GB

LUMINA 38
LUMINA 38 TOUCH
F38

USER MANUAL

VERSION D1

Art.Nr. 5911532

GB130715

Table of contents

1. General introduction

This manual has been compiled with the utmost care. If, however, you should discover an error, please inform Fancom B.V..

1.1 Documentation with the control computer

The documentation consists of the following manuals:

- User's manual

  The user's manual is intended for the end user. This manual supplies information about working with the control computer after installation.

- Installer's manual

  The installer's manual is intended for installers. This manual supplies information about connecting and configuring the control computer.

- Operation and safety instructions

  These subjects are covered in a separate manual. This manual also applies to other control computers in the Fancom F2000-line. Always read the safety instructions and warnings carefully before using the control computer.

Always keep this manual close to the control computer.

1.2 How to use this manual

The following symbols are used in this manual:


Tips and suggestions.


Note providing recommendations and additional information.


Warning indicating damage to the product if you do not follow procedures carefully.


Warning indicating danger to humans or animals.


Electrical shock hazard. Danger to humans and animals.


Example of a practical application of the described functionality.


Calculation example.


Describes the key combinations for arriving at a particular screen.

Decimals

The control computer and this manual use a decimal point in values. For example: a weight is shown as 1.5 kg (not as 1,5 kg).

1.3 Fancom helpdesk

For any questions and support, please contact the local Fancom Sales & Service Center.

1.4 F-Central FarmManager™

Virtually all Fancom equipment can be controlled and managed from a central location. This requires the F-Central FarmManager software package and a communication module. The screens in the control computers are also used in F-Central FarmManager. This means you can start working immediately.

2. Lumina 38 climate computer

The Lumina 38 climate computer is a climate controller for poultry houses. The control computer is versatile and suitable for a wide range of climatic conditions.

The Lumina 38 can be used worldwide in:

- Laying hen houses
- Rearing houses
- Rearing laying hen houses
- Broiler houses
- Turkey houses

Characteristics of the control computer:

- Completely computerized climate control based on the animals' lifecycle.
- Animal management: Registration of set up, delivery and animal mortality.
- Control of external equipment using time clocks. Consumption registration (e.g. gas or electricity) based on feedback information.
- Extensive (and partially adjustable) alarm system, enabling immediate intervention if a process does not proceed as expected.

2.1 Symbols used in the control computer

Curve day number

On

Modulating

Off


House temperature


Setpoint house temperature


Night correction


Ventilation


Fan (status)


Ventilation: M/MT-part (analog)


Ventilation: M/MT-part (relay)


Ventilation temperature


Cooling


Pressure


Heating


Temperature overview with minimum and maximum measured temperatures


Temperature overview (heating is active)


Temperature overview (cooling is active)


Inlets


Humidification


RH house


RH outside


Outside conditions


Tunnel inlet


Management


Animal data


Graph

Weather vane

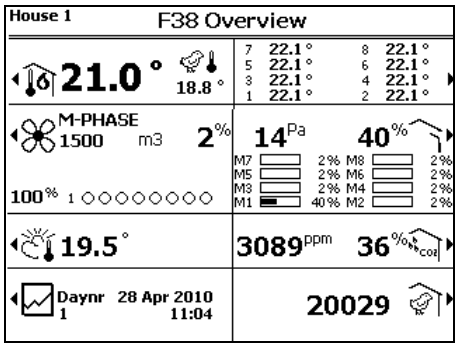
N.E.T. temperature

2.2 Working with the control computer

As standard the control computer displays the screen *Lumina 38 Overview*. This screen shows a total overview of the actual process status and of all the equipment controlled by the control computer. The overview relates to the controls built into the control computer. The Overview is also a menu, which can be used to request more control data. This is explained in the following section.

The screen *Lumina 38 Overview* will be referred to as *Overview* in the rest of this manual.

The illustration below shows an example of the Overview. This may differ from your screen, as the control computer only shows parts that have been installed. You can always call up the Overview by pressing (a couple of times).



2.2.1 Requesting and changing control data via the overview

Data can only be shown in the Overview, not changed. The Overview is also a menu, which can be used to call up screens with control data. Data can be changed in these screens. The control computer indicates menu options using ▶ next to the key.

For example: Press the key next to to request the Ventilation screen. In this manual this option appears as follows:

Overview →

After a selection has been made, the Ventilation screen will appear. The screen also displays the ventilation graph. It also shows which fans are currently running.

The most important data in this screen can be changed, in this case the minimum and maximum ventilation level. Return to the Overview by pressing several times.

3. Basic principles climate management

This chapter explains the basic principles and the terminology used for the Lumina 38 climate computer. The control computer is suitable to control temperature, relative humidity (RH) and fresh air in animal houses through ventilating, heating and cooling.

As the control computer is suitable for use in a wide variety of climatic conditions, many parts of this chapter may not be relevant for all users.

3.1 Aims

Climate management has one central aim: controlling the temperature, relative humidity and the CO_2 or NH_3 concentrations during the animals' lifecycle. This leads to the following aims:

- The lifecycle of the animals is leading for climate management. Young, growing animals need, for example, more heat and less fresh air than older animals. For this reason the ambient temperature during the animal's lifecycle should gradually decrease, while ventilation should increase.
- Even temperature and air distribution in the house.
- Continuous monitoring of the house climate.
- Taking outside influences into account, such as outside temperature, wind and relative humidity.

  Influences can be used to optimise climate management. Even if this option is not used, the control computer will control the climate satisfactorily.

3.2 M/MT ventilation

The Lumina 38 is extremely suitable for climate control in an MTT-house. The abbreviation MTT stands for **Minimum/Transitional/Tunnel**. Using this concept, the control computer gradually increases the ventilation from minimum ventilation to tunnel ventilation.

Tunnel ventilation is (virtually) self-evident in warm climates, such as the Middle East and Asia. However, tunnel ventilation can also be used in temperate or cold climates, to prevent mortality during hot weather. With Fancom's MTT-concept the transition from minimum ventilation to tunnel ventilation is gradual. The extra costs of tunnel ventilation (compared to other systems) are slight, thanks to efficient use of the equipment.

Ventilation according to the MTT-concept features the following ventilation phases.

- Minimum ventilation (M-phase)
- Transition (M/T-phase)
- Tunnel ventilation (T-phase)

In each ventilation phase your ventilation system is used in a certain way. This is explained in the sections below. If only minimum or only tunnel ventilation is used, certain of the sections below can be ignored. The ventilation systems shown are some examples of the possibilities.

3.2.1 Minimum ventilation (M-phase)

In this phase the control computer uses fans combined with air inlets. The tunnel inlets are closed. In places without air inlets, the natural curtain together with the tunnel inlets can provide minimum ventilation.

Ridge ventilation is used in this example. The air inlets distribute the fresh air well through the house. Thanks to the minimum exhaust, no energy is wasted. One of the fan types below can be used:

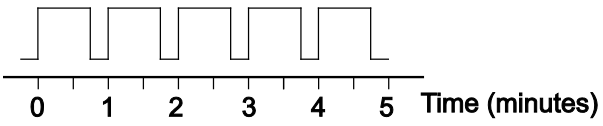
- Linear controllable fans

  The control computer controls ventilation using a percentage, for example from 30% to 100%. The control computer can increase ventilation precisely up to the required level.
- Modulating fans and on/off fans

  The other fans are on/off fans. The control computer can use these as modulating fans. The control computer activates/deactivates the fans using a fixed pattern. This supplies fresh air in short repeated periods.

Example: Modulating ventilation

The control computer uses four fans for modulating ventilation. The ventilation level is 70%. This means that the fans are on for 70% of the time and off for the remaining time.



At a ventilation level of 100%, the fans run the entire time.

3.2.2 Transition zone minimum ventilation – tunnel ventilation (MT-phase)

In this phase the control computer uses fans combined with air inlets and tunnel inlets.

In this phase the control computer uses the following fan types:

- Linear controllable or modulating fans (like in the M-phase)
- On/off fans

  In this example the on/off fans are mounted in the rear wall of the house. On/off fans are either on or off at a certain ventilation level — there is no intermediate position.

3.2.3 Mechanical ventilation

With mechanical ventilation the control computer can control the house temperature using fans. The control computer can control various numbers and types of fans. Which of the fans will be used to achieve a certain ventilation demand has been set in the combi-table.

With mechanical ventilation use is made of:

- **Controllable fans**

  The control computer can control the controllable fans at a certain percentage. The control computer controls the fans from, for example, 30% to 100%. This enables the control computer to increase ventilation precisely up to the required level.

  As well as the standard controllable fans, extra controllable fans can also be controlled. All controllable fans are always controlled at the same percentage.

- **Extra fans (on/off relay)**

  Extra fans can only be switched on or off. They are usually used when the controllable fans are running at maximum or in combination with controllable fans to achieve a gradual increase in ventilation.

Ventilation control

The control computer uses **control values** to control the climate management system. It continually adjusts these control values, because the control computer constantly monitors the climatic conditions in and around the house. The user can change the control values.

The following applies for ventilation:

- The ventilation will never become lower than the set **minimum ventilation**.

  This means the house is always ventilated enough to supply the animals with sufficient fresh air. The control computer calculates the minimum ventilation using the curve ("Curves" page 64).

- If the house becomes too warm, the control computer will increase the ventilation in order to lower the house temperature.

  The control computer gradually increases the ventilation. However, ventilation will never exceed the set **maximum ventilation**.

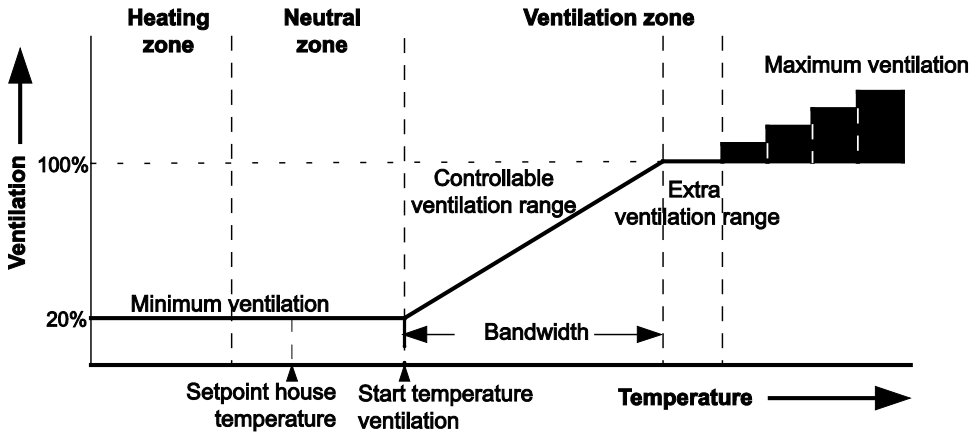


Figure 1: Ventilation graph

The ventilation graph has the following zones:

- Heating zone

  The heating is on and there is **minimum ventilation**.

- Neutral zone

  The heating is off and there is **minimum ventilation**.

  This neutral zone avoids the heating or additional ventilation activating due to slight temperature fluctuations. This saves energy. The *Control value heating*, *Setpoint house temperature* and *Start temperature ventilation* are user settings. These can be used to set the neutral zone.

- Ventilation zone

  The control computer gradually increases ventilation from minimum (for example 20%) to maximum (for example 100%).

  In the controllable ventilation range the controllable fans are used. In the extra ventilation range the extra fans are used.

Combi-table

The control computer determines how the fans and air inlets are used based on the combi-table. The combi-table has been set by your installer for your house.

3.3 Heating

The **setpoint house temperature** is the foundation for both heating and extra ventilation. There is a margin above and below the **setpoint house temperature**: the neutral zone. In the neutral zone there is minimum ventilation and no heating. Setting the neutral zone correctly saves on energy costs.

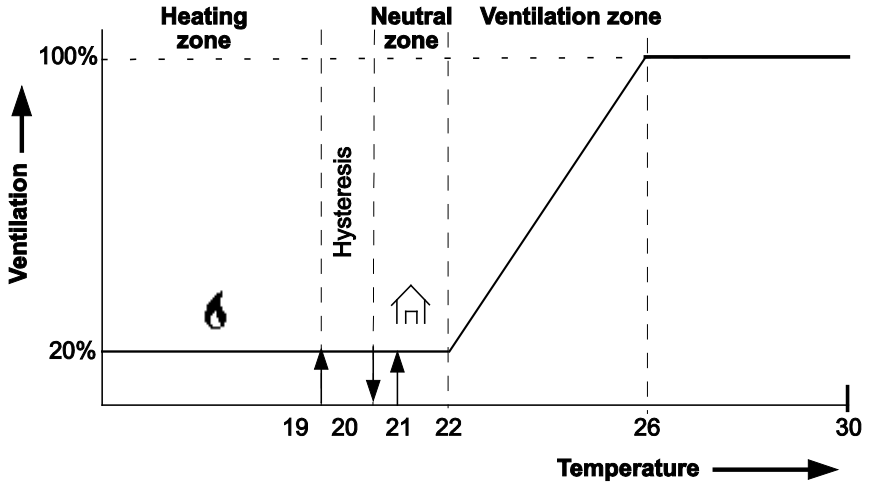


Figure 2: Ventilation graph. Setpoint house is 21°C, the control value heating is 20.5°C.

The control computer uses a hysteresis when controlling the heating. This prevents the heating being activated/deactivated with slight temperature fluctuations. The hysteresis in the figure is 1°C.

The control computer activates/deactivates the heating as follows:

- Heating ON: if the house temperature falls below the hysteresis (in the example, 19.5°C).
- Heating OFF: if the house temperature rises above the control value heating (in the example 20.5°C).

Several heating units

The house (or section) can be divided into zones which can be heated separately. Per zone, temperature sensors can be linked to the heating for that particular zone.

Heaters can also be linked together. The linked heater then shadows, possibly using a certain offset, the heating values of the first heater. The feature can also be used for low/high control. The control computer will activate the heaters one by one.

Separate setpoint heating

The previous example assumed one setpoint house temperature for ventilation and heating. The heating can also be given a separate setpoint, the so-called ‘extra temperature’. The extra temperature can be entered in the curve.

This may be necessary to control floor heating. In this case, the sensor measures a different temperature to the actual house temperature. Other setpoints must be set in this case.

3.4 Cooling

The control computer has one cooling control with separately assigned temperature sensors. The control computer can activate the cooling at high temperatures.

The control computer automatically activates the cooling based on the *control value cooling*. The user can enter the control value. The control computer can use a hysteresis. This prevents the cooling being activated/deactivated because of slight temperature fluctuations:

- Cooling ON: if the temperature in the house rises above the hysteresis.
- Cooling OFF: if the temperature in the house drops below the setpoint cooling.

The control computer can control the following types of cooling:

- **Dry cooling**, for example, a heat exchanger or air conditioner.

  The temperature of the air inlet is lowered. The absolute humidity of the air will not increase. As the temperature falls, the Relative Humidity (RH) will be increased.

- **Evaporative cooling**, for example using cooling pads in the inlets.

  The temperature is lowered by the effect of the water evaporating. Both absolute humidity and RH increase.

  Water is sprayed at regular intervals. The water supply is controlled modulating, so the supply is on or off at regular intervals. Depending on the house temperature, the on-off time is determined based on the bandwidth set by the user, the maximum on-time and the period within which cooling may be active. When the house temperature drops below the setpoint cooling temperature, the cooling turns off.

Linking cooling control to ventilation

With a standard cooling control in a house with basic ventilation the cooling control is often linked to *STV.+BW* (*Start temp. ventilation + bandwidth*). The control computer activates the cooling as soon as the ventilation is at maximum. *Start temperature ventilation* depends on *Setpoint section temperature*, even if this is linked to the curve.

Separate setpoint for cooling

The cooling can also be given a separate setpoint, the so-called ‘extra temperature’. The extra temperature must be entered in the curve. The extra temperature is used if the control value of the cooling differs greatly from the setpoint house temperature.

3.5 Relative humidity

The control computer can influence the relative humidity (RH) in the house. The maximum RH can be entered in the curve. The control computer determines the *RH control value* based on the curve.

The control computer can control the humidity as follows:

- RH is too low: The control computer can activate extra humidity. For example, water nozzles.
- RH is too high: The control computer can activate extra heating or ventilation. Warmer air can absorb more moisture. Extra ventilation can be used to extract more moisture from the air.

3.6 HumiTemp and Windchill (N.E.T.)

For the best results animals have to stay in their comfort zone. This comfort zone depends on a number of factors including temperature, relative humidity and airspeed. HumiTemp can correct the temperature based on the actual relative humidity in combination with the actual temperature. The effect of the HumiTemp can be controlled by the following factors:

- Age
- Minimum correction
- Maximum correction

When HumiTemp is activated the control works on the HumiTemp instead of the average house temperature.

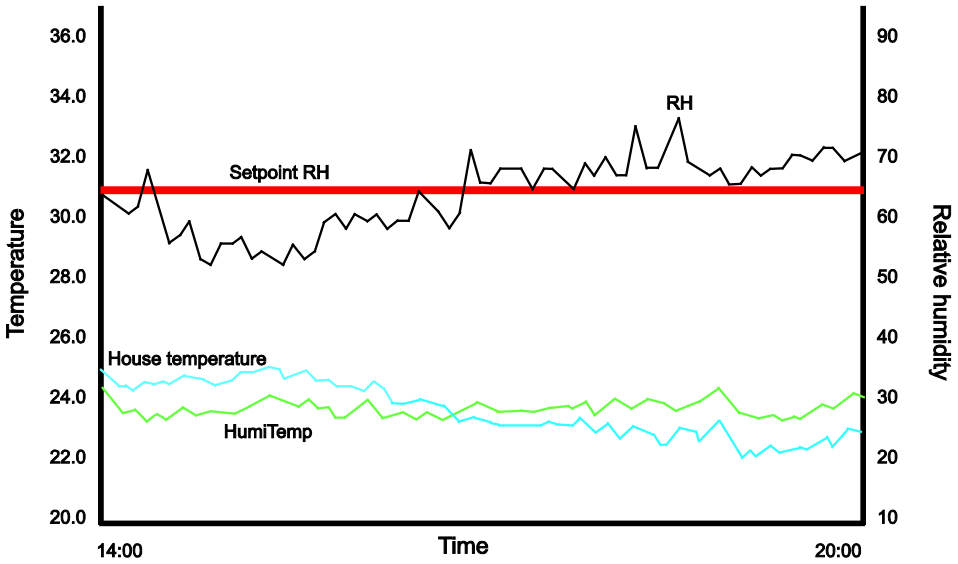


Figure 3: Example HumiTemp

Setpoint RH	Setpoint RH
RH	Measured RH
House temperature	Measured house temperature
HumiTemp	Measured house temperature after HumiTemp corrections

On the left side of the graph the RH is below the setpoint RH. Therefore HumiTemp is significantly under the measured house temperature. On the right side of the graph the RH is measured the setpoint RH. Therefore HumiTemp is significantly above the measured house temperature.

Windchill (N.E.T.)

The Net Effective Temperature, also called windchill, is the temperature that the animals experience. It is a combination of temperature, humidity and airspeed in the house. N.E.T. appears on the screen as an additional icon (little chicken + thermometer)

3.7 Clock

The control computer has a number of clocks used to activate/deactivate equipment.

3.7.1 Water and feed

The supply of water and feed can be controlled based on time or amount. The water or feed clock activates a valve in the supply pipe. The water and feed supply can be controlled as follows:

- Based on **time** using the water and feed clock.
- Based on the supplied **amount** using a registration unit.
- Based on the set **curve**.

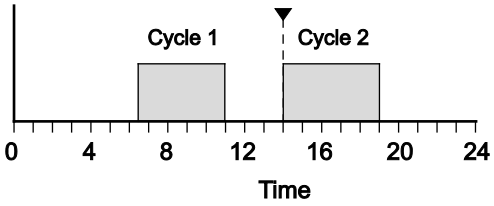
Measuring the amount of water is only possible if a water meter is used. This must be indicated at *Water registration* in the system settings. The registration of amounts is set at registration in the system settings.

How does the control computer control the watering process?

The supply to the drinking nipple or drinking cups can be opened or closed using a valve. If you want to register amounts, you require a water meter. It is possible to use 11 water meters (1 central meter and 10 meters for each water line). The measurements are only suitable for monitoring.

The watering process is controlled by the Lumina 38 as follows:

1. The water clock indicates that watering must start.



2. The valve is opened. The watering system must be completely filled first. For this reason no maximum flow alarm will be given during a set wait time.

   After this wait time, a check can be made to see the water consumption is too low (blockage) or too high (leakage). This is done by repeatedly checking if too little water has flowed through the system. A check is also made to see if too much water has been consumed during a period.

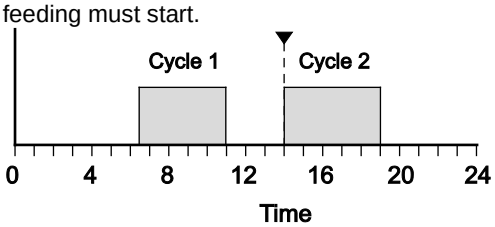
How does the control computer control the feed process?

The Lumina 38 uses a so-called "full system". This means that after the feeding process has stopped, the computer ensures the hoppers are always filled. When feeding starts, a large amount of feed can be supplied within a short time. As the hoppers are completely filled again after the feeding cycle, the control computer knows how much feed was used in each feeding cycle.

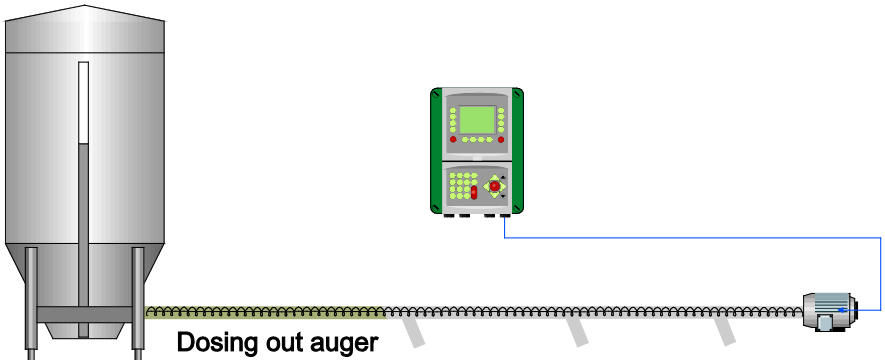
The hoppers are filled via the overflow principle. Feed falls into the hoppers via a chute. When the first hopper is full, the feed overflows into the next one etc. The feed line auger runs synchronously to the feed supply from the silo. If the feed supply stops, the feed line stops too.

The feed process is controlled by the Lumina 38 as follows:

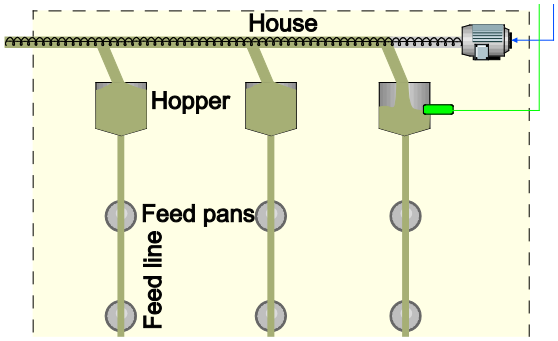
1. The feed clock indicates that feeding must start.



2. The dosing out auger transports the feed to the hoppers. When there is a feed demand (feed sensor uncovered), the dosing out auger will activate. The feed is transported to the hoppers.



3. The hoppers are filled successively according to the overflow principle. When the last hopper is full (detected by the demand sensor), the control computer stops supplying feed.



4. From the hoppers the feed line augers transport feed to the feed pans. The feed pans are also filled according to the overflow principle.

Program

There are two ways to control the process. We refer to this as the program:

- *REGISTRATION*

  Ad libitum. The amount is determined by the animals' behavior. The clock determines how long feed or water is supplied. Within each cycle, the animals can consume as much feed or water as they like. The demand sensor in the final hopper indicates if dosing out is possible.

  The curve has no influence on the amount of feed or water given. The curve only indicates the theoretical amount required and is used as a reference. If the amount given differs too greatly from the amount in the curve, an alarm can be given.

- *DOSING*

  Limited. The amount is determined based on the curve. The computer calculates the required amount per day using the curve. The day amount is divided over the number of cycles.

  When the required amount in a cycle has been dosed out (within the time the cycle lasts), dosing out will stop. If the animals consume less feed or water during the cycle than the calculated required amount, the supplied amount will be registered. The time of the cycle must be long enough to allow the required amount to be dosed out within the set time. If the required amount is not dosed out within the cycle, an alarm can be given.

  If you want to adjust the amounts automatically, then you have to enter this data beforehand in a curve. If you assign the right curve, the control computer will automatically control how feed or water is given. These settings can be differed from, if for example more or less feed or water must be given.

3.7.2 Light

Several light clocks are available per house. These clocks can be switched inter-dependently and independently. Lighting can be activated and deactivated and controllable lighting can also be controlled. Controllable lighting can be controlled in percentages. This allows natural light patterns to be imitated. The lighting in the house can also be made dependent on the measured light intensity (using a light sensor). This allows the light intensity to take the incidence of natural day light into account.

Light schemes

The switching pattern for the light clocks, including the high and low level, can be set in a curve.

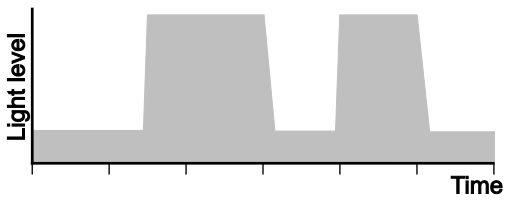
A light scheme is basically the same as a fixed setting for the time clock, with on and off times and a light intensity. Several light schemes can be set. These schemes can be assigned to certain days in the animals' lifecycle. From that day the light scheme will be applied.

The light scheme can be adjusted here per day number. The example below uses three light schemes.

Example: light schemes

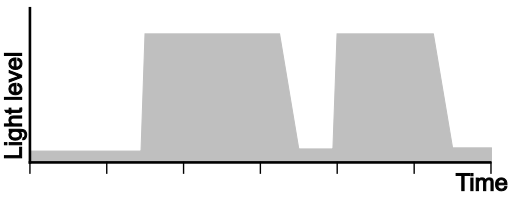
Normal light clock setting:

ON – OFF	Increase time: 00:10:00
06:00 – 12:00	High level: 90%
16:00 – 20:00	Decrease time: 00:30:00
	Low level: 20%

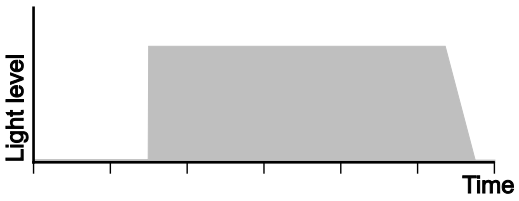


Two schemes are defined:

Scheme 1:	Curve day 7
ON – OFF	Increase time: 00:10:00
06:00 – 13:00	High level: 75%
16:00 – 21:00	Decrease time: 01:00:00
	Low level: 10%



Scheme 2:	Curve day 12
ON – OFF	Increase time: 00:00:00
06:00 – 21:30	High level: 70%
	Decrease time: 01:30:00
	Low level: 0%



According to these settings the light in the house will follow the pattern set at the normal light clock settings until day 6. From day 7 light scheme 1 will be applied. From day 12 light scheme 2 will be applied.

3.8 Registration

The control computer has a number of registration inputs to which a signal pulse or contact can be connected. These can be used to register ("Registration" page 63) amounts (for example, water consumption).

3.9 Climate based on curves

The optimal house climate is a combination of the correct temperature, ventilation and relative humidity:

- Temperature. As animals grow, their need for heat decreases.
- Ventilation. As animals grow, their need for ventilation increases. Fancom uses the term 'minimum ventilation' for this. Extra ventilation is required on warm days.
- Relative humidity (RH). As animals grow, the required relative humidity can also change.

There are two ways to control the section climate during the animals' lifecycle:

- **Manually**

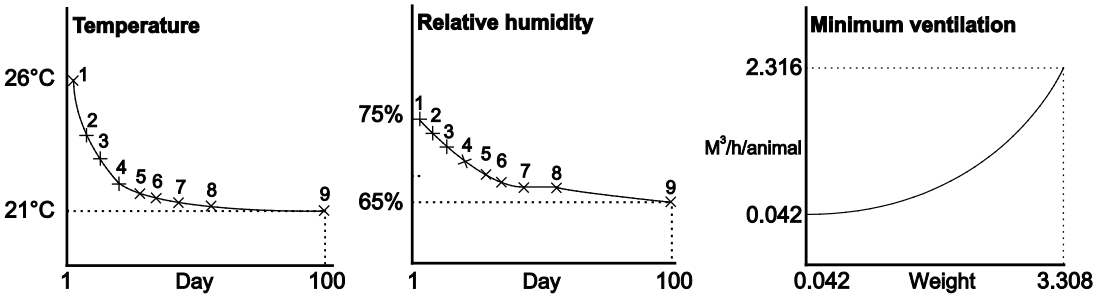
  Enter the control values manually. This means the computer will use the same control values each day until they are changed. This approach can be used with constant climatic conditions.

- **Automatically, based on the curve**

  The animals grow, which means the climate has to be regularly adjusted. The changing temperature, ventilation and RH can be set in a table adjusted to suit the weight and needs of the animals during their life cycle. This table is called the ‘curve’.

  See: Curve ("Curves" page 64).

Examples of curves with the changing temperature, RH and ventilation during the animals' lifecycle:



4. Daily management

This chapter contains information about general management. The house management can be assessed quickly using the screen *Overview*. Use the menu options to request data about the controls and make any changes to important control values.

This chapter only describes the most important control data. Settings relating to control and influences will be explained in following chapters.

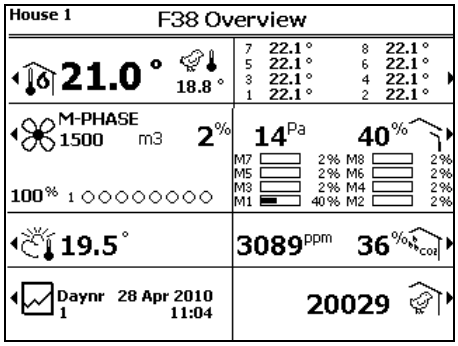
Only data important to you will appear on your control computer. This has been set in the installation menus (*HOUSE SETUP*). This chapter explains all the management screens, which may include screens that are irrelevant in your situation. Skip any sections not of importance to you.

4.1 Overview screen

The control computer displays the *Overview* screen by default. This screen is a complete overview of the current process status and of any equipment managed by the control computer. The screen layout is related to the controls built into the control computer.

The image below is an example of the *Overview*. This image may differ from your screen because the control computer only displays the installed components.

You can always call up the *Overview* screen by pressing a few times.

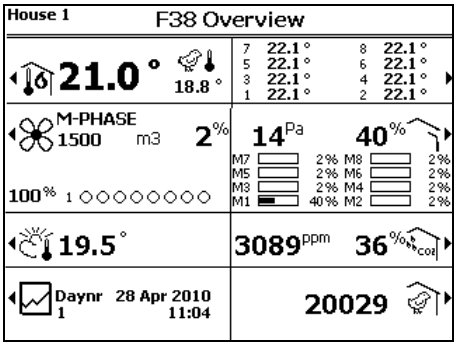


Symbol	Meaning	Displayed value
	Temperature settings	HumiTemp House temperature
	Night correction active	Moon icon
	N.E.T. temperature	Netto Effective Temperature. The bird experience temperature including windchill.
	Ventilation settings	Ventilation position
	Outside conditions	Outside temperature
	Management data	Day number / time and date
	Temperature readouts	Temperature sensors
	Ventilation settings	Air inlet position / pressure
	Relative humidity settings	Relative humidity / CO_2
	Animal data	Number of animals

4.2 Heating and cooling

The control computer displays the actual average house temperature in the overview screen ( ). This is the average temperature of the sensors placed in the house.

The control computer also shows the actual outside temperature in the overview screen ( ).



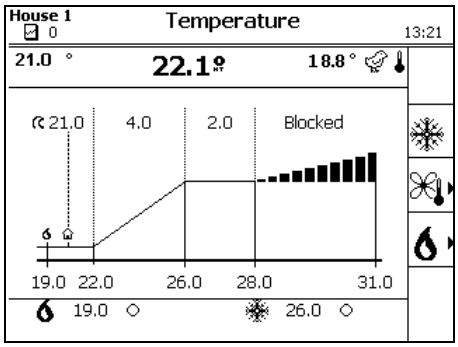
The control computer can show the temperature symbol as follows:

	Heating and cooling are off.
	Heating is on.
	Cooling is on.

4.2.1 Temperature graph

The temperature graph shows the ventilation level with respect to the temperature.

Overview →



In the header the left value is the real measured temperature, the one in the middle represents the HumiTemp en at the right the N.E.T.(experience) temperature is shown. This graph shows the following temperatures:

	Setpoint heating	(19.0°C)
	Setpoint house	(21.0°C)
	Actual temperature	(21.0°C)
	HumiTemp	(22.1°C)
	N.E.T. temperature	(18.8°C)
	Bandwidth	(4.0°C)
	Offset tunnel position	(2.0°C)
	Start temperature Mechanical ventilation (tunnel)	(28.0°C)

The following two control values appear at the base of the screen:

	Control value heating	(19.0°C)
	Control value cooling	(26.0°C)

These are the control values of heating 1 and cooling 1. The status of the heating and cooling equipment is shown as follows:

- On
- Modulating
- Off

Changing data

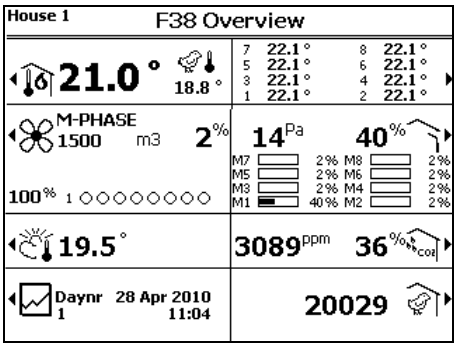
- *Setpoint house*: The temperature graph is linked to the *Setpoint house* (control value). If this value is increased, for example, the control computer will also increase the linked value.
- *Bandwidth*: The bandwidth is the set number of degrees from start temperature ventilation, within which ventilation goes from the minimum to the maximum position.
- *Offset tunnel position*: This offset prevents the control computer activating the tunnel ventilation if there is just a slight rise in the house temperature. If the house temperature drops below the lowest tunnel ventilation position the *Offset tunnel position* applies.

Heating or cooling not linked to *Setpoint house*

The values in the temperature graph are general values. However, the method of control can also be set per heating or cooling unit. For example, the floor heating can be controlled using a separate *Extra temperature*, as the temperature sensor is placed in the water circuit. The *Extra temperature* can be set separately in the curve.

4.3 Ventilation

The control computer shows general information about ventilation in the overview screen ( ).



The control computer always shows latest data, including all offsets and influences. The ventilation settings concern:

- Fan positions.
- The positions of air inlets and extra inlets.
- The pressure in the house.

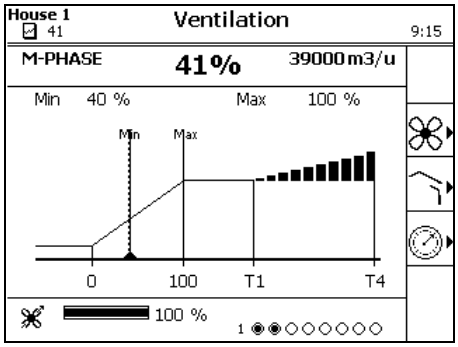
4.3.1 Ventilation graph

The readout of the ventilation level and the air quantity is shown in the ventilation graph. The control computer uses the ventilation level to determine the positions of the fans, air inlets and extra inlets, based on the combi-table. If an under pressure control is also used, the air inlet positions may be adjusted to achieve the required under pressure.

The ventilation level depends on the house temperature. The control computer shows the ventilation level either as percentage (0 – 100%) or tunnel phase (T1, T2 etc.).

The control computer can activate tunnel ventilation, if the house temperature is higher than the upper limit of the bandwidth (increased with the offset bandwidth). This is only possible if the maximum ventilation level is set to at least T1. If the maximum ventilation level is set to 100% or lower, the control computer will not activate tunnel ventilation.

Overview →



Symbol	Meaning	Displayed value
	Position of the controllable fan	(100%)
	Minimum ventilation	(40%)
	Maximum ventilation	(100%)
T1	Minimum tunnel position	
T4	Maximum tunnel position	
○	Status of extra fans	(8 extra fans; two on, six off)

Changing data

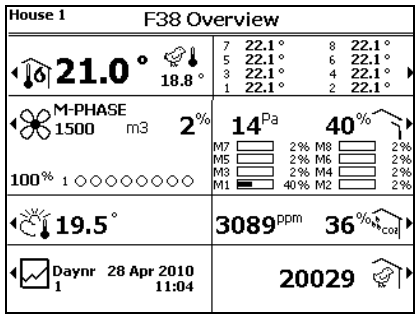
The minimum and maximum ventilation level can be changed in the ventilation screen. If the climate is controlled using the curve, the actual minimum ventilation level may never be lower than the calculated setpoint. The actual ventilation level cannot be changed by the user, but can be influenced using these settings:

- If, for example, there is not enough fresh air in the house, the minimum ventilation level can be increased.
- Increasing the maximum ventilation level allows the ventilation to increase further with higher temperatures. Use the plus-key to change the percentage into a maximum tunnel phase (T1, T2, etc.).

If the climate is controlled using the curve, the actual minimum ventilation level can never be lower than the minimum norm in the curve.

4.4 Relative humidity

The control computer shows the relative humidity (RH) in the overview screen ( ).



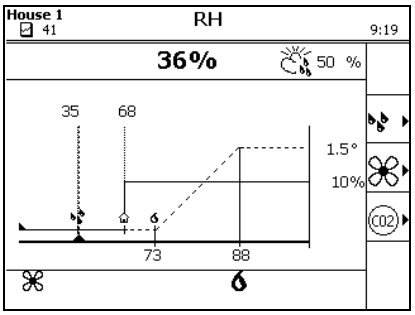
The control computer always shows the latest data, including all offsets and influences. The humidity settings apply to:

	Humidification.
	Ventilation.
CO2	Carbon dioxide (CO2)

4.4.1 Relative humidity graph

This graph shows the relative humidity level with respect to the temperature and ventilation measurements.

Overview →



Control value humidity (35%). The control computer activates a humidifier, if the actual RH drops below the *Control value humidity*. Enter the *Control value humidity* manually. The control computer does not determine this based on the curve ("Curves" page 64).

Control value RH (68%). The *Control value RH* is the maximum permitted RH. If control is based on the curve, the control computer determines the setpoint based on the curve.

The control computer can lower a too high RH using extra heating or ventilation. The actual influence on ventilation ( ) and heating ( ) appears at the bottom of the screen. The influence settings concerned are explained separately.

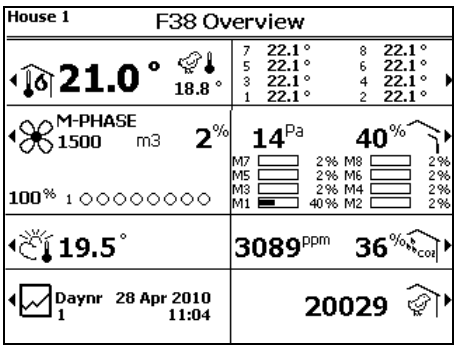
36% Actual relative humidity in the house.

Actual outside relative humidity.

See: Influence high RH on minimum ventilation ("High RH influence on minimum ventilation" page 58).

4.5 Outside conditions

The control computer shows general information about the outside conditions in the overview screen ( ).

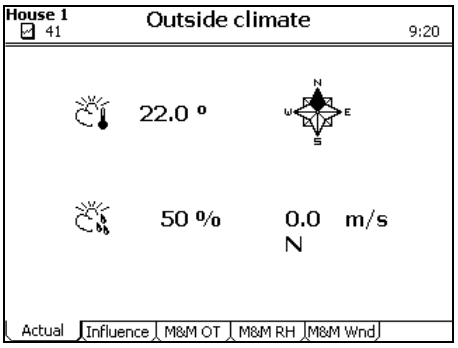


4.5.1 Outside conditions data

This screen shows the measured values of the outside conditions of the house.

Overview → .

Depending on the connected equipment the overview will show the outside temperature, relative humidity (RH) and wind speed and direction.



Actual outside temperature

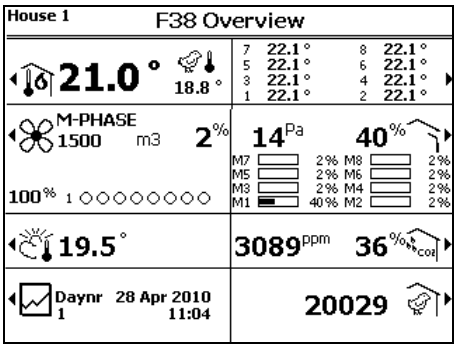
Actual outside relative humidity

Actual wind speed and wind direction

Overviews of this data can be requested on separate tab pages. The control computer shows last week's data on the *M&M* tab pages.

4.6 Air inlets

The control computer shows general information about the air inlets in the overview screen ( ).



The control computer always shows latest data, including all offsets and influences. The ventilation settings concern:

Fan positions.

The positions of air inlets and extra inlets.

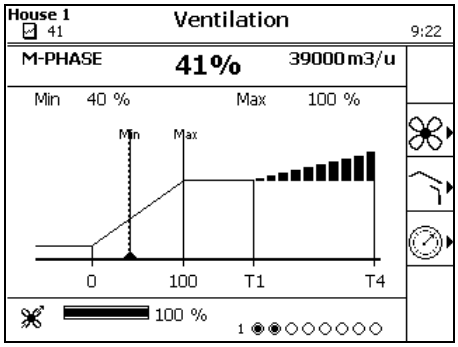
The under pressure in the house.

4.6.1 Ventilation graph

The readout of the ventilation level and the air quantity is shown in the ventilation graph. The control computer uses the ventilation level to determine the positions of fans, air inlets and extra inlets, based on the combi-table. If an under pressure control is also used, the air inlet positions may be adjusted to achieve the required under pressure.

The ventilation level depends on the house temperature. The control computer shows the ventilation level either as percentage (0 – 100%) or tunnel phase (T1, T2 etc.).

Overview →



Symbol	Meaning
T1	Minimum tunnel position
T4	Maximum tunnel position
	Temperature and air inlet percentage

Changing data

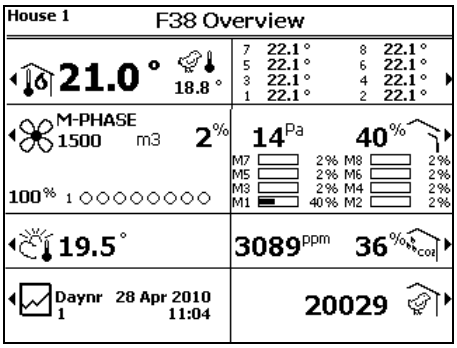
The minimum and maximum ventilation level can be changed. The actual ventilation level cannot be changed by the user, but can be influenced using these settings:

- If, for example, there is not enough fresh air in the house, the minimum ventilation level can be increased.
- If the maximum ventilation level is increased, the ventilation can increase more with higher temperatures.

If the climate is controlled by the curve, the actual minimum ventilation level can never be lower than the minimum norm in the curve.

4.7 House management

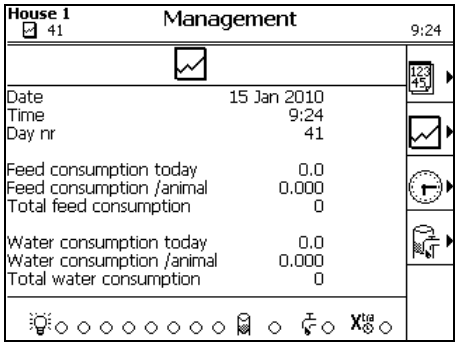
The control computer shows general information about management data in the overview screen (☑). The figure shows the day number and the current date and time.



House management concerns registration, curves, clocks and consumption.

4.7.1 House management data

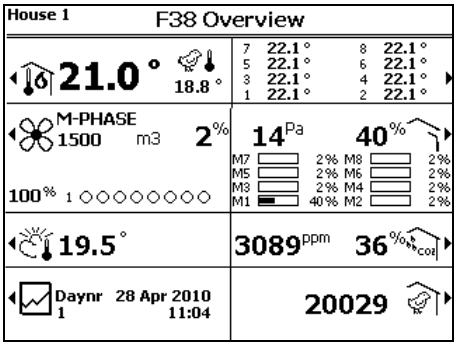
Overview → ☑



Symbol	Meaning	Displayed value
	Registration	
	Curve	
	Clocks	
	Consume	
	Light clocks (8×)	○ (Off)
	Feed clock	○ (Off)
	Water clock	○ (Off)
	Extra clock	○ (Off)

4.8 Animal management

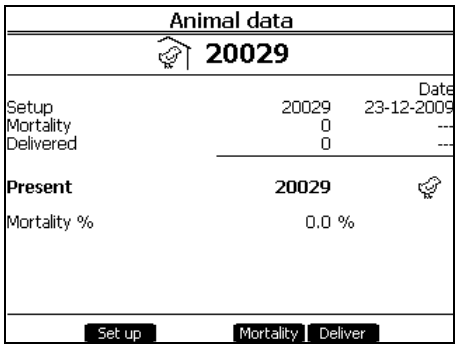
The control computer shows the current number of animals in the house in the overview screen ( ).



Animal management concerns the set up, mortality and delivery of animals.

4.8.1 Animal management data

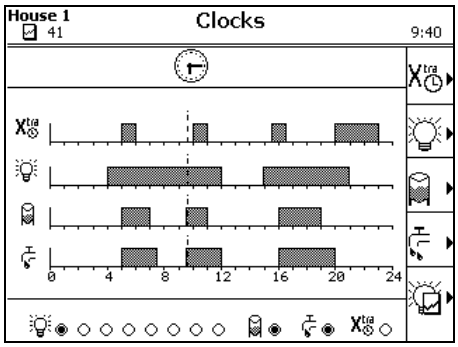
Overview →



5. Clocks

The control computer shows the cycles already set per clock. The current time is indicated by a vertical line, so you can see which cycles are being run.

Overview → → →



This screen displays an overview of all the clocks. Each clock has its own graph displaying the on and off times. The current status of the set clocks is shown at the bottom of the screen (ON ◉ or OFF ○)

You can select more specific information about the clock concerned here. For example: start and stop times, light level, dosing or registering feed and water.

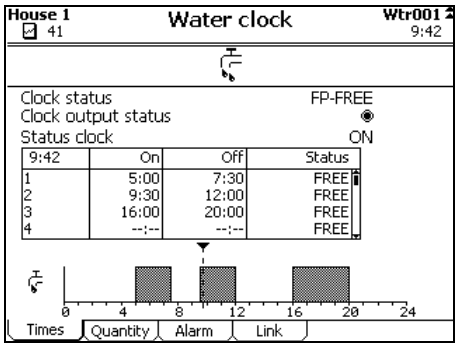
5.1 Water clock

The water clock functions in the same way as the feed clock. In this chapter we refer to the water clock. Please read 'feed' for water.

The same applies to the screenshots, these are taken from the water clock, but also apply to the feed clock.

The cycles, actual clock status and a graph of the set watering cycles are shown on tab page *Times*.

Overview → → → → tab page *Times*



Clock status — Readout of the current clock status. This status can be *BLOCK*, *FREE*, *FP-FREE* or *FP-BLOCK*. The control computer can set the status to *FP-BLOCK*. This means that the feed place is blocked because no animals have been set up. You must set up animals first.

Clock output status — Readout of the actual clock output status, on (◉) or off (○).

Status clock — Readout of the clock status, *ON* or *OFF*.

Manual interruption

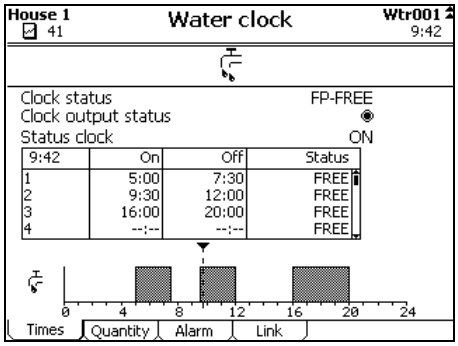
Select the required option per feeding cycle in the *Status* column:

- *BLOCK*: The cycle is blocked: this cycle will not be activated. The amount of intended to be given during this cycle will not be supplied.
- *FREE*: Normal situation. The clock may activate this cycle. The control computer places the status to *READY* if the cycle is run within the current day.

The control computer can set the status to *FP-BLOCK*. This means that the feed place is blocked because no animals have been set up. You must set up animals first. The status will then change to *FP-FREE*.

5.1.1 Setting watering times

Overview → → → → tab page *Times*



On — Setting of the time the water valve must open.

Off (Duration) — Setting of the off time or the duration after which the water valve must close. This depends on the system settings.

Status — Setting of the status per cycle:

- *FREE*: The control computer can run the cycle.
- *BLOCKED*: The control computer will skip the cycle.
- *SKIP*: The control computer will skip the following cycle and then set the status of this cycle to *FREE*. The amount intended to be given during this cycle will not be supplied.
- *ONCE*: The control computer will run the following cycle to supply an extra amount. Then the status of this cycle will be set to *BLOCK*.

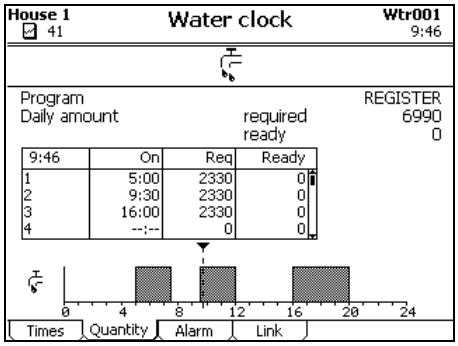
The control computer will set the status to *READY* as soon as it has finished running the cycle on this day.

The cycles are run in the same sequence as the table. Cycle 2 will always be run after cycle 1, cycle 3 after cycle 2 etc. The day change must always be before the first cycle and after the last cycle. This is checked when the times are entered.

5.1.2 Setting water clock program

The method of watering is called a water program.

Overview → → → → tab page *Quantity*



Program — Setting the type of program:

- *REGISTER*: Unlimited supply of feed and water as long as the clock is on.
- *DOSE*: Limited, the system stops supplying feed or water if the required amount has been given within the clock time. If the required amount is not dosed out within the cycle, an alarm can be given.

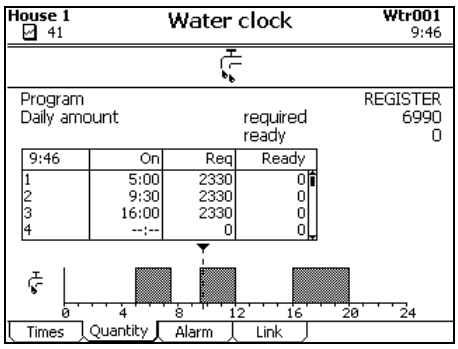
Req — Readout of required amounts per cycle. The daily amount is divided over the number of cycles.

*Dos.T** — Readout of dosing time: how long the system requires to supply the required amount in the cycle. (This readout is only active with the program *DOSE*.)

5.1.3 Dividing required water amounts in the watering cycles

The amount of water supplied in a cycle is always registered.

Overview → → → → tab page *Quantity*



Tab page *Quantity* shows the required day amount, which the control computer calculates from the curve. This amount is equally divided over the cycles with status *FREE*, *SKIP* or *BLOCK*.

If the program *DOSE* has been selected, this division can be changed in the column *Bio%* (biorhythm). Enter the difference in percent per cycle. The sum of the entered biorhythm percentages must add up to zero.

	10000 animals x 0.212 =	2120
Cycle 1: in the morning	-10% =>	636 l
Cycle 2: in the afternoon	0% =>	707 l
Cycle 3: in the evening	+10%=>	777 l
Total	**0%**	**2120 l**

Check the required daily amount and the amount that has already been given in the fields *Daily amount required* and *Ready*, and in the table column *Ready*.

If the sum of the biorhythm percentages does not add up to 0%, all the percentages will be set to 0%. This situation can occur, for example, if a watering cycle is no longer active when a curve day is reached or if a watering cycle is blocked.

5.1.4 Setting water alarm

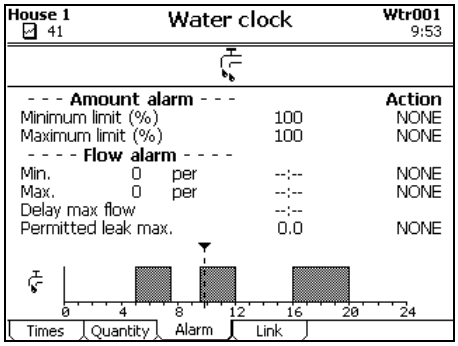
The control computer can give an alarm if the amount of water registered is outside certain limits.

Alarms for the amount of water are only possible if a water meter is used. This must be set in the system settings.

At the end of the watering cycle a check is run to see if the animals have received the right amounts of water.

Upper and lower limits can be set on tab page *Alarm*. If the water amounts fall outside the entered limits, the control computer will initiate the action indicated at *Action*.

Overview → → → → tab page *Alarm*



Amount alarm — Setting of the upper and lower limit of the amount in percentages. At the end of a cycle, the control computer checks if the right amount has been supplied. If the amount falls outside the entered limits, the control computer will initiate the action indicated.

Flow alarm — Setting of the minimum and maximum amounts per time unit. During the supply the control computer checks the flow speed. If the flow falls outside the entered limits, the control computer will initiate the action indicated.

Delay max flow
Setting of the time within which, at the start of the cycle, the flow may exceed the entered maximum. This prevents an unnecessary alarm if the supply is started in an empty system.

Permitted leak max.
Setting of the amount that may be registered when the clock is inactive. This is the absolute amount that may be lost as leakage during the time the clock is off.

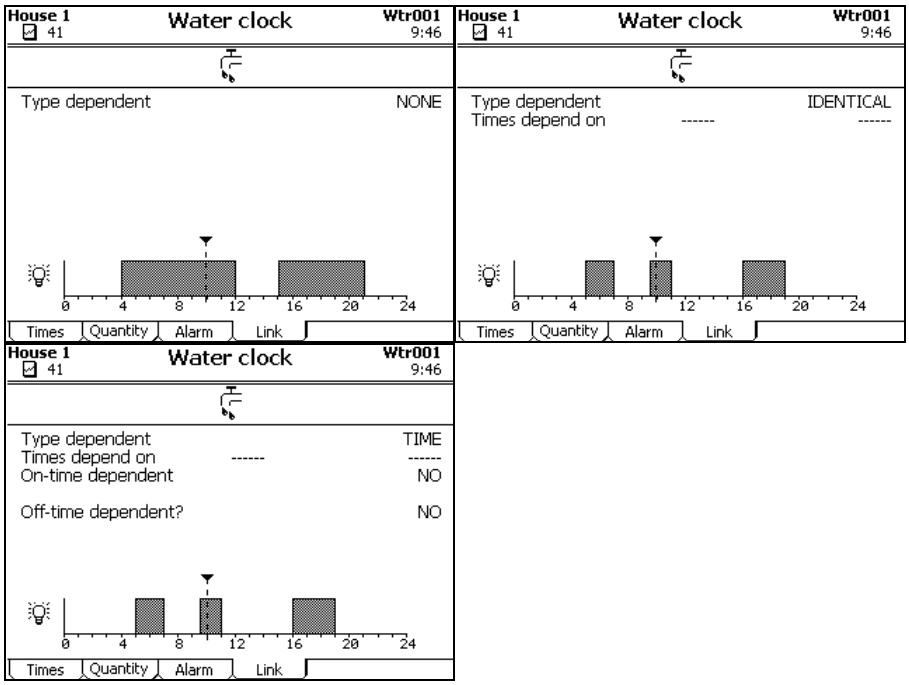
Action
Setting of how the alarm is dealt with:

- *NONE*: The control computer will not send an alarm report and continues with the normal process.
- *LOUD*: The control computer stops the process and gives a loud alarm.
- *SILENT*: The control computer gives a silent alarm and completes the normal process.

5.1.5 Setting water clock link

Clock times can be linked to another clock. This means that the times depend on the other clock. Linking clocks is only possible if this has been entered in the system settings.

Overview → → → → tab page *Link*



Type dependent
Setting of the type of dependency:

- *NONE*: The clock is not linked to another clock. You must enter the clock times.
- *IDENTICAL*: The clock times are adopted from the clock to which this clock is linked.
- *TIME*: The clock times are adopted from the clock to which this clock is linked. However, the times of the light clock will be shifted compared to the clock to which it is linked.

Times depend on
Setting of the clock type and clock index using the + and – key from which the times must be adopted.

On-time dependent
Setting the link of the on time to the entered clock. If *NO* is selected, enter the end time or duration of the cycle in tab page *Times*.

*Time difference**
Setting of the time difference between the clock times and the linked clock. If the clock must start earlier, enter a neg. time duration, e.g. -00:10 minutes.

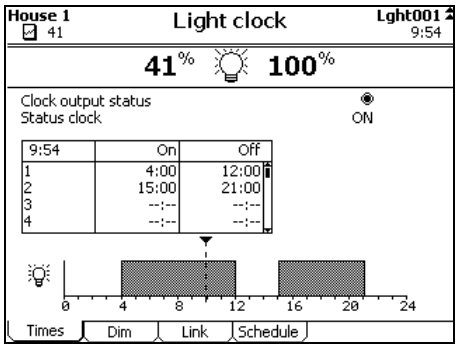
Off-time dependent
Setting the link of the on time to the entered clock. If *NO* is selected, enter the end time or duration of the cycle in tab page *Times*.

*Time difference**
Setting of the time difference between this clock and the linked clock. If the clock should start later, enter a positive time duration, e.g. 00:30 minutes.

5.2 Light clock

The cycles, actual clock status and a graph of the set times are shown on tab page *Times*.

Overview → → → → tab page *Times*



Clock output status Readout of the actual clock output status, on (◉) or off (○).

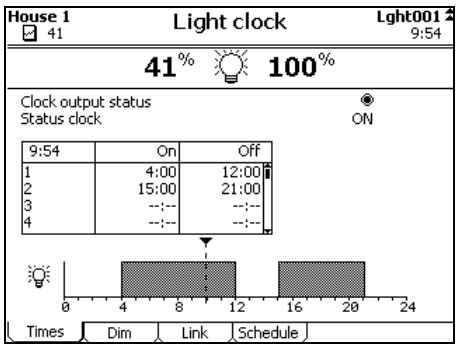
Status clock Readout of the clock status, *ON* or *OFF*.

The cycles are run in the same sequence as the table. Cycle 2 will always be run after cycle 1, cycle 3 after cycle 2 etc. The day change must always be before the first cycle and after the last cycle. This is checked when the times are entered.

5.2.1 Setting lighting times

There are several light clocks. They can be selected using the index keys (▲, ▼). The name of the clock, set in the system settings, will appear at the upper right of the screen.

Overview → → → → tab page *Times*



On Setting of the time the light must switch on.

Off (duration) Setting of the off time or the duration after which the light must switch off. This depends on the system settings.

If intermittent light has been selected in the system settings, set the relevant times here. With intermittent light the lights can be activated for 15 minutes, for example, at the beginning of each hour, and then deactivated for the other 45 minutes. *On* is the time that intermittent light starts. *Duration* is the time the light is on within the repeat time. *RepeatT* is the repeat time after which light activation will be repeated. *Times* is the number of times within a 24-hour period that the light will be activated.

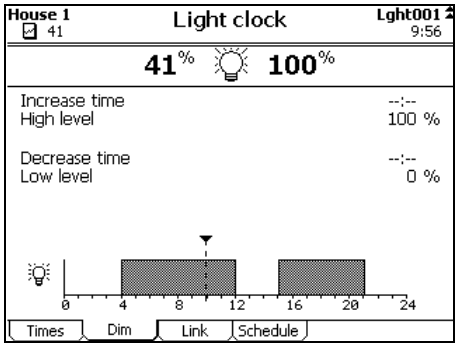
5.2.2 Setting light control

Lights can be gradually activated and deactivated on tab page *Dim*.

Using light measurement with a light sensor

If a light sensor has been installed in the house, the light level can be set to light intensity (Lux) instead of to a percentage. This is particularly important if natural daylight can enter the house. The intensity of the lights can be adapted to suit the natural light levels.

Overview → ☑ → 🕒 → 💡 → tab page *Dim*



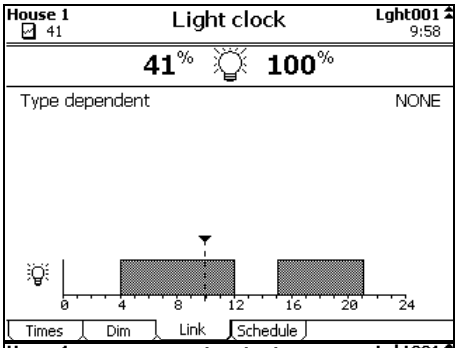
Increase time	Setting of the time in which the light goes from low level (Off) to high level (On).
High level	Setting of the maximum light intensity. This can be entered in percentages; with light measurement Lux based control is also possible.
Decrease time	Setting of the time in which the light goes from high level (On) to low level (Off).
Low level	Setting of the minimum light intensity. This can be entered in percentages; with light measurement Lux based control is also possible.

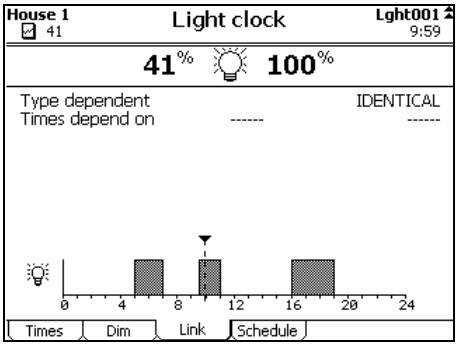
5.2.3 Linking lighting times

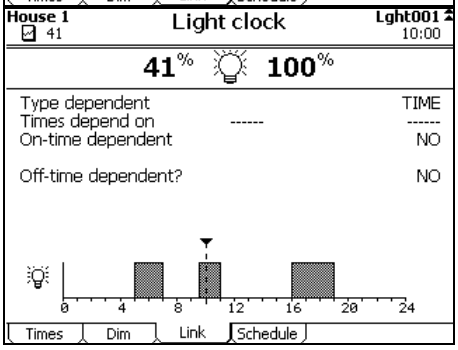
Clock times can be linked to another clock. This means that the times depend on another clock. Linking clocks is only possible if this has been set in the system settings.

The settings on tab page *Link* differ per setting of the type of link:

Overview → ☑ → 🕒 → 💡 → tab page *Link*







Type dependent

Setting of the type of dependency:

- *NONE*: The clock is not linked to another clock. You must enter the clock times.
- *IDENTICAL*: The clock times are adopted from the clock to which this clock is linked.
- *TIME*: The clock times are adopted from the clock to which this clock is linked. However, the times of the light clock will be shifted compared to the clock to which it is linked.

Times depend on

Setting of the clock type and clock index using the + and – key from which the times must be adopted.

On-time dependent

Setting the link of the on time to the entered clock. If *NO* is selected, enter the end time or duration of the cycle in tab page *Times*.

*Time difference**

Setting of the time difference between the clock times and the linked clock. If the clock must start earlier, enter a neg. time duration, e.g. -00:10 minutes.

Off-time dependent

Setting the link of the off time to the entered clock. If *NO* is selected, enter the end time or duration of the cycle in tab page *Times*.

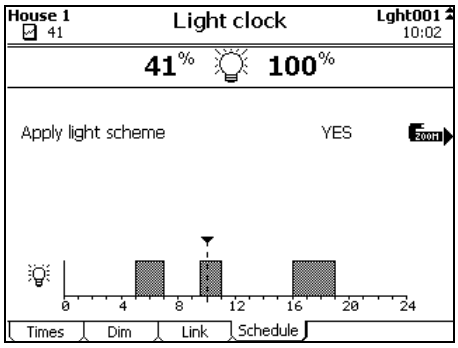
*Time difference**

Setting of the time difference between this clock and the linked clock. If the clock should start later, enter a positive time duration, e.g. 00:30 minutes.

5.2.4 Setting light schemes

Light schemes can only be used if this has been set in the system settings.

Overview → → → → tab page *Schedule*

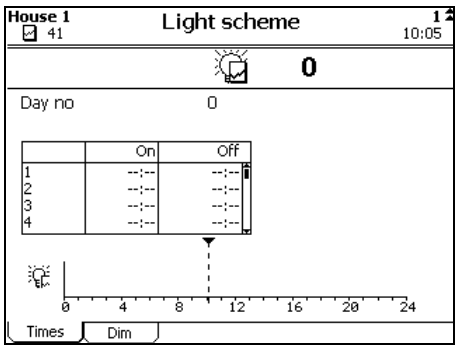


Apply light scheme

Setting for light scheme application.

Press the key at *ZOOM* to enter the various light schemes.

Overview → → → → tab page *Schedule* → *ZOOM*



Enter a light scheme as follows:

1. Select tab page *Times*.
2. Select the number of the light scheme to be entered using the index keys. 20 light schemes (maximum) can be entered.
3. Enter the *Curve day*. The scheme will be applied from the entered curve day onwards.

   If light schemes are set, the ordinary clock setting (as entered at *Times* of setting light clocks "Setting lighting times" page 24) applies until the first day on which a light scheme has been set.
4. Enter the details of the light scheme in the tab page *Times* and tab page *Dim*. Enter details in the same way as described at *Times* of setting light clocks "Setting lighting times" page 24.

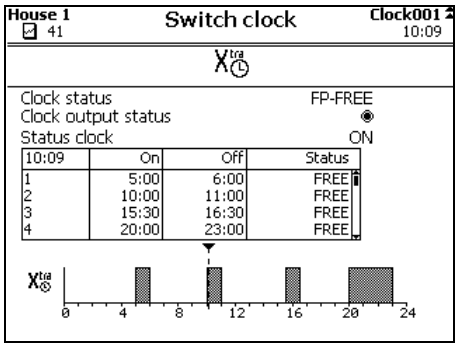
Light schemes can also be accessed via:

Overview → → → →

5.3 Extra clock

The extra (switch) clock can be also used to activate a different process than the feed clock, water clock and light clocks. The cycles, actual clock status and a graph of the set cycles are shown in the screen below.

Overview → → → →



Clock status — Readout of the current clock status. This status can be *BLOCK*, *FREE*, *FP-FREE* or *FP-BLOCK*. The control computer can set the status to *FP-BLOCK*. This means that the feed place is blocked because no animals have been set up. You must set up animals first.

Clock output status — Readout of the actual clock output status, on (◉) or off (○).

Status clock — Readout of the clock status, *ON* or *OFF*.

On — Setting of the required on-time.

Off (Duration) — Setting of the off time or the duration. This depends on the system settings.

Status — Setting of the status per cycle:

- *FREE*: The control computer can run the cycle.
- *BLOCKED*: The control computer will skip the cycle.
- *ONCE*: The time period will be run once on the next occasion that the on time of the time period is reached. Afterwards, the control computer sets the status to *BLOCK*.
- *SKIP*: The time period will be skipped next time. Afterwards, the control computer sets the status to *FREE*.

The control computer sets the status to *READY* when it has finished running the cycle on this day.

6. Animal management

Animal management covers all actions which result in a different number of animals:

- Set up animals

  The control computer will control the climate based on the curve, if a curve is used. At set up enter from which curve day the climate must be controlled.

- Registering mortality

  The controls that depend on the number of animals will be adjusted.

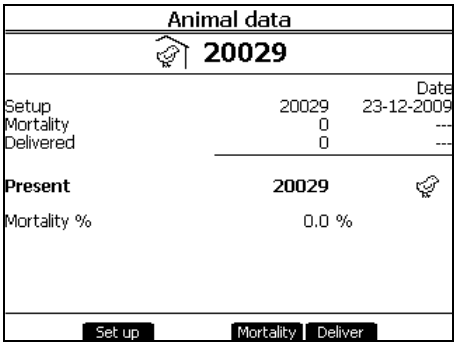
- Delivering animals

  When some of the animals leave the house, the controls will be adjusted. If all the animals are delivered, the control computer switches to control based on the empty settings.

6.1 Animal management data

The overview screen shows the number of animals present in the house. More data is displayed in the screen below.

Overview → 



The *Animal data* screen displays the total numbers set up, mortality and delivered. The date of the last change is shown behind each piece of information. The control computer calculates the data shown as follows:

Number of animals present = *Set up* – *Delivered* – *Mortality*

Mortality percentage = (Total *mortality* rate / Number of animals *set up*) × 100

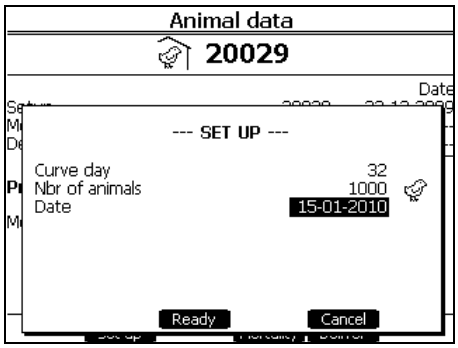
When animals have been delivered, the control computer shows the data of the delivered animals. This (old) data is saved until new animals are set up.

6.2 Set up flock

Set up the animals as soon as they enter the house. If control is based on the curve, the control computer will use the settings from the curve. If not enter these settings manually.

If there are no animals present, the control computer will set this number to 0. The control and registration data will not be saved. Note this data if you still need it.

Overview →  → *Set up*



Curve day

Setting of the curve day number:

- Day number 0: do not control with the curve
  All control data must be entered manually. The day number stays 0 during the lifecycle of the animals.
- Day number 1 or higher: control with the curve
  The control computer increases this number by 1 every day at midnight.

At set up you usually start with day 1. If a higher day number is chosen, control will start further along in the curve.

Nbr of animals

Setting of the number of animals that have been set up.

Date

Setting of the date. The control computer only uses the *Date* for data registration. The control computer starts control immediately after the animals have been set up, even if a past or future date has been entered.

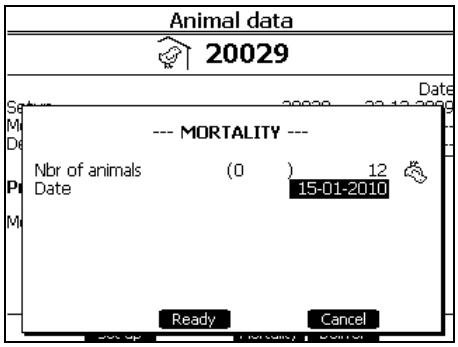
6.3 Animal mortality

The term mortality refers to sick or dead animals that have been removed from the house.

As mortality decreases the number of animals, the controls must also be adjusted. This can be done as follows:

- If control is manual (day number 0) enter the new settings manually.
- If control is based on the curve (day number 1 or higher), the control computer will automatically adjust the settings.

Overview → → *Mortality*



Nbr of animals

Setting of the number of removed animals. The number of present animals will appear between brackets.

Date

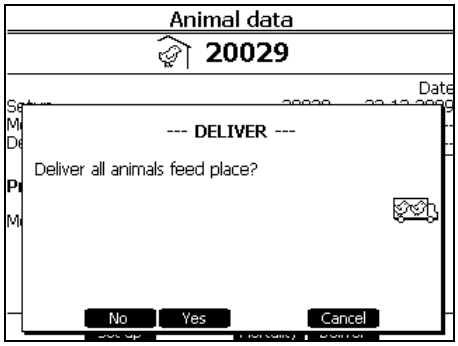
Readout of the current date.

6.4 Delivering animals

When animals are delivered they leave the house. These animals are booked out of the control computer. Animals can also be delivered at intervals.

When all the animals are delivered the control computer sets the day number to 0, and switches to control based on the empty settings page 67. All offsets are set to 0.

Overview → → *Deliver*



Enter delivery data as follows:

1. Select the menu *Animal data*.
2. Press the key at *Deliver.*
3. Select one of the two options:

   Deliver all animals. To deliver all the animals in a house at the same time:

   1. Press the key at *YES.*
   2. Press the key at *Ready* to confirm the delivery.

   Deliver a group of animals. To deliver a group of animals in a house:

   1. Press the key at *NO.*
   2. Enter the number of animals to be delivered and then press the Enter key.
   3. Press the key at *Ready* to confirm the delivery.

7. Advanced climate settings

This chapter covers the advanced settings in the control computer.

7.1 Requesting and setting control settings

After a menu option for specific data, the control computer displays a number of tab pages with codes. Certain tab pages concern a control, others an influence.

This section explains what comprises a control. It's better to read a screen concerning a control from top to bottom. This shows you exactly how the computer has calculated the actual control value.

The computer usually shows the following data:

- Norm value or setpoint.
  The setpoint is the value usually calculated by the computer based on the curve or setting in the combi-table.
- Offset or Curve correction
  The offset is the difference between the setpoint and the required control value. If the control value is changed, the computer will automatically determine the offset. The control computer adds the offset to the setpoint.
  An offset is retained. You can reset the offset to zero in edit mode. If a curve is used, the offset will be reset if the day number is set to 0.
- Total of all influences. See also: Requesting Management & Monitoring overviews page 31.
  For example, temperature, RH, wind and pressure influences.
  This total is also added to the setpoint or subtracted.
- Current value or control value.
  The computer uses the control value to control the climate management system.

	Select the required control value for the section climate based on your own judgement.
	A value with an offset is shown bold in the overview screens.

7.2 Manual adjustment of the current values

You may sometimes want to manually adjust the values calculated by the computer. You simply have to adjust the control values in the settings. The computer calculates the difference (offset) compared to the setpoint.

The following applies after the settings have been adjusted manually:

- The setpoint remains unchanged.
- The computer controls using the manually set values (setpoint + offset).
- The difference is retained.
- A value with an offset is shown bold in the overview screen.
- The offset compared to the curve is shown in the section screen concerned as "curve correction", "offset" or between brackets ().
- The difference can be reset to 0.0 in edit mode in the settings screen.
- If you use a curve, the offset will be reset if you set the day number to 0 and when all the animals are delivered.

7.3 Requesting Management & Monitoring overviews

The computer shows certain historical data on tab pages *M&M*. The control computer updates the overviews every day. The most recent data appears at the top.

7.4 Setting influences

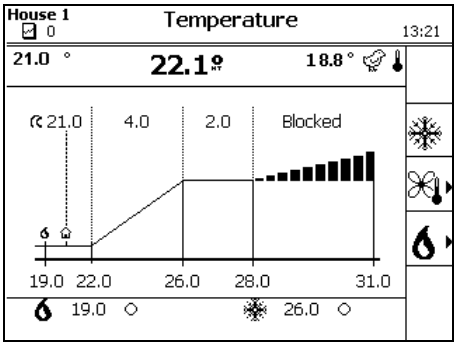
The climate controls can be optimised by taking into account the influence of the outside temperature, humidity or wind on the indoor temperature. The influences are usually on a separate tab page *Influences*.

	Influences are used to optimise the controls. The computer will control the climate well even if these influences are not used.

Determine per influence if you want to use it or not. The computer will not show the corresponding settings if a certain type of influence is not used. The control computer always shows the calculated, actual influence based on the settings made for the maximum and actually measured values. See Optimising controls using influences (page 50).

7.5 Temperature settings

Use the options in the *Temperature* screen to control the cooling and heating units and to set the temperature settings for ventilation.

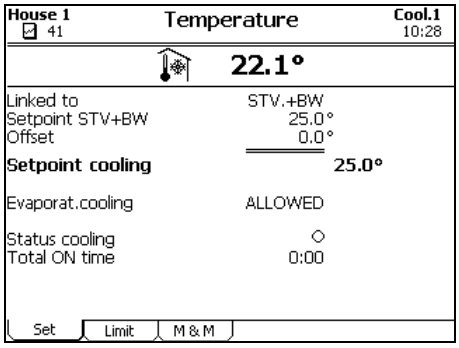


See: Heating page 6, page 35, Ventilation page 33 and Cooling page 7, page 32.

7.5.1 Cooling

The installer has set the type of cooling.

Overview → → → tab page *Set*



Linked to
Setting of which the setpoint cooling can be linked to the control value house:

- *STV+BW*: Start temperature ventilation + bandwidth.
- *EXTRA TEMP.*: extra temperature.
- *SETPOINT HOUSE*: Setpoint house.
- *TUNNEL POS. #*: Tunnel position.

The setpoint will continue to follow the value of the linked settings.

Setpoint...
Readout of the target value used for calculating the *Heat exchanger setpoint*. The control computer uses the target value set at *Linked to*.

Offset
Readout of the offset between the set *control value* and the *setpoint*.

Control value cooling
Readout of the calculated cooling control value.

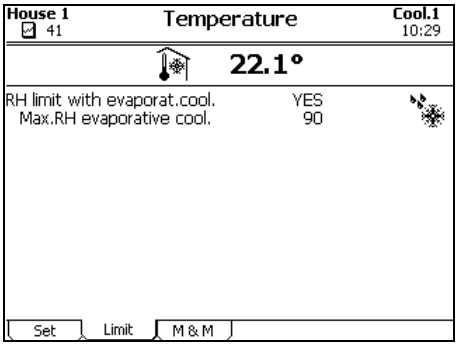
Evaporat.cooling
Readout indicating if evaporative cooling is used. This has been set in the installation menus.

Status cooling
Readout of the actual cooling status, on (◉) or off (○).

Total ON time
Readout of the total time that the control was on.

Evaporative cooling can increase the RH in the house. To ensure that the RH does not become too high, enter a *Max. RH evaporative cooling*. If the RH in the house exceeds the set value, the cooling deactivates.

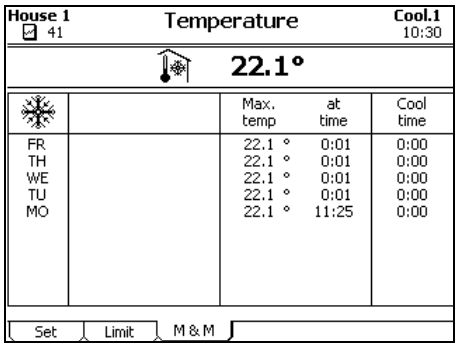
Overview → → → tab page *Limit*



RH limit evaporat. cool.	Setting if the control computer must deactivate cooling if the house RH becomes too high.
Max.RH evaporative cool.	Setting of the RH above which cooling must be deactivated.

The computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → tab page *M & M*

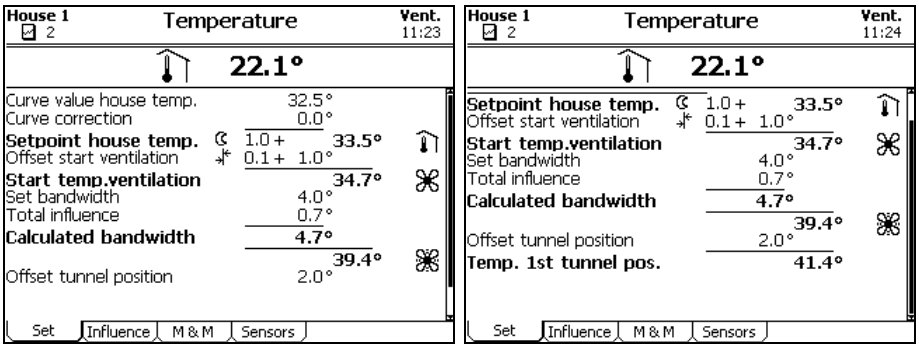


Max. temp	Readout of the calculated maximum temperature.
At time	Readout of the moment at which the maximum temperature was reached.
Cool time	Readout of the on-time of the cooling.

7.5.2 Ventilation

These temperature settings determine the start and end of the bandwidth.

Overview → → → tab page *Set*



Curve value house temp. Readout of the house temperature based on the curve. The house temperature is derived from the day number.

Curve correction Setting of the curve value correction. This value can only be reset.

Setpoint house temp. Setting of the required house temperature. This is always between the Control value heating and the Start temperature ventilation.

Offset start ventilation Readout of the offset between *Setpoint house temp.* and *Start temp. ventilation*. This value can only be reset.

Start temp. ventilation Setting of the temperature above which ventilation must increase. As long as the house temperature is lower than this setting, the calculated ventilation will equal *Minimum ventilation*. If the temperature rises above the set *Start temp. ventilation*, ventilation will increase. Ventilation can increase until the set *Maximum ventilation actual*.

Set bandwidth Readout of the difference between *Start temp. ventilation* and the temperature above which ventilation is at maximum. This value is without any influences applying.

Total influence Readout of the total correction by influences.

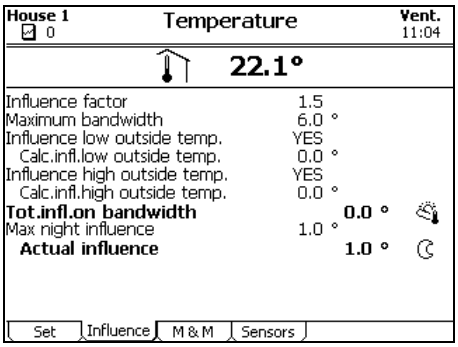
Calculated bandwidth Setting of the bandwidth after influences applying.

*Max. vent. temp.** Readout of the temperature above which ventilation is at maximum. This value is based on the *Start temp. Ventilation* and the *Calculated bandwidth*.

Offset tunnel position Readout of the offset between the set *control value* and the *setpoint*.

Temp. 1st tunnel pos. Setting of the temperature from which tunnel position 1 applies, if the temperature rises.

Overview → → → tab page *Influence*



Influence factor Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.

Maximum bandwidth Readout of the maximum possible bandwidth. This is the bandwidth if the influence outside temperature is maximum.

Influence low outside temp. Setting if a low outside temperature may influence the bandwidth.

Calc.infl.low outside temp. Readout of the influences above.

Influence high outside temp. Setting if a high outside temperature may influence the bandwidth, start temperature ventilation or section temperature.

Calc.infl.high outside temp. Readout of the influences above.

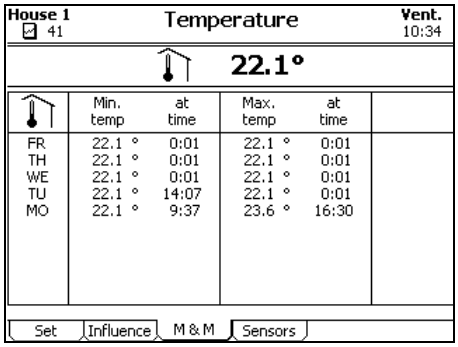
Tot.infl.on bandwidth Readout of the total correction by influences.

Max night influence Setting of the maximum influence on temperature during night correction. If the light level gradually increases or decreases, the influence will also be applied gradually.

Actual influence Readout of the actual night correction influence.

The computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

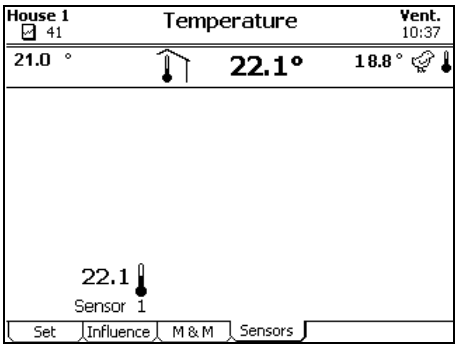
Overview → → → tab page *M & M*



Min./Max. temp Readout of the measured minimum and maximum temperature.

At time Readout of the times the minimum and maximum were reached.

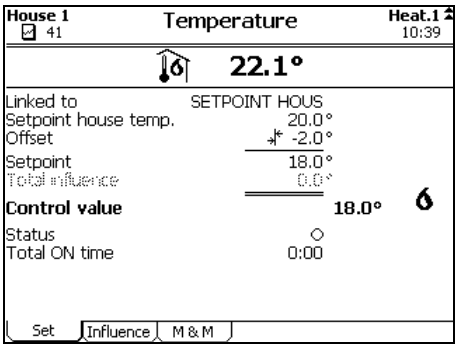
Overview → → → tab page *Sensors*



Readout of the current temperature of the individual sensors.

7.5.3 Heating

Overview → → → tab page *Settings*



Linked to — Setting to link heating control. The following options are available:

- *SETPOINT HOUSE*. This is normally used for the standard heating control. The control value heating automatically follows the house temperature, even if this is linked to the curve.
- *EXTRA TEMP*. This setting is used to control heating on its own setpoint, for example, floor heating. *EXTRA TEMP* can also be set using a curve.
- *HEATING 1*. This setting is only possible if there are several heating units. The following heating units can be linked to the 1st heating unit. Only set the control value for the 1st heating control. This setting can be used for high/low controls.
- *NONE*. This setting is used to control an independent heating control.

Setpoint... — Readout of the setpoint used to calculate the *Control value*. The control computer uses the setpoint set at *Linked to*.

*Heating 1** — Readout of the *Setpoint* of heating 1. If you use **several** heating units, these units can be linked to heating 1.

Offset — Readout of the offset of the setpoint heating. This value can only be reset.

Setpoint — Readout of the calculated setpoint heating.

Total influence — Readout of the total correction by influences.

Control value — Readout of the calculated control value setpoint heating, with correction by the influence.

Analog control

(Depending on the settings made by the installer)

*Actual control** — Readout of the actual percentage on which heating is currently being controlled.

*Minimum setting** — Setting of the minimum air inlet position.

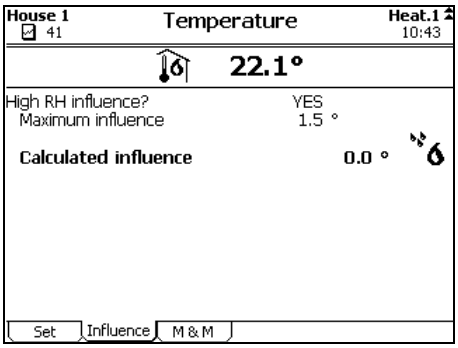
Relay control

(Depending on the settings made by the installer)

Status — Readout of the actual heating status, on (◉) or off (○).

Total ON-time — Readout of the total time that the control was on.

Overview → → → tab page *Influence*



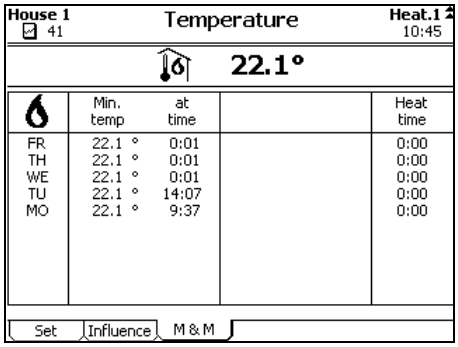
High RH Influence? — Setting, if the RH may influence the *Setpoint*. Influences RH page 58

Maximum influence — Readout of the maximum influence.

Calculated influence — Readout of the calculated influence of the setpoint heating.

The computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → tab page *M & M*



Min. temp Readout of the calculated minimum temperature.

At time Readout of the moment at which the maximum temperature was reached.

Heat time Readout of the on-time of the heating.

7.6 Ventilation settings

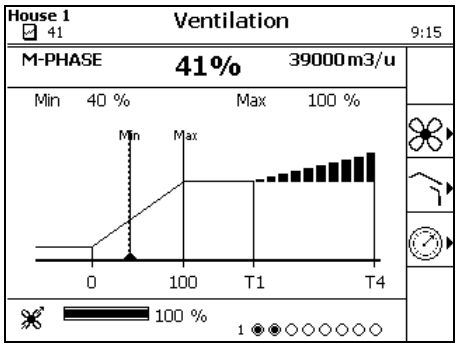
The actual ventilation position is determined using the minimum and maximum ventilation settings, the actual section temperature and the bandwidth.

The actual ventilation level cannot be set, but it can be influenced by adjusting the minimum and maximum ventilation level:

- If, for example, there is not enough fresh air in the section, the *minimum* ventilation level can be increased.
- If the *maximum* ventilation level is increased, the ventilation can increase more with higher temperatures.

The control computer always shows the latest data, which incorporates all offsets and influences. If the climate is controlled using the curve, the actual minimum ventilation level can never be lower than the calculated setpoint.

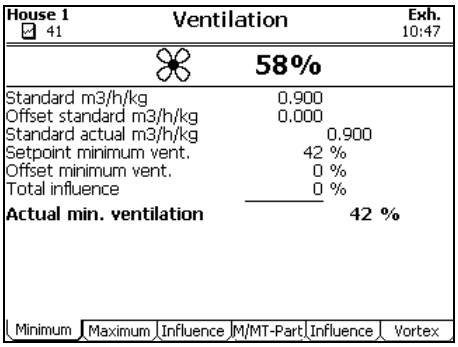
Overview → .



7.6.1 Exhaust

Setting of the minimum and maximum ventilation level.

Overview → → → tab page *Minimum*



Standard m3/h/kg — Readout of the *Minimum ventilation norm* from the curve. If the curve is not used, set the *Setpoint minimum ventilation* manually. The control computer then calculates the *Setpoint minimum vent* based on the manually entered *Standard actual.* The control computer shows the norm as *m3/h/animal or* as a percentage (depending on the installation settings). See: Settings for minimum and maximum ventilation page 65.

If the control computer controls based on the number of animals, it will automatically adjust the minimum ventilation. If the control computer controls using a fixed percentage, the user must change this percentage if animals are removed (with mortality or delivery). If this is not done, there may be excess ventilation. This costs more energy and money.

Offset standard m3/h/kg — Readout of the difference between the calculated *Minimum ventilation norm* from the curve and the set *Standard actual* is shown here (only if a curve is used).

Standard actual m3/h/kg — Readout of the actual minimum ventilation volume in m^3/hour.

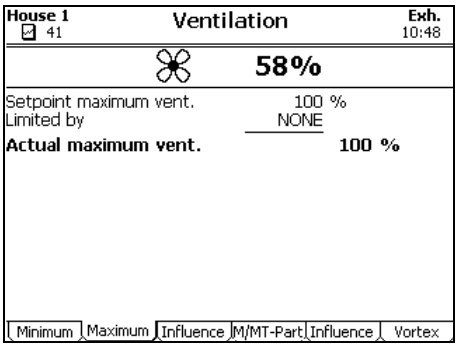
Setpoint minimum vent. — Readout of the calculated setpoint of the minimum ventilation position.

Offset minimum vent. — Readout of the offset between the *Setpoint minimum vent.* and *Actual min. ventilation*. This value can only be reset.

Total influence — Readout of the total correction by influences.

Actual min. ventilation — Setting of the calculated control value of the minimum ventilation level, with correction by offset and influences.

Overview → → → tab page *Maximum*



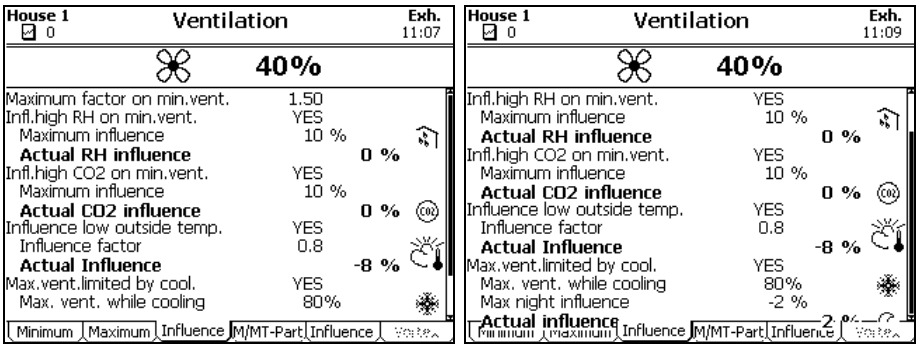
Setpoint maximum vent. — Readout of the calculated setpoint of *Maximum ventilation position,* without correction by influences.

Limited by — Readout of the method used to limit maximum ventilation.

It is possible to link the maximum ventilation to the presence of animals in the house. Your installer can set this function.

Actual maximum vent. — Setting of the calculated control value of the maximum ventilation level.

Overview → → → tab page *Influence* (Maximum)



Maximum factor on min.vent. — Setting of the factor used to limit the total of all influences on minimum ventilation.

Infl.high RH on min.vent. — Setting, if relative humidity may influence *Setpoint minimum vent*.

Maximum influence — Readout of the maximum influence.

Actual RH influence — Readout of the calculation of the actual influence based on the measured RH.

Infl.high CO2 on min.vent. — Setting, if CO_2 may influence *Setpoint minimum vent*. See: Influences of CO2 or NH3 page 61.

Actual CO2 influence — Readout of the calculation of the actual influence based on the measured CO_2.

Influence low outside temp. — Setting, if a measured low outside temperature may influence *Setpoint minimum vent*.

Influence factor — Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.

Actual influence — Readout of the actual influence.

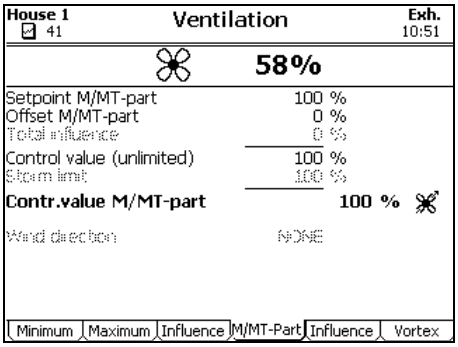
Max.vent.limited by cool. — Setting, if cooling may influence the *Setpoint maximum ventilation*.

Max. vent. while cooling — Setting of the maximum ventilation position during cooling.

Max night influence — Setting of the maximum influence on ventilation during night correction. If the light level gradually increases or decreases, the influence will also be applied gradually.

Actual influence — Readout of the actual night correction influence.

Overview → → → tab page *M/MT-Part*



Setpoint M/MT-part — Readout of the setpoint for the control part, without influences and offsets.

Offset M/MT-part — Readout of the offset between the set *control value* and the *setpoint*.

Total influence — Readout of the total correction by influences.

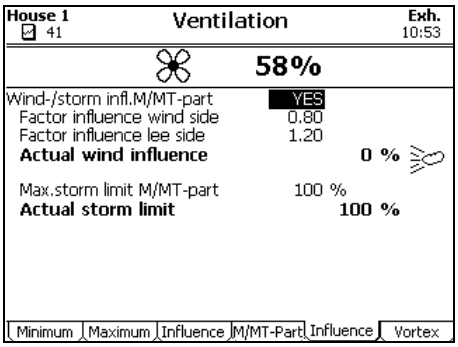
Control value (unlimited) Readout of the control value, after correction by influences and offset, but without application of the *Storm limit*.

Storm limit Readout of the influence during a storm on the controllable part of the ventilation.

Contr.value M/MT-part Setting of the calculated control value, after correction by influences, offset and storm limit.

Wind direction Readout of the wind direction actually influencing the control (*NONE*, *LEE* or *WIND*).

Overview → → → tab page *Influence* (M/MT-Part)



Wind-/storm infl.M/MT-part Setting if wind direction and wind speed may influence the ventilation position.

Factor influence wind side Setting of the factor used to decrease the *Control value control part* on the wind side.

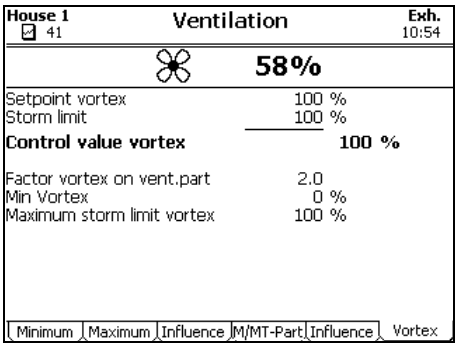
Factor influence lee side Setting of the factor used to increase the *Control value control part* on the lee side.

Actual wind influence Setting of the calculation of the actual influence based on the wind.

Max.storm limit M/MT-part Setting of the maximum *Control value* during a storm.

Actual storm limit Readout of the actual storm limit (maximum control value).

Overview → → → tab page *Vortex*



Setpoint vortex Readout of the *Setpoint vortex* without wind influence correction.

The control value of the vortex damper is linked to the control value of the controllable part. If the control value controllable part value increases, for example, the vortex damper position will increase accordingly. Use *Factor vortex on vent.part* to increase the control value of the vortex damper quicker or slower than the control value of the controllable part. If the control value vortex increases quicker, it will be fully open before the controllable part has reached its maximum control value.

Storm limit Readout of the influence during a storm on the controllable part of the ventilation.

Control value vortex Readout of the control value vortex damper, after correction by influences, offset and storm limit.

Factor vortex on vent.part Setting of the factor used by the control computer to calculate the *Setpoint vortex*, based on the *Setpoint cont. part*.

Setpoint vortex = *Setpoint cont. part* × *Fact.vortex*

Min Vortex Setting of the minimum air inlet position.

Maximum storm limit vortex Setting of the maximum *Control value* during a storm.

Example: Control value vortex

Setpoint controllable part: 40%

Factor vortex on vent.part: 2.0

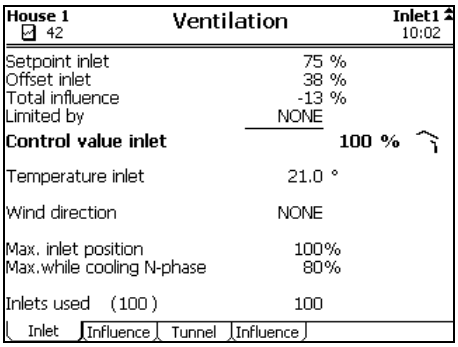
Setpoint vortex damper = 40 × 2 = 80%

If the *Setpoint controllable part* is 50%, the vortex damper will reach the maximum control value of 100%.

7.6.2 Inlets

The control computer determines the inlet positions based on the combi-table. Air pressure and wind can influence these inlet positions. The computer can also correct the temperature differences between the left and right side and front and rear of the house.

Overview → → → tab page *Inlet*



Setpoint inlet Readout of the setpoint for the control part, without influences and offsets.

Offset inlet Readout of the offset between the set *control value* and the *setpoint*.

Total influence Readout of the total correction by influences.

Limited by Readout of the method used to limit maximum ventilation.

It is possible to link the maximum ventilation to the presence of animals in the house. Your installer can set this function.

Control value inlet Setting of the calculated control value, after correction by influences, offset and storm limit.

Temperature inlet Readout of the actual, average air inlet temperature.

*Wind direction** Readout of the wind direction actually influencing the control (*NONE*, *LEE* or *WIND*).

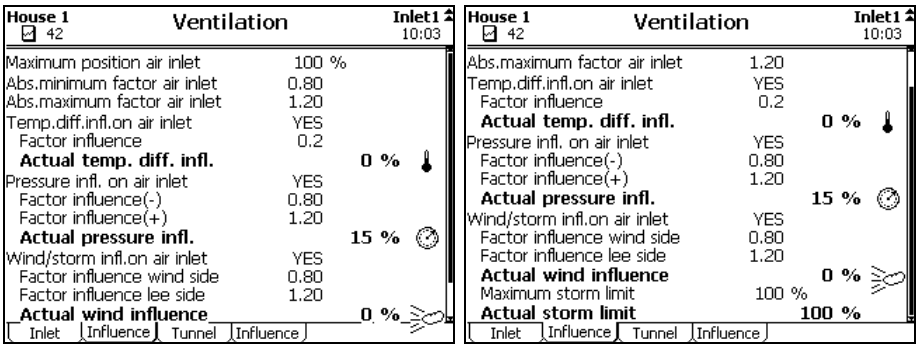
Max. inlet position Setting of the maximum air inlet position.

Max. position while cooling... Setting of the maximum ventilation level while cooling.

Inlets used Setting indicating the number of air inlets to be used. The total number of inlets installed is shown in brackets. If the number of inlets used is less than the number of inlets installed, the control computer corrects the opening.

For example if only 40 inlets of the total of 100 are in use and the calculated opening is 2% then the 40 inlets will open: 100 / 40 × 2% = 5%.

Overview → → → tab page *Influence* (Inlet)



Maximum position air inlet
Setting of the air inlet position limit. If the setpoint air inlet exceeds the value of this setting, the control computer determines the combi position corresponding to this air inlet position. The entire ventilation control will be limited by this value. This enables, for example, a Fancom air inlet to be limited to 70% in the winter to prevent it from tipping.

Abs.minimum factor air inlet
Setting of the factor used to calculate the lower limit of the **total** influence. The sum of calculated influences for wind, outside temperature, temperature difference and pressure may not drop below the calculated lower limit.

Abs.maximum factor air inlet
Setting of the factor used to calculate the upper limit of the **total** influence. The sum of the calculated influences for wind, temperature difference and pressure may not exceed the calculated upper limit.

Temp.diff.infl.on air inlet
Setting, if the measured temperature difference may correct the mutual positions of air inlets.

See: Influence temperature difference on air inlets page 55 and Total influence on air inlets page 62.

Factor influence
Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.

Actual temp. diff. infl.
Readout of the calculated influence on *Setpoint air inlet*.

Pressure infl. on air inlet
Setting, if the measured pressure may influence the inlet position. This influence can only be used if a pressure control is used.

Factor influence (+/–)
Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.

Actual pressure infl.
Readout of the measured pressure.

Wind/storm infl.on air inlet
Setting, if wind and/or storm may influence the inlet position.

Factor influence wind side
Setting of the factor used to decrease the *Control value control part* on the wind side.

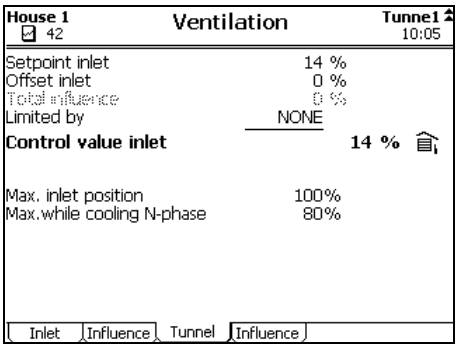
Factor influence lee side
Setting of the factor used to increase the *Control value control part* on the lee side.

Actual wind influence
Readout of the calculation of the actual influence based on the wind.

Maximum storm limit
Setting of the maximum influence during a storm on the setpoint control part. See: Influence storm page 57.

Actual storm limit
Readout of the actual storm limit (maximum control value).

Overview → → → tab page *Tunnel*



Setpoint inlet — Readout of the setpoint for the control part, without influences and offsets.

Offset inlet — Readout of the offset between the set *control value* and the *setpoint*.

Total influence — Readout of the total correction by influences.

Limited by — Readout of the method used to limit maximum ventilation.

> It is possible to link the maximum ventilation to the presence of animals in the house. Your installer can set this function.

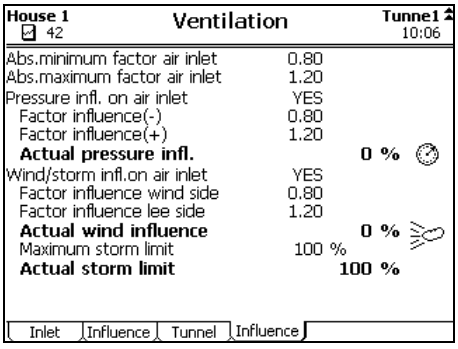
Control value inlet — Setting of the calculated control value, after correction by influences, offset and storm limit.

Wind direction — Readout of the wind direction actually influencing the control (*NONE*, *LEE* or *WIND*).

Max. inlet position — Setting of the maximum air inlet position.

Max. position while cooling... — Setting of the maximum ventilation level while cooling.

Overview → → → tab page *Influence* (Tunnel)



Abs.minimum factor air inlet — Setting of the factor used to calculate the lower limit of the **total** influence. The sum of calculated influences for wind, outside temperature, temperature difference and pressure may not drop below the calculated lower limit.

Abs.maximum factor air inlet — Setting of the factor used to calculate the upper limit of the **total** influence. The sum of the calculated influences for wind, temperature difference and pressure may not exceed the calculated upper limit.

Pressure infl. on air inlet — Setting, if the measured pressure may influence the inlet position. This influence can only be used if a pressure control is used.

Factor influence (–/+) — Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.

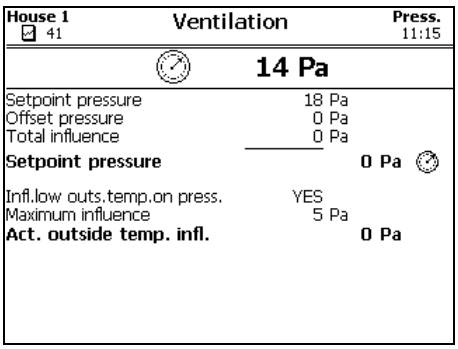
Actual pressure infl. — Readout of the measured pressure.

Wind/storm infl.on air inlet	Setting, if wind and/or storm may influence the inlet position.
Factor influence wind side	Setting of the factor used to decrease the *Control value control part* on the wind side.
Factor influence lee side	Setting of the factor used to increase the *Control value control part* on the lee side.
Actual wind influence	Readout of the calculation of the actual influence based on the wind.
Maximum storm limit	Setting of the maximum influence during a storm on the setpoint control part. See: Influence storm page 57.
Actual storm limit	Readout of the actual storm limit (maximum control value).

7.6.3 Pressure

When controlling ventilation, the control computer first controls the positions of air inlets and extra inlets. Then it checks if the required pressure has been reached. If not, it can adjust the inlet positions.

Overview → →



Setpoint pressure	Readout of the setpoint for the control part, without influences and offsets.
Offset pressure	Readout of the offset between the set *control value* and the *setpoint*.
Total influence	Readout of the total correction by influences.
Control value pressure	Setting of the calculated control value for the pressure control, after correction by influences and offsets.
Infl.low outs.temp.on press.	Setting, if a low outside temperature may influence pressure control. This influence can only be used if a pressure control is used.
Maximum influence	Readout of the maximum influence.
Act. outside temp. infl.	Readout of the actual influence.

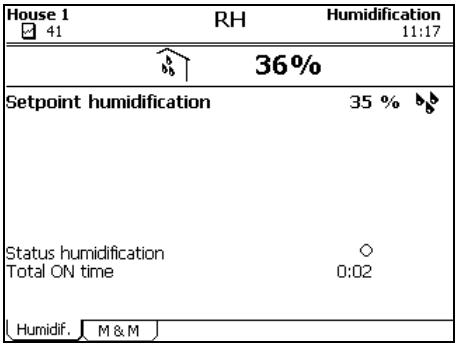
7.7 RH settings

A lower and upper limit for house RH can be set. If the air is too dry, the computer can activate extra humidification. If the RH is too high, the computer can lower RH using extra ventilation or heating.

7.7.1 Humidification

A too low RH can be raised using with extra humidity, for example nozzles.

Overview → → → → tab page *Humidif.*



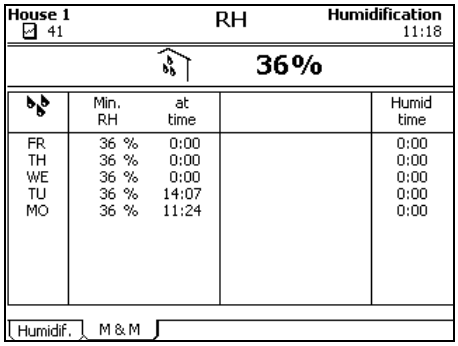
Setpoint humidification Setting of the RH below which humidification must be activated.

Status humidification Readout of the actual humidification status, on (◉) or off (○).

Total ON time Readout of the total time that the control was on.

The computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → → tab page *M & M*



Min. RH Readout of the minimum measured RH.

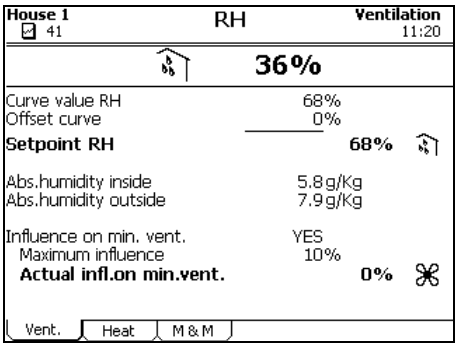
At time Readout of the time the minimum was reached.

Humid time Readout of the total on-time of the humidifier.

7.7.2 Dehumidification

A too high RH can be lowered using extra ventilation or heating.

Overview → → → tab page *Vent.*



Curve value RH — Readout of the setpoint RH if the curve is used.

Offset curve — Readout of the offset between the curve value and the setpoint value.

Control value RH — Setting of the control value RH. If the curve is not used this is the setpoint for RH in the house. If the curve is used you can adjust this value manually. The *Curve correction* will then be the difference between the manually adjusted *Setpoint* and the *Curve value*.

Abs.humidity inside — Readout of the measured absolute humidity inside (g/kg).

Abs.humidity outside — Readout of the measured absolute humidity outside (g/kg).

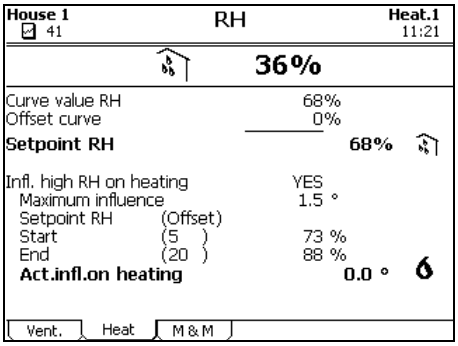
Influence on min. vent. — Setting if relative humidity may influence the minimum ventilation level.

Maximum influence — Readout of the maximum influence.

Actual infl.on min.vent. — Readout of the actual influence.

See: Influence high RH on minimum ventilation ("High RH influence on minimum ventilation" page 58).

Overview → → → tab page *Heat*



Curve value RH — Readout of the setpoint RH if the curve is used.

Offset curve — Readout of the offset between the curve value and the setpoint value.

Setpoint RH — Setting of the control value RH. If the curve is not used this is the setpoint for RH in the house. If the curve is used you can adjust this value manually. The *Curve correction* will then be the difference between the manually adjusted *Setpoint* and the *Curve value*.

Infl. high RH on heating — Setting to indicate if the influence will be used.

- *NO*
- *YES*: Control RH using heating.
- *YES+*: First try to control RH by increasing minimum ventilation. If this has no effect, the computer will use extra heating. If the outside air is not dry enough, the computer will use extra heating immediately.

Maximum influence — Readout of the maximum influence.

Setpoint RH (Offset) Readout of the RH path in which the setpoint heating can increase to the *Maximum influence*.

Start Setting of the starting point as an offset compared to the control value RH (between brackets). Followed by the readout of the RH from which the influence will start.

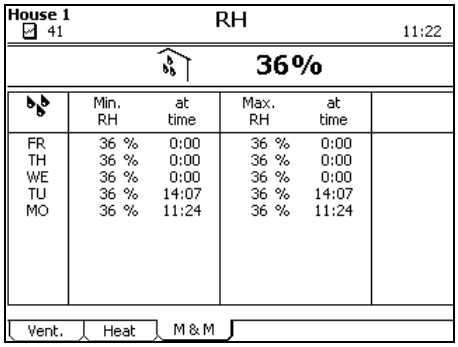
End Setting of the end point as an offset compared to the control value RH (between brackets). Followed by the readout of the RH at which the influence will be at maximum.

Act.infl.on heating Readout of the actual influence.

See: Influence high RH on heating page 59.

The control computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → tab page *M & M*



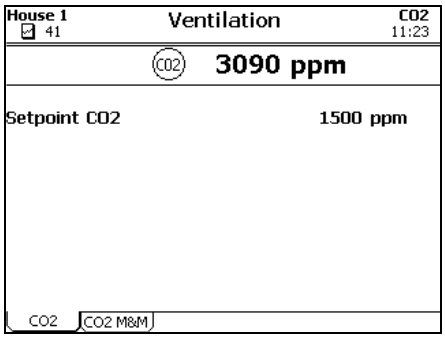
Min./Max. RH Readout of the minimum and maximum RH.

At time Readout of the times the minimum and maximum were reached.

7.8 CO2 settings

The control computer can measure the concentrations of CO_2. If the concentration of CO_2 in the house is too high, the control computer can increase minimum ventilation to disperse the excess. This influence starts to apply when the CO_2 concentration in the house is higher than the *Setpoint CO2*.

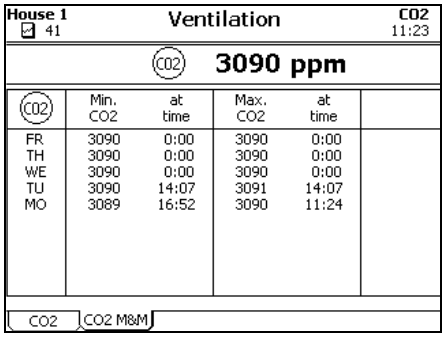
Overview → → → tab page *CO2*



Setpoint CO2 Setting of the concentration level above which ventilation must be activated.

The control computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → tab page *CO2 M&M*



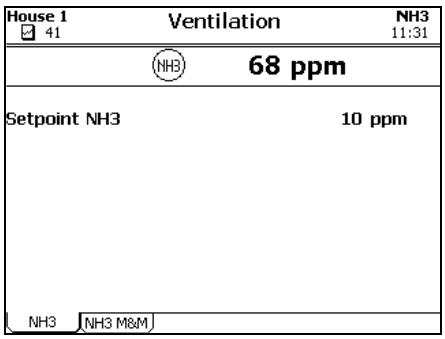
Min./Max. CO2 Readout of the minimum or maximum measured concentration.

At time Readout of the times the minimum and maximum were reached.

7.9 NH3 settings

The control computer can measure the concentrations of NH_3. If the concentration of NH_3 in the house is too high, the control computer can increase minimum ventilation to disperse the excess. This influence starts to apply when the NH_3 concentration in the house is higher than the *Setpoint NH3*.

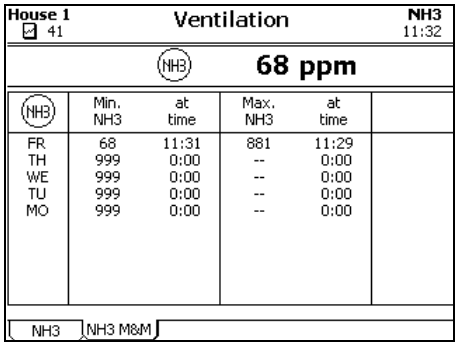
Overview → → → tab page *NH3*



Setpoint NH3 Setting of the concentration level above which ventilation must be activated.

The control computer shows certain historical data on tab pages *M&M* (Management & Monitoring). The control computer updates the overviews every day. The most recent data appears at the top.

Overview → → → tab page *NH3 M&M*



Min./Max. NH3 Readout of the minimum or maximum measured concentration.

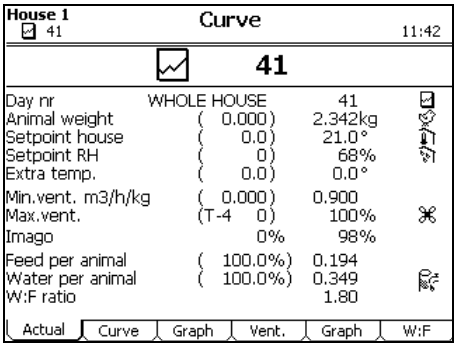
At time Readout of the times the minimum and maximum were reached.

7.10 Actual data

The tab page *Actual* contains the actual setpoints originating from the curve. These values can be changed. If the curve is not used, enter these values manually.

If the curve is used, the control computer shows two columns with figures. The column on the right shows actual setpoints. The column on the left shows the offsets on the setpoints calculated by the control computer based on the curve between brackets. All offsets remain valid until they are changed. When all the animals have been delivered, the control computer will set all offsets to 0.

Overview → → → → tab page *Actual*



Day nr
Readout of the actual day number. The control computer increases the day number by 1 each night at 00:01hrs.

The control computer uses day number 0 to control based on empty settings. A negative day number can be used to reach a certain house climate before a new group of animals is set up.

Animal weight
Readout of animal weight. If the curve is used, the control computer determines the setpoint based on the animal weight.

Setpoint house
Setting of the required house temperature. This is always between the Control value heating and the Start temperature ventilation.

Setpoint RH
Readout of the setpoint RH. This value can be changed.

Extra temp.
Readout of the extra temperature. This setpoint can be used to determine the control value per cooling or heating unit. This depends on your settings.

Min.vent. m3/h/kg
Readout of the *Minimum ventilation norm*. If the curve is not used, set this value manually. The control computer then calculates the *Minimum ventilation position* based on the manually entered *Norm actual.* The control computer shows the norm as *m3/h/animal* or as a percentage, irrespective of the number of animals (depending on the installation settings).

Max.vent.
Readout of the maximum percentage ventilation.

Imago
Readout of the percentage of ventilation with Imago.

Feed per animal
Setting of the required feed amount per animal. (Based on the entered value, the control computer will calculate the difference from the feed curve as a percentage. This difference will be used for all the following days. The current difference in percentages is shown between brackets.)

Water per animal
Setting of the required water amount per animal. (Based on the entered value, the control computer will calculate the difference from the water curve as a percentage. This difference will be used for all the following days. The current difference in percentages is shown between brackets.)

W:F ratio
Readout of the required water/feed ratio.

8. Optimising controls using influences

Influences can be used to optimise climate management. Even without these influences, the control computer will control the climate **well**.

Determine per influence if it applies or not. If an influence is active, extra codes will usually appear. These are used to indicate how an influence is used. The relevant codes appear at the end of the section explaining the influence.

The influences are classified according to the cause, such as a too high or too low RH, low or high outside temperature etc. If a certain condition arises, you can see immediately which influences you can set in the control computer.

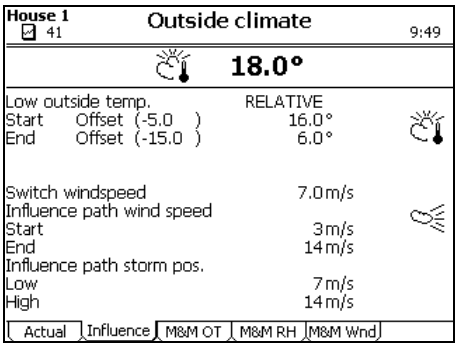
			Influence of								
			Temp. Outside (p. 50)	Temp Difference (p. 55)	Wind (p. 56)	Storm (p. 56)	RH (p. 58)	Cooling (p. 60)	Pressure (p. 60)	CO_2/NH_3 (p. 61)	Night correction (p. 61)
On control	Temp.	Ventilation	✓								✓
		Heating					✓				✓
		Cooling					✓				
	Exhaust	Minimum vent.	✓				✓			✓	✓
		Bandwidth	✓								
		Maximum vent.						✓			
		M/MT-part			✓	✓					
		Vortex damper				✓					
	Inlet	Inlet	✓	✓	✓	✓			✓		
		Tunnel inlet	✓		✓	✓			✓		
		Pressure	✓								

8.1 Influences outside temperature

8.1.1 Settings for outside climate

Request an overview of the actual outside climate using  .

Overview →  → tab page *Influence*



Low outside temp.	Setting, if the **low** outside temperature influence is to apply in relation to *setpoint house* (*RELATIVE*) or to a fixed temperature (*ABSOLUTE*). An absolute range is always the same. It does not depend on *Start temp. Ventilation*. The relative range does depend on *Start temp. ventilation*.
Start Offset	Setting of the starting point as an offset compared to the *Control value house* (between brackets). Followed by the readout of the outside temperature from which the influence will start.
End Offset	Setting of the end point as an offset compared to the *Control value house* (between brackets). Followed by the readout of the outside temperature at which the influence will be at maximum.
*Decr.high OT infl.**	Setting if the **high** outside temperature influence should decrease within a certain amount of time (*DURATION*), or if the decrease should be completed at a certain defined time (*ENDTIME*). If the outside temperature is lower than the start temperature ventilation, a high outside temperature will no longer influence the bandwidth after the set time.
Switch windspeed	Readout of the switch wind speed. If the wind speed exceeds this value, a relay, if assigned, will be activated.
Influence path wind speed	Setting of the lower limit (*Start*), above which the wind influence applies. Setting of the upper limit (*End*), above which the wind influence is maximum.
Influence path storm pos.	Setting of the lower limit (*Low*), above which the wind influence applies. Setting of the upper limit (*High*), above which the wind influence is maximum.

8.1.2 Influence high outside temperature on bandwidth ventilation

On a warm summer day ventilation is at maximum. At night or after a thunder storm the outside air often cools down rapidly. This can result in too much cold air entering the house causing the house temperature to drop. Avoid this kind of situations using the *Influence high outside temp.*

By setting this influence, the bandwidth will become larger as the temperature rises. When the house temperature drops, the control computer will immediately start controlling on a lower ventilation percentage. When the outside temperature drops below *Start temperature ventilation*, the bandwidth will decrease back to its original value.

Example: Influence high outside temperature on bandwidth ventilation

Start temp.ventilation (STV): 20°

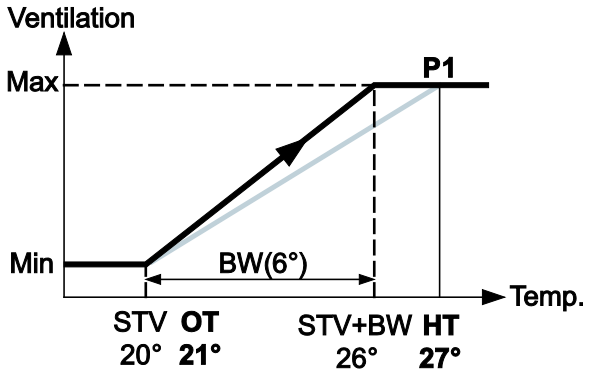
Outside temperature (OT): 21°

House temperature (HT): 27°

Set bandwidth (BW): 6°

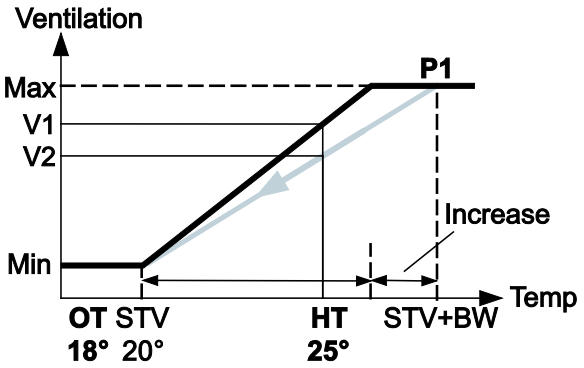
The control computer will **increase** the bandwidth, as long as the house temperature is too high (higher than STV+BW) and the outside temperature is higher than *Start temp. ventilation*. When increased the ventilation always stays maximum.

As long as the outside temperature is too high, the *Calculated bandwidth* will increase and finally reach point **P1**.



If the outside temperature falls (greatly) the cold air will also cause the house temperature to drop. The control computer will control using a lower ventilation position after point **P1** has been reached. The example shows the ventilation position at a house temperature of 25°C.

As soon as the Outside temperature drops below *Start temp. ventilation*, the control computer will decrease the bandwidth again.



Overview → → → tab page *Influence*

Influence high outside temp.	Setting to indicate if the influence will be used.
Influence factor	Setting of the factor used by the control computer to calculate the influence.
Calc.infl.high outside temp.	Readout of the actual influence.

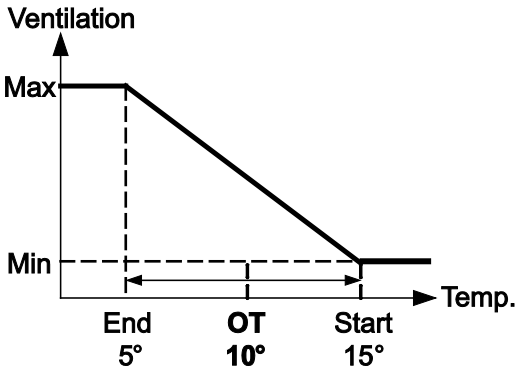
Settings to decrease the high outside temperature influence are described in: Settings for outside climate page 50.

8.1.3 Influence low outside temperature on bandwidth ventilation

If it is cold outside, the cooling effect of outside air is greater than if the outside air is warm. To prevent draughts occurring in the house, the bandwidth can be increased with very low outside temperatures. The ventilation level will then increase slower than normally.

Example: Influence low outside temperature on bandwidth ventilation

Start temp. ventilation (STV): 20°
House temperature (HT): 23°
Set Bandwidth (BW): 6°
Outside temperature (OT) 10°
Influence path low outside temperature
Start: 15°
End: 5°
Influence factor: 2.0



The settings low outside temperature *Start*, low outside temperature *End* and *Influence factor* determine the bandwidth increase. The control computer calculates a *Bandwidth* from these three settings. The *Bandwidth* increase is as follows:

With an outside temperature of 5° or lower the influence is at **maximum**. This means a *Bandwidth* of 2.0 × 6° = 12°.

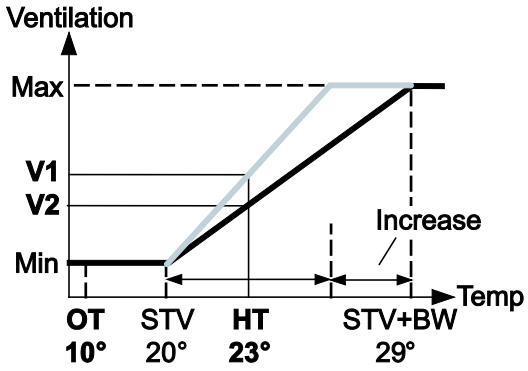
At an outside temperature of 15° or higher there is no influence. This means a *Bandwidth* of 1.0 × 6° = 6°.

In this example the outside temperature is 10°. This temperature is halfway between low outside temperature *Start* and low outside temperature *End*.

The control computer calculates a *bandwidth* of 1.5 × 6° = 9°.

For a house temperature of 23° the control computer now calculates a ventilation percentage of **V2**.

This ventilation percentage is **lower** than the original ventilation percentage **V1**.



Overview → → → tab page *Influence*

Influence low outside temp.	Setting to indicate if the influence will be used.
Influence factor	Setting of the factor used by the control computer to calculate the influence.
Calc.infl.low outside temp.	Readout of the actual influence.

Settings for the path this influence applies to are described in: Settings for outside climate page 50.

8.1.4 Influence low outside temperature on pressure or inlet position

Prevent a cold drop by increasing the air speed through the air inlet. Use one of the following influences:

- Low outside temperature influence on setpoint pressure
  The pressure influence applies when pressure measurement is used and the required pressure has been set to a value higher than 0 Pa.
- Low outside temperature influence on setpoint air inlets
  If there is no pressure measurement a low outside temperature influence can be set to 'squeeze' the inlets during cold weather.

Low outside temperature influence on setpoint pressure

The computer increases *Control value pressure* with a too low outside temperature.

Example: Low outside temperature influence on setpoint pressure

Setpoint pressure: 15 Pa

Influence path low outside temperature

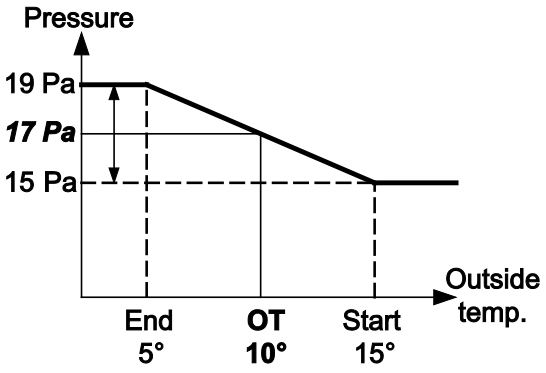
Start: 15°C

End: 5°C

Maximum influence: 4 Pa

Actual outside temperature (OT): 10°C

The maximum influence on *Setpoint pressure* is 4 Pa. This means the under pressure can rise to 19 Pa. The actual outside temperature is 10°C, precisely midway in the influence path. The *Control value pressure* is 15 Pa + 2 Pa = 17 Pa.



Overview → → →

Infl.low outs.temp.on press.	Setting to indicate if the influence will be used.
Maximum influence	Readout of the maximum influence.
Act. outside temp. infl.	Readout of the actual influence.

See also: Total influence on air inlets page 62.

See for the path to which this influence applies: Settings for outside climate page 50.

Low outside temperature influence on setpoint air inlets

The control computer lowers the *Control value air inlets* with a low outside temperature. This description applies to both the inlet and the extra inlet.

Example: Influence low outside temperature on air/extra inlet

Setpoint air inlet / *extra inlet*: 50%

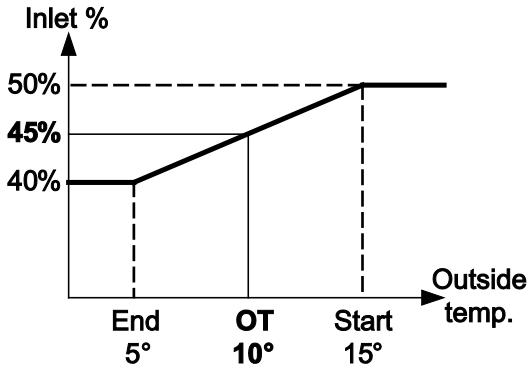
Influence path low outside temperature

*Start:*15°C

End: 5°C

Factor influence: 0.8

Actual outside temperature (OT): 10°C



The factor influence is 0.8. The *Control value air / extra inlet* can therefore be lowered to 0.8 × 50% = 40%. The actual outside temperature is 10°C, precisely midway in the influence path. The *control value air*/*extra inlet* is then 45%.

Overview → → → tab page *Influence* (Inlet)

Temp.diff.infl.on air inlet	Setting, if the measured temperature difference may correct the mutual positions of air inlets. See: Influence temperature difference on air inlets page 55 and Total influence on air inlets page 62.
Actual temp. diff. infl.	Readout of the actual influence.
Pressure infl. on air inlet	Setting, if the measured pressure may influence the inlet position. This influence can only be used if a pressure control is used.
Wind/storm infl.on air inlet	Setting, if wind and/or storm may influence the inlet position.

See also: Total influence on air inlets page 62.

Settings for the path this influence applies to are described in: Settings for outside climate page 50.

8.1.5 Influence low outside temperature on minimum ventilation

This influence prevents a cold drop by lowering the minimum ventilation when the outside temperature is low.

Example: Influence low outside temperature on minimum ventilation

House temperature (HT): 23°C

Setpoint minimum ventilation: 30%

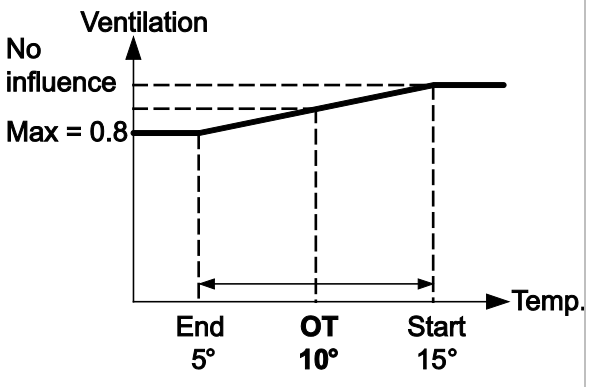
Outside temperature (OT) 10°C

Influence path low outside temperature:

Start: 15°C

End: 5°C

Influence factor: 0.8



The settings low outside temperature *Start*, low outside temperature *End* and *Influence factor* determine the minimum ventilation setpoint decrease. The control computer calculates a new *Setpoint minimum ventilation* from these settings. The new setpoint is calculated as follows:

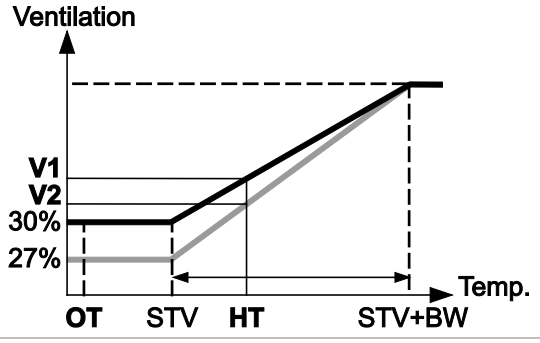
- With an outside temperature of 5°C or lower the influence is **maximum**. This means a new setpoint of 0.8 × 30% = 24%.
- At an outside temperature of 15°C or higher there is no influence. This means a *Setpoint minimum ventilation* of 1.0 × 30%= 30%.

In this example the outside temperature is 10°C. This temperature is halfway between low outside temperature *Start* and low outside temperature *End*.

The control computer calculates a *Setpoint minimum ventilation* of 0.9 × 30% = 27%.

For a House temperature of 23°C the control computer now calculates a ventilation percentage of **V2**.

This ventilation percentage is **lower** than the original ventilation percentage **V1**.



Overview → → → tab page *Influence*

Influence low outside temp.	Setting, if a measured low outside temperature may influence *Setpoint minimum vent*.
Influence factor	Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.
Actual influence	Readout of the actual influence.

8.2 Influence temperature difference on air inlets

If more than one air inlet is used and there is a temperature difference in the house, the temperature difference influence can be used.

This influence ensures that the control computer adjusts the air inlets **independently** in order to minimise the temperature differences. The average position of the air inlets remains the same.

Example: Influence temperature difference on air inlet

Setpoint air inlet: 30%

Temperature air inlet 1: 24°C

Temperature air inlet 2: 26°C

Factor influence: 0.2

The average air inlet temperature is 25°. The difference between the average air temperature and the temperature of air inlet 1and air inlet 2 is 1°C.

The control computer calculates the following influence:

Factor influence x Temperature difference x *Setpoint air inlet* = 0.2 x 1 x 30 = 6%.

Temperature air inlet 1 is too low (too cold). The control computer will try to correct this by **decreasing** the actual output of the air inlet 1 by 6%.

Temperature air inlet 2 is too high (too warm). The control computer will try to correct this by **increasing** the actual output of air inlet 2 by 6%.

Overview → → → tab page *Influence* (Inlet)

Temp.diff.infl.on air inlet	Setting to indicate if the influence will be used.
Factor influence	Setting of the factor used by the control computer to calculate the maximum influence during natural ventilation.
Actual temp. diff. infl.	Readout of the actual influence.

Temperature differences in the house can also be minimised using the air inlets of the natural ventilation.

See also: Total influence on air inlets page 62.

8.3 Influences wind and storm

Wind direction, wind speed and storm can influence the *Setpoint controllable part*, *vortex damper* and *air inlets*. These influences can be limited by *influence factors*.

8.3.1 Influence path wind and storm

Use these settings to set when wind and storm influences apply. These settings apply to all wind and storm influences.

Overview → → tab page *Influence*

Influence path wind speed	Setting of the lower limit (*Start*), above which the wind influence applies. Setting of the upper limit (*End*), above which the wind influence is maximum.
Influence path storm pos.	Setting of the lower limit (*Low*), above which the wind influence applies. Setting of the upper limit (*High*), above which the wind influence is maximum.

The lower limit (*Low*) will be increased with high outside temperatures (higher than Setpoint house). This is automatically determined by the control computer.

8.3.2 Influence wind

Depending on the wind speed and direction the control computer can influence the controllable ventilation and the air inlets. The working of this influence depends on the wind direction. The control computer uses this to determine if the fans or inlets are on the wind or lee side. The fans and air inlets can be increased and decreased. This description applies to the controllable part, air inlets and extra inlet, but these can be set separately.

Example: Influence wind on air inlets

Setpoint air inlet / *extra inlet*: 30%

Influence path wind speed:

Start: 3m/s

End: 12m/s

Factor influence wind side: 0.5

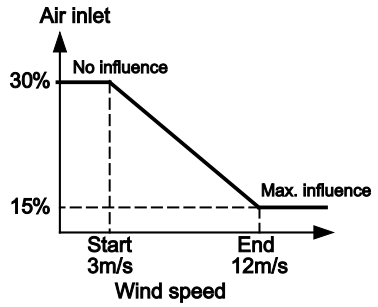
Factor influence lee side: 1.3

If wind speed equals or is lower than 3m/s, the *Control value air/extra inlet* equals the *Setpoint air/extra inlet*.

If the wind speed increases to 12m/s, the control computer will decrease (linearly) the **Control value air/extra inlet** for the defined *wind side* to:

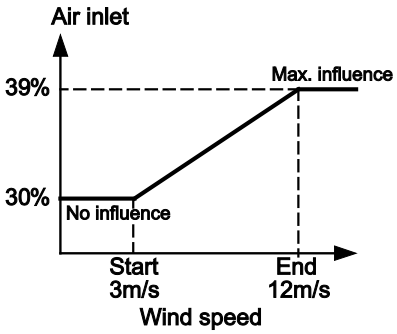
0.5 ×30% = 15%.

With wind speeds **higher** than 12m/s the *Control value air/extra inlet* is 15%.



With wind speeds between 3 and 12m/s the control computer will increase the **Control value air/extra inlet** for the defined *Lee side* of the house to: 1.3 × 30% = 39%.

With wind speeds **higher** than 12m/s the *Control value air/extra inlet* remains 39%.



Overview → → → tab page *Influence* (Inlet)

Wind/storm infl.on air inlet	Setting to indicate if the influence will be used.
Actual wind influence	Readout of the actual influence.

Overview → → → tab page *Influence* (Tunnel)

Pressure infl. on air inlet	Setting to indicate if the influence will be used.
Wind/storm infl.on air inlet	Setting to indicate if the influence will be used.

A wind influence can also apply to the controllable part in the same way.

Use this influence as follows:

- If the fans are on the lee side of the house, the *Control value M/MT-part* will decrease. The *Factor influence wind side* must be **less** than 1.
- If the fans are on the wind side of the house, the *Control value M/MT-part* will increase. The *Factor influence wind side* must be **higher** than 1.

Overview → → → tab page *Influence* (M/MT-Part)

Wind-/storm infl.M/MT-part	Setting to indicate if the influence will be used.
Factor influence wind side	Setting of the factor used to decrease the *Control value control part* on the wind side.
Factor influence lee side	Setting of the factor used to increase the *Control value control part* on the lee side.
Actual wind influence	Readout of the actual influence.

8.3.3 Influence storm

For extremely high winds, a maximum control value can be entered. As the wind blows harder, the maximum control value will decrease until it reaches the *Maximum storm limit*. This description applies to the controllable part, vortex damper, air inlets and extra inlets, but these can be set separately.

The actual wind direction is not important with the storm influence.

Example: Influence storm on air inlets

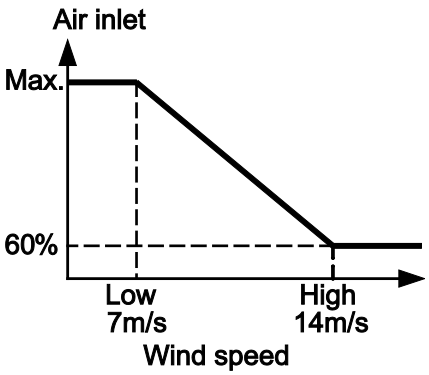
Influence path storm pos.	7m/s
Low:	14m/s
High:	60%
Maximum storm limit:	

If wind speed equals or is lower than 7m/s, the *Control value air/extra inlet* equals the *Setpoint air/extra inlet*.

If wind speed increases to 14 m/s, the control computer will decrease (linearly) the *Control value air/extra inlet* to 60%.

With wind speeds **higher** than 14m/s the *Control value air/extra inlet* remains 60%.

If the actual air/extra inlet position is smaller than the set *Maximum storm limit*, this influence will not apply.



Overview → → → tab page *Influence* (Inlet)

Wind/storm infl.on air inlet	Setting to indicate if the influence will be used.

Overview → → → tab page *Influence* (M/MT-Part)

Wind-/storm infl.M/MT-part	Setting to indicate if the influence will be used.
Max.storm limit M/MT-part	Setting of the maximum *Control value* during a storm.
Actual storm limit	Readout of the actual storm limit (maximum control value).

The *Setpoint vortex damper* is linked to the *Control value M/MT-part.* Any wind influence on the controllable part is calculated to the vortex damper control via a factor.

Overview → → → tab page *Vortex*

Maximum storm limit vortex	Setting of the maximum *Control value* during a storm.

8.4 Influences RH

8.4.1 High RH influence on minimum ventilation

If house relative humidity is too high, the control computer can increase minimum ventilation to disperse the excess moisture. This extra minimum ventilation is only possible if the outside air is dry enough. For this reason the control computer determines the absolute humidity content of the inside and outside air. This influence starts to apply when house RH is higher than the *Control value RH*.

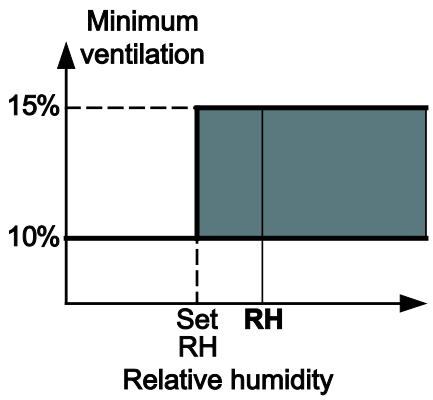
The control computer increases the minimum ventilation level by 1%, and checks if the RH decreases. If this is not the case, it increases the minimum ventilation again by 1%. This process continues until the house RH starts to drop.

Example: High RH influence on minimum ventilation

Setpoint minimum ventilation: 10%

Maximum influence: 5%

Minimum ventilation actual (control value) can increase to maximum 15%.



Overview → → → tab page *Vent.*

Influence on min. vent.	Setting to indicate if the influence will be used.
Maximum influence	Readout of the maximum influence.

Overview → → → tab page *Influence* (Maximum)

Maximum factor on min.vent.	Setting of the factor used to limit the total of all influences on minimum ventilation.

8.4.2 Influence high RH on heating

When humidity in the house increases, the control computer can increase the *Control value* heating.

The increase of *Control value* heating will take place within a certain period of time. This period is determined by the settings *Start* and *End.* During this period the heating temperature increases linearly. So, the higher the RH, the higher the increase of *Setpoint* heating.

Example: High RH influence on heating

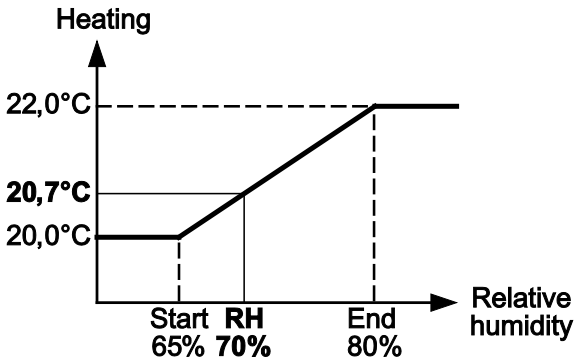
Setpoint heating: 20.0°C

Actual RH: 70%

Start: 65%

End: 80%

Maximum influence: 2.0°C



The measured relative humidity in the house is 70%. This is 1/3 of the way between *Start – End*. The control computer calculates an influence of: 2.0 / 3 = 0.7°C.

Control value heating will be: 20.0 + 0.7 = 20.7°C. The control value can never become higher than 20.0 + 2.0 = 22.0°C.

Overview → → → tab page *Heat*

Infl. high RH on heating — Setting to indicate if the influence will be used.

- *NO*
- *YES*: Control RH using heating.
- *YES+*: First try to control RH by increasing minimum ventilation. If this has no effect, the computer will use extra heating. If the outside air is not dry enough, the computer will use extra heating immediately.

Maximum influence — Readout of the maximum influence.

Setpoint RH (offset) Start … End — RH path within which heating may increase. This is the offset compared to the control value.

Act.infl.on heating — Readout of the actual influence.

8.4.3 Influence high RH on cooling

Evaporative cooling can increase the RH in the house. To ensure that the RH does not become too high, enter a *Max. RH evaporative cooling*. If the RH in the house exceeds the set value, the cooling deactivates.

Overview → → → tab page *Limit*

RH limit evaporat.cool. — Setting to indicate if the influence will be used.

Max.RH evaporative cool. — Setting of the RH above which cooling must be deactivated.

8.5 Influence cooling on maximum ventilation

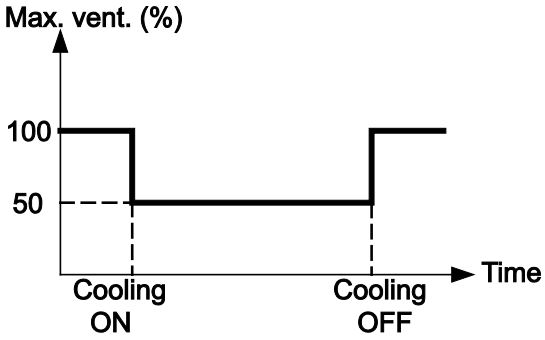
If the temperature rises so much it cannot be controlled with maximum ventilation, a cooling system can be activated. If cooling is active it has no sense at all maintaining the maximum ventilation. All this does is cool the outside air.

Example: Influence cooling on maximum ventilation

Maximum ventilation: 100%

Maximum ventilation while cooling: 50%

If cooling is active, the control computer will decrease the maximum ventilation level to 50%.



If cooling has been set as modulating cooling and is active, maximum ventilation will equal maximum ventilation during cooling, even if modulating means cooling is briefly not active.

Overview → → → tab page *Influence* (Maximum)

Max.vent.limited by cool.	Setting to indicate if the influence will be used.
Max. vent. while cooling	Setting of the maximum ventilation level while cooling.

8.6 Influence pressure on air inlets

If pressure in the house is too low, the control computer will close the air/extra inlet further to raise the pressure in the house. However, if pressure becomes too high, the control computer will open the air/extra inlet further to lower the pressure in the house.

To prevent the inlet opening or closing too far, a limit can be set using two influence factors: *Factor influence (-)* and *Factor influence (+)*.

Example: Influence pressure on air inlet

Measured pressure: 5Pa

Setpoint air inlet / extra inlet: 30%

Factor influence (-): 0.8

Factor influence (+): 1.3

The control computer calculates a *Control value air inlet* of: 0.8 × 30% = 24%. With **too little under pressure** the *Control value* will not be lower than 24%.

The control computer calculates a limit *Control value air inlet* of: 1.3 × 30% = 39%. With **too high under pressure** the *Setpoint* will not be higher than 39%.

Overview → → → tab page *Influence* (Inlet)

Pressure infl. on air inlet	Setting, if the measured pressure may influence the inlet position. This influence can only be used if a pressure control is used.
Factor influence(-)	Setting of the factor used to calculate the lowest possible inlet position.
Factor influence(+)	Setting of the factor used to calculate the highest possible inlet position.
Actual pressure infl.	Readout of the actual influence.

8.7 Influences of CO2 or NH3

The control computer can measure the concentrations of CO_2 or NH_3. If the concentration of CO_2 or NH_3 in the house is too high, the control computer can increase minimum ventilation to disperse the excess. This influence starts to apply when the CO_2 or NH_3 concentration in the house is higher than *Control value*.

The control computer increases the minimum ventilation level by 1%, and checks if the concentration of CO_2 or NH_3 has started to fall. If this is not the case, it increases the minimum ventilation again by 1%. The control computer continues this process until the concentration in the house falls.

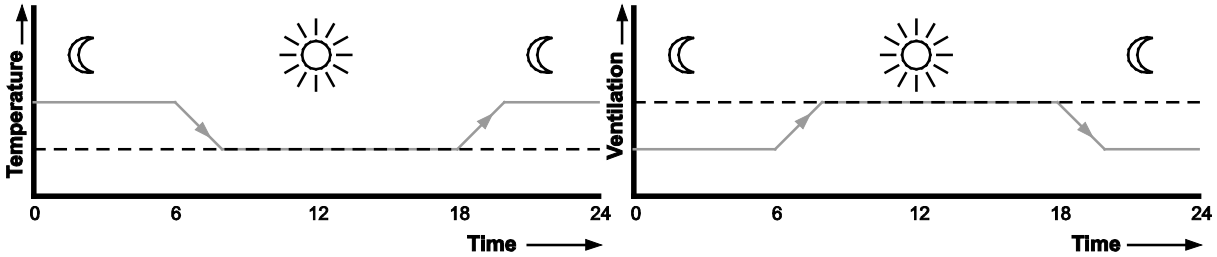
Overview → → → tab page *Influence* (Maximum)

Maximum factor for min.vent.	Setting of the factor used to limit the total of all influences on minimum ventilation.
Inf.high CO2/NH3 on min.vent.	Setting to indicate if the influence will be used.
Maximum influence	Setting of the maximum extra minimum ventilation by CO_2/NH_3 influence.

8.8 Influences night correction

Animals usually rest at night and therefore produce less heat and gasses in this period. To maintain a comfortable climate in the house, the minimum ventilation and the setpoint house temperature can be automatically adjusted.

Night correction can influence the minimum ventilation level and the setpoint house temperature depending on the period of the day. The period is determined by a light clock which has been set with the required times and linked to this function. If necessary, the transitional period from day to night and vice versa can also be set using the dim settings of the light clock.



When night correction is active, the control computer adjusts the setpoints of the house temperature and the minimum ventilation accordingly. If the light level of the linked light clock gradually increases or decreases, these setpoints are adjusted accordingly.

8.8.1 Influence night correction on minimum ventilation

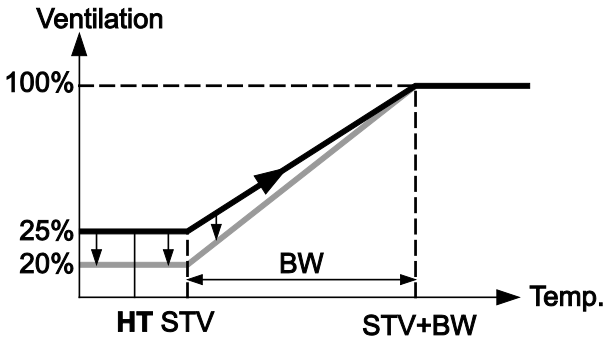
Example: Influence night correction on minimum ventilation

Minimum ventilation: 25%

Max night influence: 5%

At night, the control computer adjusts the minimum ventilation setpoint to 25% – 5% = 20%.

If the linked light clock gradually dims, the ventilation will be adjusted at the same rate.



Overview → → → tab page *Influence*

Max night influence	Setting of the maximum influence on ventilation during night correction. If the light level gradually increases or decreases, the influence will also be applied gradually.
Actual influence	Readout of the actual night correction influence.

8.8.2 Influence night correction on setpoint house temperature

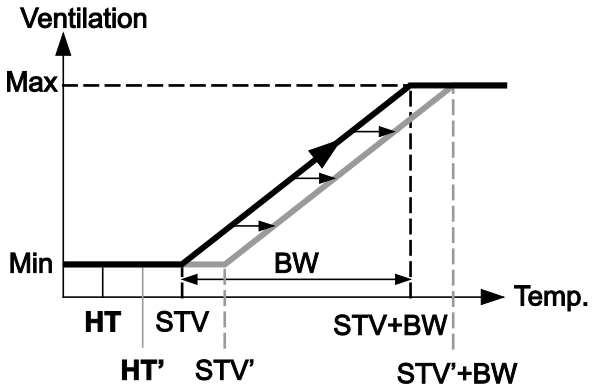
Example: Influence night correction on set point house temperature

Setpoint house temperature (HT): 19°

Max night influence: 1°

At night, the control computer adjusts the house temperature setpoint to 19° + 1° = 20°.

If the linked light clock gradually dims, the temperature will be adjusted at the same rate.



Overview → → → tab page *Influence*

Max night influence	Setting of the maximum influence on temperature during night correction. If the light level gradually increases or decreases, the influence will also be applied gradually.
Actual influence	Readout of the actual night correction influence.

8.9 Total influence on air inlets

Total influence is the sum of all influences. The control computer can limit this total influence with a *Minimum factor* and a *Maximum factor*.

Example: Total influence on air inlet

Setpoint air inlet: 30%

Abs. minimum factor air inlet: 0.5

Abs. maximum factor air inlet: 1.5

The control computer calculates a minimum limit of 0.5 × 30% = 15% and a maximum limit of 1.5 × 30% = 45%. The control computer calculates the following influences:

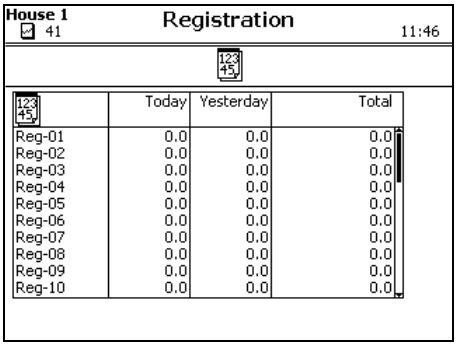
- Influence temperature difference: 5%
- Influence pressure: 5%
- Influence wind: 7%

The total influence is 17%. The *Control value air inlet* will then be: 30% (*Setpoint air inlet*) + 17% (*Total influence*) = 47%. However, the control computer will *limit* the actual **Control value air inlet** to 45%.

9. Registration

The control computer has a number of registration inputs. For example, to register water consumption.
The use of the registration inputs has been set in the installation menu (*HOUSE SETUP*).

Overview → ☑ → 123 45



10. Curves

10.1 Settings for temperature, RH and weight

Enter the data for each bending point of the curve. You can use a weekly pattern, for example, by entering the data for day 1, 8, 15, etc.

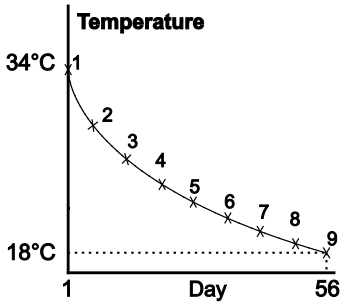
The lifecycle of the animals is indicated by the weight per animal. Enter in the curve the animal weight which is used as the basis for the ventilation curve.

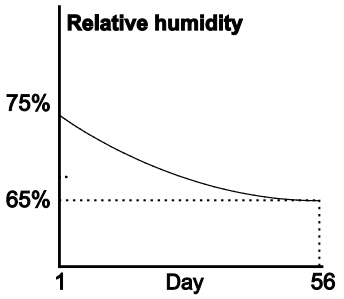
The computer calculates the intermediate setpoints so that the change in climate is gradual.

The curve is only used if the day number is higher than 0.

Example: Curve

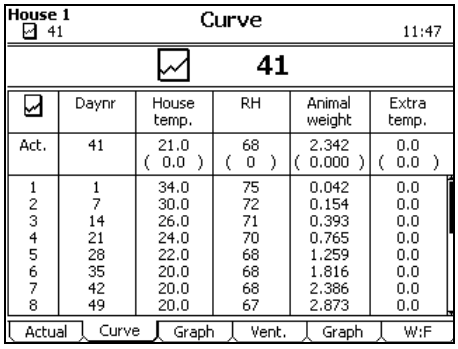
Bending point	Day no.	Temp (°C)	RH (%)	Weight (kg)
1	1	34.0	75	0.042
2	7	28.0	72	0.154
3	14	26.0	71	0.393
4	21	24.0	70	0.765
5	28	22.0	68	1.200
6	35	21.0	68	1.816
7	42	20.0	68	2.386
8	49	19.0	67	2.873
9	56	18.0	65	3.308





The bending points of the curves can be entered in the screen below.

Overview → ☑ → ☑ → tab page *Curve*

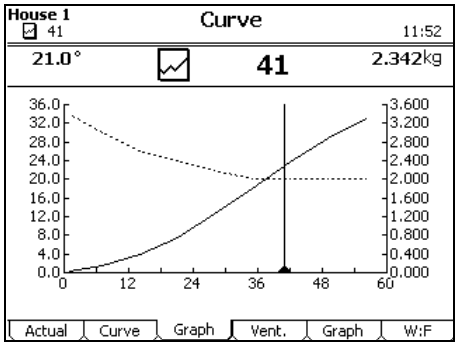


Enter the bending points of the curve as follows:

1. Enter the day and required data per bending point.
2. If the final lines are unused, do not enter any data. After the last bending point the control computer will use these values as reference.

A graphical presentation of the curves is shown in the screen below.

Overview → ☑ → ☑ → tab page *Graph* (Curve)



10.2 Settings for minimum and maximum ventilation

Ventilation in m³/h/animal

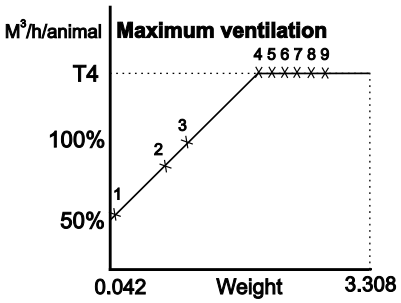
Your installer sets whether minimum ventilation is based on m³/h/animal or on a percentage (%). The maximum ventilation position is always shown as a '%'.

Selecting m³/h/animal offers the following advantages:

- The minimum and maximum ventilation are related to animal weight. This means that if the animal weight is adjusted, the control computer will recalculate the minimum and maximum ventilation positions based on the curve.
- The minimum ventilation is automatically corrected by the number of animals present.

Example: Ventilation in m³/h/animal

Bending point	Weight (kg)	Ventilation	
		Min. m3/h/animal	Max. (%)
1	0.042	1.00	50
2	0.154	0.96	80
3	0.393	0.93	100
4	0.765	0.89	100
5	1.200	0.85	T1
6	1.816	0.81	T2
7	2.386	0.78	T3
8	2.873	0.74	T4
9	3.308	0.70	T4

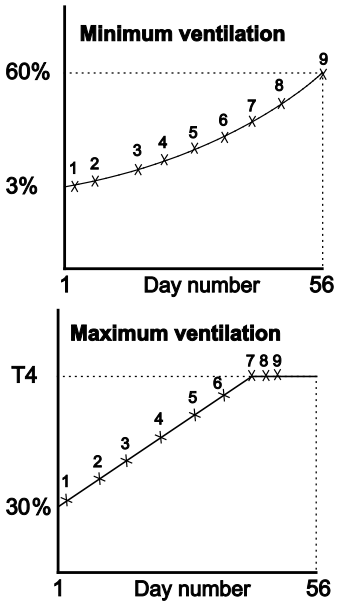


Ventilation in percentages (%)

With settings based on percentages the minimum and maximum ventilation are entered as a '%' compared to the maximum installed capacity (100%). Minimum and maximum ventilation are entered per day number in the curve. In this situation, ventilation is not based on animal weight but on age.

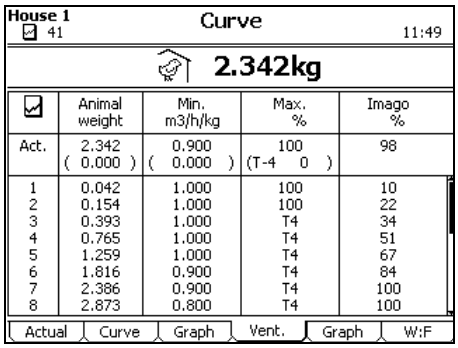
Example: Curve in %

Bending point	Weight (kg)	Ventilation	
		Min. (%)	Max. (%)
1	0.042	3	30
2	0.154	7	40
3	0.393	15	50
4	0.765	20	60
5	1.200	25	70
6	1.816	32	80
7	2.386	40	100
8	2.873	49	100
9	3.308	60	100



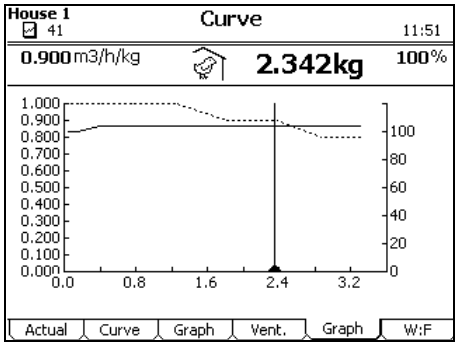
The bending points of the minimum and maximum ventilation curves can be entered in the screen below.

Overview → ☑ → ☑ → tab page *Vent.*



A graphical presentation of the curves is shown in the screen below.

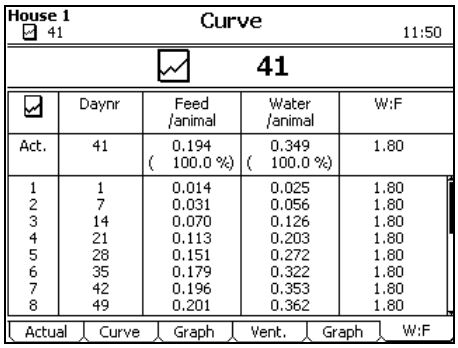
Oveview → ☑ → ☑ → tab page *Graph* (Vent.)



10.3 Settings for water-feed ratio

The bending points of the curve for the water-feed ratio can be entered in the screen below.

Overview → ☑ → ☑ → tab page *W:F*



10.4 Climate management at the start of the lifecycle

10.4.1 Empty settings

The empty settings are the settings that apply on day number 0. On day number 0 the control computer only uses manual settings and not the curve. When the house is empty you probably only use minimum climate settings, for example only the heating.

When all the animals have been delivered, the control computer sets the day number to 0 and controls according to the empty settings. The control computer also sets all offsets to 0.

Entering empty settings:

1. *Overview* → ☑
2. Change the *Day nr* into 0.

   The control computer automatically starts controlling according to the old empty settings. These values are saved in the control computer.
3. Return to *Overview* and check the settings. Change as necessary.

See also: Set up animals ("Set up flock" page 28).

10.4.2 The correct climate before setting up animals

As soon as the animals have been set up, the climate can be controlled based on the curve ("Curves" page 64).

The climate can also be set manually. Control is not (yet) curve based.

This process can also be started earlier, for example if you want the house to reach a certain temperature before the animals arrive. Do this by:

- Changing the empty settings

  Use day number 0, and adjust the climate settings manually.
- Activate climate management according to the curve earlier

  Enter a negative day number. The control computer will continue to control the climate based on the empty settings. The control computer increases the day number by 1 each day, and skips day number 0. After a few days the control computer reaches day number 1, and will start controlling the climate based on the curve.

Example: Start using curve at midnight

On Thursday enter *Day number* –4. The control computer increases this number by 1 every day at midnight.

Th	Fr	Sa	Su	Mo
–4	–3	–2	–1	1

On Monday at 00:01 the day number has value 1, and the control computer will start controlling the climate based on the curve.

11. Alarm

Request the alarm overview using the alarm key .

There are three tab pages under the alarm key:

1. *Overview* to readout the status.
2. *Settings* to change the alarm settings.
3. *History* to readout the last 20 alarm messages.

Types of alarm

There are two types of alarm:

1. *LOUD*: A loud alarm means a report is shown on the screen and a siren is sounded (if connected). Take action immediately.
2. *SILENT*: With a silent alarm (warning), a report will appear on the screen. This type of alarm is usually less serious. An active process can be stopped, if required.

With both types an alarm message will appear on the screen.

Alarms can be set to *LOUD* or *SILENT*, if required. For nearly all the alarms the user decides the limits outside which alarms must be given.

Alarm statuses

An alarm can have the following statuses:

- *ALARM*: Active loud alarm.
- *WARNING*: Active warning (silent alarm).
- *OFF FOR ..:..*: The user has noticed the alarm; the alarm situation is still present.
- *RECOVERED*: The control computer has automatically recovered the alarm; the alarm situation is no longer present.

Alarm history

As soon as the control computer gives an alarm, the alarm is included in the alarm history. The last 20 alarms with corresponding dates and times can be readout on tab page *History*.

11.1 Dealing with alarms

11.1.1 Dealing with a LOUD alarm

If the alarm system is active and a LOUD alarm occurs, the siren will activate and the LED near the alarm key will flash red.

1. Press once on the alarm key to display the alarm message on the screen. The siren will fall silent at the same time.
2. Then press - within one minute - once more on the alarm key to change the alarm status from *ALARM* to *OFF for 00:15*. This means the alarm has been noticed, but the alarm situation is still present! For the next 15 minutes the computer will not give an alarm again for this situation. A new alarm will only be given if the alarm is briefly within, then outside the alarm limits in this 15 minute period. This time can be adjusted for alarms that require more time to be remedied.

If you do **not** press the alarm key **again** within 1 minute, the alarm will reactivate. In this case, start again at step 1 to switch off the alarm.

11.1.2 Dealing with a SILENT alarm

If the alarm system is active and a SILENT alarm occurs, the LED near the alarm key will flash green. When the alarm key has been pressed 1x the alarm screen will appear with the warning. Press alarm key 2x to remove the warning from the screen.

11.1.3 An alarm recovers

With LOUD alarms the alarm situation can be recovered after a while by the user or the control computer.

In the event of a LOUD alarm, the siren will activate first (*Alarm status = ALARM*). If the value responsible for causing the alarm comes within the alarm limits again, the situation is considered recovered and the alarm is over. The siren automatically deactivates and the alarm status changes into *RECOVERED*. This message remains visible so the user can see what caused the alarm. Press alarm key 2x to remove the message from the screen.

11.2 Deactivating the alarm system

The controller alarm can be fully deactivated. Do this e.g. when the house is empty. The controller will give a warning to indicate that the entire alarm system has been deactivated.

If the alarm system is deactivated the control computer will not generate any alarm messages (except system alarms). Never switch the alarm system off during regular operation.

Deactivate the alarm system as follows:

1. Press the alarm key.
2. Change the *Alarm system* status to *OFF*.

   The screen shows that the alarm system has been deactivated. A corresponding alarm message will also appear in the *Alarm overview*. The LED near the alarm key will flash green.

Reactivate the alarm system by changing the *Alarm system* to *ACTIVE*. The alarm message stating that the system has been deactivated will be cleared from the *Alarm overview*.

11.3 Testing the alarm system

Test the alarm system as follows:

1. Press the alarm key.
2. Change the *Alarm system* status to *TEST*.

   The control computer prepares an alarm message. This appears in the alarm overview and can be cleared by pressing the alarm key. The status of the alarm system will immediately revert to *ACTIVE*.

Fancom advises testing the alarm system weekly for correct functioning. During the test the control computer will give a loud alarm.

11.4 Setting temperature alarms

Certain settings for temperature alarms must be set at:

→ tab page *Settings*

Setting absolute temperature alarms

The absolute temperature alarm limits must not be exceeded under any circumstance!

Set the absolute temperature alarm limits:

- *Min*: If the house temperature is lower than the set absolute minimum temperature, the control computer will give a minimum temperature alarm.
- *Max*: If the house temperature is higher than the set absolute maximum temperature, the control computer will give a maximum temperature alarm.

Setting temperature difference alarms

A difference alarm is an alarm that 'shadows' the climate controller settings. The control computer will give an alarm if the temperature differs too much from the *Setpoint house temperature*.

Set the difference alarm limits:

- *Min*: The control computer gives a minimum temperature difference alarm if the house temperature is below:
  Setpoint house – *Minimum difference*,
- *Max*: The control computer gives a maximum temperature difference alarm if the house temperature is above:
  Start temperature ventilation + *Set Bandwidth* + *Maximum difference*

  The control computer automatically adjusts the alarm test if the Outside temperature is above:
  Start temperature ventilation

  The control computer then gives a maximum temperature difference alarm if the house temperature is above:
  Outside temperature + *Calculated Bandwidth* + *Maximum difference*

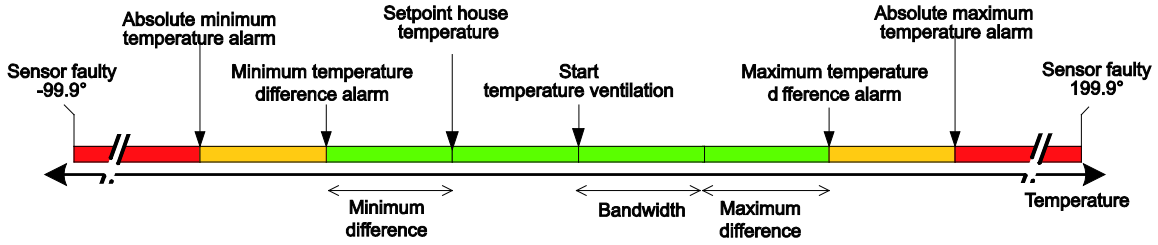
Temperature sensor faulty

Measurements from connected sensors (except the outside sensor) are reliable as long as measurements are between –99.9°C and +199.9°C.

Outside these limits, the measurements are unreliable. The control computer will give an alarm. This can mean that the temperature sensor has not been correctly connected or is faulty. The screen displays the value '- -' at the temperature readout

Total overview temperature alarms

The figure below shows the relationship between the various temperature alarms.



11.5 Setting pressure alarms

Setting alarm limits

For a pressure alarm set the relative alarm limits in relation to the *Control value pressure.* These limits must not be exceeded under any circumstance!

Set the pressure alarm limits:

- *Min*: The control computer will give a minimum pressure alarm if the measured under pressure is lower than the set *Minimum pressure alarm*. This only applies if the *Control value pressure* has been set to a value above 0 Pa.
- *Max*: The control computer will give a maximum pressure alarm if the measured under pressure is higher than the set *Maximum pressure alarm*. This only applies if the *Control value pressure* has been set to a value above 0 Pa.

Pressure sensor faulty

The control computer will give an alarm if the pressure sensor is incorrectly connected or faulty. The display shows the pressure concerned '- -'.

11.6 Setting RH alarms

Setting alarm limits

The RH alarm limits must not be exceeded under any circumstance!

Set the RH alarm limits:

- *Min*: The control computer will give a minimum RH alarm if the measured RH is lower than the set **absolute** *Minimum RH alarm*.
- *Max*: The control computer will give a maximum RH alarm if the measured RH is higher than the set **relative** *Maximum RH alarm*.

  This relative limit depends on the Control value RH.

RH sensor faulty

The control computer will give an alarm if the RH sensor is incorrectly connected or faulty. The screen displays a value of 101% at the RH readout.

11.7 CO2 or NH3 Alarm

If CO2 or NH3 measurement is used, the control computer will give an alarm if the set minimum or maximum is exceeded.

11.8 External alarms

The control computer has received an alarm signal from external equipment or intelligent modules.

11.9 Thermo differential

An extreme rise in house temperature can be caused by fire. In such a case, it is important that an alarm is raised quickly. The sensors in the zones can detect sudden rises in temperature. A sensor issues an alarm if:

- It measures a temperature above 58°C;
- The maximum temperature increase is exceeded (e.g. an increase of 5°C within 2 minutes).
  The control computer monitors to that effect the current house temperature every 30 seconds and compares it with the values of the last 2 minutes.

In addition to the alarm relay, the control computer has an extra relay to connect to the fire alarm installation (FAI). In case of a fire alarm, this FAI relay then initiates additional actions such as closing fire doors, turning on sprinklers or turning off ventilators.

11.10 System alarms (ERROR nn)

The control computer also tests a number of functions of the control computer itself.

Always warn the installer if a system alarm occurs.