99-97-1964
(V 5.4)

Viper Climate- and Production Computer
User's Manual • Flex-Step
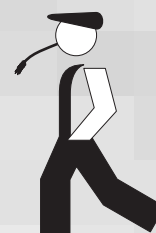
Big Dutchman

Program Version

The product described in this manual is computer based, and most functions are realised by software. This manual corresponds to:

- Software Version CPU 5.4

It was released in May, 2006.

Product and Documentation Changes

BIG DUTCHMAN reserve the right to change this document and the product herein described without further notice. In case of doubt, please contact BIG DUTCHMAN.

Latest date of change appears from the back page.

IMPORTANT

NOTES CONCERNING THE ALARM SYSTEM

Where climatic control is used in livestock buildings, breakdowns, malfunctions or faulty settings may cause substantial damage and financial losses. It is therefore most important to install a separate, independent alarm system, which monitors the house concurrently with the climate computer. According to EU-directive No. 91/629/EEC and 91/630/EEC an alarm system must be installed in any house that is mechanically ventilated.

Please note that the product liability clause of BIG DUTCHMAN's general terms and conditions of sale and delivery specifies that an alarm system must be installed.

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

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

1 INTRODUCTION

This user's manual deals with the operation of the Viper Climate and Production Computer. The user's manual provides the user with the fundamental knowledge about the functions of the computer that is required to ensure optimum use of Viper.

The manual contains a complete description of all the functions of the climate and production computer. Furthermore, the structure of the manual follows the menu structure of the computer. As the Viper software is modular software, this manual will contain sections that are irrelevant to the setup of your computer. If in doubt, please contact BIG DUTCHMAN service or your BIG DUTCHMAN dealer.

The Viper climate and production computer controls the climate according to the control principle Flex-Step.

With Flex-Step, it is possible to set the climate regulation precisely as the user requires. Viper regulates the climate based on up to 63 set ventilation levels, for which the user has determined the settings. When the ventilation levels are adjusted, it is not necessary to change them during the daily work. In Flex-Step, Viper controls the climate according to curves for temperature, heat and minimum and maximum ventilation level. There is no humidity control and MultiStep® in Flex-Step.

Viper is a climate and production computer which is capable both of regulating and monitoring the climate and production in poultry houses.

<div align="center">

BIG DUTCHMAN would like to congratulate you on your choice of a new

Viper Climate and Production Computer

</div>

2 USER'S GUIDE

2.1 🚶 Get started

2.1.1   Keyboard

⌂ **Outline menu key**

- read the outline screen
- gain direct access to setting values

Numeric keyboard

- used to enter values
- the keys 1-4 are used as shortcut keys when the outline screen is displayed

📄 **Main menu key**

- read the values and settings in the function menu
- set function menus

ℹ **Information key**

- gain access to the help menu

📢 🔵 Alarm lamp

Quick flashing →   alarm
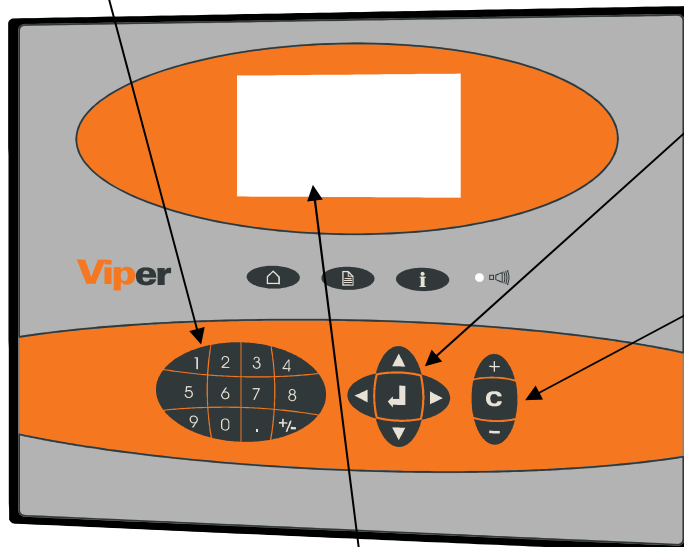
Slow flashing →   acknowledged alarm

Constant light →   non-acknowledged alarm where the error has disappeared
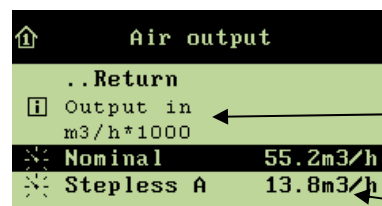
Arrow keys and enter key

- with the arrow keys, you can move around in the menus
- with the enter key, you can connect or disconnect functions and accept changes

+, - and C key

- used to change/delete settings

Display

```
⌂      Air output
    ..Return
ℹ  Output in
    m3/h*1000
☀ Nominal        55.2m3/h
☀ Stepless A     13.8m3/h
```

A scroll panel on the right side of the display shows you how long the menu is and where you are in the menu.

Values, which are readings or calculations, are in `normal type`. The values and functions, which you can change, are highlighted in **`bold type`**.

2.1.2   Display and Menus

2.1.2.1   Outline Screen

To gain access to the outline screen that provides you with an overview of the current conditions in the house, press the outline key [⌂] once. Here, you can read the values which you will be needing most often in your work.
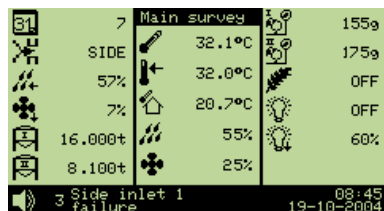
→   The icons indicate which menu item is involved

→   The settings can be changed directly from the outline screen when the setting is selected

Icon	Menu text	Icon	Menu text
	Temperature setpoint		Auxiliary sensor
	Indoor temperature		Negative pressure
	Outside temperature		Effective temperature
	Ventilation		Wind speed
	Minimum ventilation	31	Day no.
	Alarm		Feed
	Zone		Light
	Side mode		Light dimmer
	Tunnel		Silo
	Humidity		Animal weigher
	Humidity setpoint		Number of animals
	Cooling		Water
	Heating		

Tabel 1:   Icons in the Outline Screen

2.1.2.1.1   Message line

At the bottom, the display shows a message line, which for instance informs about acknowledged alarms and the fact that the computer is set to in-between function in connection with cleaning.

The current time and date are indicated farthest to the right.

When, in connection with setup or service, the computer is set to manual regulation of the system, Viper will indicate the manual control in the message line.

The display reading returns to the outline screen when the computer has not been operated for ten minutes.

2.1.2.1.2   Changing a Setting via the Outline Screen,
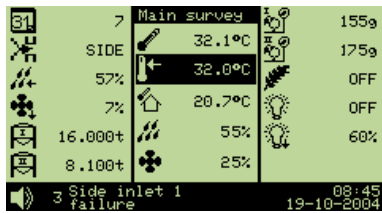
→   select the required setting (e.g. 🌡 `Temperature setpoint`), and press the rotary button
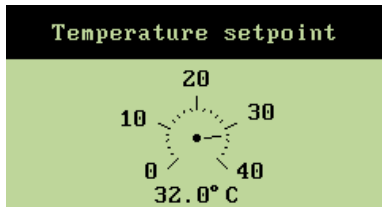
→   change the setting
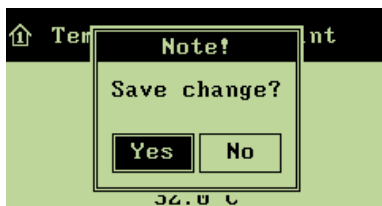
→   when `Yes` is highlighted, press to approve and save the change

 or

→   when `No` is highlighted, press to undo

2.1.2.1.3   Installation Overview via Outline View

The numeric keyboard can help you to get an overview of what has been installed on inputs and outputs as well as which climate and production functions have been installed.

2.1.2.1.3.1   Outline of Inputs
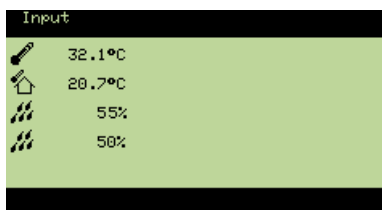
→   press **1** on the numeric keyboard

From this menu, you can read the values of the individual inputs.

2.1.2.1.3.2   Outline of Climate Functions
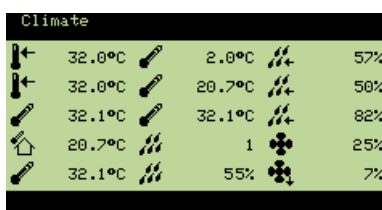
→   press **2** on the numeric keyboard

From this menu, you have direct access to change the values set. (e.g. 🌡 `Temperature setpoint`)

2.1.2.1.3.3 Outline of Production Functions
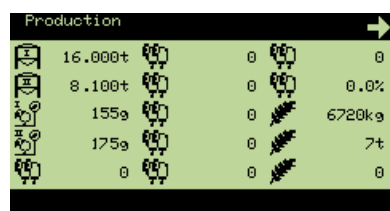
→   press **3** on the numeric keyboard

From this menu, you can read the values of the installed production functions.

In the right corner of the display an arrow indicates if more functions are available than shown in the display.

2.1.2.1.3.4 Outline of Outputs

→   press **4** on the numeric keyboard

From this menu, you can read which functions are active/inactive.

2.1.2.2 Function Menus

To gain access to reading and setting the menus, press the main menu key. The Climate, Production, Management and Alarms menus are for the everyday user while the menus under Technical have to be changed only if changes are made to the actual installation (if necessary, see the *Technical Manual*).
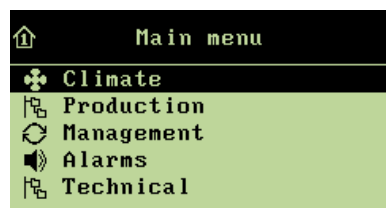
All the Viper functions can be accessed via these menus by selecting the required function (e.g. `Climate`), and pressing the rotary button

(an outline of the functions of the individual menus is provided at the start of each menu section).

Icon	Function	Icon	Function
	Setting		Options
	Reading		More submenus
	Connect		Curve setting
	Disconnect		Entering of code/name

Tabel 2:   Operating icons

2.2   Climate Functions in Flex-Step

2.2.1   *Current Ventilation Level*

In the `Current level` menu, you can read the current ventilation level. You can also change the current level when you estimate that either a lower or a higher ventilation level is needed in the house.

Viper continues to control the ventilation level automatically, and the computer will gradually return to the level, which conforms to the computer calculations of the correct ventilation level.

When you want to … set the current ventilation level, open the `Climate` menu, and
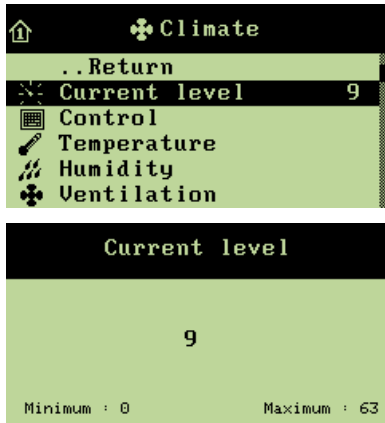
→   select `Current level`, and press

→   set the ventilation level, and press when `Yes` is highlightet to save the change

2.2.2   🖳 *Control*

The `Control` menu offers you a survey menu of the ventilation levels of your computer. You also get access to setting of each level.

The size and structure of the menu depends on the installations on the computer, e.g. fans in side and tunnel mode.

🖳	Lev.	Diff	On	Off	Mode	S1	S2..	T1	T2..	Press	SI1	SI2	SI3..	TI1	TI2
	0	0.0	25	100	Side	R	.	.	.	20	10	10	10	0	0
	1	0.0	40	85	Side	R	.	.	.	30	20	20	20	0	0
	2 …	0.0	60	65	Side	R	R	.	.	25	30	30	30	0	0
	41	0.0	80	45	Side	C	C	C	.	20	100	100	100	0	0
	42	1.0	360	60	Tunnel	.	.	F	C	20	20	20	20	50	50
	43 …	2.5	360	60	Tunnel	.	.	F	F	20	0	0	0	70	70
	63	12.0	360	60	Tunnel	.	.	F	F	20	0	0	0	100	100

Table 1:   Survey of control menu

Each row in the control menu matches one ventilation level (`Lev.`). In the columns, you enter the settings of this level. You can i.a. select `Mode` (`Side`- and `Tunnel` ventilation), set how much the fans are to run and adjust the pressure level (`Press`).

2.2.2.1　Control Menu Functions

Lev.	Diff	ON	OFF	Mode	S1
1	0.0	25	100	Side	R
2	0.0	40	85	Side	R
3	0.0	60	65	Side	R
4	0.0	80	45	Side	C

→ **Lev.** indicates the number of ventilation levels in the computer. Viper has from zero to 63 ventilation levels

→ in **Diff** you set the temperature difference in relation to **Temperature setpoint** which activates each ventilation level

→ in **ON** and **OFF** you set the number of seconds in which the fans are to be on and off respectively. The settings are only used for rotation or cycle

→ in **Mode** you choose between side and tunnel ventilation. NB! When you switch from **Side** to **Tunnel**, **Mode** will be changed to **Tunnel** on the subsequent ventilation levels

Lev.	S1	S2	S3	S4	T1	T2
41	C	C	.	R	C	.
42	.	.	.	.	F	C
43	.	.	.	.	F	F
44	.	.	.	.	F	F

→ **S1-S16** and **T1-T16** indicates the number of fans. **S1-S16** are side fans. **T1-T16** are tunnel fans. You set, which fans are to be activated and how they are to run

The fan:

. = does not run　　　　**R** = rotates

C = runs in cycle　　　　**F** = runs continuously

Lev.	Press	SI1	SI2	SI3	TI1
41	20	100	100	100	0
42	20	20	20	20	50
43	20	0	0	0	70
44	20	0	0	0	100

→ in **Press** you set the required pressure level for each ventilation level

→ in **SI1-SI6** and **TI1-TI2** you set the position of the side and tunnel air inlets respectively, they can be adjusted from zero to 100 %

2.2.2.2　Control Menu Settings

When you want to … set one of the control menu functions, open the **Climate/Control** menu, and

Lev.	Diff	ON	OFF	Mode	S1
1	0.0	25	100	Side	R
2	0.0	40	85	Side	R
3	0.0	60	65	Side	R
4	0.0	80	45	Side	C

→ select the required field, and press

Adjust

25

Minimum : 0　　　　Maximum : 999

→ set the function, and press to save the change

→ press 📄 to return to the **Climate** menu

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2.2.3 🌡 *Temperature*

🌡	1st level		2nd level	
Inside temperature	**Temperature setpoint**	**22.0 °C**		
	Temp. setpoint w. additions (Diff)	22.0 °C		
	Current temp.	21.8 °C		
	Heat zone 1-6 temp.	18.0 °C		
	Brooding zone 1-4 temp.	18.0 °C		
	Trend temperature			
	Lowest temp. 24 h	21.2 °C		
	Highest temp. 24 h	22.2 °C		
Outside temperature	Outside temperature	20.7 °C		
	Trend outside temp.			
Heating	**Active**			
	Heaters		**Heater 1-6 temp. setpoint**	**18.0°C**
			Heater 1-6 demand	0 %
	Brooding heaters		**Heater 1-4 temp. setpoint**	**18.0 °C**
			Heater 1-4 demand	0 %
Cooling	Cooling requirement	0 %		
	Cooling temp.	**2 °C**		
	Stop cooling	**85 %**		
	Start level	**10**		

Table 2:   Outline of the temperature menu (changeable values are highlighted in bold types)

2.2.3.1 Inside Temperature

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

When the inside temperature is too high, the Viper computer increases ventilation by supplying more fresh air, and when the temperature is too low, the computer limits ventilation in order to maintain the heat in the house.

With Viper the house can be divided into three `Grow zones`. Each grow zone is assigned a number of temperature sensors to register the temperature in each zone. According to the age and the size of the animals Viper activates the zones (see the menu `Technical` / `Setup` / `Adjustment` / `Climate` / `Configuration` in the *Technical manual* regarding setting of number of grow zones).

When the individual temperature sensor has been assigned to a zone, it will be active only when the associated zone is active. Thus, the sensors in `Grow zone 2` and **3** are inactive when `Grow zone 2` and **3** are inactive. Viper's temperature indication therefore depends on which grow zone is active.

All menu items … in the temperature menu `Inside temperature` can be set by

→   pressing the ▤ menu key
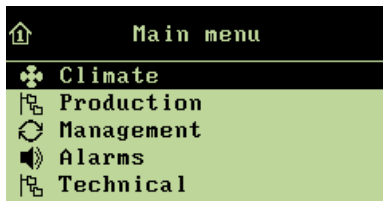
→   select `Climate`, and press
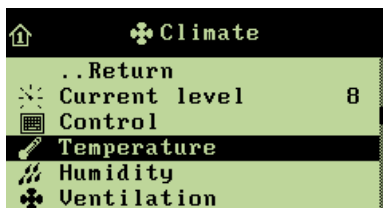
→   select `Temperature`, and press
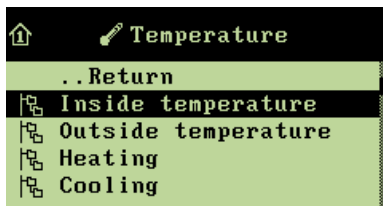
→   select `Inside temperature`, and press

2.2.3.1.1   Setting the Temperature Setpoint

When you want to … set the temperature,
open the `Climate`/`Temperature`/`Inside temperature` menu, and
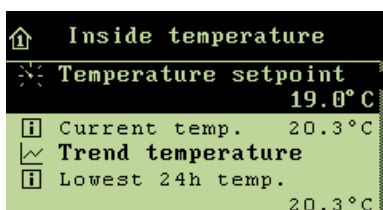
→   select `Temperature setpoint`, and press
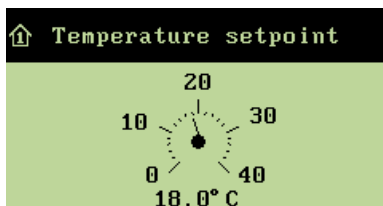
→   set the temperature, and press
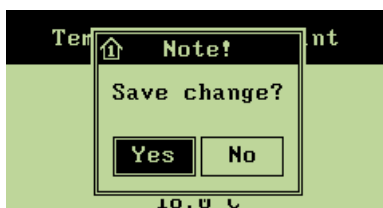
→   when `Yes` is highlighted, press to save the change

2.2.3.1.2   Set Temperature incl. Supplement

`Temperature setpoint` is the starting point of Viper's calculations of the ventilation requirement of the house. However, the computer will adjust the set temperature by a supplement matching the number of degrees set for each ventilation level, and calculate the ventilation requirement from this (see `Diff`, section 2.2.2.1).

2.2.3.1.3   Heat Zone Temperature

Viper can control the temperature in up to six heat zones at a time. `Heat zone 1 – 6 temp.` indicate the temperature in each heat zone.

When you want to … read the temperature in a heat zone,
open the `Climate`/`Temperature`/`Inside temperature` menu, and

```
⌂  Inside temperature
☀  Temperature setpoint
                  19.0°C
ⓘ  Current temp.    20.7°C
ⓘ  Heat zone 1 temp.
                  19.0°C
```

→ read `Heat zone 1 temp.`

2.2.3.1.4   Brooding Zone Temperature

You can divide the house up into smaller zones, brooding zones, where the heat is concentrated on a smaller area in the growing zone. Viper controls the temperature in the brooding zones and heats them by means of heaters. `Brooding zone 1 - 4 temp.` indicate the temperature in each brooding zone.

When you want to … read the temperature in a heat zone,
open the `Climate`/`Temperature`/`Inside temperature` menu, and

```
⌂  Inside temperature
ⓘ  Heat zone 6 temp.
                  19.0°C
ⓘ  Brooding zone 1 temp.
                  19.0°C
ⓘ  Brooding zone 2 temp.
```

→ read `Brooding zone 1 temp.`

2.2.3.1.5   Temperature Curve

The `Trend temperature` curve provides you with a clear picture of the temperature development in the house during the last 24 hours.

When you want to … read the temperature development in the house,
open the `Climate`/`Temperature`/`Inside temperature` menu, and

```
⌂  Inside temperature
〜  Trend temperature
ⓘ  Lowest temp. 24 h
                  16.2°C
ⓘ  Highest temp. 24 h
                  20.0°C
```

→ select `Trend temperature`, and press
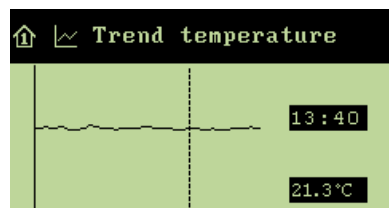
```
⌂ ∿ Trend temperature


                      13:40


             21.3°C
```

→   press the arrow keys to read the exact time and figure values

→   press the enter key to return to the inside temperature menu

2.2.3.1.6 Lowest and Highest 24-hour Temperatures

The 24h temperatures indicate the lowest and highest measured temperatures within the last 24 hours.

- -

2.2.3.2 Outside Temperature and Outside Temperature Curve

`Outside temperature` indicates the current temperature outside the house. The `Trend outside temp.` curve indicates the temperature development outside the house during the last 24 hours.

When you want to … read the temperature or the temperature development outside the house, open the `Climate`/`Temperature` menu, and

```
⌂        ✎ Temperature
    ..Return
 ⌘ Inside temperature
 ⌘ Outside temperature
 ⌘ Heating
 ⌘ Cooling
```
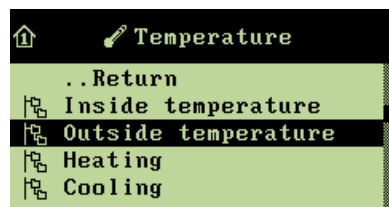
→   select `Outside temperature`, and press

```
⌂  Outside temperature
    ..Return
 ⊞ Outside temperature
              20.7°C
 ∿ Trend outside temp.
```
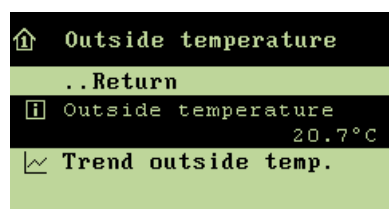
→   read the `Outside temperature` menu item

```
⌂  Outside temperature
    ..Return
 ⊞ Outside temperature
              20.7°C
 ∿ Trend outside temp.
```
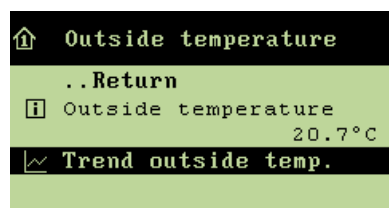
→   select `Trend outside temp.`, and press
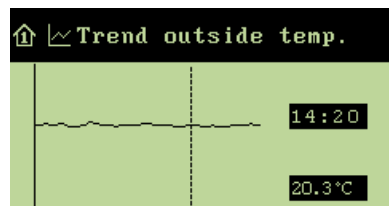
```
⌂ ∿ Trend outside temp.


                      14:20


             20.3°C
```

→   press the arrow keys to read the exact time and figure values

→   press the enter key to return to the outside temperature menu

- -

2.2.3.3 Heating

This section is relevant only to houses with heating systems.

In houses with heating systems, the Viper computer adjusts the inside temperature according to the set temperature and a lower temperature limit, for example `Heater 1 temp. setpoint`. Viper will

gradually supply more heat when the inside temperature in the heat and brooding zones falls below the `Heater 1 temp. setpoint`.

2.2.3.3.1 Connecting or Disconnecting Heating

When you want to stop heating in the house, disconnect `Heating`. Viper will then automatically turn off heating.

If you turn off heating manually without disconnecting `Heating` on the Viper Climate- and Production Computer, adjustment of the ventilation will be inappropriate as the computer will try to base its regulation on the belief that heating is still available.

When you want to … connect or disconnect heating,
open the `Climate`/`Temperature`/`Heating` menu, and

→ select `Active`, and press to connect or disconnect

2.2.3.3.2 Heaters

Viper controls the heating level of the house according to the climate conditions in the active grow zone of the house. When only 1/3 and 2/3 of the house are used as grow zone (`Grow zone 1` or `2`), Viper can control both the heaters in the active zones and ensure that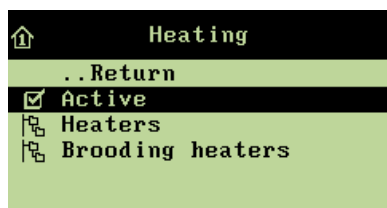 they run at minimum in the inactive grow zones. This way, you avoid condensate on the curtains, and the inactive zones are heated faster when they are to be used as grow zones again. You can use up to six `Heaters`.

2.2.3.3.2.1 Setting the Heater Temperature and Reading the Heating Demand

In `Heater 1 temp. setpoint`, set the temperature, which is the lowest one allowed at the heater in question. When the inside temperature is lower than this setting, the heater supplies heat. `Heater 1 demand` indicates the heating demand percentage of the grow zone.

When you want to … set the temperature for heaters or read the heating demand,
open the `Climate`/`Temperature`/`Heating`/`Heaters` menu, and
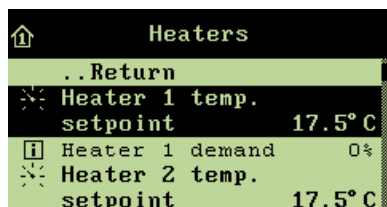
→ select `Heater 1 temp. setpoint`, and press

→ set the temperature, and when `Yes` is highlighted, press to approve the change

Repeat the setting for the installed number of heaters.

```
⌂        Heaters
    ..Return
☼: Heater 1 temp.
   setpoint        17.5°C
 ⓘ Heater 1 demand    10%
☼: Heater 2 temp.
   setpoint        17.5°C
```

→ read **Heater 1 demand**

2.2.3.3.2.2 Brooding Heaters

Viper controls the heating in the brooding zones of the house, independently of the heating level in the rest of the house. As heating is concentrated around the brooding zones, the house temperature outside the zones can be kept down to reduce heating consumption. Viper controls the temperature in the brooding zones and heats them by means of heaters located in each zone. Each heater belongs to a specific brooding zone, and when you activate a brooding zone, you also activate the heater of the zone. You can use up to four **Brooding heaters**.
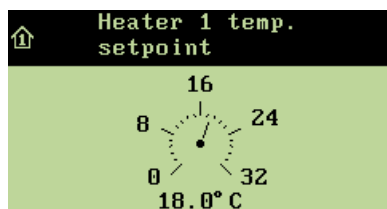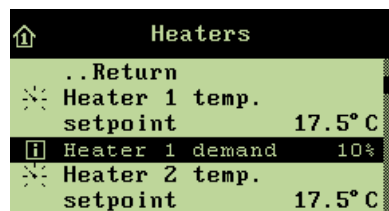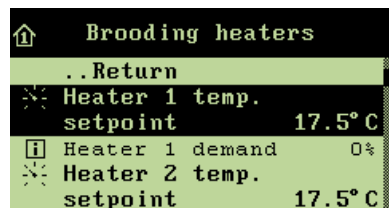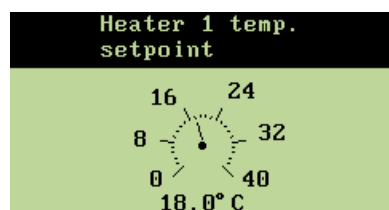
2.2.3.3.2.3 Setting the Brooding Heater Temperature and Reading the Heating Demand

In **Heater 1 temp. setpoint**, set the temperature, which is the lowest one allowed at the heater in question. When the inside temperature is lower than this setting, the heater supplies heat. **Heater 1 demand** indicates the heating demand percentage of the brooding zone.

When you want to … set the brooding heater temperature or read the heating demand, open the **Climate**/**Temperature**/**Heating**/**Brooding heaters** menu and

```
⌂   Brooding heaters
    ..Return
☼: Heater 1 temp.
   setpoint        17.5°C
 ⓘ Heater 1 demand    0%
☼: Heater 2 temp.
   setpoint        17.5°C
```

→ select **Heater 1 temp. setpoint**, and press

```
   Heater 1 temp.
   setpoint

        16    24
     8 ⟍  ⦿  ⟋ 32
        0 ⟋  ⟍ 40
        18.0°C
```

→ set a temperature, and when **Yes** is highlighted, press to approve the change

Repeat the setting for the installed number of heaters.

```
⌂   Brooding heaters
    ..Return
☼: Heater 1 temp.
   setpoint        17.5°C
 ⓘ Heater 1 demand    10%
☼: Heater 2 temp.
   setpoint        17.5°C
```

→ read **Heater 1 demand**

- -

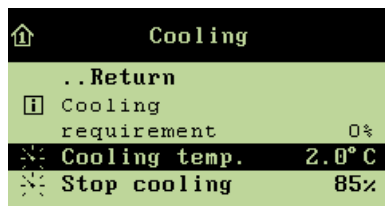## 2.2.3.4 Cooling

This section is relevant only to houses with cooling systems.

Cooling is used in houses where ventilation cannot reduce the inside temperature sufficiently. Cooling has the advantage over ventilation in that it can bring the inside temperature down below the outside temperature. On the other hand, cooling will also increase air humidity in the house.
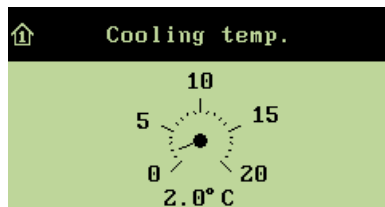
Viper activates cooling when the inside temperature rises above the `Temperature setpoint`.

2.2.3.4.1 Setting Cooling

When you want to … set cooling,
open the `Climate`/`Temperature`/`Cooling` menu, and

```
⌂        Cooling
   ..Return
 ⓘ Cooling
   requirement        0%
 ☼ Cooling temp.   2.0°C
 ☼ Stop cooling      85%
```

→ select `Cooling temp.`, and press

```
⌂     Cooling temp.

         10
    5        15

    0        20
       2.0°C
```

→ set a temperature, and when `Yes` is highlighted, press to save the change

2.2.3.4.2 Setting the Humidity Limit for Cooling

When you want to … set a humidity limit for cooling,
open the `Climate`/`Temperature`/`Cooling` menu, and

```
⌂        Cooling
   ..Return
 ⓘ Cooling
   requirement        0%
 ☼ Cooling temp.   2.0°C
 ☼ Stop cooling      85%
```
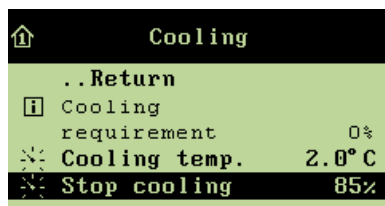
→ select `Stop cooling`, and press

```
⌂      Stop cooling


          85%


 Minimum : 0   Maximum : 125
```

→ set a percentage, and when `Yes` is highlighted, press to save the change

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

2.2.4 ::: *Humidity*

|	**1st level**
[i] Current humidity	74 % RH
[∿] Trend humidity	
[i] Lowest humidity 24 h	72 %
[i] Highest humidity 24 h	76 %

Table 3: Outline of the humidity menu

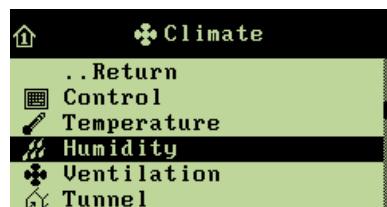This section is relevant only to houses with humidity sensors.

The Viper computer can show you the humidity content of the house air. Humidity is supplied to the house air partly from animals, feed, drinking water and litter, and partly from the cooling function.

All menu items … under the `Humidity` menu can be read by

→   pressing the [📄] menu key
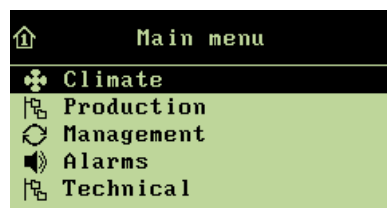
→   select `Climate`, and press

→   select `Humidity`, and press

- -

2.2.4.1   Current Humidity Level

Viper shows the current humidity level of the house air in the `Current humidity` menu on the basis of the registrations made by the house humidity sensor.

When you want to … read the current humidity level,
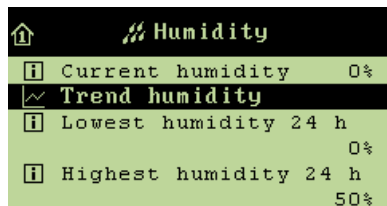open the `Climate`/`Humidity` menu, and

→   read the menu item

2.2.4.2   Humidity Curve

The **Trend humidity** curve indicates the humidity level in the house during the last 24 hours.

When you want to … read the humidity development in the house,
open the **Climate**/**Humidity** menu, and

→   select **Trend humidity**, and press

→   press the arrow key to read the exact time and figure values

→   press the enter-key to return to the humidity menu

2.2.5 ❀ *Ventilation*

❀	1st level		2nd level	
☼	**Min. level**	**3**		
☼	**Max. level**	**63**		
⊞	CO$_2$ min. ventilation		ℹ CO$_2$	3000 ppm
☼	**Min. time at level**	**02:00 m:s**		
⊞	Ventilation status		ℹ Side inlet 1-6	49 %
			ℹ Air outlet 1/2	80 %
			ℹ Stepless 1/2	70 %
			ℹ Side stage fan 1-16	OFF
			ℹ MultiStep 1-8	OFF

Table 4: Outline of ventilation menu (changeable values are highlighted in bold types)

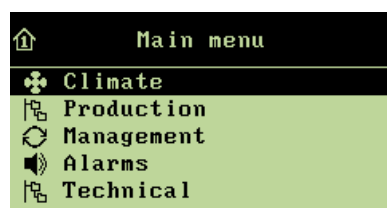The house ventilation consists of an air inlet and an air outlet. Apart from supplying fresh air to the house, ventilation is to remove any humidity and excess heat.
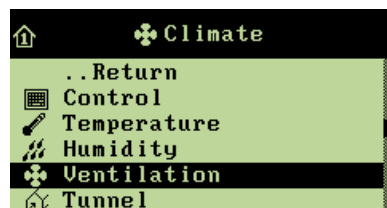
Viper continuously adjusts the ventilation according to a calculation of the current ventilation requirement. Thus, the computer will increase or limit ventilation according to whether the inside temperature and air humidity are too high or too low.

All menu items ... in the `Ventilation` menu can be read by

→ pressing the 📄 menu key

```
⌂   Main menu
❀ Climate
⊞ Production
↻ Management
◀» Alarms
⊞ Technical
```

→ select `Climate`, and press

```
⌂       ❀Climate
  ..Return
▦ Control
✎ Temperature
░ Humidity
❀ Ventilation
⌂ Tunnel
```
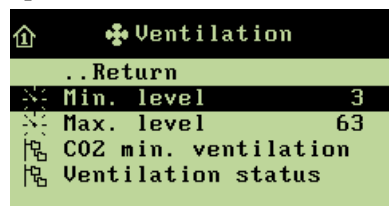
→ select `Ventilation`, and press
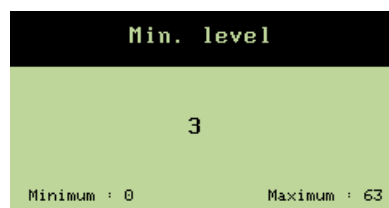
2.2.5.1   Minimum and Maximum Ventilation Level

In `Min. level`, you must set a limit for the minimum ventilation level, so that Viper as a minimum supplies the house with an airflow that ensures an acceptable air quality. This function is particularly relevant in periods with cold weather when it is not necessary to ventilate to keep down the inside temperature.

In `Max. level`, you must set a limit for the maximum ventilation level. This function can be relevant to use at very high outside temperatures when ventilation at total capacity of the system would make the inside temperature exceed the required temperature. This function can also prevent e.g. small animals from being exposed to ventilation, which is more powerful than they can tolerate.

When you want to … set the minimum ventilation level,
open the **Climate**/**Ventilation** menu, and

```
🏠    ♣ Ventilation
     ..Return
☀  Min. level           3
☀  Max. level          63
🔧 CO2 min. ventilation
🔧 Ventilation status
```

→ select `Min. level`, and press

```
        Min. level


            3


Minimum : 0        Maximum : 63
```

→ set the ventilation level, and when **Yes** is highlighted, press to save the change
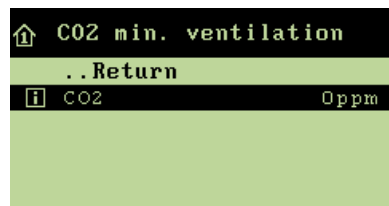
Setting of `Max. level` is carried out in the same way.

2.2.5.2   CO₂ Minimum Ventilation

This section is relevant only to houses with CO_2 sensor.

In the CO_2 menu, you can see the content of CO_2 in the house air.

When you want to … read CO_2,
open the **Climate**/**Ventilation**/**CO₂ min. ventilation** menu, and

```
🏠  CO2 min. ventilation
     ..Return
ℹ  CO2             0ppm
```

→ read the menu item

- -

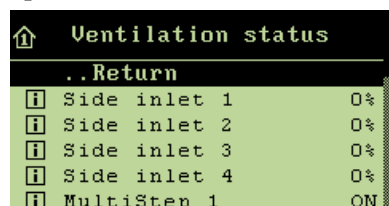## 2.2.5.3   Ventilation Status

2.2.5.3.1   Flap Opening

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

When you want to … read the ventilation status,
open the **Climate**/**Ventilation**/**Ventilation status** menu, and

```
🏠  Ventilation status
     ..Return
ℹ  Side inlet 1        0%
ℹ  Side inlet 2        0%
ℹ  Side inlet 3        0%
ℹ  Side inlet 4        0%
ℹ  MultiStep 1         ON
```

→ read the required menu item

2.2.6 ⌂ *Tunnel*

⌂	**1ˢᵗ level**		**2ⁿᵈ level**	
	🔳 **Pad cooling**	ℹ	Cool demand	0 %
		ℹ	Pad temperature	28.0 °C
		☀	**Start level**	**10**
		☀	**Cool temperature**	**0.0 °C**
		☀	**Humidity limit**	**85 %**
	🔳 **Tunnel status**	ℹ	Tunnel inlet 1-2	0 %
		ℹ	Tunnel stage fan 1-16	OFF
		ℹ	Tunnel MultiStep 1-8	OFF

Table 5: Outline of the tunnel menu (changeable values are highlighted in bold types)

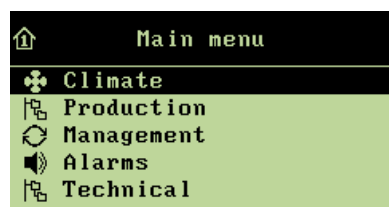This section is relevant only to houses with tunnel ventilation.

Tunnel ventilation is used at high temperatures and when the air intake through wall inlets and curtains is insufficient to keep the animals chilled.

The air outlet takes place through a number of gable fans in one end of the house, which makes the air move at high speed lengthwise in the house. This high air speed makes the measured temperature feel colder, and thus more comfortable for the animals.

Tunnel ventilation can be combined with pad cooling. Here, the air intake takes place through a pad cooling system. Recirculating water keeps the pads moist. Fans draw fresh air into the house through the moist pads and thus the air absorbs water vapour, which makes it feel cooler.

All menu items … in the `Tunnel` menu can be read and set by

→ pressing the 📄 menu key

```
⌂        Main menu
✣ Climate
🔳 Production
↻ Management
🔊 Alarms
🔳 Technical
```

→ select `Climate`, and press

```
⌂        ✣Climate
  ..Return
▦ Control
✎ Temperature
⋰ Humidity
✣ Ventilation
⌂ Tunnel
```

→ select `Tunnel`, and press

2.2.6.1   Pad Cooling

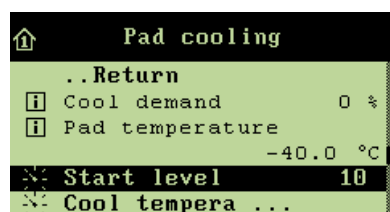### 2.2.6.1.1   Cool Demand and Pad Temperature

`Cool demand` indicates the current cooling demand in tunnel ventilation. `Cool demand` is a value calculated between 0 and 100 %.

`Pad temperature` indicates the current temperature on the inside of the moist pads.

2.2.6.1.2   Setting of Ventilation Level for Start of Pad Cooling

In the `Start level` function, you must set the ventilation level where Viper is to start the pad cooling.

When you want to ... set the ventilation level for pad cooling,
open the `Climate`/`Tunnel`/`Pad cooling` menu, and

```
⌂        Pad cooling
    ..Return
  ⓘ Cool demand         0 %
  ⓘ Pad temperature
                     -40.0 °C
  ☼ Start level         10
  ☼ Cool tempera ...
```

→   select `Start level`, and press

```
⌂        Start level
              30
         15  ∙ˡ∙  45
             •
          0 ╱   ╲ 63
              10
```
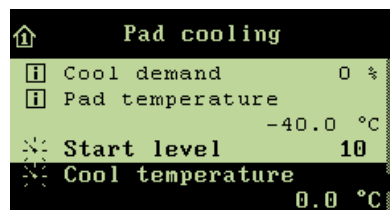
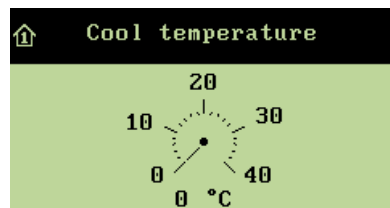→   set a level, and when `Yes` is highlighted, press to save the change

2.2.6.1.3   Setting of Cooling Temperature

In the `Cool temperature` function, you can set an extra number of degrees by which the inside temperature is to rise before Viper activates the pad cooling. The extra number of degrees that you set in `Cool Temperature` will be added to `Temperature setpoint`.

When you want to … set a cooling temperature,
open the `Climate`/`Tunnel`/`Pad cooling` menu, and

```
⌂        Pad cooling
  ⓘ Cool demand         0 %
  ⓘ Pad temperature
                     -40.0 °C
  ☼ Start level         10
  ☼ Cool temperature
                      0.0 °C
```

→   select `Cool temperature`, and press

```
⌂        Cool temperature
              20
         10  ∙ˡ∙  30
             •
          0 ╱   ╲ 40
             0 °C
```
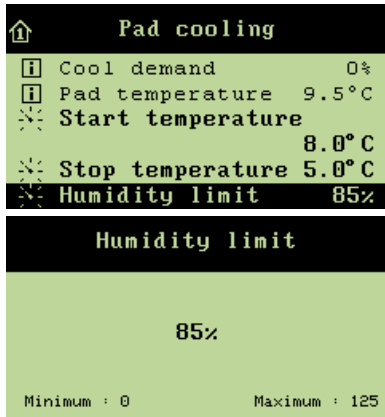
→   set a temperature, and when `Yes` is highlighted, press to save the change

2.2.6.1.4   Setting Stop Cooling - Humidity Limit

When the house humidity is equal to or higher than the setting for `Humidity limit`, Viper stops pad cooling.

When you want to … set a humidity limit for pad cooling,
open the `Climate`/`Temperature`/`Pad cooling` menu, and

```
⌂      Pad cooling
ⓘ Cool demand          0%
ⓘ Pad temperature    9.5°C
☼: Start temperature
                     8.0°C
☼: Stop temperature  5.0°C
☼: Humidity limit      85%
```

→ select **Humidity limit**, and press

```
      Humidity limit



          85%


Minimum : 0      Maximum : 125
```

→ set a value, and when **Yes** is highlighted, press to save the change

> ⚠ The combination of a high house temperature and high air humidity can be life threatening to the animals. Pad cooling should, therefore, be disconnected when air humidity is very high since cooling will increase air humidity further.

2.2.6.2   Tunnel Status

Tunnel ventilation consists partly of one or two stepless air inlets, and partly of a number of ON/OFF exhaust units. The flap opening is a percentage indication of how much the tunnel air inlet is open (`Tunnel inlet 1`/`2`). At `Tunnel stage fan,` the exhaust units are either on or off (`ON`/`OFF`).

When you want to … read `Tunnel status`,
open the `Climate`/`Tunnel` menu, and

```
⌂      ⌂Tunnel
☼: Start temperature
                    34.2°C
☼: Stop temperature
                    30.2°C
🔧 Pad cooling
🔧 Tunnel status
```
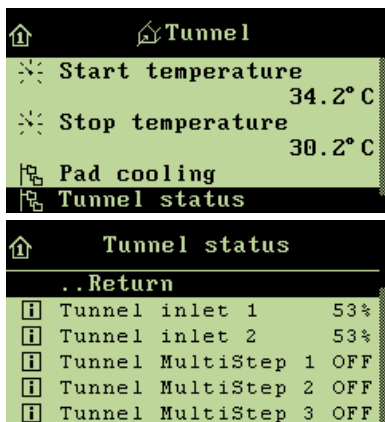
→ select **Tunnel status**, and press

```
⌂      Tunnel status
    ..Return
ⓘ Tunnel inlet 1       53%
ⓘ Tunnel inlet 2       53%
ⓘ Tunnel MultiStep 1 OFF
ⓘ Tunnel MultiStep 2 OFF
ⓘ Tunnel MultiStep 3 OFF
```

→ read the required menu item

- -

2.2.7 ∪ *Pressure Control*

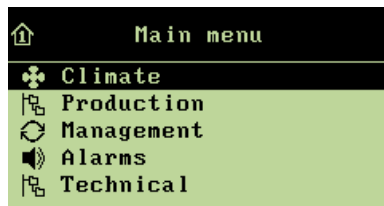|	1st level	
	Pressure demand	0 %
	Pressure setpoint	20 Pa
	Pressure regulator actual value	20 Pa

Table 6:   Outline of the pressure control menu

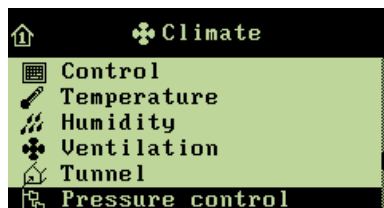This section is relevant only to houses with pressure sensors.

By means of a pressure sensor, the Viper computer can control the pressure level in the house. According to the measurements from the sensor, Viper controls the position of the inlets and in this way maintains the required pressure level in the house. Viper controls the pressure level in the house based on your settings in the `Control` menu.

All menu items … in the `Pressure control` menu can be set and read by

→ pressing the 📄 menu key

```
⌂      Main menu
✤ Climate
   Production
   Management
   Alarms
   Technical
```

→ select `Climate`, and press

```
⌂      ✤ Climate
   Control
   Temperature
   Humidity
✤ Ventilation
   Tunnel
   Pressure control
```

→ select `Pressure control`, and press

2.2.7.1 Reading the Pressure Demand

The `Pressure demand` menu item is a percentage indication of how much the flaps in the active grow zone are to be open to maintain the `Pressure setpoint`.

When you want to … read the pressure demand,
open the `Climate`/`Pressure control` menu, and

```
⌂    Pressure control
   ..Return
   Pressure demand    0%
   Pressure setpoint 20Pa
   Pressure regulator
   actual value       0Pa
```
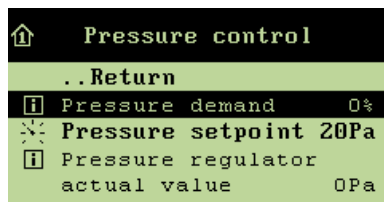
→ read the menu item

2.2.7.2 Pressure Level

You can read the current pressure level of the house in **`Pressure regulator actual value`**.

When you want to … read the pressure level,

```
⌂   Pressure control
    ..Return
[i] Pressure demand      0%
[i] Pressure regulator
    actual value       20Pa

```
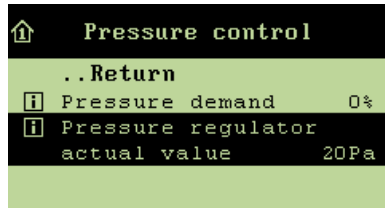
→ read the menu item

2.2.8   Auxiliary Sensors

	1st level	2nd level
	Aux. sensor 1-4	CO_2 sensor 3000 ppm
		Trend aux. sensor 1-4
		Press. sensor 20 pa
		Trend aux. sensor 1-4
		NH_3 sensor 0 ppm
		Trend aux. sensor 1-4
		O_2 sensor 0 ppm
		Trend aux. sensor 1-4
		Temperature sensor 22.0 °C
		Trend aux. sensor 1-4
		Humidity sensor 74.0 %
		Trend aux. sensor 1-4
		Air speed sensor 1.5 m/s
		Trend aux. sensor 1-4
		Wind direction sensor 0
		Trend aux. sensor 1-4

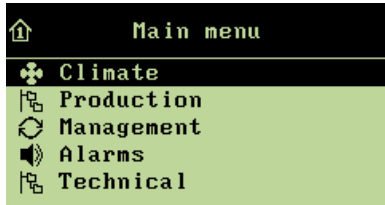**Table 7: Outline of the auxiliary sensors menu (changeable values are highlighted in bold types)**

This section is relevant only to houses with auxiliary sensors.

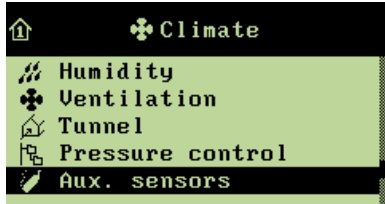In the `Aux. sensors` menu, you can read Viper's registrations from the auxiliary sensors installed.

CO_2, pressure, NH_3, O_2, temperature, humidity, air speed and wind direction sensors can be connected. Viper can be connected to up to four auxiliary sensors; the `Aux. sensors` menu display depends on which types of auxiliary sensors you install.

All menu items … in the **Aux. sensors** menu can be read by

→ pressing the 📄 menu key

```
⌂        Main menu
✤ Climate
⧉ Production
↻ Management
◀) Alarms
⧉ Technical
```

→ select **Climate**, and press

```
⌂        ✤ Climate
⁂ Humidity
✤ Ventilation
⌂ Tunnel
⧉ Pressure control
✎ Aux. sensors
```
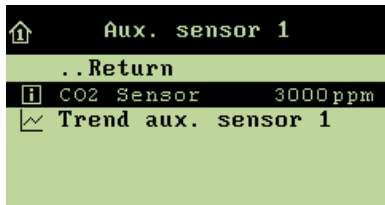
→ select **Aux. sensors**, and press

2.2.8.1   Reading the Auxiliary Sensors

When you want to … read the current value of an auxiliary sensor;
open the **Climate**/**Aux. sensors** menu, and

```
⌂      ✎ Aux. sensors
  ..Return
⧉ Aux. sensor 1
⧉ Aux. sensor 2
⧉ Aux. sensor 3
⧉ Aux. sensor 4
```
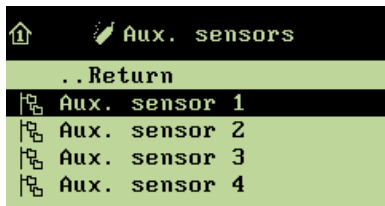
→ select **Aux. sensor 1**, and press

```
⌂      Aux. sensor 1
  ..Return
ⓘ CO2 Sensor      3000ppm
〜 Trend aux. sensor 1
```

→ read the sensor registration

Repeat the reading for the installed number of sensors.

- -

2.2.8.2   Auxiliary Sensor Curve

The auxiliary sensor trend curve indicates the registrations from the auxiliary sensor during the last 24 hours.

When you want to … read the trend curve,
open the **Climate**/**Aux. sensors**/**Aux. sensor 1**, and
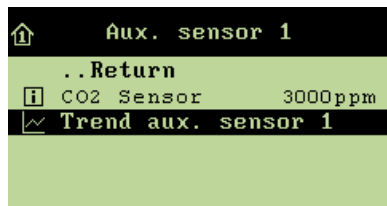
→   select **Trend aux. sensor 1**, and press
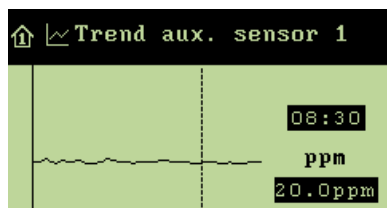
→   press the arrow keys to read the exact time and figure values

→   press the enter key to return to the **Aux. sensor 1** menu

Repeat the reading for the installed number of sensors.

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V

W

Notes

Notes

Big Dutchman