

# ***MVB-ORANGE 10 Control Unit Version 48V***

Installation and Instructions

***Version 4.3A***



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**WARNING:** All of the examples and all of the values that you may find hereinafter are provided for the purposes of information only and must be adapted according to the constraints and particularities of your installation.

## 1. Presentation

The MVB Orange 48V control unit is an electronic regulator intended to control the ventilation of technical buildings of the telecommunication-shelter type for example. These buildings usually shelter electronic equipment that requires adapted ventilation.

In addition to ventilation, the control unit also allows the main related elements to be controlled such as for example the cold unit, alarms, etc.

With its 48Volt DC power supply, this version is more particularly intended for sites where all of the elements are connected to the 48V DC power supply and/or for sites at risk for which 230V power would not exist or be highly disturbed by power outages.

**Warning**, the control unit is a very important element in the ventilation chain but it is not the only one. You must absolutely comply with the recommendations provided by the manufacturer or his distributor when choosing the other links in the chain in order to guarantee optimised operation of the latter (fans, caissons, registers, filters, etc.).

Finally, the greatest care went into designing and manufacturing this product, but it is not sheltered from major disturbances which could cause it to break down. As such, we suggest that you carefully take the recommendations in chapter 17 into account.

## 2. Technical characteristics

- Operating temperature: +10 à +40°C (box)
  - ◆ Ambient temperature sensors: 0 to +51°C
  - ◆ Outside temperature sensor: -40 to +51°C
- Dimensions: Height: 255 mm    Width: 220 mm    Depth: 110 mm
- 50 volt DC power supply + / - 10 volts Maxi
- Main 0/10 volts output (+out): I max 0.1 mA (Rmin = 10,000 ohms or more)
- Other 0-10V outputs (+out1 to +out4): 3mA Maxi @ 10VDC
- Tachy Input: Pulses – open U type collector max: 12 VDC / I<sub>max</sub> 1mA
- Relay Characteristics:
  - 0.5A / 24V DC (Alarm / RNF)
  - 0.5A / 230V AC (R1 to R5)
- ABS box
- Equipment Provided: 2 sensors.

### 3. Appendix – General recommendations

The "**Appendix**" document contains the general installation recommendations for this device.

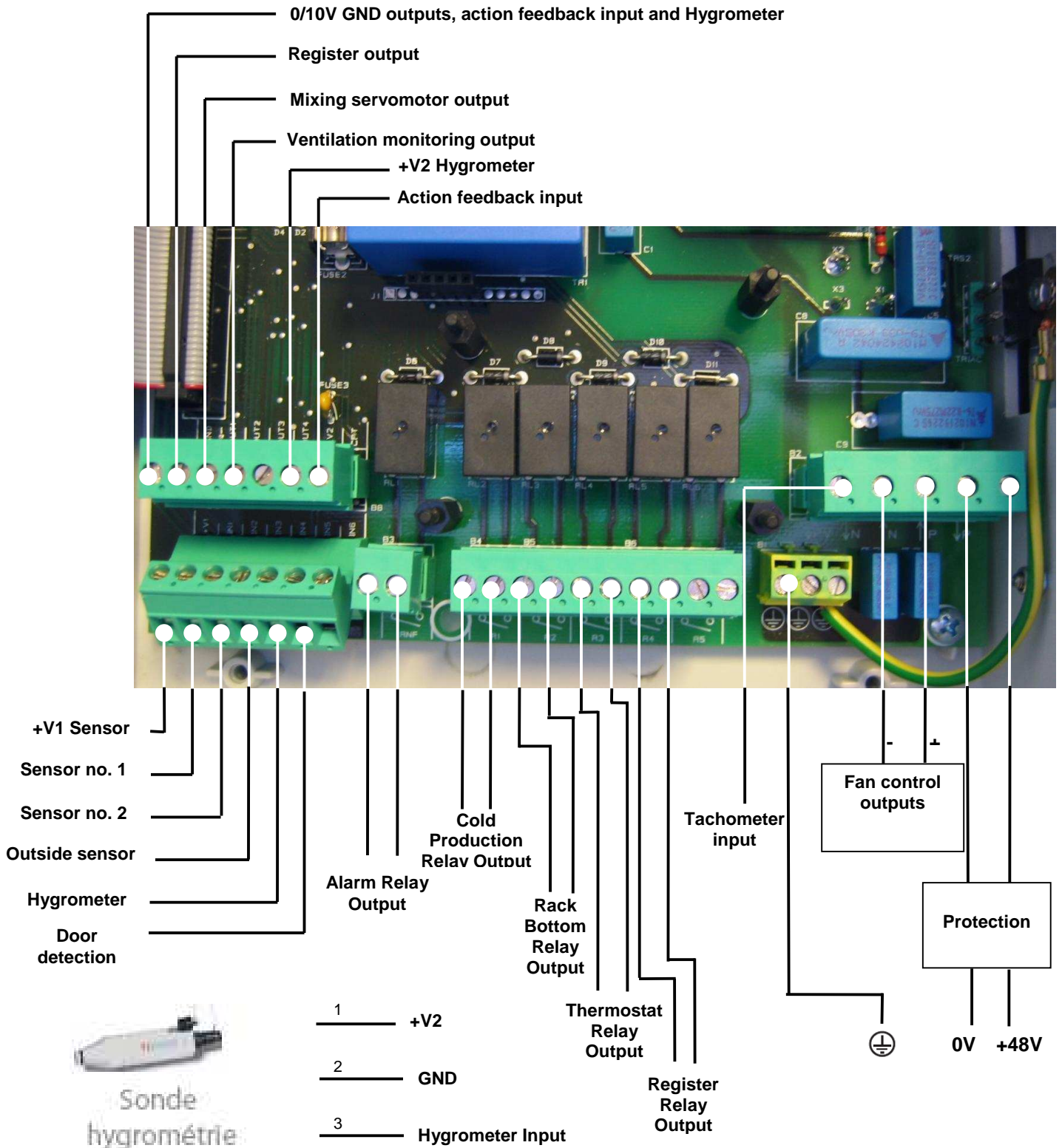
### 4. Environment / Recycling

At the end of its life cycle, the product must be recycled by an authorized agent in accordance with regulations.

### 5. Connections

Tachometer Input: (its use is not mandatory) In order to control the rotating speed of the fan, the tachometer output of the fan must be of the "Open Collector" type. Its hot point must be connected to the "**TACH**" terminal and its cold point to the "**OUT –**" terminal of the 0/10 volts main control output (connector B2).

The **Door Detection** input as well as the **Temperature Sensors** are wired between +V1 and their respective inputs. The **Action Feedback** input and the **0/10V Outputs** are wired between their respective inputs or outputs and GND.



**Safety, do not forget:**

- Upstream of the product: differential – circuit breaker – fuses according to practices, rules of the profession and the standards in effect in the country.

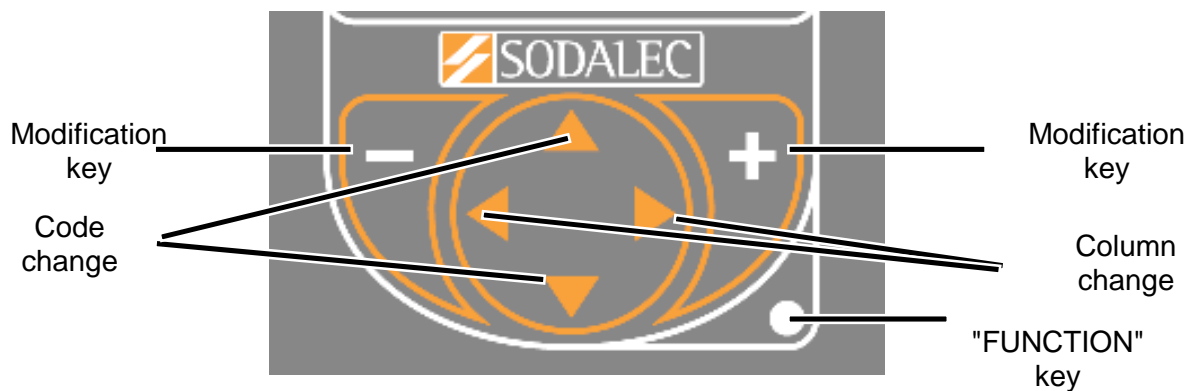
- Downstream of the product where applicable: thermal or thermal-magnetic protection.
- Warning: with mixed operation (ventilation + air conditioning/cold unit), be aware that certain systems that have manual remote controls are rarely compatible with the safety in service.
- The installation of a safety system (independent mechanical thermostat for example) which provides the safety in degraded mode of the full system. Your distributor is available to study and suggest, according to your needs and at your initiative, the best solution according to your constraints and your environment (see for example Chapter 17 "Specific Recommendations").

## 6. Software version and using the buttons

When the device is powered up, the software version is displayed for 5 seconds. This version number contains 2 parts. The first part indicates the type of software and the second indicates the software modification number.

For example, for the 4<sup>th</sup> version of the "MVB-ORANGE 48V" type software, we have:

"Lo or 48"  
" = 4"





Holding the button down for an extended period of time will scroll through the codes or the values depending on the case.

## 7. Access to the "INSTALLER" mode and unlocking the control unit

The control unit has a three-character locking code. The digits 0 to 9 and then sixteen letters from A to Y can be used.

At start-up of the control unit, the code is inactive and as such it is impossible to modify the parameters in "User" mode and the "Installer" mode cannot be accessed.



To access the screen where the code can be entered, you press the 

and  keys for 5 seconds. Once the code screen is displayed, each character must be configured

independently using the navigation arrows. Once the code has been entered, confirm using the

 button. The factory-set code is "000"; it can be modified in Installer mode (*Installer code 46*).

If the code is correct, the message **"yES"** will then be displayed for a few seconds; if the code is incorrect, **"no"** will be displayed for a few seconds and in both cases control reverts back to **"User"** mode. If the code is correct, the parameters can then be changed and access is granted to the **"Installer"** mode (refer to the access procedure below). The code is active for 5 minutes after the last time a button is pressed. Once the code is deactivated, control returns to the locked **"User"** mode.

Switching to **"Installer"** mode is accomplished by simultaneously pressing the  and  buttons for 5 seconds. The same combination of buttons is used to return to **"User"** mode.

When the device switches to **"Installer"** mode, the **"Alarm"** relay is released and there is no longer any contact, unless monitoring is deactivated.

Switching to **"Installer"** mode is indicated by the simultaneous blinking of the indicators

and 



If no button is pressed within 5 minutes, the display automatically reverts back to **"User"** mode.

*Note: If you have forgotten your code or if you experience any problems after a software version change, please send an email to the following email address: [be@sodalec.fr](mailto:be@sodalec.fr)*

## 8. "INSTALLER" Mode

Code	Description	Possible values	Notes
00	Ventilation output sensor	1, 2, 3	1=Sensor 1, 2=Sensor 2, 3=Sensor 1 +2.
01	Ventilation curve selection	1, 2	1 = Standard curve 2 = Adjustable curve
02	Cold production delay	1 to 999 minutes	
03	Hygro relay set point **	0 to 100%	
04	Hysteresis hygro relay **	0 to 10%	
05	Alarm high point difference	0 to 10°C in steps of 0.2	
06	Absolute alarm high point	30 to 45°C in steps of 0.2	
07	Mixing threshold set point	-15 to 10°C in steps of 0.2	
08	Mixing range	0 to 20°C in steps of 0.2	
09			
10	Calibration of sensor 1	-5.0 / +5.0°C in steps of 0.2	Appears if sensor used
11	Calibration of sensor 2	-5.0 / +5.0°C in steps of 0.2	Appears if sensor used
12	Calibration outside sensor	-5.0 / +5.0°C in steps of 0.2	
13	Calibration of hygrometric sensor **	-25 to +25% in steps of 1%	
14	Thermostat set point	5 to 8°C in steps of 0.2	
15	Hysteresis thermostat	2 to 5°C in steps of 0.2	
16			
17			
18			
19			
20	Ventilation output 0% *	0 to 10V in steps of 0.1	Idle adjustment. Output is forced to the value.
21	Ventilation output 10% *	0 to 10V in steps of 0.1	Code visible if 01= 2 (adjustable curve). Output is forced to the value.
22	Ventilation output 20% *	0 to 10V in steps of 0.1	Code visible if 01= 2 (adjustable curve). Output is forced to the value.
23	Ventilation output 40% *	0 to 10V in steps of 0.1	Code visible if 01= 2 (adjustable curve). Output is forced to the value.
24	Ventilation output 60% *	0 to 10V in steps of 0.1	Code visible if 01= 2 (adjustable curve). Output is forced to the value.



25	Ventilation output 80% *	0 to 10V in steps of 0.1	Code visible if 01= 2 (adjustable curve). Output is forced to the value.
26	Ventilation output 100% *	0 to 10V in steps of 0.1	
27			
28			
29			
30	Tachometer monitoring	ON / OFF	
31	Tachometer high point	0 to 255 in steps of 1	
32	Tachometer low point	0 to 255 in steps of 1	
33	Tachometer delay	1 to 30 min	
34			
35			
36			
37			
38			
39			
40	Register output voltage 0% *	0.0 to 10V in steps of 0.1	
41	Register output voltage 100% *	0.0 to 10V in steps of 0.1	
42			
43			
44	Minimum optimized ventilation	0 to 50% in steps of 1%	
45	Mixing servomotor mode	0 or 1	0 = 0/10V output, 1 = 10/0V output
46	Locking code	000 to YYY	
47	Backup ventilation mode	ON / OFF	
48	Backup ventilation set point	0 to 51°C in steps of 0.2	
49	Door detection	ON / OFF	
50	Monitoring output voltage 0% *	0.0 to 10V in steps of 0.1	
51	Monitoring output voltage 1% *	0.0 to 10V in steps of 0.1	
52	Monitoring output voltage 10% *	0.0 to 10V in steps of 0.1	
53	Monitoring output voltage 20% *	0.0 to 10V in steps of 0.1	
54	Monitoring output voltage 40% *	0.0 to 10V in steps of 0.1	
55	Monitoring output voltage 60% *	0.0 to 10V in steps of 0.1	
56	Monitoring output voltage 80% *	0.0 to 10V in steps of 0.1	
57	Monitoring output voltage 100% *	0.0 to 10V in steps of 0.1	
58			
59	Terminal no.	1 to 99	

\* : **"forced output"** indicates that the output involved is forced to the set value as long as this code is displayed.

\*\* : **Influence if hygrometric sensor connected.**



## 9. USER Mode

Code	Description	Possible values	Notes
00	Ambient temperature.	0 to 51°C in steps of 0.2	Mini/Maxi display if +/- pressed (Read only)
01	Outside temperature	-40 to 51°C in steps of 0.2	Mini/Maxi display if +/- pressed (Read only)
02	Ventilation level	0 to 100 % in steps of 1%	(Read only)
03	Lower limit ambient temperature set point	16 to 51°C in steps of 0.2	
04	Ventilation mini set point	0 to 100 % in steps of 1%	
05	Ventilation maxi set point	0 to 100 % in steps of 1%	
06	Delta T mini set point	-5 to +10°C in steps of 0,2	
07	Delta T maxi set point	-5 to +10°C in steps of 0,2	
08	Summer-winter difference set point	0 to +10°C in steps of 0,2	
09	Resultant set point	0 to 51°C in steps of 0.2	(Read only)
10	Minimum outside temperature set point	-40 to 51°C in steps of 0.2	
11	Delta T	-40 to +51°C in steps of 0,2	(Read only)
12	Range set point	0 to +10°C in steps of 0,2	
13	Set point mode	1, 2 or 3	1 = Auto, 2 = Winter, 3 = Summer
14	Minimum Summer outside temperature set point	-40 to 51°C in steps of 0.2	
15	Maximum Summer outside temperature set point	-40 to 51°C in steps of 0.2	
16	Cold production	OFF / Fr. / Fr.r	Fr. et Fr.r = Cold unit triggered if ambient Temperature > code 17
17	Ambient temperature high set point	0 to 51°C in steps of 0.2	
18			
19			
20	Hygrometry**	0 to 100 % in steps of 1%	(Read only)
21	Maximum hygrometry set point**	0 to 100 % in steps of 1%	
22	Hygrometry action set point**	0 to +10°C in steps of 0,2	
23			
24			
25			
26			
27			
29			
30	Register level	0 to 100 % in steps of 1%	(Read only)
31	Register mini set point	0 to 100 % in steps of 1%	
32	Register maxi set point	0 to 100 % in steps of 1%	
33	Register delay set point	0 to 50 min in steps of 1 min	
34	Minimum ambient temperature set point	0 to 51°C in steps of 0.2	
35	Maximum ambient temperature set point	30 to 45°C in steps of 0.2	

\*\* : No influence if hygrometry sensor absent.

## 10. Operating principles

The control unit has three possible control modes which are selected in User mode (*User code 13*). The three modes are Winter, Summer and Automatic.

The following is required to authorise temperature control regardless of the operating mode of the control unit:

- An Outside Temperature (*User code 01*) > Minimum Outside Temperature set point (*User code 10*)
- An Ambient Temperature (*User code 00*) > Resultant set point (*User code 09*)
- End of the delay on the registers (*User code 33*)

The **Resultant set point** (*User code 09*) depends on the actions of the hygrometry and on the Summer / Winter offset:

$$\text{Resultant set point} = \text{Hygrometry Action set point} + \text{Summer-Winter Offset Set Point} + \text{Low Limit Ambient Temperature Set Point}$$
$$(\text{User code } 09) = (\text{User code } 22) \quad + \quad (\text{User code } 08) \quad + \quad (\text{User code } 03)$$

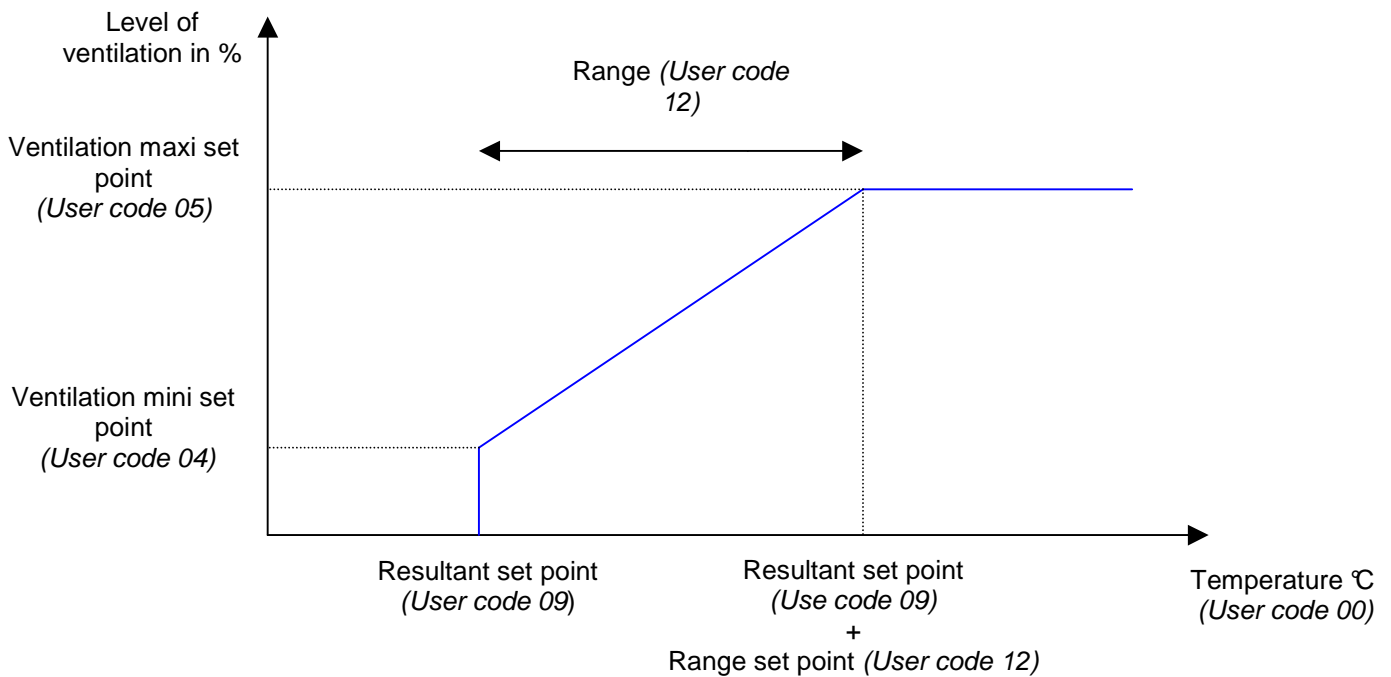
The **Hygrometry Action Set Point** (*User code 22*) is taken into account when calculating the **Resultant Set Point** (*User code 09*) if a hygrometry sensor is used and if the **Rate of Hygrometry** (*User code 20*) is higher than the **Maxi Hygrometry Threshold** (*User code 21*).

If the Hygrometry sensor is absent or its action is null, then the **Hygrometry Action Set Point** (*User code 22*) is 0. The same applies if the operating mode is on Summer, then the **Summer-Winter Offset Set Point** (*User code 08*) is not to be added when calculating the **Resultant Set Point** (*User code 09*).

### 10.1. Winter Mode

In winter mode the **Summer-Winter Offset Set Point** (*User code 08*) that can be configured is systematically added when calculating the **Resultant Set Point** (*User code 09*). This makes it possible to raise the lower limit ventilation set point in order to limit the entry of air that is too cold.

This mode allows the control unit to manage fan operation according to the **Ambient Temperature** (*User code 00*) in relation to the **Resultant Set Point** (*User code 09*) and the various outside actions according to the principle hereinafter:



If the **Ambient Temperature** (*User code 00*) is less than the **Resultant Set Point** (*User code 09*) then the **Level of Ventilation** (*User code 02*) is equal to zero.

If the **Ambient Temperature** (*User code 00*) is higher than the **Resultant Set Point** (*User code 09*) + **Range** (*User code 12*) then the **Level of Ventilation** (*User code 02*) is equal to the **Maxi Ventilation** (*User code 05*) programmed.

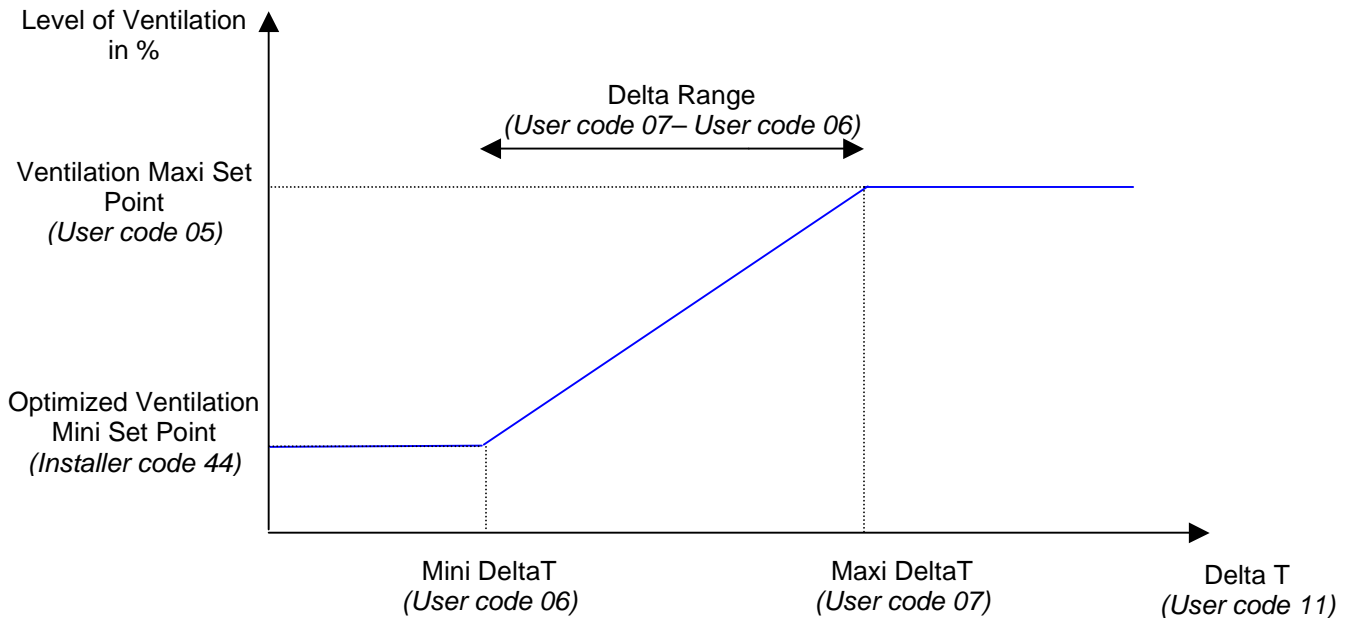
In all of the other cases the **Level of Ventilation** (*User code 02*) changes linearly between the **Mini Ventilation** (*User code 04*) and the **Maxi Ventilation** (*User code 05*) according to the **Ambient Temperature** (*User code 00*).

A delay of one second checks the change in the level; if the level of ventilation changes, the level is increased or decreased by 1% per second. If the **Ambient Temperature** (*User code 00*) is less than the **Resultant Set Point** (*User code 09*) then ventilation stops.

*Note: If **Maximum Ventilation** (*User code 05*) < **Minimum Ventilation** (*User code 04*) then **Ventilation Level** (*User code 02*) = 0.*

## 10.2. Summer Mode

This mode allows the control unit to manage fan operation according to the difference in temperature between the ambient and the outside according to the principle hereinafter:



In Summer mode the **Summer / Winter Offset Set Point (User code 08)** is not taken into account when calculating the **Resultant Set Point (User code 09)**.

If the **Delta T (User code 11)** between the **Ambient Temperature (User code 00)** and the **Outside Temperature (User code 01)** is less than the **Delta T Mini (User code 06)**, then ventilation is at the mini optimized programmed level (*Installer code 44*). If the **Delta T (User code 11)** between the **Ambient Temperature (User code 00)** and the **Outside Temperature (User code 01)** is higher than the **Maxi Delta T (User code 07)** then ventilation is at the maxi programmed level (*User code 05*).

If the **Ambient Temperature (User code 00)** is less than the **Resultant Set Point (User code 09)** then ventilation stops.

In all of the other cases the level of ventilation is calculated according to the **Delta T (User code 11)** between the **Ambient Temperature (User code 00)** and the **Outside Temperature (User code 01)**. It changes between the mini and maxi levels programmed (*Installer code 44 and User code 05*) linearly according to the Mini and Maxi Delta T programmes (*User codes 06 and 07*).

A delay of one second checks the change in the level; if the level of ventilation changes, the level is increased or decreased by 1% per second. If the Delta T is less than the mini Delta T set point and the **Ambient Temperature (User code 00)** is less than the **Resultant Set Point (User code 09)**, then ventilation stops.

Note: If **Maximum Ventilation (User code 05) < Minimum Ventilation (User code 04)** then **Ventilation Level (User code 02) = Minimum optimized ventilation level (Installer code 44)**.

Likewise, if **Maxi DeltaT (User code 07) < DeltaT mini (User code 06)** then **Ventilation Level (User code 02) = Minimum optimized ventilation level (Installer code 44)**.

### 10.3. Auto Mode

In this mode, the control unit automatically calculates the configuration that is best suited. As such, it takes into account the change in outside temperature over the last 24 hours. For the control unit to switch automatically to summer mode, the minimum for the outside temperature recorded must be above "**Mini Summer Outside Temperature**" (User code 14) and the maximum for the outside temperature recorded must be above "**Maxi Summer Outside Temperature**" (User code 15).

Example:

Mini summer Outside T. (User code 14) = 10°C

Maxi summer Outside T. (User code 15) = 25°C

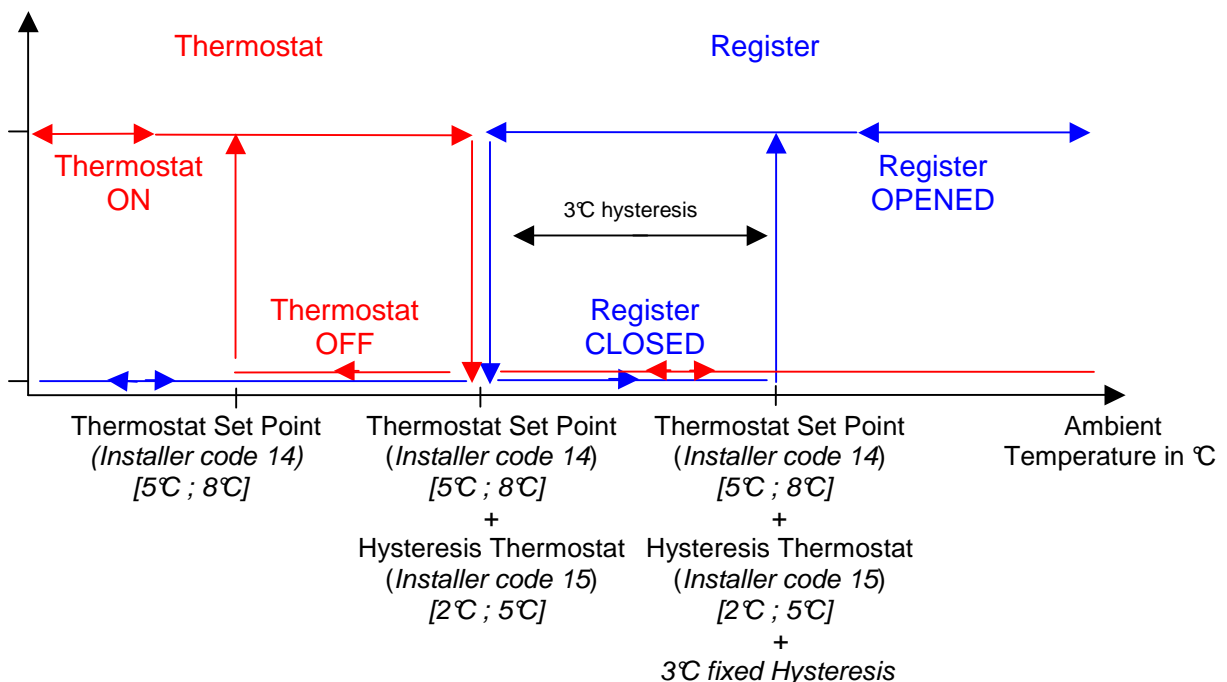
The following is required to switch to Summer mode:

Mini Outside Temperature > 10°C and Maxi Summer Temperature > 25°C. If one of the two conditions is not satisfied then the system operates in Winter mode.

### 10.4. Relay and 0/10V register output

The opening of the registers changes between a **Mini register** (User code 31) and a **Maxi register** (User code 32). Switching from one state to another is controlled by a delay which changes the level by 1% per second. In the same way as in the Ventilation section, a 0/10V output voltage is associated according to the settings made in the Installer portion (*Installer codes 40 and 41*), but only for the levels 0% and 100%.

The functioning is as follows :



- If the **Ambient Temperature** (*User code 00*) is lower than the **Thermostat Set Point** (*Installer code 14*) more the **Hysteresis Thermostat** (*Installer code 15*) then the register is closed.
- If the **Ambient Temperature** (*User code 00*) is higher than the **Thermostat Set Point** (*Installer code 14*) more the **Hysteresis Thermostat** (*Installer code 15*) more a 3 degree fixed hysteresis then the register is opened and the ventilation is allowed to operate once the **Register Delay** (*User code 33*) has elapsed. But the ventilation is not necessarily in operation as dependent of temperature conditions.

This register function is performed by a dedicated 0/10V output for 0/10V servo-motor control. There are also on/off registers on the market which can be controlled by a relay. Stuck or off it can drive the register all or nothing.

Since we can program the output voltage to 0% and 100% (*Installer code 40 and 41*), we obtain the following cases :

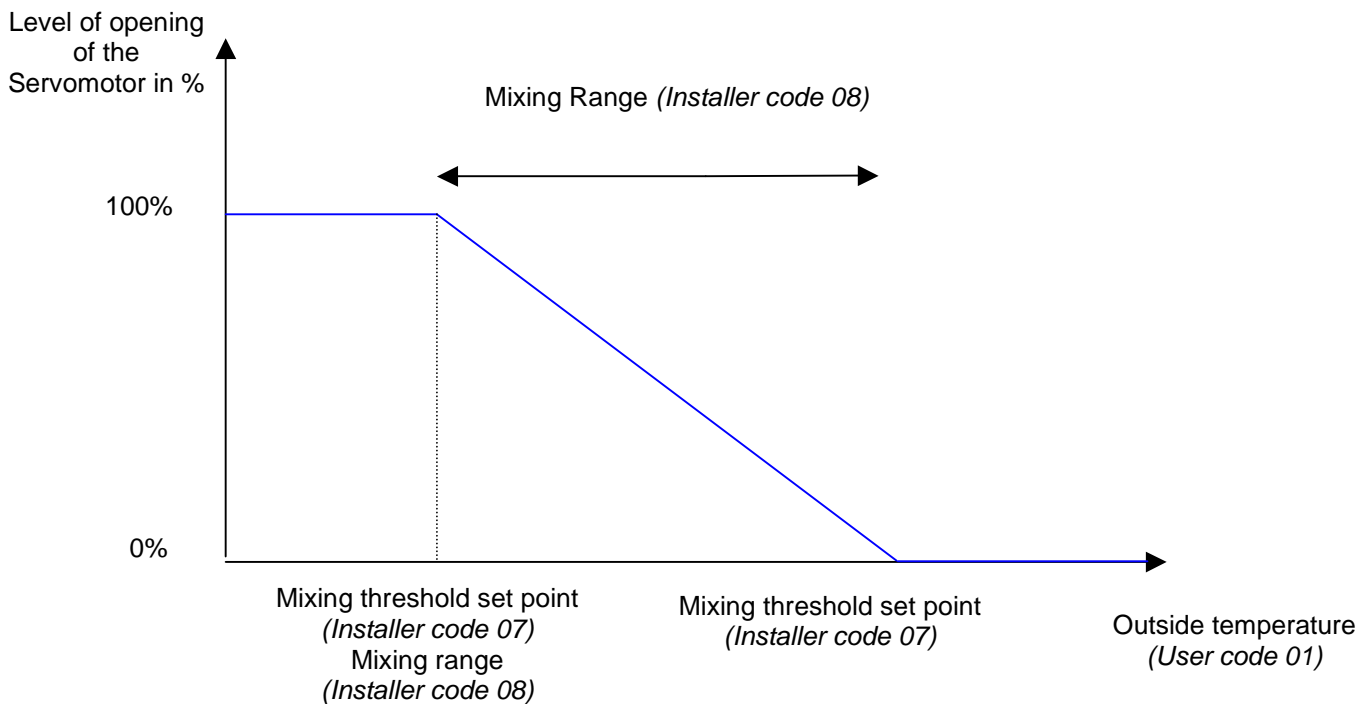
- If the **Register Output Voltage 0%** (*Installer code 40*) is lower than the **Register Output Voltage 100%** (*Installer code 41*) then the register relay is off in closure position. So in case of power failure, the 0-10Volts output will be to 0V, the relay will be off and the register will be closed.
- If the **Register Output Voltage 0%** (*Installer code 40*) is higher than the **Register Output Voltage 100%** (*Installer code 41*) then the register relay is off in opening position. So in case of power failure, the 0-10Volts output will be to 0V, the relay will be off and the register will be opened.


### **10.5. Monitoring output ventilation**

The control unit has a monitoring 0/10V output, which can be configured for the 0%, 1%, 10%, 20%, 40%, 60%, 80% and 100% levels (*Installer codes 50 to 57*). A voltage between 0 and 10 volts is applied to the mentioned levels, and as such for a given level of ventilation, a voltage is assigned. Between the various configured levels (*Installer codes 50 to 57*) the voltage is calculated linearly (*cf. paragraph 13.2*).

### **10.6. Mixing servomotor control**

The control unit has a 0/10V output that allows a mixing servomotor to be controlled according to the outside temperature. It can be configured either as 0/10V output or as 10/0V output (*installer code 45*). A "**Mixing Threshold Set Point**" is also configured (*Installer code 07*) and a "**Mixing Range**" (*Installer code 08*). We thus have the following operation for servomotor control:



At any time, except in the event of an alarm, the level of opening of the mixing servomotor can be viewed by going to the *User code 30* that corresponds to the **Register Level**, then pressing the  key.

*Note: Give particular attention when setting the Mixing Threshold Set Point and the Mixing Range since the operating range for the outside Temperature is [-20 C; +51 C]*

## 11. Auxiliary Functions

### 11.1. "Cold Production" Relay

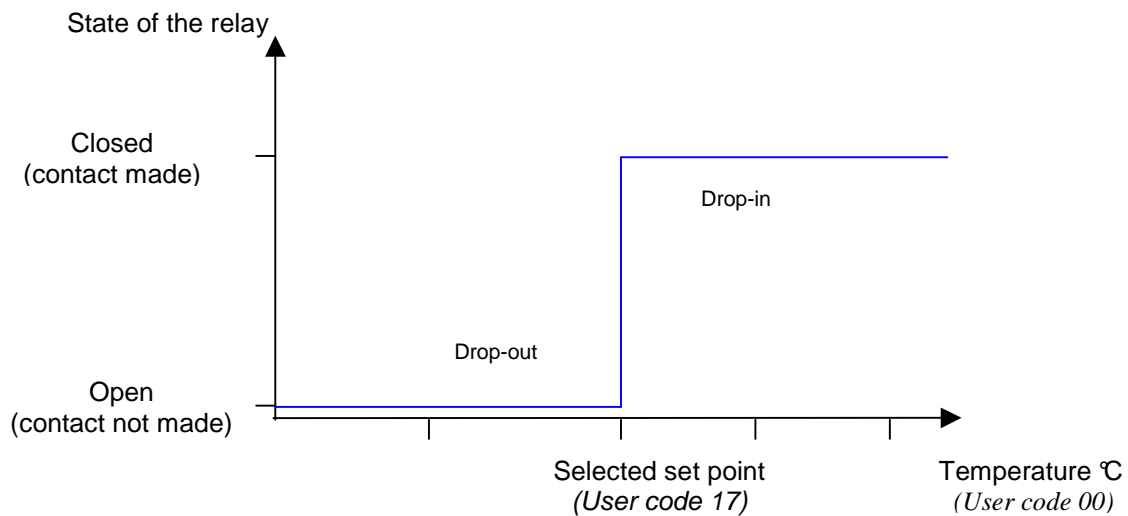
The relay can come into contact only when the display of the software version has been carried out. **Cold Production** is activated / deactivated from the User mode (*User code 16*) and an active delay from 1 to 999 minutes is configured in Installer mode (*Installer code 02*) In this case, the relay reacts according to two parameters: the **Ambient Temperature** (*User code 00*) given by the sensor selected in installer mode (sensor 1, sensor 2 or sensor 1+2) and the **High Point of the Ambient Temperature** (*User code 17*).

In this operating mode, the control unit makes it possible to control cold units / air conditioners. There are two possible variants in this mode:

- Cold production without action feedback (Fr. )
- Cold production with action feedback (Fr.r)

Certain cold groups / air conditioners have a special output called "**Action Feedback**" that allows the system controlling it to take any possible problems with the unit into account.. Many low-cost cold units / air conditioners do not have this option. It is still possible to provide an auxiliary contact on the power switch of the unit but the action feedback simulated as such does not provide the same level of guarantee in terms of operating safety (coolant absent, unit breakdown, etc.).





Cold production without action feedback (Fr.):

When the **Ambient Temperature** (*User code 00*) is higher than the **Ambient Temperature High Point** (*User code 17*) the relay is then triggered and ventilation stops and the register closes. It returns to normal operation when the relay returns to its idle position.

The cold production relay is triggered if the **Ambient Temperature** is lower than the **Ambient Temperature High Point** but only after a **Cold Unit Delay** (*Installer code 02*). In the event this delay would be equal to 0, a hysteresis of 0.4°C is provided in order to prevent the untimely dropping in and dropping out of the relay.

Cold production with action feedback (Fr.r):

This operating mode is the same as the preceding one other than it is secured by control information concerning the operation of the group.

The "**Action Feedback**" information must be received by the control unit when the Cold Production mode is solicited. In the absence of this information, the control unit puts the ventilation back into service while keeping the cold production relay triggered.

*Note: Warning, The ventilation is turned on in two steps (managing the register then the fan after a Register Delay (User code 33)).*

Other case of reverting to ventilation mode with the action feedback signal present:

**Cold production delay** (*User code 02*) elapsed  
**and**  
**Ambient Temperature** (*User code 00*) less than **Ambient Temperature High Point** (*User code 17*)  
**and**  
**Ambient Temperature** (*User code 00*) higher than the **Outside Temperature** (*User code 01*)

Otherwise, the control unit remains in Cold Production.

*Note: The **Cold Unit Delay** (Installer code 02) is a delay for maintaining a minimum of cold production.*

## **11.2. Door opening detection mode**

To configure this function, simply set **Door Detection** (*Installer code 49*) to "ON".

The opening of the door will cause ventilation to stop regardless of the temperature conditions (except if the **Ambient Temperature** (*User code 00*) is higher than the **Backup Ventilation Set Point** (*Installer code 48*), see the following paragraph).

This makes it possible to limit noise in the building / shelter in the presence of a person.

The loop should normally be closed. Opening the door causes the loop to open. Once the door is closed, the system resumes normal operation.

## **11.1. Backup ventilation mode**

A **Backup Ventilation** can be configured (*Installer code 47*). For this, a **Backup Ventilation Set Point** (*Installer code 48*) is configured, above this set point Cold Production is maintained triggered if the function is activated but this is supplemented by adding ventilation at 100% as well as a maximum opening of the registers. This function has priority over all of the others, including door detection.

Ventilation resumes normal operation if the system falls below the backup ventilation set point with a hysteresis of 0.4°C.

### Backup ventilation mode (*Installer code 47 = ON*)

This function allows the ventilation to be forced to the maximum possible as the temperature is assumed to be much too high. The consequences are as follows:

#### Ventilation:

Independently of the other sensors, if the inside temperature exceeds the **Backup Ventilation Set Point** (*Installer code 48*), then ventilation is positioned at 100% without taking the **Maximum Ventilation** configured in User code 05 into account

#### Cold production relay:

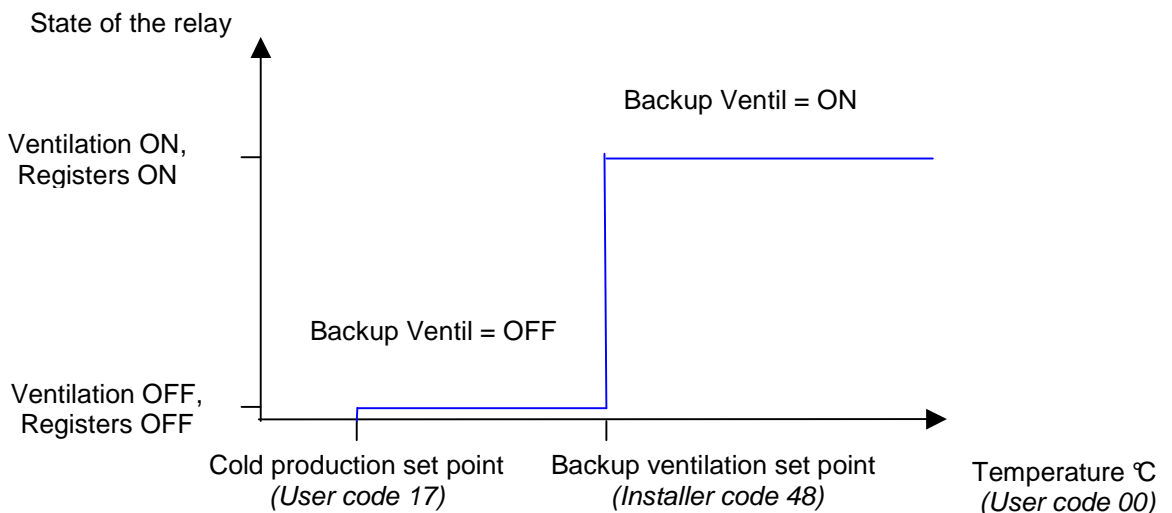
The **Cold Production** relay remains triggered if the function is activated.

#### Register output:

The register controlled by the 0/10V output opens at the **Maxi Register** (*User code 32*) and the register relay is controlled (opened or closed according to the parameters, cf the corresponding paragraph). The **Register Delay** (*User code 33*) is not taken into account.

#### "Monitoring" Output:

The voltage of the monitoring output is then equal to that configured in *Installer code 57*.



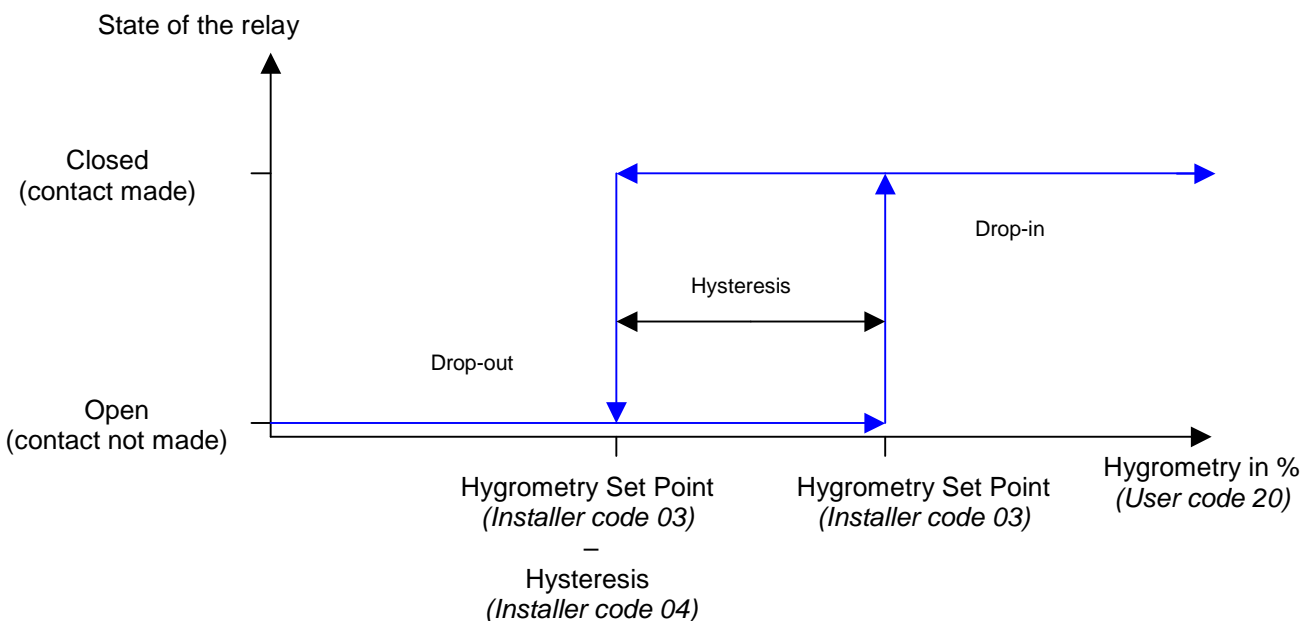
Backup ventilation mode (Installer code 47 = OFF)

In this case, the backup mode and the forcing that stems from it are inactive. The system operates such as it was presented in the preceding chapters.

**12. "Rack bottom" Relay**

This relay is activated thanks to the **Maximum Hygrometry Set Point (Installer code 03)**. The relay is triggered if the **Rate of Hygrometry (User code 20)** is greater than or equal to this threshold. On paramètre également l'**Hystérésis Relais Hygrométrie (code Installateur 04)** pour sa désactivation.

The operation is as follows:

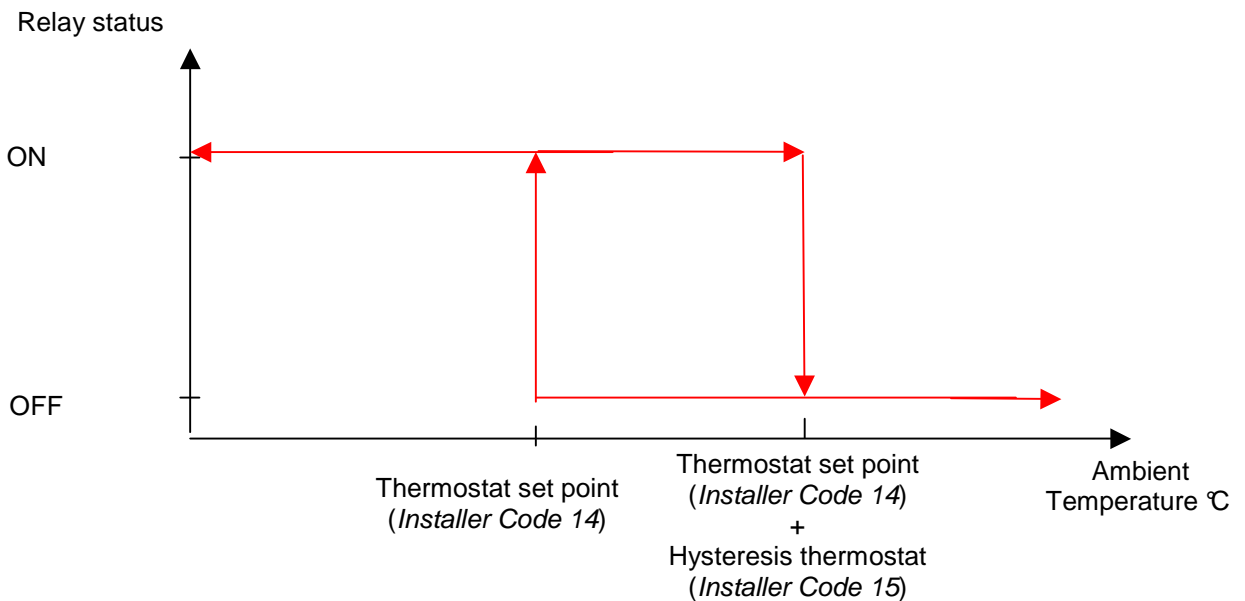


### 13. "Thermostat" Relay

Two codes are used to configure the thermostat relay in Installer menu, the **Thermostat set point** (Installer Code 14) and the **Hysteresis thermostat** (Installer Code 15).

The operation is as follows :

- If **Ambient temperature** (User Code 00)  $\leq$  **Thermostat set point** (Installer Code 14) : the thermostat relay is "ON".
- If **Ambient temperature** (User Code 00)  $>$  **Thermostat set point** (Installer Code 14) + **Hysteresis thermostat** (Installer Code 15) : the thermostat relay is "OFF".



### 14. Fan Output

The control unit has a main 0/10V output as well as a monitoring output (cf. paragraph 10.5). Their operation is directly linked to the **Level of Ventilation** (User code 02).

These outputs make possible:

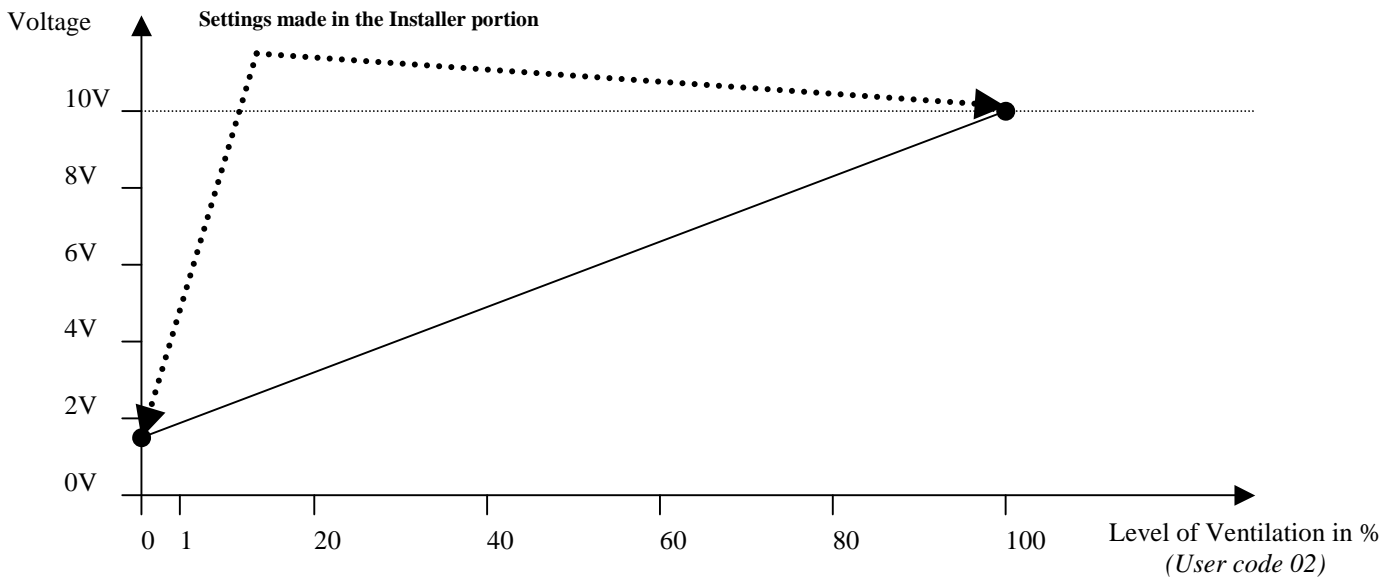
- the controlling of one or more fan(s) with 0/10 volt control
- the opening of the air inlet or of the air outlet in proportion to the ventilation
- the possible controlling of any accessory that depends on the level of ventilation

The change in the 0/10 Volt signal according to the level of ventilation is linear and depends on eight parameters including one (Voltage 0%) which makes it possible to handle the special case where ventilation is at 0%.

These outputs can change either in 0/10V mode, or in 10/0V mode according to the settings in Installer mode (Installer codes 20 to 26 for the main output and 50 to 57 for the monitoring output).

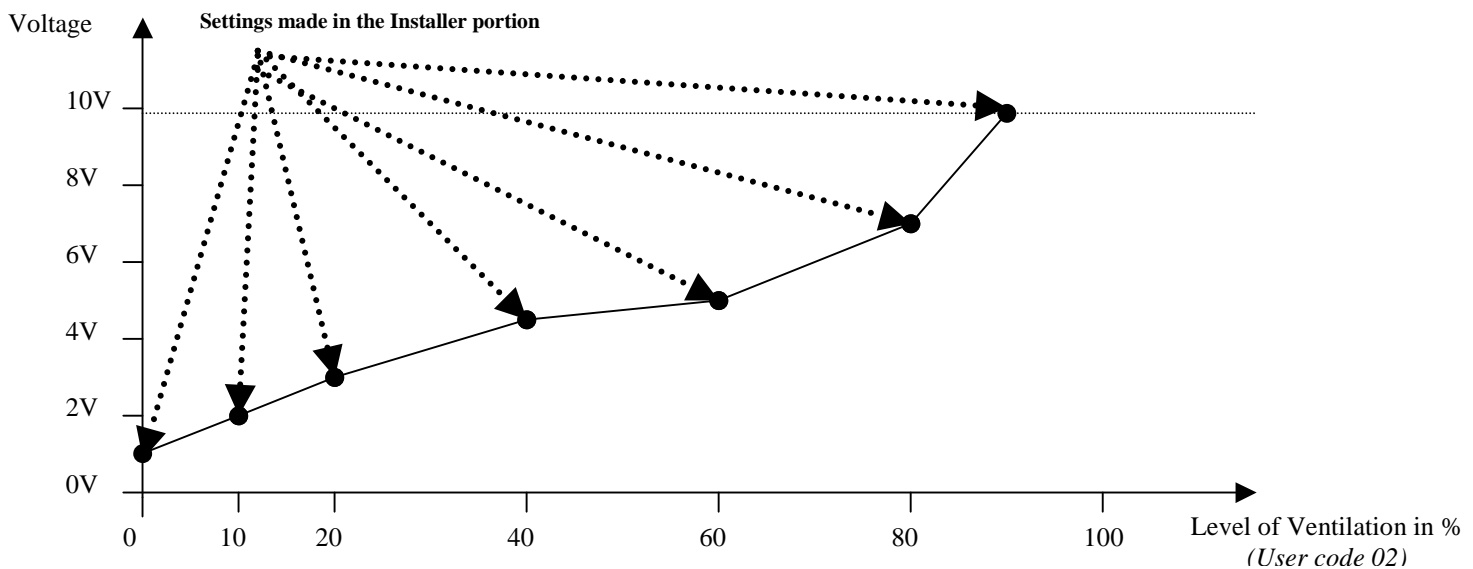
Two choices are offered for ventilation output (Installer code 01). First of all, the standard output (Installer code 01 = 1) which requires only the settings concerning the idle and the maximum in Installer mode. Then, the level is calculated in a linear manner, as is explained below. Then, the second setting (Installer code 01 = 2) is the configurable curve where the voltage associated with the ventilation percentage is entered.

**14.1. "Standard" Curve**



**14.2. "Adjustable" Curve**

For the "adjustable" curve, the various levels are configured in the following way:



In the example above, when the ventilation is stopped (0%), the 0/10volt signal is equal to 1 volt and then when the ventilation changes from 10 to 100% then the signal changes from 2 to 10 volts. This flexibility in programming allows the control range to be adapted to the load (fans, linear register, etc.) which is not systematically 10 volts. It also makes it possible in certain cases to organise the system with positive safety in such a way that the 0/10 volt signal is inversely proportional to the level of ventilation.

Take for example a linear register with the following settings:

- Voltage 0% (*Installer code 20*) = 10 volts
- Voltage 1% (*Installer code 21*) = 9.9 volts
- ...
- Voltage 100% (*Installer code 26*) = 0 volts

With this type of adjustment, the register will operate with positive safety. In the event of a power cut-off for the control unit (0/10V output = 0V mandatory), then the register will open fully.

## 15. Tachometer Function

The MVB Orange 48V control unit has a tachometer function that makes it possible to provide for the proper operation of the fan when the latter has this function. This is a counting input that examines the pulses provided by the fan. The control unit can then measure the rotating speed of the fan in revolutions per second and generate an alarm in the event of an anomaly.

In Installer mode, this option can be activated or not activated (*Installer code 30*) and also set a tachometer high point for stopping the fan (*Installer code 31*), a tachometer low point for the operation of the fan (*Installer code 32*) and a tachometer delay (*Installer code 33*).

An alarm is generated in the following cases:

If the output voltage is equal to 0 Volt (*STOP*) and if the tachometer counter is higher than the "**Tachometer High Point**" then a "**High Point**" alarm is generated.

If the output voltage is not equal to 0 Volt (*OPERATION*) and if the tachometer counter is less than the "**Tachometer Low Point**" then a "**Low Point**" alarm is generated.

The default is taken into consideration after a duration equal to the tachometer delay. An additional 45 seconds elapse before the display on the screen and the triggering of the alarm relay.

The "**Tachometer Delay**" time delay must be long enough in order to prevent false alarms linked to the inertia of the fan or pumping effects.

The thresholds are indicated in Pulses/Second.

### Settings for the tachometer thresholds:

*Example: If we want to set a threshold to 1300 rpm and the motor is set to provide 3 pulses per revolution, then:*

$$1300 \text{ rpm} = 1300 / 60 = 21.66 \text{ rps}$$

*at 3 pulses per revolution, there will be  $21.66 \times 3 = 65$  pulses per second*



*The threshold of 1300 rpm for a fan generating 3 pulses per revolution will be 65 pulses per second.*

## 16. Statistics and Mini/Maxi

Minis and Maxis are taken for all of the following data:

- User Code 00 – Ambient Temp.
- User Code 01 – Outside Temp.
- User Code 02 – Ventil. Level

The back-up takes place constantly and provides automatic statistics over 24 hours.



Statistics are visible on all of the recorded codes by pressing the  button for the mini, and the  button for the maxi.

Statistics are also visible in the screen saver, also by pushing

on the  et  buttons.

As such, the user can see all of the minis or all of the maxis by pressing a single button.

The statistics can be erased by pressing the  button for the mini and the  button for the maxi for 5 seconds.

The minis and maxis can be erased at the same time by pressing simultaneously on both the  and  buttons for 5 seconds.

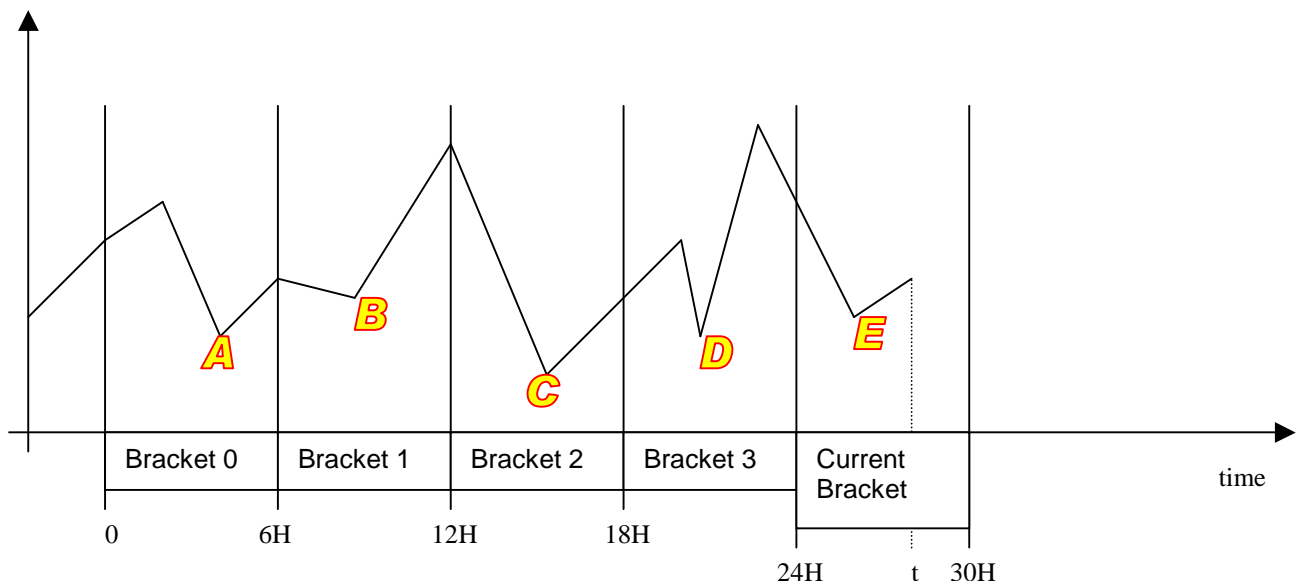
The display indicates "dEL" to show that the data is being erased; when "dEL" disappears from the display, the statistics have been deleted.

### 16.1. Operation

Statistics are carried out over 24 hours. Backups are carried out continuously and are stored in 6-hour brackets. As such, the control unit has 4 brackets plus the current one.

Here is a sample change for a piece of data taken as an example: **Mini VE Level**

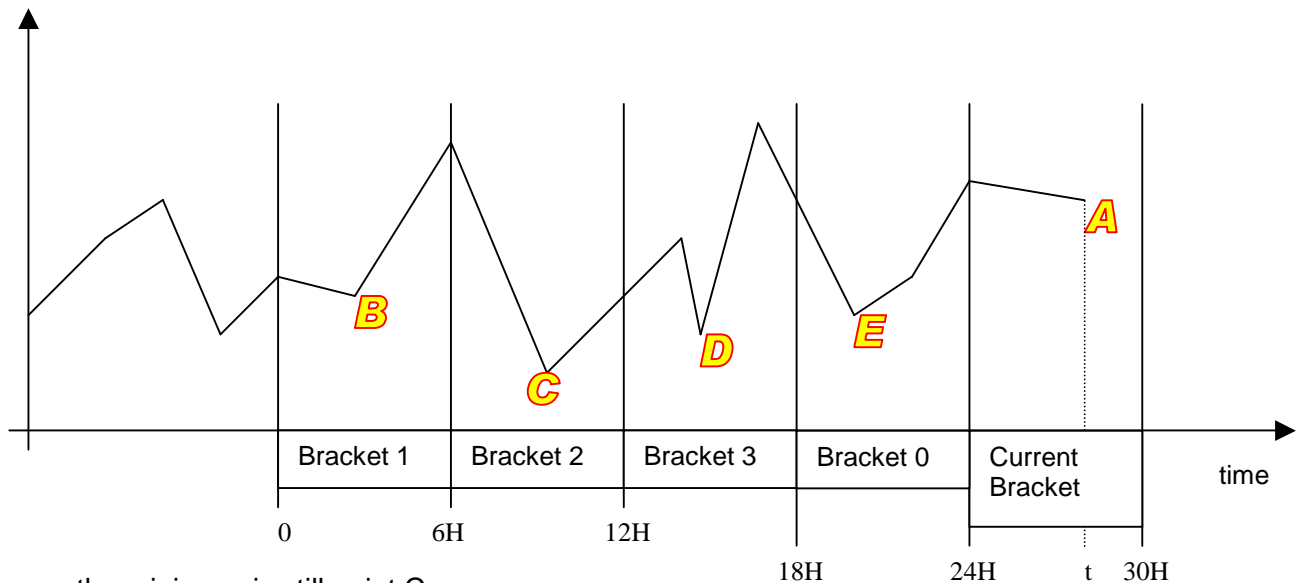
Mini VE level





Here, the minimum is point C. Six hours later, the following statistics are obtained:

Mini VE level



In this case, the minimum is still point C.

## 16.2. Power cut-off

In the event the power is cut off, the control unit, when power is restored, recovers the values of the last four brackets saved plus the current bracket. As such, no data is lost when the power is cut off.


## 17. Monitoring

### 17.1. Displaying faults

Monitoring (i.e. triggering of the alarm relay) is carried out 15 seconds after the device is turned on. Beforehand, the relay is "Off", i.e. it is in an open position.

When there is a fault, the relay is triggered ("Open" position) 1 minute after the information has been taken into account. If in the meantime the fault goes away, then the relay remains in "Closed" position. If a fault lasts for more than one minute, the relay is released, the backlighting blinks, a message indicates the source of the problem and the "Alarm" indicator is displayed constantly.

The fault is removed from the display if a key is pressed. It will be displayed again 40 seconds after keyboard manipulation if the fault is still present.

To display a fault again that is still present after changing parameters for example, the  button must be pressed.

The origin of the fault is indicated in the following way:



In this case there is a **Absolute Alarm High Point** default (*Installer code 06*) because the **Ambient Temperature** sensor (*User code 00*) is measuring a temperature of 43° and displays a type 06 default.

The "*Sensor code associated with the fault*" will either be 00 for a fault associated with the ambient output or 01 for a fault with the outside sensor.

In the case of a sensor fault (power cut-off or short circuit), the "*Fault code*" is replaced with 2 dashes: -

The "*Sensor value associated with the fault*" indicates the defective sensor in relation to the wiring:

- --1 for sensor 1,
- --2 for sensor 2,
- -E for the outside sensor.



**Warning:** There is an order of priority for the various faults if they occur at the same time:

- *Ambient sensor fault*: sensor absent (sensor 1, sensor 2 or sensor 1 + 2 according to the selection in Installer mode (*code 00*))
- *Outside sensor fault* (*code 01*)
- *Cold production fault* (*code 16*)
- *Fault of low threshold Tachometer* (*Code 02*)
- *Fault of high threshold Tachometer* (*Code 02*)
- *Fault of the absolute ambient monitoring type* (*code 06*)
- *Fault of the high ambient monitoring type* (*code 35*)
- *Fault of the low ambient monitoring type* (*code 34*)

If all of the faults have disappeared, then the relay makes contact again, the "**Alarm**" indicator goes out, but the backlighting continues to blink and the screen still displays the origin of the previous fault. Going back to "**normal**" mode is accomplished by simply pressing one of the buttons.

## 17.2. Outside Temperature Influence

The the **Outside Temperature** (*User code 01*) has an influence on the **Alarm High Point**. Two codes can be configured in installer mode, the **Alarm High Point Difference** (*Installer code 05*) and the **Absolute High Point** (*Installer code 06*).

The first allows the difference tolerated to be set in relation to the **Outside Temperature** (*User code 01*) and the second determines the absolute threshold above which an alarm is triggered regardless of what happens. The **Alarm High Point** is at every moment the maximum between the **Maxi Ambient Temperature Set Point** (*User code 35*) and the sum of the **Outside Temperature** (*User code 01*) and the **Alarm High Point Difference** (*Installer code 05*).

If the **Outside Temperature** (*User code 01*) plus the **Alarm High Point Difference** (*Installer code 05*) is greater than the **Maxi Ambient Temperature Set Point** (*User code 35*), then the **Alarm High Point** is equal to the **Outside Temperature** (*User code 01*) plus the **Alarm High Point Difference** (*Installer code 05*). In the opposite case, the **Alarm High Point** is equal to the **Maxi Ambient Temperature Set Point** (*User code 35*).

As such, the **Alarm High Point** depends on the **Outside Temperature** (*User code 01*). It has the **Absolute Alarm High Point** (*Installer code 06*) as a maximum value; beyond this threshold a "Fault of the absolute ambient monitoring type" alarm is triggered.

## 18. Special recommendations

In addition to the rules announced in the Recommendations APPENDIX" document provided with the device, the following specific rules must be complied with:"

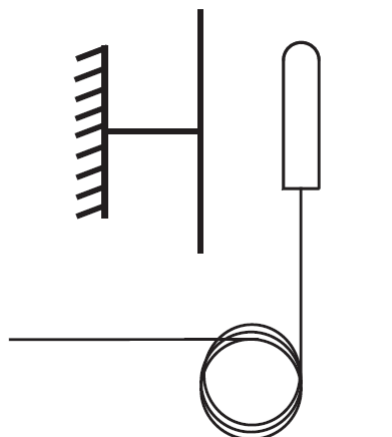
The case must be properly closed with its 2 screws. The cable glands must be properly tightened and sealed.

In order to prevent the condensation from forming in the case, it is recommended that the device be left powered up constantly.

Applicable installation recommendations and standards must be complied with.

If the indicated recommendations are not complied with, SODALEC cannot be held liable and may void the warranty provided with this product.

Installation diagram for an outside sensor :



The outside sensor must be oriented upwards in a tube that protects the infrared. It is also preferable to provide an anti-drop shield.

\* \* \*

Do not forget to place a mechanical thermostat in parallel with the controller to overcome a possible failure of it.

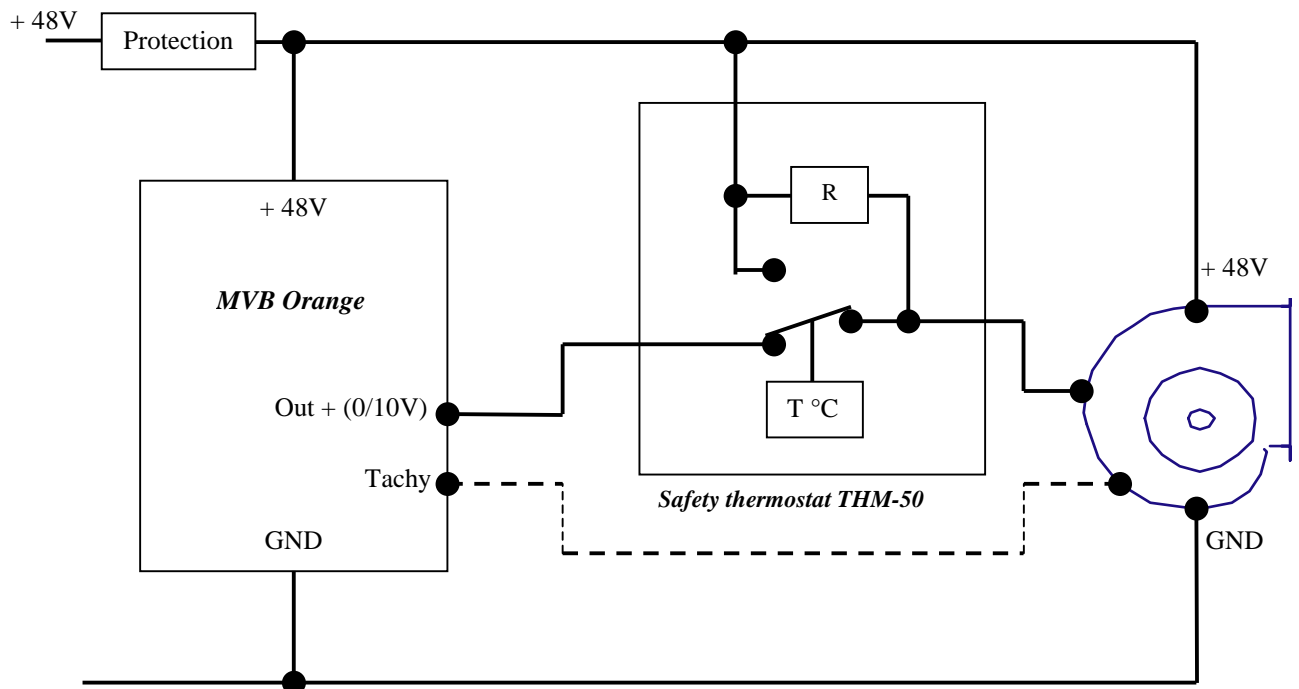
It is necessary to test its operation regularly and always ensure that the setting is suited to the site and equipment.

It is possible to place a second thermostat with a different threshold for an alarm for example.

Caution : there is a need to relay with a positive security in case of dual control (ventilation + air intake motor, air conditioning, etc ...). Contact your dealer for details.

If the recommendations given are not respected, SODALEC disclaims any liability and may withdraw the guarantee for this product.

Example schema installation of a safety thermostat :



The resistance R must be adjusted depending on the type of fan used.

## 19. Version history

<b>Version</b>	<b>Modifications</b>
1.0	Initial version
2.0	Added the paragraph "Mixing servomotor control" New alarm management Additional condition for switching from Cold Production to ventilation
4.0	Added the paragraph "Monitoring output ventilation" Added a locking code for the modification of parameters Added a Door Detection input Added the Cold Production without action feedback mode
4.0A	Added Tachometer alarm in the list Added installation schema of the safety thermostat
4.0B	Correction of the range of the Maximum ambient temperature set point
4.0C	Correction of the ventilation output default settings
4.1A	Correction of the range of Delta T Mini, Delta T Maxi and Delta T. Added a Minimum optimized ventilation in Installer.
4.2A	Added the thermostat function on relay number 3 and the very low outside temperature.
4.3A	Change of the opening register and adding of the register relay

## 20. Default settings

### 20.1. Installer settings

Code	Description	Possible values	Default settings
00	Ventilation output sensor	1 : Sensor 1, 2 : Sensor 2, 3 : Sensor 1 +2	<b>1</b>
01	Ventilation curve selection	1: standard curve 2: adjustable curve	<b>1</b>
02	Cold production delay	1 to 999 minutes	<b>60 mn</b>
03	Hygro relay set point	0 to 100 %	<b>80%</b>
04	Hysteresis hygro relay	0 to 10 %	<b>5%</b>
05	Alarm high point difference	0 to 10°C in steps of 0.2	<b>5.0°C</b>
06	Absolute alarm high point	30 to 45°C in steps of 0.2	<b>42.0°C</b>
07	Mixing threshold set point	-15 to 10°C in steps of 0.2	<b>0.0°C</b>
08	Mixing range	0 to 20°C in steps of 0.2	<b>10.0°C</b>
10	Calibration of sensor 1	-5.0 / +5.0°C in steps of 0.2	<b>0.0°C</b>
11	Calibration of sensor 2	-5.0 / +5.0°C in steps of 0.2	<b>0.0°C</b>
12	Calibration outside sensor	-5.0 / +5.0°C in steps of 0.2	<b>0.0°C</b>
13	Calibration of hygro sensor	-25 to + 25% in steps of 1	<b>0°C</b>
14	Thermostat set point	5 to 8°C in steps of 0.2	<b>7.0°C</b>
15	Hysteresis thermostat	2 to 5°C in steps of 0.2	<b>3.0°C</b>
20	Ventilation output 0%	0.0 to 10V in steps of 0.1	<b>0 V</b>
21	Ventilation output 10%	0.0 to 10V in steps of 0.1	<b>1.0 V</b>
22	Ventilation output 20%	0.0 to 10V in steps of 0.1	<b>2.0 V</b>
23	Ventilation output 40%	0.0 to 10V in steps of 0.1	<b>4.0 V</b>
24	Ventilation output 60%	0.0 to 10V in steps of 0.1	<b>6.0 V</b>
25	Ventilation output 80%	0.0 to 10V in steps of 0.1	<b>8.0 V</b>
26	Ventilation output 100%	0.0 to 10V in steps of 0.1	<b>10.0 V</b>
30	Tachometer monitoring	YES / NO	<b>OFF</b>
31	Tachometer high point	0 to 255 in steps of 1	<b>0</b>
32	Tachometer low point	0 to 255 in steps of 1	<b>0</b>
33	Tachometer delay	1 to 30 min	<b>1 mn</b>
40	Register output voltage 0%	0.0 to 10V in steps of 0.1	<b>0.0V</b>
41	Register output voltage 100%	0.0 to 10V in steps of 0.1	<b>10.0V</b>
44	Minimum optimized ventilation	0 to 50% in steps of 1%	<b>0%</b>
45	Mixing servomotor mode	0 or 1	<b>0</b>
46	Locking code	000 to YYY	<b>000</b>
47	Backup ventilation mode	ON / OFF	<b>ON</b>
48	Backup ventilation set point	0 to 51°C in steps of 0.2	<b>38.0°C</b>
49	Door detection	ON / OFF	<b>OFF</b>
50	Monitoring output voltage 0%	0.0 to 10V in steps of 0.1	<b>0.0V</b>
51	Monitoring output voltage 1%	0.0 to 10V in steps of 0.1	<b>0.1V</b>
52	Monitoring output voltage 10%	0.0 to 10V in steps of 0.1	<b>1.0V</b>
53	Monitoring output voltage 20%	0.0 to 10V in steps of 0.1	<b>2.0V</b>
54	Monitoring output voltage 40%	0.0 to 10V in steps of 0.1	<b>4.0V</b>
55	Monitoring output voltage 60%	0.0 to 10V in steps of 0.1	<b>6.0V</b>
56	Monitoring output voltage 80%	0.0 to 10V in steps of 0.1	<b>8.0V</b>
57	Monitoring output voltage 100%	0.0 to 10V in steps of 0.1	<b>10.0V</b>

## 20.2. User settings

Codes	Description	Possible values	Default settings
00	Ambient temperature	0 to 51°C in steps of 0.2	
01	Outside temperature	-40 to 51°C in steps of 0.2	
02	Level of ventilation	0 to 100 %	
03	Low Limit Ambient Temperature	16 to 51°C in steps of 0.2	<b>20°C</b>
04	Mini Ventilation	0 to 100 %	<b>0%</b>
05	Maxi Ventilation	0 to 100 %	<b>100%</b>
06	Mini Delta T	-5 to 10°C in steps of 0.2	<b>2.0°C</b>
07	Maxi Delta T	-5 to 10°C in steps of 0.2	<b>5.0°C</b>
08	Summer/Winter Difference	0 to 10°C in steps of 0.2	<b>2.0°C</b>
09	Resultant set point	0 to 51°C in steps of 0.2	
10	Mini outside Temperature Point	-40 to 51°C in steps of 0.2	<b>0.0°C</b>
11	Delta T	-40 to 51°C in steps of 0.2	
12	Range	0 to 10°C in steps of 0.2	<b>8.0°C</b>
13	Mode	1: Auto 2: Winter 3: Summer	<b>1</b>
14	Summer mini outside temperature	-40 to 51°C in steps of 0.2	<b>18.0°C</b>
15	Summer maxi outside temperature	-40 to 51°C in steps of 0.2	<b>30.0°C</b>
16	Cold production	OFF / Fr. / Fr.r	<b>OFF</b>
17	Ambient temperature high point	0 to 51°C in steps of 0.2	<b>35.0°C</b>
20	Hygrometry	0 to 100 %	
21	Maximum hygrometry	0 to 100 %	<b>80%</b>
22	Hygrometry Action	0 to +10°C	<b>+2°C</b>
30	Register level	0 to 100 %	
31	Mini Register	0 to 100 %	<b>0%</b>
32	Maxi Register	0 to 100 %	<b>100%</b>
33	Register Delay	0 to 50 min	<b>20 mn</b>
34	Minimum ambient temperature set point	0 to 51°C in steps of 0.2	<b>5.0°C</b>
35	Maximum ambient temperature set point	30 to 45°C in steps of 0.2	<b>40.0°C</b>







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