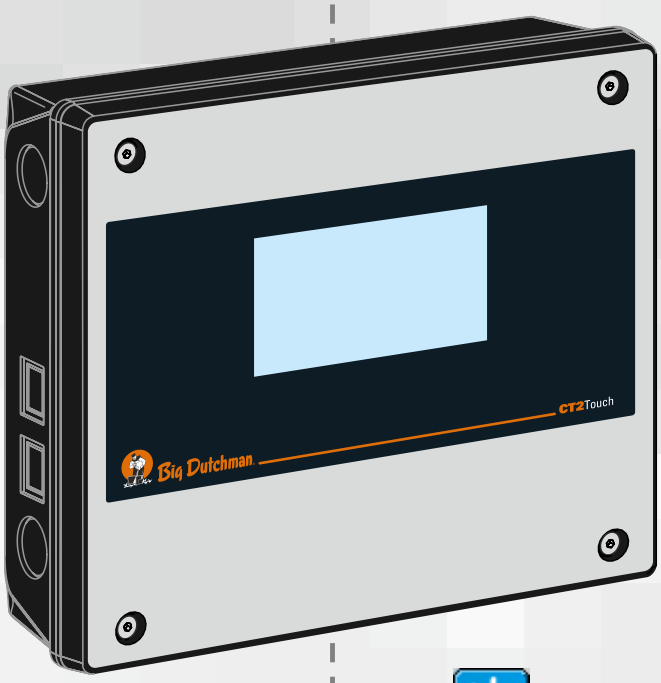
CT2 Touch Climate Computer

User Manual



Code no. 99-97-5104 GB

Edition: 06/2016

Software version 3.1

Big Dutchman

Program Version

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

- Software version 3.1

It was released in 2016.

Product and Documentation Changes

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

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 essential to install a separate, independent alarm system which monitors the house concurrently with the climate and production computer. According to EU directives 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' general terms and conditions of sale and delivery specifies that an alarm system must be installed.

In case of operating error 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' terms and conditions of sale and delivery.

Note

PRODUCT DESCRIPTION

This user's manual deals with the operation of the CT2 Touch. The user's manual provides the user with the fundamental knowledge about the functions of the computer that is required to ensure optimum use of CT2 Touch.

As the CT2 Touch software is modular, this manual will contain sections that are irrelevant to the setup of your computer. If in doubt, please contact Big Dutchman service or your Big Dutchman dealer.

CT2 Touch is a climate computer designed for poultry houses. It is capable of regulating and monitoring the climate and has a complete two-zone control system to regulate temperature, humidity, ventilation, cooling and humidification in two separate zones.

Curve regulation

CT2 Touch can regulate the climate on the basis of curves for temperature, heat, humidity, chill – outdoor temperature, chill – factor, minimum and maximum ventilation. It is therefore not necessary to adjust the climate settings in your daily work.

Optimised regulation

CT2 Touch has a method for advanced climate control which improves the association 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.

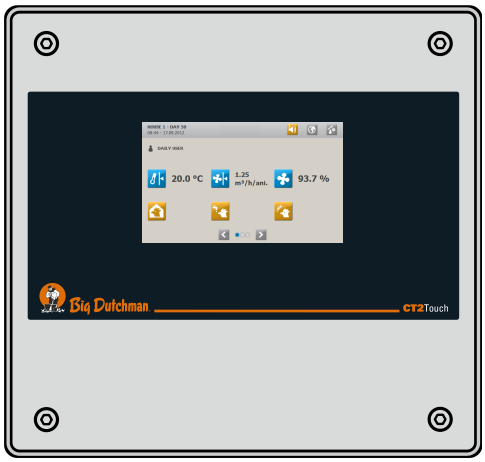
Big Dutchman congratulate you on your new

CT2 Touch

USER'S GUIDE

1 Operation

CT2 Touch is operated entirely by means of the touch screen.

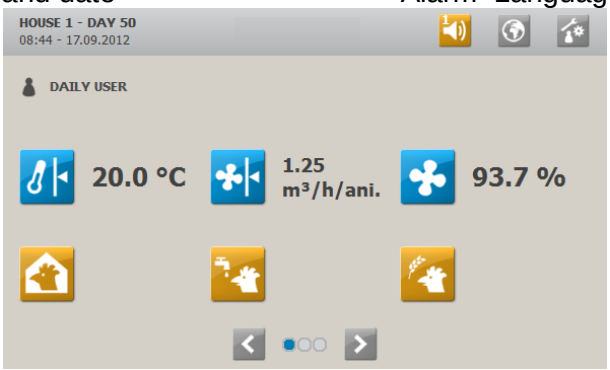


1.1 Front Menu

Location name Day number
Time and date Alarm Language User menu

Current user type

Current values or settings

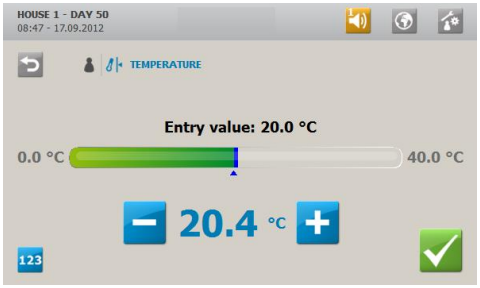


1.1.1 Icons

Press the icon to gain access to the relevant function.

Navigation buttons:	Menu buttons:
Alarm log - number of active alarms are indicated in the icon	Climate menu
Language selection	Management menu
User menu selection	Alarm menu
Return to previous view	Technical menus (only accessible from Service user)

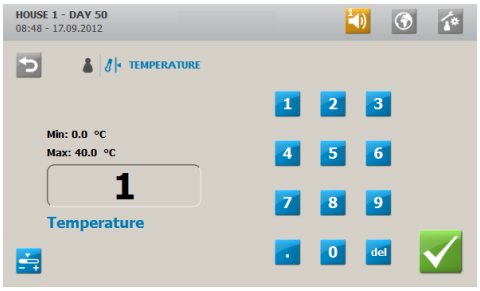
1.2 Changing Settings



Press − and + to change the current value. A blue marking on the bar shows the change.

Press ✓ to use the change.

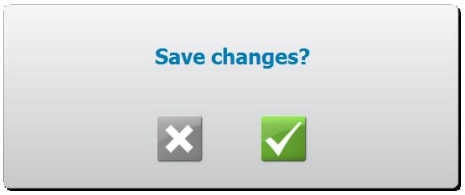
Press ↩ to undo the change.



Press the figures to enter a value.

Press ✓ to use the change.

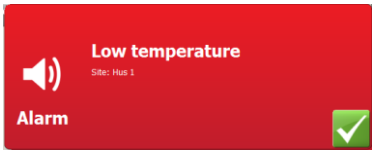
Press ↩ to undo the change.

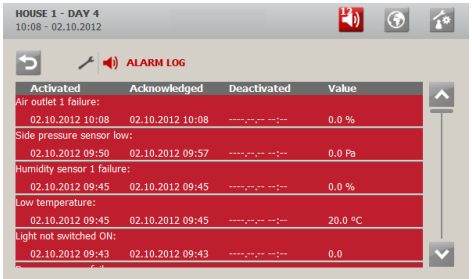


✓ Yes/ Approve

✗ No/ Undo

1.3 Alarm View





CT2 Touch displays alarms a pop-up.

Press ✓ to acknowledge the alarm.

The alarm log icon indicate the number of active alarms as long as an alarm mode has not ended.

Press to open the alarm log.

The alarm log contains information about:

- When the alarm was generated.
- When it was acknowledged.
- The value which generated the alarm

Still active alarms are marked red.

Alarm relay is triggered only by hard alarms.

Soft alarms generate a pop-up in the display. See also section 4.

1.4 Language Selection

CT2 Touch is supplied with direct access to all the active languages.

Select  Language selection and highlight the language requested.

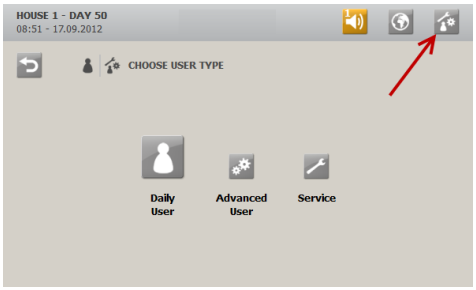
1.5 User Menus

CT2 Touch has 3 different user menus: daily user, advance user and service user.

The menu views for the daily user and the advanced user must be set up to ensure availability of exactly the functions and information in the menus which they are to be able to access. Before setting up user menus, see section 1.5.1.

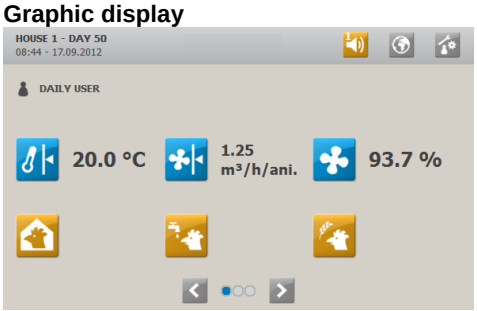
The user menus consist partly of a graphic display with icons and values, and partly of a submenu structured according to main functionality.

Press  for access to selecting user menu.



Press  for access to selecting user menu.

Graphic display



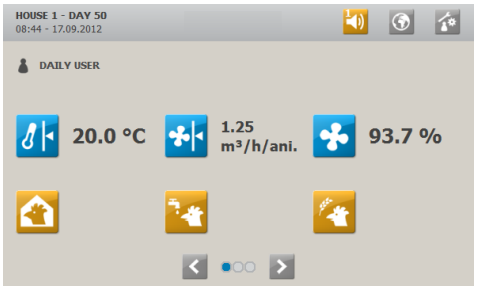
 The daily user menu displays up to six functions on the front.

The typical daily user only knows the functions required for the daily operation and needs only be able to carry out minor adjustments of settings of importance to the regulation.

 The advanced user menu displays up to 16 functions on the front.

The advanced user typically has thorough knowledge of the animals and house computer functions.

The user can adapt settings continuously and thus optimise operation; for this, the user needs various data to get an overview of the current status.

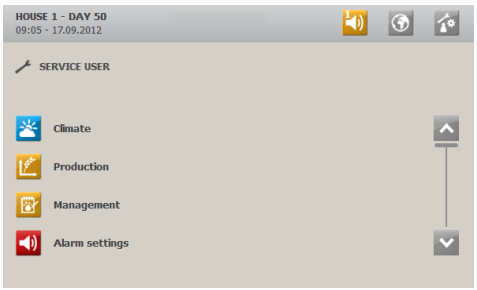


Underlying pages can be added to the menu for the daily user and the advanced user. See section 1.5.1.

Press the  arrows or

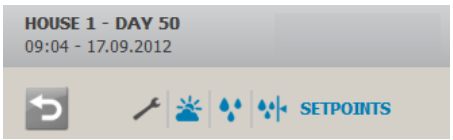
move your finger across the screen  to switch between the pages.

Press an icon to change the value in question.



 Service menu

All functions can be accessed from the service menu. They are divided into the following sub-main menus: climate, production, Management, alarm limits and technical.

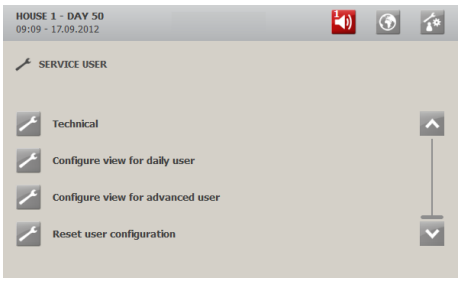


In the menus, an icon path indicates the current display.

Ex.: **Service user/ Climate/ Humidity/ Setpoints**

1.5.1 Setting up the User Menus

Only users with access to service user menus are allowed to set up user menus.

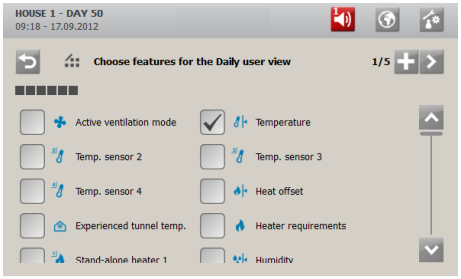


Press  User type.

Press  Service.

Press  Configure view for…

Two steps are required to set up user displays.

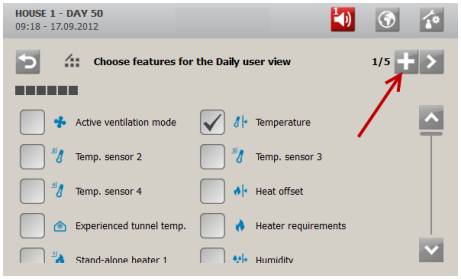


Step 1. Select functions

Select the functions to be accessible in the menu of the relevant user type.

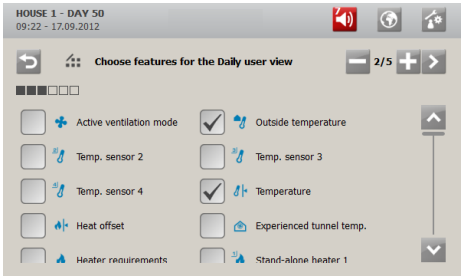
All the functions displayed can be selected.

 indicates a function selected.

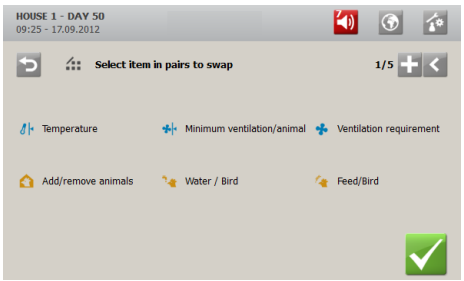


Press  to add up to five underlying pages to the menu.

Press  to proceed to the next step.



Press  to go back to the previous page.



Step 2. Adapt the order displayed

Press a function and then another function to make the two functions change places.

Press  to proceed to the next page.

Press  to go back to the previous page.

Press  to go back to step 1.

Press  to save the setup.

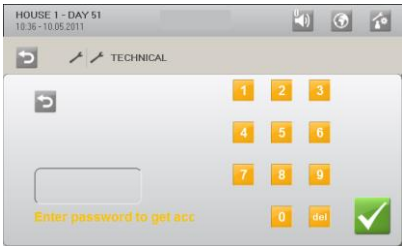
It is also possible to move functions between pages by pressing a function and switching pages using  and  .

1.6 Password

CT2 Touch can be secured against unauthorised operation by using passwords. This function is activated in the **Technical/ Use password** menu under Service user.

Each user level has its own password. These can be changed in the **Management** menu.

You can limit the operation access of CT2 Touch by means of passwords. In order to have access to changing a setting, you must enter a password analogous to the view level in which the function in question is to be found **(Daily, Advanced** and **Service**).



Enter a total of four digits.

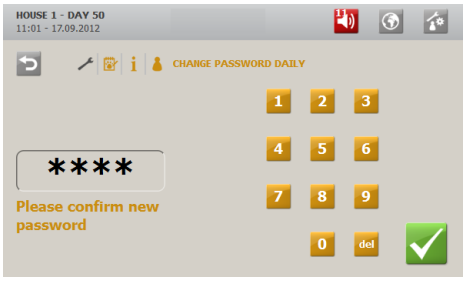
Having entered the password, CT2 Touch can be operated at the corresponding user level until it again returns to the front menu after 10 minutes without operation.

You can change the password for each of the three view levels in the menu **Management/ Change password**.

In order to gain access to changing a password, you must first enter the valid password.

User level	Gives access to	Factory-set code
Daily	User level daily	1111
Advanced	User level daily + advanced	2222
Service	User level daily + advanced + service	3333

Big Dutchman recommend changing the passwords of the factory setting and subsequently changing the password on a regular basis.



Enter a new four-digit password twice to change an existing password.

2 Climate

2.1 Type of ventilation

Main Menu	Submenu
Climate	
Active ventilation mode	
Side Tunnel Roof Heating Recovery Unit	

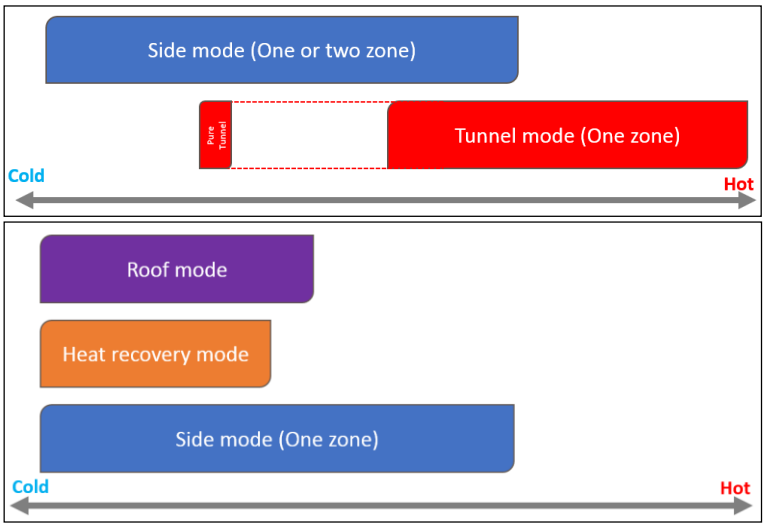
Table 1: Display of current ventilation mode

Depending on which ventilation components the house has, the house computer can switch between different ventilation modes to achieve the optimum air change.

The following ventilation modes can be achieved with the indicated components:

Side	Air intake on the sides of the house, e.g., wall inlets. See paragraph 2.5. *Objective:* With Side, a consistent climate is achieved throughout the house and this ventilation method will therefore often be preferred.
Roof	Air intake, e.g., roof inlets for equal pressure. *Objective: The same as Side but for lower ventilation needs.*
Tunnel	Air intake in one gable of the house, for example with gable fans. See paragraph 2.7 *Objective: With Tunnel higher air speed is achieved and thus air change in the house, so that the animals can be cooled even at high outside temperatures.*
Heat recovery	Air intake via heat recovery that mixes dry, cold outdoor air with moist, warm indoor air. See paragraph 2.4 *Objective: Energy savings is achieved on heating the house using the heat exchanger by recycling the heat from the indoor air. In addition, humidity in the house is reduced, resulting in better bedding.*

All ventilation modes cannot be used in the same house but will in practice usually be limited to the following two combinations (if installed) - here shown in relation to the temperature range they are used for:

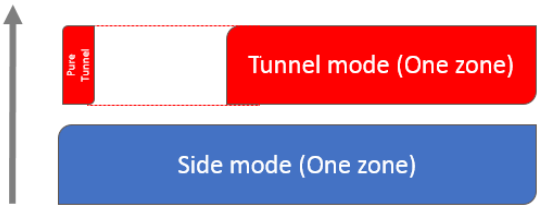


2.1.1 Changing between Ventilation Modes

To understand when a change is made between the different ventilation modes, it is necessary to know the relationship between them and their settings.

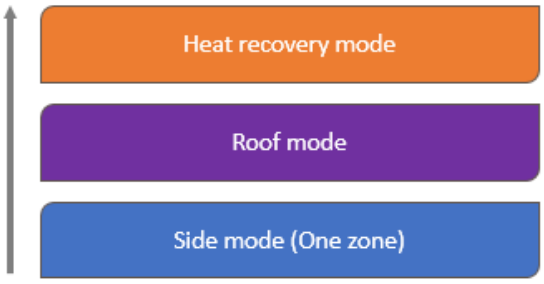
The change in ventilation mode happens as soon as the conditions are met for the ventilation mode that has climate-related priorities. When the conditions are no longer met, the ventilation returns to a secondary mode - possibly over a period of adjustment.

Climatic priorities



Tunnel has priority over Side.

Climatic priorities



Heat recovery has priority over Roof and Side.

Roof has priority over Side.

When the house computer switches "back" to a secondary ventilation mode , it will typically be because the conditions for the other ventilation modes are no longer met.

2.1.1.1 Change to Tunnel (combi-tunnel)

Tunnel ventilation can only be activated when both the indoor and outdoor temperatures are high enough.

- To switch to Tunnel at a **lower** indoor temperature, you need to **reduce** the chill factor.
- To switch to Tunnel at a **higher** indoor temperature, **increase** the chill factor.

Outside temperature above Tunnel outside temp. limit (value from hold curve)

Inside temperature over Temp. setpoint incl. additions + Min. air speed * Chill Factor * Hysteresis (1.2 factor)

From Tunnel to Side

Outside temperature **under** Tunnel outside temp.limit (value form hold curve) - Hysteresis (1 °C)

or Inside temperature **under** Temp. setpoint incl. additions + Min. air speed * Chill Factor * Hysteresis (1 °C)

2.1.1.2 Change to Roof

The adjustment of Roof ventilation is done using a special the negative pressure curve that covers the low ventilation requirements.

Changing to Roof occurs when the ventilation requirements according to the negative pressure curve are lower than that which may be supplied by Side ventilation.

By creating a gap in between the last point of the Roof curve and the first point of the Side curve - e.g.. from 25% to 30% - it is possible to provide a dead band in the ventilation, which makes the transition between the two ventilation modes more even.

A ventilation requirement under Side curve's first point - hysteresis.
(The hysteresis is calculated by subtracting the roof curve's last point from the side curve's first. It should be at least 2%)

From Roof to Side

Changing back to Side occurs when the ventilation requirements according to the negative pressure curve are higher than that which may be provided by Roof ventilation.

The ventilation requirement above the Roof curve's last point + hysteresis (see also above).

2.1.1.3 Change to Heat Recovery

The adjustment of the ventilation using the heat recovery unit is done with a special negative pressure curve that covers the low ventilation requirements.

For optimal use of the heat recovery unit, the negative pressure curve should be set up so that the heat recovery unit mode covers as large a part of the ventilation sequence as possible.

Unable to switch to heat recovery when:

- the heat recovery unit is being cleaned.
- the outside temperature is too low (Outside temp < Low outside temperature limit + 2 ° C).
- the outside temperature is too high - i.e., the difference between the outdoor and indoor temperature is too small.
- (Outside temp. is above Temp. setpoint incl. additions - High outside temperature limit - 2 ° C).
- the ventilation requirement exceeds the heat recovery unit's last point in the negative pressure curve.

From Heat Recovery to Side

When the conditions for heat recovery are not met.

2.2 Temperature

Main menu		Sub menu	
Climate			
Temperature			
Setpoints			
	Temp. setpoint incl. additions		
	Temperature		
	Tunnel temperature		
	Heat-offset		
	Absolute heat setpoint		
	Stand alone heater 1-4		
	Tunnel temperature		
	Heater 1 setpoint		
	Stand alone heater 1-4		
Info			
TUNNEL	Experienced tunnel temp.		
TUNNEL	Current tunnel temp.		
LPV	Current temperature		
	Outside temperature		
	Actual day and night adjustment		
	House heater requirements		Heater requirements
	Stand alone heater requirements		Heater1-4
LPV	House heater temperature		
TUNNEL	Experienced heating temp.		
	Stand alone heater temperature		Heater 1-4
	Min./max. temperature		Maximum 24 h
			Maximum 24 h time
			Minimum 24 h
			Minimum 24 h time
			Sensor min./max.
	Individual temperature sensors		**Temp. sensor 1-8**
TUNNEL	**Min./max. temperature tunnel**		Tunnel temperature minimum
			Tunnel temperature minimum time
			Tunnel temperature maximum
			Tunnel temperature maximum time

Main menu		Sub menu	
Climate			
Temperature			
	Min./max. temperature outside		Outside temperature min.
			Outside temperature min. time
			Outside temperature max.
			Outside temperature max. time
House heaters			
	Minimum heating		**Outside temperature below**
			Minimum heating
	Active		**Yes/No**
Stand alone heaters			
	Active		**Yes/No**
	Stand alone heater 1 active		
Additions			
	Comfort temperature		
	Advanced Comfort		
LPV	**Extra ventilation**		
	Day and night adjustment		**Temperature**
			Start time
			Stop time

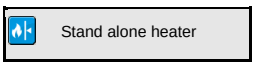
Table 1: Overview of the complete Temperature menu at service user level.

2.2.1 Setpoints

Climate/ Temperature/ Setpoints

Temp. setpoint incl. additions	Corrected temperature value for **Temperature setpoint** (see section 2.2.1.1).
Temperature setpoint	Upper temperature setpoint (see section 2.2.1.1) that activates ventilation.
Heating offset	Offset set to the required temperature. When the housing temperature drops below the required temperature by more than the set number of degrees, CT2 Touch activates the heat supply for the house. See section 2.2.1.3.1.
Absolute heating temperature	The calculated temperature that activates the room heating supply (= **Temperature** – **Heating offset**).
Temperature	A user offset set for the standard temperature curve.
Comfort temperature	A user offset set for the standard comfort temperature curve.

A user offset set for the standard heating temperature curve.



Set the temperature that activates the local heat supply.

When the inside temperature is too high, CT2 Touch increases the ventilation level to supply more fresh air. When the temperature is too low, the computer reduces the ventilation level to keep the heat in the house and supplies possibly more heat.

2.2.1.1 Temperature Setpoint with Additions

The **Temperature setpoint** is the basis for CT2 Touch's calculations of the ventilation requirement of the house. If the computer is set up with the functions; comfort temperature, humidity control with temperature reduction, or day and night adjustment, the computer will correct the temperature setpoint by increasing or decreasing a few degrees and calculating ventilation requirements accordingly.

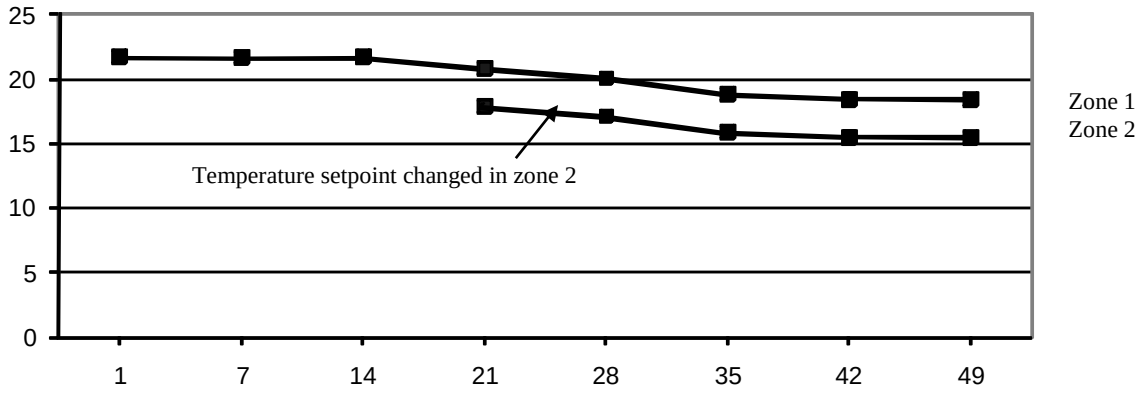
2.2.1.2 Temperature Setpoint

CT2 Touch regulates the indoor temperature according to the **Temperature setpoint**.

Using zone control, front and rear have their own individual temperature setting. Thus, the temperature can be set separately in each individual zone; however, the two zones use the same temperature curve.

If you want to change the temperature with the same number of degrees in both zones, you can change through the curve.

Example 1: Temperature curve changed through Temperature setpoint



If you only want to change the temperature setting in one of the zones, or change both zones but with a different number of degrees in each individual zone, you have to do it through Temperature setpoint.

2.2.1.3 Heating

CT2 Touch can regulate two types of heating:

Room heating: Used to heat the entire house and cold areas in the house. All heaters connected as room heaters are regulated according to the same temperature setpoint.

Stand-alone heating: Used for instance as heating for brooding. Each heater has its own temperature setting.

2.2.1.3.1 Room Heating

Room heating can be regulated as common or individual heating.

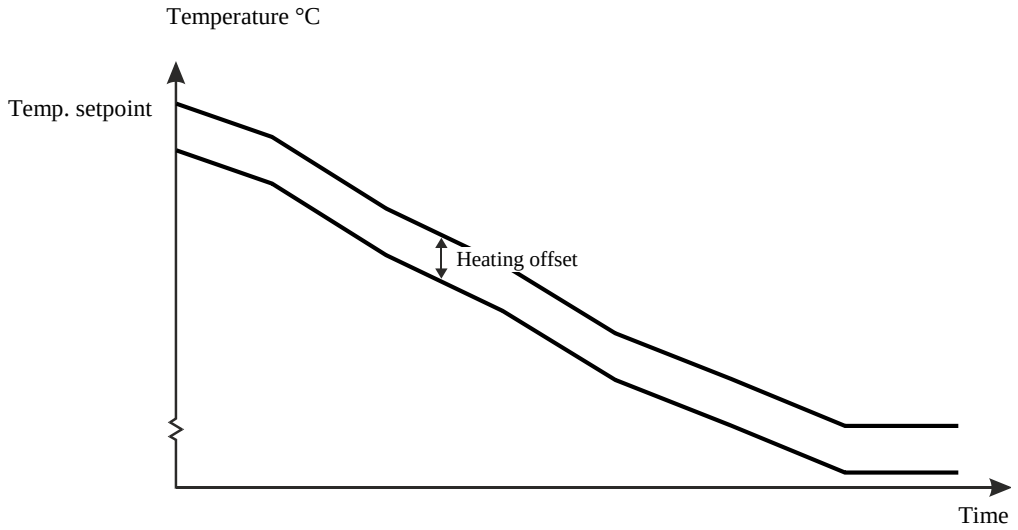
Common room heating: Up to two heaters are regulated according to a common heating requirement.

Individual room heating: For each heater, choose which sensors are to control the heating requirement. **Up to six heaters in one-zone houses or up to four heaters in each zone in two-zone houses can be used.**

Set heating offset

In houses with heating systems, CT2 Touch regulates the inside temperature according to the set temperature, **Temperature**, and according to a lower temperature limit, **Absolute heating temperature**.

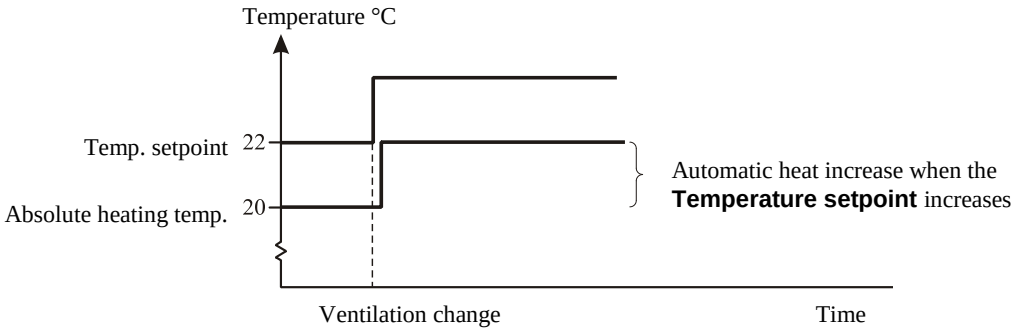
Example 2: Heating offset



*Set the number of degrees (**Heating offset**) that the temperature is allowed to drop below the required temperature before CT2 Touch is to supply heat.*

If you want to increase the **Temperature setpoint** without increasing the **Absolute heating temperature,** you must first adjust the **Temperature setpoint** and then increase the **Heating offset** by the corresponding number of degrees.

Example 3: Heat supply



*Note that when you increase the **Temperature setpoint**, the **Absolute heating temperature** will increase correspondingly so that the offset between the two values will always be the same.*

2.2.1.3.2 Stand-alone Heater Setpoint

You can use up to four stand-alone heaters to which a local zone should be assigned at computer setup. CT2 Touch regulates heating in the local zones of the house independently of room heating, and heats them by means of heaters located in each zone.

As heating is concentrated on the local zones, the inside temperature outside the zones can be kept down to reduce heat consumption.

In **Stand-alone heater**, set the temperature which is the lowest temperature allowed at the heater in question.

When the inside temperature is lower than this setting, the heater supplies heat.

2.2.2 Info

Climate/ Temperature/ Info

Experienced tunnel temp.	In tunnel mode, CT2 Touch considers the chill factor when regulating the heat supply.
Current tunnel temp.	CT2 Touch continuously calculates the current cooling in the house. **Experienced tunnel temp.** indicates the temperature, which the animals sense, i.e. the effective temperature.
Current temp.	CT2 Touch continuously calculates the current cooling in the house. **Current temp.** indicates the temperature, which the animals sense, i.e. the effective temperature.
Actual temp.	DOL 539 continuously calculates the current cooling in the house. **Actual temp.** indicates the temperature that the animals experience, i.e., the effective temperature at LPV ventilation.
Outside temperature	Current outside temperature.
Actual day and night adjustment	Current change of temperature in relation to **Temperature setpoint**.
House heater requirement	Current heat supply for installed **House heaters**.

Stand alone heater requirement	Current heat supply for the individual stand alone heater.
House heater temperature	Current temperature at the sensor/sensors that regulates the heater.
Experienced heating temp.	In tunnel mode, CT2 Touch considers the chill factor when regulating the heat supply.
Stand alone heater temperature	Current temperature at the sensor/sensors that regulates the heater.
Min. 24h	Lowest temperature during the last 24 hours and the time of occurrence are stated for all temperature measurements.
Max. 24h	Highest temperature during the last 24 hours and the time of occurrence are stated for all temperature measurements.
Sensor min/max	Lowest/highest temperature during the last 24 hours at the individual sensor.
Individual temp. sensor	The current temperature at the individual sensor.

2.2.3 Heating

Climate/ Temperature/ House heaters

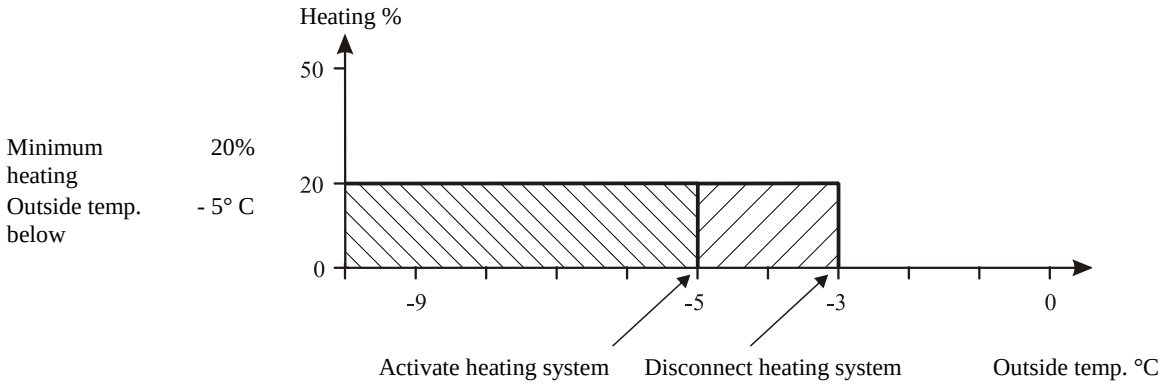
This section is relevant only to houses with heating systems.

Outside temp. below	Setting the outside temperature that activates the **Minimum heating** function. (see section 2.2.3.1).
Minimum heating	Setting the percentage of the heating system capacity at which the system opens at minimum heating.
Active	Connecting or disconnecting heat supply (see section 2.2.3.2).

2.2.3.1 Minimum Heating

Minimum heating is a function which CT2 Touch activates in cold weather. Minimum heating can e.g. minimize ice formation in the air inlet.

Example 4: Minimum heating



*The computer will not turn off the heating system again until the outside temperature exceeds **Outside temperature below** by more than 2° C. This prevents the heating system from connecting and disconnecting continuously when the outside temperature fluctuates around the set temperature.*

2.2.3.2 Connecting or Disconnecting Heat Supply

When you want to stop the heat supply in the house, disconnect heating. CT2 Touch will then automatically turn off the heat supply.

If you turn off the heat supply manually without disconnecting heating (**Active**) on CT2 Touch, regulation of the ventilation will be inappropriate as the computer will try to regulate based on the assumption that heating is still available.

NB When you disconnect heating in a house with a humidity sensor, CT2 Touch will automatically regulate the air humidity according to the principle of temperature reduction (see section 2.3.2.2, Humidity/ Humidity Control Principles).

NB

2.2.4 Stand-alone Heater

This section is relevant only to houses with stand-alone heaters.

Active	Connecting or disconnecting all stand alone heaters.
Heaters active	Connecting or disconnecting the individual stand alone heater.

2.2.5 Additions

Climate/ Temperature/ Additions

Comfort temp.	Setting a number of degrees which the inside temperature is raised in order to compensate for the chill effect that the animals are exposed to with strong ventilation (see section 2.2.5.1).
Advanced comfort	The function **Advanced Comfort** enables CT2 Touch to optimise the inside temperature in relation to the age of the animals, heat regulation and the climate in the house.
Extra ventilation	Setting a number of degrees which the inside temperature is raised in order to compensate for the chill effect that the animals are exposed to when extra ventilation is activated (only LPV, see section 2.2.5.2).
Day and night adjustment	The number of degrees by which the temperature will deviate from **Temperature setpoint**. (see section 0).
Start time	The time at which the function starts.
Stop time	The time at which the function stops.

2.2.5.1 Comfort Temperature

When CT2 Touch increases ventilation on hot days to keep the inside temperature down, the higher air speed in the house will make the air feel colder to the animals. Thus, for example 20° C in calm weather feels warmer than 20° C in windy weather.

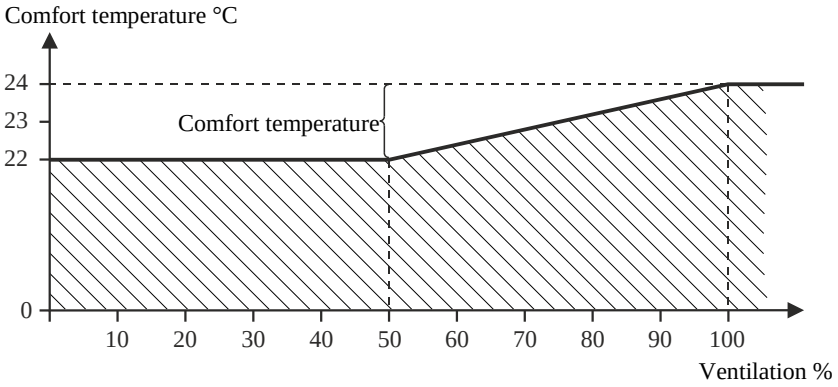
To counteract the fact that the animals are chilled because of the higher air speed, CT2 Touch increases the inside temperature by the set **Comfort temperature** before ventilation increases to

maximum. This temperature increase counteracts the fact that the animals feel the extreme ventilation as draught.

During continuous operation activates DOL 539 function **Comfort temperature** , when the ventilation requirement is higher than the ventilation rate that the **Start ventilation** is set at.

Example 5: Comfort temperature at continuous production

Comfort temp. 2° C
(Installation: vent. 50%)
start (start comfort)

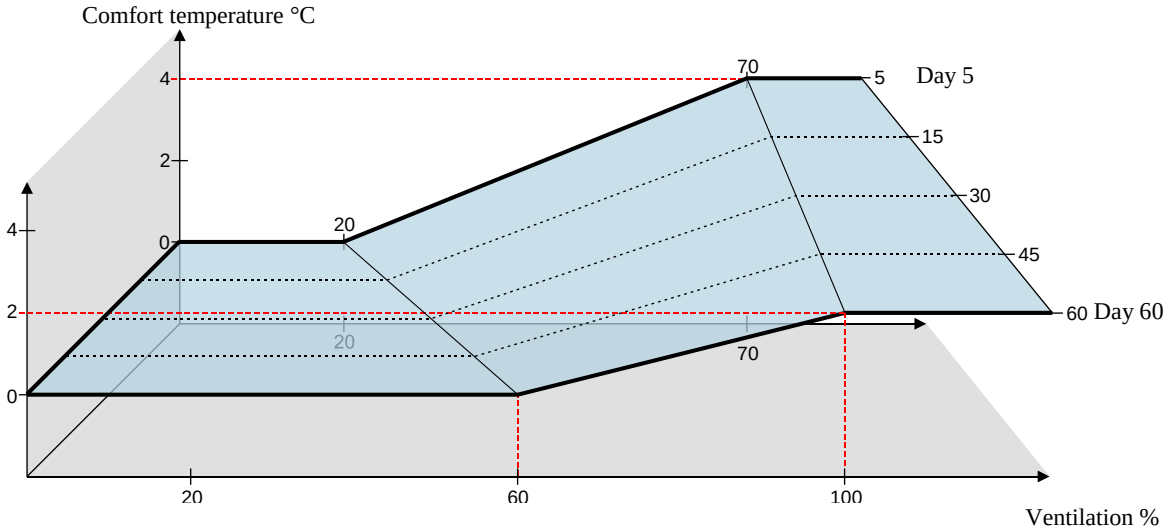


*You must set the **Comfort temp.** to the number of degrees by which the indoor temperature is to increase before ventilation increases to maximum.*

At batch production, the comfort temperature can be set as a curve equating to a time span of two day numbers. The ventilation can thus be increased for the smaller birds at a later stage.

Example 6: Comfort temperature at batch production

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



*In the technical menu **Technical/ Service/ Control parameters/Comfort/ Comfort ventilation**, the comfort start and max. ventilation values are also set so they equate to a time span of two day numbers.*

2.2.5.2 Extra Ventilation

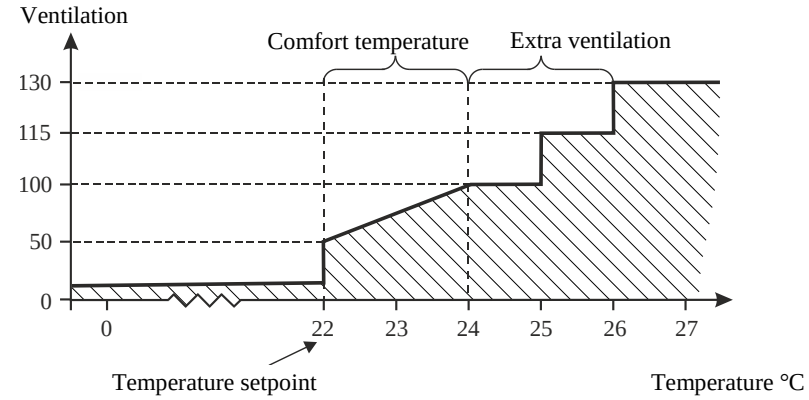
The function is only accessible in houses with LPV ventilation.

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.

CT2 Touch 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 7: Extra ventilation

Temperature setpoint	22° C
Comfort temperature	2° C
Extra ventilation	2° C
Start ventilation (start comfort)	50 %



*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.

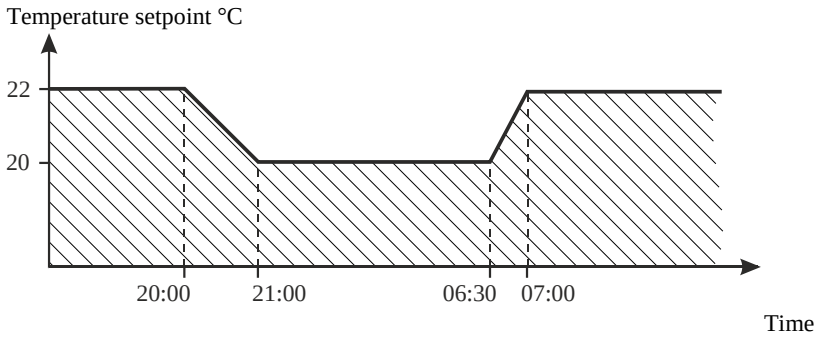
2.2.5.3 Day and Night Adjustment

Day and night adjustment is intended for changing the inside temperature over a set period every night in order to support the animal's normal behaviour. A lower inside temperature will make the animals experience a normal circadian rhythm. Furthermore, the ventilation level will be relatively higher, thus ensuring a better air quality.

NB You cannot activate **Day and night adjustment** when the house is set at **Empty house**.

Example 8: Day and night adjustment

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



The inside temperature will gradually adapt to day and night adjustments within the period the reduction in temperature is set to last.

This function is designed for a nightly temperature setback but can be set for running at any time and for letting the temperature rise (by setting the value at a positive figure).

In batch production mode, the function can be set to lower the temperature automatically during the processing of the batch. See the **Management/ Batch curves/ Climate** menu to set a curve for **Day and night adjustment**.

2.3 Humidity

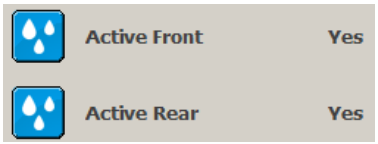
Main menu	Sub menu
Climate	
Humidity	
Setpoints	
Humidity	
Humidification	
Humidification last day	
Info	
Current humidity	
Humidification requirement	
Min./max. humidity	Min. humidity 24 h
	Max. humidity 24 h
Individual humidity sensors	Hum. sensor 1-2
Active	
Humidity control mode	
Humidity ventilation	
Temperature reduction	
Humidity heat	

Table 2: Overview of the Humidity menu at service user level.

This section is relevant only to houses with humidity sensors.

The CT2 Touch climate and production 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 cooling and humidification functions.

When air humidity is higher than the set **Humidity**, the computer will increase ventilation (when the temperature regulation permits) to reduce the humidity level, or increase the heat supply, depending on the selected humidity control mode. When air humidity is lower than the setting, the computer first reduces ventilation and then activates humidification if the house has a humidification system.

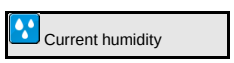


In two-zone houses, humidity control can be activated separately in each zone.

Climate/ Humidity

Setting of upper air humidity limit.

Setting of lower air humidity limit. See section 2.3.1.



Current humidity level.

Humidification last day	Setting of the day number when CT2 Touch deactivates humidification. CT2 Touch thus humidifies only at the start of the batch, until the natural humidity level in the house has reached the desired level.
Min. humidity 24 h	Lowest air humidity these 24 hours.
Max.humidity 24 h	Highest air humidity these 24 hours.
Humidification requirement	Current humidification requirement.
Active	Connecting and disconnecting humidity control. See section 2.3.2.
Humidity control mode	Selecting type of humidity control. See section 2.3.2.1, 2.3.2.2 and 2.3.2.3.

2.3.1 Humidification

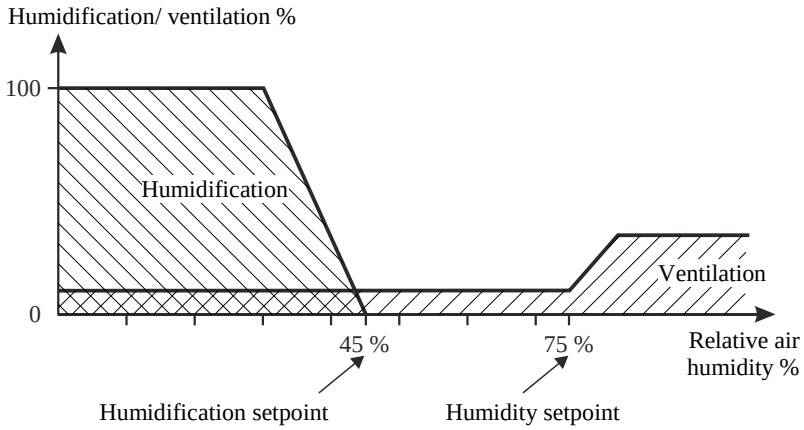
Climate/ Humidity/ Setpoints/ Humidification

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

CT2 Touch increases humidification as long as the air humidity is below the **Humidification setpoint**.

Example 9: Humidity and humidification setpoint

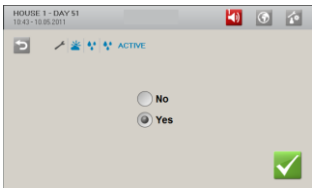
Humidity	75%
Humidification	45%
Minimum ventilation	10%



*When the inside temperature is below the **Temperature setpoint**, CT2 Touch is factory preset to limit humidification. Humidification will be disconnected if the inside temperature is 1° C below the temperature setpoint. Humidification could otherwise make the inside temperature drop further.*

2.3.2 Humidity Control

Climate/ Humidity/ Active



When humidity control is disconnected, CT2 Touch regulates ventilation according to the inside temperature alone.

2.3.2.1 Humidity Ventilation

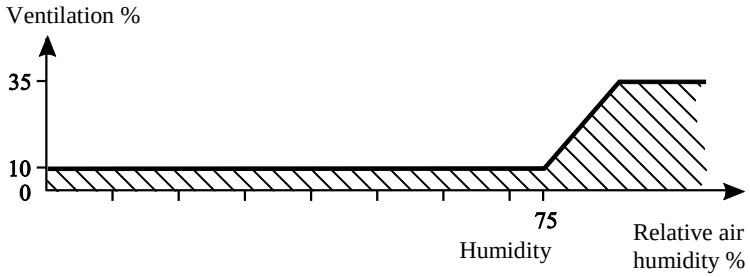
This function is not active in Combi-Tunnel houses, when they are ventilated according to the Tunnel principle.

When CT2 Touch is set up to control humidity according to the principle of humidity ventilation, it 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 ventilation makes it possible to keep the house air humidity on the set humidity.

Example 10: Humidity ventilation

Humidity 75%
Minimum ventilation 10%
Max. humidity vent. 35%)



2.3.2.2 Temperature Reduction

CT2 Touch can control the house humidity according to the humidity control principle with temperature reduction when the animals can tolerate a temperature drop at high air humidity. This function limits the use of heating in the house but cannot keep the air humidity at the humidity setpoint.

NB In your daily work, you should only adjust humidity via **Humidity setpoint**.

2.3.2.2.1 Temperature Reduction with Heat Supply

When CT2 Touch has been set up to control humidity according to the temperature reduction principle, the computer will adjust a too high humidity level by reducing the inside temperature by a few degrees (**Reduction**).

At a lower temperature setting, CT2 Touch will thus increase ventilation and consequently the change of air. When this has made the inside temperature drop, ventilation will decrease to minimum ventilation in order to limit the heat loss from the ventilation.

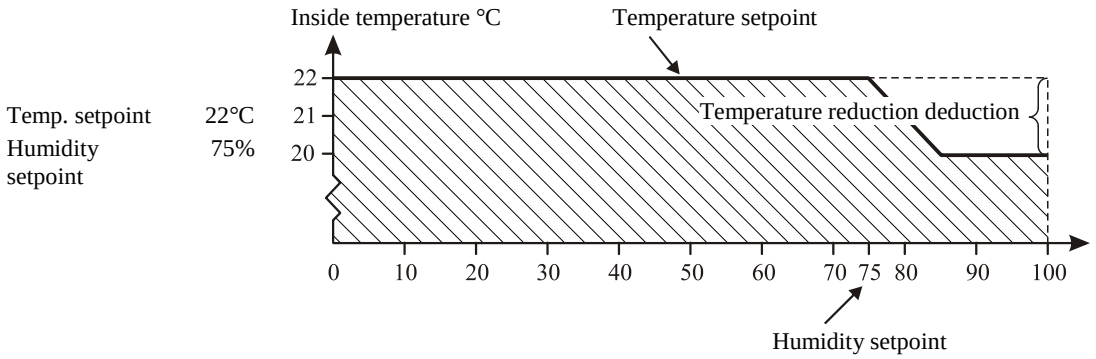
If this is insufficient to maintain the reduced **House heater setpoint**, the computer will gradually supply more heat.

2.3.2.2.2 Temperature Reduction without Heat Supply

When heat supply has been disconnected, CT2 Touch automatically regulates the air humidity according to the temperature reduction principle.

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

Example 11: Humidity control with temperature reduction



CT2 Touch will lower the set temperature by 1° C each time the air humidity exceeds the humidity setpoint by 5%.

2.3.2.3 Humidity Heat

When CT2 Touch has been set to control humidity according to the humidity heat principle, it will reduce a too high humidity level by gradually increasing the heat supply. The increased heat supply will make the inside temperature rise. In order to maintain the temperature, the ventilation system will gradually increase ventilation.

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

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

2.4 Heat Recovery Unit

These functions are only accessible in houses with heat recovery units. The availability of the functions described depends on the structure of the heat recovery unit in question.

Main menu		Sub menu	
Climate			
Heat recovery unit			
	Heat recovery unit		
	Activate heat recovery unit	**Yes/No**	
Only in connection with a temp. sensor in the inlet	Heat recovery unit efficiency		
	Heat recovery unit power recovery		
	Low outside temperature limit	**Low outside temperature limit enable**	
		Outside temperature	
		Disable heat recovery unit at outside temperature below	
	High outside temperature limit	**High outside temperature limit enable**	
		Heat recovery unit disabled at outside temperature above	
		Disable heat recovery unit below set point	
	Anti-ice	Anti-ice	Active/Inactive
		Anti-ice active at outside temperature below	
		Outside temperature	
		Anti-ice sensor	
		Heater enable	Yes/No
Only in connection with an integrated cleaning function	**Cleaning programs**	**Cleaning program**	
	Info	Anti-ice sensor	
		Inlet temperature	
		Heat recovery unit inlet 1 fan	
		Heat recovery unit inlet 1 flap	
		Heat recovery unit outlet 1 fan	
		Heat recovery unit outlet 1 flap	

Table 3: Overview of the complete Heat recovery unit menu at service user level.

A heat recovery unit is an integrated part of the house ventilation system and is used for minimum ventilation for a number of days at the start of a batch (broilers approx. 20 days). When more ventilation is needed, the ordinary ventilation system will gradually take over.

The heat recovery unit has two fans. One of the fans removes warm, humid air from the house. The other fan draws fresh, preheated air into the house. An automatic, adjustable flap opens to let outside air into the house. Outside air is heated inside the heat recovery unit by the warm, humid house air and is drawn into the house as dry, fresh air. When the flap is closed, the heat recovery unit is running in recirculating mode and the air outlet fan is off.

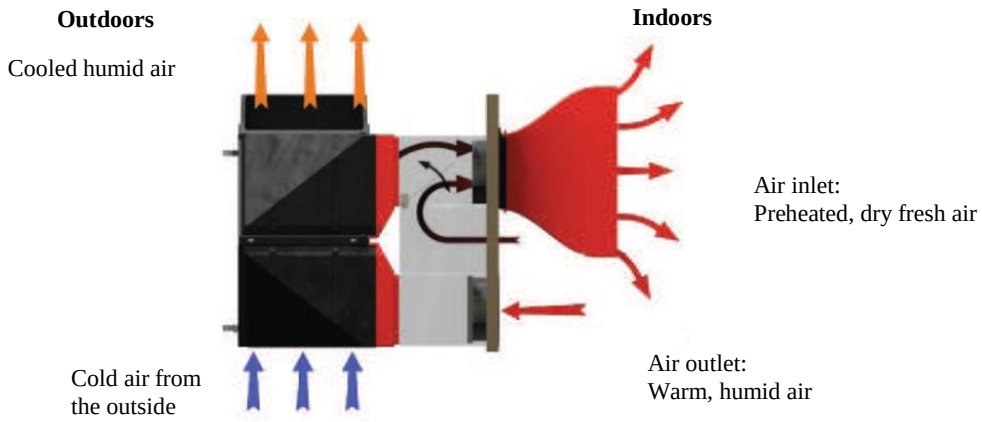


Figure 1: Simplified sketch of method of operation of heat recovery unit

Climate/ Heat recovery unit

Heat recovery unit

The heat recovery unit's current air output shown as a percentage of total output.

Activate heat recovery unit

Connection and disconnection of recovery unit. When the heat recovery unit is disconnected, the other heat components of the ventilation system takes over.

Forced dehumidification

Connection and disconnection of forced dehumidification.

This function is available when a humidity sensor is installed and **Humidity ventilation** is active (in the menu **Climate**/**Humidity**/**Humidity control mode**). See paragraph 2.3.2.1.

To use the heat recovery unit's ability to dehumidify in the best way possible, CT2 Touch reduces a too high air humidity by, among other things, letting the inside temperature rise at the same time as increasing the air outlet.

Heat recovery unit efficiency

View of the efficiency, indicating how much the air in the inlet is heated in relation to the outside temperature. The value should be taken as an estimate as it is based on the average temperature of the air in the air intake.

Heat recovery unit energy efficiency

View of the calculated value of how much energy is currently being recovered (power). The value should be taken as an estimate as it is based on estimated values of air volume and average temperature of the air in the air intake.

Low and high outside temperature limit

Low outside temperature limit enable

Connection and disconnection of heat recovery unit at low outside temperature. The purpose of this function is to prevent the heat recovery unit from running at very low outside temperatures.

Outside temperature

View of current outside temperature.

Disable heat recovery unit at outside temperature below

Setting the outside temperature at which the heat recovery unit disconnects. Also see Example 12.

High outside temperature limit enable

Connection and disconnection of heat recovery unit at high outside temperature. The purpose of this function is to prevent the heat recovery unit from running when the difference between the outside and inside temperatures is small.

The heat recovery unit disables when the outside temperature gets close to the temperature setpoint. Set the number of degrees for the minimum difference between outside and indside temperature. Also see Example 12.

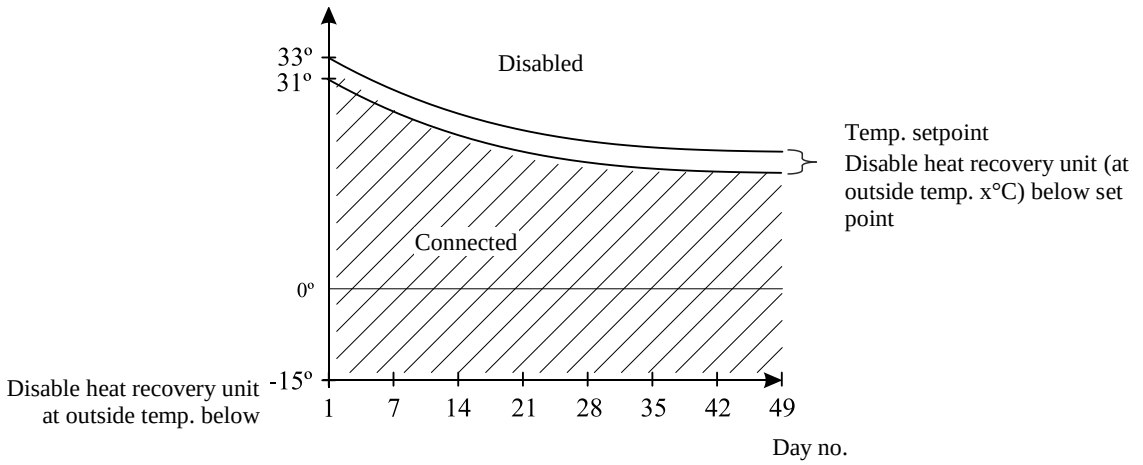
Heat recovery unit disabled at outside temperature above

View of the outside temperature that makes the heat recovery unit disconnect.

Disable heat recovery unit below set point

Setting degrees. When the outside temperature is closer to the temperature setpoint than the set degrees, the heat recovery unit disconnects. Also see Example 12.

Example 12: Heat recovery unit – low and high outside temperature limits



Anti-icing function

Anti-icing

View of whether the function is active or not.

When the anti-icing function is active, the air inlet of the heat recovery unit alternately turns on and off to prevent ice from forming in the unit.

Anti-icing active at an outside temp. below

Setting the outside temperature which activates the anti-icing function.

Anti-icing sensor

View of current temperature at the anti-icing sensor. The sensor value is not used for controlling the anti-ice function.

Activate heat

Connection and disconnection of an external heat source in connection with the heat recovery unit.

Cleaning program

Cleaning program

When the heat recovery unit used has a built-in cleaning system, CT2 Touch can run up to three cleaning programs per 24 hours.

Setting of number of cleaning programs per 24 hours.

Setting for each cleaning program at the time when cleaning is to run and the time at which it will stop.

Current status

Info

Status views of the heat recovery unit's individual parts.

2.5 Ventilation

These functions are not accessible in houses with Tunnel ventilation.

Main menu	Sub menu	
Climate		
Ventilation		
Minimum ventilation setpoints		
Minimum ventilation/animal		
Maximum ventilation setpoints		
Maximum ventilation		
Zone controlled inlet		
Temperature deviation		
Inlet correction factor		
CO2 minimum ventilation		
CO2		
CO2 minimum ventilation		
CO2 setpoint		
Active		
Inlet de-ice		
Outside temperature below		
Info		
Ventilation requirement		
Minimum ventilation		
Humidity ventilation		
Maximum ventilation		
Dynamic MultiStep mode	High/ Low	
Ventilation status	**Cycle timer minimum inlet**	**Cycling stopped**
		Next change:
	Cycle timer air outlet	**Cycling stopped**
		Cycling
	Roof inlet flap	
	Roof inlet fan	
	Roof inlet recirculation fan speed	
	Side inlet 1-6	
	Air outlet 1-2	
	Stepless 1-2	
	MultiStep1-16	

Table 4: Overview of the complete Ventilation menu at service user level.

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

CT2 Touch continuously adjusts the ventilation according to a calculation of the ventilation requirement. The computer will therefore increase or limit the ventilation based on whether the inside temperature and air humidity are either too high or too low.

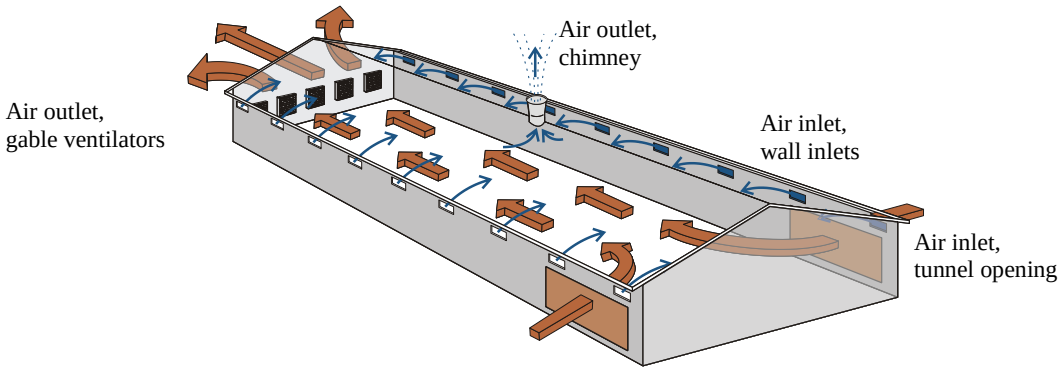


Figure 1: Combi-Tunnel ventilation

Climate/ Ventilation

Min. ventilation	The lower limit for the degree of ventilation in relation to the animals' air requirement (m^3/h per animal – Real air).
Max. ventilation	The upper limit for how much of the system capacity the computer can activate (see section 2.5.2).
Temp. deviation	The function zone-controlled air intake. Temperature span from **Temperature setpoint** in relation to which CT2 Touch adjusts the shutter position of the air inlets. Also, see section 2.5.3.
Inlet correction factor	Factor for zone regulation of the air inlet flap position.
CO2	Current CO_2 level.
CO2 minimum ventilation	Current ventilation requirement (as a percentage of the systems capacity) to keep CO2 levels under the CO2 setpoint.
CO2 setpoint	Upper limit for CO_2 in the house air.
Outside temp. below	The lower limit for the outside temperature. If the outside temperature drops below the lower limit, CT2 Touch activates the de-icing function.
Ventilation requirement	Current ventilation requirement.
Active	Connecting and disconnecting the function CO_2 minimum ventilation.
Ventilation status	Status for air inlet and air outlet.
Cycle timer min. inlet	Status for cycle timer by the function minimum air inlet.

2.5.1 Minimum Ventilation

Climate/ Ventilation/ Minimum ventilation setpoints

The minimum ventilation function 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 keep the inside temperature down.

CT2 Touch 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 the indicated minimum ventilation.

The animals' requirement for fresh air varies, depending on breed and weight. You must indicate 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 doubt.

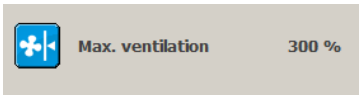
Please note that the correct number of animals must be set in the **Production/ Animals** menu.

2.5.2 Maximum Ventilation

Climate/ Ventilation/ Maximum ventilation setpoints

The maximum ventilation function sets a limit to how much of the ventilation system capacity (in percent) the computer can activate. 100% ventilation corresponds to the animals' calculated requirement, while ventilation utilising the total system capacity may reach e.g. 160% (see also the section on extra ventilation).

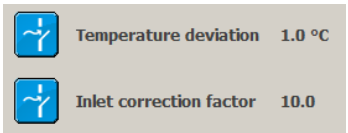
The function can be relevant to use during very high outside temperatures where ventilation utilising the total system capacity would make the inside temperature exceed the required temperature. The function can also prevent young animals from being exposed to a level of ventilation which they do not tolerate.



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

2.5.3 Zone-controlled Inlet

In order to neutralize possible temperature differences in very large one-zone houses, the air inlets can be grouped in up to six zones and each group is adjusted according to the temperature measured by the CT2 Touch computer in that particular zone. When the temperature in an air inlet zone deviates from **Temperature setpoint**, CT2 Touch adjusts the shutter position of the air inlet.



The temperature setting specifies the level of adjustment to be carried out by the CT2 Touch computer.

The higher the **Temp. deviation** is set, the slower adjustment.

When the temperature in the air inlet zone deviates from **Temperature setpoint**, the shutter position will be adjusted with this factor in relation to the extent of the deviation.

The higher the factor is set, the more the shutter position is adjusted. Also, see example in *Technical manual*.

2.5.4 CO_2 Minimum Ventilation

Climate/ Ventilation/ CO_2 minimum ventilation

This function is not active in Combi-Tunnel houses, when they are ventilated according to the Tunnel principle.

By using a CO_2 sensor the current CO_2 level in the house can be monitored and used as an indicator of air quality.

The function either increases or limits the minimum ventilation and the current ventilation level, depending on the CO_2 content of the house air, i.e. whether or not it is higher or lower than the **CO_2 setpoint**.

You can connect and disconnect the **CO_2 min. ventilation** function which is active when minimum ventilation is active.

When the CO_2 level of the house air exceeds the **CO_2 setpoint**, the function increases ventilation CT2 Touch reduces the minimum ventilation if the CO_2 level in the house is below the **CO2 setpoint**. **.** In the first 10 days of the batch, ventilation can also be limited below 25 % of the minimum ventilation curve.

In order to prevent a defective CO_2 sensor from causing a ventilation level which is far too low or far too high, CT2 Touch disconnects the CO_2 function and activates **Min. ventilation**.

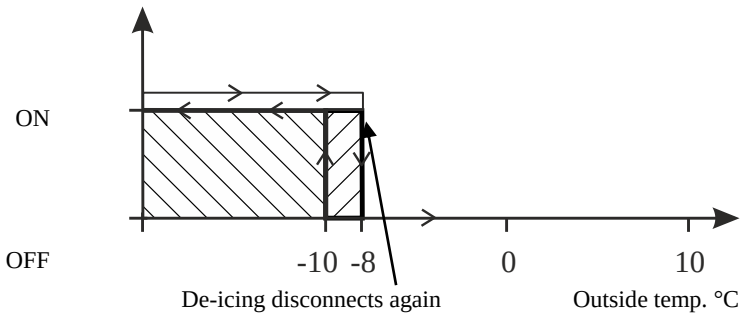
2.5.5 De-icing Air Inlet

Climate/ Ventilation/ Inlet de-ice

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.

CT2 Touch activates de-icing when the outside temperature falls below the setting for **Outside temp. below.**

Example 13: Activation of de-icing



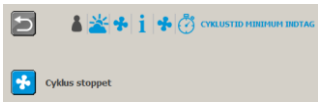
*You must set **Outside temp. below** to the number of degrees to which the outside temperature can fall before CT2 Touch activates the de-icing function.*

2.5.6 Ventilation Status

Climate/ Ventilation/ Info

2.5.6.1 Cycle Timer at Minimum Air Intake

This menu line is visible only when the function Cycle timer min. inlet is used (set in the menu **Technical/ Service/ Adjust negative pressure/ Side/ Minimum air inlet**).



When CT2 Touch regulates minimum ventilation with cycle timer, the flaps alternately open and close. **Next change** indicates the time until the flap position changes the next time.

2.5.6.2 Stepless and MultiStep Position

The air outlet in the house consists partly of one or more stepless exhaust units, and partly of 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 while 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 is connected at the same time as the output of the stepless exhaust unit is reduced. This way, the computer ensures stepless transition from one ventilation level to the next. If the ventilation requirement increases further, the stepless exhaust unit will perform up to its maximum until it reduces its output when the next group of ON/OFF exhaust units is connected.

Each exhaust unit in the house is marked to indicate whether it is a stepless or an ON/OFF exhaust unit. The latter are numbered according to which MultiStep® they belong. This way, it is possible to recognise the individual exhaust units and compare their actual output with the status that you can read in the **Ventilation** menu. This is relevant particularly in connection with troubleshooting work.

2.5.6.3 Flap Opening

The flap opening is a percentage indication of how much the flaps of both air inlet and air outlet are open. If you are in doubt about the actual ventilation output, you can compare the display of the ventilation status in the ventilation menu with the output that you can actually observe in the house. The percentage indications are relevant particularly in connection with troubleshooting work.

2.6 Spray Cooling

This section is relevant only to houses with spray cooling systems.

Main menu	Sub menu
Climate	
Spray cooling	
Setpoints	
	Start cooling
	Humidity to stop spray cooling
Info	
	Spray cooling requirement
	Requirement incl. humidification

Table 5: Overview of the complete Spray cooling menu at service user level.

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

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

The combination of a high inside temperature and high air humidity can be life-threatening to the animals. As cooling makes the house humidity increase, CT2 Touch automatically disconnects cooling when the house humidity exceeds **Humidity to stop spray cooling** (normally 75-85%).

Climate/ Spray cooling

Start cooling

The number of degrees by which the temperature is to increase above the **Temperature setpoint** + **Comfort temp**. before cooling starts.

Humidity to stop spray cooling

The air humidity percentage that makes CT2 Touch stop the cooling function. Furthermore, a humidity limit can be set for the tunnel cooling.

Spray cooling requirement

Display of the current cooling requirement.

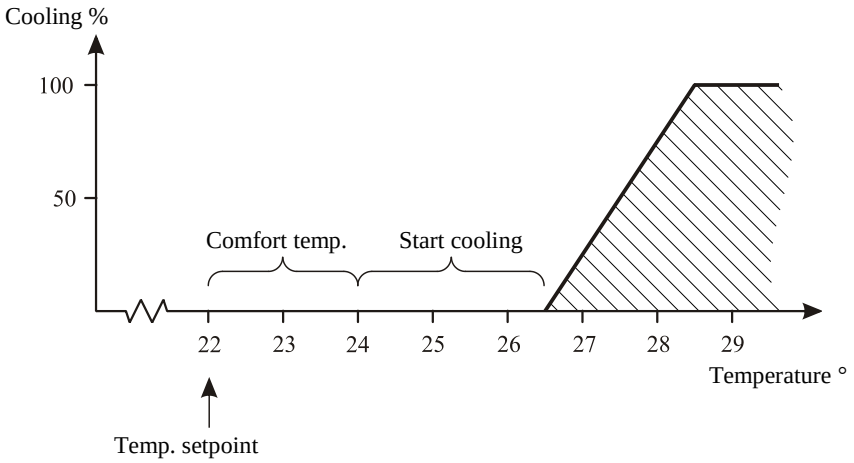
Requirement incl. humidification

This reading is displayed when humidification is also connected to the relay for high-pressure cooling system. The reading shows how big a percentage of the high-pressure cooling system's capacity that is currently active.

This feature is particularly useful in hot and dry areas where high-pressure cooling will run alternately to the humidification, respectively to cool and increase humidity.

Example 14: Cooling

Temp. setpoint	22° C
Comfort temp.	2° C
Start cooling	2.5° C



CT2 Touch gradually increases cooling.

2.7 Tunnel

These functions are not accessible in houses with LPV ventilation.

Main menu	Sub menu	
Climate		
Tunnel		
Setpoints		
	Stop speed cycle timer	
	Minimum air speed	
	Maximum air speed	
	Chill factor	
	Tunnel outside temperature limit	
Tunnel	**Minimum ventilation/animal**	
CO2 minimum ventilation (in Combi-Tunnel houses, this function can be found in the menu Ventilation)		
	CO2	
	CO2 minimum ventilation	
	CO2 setpoint	
	Active	
Info		
	Air speed requirement	
	Tunnel start temperature	
	Tunnel stop temperature	
	Air speed	
	Possible max. air speed	
	User limited max. air speed	
	Current max. air speed	
	Chill effect	
	Tunnel status	Cycling stopped
		Next change:
		Tunnel inlet 1-4
		Tunnel outlet 1-2
		Stepless tunnel 1-2
		Tunnel MultiStep 1-16

Table 6: Overview of the complete Tunnel menu at service user level.

Tunnel ventilation is used at high temperatures. The air is let in through a tunnel opening at one end of the house and the air is exhausted through a number of gable fans at the other end of the house. This makes the air move quickly in a lengthwise direction in the house and the air therefore feels cooler.

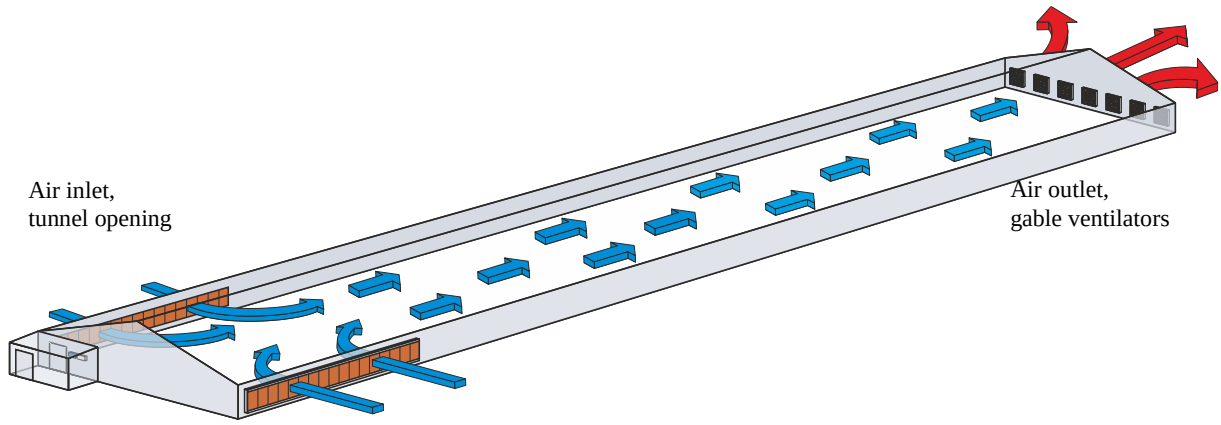


Figure 2: Tunnel ventilation

Climate/ Tunnel/ Setpoints

Tunnel ventilation cannot be activated until both the outside and inside temperatures are sufficiently high.

Stop speed cycle timer	Setting of the highest acceptable air speed when tunnel ventilation is running cycle timer (see section 2.7.1) (only Combi-Tunnel). Above this level, ordinary tunnel ventilation without cycle timer is used to ventilate.
Min. air speed	Setting of lowest air speed acceptable in tunnel mode (see section 2.7.2).
Max. air speed	Setting of the highest air speed acceptable in tunnel mode (see section 2.7.2).
Chill factor	The degree of cooling which an animal of a given age and breed will experience at 1.0 m/s.
Tunnel outside temp. limit	The lower outside temperature limit for activation of Tunnel ventilation. The limit is set in the batch curve **Chill curve. – outside temp.** (only Combi-Tunnel).
Min. vent./animal	The lower limit for how little is ventilated in relation to the air requirement of the birds (m^3/h per bird).

Climate/ Tunnel/ Info

Air speed requirement	The current ventilation requirement (only Tunnel).
Tunnel start temperature	The high inside temperature that activates Tunnel ventilation (only Combi-Tunnel).
Tunnel stop temperature	The low inside temperature that stops Tunnel ventilation (only Combi-Tunnel).
Air speed	Display of the calculated air speed in the house.
Possible max. air speed	Reading the systems maximum air speed.
User limited max. air speed	Reading the system set maximum air speed.(**Max. Air speed**).
Current max. air speed	The current max. air speed.

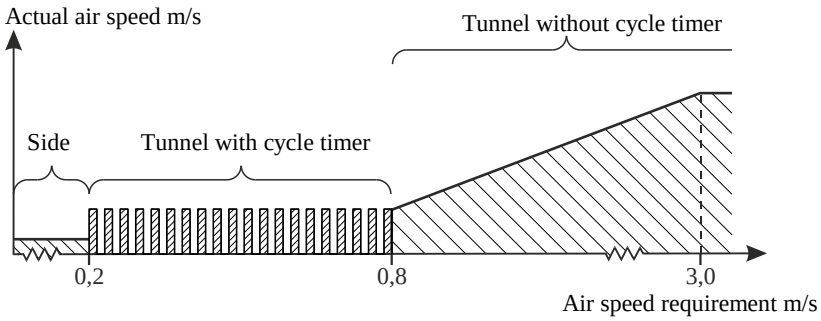
Chill effect	CT2 Touch's calculation of the degree of cooling in ºC which an animal of a given age and breed will experience.
Tunnel status	Menu for status of air intake, MultiStep and Dynamic MultiStep.

2.7.1 Cycle Timer at Tunnel Ventilation

When tunnel ventilating at low ventilation requirement (e.g. below 0.8 m/s), the distribution of air in the house can be ensured by means of a cycle timer. CT2 Touch will alternately switch the fans on and off. This will prevent temperature differences.

Example 15: Ventilation sequence with cycle timer at tunnel ventilation

Min. air speed	0.2 m/s
Stop speed cycle timer	0.8 m/s
Max. air speed	3.0 m/s



*When a cycle timer is used at tunnel ventilation, the air speed will cycle between 0.0 and 0.8 m/s. As always the setting of **Min. air speed** will function as a start condition for tunnel, but now with the possibility of starting at a lower setting, eg. 0.2 m/s.*

2.7.2 Minimum and Maximum Air Speeds

If the speed is too low, the temperature difference between the two ends of the house will be too high. Therefore, you must set a lower limit for the air speed in tunnel mode.

In order to prevent small animals from being ventilated too much, it is possible to set an upper limit for the air speed in the house, **Max. air speed**.

2.7.3 Chill Factor and Chill Effect

The chill factor is an expression of the cooling effect of the air, depending on the age and breed of the animals. The younger the animals, the colder they feel the temperature at a given air speed.

CT2 Touch calculates the current cooling effect on the basis of the air speed in the house and the current chill factor.

Example 16: ***Chill factor and chill effect***

	Full-grown animals	***Day-old chickens***
Air speed	*1.5 m/s*	*1.5 m/s*
Chill factor	*3*	*8*
Chill effect	*4.5° C*	*12° C*
30° C feels like	***25.5° C***	***18° C***

2.7.4 Start Tunnel

The computer continuously calculates which inside temperature is required before Tunnel ventilation can be activated (only Combi-Tunnel).

- To change to tunnel at a **lower** inside temperature, you must **reduce the chill factor**.
- To change to tunnel at a **higher** inside temperature, you must **increase the chill factor**.

2.7.5 Current Air Speed

The current air speed is a calculated value (metres/sec.). The climate and production computer calculates the current air speed through the house based on the cross-sectional area (m^2) and the current capacity of the tunnel fans.

2.8 Tunnel Cooling

This section is relevant only to houses with tunnel cooling or cooling systems.

Main menu	Sub menu
Climate	
Tunnel cooling	
Setpoints	
Calculated start	
Start air speed	
Start temperature	
Stop air speed	
Humidity to stop tunnel cooling	
Bleed off active	
Time for bleed off (Pad rinsing)	
Info	
Cooling blocked by:	Air speed Temperature Tunnel cooling temperature Humidity Humidity sensor error
Tunnel cooling requirement	
Tunnel cooling temperature 1-2	
Starts yesterday	
Runtime since last bleed off (Pad rinsing)	
Total runtime	
Relay 1-6	
Remaining time relay 1-6	
Start based on:	
Air speed Temperature	

Table 7: Overview of the complete Tunnel cooling menu at service user level.

Climate/ Tunnel cooling/ Setpoints

Calculated start

Calculation of the inside temperature that makes CT2 Touch start the tunnel cooling function.

Start air speed

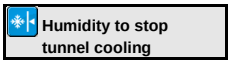
Setting of the air speed that starts tunnel cooling.

Start temperature

The number of degrees by which the temperature is to increase above the **Temperature setpoint**+ (**Max. speed x Chill factor**) before tunnel cooling starts.

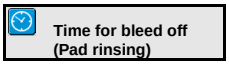
Stop air speed

Setting of the air speed that stops tunnel cooling.



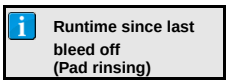
The air humidity percentage that makes CT2 Touch stop the tunnel cooling function.
When running at 10% or less the tunnel cooling is gradually reduced before being stopped. Furthermore, a humidity limit can be set for the spray cooling.

Connection and disconnection of pad cleaning.



The time when the drainage function starts after tunnel cooling has run for a set interval (**Running time between drainage intervals**).

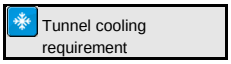
Drainage does not start while tunnel ventilation is active.



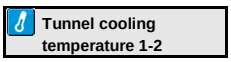
Reading of the time tunnel cooling has been running since the last drainage process.

Reading of total drainage running time. Can be used as an indicator of whether cooling pads need to be replaced.

In order to ensure that the cooling system does not run under inappropriate conditions (not desirable due to the well-being of the birds), CT2 Touch will stop the cooling even though the inside temperature is high.



Display of the current cooling requirement at Tunnel ventilation.



The temperature on the interior of the cooling system. The temperature is used for alarm in connection with cooling system failure.

The function disconnects cooling if the temperature falls below the outside temperature limit in the chill curve (cf. the age of the animals). This way small animals will not be exposed to cold air.

Selecting which factor is to activate tunnel cooling. (**Temperature/ Air speed**).

Example 17: Start of tunnel cooling

Temperature setpoint:	*23° C*
Max. air speed:	*3.0 m/s*
Chill factor:	*2.5*
Start temperature:	*2° C*
Calculation:	***23 + (3.0 *2.5) + 2***
Start of tunnel cooling:	***32.5° C***

2.9 Pressure Control

This section is relevant only to houses with active pressure control.

Main menu		
Climate		
Pressure		
Setpoints		
	Pressure setpoint	
	Active	Yes/No
Info		
	Pressure sensor	
	Calculated air inlet	

Table 8: Overview of the complete Pressure menu at service user level.

By means of a pressure sensor, the CT2 Touch can control the pressure level in the house. On the basis of the sensor measurements, CT2 Touch controls the opening of the flaps; this way, it maintains the required pressure level in the house (**Pressure setpoint**).

Climate/ Pressure

Pressure setpoint	Setting of the pressure level.
Active	Connection and disconnection of pressure control.
Pressure sensor	The current pressure level in the house.
Calculated air inlet	An indication (percentage) of how much the flaps are to be open to maintain the **Pressure setpoint**.

2.10 Auxiliary Sensors

This section is relevant only to houses with auxiliary sensors.

Main menu
Climate
Auxiliary sensors
Auxiliary sensors
CO2 sensor 1-4
Pressure sensor 1-4
NH3 sensor 1-4
O2 sensor 1-4
Temperature sensor 1-4
Humidity sensor 1-4
Air speed sensor 1-4
Wind direction sensor 1-4

Table 9: Overview of the complete Auxiliary sensor menu at service user level.

Climate/ Auxiliary sensors

The **Auxiliary sensors** menu gives you a quick overview of the registrations of the CT2 Touch from the auxiliary sensors.

CT2 Touch registers the content of CO_2, NH_3, O_2 and humidity in the house air, as well as pressure and temperature. You can also connect air speed and wind direction sensors that can measure the wind direction and air speed outside the house.

CT2 Touch can be connected to up to four auxiliary sensors. The display of the **Aux. sensors** menu depends on which types of auxiliary sensors you install.

Current value registered by the sensor.

2.11 Stir Fan

Main menu			Sub menu
Climate			
Stir fan			
Stir fan 1-4			
	Mode		
	24-hour clock		
	Temperature		
	Heater		
	24-hour clock	**Start time**	
		Stop time	
		ON-time	
		OFF-time	
		Start ventilation	
		Stop ventilation	
	Temperature	**Start ventilation**	
		Stop ventilation	
		Control	**1 sensor** **2 sensors**
		Sensors installed	
1 sensor		**Sensor no.**	
2 sensors		**Temp. 1 sensor no./ Temp. 2 sensor no.**	
2 sensors		**Stir fan temperature**	
2 sensors		**Stir fan difference temperature**	
2 sensors		**ON-time**	
		OFF-time	
	Heater	**Start ventilation**	
		Stop ventilation	
		Control	**With heater** **After heater**
		Start delay	
With heater		**Stop delay**	
After heater		**ON-time**	

Table 10: Overview of the complete Stir fan menu at service user level.

A stir fan improves circulation of the air and thus provides a more uniform temperature in the house. CT2 Touch can regulate up to four stir fans at a time.

Climate/ Stir fan

Start/Stop ventilation

Mode

The stir fans are only active within designated ventilation levels.

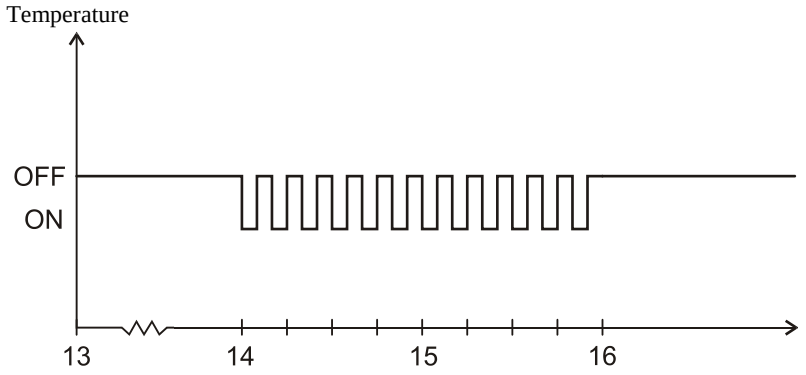
Each stir fan can be regulated in connection with a heat source, a temperature sensor or a 24-hour clock.

2.11.1 24-Hour Regulation of Stir Fan

The stir fan operates according to a set ON/OFF time and the time setting as to when it should start and stop.

Example 18: 24-hour clock regulation

Start time	14:00 h:m
Stop time	16:00 h:m
ON time	5 min.
OFF time	5 min.



2.11.2 Temperature Sensor Regulation of the Stir Fan

When a stir fan should operate in connection with temperature sensors, you have to set how many (one or two) and according to which sensors the computer should control and the temperature activating the stir fan.

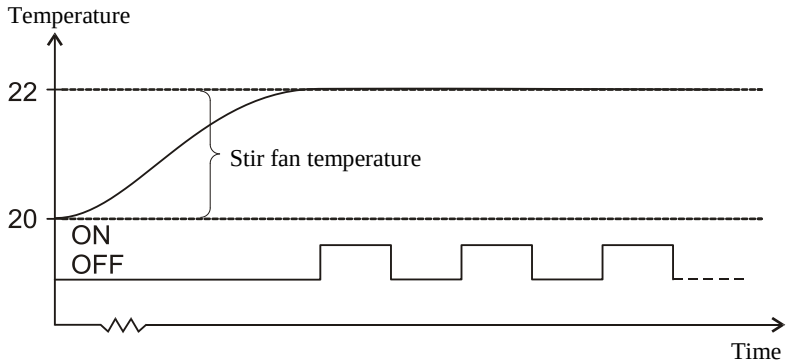
The stir fan runs for a set ON/OFF time.

One temperature sensor: **Stir fan temp.** is a deviation from **Temperature setpoint**.

Two temperature sensors: **Stir fan diff. temp.** is a temperature difference between the two sensors.

Example 19: Temperature sensor regulation

Stir fan temp.	2° C
ON time	5 min.
OFF time	5 min.
Temp. setpoint	



2.11.3 Regulation of the Heat Source

When the stir fan is to operate in connection with heat sources, you must opt for a way to control and set the start and stop time of the fan.

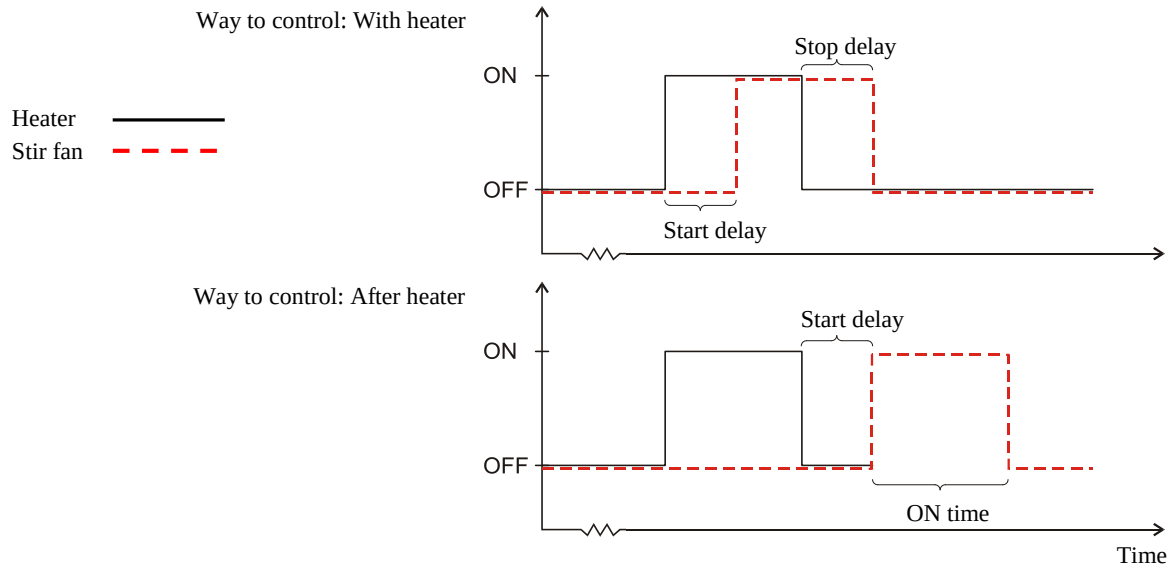
Control:

With heater: The stir fan runs while the heat source supplies heat, but starts and stops with a set time delay (**Start delay/ Stop delay**).

After heater: The stir fan runs after the heat source has supplied heat. It starts with a time delay (**Start delay)** and runs for a set period of time (**ON time**).

This function is active only when heating is required.

Example 20: Heat source regulation



2.12 Weather Station

The weather station is used to record wind direction and speed.

Main Menu	Submenu	
Climate		
Weather station		
	Wind direction absolute	N
	Wind direction relative	Rear
	Wind speed	

Table 2: Overview of the complete Weather station menu at service user level.

Wind direction	Display of current wind direction.
Wind speed	Display of current wind speed

2.13 User Offsets

Main Menu	Submenu
Climate	
User offsets	
	Temperature
	Heater setpoint
	Comfort temperature
	Stand-alone heater 1-4
	Humidity
	Chill factor
	Minimum ventilation
	Minimum ventilation (Natural)
	Maximum ventilation
	Minimum air speed
	Maximum air speed
	Tunnel cooling start air speed
	Tunnel cooling stop air speed
	Day-and-night temperature

Table 3: Overview of the complete user-offset menu

User- offsets	Viewing the current user offset to the standard curve values.

3 Management

Main Menu	Submenu		
Management			
House data			
	Batch state	Active house Empty house	
	Service Access activated		
	Day number		
Breeders	**Week number**		
	Stocked birds		
	Adjust date and time		
	Week day		
	House name		
	Start batch on day		
Trend curves			
	Climate	**Temperature**	
		Humidity	
		Outside temp.	
		CO2 sensor	
		Pressure sensor	
		Tunnel temperature 1-2	
		Auxiliary sensors	Trend aux. sensors 1-4
		Ventilation	Trend air outlet Trend air speed
		Cooling	Tunnel cooling Spray cooling
		Heater	
		Stand alone heater	Trend heater 1
		Heat recovery unit	Heat recovery unit efficiency Heat recovery unit energy efficiency
	Power monitoring	**Power monitor 1-2**	Trend curve 24 h Trend curve 50 days
Batch curves			
	Climate	Inside temperature	
		Heat offset temperature	
		Comfort temperature	
		Stand-alone heater temperature	

Main Menu	Submenu	
Management		
		Humidity
		Chill curve – outside temperature
		Chill factor curve
		Minimum ventilation
		Maximum ventilation
Only with batch production		Minimum air speed in tunnel
Tunnel		Maximum air speed in tunnel
Tunnel		Tunnel cooling start/stop speed
		Day and night adjustment
In-between function		
	Soaking/ Washing/ Drying	**Roof inlet flap**
		Roof inlet fan
		Re-circulation inlet
		Side inlet
		Tunnel inlet
		Ventilation
		Air outlet 1 flap
		Air outlet fan speed
Soaking		**Soaking time**
Soaking		**Cycling time**
Soaking		**ON time**
Washing		**Washing time**
Drying		**Heating**
Drying		**Drying time**
	Empty house	**Roof inlet flap**
		Roof inlet fan
		Re-circulation inlet
		Side inlet
		Tunnel inlet
		Ventilation
		Air outlet flap
		Air outlet fan speed
		Heating
		Preheating
		Preheating setpoint
		Preheating start temperature

Main Menu		Submenu		
Management				
Catching				
	Catching	**Inactive** **Active**		
Only when installed as Key	**Catching ready**	**Date/time**		
	Catching start			
	Catching stop			
	Setup	**Timing**	Maximum active time	
Only when installed as Key			Maximum ready time	
		Climate	Inlets Stepless MultiStep	
Consumption				
	Ventilation consumption	Total this batch		
	Heat consumption	Total this batch		
	Stand alone heat consumption	Total this batch		
	Energy consumption	**Energy meter 1-2**	Energy this batch Energy total Actual power consumption	
Change password				
	Change password Daily			
	Change password Advanced			
	Change password Service			

Table 11: Overview of the menu items in the Management **menu**

3.1 House Data

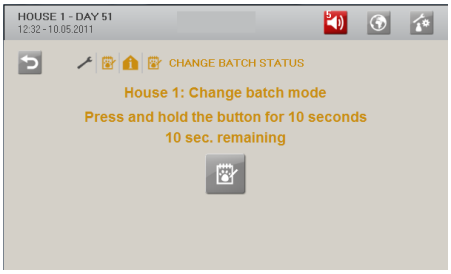
Batch status	Reading of batch status (**Active house**/ **Empty house**).
Service Access activated	Information that the house computer is being remotely services via the farm management program BigFarmNet Manager. When Service Access is activated the icon for the user menu is red .
Day number	Setting the day number. The day number adds one for each day that passes after the house has been set at active house. Day number can be set to -9 so CT2 Touch can control the preheating of the house prior to the birds being stocked (also see section 3.1.1.1).
Stocked animals	Setting of number of animals.
Adjust data and time	Setting the current time and date.
Week day	Display of current week day

House name — Setting the house name.

Start batch on day — Setting of the day on which the batch shall start.

When batch status is **Empty house**, all alarm functions are disconnected.

3.1.1 Setting Active House/ Empty House



Set the 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. The day number then changes to day 0, and the computer will run according to the automatic settings for climate.

Set the batch status to **Empty house** after the house has been depopulated.

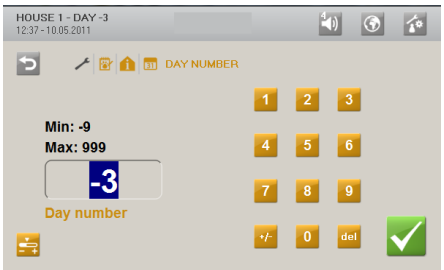
When the house is empty, CT2 Touch will disconnect the regulation of the house climate and control according to the settings for the in-between functions empty house and frost protection.

This is to protect the animals in case the wrong house is set at **Empty house**.

If, on the other hand, you want the system to close when the batch status is empty house, reset the settings in the in-between function empty house.

In the Empty house batch status, CT2 Touch will also reset any changes of curves which you have made during the previous batch course.

3.1.1.1 Preheating Livestock House



Day number can be set to a negative day number (up to 9) so preheating of the house is carried out on the negative day numbers.

1. Set batch status to **Active house**.
2. Set **Day number** to the number of days required for preheating
   e.g. -3.
3. Make sure that the first curve point of **Minimum ventilation** is set to 0% in the menu **Management/ Batch curves/ Climate/ Min. ventilation**.

3.1.2 Time

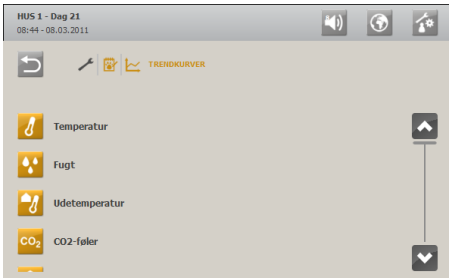
Correct setting of the time is important for several control functions and for the registration of alarms. The clock is not switched off in case of power failure.

3.1.3 House Name

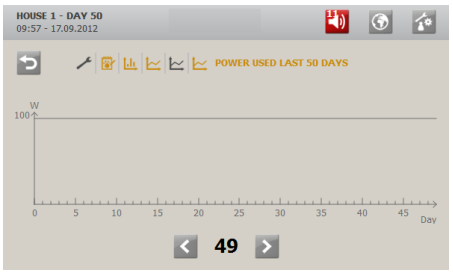
When the house computer is integrated in a LAN network, it is important that each house section has a unique name. The house name is transferred through the network and the house should therefore be identifiable based on its name.

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

3.2 Trend Curves



Climate trend curves give a picture of how the climate has developed during the last 24 hours.

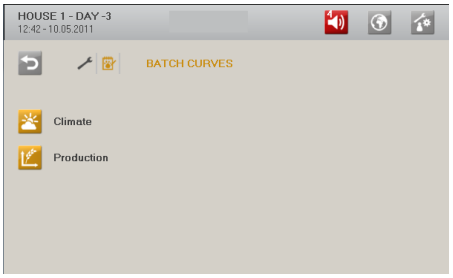


The trend curves' monitoring of power shows the level of power consumption for the most recent 24 hours and the last 50 days.

3.3 Batch Curves

This section is relevant only to houses with batch production.

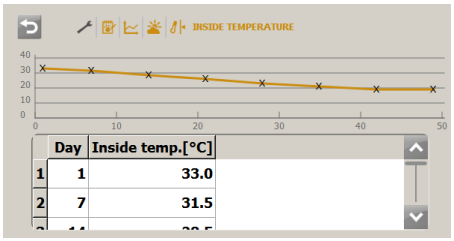
Together with other information, the curve settings form the basis of CT2 Touch's calculations of climate regulation.



CT2 Touch can automatically adjust settings for temperature, heat, comfort temperature, tunnel start, ventilation and the function day and night adjustments in relation to bird age.

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

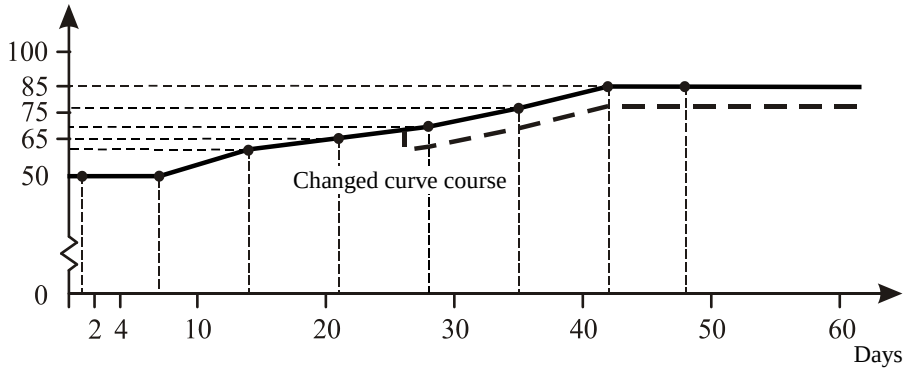
3.3.1 Setting Curves



For each curve, set

1) a day number for each of the eight curve points.
2) the required value of the function of each of the eight curve points.

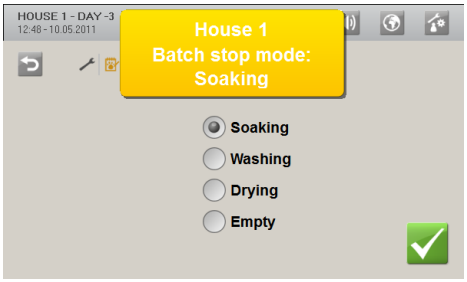
Example 21: Curve for humidity



It generally applies to the curve functions that CT2 Touch will automatically displace the rest of a curve course in parallel when you change the settings of the curves during a batch.

3.4 In-between Function

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



The CT2 Touch computer can activate the in-between functions only when the batch status is **Empty house** (in the menu **Management**/ **House data**/ **Batch status**).

The menu is visible only when the batch status is **Empty house.**

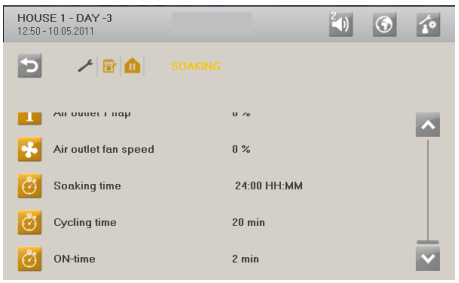
When the time for an in-between function is up, the computer will again regulate according to the settings for **Empty house**.

The house is...	Menu for setting the in-between function.
Roof inlet flap	Setting the shutter position for the roof inlets (roof).
Roof inlet fan	Setting the speed control for the roof inlets (roof).
Recirculation inlet	Setting the recirculation fan for the roof inlets (roof).
Side inlet	Setting the flap opening for side air inlet.
Tunnel inlet	Setting the flap opening for tunnel air inlet.
Ventilation	Setting the percentage of nominal ventilation.
Air outlet flap	Setting the flap opening for air outlet.
Air outlet fan speed	Setting of speed control for air outlet.
Soaking time	Setting the active period for soaking.
Cycle time	Setting the intervals in which the soaking system is active.
ON-time	Setting the period in which the soaking system is running.
Washing time	Setting the active period for washing.
Heating	Setting the heating in connection with the **Drying** function.
Drying time	Setting the active period for drying.
Preheating setpoint	Setting of temperature for preheating at batch start.
Preheating start temperature	Setting of temperature for preheating at batch stop.

When batch status is **Empty house**, the computer will disconnect all automatic settings and run according to the settings in the **Empty house** in-between function.

3.4.1 Soaking

This section is relevant only to houses with spray cooling systems or soaking systems.



Soaking will run according to a soaking function which will soak the house with water to loosen dust and dirt. This will not only reduce the amount of dust during the subsequent cleaning but also make cleaning easier.

In soaking mode, stop ventilation to maintain the humidity in the house. 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 process is to last.

3.4.2 Washing

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

3.4.3 Drying

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

3.4.4 Empty House

When batch status is **Empty house** (in the **Management/ House data** menu**)**, the CT2 Touch computer will regulate according to the settings for **Empty house** (set in the **In-between function** menu).

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

In **Empty house**, all other alarm functions are disabled.

3.4.4.1 Preheating

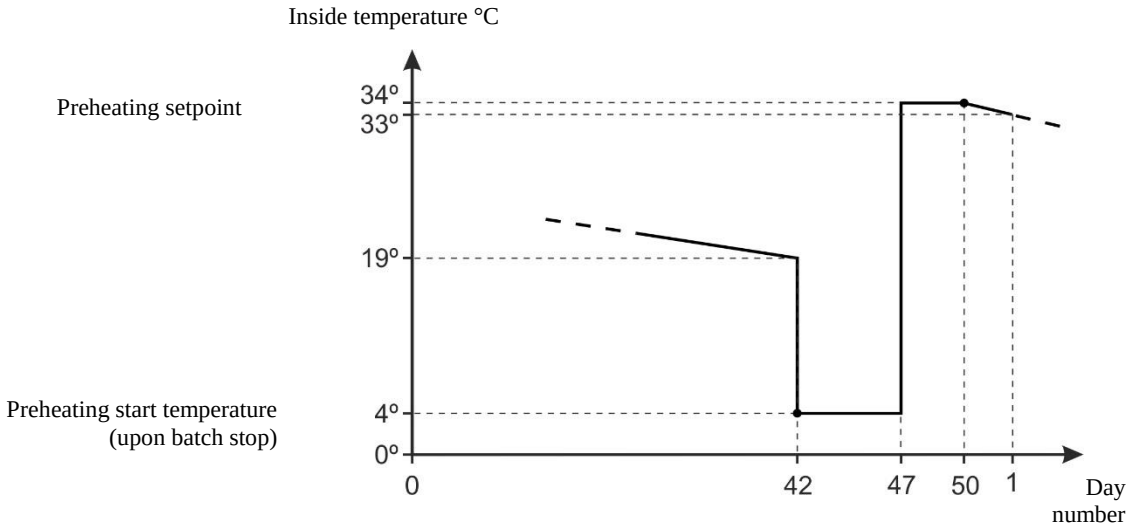
Preheating ensures that the inside temperature does not fall below the preheat temperature when batch status is empty house for a longer period of time.

Thus, the function can also be used to protect the house against frost.

In batch production the function **Preheating start temperature** can maintain an inside temperature of 4°C, for example, between two batches. Note that ventilation must be closed and the heating system must be on.

When the user changes the batch state to **Active house**, CT2 Touch will adjust the inside temperature according to the **Preheating setpoint** until day 3, when the birds come into the house.

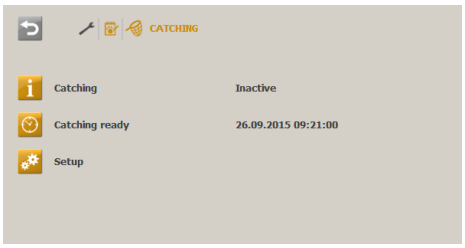
Example 22: Preheating



*When the batch state is **Empty house** (**Management**/ **House data**) and **Preheating** has been connected, CT2 Touch will regulate according to the temperature for**Preheating start temperature**.*

3.5 Catching

Catching is designed to change the air change in the house in the event that the animals or a part of them are to be taken out the house. The ventilation status will change to Catching and adapt its settings. When it changes back, the ventilation returns to half the ventilation requirement that was just before the function started.



Catching can be set up to activate in two ways:

- External key
- Display Operation

Key

Catching ready Setting the date and time that the DOL 539 can activate the function.

Maximum ready time Setting the period when DOL 539 can activate the function. If you forget to end the catching function, the DOL 539 provides an alarm when this time is exceeded.

Display Operation

Catching Connection and disconnection of the function.

Shared Settings

Maximum active time Setting the maximum period that **Catching** can be active.

Catching start Displaying the time when Catching was activated. Only visible when the function is active.

Catching stop Displaying the time when the function is to stop (using the **Maximum active time**). If the catching takes a longer than expected, then the stop time can be changed. Only visible when the function is active.

Inlets Setting how much the air inlets must be open in percent.

Stepless Setting how much the air inlets must be open in percent.

MultiSteps Selecting which MultiStep should be active during Catching.

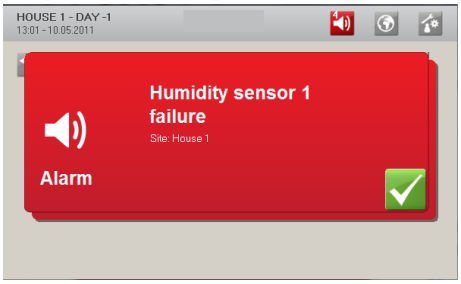
For example you can control the desired direction of the airflow, by only activating the MultiSteps at one end of the house.

3.6 Change Password

See section 1.6.

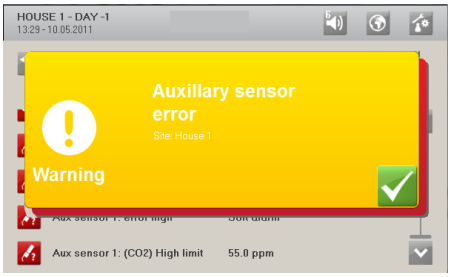
4 Alarms

Alarms only work when batch status is **Active house**.



When an alarm is generated, CT2 Touch registers the type of alarm and the time at which it occurred.

This information will be shown in a special alarm window in the display.

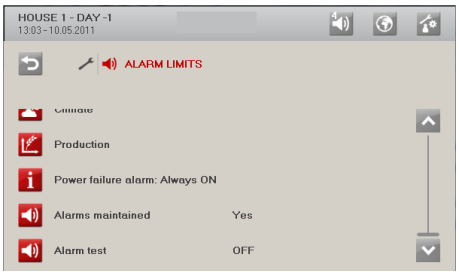


There are two types of alarm:

Hard alarm: Red pop-up alarm on CT2 Touch and alarm generation with the connected alarm units, e.g. a horn.

Soft alarm: Yellow pop-up alert on CT2 Touch.

In the alarm menu, it is possible to select whether some climate alarms are to be hard or soft.



The computer will also generate an alarm signal which you can choose to maintain.

The signal will thus continue until you acknowledge it. This also applies even if the event that generated the alarm has stopped.

Alarms maintained:

YES: The signal continues after the alarm event has stopped.

NO: The signal stops after the alarm event has stopped.

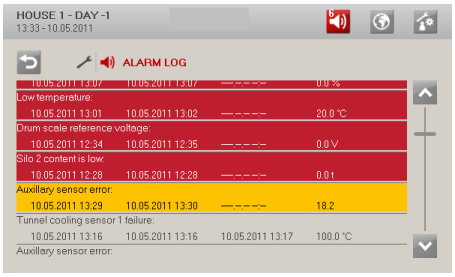
4.1 Stopping the Alarm Signal

The alarm window in the display disappears and the alarm signal stops when you acknowledge the alarm by pressing the adjustment knob.

4.2 Alarm Log

The CT2 Touch climate and production computer registers alarms including information about when they occurred and when they stopped. Several alarms often succeed each other because an error in one function affects other functions.

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



The colours in the alarm log reflect the status of alarms:

Red: active alarm

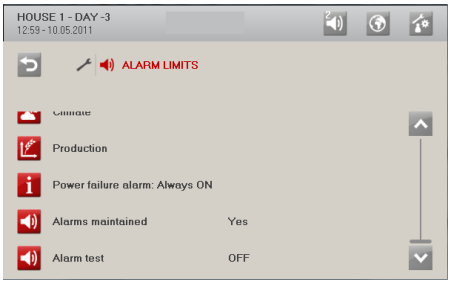
Yellow: active warning

Grey: alarm ended

CT2 Touch saves up to 20 active and previous alarms. When the 21st alarm is generated, the computer deletes the oldest alarm from its memory.

4.3 Alarm Test

Regular testing of alarms contributes to ensuring that they actually work when needed. Therefore, you should test the alarms every week.



Alarms

Press **Alarm test**, and press ON in order to start testing.

Check that the alarm lamp is flashing.

Check that the alarm system works as intended.

Press **Alarm test** to end the alarm test.

CT2 Touch has a range of alarms which the computer generates 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.

It is always the user's responsibility to ensure that the alarm settings are correct.

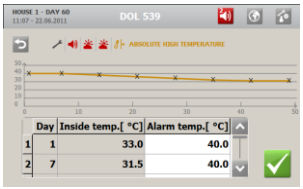
Alarm settings			
Climate			
	Temperature alarm	**High temperature limit**	**4 °C**
		Low temperature alarm	Disabled Hard alarm Soft alarm
		Low temperature limit	**- 3 °C**
		Summer temp. at 20° C/68° F outside temp.	**8 °C**
		Summer temp. at 30° C/86° F outside temp.	**4 °C**
		Actual abs. high temperature	**32 °C**

Alarm settings			
		Temp. diff. in tunnel Front/Rear	0.0 °C
	Humidity alarm	Abs. high humidity	Disabled Hard alarm Soft alarm
		Abs. high hum. limit	100 %
	Flap alarm	Error roof inlet 1-6	Disabled Hard alarm Soft alarm
		Error side inlet 1-6	Disabled Hard alarm Soft alarm
		Error tunnel inlet 1-2	Disabled Hard alarm Soft alarm
		Error tunnel outlet 1-2	Disabled Hard alarm Soft alarm
	Sensor errors	Error inside temperature sensor: Always ON	
		Error outside temperature sensor	Disabled Hard alarm Soft alarm
		Misplaced outside sensor	5 °C
		Tunnel cooling sensor alarm limit. Tunnel opening failure	2 °C
		Tunnel cooling sensor alarm limit. Cooling pump limit	- 1 °C
		Tunnel cooling sensor alarm	Disabled Hard alarm Soft alarm
		Error humidity sensor (5%)	Disabled Hard alarm Soft alarm
		Aux. sensor 1 error low	Disabled Hard alarm Soft alarm
		Aux. sensor 1 low limit	500 ppm
		Aux. sensor 1 error high	Disabled Hard alarm Soft alarm
		Aux. sensor 1 high limit	5000 ppm
		CO2 sensor error low	Disabled Hard alarm Soft alarm
		CO2-sensor low limit	500 ppm
		CO2-sensor error high	Disabled Hard alarm Soft alarm
		CO2-sensor high limit	8500 ppm
	Pressure sensor	Sensor alarm delay	01:00 m:s
		Pressure high alarm	ON OFF
		Pressure high limit	100 Pa
		Pressure low alarm side	ON OFF
		Pressure low alarm tunnel	ON OFF

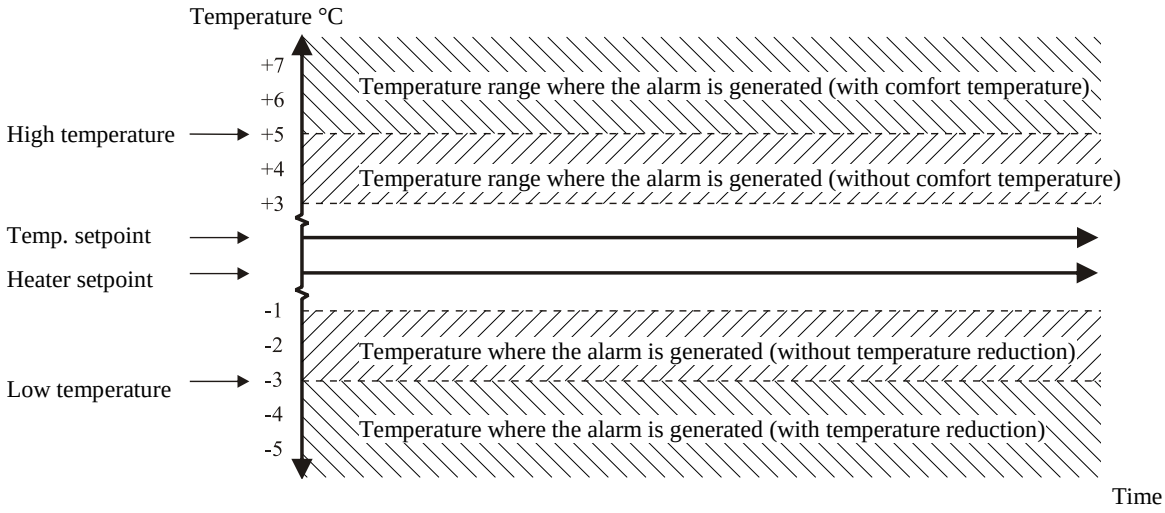
Alarm settings			
		Pressure low limit	5 Pa
	Heat recovery unit-alarm	Error heat recov. 1 inlet flap	Disabled Hard alarm Soft alarm
		Error heat recov. 1 oulet flap	Disabled Hard alarm Soft alarm
		Error heat recov. 1 inlet temp. sensor	Disabled Hard alarm Soft alarm
		Error heat recov. 1 inlet low temp.	Disabled Hard alarm Soft alarm
		Heat recov. 1 low temperature limit	-3 °C
	Emergency opening	High temperature: ON	
		Absolute high temperature: ON	
		Absolute high humidity	
		Pressure high alarm: ON	
		Pressure low alarm: ON	
		Power failure: ON	
	Temp. controlled emergency opening	Emergency opening temp.	40.0 °C
		Temperature setpoint	19.0 °C
		Warning at emergency temp.	
		Warning emergency temp. limit	6 °C
		Battery alarm	
		Battery voltage limit	16 V
		Power failure: ON	
		Current battery voltage	17.1 V
		Lowest measured battery voltage	16.4 V
	Emergency inlet	Emergency inlet	
		Absolute high temperature	
		Error temperaturesensor	
		Power failure: ON	
Power failure alarm: Always ON			
Alarms maintained			
Alarm test			

Table 12: Overview of the Alarm menu

4.4 Alarms for Climate

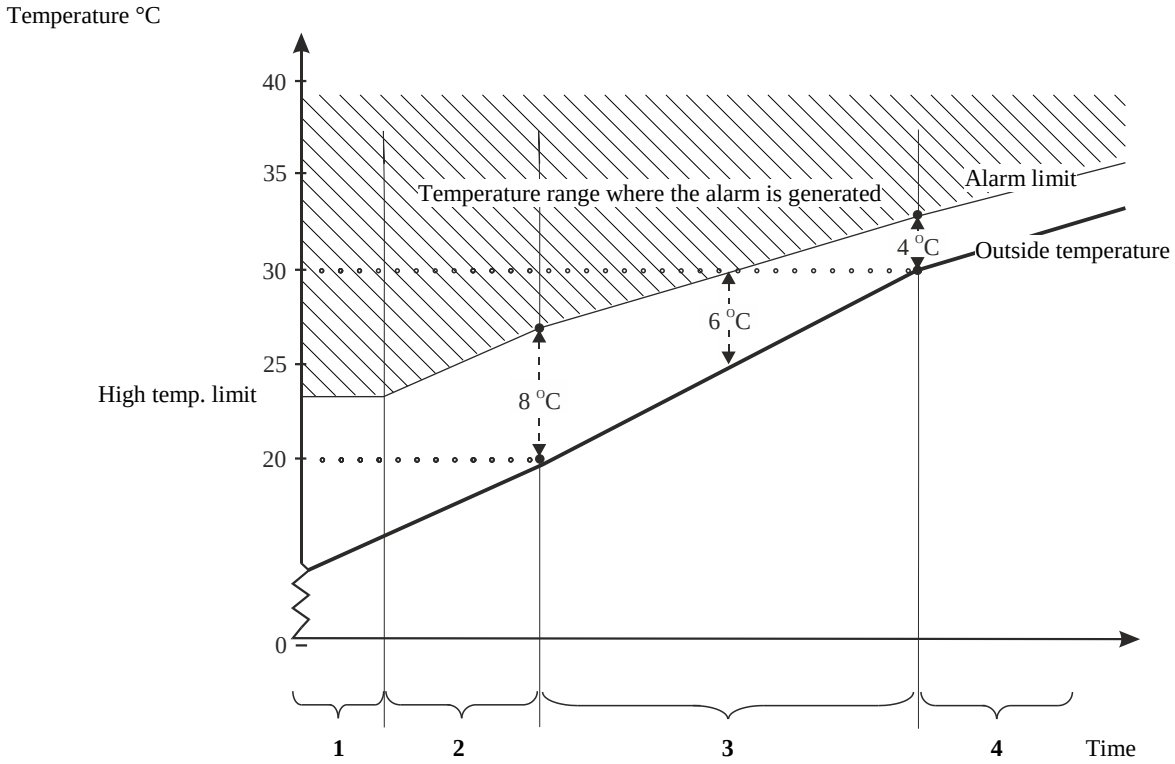
Temperature	
High temperature alarm	The temperature alarm for high temperature is only activate when the batch state is **Active house**. The alarm is set as an excess temperature to **Temperature setpoint**. See also section 2.2.1.2.
Low temperature limit	Alarm for excessively low temperature in relation to the **Temperature setpoint**.
Summer temperature at 20° C and 30° C outside	The function has a varying alarm limit which follows the changes that occur in high outside temperatures. When the temperature increases, the alarm limit also increases. It therefore delays the time at which the high temperature alarm will be generated. The CT2 Touch computer generates the alarm only if the inside temperature also exceeds the high temperature alarm.
Absolute high temperature	The alarm for absolute high temperature is generated by the actual temperature, e.g. 32° C. CT2 Touch will generate the absolutely high temperature alarm when the inside temperature exceeds this setting.
	Alarm for **Absolute high temperature** is set like a temperature curve.
Temperature difference between front and rear zones **(2 zones)**	The alarm is active at Tunnel ventilation where ventilation is regulated according to an average value of the front and rear temperatures. CT2 Touch generates an alarm when the temperature difference between the front and rear zones exceeds the set number of degrees.

Example 23: Alarm high and low temperature



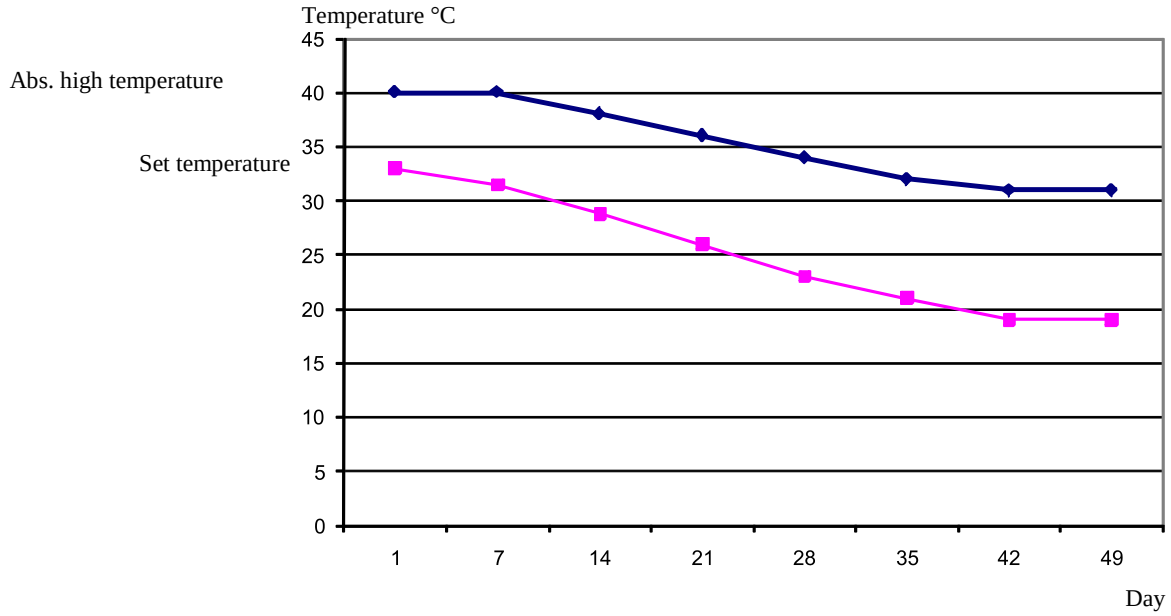
When the CT2 Touch computer is set up with the functions comfort temperature or humidity control with temperature reduction, the computer adds the number of degrees to which the comfort temperature is set to ***Temperature setpoint****, or subtracts the number of degrees to which the humidity control with temperature reduction is set from* ***Temperature setpoint****. A high temperature alarm will therefore be calculated in relation to* ***Temperature setpoint*** *plus an addition for* ***Comfort temp.*** *or minus* ***Reduction*** *for humidity control.*

Example 24: Summer temperature at 20° C and 30° C outside



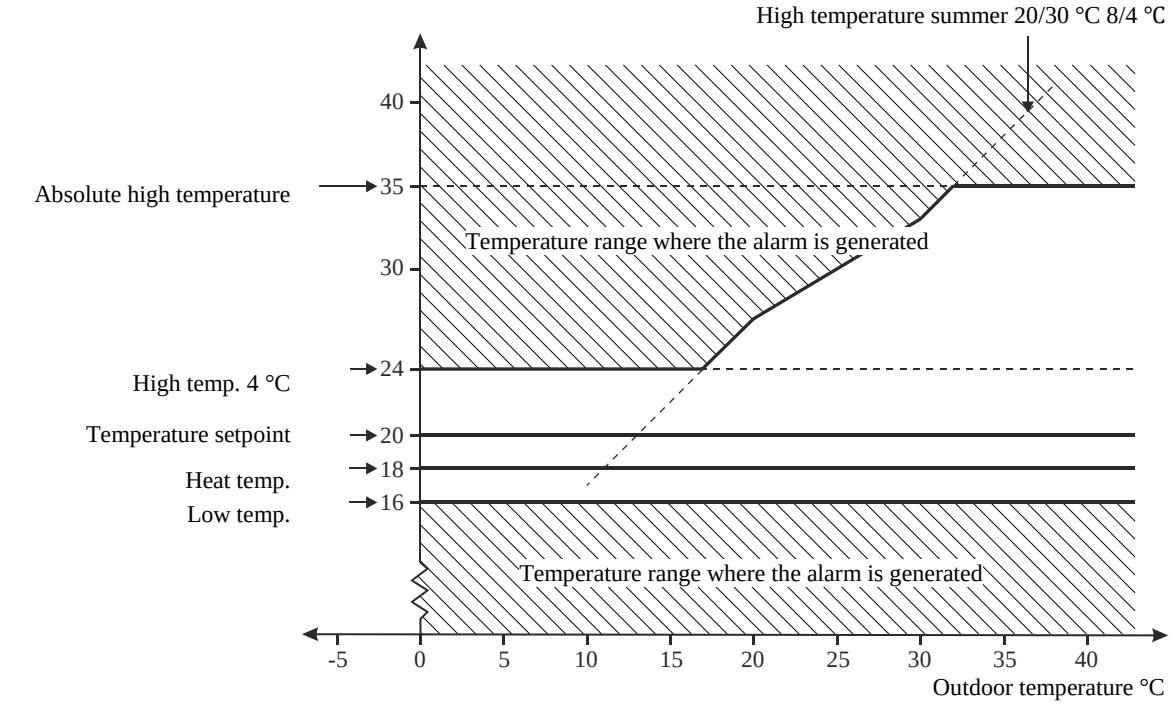
1. *The alarm limit does not drop below the* ***High temperature limit****.*
2. *Below 20° C outside, the alarm limit +8° C is staggered in relation to the outside temperature.*
3. *Between 20° C and 30° C outside, a gradual transition from 8° C to 4° C takes place. At an outside temperature of e.g. 25° C, the inside temperature must thus be 6° C higher (exceed 30° C) before the alarm is generated.*
4. *Above 30° C outside, the alarm limit is staggered 4° C in relation to the outside temperature.*

Example 25: Alarm for Absolute high temperature - poultry



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

Example 26: All temperature alarms



*The high temperature alarm adjusts for comfort temperatures so that the alarm does not generate until the **Comfort temperature** has been added to the **Temperature setpoint** set.*

Humidity	
Absolute high humidity	The CT2 Touch computer generates an alarm for absolute high humidity when house humidity exceeds the setting. This may be caused by e.g. missing ventilation or a technical sensor error.
Flap	
Flap alarm	The flap alarms are technical alarms. The CT2 Touch computer generates an alarm if the actual flap opening of the air inlet or air outlet is different from the setting calculated as the correct one by the computer.
Sensors	
Error in inside temperature sensor	The CT2 Touch computer generates an alarm in case of short circuit or interruption of the inside temperature sensor. Without this sensor, CT2 Touch 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.
Error in outside temperature sensor	CT2 Touch generates an alarm if the outside temperature sensor is short-circuited or disconnected.
Misplaced outside sensor	The alarm indicates if the sensor is exposed to solar heating and therefore shows a wrong outside temperature. CT2 Touch generates an alarm when the computer measures the inside temperature to be the number of degrees below the outside temperature to which the function is set (e.g. 5° C).
Tunnel sensor	The CT2 Touch computer generates an alarm when the tunnel temperature exceeds the outside temperature by the number of degrees set in the **Tunnel sensor limit**. **Tunnel opening failure**. The alarm is active only at Tunnel ventilation.
Error in humidity sensor	The CT2 Touch computer generates an alarm when the humidity sensor is interrupted or the air humidity is below the setpoint. The alarm limit is preset by the factory at a level (5%) so low that the alarm will be generated only in case of actual sensor errors.
Auxiliary sensor error **CO2 sensor error**	The CT2 Touch computer generates an alarm when the values for the sensor fall below or exceed the settings.
Pressure	
Pressure alarms	In the function **Sensor alarm delay**, you can delay the alarm signal so that the alarm is not generated due to short changes in the house pressure level, e.g. when you open a house door. The CT2 Touch computer generates an alarm when the pressure in the house drops below or exceeds the settings for **Pressure low limit/ high limit**.

Heat recovery unit	
	The flap alarm for the heat recovery unit works in the same way as the other flap alarms. See above. CT2 Touch can generate an alarm if the temperature sensor in the air inlet is short-circuited or disconnected. CT2 Touch generates an alarm when the temperature in the air inlet is below the set limit (-5 ℃).
Catching	
Catching key error	Alarm that the catching is not completed within the set period.

4.4.1 Emergency Control

4.4.1.1 Emergency Opening

Emergency opening is a standard function in the CT2 Touch computer, whether a proper emergency opening is installed or not. As long as power is available, the computer will open the ventilation system 100% in case of a relevant alarm – even when it is cold outside.

Emergency opening can be released by five types of alarm.

Emergency opening	Released by	
	High temperature	Always release
	Abs. high temperature	Always release
	Pressure high alarm	Always release
	Power failure	Always release
	Abs. high humidity	Connect or disconnect

Table 13: Release of emergency opening

It may be an advantage to disconnect absolute high humidity in houses situated in areas with very high outside air humidity, and if a technical sensor error occurs.

4.4.1.2 Temperature Controlled Emergency Opening

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

Temperature controlled emergency opening is released only when the inside temperature exceeds the temperature at 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 case of power failure.

4.4.1.2.1 Emergency Opening Temperature

The temperature at which emergency opening is to open should be set directly on the adjustment button of the emergency opening controller unit. The setting can be read in the display together with **Temperature setpoint**.

4.4.1.2.2 Warning at Emergency Temperature

The CT2 Touch 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 relevant particularly 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 by mistake.

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

4.4.1.2.3 Battery Alarm and Battery Voltage

The temperature controlled emergency opening function has a battery to ensure that the emergency opening will operate in spite of power failure when the inside temperature exceeds the setting of the **Emergency opening temperature.**

You can read the current and the lowest measured voltages of the battery. These readings indicate when you must change the battery or if a technical error has caused a battery alarm.

CT2 Touch can generate an alarm when the battery which powers the emergency opening does not function.

Make sure not to set the **Battery voltage limit** too low as this will make the alarm inactive.

4.4.1.3 Emergency Air Intake

This section is relevant only to houses where emergency air intake is installed.
The emergency air intake can be generated by four types of alarms.

Emergency inlet	Activated by	
	Emergency inlet (Temperature)	Set
	Abs. high temperature	Connect or disconnect
	Error inside temp. sensors	Connect or disconnect
	Power failure	Always activate

Table 14: Activation of emergency air intake

Whether a faulty inside temperature sensor should activate the emergency air intake depends on the general climate conditions. If it is very hot, you could profit from using the function. However, if it is cold, you should consider the necessity of using it and whether the animals will suffer.

Emergency air intake has its own temperature setting, **Emergency air intake**, which constitutes a number of degrees to be added to **Temperature setpoint** and possibly **Comfort temperature**.

This setting makes it possible to open the air intake during a hot season where the air intake, under normal conditions, is not activated by the normal high temperature alarm limit.

4.4.1.4 Power Failure Alarm

The CT2 Touch computer will always generate an alarm in case of power failure.

MAINTENANCE GUIDE

CT2 Touch requires no maintenance to function correctly.

The alarm system should be tested weekly.

Only use original spare parts.

Cleaning

Clean CT2 Touch with a firmly wrung cloth; do not use solvents. Do not expose it to water jets or high-pressure cleaning.

As for all electronic equipment, it is best for CT2 Touch to be constantly powered as this will prolong its life and keep it dry and free from condensation.

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 a customer 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.

EU - Declaration of Conformity

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

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

Product:	DOL 530 series
Type, model:	House computer
EU directives:	2014/35/EU (Low Voltage Directive (LVD)) 2014/30/EU (Electromagnetic Compatibility (EMC)) 2006/42/EC (Directive on Machinery)
Standards:	EN 61000-6-2:2005 + AC:2005 EN 61000-6-4:2007 + A1:2011

We declare as manufacturer

that the products meet the requirements of the listed directives and standards.

Location: Hedelund 4, DK-7870 Roslev

Date: 2015.09.18

Jesper Mogensen

CTO

Big Dutchman

2016.03.16 • 611581-02 • 9.18 • EN

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