 1st level		Advanced operation 2nd level	
	Active			
	Current humidity	74 % RH		
	Humidity setpoint	**75 % RH**		
	Humidification setpoint	**45 % RH**		
	Humidification requirement	0 %		
	More...		Lowest hum. 24 hrs	72 %
			Highest hum. 24 hrs	76 %
			Trend curve	

Table 2: Survey of the humidity menu (you can change the values highlighted in bold writing)

3.2.1 Active

When the humidity sensor is installed and activated, the computer adjusts the house air humidity according to the humidity setpoint. Humidity is supplied to the house air partly from animals, feed, drinking water and litter, and partly from the functions spraying, cooling and humidification.

3.2.2 Humidity Setpoint

When the air humidity is higher than **`Humidity setpoint`**, the computer will increase ventilation to reduce the humidity level. When the air humidity is lower than the setting, the computer will initially reduce ventilation to increase the humidity level and then activate humidification if the house has a humidification system.

It takes some time to change the humidity level in the house. Therefore, when you want to change the humidity setting, you must start by adjusting Humidity setpoint by 2-4 %. Wait 12-24 hours and estimate if you have obtained the required result. If you are in doubt concerning the humidity setting, please contact your adviser.

3.2.3 Humidification Setpoint

Humidification increases the air humidity of the house by supplying atomized water to the air. It is important to maintain a certain air humidity, to avoid dehydration of the animals' mucous membranes.

135Pro climate computer increases humidification as long as the air humidity is below **`Humidification setpoint`**.

When the inside temperature is 2 °C below **`Temperature setpoint`**, the 135Pro is factory preset to limit humidification. Humidification will be disconnected if the inside temperature is 3 °C below. Otherwise humidification could make the inside temperature drop further.

There must be a minimum of 5 % between **`Humidity setpoint`** and **`Humidification setpoint`** to avoid the situation that the computer alternately ventilates and humidifies.

There are two humidity control principles to choose between duing the set up.

1: Humidity control with heating

This control form will reduce a too high humidity level by increasing ventilation gradually. The increased air change will make the inside temperature fall. To maintain the temperature of **`Heating temperature`**, the heating system will gradually supply more heating.

Humidity control with heating makes it possible to keep the house air humidity on the set humidity. This principle is therefore to be preferred, even if it requires increased heat consumption.

If you disconnect heating while 135Pro is set up for humidity control with heating, the computer will automatically switch to the other humidity control principle, namely temperature reduction.

The lower the humidity setting, the stronger the ventilation and heat supply will react to it. A low humidity setting may therefore lead to increased energy consumption for ventilation and heat.

2: Humidity control by temperature reduction

This control form can be used when the animals can stand a drop in temperature at high air humidity. This function limits the use of heating in the house, but it cannot keep the air humidity on the set humidity.

When 135Pro climate computer is set up to control humidity according to the principle of temperature reduction, the computer will adjust a too high humidity level by reducing the setting of the inside temperature by a few degrees (**`Reduction`**).

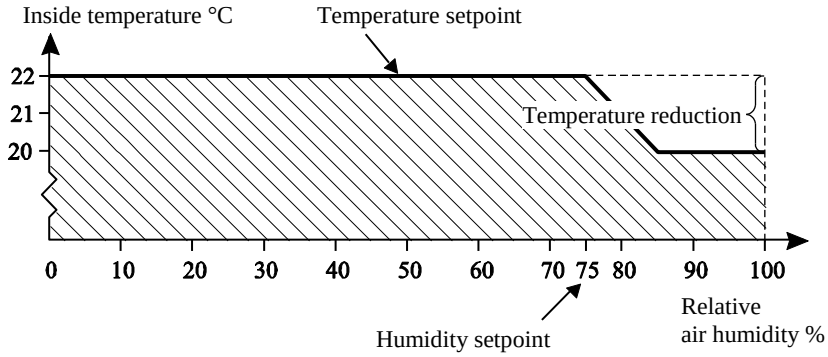
At a lower temperature setting, 135Pro will thus increase ventilation and with that the air change. When this has made the inside temperature fall, the ventilation will decrease to minimum ventilation in order to limit the heat loss from ventilation. If this is not sufficient to maintain the reduced **`Heating temperature`**, the computer will supply more heating gradually.

When you have disconnected heating, 135Pro will automatically adjust the air humidity according to the principle of temperature reduction.

The course of humidity control is the same as with heating until the point where ventilation is reduced to minimum ventilation. Without heating, the inside temperature could continue to fall below **`Heating temperature`**.

Example 19: Humidity control with temperature reduction

Temp. setpoint	22 °C
Humidity setpoint	75 %
(Setup menu: Reduction)	2 °C)



135Pro climate computer will lower the temperature setpoint by 1 °C with each 5 % the air humidity exceeds the humidity setpoint.

3.3 Alarms

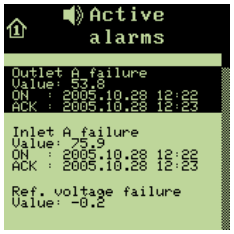
	Ordinary operation 1st level		Advanced operation 2nd level	
Active alarms	Error air intake			
	Value	- 0.0		
	ON	10.11.14 12:19:08		
	ACK	10.11.14 12:19:12		
Previous alarms	Error air intake			
	Value	- 0.0		
	ON	10.11.14 12:43:00		
	ACK	10.11.14 12:50:35		
	OFF	--.--.-- --:--:--		
Alarm limits				
Alarms not maintained				
Temp. alarm	**High temp. limit**	**3 °C**		
	Low temp. alarm			
	Low temp. limit	**- 3 °C**	**Summer alarm at 20 °C outside**	**7 °C**
	More...		**Summer alarm at 30 °C outside**	**3 °C**
			Abs. high temp.	**32 °C**
Humidity alarm	**Abs. high humidity**			
	More...		**Abs. high humidity limit**	**95 %**
Flap alarm	**Error air intake 1**			
	Error Combi-Diff. inl.			
	Error air outlet 1-1			
	Common exhaustion Air outlet 1-2			
Dynamic Air Alarm	**Dynamic air alarm**			
	Dynamic air limit	**10 %**		
Sensor alarms	Error inside temp. sensor			
	Error outside temp sensor			
	Misplaced outside sensor	**5 °C**		
	Error humidity sensor			
	Error hum. sensor limit	5 %		
	CO_2 sensor error Low			
	CO_2 sensor Low limit	**500 ppm**		
	CO_2 sensor error High			
	CO_2 sensor High limit	**8500 ppm**		
Water alarm	**Max. water alarm**			
	Max. water alarm	**15 %**		

	Ordinary operation 1st level		Advanced operation 2nd level	
	Min. water alarm			
	Min. water alarm	-10 %		
	Start alarm day	2		
	Start alarm time	15:00		
	Stop water		Water meter 1 stop	
			Leakage 1 limit	
Emergency control	Emergency air intake		Emergency air intake	4 °C
			Abs. High temp.	
			Error temp. sensor	
			Power failure	
	Emergency opening		High temp.	
			Abs. High temperature	
			Abs. High humidity	
			Error inside temp. sensor	
			Power failure	
	Temp. controlled emerg. Opening		Emergency opening temp.	29.0 °C
			Temp. setpoint	25.5 °C
			Warning at emergency temp.	
			Warning emergency temp. limit	6 °C
			Battery alarm	
			Battery voltage limit	16 V
			Power failure	
			Current voltage	17.1 V
			Lowest measured voltage	16.4 V
Power failure				
Alarm test				
Open water				

Table 3: Survey of the alarm menu (you can change the values highlighted in bold writing)

3.3.1 Active Alarms

When an alarm is generated, 135Pro climate computer will register the type of alarm and the time for its generation. This information will be shown in a special alarm window in the display.



The failure is registerd as a failure on the outlet A.

The value 53.8 indicate the level of the failure

ON : The time the failure was generated

ACK : The time the failur was acknowledged

The computer will also generate an alarm signal, which you can choose to maintain. Thus the signal will continue, even if the condition that caused the alarm has stopped.

Stop alarm

You must actively disconnect the alarm signal by acknowledging the alarm (press enter).

3.3.2 Previous Alarms

Info history

135Pro climate computer registers alarms including information about when they were generated and when they stopped. It often happens that several alarms succeed each other because an error in one function also affects other functions.

Thus, a flap alarm could be succeeded by a temperature alarm, as the computer cannot control the temperature correctly with a defective flap. In this way, the previous alarms enable you to follow an alarm course back in time and find the error that caused the alarms.

135Pro saves up to 20 active and previous alarms. When the 21st alarm is generated, the computer deletes the oldest alarm from its memory.

3.3.3 Alarm Limits

135Pro climate computer has a range of alarms, which the computer will generate if a technical error occurs or the alarm limits are exceeded. A few of the alarms are always connected, e.g. Power failure. You can connect and disconnect the others (☐ /☑) and for some you can set the alarm limits

<u>It is always the user's responsibility that the alarm settings are correct.</u>

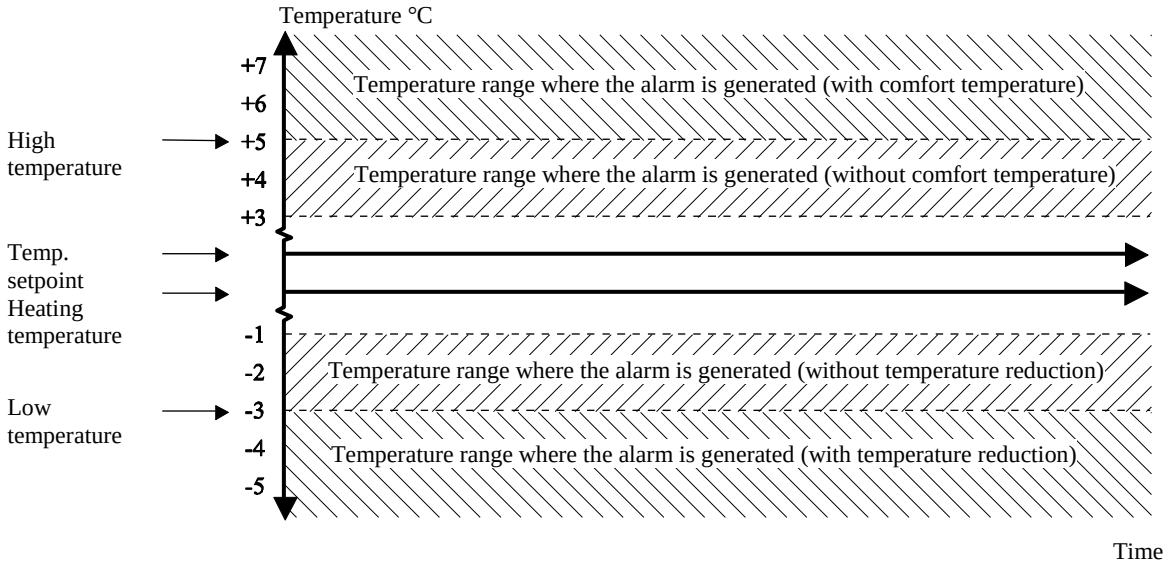
Alarms for climate regulation are not active when the batch status is Empty house. Also see paragraph 3.6.1.1.

☐ Alarms not maintained

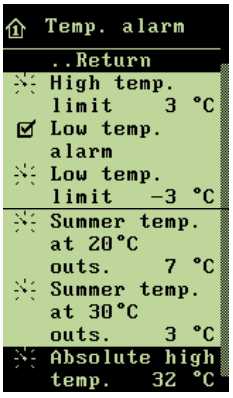
Alarms not maintained means that the alarm signal will continue until you acknowledge the alarm by pressing the adjustment knob. This also applies even if the situation that generated the alarm has stopped. You can connect and disconnect the function.

Temperature alarm

Example 20: Alarm high and low temperature



When the 135Pro Climate Computer is set up with the functions comfort temperature or humidity control with temperature reduction, the computer will add the number of degrees(to which the comfort temperature is set) to ***Temperature setpoint****, or subtract the number of degrees (to which humidity control with temperature reduction is set) from* ***Temperature setpoint****. A high temperature alarm will therefore be calculated in comparison with* ***Temperature setpoint*** *+ an addition for* ***Comfort temperature*** *or - a* ***Reduction*** *for humidity control.*

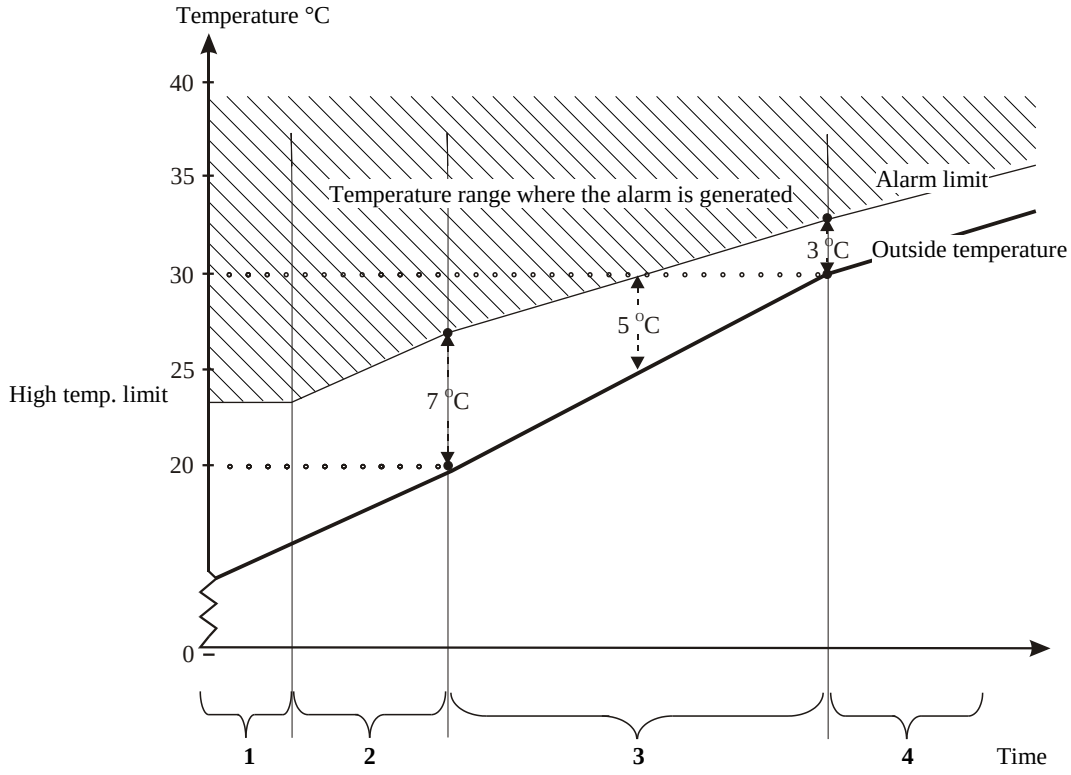


The chosen 3ºC / -3ºC means that an alarm will be generated, when the set temperature exceeds more than 3ºC.
Setting of summer temperature ved 20 °C and 30 °C outside.

The function has a varying alarm limit, which follows the changes of high outside temperatures. When the temperature increases, the alarm limit will increase also. Thus, it delays the time when the high temperature alarm is generated.

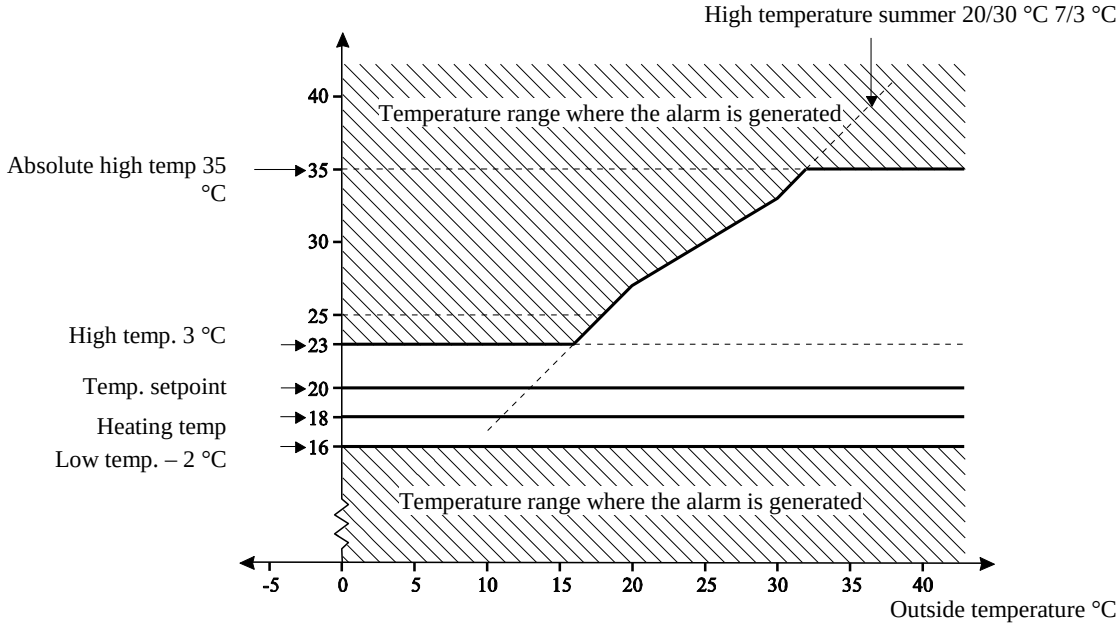
The alarm for absolute high temperature is generated by the actual temperature, e.g. 32 °C. Thus, it will neither, like the alarm for high temperature, vary according to the setting of **Temperature setpoint**, nor can it be delayed by a high temperature at 20/30 °C.

Example 21: Summer temperature at 20 °C and 30 °C outside



1. *The alarm limit does not drop below the* ***High temperature limit****.*
2. *Below 20 °C outside, the alarm limit +7 °C is staggered in relation to the outside temperature.*
3. *Between 20° C and 30 °C outside, a gradual transition from 7 °C to 3 °C takes place. At an outside temperature of e.g. 25 °C, the inside temperature must thus be 5 °C higher (exceed 30 °C) before the alarm is generated.*
4. *Above 30 °C outside, the alarm limit is staggered +3 °C in relation to the outside temperature.*

Example 22: All temperature alarms



The high temperature alarm takes the comfort temperature into account so that the alarm is not generated until the ***Comfort temperature*** *has been added to the* ***Temperature setpoint****.*

Humidity alarm

135Pro climate computer generates an alarm for absolute high humidity when the house humidity exceeds the setting. This may for example be caused by a technical sensor error.

Flap alarm

The flap alarms are technical alarms. The 135Pro climate computer generates an alarm if the actual flap opening of the air intake or air outlet is different from the setting, which the computer calculates as correct.

You can connect or disconnect the function. Connection and disconnection works in the same way for both air intake, air outlet, and combi-diffuse inlet.

Dynamic Air alarm

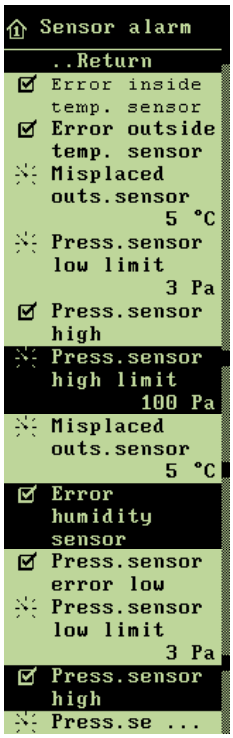
The Dynamic Air alarm is triggered in case of mechanical error. 135Pro triggers an alarm if the measurement of the ventilation output deviates from the calculated ventilation requirement.

You can activate and deactivate the function and set an acceptable deviation.

The Dynamic Air alarm may be due to a mechanical error in the fan, the pressure sensor or the flap position.

Check the fan while it is running. Further troubleshooting must be carried out by technically trained personnel.

Sensor alarm



The computer generates an alarm in case of short circuit or interruption of the inside temperature sensor. Without this sensor the computer cannot control the inside temperature and the error will, in addition to the alarm, generate an emergency control of the ventilation system, which will open 50 %. The alarm for error in the inside temperature sensor is always active.

An alarm will also be generated in case of short circuit or interruption of the outside temperature sensor. You can connect or disconnect the function.

The alarm indicates if the sensor is exposed to solar heating and consequently shows a wrong outside temperature. The computer generates an alarm when it measures the inside temperature to the number of degrees below outside temperature to which the function is set (e.g. 5 °C).

135Pro climate computer generates an alarm when the humidity sensor is interrupted or the air humidity is below the setpoint. The alarm limit is factory preset at such a low level (5 %) that the alarm is only generated in case of actual sensor errors. You can connect or disconnect the function.

135Pro climate computer generates an alarm when the pressure in the exhaust duct falls below or exceeds the settings for **`Pressure sensor error Low/High limit`**. You can connect or disconnect the function.

3.3.3.1 Emergency Control

3.3.3.1.1 Emergency air intake

This section is only relevant to houses in which emergency air intake is installed.

The emergency air intake can be released by four types of alarms.

Emergency air intake	Released by	
	Power failure	Always release
	Absolute high temperature	Connect or disconnect
	Error inside temp. sensor	Connect or disconnect
	Emergency air intake temp.	Set

Table 4: Release of emergency air

Whether an error in an inside temperature sensor is to release the emergency air intake depends on the general climatic conditions. If it is very warm, you can use the function to advantage. If, however, it is cold, you must consider whether it is necessary and whether the animals can withstand it.

Emergency air intake has its own temperature setting, **`Emergency air intake - temperature`**, which is a number of degrees that is added to **`Temperature setpoint`** and possibly **`Comfort temperature`**. This setting makes it possible to open the air intake in warm periods when the air intake would not otherwise be released by the normal high temperature alarm limit.

It may be an advantage to disconnect absolute high humidity in houses that are situated in areas with very high outside air humidity, and in the event of a technical sensor error.

3.3.3.1.2 Emergency opening

135Pro climate computer has emergency opening as a standard function, whether a proper emergency opening is installed or not. As long as there is power, the computer will open the ventilation system 100 % in case of a relevant alarm - even when it is cold outside.

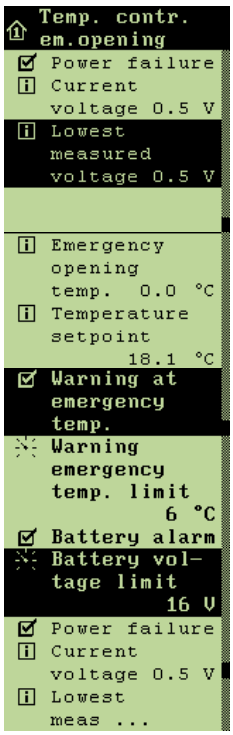
The emergency opening can be released by five types of alarms.

Emergency opening	Released by	
	High temperature	Always release
	Absolute high temperature	Always release
	Error inside temp. sensor	Always release
	Power failure	Always release
	Absolute high humidity	Connect or disconnect

Table 5: Release of emergency opening

3.3.3.1.3 Temperature Controlled Emergency Opening

This section is only relevant to houses where temperature controlled emergency opening is installed.



Temperature controlled emergency opening is only released when the inside temperature exceeds the temperature to which the emergency opening is set (**Emergency opening - temperature**). You can read the setting as an actual figure in the display. The emergency opening is also active in the event of power failure.

You must set the temperature at which the emergency opening is to operate, on the emergency opening controller unit itself, by means of the adjustment knob. The setting can be read in the display together with **Temperature Setpoint**.

135Pro climate computer can give a warning, which will flash in the display if **Emergency opening - temperature** is set too high compared to **Temperature setpoint** (inside temperature). This is particularly relevant in houses with batch production and a decreasing temperature curve. Here you must continuously make a downward adjustment of **Emergency opening - temperature**. However, the too high setting may also have been created in error.

The warning function can be connected or disconnected. It must be set with the number of degrees that **Emergency opening - temperature** is allowed to exceed **Temperature setpoint** before the computer is to give a warning.

Temperature controlled emergency opening has a battery, which ensures that the emergency opening will operate in spite of power failure when the inside temperature exceeds the setting of **Emergency opening - temperature**.

You can read the current and the lowest measured voltage of the battery. These readings indicate when you must change the battery or if a technical error is possibly causing the battery alarm. 135Pro can generate an alarm when the battery, which powers the emergency opening, does not function. This function can be connected or disconnected.

Make sure not to set the **Battery voltage limit** too low, as this will make the alarm inactive. Minimum 15 V, if nothing else is specified

3.3.3.2 Power Failure

135Pro climate computer will always generate an alarm in case of power failure.

3.3.4 Alarm Test

Regular testing of alarms contributes to ensuring that they actually work when needed. Therefore, you should test the alarms every week. The test must be made in all houses separately.

Turn until **Alarms** is marked, and press enter to start the testing

→ check that the alarm lamp is flashing

→ check that the alarm system works when activated

Alarm type		When the alarm is generated, it releases …
Temperature alarm	High temperature	Alarm signal
		Emergency opening
	Summer temperature at 20 °C and 30 °C	Alarm signal
		Emergency opening
	Low temperature	Alarm signal
	Absolute high temperature	Alarm signal
		Emergency air intake ON/OFF
		Emergency opening
Humidity alarm	Absolute high humidity	Alarm signal
		Emergency opening (ON/OFF)
Flap alarm	Error air outlet	Alarm signal
	Error air intake	Alarm signal
Dynamic Air alarm	Mechanical error	Alarm signal
Sensor alarm	Error inside temp. sensor	Alarm signal
		The ventilation system runs 50 %
		Emergency opening
		Emergency air intakeON/OFF
	Error outside temp. sensor	Alarm signal
	Misplaced outside sensor	Alarm signal
	Error humidity sensor	Alarm signal
	Auxiliary sensor	Alarm signal
	Pressure sensor	Alarm signal
Power failure		Alarm signal
		Emergency air intake
		Emergency opening
		Temperature controlled emergency opening (only if **`Emergency air intake-temperature`** is exceeded)

Table 6: Survey of alarm functions

3.4 Ventilation

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
	Dynamic Air 10,053 m³/h		
	Ventilation requirement 49 %		
	Minimum ventilation 9.3 %		
	Min. vent./ animal 7.2 m³/h		
	Maximum ventilation 300 %		
	More...	**Ventilation status**	
			Dynamic Air outlet 9450 m³/h
			Dynamic MultiStep Low/High
			Dynamic MultiStep free range Closed/ open
			Stepless 1 70 %
			Air outlet 1/2 80 %
			MultiStep 1 OFF
			Air intake 1/2 49 %
			Inlet fan 1 41 %
		CO_2 minimum ventilation	
			Active
			CO_2 8100 ppm
			CO_2 minimum ventilation 80 %
			CO_2 setpoint 2000 ppm

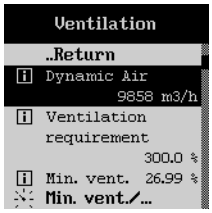
Table 7: Survey of the ventilation menu (you can change the values highlighted in bold writing)

The house ventilation consists of an air intake and an air outlet. Apart from supplying fresh air to the house, the ventilation is to remove humidity and possible excess heat.

135Pro currently adjusts the ventilation according to a calculation of the actual ventilation requirement. Thus the computer will increase or limit ventilation according to whether the inside temperature and air humidity is too high or too low.

When you want to make adjustments of the ventilation the question is primarily which limits you want for how much, or how little the ventilation is to run.

3.4.1 Dynamic Air



Dynamic Air provides the opportunity to ensure the correct air change in the livestock house, also under changing pressure conditions.

Dynamic Air requires the installation of a sensor in the stepless air outlet(s). Measurement of the varying stepless output precisely reflects the output of the ventilation system.

Independent of the installation, Dynamic Air can be applied as Dynamic Flow or Dynamic Control (also see *135Pro Technical Manual*).

Dynamic Flow	With Dynamic Flow 135Pro measures the output of the ventilation system. Ventilation control proceeds (as before) according to a curve value of the stepless air outlet(s).
Dynamic Control	With Dynamic Control the fan in the stepless air outlet is regulated in accordance with the measurement in the air outlet whereas the flap continues to be regulated according to a curve value of the stepless air outlet(s). This provides an improved regulation particularly at minimum ventilation and thus also possible savings on heating.

3.4.2 Minimum Ventilation

The function minimum ventilation, supplies exactly the amount of air required in the house to ensure an acceptable air quality. The function is particularly relevant during periods of cold weather when it is not necessary to ventilate to reduce the inside temperature.

The 135Pro calculates the necessary minimum ventilation based on the animals' requirement for fresh air. You can read the minimum ventilation either as a percentage of the ventilation system capacity or as m^3/h per animal. The system will never ventilate less than this indicated minimum ventilation.

Setting of Minimum Ventilation per Animal

The animals' requirement for fresh air varies depending on breed and weight. You must state the requirement as cubic metre air per hour (m^3/h) per animal. You can find the correct figure in the technical literature or ask your adviser if in any doubt.

Please note that the correct number of animals must be set in the management menu.

3.4.3 Maximum Ventilation

The function maximum ventilation sets a limit to how much of the ventilation system capacity (in per cent) the computer can activate. 100 % ventilation corresponds to the animals' calculated requirement; while ventilation utilising the total capacity of the system, may reach, for example 160 % (see also the section concerning extra ventilation).

The function can be relevant to use during very high outside temperatures, where ventilation with the whole system capacity would make the inside temperature exceed the required setting. The function can also prevent, for example, small animals being exposed to excessive ventilation.

When you want to ignore the function, you must set **`Maximum ventilation`** to 300 % (factory setting). This way, you make sure that no limit has actually been set for how much of the ventilation system capacity that can be used.

Ventilation is mainly to remove the water vapour, which comes from animals and manure among other things. At the same time the ventilation removes heat. However, this heat loss is a necessary price for being able to reduce the air humidity.

3.4.4 Extra Ventilation Air Intake in %

This section is only relevant to houses in which 135Pro is set up with reduction of the air intake.

Reduction of the air intake is designed for increasing the air velocity throughout the house, providing a greater cooling effect when the house during warm periods is provided with extra ventilation. Thus, the function enables you to partly open an extra air inlet in the gable, and reduce or close the main air inlets in the sides of the house at the same time.

135Pro activates the function while the last step of the extra ventilation is activated.

3.4.5 Ventilation Status

Stepless and MultiStep® position

The air outlet in the house partly consists of one or more stepless exhaust units, and partly groups of ON/OFF exhaust units. The stepless exhaust unit is variable, as the computer can adjust the motor performance and flap opening of the fan, whilst the fans in the other exhaust units are either on or off.

The ventilation system starts by connecting the stepless exhaust unit. When the ventilation requirement exceeds the capacity of the stepless exhaust unit, a group of the other exhaust units are connected while the output of the stepless exhaust unit is reduced. Thus, the computer achieves the stepless transition from one ventilation level to the next. If the ventilation requirement is further increased, the stepless exhaust unit will run to its maximum until it reduces its output when the next group of ON/OFF exhaust units is connected.

All exhaust units in the house are marked with an indication of whether it is a stepless or an ON/OFF exhaust unit. Thus, the last-mentioned are numbered according to which MultiStep® they belong to. In this way, it is possible to recognize the individual exhaust units and compare their actual output with the status that you can read in the ventilation menu. This is particularly relevant in connection with fault finding.

Flap opening

The flap opening is a percentage specification of how much the flaps of both air intake and air outlet are open. If you have doubts about the actual output of the ventilation, you can compare the reading of the ventilation status in the ventilation menu with the output that you can actually observe in the house. Thus, the percentage specifications are particularly relevant in connection with fault finding.

3.4.5.1 Free Range

This section is only relevant to houses in which the function free range is active.

Free range is a function, which for economy reasons reduces/stops the fans while the animals are outside. This also reduces the draught, which is created when doors are opened to the outside.

When doors are opened to the outside and the function is connected (**Open**), the function reduces/stops the fans while the chimneys are kept open. When the free range function is disconnected (**Closed**), the ventilation system runs normally.

Free range is controlled by an external free range switch.

When you open passages to the house while the ventilation is running, fresh air will come in through the openings and create draught in the passages. The animals will avoid places with draught and thus will not go out of the house.

3.4.6 CO_2 Minimum Ventilation

This section is only relevant to houses in which a CO_2 sensor is installed.

The CO_2 minimum ventilation function regulates the house air CO_2 contents to lie on the set level as a maximum. Thus, this function takes over regulation of the ventilation. You can connect and disconnect the function.

3.5 Common exhaustion

	Ordinary operation		Advanced operation	
	1st level		2nd level	
(pressure control)	Dynamic Air	10,053 m³/h		
	Com. exh. requirement	75 %		
	Measured pressure	23 Pa		
(pressure control)	**Pressure setpoint**	**23 Pa**		
	Common exhaustion		Dynamic Air outlet	9450 m³/h
			Stepless 1	100 %
			MultiStep 1	ON
			Air outlet 1	82 %
			Dynamic MultiStep com. exh.	Low/High

Table 8: Survey of the common exhaustion menu (you can change the values highlighted in bold writing)

From one climate computer the common exhaustion function can regulate the exhaustion from all sections in a house with a common exhaust duct. At setup of the climate computer, it is decided in which way the common exhaustion is to be regulated. Setting must only be made when the common exhaustion is pressure-controlled.

3.5.1 Dynamic Air

Dynamic Air provides the opportunity to ensure the correct air change in the livestock house, also under changing pressure conditions.

Dynamic Air requires the installation of a sensor in the stepless air outlet(s). Measurement of the varying stepless output precisely reflects the output of the ventilation system.

Independent of the installation, Dynamic Air can be applied as Dynamic Flow or Dynamic Control (also see *135Pro Technical Manual*).

Dynamic Flow	With Dynamic Flow 135Pro measures the output of the ventilation system. Ventilation control proceeds (as before) according to a curve value of the stepless air outlet(s).
Dynamic Control	With Dynamic Control the fan in the stepless air outlet is regulated in accordance with the measurement in the air outlet whereas the flap continues to be regulated according to a curve value of the stepless air outlet(s). This provides an improved regulation particularly at minimum ventilation and thus also possible savings on heating and power.

3.6 Management

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
House data	House name: House 1 Batch status: Active / Empty Number of animals: 300 Day no: 50 Time: 14:15:16 Date: 2012:10:08		
Environment function	Manual start Manual period: 00:30:00 Day program active More…	Environment temperature: - 2 °C Environment ventilation: + 10 % Day program Program course	Active periods 1-4 Start 1-4: 07:15 Stop 1-4: 08:00 Cycle time: 120 s. ON-time: 30 s.
Batch curves	Inside temperature Heating temperature Combi-Diffuse limit Comfort Floor heating Humidity Minimum ventilation Maximum ventilation Night setback		
24-hour clock	24-hour clock 1	Number of active points Start: 04:00 ON-time: 00:30:00	
Catching function	Status: Not active More..	Start time: 23:00:00 Start date: 2012:10:08 Stop time: 02:00:00	

	Ordinary operation	Advanced operation	
	1st level	2nd level	3rd level
		Stop date 2012:10:09 Air inlet 1 0 % Air inlet 1 fan 50 % Ventilation 100 % Air outlet 0 % Fan speed controller 0 % Heat 0 %	

Table 9: Survey of the management menu (you can change the values highlighted in bold writing)

Under **Management**, you must enter various information about e.g. the number of animals and the time, which 135Pro uses for calculating the climate control. In this menu are also functions that control both the course of a batch as well as the starting and the finishing of it.

3.6.1 House Data

3.6.1.1 Batch status: Active House/Empty House

Set batch status to **Active house** the day before the animals are stocked in the house so that the computer has time to adapt the climate to the animals' requirement. Hereafter day no. changes to day 0, and the computer runs according to the automatic settings for temperature, humidity and ventilation

Set batch status to **Empty house** after the house has been depopulated. For 2-house computers, this function is not accessible in the house with the lower day number.

With an empty house, 135Pro will disconnect control of the house climate and control according to the settings for the in-between functions empty house and frost protection. This works as protection of the animals in case the wrong house is set to **Empty house**.

On the other hand, if you want the system to close when batch status is empty house, you must reset the settings in the in-between function empty house. In batch status **Empty house**, 135Pro will also reset all possible changes of curves, which you have made during the previous batch course.

3.6.1.1.1 Protection against Incorrect Setting of Empty House

Temperature Monitoring

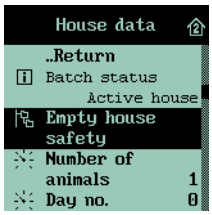
135Pro is protected against incorrect setting of Empty house. The climate computer monitors the house for an hour when batch status has been changed to Empty house. If the temperature increases by more than 5° C during this period of time (there are animals in the house), 135Pro generates an alarm and activates all ventilation.

135Pro disconnects temperature monitoring when an in-between function is activated.

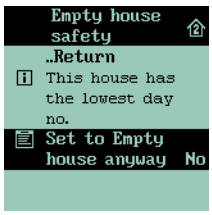
As regards a one-house poultry computer, the function can be deactivated in the menu **In-between functions/Empty house**.

Day Number Protection

This function is relevant only to houses with 2-house climate computers



In the house with the lower day number, the ***Batch status*** function is not directly accessable in the menu, and therefore the house cannot be set to ***Empty house.***



However, this blocking function can be bypassed in the sub-menu.

When you select **Set to Empty house anyway**, the **Batch status** function appears in the menu **House data**.

Number of animals

A correct setting of the number of animals in the house is decisive for all functions of the climate computer to run optimally in relation to the current requirement.

Time

Date

A correct setting of the time is important for the sake of several control functions and the registration of alarms. The clock is not switched off in case of power failure.

Day no.

The day number counts one up for each day that passes after the house has been set to active house.

House name

When the house computer is integrated in a LAN network, it is important that each house section has a unique name. The house name is transferred through the network and the livestock house should therefore be identifiable based on the name.

Set up a plan for the naming of all computers connected to the network.

Also see *BFN Network Technical Manual*.

3.6.2 Environment Function

This section is only relevant to houses in which the environment function is installed.

The working environment function is aimed at reducing the content of dust and gases in the house air when the farmer works in the house.

The air quality is improved by increasing the ventilation and activating an environment system, which humidifies the house with water (possibly supplied with oil). When the environment function starts, the 135Pro will gradually adapt the house climate to the function settings and thereafter gradually return to the normal setting.

Manual start

Manual period

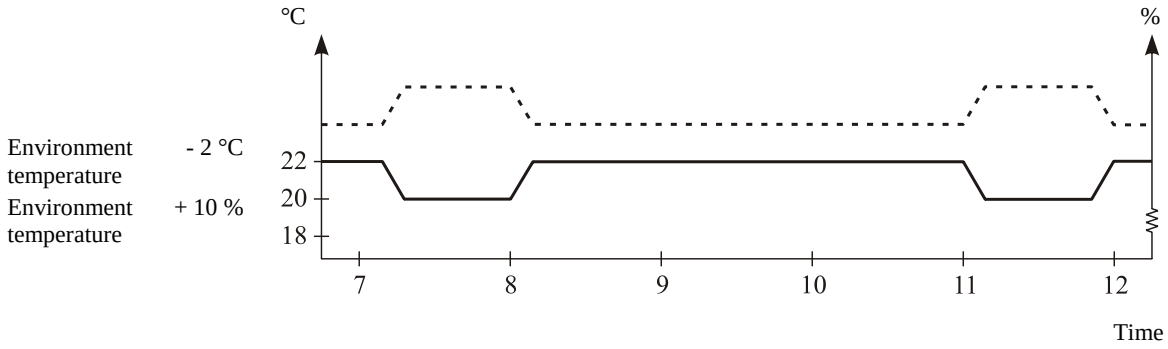
You can connect and disconnect the day program of the function, which can have up to four active periods. You can also activate the function manually if you are in the house out of one of the four set periods.

NB The function is not active when the house is set to **Empty house**.

Day program active

Activate or deactivate the environment function

Example 23: Environment function



Partly you must set the **`Environment function`** *to the number of degrees by which the inside temperature is to drop and set the* **`Environment ventilation`** *to the percentage by which the* **`Minimum ventilation`** *is to increase, and partly set the periods during which the function is to be active.*

Day program Choose number of active periodes and time for each periode.

Program course Choose cycle-time and on-time.

3.6.3 Batch Curves

This section is only relevant to houses with batch production.

135Pro can automatically adjust the settings for temperature, humidity and ventilation and the function night setback according to the animals' age.

It generally applies to the curve functions that 135Pro will automatically displace the rest of a curve course in parallel when you change the settings of the curves during a batch.

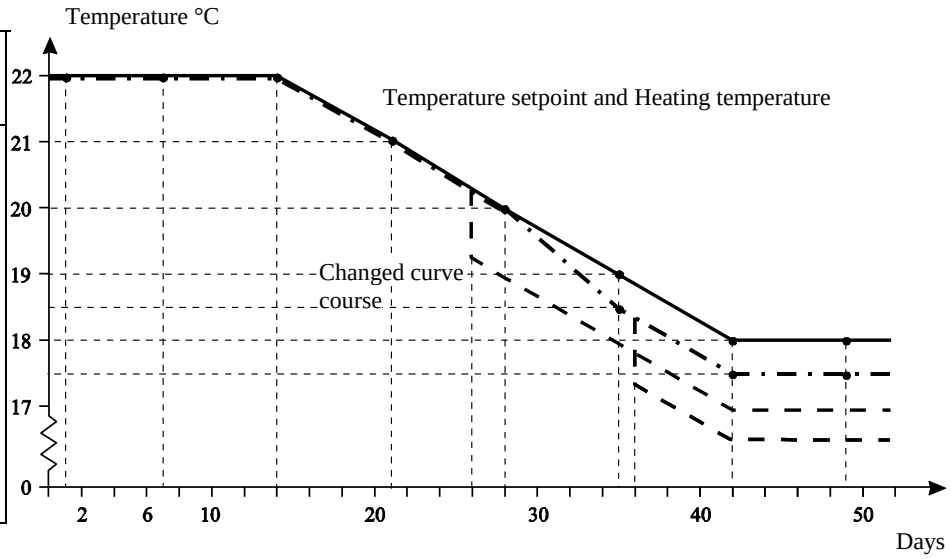
3.6.3.1 Setting curves

Select day numbers for each of the eight curve points that cover the whole batch course. For each curve point, you must first set a day number and then the required value for the function. In this way, you set up a curve course, which will make 135Pro currently adapt the conditions in the house to changes in the animals' requirements. For temperature setpoint and heating temperature, however, there are common day numbers.

See also the individual sections concerning inside temperature, heating temperature etc. to get an explanation of these functions.

Example 24: Curve for temperature setpoint and heating temperature

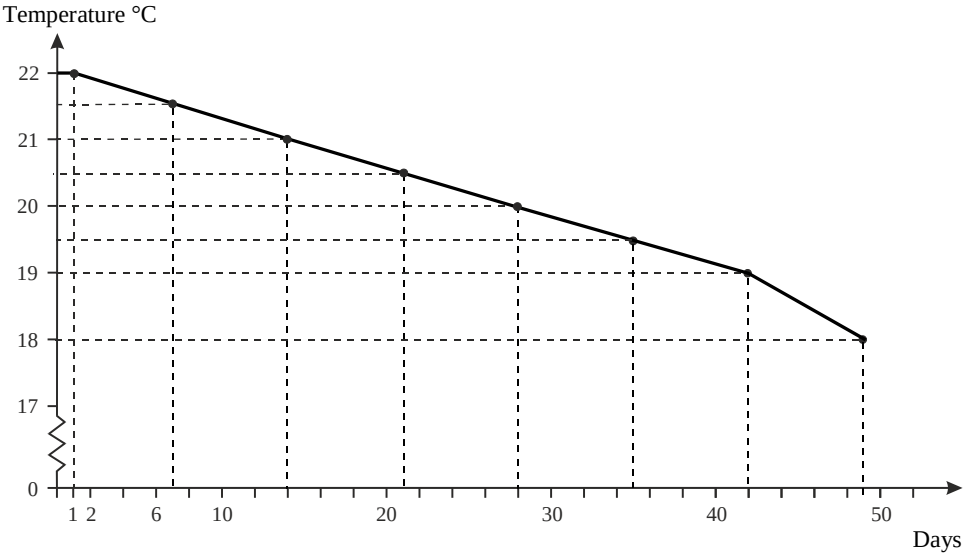
Day	Heating temp	Temp. set-point
1	22	22
7	22	22
14	22	22
21	21	21
28	20	20
35	18.5	19
42	17.5	18
48	17.5	18



When you change ***Temperature setpoint****, you can read the setting of* ***Heating temperature*** *in parentheses between day number and temperature. With such a change, 135Pro will for the rest of the batch course displace both the curve for* ***Temperature setpoint*** *and* ***Heating temperature*** *in parallel according to the change.*

Example 25: Curve for Combi-Diffuse outside temperature limit

Day	Outside temp. limit
1	22.0
7	21.5
14	21.0
21	20.5
28	20.0
35	19.5
42	19
49	18

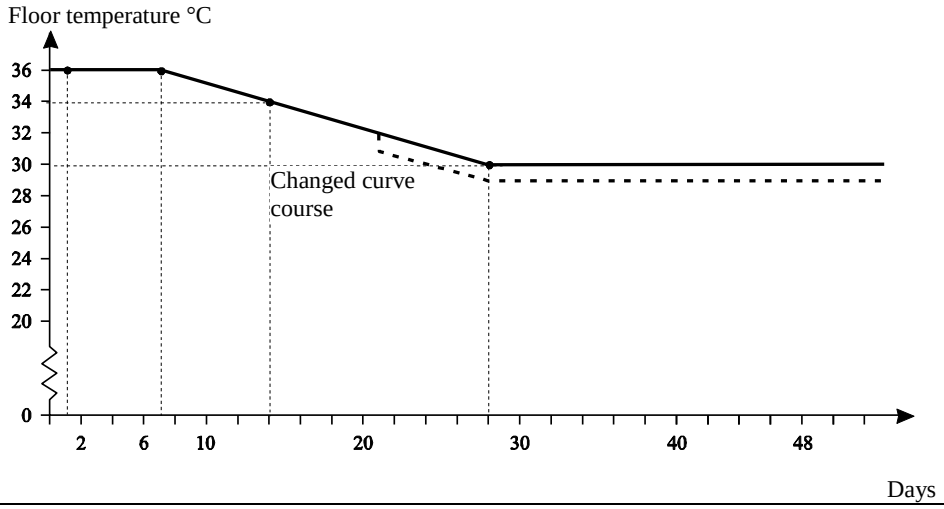


The current outside temperature limit can be changed in the ***Temperature/Combi-Diffuse inlet*** *menu.*

Day-dependent outside temperature limit in connection with Combi-Diffuse should not be applied in pressure-controlled installations integrating a central duct.

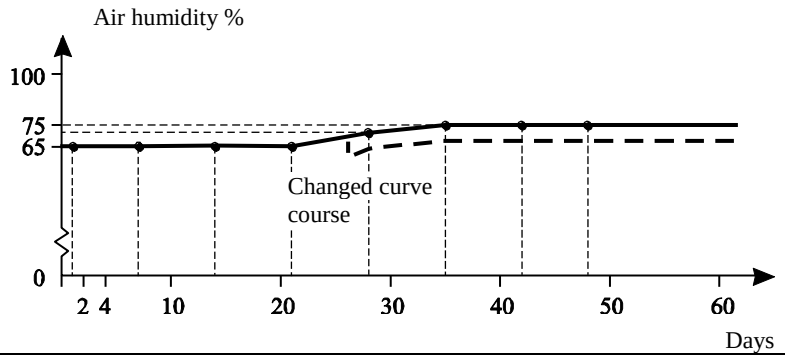
Example 26: Curve for floor temperature setpoint

Day	Floor temp
1	36
7	36
14	34
28	30



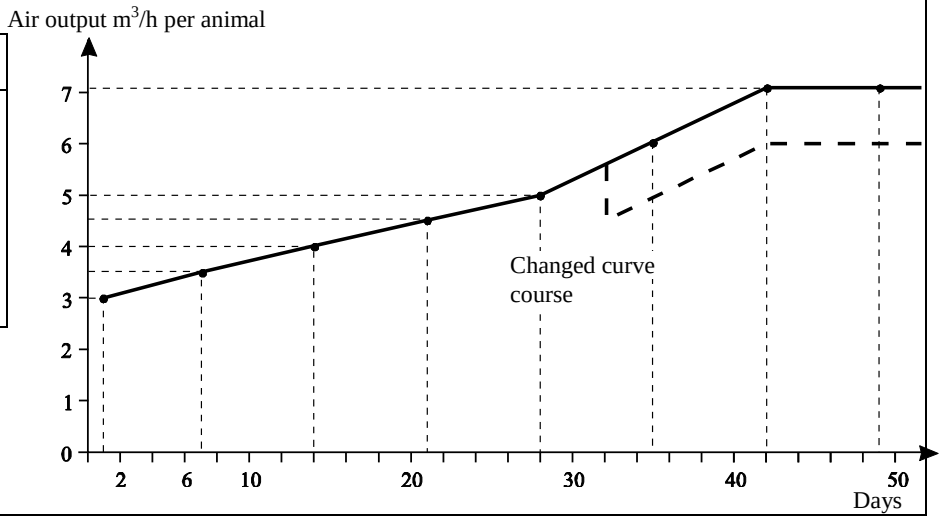
Example 27: Curve for air humidity

Day	Air humidity	Change day 26
1	65	
7	65	
14	65	
21	64	
28	70	65
35	75	70
42	75	75
49	75	75



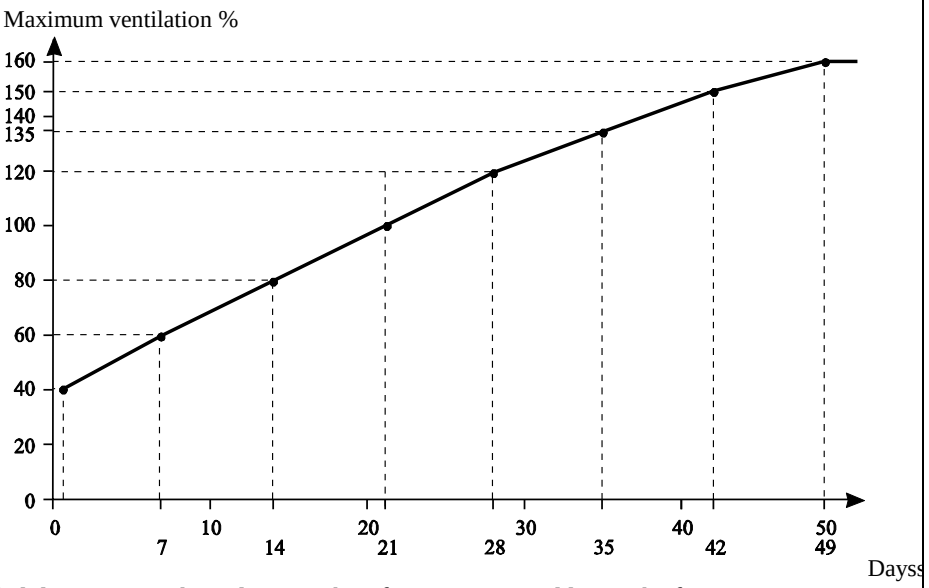
Example 28: Curve for minimum ventilation

Day	Vent.	Change day 32
1	3.0	
7	3.5	
14	4.0	
21	4.5	
28	5.0	
35	6.0	5.5
42	7.1	6.0
49	7.1	6.0



Example 29: Curve for maximum ventilation

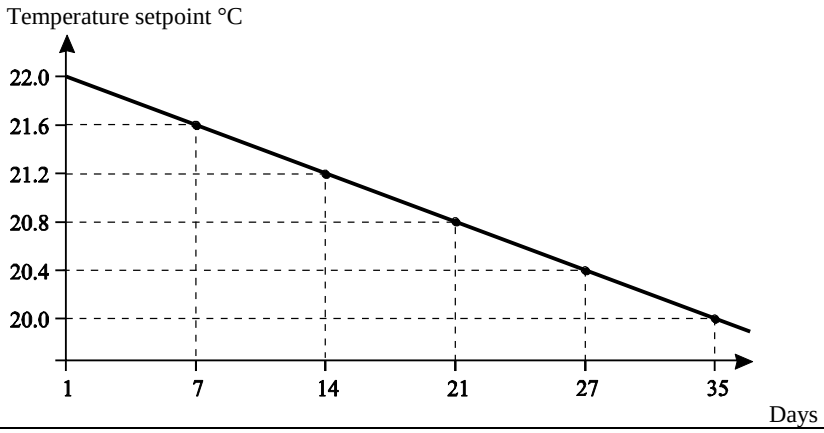
Day	Vent.
1	40
14	60
21	80
28	100
35	120
42	140
49	160



This function is only needed during special conditions. Therefore, it is overridden in the factory setting as it is set to 300 %.

Example 30: Curve for night setback

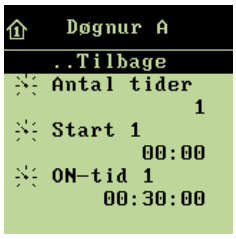
Day	Night temp.
1	- 0,1
7	- 0,4
14	- 0,8
21	- 1,2
28	- 1,6
35	- 2,0



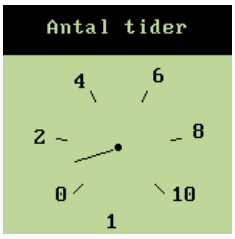
3.6.4 24-hour Clock

You can set the 24-hour clock, partly with a total number of operation times, and partly with a start time and an ON-time for every operation time.

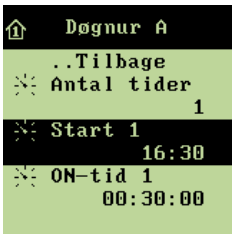
In the example mentioned below it is desired to turn on the light two times. First, at 16:30 o'clock with 4 hours "ON-time". Second, at 05:00 in 3 hours.



Enter



Turn, enter



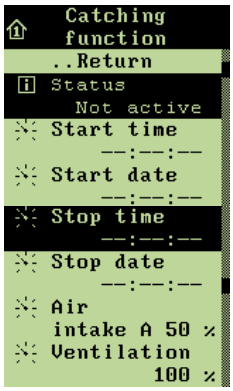
Enter

Turn, enter

3.6.5 Catching Function

The catching function is designed for increasing the ventilation in the house while the animals are being caught. This enables the air quality to be improved in consideration of the staff's health and the animals' well-being.

When this function is running, there is no temperature control in the house, as the ventilation is only active for air change purposes. The function will also limit the flap openings in order to minimize light coming in. Therefore the alarms for low temperature, error air intake and air outlet are not active together with the catching function.



The catching function can be installed by means of a key. Then the function will not start until it is activated by a key within the start and stop times.

If the catching function is installed without a key, it will automatically start on the set date and time. In both cases, it automatically returns to **Not active** when the set stop time is passed.

When the catching function starts, 135Pro will gradually adapt the house climate to the settings of the function, and gradually return to the normal setting.

When the catching function starts, 135Pro will gradually adapt the house climate to the settings of the function, and gradually return to the normal setting.

3.7 In-between Function

	Ordinary operation 1st level		Advanced operation 2nd level	
	The house is…		Soaking / Washing / DryingDesinfection / Empty	
	Remaining time	00:00		
Soaking			**Air intake 1**	**0 %**
			Air intake fan	**0 %**
			Ventilation	**0 %**
			Air outlet	**0 %**
			Fan speed control	**0 %**
			Soaking time	**24:00**
			Cycle time	**20 min.**
			ON-time	**2 min.**
Washing			**Air intake 1**	**20 %**
			Air intake fan	**20 %**
			Ventilation	**30 %**
			Air outlet	**80 %**
			Fan speed control	**0 %**
			Washing time	**1:00**
Drying			**Air intake 1**	**40 %**
			Air intake fan	**40 %**
			Ventilation	**80 %**
			Air outlet	**80 %**
			Fan speed control	**0 %**
			Heating	**100 %**
			Drying time	**6:00**
Desinfection			**Desinfection time**	**24:00**
			Temperature	**4.0 °C**
Empty house			**Air intake 1**	**50 %**
			Air intake fan	**50 %**
			Ventilation	**50 %**
			Air outlet	**50 %**
			Fan speed control	**0 %**
			Heating	**0 %**
			Frost protection	
			Frost protection temp.	**4.0 °C**

Table 10: Survey of the in-between menu (you can change the values highlighted in bold writing)

135Pro climate computer can only activate the in-between functions when **`Batch status`** is set to **`Empty house`** (the house data menu under management). You can choose between the in-between functions and activate them when the house is empty.

In batch status **`Empty house`** the computer will disconnect all automatic temperature regulations and run according to the settings in the function empty house. Thus, the computer will be in empty house mode until you activate one of the other in-between functions, and it will return to empty house when the functions are complete.

The in-between functions are partly designed for facilitating the activities, which you must carry out in the house in order to clean it, and for ensuring the air change and temperature in the house while it is empty.

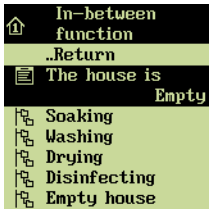
3.7.1 Activating the In-between Function

The in-between functions can be activated:

- manually
- time-controlled
  - but only when batch status is set to **Empty house**.

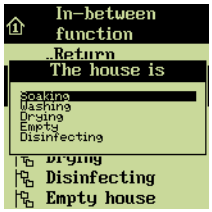
The manual activation overrides the time-controlled activation

When you want to … activate an in-between function manually,
open the **In-between function** menu, and

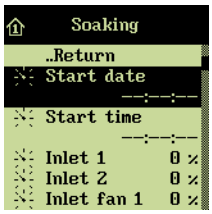


→ turn until **The house is Empty** is selected, and press

→ This menu line is only visible when the house is set to **Empty house** (in the menu **Management** / **House data** / **Batch status**



→ turn until one of the five functions are selected, and press (**Soaking/ Washing/ Drying/ Disinfection/ Empty**)



→ By means of the time control function, each in-between function can be set to start at a time indicated. It is thus possible to set a total sequence for the in-between functions.

Each in-between function is active (when **Batch status** is **Empty house**) either until the set time expires or until another in-between function has been set to start.

3.7.2 Soaking

This section is only relevant for houses with spraying/cooling system.

With the setting of soaking, the system will run according to a soaking function, which will moisten the house with water and by that means loosen dust and dirt. In this way the amount of dust will be reduced during the subsequent cleaning, making it easier.

In soaking mode, you must stop ventilation to maintain the humidity in the house. You must set the soaking system to run at intervals (cycle time) for a number of minutes (ON-time) during the total period (soaking time), which the soaking is to last.

3.7.3 Washing

While you carry out the manual washing of the house, the ventilation must run again so that the air change in the house is started.

3.7.4 Drying

Drying is a combination of ventilation and heating. The more heating you supply to the house, the quicker it dries.

3.7.5 Disinfection

Under disinfection, a certain temperature is to be maintained in the house to ensure optimum effect of the disinfectant (often above 20° C). 135Pro supplies heat and turns off the ventilation system.

3.7.6 Empty House

When the batch status in the management menu is empty house, the 135Pro climate computer will regulate according to the settings in **`Empty house`** (in the in-between function menu). This function will maintain the air change in the house by allowing ventilation to run at a fid percentage (50 %) of the system capacity. This is to protect the animals in case a house is set to **`Empty house`** by mistake.

This function also enables you to make frost protection of the house.

3.7.6.1 Frost protection

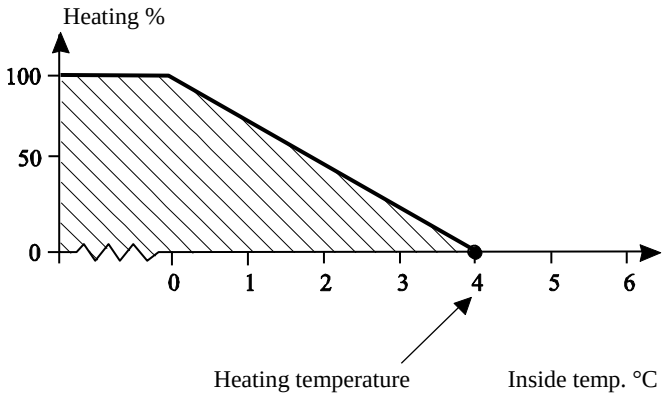
Ensures that the inside temperature does not fall below the temperature setpoint for frost protection when batch status is empty house during a prolonged period. (See also the **`House data / Management`** menu).

With batch production the function can also maintain an inside temperature of e.g. 20 °C between two batches. Note that ventilation must be disconnected and the heating system connected.

Example 31: Frost protection

Temperature setpoint 4 °C
(can vary between 0 and 40 °C)

Heating temperature 4 °C



*When batch statusis empty house (**`Management/House data`**), and **`Frost protection`** is connected, the computer will copy the temperature settings of the ant freeze to **`Temperature setpoint`** and **`Heatingtemperature`**.*

3.8 Consumption

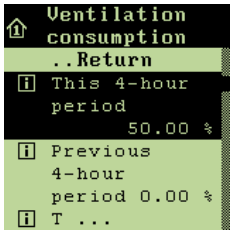
	Ordinary operation 1st level		Advanced operation 2nd level	
Ventilation consumption	This 4-hour period	78 %		
	Previous 4-hour period	88 %		
	More...		These 24 hrs	110 %
			Previous 24 hrs	107 %
			Total this batch	35.3 h.
Heating consumption	This 4-hour period	16 %		
	Previous 4-hour period	16 %		
	More...		These 24 hrs	16 %
			Previous 24 hrs	15 %
			Total this batch	101.3 h.
Water consumption	Water meter 1		Total this batch	5 m^3
			◄ Back ►	
			Today until now	
			Day no	5
			Amount	0 l
			Consumption in per cent	100 %
Energy consumption	Energy meter 1-2			
			Energy this batch	
			Total energy consumption	
			Actual power consumption	
Trend curves	Temperature			
	Humidity			
	Outside temperature			
	Auxiliary sensor			
	Water consumption			

Table 11: Survey of the consumption menu (you can change the values highlighted in bold writing)

135Pro climate computer enables you to follow the development of ventilation, heating and water consumption. You can take a reading of both the current consumption and earlier comparisons.

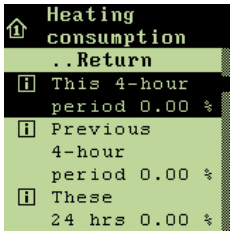
3.8.1 Ventilation Consumption

The short period calculations enable you to analyse deviations of the ventilation course at an earlier stage, which is particularly useful in connection with fault finding.



Ventilation consumption is calculated as an average output partly for the previous four hours, and for the previous 24 hours. This output is converted into an average figure for the number of hours with 100 % ventilation during the whole batch course.

3.8.2 Heating Consumption

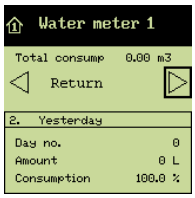


Heating consumption is calculated as an average consumption partly for the previous four hours, and for the previous 24 hours. This consumption is converted into an average figure for the number of hours with 100 % heating during the whole batch course.

3.8.3 Water Consumption

135Pro can be connected to one water meter.

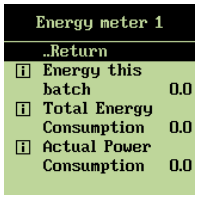
The water consumption is calculated in m^3 to give a total survey.



In order to make sudden changes visible, the water consumption is also calculated in percent. You can use such changes as an early indication that some conditions in the house are not as they ought to be. For example, that disease is present or damage to a water pipe. Under normal conditions, these percentages will rise by a few percent per day, as the animals get older.

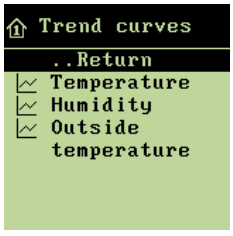
3.8.4 Energy Consumption

135Pro can be connected to up to two energy meters.



135Pro shows energy consumption for the current batch so far, consumption since the system started as well as current consumption.

3.8.5 Trend Curves



Trend curves give you a clear picture of the house climate during the previous 24 hours. This can be particularly useful in connection with fault finding. Trend curves make it possible for example to compare data and analyse the stability of the house climate.

Select the required trend curve

Turn the adjustment knob to read the accurate time and value figures

3.9 Access Code to Access Levels

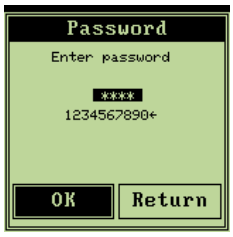
You can limit the access to operation of the 135Pro Climate Computer by means of access codes.

The functions of the climate computer are on three different access levels, which can be activated individually. On each level, there is access to reading and setting all settings and values, while access to changing settings requires the entry of an access code.

Therefore, you must, when setting up the computer, choose which of the three levels are to be active and thus code protected against unauthorized changes.

When you want to change a setting in a protected access level, the computer requires the entry of an access code.

If you want to … enter an access code, you must



→ turn until the first digit of your access code is marked, and press
An asterisk (*) in the black box indicates that you have selected the first digit

→ repeat for the last three digits

→ turn clockwise until OK is marked and press to approve

See the *Technical Manual* concerning selection and change of access code.

3.9.1 Access Levels

Access level 1		
Main menu	**Submenu**	**Access level 1**
Temperature	**Inside temperature**	Temperature setpoint
	Heating	Heating temperature
	Floor heating	Floor temperature setpoint
		Floor heating setpoint
Humidity		Humidity setpoint
Ventilation	CO_2 minimum ventilation	

Access level 2		
Main menu	**Submenu**	**Access level 2**
Temperature	**Heating**	Active
		Minimum heating
		Minimum heating active
	Cooling	Cooling temperature
		Stop cooling
	Spraying	Active
		Minimum spraying
		Stop at outside temperature
		Temperature at 0 %
		Temperature at 100 %
		Start time
		Stop time
		Cycle time 0 %

Access level 2		
Main menu	**Submenu**	**Access level 2**
		ON-time 0 %
		Cycle time 100 %
		ON-time 100 %
	Floor heating	Minimum floor heating
	Night setback	Night temperature
		Start time
		Stop time
Humidity		Active
		Humidification setpoint
Alarms	**Temperature alarm**	Alarms not maintained
		High temperature limit
		Low temperature alarm
		Low temperature limit
	Humidity alarm	Absolute high humidity limit
	Flap alarm	Error air intake 1
		Error air intake 2
		Error air outlet 1
		Error air outlet 2
	Sensor alarm	Error outside temperature sensor
		Misplaced outside sensor
		Error humidity sensor
		CO_2 sensor error Low
		CO_2 sensor Low limit
		CO_2 sensor error High
		CO_2 sensor High limit
	Water alarm	Maximum water alarm
		Maximum water alarm
		Minimum water alarm
		Minimum water alarm
		Start alarm day
		Start alarm time
	Emergency air intake	Emergency air intake
		Abs. high temp.
		Error temp. sensor
	Emergency opening	Absolute high humidity
	Temperature controlled emergency opening	Warning at emergency temperature
		Warning emergency temperature limit
		Battery alarm
		Battery voltage limit
Ventilation		Minimum ventilation/animal
		Maximum ventilation
Common exhaustion	Common exhaustion	Set pressure
Management	**House data**	Batch status
		Number of animals

Access level 2		
Main menu	**Submenu**	**Access level 2**
		Time
		Date
		Day no.
		House name
	Environment function	Manuel start
		Manuel period
		Environment temperature
		Environment ventilation
		Day program active
		Day program
		Active periods 1-4
		Start 1-4
		Stop 1-4
		Program course
		Cycle time
		ON-time
	Batch curves	Inside temperature
		Heating temperature
		Floor heating
		Humidity
		Minimum ventilation
		Maximum ventilation
		Night setback
	24-hour clock 1-4	Number of active points 1-10
		Start 1-10
		ON-time 1-10
	Catching function	Start date
		Start time
		Stop date
		Stop time
		Air inlet
		Air inlet ventilation
		Ventilation
		Air outlet
		Fan speed control
		Heat
In-between function	**Soaking**	Air intake
		Air intake ventilation
		Ventilation
		Air outlet
		Fan speed control
		Soaking time
		Cycle time
		ON-time
	Washing	Air intake

Access level 2		
Main menu	**Submenu**	**Access level 2**
		Air intake ventilation
		Ventilation
		Air outlet
		Fan speed control
		Washing time
	Drying	Air intake
		Air intake ventilation
		Ventilation
		Air outlet
		Fan speed control
		Drying time
	Empty house	Air intake
		Air intake ventilation
		Ventilation
		Air outlet
		Fan speed control
		Frost protection
		Frost protection temperature

Access level 3		
Main menu	**Submenu**	**Access level 3**
Temperature	**Inside temperature**	Comfort temperature
		Heat wave comfort
		Extra ventilation
		Differential temperature
		Maximum temperature setpoint
		De-icing active
	Combi-Diffuse inlet	Stepless opening
	Cooling	Control parameters
		Nozzle cleaning
Alarms	**Temperature alarm**	Summer temp. at 20 °C outside
		Summer temp. at 30 °C outside
		Absolute high temperature
		Absolute high humidity
Ventilation		Extra ventilation air intake
	CO_2 minimum ventilation	CO_2 setpoint

All functions in the technical menus **`Setup`**, **`User setup`** and **`Service`** are on access level 3.

4 Maintenance

135Pro climate computer requires no maintenance to function correctly.

You must clean the computer with a damp cloth without using dissolvent. Do not expose the computer to water or cleaning with a high-pressure cleaner.

Like all types of electronics, it is best for the computer to be continuously connected to power as this keeps it dry and free from possible condensation.

Ensure that all alarm systems are tested weekly.

Only use genuine spare parts.

Removal for Recycling/Disposal

Big Dutchman´ products which are suited for recycling are marked with a pictogram showing a refuse bin that is crossed out. See the picture.

It will be possible for customers to deliver Big Dutchman products to local collection sites/recycling stations according to local instructions. The recycling station will then send the products to an approved plant for recycling and reuse.

EC - Declaration of Conformity

Manufacturer: SKOV A/S

Address: Hedelund 4, DK-7870 Roslev
Telephone: +45 72 17 55 55

hereby declares that the climate computer type 135Pro including item numbers 135980, 135981, 135982, 135983

conform with the following EU directives:

2006/95/EC (The directive on Low voltage current)
2004/108/EC (The EMC directive)

Location: Hedelund 4, DK-7870 Roslev
Date: 2012.06.22

Leo Østergaard
R&D Manager

2013.01.31 • 610971-02 • 9.13 • EN

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