Chorus

GEWISS

Easy temperature/humidity sensor - flush-mounting

CE

KNX

GW 1x769H

Technical manual

Contents

1 Introduction

This manual explains the functions of the "**KNX Easy temperature and humidity adjustment sensors**" (GW1x769H), and how they are set and configured with the aid of the ETS configuration software.

2 Application

With the aid of a KNX Easy timed thermostat (GW 1x764 - GW 1x764H) or a KNX Easy thermostat (GW 1x765 - GW 1x765H), the KNX Easy flush-mounting temperature adjustment sensor allows you to manage the temperature of the room where it is installed (or of another room, when used with an external temperature sensor).

The sensor is not equipped with its own visualisation and command elements, so it must be used with a KNX device (e.g. a KNX Easy thermostat or a KNX Easy timed thermostat) that can control its parameters (HVAC or Setpoint mode and operating type).

The sensor is also able to detect the humidity, and as a result turn a dehumidifier/humidifier on/off; the humidity values are transmitted on the bus and are displayed on the supervisor or on the KNX Easy timed thermostats (GW 10 764H - GW 12 764H - GW 14 764H) or the KNX Easy thermostats (GW 10 765H - GW 12 765H – GW 14 765H).

The temperature adjustment and humidity parts are independent of each other, and the main functions are indicated below:

- **Temperature control**
    - 2 points, with ON/OFF commands
    - proportional-integral control with PWM commands
- **Fancoil management**
    - fancoil speed control (3 speeds) with ON/OFF selection commands
    - management of 2-way or 4-way systems, with ON/OFF commands
- **Operating mode setting**
    - 2 types of remote control via BUS: HVAC (1 byte object) and setpoint (2 byte object)
- **Operating Setpoint setting**
    - 4 possible setpoints in heating mode, and 4 in cooling mode
- **Temperature measurement**
    - with a built-in sensor
    - mixed built-in sensor / KNX temperature adjustment sensor / external temperature sensor with definition of the relative weight
- **Underfloor sensor**
    - setting of threshold value for floor temperature alarm
- **Temperature control for specific zones:**
    - with the operating mode received from the Master device, and the use of a local setpoint
- **Scenes**
    - memorisation and activation of 8 scenes (value 0..63)
- **Auxiliary input**
    - for a potential-free contact (window contact) or an external NTC temperature probe (e.g. protective sensor for under-floor heating)
- **Other functions:**
    - setting of temperature adjustment mode (Eco/Precom/Comf/Off) via BUS
    - setting of the functioning type (heating/air cooling) from the BUS
    - transmission of the status information (mode, type), measured temperature and current setpoint on the BUS
- **Humidity:**
    - internal sensor for measuring the specific humidity in g/kg
    - calculation of the relative humidity expressed as a percentage
    - 5 thresholds for switching the humidifier/dehumidifier on/off, with 1-bit, 1-Byte and 2-Byte objects

2.1 Association limits

Maximum number of group addresses: 254
Maximum number of associations: 254

This means that up to 254 group addresses can be defined, and up to 254 associations can be made (communication objects and group addresses).

3 *"Settings"* menu

The **Settings** menu contains only the parameter for configuring the programming mode - either ETS ("System" mode) or Easy - via the Easy software controller.

If **ETS mode** is selected, two further parameters appear, for configuring the functioning of the **operation LED** and the **Status LED active load**, as shown in Fig. 3.1.
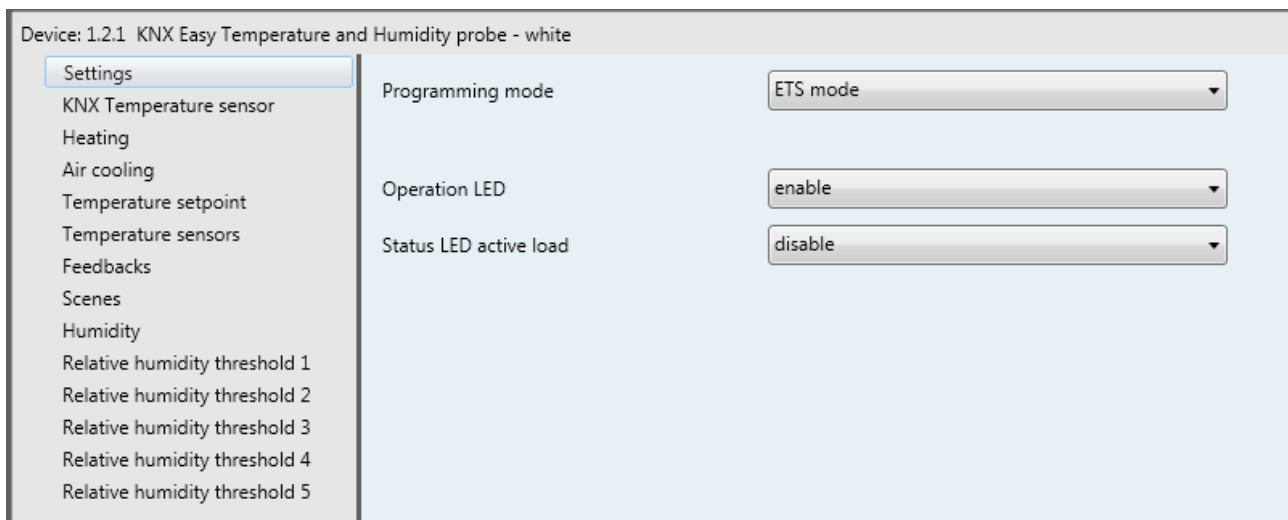

Device: 1.2.1 KNX Easy Temperature and Humidity probe - white

Settings	Programming mode	ETS mode
KNX Temperature sensor		
Heating		
Air cooling	Operation LED	enable
Temperature setpoint		
Temperature sensors	Status LED active load	disable
Feedbacks		
Scenes		
Humidity		
Relative humidity threshold 1		
Relative humidity threshold 2		
Relative humidity threshold 3		
Relative humidity threshold 4		
Relative humidity threshold 5		

Fig. 3.1

3.1 Parameters

➢ *3.1.1 Programming mode*
Determines the programming mode for the device:

- *Easy mode (default value)*
  This option must be selected if the device is to be configured with the Easy controller software.
  If the device has been previously configured with ETS and it is to be included in an Easy project, download the application via ETS with this parameter selected in "Easy mode" to allow the Easy controller software to then be able to configure it.
- *ETS mode*
  This option must be selected if the device is configured with ETS ("System Mode").
  In ETS mode, the following LED configuration parameters are visible.

➢ *3.1.2 Operation LED*
The **"Operation LED"** parameter is used to enable the luminous signalling of the green LED, indicating that the device is working correctly. The values that can be set are:

- *disable*
- *enable (default value)*

➤ *3.1.3 Status LED active load*

The **"Status LED active load"** parameter is used to enable the luminous signalling of the red LED identifying the activation of the solenoid valve corresponding to the active operating mode. The values that can be set are:

- *disable (default value)*
- *enable*

Selecting **enable**, the red LED turns on when the control algorithm activates the relative temperature adjustment valve. If the valve feedback is active, the red signal flashes if there is no valve status feedback.

4 "KNX temperature adjustment sensor" menu

The **KNX temperature adjustment sensor** menu contains the parameters used to enable the various functions implemented by the device for the remote control of the KNX sensor that, not having its own display and control device, must rely on another device to control and display the operating parameters.
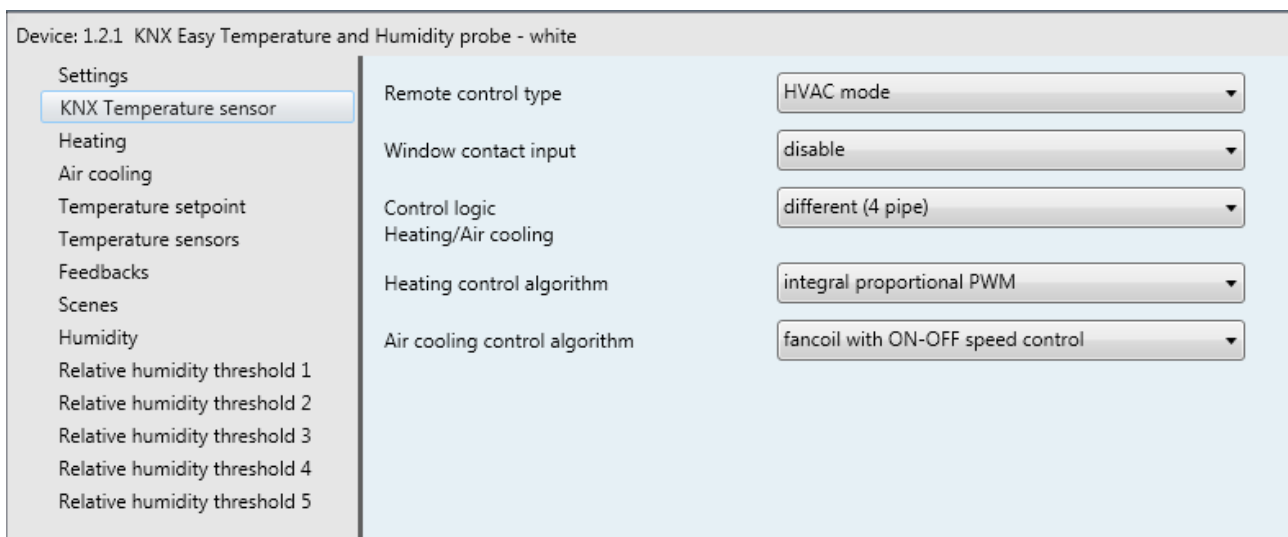

Fig. 4.1

The device is configured so it can manage the temperature adjustment system with the aid of a remote device (such as the timed thermostat/programmer or KNX Easy flush-mounting thermostat). With this configuration, the device does not control the entire system but only a part of it, called a zone. There is a remote device in the system that controls its operating mode and type; in this case, the KNX sensor controls the temperature of the environment where it is located whereas it is the remote device that decides the functioning set by the user. The operating parameters of the device cannot be changed locally.

The type of temperature adjustment functioning (heating/cooling) is managed remotely via the ***Functioning type input*** communication object (Data Point Type: 1.100 DPT_Heat/Cool), which makes it possible to receive the remote functioning type setting commands.
When the application is downloaded, the set functioning type is HEATING.

4.1 Parameters

➢ *4.1.1 Remote control type*

The device can be controlled remotely via a single setpoint, or by changing the active HVAC mode; the **"Remote control type"** parameter is used to set the type of control that the remote device performs on the KNX probe. The values that can be set are:

- *HVAC mode (default value)*
  Selecting **HVAC mode** displays the *HVAC mode input* communication object (Data Point Type: 20.102 DPT_HVACMode), via which the remote device modifies the HVAC mode of the probe.
- *setpoint*
  Selecting **setpoint** displays the *Setpoint input* communication object (Data Point Type: 9.001 DPT_Value_Temp), via which the remote device modifies the operating setpoint of the probe.

If the remote control type is **HVAC mode**, there is a value setting limit (between the various setpoints belonging to the same functioning type) that must be respected. This limit is determined by the following relation:

- $T_{antifreeze} \leq T_{economy} \leq T_{precomfort} \leq T_{comfort}$ in heating mode ("T" indicates the general value of the mode setpoint)
- $T_{comfort} \leq T_{precomfort} \leq T_{economy} \leq T_{high\ temp.\ protection}$ in air cooling mode ("T" indicates the general value of the mode setpoint)

If the remote control type is **setpoint**, there is a value setting limit (between the various setpoints belonging to the same functioning type) that must be respected. This limit is determined by the following relation:

- $T_{building\ protection} \leq T_{functioning}$ in heating mode ("T" indicates the general value of the setpoint)
- $T_{functioning} \leq T_{building\ protection}$ in air cooling mode ("T" indicates the general value of the setpoint)

There is also a priority constraint between the different functions of the device and the different communication objects that can be used for the remote commands. It is summarised in the following table:

Priority	Object	Size
Maximum	Window contact function via the BUS/ Window contact function, aux input	1 bit/-
Minimum	HVAC mode input/Setpoint input/Scene	1 byte/2 byte/ 1 byte

➤ *4.1.2 Window contact input*

The device implements the window contact function which makes it possible, when an "open window" condition is detected by a remote device, to force the KNX probe to HVAC OFF/Building Protection mode if the remote control type is **HVAC mode**, or to set the Building Protection setpoint if the remote control type is **setpoint** (NB: "Building Protection" status means anti-freeze protection in heating mode, or overtemperature protection in cooling mode).When the "closed window" condition is restored, the KNX sensor resumes the condition it was in beforehand.

The **Window contact input** parameter is used to enable the "window contact" function of the KNX probe. The values that can be set are:

- *disable*
  The window contact function is not managed
- *enable (default value)*
  Select **enable** to view the *Window status input* object (Data Point Type: 1.019 DPT_Window_Door), which makes it possible for the device to be aware of the window status.

➤ *4.1.3 Control logic Heating/Air cooling*

The KNX sensor implements a stand alone control logic by using various control algorithms. Given the different types of temperature adjustment systems, it is possible to dedicate a common solenoid valve control object to the heating and air cooling system or dedicate one to each of the two types of operation. The **Control logic Heating/Air cooling** parameter defines whether the system control logic (and therefore the control communication object) is common to both heating and air cooling, or whether it is different. The values that can be set are:

- *common (2-pipe)*
  Selecting **common** displays the **Heating/Cooling control algorithm** and **Heating/Cooling valve status feedback** parameters, via which you can set the common control algorithm and the relative status feedback.
- *different (4-pipe)*   *(default value)*
  Selecting **different (4-pipe)** displays the **Heating control algorithm** and **"Cooling control algorithm"** parameters, via which you can specify a suitable separate algorithm for heating and cooling.

➤ *4.1.4 Heating control algorithm*

The **"Heating control algorithm"** parameter is used to define the control algorithm used for the heating system. The values that can be set are:

- *2 points ON-OFF(default value)*
  Select **2 points ON-OFF** to view the **"Regulation differential (tenths of °C)"** parameter in the **Heating** menu, and the *Heating valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.
- *PWM proportional-integral*
  Select **PWM proportional integral** to view the **"Select heating system"**, **"Proportional band"**, **"Integration time"** and "Cycle time" parameters in the Heating menu, along with the *Heating valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.
- *fancoil with ON-OFF speed control*
  Select **fancoil with ON-OFF speed control** to view the **"Valve regulation differential (tenths of °C)"**, **"Speed 1 regulation differential (tenths of °C)"**, **"Speed 2 regulation differential (tenths of °C)"**, **"Speed 3 regulation differential (tenths of °C)"**, **"Speed 1 inertia time (seconds)"**, **"Speed 2 inertia time (seconds)"**, **"Speed 3 inertia time (seconds)"** and **"Fancoil speed status feedback"** parameters in the **Heating** menu, along with the *Heating fan V1 switching*, *Heating fan V2 switching* and *Heating fan V3 switching* communication objects (Data Point Type: 1.001 DPT_Switch), via which the device sends the command telegrams to the actuator in order to alter the fancoil speed.

➢ *4.1.5 Air cooling control algorithm*

The **"Air cooling control algorithm"** parameter is used to define the control algorithm used for the air cooling system. The values that can be set are:

- *2 points ON-OFF(default value)*
  Select **2 points ON-OFF** to view the **"Regulation differential (tenths of °C)"** parameter in the **Air cooling** menu, and the *Air cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.

- *PWM proportional-integral*
  Select **PWM proportional integral** to view the **"Select air cooling system"**, **"Proportional band"**, **"Integration time"** and "Cycle time" parameters in the **Air cooling** menu, along with the *Air cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.

- *fancoil with ON-OFF speed control*
  Select **fancoil with ON-OFF speed control** to view the **"Valve regulation differential (tenths of °C)"**, **"Speed 1 regulation differential (tenths of °C)"**, **"Speed 2 regulation differential (tenths of °C)"**, **"Speed 3 regulation differential (tenths of °C)"**, **"Speed 1 inertia time (seconds)"**, **"Speed 2 inertia time (seconds)"**, **"Speed 3 inertia time (seconds)"** and **"Fancoil speed status feedback"** parameters in the **Cooling** menu, along with the *Cooling fan V1 switching*, *Cooling fan V2 switching* and *Cooling fan V3 switching* communication objects (Data Point Type: 1.001 DPT_Switch), via which the device sends the command telegrams to the actuator in order to alter the fancoil speed.

➢ *4.1.6 Heating/air cooling control algorithm*

The **"Heating/Air cooling control algorithm"** parameter defines the control algorithm used for the common (2-pipe) heating/air cooling system. The values that can be set are:

- *2 points ON-OFF(default value)*
  Select **2 points ON-OFF** to view the "Regulation differential (tenths of °C)" parameter in the **Heating** and **Cooling** menu, along with the *Heating/Cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.

- *PWM proportional-integral*
  Select **PWM proportional integral** in the **Heating** and **Cooling** menu to display the **"Select heating system"** (**"Select air cooling system"** in the **Air cooling** menu), **"Proportional band"**, **"Integration time"** and **"Cycle time"** parameters, along with the *Heating/Air cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch) via which the device sends the command telegrams.

- *fancoil with ON-OFF speed control*
  If you select **fancoil with ON-OFF speed control**, the **Heating** and **Air cooling** menus will display the **"Speed 1 regulation differential (tenths of °C)"**, **"Speed 2 regulation differential (tenths of °C)"**, **"Speed 3 regulation differential (tenths of °C)"**, **"Speed 1 inertia time (seconds)"**, **"Speed 2 inertia time (seconds)"**, **"Speed 3 inertia time (seconds)"**, "Fancoil speed status feedback" and "Valve regulation differential (tenths of °C)" parameters, along with the *Heating fan V1 switching*, *Heating fan V2 switching*, *Heating fan V3 switching*, *Air cooling fan V1 switching*, *Air cooling V2 switching* and *Air cooling V3 switching* communication objects 1.001 DPT_Switch), via which the device sends the command telegrams to the actuator in order to alter the fancoil speeds in heating and cooling mode.

  If the control algorithm is fancoil, the format of the heating/air cooling solenoid valve commands (2-way system) is independent of that of the fancoil speed control. When the selected algorithm is fancoil, the solenoid valve control logic is **2 points ON-OFF**. Via the *Heating/air cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch), the device sends the command telegrams to the solenoid valve.

➤ *4.1.7 Heating/air cooling valve status feedback*

The **"Heating/air cooling valve status feedback"** parameter is used to enable the device to receive feedback from the actuator that commands the heating/air cooling solenoid valve; in this way, the device is able to receive the telegram after the solenoid valve switched and to repeat the command if the switching did not take place. The values that can be set are:

- *disable*

  Select **disable** to view the **"Command repetition time with feedback disabled"** parameter. With solenoid valve status feedback disabled, it may be useful to cyclically repeat the command to the actuator that manages the solenoid valve so that if the first command telegram is lost, one of the subsequent ones will be received eventually.

- *enable (default value)*

  Select **enable** to view the *Heating/air cooling valve status feedback* communication object(Data Point Type: 1.001 DPT_Switch).

  When the BUS voltage is restored, the device sends a read request command via the *Heating/air cooling valve status feedback* object in order to be updated about the status of the heating/air cooling solenoid valve.

  With feedback enabled, the device sends the switching command to the solenoid valve and then waits - for one minute of its clock - for the actuator to send the feedback that switching has actually taken place; if this does not happen, it sends the command again to the solenoid valve every minute until it receives the feedback of correct switching. It is possible that, during the normal temperature adjustment process, the actuator status is changed by a command from outside the thermostat (that forces its status to be modified). In this case, the device repeats the valve switching command to realign the status of the actuator with the one determined by the control logic of the thermostat, triggering the process for waiting for confirmation and repeating the command until the confirmation is received.

➤ *4.1.8 Command repetition time with feedback disabled*

If the solenoid valve status feedback is disabled, you can use this parameter to set the time for the cyclical sending of the command to the actuator, in order to be sure it has actually been implemented. The values that can be set are:

- *no repetition*
- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes*   *(default value)*

4.2 Control algorithms

Depending on the selected algorithm (but regardless of whether the control logic is common or different between the two operating types), the logic is as follows:

- *2 points ON-OFF*

The algorithm used for controlling the temperature adjustment system is the classic type, called "2-point control". This type of control involves the turning on and off of the temperature adjustment system following a hysteresis cycle. This means there isn't a single threshold that discriminates between the turning on and off of the system, but two.
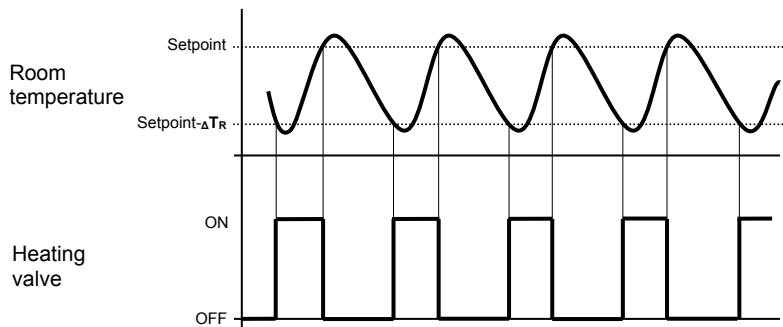
When the measured temperature is lower than the value setpoint-ΔT_R" (where ΔT_R identifies the value of the heating regulation differential) the device turns on the heating system, sending the relative BUS command to the actuator that manages it; when the detected temperature reaches the fixed setpoint value, the device turns off the heating system, sending the relative BUS command to the actuator that manages it.

This makes it clear that there are two decision thresholds for turning the heating system on and off, the first consists of the value "setpoint- ΔT_R" below which the device turns on the system, the second consists of the setpoint value that was set, above which the device turns off the system.
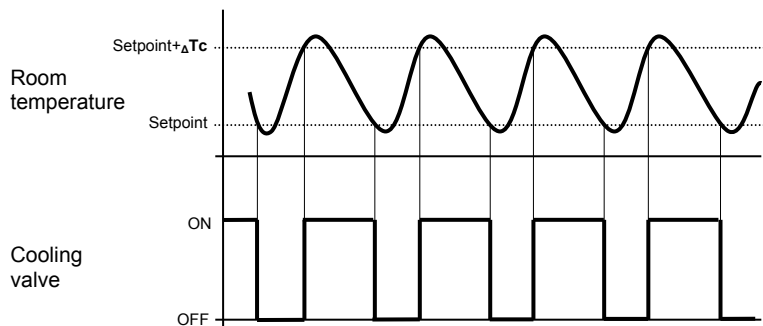
When the measured temperature is higher than the value "setpoint+ ΔT_C" (where ΔT_C identifies the air cooling regulation differential) the device turns on the air cooling system, sending the relative BUS command to the actuator that manages it; when the detected temperature reaches the fixed setpoint value, the device turns off the air cooling system, sending the relative BUS command to the actuator that manages it.

This makes it clear that there are two decision thresholds for turning the air cooling system on and off, the first is the setpoint value that was set, below which the device turns off the system, the second is the value "setpoint+ΔT_C" above which the device turns on the system.

To avoid the continuous switching of the solenoid valves, after an OFF-ON-OFF sequence, the next ON command can only be sent after at least 2 minutes have elapsed.

- *PWM proportional-integral*

The algorithm used to control the temperature adjustment system allows you to drastically reduce the times subject to thermal inertia and introduced by the 2-point control, called PWM control. This type of control involves the modulation of the impulse duty-cycle, represented by the temperature adjustment system

activation time, on the basis of the difference between the fixed set-point and the temperature effectively detected. Two components are needed to calculate the output function: the proportional component and the integral component.

$$u(t) = K_p e(t) + K_i \int_0^t e(\tau)\, d\tau$$
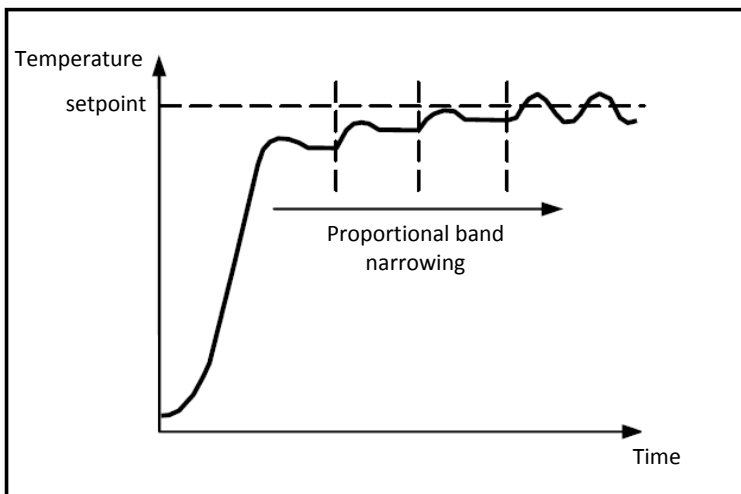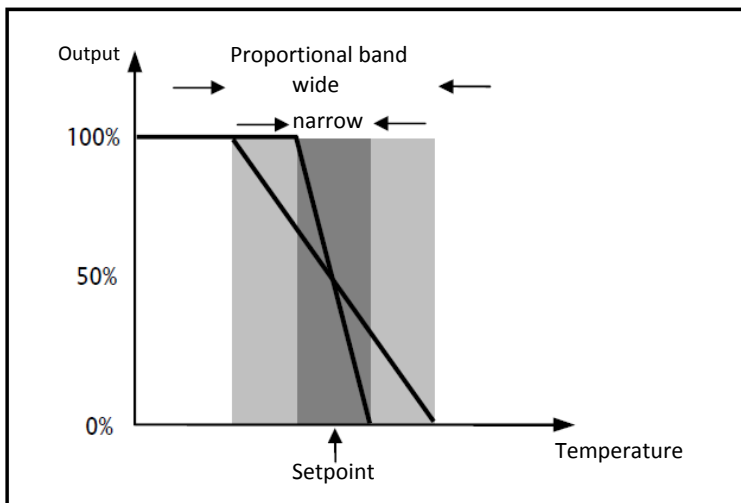
Proportional component

In the proportional component, the output function is proportional to the error (difference between setpoint and measured temperature).

$$P_{out} = K_p e(t)$$

Once the proportional band is defined, the duty-cycle within the band varies between 0% and 100%; outside the band, the duty-cycle will be maximum or minimum depending on the reference limits.

The width of the proportional band determines the extent of the response to the error. If the band is too "narrow", the system will oscillate as it becomes more reactive; if the band is too "wide" the control system is slow. The ideal situation is when the proportional band is as narrow as possible without causing oscillations.

The diagram below shows the effect of narrowing the proportional band until the oscillation point of the output function. A "wide" proportional band results as a straight line in the control, but with an initial error between the setpoint and the actually perceptible temperature. As the band becomes narrower, the temperature approaches the reference value (setpoint) until it becomes unstable and starts to oscillate around it.

Integral component

The contribution of the integral period is proportional to the error (difference between the setpoint and the measured temperature) and its duration. The integral is the sum of the instantaneous error for every moment

of time and provides the accumulated offset that should have been previously corrected. The accumulated error is then added to the regulator output.

$$I_{out} = K_i \int_0^t e(\tau)\, d\tau$$

The integral period accelerates the dynamics of the process towards the setpoint and eliminates the residuals of the stationary error status that takes place with a pure proportional controller.

The integration time is the parameter that determines the action of the integral component. The longer the integration time, the slower the modification of the output and hence the slower the system response. If the time is too short, the threshold value will be exceeded (overshoot), and the function will swing around the set-point.
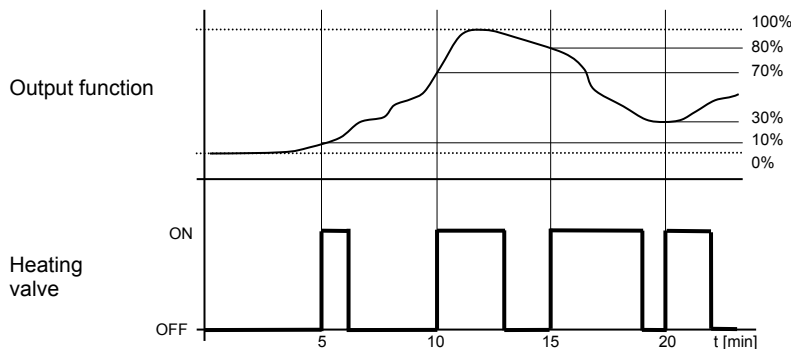
The device keeps the heating system switched on for a cycle time percentage that depends on the output function of the proportional-integral control; the device continuously regulates the heating system, modulating the system turning on-off times with a duty-cycle (shown to the right along the vertical axis) that depends on the output function value calculated at every time interval equal to the cycle time. The cycle time is reinitialised every time the reference set-point is modified.

With this type of algorithm, there is no longer a hysteresis cycle on the heating device, so the inertia times (system heating and air cooling times) introduced by the 2-point control are eliminated. This produces energy savings because the system does not remain switched on when it is not needed and, once the required temperature has been reached, it continues to provide a heat limited contribution to compensate for the environmental heat dispersion.
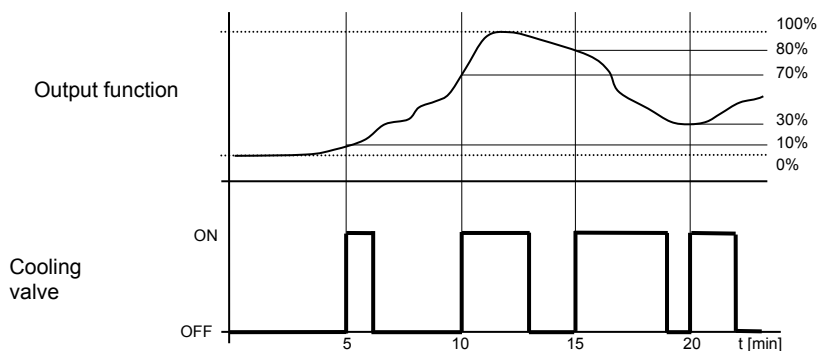
As seen in the figure, the device keeps the air cooling system switched on for a cycle time percentage that depends on the output function of the proportional-integral control; the device continuously regulates the air cooling system, modulating the system turning on-off times with a duty-cycle (shown to the right along the vertical axis) that depends on the output function value calculated at every time interval equal to the cycle time. The cycle time is reinitialised every time the reference set-point is modified.

With this type of algorithm, there is no longer a hysteresis cycle on the air cooling device, so the inertia times (system air cooling and heating times) introduced by the 2-point control are eliminated. This produces energy savings because the system does not remain switched on when it is not needed and, once the required temperature has been reached, it continues to provide a limited contribution of cold air to compensate for the contribution of environmental heat.

- *fancoil with ON-OFF speed control*

The type of control that is applied when the fancoil control is enabled is similar to the 2-point control analysed in previous sections, which is to turn the fancoil speed on /off based on the difference between the setpoint that was set and the measured temperature.

The substantial difference with the 2-point algorithm is that, in this case, there is only one stage on which the hysteresis cycle is carried out, fixing the speed on and off thresholds, but there can be three (depending on the number of fancoil speeds). In short, this means that each stage corresponds to a speed and when the difference between the measured temperature and the setpoint that was set causes a certain speed to be turned on, this means that before turning on the new speed, the other two must absolutely be turned off.
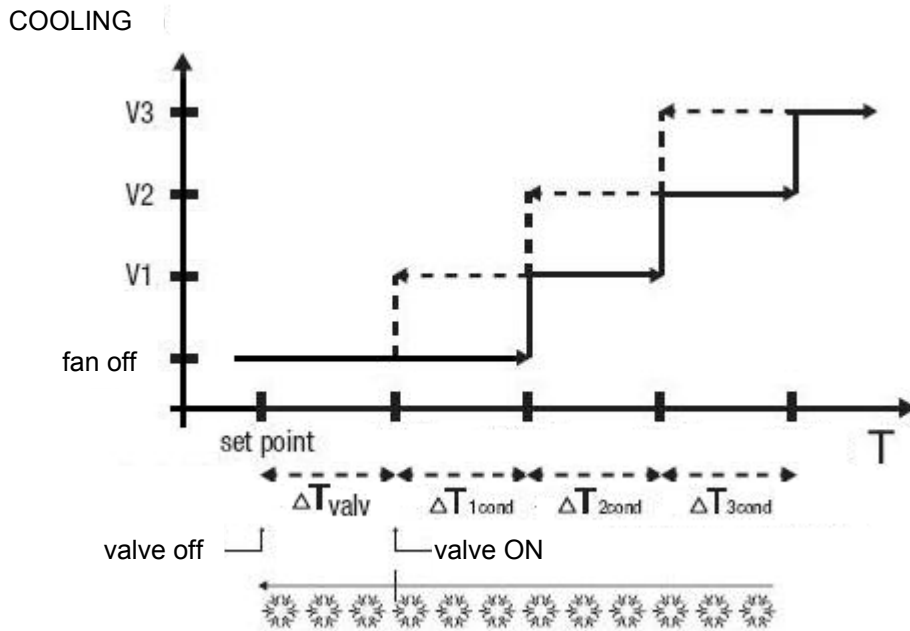
HEATING
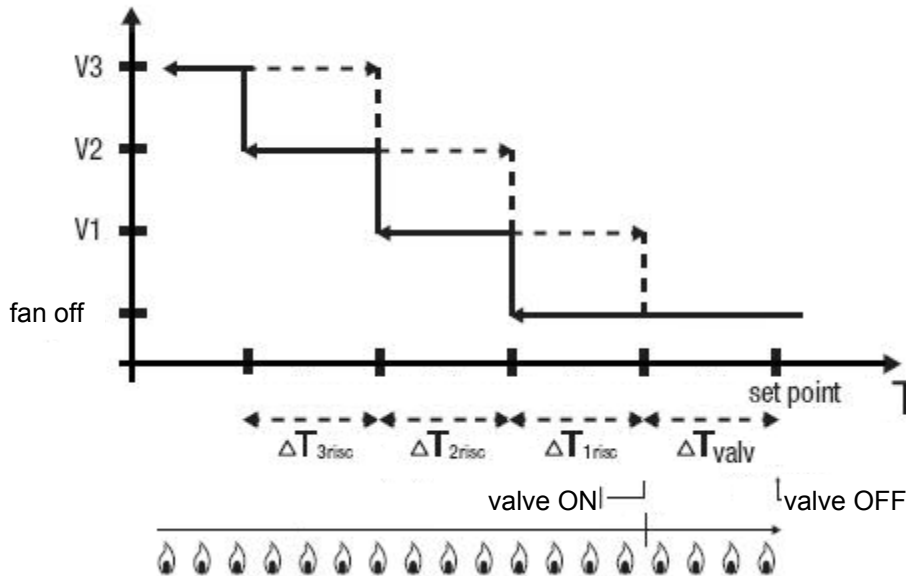
The figure refers to the control of the fancoil speeds with three operating stages for heating. The chart shows that each stage has a hysteresis cycle, and each speed is associated with two thresholds that determine its activation and deactivation. The thresholds are determined by values set for the various regulation differentials, and can be summarised as follows:

o   Speed V1 (1st stage): the speed is turned on when the temperature value is lower than the value "setpoint-ΔT_{valv}-$\Delta T_{1\ heat}$" and turned off when the temperature value reaches the value "setpoint-ΔT_{valv}" (or the "setpoint" value if $\Delta T_{1\ heat}$=0). The first speed is also turned off when a higher speed needs to be activated

o   Speed V2 (2nd stage): the speed is turned on when the temperature value is lower than the value "setpoint-ΔT_{valv}-$\Delta T_{1\ heat}$-$\Delta T_{2\ heat}$" and turned off when the temperature value reaches the value "setpoint-ΔT_{valv}-$\Delta T_{1\ heat}$". The second speed is also turned off when the V3 speed needs to be activated

o   Speed V3 (3rd stage): the speed is turned on when the temperature value is lower than the value "setpoint-ΔT_{valv}-$\Delta T_{1\ heat}$-$\Delta T_{2\ heat}$-$\Delta T_{3\ heat}$" and turned off when the temperature value reaches the value "setpoint-ΔT_{valv}-$\Delta T_{1\ heat}$-$\Delta T_{2\ heat}$"

With regards the heating solenoid valve, once the measured temperature is lower than the value "setpoint-ΔT_{valv}", the KNX probe sends the activation command to the solenoid valve that manages the heating system; the solenoid valve is deactivated when the detected temperature reaches the fixed setpoint value. In this way, the heating of the fancoil can also be exploited for irradiation, without any speed being activated.

COOLING

The figure refers to the control of the speeds of a fancoil with three operating stages for air cooling. The chart shows that each stage has a hysteresis cycle, and each speed is associated with two thresholds that determine its activation and deactivation. The thresholds are determined by values set for the various regulation differentials, and can be summarised as follows:

- Speed V1 (1st stage): the speed is turned on when the temperature value is higher than the value "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$" and turned off when the temperature value reaches the value "setpoint+ΔT_{valv}" (or the "setpoint" value if $\Delta T_{1\ cool}$=0). The first speed is also turned off when a higher speed needs to be activated

- Speed V2 (2nd stage): the speed is turned on when the temperature value is higher than the value "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$+$\Delta T_{2\ cool}$" and turned off when the temperature value reaches the value "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$". The second speed is also turned off when the V3 speed needs to be activated

- Speed V3 (3rd stage): the speed is turned on when the temperature value is higher than the value "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$+$\Delta T_{2\ cool}$+$\Delta T_{3\ cool}$" and turned off when the temperature value reaches the value "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$+$\Delta T_{2\ cool}$"

With regards the air cooling solenoid valve, once the measured temperature is higher than the value "setpoint+ΔT_{valv}", the KNX probe sends the activation command to the solenoid valve that manages the air cooling system; the solenoid valve is deactivated when the detected temperature reaches the fixed setpoint value. In this way, the air cooling of the fancoil can also be exploited for irradiation, without any speed being activated.

To avoid continuous switching, the KNX probe can wait up to 2 minutes before sending the activation command to the actuator that controls the temperature adjustment system, or to the actuator channels that command the fancoil speeds.

5 *"Heating"* menu

The **Heating** menu contains the characteristic parameters of the load control algorithms for the heating system. Depending on the parameter settings in the "KNX temperature adjustment probe" menu, certain parameters for configuring the selected heating mode and type of system are made visible.
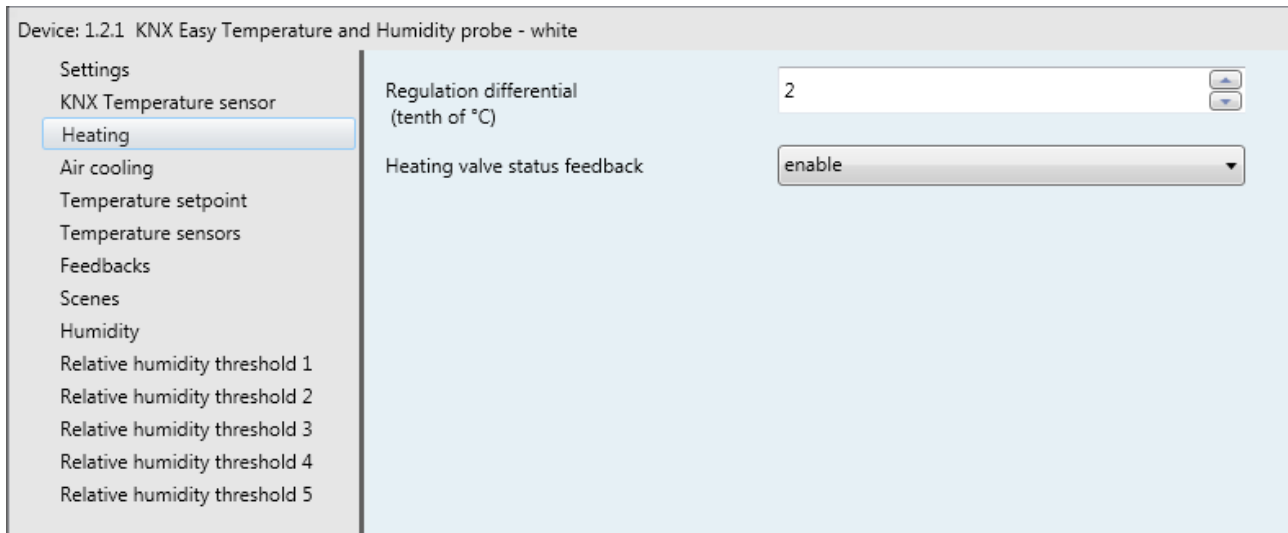

Fig. 5.1

5.1 Parameters

➢ 5.1.1 Regulation differential (tenths of °C)
This parameter is used to set the value of the adjustment differential of the **2 points ON-OFF** heating control algorithm (see par. 4.2) which, when subtracted from the setpoint value, determines the threshold below which the heating system is activated in 2-point control mode. The values that can be set are:

- *from 1 to 20 in steps of 1 (default value 2)*

➢ 5.1.2 Select heating system
If the heating control algorithm is "PWM proportional integral", this parameter appears. It is used to automatically size the operating parameters (Proportional band and Integration time) of the proportional integral algorithm according to the selected heating system. The values that can be set are:

- **hot water heating**
  Selecting **hot water heating**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **3.5°C** and **150** are displayed.
- **underfloor heating (default value)**
  Selecting **floor heating**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **3.5°C** and **240** are displayed.
- **fancoil unit**
  Selecting **fancoil unit**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **3 °C** and **90** are displayed.
- **electric heating**
  Selecting **electric heating**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **3°C** and **100** are displayed.
- **customised**
  Selecting **customised**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified.

➢ *5.1.3 Proportional band*

The **"Proportional band"** parameter is used to set the width of the PWM proportional band of the **PWM proportional integral** heating control algorithm (see par. 4.2) which, when subtracted from the setpoint, determines the lower limit of the proportional band used for the proportional integral control. The values that can be set are:

- *from 1.0°C to 10°C in steps of 0.5°C (default value 2.0°C)*

➢ *5.1.4 Integration time*

The **"Integration time"** parameter is used to set the contribution of the integral action in the proportional integral control (see par. 4.2). The values that can be set are:

- *from 1 to 250 minutes in steps of 1 (default value 60)*
- *no integral -* if this value is selected, the integral component is zero and the effect of a pure proportional control is obtained.

➢ *5.1.5 Cycle time*

The **"Cycle time"** parameter is used to set the frequency with which the device carries out PWM modulation, modifying the duty-cycle. The values that can be set are:

- *5 minutes*
- *10 minutes*
- *15 minutes*
- *20 minutes (default value)*
- *30 minutes*
- *40 minutes*
- *50 minutes*
- *60 minutes*

➢ *5.1.6 Valve regulation differential (tenths of °C)*

If the control algorithm is fancoil, the format of the heating solenoid valve commands (4-way system) is independent of that of the fancoil speed control. When the selected algorithm is fancoil, the solenoid valve control logic is **2 points ON-OFF**. Via the *Heating valve switching* communication object (Data Point Type: 1.001 DPT_Switch), the device sends the command telegrams to the heating solenoid valve.

This parameter is used to set the value of the regulation differential value of the 2-point control of the solenoid valve for fancoil operation (already mentioned in paragraph 4.2). The values that can be set are:

- *from 1 to 20 in steps of 1* (default value 2)

➢ *5.1.7 Speed 1 regulation differential (tenths of °C)*

The **"Speed 1 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the first speed of the **fancoil with speed control ON-OFF** heating control algorithm, already mentioned in paragraph 4.2. This value, subtracted from the "setpoint-ΔT_{valv}" value, determines the value of the threshold below which fancoil speed 1 is activated. The values that can be set are:

- *from 0 to 20 in steps of 1* (default value 2)
  Setting the value **0** obtains the condition "$\Delta T_{1\ heat} = \Delta T_{valv}$", so the value of the speed 1 activation threshold is "setpoint-ΔT_{valv}" and the deactivation value is "setpoint".

➢ *5.1.8 Speed 2 regulation differential (tenths of °C)*

The **"Speed 2 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the second speed of the **fancoil with speed control ON-OFF** heating control algorithm,

already mentioned in paragraph 4.2. This value, subtracted from the "setpoint-$\Delta T_{valv}\Delta T_{1\ heat}$" value, determines the threshold below which fancoil speed 2 is activated. The values that can be set are:

- *from 1 to 20 in steps of 1* **(default value 2)**

➤ *5.1.9 Speed 3 regulation differential (tenths of °C)*

The **"Speed 3 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the third speed of the **fancoil with speed control ON-OFF** heating control algorithm, already mentioned in paragraph 4.2. This value, subtracted from the "setpoint-$\Delta T_{valv}\Delta T_{1\ heat}$-$\Delta T_{2\ heat}$" value, determines the threshold below which fancoil speed 3 is activated. The values that can be set are:

- *from 1 to 20 in steps of 1* **(default value 2)**

➤ *5.1.10 Speed 1 inertia time (seconds)*

Defining the inertia times is useful for preserving the integrity of the fancoil, because the fact of turning off the power supply to the motor (turning off the actuator) of a fancoil speed does not guarantee that current is no longer circulating in the winding and the instantaneous supply of power to another winding could damage the fancoil (simultaneous powering of multiple windings).

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 1 is active, a delay can be inserted between the moment in which the speed 1 deactivation notice is received (or the moment when the speed 1 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 1 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 1 and the activation of the new speed. The values that can be set are:

- *from 0 to 10 in steps of 1* **(default value 0)**

➤ *5.1.11 Speed 2 inertia time (seconds)*

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 2 is active, a delay can be inserted between the moment in which the speed 2 deactivation notice is received (or the moment when the speed 2 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 2 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 1 and the activation of the new speed. The values that can be set are:

- *from 0 to 10 in steps of 1* **(default value 0)**

➤ *5.1.12 Speed 3 inertia time (seconds)*

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 3 is active, a delay can be inserted between the moment in which the speed 3 deactivation notice is received (or the moment when the speed 3 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 3 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 3 and the activation of the new speed. The values that can be set are:
- *from 0 to 10 in steps of 1* **(default value 0)**

➤ *5.1.13 Heating valve status feedback*

The **"Heating valve status feedback"** parameter is used to enable the device to receive feedback from the actuator that commands the heating solenoid valve. In this way, the device is able to receive the telegram after the solenoid valve switched and to repeat the command if the switching did not take place. The values that can be set are:

- *disable*
  select **disable** to view the **"Command repetition time with feedback disabled"** parameter
- *enable (default value)*
  Select **enable** to view the *Heating valve status feedback* communication object (Data Point Type: 1.001 DPT_Switch).
  When the BUS voltage is restored, the device sends a read request command via the *Heating valve status feedback* object in order to be updated about the status of the heating solenoid valve.

With feedback enabled, the device sends the switching command to the solenoid valve and then waits - for one minute of its clock - for the actuator to send the feedback that switching has actually taken place; if this does not happen, it sends the command again to the solenoid valve every minute until it receives the feedback of correct switching. It is possible that, during the normal temperature adjustment process, the actuator status is changed by a command from outside the KNX probe (that forces its status to be modified). In this case, the device repeats the valve switching command to realign the status of the actuator with the one determined by the control logic of the KNX probe, triggering the process of waiting for confirmation and repeating the command until confirmation is received. In the same manner, if the control algorithm is operating in heating mode and feedback is received that the air cooling valve is activated, the algorithm is suspended immediately while the command for deactivating the air cooling solenoid valve is sent (triggering the process for waiting for confirmation and repeating the command until the confirmation is received) until the problem is resolved.

➢ 5.1.14 Command repetition time with feedback disabled

With the heating solenoid valve status feedback disabled, it may be useful to cyclically repeat the command to the actuator that manages the solenoid valve so that if the first command telegram is lost, one of the subsequent ones will be received eventually. The **"Command repetition time with feedback disabled"** parameter is used to define the frequency for cyclical sending. The values that can be set are:

- *no repetition*
- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes (default value)*

➢ 5.1.15 Fancoil speed status feedback

If the control algorithm is fancoil, the possibility to receive feedback about the fancoil speed ON status is more important than the valve feedback. By enabling feedback, the device is always aware of the status of the speeds it commands; in fact, if a command is sent to the actuator that manages a certain speed, and the actuator does not send confirmation to the KNX probe within one minute that the command was implemented, the probe will send the command again every minute until correct confirmation is received from the actuator. As the system does not always have actuators dedicated to the fancoil with mechanically interlocked outputs, the logical interlock function must be implemented on a firmware level which makes it possible to turn on a fancoil speed that is different than what is on only if the correct feedback is received from the latter that it was turned off (providing speed feedback is enabled); as long as the KNX probe does not receive feedback that the active speed has been deactivated, it will not send the new speed activation command. This prevents multiple fancoil windings from being powered at the same time, which would cause the fancoil itself to break. The **"Fancoil speed status feedback"** parameter enables the device to receive feedback from the actuator that commands the fancoil speeds. The values that can be set are:

- *disable*
  select **disable** to view the **"Fancoil speed command repetition time"** parameter.
- *enable (default value)*
  selecting **enable** displays the *Heating fan V1 status feedback, Heating fan V2 status feedback* and *Heating fan V3 status feedback* communication objects (Data Point Type: 1.001 DPT_Switch).
  When the BUS voltage is restored, the device sends a read request command via the *Heating fan V1 status feedback, Heating fan V2 status feedback, Heating fan V3 status feedback* objects in order to be updated about the activation status of the fancoil speeds.
  If the fancoil feedback is disabled, deactivation commands of the inactive speeds must be sent for every speed activation command. In the same way, every speed deactivation command must be sent together with deactivation commands for the other speeds.

➢ *5.1.16 Fancoil speed command repetition time*

The **"Fancoil speed command repetition time"** parameter is used to define the frequency for cyclical sending to the fancoil speeds. The values that can be set are:

- *no repetition*
- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes (default value)*

By selecting any value other than **no repetition**, the commands are repeated on all the speed communication objects.

6   *"Air cooling"* menu

The **Air cooling** menu contains the characteristic parameters of the load control algorithms for the air cooling system. Depending on the parameter settings in the "KNX temperature adjustment probe" menu, certain parameters for configuring the selected cooling mode and type of system are made visible.
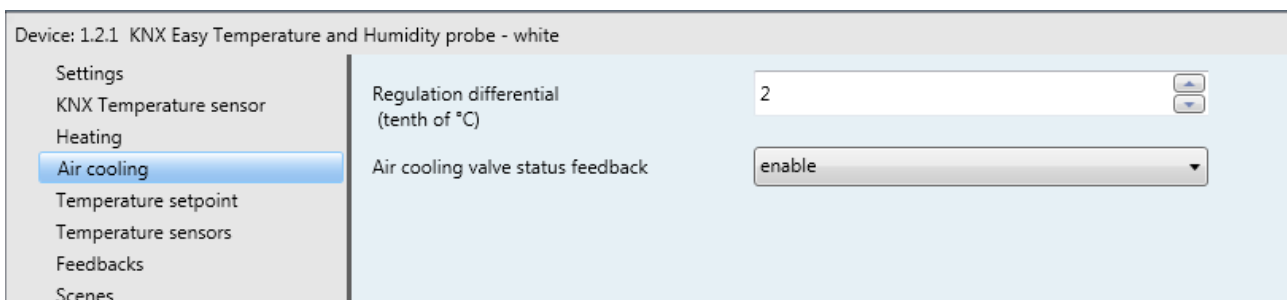

Fig. 6.1

6.1   *Parameters*

➢ *6.1.1 Regulation differential (tenths of °C)*

This parameter is used to set the value of the adjustment differential of the **2 points ON-OFF** heating control algorithm (see par. 4.2) which, when added to the setpoint value, determines the threshold below which the cooling system is activated in 2-point control mode. The values that can be set are:

- *from 1 to 20 in steps of 1 (default value 2)*

➢ *6.1.2 Select air cooling system*

If the cooling control algorithm is "PWM proportional integral", this parameter appears. It is used to automatically size the operating parameters (Proportional band and Integration time) of the proportional integral algorithm according to the selected cooling system. The values that can be set are:

- *ceiling air cooling* **(default value)**
  Selecting **ceiling cooling**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **5°C** and **240** are displayed.
- **fancoil unit**
  Selecting **fancoil unit**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified, and the values **4°C** and **90** are displayed.

- **customised**
  Selecting **customised**, the **"Proportional band"** and **"Integration time (minutes)"** parameters will be displayed but cannot be modified.

➢ *6.1.3 Proportional band*

The **"Proportional band"** parameter is used to set the width of the PWM proportional band of the **PWM proportional integral** cooling control algorithm (see par. 4.2) which, when added to the setpoint, determines the upper limit of the proportional band used for the proportional integral control. The values that can be set are:

- *from 1.0°C to 10°C in steps of 0.5°C (default value 2.0°C)*

➢ *6.1.4 Integration time*

The **"Integration time"** parameter is used to set the contribution of the integral action in the proportional integral control (see par. 4.2). The values that can be set are:

- *from 1 to 250 minutes in steps of 1 (default value 60)*
- *no integral -* if this value is selected, the integral component is zero and the effect of a pure proportional control is obtained.

➢ *6.1.5 Cycle time*

The **"Cycle time"** parameter is used to set the frequency with which the device carries out PWM modulation, modifying the duty-cycle. The values that can be set are:

- *5 minutes*
- *10 minutes*
- *15 minutes*
- *20 minutes (default value)*
- *30 minutes*
- *40 minutes*
- *50 minutes*
- *60 minutes*

➢ *6.1.6 Valve regulation differential (tenths of °C)*

If the control algorithm is fancoil, the format of the air cooling solenoid valve commands (4-way system) is independent of that of the fancoil speed control. When the selected algorithm is fancoil, the solenoid valve control logic is **2 points ON-OFF**. Via the *Air cooling valve switching* communication object (Data Point Type: 1.001 DPT_Switch), the device sends the command telegrams to the air cooling solenoid valve.
This parameter is used to set the value of the regulation differential value of the 2-point control of the solenoid valve for fancoil operation (already mentioned in paragraph 4.2). The values that can be set are:

- *from 1 to 20 in steps of 1* (default value 2)

➢ *6.1.7 Speed 1 regulation differential (tenths of °C)*

The **"Speed 1 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the first speed of the **fancoil with speed control ON-OFF** cooling control algorithm, already mentioned in paragraph 4.2. This value, added to the "setpoint+ΔT_{valv}" value, determines the threshold below which fancoil speed 1 is activated. The values that can be set are:

- *from 0 to 20 in steps of 1* (default value 2)

Setting the value **0** obtains the condition "$\Delta T_{1\ cool} = \Delta T_{valv}$", so the value of the speed 1 activation threshold is "setpoint+ΔT_{valv}" and the deactivation value is "setpoint".

➢ 6.1.8 Speed 2 regulation differential (tenths of °C)

The **"Speed 2 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the second speed of the **fancoil with speed control ON-OFF** cooling control algorithm, already mentioned in paragraph 4.2. This value, added to the "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$" value, determines the threshold above which fancoil speed 2 is activated. The values that can be set are:

- *from 1 to 20 in steps of 1* **(default value 2)**

➢ 6.1.9 Speed 3 regulation differential (tenths of °C)

The **"Speed 3 regulation differential (tenths of °C)"** parameter is used to set the value of the regulation differential of the third speed of the **fancoil with speed control ON-OFF** cooling control algorithm, already mentioned in paragraph 4.2. This value, added to the "setpoint+ΔT_{valv}+$\Delta T_{1\ cool}$+$\Delta T_{2\ cool}$" value, determines the threshold above which fancoil speed 3 is activated. The values that can be set are:

- *from 1 to 20 in steps of 1* **(default value 2)**

➢ 6.1.10 Speed 1 inertia time (seconds)

Defining the inertia times is useful for preserving the integrity of the fancoil, because the fact of turning off the power supply to the motor (turning off the actuator) of a fancoil speed does not guarantee that current is no longer circulating in the winding and the instantaneous supply of power to another winding could damage the fancoil (simultaneous powering of multiple windings).

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 1 is active, a delay can be inserted between the moment in which the speed 1 deactivation notice is received (or the moment when the speed 1 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 1 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 1 and the activation of the new speed. The values that can be set are:

- *from 0 to 10 in steps of 1* **(default value 0)**

➢ 6.1.11 Speed 2 inertia time (seconds)

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 2 is active, a delay can be inserted between the moment in which the speed 2 deactivation notice is received (or the moment when the speed 2 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 2 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 1 and the activation of the new speed. The values that can be set are:

- *from 0 to 10 in steps of 1* **(default value 0)**

➢ 6.1.12 Speed 3 inertia time (seconds)

When, according to the "fancoil with speed control" algorithm, the device must activate any speed and speed 3 is active, a delay can be inserted between the moment in which the speed 3 deactivation notice is received (or the moment when the speed 3 deactivation command is sent, if fancoil speed info is disabled) and the moment in which the activation command for the new speed is sent; the **"Speed 3 inertia time (seconds)"** parameter is used to define the extent of the delay between the deactivation of speed 3 and the activation of the new speed. The values that can be set are:

- *from 0 to 10 in steps of 1* **(default value 0)**

➤ *6.1.13 Air cooling valve status feedback*

The **"Air cooling valve status feedback"** parameter is used to enable the device to receive feedback from the actuator that commands the air cooling solenoid valve. In this way, the device is able to receive the telegram after the solenoid valve switched, and repeat the command if the switching did not take place. The values that can be set are:

- *disable*
  select **disable** to view the **"Command repetition time with feedback disabled"** parameter
- *enable (default value)*
  Select **enable** to view the *Air cooling valve status feedback* communication object (Data Point Type: 1.001 DPT_Switch).
  When the BUS voltage is restored, the device sends a read request command via the *Air cooling valve status feedback* object in order to be updated about the status of the air cooling solenoid valve.

With feedback enabled, the device sends the switching command to the solenoid valve and then waits - for one minute of its clock - for the actuator to send the feedback that switching has actually taken place; if this does not take happen, it sends the command again to the solenoid valve every minute until it receives the feedback of correct switching. It is possible that, during the normal temperature adjustment process, the actuator status is changed by a command from outside the KNX probe (that forces its status to be modified). In this case, the device repeats the valve switching command to realign the status of the actuator with the one determined by the control logic of the KNX probe, triggering the process of waiting for confirmation and repeating the command until confirmation is received. In the same manner, if the control algorithm is operating in cooling mode and feedback is received that the air cooling valve is activated, the algorithm is suspended immediately while the command for deactivating the air cooling solenoid valve is sent (triggering the process of waiting for confirmation and repeating the command until the confirmation is received) until the problem is resolved.

➤ *6.1.14 Command repetition time with feedback disabled*

With the air cooling solenoid valve status feedback disabled, it may be useful to cyclically repeat the command to the actuator that manages the solenoid valve so that if the first command telegram is lost, one of the subsequent ones will be received eventually. The **"Command repetition time with feedback disabled"** parameter is used to define the frequency of the cyclical sending. The values that can be set are:

- *no repetition*
- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes (default value)*

➤ *6.1.15 Fancoil speed status feedback*

If the control algorithm is fancoil, the possibility to receive feedback about the fancoil speed ON status is more important than the valve feedback. By enabling feedback, the device is always aware of the status of the speeds it commands; in fact, if a command is sent to the actuator that manages a certain speed, and the actuator does not send confirmation to the KNX probe within one minute that the command was implemented, the probe will send the command again every minute until correct confirmation is received from the actuator. As the system does not always have actuators dedicated to the fancoil with mechanically interlocked outputs, the logical interlock function must be implemented on a firmware level which makes it possible to turn on a fancoil speed that is different than what is on only if the correct feedback is received from the latter that it was turned off (providing speed feedback is enabled); as long as the KNX probe does not receive feedback that the active speed has been deactivated, it will not send the new speed activation command. This prevents multiple fancoil windings from being powered at the same time, which would cause the fancoil itself to break. The **"Fancoil speed status feedback"** parameter enables the device to receive feedback from the actuator that commands the fancoil speeds. The values that can be set are:

- *disable*
  select **disable** to view the **"Fancoil speed command repetition time"** parameter.
- *enable (default value)*
  selecting **enable** displays the *Cooling fan V1 status feedback*, *Cooling fan V2 status feedback* and *Cooling fan V3 status feedback* communication objects (Data Point Type: 1.001 DPT_Switch). When the BUS voltage is restored, the device sends a read request command via the *Air cooling fan V1 status feedback*, *Air cooling fan V2 status feedback*, *Air cooling fan V3 status feedback* objects in order to be updated about the activation status of the fancoil speeds.
  If the fancoil feedback is disabled, deactivation commands of the inactive speeds must be sent for every speed activation command. In the same way, every speed deactivation command must be sent together with deactivation commands for the other speeds.

➢ *6.1.16 Fancoil speed command repetition time*

The **"Fancoil speed command repetition time"** parameter is used to define the frequency of the cyclical sending to the fancoil speeds. The values that can be set are:

- *no repetition*
- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes (default value)*

By selecting any value other than **no repetition**, the commands are repeated on all speed communication objects.

7 "Temperature setpoint" menu

The **Temperature setpoint** menu contains the parameters used to configure the setpoint values of the various temperature adjustment modes of the two functioning types - Heating and Air cooling.

Fig. 7.1

7.1 Parameters

Heating

> ### 7.1.1 Comfort setpoint (tenths of °C)
This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the COMFORT mode for HEATING operation. The values that can be set (in tenths of a degree) are:

- *from 50 to 400 in steps of 1 (default value 200)*

Remember that when setting this value, there is a constraint that it must be higher than the value set for the **"Precomfort setpoint (tenths of °C)"** item for heating operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.2 Precomfort setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the PRECOMFORT mode for HEATING operation. The values that can be set (in tenths of a degree) are:

- *from 50 to 400 in steps of 1 (default value 180)*

Remember that when setting this value, there is a constraint that it must lie between the value set for the **"Comfort setpoint (tenths of °C)"** item and the value set for the **"Economy setpoint (tenths of °C)"** item for heating operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.3 Economy setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the ECONOMY mode for HEATING operation. The values that can be set (in tenths of a degree) are:

- *from 50 to 400 in steps of 1 (default value 160)*

Remember that when setting this value, there is a constraint that it must lie between the value set for the **"Precomfort setpoint (tenths of °C)"** item and the value set for the **"Anti-freeze setpoint (tenths of °C)"** item for heating operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.4 Operating setpoint (tenths of °C)*

This parameter is visible if the remote control type is "setpoint". It is used to fix the setpoint value for HEATING operation. The values that can be set are:

- *from 50 to 400 in steps of 1 (default value 200)*

Remember that this value can be modified via a BUS telegram on the communication object assigned to it.

➢ *7.1.5 Anti-freeze setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the OFF mode for HEATING operation. The values that can be set (in tenths of a degree) are:

- *from 20 to 70 in steps of 1 (default value 50)*

Remember that when setting this value, there is a constraint that it must be lower than the value set for **"Economy setpoint (tenths of °C)"** item for heating operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.6 Anti-freeze setpoint with window open (tenths of °C)*

This parameter is visible if the remote control type is "setpoint". It is used to fix the setpoint value for HEATING operation when the device is disabled via auxiliary input 1 with the window contact function. The values that can be set are:

- *from 20 to 70 in steps of 1 (default value 50)*

Air-cooling

➢ *7.1.7 Comfort setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the COMFORT mode for COOLING operation. The values that can be set (in tenths of a degree) are:

- *from 50 to 400 in steps of 1 (default value 240)*

Remember that when setting this value, there is a constraint that it must be lower than the value set for **"Precomfort setpoint (tenths of °C)"** item for air cooling operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.8 Precomfort setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the PRECOMFORT mode for COOLING operation. The values that can be set (in tenths of a degree) are:

- ● *from 50 to 400 in steps of 1 (default value 260)*

Remember that when setting this value, there is a constraint that it must lie between the value set for **"Comfort setpoint (tenths of °C)"** item and the value set for **"Economy setpoint (tenths of °C)"** item for air cooling operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.9 Economy setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the ECONOMY mode for COOLING operation. The values that can be set (in tenths of a degree) are:

- ● *from 50 to 400 in steps of 1 (default value 280)*

Remember that when setting this value, there is a constraint that it must lie between the value set for **"Precomfort setpoint (tenths of °C)"** item and the value set for **"High temperature protection setpoint (tenths of °C)"** item for air cooling operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.10 Operating setpoint (tenths of °C)*

This parameter is visible if the remote control type is "setpoint". It is used to fix the setpoint value for COOLING operation. The values that can be set are:

- ● *from 50 to 400 in steps of 1 (default value 240)*

Remember that this value can be modified via a BUS telegram on the communication object assigned to it.

➢ *7.1.11 High temperature protection setpoint (tenths of °C)*

This parameter is visible if the remote control type is HVAC mode. It is used to fix the setpoint value of the OFF mode for COOLING operation. The values that can be set (in tenths of a degree) are:

- ● *from 300 to 400 in steps of 1 (default value 350)*

Remember that when setting this value, there is a constraint that it must be higher than the value set for **"Economy setpoint (tenths of °C)"** item for air cooling operation.
Remember that this value cannot be changed once the application has been downloaded.

➢ *7.1.12 High temperature protection setpoint with window open (tenths of °C)*

This parameter is visible if the remote control type is "setpoint". It is used to fix the setpoint value for COOLING operation when the device (in Slave functioning) is switched off manually by the user. The values that can be set are:

- ● *from 300 to 400 in steps of 1 (default value 350)*

8 *"Temperature sensors"* menu

The **Temperature sensors** menu contains the parameters used to configure the operation of the sensor inside the device and the potential NTC external sensor.
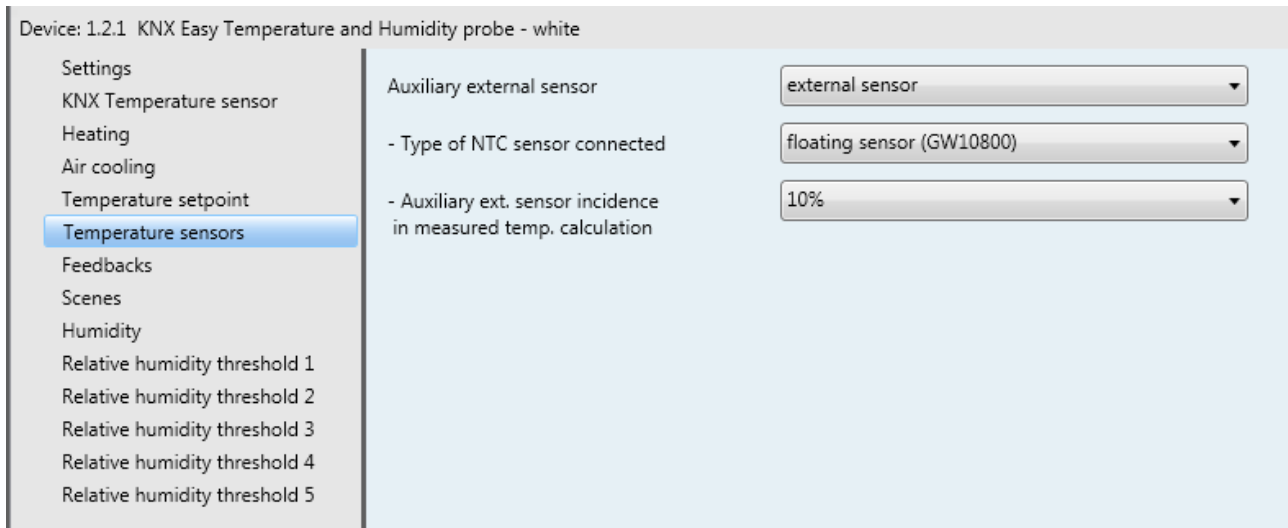

Fig. 8.1

8.1 *Parameters*

➤ *8.1.1 Auxiliary temperature sensor function*

This is used to configure the auxiliary sensor input to connect an NTC temperature sensor for measuring the room temperature or the floor temperature; the terminals of the auxiliary sensor input are used for this function. The values that can be set are:

- *none*   *(default value)*

- *external sensor*
  Selecting **external sensor** displays the **"Type of NTC sensor connected"** and **"Auxiliary external sensor incidence in measured temperature calculation"** *parameters.*

- *floor sensor*
  Selecting **floor sensor** displays the **"Type of NTC sensor connected"** and **"Temperature alarm threshold value (tenths of °C)"** parameters.

➤ *8.1.2 Type of NTC sensor connected*

Different temperature sensors can be connected to the device. Given the different characteristics of each transducer, the **"Type of NTC sensor connected"** parameter is used to define which of the possible sensors will be connected to the device contacts, in order to interface correctly with the sensor. The values that can be set are:

- *Wired sensor (GW10800)*   *(default value)*
- *1-module flush-mounting sensor (GW1x900)*

➢ *8.1.3 Auxiliary external sensor incidence in measured temperature calculation*

Once the auxiliary sensor input has been enabled and an external temperature sensor fitted, the measured temperature will no longer be determined by the device sensor alone, but by the weighted average between the value measured by the device sensor and the value measured by the auxiliary NTC external sensor. The **"Auxiliary ext. sensor incidence in measured temp. calculation"** parameter determines the incidence of the value measured by the auxiliary external sensor when calculating the measured temperature, which ranges from a minimum of 10% to a maximum of 100% (external sensor measured value = measured temperature). The complete formula for the temperature calculation is:

$$T_{measured}= T_{auxiliary\ external\ sensor} \times Incidence_{auxiliary\ external\ sensor}+T_{device\ sensor} \times (100\%-Incidence_{auxiliary\ external\ sensor}).$$

The parameter may assume the following values:

- *from 10% to 100% in steps of 10% (default value 10%)*

If the external temperature sensor is not working properly, its contribution is excluded from the calculation of the measured temperature (which then depends exclusively on the value measured by the device sensor).

➢ *8.1.4 Temperature alarm threshold value (tenths of °C)*

If the auxiliary temperature sensor function is set to "floor sensor", this parameter is visualised. It is used to define the maximum floor temperature above which the device stops heating as the temperature of the conduits is too high and could cause damage (temperature alarm). The floor temperature value is measured using the NTC sensor connected to the device on the contacts of the auxiliary sensor input. The values that can be set are:

- *from 150 to 1000 in steps of 1 (default value 500)*
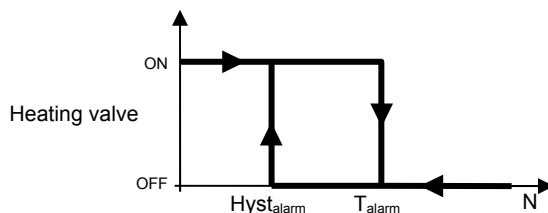
The floor temperature alarm hysteresis threshold (that, subtracted from the temperature alarm threshold, determines the value below which the heating system is turned on again) is fixed and equal to 2°C.
If the floor temperature sensor is not working properly, the temperature alarm is activated immediately (it stops when the floor sensor resumes its normal operation).In the event of a floor temperature alarm, the green LED flashes.

9 "Feedbacks"menu

The **Feedbacks** menu contains the parameters used to set the conditions for sending the feedback that the device sends via BUS telegrams.
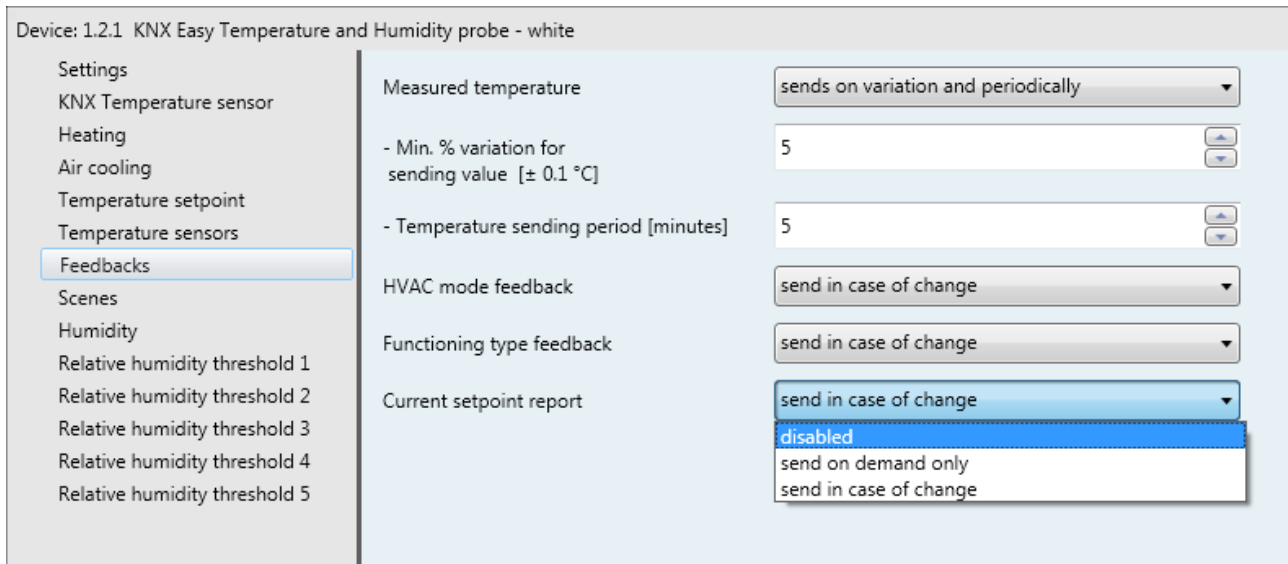

Fig. 9.1

9.1 Parameters

➢ 9.1.1 Measured temperature

This is used to define the conditions for sending the value of the temperature measured by the device (which may or may not be influenced by the external sensor). The values that can be set are:

- **do not send**   **(default value)**
  No object with the measured temperature is sent. Selecting any value other than **do not send** displays the communication object *Measured temperature* (Data Point Type: 9.001 DPT_Temp)

- **send on demand only**
  Selecting the value **send on demand only**, no new parameter will be enabled, as the temperature value is not sent spontaneously by the device (it is only sent in reply to a read request). In this case, it sends the requester a telegram in response to the received command, which includes information about the measured temperature value.

- **send in case of change**
  Selecting **send in case of change** or **send in case of change and periodically** will display the **"Minimum temperature variation for sending the value [± 0.1°C]** parameter, with which you can specify the change above which the device must send the value.

- **send periodically**
  Selecting **send periodically** or **send in case of change and periodically** will display the **"Temperature sending period [minutes]"** parameter, with which you can specify the frequency for sending the measured temperature.

- **send in case of change and periodically**
  Selecting **send in case of change and periodically** displays the **"Minimum temperature variation for sending value [± 0.1°C]** and **"Temperature sending period [minutes]"** parameters, with which you can specify the sending of the measured temperature on the BUS when there is a minimum variation or at the end of the set time.

➢ *9.1.2 Minimum variation for sending value [± 0.1°C]*

The **"Minimum temperature variation for sending value [± 0.1°C]"** parameter (visible if the temperature is sent due to a variation) is used to define the minimum temperature variation - in relation to the last sent value - for generating the spontaneous sending of the new measured value. The values that can be set are:

- *from 1 to 10 in steps of 1 (default value 5)*

➢ *9.1.3 Temperature sending period [minutes]*

The **"Temperature sending period [minutes]"** parameter (visible if the temperature is sent periodically) is used to define the frequency with which the measured temperature feedback telegrams are sent spontaneously. The values that can be set are:

- *from 1 to 255 in steps of 1 (default value 5)*

➢ *9.1.4 HVAC mode feedback*

The **"HVAC mode feedback"** parameter (visible if the remote control type is HVAC mode) is used to enable and set the conditions for sending HVAC mode feedback via the ***HVAC mode feedback*** communication object (Data Point Type: 20.102 DPT_HVACMode). The values that can be set are:

- *disabled (default value)*
- *send on demand only*
  Selecting **send on demand only**, the HVAC mode feedback will not be sent spontaneously by the device via the ***HVAC mode feedback*** communication object. it is only sent in response to a read request via the BUS. In this case, it sends the requester a telegram in response to the received command, which includes information about the HVAC mode set on the device.
- *send in case of change*
  Selecting **send in case of change**, the HVAC mode feedback will be sent spontaneously by the device via the ***HVAC mode feedback*** communication object every time the mode is changed. After a BUS voltage recovery, feedback about the active mode should be sent in order to update any connected devices.

➢ *9.1.5 Functioning type feedback*

The **"Functioning type feedback"** parameter is used to enable and set the conditions for sending feedback about the functioning type (Heating/Air cooling) set on the device via a BUS telegram on the ***Functioning type feedback*** communication object (Data Point Type: 1.100 DPT_Heat/Cool). The values that can be set are:

- *disabled (default value)*
- *send on demand only*
  Selecting **send on demand only** the feedback of the functioning type set on the device is not sent spontaneously by the device via the ***Functioning type feedback*** communication object; it is only sent in response to a read request via the BUS. In this case, it sends the requester a telegram in response to the received command, which includes information about the functioning type set on the device.
- *send in case of change*
  Selecting **send in case of change**, the feedback of the functioning type set on the device is sent spontaneously by the device via the ***Functioning type feedback*** communication object every time the functioning type changes. After a BUS voltage recovery, feedback about the type of active operation should be sent in order to update any connected devices.

➢ *9.1.6 Current setpoint feedback*

This is used to enable and set the conditions for sending the feedback regarding the set current setpoint value by the device via a BUS telegram on the *Current setpoint feedback* communication object (Data Point Type: 9.001 DPT_Temp). The values that can be set are:

- *disabled (default value)*

- *send on demand only*
  Selecting **send on demand only**, feedback about the active setpoint on the device will not be sent spontaneously by the device via the *Current setpoint feedback* communication object. It is only sent in response to a read request via the BUS.In this case, it sends the requester a telegram in response to the received command, which includes information about the current device setpoint.

- *send in case of change*
  Selecting **send in case of change**, the feedback regarding the active setpoint on the device is sent spontaneously by the device via the *Current setpoint feedback* communication object every time there is a change in the setpoint itself. After a BUS voltage recovery, feedback about the active setpoint should be sent in order to update any connected devices.

10 *"Scenes"* menu

The scene function is used to replicate a certain previously memorised condition upon receipt of the scene execution command.
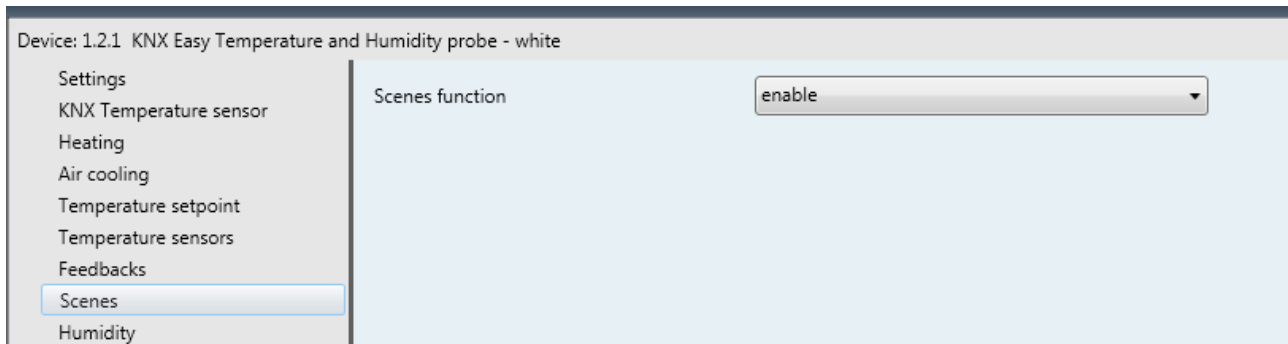
Fig. 10.1

10.1 Parameters

➢ 10.1.1 Scene function

The **Scene function** parameter is used to activate and configure the function, displaying the various function configuration parameters and the relative communication object ***KNX probe scene*** (Data Point Type: 18.001 DPT_SceneControl).
The scene function is used to send two possible commands to the device:
- execute scene, which is a command to assume a determined condition
- store scene, which is a command to memorise the current status (the moment the command is received) of the different functional parameters of the device defined in the configuration phase

This function provides 8 scenes, for which the device can store/reproduce 8 different conditions of these functional parameters. The values that can be set are:

- ***disable (default value)***
- ***enable***
  selecting **enable** displays the ***KNX sensor scene*** communication object via which the scene execution/storage telegrams are received.
  The numerical value used to identify and as a result execute/store the scenes ranges from 0 (scene 1) to 7 (scene 8).
  The KNX probe has various parameters that can change while it is functioning. Those that are involved with the scene function are: HVAC mode (or operating setpoint) and functioning time.

11 *"Humidity"* menu

The **Humidity** menu contains the parameters for configuring the functioning of the internal humidity sensor.
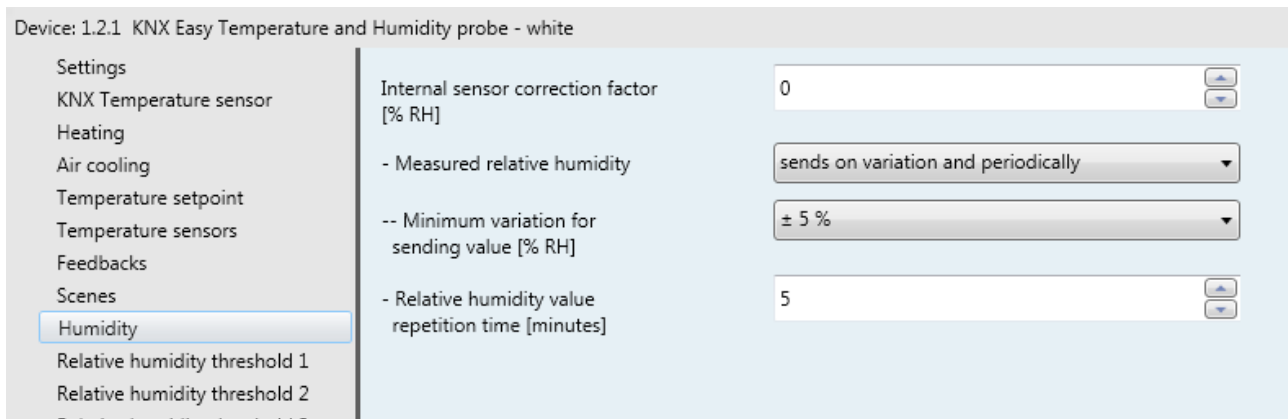

Device: 1.2.1 KNX Easy Temperature and Humidity probe - white

Settings	Internal sensor correction factor [% RH] — 0
KNX Temperature sensor	
Heating	
Air cooling	- Measured relative humidity — sends on variation and periodically
Temperature setpoint	
Temperature sensors	-- Minimum variation for sending value [% RH] — ± 5 %
Feedbacks	
Scenes	- Relative humidity value repetition time [minutes] — 5
Humidity	
Relative humidity threshold 1	
Relative humidity threshold 2	

Fig. 11.1

11.1 Parameters

➢ 11.1.1 Internal sensor correction factor [% RH]
The **"Internal sensor correction factor [% RH]"** parameter is used to set the correction factor to be applied to the relative humidity value measured by the device sensor. The values that can be set are:

- *from -10 to +10 in steps of 1 (default value 0)*

➢ 11.1.2 Measured relative humidity
The **"Measured relative humidity"** parameter defines which event should trigger the sending - on the BUS - of the *Measured relative humidity* object (Data Point Type: 9.007 DPT_Value_Humidity). The parameter may assume the following values:

- *do not send*   *(default value)*
  No object with the measured humidity value is sent. Selecting any value other than **do not send** displays the *Measured relative humidity* communication object.
- *send on demand only*
  Selecting **send on demand only**, no new parameter will be enabled, as the relative humidity value is not sent spontaneously by the device (it is only sent in reply to a read request via the BUS). In this case, it sends the requester a telegram in response to the received command, which includes information about the measured humidity value.
- *send in case of change*
  Selecting **send in case of change** or **send in case of change and periodically** will display the **"Minimum variation for sending value [%RH]"** parameter, with which you can specify the change above which the device must send the value.
- *send periodically*
  Selecting **send periodically** or **send in case of change and periodically** will display the **"Relative humidity value repetition time [minutes]"** parameter, with which you can specify the frequency for sending the measured humidity value.
- *send in case of change and periodically*
  Selecting **send in case of change and periodically** displays the **"Minimum variation for sending value [%RH]** and **"Relative humidity sending time [minutes]"** parameters, with which you can specify the sending of the measured humidity on the BUS when there is a minimum variation or at the end of the set time.

➢ *11.1.3 Minimum variation for sending value [% RH]*

The **"Minimum variation for sending value [%RH]"** parameter (visible if the humidity is sent on variation) is used to define the minimum humidity variation - in relation to the last humidity value sent - for generating the spontaneous sending of the new measured value. The values that can be set are:

- ± 1%   1
- ± 2%   2
- **± 5%   5 (default)**
- ± 10%   10

➢ *11.1.4 Relative humidity value sending time [minutes]*

The **"Relative humidity value sending time [minutes]"** parameter (visible if the humidity is sent periodically) is used to define the frequency with which the measured relative humidity feedback telegrams are sent spontaneously. The values that can be set are:

- *from 1 to 255 in steps of 1 (default value 5)*

12 *"Relative humidity threshold X"* menu

The device allows you to configure 5 relative humidity thresholds, associated with the sending of a BUS command when the fixed threshold value is exceeded. All 5 thresholds are identical and therefore, for the sake of simplicity, the operation and dedicated parameters are summarised in this paragraph, indicating the reference threshold with a general "x" (1 .. 5). The structure of the menu is as follows:
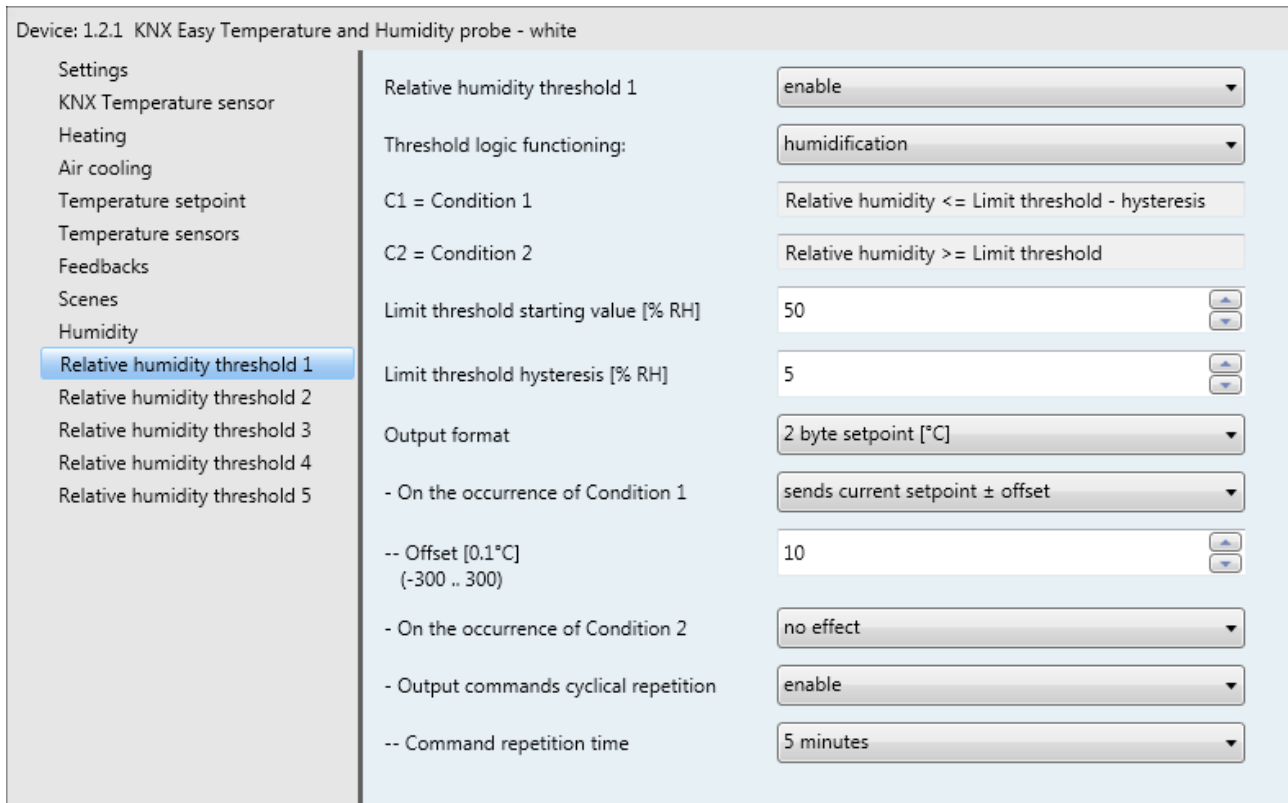

Fig. 12.1

12.1 Parameters

➢ 12.1.1 Relative humidity threshold x
The **"Relative humidity threshold x"** parameter allows you to activate and configure the function, making the various function configuration parameters and communication objects visible. The values that can be set are:

- *disable (default value)*
- *enable*
  Selecting **enable** displays the configuration parameters and the ***Relative humidity threshold x feedback*** communication object (Data Point Type: 9.007 DPT_Value_Humidity). The telegrams are sent via this object following a BUS request, spontaneously upon each threshold variation,and when the BUS voltage is restored.

➢ 12.1.2 Threshold logic functioning
The **"Threshold logic functioning"** parameter is used to define the type of hysteresis to be adopted and, as a result, the hysteresis limit values. The parameter may assume the following values:

- *humidification (default value)*
  By selecting humidification, the two conditions will be defined as follows:

  Condition 1 = Relative humidity ≤ Limit threshold – Hysteresis

Condition 2 = Relative humidity ≤ Limit threshold
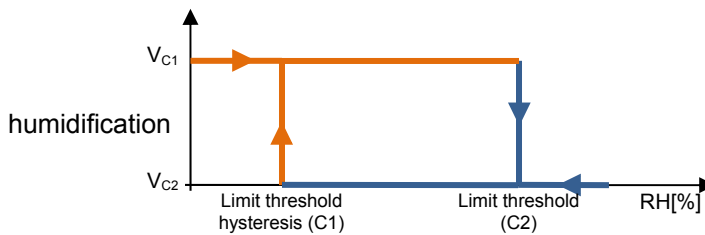
When the relative humidity of reference is lower than value C1 (limit threshold hysteresis), the device will send the command associated with Condition 1. When the relative humidity of reference reaches value C2 (limit threshold), the device will send the command associated with Condition 2.

- **dehumidification**
  By selecting dehumidification, the two conditions will be defined as follows:

  Condition 1 = Relative humidity ≥ Limit threshold + Hysteresis
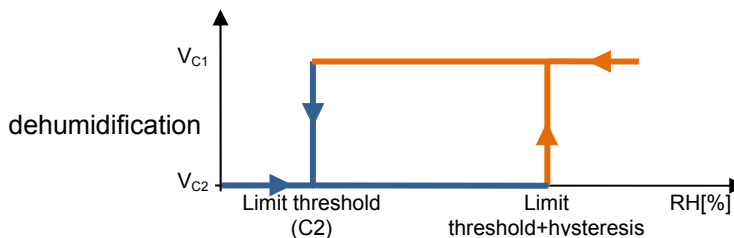 Condition 2 = Relative humidity ≤ Limit threshold

When the relative humidity of reference is higher than value C1 (limit threshold+hysteresis), the device will send the command associated with Condition 1. When the relative humidity of reference reaches value C2 (limit threshold), the device will send the command associated with Condition 2.

➢ *12.1.3 Limit threshold starting value [%RH]*
Via the **"Limit threshold starting value [%RH]"** parameter you can set the initial value of the limit threshold associated with the relative humidity threshold x (which can be changed via BUS via the specific communication object). The parameter may assume the following values:

- *from 0 to 100 in steps of 1 (default value 50)*

➢ *12.1.4 Limit threshold hysteresis [%RH]*
The **"Limit threshold hysteresis [%RH]"** parameter can be used to set the hysteresis value that, when added to or subtracted from the limit threshold, helps define the second limit value for sending the commands. This parameter may assume the following values:

- *from 1 to 20 in steps of 1 (default value 5)*

➢ *12.1.5 Output format*
For each threshold, it is possible to send a BUS command (when conditions 1 and 2 arise) via the *Relative humidity threshold x output* communication object. The parameter **"Output format"** is used to set the format and coding of the BUS telegram that will be sent by the device. The value set for this item will cause the values set for the **"On the occurrence of condition 1"** and **"On the occurrence of condition 2"** parameters to change as a result.
The **"On the occurrence of condition 1"** parameter is used to set the command or value to be sent when condition 1 arises.
The **"On the occurrence of condition 2"** parameter is used to set the command or value to be sent when condition 2 arises.

The values that can be set are:

- *1 bit (default value)*
  If the output format is **1 bit**, this displays the **Relative humidity threshold x output** communication object (Data Point Type: 1.001 DPT_Switch) and the **"Relative humidity threshold output status feedback"** parameter. The values that can be set for the two parameters listed above are:

    – **no effect**   **0 (default value on occurrence of cond 2)**
    – *send 0*   *1*
    – **send 1**   **2 (default value on occurrence of cond 1)**

- *1 byte HVAC mode*
  If the output format is **1 byte HVAC mode**, this displays the *Relative humidity threshold x output* communication object (Data Point Type: 20.102 DPT_HVACMode). The values that can be set for the two parameters listed above are:

    – **no effect**   **0 (default value cond 2)**
    – send auto   1
    – **send comfort**   **2 (default value cond 1)**
    – send precomfort   3
    – send economy   4
    – send off (building protection)   5
    – send current HVAC mode ± offset   6
    – send reference HVAC mode ± offset   7

  Selecting **send current HVAC mode ± offset** displays the **"Offset (-3 .. +3)"** parameter, whereas the output value will be the current HVAC mode of the device to which the offset will be added (the order of the modes is: auto, comfort, precomfort, economy, off); if device operation is at setpoint, no output value will be sent.

  EXAMPLE: to switch from "comfort" mode to "economy" mode, the offset must be "+2". The set is not circular, so once the limit values are reached ("auto" or "off") the calculation is ended even if the offset that is set is greater than what is actually applied to reach the limit value.

  The **"Offset (-3 .. +3)"** parameter is used to set the offset to be applied to the current HVAC mode to obtain the value to be sent via the *Relative humidity threshold x output* object. The possible values are:

    - from -3 to +3 in steps of 1 **(default value +1)**

- *2 byte setpoint in °C*
  If the output format is **2 byte setpoint in °C**, this displays the *Relative humidity threshold x output* communication object (Data Point Type: 9.001 DPT_Value_Temp). The values that can be set for the two parameters listed above are:

    - **no effect**   **0 (default value cond 2)**
    - **send current setpoint ± offset**   **1 (default value cond 1)**

  Selecting **send current setpoint ± offset** displays the **"Offset [0.1°C] (-300 .. +300)"** parameter, whereas the output value will be the current setpoint of the device to which the offset is added.

  The **"Offset [0.1°C] (-300 .. +300)"** parameter is used to set the offset to be applied to the current setpoint to obtain the value to be sent via the *Relative humidity threshold x output* object. The possible values are:

    - from -300 to +300 in steps of 1 **(default value +10)**

The *Relative humidity threshold x output* object is sent upon demand, spontaneously on variation of the current condition (C1 or C2), periodically (if cyclical repetition is enabled) and when the BUS voltage is restored only if condition C1 or C2 has occurred (otherwise, no value is sent).

➢ *12.1.6 Output commands cyclical repetition*

The **"Output commands cyclical repetition"** parameter is used to enable the periodic sending of the output value. The possible values are:

- *disable (default value)*
- *enable*
  Selecting **enable** displays the **"Command repetition time"** parameter which is used to set the repetition period of the commands.

➢ *12.1.7 Command repetition time*

The **"Command repetition time"** parameter is used to set the frequency for repeating the commands. The possible values are:

- *1 minute*
- *2 minutes*
- *3 minutes*
- *4 minutes*
- *5 minutes*   *(default)*

13 Communication objects

The communication objects are listed in the following table:

Output objects:

#	Object name	Object function	Description	Datapoint type
6	HVAC mode feedback	Auto/Eco/Precom/Comf/Off	Sends HVAC mode setting	20.102 DPT_HVACMode
7	Functioning type feedback	Heating/Air cooling	Sends HVAC type setting	1.100 DPT_Heat/Cool
8	Measured temperature	Value °C	Sends temperature values in Celsius calculated by internal sensor	9.001 DPT_Temp
9	Current setpoint report	Value °C	Sends current setpoint setting values in Celsius	9.001 DPT_Temp
10	Measured relative humidity	Value [% RH]	Sends relative humidity values measured by internal sensor	9.007 DPT_Value_Humidity
12	Relative humidity threshold 1 feedback	Value [% RH]	Sends current threshold 1 setting value	9.007 DPT_Value_Humidity
14	Relative humidity threshold 2 feedback	Value [% RH]	Sends current threshold 2 setting value	9.007 DPT_Value_Humidity
16	Relative humidity threshold 3 feedback	Value [% RH]	Sends current threshold 3 setting value	9.007 DPT_Value_Humidity
18	Relative humidity threshold 4 feedback	Value [% RH]	Sends current threshold 4 setting value	9.007 DPT_Value_Humidity
20	Relative humidity threshold 5 feedback	Value [% RH]	Sends current threshold 5 setting value	9.007 DPT_Value_Humidity
22	Heating valve switch	On/Off	Sends switching On/Off command to the heating valve	1.001 DPT_Switch
22	Heating/Cooling valve switch	On/Off	Sends switching On/Off command to the heating/cooling valve	1.001 DPT_Switch
24	Air cooling valve switch	On/Off	Sends switching On/Off command to the cooling valve	1.001 DPT_Switch
26	V1 fan switching heating	On/Off	Sends On/Off switching commands speed 1 heating fan coil	1.001 DPT_Switch
28	V2 fan switching heating	On/Off	Sends On/Off switching commands speed 2 heating fan coil	1.001 DPT_Switch
30	V3 fan switching heating	On/Off	Sends On/Off switching commands speed 3 heating fan coil	1.001 DPT_Switch
32	V1 fan switching air cooling	On/Off	Sends On/Off switching commands speed 1 air cooling fan coil	1.001 DPT_Switch
34	V2 fan switching air cooling	On/Off	Sends On/Off switching commands speed 2 air cooling fan coil	1.001 DPT_Switch
36	V3 fan switching air cooling	On/Off	Sends On/Off switching commands speed 3 air cooling fan coil	1.001 DPT_Switch
38	Relative humidity threshold 1 output	On/Off	Sends On/Off relative humidity threshold 1 values	1.001 DPT_Switch
39	Relative humidity threshold 1 output	HVAC Mode (com/precom/eco/off)	Sends HVAC mode status about relative humidity threshold 1	20.102 DPT_HVAC_Mode
40	Relative humidity threshold 1 output	Setpoint value [°C]	Sends setpoint values in Celsius about relative humidity threshold 1	9.001 DPT_Value_Temp
42	Relative humidity threshold 2 output	On/Off	Sends On/Off relative humidity threshold 2 values	1.001 DPT_Switch
43	Relative humidity threshold 2 output	HVAC mode (com/precom/eco/off)	Sends HVAC mode status about relative humidity threshold 2	20.102 DPT_HVAC_Mode
44	Relative humidity threshold 2 output	Setpoint value [°C]	Sends setpoint values in Celsius about relative humidity threshold 2	9.001 DPT_Value_Temp
46	Relative humidity threshold 3 output	On/Off	Sends On/Off relative humidity threshold 3 values	1.001 DPT_Switch
47	Relative humidity threshold 3 output	HVAC mode (com/precom/eco/off)	Sends HVAC mode status about relative humidity threshold 3	20.102 DPT_HVAC_Mode
48	Relative humidity threshold 3 output	Setpoint value [°C]	Sends setpoint values in Celsius about relative humidity threshold 3	9.001 DPT_Value_Temp
50	Relative humidity threshold 4 output	On/Off	Sends On/Off relative humidity threshold 4 values	1.001 DPT_Switch
51	Relative humidity threshold 4 output	HVAC mode (com/precom/eco/off)	Sends HVAC mode status about relative humidity threshold 4	20.102 DPT_HVAC_Mode

52	Relative humidity threshold 4 output	Setpoint value [°C]	Sends setpoint values in Celsius about relative humidity threshold 4	9.001 DPT_Value_Temp
54	Relative humidity threshold 5 output	On/Off	Sends On/Off relative humidity threshold 5 values	1.001 DPT_Switch
55	Relative humidity threshold 5 output	HVAC mode (com/precom/eco/off)	Sends HVAC mode status about relative humidity threshold 5	20.102 DPT_HVAC_Mode
56	Relative humidity threshold 5 output	Setpoint value [°C]	Sends setpoint values in Celsius about relative humidity threshold 5	9.001 DPT_Value_Temp

Input objects:

#	Object name	Object function	Description	Datapoint type
0	HVAC mode input	Auto/Eco/Precom/Comf/Off	Input setting of HVAC mode	20.102 DPT_HVACMode
1	Window status input	1 = open/0 = closed	Input from a window contact	1.019 DPT_Window_Door
2	KNX sensor scene	Execute/Store	Command to execute/store sensor scene	18.001 DPT_SceneControl
3	Functioning type input	Heating/Air cooling	Command setting of HVAC type (Heating/Cooling)	1.100 DPT_Heat/Cool
4	Setpoint input	Value [°C]	Setpoint value setting in Celsius	9.001 DPT_Temp
11	Relative humidity threshold 1 value input	Value [% RH]	Input of relative humidity threshold 1 values	9.007 DPT_Value_Humidity
13	Relative humidity threshold 2 value input	Value [% RH]	Input of relative humidity threshold 2 values	9.007 DPT_Value_Humidity
15	Relative humidity threshold 3 value input	Value [% RH]	Input of relative humidity threshold 3 values	9.007 DPT_Value_Humidity
17	Relative humidity threshold 4 value input	Value [% RH]	Input of relative humidity threshold 4 values	9.007 DPT_Value_Humidity
19	Relative humidity threshold 5 value input	Value [% RH]	Input of relative humidity threshold 5 values	9.007 DPT_Value_Humidity
21	Heating valve status feedback	On/Off status	Heating valve status feedback	1.001 DPT_Switch
21	Heating/air cooling valve status feedback	On/Off status	Heating/Air cooling valve status feedback	1.001 DPT_Switch
23	Air cooling valve status feedback	On/Off status	Air cooling valve status feedback	1.001 DPT_Switch
25	Heating fan V1 status feedback	On/Off status	Heating V1 speed fan coil status feedback	1.001 DPT_Switch
27	Heating fan V2 status feedback	On/Off status	Heating V2 speed fan coil status feedback	1.001 DPT_Switch
29	Heating fan V3 status feedback	On/Off status	Heating V3 speed fan coil status feedback	1.001 DPT_Switch
31	Air cooling fan V1 status feedback	On/Off status	Air cooling V1 speed fan coil status feedback	1.001 DPT_Switch
33	Air cooling fan V2 status feedback	On/Off status	Air cooling V2 speed fan coil status feedback	1.001 DPT_Switch
35	Air cooling fan V3 status feedback	On/Off status	Air cooling V3 speed fan coil status feedback	1.001 DPT_Switch
37	Relative humidity threshold 1 output status	On/Off status	Status feedback relative humidity threshold 1	1.001 DPT_Switch
41	Relative humidity threshold 2 output status	On/Off status	Status feedback relative humidity threshold 2	1.001 DPT_Switch
45	Relative humidity threshold 3 output status	On/Off status	Status feedback relative humidity threshold 3	1.001 DPT_Switch
49	Relative humidity threshold 4 output status	On/Off status	Status feedback relative humidity threshold 4	1.001 DPT_Switch
53	Relative humidity threshold 5 output status	On/Off status	Status feedback relative humidity threshold 5	1.001 DPT_Switch

14 ETS programming error feedback

The device is able to detect and therefore indicate various programming errors via the alternative flashing for 500 ms of the green LED and 500 ms of the red LED:

Possible errors
The constraints between the setpoints of the various HVAC modes belonging to the same functioning type are not respected: - $T_{anti-freeze} \leq T_{economy} \leq T_{precomfort} \leq T_{comfort}$ in heating mode - $T_{comfort} \leq T_{precomfort} \leq T_{economy} \leq T_{high\ temp.\ protection}$ in air cooling mode or if the control type is setpoint, the constraints are: - $T_{anti-freeze} \leq T_{operation}$ in heating mode - $T_{operation} \leq T_{high\ temp.\ protection}$ in air cooling mode The HVAC mode setpoints are out of the maximum range - The comfort/economy/precomfort setpoints are not between 5 °C and 40 °C - The antifreeze setpoint is not between 2 °C and 7 °C - The high temperature protection setpoint is not between 30 °C and 40 °C or if the control type is setpoint - The operating setpoint is not between 5 °C and 40 °C - The antifreeze setpoint is not between 2 °C and 7 °C - The high temperature protection setpoint is not between 30 °C and 40 °C For every HVAC mode, the difference between the heating and air cooling setpoints is lower than 1 °C (only if the dead zone is enabled via ETS). Connection error of the communication objects dedicated to sending commands to the actuation devices (valves and fancoils): - if different control logic is enabled but command objects for the heating and air cooling solenoid valves are connected in the same group address - Coherency between the connection of the speeds from the fancoil. With regard to the command objects for 1 bit fancoil speeds, they can be linked to the same address or to different addresses, however it is important to maintain coherency between the pairs: if the two objects for controlling heating and air cooling speed 1 are linked to two addresses that are the same, also the pairs for speeds 2 and 3 must be the linked to two addresses that are the same. In this manner, if linked to two different addresses, also the pairs for speeds 2 and 3 must be linked to two different addresses. If a solenoid valve is connected (heating or air cooling), also the respective speeds must be connected, and vice versa. In common logic mode, and if connecting the heating fan speeds, they must also be connected for air cooling, and vice versa. - if the second stage is active and the command objects for the relative solenoid valves are not connected. - if the second stage is active for both functioning types and the command objects are connected to the same address (in the second stage the control logic is always different).

If multiple errors are detected, the error signalling (green/red flashing) will continue until the ETS application is downloaded again with the necessary corrections.

SAT

+39 035 946 111
8.30 - 12.30 / 14.00 - 18.00
lunedì ÷ venerdì - monday ÷ friday

+39 035 946 260
24h

sat@gewiss.com
www.gewiss.com